



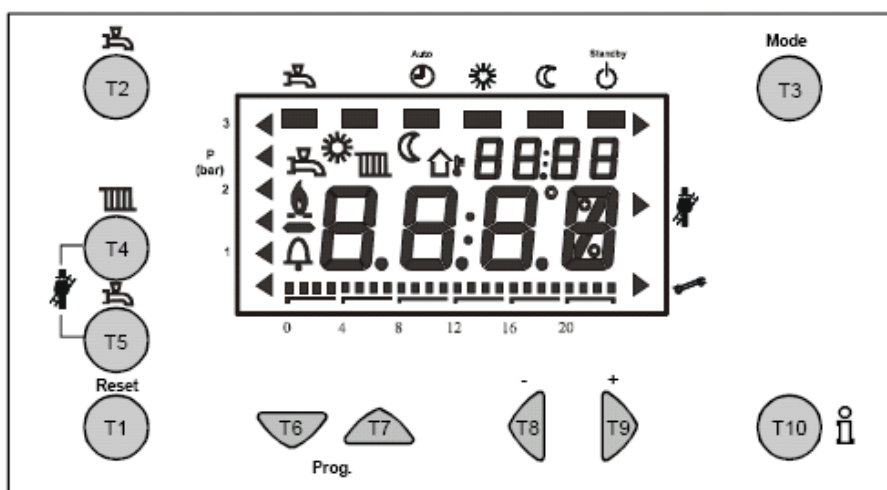
## ProCon Boiler Controller Commissioning Quick Reference Guide

This sheet is intended as a quick reference guide and should be read in conjunction with the operating and maintenance manual for the boiler supplied by MHG Heating Ltd.

Adjustment of the appliances controller can only be undertaken once power has been applied to the boiler and it has passed through its internal system checks.

The level of parameter adjustment required will be dependent upon the age of the appliance and the required system control.

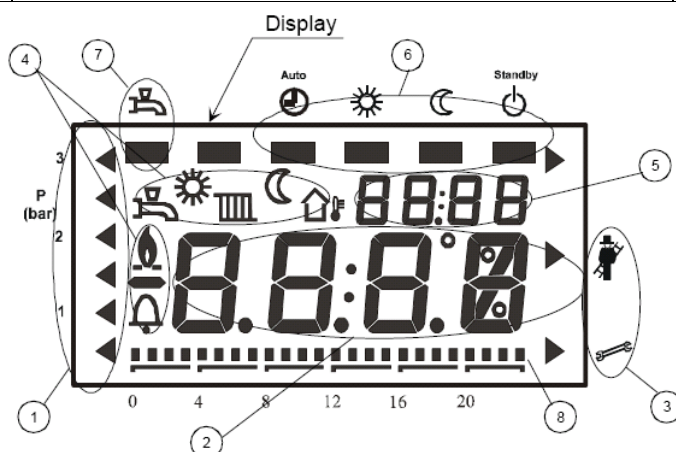
All appliance operational mode adjustments and settings are undertaken via the unit control fascia.



### Legend

Button	Label	Function	Units	Defaults
T1	RESET	Resets indicated large flashing fault codes. Places the boiler into fault is no fault is present (E153)	0-200	N/A
T2	HOT WATER (HWS)	Activates HWS generation capability. Indicated on the screen by a dash beneath the  icon.	-	
T3	MODE	Adjusts the operating mode for the heating circuit.		
T4	HWS SETPOINT	Hot water storage temperature adjustment. Only possible is a HWS sensor is used.	20-60	55°C
T5	HEATING CIRCUIT FLOW TEMPERATURE SETPOINT	Heating flow temperature adjustment.	20 – 90	80°C
		Or Assumed room temperature adjustment. (If outside air sensor installed)	10 - 35	21°C

T6	PROGRAM DOWN	Access to program settings accessing in reverse order.	Time of day/ time switches/ operational settings.	-
T7	PROGRAM UP	Access to program settings accessing in sequential order.	-	-
T8	PROGRAM + PLUS	Alteration of program settings positively.	-	-
T9	PROGRAM – MINUS	Alteration of program settings negatively.	-	-
T10	INFORMATION	Access to operational information and saving altered program settings.	Fault Indication/ Boiler Flow Temperature/ Stored HWS/ Operation Mode/ Outside Air Temperature.	-



