SIEMENS

Albatros^2
CHP Controller
RVC32.4x0
User Manual OEM

Preliminary

Edition 0.12 Preliminary
Controller series Z
CE1UsManCHP1OEMen
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Building Technologies
HVAC Products

Contents

1 Overview of OEM settings and display values

The table shows all available settings up to the OEM level. However, certain operating lines may be hidden, depending on the type of unit.
Some settings (menu configuration) which influence the hardware configuration are possible only if both burners are turned off.
OEM Password: XXXXX (company specific)

Legend

The following overview is still under development and may be not complete.
E = End user , F1 = commissioning F2 = heating
BZ = operating line
NEW

Operating line	User level	Function	Default value	Min	Max	Unit
Time of day and date						
1	E	Hours/minutes	-	00:00	23:59	hh:mm
2	E	Day/Month	-	01.01	31.12	dd.mm
3	E	Year	-	2004	2099	yyyy
5	F2	Start of summer time	25.03	01.01	31.12	dd.mm
6	F2	End of summer time	25.10	01.01	31.12	dd.mm
Operator section						
20	E	Language German ¦ English…	English			-
22	F2	Info Temporarily ¦ Permanently	Temporarily			-
26	F2	Operation lock Off ¦ On	Off			-
27	F2	Programming lock Off ¦ On	Off			-
28	F1	Direct adjustment Storage with confirmation ¦ Automatic storage	Storage with confirmation			
30	O	Read data No ¦ Yes	No			
31	O	Write data No ¦ Yes	No			
40	F1	Used as Room unit 1 ¦ Room unit 2 ¦ Operator unit ¦Service unit	Room unit 1			-
42	F1	Assignment room unit 1 Heating circuit 1 ¦ Heating circuits 1 and 2	Heating circuit 1			-
44	F1	Operation HC2 Commonly with HC1 ¦ Independently	Commonly with HC1			-
46	F1	Operation HCP Commonly with HC1 ¦ Independently	Commonly with HC1			-
48	F1	Action occupancy button None ¦ Heating circuit 1 ¦ Heating circuit 2 ¦ Commonly	Heating circuit 1			-
54	F2	Readjustment room sensor	0.0	-3	3	°C
70	F2	Software version (room unit or HMI)	-	00.0	99.9	-
Wireless						
120	F1	Binding No ¦ Yes	No			
121	F1	Test mode	Off			

Operating line	User level	Function	Default value	Min	Max	Unit
		Off ¦ On				
130	F1	Room unit 1 Missing ¦ Ready ¦ No reception ¦ Change batt	-			-
131	F1	Room unit 2 Missing ¦ Ready ¦ No reception ¦ Change batt	-			-
132	F1	Outside sensor Missing ¦ Ready ¦ No reception ¦ Change batt	-			-
133	F1	Repeater Missing ¦ Ready ¦ No reception	-			-
134	F1	Operator unit Missing ¦ Ready ¦ No reception ¦ Change batt	-			-
135	F1	Service unit Missing ¦ Ready ¦ No reception ¦ Change batt	-			-
138	F1	Delete all devices No ¦ Yes	No			-
Time program heating circuit 1						
500	E	Preselection Mo - Su ¦ Mo - Fr ¦ Sa - Su ¦ Mo ¦ Tu ¦ We ¦ Th ¦ Fr ¦ Sa ¦ Su	Mo - Su			-
501	E	1st phase on	6:00	00:00	24:00	hh:mm
502	E	1st phase off	22:00	00:00	24:00	hh:mm
503	E	2nd phase on	--:--	00:00	24:00	hh:mm
504	E	2nd phase off	--:--	00:00	24:00	hh:mm
505	E	3rd phase on	--:--	00:00	24:00	hh:mm
506	E	3rd phase off	--:--	00:00	24:00	hh:mm
516	E	Default values No ¦ Yes	No			-
Time program heating circuit 2						
520	E	Preselection Mo - Su ¦ Mo - Fr ¦ Sa - Su ¦ Mo ¦ Tu ¦ We ¦ Th ¦ Fr ¦ Sa ¦ Su	Mo - Su			-
521	E	1st phase on	6:00	00:00	24:00	hh:mm
522	E	1st phase off	22:00	00:00	24:00	hh:mm
523	E	2nd phase on	--:--	00:00	24:00	hh:mm
524	E	2nd phase off	--:--	00:00	24:00	hh:mm
525	E	3rd phase on	--:--	00:00	24:00	hh:mm
526	E	3rd phase off	--:--	00:00	24:00	hh:mm
536	E	Default values No ¦ Yes	No			-
Time program 3/HCP						
540	E	Preselection Mo - Su ¦ Mo - Fr ¦ Sa - Su ¦ Mo ¦ Tu ¦ We ¦ Th ¦ Fr ¦ Sa ¦Su	Mo - Su			-
541	E	1st phase on	6:00	00:00	24:00	hh:mm
542	E	1st phase off	22:00	00:00	24:00	hh:mm
543	E	2nd phase on	--:--	00:00	24:00	hh:mm
544	E	2nd phase off	--:--	00:00	24:00	hh:mm
545	E	3rd phase on	--:--	00:00	24:00	hh:mm
546	E	3rd phase off	--:--	00:00	24:00	hh:mm
556	E	Default values No ¦ Yes	No			-
Time program 4/DHW						

Operating line	User level	Function	Default value	Min	Max	Unit
560	E	Preselection Mo - Su ¦ Mo - Fr ¦ Sa - Su ¦ Mo ¦ Tu ¦ We ¦ Th ¦ Fr ¦ Sa ¦ Su	Mo - Su			-
561	E	1st phase on	6:00	00:00	24:00	hh:mm
562	E	1st phase off	22:00	00:00	24:00	hh:mm
563	E	2nd phase on	--:--	00:00	24:00	hh:mm
564	E	2nd phase off	--:--	00:00	24:00	hh:mm
565	E	3rd phase on	--:--	00:00	24:00	hh:mm
566	E	3rd phase off	--:--	00:00	24:00	hh:mm
576	E	Default values No ¦ Yes	No			-
Holidays heating circuit 1						
642	E	Start	--.--	01.01	31.12	dd.mm
643	E	End	--.--	01.01	31.12	dd.mm
648	E	Operating level Frost protection ¦ Reduced	Frost protection			-
Holidays heating circuit 2						
652	E	Start	--.--	01.01	31.12	dd.mm
653	E	End	--.--	01.01	31.12	dd.mm
658	E	Operating level Frost protection ¦ Reduced	Frost protection			-
Holidays heating circuit P						
662	E	Start	--.--	01.01	31.12	dd.mm
663	E	End	--.--	01.01	31.12	dd.mm
668	E	Operating level Frost protection ¦ Reduced	Frost protection			-
Heating circuit 1						
700	ACS	Operating mode HC1 Protection¦ Reduced ¦ Comfort ¦ Automatic				
710	E	Comfort set point	20.0	BZ 712 (4)	BZ 716 (35)	°C
712	E	Reduced set point	16	BZ 714 (4)	BZ 710 (35)	°C
714	E	Frost protection set point	10.0	4	BZ 712 (35)	°C
716	O	Comfort set point max	35.0	BZ 710 (4)	35	°C
720	E	Heating curve slope	1.50	0.10	4.00	-
721	F2	Heating curve displacement	0.0	-4.5	4.5	°C
726	F2	Heating curve adaption Off ¦ On	Off			-
730	E	Summer / winter heating limit	18	– – – / 8	30	°C
732	F2	24-hour heating limit	0	– – – / -10	10	°C
740	F2	Flow temp set point min	8	8	BZ 741 (95)	°C
741	F2	Flow temp set point max	80	BZ 740 (8)	95	°C
742	F2	Flow temp. set point room thermostat	70	BZ740 (8)	BZ741 (95)	°C
750	F1	Room influence	100	– – – / 0	100	%
759	F1	Type room heating Manually adjusted/ radiator fast/ radiator medium/ radiator slow/ floor heat fast / floor heat medium / floor heat slow	Radiator medium			
760	F2	Room temp limitation	1.0	– – – / 0.5	4.0	°C
761	F2	Heating limit room temp control	16	0	80	%
762	F2	Deriv action time room temp control	480			min
763	F2	Integral action time room temp control	3600	0		min

Operating line	User level	Function	Default value	Min	Max	Unit
764	F2	Prop Band room temp control	3			K
770	F2	Boost heating	– – –	– – – / 0	20	°C
780	F2	Quick setback Off ¦ Down to reduced set point ¦ Down to frost prot set point	Down to reduced set point			-
	O ACS	Torerance time start optimization	10		120	min
789	F2	Opt start control max for opt energy production	0	0	1200	min
790	F2	Optimum start control max	0	0	1200	min
791	F2	Optimum stop control max	0	0	360	min
792	O	Learn heat up grad Off/On	on			
793	O	Heat up gradient for optimum energy production	120	0	480	Min
794	O	Heat up gradient	60	0	360	Min
800	F2	Red set point increase start	– – –	– – – / -30	10	°C
801	F2	Red set point increase end	-15	-30	BZ 800 (10)	°C
810	O	Frost protection plant heating circuit pump Off ¦ On ¦	On			
820	F2	Overtemp protection pump circuit Off ¦ On	Off			-
830	F2	Mixing valve boost	10	0	50	°C
832	O	Actuator type 2-position ¦ 3-position	3-position			-
833	O	Switching differential 2-pos	2	0	20	°C
834	F2	Actuator running time	120	30	873	s
835	O	Mixing valve P-band Xp	32	1	100	°C
836	O	Mixing valve integral action time Tn	120	10	873	s
850	F2	Floor curing function Off ¦ Functional heating ¦ Curing heating ¦ Functional/curing heating¦ Manually	Off			-
851	F2	Floor curing setp manually	25	0	95	°C
855	F2 (RO)	Flow temp setpoint flooring plaster dry up HC1				°C
856	F2 (RO)	Flooring plaster dry up day HC1				
857	F2 (RO)	Floor curing HC1 days fulfilled				
Heating circuit 2						
1000	ACS	Operating mode HC2 Protection¦ Reduced ¦ Comfort ¦ Automatic				
1010	E	Comfort set point	20.0	BZ 1012	BZ 1016	°C
1012	E	Reduced set point	16	BZ 1014	BZ 1010	°C
1014	E	Frost protection set point	10.0	4	BZ 1012	°C
1016	O	Comfort set point max	35.0	BZ 1010	35	°C
1020	E	Heating curve slope	1.50	0.10	4.00	-
1021	F2	Heating curve displacement	0.0	-4.5	4.5	°C
1026	F2	Heating curve adaption Off ¦ On	Off			-

Operating line	User level	Function	Default value	Min	Max	Unit
1030	E	Summer / winter heating limit	18	– – – / 8	30	°C
1032	F2	24-hour heating limit	0	– – – / -10	10	°C
1040	F2	Flow temp set point min	8	8	BZ 1041	°C
1041	F2	Flow temp set point max	80	BZ 1040	95	°C
1042	F2	Flow temp. set point room thermostat	70	8/BZ1040	BZ1041/95	°C
1050	F1	Room influence	100	– – – / 0	100	%
1059	F1	Type room heating Manually adjusted/ radiator fast/ radiator medium/ radiator slow/ floor heat fast / floor heat medium / floor heat slow	Radiator medium			
1060	F2	Room temp limitation	1.0	– – – / 0.5	4.0	°C
1061	F2	Heating limit room temp control	16	0	90	%
1062	F2	Deriv action time room temp control	480			min
1063	F2	Integral action time room temp control	3600	0		min
1064	F2	Prop Band room temp control	3			K
1070	F2	Boost heating	– – –	– – – / 0	20	°C
1080	F2	Quick setback Off ¦ Down to reduced set point ¦ Down to frost prot set point	Down to reduced set point			-
	O ACS	Torerance time start optimization	10		120	min
1089	F2	Opt start control max for opt energy production	0	0	1200	min
1090	F2	Optimum start control max	0	0	360	min
1091	F2	Optimum stop control max	0	0	360	min
1092	O	Learn heat up grad Off/On	on			
1093	O	Heat up gradient for optimum energy production	120	0	480	Min
1094	O	Heat up gradient	60	0	360	Min
1100	F2	Red set point increase start	– – –	– – – / -30	10	°C
1101	F2	Red set point increase end	-15	-30	BZ 1100	°C
1110	O	Frost protection plant heating circuit pump Off ¦ On ¦	On			
1120	F2	Overtemp protection pump circuit Off ¦ On	Off			-
1130	F2	Mixing valve boost	10	0	50	°C
1132	O	Actuator type 2-position ¦ 3-position	3-position			-
1133	O	Switching differential 2-pos	2	0	20	°C
1134	F2	Actuator running time	120	30	873	s
1135	O	Mixing valve P-band Xp	32	1	100	°C
1136	O	Mixing valve integral action time Tn	120	10	873	s
1150	F2	Floor curing function Off ¦ Functional heating ¦ Curing heating ¦ Functional/curing heating¦ Manually	Off			-
1151	F2	Floor curing setp manually	25	0	95	°C
1155	F2	Flow temp setpoint flooring plaster dry up HC1				°C
1156	F2	Flooring plaster dry up day HC1				
1157	F2 (RO)	Floor curing HC1 days fulfilled				

Operating line	User level	Function	Default value	Min	Max	Unit
Heating circuit P						
1300	E	Operating mode Protection ¦ Automatic ¦ Reduced ¦ Comfort	Automatic			-
1310	E	Comfort set point	20.0	BZ 1012	BZ 1016	°C
1312	E	Reduced set point	16	BZ 1014	BZ 1010	°C
1314	E	Frost protection set point	10.0	4	BZ 1012	°C
1316	O	Comfort set point max	35.0	BZ 1010	35	°C
1320	E	Heating curve slope	1.50	0.10	4.00	-
1321	F2	Heating curve displacement	0.0	-4.5	4.5	°C
1326	F2	Heating curve adaption Off ¦ On	Off			-
1330	E	Summer / winter heating limit	18	– – – / 8	30	°C
1332	F2	24-hour heating limit	0	– – – / -10	10	°C
1340	F2	Flow temp set point min	8	8	BZ 1041	°C
1341	F2	Flow temp set point max	80	BZ 1040	95	°C
1342	F2	Flow temp. set point room thermostat	70	8/BZ1040	BZ1041/95	°C
1350	F1	Room influence	100	– – – / 0	100	%
1359	F1	Type room heating Manually adjusted/ radiator fast/ radiator medium/ radiator slow/ floor heat fast / floor heat medium / floor heat slow	Rediator medium			
1360	F2	Room temp limitation	1.0	– – – / 0.5	4.0	°C
1361	F2	Heating limit room temp control	16	0	90	%
1362	F2	Deriv action time room temp control	480			min
1363	F2	Integral action time room temp control	3600	0		min
1364	F2	Prop Band room temp control	3			K
1370	F2	Boost heating	– – –	– – – / 0	20	°C
1380	F2	Quick setback Off ¦ Down to reduced set point ¦ Down to frost prot set point	Down to reduced set point			-
	O ACS	Torerance time start optimization	10		120	min
1389	F2	Opt start control max for opt energy production	0	0	1200	min
1390	F2	Optimum start control max	0	0	360	min
1390	F2	Optimum start control max	0	0	360	min
1391	F2	Optimum stop control max	0	0	360	min
1392	O	Learn heat up grad Off/On	on			
1393	O	Heat up gradient for optimum energy production	120	0	480	Min
1394	O	Heat up gradient	60	0	360	Min
1400	F2	Red set point increase start	– – –	– – – / -30	10	°C
1401	F2	Red set point increase end	-15	-30	BZ 1100	°C
1410	O	Frost protection plant heating circuit pump Off ¦ On ¦	On			
1420	F2	Overtemp protection pump circuit Off ¦ On	Off			-
1430	F2	Mixing valve boost	10	0	50	°C
1432	O	Actuator type 2-position ¦ 3-position	3-position			-
1433	O	Switching differential 2-pos	2	0	20	°C

Operating line	User level	Function	Default value	Min	Max	Unit
1434	F2	Actuator running time	120	30	873	s
1435	O	Mixing valve P-band Xp	32	1	100	°C
1436	O	Mixing valve integral action time Tn	120	10	873	s
1450	F2	Floor curing function Off ¦ Functional heating ¦ Curing heating ¦ Functional/curing heating¦ Manually	Off			-
1451	F2	Floor curing setp manually	25	0	95	°C
1455	F2	Flow temp set point flooring plaster dry up HC1				°C
1456	F2	Flooring plaster dry up day HC1				
1457	F2 (RO)	Floor curing HC1 days fulfilled				
Domestic hot water						
1600	ACS	DHW operating mode Off/On	Off			
1610	E	Nominal set point	55	BZ 1612	BZ 1614 OEM	°C
1612	F2	Reduced set point	40	8	BZ 1610	°C
1614	O	Nominal set point max	65	8	80	°C
1620	F1	Release 24h/day ¦ Time programs HCs ¦ Time program 4/DHW	24h/day			-
1630	F1	Charging priority Absolute ¦ Shifting ¦ None ¦ MC shifting, PC absolute	absolute			-
1640	F2	Legionella function Off ¦ Periodically ¦ Fixed weekday	Off			-
1641	F2	Legionella funct periodically	3	1	7	Days
1642	F2	Legionella funct weekday Monday ¦ Tuesday ¦ Wednesday ¦ Thursday ¦ Friday ¦ Saturday ¦ Sunday	Monday			
1644	F2	Legionella funct time	--:--	--:-- / 00:00	23:00	hh:mm
1645	F2	Legionella funct set point	65	55	95	°C
1646	F2	legionella funct duration	– – –	– – – / 10	360	min
1647	F2	Legionella funct circ pump Off ¦ On	On			-
1660	F1	Circulating pump release Time program 3/HCP ¦ DHW release ¦ Time program 4/DHW	DHW release			-
1661	F1	Circulating pump cycling Off ¦ On	On			-

Operating line	User level	Function	Default value	Min	Max	Unit
Boiler						
2212	F2	Set point max	85	Set point manual control	BZ 2213 OEM	°C
2213	O	Set point max OEM	90	8	120	°C
2215	O	Set point max room heating	90	8	120	°C
2250	O	Pump overrun time	10	0	20	min
2251	O	Dry fire protection Off ¦ On	Off			
2300	O	Frost protection plant boiler pump Off ¦ On	On			
2605	O	Eng Burner Prop band Head temp	64	1	100	K
2606	O	Eng Burner Integral action time Head temp	90	10	873	Sec
2610	O	Eng Burner Prop band Boiler temp	10	1	100	K
2611	O	Eng Burner Integral action time Boiler temp	180	10	873	Sec
2612	O	Eng Burner Deriv action time Boiler temp	30	0	240	Sec
2615	O	Supp Burner Prop band Xp	26	1	100	K
2616	O	Supp Burner Integral action time Tn	240	10	873	Sec
2620	O	Max diff temp flow-return	25	0	140	K
2621	O	Limit diff temp flow-return	40	0	140	K
2622	O	Limit diff temp flow-return eng bu	---	0	140	K
2623	O	Pack temperature max	70	0	140	°C
2624	O	Time pack temp max	10	0	255	Min
2629	O	Stop deaeration by button Yes/No				
2630	O	Automatic deaeration procedure On/Off				
2655	O	Pump "on"-time deaeration				
2656	O	Pump “off”-time deaeration				
2657	O	Number of repetitions				
6140[1)]	O	Water pressure max	3.5	0	10	bar
6142[1)]	O	Water pressure critical min	0.7	0	10	bar
6143[1)]	O	Water pressure switching differential	0.5	0	10	bar
6144[1)]	O	Min pressure diff pump on	0.2	0	10	bar
6145[1)]	O	Max pressure diff pump on	1.3	0	10	bar
6190[2)]	O	Waiting time dry fire flow switch t1	12 sec	1	240	s
6191[2)]	O	Waiting time lockout t2	10 Min	4	240	min
6192[2)]	O	Waiting time anti welding function t4	10 sec	1	240	s

