Application Description

7

Hot Water Heating

11

Room Heating Control

4

Summary:

This document is a part of the HVAC Application Interworking Standard for Hot Water Heating applications. This chapter describes the Functional Blocks for Room Heating Zone Control and Individual Room Control.

Version 01.03.01 is a KNX Approved Standard.

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

Document updates

Version	Date	Modifications
0.1	2001.07.24	BKY, document created from HWHFuncBlocV20 => document split-up into multiple chapters Functional block diagrams updated Complete revision of the document: HIRC, HZC all datapoint descriptions updated
0.2	2001.09.11	BKY: specification for HRDM, HDTACT and HDTRT added
0.3	2001.11.26	BKY, editorial update, changes according to HWH22 meeting decisions; resolution of general TFI comments; changes are marked release for assessment in TFI
0.4	2001.11.28	BKY, HDAUX included
0.5	2002.01.08	BKY, wording in chapter 1.3 updated; resolution of TFI comments; various editorial corrections
0.6	2002.02.22	BKY, editorial corrections; missing DPT added; updated forcing/locking signals according to chapter 7-11-5; SummerMode attribute in StatusHZC and StatusHIRC added; TFI approved, KNX Handbook 1.0
1.0	2002.09.10	BKY, editorial corrections; inclusion of new attribute EmergDem in DPT_TempFlowWaterDemAbs (210.100), DPT_ActPosDemAbs (207.104), DPT_TempRoomDemAbs (209.101), TFI approved, updated for KNX Handbook 1.1
1.1	2003.08.25	BKY, editorial corrections; correction of timeout StatusHPM input; TFI approved, updated for KNX Handbook 1.1
1.2	2005.02.24	BKY, editorial correction: property ID in HIRC for ActPosHeatStageA input corrected
1.2	2006.01.09	BKY: inclusion of new attribute DHWLegioReq in DPT_TempFlowWaterDemAbs (210.100)
1.3	2009.06.17	Update in view of publication in the KNX Specifications v2.0.
01.03.01	2013.10.28	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 7/11/1 “Heat Production”
[08] Chapter 7/11/2 “Heat Distribution”
[09] Chapter 7/11/5 “Load Management”
[10] Part 7/12 “Direct Electric Heating”
[11] Part 7/13 “Terminal Unit Functional Blocks”
[12] Part 7/14 “Ventilation & Air Conditioning and Cold Water”
[13] Chapter 7/19/11 “Boiler Controller”
[14] Part 10/1 “Logical Tag Extended”

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Contents

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 Room Heating Control.

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

Functional Blocks specification for applications VAC [12], terminal units (TU) [11] and direct electric heating (DEH) [10] 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 [14]).

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.

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; Supplement 11 (TFI 18)

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) [10]

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

General

Abbreviation	Description
cs	Company specific
NA	not allowed / not available
LTE	Logical Tag Extended Mode, see [14] 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: Room Heating Control

2.1 Aims and Objectives

2.1.1 Apartment heating control / zone control

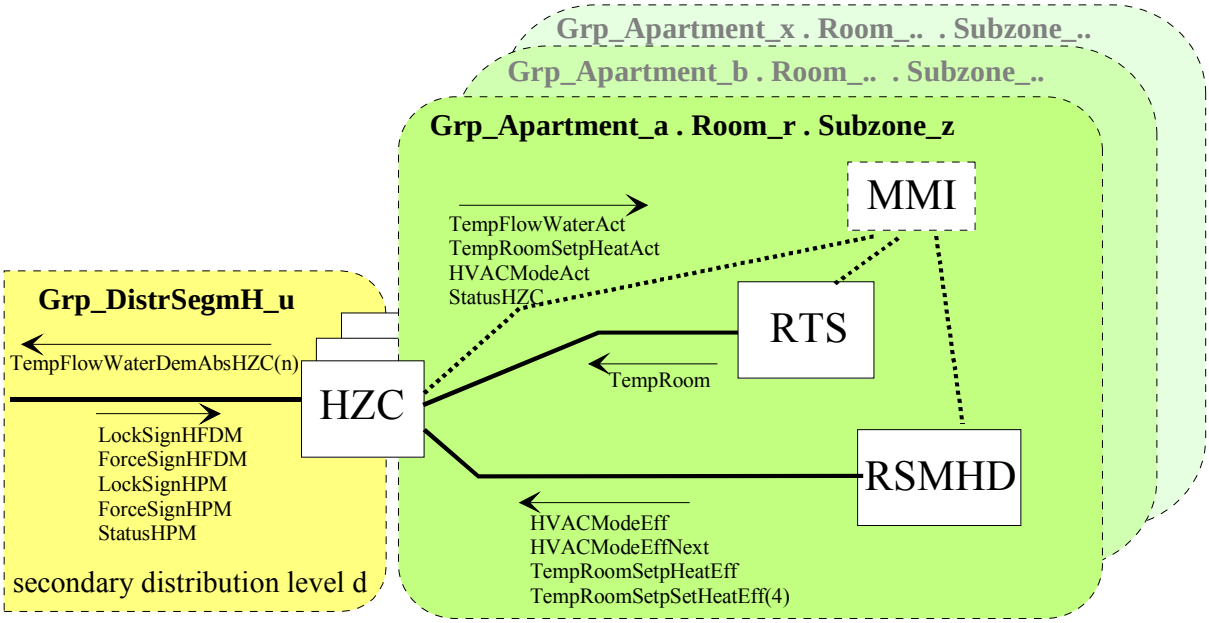


Figure 1 Heating Zone Control system (simplified)

Functional Blocks:	HZC:	Heating Zone Controller
	RSMHD:	Room Setpoint Manager HVAC Mode Driven
	MMI:	Man Machine Interface
	RTS:	Roomtemperature Sensor

This section describes room temperature control for a heating zone. A zone is in residential buildings e.g. an entire apartment or a single family home. In non residential applications a zone could be a kindergarten, restaurant, shop etc. To simplify the description, the example of apartment control is described hereafter. In the LTE implementation the Geographical zone ‘Apartment’ is used to address Functional Blocks within the same heating zone.

The application model shall also support multiple heating circuits in the same Apartment:

- Example 1: an Apartment heating system may have one HZC for floor heating and one HZC for radiator heating.
- Example 2: an Apartment heating system may have one HZC for floor heating and multiple HIRC for individual room control with radiator heating.

In such mixed systems a duplication of HZC, RSMHD etc. occurs. Especially the handling of room setpoints, HVAC Modes, HVAC Schedules may be tricky (unambiguous linking of functional blocks)

LTE Zoning for the HZC: usage of Room Level ‘R’ and SubZone ‘S’
In simple systems with only one heating circuit (one HZC) per Apartment, the support of the Room and Subzone tags is in principle not relevant.
In a first approach to the HZC model, the HZC was therefore only communicating in the LTE binding group A.*.* (wildcard on Room and Subzone). This solution would lead to zoning conflicts and ambiguous addressing in mixed HZC and HIRC systems within the same Apartment

A flexible mix of HZC and HIRC within one Apartment shall be possible. The HZC is therefore always communicating with explicit A.R.S zoning information (unambiguous zoning information, no wildcard on Room or Subzone).

- the HZC shall support the setting of the 'Apartment' parameter
- in HZC implementation the support of the 'Room' parameter is optional
  If 'Room' parameter setting is not supported, the HZC shall communicate on the default Room=1 => Geographical Zone A.**1**.S
- in HZC implementation the support of the 'Subzone' parameter is optional
  If 'Subzone' parameter setting is not supported, the HZC shall communicate on the default Subzone=1 => Geographical Zone A.R.**1**
- if both Room and Subzone parameters are not supported, the HZC shall communicate on the default Geographical Zone A.**1.1** *)

*) *Remark:*
In mixed systems with HZC and HIRC the installer shall pay attention to the fact that the HZC occupies per default the zone A.1.1. I.e. Room N° 1 is per default "occupied" by the HZC.

In this case there are various addressing possibilities for HIRC, e.g.:

- *locate the first HIRC in A.1.2 (usage of subzone, HZC and HIRC belong logically to the same Room and may share the same room temp sensor). Further HIRC are addressed in A.2.1 ... A.n.1*
- *reserve Room N° 1 for the HZC. The HIRC are addressed starting with Room N° 2 using addresses A.2.1 ... A.m.1*
- *Change the zoning address of the HZC to a "high" Room N°; e.g. A.31.1 (only possible if parameter 'Room' is supported by the device). HIRC addressing may start with Room N° 1 => zones A.1.1 .. A.n.1*

The preferred solution will depend on the installation, e.g. which scheduler programs / RSMHD or room temp sensors have to be shared ?

It was also discussed to reserve for the HZC a default address with a high (normally unused) Room N° , e.g. A.31.1. This solution was dropped because in simple systems with only a HZC per Apartment (majority of installations) plug and play binding using the ex factory geographical zone 1.1.1 will no longer work.

For further information on geographical LTE zones see also [14]

Room temperature control:

The room temperature of one Apartment / Subzone is controlled by one Heating Zone Controller (HZC) which calculates and controls the corresponding flow temperature of the zone. The apartment heating system does not comprise (bus connected) individual room controllers.

The flow temperature setpoint is mainly calculated according to the actual HVACMode and the corresponding room temperature setpoint. These information are mandatory inputs which are provided by the Roomtemperature Setpoint Manager (RSMHD). The HVACMode from RSMHD may depend on automatic time schedule, local user operation (MMI) presence detection, window status, Comfort Prolongation etc.

The method of calculation of the flow temperature setpoint in the HZC is company-specific and uses build in algorithm like OTC (outside temperature compensation), load compensation or any other. For these algorithms additionally the outside temperature (=> heating curve) and the actual room temperature may be used.

In more advanced systems the HZC may incorporate local optimizer functionality (company specific functionality). The optimizer part of the HZC may provide functions like morning boost, start and stop optimization etc. In this case the optimizer will have influence on the HVAC Mode and the room temperature setpoint used internally by the HZC.

In addition the HZC provides optional inputs for an external (central) “HVAC Optimizer” which may be located in a management station etc. See clause 2.1.5

Heat demand generation and load management functions:

The HZC is connected to one Heat Distribution Segment and sends its heat demand to the corresponding HFDM which provides demand dependent hot water flow.

Out of the flow temperature setpoint, the HZC calculates the corresponding flow temperature demand signal which is sent to the HFDM in the corresponding Heat Distribution Segment. The HFDM in the Heat Distribution Segment collects the heat demands from all apartments (HZC) and other consumers (e.g. DHW) and calculates the resulting heat demand (see [08])

Load priority between HZC and other consumers (e.g. DHW) in the Heat Distribution Segment is controlled by the HFDM according to priority attributes in the heat demand signals. If load priority is requested by one or a class of consumers, the HFDM will send a locking signal to the consumers in the secondary Heat Distribution Segment. These locking signals for load priority as well as locking signals due to boiler overload are handled by the HZC.

Forcing signals due to boiler overheat protection or oversupply or intelligent usage of spare energy are also handled by the HZC (temporary increased energy consumption).

Usage of status information from heat production:

The signal StatusHPM is provided by the HPM / HFDM to inform consumers like HZC 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).

Examples:

– if boiler is off due to SummerMode or manually switched 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.

User Interface:

A user interface in the apartment can be used for remote control of the HZC and may also contain the Roomtemperature Setpoint Manager (RSMHD), a room temperature sensor (RTS), room temperature setpoint adjustment etc.

2.1.2 Heating Individual Room Control for residential applications

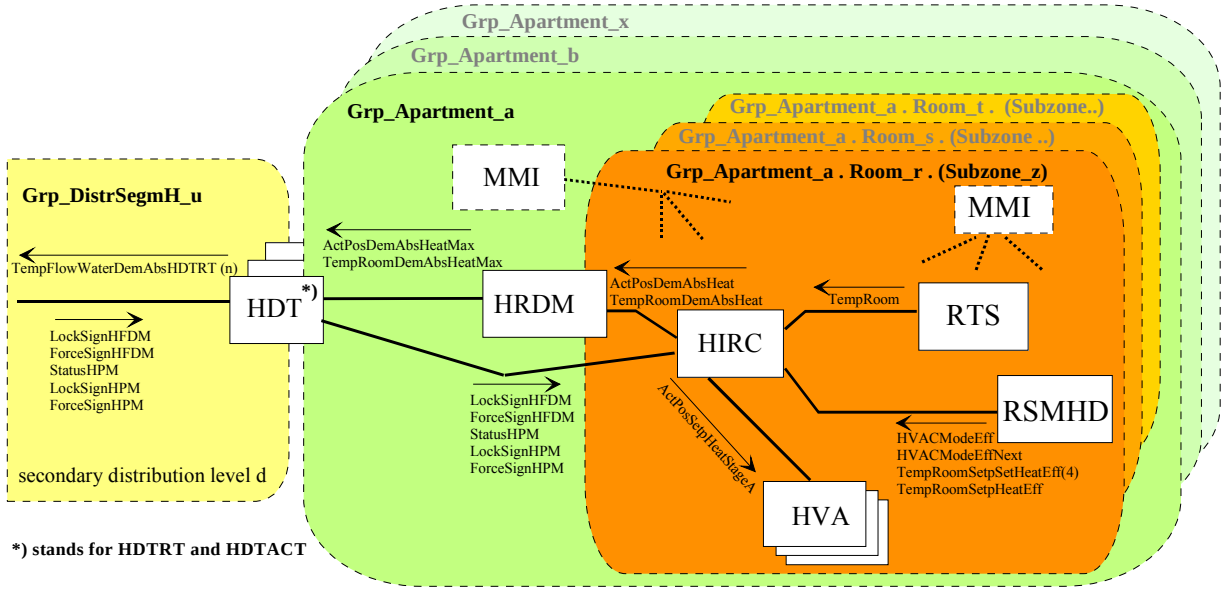


Figure 2 Residential Individual Room Control system (simplified)

Functional Blocks:
- HDT: Heating Demand Transformer (for more details see clause 0)
- HRDM: Heating Room Demand Manager
- RSMHD: Room Setpoint Manager HVAC Mode Driven
- HIRC: Heating Individual Room Controller
- RTS: Roomtemp. Sensor
- HVA: Heating Valve Stage A
- MMI: Man Machine Interface

This section describes individual room temperature control system which is mainly designed for residential applications. Each room within an entire apartment or a single family home is controlled individually.

In the LTE implementation the Geographical zone ‘Apartment.Room’ is used to address Functional Blocks within the same individual room control zone.

This application model makes the configuration of an IRC system easy because all IRC devices of an apartment are connected to the same Heat Distribution Segment which provides demand dependent hot water flow. Therefore collection and management of the heat demand from all rooms within one apartment can be done centrally at the level of apartment.

Constraints:
This Individual Room Control model is less suitable for large commercial applications because the hydraulic system may be different from the geographical structure of the building. The Rooms of one Floor could be connected to different Heat Distribution Segments. Therefore collection and management of the heat demand from all rooms within one floor can usually not be done centrally at the level of one Floor. The Terminal Unit (TU) application model [11] is more flexible for IRC applications in commercial buildings but additional configuration of the Heat Distribution Segment per Individual Room Controller is necessary.

Room temperature control:

Each room (or subzone of a room) in an apartment is controlled individually by an HIRC according to the actual HVACMode and the corresponding room temperature setpoint. These information are mandatory inputs which are provided by the Roomtemperature Setpoint Manager (RSMHD).

The actual room temperature setpoint and the HVACMode in each room are calculated by the RSMHD. The HVACMode may depend on automatic time schedule, local user operation (MMI), presence detection, window status, Comfort Prolongation etc.

The HIRC calculates and controls the position of the valve(s) in the room (or subzone of a room). Within one room (or subzone of a room) all valves HVA are controlled together by the HIRC. The method of calculation of the valve position in the HIRC is company-specific.

The actual room temperature value (provided by RTS) is used for room temperature control loop mechanism. It is a mandatory input for HIRC.

In more advanced systems the HIRC may incorporate local optimizer functionality (company specific functionality). The optimizer part of the HIRC may provide functions like morning boost, start and stop optimization etc. In this case the optimizer will have influence on the HVAC Mode and the room temperature setpoint used internally by the HIRC.

In addition the HIRC provides optional inputs for an external (central) “HVAC Optimizer” which may be located in a management station etc. See clause 2.1.5

Heat demand generation and load management functions:

All HIRC of the same Apartment are connected to one Heat Distribution Segment which provides demand dependent hot water flow.

The HIRC calculates the room heating demand to enable demand-dependant heat production. The heat demand calculation is based on the same mechanisms as room temperature control (see above). The heat demand is either expressed as a (rated) room temperature setpoint or (rated) valve position setpoint. See also chapter 0. The calculation mechanism is manufacturer specific.

The Heating Room Demand Manager (HRDM) collects the room demands from all HIRC’s in the apartment and calculates the resulting heating room demand which is transmitted to the “Heating Demand Transformer” (HDT). **Note: “HDT” stands for a cluster of two functional blocks used for demand transformation, see clause 2.1.3)**

The “HDT” translates the resulting heating room demand to the corresponding hot water heat demand (requested water flow temperature) which is then transmitted to the HFDM in the corresponding Heat Distribution Segment. HRDM and “HDT” functional blocks are often located in the same device.

The HFDM collects the heat demands from all apartments (“HDT”) and other consumers in the Distribution Segment and calculates the resulting heat demand (see [08]).

Load priority between the HIRC and other consumers (e.g. DHW) is controlled by the HFDM according to priority attributes in the heat demand signals. If load priority is requested by one or a class of consumers, the HFDM will send a locking signal to the consumers in the distribution segment. These locking signals for load priority as well as locking signals due to boiler overload are handled by the HIRC

Forcing signals due to boiler overheat protection or oversupply or intelligent usage of spare energy are also handled by the HIRC (temporary increased energy consumption).

Forcing and locking signals are received by the DT and must be routed to the HIRC controls. Locking signals can be used in HIRC, but normally without big effect because the heat consumption is already reduced before the HIRC system (e.g. in a pre-controller). Forcing signals can be handled by the HIRC solely because in an IRC system only the HIRC functional block can control the valves to be open and consume more energy.

Usage of status information from heat production:

The signal StatusHPM is provided by the HPM / HFDM in the Heat Distribution Segment to inform consumers e.g. if the heat production is on and is able do provide energy. StatusHPM is received by the DT and must be routed to the HIRC controls. Due to this routing mechanism, the HIRC's do not need to know to which Producer system (Heat Prod. Segment) they are connected.

Status HPM is used in the HIRC for optimization purpose and "learning-functions"(e.g. heat-curve adaptation).

Examples:

– if boiler is off due to SummerMode or manually switch off, it is not reasonable in the IRC system to change the actuator position (=> all valves closed)

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

User Interface:

A user interface in the room (room MMI) can be used for remote control of the HIRC and may also contain the Room Setpoint Manager RSMHD, a room temperature sensor (RTS), room temperature setpoint adjustment etc.

A user interface in the apartment (apartment MMI) can be used for centralized remote control of the RSMHD's and HIRC's.

LTE Zoning:

HIRC, RSMHD, RTS, HVA [1)] and room MMI in the same room are grouped by the Group 'Apartment.Room and the room Subzone is normally not relevant.

[1)] *Remark: Usually all valves HVA in the same room are controlled in parallel. But in some cases Subzoning of valves in the same room is requested (optional feature) => Apartment.Room.Subzone*

- all valves HVA connected to a HIRC are controlled together and belong to the same Subzone. I.e. for multiple Room Heating Subzones different heating controllers are responsible (HIRC or HZC)
- the HIRC and associated functional blocks shall support the setting of the 'Apartment' and 'Room' parameters
- the support of the 'Subzone' parameter is optional. If 'Subzone' parameter setting is not supported, the HIRC and associated functional blocks shall communicate on the default Subzone=1 => Geographical Zone A.R.**1**

"HDT", HRDM and apartment MMI belong to the overall group 'Apartment.*.*'. They collect data from Rooms and Subzones within the Apartment. They have therefore LTE 'Sniffer' functionality within the Apartment. For further information on LTE 'Sniffer' functionality see also [14]

"HDT" also belongs to a Group 'DistrSegmH' because the heat demand of the Apartment is sent to the corresponding Heat Distribution Segment.

2.1.3 Heating IRC Demand Transformation

The “HDT” in chapter 2.1.2 is a collection of ‘Heating Demand Transformer Room Temperature’ HDTRT and ‘Heating Demand Transformer Actuator Position’ HDTACT.

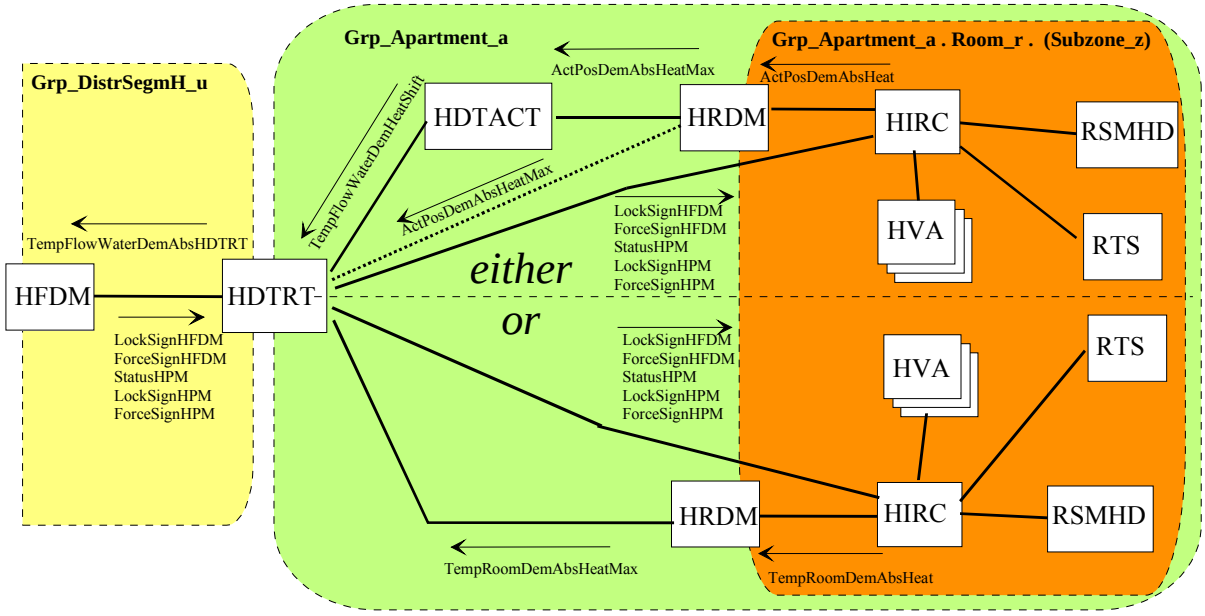


Figure 3 IRC heat demand calculation (simplified)

TWO heat demand calculation methods are supported by the system

- In the existing EIB solution, the valve positions are used for the calculation of the heat demand ActPosDemAbsHeat. From each HIRC the valve position (setpoint) is collected in the HRDM and the max. valve position ActPosDemAbsHeatMax is calculated. A control loop mechanism in the HDTACT calculates the FlowTemperature Demand so that valves are working in a mid-position. The Flow Temperature Demand TempFlowWaterDemHeatShift is transmitted by the HDTACT as Δ - flow temperature value to the HDTRT where the resulting absolute Flow Temperature Demand TempFlowWaterDemAbsHDTRT is calculated. The basic flow temperature demand value in the HDTRT may be fixed or outside temperature dependent. Further information is available in the corresponding EIB ObIS model [13].

  ActPosDemAbsHeat signals from the HIRC and the resulting ActPosDemAbsHeatMax signal from HRDM may contain optional load priority and emergency heat demand information which is not considered in the HDTACT.
  Load priority information can be used in the HDTRT to set load priority attributes in the resulting TempFlowWaterDemAbsHDTRT signal.
  Emergency heat demand information can be used in the HDTRT to set the ‘EmergDem’ attribute in the resulting TempFlowWaterDemAbsHDTRT signal.
  In order to maintain load priority and emergency heat demand information, the HDTRT may optionally receive and evaluate the ActPosDemAbsHeatMax signal.

- In the second solution, room temperature setpoints are used for the calculation of the Flow Temperature Demand. From each HIRC the actual room temperature setpoint TempRoomDemAbsHeat is collected in the HRDM and the max. room temperature setpoint TempRoomDemAbsHeatMax is calculated, which is then transmitted to the HDTRT. In the HDTRT, the absolute FlowTemperature Demand TempFlowWaterDemAbsHDTRT is calculated (e.g. using outside temperature and a heat curve).This mechanisms is in its simplest form only a control system without control-loop function. The mechanism may be extended by consideration of the difference between room temperature setpoint and actual room temperature value. In addition also the valve position can be used for further amendments.
  TempRoomDemAbsHeat signals from the HIRC and the resulting TempRoomDemAbsHeatMax signal from HRDM may contain optional load priority and emergency heat demand information which can be considered in the HDTRT to set load priority attributes and emergency heat demand attribute in the resulting TempFlowWaterDemAbsHDTRT signal.
  The detailed mechanism for the calculation of the Flow Temperature Demand is company specific and not subject of this specification.

HRDM shall support both mechanisms:
- calculation of the max. valve position setpoint
- calculation of max. room temperature setpoint.

In the HDTRT the delta value TempFlowWaterDemHeatShift from HDTACT is added to the absolute Flow Temperature Demand and the resulting TempFlowWaterDemAbsHDTRT signal is generated.

Constraints
- There is only one HRDM, HDTACT and HDTRT per Apartment zone
- Mix of both methods within one apartment is not allowed. If both TempRoomDemAbsHeatMax and ActPosDemAbsHeatMax signals occur, the behaviour of the system will be manufacturer specific.

2.1.4 Room Temperature Setpoint Management

Overview only: for more details see RSMHD in [02], [03], [04], [05] and [06]

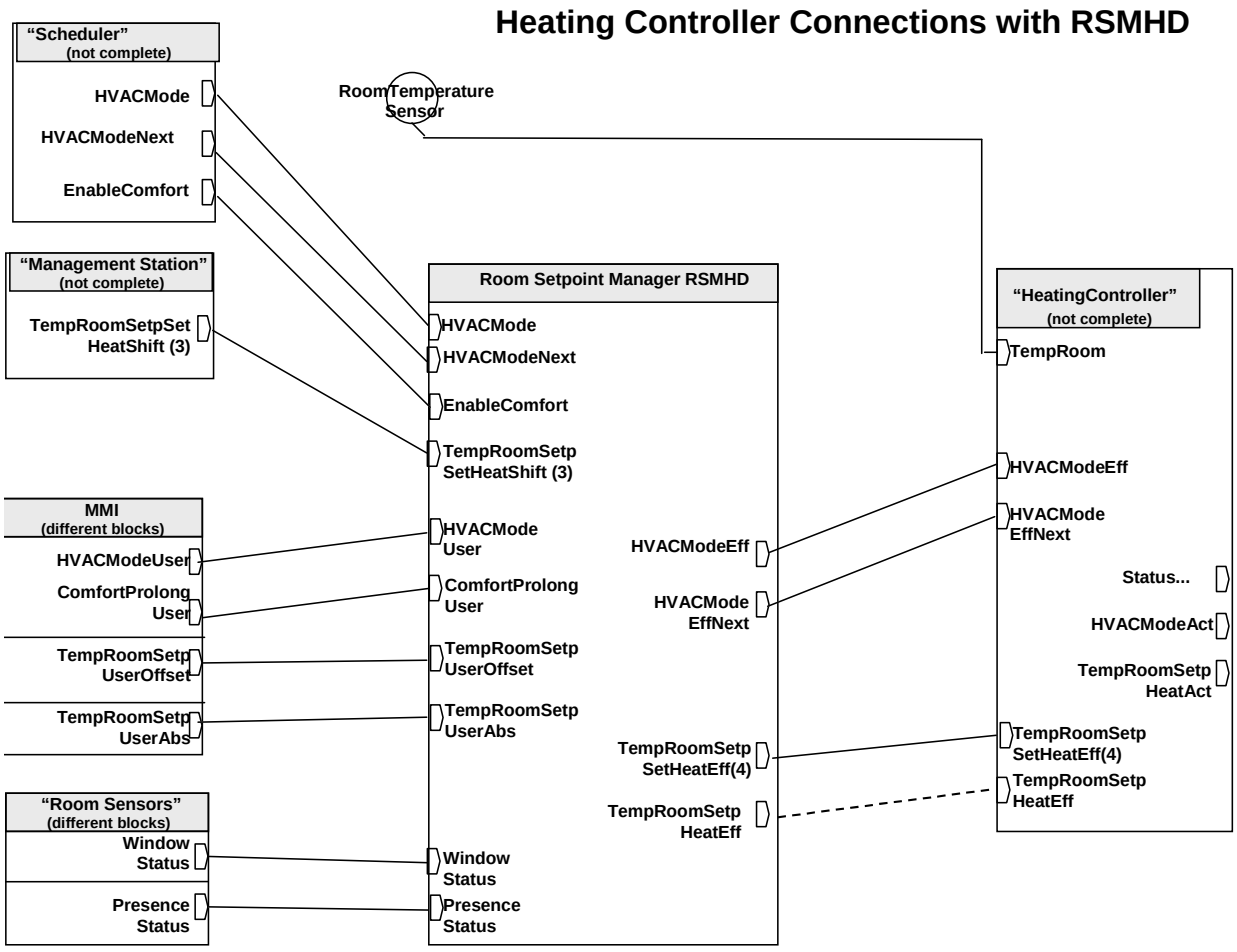


Figure 4 Room Setpoint Management (simplified)

The separation of the heating controller from RSMHD and "scheduling" allows much more flexibility for device design. The figure in above shows the dependencies between the Functional Blocks

The RSMHD provides the active HVAC mode (HVACModeEff), the scheduler-dependent next HVAC mode and the time until change of mode (HVACModeEffNext) and a set of 4 room temperature setpoints, one for each HVAC mode. In addition the actual room temperature setpoint (TempRoomSetpHeatEff) is provided for simple heating systems which are using the room temperature setpoint only (no usage of the HVAC mode, no optimizer functionality, no cooling)

The outputs of the RSMHD may depend on user interaction from an MMI, automatic scheduler program, interaction from a management station and room sensors (presence, window status etc.).

