Application Note 138/10 v5

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[01] Volume 7/10/11 HVAC Channels v1.0 AS

[01] Application Note 112 v03 E-Mode Channels for Fan Coils AS

[03] Application Note 122 v11 Realisation of OpenTherm on KNX RF AS

Document updates

Version	Date	Modifications

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1 Abbreviations used

Abbreviation	Meaning
si	Channel type sink
so	Channel type source
WC	Window Contact
CA	Cooling Actuator
HA	Heating Actuator
HCA A	Heat/Cool Actuator type A
HCA B	Heat/Cool Actuator type B
PDB	Presence Detector Basic
MPSEL	Maximum Position Selector
RRTB	Room Regulator Type B
CHC	Central Heating Controller
OTS	Outside Temperature Sensor
SCHED	Scheduler
SETPCONTR	Set Point Controller
HPUMP	Heat pump
STS	Solar Temperature Sensor
SOLARC	Solar Controller
HCPM	Heat Circuit/Pump/Mixer Controller
CHDHWC	Central Heating Domestic Hot Water Controller
CHDHWP	Central Heating Domestic Hot Water Producer
CHC	Central Heating Controller
DHWC	Domestic Hot Water Controller
HM	Heating Meter

2 Introduction

Currently a number of HVAC related channels are defined in [1], complemented by those that are documented in [2] to [4].

These channels are however insufficient to model a full-fledged central heating system, including hot water production and taking into account systems like heat pumps and solar panels. The current available channels also do not allow influencing heat/cool production depending on the valve positions in the individual rooms.

This application note contains a description of such a full-fledged heating system: the introduction of these new channels however also oblige an extension of the (optional) part of the channels as described in [3], of which an update is published at the same time as drafting this Application Note.

3 Channel general overview

An overview of the application model is given in Figure 1 , showing the different involved channels as well as the principal links between the individual channels.

The application principally works as follows:

- The core of the system consists of a Room Regulator Type B (RRTB) and a Central Heating Controller (CHC), to which a number of devices are linked, all modelled as easy (extendable) channels.
- A room is equipped with a RRTB, containing a source and sink channel[1].

  The RRTB sink channel is linked amongst others to:
  - A scheduler (SCHED) informing about the current HVAC Mode;
  - Several Window/door contacts (WC) which are internally logically OR-ed;
  - A Presence Detector Basic (PDB), informing on presence in the individual rooms;
  - A Room Temperature sensor (RTS) (if not already available hard-wired) and Outside Temperature sensor (OTS);

  The corresponding RRTB source channel controls the connected heating or cooling valves and provides several status information (e.g. effective HVAC Mode, Room Temperature, ...).

  Different channel flavours of heating/cooling actuators are specified: actuators that simply heat (HA) or simply cool (CA) and a combination thereof, again in two flavours (HCA A and HCA B).

  The application can be extended with a Maximum Position Selector, which collects via its sink channel the valve positions as sent by the available RRTB source channels. The MPSEL then calculates the maximum position and provides this as input to via its source channel to another MPSEL sink channel directly in the central heating controller.
- The CHC device may support the following source and sink channels[2]:
  - A MPSEL sink channel to immediately receive the calculated maximum position of the installed valves;
  - A SCHED sink channel to directly receive the current HVAC mode from a SCHED source;

[1] If desired, these channels could be realised as separate devices.

[2] It is left up to the manufacturers which of the channels depicted in figure 1 are implemented in the central heating controller.

- An OTS sink channel to link an outside temperature source directly to the central heating controller;
- A SETPCONTR sink channel that can calculate on the basis of outside temperature and the central heating flow temperature a shift/correction of the central heating, if desired complemented by amongst others the received maximum position of the valves;
- A Heat Pump sink channel (HPUMP) allowing to turn off the central heating if decided by the linked HPUMP source;
- A Solar Controller sink channel (SOLARC) allowing turning off the domestic hot water production if decided by the linked SOLARC source. This SOLARC source may in turn receive the actual temperature of the solar collector via a linked Solar Temperature Sensor (STS).
- A Heat Circuit/Pump/Mixer Controller source channel (HCPMC), which is able to influence the set point of the revolution speed ratio of the heating pump, containing the corresponding HCPMC sink channel.
- The controller and producer channels as described in [2] to regulate the actual central heating and the domestic hot water production[3].
- A Heat Meter source channel, allowing to inform on the actual consumed heat.

Note:

The dotted lines surrounding two or more channels indicate that these channels are typically combined into one single physical device.

Arrows between channels indicate the links: in case these lines are dotted, this signifies that alternative links are possible. As an example, the RRTB source channel can be combined with a heating or cooling actuator channel or a channel supporting both.

In the underneath description, the mandatory data points are given in bold in the graphical representation of the channels.

[3] See update of AN 122 for extensions of the optional data points.

