

TAC5 Regulation + SAT KNX Module





Installation and user's manual





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1. FUNCTIONALITIES OF THE REGULATION

The TAC5 control boards are mounted in the HRglobal [TAC5 DG], HRup [TAC5 DG], HRflat [TAC5 DG], HRmural [TAC5 DM] units and single flow units as COMPO [TAC5 SC] or CUBUS [TAC5 F].

The features of each TAC5 regulation are plainly explained in their specific user manual.

The TAC5 control boards provide the following functionalities:

- Control of supply and exhaust fans in constant air flow (CA), constant torque (TQ), constant airflow linked to a 0-10V signal (LS) mode, constant measured pressure (CPs) and calculated pressure (CPf, only available on [TAC5 SC] and [TAC5 F] control boards).
- Management of 6 time slots.
- Default, set point and pressure alarms.
- Management of airflows in case of fire alarm.
- BOOST function that helps to force the supply and exhaust airflows to a value set beforehandoverriding all configurations and conditions.
- Automatic management of the bypass for free cooling (100% bypass on HRglobal-Up-flat units and 70% bypass in HRmural unit). [TAC5 DG], [TAC5 DT], [TAC5 DM].
- Automatic management of the opening and closing of valves mounted on the suction side.
- Anti-frost protection of the heat recovery exchanger by modulation of the supply airflow or by regulating the power of the pre-heating electric coil (KWin). [TAC5 DG], [TAC5 DT].
- Regulation of the post-heating water (NV) or electric (KWout) coils to maintain a constant supply temperature. [TAC5 DG] , [TAC5 DT]
- Display of the settings and working fans
- Analogical output signals of airflow and pressure. [TAC5 DG], [TAC5 DT]
- Advanced setup

The following options can be combined with the TAC5 control board:

- Option SAT TAC5 BA/KW [TAC5 DG], [TAC5 DT], [TAC5 DM], [TAC5 SC]: Regulation of 2 external heat exchangers (hot and/or cold).
- SAT3 Option:

Circuit with 2 relays for

- Information about the « Pressure alarm » (on O.R.1)
- Information about the « FAN ON » (or the control of damper(s) CT [TAC5 DM], [TAC5 SC], [TAC5 F]) (on O.R.2).

and/or [TAC5 DG], [TAC5 DT]

- Status of NV option circulator (on O.R.3)
- Information about the status of the « bypass » (on O.R.4)

SAT KNX option is not compatible with SAT MODBUS/ SAT ETHERNET/ SAT WIFI options and so neither with GRC option.

To have more details, see the install manual of each option



2. OPERATING PRINCIPLE

The SAT KNX enable to link one or several TAC5 (DM, DG, DT, SC, F) units on a KNX TP (Twisted Pair) type network. It will be then possible to drive and monitor the units by this network through the ETS $^{\text{TM}}$ software which is provided by the KNX association or through other KNX devices by group objects associations.

The units' configuration should be done beforehand locally (via RC or directly on TAC5 DM/SC/F).

2.1 KNX Network

2.1.1 Topology

The devices are linked on a line of the KNX network. They can reach a theoretical maximum of 256 but the real limit is 64 on KNX TP network (see KNX network specification). Each line must have a KNX power supply (24VDC and coil). 16 lines can be grouped by line couplers to form areas. Those areas can themselves be linked with area couplers till a maximum of 16 on a line called main line or «Backbone». Figure 1 shows this topology.

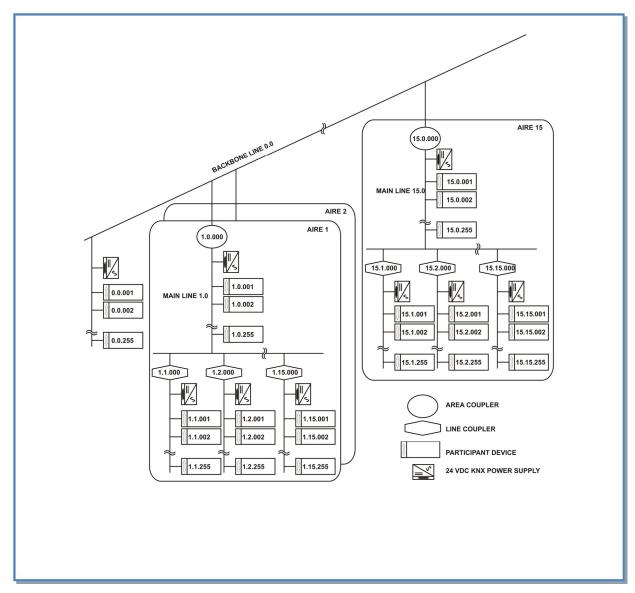


Figure 1 - KNX Network Topology

2.1.2 Individual Addresses

The devices will each have an individual address which is unique on the network. This individual address will match the location of the device in the network topology. It is made up by 4 bits identifying the area, 4 bits the line and 8 the device (see figure 2). The individual address can be programmed by ETS^{TM} .

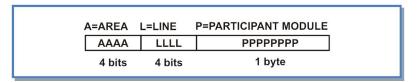


Figure 2 - Individual address structure

2.1.3 Selecting, configuring and programming

The ETS™ software supplied by the KNX association enables the KNX network management. The different devices to connect on the network can be selected by this software and be inserted in the network according to the desired topology.

The devices parameters concerned with the network optimisation can be configured through ETS™. ETS™ will also enable the programming of the individual address of the device upon which the programming button shall be pressed.

2.1.4 Group Objects

The KNX devices can have one or several memory locations called group objects which size can range from 1 bit to 14 bytes according to the object functionality.

The different value types are defined by the datapoints which include the data type and the size. The data type is itself based on the format and coding of the data while the size is based on the range (max and min value) and the unit (see figure 3). The datapoints are identified by a name, the DPT_NAME and by 2 numbers separated by a point (main number and sub-number), the DPT_ID. They are classified in 5 big categories detailed in annex 1. The datapoints are standardized and allow the compatibility on the bus of devices from different manufacturers (see the most frequent in annex 2).

