Application Description

7

Hot Water Heating

11

Domestic Hot Water Control

3

Summary:

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

Version 01.02.01 is a KNX Approved Standard.

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

Document updates

Version	Date	Modifications
0.1	2001.09.12	BKY, document created from HWHFuncBlocV20 => document split-up into multiple chapters Functional block diagrams and DP overview updated
0.2	2001.09.27	BKY, detailed DP descriptions added
0.3	2001.12.21	BKY, inclusion of general TFI decisions (editorial); Modified Standard Mode interface (basic FB) according to TFI decisions; additional 2nd DHWZone binding group in DHWSM: link with DHWS; TempDHWSetpEff added in DHWSM, DHWZC; New chapter 2.1.5 circulation pump control; Data interface of DHWCPC updated; introduction of DHWCPS scheduler new: Specification of DHWTS, COLTS, UDHWSET => release for TFI assessment
0.4	2002.02.22	BKY, editorial corrections; missing DPT added; updated forcing/locking signals according to chapter 7-11-5; TFI approved, KNX Handbook 1.0
1.0	2002.09.10	BKY, editorial corrections; inclusion of new attribute EmergDem in DPT_TempFlowWaterDemAbs (210.100), TFI approved, updated for KNX Handbook 1.1
1.1	2002.11.29	BKY, editorial corrections; correction timeout of StatusHPM input, change of MinRepTime for DHWModeUser, DHWModeUserEff, DHWModeEff, DHWPushUser, TempDHWSetpUser, DHWCPCPush, DHWOtherEnergySource.
1.1	2003.08.25	signal DHWModeUserEff added in DHWSM and UDHWSET
1.1	2004.01.08	DHWSM: no timeout for DHWModeUser and TempDHWSetpUser inputs (LTE and S-Mode). UDHWSET: heartbeat repetition is optional for DHWModeUser and TempDHWSetpUser outputs (LTE and S-Mode) TFI approved, updated for KNX Handbook 1.1
1.2	2006.01.12	[BKY]: DHWC inclusion of new attribute DHWLegioReq in DPT_TempFlowWaterDemAbs (210.100)
1.2	2009.06.17	Update in view of publication in the KNX Specifications v2.0.
01.02.01	2013.10.29	Editorial updates for the publication of KNX Specifications 2.1.

References

[01] Chapter 3/7/2 “Datapoint Types”
[02] Chapter 7/10/1 “HVAC Sensor Functional Blocks”
[03] Chapter 7/10/2 “HVAC HMI Functional Blocks”
[04] Chapter 7/10/3 “HVAC Actuator Functional Blocks”
[05] Chapter 7/10/4 “HVAC Common Functional Blocks”
[06] Chapter 7/10/5 “HVAC Scheduler Functional Blocks”
[07] Chapter 7/11/1 “Heat Production”
[08] Chapter 7/11/2 “Heat Distribution”
[09] Chapter 7/11/5 “Load Management”
[10] Chapter 7/11/9 “Property Identifiers”
[11] Part 7/12 “Direct Electric Heating”
[12] Part 7/13 “Terminal Unit Functional Blocks”
[13] Part 7/14 “Ventilation & Air Conditioning and Cold Water”
[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 Domestic Hot Water Control.

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

Functional Blocks specification for applications VAC [13], terminal units (TU) [12] and direct electric heating (DEH) [11] 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 documents [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].**

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) [11]

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: Domestic Hot Water Control

2.1 Aims and Objectives

2.1.1 DHW control system

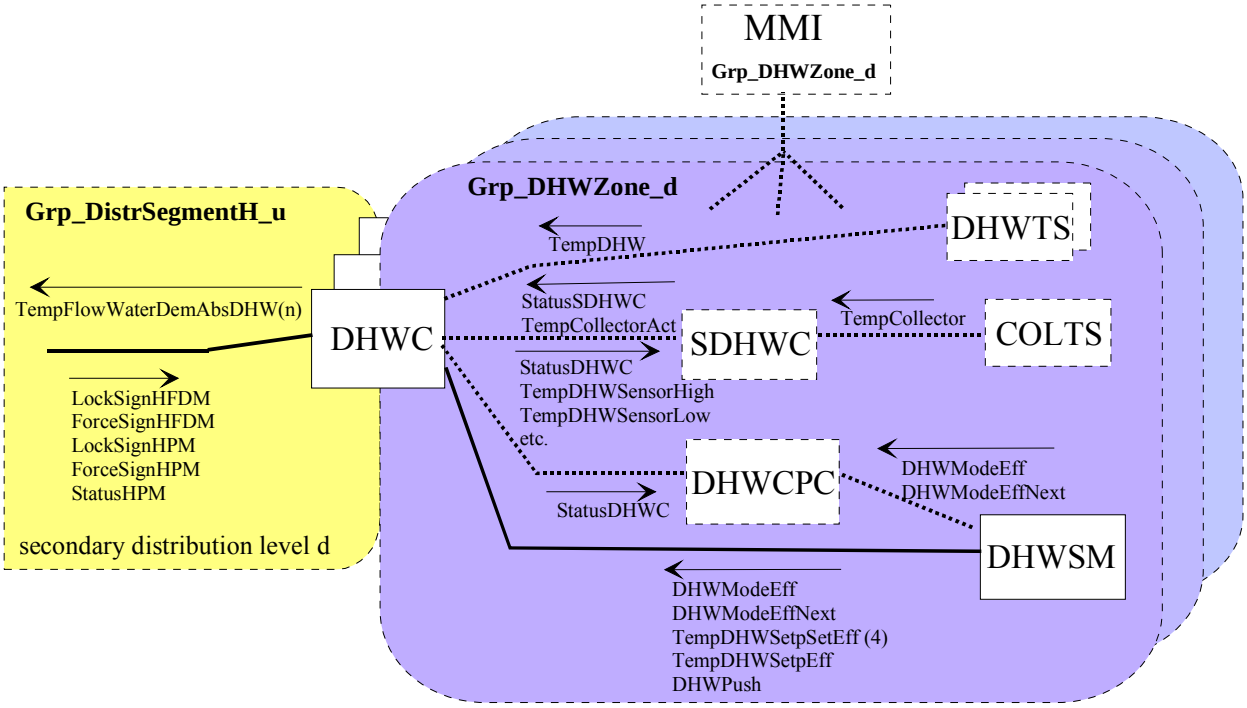


Figure 1 DHW Control system (simplified)

Functional Blocks:	DHWC:	Domestic Hot Water Controller	SDHWC:	Solar Domestic Hot Water Controller
	DHWSM:	DHW Setpoint Manager	DHWTS:	DHW Temperature Sensor
	DHWCPC:	DHW Circulation Pump Controller	COLTS:	Collector Temperature Sensor
	MMI:	Man Machine Interface	PUMP:	DHW circulation pump

The diagram above shows a sophisticated DHW application and the related functional blocks including solar DHW preparation and optimized circulation pump control. The DHW control system is composed of multiple functional blocks (some functional blocks are optional). Usually all of these functional blocks – except DHWSM or SDHWC - are located in the same device.

Additional electrical DHW load (e.g. during summer time) is possible and supported by the DHWC but the corresponding functional block is not part of this specification.

Domestic hotwater control:

A Domestic Hot Water circuit is controlled by a DHW Controller (DHWC) according to the current hot water temperature setpoint. The DHW setpoint depends on the actual DHW operating mode ‘DHWModeEff’ and a set of DHW temperature setpoints ‘TempDHWSetpSetEff(4)’, each corresponding to one of the DHW operating modes. These information are inputs for the DHWC which are provided by the DHW Setpoint Manager (DHWSM). The DHW operating mode from DHWSM may depend on automatic time schedule or user operation (MMI).In simple systems the DHWSM only provides the actual setpoint ‘TempDHWSetpEff’ because ‘DHWModeEff‘ and ‘TempDHWSetpSetEff(4)’ are not available

The current DHW temperature ‘TempDHW’ (normally a set of 2 different sensor values: DHW start/stop sensors) is also a mandatory for DHW control loop. DHW sensor(s) are usually hard-wired to the device containing the DHWC.

In more sophisticated systems the DHWC may incorporate local optimizer functionality like optimized start/stop of DHW load. In this case the optimizer will have influence on the DHW operating mode and the DHW temperature setpoint used internally by the DHWC. The local optimizer functions in the DHWC are company specific and not part of this specification. Usually optimizer functionality may depend on:

- 'DHWModeEff', the next DHW operating mode & time until change 'DHWModeEffNext' from DHWSM
- Status information from DHWC including actual DHW temperature
- DHW temp. setpoints

etc.

In addition the DHWC provides optional inputs for an external (central) "HVAC Optimizer" which may be located in a management station etc. See chapter 2.1.3

Solar energy: In solar energy supported DHW systems and additional Solar Domestic Hot Water Controller (SDHWC) is present. Usually SDHWC works autonomously, i.e. SDHWC provides as much energy as possible to the DHW storage tank. SDHWC control mechanisms are very manufacturer specific.
Conventional DHW load may be influenced by the availability of solar energy. Usually conventional DHW load by the DHWC is disabled, if sufficient solar energy is available (the DHWC decides depending on SDHW status information). The SDHWC provides the 'StatusSDHWC' containing information about availability of solar energy.

DHW push: If DHW temperature is below comfort level and DHW load is not activated due to the actual DHW operating mode, the user may still activate DHW load by the 'DHWPush' function. The 'DHWPush' signal is provided by the DHWSM after user operation and it forces the DHWC to load the DHW storage tank once to DHW comfort temperature level. DHW push is blocked by the DHWSM if DHW preparation is disabled, e.g. by a management station.

DHW heat demand:

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

DHW load often requires max. limitation of the flow temperature in the Distribution Segment to avoid calcification of the water heater. In this case the attribute „MaxTempLimit" will be set in the heat demand signal (TempFlowWaterDemAbsDHW).

With the 'EmergDem' attribute in the heat demand signal the DHWC can indicate an emergency heat demand e.g. for frost protection

DHW controls are often connected to the primary Distribution Segment or are located in a specific Distribution Segment.

DHW load management and priority:

Usually DHW control requests load priority by setting the corresponding attributes in the heat demand signal (TempFlowWaterDemAbsDHW)

- „absolute load priority“: if DHW load requests all available power in the Distribution Segment
- „shifting load priority“: DHW load has priority in case of boiler overload

Load priority between DHWC and other consumers is controlled by the HFDM according to priority attributes in the heat demand signals. If absolute 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 signal must be handled in the DHW as well as locking signals due to boiler overload.

Forcing signal must also be handled by the DHWC. In case of boiler overheat, DHW load will usually be activated first.

For further information on forcing and locking signals: see also document [09].

Usage of status information from heat production:

The signal ‘StatusHPM’ is provided by the HPM / HFDM to inform consumers like DHWC e.g. if the heat production is on and is able do provide energy. This information is used in the DHWC e.g. in order to avoid unloading of the DHW storage tank if heat production is not ready.

DHW circulation pump:

DHW circulation pump is controlled by the functional block DHW circulation pump controller DHWCPC. The purpose of this functional block is to reduce runtime of the DHW circulation pump to a minimum.

The local mechanisms of DHWCPC are manufacturer specific. Usually the actual DHW operating mode, TempDHW, DHWPush etc. are used in order to decide whether the pump is on or off. Also a separate program from a DHW Circulation Pump Scheduler is possible. The circulation pump is normally hard wired but optionally also a bus-connected pump is possible.

DHW Zoning:

In LTE implementations of a DHW system all functional blocks used for DHW control are belonging to the specific group DWHZone. DHW zoning is completely independent of the building structure / geographical zones (e.g. one centralized DHW control for all apartments or individual DHW control for each apartment is possible).
DHWZone is used for the distribution of DHW scheduler, load management and remote-control/diagnostic data.

The LTE system supports up to 31 independent DHW Zones and one DHW-“Broadcast” address for all DHW Zones (LTE Wildcard addressing).

User Interface:

A user interface (MMI) can be used for remote management of the DHW control. It may also contain the DHW Setpoint Manager (DHWSM), DHW temperature setpoint adjustment etc. In LTE implementations this MMI must also be configured with the corresponding DHWZone

2.1.2 DHW Setpoint Management

Overview only: for more details see DHWSM in chapter 2.2

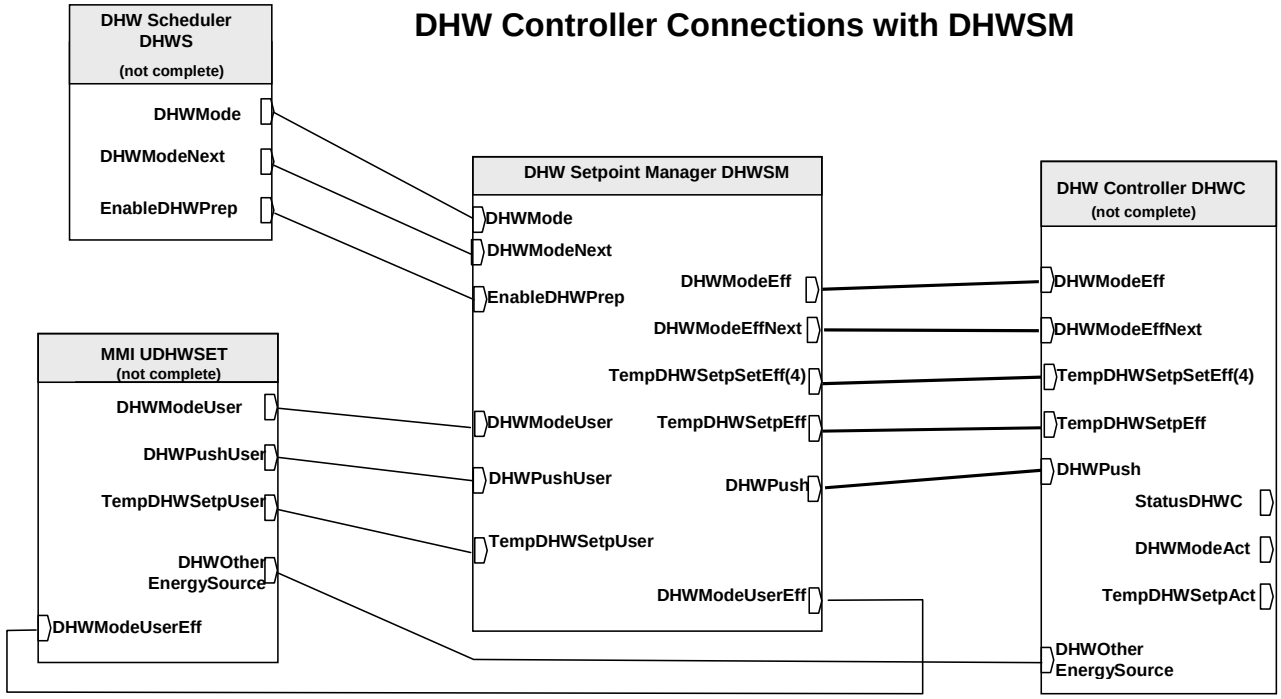


Figure 2 DHW Setpoint Management (simplified)

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

The DHWSM provides the active DHW mode (DHWModeEff), the scheduler-dependent next DHW mode and the time until change of mode (DHWModeEffNext) and a set of 4 DHW temperature setpoints, one for each DHW mode. In simple systems only the actual DHW setpoint 'TempDHWSetpEff' is provided.

The outputs of the DHWSM may depend on user interaction from an MMI, automatic scheduler program or interaction from a management station

The DHW Controller uses these signals from the DHWSM to calculate the actual DHW temperature setpoint.

The DHW Scheduler DHWS provides the current DHWMode and the next DHWMode (including the delay time until change of mode). DHWS is specified in [06].

From an MMI containing the functional Block UDHWSET automatic DHW scheduling can be overridden manually (signals DHWModeUser, DHWPushUser) and the DHW temperature setpoint can be modified (TempDHWSetpUser).

The DHW Setpoint Manager may provide the output signal DHWModeUserEff which contains the resulting user interaction on DHW Mode for feedback on the MMI. Manual override of DHWMode may be influenced besides by the signal DHWModeUser from an MMI also by other parameters (e.g. signal EnableDHWPrep or local settings on the device containing the DHWSM). It may therefore be necessary to give feedback to the MMI (UDHWSET) about the result of user interaction on DHW Mode.

2.1.3 External HVAC Optimizer

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

In more sophisticated systems the DHWC may incorporate local optimizer functionality (company specific functionality like start and stop optimization etc).

In addition the DHWC 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 DHW Mode (DHWModeOptim) and a delta DHW temperature setpoint value which allows shift the actual setpoint (TempDHWSetpOptimShift). These values are consumed by the DHWC.

The DHWC provides 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 DHW temperature setpoint.. These information are mainly used for visualization (e.g. on a room unit)

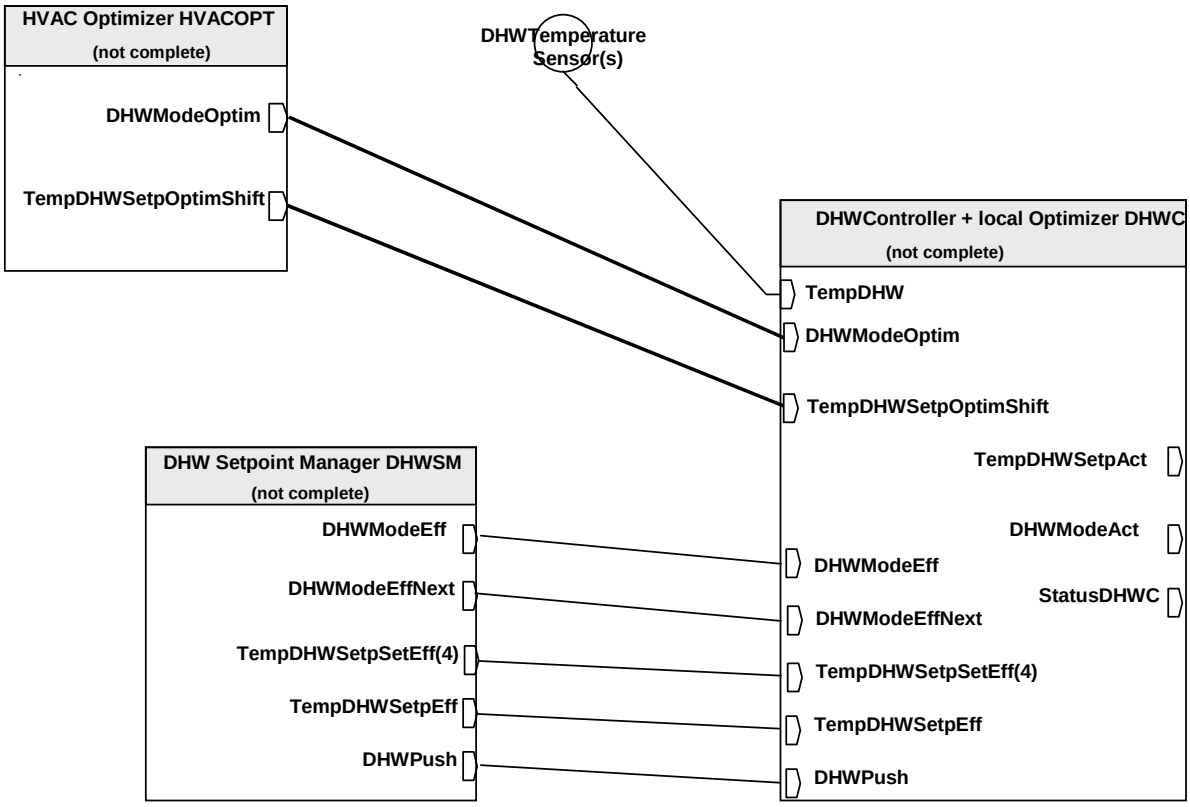


Figure 3 Link with HVAC Optimizer (simplified)

2.1.4 Solar DHW applications

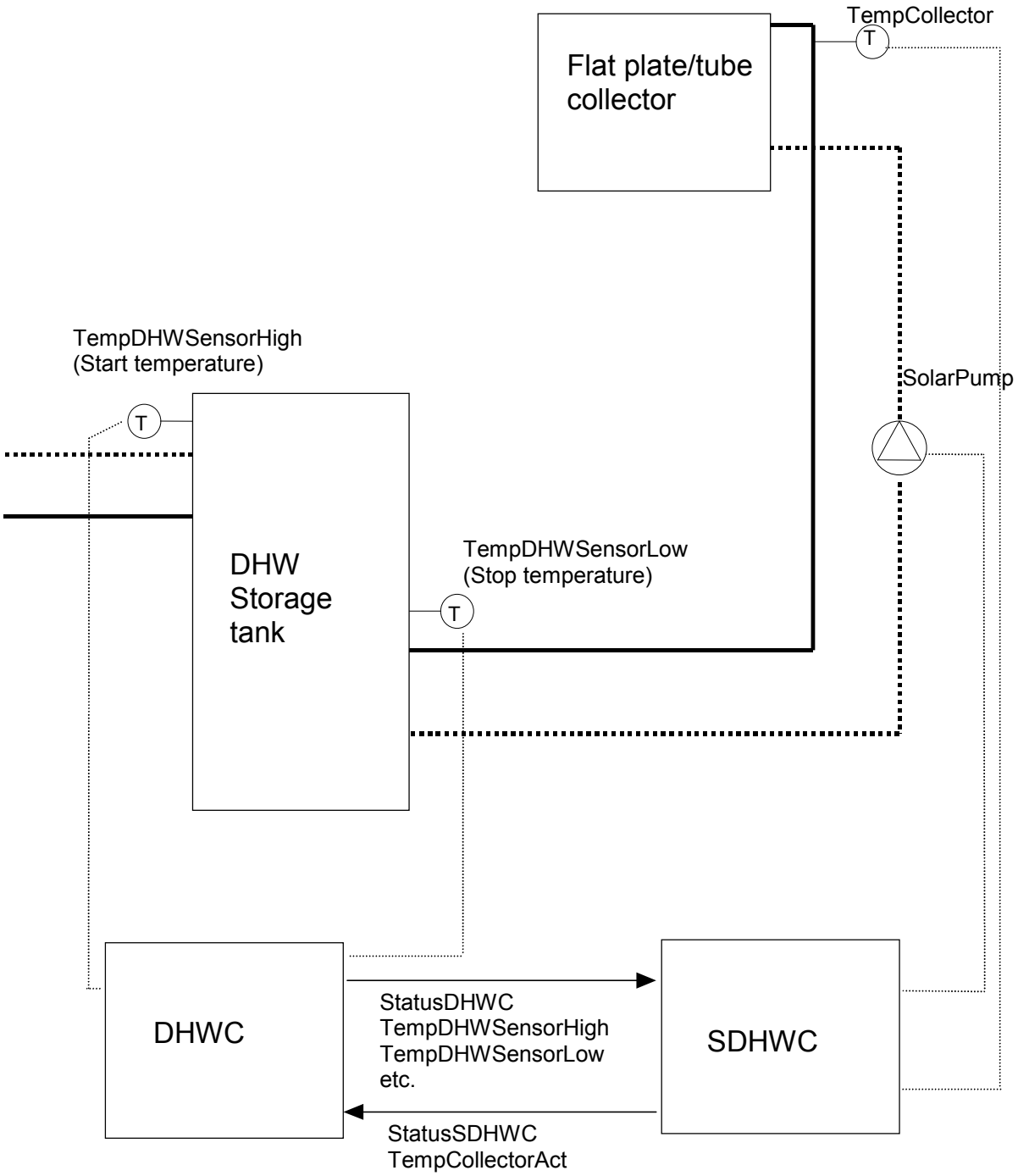


Figure 4 Link with Solar DHW Controller (simplified)

In solar energy supported DHW systems an additional Solar Domestic Hot Water Controller (SDHWC) is present. Usually SDHWC works autonomously, i.e. SDHWC provides as much energy as possible to the DHW storage tank. SDHWC control mechanisms are very company specific.

