Application Descriptions

7

Hot Water Heating

11

Heat Production

1

Summary

This document is a part of the HVAC Application Interworking Standard for Hot Water Heating applications. This Chapter describes the Functional Blocks for Heat Production.

Version 01.02.01 is a KNX Approved Standard.

This document is part of the KNX Specifications v2.1.

Document updates

Version	Date	Modifications
0.1	2001.03.22	BKY, document created from HWHFuncBlocV20 => document split-up into multiple chapters All functional block diagrams updated Complete revision of the document: all datapoint descriptions updated
0.2	2001.07.03	BKY, 32 bit encoding of operating hours, all DPT's updated, Full integration of S-interface in all FB's All diagnostic data and parameters updated in BUC, BOC, HPM Revision of Data-Interface, diagnostic data and parameters of HPM-BST and HPM-BST/BOC
0.3	2001.07.16	BKY, editorial update, changes are marked release for assessment in TFI
0.4	2001.10.25	BKY, resolution of TFI & HWH TF comments
0.5	2001.11.16	BKY, resolution of TFI comments
0.6	2002.01.07	BKY, wording in chapter 1.3.2 updated; some editorial corrections; rename DPT_StatusFTC -> DPT_StatusWTC; CtrlSignPump: not yet defined; Safety Temperature Limiter function: constraints added in BUC and BOC
0.7	2002.02.22	BKY, editorial corrections, OpHrsBurner optional implementation in BOC; updated forcing/locking signals according to chapter 7-11-5; TFI approved, KNX Handbook 1.0
1.0	2002.09.10	BKY, editorial corrections; inclusion of new attribute EmergDem in DPT_TempFlowWaterDemAbs (210.100), TFI approved, updated for KNX Handbook 1.1
1.1	2004.12.21	BKY, editorial: ProdSegmH parameters: range corrected from 1..31 to 1..16 according to LTE Specification Vol 10-1. Range of Heat Production Segments (1..16) and not supported wildcard addressing feature for Heat Production Segments is now explicitely stated in Introduction chapter 2.1
1.2	2006.01.09	BKY: inclusion of new attribute DHWLegioReq in DPT_TempFlowWaterDemAbs (210.100)
1.2	2009.05.29	Update in view of publication in the KNX Specifications v2.0.
1.2	2009.06.17	Update in view of publication in the KNX Specifications v2.0.
01.02.01	2013.10.29	Editorial updates for the publication of KNX Specifications 2.1.

References

[01] Chapter 3/7/2 "Datapoint Types"
[02] Chapter 7/10/1 "HVAC Sensor Functional Blocks"
[03] Chapter 7/10/2 "HVAC HMI Functional Blocks"
[04] Chapter 7/10/3 "HVAC Actuator Functional Blocks"
[05] Chapter 7/10/4 "HVAC Common Functional Blocks"
[06] Chapter 7/10/5 "HVAC Scheduler Functional Blocks"
[07] Chapter 7/11/4 "Room Heating Control"
[08] Chapter 7/11/5 "Load Management"
[09] Part 7/12 "Direct Electric Heating"
[10] Part 7/13 "Terminal Unit Functional Blocks"
[11] Part 7/14 "Ventilation, air conditioning and cold water"
[12] Chapter 7/19/11 "Boiler Controller"
[13] Part 10/1 "Logical Tag Extended"

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1 Introduction

1.1 Scope

This document is part of the KNX HVAC Application Interworking Standard.
It contains the Specification of the Functional Blocks used for HVAC Hot Water Heating (HWH) applications – part Heat Production.

The target market is mainly (European) residential and small commercial buildings.

Functional Blocks specification for applications VAC [11], terminal units (TU) [10] and direct electric heating (DEH) [09] are described in separate documents.

General purpose Functional Blocks used for HVAC applications such as sensors, actuators, MMI and some common HVAC Functional Blocks are described in a separate document (HVAC Specification Functional Blocks, Sensors, MMI, Actuators, Common Controller Functions [02], [03], [04], [05] and [06]).

This document does not describe the general HVAC-HWH application field and application requirements to be covered. It does also not contain the description of typical application examples (scenarios) and application profiles.

1.2 Objectives

This document includes the information necessary to build interoperable HVAC HWH products using the KNX Bus. Runtime process interworking between HVAC control devices at the application level is the focus. Also data-interfaces for parameter setting, visualisation etc. are specified where appropriate (only state of the art datapoints generally used in all companies).

In addition, this document specifies the specific mechanisms for zoning and runtime process data distribution used in HVAC for an ‘easy installation’ system (LTE-HEE Mode [13]).

This is a technical specification with informative material provided as needed to convey key concepts. The approach taken here is a top-down view of interoperability. The HVAC system model is based on the decomposition of the distributed HVAC application by means of functional blocks, i.e. black-box description of functional blocks including data-interface and relationship to other functional blocks.

Every functional block may be part of a complex device (e.g. a boiler & heating controller) containing more than one functional block. Because of this modular approach, there is no attempt in this specification to describe or dictate the internal construction of a functional block or to describe specific device types.

This document only includes details of the transport protocol as needed to specify interoperability and easy installation mechanisms. The document does not specifically cover implementation aspects, but guidelines are included where appropriate.

This part of the KNX HVAC specification is mainly but not completely independent of the underlying protocol since specific mechanisms for “easy configuration” and runtime data distribution must be available on the network.

Completely protocol dependent parts of the HVAC HWH Specification such as data encoding and datapoint-types, object address tables, group address tables etc. are not part of this document.

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1.3 Dependence on Configuration Modes

The main focus of this document is the specification of the **Basic Functional Blocks** and the **LTE specific parts**.

The document provides all necessary information needed:

- for a complete implementation of the Functional Blocks in LTE mode
- for the implementation of mandatory objects used for runtime interworking in standard mode (Basic Functional Block)

1.3.1 Runtime Interworking

Mode dependent (S, LT-R, LT-S, Ctrl, Pb, A) implementation of optional runtime interworking objects is not specified in this document, e.g. “easy channel” definitions.

The following table (example) shows the mode dependencies concerning runtime interworking

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Inputs	Inp1	**NA**	NA	NA	M
	Inp2	**NA**	NA	NA	O
	Inp3	**(GO_b)**		(GO)	O
Outputs	Outp1	**NA**	NA	NA	M
	- Outp1-1	**GO_b**	GO	GO	NA
	- Outp1-2	**GO_b**	GO	GO	NA
	Outp2	**GO_b**	GO	GO	M

Inp1: is mandatory M in LTE Mode but the information is not available NA in the Basic FB and all other modes because the datapoint type (DPT) is today not available in standard mode and there are no products on the market with this functionality.

Inp2: is optional O in LTE Mode but the information is not available NA in the Basic FB and all other modes because the DPT is today not available in standard mode and there are no products on the market with this functionality.

Inp3: is optional O in LTE Mode and an optional Group Object in the Basic FB (GO_b). The datapoint is optionally supported as Group Object in the LTE Standard Mode Interface (GO).
For all other modes the implementation is not defined. This is indicated by an empty field.

Outp1: is mandatory M in LTE Mode and has a structured DPT or a DPT with extended features which is today not available in standard mode. In the Basic FB the information of Outp1 is split up into Outp1-1 and Outp1-2 (separate datapoints with standard DPT).
Outp1-1 and Outp1-2 are mandatory Group Objects GO in the Basic FB and are therefore mandatory in all modes.

Outp2: is mandatory in all modes

1.3.2 Parameters and Diagnostic Data

LTE implementation:

- Parameters and Diagnostic Data of a Functional Block shall be implemented as Properties of the corresponding Interface Object which are accessed using individual addressing.
- These Properties are addressed via the standard Interface Object Type (IO Type) for this Functional Block. This IO Type is also used for datapoint addressing in the LTE runtime interworking model
- Standard DPT or HVAC specific DPT with extended features are used where appropriate.

Other modes:

- Parameters and Diagnostic Data can in principle be implemented as memory mapped datapoints or Group Objects or Properties of an Interface Object using individual addressing. This document does not lay down how to implement Parameters and Diagnostic Data in S, LT-R, LT-S, Ctrl, Pb and A-Mode.
- In case of **Memory Mapped** datapoints the DPT may be manufacturer specific
- In case of **Group Objects** standard DPT shall be used instead of HVAC specific (extended) DPT. The description of these Group Objects shall be part of the mode-dependent specification (e.g. Channel definition).
- In case of **Properties**, the implementation of HVAC specific DPT with extended features may be a problem (depending on the available microcontroller resources). The manufacturer has the choice:
  - ⇨ to use the LTE style Property implementation as specified in this document (with the DPT and IO Type for LTE implementations) **$\text{IO Type}^{\text{used}} = \text{IO Type}^{\text{HVAC-LTE}}$**
  - ⇨ to implement these Properties using standard DPT only.
    In this case, the same Property ID but a different IO Type shall be used since the DPT of a Property shall be unambiguous for each IO Type.
    Simple IOT mapping rule: $\text{IO Type}^{\text{used}} = \text{IO Type}^{\text{standardDPT}} = \text{IO Type}^{\text{HVAC-LTE}} + 10000\text{d}$
    (e.g. $\text{BUC}^{\text{HVAC-LTE}} = 128 \Rightarrow \text{BUC}^{\text{standardDPT}} = 10128$)
  - ⇨ It is allowed to implement in a device both Interface Object Types $\text{IO Type}^{\text{HVAC-LTE}}$ and $\text{IO Type}^{\text{standardDPT}}$. The implementation of parameters and diagnostic data of one given Functional Block shall however be complete. It is thus not allowed to implement part of the datapoints of a Functional Block in $\text{IO Type}^{\text{standardDPT}}$ and the remaining in $\text{IO Type}^{\text{HVACLTE}}$.

	Implementation of Parameter and Diagnostic Data			
	Property based		**Group Object**	**Memory mapped**
	HVAC-LTE style	**Standard DPT**		
IO Type	$\text{IO Type}^{\text{HVAC-LTE}}$ e.g. BUC=128	$\text{IO Type}^{\text{HVAC-LTE}}$ + 10000 e.g. BUC=10128		
Property ID	Property ID x	=> same Property ID x		
DPT	if standard DPT	=> same standard DPT	=> same standard DPT	company specific
	if HVAC-LTE specific***)** e.g. 205.100	=> mapped standard DPT, e.g. 9.001	=> mapped standard DPT, e.g. 9.001	

In this document only the **HVAC-LTE style** of Parameters and Diagnostic Data is specified for $\text{IO Type}^{\text{HVAC-LTE}}$.

In the FB datapoint overview those Parameters and Diagnostic Data with HVAC-LTE specific (extended) DPT are marked " ***)** "
The mapping of HVAC specific DPT to standard DPT is generic and described in the document **[01]** – HVAC Datapoint Types.

1.4 Abbreviations

Functional Blocks:

Hot Water Heating (HWH)

Abbreviation	Description
BUC	Burner Controller
BOC	Boiler Controller
HPM	Heat Production Manager
BST	Buffer Storage Tank
HFDM	Heating Flow Demand Manager
FTC	Flow Temperature Controller
HPM	Heat Production Manager
HZC	Heating Zone Controller
HIRC	Heating Individual Room Controller
HRDM	Heating Room Demand Manager
HDTACT	Heat Demand Transformer Actuator Position
HDTRT	Heat Demand Transformer Room Temperature
HDAUX	Auxiliary Heat Demand
DHWC	Domestic Hot Water Controller
DHWS	Domestic Hot Water Scheduler
DHWCPS	Domestic Hot Water Circulation Pump Scheduler
SDHWC	Solar Domestic Hot Water Controller
DHWSM	Domestic Hot Water Setpoint Manager
DHWCPC	Domestic Hot Water Circulation Pump Controller
UDHWSET	DHW User Settings

Ventilation, Air Conditioning and Cold Water (VAC)

Abbreviation	Description
AHUC	Air Handling Unit Controller
CC	Chiller Control
CDAUX	Auxiliary Cooling Demand
CDAUXPER	Auxiliary Cooling Demand Precent
CDTAHU	Cooling Demand Transformer Air Handling Unit
CFDM	Cooling Flow Demand Manager
CPM	Cold Water Production Manager
CRC	Re-Cooling Controller
CZC	Cooling Zone Controller
HDAUXPER	Auxiliary Heating Demand Precent
HDTAHU	Heating Demand Transformer Air Handling Unit
SATC	Supply Air Temperature Controller

Terminal Units (TU) [09]

Abbreviation	Description
ACDTTU	Air Cooler Energy Demand Transformer Terminal Unit
AHDTTU	Air Heater Energy Demand Transformer Terminal Unit
CCDTTU	Chilled Ceiling Energy Demand Transformer Terminal Unit
FCC	Fan Coil Unit Controller
RCC	Radiator and Chilled Ceiling Control
RHDTTU	Radiator Heating Energy Demand Transformer Terminal Unit
SPUC	Split Unit Control
VAVC	Variable Air Volume Control
VDTTU	Ventilation Demand Transformer Terminal Unit
WHPC	Water Heat Pump Control

Sensor, MMI, Actuators - Common Controller Functions [02], [03], [04], [05] and [06]

Abbreviation	Description
CFWTS	Condensor Flow Temperature Sensor
CRNWTS	Condensor Retrun Water Temperature Sensor
DPS	Dew Point Status Sensor
FWTS	Flow Water Temperature Sensor
HVA	HVAC Valve
OAD	Outside Air Damper
ORHS	Outside Relative Humidity Sensor
OAQS	Outside Air Quality Sensor
OTS	Outside Air Temperature Sensor
PRD	Presence Detector
RRHS	Room Relative Humidity Sensor
RAQS	Room Air Quality Sensor
RNARHS	Return Air Relative Humidity Sensor
RNAQS	Return Air Quality Sensor
RNATS	Return Air Temperature Sensor
RNWTS	Return Water Temperature Sensor
RSMHD	Room Setpoint Manager HVAC-Mode Driven
RSMTD	Room Setpoint Manager Temperature Driven
RTS	Room Temperature Sensor
SARHS	Supply Air Relative Humidity Sensor
SAQS	Supply Air Quality Sensor
SATS	Supply Air Temperature Sensor
SIS	Sun Intensity Sensor
SMAQ	Setpoint Manager Air Quality
SMRH	Setpoint Manager relative Humidity
UAQSS	Air Quality Setpoint Setting
URHSS	Air Relative Humidity Setpoint Setting
UHRS	User HVAC Room Setting
UHD	User HVAC Display
WCOS	Water Change over Status Sensor
WOS	Window Switch
WSS	Wind Speed Sensor

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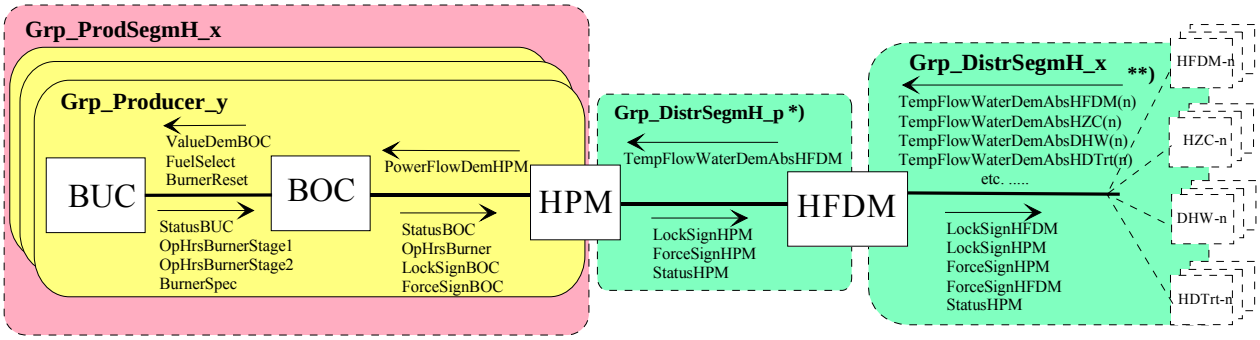
General

Abbreviation	Description
cs	Company specific
NA	not allowed / not available
LTE	Logical Tag Extended Mode, see [13] Volume 10, LTE Specification
FB	Functional Block
DPT	Datapoint Type
IO	Interface Object
IR	LTE InfoReport Input / Output
IR/P	LTE InfoReport Input with Polling capability (LTE property client)
W	LTE Write Input / Output

2 Functional Blocks: Heat Production

2.1 Aims and objectives



**) normally HPM and first HFDM are in the same device DistrSegmH_31 is default for special cases where HPM and HFDM are located in different devices*

***) first primary Distribution Segment in the system, default value DistrSegmH_1*

Figure 1 - Heat Production System (simplified)

Remark: the figure gives a rough overview of the main signals to be exchanged between functional blocks in the corresponding binding groups. The indication of signals is not complete.

Functional Blocks:	BUC:	Burner Controller	BOC:	Boiler Controller
	HPM:	Heat Producer Manager	HFDM:	Heating Flow Demand Manager

Data communication with the heat production in a distributed heating system has mainly 2 targets:
– energy savings due to demand-dependent heat production
– load management / load shedding in case of boiler overload or boiler overheat conditions

The figure shows a Heat Production Segment ‘ProdSegmH’containing one or more producers (boiler sequence) which are coordinated by the Heat Producer Manager HPM. In a system with only one boiler the HPM functionality is reduced to a minimum.

Each producer contains a Burner Controller BUC and a Boiler Controller BOC which have a 1:1 relationship. They are often integrated into one device – otherwise BUC and BOC are linked by the group ‘Producer’

The Producer Manager receives the resulting overall heat flow demand in the heating system from the „first“ Heating Flow Demand Manager HFDM in the primary Heating Distribution Segment. HPM and „first“ HFDM have always a 1:1 relationship and are usually located in the same device (and therefore data-flow between HPM and HFDM is normally purely device-internal). DistrSegmentH_31 is default for those special cases where HPM and „first“ HFDM are not in the same device.

The HPM controls the Producers according to the current resulting overall heat flow demand by sending the appropriate flow temperature demand or power control information to each Boiler Controller BOC which then controls the Burner Controller BUC accordingly.

For boiler overheat protection or indication of oversupply or spare energy the BOC can send a forcing signal to the HPM. Contrary, locking signals from BOC are used for boiler startup and overload protection. Forcing and locking signals from each BOC are collected in the HPM and the resulting signals are passed by the „first“ HFDM to the consumers and HFDM’s in the primary heat distribution segment. For further details see [08].

– Forcing and locking signals from the HPM will be transparently routed from the „first“ HFDM to the next „right-hand“ HFDM and from there to the following Heat Distribution Segments etc. Therefore heat consumers will not have to know „their“ ‘ProdSegmH’. Since complex nesting of Heat Distribution Segments is rarely used, there is only minimal extra traffic on the bus due to routing of forcing and locking signals by the HFDM‘s

– HFDM may also generate forcing and locking signals which are distributed independently from forcing / locking information from HPM.

Multiple independent Heat Production Segments (up to 16) are possible for completely independent heating sub-systems. This is a market need because houses with independent heating systems are today often linked by bus for remote management only. This feature is also interesting for DHW schemes with separate boilers for DHW generation or nested heat production systems with buffer storage tanks..

Heat Production Segments are differentiated by different ProdSegmH numbers (1..16). Heat Distribution Segment numbers are not related to the ProdSegmH numbers (flat structure). Therefore each Heat Distribution Segment number must be unique in the system and may not be reused in different Heat Production Segments.

Wildcard addressing for all Heat Production Segments is not supported.

2.2 Functional Block: Burner Controller (BUC)

2.2.1 Functional Specification

The functional block BUC controls the burner (burner on/off, one stage, two stage or modulating) according to the process demand signal and further control information generated by the boiler controller BOC:

- ‘ValueDemBOC’ — The input signal which is received from the BOC contains information whether the burner should be off or on and additionally the requested relative power of the burner for 2-stage and modulating burner-type.
- ‘FuelSelect’ — With this optional input signal the type of fuel (oil, gas etc.) can be selected.
- ‘BurnerReset’ — A remote reset of the burner can be executed with this input signal (optional command). Safety-relevant handling of this signal in the BUC is company specific.

Burner Controller Outputs:

- ‘StatusBUC’ — BUC sends its current status information to the BOC (e.g. stage 1,2 active; current % modulation; fault etc.). This feedback is used in the BOC for optimized boiler control.
- ‘OpHrsBurnerStage1’ — burner operating hours for stage 1 / base stage
- ‘OpHrsBurnerStage2’ — burner operating hours for stage 2 / modulation
- ‘BurnerSpec’ — Optionally the burner can provide a specification signal containing burner type and characteristics.

2.2.2 Constraints

The BUC has a safety relevant functionality and therefore must not rely on bus communication.

Implementation of Safety Temperature Limiter (STL) function (according to EN 60730-2-9):
In todays solutions the STL is usually an independent electromechanical thermostat which is redundant and not using the boiler temperature sensor. However in future solutions it is quite possible that fully electronic STL solutions will be implemented. The STL function could either be implemented in the BUC or in the BOC. In both cases redundant safety mechanisms have to be implemented and redundant temperature sensors are needed.

- The BUC is already containing safety relevant functionality and therefore it would be natural to implement the STL also in the BUC ("all in one" safety approbation). However the BUC has today no BoilerTemperature sensor(s) connected which are needed for STL function and which are today connected to the BOC. The BUC would provide the TempBoiler information to the BOC and the BOC would need an additional TempBoiler input
- The BOC has today already a local Boiler Temperature Sensor connected and therefore it would be natural to implement the STL function also in the BOC. But the BOC is today not containing safety relevant functionality. The drawback of this solution is that with the STL function integrated the BOC needs a safety approbation.

The current KNX specification of the BUC and the BOC is not covering STL functionality and the additional signals and mechanisms are not described. If one electronic solution becomes well established on the market, this specification will be updated accordingly.

Burner Controller BUC has a 1:1 relationship with Boiler Controller BOC which are linked in LTE mode by the group 'Producer' in the same Production Segment.
The control of the burner is today often done directly by relays.

IMPORTANT: the input signal ValueDemBOC from BOC can today not be implemented in standard mode because the necessary compound HVAC DPT for runtime-interworking is not yet available in standard mode and mapping of this signal to multiple standard datapoints is not possible because of the necessary data consistency.

Therefore for the time being only LTE implementations of the BUC functional block offer a bus-link to a BOC which controls the BUC by means of the ValueDemBOC signal.

However the basic FB definition of the BUC enables the integration of the BUC into a standard system for remote control or visualisation.

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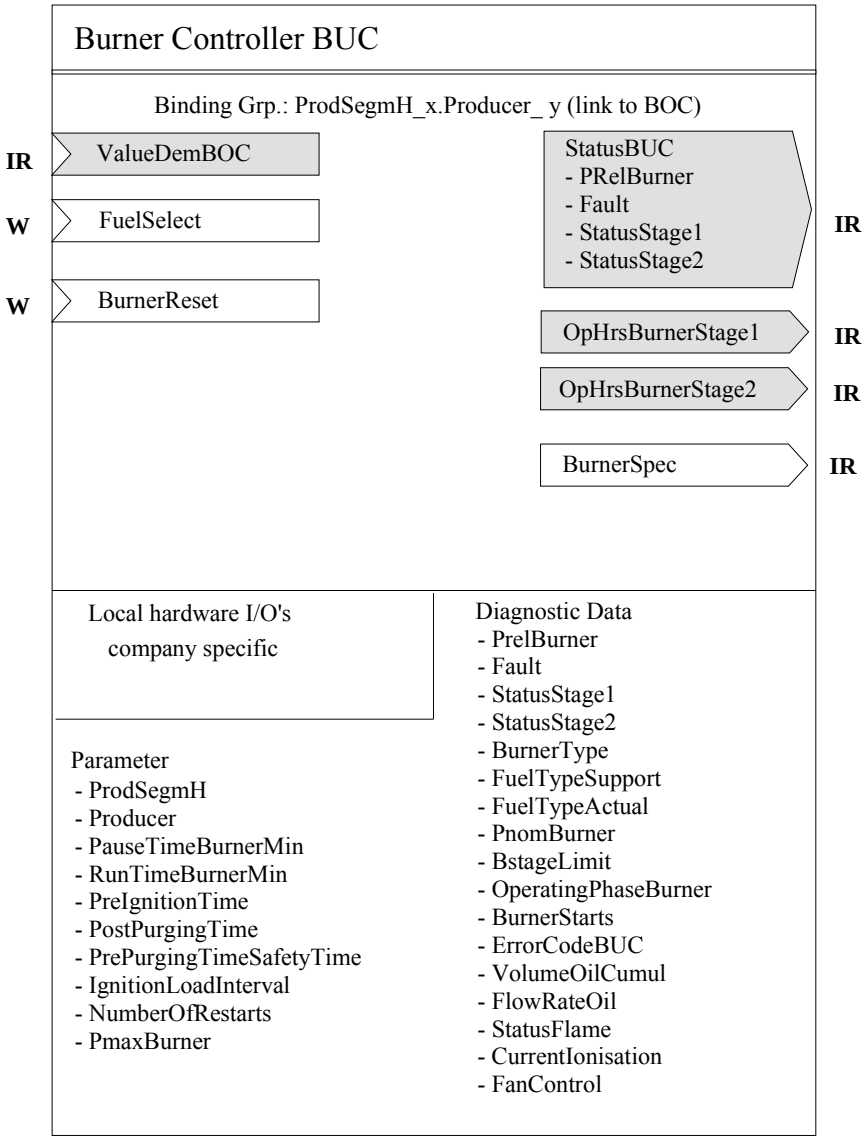
2.2.3 Functional block diagram



2.2.4 Datapoint description

2.2.4.1 Overview

Data Point	Description	Datapoint Type	DPT N°
Outputs			
StatusBUC	Status information from BUC to BOC	DPT_StatusBUC	207.100
- PrelBurner	Current relative power of burner, % value (S-interface)	DPT_Percent_U8	5.004
- Fault	burner failure, some error in the BUC (S-interface)	DPT_Bool	1.002
- StatusStage1	status stage 1 / base stage: on/off (S-interface)	DPT_Switch	1.001
- StatusStage2	status stage 2 / modulation: on/off (S-interface)	DPT_Switch	1.001
OpHrsBurnerStage1	burner operating hours stage 1 / base stage	DPT_LongDeltaTimeSec	13.100
OpHrsBurnerStage2	burner operating hours stage 2 / modulation	DPT_LongDeltaTimeSec	13.100
BurnerSpec	Burner type information	DPT_SpecHeatProd	216.100
Inputs			
ValueDemBOC	Process demand signal from BOC	DPT_ValueDemBOC	207.102
FuelSelect	switch between different burner fuel options	DPT_FuelType	20.100
BurnerReset	Command for burner remote reset	DPT_Reset	1.015
Parameters	[r]) for remote access: read only		
ProdSegmH	LTE zoning information Heat Production Segment number	DPT_UcountValue8_Z	202.002
Producer	LTE zoning information Heat Producer number	DPT_UcountValue8_Z	202.002
PauseTimeBurnerMin	min burner pause time [r])	DPT_TimePeriod100MSec	7.004
RunTimeBurnerMin	min burner run time [r])	DPT_TimePeriod100MSec	7.004
PreIgnitionTime	burner pre-ignition time [r])	DPT_TimePeriod100MSec	7.004
PostPurgingTime	burner post purging time [r])	DPT_TimePeriod100MSec	7.004
PrePurgingTime	burner pre purging time [r])	DPT_TimePeriod100MSec	7.004
SafetyTime	burner safety time [r])	DPT_TimePeriod100MSec	7.004
IgnitionLoadInterval	burner ignition load interval [r])	DPT_TimePeriod100MSec	7.004
NumberOfRestarts	allowed number of burner restarts [r])	DPT_Value_1_Ucount	5.010
PmaxBurner	max. limitation of burner power [r])	DPT_PowerKW_Z	203.014 *)
Diagnostic Data			
PrelBurner	current relative power of burner, % value	DPT_RelValue_Z	202.001 *)
Fault	burner failure (some error in the BUC)	DPT_Bool	1.002
StatusStage1	status stage 1 / base stage: on/off	DPT_Switch	1.001
StatusStage2	status stage 2 / modulation: on/off	DPT_Switch	1.001
BurnerType	type of burner: 1 stage, 2 stage, modulating	DPT_BurnerType	20.101
FuelTypeSupport	supported set of fuel types: gas, oil, solid state fuel etc	DPT_FuelTypeSet	21.104
FuelTypeActual	currently used fuel type	DPT_FuelType	20.100

Data Point	Description	Datapoint Type	DPT N°
PnomBurner	nominal power of burner [kW]	DPT_PowerKW_Z	203.14 *)
BstageLimit	relative power limit % of stage 1 / base stage; void for 1stage boiler	DPT_RelValue_Z	202.001 *)
OperatingPhaseBurner	current burner operating phase, numerical value; company specific interpretation	DPT_Value_1_Ucount	5.010
BurnerStarts	number of burner starts	DPT_Value_4_Ucount	12.001
ErrorCodeBUC	company specific numeric error code	DPT_Value_2_Ucount	7.001
VolumeOilCumul	cumulated oil volume in liter / in m^3 (standard mode)	DPT_VolumeLiter_Z	218.001 *)
FlowRateOil	current oil flow rate in liter/h	DPT_UflowRateLiter/h_Z	203.011 *)
StatusFlame	burner flame status on/off	DPT_Switch	1.001
CurrentIonisation	ionisation current value µA	DPT_UelCurrentµA_Z	203.013 *)
FanControl	relative fan control value %	DPT_RelValue_Z	202.001 *)

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Inputs	ValueDemBOC	**NA** [1)]	NA	NA	M
	FuelSelect	**NA**	NA	NA	O
	BurnerReset	**(GO_b)**		(GO)	O
Outputs	StatusBUC	**NA**	NA	NA	M
	- PrelBurner	**GO_b** [3)]	GO [3)]	GO [3)]	NA
	- Fault	**GO_b**	GO	GO	NA
	- StatusStage1	**GO_b**	GO	GO	NA
	- StatusStage2	**GO_b** [2)]	GO [2)]	GO [2)]	NA
	OpHrsBurnerStage1	**GO_b**	GO	GO	M
	OpHrsBurnerStage2	**GO_b** [2)]	GO [2)]	GO [2)]	M [2)]
	BurnerSpec	**NA**	NA	NA	O

[1)] mandatory in LTE Mode but the information is NA in the Basic FB and all other modes because the datapoint type is today not available in standard mode. Splitting of DPT is not possible because of necessary data consistency

[2)] not available on 1-stage burner

[3)] not available on 1-stage burner, optional for 2-stage burner, mandatory for modulating burner

Table 1: BUC Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	ProdSegmH	M
	Producer	M

Table 2: BUC LTE specific Properties

		Support
Parameter	PauseTimeBurnerMin	O
	RunTimeBurnerMin	O
	PreIgnitionTime	O
	PostPurgingTime	O
	PrePurgingTime	O
	SafetyTime	O
	IgnitionLoadInterval	O
	NumberOfRestarts	O
	PmaxBurner	O
Diagnostic Data	PrelBurner	O
	Fault	M
	StatusStage1	O
	StatusStage2	O
	BurnerType	O
	FuelTypeSupport	O
	FuelTypeActual	O
	PnomBurner	O
	BstageLimit	O
	OperatingPhaseBurner	O
	BurnerStarts	O
	ErrorCodeBUC	O
	VolumeOilCumul	O
	FlowRateOil	O
	StatusFlame	O
	CurrentIonisation	O
	FanControl	O

Table 3: BUC Standard Properties of Interface Objects (or memory mapped DP)

2.2.4.2 Output StatusBUC

Standard mode: NA => mapped to PrelBurner, Fault, StatusStage1 & 2

LTE-HEE mode:

FB: BUC	**LTE Server Output Name:** StatusBUC	Mandatory ☒ Optional ☐

Description:

This output process signal contains status information of the burner to be used in the BOC for boiler control

DPT:	Name	DPT_StatusBUC	DPT ID	207.100	Datatype format	U_8B_8

Field	Description	Sup.	Range	Unit	COV	Default
PrelBurner	current relative power	M [1)]	0..100%	%	10	cs [*)]
Attributes	Bitset containing status info					
– Fault	burner failure	M	true/false	bool	Y	false
– StatusStage1	stage 1 / base stage active	M	on/off	bool	Y	off
– StatusStage2	stage 2 / modulation active	M [2)]	on/off	bool	Y	off
– PrelBurnerValid	validity of PrelBurner field	M	true/false	bool	Y	false [*)]

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 128 (BUC)	Property ID: 51
LTE-Services (event): InfoReport ☒	COV ☒ MinRepTime: 10 sec	Heartbeat: 3 min
	Output per default communicating ☐	Binding Group Wildcard allowed ☐
	Tx Prio: High ☐ Normal ☒ Low ☐	
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐	
Property-Service (individual access):	Read only ☒ Read/Write ☐	

Exception Handling: Save at Powerdown ☐

--

Special Features:

BUC and BOC are usually located in the same device. In thic case this signal can be device internal.