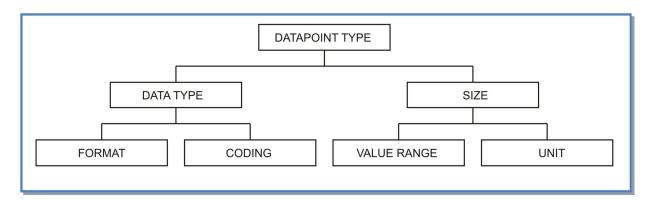


Figure 3 – datapoint composition

The value changes can be communicated on the bus by different types of telegrams and the communication related behaviour of each group object is defined by flags:

- Communication:
 - Active flag: the object has a normal link to the bus.
 - Inactive flag: The telegrams are validated. The group object is not modified.
- READ:
 - Active flag: the object value can be read by the bus.
 - Inactive flag: the object value cannot be read by the bus.
- WRITE:
 - Active flag: the value of the object can be modified by the bus.



• Inactive flag: the value of the object cannot be modified by the bus.

TRANSMIT:

- Active flag: a telegram is transmitted when the group object value has changed.
- Inactive flag: the group object will send an answer only after the reception of a reading request.

- UPDATE:

- Active flag: the answer telegram values are interpreted as writing command. The value of the group object is updated.
- Inactive flag: the answer telegram values are not interpreted as writing command. The value of the group object stays unchanged.

READ ON INIT:

- Active flag: the device sends independently the value read command for the initialization of the group object after the switch on.
- Inactive flag: after the switch on, the device doesn't initialize the value of the assigned objects with value read command.

The default values of these flags should not be modified.

2.1.5 Group Address and Associations

The devices group objects can be grouped by functionalities and associated to each other for interacting provided that they are of the same datapoint type. The grouping is done by giving a group address which can have the following structures:

- Level 3 address: made of 5 bits (values ranging from 0 to 31) to identify the main group, 3 bits (values ranging from 0 to 7) to identify the middle group and 8 bits (from 0 to 255) for the subgroup.
- Level 2 address: same as level 3 without the middle group
- Free group: address id defined with the 16 available bits (from 0 to 65535).

The address 0/0/0 is reserved for broadcast messages sent to all the devices on the bus.

The ETS™ software enables to create the different groups levels and to associate the group addresses to the desired group objects.

Several group objects from different devices but with the same datapoint type can receive the same group address, this way and according to their respective communication flags, the value change of a group object at this address will be transmitted to all the other objects with the same group address and these ones, once more according to their communications flags, will update their value to the one transmitted.

It is important to distinguish the group addresses of the group objects of the device with the individual address of that device, which will be used to find it on the network and to program it. The individual address is unique on the network and associated to the device, the group address is not unique on the network and is associated to the group objects of that device. A device can have one or several group objects.

3. WIRING OF SAT KNX

Just switch off and plug the SAT KNX on the « MODBUS » connector on the TAC5 board (figure 4).

Warning: plugging the SAT KNX in the wrong connector on the TAC5 board can be fatal to both circuits!

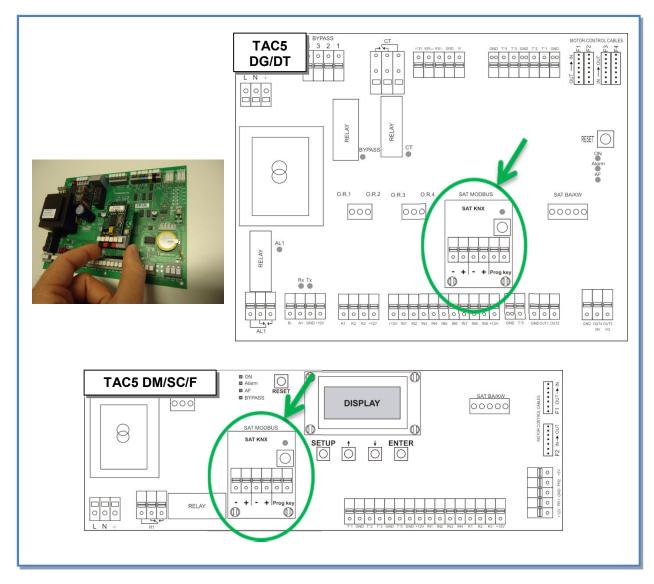


Figure 4 - Plugging of SAT KNX on the TAC5 control board



Then, connect the SAT KNX to the KNX network as shown in figure 5 and in respect with the KNX TP network specification (see point 4).

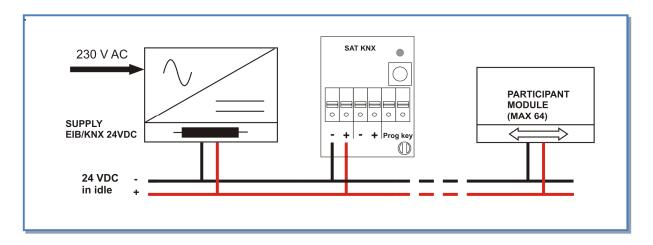


Figure 5 – Wiring to the KNX Network

4. GROUP OBJECTS OF THE SAT KNX MODULE

The group objects of SAT KNX are categories sets. One set of categories is dedicated to TAC5 DG, DM and DT controls, the other to TAC5 SC and F.

The data flow direction is given by I (Input) or O (Output):

4.1 Group objects categories for TAC5 DG, DM and DT

4.1.1 Drive Category for TAC5 DG, DM and DT

The SAT KNX group objects of the drive category are listed and detailed in table 1:

N.	Name	I/O	Size	Type (DPT)	Flags CRWTU				
	Function								
	Pilot - Main switch - Switch	- 1	1 bit	DPT 1.001	C-W-U				
1	Turn fans on or off. If turned on and group object < Airflow - Supply flow - Value> or < Airflow - Exhaust flow - Value> is set to a value > 0, then the fans are started in 'constant airflow' mode. If turned on and group objects < Airflow - Supply flow - Value> and < Airflow - Exhaust flow - Value> are set to 0, then the fans are started in the mode that is configured.								
2	Pilot - Main switch - State	0	1 bit	DPT 1.001	CR-T-				
	Shows if HVAC unit is currently On or	Off. 'On'	means fans running. Is	always sent on start up.					
	Pilot - Fan speed 1 on/off - Switch	- 1	1 bit	DPT 1.001	C-W-U				
3	Select fans speed 1. Writing value 1 activates speed 1 and resets the other < <i>Pilot - Fan speed * on/off - Switch></i> group objects. Writing 0 stops fans.								
	Pilot - Fan speed 2 on/off - Switch	- 1	1 bit	DPT 1.001	C-W-U				
4	Select fans speed 2. Writing value 1 activates speed 2 and resets the other < <i>Pilot - Fan speed * on/off - Switch></i> group objects. Writing 0 stops fans.								
	Pilot - Fan speed 3 on/off - Switch	I	1 bit	DPT 1.001	C-W-U				
5	Select fans speed 3 on/off - Switch 1 1 1 1 1 1 1 1 1								