Operating line	User level	Function	Default value	Min	Max	Unit
6193[2)]	O	Anti welding function	Yes	No	Yes	
6194[2)]	O	Flow switch input (normally closed/ normally open)	NO	NC	NO	
2660	O	Pump off period maximum	---	30	255	Min
2661	O	Control consumer opt energy off / on	on			
Burner control (OEM only)						
9500	O	Prepurge time	9	0	255	Sec
9540	O	Postpurge time	9	0	255	Sec
9570	O	Eng Burner Min rate	1600	0	10000	
9571	O	Eng Burner ignition rate	3200	0	10000	
9572	O	Eng Burner Max rate	6900	0	10000	
9575	O	Supp Burner Min rate	1600	0	10000	
9576	O	Supp Burner ignition rate	3200	0	10000	
9577	O	Supp Burner Max rate	8000	0	10000	
9578	O	Supp Burner Max rate CH	8000	0	10000	
9590	O	Burner start limitation 0=off, 1= on	on			
9591	O	Eng Burner (rate) phase 1	4700	0	10000	
9592	O	Eng Burner (rate) phase 2	5200	0	10000	
9593	O	Supp Burner (rate) start phase	8000	0	10000	
9594	O	Head temp phase 2	300°C	0	700	
9595	O	Head temp phase 3	400°C	0	700	
9596	O	Time duration phase 3	5 min	0	255	
Burner sequence (OEM only)						
2240	O	Switching differential boiler	6	0	200	K
2241	O	Burner running time min	10	0	255	Min
2243	O	Burner off time min	5	0	255	Min
2244	O	Supp Burner off time min	0	0	255	Min
3200	O	Min wait time 2nd burner	30	1	255	Sec
3201	O	Locking time min supp burner	3	0	40	Min
3202	O	Release integral supp bu	20	0	500	K*Min
3206	O	H'temp start delay supp bu	450	0	700	°C
3208	O	Release time min mod part supp bu	5	0	255	Min
3209	O	Release integral mod part supp bu	12	0	500	K*Min
3210	O	Reset integral supp bu	30	0	500	K*Min
3212	O	Minimum room temp difference to releases supp burner	0.2	---/ 0	5	K
3213	O	Release DHW charging No restrictions/ Eng bu only/ First charg eng bu/ Fir'cha. eng bu, supp bu else	No restrictions			

Operating line	User level	Function	Default value	Min	Max	Unit
Engine/Grid (OEM only)						
3300	O	Max head temp set point	500	0	700	°C
3301	O	Head temp min off	130	0	700	°C
~~3302~~	~~O~~	~~Head temp red OC~~	~~450~~	~~0~~	~~700~~	~~°C~~
~~3303~~	~~O~~	~~Time head temp red OC~~	~~5~~	~~0~~	~~700~~	~~Min~~
3304	O	Head temp grid connect	180	150	300	°C
3305	O	Head temp grid disconnect	150	100	250	°C
3306	O	Head temp grid con en	170	100	250	°C
3307	O	Head temp over temp off	540	500	575	°C
3308	O	Head temp min operation	400	300	550	°C
3309	O	Power set point	1000	800	1100	W
3310	O	Return temp power roll-off	60	40	70	°C
3311	O	Power roll-off rate	20	10	40	W/K
~~3320~~	~~O~~	~~Engine Overcurrent~~	~~4.7~~	~~0~~	~~10~~	~~A~~
3321	O	Engine Short Circuit	18.8	0	20	A
3322	O	Measuring time SC	60	30	400	msec
3327	O	Engine current set point	4.7	4	5	A
DHW storage tank						
5010	F2	Charging Once/day ¦ Several times/day	Several times/day			-
5011	O	Forward shift DHW charging	---	?	?	
5020	F2	Flow set point boost	20	0	30	°C
5022	F2	Type of charging With B3 ¦ With B3/B31 ¦ With B3, legio B3/B31	With B3			-
5024	O	Switching differential	5	0	20	°C
5030	O	Charging time limitation	120	– – – / 10	600	min
5040	O	Discharging protection Off ¦ Always ¦ Automatically	Off			-
5070	O	Automatic push Off ¦ On	Off			-
Configuration						
5702	F1	Plant type Free Configuration¦ W-Plan ¦ S-Plan ¦ Y-Plan ¦ 1 hc ¦ 2 hc ¦ 3 hc ¦ combi	S-Plan			
5709	F1	Type Heating circuit 1 No¦ No Actuator ¦ Pump ¦ On/Off-Valve ¦ Mixing Valve	On/off Valve			

Operating line	User level	Function	Default value	Min	Max	Unit
5714	F1	Type Heating circuit 2 No ¦ No Actuator¦ Pump¦ On/Off-Valve ¦ Mixing Valve	No			
5720	F1	Type Heating circuit P No ¦ No Actuator¦ Pump¦ On/Off-Valve ¦ Mixing Valve	No			
5729	F1	Type DHW Charging No¦ No Actuator¦ Charging Pump¦ Valve ¦ Diverting Valve ¦ Midposition Valve¦ Combi	Valve			
5731	O	DHW actuating device Q3				
5890	O RO	Relay output QX1 None ¦ Boiler Pump Q1¦ DHW actuator Q3¦ HC1 actuator Q2 ¦ HC2 actuator Q6 ¦ HCP actuator Q20 ¦ Alarm output K10 ¦ Circulating Pump Q4 ¦ Transport pump Q14	Boiler Pump Q1			
5891	F1	Relay output QX2 None ¦ Boiler Pump Q1¦ DHW actuator Q3 ¦ HC1 actuator Q2 ¦ HC2 actuator Q6 ¦ HCP actuator Q20 ¦ Alarm output K10 ¦ Circulating Pump Q4 ¦ Transport pump Q14	HC1 actuator Q2			
5892	F1	Relay output QX3 None ¦ Boiler Pump Q1¦ DHW actuator Q3¦ HC1 actuator Q2 ¦ HC2 actuator Q6 ¦ HCP actuator Q20 ¦ Alarm output K10 ¦ Circulating Pump Q4 ¦ Transport pump Q14	DHW actuator Q3			
5894	F1	Relay output QX4 None ¦ Boiler Pump Q1¦ DHW actuator Q3 ¦ HC1 actuator Q2 ¦ HC2 actuator Q6 ¦ HCP actuator Q20 ¦ Alarm output K10 ¦ Circulating Pump Q4 ¦ Transport pump Q14	None			
5977	O	Input H5 function selection None ¦ DHW flow switch¦ DHW flow sensor ¦ DHW turbine	None			
5980	F1	Function input EX1 None ¦ Room thermostat HC1 ¦ Room thermostat HC2 ¦ Room thermostat HCP ¦ DHW thermostat ¦ xx¦xxx¦ external heat demand, release engine burner ¦ external heat demand, release supp burner ¦ external heat demand, release eng burner + supp burner	None			-
5981	F1	Contact type input EX1 NC ¦ NO	NO			
5982	F1	Function input EX2 None ¦ Room thermostat HC1 ¦ Room thermostat HC2 ¦ Room thermostat HCP ¦ DHW thermostat ¦ xx¦xxx¦ external heat demand, release engine burner ¦ external heat demand, release supp burner ¦ external heat demand, release eng burner + supp burner	None			-
5983	F1	Contact type input EX2 NC ¦ NO	NO			
6020	F1	Function extension module 1 None ¦ Multifunction ¦ Heating Circuit 1 ¦ Heating circuit 2 ¦ Heating circuit P	None			
6021	F1	Function extension module 2 None ¦ Multifunction ¦ Heating Circuit 1 ¦ Heating circuit 2 ¦ Heating circuit P	None			
6022	F1	Function extension module 3 None ¦ Multifunction ¦ Heating Circuit 1 ¦ Heating circuit 2 ¦ Heating circuit P	None			
6030	F1	Relay output QX21 None ¦ Boiler Pump Q1¦ DHW actuator Q3¦ HC1 actuator Q2 ¦ HC2 actuator Q6 ¦ HCP actuator Q20 ¦ Alarm output K10 ¦ Circulating Pump Q4 ¦ Transport pump Q14	None			
6031	F1	Relay output QX22 None ¦ Boiler Pump Q1¦ DHW actuator Q3¦ HC1 actuator Q2 ¦ HC2 actuator Q6 ¦ HCP actuator Q20 ¦ Alarm	None			

Operating line	User level	Function	Default value	Min	Max	Unit
		output K10 ¦ Circulating Pump Q4 ¦ Transport pump Q14				
6032	F1	Relay output QX23 None ¦ Boiler Pump Q1¦ DHW actuator Q3¦ HC1 actuator Q2¦ HC2 actuator Q6 ¦ HCP actuator Q20 ¦ Alarm output K10 ¦ Circulating Pump Q4 ¦ Transport pump Q14	None			
6100	F2	Readjustm outside sensor	0.0	-3.0	3.0	°C
6103	O	Pack temperature sensor No/Yes				
6110	F2	Time constant building	20	0	50	h
~~6112~~	~~O~~	~~Gradient room model~~	~~60~~	~~0~~	~~300~~	~~min/°C~~
6120	F2	Frost protection plant Off ¦ On	Off			-
6146	O	Pressure value 3.5 V	4	0.0	10.0	bar
6147	O	Pressure sensor No ¦ Yes	No			
6194	O	Flow switch input normally closed/ normally open	NO		NC	NO
6200	F1	Save sensors No ¦ Yes	No			
6204	F2	Save parameters	No			-
6205	F2	Reset to default parameters No ¦ Yes	No			-
6212	F1	Check no. heat source 1	-	0	199’999	-
6215	F1	Check no. storage tank	-	0	199’999	-
6217	F1	Check no. heating circuits	-	0	199’999	-
6218	O	VVS Dev ID				
6219	F2	Software version Sub System		00.0	99.9	
6220	F2	Software version	-	00.0	99.9	-
6221	F2	Development Index		00.0	99.9	
6222	O	Device hours run	0	0	208330:00	h
6223	F2	Software version power meter		00.0	99.9	
6228	O	Boot loader version				
6229	O	EEProm Version				
Fault						
6707	F1	Error Code Subsystem				
6710	F1	Reset alarm relay No ¦ Yes	No			-
6800	F2	History 1	-			
6801	F2	Error code 1	-	0	255	-
6802	F2	History 2	-			
6803	F2	Error code 2	-	0	255	-
6804	F2	History 3	-			
6805	F2	Error code 3	-	0	255	-
6806	F2	History 4	-			
6807	F2	Error code 4	-	0	255	-
6808	F2	History 5	-			
6809	F2	Error code 5	-	0	255	-
6810	F2	History 6	-			
6811	F2	Error code 6	-	0	255	-
6812	F2	History 7	-			
6813	F2	Error code 7	-	0	255	-

Operating line	User level	Function	Default value	Min	Max	Unit
6814	F2	History 8	-			
6815	F2	Error code 8	-	0	255	-
6816	F2	History 9	-			
6817	F2	Error code 9	-	0	255	-
6818	F2	History 10	-			
6819	F2	Error code 10	-	0	255	-
6820	O	Reset history No ¦ Yes	No			-
Maintenance / service						
7040	F2	Burner hours interval (engine burner)	– – –	– – – / 10	10000	h
7041	F2	Burner hrs since maintenance (engine burner)	0	0	10000	h
7042	F2	Burner starts interval (engine burner)	– – –	– – – / 60	65535	-
7043	F2	Burn starts since maint (engine burner)	0	0	65535	-
7044	F2	Maintenance Interval	– – –	– – – / 1	240	months
7045	F2	Time since maintenance	0	0	240	months
7046	F2	Burner 2 hours interval (supp bu)	– – –	– – – / 10	10000	h
7047	F2	Burner 2 hrs since maintenance (supp bu)	0	0	10000	h
7048	F2	Burner 2 starts interval (supp bu)	– – –	– – – / 60	65535	-
7049	F2	Burn 2 starts since maint (supp bu)	0	0	65535	-
7130	E	Chimney sweep function				
7131	E	Chimney sweep function burner output Eng Bu min ¦ Eng Bu max ¦ Supp Bu min ¦ Supp Bu max ¦ Eng + Supp Bu min ¦ Eng + Supp Bu max				
7150	F1	Simulation outside temperature	– – –	-50.0	50.0	°C
7170	F1	Telephone number customer service	0			
7200	F2	Commissioning function Off/On	Off			
7201	O	Commissioning mode burner Fixed firing rate ¦ adjustable firing rate	Fixed			
7205	O	Set point fan				
7206	O	Set point spool valve				
7210	F2	Commissioning eng burner Off ¦ On	Off			
7211	F2	Firing rate engine burner Minimum¦ Ignition ¦ Maximum	Ignition			
7215	F2	Commissioning supp burner Off ¦ On	Off			
7216	F2	Firing rate supp burner Minimum¦ Ignition ¦ Maximum	Ignition			
7220	O	Boiler off function Active ¦ Inactive				
7221	O	Disable Engine Burner Active ¦ Inactive				
7222	O	Disable Supp Burner Active ¦ Inactive				
Input/output test						
7700	O	Relay test No test ¦ Everything off ¦ Relay output QX1 ¦ Relay output QX2¦ Relay output QX3 ¦ Relay output QX4 ¦ Relay output QX21 module 1 ¦ Relay output QX22 module 1 ¦ Relay output QX23 module 1 ¦ Relay output QX21 module 2 ¦ Relay output QX22 module 2 ¦ Relay	No test			-

Operating line	User level	Function	Default value	Min	Max	Unit
		output QX23 module 2 ¦				
7716	O	Fan Speed PWM		0	100	%
7730	F1	Outside temperature B9	-	-50.0	50.0	°C
7750	F1	DHW temperature B3	-	0.0	140.0	°C
7751	F1	DHW temperature B31	-	0.0	140.0	°C
7760	F1	Boiler temperature B2	-	0.0	140.0	°C
7763	F1	Pack temperature B23	-	0.0	140.0	°C
7764	F1	Head Control temperature B24	-	0.0	600.0	°C
7765	F1	Head limit temperature B25	-	0.0	600.0	°C
7769	F1	Return temperature B7	-	0.0	140.0	°C
7861	F1	Contact State H5 closed ¦ open				
7869	F1	Voltage signal pressure sensor				bar
7911	F1	Input EX1 0V ¦ 230V				-
7912	F1	Input EX2 0V ¦ 230V				-
7932	F1	Input SC1 BCU1 Closed ¦ Open				
7933	F1	Input SC2 BCU1 Closed ¦ Open				
7934	F1	Input SC 1 BCU2 Closed ¦ Open				
7935	F1	Input SC 2 BCU2 Closed ¦ Open				
7940	F1	Input flow switch (dry fire)		Open	Closed	
8220	F1	G83/ENS Closed ¦ Open				
8221	F1	Alternator overload Closed ¦ Open				
8222	F1	Regenerator thermostat Closed ¦ Open				
8223	F1	Dynamic absorber sw Closed ¦ Open				
8224	F1	WCS thermostat Closed ¦ Open				
8226	F1	Head temp undertemp Closed ¦ Open				
8227	F1	Head temp overtemp Closed ¦ Open				
8228	F1	Engine short-circuit Closed ¦ Open				
8229	F1	Engine Dome overtemp Closed ¦ Open				
8320	F1	Position Spool valve	-	0.00	255.00	
8323	F1	Fan Speed	-	0	16’000	rpm
State						
8000	F1	State heating circuit 1	-			-
8001	F1	State heating circuit 2	-			-
8002	F1	State heating circuit P	-			-
8003	F1	State DHW	-			-
8005	F1	State boiler	-			-
8012	F1	State engine burner	-			-

Operating line	User level	Function	Default value	Min	Max	Unit
8013	F1	State supplementary burner	-			-
8014	F1	State generator	-			-
8015	F1	Lockout reason engine burner				
8016	F1	Lockout reason supplementary burner				
8017	F1	Engine burner WHY				
8018	F1	Supplementary burner WHY				
8019	F1	Boiler WHY				
8020	F1	EGC WHY				
Diagnostics engine						
8200	F1	Power		0		W
8201	F1	Voltage		0		V
8202	F1	Current		0		A
8204	F1	Energy (generated) to Date		0		kWh
8205	F1	Energy since reset		0		kWh
8206	O	Engine frequency				Hz
8207	O	Phase angle				°
8210	F1	Reset Energy counter No ¦ Yes				
8220	F1	G83/ENS Closed ¦ Open				
8229	F1	Engine Dome overtemp Closed ¦ Open				
8222	F1	Regenerator thermostat Closed ¦ Open				
8223	F1	Dynamic absorber sw Closed ¦ Open				
8224	F1	WCS Thermostat Closed ¦ Open				
8221	F1	Alternator overload Closed ¦ Open				
8226	F1	Head temp undertemp Closed ¦ Open				
8227	F1	Head temp overtemp Closed ¦ Open				
8228	F1	Engine short-circuit Closed ¦ Open				
Diagnostics heat generation						
8304	F1	Boiler pump Q1 Off ¦ On				
8310	F1	Boiler temperature	-	0.0	140.0	°C
8311	F1	Boiler temperature set point	-	0.0	140.0	°C
8314	F1	Boiler return temperature	-	0.0	140.0	°C
8319	F1	Pack temperature	-	0.0	140.0	°C
8320	F1	Position spool valve	-	0.00	255.00	
8323	F1	Fan Speed	-	0	9000	rpm
8327	F1	Water pressure	-	0.0	10.0	bar
8341	F1	Engine Burner run Hours	0	0	65535	h
8342	F1	Engine Burner Start counter	0	0	199'999	-
8343	F1	Supplementary Burner run Hours	0	0	65535	h
8344	F1	Supplementary Burner Start counter	0	0	199'999	-
8360	F1	Head temperature actual value	-	0.0		°C

Operating line	User level	Function	Default value	Min	Max	Unit
8361	F1	Head control temperature set point	-	0.0		°C
~~8362~~	~~F1~~	~~Head limit temperature~~	~~-~~	~~0.0~~		~~°C~~
8363	F2	Mass flow demand engine burner				
8364	F2	Mass flow demand supplementary burner				
8365	F2	Boiler Pump run Hours				
8370	F1	Boiler temperature limiter Closed ¦ Open				
8371	F1	Flue gas temperature limiter Closed ¦ Open				
8372	F1	Condensate Closed ¦ Open				
8373	F1	State burners off ¦ 1 ¦ 2 ¦ 1+2				
Diagnostics consumers						
8700	F1	Outside temperature	-	-50.0	50.0	°C
8703	F1	Outside temp attenuated	-	-50.0	50.0	°C
8704	F1	Outside temp composite	-	-50.0	50.0	°C
8730	F1	Heating circuit pump Q2 No function ¦ Off ¦ On	-			-
8740	F1	Room temperature 1	-	0.0	50.0	°C
8741	F1	Room set point 1	-	4.0	35.0	°C
8742	O	Room temperature 1 model	-	0.0	50.0	°C
8743	F1	Flow temperature 1	-	0.0	140.0	°C
8744	F1	Flow temperature set point 1	-	0.0	140.0	°C
8749	F1	Room thermostat 1 No demand ¦ Demand	-			-
8760	F1	Heating circuit pump Q6 No function ¦ Off ¦ On	-			-
8770	F1	Room temperature 2	-	0.0	50.0	°C
8771	F1	Room set point 2	-	4.0	35.0	°C
8772	O	Room temperature 2 model	-	0.0	50.0	°C
8773	F1	Flow temperature 2	-	0.0	140.0	°C
8774	F1	Flow temperature set point 2	-	0.0	140.0	°C
8779	F1	Room thermostat 2 No demand ¦ Demand	-			-
8790	F1	Heating circuit pump Q20 No function ¦ Off ¦ On	-			-
8800	F1	Room temperature P	-	0.0	50.0	°C
8801	F1	Room set point P	-	4.0	35.0	°C
8802	O	Room temperature P model	-	0.0	50.0	°C
8803	F1	Flow temperature set point P	-	0.0	140.0	°C
8804	F1	Flow temperature 3	-	0.0	140.0	°C
8809	F1	Room thermostat P No demand ¦ Demand	-			-
8820	F1	DHW pump Q3 No function ¦ Off ¦ On	-			-
8822	F1	Circulating pump Q4 No function ¦ Off ¦ On	-			-
8830	F1	DHW temperature 1	-	0.0	140.0	°C
8831	F1	DHW temperature set point	-	8.0	80.0	°C
8832	F1	DHW temperature 2	-	0.0	140.0	°C

Operating line	User level	Function	Default value	Min	Max	Unit
8839	F1	DHW thermostat No demand ¦ Demand	-			-
9031	F1	Relay output QX1 Off ¦ On	-			-
9032	F1	Relay output QX2 Off ¦ On	-			-
9033	F1	Relay output QX3 Off ¦ On	-			-
9034	F1	Relay output QX4 Off ¦ On	-			-
9050	F1	Relay output QX21 module 1 Off ¦ On	-			-
9051	F1	Relay output QX22 module 1 Off ¦ On	-			-
9052	F1	Relay output QX23 module 1 Off ¦ On	-			-
9053	F1	Relay output QX21 module 2 Off ¦ On	-			-
9054	F1	Relay output QX22 module 2 Off ¦ On	-			-
9055	F1	Relay output QX23 module 2 Off ¦ On	-			-
9056	F1	Relay output QX21 module 3 Off ¦ On				
9057	F1	Relay output QX22 module 3 Off ¦ On				
9058	F1	Relay output QX23 module 3 Off ¦ On				

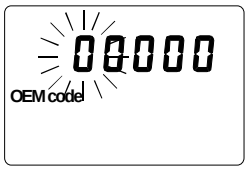
[1)] Dry fire protection by pressure sensor only
[2)] Dry fire protection by flow switch only

2 Handling

The handling is described in detail in chapter 5 of the User manual.

