Application Description

7

Ventilation, Air Conditioning and Cold Water

14

Cold Water

2

Summary

This document is a part of the HVAC Application Interworking Standard.
It describes the specific Functional Blocks for cold water applications.

Version 01.03.01 is a KNX Approved Standard.

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

Document updates

Version	Date	Modifications
0.1	2000.08.24	First draft, overview and chapter ventilation and air conditioning
0.2	2000.09.05	Revising chapter ventilation and air conditioning
0.3	2000.10.13	Chapter ventilation & air conditioning new datapoint format
0.4	2001.02.14	Reformat Document, minor changes in chapter ventilation & air conditioning and adding datapoint tables
0.5	2001.03.02	Chapter cold water first draft and chapter 3 ventilation & air conditioning adding datapoint tables
0.6	2001.08.02	Document split and changes after 1st review
0.7	2001.08.17	New chapter structure and update of CZC
0.8	2001.12.13	Finish document as draft for TFI
0.9	2002.02.08	Correction of comments from TFI
0.10	2002.03.05	Release
1.0	2002.03.28	TFI approved
1.1	2002.12.17	Update handbook v1.1 - Emergenccy demand DPT: 210.100 - ChangeOverStatusWater in DistrSegmC, DPT B_1Z_8
1.2	2005.02.28	AHU, editorial: ProdSegMC parameters: range corrected from 1..31 to 1..16 according to LTE Specification Vol 10-1 Not supported wildcard addressing feature for Cold Water Production Segements.
1.3	2006.01.09	- DHWLegioReq at DPT: 210.100
1.3	2009.06.19	Update in view of publication in the KNX Specifications v2.0.
01.03.01	2013.10.29	Editorial updates for the publication of KNX Specifications 2.1.

References

[01] Chapter 3/7/2 “Datapoint Types”
[02] Part 7/10 “HVAC General Functional Blocks”
[03] Chapter 7/10/10 “Interface Object Type Identifier”
[04] Chapter 7/11/1 “HWH Production”
[05] Chapter 7/11/2 “HWH Distribution”
[06] Chapter 7/11/3 “HWH Domestic Hot Water Control”
[07] Chapter 7/11/4 “HWH Room Heating Control”
[08] Chapter 7/11/5 “HWH Load Management”
[09] Chapter 7/11/9 “HWH Property Identifiers”
[10] Part 7/12 “Direct Electric Heating”
[11] Part 7/13 “Terminal Unit Functional Blocks”
[12] Chapter 7/19/11 “Boiler Controller”
[13] Part 10/1 “Logical Tag Extended”

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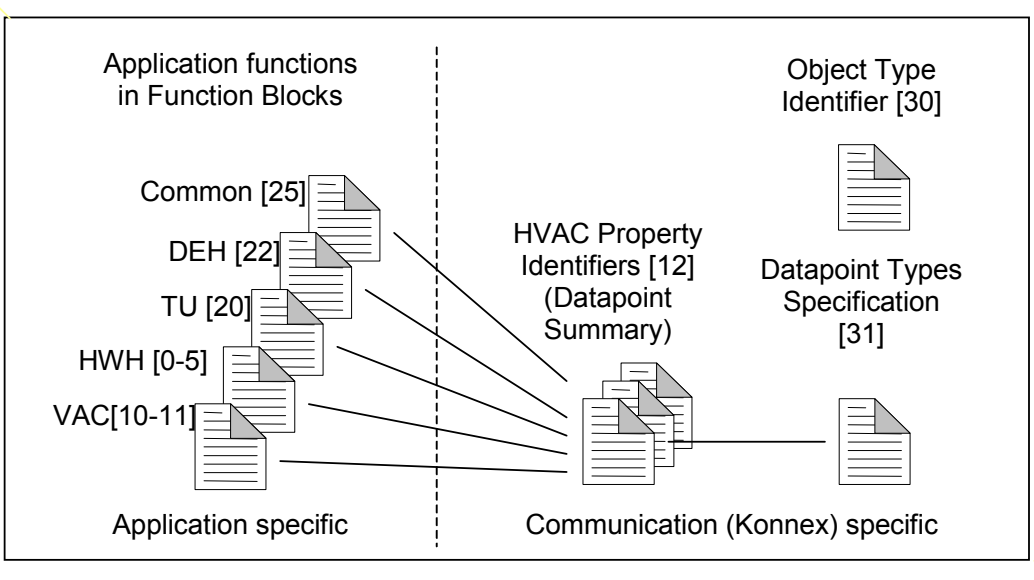
Contents

1 Introduction

1.1 Scope

This document contains the specification of the specific Functional Blocks used for HVAC cold water (VAC) applications, mainly for (European) residential and small commercial markets.



Functional Blocks specification for applications like hot water heating (HWH) [0-5], ventilation, air conditioning (VAC) (this document), terminal units (TU) [11] and direct electric heating (DEH) [10] are described in separate documents.

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

All these documents are part of the KNX HVAC-Application Interworking Standard.

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 VAC specification such as data encoding and Datapoint Types, object address tables, Group Address tables etc. are not part of this specification. This is described in HVAC Interface Object Type Identifier [03] and HVAC Specifications Datapoint Types [01].

1.2 Objectives

This document includes the information necessary to build interoperable HVAC products using the KNX system.

The focus is runtime process interworking between HVAC control-devices at the application level.

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

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

Every Functional Block may be part of a complex device (e.g. a chiller and cold water 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 document does not describe the general HVAC-VAC application field and application requirements and it does also not contain the description of typical application examples (scenarios) and application profiles.

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, and
- for the implementation of mandatory objects used for runtime interworking in Standard Mode (Basic Functional Block).

1.3.1 Runtime Interworking

Mode dependent (S-Mode, Ctrl-Mode, PB-Mode) 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

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 supports 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.

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. This document does not lay down how to implement Parameters and Diagnostic Data in S-Mode, Ctrl-Mode and PB-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)
  - ⇨ to implement these Properties using standard DPT only.
    In this case, the same Property ID but a different IO Type^b shall be used since the DPT of a Property shall be unambiguous for each IO Type.

    Simple IOT mapping rule: **$\text{IO Type}^b = \text{IO Type}^{LTE} + 10000d$**
    (e.g. $BUC^{LTE} = 128 \Rightarrow BUC^b = 10128$)
  - ⇨ It is allowed to implement in a device both Interface Object Types IO Type$^{HVAC\text{-}LTE}$ and IO Type^{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 IO Type^{standardDPT} and the remaining in IO Type^{HVACLTE}.

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

In this document only the **LTE style** of Parameters and Diagnostic Data is specified.

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

1.4 Abbreviations of Functional Blocks

This clause shows an overview of Functional Blocks, which are used in this document.

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 Percent
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 Percent
HDTAHU	Heating Demand Transformer Air Handling Unit
SATC	Supply Air Temperature Controller

Hot Water Heating (HWH) [04]-[08]

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
HDAUX	Auxiliary Heating Demand
HDTACT	Heat Demand Transformer Actuator Position
HDTRT	Heat Demand Transformer Room Temperature
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

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, HMI, Actuators - Common Controller Functions [02]

Abbreviation	Description
CFWTS	Condenser Flow Temperature Sensor
CRNWTS	Condenser Return Water Temperature Sensor
DPS	Dew Point Status Sensor
FWTS	Flow Water Temperature Sensor
HVA	HVAC Valve
HVACOPT	HVAC Optimiser
HVACEMS	HVAC Emergency Source
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
DPT	Datapoint Type
FB	Functional Block
GO	Group Object
IO	Interface Object
IR	LTE-Service InfoReport
LTE	Logical Tag Extended Mode, see [13] Volume 10, LTE Specification
NA	not available
M	Mandatory
O	Optional
W	LTE-Service Write

2 Cold Water Production

2.1 Overview

The Functional Block Cold Water Flow Demand Manager CFDM collects all chilled water requirements and sends the calculated TempFlowWaterDemAbsCFDM to the Cold Water Production Manager CPM. The CPM is controlling/scheduling one or more Chiller Controllers CC. A Chiller Controller CC is a stand alone chilled water production unit. The control of the condensed water circuit may be implemented via:

a) Package unit (within the Chiller Controller CC)

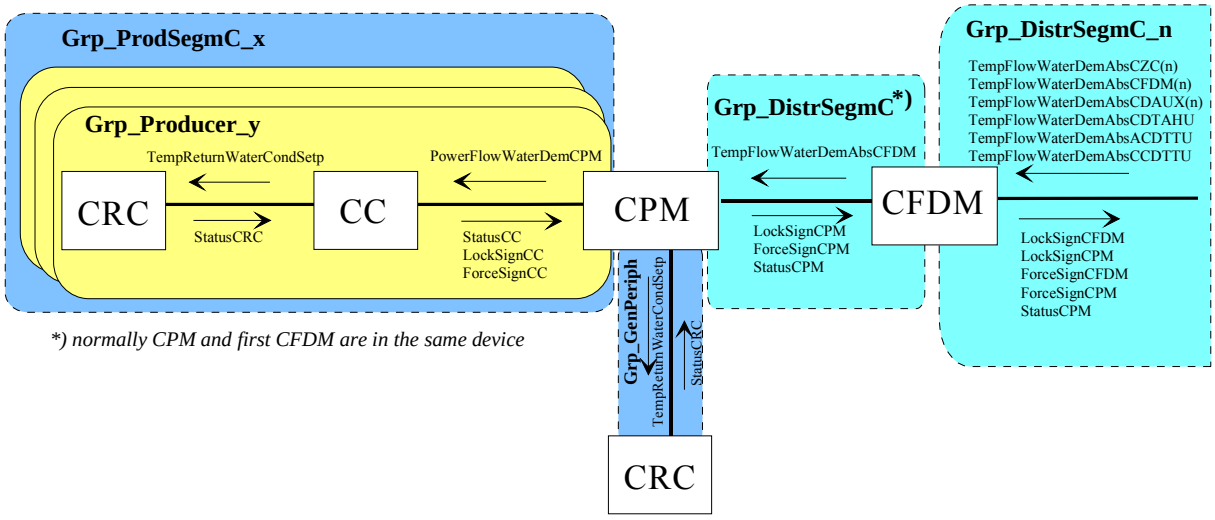
b) Split unit, remote location from the Chiller Controller CC (on the roof). For this scenario, a Re-Cooling Controller CRC is connected to the Chiller Controller CC.

c) With a common Re-Cooling Controller e.g. cooling tower (wet, dry) or seawater re-cooling. For this scenario a Re-Cooling Controller CRC is connected directly to the Cold Water Production Manager CPM.

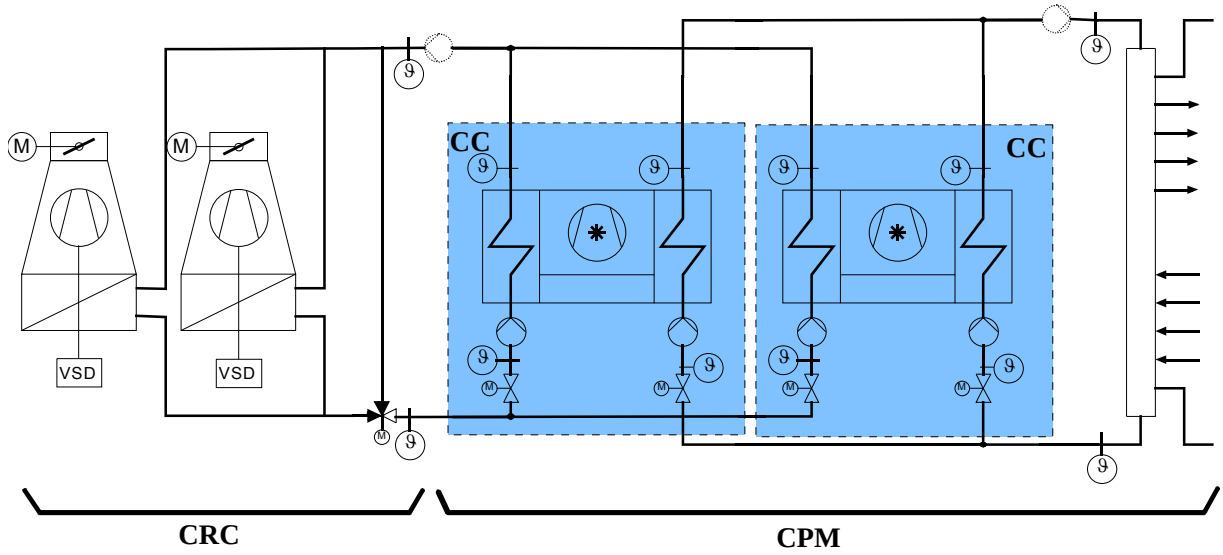
The functions of cold water system with buffer storage tanks are incorporated in the Cold Water Production Manager CPM.

Wildcardaddressing for all Cold Water Production Segements is not supported.

The overview below shoes all scenarios combined in one picture.



Especially larger chilled water systems may have common condensed water cooling tower (or a group of cooling towers). An example is shown below. Instead of the cooling tower they may be a common dry or wet air cooler system. The Re-Cooling Controller CRC controls this functionality.


M
M
VSD
VSD
CC
CC
CRC
CPM

2.2 Functional Block: Chiller Controller (CC)

2.2.1 Description

The Functional Block Chiller Controller CC is a cold water producer, so called chiller unit and controls the chilled water temperature / flow temperature and optionally return temperature according to the present cooling demand PowerFlowWaterDemCPM from the Cold Water Production Manager CPM.

A Cold Water Production Manager CPM may controls more than one chiller in a cooling production segment (ProdSegmC). So a chiller is in its own production segment (Prod). Therefore the Chiller Controller CC has the binding group ProdSemgC.Prod.

The Chiller Controller CC reports to the Cold Water Production Manager CPM via:

- StatusCC: These are operating mode, flow temperature, fault, operating hoursinformation for the CPM to determine the control strategy.
- LockSignCC: The chiller may generate a looking signal (e.g. start-up or overload protection) which is evaluated by the CPM.
- ForceSignCC The chiller may generate a forcing signal (e.g. freezing protection) which is evaluated by the CPM.

Sensors, like chilled water flow temperature or chilled water return temperature and actuators, like the chiller primary water pump are hard-wired to the Chiller Control out of safety reasons. But temperature values and pump status are available via StatusCC or more detailed via diagnostic data.

The function of the CC may also manage the temperature setpoints and status of a condenser water re-cooling circuit or air re-cooling circuit. The Re-Cooling Controller CRC is responsible for the actual temperature control.

2.2.2 Constraints

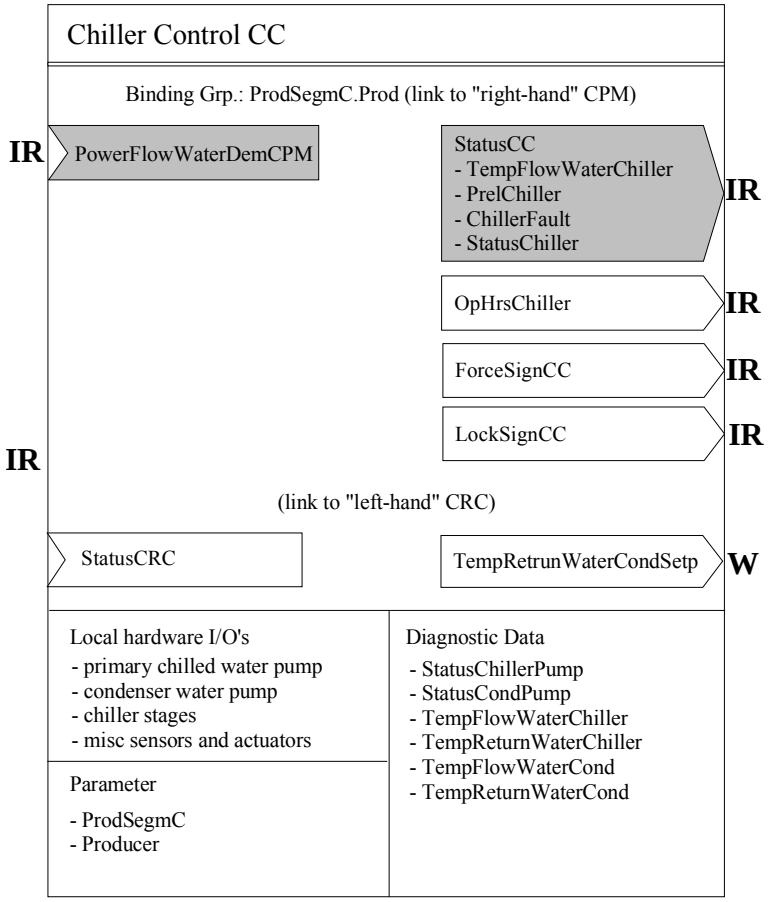
A CC is controlled only by one CPM (1:1 link)

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

Therefore for the time being only LTE implementations of the CC functional block offer a bus-link to a CPM which controls one or multiple CC by means of the signal PowerFlowWaterDemCPM (demand dependent cold water production).

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

2.2.3 Functional Block diagram



2.2.4 Description of Datapoints

Datapoint	Description	Datapoint Type	DPT_ID
Outputs			
StatusCC	Status information from Chiller Control	DPT_StatusCC	215.101
- TempFlowWaterChiller	Chilled water flow temperature (S-interface)	DPT_Value_Temp	9.001
- PrelChiller	Current relative power usage of chiller, in % (S-interface)	DPT_Percent_U8	5.004
- ChillerFault	Chiller Fault (S-interface)	DPT_Bool	1.002
- StatusChiller	Operating status of chiller controller (S-interface)	DPT_Switch	1.001
OpHrsChiller	Operating Hours chiller controller (LTE and S-interface)	DPT_LongDeltaTimeSec	13.100
ForceSignCC	Calculated forcing signal, to force the consumers to consume energy from chiller	DPT_ForceSignCool	21.101

Datapoint	Description	Datapoint Type	DPT_ID
LockSignCC	Calculated locking signal, to force the consumers to reduce energy consumption from chiller	DPT_LockSign	207.101
TempReturnWater CondSetp	Condenser water return temperature setpoint (condenser temperature setpoint back to the chiller unit) (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
Inputs			
PowerFlowWater DemCPM	Demand signal from CPM	DPT_PowerFlowWater DemCPM	214.101
StatusCRC	Status information from CRC	DPT_StatusWTC	209.103
Parameters			
ProdSegmC	LTE zoning number Cooling Production Segment	DPT_UCountValue8_Z	202.002
Producer	LTE zoning number Cold Water Production	DPT_UCountValue8_Z	202.002
Diagnostic Data			
StatusChillerPump	Chilled water pump status	DPT_RelValue_Z	202.001 *)
StatusCondPump	Condensed water pump status	DPT_RelValue_Z	202.001 *)
TempFlowWaterChiller	Chilled water flow temperature sensor	DPT_TempHVACAbs_Z	205.100 *)
TempReturnWater Chiller	Chilled water return temperature sensor	DPT_TempHVACAbs_Z	205.100 *)
TempFlowWaterCond	Condenser water flow temperature sensor	DPT_TempHVACAbs_Z	205.100 *)
TempReturnWaterCond	Condenser water return temperature sensor	DPT_TempHVACAbs_Z	205.100 *)

*) Implementation of Properties using standard DPT see clause 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	StatusCC	**NA**	NA	NA	M
	- TempFlowWaterChiller	**GO_b**	GO	GO	NA
	- PrelChiller	**(GO_b)**	(GO)	(GO)	NA
	- ChillerFault	**GO_b**	GO	GO	NA
	- StatusChiller	**GO_b**	GO	GO	NA
	OpHrsChiller	**(GO_b)**	(GO)	(GO)	O
	ForceSignCC	**NA[1])**	NA	NA	O
	LockSignCC	**NA[1])**	NA	NA	O
	TempReturnWaterCondSetp	**(GO_b)**		(GO)	O
Inputs	PowerFlowWaterDemCPM	**NA[1])**	NA	NA	M
	StatusCRC	**NA**	NA	NA	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 1: CC Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	ProdSegmC	M
	Producer	M

Table 2: CC LTE specific Properties

		Support
Parameter	---	---
Diagnostic Data	StatusChillerPump	O
	StatusCondPump	O
	TempFlowWaterChiller	O
	TempReturnWaterChiller	O
	TempFlowWaterCond	O
	TempReturnWaterCond	O

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

2.2.4.1 Output signal: StatusCC

Standard Mode

Not applicable.

➔ mapped to TempFlowWaterChiller, PrelChiller, ChillerFault, StatusChiller

LTE-HEE Mode

FB: CC	**LTE Server Output Name:** StatusCC	Mandatory ☒ Optional ☐

Description:

This output process signal contains status information of the chiller controller to be used in the CPM for chiller control strategy. This is the chilled water flow temperature, current relative power usage of chiller a number in percent, chiller operating hours and attributes like fault, permanent off, requirement of next stages or next chiller.

DPT:	Name	DPT_StatusCC	DPT ID	215.101	Datatype format	$V_{16}U_8B_{16}$

Field	Description	Sup.	Range	Unit	COV	Default
TempChiller	Chilled water flow temperature	O	full range	°C	0.5	cs
PrelChiller	Current relative power (stages in percent)	O	0..100	%	10	0%
Attributes						
– TempChillerValid	Validity of ChillerTemp field	M	true/false	bool	Y	false
– PrelChillerValid	Validity of PrelChiller field	M	true/false	bool	Y	false
– Status	Chiller running status	M	true/false	bool	Y	false
– Fault	Chiller failure	M	true/false	bool	Y	false
– OffPerm	Permanently off (manual switch of failure)	O	true/false	bool	Y	false
– ReqNextStage	Power limit of current stage is reached, next stage required	O	true/false	bool	Y	false
– ReqNextChiller	Power limit of chiller is reached, next chiller required	O	true/false	bool	Y	false
– ReducedAvailability	Reduce availability, chiller is in principle available, but preferably an other chiller is used	O	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 192 (CC)	Property ID: 51
LTE-Services (event): InfoReport ☒	COV ☒ MinRepTime: 10 sec	Heartbeat: 3 min
	Output per default communicating ☐	Binding Group Wildcard allowed ☐
	Tx Prio: High ☐	Normal ☒ Low ☐
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☐	Act Value ☒ Default Value ☐
Property-Service (individual access):	Read only ☒	Read/Write ☐

Exception Handling: Save at Powerdown ☐

Special Features:

2.2.4.2 Output signal: TempFlowWaterChiller

Standard Mode

DP Name:	TempFlowWaterChiller	Abbr.:	--	Mandatory	☒
FB Name:	CC			Can be internal	☐

Description

Current chilled water flow temperature.