Conventional DHW load may be influenced by the availability of solar energy. Usually conventional DHW load by the DHWC will be stopped, if sufficient solar energy is available (decision of DHWC). The SDHWC provides the ‘StatusSDHWC’ and ‘TempCollectorAct’ containing information about availability of solar energy.

2.1.5 DHW Circulation Pump Control

Overview only: for more details see DHWSM in chapter 2.4

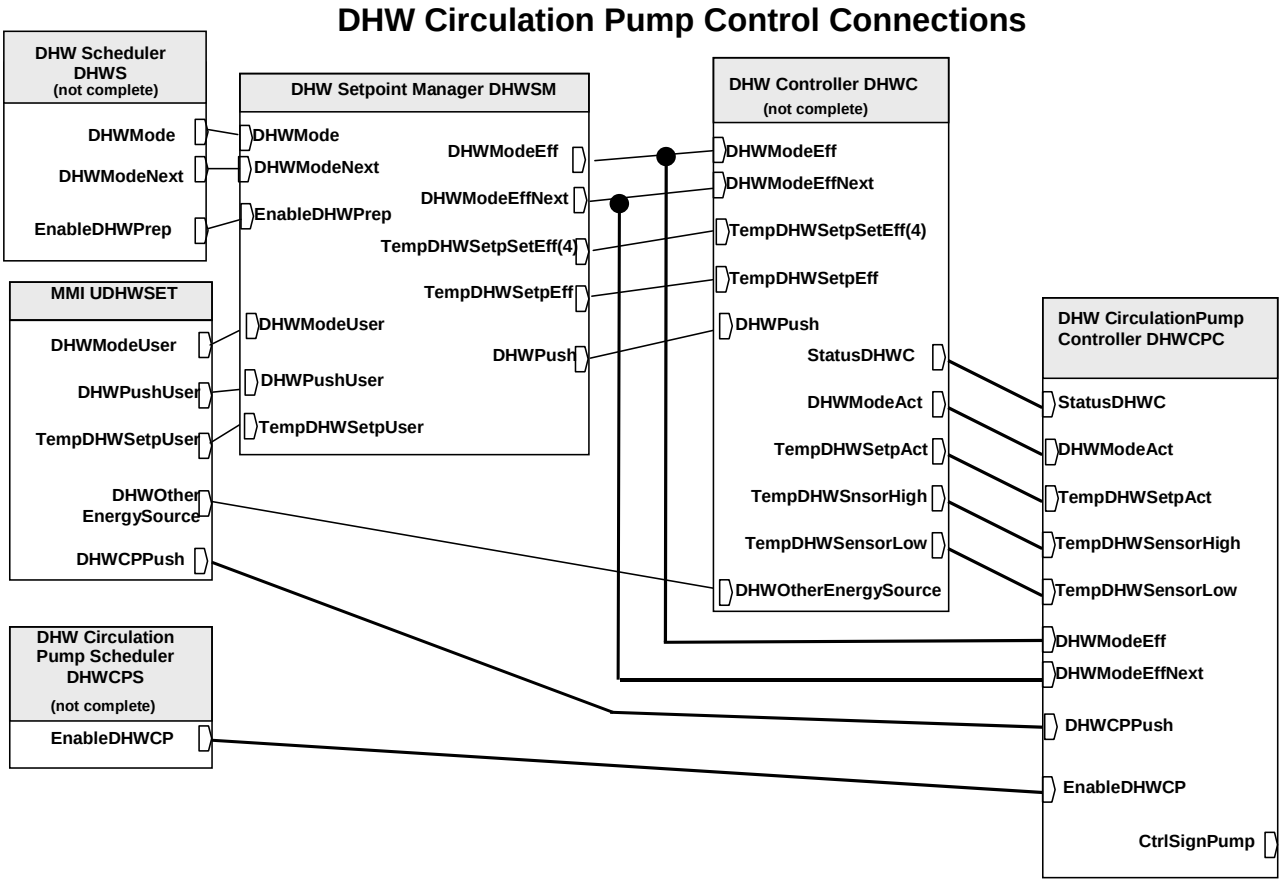


Figure 5 DHW Circulation Pump Control

Control of the DHW Circulation Pump may depend on:

- currently active DHW operating mode(s) from DHWSM, DHWC and the next DHW operating mode. In this case DHW load and operation of the DHW circulation pump are “synchronised”.
- a separate DHW circulation pump scheduler. In this case DHW load and operation of the DHW circulation pump are completely independent. E.g. load of the DHW storage tank during night time (e.g. 04:00 – 06:00) and operation of the DHW circulation pump depending on the needs of the user (e.g. from 06:00 – 22:00)
- the current temperatures in the DHW storage tank. It does not make sense to run the circulation pump if DHW temperature is much below the requested DHW temperature setpoint.
- a DHW circulation pump push “trigger” command from an MMI: to run the circulation pump on user request for a limited time (parameter).

2.2 Functional Block: Domestic Hot Water Setpoint Manager (DHWSM)

2.2.1 Functional Specification

The Domestic Hot Water Setpoint Manager DHWSM provides resulting DHW operating modes and setpoints to the DHW system in a DHWZone.

The following output signals are provided by the DHWSM:

- ‘DHWModeEff’ Contains the actual resulting DHW operating mode; DHWModeEff may depend on automatic time schedule, local user operation (MMI) etc.
  = value of DHWMode input if DHWModeUser = AUTO
  = value of DHWModeUser input if DHWModeUser <> AUTO
  = Off/FrostProtect if input EnableDHWPrep=false
  See example below [1])

- ‘TempDHWSetpSetEff[4]’ This output contains the effective temperature setpoints for the four different DHW operating modes: ‘LegioProtect’, ‘Normal’, ‘Reduced’ and ‘Off/FrostProtect’.

  This set of 4 setpoint values is usually derived from the parameters:
  - TempDHWSetpLegioProtect,
  - TempDHWSetpNormal,
  - TempDHWSetpReduced,
  - TempDHWSetpOff/FrostProtect

  The setpoint for ‘Normal’ level may also be derived from ‘TempDHWSetpUser’ (if present).

  The datapoint has no 'temperature valid' attributes, i.e. all four temperature fields must contain valid data. If a device does not support some DHW operating modes and the corresponding DHW setpoints, reasonable default values must be generated by the DHWSM.

  The DHWSM shall guarantee a reasonable and consistent set of setpoints. The following rule shall be observed:

  - TempDHWSetpSet.LegioProtect ≥ TempDHWSetpSet.Normal
  - TempDHWSetpSet.Normal ≥ TempDHWSetpSet.Reduced
  - TempDHWSetpSet.Reduced ≥ TempDHWSetpSet.Off/FrostProtect

- ‘DHWModeEffNext’ Contains the next expected DHW operating mode and the delay time until the change of DHWModeEff (according to advanced scheduling information, local user operation etc.)
  => used in the DHWC for local optimiser functionality

- ‘TempDHWSetpEff’ The currently effective DHW temperature setpoint
  (For simple DHW applications; no usage of DHWMode.)

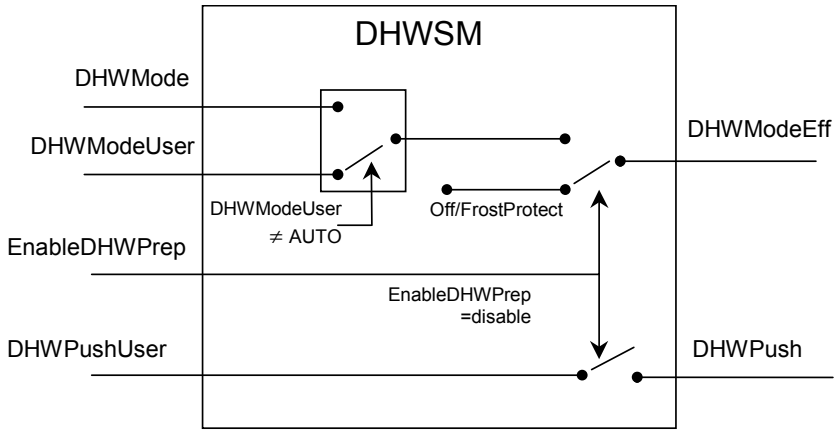
- ‘DHWPush’ This signal indicates that a user needs short time DHW ‘Normal’ temperature independent of the DHW operating mode. DHW storage tank must be loaded once to ‘Normal’ temperature level. This signal is only generated if ‘EnableDHWPrep’ input has the value ‘enabled’.
  See example below [1)]

- ‘DHWModeUserEff’ Resulting user interaction on DHW Mode (manual override ‘LegioProtect’, ‘Normal’, ‘Reduced’ and ‘Off/FrostProtect’ or ‘AUTO’ to enable DHW scheduler).
  The value of DHWModeUserEff can be the result of the signal DHWModeUser from an MMI (UDHWSET) or the signal EnableDHWPrep from DHW scheduler (DHWS) or e.g. local settings on the device containing the DHWSM.
  This output signal can be used on the MMI (UDHWSET) for immediate feedback about the result of user interaction.
  See example below [2])

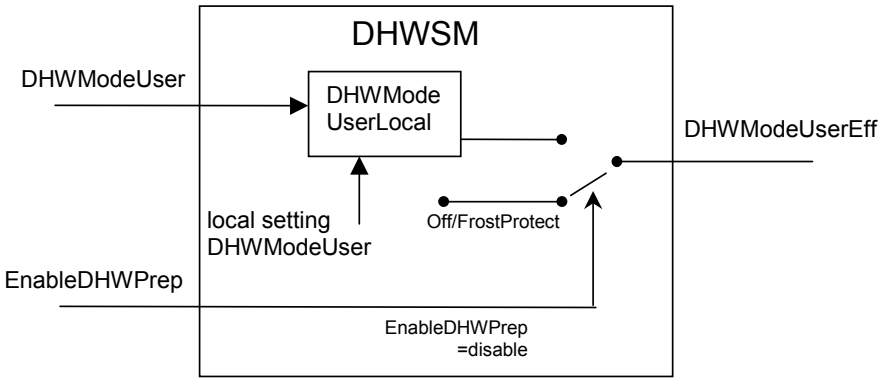
The above output values are calculated by the DHWSM depending on various input information originated by a DHW scheduler, user MMI, management station etc.

- ‘DHWMode’ Actual/present DHW operating mode (‘LegioProtect’, ‘Normal’, ‘Reduced’ and ‘Off/FrostProtect’) being provided by DHWS in a “management / programme unit”
- ‘DHWModeNext’ Next DHW operating mode (‘LegioProtect’, ‘Normal’, ‘Reduced’ and ‘Off/FrostProtect’) and the delay time until the change of DHWMode being provided by DHWS in a “management / program unit”
- ‘EnableDHWPrep’ Information from DHWS e.g. in a management station whether DHW preparation is enabled or not (e.g. availability of hot water supply)
  The value of this input enables or disables user requests for DHW preparation according to DHWModeUser and DHWPushUser inputs. See example below [1)]
- ‘DHWModeUser’ DHW operating mode (‘LegioProtect’, ‘Normal’, ‘Reduced’ and ‘Off/FrostProtect’ or AUTO) being provided by a MMI unit, in order to be able to change the mode manually. The value of this input has no effect if ‘EnableDHWPrep’ input has the value ‘disabled’ See example below [1)]
- ‘DHWPushUser’ Trigger command from an MMI. The user requests a DHW “push” This function only makes sense in residential applications where DHW load is controlled individually per apartment or single family home. DHW “push” from different users / apartments in the same DHWZone is usually not applicable.
  The value of this input has no effect if ‘EnableDHWPrep’ input has the value ‘disabled’. See example below [1)]
- ‘TempDHWSetpUser’ This input can be considered as a remote override of the DHW temp. setpoint for ‘Normal’ operating mode.
  In simple systems without DHW scheduler (fixed ‘Normal’ operating mode DHWModeEff), the user has the possibility for manual adjustment of the DHW temperature setpoint. See example below [3])

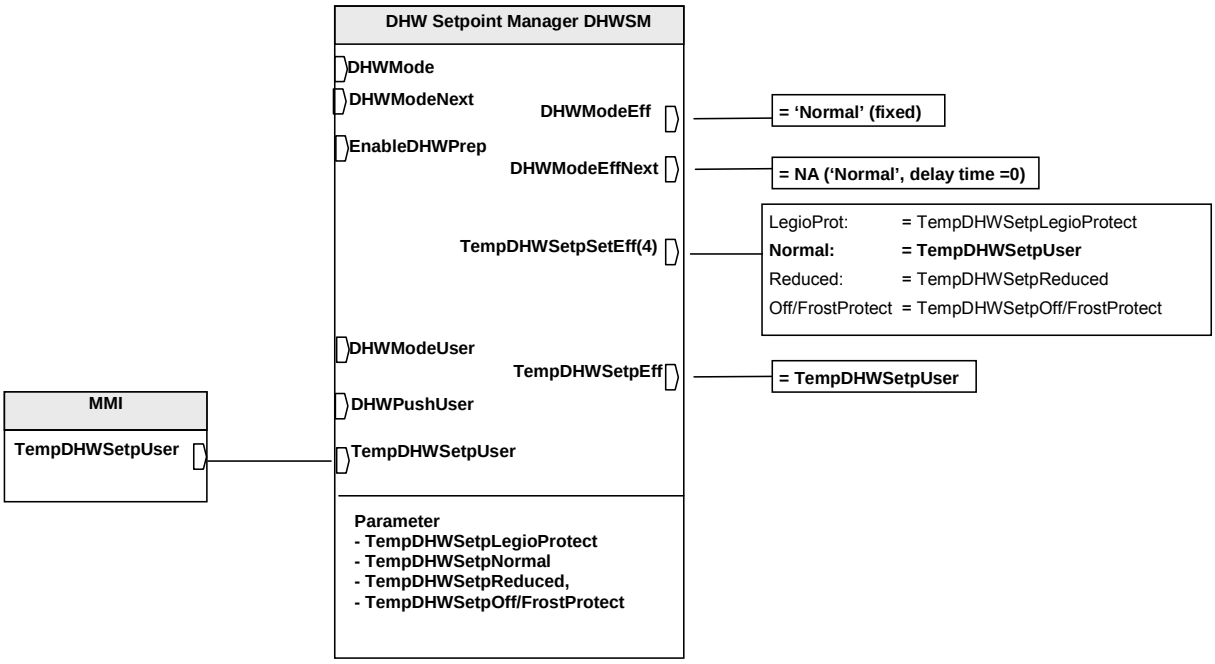
[1)] illustrative example(not normative): generation of DHWModeEff and DHWPush depending on input signals



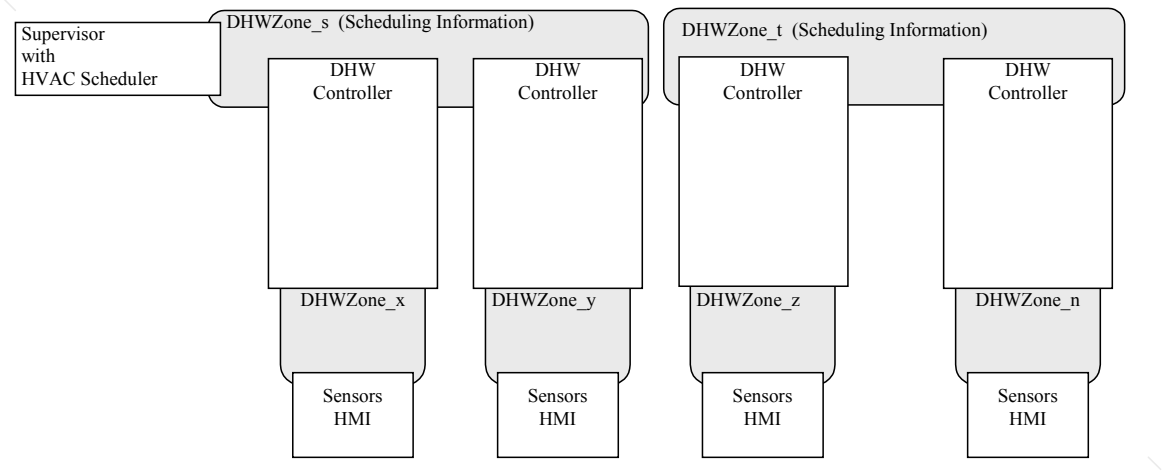
[2)] illustrative example(not normative): generation of DHWModeUserEff output depending on DHWModeUser and EnableDHWPrep input signals and local settings. In this example local setting of DHWModeUser is a "trigger" (last update of DHWModeUserLocal wins)



[3)] illustrative example: Simple system without DHW Scheduler, 24 h DHW preparation (fixed DHWMode)



Binding Groups (LTE)
The DHWSM may belog to two different DHWZone different binding groups.

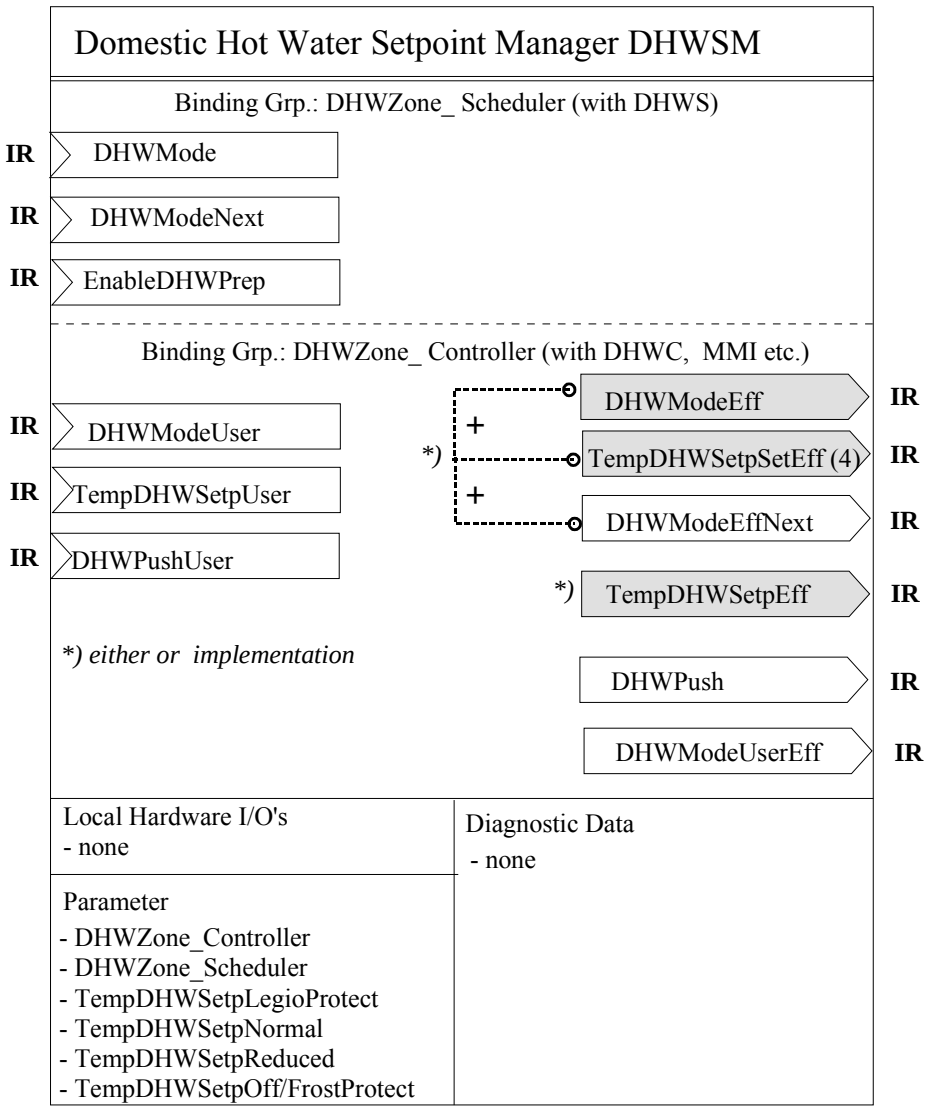


- Binding group x, y, z, n — This binding group corresponds with the DHWZone to which the DHW functional block effectively belongs.
- Binding group s, t — This binding group is used to get the 'programme information' from the supervisor/scheduler. I.e. the DHWSM may get ‘programme information’ such as DHWMode, DHWModeNext etc. from a different DHWZone.
  Example:
  The DHW circuits with DHWZone_x and DHWZone_y
  use the same 'programme' form DHWZone_s

2.2.2 Constraints

Only one DHWSM is allowed in a DHWZone which reperesents a DHW control circuit

2.2.3 Functional block diagram



2.2.4 Datapoint description

2.2.4.1 Overview

Datapoint	Description	Datapoint Type	DPT N°
Outputs			
DHWModeEff	present/effective DHW operating mode; it may depend on automatic time schedule, local user operation etc. / LTE and S-interface	DPT_DHWMode_Z DPT_DHWMode	201.102 20.103
DHWModeEffNext	next DHW operating mode and time until change of mode	DPT_DHWModeNext	206.102
TempDHWSetpSetEff [4]	set of effective DHW temperature setpoints for 'LegioProt', 'Normal', 'Reduced' and 'Off/Protection' operating modes	DTP_TempDHWSetpSet[4]	213.101
TempDHWSetpEff	present/effective DHW temperature setpoint / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
DHWPush	resulting DHW push command	DPT_Trigger	01.017
DHWModeUserEff	resulting user DHW operating mode (manual override); may be used for feedback on the MMI (UDHWSET) / LTE and S-interface	DPT_DHWMode_Z DPT_DHWMode	201.102 20.103
Inputs			
DHWMode	scheduler dependent DHW operating mode/ LTE and S-interface	DPT_DHWMode_Z DPT_DHWMode	201.102 20.103
DHWModeNext	scheduler dependent next DHW operating mode and time until change of DHWMode	DPT_DHWModeNext	206.102
EnableDHWPrep	indicates whether energy supply for DHW load is available or not	DPT_Enable	1.003
DHWModeUser	DHW operating mode selected by user (manual override) / LTE and S-interface	DPT_DHWMode_Z DPT_DHWMode	201.102 20.103
TempDHWSetpUser	DHW temperature setpoint, manually set by user on an MMI / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
DHWPushUser	DHW push command from user MMI	DPT_Trigger	01.017
Parameters			
DHWZone_Scheduler	LTE zone: DHW zone number; link with scheduler	DPT_UcountValue8_Z	202.002
DHWZone_Controller	LTE zone: DHW zone number; link with DHW control circuit	DPT_UcountValue8_Z	202.002
TempDHWSetpLegioProtect	DHW temperature setpoint for 'LegioProt' operating mode	DPT_TempHVACAbs_Z	205.100 *)
TempDHWSetpNormal	DHW temperature setpoint for 'Normal' operating mode	DPT_TempHVACAbs_Z	205.100 *)
TempDHWSetpReduced	DHW temperature setpoint for 'Reduced' operating mode	DPT_TempHVACAbs_Z	205.100 *)
TempDHWSetpOff/FrostProtect	DHW temperature setpoint for 'Off/Protection' operating mode	DPT_TempHVACAbs_Z	205.100 *)
Diagnostic Data			
--			

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	DHWModeEff	**GO_b** [2]	GO [2]	GO [2]	M [2]
	DHWModeEffNext	**NA** [1]	NA	NA	O [2]
	TempDHWSetpSetEff [4]	**NA** [1]	NA	NA	M [2]
	TempDHWSetpEff	**GO_b** [2]	GO [2]	GO [2]	M [2]
	DHWPush	**(GO_b)**		(GO)	O
	DHWModeUserEff	**(GO_b)**		(GO)	O
Inputs	DHWMode	**(GO_b)**		(GO)	O
	DHWModeNext	**NA** [1]	NA	NA	O
	EnableDHWPrep	**(GO_b)**		(GO)	O
	DHWModeUser	**(GO_b)**		(GO)	O
	TempDHWSetpUser	**(GO_b)**		(GO)	O
	DHWPushUser	**(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 { DHWModeEff + TempDHWSetpSetEff [4] (+ DHWModeEffNext) } or { TempDHWSetpEff }*

Table 1: DHWSM Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DHWZone_Controller	M
	DHWZone_Scheduler	O

Table 2: DHWSM LTE specific Properties

		Support
Parameter	TempDHWSetpLegioProtect	O
	TempDHWSetpNormal	M
	TempDHWSetpReduced	O
	TempDHWSetpOff/FrostProtect	O
Diagnostic Data	--	

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

2.2.4.2 Output DHWModeEff

Standard mode:

DP Name:	DHWModeEff	Abbr.:	---	Mandatory [2]	☒
FB Name:	DHWSM			Can be internal	☐

Description

This output contains the effective DHW Mode of the DHW zone

Datapoint Type

DPT_Name:	DPT_DHWMode				
DPT Format:	N_8	DPT_ID:	20.103		
Field	Description	Supp.	Range	Unit	Default
			1..4 [1]		cs

Access Type

♦ Output

this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:		Min repetition period:	2sec [3]
		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

[2] Either implementation of {DHWModeEff } or {TempDHWSetpEff}

[3] the Min repetition period of 2 sec shall be respected if the COV of the signal is the result of a calculation. However the signal may be sent immediately if the COV is the result of user interaction (locally or by input signal).