2.1 OEM Password

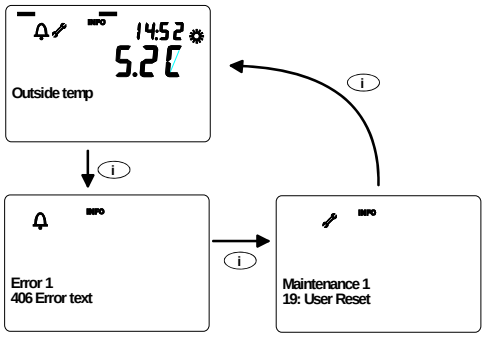
The OEM level is protected by a customer specific password.
If the OEM level is selected, the password (OEM code) is requested.



The password may be changed by setting the correct number by turning the selector knob. By pressing the OK button, the selected number is accepted.
By pressing ESC, the cursor goes back.

2.2 User Reset, Service Reset

User Reset



If an error occurs which requires a User Reset, this will be displayed with a bell and a screw wrench in the display.

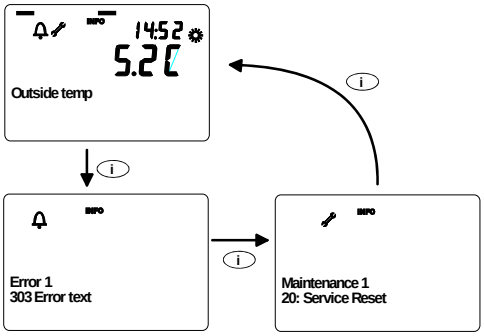
By pressing the Info button, the type of error will be displayed with an error code number and a short error text.

By pressing the Info button once again, the next display will display which type of Reset (User Reset or Service Reset) is required. A User Reset may be done on the operator unit.


User Reset Button

The number of User or Service Resets is limited to 5 Resets in every 15 minutes.
If no Reset has been performed for more then 15 minutes, the Reset credit counter will be 5. This is the maximum credit number. With each Reset, the credit will be decremented. If the credit is 0, it is not possible to activate a Reset. Each 3 minutes, the credit will be increased by +1 up to the maximum of 5 credits.

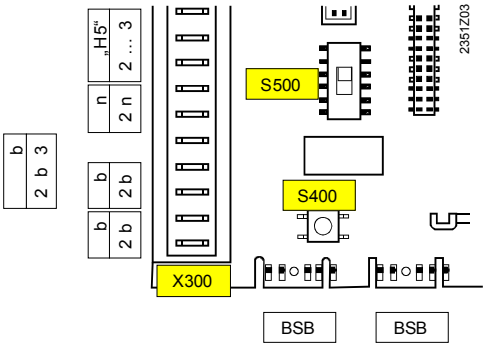
Service Reset



If an error occurs which requires a Service Reset, this will be displayed with a bell and a screw wrench in the display.

By pressing the Info button, the type of error will be displayed with an error code number and a short error text.

By pressing the Info button once again, the next display will display which type of Reset (User Reset or Service Reset) is required. For a Service Reset, call your appliance service organisation.



S400 Service Reset

Press the Service Reset Button between 1 and 20 seconds.

3 The settings in detail

3.1 Operator section

Operation and display

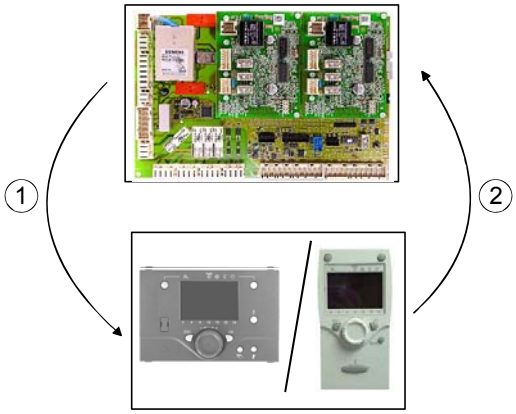
Line no.	*Operating line*
30	**Read data** No Yes
31	**Write data** No Yes

Read data

The settings for all operating levels are copied from the controller to the memory of the operator unit or HMI. This means that previous data in the operator unit will be overwritten. Some data points may be exempted from this.

Write data

The settings for all operating levels are transferred from the memory of the operator unit or HMI to the connected controller. Previous setting data in the controller will be overwritten.



① Read Data
② Write Data

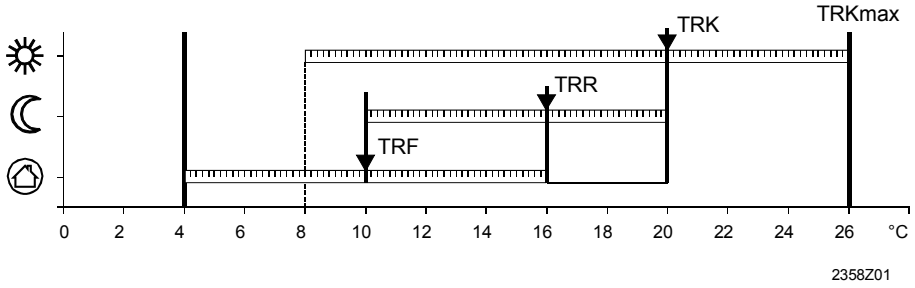
3.2 Heating circuits

Set points

Line no.			*Operating line*
HC1	*HC2*	*HCP*	
710	**1010**	**1310**	**Comfort set point**
712	**1012**	**1312**	**Reduced set point**
714	**1014**	**1314**	**Frost protection set point**
716	**1016**	**1316**	**Comfort set point max**

Room temperature

The room temperature can be shifted according to different set points. These set points become active depending on the selected operating mode, thus producing different temperature levels in the rooms.
The ranges of adjustable set points result from the interdependencies, as shown in the following diagram.



TRKmax Comfort set point maximum
TRK Comfort set point
TRR Reduced set point
TRF Frost protection set point

Comfort set point limitation

Operating line			
HC1	*HC2*	*HC3P*	
716	**1016**	**1316**	**Comfort set point max**

The upper limit of the room temperature set point may be limited to the value of the comfort set point max.

Room temperature control; PID parameters

Operating line			
HC1	*HC2*	*HC3P*	
762	**1062**	**1362**	**Derivative action time Tv room temp control**
763	**1063**	**1363**	**Integral action time Tn room temp control**
764	**1064**	**1364**	**Prop band Xp room temp control**

Optimum start control Fehler! Textmarke nicht definiert.

Operating line			
HC1	*HC2*	*HC3P*	
792	**1092**	**1392**	**Learn heat up gradient**
793	**1093**	**1393**	**Heat up gradient for optimum energy production**
794	**1094**	**1394**	**Heat up gradient**

Heat up gradient

This gradient is used to calculate the start time of the supplementary burner.
With room temperature operation, this gradient is automatically adjusted.
This gradient is also used to calculate the room model. This setting replaces the former setting 6112 (Gradient room model). This allows having different gradients for each heating circuit. This gradient is used in normal operation.

Heat up gradient for optimum energy production

This gradient is used to calculate the start time of the engine burner.
With room temperature operation, this gradient is automatically adjusted.
This gradient is used to calculate the room model during start optimization with engine only operation.

Learn heat up gradient

It is possible to switch off the automatic learning of the gradient. This could be necessary if the room units are placed in a location, where the room temperature measurement could be a problem.

Frost protection plant

Line no.			Operating line
HC1	HC2	HCP	
810	**1110**	**1410**	**Frost protection plant heating circuit pump**

If the setting 6120: Frost protection for the plant (menu configuration) is set to on, and if this function is activated (on), the heating circuit pump will run depending on the outside temperature as described in the frost protection function.

The plant frost protection function activates the heating circuit pump (or valve) depending on the actual outside temperature, to protect the heating installation against freezing.
If the parameter is set to off, the pump (valve) of the heating circuit will not be activated by the plant frost protection function.

Actuator type

In combination with an extension module, it is possible to use mixing circuits for heating circuit 1 and heating circuit 2.

Operating line			
HC1	HC2	HC3P	
832	**1132**	**1432**	**Actuator type** 2-position 3-position
833	**1133**	**1433**	**Switching differential 2-pos**

Mixing valve control

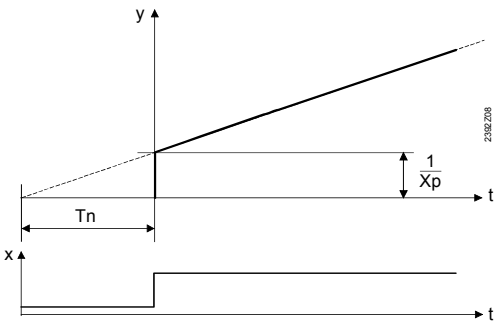
Operating line			
HC1	HC2	HC3P	
835	**1135**	**1435**	**Mixing valve P-band Xp**
836	**1136**	**1436**	**Mixing valve integral action time Tn**

Mixing valve P-band Xp

The proportional band defines within which change of the control variable ∆x (∆T of the flow) the whole correcting span y (valve travel) is traversed.
The smaller the proportional band, the greater the change of the manipulated variable ∆y at a given change of the control variable ∆x.

Mixing valve integral action time Tn

The integral action time is the period of time the controller's I-part would require to produce the same change of the manipulated variable as the P-part.
An adjustment of the integral action time changes the valve's rate of response.
The longer the integral action time Tn, the slower the response of the controlled system.



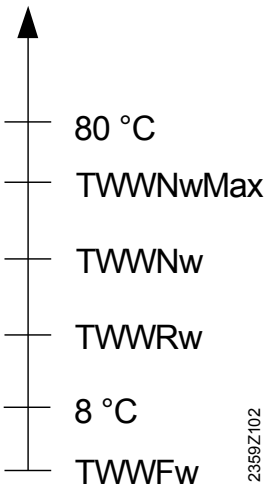
3.3 DHW

3.3.1 Set points

Different set points are available for DHW heating, with partially linked adjustment.

Nominal set point max: Sets the maximum limit of adjustment of the nominal set point.

Frost protection set point: Frost protection set point when DHW heating is switched off. Not adjustable, fixed at 5 °C (factory setting).



TWWNwMax	DHW nominal set point, maximum
TWWNw	DHW nominal set point
TWWRw	DHW reduced set point
TWWFw	DHW frost protection set point = 5 °C

The DHW set point acting on the control is selected based on the current operating level which incorporates the impact of the operating mode, the release (possibly the switching program), the DHW push and the legionella function.

Line no.	*Operating line*
1614	**Nominal set point max**

3.3.2 Operating modes

The DHW operating mode is selected using the DHW operating mode button.
2 DHW operating modes are available:

On DHW charging takes place automatically, the set point being the nominal DHW set point or the reduced DHW set point based on the selected kind of DHW release.

Off Continuous operation, the set point being the DHW frost protection set point (5 °C).

3.3.3 Holiday program

If the holiday program is active with all heating circuits (“Automatic” mode and holiday program active), the DHW set point is set to the frost protection level. At the end of the holiday period, the operating level according to the release will apply again. While the holiday program is active, DHW heating can be triggered at any time by making a manual DHW push (one-time DHW charging to the nominal set point).

If the legionella function was not performed because of a holiday period, it will be made up the first time DHW is heated to the nominal set point.

3.4 DHW storage tank

3.4.1 Charging

Line no.	*Operating line*
5010	**Charging** Once / day Several times / day
5011	**Forward shift DHW charging**

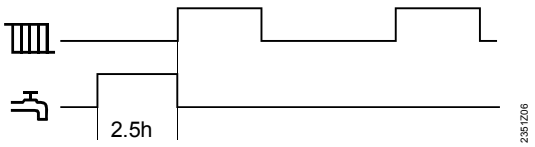
Selection of charging “Once/day“ or “Several times/day” is active only if DHW release is set according to the time programs of the heating circuits.
Release of DHW charging is given a certain time in advance before the first heat request from the heating circuit is received. The time of forward shift depends on setting 5010 and 5011.

Forward shift DHW charging

If setting 5011 is set to --- (OSV), the time of forward shift depends only on the setting 5010. (see below)This will fit for most of the applications.
If a certain time of forward shift is desired, this may be set with setting 5011.

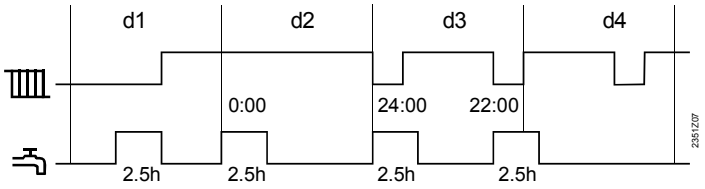
Once / day

Release of DHW charging is given 2.5 hours before the first heat request from the heating circuit is received. Then, the reduced DHW set point applies for the whole day.



TSP heating
DHW release

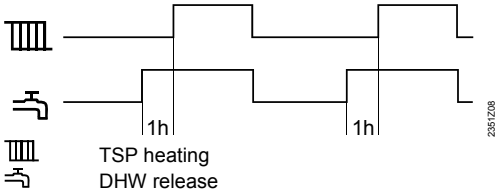
In the case of continuous heating (with no setback periods), release of DHW charging is given at 0:00. The same rule also applies if the first request for heat from the heating circuit is received before 02:30. If a request for heat is delivered at midnight, DHW charging is released after the first setback period, but no earlier than 2.5 hours before midnight.



TSP heating
DHW release
d1 – d4 Day 1 - 4

Several times / day

When selecting “Several times/day“, release of DHW charging is put forward in time by 1 hour against the periods of time the heating circuit calls for heat, and is then maintained during these periods of time.



3.4.2 Sensors or thermostat

A DHW sensor has to be connected to terminal B3 or a DHW thermostat has to be selected in the configuration (Ex1, Ex2). It is possible to use two DHW sensors. (Sensor B3 and B31)

Available sensors			Type of heat demand to the boiler
B3	**B31**	**Ex1, Ex2**	
--	x		No DHW heat demand
Sensor	--		B3 / SD
Sensor	Sensor		B3 / SD or B3 start / B31stop
x	x	Thermostat	start / stop

-- No sensor connected
x Makes no difference
SD Switching differential

DHW charging with 1 sensor

In the case of DHW heating with 1 sensor (B3), the charging request is made with a 2-position controller.

If the DHW temperature is lower than the current set point minus the set switching differential, DHW charging will be started.
DHW charging will be terminated when the temperature reaches the current set point.

When DHW heating is released for the first time in the morning, forced charging will take place, which means that DHW charging will also be started when the DHW temperature lies within the switching differential. But if the temperature lies less than 1 K below the set point, charging will not take place.

DHW charging with 2 sensors

In the case of DHW heating with 2 sensors (B3 and B31), the charging request is also made with a 2-position controller.

If both DHW temperatures are lower than the current set point, minus the set switching differential, DHW charging will be started.
DHW charging will be terminated when both temperatures reach the current set point.

When DHW heating is released for the first time in the morning, forced charging will take place, which means that DHW charging will also be started when only one of the DHW temperatures lies below the current set point minus the set switching differential. But if the temperature lies less than 1 K below the set point, charging will not take place.

In the case of charging with 2 sensors, the switching differential can be set to 0 K.

DHW charging with a thermostat

In place of a temperature sensor, it is also possible to use a thermostat.
With this application, DHW heating is only dependent on the thermostat's contact position and the release of DHW heating.

DHW charging is started when the thermostat's contact indicates "cold"and the current DHW set point is the nominal set point.
DHW charging is terminated when the contact indicates "hot". If the current DHW set point changes to the reduced set point or the frost protection level, DHW charging will also be aborted.

The adjusted set points are of no importance since temperatures cannot be acquired. When using the thermostat application, the legionella function is not active because there is no sensor.
If DHW heating is switching off, even the "cold" thermostat triggers no request. This means that when DHW heating is switched off, frost protection cannot be ensured either.

Line no.	*Operating line*
5024	**Switching differential**

3.4.3 Charging time limitation

Since space heating may obtain no or too little heating energy during DHW charging (DHW priority, diverting valve), it can be useful to introduce a temporay limitation for DHW charging.
If activated, DHW heating will be stopped for the same period of time on completion of the parameterized time, and then resumed. During this charging pause, the boiler's / heat pump's capacity is used for space heating.
If the heating circuits are switched off (summer operation, ECO, etc.), DHW charging will not be interrupted.

Line no.	*Operating line*
5030	**Charging time limitation**

3.4.4 Discharging protection

During charging

Function “DHW discharging protection“ ensures that the charging pump will be activated only when the temperature of the boiler is high enough.

The function can be activated / deactivated.

Line no.	*Operating line*
5040	**Discharging protection**

In the case of diverting valves, the function is automatically deactivated.

Application with sensor

The charging pump is only activated when the heat source temperature lies above the DHW temperature plus half the charging boost. If, during charging, the heat source temperature drops to a level below the DHW temperature plus 1/8 the charging boost, the charging pump will be deactivated again.

If 2 DHW sensors are parameterized for DHW charging, the lower temperature is used for the discharging protection function (usually sensor B31).

Application with thermostat

The charging pump is only activated when the heat source temperature lies above the nominal DHW set point. If, during charging, the heat source temperature drops below the nominal DHW set point minus the DHW switching differential, the charging pump will be deactivated again (with no overrun).

After charging

When the DHW set point is reached, pump overrun starts. If, during pump overrun, the boiler temperature or the common flow temperature falls below the DHW storage tank temperature, pump overrun will be terminated. If 2 DHW sensors are used, the higher sensor value will be taken into consideration.

3.4.5 Pump overrun

On completion of DHW charging, the charging pump always observes an overrun time of 1 minute. If none of the other consumers draw significant amounts of heat, the heat source can generate a forced signal “Overrun“ for the charging pump during that period of time. The overrun time can be set with the heat source parameters.
On applications with diverting valves, the heat source pump overruns. The diverting valve maintains the DHW charging position during the overrun time. Pump overrun can be aborted by “Discharging protection after DHW charging“.

3.4.6 DHW push

Manual push

The manual DHW push is triggered via the operator unit. It initiates a single DHW charging cycle to the nominal set point. The push is active until the nominal DHW set point is reached. If, at the time of the manual push, the legionella function is due, the push is made until the legionella set point is reached.

Once triggered, the DHW push cannot be aborted via the operator unit.