Datapoint Type

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

Access Type

♦ Output

this → M	☒ [1])	this → 1	☐				
Spontaneous	☒	COV:	☒	Δ-Value:	0.5 K	Min repetition period:	10s
		Cyclic	☒	Period:	3 Min		
Request	☒						

Communication Type

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

Dynamics

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

Exception Handling

Special Features

[1]) this datapoint is also interesting for visualisation and not only used in the CPM

LTE-HEE Mode

Not applicable.

2.2.4.3 Output signal: PrelChiller

Standard Mode

DP Name:	PrelChiller	Abbr.:	--	Mandatory	☐
FB Name:	CC			Can be internal	☒

Description

Current relative power usage of the chiller unit.

Datapoint Type

DPT_Name:	DPT_RelPos_Valve				
DPT Format:	U_8	DPT_ID:	5.004		

Field	Description	Supp.	Range	Unit	Default
			0..100	%	0

Access Type

♦ Output

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

Communication Type

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

Dynamics

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

Exception Handling

Special Features

LTE-HEE Mode

Not applicable.

2.2.4.4 Output signal: ChillerFault

Standard Mode

DP Name:	ChillerFault			Abbr.:	--				Mandatory	☒	
FB Name:	CC								Can be internal	☐	
Description											
Reports a chiller failure.											
Datapoint Type											
DPT_Name:	DPT_Bool										
DPT Format:	B_1						DPT_ID:	1.002			
Field	Description						Supp.	Range		Unit	Default
											false
Access Type											
♦ Output											
this → M	☒ 1)		this → 1	☐							
Spontaneous	☒	COV:	☐	Δ-Value:	--	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) this datapoint is also interesting for visualisation and not only used in the CPM											

LTE-HEE Mode

Not applicable.

2.2.4.5 Output signal: StatusChiller

Standard Mode

DP Name:	StatusChiller	Abbr.:	--	Mandatory	☒
FB Name:	CC			Can be internal	☒

Description
Operating status of chiller controller.

Datapoint Type					
DPT_Name:	DPT_Switch				
DPT Format:	B_1	DPT_ID:	1.001		
Field	Description	Supp.	Range	Unit	Default
					Off

Access Type							
♦ Output							
this → M	☒ [1])	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:	--	Min repetition period:	10s
		Cyclic	☒	Period:	3 Min		
Request	☒						

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

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

Exception Handling

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

LTE-HEE Mode

Not applicable.

2.2.4.6 Output signal: OpHrsChiller

Standard Mode

DP Name:	OpHrsChiller		Abbr.:	--			Mandatory	☐	
FB Name:	CC						Can be internal	☒	
Description									
Current operating hours of chiller unit.									
Datapoint Type									
DPT_Name:	DPT_LongDeltaTimeSec								
DPT Format:	V_{32}				DPT_ID:	13.100			
Field	Description				Supp.	Range		Unit	Default
						>=0 [1]		h	0
Access Type									
♦ Output									
this → M	☒ [2]	this → 1	☐						
Spontaneous	☒	COV:	☐	Δ-Value:	--	Min repetition period:			
		Cyclic	☒	Period:	1 h				
Request	☒								
Communication Type									
♦ Group Object Datapoint						Mandatory:	☒		
Default Group Address:	--								
Dynamics									
Power down:	Save:	☒							
Power up:	Value:	No initialisation:	☐	Default value:	☐				
		Saved value:	☒	Actual value (not for input):	☐				
	Transmit on bus (only for output):	☐		Read from bus (only for input):	☐				
Exception Handling									

Special Features									

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

[2] this datapoint is also interesting for visualisation and not only used in the CPM

LTE-HEE Mode

FB: CC	**LTE Server Output Name:** OpHrsChiller	Mandatory ☐ Optional ☒

Description:

This output process signal contains the current chiller operating hours

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

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	192 (CC)	Property ID:	52
LTE-Services (event):	COV ☐	MinRepTime: -- sec	Heartbeat:	15 min
InfoReport ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☒	Act Value ☐	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☒

--

Special Features:

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

2.2.4.7 Output signal: ForceSignCC

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CC	**LTE Server Output Name:** ForceSignCC	Mandatory ☐ Optional ☒

Description:

This output process signal indicates that the chiller has remaining energy to be used by the consumers. The signal is used in the CPM for chiller control sequence and generation of ForcesSignCC signal.

DPT:	Name	DPT_ForceSignCool	DPT ID	21.101	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
Attributes – ForceRequest	Forced power consumption is necessary	M	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 192 (CC)	Property ID: 53		
LTE-Services (event): InfoReport ☒	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
	Output per default communicating ☐	Binding Group Wildcard allowed ☐		
	Tx Prio: High ☐	Normal ☒	Low ☐	
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

Special Features:

2.2.4.8 Output signal: LockSignCC

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CC	**LTE Server Output Name:** LockSignCC	Mandatory ☐ Optional ☒

Description:

This output process signal indicates that the chiller is overloaded and the consumers have to reduce the chilled water consumption. The signal is used in the CPM for chiller sequence control and generation of LockSignCC signal.

DPT:	Name	DPT_LockSign	DPT ID	207.101	Datatype format	U_8B_8

Field	Description	Sup.	Range	Unit	COV	Default
PwrReduction	Requested power reduction (100% = maximum reduction)	M	0..100	%	5	cs
Attributes						
– LockRequest	Indicates if power reduction is necessary (validity of PwrReduction)	M	true/false	bool	Y	false
– Type	Type of overload, value only valid if LockRequest = true	O	uncritical / critical	bool	Y	uncrit.

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	192 (CC)	Property ID:	54		
LTE-Services (event): InfoReport ☒	COV ☒	MinRepTime:	10 sec	Heartbeat:	15 min	
	Output per default communicating ☐		Binding Group Wildcard allowed ☐			
	Tx Prio:	High ☐	Normal ☒	Low ☐		
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐			
Property-Service (individual access):	Read only ☒	Read/Write ☐				

Exception Handling: Save at Powerdown ☐

Special Features:

2.2.4.9 Output signal: TempReturnWaterCondSetp

Standard Mode

DP Name:	TempReturnWaterCondSetp	Abbr.:	--					Mandatory	☐	
FB Name:	CC							Can be internal	☒	
Description										
see LTE-HEE mode										
Datapoint Type										
DPT_Name:	DPT_Value_Temp									
DPT Format:	F_{16}					DPT_ID:	9.001			
Field	Description					Supp.	Range	Unit	Default	
							full range	°C	cs	
Access Type										
♦ Output										
this → M	☐	this → 1	☒							
Spontaneous	☒	COV:	☒	Δ-Value:	0.5 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: CC	**LTE Client Output Name:** TempReturnWaterSetp	Mandatory ☐ Optional ☒

Description:

This signal is optionally used by the CC to control an “intelligent” condenser water return temperature controller (CRC).

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

Field	Description	Sup.	Range	Unit	COV	Default
TempReturnWaterSetp	Condenser water temperature setpoint	M	full range	°C	0.5	cs
Command - Write - other Commands	Standard Command field Normal Write not applicable	 M NA		enum		

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	200 (CRC)	Property ID:	51
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
Write ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup:	Stored Value ☐	Act Value ☒	Default Value ☐

Exception Handling: Save at Powerdown ☐

Special Features:

2.2.4.10 Input signal: PowerFlowWaterDemCPM

Standard Mode

Not applicable.

(Reason: Splitting of DPT is not possible because of necessary data consistency).

LTE-HEE Mode

FB: CC	**LTE Client Input Name:** PowerFlowWaterDemCPM	Mandatory ☒ Optional ☐

Description:

This input signal contains the current flow temperature demand (absolute value) and further chiller control information from the Cold Water Production Manager CPM.

DPT:	Name	DPT_ PowerFlowWaterDemCPM	DPT ID	214.101	Datatype format	$V_{16}U_8B_8$

Field	Description	Sup.	Unit	Default
TempFlowDem	Chilled water flow temperature demand	M[1)]	°C	cs
RelDemLimit	This value sets the relative demand limit in percent, used in chiller sequences controlled by the Cold Water Production Manager CPM (0% = no stages, 100% = all stages)	M[1)]	%	cs
Attributes				
– TempFlowDemValid	Validity of chilled water flow temperature	M	bool	false
– RelDemLimitValid	Validity of relative demand limit	M	bool	false
– Chiller Enable	Chilled water pump enabled (must be enabled before chiller compressor is started, only applicable when chilled water pump available)	O	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	199 (CPM)	Property ID:	52
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	7 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:	--		

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

Special Features:

[1)] Either / or. Any of these datapoints may be mandatory or optional

2.2.4.11 Input signal: StatusCRC

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CC	**LTE Client Input Name:** StatusCRC					Mandatory ☐ Optional ☒
Description:						
This input signal contains status information of the Re-cooling controller CRC.						
DPT: Name	DPT_ StatusWTC	DPT ID	209.103	Datatype format	$V_{16}B_8$	
Field	Description			Sup.	Unit	Default
TempWater	Current condenser water return temperature value			M	°C	cs
Attributes						
– TempWaterValid	Validity of TempWater field			M	bool	false
– Fault	Some failure in the CRC			M	bool	false
– CtrlStatus	Controller status on: CRC is working (default if not supported) off: CRC is stopped; no control			O	bool	on
Communication:						
Binding Group:						
Class	Type			Default		
Geographical ☐						
Application Specific ☒	ProdSegmC.Producer			1.1		
Unassigned ☐	Broadcast ☐	Configurable ☐				
DP Address:	IO Type(ID):	200 (CRC)	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 Powerup:	Default Value ☒			Stored Value ☐		
Exception Handling:				Save at Powerdown ☐		

Special Features:						

2.2.4.12 Parameter: ProdSegmC

FB: CC	Property Name (Server): ProdSegmC	Mandatory ☒ Optional ☐

Description:

LTE zoning information Cold Water Production Segment

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

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

Communication:

DP Address: (in the server)	IO Type(ID):	192 (CC)	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:

CC DP's are not LTE communicating if zone is 'OutOfService'. If ProdSegmC is 'OutOfService' also the corresponding Producer zone is 'OutOfService' (common flag)

2.2.4.13 Parameter: Producer

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

Description:

LTE zoning information Cold Water Producer number

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

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

Communication:

DP Address: (in the server)	IO Type(ID):	192 (CC)	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:

CC DP's are not LTE communicating if zone is 'OutOfService'. If ProdSegmC is 'OutOfService' also the corresponding Producer zone is 'OutOfService' (common flag)

2.2.4.14 Diagnostic data: StatusChillerPump

FB: CC	Property Name (Server): StatusChillerPump	Mandatory ☐ Optional ☒

Description:

Current relative power of the chiller 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):	192 (CC)	Property ID:	110
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

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

Special Features:

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

2.2.4.15 Diagnostic data: StatusCondPump

FB: CC	Property Name (Server): StatusCondPump	Mandatory ☐ Optional ☒

Description:

Current relative power of the condenser 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):	192 (CC)	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

2.2.4.16 Diagnostic data: TempFlowWaterChiller

FB: CC	Property Name (Server): TempFlowWaterChiller	Mandatory ☐ Optional ☒

Description:

This diagnostic signal contains the chilled water flow temperature value. Out of safety reason, this sensor is always hardwired to the Chiller Controller.

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

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

Communication:

DP Address: (in the server)	IO Type(ID):	192 (CC)	Property ID:	112
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.2.4.17 Diagnostic data: TempReturnWaterChiller

FB: CC	Property Name (Server): TempReturnWaterChiller	Mandatory ☐ Optional ☒

Description:

This diagnostic signal contains the chilled water return temperature value. Out of safety reason, this sensor – whenever applicable - is always hardwired to the Chiller Controller.

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

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

Communication:

DP Address: (in the server)	IO Type(ID):	192 (CC)	Property ID:	113
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.2.4.18 Diagnostic data: TempFlowWaterCond

FB: CC	Property Name (Server): TempFlowWaterCond	Mandatory ☐ Optional ☒

Description:

This diagnostic signal contains the condenser water flow temperature value. Out of safety reason, this sensor – whenever applicable - is always hardwired to the Chiller Controller.

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

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

Communication:

DP Address: (in the server)	IO Type(ID):	192 (CC)	Property ID:	114
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.2.4.19 Diagnostic data: TempReturnWaterCond

FB: CC	Property Name (Server): TempReturnWaterCond	Mandatory ☐ Optional ☒

Description:

This diagnostic signal contains the condenser water return temperature value. Out of safety reason, this sensor – whenever applicable - is always hardwired to the Chiller Controller.

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

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

Communication:

DP Address: (in the server)	IO Type(ID):	192 (CC)	Property ID:	115
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.3 Functional Block: Cold Water Producer Manager (CPM)

2.3.1 Description

The Functional Block Cold Water Production Manager CPM is responsible for demand depended cold water production of 1 to 31 production units, so called Chiller Controllers CC.

The CPM controls each chilled water unit in its own producer segment within a cooling production segment. Therefore the link(s) to the Chiller Controller(s) is made via ProdSegmC.Prod (for an overview please refer to clause 2.1).

Each Chiller Controller CC reports via:

- StatusCC
- LockSignCC
- ForceSignCC

to the Cold Water Production Manager CPM. For a description of this signals please refer to the description of the Functional Block CC, clause 2.2.

To determine the demand, the CPM collects the TempFlowWaterDemAbsCFDM and converts it to the PowerFlowWaterDemCPM for each of the chiller units. It is possible to connect up to 31 chiller units to a CPM. There is always an 1 : 1 connection between the first Cooling Flow Demand Manager and the CPM. These two Functional Blocks are often integrated in one device.

This chiller control sequence algorithm, evaluation of optimum COP and other control strategies are company specific and not part of this description.

The function of the CPM also manages the temperature setpoints and status of a common condenser water re-cooling circuit or air re-cooling circuit. Note: This is an optional feature (refer scenario c, clause 2.1). The Re-Cooling Controller CRC is responsible for the actual temperature control.

There may be a chilled water pump connected to the CPM. Note: Condenser water pumps are connected depending on the scenario:

a) directly to the CC

b&c) within the CRC controller

The functions of cold water system with buffer storage tanks are incorporated in within this Functional Blocks, via company specific control algorithm.

2.3.2 Constraints

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

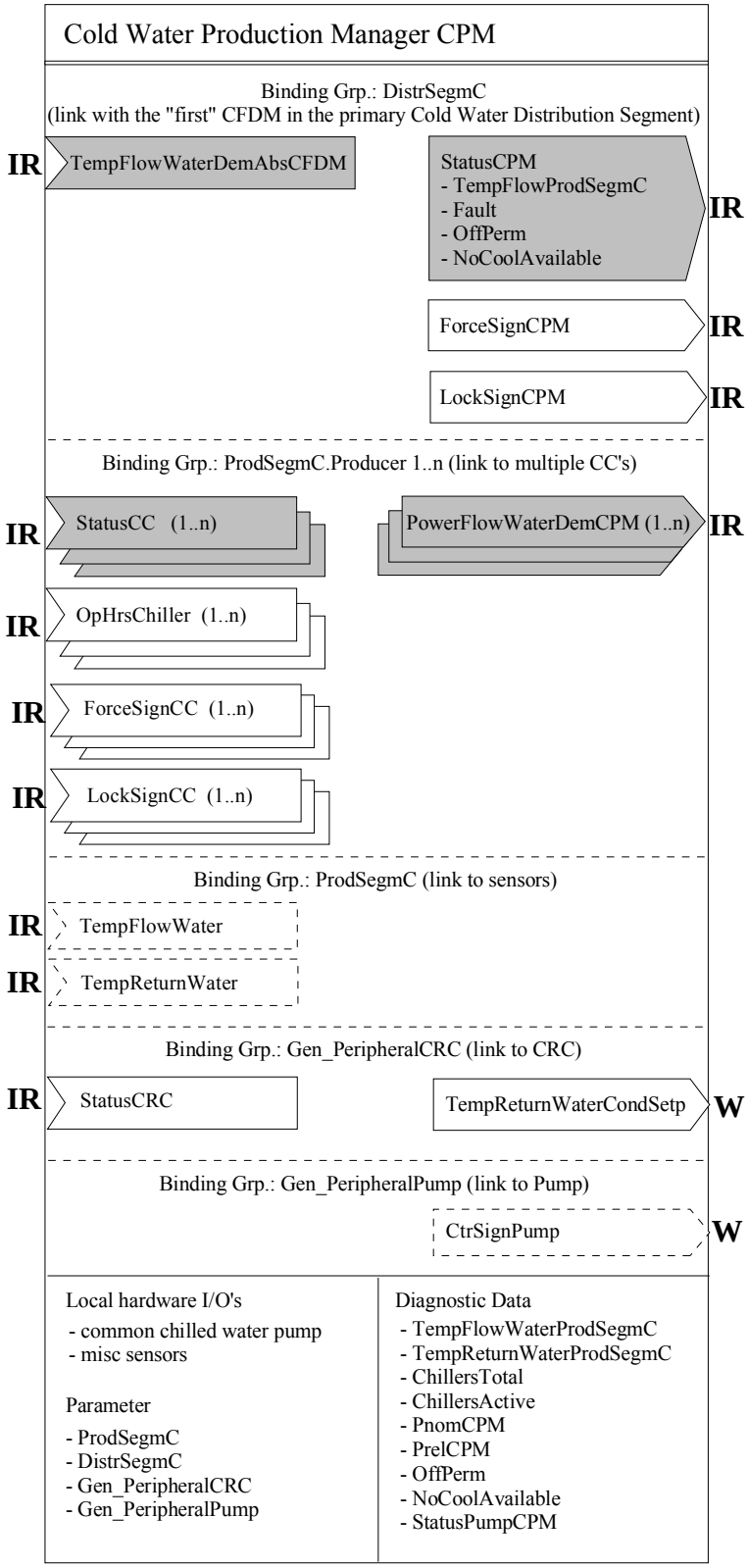
Therefore for the time being only LTE implementations of the CPM and CC functional blocks offer a bus-link to control one or multiple CC by means of the signal PowerFlowWaterDemCPM (demand dependent chiller control).

The cold water demand input signal TempFlowWaterDemAbsCFDM from the associated CFDM can today not be implemented in Standard Mode because the necessary compound HVAC DPT for runtime-interworking is not yet available in Standard Mode

Therefore for the time being only LTE implementations of the CPM and CFDM functional blocks offer a bus-link to a demand dependent cold water distribution system.

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

2.3.3 Functional Block diagram



2.3.4 Description of Datapoints

Datapoint	Description	Datapoint Type	DPT_ID
Outputs			
StatusCPM	Status information of the CPM	DPT_StatusCPM	209.102
- TempFlowWater ProdSegmC	Common flow temperature of the cooling production segment (S-interface)	DPT_Value_Temp	9.001
- Fault	Chiller Fault (S-interface)	DPT_Bool	1.002
- OffPerm	Chiller sequence is permanently off (S-interface)	DPT_Bool	1.002
- NoCoolAvailable	Chiller sequence is temporary not providing cold water (S-interface)	DPT_Bool	1.002
PowerFlowWater DemCPM	CPM demand signal and control information (1..n different signals)	DPT_PowerFlowWater DemCPM	214.101
ForceSignCPM	Resulting forcing signal of Cold Water Production Segment sent to the “first” CFDM, to force the consumers to consume energy	DPT_ForceSignCool	21.101
LockSignCPM	Resulting locking signal of Cold Water Production Segment sent to the “first” CFDM, to force the consumers to reduce energy consumption	DPT_LockSign	207.101
CtrlSignPump	Command of common chiller pump by bus	t.b.d. probably complex DPT	?
TempReturnWater CondSetp	Condenser water return temperature setpoint (condenser temperature setpoint to a common re-cooling unit) LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
Inputs			
TempFlowWaterDem AbsCFDM	Flow temperature demand from the “first” CFDM in the primary Cold Water Distribution Segment	DTP_TempFlowWater DemAbs	210.100
StatusCC	Status information from multiple CC (1..n). Needed in chiller sequence application.	DPT_StatusCC	215.101
OpHrsChiller	Operating Hours CC (1..n)	DPT_LongDeltaTimeSec	13.100
ForceSignCC	Forcing signal from multiple CC (1..n) Used to force the consumers to consume energy from chiller	DPT_ForceSignCool	21.101
LockSignCC	Locking signal from multiple CC (1..n) Used to force the consumers to reduce energy consumption from chiller	DPT_LockSign	207.101
StatusCRC	Status information from Re-Cooling Controller	DPT_StatusWTC	209.103
TempFlowWater	Common chilled water flow temperature sensor LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001

Datapoint	Description	Datapoint Type	DPT_ID
TempReturnWater	Common chilled water return temperature sensor LTE and S-interface	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
Parameters			
ProdSegmC	LTE zoning number Cooling Production Segment	DPT_UCountValue8_Z	202.002
DistSegmC	LTE zoning number Cold Water Distribution Segment	DPT_UCountValue8_Z	202.002
Gen_PeripheralCRC	LTE zoning number general peripheral for common Re-Cooling Controller	DPT_UCountValue16_Z	203.012
Gen_PeripheralPump	LTE zoning number general peripheral for common chiller pump	DPT_UCountValue16_Z	203.012
Diagnostic Data			
TempFlowWater ProdSegmC	Chilled water flow temperature sensor	DPT_TempHVACAbs_Z	205.100 *)
TempReturnWater ProdSegmC	Chilled water return temperature sensor	DPT_TempHVACAbs_Z	205.100 *)
ChillersTotal	Total number of chiller in chiller sequence	DPT_Value_1_UCount	5.010
ChillersActive	Number of currently active chillers in chiller sequence	DPT_Value_1_UCount	5.010
PnomCPM	Nominal power kW of chiller sequence	DPT_PowerKW_Z	203.014 *)
PrelCPM	Current relative power of chiller sequence	DPT_RelValue_Z	202.001 *)
OffPerm	Chiller sequence is permanently switched off	DPT_Bool	1.002
NoCoolAvailable	Chiller sequence is temporary not providing any cold water	DPT_Bool	1.002
StatusPumpCPM	common chilled water pump in the chiller sequence; for switched pump 0%=off, 100%=on	DPT_RelValue_Z	202.001 *)

*) Implementation of Properties using standard DPT see clause 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	StatusCPM	**NA**	NA	NA	M
	- TempFlowWater ProdSegmC	**GO_b**	GO	GO	NA
	- Fault	**GO_b**	GO	GO	NA
	- OffPerm	**(GO_b)**		(GO)	NA
	- NoCoolAvailable	**(GO_b)**		(GO)	NA
	PowerFlowWaterDemCPM	**NA[1])**	NA	NA	M
	ForceSignCPM	**NA[1])**	NA	NA	O
	LockSignCPM	**NA[1])**	NA	NA	O
	CtrlSignPump (not defined yet)				
	TempReturnWaterCondSetp	**(GO_b)**		(GO)	O
Inputs	TempFlowWaterDem AbsCFDM	**NA[1])**	NA	NA	M
	StatusCC	**NA[1])**	NA	NA	M
	OpHrsChiller	**GO**	GO	GO	O
	ForceSignCC	**NA[1])**	NA	NA	O
	LockSignCC	**NA[1])**	NA	NA	O
	StatusCRC	**NA[1])**	NA	NA	O
	TempFlowWater	**(GO_b)**		(GO)	O
	TempReturnWater	**(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 4: CPM Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	ProdSegmC	M
	DistrSegmC	M or NA[1)]
	Gen_PeripheralCRC	O
	Gen_PeripheralPump	O

Table 5: CPM LTE specific Properties

[1)] Whenever the first CFDM and CPM are in the same device, the data of this Distribution Segment (refer clause 3.1) does not have to be available on the bus. Therefore this DistrSegmC is only mandatory when the first CFDM and CPM are located in different devices.