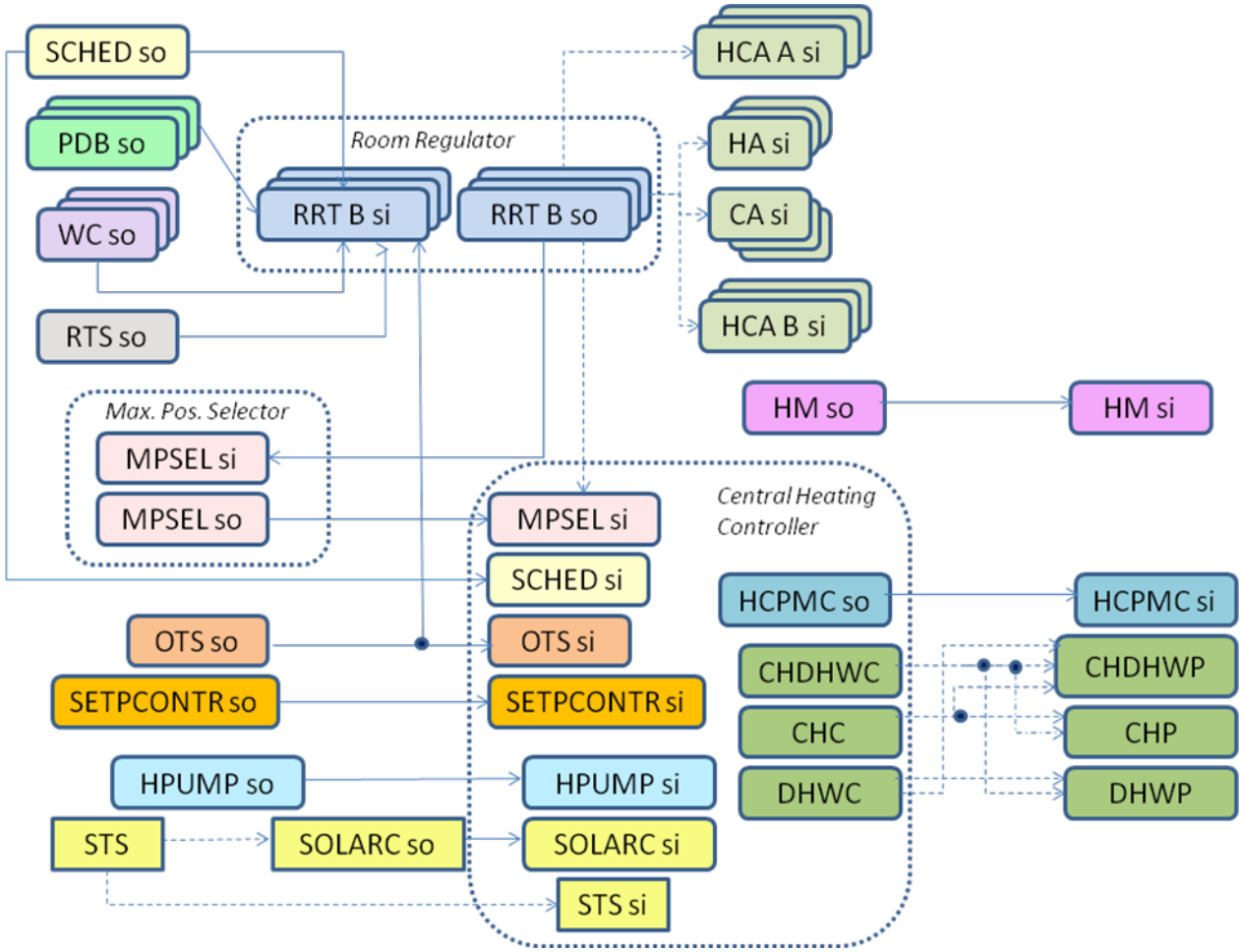


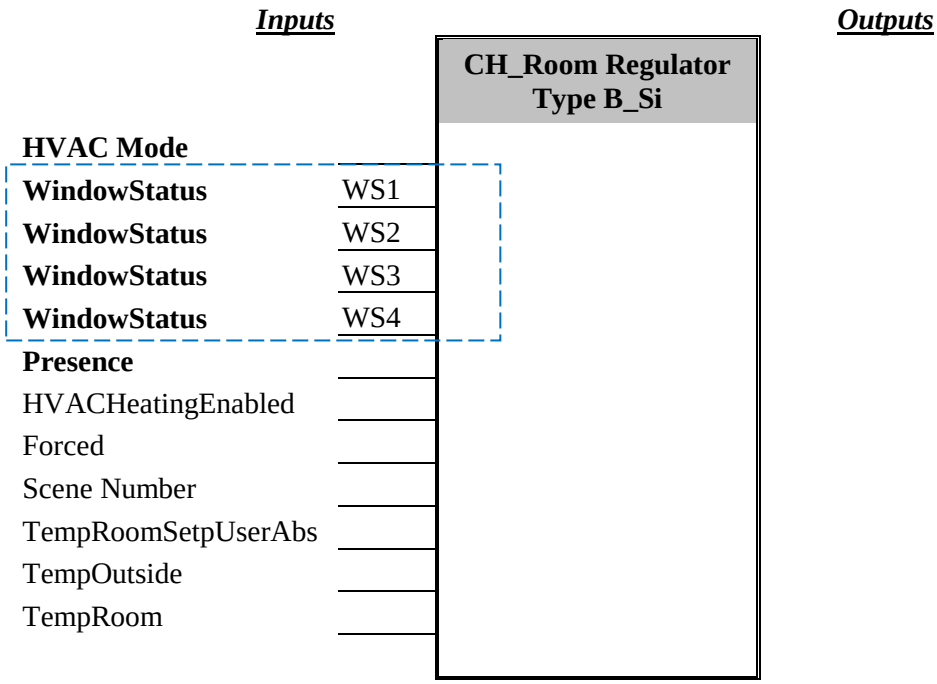
Figure 1 – Overview of Application Model

4 CH_Room Regulator Type B (RRTB si) (Channel Code 0512h)

- **Name:** CH_Room Regulator Type B
- **ID:** 0512h
- **Classification:** Functional Module (Sink)
- **General functional description:**

The RRTB sink channel collects information amongst others on the applicable HVAC Mode, status of windows or door contacts, presence in the area it controls. It will typically be combined with the corresponding source channel in the same device.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	HVACMode	1	CC_HVAC_Mode (31)	---	I	20.102
This data point would be typically linked to a Scheduler channel (0207h), as implemented in a central display or clock						
2	WindowStatus	1	CC_Window_Status (30)	---	I,X	1.019
3	WindowStatus	2	CC_Window_Status (30)	---	I,X	1.019
4	WindowStatus	3	CC_Window_Status (30)	---	I,X	1.019
5	WindowStatus	4	CC_Window_Status (30)	---	I,X	1.019
Via this data point information is provided to the room controller on open doors or windows, as supplied by a connected Window Contact channel (0023h). The 4 subunits shall be internally ORed.						
6	PresenceHeating	1	CC_PresenceStatus (54)	---	I	1.001
Via this data point a connected PDB provides information on presence in the area controlled by the room regulator. The behaviour of the room regulator is manufacturer specific.						

Optional data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	HVACHeating Enabled	1	CC_Heating_Enabled (33)	CC_Enable (16)	I	1.003
Via this data point, the regulator can be informed whether or not the central heating system is active (e.g. shut down during summer months).						
	Forced	1	CC_Forced (4)	---	I	2.001
The data point allows setting the room regulator in forced mode, resulting in the setting of a predefined HVAC Mode.						
	Scene Number	1	CC_SceneNumber (8)	---	I	17.001
Via this data point, a connected scene controller can set scenes as pre-programmed into the regulator to influence the HVAC mode.						
	TempRoomSetp UserAbs	1	CC_TRSUA (43)	---	I	9.001
This data point allows the user to set a dedicated room temperature set point (e.g. via another room module or display).						

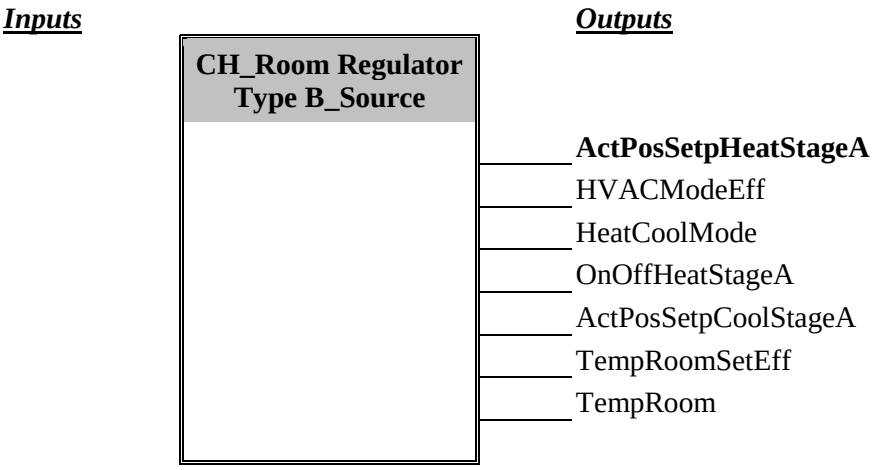
	TempOutside	1	CC_TO (36)	---	I	9.001
Via this data point the room regulator is informed about the outside temperature, as supplied by an OTS source channel (0024h, e.g. for summer compensation in air conditioning applications.						
	TempRoom	I	CC_TR (37)	---	I	9.001
Via this data point the room regulator is informed about the room temperature, as supplied by an RTS source channel (0025h) or hardwired.						

5 CH_Room Regulator Type B (RRTB so) (Channel Code 0513h)

- **Name:** CH_Room Regulator Type B
- **ID:** 0513h
- **Classification:** Functional Module (Source)
- **General functional description:**

The corresponding RRTB source channel controls the connected heating or cooling valves and provides several status information (e.g. effective HVAC Mode, Room Temperature, ...).

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	ActPosSetpHeat Stage A	1	CC_Heat_Scaling (35)	---	O	5.001
Via this data point the room regulator sets the position of the linked heating valve.						

Optional data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	HVACModeEff	1	CC_HVAC_Mode_ Status (39)	---	O	20.102
This data point can be linked to a visualization to inform the user on the effective HVAC mode.						
	HeatCoolMode	1	CC_HeatCool (41)	---	O	1.100
This data point informs the connected heating and/or cooling valve whether the room regulator is currently in heat or cool mode.						
	OnOffHeatStageA	1	CC_Switch (01)	---	O	1.001
This data point can be linked to a simple switching actuator: this is the pulse width modulation equivalent of the mandatory data point ActPosSetpHeatStageA (open (1) or closed (0)).						
	ActPosSetpCool StageA	1	CC_Cool_ Scaling(88)	---	O	5.001
Via this data point the room regulator sets the position of the linked cooling valve.						
	TempRoomSetEff	1	CC_TRSUA (43)	---	O	9.001
Via this data point the room regulator can provide the necessary input data to heating/cooling actuators of type A, who take into account the effective set room temperature and the actual room temperature during calculation of the van positions.						
	TempRoom	1	CC_TR (37)	---	O	9.001
Via this data point the room regulator can provide the necessary input data to heating/cooling actuators of type A, who take into account the effective set room temperature and the actual room temperature during calculation of the van positions.						

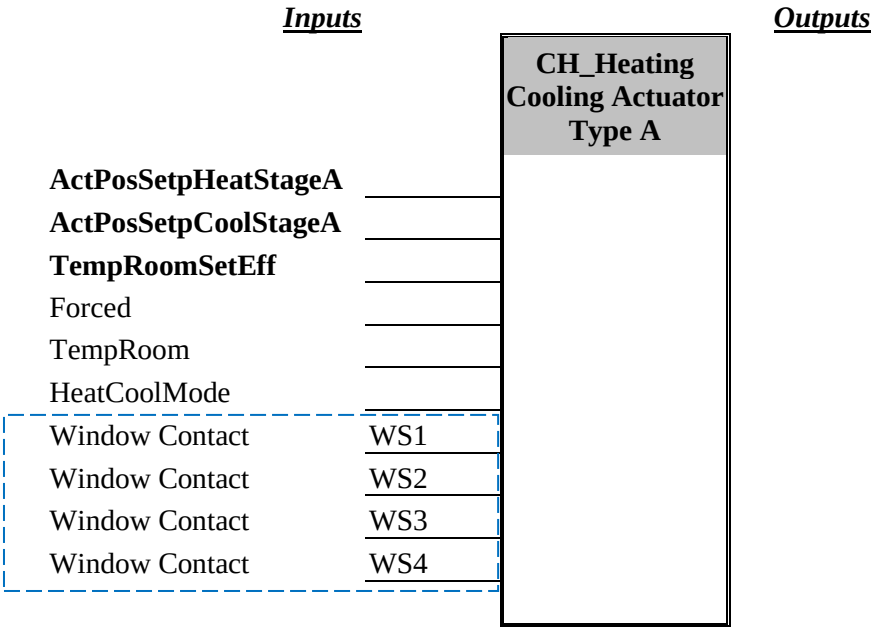
6 CH_Heating Cooling Actuator Type A (HCA A) (Channel Code 0514h)

- **Name:** CH_Heating Cooling Actuator Type A
- **ID:** 0514h
- **Classification:** Functional Module (Actuator)
- **General functional description:**

Different channel flavours of heating/cooling actuators are specified: actuators that simply heat (HA) or simply cool (CA) and a combination thereof, again in two flavours (HCA A and HCA B).