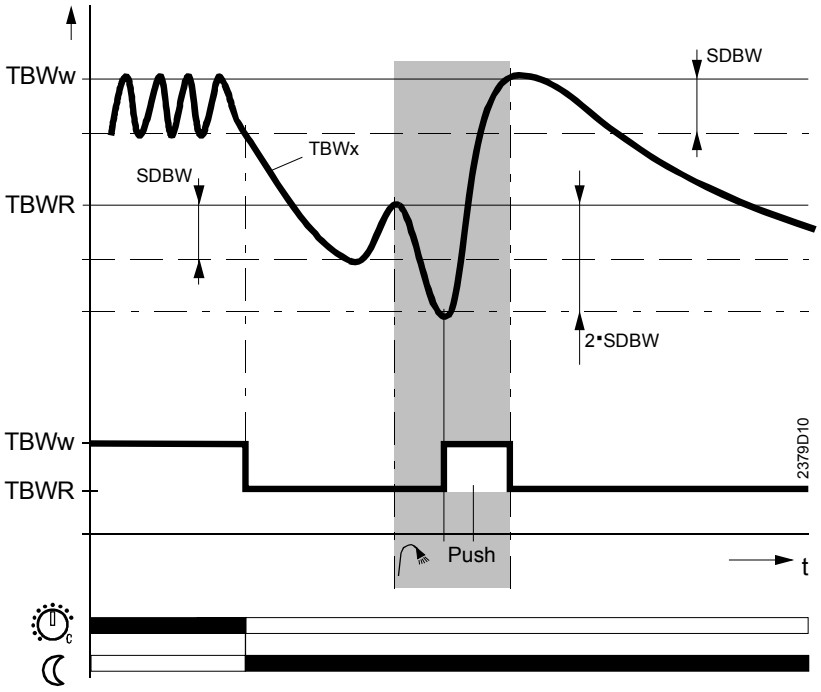
Automatic push

The automatic DHW push is triggered in the controller.
If the DHW temperature drops below the reduced set point by more than 2 switching differentials, another single charging cycle to the nominal DHW set point takes place.

This function is only active when DHW heating is switched on.

Line no.	*Operating line*
5070	**Automatic push**

Example



SDBW Switching differential DHW
TBWw Nominal DHW temperature set point
TBWR Reduced temperature set point

3.4.7 Frost protection for the DHW storage tank

If the DHW temperature drops below 5 °C, the heat source will be released.

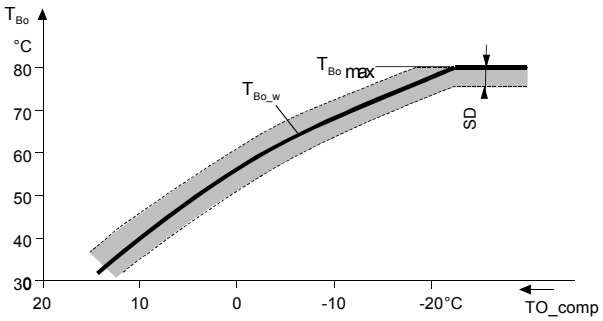
When the DHW storage tank temperature returns to a level of 8 °C, the heat source will be switched off.

This function cannot be deactivated.

3.5 Boiler

3.5.1 Set points

The boiler temperature set point is limited by the parameterized maximum limit of the boiler temperature – even if the consumers call for a higher temperature.
The burner's switch-on point is limited by the boiler's switching differential below the boiler's maximum temperature. The burner's switch-off point is limited at the maximum boiler temperature.
When the boiler temperature reaches the adjusted maximum, the burner will be switched off.



Legend

TBo	Boiler temperature
TBow	Boiler temperature setpoint
TBomax	Maximum limitation of the boiler temperature
SD	Switching differential
TO comp	Composite outside temperature

Set point limitation

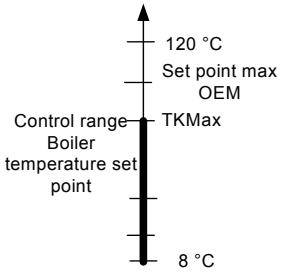
Line no.	*Operating line*
2213	**Set point max OEM**
2215	**Set point max room heating**

Set point max OEM

Limitation of the boiler temperature by the OEM is a limit value for the boiler temperature's set point at the top (TKMax).

Set point max room heating

If a lower limitation for room heating is required compared to DHW preparation, it is possible to use set point max room heating. This limit has to be lower than set point max. If set point max room heating is set to ---(OSV), this limit is not taken into account.



Boiler temperature set point

In case of a modulating burner, the setting "set point max" is the temperature limit where the burner is switched off. The actual set point value for the modulating burner is below this value. If only one burner is running, the set point is 2K below the set point maximum. If both burners are running, the set point for the supplementary burner is 4K below the set point maximum. At 2K below the set point maximum, the supplementary burner will be switched off and the set point for the engine burner will be 2K below the set point maximum. The engine burner will be switched off, if the boiler temperature is higher then the set point maximum.

3.5.2 Heat exchanger overtemperature protection

This function is limiting the boiler temperature set point to
Boiler Limit Temperature = Return temperature + Max diff temp flow-return – 1K

Flow temperature set point =
Min (Flow temperature set point; Boiler Limit Temperature)

Example
Return temperature = 30°C
Max diff temp flow return = 25K
The boiler temperature set point will be limited to 54°C.

In CH mode

The heat exchanger protection function limits the boiler temperature set point, to prevent too high temperature difference between flow and return temperature.

Line no.	*Operating line [Menu Boiler]*
2620	**Max diff temp flow return**
2621	**Limit diff temp flow return**
2622	**Limit diff temp flow return eng bu**

If either the temperature difference (T_{flow} - T_{return}) is
- above the maximum setting (2620) for more than 5 minutes or
- the temperature difference is above the limit value (2621),
both burners will stop running and the error 270 “Excessive temperature difference heat exchanger” will be displayed.
In case of error caused by exceeding maximum setting, the error is reset immediately (automatically) if the temperature difference is smaller than (maximum setting – switching differential boiler)
In case of error caused by exceeding limit value, the error is reset automatically if the temperature difference is smaller than (limit setting – switching differential boiler) for 10 minutes.

Engine operation only

In case of engine operation only, setting 2622 will be taken into account.
If the temperature difference (T_{flow} - T_{return}) is above setting (2622) for more than 30 seconds, engine burner will be switched off and error 421 will be displayed.
The error is reset automatically if the temperature difference is smaller than (limit setting – switching differential boiler) for 10 minutes.

In DHW mode

In the Combi application, the heat exchanger over temperature protection is disabled during DHW preparation.

⚠ In case of return temperature sensor fault, error 40 will be displayed. The heat exchanger protection function will be switched off.

Boiler temperature limitation

Line no.	*Operating line*
8374	**Boiler temperature limitation**

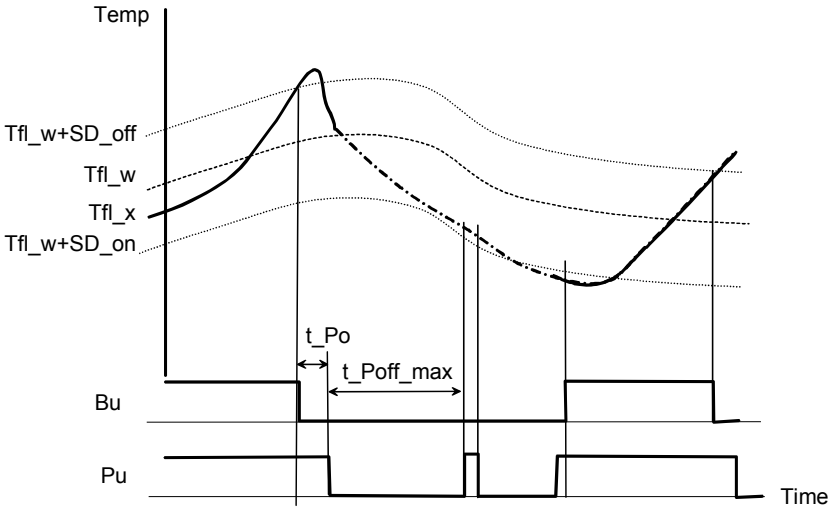
For diagnostic reasons, it will be displayed on line 8374 (diagnostics heat generation) if the heat exchanger over temperature protection function is limiting the boiler temperature set point.

3.5.3 Boiler pump running time optimization

Line no.	*Operating line*
2660	**Pump off period maximum**

Without pump running time optimization function, the boiler pump is on as long as there is a heat demand from room heating or DHW.
Even if the burner is off for some time, the pump is kept running, because there is a demand for a certain flow temperature. Correct measurement of flow temperature is only possible if the pump is on.
There are some situations, where flow temperature set point is very low and after turning off the burner, it may take some time until the flow temperature has cooled down below the starting point of the burner.
Boiler pump optimization function is switching off the boiler pump after pump overrun time. Based on a model, the time to switch on the boiler is calculated. After this time, the boiler pump will switch on, measure the flow temperature for some time and start the burner, if required.
Minimum off time has to be 5 minutes. Otherwise, the pump will not switch off.
The pump will start latest after setting 2660, e.g. 30 minutes, and run the pump for 3 minutes. If it is still to early to start the burner, the pump will switch off once again.

If setting 2660 is ---, OSV, pump running time optimization function is Off.
If 2660 is set to e.g. 30 minutes, the pump running time optimization function is activated.



t_Po	Pump overrun time	SD	Switching differential
t_Poff_max	Pump off period maximum	Bu	Burner
Tfl_w	Flow temperature set point	Pu	Pump
Tfl_x	Flow temperature measured		

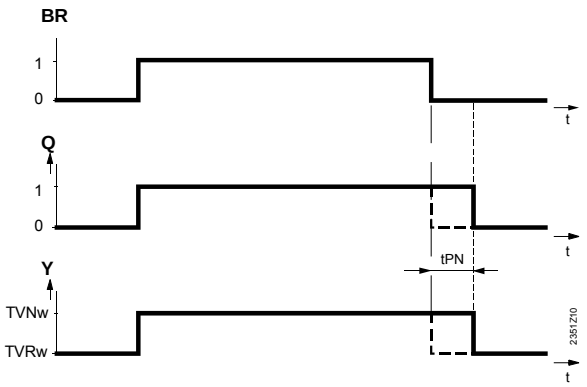
3.5.4 Engine burner running time optimization

Line no.	*Operating line*
2661	**Control consumer opt energy** Off/**On**

If more than one heating circuits are active, start optimization with engine burner may be only available for a limited number of heating circuits because of limited heating power by engine burner. This is automatically controlled by the heat generation.
Because of lack of experience, this parameter should be used only in case of problems.
If the parameter is set to OFF, heating circuits will not be restricted in case of limited heating power. In normal operation, this parameter should be ON.

3.5.5 Overtemperature protection, pump overrun

When the burner is switched off, or if the boiler request becomes invalid, a forced signal will be delivered during the parameterized pump overrun time. If such a forced signal is received, the consumer pumps must not be switched off. The system calls for an overrun time of 1 minute. If there is no forced signal within that period of time of 1 minute, the pumps may switch off.
For flow temperature control, the mixing valve's set point is maintained at the previous set point during the period of time the forced signal is active.



1	On
0	Off
BR	Burner
Q	Pumps
Y	Mixing valve
TVNw	Nominal flow temperature set point
TVRw	Reduced flow temperature set point
tPN	Pump overrun time
t	Time

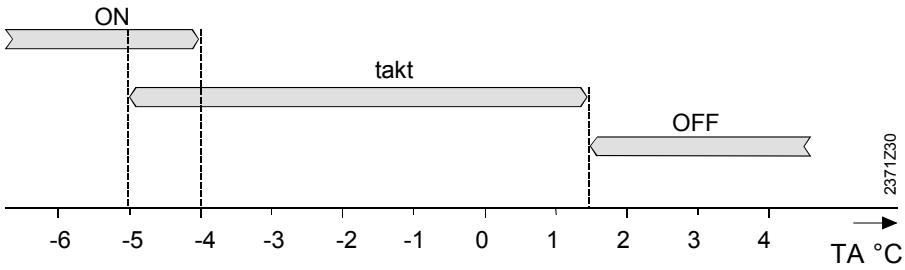
Line no.	*Operating line*
2250	**Pump overrun time**

3.5.6 Frost Protection for the plant

The controller activates all released plant pumps, depending on the current outside temperature, thus protecting the heating installation against freezing. In this case, the heat sources will not be put into operation.

⚠ Prerequisite for proper functioning is a fully operational plant. Frost protection for the plant necessitates an outside sensor. If that sensor is missing, the function will nevertheless be ensured by simulating an outside temperature of 0 °C and by delivering an error message.

Outside temperature TA	Pump	Diagram
...-4 °C	Continuously on	ON
-5...10.5 °C	On for 10 minutes at 6-hour intervals	takt
1.5 °C...	Continuously off	OFF



ℹ In between -4 and -5 °C, different operating states can occur. In this range, operation is dependent on what existed before:
If the temperature was previously higher (in the range of "takt"), the pump will also cycle in the temperature range from -4 to -5 °C, and is continuously on only when the temperature drops further.
If the temperature was previously lower (in the range of ON), the pump is continuously running in the range of up to –4 °C also and cycles only when the outside temperature is higher.

Line no.	Operating line
6120	**Frost protection for the plant** **Off ¦ On**

Each pump (boiler pump, heating circuit pump,…) may be set individually, if the pump has to be activated, if the frost protection for the plant is active

The frost protection plant boiler pump setting allows the boiler pump to be activated as described above.
If the parameter is set to off, the boiler pump will not be activated by the plant frost protection function.

Line no.	Operating line
2300	**Frost protection plant boiler pump** **Off ¦ On**

3.5.7 Appliance/plant Frost protection

Return temperature frost protection

The appliance/plant frost protection function is based on the return temperature.
If the return temperature is below 7°C, boiler pump and heating circuit pump/valve are activated or opened. If the temperature rises above 8°C, the frost protection function will be terminated. If the return temperature falls below 3°C, the supplementary burner will get a heat demand of 50°C. If the return temperature reaches 25°C, the appliance frost protection will be terminated.
If the supplementary burner is locked, the engine burner will be used. In this case, the return temperature limit to start the burner is increased from 3 to 10°C.

Boiler temperature frost protection

If the boiler frost protection function puts the boiler into operation when the boiler temperature drops below the frost protection level (8°C)

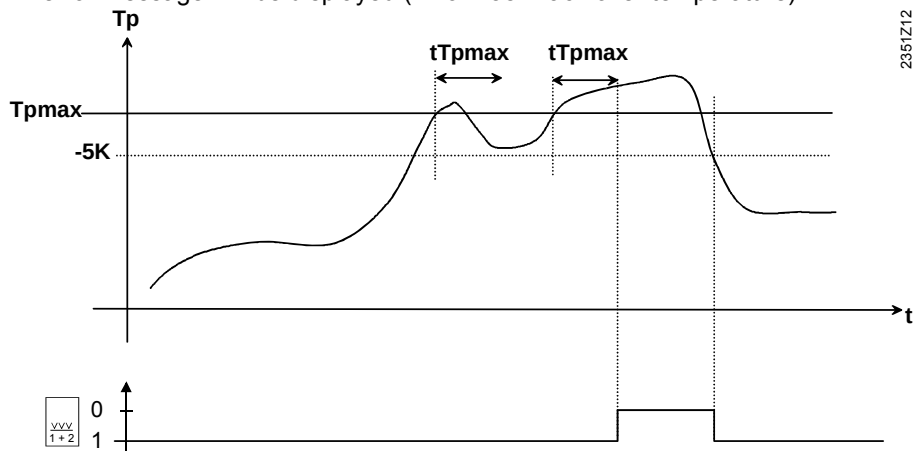
3.5.8 Appliance over temperature protection

Line no.	*Operating line*	
2623	**Pack temperature max**	(TPmax)
2624	**Time pack temperature max**	(tTPmax)

The pack temperature sensor monitors the pack temperature to prevent too much heat building up inside the appliance.

Line no.	*Operating line*
6103	**Pack temperature sensor** No/Yes

This configuration allows defines whether a pack temperature sensor is required or not.
If the pack temperature exceeds the (2623) Pack temperature max value for more than (2624) Time pack temperature max, then both burners will be turned off, until the pack temperature is lower then Pack temperature max – 5K.
An error message will be displayed (Error 258: Pack over temperature)



Tp Pack Temperature
TPmax Pack temperature max.
tTPmax Time pack temperature max

0 Disable Boiler
1 Enable Boiler

In case of a pack temperature sensor error, the pack over temperature function will be off. A sensor error (Error 257: Pack temp sensor fault) will be indicated.

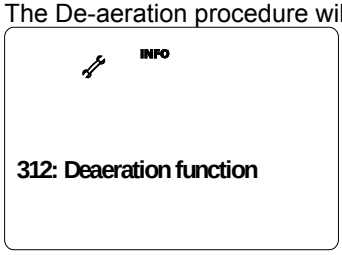
3.5.9 Boiler temperature sensor error

If there is no signal from the boiler temperature sensor (open-circuit / short-circuit), the burner will immediately be switched off, independent of any heat demand.

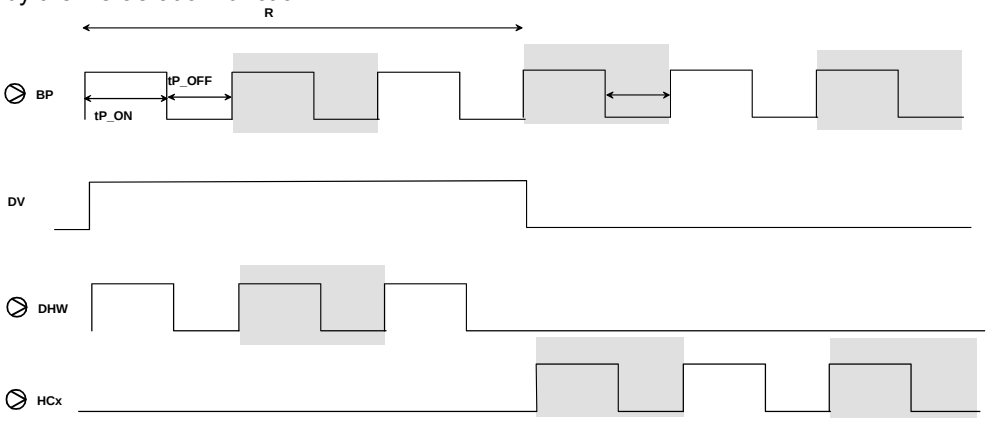
3.5.10 De-aeration procedure

Line no.	*Operating line [Menu Boiler]*
2629	**Stop deaeration by button** No/Yes
2630	**De-aeration procedure** Off/On
2655	**Pump "on"-time deaeration**
2656	**Pump “off”-time deaeration**
2657	**Number of repetitions**
2658	**Pump stage during deaeration**

If this function is selected, after power up the De-aeration procedure will be executed immediately.
The De-aeration procedure will be displayed by



The De-aeration procedure depends on the plant type.
In general: all hydraulic circuits which are supplied by the boiler pump will be covered by the De-aeration function.



BP	Boiler pump	R	Number of Repetitions
DV	Diverter valve	tP_ON	Pump "on"-time deaeration
DHW	DHW pump/valve	tP_OFF	Pump "off"-time deaeration
HCx	Heating circuit pump/valve		

Number of Repetitions means the number of ON/OFF cycles. In the example, R is set to 3. 3 ON/OFF cycles are repeated in DHW position and 3 ON/OFF cycles are repeated in heating position.

Stop De-aeration procedure

If setting 2629 is set to YES, de-aeration procedure may be stopped by pressing the ESC button for more than 3 seconds.

3.5.11 Flow supervision, Water pressure supervision, Dry fire protection

Selection of function

Line no.	*Operating line*
2251	**Dry fire protection** Off ¦ On

The flow and water pressure supervision function (dry fire protection function) may be deactivated (off).
Depending on the Hardware version, it is possible to have this function based on a pressure sensor, flow switch or on flow and return temperature measurement. The solutions based on flow switch and pressure sensor is described below. The version base on flow and return temperature has to be defined company specific.

Supervision by pressure sensor

Line no.	*Operating line*
6147	**Pressure sensor** No ¦ Yes
6148	**Pressure value 3.5 V**

Setting in the configuration menu

All configuration settings have to be changed before the appliance (burner, pump) is running.