[1)] - mandatory for modulating burner;
- void value for 1 stage burner => PrelBurnerValid Flag=false
[*)] the PrelBurner field may contain in this case “any” value)
- value for 2 stage burner: some 2 stage BUC may be able to indicate % value if only stage 1 is on. But this is an optional feature: This field is optional for 2 stage burner => validity according to PrelBurnerValid flag

[2)] mandatory for 2 stage / modulation burner only; not available in 1 stage burner => default value

2.2.4.3 Output PrelBurner

Standard mode

DP Name:	PrelBurner	Abbr.:	--	Mandatory [1]	☒
FB Name:	BUC			Can be internal	☒

Description
Current relative power of the burner

Datapoint Type					
DPT_Name:	DPT_Percent_U8				
DPT Format:	U_8	DPT_ID:	5.004		
Field	Description	Supp.	Range	Unit	Default
			0..100%	%	0%

Access Type							
♦ Output							
this → M	☐	this → 1	☒				
Spontaneous	☒	COV:	☒	Δ-Value:	10%	MinRepTime:	10s
		Cyclic	☒	Period:	3 Min		
Request	☒						

Communication Type		
♦ Group Object Datapoint	Mandatory:	☒ [1]
Default Group Address:	--	

Dynamics						
Power down:	Save:	☐				
Power up:	Value:	No initialisation:	☐	Default value:	☐	
		Saved value:	☐	Actual value (not for input):	☒	
	Transmit on bus (only for output):		☐	Read from bus (only for input):		☐

Exception Handling
--

Special Features
[1] not available on 1-stage burner, optional for 2-stage burner, mandatory for modulating burner

LTE-HEE mode: NA

2.2.4.4 Output OpHrsBurnerStage1

Standard mode

DP Name:	OpHrsBurnerStage1			Abbr.:	--				Mandatory	☒	
FB Name:	BUC								Can be internal	☒	
Description											
Current burner operating hours for stage 1 / base stage											
Datapoint Type											
DPT_Name:	DPT_LongDeltaTimeSec										
DPT Format:	V_{32}						DPT_ID:		13.100		
Field	Description						Supp.	Range		Unit	Default
								>=0 [1]		h	0
Access Type											
♦ Output											
this → M	☐		this → 1	☒							
Spontaneous	☒	COV:	☐	Δ-Value:		MinRepTime:					
		Cyclic	☒	Period:	1 h						
Request	☒										
Communication Type											
♦ Group Object Datapoint								Mandatory:	☒		
Default Group Address:	--										
Dynamics											
Power down:	Save:	☒									
Power up:	Value:	No initialisation:	☐	Default value:	☐						
		Saved value:	☒	Actual value (not for input):	☐						
	Transmit on bus (only for output):	☐		Read from bus (only for input):	☐						
Exception Handling											
--											
Special Features											
[1] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible											

LTE-HEE mode:

FB: BUC	**LTE Server Output Name:** OpHrsBurnerStage1	Mandatory ☒ Optional ☐

Description:

This output process signal contains the current burner operating hours for stage 1 / base stage

DPT:	Name	DPT_LongDeltaTimeSec	DPT ID	13.100	Datatype format	V_{32}

Field	Description	Sup.	Range	Unit	COV	Default
			>=0 [1)]	h	--	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	55
LTE-Services (event):	COV ☐	MinRepTime: -- sec	Heartbeat:	15 min
InfoReport ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐ Normal ☒ Low ☐		
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐			
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☒

--

Special Features:

BUC and BOC are usually located in the same device. In thic case this signal can be device internal.

1) encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible

2.2.4.5 Output OpHrsBurnerStage2

Standard mode

DP Name:	OpHrsBurnerStage2	Abbr.:	--	Mandatory [2]	☒
FB Name:	BUC			Can be internal	☒

Description

Current burner operating hours for stage 2 / modulation

Datapoint Type

DPT_Name:	DPT_LongDeltaTimeSec				
DPT Format:	V_{32}	DPT_ID:	13.100		
Field	Description	Supp.	Range	Unit	Default
			>=0 [1]	h	0

Access Type

♦ Output

this → M	☐	this → 1	☒				
Spontaneous	☒	COV:	☐	Δ-Value:		MinRepTime:	
		Cyclic	☒	Period:	1 h		
Request	☒						

Communication Type

♦ Group Object Datapoint		Mandatory:	☒ [2]
Default Group Address:	--		

Dynamics

Power down:	Save:	☒			
Power up:	Value:	No initialisation:	☐	Default value:	☐
		Saved value:	☒	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

[1] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible

[2] mandatory for 2 stage / modulation burner only; not available in 1 stage burner

LTE-HEE mode:

FB: BUC	**LTE Server Output Name:** OpHrsBurnerStage2	Mandatory ☒ 2) Optional ☐

Description:

This output process signal contains the current burner operating hours for stage 2 / modulation

DPT:	Name	DPT_LongDeltaTimeSec	DPT ID	13.100	Datatype format	V_{32}

Field	Description	Sup.	Range	Unit	COV	Default
			>=0 1)	h	--	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 128 (BUC)	Property ID: 56
LTE-Services (event):	COV ☐ MinRepTime: -- sec	Heartbeat: 15 min
InfoReport ☒	Output per default communicating ☐	Binding Group Wildcard allowed ☐
(LTE Read-Response polling of the output shall always be supported)	Tx Prio: High ☐ Normal ☒ Low ☐	
	Transm after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐	
Property-Service (individual access):	Read only ☒ Read/Write ☐	

Exception Handling: Save at Powerdown ☒

--

Special Features:

BUC and BOC are usually located in the same device. In thic case this signal can be device internal.

1) encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible

2) mandatory for 2 stage / modulation burner only; not available in 1 stage burner

2.2.4.6 Output Fault

Standard mode

DP Name:	Fault	Abbr.:	--	Mandatory	☒
FB Name:	BUC			Can be internal	☐

Description
reports a burner failure

Datapoint Type					
DPT_Name:	DPT_Bool				
DPT Format:	B_1	DPT_ID:			
Field	Description	Supp.	Range	Unit	Default
					false

Access Type							
♦ Output							
this → M	☒ 1)	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:	--	MinRepTime:	10s
		Cyclic	☒	Period:	15 Min		
Request	☒						

Communication Type		
♦ Group Object Datapoint	Mandatory:	☒
Default Group Address:	--	

Dynamics						
Power down:	Save:	☐				
Power up:	Value:	No initialisation:	☐	Default value:	☒	
		Saved value:	☐	Actual value (not for input):	☐	
	Transmit on bus (only for output):		☐	Read from bus (only for input):		☐

Exception Handling
--

Special Features
1) this datapoint is also interesting for visualisation and not only used in the BOC

LTE-HEE mode: NA

2.2.4.7 Output StatusStage1

Standard mode

DP Name:	StatusStage1			Abbr.:	--				Mandatory	☒	
FB Name:	BUC								Can be internal	☒	
Description											
status burner stage 1 / base stage: on/off											
Datapoint Type											
DPT_Name:	DPT_Switch										
DPT Format:	B_1						DPT_ID:	1.001			
Field	Description						Supp.	Range		Unit	Default
											off
Access Type											
♦ Output											
this → M	☐	this → 1	☒								
Spontaneous	☒	COV:	☐	Δ-Value:	--	MinRepTime:	10s				
		Cyclic	☒	Period:	3 Min						
Request	☒										
Communication Type											
♦ Group Object Datapoint									Mandatory:	☒	
Default Group Address:	--										
Dynamics											
Power down:	Save:	☐									
Power up:	Value:	No initialisation:	☐			Default value:	☒				
		Saved value:	☐			Actual value (not for input):	☐				
	Transmit on bus (only for output):	☐				Read from bus (only for input):	☐				
Exception Handling											
--											
Special Features											
--											

LTE-HEE mode: NA

2.2.4.8 Output StatusStage2

Standard mode

DP Name:	StatusStage2		Abbr.:	--			Mandatory [2]	☒		
FB Name:	BUC						Can be internal	☒		
Description										
status burner stage 1 / base stage: on/off										
Datapoint Type										
DPT_Name:	DPT_Switch									
DPT Format:	B_1						DPT_ID:	1.001		
Field	Description						Supp.	Range	Unit	Default
										off
Access Type										
♦ Output										
this → M	☐		this → 1	☒						
Spontaneous	☒	COV:	☐	Δ-Value:	--	MinRepTime:	10s			
		Cyclic	☒	Period:	3 Min					
Request	☒									
Communication Type										
♦ Group Object Datapoint							Mandatory:	☒ [2]		
Default Group Address:	--									
Dynamics										
Power down:	Save:	☐								
Power up:	Value:	No initialisation:	☐			Default value:	☒			
		Saved value:	☐			Actual value (not for input):	☐			
	Transmit on bus (only for output):	☐				Read from bus (only for input):	☐			
Exception Handling										
--										
Special Features										
[2] not available on 1-stage burner										

LTE-HEE mode: NA

2.2.4.9 Output BurnerSpec

Standard mode

Not applicable

LTE-HEE mode:

FB: BUC	**LTE Server Output Name:** BurnerSpec	Mandatory ☐ Optional ☒

Description:

This datapoint specifies the type and characteristics of the burner. This information may be read by the BoilerController in order to allow specific boiler control mechanisms. The value of this datapoint may in some cases change during runtime. Changes are reported spontaneously.

DPT:	Name	DPT_SpecHeatProd	DPT ID	216.100	Datatype format	$U_{16}U_8N_8B_8$

Field	Description	Sup.	Range	Unit	COV	Default
Pnom	Burner nominal power	M	0 .. 65535	kW	1	cs
BstageLimit	relative power limit % of stage 1 resp. base stage	M [1)]	0..100%	%	10	cs
BurnerType	1 stage, 2 stage, modulating etc.	M	[1..3]	enum.	Y	cs
FuelType	set of supported fuel types	M	b2..b0	bitset	Y	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	52
LTE-Services (event):	COV ☒	MinRepTime: -- sec	Heartbeat:	-- min
InfoReport ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
(LTE Read-Response polling of the output shall always be supported)	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

BUC and BOC are usually located in the same device. In thic case this signal can be device internal.
This datapoint has usually a constant value and is read once by the BOC after system installation / power up. The datapoint may also change during runtime. In this case spontaneous transmission (COV) of the datapoint shall be supported (no heartbeat).

[1)] dummy value for 1 stage burner: 100%

2.2.4.10 Input ValueDemBOC

Standard mode: NA

LTE-HEE mode:

FB: BUC	**LTE Client Input Name:** ValueDemBOC	Mandatory ☒ Optional ☐

Description:

This input signal contains the current burner control information from the BOC. It is used to control the stages/modulation grade of one burner

DPT:	Name	DPT_ValueDemBOC	DPT ID	207.102	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
RelBurnerDem	Relative demand %: for modulating burner only	M [1)]	%	cs
Attributes	Bitset containing control info			
– Stage1Control	controls operation of stage 1 or base stage	M	bool on/off	cs
– Stage2Control	controls stage 2 for two stage / modulating burner	M [2)]	bool on/off	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	53
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:		--	
	Timeout:	7	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:		--	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

The burner controller will use a company specific default value after power-up or in case of communication failure, if no data from BOC is received (normally burner off).
Current burner stage / modulation grade is also depending on safety related mechanisms within the burner controller

Special Features:

This input can be internal (1:1 link with BOC)
Interpretation of data fields:see table below
[1)] mandatory for modulating burner, not supported by 1 stage or 2 stage burner
[2)] mandatory for modulating burner or 2 stage burner, not supported by 1 stage burner

Burner type	**BurnerMode**	**Stage 1 control**	**Stage 2 control**	**RelBurner Dem**
1 Stage	off	**0**	x	x
	on	**1**	x	x
2 Stage	off	**0**	x	x
	Stage 1 on Stage 2 off	**1**	**0**	x
	Stage 2 on	**1**	**1**	x
Modulating	off	**0**	x	x
	Base Stage on Modulation disabled	**1**	**0**	x
	Base Stage on Modulation enabled	**1**	**1**	**%**

0 = off; 1 = on; x = don't care

Table 4: Burner type dependent BUC Control

2.2.4.11 Input FuelSelect

Standard mode: NA

LTE-HEE mode:

FB: **BUC**	**LTE Server Input Name:** **FuelSelect**	Mandatory ☐ Optional ☒

Description:

This input allows to switch between different fuel options and contains the type of fuel to be used by the BUC. This information may be written by the BoilerController.

DPT:	Name	DPT_FuelType	DPT ID	20.100	Datatype format	N_8

Field	Description	Sup.	Unit	Default
FuelSelect	see above	M	enum	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	53
LTE-Service (event): Write ☒	Timeout:	--[2)]	Min	
Property-Service (individual access):	Read only ☐		Read/Write ☒	

Value after Powerup: [1)] Default Value ☒ Stored Value ☒

Exception Handling: Save at Powerdown[1)] ☒

[1)] The burner controller will use a company specific default value or stored value after power-up (company specific behavior)

[2)] This signal has no heartbeat => last value from BOC is kept until next update or default after power-up

Special Features:

This input can be internal (1:1 link with BOC)

2.2.4.12 Input BurnerReset

Standard Mode:

DP Name:	BurnerReset	Abbr.:	---	Mandatory	☐
FB Name:	BUC			Can be internal	☒

Description

see LTE-HEE Mode

Datapoint Type

DPT_Name:	DPT_Reset				
DPT Format:	B_1	DPT_ID:	01.015		
Field	Description	Supp.	Range	Unit	Default
			{0,1} [1)]	bool	0

Access Type

♦ Input

N → this	☐	1 → this	☒			
Spontaneous	☒	Cyclically:	☐	Time-out:	--	
Request	☐	Polling:	☐	Period:		

Communication Type

♦ Group Object Datapoint		Mandatory:	☒
Default Group Address:	---		

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐		
				Read from bus:	☐

Exception Handling

--

Special Features

[1)] This is a transient “trigger” command, which may also be executed using individual addressing. The datapoint value is 1 = Reset. Value = 0 (‘no action’) is not transmitted and would be ignored by the receiver!

LTE-HEE mode:

FB: **BUC**	**LTE Server Input Name:** **BurnerReset**	Mandatory ☐ Optional ☒

Description:

This optional datapoint allows remote reset the burner. This information may be written by the Boiler Controller or a tool etc.

DPT:	Name	DPT_Reset	DPT ID	01.015	Datatype format	B_8

Field	Description	Sup.	Unit	Default
BurnerReset	0 = no action / 1 = Reset command (“trigger”)	M	boolean	0

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	54
LTE-Service (event): Write ☒	Timeout:	--[2]	Min	
Property-Service (individual access):	Read only ☐	Read/Write ☒ [1]		

Value after Powerup: [1] Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

Important: Remote reset of the burner may be safety-relevant. This must be handled by the BUC (e.g. “permanent” sending of BurnerReset by a faulty BOC must not lead to safety critical behavior in the BUC)

Special Features:

[1] This is a transient command, which may also be executed using individual addressing. Read access to this datapoint is not useful and will have the resulting data value ‘0’.

[2] heartbeat repetition of this signal is not allowed => no receiver timeout

2.2.4.13 Parameter ProdSegmH

FB: BUC	Property Name (Server): ProdSegmH	Mandatory ☒ Optional ☐

Description:

LTE zoning information Heat Production Segment

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Heat Production Segment number	M	1..16	--	1
Status - OutOfService - all other flags	 zone active /inactive not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 set zone inactive / active not supported	 M O NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	101
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

BUC DP's are not LTE communicating if zone is 'OutOfService'. If ProdSegmH is 'OutOfService' also the correspoinding Producer zone is 'OutOfService' (common flag)

2.2.4.14 Parameter Producer

FB: BUC	Property Name (Server): Producer	Mandatory ☒ Optional ☐

Description:

LTE zoning information Heat Producer number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Producer-number	M	1..31	--	1
Status - OutOfService - all other flags	 zone active /inactive not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 set zone inactive / active not supported	 M O NA		enum	

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	102
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

BUC DP's are not LTE communicating if zone is 'OutOfService'. If ProdSegmH is 'OutOfService' also the correspoinding Producer zone is 'OutOfService' (common flag)

2.2.4.15 Parameter PauseTimeBurnerMin

FB: BUC	Property Name (Server): PauseTimeBurnerMin	Mandatory ☐ Optional ☒

Description:

Min. burner pause timewith 100ms resolut

DPT:	Name	DPT_TimePeriod100MSec	DPT ID	7.004	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0..6553.5 s	s	cs

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	129
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

safety critical parameter, read-only via bus

2.2.4.16 Parameter RunTimeBurnerMin

FB: BUC	Property Name (Server): RunTimeBurnerMin	Mandatory ☐ Optional ☒

Description:

Min burner run time with 100ms resolution

DPT:	Name	DPT_TimePeriod100MSec	DPT ID	7.004	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0..6553.5 s	s	cs

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	130
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

safety critical parameter, read-only via bus

2.2.4.17 Parameter PreIgnitionTime

FB: BUC	Property Name (Server): PreIgnitionTime	Mandatory ☐ Optional ☒

Description:

Burner pre-ignition time with 100ms resolution

DPT:	Name	DPT_TimePeriod100MSec	DPT ID	7.004	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0..6553.5 s	s	cs

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	131
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

safety critical parameter, read-only via bus

2.2.4.18 Parameter PostPurgingTime

FB: BUC	Property Name (Server): PostPurgingTime	Mandatory ☐ Optional ☒

Description:

Burner post purging time with 100ms resolution

DPT:	Name	DPT_TimePeriod100MSec	DPT ID	7.004	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0..6553.5 s	s	cs

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	132
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

safety critical parameter, read-only via bus

2.2.4.19 Parameter PrePurgingTime

FB: BUC	Property Name (Server): PrePurgingTime	Mandatory ☐ Optional ☒

Description:

Burner pre purging time with 100ms resolution

DPT:	Name	DPT_TimePeriod100MSec	DPT ID	7.004	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0..6553.5 s	s	cs

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	133
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

safety critical parameter, read-only via bus

2.2.4.20 Parameter SafetyTime

FB: BUC	Property Name (Server): SafetyTime	Mandatory ☐ Optional ☒

Description:

Burner safety time with 100ms resolution

DPT:	Name	DPT_TimePeriod100MSec	DPT ID	7.004	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0..6553.5 s	s	cs

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	134
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

safety critical parameter, read-only via bus

2.2.4.21 Parameter IgnitionLoadInterval

FB: BUC	Property Name (Server): IgnitionLoadInterval	Mandatory ☐ Optional ☒

Description:

Burner ignition load interval with 100ms resolution

DPT:	Name	DPT_TimePeriod100MSec	DPT ID	7.004	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0..6553.5 s	s	cs

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	135
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

safety critical parameter, read-only via bus

2.2.4.22 Parameter NumberOfRestarts

FB: BUC	Property Name (Server): NumberOfRestarts	Mandatory ☐ Optional ☒

Description:

Allowed number of burner restarts (counter value)

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..255	--	cs

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	136
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

safety critical parameter, read-only via bus

2.2.4.23 Parameter PmaxBurner

FB: BUC	Property Name (Server): PmaxBurner	Mandatory ☐ Optional ☒

Description:

Max. limitation of burner power => adaption to boiler

DPT:	Name	DPT_PowerKW_Z	DPT ID	203.014	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Power	power value, 1kW resolution	M	0..65535	kW	cs
Status - OutOfService - all other flags	 max limitation active /inactive not supported, fixed to '0'	 O NA	 true/false	bitset	 false

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	137
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

safety critical parameter, read-only via bus

2.2.4.24 Diagnostic data PrelBurner

FB: BUC	Property Name (Server): PrelBurner	Mandatory ☐ Optional ☒

Description:

Current relative power of burner

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
RelValue	relative value	M	0..100%	%	--(void)
Status - OutOfService - all other flags	 RelValue valid / void not supported, fixed to '0'	 M NA	 true/false	bitset	 true

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	110
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.2.4.25 Diagnostic data Fault

FB: BUC	Property Name (Server): Fault	Mandatory ☒ Optional ☐

Description:

Burner failure (some error in the BUC)

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	111
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.2.4.26 Diagnostic data StatusStage1

FB: BUC	Property Name (Server): StatusStage1	Mandatory ☐ Optional ☒

Description:

Status stage 1 / base stage: on/off

DPT:	Name	DPT_Switch	DPT ID	1.001	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			on/off	bool	off

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	128 (BUC) 1	Property ID: N° of elements	112 1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.2.4.27 Diagnostic data StatusStage2

FB: BUC	Property Name (Server): StatusStage2	Mandatory ☐ Optional ☒

Description:

Status stage 2 / modulation: on/off

DPT:	Name	DPT_Switch	DPT ID	1.001	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			on/off	bool	off

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	128 (BUC) 1	Property ID: N° of elements	113 1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.2.4.28 Diagnostic data BurnerType

FB: BUC	Property Name (Server): BurnerType	Mandatory ☐ Optional ☒

Description:

Type of burner: 1 stage, 2 stage, modulating

DPT:	Name	DPT_BurnerType	DPT ID	20.101	Datatype format	N_8

Field	Description	Sup.	Range	Unit	Default
			[1..3]	enum.	cs

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	114
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

--

2.2.4.29 Diagnostic data FuelTypeSupport

FB: BUC	Property Name (Server): FuelTypeSupport	Mandatory ☐ Optional ☒

Description:

supported set of fuel types: gas, oil, solid state fuel

DPT:	Name	DPT_FuelTypeSet	DPT ID	21.104	Datatype format	B_8

Field	Description	Sup.	Range	Unit	Default
			b2..b0	bitset	cs

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	115
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

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2.2.4.30 Diagnostic data FuelTypeActual

FB: BUC	Property Name (Server): FuelTypeActual	Mandatory ☐ Optional ☒

Description:

Currently used fuel type

DPT:	Name	DPT_FuelType	DPT ID	20.100	Datatype format	N_8

Field	Description	Sup.	Range	Unit	Default
			[1..3] [1)]	enum	cs

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	116
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] not to be mixed-up with FuelSelect: the value Auto is not allowed

2.2.4.31 Diagnostic data PnomBurner

FB: BUC	Property Name (Server): PnomBurner	Mandatory ☐ Optional ☒

Description:

Nominal power of burner

DPT:	Name	DPT_PowerKW_Z	DPT ID	203.014	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Power	power value, 1kW resolution	M	0..65535	[kW]	cs
Status - OutOfService - all other flags	Pnom value valid or unknown/void not supported, fixed to '0'	O NA	true/false	bitset	false

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	117
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

--

2.2.4.32 Diagnostic data BstageLimit

FB: BUC	Property Name (Server): BstageLimit	Mandatory ☐ Optional ☒

Description:

Relative power limit % of stage 1 / base stage

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
RelValue	relative value	M	0..100%	%	cs
Status - OutOfService - all other flags	 RelValue valid / void not supported, fixed to '0'	 O NA	 true/false	bitset	 false

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	118
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

void for 1stage burner

2.2.4.33 Diagnostic data OperatingPhaseBurner

FB: BUC	Property Name (Server): OperatingPhaseBurner	Mandatory ☐ Optional ☒

Description:

Current burner operating phase, numerical value; company specific interpretation

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..255	--	cs

Communication:

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	121
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.2.4.34 Diagnostic data BurnerStarts

FB: BUC	Property Name (Server): BurnerStarts	Mandatory ☐ Optional ☒

Description:

Number of burner starts, 32 bit counter

DPT:	Name	DPT_Value_4_Ucount	DPT ID	12.001	Datatype format	U_{32}

Field	Description	Sup.	Range	Unit	Default
			full range	--	0

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	122
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

--

2.2.4.35 Diagnostic data ErrorCodeBUC

FB: BUC	Property Name (Server): ErrorCodeBUC	Mandatory ☐ Optional ☒

Description:

Company specific numeric 16 bit error code

DPT:	Name	DPT_Value_2_Ucount	DPT ID	7.001	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			full range	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	123
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.2.4.36 Diagnostic data VolumeOilCumul

FB: BUC	Property Name (Server): VolumeOilCumul	Mandatory ☐ Optional ☒

Description:

Cumulated oil volume in liter

DPT:	Name	DPT_VolumeLiter_Z	DPT ID	218.001	Datatype format	$V_{32}Z_8$

Field	Description	Sup.	Range	Unit	Default
VolumeLiter	cumulated value	M	>= 0 [1]	liter	0
Status				bitset	
- OutOfService	VolumeLiter valid or void/not available	M	true/false		false
- Fault	VolumeLiter corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- Write	normal Write => reset counter value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	124
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [2]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

[1] encoding on 32 bit signed integer value with 1 liter transport format resolution. The granularity of the internal resolution may be higher. In practise no binary overflow possible

[2] optional Write acces for counter reset or alarm acknowledge

2.2.4.37 Diagnostic data FlowRateOil

FB: BUC	Property Name (Server): FlowRateOil	Mandatory ☐ Optional ☒

Description:

Current oil flow rate in liter/h

DPT:	Name	DPT_UFlowRateLiter/h_Z	DPT ID	203.011	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
FlowRate	flow rate current value, 0.01 l/h resolution	M	0..655.35	l/h	cs
Status				bitset	
- OutOfService	FlowrRate valid or void/not available	M	true/false		false
- Fault	FlowRate corrupted, sensor failure	M	true/false		false
- all other flags	not supported, fixed to '0'	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	125
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

2.2.4.38 Diagnostic data StatusFlame

FB: BUC	Property Name (Server): StatusFlame	Mandatory ☐ Optional ☒

Description:

Burner flame status on/off

DPT:	Name	DPT_Switch	DPT ID	1.001	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			on/off	bool	off

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	126
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

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2.2.4.39 Diagnostic data CurrentIonisation

FB: BUC	Property Name (Server): CurrentIonisation	Mandatory ☐ Optional ☒

Description:

Ionisation current value µA

DPT:	Name	DPT_UElCurrentµA_Z	DPT ID	203.013	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
ElCurrent	ionisation current, 0.01 µA resolution	M	0..655.35	µA	cs
Status				bitset	
- OutOfService	ElCurrent valid or void/not available	M	true/false		false
- Fault	ElCurrent corrupted, sensor failure	M	true/false		false
- all other flags	not supported, fixed to '0'	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	127
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.2.4.40 Diagnostic data FanControl

FB: BUC	Property Name (Server): FanControl	Mandatory ☐ Optional ☒

Description:

Relative fan control value %

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
RelValue	relative value	M	0..100%	%	cs
Status				bitset	
- OutOfService	RelValue valid / void	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	128 (BUC)	Property ID:	128
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

--

2.3 Functional Block: Boiler Controller (BOC)

2.3.1 Functional Specification

The functional block Boiler Controller BOC controls the boiler temperature / flow temperature and optionally the boiler return temperature according to the present heat demand and boiler specific min. / max. temperature limitations.