The underneath specifies the type A with heating and cooling.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Whether the device heats or cools shall depend on local settings on the device.

Whether the device takes into account own regulation inputs (e.g. TempRoomSetEff, TempRoom) or not may also depend on local settings on the device.

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I	5.001
Via this data point the room regulator sets the position of the heating valve.						
2	ActPosSetpCool StageA	4	CC_Cool_Scaling (88)	---	I	5.001
Via this data point the room regulator sets the position of the cooling valve.						
3	TempRoomSetEff	1	CC_TRSUA (43)	---	I	9.001
Via this data point the room regulator can provide the necessary input data to the HCA A, who can take into account the effective set room temperature during calculation of the van positions.						

Optional data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Forced	1	CC_Forced (4)	---	I	2.001
The data point allows setting the heat/cool actuator in a predefined position, e.g. 0 (forced off) and 100 %. (forced on).						
	TempRoom	I	CC_TR (37)	---	I	9.001
Via this data point the room regulator can provide the necessary input data to the HCA A, who can optionally take into account the actual room temperature during calculation of the van positions.						
	HeatCoolMode	1	CC_HeatCool (41)	---	I	1.100
Via this data point the room regulator informs the connected heating/cooling valve whether the room regulator is currently in heat or cool mode.						
	WindowStatus	1	CC_Window_Status (30)	---	I,X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
Via this data point information is provided to the HCA A on open doors or windows, as supplied by a connected Window Contact channel (0023h). The 4 subunits shall be internally ORed. These optional data points are especially favourable in case the RRTB and the window contacts are battery powered.						

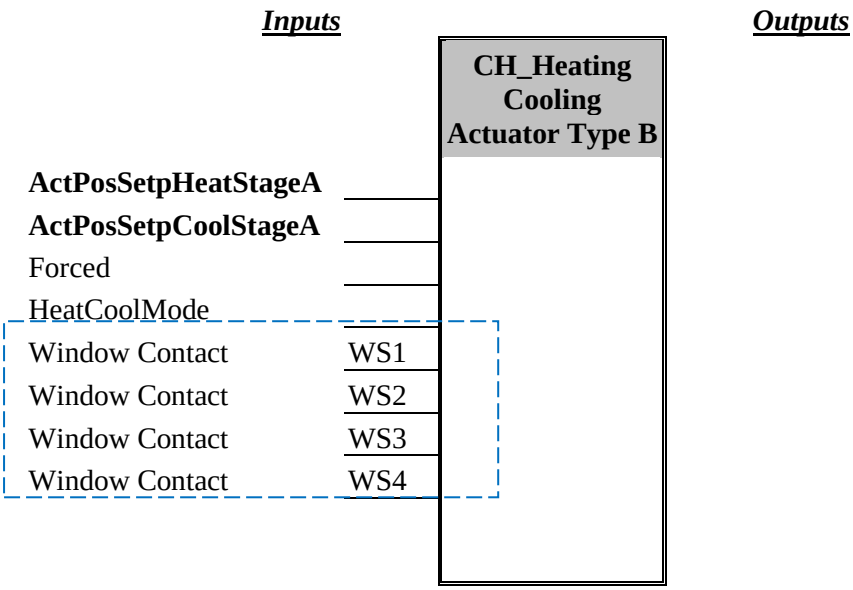
7 CH_Heating Cooling Actuator Type B (HCA B) (Channel Code 0515h)

- **Name:** CH_Heating Cooling Actuator Type B
- **ID:** 0515h
- **Classification:** Functional Module (Actuator)
- **General functional description:**

Different channel flavours of heating/cooling actuators are specified: actuators that simply heat (HA) or simply cool (CA) and a combination thereof, again in two flavours (HCA A and HCA B).

The underneath specifies the type B with heating and cooling. Type B can be regarded as a downsized version of Type A.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I	5.001
Via this data point the room regulator sets the position of the heating valve.						
2	ActPosSetpCool StageA	4	CC_Cool_Scaling (88)	---	I	5.001
Via this data point the room regulator sets the position of the cooling valve.						

Optional data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Forced	1	CC_Forced (4)	---	I	2.001
The data point allows setting the heat/cool actuator in a predefined position, e.g. 0 (forced off) and 100 %. (forced on).						
	HeatCoolMode	1	CC_HeatCool (41)	---	I	1.100
Via this data point the room regulator informs the connected heating/cooling valve whether the room regulator is currently in heat or cool mode.						
	WindowStatus	1	CC_Window_Status (30)	---	I,X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
Via this data point information is provided to the HCA A on open doors or windows, as supplied by a connected Window Contact channel (0023h). The 4 subunits shall be internally ORed. These optional data points are especially favourable in case the RRTB and the window contacts are battery powered.						

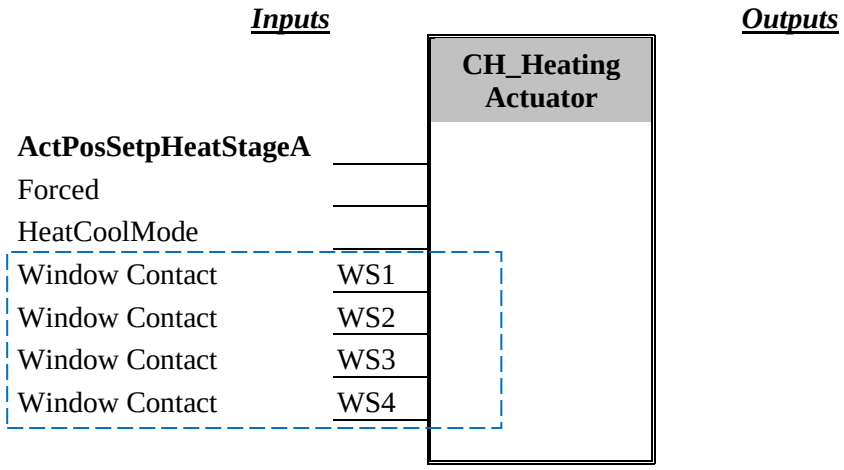
8 CH_Heating Actuator (HA) (Channel Code 0516h)

- **Name:** CH_Heating Actuator
- **ID:** 0516h
- **Classification:** Functional Module (Actuator)
- **General functional description:**

Different channel flavours of heating/cooling actuators are specified: actuators that simply heat (HA) or simply cool (CA) and a combination thereof, again in two flavours (HCA A and HCA B).

The underneath specifies the actuator that only intended for heating applications.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I	5.001
Via this data point the room regulator sets the position of the heating valve.						

Optional data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Forced	1	CC_Forced (4)	---	I	2.001
The data point allows setting the heat/cool actuator in a predefined position, e.g. 0 (forced off) and 100 %. (forced on).						
The data point allows setting the heat/cool actuator in a predefined position.						
	HeatCoolMode	1	CC_HeatCool (41)	---	I	1.100
Via this data point the room regulator informs the connected heating/cooling valve whether the room regulator is currently in heat or cool mode.						
	WindowStatus	1	CC_Window_Status (30)	---	I,X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
Via this data point information is provided to the HCA A on open doors or windows, as supplied by a connected Window Contact channel (0023h). The 4 subunits shall be internally ORed. These optional data points are especially favourable in case the RRTB and the window contacts are battery powered.						

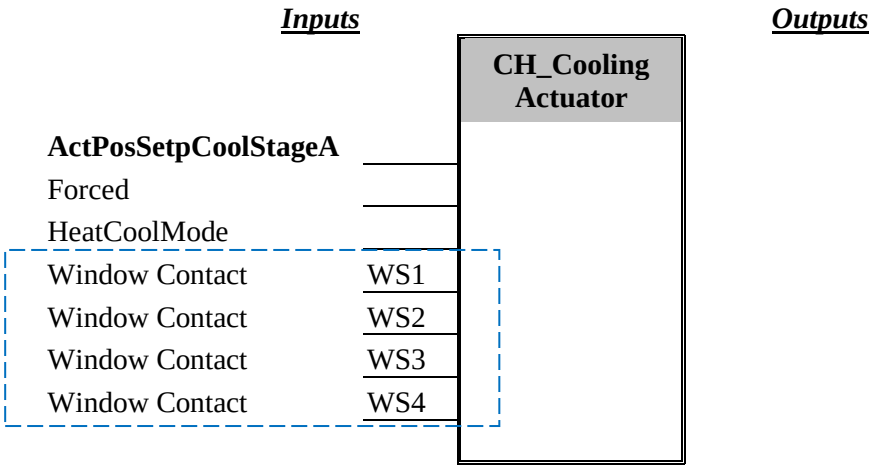
9 CH_Cooling Actuator (CA) (Channel Code 0517h)

- **Name:** CH_Cooling Actuator
- **ID:** 0517h
- **Classification:** Functional Module (Actuator)
- **General functional description:**

Different channel flavours of heating/cooling actuators are specified: actuators that simply heat (HA) or simply cool (CA) and a combination thereof, again in two flavours (HCA A and HCA B).