If a configuration with water pressure sensor was selected and flow and water pressure supervision was released, the MCB must read in a valid value for the water pressure. Otherwise, there will be start prevention with error code 118 (pressure too low).

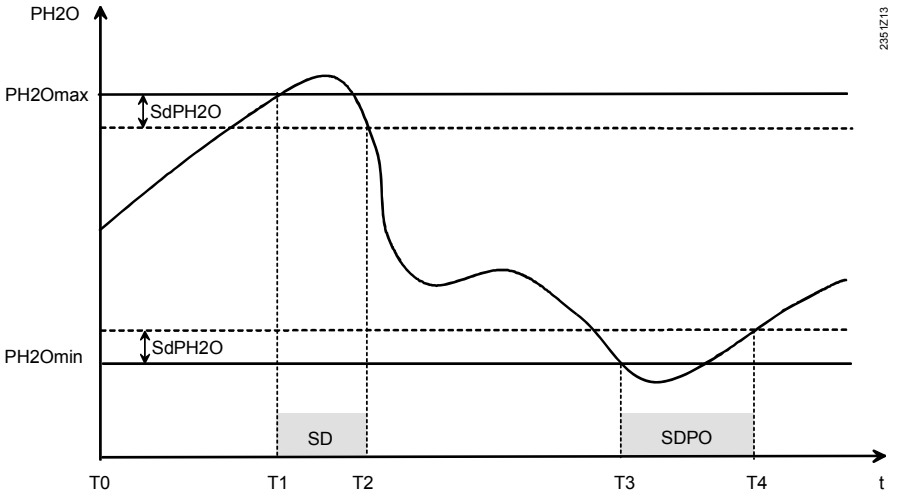
The type of pressure sensor may be adjusted by the nominal pressure value at 3.5 V.

If a configuration with water pressure sensor was selected and water pressure supervision was not selected, a missing pressure sensor will show an error message 78 (pressure sensor fault) It will not result in start prevention.
If water pressure supervision was selected and a configuration without water pressure sensor was selected, this will be displayed with error code 273 (configuration fault pressure sensor) and will result in a start prevention.

Pressure Sensor	Config pressure sensor	Dry fire protection	Error code	Burner Start prevention
No	No	No	no	No
No	Yes	No	78	No
No	Yes	Pressure sensor	118	YES
X	No	Pressure sensor	273	YES

Static supervision function

Water pressure supervision has priority over boiler temperature control. When certain threshold values are crossed, the MCB responds by Shutting down the boiler and in some cases with turning off the pump
No overrun will be done in case of shutting down of boiler and pump.
If water pressure is too high or too low, there will be start prevention and an error message will show up.
When water pressure returns to the permitted pressure range, the boiler will be released with no delay. The following graph shows the various phases of water pressure supervision:



Static water pressure supervision .

SD Shutdown
SDPO Shutdown pump off

- Boiler shutdown will be triggered when: Ph2o ≥ PH2Omax (6140)
- Boiler and pump shutdown will be triggered when: Ph2o ≤ PH2Omin (6142)
- Boiler shutdown will be cancelled when: Ph2o < PH2Omax – SdPH2O
  Ph2o > PH2Omin + SdPH2O

To ensure that short-term changes in water pressure thresholds do not immediately give rise to a response, the measured water pressure will be filtered ($\tau \approx 2$ seconds).

Dynamic supervision function

When the boiler pump is activated, the pressure downstream from the pump will increase and the pressure upstream will decrease. These changes in pressure depend on the pumping power and the pump's capacity.

The pressure sensor acquires the pressure before and after the pump is switched on. The pressure differential must exceed a minimum threshold (dpH2OminPuOn (6144)) to ensure proper functioning of the pump.

At the same time, the same pressure differential may not exceed a maximum threshold (dpH2OmaxPuOn (6145)), which could lead to the indication of too little circulation or no circulation at all.

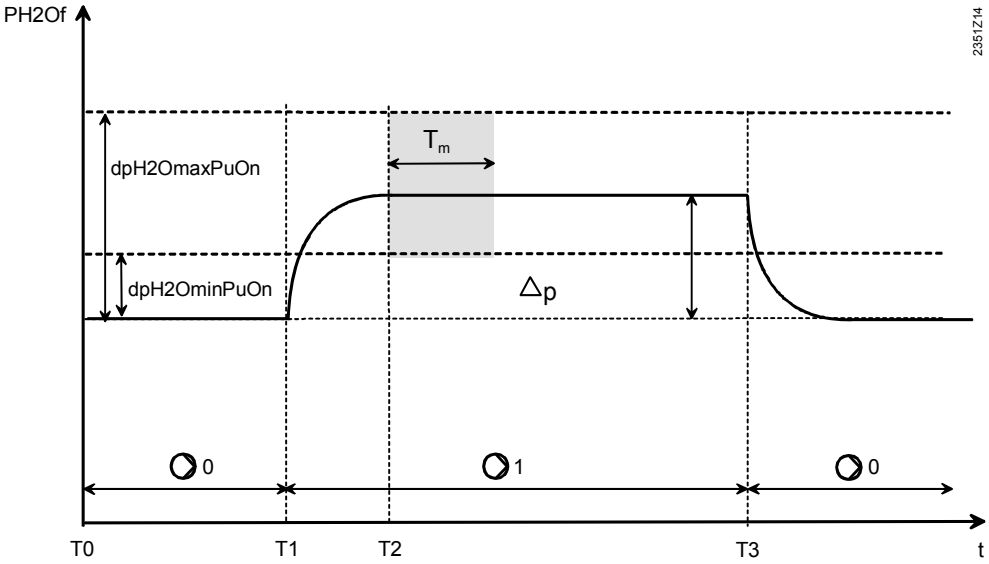
If this criterion is not met, start of the pump will be prevented for 10 minutes (this is a setting). There will be no error code displayed. Status Boiler and Burner WHY will indicate the problem.

If start prevention takes place 6 times in successive order, lockout will be triggered and an error message will be displayed. A User reset will be required.

The pressure thresholds can be parameterized in the range from 0 to 5 bar, the resolution being 0.1 bar. Checking of the pressure thresholds is individually switched off by selecting 0 bar as the minimum value and 5 bar as the maximum value.

Note
If a plant diagram was configured without a pump Q1, the function must be deactivated.

The differential pressure is checked 8 seconds after the pump was switched on. During the following 10 seconds, the differential pressure will be checked. Then, during normal pump operation, the differential pressure will no longer be checked.



Dynamic water pressure supervision.

PH20f filtered

Valid pressure range after pump on
Tm Supervision Time
Δp diferential pressuref
0 Pump off
1 Pump on
t Time

Settings

Line no.	*Operating line*	
6140	**Water pressure max**	(PH2Omax)
6142	**Water pressure critical min**	(PH2Omin)
6143	**Water pressure switching differential**	(SdPH2O)
6144	**Min pressure diff pump on**	(dpH2OminPuOn)
6145	**Max pressure diff pump on**	(dpH2OmaxPuOn)

Diagnostics Heat generation

Line no.	*Operating line*
8327	**Water pressure**

Input/output test

Line no.	*Operating line*
7869	**Voltage signal pressure sensor**

Error messages

Error code	*Message*	*Description*
78	Pressure sensor	Pressure sensor fault
117	Pressure too high	
118	Pressure too low	
271	Differential pressure too high	
272	Differential pressure too low	
273	Configuration fault pressure sensor	Configuration fault

Supervision by flow switch

Menu configuration

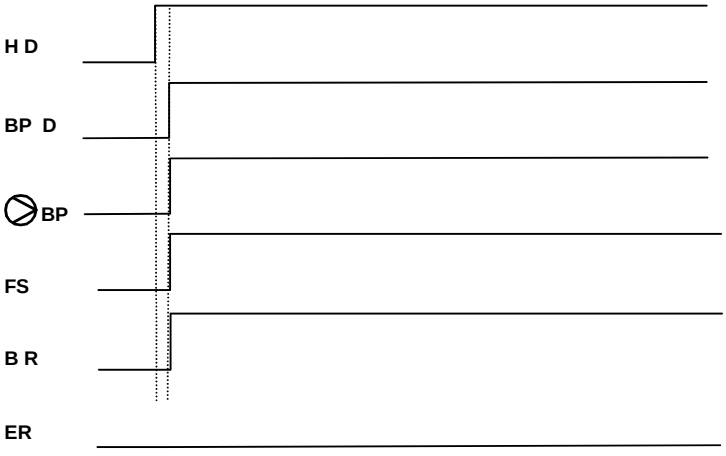
Line no.	*Operating line*
6194	**Flow switch input** normally closed/ normally open

To connect the flow switch input to the board, the same input will be used as for the pressure sensor. (Connector X204)
If the Hardware is designed for flow switch function, it is not possible to connect a pressure sensor. Setting 6147 Pressure sensor NO/YES will be ignored in case of flow switch function.
Configuration Flow switch input
Normally open means: the input is closed if flow is detected
Normally closed means: input is opened if flow is detected

Menu Boiler

Line no.	*Operating line*
6190	**Waiting time dry fire flow switch t1**
6191	**Waiting time lockout t2**
6192	**Waiting time anti welding function t4**
6193	**Anti welding function** Off/On

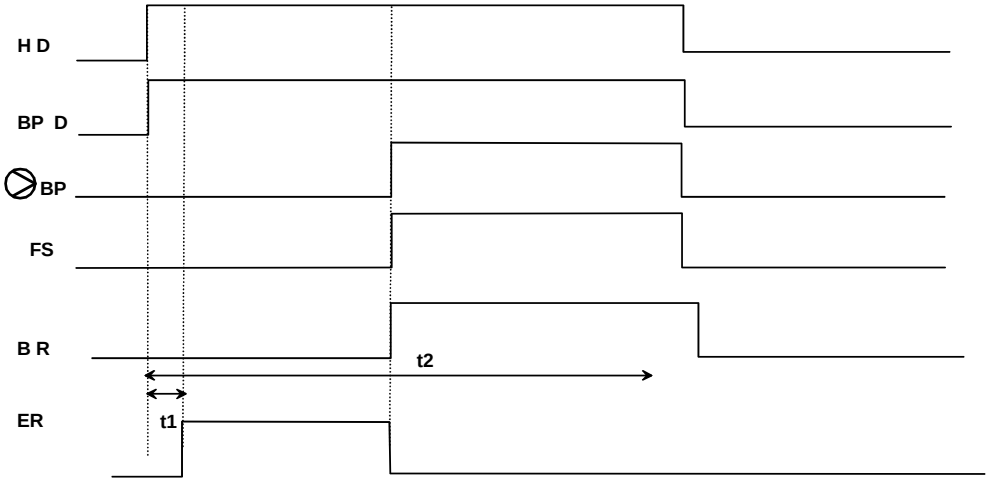
The contact of the flow switch will be closed if sufficient flow is running through the boilers heat exchanger. The flow switch will be tested when the boiler pump is running and heat demand is requested.
If the contact is closed within a certain time (“waiting time dry fire flow switch t1”) after boiler pump signal is on, burner start up will be released.



Normal operation

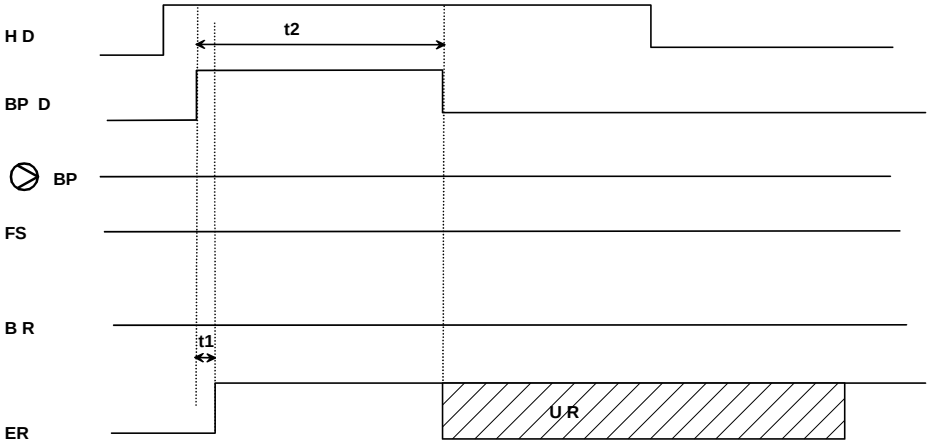
HD Heat demand
BP D Boiler pump demand
BP Boiler pump
FS Flow switch
BR Burner release
ER Error

If the contact stays open, after 12 seconds burner start prevention will stay active. Pump stays running. Error 164 “Flow-/Pressure sensor” will be displayed (automatic reset)
If the flow switch closes within t2 (“waiting time lockout t2”,setting 6191), the burner will be released and the error will be deleted.
If setting 6191 is changed to ---, this function is turned off.



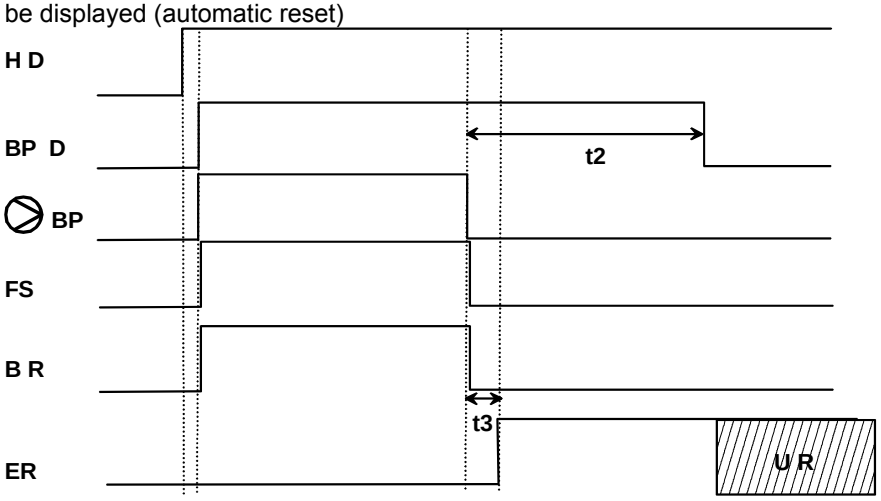
Flow switch closing too late

If the flow switch does not close within time t2, boiler pump will be turned off and a user reset is required. Error 274 Dry fire protection will be displayed. User reset is required



Flow switch does not close

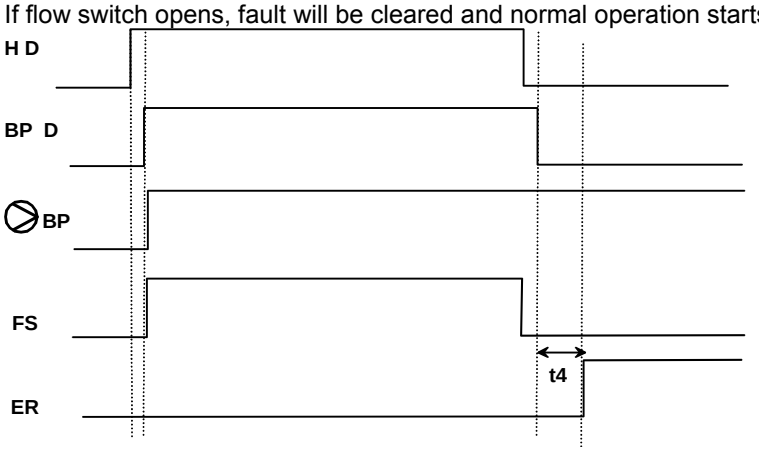
If the burner is already running, the burner will be switched off immediately, if the flow switch opens for more then 2 seconds (t3) Error 164 Flow-/Pressure sensor error will be displayed (automatic reset)



Flow switch is opening during operation

Anti welding function (Flow switch supervision)

If boiler pump is off >10 seconds and flow switch is still closed, “Error 164” will be displayed and burner start will be prevented.
If flow switch opens, fault will be cleared and normal operation starts again.

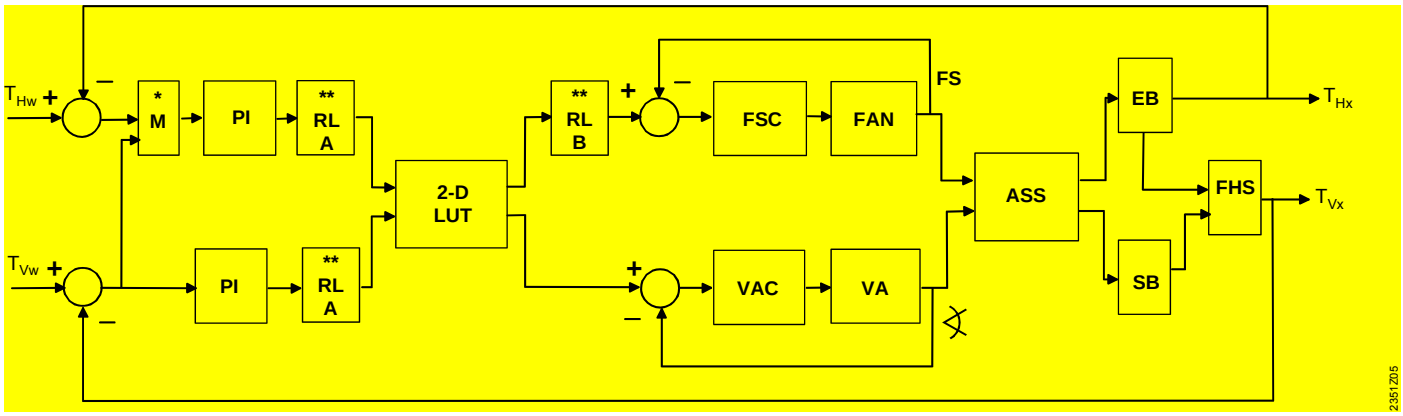


Anti welding function

Input/output test

Line no.	*Operating line*
7940	**Input flow switch**

3.6 Gastrain control



M	Min	VA	Valve actuator
PI	PI-Controller	ASS	Air flow splitter system
RL A	Rate-limiter A	EB	Engine Burner
2 - D LUT	2 – Dimensional look-up table	SB	Supplementary Burner
RL B	Rate-limiter B	FHS	Flow heating system
FSC	Fan speed control	THw	Engine head temperature set point
FAN	Fan	TVw	Flow temperature set-point
FS	Fan speed	THx	Engine head temperature
VAC	Valve angle control	TVx	Flow temperatur

* Selection of dominant control error (head of boiler flow): smaller demand wins

** Rate Limiter A is active if 1 burner is already on,
Rate Limiter B is active if no burner is on

Control parameters

Line no.	*Operating line*
2605	**Proportional band Eng Burner Headtemp control**
2606	**Integral action time Eng Burner Headtemp control**
2610	**Proportional band Eng Burner Boilertemp control**
2611	**Integral action time Eng Burner Boilertemp control**
2612	**Derivative action time Eng Burner BoilerTemp control**
2615	**Proportional band Supp Burner**
2616	**Integral action time Supp Burner**
2617	**Derivative action time Supp Burner**

These settings are part of the boiler menu.

Engine burner control parameters

P-band Head temp	Proportional Band for engine burner head temperature control
Integral action time Head temp	Integral action time for engine burner head temperature control
P-band Boiler temp	Proportional Band for engine burner boiler temperature control
Integral action time Boiler temp	Integral action time Tn for engine burner boiler temperature control
Derivative action time Boiler temp	Derivative action time Tv for engine burner boiler temperature control

Supplementary burner control parameters

P-band	Proportional Band for supplementary burner boiler temperature control
Integral action time	Integral action time Tn for for supplementary burner boiler temperature control
Derivative action time	Derivative action time Tv for for supplementary burner boiler temperature control

3.7 Burner control

The BCU units are safety critical devices, which have EN 298 certification. The engine and supplementary BCUs are identical and programmed with identical timings.
The timings are specified in the table below.