The Heating Controller (HZC or HIRC) uses these signals from the RSMHD to calculate the actual room temperature setpoint.

2.1.5 External HVAC Optimizer

Overview only: for more details see [02], [03], [04], [05] and [06]

In more advanced systems the heating controller functional block HZC and HIRC may incorporate local optimizer functionality (company specific functionality like morning boost, start and stop optimization etc).

In addition the HZC and HIRC may provide optional inputs for an external (central) "HVAC Optimizer" which may be located in a central unit or management station etc.

HVAC Optimizer provides an optimized HVAC Mode (HVACModeOptim) and a delta room temperature setpoint value which allows shift the actual roomtemp. setpoint, e.g. for morning boost (TempRoomSetpOptimHeatShift). These values are consumed by the heating controller

The HZC and HIRC provide a Status output signal with optimizer-attributes, the operating mode which the controller is currently using (including external and local optimization) and the currently active room temperature setpoint.. These information are mainly used for visualization (e.g. on a room unit)

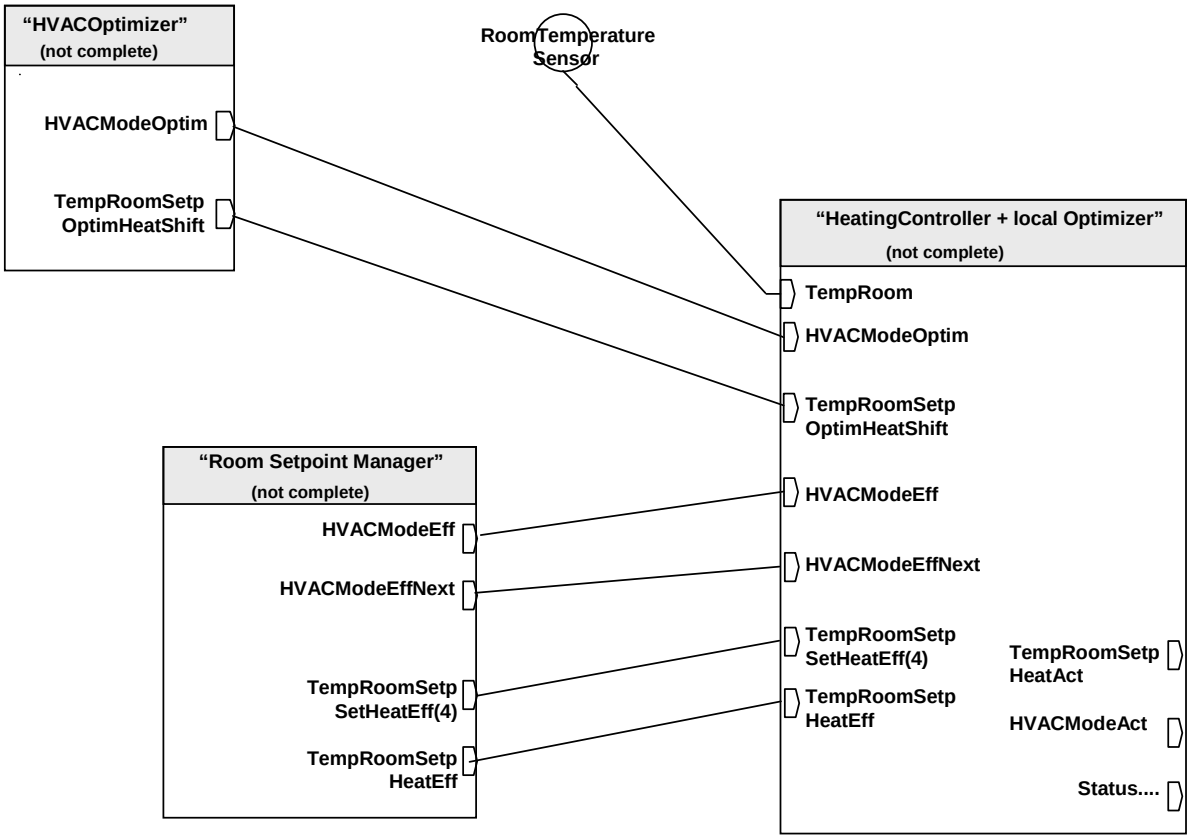


Figure 5 Link with HVAC Optimizer (simplified)

2.2 Functional Block: Heating Zone Controller (HZC)

2.2.1 Functional Specification

2.2.1.1 Room temperature control

The Heating Zone Controller HZC calculates and controls the necessary flow temperature for its zone (flow temperature control-loop) in order to control the room temperature according the requested room temperature setpoint.

Calculation of the flow temperature setpoint and the control-loop mechanism for flow temperature control is company-specific and not part of this specification. HZC may use built-in algorithm like OTC (outside temperature compensation), load compensation or any other.

But for HZC control loop mechanism the effective HVAC Mode and a set of room temperature setpoints (for the different HVAC Modes) or the effective Room Temperature Setpoint are mandatory inputs. Usually also the current room temperature, outside temperature etc. are used in addition.

Optionally the HZC may incorporate local functions like morning boost, start/stop optimization, ECO-function etc. **These optimization functions are company specific and not part of the HZC specification**

The RSMHD provides necessary information for the HZC as:

- ‘HVACModeEff’ Contains the present/active ‘HVACMode’ which may depend on automatic time schedule, local user operation (MMI) presence detection, window status, comfort prolongation etc.
- ‘HVACModeEffNext’ Contains the effective next ‘HVACMode’ and the delay time until the change of HVACMode (according to advanced scheduling information, local user operation etc.)
  => used in the HZC for local optimiser functionality
- ‘TempRoomSetpSetHeatEff(4)’ The effective temperature setpoints for heating for ‘Comfort’, ‘Standby’, ‘Economy’ and ‘BuildingProtection’ (set of setpoints).
- ‘TempRoomSetpHeatEff’ The effective room temperature setpoint for heating.

Interaction with an external HVAC Optimizer: see also chapter 2.1.5

- ‘HVACModeOptim’ Contains the optimzed ‘HVACMode’ to be used in the HZC instead of the ‘HVACModeEff’
- ‘TempRoomSetpOptimHeatShift delta correction value to be added in the HZC to the actual room temperature setpoint

2.2.1.2 Flow temperature demand

The Heating Zone Controller HZC is connected to one Heat Distribution Segment. The HZC calculates from the flow temperature setpoint for its zone the corresponding flow temperature demand.

- TempFlowWaterDemAbsHZC — This mandatory output signal contains the calculated flow temperature demand (absolute value) of the HZC which is sent to the HFDM in the Heat Distribution Segment.

  Calculation of the flow temperature demand is company-specific and not part of this specification. Normally a temperature offset is added to compensate temperature difference in the valve.

  The signal contains also attributes for load priority management (see clause 2.2.1.8) and control of a common system pump in the Heat Distribution Segment (see clause 2.2.1.9)

  The emergency demand 'EmergDem' is also supported in the HZC heat demand signal (optional feature). This attribute can be set by the HZC to indicate a critical heat demand for frost protection, e.g. if the room- and/or outside temperature is below a critical value and no heat is provided by the heat production system (e.g. because boiler is in 'summer mode' or manually switched off).
  If supported by the heat production system (HPM), the attribute 'EmergDem'=true will activate heat production in any case (override of e.g. local 'summer mode')

2.2.1.3 Usage of StatusHPM by the HZC

The signal StatusHPM which is provided by the HPM / HFDM informs the HZC e.g. if the heat production is on and is able do provide energy. This information may be used in the HZC for optimization purpose and "learning-functions"(e.g. heat-curve adaptation). These functions are company-specific.

2.2.1.4 Usage of LockSignHPM by the HZC

If the HZC receives a critical locking signal from the HPM the HZC will reduce the flow according to the % reduction factor in any case.

If the HZC receives a uncritical locking signal from the HPM the HZC will reduce the flow according to the % reduction factor if the HZC has not requested load priority.

IMPORTANT: LockSignHPM must NOT have an influence on the calculation of the flow temperature demand signal (otherwise system may „oscillate")

Usage of LockSignHPM is an optional feature of the HZC. See also document [09].

2.2.1.5 Usage of ForceSignHPM by the HZC

Forcing signals of the type 'Protection' or 'Oversupply' are only accepted by the HZC if either the attribute 'RoomHMax' or 'RoomHComf' is set (activate room heating).

- If the HZC receives a critical forcing signal (type 'Protection') it will react in any case (unconditional load). If 'RoomHMax' attribute is set the HZC will increase the flow until a max. flow temperature (parameter) is reached. If 'RoomHComf' attribute is set: room heating shall be temporarily activated with 'Comfort' room temperature setpoint (HVACMode = Comfort)
- If the HZC receives a uncritical forcing signal (type 'Oversupply') it may react or may ignore the signal (conditional load). Forcing signal could e.g. be ignored if the HZC is in an energy saving mode. If the signal is accepted, the reaction is the same as for type 'Protection', see above

If the HZC receives a forcing signal with the type 'Overrun' immediately after load shutdown it will temporarily keep the last flow temperature setpoint (used before shutdown) for control loop (pump overrun). So remaining energy in the heat producer / heat exchanger is efficiently used after load shutdown.

IMPORTANT: ForceSignHPM must NOT have an influence on the calculation of the flow temperature demand signal (otherwise system may „oscillate")

The implementation of forcing signals is an optional feature of the HZC. See also document [09].

2.2.1.6 Usage of received LockSignHFDM in the HZC

same procedure as for LockSignHPM, see clause 2.2.1.3

2.2.1.7 Usage of received ForceSignHFDM in the HZC

same procedure as for ForceSignHPM, see clause 2.2.1.5

2.2.1.8 Load Priority Management

Absolute or shift load priority can be requested by the HZC by setting the attributes 'AbsLoadPriority' or 'ShiftLoadPriority' in the TempFlowWaterDemAbsHZC signal.

Load Priority between the consumers within a Heat Distribution Segment is controlled by the HFDM according to priority attributes in the received heat demand signals. If absolute load priority is requested by one or a class of consumers, the HFDM will send a 'uncritical' locking signal LockSignHFDM with 100% power reduction to the consumers in the Heat Distribution Segment.

If the HFDM can not provide the requested flow temperature (e.g. in a heat-exchanger) and if a consumer requests shift load priority the HFDM will send an 'uncritical' locking signal with X % power reduction to the consumers in the Heat Distribution Segment. See also [08] and [09]

If the heat production system can not provide the requested boiler- / flow temperature and if a consumer requests shift load priority the HPM will send an 'uncritical' locking signal LockSignHPM with X % power reduction. See also [07] and [09]

2.2.1.9 Sensors and actuators

The control of the pump of the heating zone and an optional 3-way valve is normally done directly by relays (hard wired).

In larger system a common System Pump is usually installed in the Heat Distribution Segment to provide water flow in the Segment. The System Pump is normally controlled by the HFDM.
HZC without an own pump will set the 'SystemPumpReq' attribute in the TempFlowWaterDemAbsHZC signal if it has a valid heat demand.

HZC with an own pump will normally not set the 'SystemPumpReq' attribute in the TempFlowWaterDemAbsHZC signal if they have a valid heat demand.

Usage of a flow temperature sensor is mandatory for heating zone control. The flow temperature sensor is always connected to the HZC locally (hard wired).

Zone return temperature sensor is optional and is also always hard wired.

The common flow temperature and return temperature in the Heat Distribution Segment are optional input signals to the HZC.

The HZC will optionally also use the outside temperature (and in some cases wind speed and sun intensity) and the room temperature for the zone control loop mechanism. These sensors may be hard-wired to the device containing the HZC or may be received as external inputs from the bus.
If one of these sensors is connected locally to the device containing the HZC, the corresponding Functional Block is activated.

2.2.2 Constraints

Constraints concerning the usage of the LTE zone ‘Room’ and ‘Subzone’ see 2.1.1

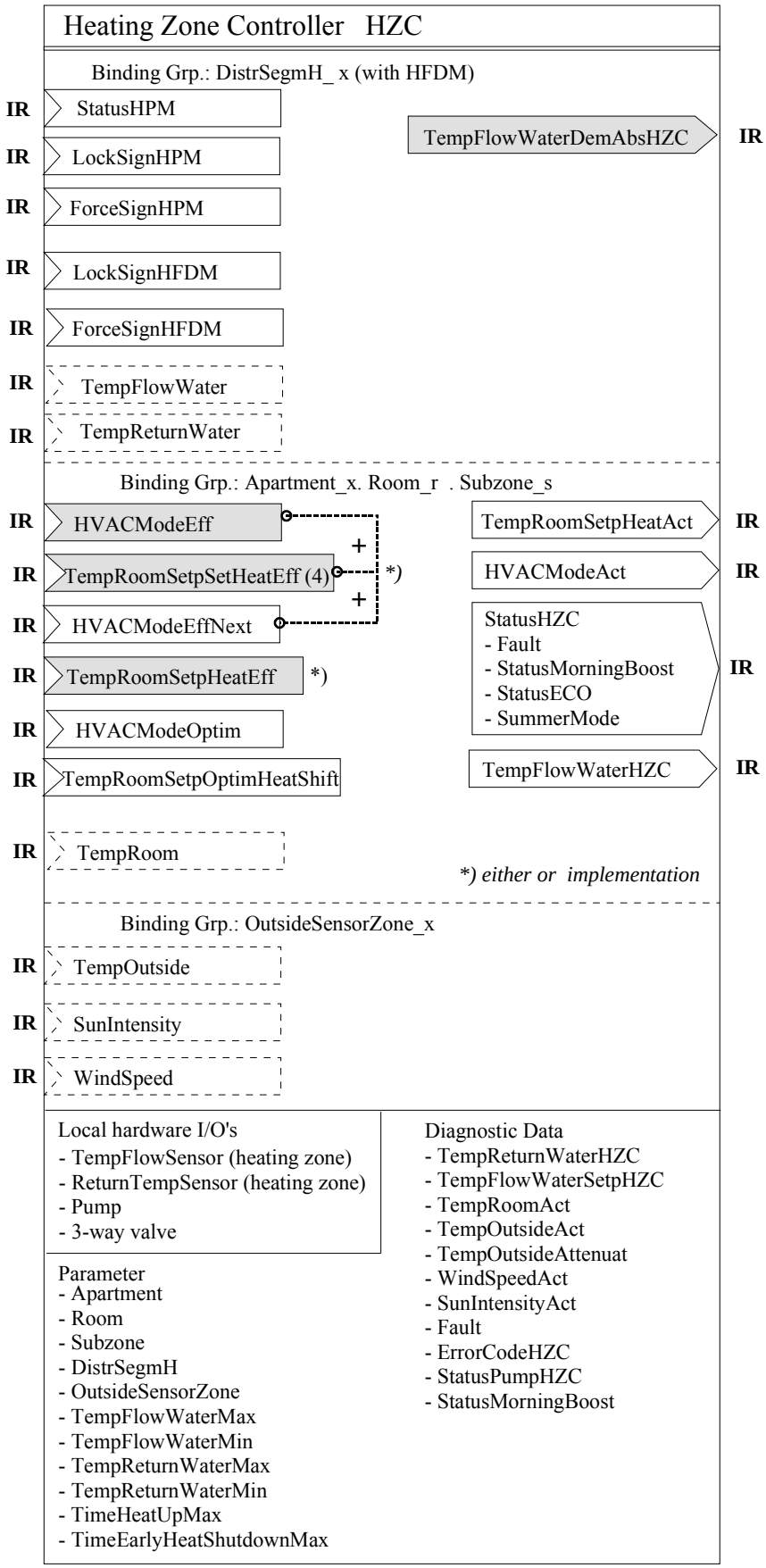
In the Standard Model all outside sensors are located in the same LTE Outside Sensor Zone (only one zoning parameter). Manufacturer specific parameters shall be used if different Outside Sensor Zones for the outside temperature, wind speed or sun intensity have to be supported.

The usage of HVACModeEff / HVACModeEffNext + TempRoomSetpSetHeatEff[4] for optimized zone control is restricted to LTE implementations only since the the necessary compound HVAC DPT for runtime-interworking are not yet available in Standard Mode.
In Standard Mode implemetations, the HZC room temperature control mechanism is based on the TempRoomSetpHeatEff information only (simplified model used in EIB ObIS **[13]**). In this case more sophisticated functions like start/stop optimization in the HZC can not be implemented.

IMPORTANT: reporting of the Heat Demand signal TempFlowWaterDemAbsHZC by the HZC 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 HZC functional block offer a link to a demand dependent heat distribution (HFDM) and heat production system (HPM).
HZC implementations in Standard Mode must therefore rely on an “autonomous” heat production / heat distribution system which provides sufficient hot water flow temperature.

2.2.3 Functional block diagram



2.2.4 Datapoint description

2.2.4.1 Overview

Data Point	Description	Data Point Type	DPT N°
Outputs			
TempFlowWaterDemAbsHZC	Flow temperature demand of the HZC to be sent to the allocated HFDM	DPT_ TempFlowWaterDemAbs	210.100
TempRoomSetpHeatAct	Actual room temperature setpoint of the heating zone / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
HVACModeAct	Actual active HVAC mode used by the HZC / LTE and S-interface	DPT_HVACMode_Z DPT_HVACMode	201.100 20.102
StatusHZC	Status attributes of HZC	DTP_StatusRHC	21.102
- Fault	Failure, some error in the HZC (S-interface)	DPT_Bool	1.002
- StatusMorningBoost	Morning boost function active (S-interface)	DPT_Bool	1.002
- StatusECO	ECO function active (S-interface)	DPT_Bool	1.002
- SummerMode	HZC is in summer mode (S-interface)	DPT_Bool	1.002
TempFlowWaterHZC	Actual water flow temperature of the heating zone / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
Inputs			
StatusHPM	Status information from 'Producer Manager'	DPT_StatusHPM	209.100
ForceSignHPM	Forcing signal from HPM due to overheat, to force the consumers to consume energy	DPT_ForceSign	21.100
LockSignHPM	Locking signal from HPM due to boiler overload, to force the consumers to reduce energy consumption	DPT_LockSign	207.101
ForceSignHFDM	Forcing signal from HFDM in the Heat Distribution Segment	DPT_ForceSign	21.100
LockSignHFDM	Locking signal from HFDM in the Heat Distribution Segment	DPT_LockSign	207.101
TempFlowWater	Common flow temperature of the hydraulic group, Heat Distribution Segment / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
TempReturnWater	Common return temperature of the hydraulic group, Heat Distribution Segment / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
HVACModeEff	Current/active 'HVACMode' from RSMHD	DPT_HVACMode_Z	201.100
TempRoomSetpSetHeatEff [4]	Set of 4 effective temperature setpoints for heating 'Comfort', 'Standby', 'Economy' and 'BuildingProt'	DPT_RoomSetpSet[4]	213.100
HVACModeEffNext	Next 'HVACMode' and time until next mode from RSMHD	DPT_HVACModeNext	206.100
TempRoomSetpHeatEff	The effective actual temperature setpoint for heating / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
HVACModeOptim	Optimized HVAC Mode from external HVAC Optimizer	DPT_HVACMode_Z	201.100
TempRoomSetpOptimHeatShift	Room temp. setpoint shift from external HVAC Optimizer / LTE and S-interface	DPT_TempHVACRel_Z DPT_Value_Tempd	205.101 9.002
TempRoom	Current room temperature value / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
TempOutside	Current outside temperature / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001

Data Point	Description	Data Point Type	DPT N°
WindSpeed	Current wind speed value / LTE and S-interface	DPT_WindSpeed_Z DPT_Value_Wsp	203.101 9.005
SunIntensity	Current sun intensity value W/m^2/ LTE and S-interface	DPT_SunIntensity_Z DPT_PowerDensity	203.102 9.022
Parameters			
Apartment	LTE zone: Apartment number	DPT_UcountValue8_Z	202.002
Room	LTE zone: Room number	DPT_UcountValue8_Z	202.002
Subzone	LTE zone: Subzone number	DPT_UcountValue8_Z	202.002
DistrSegmH	LTE zone: number of the Heat Distribution Segment	DPT_UcountValue8_Z	202.002
OutsideSensorZone	LTE zone for external Outside temperature sensor	DPT_UcountValue8_Z	202.002
TempFlowWaterMax	Max. flow temperature in the heating zone	DPT_TempHVACAbs_Z	205.100 *)
TempFlowWaterMin	Min. flow temperature in the heating zone	DPT_TempHVACAbs_Z	205.100 *)
TempReturnWaterMax	Max. return temperature in the heating zone	DPT_TempHVACAbs_Z	205.100 *)
TempReturnWaterMin	Min. return temperature in the heating zone	DPT_TempHVACAbs_Z	205.100 *)
TimeHeatUpMax	Maximum heat-up time for local start optimization	DPT_TimePeriodMin	7.006
TimeEarlyHeatShutdownMax	maximum advanced shutdown time for local stop optimization	DPT_TimePeriodMin	7.006
Diagnostic Data			
TempReturnWaterHZC	Actual return temperature in the heating zone	DPT_TempHVACAbs_Z	205.100 *)
TempFlowWaterSetpHZC	Actual flow temperature setpoint in the heating zone	DPT_TempHVACAbs_Z	205.100 *)
TempRoomAct	Actual room temperature used by the HZC	DPT_TempHVACAbs_Z	205.100 *)
TempOutsideAct	Actual outside temperature used by the HZC	DPT_TempHVACAbs_Z	205.100 *)
TempOutsideAttenuat	Actual attenuated outside temperature used by the HZC	DPT_TempHVACAbs_Z	205.100 *)
WindSpeedAct	Actual wind speed value used by the HZC	DPT_WindSpeed_Z	203.101 *)
SunIntensityAct	Actual sun intensity value used by the HZC	DPT_SunIntensity_Z	203.102 *)
StatusPumpHZC	actual relative power of the pump in the heating zone, % value; for switched pump 0%=off, 100%=on	DPT_RelValue_Z	202.001 *)
Fault	failure, some error in the HZC	DPT_Bool	1.002
ErrorCodeHZC	company specific numeric error code	DPT_Value_2_Ucount	7.001
StatusMorningBoost	Status of morning boost function	DPT_Bool	1.002

*) Implementation of Properties using standard DPT see clause 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	TempFlowWaterDemAbsHZC	**NA** [1)]	NA	NA	M
	TempRoomSetpHeatAct	**(GO$_b$)**		(GO)	O
	HVACModeAct	**(GO$_b$)**		(GO)	O
	StatusHZC	**NA**	NA	NA	O
	- Fault	**(GO$_b$)**		(GO)	NA
	- StatusMorningBoost	**(GO$_b$)**		(GO)	NA
	- StatusECO	**(GO$_b$)**		(GO)	NA
	- SummerMode	**(GO$_b$)**		(GO)	NA
	TempFlowWaterHZC	**(GO$_b$)**		(GO)	O
Inputs	StatusHPM	**NA** [1)]	NA	NA	O
	ForceSignHPM	**NA** [1)]	NA	NA	O
	LockSignHPM	**NA** [1)]	NA	NA	O
	ForceSignHFDM	**NA** [1)]	NA	NA	O
	LockSignHFDM	**NA** [1)]	NA	NA	O
	TempFlowWater	**(GO$_b$)**		(GO)	O
	TempReturnWater	**(GO$_b$)**		(GO)	O
	HVACModeEff	**NA** [3)]	NA	NA	M [2)]
	TempRoomSetpSetHeatEff [4]	**NA** [1)]	NA	NA	M [2)]
	HVACModeEffNext	**NA** [1)]	NA	NA	O [2)]
	TempRoomSetpHeatEff	**GO$_b$** [2)]	GO	GO	M [2)]
	HVACModeOptim	**NA** [3)]	NA	NA	O
	TempRoomSetpOptimHeatShift	**(GO$_b$)**		(GO)	O
	TempRoom	**(GO$_b$)**		(GO)	O
	TempOutside	**(GO$_b$)**		(GO)	O
	WindSpeed	**(GO$_b$)**		(GO)	O
	SunIntensity	**(GO$_b$)**		(GO)	O

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

[2)] Either implementation of { HVACModeEff + TempRoomSetpSetHeatEff [4] (+ HVACModeEffNext) } or { TempRoomSetpHeatEff }

[3)] Implementation of HVACModeEff or HVACModeOptim inputs only without TempRoomSetpSetHeatEff [4] does not make sense

Table 1: HZC Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	Apartment	M
	Room	O
	Subzone	O
	DistrSegmH	M
	OutsideSensorZone	O

Table 2: HZC LTE specific Properties

		Support
Parameter	TempFlowWaterMax	O
	TempFlowWaterMin	O
	TempReturnWaterMax	O
	TempReturnWaterMin	O
	TimeHeatUpMax	O
	TimeEarlyHeatShutdownMax	O
Diagnostic Data	TempReturnWaterHZC	O
	TempFlowWaterSetpHZC	O
	TempRoomAct	O
	TempOutsideAct	O
	TempOutsideAttenuat	O
	WindSpeedAct	O
	SunIntensityAct	O
	StatusPumpHZC	O
	Fault	O
	ErrorCodeHZC	O
	StatusMorningBoost	O

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

2.2.4.2 Output TempFlowWaterDemAbsHZC

Standard Mode

Not applicable

LTE-HEE mode:

FB: HZC	LTE Server Output Name: TempFlowWaterDemAbsHZC	Mandatory ☒ Optional ☐

Description:

This output signal contains the calculated flow temperature demand (absolute value) of the HZC. It is sent to the HFDM in the corresponding Heat Distribution Segment. Calculation of the flow temperature demand: see clause 2.2.1.2

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

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowDem	requested flow temperature	M	full temp. range	°C	2	cs
Attributes						
- DemValid	Validity of TempFlowDem (false means also “no demand”)	M	true/false	bool	Y	false
- AbsLoadPriority	set if absolute load priority is requested by the HZC	O	true/false	bool	Y	false
- ShiftLoadPriority	set if shift load priority is requested by the HZC	O	true/false	bool	Y	false
- MaxTempLimit	set if flow temp. in the Distribution Segment must be limited to max. value (normally not the case for HZC)	O	true/false	bool	Y	false
- MinTempLimit	for cold water only	NA	false	bool	N	false
- DHWReq	for DHW only	NA	false	bool	N	false
- RoomCtrlReq	indicates that a room heating circuit has heat demand	M	true/false	bool	Y	false
- VentReq	for Ventilation only	NA	false	bool	N	false
- AuxAllSeasonReq	for auxiliary heat consumer only	NA	false	bool	N	false
- SystemPumpReq	request for water circulation in the distribution segment (common system pump on)	O	true/false	bool	Y	false
- EmergDem	emergency heat demand for room frost protection	O	true/false	bool	Y	false
- DHWLegioReq	for DHW only	NA	false	bool	N	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 160 (HZC)		Property ID: 51	
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 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: Stored Value ☐		Act Value ☒	Default Value ☐
Property-Service (individual access):	Read only ☒		Read/Write ☐	

Exception Handling: Save at Powerdown ☐

--

Special Features:

This signal can be internal if the assiciated HFDM is located in the same device

2.2.4.3 Output TempRoomSetpHeatAct

Standard Mode:

DP Name:	TempRoomSetpHeatAct			Abbr.:	--				Mandatory	☐	
FB Name:	HZC								Can be internal	☐	
Description											
Actual room temperature setpoint of the heating zone (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:	0.2	Min repetition period:	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: HZC	**LTE Server Output Name:** TempRoomSetpHeatAct	Mandatory ☐ Optional ☒

Description:

Actual room temperature setpoint of the heating zone (mainly used for visualisation)

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	temperature setpoint value	M	full	°C	0.2	cs
Status - OutOfService - Overridden - all other flags	standard Status attributes void value: setpoint not available setpoint overridden true / false not supported	 M O	 true/false true/false	 bool bool	 Y Y	 true false
Command - Override & Release - all other commands	standard Command, write only override and release setpoint not supported	O NA				

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.Subzone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 160 (HZC)	Property ID: 53
LTE-Services (event):	COV ☒ MinRepTime: 10 sec	Heartbeat: 15 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: Stored Value ☐ Act Value ☒ Default Value ☐	
Property-Service (individual access):	Read only ☐ Read/Write ☒ [1)]	

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1)] write access is optional; for Override / Release function only. If 'Overridden' the HZC uses the override value for room temperature control

2.2.4.4 Output HVACModeAct

Standard Mode:

DP Name:	HVACModeAct	Abbr.:	---	Mandatory	☐
FB Name:	HZC			Can be internal	☐

Description

This output contains the actual HVAC Mode of the heating zone (mainly used for visualisation)

Datapoint Type

DPT_Name:	DPT_HVACMode				
DPT Format:	N_8	DPT_ID:	20.102		
Field	Description	Supp.	Range	Unit	Default
			1..4 [1)]		cs

Access Type

♦ Output

this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☒	Δ-Value:		Min repetition period:	10sec
		Cyclic	☒	Period:	15min		
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:	☒
	Transmit on bus:	☐			☐

Exception Handling

Special Features

[1)] value 0='Auto' is not allowed

LTE-HEE mode:

FB: HZC	**LTE Server Output Name:** HVACModeAct	Mandatory ☐ Optional ☒

Description:

Actual HVAC Mode of the heating zone (which may also depend on internal optimiser functions in the HZC, mainly used for visualisation)

DPT:	Name	DPT_HVACMode_Z	DPT ID	201.100	Datatype format	N_8Z_8

Field	Description	Sup.	Range	Unit	COV	Default
HVACMode	actual HVAC Mode	M	[1..4] [1)]		Y	cs
Status - Overridden - all other flags	standard Status attributes HVAC mode overridden true / false not supported	O	true/false	bool	Y	false
Command - Override & Release - all other commands	standard Command, write only override and release setpoint not supported	O NA				

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.Subzone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 160 (HZC)	Property ID: 52
LTE-Services (event):	COV ☒ MinRepTime: 10 sec	Heartbeat: 15 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: Stored Value ☐ Act Value ☒ Default Value ☐	
Property-Service (individual access):	Read only ☐ Read/Write ☒ [2)]	

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1)] value 'Auto' is not allowed

[2)] write access is optional; for Override / Release function only: if 'Overridden' the HZC uses the override value for room temperature control

2.2.4.5 Output StatusHZC

Standard Mode: separate datapoints Fault, StatusMorningBoost, StatusECO, SummerMode

LTE-HEE mode:

FB: HZC	**LTE Server Output Name:** StatusHZC	Mandatory ☐ Optional ☒

Description:

Information provided by the HZC mainly for visualisation & monitoring e.g. on an end-user MMI (e.g. room unit)

DPT:	Name	DPT_StatusRHC	DPT ID	21.102	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
- Fault	HZC has a failure	M	true/false	bool	Y	false
- StatusECO	ECO status; temporary energy saving mode e.g. due to high room temperature or high outside temperature	O	true/false	bool	Y	false
- TempFlowLimit	Flow temperature limitation active (max. or min. limitation)	O	true/false	bool	Y	false
- TempReturnLimit	Return temperature limitation active (max. or min. limitation)	O	true/false	bool	Y	false
- StatusMorningBoost	morning boost active (mainly for monitoring)	O	true/false	bool	Y	false
- StatusStartOptim	start optimization active(mainly for monitoring)	O	true/false	bool	Y	false
- StatusStopOptim	stop optimization active (mainly for monitoring)	O	true/false	bool	Y	false
- SummerMode	room heating is disabled due to local summer/winter mode	O	true/false	bool	Y	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.Subzone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 160 (HZC)	Property ID: 54
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐	
Property-Service (individual access):	Read only ☒ Read/Write ☐	

Exception Handling: Save at Powerdown ☐

--

Special Features:

--

2.2.4.6 Output Fault

Standard Mode

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

Description

reports a failure in the HZC, 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:		Min repetition period:	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

2.2.4.7 Output StatusMorningBoost

Standard Mode

DP Name:	StatusMorningBoost	Abbr.:	--	Mandatory	☐
FB Name:	HZC			Can be internal	☐

Description
morning boost function active, 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:		Min repetition period:	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

2.2.4.8 Output StatusECO

Standard Mode

DP Name:	StatusECO	Abbr.:	--	Mandatory	☐
FB Name:	HZC			Can be internal	☐

Description

ECO function active (room heating is temporarily reduced/off due to high outside temperature or high room temperature), 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:		Min repetition period:	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

2.2.4.9 Output SummerMode

Standard Mode

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

Description

room heating is disabled 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

2.2.4.10 Output TempFlowWaterHZC

Standard Mode

DP Name:	TempFlowWaterHZC			Abbr.:	--				Mandatory	☐	
FB Name:	HZC								Can be internal	☐	
Description											
Current flow temperature of the heating zone											
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	Min repetition period:	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: HZC	**LTE Server Output Name:** TempFlowWaterHZC	Mandatory ☐ Optional ☒

Description:

Current flow temperature of the heating zone

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	flow temperature value	M	full	°C	2	cs
Status	standard Status attributes					
- Fault	sensor failure true / false	M	true/false	bool	Y	false
- InAlarm	sensor value alarm true /false	O	true/false	bool	Y	false
- AlarmUnAck	alarm acknowledgement status ack / unack	O	ack/unack	bool	Y	unack
- all other flags	not supported					
Command	standard Commands, Write only					
- AlarmAck	alarm acknowledge	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.Subzone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	160 (HZC)	Property ID:	55		
LTE-Services (event):	COV ☒	MinRepTime:	10 sec	Heartbeat:	15	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:	Stored Value ☐	Act Value ☒	Default Value ☐		
Property-Service (individual access):	Read only ☐	Read/Write ☒ [1)]				

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1)] write access is optional; for AlarmAck function only

2.2.4.11 Input StatusHPM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HZC	**LTE Client Input Name:** StatusHPM	Mandatory ☐ Optional ☒

Description:

This signal contains various status information of the heat production. StatusHPM may also used for local control functionality in the HZC (company specific solution). See clause 2.2.1.1

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

Field	Description	Sup.	Unit	Default
TempFlowProdSegmH	common flow temperature of heat production segment	M	°C	cs
Attributes				
- TempFlowValid	validity of TempFlowProdSegmH	M	bool	false
- Fault	one or more boiler(s) have a failure (mainly for monitoring); manufacturer specific reaction in the HZC	M	bool	false
- SummerMode	boiler / boiler sequence switched off due to local summer/winter mode (mainly for monitoring)	O	bool	false
- OffPerm	boilers are permanently off (manual switch or failure)	O	bool	false
- NoHeatAvailable	boiler / boiler sequence is temporary not producing heat	O	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	136 (HPM)	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:

--

2.2.4.12 Input LockSignHPM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HZC	**LTE Client Input Name:** LockSignHPM	Mandatory ☐ Optional ☒

Description:

see clause 2.2.1.3 and document [09]

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 ☒	DistrSegmH	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	54
LTE-Service (event):	InfoReport Sniffer on Binding Group:			--
InfoReport ☒	Timeout: [1]	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:

[1] The signal is received on event and periodically (if no COV occurred) as long as the LockRequest attribute is true. When the overload condition in the HPM disappears, the LockRequest attribute changes to false and the signal will be repeated by the HPM 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)

2.2.4.13 Input ForceSignHPM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HZC	LTE Client Input Name: ForceSignHPM	Mandatory ☐ Optional ☒

Description:

see clause 2.2.1.5 and document [09]

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 HPM (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 supply temp is much higher than requested by heat demand	M	bool	false
- Overrun	indicates that remaining energy is available in the boiler(s) after load shutdown	M	bool	false
- DHWNorm [2)]	Load DHW to 'Normal' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- DHWLegio [2)]	Load DHW to 'LegioProtect' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- RoomHComf	Load Room Heating to 'Comfort' Level in case of overheat ('Protection' or 'Oversupply')	M	bool	false
- RoomHMax	Load Room Heating with maximum flow temperature in case of overheat ('Protection' or 'Oversupply')	M	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	53
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout: [1)]	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:

[1)] The signal is received on event and periodically (if no COV occurred) 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 will be repeated by the HPM 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)] HPM with higher functionality may indicate whether DHW or Room Heating should be activated in case of overheat. The flags for DHW are not considered in the HZC

2.2.4.14 Input LockSignHFDM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HZC	**LTE Client Input Name:** LockSignHFDM	Mandatory ☐ Optional ☒

Description:

see clause 2.2.1.6 and document [09]

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; value is only meaningful if LockRequest=true	M [2)]	bool	uncritical

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	144 (HFDM)	Property ID:	52
LTE-Service (event):	InfoReport Sniffer on Binding Group:			--
InfoReport ☒	Timeout: [1)]	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:

[1)] The signal is received on event and periodically (if no COV occurred) as long as the LockRequest attribute is true. If LockRequest attribute changes to false, the signal is still repeated by the preceding HFDM with the heartbeat-period during 9 minutes (3 messages). Afterwards re-transmission is stopped until a new locking condition appears (this procedure reduces unnecessary bus-load)

[2)] LockSignHFDM have usually the type 'uncritical' – only the % value varies. At the moment no useful applications for 'critical' LockSignHFDM are known. But in principle it is allowed to implement 'critical' LockSignHFDM and the HZC shall react accordingly

2.2.4.15 Input ForceSignHFDM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HZC	LTE Client Input Name: ForceSignHFDM	Mandatory ☐ Optional ☒

Description:

see clause 2.2.1.7 and document [09]

DPT:	Name	DPT_ForceSign	DPT ID	21.101	Datatype format	B_8

Field	Description	Sup.	Unit	Default
Attributes				
- ForceRequest	indicates if forced power consumption is necessary (validity of the remaining attrib)	M	bool	false
- Protection	indicates that overheat is critical e.g. in heat exchanger	M	bool	false
- Oversupply	indicates that overheat is uncritical but supply temp is much higher than requested by heat demand	M	bool	false
- Overrun	indicates that remaining energy is available in the heat-exchanger after load shutdown	M	bool	false
- DHWNorm [2)]	Load DHW to 'Normal' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- DHWLegio [2)]	Load DHW to 'LegioProtect' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- RoomHComf	Load Room Heating to 'Comfort' Level in case of overheat ('Protection' or 'Oversupply')	M	bool	false
- RoomHMax	Load Room Heating with maximum flow temperature in case of overheat ('Protection' or 'Oversupply')	M	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	144 (HFDM)	Property ID:	53
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout: [1)]	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:

[1)] The signal is received on event and periodically (if no COV occurred) as long as the ForceRequest attribute is true. When the forcing condition in the HFDM disappears, the ForceRequest attribute changes to false and the signal will be repeated by the HFDM 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)] HFDM with higher functionality may indicate whether DHW or Room Heating should be activated in case of overheat. The flags for DHW are not considered in the HZC

2.2.4.16 Input TempFlowWater

Standard Mode

DP Name:	TempFlowWater	Abbr.:	--	Mandatory	☐
FB Name:	HZC			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

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LTE-HEE mode:

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

Description:

This process signal from a flow temperature sensor contains the common water flow temperature of the Heat Distribution Segment => may be used in the HZC for optimized zone control

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 ☒	DistrSegmH	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	324 (FWTS)	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 ☐

The HZC 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

2.2.4.17 Input TempReturnWater

Standard Mode

DP Name:	TempReturnWater		Abbr.:	--				Mandatory	☐		
FB Name:	HZC							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: HZC	**LTE Client Input Name:** TempReturnWater	Mandatory ☐ Optional ☒

Description:

This process signal from a temperature sensor contains the common return water temperature of the Heat Distribution Segment => may be used in the HZC for optimized zone control

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 ☒	DistrSegmH	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 HZC 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

2.2.4.18 Input HVACModeEff

Standard Mode

Not applicable

LTE-HEE Mode:

FB: HZC	**LTE ClientInput Name:** HVACModeEff	Mandatory ☒ [1] Optional ☐

Description:

This input is provided by the RSMHD and defines the actual HVAC operating mode of the heating zone

DPT:	Name	DPT_HVACMode_Z	DPT ID	201.100	Datatype format	N_8Z_8

Field	Description	Sup.	Unit	Default
HVACMode	Actual HVAC Mode, range [1..4] [2]	M	enum.	cs
Status - Overridden - all other flags	standard Status attributes HVACMode overridden true / false not supported	 O NA	 bool	 false

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	100 (RSMHD)	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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

If the signal HVACModeOptim is received from an external Optimizer, the HZC will ignore the signal HVACModeEff from the RSMHD and use the optimised HVAC Mode instead. See also chapter 2.1.5

[1] Either implementation of {HVACModeEff + TempRoomSetpSetHeatEff [4] (+ HVACModeEffNext) } or {TempRoomSetpHeatEff}. This input can be device-internal

[2] value 0='Auto' is not allowed => to be ignored by the HZC => use default value

2.2.4.19 Input TempRoomSetpSetHeatEff [4]

Standard Mode

Not applicable

LTE-HEE Mode:

FB: HZC	**LTE ClientInput Name:**	**TempRoomSetpSetHeatEff [4]**	Mandatory ☒ [1] Optional ☐

Description:

This input is provided by the RSMHD and contains the four effective (after corrections) heating room temperature setpoints which are valid for the controller.

DPT:	Name	DPT_TempRoomSetpSet[4]	DPT ID	213.100	Datatype format	$V_{16}V_{16}V_{16}V_{16}$

Field	Description	Sup.	Unit	Default
TempSetpComf	Comfort setpoint heating	M	°C	cs
TempSetpStdby	Standby setpoint heating	O	°C	cs
TempSetpEco	Economy setpoint heating	M	°C	cs
TempSetpBProt	Building protection setpoint heating	M	°C	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	100 (RSMHD)	Property ID:	53
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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1] Either implementation of {HVACModeEff + TempRoomSetpSetHeatEff [4] (+ HVACModeEffNext) } or {TempRoomSetpHeatEff}. This input can be device-internal

2.2.4.20 Input HVACModeEffNext

Standard Mode

Not applicable

LTE-HEE Mode:

FB: HZC	LTE ClientInput Name: HVACModeEffNext	Mandatory ☐ Optional ☒ 1)

Description:

This input is provided by the RSMHD and defines the next HVAC operating mode and the delay time to it. This information is used by the HZC for local optimiser functions, e.g. start/stop optimisation

DPT:	Name	DPT_HVACModeNext	DPT ID	206.100	Datatype format	$U_{16}N_8$

Field	Description	Sup.	Unit	Default
DelayTime	Time to next HVAC mode in minutes 0 = no next HVAC Mode available 2)	M	min	0
HVACMode	Next HVAC Mode, range [1..4] and [0] = Mode Undefined 2)	M	enum.	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	100 (RSMHD)	Property ID:	52
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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

1) Either implementation of { HVACModeEff + TempRoomSetpSetheatEff [4] (+ HVACModeEffNext) } or { TempRoomSetpHeatEff }. This input can be device-internal

2) encoding of special conditions, see table below

Interpretation of Time and HVACMode fields

Time	HVACMode	
= 0 (Undefined)	= 0 (Undefined)	the content of the datapoint is void / undefined => no next HVAC Mode available for an undefined time period
= 0 (Undefined)	= {1..4}	defined and valid next HVACMode but the delay time is undefined/unknown => in case of manually selected HVACModeUser ≠ 'Auto' (i.e. next HVACMode = current HVACModeEff)
> 0	= 0 (Undefined)	undefined (unknown) HVACMode during a defined delay time => in practice this combination is useless and is interpreted like Time=0 / HVACMode=0 (default value)
> 0	= {1..4}	defined and valid HVACMode and delay time

2.2.4.21 Input TempRoomSetpHeatEff

Standard Mode

DP Name:	TempRoomSetpHeatEff	Abbr.:	--	Mandatory	☒
FB Name:	HZC			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: HZC	**LTE Client Input Name:** TempRoomSetpHeatEff	Mandatory ☒ [1] Optional ☐

Description:

This input is provided by the RSMHD and defines the effective (after corrections) heating setpoint which is valid for the controller. This information is used for simple applications (heating only).

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

Field	Description	Sup.	Unit	Default
Temperature	room temperature setpoint value	M	°C	cs
Status	standard Status attributes	M	bitset	
- OutOfService	void setpoint value	M	bool	false
- Overridden	setpoint value overridden true / false	O	bool	false
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	100 (RSMHD)	Property ID:	55
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 ☐

In case of missing input data (timeout) or value 'OutOfService' the HZC will have a company specific behaviour

Special Features:

[1] Either implementation of { HVACModeEff + TempRoomSetpSetheatEff [4] (+ HVACModeEffNext) } or { TempRoomSetpHeatEff }. This input can be device-internal

2.2.4.22 Input HVACModeOptim

Standard Mode

Not applicable

LTE-HEE Mode:

FB: HZC	LTE ClientInput Name: HVACModeOptim	Mandatory ☐ Optional ☒

Description:

This input can be provided by an external HVAC Optimiser and defines the optimised HVAC operating mode for the heating zone.

DPT:	Name	DPT_HVACMode_Z	DPT ID	201.100	Datatype format	N_8Z_8

Field	Description	Sup.	Unit	Default
HVACMode	optimised HVAC Mode, range [1..4] or 0 [1)]	M	enum.	0
Status	standard Status attributes	M	bitset	
- OutOfService	void value => no optimized HVAC Mode available	M	bool	true
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	115 (HVACOPT)	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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1)] HVACMode 0= 'Auto' or Status 'OutOfService' => no optimiser active, HZC uses HVACModeEff
HVACMode 1..4: IMPORTANT, if this signal is supported by the HZC and received from the HVAC Optimiser, the HZC will ignore the signal HVACModeEff from the RSMHD and use the optimised HVAC Mode instead if HVACModeOptim is ≠ 'Auto

2.2.4.23 Input TempRoomSetpOptimHeatShift

Standard Mode:

DP Name:	TempRoomSetpOptimHeatShift	Abbr.:	---	Mandatory	☐
FB Name:	HZC			Can be internal	☐

Description

This optional input signal from an external HVAC Optimiser contains a correction value to the actual room temperature setpoint. This shift value is used e.g. for morning boost.

Datapoint Type

DPT_Name:	DPT_Value_Tempd		
DPT Format:	F_{16}	DPT_ID:	9.002

Field	Description	Supp.	Range	Unit	Default
			full	K	0

Access Type

♦ Input

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

--

LTE-HEE Mode Interface:

FB: HZC	**LTE Client Input Name:**	**TempRoomSetpOptimHeatShift**	Mandatory ☐ Optional ☒

Description:

This optional input signal from an external HVAC Optimiser contains a correction value to the actual room temperature setpoint. This shift value is used e.g. for morning boost.

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

Field	Description	Sup.	Unit	Default
Temperature	room temperature setpoint shift value	M	K	0
Status - all flags	standard Status attributes not supported, can be ignored	M NA	bitset bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	115 (HVACOPT)	Property ID:	52
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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

--

2.2.4.24 Input TempRoom

Standard Mode

DP Name:	TempRoom	Abbr.:	--	Mandatory	☐
FB Name:	HZC			Can be internal	☒

Description

Current room temperature value from RTS

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

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LTE-HEE mode:

FB: HZC	**LTE Client Input Name:** TempRoom	Mandatory ☐ Optional ☒

Description:

This process signal from a room temperature sensor RTS contains the current room temperature of the heating zone

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

Field	Description	Sup.	Unit	Default
TempRoom	current room 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 ☒	Apartment . Room . SubZone [1]	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	321 (RTS)	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:	[2]		

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

The HZC 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

[1] The RTS may also send on the zone A.R.* (one sensor per room) or A.*.* (one reference room temp sensor for the apartment)

[2] The HZC may support the calculation of the mean value from different room temperature sensors. These sensors may e.g. have different Room or Subzone information => in this case the HZC is a sniffer for room temperature values from different zones (company specific feature)

2.2.4.25 Input TempOutside

Standard Mode: see specification in document **[07]**, functional Block BOC

LTE-HEE mode:

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

Description:

Outside temperature from a remote outside temperature sensor can be used for flow temperature setpoint / demand calculation or ECO Mode mechanism etc.

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 HZC 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 behavior)

Special Features:

This input can be internal

2.2.4.26 Input WindSpeed

Standard Mode

DP Name:	WindSpeed		Abbr.:	--			Mandatory	☐		
FB Name:	HZC						Can be internal	☒		
Description										
Current wind speed value										
Datapoint Type										
DPT_Name:	DPT_Value_Wsp									
DPT Format:	U_{16}				DPT_ID:	9.005				
Field	Description				Supp.	Range		Unit	Default	
						full range		m/s	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: HZC	**LTE Client Input Name:** WindSpeed	Mandatory ☐ Optional ☒

Description:

This process signal from a wind speed sensor WSS contains the current wind speed information

DPT:	Name	DPT_WindSpeed_Z	DPT ID	203.101	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Unit	Default
WindSpeed	current wind speed value with 0.01 m/s resolution	M	m/s	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):	347 (WSS)	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 ☐

The HZC 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

2.2.4.27 Input SunIntensity

Standard Mode

DP Name:	SunIntensity		Abbr.:	--				Mandatory	☐		
FB Name:	HZC							Can be internal	☒		
Description											
Current sun intensity value											
Datapoint Type											
DPT_Name:	DPT_PowerDensity										
DPT Format:	U_{16}					DPT_ID:	9.022				
Field	Description					Supp.	Range		Unit	Default	
							full range		W/m^2	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: HZC	**LTE Client Input Name:** SunIntensity	Mandatory ☐ Optional ☒

Description:

This process signal from a sun intensity sensor SIS contains the current sun intensity information in W/m^2 => not to be confused with Light sensor which provides Lux information

DPT:	Name	DPT_SunIntensity_Z	DPT ID	203.102	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Unit	Default
SunIntensity	current sun intensity value with 0.05 W/m^2 resolution	M	W/m^2	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):	348 (SIS)	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 HZC 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

2.2.4.28 Parameter Apartment

FB: HZC	Property Name (Server): Apartment	Mandatory ☒ Optional ☐

Description:

LTE zone: Apartment number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Apartment number	M	1..126	--	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):	160 (HZC)	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:

HZC DP's are not LTE communicating if zone is 'OutOfService'. If Apartment is 'OutOfService' also the corresponding Room and Subzone is 'OutOfService' (common flag)

2.2.4.29 Parameter Room

FB: HZC	Property Name (Server): Room	Mandatory ☐ Optional ☒

Description:

LTE zone: Room number. parameter used or fixed value '1' => see remark in chapter 2.1.1

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Room number	M	1..63	--	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):	160 (HZC)	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:

HZC DP's are not LTE communicating if zone is 'OutOfService'. If Apartment is 'OutOfService' also the corresponding Room and Subzone is 'OutOfService' (common flag)

2.2.4.30 Parameter Subzone

FB: HZC	Property Name (Server): Subzone	Mandatory ☐ Optional ☒

Description:

LTE zone: Subzone number within the Apartment & Room => see remark in chapter 2.1.1

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Subzone number	M	1..15	--	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):	160 (HZC)	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:

HZC DP's are not LTE communicating if zone is 'OutOfService'. If Apartment is 'OutOfService' also the corresponding Subzone is 'OutOfService' (common flag)

2.2.4.31 Parameter DistrSegmH

FB: HZC	Property Name (Server): DistrSegmH	Mandatory ☒ Optional ☐

Description:

LTE zoning information : link with the HFDM in the corresponding 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 Distribution Segment 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):	160 (HZC)	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:

HZC DP's on the Heat Distribution Segment are not LTE communicating if zone is 'OutOfService'

2.2.4.32 Parameter OutsideSensorZone

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

Description:

LTE zoning number for the link with an Outside Temperature Sensor, Wind Speed sensor and Sun Intensity Sensor. Only one zone parameter is standardised for all outside sensors, see remark in chapter 2.2.2

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 - 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):	160 (HZC)	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:

HZC is not using external outside sensor (s) if zone is 'OutOfService'

2.2.4.33 Parameter TempFlowWaterMax

FB: HZC	Property Name (Server): TempFlowWaterMax	Mandatory ☐ Optional ☒

Description:

Flow temperature limitation in the heating zone

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	 max 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: (in the server)	IO Type(ID):	160 (HZC)	Property ID:	110
	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

2.2.4.34 Parameter TempFlowWaterMin

FB: HZC	Property Name (Server): TempFlowWaterMin	Mandatory ☐ Optional ☒

Description:

Min flow temperature limitation in the heating zone. Flow temperature shall not be below this limit.

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	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):	160 (HZC)	Property ID:	111
	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

2.2.4.35 Parameter TempReturnWaterMax

FB: HZC	Property Name (Server): TempReturnWaterMax	Mandatory ☐ Optional ☒

Description:

Max. return temperature limitation in the heating zone. The retur temperature shall be below this limit.

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):	160 (HZC)	Property ID:	112
	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

2.2.4.36 Parameter TempReturnWaterMin

FB: HZC	Property Name (Server): TempReturnWaterMin	Mandatory ☐ Optional ☒

Description:

Min return temperature limitation in the heating zone. The return temperature shall be above this limit.