LTE-HEE mode:

FB: **DHWSM**	**LTE Server Output Name:** **DHWModeEff**	Mandatory ☒ [3] Optional ☐

Description:

This output contains the effective DHW Mode of the DHW zone

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

Field	Description	Sup.	Range	Unit	COV	Default
DHWMode	actual DHW Mode	M	[1..4] [1]		Y	cs
Status - Overridden - all other flags	standard Status attributes DHW mode overridden true / false not supported	O	true/false	bool	Y	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 ☐		
Application Specific ☒	DHWZone (Link with Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 176 (DHWSM)	Property ID: 51
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒ MinRepTime: 2 sec [4]	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 DHWSM sends the override value

[3] Either implementation of {DHWModeEff + TempDHWSetpSetEff [4] (+ DHWModeEffNext) } or {TempDHWSetpEff}

[4] the 2 sec MinRepTime shall be respected if the COV of the signal is the result of a calculation. However the signal may be sent immediately if the COV is the result of user interaction (locally or by input signal).

2.2.4.3 Output DHWModeEffNext

Standard mode: NA

LTE-HEE mode:

FB: DHWSM	**LTE Server Output Name:** DHWModeEffNext	Mandatory ☐ Optional ☒

Description:

This output contains the next DHW operating mode and the delay time to it
This information is e.g. used by the DHWC for local optimizer functions, e.g. start/stop optimization

DPT:	Name	DPT_DHWModeNext	DPT ID	206.102	Datatype format	$U_{16}N_8$

Field	Description	Sup.	Range	Unit	COV	Default
DelayTime	Time to next DHW mode in minutes 0 = no next DHW Mode available [1)]	M	full	min	15 [2)]	0
DHWMode	Next DHW Mode [0] = Mode Undefined [1)]	M	[1..4] and [0] [1)]	Y		cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Link with Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 176 (DHWSM)	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)] encoding of special conditions, see table below
[2)] COV value is identical to heartbeat time (15 min).

Interpretation of Time and DHWMode fields

Time	DHWMode	
= 0 (Undefined)	= 0 (Undefined)	the content of the datapoint is void / undefined => no next DHWMode available for an undefined time period
= 0 (Undefined)	= {1..4}	defined and valid next DHWMode but the delay time is undefined/unknown => in case of manually selected DHWModeUser ≠ 'Auto' (i.e. next DHWMode = current DHWModeEff)
> 0	= 0 (Undefined)	undefined (unknown) DHWMode during a defined delay time => in practice this combination is useless and not allowed
> 0	= {1..4}	defined and valid DHWMode and delay time

2.2.4.4 Output TempDHWSetpSetEff[4]

Standard mode: NA

LTE-HEE mode:

FB: DHWSM	**LTE Server Output Name:** TempDHWSetpSetEff[4]	Mandatory ☒ [1] Optional ☐

Description:

This output contains a set of effective DHW temperature setpoints for 'LegioProt', 'Normal', 'Reduced' and 'Off/Protection' operating modes. The temperature set is e.g. used in the DHWC in order to determine the actual DHW temperature setpoint.
For further details see chapter 2.2.1, description of TempDHWSetpSetEff[4] output

DPT:	Name	DPT_TempDHWSetpSet[4]	DPT ID	213.101	Datatype format	$V_{16}V_{16}V_{16}V_{16}$

Field	Description	Sup.	Range	Unit	COV	Default
TempSetpLegioProtect	DHW temperature setpoint for LegioProtect operating mode	M	cs	°C	0.2	cs
TempSetpNormal	DHW temperature setpoint for Normal operating mode	M	cs	°C	0.2	cs
TempSetpReduced	DHW temperature setpoint for Reduced operating mode	M	cs	°C	0.2	cs
TempSetpOff/FrostProtect	DHW temperature setpoint for Off/FrostProtect operating mode	M	cs	°C	0.2	cs

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Link with Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 176 (DHWSM)	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 ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

Some rules shall be respected, for further details see chapter 2.2.1, description of TempDHWSetpSetEff[4] output
[1] Either implementation of {DHWModeEff + TempDHWSetpSetEff [4] (+ DHWModeEffNext) } or {TempDHWSetpEff}

2.2.4.5 Output TempDHWSetpEff

Standard mode:

DP Name:	TempDHWSetpEff		Abbr.:	--				Mandatory [1]	☒		
FB Name:	DHWSM							Can be internal	☐		
Description											
Currently effective DHW temperature setpoint											
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 °C	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 {DHWModeEff } or {TempDHWSetpEff}											

LTE-HEE mode:

FB: **DHWSM**	**LTE Server Output Name:** **TempDHWSetpEff**	Mandatory ☒ 2) Optional ☐

Description:

Currently effective DHW temperature setpoint of the DHW zone

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°C	--
Status	standard Status attributes					
- OutOfService	void value: setpoint not available	M	true/false	bool	Y	true
- Overridden	setpoint value overridden true / false	O	true/false	bool	Y	true
- all other flags	not supported					
Command	standard Command, write only					
- Override & Release	override and release setpoint	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Link with Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 176 (DHWSM)		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 Override / Release function only. If 'Overridden' the DHWC uses the override value for DHW temperature control

2) Either implementation of {DHWModeEff + TempDHWSetpSetEff [4] (+ DHWModeEffNext) } or {TempDHWSetpEff}

2.2.4.6 Output DHWPush

Standard mode:

DP Name:	DHWPush	Abbr.:	---	Mandatory	☐
FB Name:	DHWSM			Can be internal	☐

Description

Resulting DHWPush command from DHWSM; for further details see LTE-Mode

Datapoint Type

DPT_Name:	DPT_Trigger				
DPT Format:	B_1	DPT_ID:	01.017		
Field	Description	Supp.	Range	Unit	Default
			{0,1} [1)]		0

Access Type

♦ Output

this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:		Min repetition period:	10sec
		Cyclic	☐	Period:	--		
Request	☐						

Communication Type

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

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value:	☐
	Transmit on bus:	☐			

Exception Handling

--

Special Features

[1)] this signal is transmitted once if condition for a DHW push occurs: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is not transmitted !

LTE-HEE mode:

FB: **DHWSM**	**LTE Server Output Name:** **DHWPush**	Mandatory ☐ Optional ☒

Description:

This trigger signal from the DHWSM indicates that the DHW storage tank must be loaded once to 'Normal' temperature level, independent of the actual DHW operating mode (DHWModeEff or DHWModeOptim). This signal is provided by the DHWSM only once on event (no heartbeat) after reception of a DHWPushUser signal if heat production is enabled (EnableDHWPrep = true). Redundant retransmission of DHWPush for higher reliability is not necessary => feedback for visualization is provided by DHWC in StatusDHWC

DPT:	Name	DPT_Trigger	DPT ID	01.017	Datatype format	B_1

Field	Description	Sup.	Range	Unit	COV	Default
			{0,1} [1)]	--	Y [1)]	0

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Link with Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	176 (DHWSM)	Property ID:	54
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒	MinRepTime: 10 sec	Heartbeat: -- min	
	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☐	Default Value ☐	
Property-Service (individual access):	Read only ☐ [2)]	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

--

Special Features:

[1)] this signal is transmitted once if condition for a DHW push occurs: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is not transmitted !

[2)] Read access is in principle possible but in practice not useful since the read-back value of this transient DP will always be 0

2.2.4.7 Output DHWModeUserEff

Standard mode:

DP Name:	DHWModeUserEff	Abbr.:	---	Mandatory	☐
FB Name:	DHWSM			Can be internal	☐

Description

This output contains the resulting DHW operating mode requested by the user. DHWMode from the DHW scheduler is overridden in the DHWSM if the value of DHWModeUserEff is ≠ 'AUTO'. DHWModeUserEff is derived from DHWModeUser and EnableDHWPrep inputs and possible local settings on the device containing the DHWSM. This output can be used for feedback on the MMI (UDHWSET). See also chapter 2.2.1

Datapoint Type

DPT_Name:	DPT_DHWMode				
DPT Format:	N_8	DPT_ID:	20.103		
Field	Description	Supp.	Range	Unit	Default
			0..4		cs

Access Type

♦ Output

this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☒	Δ-Value:		Min repetition period:	2 sec [1]
		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] the Min repetition period of 2 sec shall be respected if the COV of the signal is the result of a calculation. However the signal may be sent immediately if the COV is the result of user interaction (locally or by input signal, e.g. DHWModeUser).

LTE-HEE mode:

FB: DHWSM	**LTE Server Output Name:** DHWModeUserEff	Mandatory ☐ Optional ☒

Description:

This output contains the resulting DHW operating mode requested by the user in the same DHW Zone. DHWMode from the DHW scheduler is overridden in the DHWSM if the value of DHWModeUserEff is ≠ 'AUTO'. DHWModeUserEff is derived from DHWModeUser and EnableDHWPrep inputs and possible local settings on the device containing the DHWSM. This output can be used for feedback on the MMI (UDHWSET). See also chapter 2.2.1

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

Field	Description	Sup.	Range	Unit	COV	Default
DHWMode	actual DHW Mode	M	[0..4]		Y	cs
Status	standard Status attributes					
- OutOfService	void value true / false	O	true/false	bool	Y	false
- Overridden	DHW mode overridden true / false	O	true/false	bool	Y	false
- all other flags	not supported					
Command	standard Commands, Write only					
- Override / Release	Temporary override / release of DHWMode	O				
- Set / Reset OSV	Set / reset of out of service	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 176 (DHWSM)	Property ID: 56
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒ MinRepTime: 2 sec [2)]	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 or Set/Reset OSV function only (in practice usually not very meaningful for DHWModeUserEff)

[2)] the 2 sec MinRepTime shall be respected if the COV of the signal is the result of a calculation. However the signal may be sent immediately if the COV is the result of user interaction (locally or by input signal, e.g. DHWModeUser).

2.2.4.8 Input DHWMode

Standard Mode:

DP Name:	DHWMode	Abbr.:	---	Mandatory	☐
FB Name:	DHWSM			Can be internal	☒

Description

This input signal from a scheduler, management station etc. contains the actual requested DHW operating mode. In simple systems without DHW scheduling this input may be optional (usage of DHWModeUser only or fixed default DHW mode inside the DHWSM).

Datapoint Type

DPT_Name:	DPT_DHWMode				
DPT Format:	N_8	DPT_ID:	20.103		
Field	Description	Supp.	Range	Unit	Default
			1...4 [1)]	--	cs

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

[1)] value 0='Auto' is not allowed and shall be ignored => use default value

LTE-HEE Mode:

FB: DHWSM	**LTE ClientInput Name:** DHWMode	Mandatory ☐ Optional ☒

Description:

This input signal from a scheduler, management station etc. contains the actual requested DHW operating mode. In simple systems without DHW scheduling this input may be optional (usage of DHWModeUser only or fixed default DHW mode inside the DHWSM).

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

Field	Description	Sup.	Unit	Default
DHWMode	Actual DHW Mode, range [1..4] [1)]	M	enum.	cs
STATUS	Can be ignored by the DHWSM	NA		

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Link with Scheduler)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	111 (DHWS)	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)] value 0='Auto' is not allowed => to be ignored by the DHWSM => use default value
This input may be device-internal

2.2.4.9 Input DHWModeNext

Standard Mode: NA

LTE-HEE Mode:

FB: DHWSM	**LTE ClientInput Name:** DHWModeNext	Mandatory ☐ Optional ☒

Description:

This optional input signal from a scheduler, management station etc. contains next DHW operating mode and the time until the next mode.
This information is used by the DHWSM to generate the DHWModeEffNext output (considering also DHWModeUser)

DPT:	Name	DPT_DHWModeNext	DPT ID	206.102	Datatype format	$U_{16}N_8$

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

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Link with Scheduler)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	111 (DHWS)	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:

[1)] encoding of special conditions, see table below
This input may be device-internal

Interpretation of Time and DHWMode fields

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

2.2.4.10 Input EnableDHWPrep

Standard Mode:

DP Name:	EnableDHWPrep	Abbr.:	---	Mandatory	☐
FB Name:	DHWSM			Can be internal	☒

Description

see LTE-HEE Mode

Datapoint Type

DPT_Name:	DPT_Enable				
DPT Format:	B_1	DPT_ID:	1.003		
Field	Description	Supp.	Range	Unit	Default
				bool	enable

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: DHWSM	**LTE Client Input Name:** EnableDHWPrep	Mandatory ☐ Optional ☒

Description:

This input is provided by a scheduler or a supervisor and enables / disables DHW preparation requested by user interaction (DHWPushUser, DHWModeUser); see also chapter 2.2.1

DPT:	Name	DPT_Enable	DPT ID	1.003	Datatype format	B_1

Field	Description	Sup.	Unit	Default
			enum.	enable

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Link with Scheduler)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	111 (DHWS)	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 ☐

The DHWSM will use the default value ‘enable’ if this input signal is not present.

Special Features:

This input may be device-internal

2.2.4.11 Input DHWModeUser

Standard Mode:

DP Name:	DHWModeUser	Abbr.:	---	Mandatory	☐
FB Name:	DHWSM			Can be internal	☒

Description

This input signal from a HMI contains the actual DHW operating mode requested by the user. This input will override the DHWMode from the DHW scheduler if the value of DHWModeUser is ≠ 'AUTO'. See also chapter 2.2.1

Datapoint Type

DPT_Name:	DPT_DHWMode				
DPT Format:	N_8	DPT_ID:	20.103		
Field	Description	Supp.	Range	Unit	Default
			0...4	--	cs

Access Type

♦ Input

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

Communication Type

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

Dynamics

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

Exception Handling

--

Special Features

The signal is sent due to user interaction and has no timeout on the input side

LTE-HEE Mode:

FB: **DHWSM**	**LTE ClientInput Name:** **DHWModeUser**	Mandatory ☐ Optional ☒

Description:

This input signal from a HMI contains the actual DHW operating mode requested by the user in the same DHW Zone. This input will override the DHWMode from the DHW scheduler if the value of DHWModeUser is ≠ 'AUTO'. See also chapter 2.2.1

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

Field	Description	Sup.	Unit	Default
DHWMode	Actual DHW Mode, range [0..4]	M	enum.	cs
Status	standard Status attributes	M	bitset	
- OutOfService	void DHWMode value	M	bool	false
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	181 (UDHWSET)	Property ID:	51
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	-- 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 may be device-internal
The signal is sent due to user interaction and has no timeout on the input side

2.2.4.12 Input TempDHWSetpUser

Standard Mode:

DP Name:	TempDHWSetpUser	Abbr.:	---	Mandatory	☐
FB Name:	DHWSM			Can be internal	☒

Description

This input signal from a HMI contains the actual DHW setpoint for 'Normal' DHW operation mode requested by the user. This input value will be used to generate TempDHWSetpSetEff.Normal output value . See also chapter 2.2.1

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:	--
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

The signal is sent due to user interaction and has no timeout on the input side

LTE-HEE mode:

FB: **DHWSM**	**LTE Client Input Name:** **TempDHWSetpUser**	Mandatory ☐ Optional ☒

Description:

This input signal from a HMI in the same DHW Zone contains the actual DHW setpoint for 'Normal' DHW operation mode requested by the user. This input value will be used to generate TempDHWSetpSetEff.Normal output value . See also chapter 2.2.1

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

Field	Description	Sup.	Unit	Default
Temperature	DHW temperature setpoint value, 'Normal' level	M	°C	cs
Status	standard Status attributes	M	bitset	
- OutOfService	void setpoint value	M	bool	false
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	181 (UDHWSET)	Property ID:	52
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	-- 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 or value 'OutOfService' the DHWSM will use the TempDHWSetpSet.Normal parameter as default value to generate TempDHWSetSetEff[4] output

Special Features:

This input may be device-internal
The signal is sent due to user interaction and has no timeout on the input side

2.2.4.13 Input DHWPushUser

Standard Mode:

DP Name:	DHWPushUser	Abbr.:	---	Mandatory	☐
FB Name:	DHWSM			Can be internal	☒

Description

see LTE-HEE Mode

Datapoint Type

DPT_Name:	DPT_Trigger				
DPT Format:	B_1	DPT_ID:	01.017		
Field	Description	Supp.	Range	Unit	Default
			{0,1} [1)]	bool	0

Access Type

♦ Input

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

Communication Type

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

Dynamics

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

Exception Handling

--

Special Features

[1)] this signal is received once if condition for a DHW push occurred: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is not transmitted and would be ignored by the receiver!

LTE-HEE Mode Interface:

FB: DHWSM	**LTE Client Input Name:** DHWPushUser	Mandatory ☐ Optional ☒

Description:

This trigger signal is provided by HMI once on event (no heartbeat). It indicates that the user requests load of the DHW storage tank (once to 'Normal' temperature level, independent of the actual DHW operating mode). After reception of a DHWPushUser signal the DHWSM will generate one DHWPush signal if EnableDHWPrep = enabled; see also chapter 2.2.1

DPT:	Name	DPT_Trigger	DPT ID	1.017	Datatype format	B_1

Field	Description	Sup.	Unit	Default
			enum.	0

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	181 (UDHWSET)	Property ID:	53
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	-- 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 trigger signal is received once if condition for a DHW push occurred: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is normally not transmitted and would be ignored by the receiver!
This input may be device-internal

2.2.4.14 Parameter: DHWZone_Controller

FB: DHWSM	Property Name (Server): DHWZone_Controller	Mandatory ☒ Optional ☐

Description:

LTE zone: DHW Zone number, link with the FB's in the DHW controller circuit

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	number of DHW Zone	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):	176 (DHWSM)	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:

The corresponding DHWSM DP's are not LTE communicating if DHWZone_Controller is 'OutOfService'.

2.2.4.15 Parameter: DHWZone_Scheduler

FB: DHWSM	Property Name (Server): DHWZone_Scheduler	Mandatory ☐ Optional ☒

Description:

LTE zone: DHW Zone number, link with a DHW scheduler

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	number of DHW Zone	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):	176 (DHWSM)	Property ID:	102
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	

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

--

Special Features:

The implementation of this parameter is optional. If implemented the DHWSM may receive the information from an "external" DHW scheduler in a different DHWZone. If not implemented, the parameter DHWZone_Controller is valid for all inputs and outputs of the RSMHD.
The corresponding DHWSM DP's are not LTE communicating if DHWZone_Scheduler is 'OutOfService'.

2.2.4.16 Parameter TempDHWSetpLegioProtect

FB: DHWSM	Property Name (Server):	TempDHWSetpLegioProtect	Mandatory ☐ Optional ☒

Description:

DHW temperature setpoint for 'LegioProt' operating mode

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

Field	Description	Sup.	Range	Unit	Default
Temp	temperature setpoint value	M	cs	° C	cs [1]
Status - all flags	not supported, fixed to '0'	NA		bitset	
Command - NormalWrite - all other commands	not supported	M NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	176 (DHWSM)	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:

[1] recommended default value: 65°

2.2.4.17 Parameter TempDHWSetpNormal

FB: DHWSM	Property Name (Server):	TempDHWSetpNormal	Mandatory ☒ Optional ☐

Description:

DHW temperature setpoint for 'Normal' operating mode

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

Field	Description	Sup.	Range	Unit	Default
Temp	temperature setpoint value	M	cs	° C	cs [1]
Status - all flags	not supported, fixed to '0'	NA		bitset	
Command - NormalWrite - all other commands	not supported	M NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	176 (DHWSM)	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:

[1] recommended default value: 55°

2.2.4.18 Parameter TempDHWSetpReduced

FB: DHWSM	Property Name (Server):	TempDHWSetpReduced	Mandatory ☐ Optional ☒

Description:

DHW temperature setpoint for 'Reduced' operating mode

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

Field	Description	Sup.	Range	Unit	Default
Temp	temperature setpoint value	M	cs	° C	cs [1]
Status - all flags	not supported, fixed to '0'	NA		bitset	
Command - NormalWrite - all other commands	not supported	M NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	176 (DHWSM)	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:

[1] recommended default value: 40°

2.2.4.19 Parameter TempDHWSetpOff/FrostProtect

FB: DHWSM	Property Name (Server):	TempDHWSetpOff/FrostProtect	Mandatory ☐ Optional ☒

Description:

DHW temperature setpoint for 'Off/FrostProtect' operating mode

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

Field	Description	Sup.	Range	Unit	Default
Temp	temperature setpoint value	M	cs	° C	cs [1]
Status - all flags	not supported, fixed to '0'	NA		bitset	
Command - NormalWrite - all other commands	not supported	M NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	176 (DHWSM)	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:

[1] recommended default value: 5°

2.3 Functional Block: Domestic Hot Water Controller (DHWC)

2.3.1 Functional Specification

2.3.1.1 DHW temperature control

Load of a Domestic Hot Water circuit is controlled by a DHW Controller (DHWC) according to the requested actual hot water temperature setpoint and the actual temperature value(s) of the DHW storage tank.