Legend

Button	Label	Function
1	WATER PRESSURE INDICATOR	Not used In ProCon Ranges
2	MAIN DISPLAY	Flow Temperature or Selected Parameter Setting
3	COMMISSIONING MODE	Commissioning Mode Indicator Full Power (no adjustment.)/Engineers Mode (full adjustment via Program Up & Down Buttons.)
4	SPECIFIC OPERATIONAL MODE INDICATOR	The Display Reflects the Operational Mode Dependent Upon Inputs.
5	TIME OF DAY / AUTO RESETTING ERROR	Time of Day Alternating with Automatic Resetting Error Codes.
6	HEATING CIRCUIT MODE INDICATOR	Indicator of Selected Heating Circuit Operating Mode.
7	HOT WATER ACTIVATION INDICATOR	Indication of Activation of Hot Water Production Mode.

If required an enhanced operational review level can be accessed.

The table on the following page indicates the level of information that is available.

To access these parameters the following sequence must be undertaken.

Press and release the INFO.

Press & Hold the   Program Buttons simultaneously for at least 3 second.

The display will indicate b0

Use the   Button to access the various b level parameters.

Use the  or  to access the other parameter levels C & d

Use the   Button to access the required levels within the desired parameter level.

To leave the enhanced operational review level press INFO or wait 8 minutes for automatic refresh.


Display level	Name of LMU... variable	Description
<b>Temperatures (service level)</b>		
b 0	DiagnoseCode	LMU...-internal software diagnostic code
b 1	TkRuec	Boiler return temperature
b 2	TbwIst2	D.h.w. temperature sensor 2
b 3	Tabgas	Flue gas temperature
b 4	TiAussen	Outside temperature
b 5	TaGem	Composite outside temperature
b 6	TaGed	Attenuated outside temperature
b 7	TvIst	Flow temperature AGU2.500...
<b>Process values (service level)</b>		
C 1	IonStrom	Ionization current
C 2	GebI_Drehz	Fan speed
C 3	GebI_PWM_AusAkt	Current fan control (PWM)
C 4	RelModLevel	Relative output
C 5	Pumpe_PWM	Pump setpoint (PWM)
C 6	ek0	Control differential
<b>Setpoints (service level)</b>		
d 1	Tsoll	Setpoint of 2-position or modulating controller (PID)
d 2	TkSoll	Current boiler temperature setpoint
d 3	TsRaum	Room temperature setpoint
d 4	TbwSoll	D.h.w. temperature setpoint
d 5	PhzMax	Maximum degree of modulation in heating mode
d 6	NhzMax	Maximum speed at maximum output in heating mode

The ProCon range has two levels of fault code indication.

**Automatic Resetting Fault Code.**

A small fault code alternating with the time of day.  
 The appliance will stop operating for a limited period/until the error has been corrected.  
 Repeated occurrences of an Automatic Resetting Fault Codes will result in a Manual Reset Fault Code.

**Manual Reset Fault Code.**

A large fault code is displayed on the screen along with the  symbol.  
 The appliance will stop operating until the error has been corrected and the RESET button has been pressed.

**PLEASE NOTE.**

**If the RESET button is pressed when a small fault code is displayed or no fault code is displayed the unit will display a Manual Reset Fault Code of E153 will be displayed. The RESET button must be pressed again to clear this code.**

If a fault is encountered within the appliance or Cascade LPB network, a fault code will be generated and displayed by the failing appliance and all LPB networked RVA and Opentherm units .

If a fault is encountered by a RVA controller or is communicated to a RVA controller via the LPB network ER will be generated on the display.

Opening the controllers flap and pressing the Down PROG button twice will gain access to parameter line 50 where the generated fault code can be reviewed.

In either case the fault code should be noted for future reference.

If the fault is related to a specific appliance the unit can be reset by pressing the Lockout Reset Button.

If the fault is related to a RVA controller or the LPB communication network the fault code will clear automatically following the rectification of the fault.

This is also applicable following the rectification of any appliance fault. This can take up to 10 minutes.