Interworking with Heat Producer Manager HPM:

The operation of the Boiler Controller BOC is controlled by one Heat Producer Manager. The HPM may control multiple BOC's (boiler cascade) which must be located in the same Heat Production Segment.

Input:

- 'PowerFlowWaterDemHPM' The BOC the gets the flow temperature demand and power control information from the Producer Manager and controls correspondingly the boiler temperature, the boiler pump and burner stages or burner modulation.

Outputs:

- 'StatusBOC' The BOC reports the boiler status to the Producer Manager, which is used in the HPM for boiler sequence control.
- 'OpHrsBurner' burner operating hours for stage 1 / base stage
- 'LockSignBOC' The BOC may generate locking signal (for boiler startup protection and overload protection) which is evaluated in the HPM.
- 'ForceSignBOC' The BOC may generate forcing signal (for overheat protection or indication of oversupply or spare energy) which is evaluated in the HPM.
- 'BoilerSpec' Optionally the BOC can provide information containing boiler type and characteristics to be used in the HPM for optimized boiler control e.g. in a cascade.

Interworking with Burner Controller BUC:

Outputs used to control the burner:

- 'ValueDemBOC' The control of the burner BUC by the BOC can be done directly by relays or by communicating with the Burner Controller BUC. In case of bus controlled BUC, the boiler controller will generate the process demand signal ValueDemBOC. This signal contains information whether the burner should be off or on and additionally the requested relative power of the burner for 2-stage and modulating burner-type.
- 'FuelSelect' With this optional signal the type of fuel in the BUC (oil, gas etc.) can be selected by the BOC.
- 'BurnerReset' A remote reset of the burner can be executed by the BOC with the signal BurnerReset (optional command).

Information from the burner:

- 'StatusBUC' This input contains burner status information from the BUC (e.g. stage 1,2 active; current % modulation; fault etc.). This feedback is used in the BOC for optimized boiler control.
- 'OpHrsBurnerStage1' burner operating hours for stage 1 / base stage
- 'OpHrsBurnerStage2' burner operating hours for stage 2 / modulation
- 'BurnerSpec' The datapoint BurnerSpec contains burner type and characteristics in order to allow specific control mechanisms in the BOC.

Boiler Controller BOC has a 1:1 relationship with Burner Controller BUC. Both functional blocks are linked by the group 'ProdSegmH.Producer'.

Sensors/actuators:

The boiler temperature is mandatory for boiler control. The boiler temperature sensor is always connected to the BOC locally (hard wired, safety relevant).

A boiler return temperature sensor is optional and is also always hard wired.

In case of boiler sequence also the common flow temperature is optionally often used. The flow temperature sensor may either be connected locally (hard wired) to the device containing the BOC *) or sensor data may be received from the bus. In addition also common return temperature is optionally used (either hard wired *) or data input from bus).

*) *Remark: if flow temperature sensor resp. return temperature sensor is connected locally to the device containing the BOC, the corresponding Functional Blocks FLT (flow temperature) resp. RET (return temperature) are activated and distribute the temperature value in the 'ProdSegmH'*

The boiler pump is normally hard wired but optionally also bus-connected pump is possible.

Optional boiler return temperature control can be handled by a Flow Temperature Controller FTC. The Flow Temperature Controller and the BOC have a 1:1 relationship and are often located in the same device (hard wired actuator). Otherwise the 1:1 functional binding is established by setting a specific 1:1 link group 'GenPeripheral'

Outside temperature input may be used for local SummerMode mechanism.

2.3.2 Constraints

The control of the burner (BUC) is today often done directly by relays in the BOC

A BOC is controlled only by one HPM (1:1 link)

IMPORTANT: the output signal ValueDemBOC to control a BUC via bus can today not be implemented in standard mode because the necessary compound HVAC DPT for runtime-interworking is not yet available in standard mode and mapping of this signal to multiple standard datapoints is not possible because of the necessary data consistency.

Therefore for the time being only LTE implementations of the BUC and BOC functional blocks offer a bus-link to control the BUC by means of the ValueDemBOC signal.

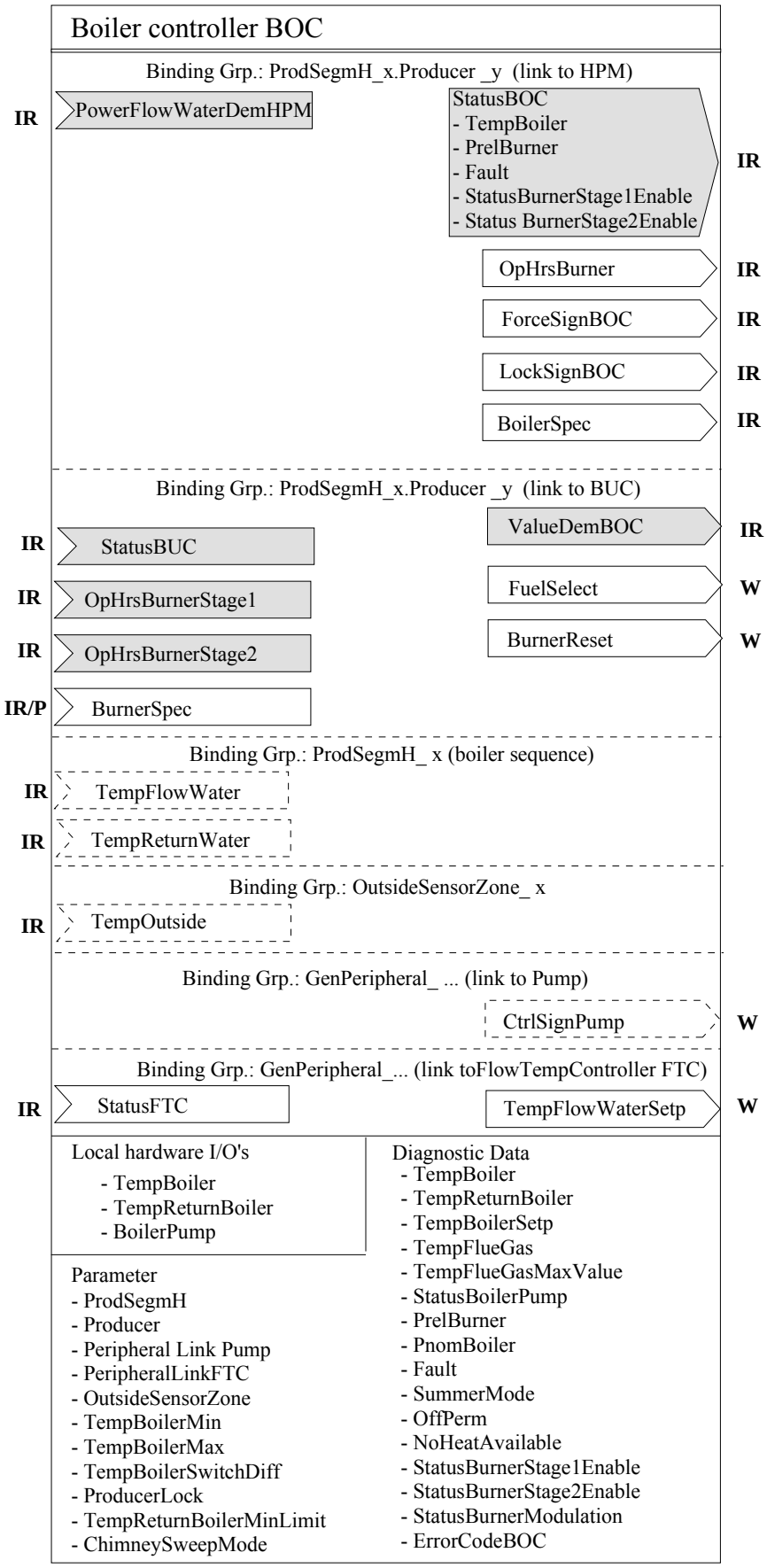
The input signal PowerFlowWaterDemHPM from HPM can today not be implemented in standard mode because the necessary compound HVAC DPT for runtime-interworking is not yet available in standard mode and mapping of this signal to multiple standard datapoints is not possible because of the necessary data consistency.

Therefore for the time being only LTE implementations of the BOC functional block offer a bus-link to a HPM which controls one ore multiple BOC by means of the signal PowerFlowWaterDemHPM (demand dependent heat production).

However the basic FB definition of the BOC enables the integration of the BOC into a standard system for remote control or visualisation.

Implementation of Safety Temperature Limiter (STL) function (according to EN 60730-2-9):
see remarks in functional block BUC, chapter 2.2.2

2.3.3 Functional block diagram



2.3.4 Datapoint description

2.3.4.1 Overview

Data Point	Description	Datapoint Type	DPT N°
Outputs			
StatusBOC	Status information from BOC	DPT_StatusBOC	215.100
- TempBoiler	Boiler temperature (S-interface)	DPT_Value_Temp	9.001
- PrelBurner	Current relative power of the attached burner (S-interface)	DPT_Percent_U8	5.004
- Fault	Boiler Fault (S-interface)	DPT_Bool	1.002
- StatusBunerStage1Enable	buner stage 1 / base stage: enabled /disabled (S-interface)	DPT_Enable	1.003
- StatusBunerStage2Enable	burner stage 2 / modulation: enabled /disabled (S-interface)	DPT_Enable	1.003
OpHrsBurner	Current operating hours stage 1, base stage of the attached burner: mapped/calculated value in the BOC	DPT_LongDeltaTimeSec	13.100
ForceSignBOC	Forcing signal, to force the consumers to consume energy from boiler	DPT_ForceSign	21.100
LockSignBOC	Locking signal, to force the consumers to reduce energy consumption from boiler	DPT_LockSign	207.101
BoilerSpec	Boiler type information	DPT_SpecHeatProd	216.100
ValueDemBOC	Process demand signal from BOC	DPT_ValueDemBOC	207.102
FuelSelect	switch between different burner fuel options	DPT_FuelType	20.100
BurnerReset	Command for burner remote reset	DPT_Reset	1.015
CtrlSignPump	Command for boiler pump with bus interface	t.b.d, probably multiple or complex DPT	?
TempFlowWaterSetp	Set value of boiler return temperature to be controlled by the FTC / LTE and S-interface	DPT_TempHVACAbs_Z	205.100 9.001
Inputs			
PowerFlowWaterDemHPM	Temperature demand from HPM	DPT_PowerFlowWater DemHPM	214.100
StatusBUC	Status information from BUC to BOC	DPT_StatusBUC	207.100
OpHrsBurnerStage1	Current burner operating hours for stage 1 / base stage	DPT_LongDeltaTimeSec	13.100
OpHrsBurnerStage2	Current burner operating hours for stage 2 / modulation	DPT_LongDeltaTimeSec	13.100
BurnerSpec	Burner type information	DPT_SpecHeatProd	216.100
TempFlowWater	Common flow water temperature of the hydraulic group / LTE and S-interface	DPT_TempHVACAbs_Z, DPT_Value_Temp	205.100 9.001
TempReturnWater	Common return water temperature of the hydraulic group / LTE and S-interface	DPT_TempHVACAbs_Z, DPT_Value_Temp	205.100 9.001
TempOutside	Outside temperature / LTE and S-interface	DPT_TempHVACAbs_Z, DPT_Value_Temp	205.100 9.001
StatusFTC	Status information from Flow Temperature Controller	DPT_StatusWTC	209.103
Parameters			
ProdSegmH	LTE zoning number Heat Production Segment	DPT_UcountValue8_Z	202.002
Producer	LTE zoning number Heat Producer	DPT_UcountValue8_Z	202.002
PeripheralLinkPump	LTE zoning number Peripheral link to pump	DPT_UcountValue16_Z	203.012

Data Point	Description	Datapoint Type	DPT N°
PeripheralLinkFTC	LTE zoning number Peripheral link to FTC	DPT_UcountValue16_Z	203.012
OutsideSensorZone	LTE zoning number for Outside Temperature	DPT_UcountValue8_Z	202.002
TempBoilerMax	Max. boiler temperature	DPT_TempHVACAbs_Z	205.100 *)
TempBoilerMin	Min. boiler temperature	DPT_TempHVACAbs_Z	205.100 *)
TempBoilerSwitchDiff	boiler switching temperature difference	DPT_TempHVACRel_Z	205.101 *)
ProducerLock	boiler is locked manually (parameter or diagnostic value only)	DPT_Bool	1.002
TempReturnBoilerMinLimit	minimal boiler return temperature	DPT_TempHVACAbs_Z	205.100 *)
ChimneySweepMode	chimney sweep function active (parameter or diagnostic value only)	DPT_Bool	1.002
Diagnostic Data			
TempBoiler	Current boiler temperature	DPT_TempHVACAbs_Z	205.100 *)
TempReturnBoiler	Current boiler return temperature	DPT_TempHVACAbs_Z	205.100 *)
TempBoilerSetp	current boiler temperature setpoint	DPT_TempHVACAbs_Z	205.100 *)
TempFlueGas	flue gas temperature	DPT_TempHVACAbs_Z	205.100 *)
TempFlueGasMaxValue	max. flue gas temp value; with reset possibility	DPT_TempHVACAbs_Z	205.100 *)
StatusBoilerPump	current relative power of the boiler pump, % value; for switched pump 0%=off, 100%=on	DPT_RelValue_Z	202.001 *)
PrelBurner	current relative burner power (mapped/calculated value in the BOC)	DPT_RelValue_Z	202.001 *)
PnomBoiler	nominal boiler power	DPT_PowerKW_Z	203.014 *)
Fault	boiler failure (some error in the BOC)	DPT_Bool	1.002
SummerMode	boiler in summer mode	DPT_Bool	1.002
OffPerm	boiler perrmanently off	DPT_Bool	1.002
NoHeatAvailable	boiler is temporarily not providing heat	DPT_Bool	1.002
StatusBurnerStage1Enable	buner stage 1 / base stage: enabled /disabled	DPT_Enable	1.003
StatusBurnerStage2Enable	burner stage 2 / modulation: enabled /disabled	DPT_Enable	1.003
StatusBurnerModulation	status of burner modulation, % value	DPT_RelValue_Z	202.001 *)
ErrorCodeBOC	company specific numeric error code	DPT_Value_2_Ucount	7.001

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Inputs	PowerFlowWaterDemHPM	**NA** [1)]	NA	NA	M
	StatusBUC	**NA** [1)]	NA	NA	M
	OpHrsBurnerStage1	**GO$_b$**	GO	GO	M
	OpHrsBurnerStage2	**GO$_b$** [2)]	GO [2)]	GO [2)]	M[2)]
	BurnerSpec	**NA**	NA	NA	O
	TempFlowWater	**(GO$_b$)**		(GO)	O
	TempReturnWater	**(GO$_b$)**		(GO)	O
	TempOutside	**(GO$_b$)**		(GO)	O
	StatusFTC	**NA**	NA	NA	O
Outputs	StatusBOC	**NA**	NA	NA	M
	- TempBoiler	**GO$_b$**	GO	GO	NA
	- PrelBurner	**GO$_b$**	GO	GO	NA
	- Fault	**GO$_b$**	GO	GO	NA
	- StatusBurnerStage1Enable	**GO$_b$**	GO	GO	NA
	- StatusBurnerStage2Enable	**GO$_b$** [2)]	GO [2)]	GO [2)]	NA
	OpHrsBurner	**(GO$_b$)**		(GO)	O
	ForceSignBOC	**NA**	NA	NA	O
	LockSignBOC	**NA**	NA	NA	O
	BoilerSpec	**NA**	NA	NA	O
	ValueDemBOC	**NA** [1)]	NA	NA	M
	FuelSelect	**NA**	NA	NA	O
	BurnerReset	**(GO$_b$)**		(GO)	O
	CtrlSignPump not yet defined				
	TempFlowWaterSetp	**(GO$_b$)**		(GO)	O

[1)] *mandatory in LTE Mode but the information is NA in the Basic FB and all other modes because the datapoint type is <u>today</u> not available in standard mode.. Splitting of DPT is not possible because of necessary data consistency*

[2)] *mandatory if BOC is supporting 2-stage burner or modulating burner; not available if BOC is supporting 1 stage burner only*

Table 5: BOC Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	ProdSegmH	M
	Producer	M
	PeripheralLinkPump	O
	PeripheralLinkFTC	O
	OutsideSensorZone	O

Table 6: BOC LTE specific Properties

		Support
Parameter	TempBoilerMax	O
	TempBoilerMin	O
	TempBoilerSwitchDiff	O
	ProducerLock	O
	TempReturnBoilerMinLimit	O
	ChimneySweepMode	O
Diagnostic Data	TempBoiler	M
	TempReturnBoiler	O
	TempBoilerSetp	M
	TempFlueGas	O
	TempFlueGasMaxValue	O
	StatusBoilerPump	O
	PrelBurner	O
	PnomBoiler	O
	Fault	M
	SummerMode	O
	OffPerm	O
	NoHeatAvailable	O
	StatusBurnerStage1Enable	O
	StatusBurnerStage2Enable	O
	StatusBurnerModulation	O
	ErrorCodeBOC	O

Table 7: BOC Standard Properties of Interface Objects (or memory mapped DP)

2.3.4.2 Output StatusBOC

Standard mode: NA => mapped to the datapoints TempBoiler, PrelBurner, Fault, StatusBurnerStage1Enable, StatusBurnerStage2Enable

LTE-HEE mode:

FB: **BOC**	**LTE Server Output Name:** **StatusBOC**	Mandatory ☒ Optional ☐

Description:

This signal contains status information of the boiler controller to be used in the HPM for boiler sequence control

DPT:	Name	DPT_StatusBOC	DPT ID	215.100	Datatype format	$V_{16}U_8B_{16}$

Field	Description	Sup.	Range	Unit	COV	Default
TempBoiler	Boiler temperature	M	full range	°C	2	cs
PrelBurner [1)]	Current relative power of the attached burner	O	0..100 %	%	10	cs
Attributes	Bitset containing status info					
–TempBoilerValid	validity of TempBoiler Field	M	true/false	bool	Y	false
– PrelBurnerValid	validity of PrelBoil Field	M	true/false	bool	Y	false
– Fault	boiler failure	M	true/false	bool	Y	false
– SummerMode	boiler switched off due to local summer/winter mode	O	true/false	bool	Y	false
– OffPerm	permanently off (manual switch or failure)	O	true/false	bool	Y	false
– NoHeatAvailable	boiler is temporary not providing heat	O	true / false	bool	Y	false
– StatusBurnerStage1Enable	stage 1 or base stage enabled	M	enable/ disable	bool	Y	disable
– StatusBurnerStage2Enable	stage 2 / modulation enabled	M [2)]	enable/ disable	bool	Y	disable
– ReqNextStage	for boiler with two stage burner: power limit of stage 1 is reached, HPM is requested to enable stage 2	O	true/false	bool	Y	false
– ReqNextBoiler	power limit of boiler is reached, HPM is requested to enable next boiler in cascade	O	true/false	bool	Y	false
– ReducedAvailability	boiler is in principle available but other boilers should be used with preference	O	true/false	bool	Y	false
– ChimneySweep	ChimneySweep function active	O	true/false	bool	Y	false

Communication:			
Binding Group:			
Class	Type		Default
Geographical ☐			
Application Specific ☒	ProdSegmH.Producer		1.1
Unassigned ☐	Broadcast ☐ Configurable ☐		
DP Address:	IO Type(ID): 129 (BOC)	Property ID: 51	
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒ MinRepTime: 10 sec	Heartbeat: 3 min	
	Output per default communicating ☐	Binding Group Wildcard allowed ☐	
	Tx Prio: High ☐ Normal ☒ Low ☐		
	Transm after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐		
Property-Service (individual access):	Read only ☒ Read/Write ☐		
Exception Handling:			Save at Powerdown ☐
--			
Special Features:			
In simple systems with only one boiler (no boiler sequence) HPM and BOC are usually located in the same device and in this case this signal can be device internal. 1) value for 1 stage or 2 stage burner: some BOC may be able to calculate % value according to stage on/off ratio. This field is optional for 1 and 2 stage burner => PrelBurnerValid Flag 2) mandatory for boiler with 2 stage /modulation burner only; not available in 1 stage burner => default value			

2.3.4.3 Output TempBoiler

Standard mode

DP Name:	TempBoiler	Abbr.:	--	Mandatory	☒
FB Name:	BOC			Can be internal	☐
Description					
Current boiler temperature					
Datapoint Type					
DPT_Name:	DPT_Value_Temp				
DPT Format:	F_{16}	DPT_ID:	9.001		
Field	Description	Supp.	Range	Unit	Default
			full range	°C	cs
Access Type					
♦ Output					
this → M ☒ 1)	this → 1 ☐				
Spontaneous ☒	COV: ☒	Δ-Value: 2 K	MinRepTime: 10s		
	Cyclic ☒	Period: 3 Min			
Request ☒					
Communication Type					
♦ Group Object Datapoint				Mandatory:	☒
Default Group Address:	--				
Dynamics					
Power down:	Save: ☐				
Power up:	Value:	No initialisation: ☐	Default value: ☐		
		Saved value: ☐	Actual value (not for input): ☒		
	Transmit on bus (only for output): ☐		Read from bus (only for input): ☐		
Exception Handling					
--					
Special Features					
1) this datapoint is also interesting for visualisation and not only used in the HPM					

LTE-HEE mode: NA

2.3.4.4 Output PrelBurner

Standard mode

DP Name:	PrelBurner	Abbr.:	--	Mandatory [1]	☒
FB Name:	BOC			Can be internal	☒

Description

Current relative power of the attached burner

Datapoint Type

DPT_Name:	DPT_Percent_U8				
DPT Format:	U_8	DPT_ID:	5.004		
Field	Description	Supp.	Range	Unit	Default
			0..100%	%	0%

Access Type

♦ Output

this → M	☐	this → 1	☒					
Spontaneous	☒	COV:	☒	Δ-Value:	10%	MinRepTime:	10s	
		Cyclic	☒	Period:	3 Min			
Request	☒							

Communication Type

♦ Group Object Datapoint		Mandatory:	☒ [1]
Default Group Address:	--		

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☐
		Saved value:	☐	Actual value (not for input):	☒
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

[1] not available on 1-stage burner, optional for 2-stage burner, mandatory for modulating burner

LTE-HEE mode: NA

2.3.4.5 Output Fault

Standard mode

DP Name:	Fault			Abbr.:	--				Mandatory	☒	
FB Name:	BOC								Can be internal	☐	
Description											
reports a boiler failure											
Datapoint Type											
DPT_Name:	DPT_Bool										
DPT Format:	B_1						DPT_ID:	1.002			
Field	Description						Supp.	Range		Unit	Default
											false
Access Type											
♦ Output											
this → M	☒ 1)		this → 1	☐							
Spontaneous	☒	COV:	☐	Δ-Value:	--	MinRepTime:	10s				
		Cyclic	☒	Period:	15 Min						
Request	☒										
Communication Type											
♦ Group Object Datapoint									Mandatory:	☒	
Default Group Address:	--										
Dynamics											
Power down:	Save:	☐									
Power up:	Value:	No initialisation:	☐			Default value:	☒				
		Saved value:	☐			Actual value (not for input):	☐				
	Transmit on bus (only for output):	☐				Read from bus (only for input):	☐				
Exception Handling											
--											
Special Features											
1) this datapoint is also interesting for visualisation and not only used in the HPM											

LTE-HEE mode: NA

2.3.4.6 Output StatusBurnerStage1Enable

Standard mode

DP Name:	StatusBunerStage1Enable	Abbr.:	--	Mandatory	☒
FB Name:	BOC			Can be internal	☒
Description					
buner stage 1 / base stage: enable / disable					
Datapoint Type					
DPT_Name:	DPT_Enable				
DPT Format:	B_1		DPT_ID:	1.003	
Field	Description		Supp.	Range	Unit / Default
					disable
Access Type					
♦ Output					
this → M	☐	this → 1	☒		
Spontaneous	☒	COV:	☐	Δ-Value: --	MinRepTime: 10s
		Cyclic	☒	Period: 3 Min	
Request	☒				
Communication Type					
♦ Group Object Datapoint				Mandatory:	☒
Default Group Address:	--				
Dynamics					
Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐
Exception Handling					
--					
Special Features					
--					

LTE-HEE mode: NA

2.3.4.7 Output StatusBurnerStage2Enable

Standard mode

DP Name:	StatusBunerStage2Enable	Abbr.:	--	Mandatory	☒
FB Name:	BOC			Can be internal	☒
Description					
buner stage 1 / base stage: enable / disable					
Datapoint Type					
DPT_Name:	DPT_Enable				
DPT Format:	B_1	DPT_ID:	1.003		
Field	Description	Supp.	Range	Unit	Default
					disable
Access Type					
♦ Output					
this → M	☐	this → 1	☒		
Spontaneous	☒	COV:	☐	Δ-Value: --	MinRepTime: 10s
		Cyclic	☒	Period: 3 Min	
Request	☒				
Communication Type					
♦ Group Object Datapoint				Mandatory:	☒
Default Group Address:	--				
Dynamics					
Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value (not for input):	☐
	Transmit on bus (only for output):	☐		Read from bus (only for input):	☐
Exception Handling					
--					
Special Features					
[2] mandatory if BOC is supporting 2-stage burner or modulating burner; not available if BOC is supporting 1 stage burner only					

LTE-HEE mode: NA

2.3.4.8 Output OpHrsBurner

Standard mode

DP Name:	OpHrsBurner	Abbr.:	--	Mandatory	☐
FB Name:	BOC			Can be internal	☒

Description

Current operating hours stage 1, base stage of the attached burner

Datapoint Type

DPT_Name:	DPT_LongDeltaTimeSec				
DPT Format:	V_{32}	DPT_ID:	13.100		
Field	Description	Supp.	Range	Unit	Default
			>=0 [1]	h	0

Access Type

♦ Output

this → M	☒ [2]	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:		MinRepTime:	
		Cyclic	☒	Period:	1 h		
Request	☒						

Communication Type

♦ Group Object Datapoint		Mandatory:	☒
Default Group Address:	--		

Dynamics

Power down:	Save:	☒			
Power up:	Value:	No initialisation:	☐	Default value:	☐
		Saved value:	☒	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

This output is optional because in stand alone boilers (no boiler sequence) this information is normally not used / not implemented

[1] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible

[2] this datapoint could also be interesting for visualisation and not only used in the HPM

LTE-HEE mode:

FB: BOC	**LTE Server Output Name:** OpHrsBurner	Mandatory ☐ Optional ☒

Description:

This output process signal contains the current boiler operating hours: burner stage 1, base stage (mapped/calculated value in the BOC)

DPT:	Name	DPT_LongDeltaTimeSec	DPT ID	13.100	Datatype format	V_{32}

Field	Description	Sup.	Range	Unit	COV	Default
			>=0 [1)]	h	--	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 129 (BOC)	Property ID: 56
LTE-Services (event):	COV ☐ MinRepTime: -- sec	Heartbeat: 15 min
InfoReport ☒	Output per default communicating ☐	Binding Group Wildcard allowed ☐
(LTE Read-Response polling of the output shall always be supported)	Tx Prio: High ☐ Normal ☒ Low ☐	
	Transm after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐	
Property-Service (individual access):	Read only ☒ Read/Write ☐	

Exception Handling: Save at Powerdown ☒

--

Special Features:

This output is optional because in stand alone boilers (no boiler sequence) this information is normally not used / not implemented

[1)] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible

2.3.4.9 Output ValueDemBOC

Standard mode: NA

LTE-HEE mode:

FB: **BOC**	**LTE Server Output Name:** **ValueDemBOC**	Mandatory ☒ Optional ☐

Description:

This signal is provided by the BOC in order to control the corresponding burner BUC

DPT:	Name	DPT_ValueDemBOC	DPT ID	207.102	Datatype format	U_8B_8

Field	Description	Sup.	Range	Unit	COV	Default
RelBurnerDem	Relative demand %: for modulating burner	O	0..100%	%	5	0%
Attributes – Stage1Control	Bitset containing control info controls operation of burner stage 1 or base stage	M		bool on/off	Y	off
– Stage2Control	controls stage 2 for two stage / modulating burner	M [1)]		bool on/off	Y	off

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 129 (BOC)		Property ID: 53	
LTE-Services (event):	COV ☒	MinRepTime: 10 sec		Heartbeat: 3 min
InfoReport ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
(LTE Read-Response polling of the output shall always be supported)	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

burner stage control information: see chapter 2.2.4.10

This signal can be device internal if BUC and BOC are located in the same device

[1)] mandatory if BOC supports modulating burner or 2 stage burner, not supported if BOC may control only 1 stage burner

2.3.4.10 Output LockSignBOC

Standard mode: NA

LTE-HEE mode:

FB: BOC	**LTE Server Output Name:** LockSignBOC	Mandatory ☐ Optional ☒

Description:

The BOC indicates with this output signal, that the boiler is overloaded. See document [08]. The signal is used in the HPM for boiler sequence control and generation of LockSignHPM signal. Two types of overload situations are distinguished: overload is critical (too low boiler temp.) or uncritical (requested boiler temperature can not be provided but boiler temperature is above critical lower limit)

DPT:	Name	DPT_LockSign	DPT ID	207.101	Datatype format	U_8B_8

Field	Description	Sup.	Range	Unit	COV	Default
PwrReduction	Requested power-consumption reduction – 0 % no reduction – 100% max. reduction	M	0..100%	%	5	cs
Attributes – LockRequest	Bitset containing status info indicates if power reduction is necessary (validity of PwrReduction)	M	true/false	bool	Y	false
– Type	type of overload; value is only meaningful if LockRequest=true	M	critical / uncritical	bool	Y	uncritical

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 129 (BOC)		Property ID: 55	
LTE-Services (event): InfoReport ☒	COV ☒	MinRepTime: 10 sec	Heartbeat: 3 [1)] min	
	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
(LTE Read-Response polling of the output shall always be supported)	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: [1)] Stored Value ☐	Act Value ☐	Default Value ☐	
Property-Service (individual access):	Read only ☒ [2)]	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

This signal can be device internal if BOC and HPM are located in the same device

1) Heartbeat: the signal is re-transmitted periodically (if no COV occured) as long as the LockRequest attribute is true. When the overload condition in the BOC disappears, the LockRequest attribute changes to false and the signal is still repeated with the heartbeat-period during 9 minutes (3 messages). Afterwards re-transmission is stopped until a new overload condition appears (this procedure reduces unnecessary bus-load).