The underneath specifies the actuator that is only intended for cooling applications.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	ActPosSetpCool StageA	4	CC_Cool_Scaling (88)	---	I	5.001
Via this data point the room regulator sets the position of the cooling valve.						

Optional data points

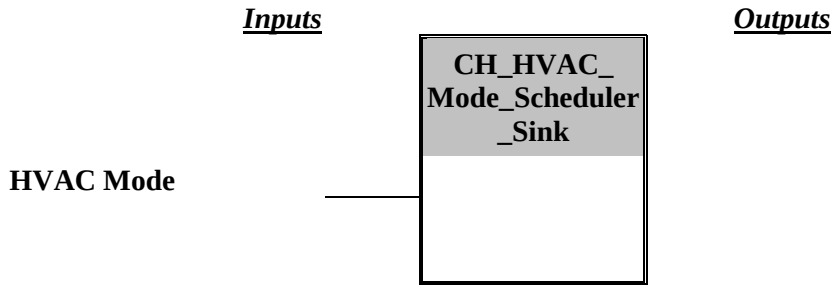
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Forced	1	CC_Forced (4)	---	I	2.001
The data point allows setting the heat/cool actuator in a predefined position, e.g. 0 (forced off) and 100 %. (forced on).						
The data point allows setting the heat/cool actuator in a predefined position.						
	HeatCoolMode	1	CC_HeatCool (41)	---	I	1.100
Via this data point the room regulator informs the connected heating/cooling valve whether the room regulator is currently in heat or cool mode.						
	WindowStatus	1	CC_Window_Status (30)	---	I,X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
	WindowStatus	1	CC_Window_Status (30)	---	I, X	1.019
Via this data point information is provided to the HCA A on open doors or windows, as supplied by a connected Window Contact channel (0023h). The 4 subunits shall be internally ORed. These optional data points are especially favourable in case the RRTB and the window contacts are battery powered.						

10 CH_HVAC_Mode_Scheduler (SCHED si) (Channel Code 0518h)

- **Name:** CH_HVAC_Mode_Scheduler
- **ID:** 0518h
- **Classification:** Functional Module (Sink)
- **General functional description:**

This channel is the sink counterpart of the already defined Scheduler source channel, i.e. 0207h. This channel can be realized in the central heating controller device to inform the latter directly of the currently active HVAC Mode (e.g. to realize overall night reduction mode of a heating system).

- **Graphical representation:**



- **Data point list:**

Mandatory data points

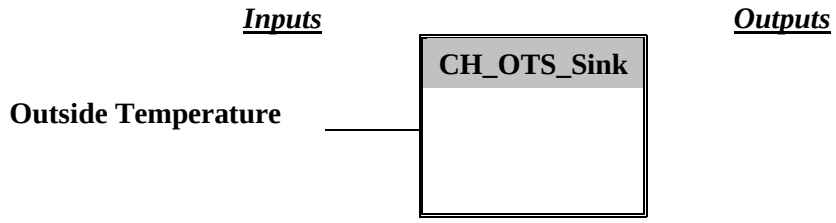
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	HVAC Mode	1	CC_HVAC_Mode (31)	---	I, X	20.102
Via this data point a scheduler (e.g. as realized in a channel 0207h) can inform the central heating controller on the active HVAC Mode						

11 CH_Outside Temperature Sensor (Channel Code 0519h)

- **Name:** CH_Outside Temperature Sensor
- **ID:** 0519h
- **Classification:** Functional Module (Sink)
- **General functional description:**

This channel is the sink counterpart of the already defined Outside Temperature Sensor source channel, i.e. 0024h. This channel can be realized in the central heating controller device to inform the latter directly of the current Outside Temperature.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

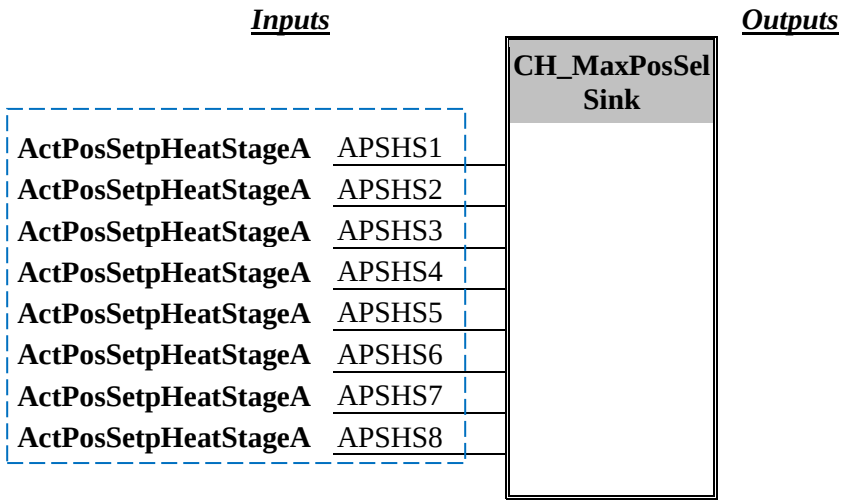
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Outside Temperature	1	CC_TO (36)	---	I, X	9.001
Via this data point an OTS source (e.g. as realized in a channel 0024h) can inform the central heating controller on the current outside temperature						

12 CH_Maximum Position Selector Sink (MPSEL si) (Channel Code 051Ah)

- **Name:** CH_Maximum Position Selector Sink
- **ID:** 051Ah
- **Classification:** Functional Module (Sink)
- **General functional description:**

This channel with up to maximum 8 subunits is intended to collect the position of the linked heating valves as sent out by the room regulators controlling these valves.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

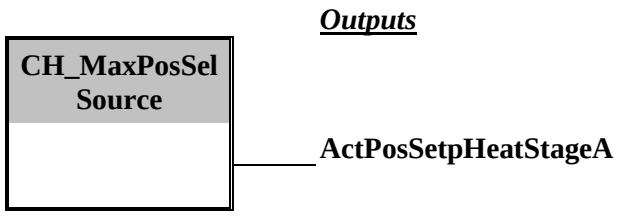
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I, X	5.001
2	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I, X	5.001
3	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I, X	5.001
4	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I, X	5.001
5	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I, X	5.001
6	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I, X	5.001
7	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I, X	5.001
8	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I, X	5.001
The output by means of which the room regulator communicates the position of the heating valves can be linked to one sub unit input of the maximum position selector sink channel.						

13 CH_Maximum Position Selector Source (MPSEL so) (Channel Code 051Bh)

- **Name:** CH_Maximum Position Selector Source
- **ID:** 051Bh
- **Classification:** Functional Module (Source)
- **General functional description:**

This channel sends out the calculated maximum position of the connected heating valves, as received via the room regulator.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

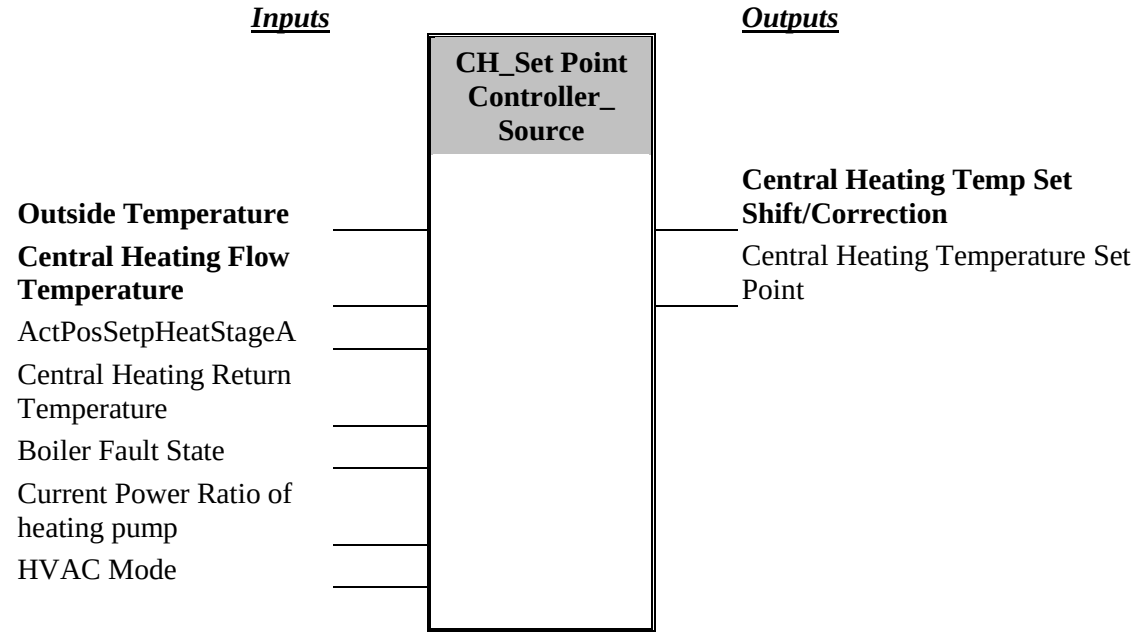
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	O	5.001
As a result of the values received via the maximum position selector sink channel, the corresponding source channel is able to inform the central heating controller on the maximum position of the connected heating valves: the calculation of the output value is based on manufacturer specific algorithms. In case of buildings with multiple flats, the output of the maximum position selector sources shall again be fed into a maximum position selector sink before feeding it into the central heating controller.						