N.	Name	I/O	Size	Type (DPT)	Flags CRWTU				
IN.	Function CRW10								
	Pilot - Fan speed 1 on/off - State	0	1 bit	DPT 1.001	CR-T-				
6	Is 'On' if fans are running with speed	_		DI 1 1.001	OIT I				
	Pilot - Fan speed 2 on/off - State	0	1 bit	DPT 1.001	CR-T-				
7	Is 'On' if fans are running with speed 2	_		2					
	Pilot - Fan speed 3 on/off - State	0	1 bit	DPT 1.001	CR-T-				
8	Is 'On' if fans are running with speed 3								
	Pilot - Speed % - Value	I	1 byte	DPT 5.001 DPT Scaling	C-W-U				
9	Select fans speed with a percentage value. 0 - 9%: Fans OFF 40 - 69%: MEDIUM speed 10 - 39%: LOW speed 70 - 100%: HIGH speed								
	Pilot - Speed % - State	0	1 byte	DPT 5.001	CR-T-				
	That opeca // State		1 byte	DPT Scaling	OIC I				
10	Shows the current fans speed as a pe	ercentage	. :	21 1_00amig					
	0% if fans are OFF, 33% for LOW spe			0% for HIGH speed.					
	Pilot - Set Supply flow % - Value		1 byte	DPT 5.001	C-W-U				
	тист согоррумини		,	DPT Scaling					
11	Set supply flow as 0100% of the fan' This overrides the normal control via the set: forces 'constant airflow' mode with the set: forces 'constant airflow' set to a value > 0, then the 'constant airflow' figroup object < Airflow - Supply flow set to 0, then the 'constant airflow' moviewer is resumed. (DPT 5.001: Value)	ow - Value> is changed ans are started. ow - Value> is changed a	and either is set and both are						
	Pilot - Set Supply flow % - State	02001	1 byte	DPT 5.001	CR-T-				
12	That Got Supply now 70 State		1 Dyto	DPT Scaling	OIT I				
	Feedback of group object < Airflow - S	Supply flo	w - Value>	21 1_00amig					
	Pilot - Set Exhaust flow % - Value	ì	1 byte	DPT 5.001 DPT_Scaling	C-W-U				
13	Set exhaust flow as 0100% of the fan's max flow. This overrides the normal control via the viewer OFF/I/II/III buttons. If set: forces 'constant airflow' mode with independent airflow setpoints for supply and exhaust fans. If group object <airflow -="" flow="" supply="" value=""> or <airflow -="" exhaust="" flow="" value=""> is changed and either is set to a value > 0, then the 'constant airflow' mode is activated and the fans are started. If group object <airflow -="" flow="" supply="" value=""> or <airflow -="" exhaust="" flow="" value=""> is changed and both are set to 0, then the 'constant airflow' mode is terminated and the fans are stopped. Normal control via the viewer is resumed. (DPT 5.001: Value 0255 means 0100%).</airflow></airflow></airflow></airflow>								
14	Pilot - Set Exhaust flow % - State			DPT 5.001 DPT_Scaling	CR-T-				
	Feedback of group object <airflow -="" e<="" td=""><td>_</td><td></td><td>DDT 4 000</td><td>65 T</td></airflow>	_		DDT 4 000	65 T				
4.5	Pilot - Fans Running - State	O nnina) an	1 bit	DPT 1.002	CR-T-				
15	Shows that all fans (that should be rul	nning) ar	e running. is 1 (True) if t	ans are running.					
	Is always sent on start up.		2 buto unoispad	DDT 7 007	CD T				
10	Pilot - Working hours - State	O of the for	2 byte unsigned	DPT 7.007	CR-T-				
16	Shows the number of working hours interned			roported as 65525 have	e in KNV				
	If the number of working hours internated Pilot - Reset working hours - Trigger	ally IS OVE		PPT 1.015	S IN KNX. C-W-U				
17	r iiot - Reset working nours - migger	'	1 bit	DPT 1.015 DPT Reset	C-VV-U				
17	Reset Fans working hours to zero. 0 =	= no cotic	on 1 = reest le turned e						
	Pilot - Reset pending alarms -	- no acud	1 bit	DPT 1.015	C-W-U				
	Trigger		I DIL	DPT 1.015 DPT Reset	C-VV-U				
18	Perform a RESET to clear pending ala								
	0 = no action. 1 = reset. Is turned off a Pilot - Working mode - State	automatic O	1 byte	DPT 5	CR-T-				
	Value that shows the current working This is an enumeration. Each value re	mode.	·		OR-1-				
19		-	_						
. •	0 = Off (OFF) 1 = Constant airflow mode (CA)		= Constant air pressure = Initializing (INIT)	mode with sensor (CPs)					
	2 = Linked system mode (LS)		= Initializing (INLL) = Constant Torque mode	e (TO)					
	3 = Constant air pressure mode (CPf)		255: reserved	((\ \ \)					

Table 1 SAT KNX Group objects – Drive category for TAC5 DG, DM and DT



4.1.2 Mode and functions Category for TAC5 DG, DM and DT

The SAT KNX group objects of the Mode and functions category are listed and detailed in table 2:

31 Set voltage setpoint for CPs mode for the supply fans. Range 0 10000 mV. (voltage is internally stored with 0.1V resolution) CPs mode - Supply fan setpoint - State O 2 byte float DPT 9.020 Feedback of group object < CPs mode - Supply fan setpoint - Value>	C-W-U							
31 Set voltage setpoint for CPs mode for the supply fans. Range 0 10000 mV. (voltage is internally stored with 0.1V resolution) CPs mode - Supply fan setpoint - State O 2 byte float DPT 9.020 Feedback of group object < CPs mode - Supply fan setpoint - Value>								
(voltage is internally stored with 0.1V resolution) CPs mode - Supply fan setpoint - State O 2 byte float DPT 9.020 Feedback of group object < CPs mode - Supply fan setpoint - Value>	CR-T-							
Feedback of group object <cps -="" fan="" mode="" setpoint="" supply="" value=""></cps>	CR-T-							
Feedback of group object <cps -="" fan="" mode="" setpoint="" supply="" value=""></cps>								
CPs mode - Exhaust fan setpoint - Value I 2 byte float DPT 9.020 C	C-W-U							
33 Set voltage setpoint for CPs mode for the exhaust fans. Range 0 10000 mV. (voltage is internally stored with 0.1V resolution)								
CPs mode - Exhaust fan setpoint - State O 2 byte float DPT 9.020	CR-T-							
Feedback of group object <cps -="" exhaust="" fan="" mode="" setpoint="" value=""></cps>								
Operation mode - Automatic on/off - Switch I 1 bit DPT 1.001 C	C-W-U							
39 Turn 'automatic' mode on or off. In automatic mode, the HVAC is controlled using a timetable. Autom	natic							
mode can only be used if a timetable is configured.								
Operation mode - Automatic on/off - State O 1 bit DPT 1.001	CR-T-							
Shows if 'automatic' mode is on								
Operation mode - Boost on/off - Switch I 1 bit DPT 1.001	C-W-U							
Force boost mode on (high air flow).								
Operation mode Poset on/off State O 1 hit DDT 1 001	CR-T-							
Shows if boost mode is on								
	C-W-U							
Force the bypass on (valve open or heat wheel stop). Normally, the bypass is controlled automaticall	v. When							
this group object is set to 'on' the bypass function is forced on.								
	CR-T-							
Feedback of group object <bypass -="" force="" function="" on="" switch=""></bypass>								
	CR-T-							
Shows if the bypass is on (valve open or heatwheel stop) or off.								
If the bypass valve is partially open, its status is reported as 'on'.								
While the bypass valve is opening, the status is reported as 'on'.								
While the bypass valve is closing, the status is reported as 'off'.								
Air inlet function - Valve open/close - State O 1 bit DPT 1.009	CR-T-							
Shows the status of the air inlet valve (CT-in option). (0=open, 1=closed)								
While the valve is opening, the status is reported as 'open'.								
While the valve is closing, the status is reported as 'closed'.								
MK3 function - MK3 on/off - Switch I 1 bit DPT 1.001 C	C-W-U							
Force activation of MK3 (mixing cabinet). When this group object is set to 'on' the MK3 function is for	ced							
active.								
MK3 function - Current Status - State O 1 bit DPT 1.001	CR-T-							
Shows if the MK3 function is on.								
During the switchover from off to on, the status is reported as 'on'.								
During the switchover from on to off, the status is reported as 'off'.								

Table 2 SAT KNX Group objects – Mode and Function category for TAC5 DG, DM and DT

4.1.3 Flow, Pressure, Voltage, Temperature Category for TAC5 DG, DM and DT

The SAT KNX group objects of the Flow, Pressure, Voltage, Temperature category are listed and detailed in table 3:

	Name	I/O	Size	Type (DPT)	Flags		
N.	Ivalile	1/0	Size	Type (DFT)	CRWTU		
		Fun	iction		Siturio		
	Airflow - Ratio exhaust/supply flow - Value	I	1 byte	DPT 5.004	C-W-U		
51				DPT_Percent_U8			
	Set the desired exhaust flow / supply flow ratio						
	Airflow - Ratio exhaust/supply flow – State	0	1 byte	DPT 5.004	CR-T-		
52	Shows the configured exhaust flow / supply flo	w ratio		DPT_Percent_U8			
	Range 5255%. If the ratio is configured > 255	5% it wil	l be reported a	s 255% in KNX			
	Airflow - Sleep mode - Value	I	1 byte	DPT 5.001	C-W-U		
53	·		•	DPT_Scaling			
00	Set the desired sleep mode airflow reduction p						
	(this value is internally stored with 1% resolution				CD T		
54	Airflow - Sleep mode - State	0	1 byte	DPT 5.001 DPT Scaling	CR-T-		
J-	Shows the configured sleep mode airflow redu	ction pe	ercentage. Ran				
	Fan 1 - Current airflow - State	0	2 byte float	DPT 9.009	CR-T-		
55	Shows the current airflow of fan 1. Range 019	9999 m	3/h. Transmissi	ion rate is controlled by para	ameter		
	<minimum air<="" airflow="" current="" next="" or="" p="" time="" until=""></minimum>	-					
	Fan 1 - Current airpressure - State	0	2 byte float	DPT 9.006	CR-T-		
56	Shows the current airpressure on fan 1. Range Minimum time until next current airflow/airpressure				parameter		
	Fan 2 - Current airflow - State	0	2 byte float	DPT 9.009	CR-T-		
57	Shows the current airflow of fan 2. Range 019	_					
	<minimum airflow="" airpre<="" current="" next="" td="" time="" until=""><td></td><td></td><td></td><td></td></minimum>						
	Fan 2 - Current airpressure - State	0	2 byte float	DPT 9.006	CR-T-		
58	Shows the current airpressure on fan 2. Range				arameter		
	<minimum airflow="" airpre<="" current="" next="" p="" time="" until=""> Fan 3 - Current airflow - State</minimum>			sion>. DPT 9.009	CR-T-		
59	Shows the current airflow of fan 3. Range 01	0 0000 m	2 byte float				
55	Shows the current airnow of fair 5. Nange 6.15 <i>Minimum time until next current airflow/airpre</i>				arrietei		
	Fan 3 - Current airpressure - State	0	2 byte float	DPT 9.006	CR-T-		
60	Shows the current airpressure on fan 3. Range				arameter		
	<minimum airflow="" airpre<="" current="" next="" p="" time="" until=""></minimum>						
61	Fan 4 - Current airflow - State	0000 m	2 byte float	DPT 9.009	CR-T-		
01	Shows the current airflow of fan 4. Range 019999 m3/h. Transmission rate is controlled by parameter Minimum time until next current airflow/airpressure/torque transmission .						
	Fan 4 - Current airpressure - State	0	2 byte float	DPT 9.006	CR-T-		
62	Shows the current airpressure on fan 4. Range	e 0199	9 Pa. Transmis	ssion rate is controlled by pa	arameter		
	<minimum airflow="" airpre<="" current="" next="" p="" time="" until=""></minimum>						
	Supply fan - Current flow setpoint - State	0	2 byte float	DPT 9.009	CR-T-		
63	Shows the current flow setpoint of the supply f One of these (m3/h, Pa or mV) will be used. The			m3/n.			
	Transmission rate is controlled by parameter <			ext fan setpoint transmission	/>.		
	Supply fan - Current pressure setpoint -	0	2 byte float	DPT 9.006	CR-T-		
	State		•				
64	Shows the current pressure setpoint of the sup			999 Pa.			
	One of these (m3/h, Pa or mV) will be used. The Transmission rate is controlled by parameter of			yt fan aatnaint transmission			
	Transmission rate is controlled by parameter < Supply fan - Current voltage setpoint - State	-wiiriiriu O	2 byte float	DPT 9.020	CR-T-		
0.5	Shows the current voltage setpoint of the supp	_			OI (I		
65	One of these (m3/h, Pa or mV) will be used. The						
	Transmission rate is controlled by parameter <						
	Exhaust fan - Current flow setpoint - State	0	2 byte float	DPT 9.009	CR-T-		
66	Shows the current flow setpoint of the exhaust			9 m3/h.			
	One of these (m3/h, Pa or mV) will be used. The Transmission rate is controlled by parameter <			ext fan setpoint transmission	>_		
	Exhaust fan - Current pressure setpoint -	0	2 byte float	DPT 9.006	CR-T-		
67	State		,				
01	Shows the current pressure setpoint of the exh			1999 Pa.			
	One of these (m3/h, Pa or mV) will be used. The	ne othe	s will be 0.				