2) Read access is possible but in practice not very useful

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2.3.4.11 Output ForceSignBOC

Standard mode: NA

LTE-HEE mode:

FB: BOC	LTE Server Output Name: ForceSignBOC	Mandatory ☐ Optional ☒

Description:

The BOC indicates with this output signal, that the boiler is overheated or that the boiler has remaining energy to be used by the consumers. See document [08]. The signal is used in the HPM for boiler sequence control and generation of ForceSignHPM signal.

DPT:	Name	DPT_ForceSign	DPT ID	21.100	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
Attributes	Bitset containing status info					
- ForceRequest	indicates if forced power consumption is necessary (validity of remaining attributes)	M	true / false	bool	Y	false
- Protection	indicates that overheat is critical (too high boiler temp.)	M	true / false	bool	Y	false
- Oversupply	indicates that overheat is uncritical but boiler temperature is much higher than requested by heat demand from HPM	M	true / false	bool	Y	false
- Overrun	indicates that remaining energy is available in the boiler after load shutdown	M	true / false	bool	Y	false
- DHWNorm	not available in ForceSignBOC	NA	false	bool	--	false
- DHWLegio	not available in ForceSignBOC	NA	false	bool	--	false
- RoomHComf	not available in ForceSignBOC	NA	false	bool	--	false
- RoomHMax	not available in ForceSignBOC	NA	false	bool	--	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	54
LTE-Services (event): InfoReport ☒	COV ☒	MinRepTime: 10 sec	Heartbeat: 3 [1] min	
	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: [1] Stored Value ☐	Act Value ☐	Default Value ☐	
Property-Service (individual access):	Read only [2] ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

This signal can be device internal if BOC and HPM are located in the same device

[1] Heartbeat: the signal is re-transmitted periodically (if no COV occured) as long as the ForceRequest attribute is true. When the forcing condition in the BOC disappears, the ForceRequest attribute changes to false and the signal is still repeated with the heartbeat-period during 9 minutes (3 messages). Afterwards re-transmission is stopped until a new forcing condition appears (this procedure reduces unnecessary bus-load

[2] Read access is possible but in practice not very useful

2.3.4.12 Output BoilerSpec

Standard mode: NA

LTE-HEE mode:

FB: **BOC**	**LTE Server Output Name:** **BoilerSpec**	Mandatory ☐ Optional ☒

Description:

This datapoint specifies the type and characteristics of the boiler. This information may be read by the HPM in order to allow specific boiler control mechanisms. The content of this signal is often the same as in the corresponding BurnerSpec signal. But a boiler could contain more than one burner (exception to the standard HWH application model) and therefore the information should be separated. The value of this datapoint may in some cases change during runtime. Changes are reported spontaneously.

DPT:	Name	DPT_SpecHeatProd	DPT ID	216.100	Datatype format	$U_{16}U_8N_8B_8$

Field	Description	Sup.	Range	Unit	COV	Default
Pnom	Boiler nominal power	M	0 .. 65535	kW	1	cs
BstageLimit	relative power limit % of stage 1 resp. base stage	M [1)]	0..100%	%	10	cs
BurnerType	1 stage, 2 stage, modulating.	M	[1..3]	enum.	Y	cs
FuelType	set of supported fuel types	M	b2..b0	bitset	Y	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 129 (BOC)	Property ID: 52	
LTE-Services (event):	COV ☒ MinRepTime: -- sec	Heartbeat: -- min	
InfoReport ☒	Output per default communicating ☐	Binding Group Wildcard allowed ☐	
(LTE Read-Response polling of the output shall always be supported)	Tx Prio: High ☐	Normal ☒ Low ☐	
	Transm after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐		
Property-Service (individual access):	Read only ☒	Read/Write ☐	

Exception Handling: Save at Powerdown ☐

--

Special Features:

This datapoint has usually a constant value and is read once by the HPM after system installation / power up. The datapoint may also change during runtime. In this case spontaneous transmission (COV) of the datapoint shall be supported (no heartbeat).
This signal can be device internal if BOC and HPM are located in the same device
[1)] dummy value for 1 stage burner: 100%

2.3.4.13 Output FuelSelect

Standard mode: NA

LTE-HEE mode:

FB: **BOC**	**LTE Client Output Name:** **FuelSelect**	Mandatory ☐ Optional ☒

Description:

This datapoint is used by the BOC to switch between different fuel options in the BUC. The BOC knows the supported fuel types according to the BurnerSpec information

DPT:	Name	DPT_FuelType	DPT ID	20.100	Datatype format	N_8

Field	Description	Sup.	Range	Unit	COV	Default
FuelSelect	see above	M	[1-3]	enum	Y	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	53
LTE-Services (event): Write ☒	COV ☒	MinRepTime: -- sec	Heartbeat: -- min	
	Output per default communicating ☐	Binding Group Wildcard allowed ☐		
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	

Exception Handling: Save at Powerdown ☐

--

Special Features:

This signal can be device internal if BUC and BOC are located in the same device

2.3.4.14 Output BurnerReset

Standard mode:

DP Name:	BurnerReset	Abbr.:	--	Mandatory	☐
FB Name:	BOC			Can be internal	☒

Description

see LTE-HEE Mode

Datapoint Type

DPT_Name:	DPT_Reset				
DPT Format:	B_1	DPT_ID:	1.015		
Field	Description	Supp.	Range	Unit	Default
			{0,1} [1)]	bool	0

Access Type

♦ Output

this → M	☐	this → 1	☒				
Spontaneous	☒	COV:	☐	Δ-Value:	--	MinRepTime:	10s
		Cyclic	☐	Period:	--		
Request	☐						

Communication Type

♦ Group Object Datapoint		Mandatory:	☒
Default Group Address:	--		

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

[1)] This is a transient “trigger” command. Only the value ‘1’ is transmitted. Heartbeat repetition of this signal is not allowed; no transmission after power-up

LTE-HEE mode:

FB: **BOC**	**LTE Client Output Name:** **BurnerReset**	Mandatory ☐ Optional ☒

Description:

This information may be written by the BoilerController to reset the BUC. Remote reset of the burner may be safety-relevant. These safety mechanisms are handled by the BUC.

DPT:	Name	DPT_Reset	DPT ID	01.015	Datatype format	N_8

Field	Description	Sup.	Range	Unit	COV	Default
BurnerReset	"reset" trigger 0 = no action 1 = trigger command	M	[0/1]	bool	Y	0

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	54
LTE-Services (event):	COV ☒	MinRepTime: -- sec	Heartbeat: --[1] min	
Write ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: [1]	Stored Value ☐	Act Value ☐	Default Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This signal can be device internal if BUC and BOC are located in the same device

[1] This is a transient "trigger" command. Only the value '1' is transmitted. Heartbeat repetition of this signal is not allowed; no transmission after power-up

2.3.4.15 Output CtrlSignPump

To be defined later together with pump manufacturers.

2.3.4.16 Output TempFlowWaterSetp

Standard mode

DP Name:	TempFlowWaterSetp		Abbr.:	--			Mandatory	☐	
FB Name:	BOC						Can be internal	☒	
Description									
see LTE-HEE mode									
Datapoint Type									
DPT_Name:	DPT_Value_Temp								
DPT Format:	F_{16}				DPT_ID:	9.001			
Field	Description				Supp.	Range	Unit	Default	
						full range	°C	cs	
Access Type									
♦ Output									
this → M	☐		this → 1	☒					
Spontaneous	☒	COV:	☒	Δ-Value:	1 °C	MinRepTime:	10s		
		Cyclic	☒	Period:	15 Min				
Request	☒								
Communication Type									
♦ Group Object Datapoint						Mandatory:	☒		
Default Group Address:	--								
Dynamics									
Power down:	Save:	☐							
Power up:	Value:	No initialisation:	☐	Default value:	☐				
		Saved value:	☐	Actual value (not for input):	☒				
		Transmit on bus (only for output):	☐	Read from bus (only for input):	☐				
Exception Handling									
--									
Special Features									
--									

LTE-HEE mode:

FB: **BOC**	**LTE Client Output Name:** **TempFlowWaterSetp**	Mandatory ☐ Optional ☒

Description:

This signal is optionally used by the BOC to control an “intelligent” boiler return temperature controller.

DPT:	Name	DPT_TempHVACAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowWaterSetp	temperature setpoint	M	full range	°C	1	cs
Command - Write - other Commands	standard Command field normal Write not applicable	 M NA		enum		

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☐		
Unassigned ☒	Broadcast ☐ Configurable ☒	1

DP Address:	IO Type(ID):	120 (FTC)	Property ID:	52
LTE-Services (event): Write ☒	COV ☒	MinRepTime: 10 sec	Heartbeat:	15 min
	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	

Exception Handling:	Save at Powerdown ☐
--	

Special Features:

--

2.3.4.17 Input PowerFlowWaterDemHPM

Standard mode: NA

LTE-HEE mode:

FB: BOC	**LTE Client Input Name:** PowerFlowWaterDemHPM	Mandatory ☒ Optional ☐

Description:

This input signal contains the current flow temperature demand (absolute value) and further boiler control information from the Heat Producer Manager HPM. The burner controller BUC is controlled by the BOC according to the PowerFlowWaterDemHPM signal but other information like current boiler temperature / common flow temperature etc. is also considered. The boiler control mechanism is company specific.

DPT:	Name	DPT_PowerFlowWaterDemHPM	DPT ID	214.100	Datatype format	$V_{16}U_8B_8$

Field	Description	Sup.	Unit	Default
TempFlowDem	flow temperature demand / requested boiler temp	M	°C	cs
RelDemLimit	Relative demand %: max. limitation for modulating burner => used in boiler sequence	M [1)]	%	cs
Attributes	Bitset containing control info			
– TempFlowDemValid	validity of TempFlowDem: true / false ('false' means also 'no demand')	M	bool	cs
– Stage1Enabled	enabled / diabled: if enabled, stage 1 can be activated by the BOC => forced or auto	M	bool	cs
– Stage1Forced	forced / auto: if forced: stage 1 is generally on if auto: stage 1 is activated if necessary according to boiler temperture	M	bool	cs
– Stage2Enable	stage 2 control: see stage 1	M [2)]	bool	cs
– Stage2Forced	stage 2 control: see stage 1	M [2)]	bool	cs
– BoilerEnable	enable / disable: boiler pump is on (water flow) must be enabled before burner is turned on	M	bool	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	52
LTE-Service (event):	InfoReport Sniffer on Binding Group:		--	
InfoReport ☒	Timeout:	7 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:		--	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

The boiler controller will use a company specific default value after power-up or in case of communication failure, if no data from HPM is received

Special Features:

This input can be internal (1:1 link with HPM)

[1)] mandatory if BOC supports modulating burner; not supported if BOC may control only 1 stage or 2 stage burner

[2)] mandatory if BOC supports modulating burner or 2 stage burner; not supported if BOC may control only 1 stage burner

Boiler power control: table below

Burner type	**Boiler Mode**		**Stage 1 enabled**	**Stage 1 forced**	**Stage 2 enabled**	**Stage 2 forced**	**Rel Demand Limit**	**Flow Temp Dem**
1 Stage	disabled		**0**	x	x	x	x	x
	enabled	forced	**1**	**1**	x	x	x	x
		auto *)	**1**	**0**	x	x	x	**°C**
2 Stage	disabled		**0**	x	x	x	x	x
	Stage 1 enabled	Stage1 forced	**1**	**1**	**0**	x	x	x
	Stage 2 disabled	Stage 1 auto	**1**	**0**	**0**	x	x	**°C**
	Stage 2 enabled	Stage 1 & 2 forced	**1**	x	**1**	**1**	x	x
		Stage 1 auto Stage 2 auto *)	**1**	**0**	**1**	**0**	x	**°C**
		Stage 1 forced Stage 2 auto	**1**	**1**	**1**	**0**	x	**°C**
Modulating	disabled		**0**	x	x	x	x	x
	Base Stage enabled	B. Stage forced	**1**	**1**	**0**	x	x	x
	Modulation disabled	B. Stage auto	**1**	**0**	**0**	x	x	**°C**
	Modulation enabled	forced (100 %)	**1**	x	**1**	**1**	x	x
		B. Stage auto Modulation limit	**1**	**0**	**1**	**0**	**%**	**°C**
		B. Stage forced Modulation limit	**1**	**1**	**1**	**0**	**%**	**°C**
		auto *)	**1**	**0**	**1**	**0**	**100%**	**°C**

*) typically stand alone operation, all other states are usually used in boiler cascade

Table 8: Boiler Power Control (PowerFlowWaterDemHPM)

2.3.4.18 Input StatusBUC

Standard mode: NA

LTE-HEE mode:

FB: BOC	**LTE Client Input Name:** StatusBUC	Mandatory ☒ Optional ☐

Description:

This process signal from BUC contains status information of the burner to be used in the BOC for boiler control.

DPT:	Name	DPT_StatusBUC	DPT ID	207.100	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
PrelBurner [1]	Current relative power	M	%	0%
Attributes	Bitset containing status info			
– Fault	burner failure	M	bool	false
– StatusStage1	stage 1 or base stage active	M	bool	false
– StatusStage2	stage 2 active	M	bool	false
– PrelBurnerValid [1]	validity of PrelBurner Field	M	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	51
LTE-Service (event):	InfoReport Sniffer on Binding Group:		--	
InfoReport ☒	Timeout:	7 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:		--	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This input can be internal (1:1 link with BUC)

[1] value for 1 stage burner: void => PrelBurnerValid Flag=false
value for 2 stage burner: some 2 stage BUC may be able to indicate % value if only stage 1 is on. But this is an optional feature: This field is optional for 2 stage burner => validity according to PrelBurnerValid flag

[2] value for 1 stage burner: void => OpHrsSt2Valid Flag=false

2.3.4.19 Input OpHrsBurnerStage1

Standard mode

DP Name:	OpHrsBurnerStage1		Abbr.:	--			Mandatory	☒	
FB Name:	BOC						Can be internal	☒	
Description									
Current burner operating hours for stage 1 / base stage of the attached burner									
Datapoint Type									
DPT_Name:	DPT_LongDeltaTimeSec								
DPT Format:	V_{32}				DPT_ID:	13.100			
Field	Description				Supp.	Range		Unit	Default
						>=0 [1]		h	0
Access Type									
♦ Input									
N → this	☐	1 → this	☒						
Spontaneous	☒	Cyclically:	☒	Time-out:	121 min				
Request	☐	Polling:	☐	Period:					
Communication Type									
♦ Group Object Datapoint							Mandatory:	☒	
Default Group Address:	--								
Dynamics									
Power down:	Save:	☒							
Power up:	Value:	No initialisation:	☐	Default value:	☐				
		Saved value:	☒	Actual value (not for input):	☐				
	Transmit on bus (only for output):	☐		Read from bus (only for input):	☐				
Exception Handling									
--									
Special Features									
[1] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible									

LTE-HEE mode:

FB: **BOC**	**LTE Client Input Name:** **OpHrsBurnerStage1**	Mandatory ☒ Optional ☐

Description:

Current burner operating hours for stage 1 / base stage of the attached burner

DPT:	Name	DPT_LongDeltaTimeSec	DPT ID	13.100	Datatype format	V_{32}

Field	Description	Sup.	Unit	Default
			h	0

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	55
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:			--
	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: [1] Default Value ☐ Stored Value ☒

Exception Handling: Save at Powerdown ☒

--

Special Features:

This input can be internal (1:1 link with BUC)

[1] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible

2.3.4.20 Input OpHrsBurnerStage2

Standard mode

DP Name:	OpHrsBurnerStage2		Abbr.:	--			Mandatory [2]	☒	
FB Name:	BOC						Can be internal	☒	
Description									
Current burner operating hours for stage 2 / modulation of the attached burner									
Datapoint Type									
DPT_Name:	DPT_LongDeltaTimeSec								
DPT Format:	V_{32}				DPT_ID:		13.100		
Field	Description				Supp.	Range		Unit	Default
						>=0 [1]		h	0
Access Type									
♦ Input									
N → this	☐	1 → this	☒						
Spontaneous	☒	Cyclically:	☒	Time-out:	121 min				
Request	☐	Polling:	☐	Period:					
Communication Type									
♦ Group Object Datapoint						Mandatory:	☒ [2]		
Default Group Address:	--								
Dynamics									
Power down:	Save:	☒							
Power up:	Value:	No initialisation:	☐	Default value:	☐				
		Saved value:	☒	Actual value (not for input):	☐				
	Transmit on bus (only for output):	☐		Read from bus (only for input):	☐				
Exception Handling									
--									
Special Features									
[1] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible [2] mandatory if BOC is supporting 2-stage burner or modulating burner; not available if BOC is supporting 1 stage burner only									

LTE-HEE mode:

FB: **BOC**	**LTE Client Input Name:** **OpHrsBurnerStage2**	Mandatory ☒[2)] Optional ☐

Description:
Current burner operating hours for 2 / modulation of the attached burner

DPT:	Name	DPT_LongDeltaTimeSec	DPT ID	13.100	Datatype format	V_{32}

Field	Description	Sup.	Unit	Default
			h	0

Communication:			
Binding Group:			
Class	Type	Default	
Geographical ☐			
Application Specific ☒	ProdSegmH.Producer	1.1	
Unassigned ☐	Broadcast ☐ Configurable ☐		
DP Address:	IO Type(ID): 128 (BUC)	Property ID: 56	
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group: --		
	Timeout: 31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group: --		

Value after Powerup: [1)]	Default Value ☐	Stored Value ☒
Exception Handling:		Save at Powerdown ☒
--		

Special Features:
This input can be internal (1:1 link with BUC) [1)] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible [2)] mandatory if BOC is supporting 2-stage burner or modulating burner; not available if BOC is supporting 1 stage burner only

2.3.4.21 Input BurnerSpec

Standard mode: NA

LTE-HEE mode:

FB: BOC	**LTE Client Input Name:** BurnerSpec	Mandatory ☐ Optional ☒

Description:

This process signal from BUC specifies the type and characteristics of the burner. This information is used by the BoilerController in order to activate appropriate burner control mechanisms.

DPT:	Name	DPT_SpecHeatProd	DPT ID	216.100	Datatype format	$U_{16}U_8N_8B_8$

Field	Description	Sup.	Unit	Default
Pnom	Burner nominal power	M	kW	cs
BstageLimit [1]	relative power limit % of stage 1 resp. base stage	M	%	cs
BurnerType	1 stage, 2 stage, modulating etc.	M	enum.	cs
FuelType	set of supported fuel types	M	bitset	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	128 (BUC)	Property ID:	52
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	-- Min		
LTE-Service (polling): Read – Response [2] ☒	Read Wildcard / Resp Sniffer on Binding Group:	--		

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

[2] If the BUC is not supporting this datapoint (no response => timeout), the boiler controller will use a company specific default value, as well as after power-up or in case of communication failure

Special Features:

This datapoint has usually a constant value and is read once by the BOC after system installation / power up. But in some cases it may change during runtime. Changes are reported by the BUC spontaneously (no heartbeat !) and therefore spontaneous reception must be supported in the BOC
This input can be internal (1:1 link with BUC)
[1] dummy value for 1 stage burner: 100%

2.3.4.22 Input TempFlowWater

Standard mode

DP Name:	TempFlowWater	Abbr.:	--	Mandatory	☐
FB Name:	BOC			Can be internal	☒

Description

see LTE-HEE mode

Datapoint Type

DPT_Name:	DPT_Value_Temp				
DPT Format:	F_{16}	DPT_ID:	9.001		
Field	Description	Supp.	Range	Unit	Default
			full range	°C	cs

Access Type

♦ Input

N → this	☐	1 → this	☒			
Spontaneous	☒	Cyclically:	☒	Time-out:	31 min	
Request	☐	Polling:	☐	Period:		

Communication Type

♦ Group Object Datapoint		Mandatory:	☐
Default Group Address:	--		

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

--

LTE-HEE mode:

FB: **BOC**	**LTE Client Input Name:** **TempFlowWater**	Mandatory ☐ Optional ☒

Description:

This process signal from a flow temperature sensor contains the common water flow temperature of the hydraulic boiler group (cascade) which may be optionally used by the BOC instead of a local flow temperature sensor

DPT:	Name	DPT_TempHVACAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Unit	Default
TempFlowWater	temperature value	M	°C	cs
Status	standard Status attributes	M	bitset	
- OutOfService	void sensor value true / false	M	bool	false
- Fault	sensor failure true / false	M	bool	false
- Overridden	sensor value overridden true / false	O	bool	false
- InAlarm	sensor value alarm true /false	O	bool	false
- AlarmUnAck	alarm acknowledgement status ack / unack	O	bool	unack
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	324 (FWTS)	Property ID:	51
LTE-Service (event):	InfoReport Sniffer	on Binding Group:		--
InfoReport ☒	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

The boiler controller will use a company specific default value after power-up or in case of communication failure, if no sensor data is received.

Special Features:

This input can be internal

2.3.4.23 Input TempReturnWater

Standard mode

DP Name:	TempReturnWater	Abbr.:	--	Mandatory	☐
FB Name:	BOC			Can be internal	☒

Description

see LTE-HEE mode

Datapoint Type

DPT_Name:	DPT_Value_Temp				
DPT Format:	F_{16}	DPT_ID:	9.001		
Field	Description	Supp.	Range	Unit	Default
			full range	°C	cs

Access Type

♦ Input

N → this	☐	1 → this	☒			
Spontaneous	☒	Cyclically:	☒	Time-out:	31 min	
Request	☐	Polling:	☐	Period:		

Communication Type

♦ Group Object Datapoint		Mandatory:	☐
Default Group Address:	--		

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

--

LTE-HEE mode:

FB: BOC	**LTE Client Input Name:** TempReturnWater	Mandatory ☐ Optional ☒

Description:

This process signal from a temperature sensor contains the common return water temperature of the hydraulic boiler group (cascade).

DPT:	Name	DPT_TempHVACAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Unit	Default
TempReturnWater	temperature value	M	°C	cs
Status	standard Status attributes	M	bitset	
- OutOfService	void sensor value true / false	M	bool	false
- Fault	sensor failure true / false	M	bool	false
- Overridden	sensor value overridden true / false	O	bool	false
- InAlarm	sensor value alarm true /false	O	bool	false
- AlarmUnAck	alarm acknowledgement status ack / unack	O	bool	unack
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	325 (RNWTS)	Property ID:	51
LTE-Service (event):	InfoReport Sniffer on Binding Group:		--	
InfoReport ☒	Timeout:	31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:		--	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

The boiler controller will use a company specific default value after power-up or in case of communication failure, if no sensor data is received.

Special Features:

This input can be internal

2.3.4.24 Input TempOutside

Standard mode

DP Name:	TempOutside	Abbr.:	--	Mandatory	☐
FB Name:	BOC			Can be internal	☒
Description					
see LTE-HEE mode					
Datapoint Type					
DPT_Name:	DPT_Value_Temp				
DPT Format:	F_{16}		DPT_ID:	9.001	
Field	Description	Supp.	Range	Unit	Default
			full range	°C	cs
Access Type					
♦ Input					
N → this	☐	1 → this	☒		
Spontaneous	☒	Cyclically:	☒	Time-out:	31 min
Request	☐	Polling:	☐	Period:	
Communication Type					
♦ Group Object Datapoint				Mandatory:	☐
Default Group Address:	--				
Dynamics					
Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐
Exception Handling					
--					
Special Features					
--					

LTE-HEE mode:

FB: **BOC**	**LTE Client Input Name:** **TempOutside**	Mandatory ☐ Optional ☒

Description:

Outside temperature from a remote outside temperature sensor can be used for local SummerMode mechanism

DPT:	Name	DPT_TempHVACAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Unit	Default
TempOutside	temperature value	M	°C	cs
Status	standard Status attributes	M	bitset	
- OutOfService	void sensor value true / false	M	bool	false
- Fault	sensor failure true / false	M	bool	false
- Overridden	sensor value overridden true / false	O	bool	false
- InAlarm	sensor value alarm true /false	O	bool	false
- AlarmUnAck	alarm acknowledgement status ack / unack	O	bool	unack
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	OutsideSensorZone	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	320 (OTS)	Property ID:	51
LTE-Service (event):	InfoReport Sniffer on Binding Group:		--	
InfoReport ☒	Timeout:	31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:		--	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

The boiler controller will use a company specific default value after power-up or in case of communication failure, if no sensor data is received. The outside temperature value from another OTS (different zone) may also be used (company specific behaviour)

Special Features:

This input can be internal

2.3.4.25 Input StatusFTC

Standard mode: NA

LTE-HEE mode:

FB: **BOC**	**LTE Client Input Name:** **StatusFTC**	Mandatory ☐ Optional ☒

Description:

This signal contains the current flow temperature and other status information of a Flow Temperature Controller
An “intelligent” boiler return temperature controller sends it status information to the BOC. The BOC may use this information for optimized boiler control.