DHW control loop mechanisms, load strategies and calculation methods for the flow temperature setpoint are company-specific and not part of this specification.

Optionally the DHWC may incorporate local optimizer functions like start/stop optimization for DHW load. **These optimization functions are company specific and not part of the DHWC specification**

The DHWSM provides information for the DHWC for DHW setpoint calculation:

- ‘DHWModeEff’ Contains the currently effective DHW operating mode from DHWSM which may depend on automatic time schedule, local user operation (MMI) etc.
- ‘DHWModeEffNext’ Contains the next DHW operating mode and the delay time until change of mode (according to advanced scheduling information, local user operation etc.)
  => used in the DHWC for local optimiser functionality
- ‘TempDHWSetpSetEff(4)‘ The effective temperature setpoints from DHWSM for the four different DHW operating modes: ‘LegioProtect’, ‘Normal’, ‘Reduced’ and ‘Off/FrostProtect’ (set of setpoints).
- ‘TempDHWSetpEff’ The currently effective DHW temperature setpoint from DHWSM (For simple DHW applications; no usage of DHWModeEff.)
- ‘DHWPush’ This signal provided by the DHWSM indicates that the DHW storage tank must be loaded once to ‘Normal’ temperature level, independent of the actual DHW operating mode

Interaction with an external HVAC Optimizer: see also chapter 2.1.3

- ‘DHWModeOptim’ Contains the optimised ‘DHWMode’ to be used in the DHWC instead of the ‘DHWModeEff’
- 'TempDHWSetpOptimShift' delta correction value to be added in the DHWC to the actual DHW temperature setpoint

DHW temperature setpoint calculation: For DHW load, the DHWC calculates the DHW temperature setpoint according to:

- ‘TempDHWSetpEff’ in very simple systems which are not based on DHWMode information
- 'DHWModeEff' or ‘DHWModeOptim’ (has priority) and the the corresponding setpoint from ‘TempDHWSetpSetEff(4)’
- the temperature offset 'TempDHWSetpOptimShift' provided by a central HVAC Optimizer
- local max. and min. DHW temperature limits: The DHWC is responsible that the DHW temperature setpoint is limited to these values. These values are neither checked in the DHWSM nor in a HVAC Optimizer.

Further inputs for DHW control are:

- ‘TempDHW’ — The actual DHW temperature from a DHWTS. Normally two independent sensors are connected: DHW High (start) and DHW Low (stop) sensors. Usually the DHW sensors are hard wired.

  Instead of the sensors also hard wired DHW thermostat(s) are possible.
- ‘StatusHPM’ — see chapter 2.3.1.7
- ‘StatusSDHWC’ — Contains information about availability of solar energy if a solar DHW controller is present in the DHWZone. This signal is used in the DHWC to disable conventional DHW load if sufficient solar energy is available.
- ‘LockSign...’ / ‘ForceSign...’ — The DHWC consumes locking and forcing signals from the HFDM and HPM, taking them into consideration by controlling the energy consumption of the DHW load procedure. See chapters 2.3.1.8 .. 2.3.1.11 and document [09]
- ‘DHWOtherEnergySource’ — This signal indicates, that another DHW source is active (e.g. electric DHW load) and that load by the DHWC should be disabled, see chapter 2.3.1.3

2.3.1.2 Flow temperature demand

The DHWC is connected to one Heat Distribution Segment. The DHWC calculates from the DHW temperature setpoint the corresponding flow temperature demand for its zone.

- TempFlowWaterDemAbsDHW — This mandatory output signal contains the calculated flow temperature demand (absolute value) of the DHWC 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 the DHW temperature setpoint to compensate temperature difference in the heat exchanger.

  The demand signal contains also attributes for load priority management (see chapter 2.3.1.12) and control of a common system pump in the Heat Distribution Segment (see chapter 2.3.1.14)

  The emergency demand ‘EmergDem’ attribute is also supported in the DHWC heat demand signal (optional feature). This attribute can be set by the DHWC to indicate a critical heat demand for frost protection if 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’)

The ‘DHWLegioReq’ attribute is included in the DHWC heat demand signal (optional feature) to indicate, that DHW load is active in legionella protection mode. ‘DHWLegioReq’ may be set only if DHW load is active (‘DHWReq’ attribute set)
‘DHWLegioReq’ information can be useful in the heat distribution system (HFDM) for optimized flow-/return temperature control. A pre-controller in the heat distribution system with active return temperature limitation can affect proper legionella protection due to reduced flow temperature to the DHWC. With ‘DHWLegioReq’ appropriate adaptation of the return temperature limitation can be managed by the heat distribution system

2.3.1.3 DHW energy source

DHW load during summer time is often done using electrical energy instead of conventional hot water supplied DHW load. The signal ‘DHWOtherEnergySource’ indicates whether load by DHWC is enabled or not. The function controlling electrical DHW load is located in the same device as DHWC and not part of this specification.

2.3.1.4 Solar energy support

Conventional DHW load may be supported by solar DHW load. DHW load mechanism can be influenced by the availability of solar energy. Usually conventional DHW load by the DHWC will be reduced or stopped, if sufficient solar energy is available (decision of DHWC).

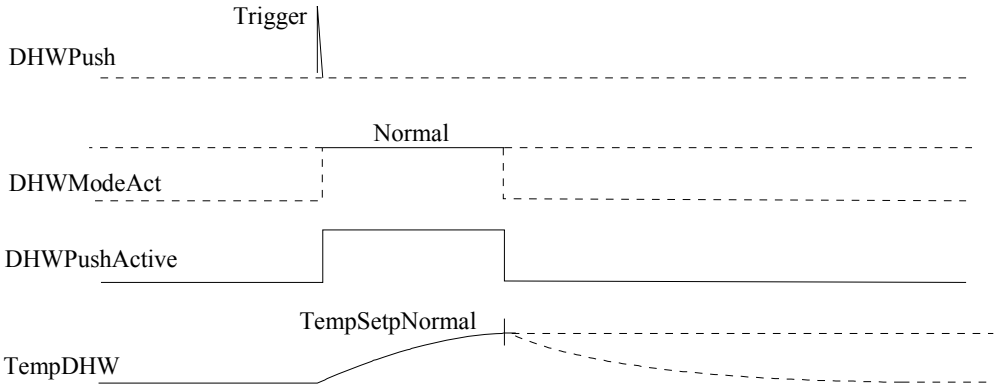
- The SDHWC provides the ‘StatusSDHWC’ containing information about availability of solar energy and ‘TempCollectorAct’ of the Flat plate/tube collector
- The DHWC provides attributes in ‘StatusDHWC’ indicating whether conventional DHW load by DHWC is stopped or reduced because of solar DHW load.

2.3.1.5 DHW Push

This command from the DHWSM indicates that the DHW storage tank must be loaded once to ‘Normal’ temperature level, independent of the actual DHW operating mode (DHWModeEff or DHWModeOptim). This signal is provided by the DHWSM only on event (no heartbeat) after reception of a DHWPushUser signal if heat production is enabled (EnableDHWPrep = true).

DHWPush has also an influence on the actual DHW mode in the DHWC:
=> DHWModeAct = ‘Normal’ during DHWPush

Example:



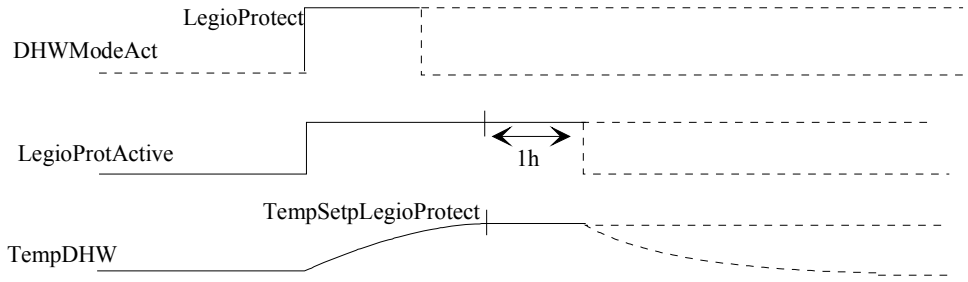
2.3.1.6 Legionella Protection

This function has similar behavior as “DHWPush”. Change from other DHW operating modes to LegioProtect mode is like a trigger for the DHWC to load DHW until the LegioProtect setpoint is reached and maintained during 1 hour.

If LegioProtect operating mode is only active for a short time (e.g. less than one hour) this can be considered as a trigger to start the legionella protection procedure as described above.

If LegioProtect operating mode is active for several hours (i.e. longer than the loading and hold time) this leads to a prolongation of the legionella protection procedure.

Example:



In case of LegioProtect mode the ‘DHWLegioReq’ attribute can be set in the DHWC heat demand signal (optional feature) for optimized flow-/return temperature control by the heat distribution system (HFDM), see 2.3.1.2

2.3.1.7 Usage of StatusHPM by the DHWC

The signal StatusHPM which is provided by the HPM / HFDM informs the DHWC e.g. if the heat production is on and is able do provide energy. This information is used in the DHWC e.g. in order to avoid unloading of the DHW storage tank if heat production is not ready.This information may also be used in the DHWC for local optimization purpose and “learning-functions”. These functions are company-specific.

2.3.1.8 Usage of LockSignHPM by the DHWC

If the DHWC receives a critical locking signal from the HPM the DHWC will stop/reduce DHW load according to the % reduction factor in any case.

If the DHWC receives a uncritical locking signal from the HPM the DHWC may stop/reduce DHW load according to the % reduction factor if the DHWC 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 DHWC. See also document [09]

2.3.1.9 Usage of ForceSignHPM by the DHWC

Forcing signals of the type ‘Protection’ or ‘Oversupply’ from HPM are only accepted by the DHWC if either the attribute ‘DHWLegio’ or ‘DHWNorm ‘is set (activate DHW load).

- If the DHWC receives a critical forcing signal (type ‘Protection’) it will react in any case (unconditional load). If ‘DHWLegio’ attribute is set, DHW load shall be activated with ‘LegioProtect’ setpoint. If ‘DHWNorm’ attribute is set, DHW load shall be activated with ‘Normal’ setpoint
- If the DHWC 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 solar DHW load is currently active. If the signal is accepted, the reaction is the same as for type ‘Protection’, see above

If the DHWC 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: Forcing signals must NOT have an influence on the calculation of the flow temperature demand signal of the DHWC (otherwise system may „oscillate“)

Implemetation of ForceSignHPM is an optional feature of the DHWC. . See also document [09]

2.3.1.10 Usage of LockSignHFDM in the DHWC

same procedure as for LockSignHPM, see chapter 2.3.1.8

2.3.1.11 Usage of ForceSignHFDM in the DHWC

same procedure as for ForceSignHPM, see chapter 2.3.1.9

2.3.1.12 DHW Load Priority Management

In many applications DHW load priority is requested. Absolute or shift load priority can be requested by the DHWC by setting the attributes ‘AbsLoadPriority’ or ‘ShiftLoadPriority’ in the TempFlowWaterDemAbsDHW 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 value 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 LockSignHFDM with X % power reduction value. See also documents [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 value. See also documents [07] and [09]

2.3.1.13 DHW load actuators

DHW load pump and mixing/switching valve are hard wired to the DHWC. Connection of intelligent pump/valve via bus is possible but not part of this specification.

2.3.1.14 System pump

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, see document [08]. The DHWC has usually its own load pump (see chapter 2.3.1.13) but depending on the hydraulic system the DHWC may need the activation of the common System Pump for DHW load. In this case the DHWC will set the ‘SystemPumpReq’ attribute in the TempFlowWaterDemAbsDHW signal if it has a valid heat demand.

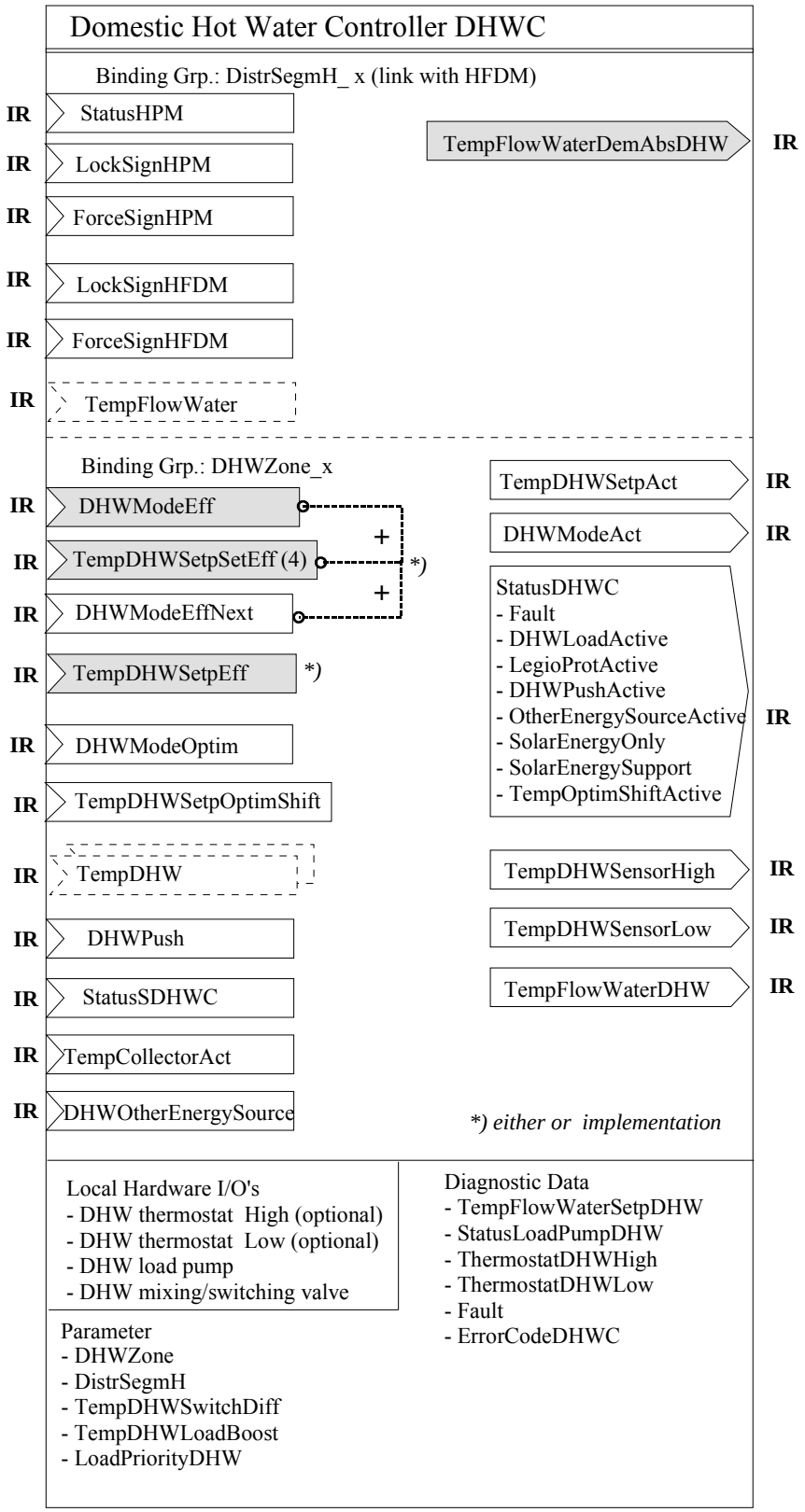
2.3.1.15 Common flow temperature

The common flow temperature ‘TempFlowWater’ in the Heat Distribution Segment is an optional input signal to the DHWC. It may be used to check the flow temperature before DHW loading in order to avoid unloading of the DHW storage tank.

2.3.2 Constraints

There is only one DHWC in one DHWZone.

2.3.3 Functional block diagram



2.3.4 Datapoint description

2.3.4.1 Overview

Datapoint	Description	Datapoint Type	DPT N°
Outputs			
TempFlowWaterDemAbsDHW	Flow temperature demand of the DHWC to be sent to the allocated HFDM	DPT_ TempFlowWaterDemAbs	210.100
TempDHWSetpAct	Actual DHW temperature setpoint / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
DHWModeAct	Actual active DHW mode used by the DHWC / LTE and S-interface	DPT_DHWMode_Z DPT_DHWMode	201.102 20.103
StatusDHWC	Status attributes of DHWC	DPT_StatusDHWC	22.100
- Fault	failure, some error in the DHWC (S-interface)	DPT_Bool	1.002
- DHWLoadActive	actual DHW load status: on / off (S-interface)	DPT_Bool	1.002
- LegioProtActive	legionella protection procedure active (load & hold) / (S-interface)	DPT_Bool	1.002
- DHWPushActive	DHW load due to DHW Push is active (S-interface)	DPT_Bool	1.002
- OtherEnergySourceActive	load by DHWC is disabled due to other active energy source, e.g. electrical (S-interface)	DPT_Bool	1.002
- SolarEnergyOnly	load by DHWC is disabled due to sufficient solar energy (S-interface)	DPT_Bool	1.002
- SolarEnergySupport	DHW load is partly done by solar energy (S-interface)	DPT_Bool	1.002
- TempOptimShiftActive	actual DHW temp setpoint is influenced by TempDHWSetpOptimShift ≠ 0 (S-interface)	DPT_Bool	1.002
TempDHWSensorHigh	actual DHW temperature sensor with higher position/temperature (DHW start temp) / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
TempDHWSensorLow	actual DHW temperature sensor with lower position/temperature (DHW stop temp) / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
TempFlowWaterDHW	Actual water flow temperature for DHW load / 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
DHWModeEff	present/active 'DHWMode' from DHWSM	DPT_DHWMode_Z	201.102

Datapoint	Description	Datapoint Type	DPT N°
TempDHWSetpSetEff [4]	set of effective DHW temperature setpoints for 'LegioProt', 'Normal', 'Reduced' and 'Off/Protection' operating modes from DHWSM	DTP_TempDHWSetpSet[4]	213.101
DHWModeEffNext	next DHW operating mode and time until change of mode from DHWSM	DPT_DHWModeNext	206.102
TempDHWSetpEff	present/effective DHW temperature setpoint from DHWSM / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
DHWModeOptim	optimized DHW mode from external HVAC Optimizer	DPT_DHWMode_Z	201.102
TempDHWSetpOptimShift	DHW temp. setpoint shift from external HVAC Optimizer / LTE and S-interface	DPT_TempHVACRel_Z DPT_Value_Tempd	205.101 9.002
TempDHW	Actual DHW storage tank temperature value(s). Two independent high / low sensors are possible - each sending its temperature value / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
DHWPush	DHW push command from DHWSM	DPT_Trigger	01.017
DHWOtherEnergySource	Status information from MMI etc. to indicate that another source for DHW load is active => disable load by DHWC	DPT_Bool	1.002
StatusSDHWC	indicates whether solar energy for DHW load is available or not	DPT_StatusSDHWC	21.103
TempCollectorAct	Solar flat plate/tube collector temperature from SDHWC / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
Parameters			
DHWZone	LTE zone: DHW zone number	DPT_UcountValue8_Z	202.002
DistrSegmH	LTE zone: number of the Heat Distribution Segment	DPT_UcountValue8_Z	202.002
TempDHWSwitchDiff	DHW switching differential temperature	DPT_TempHVACRel_Z	205.101 *)
TempDHWLoadBoost	DHW loading boost temperature	DPT_TempHVACRel_Z	205.101 *)
LoadPriorityDHW	DHW load priority: none, shift, absolute	DPT_LoadPriority	20.104
Diagnostic Data			
TempFlowWaterSetpDHW	Actual flow temperature setpoint for DHW load	DPT_TempHVACAbs_Z	205.100 *)
StatusLoadPumpDHW	actual relative power of the DHW load pump, % value; for switched pump 0%=off, 100%=on	DPT_RelValue_Z	202.001 *)
ThermostatDHWHigh	status of the DHW thermostat with higher position / temperature	DPT_Switch	1.001
ThermostatDHWLow	status of the DHW thermostat with lower position / temperature	DPT_Switch	1.001
Fault	failure, some error in the DHWC	DPT_Bool	1.002
ErrorCodeDHWC	company specific numeric error code	DPT_Value_2_Ucount	7.001

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**HEE**
Outputs	TempFlowWaterDemAbsDHW	**NA** [1]	NA	NA	M
	TempDHWSetpAct	**(GO$_b$)**		(GO)	O
	DHWModeAct	**(GO$_b$)**		(GO)	O
	StatusDHWC	**NA** [1]	NA	NA	O
	- Fault	**(GO$_b$)**		(GO)	NA
	- DHWLoadActive	**(GO$_b$)**		(GO)	NA
	- LegioProtActive	**(GO$_b$)**		(GO)	NA
	- DHWPushActive	**(GO$_b$)**		(GO)	NA
	- OtherEnergySourceActive	**(GO$_b$)**		(GO)	NA
	- SolarEnergyOnly	**(GO$_b$)**		(GO)	NA
	- SolarEnergySupport	**(GO$_b$)**		(GO)	NA
	- TempOptimShiftActive	**(GO$_b$)**		(GO)	NA
	TempDHWSensorHigh	**(GO$_b$)**		(GO)	O
	TempDHWSensorLow	**(GO$_b$)**		(GO)	O
	TempFlowWaterDHW	**(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
	DHWModeEff	**NA** [3]	NA	NA	M [2]
	TempDHWSetpSetEff [4]	**NA** [1]	NA	NA	M [2]
	DHWModeEffNext	**NA** [1]	NA	NA	O [2]
	TempDHWSetpEff	**GO$_b$** [2]	GO [2]	GO [2]	M [2]
	DHWModeOptim	**NA** [3]	NA	NA	O
	TempDHWSetpOptimShift	**(GO$_b$)**		(GO)	O
	TempDHW	**(GO$_b$)**		(GO)	O
	DHWPush	**(GO$_b$)**		(GO)	O
	DHWOtherEnergySource	**(GO$_b$)**		(GO)	O
	StatusSDHWC	**NA** [1]	NA	NA	O
	TempCollectorAct	**(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 { DHWModeEff + TempDHWSetpSetEff [4] (+ DHWModeEffNext) } or { TempDHWSetpEff }.
[3)] Implementation of DHWModeEff or DHWModeOptim inputs only without TempDHWSetpSetEff [4] does not make sense

Table 4: DHWC Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DHWZone	M
	DistrSegmH	M

Table 5: DHWC LTE specific Properties

		Support
Parameter	TempDHWSwitchDiff	O
	TempDHWLoadBoost	O
	LoadPriorityDHW	O
		O
Diagnostic Data	TempFlowWaterSetpDHW	O
	StatusLoadPumpDHW	O
	ThermostatDHWHigh	O
	ThermostatDHWLow	O
	Fault	O
	ErrorCodeDHWC	O
		O

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

2.3.4.2 Output TempFlowWaterDemAbsDHW

Standard mode: NA

LTE-HEE mode:

FB: DHWC	LTE Server Output Name: TempFlowWaterDemAbsDHW	Mandatory ☒ Optional ☐

Description:

This output signal contains the calculated flow temperature demand (absolute value) of the DHWC. It is sent to the HFDM in the corresponding Heat Distribution Segment. Calculation of the flow temperature demand: see chapter 2.3.1.2

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 for DHW load	M	full temp. range	°C	2	cs
Attributes						
- DemandValid	Validity of TempFlowDem (false means also "NoDemand")	M	true/false	bool	Y	false
- AbsLoadPriority	set if absolute load priority is requested by the DHWC	O	true/false	bool	Y	false
- ShiftLoadPriority	set if shift load priority is requested by the DHWC	O	true/false	bool	Y	false
- MaxTempLimit	set if flow temp. in the Distribution Segment must be limited to max. value (often the case for DHW load)	O	true/false	bool	Y	false
- MinTempLimit	for cold water only	NA	false	bool	N	false
- DHWReq	indicates that a DHW circuit has heat demand	M	true/false	bool	N	false
- RoomCtrlReq	for Room heating only	NA	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 frost protection	O	true/false	bool	Y	false
- DHWLegioReq	demand from DHW while legionella function is active (can only be 'true' if DHWReq = 'true')	O	true/false	bool	N	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	177 (DHWC)	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:

--

2.3.4.3 Output TempDHWSetpAct

Standard mode:

DP Name:	TempDHWSetpAct			Abbr.:	--				Mandatory	☐	
FB Name:	DHWC								Can be internal	☐	
Description											
Currently active DHW temperature setpoint											
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 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: **DHWC**	**LTE Server Output Name:** **TempDHWSetpAct**	Mandatory ☐ Optional ☒

Description:

Currently active DHW temperature setpoint of the DHW zone

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	standard Status attributes					
- OutOfService	void value: setpoint not available	M	true/false	bool	Y	true
- Overridden	setpoint value overridden true / false	O	true/false	bool	Y	false
- all other flags	not supported					
Command	standard Command, write only					
- Override & Release	override and release setpoint	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 177 (DHWC)	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 ☒ [1)]	

Exception Handling: Save at Powerdown ☐

--

Special Features:

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

2.3.4.4 Output DHWModeAct

Standard mode:

DP Name:	DHWModeAct	Abbr.:	---	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

This output contains the currently active DHW Mode used by the DHWC (output used mainly for visualisation or in the DHW Circulation Pump Controller)

Datapoint Type

DPT_Name:	DPT_DHWMode				
DPT Format:	N_8	DPT_ID:	20.103		
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: DHWC	**LTE Server Output Name:** DHWModeAct	Mandatory ☐ Optional ☒

Description:

This output contains the currently active DHW Mode used by the DHWC (used mainly for visualisation or in the DHW Circulation Pump Controller)

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

Field	Description	Sup.	Range	Unit	COV	Default
DHWMode	actual DHW Mode	M	[1..4] 1)		Y	cs
Status - Overridden - all other flags	standard Status attributes DHW 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 ☐		
Application Specific ☒	DHWZone	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 177 (DHWC)	Property ID: 56
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 DHWC uses internally and sends the override value

2.3.4.5 Output StatusDHWC

Standard mode: separate boolean datapoints Fault, DHWLoadActive, LegioProtActive, DHWPushActive, OtherEnergySourceActive, SolarEnergyOnly, SolarEnergySupport, TempOptimShiftActive

LTE-HEE mode:

FB: DHWC	**LTE Server Output Name:** StatusDHWC	Mandatory ☐ Optional ☒

Description:

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

DPT:	Name	DPT_StatusDHWC	DPT ID	22.100	Datatype format	B_{16}

Field	Description	Sup.	Range	Unit	COV	Default
- Fault	DHWC has a failure	M	true/false	bool	Y	false
- DHWLoadActive	DHW load is currently active	O	true/false	bool	Y	false
- LegioProtActive	legionella protection procedure active (load & hold)	O	true/false	bool	Y	false
- DHWPushActive	true during DHW load triggered by a 'DHWPush' command	O	true/false	bool	Y	false
- OtherEnergySource Active	load by DHWC is disabled due to other active energy source (e.g. electrical)	O	true/false	bool	Y	false
- SolarEnergyOnly	load by DHWC is disabled due to sufficient solar energy	O	true/false	bool	Y	false
- SolarEnergySupport	DHW load is partly done by solar energy	O	true/false	bool	Y	false
- TempOptimShiftActive	actual DHW temp setpoint is influenced by TempDHWSetpOptimShift ≠ 0	O	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 177 (DHWC)	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:

--

2.3.4.6 Output Fault

Standard mode

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

Description

reports a failure in the DHWC; 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

2.3.4.7 Output DHWLoadActive

Standard mode

DP Name:	DHWLoadActive	Abbr.:	--	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

indicates whether DHW load is currently 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

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LTE-HEE mode: NA

2.3.4.8 Output LegioProtActive

Standard mode

DP Name:	LegioProtActive	Abbr.:	--	Mandatory	☐
FB Name:	DHWC			Can be internal	☐
Description					
indicates whether legionella protection procedure is active (load & hold); 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

2.3.4.9 Output DHWPushActive

Standard mode

DP Name:	DHWPushActive			Abbr.:	--			Mandatory	☐
FB Name:	DHWC							Can be internal	☐
Description									
reports whether DHW load due to DHW Push is active or not; 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

2.3.4.10 Output OtherEnergySourceActive

Standard mode

DP Name:	OtherEnergySourceActive	Abbr.:	--	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

reports whether load by DHWC is disabled due to other active energy source, e.g. electrical; 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

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LTE-HEE mode: NA

2.3.4.11 Output SolarEnergyOnly

Standard mode

DP Name:	SolarEnergyOnly	Abbr.:	--	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

reports whether load by DHWC is disabled due to sufficient solar energy; 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

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LTE-HEE mode: NA

2.3.4.12 Output SolarEnergySupport

Standard mode

DP Name:	SolarEnergySupport	Abbr.:	--	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

reports whether DHW load is partly done by solar energy; 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

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LTE-HEE mode: NA

2.3.4.13 Output TempOptimShiftActive

Standard mode

DP Name:	TempOptimShiftActive	Abbr.:	--	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

reports whether actual DHW temp setpoint is influenced by TempDHWSetpOptimShift ≠ 0; 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

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LTE-HEE mode: NA

2.3.4.14 Output TempDHWSensorHigh

Standard mode

DP Name:	TempDHWSensorHigh		Abbr.:	--				Mandatory	☐		
FB Name:	DHWC							Can be internal	☐		
Description											
Current value of the DHW temperature sensor with higher position/temperature (DHW start temperature)											
Datapoint Type											
DPT_Name:	DPT_Value_Temp										
DPT Format:	F_{16}						DPT_ID:	9.001			
Field	Description						Supp.	Range		Unit	Default
								full range		°C	cs
Access Type											
♦ Output											
this → M	☒		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: DHWC	**LTE Server Output Name:** TempDHWSensorHigh	Mandatory ☐ Optional ☒

Description:

Current value of the DHW temperature sensor with higher position/temperature (DHW start temperature)

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	DHW 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 ☐		
Application Specific ☒	DHWZone	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 177 (DHWC)		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 AlarmAck function only

2.3.4.15 Output TempDHWSensorLow

Standard mode

DP Name:	TempDHWSensorLow			Abbr.:	--				Mandatory	☐	
FB Name:	DHWC								Can be internal	☐	
Description											
Current value of the DHW temperature sensor with lower position/temperature (DHW stop temperature)											
Datapoint Type											
DPT_Name:	DPT_Value_Temp										
DPT Format:	F_{16}						DPT_ID:	9.001			
Field	Description						Supp.	Range		Unit	Default
								full range		°C	cs
Access Type											
♦ Output											
this → M	☒		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: DHWC	**LTE Server Output Name:** TempDHWSensorLow	Mandatory ☐ Optional ☒

Description:

Current value of the DHW temperature sensor with lower position/temperature (DHW stop temperature)

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	DHW 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 ☐		
Application Specific ☒	DHWZone	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 177 (DHWC)	Property ID: 54
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

2.3.4.16 Output TempFlowWaterDHW

Standard mode

DP Name:	TempFlowWaterDHW			Abbr.:	--				Mandatory	☐	
FB Name:	DHWC								Can be internal	☐	
Description											
Current water flow temperature for DHW load											
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: **DHWC**	**LTE Server Output Name:** **TempFlowWaterDHW**	Mandatory ☐ Optional ☒

Description:

Current water flow temperature for DHW load

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	DHW 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 ☐		
Application Specific ☒	DHWZone	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 177 (DHWC)		Property ID: 57	
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 AlarmAck function only

2.3.4.17 Input StatusHPM

Standard mode: NA

LTE-HEE mode:

FB: DHWC	**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 DHWC (company specific solution). See chapter 2.3.1.7

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	some failure in the boiler/boiler sequence (mainly for monitoring); manufacturer specific reaction in the DHWC	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:

--

2.3.4.18 Input LockSignHPM

Standard mode: NA

LTE-HEE mode:

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

Description:

see chapter 2.3.1.8 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)

2.3.4.19 Input ForceSignHPM

Standard mode: NA

LTE-HEE mode:

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

Description:

see chapter 2.3.1.9 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	Load DHW to 'Normal' Level in case of overheat ('Protection' or 'Oversupply')	M	bool	false
- DHWLegio	Load DHW to 'LegioProtect' Level in case of overheat ('Protection' or 'Oversupply')	M	bool	false
- RoomHComf [2)]	Load Room Heating to 'Comfort' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- RoomHMax [2)]	Load Room Heating with maximum flow temperature in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	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 Room Heating are not considered in the DHWC

2.3.4.20 Input LockSignHFDM

Standard mode: NA

LTE-HEE mode:

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

Description:

see chapter 2.3.1.10 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 (primary)	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 DHWC shall react accordingly

2.3.4.21 Input ForceSignHFDM

Standard mode: NA

LTE-HEE mode:

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

Description:

see chapter 2.3.1.11 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	Load DHW to 'Normal' Level in case of overheat ('Protection' or 'Oversupply')	M	bool	false
- DHWLegio	Load DHW to 'LegioProtect' Level in case of overheat ('Protection' or 'Oversupply')	M	bool	false
- RoomHComf [2)]	Load Room Heating to 'Comfort' Level in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false
- RoomHMax [2)]	Load Room Heating with maximum flow temperature in case of overheat ('Protection' or 'Oversupply') =>not supported	NA	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmH (primary)	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 Room Heating are not considered in the DHWC

2.3.4.22 Input TempFlowWater

Standard mode

DP Name:	TempFlowWater	Abbr.:	--	Mandatory	☐
FB Name:	DHWC			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: **DHWC**	**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. Usage in the DHWC => see chapter 2.3.1.15

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

Special Features:

This input can be internal

2.3.4.23 Input DHWModeEff

Standard Mode: NA

LTE-HEE Mode:

FB: DHWC	**LTE ClientInput Name:** DHWModeEff	Mandatory ☒ [1] Optional ☐

Description:

This input signal from DHWSM contains the currently active DHW operating mode of the DHW Zone which is used in the DHWC to determine the actual DHW temperature setpoint.

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	176 (DHWSM)	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 DHWModeOptim is received from an external Optimizer, the DHWC will ignore the signal DHWModeEff from the DHWSM and use the optimised DHW Mode instead. See also chapter 2.1.3

[1] Either implementation of { DHWModeEff + TempDHWSetpSetEff [4] (+ DHWModeEffNext) } or { TempDHWSetpEff }. This input can be device-internal

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

2.3.4.24 Input TempDHWSetpSetEff [4]

Standard Mode: NA

LTE-HEE Mode:

FB: DHWC	**LTE ClientInput Name:** TempDHWSetpSetEff [4]	Mandatory ☒ 1) Optional ☐

Description:

This input signal contains the calculated set (4 values) of DHW temperature setpoints for 'LegioProtect', 'Normal', 'Reduced' and 'Off/FrostProtect' from the DHWSM in the same DHWZone. The temperature set is used in the DHWC in order to determine the actual DHW temperature setpoint.

DPT:	Name	DPT_TempDHWSetpSet[4]	DPT ID	213.101	Datatype format	$V_{16}V_{16}V_{16}V_{16}$

Field	Description	Sup.	Unit	Default 2)
TempSetpLegioProtect	DHW temperature setpoint for LegioProtect operating mode	M	°C	cs
TempSetpNormal	DHW temperature setpoint for Normal operating mode	M	°C	cs
TempSetpReduced	DHW temperature setpoint for Reduced operating mode	M	°C	cs
TempSetpOff/FrostProtect	DHW temperature setpoint for Off/FrostProtect operating mode	M	°C	cs

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	176 (DHWSM)	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 { DHWModeEff + TempDHWSetpSetEff [4] (+ DHWModeEffNext) } or { TempDHWSetpEff }. This input can be device-internal

2) recommended default values: 65°, 55°, 40°, 5°

2.3.4.25 Input DHWModeEffNext

Standard Mode: NA

LTE-HEE Mode:

FB: DHWC	**LTE ClientInput Name:** DHWModeEffNext	Mandatory ☐ Optional ☒ [1]

Description:

This optional input signal from DHWSM contains next DHW operating mode and the time until the next mode
This signal is e.g. used by the DHWC to calculate the optimised start/stop time for DHW load

DPT:	Name	DPT_DHWModeEffNext	DPT ID	206.102	Datatype format	$U_{16}N_8$

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	176 (DHWSM)	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 { DHWModeEff + TempDHWSetpSetEff [4] (+ DHWModeEffNext) } or { TempDHWSetpEff }. This input can be device-internal
[2] encoding of special conditions, see table below

Interpretation of Time and DHWMode fields

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

2.3.4.26 Input TempDHWSetpEff

Standard mode

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

Description:

This input is provided by the DHWSM and defines the effective (after corrections) DHW setpoint which is currently valid for the DHW controller. This information is used for simple applications (operation without DHWMode).

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

Field	Description	Sup.	Unit	Default
Temperature	DHW 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 ☐		
Application Specific ☒	DHWZone (Link with Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	176 (DHWSM)	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 DHWC will have a company specific behaviour

Special Features:

[1] Either implementation of { DHWModeEff + TempDHWSetpSetEff [4] (+ DHWModeEffNext) } or { TempDHWSetpEff }. This input can be device-internal

2.3.4.27 Input DHWModeOptim

Standard Mode: NA

LTE-HEE Mode:

FB: DHWC	**LTE ClientInput Name:** DHWModeOptim	Mandatory ☐ Optional ☒

Description:

This input can be provided by an external HVAC Optimiser and defines the optimised DHW operating mode for the DHWC

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	115 (HVACOPT)	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)] DHWMode 0= ‘Auto’ or Status ‘OutOfService’ => no optimiser active, DHWC uses DHWModeEff
DHWMode 1..4: IMPORTANT: if this signal is supported by the DHWC and received from the HVAC Optimiser, the DHWC will ignore the signal DHWModeEff from the DHWSM and use the optimised DHW Mode instead if DHWModeOptim is ≠ ‘Auto

2.3.4.28 Input TempDHWSetpOptimShift

Standard Mode:

DP Name:	TempDHWSetpOptimShift	Abbr.:	---	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

This optional input signal from an external HVAC Optimiser contains a correction value to the actual DHW temperature setpoint.

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

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LTE-HEE Mode Interface:

FB: DHWC	**LTE Client Input Name:** TempDHWSetpOptimShift	Mandatory ☐ Optional ☒

Description:

This optional input signal from an external HVAC Optimiser contains a correction value to the actual DHW temperature setpoint.

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

Field	Description	Sup.	Unit	Default
Temperature	DHW 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 ☐		
Application Specific ☒	DHWZone	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	115 (HVACOPT)	Property ID:	54
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:

--

2.3.4.29 Input TempDHW

Standard mode

DP Name:	TempDHW	Abbr.:	--	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

This input signal from a remote DHW temperature sensor (DHWTS) contains one actual DHW temperature value which is used for DHW load control.
In simple DHW systems, only one DHW temperature sensor may be linked to the DHWC. But in more sophisticated systems two temperature values are needed in the DHWC in order to take into account the different water temperature levels in the DHW storage tank.

– DHW sensor high (start temperature): sensor placed at a position in the DHW storage tank with the highest water temperature. DHW load starts if this temperature is below the actual DHW setpoint.
– DHW sensor low (stop temperature): sensor placed at a position in the DHW storage tank with the lowest water temperature. DHW load stops if this temperature reaches the actual DHW setpoint.

If both temperatures are needed by the DHWC, two independent remote DHWTS can be linked to the DHWC. In standard mode two separate group objects have to be implemented in the DHWC.

The mapping of these two sensor values to the TempDHWSensorHigh and TempDHWSensorLow datapoints can be done automatically in the DHWC.
– the sensor providing the higher temperature value is mapped to the TempDHWSensorHigh datapoint
– the sensor providing the lower temperature value is mapped to the TempDHWSensorLow datapoint

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

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Special Features

DHW temperature sensors are today usually hard wired.
In simple systems a hard-wired DHW thermostat may be used instead of the TempDHW sensors

LTE-HEE mode:

FB: DHWC	**LTE Client Input Name:** TempDHW	Mandatory ☐ Optional ☒

Description:

This input signal from a remote DHW temperature sensor (DHWTS) contains one actual DHW temperature value which is used for DHW load control. In simple DHW systems, only one DHW temperature sensor may be linked to the DHWC. But in more sophisticated systems two temperature values are needed in the DHWC in order to take into account the different water temperature levels in the DHW storage tank.

DHW load strategy with two sensors (illustrative example):

– DHW sensor high (start temperature): sensor placed at a position in the DHW storage tank with the highest water temperature. DHW load starts if this temperature is below the actual DHW setpoint.
– DHW sensor low (stop temperature): sensor placed at a position in the DHW storage tank with the lowest water temperature. DHW load stops if this temperature reaches the actual DHW setpoint.

If both temperatures are needed by the DHWC, two independent remote DHWTS can be linked to the DHWC. In LTE-mode both sensors will send the TempDHW signal (same datapoint) in the same binding group DHWZone. The signals are differentiated in the receiver only by the source individual address of the sender.

The mapping of these two sensor values to the TempDHWSensorHigh and TempDHWSensorLow datapoints can be done automatically in the DHWC.

– the sensor providing the higher temperature value is mapped to the TempDHWSensorHigh datapoint
– the sensor providing the lower temperature value is mapped to the TempDHWSensorLow datapoint

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

Field	Description	Sup.	Unit	Default
TempDHW	DHW 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 ☒	DHWZone	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	180 (DHWTS)	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 DHWC will use a company specific default value after power-up or in case of communication failure, if no sensor data is received.

Special Features:

DHW temperature sensors are today usually hard wired.
In simple systems a hard-wired DHW thermostat may be used instead of the TempDHW sensors

2.3.4.30 Input DHWPush

Standard Mode:

DP Name:	DHWPush	Abbr.:	---	Mandatory	☐
FB Name:	DHWC			Can be internal	☒

Description

see LTE-HEE Mode

Datapoint Type

DPT_Name:	DPT_Trigger				
DPT Format:	B_1	DPT_ID:	01.017		
Field	Description	Supp.	Range	Unit	Default
			{0,1} [1)]	bool	0

Access Type

♦ Input

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

Communication Type

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

Dynamics

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

Exception Handling

--

Special Features

[1)] this signal is received once if condition for a DHW push occurred: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is not transmitted and would be ignored by the receiver!

LTE-HEE Mode Interface:

FB: DHWC	**LTE Client Input Name:** DHWPush	Mandatory ☐ Optional ☒

Description:

This trigger signal is provided by the DHWSM once on event (no heartbeat). It indicates that the user requests load of the DHW storage tank (once to 'Normal' temperature level, independent of the actual DHW operating mode); see also chapter 2.3.1.5

DPT:	Name	DPT_Trigger	DPT ID	1.017	Datatype format	B_1

Field	Description	Sup.	Unit	Default
			enum.	0

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	176 (DHWSM)	Property ID:	54
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	-- 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 trigger signal is received once if condition for a DHW push occurred: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is normally not transmitted and would be ignored by the receiver!
This input can be device-internal.

2.3.4.31 Input DHWOtherEnergySource

Standard Mode:

DP Name:	DHWOtherEnergySource	Abbr.:	---	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

See LTE-HEE Mode

Datapoint Type

DPT_Name:	DPT_Bool				
DPT Format:	B_1	DPT_ID:	01.002		

Field	Description	Supp.	Range	Unit	Default
			false, true	bool	cs

Access Type

♦ Input

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

Communication Type

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

Dynamics

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

Exception Handling

--

Special Features

--

LTE-HEE Mode Interface:

FB: DHWC	**LTE Client Input Name:** DHWOtherEnergySource	Mandatory ☐ Optional ☒

Description:

This signal from e.g. an user MMI or management station indicates, that another DHW energy source is active and that load by the DHWC should be disabled.
Example: electric DHW load during summer time

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

Field	Description	Sup.	Unit	Default
			bool.	cs

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	181 (UDHWSET)	Property ID:	54
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:			--
	Timeout:	121 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 device-internal

2.3.4.32 Input StatusSDHWC

Standard mode: NA

LTE-HEE mode:

FB: DHWC	LTE Client Input Name: StatusSDHWC	Mandatory ☐ Optional ☒

Description:

This signal contains various status information concerning availability of solar energy. It is only provided if a solar DHW controller SDHWC is present in the DHWZone. This signal is used in the DHWC to disable conventional DHW load if sufficient solar energy is available.

DPT:	Name	DPT_StatusSDHWC	DPT ID	21.103	Datatype format	B_8

Field	Description	Sup.	Unit	Default
Attributes				
- Fault	SDHWC has a failure	M	bool	false
- SDHWLoadActive	SDHW load currently active, solar pump is running	M	bool	false
- SolarLoadSufficient	enough solar energy available for DHW load to reach the DHW temperature setpoint	M	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	186 (SDHWC)	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:

--

2.3.4.33 Input TempCollectorAct

Standard mode

DP Name:	TempCollectorAct	Abbr.:	--	Mandatory	☐
FB Name:	DHWC			Can be internal	☐

Description

Actual solar flat plate/tube collector temperature (usually provided by SDHWC) ; see chapter 2.3.1.4

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: **DHWC**	**LTE Client Input Name:** **TempCollectorAct**	Mandatory ☐ Optional ☒

Description:							
Solar flat plate/tube collector temperature from SDHWC; see chapter 2.3.1.4							
DPT:	Name	DPT_TempHVACAbs_Z	DPT ID	205.100	Datatype format	$V_{16}Z_8$	
Field	Description				Sup.	Unit	Default
TempCollector	Collector 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 ☒	DHWZone		1	
Unassigned ☐	Broadcast ☐	Configurable ☐		
DP Address:	IO Type(ID):	186 (SDHWC)	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 Powerup:	Default Value ☒	Stored Value ☐
Exception Handling:		Save at Powerdown ☐
The DHWC will use a company specific default value after power-up or in case of communication failure, if no sensor data is received.		
Special Features:		
--		

2.3.4.34 Parameter: DHWZone

FB: DHWC	Property Name (Server): DHWZone	Mandatory ☒ Optional ☐

Description:

LTE zone: DHW Zone number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	number of DHW Zone	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):	177 (DHWC)	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:

DHWC DP's are not LTE communicating if DHWZone is 'OutOfService'.