	Mana	1/0	0:	T (DDT)	Flores				
N.	Name	I/O	Size	Type (DPT)	Flags CRWTU				
IN.		Function							
	Transmission rate is controlled by parameter < Minimum time until next fan setpoint transmission >.								
	Exhaust fan - Current voltage setpoint -	0	2 byte float	DPT 9.020	CR-T-				
	State	Ŭ	2 byte float	B1 1 3.020	OIV I				
68	Shows the current voltage setpoint of the exha	aust fans	s. Range 0 10	0000 mV.					
	One of these (m3/h, Pa or mV) will be used. T								
	Transmission rate is controlled by parameter <	<minimu< td=""><td>m time until ne</td><td>xt fan setpoint transmission</td><td>>.</td></minimu<>	m time until ne	xt fan setpoint transmission	>.				
	Temperature - T1 - State	0	2 byte float	DPT 9.001	CR-T-				
69	Shows the T1 temperature, in °C.								
	Transmission rate is controlled by parameter <	<minimu< td=""><td>m time until ne</td><td>xt current temperature trans</td><td>smission>.</td></minimu<>	m time until ne	xt current temperature trans	smission>.				
	Temperature - T2 - State	0	2 byte float	DPT 9.001	CR-T-				
70	Shows the T2 temperature, in °C.								
	Transmission rate is controlled by parameter	_							
	Temperature - T3 – State	0	2 byte float	DPT 9.001	CR-T-				
71	Shows the T3 temperature, in °C. Transmission rate is controlled by parameter < Minimum time until next current temperature transmission>.								
70	Temperature – T4 – State	0	2 byte float	DPT 9.001	CR-T-				
72	Shows the T4 temperature, in °C.	- 1 <i>1 in i</i> nn	4:4:1						
	Transmission rate is controlled by parameter								
73	Temperature - T5 – State	0	2 byte float	DPT 9.001	CR-T-				
13	Shows the T5 temperature, in °C. Transmission rate is controlled by parameter <	-Minimu	m time until ne	vt current temperature trans	emiccion>				
	Temperature – T7 – State	-wiii iii iu O	2 byte float	DPT 9.001	CR-T-				
74	Shows the T7 temperature, in °C.	U	2 byte float	DI 1 9.001	OIX-1-				
, -	Transmission rate is controlled by parameter <	<minimu< td=""><td>m time until ne</td><td>xt current temperature trans</td><td>smission>.</td></minimu<>	m time until ne	xt current temperature trans	smission>.				
	Temperature – T8 - State	0	2 byte float	DPT 9.001	CR-T-				
75	Shows the T8 temperature, in °C.	_	_ 2,10000	2 0.00	J				
	Transmission rate is controlled by parameter	<minimu< td=""><td>m time until ne</td><td>xt current temperature trans</td><td>smission>.</td></minimu<>	m time until ne	xt current temperature trans	smission>.				
	parameter.								

Table 3 SAT KNX Group objects – Flow, Pressure, Voltage, Temperature category for TAC5 DG, DM and DT

4.1.4 Heat/Cool exchanger Category for TAC5 DG, DM and DT

The SAT KNX group objects of the Heat/Cool exchanger category are listed and detailed in table 4:

N.	Name	I/O	Size	Type (DPT)	Flags (CRWTU)		
IN.	Function						
	Postheating - On/Off - Switch	ı	1 bit	DPT 1.001	C-W-U		
81	Switch the postheating on or off. Normally, postheating is enabled. Then it is controlled automatically.						
	Postheating can be switched off by setting this group object to 'Off'.						
82	Postheating - On/Off - State	0	1 bit	DPT 1.001	CR-T-		
02	Feedback of group object < Postheating - On/Off - St	vitch>					
83	Postheating - Temperature setpoint - Value	ı	2 byte float	DPT 9.001	C-W-U		
03	Sets the desired postheating temperature. In degree	s Cels	sius. Range 0	99,9°C.			
84	Postheating - Temperature setpoint - State	0	2 byte float	DPT 9.001	CR-T-		
04	Feedback of group object < Postheating - Temperatu	re set	point - Value>				
	Postcooling - On/Off - Switch	ı	1 bit	DPT 1.001	C-W-U		
85	Switch the postcooling on or off. Normally, postcooling is enabled. Then it is controlled automatically.						
	Postcooling can be switched off by setting this group object to 'Off'.						
86	Postcooling - On/Off - State	0	1 bit	DPT 1.001	CR-T-		
00	Feedback of group object < Postcooling - On/Off - Sv	vitch>					
87	Postcooling - Temperature setpoint - Value	- 1	2 byte float	DPT 9.001	C-W-U		
O1	Sets the desired postcooling temperature. In degrees Celsius. Range 0 99,9°C.						
88	Postcooling - Temperature setpoint - State	0	2 byte float	DPT 9.001	CR-T-		
00	Feedback of group object < Postcooling - Temperature setpoint - Value>						
89	Postheating/Postcooling - Antifreeze on/off - State	0	1 bit	DPT 1.001	CR-T-		
09	Shows if the antifreeze for the external postheating (BA+)	or postcooling	(BA-) units is activ	vated.		
	Postheating/Postcooling - Heating/Cooling - Switch	ı	1 bit	DPT 1.100	C-W-U		
				DPT_Heat/Cool			
90	Selects 'heating' or 'cooling'. 0 = cooling. 1 = heating						
	If 'cooling' is selected, cooling is enabled and heating						
	If 'heating' is selected, heating is enabled and cooling	g is di	sabled.				