DPT:	Name	DPT_StatusWTC	DPT ID	209.103	Datatype format	$V_{16}B_8$

Field	Description	Sup.	Unit	Default
TempWater	current flow temperature of FTC	M	°C	cs
Attributes				
- TempWaterValid	validity of TempWater field	M	bool	false
- Fault	some failure in the FTC	M	bool	false
- CtrlStatus	Controller status on: FTC is working (default if not supported) off: FTC is stopped; no control of flow temperature	O	bool	on

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☐		
Unassigned ☒	Broadcast ☐ Configurable ☒	1

DP Address:	IO Type(ID): 120 (FTC)	Property ID:	51
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group: --		
	Timeout: 31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group: --		

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This input can be internal

2.3.4.26 Parameter ProdSegmH

FB: BOC	Property Name (Server): ProdSegmH	Mandatory ☒ Optional ☐

Description:

LTE zoning information Heat Production Segment

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Heat Production Segment number	M	1..16	--	1
Status				bitset	
- OutOfService	zone active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set zone inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	101
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

BOC DP's are not LTE communicating if zone is 'OutOfService'. If ProdSegmH is 'OutOfService' also the correspoinding Producer zone is 'OutOfService' (common flag)

2.3.4.27 Parameter Producer

FB: BOC	Property Name (Server): Producer	Mandatory ☒ Optional ☐

Description:

LTE zoning information Heat Producer number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Producer-number	M	1..31	--	1
Status - OutOfService - all other flags	 zone active /inactive not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 set zone inactive / active not supported	 M O NA		enum	

Communication:

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	102
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

BOC DP's are not LTE communicating if zone is 'OutOfService'. If ProdSegmH is 'OutOfService' also the correspoinding Producer zone is 'OutOfService' (common flag)

2.3.4.28 Parameter PeripheralLinkPump

FB: BOC	Property Name (Server): PeripheralLinkPump	Mandatory ☐ Optional ☒

Description:

LTE zoning number Peripheral link to boiler pump

DPT:	Name	DPT_UcountValue16_Z	DPT ID	203.012	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
CounterValue	peripheral link number	M	full	--	1
Status - OutOfService - all other flags	 zone active /inactive not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 set zone inactive / active not supported	 M O NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	103
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

BOC is not LTE communicating with the pump if zone is 'OutOfService'

2.3.4.29 Parameter PeripheralLinkFTC

FB: BOC	Property Name (Server): PeripheralLinkFTC	Mandatory ☐ Optional ☒

Description:

LTE zoning number Peripheral link to FTC

DPT:	Name	DPT_UcountValue16_Z	DPT ID	203.012	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
CounterValue	peripheral link number	M	full	--	1
Status - OutOfService - all other flags	 zone active /inactive not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 set zone inactive / active not supported	 M O NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	104
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

BOC is not LTE communicating with the FTC if zone is 'OutOfService'

2.3.4.30 Parameter OutsideSensorZone

FB: BOC	Property Name (Server): OutsideSensorZone	Mandatory ☐ Optional ☒

Description:

LTE zoning number for the link with an Outside Temperature Sensor

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Outside sensor zone number	M	1..31	--	1
Status				bitset	
- OutOfService	zone active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set zone inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	105
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

BOC is not using an external outside temperature sensor if zone is 'OutOfService'

2.3.4.31 Parameter TempBoilerMax

FB: BOC	Property Name (Server): TempBoilerMax	Mandatory ☐ Optional ☒

Description:

Max. limitation of boiler temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- OutOfService	max limitation active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set limitation parameter inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	114
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

Limitation function is activated or deactivated by the 'OutOfService' Status

2.3.4.32 Parameter TempBoilerMin

FB: BOC	Property Name (Server): TempBoilerMin	Mandatory ☐ Optional ☒

Description:

Min. limitation of boiler temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- OutOfService	min limitation active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set limitation parameter inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	115
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

Limitation function is activated or deactivated by the 'OutOfService' Status

2.3.4.33 Parameter TempBoilerSwitchDiff

FB: BOC	Property Name (Server): TempBoilerSwitchDiff	Mandatory ☐ Optional ☒

Description:

Boiler switching temperature difference

DPT:	Name	DPT_TempHVACRel_Z	DPT ID	205.101	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature delta value	M	cs	° K	cs
Status				bitset	
- all flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	116
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

--

2.3.4.34 Parameter ProducerLock

FB: BOC	Property Name (Server): ProducerLock	Mandatory ☐ Optional ☒

Description:

Boiler is locked manually (can be parameter or diagnostic value only)

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	--	false

Communication:

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	117
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

--

2.3.4.35 Parameter TempReturnBoilerMinLimit

FB: BOC	Property Name (Server): TempReturnBoilerMinLimit	Mandatory ☐ Optional ☒

Description:

Minimal boiler return temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status - OutOfService - all other flags	 min limitation active /inactive not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 set limitation parameter inactive / active not supported	 M O NA		enum	

Communication:

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	118
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

Limitation function is activated or deactivated by the 'OutOfService' Status

2.3.4.36 Parameter ChimneySweepMode

FB: BOC	Property Name (Server): ChimneySweepMode	Mandatory ☐ Optional ☒

Description:

Chimney sweep function active (can be parameter or diagnostic value only)

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	--	false

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	119
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒ 1)		Read/Write ☒ 2)	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☐ Default Value ☒

--

Special Features:

1) diagnostic value only: chimney sweep mode can only be set locally (not via bus)
2) parameter: remote setting of chimney sweep mode via bus

2.3.4.37 Diagnostic data TempBoiler

FB: BOC	Property Name (Server): TempBoiler	Mandatory ☒ Optional ☐

Description:

Current boiler temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	110
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ 1)	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

1) optional Write access for Alarm acknowledgement only

2.3.4.38 Diagnostic data TempReturnBoiler

FB: BOC	Property Name (Server): TempReturnBoiler	Mandatory ☐ Optional ☒

Description:

Current boiler return temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	111
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.3.4.39 Diagnostic data TempBoilerSetp

FB: BOC	Property Name (Server): TempBoilerSetp	Mandatory ☒ Optional ☐

Description:

Current boiler temperature setpoint

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- OutOfService	boiler is out of service => no setpoint	O	true/false		false
- Overridden	external override of the setpoint	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- Override & Release	override and release setpoint	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	112
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Override / Release function only

2.3.4.40 Diagnostic data TempFlueGas

FB: BOC	Property Name (Server): TempFlueGas	Mandatory ☐ Optional ☒

Description:

Current flue gas temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	120
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.3.4.41 Diagnostic data TempFlueGasMaxValue

FB: BOC	Property Name (Server): TempFlueGasMaxValue	Mandatory ☐ Optional ☒

Description:

Max. flue gas temp value; with reset possibility

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- all flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- NormalWrite	=> reset max. value	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	121
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

[1)] optional Write access if reset faeture is supported

2.3.4.42 Diagnostic data StatusBoilerPump

FB: BOC	Property Name (Server): StatusBoilerPump	Mandatory ☐ Optional ☒

Description:

Current relative power of the boiler pump

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
RelValue	relative value	M	0..100%	%	cs
Status - OutOfService - all other flags	 RelValue valid / void not supported, fixed to '0'	 O NA	 true/false	bitset	false

Communication:

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	113
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

for switched pump 0%=off, 100%=on

2.3.4.43 Diagnostic data PrelBurner

FB: BOC	Property Name (Server): PrelBurner	Mandatory ☐ Optional ☒

Description:

Current relative power of the attached burner (mapped/calculated value in the BOC)

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
RelValue	relative value	M	0..100%	%	cs
Status - OutOfService - all other flags	 RelValue valid / void not supported, fixed to '0'	 M NA	 true/false	bitset	true

Communication:

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	122
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.3.4.44 Diagnostic data PnomBoiler

FB: BOC	Property Name (Server): PnomBoiler	Mandatory ☐ Optional ☒

Description:

Nominal power of the boiler

DPT:	Name	DPT_PowerKW_Z	DPT ID	203.014	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Power	power value, 1kW resolution	M	0..65535	[kW]	cs
Status - OutOfService - all other flags	Pnom value valid or unknown/void not supported, fixed to '0'	O NA	true/false	bitset	false

Communication:

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	123
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

usually a constant value

2.3.4.45 Diagnostic data Fault

FB: BOC	Property Name (Server): Fault	Mandatory ☒ Optional ☐

Description:

Boiler failure (some error in the BOC)

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	125
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.3.4.46 Diagnostic data SummerMode

FB: BOC	Property Name (Server): SummerMode	Mandatory ☒ Optional ☐

Description:

Summer mode status of the boiler

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	126
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.3.4.47 Diagnostic data OffPerm

FB: BOC	Property Name (Server): OffPerm	Mandatory ☐ Optional ☒

Description:

Status info indicating whether boiler perrmanently off (e.g. manually switched off). This datapoint can also be a parameter to switch the boiler off via bus

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	127
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] Write access only if this datapoint is also used to switch the boiler off via bus. This is an optional feature, e.g. used for service

2.3.4.48 Diagnostic data NoHeatAvailable

FB: BOC	Property Name (Server): NoHeatAvailable	Mandatory ☐ Optional ☒

Description:

Status info indicating whether boiler is temporarily not providing heat

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	129 (BOC) 1	Property ID: N° of elements	128 1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.3.4.49 Diagnostic data StatusBurnerStage1Enable

FB: BOC	Property Name (Server): StatusBurnerStage1Enable	Mandatory ☐ Optional ☒

Description:

Status info indication whether buner stage 1 / base stage is enabled or disabled

DPT:	Name	DPT_Enable	DPT ID	1.003	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
				bool	disable

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	129 (BOC) 1	Property ID: N° of elements	129 1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.3.4.50 Diagnostic data StatusBurnerStage2Enable

FB: BOC	Property Name (Server): StatusBurnerStage2Enable	Mandatory ☐ Optional ☒

Description:

Status info indication whether burner stage 2 / modulation is enabled or disabled

DPT:	Name	DPT_Enable	DPT ID	1.003	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
				bool	disable

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	129 (BOC) 1	Property ID: N° of elements	130 1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.3.4.51 Diagnostic data StatusBurnerModulation

FB: BOC	Property Name (Server): StatusBurnerModulation	Mandatory ☐ Optional ☒

Description:

Current status of burner modulation: % value which is used by the BOC to control a attached modulating burner

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
RelValue	relative value	M	0..100%	%	--(void)
Status - OutOfService - all other flags	 RelValue valid / void not supported, fixed to '0'	 M NA	 true/false	bitset	 true

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	129 (BOC) 1	Property ID: N° of elements	131 1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

Status 'OutOfService' if the attached burner does not support modulation or if modulation is off

Special Features:

--

2.3.4.52 Diagnostic data ErrorCodeBOC

FB: BOC	Property Name (Server): ErrorCodeBOC	Mandatory ☐ Optional ☒

Description:

Company specific numeric 16 bit error code

DPT:	Name	DPT_Value_2_Ucount	DPT ID	7.001	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			full range	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	129 (BOC)	Property ID:	132
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.4 Functional Block: Heat Producer Manager (HPM)

2.4.1 Functional Specification

The HPM is responsible for demand dependent heat-production, controlling a single boiler or a boiler sequence (cascade). The HPM gets the resulting flow temperature demand from the "first" Heating Flow Demand Manager HFDM on the primary Heating Distribution Segment and controls the allocated Boilers BOC including management of an boiler sequence.

Interworking with Boiler Controllers (BOC):

The operation of the Boiler Controller BOC is controlled by only one Heat Producer Manager. The HPM may control multiple BOC's (boiler cascade) which must be located in the same Heat Production Segment.

Inputs:

- 'StatusBOC' — The BOC reports the boiler status to the Producer Manager, which is used in the HPM for boiler sequence control. Since this signal is mandatory in BOC and HPM, it can be used in the HPM to build up a boiler directory => see description of StatusBOC signal.
- 'OpHrsBurner' — burner operating hours for stage 1 / base stage of the attached burner
- 'LockSignBOC' — The BOC may generate locking signal (for boiler startup protection and overload protection) which is evaluated in the HPM.
- 'ForceSignBOC' — The BOC may generate forcing signal (for overheat protection or indication of oversupply or spare energy) which is evaluated in the HPM.
- 'BoilerSpec' — Optionally the BOC can provide information containing boiler type and characteristics to be used in the HPM for optimized boiler control e.g. in a cascade.

Output:

- 'PowerFlowWaterDemHPM' — The HPM sends the flow temperature demand and power control information to the different BOC's and controls correspondingly the boiler temperatures, the boiler pump and burner stages or burner modulation.

For each boiler the HPM must handle these inputs and outputs individually. I.e. multiple instances of these datapoints exist in the HPM. The number of boilers to be handled by a HPM is company specific and can be restricted (e.g. memory limitation).

Interworking with first HFDM:

Input:

- 'TempFlowWaterDemAbsHFDM' — This input contains the resulting flow temperature demand for the heat production. In addition to the requested flow temperature the demand signal contains several attributes which are used for enhanced control of the heat production system:
  - the types of heat consumer(s) which request heat (DHW, room heating, ventilation etc.) are indicated. Dependent on the type of heat consumers the control mechanism for the heat production system may be different (e.g. in local 'SummerMode')
  - load priority attributes are used for load management (generation of locking signals)
  - attribute for control of a common system pump in the first Heat Distribution Segment

- attribute for flow temperature limitation (e.g. for DHW load)
- Emergency demand 'EmergDem' attribute: If supported by the heat production system, the attribute 'EmergDem'=true will activate heat production in any case (override of e.g. local 'summer mode') for frost protection.
- The 'DHWLegioReq' attribute is included in the heat demand signal (optional feature) to indicate, that DHW load is active in legionella protection mode. 'DHWLegioReq' may be set only if DHW load is active ('DHWReq' attribute set)
  A heat production system with active return temperature limitation can affect proper legionella protection due to reduced flow temperature to the DHWC. With 'DHWLegioReq' information,appropriate adaptation of the return temperature limitation can be managed by the heat production system

Output:

- 'LockSignHPM' — The HPM may generate locking signal (for boiler sequence startup protection and overload protection)
- ForceSignHPM — The HPM may generate forcing signal (for overheat protection or indication of oversupply or spare energy)

The HPM collects the locking and forcing signals from the BOC's and generates resulting locking and forcing signals which are then transmitted to the "first" HFDM who will distributed them to the consumers and HFDM's linked to the primary Heat Distribution Segment.

- StatusHPM — current values and attributes of the HPM
  Status HPM is provided by the HPM for visualisation or to inform the consumers e.g. if the heat production is on and is able do provide energy. This information is used in the heat consumers for optimization purpose and "learning-functions"(e.g. heat-curve adaptation).

  The signal StatusHPM is reported by the HPM to the primary Distribution Segment where the HFDM will route it to the next "right-hand" Distribution Segments and HFDM's etc

  Examples:
  If boiler is off due to SummerMode or manual switch off, it is not reasonable in the heating zone controllers to turn the circulation pumps on

  If the boiler can't provide energy, learning functions in the controllers should temporary be disabled.

Interworking with Peripheral Functional Blocks:

In case of boiler sequence also the common flow temperature of the hydraulic group is optionally used in the HPM. The flow temperature sensor may either be connected locally (hard wired) to the device containing the HPM*) or sensor data may be received in the HPM from the bus. In addition also common return temperature is optionally used (either hard wired*) or data input from bus).

*) *Remark: if flow temperature sensor resp. return temperature sensor is connected locally to the device containing the HPM, the corresponding Functional Blocks FWTS (flow temperature) resp. RNWTS (return temperature) are activated and distribute the temperature value in the 'ProdSegmH'*

The common boiler sequence pump is normally hard wired but optionally also bus-connected pump is possible.

Optionally the control of common boiler sequence return temperature can be handled by an Flow Temperature Controller FTC. The Flow Temperature Controller and the HPM have a 1:1 relationship and are often located in the same device (hard wired actuator). Otherwise the 1:1 functional binding is established by setting a specific 1:1 link group ‘GenPeripheral’

Outside temperature input may be used for local SummerMode mechanism.

Interworking with EIB Boiler OBIS

TempFlowWaterDemHeatShift is an optional input which is implemented in S-Mode only. It enables linking with HVAC devices for demand dependent heat generation (Boiler OBIS [12])
=> shifting of the temperature setpoint in the HPM.

=> this datapoint corresponds with PID_TEMP_SUPPLY_WATER_DELTA (dTsw, Delta supply water temperature) in the Boiler OBIS [12]

=> in the KNX HWH Model this datapoint is provided by the HDTACT functional block, see [07]

The absolute heat demand value in the HPM is derived from a fixed setpoint + TempFlowWaterDemHeatShift.

2.4.2 Constraints

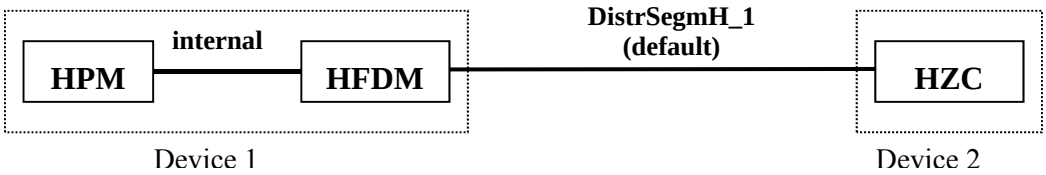
The boiler sequence control mechanisms are company specific and are not subject of this specification.

The number of boilers to be handled by a HPM is company specific and can be restricted (e.g. memory limitation) => to be indicated in the data-sheet of the product

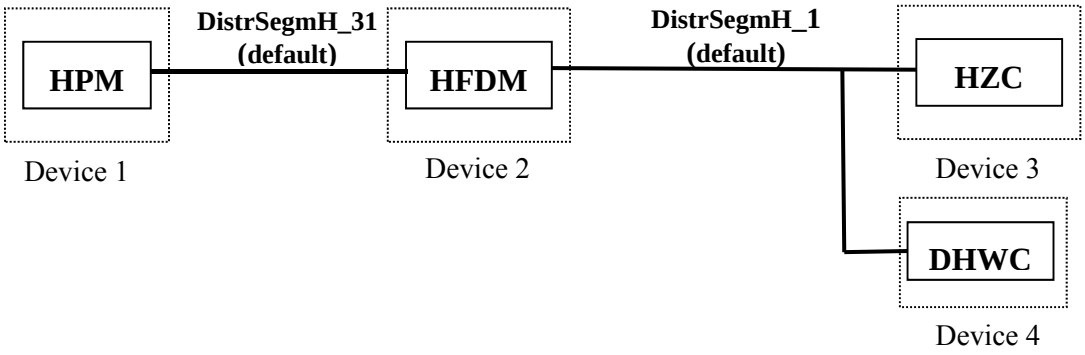
In simple systems with only one boiler, the HPM functionality is reduced to a minimum. In this case BOC and HPM are usually located in the same device and data communication between BOC and HPM is device-internal.

The HPM and the "first" HFDM are normally located in the same device since they have a 1:1 relationship and rather tight coupling. Especially the handling of resulting forcing/locking signals from the HPM is simplified. In LTE mode the DistrSegmH_31 is default for those special cases where HPM and „first" HFDM are not in the same device.

Example 1: simple system (e.g. single family home) "plug & play" LTE zoning
- system has only one heat distribution level
- HPM and HFDM are located in the same device
- a Heating Zone Controller HZC is directly connected to the heat production system.



Example 2: small system with multiple devices, "plug & play" LTE zoning for heat consumers
- system has only one heat distribution level
- HPM and HFDM are NOT located in the same device => DistrSegmH_31 & DistSegmH_1 to be configured on the HFDM
- a Heating Zone Controller HZC and a DHW controller are directly connected to the heat production system.



IMPORTANT: the output signal PowerFlowWaterDemHPM to control a BOC via bus can today not be implemented in standard mode because the necessary compound HVAC DPT for runtime-interworking is not yet available in standard mode and mapping of this signal to multiple standard datapoints is not possible because of the necessary data consistency.

Therefore for the time being only LTE implementations of the HPM and BOC functional blocks offer a bus-link to control one ore multiple BOC by means of the signal PowerFlowWaterDemHPM (demand dependent boiler control).

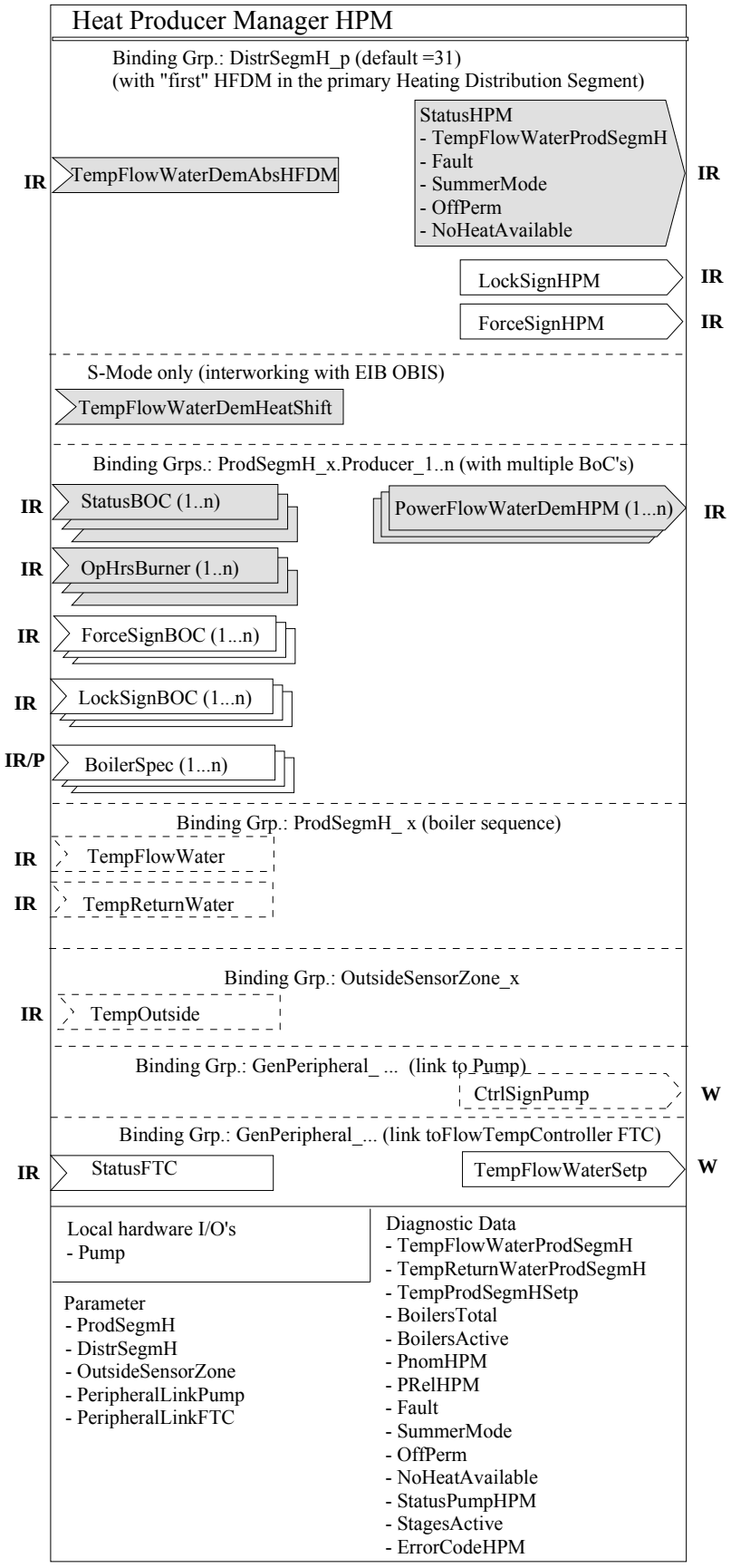
The Heat Demand input signal TempFlowWaterDemAbsHFDM from the associated HFDM can today not be implemented in standard mode because the necessary compound HVAC DPT for runtime-interworking is not yet available in standard mode

Therefore for the time being only LTE implementations of the HPM and HFDM functional blocks offer a bus-link to a demand dependent heat distribution system.

However in standard mode implementation, the HPM supports the functionality of demand dependent heat production according to ObIS Model [12].

In addition the basic FB definition of the HPM enables the integration of the HPM into a standard system for remote control or visualisation.

2.4.3 Functional block diagram



2.4.4 Datapoint description

2.4.4.1 Overview

Data Point	Description	Datapoint Type	DPT N°
Outputs			
StatusHPM	Status information from 'Producer Manager'	DPT_StatusHPM	209.100
- TempFlowWaterProdSegmH	Common flow temperature of heat production segment	DPT_Value_Temp	9.001
- Fault	Boiler Fault (S-interface)	DPT_Bool	1.002
- SummerMode	Boiler sequence is in summer mode (S-interface)	DPT_Bool	1.002
- OffPerm	Boiler sequence is perrmanently off (S-interface)	DPT_Bool	1.002
- NoHeatAvailable	Boiler sequence is temporarily not providing heat (S-interface)	DPT_Bool	1.002
ForceSignHPM	Resulting locking signal of 'ProdSegment' sent to „first" HFDM, to force the consumers to reduce energy consumption	DPT_ForceSign	21.100
LockSignHPM	Resulting forcing signal of 'ProdSegment' sent to „first" HFDM, force the consumers to consume energy	DPT_LockSign	207.101
PowerFlowWaterDemHPM	Boiler temperature demand and control information to multiple BOC (1..n different signals)	DPT_PowerFlowWaterDemHPM	214.100
CtrlSignPump	Command for boiler pump with bus interface	t.b.d, probably multiple or complex DPT	?
TempFlowWaterSetp	Set value of boiler return temperature to be controlled by the FTC / LTE and S-interface	DPT_TempHVACAbs_Z	205.100 9.001
Inputs			
TempFlowWaterDemAbsHFDM	Flow temperature demand from „first" HFDM in the primary Heat Distribution Segment (absolute temp)	DPT_TempFlowWaterDemAbs	210.100
TempFlowWaterDemHeatShift	link with EIB Boiler OBIS => shifting of the heat demand, S-interface only	DPT_Value_Tempd	9.002
StatusBOC	Status information from multiple BOC (1..n different signals). Needed in boiler sequence application.	DPT_StatusBOC	215.100
OpHrsBurner	Current operating hours stage 1, base stage from multiple BOC (1..n different signals)	DPT_LongDeltaTimeSec	13.100
ForceSignBOC	Forcing signal from multiple BOC (1..n different signals). Used to force the consumers to consume energy from boiler. Mapped to ForceSignHPM or locally used	DPT_ForceSign	21.100
LockSignBOC	Locking signal from multiple BOC (1..n different signals). Used to request the consumers to reduce energy consumption from boiler. Mapped to LockSignHPM or locally used	DPT_LockSign	207.101
BoilerSpec	Boiler type information from multiple BOC (1..n different signals)	DPT_SpecHeatProd	216.100
TempFlowWater	Common flow water temperature of the hydraulic group. LTE and S-interface	DPT_TempHVACAbs_Z, DPT_Value_Temp	205.100 9.001

Data Point	Description	Datapoint Type	DPT N°
TempReturnWater	Common return water temperature of the hydraulic group. LTE and S-interface	DPT_TempHVACAbs_Z, DPT_Value_Temp	205.100 9.001
TempOutside	Outside temperature / LTE and S-interface	DPT_TempHVACAbs_Z, DPT_Value_Temp	205.100 9.001
StatusFTC	Status information from Flow Temperature Controller	DPT_StatusWTC.	209.103
Parameters			
ProdSegmH	LTE zoning number Heat Production Segment	DPT_UcountValue8_Z	202.002
DistrSegmH	LTE zoning number Heat Distribution Segment: link with the attached HDFM	DPT_UcountValue8_Z	202.002
PeripheralLinkPump	LTE zoning number Peripheral link to common pumpin boiler sequence	DPT_UcountValue16_Z	203.012
PeripheralLinkFTC	LTE zoning number Peripheral link to FTC	DPT_UcountValue16_Z	203.012
OutsideSensorZone	LTE zoning number for Outside Temperature	DPT_UcountValue8_Z	202.002
Diagnostic Data			
TempFlowWaterProdSegmH	Common flow temperature of heat production segment	DPT_TempHVACAbs_Z	205.100 *)
TempReturnWater ProdSegmH	Common return temp of heat production segment	DPT_TempHVACAbs_Z	205.100 *)
TempProdSegmHSetp	boiler sequence flow temperature setpoint	DPT_TempHVACAbs_Z	205.100 *)
BoilersTotal	Total number of boilers in boiler sequence	DPT_Value_1_Ucount	5.010
BoilersActive	Number of active boilers in boiler sequence	DPT_Value_1_Ucount	5.010
PnomHPM	Nominal power kW of boiler sequence	DPT_PowerKW_Z	203.014 *)
PrelHPM	Current relative power % of boiler sequence	DPT_RelValue_Z	202.001 *)
Fault	some error in the HPM (only HPM functionality, BOC have their own Fault attributes)	DPT_Bool	1.002
SummerMode	boiler sequence is in summer mode	DPT_Bool	1.002
OffPerm	boiler sequence is permanently off	DPT_Bool	1.002
NoHeatAvailable	boiler sequence is temporarily not providing heat	DPT_Bool	1.002
StatusPumpHPM	current relative power of the common pump in the boiler sequrence; for switched pump 0%=off, 100%=on	DPT_RelValue_Z	202.001 *)
StagesActive	number of active stages in the boiler sequence: - stage 1active = 1; - stage 2 active = 2; - modulating = 1	DPT_Value_1_Ucount	5.010
ErrorCodeHPM	company specific numeric error code (only HPM functionality, BOC have their own ErrorCodeBOC)	DPT_Value_2_Ucount	7.001