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	 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: (in the server)	IO Type(ID):	160	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:

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

2.2.4.37 Parameter: TimeHeatUpMax

FB: HZC	Property Name (Server): TimeHeatUpMax	Mandatory ☐ Optional ☒

Description:

This optional configuration parameter is used as a time limit for early heating up (in the morning)

DPT:	Name	DPT_TimePeriodMin	DPT ID	7.006	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0 [1)] 1..65535	min	cs

Communication:

DP Address: (in the server)	IO Type(ID):	160 (HZC)	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:

[1)] 0 = no early heating up, start optimization is disabled

2.2.4.38 Parameter: TimeEarlyHeatShutdownMax

FB: HZC	Property Name (Server): TimeEarlyHeatShutdownMax	Mandatory ☐ Optional ☒

Description:

This optional configuration parameter is used as a time limit for early shutdown of the heating (in the evening)

DPT:	Name	DPT_TimePeriodMin	DPT ID	7.006	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0 [1)] 1..65535	min	cs

Communication:

DP Address:	IO Type(ID):	160 (HZC)	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:

[1)] 0 = no early shutdown, stop optimization is disabled

2.2.4.39 Diagnostic data TempReturnWaterHZC

FB: HZC	Property Name (Server): TempReturnWaterHZC	Mandatory ☐ Optional ☒

Description:

Current return temperature of the heating zone

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):	160 (HZC)	Property ID:	116
(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

2.2.4.40 Diagnostic data TempFlowWaterSetpHZC

FB: HZC	Property Name (Server): TempFlowWaterSetpHZC	Mandatory ☐ Optional ☒

Description:

Actual flow temperature setpoint of the HZC

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	=> no setpoint (e.g. heating is off)	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):	160	Property ID:	117
	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

2.2.4.41 Diagnostic data TempRoomAct

FB: HZC	Property Name (Server): TempRoomAct	Mandatory ☐ Optional ☒

Description:

Actual room temperature value used by the HZC for room temperature control loop. This is the local image of the TempRoom input or of a hard wired sensor which may be overridden by a tool for service functions

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	TempRoomAct is not available	O	true/false		false
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	160 (HZC)	Property ID:	118
	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

2.2.4.42 Diagnostic data TempOutsideAct

FB: HZC	Property Name (Server): TempOutsideAct	Mandatory ☐ Optional ☒

Description:

Actual outside temperature value used by the HZC for room temperature control loop (e.g. together with a heat-curve). This is the local image of the TempOutside input or a hard-wired sensor which may be overridden by a tool for service functions

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	TempOutsideAct is not available	O	true/false		cs
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	160 (HZC)	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)] optional Write access for Alarm acknowledgement only

2.2.4.43 Diagnostic data TempOutsideAttenuat

FB: HZC	Property Name (Server): TempOutsideAttenuat	Mandatory ☐ Optional ☒

Description:

Actual attenuated outside temperature value used by the HZC for room temperature control loop (e.g. together with a heat-curve). Temperature attenuation mechanism is company specific.
This value may be overridden by a tool for service functions

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	TempOutside Attenuat is not available	O	true/false		cs
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	160 (HZC)	Property ID:	120
	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

2.2.4.44 Diagnostic data WindSpeedAct

FB: HZC	Property Name (Server): WindSpeedAct	Mandatory ☐ Optional ☒

Description:

Actual wind speed value used by the HZC for room temperature control loop. This is the local image of the WindSpeed input or a hard-wired sensor which may be overridden by a tool for service functions

DPT:	Name	DPT_WindSpeed_Z	DPT ID	203.101	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
WindSpeed	actual wind speed value with 0.01 m/s resolution	M	cs	m/s	cs
Status				bitset	
- OutOfService	WindSpeedAct is not available	O	true/false		cs
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	160 (HZC)	Property ID:	121
	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

2.2.4.45 Diagnostic data SunIntensityAct

FB: HZC	Property Name (Server): SunIntensityAct	Mandatory ☐ Optional ☒

Description:

Actual sun intensity value used by the HZC for room temperature control loop. This is the local image of the SunIntensity input or a hard-wired sensor which may be overridden by a tool for service functions

DPT:	Name	DPT_SunIntensity_Z	DPT ID	203.102	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
SunIntensity	actual sun intensity value with 0.05 W/m2 resolution	M	cs	W/m2	cs
Status				bitset	
- OutOfService	SunIntensity is not available	O	true/false		cs
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	160 (HZC) 1	Property ID: N° of elements	122 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

2.2.4.46 Diagnostic data StatusPumpHZC

FB: HZC	Property Name (Server): StatusPumpHZC	Mandatory ☐ Optional ☒

Description:

Actual relative power of the pump in the heating zone

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): Start-Index:	160 (HZC) 1	Property ID: N° of elements	123 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

2.2.4.47 Diagnostic data Fault

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

Description:

Some error in the HZC

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):	160 (HZC)	Property ID:	124
	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:

--

2.2.4.48 Diagnostic data ErrorCodeHZC

FB: HZC	Property Name (Server): ErrorCodeHZC	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):	160 (HZC)	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:

--

2.2.4.49 Diagnostic data StatusMorningBoost

FB: HZC	Property Name (Server): StatusMorningBoost	Mandatory ☐ Optional ☒

Description:

Status of the morning boost function due to local optimizer function.
- true: morning boost active
- false: normal operation

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:	160 (HZC) 1	Property ID: N° of elements	126 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: Heating Individual Room Controller (HIRC)

2.3.1 Functional Specification

2.3.1.1 Room temperature control

The Heating Individual Room Controller HIRC calculates and controls the position of the valve(s) in its heating zone in order to control the room temperature according the requested room temperature setpoint. All valves connected to the HIRC are controlled together by the HIRC. Usually there is only one heating zone per room, i.e. within one room, all valves VA are usually controlled in parallel. In some cases Subzoning for Valves in the same room is necessary (e.g. combined floor heating and radiator heating). In this case two or more heating controllers (HIRC, HZC) are controlling each one Subzone of the room. Support of Room- Subzones is an optional feature of the HIRC.

The method of calculation of the valve position (setpoint) in the HIRC is **company-specific**.

For HIRC control loop mechanism the current room temperature value, the effective HVAC Mode and a set of room temperature setpoints (for the different HVAC Modes) or the effective Room Temperature Setpoint are mandatory inputs. The outside temperature, sun intensity and wind speed may also be used for more sophisticated room temperature control.

Optionally the HIRC may incorporate local functions like morning boost, start/stop optimization, ECO-function etc. **These optimization functions are company specific and not part of the HIRC specification**

The RSMHD provides necessary information for the HIRC as:

- ‘HVACModeEff’ — Contains the present/active ‘HVACMode’ which may depend on automatic time schedule, local user operation (MMI) presence detection, window status, comfort prolongation etc.
- ‘HVACModeEffNext’ — Contains the effective next ‘HVACMode’ and the delay time until the change of HVACMode (according to advanced scheduling information, local user operation etc.)
  => used in the HIRC for local optimiser functionality
- ‘TempRoomSetpSetHeatEff(4)’ — The effective temperature setpoints for heating for ‘Comfort’, ‘Standby’, ‘Economy’ and ‘BuildingProtection’ (set of setpoints).
- ‘TempRoomSetpHeatEff’ — The effective room temperature setpoint for heating.

Interaction with an external HVAC Optimizer: see also chapter 2.1.5

- ‘HVACModeOptim’ — Contains the optimzed ‘HVACMode’ to be used in the HIRC instead of the ‘HVACModeEff’
- ‘TempRoomSetpOptimHeatShift — delta correction value to be added in the HIRC to the actual room temperature setpoint

2.3.1.2 Room heat demand

The HIRC uses the actual room temperature setpoint, the actual room temperature value, the valve position etc. to determine a room heat demand parameter that is sent to the Room Demand Manager HRDM.

The room heat demand can be expressed as (see also chapter 2.1.2):

- TempRoomDemAbsHeat — room temperature demand (based on the actual room temperature setpoint which may be corrected by an offset depending on an internal demand calculation algorithm)
- ActPosDemAbsHeat — or the actuator position (set point), see EIB ObIS model [13] "Supply Water Temperature Controller based on Evaluation of Valve Positions"

Calculation of the room heat demand is company-specific and not part of this specification. Either TempRoomDemAbsHeat or ActPosDemAbsHeat must be provided by the HIRC.

The emergency demand ‘EmergDem’ attribute which was originally introduced for VAC application is also supported in the HIRC heat demand signal (optional feature). This attribute can be set by the HIRC to indicate a critical heat demand for frost protection, e.g. if the room- and/or outside temperature is below a critical value and no heat is provided by the heat production system (e.g. because boiler is in ‘summer mode’ or manually switched off).
If supported by the heat production system (HPM), the attribute ‘EmergDem’=true will activate heat production in any case (override of e.g. local ‘summer mode’)

2.3.1.3 Usage of StatusHPM by the HIRC

The signal StatusHPM which is provided from the HPM via HDTRT informs the HIRC e.g. if the heat production is on and is able do provide energy. This information may be used in the HIRC for optimization purpose and “learning-functions”. These functions are company-specific.

2.3.1.4 Usage of LockSignHPM by the HIRC

Locking signals can be used in HIRC, but normally without big effect because the heat consumption is already reduced before the HIRC system (e.g. in a pre-controller).

If the HIRC receives a critical locking signal from the HPM the HIRC will reduce the flow according to the % reduction factor in any case.

If the HIRC receives a uncritical locking signal from the HPM the HIRC will reduce the flow according to the % reduction factor if the HIRC has not requested load priority.

IMPORTANT: LockSignHPM must NOT have an influence on the calculation of the flow temperature demand signal (otherwise system may „oscillate“)

Usage of LockSignHPM is an optional feature of the HIRC. See also document [09].

2.3.1.5 Usage of ForceSignHPM by the HIRC

Forcing signals of the type ‘Protection’ or ‘Oversupply’ are only accepted by the HIRC if either the attribute ‘RoomHMax’ or ‘RoomHComf’ is set (activate room heating).

- If the HIRC receives a critical forcing signal (type ‘Protection’) it will react in any case (unconditional load). If ‘RoomHMax’ attribute is set the HIRC will open the valve (100% flow). If ‘RoomHComf’ attribute is set the room heating shall be temporarily activated with ‘Comfort’ room temperature setpoint (HVACMode = Comfort)
- If the HIRC receives a uncritical forcing signal (type ‘Oversupply’) it may react or may ignore the signal (conditional load). Forcing signal could e.g. be ignored if the HIRC is in an energy saving mode. If the signal is accepted, the reaction is the same as for type ‘Protection’, see above

If the HIRC receives a forcing signal with the type ‘Overrun’ immediately after load shutdown it will temporarily keep the last flow temperature setpoint (used before shutdown) for control loop (pump overrun). So remaining energy in the heat producer is efficiently used after load shutdown.

IMPORTANT: Forcing signals must NOT have an influence on the calculation of the heat demand signal of the HIRC or HDTRT (otherwise system may „oscillate“)

The implementation of forcing signals is an optional feature of the HIRC. See also document [09].

2.3.1.6 Usage of received LockSignHFDM in the HIRC

same procedure as for LockSignHPM, see clause 2.3.1.4

2.3.1.7 Usage of received ForceSignHFDM in the HIRC

same procedure as for ForceSignHPM, see clause 2.3.1.5

2.3.1.8 Load Priority Management

Absolute or shift load priority can be requested by the HIRC by setting the attributes ‘AbsLoadPriority’ or ‘ShiftLoadPriority’ in the TempRoomDemAbsHeat or ActPosDemAbsHeat signal.

Load Priority between the consumers within a Heat Distribution Segment is controlled by the HFDM according to priority attributes in the received heat demand signals. If absolute load priority is requested by one or a class of consumers, the HFDM will send a ‘uncritical’ locking signal LockSignHFDM with 100% power reduction to the consumers in the Heat Distribution Segment

If the HFDM can not provide the requested flow temperature (e.g. in a heat-exchanger) and if a consumer requests shift load priority the HFDM will send an ‘uncritical’ locking signal with X % power reduction to the consumers in the Heat Distribution Segment. See also [08] and [09]

If the heat production system can not provide the requested boiler- / flow temperature and if a consumer requests shift load priority the HPM will send an ‘uncritical’ locking signal LockSignHPM with X % power reduction. See also [07] and [09].

2.3.1.9 Sensors and actuators

The HIRC uses the actual room temperature and optionally the outside temperature (and in some cases wind speed and sun intensity) for the room temperature control loop mechanism. These sensors may be hard-wired to the device containing the HIRC or may be received as external inputs from the bus.
If one of these sensors is connected locally to the device containing the HIRC, the corresponding Functional Block is activated.

The HIRC controls one ore multiple valves HVA. The valves are either hard wired or connected via bus. Within one room, all valves VA are usually controlled together by the HIRC. In some cases Subzoning for Valves in the same room is necessary (e.g. combined floor heating and radiator heating). See also chapter 2.1.2

2.3.2 Constraints

The LTE zone ‘Subzone’ can be configured on the HIRC if two or more heating zones within one room are supported (e.g. floor heating combined with radiator heating). This is an optional feature of the HIRC. If ‘Subzone’ is not configurable => internal value ‘1’, see clause 2.1.2

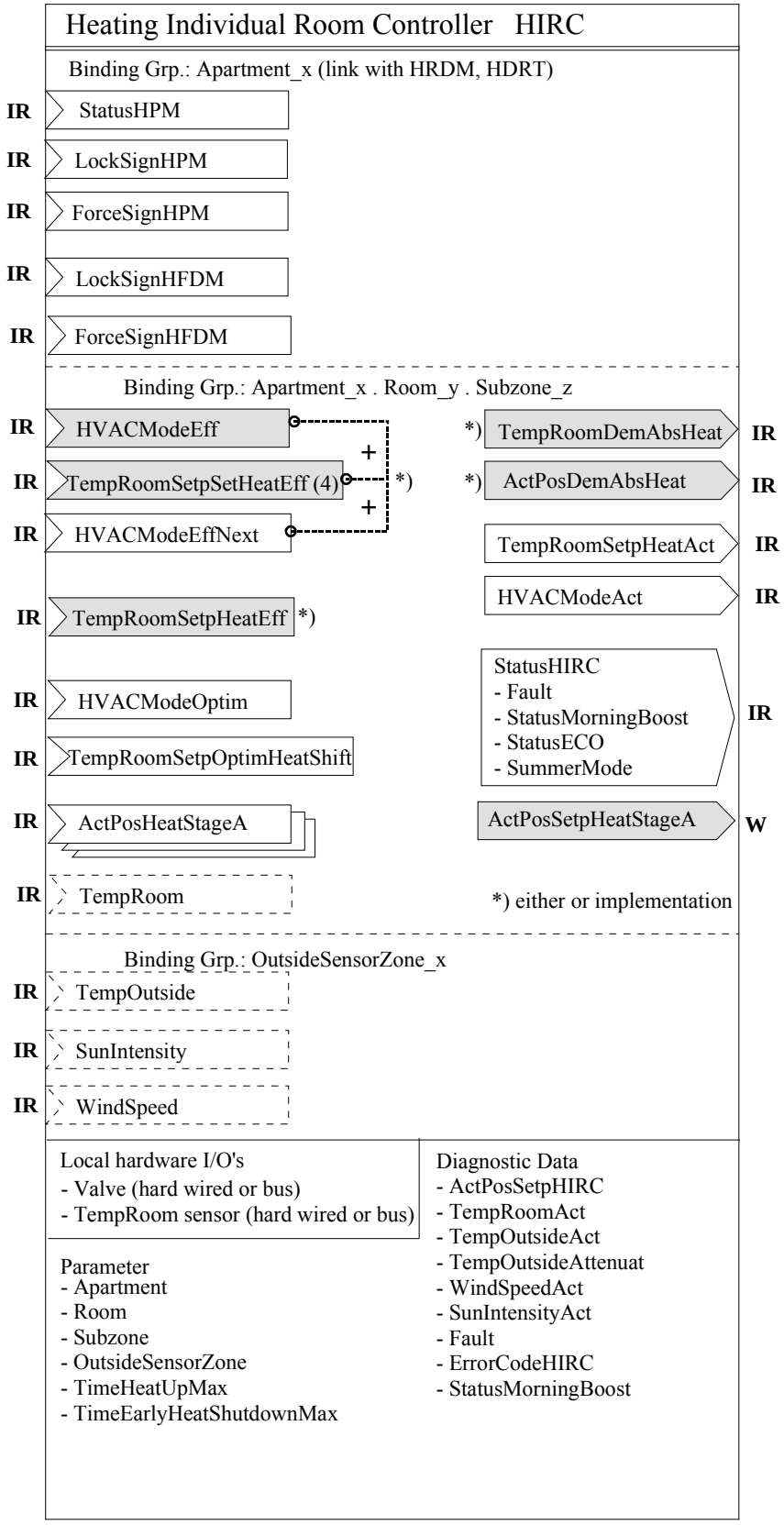
In the standard HIRC application model all outside sensors are located in the same LTE zone (only one zoning parameter). Manufacturer specific parameters shall be used if different outside sensor zones have to be supported.

This Individual Room Control application model is only applicable if all room heating circuits of one Apartment are connected to the same Heat Distribution Segment (mainly residential buildings).
See also chapter 2.1.2

The usage of HVACModeEff / HVACModeEffNext + TempRoomSetpSetHeatEff[4] for optimized room temperature control is restricted to LTE implementations only since the the necessary compound HVAC DPT for runtime-interworking are not yet available in Standard Mode.
In Standard Mode implemetations, the HIRC room temperature control mechanism is based on the TempRoomSetpHeatEff information only (simplified model used in EIB ObIS **[13]**). In this case more sophisticated functions like start/stop optimization in the HIRC can not be implemented.

For non LTE-HEE implementations using the shared variable model the number of valves HVA connected to the HIRC is limited (max. number to be defined at design time of a product) because for every valve status information input (ActPosHeatStageA, t.b.d. in standard mode) one separate group object and group address must be assigned.

2.3.3 Functional block diagram



2.3.4 Datapoint description

2.3.4.1 Overview

Data Point	Description	Data Point Type	DPT N°
Outputs			
TempRoomDemAbsHeat	Heating room temperature demand to the allocated HRDM / LTE and S-interface	DPT_TempRoomDemAbs DPT_Value_Temp	209.101 9.001
ActPosDemAbsHeat	Heating actuator position demand to the allocated HRDM / LTE and S-interface	DPT_ActPosDemAbs DPT_Scaling	207.104 5.001
TempRoomSetpHeatAct	Actual room temperature setpoint of the HIRC zone / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
HVACModeAct	Actual active HVAC mode used by the HIRC / LTE and S-interface	DPT_HVACMode_Z DPT_HVACMode	201.100 20.102
StatusHIRC	Status attributes of HIRC	DTP_StatusRHC	21.102
- Fault	failure, some error in the HIRC (S-interface)	DPT_Bool	1.002
- StatusMorningBoost	morning boost function active (S-interface)	DPT_Bool	1.002
- StatusECO	ECO function active (S-interface)	DPT_Bool	1.002
- SummerMode	HIRC is in summer mode (S-interface)	DPT_Bool	1.002
ActPosSetpHeatStageA	Actuator position set point to be written to the connected valve(s) HVA / LTE and S-interface	DPT_RelValue_Z DPT_Scaling	202.001 5.001
Inputs			
StatusHPM	Status information from ‘Producer Manager’	DPT_StatusHPM	209.100
ForceSignHPM	Forcing signal from HPM due to overheat, to force the consumers to consume energy	DPT_ForceSign	21.100
LockSignHPM	Locking signal from HPM due to boiler overload, to force the consumers to reduce energy consumption	DPT_LockSign	207.101
ForceSignHFDM	Forcing signal from allocated HFDM in the Heat Distribution Segment	DPT_ForceSign	21.100
LockSignHFDM	Locking signal from allocated HFDM in the Heat Distribution Segment	DPT_LockSign	207.101
HVACModeEff	present/active ‘HVACMode’ from RSMHD	DPT_HVACMode_Z	201.100
TempRoomSetpSetHeatEff [4]	set of 4 effective temperature setpoints for heating ‘Comfort’, ‘Standby’, ‘Economy’ and ‘BuildingProt’	DPT_RoomSetpSet[4]	213.100
HVACModeEffNext	next ‘HVACMode’ and time until next mode from RSMHD	DPT_HVACModeNext	206.100
TempRoomSetpHeatEff	The effective actual temperature setpoint for heating / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
HVACModeOptim	optimized HVAC Mode from external HVAC Optimizer	DPT_HVACMode_Z	201.100
TempRoomSetpOptimHeatShift	room temp. setpoint shift from external HVAC Optimizer / LTE and S-interface	DPT_TempHVACRel_Z DPT_Value_Tempd	205.101 9.002
ActPosHeatStageA	Status of the connected heating valve(s) HVA / LTE and S-interface	DPT_StatusAct DPT_??? t.b.d.	207.105 ???
TempRoom	Current room temperature value / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
TempOutside	Current outside temperature / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001

Data Point	Description	Data Point Type	DPT N°
WindSpeed	Current wind speed value / LTE and S-interface	DPT_WindSpeed_Z DPT_Value_Wsp	203.101 9.005
SunIntensity	Current sun intensity value W/m^2/ LTE and S-interface	DPT_SunIntensity_Z DPT_PowerDensity	203.102 9.022
Parameters			
Apartment	LTE zone: Apartment number	DPT_UcountValue8_Z	202.002
Room	LTE zone: Room number	DPT_UcountValue8_Z	202.002
Subzone	LTE zone: Subzone number	DPT_UcountValue8_Z	202.002
OutsideSensorZone	LTE zone for external Outside temperature sensor	DPT_UcountValue8_Z	202.002
TimeHeatUpMax	Maximum heat-up time for local start optimization	DPT_TimePeriodMin	7.006
TimeEarlyHeatShutdownMax	maximum advanced shutdown time for local stop optimization	DPT_TimePeriodMin	7.006
Diagnostic Data			
ActPosSetpHIRC	Actual calculated actuator position setpoint	DPT_RelValue_Z	202.001 *)
TempRoomAct	Actual room temperature used by the HIRC	DPT_TempHVACAbs_Z	205.100 *)
TempOutsideAct	Actual outside temperature used by the HIRC	DPT_TempHVACAbs_Z	205.100 *)
TempOutsideAttenuat	Actual attenuated outside temperature used by the HIRC	DPT_TempHVACAbs_Z	205.100 *)
WindSpeedAct	Actual wind speed value used by the HIRC	DPT_WindSpeed_Z	203.101 *)
SunIntensityAct	Actual sun intensity value used by the HIRC	DPT_SunIntensity_Z	203.102 *)
Fault	failure, some error in the HIRC	DPT_Bool	1.002
ErrorCodeHIRC	company specific numeric error code	DPT_Value_2_Ucount	7.001
StatusMorningBoost	Status of morning boost function	DPT_Bool	1.002

*) Implementation of Properties using standard DPT see clause 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	TempRoomDemAbsHeat	**GO_b** [1]	GO [1]	GO [1]	M [1]
	ActPosDemAbsHeat	**GO_b** [1]	GO [1]	GO [1]	M [1]
	TempRoomSetpHeatAct	**(GO_b)**		(GO)	O
	HVACModeAct	**(GO_b)**		(GO)	O
	StatusHIRC	**NA**	NA	NA	O
	- Fault	**(GO_b)**		(GO)	O
	- StatusMorningBoost	**(GO_b)**		(GO)	O
	- StatusECO	**(GO_b)**		(GO)	O
	- SummerMode	**(GO_b)**		(GO)	NA
	ActPosSetpHeatStageA	**GO_b**	GO	GO	M
Inputs	StatusHPM	**NA** [2]	NA	NA	O
	ForceSignHPM	**NA** [2]	NA	NA	O
	LockSignHPM	**NA** [2]	NA	NA	O
	ForceSignHFDM	**NA** [2]	NA	NA	O
	LockSignHFDM	**NA** [2]	NA	NA	O
	HVACModeEff	**NA** [4]	NA	NA	M [3]
	TempRoomSetpSetHeatEff [4]	**NA** [2]	NA	NA	M [3]
	HVACModeEffNext	**NA** [2]	NA	NA	O [3]
	TempRoomSetpHeatEff	**GO_b** [3]	GO	GO	M [3]
	HVACModeOptim	**NA** [4]	NA	NA	O
	TempRoomSetpOptimHeatShift	**(GO_b)**		(GO)	O
	ActPosHeatStageA	**t.b.d.**			O
	TempRoom	**(GO_b)**		(GO)	O
	TempOutside	**(GO_b)**		(GO)	O
	WindSpeed	**(GO_b)**		(GO)	O
	SunIntensity	**(GO_b)**		(GO)	O

[1] Either implementation of TempRoomDemAbsHeat or ActPosDemAbsHeat
[2] the information is NA in the Basic FB and all other modes because the datapoint type is today not yet available in standard mode. Splitting of DPT is not possible because of necessary data consistency
[3] Either implementation of { HVACModeEff + TempRoomSetpSetHeatEff [4] (+ HVACModeEffNext) } or { TempRoomSetpHeatEff }
[4] Implementation of HVACModeEff or HVACModeOptim inputs only without TempRoomSetpSetHeatEff [4] does not make sense

Table 4: HIRC Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	Apartment	M
	Room	M
	Subzone	O
	OutsideSensorZone	O

Table 5: HIRC LTE specific Properties

		Support
Parameter	TimeHeatUpMax	O
	TimeEarlyHeatShutdownMax	O
Diagnostic Data	ActPosSetpHIRC	O
	TempRoomAct	O
	TempOutsideAct	O
	TempOutsideAttenuat	O
	WindSpeedAct	O
	SunIntensityAct	O
	Fault	O
	ErrorCodeHIRC	O
	StatusMorningBoost	O

Table 6: HIRC Standard Properties of Interface Objects (or memory mapped DP)

2.3.4.2 Output TempRoomDemAbsHeat

Standard Mode

DP Name:	TempRoomDemAbsHeat		Abbr.:	--				Mandatory [1]	☒		
FB Name:	HIRC							Can be internal	☐		
Description											
see LTE-HEE mode, only temperature value, no load priority attributes etc.											
Datapoint Type											
DPT_Name:	DPT_Value_Temp										
DPT Format:	F_{16}						DPT_ID:	9.001			
Field	Description						Supp.	Range		Unit	Default
see LTE-HEE mode											
Access Type											
♦ Output											
this → M	☐		this → 1	☒							
Spontaneous	☒	COV:	☒	Δ-Value:	0.2 K	Min repetition period:	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] Either implementation of TempRoomDemAbsHeat or ActPosDemAbsHeat											

LTE-HEE mode:

FB: HIRC	**LTE Server Output Name:** TempRoomDemAbsHeat	Mandatory ☒ [1] Optional ☐

Description:

This output signal contains the room heating temperature demand (absolute value, expressed as a temperature setpoint value) of the HIRC which is sent to the HRDM in the same apartment. Calculation of the room temperature demand: method is company specific. See clause 2.3.1.2
HIRC may optionally request load priority: see clause 2.3.1.8

DPT:	Name	DPT_TempRoomDemAbs	DPT ID	209.101	Datatype format	$V_{16}B_8$

Field	Description	Sup.	Range	Unit	COV	Default
TempRoomDemAbs	requested temperature setpoint value	M	full	°C	0.2	cs
Attributes						
- DemValid	Validity of TempRoomDemAbs (false means also “no heat demand”)	M	true/false	bool	Y	false
- AbsLoadPriority	set if absolute load priority is requested by the HIRC	O	true/false	bool	Y	false
- ShiftLoadPriority	set if shift load priority is requested by the HIRC	O	true/false	bool	Y	false
- EmergDem	emergency heat demand for room frost protection	O	true/false	bool	Y	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.Subzone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 167 (HIRC)		Property ID: 51	
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1] Either implementation of TempRoomDemAbsHeat or ActPosDemAbsHeat

2.3.4.3 Output ActPosDemAbsHeat

Standard Mode

DP Name:	ActPosDemAbsHeat			Abbr.:	--				Mandatory [1]	☒	
FB Name:	HIRC								Can be internal	☐	
Description											
see LTE-HEE mode, only % value, no load priority attributes etc.											
Datapoint Type											
DPT_Name:	DPT_Scaling										
DPT Format:	U_8						DPT_ID:	5.001			
Field	Description						Supp.	Range		Unit	Default
see LTE-HEE mode											
Access Type											
♦ Output											
this → M	☐		this → 1	☒							
Spontaneous	☒	COV:	☒	Δ-Value:	5%	Min repetition period:	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] Either implementation of TempRoomDemAbsHeat or ActPosDemAbsHeat											

LTE-HEE mode:

FB: HIRC	**LTE Server Output Name:** ActPosDemAbsHeat	Mandatory ☒ [1] Optional ☐

Description:

This output signal contains the heating actuator position demand (expressed as valve position setpoint, absolute value) of the HIRC which is sent to the HRDM in the same apartment.
Calculation of the valve position demand: method is company specific. See clause 2.3.1.2
HIRC may optionally request load priority: see clause 2.3.1.8

DPT:	Name	DPT_ActPosDemAbs	DPT ID	207.104	Datatype format	U_8B_8

Field	Description	Sup.	Range	Unit	COV	Default
ActPosDemAbs	Absolute actuator position demand (setpoint, valve linearized)	M	0..100%	%	5	cs
Attributes						
- DemValid	Validity of ActPosDem (false means also “no heat demand”)	M	true/false	bool	Y	false
- AbsLoadPriority	set if absolute load priority is requested by the HIRC	O	true/false	bool	Y	false
- ShiftLoadPriority	set if shift load priority is requested by the HIRC	O	true/false	bool	Y	false
- EmergDem	emergency heat demand for room frost protection	O	true/false	bool	Y	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.Subzone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 167 (HIRC)		Property ID: 52	
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1] Either implementation of TempRoomDemAbsHeat or ActPosDemAbsHeat

2.3.4.4 Output TempRoomSetpHeatAct

Standard Mode:

same as in HZC, see clause 2.2.4.2

LTE-HEE mode:

FB: HIRC	**LTE Server Output Name:** TempRoomSetpHeatAct	Mandatory ☐ Optional ☒

Description:

Actual room temperature setpoint of the HIRC (mainly used for visualisation)

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	temperature setpoint value	M	full	°C	0.2	cs
Status - OutOfService - Overridden - all other flags	standard Status attributes void value: setpoint not available setpoint overridden true / false not supported	 M O	 true/false true/false	 bool bool	 Y Y	 true true
Command - Override & Release - all other commands	standard Command, write only override and release setpoint not supported	O NA				

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.Subzone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	167 (HIRC)	Property ID:	53		
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐			
Property-Service (individual access):	Read only ☐	Read/Write ☒ [1)]				

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1)] write access is optional; for Override / Release function only. If 'Overridden' the HIRC uses the override value for room temperature control

2.3.4.5 Output HVACModeAct

Standard Mode:

same as in HZC, see clause 2.2.4.4

LTE-HEE mode:

FB: HIRC	**LTE Server Output Name:** HVACModeAct	Mandatory ☐ Optional ☒

Description:

Actual HVAC Mode of the room heating zone (which may also depend on internal optimiser functions in the HIRC; mainly used for visualisation)

DPT:	Name	DPT_HVACMode_Z	DPT ID	201.100	Datatype format	N_8Z_8

Field	Description	Sup.	Range	Unit	COV	Default
HVACMode	actual HVAC Mode	M	[1..4] [1)]		Y	cs
Status - Overridden - all other flags	standard Status attributes HVA mode overridden true / false not supported	O	true/false	bool	Y	false
Command - Override & Release - all other commands	standard Command, write only override and release setpoint not supported	O NA				

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.Subzone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 167 (HIRC)		Property ID: 54	
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐	
Property-Service (individual access):	Read only ☐	Read/Write ☒ [2)]		

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1)] value 'Auto' is not allowed

[2)] write access is optional; for Override / Release function only: if 'Overridden' the HIRC uses the override value for room temperature control

2.3.4.6 Output StatusHIRC

Standard Mode

Separate datapoints Fault, StatusMorningBoost, StatusECO, SummerMode

LTE-HEE mode:

FB: HIRC	**LTE Server Output Name:** StatusHIRC	Mandatory ☐ Optional ☒

Description:

Information provided by the HIRC mainly for visualization & monitoring e.g. on an end-user MMI (e.g. room unit)

DPT:	Name	DPT_StatusRHC	DPT ID	21.102	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
- Fault	HIRC has a failure	M	true/false	bool	Y	false
- StatusECO	ECO status; temporary energy saving mode e.g. due to high room temperature or high outside temperature	O	true/false	bool	Y	false
- TempFlowLimit	Flow temperature limitation active (max. or min. limitation)	O	true/false	bool	Y	false
- TempReturnLimit	Return temperature limitation active (max. or min. limitation)	O	true/false	bool	Y	false
- StatusMorningBoost	morning boost active (mainly for monitoring)	O	true/false	bool	Y	false
- StatusStartOptim	start optimization active(mainly for monitoring)	O	true/false	bool	Y	false
- StatusStopOptim	stop optimization active (mainly for monitoring)	O	true/false	bool	Y	false
- SummerMode	room heating is disabled due to local summer/winter mode	O	true/false	bool	Y	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.Subzone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 167 (HIRC)	Property ID: 55
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐	
Property-Service (individual access):	Read only ☒ Read/Write ☐	

Exception Handling: Save at Powerdown ☐

--

Special Features:

--

2.3.4.7 Output Fault

Standard Mode

same as in HZC, see clause 2.2.4.6

LTE-HEE mode: NA

2.3.4.8 Output StatusMorningBoost

Standard Mode

same as in HZC, see clause 2.2.4.7

LTE-HEE mode: NA

2.3.4.9 Output StatusECO

Standard Mode

same as in HZC, see clause 2.2.4.8

LTE-HEE mode: NA

2.3.4.10 Output SummerMode

Standard Mode

same as in HZC, see clause 2.2.4.9

LTE-HEE mode: NA

2.3.4.11 Output ActPosSetpHeatStageA

Standard Mode

DP Name:	ActPosSetpHeatStageA		Abbr.:	--				Mandatory	☒		
FB Name:	HIRC							Can be internal	☒		
Description											
This datapoint contains the percent setpoint value for the actuator position.											
Datapoint Type											
DPT_Name:	DPT_Scaling										
DPT Format:	U_8					DPT_ID:		5.001			
Field	Description					Supp.		Range	Unit	Default	
								0..100%	%	cs	
Access Type											
♦ Output											
this → M	☒ [1]		this → 1	☐							
Spontaneous	☒	COV:	☒	Δ-Value:	5%	Min repetition period:	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] one or multiple valves can be controlled in parallel											

LTE-HEE mode:

FB: HIRC	**LTE Client Output Name:** ActPosSetpHeatStageA	Mandatory ☒ Optional ☐

Description:

This output signal contains the actuator position setpoint which is sent by the HIRC to the valve(s) in the same room (or subzone of a room). Normally all valves in the room are controlled together. In more sophisticated systems also sub-zoning is possible (e.g. N radiator valves in a subzone and one floor heating circuit). See clause 2.1.2

Calculation of the valve position setpoint: method is company specific. See also chapter 2.3.1.1.