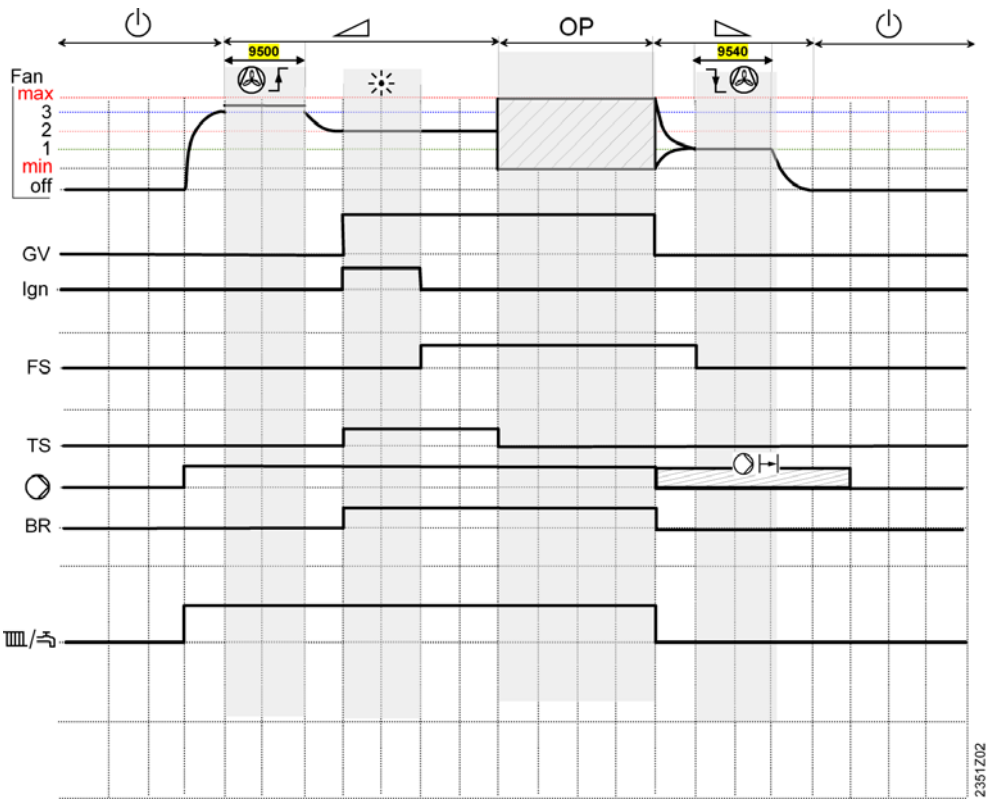
State Timings	State Timing Description	Time (s)
Ignition	The period of time for which the ignition units are energised in the safety state.	5
Safety	In the safety state the gas valve is energised.	5
Pilot Stabilisation	In this state the gas valve is energised and the ignition unit is de-energised. The pilot stabilisation state is an intermediate state between the safety and running states.	0.2 (?)
Inter-Purge	In the inter-purge state the gas valve and the ignition unit are de-energised.	~26

The settings for fan speed and spool angle for the different burner sequences are defined by the Mass flow demand for the related sequence.
For each mass flow demand a pair of values for fan speed and spool angle is defined.
These values are defined in a look-up table.
These settings are also used for the burner commissioning at fixed rates.

Line no.	*Operating line*
9500	**Prepurge time**
9540	**Postpurge time**
9570	**Eng Burner Min rate**
9571	**Eng Burner ignition rate**
9772	**Eng Burner Max rate**
9575	**Supp Burner Min rate**
9576	**Supp Burner ignition rate**
9577	**Supp Burner Max rate**
9578	**Supp Burner Max rate CH**

Setting 9578 allows having a separate setting which applies for room heating only.

3.7.1 Normal operation



State diagram for normal operation

OP	Operation
◺	Shut down
◿	Start up
⏻	Standby
Fan	Fan Speed and Spool valve position
1	Post-purge
2	Ignition
3	Pre-purge
GV	Gas valve
Ign	Ingition
Ign	Ingition
FS	Flame signal
TS	Safety time
	Pump
BR	Burner
	Demand
	Post-purge time
	Pre-purge time
	Ignition
	Pump overrun

Settings for Minimum mass flow demand, Ignition mass flow demand and Nominal maximum mass flow demand are available for engine burner and supplementary burner.

Ignition mass flow demand is used for pre-purge and post-purge.

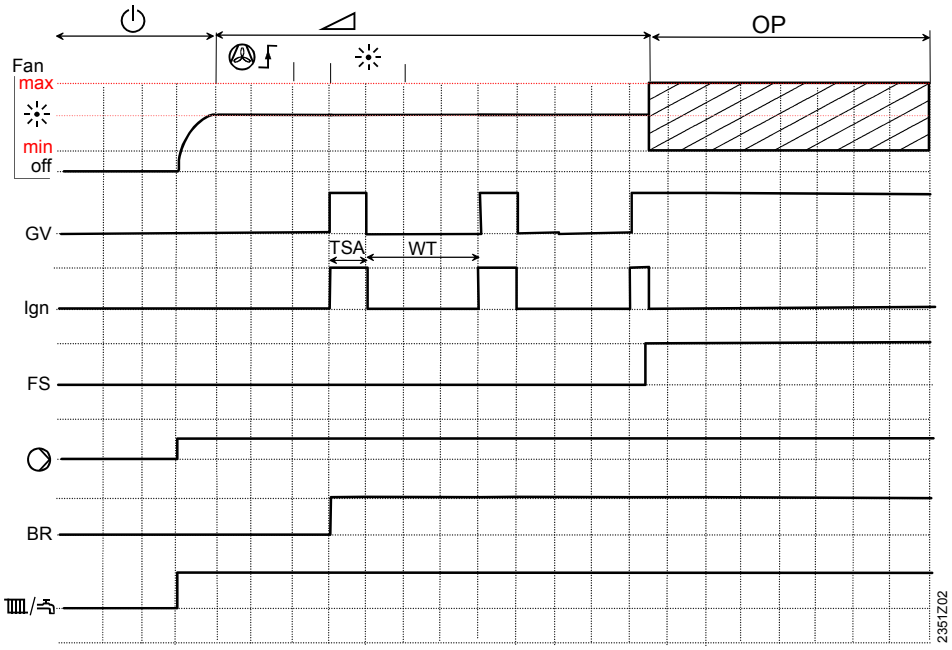
For each mass flow demand a pair of values for fan speed and spool valve angle is defined in a look-up table. This table may not be changed.

The timing for Ignition, Safety and Inter-Purge are fixed values and may not be changed.

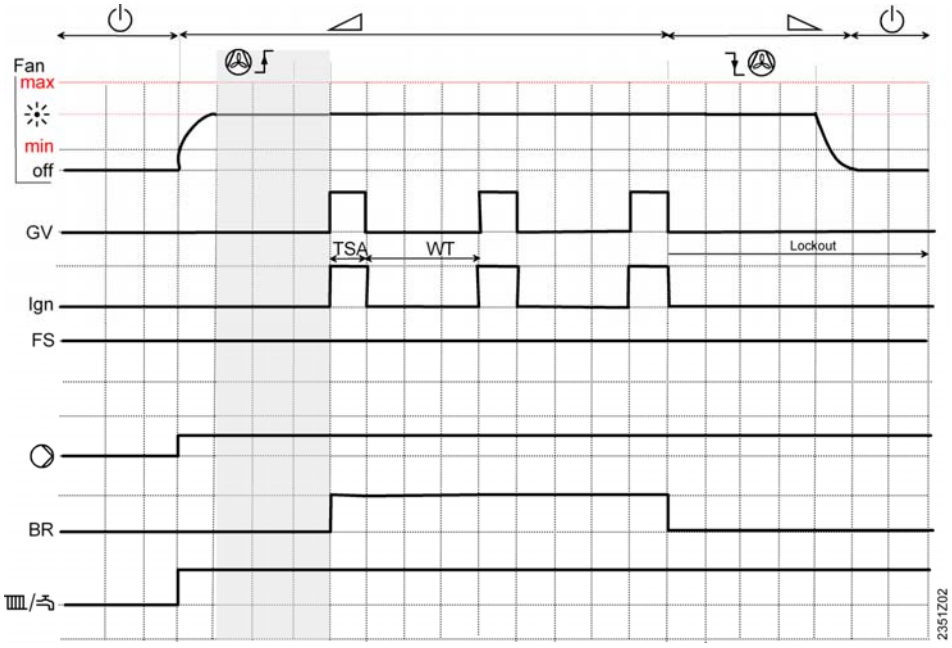
3.7.2 Multitry function

The BCU will allow a maximum of three ignition attempts before locking-out a burner. The figure below shows an example state timing sequence for successful ignition occurring on the third attempt.

repetition rate:	3 Ignition attempts.
repetition delay (WT):	~26 sec



State diagram for successful ignition on third attempt

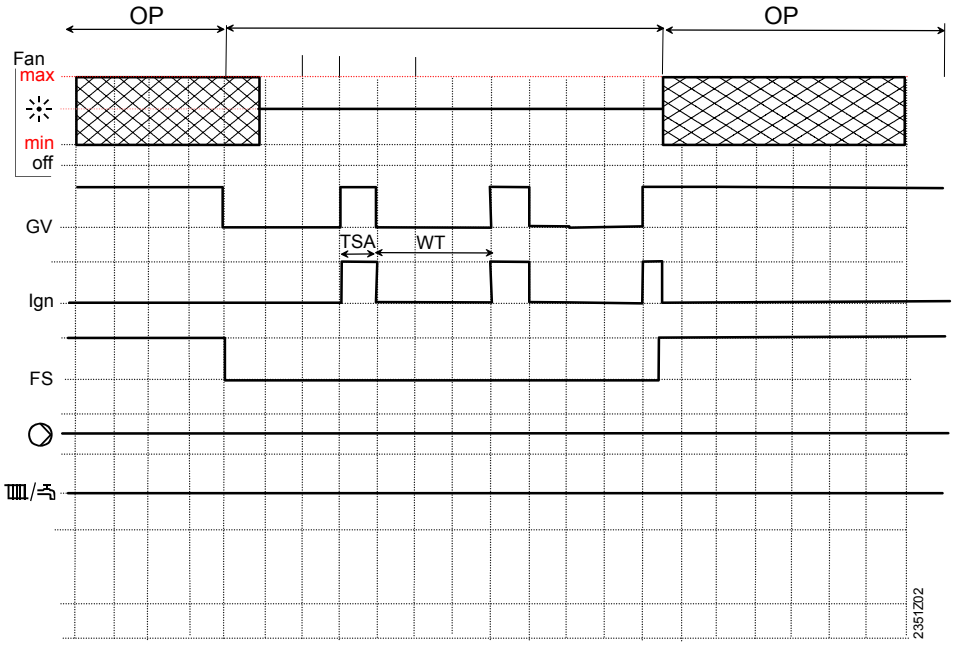


State diagram of ignition failure

OP	Operation	TS	Safety time
	Shut down		Pump
	Start up	BR	Burner
	Standby		Demand
Fan	Fan Speed and Spool valve position		Post-purge time
GV	Gas valve		Pre-purge time
Ign	Ingition		Ignition
FS	Flame signal		Lockout

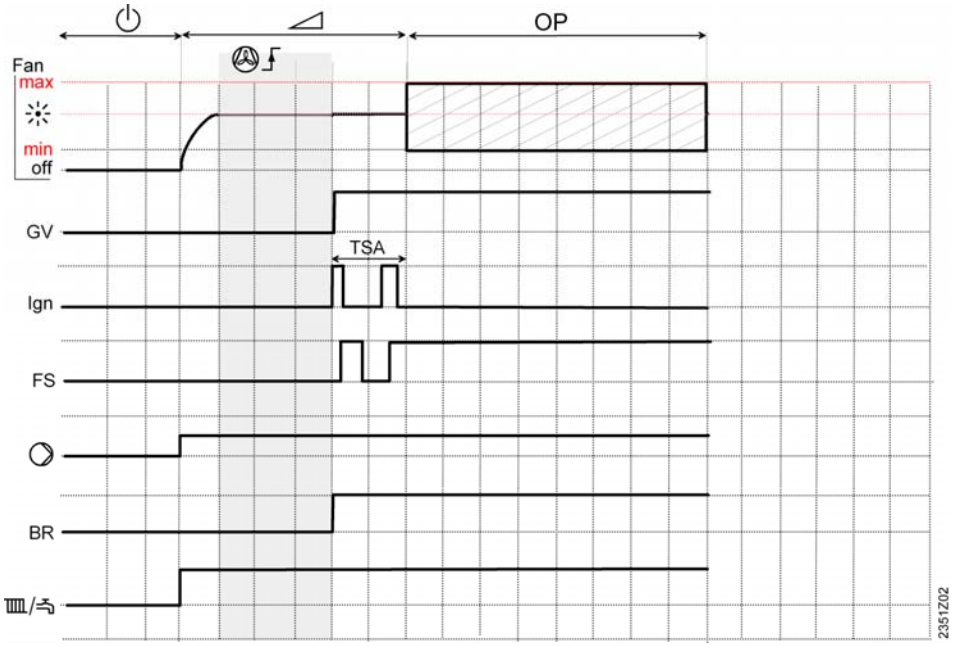
3.7.3 Loss of Flame during normal operation

Loss of the flame signal during normal operation causes restart of the igniter.



3.7.4 Loss of Flame during TSA (safety time)

Loss of the flame signal during TSA causes restart of the igniter.



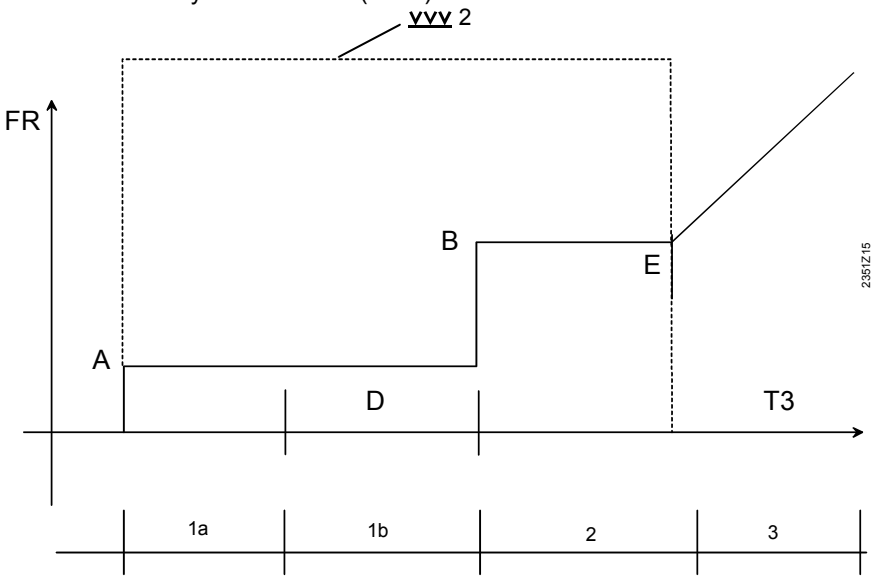
State diagram : loss of flame during safety time

OP	Operation	TS	Safety time
	Shut down		Pump
	Standby	BR	Burner
Fan	Fan Speed and Spool valve position		Demand
GV	Gas valve		Pre-purge time
Ign	Ingition		Ignition
FS	Flame signal		

3.7.5 Burner soft start

Line no.	*Operating line*	
9590	**Burner start limitation** **0=off, 1= on**	
9591	**Eng Burner (rate) phase 1**	(A)
9592	**Eng Burner (rate) phase 2**	(B)
9593	**Supp Burner (rate) start phase**	(C)
9594	**Head temp start phase 2**	(D)
9595	**Head temp start phase 3**	(E)
9596	**Time duration phase 3**	(T3)

The burner start limitation (soft-start procedure) for the engine burner should prevent noise. This includes a limitation of the power rise and to set the spool valve in the position of the supplementary burner, without igniting the supplementary burner. This function may be turned off (9590).



Phase 1a lasts until the head temperature has reached 180°C and grid is connected.
Phase 1b lasts until the head temperature has reached setting “9594” or 5 Minutes
Phase 2 lasts until the head temperature has reached setting “9595” or 5 Minutes
Phase 3: The head temperature set point will be increased by the HBC in steps.

FR Firing Rate
VVV 2 Supplementary Burner

9591 Eng Burner rate phase 1
Firing rate engine burner phase

9592 Eng Burner rate phase 2
Firing rate engine burner phase 2

9593 Supp Burner rate start phase
Firing rate Supp burner phase 1+2

9594 Head temp start phase 2
Head temperature to be reached to start phase 2,
time limit of 5 minutes for phase 1b

9595 Head temp start phase 3
Head temperature to be reached to start phase 3,
time limit of 5 minutes for phase 2

9596 Time duration phase 3
time duration phase 3

This function will not be active in GIM-Black start situation

3.7.6 Spool valve and fan supervisory functions

Calibration function

For safety reasons, the spool valve will do a min/max calibration after power up.
The same is done with the fan, to check if the fan runs within certain limits.
If the fan or the spool valve are not within certain limits, a spool valve calibration error (Error 269) or a fan calibration error (Error 267) will occur and both burners will be stopped.
The spool valve calibration test is repeated at midnight, if no burner is running.

Supervisory function during operation

During normal operation, spool valve position and fan speed are supervised if they run within certain limits in respect of the set point.
If the fan or the spool valve is not within certain limits, a spool valve (Error 268) or a fan fault (Error 266) will occur and both burners will be stopped.

3.7.7 False Flame Detection

False flame is detected for each burner separately.
If a burner is not running and flame is detected, a false flame purge is executed, meaning that the fan purges on ignition fan speed during three times the pre-purge time. If the flame is still detected afterwards, the corresponding error 298, 299 is generated.
The failure condition is removed by auto-restarting when the flame is not detected any more.
A user Reset causes a false flame purge again (for end user and installer).

The burner that is not affected may operate normally.

Error messages

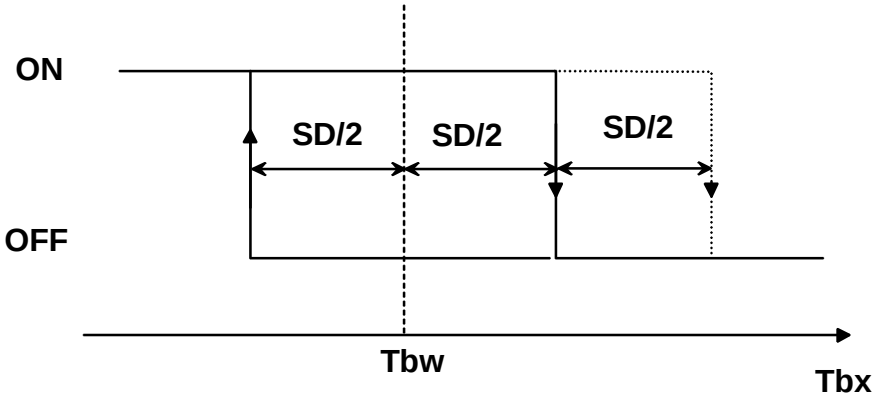
Error code	Message	Description
298	False flame eng bu	False flame detected at engine burner
299	False flame supp bu	False flame detected at supplementary burner

3.8 Burner sequence control

Line no.	*Operating line*	
2240	**Switching differential boiler**	(SdBR)
2241	**Burner running time minimum**	(tOnBRMin)
2243	**(Eng) Burner off time minimum**	(tOffBRMin)
2244	**Supp Burner off time minimum**	
3200	**Min wait time 2nd burner**	(tz)
3201	**Locking time min supp burner**	(t3)
3202	**Release integral supp bu**	(A)
3206	**Head temp start delay supp bu**	(Th)
3208	**Release time minimum mod part supp burner**	(t5)
3209	**Release integral mod part supp burner**	(B)
3210	**Reset integral (supp burner)**	(C)
3211	**Release time supp bu start optimization**	
3212	**Minimum room temperature difference to release supp burner**	
3213	**Release DHW charging.**	

Switching differential boiler

The average boiler temperature should be close to the boiler temperature set point to fulfil the heat demand requested by the heating circuits.
This is the reason why the switching differential boiler SD (2240) is symmetrical to the boiler temperature set point.