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	StatusHPM	**NA**	NA	NA	M
	-TempFlowWaterProdSegmH	**GO_b**	GO	GO	NA
	- Fault	**GO_b**	GO	GO	NA
	- SummerMode	**(GO_b)**		(GO)	NA
	- OffPerm	**(GO_b)**		(GO)	NA
	- NoHeatAvailable	**(GO_b)**		(GO)	NA
	ForceSignHPM	**NA**	NA	NA	O
	LockSignHPM	**NA**	NA	NA	O
	PowerFlowWaterDemHPM	**NA** [1)]	NA	NA	M
	CtrlSignPump not yet defined				
	TempFlowWaterSetp	**(GO_b)**		(GO)	O
Inputs	TempFlowWaterDem AbsHFDM	**NA** [1)]	NA	NA	M
	TempFlowWaterDemHeatShift	**GO_b**	GO	GO	NA
	StatusBOC	**NA** [1)]	NA	NA	M
	OpHrsBurner	**GO_b**	GO	GO	M
	ForceSignBOC	**NA**	NA	NA	O
	LockSignBOC	**NA**	NA	NA	O
	BoilerSpec	**NA**	NA	NA	O
	TempFlowWater	**(GO_b)**		(GO)	O
	TempReturnWater	**(GO_b)**		(GO)	O
	TempOutside	**(GO_b)**		(GO)	O
	StatusFTC	**NA**	NA	NA	O

[1)] *mandatory in LTE Mode but the information is NA in the Basic FB and all other modes because the datapoint type is today not available in standard mode. Splitting of DPT is not possible because of necessary data consistency*

Table 9: HPM Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	ProdSegmH	M
	DistrSegmH	M [1)] NA [2)]
	PeripheralLinkPump	O
	PeripheralLinkFTC	O
	OutsideSensorZone	O

[1)] if HPM and the first HFDM are not in the same device
[2)] if HPM and the first HFDM are located in the same device

Table 10: HPM LTE specific Properties

		Support
Parameter	--	--
Diagnostic Data	TempFlowWaterProdSegmH	M
	TempReturnWater ProdSegmH	O
	TempProdSegmHSetp	M
	BoilersTotal	O
	BoilersActive	O
	PnomHPM	O
	PrelHPM	O
	Fault	M
	SummerMode	O
	OffPerm	O
	NoHeatAvailable	O
	StatusPumpHPM	O
	StagesActive	O
	ErrorCodeHPM	O

Table 11: HPM Standard Properties of Interface Objects (or memory mapped DP)

2.4.4.2 Output StatusHPM

Standard mode: NA => mapped to TempFlowProdSegmH, Fault, SummerMode, OffPerm, NoHeatAvailable

LTE-HEE mode:

FB: HPM	**LTE Server Output Name:** StatusHPM	Mandatory ☒ Optional ☐

Description:

This signal contains status information of the boiler sequence *) in order to inform the consumers e.g. if the heat production is on and is able to provide energy. This information is used in the heat consumers for optimization purpose and "learning-functions"(e.g. heat-curve adaptation). The signal will be received by the "first" HFDM and then be routed to the right-hand Heat Distribution Segment(s)

DPT:	Name	DPT_StatusHPM	DPT ID	209.100	Datatype format	$V_{16}B_8$

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowProdSegmH	common flow temperature of heat production segment	M	full range	°C	2	cs
Attributes						
- TempFlowValid	validity of TempFlowProdSegmH	M	true/false	bool	Y	false
- Fault	some failure in boiler sequence (mainly for monitoring)	M	true/false	bool	Y	false
- SummerMode	boiler sequence switched off due to local summer/winter mode (mainly for monitoring)	O	true/false	bool	Y	false
- OffPerm	boiler sequence is permanently off (manual switch or failure)	O	true/false	bool	Y	false
- NoHeatAvailable	boiler sequence is temporarily not producing heat	O	true/false	bool	Y	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmH	31 or NA
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	51
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat:	15 min
InfoReport ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
(LTE Read-Response polling of the output shall always be supported)	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

Special Features:

*) HPM is also present in a system with only 1 boiler
HPM and the first HFDM are usually located in the same device => device – internal signal only

2.4.4.3 Output TempFlowWaterProdSegmH

Standard mode

DP Name:	TempFlowWaterProdSegmH	Abbr.:	--	Mandatory	☒
FB Name:	HPM			Can be internal	☐

Description					
Common flow temperature of heat production segment, mainly used for visualisation					
Datapoint Type					
DPT_Name:	DPT_Value_Temp				
DPT Format:	F_{16}	DPT_ID:	9.001		
Field	Description	Supp.	Range	Unit	Default
			full range	°C	cs

Access Type								
♦ Output								
this → M	☒	this → 1	☐					
Spontaneous	☒	COV:	☒	Δ-Value:	2 K	MinRepTime:	10s	
		Cyclic	☒	Period:	15 Min			
Request	☒							

Communication Type			
♦ Group Object Datapoint		Mandatory:	☒
Default Group Address:	--		

Dynamics						
Power down:	Save:	☐				
Power up:	Value:	No initialisation:	☐	Default value:	☐	
		Saved value:	☐	Actual value (not for input):	☒	
	Transmit on bus (only for output):		☐	Read from bus (only for input):		☐

Exception Handling
--
Special Features
--

LTE-HEE mode: NA

2.4.4.4 Output Fault

Standard mode

DP Name:	Fault	Abbr.:	--	Mandatory	☒
FB Name:	HPM			Can be internal	☐

Description
reports a failure in the boiler sequence, mainly used for visualisation

Datapoint Type					
DPT_Name:	DPT_Bool				
DPT Format:	B_1	DPT_ID:	1.002		
Field	Description	Supp.	Range	Unit	Default
					false

Access Type							
♦ Output							
this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:	--	MinRepTime:	10s
		Cyclic	☒	Period:	15 Min		
Request	☒						

Communication Type			
♦ Group Object Datapoint		Mandatory:	☒
Default Group Address:	--		

Dynamics						
Power down:	Save:	☐				
Power up:	Value:	No initialisation:	☐	Default value:	☒	
		Saved value:	☐	Actual value (not for input):	☐	
	Transmit on bus (only for output):		☐	Read from bus (only for input):		☐

Exception Handling
--

Special Features
--

LTE-HEE mode: NA

2.4.4.5 Output SummerMode

Standard mode

DP Name:	SummerMode	Abbr.:	--	Mandatory	☐
FB Name:	HPM			Can be internal	☐

Description

boiler sequence switched off due to local summer/winter mode, mainly used for visualisation

Datapoint Type

DPT_Name:	DPT_Bool				
DPT Format:	B_1	DPT_ID:	1.002		
Field	Description	Supp.	Range	Unit	Default
					false

Access Type

♦ Output

this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:	--	MinRepTime:	10s
		Cyclic	☒	Period:	15 Min		
Request	☒						

Communication Type

♦ Group Object Datapoint — Mandatory: ☐

Default Group Address:	--

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

--

LTE-HEE mode: NA

2.4.4.6 Output OffPerm

Standard mode

DP Name:	OffPerm			Abbr.:	--			Mandatory	☐
FB Name:	HPM							Can be internal	☐
Description									
boiler sequence is permanently off (manual switch or failure), mainly used for visualisation									
Datapoint Type									
DPT_Name:	DPT_Bool								
DPT Format:	B_1					DPT_ID:	1.002		
Field	Description					Supp.	Range	Unit	Default
									false
Access Type									
♦ Output									
this → M	☒		this → 1	☐					
Spontaneous	☒	COV:	☐	Δ-Value:	--	MinRepTime:	10s		
		Cyclic	☒	Period:	15 Min				
Request	☒								
Communication Type									
♦ Group Object Datapoint							Mandatory:	☐	
Default Group Address:	--								
Dynamics									
Power down:	Save:	☐							
Power up:	Value:	No initialisation:	☐	Default value:	☒				
		Saved value:	☐	Actual value (not for input):	☐				
	Transmit on bus (only for output):	☐		Read from bus (only for input):	☐				
Exception Handling									
--									
Special Features									
--									

LTE-HEE mode: NA

2.4.4.7 Output NoHeatAvailable

Standard mode

DP Name:	NoHeatAvailable	Abbr.:	--	Mandatory	☐
FB Name:	HPM			Can be internal	☐

Description

boiler sequence is temporarily not producing heat, mainly used for visualisation

Datapoint Type

DPT_Name:	DPT_Bool				
DPT Format:	B_1	DPT_ID:	1.002		
Field	Description	Supp.	Range	Unit	Default
					false

Access Type

♦ Output

this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:	--	MinRepTime:	10s
		Cyclic	☒	Period:	15 Min		
Request	☒						

Communication Type

♦ Group Object Datapoint — Mandatory: ☐

Default Group Address:	--

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

--

LTE-HEE mode: NA

2.4.4.8 Output ForceSignHPM

Standard mode: NA

LTE-HEE mode:

FB: **HPM**	**LTE Server Output Name:** **ForceSignHPM**	Mandatory ☐ Optional ☒

Description:

The HPM indicates with this output signal, that one or more boilers are overheated or that boilers have remaining energy to be used by the consumers. The following cases are possible:

- Overheating is critical, i.e. boiler temperatures are too high => critical ForceSignHPM is sent (type 'Protection'). The addressed heat consumers shall consume energy (unconditional load), see [08]
- Oversupply, i.e. the boilers produce more than the requested flow temperature => uncritical ForceSignHPM is sent (type 'Oversupply'). The addressed heat consumers may consume energy (conditional load), see [08]
- After load shutdown, still some remaining energy is available from the boiler(s) => uncritical ForceSignHPM is sent (type 'Overrun'), consumers will continue to consume energy according to the last setpoint (just before shutdown), see [08]

In case of 'Protetion' and 'Oversupply' the ForceSignHPM signal allows to load DHW or room heating consumers separately and the load level is indicated in addition, see [08]

DPT:	Name	DPT_ForceSign	DPT ID	21.100	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
Attributes						
- ForceRequest	indicates if forced power consumption is necessary (validity of the remaining attributes)	M	true / false	bool	Y	false
- Protection	indicates that overheat is critical (too high boiler temp.)	M	true / false	bool	Y	false
- Oversupply	indicates that overheat is uncritical but boiler temperature is much higher than requested by heat demand	M	true / false	bool	Y	false
- Overrun	indicates that remaining energy is available in the boiler after load shutdown	M	true / false	bool	Y	false
- DHWNorm [3)]	Load DHW to 'Normal' Level in case of overheat ('Protection' or 'Oversupply')	O	true / false	bool	Y	cs
- DHWLegio [3)]	Load DHW to 'LegioProtect' Level in case of overheat ('Protection' or 'Oversupply')	O	true / false	bool	Y	cs
- RoomHComf [3)]	Load Room Heating to 'Comfort' Level in case of overheat ('Protection' or 'Oversupply')	O	true / false	bool	Y	cs
- RoomHMax [3)]	Load Room Heating with maximum flow temperature in case of overheat ('Protection' or 'Oversupply')	O	true / false	bool	Y	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmH	31 or NA
Unassigned ☐	Broadcast ☐ Configurable ☐	
DP Address:	IO Type(ID): 136 (HPM)	Property ID: 53
LTE-Services (event):	COV ☒ MinRepTime: 10 sec	Heartbeat: 3 [1)] min

InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	Output per default communicating ☐	Binding Group Wildcard allowed ☐
	Tx Prio: High ☐ Normal ☒ Low ☐	
	Transm after Powerup: [1]Stored Value ☐ Act Value ☐ Default Value ☐	
Property-Service (individual access):	Read only [2] ☒ Read/Write ☐	
Exception Handling:		Save at Powerdown ☐
--		

Special Features:

HPM and the first HFDM are usually located in the same device => device – internal signal only
Some logical combinations of these attributes are not allowed, see [08]

1) Heartbeat: the signal is re-transmitted periodically (if no COV occured) as long as the ForceRequest attribute is true. When the forcing condition in the HPM disappears, the ForceRequest attribute changes to false and the signal is still repeated with the heartbeat-period during 9 minutes (3 messages). Afterwards re-transmission is stopped until a new forcing condition appears (this procedure reduces unnecessary bus-load

2) Read access is possible but in practice not very useful

3) HPM's with higher functionality may indicate whether DHW or Room Heating should be activated in case of 'Protection' or 'Oversupply' and in addition the load level is selected. With this feature "intelligent" load management is possible. If this function is not supported, the attributes DHWNorm, DHWLegio, RoomHComf and RoomHMax shall be set to an allowed and reasonable default value. At least one of these attributes shall be set to '1', see [08]

2.4.4.9 Output LockSignHPM

Standard mode: NA

LTE-HEE mode:

FB: HPM	**LTE Server Output Name:** LockSignHPM	Mandatory ☐ Optional ☒

Description:

The HPM indicates with this output signal, that:
- the boiler (in a single boiler system) is overloaded.
- the whole boiler sequence is overloaded

The following cases are possible: for further details see [08]
- Overload is critical, i.e. boiler temperatures or return temperature are too low => critical LockSignHPM is sent, all consumers should reduce energy consumption
- Overload is uncritical, i.e. the requested flow temperature is not reached but boiler temperatures / return temperature are above critical lower limits. Some consumers request load priority => uncritical LockSignHPM is sent, some consumers (those without load priority) should reduce energy consumption
- Overload is uncritical (same as 2) but no consumers request load priority => no LockSignHPM is sent

DPT:	Name	DPT_LockSign	DPT ID	207.101	Datatype format	$U_8B_{(8}$

Field	Description	Sup.	Range	Unit	COV	Default
PwrReduction	Requested power reduction – 0 % no reduction – 100% max. reduction	M	0..100%	%	5	cs
Attributes - LockRequest	Bitset containing status info indicates if power reduction is necessary, validity of PwrReduction	M	true/false	bool	Y	false
- Type	type of overload; value is only meaningful if LockRequest=true	M	critical / uncritical	bool	Y	uncritical

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmH	31 or NA
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	54
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒	MinRepTime: 10 sec	Heartbeat: 3 [1] min	
	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: [1] Stored Value ☐	Act Value ☐	Default Value ☐	
Property-Service (individual access):	Read only ☒ [2]	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

HPM and the first HFDM are usually located in the sam device => device – internal signal only

[1] Heartbeat: the signal is re-transmitted periodically (if no COV occured) as long as the LockRequest attribute is true. When the overload condition in the BOC disappears, the LockRequest attribute changes to false and the signal is still repeated with the heartbeat-period during 9 minutes (3 messages). Afterwards re-transmission is stopped until a new overload condition appears (this procedure reduces unnecessary bus-load).

[2] Read access is possible but in practice not very useful

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2.4.4.10 Output PowerFlowWaterDemHPM

Standard mode: NA

LTE-HEE mode:

FB: HPM	LTE Server Output Name: PowerFlowWaterDemHPM	Mandatory ☒ Optional ☐

Description:

This output signal contains the current flow temperature demand (absolute value) and further boiler control information from the Producer Manager to be sent to the individual BOC's. Each Producer BOC is controlled individually by the HPM => multiple signals

DPT:	Name	DPT_PowerFlowWaterDemHPM	DPT ID	214.100	Datatype format	$V_{16}U_8B_8$

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowDem	flow temperature demand / requested boiler temp	M	full	°C	2	cs
RelDemLimit	Relative demand %: max. limitation for modulating burner => used in boiler sequence	O	0..100%	%	10	100
Attributes	Bitset containing control info					
– TempFlowDemValid	validity of TempFlowDem ('false' means also 'no demand')	M	true / false	bool	Y	false
– Stage1Enabled	if enabled, stage 1 can be activated by the BOC => forced or auto	M	enabled / disabled	bool	Y	disabled
– Stage1Forced	if forced: stage 1 is generally on if auto: stage 1 is activated if necessary according to boiler temp	M	forced/auto	bool	Y	auto
– Stage2Enable	stage 2 control: see stage 1	O	see stage 1	bool	Y	disabled
– Stage2Forced	stage 2 control: see stage 1	O	see stage 1	bool	Y	auto
– BoilerEnable	boiler pump is on (water flow), must be enabled before burner is turned on	M	enabled / disabled	bool	Y	disabled

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer (1..n)	1.n
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 136 (HPM)	Property ID: 52
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒ MinRepTime: 10 sec	Heartbeat: 3 min
	Output per default communicating ☐	Binding Group Wildcard allowed [1] ☒
	Tx Prio: High ☐ Normal ☒ Low ☐	
	Transm after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐	
Property-Service (individual access):	Read only ☒ Read/Write ☐	

Exception Handling: Save at Powerdown ☐

--

Special Features:

The HPM knows the type of connected BOC and only the relevant fields in the datapoint are set accordingly. The other fields contain the default value. Boiler control information: see chapter 2.3.4.15
In simple systems with only one boiler (no boiler sequence) HPM and BOC are usually located in the same device and HPM functionality is very limited. In thic case this signal is device internal.
[1] Wildcard on Producer is allowed to control all BOC in the same ProdSegment in parallel.

2.4.4.11 Output CtrlSignPump

same as in BOC, see chapter 2.3.4.15

2.4.4.12 Output TempFlowWaterSetp

same as in BOC, see chapter 2.3.4.16

2.4.4.13 Input TempFlowWaterDemAbsHFDM

Standard mode: NA

LTE-HEE mode:

FB: HPM	LTE Client Input Name: TempFlowWaterDemAbsHFDM	Mandatory ☒ Optional ☐

Description:

This input signal contains the calculated resulting flow temperature demand (absolute flow temperature value to be provided by the HPM) of the „first“ HFDM in the primary Heat Distribution Segment, i.e. the relevant heat demand for the whole ‘ProdSegmH’.

DPT:	Name	DPT_TempFlowWaterDemAbs	DPT ID	210.100	Datatype format	$V_{16}B_{16}$

Field	Description	Sup.	Unit	Default
TempFlowDem	flow temperature demand (setpoint)	M	°C	cs
Attributes				
- DemValid	Validity ofTempFlowDem (‘false’ means also ‘no demand’)	M	bool	false
- AbsLoadPriority	absolute load priority if one or more consumer(s) request all available power => evtl. LockSignHPM	O	bool	false
- ShiftLoadPriority	shift load priority: set e.g. if DHW load has priority in case of boiler overload => evtl. LockSignHPM	O	bool	false
- MaxTempLimit	TempFlowDem contains max. temp. limit e.g. for DHW load. Flow temp must be limited to max level	M	bool	false
- MinTempLimit	for cold water only	NA	bool	false
- DHWReq	Heat demand from DHW => for DHW preparation during summer	O	bool	false
- RoomCtrlReq	Heat demand from Room Heating	O	bool	false
- VentReq	Heat demand from Ventilation	O	bool	false
- AuxAllSeasonReq	demand from auxiliary heat consumer; all season	O	bool	false
- SystemPumpReq	request for water circulation in the distribution segment (common system pump on)	O	bool	false
- EmergDem	emergency heat demand for frost protection => heat production to be enabled in any case	O	bool	false
- DHWLegioReq	demand from DHW while legionella function is active (can only be ‘true’ if DHWReq = ‘true’)	O	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmH	31 or NA
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	144 (HFDM)	Property ID:	51
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:			--
	Timeout: [1]	31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

[1] The HPM needs this signal for normal operation. Due to the “heartbeat” repetition of the signal, it is easy to supervise the presence of the HFDM.

Special Features:

The HPM and the “first” HFDM are normally located in the same device since they have a 1:1 relationship and rather tight coupling. Therefore this is usually a device internal signal.

2.4.4.14 Input TempFlowWaterDemHeatShift

Standard mode

DP Name:	TempFlowWaterDemHeatShift	Abbr.:	--	Mandatory	☒
FB Name:	HPM			Can be internal	☐

Description

Link with EIB Boiler OBIS => shifting of the heat demand, S-interface only
This datapoint corresponds with PID_TEMP_SUPPLY_WATER_DELTA (dTsw, Delta supply water temperature) in the EIB Boiler OBIS. For further information see EIB Boiler OBIS document
In the KNX HWH model this datapoint is provided by the HDTACT functional block, see [07]

Datapoint Type

DPT_Name:	DPT_Value_Tempd				
DPT Format:	F_{16}	DPT_ID:	9.002		
Field	Description	Supp.	Range	Unit	Default
			full range	K	0 K

Access Type

♦ Input

N → this	☐	1 → this	☒			
Spontaneous	☒	Cyclically:	☒	Time-out:	31 min	
Request	☐	Polling:	☐	Period:		

Communication Type

♦ Group Object Datapoint		Mandatory:	☒
Default Group Address:	--		

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value (not for input):	☐
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

--

LTE-HEE mode: NA

2.4.4.15 Input StatusBOC

Standard mode: NA

LTE-HEE mode:

FB: HPM	**LTE Client Input Name:** StatusBOC	Mandatory ☒ Optional ☐

Description:

This signal is received from multiple BOC's (n:1) and contains status information of the indivudual boilers to be used in the HPM for boiler sequence control.

DPT:	Name	DPT_StatusBOC	DPT ID	215.100	Datatype format	$V_{16}U_8B_{16}$

Field	Description	Sup.	Unit	Default
TempBoiler	Current boiler temperature	M	°C	cs
PrelBurner	Current relative power of the attached boiler/burner	M	%	cs
Attributes	Bitset containing status info			
–TempBoilerValid	validity of TempBoiler Field	M	bool	false
– PrelBurnerValid	validity of PrelBoil Field	M	bool	false
– Fault	boiler failure	M	bool	false
– SummerMode	boiler switched off due to local summer/winter mode	M	bool	false
– OffPerm	boiler is permanently off (manual switch or failure)	M	bool	false
– NoHeatAvailable	boiler is temporary not providing heat	M	bool	false
– StatusBurnerStage1Enable	stage 1 or base stage enabled	M	bool	disable
– StatusBurnerStage2Enable	stage 2 / modulation enabled	M	bool	disable
– ReqNextStage	for two stage boiler: power limit of stage 1 is reached, HPM is requested to enable stage 2	M	bool	false
– ReqNextBoiler	power limit of boiler is reached, HPM is requested to enable next boiler in cascade	M	bool	false
– ReducedAvailability	boiler is in principle available but other boilers should be used with preference	M	bool	false
– ChimneySweep	boiler is in principle available but other boilers should be used with preference	M	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer (1..n)	1.n
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	51
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:		Producer	
	Timeout:	7	Min	
LTE-Service (polling): Read – Response [1] ☒	Read Wildcard / Resp Sniffer on Binding Group:		Producer	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

The HPM can check the presence of the BOC in boiler sequence. If StatusBOC from a new boiler is received, the boiler is entered in the boiler directory. If no data from BOC is received anymore an error message may be generated to indicate defect/removal of a boiler. Handling of these situations is company-specific.

Special Features:
Since StatusBOC is mandatory for BOC, it can be used in the HPM in order to find out, which boiler controllers are connected to the HPM in the boiler sequence. Therefore a boiler directory in the HPM can easily be built up and maintained. This is an important feature too make boiler sequence configuration easy. No manual configuration of a boiler directory in the HPM is necessary. In the HPM, this signal must be handled individually for each boiler in the cascade – including the timeout condition. HPM and one BOC are often located on the same device – in this case the input from this BOC is purely device-internal In simple systems with only one boiler (no boiler sequence) HPM and BOC are usually located in the same device and HPM functionality is very limited. In thic case this signal can be device internal. [1] polling is optional in the HPM => may be used to build up quickly a boiler directory using one read request with wildcard addressing

2.4.4.16 Input OpHrsBurner

Standard mode

DP Name:	OpHrsBurner	Abbr.:	--	Mandatory	☒
FB Name:	HPM			Can be internal	☒

Description
Current burner operating hours stage 1, base stage of the attached BOC&BUC

Datapoint Type					
DPT_Name:	DPT_LongDeltaTimeSec				
DPT Format:	V_{32}	DPT_ID:	13.100		
Field	Description	Supp.	Range	Unit	Default
			>=0 [1]	h	0

Access Type							
♦ Input							
	N → this	☐	1 → this	☒			
	Spontaneous	☒	Cyclically:	☒	Time-out:	121 min	
	Request	☐	Polling:	☐	Period:		

Communication Type			
♦ Group Object Datapoint		Mandatory:	☒
	Default Group Address:	--	

Dynamics						
	Power down:	Save:	☒			
	Power up:	Value:	No initialisation:	☐	Default value:	☐
			Saved value:	☒	Actual value (not for input):	☐
		Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling
--

Special Features
[1] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible

LTE-HEE mode:

FB: HPM	**LTE Client Input Name:** OpHrsBurner	Mandatory ☒ Optional ☐

Description:

Current burner operating hours stage 1, base stage of the attached BOC&BUC

DPT:	Name	DPT_LongDeltaTimeSec	DPT ID	13.100	Datatype format	V_{32}

Field	Description	Sup.	Unit	Default
			h	0

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	56
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:			--
	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: [1] Default Value ☐ Stored Value ☒

Exception Handling: Save at Powerdown ☒

--

Special Features:

This input can be internal (1:1 link with BOC).
In stand alone boilers (no boiler sequence) HPM and BOC are normally located in the same device and BOC is usually not providing burner operation hours information because in simple system this information is not needed.
[1] encoding on 32 bit signed integer value with 1 second transport format resolution. The granularity of the internal resolution may be higher. Used range: 0..~68 years => in practise no binary overflow possible

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2.4.4.17 Input ForceSignBOC

Standard mode: NA

LTE-HEE mode:

FB: HPM	**LTE Client Input Name:** ForceSignBOC	Mandatory ☐ Optional ☒

Description:

This signal is received from multiple BOC's. The BOC can indicate with this signal, that the boiler is overheated or that the boiler has remaining energy to be used by the consumers. See also document [08]
This signal may be used in the HPM for boiler sequence control => company-specific behavior
In case of overheat condition or remaining energy in the whole boiler cascade or in a system with only one boiler, the corresponding ForceSignHPM signal is generated by the HPM.

DPT:	Name	DPT_ForceSign	DPT ID	21.100	Datatype format	B_8

Field	Description	Sup.	Unit	Default
Attributes	Bitset containing status info			
- ForceRequest	indicates overheat condition in the BOC (validity of remaining attributes)	M	bool	false
- Protection	indicates that overheat is critical, too high boiler temp	M	bool	false
- Oversupply	indicates that overheat is uncritical but boiler temp is much higher than requested by heat demand from HPM	M	bool	false
- Overrun	indicates that remaining energy is available in the boiler after load shutdown	M	bool	false
- DHWNorm	unused in ForceSignBOC, to be ignored	NA	bool	false
- DHWLegio	unused in ForceSignBOC, to be ignored	NA	bool	false
- RoomHComf	unused in ForceSignBOC, to be ignored	NA	bool	false
- RoomHMax	unused in ForceSignBOC, to be ignored	NA	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer (1..n)	1.n
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	54
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:		Producer	
	Timeout: [1]	7 Min		
LTE-Service (polling): Read – Response ☒	Read Wildcard / Resp Sniffer on Binding Group:		Producer	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This signal can be device internal if BOC and HPM are located in the same device. In the HPM, this signal must be handled individually for each boiler in the cascade – including the timeout condition
[1] The signal is received on event and periodically (if no COV occured) as long as the ForceRequest attribute is true. When the forcing condition in the BOC disappears, the ForceRequest attribute changes to false and the signal will be repeated by the BOC with the heartbeat-period during during 9 minutes (3 messages). Afterwards re-transmission is stopped until a new forcing condition appears (this procedure reduces unnecessary bus-load).

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2.4.4.18 Input LockSignBOC

Standard mode: NA

LTE-HEE mode:

FB: HPM	**LTE Client Input Name:** LockSignBOC	Mandatory ☐ Optional ☒

Description:

This signal is received from multiple BOC's. The BOC can indicate with this signal, that the boiler is overloaded. Two types of overload situations are distinguished: overload is critical (too low boiler temp.) or uncritical (requested boiler temperature can not be provided but boiler temperature is above critical lower limit)
See also document [08]
This signal may be used in the HPM for boiler sequence control => company-specific behavior. Normally other boilers (if available) will be activated in case of overload.
In case of overload condition in the whole boiler cascade or in a system with only one boiler, the corresponding LockSignHPM signal is generated by the HPM.