N.	Name	I/O	Size	Type (DPT)	Flags (CRWTU)		
14.	Function						
	Postheating/Postcooling- Heating/Cooling - State	0	1 bit	DPT 1.100	CR-T-		
91				DPT_Heat/Cool			
	Shows if heating or cooling is selected. 0 = cooling.	1 = he	ating.				
92	Postheating/Postcooling - On/Off - State	0	1 bit	DPT 1.001	CR-T-		
92	Shows if heating or cooling is on.						
93	Postheating/Postcooling - Current setpoint - State	0	2 byte float	DPT 9.001	CR-T-		
93	Shows the current setpoint for heating/cooling setpoint temperature. Range 0 99.9 °C.						
94	Heat exchanger - Antifreeze on/off - State	0	1 bit	DPT 1.001	CR-T-		
94	Shows if the antifreeze for the internal heat exchanger or NV is activated.						
95	Freecooling - Temperature setpoint - Value	ı	2 byte float	DPT 9.001	C-W-U		
95	Sets the desired freecooling temperature. In degrees Celsius. Range 0 99,9°C.						
96	Freecooling - Temperature setpoint – State	0	2 byte float	DPT 9.001	CR-T-		
90	Feedback of group object <freecooling -="" setpoint="" temperature="" value=""></freecooling>						

Table 4 SAT KNX Group objects – Heat/Cool exchanger category for TAC5 DG, DM and DT

4.1.5 Alarms Category for TAC5 DG, DM and DT

The SAT KNX group objects of the Alarms category are listed and detailed in table 5:

Name	I/O	Size	Type (DPT)	Flags CRWTU				
	Fui	nction						
Alarm - Pressure - Trigger	I	1 bit	DPT 1.005	C-W-U				
Force a pressure alarm. Intended for extern	nal overpr	essure detecto	r. 0 = no alarm. 1 = alaı	m.				
Alarm - Fire - Trigger	ı	1 bit	DPT 1.005	C-W-U				
Set the fire alarm on. Intended for external fire alarm I. 0 = no alarm. 1 = alarm.								
Alarm - State	0	1 bit	DPT 1.005	CR-T-				
J , ,			<u> </u>					
	_			CR-T-				
			•	0D T				
	O	1 byte	DPI 5	CR-T-				
This is an enumeration. Each value repress 0 = No alarm 1 = Software alarm: The program code in finas a checksum error. Fatal. 2 = Fan alarm: a fan is defective. Fatal. 3 = Pressure alarm: overpressure. 4 = T° sensor alarm: a temperature sensor 5 = Setpoint alarm: can't reach the request 6 = Service warning alarm. 7 = Stop-for-service alarm. Fatal. 8 = Fire Alarm. Fatal. 9 = Antifrost alarm: in antifreeze mode. 10 = Condensate drain pan is full. 11 = Comfort temperature alarm (postheating the program of the pro	is defectived setpoiring, postcotal.	checksum errove. Ve. Fatal. nt.	or, or the configuration	data in eeprom				
Is always sent on start up.								
	Alarm - Pressure - Trigger Force a pressure alarm. Intended for external Alarm - Fire - Trigger Set the fire alarm on. Intended for external Alarm - State Shows that an alarm (non-fatal or fatal) is palarm number is in group object < Alarm - Nalarm - Fatal - State Shows that a fatal alarm is pending. Ventila Alarm number is in group object < Alarm - Nalarm - Number - State Value that shows the pending alarm. This is an enumeration. Each value repressure of a No alarm 1 = Software alarm: The program code in finasia a checksum error. Fatal. 2 = Fan alarm: a fan is defective. Fatal. 3 = Pressure alarm: overpressure. 4 = T° sensor alarm: a temperature sensor for service warning alarm. 7 = Stop-for-service alarm. Fatal. 8 = Fire Alarm. Fatal. 9 = Antifrost alarm: in antifreeze mode. 10 = Condensate drain pan is full. 11 = Comfort temperature alarm (postheating the program of the prog	Alarm - Pressure - Trigger Force a pressure alarm. Intended for external overproper Alarm - Fire - Trigger Set the fire alarm on. Intended for external fire alarm Alarm - State O Shows that an alarm (non-fatal or fatal) is pending. O Alarm number is in group object < Alarm - Number - State Alarm - Fatal - State O Shows that a fatal alarm is pending. Ventilation is stotal alarm number is in group object < Alarm - Number - State Alarm - Number - State O Value that shows the pending alarm. This is an enumeration. Each value represents a certon on a larm Software alarm: The program code in flash has a has a checksum error. Fatal. 2 = Fan alarm: a fan is defective. Fatal. 3 = Pressure alarm: overpressure. 4 = T° sensor alarm: a temperature sensor is defective. 5 = Setpoint alarm: can't reach the requested setpointed = Service warning alarm. 7 = Stop-for-service alarm. Fatal. 8 = Fire Alarm. Fatal. 9 = Antifrost alarm: in antifreeze mode. 10 = Condensate drain pan is full. 11 = Comfort temperature alarm (postheating, postor 2 = Heatwheel speed. Fatal. 13 = Modulating bypass position alarm. Fatal. 14 = SAT-BA module does not respond. Fatal.	Alarm - Pressure - Trigger I 1 bit Force a pressure alarm. Intended for external overpressure detecto Alarm - Fire - Trigger I 1 bit Set the fire alarm on. Intended for external fire alarm I. 0 = no alarm Alarm - State O 1 bit Shows that an alarm (non-fatal or fatal) is pending. 0 = no alarm, 1: Alarm number is in group object <alarm -="" number="" state=""> Is alway Alarm - Fatal - State O 1 bit Shows that a fatal alarm is pending. Ventilation is stopped. 0 = no a Alarm number is in group object <alarm -="" number="" state=""> Is alway Alarm - Number - State O 1 byte Value that shows the pending alarm. This is an enumeration. Each value represents a certain alarm. 0 = No alarm 1 = Software alarm: The program code in flash has a checksum error has a checksum error. Fatal. 2 = Fan alarm: a fan is defective. Fatal. 3 = Pressure alarm: overpressure. 4 = T° sensor alarm: a temperature sensor is defective. Fatal. 5 = Setpoint alarm: can't reach the requested setpoint. 6 = Service warning alarm. 7 = Stop-for-service alarm. Fatal. 8 = Fire Alarm. Fatal. 9 = Antifrost alarm: in antifreeze mode. 10 = Condensate drain pan is full. 11 = Comfort temperature alarm (postheating, postcooling) 12 = Heatwheel speed. Fatal. 13 = Modulating bypass position alarm. Fatal. 14 = SAT-BA module does not respond. Fatal.</alarm></alarm>	Function Alarm - Pressure - Trigger I 1 bit DPT 1.005 Force a pressure alarm. Intended for external overpressure detector. 0 = no alarm. 1 = alard Alarm - Fire - Trigger I 1 bit DPT 1.005 Set the fire alarm on. Intended for external fire alarm I. 0 = no alarm. 1 = alarm. Alarm - State O 1 bit DPT 1.005 Shows that an alarm (non-fatal or fatal) is pending. 0 = no alarm, 1 = alarm. Alarm number is in group object <alarm -="" number="" state=""> Is always sent on start up. Alarm - Fatal - State O 1 bit DPT 1.005 Shows that a fatal alarm is pending. Ventilation is stopped. 0 = no alarm, 1 = alarm. Alarm number is in group object <alarm -="" number="" state=""> Is always sent on start up. Alarm - Number - State O 1 byte DPT 5 Value that shows the pending alarm. This is an enumeration. Each value represents a certain alarm. 0 = No alarm 1 = Software alarm: The program code in flash has a checksum error, or the configuration of the same achecksum error. Fatal. 2 = Fan alarm: a fan is defective. Fatal. 3 = Pressure alarm: overpressure. 4 = T° sensor alarm: a temperature sensor is defective. Fatal. 5 = Setpoint alarm: can't reach the requested setpoint. 6 = Service warning alarm. 7 = Stop-for-service alarm. Fatal. 8 = Fire Alarm. Fatal. 9 = Antifrost alarm: in antifreeze mode. 10 = Condensate drain pan is full. 11 = Comfort temperature alarm (postheating, postcooling) 12 = Heatwheel speed. Fatal. 13 = Modulating bypass position alarm. Fatal. 14 = SAT-BA module does not respond. Fatal.</alarm></alarm>				