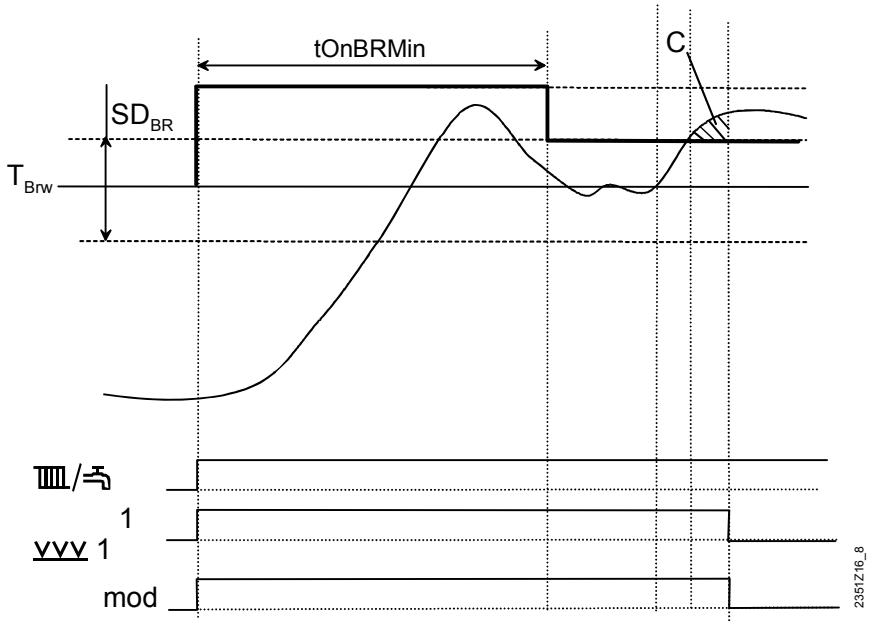


Tbw Boiler temperature set point
Tbx Boiler temperature
SD Switching differential boiler

Minimum burner running time, minimum burner off time

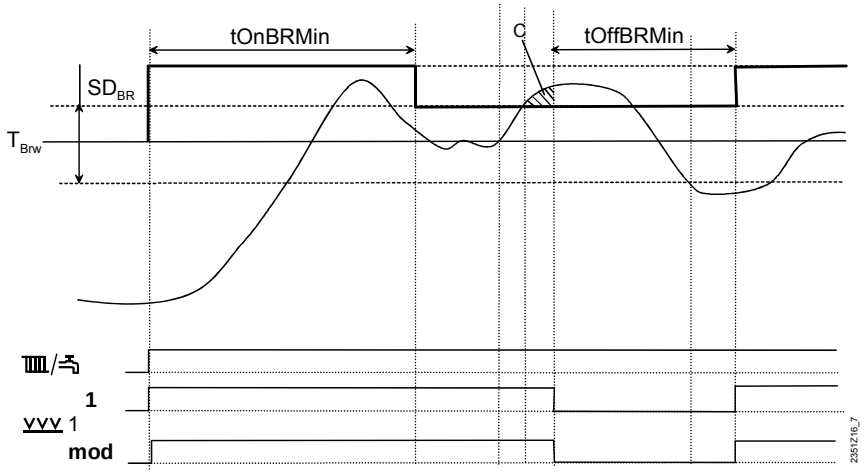
To increase engine burner running time, the “burner off limit” is increased during “burner running time min (2241)”.
After the minimum burner running time has passed, the “burner off” limits are decreased to the normal level.
Minimum burner running time applies to the engine burner and the supplementary burner.

To prevent unnecessary burner on/off cycling, the “Temperature *Time Integral” has to be larger then the “Reset Integral (3210)”, before the burner will be turned off.



Minimum burner off time

To prevent on/off cycling, the “minimum burner off time (2243)” has to pass, before the engine burner may be turned on again.
Minimum burner off time will not be taken into account in case of heat demand for DHW preparation, after a fault condition or after burner commissioning.



Heat demand
1 Engine burner
mod Modulating

Commissioning

During commissioning function, burner off time minimum will be inactive.

Supplementary burner anti-cycling scheme, soft start

Line no.	*Operating line*	
2244	**Supp Burner off time minimum**	
3200	**Min wait time 2nd burner**	(tz)
3201	**Locking time min supp burner**	(t3)
3202	**Release integral supp bu**	(A)
3206	**Head temp start delay supp bu**	(t4)
3208	**Release time minimum mod part supp burner**	(t5)
3209	**Release integral mod part supp burner**	(B)
3210	**Reset integral supplementary burner**	(C)

Minimum waiting time between two burner starts

There is minimum waiting time between the ignition of the first burner and the start of the second burner ((3200) *Minimum waiting time 2nd burner*)

To limit the number of supplementary burner start/stop events, different anti-cycling features are available.

Minimum waiting time for supplementary burner

After the engine burner is turned on and the head temperature has reached the (3206) *Head temperature start delay supplementary burner star*t, a timer is started (3201) *Locking time minimum supplementary burner*. If the boiler temperature reaches the boiler temperature set point –SD/2 within this time, the supplementary burner remains off.

Head temperature start delay supp burner

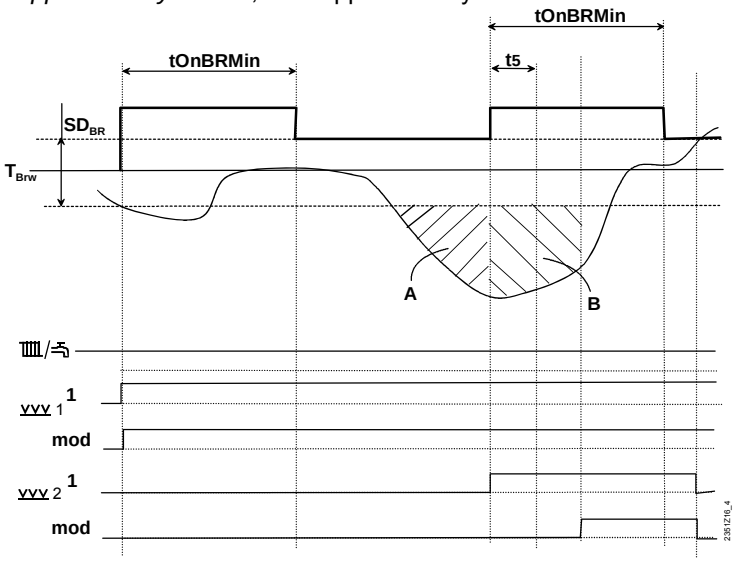
Timer 3201 will be released if head temperature is higher than the limit 3206 or latest after 15 minutes.

Supp Burner minimum off time

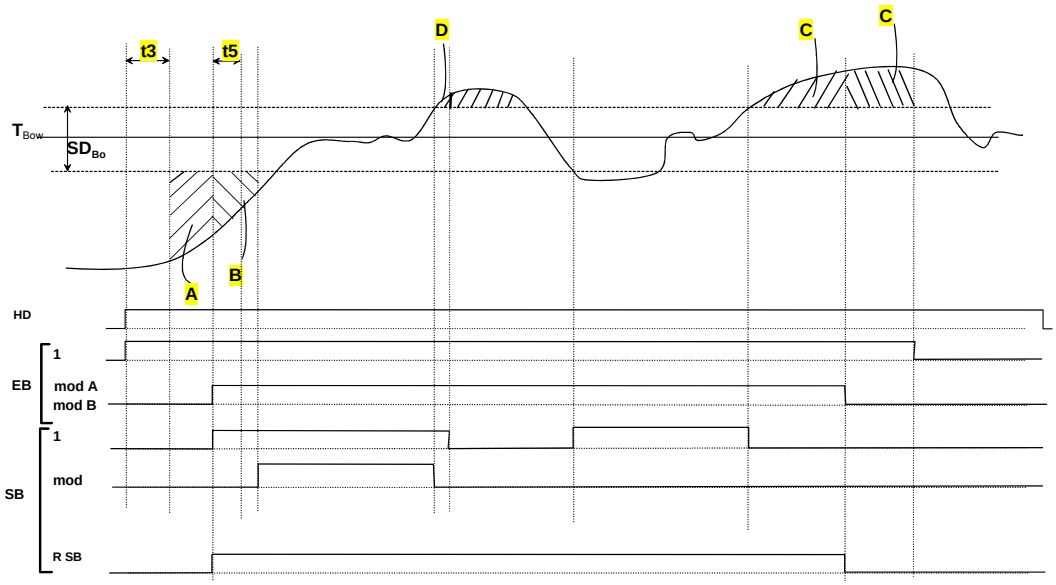
To prevent on/off cycling of the supplementary burner, the “Supplementary burner off time minimum (2244)” has to pass, before the supplementary burner may be turned on again.
Minimum burner off time will not be taken into account in case of heat demand for DHW preparation, after a fault condition or after burner commissioning.

Release integral supplementary burner

If the boiler temperature is still below boiler temperature set point –SD/2, a time-temperature integral will be calculated. If this integral reaches the value (3202) *release integral supplementary burner*, then the supplementary burner will be turned on. The firing rate of the supplementary burner will be limited to minimum firing rate for a minimum time ((3208) *release time minimum modulation supplementary burner*). After the start of the supplementary burner, a new time-temperature integral will be calculated. If this one reaches the value of the (3209) *release integral modulation supplementary burner*, the supplementary will be allowed to use maximum firing rate.

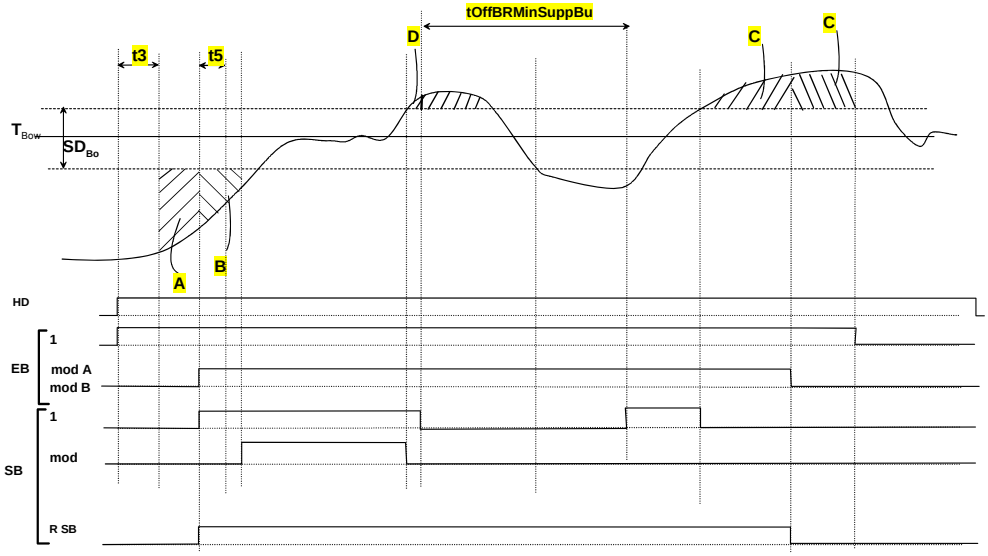


Heat demand
1 Engine Burner
mod Modulating
2 Supplementary Burner



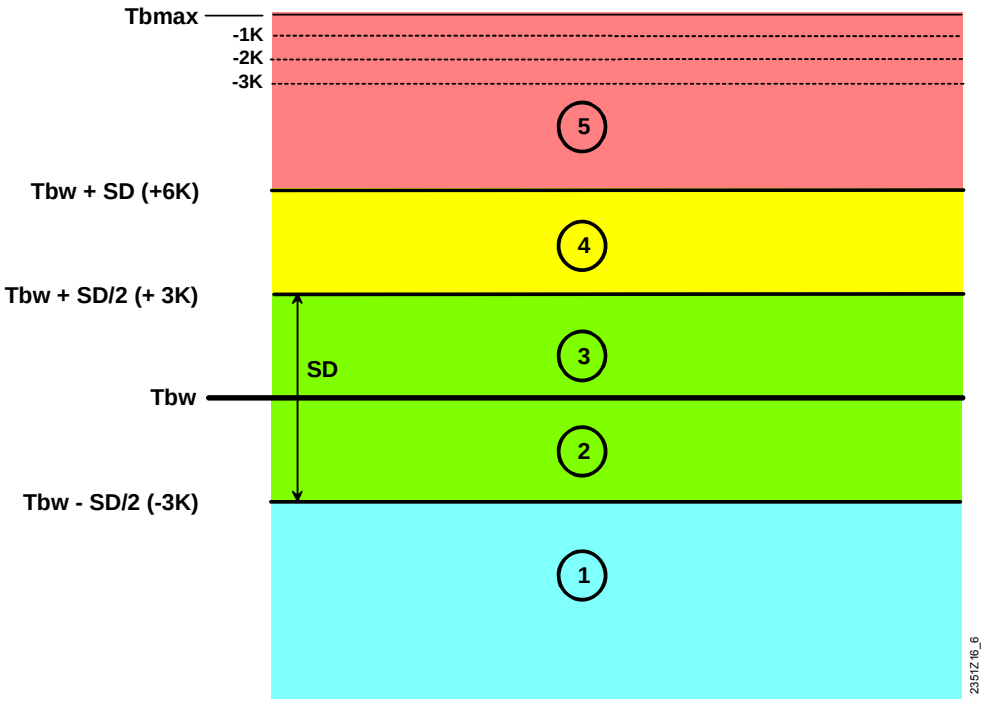
HD	Heat demand	mod A	modulation depending on head temperature set point
EB	Engine Burner	mod B	modulation depending on flow temp set point
SB	Supplementary Burner	R SB	Release supp burner

t3 will start only if head temperature has reached (3206) H'temp start delay supp bu.



HD	Heat demand	mod A	modulation depending on head temperature set point
EB	Engine Burner	mod B	modulation depending on flow temp set point
SB	Supplementary Burner	R SB	Release supp burner

Remark: If Integral A is reached, minimum modulation of supplementary burner will be released. At this point, t3 and A will be calculated in parallel to t5 and B. Therefore it is possible, modulation of supplementary burner will be releases before criterion t5/or B are reached.



Tbmax	Boiler Temperature Maximum
Tbw + SD	Boiler Temperature Set-Point + SD (+6K)
Tbw + SD/2	Boiler Temperature Set-Point + SD/2 (+3K)
Tbw	Boiler Temperature Set-Point
Tbw – SD/2	Boiler Temperature Set-Point - SD/2 (-3K)
SD	Switching differential boiler

Remark:

The temperatures mentioned in the following section may change, because these temperatures are settings.

①

Engine burner control's engine head temperature at 500 °C (3300) *Head temperature nominal operation*
If (3201) *Locking time minimum supplementary burner* has passed, the release integral will be started. If the (3202) *Release integral Supplementary burner* is completed, the supplementary burner turns on the base stage (minimum modulation level).
If the (3208) *Release time modulation supplementary burner* has passed and the (3209) *release integral modulation supplementary burner* is completed, the supplementary burner modulates in response to heat demand.

②

Engine burner control's engine head temperature at 500 °C
If not already on, the supplementary burner remains off.
If the supplementary burner is on, the supplementary burner modulates in response to heat demand and the engine head temperature is set to 500°C.

③

If not already on, the supplementary burner remains off.
Engine burner reduces engine head temperature from 500°C to 250°C as flow temperature increases within this band if the supplementary burner is already off.
If the supplementary burner is on, the supplementary burner modulates in response to heat demand and the engine head temperature is set to 500°C.

④

Remark: This limit is only valid during "Burner running time minimum (2241). After minimum burner running time, the burner-off limit will be reduced to ③

Engine burner reduces engine head temperature from 500°C to 250°C as flow temperature increases within this band.
If the supplementary burner is still on, the supplementary burner will be turned off.
The calculation of the reset integral will start. If the (3210) *Reset integral (supplementary burner)* is reached, the engine burner will be turned off.

⑤
Both burners turned off

Boiler temperature maximum

Line no.	*Operating line*	
2212	**Set point Max**	(Tbmax)

If Boiler temperature reaches (2212) *Boiler temperature Set point maximum*, there is a special function.
At Boiler temperature maximum -3 K, the supplementary burner will be reduced down to minimum modulation level.
At Boiler temperature maximum – 2K, the supplementary burner will be turned off and the engine burner will modulate down to minimum modulation level.
At Boiler temperature maximum – 1K, the engine head temperature set point will be reduced down to 250°C.
At Boiler temperature maximum the engine burner will be turned off.

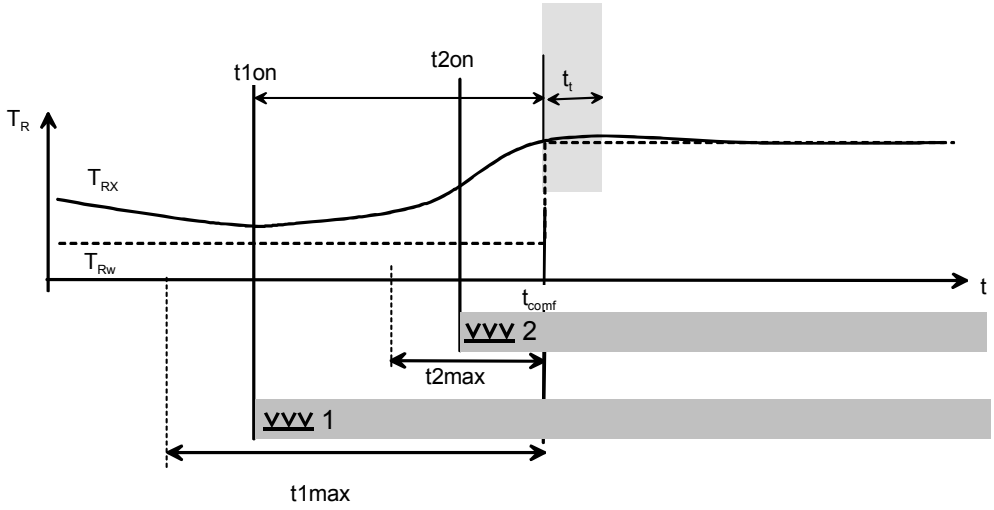
If the engine burner is locked because of an error condition, the maximum limits for the supplementary burner will be increased by 2K.

Maximiser function

Line no.	*Operating line*
789	**Optimum start control max forward shift most efficient heat generator HC1**
790	**Optimum start control max forward shift HC1**
ACS only	**Tolerance time start optimization**

The former maximiser function is now part of the start optimizer function.
In order to increase engine burner running time, start optimization function is available for engine burner only and for engine burner + supplementary burner.
The optimum start function optimizes the start of the burners in a way that the Comfort set point will be reached at the relevant switching time. The “optimum start time” depends on the actual room temperature and the room temperature gradient, which will be automatically adjusted.

Two different settings are available to limit the maximum forward shift of the starting time.
Setting 789 : Optimum start control max forward shift most efficient heat generator HC1 defines the limit for the engine burner and
Setting 790: Optimum start control max forward shift HC1 is the limit for engine burner + supplementary burner.
If the engine burner is able to reach room temperature comfort set point at the target time t_{comf} Supplementary burner will not be released.
It is possible to define a tolerance time to prevent starting the supplementary burner, if the room temperature should reach the set point within the defined tolerance time.



t1max:	Maximum forward shift engine burner only	VVV 1:	engine burner
t2max:	Maximum forward shift engine burner + supplementary burner	VVV 2:	supplementary burner
t_t:	tolerance time	t1on:	start time for engine burner
		t2on:	start time for supplementary burner
		T_R	room temperature
		T_{Rx}	room temperature actual value
		T_{Rx}	room temperature set point

Start prevention supplementary burner

To enlarge the running time of the engine burner, it is possible to prevent starting the supplementary burner depending on the room temperature deviation.
This function is available for room temperature control only.