		Support
Parameter	---	---
Diagnostic Data	TempFlowWaterProdSegmC	O
	TempReturnWaterProdSegmC	O
	ChillersTotal	O
	ChillersActive	O
	PnomCPM	O
	PrelCPM	O
	OffPerm	O
	NoCoolAvailable	O
	StatusPumpCPM	O

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

2.3.4.1 Output signal: StatusCPM

Standard Mode

Not applicable.

➔ Mapped to TempFlowProdSegmC, Fault, OffPerm, NoCoolAvailable.

LTE-HEE Mode

FB: CPM	**LTE Server Output Name:** StatusCPM	Mandatory ☒ Optional ☐

Description:

This output process signal contains status information of the Cold Water Production Manager to the different consumers to may be used for their control strategy. This is the chilled water flow temperature of the production segment, fault, permanent off and no cooling available indication.

DPT:	Name	DPT_StatusCPM	DPT ID	209.102	Datatype format	V_{16} B_8

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowProdSegmC	Chilled water flow temperature in the cooling production segment	M	full range	°C	0.5	cs
Attributes						
– TempFlowValid	Validity of TempFlowProdSegmC	M	true/false	bool	Y	false
– Fault	Chiller failure	M	true/false	bool	Y	false
– OffPerm	Permanently off (manual switch of failure)	O	true/false	bool	Y	false
– NoCoolAvailable	Temporary no cooling in the production segment available	O	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	199 (CPM)	Property ID:	51
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
InfoReport ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

Special Features:

Note: CPM is also present in a system with only 1 chiller.
CPM and the first CFDM are usually located in the same device ⇒ device – internal signal only.

2.3.4.2 Output signal: TempFlowWaterProdSegmC

Standard Mode

DP Name:	TempFlowWater ProdSegmC	Abbr.:	--	Mandatory	☒
FB Name:	CPM			Can be internal	☒

Description
Common cold water flow temperature of cold water production segment, mainly used for visualisation

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

Access Type

♦ Output

this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☒	Δ-Value:	0.5 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

Not applicable.

2.3.4.3 Output signal: Fault

Standard Mode

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

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

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

Access Type							
♦ Output							
this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:	--	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

Not applicable.

2.3.4.4 Output signal: OffPerm

Standard Mode

DP Name:	OffPerm	Abbr.:	--	Mandatory	☐
FB Name:	CPM			Can be internal	☒

Description
chiller sequence is permanently off (manual switch or failure), mainly used for visualisation

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

Access Type							
♦ Output							
this → M	☒	this → 1	☐				
Spontaneous	☒	COV:	☐	Δ-Value:	--	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

Not applicable.

2.3.4.5 Output signal: NoCoolAvailable

Standard Mode

DP Name:	NoCoolAvailable	Abbr.:	--	Mandatory	☐
FB Name:	CPM			Can be internal	☒
Description					
chiller sequence is temporarily not producing cold water, 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

Not applicable.

2.3.4.6 Output signal: PowerFlowWaterDemCPM

Standard Mode

Not applicable.

Reason: Splitting of DPT is not possible because of necessary data consistency

LTE-HEE Mode

FB: CPM	**LTE Server Output Name:** PowerFlowWaterDemCPM	Mandatory ☒ Optional ☐

Description:

This output process signal contains the current flow temperature demand (absolute value) and further chiller control information which is sent to each chiller controller individually. Therefore there are 1..n PowerFlowWaterDemCPM signal(s) to be sent in 1..n cold water production segment. producer. (⇒ multiple signals)

DPT:	Name	DPT_ PowerFlowWaterDemCPM	DPT ID	214.101	Datatype format	$V_{16}U_8B_8$

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowDem	Chilled water flow temperature demand	M[1)]	full range	°C	0.5	cs
RelDemLimit	This value sets the relative demand limit in percent, used in chiller sequences controlled by the Cold Water Production Manager CPM (0% = no stages, 100% = all stages)	M[1)]	0..100	%	5	cs
Attributes						
– TempFlowDemValid	Validity of chilled water flow temperature	M	true/false	bool	Y	false
– RelDemLimitValid	Validity of relative demand limit	M	true/false	bool	Y	false
– Chiller Enable	Chilled water pump enabled (must be enabled before chiller compressor is started, only applicable when chilled water pump available)	O	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 199 (CPM)		Property ID: 52	
LTE-Services (event): InfoReport ☒	COV ☒	MinRepTime: 10 sec	Heartbeat: 3 min	
	Output per default communicating ☐		Binding Group Wildcard allowed [2)] ☒	
(LTE Read-Response polling of the output shall always be supported)	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

Special Features:

1) Either / or. Any of these datapoints may be mandatory or optional

2) Wildcard on Producer is allowed to control all CC in the same ProdSegment in parallel.

2.3.4.7 Output signal: ForceSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CPM	**LTE Server Output Name:** ForceSignCPM	Mandatory ☐ Optional ☒

Description:

This output process signal indicates that the Cold Water Production Manager has remaining energy to be used by the consumers.

DPT:	Name	DPT_ForceSignCool	DPT ID	21.101	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
Attributes – ForceRequest	Forced power consumption is necessary	M	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 199 (CPM)	Property ID: 53		
LTE-Services (event): InfoReport ☒	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
	Output per default communicating ☐	Binding Group Wildcard allowed ☐		
	Tx Prio:	High ☐	Normal ☒	Low ☐
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only [1] ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

Special Features:

Note: CPM and first CFDM are usually located in the same device ⇒ device – internal signal only

[1]) Read access is possible but in practice not very useful.

2.3.4.8 Output signal: LockSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CPM	**LTE Server Output Name:** LockSignCPM	Mandatory ☐ Optional ☒

Description:

This output process signal indicates that the Cold Water Production Manager has a problem to deliver the requested energy and the consumers have to reduce their energy consumption.

DPT:	Name	DPT_LockSign	DPT ID	207.101	Datatype format	U_8B_8

Field	Description	Sup.	Range	Unit	COV	Default
PwrReduction	Requested power reduction (100% = maximum reduction)	M	0..100	%	5	cs
Attributes – LockRequest	Indicates if power reduction is necessary (validity of PwrReduction)	M	true/false	bool	Y	false
– Type	Type of overload, value only valid if LockRequest = true	M	uncritical / critical	bool	Y	uncrit.

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmC	31
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 199 (CPM)		Property ID: 54	
LTE-Services (event): InfoReport ☒	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only [1] ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

Special Features:

Note: CPM and first CFDM are usually located in the same device ⇒ device – internal signal only

[1]) Read access is possible but in practice not very useful.

2.3.4.9 Output signal: CtrlSignPump

To be defined later together with pump manufacturers.

2.3.4.10 Output signal: TempReturnWaterCondSetp

Same as in CC, refer to clause 2.2.4.9

2.3.4.11 Input signal: TempFlowWaterDemAbsCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CPM	LTE Client Input Name: TempFlowWaterDem AbsCDFM	Mandatory ☒ Optional ☐

Description:

This input process signal contains the flow temperature cooling demand (absolute temperature value) and the different attributes to control the Cooling Flow Demand Manager CFDM.

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

Field	Description	Sup.	Unit	Default
TempFlowDem	Flow temperature demand (setpoint)	M	°C	cs
Attributes				
– DemValid	Validity of TempFlowDemand	M	bool	false
– AbsLoadPriority	Absolute load priority	O	bool	false
– ShiftLoadPriority	Shift load priority	O	bool	false
– MaxTempLimit	TempFlowDem contains max. temperature limit [1])	O	bool	false
– MinTempLimit	TempFlowDem contains min. temperature limit (e.g. dew point limitation) [2])	O	bool	false
– DHWReq	Heat demand from DHW, for DHW only	NA	bool	false
– RoomCtrlReq	Demand from room heating or cooling	O	bool	false
– VentReq	Demand from ventilation	O	bool	false
– AuxAllSeasonReq	Demand from auxiliary heat or cool consumer, all season	O	bool	false
– SystemPumpReq	Request for water circulation in the Distribution Segment (common chilled water pump)	O	bool	false
– EmergDem	Emergency cold water demand for plant protection	O	bool	false
– DHWLegioReq	demand from DHW while legionella function is active (can only be 'true' if DHWReq = 'true')	O	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	208 (CFDM)	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 CPM needs this signal for normal operation. Due to the heartbeat repetition of the signal, it is possible to supervise the presence of the CFDM.

Special Features:

Note: CPM and first CFDM are usually located in the same device ⇒ device – internal signal only. There is a 1:1 relationship between the CPM and CFDM.

[1]) This value sets a maximum flow temperature limit from the Cooling Flow Demand Transformer CFDM. It is a high temperature limit in this hydraulic circuit.

[2]) This value sets a minimum flow temperature limit from the Cooling Flow Demand Transformer CFDM. It is a low temperature limit in this hydraulic circuit. Low temperature limits have priority.

2.3.4.12 Input signal: StatusCC

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CPM	LTE Client Input Name: StatusCC	Mandatory ☒ Optional ☐

Description:

This input signal contains the status information from the chiller controller units CC to control the CPM (strategy). This is the chilled water flow temperature, relative power usage of chiller a number in percent, and attributes like fault, permanent off, requirement of next stages or next chiller

DPT:	Name	DPT_ StatusCC	DPT ID	215.101	Datatype format	$V_{16}U_8B_{16}$

Field	Description	Sup.	Unit	Default
TempChiller	Chilled water flow temperature	O	°C	cs
PrelChiller	Current relative power (stages in percent)	O	%	cs
Attributes				
– TempChillerValid	Validity of ChillerTemp field	M	bool	false
– PrelChillerValid	Validity of PrelChiller field	M	bool	false
– Status	Chiller running status	M	bool	false
– Fault	Chiller failure	M	bool	false
– OffPerm	Permanently off (manual switch of failure)	O	bool	false
– ReqNextStage	Power limit of current stage is reached, next stage required	O	bool	false
– ReqNextChiller	Power limit of chiller is reached, next chiller required	O	bool	false
– ReducedAvailability	Reduce availability, chiller is in principle available, but preferably an other chiller is used	O	bool	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	192 (CC)	Property ID:	51
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:		--	
	Timeout:	7	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:		--	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

Special Features:

2.3.4.13 Input OpHrsChiller

Standard Mode

DP Name:	OpHrsChiller	Abbr.:	--	Mandatory	☒
FB Name:	CPM			Can be internal	☒

Description

Current chiller operating hours

Datapoint Type

DPT_Name:	DPT_LongDeltaTimeSec		
DPT Format:	V_{32}	DPT_ID:	13.100

Field	Description	Supp.	Range	Unit	Default
			>=0 [1)]	h	0

Access Type

♦ Input

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

Communication Type

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

Dynamics

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

Exception Handling

Special Features

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

LTE-HEE Mode

FB: CPM	**LTE Client Input Name:** OpHrsChiller	Mandatory ☒ Optional ☐

Description:

Current chiller operating hours

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

Field	Description	Sup.	Unit	Default
			h	0

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	192 (CC)	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: [1] Default Value ☐ Stored Value ☒

Exception Handling: Save at Powerdown ☒

Special Features:

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

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

2.3.4.14 Input signal: ForceSignCC

Standard Mode

Not applicable.

LTE-HEE Mode

FB:	**CPM**	**LTE Client Input Name:**	**ForceSignCC**			Mandatory ☐ Optional ☒	
Description:							
This input signal indicates that the chiller unit has remaining energy to be used by the consumers.							
DPT:	Name	DPT_ ForceSignCool	DPT ID	21.101	Datatype format	B_8	
Field		Description			Sup.	Unit	Default
Attributes – ForceRequest		Forced power consumption is necessary			O	bool	false
Communication:							
Binding Group:							
Class		Type			Default		
Geographical ☐							
Application Specific ☒		ProdSegmC.Producer (1..n)			1.n		
Unassigned ☐		Broadcast ☐	Configurable ☐				
DP Address:		IO Type(ID):	192 (CC)	Property ID:	53		
LTE-Service (event):		InfoReport Sniffer on Binding Group:			--		
InfoReport ☒		Timeout:	31	Min			
LTE-Service (polling):		Read Wildcard / Resp Sniffer on Binding Group:			--		
Read – Response ☐							
Value after Powerup:		Default Value ☒				Stored Value ☐	
Exception Handling:						Save at Powerdown ☐	

Special Features:							

2.3.4.15 Input signal: LockSignCC

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CPM	**LTE Client Input Name:** LockSignCC	Mandatory ☐ Optional ☒

Description:

This input signal indicates that the chiller unit is overloaded and the consumers have to reduce their chilled water consumption.

DPT:	Name	DPT_ LockSign	DPT ID	207.101	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
PwrReduction	Requested power reduction (100% = maximum reduction)	M	%	cs
Attributes				
– LockRequest	Indicates if power reduction is necessary (validity of PwrReduction)	M	bool	false
– Type	Type of overload, value only valid if LockRequest = true	O	bool	uncrit.

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	192 (CC)	Property ID:	54
LTE-Service (event):	InfoReport Sniffer on Binding Group:		--	
InfoReport ☒	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:		--	

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

Special Features:

2.3.4.16 Input signal: StatusCRC

Same as in CC, refer to clause 2.2.4.11.

2.3.4.17 Input signal: TempFlowWater

Standard Mode

DP Name:	TempFlowWater	Abbr.:	--	Mandatory	☐
FB Name:	CPM			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: CPM	**LTE Client Input Name:** TempFlowWater	Mandatory ☐ Optional ☒

Description:

This process signal from a temperature sensor contains the common chilled water flow temperature of the chiller sequence, which may be optionally used by the CPM instead of a local cold water flow temperature sensor

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

Field	Description	Sup.	Unit	Default
TempFlowWater	Temperature value	M	°C	cs
Status		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 ☒	ProdSegmC	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

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

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

Special Features:

2.3.4.18 Input signal: TempReturnWater

Standard Mode

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

Description:

This process signal from a temperature sensor contains the common chilled water return temperature of the chiller sequence, which may be optionally used by the CPM instead of a local cold water return temperature sensor

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

Field	Description	Sup.	Unit	Default
TempFlowWater	Temperature value	M	°C	cs
Status		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 ☒	ProdSegmC	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

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

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

Special Features:

2.3.4.19 Parameter: ProdSegmC

FB: CPM	Property Name (Server): ProdSegmC	Mandatory ☒ Optional ☐

Description:

LTE zoning information Cold Water Production Segment

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

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

Communication:

DP Address: (in the server)	IO Type(ID):	199 (CPM)	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:

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

2.3.4.20 Parameter: DistrSegmC

FB: CPM	Property Name (Server): DistrSegmC	Mandatory ☒ [1] Optional ☐

Description:

LTE zoning information Cold Water Primary Distribution Segment

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Cold Water Distribution Segment number	M	1..31	--	31
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):	199 (CPM)	Property ID:	102
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

Special Features:

[1] Whenever the first CFDM and CPM are in the same device the DistrSegmC does not have to be implementet.
CPM DP's are not LTE communicating if zone is 'OutOfService'.

2.3.4.21 Parameter: Gen_PeripheralCRC

FB: CPM	Property Name (Server): Gen_PeripheralCRC	Mandatory ☐ Optional ☒

Description:

LTE zoning number Peripheral link to CRC (optionally used for control of the common condenser water temperature)

DPT:	Name	DPT_UCountValue16_Z	DPT ID	203.012	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
CounterValue	peripheral link number	M	full range	--	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):	199 (CPM)	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:

CPM is not LTE communicating with the CRC if zone is 'OutOfService'

2.3.4.22 Parameter: Gen_PeripheralPump

FB: CPM	Property Name (Server): Gen_PeripheralPump	Mandatory ☐ Optional ☒

Description:

LTE zoning number Peripheral link to pump

DPT:	Name	DPT_UCountValue16_Z	DPT ID	203.012	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
CounterValue	peripheral link number	M	full range	--	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):	199 (CPM)	Property ID:	104
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

Special Features:

CPM is not LTE communicating with pump if zone is 'OutOfService'

2.3.4.23 Diagnostic data: TempFlowWaterProdSegmC

FB: CPM	Property Name (Server): TempFlowWater ProdSegmC	Mandatory ☐ Optional ☒

Description:

This diagnostic signal contains the common chilled water flow temperature value.

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

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

Communication:

DP Address:	IO Type(ID):	199 (CPM)	Property ID:	110
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.3.4.24 Diagnostic data: TempReturnWaterProdSegmC

FB: CPM	Property Name (Server): TempReturnWater ProdSegmC	Mandatory ☐ Optional ☒

Description:

This diagnostic signal contains the common chilled water return temperature value.

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

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

Communication:

DP Address:	IO Type(ID):	199 (CPM)	Property ID:	111
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

[1)] optional Write access for Alarm acknowledgement only

2.3.4.25 Diagnostic data: ChillersTotal

FB: CPM	Property Name (Server): ChillersTotal	Mandatory ☐ Optional ☒

Description:

Total number of chillers in chiller sequence (according to the chiller directory).

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..31	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	199 (CPM)	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:

2.3.4.26 Diagnostic data: ChillersActive

FB: CPM	Property Name (Server): ChillersActive	Mandatory ☐ Optional ☒

Description:

Number of currently active chillers in chiller sequence.

DPT:	Name	DPT_Value_1_Ucount	DPT ID	5.010	Datatype format	U_8

Field	Description	Sup.	Range	Unit	Default
			0..31	--	cs

Communication:

DP Address: (in the server)	IO Type(ID):	199 (CPM)	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:

2.3.4.27 Diagnostic data: PnomCPM

FB: CPM	Property Name (Server): PnomCPM	Mandatory ☐ Optional ☒

Description:

Nominal power of the chiller sequence controlled by the CPM.

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

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

Communication:

DP Address:	IO Type(ID):	199 (CPM)	Property ID:	114
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

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

Special Features:

To be calculated according to the power values PnomChillers of the attached chillers.

2.3.4.28 Diagnostic data: PrelCPM

FB: CPM	Property Name (Server): PrelCPM	Mandatory ☐ Optional ☒

Description:

Current relative power of the chiller sequence according to the relative power values of the attached chillers. The calculation is done by the CPM and the mechanism is company specific.

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

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

Communication:

DP Address:	IO Type(ID):	199 (CPM)	Property ID:	115
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

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

Special Features:

2.3.4.29 Diagnostic data: OffPerm

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

Description:

Status info indicating whether the chiller sequence is permanently off (e.g. manually switched off). This datapoint can also be a parameter of the CPM in order to switch the chiller sequence off via bus.

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

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

Communication:

DP Address:	IO Type(ID):	199 (CPM)	Property ID:	116
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

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

2.3.4.30 Diagnostic data: NoCoolAvailable

FB: CPM	Property Name (Server): NoCoolAvailable	Mandatory ☐ Optional ☒

Description:

Status info indicating whether chiller sequence is temporarily not providing cold water.

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

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

Communication:

DP Address:	IO Type(ID):	199 (CPM)	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:

2.3.4.31 Diagnostic data: StatusPumpCPM

FB: CPM	Property Name (Server): StatusPumpCPM	Mandatory ☐ Optional ☒

Description:

Current relative power of common chilled water pump in the chiller sequence.

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

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

Communication:

DP Address:	IO Type(ID):	199 (CPM)	Property ID:	118
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

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

Special Features:

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

2.4 Functional Block: Re-Cooling Control (CRC)

2.4.1 Description

The Functional Block Re-Cooling Controller CRC is controlling the incoming condenser return temperature to the chiller unit(s) by bypass valve or cooling tower fans (1..n) and/or dampers (1..m). The temperature setpoint TempReturnWaterCondSetp is determent by the Cold Water Production Manager CPM or by the Chiller Controller CC. Refer to the overview, clause 2.1.