Fault Code	Description
E-0	No Error Detected
E-10	Outside Air Sensor Fault / Not Detected
E-20	Flow Water Sensor Fault / Not Detected
E-26	System Flow Sensor Faulty / Not Detected
E-28	Flue Gas Sensor Fault / Not Detected
E-40	Return Water Sensor Fault / Not Detected
E-46	System Return Water Sensor Fault / Not Detected
E-50	HWS Sensor Short Circuit 1
E-52	HWS Sensor Short Circuit 2 (Not Used)

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E-58	HWS Volt Free Switch Fault / Not Detected
E-60	Faulty Room Sensor
E-61	Faulty Room Sensor
E-62	Incorrect Room Unit Connected
E-77	Air Pressure Sensor Not Detected (Not Used)
E-78	Water Pressure Sensor Defective (Not Used)
E-81	LPB Short Circuit (Boiler Cascade Wiring)
E-82	LPB Address Conflict (Boiler Cascade Settings)
E-86	Short Circuit on PPS Connection (Not Used in ProCon Configuration)
E-91	EEPROM
E-92	Hardware Malfunction
E-100	Conflict Between Time of Day Master Control (Boiler / QAA70 / RVA47)
E-105	Annual Service of Unit is Due. (QAA73 Service Tool Required to reset timer See Section 16.0)
E-110	Module Water Temperature Overheat
E-111	Module Temperature Too High (Auto Resetting)
E-113	Flue Gas Temperature overheat (Not Used)
E-117	High System Water Pressure Sensor (Not Used)
E-118	Low System Water Pressure Sensor (Not Used)
E-119	System Water Pressure Switch Activated (Below 0.8 bar)
E-124	Module Temperature Too High (Auto Resetting)
E-128	Flame Extinguished During Operation (LMU Version D)
E-129	Air Supply Error. Fan not operating at correct speed (LMU Version D)
E-130	Flue Temperature Too High (Auto Resetting)
E-131	Fault With Burner
E-132	External Safety Interlock Activated (Open Circuit)
E-133	No Flame Detected After Final Ignition Attempt
E-134	Flame Extinguished During Operation (LMU Version C)
E-135	Air Supply Error Fan not operating at correct speed (LMU Version C)
E-140	LPB Segment / Address Not Recognized (Boiler Cascade Settings)
E-142	LPB Missing Partner (Boiler Cascade Settings)
E-145	Wrong Device Connected to PPS Circuit (Not Used in ProCon Configuration)
E-146	Unrecognized Plant Configuration
E-147	Burner Modules Not Connected (PPS Circuit Not Used in ProCon Configuration )
E-148	LPB Interface Not Configured (Boiler Cascade Settings)
E-150	General Boiler Fault
E-151	Module LMU64 Controller Malfunction
E-152	Module LMU64 Controller Parameter Programming Error
E-153	Module Control Interlocked <b>(The Reset button has been pressed when no fault code is present.)</b>
E-154	Module Operating Outside of Predefined Parameters. (System Hydraulic Error.)
E-160	Fan Not Reaching Set Point
E-161	Module Combustion Fan Speed Too High
E-162	Air Pressure Switch Fault (Not Used)
E-164	Flow Switch / Pressure Switch Open (Not Used)
E-166	Air Pressure Switch Fault (Not Used)
E-180	Module Operating in Chimney Mode 100% Output
E-181	Module Operating in Commissioning Mode
E-183	Module Controller / QAA73 Room Unit in Parameter Setting Mode

**Enhanced Fault Diagnosis Codes (LMU Internal Software Diagnostic Codes)**

If required a more detailed fault diagnosis code can be viewed. This will assist where a definitive cause for a repeated operational error cannot be found.

The enhanced fault diagnosis code is displayed at b0 within the second INFO level.

Access to this level can be detailed on page three of this guide.

The table below indicates a limited number of enhanced fault codes. If the exact number indicated by the appliance is not detailed below please call our Technical Department or guidance.

<b>Fault Code</b>	<b>Fault Description</b>
83	Combustion Fan Not Reaching Ignition Speed
87	Combustion Fan Operating Beneath Minimum Setting
90	Combustion Fan Not Reaching Pre Purge Speed
96	Flame Rectification Signal Detected When Burner Off
97	Flame Rectification Signal Detected When Burner Off
98	Flame Signal Lost During Operation
99	Flame Signal Lost During Operation
100	Flame Signal Lost During Operation
101	Flame Signal Not Detected Following Last Ignition Attempt
102	Flame Signal Not Detected Following Last Ignition Attempt
170	The Reset Button is being Continually Depressed. (Possible Display Module Mounting Error.)
259	The Reset Button Has Been Pressed When No Error Has Been Displayed (E153 Generator.)
282	Combustion Fan Not Reaching Correct Speed
400	System Hydraulic Error. Return Temperature > Flow Temperature. (Repeatedly.)
401	System Hydraulic Error. Return Temperature > Flow Temperature. (Repeatedly.)
402	System Hydraulic Error. Return Temperature > Flow Temperature. (Repeatedly.)
403	System Hydraulic Error. Return Temperature > Flow Temperature. (Repeatedly.)
404	System Hydraulic Error. Return Temperature > Flow Temperature. (Repeatedly.)
406	Boiler Flow Temperature Rising to Above Maximum Limit Temperature When Burner Is On.
422	Boiler Flow Temperature Rising to Above Maximum Limit Temperature When Burner Is Off.
433	System Hydraulic Error. $\Delta T$ between Flow and Return Too High. (Repeatedly.)
434	System Hydraulic Error. $\Delta T$ between Flow and Return Too High. (Repeatedly.)
435	System Hydraulic Error. $\Delta T$ between Flow and Return Too High. (Repeatedly.)