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	COV	Default
RelValue	Actuator position setpoint %	M	0..100%	%	5	cs
COMMAND			enum			
- NormalWrite		M				
- all other commands	not allowed	NA				

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.* or Apartment.Room.Subzone [1)]	1.1.* or 1.1.1 [1)]
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	352 (HVA)	Property ID:	51
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat:	15 min
Write ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☒	
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Power-up: Stored Value ☐	Act Value ☒	Default Value ☐	

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1)] depending whether all valves in the room or only in a room subzone are controlled together

2.3.4.12 Input StatusHPM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HIRC	LTE Client Input Name: StatusHPM	Mandatory ☐ Optional ☒

Description:

This signal contains various status information of the heat production. StatusHPM may be used for local control functionality in the HIRC as well as for optimization purpose and “learning-functions” (company specific solution). This signal was routed by the HDTRT to its Apartment zone. See also chapter 2.3.1.3

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

Field	Description	Sup.	Unit	Default
TempFlowProdSegmH	common flow temperature of heat production segment	M	°C	cs
Attributes				
- TempFlowValid	validity of TempFlowProdSegmH	M	bool	false
- Fault	one or more boiler(s) have a failure (mainly for monitoring); manufacturer specific reaction in the HIRC	M	bool	false
- SummerMode	boiler / boiler sequence switched off due to local summer/winter mode (mainly for monitoring)	O	bool	false
- OffPerm	boilers are permanently off (manual switch or failure)	O	bool	false
- NoHeatAvailable	boiler / boiler sequence is temporary not producing heat	O	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	136 (HPM)	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:

--

2.3.4.13 Input LockSignHPM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HIRC	LTE Client Input Name: LockSignHPM	Mandatory ☐ Optional ☒

Description:

Usage in the HIRC: see clause 2.3.1.4 and document [09]
This signal was routed by the HDTRT to its Apartment zone

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 ☒	Apartment.*.*	1.*.*
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	54
LTE-Service (event):	InfoReport Sniffer on Binding Group:		--	
InfoReport ☒	Timeout: [1]	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:

[1] The signal is received on event and periodically (if no COV occurred) as long as the LockRequest attribute is true. When the overload condition in the HPM disappears, the LockRequest attribute changes to false and the signal will be repeated by the HPM 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)

2.3.4.14 Input ForceSignHPM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HIRC	LTE Client Input Name: ForceSignHPM	Mandatory ☐ Optional ☒

Description:

Usage in the HIRC: see clause 2.3.1.5 and document [09].
This signal was routed by the HDTRT to its Apartment zone

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 HPM (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 supply temp is much higher than requested by heat demand	M	bool	false
- Overrun	indicates that remaining energy is available in the boiler(s) after load shutdown	M	bool	false
- DHWNorm [2)]	Load DHW to 'Normal' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- DHWLegio [2)]	Load DHW to 'LegioProtect' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- RoomHComf	Load Room Heating to 'Comfort' Level in case of overheat ('Protection' or 'Oversupply')	M	bool	false
- RoomHMax	Load Room Heating with valve 100% open in case of overheat ('Protection' or 'Oversupply')	M	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	53
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout: [1)]	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:

[1)] The signal is received on event and periodically (if no COV occurred) 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 will be repeated by the HPM 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)] HPM with higher functionality may indicate whether DHW or Room Heating should be activated in case of overheat. The flags for DHW are not considered in the HIRC

2.3.4.15 Input LockSignHFDM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HIRC	LTE Client Input Name: LockSignHFDM	Mandatory ☐ Optional ☒

Description:

Usage in the HIRC: see clause 2.3.1.6 and document [09].
This signal was routed by the HDTRT to its Apartment zone

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; value is only meaningful if LockRequest=true	M [2)]	bool	uncritical

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	144 (HFDM)	Property ID:	52
LTE-Service (event):	InfoReport Sniffer on Binding Group:		--	
InfoReport ☒	Timeout: [1)]	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:

[1)] The signal is received on event and periodically (if no COV occurred) as long as the LockRequest attribute is true. If LockRequest attribute changes to false, the signal is still repeated by the preceding HFDM with the heartbeat-period during 9 minutes (3 messages). Afterwards re-transmission is stopped until a new locking condition appears (this procedure reduces unnecessary bus-load)

[2)] LockSignHFDM have usually the type ‘uncritical’ – only the % value varies. At the moment no useful applications for ‘critical’ LockSignHFDM are known. But in principle it is allowed to implement ‘critical’ LockSignHFDM and the HIRC shall react accordingly

2.3.4.16 Input ForceSignHFDM

Standard Mode

Not applicable

LTE-HEE mode:

FB: HIRC	LTE Client Input Name: ForceSignHFDM	Mandatory ☐ Optional ☒

Description:

Usage in the HIRC: see clause 2.3.1.7 and document [09].
This signal was routed by the HDTRT to its Apartment zone

DPT:	Name	DPT_ForceSign	DPT ID	21.101	Datatype format	B_8

Field	Description	Sup.	Unit	Default
Attributes				
- ForceRequest	indicates if forced power consumption is necessary (validity of the remaining attrib)	M	bool	false
- Protection	indicates that overheat is critical e.g. in heat exchanger	M	bool	--
- Oversupply	indicates that overheat is uncritical but supply temp is much higher than requested by heat demand	M	bool	--
- Overrun	indicates that remaining energy is available in the heat-exchanger after load shutdown	M	bool	--
- DHWNorm [2)]	Load DHW to 'Normal' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- DHWLegio [2)]	Load DHW to 'LegioProtect' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- RoomHComf	Load Room Heating to 'Comfort' Level in case of overheat ('Protection' or 'Oversupply')	M	bool	false
- RoomHMax	Load Room Heating with valve 100 % open in case of overheat ('Protection' or 'Oversupply')	M	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	144 (HFDM)	Property ID:	53
LTE-Service (event):	InfoReport Sniffer on Binding Group:		--	
InfoReport ☒	Timeout: [1)]	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:

[1)] The signal is received on event and periodically (if no COV occurred) as long as the ForceRequest attribute is true. When the forcing condition in the HFDM disappears, the ForceRequest attribute changes to false and the signal will be repeated by the HFDM 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)] HFDM with higher functionality may indicate whether DHW or Room Heating should be activated in case of overheat. The flags for DHW are not considered in the HIRC

2.3.4.17 Input HVACModeEff

Standard Mode

Not applicable

LTE-HEE Mode:

FB: HIRC	**LTE ClientInput Name:** HVACModeEff	Mandatory ☒ [1] Optional ☐

Description:

This input is provided by the RSMHD and defines the actual HVAC operating mode of the heating zone

DPT:	Name	DPT_HVACMode_Z	DPT ID	201.100	Datatype format	N_8Z_8

Field	Description	Sup.	Unit	Default
HVACMode	Actual HVAC Mode, range [1..4] [2]	M	enum.	cs
Status - Overridden - all other flags	standard Status attributes HVACMode overridden true / false not supported	O NA	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	100 (RSMHD)	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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

If the signal HVACModeOptim is received from an external Optimizer, the HIRC will ignore the signal HVACModeEff from the RSMHD and use the optimised HVAC Mode instead. See also chapter 2.1.5

[1] Either implementation of {HVACModeEff + TempRoomSetpSetHeatEff [4] (+ HVACModeEffNext) } or {TempRoomSetpHeatEff}. This input can be device-internal

[2] value 0='Auto' is not allowed => to be ignored by the HIRC => use default value

2.3.4.18 Input TempRoomSetpSetHeatEff [4]

Standard Mode

Not applicable

LTE-HEE Mode:

FB: HIRC	**LTE ClientInput Name:**	**TempRoomSetpSetHeatEff [4]**	Mandatory ☒ [1] Optional ☐

Description:

This input is provided by the RSMHD and contains the four effective (after corrections) heating room temperature setpoints which are valid for the controller.

DPT:	Name	DPT_TempRoomSetpSet[4]	DPT ID	213.100	Datatype format	$V_{16}V_{16}V_{16}V_{16}$

Field	Description	Sup.	Unit	Default
TempSetpComf	Comfort setpoint heating	M	°C	cs
TempSetpStdby	Standby setpoint heating	O	°C	cs
TempSetpEco	Economy setpoint heating	M	°C	cs
TempSetpBProt	Building protection setpoint heating	M	°C	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	100 (RSMHD)	Property ID:	53
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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1] Either implementation of {HVACModeEff + TempRoomSetpSetHeatEff [4] (+ HVACModeEffNext) } or {TempRoomSetpHeatEff}. This input can be device-internal

2.3.4.19 Input HVACModeEffNext

Standard Mode

Not applicable

LTE-HEE Mode:

FB: HIRC	LTE ClientInput Name: HVACModeEffNext	Mandatory ☐ Optional ☒ 1)

Description:

This input is provided by the RSMHD and defines the next HVAC operating mode and the delay time to it. This information is used by the HIRC for local optimiser functions, e.g. start/stop optimisation

DPT:	Name	DPT_HVACMode_Next	DPT ID	206.100	Datatype format	$U_{16}N_8$

Field	Description	Sup.	Unit	Default
DelayTime	Time to next HVAC mode in minutes 0 = no next HVAC Mode available 2)	M	min	0
HVACMode	Next HVAC Mode, range [1..4] and [0] = Mode Undefined 2)	M	enum.	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	100 (RSMHD)	Property ID:	52
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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

1) Either implementation of { HVACModeEff + TempRoomSetpSetheatEff [4] (+ HVACModeEffNext) } or { TempRoomSetpHeatEff }. This input can be device-internal

2) encoding of special conditions, see table below

Interpretation of Time and HVACMode fields

Time	HVACMode	
= 0 (Undefined)	= 0 (Undefined)	the content of the datapoint is void / undefined => no next HVAC Mode available for an undefined time period
= 0 (Undefined)	= {1..4}	defined and valid next HVACMode but the delay time is undefined (unknown) => in case of manually selected HVACModeUser ≠ 'Auto' (i.e. next HVACMode = current HVACModeEff)
> 0	= 0 (Undefined)	undefined (unknown) HVACMode during a defined delay time => in practice this combination is useless and is interpreted like Time=0 / HVACMode=0 (default value)
> 0	= {1..4}	defined and valid HVACMode and delay time

2.3.4.20 Input TempRoomSetpHeatEff

Standard Mode

same as in HZC, see clause 2.2.4.21

LTE-HEE mode:

FB: HIRC	**LTE Client Input Name:** TempRoomSetpHeatEff	Mandatory ☒ [1] Optional ☐

Description:

This input is provided by the RSMHD and defines the effective (after corrections) heating setpoint which is valid for the controller. This information is used for simple applications (heating only).

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

Field	Description	Sup.	Unit	Default
Temperature	room temperature setpoint value	M	°C	--
Status	standard Status attributes	M	bitset	
- OutOfService	void setpoint value	M	bool	false
- Overridden	setpoint value overridden true / false	O	bool	false
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	100 (RSMHD)	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: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

In case of missing input data (timeout) or value 'OutOfService' the HIRC will have a company specific behaviour

Special Features:

[1] Either implementation of { HVACModeEff + TempRoomSetpSetheatEff [4] (+ HVACModeEffNext) } or { TempRoomSetpHeatEff }. This input can be device-internal

2.3.4.21 Input HVACModeOptim

Standard Mode

Not applicable

LTE-HEE Mode:

FB: HIRC	**LTE ClientInput Name:** HVACModeOptim	Mandatory ☐ Optional ☒

Description:

This input can be provided by an external HVAC Optimiser and defines the optimised HVAC operating mode for the heating zone.

DPT:	Name	DPT_HVACMode_Z	DPT ID	201.100	Datatype format	N_8Z_8

Field	Description	Sup.	Unit	Default
HVACMode	optimised HVAC Mode, range [1..4] or 0 [1)]	M	enum.	0
Status	standard Status attributes	M	bitset	
- OutOfService	void value => no optimized HVAC Mode available	M	bool	true
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment . Room . SubZone	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	115 (HVACOPT)	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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

Special Features:

[1)] HVACMode 0= ‘Auto’ or Status ‘OutOfService’ => no optimiser active, HIRC uses HVACModeEff
HVACMode 1..4: IMPORTANT, if this signal is supported by the HIRC and received from the HVAC Optimiser, the HIRC will ignore the signal HVACModeEff from the RSMHD and use the optimised HVAC Mode instead if HVACModeOptim is ≠ ‘Auto

2.3.4.22 Input TempRoomSetpOptimHeatShift

Standard Mode:

same as in HZC, see clause 2.2.4.23

LTE-HEE Mode Interface:

FB: HIRC	**LTE Client Input Name:** TempRoomSetpOptimHeatShift					Mandatory ☐ Optional ☒
Description:						
This optional input signal from an external HVAC Optimiser contains a correction value to the actual room temperature setpoint. This shift value is used e.g. for morning boost.						
DPT: Name	DPT_TempHVACRel_Z	DPT ID	205.101	Datatype format	$V_{16}Z_8$	
Field	Description			Sup.	Unit	Default
Temperature	room temperature setpoint shift value			M	K	0
Status - all flags	standard Status attributes not supported, can be ignored			M NA	bitset bool	
Communication:						
Binding Group:						
Class	Type			Default		
Geographical ☒	Apartment . Room . SubZone			1.1.1		
Application Specific ☐						
Unassigned ☐	Broadcast ☐	Configurable ☐				
DP Address:	IO Type(ID):	115 (HVACOPT)	Property ID:	52		
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 Power-up:	Default Value ☒			Stored Value ☐		
Exception Handling:				Save at Powerdown ☐		
--						
Special Features:						
--						

2.3.4.23 Input ActPosHeatStageA

Standard Mode: t.b.d.

In Standard Mode the number of HVA connected to the HIRC will limited (max. number to be defined at design time of a product) because for every valve status input signal one group object and separate group addresses must be assigned (shared variable model). N instances of this object must be implemented

LTE-HEE mode

FB: HIRC	**LTE Client Input Name:** ActPosHeatStageA	Mandatory ☐ Optional ☒

Description:

This input contains status information of the connected heating valve(s) HVA

DPT:	Name	DPT_StatusAct	DPT ID	207.105	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
ActPos	actual actuator position in %, 0..100% 0% = fully closed, 100% = fully open	M	%	0%
Attributes			bitset	
- Failure	actuator has a failure	M	bool	false
- ManualOverride	actuator position is manually overridden	O	bool	false
- CalibrationMode	actuator is currently in calibration mode	O	bool	false
- ValveKick	valve is currently executing a valve kick	O	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment.Room.* or Apartment.Room.Subzone [1)]	1.1.* or 1.1.1 [1)]
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	352 (HVA)	Property ID:	55
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 ☐

--

Special Features:

[1)] depending whether all valves in the room or only in a room subzone are controlled together.
The signals of all connected HVA are all received in the same LTE zone and are only differentiated by their source individuall address (of the sending HVA)

2.3.4.24 Input TempRoom

Standard Mode:

same as in HZC, see clause 2.2.4.24

LTE-HEE mode:

FB: HIRC	**LTE Client Input Name:** TempRoom	Mandatory ☐ Optional ☒

Description:

This process signal from a room temperature sensor RTS contains the current room temperature of the heating zone

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

Field	Description	Sup.	Unit	Default
TempRoom	current room temperature value	M	°C	--
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 ☒	Apartment . Room . SubZone [1]	1.1.1
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	321 (RTS)	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:		[2]	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

The HIRC 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

[1] The RTS may also send on the zone A.R.* (one sensor per room)

[2] The HIRC may support the calculation of the mean value from different room temperature sensors. These sensors may e.g. have different Subzone information => in this case the HIRC is a sniffer for room temperature values from different zones (company specific feature)

2.3.4.25 Input TempOutside

Standard Mode

See description in document [07], functional Block BOC

LTE-HEE mode:

FB: HIRC	LTE Client Input Name: TempOutside	Mandatory ☐ Optional ☒

Description:

Outside temperature from a remote outside temperature sensor can be used for flow temperature setpoint / demand calculation or ECO Mode mechanism etc.

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	--
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 HIRC 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 behavior)

Special Features:

This input can be internal

2.3.4.26 Input WindSpeed

Standard Mode

same as in HZC, see clause 2.2.4.26

LTE-HEE mode:

FB: HIRC	**LTE Client Input Name:** WindSpeed	Mandatory ☐ Optional ☒

Description:

This process signal from a wind speed sensor WSS contains the current wind speed information

DPT:	Name	DPT_WindSpeed_Z	DPT ID	203.101	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Unit	Default
WindSpeed	current wind speed value with 0.01 m/s resolution	M	m/s	--
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):	347 (WSS)	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 ☐

The HIRC 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

2.3.4.27 Input SunIntensity

Standard Mode

Same as in HZC, see clause 2.2.4.27

LTE-HEE mode:

FB: HIRC	**LTE Client Input Name:** SunIntensity	Mandatory ☐ Optional ☒

Description:

This process signal from a sun intensity sensor SIS contains the current sun intensity information in W/m^2
=> not to be confused with Light sensor which provides Lux information

DPT:	Name	DPT_SunIntensity_Z	DPT ID	203.102	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Unit	Default
SunIntensity	current sun intensity value with 0.05 W/m^2 resolution	M	W/m^2	--
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):	348 (SIS)	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 ☐

The HIRC 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

2.3.4.28 Parameter Apartment

FB: HIRC	Property Name (Server): Apartment	Mandatory ☒ Optional ☐

Description:

LTE zone: Apartment number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Apartment number	M	1..126	--	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):	167 (HIRC)	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:

HIRC DP's are not LTE communicating if zone is 'OutOfService'. If Apartment is 'OutOfService' also the corresponding Room and Subzone is 'OutOfService' (common flag)

2.3.4.29 Parameter Room

FB: HIRC	Property Name (Server): Room	Mandatory ☒ Optional ☐

Description:

LTE zone: Room number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Room_number	M	1..63	--	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):	167 (HIRC)	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:

HIRC DP's are not LTE communicating if zone is 'OutOfService'. If Apartment is 'OutOfService' also the corresponding Room and Subzone is 'OutOfService' (common flag)

2.3.4.30 Parameter Subzone

FB: HIRC	Property Name (Server): Subzone	Mandatory ☐ Optional ☒

Description:

LTE zone: Subzone number within the Apartment.Room.
Subzone value is a parameter used or fixed value '1' => see remark in chapter 2.1.2

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Subzone number	M	1..15	--	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):	167 (HIRC)	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:

HIRC DP's are not LTE communicating if zone is 'OutOfService'. If Apartment is 'OutOfService' also the corresponding Subzone is 'OutOfService' (common flag)

2.3.4.31 Parameter OutsideSensorZone

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

Description:

LTE zoning number for the link with an Outside Temperature Sensor, Wind Speed sensor and Sun Intensity Sensor. Only one zone parameter is standardised for all outside sensors, see remark in chapter 2.3.2

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 - 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):	167 (HIRC)	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:

HIRC is not using external outside sensor (s) if zone is 'OutOfService'

2.3.4.32 Parameter: TimeHeatUpMax

FB: HIRC	Property Name (Server): TimeHeatUpMax	Mandatory ☐ Optional ☒

Description:

This optional configuration parameter is used as a time limit for early heating up (in the morning)

DPT:	Name	DPT_TimePeriodMin	DPT ID	7.006	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0 [1] 1..65535	min	cs

Communication:

DP Address: (in the server)	IO Type(ID):	167 (HIC)	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:

[1] 0 = no early heating up, start optimization is disabled

2.3.4.33 Parameter: TimeEarlyHeatShutdownMax

FB: HIRC	Property Name (Server): TimeEarlyHeatShutdownMax	Mandatory ☐ Optional ☒

Description:

This optional configuration parameter is used as a time limit for early shutdown of the heating (in the evening)

DPT:	Name	DPT_TimePeriodMin	DPT ID	7.006	Datatype format	U_{16}

Field	Description	Sup.	Range	Unit	Default
			0 [1] 1..65535	min	cs

Communication:

DP Address: (in the server)	IO Type(ID):	167 (HIRC)	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:

[1] 0 = no early shutdown, stop optimization is disabled

2.3.4.34 Diagnostic data ActPosSetpHIRC

FB: HIRC	Property Name (Server): ActPosSetpHIRC	Mandatory ☐ Optional ☒

Description:

Actual calculated actuator position setpoint: this local value is the source of the ActPosSetpHeatStageA output

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:	IO Type(ID):	167 (HIRC)	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:

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

2.3.4.35 Diagnostic data TempRoomAct

FB: HIRC	Property Name (Server): TempRoomAct	Mandatory ☐ Optional ☒

Description:

Actual room temperature value used by the HIRC for room temperature control loop. This is the local image of the TempRoom input or of a hard wired sensor which may be overridden by a tool for service functions

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	TempRoomAct is not available	O	true/false		false
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	167 (HIRC)	Property ID:	118
(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

2.3.4.36 Diagnostic data TempOutsideAct

FB: HIRC	Property Name (Server): TempOutsideAct	Mandatory ☐ Optional ☒

Description:

Actual outside temperature value used by the HIRC for room temperature control loop (e.g. together with a heat-curve). This is the local image of the TempOutside input or a hard-wired sensor which may be overridden by a tool for service functions

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	TempOutsideAct is not available	O	true/false		cs
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	167 (HIRC)	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)] optional Write access for Alarm acknowledgement only

2.3.4.37 Diagnostic data TempOutsideAttenuat

FB: HIRC	Property Name (Server): TempOutsideAttenuat	Mandatory ☐ Optional ☒

Description:

Actual attenuated outside temperature value used by the HIRC for room temperature control loop (e.g. together with a heat-curve). Temperature attenuation mechanism is company specific.
This value may be overridden by a tool for service functions

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	TempOutside Attenuat is not available	O	true/false		cs
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	167 (HIRC)	Property ID:	120
	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 WindSpeedAct

FB: HIRC	Property Name (Server): WindSpeedAct	Mandatory ☐ Optional ☒

Description:

Actual wind speed value used by the HIRC for room temperature control loop. This is the local image of the WindSpeed input or a hard-wired sensor which may be overridden by a tool for service functions

DPT:	Name	DPT_WindSpeed_Z	DPT ID	203.101	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
WindSpeed	actual wind speed value with 0.01 m/s resolution	M	cs	m/s	cs
Status				bitset	
- OutOfService	WindSpeedAct is not available	O	true/false		cs
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	167 (HIRC)	Property ID:	121
	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 SunIntensityAct

FB: HIRC	Property Name (Server): SunIntensityAct	Mandatory ☐ Optional ☒

Description:

Actual sun intensity value used by the HIRC for room temperature control loop. This is the local image of the SunIntensity input or a hard-wired sensor which may be overridden by a tool for service functions

DPT:	Name	DPT_SunIntensity_Z	DPT ID	203.102	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
SunIntensity	actual sun intensity value with 0.05 W/m2 resolution	M	cs	W/m2	cs
Status				bitset	
- OutOfService	SunIntensity is not available	O	true/false		cs
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	167 (HIRC)	Property ID:	122
	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

2.3.4.40 Diagnostic data Fault

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

Description:

Some error in the HIRC

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):	167 (HIRC)	Property ID:	124
	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:

--

2.3.4.41 Diagnostic data ErrorCodeHIRC

FB: HIRC	Property Name (Server): ErrorCodeHIRC	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):	167 (HIRC)	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:

--

2.3.4.42 Diagnostic data StatusMorningBoost

FB: HIRC	Property Name (Server): StatusMorningBoost	Mandatory ☐ Optional ☒

Description:

Status of the morning boost function due to local optimizer function.
- true: morning boost active
- false: normal operation

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):	167 (HIRC)	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:

--

2.4 Functional Block: Heating Room Demand Manager (HRDM)

2.4.1 Functional Specification

The function of the heating room demand manager HRDM is to collect the room heating demand values from the individual room controllers HIRC of all rooms in the apartment. The HRDM calculates a resulting maximum room heating demand. There is only one HRDM per apartment.
See also chapter 2.1.3

2 calculation methods are supported by the system

- In the existing EIB solution, the valve positions are used for the calculation of the room heating demand. From each HIRC the valve position (setpoint) is collected in the HRDM and the max. valve position is calculated which is then sent to the HDTACT. See EIB ObIS model [13] "Supply Water Temperature Controller based on Evaluation of Valve Positions"
- In the second solution, room temperature setpoints are used for the calculation of the room heating demand. From each HIRC the actual room temperature setpoint is collected in the HRDM and the max. room temperature setpoint is calculated, which is then transmitted directly to the HDTRT. This mechanisms is in its simplest form only a control system without control-loop function.

HRDM shall support both mechanisms:

- Handling of both mechanisms in the HRDM is done in parallel and separately. If the HRDM does not receive a value of one type of the demand inputs it will not send out the corresponding MaxDem output value.
- In practice, a mix of both methods within one apartment is not allowed. This shall be ensured by the installer. In a properly installed system the HRDM will send out either max valve position or max room temperature demand.
- if both TempRoomDemAbsHeat and ActPosDemAbsHeat signals occur, the HRDM will generate both corresponding output signals (NO priority of mechanisms)

2.4.1.1 Calculation of the resulting room demand (illustrative example)

Choice of the maximum demand (expressed as a room temperature setpoint or valve position setpoint) is today the standard mechanism in the HRDM. In the future other mechanisms could be possible (e.g. calculation of weighted mean value).