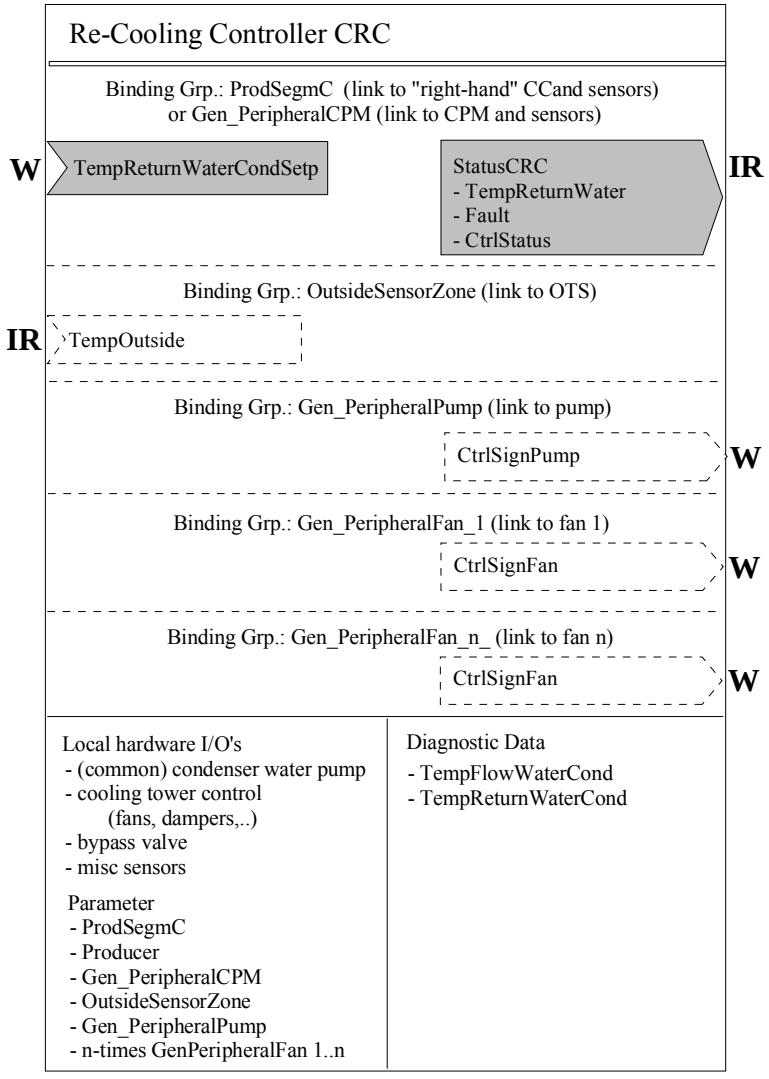
Out of controlling purpose the condenser water return sensor has to be connected to the Re-Cooling Controller, as well as the condenser water flow temperature sensor.

Additionally it is possible to connect the condenser water pump to the CRC.

2.4.2 Constraints

The TempRetrunWaterSetp signal shall be provided by one FB (1:1 link to CRC). Otherwise the actual temperature setpoint in the CRC will toggle.

2.4.3 Functional Block diagram



2.4.4 Description of Datapoints

Datapoint	Description	Datapoint Type	DPT_ID
Outputs			
StatusCRC	Status information of CRC	DPT_StatusWTC	209.103
- TempReturnWater	Current water return temperature (S-interface)	DPT_Value_Temp	9.001
- Fault	CRC fault (S-interface)	DPT_Bool	1.002
- CtrlStatus	Controller Status (S-interface)	DPT_Switch	1.001
CtrlSignPump	Command of common condenser pump by bus when the CRC is connected to the CPM, or condenser pump of a chiller unit when connected to CC.	t.b.d. probably complex DPT	t.b.d.
CtrlSignFan (1..n)	Command of re-cooling control (cooling tower fan) number #n	t.b.d. probably complex DPT	t.b.d.
Inputs			
TempReturnWater CondSetp	Condenser water return temperature setpoint (condenser temperature setpoint back to the chiller unit) (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
TempOutside	Outside air temperature sensor input (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
Parameters			
ProdSegmC	LTE zoning number Cooling Production Segment	DPT_UCountValue8_Z	202.002
Producer	LTE zoning number Cooling Producer Segment	DPT_UCountValue8_Z	202.002
Gen_PeripheralCPM	LTE zoning number general peripheral connection to CPM	DPT_UCountValue16_Z	203.012
OutsideSensorZone	LTE zoning number for outside air temperature sensor	DPT_UCountValue8_Z	202.002
Gen_PeripheralPump	LTE zoning number general peripheral connection to pump	DPT_UCountValue16_Z	203.012
Gen_PeripheralFan#1	LTE zoning number general peripheral for Fan #1	DPT_UCountValue16_Z	203.012
….	…	…	
Gen_PeripheralFan#n	LTE zoning number general peripheral for Fan #n	DPT_UCountValue16_Z	203.012
Diagnostic Data			
TempFlowWaterCond	Common condenser water flow temperature sensor	DPT_TempHVACAbs_Z	205.100 *)
TempReturnWaterCond	Common condenser water return temperature sensor	DPT_TempHVACAbs_Z	205.100 *)

*) Implementation of Properties using standard DPT see clause 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	StatusCRC	**NA**	NA	NA	M
	- TempReturnWater	**GO_b**	GO	GO	NA
	- Fault	**GO_b**	GO	GO	NA
	- CtrlStatus	**GO_b**	GO	GO	NA
	CtrlSignPump (not defined yet)				
	CtrlSignFan (1..n) (not defined yet)				
Inputs	TempReturnWaterCondSetp	**GO_b**	GO	GO	M
	TempOutside	**(GO_b)**		(GO)	O

[1] the information is NA in the Basic FB and all other modes because the datapoint type is <u>today</u> not yet available in Standard Mode. Splitting of DPT is not possible because of necessary data consistency

Table 7: CRC Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	ProdSegmC	M[1)2)]
	Producer	M[1)2)]
	Gen_PeripheralCPM	M[1)]
	OutsideSensorZone	O
	Gen_PeripheralPump	O
	Gen_PeripheralFan#1	O
	….	
	Gen_PeripheralFan#n	O

Table 8: CRC LTE specific Properties

[1)] either / or. Depending on the configuration (connection to CPM or CC, refer Overview 2.1)

[2)] these two segments are part of one LTE zone

		Support
Parameter	---	
Diagnostic Data	TempFlowWaterCond	O
	TempReturnWaterCond	O

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

2.4.4.1 Output signal: StatusCRC

Standard Mode

Not applicable.

➔ Mapped to the datapoints TempReturnWater, Fault, CtrlStatus

LTE-HEE Mode

FB: CRC	**LTE Server Output Name:** StatusCRC	Mandatory ☒ Optional ☐

Description:

This signal contains the current return temperature and status attributes of the CRC, which may be used in the partner functional block for optimised control loop mechanisms or as a diagnostic value for visualization.

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

Field	Description	Sup.	Range	Unit	COV	Default
TempWater	Current return temperature	M	full range	°C	0.5	cs
Attributes						
–TempWaterValid	Validity of TempReturnWater Field	M	true/false	bool	Y	false
– Fault	Some failure in the CRC	M	true/false	bool	Y	false
– CtrlStatus	Controller status on: CRC is working (default if not supported) off: CRC is stopped; no control of flow temperature	O	on/off	bool	Y	on

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 200 (CRC)	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:

2.4.4.2 Output TempReturnWater

Standard Mode

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

Description

Current re-cooling condenser return temperature.

Datapoint Type

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

Access Type

♦ Output

this → M	☒ [1])	this → 1	☐				
Spontaneous	☒	COV:	☒	Δ-Value:	0.5 K	MinRepTime:	10s
		Cyclic	☒	Period:	15 Min		
Request	☒						

Communication Type

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

Dynamics

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

Exception Handling

Special Features

[1]) this datapoint is also interesting for visualisation and not only used in the associated FB

LTE-HEE Mode

Not applicable.

2.4.4.3 Output Fault

Standard Mode

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

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

LTE-HEE Mode

Not applicable.

2.4.4.4 Output CtrlStatus

Standard Mode

DP Name:	CtrlStatus	Abbr.:	--	Mandatory	☐
FB Name:	CRC			Can be internal	☒

Description

Controller status
on: CRC is working (default if not supported)
off: CRC is stopped; no control of flow temperature

Datapoint Type

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

Access Type

♦ Output

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

Communication Type

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

Dynamics

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

Exception Handling

Special Features

[1] this datapoint is also interesting for visualisation and not only used in the associated FB

LTE-HEE Mode
Not applicable.

2.4.4.5 Output signal: CtrlSignPump

To be defined later together with pump manufacturer. Refer to clause 2.3.4.9.

2.4.4.6 Output signal: CtrlSignFan

To be defined later together with fan manufacturer.

2.4.4.7 Input signal: TempReturnWaterCondSetp

Standard Mode

DP Name:	TempReturnWatrerCondSetp	Abbr.:	--	Mandatory	☒
FB Name:	CRC			Can be internal	☒
Description					
Condenser water return temperature setpoint.					
Datapoint Type					
DPT_Name:	DPT_Value_Temp				
DPT Format:	F_{16}		DPT_ID:	9.001	

Field	Description	Supp.	Range	Unit	Default
	see LTE-HEE mode		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: CRC	**LTE Server Input Name:** TempReturnWaterCondSetp	Mandatory ☒ Optional ☐

Description:

This input receives the condenser return water temperature setpoint with a STATUS information. The input may be overridden by means of COMMAND.

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

Field	Description	Sup.	Unit	Default
TempFlowWaterSetp	Condenser return water temperature setpoint	M	° C	cs
STATUS	For Read Service only		Bitset	
- OutOfService	Input out of service	O	bool	false
- Overridden	Input is temporarily overridden	O	bool	false
- all other bits	fixed to '0'	NA	bool	false
COMMAND	For Write Service only		enum.	
- NormalWrite	Used for normal runtime communication (LTE Write Service)	M		
- Override / Release	Used for temporary override / release of the input (mainly by tool using Property Write access with individual addressing)	O		
- all other commands		NA		

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	200 (CRC)	Property ID:	51
LTE-Service (event): Write ☒	Timeout:	31	Min	
Property-Service (individual access):	Read only ☐		Read/Write ☒	

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

Exception Handling: Save at Power-down ☐

Special Features:

2.4.4.8 Input signal: TempOutside

Standard Mode

DP Name:	TempOutside	Abbr.:	--	Mandatory	☐
FB Name:	CRC			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: CRC	**LTE Client Input Name:** TempOutside	Mandatory ☐ Optional ☒

Description:

Outside temperature from a remote outside temperature sensor can be used for local control strategy and frost protection.

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

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

Communication:

Binding Group:

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

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

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

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

Special Features:

2.4.4.9 Parameter: ProdSegmC

FB: CPM	Property Name (Server): ProdSegmC	Mandatory ☒ [1]) Optional ☐

Description:

LTE zoning information Cold Water Production Segment. This segment is only used when the CRC is directly connected to the Chiller Controller.

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Cold Water Production 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):	200 (CRC)	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:

[1]) Depending on the configuration (connection to CPM or CC, refer Overview 2.1)
CRC DP's are not LTE communicating if zone is 'OutOfService'.

2.4.4.10 Parameter: Producer

FB: CRC	Property Name (Server): Producer	Mandatory ☒ [1]) Optional ☐

Description:

LTE zoning information Cold Water Producer number. This segment is only used when the CRC is directly connected to the Chiller Controller.

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

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

Communication:

DP Address: (in the server)	IO Type(ID):	200 (CRC)	Property ID:	102
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

Special Features:

[1]) Depending on the configuration (connection to CPM or CC, refer Overview 2.1)
CRC DP's are not LTE communicating if zone is 'OutOfService'. If ProdSegmC is 'OutOfService' also the corresponding Producer zone is 'OutOfService' (common flag)

2.4.4.11 Parameter: Gen_PeripheralCPM

FB: CRC	Property Name (Server): Gen_PeripheralCPM	Mandatory ☒ [1]) Optional ☐

Description:

LTE zoning number Peripheral link to CRC (optionally used for control of the common condenser water temperature) This segment is only used when the CRC is directly connected to the Cold Water Production Manager.

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 range	--	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):	200 (CRC)	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:

[1]) Depending on the configuration (connection to CPM or CC, refer Overview 2.1)
CPM is not LTE communicating with the CRC if zone is 'OutOfService'

2.4.4.12 Prameter: OutsideSensorZone

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

Description:

LTE zoning number for the link with an Outside Temperature Sensor

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Outside sensor zone number	M	1..31	--	1
Status - 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):	200 (CRC)	Property ID:	104
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

Special Features:

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

2.4.4.13 Parameter: Gen_PeripheralPump

Same as in CPM with the Property Identifier number 105, refer to clause 0.

2.4.4.14 Parameter: Gen_PeripheralFan

Same as above with the Property Identifier numbers 106 to [106 + (n-1)] for fan #1 to #n.

2.4.4.15 Diagnostic data: TempFlowWaterCond

LTE-HEE Mode

This diagnostic signal contains the common condenser water flow temperature value as described in clause 2.2.4.18 of the chiller controller.

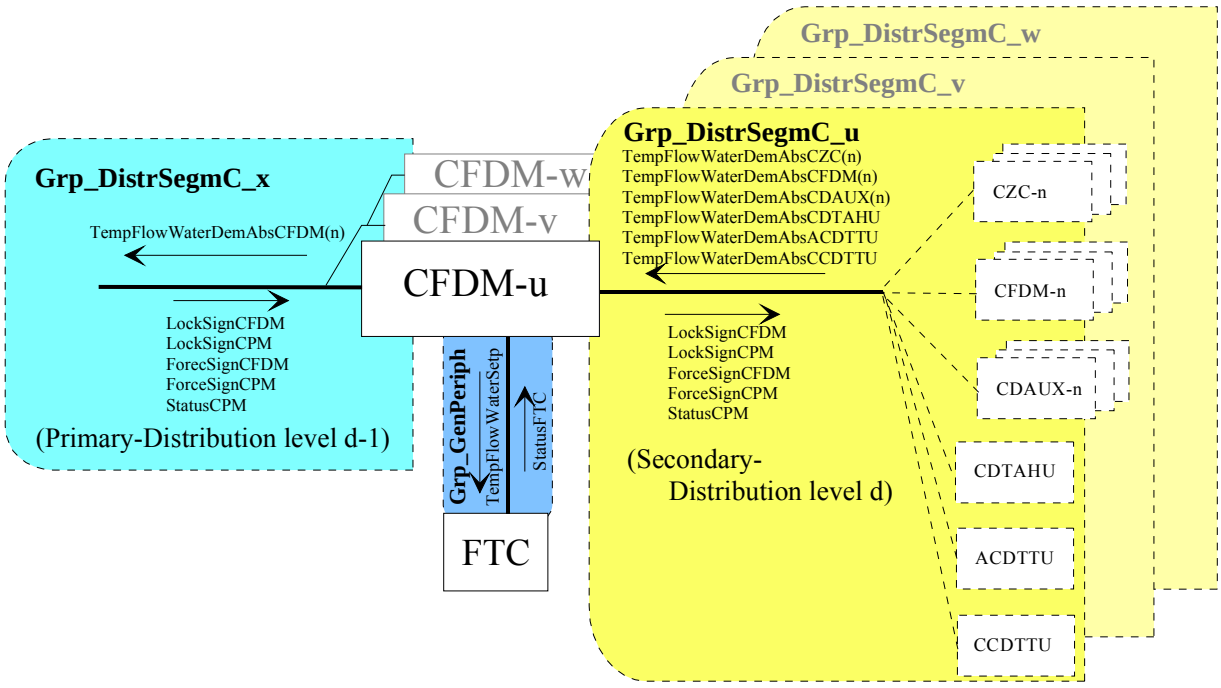
2.4.4.16 Diagnostic data: TempReturnWaterCond

LTE-HEE Mode

This diagnostic signal contains the common condenser water return temperature value as described in clause 2.2.4.19 of the chiller controller.

3 Cold Water Distribution

3.1 Overview

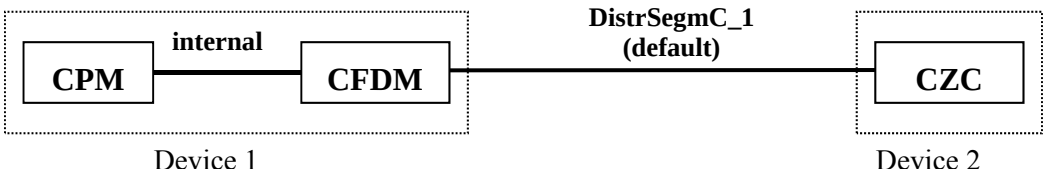


In more complex systems the consumers are not linked directly to the primary Cold Water Distribution Segment. Different levels of cold water distribution are possible. Each distribution level has there own cold water pipework.

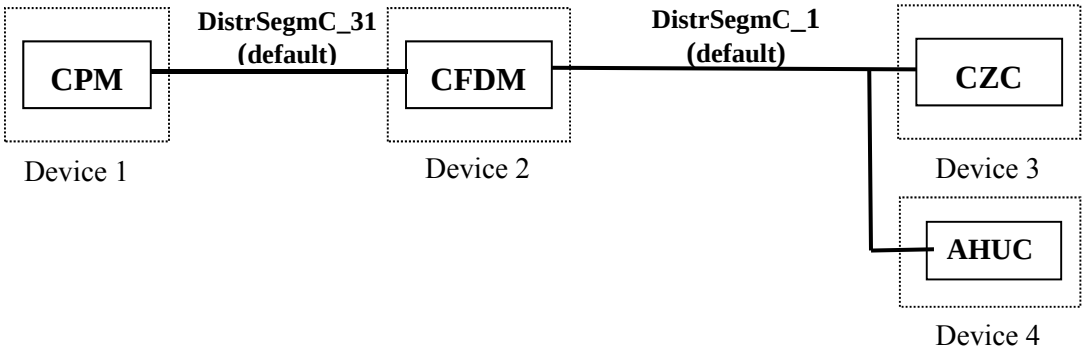
The Cold Water Demand Manager CFDM and Flow Temperature Controller FTC represent such a hydraulic cold water circuit. All the relevant demand signals from all the connected consumers in a Cold Water Distribution Segment are collected and control the hydraulic cold water circuit. A new demand signal is calculated and sent to the next distribution level (level d – 1).

The „first“ Cooling Flow Demand Manager CFDM in a Cold Water Distribution System is linked to the Cold Water Production Manager CPM which receives from the CFDM the resulting overall cold water flow demand of the primary Cold Water Distribution Segment. CPM and „first“ CFDM have always a 1:1 relationship and are usually located in the same device (and therefore data-flow between CPM and CFDM is normally purely device-internal). DistrSegmC_31 is default for those special cases where CPM and „first“ CFDM are not in the same device. DistrSegmC_1 is default for the first cold water distribution level in order to enable “plug & play” LTE zoning with cold water consumers in simple systems.

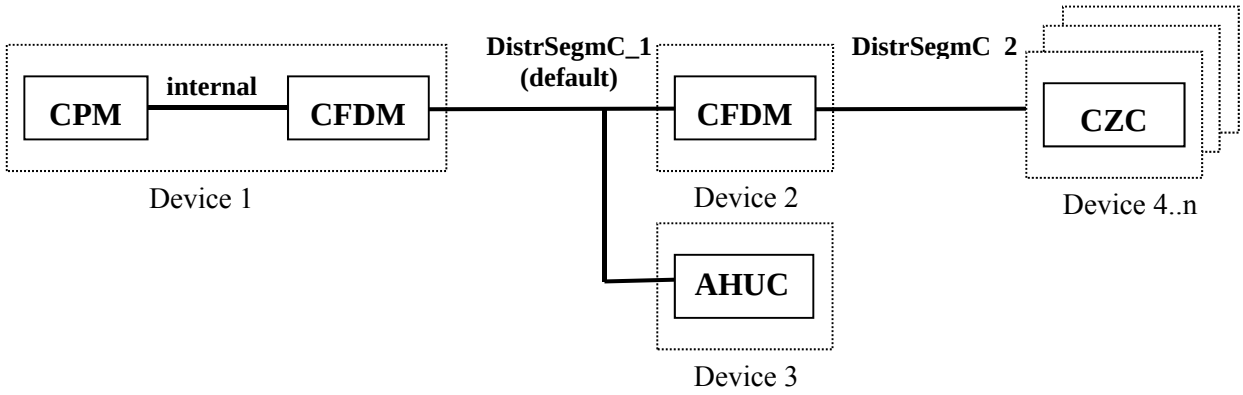
Example 1: simple system “plug & play” LTE zoning
- system has only one cold water distribution level
- CPM and CFDM are located in the same device
- a Cooling Zone Controller CZC is directly connected to the cold water production system.



Example 2: small system with multiple devices, "plug & play" LTE zoning for cold water consumers
- system has only one cold water distribution level
- CPM and CFDM are **NOT** located in the same device ⇒ DistrSegmC_31 & DistSegmC_1 to be configured on the CFDM
- a Cooling Zone Controller CZC and a Air Handling Unit Controller are directly connected to the cold water production system.



Example 3: complex system (e.g. multi family home, LTE zoning configuration necessary)
- two Cold Water Distribution Segments
- CPM and CFDM are located in the same device
- an Air Handling Unit AHUC is directly connected to the cold water production system (DistrSegmC_1)
- multiple Cooling Zone Controller are connected to the secondary Cold Water Distribution Segment (DistrSegmC_2)



There is usually no pre-controller FTC associated with the first CFDM, which is directly linked to the CPM because the CPM is already providing the requested flow temperature.