14 CH_Set pointController_Source (SETPCONTR so) (Channel code 051Ch)

- **Name:** CH_Set pointController_Source
- **ID:** 051Ch
- **Classification:** Functional Module (Source)
- **General functional description:**

This channel is responsible for the calculation of a correction factor for the central heating temperature set point. This shall be done on the basis of the outside temperature and the central heating flow temperature as provided by the set point controller sink, if desired extended with other factors, e.g. the maximum position of the valves as also provided by the set point controller sink.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Outside Temperature	1	CC_TO (36)	---	I	9.001
Via this data point the set point controller sink provides the current outside temperature value. This avoids having to link the set point controller source to the current outside temperature sensor. This data will be one element in the correction of the central heating temperature set point correction, as calculated by the set point controller source and provided to the central heating controller.						
2	Central Heating Flow Temperature	1	CC_Temperature_ Flow_Water (81)	---	I	5.001
Via this data point the central heating producer (CHP) or the heat meter (HM) channel provides information on the current temperature of the flow water. This data will be one element in the central heating temperature set point correction, as calculated by the set point controller source and provided to the central heating controller.						
3	Central Heating Temp Set Shift/Correction	1	CC_TemperatureD (44)	---	O	9.002
On the basis of the received mandatory information on the current value of the outside temperature and the flow water, the set point controller source via this data point shifts the temperature of the central heating. The algorithms how the value is calculated is manufacturer specific.						

Optional data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	I	5.001
Via this optional data point the set point controller sink channel provides information on the set positions of the available vans. Also this information can be used by the set point controller source to shift the temperature of the central heating.						
	Central Heating Return Temperature	I	CC_Temperature_ Return_Water (115)	---	I	9.001
Via this optional data point the central heating producer (CHP) or the heat meter (HM) channel provides information on the current temperature of the return water, through the set point controller sink. This data may be an additional element in the correction of the central heating temperature set point correction, as calculated by the set point controller source and provided to the central heating controller.						
	Boiler Fault State	1	CC_Fault (103)	---	I	1.005
Via this data point the set point controller source is informed about a boiler fault, as communicated t through he set point controller sink.						

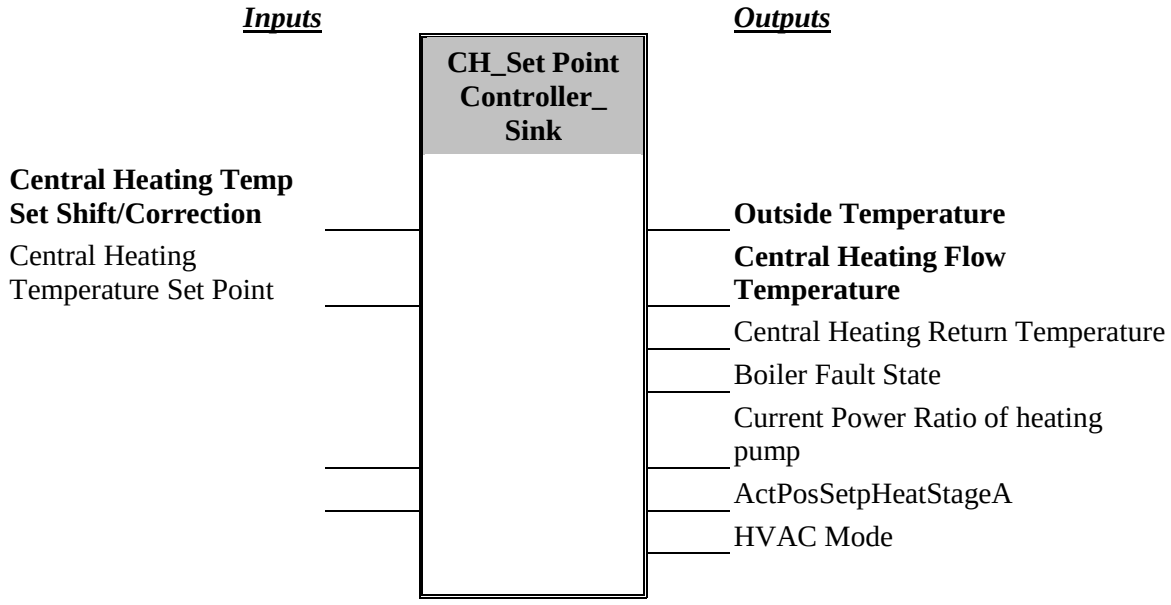
	Current Power Ratio of heating pump	1	CC_Pump_Speed_ Ratio_Status (**116**)	---	I	5.001
Via this data point the set point controller source is informed about the current power ratio of the heating pump, as provided by the heat circuit/pump/mixer controller and communicated by the set point controller sink channel.						
	HVAC Mode	1	CC_HVAC_Mode (31)	---	I	20.102
Via this data point the set point controller sink channel informs on the current active HVAC mode (e.g. night reduction). This avoids having to link additionally the set point controller source to a scheduler channel. The additional information on the active HVAC mode may then be used by the central heating controller to shift the temperature of the central heating.						
	Central Heating Temperature Set Point	1	CC_CH_TempSet point (101)	----	O	9.001
Via this data point the set point controller source may additionally set the central heating temperature set point directly instead of shifting it, by sending this information to the set point controller sink.						

15 CH_Set pointController_Sink (SETPCONTR si) (Channel code 051Dh)

- **Name:** CH_Set pointController_Sink
- **ID:** 051Dh
- **Classification:** Functional Module (Sink)
- **General functional description:**

This channel receives the calculated correction factor for the central heating temperature set point. This factor is calculated by the corresponding set point controller source, on the basis of elements provided by the sink, a.o. the outside temperature and the central heating flow temperature.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Central Heating Temp Set Shift/Correction	1	CC_TemperatureD (44)	---	I	9.002
The set point controller source will use this data point to inform about the calculated shift for the central heating temperature.						
2	Outside Temperature	1	CC_TO (36)	---	O	9.001
Via this data point the set point controller sink provides the current outside temperature value (as already available in the central heating controller). This avoids having to establish an explicit link between the set point controller source and the outside temperature sensor.						
2	Central Heating Flow Temperature	1	CC_Temperature_ Flow_Water (81)	---	O	5.001
Via this data point the set point controller sink informs the set point controller source about the central heating flow temperature as measured by the central heating producer (CHP) or the heat meter (HM) channel.						

Optional data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Central Heating Temperature Set Point	1	CC_CH_TempSet point (101)	----	I	9.001
Via this data point the set point controller source may set the central heating temperature set point explicitly, instead of shifting the value.						
	Central Heating Return Temperature	I	CC_Temperature_ Return_Water (115)	---	O	9.001
Via this data point the set point controller sink informs about the current temperature of the return water as provided by the central heating producer (CHP) or the heat meter (HM) channel.						
	Boiler Fault State	1	CC_Fault (103)	---	O	1.005
Via this data point the set point controller sink informs about a possible boiler fault to the set point controller source, as provided by the central heating (domestic hot water) producer.						
	Current Power Ratio of heating pump	1	CC_Pump_Speed_ Ratio_Status (116)	---	O	5.001
Via this data point the set point controller sink informs about the current power ratio of the heating pump, as provided by the heat circuit/pump/mixer controller.						