Table 5 SAT KNX Group objects – Alarms category for TAC5 DG, DM and DT



4.1.6 Analogue Input/Output Category for TAC5 DG, DM and DT

The SAT KNX group objects of the Analogue Input/Output category are listed and detailed in table 6:

N.	Name	I/O	Size	Type (DPT)	Flags CRWTU	
		Functi	on			
444	Analog input - K2 – State	0	1 byte	DPT 5.001 DPT Scaling	CR-T-	
111	Shows the actual level on analogue input K2. F Transmission rate is controlled by parameter <					
112	Analog input - K3 – State	0	1 byte	DPT 5.001 DPT_Scaling	CR-T-	
112	Shows the actual level on analogue input K3. F Transmission rate is controlled by parameter <					
440	Analog output - OUT1 - State	0	1 byte	DPT 5.001 DPT Scaling	CR-T-	
113	Shows the actual level on analogue output OU Transmission rate is controlled by parameter <					
444	Analog output - OUT4 - State	0	1 byte	DPT 5.001 DPT Scaling	CR-T-	
114	Shows the actual level on analogue output OUT4. In %. (DPT 5.001: Value 0255 means 0100%). Transmission rate is controlled by parameter < Minimum time until next output status transmission >.					
	Analog output - OUT7 - State	0	1 byte	DPT 5.001 DPT Scaling	CR-T-	
115	Shows the actual level on analogue output OUT7. In %. (DPT 5.001: Value 0255 means 0100%). Transmission rate is controlled by parameter < Minimum time until next output status transmission >.					
	Analog output - OUT8 - State	0	1 byte	DPT 5.001 DPT Scaling	CR-T-	
116	Shows the actual level on analogue output OU Transmission rate is controlled by parameter <			: Value 0255 means 0.		
	Analog output - KWin - State	0	1 byte	DPT 5.001 DPT_Scaling	CR-T-	
117	Shows the actual level on analogue output KW Transmission rate is controlled by parameter <			Value 0255 means 0		
110	Analog output - KWout - State	0	1 byte	DPT 5.001 DPT Scaling	CR-T-	
118	Shows the actual level on analogue output KWout. In %. (DPT 5.001: Value 0255 means 0100%). Transmission rate is controlled by parameter < Minimum time until next output status transmission >.					
110	Analog output - KWext - State	0	1 byte	DPT 5.001 DPT Scaling	CR-T-	
119	Shows the actual level on analogue output KWext. In %. (DPT 5.001: Value 0255 means 0100%). Transmission rate is controlled by parameter <i>Alinimum time until next output status transmission</i> .					
	Bypass% - Position - State	0	1 byte	DPT 5.001 DPT Scaling	CR-T-	
120	Shows the position of the proportional bypass (DPT 5.001: Value 0255 means 0100%).	valve. 0%	6 means clos		pen.	
	Transmission rate is controlled by parameter < Minimum time until next output status transmission>.					