3.2 Functional Block: Cooling Flow Demand Manager (CFDM)

3.2.1 Description

The Functional Block CFDM manages the cold water flow demand of a distribution segment. The CFDM gets demands from:

- Cooling Zone Controller CZC
- Other Cold Water Flow Demand Managers CFDM's of the "right-hand" secondary Cold Water Distribution Segment
- Auxiliary Cooling Demand CDAUX
- Cooling Demand Transformers Air Handling Unit CDTAHU (1:1 link)
- Air Cooling Demand Transformer Terminal Unit ACDTTU (1:1 link)
- Chilled Ceiling Demand Transformer Terminal Unit CCDTTU (1:1 link)

According to a company specific algorithm (e.g. minimum or average temperature and validity) the CFDM calculates the TempFlowWaterSetp for the Flow Temperature Controller FTC. This Functional Block is described in Hot Water Heating, Chapter Heat Distribution HVAC Specifications [05].

The CFDM then calculates the TempFlowWater DemAbsCFDM for the "left-hand" primary Cold Water Distribution Segment (level d-1).

The calculation of the resulting flow temperature demand output depending on cooling demand signal inputs is not part of the KNX certification.

NOTE Volume control on cold water circuits is done as part of the Flow Temperature Controller FTC as an independed control loop. To support certain control strategies the Cooling Flow Demand Manager CFDM may calculate a fake TempFlowWaterDemAbsCFDM.

Routing of forcing and locking and status signals from CPM is actually a mandatory feature of the CFDM. The only exception is a device where no CPM is implemented and this information is not available.

The CFDM handles incoming forcing and locking signals from the CPM or preceding CFDM and also generates forcing and locking signals to the consumers in the "right-hand" Cold Water Distribution Segment.

Calculation of CFDM locking signal

- normally generated by absolute or shift load priority from consumers

To insure interworking to following section describes a **recommended procedure** to calculate the resulting cold water flow temperature demand. The mechanism is complex and may also depend on company specific needs and parameter settings.

Plug & Play mechanism in the LTE-HEE implementation:

NOTE This mechanism is only possible in LTE-HEE implementations.
CFDM functionality can today not be implemented in Standard Mode since the necessary DPT are not available in Standard Mode.
If DPT_TempFlowWaterDemAbs would be available in the Standard Mode in the future, there would be still some restrictions concerning the implementation.
Reason:
In the shared variable model (e.g. S-mode) implementation all "partners" of the CFDM have to be linked and separate Group Addresses must be assigned for each Demand input signal. The number of "partners" has to be defined at design time of the product.

The CFDM does not need to know which and how many consumers are allocated in the secondary Cold Water Distribution Segment. Due to the heartbeat repetition of the TempFlowWaterDemAbs… signals, it is sufficient to have a dynamic process image of the N temporary **"most relevant"** demands.

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

Main List					
Entry N°	TempFlow WaterDem..	Attrib: - DemValid - AbsLoadPriority - MinTempLimit - EmergDem	Source FB Type and Instance	Source Individual Addr	Timeout
1					
2					
...					
N ≥ 4					

Criteria for a new entry in the main list of the most relevant signals:

1. first check if there is already an entry in the list with the same sender (source individual address) If Yes: delete the entry in the list (in the next steps the new data will be entered instead)
2. check the DemValid attribute
   Signals with DemValid = false (“no demand”) are ignored and not further processed (deleted from the list)
   If DemValid = true: If there is still free space in the list (void entries) the signal is inserted in the list.
3. The following rules apply if the new signal has DemValid = true and all entries in the list are valid. One of the entries may be replaced in the following cases:

   Check the attribute EmergDem:
   This attribute must be considered with the highest priority because the flow temperature demand of the consumers who request load priority is in this case relevant.

   Check the attribute AbsLoadPriority:
   This attribute must be considered with second priority because the flow temperature demand of the consumers who request load priority is in this case relevant.

   Check the attribute MinTempLimit:
   This attribute must be considered with third priority because min. temperature limitations must be respected. I.e. the resulting flow temperature demand must be not lower than specified in the flow temperature signal. For example as dew-point limitation.

   Check the FlowDemTemp value with forth priority. The lower the value the more relevant the signal is.

4. If one of the entries in the main list has a timeout, than this entry shall be deleted.

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

3.2.2 Constraints

IMPORTANT: CFDM functionality can today not be implemented in Standard Mode because:

- the necessary compound HVAC DPT for runtime-interworking are not yet available in Standard Mode
- mapping to standard DPT is not possible because of loss of the necessary data consistency

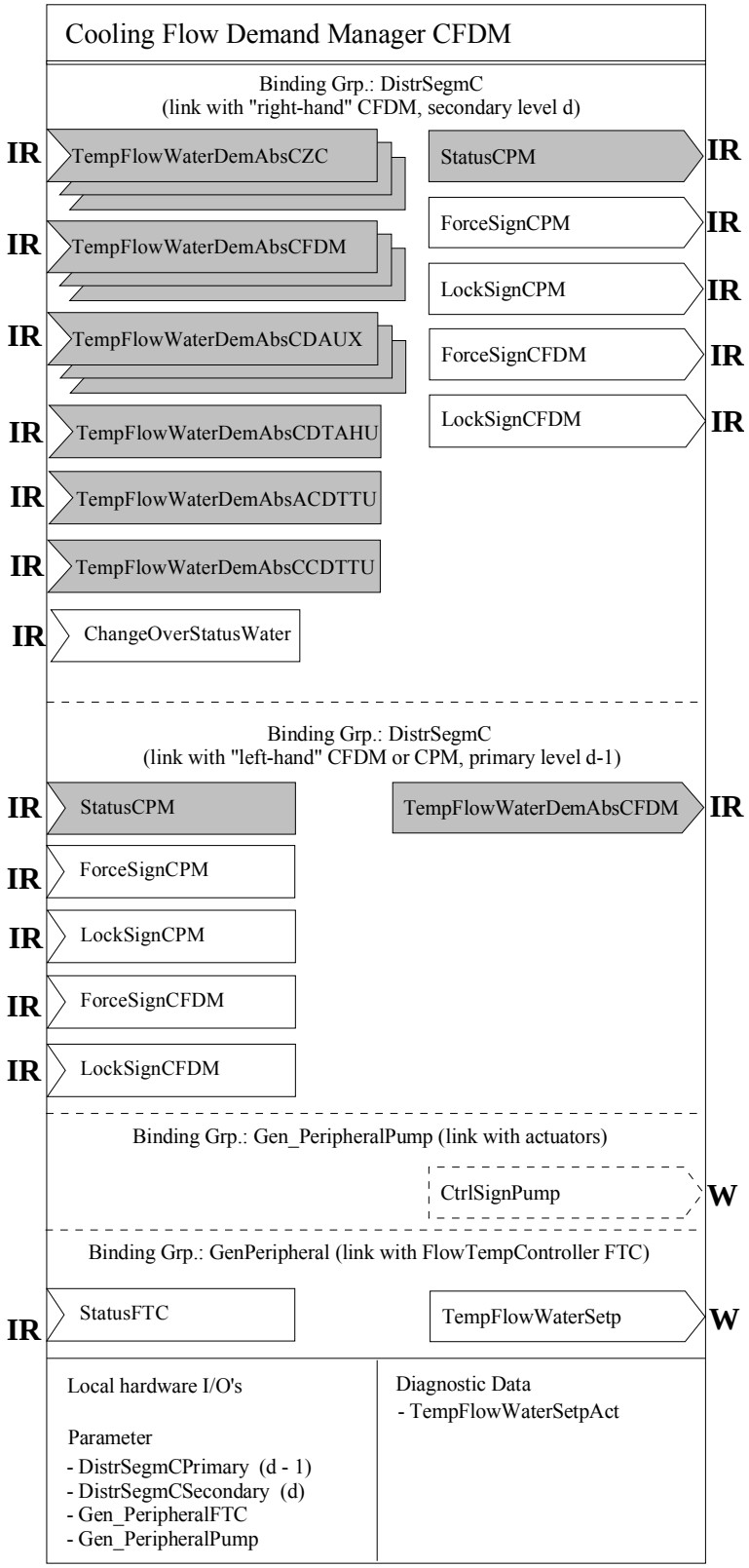
Therefore for the time being only LTE implementations of the CFDM functional block are possible.

After a transition period the DPT for Cold Water Flow Demand Management may be accepted in Standard Mode. Therefore this documents already contains references to Standard Mode implementations where appropriate.

Routing of StatusCPM by the CFDM from the primary to the secondary Cold Water Distribution Segment is necessary in LTE-HEE mode only. In Standard Mode routing of these signals is not necessary and therefore not supported because of different linking mechanisms.

In LTE implementations using the producer/consumer model, the number of partners of the CFDM in the secondary Cold Water Distribution Segment is “unlimited” and is not relevant at design time of a product. For Standard Mode implementations using the shared variable model the number of partners of the CFDM in the secondary Cold Water Distribution Segment is limited (max. number to be defined at design time of a product) because for every TempFlowWaterDemAbs.. input one separate Group Address must be assigned.

3.2.3 Functional Block diagram



3.2.4 Description of Datapoints

Datapoint	Description	Datapoint Type	DPT_ID
Outputs			
TempFlowWaterDem-AbsCFDM	Resulting flow water temperature demand to be sent to the preceding primary CFDM or CPM (absolute flow temperature including temperature shift)	DPT_TempFlowWater DemAbs	210.100
StatusCPM	Routed status information from CPM to the secondary Cold Water Distribution Segment	DPT_StatusCPM Note: this datapoint is sent as CPM	209.102
ForceSignCPM	Routed forcing signal from CPM to the secondary Cold Water Distribution Segment to force consumer to increase energy consumption	DPT_ForceSignCool Note: this datapoint is sent as CPM	21.101
LockSignCPM	Routed locking signal from CPM to the secondary Cold Water Distribution Segment ⇒ consumers reduce energy consumption	DPT_LockSign Note: this datapoint is sent as CPM	207.101
ForceSignCFDM	Forcing signal from CFDM to force consumer to consume energy	DPT_ForceSignCool	21.101
LockSignCFDM	Locking signal from CFDM for load management in the Cold Water Distribution Segment to force the consumer to reduce energy consumption	DPT_LockSign	207.101
CtrlSignPump	Command of common distribution chiller pump (SystemPump) with bus interface	t.b.d. probably complex DPT	?
TempFlowWaterSetp	Flow temperature setpoint to be controlled by the FTC. (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
Inputs			
TempFlowWaterDem-Abs…	Flow water temperature demand(s) from allocated consumer units (absolute temperature and attributes)	DPT_TempFlowWater DemAbs	210.100
StatusCPM	Status information from Cold Water Production Manager	DPT_StatusCPM	209.102
ForceSignCPM	Forcing signal from CPM due to freezing protection, to force consumer to consume more energy ⇒ to be routed to the secondary Cold Water Distribution Segment	DPT_ForceSignCool	21.101
LockSignCPM	Locking signal from CPM due to overload, to force the consumer to reduce energy consumption ⇒ to be routed to the secondary Cold Water Distribution Segment	DPT_LockSign	207.101
ForceSignCFDM	Forcing signal from CFDM in the primary Cold Water Distribution Segment	DPT_ForceSignCool	21.101
LockSignCFDM	Locking signal from CFDM in the primary Cold Water Distribution Segment	DPT_LockSign	207.101
StatusFTC	Status information from Flow Temperature Controller	DPT_StatusWTC	209.103
ChangeOverStatusWat er	Status Information of changeover sensor, 0 = cooling, 1 = heating (LTE and S-interface)	DPT_Heat/Cool_Z DPT_Heat/Cool	200.100 1.100

Datapoint	Description	Datapoint Type	DPT_ID
Parameters			
DistSegmCPrimary	LTE zoning number primary Cold Water Distribution Segment (level d - 1)	DPT_UCountValue8_Z	202.002
DistSegmCSecondary	LTE zoning number secondary Cold Water Distribution Segment (level d)	DPT_UCountValue8_Z	202.002
Gen_PeripheralFTC	LTE zoning number general peripheral for Flow Temperature Controller	DPT_UCountValue16_Z	203.012
Gen_PeripheralPump	LTE zoning number general peripheral for chilled water pump	DPT_UCountValue16_Z	203.012
Diagnostic Data			
TempFlowWaterSetp Act	Actual calculated cold water flow temperature setpoint	DPT_TempHVACAbs_Z	205.100 *)

*) Implementation of Properties using standard DPT see clause 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	S-Mode	Standard Mode Interface	LTE-Mode
Outputs	TempFlowWaterDem AbsCFDM	**NA[1])**	NA	NA	M
	StatusCPM	**NA[2])**	NA	NA	M
	ForceSignCPM	**NA[1])**	NA	NA	O
	LockSignCPM	**NA[1])**	NA	NA	O
	ForceSignCFDM	**NA[1])**	NA	NA	O
	LockSignCFDM	**NA[1])**	NA	NA	O
	CtrlSignPump (not defined yet)				
	TempFlowWaterSetp	**(GO_b)**		(GO)	O
Inputs	TempFlowWaterDemAbs…	**NA[1])**	NA	NA	M
	StatusCPM	**NA[1])**	NA	NA	M
	ForceSignCPM	**NA[1])**	NA	NA	O
	LockSignCPM	**NA[1])**	NA	NA	O
	ForceSignCFDM	**NA[1])**	NA	NA	O
	LockSignCFDM	**NA[1])**	NA	NA	O
	StatusFTC	**NA**	NA	NA	O
	ChangeOverStatusWater	**(GO_b)**		(GO)	O

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

[2)] routing of datapoint is only useful in LTE-HEE, not necessary in Standard Mode.

Table 10: CFDM Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DistrSegmCPrimary (level d - 1)	M or NA[1)]
	DistrSegmCSecondary (level d)	M
	Gen_PeripheralFTC	O
	Gen_PeripheralPump	O

Table 11: CFDM LTE specific Properties

[1)] Whenever the first CFDM and CPM are in the same device, the data of this distribution segment (refer overview) does not have to be available on the bus. Therefore this DirstSegmC is only mandatory when the first CFDM and CPM are located in different devices.

		Support
Parameter	---	
Diagnostic Data	TempFlowWaterSetpAct	O

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

3.2.4.1 Output signal: TempFlowWaterDemAbsCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CFDM	LTE Server Output Name: TempFlowWaterDemAbs CFDM	Mandatory ☒ [1]) Optional ☐

Description:

This output process signal contains the actual flow temperature cooling demand (absolute value) and the different attributes to control the Cooling Flow Demand Manager CFDM on the primary level d-1.

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

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowDem	Flow temperature demand (setpoint)	M	full range	°C	0.5	cs
Attributes						
– DemValid	Validity of TempFlowDemand	M	true/false	bool	Y	false
– AbsLoadPriority	Absolute load priority	O	true/false	bool	Y	false
– ShiftLoadPriority	Shift load priority	O	true/false	bool	Y	false
– MaxTempLimit	TempFlowDem contains max. temperature limit [2])	O	true/false	bool	Y	false
– MinTempLimit	TempFlowDem contains min. temperature limit (e.g. dew point limitation) [3])	O	true/false	bool	Y	false
– DHWReq	Heat demand from DHW, for DHW only	NA	false	bool	N	false
– RoomCtrlReq	Demand from room heating or cooling	O	true/false	bool	N	false
– VentReq	Demand from ventilation	O	true/false	bool	N	false
– AuxAllSeasonReq	Demand from auxiliary heat or cool consumer, all season	O	true/false	bool	N	false
– SystemPumpReq	Request for water circulation in the distribution segment (common chilled water pump)	O	true/false	bool	Y	false
– EmergDem	Emergency cooling demand for plant protection	O	true/false	bool	Y	false
– DHWLegioReq	for DHW only	NA	false	bool	N	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmC (primary)	1 or 31 (refer 3.1)
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	208 (CFDM)	Property ID:	51
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

Special Features:

[1]) CPM and the first CFDM are usually located in the same device ⇒ device internal signal in this case.

[2]) This value sets a maximum flow temperature limit for the CFDM. It is a high temperature limit in this hydraulic circuit.

[3]) This value sets a minimum flow temperature limit for the CFDM. It is a low temperature limit in this hydraulic circuit. Low temperature limits have priority.

3.2.4.2 Output signal: StatusCPM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CFDM	LTE Server Output Name: StatusCPM							Mandatory ☒ 3) Optional ☐
Description:								
Signal from CPM routed to the secondary Cold Water Distribution Segment. Data value is unchanged refer Clause 2.3.4.1 and CPM specification.								
DPT:	Name	DPT_StatusCPM	DPT ID	209.102	Datatype format	$V_{16}B_8$		
Field	Description		Sup.	Range	Unit	COV	Default	
see CPM specification								

Communication:			
Binding Group:			
Class	Type		Default
Geographical ☐			
Application Specific ☒	DistrSegmC (secondary)		1 or 2 (refer 3.1)
Unassigned ☐	Broadcast ☐ Configurable ☐		
DP Address:	IO Type(ID): 199 (CPM)	Property ID: 51	
LTE-Services (event): InfoReport ☒ (~~LTE Read-Response polling of the output shall always be supported~~) 1)	COV ☒ MinRepTime: 2) 10 sec	Heartbeat: 2) 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 ☐ 1) Read/Write ☐		

Exception Handling:	Save at Powerdown ☐

Special Features:

1) no storage of the signal in the CFDM (only routing) therefore read-access from the CFDM is not supported
2) transmission depends on reception of the signal (routing functionality)
3) no transmission when signal not received (therfore not always mandatory)

3.2.4.3 Output signal: ForceSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is sent as Functional Block CPM. For further info please refer to clause 2.3.4.7. Default Cold Water Distribution Segment (secondary): 1 or 2, refer 3.1.

3.2.4.4 Output signal: LockSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is sent as Functional Block CPM. For further info please refer to clause 2.3.4.8. Default Cold Water Distribution Segment (secondary): 1 or 2, refer 3.1.

3.2.4.5 Output signal: ForceSignCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CFDM	LTE Server Output Name: ForceSignCFDM	Mandatory ☐ Optional ☒

Description:

This output process signal indicates that the Cooling Flow Demand Manager has remaining energy to be used by the consumers (of secondary level d).

DPT:	Name	DPT_ForceSignCool	DPT ID	21.101	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
Attributes – ForceRequest	Forced power consumption is necessary	M	true/false	bool	Y	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmC (secondary)	1 or 2 (refer 3.1)
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	208 (CFDM)	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:

3.2.4.6 Output signal: LockSignCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CFDM	**LTE Server Output Name:** LockSignCFDM	Mandatory ☐ Optional ☒

Description:

This output process signal indicates that the Cooling Flow Demand Manager has a problem to deliver the requested energy and the consumers (of secondary level d) have to reduce their energy consumption.

DPT:	Name	DPT_LockSign	DPT ID	207.101	Datatype format	U_8B_8

Field	Description	Sup.	Range	Unit	COV	Default
PwrReduction	Requested power reduction (100% = maximum reduction)	M	0..100	%	5	cs
Attributes						
– LockRequest	Indicates if power reduction is necessary (validity of PwrReduction)	M	true/false	bool	Y	false
– Type	Type of overload, value only valid if LockRequest = true	NA	uncritical / critical	bool	---	---

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmC (secondary)	1 or 2 (refer 3.1)
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID): 208 (CFDM)		Property ID: 53	
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
InfoReport ☒	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
(LTE Read-Response polling of the output shall always be supported)	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

Special Features:

3.2.4.7 Output signal: CtrlSignPump

To be defined later together with pump manufacturers. Refer to clause 2.3.4.9.

3.2.4.8 Output signal: TempFlowWaterSetp

Standard Mode

DP Name:	TempFlowWaterSetp		Abbr.:	--				Mandatory	☐		
FB Name:	CFDM							Can be internal	☒		
Description											
see LTE-HEE mode											
Datapoint Type											
DPT_Name:	DPT_Value_Temp										
DPT Format:	F_{16}						DPT_ID:	9.001			
Field	Description						Supp.	Range		Unit	Default
								full range		°C	cs
Access Type											
♦ Output											
this → M	☐		this → 1	☒							
Spontaneous	☒	COV:	☒	Δ-Value:	0.5 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: CFDM	**LTE Client Output Name:** TempFlowWaterSetp	Mandatory ☐ Optional ☒

Description:

This signal is optionally used by the CFDM to control an “intelligent” cold water flow temperature controller.

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

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowWaterSetp	Temperature setpoint	M	full range	°C	0.5	cs
Command - Write - other Commands	Standard Command field Normal Write not applicable	 M NA		enum		

Communication:

Binding Group:

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

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

Exception Handling: Save at Powerdown ☐

Special Features:

3.2.4.9 Input signal: TempFlowWaterDemAbs…

This is the common description of all the demand signals from the CZC, ACDTTU, CCDTTU, CDTAHU, CDAUX or other CFDM.

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CFDM	**LTE Client Input Name:** TempFlowWaterDemAbs..	Mandatory ☒ Optional ☐

Description:

This input process signal(s) contains the flow temperature cooling demand (absolute value) and the different attributes to control the Cooling Flow Demand Manager CFDM. It is possible to have demands from other CFDM's (n-signals), from Cooling Zone Controllers CZC, from Cooling Demand Transformers Air Handling Unit CDTAHU (one signal), Chilled Ceiling Demand Transformer Terminal Unit CCDTTU (one signal), from Air Cooling Demand Transformer Terminal Unit ACDTTU (one signal) or from Auxiliary Cooling Demand CDAUX.