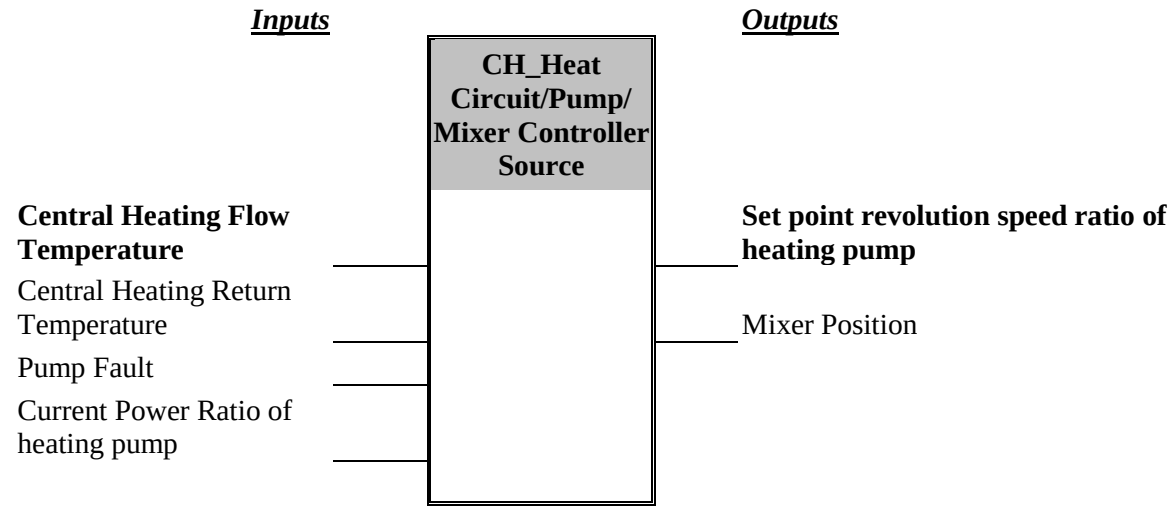
	ActPosSetpHeat StageA	1	CC_Heat_Scaling (35)	---	O	5.001
Via this optional data point the set point controller sink channel provides information on the set positions of the available vans. Also this information can be used by the set point controller source to shift the temperature of the central heating.						
	HVAC Mode	1	CC_HVAC_Mode (31)	---	O	20.102
Via this data point the set point controller sink provides the currently active HVAC Mode (as already available in the central heating controller). This avoids having to establish an explicit link between the set point controller source and a scheduler channel						

16 CH_Heat Circuit/Pump/Mixer Controller Source (HCPM so) (Channel code 051Eh)

- **Name:** CH_Heat Circuit/Pump/Mixer Controller Source
- **ID:** 051Eh
- **Classification:** Functional Module (Source)
- **General functional description:**

This channel controls the set point revolution speed ratio of a heating pump, as connected to the channel sink counterpart. The channel source calculates the before said ratio on the central heating flow temperature as received via the HCPM sink channel.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Central Heating Flow Temperature	1	CC_Temperature_ Flow_Water (81)	---	I	9.001
Via this data point the heating circuit/pump/mixer controller source channel is informed about the measured temperature of the flow water, as provided by the corresponding controller sink channel. This information will be used to adjust the set point of the speed ratio of the pump through the controller sink.						
2	Set point revolution speed ratio of heating pump	1	CC_Pump_Setp_ Speed_ratio_Setp (**119**)	---	O	5.001
This data point is used to adjust the set point of the speed ratio of the pump through the controller sink.						

Optional data points

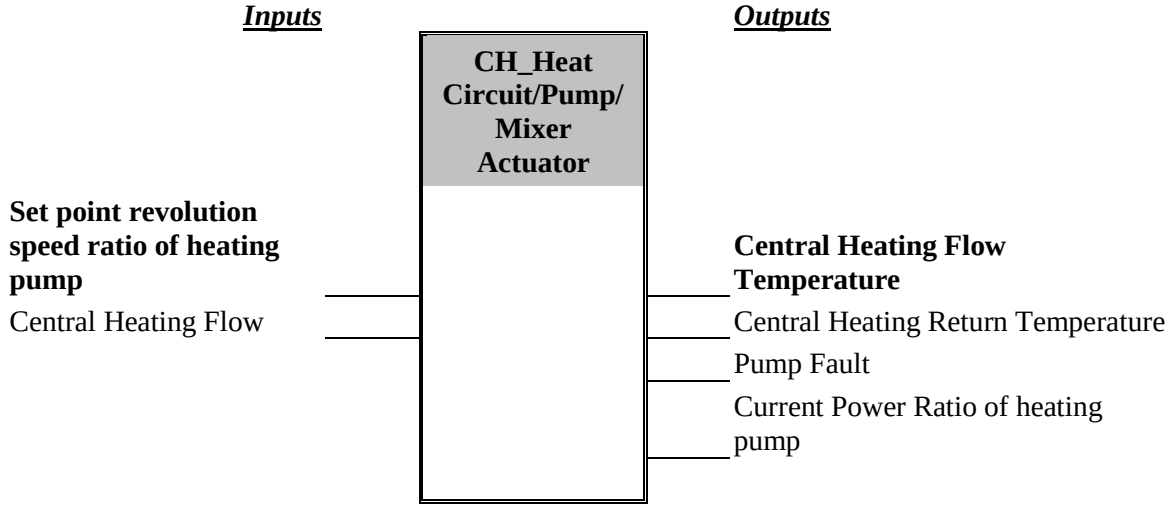
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Central Heating Return Temperature	I	CC_Temperature_ Return_Water (**115**)	---	I	9.001
Via this optional data point the central heating producer (CHP) or the heat meter (HM) channel provides information on the current temperature of the return water. This data may be an additional element in the adjustment of the speed ratio of the connected pump.						
	Pump Fault	1	CC_Fault (103)	---	I	1.005
Via this data point the heat circuit/mixer/pump controller sink may inform about possible faults of the connected pump.						
	Current Power Ratio of heating pump	1	CC_Pump_Speed_ Ratio_Status (**116**)	---	I	5.001
Via this data point the heat circuit/mixer/pump controller sink may inform about the current power ratio of the connected heating pump.						
	Mixer Position	1	CC_Mixer_Setp_ ratio (**118**)	---	O	5.001
Via this data point the heat circuit/mixer/pump controller source may set the mixer position						

17 CH_Heat Circuit/Pump/Mixer Actuator (HCPM act) (Channel code 051Fh)

- **Name:** CH_Heat Circuit/Pump/Mixer Actuator
- **ID:** 051Fh
- **Classification:** Functional Module (Actuator)
- **General functional description:**

This channel is responsible for receiving the revolution speed of the heating pump as calculated by the corresponding source channel. This ratio is calculated on the basis of the central heating flow temperature as provided by this channel to its source counterpart.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Set point revolution speed ratio of heating pump	1	CC_Pump_Setp_ Speed_ratio_Setp (119)	---	I	5.001
Via this data point the controller source adjusts the set point of the speed ratio of the pump connected to the HCPM actuator.						
2	Central Heating Flow Temperature	1	CC_Temperature_ Flow_Water (81)	---	O	9.001
Via this data point the heating circuit/pump/mixer actuator informs about the measured temperature of the flow water to the source channel, who then adjusts the set point of the speed ratio of the pump accordingly.						

Optional data points

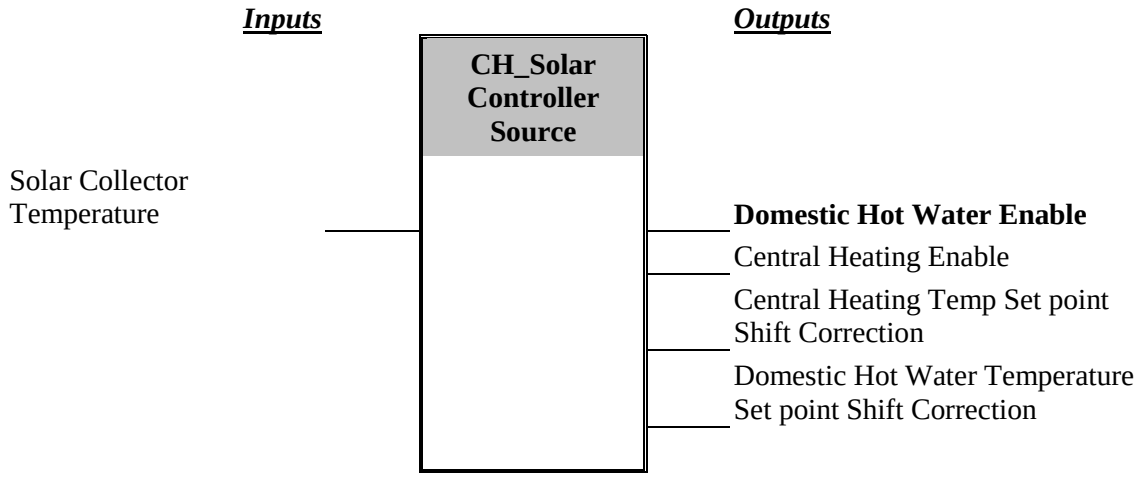
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Central Heating Flow	1	CC_HeatFlow_ Scaling (117)	---	I	5.001
Via this data point the heat circuit/mixer/pump controller source may inform about the heating flow ratio.						
	Central Heating Return Temperature	I	CC_Temperature_ Return_Water (115)	---	O	9.001
Via this optional data point the central heating producer (CHP) or the heat meter (HM) channel provides information on the current temperature of the return water. This data may be an additional element in the adjustment of the speed ratio of the connected pump by the source channel receiving this value.						
	Pump Fault	1	CC_Fault (103)	---	O	1.005
Via this data point the heat circuit/mixer/pump actuator may inform about possible faults of the connected pump.						
	Current Power Ratio of heating pump	1	CC_Pump_Speed_ Ratio_Status (116)	---	O	5.001
Via this data point the heat circuit/mixer/pump actuator may inform about the current power ratio of the connected heating pump.						