## Accessing Boiler Parameters

### Control Parameter Default Settings.

All Units are preset for correct operation.















However if alterations are required to enhance the operation of the unit following the application of optional control the procedure is detailed below.

The following Pages detail the parameters of the LMU64 controllers, For your assistance the Standard Factory settings are indicated.

(Please note, the installer/commissioning engineer may have changed some of these settings to suit the system installed.)

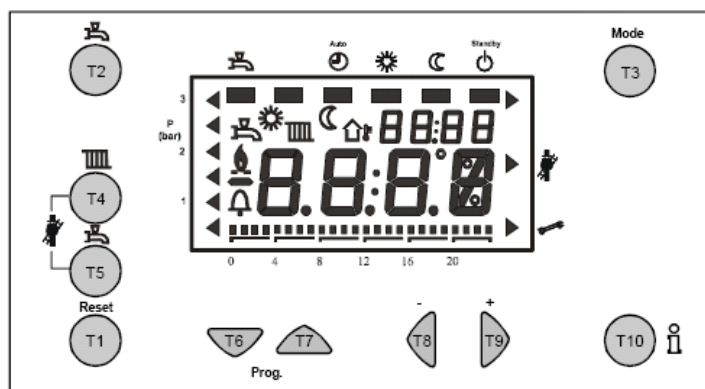
To access the parameters detailed below the boiler's control panel must be used. (Only boilers supplied prior to 2003 will require a QAA73 Room Unit to access the control parameters. The unit must be connected to the RU terminals or directly to the LMU64 controller via the X10:01 terminal.)

There are three levels of access available, as follows. If you cannot access a particular parameter line, please consult with MHG Heating Ltd Technical Department for further assistance.

- Level One (User)
- Press and release one of the  or  Program Buttons.  
The display will now indicate  
Use the Program Buttons to access the desired parameter line. Use the   Button to alter the displayed parameter to the required setting.  
To save the adjusted parameter move to the adjacent parameter or press and release the INFO Button if you wish to exit this level.  
To exit without saving any adjustment press and release the MODE Button.
- Level Two (Installer)
- Press & Hold the   Program Buttons simultaneously for at least 3 seconds.  
The display will indicate H90  
Use the Program Buttons to access the desired parameter line.  
Use the   Button to alter the displayed parameter to the required setting.  
To save the adjusted parameter move to the adjacent parameter or press and release the INFO Button if you wish to exit this level.  
To exit without saving any adjustment press and release the MODE Button.
- Level Three (OEM)
- Press & Hold the   Program Buttons simultaneously for at least 9 seconds.  
The display will indicate - - - - -  
A password is required to access this level. (Please contact MHG prior to accessing this as parameter level)  
Use the   Program Buttons to access the desired parameter line. Use the   Button to alter the displayed parameter to the required setting.  
To save the adjusted parameter move to the adjacent parameter or press and release the INFO Button if you wish to exit this level.  
To exit without saving any adjustment press and release the MODE Button.