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

Field	Description	Sup.	Unit	Default
TempFlowDem	Flow temperature demand (setpoint)	M	°C	cs
Attributes				
– DemValid	Validity of TempFlowDemand	M	bool	false
– AbsLoadPriority	Absolute load priority	O	bool	false
– ShiftLoadPriority	Shift load priority	O	bool	false
– MaxTempLimit	TempFlowDem contains max. temperature limit [1])	O	bool	false
– MinTempLimit	TempFlowDem contains min. temperature limit (e.g. dew point limitation) [2])	O	bool	false
– DHWReq	Heat demand from DHW	NA	bool	---
– RoomCtrlReq	Demand from room cooling	O	bool	false
– VentReq	Demand from ventilation	O	bool	false
– AuxAllSeasonReq	Demand from auxiliary heat or cool consumer, all season	O	bool	false
– SystemPumpReq	Request for water circulation in the distribution segment (common chilled water pump)	O	bool	false
– EmergDem	Emergency demand request for plant protection	O	bool	false
– DHWLegioReq	demand from DHW while legionella function is active (can only be 'true' if DHWReq = 'true')	O	bool	false

Communication:

Binding Group:

Class	Type		Default
Geographical ☐			
Application Specific ☒	DistrSegmC (secondary)		1 or 2 (refer 3.1)
Unassigned ☐	Broadcast ☐	Configurable ☐	

DP Address:	IO Type(ID):	208 (CFDM) 209 (CDAUX) 215 (CDTAHU) 216 (CCDTTU) 217 (ACDTTU) 224 (CZC)	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:
[1]) This value sets a maximum flow temperature limit for the Cooling Flow Demand Transformer CFDM. It is a high temperature limit in this hydraulic circuit.
[2]) This value sets a minimum flow temperature limit for the Cooling Flow Demand Transformer CFDM. It is a low temperature limit in this hydraulic circuit. Low temperature limits have priority.

3.2.4.10 Input signal: StatusCPM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: **CFDM**	**LTE Client Input Name:** **StatusCPM**	Mandatory ☒ Optional ☐

Description:
This input signal contains status information of the Cold Water Production Manager CPM, like the chilled water flow temperature of the production segment, fault, permanent off and no cooling available indication.

DPT:	Name	DPT_ StatusCPM	DPT ID	209.102	Datatype format	$V_{16}B_8$

Field	Description	Sup.	Unit	Default
TempFlowProdSegmC	Chilled water flow temperature in the cooling production segment	M	°C	cs
Attributes				
– TempFlowValid	Validity of TempFlowProdSegmC	M	bool	false
– Fault	Chiller failure	O	bool	false
– OffPerm	Permanently off (manual switch of failure)	O	bool	false
– NoCoolAvailable	Temporary no cooling in the production segment available	O	bool	false

Communication:			
Binding Group:			
Class	Type	Default	
Geographical ☐			
Application Specific ☒	DistrSegmC (primary)	1 or 31 (refer 3.1)	
Unassigned ☐	Broadcast ☐ Configurable ☐		
DP Address:	IO Type(ID): 199 (CPM)	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:

3.2.4.11 Input signal: ForceSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

FB:	**CFDM**	**LTE Client Input Name:**	**ForceSignCPM**			Mandatory ☐ Optional ☒	
Description:							
This input signal indicates that the chiller unit has remaining energy to be used by the consumers.							
DPT:	Name	DPT_ ForceSignCool	DPT ID	21.101	Datatype format	B_8	
Field		Description			Sup.	Unit	Default
Attributes – ForceRequest		Forced power consumption is necessary			O	bool	false
Communication:							
Binding Group:							
Class		Type			Default		
Geographical ☐							
Application Specific ☒		DistrSegmC (primary)			1 or 31 (refer 3.1)		
Unassigned ☐		Broadcast ☐	Configurable ☐				
DP Address:		IO Type(ID):	199 (CPM)	Property ID:	53		
LTE-Service (event):		InfoReport Sniffer on Binding Group:			--		
InfoReport ☒		Timeout:	31	Min			
LTE-Service (polling):		Read Wildcard / Resp Sniffer on Binding Group:			--		
Read – Response ☐							
Value after Powerup:		Default Value ☒				Stored Value ☐	
Exception Handling:					Save at Powerdown ☐		

Special Features:							

3.2.4.12 Input signal: LockSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CFDM	LTE Client Input Name: LockSignCPM	Mandatory ☐ Optional ☒

Description:

This input signal indicates that the Cold Water Production Managers CPM has detected an overload situation (of the chiller units) and the consumers have to reduce their energy consumption.

DPT:	Name	DPT_ LockSign	DPT ID	207.101	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
PwrReduction	Requested power reduction (100% = maximum reduction)	M	%	cs
Attributes				
– LockRequest	Indicates if power reduction is necessary (validity of PwrReduction)	M	bool	false
– Type	Type of overload, value only valid if LockRequest = true	M	bool	uncrit.

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmC (primary)	1 or 31 (refer 3.1)
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	199 (CPM)	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:

3.2.4.13 Input signal: ForceSignCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CFDM	**LTE Client Input Name:** ForceSignCFDM	Mandatory ☐ Optional ☒

Description:

This input signal indicates that the Cooling Flow Demand Manager CFDM (Cold Water Distribution Segment, secondary level d) has remaining energy to be used by the consumers.

DPT:	Name	DPT_ ForceSignCool	DPT ID	21.101	Datatype format	B_8

Field	Description	Sup.	Unit	Default
Attributes – ForceRequest	Forced power consumption is necessary	O	bool	false

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmC (primary)	1 (refer 3.1)
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	208 (CFDM)	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:

3.2.4.14 Input signal: LockSignCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CFDM	LTE Client Input Name: LockSignCFDM	Mandatory ☐ Optional ☒

Description:

This input signal indicates that the Cooling Flow Demand Manager CFDM (Cold Water Distribution Segment, secondary level d) is overloaded and the consumers have to reduce their chilled water consumption.

DPT:	Name	DPT_ LockSign	DPT ID	207.101	Datatype format	U_8B_8

Field	Description	Sup.	Unit	Default
PwrReduction	Requested power reduction (100% = maximum reduction)	M	%	cs
Attributes				
– LockRequest	Indicates if power reduction is necessary (validity of PwrReduction)	M	bool	false
– Type	Type of overload, value only valid if LockRequest = true	NA	---	---

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmC (primary)	1 (refer 3.1)
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	208 (CFDM)	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:

3.2.4.15 Input signal: StatusFTC

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CFDM	LTE Client Input Name: StatusFTC	Mandatory ☐ Optional ☒

Description:

This signal contains the current flow temperature and other status information of a Flow Temperature Controller.

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

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

Communication:

Binding Group:

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

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

Value after Powerup:	Default Value ☒	Stored Value ☐
Exception Handling:		Save at Powerdown ☐

Special Features:

3.2.4.16 Input signal: ChangeOverStatusWater

Standard Mode

DP Name:	ChangeOverStatusWater	Abbr.:	---	Mandatory	☐
FB Name:	CFDM			Can be internal	☒

Description

see LTE-HEE Mode

Datapoint Type

DPT_Name:	DPT_Heat/Cool				
DPT Format:	B_1	DPT_ID:	01.100		
Field	Description	Supp.	Range	Unit	Default
			cooling / heating	bool	cooling

Access Type

♦ Input

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

FB: CFDM	**LTE Client Input Name:** ChangeOverStatusWater	Mandatory ☐ Optional ☒

Description:

This optional input signal indicates the water change over status in a change over system. For an overview refer to clause 5. The Cooling Flow Demand Manager CFDM is deactivated whenever this input is set as heating (ChangeOverStatusWater = 1).

DPT:	Name	DPT_ Heat/Cool_Z	DPT ID	200.100	Datatype format	B_1 Z_8

Field	Description	Sup.	Unit	Default
Heat/Cool	Change over status (0 = cooling, 1 = heating)	M	bool	cooling
Status			bitset	
- Overridden	Sensor value overridden true / false	O	bool	false
- all other flags	not supported	NA	bool	---

Communication:

Binding Group:

Class	Type	Default
Geographical ☐		
Application Specific ☒	DistrSegmC (secondary)	1 or 2 (refer 3.1)
Unassigned ☐	Broadcast ☐ Configurable ☐	

DP Address:	IO Type(ID):	342 (WCOS)	Property ID:	51
LTE-Service (event):	InfoReport Sniffer on Binding Group:			--
InfoReport ☒	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

Special Features:

3.2.4.17 Parameter: DistrSegmCPrimary

FB: CFDM	Property Name (Server): DistrSegmCPrimary	Mandatory ☒ 3) Optional ☐

Description:

LTE zoning information Cold Water Distribution Segment of the primary level d - 1. This segment is not used when the first CFDM and the CPM are located in the same device.

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Cold Water Distribution Segment number	M	1..31	--	1 1) or 31 2) or NA 3)
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):	208 (CFDM)	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:

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

1) normal case for "stand alone" CFDM

2) CFDM is the "first" CFDM and is NOT located together with the CPM in the same device

3) CFDM is the "first" CFDM and is located together with the CPM in the same device : the parameter is not available

See examples clause 3.1

3.2.4.18 Parameter: DistrSegmCSecondary

FB: CFDM	Property Name (Server): DistrSegmCSecondary	Mandatory ☒ Optional ☐

Description:

LTE zoning information Cold Water Distribution Segment of the secondary level d.

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Cold Water Distribution Segment number	M	1..31	--	1 [1] or 2 [2]
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):	208 (CFDM)	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:

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

[1] CFDM is the "first" CFDM and is located together with the CPM in the same device

[2] all other cases

See examples clause 3.1

3.2.4.19 Parameter: Gen_PeripheralFTC

FB: CFDM	Property Name (Server): PeripheralFTC	Mandatory ☐ Optional ☒

Description:

LTE zoning information to Flow Temperature Controller FTC.

DPT:	Name	DPT_UCountValue16_Z	DPT ID	203.012	Datatype format	$U_{16}Z_8$

Field	Description	Sup.	Range	Unit	Default
CounterValue	peripheral link number	M	full range	--	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):	208 (CFDM)	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:

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

3.2.4.20 Parameter: Gen_PeripheralPump

Same as in CPM with the Property Identifier number 104, refer to clause 0.

3.2.4.21 Diagnostic data: TempFlowWaterSetpAct

FB: **CFDM**	**Property Name (Server):** **TempFlowWaterSetpAct**	Mandatory ☐ Optional ☒

Description:

Actual calculated cold water flow temperature setpoint in the Cold Water Distribution Segment.

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

Field	Description	Sup.	Range	Unit	Default
Temp	Temperature value	M	full range	° C	cs
Status				bitset	
- OutofService	No resulting cold water demand ⇒ no setpoint	O	true/false		true
- Overridden	External override of the setpoint	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command	Standard Command field			enum	
- Override & Release	Override and release setpoint	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	208 (CFDM)	Property ID:	110
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

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

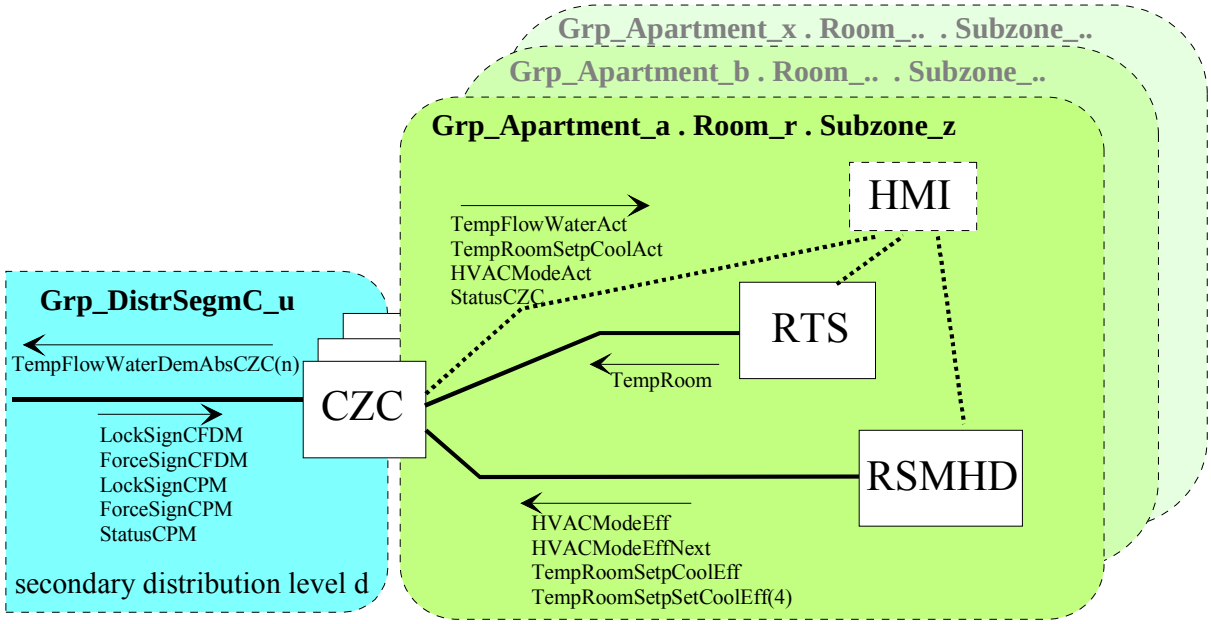
4 Cold Water Consumers

4.1 Overview

Cold water consumers are:

- Fixed setpoint or weather compensated cooling circuits CZC
- Cooling Demand Auxiliary CDAUX
- Cold water coils of air handling units (refer HVAC-VAC chapter: Ventilation and Air Conditioning, Supply Air Temperature Controller SATC, Air Handling Unit Controller AHUC, and Auxilary Cooling Demand in Percent CDAUXPER) (this document)
- Cold water coils of Terminal Units, like in fan coil units, variable air volumes… (refer HVAC-TU Specifications, Functional Blocks FCC, VAV,..[11])
- Cold water consumers like chilled ceiling units (refer HVAC-TU Specifications, Functional Block RCC [11])

4.2 Functional Block: Cooling Zone Controller (CZC)



LTE Zoning for the CZC: usage of Room Level ‘R’ and SubZone ‘S’

In simple systems with only one cooling zone controller per Apartment, the support of the Room and Subzone tags is in principle not relevant.

But also a flexible mix of CZC and Terminal Unit Controllers [11] within one Apartment shall be possible. The CZC is therefore always communicating with explicit A.R.S zoning information (unambiguous zoning information, no wildcard on Room or Subzone).

- the CZC shall support the setting of the 'Apartment' parameter
- in CZC implementation the support of the 'Room' parameter is optional
  If 'Room' parameter setting is not supported, the CZC shall communicate on the default Room=1 ⇒ Geographical Zone A.**1**.S
- in CZC implementation the support of the 'Subzone' parameter is optional
  If 'Subzone' parameter setting is not supported, the HZC shall communicate on the default Subzone=1 ⇒ Geographical Zone A.R.**1**

if both Room and Subzone parameters are not supported, the CZC shall communicate on the default Geographical Zone A.**1.1**

For further information on geographical LTE zones see also [13].

4.2.1 Description

The Cooling Zone Controller CZC calculates and controls the necessary flow temperature for its zone (flow temperature control loop). This may be a stand alone cooling control with fixed setpoints or weather-compensated cooling circuit.

Calculation of the flow temperature setpoint and the control loop mechanism for the flow temperature control is company specific and not part of this specification. CZC may use built-in algorithm like outside air temperature compensation, room temperature load compensation, dew-point compensation, or any others.

The Room setpoint manager RSMHD sets the required operating mode and the cooling temperature setpoint. These values are mandatory. Alternatively it may be possible to have set to the CZC the actual room temperature setpoint TempRoomSetCoolEff.

Optimising function, like optimised start / stop control, are incorporated within this Functional Block and company specific. A centralised HVAC optimiser HVACOPT may be connected via the inputs HVACModeOptim and TempRoomSetpOtimCoolShift. More information about the external HVAC mode optimiser are described in clause 4.2.1.1, in the Hot Water Heating document [07], and Common Controller Functions [02].

The CZC receives forcing and locking signals via the Cold Water Distribution Segment.

- Forcing: increase the consumers energy consumption
- Locking: decrease the consumers energy consumption

IMPORTANT: Neither lock- nor forcing signals must NOT have an influence on the calculation of the flow temperature demand signal (otherwise the system may oscillate!).

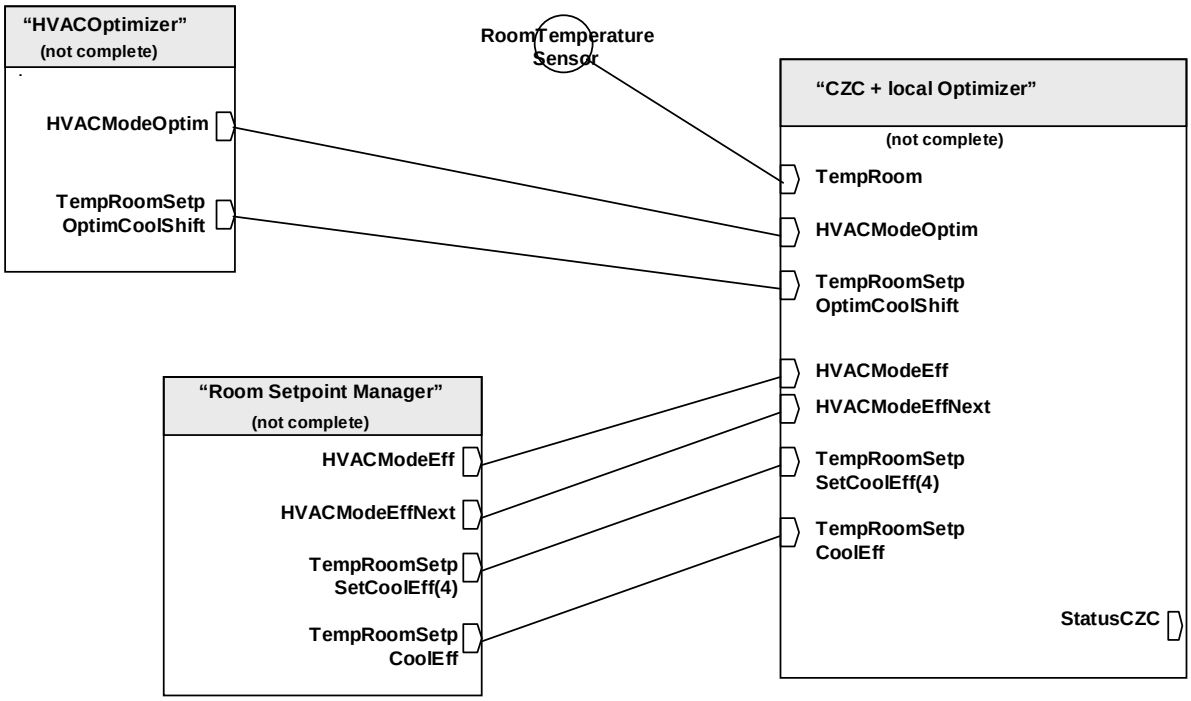
4.2.1.1 External HVAC Optimiser

Overview only: for more details see [02]

In more advanced systems the Cooling Zone Controller CZC may incorporate a local optimiser (company specific functions: pre-cool, start and stop optimisation etc).

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

HVAC Optimiser provides an optimised HVAC Mode (HVACModeOptim) and a delta room temperature setpoint values which allows shift the actual room temperature setpoint, e.g. for pre-cool (TempRoomSetpOptimCoolShift). These values are consumed by the CZC.



4.2.2 Constraints

Constraints concerning the usage of the LTE zone 'Room' and 'Subzone' refer 4.2

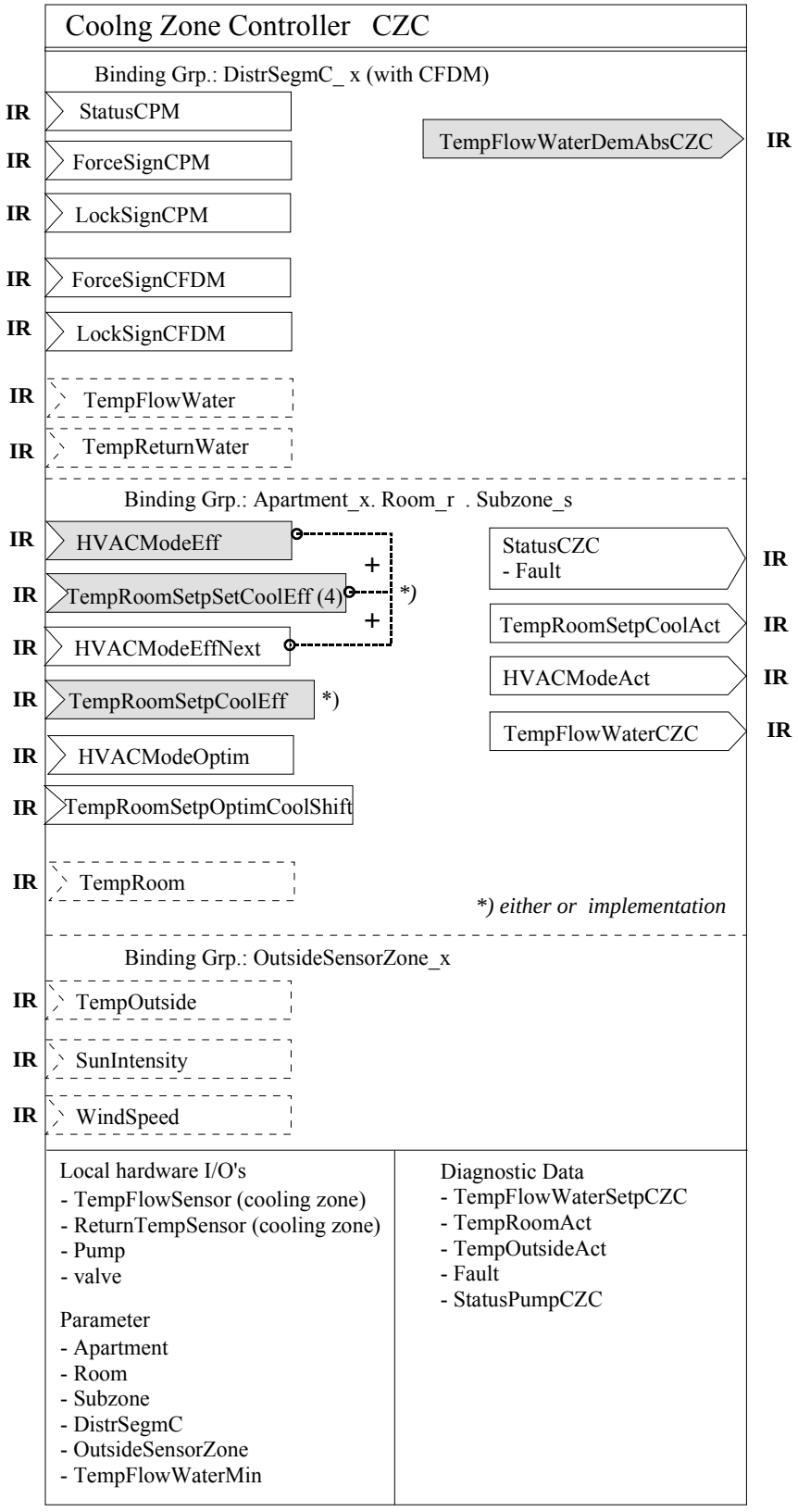
In the Standard Model all outside sensors are located in the same LTE Outside Sensor Zone (only one zoning parameter). Manufacturer specific parameters shall be used if different Outside Sensor Zones for the outside temperature, wind speed or sun intensity have to be supported.