18 CH_SolarController Source (SOLARC so) (Channel code 0520h)

- **Name:** CH_Solar Controller Source
- **ID:** 0520h
- **Classification:** Functional Module (Source)
- **General functional description:**

Depending on the production of sufficient hot water by the solar collectors, this channel may influence the further production of hot water for the central heating and/or the domestic hot water by the central heating controller.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Domestic Hot Water Enable	1	CC_DHW_Enable (105)	---	O	1.003
Via this data point the solar controller source channel is able to activate or deactivate production of domestic hot water by the central heating system, depending on the available of sufficient solar power.						

Optional data points

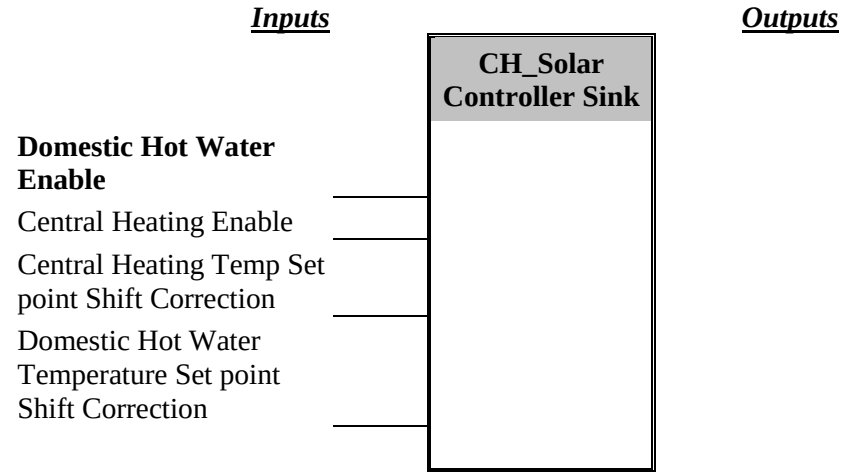
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Central Heating Enable	I	CC_CH_Enable (33)	---	O	1.003
Via this data point the solar controller source channel is able to activate or deactivate the central heating, depending on the available of sufficient solar power.						
	Central Heating Temp Set point Shift Correction	1	CC_TemperatureD (44)	---	O	9.002
Via this data point the solar controller source channel is able to shift/correct the current central heating temperature set point.						
	Domestic Hot Water Temp Set point Shift Correction	1	CC_TemperatureD_ DHW (122)	---	O	9.002
Via this data point the solar controller source channel is able to shift/correct the current domestic hot water temperature set point.						
	Temperature Solar Collector	1	CC_TempSolar (121)	---	I	9.001
Via this data point the solar controller source is informed about the current temperature of the solar collector via a bus enabled solar temperature sensor.						

19 CH_Solar Controller Sink (SOLARC si) (Channel code 0521h)

- **Name:** CH_Solar Controller Sink
- **ID:** 0521h
- **Classification:** Functional Module (Sink)
- **General functional description:**

This channel is typically realised in the central heating controller to inform on the sufficient production of hot water by the solar collector, so as to influence the further production of hot water for the central heating and/or the domestic hot water by the central heating controller.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Domestic Hot Water Enable	1	CC_DHW_Enable (105)	---	I	1.003
Via this data point the solar controller source channel is able to activate or deactivate production of domestic hot water by the central heating system, depending on the available of sufficient solar power.						

Optional data points

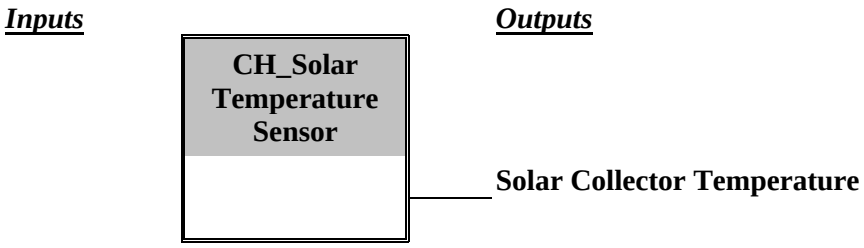
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Central Heating Enable	I	CC_CH_Enable (33)	---	I	1.003
Via this data point the solar controller source channel is able to activate or deactivate the central heating, depending on the available of sufficient solar power.						
	Central Heating Temp Set point Shift Correction	1	CC_TemperatureD (44)	---	I	9.002
Via this data point the solar controller source channel is able to shift/correct the current central heating temperature set point.						
	Domestic Hot Water Temp Set point Shift Correction	1	CC_TemperatureD_DHW (122)	---	I	9.002
Via this data point the solar controller source channel is able to shift/correct the current domestic hot water temperature set point.						

20 CH_Solar Temperature Sensor (STS) (Channel code 0522h)

- **Name:** CH_Solar Temperature Sensor
- **ID:** 0522h
- **Classification:** Functional Module (Sensor)
- **General functional description:**

This channel can be used to communicate the current solar temperature by a bus enabled solar collector sensor.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

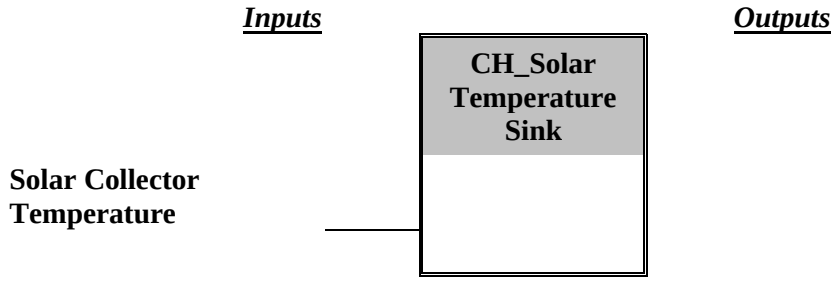
1	Temperature Solar Collector	1	CC_TempSolar (121)	---	O	9.001
Via this data point a bus enabled solar temperature sensor informs about the current temperature of the solar collector.						

21 CH_Solar Temperature Sink (STS si) (Channel code 0523h)

- **Name:** CH_Solar Temperature Sink
- **ID:** 0523h
- **Classification:** Functional Module (Sink)
- **General functional description:**

This channel can be used to feed the current solar temperature into a central heating controller, as measured by a bus enabled solar collector sensor.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

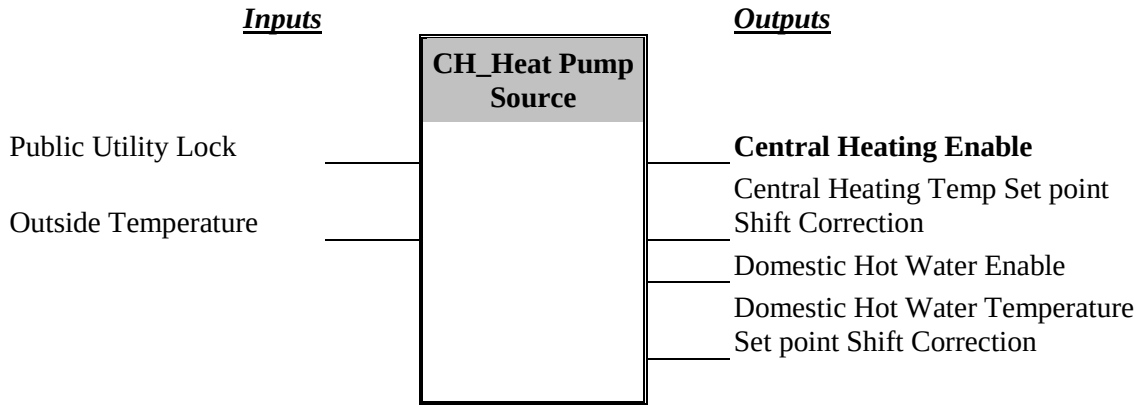
1	Temperature Solar Collector	1	CC_TempSolar (121)	---	I, X	9.001
Via this data point a bus enabled solar temperature sensor informs about the current temperature of the solar collector, e.g. directly to a central heating controller.						

22 CH_Heat Pump Source (HPUMP so) (Channel code 0524h)

- **Name:** CH_Heat Pump Source
- **ID:** 0524h
- **Classification:** Functional Module (Source)
- **General functional description:**

Depending on the production of sufficient heat by a heat pump, this channel may influence the further production of hot water for the central heating and/or the domestic hot water by the central heating controller.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Central Heating Enable	I	CC_CH_Enable (33)	---	O	1.003
Via this data point the heat pump controller is able to activate or deactivate the central heating.						