2.3.4.35 Parameter DistrSegmH

FB: DHWC	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):	177 (DHWC)	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:

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

2.3.4.36 Parameter TempDHWSwitchDiff

FB: DHWC	Property Name (Server): TempDHWSwitchDiff	Mandatory ☐ Optional ☒

Description:

DHW switching differential temperature

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

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

Communication:

DP Address:	IO Type(ID):	177 (DHWC)	Property ID:	116
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

--

Special Features:

--

2.3.4.37 Parameter TempDHWLoadBoost

FB: DHWC	Property Name (Server): TempDHWLoadBoost	Mandatory ☐ Optional ☒

Description:

DHW loading boost temperature: for flow temperature setpoint / demand calculation normally a temperature offset is added to the DHW temperature setpoint to compensate temperature difference in the heat exchanger

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

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

Communication:

DP Address:	IO Type(ID):	177 (DHWC)	Property ID:	117
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

--

Special Features:

--

2.3.4.38 Parameter LoadPriorityDHW

FB: DHWC	Property Name (Server): LoadPriorityDHW	Mandatory ☐ Optional ☒

Description:

DHW load priority: None / Shift load priority / Absolute load priority

DPT:	Name	DPT_LoadPriority	DPT ID	20.104	Datatype format	N_8

Field	Description	Sup.	Range	Unit	Default
			{0,1,2}	enum	cs

Communication:

DP Address: (in the server)	IO Type(ID):	177 (DHWC)	Property ID:	118
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

--

Special Features:

--

2.3.4.39 Diagnostic data TempFlowWaterSetpDHW

FB: DHWC	Property Name (Server): TempFlowWaterSetpDHW	Mandatory ☐ Optional ☒

Description:

Currently active flow temperature setpoint of the DHWC for DHW load

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 DHW load active)	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):	177 (DHWC)	Property ID:	110
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

--

Special Features:

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

2.3.4.40 Diagnostic data StatusLoadPumpDHW

FB: DHWC	Property Name (Server): StatusLoadPumpDHW	Mandatory ☐ Optional ☒

Description:

Actual relative power of the DHW load pump

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

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

Communication:

DP Address:	IO Type(ID):	177 (DHWC)	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:

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

2.3.4.41 Diagnostic data ThermostatDHWHigh

FB: DHWC	Property Name (Server): ThermostatDHWHigh	Mandatory ☐ Optional ☒

Description:

status of the DHW thermostat with higher position / temperature

DPT:	Name	DPT_Switch	DPT ID	1.001	Datatype format	B_1

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

Communication:

DP Address:	IO Type(ID):	177 (DHWC)	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:

--

2.3.4.42 Diagnostic data ThermostatDHWLow

FB: DHWC	Property Name (Server): ThermostatDHWLow	Mandatory ☐ Optional ☒

Description:

status of the DHW thermostat with lower position / temperature

DPT:	Name	DPT_Switch	DPT ID	1.001	Datatype format	B_1

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

Communication:

DP Address: (in the server)	IO Type(ID):	177 (DHWC)	Property ID:	113
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

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

--

Special Features:

--

2.3.4.43 Diagnostic data Fault

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

Description:

Some error in the DHWC

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):	177 (DHWC)	Property ID:	114
	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

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

--

Special Features:

--

2.3.4.44 Diagnostic data ErrorCodeDHWC

FB: DHWC	Property Name (Server): ErrorCodeDHWC	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):	177 (DHWC)	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:

--

2.4 Functional Block: DHW Circulation Pump Controller (DHWCPC)

2.4.1 Functional Specification

DHW circulation pump is controlled by the functional block DHW Circulation Pump Controller DHWCPC.

Main purpose of the DHWCPC:

- reduce runtime of the DHW circulation pump to a minimum (energy saving, noise)
- In some DHW systems the DHW circulation pump should be disabled during DHW load.

The circulation pump is usually hard wired to the DHWCPC. Connection of an intelligent remote pump via bus is in principle possible but not described in this document since control signal(s) to an intelligent pump are not yet specified.

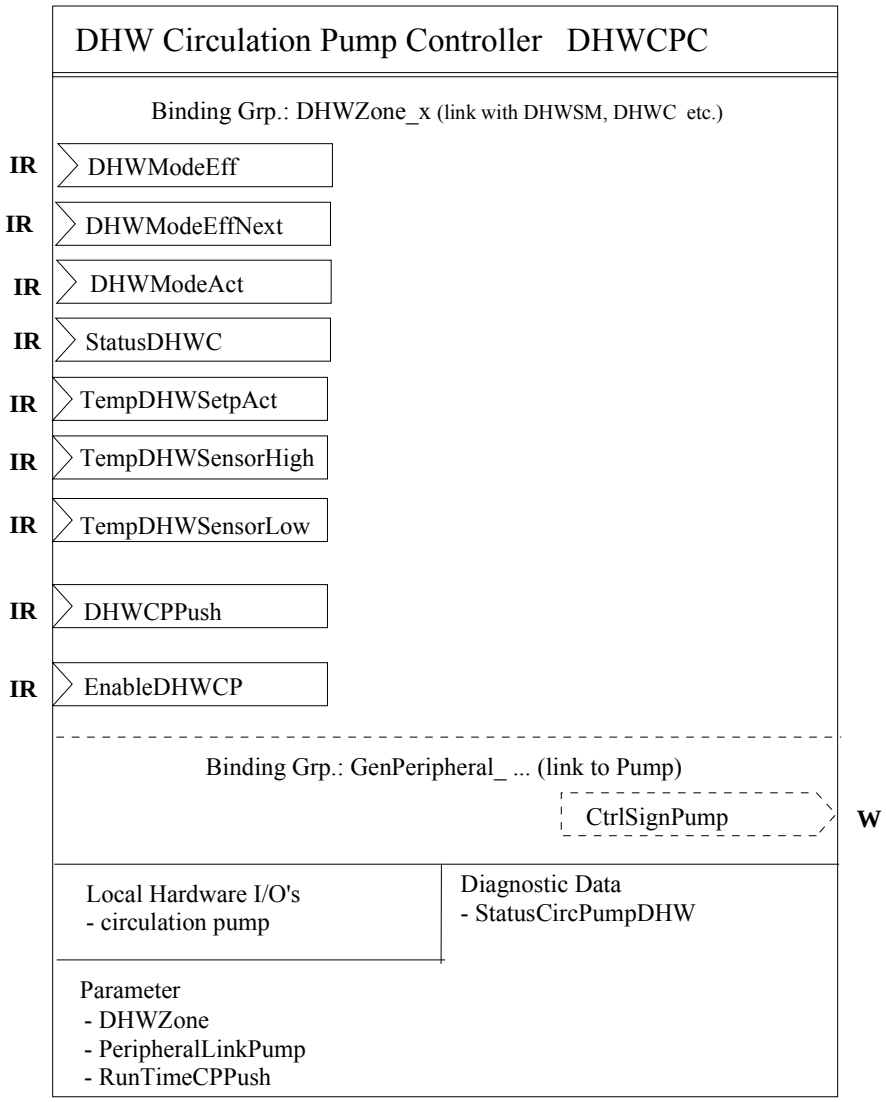
The mechanisms of DHWCPC are company specific. The following input signals can be used in order to decide whether the circulation pump is on or off. See also overview in chapter 2.1.5

- 'DHWModeEff' — Contains the effective DHW operating mode from DHWSM. It may depend on automatic time schedule, local user operation (MMI) etc. On/off ratio of the circulation pump may depend on the DHW operating mode
- 'DHWModeEffNext' — Contains the next DHW operating mode and the time until change of mode. This information may be used to turn the pump on some time before e.g. 'Normal' level is requested
- 'DHWModeAct' — Contains the locally active DHW operating mode of the DHWC which may be different of DHWModeEff due to local/external optimiser function or DHWPush => if present, DHWModeAct normally supersedes DHWModeEff
- 'StatusDHWC' — Status from DHWC containing various information which can be useful for optimisation, e.g.:
  - DHW push status: may be used to turn on the pump for a certain time
  - DHW load status: to avoid DHW circulation during DHW load
- 'TempDHWSetpAct' — Currently active DHW temperature setpoint in the DHWC
- 'TempDHWSensorHigh' — Current DHW start temperature is used to avoid transport of cold water if DHW temp is low or much below the 'TemDHWSetpAct'
- 'TempDHWSensorLow' — Current DHW stop temperature is used to avoid transport of cold water if DHW temp is low or much below the 'TemDHWSetpAct'
- 'DHWCPPush' — This signal provided by an MMI indicates that the user requests temporary DHW circulation independent of the actual DHW operating mode. This input is a trigger which starts circulation pump running for a certain time (depending on the parameter RunTimeCPPush)
- EnableDHWCP — This signal is e.g. provided by an scheduler. It enables / disables the circulation pump independent of the actual DHW Mode (schedule for DHW circulation may be independent of DHW load).

2.4.2 Constraints

The DHWCPC is often combined with the DHWC and/or DHWSM in the same device and therefore some of the inputs of the DHWCPC may be device-internal.

2.4.3 Functional block diagram



2.4.4 Datapoint description

2.4.4.1 Overview

Datapoint	Description	Datapoint Type	DPT N°
Outputs			
CtrlSignPump	placeholder (not yet defined): command for DHW circulation pump with bus interface	t.b.d, probably complex DPT	t.b.d.
Inputs			
DHWModeEff	present/active 'DHWMode' from DHWSM / LTE and S-interface	DPT_DHWMode_Z DPT_DHWMode	201.102 20.103
DHWModeEffNext	next DHW operating mode and time until change of mode from DHWSM	DPT_DHWModeNext	206.102
DHWModeAct	currently active DHW mode used by the DHWC / LTE and S-interface	DPT_DHWMode_Z DPT_DHWMode	201.102 20.103
StatusDHWC	Status attributes of DHWC	DPT_StatusDHWC	22.100
TempDHWSetpAct	currently active DHW temperature setpoint in the DHWC / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
TempDHWSensorHigh	current DHW temperature of the sensor with higher position/temperature (DHW start temp) / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
TempDHWSensorLow	current DHW temperature of the sensor with lower position/temperature (DHW stop temp) / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
DHWCPPush	DHW circulation pump push command from MMI => trigger	DPT_Trigger	01.017
EnableDHWCP	enables / disables DHW circulation pump (e.g. from a scheduler)	DPT_Enable	1.003
Parameters			
DHWZone	LTE zone: DHW zone number	DPT_UcountValue8_Z	202.002
PeripheralLinkPump	LTE zoning number Peripheral link to pump	DPT_UcountValue16_Z	203.012
RunTimeCPPush	run time of circulation pump after DHWCPPush trigger	DPT_TimePeriodMin	07.006
Diagnostic Data			
StatusCircPumpDHW	actual relative power of the DHW circulation pump, % value; for switched pump 0%=off, 100%=on	DPT_RelValue_Z	202.001 *)

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	CrlSignPump not yet defined				
Inputs	DHWModeEff	**(GO_b)**		(GO)	O
	DHWModeEffNext	**NA** [1)]	NA	NA	O
	TempDHWSetpAct	**(GO_b)**		(GO)	O
	DHWModeAct	**(GO_b)**		(GO)	O
	StatusDHWC	**NA** [1)]	NA	NA	O
	TempDHWSensorHigh	**(GO_b)**		(GO)	O
	TempDHWSensorLow	**(GO_b)**		(GO)	O
	DHWCPPush	**(GO_b)**		(GO)	O
	EnableDHWCPC	**(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

Table 7: DHWCPC Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DHWZone	M
	PeripheralLinkPump	O

Table 8: DHWCPC LTE specific Properties

		Support
Parameter	RunTimeCPPush	O
		O
Diagnostic Data	StatusCircPumpDHW	O
		O

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

2.4.4.2 Output CtrlSignPump

To be defined later together with pump manufacturers.

2.4.4.3 Input DHWModeEff

Standard Mode:

DP Name:	DHWModeEff	Abbr.:	---	Mandatory	☐
FB Name:	DHWCPC			Can be internal	☒
Description					
present/active 'DHWMode' from DHWSM					
Datapoint Type					
DPT_Name:	DPT_DHWMode				
DPT Format:	N_8	DPT_ID:	20.103		

Field	Description	Supp.	Range	Unit	Default
			1..4 [1)]	--	cs

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							
[1)] value 0='Auto' is not allowed and shall be ignored => use default value							

LTE-HEE Mode: Optional input; otherwise same as in DHWC

2.4.4.4 Input DHWModeEffNext

Standard Mode: NA

LTE-HEE Mode: Optional input; otherwise same as in DHWC

2.4.4.5 Input DHWModeAct

Standard Mode:

DP Name:	DHWModeAct	Abbr.:	---	Mandatory	☐
FB Name:	DHWCPC			Can be internal	☒

Description

See LTE-HEE mode

Datapoint Type

DPT_Name:	DPT_DHWMode				
DPT Format:	N_8	DPT_ID:	20.103		
Field	Description	Supp.	Range	Unit	Default
			1..4 [1)]	--	cs

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

[1)] value 0='Auto' is not allowed and shall be ignored => use default value

LTE-HEE Mode:

FB: DHWCPC	**LTE ClientInput Name:** DHWModeAct	Mandatory ☐ Optional ☒

Description:

This input contains the currently active DHW Mode used by the DHWC which may be different from DHWModeEff due to an optimizer function or DHWPush
If available, this input will usually have priority over DHWModeEff

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

Field	Description	Sup.	Unit	Default
DHWMode	currently active DHW Mode in DHWC, range [1..4][1)]	M	enum.	cs
Status - Overridden - all other flags	standard Status attributes DHW mode overridden true / false not supported	O NA	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	177 (DHWC)	Property ID:	56
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:	--		

Value after Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This input can be device-internal
[1)] value 0='Auto' is not allowed => to be ignored by the DHWC => use default value

2.4.4.6 Input StatusDHWC

Standard mode: NA

LTE-HEE mode:

FB: DHWCPC	**LTE Client Input Name:** StatusDHWC	Mandatory ☐ Optional ☒

Description:

This signal contains various status information of the DHWC which may be used by the DHWCPC in order to decide whether the circulation pump is on or off. Some of the attributes of StatusDHWC are usually are not relevant for circulation pump control

DPT:	Name	DPT_StatusDHWC	DPT ID	22.100	Datatype format	B_{16}

Field	Description	Sup.	Unit	Default
Attributes				
- Fault	DHWC has a failure	O	bool	false
- DHWLoadActive	DHW load is currently active	O	bool	false
- LegioProtActive	legionella protection procedure active (load & hold)	O	bool	false
- DHWPushActive	true during DHW load triggered by a 'DHWPush' command	O	bool	false
- OtherEnergySource Active	load by DHWC is disabled due to other active energy source (e.g. electrical)	O	bool	false
- SolarEnergyOnly	load by DHWC is disabled due to sufficient solar energy	(O)	bool	false
- SolarEnergySupport	DHW load is partly done by solar energy	(O)	bool	false
- TempOptimShiftActive	actual DHW temp setpoint is influenced by TempDHWSetpOptimShift ≠ 0	(O)	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 177 (DHWC)	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 ☐

--

Special Features:

This input can be device-internal

2.4.4.7 Input TempDHWSetpAct

Standard mode

DP Name:	TempDHWSetpAct	Abbr.:	--	Mandatory	☐
FB Name:	DHWCPC			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: **DHWCPC**	**LTE Client Input Name:** **TempDHWSetpAct**	Mandatory ☐ Optional ☒

Description:

This input is provided by the DHWC contains the currently active DHW temperature setpoint of the DHW zone

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

Field	Description	Sup.	Unit	Default
Temperature	DHW 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		

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	177 (DHWC)	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 Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This input can be device-internal

2.4.4.8 Input TempDHWSensorHigh

Standard mode

DP Name:	TempDHWSensorHigh	Abbr.:	--	Mandatory	☐
FB Name:	DHWCPC			Can be internal	☒

Description

Current value of the DHW temperature sensor with higher position/temperature (DHW start temperature)

Datapoint Type

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

Access Type

♦ 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: **DHWCPC**	**LTE Client Input Name:** **TempDHWSensorHigh**	Mandatory ☐ Optional ☒

Description:

This input is provided by the DHWC contains the current value of the DHW temperature sensor with higher position/temperature (DHW start temperature)

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

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	177 (DHWC)	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 Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This input can be device-internal

2.4.4.9 Input TempDHWSensorLow

Standard mode

DP Name:	TempDHWSensorLow	Abbr.:	--	Mandatory	☐
FB Name:	DHWCPC			Can be internal	☒

Description

Actual value of the DHW temperature sensor with lower position/temperature (DHW stop temperature)

Datapoint Type

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

Access Type

♦ 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: **DHWCPC**	**LTE Client Input Name:** **TempDHWSensorLow**	Mandatory ☐ Optional ☒

Description:

This input is provided by the DHWC contains the current value of the DHW temperature sensor with lower position/temperature (DHW stop temperature)

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

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	177 (DHWC)	Property ID:	54
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:			--
	Timeout:	31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This input can be device-internal

2.4.4.10 Input DHWCPPush

Standard Mode:

DP Name:	DHWCPPush	Abbr.:	---	Mandatory	☐
FB Name:	DHWCPC			Can be internal	☒

Description

see LTE-HEE Mode

Datapoint Type

DPT_Name:	DPT_Trigger				
DPT Format:	B_1	DPT_ID:	01.017		
Field	Description	Supp.	Range	Unit	Default
			{0,1} [1)]	bool	0

Access Type

♦ Input

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

Communication Type

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

Dynamics

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

Exception Handling

--

Special Features

[1)] this signal is received once if condition for a DHW circulation pump push occurred: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is not transmitted and would be ignored by the receiver!

LTE-HEE Mode Interface:

FB: DHWCPC	**LTE Client Input Name:** DHWCPPush	Mandatory ☐ Optional ☒

Description:

This trigger signal is provided by e.g. an MMI once on event (no heartbeat). It indicates that the user requests temporary DHW circulation independent of the actual DHW operating mode. This input is a trigger which starts circulation pump running for a certain time (depending on the parameter RunTimeCPPush)

DPT:	Name	DPT_Trigger	DPT ID	1.017	Datatype format	B_1

Field	Description	Sup.	Unit	Default
			enum.	0

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	181 (UDHWSET)	Property ID:	55
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	-- 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 trigger signal is received once if condition for a DHW circulation pump push occurred: the datapoint value is 1 = ‘trigger’. Value = 0 (‘no action’) is normally not transmitted and would be ignored by the receiver!
This input can be device-internal

2.4.4.11 Input EnableDHWCP

Standard Mode:

DP Name:	EnableDHWCP			Abbr.:	---			Mandatory	☐		
FB Name:	DHWCPC							Can be internal	☒		
Description											
see LTE-HEE Mode											
Datapoint Type											
DPT_Name:	DPT_Enable										
DPT Format:	B_1					DPT_ID:	1.003				
Field	Description					Supp.	Range		Unit	Default	
									bool	cs	
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: **DHWCPC**	**LTE Client Input Name:** **EnableDHWCP**	Mandatory ☐ Optional ☒

Description:							
This input is provided by a DHW circulation pump scheduler and enables / disables DHW circulation pump							
DPT:	Name	DPT_Enable	DPT ID	1.003	Datatype format	B_1	
Field	Description				Sup.	Unit	Default
						enum.	cs

Communication:			
Binding Group:			
Class	Type		Default
Geographical ☐			
Application Specific ☒	DHWZone		1
Unassigned ☐	Broadcast ☐	Configurable ☐	
DP Address:	IO Type(ID):	112 (DHWCPS) 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 device-internal

2.4.4.12 Parameter: DHWZone

FB: DHWCPC	Property Name (Server): DHWZone	Mandatory ☒ Optional ☐

Description:

LTE zone: DHW Zone number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	number of DHW Zone	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:	IO Type(ID):	179 (DHWCPC)	Property ID:	101
(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:

DHWC DP's are not LTE communicating if DHWZone is 'OutOfService'.

2.4.4.13 Parameter PeripheralLinkPump

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

Description:

LTE zoning number Peripheral link to circulation pump: pump is not yet defined. This datapoint is a placeholder.

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

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

Communication:

DP Address:	IO Type(ID):	179 (DHWCPC)	Property ID:	103
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

--

Special Features:

--

2.4.4.14 Parameter RunTimeCPPush

FB: DHWCPC	Property Name (Server): RunTimeCPPush	Mandatory ☐ Optional ☒

Description:

run time of circulation pump after DHWCPPush trigger

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

Field	Description	Sup.	Range	Unit	Default
			cs	min	cs

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	179 (DHWCPC) 1	Property ID: N° of elements	111 1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

--

Special Features:

--

2.4.4.15 Diagnostic data StatusCircPumpDHW

FB: DHWCPC	Property Name (Server): StatusCircPumpDHW	Mandatory ☐ Optional ☒

Description:

Actual relative power of the DHW circulation pump

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

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

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	179 (DHWCPC) 1	Property ID: N° of elements	110 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

2.5 Functional Block: Solar Domestic Hot Water Controller (SDHWC)

2.5.1 Functional Specification

See also figure in chapter 2.1.4

In solar energy supported DHW systems and additional Solar Domestic Hot Water Controller (SDHWC) is present besides the DHWC. Usually SDHWC works autonomously, i.e. SDHWC provides as much energy as possible to the DHW storage tank. Internal SDHWC control mechanisms are very company specific and not part of this specification.

Conventional DHW load by the DHWC may be influenced by the availability of solar energy. Usually conventional DHW load will be stopped or reduced, if sufficient solar energy is available. This is decided by the DHWC. The SDHWC provides the 'StatusSDHWC' and 'TempCollectorAct' containing information about availability of solar energy.