Menu burner sequence

Line no.	*Operating line*
3212	**Room temperature difference to release supp burner**

If the room temperature difference between set point and actual value is smaller then setting 3212, the supplementary burner will not be released for room heating, if the burner is not already running for room heating.

I This function may cause larger room temperature fluctuations.

Burner control in case of DHW charging

Line no.	*Operating line*
3213	**Release DHW charging** No restrictions Engine burner only First charge engine burner only First charge engine burner only, else supplementary burner

To optimize burner running time for DHW preparation, it is possible to restrict the release of engine and/or supplementary burner.

No restrictions
If “No restriction” is selected, release criteria for engine burner and supplementary burner are the same as for room heating.

Engine burner only
By selecting engine burner, only engine burner will be released for DHW preparation, except in case of engine burner fault.

First charge engine burner only
For the first charging of the day, engine burner will be released only, except in case of engine burner fault. All other charging will be done without restrictions.

First charge engine burner only, else supplementary burner
For the first charging of the day, engine burner will be released only. All other charging will be done with supplementary burner only, except in case of engine burner is already on.

3.9 Engine control – Grid connection

Line no.	*Operating line menu Engine/Grid*	
3300	**Max head temp set point**	(L)
3301	**Head temp min off**	(C)
~~**3302**~~	~~**Head temp red OC**~~	~~(K)~~
~~**3303**~~	~~**Time head temp red OC**~~	
3304	**Head temp grid connect**	(G)
3305	**Head temp grid disconnect**	(E)
3306	**Head temp grid con en**	(F)
3307	**Head temp over temp off**	(M)
3308	**Head temp min operation**	(H)
3309	**Power set point**	
3310	**Return temp power roll off**	
3311	**Power roll-off rate**	
~~**3320**~~	~~**Engine Overcurrent**~~	
3321	**Engine Short Circuit**	
3322	**Measuring time SC**	
3327	**Engine current set point**	

Line no.	*Operating line: menu burner sequence*	
3206	**Head temp start delay supp burner**	(J)

Head temperature control

Two temperature sensors are used for the engine head temperature control. The so called head control temperature B24 (7764) and the head limit temperature B25 (7765). The head limit temperature sensor is only used to check the plausibility of the measured value by the head control temperature sensor. If the measured values differ by more then 100K, an error is detected (error 302) and the engine burner will be turned off.
An additional check is made after the engine burner is lit. If the head temperature does not increase by more than 30°C one minute after the engine burner is lit, the engine burner will be turned off and error 303 or 304 will be displayed.
The same error will be displayed in case of short circuit or open circuit for the thermocouple sensors.

Max Head temperature set point

(3300) *Max Head temperature set point* is the maximum limitation for head temperature set point. In normal operation, head temperature set point will be defined by “power set point”.

Power set point

Head temperature set point is controlled by the power produced by the engine.
(3309) *Power set point* is the upper limit of power the engine will produce. Head temperature set point will be Head temperature set point maximum as long as power produced by the engine is below power set point. Head temperature set point is controlled to limit the power to the set point.
Power set point may be temporarily reduced if the reduced temperature is higher than setting 3310.

Head temperature minimum operation

If the boiler temperature is too high, the set point may be decreased down to (3308) *Head temperature minimum operation* value.

Head temperature over temperature off

(3307) *Head temperature over temperature off* is a first upper limit, which will turn off the engine burner. An automatic reset will occur if the head temperature cools down.

A second head temperature over temperature limit is realised in hardware and fixed to 584°C. A Service Reset is requested to return to normal operation.

Head temperature limit supp burner

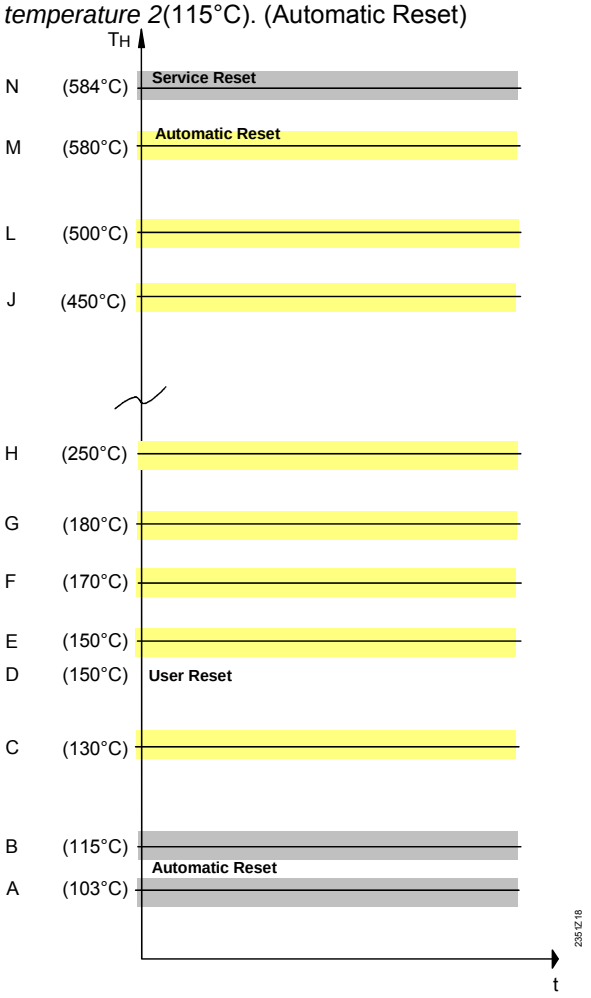
An additional setting in the menu burner sequence (3206) *Head temperature limit for supplementary burner* is used for burner sequence control. This is the minimum head temperature which has to be reached, before the supplementary burner is enabled to start. This setting is not used for engine control or grid connection.

Head temperature under temperature minimum (150°C)(no setting) is the lower limit for the head temperature. If the burner is running and head temperature falls below this level, the engine burner will be turned off. A User Reset is required to return to normal operation.

Head temperature minimum off

(3301) *head temperature minimum off* is the limit for the fan overrun.

A lower limit is also realised in Hardware. Below Lower Limit Head temperature 1 (103°C), the engine will be turned of, and it will be released above *Lower Limit Head temperature 2*(115°C). (Automatic Reset)



Hardware-limits

SW-Limits, settings

TH	Head temperature
t	Time
N	upper limit head temperature
D	no setting head temperature under temperature limit
B	Lower limit heat temperature 2
A	Lower limit heat temperature 1

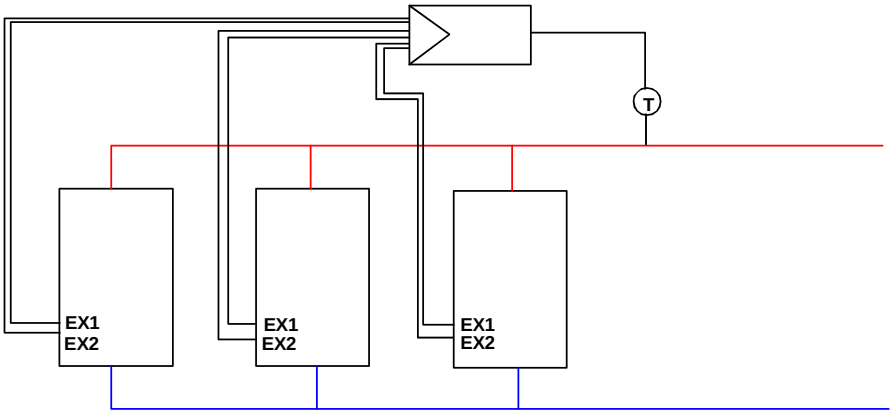
The temperatures indicated are examples only.

Grid connection	If head temperature reaches (3306) Head temperature grid connect , the engine will be connected to the grid. It will be disconnected, if the head temperature falls below (3305) *Head temperature grid disconnect*. If the engine is turned off, the head temperature has to be below (3306) *Head temperature grid connect enable* to enable the engine to connect to the grid.
Over current, short circuit	(3321) *Engine short circuit* and (3322) *Measuring time short circuit* and (3327) *Engine current set point* are engine specific parameter settings.
Return temperature power roll off	
Power roll-off rate	
Engine current set point	

3.10 Boiler control by EX1 and EX2

For a simple boiler sequence control solution with an external controller, it is possible to use input EX1 and EX2.

Line no.	*Operating line*
5980	**Function Input EX1** … ¦ Ext heat demand and rel Eng Bu ¦ Ext heat demand and rel Supp Bu Bu ¦ …..
5982	**Function Input EX2** … ¦ Ext heat demand and rel Eng Bu ¦ Ext heat demand and rel Supp Bu Bu ¦ …..



Input EX1 and/or EX2 may be used to control one or both burners

Function Input EX1/ EX2

No
Room thermostat HC1
Room thermostat HC2
Room thermostat HCP
DHW thermostat
…
External heat demand and release Eng Bu
External heat demand and release Supp Bu
External heat demand and release Eng Bu + Supp Bu

If EX1 and/or EX2 input are set to “External heat demand and release Eng Bu and/or Supp Bu”, all other heat demands will be ignored.
If one input is active, a heat demand (value = boiler temperature set point maximum (2212) will be generated and the selected burner(s) will be released immediately.
In this case, all waiting times and delays (e.g. release integral and so on) are not taken into account
Only minimum waiting time 2nd burner (3200) will be taken into account if both burners are released.
Engine burner will control head temperature as in normal mode.
Supplementary burner may be released independent of heat temperature.
The selected burner will be on until the boiler temperature reaches boiler temperature set point maximum. They will modulate back is in normal mode.
Boiler pump will be controlled as in normal mode.

3.11 Configuration

Building and room model

Line no.	*Operating line*
6112	**Gradient room model**

Gradient room model

The room model gradient gives the period of time in minutes the room needs to raise its temperature by 1 °C. This setting applies to all circuits.

The parameter is used to calculate the theoretical room temperature of all rooms that have no room temperature sensor (operating lines 8742, 8772, and 8802).

Pack temperature sensor

Line no.	*Operating line*
6103	**Pack temperature sensor** No/Yes

This configuration allows defining whether a pack temperature sensor is required or not.

Pressure sensor

Line no.	*Operating line*
6146	**Pressure sensor 3.5 V**
6147	**Pressure sensor** No/Yes

Pressure sensor 3.5V

Pressure value for 3.5V

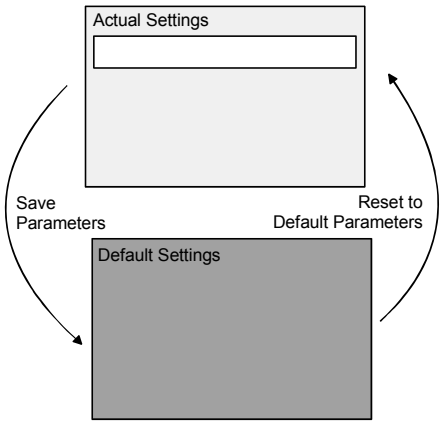
Save parameters, reset parameters

Line no.	*Operating line*
6205	**Save parameters**

All parameter settings can be stored as default values. Exempt from this are the following operating pages: Time of day and date, operator section, radio communication, and all time programs.

Line no.	*Operating line*
6205	**Reset to default parameters**

All parameters can be reset to their default values. Exempt from this are the following operating pages: Time of day and date, operator section, radio communication, and all time programs.



Device hours run

Line no.	*Operating line*
6222	**Device hours run**

This indicates the total number of operating hours since the controller was first commissioned.

3.12 Errors

History 1..10

Line no.	*Operating line*
6820	**Reset history** No Yes

Reset history

The error history with the last 10 errors will be deleted.

Error code

For a complete list of error codes: see Annex A of the User Manual

3.13 Maintenance, Service

3.13.1 Burner commissioning function

Line no.	*Operating line*
7200	**Commissioning function** Off On
7201	**Commissioning mode burner** Fixed firing rate Adjustable firing rate
7205	**Set point fan** 0… rpm
7206	**Set point spool valve** 0…255
7210	**Commissioning engine burner** Off On
7211	**Firing rate engine burner** Minimum Ignition Maximum
7215	**Commissioning supp burner** Off On
7216	**Firing rate supp burner** Minimum Ignition Maximum

The Commissioning function may be activated in the menu Maintenance/service by the setting ***Commissioning function***: off/on

In the OEM Level, it is possible to select between two different commissioning modes ***Commissioning mode:*** fixed firing rate (Mode 1)/ variable firing rate (Mode 2)

If fixed firing rate is selected, the burners will be fired at fixed rates. These rates may be selected by the setting *Firing rate engine burner* and *Firing rate supplementary burner.*

Minimum means Nominal minimum rate
Maximum means Nominal maximum rate
Ignition means Ignition rate

If the variable firing rate mode is selected, the burners will be fired at the defined rates by the setting *Fan speed set point* and *Spool valve set point*
set point fan speed 0..x rpm
Spool valve set point 0..255

The commissioning mode variable settings are independent of the look-up table, so it should be possible to set any fan speed demand or move the valve to any position over the calibrated working range.

If the commissioning function is activated, both burners will come to a stop, if they are already running.
The EGC functionality may prevent starting of the engine burner. E.g. if the head temperature is too high, it may be necessary to cool down the head before the engine burner is enabled to start.

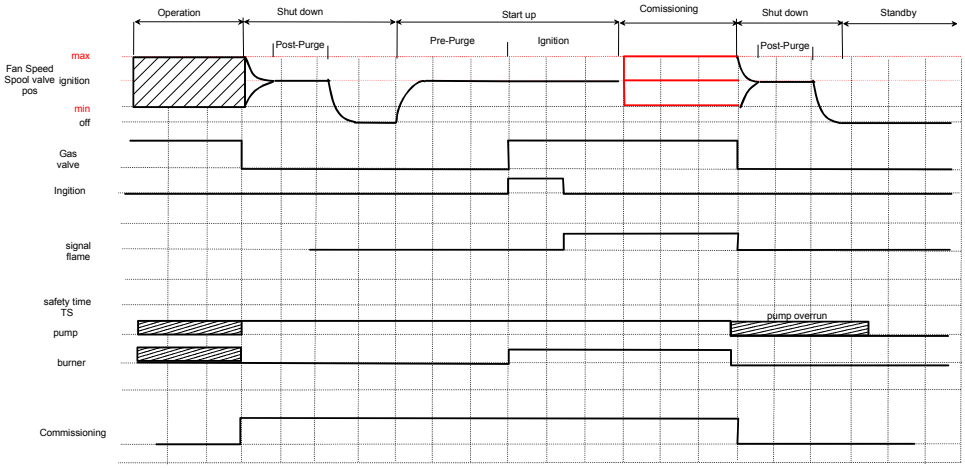
In mode 1 (fixed firing rate) a normal burner start sequence will follow. The burners will ignite at the ignition rate. After the start up sequence, the selected burner (may be both) will fire on the selected firing rate.

In mode 2 (variable firing rate) it will be the operator's task to follow an appropriate procedure for the ignition. In this mode, the ignition takes place with selected setting by the user.

If commissioning function (line 7200) is set to off, the settings of line 7210 (Commissioning engine burner) and line 7215 (Commissioning supplementary burner) are set back to Off.

To select the burner which should run in commissioning mode, the following settings are available:

Commission engine burner off/on
Commission supplementary burner off/on



During commissioning, heat demands will be ignored.
The Commissioning function will not be terminated by timeout.
The boiler pump will be running, and the heating valve/pump will be running or will be open.
The EGC part will not require any special functionality to deal with commissioning mode.
Both burners may be running at the same time.

During commissioning function active, engine head temperature and flow temperature are not controlled as in normal mode.
In mode 1 (fixed firing rate) the selected firing rates are *maximum*-limited such that the head temperature set point given by the EGC (500 or 450°C) and the maximum boiler temperature set point are not exceeded.

In mode 2 (variable firing rate) one or both burners will be turned off if the head temperature reaches the maximum head temperature (e.g. 540°C) or the maximum boiler temperature. It will need a User reset as in normal mode, to reset the burner controllers.

If both burners are selected to run, there will be minimum waiting time between two burner starts. If both are set to run and both are off, the engine burner will ignite first.

Commissioning will be indicated on the display by the maintenance/special mode symbol.

3.13.2 Burner disable function, Boiler Off-function

For test purpose, it is possible to disable the heat generation part (Boiler-off function) and to disable each burner individually. This function has to be used with care, because the disable status will not be displayed!

This appliance Off-Function should be treated as no heat demand, this means functions like overrun and so on will be executed as in normal mode.

Line no.	*Operating line[Maintenance/service]*
7220	Boiler off
7221	Disable engine burner
7222	Disable supplementary burner

Boiler Off function

If Boiler Off function is activated, heat demand for boiler will be set to “no heat demand”. This will allow the boiler to turn off the burners and turn off the boiler pump in a proper way.
Heating circuit operation and DHW preparation is not affected, even if heat generation is off.

Burner disable function

If “burner disable” is activated, the selected burner will be switched off immediately. This does not influence the boiler pump.

3.14 Input / output test

⚠ Important:
The Output test is used to check the wiring and correct functioning of the connected components.

Line no.	*Operating line*
7700	**Relay test**

The running application is not influenced during relay test! This function has to be used with care!
When selecting a setting from the relay test, the relevant relay is energized, thus putting the connected component into operation. The correct functioning of the relays and wiring can thus be tested.

Line no.	*Operating line*
7716…	**Input x**

Selected sensor or input values are updated within a maximum of 5 seconds.
The display is made with **no measured value correction**. E.g. a correction on the outside temperature sensor is not displayed on this line

3.15 Diagnostics engine

Line no.	*Operating line*
8206	Engine frequency
8207	Phase angle

3.16 Diagnostics heat generation

Line no.	*Operating line*
8341	Engine Burner run Hours
8342	Engine Burner Start counter
8343	Supplementary Burner run Hours
8344	Supplementary Burner Start counter
8365	Boiler Pump run Hours

On the OEM level, it is possible to reset run hours and start counters.

3.17 Diagnostics of consumers

Heating circuit 1, heating circuit 2, heating circuit P

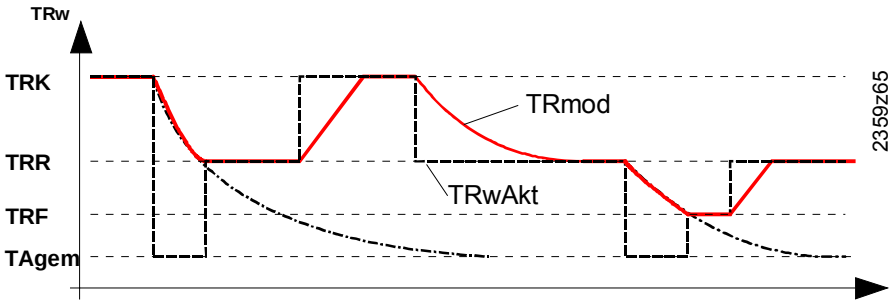
Line no.	*Operating line*
8742	**Room temperature 1 model**
8772	**Room temperature 2 model**

8802	Room temperature P model

Room temperature 1 / 2 / P model

The room model calculates a theoretical room temperature for rooms that have no room temperature sensor. The value calculated for each heating circuit is indicated on these operating lines.

This allows boost heating, quick setback and optimum start and stop control to be implemented with no need for using a room temperature sensor.
The calculation takes into account the attenuated outside temperature (operating line 8703), the room model gradient (operating line 6112) for switching to a higher set point, and the building's time constant (operating line 6110) for switching to a lower set point.



TRwAkt	Current room temperature set point
TRmod	Room temperature model
TRK	Comfort set point
TRR	Reduced set point
TRF	Frost protection set point
Tagem	Composite outside temperature

3.18 Pump / valve kick

The pump and valve kick are a protective functions aimed at preventing the pumps and valves from seizing. When the pumps are switched on, the water in the system starts to circulate. The mechanical parts of the pumps and the valve seats will be purged, thus preventing the pumps and valves from seizing.

Every Friday at 10:00, the pumps connected directly to the basic unit are activated for 30 seconds, one by one, at an interval of 1 minute.

The spool valve is activated at midnight, if no burner is running.

The pump kick / valve kick is made in the same order the relay terminals are assigned.

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