Optional data points

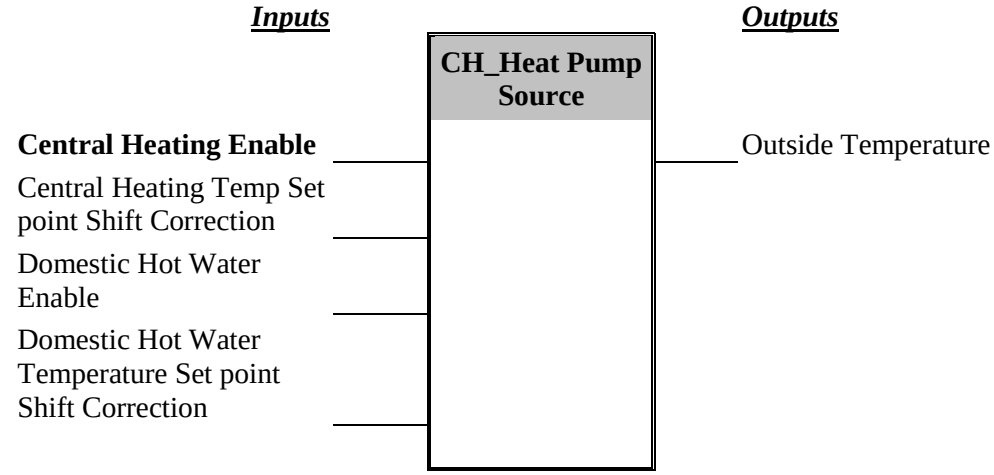
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Public Utility Lock	1	CC_SwitchOnOff (1)	---	I	1.001
Via this data point it is possible to deactivate the heat pump (e.g. in case of a public utility lock).						
	Outside Temperature	1	CC_TO (36)	---	I	9.001
Via this data point the pump controller sink informs on the current outside temperature, as this information is already available in the central heating controller. This avoids having to establish an extra link with an outside temperature sensor.						
	Central Heating Temp Set point Shift Correction	1	CC_TemperatureD (44)	---	O	9.002
Via this data point the heat pump source channel is able to shift/correct the current central heating temperature set point.						
	Domestic Hot Water Enable	1	CC_DHW_Enable (105)	---	O	1.003
Via this data point the heat pump controller source channel is able to activate or deactivate production of domestic hot water by the central heating system.						
	Domestic Hot Water Temp Set point Shift Correction	1	CC_TemperatureD_DHW (122)	---	O	9.002
Via this data point the heat pump controller source channel is able to shift/correct the current domestic hot water temperature set point.						

23 CH_Heat Pump Sink (HPUMP si) (Channel code 0525h)

- **Name:** CH_Heat Pump Sink
- **ID:** 0525h
- **Classification:** Functional Module (Sink)
- **General functional description:**

This channel is typically realised in the central heating controller to inform on the sufficient heat production by a heat pump, so as to influence the further production of hot water for the central heating and/or the domestic hot water by the central heating controller.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Central Heating Enable	I	CC_CH_Enable (33)	---	I	1.003
Via this data point the heat pump controller source is able to activate or deactivate the central heating.						

Optional data points

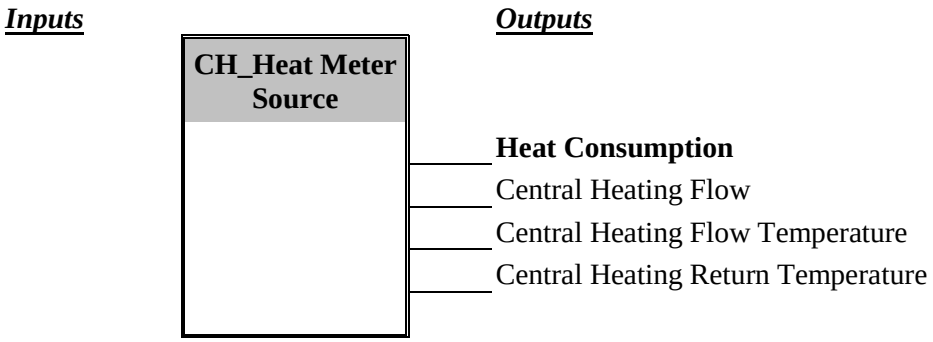
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Central Heating Temp Set point Shift Correction	1	CC_TemperatureD (44)	---	I	9.002
Via this data point the heat pump source channel is able to shift/correct the current central heating temperature set point.						
	Domestic Hot Water Enable	1	CC_DHW_Enable (105)	---	I	1.003
Via this data point the heat pump controller source channel is able to activate or deactivate production of domestic hot water by the central heating system.						
	Domestic Hot Water Temp Set point Shift Correction	1	CC_TemperatureD_DHW (122)	---	I	9.002
Via this data point the heat pump controller source channel is able to shift/correct the current domestic hot water temperature set point.						
	Outside Temperature	1	CC_TO (36)	---	O	9.001
Via this data point the pump controller sink informs on the current outside temperature, as this information is already available in the central heating controller. This avoids having to establish an extra link with an outside temperature sensor.						

24 CH_Heat Meter Source (Channel code 0526h)

- **Name:** CH_Heat Meter Source
- **ID:** 0525h
- **Classification:** Functional Module (Source)
- **General functional description:**

This channel informs on heat consumption of a heating circuit, as measured by the connected heat meter.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Heat Consumption	I	CC_Heat_ Consumption (**123**)	---	O	13.013
Via this data point the heat meter controller informs on the consumed heat.						

Optional data points

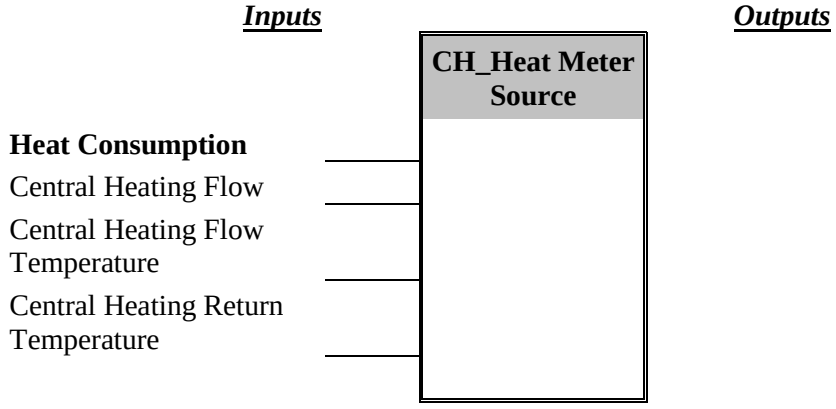
Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Central Heating Flow	1	CC_Volume_Flow (**124**)	---	O	9.025
Via this data point the heat meter controller communicates the measured volume of the flow water of the central heating.						
	Central Heating Flow Temperature	1	CC_Temperature_ Flow_Water (81)	---	O	9.001
Via this data point the heat meter controller communicates the measured central heating flow temperature.						
	Central Heating Return Temperature	1	CC_Temperature_ Return_Water (115)	---	O	9.001
Via this data point the heat meter controller communicates the measured central heating return temperature.						

25 CH_Heat Meter Sink (Channel code 0527h)

- **Name:** CH_Heat Meter Sink
- **ID:** 0526h
- **Classification:** Functional Module (Sink)
- **General functional description:**

This channel is typically realised in a device wishing to display and/or further process the information on heat consumption of a heating circuit.

- **Graphical representation:**



- **Data point list:**

Mandatory data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
1	Heat Consumption	I	CC_Heat_ Consumption (**123**)	---	I	13.013
Via this data point the heat meter controller informs on the consumed heat.						

Optional data points

Index	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v…..)	DPT
	Central Heating Flow	1	CC_Volume_Flow (**124**)	---	I	9.025
Via this data point the heat meter controller communicates the measured volume of the flow water of the central heating.						
	Central Heating Flow Temperature	1	CC_Temperature_ Flow_Water (81)	---	I	9.001
Via this data point the heat meter controller communicates the measured central heating flow temperature.						
	Central Heating Return Temperature	1	CC_Temperature_ Return_Water (115)	---	I	9.001
Via this data point the heat meter controller communicates the measured central heating return temperature.						

New defined Connection codes

Connection code			**Based on DPT:**	
Name	Identifier Dec.	Abbrev.	Name	DTP type
Central Heating Return Temperature	**115**	CC_Temperature_ Return_Water	DPT_Temp	9.001
Status Power Ratio of heating Pump	**116**	CC_Pump_Speed_ Ratio_Status	DPT_Scaling	5.001
Central Heating Flow	**117**	CC_HeatFlow_ Scaling	DPT_Scaling	5.001
Mixer Position Set point	**118**	CC_Mixer_Setp_ratio	DPT_Scaling	5.001
Set point Power Ratio of heating Pump	**119**	CC_Pump_Speed_ Ratio_Setp	DPT_Scaling	5.001
See revision of AN 122	**120**			
Temperature Solar Collector	**121**	CC_TempSolar	DPT_Temp	9.001
Domestic Hot Water Temperature Set point Shift Correction	**122**	CC_TemperatureD_ DHW	DPT_TemperatureD	9.002
Heat Consumption	**123**	CC_Heat_ Consumption	DPT_ActiveEnergy _kWh	13.013
Central Heating Flow	**124**	CC_Volume_Flow	DPT_Value_Volum e_Flow	9.025