**Level One end User Parameters**

Line #	Description	Range	Defaults
P1	Time of Day	0...23.59	---
P2	Day Of Week	1 = Monday	---
P5	Reduced Room Temperature Set Point (If outside air sensor installed) Minimum Boiler Flow Temperature	5 - 34 20 - 80	16 20
<b>Time Switch 1 Heating Zone 1 Set Points</b>			
P10	Heating Circuit 1 Time Switch 1 Day Selection	1..2, 1-5, 1-7	1-7
P11	Heating Circuit 1 Time Switch 1 First On	00:00 - 24:00	---
P12	Heating Circuit 1 Time Switch 1 First Off	00:00 - 24:00	---
P13	Heating Circuit 1 Time Switch 1 Second On	00:00 - 24:00	---
P14	Heating Circuit 1 Time Switch 1 Second Off	00:00 - 24:00	---
P15	Heating Circuit 1 Time Switch 1 Third On	00:00 - 24:00	---
P16	Heating Circuit 1 Time Switch 1 Third Off	00:00 - 24:00	---
<b>Time Switch 2 Heating Zone 2 Set Points</b> (*AGU2.500 Clip and QAD36 sensors required)			
P20*	Heating Circuit 2 Time Switch 2 Day Selection	1..2, 1-5, 1-7	1-7
P21*	Heating Circuit 2 Time Switch 2 First On	00:00 - 24:00	---
P22*	Heating Circuit 2 Time Switch 2 First Off	00:00 - 24:00	---
P23*	Heating Circuit 2 Time Switch 2 Second On	00:00 - 24:00	---
P24*	Heating Circuit 2 Time Switch 2 Second Off	00:00 - 24:00	---
P25*	Heating Circuit 2 Time Switch 2 Third On	00:00 - 24:00	---
P26*	Heating Circuit 2 Time Switch 2 Third Off	00:00 - 24:00	---
<b>Time Switch 3 HWS Set Points</b> (*QAZ36 HWS Sensor Required)			
P30**	Time Switch 3 Day Selection	1..2, 1-5, 1-7	1-7
P31**	Time Switch 3 First On	00:00 - 24:00	---
P32**	Time Switch 3 First Off	00:00 - 24:00	---
P33**	Time Switch 3 Second On	00:00 - 24:00	---
P34**	Time Switch 3 Second Off	00:00 - 24:00	---
P35**	Time Switch 3 Third On	00:00 - 24:00	---
P36**	Time Switch 3 Third Off	00:00 - 24:00	---
<b>General Functions</b>			
P45	Default Reset of Time Switch Setting	0 / 1	0
P516	Summer / Winter Changeover Temperatures	8...30	20
P727	Detailed Diagnostic Code	English .....	English





**Level Two Engineer Parameters**

#	Description	Range	16 & 27 H (16 & 27 HS)	27 S [47 S]	45,75,77 H	75 & 77 HM (Cascade Slave Boilers)
H90	Reduced Temperature for DHW	8...60	10	10	10	10
H91	DHW Production Control <i>(0=Time control 1=Constant)</i>	0...1	0	1	0	0
H93	DHW Production Control 0=Non Eco 1=Eco	0...1	0	0	0	0
H94	DHW Secondary Pump Control <i>(0= As H91. 1= As HWS Time Switch) (K2, X2:03, H615:6)</i>	0...1	0	0	0	0
H503	Minimum boiler setpoint temperature <i>(20 °C&lt;=TkSmin&lt;=TkSmax)</i>	20 ... 90 °C	20	20	20	20
H504	Maximum boiler setpoint temperature <i>(TkSmin&lt;=TkSmax&lt;=90 °C)</i>	20 ... 90 °C	90	90	90	90
H505	Boiler setpoint at design outside temperature	20 ... 90 °C	85	85	85	85
H506	Minimum flow setpoint temperature <i>(20 °C&lt;=TvSmin&lt;=TvSmax)</i>	20 ... 90 °C	25	25	25	25
H507	Maximum flow setpoint temperature <i>(TvSmin&lt;=TvSmax&lt;=90 °C)</i>	20 ... 90 °C	90	90	90	90
H516	Summer / winter changeover temperature <i>(30 °C: S / W changeover deactivated)</i>	8 ... 30 °C	18	18	18	18
H532	Heating curve slope heating circuit 1	1 ... 40	32	32	32	32
H533	Heating curve slope heating circuit 2	1 ... 40	1	1	1	1
H536	Maximum speed at maximum output in heating mode <i>(maximum speed limitation)</i>	0 ... 9950 rpm	5000	5000 [7000]	7000	7000
H541	Maximum degree of modulation in heating mode <i>(LmodTL &lt;= PhzMax &lt;= LmodVL)</i>	0 ... 100 %	65	65 [100]	100	100
H542	Minimum boiler output in kW <i>(lower calorific value)</i>	0 ... 9999 kW	6	6 [15]	15	15
H543	Maximum boiler output in kW <i>(lower calorific value)</i>	0 ... 9999 kW	25	25 [75]	75	75
H544	Overrun time of pumps, max. 210 min <i>(setting 255: continuous operation of Q1)</i>	0 ... 255 min	10	10	10	10
H545	Minimum burner pause time <i>(heat demand-dependent switching hysteresis)</i>	0 ... 3600 s	300	300	300	300
H551	Constant for quick setback without room influence	0 ... 20	2	2	2	2
H552	Hydraulic system adjustment	0 ... 255	67	70	66	80
554	Setting flags: status code open-circuit sensor for ANx channel suppressed / not suppressed	0 ... 255	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0	b0=1 b1=0 b2=1 b3=1 b4=0 b5=1 b6=0 b7=0