The usage of HVACModeEff / HVACModeEffNext + TempRoomSetpSetCoolEff[4] for optimised zone control is restricted to LTE implementations only since the necessary compound HVAC DPT for runtime-interworking are not yet available in Standard Mode.
In Standard Mode implemetations, the CZC room temperature control mechanism is based on the TempRoomSetpCoolEff information only (simplified model used in EIB ObIS [12]). In this case more sophisticated functions like start/stop optimisation in the CZC can not be implemented.

IMPORTANT: reporting of the Cold Water Demand signal TempFlowWaterDemAbsCZC by the CZC can today not be implemented in Standard Mode because the necessary compound HVAC DPT for runtime-interworking is not yet available in Standard Mode

Therefore for the time being only LTE implementations of the CZC functional block offer a link to a demand dependent cold water distribution (CFDM) and cold water production system (CPM).
CZC implementations in Standard Mode must therefore rely on an "autonomous" cold water production / cold water distribution system which provides sufficient cold water flow temperature.

4.2.3 Functional Block diagram



4.2.4 Description of Datapoints

Datapoint	Description	Datapoint Type	DPT_ID
Outputs			
TempFlowWaterDemAbsCZC	Flow water temperature demand of the CZC to be sent to the allocated CFDM	DPT_TempFlowWaterDemAbs	210.100
StatusCZC	Status information of CZC	DPT_StatusRCC	21.105
- Fault	Failure, some error in the CZC (S-interface)	DPT_Bool	1.002
TempRoomSeptCoolAct	Actual room temperature setpoint of the cooling zone (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
HVACModeAct	Actual active HVAC mode used by the CZC (LTE and S-interface)	DPT_HVACMode_Z DPT_HVACMode	201.100 20.102
TempFlowWaterCZC	Actual water flow temperature of the cooling zone (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
Inputs			
StatusCPM	Status information from Cold Water Production Manager	DPT_StatusCPM	209.102
ForceSignCPM	Forcing signal from CPM due to danger of freezing, to force consumer to consume more energy	DPT_ForceSignCool	21.101
LockSignCPM	Locking signal from CPM due to chiller overload, to force the consumer to reduce energy consumption	DPT_LockSign	207.101
ForceSignCFDM	Forcing signal from CFDM in the Cold Water Distribution Segment	DPT_ForceSignCool	21.101
LockSignCFDM	Locking signal from CFDM in the Cold Water Distribution Segment	DPT_LockSign	207.101
TempFlowWater	Common chilled water flow temperature value in the distribution segment (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
TempReturnWater	Common chilled water return temperature value in the distribution segment (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
HVACModeEff	Current/active HVAC mode from RSMHD	DPT_HVACMode_Z	201.100
TempRoomSetpSetCoolEff (4)	Set of 4 effective temperature setpoints for cooling ‘Comfort’, ‘Standby’, ‘Economy’, ‘BuildingProt’	DPT_TempRoomSetpSet[4]	213.100
HVACModeEffNext	Next HVAC mode and time to next HVAC mode from RSMHD	DPT_HVACModeNext	206.100
TempRoomSetpCoolEff	Effective actual temperature setpoint for cooling (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
HVACModeOptim	Optimised HVAC mode from external HVAC mode optimiser	DPT_HVACMode_Z	201.100

Datapoint	Description	Datapoint Type	DPT_ID
TempRoomSetpOptim CoolShift	Room temperature setpoint shift from external HVAC mode optimiser (LTE and S-interface)	DPT_TempHVACRel_Z DPT_Value_Tempd	205.101 9.002
TempRoom	Current room temperature (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
TempOutside	Current outside air temperature (LTE and S-interface)	DPT_TempHVACAbs_Z DPT_Value_Temp	205.100 9.001
SunIntensity	Current sun intensity value in W/m^2 (LTE and S-interface)	DPT_SunIntensity_Z DPT_PowerDesity	203.102 9.022
WindSpeed	Current wind speed value (LTE and S-interface)	DPT_WindSpeed_Z DPT_Value_Wsp	203.101 9.005
Parameters			
Apartment	LTE zoning number Apartment	DPT_UCountValue8_Z	202.002
Room	LTE zoning number Room	DPT_UCountValue8_Z	202.002
Subzone	LTE zoning number Subzone	DPT_UCountValue8_Z	202.002
DistrSegmC	LTE zoning number Cold Water Distribution Segment	DPT_UCountValue8_Z	202.002
OutsideSensorZone	LTE zoning number Outside air Segment	DPT_UCountValue8_Z	202.002
TempFlowWaterMin	Minimum flow temperature setting to ensure there is no condensation	DPT_TempHVACAbs_Z	205.100 *)
Diagnostic Data			
TempFlowWater SetpCZC	Actual flow water temperature setpoint in the cooling zone	DPT_TempHVACAbs_Z	205.100 *)
TempRoomAct	Actual room temperature used by the CZC	DPT_TempHVACAbs_Z	205.100 *)
TempOutsideAct	Actual outside temperature used by the CZC	DPT_TempHVACAbs_Z	205.100 *)
Fault	Failure, some error in the CZC	DPT_Bool	1.002
StatusPumpCZC	Chilled water pump status in the CZC	DPT_RelValue_Z	202.100 *)

*) Implementation of Properties using standard DPT see clause 1.3.2

			STANDARD MODE	EXTENDED MODE	
		Basic FB	**S-Mode**	**Standard Mode Interface**	**LTE-Mode**
Outputs	TempFlowWaterDem AbsCZC	**NA[1])**	NA	NA	M
	StatusCZC	**NA**	NA	NA	O
	- Fault	**(GO_b)**		(GO)	NA
	TempRoomSeptCoolAct	**(GO_b)**		(GO)	O
	HVACModeAct	**(GO_b)**		(GO)	O
	TempFlowWaterCZC	**(GO_b)**		(GO)	O
Inputs	StatusCPM	**NA[1])**	NA	NA	O
	ForceSignCPM	**NA[1])**	NA	NA	O
	LockSignCPM	**NA[1])**	NA	NA	O
	ForceSignCFDM	**NA[1])**	NA	NA	O
	LockSignCFDM	**NA[1])**	NA	NA	O
	TempFlowWater	**(GO_b)**		(GO)	O
	TempReturnWater	**(GO_b)**		(GO)	O
	HVACModeEff	**NA[3])**	NA	NA	M [2])
	TempRoomSetpSet CoolEff(4)	**NA[2])**	NA	NA	M [2])
	HVACModeEffNext	**NA[1])**	NA	NA	O [2])
	TempRoomSetpCoolEff	**GO_b**	GO	GO	M [2])
	HVACModeOptim	**NA[3])**	NA	NA	O
	TempRoomSetpOptim CoolShift	**(GO_b)**		(GO)	O
	TempRoom	**(GO_b)**		(GO)	O
	TempOutside	**(GO_b)**		(GO)	O
	SunIntensity	**(GO_b)**		(GO)	O
	WindSpeed	**(GO_b)**		(GO)	O

[1)] the information is NA in the Basic FB and all other modes because the datapoint type is <u>today</u> not yet available in Standard Mode. Splitting of DPT is not possible because of necessary data consistency
[2)] Either implementation of {HVACModeEff + TempRoomSetpSetCoolEff[4]} or {TempRoomSetpCoolEff}
[3)] Implementation of HVACModeEff or HVACModeOptim inputs only without TempRoomSetpSetCoolEff [4] does not make sense

Table 13: CZC Runtime Interworking - dependence on Configuration Modes

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

Table 14: CZC LTE specific Properties

		Support
Parameter	TempFlowWaterMin	O
Diagnostic Data	TempFlowWaterSetpCZC	O
	TempRoomAct	O
	TempOutsideAct	O
	Fault	O
	StatusPumpCZC	O

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

4.2.4.1 Output TempFlowWaterDemAbsCZC

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CZC	LTE Server Output Name: TempFlowWaterDemAbsCZC	Mandatory ☒ Optional ☐

Description:

This output signal contains the calculated flow temperature demand (absolute value) of the CZC. It is sent to the CFDM in the corresponding Cold Water Distribution Segment.

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

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowDem	Requested flow temperature	M	full range	°C	0.5	cs
Attributes						
– DemValid	Validity of TempFlowDemand	M	true/false	bool	Y	false
– AbsLoadPriority	Absolute load priority	O	true/false	bool	Y	false
– ShiftLoadPriority	Shift load priority	O	true/false	bool	Y	false
– MaxTempLimit	TempFlowDem contains max. temperature limit [1])	O	true/false	bool	Y	false
– MinTempLimit	TempFlowDem contains min. temperature limit (e.g. dew point limitation) [2])	O	true/false	bool	Y	false
– DHWReq	Heat demand from DHW, for DHW only	NA	false	bool	N	false
– RoomCtrlReq	Demand from room heating or cooling	O	true/false	bool	N	false
– VentReq	Demand from ventilation	O	true/false	bool	N	false
– AuxAllSeasonReq	Demand from auxiliary heat or cool consumer, all season	O	true/false	bool	N	false
– SystemPumpReq	Request for water circulation in the distribution segment (common chilled water pump)	O	true/false	bool	Y	false
– EmergDem	Emergency cooling demand for plant / room protection	O	true/false	bool	Y	false
– DHWLegioReq	for DHW only	NA	false	bool	N	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	224 (CZC)	Property ID:	51
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☒	Read/Write ☐		

Exception Handling: Save at Powerdown ☐

Special Features:

[1]) This value sets a maximum flow temperature limit for the Cooling Flow Demand Transformer CFDM. It is a high temperature limit in this hydraulic circuit.

[2]) This value sets a minimum flow temperature limit for the Cooling Flow Demand Transformer CFDM. It is a low temperature limit in this hydraulic circuit. Low temperature limits have priority.

4.2.4.2 Output: StatusCZC

Standard Mode

Not applicable.

Separate Datapoint Fault.

LTE-HEE Mode

FB: CZC	**LTE Server Output Name:** StatusCZC	Mandatory ☐ Optional ☒

Description:

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

DPT:	Name	DPT_StatusRCC	DPT ID	21.105	Datatype format	B_8

Field	Description	Sup.	Range	Unit	COV	Default
- Fault - reserved	CZC has a failure reserved for future attributes	M	true/false	bool	Y	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 224 (CZC)	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:

4.2.4.3 Output Fault

Standard Mode

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

Description

Reports a failure in the CZC, 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

Not applicable.

4.2.4.4 Output TempRoomSetpCoolAct

Standard Mode

DP Name:	TempRoomSetpCoolAct		Abbr.:	--				Mandatory	☐		
FB Name:	CZC							Can be internal	☒		
Description											
Actual room temperature setpoint of the cooling zone.											
Datapoint Type											
DPT_Name:	DPT_Value_Temp										
DPT Format:	F_{16}					DPT_ID:		9.001			
Field	Description					Supp.		Range		Unit	Default
								full range		°C	cs
Access Type											
♦ Output											
this → M	☒		this → 1	☐							
Spontaneous	☒	COV:	☒	Δ-Value:	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: HZC	**LTE Server Output Name:** TempRoomSetpCoolAct	Mandatory ☐ Optional ☒

Description:

Actual room temperature setpoint of the cooling 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 range	°C	0.2	cs
Status				bitset		
- OutOfService	Void value: setpoint not available	M	true/false	bool	Y	true
- Overridden	Setpoint overridden true / false	O	true/false	bool	Y	true
- all other flags	not supported					
Command	(write only)			bitset		
- Override & Release	Override and release setpoint	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

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

DP Address:	IO Type(ID): 224 (CZC)		Property ID: 53	
LTE-Services (event):	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
InfoReport ☒	Output per default communicating ☒		Binding Group Wildcard allowed ☐	
(LTE Read-Response polling of the output shall always be supported)	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐	
Property-Service (individual access):	Read only ☐	Read/Write ☒ [1)]		

Exception Handling: Save at Powerdown ☐

Special Features:

[1)] Write access is optional; for Override / Release function only. If ‘Overridden’ the CZC uses the override value for room temperature control.

4.2.4.5 Output: HVACModeAct

Standard Mode

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

Description

This output contains the actual HVAC Mode of the Cold Water Distribution Segment.

Datapoint Type

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

Access Type

♦ Output

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

Communication Type

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

Dynamics

Power down:	Save:	☐			
Power up:	Value:	No initialisation:	☐	Default value:	☐
		Saved value:	☐	Actual value:	☒
	Transmit on bus (only for output):		☐		☐

Exception Handling

Special Features

[1]) value 0=‘Auto’ is not allowed

LTE-HEE Mode

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

Description:

Actual HVAC Mode of the cooling zone (which may also depend on internal optimiser functions in the CZC).

DPT:	Name	DPT_HVACMode_Z	DPT ID	201.100	Datatype format	N_8Z_8

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	224 (HZC)	Property ID:	54		
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒	MinRepTime:	10 sec	Heartbeat:	15 min	
	Output per default communicating ☒		Binding Group Wildcard allowed ☐			
	Tx Prio:	High ☐	Normal ☒	Low ☐		
	Transm after Powerup: Stored Value ☐	Act Value ☒	Default Value ☐			
Property-Service (individual access):	Read only ☐	Read/Write ☒ [2)]				

Exception Handling: Save at Powerdown ☐

Special Features:

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

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

4.2.4.6 Output TempFlowWaterCZC

Standard Mode

DP Name:	TempFlowWaterCZC		Abbr.:	--				Mandatory	☐		
FB Name:	CZC							Can be internal	☒		
Description											
Actual flow temperature of the Cold Water Distribution Segment.											
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:	0.5 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: CZC	**LTE Server Output Name:** TempFlowWaterCZC	Mandatory ☐ Optional ☒

Description:

Actual flow temperature of the cold water zone.

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

Field	Description	Sup.	Range	Unit	COV	Default
Temp	Cold water flow temperature	M	full range	°C	0.5	cs
Status				bitset		
- 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	(write only)					
- AlarmAck	Alarm acknowledge	O				
- all other commands	not supported	NA				

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	224 (CZC)	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 ☒ [1)]				

Exception Handling: Save at Powerdown ☐

Special Features:

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

4.2.4.7 Input signal: StatusCPM

Standard Mode

Not applicable.

LTE-HEE Mode

This optional (difference to reference) signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.10.

4.2.4.8 Input signal: ForceSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.11.

4.2.4.9 Input signal: LockSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.12.

4.2.4.10 Input signal: ForceSignCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.13.

4.2.4.11 Input signal: LockSignCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.14.

4.2.4.12 Input signal: TempFlowWater

Standard Mode

DP Name:	TempFlowWater	Abbr.:	--	Mandatory	☐
FB Name:	CZC			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: CZC	**LTE Client Input Name:** TempFlowWater	Mandatory ☐ Optional ☒

Description:

This process signal from a flow temperature sensor contains the common chilled water flow temperature of the Cold Water Distribution Segment ⇒ may be used in the CZC for a company specific control algorithm (Dew point compensation).

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		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 ☒	DistrSegmC	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

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

Value after Powerup:	Default Value ☒	Stored Value ☐
Exception Handling:		Save at Powerdown ☐

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

Special Features:

4.2.4.13 Input signal: TempReturnWater

Standard Mode

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

Description:

This process signal from a temperature sensor contains the common return water temperature of the Cold Water Distribution Segment ⇒ may be used in the CZC for optimised zone control.

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

Field	Description	Sup.	Unit	Default
TempReturnWater	Temperature value	M	°C	cs
Status		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 ☒	ProdSegmC	1
Unassigned ☐	Broadcast ☐ Configurable ☐	

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

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

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

Special Features:

4.2.4.14 Input signal: HVACModeEff

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CZC		**LTE Client Input Name:** HVACModeEff				Mandatory ☒ [1]) Optional ☐	
Description:							
This input is provided by the RSMHD and defines the actual HVAC operating mode of the cooling zone controller.							
DPT:	Name	DPT_HVACMode_Z	DPT ID	201.100	Datatype format	N_8Z_8	
Field	Description				Sup.	Unit	Default
HVACMode STATUS	Actual HVAC Mode, range [1..4] [2] Can be ignored by the CZC				M NA	enum.	cs

Communication:				
Binding Group:				
Class	Type		Default	
Geographical ☒	Apartment . Room . SubZone		1.1.1	
Application Specific ☐				
Unassigned ☐	Broadcast ☐	Configurable ☐		
DP Address:	IO Type(ID):	100 (RSMHD)	Property ID:	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]) Either implementation of {HVACModeEff + TempRoomSetpSetCoolEff [4] (+ HVACModeEffNext)} or {TempRoomSetpCoolEff}

[2]) value 0='Auto' is not allowed ⇒ to be ignored by the CZC ⇒ use default value

4.2.4.15 Input signal: TempRoomSetpSetCoolEff [4]

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CZC	LTE Client Input Name: TempRoomSetpSetCoolEff [4]	Mandatory ☒ 1) Optional ☐

Description:

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

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

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

Communication:

Binding Group:

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

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

1) Either implementation of {HVACModeEff + TempRoomSetpSetCoolEff [4] (+ HVACModeEffNext)} or {TempRoomSetpCoolEff}

4.2.4.16 Input signal: HVACModeEffNext

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CZC	LTE Client Input Name: HVACModeEffNext	Mandatory ☐ Optional ☒ 1)

Description:

This input is provided by the RSMHD and defines the next HVAC operating mode and the delay time to it. If the next mode is not available the time is set to zero (e.g. in case of manually selected HVACModeUser ≠ 'Auto').
This information is used by the CZC for local optimiser functions, e.g. start/stop optimisation.

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

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	100 (RSMHD)	Property ID:	52
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:	--		

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

Exception Handling: Save at Powerdown ☐

Special Features:

1) Either implementation of {HVACModeEff + TempRoomSetpSetCoolEff [4] (+ HVACModeEffNext)} or {TempRoomSetpCoolEff}
2) encoding of special conditions, see table below

Interpretation of Time and HVACMode fields

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

4.2.4.17 Input signal: TempRoomSetpCoolEff

Standard Mode

DP Name:	TempRoomSetpCoolEff	Abbr.:	--	Mandatory	☒
FB Name:	CZC			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: CZC	**LTE Client Input Name:** TempRoomSetpCoolEff	Mandatory ☒ [1)] Optional ☐

Description:

This input is provided by the RSMTD and defines the effective (after corrections) cooling setpoint, which is valid for the controller. This information is used for simple applications.

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

Field	Description	Sup.	Unit	Default
Temperature	Room temperature setpoint value	M	°C	cs
Status		M	bitset	
- OutOfService	Void setpoint value	M	bool	false
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	100 (RSMHD)	Property ID:	56
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:			--
	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

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

Special Features:

[1]) Either implementation of {HVACModeEff + TempRoomSetpSetCoolEff [4] (+ HVACModeEffNext)} or {TempRoomSetpCoolEff}

4.2.4.18 Input signal: HVACModeOptim

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CZC	LTE Client Input Name: HVACModeOptim	Mandatory ☐ Optional ☒

Description:

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

DPT:	Name	DPT_HVACMode_Z	DPT ID	201.100	Datatype format	N_8Z_8

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	115 (HVACOPT)	Property ID:	51
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:			--
	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

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

Exception Handling: Save at Powerdown ☐

Special Features:

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

4.2.4.19 Input signal: TempRoomSetpOptimCoolShift

Standard Mode

DP Name:	TempRoomSetpOptimCoolShift	Abbr.:	---	Mandatory	☐
FB Name:	CZC			Can be internal	☒

Description

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

Datapoint Type

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

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

FB: CZC	**LTE Client Input Name:**	**TempRoomSetpOptimCoolShift**	Mandatory ☐ Optional ☒

Description:

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

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

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

Communication:

Binding Group:

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

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

Exception Handling: Save at Powerdown ☐

Special Features:

4.2.4.20 Input signal: TempRoom

Standard Mode

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

Description

Current room temperature value.

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: CZC	**LTE Client Input Name:** TempRoom	Mandatory ☐ Optional ☒

Description:

This process signal from a room temperature sensor RTS contains the current room temperature.

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

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

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	321 (RTS)	Property ID:	51
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:	--		
	Timeout:	31 Min		
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:	--		

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

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

Special Features:

4.2.4.21 Input signal: TempOutside

Standard Mode & LTE-HEE Mode

This signal is described in the Functional Block CRC. For further info please refer to clause 2.4.4.8.

4.2.4.22 Input signal: SunIntensity

Standard Mode

DP Name:	SunIntensity	Abbr.:	--	Mandatory	☐
FB Name:	CZC			Can be internal	☒

Description
Current sun intensity value.