DPT:	Name	DPT_LockSign	DPT ID	207.101	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
PwrReduction	Requested power-consumption reduction – 0 % no reduction – 100% max. reduction	M	%	cs
Attributes – LockRequest	Bitset containing status info indicates if power reduction is necessary (validity of PwrReduction)	M	bool	false
– Type	type of overload critical/uncritical; value is only meaningful if LockRequest=true	M	bool	uncritical

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer (1..n)	1.n
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	55
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:		Producer	
	Timeout: [1]	7	Min	
LTE-Service (polling): Read – Response ☒	Read Wildcard / Resp Sniffer on Binding Group:		Producer	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This signal can be device internal if BOC and HPM are located in the same device
[1] The signal is received on event and periodically (if no COV occured) as long as the LockRequest attribute is true. When the overload condition in the BOC disappears, the LockRequest attribute changes to false and the signal will be repeated by the BOC with the heartbeat-period during 9 minutes (3 messages). Afterwards re-transmission is stopped until a new overload condition appears (this procedure reduces unnecessary bus-load)
In the HPM, this signal must be handled individually for each boiler in the cascade – including the timeout condition.

2.4.4.19 Input BoilerSpec

Standard mode: NA

LTE-HEE mode:

FB: HPM	LTE Client Input Name: BoilerSpec	Mandatory ☐ Optional ☒

Description:

This signal is received from multiple BOC's. The datapoint specifies the type and characteristics of the boiler. The value of this datapoint may in some cases change during runtime. Changes are reported spontaneously by the BOC. This information may be used by the HPM in order to allow specific boiler control mechanisms. This information could be a part of the boiler directory in the HPM. It must be handled for each boiler individually.

DPT:	Name	DPT_SpecHeatProd	DPT ID	216.100	Datatype format	$U_{16}U_8N_8B_8$

Field	Description	Sup.	Unit	Default
Pnom	Boiler nominal power	M	kW	cs
BstageLimit [1)]	relative power limit % of stage 1 resp. base stage	M	%	cs
BurnerType	1 stage, 2 stage, modulating etc.	M	enum.	cs
FuelType	set of supported fuel types	M	bitset	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer (1..n)	1.n
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	52
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:		Producer	
	Timeout: [2)]	--	Min	
LTE-Service (polling): Read – Response [2)] ☒	Read Wildcard / Resp Sniffer on Binding Group:		Producer	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

Special Features:

This signal can be device internal if BOC and HPM are located in the same device

[1)] can be ignored in case of 1 stage burner: dummy value 100%

[2)] This datapoint has usually a constant value and is read once by the HPM after system installation / power up. The datapoint may also change during runtime and is then reported spontaneously by the BOC

2.4.4.20 Input TempFlowWater

same as in BOC, see chapter 2.3.4.22

2.4.4.21 Input TempReturnWater

same as in BOC, see chapter 2.3.4.23

2.4.4.22 Input TempOutside

same as in BOC, see chapter 2.3.4.24

2.4.4.23 Input StatusFTC

same as in BOC, see chapter 2.3.4.25

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2.4.4.24 Parameter ProdSegmH

FB: HPM	Property Name (Server): ProdSegmH	Mandatory ☒ Optional ☐

Description:

LTE zoning information Heat Production Segment

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Heat Production Segment number	M	1..16	--	1
Status - OutOfService - all other flags	 zone active /inactive not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 set zone inactive / active not supported	 M O NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	101
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

HPM DP's are not LTE communicating with the BOC's if zone is 'OutOfService'.

2.4.4.25 Parameter DistrSegmH

FB: HPM	Property Name (Server): DistrSegmHPrimary	Mandatory ☒ [1] Optional ☐

Description:

LTE zoning information : link with the HFDM in the primary Heat Distribution Segment

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Heat DistributionSegment number	M	1..31	--	1 or 31 [3]
Status - OutOfService - all other flags	 zone active /inactive [2] not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 set zone inactive / active not supported	 M O NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	102
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

[1] mandatory if the first HFDM is not located in the same device; NA if HPM and HFDM are in the same device

[2] HPM DP's are not LTE communicating with the corresponding HFDM if zone is 'OutOfService'

[3] see chapter 2.4.1 and specification of HFDM

2.4.4.26 Parameter PeripheralLinkPump

FB: HPM	Property Name (Server): PeripheralLinkPump	Mandatory ☐ Optional ☒

Description:

LTE zoning number Peripheral link to common pump in boiler sequence

DPT:	Name	DPT_UcountValue16_Z	DPT ID	203.012	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
CounterValue	peripheral link number	M	full	--	1
Status				bitset	
- OutOfService	zone active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set zone inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	103
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

HPM is not LTE communicating with the pump if zone is 'OutOfService'

2.4.4.27 Parameter PeripheralLinkFTC

FB: HPM	Property Name (Server): PeripheralLinkFTC	Mandatory ☐ Optional ☒

Description:

LTE zoning number Peripheral link to FTC (optionally used for control of the common return temperature)

DPT:	Name	DPT_UcountValue16_Z	DPT ID	203.012	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
CounterValue	peripheral link number	M	full	--	1
Status				bitset	
- OutOfService	zone active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set zone inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	104
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

HPM is not LTE communicating with the FTC if zone is 'OutOfService'

2.4.4.28 Parameter OutsideSensorZone

FB: HPM	Property Name (Server): OutsideSensorZone	Mandatory ☐ Optional ☒

Description:

LTE zoning number for the link with an Outside Temperature Sensor

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Outside sensor zone number	M	1..31	--	1
Status				bitset	
- OutOfService	zone active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set zone inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	105
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

HPM is not using an external outside temperature sensor if zone is 'OutOfService'

2.4.4.29 Diagnostic data TempFlowWaterProdSegmH

FB: HPM	Property Name (Server): TempFlowWaterProdSegmH	Mandatory ☒ Optional ☐

Description:

Current flow temperature provided by the heat production segment

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	110
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.4.4.30 Diagnostic data TempReturnWaterProdSegmH

FB: HPM	Property Name (Server): TempReturnWaterProdSegmH	Mandatory ☐ Optional ☒

Description:

Current common return temperature of the heat production segment

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	111
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.4.4.31 Diagnostic data TempProdSegmHSetp

FB: HPM	Property Name (Server): TempProdSegmHSetp	Mandatory ☒ Optional ☐

Description:

Current common flow water temperature setpoint of boiler sequence

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- OutOfService	boiler is out of service => no setpoint	O	true/false		false
- Overridden	external override of the setpoint	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- Override & Release	override and release setpoint	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	112
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Override / Release function only

2.4.4.32 Diagnostic data BoilersTotal

FB: HPM	Property Name (Server): BoilersTotal	Mandatory ☐ Optional ☒

Description:

Total number of boilers in boiler sequence (according to the boiler directory)

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..31	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	113
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.4.4.33 Diagnostic data BoilersActive

FB: HPM	Property Name (Server): BoilersActive	Mandatory ☐ Optional ☒

Description:

Number of currently active boilers in boiler sequence

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..31	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	114
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.4.4.34 Diagnostic data PnomHPM

FB: HPM	Property Name (Server): PnomHPM	Mandatory ☐ Optional ☒

Description:

Nominal power of the boiler sequence controlled by the HPM

DPT:	Name	DPT_PowerKW_Z	DPT ID	203.014	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Power	power value, 1kW resolution	M	0..65535	[kW]	cs
Status - OutOfService - all other flags	Pnom value valid or unknown/void not supported, fixed to '0'	O NA	true/false	bitset	false

Communication:

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	115
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

To be calculated according to the power values PnomBoiler of the attached boilers

2.4.4.35 Diagnostic data PrelHPM

FB: HPM	Property Name (Server): PrelHPM	Mandatory ☐ Optional ☒

Description:

Current relative power of the boiler sequence according to the relative power values of the attached boilers. The calculation is done by the HPM and the mechanism is company specific.

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
RelValue	relative value	M	0..100%	%	cs
Status - OutOfService - all other flags	RelValue valid / void not supported, fixed to '0'	M NA	true/false	bitset	true

Communication:

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	116
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.4.4.36 Diagnostic data Fault

FB: HPM	Property Name (Server): Fault	Mandatory ☒ Optional ☐

Description:

Some error in the HPM (only concerning HPM functionality, BOC have their own Fault attributes)

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	117
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.4.4.37 Diagnostic data SummerMode

FB: HPM	Property Name (Server): SummerMode	Mandatory ☐ Optional ☒

Description:

Summer mode status in the HPM => relevant for the whole boiler sequence

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	118
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.4.4.38 Diagnostic data OffPerm

FB: HPM	Property Name (Server): OffPerm	Mandatory ☐ Optional ☒

Description:

Status info indicating whether the boiler sequence is perrmanently off (e.g. manually switched off). This datapoint can also be a parameter of the HPM in order to switch the boiler sequence off via bus

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	119
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] Write access only if this datapoint is also used to switch the boiler sequence off via bus. This is an optional feature, e.g. used for service

2.4.4.39 Diagnostic data NoHeatAvailable

FB: HPM	Property Name (Server): NoHeatAvailable	Mandatory ☐ Optional ☒

Description:

Status info indicating whether boiler sequence is temporarily not providing heat

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	120
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.4.4.40 Diagnostic data StatusPumpHPM

FB: HPM	Property Name (Server): StatusPumpHPM	Mandatory ☐ Optional ☒

Description:

Current relative power of common pump in the boiler sequence

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
RelValue	relative value	M	0..100%	%	cs
Status - OutOfService - all other flags	 RelValue valid / void not supported, fixed to '0'	 O NA	 true/false	bitset	 false

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	121
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

for switched pump 0%=off, 100%=on

2.4.4.41 Diagnostic data StagesActive

FB: HPM	Property Name (Server): StagesActive	Mandatory ☐ Optional ☒

Description:

Number of active stages in the boiler sequence. This value is calculated by the HPM according to the currently active burner stages which are counted as follows:
- stage 1active = 1
- stage 2 active = 2
- modulating = 1

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..62	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	122
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

2.4.4.42 Diagnostic data ErrorCodeHPM

FB: HPM	Property Name (Server): ErrorCodeHPM	Mandatory ☐ Optional ☒

Description:

Company specific numeric 16 bit error code

DPT:	Name	DPT_Value_2_Ucount	DPT ID	7.001	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			full range	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	136 (HPM)	Property ID:	123
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

3 Heat production including Buffer Storage Tank (BST)

3.1 Aims and Objectives

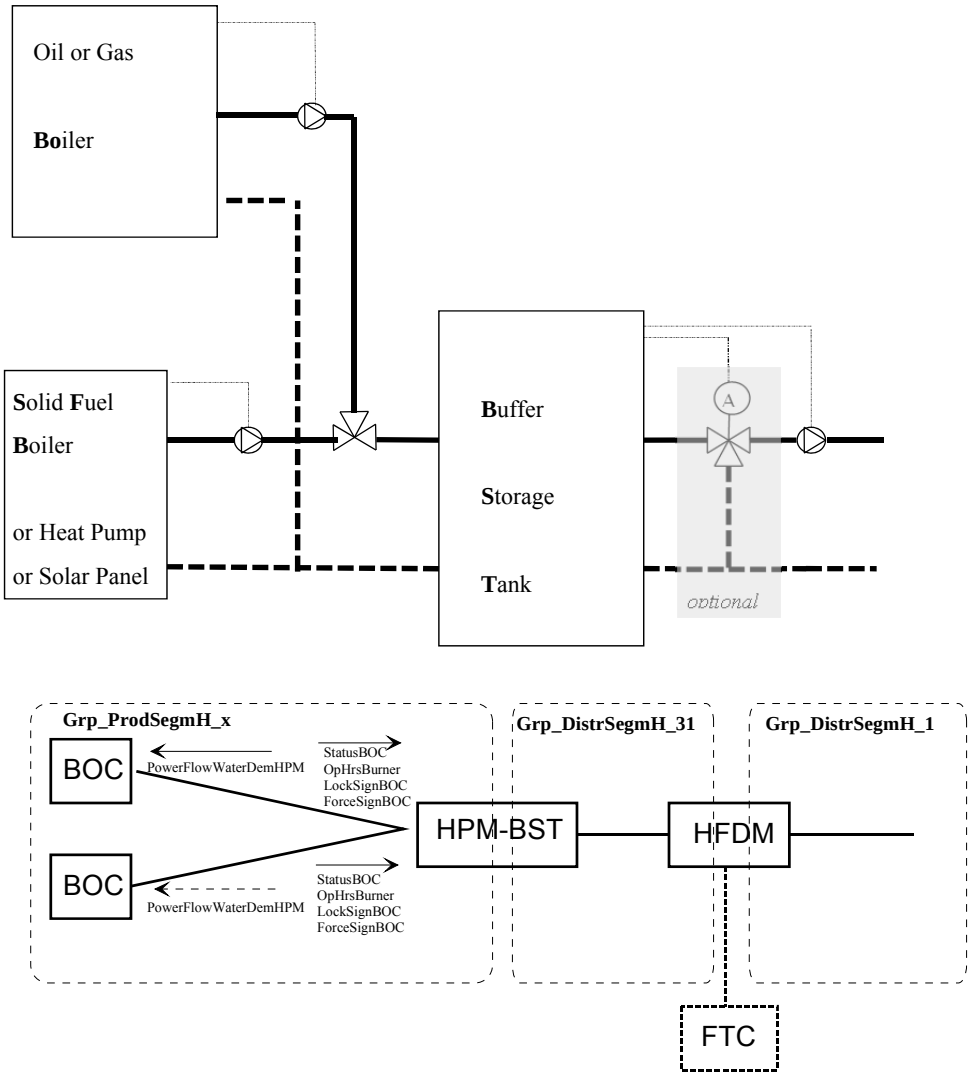
A buffer storage tank is used for optimized heat production and peak demand management.

E.g.

- store solar energy: moment and amount of energy production can't be influenced
- store oversupply energy from solid fuel boiler (e.g. wood fired): quick control of the current power of these boilers is not possible.
- loading of a buffer storage tank enables longer burner run-time and therefore higher efficiency
- stored energy in the BST is used to handle peak demand (e.g. morning boost). Nominal boiler power or the number of boilers in a cascade may be reduced.

A buffer storage tank is a part of a heat production system. Two application scenarios are considered.

Scenario 1



This BST application consists of a combination of oil/gas boiler(s) and solid fuel boiler(s) which are all connected to a buffer storage tank. No other boilers are present in the system.

The primary Heat Distribution Segment is connected to the BST – either directly or via an optional pre-controller ('HFDM' + 'FTC').

The combination of heat producers (boilers, solar panel etc.) and the BST can be considered as one Heat Production Segment with a special heat producer manager 'HPM-BST'.

The 'HPM-BST' receives its heat demand from the corresponding 'HFDM'.

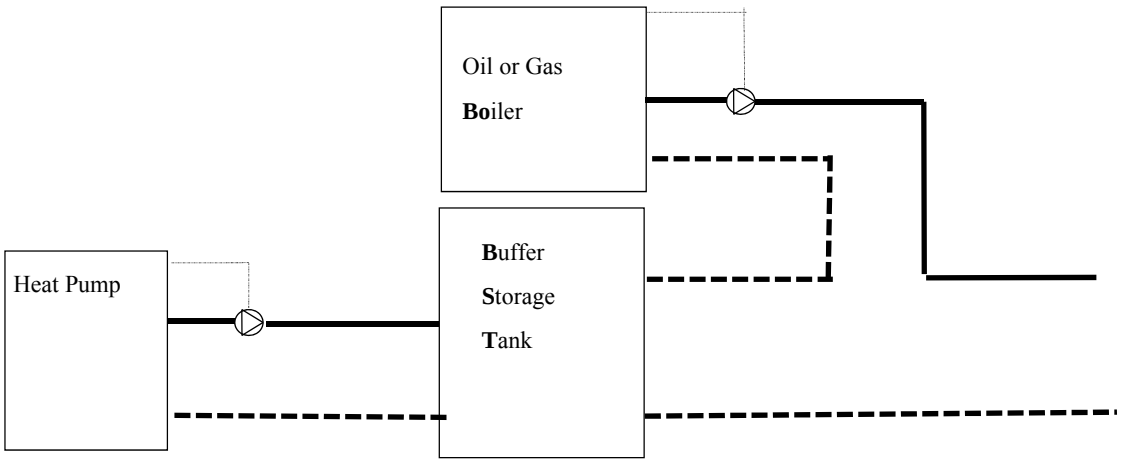
'HPM-BST' and 'HFDM' have a 1:1 relationship and are usually located in the same device, otherwise the default group DistrSegmH_31 is used for binding => same as HPM

The heat demand is translated by the 'HPM-BST' to the corresponding BST water temperature and load status. The 'HPM-BST' controls the load of the storage tank and the power of the boilers so far as possible (oil or gas boilers). The interfaces to BOC are the same as in a normal boiler cascade.

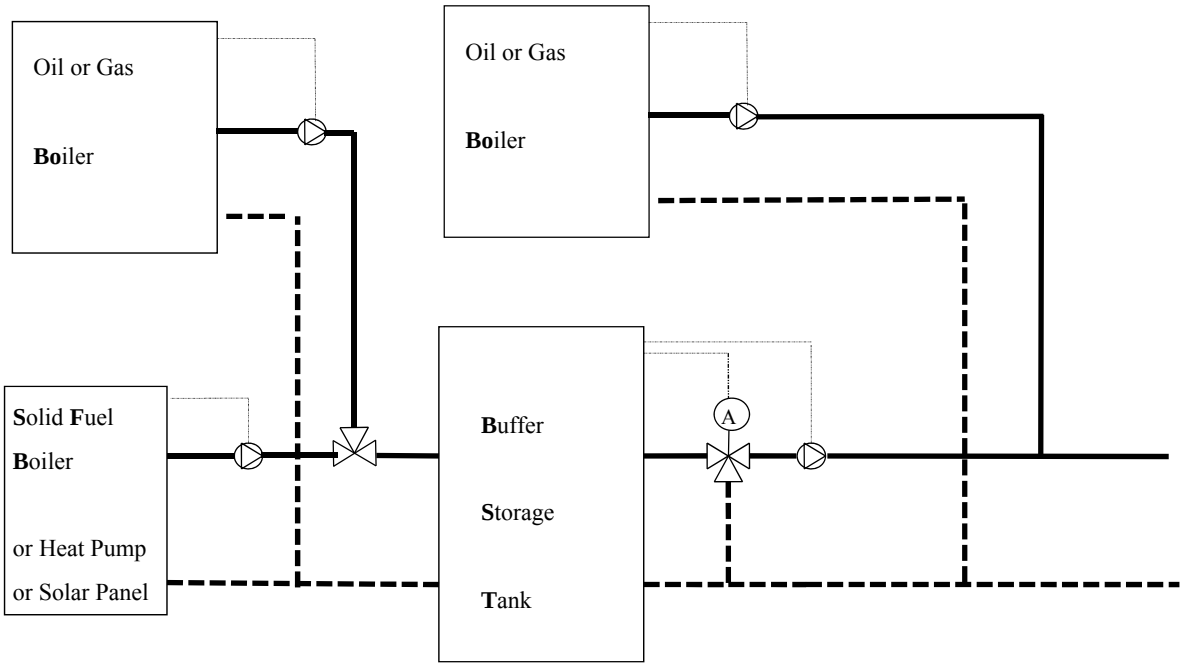
The 'HPM-BST' will usually have only little influence on the heat production in a solar system or a solid fuel boiler. The data interface from 'HPM-BST' to this class of heat producers will be the same as for normal BOC, but 'PowerFlowWaterDemHPM' signal may not be considered by the producers. On the other hand, the producers will send their StatusBOC, LockSignBOC and ForceSignBOC signals to the 'HPM-BST'. These signals are used for optimized BST load control.

Alternative BST Scenario:
Parallel connection of a boiler to the buffer storage tank is not the only solution. Also serial connection is used in existing implementations. The boiler is used e.g. in heat-pump applications to raise the flow temperature from the BST to the needed level.

This scenario can be mapped to the same functional blocks as in buffer storage tank scenario 1 (HPM-BST controlling the buffer storing tank and the boiler)



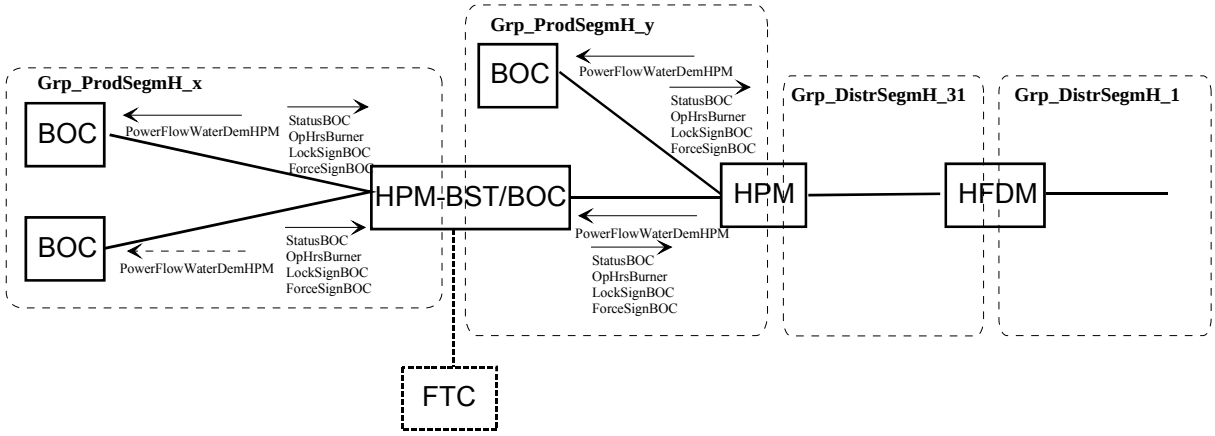
Scenario 2



A boiler / BST system as described in scenario 1 is part of a boiler cascade and is connected together with other boiler(s) to a 'HPM'. The sub-system described in scenario 1 can be considered as a sub-cascade within a boiler cascade and the BST is seen as a boiler 'BOC' from the 'HPM'. The additional boiler(s) connected to the HPM are not loading the BST.

Scenario 2 is not very usual, but in some applications it is favorable to connect one or more additional boilers directly to the primary Distribution Segment and therefore bypass the BST.

The concept of sub-cascades within a boiler cascade can be handled easily in the HWH application model as follows:



The sub-cascade including the BST is handled by the complex and compound functional block 'HPM-BST/BOC' which behaves in the sub - heat Production Segment x like a 'HPM' as described in scenario 1, and in the higher level heat Production Segment y as a boiler 'BOC' which is controlled by a normal 'HPM'.

The 'HPM-BST/BOC' includes also the pre-controller after the BST and tries to provide the flow temperature requested by the 'HPM'.

Both scenarios fit into the existing boiler / boiler sequence concept. The existing mechanisms can be re-used. This leads to a homogeneous solution.

3.2 Functional Block: Heat Producer Manager for BST (HPM-BST)

3.2.1 Functional Specification

The ‘HPM-BST’ is responsible for demand dependent heat-production / boiler cascade management and buffer storage tank management as described in scenario 1 in chapter 3.1

In addition the ‘HPM-BST’ controls the load of the buffer storage tank using one or more BST temperature sensors and actuators (pump, switching valves etc.). These I/O’s are usually hard wired.

The BST is expected to provide the requested flow temperature according to the TempFlowWaterDemAbsHFDM signal from ‘HFDM’ in the primary Distribution Segment. In some applications the primary Distribution Segment is directly connected to the BST without pre-control. In this case, the ‘HPM-BST’ will strive to provide at least the requested flow temperature. If the application requires a more accurate flow temperature, a pre-controller ‘FTC’ is added to the BST and controlled by the ‘HFDM’.

3.2.2 Constraints

The ‘HPM-BST’ and the “first” ‘HFDM’ and ‘FTC’ are normally located in the same device since these functional blocks have a 1:1 relationship and rather tight coupling.

Important: Combined BST load management and boiler sequence control mechanisms are usually complex and very company specific. The local functionality of the HPM-BST is not subject of this specification.

LTE-HEE runtime interworking:
Regarding the interworking with the connected boilers and the “first” Heating Flow Demand Manager ‘HFDM’ on the primary Heat Distribution Segment, the data interface and black box behavior of the ‘HPM-BST’ is identical to the ‘HPM’ as described in chapter 2.4. Therefore concerning LTE-HEE runtime-interworking the HPM-BST behaves like a standard HPM. I. e. the process signals sent by the HPM-BST using InfoReport Service contain the Source Functional Block ‘HPM’

The S-interface is identical to the HPM, see chapter 2.4.2

Parameters and diagnostic values:

- same type of datapoints as in HPM
- the datapoints are addressed by the Interface Object Type HPM-BST (137) and the corresponding local Property ID
- some HPM-BST specific additional datapoints are described in this chapter

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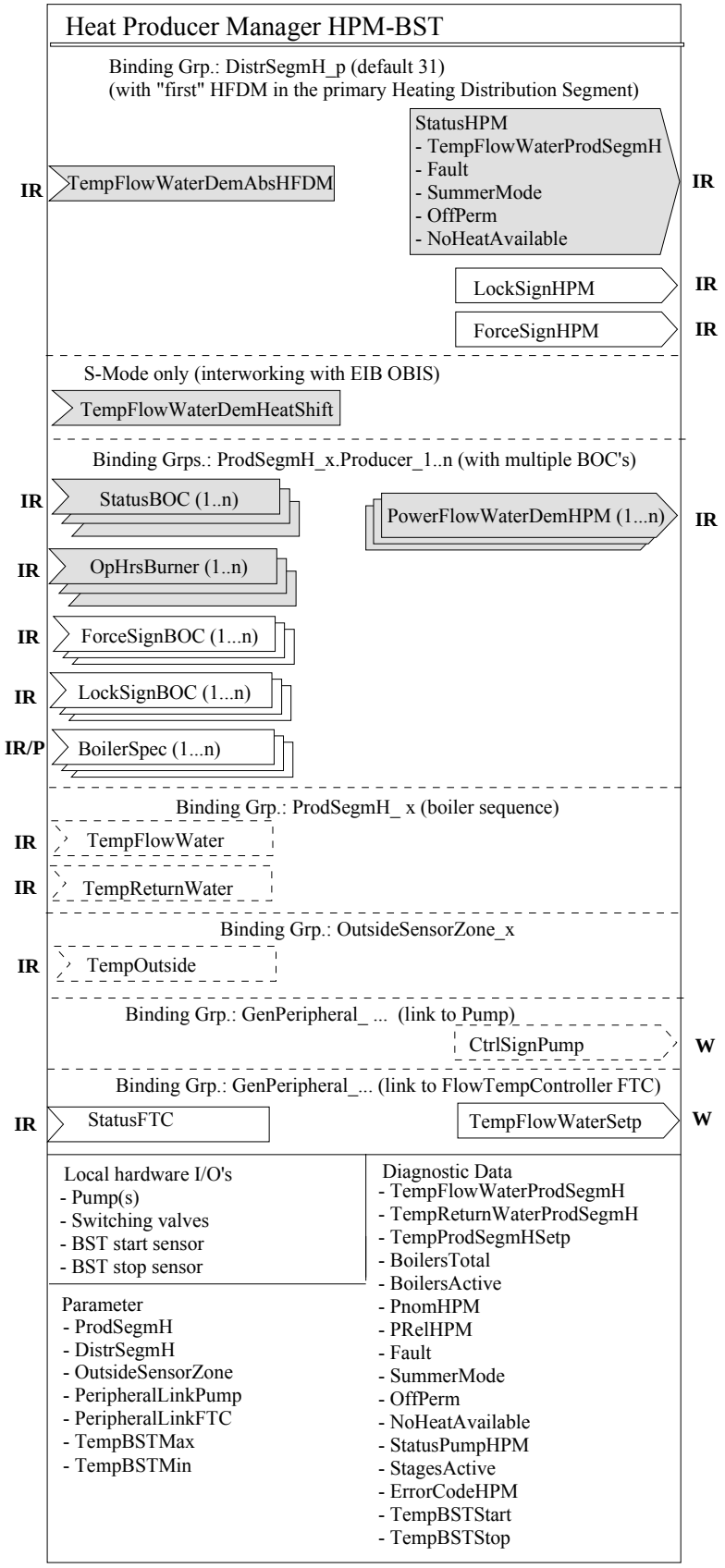
3.2.3 Functional block diagram



3.2.4 Datapoint description

3.2.4.1 Overview

Data Point	Description	Datapoint Type	DPT N°
Outputs			
for runtime interworking: same as 'HPM', see chapter 2.4.4			
Inputs			
for runtime interworking: same as 'HPM', see chapter 2.4.4			
Parameters			
ProdSegmH	LTE zoning information: same as 'HPM', see chapter 2.4.4 Interface Object type: 137 (HPM-BST) but same Property ID, same features		
DistrSegmH			
PeripheralLinkPump			
PeripheralLinkFTC			
OutsideSensorZone			
TempBSTMax	BST maximum temperature	DPT_TempHVACAbs_Z	205.100 *)
TempBSTMin	BST minimum temperature	DPT_TempHVACAbs_Z	205.100 *)
Diagnostic Data			
TempFlowWaterProdSegmH	same as 'HPM', see chapter 2.4.4 Interface Object type: 137 (HPM-BST) but same Property ID, same features		
TempReturnWater ProdSegmH			
TempProdSegmHSetp			
BoilersTotal			
BoilersActive			
PnomHPM			
PrelHPM			
Fault			
SummerMode			
OffPerm			
NoHeatAvailable			
StatusPumpHPM			
StagesActive			
ErrorCodeHPM			
TempBSTStart	BST start temperature	DPT_TempHVACAbs_Z	205.100 *)
TempBSTStop	BST stop temperature	DPT_TempHVACAbs_Z	205.100 *)

*) Implementation of Properties using standard DPT see chapter 1.3.2

3.2.4.2 Parameter TempBSTMax

FB: HPM-BST	Property Name (Server): TempBSTMax	Mandatory ☐ Optional ☒

Description:

Max. limitation of BST temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- OutOfService	max limitation active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set limitation parameter inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	137 (HPM-BST)	Property ID:	140
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

Limitation function is activated or deactivated by the 'OutOfService' Status

3.2.4.3 Parameter TempBSTMin

FB: HPM-BST	Property Name (Server): TempBSTMin	Mandatory ☐ Optional ☒

Description:

Min. limitation of BST temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- OutOfService	min limitation active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set limitation parameter inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	137 (HPM-BST)	Property ID:	141
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

Limitation function is activated or deactivated by the 'OutOfService' Status

3.2.4.4 Diagnostic data TempBSTStart

FB: HPM-BST	Property Name (Server): TempBSTStart	Mandatory ☐ Optional ☒

Description:

Current BST start temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	137 (HPM-BST)	Property ID:	142
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Alarm acknowledgement only

3.2.4.5 Diagnostic data TempBSTStop

FB: HPM-BST	Property Name (Server): TempBSTStop	Mandatory ☐ Optional ☒

Description:

Current BST stop temperature

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	137 (HPM-BST)	Property ID:	143
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Alarm acknowledgement only

3.3 Functional Block: BST in boiler sub-cascade (HPM-BST/BOC)

3.3.1 Functional Specification

The ‘HPM-BST/BOC’ is responsible for demand dependent heat-production / boiler cascade management and buffer storage tank management in a **boiler sub-cascade** as described in scenario 2 in chapter 3.1

In addition, the ‘HPM-BST/BOC’ controls the load of the buffer storage tank using one or more BST temperature sensors and actuators (pump, switching valves etc.). These I/O’s are usually hard wired.