#	Description	Range	16 & 27 H (16 & 27 HS)	27 S [47 S]	45,75,77 H	75 & 77 HM (Cascade Slave Boilers)
H555	Setting flags	0 ... 255	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0	b0=0 b1=0 b2=0 b3=0 b4=1 b5=0 b6=0 b7=0
H558	Setting flags	0 ... 255	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=1 b7=0
H596	Running time of actuator in heating circuit 2 (TimeOpening / TimeClosing)	30 ... 873 s	150	150	150	150
H605	LPB device number of LMU (HM or Master Boiler 2 then Slave units 3...12)	0 ... 16*	1	1	1	2 {3...12}
H606	LPB segment number of LMU	0 ... 14	0	0	0	0
H614	Program input LMU basis	0 ... 255	3	3	3	3
H615	Function programmable output K2 LMU	0 ... 255	0	0	0	0
H618	Progr input on clip-in function module	0 ... 255	0	0	0	0
H619	Function output1 clip-in function module	0 ... 255	0	0	0	0
H620	Function output2 clip-in function module	0 ... 255	0	0	0	0
H621	Function output3 clip-in function module	0 ... 255	0	0	0	0
H622	Maximum value of heat demand with external predefined temperature setpoint (5 °C ≤ TAnfoExtMax ≤ 130 °C)	5 ... 130 °C	85	85	85	85
H630	Setting flags of maintenance alarms	0 ... 255	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0	b0=1 b1=0 b2=0 b3=0 b4=0 b5=0 b6=0 b7=0
H636	Months (interval) since last service visit	0 ... 255 months	0	0	0	0
H700	1st Historical Fault – Number of Occurrences.					
H701	1st Historical Fault – Operating Phase.					
H702	1st Historical Fault – Operating Error Code					
H703	2nd Historical Fault – Number of Occurrences.					

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#	Description	Range	16 & 27 H (16 & 27 HS)	27 S [47 S]	45,75,77 H	75 & 77 HM (Cascade Slave Boilers)
H704	2nd Historical Fault – Operating Phase.					
H705	2nd Historical Fault – Operating Error Code					
H706	3rd Historical Fault – Number of Occurrences.					
H707	3rd Historical Fault – Operating Phase.					
H708	3rd Historical Fault – Operating Error Code					
H709	4th Historical Fault – Number of Occurrences.					
H710	4th Historical Fault – Operating Phase.					
H711	4th Historical Fault – Operating Error Code					
H712	5th Historical Fault – Number of Occurrences.					
H713	5th Historical Fault – Operating Phase.					
H714	5th Historical Fault – Operating Error Code					
H715	Current Historical Fault – Number of Occurrences					
H716	Current Historical Fault – Operating Phase.					
H717	Current Historical Fault – Operating Error Code					
H718	Hours run burner	0 ... 131070 hrs	0	0	0	0
H719	Hours run heating mode	0 ... 131070 hrs	0	0	0	0
H720	Hours run DHW heating	0 ... 131070 hrs	0	0	0	0
H721	Hours run zone	0 ... 131070 hrs	0	0	0	0
H722	Start counter	0 ... 327675	0	0	0	0
H727	Current Fault Code – ALBATROS Error Code	0 ... 583				
H728	1st Historical Fault – ALBATROS Error Code					
H729	2nd Historical Fault – ALBATROS Error Code					
H730	3rd Historical Fault – ALBATROS Error Code					
H731	4th Historical Fault – ALBATROS Error Code					
H732	5th Historical Fault – ALBATROS Error Code					
H732	Current Historical Fault – ALBATROS Error Code					
H755	Measured value of ionization current	-				