Datapoint Type					
DPT_Name:	DPT_PowerDensity				
DPT Format:	U_{16}	DPT_ID:	9.022		
Field	Description	Supp.	Range	Unit	Default
			full range	W/m^2	cs

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

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

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

Exception Handling

Special Features

LTE-HEE Mode

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

Description:

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

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

Field	Description	Sup.	Unit	Default
SunIntensity	Sun intensity value	M	W/m^2	cs
Status		M	bitset	
- OutOfService	Void sensor value true / false	M	bool	false
- Fault	Sensor failure true / false	M	bool	false
- Overridden	Sensor value overridden true / false	O	bool	false
- InAlarm	Sensor value alarm true /false	O	bool	false
- AlarmUnAck	Alarm acknowledgement status ack / unack	O	bool	unack
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	348 (SIS)	Property ID:	51
LTE-Service (event):	InfoReport Sniffer on Binding Group:			--
InfoReport ☒	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

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

Special Features:

4.2.4.23 Input signal: WindSpeed

Standard Mode

DP Name:	WindSpeed	Abbr.:	--	Mandatory	☐
FB Name:	CZC			Can be internal	☒

Description
Current wind speed value.

Datapoint Type					
DPT_Name:	DPT_Value_Wsp				
DPT Format:	U_{16}	DPT_ID:	9.005		
Field	Description	Supp.	Range	Unit	Default
			full range	m/s	cs

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

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

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

Exception Handling

Special Features

LTE-HEE Mode

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

Description:

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

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

Field	Description	Sup.	Unit	Default
WindSpeed	Wind speed value	M	m/s	cs
Status		M	bitset	
- OutOfService	Void sensor value true / false	M	bool	false
- Fault	Sensor failure true / false	M	bool	false
- Overridden	Sensor value overridden true / false	O	bool	false
- InAlarm	Sensor value alarm true /false	O	bool	false
- AlarmUnAck	Alarm acknowledgement status ack / unack	O	bool	unack
- all other flags	not supported	NA	bool	

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	347 (WSS)	Property ID:	51
LTE-Service (event): InfoReport ☒	InfoReport Sniffer on Binding Group:			--
	Timeout:	31	Min	
LTE-Service (polling): Read – Response ☐	Read Wildcard / Resp Sniffer on Binding Group:			--

Value after Powerup: Default Value ☒ Stored Value ☐

Exception Handling: Save at Powerdown ☐

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

Special Features:

4.2.4.24 Parameter: Apartment

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

Description:

LTE zone: Apartment number

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Apartment number	M	1..126	--	1
Status				bitset	
- OutOfService	Zone active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	Set zone inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	224 (CZC)	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:

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

4.2.4.25 Parameter: Room

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

Description:

LTE zone: Room number. parameter used or fixed value '*' (=0) ⇒ see remark in clause 4.2

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Room number	M	0, 1..63	--	1
Status				bitset	
- OutOfService	Zone active /inactive	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command				enum	
- NormalWrite		M			
- SetOSV & ResetOSV	Set zone inactive / active	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	224 (CZC)	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:

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

4.2.4.26 Parameter: Subzone

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

Description:

LTE zone: Subzone number within the Subzone. see remark in clause 4.2

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Subzone number	M	0, 1..15	--	1
Status - OutOfService - all other flags	 Zone active /inactive not supported, fixed to '0'	 O NA	 true/false	bitset	 false
Command - NormalWrite - SetOSV & ResetOSV - all other commands	 Set zone inactive / active not supported	 M O NA		enum	

Communication:

DP Address: (in the server)	IO Type(ID):	224 (CZC)	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:

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

4.2.4.27 Parameter: DistrSegmC

FB: CZC	Property Name (Server): DistrSegmC	Mandatory ☒ Optional ☐

Description:

LTE zoning information Cold Water Distribution Segment.

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Cold Water 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):	224 (CZC)	Property ID:	104
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

Special Features:

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

4.2.4.28 Parameter: OutsideSensorZone

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

Description:

LTE zoning number for the link with an Outside Temperature Sensor

DPT:	Name	DPT_UcountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

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

Communication:

DP Address: (in the server)	IO Type(ID):	224 (CZC)	Property ID:	105
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

Special Features:

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

4.2.4.29 Parameter: TempFlowWaterMin

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

Description:

Min flow temperature limitation in the cold water zone. Flow temperature shall not be below this limit because of condensation.

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

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

Communication:

DP Address: (in the server)	IO Type(ID):	224 (CZC)	Property ID:	110
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒	
Protection	Read level	--	Write level	--

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

Special Features:

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

4.2.4.30 Diagnostic data: TempFlowWaterSetpCZC

FB: CZC	Property Name (Server): TempFlowWaterSetpCZC	Mandatory ☐ Optional ☒

Description:

Actual cold water flow temperature setpoint of the CZC.

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

Field	Description	Sup.	Range	Unit	Default
Temp	Temperature value	M	full range	° C	cs
Status				bitset	
- OutOfService	⇒ no setpoint (e.g. cooling is off)	O	true/false		false
- Overridden	External override of the setpoint	O	true/false		false
- all other flags	not supported, fixed to '0'	NA			
Command	Standard Command field			enum	
- Override & Release	Override and release setpoint	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID):	224 (CZC)	Property ID:	111
	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1]	
Protection	Read level	--	Write level	--

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

Special Features:

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

4.2.4.31 Diagnostic data: TempRoomAct

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

Description:

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

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

Field	Description	Sup.	Range	Unit	Default
Temp	Temperature value	M	full range	° C	cs
Status				bitset	
- OutOfService	TempRoomAct is not available	O	true/false		false
- Overridden	Override of the temperature value	O	true/false		false
- Fault	Temperature corrupted, sensor failure	M	true/false		false
- InAlarm	Critical limit is reached	O	true/false		false
- AlarmUnAck	Alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	Standard Command field			enum	
- Override & Release	Override and release temperature value	O			
- AlarmAck	Alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address:	IO Type(ID):	224 (CZC)	Property ID:	112
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

[1)] optional Write access for Alarm acknowledgement only

4.2.4.32 Diagnostic data: TempOutsideAct

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

Description:

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

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

Field	Description	Sup.	Range	Unit	Default
Temp	Temperature value	M	full range	° C	cs
Status				bitset	
- OutOfService	TempOutsideAct is not available	O	true/false		cs
- Overridden	Override of the temperature value	O	true/false		false
- Fault	Temperature corrupted, sensor failure	M	true/false		false
- InAlarm	Critical limit is reached	O	true/false		false
- AlarmUnAck	Alarm acknowledgement status	O	ack/unack		unack
- all other flags	not supported, fixed to '0'	NA			
Command	Standard Command field			enum	
- Override & Release	Override and release temperature value	O			
- AlarmAck	Alarm acknowledge	O			
- all other commands	not supported	NA			

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	224 (CZC) 1	Property ID: N° of elements	113 1
Property access:	Read only ☐		Read/Write ☒ [1)]	
Protection	Read level	--	Write level	--

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

Special Features:

[1)] optional Write access for Alarm acknowledgement only

4.2.4.33 Diagnostic data: Fault

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

Description:

Some error in the CZC

DPT:	Name	DPT_Bool	DPT ID	1.002	Datatype format	B_1

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

Communication:

DP Address: (in the server)	IO Type(ID): Start-Index:	224 (CZC) 1	Property ID: N° of elements	114 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:

4.2.4.34 Diagnostic data: StatusPumpCZC

FB: CZC	Property Name (Server): StatusPumpCZC	Mandatory ☐ Optional ☒

Description:

Actual relative power of the pump in the cooling zone.

DPT:	Name	DPT_RelValue_Z	DPT ID	202.001	Datatype format	U_8Z_8

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

Communication:

DP Address:	IO Type(ID):	224 (CZC)	Property ID:	115
(in the server)	Start-Index:	1	N° of elements	1
Property access:	Read only ☒		Read/Write ☐	
Protection	Read level	--	Write level	--

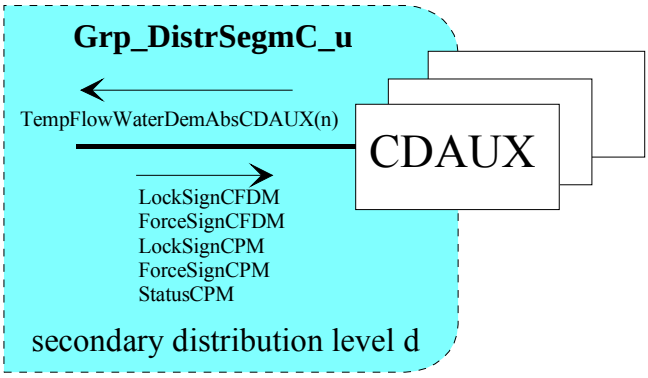
Exception Handling: Value after Powerup: Stored Value ☐ Act Value ☒ Default Value ☐

Special Features:

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

4.3 Functional Block: Auxiliary Cooling Demand (CDAUX)

The CDAUX connects an auxiliary “multi-purpose” cold water consumer to the cold water distribution system. The CDAUX can be used to model very specific / “exotic” cold water consumers which do not belong to the category “Cooling Zone Controller” (e.g. cooling of a soie etc.).



4.3.1 Description

The Auxiliary Cooling Demand CDAUX calculates the necessary flow temperature demand TempFlowWaterDemAbsCDAUX in the Cold Water Distribution Segment.

Calculation of the flow temperature demand (and any control loop mechanism for the flow temperature control) is company specific and not part of this specification.

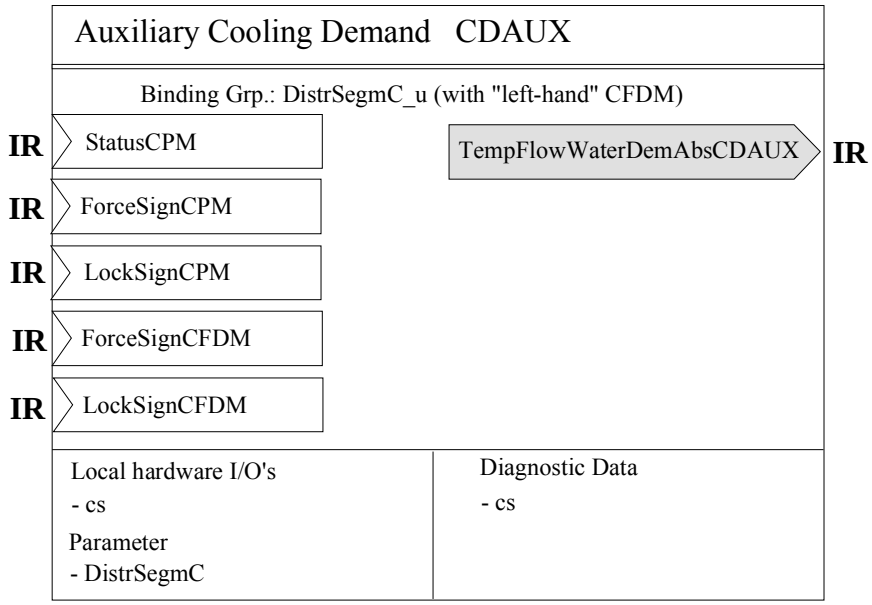
4.3.2 Constraints

IMPORTANT: reporting of the Cold Water Demand signal TempFlowWaterDemAbsCDAUX by the CDAUX can today not be implemented in Standard Mode because the necessary compound HVAC DPT for runtime-interworking is not yet available in Standard Mode.

Therefore for the time being only LTE implementations of the CDAUX functional block offer a link to a demand dependent cold water distribution (CFDM) and cold water production system (CPM).

CDAUX implementations in Standard Mode are currently not meaningful.

4.3.3 Functional Block diagram



4.3.4 Description of Datapoints

Datapoint	Description	Datapoint Type	DPT_ID
Outputs			
TempFlowWaterDemAbsCDAUX	Flow water temperature demand of the CDAUX to be sent to the CFDM	DPT_TempFlowWaterDemAbs	210.100
Inputs			
StatusCPM	Status information from Cold Water Production Manager	DPT_StatusCPM	209.102
ForceSignCPM	Forcing signal from Cold Water Production Manager, to force consumer to consume more energy	DPT_ForceSignCool	21.101
LockSignCPM	Locking signal from Cold Water Production Manager, to force the consumer to reduce energy consumption	DPT_LockSign	207.101
ForceSignCFDM	Forcing signal from Cooling Flow Demand Manager, to force consumer to consume more energy	DPT_ForceSignCool	21.101
LockSignCFDM	Locking signal from Cooling Flow Demand Manager, to force the consumer to reduce energy consumption	DPT_LockSign	207.101
Parameters			
DistrSegmC	LTE zoning number Cold Water Distribution Segment	DPT_UCountValue8_Z	202.002
Diagnostic Data			

			STANDARD MODE	EXTENDED MODE	
		Basic FB	S-Mode	Standard Mode Interface	LTE-Mode
Outputs	TempFlowWaterDem AbsCDAUX	**NA[1])**	NA	NA	M
Inputs	StatusCPM	**NA[1])**	NA	NA	O
	ForceSignCPM	**NA[1])**	NA	NA	O
	LockSignCPM	**NA[1])**	NA	NA	O
	ForceSignCFDM	**NA[1])**	NA	NA	O
	LockSignCFDM	**NA[1])**	NA	NA	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 16: CDAUX Runtime Interworking - dependence on Configuration Modes

		Support
Parameter	DistrSegmC	M
	---	---

Table 17: CDAUX LTE specific Properties

		Support
Parameter	---	---
Diagnostic Data	---	---
	---	---

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

4.3.4.1 Output TempFlowWaterDemAbsCDAUX

Standard Mode

Not applicable.

LTE-HEE Mode

FB: CDAUX	LTE Server Output Name:	TempFlowWaterDemAbsCDAUX	Mandatory ☒ Optional ☐

Description:

This output signal contains the calculated flow temperature demand (absolute value) of the CDAUX. It is sent to the CFDM in the corresponding Cold Water Distribution Segment.

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

Field	Description	Sup.	Range	Unit	COV	Default
TempFlowDem	Requested flow temperature	M	full range	°C	0.5	cs
Attributes						
– DemValid	Validity of TempFlowDemand	M	true/false	bool	Y	false
– AbsLoadPriority	Absolute load priority	O	true/false	bool	Y	false
– ShiftLoadPriority	Shift load priority	O	true/false	bool	Y	false
– MaxTempLimit	TempFlowDem contains max. temperature limit [1])	O	true/false	bool	Y	false
– MinTempLimit	TempFlowDem contains min. temperature limit (e.g. dew point limitation) [2])	O	true/false	bool	Y	false
– DHWReq	Heat demand from DHW, for DHW only	NA	false	bool	N	false
– RoomCtrlReq	Demand from room heating or cooling	O	true/false	bool	N	false
– VentReq	Demand from ventilation	O	true/false	bool	N	false
– AuxAllSeasonReq	Demand from auxiliary heat or cool consumer, all season	O	true/false	bool	N	false
– SystemPumpReq	Request for water circulation in the distribution segment (common chilled water pump)	O	true/false	bool	Y	false
– EnergyDem	Emergency cooling demand for plant protection	O	true/false	bool	Y	false
– DHWLegioReq	for DHW only	NA	false	bool	N	false

Communication:

Binding Group:

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

DP Address:	IO Type(ID):	209 (CDAUX)	Property ID:	51
LTE-Services (event): InfoReport ☒ (LTE Read-Response polling of the output shall always be supported)	COV ☒	MinRepTime: 10 sec	Heartbeat: 15 min	
	Output per default communicating ☐		Binding Group Wildcard allowed ☐	
	Tx Prio:	High ☐	Normal ☒	Low ☐
	Transm after Powerup:	Stored Value ☐	Act Value ☒	Default Value ☐
Property-Service (individual access):	Read only ☒		Read/Write ☐	

Exception Handling: Save at Powerdown ☐

Special Features:

[1]) This value sets a maximum flow temperature limit for the Cooling Flow Demand Transformer CFDM. It is a high temperature limit in this hydraulic circuit.

[2]) This value sets a minimum flow temperature limit for the Cooling Flow Demand Transformer CFDM. It is a low temperature limit in this hydraulic circuit. Low temperature limits have priority.

4.3.4.2 Input signal: StatusCPM

Standard Mode

Not applicable.

LTE-HEE Mode

This optional (difference to reference) signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.10.

4.3.4.3 Input signal: ForceSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.11.

4.3.4.4 Input signal: LockSignCPM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.12.

4.3.4.5 Input signal: ForceSignCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.13.

4.3.4.6 Input signal: LockSignCFDM

Standard Mode

Not applicable.

LTE-HEE Mode

This signal is described in the Functional Block CFDM. For further info please refer to clause 3.2.4.14.

4.3.4.7 Parameter: DistrSegmC

FB: CDAUX	Property Name (Server): DistrSegmC	Mandatory ☒ Optional ☐

Description:

LTE zoning information Cold Water Distribution Segment.

DPT:	Name	DPT_UCountValue8_Z	DPT ID	202.002	Datatype format	U_8Z_8

Field	Description	Sup.	Range	Unit	Default
CounterValue	Cold Water 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):	209 (CDAUX)	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 ☐

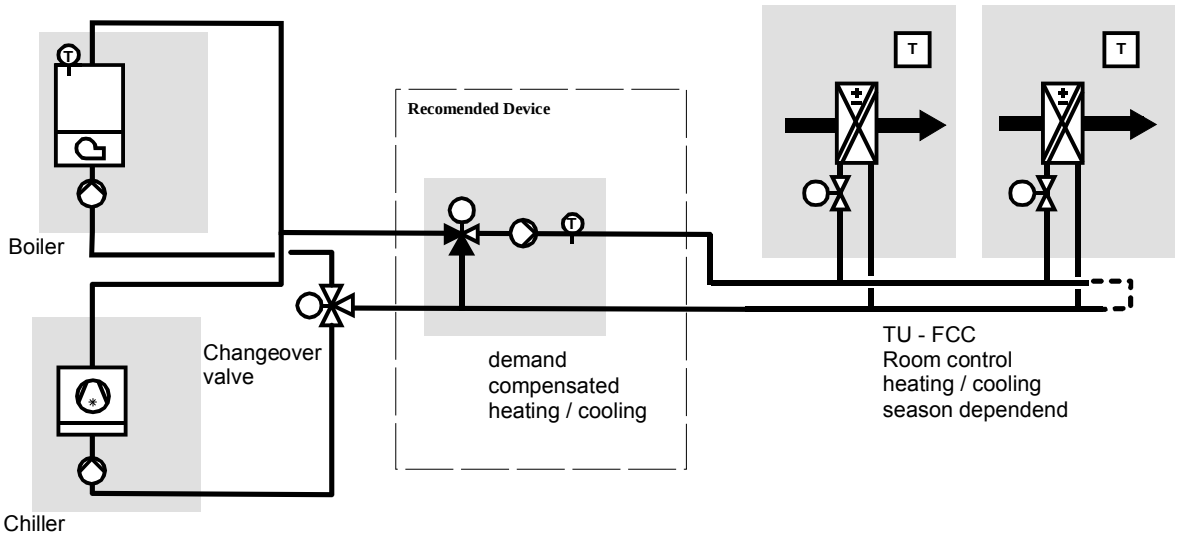
Special Features:

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

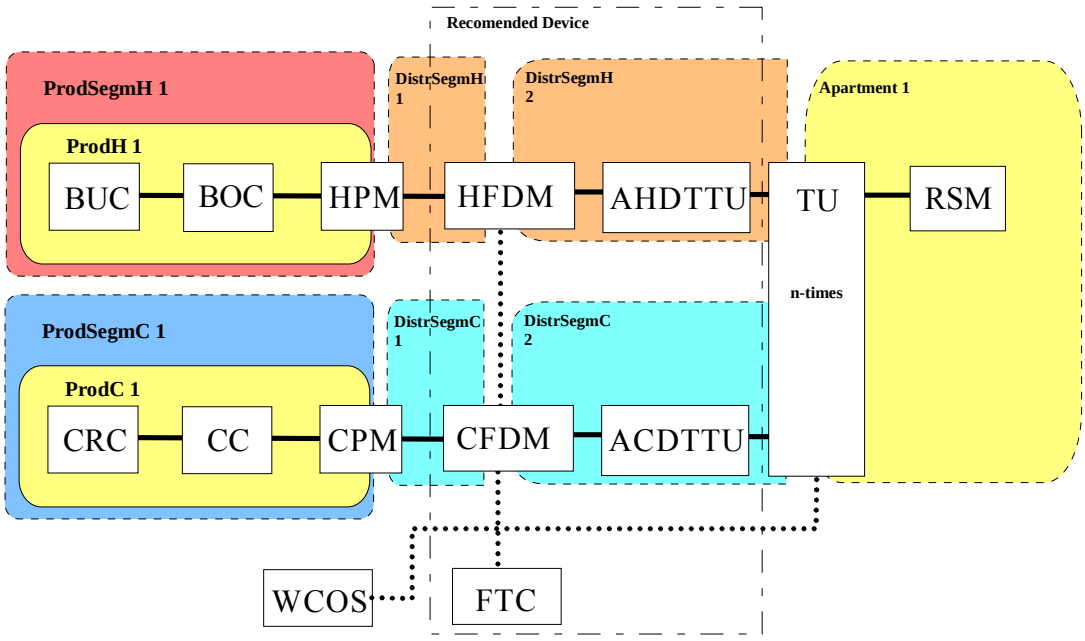
5 Cold / Hot Water Distribution in changeover systems

5.1 Overview

Changeover systems are used to reduce the pipework (installation cost) in the Terminal Unit area. The following schematic diagram shows a simplified example of a 2-pipe changeover system:



The modulation of a changeover system “demand compensated heating / cooling” with KNX Functional Blocks:



The Terminal Unit controllers are sending their demands regardless of the status of the changeover system in their Distribution Segments. The transformers AHDTTU and ACDTTU are collecting all the data and determine a setpoint for the HFDM respective CFDM.

The calculated setpoint of the Flow Temperature Controller is set depending on the changeover sensor input into the HFDM / CFDM.

Flow Temperature Demand signals to the HPM / CPM are only sent if the changeover sensor is set accordingly.