From the point of view of the ‘HPM’, the BST is expected to provide the requested flow temperature like a boiler according to the PowerFlowWaterDemHPM signal. Usually a pre-controller ‘FTC’ is added to the BST in order to provide the requested flow temperature. The ‘FTC’ is directly controlled by the ‘HPM-BST/BOC’. ‘HPM-BST/BOC’ and ‘FTC’ are normally located in the same device since these functional blocks have a 1:1 relationship and rather tight coupling.

3.3.2 Constraints

Important: Combined BST load management and boiler sub-sequence control mechanisms are usually complex and very company specific. The local functionality of the HPM-BST/BOC is not subject of this specification.

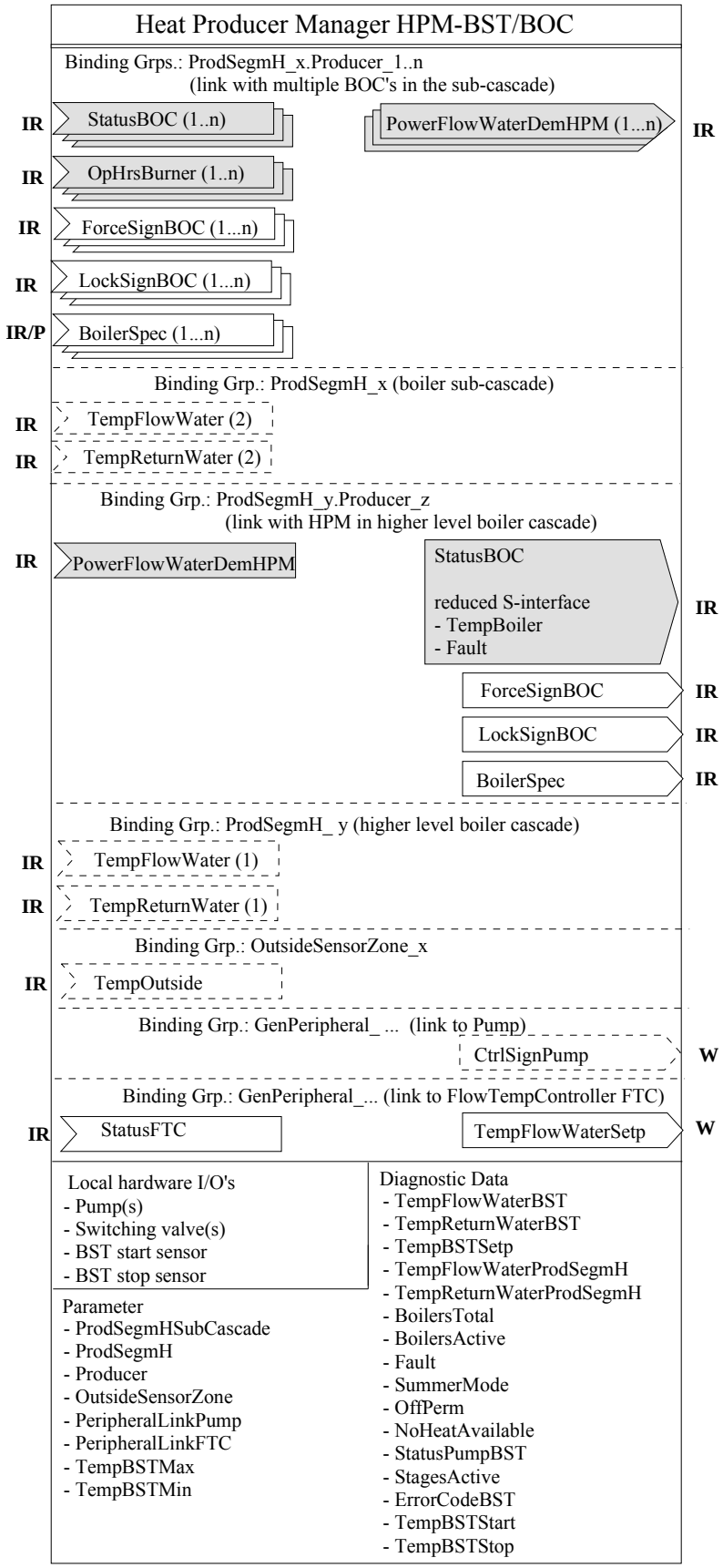
LTE-HEE runtime interworking:
Regarding the interworking with the connected boilers in the sub-cascade, the data interface and black box behavior of the ‘HPM-BST/BOC’ is identical to the ‘HPM’ as described in chapter 2.4. Therefore concerning LTE-HEE runtime-interworking the HPM-BST/BOC behaves like a standard HPM. I. e. the process signals sent by the HPM-BST/BOC using InfoReport Service contain the Source Functional Block ‘HPM’

Regarding the interworking with the ‘HPM’ in the higher level boiler cascade, the data interface and black box behavior of the ‘HPM-BST/BOC’ is identical to a ‘BOC’ **with 1-stage burner** as described in chapter 2.3. Therefore concerning LTE-HEE runtime-interworking the HPM-BST/BOC behaves in principle like a standard BOC. I. e. the process signals sent by the HPM-BST/BOC using InfoReport Service contain the Source Functional Block ‘BOC’.

Restrictions: since the HPM-BST/BOC “emulates” a BOC some data values are not available (e.g. in StatusBOC) or fixed. This leads to a reduced S-interface in comparison with a normal BOC.

Same constraints concerning basic FB and standard mode implemetation as for BOC and HPM, see chapters 2.3.2 and 2.4.2

3.3.3 Functional block diagram



3.3.4 Datapoint description

3.3.4.1 Overview

Data Point	Description	Datapoint Type	DPT N°
Outputs			
PowerFlowWaterDemHPM	for runtime interworking: same as 'HPM', see chapter 2.4.4		
StatusBOC	StatusBOC: for runtime interworking: same as BOC, some fields are void => reduced S-interface S-interface: see BOC chapter 2.3.4.3 and 2.3.4.5		
TempBoiler			
Fault			
ForceSignBOC	for runtime interworking: see BOC, chapter 2.3.4.10 and 2.3.4.11		
LockSignBOC			
BoilerSpec	for runtime interworking: same as BOC, some fields contain dummy values for BST/BOC		
CtrlSignPump	for runtime interworking: see 'HPM' or 'BOC' (identical data interface)		
TempFlowWaterSetp			
Inputs			
StatusBOC	for runtime interworking: same as 'HPM', see chapter 2.4.4		
OpHrsBurner			
ForceSignBOC			
LockSignBOC			
BoilerSpec			
TempFlowWater (1)			
TempReturnWater (1)			
PowerFlowWaterDemHPM	for runtime interworking: same as 'BOC', see chapter 2.3.4		
TempFlowWater (2)			
TempReturnWater (2)			
TempOutside	for runtime interworking: see 'HPM' or 'BOC'		
StatusFTC			
Parameters			
ProdSegmHSubCascade	LTE zoning number Heat Production Segment of the sub-cascade	DPT_UcountValue8_Z	202.002
ProdSegmH	LTE zoning number Heat Production Segment of the higher level HPM	DPT_UcountValue8_Z	202.002
Producer	LTE zoning number Producer number of the BOC part in the higher level HPM system	DPT_UcountValue8_Z	202.002
PeripheralLinkPump	LTE zoning number Peripheral link to common pump in the BST system	DPT_UcountValue16_Z	203.012
PeripheralLinkFTC	LTE zoning number Peripheral link to FTC in the BST system used for control of the flow temperature from BST	DPT_UcountValue16_Z	203.012
OutsideSensorZone	LTE zoning number for Outside Temperature	DPT_UcountValue8_Z	202.002
TempBSTMax	BST maximum temperature	DPT_TempHVACAbs_Z	205.100 *)
TempBSTMin	BST minimum temperature	DPT_TempHVACAbs_Z	205.100 *)

Data Point	Description	Datapoint Type	DPT N°
Diagnostic Data			
TempFlowWaterBST	current BST flow temperature (in higher level ProdSegmH)	DPT_TempHVACAbs_Z	205.100 *)
TempReturnWaterBST	current BST return temperature (in higher level ProdSegmH)	DPT_TempHVACAbs_Z	205.100 *)
TempBSTSetp	current BST temperature setpoint	DPT_TempHVACAbs_Z	205.100 *)
TempFlowWaterProdSegmH	common flow temperature in sub-cascade	DPT_TempHVACAbs_Z	205.100 *)
TempReturnWaterProdSegmH	common return temperature in sub-cascade	DPT_TempHVACAbs_Z	205.100 *)
BoilersTotal	Total number of boilers in sub-cascade	DPT_Value_1_Ucount	5.010
BoilersActive	Number of active boilers in sub-cascade	DPT_Value_1_Ucount	5.010
Fault	some error in the HPM-BST/BOC (only BST functionality, attached BOC have their own Fault attributes)	DPT_Bool	1.002
SummerMode	sub-cascade is in summer mode	DPT_Bool	1.002
OffPerm	sub-cascade is permanently off	DPT_Bool	1.002
NoHeatAvailable	sub-cascade is temporarily not providing heat	DPT_Bool	1.002
StatusPumpBST	current relative power of the common pump in the sub-cascade; for switched pump 0%=off, 100%=on	DPT_RelValue_Z	202.001 *)
StagesActive	number of active stages in the sub-cascade: - stage 1active = 1; - stage 2 active = 2; - modulating = 1	DPT_Value_1_Ucount	5.010
ErrorCodeBST	company specific numeric error code (only BST functionality, BOC have their own ErrorCodeBOC)	DPT_Value_2_Ucount	7.001
TempBSTStart	BST start temperature	DPT_TempHVACAbs_Z	205.100 *)
TempBSTStop	BST stop temperature	DPT_TempHVACAbs_Z	205.100 *)

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	PowerFlowWaterDemHPM	**NA** [1)]	NA	NA	M
	StatusBOC	**NA**	NA	NA	M
	- TempBoiler	**GO$_b$**	GO	GO	NA
	- Fault	**GO$_b$**	GO	GO	NA
	ForceSignBOC	**NA**	NA	NA	O
	LockSignBOC	**NA**	NA	NA	O
	BoilerSpec	**NA**	NA	NA	O
	CtrlSignPump not yet defined				
	TempFlowWaterSetp	**(GO$_b$)**		(GO)	O
Inputs	StatusBOC	**NA** [1)]	NA	NA	M
	OpHrsBurner	**GO$_b$**	GO	GO	M
	ForceSignBOC	**NA**	NA	NA	O
	LockSignBOC	**NA**	NA	NA	O
	BoilerSpec	**NA**	NA	NA	O
	TempFlowWater (2)	**(GO$_b$)**		(GO)	O
	TempReturnWater (2)	**(GO$_b$)**		(GO)	O
	PowerFlowWaterDemHPM	**NA** [1)]	NA	NA	M
	TempFlowWater (1)	**(GO$_b$)**		(GO)	O
	TempReturnWater (1)	**(GO$_b$)**		(GO)	O
	TempOutside	**(GO$_b$)**		(GO)	O
	StatusFTC	**NA**	NA	NA	O

1) *mandatory in LTE Mode but the information is NA in the Basic FB and all other modes because the datapoint type is today not available in standard mode. Splitting of DPT is not possible because of necessary data consistency*

Table 12: HPM-BST/BOC Runtime Interworking - dependence on Configuration Modes

In the following chapters only the Inputs and Outputs of HPM-BST/BOC are specified again if there are relevant differences in comparison with HPM or BOC data interface. Otherwise the corresponding datapoint specifications of HPM or BOC shall be taken as reference.

		Support
Parameter	ProdSegmHSubCascade	M
	ProdSegmH	M
	Producer	M
	PeripheralLinkPump	O
	PeripheralLinkFTC	O
	OutsideSensorZone	O

Table 13: HPM-BST/BOC LTE specific Properties

		Support
Parameter	TempBSTMax	O
	TempBSTMin	O
Diagnostic Data	TempFlowWaterBST	M
	TempReturnWaterBST	O
	TempBSTSetp	M
	TempFlowWaterProdSegmH	M
	TempReturnWaterProdSegmH	O
	BoilersTotal	O
	BoilersActive	O
	Fault	M
	SummerMode	O
	OffPerm	O
	NoHeatAvailable	O
	StatusPumpBST	O
	StagesActive	O
	ErrorCodeBST	O
	TempBSTStart	O
	TempBSTStop	O

Table 14: HPM-BST/BOC Standard Properties of Interface Objects (or memory mapped DP)

3.3.4.2 Output StatusBOC

Standard mode: NA => mapped to the datapoints TempBoiler, Fault => reduced S-interface because some fields of StatusBOC are void (dummy values)

LTE-HEE mode:

FB: **HPM-BST/BOC**	**LTE Server Output Name:** **StatusBOC**	Mandatory ☒ Optional ☐

Description:

This signal contains status information of the HPM-BST/BOC to be used in the higher level HPM for boiler sequence control

DPT:	Name	DPT_StatusBOC	DPT ID	215.100	Datatype format	$V_{16}U_8B_{16}$

Field	Description	Sup.	Range	Unit	COV	Default
TempBoiler	Boiler temperature	M	full range	°C	2	cs
PrelBurner	dummy field for HPM-BST/BOC	**NA**		%	--	cs
Attributes	Bitset containing status info					
–TempBoilerValid	validity of TempBoiler Field	M	true/false	bool	Y	false
– PrelBurnerValid	validity of PrelBoil Field	M	**false**	bool	N	false
– Fault	failure in HPM-BST/BOC	M	true/false	bool	Y	false
– SummerMode	HPM-BST/BOC switched off due to local summer/winter mode	O	true/false	bool	Y	false
– OffPerm	permanently off (manual switch or failure)	O	true/false	bool	Y	false
– NoHeatAvailable	HPM-BST/BOC is temporary not providing heat	O	true / false	bool	Y	false
– StatusBurnerStage1Enable	stage 1 or base stage enabled dummy for HPM-BST/BOC	M	**enable**	bool	Y	enable
– StatusBurnerStage2Enable	stage 2 / modulation enabled dummy for HPM-BST/BOC	M	**disable**	bool	Y	disable
– ReqNextStage	for boiler with two stage burner: power limit of stage 1 is reached, HPM is requested to enable stage 2 dummy for HPM-BST/BOC	O	**false**	bool	Y	false
– ReqNextBoiler	power limit of producer is reached, HPM is requested to enable next boiler in cascade	O	true/false	bool	Y	false
– ReducedAvailability	HPM-BST/BOC is in principle available but other boilers should be used with preference	O	true/false	bool	Y	false
– ChimneySweep	ChimneySweep function active	O	true/false	bool	Y	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	51

LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒	MinRepTime:	10 sec	Heartbeat:	3 min
	Output per default communicating ☐		Binding Group Wildcard allowed ☐		
	Tx Prio:	High ☐	Normal ☒	Low ☐	
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐		
Property-Service (individual access):	Read only ☒	Read/Write ☐			
Exception Handling:			Save at Powerdown ☐		
--					
Special Features:					
some fields are void, see above					

3.3.4.3 Output BoilerSpec

Standard mode: NA

LTE-HEE mode:

FB: HPM-BST/BOC	**LTE Server Output Name:** BoilerSpec	Mandatory ☐ Optional ☒

Description:

This datapoint specifies the type and characteristics of the producer. In case of HPM-BST/BOC some fields are dummy values.
This information may be read by the HPM in order to allow specific boiler control mechanisms. The value of this datapoint may in some cases change during runtime. Changes are reported spontaneously.

DPT:	Name	DPT_SpecHeatProd	DPT ID	216.100	Datatype format	$U_{16}U_8N_8B_8$

Field	Description	Sup.	Range	Unit	COV	Default
Pnom	HPM-BST/BOC nominal power	M	0 .. 65535	kW	1	cs
BstageLimit	dummy field, fixed value	M	100%	%	--	100%
BurnerType	1 stage (fixed)	M	1	enum.	--	1
FuelType	set of supported fuel types	M	b2..b0	bitset	Y	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	ProdSegmH.Producer	1.1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	129 (BOC)	Property ID:	52	
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒	MinRepTime:	-- sec	Heartbeat:	-- min
	Output per default communicating ☐		Binding Group Wildcard allowed ☐		
	Tx Prio:	High ☐	Normal ☒	Low ☐	
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐		
Property-Service (individual access):	Read only ☒	Read/Write ☐			
Exception Handling:			Save at Powerdown ☐		
--					

Special Features:

This datapoint has usually a constant value and is read once by the HPM after system installation / power up. The datapoint may also change during runtime. In this case spontaneous transmission (COV) of the datapoint shall be supported (no heartbeat).
[1)] dummy value for 1 stage burner: 100%

3.3.4.4 Input PowerFlowWaterDemHPM

Same behaviour as described in the BOC. For the HPM-BST/BOC the requested water temperature is usually relevant whereas "burner" stage 1, stage2 or modulation control information does not make much sense for HPM-BST/BOC. The HPM-BST/BOC "emulates" a boiler with 1 stage. Therefore the control information from the HPM will be usually interpreted as follows:

"Burner type"	**HPM-BST/BOC Mode**		**Stage 1 enabled**	**Stage 1 forced**	**Stage 2 enabled**	**Stage 2 forced**	**Rel Demand Limit**	**Flow Temp Dem**
1 Stage	disabled	[1]	**0**	x	x	x	x	x
	enabled	forced [2]	**1**	**1**	x	x	x	x
		auto [3]	**1**	**0**	x	x	x	**°C**

[1] the HPM-BST/BOC will not activate boilers in the sub-cascade but the BST will normally be loaded if solar energy is available

[2] the HPM-BST/BOC will activate all boilers in the sub-cascade if BST temperature is below a maximum temperature

[3] the HPM-BST/BOC will control the boilers in the sub-cascade in order to reach the requested BST temperature

3.3.4.5 Parameter ProdSegmHSubCascade

FB:	**HPM-BST/BOC**	**Property Name (Server):**	**ProdSegmHSubCascade**				Mandatory ☒ Optional ☐
Description:							
LTE zoning information Heat Production Segment of the sub-cascade							
DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8	
Field	Description			Sup.	Range	Unit	Default
same as ProdSegmH in HPM							
Communication:							
DP Address: (in the server)	IO Type(ID): 138 (HPM-BST/BOC) Start-Index: 1			Property ID: 101 N° of elements 1			
Property access:	Read only ☐ Read/Write ☒						
Protection	Read level --			Write level --			
Exception Handling:	Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐						
--							
Special Features:							
HPM-BST/BOC DP's are not LTE communicating with the BOC's if zone is 'OutOfService'.							

3.3.4.6 Parameter ProdSegmH

FB: HPM-BST/BOC	Property Name (Server): ProdSegmH	Mandatory ☒ Optional ☐

Description:

LTE zoning information Heat Production Segment with the higher level HPM

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
same as ProdSegmH in BOC					

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	102
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

HPM-BST/BOC DP's are not LTE communicating with the HPM if zone is 'OutOfService'.

3.3.4.7 Parameter Producer

FB: HPM-BST/BOC	Property Name (Server): Producer	Mandatory ☒ Optional ☐

Description:

LTE zoning information Heat Producer number within the higher level Heat Production Segment

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
same as Producer parameter in BOC					

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	103
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

If ProdSegmH is 'OutOfService' also the correspoinding Producer zone is 'OutOfService' (common flag)

3.3.4.8 Parameter PeripheralLinkPump

FB: HPM-BST/BOC	Property Name (Server): PeripheralLinkPump	Mandatory ☐ Optional ☒

Description:

LTE zoning number : Peripheral link to common pump in the BST system

DPT:	Name	DPT_UcountValue16_Z	DPT ID	203.012	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
same as PeripheralLinkPump in HPM					

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	104
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

HPM-BST/BOC is not LTE communicating with the pump if zone is 'OutOfService'

3.3.4.9 Parameter PeripheralLinkFTC

FB: HPM-BST/BOC	Property Name (Server):	PeripheralLinkFTC	Mandatory ☐ Optional ☒

Description:

LTE zoning number Peripheral link to FTC (optionally used for control of the flow temperature from BST)

DPT:	Name	DPT_UcountValue16_Z	DPT ID	203.012	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
same as PeripheralLinkFTC in HPM					

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	105
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

HPM-BST/BOC is not LTE communicating with the FTC if zone is ‘OutOfService’

3.3.4.10 Parameter OutsideSensorZone

FB: HPM-BST/BOC	Property Name (Server):	OutsideSensorZone	Mandatory ☐ Optional ☒

Description:

LTE zoning number for the link with an Outside Temperature Sensor

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
same as OutsideSensorZone in HPM					

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	106
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☒ Act Value ☐ Default Value ☐

--

Special Features:

HPM-BST/BOC is not using an external outside temperature sensor if zone is ‘OutOfService’

3.3.4.11 Diagnostic data TempFlowWaterBST

FB: HPM-BST/BOC	Property Name (Server): TempFlowWaterBST	Mandatory ☒ Optional ☐

Description:

Current BST flow temperature (in higher level ProdSegmH)

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	110
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1] optional Write access for Alarm acknowledgement only

3.3.4.12 Diagnostic data TempReturnWaterBST

FB: HPM-BST/BOC	Property Name (Server): TempFlowWaterBST	Mandatory ☐ Optional ☒

Description:

Current BST return temperature (in higher level ProdSegmH)

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
same as TempFlowWaterBST					

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	111
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1] optional Write access for Alarm acknowledgement only

3.3.4.13 Diagnostic data TempBSTSetp

FB: HPM-BST/BOC	Property Name (Server): TempBSTSetp	Mandatory ☒ Optional ☐

Description:

Current BST temperature setpoint

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- OutOfService	boiler is out of service => no setpoint	O	true/false		false
- Overridden	external override of the setpoint	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- Override & Release	override and release setpoint	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	112
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Override / Release function only

3.3.4.14 Diagnostic data BoilersTotal

FB: HPM-BST/BOC	Property Name (Server): BoilersTotal	Mandatory ☐ Optional ☒

Description:

Total number of boilers in boiler sub-cascade (according to the boiler directory in the HPM-BST/BOC)

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..31	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	113
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

3.3.4.15 Diagnostic data BoilersActive

FB: HPM-BST/BOC	Property Name (Server): BoilersActive	Mandatory ☐ Optional ☒

Description:

Number of currently active boilers in boiler sub-cascade

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..31	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	114
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

3.3.4.16 Diagnostic data TempFlowWaterProdSegmH

FB: HPM-BST/BOC	Property Name (Server): TempFlowWaterProdSegmH	Mandatory ☒ Optional ☐

Description:

Current common flow temperature in sub-cascade

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	115
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Alarm acknowledgement only

3.3.4.17 Diagnostic data TempReturnWaterProdSegmH

FB: HPM-BST/BOC	Property Name (Server): TempReturnWaterProdSegmH	Mandatory ☐ Optional ☒

Description:

Current common return temperature of the sub-cascade

DPT:	Name	DPT_HVACTempAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
Temp	temperature value	M	cs	° C	cs
Status				bitset	
- Fault	temperature corrupted, sensor failure	M	true/false		false
- InAlarm	critical limit is reached	O	true/false		false
- AlarmUnAck	alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	standard Command field			enum	
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	116
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] optional Write access for Alarm acknowledgement only

3.3.4.18 Diagnostic data Fault

FB: HPM-BST/BOC	Property Name (Server): Fault	Mandatory ☒ Optional ☐

Description:

Some error in the HPM-BST/BOC (only concerning BST functionality, BOC have their own Fault attributes)

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	117
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

3.3.4.19 Diagnostic data SummerMode

FB: HPM-BST/BOC	Property Name (Server): SummerMode	Mandatory ☐ Optional ☒

Description:

Summer mode status in the HPM-BST/BOC => relevant for the whole sub-cascade

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	118
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

3.3.4.20 Diagnostic data OffPerm

FB: HPM-BST/BOC	Property Name (Server): OffPerm	Mandatory ☐ Optional ☒

Description:

Status info indicating whether the sub-cascade is perrmanently off (e.g. manually switched off). This datapoint can also be a parameter of the HPM-BST/BOC in order to switch the boiler sequence off via bus

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	119
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

[1)] Write access only if this datapoint is also used to switch the boiler sequence off via bus. This is an optional feature, e.g. used for service

3.3.4.21 Diagnostic data NoHeatAvailable

FB: HPM-BST/BOC	Property Name (Server): NoHeatAvailable	Mandatory ☐ Optional ☒

Description:

Status info indicating whether sub-cascade is temporarily not providing heat

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			true/false	bool	false

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	120
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

--

3.3.4.22 Diagnostic data StatusPumpBST

FB: HPM-BST/BOC	Property Name (Server): StatusPumpBST	Mandatory ☐ Optional ☒

Description:

Current relative power of common pump in the BST system

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
RelValue	relative value	M	0..100%	%	cs
Status - OutOfService - all other flags	 RelValue valid / void not supported, fixed to '0'	 O NA	 true/false	bitset	false

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	121
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

for switched pump 0%=off, 100%=on

3.3.4.23 Diagnostic data StagesActive

FB: HPM-BST/BOC	Property Name (Server): StagesActive	Mandatory ☐ Optional ☒

Description:

Number of active stages in the sub-cascade. This value is calculated by the HPM-BST/BOC according to the currently active burner stages which are counted as follows:
- stage 1active = 1
– stage 2 active = 2
– modulating = 1
only active boiler stages are counted (excluding solar panel)

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..62	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	122
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

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3.3.4.24 Diagnostic data ErrorCodeBST

FB: HPM-BST/BOC	Property Name (Server): ErrorCodeBST	Mandatory ☐ Optional ☒

Description:

Company specific numeric 16 bit error code

DPT:	Name	DPT_Value_2_Ucount	DPT ID	7.001	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			full range	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	138 (HPM-BST/BOC)	Property ID:	123
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

--

Special Features:

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3.3.4.25 Parameter TempBSTMax

same as in HPM-BST; except IO Type (ID) = 138

3.3.4.26 Parameter TempBSTMin

same as in HPM-BST; except IO Type (ID) = 138

3.3.4.27 Diagnostic data TempBSTStart

same as in HPM-BST; except IO Type (ID) = 138

3.3.4.28 Diagnostic data TempBSTStop

same as in HPM-BST; except IO Type (ID) = 138