The following section is an **illustrative example for LTE implementations** which describes heat demand collection and calculation of the resulting heat demand in the HRDM. This example is introduced for better understanding of the functionality of a HRDM. The HRDM mechanism is quite complex and may incorporate other manufacturer specific solutions.

The calculation of the resulting room demand output depending on heat demand signal inputs is not part of the KNX certification.

The HRDM acts a data collector of “many” TempRoomDemAbsHeat or ActPosDemAbsHeat signals received in the same Apartment. In the LTE-HEE implementation the HRDM is a ‘Sniffer’ within the Apartment.
Out of these signals the resulting maximum heat demand is calculated. The received and the resulting heat demand signals have the following content:

Data field	Description
TempRoomDemAbsHeat or ActPosDemAbsHeat	room temperature demand (setpoint) or Actuator position (setpoint)
Attributes - DemValid - AbsLoadPriority - ShiftLoadPriority - EmergDem	 Validity of TempRoomDem or ActPosDemAbs absolute load priority if one or more consumer(s) request all available power shift load priority: set e.g. if HIRC has load priority in case of boiler overload set if one or more HIRC have emergency heat demand for room frost protection, e.g. if the room- and/or outside temperature is below a critical value and no heat is provided by the heat production system (e.g. because boiler is in 'summer mode' or manually switched off)

Plug & Play mechanism in the LTE-HEE implementation:

Remark: This mechanism is only possible in LTE-HEE implementations.
In the shared variable model (e.g. S-mode) implementation all "partners" of the HRDM have to be linked and separate Group Addresses must be assigned for each Demand input signal. The number of "partners" has to be defined at design time of the product.

The HRDM does not need to know which and how many HIRC are allocated in the same Apartment. The HRDM has no complete list of all HIRC connected to it (no directory). Therefore adding or removing of "partners" is simple.

It is not necessary to store TempRoomDemAbsHeat or ActPosDemAbsHeat signals (data image) from **all** connected HIRC s in the HRDM in order to calculate the resulting room demand. Due to the "heartbeat" repetition of the demand signals, it is sufficient to have a dynamic process image of the N temporary **"most relevant"** demands.

The dynamic data image consists of a main list and two attributes lists because the resulting room demand signal is a "mixture" of some of the received signals.

Out of this dynamic data image the entry of the main list with the highest priority is taken for the calculation of the resulting demand signal. In addition the attributes of other signals are also considered according to the attributes lists.

Structure of the Main List (recommendation, manufacturer specific solution)

Handling of TempRoomDemAbsHeat and ActPosDemAbsHeat is done separately. I.e. in the HRDM there could be two separate Main Lists or one Main List containing both types of entries.In practice mix of TempRoomDemAbsHeat and ActPosDemAbsHeat within one Apartment is not allowed.

Demand List					
Entry N°	TempRoomDemAbsHeat or ActPosDemAbsHeat	Attrib: - DemValid	Source FB HIRC Instance	Source Individual Addr	Timeout
1					
2					
...					
N ≥ 4					

Besides the value of the °C or % demand, the list entry contains also the attribute ‘DemValid’

Each entry contains also the source functional block (HIRC instance) and the source individual address of the sender in order to have an unique identifier.

Also a receiver timeout must be handled for each entry independently. In case of removal of a device from the system its relevant heat demand should not remain forever in the list !

The HRDM will use the default value ‚no demand‘ and default individual address of the sender in the dynamic list if there are no valid demand signals or after power-up or in case of communication failure, if no data is received.

The min. size of the list $N \geq 4$
The probability that the N most relevant demand signals change to “no demand” at the same time is very low => in this case, resulting demand would be “no demand for a short period until the new dynamic process image is built up with the N most relevant demand from other devices.

Criteria for a new entry in the Main List: (recommendation, manufacturer specific solution)
Each received signal is checked if it is relevant enough to become an entry of the list. The steps are as follows:

1. first check if there is already an entry in the list with the same sender (source individual addr).
If Yes: delete the entry in the list (in the next steps the new data will be entered instead)

2. check **DemValid** attribute
Signals with **DemValid** = false (“no demand”) are ignored and not further processed
If **DemValid** = true: If there is still free space in the list (void entries) the signal is inserted in the list.

3. The following rule applies if the new signal has **DemValid** = true and all entries in the list are valid. One of the entries may be replaced in the following case:
Check the **TempRoomDemAbsHeat** or **ActPosDemAbsHeat** value. The higher the value the more relevant the signal is. Both types of demand signals shall be checked separately.
An existing entry in the list with the lowest **Demand** value will be removed by a signal having a higher **Demand** value only

Handling of the Attributes Lists: (recommendation, manufacturer specific solution)
For each of the attributes
- AbsLoadPriority
- ShiftLoadPriority
- EmergDem

a separate list exists with the following structure

List for Attribute				
Entry N°	Attrib value true/false	Source FB HIRC Instance	Source Individual Addr	Timeout
1				
2				
...				
N ≥ 4				

A void entry in the list is marked with the attribute value = false

Each entry contains also the instance number of the HIRC and the source individual address of the sender in order to have an unique identifier.

Also a receiver timeout must be handled for each entry independently. In case of removal of a device from the system the attribute should not remain forever in the list !

The HRDM will use the default attribute value = false and default individual address of the sender in the dynamic list if there are no signals with the attribute value = true or after power-up or in case of communication failure, if no data is received.

Mechanisms for new entries in Attribute lists: (recommendation, manufacturer specific solution)

1. first check if there is already an entry in the list with the same sender (source individual addr).
If Yes: delete the entry in the list if the attribute is now false otherwise the entry is unchanged
=> no further action.

2. check the attribute value of the received signal
Signals with attribute value = false are ignored and not further processed

Signals with attribute value = true: if there is still free space in the list (void entries) the signal is inserted in the list.

Resulting Attribute from each list: (recommendation, manufacturer specific solution)
- calculation: logical OR of the attribute value of each entry
- if the resulting attribute is true this means that at least one of the Demand signals has the attribute value = true

This means for:
- AbsLoadPriority: at least one heat consumer wants absolute load priority
- ShiftLoadPriority: at least one heat consumer wants shift load priority in case of overload
- EmergDem: at least one heat consumer has emergency heat demand for room frost protection

Calculation of the resulting heat demand out of the dynamic lists: (recommendation, manufacturer specific solution)

First extract the most relevant entry out of the **Main List**.

1. From all entries take the one with the highest valid **Demand** value
   Both types of demand signals shall be handled separately.
   2. If no entries with a valid demand => no demand

The resulting value*) out of this procedure is inserted in the **TempRoomDemAbsHeatMax** or **ActPosDemAbsHeatMax** signal

Example:

Main List					
Entry N°	TempRoomDemAbsHeat	Attrib: – DemValid	Source FB HIRC Instance	Source Individual Addr	Timeout
1	22 °C	true	(1)	....	....
2	20 °C	true	....	....	....
3	24 °C	true	....	....	....
4	--	false	....	....	....

TempRoomDemAbsHeatMax signal will contain the value of entry 3.

In addition for each attribute out of the **Attributes Lists** the resulting value is separately calculated (logical OR) and the corresponding value *) is inserted in the resulting demand signal.

The following combinations are allowed.

Feature	AbsLoadPriority	ShiftLoadPriority
A	false	false
B	false	true
C	true	false
	true	true
	THIS COMBINATION IS NOT ALLOWED	

If demand signals with ShiftLoadPriority and AbsLoadPriority occur at the same time then AbsLoadPriority has higher priority => Feature C

*) It shall be allowed in implementations of the HRDM that individual attributes (except ‘DemValid‘) in the resulting Demand signal are not supported
=> default value ‘false’

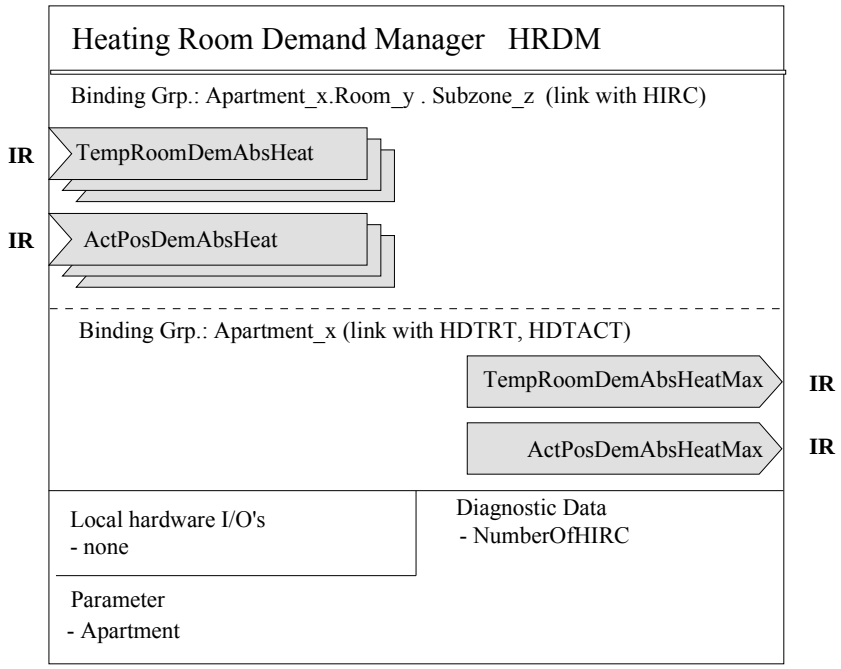
It shall be allowed in implementations of the HRDM that propagation of individual attributes (except ‘DemValid‘) in the resulting Demand signal may be suppressed or activated according to parameter settings.

2.4.2 Constraints

For non LTE-HEE implementations using the shared variable model the number of partners of the HRDM is limited (max. number to be defined at design time of a product) because for every Demand input one separate group object and group address must be assigned.

For non LTE-HEE implementations load priority functionality is not supported.

2.4.3 Functional block diagram



2.4.4 Datapoint description

2.4.4.1 Overview

Data Point	Description	Data Point Type	DPT N°
Outputs			
TempRoomDemAbsHeatMax	Resulting maximum heating room temperature demand => sent to the allocated HDTRT / LTE and S-interface	DPT_TempRoomDemAbs DPT_Value_Temp	209.101 9.001
ActPosDemAbsHeatMax	Resulting maximum heating actuator position demand => sent to the allocated HDTACT / LTE and S-interface	DPT_ActPosDemAbs DPT_Scaling	207.104 5.001
Inputs			
TempRoomDemAbsHeat	Heating room temperature demand from various HIRC / LTE and S-interface	DPT_TempRoomDemAbs DPT_Value_Temp	209.101 9.001
ActPosDemAbsHeat	Heating actuator position demand from various HIRC / LTE and S-interface	DPT_ActPosDemAbs DPT_Scaling	207.104 5.001
Parameters			
Apartment	LTE zone: Apartment number	DPT_UcountValue8_Z	202.002
Diagnostic Data			
NumberOfHIRC	Number of linked HIRC sending TempRoomDemAbsHeat or ActPosDemAbsHeat	DPT_Value_1_Ucount	5.010

			STANDARD MODE	EXTENDED MODE	
		Basic FB	S-Mode	Standard Mode Interface	LTE-Mode
Outputs	TempRoomDemAbsHeatMax	**GO$_b$**	GO	GO	M
	ActPosDemAbsHeatMax	**GO$_b$**	GO	GO	M
Inputs	TempRoomDemAbsHeat	**GO$_b$**	GO	GO	M
	ActPosDemAbsHeat	**GO$_b$**	GO	GO	M

Table 7: HRDM Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	Apartment	M

Table 8: HRDM LTE specific Properties

		Support
Parameter	--	
Diagnostic Data	NumberOfHIRC	O

Table 9: HRDM Standard Properties of Interface Objects (or memory mapped DP)

2.4.4.2 Output TempRoomDemAbsHeatMax

Standard Mode

DP Name:	TempRoomDemAbsHeatMax		Abbr.:	--				Mandatory	☒		
FB Name:	HRDM							Can be internal	☒		
Description											
see LTE-HEE mode, only temperature value, no load priority attributes etc.											
Datapoint Type											
DPT_Name:	DPT_Value_Temp										
DPT Format:	F_{16}					DPT_ID:	9.001				
Field	Description					Supp.	Range		Unit	Default	
see LTE-HEE mode											
Access Type											
♦ Output											
this → M	☐		this → 1	☒							
Spontaneous	☒	COV:	☒	Δ-Value:	0.2 K	Min repetition period:	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											
This output is not sent spontaneously if there are no TempRoomDemAbsHeat input signals											
Special Features											
--											

LTE-HEE mode:

FB: HRDM	**LTE Server Output Name:**	**TempRoomDemAbsHeatMax**	Mandatory ☒ Optional ☐

Description:

This output signal contains the calculated maximum room heating temperature demand (absolute value, expressed as a temperature setpoint value) of the Apartment zone which is sent to the HDTRT in the same apartment. Calculation of the max. room temperature demand: method is company specific. See clause 2.4.1.1

DPT:	Name	DPT_TempRoomDemAbs	DPT ID	209.101	Datatype format	$V_{16}B_8$

Field	Description	Sup.	Range	Unit	COV	Default
TempRoomDemAbs	requested temperature setpoint value	M	full	°C	0.2	cs
Attributes						
- DemValid	Validity of TempRoomDemAbs (false means also “no heat demand”)	M	true/false	bool	Y	false
- AbsLoadPriority	set if absolute load priority is requested by one or more HIRC	O	true/false	bool	Y	false
- ShiftLoadPriority	set if shift load priority is requested by one or more HIRC	O	true/false	bool	Y	false
- EmergDem	set if emergency heat demand for room frost protection is requested by one or more HIRC	O	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 170 (HRDM)		Property ID: 51	
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

This output is not sent spontaneously if there are no TempRoomDemAbsHeat input signals within the Apartment zone

Special Features:

--

2.4.4.3 Output ActPosDemAbsHeatMax

Standard Mode

DP Name:	ActPosDemAbsHeatMax	Abbr.:	--	Mandatory	☒
FB Name:	HRDM			Can be internal	☒

Description

This datapoint corresponds to the VPmax object in the ObIS [13]
see LTE-HEE mode, only % value, no load priority attributes etc.

Datapoint Type

DPT_Name:	DPT_Scaling				
DPT Format:	U_8	DPT_ID:	5.001		
Field	Description	Supp.	Range	Unit	Default
see LTE-HEE mode					

Access Type

♦ Output

this → M	☐	this → 1	☒				
Spontaneous	☒	COV:	☒	Δ-Value:	5%	Min repetition period:	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

This output is not sent spontaneously if there are no ActPosDemAbsHeat input signals

Special Features

--

LTE-HEE mode:

FB: HRDM	**LTE Server Output Name:**	**ActPosDemAbsHeatMax**	Mandatory ☒ Optional ☐

Description:

This output signal contains the calculated maximum heating actuator position demand (expressed as valve position setpoint, absolute value) of the HRDM which is sent to the HDTACT in the same apartment.
Calculation of the maximum valve position demand: method is company specific. See clause 2.4.1.1

DPT:	Name	DPT_ActPosDemAbs	DPT ID	207.104	Datatype format	U_8B_8

Field	Description	Sup.	Range	Unit	COV	Default
ActPosDemAbs	Absolute actuator position demand (setpoint, valve linearized)	M	0..100%	%	5	cs
Attributes						
- DemValid	Validity of ActPosDem (false means also “no heat demand”)	M	true/false	bool	Y	false
- AbsLoadPriority	set if absolute load priority is requested by one or more HIRC	O	true/false	bool	Y	false
- ShiftLoadPriority	set if shift load priority is requested by one or more HIRC	O	true/false	bool	Y	false
- EmergDem	set if emergency heat demand for room frost protection is requested by one or more HIRC	O	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 170 (HRDM)		Property ID: 52	
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

This output is not sent spontaneously if there are no ActPosDemAbsHeat input signals within the Apartment zone

Special Features:

--

2.4.4.4 Input TempRoomDemAbsHeat

Standard Mode

DP Name:	TempRoomDemAbsHeat	Abbr.:	--	Mandatory	☒
FB Name:	HRDM			Can be internal	☐

Description

This input signal contains the room heating temperature demand (absolute value, expressed as a temperature setpoint value) of one HIRC. It is used in the HRDM to calculate the maximum demand; only temperature value, no load priority attributes etc.

Datapoint Type

DPT_Name:	DPT_Value_Temp				
DPT Format:	F_{16}	DPT_ID:	9.001		
Field	Description	Supp.	Range	Unit	Default
see LTE-HEE mode					

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

In Standard mode the number of HIRC partners of the HRDM is limited (max. number to be defined at design time of a product) because for every demand input one group object and separate group addresses must be assigned (shared variable model). N instances of this object must be implemented.

LTE-HEE mode:

FB:	**HRDM**	**LTE Client Input Name:**	**TempRoomDemAbsHeat**	Mandatory ☒ Optional ☐

Description:

This input signal contains the room heating temperature demand (absolute value, expressed as a temperature setpoint value) of the HIRC in the same apartment. On this input, demand signals of multiple HIRC are collected and the resulting max. demand is calculated. See clause 2.4.1.1

DPT:	Name	DPT_TempRoomDemAbs	DPT ID	209.101	Datatype format	$V_{16}B_8$

Field	Description	Sup.	Unit	Default
TempRoomDemAbs	requested temperature setpoint value	M	°C	cs
Attributes				
- DemValid	Validity of TempRoomDemAbs (false means also “no heat demand”)	M	bool	false
- AbsLoadPriority	set if absolute load priority is requested by the HIRC	O	bool	false
- ShiftLoadPriority	set if shift load priority is requested by the HIRC	O	bool	false
- EmergDem	set if emergency heat demand for room frost protection is requested by the HIRC	O	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment. Room(1..n). SubZone(1..n)	1.n.n
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	167 (HIRC)	Property ID:	51
LTE-Service (event):	InfoReport Sniffer	on Binding Group:		Room and Subzone
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 ☐

See clause 2.4.1.1

Special Features:

--

2.4.4.5 Input ActPosDemAbsHeat

Standard Mode

DP Name:	ActPosDemAbsHeat	Abbr.:	--	Mandatory	☒
FB Name:	HRDM			Can be internal	☐

Description

This input signal contains the heating actuator position demand (expressed as valve position setpoint, absolute value)of one HIRC. It is used in the HRDM to calculate the maximum demand;
only % value, no load priority attributes etc.

Datapoint Type

DPT_Name:	DPT_Scaling				
DPT Format:	U_8	DPT_ID:	5.001		
Field	Description	Supp.	Range	Unit	Default
see LTE-HEE mode					

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

In Standard mode the number of HIRC partners of the HRDM is limited (max. number to be defined at design time of a product) because for every demand input one group object and separate group addresses must be assigned (shared variable model). N instances of this object must be implemented.

LTE-HEE mode:

FB:	**HRDM**	**LTE Client Input Name:**	**ActPosDemAbsHeat**	Mandatory ☒ Optional ☐

Description:

This input signal contains the heating actuator position demand (expressed as valve position setpoint, absolute value) of the HIRC in the same apartment. On this input, demand signals of multiple HIRC are collected and the resulting max. demand is calculated. See clause 2.4.1.1

DPT:	Name	DPT_ ActPosDemAbs	DPT ID	207.104	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
ActPosDemAbs	Absolute actuator position demand (setpoint, valve linearized)	M	%	cs
Attributes				
- DemValid	Validity of ActPosDem (false means also “no heat demand”)	M	bool	false
- AbsLoadPriority	set if absolute load priority is requested by the HIRC	O	bool	false
- ShiftLoadPriority	set if shift load priority is requested by the HIRC	O	bool	false
- EmergDem	set if emergency heat demand for room frost protection is requested by the HIRC	O	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☒	Apartment. Room(1..n). SubZone(1..n)	1.n.n
Application Specific ☐		
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	167 (HIRC)	Property ID:	52
LTE-Service (event):	InfoReport Sniffer on Binding Group:		Room and Subzone	
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 ☐

See clause 2.4.1.1

Special Features:

--

2.4.4.6 Parameter Apartment

FB: HRDM	Property Name (Server): Apartment	Mandatory ☒ Optional ☐

Description:

LTE zone: Apartment number. The HRDM is a “Sniffer” on all Room & Subzones within the Apartment.

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Apartment number	M	1..126	--	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):	170 (HRDM)	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:

HRDM DP’s are not LTE communicating if zone is ‘OutOfService’.

2.4.4.7 Diagnostic data NumberOfHIRC

FB: HRDM	Property Name (Server): NumberOfHIRC	Mandatory ☐ Optional ☒

Description:

Total number of HIRC linked to the HRDM which are sending TempRoomDemAbsHeat or ActPosDemAbsHeat

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			full	--	0

Communication:

DP Address: (in the server)	IO Type(ID):	170 (HRDM)	Property ID:	110
	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 ☒ [1)] Act Value ☐ Default Value ☒ [1)]

[1)] Behaviur after power-up:
- the value is re-calculated staring from 0. The value is stable if all connected HIRC have sent the demand signal
  once (this may take up to 15 minutes)
– the value is stored in non volatile memory

Special Features:

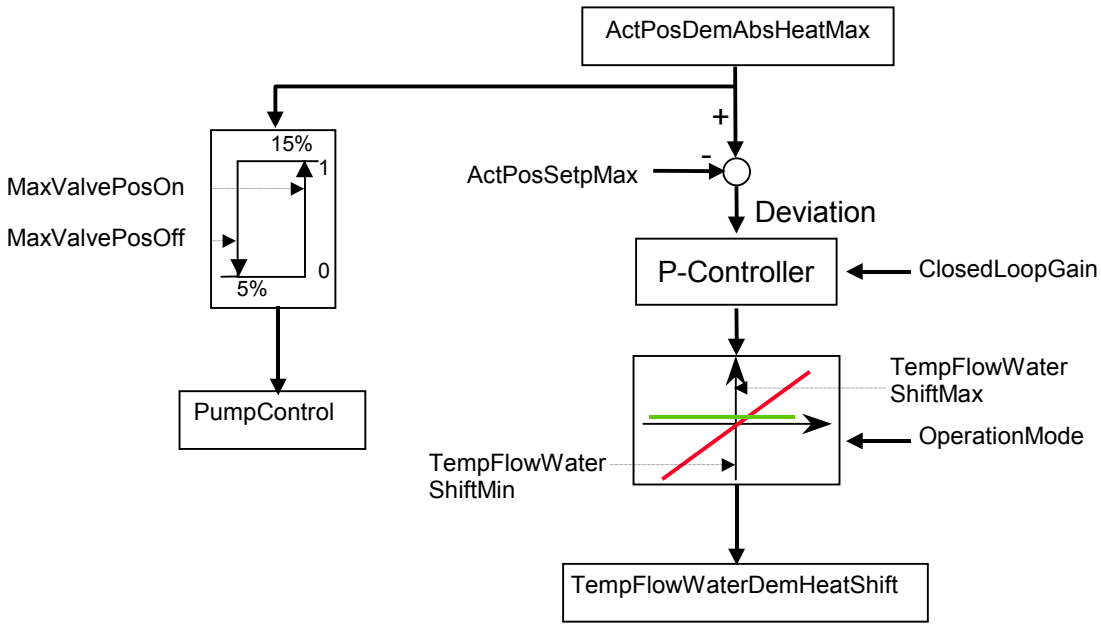
This diagnostic value can only be made available if the HRDM has a complete list of connected HIRC (directory). The implementation of a short dynamic list as described in chapter 2.4.1.1 is not sufficient.

2.5 Functional Block: Heating Demand Transformer Actuator Position (HDTACT)

2.5.1 Functional Specification

The Functional Block HDTACT gets the max. heating actuator position demand value ActPosDemAbsHeatMax from the Heating Room Demand Manager HRDM in the same apartment and calculates the resulting heating flow temperature demand delta value for the HDTRT functional block (Heat Demand Transformer Room Temperature) in the same apartment.

The HDTACT uses a control loop mechanism to calculate a delta flow temperature demand. See description in EIB ObIS model [13] "Supply Water Temperature Controller based on Evaluation of Valve Positions".



If the HDTACT does not get a valid demand from the HRDM it will set the flow temperature demand delta value to zero.

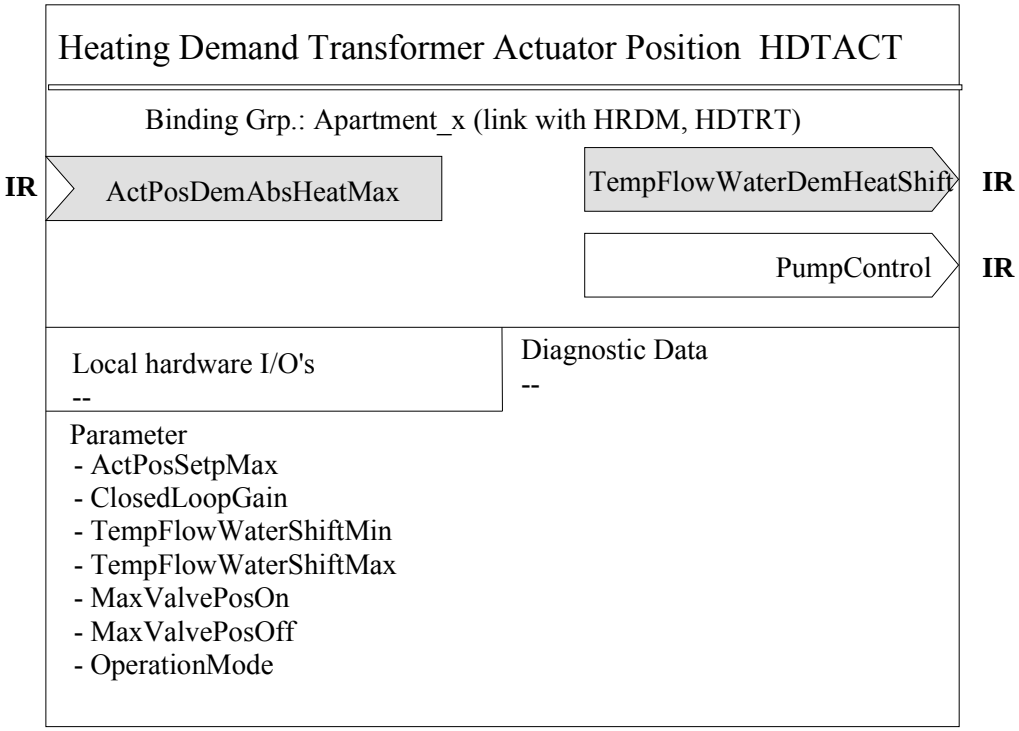
The current maximum valve position ActPosDemAbsheatMax can be used to control a circulation pump. The signal PumpControl is created using a hysteresis function. Below the value MaxValvePosOff the circulation pump may be switched off due to approximately no heat demand. Above the value MaxValvePosOn the circulation pump should run due to actual heat demand. The signal PumpControl may be used to switch a circulation pump directely or the value is used in the HDTRT to calculate the SystemPumpReq attribute in the Flow Temperaure Demand signal.

See also description of HDTRT functional block.