Inputs:

- 'TempCollector' is the flow-temperature from flat plate/tube collector. This sensor is usually hard wired but also a bus connected remote sensor is possible.
- 'StatusDHWC' containing various status information from DHWC
- 'TempDHWSetpAct' actual DHW temperature setpoint in the DHWC
- 'TempDHWSensorHigh' actual DHW start temperature of DHW storage tank near solar heat exchanger
- 'TempDHWSensorLow' actual DHW stop temperature of DHW storage tank

Output:

- Signal for solar pump I/0
- 'StatusSDHWC' DHWC load control containing information about availability of solar energy, solar load status
- 'TempCollectorAct' actual collector temperature (e.g. for an MMI)

SDHW load function (example):

DT = 'TempCollector' – 'TempDHWSensorLow'

If DT > 6 - 8 K then solar pump on

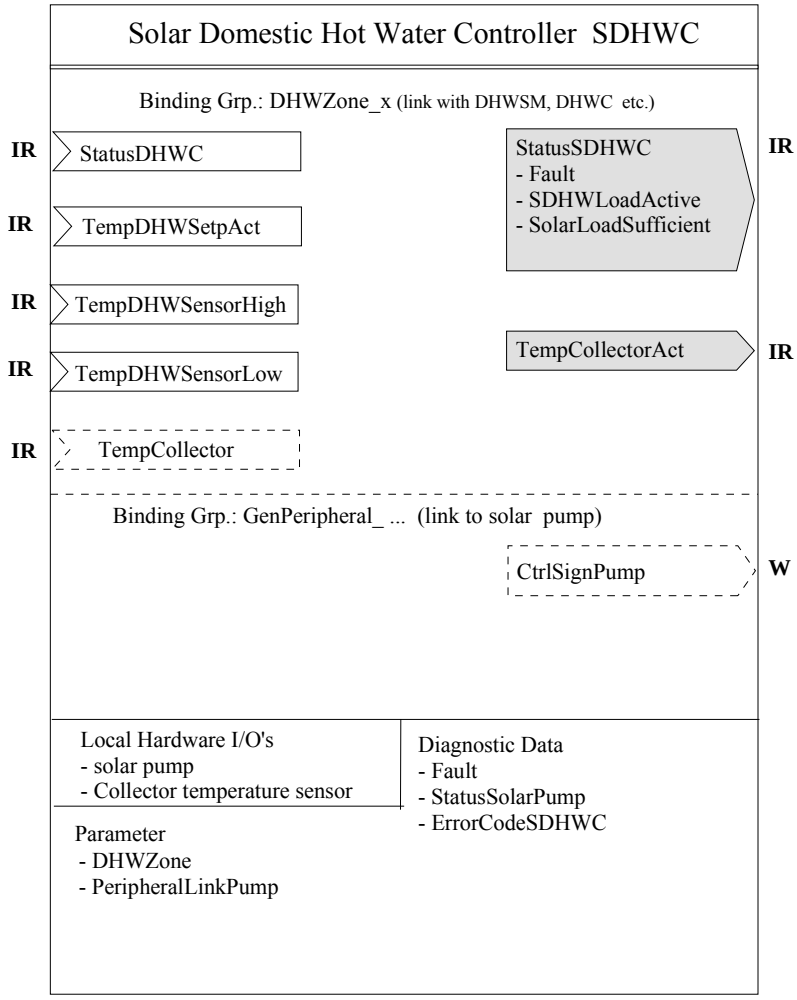
If DT < 2 K then solar pump off

If 'TempDHWSensorHigh' > 65°C then solar pump off

2.5.2 Constraints

Only one SDHWC is allowed in one DHWZone

2.5.3 Functional block diagram



2.5.4 Datapoint description

2.5.4.1 Overview

Datapoint	Description	Datapoint Type	DPT N°
Outputs			
StatusSDHWC	indicates whether solar energy for DHW load is available or not	DPT_StatusSDHWC	21.103
- Fault	failure, some error in the SDHWC	DPT_Bool	1.002
- SDHWLoadActive	SDHW load currently active, solar pump is running	DPT_Bool	1.002
- SolarLoadSufficient	enough solar energy available for DHW load to reach the DHW temperature setpoint	DPT_Bool	1.002
TempCollectorAct	Current collector temperature used by SDHWC / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
CtrlSignPump	placeholder (not yet defined): command for DHW solar pump with bus interface	t.b.d, probably complex DPT	t.b.d.
Inputs			
StatusDHWC	Status attributes of DHWC	DPT_StatusDHWC	22.100
TempDHWSetpAct	Actual DHW temperature setpoint / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
TempDHWSensorHigh	actual DHW temperature sensor with higher position/temperature (DHW start temp) / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
TempDHWSensorLow	actual DHW temperature sensor with lower position/temperature (DHW stop temp) / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
TempCollector	collector temperature sensor value / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
Parameters			
DHWZone	LTE zone: DHW zone number	DPT_UcountValue8_Z	202.002
PeripheralLinkPump	LTE zoning number Peripheral link to solar pump	DPT_UcountValue16_Z	203.006
Diagnostic Data			
Fault	failure, some error in the SDHWC	DPT_Bool	1.002
StatusSolarPump	actual relative power of the solar pump, % value; for switched pump 0%=off, 100%=on	DPT_RelValue_Z	202.001 *)
ErrorCodeSDHWC	company specific numeric error code	DPT_Value_2_Ucount	7.001

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	S-Mode	Standard Mode Interface	LTE-Mode
Outputs	StatusSDHWC	**NA** [1)]	NA	NA	M
	- Fault	**GO$_b$**	GO	GO	NA
	- SDHWLoadActive	**GO$_b$**	GO	GO	NA
	- SolarLoadSufficient	**GO$_b$**	GO	GO	NA
	TempCollectorAct	**GO$_b$**	GO	GO	M
	CrlSignPump not yet defined				
Inputs	StatusDHWC	**NA** [1)]	NA	NA	O
	TempDHWSetpAct	**(GO$_b$)**		(GO)	O
	TempDHWSensorHigh	**(GO$_b$)**		(GO)	O
	TempDHWSensorLow	**(GO$_b$)**		(GO)	O
	TempCollector	**(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*

Table 10: SDHWC Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DHWZone	M
	PeripheralLinkPump	O

Table 11: SDHWC LTE specific Properties

		Support
Parameter	--	
		O
Diagnostic Data	Fault	O
	StatusSolarPump	O
	ErrorCodeSDHWC	O

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

2.5.4.2 Output StatusSDHWC

Standard mode: separate datapoints Fault, SDHWLoadActive, SolarLoadSufficient

LTE-HEE mode:

FB: SDHWC	**LTE Server Output Name:** StatusSDHWC	Mandatory ☒ Optional ☐

Description:

This signal contains various status information concerning availability of solar energy. This signal can be used for visualization or optimized DHW load control (e.g. in the DHWC to disable conventional DHW load if sufficient solar energy is available)

DPT:	Name	DPT_StatusSDHWC	DPT ID	21.103	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
Attributes			true/false	bool	Y	false
- Fault	SDHWC has a failure	M	true/false	bool	Y	false
- SDHWLoadActive	SDHW load currently active, solar pump is running	M	true/false	bool	Y	false
- SolarLoadSufficient	enough solar energy available for DHW load to reach the DHW temperature setpoint	M	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	186 (SDHWC)	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:

--

2.5.4.3 Output Fault

Standard mode

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

Description

reports a failure in the SDHWC; 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

2.5.4.4 Output SDHWLoadActive

Standard mode

DP Name:	SDHWLoadActive			Abbr.:	--				Mandatory	☒	
FB Name:	SDHWC								Can be internal	☐	
Description											
indicates whether SDHW load is currently active and solar pump is running											
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

2.5.4.5 Output SolarLoadSufficient

Standard mode

DP Name:	SolarLoadSufficient	Abbr.:	--	Mandatory	☒
FB Name:	SDHWC			Can be internal	☐

Description
indicates whether enough solar energy is available for DHW load to reach the DHW temperature setpoint

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

2.5.4.6 Output TempCollectorAct

Standard mode

DP Name:	TempCollectorAct			Abbr.:	--				Mandatory	☒	
FB Name:	SDHWC								Can be internal	☐	
Description											
Currently value of the solar collector temperature sensor of the SDHWC											
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: SDHWC	**LTE Server Output Name:** TempCollectorAct	Mandatory ☒ Optional ☐

Description:

Current value of the solar collector temperature sensor of the SDHWC

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	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 ☐		
Application Specific ☒	DHWZone	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 186 (SDHWC)	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 ☒ [1)]	

Exception Handling: Save at Powerdown ☐

--

Special Features:

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

2.5.4.7 Output CtrlSignPump

To be defined later together with pump manufacturers.

2.5.4.8 Input StatusDHWC

Standard mode: NA

LTE-HEE mode: same as in DHWCPC, see chapter 2.4.4.6

Some attributes have no effect on the SDHWC or must be ignored to avoid a 'closed loop' with DHWC:
- SolarEnergyOnly
- SolarEnergySupport

2.5.4.9 Input TempDHWSetpAct

same as in DHWCPC, see chapter 2.4.4.7

2.5.4.10 Input TempDHWSensorHigh

same as in DHWCPC, see chapter 2.4.4.8

2.5.4.11 Input TempDHWSensorLow

same as in DHWCPC, see chapter 2.4.4.9

2.5.4.12 Input TempCollector

Standard mode

DP Name:	TempCollector	Abbr.:	--	Mandatory	☐
FB Name:	SDHWC			Can be internal	☒

Description

Current solar flat plate/tube collector sensor value (from remote sensor)

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: SDHWC	**LTE Client Input Name:** TempCollector	Mandatory ☐ Optional ☒

Description:

Current solar flat plate/tube collector sensor value (from remote sensor)

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

Field	Description	Sup.	Unit	Default
TempCollector	Collector temperature value	M	°C	cs
Status	standard Status attributes	M	bitset	
- Fault	sensor failure true / false	M	bool	false
- OutOfService	void sensor value true / false	O	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 ☒	DHWZone	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	187 (COLTS)	Property ID:	51
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:			--
	Timeout:	31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This input can be device-internal. The sensor is often hard-wired

2.5.4.13 Parameter: DHWZone

FB: SDHWC	Property Name (Server): DHWZone	Mandatory ☒ Optional ☐

Description:

LTE zone: DHW Zone number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	number of DHW Zone	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):	186 (SDHWC)	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:

DHWC DP's are not LTE communicating if DHWZone is 'OutOfService'.

2.5.4.14 Parameter PeripheralLinkPump

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

Description:

LTE zoning number Peripheral link to solar pump: pump is not yet defined. This datapoint is a placeholder.

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

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

Communication:

DP Address: (in the server)	IO Type(ID):	186 (SDHWC)	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:

--

2.5.4.15 Diagnostic data Fault

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

Description:

Some error in the SDHWC

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):	186 (SDHWC)	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:

--

2.5.4.16 Diagnostic data StatusSolarPump

FB: SDHWC	Property Name (Server): StatusSolarPump	Mandatory ☐ Optional ☒

Description:

Actual relative power of the solar pump

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

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

Communication:

DP Address: (in the server)	IO Type(ID):	186 (SDHWC)	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:

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

2.5.4.17 Diagnostic data ErrorCodeSDHWC

FB: SDHWC	Property Name (Server): ErrorCodeSHHWC	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):	186 (SDHWC)	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:

--

2.6 Functional Block: DHW Temperature Sensor (DHWTS)

2.6.1 Functional Specification

The functional block 'Domestic Hot Water Temperature Sensor' measures the temperature in the DHW storage tank and provides the data to the bus / system.

Normally two independent DHW temperature sensors are connected to a DHW storage tank:
i.e. DHW High (start) and DHW Low (stop) sensors. In LTE mode this two sensors are located in the same LTE zone (see below).

The distribution of the DHW temperature in the system is event-driven (COV-condition, change of value) and in addition repeated periodically.

Optional feature: The sensor value may be corrected by a parameter value.

In the LTE-Mode the DHWTS supports LTE DHW zoning,
i.e. multiple DHW temperature values may be distributed in the system in parallel for different DHW zones.

Optional features in LTE Mode:
- Faults in the sensor device may be detected and reported.
- The sensor value may temporary be overridden by means of a tool for service purposes. The 'Overridden' condition must be reported.
- Alarm limits may be detected by the sensor and are reported. The alarm may be acknowledged.
- The sensor may be set / reset out of service by means of a tool for service purposes.

Output

- TempDHW	This output provides the DHW temperature to the bus.

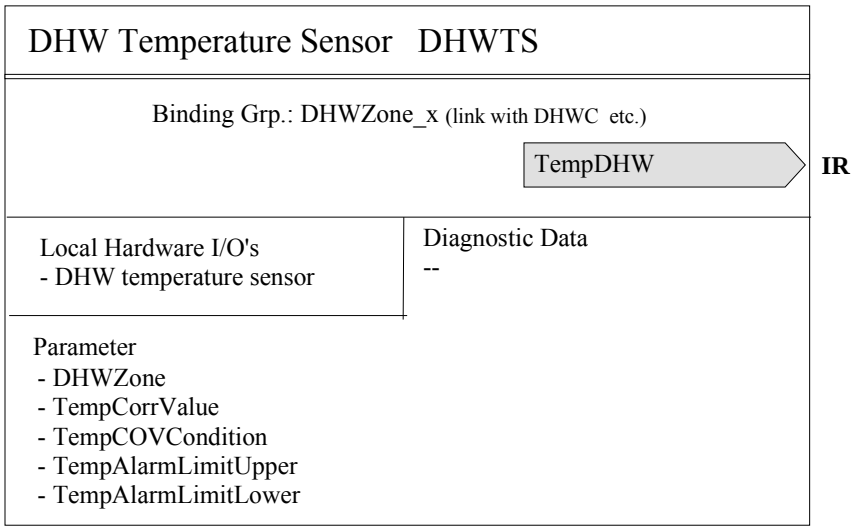
Parameters

- TempCorrValue	This parameter specifies the correction value for the sensor.
- TempCOVCondition	This parameter defines the delta temperature value at which the information spontaneously is transmitted.
- TempAlarmLimitUpper	This value can be used to create an alarm.
- TempAlarmLimitLower	This value can be used to create an alarm.

2.6.2 Constraints

DHW sensors are today often hard-wired to the DHWC

2.6.3 Functional block diagram



2.6.4 Datapoint description

2.6.4.1 Overview

Datapoint	Description	Datapoint Type	DPT N°
Outputs			
TempDHW	Current DHW temperature sensor value / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
Inputs			
--			
Parameters			
DHWZone	LTE zone: DHW zone number	DPT_UcountValue8_Z	202.002
TempCorrValue	For offset correction of the sensor value	DPT_TempHVACRel_Z	205.101 *)
TempCOVCondition	Value for COV condition	DPT_TempHVACRel_Z	205.101 *)
TempAlarmLimitUpper	Upper alarm limit for generating STATUS ‘Alarm’	DPT_TempHVACAbs_Z	205.100 *)
TempAlarmLimitLower	Lower alarm limit for generating STATUS ‘Alarm’	DPT_TempHVACAbs_Z	205.100 *)
Diagnostic Data			
--			

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	S-Mode	Standard Mode Interface	LTE-Mode
Outputs	TempDHW	**GO_b**	GO	GO	**M**
Inputs	--				

Table 13: DHWTS Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DHWZone	M

Table 14: DHWTS LTE specific Properties

		Support
Parameter	TempCorrValue	O
	TempCOVCondition	O
	TempAlarmLimitUpper	O
	TempAlarmLimitLower	O
Diagnostic Data	--	

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

2.6.4.2 Output TempDHW

Standard Mode:

DP Name:	TempDHW	Abbr.:	---	Mandatory	☒
FB Name:	DHWTS			Can be internal	☐

Description

This output contains the value of the DHW temperature sensor

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

♦ Output

this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☒	Delta-Value:	2 K [1)]	MinRepTime:	10sec
		Cyclic	☒	Period:	15min (recommended value)		
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)] COV see parameter

LTE-HEE Mode:

FB: **DHWTS**	**LTE Server Output Name:** **TempDHW**	Mandatory ☒ Optional ☐

Description:

This output contains the current value of the DHW temperature sensor

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	DHW temperature value	M	Full Range	°C	2 [1)]	cs
Status	standard Status attributes					
- Fault	sensor failure true / false	M	true/false	bool	Y	false
- OutOfService	void sensor value true / false	O	true/false	bool	Y	false
- Overridden	Sensor is temporarily overridden	O	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					
- Override / Release	Temporary override / release of sensor value	O				
- Set / Reset OSV	Set / reset of out of service	O				
- AlarmAck	alarm acknowledge	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	180 (DHWTS)	Property ID:	51
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
InfoReport ☒	Output per default communicating ☒		Binding Group Wildcard allowed ☐	
(LTE Read-Response polling of the output shall always be supported)	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Power-up: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☐	Read/Write ☒		

Exception Handling: Save at Powerdown ☐

Special Features:

[1)] COV see parameter

2.6.4.3 Parameter: DHWZone

FB: DHWTS	Property Name (Server): DHWZone	Mandatory ☒ Optional ☐

Description:

LTE zone: DHW Zone number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	number of DHW Zone	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):	180 (DHWTS)	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:

DHWTS is not LTE communicating if DHWZone is 'OutOfService'.

2.6.4.4 Parameter TempCorrValue

FB: DHWTS	Property Name (Server): TempCorrValue	Mandatory ☐ Optional ☒

Description:

Temperature value correction for sensor value.

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

Field	Description	Sup.	Range	Unit	Default
Temperature	Temperature correction value	O	Full Range	K	0
Status - all flags	 not supported, fixed to '0'	 NA		bitset	
Command - NormalWrite - all other commands	 not supported	 M NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	180 (DHWTS)	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 Power-up: Stored Value ☒ Act Value ☐ Default Value ☐

Special Features:

2.6.4.5 Parameter TempCOVCondition

FB: DHWTS	Property Name (Server): TempCOVCondition	Mandatory ☐ Optional ☒

Description:

Delta temperature value for COV condition

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

Field	Description	Sup.	Range	Unit	Default
Temperature	Temperature COV value	O	Full Range	K	0.2
STATUS				Bitset	
- all bits	not supported, fixed to '0'	NA		bool	false
COMMAND			enum		cs
- NormalWrite		M			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	180 (DHWTS)	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 Power-up: Stored Value ☒ Act Value ☐ Default Value ☐

Special Features:

2.6.4.6 Parameter TempAlarmLimitUpper

FB: DHWTS	Property Name (Server): TempAlarmLimitUpper	Mandatory ☐ Optional ☒

Description:

Upper temperature value for alarm.

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

Field	Description	Sup.	Range	Unit	Default
Temperature	Temperature limit value	O	Full Range	°C	cs
STATUS				Bitset	
- OutofService	limit active / inactive	O	true/false		false
- all other bits	not supported, fixed to '0'	NA		bool	false
COMMAND			enum		cs
- NormalWrite		M			
- SetOSV & ResetOSV	Set limit inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	180 (DHWTS)	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 Power-up: Stored Value ☒ Act Value ☐ Default Value ☐

Special Features:

2.6.4.7 Parameter TempAlarmLimitLower

FB: DHWTS	Property Name (Server): TempAlarmLimitLower	Mandatory ☐ Optional ☒

Description:

Lower temperature value for alarm.

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

Field	Description	Sup.	Range	Unit	Default
Temperature	Temperature limit value	O	Full Range	°C	cs
STATUS				Bitset	
- OutofService	limit active / inactive	O	true/false		false
- all other bits	not supported, fixed to '0'	NA		bool	false
COMMAND			enum		cs
- NormalWrite		M			
- SetOSV & ResetOSV	Set limit inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	180 (DHWTS)	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 Power-up: Stored Value ☒ Act Value ☐ Default Value ☐

Special Features:

2.7 Functional Block Collector Temperature Sensor (COLTS)

2.7.1 Functional Specification

The functional block ‘Collector Temperature Sensor’ measures the flow-temperature from flat plate/tube collector and provides the data to the bus / system.

The distribution of the Collector temperature in the system is event-driven (COV-condition, change of value) and in addition repeated periodically.

Optional feature: The sensor value may be corrected by a parameter value.

In the LTE-Mode the COLTS supports LTE DHW zoning,
i.e. separate temperature values form different collectors may be distributed in the system in parallel for different DHW zones.

Optional features in LTE Mode:
- Faults in the sensor device may be detected and reported.
- The sensor value may temporary be overridden by means of a tool for service purposes. The ‘Overridden’ condition must be reported.
- Alarm limits may be detected by the sensor and are reported. The alarm may be acknowledged.
- The sensor may be set / reset out of service by means of a tool for service purposes.

Output

- TempCollector	This output provides the Collector temperature to the bus.

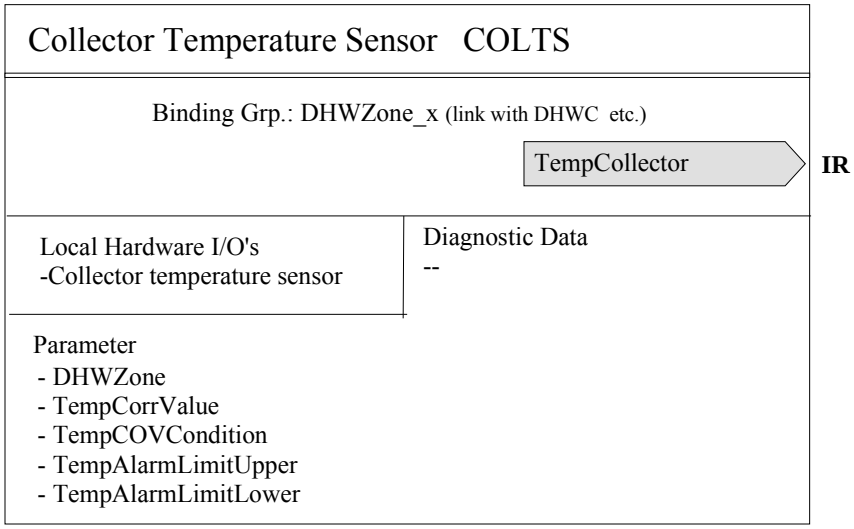
Parameters

- TempCorrValue	This parameter specifies the correction value for the sensor.
- TempCOVCondition	This parameter defines the delta temperature value at which the information spontaneously is transmitted.
- TempAlarmLimitUpper	This value can be used to create an alarm.
- TempAlarmLimitLower	This value can be used to create an alarm.

2.7.2 Constraints

This sensor is usually hard wired but also a bus connected remote sensor is possible.

2.7.3 Functional block diagram



2.7.4 Datapoint description

2.7.4.1 Overview

Datapoint	Description	Datapoint Type	DPT N°
Outputs			
TempCollector	Current solar flat plate/tube collector sensor value / LTE and S-interface	DPT_TempHVACAbs DPT_Value_Temp	205.100 9.001
Inputs			
--			
Parameters			
DHWZone	LTE zone: DHW zone number	DPT_UcountValue8_Z	202.002
TempCorrValue	For offset correction of the sensor value	DPT_TempHVACRel_Z	205.101 *)
TempCOVCondition	Value for COV condition	DPT_TempHVACRel_Z	205.101 *)
TempAlarmLimitUpper	Upper alarm limit for generating STATUS ‘Alarm’	DPT_TempHVACAbs_Z	205.100 *)
TempAlarmLimitLower	Lower alarm limit for generating STATUS ‘Alarm’	DPT_TempHVACAbs_Z	205.100 *)
Diagnostic Data			
--			

*) Implementation of Properties using standard DPT see chapter 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	TempCollector	**GO_b**	GO	GO	**M**
Inputs	--				

Table 16: COLTS Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DHWZone	M

Table 17: COLTS LTE specific Properties

		Support
Parameter	TempCorrValue	O
	TempCOVCondition	O
	TempAlarmLimitUpper	O
	TempAlarmLimitLower	O
Diagnostic Data	--	

Table 18: COLTS Standard Properties of Interface Objects (or memory mapped DP)

2.7.4.2 Output TempCollector

Standard Mode:

DP Name:	TempCollector	Abbr.:	---	Mandatory	☒
FB Name:	COLTS			Can be internal	☐

Description
This output contains the current solar flat plate/tube collector sensor value

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								
♦ Output								
this → M	☒	this → 1	☐					
Spontaneous	☒	COV:	☒	Delta-Value:	2 K [1)]	MinRepTime:	10sec	
		Cyclic	☒	Period:	15min (recommended value)			
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)] COV see parameter

LTE-HEE Mode:

FB: **COLTS**	**LTE Server Output Name:** **TempCollector**	Mandatory ☒ Optional ☐

Description:

This output contains the current solar flat plate/tube collector sensor value

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	collector temperature value	M	Full Range	°C	2 [1)]	cs
Status	standard Status attributes					
- Fault	sensor failure true / false	M	true/false	bool	Y	false
- OutOfService	void sensor value true / false	O	true/false	bool	Y	false
- Overridden	Sensor is temporarily overridden	O	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					
- Override / Release	Temporary override / release of sensor value	O				
- Set / Reset OSV	Set / reset of out of service	O				
- AlarmAck	alarm acknowledge	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	187 (COLTS)	Property ID:	51
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat:	15 min
InfoReport ☒	Output per default communicating ☒		Binding Group Wildcard allowed ☐	
(LTE Read-Response polling of the output shall always be supported)	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Power-up: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☐	Read/Write ☒		

Exception Handling: Save at Powerdown ☐

Special Features:

[1)] COV see parameter

2.7.4.3 Parameter: DHWZone

FB: COLTS	Property Name (Server): DHWZone	Mandatory ☒ Optional ☐

Description:

LTE zone: DHW Zone number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	number of DHW Zone	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):	187 (COLTS)	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:

DHWTS is not LTE communicating if DHWZone is 'OutOfService'.