2.5.2 Constraints

ActPosDemAbsHeatMax signal from HRDM may contain optional load priority and emergency heat demand information which is not considered in the HDTACT. See clause2.1.3

2.5.3 Functional block diagram



2.5.4 Datapoint description

2.5.4.1 Overview

Data Point	Description	Data Point Type	DPT N°
Outputs			
TempFlowWaterDemHeatShift	Resulting heating flow temperature demand delta value / LTE and S-interface	DPT_TempHVACRel_Z DPT_Value_Tempd	205.101 9.002
PumpControl	This signal may be used to switch off a pcirculation pump if there is almost no heat demand	DPT_Switch	1.001
Inputs			
ActPosDemAbsHeatMax	Resulting maximum heating actuator position demand from HRDM / LTE and S-interface	DPT_ActPosDemAbs DPT_Scaling	207.104 5.001
Parameters			
Apartment	LTE zone: Apartment number	DPT_UcountValue8_Z	202.002
ActPosSetpMax	Set point for position control algorithm 0 -100%	DPT_Scaling	5.001
ClosedLoopGain	Closed-loop gain of the controller. Permitts the utilization of the full range of the supply water temperature as a function of the installed heating system (e.g. underfloor heating). 0.1 - 10 K/%	DPT_KelvinPerPercent	9.023
TempFlowWaterShiftMin	Lower limit of flow temperature demand shift	DPT_TempHVACRel_Z	205.101 *)
TempFlowWaterShiftMax	Upper limit of flow temperature demand shift	DPT_TempHVACRel_Z	205.101 *)
OperationMode	Used to limit the influence of actuator position on flow temperature demand delta. Used to adjust for various heating circuits.	DPT_Mode_Boiler	3.009
MaxValvePosOn	Above this value the circulation pump should run due to actual heat demand.	DPT_Scaling	5.001
MaxValvePosOff	Below this value the circulation pump may be switched off due to approximately no heat demand.	DPT_Scaling	5.001
Diagnostic Data			

*) Implementation of Properties using standard DPT see clause 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	S-Mode	Standard Mode Interface	LTE-Mode
Outputs	TempFlowWaterDemHeatShift	**GO_b**	GO	GO	M
	PumpControl	**(GO_b)**		(GO)	O
Inputs	ActPosDemAbsHeatMax	**GO_b**	GO	GO	M

Table 10: HDTACT Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	Apartment	M

Table 11: HDTACT LTE specific Properties

		Support
Parameter	ActPosSetpMax	O
	ClosedLoopGain	O
	TempFlowWaterShiftMin	O
	TempFlowWaterShiftMax	O
	OperationMode	O
	MaxValvePosOn	O
	MaxValvePosOff	O
Diagnostic Data	--	

Table 12: HDTACT Standard Properties of Interface Objects (or memory mapped DP)

2.5.4.2 Output TempFlowWaterDemHeatShift

Standard Mode

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

Description

This output signal contains a correction value to the heating flow temperature setpoint in the HDTRT. This shift value is provided by the HDTACT in order to have an optimal flow temperature according to the valve position of the connected HIRC.
This value is calculated using PID control loop mechanism according to the ActPosDemAbsHeatMax input. For further details see OBIS [13].

Datapoint Type

DPT_Name:	DPT_Value_Tempd				
DPT Format:	F_{16}	DPT_ID:	9.002		
Field	Description	Supp.	Range	Unit	Default
			–10 + 30 [1)]	K	0

Access Type

♦ Output

this → M	☐	this → 1	☒				
Spontaneous	☒	COV:	☒	Δ-Value:	2 K	Min repetition period:	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)] Range limitation only in mixed installations with bus controlled valves and stand alone valves. Otherwise the full temperature range is allowed.

LTE-HEE mode:

FB: HDTACT	**LTE Server Output Name:** TempFlowWaterDemHeatShift	Mandatory ☒ Optional ☐

Description:

This output signal contains a correction value to the heating flow temperature setpoint in the HDTRT. This shift value is provided by the HDTACT in order to have an optimal flow temperature according to the valve position of the connected HIRC in the same apartment.
This value is calculated using PID control loop mechanism according to the ActPosDemAbsHeatMax input. For further details see OBIS [13].
If all HIRC have no heat demand (e.g. ActPosDemAbsHeatMax is below a certain limit) the TempFlowWaterDemHeatShift output has the status 'OutOfService'. This indicates that no heat is requested.

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

Field	Description	Sup.	Range	Unit	COV	Default
Temperature	flow temperature setpoint shift value	M	–10 + 30 [1)]	K	2	cs
Attributes						
- OutOfService	false = shift value is active, heat is requested (demand) true = shift value is void, no heat demand	M	true/false	bool	Y	true
- all other flags	not supported	NA				

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	169 (HDTACT)	Property ID:	51	
LTE-Services (event):	COV ☒	MinRepTime:	10 sec	Heartbeat:	15 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:	Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒		Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1)] Range limitation only in mixed installations with bus controlled valves and stand alone valves. Otherwise the full temperature range is allowed.

2.5.4.3 Output PumpControl

Standard Mode

DP Name:	PumpControl	Abbr.:	--	Mandatory	☐
FB Name:	HDTACT			Can be internal	☒

Description

This signal indicates if a circulation pump may be switched off due to very low heat demand (if all valves are almost closed)

Datapoint Type

DPT_Name:	DPT_Switch				
DPT Format:	B_1	DPT_ID:	1.001		
Field	Description	Supp.	Range	Unit	Default
					on

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:

FB: HDTACT	**LTE Server Output Name:** PumpControl	Mandatory ☐ Optional ☒

Description:

This signal indicates if a circulation pump may be switched off due to very low heat demand (if all valves are almost closed)

DPT:	Name	DPT_Switch	DPT ID	1.001	Datatype format	B_1

Field	Description	Sup.	Range	Unit	COV	Default
				bool	--	on

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	169 (HDTACT)	Property ID:	52
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 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: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

--

2.5.4.4 Input ActPosDemAbsHeatMax

Standard Mode

DP Name:	ActPosDemAbsHeatMax	Abbr.:	--	Mandatory	☒
FB Name:	HDTACT			Can be internal	☒

Description

This signal from HRDM contains the maximum heating actuator position demand of the linked HIRC expressed as linearized valve position setpoint (absolute value). It is used in the HDTACT to calculate the delta flow temperature demand TempFlowWaterDemHeatShift;
only % value, no load priority attributes etc.
This datapoint corresponds to the VPmax object in the ObIS [13]

Datapoint Type

DPT_Name:	DPT_Scaling				
DPT Format:	U_8	DPT_ID:	5.001		
Field	Description	Supp.	Range	Unit	Default
see LTE-HEE mode					

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:	**HDTACT**	**LTE Client Input Name:**	**ActPosDemAbsHeatMax**	Mandatory ☒ Optional ☐

Description:

This signal from HRDM contains the maximum heating actuator position demand of the HIRC in the same apartment expressed as linearized valve position setpoint (absolute value). It is used in the HDTACT to calculate the delta flow temperature demand TempFlowWaterDemHeatShift

DPT:	Name	DPT_ActPosDemAbs	DPT ID	207.104	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
ActPosDemAbs	Absolute actuator position demand (setpoint, valve linearized)	M	%	cs
Attributes				
- DemValid	Validity of ActPosDem (false means also “no heat demand”)	M	bool	false
- AbsLoadPriority	set if absolute load priority is requested by the HIRC	O	bool	false
- ShiftLoadPriority	set if shift load priority is requested by the HIRC	O	bool	false
- EmergDem	set if emergency heat demand for room frost protection is requested by the HIRC	O	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	170 (HRDM)	Property ID:	52
LTE-Service (event):	InfoReport Sniffer	on Binding Group:		Room and Subzone
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 ☐

--

Special Features:

If DemValid = false (no demand) the Status Attribute ‘OutOfService’ is set in the output TempFlowWaterDemHeatShift. This indicates that the HIRC system is not requesting heat.
‘AbsLoadPriority’, ‘ShiftLoadPriority’ and ‘EmergDem’ attributes are not relevant for HDTACT and usually ignored
This input can be internal.

2.5.4.5 Parameter Apartment

FB: HDTACT	Property Name (Server): Apartment	Mandatory ☒ Optional ☐

Description:

LTE zone: Apartment number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Apartment number	M	1..126	--	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):	169 (HDTACT)	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:

HDTACT DP's are not LTE communicating if zone is 'OutOfService'.

2.5.4.6 Parameter ActPosSetpMax

FB: HDTACT	Property Name (Server): ActPosSetpMax	Mandatory ☐ Optional ☒

Description:

The setpoint maximum valve position is optimized for the room with the greatest heat demand. This parameter depends on the kind of the used radiator valves resp. their characteristic and of the kind of the installed heating system (e.g. condensing technology boiler)
This datapoint corresponds to the VPSmax parameter in the ObIS [13]

DPT:	Name	DPT_Scaling	DPT ID	5.001	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			1..100 %	%	50%

Communication:

DP Address: (in the server)	IO Type(ID):	169 (HDTACT)	Property ID:	110
	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:

--

2.5.4.7 Parameter ClosedLoopGain

FB: HDTACT	Property Name (Server): ClosedLoopGain	Mandatory ☐ Optional ☒

Description:

Closed-loop gain of the controller. Permitts the utilization of the full range of the supply water temperature as a function of the installed heating system (e.g. underfloor heating).
This datapoint corresponds to the CLG parameter in the ObIS [13]

DPT:	Name	DPT_KelvinPerPercent	DPT ID	9.023	Datatype format	F_{16}

Field	Description	Sup.	Range	Unit	Default
			0.1 - 10	K/%	0.5

Communication:

DP Address:	IO Type(ID):	169 (HDTACT)	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:

--

2.5.4.8 Parameter TempFlowWaterShiftMin

FB: HDTACT	Property Name (Server): TempFlowWaterShiftMin	Mandatory ☐ Optional ☒

Description:

Lower limit of delta supply water temperature depending on the mode of operation.
Example: In a given installation there are rooms equipped with and without RTC's. Heat demand of rooms without RTC will not be detected. Thus this parameter limits the decrease of the supply water temperature to ensure heat supply for all rooms.
This datapoint corresponds to the LLdTsw parameter in the ObIS [13]

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

Field	Description	Sup.	Range	Unit	Default
Temp	flow temperature setpoint shift value	M	cs	K	-10
Status				bitset	
- OutOfService	no min. limitation	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	set parameter inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	169 (HDTACT)	Property ID:	112
(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:

--

2.5.4.9 Parameter TempFlowWaterShiftMax

FB: HDTACT	Property Name (Server): TempFlowWaterShiftMax	Mandatory ☐ Optional ☒

Description:

Upper limit of delta supply water temperature to ensure control accurancy (to avoid overshoot).
This datapoint corresponds to the ULdTsw parameter in the ObIS [20

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

Field	Description	Sup.	Range	Unit	Default
Temp	flow temperature setpoint shift value	M	cs	K	30
Status - OutOfService - all other flags	 no min. limitation not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 set parameter inactive / active not supported	 M O NA		enum	

Communication:

DP Address:	IO Type(ID):	169 (HDTACT)	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:

--

2.5.4.10 Parameter MaxValvePosOn

FB: HDTACT	Property Name (Server): MaxValvePosOn	Mandatory ☐ Optional ☒

Description:

Above this value the circulation pump should run due to actual heat demand.
This datapoint corresponds to the MaxVPon parameter in the ObIS [13]

DPT:	Name	DPT_Scaling	DPT ID	5.001	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			1..100 %	%	15%

Communication:

DP Address:	IO Type(ID):	169 (HDTACT)	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:

--

2.5.4.11 Parameter MaxValvePosOff

FB: HDTACT	Property Name (Server): MaxValvePosOff	Mandatory ☐ Optional ☒

Description:

Below this value the circulation pump may be switched off due to approximately no heat demand.
This datapoint corresponds to the MaxVPoff parameter in the ObIS [13]

DPT:	Name	DPT_Scaling	DPT ID	5.001	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			1..100 %	%	5%

Communication:

DP Address: (in the server)	IO Type(ID):	169 (HDTACT)	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:

--

2.5.4.12 Parameter OperationMode

FB: HDTACT	Property Name (Server): OperationMode	Mandatory ☐ Optional ☒

Description:

See below
This datapoint corresponds to the BC parameter in the ObIS [13]

DPT:	Name	DPT_Mode_Boiler	DPT ID	3.009	Datatype format	B_1B_3

Field	Description	Sup.	Range	Unit	Default
			--	--	--

Communication:

DP Address: (in the server)	IO Type(ID):	169 (HDTACT)	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:

--

Description:

7	6	5	4	3	2	1	0
0	0	0	0	setpoint mode 0=fixed 1=calculated	Mode 2	Mode 1	Mode 0
					Mode of Operation		

Boiler control is a “write only” parameter in which only bits 0 to 2 can be modified. Bit 3 of the DPT is unused in this context. Bits 4 to 7 are always zero.

Setpoint Mode: unused, always zero

Mode of Operation

1 Mode of Operation “0”: the electronic heat demand control is not active (horizontal curve); the supply water temperature is determined by the heating curve, the circulation pump is ON (mode “0” is offered to enable outdoor temperature controlled supply water temperature)

2 Mode of Operation “1”: the electronic heat demand control is active; the negative delta is set to 0, the max. positive delta is a parameter to be entered; the electronic room temperature control determines the supply water temperature in the right (positive) branch of the curve; the heating curve determines the supply water temperature in the left (negative) branch of the curve; the circulation pump is ON (mode “1” is recommended for mixed installations to avoid too low supply water temperature).

3 Mode of Operation “2”: the electronic heat demand control is active; the max. positive and the max. negative delta are parameters to be entered; the supply water temperature is determined by the electronic room temperature control (mode “2” is the standard mode for optimal energy savings).

2.6 Functional Block: Heating Demand Transformer Room Temperature (HDTRT)

2.6.1 Functional Specification

The purpose of this functional block is to transform the heating demand of an apartment to the corresponding heating flow temperature demand TempFlowWaterDemAbsHDTRT in its Heat DistributionSegment.

The HDTRT uses two alternative inputs for calculation. It gets either:

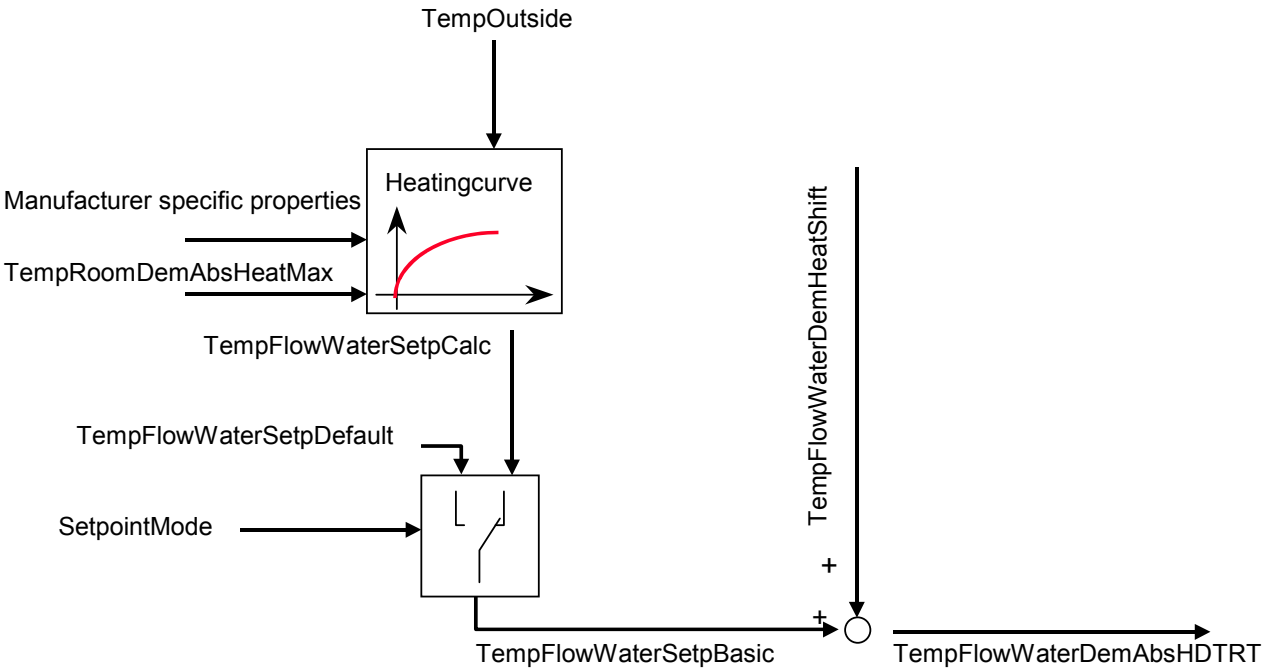
- the max. room heating temperature demand TempRoomDemAbsHeatMax from the Heating Room Demand Manager HRDM in the same apartment or
- the flow temperature demand delta value TempFlowWaterDemHeatShift from the HDTACT in the same apartment

Which input channel is active, depends on the method of heat demand calculation in the apartment. The heat demand of an apartment may be expressed either as a room temperature setpoint or a valve position setpoint (which is mapped in the HDTACT to a flow temperature delta value).
=> see clause 2.1.2

Mix of both methods within one apartment is not allowed ! This shall be ensured by the installer.
If both methods are mixed within one Apartment and both types of demand input signals are received by the HDTRT, the resulting heat demand depends on manufacturer specific implemetation.

The resulting heating flow temperature demand (absolute value) is sent to the Heating Flow Demand Manager HFDM in the corresponding Heat Distribution Segment.

Heat demand calculation (illustrative example):



The HDTRT determines the basic setpoint TempFlowWaterSetpBasic for the flow temperature demand using either a default value TempFlowWaterSetpDefault or via a heating curve or similar function (depending on parameter SetpointMode). The flow temperature demand delta value TempFlowWaterDemHeatShift from the HDTACT is added to the flow temperature basic setpoint. So the flow temperature demand is changed depending on the current energy consumption (valve position or max. room temperature setpoint) of the individual rooms.

- If TempFlowWaterSetpDefault is used for the basic setpoint, the TempRoomDemAbsHeatMax input has no influence => to be used together with valve position mechanism only
- If HDTRT gets the room temperature demand TempRoomDemAbsHeatMax from HRDM, the corresponding flow temperature demand TempFlowWaterSetpCalc is calculated. The Outside Temperature input is usually required for transformation of room temperature demand into TempFlowWaterSeptCalc using a heating curve.
  If the TempRoomDemAbsHeatMax contains the attribute 'No Demand', the resulting TempFlowWaterDemAbsHDTRT signal will also have the attribute set to 'no demand'.
- If HDTRT gets the flow temperature demand delta value TempFlowWaterDemHeatShift from HDTACT, the basic setpoint value is set to the TempFlowWaterSetpDefault or is depending on a manufacturer specific heating curve and the delta value is added.
  If TempFlowWaterDemHeatShift is 'OutOfService' the resulting TempFlowWaterDemAbsHDTRT signal will also have the attribute set to 'no demand'.
- If the HDTRT does not get any demand either from HRDM or HDTACT in the apartment, it will set the resulting TempFlowWaterDemAbsHDTRT signal attribute to 'no demand'.

Absolute load priority and shift load priority:

- attributes are contained in the TempRoomDemAbsHeatMax signal and are copied to TempFlowWaterDemAbsHDTRT signal.
- attributes are contained in the ActPosDemAbsHeatMax (optionally supported, normally LTE-HEE only) and are copied to TempFlowWaterDemAbsHDTRT signal.

Emergency heat demand:

- 'EmergDem' attribute is contained in the TempRoomDemAbsHeatMax signal and is copied to TempFlowWaterDemAbsHDTRT signal.
- 'EmergDem' attribute is contained in the ActPosDemAbsHeatMax (optionally supported, normally LTE-HEE only) and is copied to TempFlowWaterDemAbsHDTRT signal.

Max temperature limit:
The corresponding attribute in the TempFlowWaterDemAbsHDTRT signal can be set if necessary (manufacturer specific function)

SystemPumpReq:
The input signal PumpControl from HDTACT may be used to in the HDTRT to calculate the SystemPumpReq attribute in the TempFlowWaterDemAbsHDTRT signal.

Handling of Forcing/locking Signals and StatusHPM:
The forcing and locking signals from HPM and HFDM as well as StatusHPM are received from the Heating Flow Demand Manager HFDM and transferred to the individual room control blocks of one apartment. These signals are transparently routed by the HDTRT to the binding group 'Apartment' without changing of datapoint values or datapoint addressing. I.e. only the binding group (LTE-HEE) is changed by the HDTRT. Because of this routing mechanism, the HIRC do not need to know to which 'ProdSegmH' resp. 'DistrSegmH' they are connected

Since the HDTRT has no built-in pre-controller functionality these signals have no functional effect on the HDTRT itself.

2.6.2 Constraints

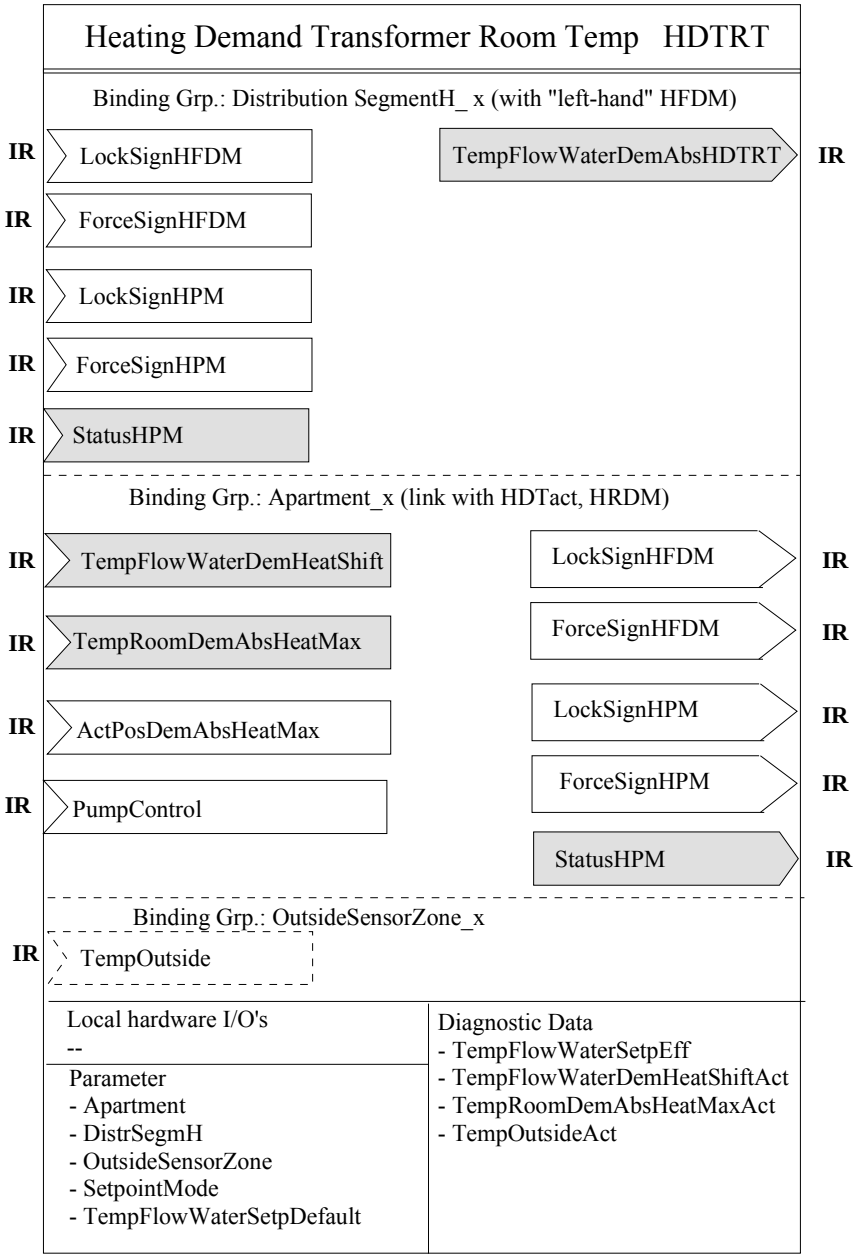
For each apartment there must be one HDTRT and one HRDM. For each apartment there may also be one optional HDTACT. If an apartment has different types of heating loops, they must be handled like different apartments, if the heating loop characteristic shall be considered in the HDTRT.

The HDTRT functional block may be located in a device at the apartment level or at the producer level or in both type of devices. In small applications (only one apartment or heating loop) this block is typically located in the boiler control device. In applications with several apartments and different types of heating loops these blocks are typically located in the pre-control devices.
Since the HDTRT is often combined with other functional blocks in one device the data flow may be device internal only.

IMPORTANT: reporting of the Heat Demand signal TempFlowWaterDemAbsHDTRT by the HDTRT 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 HDTRT functional block offer a bus-link to a demand dependent heat distribution (HFDM) and heat production system (HPM).
In Standard Mode implementations for small systems (e.g. according to ObIS Model **[13]**) the HDTRT is usually implemented in the Boiler (same device including HFDM, HPM and BOC). In this case the data flow from HDTRT to HFDM is device internal.

2.6.3 Functional block diagram



2.6.4 Datapoint description

2.6.4.1 Overview

Data Point	Description	Data Point Type	DPT N°
Outputs			
TempFlowWaterDemAbsHDTRT	Flow temperature demand of the HDTRT to be sent to the allocated HFDM	DPT_ TempFlowWaterDemAbs	210.100
StatusHPM	routed status information from HPM to the Apartment	DPT_StatusHPM	209.100
LockSignHPM	routed locking signal from HPM to the Apartment => consumers reduce energy consumption	DPT_LockSign	207.101
ForceSignHPM	routed forcing signal from HPM to the Apartment to force the consumers to increase energy consumption	DPT_ForceSign	21.100
LockSignHFDM	routed locking signal from HFDM to the Apartment for loadmanagement in the Heat Distribution Segment, to force the consumers to reduce energy consumption	DPT_LockSign	207.101
ForceSignHFDM	routed forcing signal from HFDM to the Apartment in case of overheat/oversupply in the HFDM, to force the consumers to consume energy	DPT_ForceSign	21.100
Inputs			
StatusHPM	Status information from 'Producer Manager'	DPT_StatusHPM	209.100
ForceSignHPM	Forcing signal from HPM due to overheat, to force the consumers to consume energy => to be routed to the Apartment	DPT_ForceSign	21.100
LockSignHPM	Locking signal from HPM due to boiler overload, to force the consumers to reduce energy consumption => to be routed to the Apartment	DPT_LockSign	207.101
ForceSignHFDM	Forcing signal from HFDM in the Heat Distribution Segment => to be routed to the Apartment	DPT_ForceSign	21.100
LockSignHFDM	Locking signal from HFDM in the Heat Distribution Segment => to be routed to the Apartment	DPT_LockSign	207.101
PumpControl	This signal may be used to control the SystemPumpReq attribute in the TempFlowWaterDemAbsHDTRT signal	DPT_Switch	1.001
TempRoomDemAbsHeatMax	Resulting maximum heating room temperature demand from HRDM / LTE and S-interface	DPT_TempRoomDemAbs DPT_Value_Temp	209.101 9.001
ActPosDemAbsHeatMax	Resulting maximum heating actuator position demand (contains load priority information LTE only)	DPT_ActPosDemAbs	207.104
TempFlowWaterDemHeatShift	heating flow temperature demand delta value from HDTACT / LTE and S-interface	DPT_TempHVACRel_Z DPT_Value_Tempd	205.101 9.002
TempOutside	Current outside temperature / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001

Data Point	Description	Data Point Type	DPT N°
Parameters			
Apartment	LTE zone: Apartment number	DPT_UcountValue8_Z	202.002
DistrSegmH	LTE zone: number of the Heat Distribution Segment	DPT_UcountValue8_Z	202.002
OutsideSensorZone	LTE zone for external Outside temperature sensor	DPT_UcountValue8_Z	202.002
SetpointMode	selects fixed basic flow temperature setpoint or outside temperature dependent: Fixed / Calculated	DPT_InputSource	1.014
TempFlowWaterSetpDefault	Default flow temperature setpoint instead of outside temperature dependent flow temp.	DPT_TempHVACAbs	205.100 *)
Diagnostic Data			
TempFlowWaterSetpEff	calculated flow temperature setpoint	DPT_TempHVACAbs	205.100 *)
TempFlowWaterDemHeatShiftAct	Actual local copy of the flow temperature setpoint shift value from HDTACT	DPT_TempHVACRel	205.101 *)
TempRoomDemAbsHeatMaxAct	Actual local copy of the room temperature demand used for flow temperature setpoint calculation	DPT_TempRoomDemAbs	209.101 *)
TempOutsideAct	Actual local copy of the outside temperature used by the HDTRT	DPT_TempHVACAbs	205.100 *)

*) Implementation of Properties using standard DPT see clause 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	S-Mode	Standard Mode Interface	LTE-Mode
Outputs	TempFlowWaterDemAbsHDTRT	**NA** [1)]	NA	NA	M
	StatusHPM	**NA** [2)]	NA	NA	M
	ForceSignHFDM	**NA** [2)]	NA	NA	O
	LockSignHFDM	**NA** [2)]	NA	NA	O
	ForceSignHPM	**NA** [2)]	NA	NA	O
	LockSignHPM	**NA** [2)]	NA	NA	O
Inputs	TempFlowWaterDemHeatShift	**GO_b**	GO	GO	M
	TempRoomDemAbsHeatMax	**GO_b**	GO	GO	M
	ActPosDemAbsHeatMax	**NA** [3)]	NA	NA	O
	StatusHPM	**NA** [2)]	NA	NA	M
	ForceSignHFDM	**NA** [2)]	NA	NA	O
	LockSignHFDM	**NA** [2)]	NA	NA	O
	ForceSignHPM	**NA** [2)]	NA	NA	O
	LockSignHPM	**NA** [2)]	NA	NA	O
	PumpControl	**(GO_b)**		(GO)	O
	TempOutside	**(GO_b)**		(GO)	O

[1)] the information is NA in the Basic FB and all other modes because the datapoint type is today not yet available in standard mode. Splitting of DPT is not possible because of necessary data consistency
[2)] Reason: routing of datapoint is only useful in LTE-HEE, not necessary in standard mode
[3)] Implementation of this input is not useful in standard modes because this input may be used only to set attributes in TempFlowWaterDemAbsHDTRT signal which is not available in standard mode

Table 13: HDTRT Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	Apartment	M
	DistrSegmH	M
	OutsideSensorZone	O

Table 14: HDTRT LTE specific Properties

		Support
Parameter	TempFlowWaterSetpDefault	O
	SetpointMode	O
Diagnostic Data	TempFlowWaterSetpEff	O
	TempFlowWaterDemHeatShiftAct	O
	TempRoomDemAbsHeatMaxAct	O
	TempOutsideAct	O

Table 15: HDTRT Standard Properties of Interface Objects (or memory mapped DP)

2.6.4.2 Output TempFlowWaterDemAbsHDTRT

Standard Mode

Not applicable

LTE-HEE mode:

FB: HDTRT	LTE Server Output Name:	TempFlowWaterDemAbsHDTRT	Mandatory ☒ Optional ☐

Description:

This output signal contains the calculated flow temperature demand (absolute value) of the HDTRT. It is sent to the HFDM in the corresponding Heat Distribution Segment. Calculation of the flow temperature demand: see clause 2.6.1

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

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowDem	requested flow temperature	M	full range	°C	2	cs
Attributes						
- DemValid	Validity of TempFlowDem (false means also “no heat demand”)	M	true/false	bool	Y	false
- AbsLoadPriority	set if absolute load priority is requested by the HDTRT and the corresponding HIRC heating system (usually not applicable)	O	true/false	bool	Y	false
- ShiftLoadPriority	set if shift load priority is requested by the HDTRT and the corresponding HIRC heating system (usually not applicable)	O	true/false	bool	Y	false
- MaxTempLimit	set if flow temp. in the Heat Distribution Segment must be limited to max. value (normally not the case for HDTRT)	O	true/false	bool	Y	false
- MinTempLimit	for cold water only	NA	false	bool	N	false
- DHWReq	for DHW only	NA	false	bool	N	false
- RoomCtrlReq	indicates that a room heating circuit has heat demand	M	true/false	bool	Y	false
- VentReq	for Ventilation only	NA	false	bool	N	false
- AuxAllSeasonReq	for auxiliary heat consumer only	NA	false	bool	N	false
- SystemPumpReq	request for water circulation in the distribution segment (common system pump on)	O	true/false	bool	Y	false
- EmergDem	set if emergency heat demand for room frost protection is requested by the HDTRT and the corresponding HIRC heating system	O	true/false	bool	Y	false
- DHWLegioReq	for DHW only	NA	false	bool	N	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	151 (HDTRT)	Property ID:	51
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling:	Save at Powerdown ☐

--

Special Features:
--

2.6.4.3 Output StatusHPM

Standard Mode

Not applicable

LTE-HEE mode:

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

Description:

Signal from HPM routed to the 'Apartment' zone. Data value is unchanged. See clause 2.6.1 and HPM specification

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

Field	Description	Sup.	Range	Unit	COV	Default
see HPM specification						

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 136 (HPM)		Property ID: 51	
LTE-Services (event):	COV ☒	MinRepTime: [2] 10 sec	Heartbeat: [2] 15 min	
InfoReport ☒ (~~LTE Read-Response polling of the output shall always be supported~~) [1]	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 ☐ [1]	Read/Write ☐		

Exception Handling:	Save at Powerdown ☐
--	

Special Features:

[1] no storage of the signal in the HDTRT (only routing) therefore read-access from the HDTRT is not supported

[2] transmission depends on reception of the signal (routing functionality)

2.6.4.4 Output ForceSignHPM

Standard Mode

Not applicable

LTE-HEE mode:

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

Description:

Signal from HPM routed to the 'Apartment' zone. Data value is unchanged. See clause 2.6.1 and HPM specification. Routing functionality is optional and may be enabled / disabled by a company specific parameter according to the installation needs.