2.7.4.4 Parameter TempCorrValue

FB: DHWTS	Property Name (Server): TempCorrValue	Mandatory ☐ Optional ☒

Description:

Temperature value correction for sensor value.

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

Field	Description	Sup.	Range	Unit	Default
Temperature	Temperature correction value	O	Full Range	K	0
Status - all flags	 not supported, fixed to '0'	 NA		bitset	
Command - NormalWrite - all other commands	 not supported	 M NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	187 (COLTS)	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 Power-up: Stored Value ☒ Act Value ☐ Default Value ☐

Special Features:

2.7.4.5 Parameter TempCOVCondition

FB: DHWTS	Property Name (Server): TempCOVCondition	Mandatory ☐ Optional ☒

Description:

Delta temperature value for COV condition

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

Field	Description	Sup.	Range	Unit	Default
Temperature	Temperature COV value	O	Full Range	K	0.2
STATUS				Bitset	
- all bits	not supported, fixed to '0'	NA		bool	false
COMMAND			enum		cs
- NormalWrite		M			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	187 (COLTS)	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 Power-up: Stored Value ☒ Act Value ☐ Default Value ☐

Special Features:

2.7.4.6 Parameter TempAlarmLimitUpper

FB: DHWTS	Property Name (Server): TempAlarmLimitUpper	Mandatory ☐ Optional ☒

Description:

Upper temperature value for alarm.

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

Field	Description	Sup.	Range	Unit	Default
Temperature	Temperature limit value	O	Full Range	°C	cs
STATUS				Bitset	
- OutofService	limit active / inactive	O	true/false		false
- all other bits	not supported, fixed to '0'	NA		bool	false
COMMAND			enum		cs
- NormalWrite		M			
- SetOSV & ResetOSV	Set limit inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	187 (COLTS)	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 Power-up: Stored Value ☒ Act Value ☐ Default Value ☐

Special Features:

2.7.4.7 Parameter TempAlarmLimitLower

FB: DHWTS	Property Name (Server): TempAlarmLimitLower	Mandatory ☐ Optional ☒

Description:

Lower temperature value for alarm.

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

Field	Description	Sup.	Range	Unit	Default
Temperature	Temperature limit value	O	Full Range	°C	cs
STATUS				Bitset	
- OutofService	limit active / inactive	O	true/false		false
- all other bits	not supported, fixed to '0'	NA		bool	false
COMMAND			enum		cs
- NormalWrite		M			
- SetOSV & ResetOSV	Set limit inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	187 (COLTS)	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 Power-up: Stored Value ☒ Act Value ☐ Default Value ☐

Special Features:

2.8 Functional Block DHW User Settings (UDHWSET)

2.8.1 Functional Specification

The functional block ‘DHW User Settings’ represents the part of an user MMI which provides output signals in order to influence the behaviour of the DHW system according to the needs of the user.

In the LTE-Mode the UDHWSET supports LTE DHW zoning,
i.e. separate DHW user settings form different MMIs may be distributed in the system in parallel for different DHW zones.

The UDHWSET provides information to the DHWSM, DHWC and DHWCPC in the same DHWZone.

Output signals

- ‘DHWModeUser’ — DHW operating mode (‘LegioProtect’, ‘Normal’, ‘Reduced’ and ‘Off/FrostProtect’ or AUTO) is provided in order to be able to change the DHW mode in the DHWSM manually. The value of this output has no effect if ‘EnableDHWPrep’ input in the DHWSM has the value ‘disabled’
- ‘DHWPushUser’ — The user can request with this trigger command a DHW “push” in the DHWSM. This function only makes sense in residential applications where DHW load is controlled individually per apartment or single family home. DHW “push” from different users / apartments in the same DHWZone is usually not applicable.
  The value of this output has no effect if ‘EnableDHWPrep’ input on the DHWSM has the value ‘disabled’
- ‘TempDHWSetpUser’ — This output can be considered as a remote override of the DHW temp. setpoint for ‘Normal’ operating mode in the DHWSM.
  In simple systems without DHW scheduler (fixed ‘Normal’ operating mode DHWModeEff), the user has the possibility for manual adjustment of the DHW temperature setpoint.
- ‘DHWOtherEnergySource’ — This signal indicates, that another DHW source is active (e.g. electric DHW load) and that load by the DHWC should be disabled, see chapter 2.3.1.3
- ‘DHWCPPush’ — This signal indicates that the user requests temporary DHW circulation independent of the actual DHW operating mode. This output is a trigger which starts circulation pump running for a certain time => to be contolled by the DHWCPC

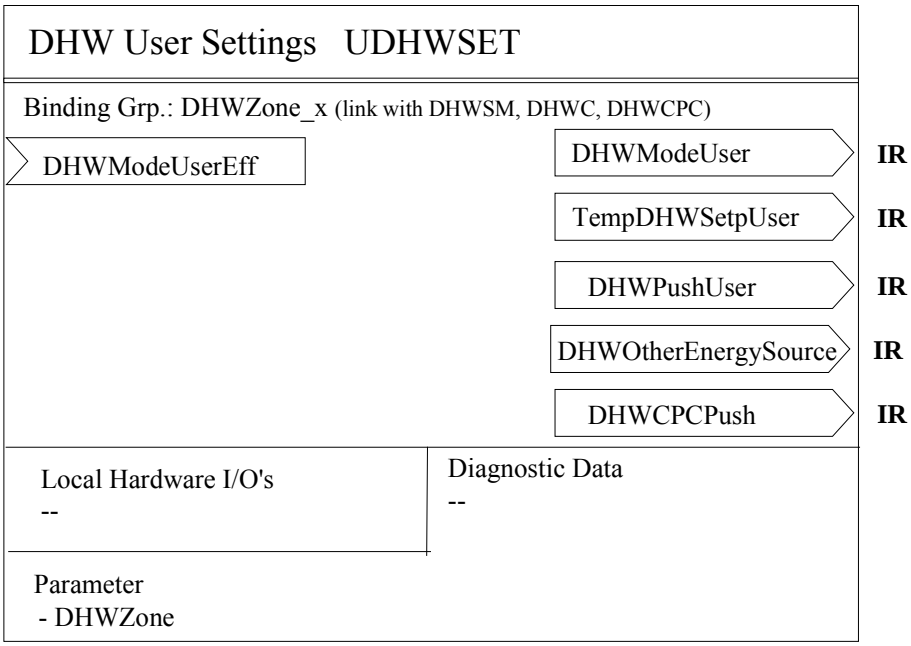
Input signals:

- ‘DHWModeUserEff’ — Resulting user DHW Mode on DHWSM (manual override ‘LegioProtect’, ‘Normal’, ‘Reduced’ and ‘Off/FrostProtect’ or ‘AUTO’ to enable DHW scheduler).
  The value of DHWModeUserEff can be the result of the signal DHWModeUser from an MMI (UDHWSET) or the signal EnableDHWPrep from DHW scheduler (DHWS) or e.g. local settings on the device containing the DHWSM.
  This input signal is used on the MMI (UDHWSET) for immediate feedback about the result of user interaction. DHWModeUser output and DHWModeUserEff input are usually synchronised in a closed loop

2.8.2 Constraints

Only one UDHWSET is allowed in one DHWZone

2.8.3 Functional block diagram



2.8.4 Datapoint description

2.8.4.1 Overview

Datapoint	Description	Datapoint Type	DPT N°
Outputs			
DHWModeUser	DHW operating mode selected by user (manual override) / LTE and S-interface	DPT_DHWMode_Z DPT_DHWMode	201.102 20.103
TempDHWSetpUser	DHW temperature setpoint, manually set by user / LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
DHWPushUser	DHW push command from user MMI	DPT_Trigger	01.017
DHWOtherEnergySource	Information to indicate that another source for DHW load is active => disable load by DHWC	DPT_Bool	1.002
DHWCPPush	DHW circulation pump push command => trigger	DPT_Trigger	01.017
Inputs			
DHWModeUserEff	resulting user DHW operating mode (manual override) from DHWSM; may be used for feedback on the MMI / LTE and S-interface	DPT_DHWMode_Z DPT_DHWMode	201.102 20.103
Parameters			
DHWZone	LTE zone: DHW zone number	DPT_UcountValue8_Z	202.002
Diagnostic Data			
--			

			STANDARD MODE	EXTENDED MODE	
		Basic FB	S-Mode	Standard Mode Interface	LTE-Mode
Outputs	DHWModeUser	**(GO_b)**		(GO)	O
	TempDHWSetpUser	**(GO_b)**		(GO)	O
	DHWPushUser	**(GO_b)**		(GO)	O
	DHWOtherEnergySource	**(GO_b)**		(GO)	O
	DHWCPPush	**(GO_b)**		(GO)	O
Inputs	DHWModeUserEff	**(GO_b)**		(GO)	O

Table 19: UDHWSET Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DHWZone	M

Table 20: UDHWSET LTE specific Properties

		Support
Parameter	--	
Diagnostic Data	--	

Table 21: UDHWSET Standard Properties of Interface Objects (or memory mapped DP)

2.8.4.2 Output DHWModeUser

Standard mode:

DP Name:	DHWModeUser	Abbr.:	---	Mandatory	☐
FB Name:	UDHWSET			Can be internal	☐

Description

This output contains the DHW operating mode requested by the user. This signal will override the DHWMode from the DHW scheduler in the DHWSM if the value of DHWModeUser is ≠ 'AUTO'. See also chapter 2.2.1

Datapoint Type

DPT_Name:	DPT_DHWMode				
DPT Format:	N_8	DPT_ID:	20.103		
Field	Description	Supp.	Range	Unit	Default
			0..4		cs

Access Type

♦ Output

this → M	☐	this → 1	☒				
Spontaneous	☒	COV:	☒	Δ-Value:		Min repetition period:	0sec [1]
		Cyclic	☐ [2]	Period:	-- [2]		
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] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

[2] heartbeat repetition is allowed but an optional feature, the repetition rate is company specific (recommended 15 min)

LTE-HEE mode:

FB: **UDHWSET**	**LTE Server Output Name:** **DHWModeUser**	Mandatory ☐ Optional ☒

Description:

This output contains the DHW operating mode requested by the user in the same DHW Zone. This signal will override the DHWMode from the DHW scheduler in the DHWSM if the value of DHWModeUser is ≠ 'AUTO'. See also chapter 2.2.1

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

Field	Description	Sup.	Range	Unit	COV	Default
DHWMode	actual DHW Mode	M	[0..4]		Y	cs
Status	standard Status attributes					
- OutOfService	void value true / false	O	true/false	bool	Y	false
- Overridden	DHW mode overridden true / false	O	true/false	bool	Y	false
- all other flags	not supported					
Command	standard Commands, Write only					
- Override / Release	Temporary override / release of DHWMode	O				
- Set / Reset OSV	Set / reset of out of service	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 181 (UDHWSET)	Property ID: 51
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒ MinRepTime: 0 sec [2]	Heartbeat: [3] min
	Output per default communicating ☒	Binding Group Wildcard allowed ☐
	Tx Prio: High ☐ Normal ☒ Low ☐	
	Transm after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐	
Property-Service (individual access):	Read only ☐ Read/Write ☒ [1]	

Exception Handling:	Save at Powerdown ☐
--	

Special Features:

[1] write access is optional; for Override / Release or Set/Reset OSV function only (in practice usually not very meaningful for DHWModeUser)

[2] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

[3]) heartbeat repetition is allowed but an optional feature, the repetition rate is company specific (recommended 15 min)

2.8.4.3 Output TempDHWSetpUser

Standard mode:

DP Name:	TempDHWSetpUser	Abbr.:	--	Mandatory	☐
FB Name:	UDHWSET			Can be internal	☐

Description

This output contains the actual DHW setpoint for 'Normal' DHW operating mode requested by the user. This signal is used in the DHWSM to generate TempDHWSetpSetEff.Normal value . See also chapter 2.2.1

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 K	Min repetition period:	0sec [2]
		Cyclic	☐ [3]	Period:	[3]		
Request	☒						

Communication Type

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

Dynamics

Power down:	Save:	☒			
Power up:	Value:	No initialisation:	☐	Default value:	☐
		Saved value:	☒ [1]	Actual value (not for input):	☒ [1]
	Transmit on bus (only for output):		☐	Read from bus (only for input):	☐

Exception Handling

--

Special Features

[1] to be saved at power down if electronically set. Actual value is used in case of mechanical setting

[2] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

[3] heartbeat repetition is allowed but an optional feature, the repetition rate is company specific (recommended 15 min)

LTE-HEE mode:

FB: **UDHWSET**	**LTE Server Output Name:** **TempDHWSetpUser**	Mandatory ☐ Optional ☒

Description:

This output contains the actual DHW setpoint for 'Normal' DHW operation mode requested by the user. This signal is used to generate TempDHWSetpSetEff.Normal value of the DHWSM in the same DHW Zone. See also chapter 2.2.1

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	--
Status	standard Status attributes					
- OutOfService	void value true / false	O	true/false	bool	Y	false
- Overridden	setpoint overridden true / false	O	true/false	bool	Y	false
- all other flags	not supported					
Command	standard Commands, Write only					
- Override / Release	Temporary override / release of setpoint	O				
- Set / Reset OSV	Set / reset of out of service	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Link with Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 181 (UDHWSET)	Property ID: 52
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒ MinRepTime: 0 sec [3]	Heartbeat: [4] min
	Output per default communicating ☒	Binding Group Wildcard allowed ☐
	Tx Prio: High ☐ Normal ☒ Low ☐	
	Transm after Powerup: Stored Value ☒[2] Act Value ☒[2] 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 or Set/Reset OSV function only (in practice usually not very meaningful for DHWModeUser)

[2] to be saved at power down if electronically set. Actual value is used in case of mechanical setting

[3] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

[4]) heartbeat repetition is allowed but an optional feature, the repetition rate is company specific (recommended 15 min)

2.8.4.4 Output DHWPushUser

Standard mode:

DP Name:	DHWPushUser	Abbr.:	---	Mandatory	☐
FB Name:	UDHWSET			Can be internal	☐

Description

DHWPush command requested by a user; for further details see LTE-Mode

Datapoint Type

DPT_Name:	DPT_Trigger				
DPT Format:	B_1	DPT_ID:	01.017		
Field	Description	Supp.	Range	Unit	Default
			{0,1} [1]		0

Access Type

♦ Output

this → M	☐	this → 1	☒				
Spontaneous	☒	COV:	☐	Δ-Value:		Min repetition period:	0sec [2]
		Cyclic	☐	Period:	--		
Request	☐						

Communication Type

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

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value:	☐
	Transmit on bus:	☐			

Exception Handling

--

Special Features

[1] this signal is transmitted once if condition for a DHW push occurs: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is not transmitted !

[2] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

LTE-HEE mode:

FB: **UDHWSET**	**LTE Server Output Name:** **DHWPushUser**	Mandatory ☐ Optional ☒

Description:

This trigger signal from the UDHWSET is used in the DHWSM and indicates that the user requests the DHW storage tank to be loaded once to 'Normal' temperature level, independent of the actual DHW operating mode (DHWModeEff or DHWModeOptim). This signal is provided only once on event (no heartbeat).

DPT:	Name	DPT_Trigger	DPT ID	01.017	Datatype format	B_1

Field	Description	Sup.	Range	Unit	COV	Default
			{0,1} [1]	--	Y [1]	0

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 181 (UDHWSET)	Property ID: 53
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒ MinRepTime: 0 sec [3]	Heartbeat: -- min
	Output per default communicating ☐	Binding Group Wildcard allowed ☐
	Tx Prio: High ☐ Normal ☒ Low ☐	
	Transm after Powerup: Stored Value ☐ Act Value ☐ Default Value ☐	
Property-Service (individual access):	Read only ☐ [2] Read/Write ☐	

Exception Handling:	Save at Powerdown ☐
--	

Special Features:

[1] this signal is transmitted once if condition for a DHW push occurs: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is not transmitted !

[2] Read access is in principle possible but in practice not useful since the read-back value of this transient DP will always be 0

[3] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

2.8.4.5 Output DHWOtherEnergySource

Standard mode:

DP Name:	DHWOtherEnergySource	Abbr.:	---	Mandatory	☐
FB Name:	UDHWSET			Can be internal	☐

Description

This signal indicates, that the user requests another DHW energy source and that load by the DHWC should be disabled. Example: electric DHW load during summer time

Datapoint Type

DPT_Name:	DPT_Bool				
DPT Format:	B_1	DPT_ID:	01.002		
Field	Description	Supp.	Range	Unit	Default
			false, true		false

Access Type

♦ Output

this → M	☐		this → 1	☒			
Spontaneous	☒	COV:	☐	Δ-Value:		Min repetition period:	0sec [1]
		Cyclic	☒	Period:	60 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:	☐
	Transmit on bus:		☐		

Exception Handling

--

Special Features

[1] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

LTE-HEE mode:

FB: **UDHWSET**	**LTE Server Output Name:**	**DHWOtherEnergySource**	Mandatory ☐ Optional ☒

Description:

This signal indicates, that the user requests another DHW energy source and that load by the DHWC in the same DHWZone should be disabled. Example: electric DHW load during summer time

DPT:	Name	DPT_Bool	DPT ID	01.002	Datatype format	B_1

Field	Description	Sup.	Range	Unit	COV	Default
			true, false	--	Y	0

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	181 (UDHWSET)	Property ID:	54
LTE-Services (event):	COV ☒	MinRepTime: 0 sec [1]	Heartbeat: 60 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] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

2.8.4.6 Output DHWCPPush

Standard mode:

DP Name:	DHWCPPush	Abbr.:	---	Mandatory	☐
FB Name:	UDHWSET			Can be internal	☐

Description

Push command requested by a user for DHW circulation pump; for further details see LTE-Mode

Datapoint Type

DPT_Name:	DPT_Trigger				
DPT Format:	B_1	DPT_ID:	01.017		
Field	Description	Supp.	Range	Unit	Default
			{0,1} [1]		0

Access Type

♦ Output

this → M	☐	this → 1	☒				
Spontaneous	☒	COV:	☐	Δ-Value:		Min repetition period:	0sec [2]
		Cyclic	☐	Period:	--		
Request	☐						

Communication Type

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

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☒
		Saved value:	☐	Actual value:	☐
	Transmit on bus:	☐			

Exception Handling

--

Special Features

[1] this signal is transmitted once if condition for a DHW circulation pump push occurred: the datapoint Value is 1 = 'trigger'. Value = 0 ('no action') is not transmitted !

[2] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

LTE-HEE mode:

FB: **UDHWSET**	**LTE Server Output Name:** **DHWCPPush**	Mandatory ☐ Optional ☒

Description:

This trigger signal from the UDHWSET is used in the DHWCPC in the same DHWZone and indicates that the user requests temporary DHW circulation independent of the actual DHW operating mode. This trigger will start the circulation pump running for a certain time (depending on the parameter RunTimeCPPush in the DHWCPC) This signal is provided only once on event (no heartbeat).

DPT:	Name	DPT_Trigger	DPT ID	01.017	Datatype format	B_1

Field	Description	Sup.	Range	Unit	COV	Default
			{0,1} [1]	--	Y [1]	0

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 181 (UDHWSET)	Property ID: 55
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒ MinRepTime: 0 sec [3]	Heartbeat: -- min
	Output per default communicating ☐	Binding Group Wildcard allowed ☐
	Tx Prio: High ☐ Normal ☒ Low ☐	
	Transm after Powerup: Stored Value ☐ Act Value ☐ Default Value ☐	
Property-Service (individual access):	Read only ☐ [2] Read/Write ☐	

Exception Handling:	Save at Powerdown ☐
--	

Special Features:

[1] this signal is transmitted once if condition for a DHW circulation pump push occurs: the datapoint value is 1 = 'trigger'. Value = 0 ('no action') is not transmitted !

[2] Read access is in principle possible but in practice not useful since the read-back value of this transient DP will always be 0

[3] the signal may be sent immediately if the COV is the result of user interaction enabling fast feedback

2.8.4.7 Input DHWModeUserEff

Standard Mode:

DP Name:	DHWModeUserEff	Abbr.:	---	Mandatory	☐
FB Name:	UDHWSET			Can be internal	☒

Description

This input signal contains feedback from the DHWSM concerning the resulting DHW user operating mode (manual override of DHWMode). DHWModeUserEff is derived in the DHWSM from DHWModeUser and EnableDHWPrep and possible local settings on the device containing the DHWSM. DHWModeUser output and DHWModeUserEff input on the UDHWSET are usually synchronised in a closed loop (both datapoints containing the same value). See also chapter 2.2.1

Datapoint Type

DPT_Name:	DPT_DHWMode				
DPT Format:	N_8	DPT_ID:	20.103		
Field	Description	Supp.	Range	Unit	Default
			0...4	--	cs

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

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LTE-HEE Mode:

FB: UDHWSET	**LTE ClientInput Name:** DHWModeUserEff	Mandatory ☐ Optional ☒

Description:

This input signal contains feedback from the DHWSM in the same DHW Zone concerning the resulting DHW user operating mode (manual override of DHWMode). DHWModeUserEff is derived in the DHWSM from DHWModeUser and EnableDHWPrep and possible local settings on the device containing the DHWSM. DHWModeUser output and DHWModeUserEff input on the UDHWSET are usually synchronised in a closed loop (both datapoints containing the same value). See also chapter 2.2.1

DPT:	Name	DPT_DHWMode_Z	DPT ID	201.102	Datatype format	N_8Z_8

Field	Description	Sup.	Unit	Default
DHWMode	Actual DHW Mode, range [0..4]	M	enum.	cs
Status	standard Status attributes	M	bitset	
- OutOfService	void DHWMode value	M	bool	cs
- all other flags	not supported, can be ignored	NA	bool	

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DHWZone (Controller)	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	176 (DHWSM)	Property ID:	56
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:	--		

Value after Power-up: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

--

Special Features:

This input may be device-internal

2.8.4.8 Parameter: DHWZone

FB: UDHWSET	Property Name (Server): DHWZone	Mandatory ☒ Optional ☐

Description:

LTE zone: DHW Zone number

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

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

Communication:

DP Address:	IO Type(ID):	181 (UDHWSET)	Property ID:	101
(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:

UDHWSET is not LTE communicating if DHWZone is 'OutOfService'.