DPT:	Name	DPT_ForceSign	DPT ID	21.100	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
see HPM specification						

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	136 (HPM)	Property ID:	53
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat: 3 [2] min	
InfoReport ☒ (~~LTE Read Response polling of the output shall always be supported~~) [1]	Output per default communicating ☐	Binding Group Wildcard allowed ☐		
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: [2] Stored Value ☐	Act Value ☐	Default Value ☐	
Property-Service (individual access):	Read only [1] ☐	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1] no storage of the signal in the HDTRT (only routing) therefore read-access from the HDTRT is not supported

[2] transmission depends on reception of the signal (routing functionality)

2.6.4.5 Output LockSignHPM

Standard Mode

Not applicable

LTE-HEE mode:

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

Description:

Signal from HPM routed to the 'Apartment' zone. Data value is unchanged. See clause 2.6.1 and HPM specification. Routing functionality is optional and may be enabled / disabled by a company specific parameter according to the installation needs.

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

Field	Description	Sup.	Range	Unit	COV	Default
see HPM specification						

Communication:

Binding Group:

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

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

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1] no storage of the signal in the HDTRT (only routing) therefore read-access from the HDTRT is not supported

[2]) transmission depends on reception of the signal (routing functionality)

2.6.4.6 Output signal: LockSignHFDM

Standard Mode

Not applicable

LTE-HEE mode:

FB: **HDTRT**	**LTE Server Output Name:** **LockSignHFDM**						Mandatory ☐ Optional ☒
Description:							
see clause 2.6.1 and HFDM Specification							
DPT: Name	DPT_LockSign	DPT ID	207.101	Datatype format	U_8B_8		
Field	Description	Sup.	Range	Unit	COV	Default	
see HFDM specification							
Communication:							
Binding Group:							
Class	Type				Default		
Geographical ☐							
Application Specific ☒	Apartment.*.*				1.*.*		
Unassigned ☐	Broadcast ☐ Configurable ☐						
DP Address:	IO Type(ID): 144 (HFDM) Property ID: 52						
LTE-Services (event): InfoReport ☒ ~~(LTE Read-Response polling of the output shall always be supported)~~	COV ☒ MinRepTime: 10 sec Heartbeat: 3 [2] min						
	Output per default communicating ☐	Binding Group Wildcard allowed ☐					
	Tx Prio: High ☐ Normal ☒ Low ☐						
	Transm after Powerup: [2] Stored Value ☐ Act Value ☐ Default Value ☐						
Property-Service (individual access):	Read only ☐ [1] Read/Write ☐						
Exception Handling:							Save at Powerdown ☐
--							
Special Features:							
[1] no storage of the signal in the HDTRT (only routing) therefore read-access from the HDTRT is not supported [2]) transmission depends on reception of the signal (routing functionality)							

2.6.4.7 Output ForceSignHFDM

Standard Mode

Not applicable

LTE-HEE mode:

FB: **HDTRT**	**LTE Server Output Name:** **ForceSignHFDM**	Mandatory ☐ Optional ☒

Description:

see clause 2.6.1 and HFDM Specification

DPT:	Name	DPT_ForceSign	DPT ID	21.101	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
see HFDM specification						

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	144 (HFDM)	Property ID:	53
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat: 3 [2] 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: [2] Stored Value ☐	Act Value ☐	Default Value ☐	
Property-Service (individual access):	Read only [1] ☐	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1] no storage of the signal in the HDTRT (only routing) therefore read-access from the HDTRT is not supported

[2] transmission depends on reception of the signal (routing functionality)

2.6.4.8 Input TempFlowWaterDemHeatShift

Standard Mode:

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

Description

This mandatory input signal from HDTACT contains a correction value to the heating flow temperature setpoint in the HDTRT. This shift value is provided by the HDTACT in order to have an optimal flow temperature according to the valve positions in the heating IRC system of one apartment. Handling of the input value: see clause 2.6.1

Datapoint Type

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

Access Type

♦ Input

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

--

LTE-HEE Mode Interface:

FB:	**HDTRT**	**LTE Client Input Name:**	**TempFlowWaterDemHeatShift**	Mandatory ☒ Optional ☐

Description:

This input signal from HDTACT contains a correction value to the heating flow temperature setpoint in the HDTRT. This shift value is provided by the HDTACT in order to have an optimal flow temperature according to the valve position of the connected HIRC in the same apartment. If all HIRC have no heat demand (e.g. ActPosDemAbsHeatMax is below a certain limit) the TempFlowWaterDemHeatShift output has the status 'OutOfService'. This indicates that no heat is requested. Handling of the input value: see clause 2.6.1

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

Field	Description	Sup.	Unit	Default
Temperature	flow temperature setpoint shift value	M	K	--
Status	standard Status attributes	M	bitset	
- OutOfService	false = shift value is active, heat is requested (demand) true = shift value is void, no heat demand	M		true
- all flags	not supported, can be ignored	NA	bool	

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	169 (HDTACT)	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 Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This input can be internal

2.6.4.9 Input TempRoomDemAbsHeatMax

Standard Mode

DP Name:	TempRoomDemAbsHeatMax	Abbr.:	--	Mandatory	☒
FB Name:	HDTRT			Can be internal	☒

Description

This input signal contains the resulting maximum room heating temperature demand (absolute value, expressed as a room temperature setpoint value) of one apartment, which was calculated by the HRDM in the same apartment. This room temperature demand is mapped by the HDTRT to the corresponding flow temperature demand in the Heat Distribution Segment. See clause 2.6.1

Datapoint Type

DPT_Name:	DPT_Value_Temp				
DPT Format:	F_{16}	DPT_ID:	9.001		
Field	Description	Supp.	Range	Unit	Default
			full	°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:	**HDTRT**	**LTE Client Input Name:**	**TempRoomDemAbsHeatMax**	Mandatory ☒ Optional ☐

Description:

This input signal contains the resulting maximum room heating temperature demand (absolute value, expressed as a room temperature setpoint value) of one apartment, which was calculated by the HRDM in the same apartment. This room temperature demand is mapped by the HDTRT to the corresponding flow temperature demand in the Heat Distribution Segment. See clause 2.6.1

DPT:	Name	DPT_TempRoomDemAbs	DPT ID	209.101	Datatype format	$V_{16}B_8$

Field	Description	Sup.	Unit	Default
TempRoomDemAbs	requested temperature setpoint value	M	°C	cs
Attributes				
- DemValid	Validity of TempRoomDemAbs (false means also “no heat demand”)	M	bool	false
- AbsLoadPriority	set if absolute load priority is requested by the HIRC	O	bool	false
- ShiftLoadPriority	set if shift load priority is requested by the HIRC	O	bool	false
- EmergDem	set if emergency heat demand for room frost protection is requested by one or more HIRC	O	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	170 (HRDM)	Property ID:	51
LTE-Service (event):	InfoReport Sniffer	on Binding Group:		Room and Subzone
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 ☐

--

Special Features:

This input can be internal

2.6.4.10 Input PumpControl

Standard Mode

DP Name:	PumpControl	Abbr.:	--	Mandatory	☐
FB Name:	HDTRT			Can be internal	☒
Description					
see LTE-HEE Mode					
Datapoint Type					
DPT_Name:	DPT_Switch				
DPT Format:	B_1	DPT_ID:	1.001		
Field	Description	Supp.	Range	Unit	Default
see LTE-HEE mode					
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: HDTRT	LTE Client Input Name: PumpControl	Mandatory ☐ Optional ☒

Description:

Input signal from HDTACT which indicates whether water circulation is necessary or not (according to current valve positions) => this signal may be used to set the attribute SystemPumpReq in the TempFlowWaterDemAbsHDTRT signal. To be used together with HDTACT / valve position mechanism only

DPT:	Name	DPT_Switch	DPT ID	1.001	Datatype format	B_1

Field	Description	Sup.	Unit	Default
			bool	on

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	169 (HDTACT)	Property ID:	52
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:		Room and Subzone	
	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

2.6.4.11 Input StatusHPM

Standard Mode

Not applicable

LTE-HEE mode:

- same as StatusHPM input on HZC
- the datapoint value is transparently routed to the Apartment zone => StatusHPM output

2.6.4.12 Input LockSignHPM

Standard Mode

Not applicable

LTE-HEE mode:

- same as LockSignHPM input on HZC
- the datapoint value is transparently routed to the Apartment zone => LockSignHPM output

2.6.4.13 Input ForceSignHPM

Standard Mode

Not applicable

LTE-HEE mode:

- same as ForceSignHPM input on HZC
- the datapoint value is transparently routed to the Apartment zone => ForceSignHPM output

2.6.4.14 Input LockSignHFDM

Standard Mode

Not applicable

LTE-HEE mode:

- same as LockSignHFDM input on HZC
- the datapoint value is transparently routed to the Apartment zone => LockSignHFDM output

2.6.4.15 Input ForceSignHFDM

Standard Mode

Not applicable

LTE-HEE mode:

- same as ForceSignHFDM input on HZC
- the datapoint value is transparently routed to the Apartment zone => ForceSignHFDM output

2.6.4.16 Input TempOutside

Standard Mode: see description in functional Block BOC

LTE-HEE mode:

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

Description:

Outside temperature from a remote outside temperature sensor can be used for flow temperature setpoint / demand calculation using a heat curve. See clause 2.6.1.

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	--
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 ☒	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 ☐

The HDTRT 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 behavior)

Special Features:

This input can be internal

2.6.4.17 Input ActPosDemAbsHeatMax

Standard Mode

Not applicable

(not useful)

LTE-HEE mode:

FB: HDTACT	**LTE Client Input Name:** ActPosDemAbsHeatMax	Mandatory ☐ Optional ☒

Description:

This signal from HRDM contains the maximum heating actuator position demand of the linked HIRC expressed as linearized valve position setpoint (absolute value) and load priority attributes. It can be used in the HDTRT to set the load priority and emergency heat demand attributes in the TempFlowWaterDemAbsHDTRT signal

DPT:	Name	DPT_ActPosDemAbs	DPT ID	207.104	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
ActPosDemAbs	Absolute actuator position demand (setpoint, valve linearized)	M	%	cs
Attributes				
- DemValid	Validity of ActPosDem (false means also “no heat demand”)	M	bool	false
- AbsLoadPriority	set if absolute load priority is requested by the HIRC	O	bool	false
- ShiftLoadPriority	set if shift load priority is requested by the HIRC	O	bool	false
- EmergDem	set if emergency heat demand for room frost protection is requested by one or more HIRC	O	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	170 (HRDM)	Property ID:	52
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:		Room and Subzone	
	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

2.6.4.18 Parameter Apartment

FB: HDTRT	Property Name (Server): Apartment	Mandatory ☒ Optional ☐

Description:

LTE zone: Apartment number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Apartment number	M	1..126	--	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):	151 (HDTRT)	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:

HDTRT DP's are not LTE communicating in the Apartment zone if zone is 'OutOfService'.

2.6.4.19 Parameter DistrSegmH

FB: HDTRT	Property Name (Server): DistrSegmH	Mandatory ☒ Optional ☐

Description:

LTE zoning information : link with the HFDM in the corresponding 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 Distribution Segment 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):	151 (HDTRT)	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:

HDTRT DP's on the Heat Distribution Segment are not LTE communicating if zone is 'OutOfService'

2.6.4.20 Parameter OutsideSensorZone

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

Description:

LTE zoning number for the link with an Outside Temperature Sensor, Wind Speed sensor and Sun Intensity 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 - 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):	151 (HDTRT)	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:

HDTRT is not using external outside sensor (s) if zone is 'OutOfService'

2.6.4.21 Parameter TempFlowWaterSetpDefault

FB: HDTRT	Property Name (Server): TempFlowWaterSetpDefault	Mandatory ☐ Optional ☒

Description:

This optional configuration parameter is used for the flow temperature demand calculation (mechanism using a flow temp. correction value dependent of the valve positions)

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	 setpoint 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: (in the server)	IO Type(ID):	151 (HDTRT)	Property ID:	111
	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:

Setpoint value is activated or deactivated by the 'OutOfService' Status

2.6.4.22 Parameter SetpointMode

FB:	HDTRT	Property Name (Server):	SetpointMode	Mandatory ☐ Optional ☒

Description:

Basic setpoint is fixed or calculated using outside temperature and a heating curve
This datapoint corresponds to the SM parameter in the ObIS [13]

DPT:	Name	DPT_InputSource	DPT ID	1.014	Datatype format	B_1

Field	Description	Sup.	Range	Unit	Default
			fixed / calculated		calculated

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	151 (HDTRT) 1	Property ID: N° of elements	115 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:

--

2.6.4.23 Diagnostic data TempFlowWaterSetpEff

FB:	HDTRT	Property Name (Server):	TempFlowWaterSetpEff	Mandatory ☐ Optional ☒

Description:

Actual flow temperature setpoint calculated by the HDTRT => setpoint value to be copied in the TempFlowWaterDemAbsHDTRT signal

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	=> no setpoint (e.g. no demand)	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): Start-Index:	151 (HDTRT) 1	Property ID: N° of elements	110 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

2.6.4.24 Diagnostic data TempFlowWaterDemHeatShiftAct

FB: HDTRT	Property Name (Server): TempFlowWaterDemHeatShiftAct	Mandatory ☐ Optional ☒

Description:

Actual local copy of the TempFlowWaterDemHeatShift input value from HDTACT

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

Field	Description	Sup.	Range	Unit	Default
Temp	flow temperature setpoint shift value	M	full	K	--
Status - OutOfService - all other flags	 shift value is not available not supported, fixed to '0'	 M NA	 true/false	bitset	 true

Communication:

DP Address: (in the server)	IO Type(ID):	151 (HDTRT)	Property ID:	112
	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 ☒

value is 'OutofService' if the signal from HDTACT is not available or in case of 'no demand'

Special Features:

--

2.6.4.25 Diagnostic data TempRoomDemAbsHeatMaxAct

FB: HDTRT	Property Name (Server): TempRoomDemAbsHeatMaxAct	Mandatory ☐ Optional ☒

Description:

Actual local copy of the TempRoomDemAbsHeat input from HRDM used for flow temperature setpoint calculation

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	full	° C	--
Status - OutOfService - all other flags	 Temp value is not available not supported, fixed to '0'	 O NA	 true/false	bitset	 true

Communication:

DP Address: (in the server)	IO Type(ID):	151 (HDTRT)	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:

value is 'OutofService' if the signal from HRDM is not available or in case of 'no demand'

2.6.4.26 Diagnostic data TempOutsideAct

FB: HDTRT	Property Name (Server): TempOutsideAct	Mandatory ☐ Optional ☒

Description:

Actual local copy of the outside temperature used by the HDTRT (e.g. together with a heat-curve). This is the local image of the TempOutside input or a hard-wired sensor which may be overridden by a tool for service functions

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	TempOutsideAct is not available	O	true/false		cs
- Overridden	override of the temperature value	O	true/false		false
- 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	
- Override & Release	override and release temperature value	O			
- AlarmAck	alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	151 (HDTRT)	Property ID:	114
	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 ☐

--

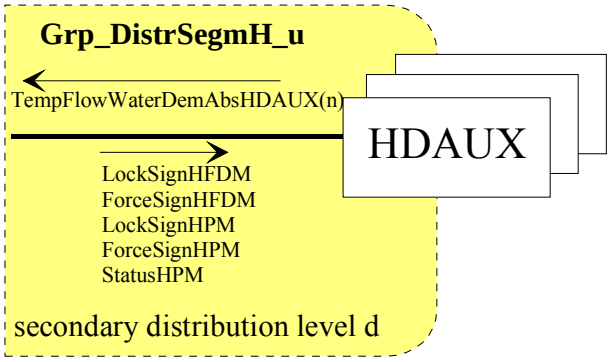
Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.7 Functional Block: Auxiliary Heat Demand (HDAUX)

2.7.1 Functional Specification

The HDAUX connects an auxiliary “multi-purpose” heat consumer to the heat distribution system. The HDAUX can be used to model very specific / “exotic” heat consumers which do not belong to the category “Room Heating” or “Domestic Hot Water Control” (e.g. heating of a swimming pool etc.).



2.7.1.1 Flow temperature demand

The HDAUX is connected to one Heat Distribution Segment. The HDAUX calculates from the flow temperature setpoint for its zone the corresponding flow temperature demand.

- TempFlowWaterDemAbsHDAUX — This mandatory output signal contains the calculated flow temperature demand (absolute value) of the HHDAUX which is sent to the HFDM in the heat Distribution Segment.

  Calculation of the flow temperature demand (and any control loop mechanism for the flow temperature control) is completely company-specific and not part of this specification.

  The signal contains also attributes for load priority management (see also chapter 2.2.1.8), emergency heat demand and control of a common system pump in the Heat Distribution Segment (see also chapter 2.2.1.9)

2.7.1.2 Usage of StatusHPM by the HDAUX

The signal StatusHPM which is provided by the HPM / HFDM informs the HDAUX e.g. if the heat production is on and is able do provide energy. This information may be used in the HDAUX for any control loop or optimization and “learning-functions”. These functions are company-specific.

2.7.1.3 Usage of LockSignHPM and ForceSignHPM by the HDAUX

Due to the nature of the HDAUX the reaction to locking and forcing signals from HPM is manufacturer specific and depending on the specific application of the HDAUX. See document [09]

Usage of these signals is an optional feature of the HDAUX

2.7.1.4 Usage of LockSignHFDM and ForceSignHFDM in the HDAUX

same procedure as for LockSignHPM and ForceSignHPM

2.7.1.5 Load Priority Management

Absolute or shift load priority can be requested by the HDAUX by setting the attributes 'AbsLoadPriority' or 'ShiftLoadPriority' in the TempFlowWaterDemAbsHDAUX signal.
This is an optional feature of the HDAUX

See also Load Priority Management in the HZC, chapter 2.2.1.8 and document [09]

2.7.1.6 Sensors and actuators

The HDAUX may use any sensor or actuator which is necessary for its local functionality. These I/O are manufacturer specific and not specified in this document.

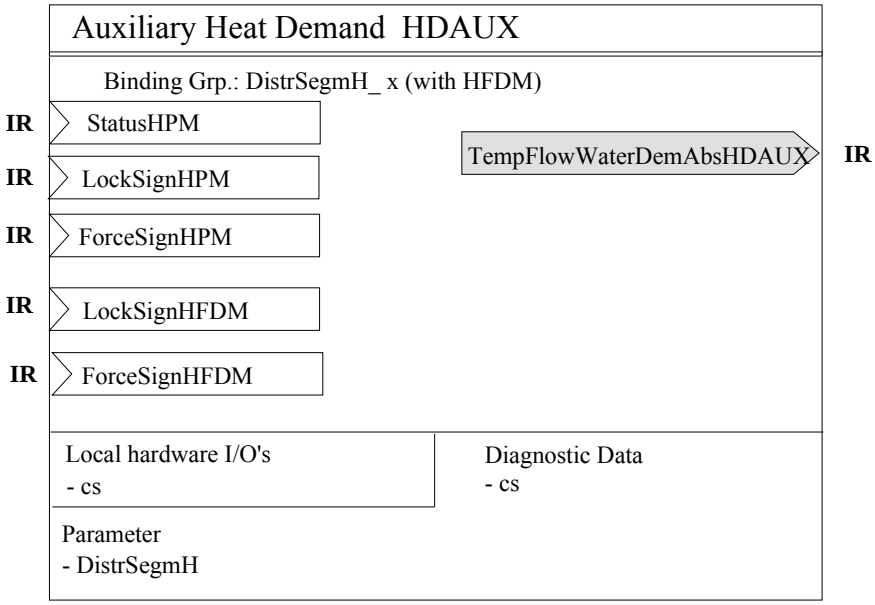
2.7.2 Constraints

IMPORTANT: reporting of the Heat Demand signal TempFlowWaterDemAbsHDAUX by the HDAUX 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 HDAUX functional block offer a link to a demand dependent heat distribution (HFDM) and heat production system (HPM).

HDAUX implementations in Standard Mode are currently not meaningful.

2.7.3 Functional block diagram



2.7.4 Datapoint description

2.7.4.1 Overview

Data Point	Description	Data Point Type	DPT N°
Outputs			
TempFlowWaterDem AbsHDAUX	Flow temperature demand of the HDAUX to be sent to the allocated HFDM	DPT_ TempFlowWaterDemAbs	210.100
Inputs			
StatusHPM	Status information from 'Producer Manager'	DPT_StatusHPM	209.100
ForceSignHPM	Forcing signal from HPM due to overheat, to force the consumers to consume energy	DPT_ForceSign	21.100
LockSignHPM	Locking signal from HPM due to boiler overload, to force the consumers to reduce energy consumption	DPT_LockSign	207.101
ForceSignHFDM	Forcing signal from HFDM in the Heat Distribution Segment	DPT_ForceSign	21.100
LockSignHFDM	Locking signal from HFDM in the Heat Distribution Segment	DPT_LockSign	207.101
Parameters			
DistrSegmH	LTE zone: number of the Heat Distribution Segment	DPT_UcountValue8_Z	202.002
Diagnostic Data			
--			

		STANDARD MODE	**EXTENDED MODE**	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	TempFlowWaterDem AbsHDAUX	**NA** [1)]	NA	NA	M
Inputs	StatusHPM	**NA** [1)]	NA	NA	O
	ForceSignHPM	**NA** [1)]	NA	NA	O
	LockSignHPM	**NA** [1)]	NA	NA	O
	ForceSignHFDM	**NA** [1)]	NA	NA	O
	LockSignHFDM	**NA** [1)]	NA	NA	O

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

Table 16: HDAUX Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DistrSegmH	M

Table 17: HDAUX LTE specific Properties

		Support
Parameter	--	
Diagnostic Data	--	

Table 18: HDAUX Standard Properties of Interface Objects (or memory mapped DP)

2.7.4.2 Output TempFlowWaterDemAbsHDAUX

Standard Mode

Not applicable

LTE-HEE mode:

FB: HDAUX	**LTE Server Output Name:** TempFlowWaterDemAbsDAUX	Mandatory ☒ Optional ☐

Description:

This output signal contains the calculated flow temperature demand (absolute value) of the HDAUX. It is sent to the HFDM in the corresponding Heat Distribution Segment

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

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowDem	requested flow temperature	M	full temp. range	°C	2	cs
Attributes						
- DemValid	Validity of TempFlowDem (false means also “no demand”)	M	true/false	bool	Y	false
- AbsLoadPriority	set if absolute load priority is requested by the HDAUX	O	true/false	bool	Y	false
- ShiftLoadPriority	set if shift load priority is requested by the HDAUX	O	true/false	bool	Y	false
- MaxTempLimit	set if flow temp. in the Distribution Segment must be limited to max. value	O	true/false	bool	Y	false
- MinTempLimit	for cold water only	NA	false	bool	N	false
- DHWReq	Heat demand from DHW	O	true/false	bool	N	false
- RoomCtrlReq	Heat demand from Room Heating	O	true/false	bool	N	false
- VentReq	Heat demand from Ventilation	O	true/false	bool	N	false
- AuxAllSeasonReq	Heat demand from auxiliary heat consumer, all season request	O	true/false	bool	N	false
- SystemPumpReq	request for water circulation in the distribution segment (common system pump on)	O	true/false	bool	Y	false
- EmergDem	set if emergency heat demand for e.g. frost protection is requested by the HDAUX	O	true/false	bool	Y	false
- DHWLegioReq	for DHW only	NA	false	bool	N	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 145 (HDAUX)	Property ID: 51		
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	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 ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

--

2.7.4.3 Input StatusHPM

Standard Mode

Not applicable

LTE-HEE mode

see HZC, chapter 2.2.4.11

2.7.4.4 Input LockSignHPM

Standard Mode

Not applicable

LTE-HEE mode

see HZC, chapter 2.2.4.12

2.7.4.5 Input ForceSignHPM

Standard Mode

Not applicable

LTE-HEE mode

see HZC, chapter 2.2.4.13

2.7.4.6 Input LockSignHFDM

Standard Mode

Not applicable

LTE-HEE mode

see HZC, chapter 2.2.4.14

2.7.4.7 Input ForceSignHFDM

Standard Mode

Not applicable

LTE-HEE mode

see HZC, chapter 2.2.4.15

2.7.4.8 Parameter DistrSegmH

FB: HDAUX	Property Name (Server): DistrSegmH	Mandatory ☒ Optional ☐

Description:

LTE zoning information : link with the HFDM in the corresponding 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 Distribution Segment 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: (in the server)	IO Type(ID):	145 (HDAUX)	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:

HDAUX DP's on the Heat Distribution Segment are not LTE communicating if zone is 'OutOfService'