Table 6 SAT KNX Group objects – Analogue Input/Output category for TAC5 DG, DM and DT

4.1.7 Constant Torque Category for TAC5 DG, DM and DT

The SAT KNX group objects of the Constant Torque category are listed and detailed in table 7:

N.	Name	I/O	Size	Type (DPT)	Flags CRWTU			
		Fun	ction					
131	Fan 1 - Current torque - State	Output	1 byte	DPT 5.001 DPT_Scaling	CR-T-			
131		Shows the torque on fan 1. Range 0100%. Transmission rate is controlled by parameter < Minimum time until next current airflow or air pressure transmission>.						
132	Fan 2 - Current torque - State	Output	1 byte	DPT 5.001 DPT_Scaling	CR-T-			
132	Shows the torque on fan 2. Range 0100%. Transmission rate is controlled by parameter < Minimum time until next current airflow or air pressure transmission>.							
133	Fan 3 - Current torque - State	Output	1 byte	DPT 5.001 DPT_Scaling	CR-T-			
133	Shows the torque on fan 3. Range 0100%. Transmission rate is controlled by parameter < Minimum time until next current airflow or air pressure transmission>.							
134	Fan 4 - Current torque - State	Output	1 byte	DPT 5.001 DPT_Scaling	CR-T-			
134	Shows the torque on fan 4. Range 0100%. Transmission rate is controlled by parameter < Minimum time until next current airflow or air pressure transmission>.							

Table 7 SAT KNX Group objects – Constant Torque category for TAC5 DG, DM and DT



4.2 Group objects categories for TAC5 SC, F

The categories are presented with the hypothesis that two fans are presents. If only one fan is present, only the objects referred to "fan 1" should be considered.

4.2.1 Drive Category for TAC5 SC, F

The SAT KNX group objects of the drive category are listed and detailed in table 8:

Pilot - Main switch — Switch I 1 bit DPT 1.001 C-W-U Turn fans on or off. If turned on and group objects Airflow — Fan 1 flow - Value"> or Airflow — Fan 2 flow - Value are set to a value > 0, then the fans are started in 'constant airflow' mode. If turned on and group objects Airflow — Fan 1 flow - Value and Airflow — Fan 2 flow - Value are set to 0, then the fans are started in the mode that its configured. The intention is to control the HVAC using one of the following group objects: use <pilot -="" <a="" href="Airflow" main="" or="" switch="">Airflow — Fan 2 flow - Value></pilot> are set to 0, then the fans are started in the mode that its configured. The intention is to control the HVAC using one of the following group objects: use <pilot -="" 1="" <a="" fan="" href="Airflow" on="" or="" orioff="" speed="" switch="">Airflow — Fan 1 flow - Value> or Airflow — Fan 1 flow - Value> or Airflow — Fan 1 flow - Value> or Airflow — Fan 1 flow - Value> or Airflow — Fan 1 flow - Value> or Airflow — Fan 1 flow - Value> or Airflow — Fan 1 flow - Value> (using a mix might get confusing) Pilot - Fan speed 1 on/off - Switch</pilot>	N.	Name	I/O	Size	Type (DPT)	Flags CRWTU			
Turn fans on or off. If turned on and group object Airflow = Fan 1 flow - Value> or Airflow = Fan 2 flow - Value> is set to a value > 0, then the fans are started in 'constant airflow' mode. If turned on and group objects Airflow = Fan 1 flow - Value> and Airflow = Fan 2 flow - Value> are set to 0, then the fans are started in the mode that is configured. The intention is to control the HVAC using one of the following group objects: use Pilot - Main switch - Switch> or Airflow - Fan 1 flow - Value> use Pilot - Main switch - Switch> or Airflow - Value> or Airflow - Fan 2 flow * Value> (using a mix might get confusing) Pilot - Set Fan 1 flow % - Value> and Airflow - Fan 2 flow * Value> (using a mix might get confusing) Pilot - Set seed 1 or off - Switch			F	unction					
If furned on and group object. Ashrow — Fan 1 flow - Value> or Ashrilow — Fan 2 flow - Value> is set to a value > 0, then the fans are started in vonstant airflow mode. If turned on and group objects - Airflow — Fan 1 flow - Value> and - Airflow — Fan 2 flow - Value> are set to 0, then the fans are started in the mode that is configured. The intention is to control the HVAC using one of the following group objects: use <pilot -="" main="" switch=""> or <pilot %="" -="" sped="" value=""> or <pilot %="" %<="" +="" -="" sped="" td="" value=""><td></td><td>Pilot - Main switch - Switch</td><td>I</td><td>1 bit</td><td>DPT 1.001</td><td>C-W-U</td></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot>		Pilot - Main switch - Switch	I	1 bit	DPT 1.001	C-W-U			
> 0, then the fans are started in 'constant airflow' mode. If turned on and group objects - <i>Airflow - Fan 1 flow - Value</i> > and - <i>Airflow - Fan 2 flow - Value</i> > are set to 0, then the fans are started in the mode that is configured. The intention is to control the HVAC using one of the following group objects: use <pli>use <pli>or <-Pilot - Sepeed 's - Value> or <-Pilot - Fan speed 's - Value> or <-Pilot - Fan speed 's - Value - Is always sent on start up. Pilot - Fan speed 1 or/off - Switch</pli></pli>									
If turned on and group objects <a -="" 0"="" <a="" and="" are="" href="Airflow" set="" to="" value"="">Airflow - Fan 2 flow - Value are set to 0, then the fans are started in the mode that is configured. The intention is to control the HVAC using one of the following group objects: use <pilot %="" -="" 1="" <pilot="" a="" confusing)="" fan="" flow="" get="" main="" might="" mix="" or="" pilot="" quising="" set="" speed="" state<="" switch="" td="" value=""><td></td><td></td><td></td><td></td><td>flow – Fan 2 flow - Value></td><td>is set to a value</td></pilot>					flow – Fan 2 flow - Value>	is set to a value			
then the fans are started in the mode that is configured. The intention is to control the HVAC using one of the following group objects: use <pilot -="" main="" switch=""> or <pilot -="" 1="" fan="" off="" on="" speed="" switch="">. Pilot - Fan speed 3 on/off - Switch> or <pilot %="" -="" speed="" value=""> or <pilot %="" -="" sepeed="" value=""> or <pilot -="" 1="" fan="" off="" on="" speed="" switch<="" td=""><td></td><td></td><td></td><td></td><td></td><td></td></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot>									
The intention is to control the HVAC using one of the following group objects: use <pirlot -="" main="" switch=""> or <pilot -="" 1="" fan="" off="" on="" speed="" switch="">. or <pilot %="" -="" speed="" value=""> or <pilot %="" -="" speed="" value=""> and <pilot %="" -="" 1="" fan="" flow="" set="" value=""> or <pilot %="" -="" 1="" fan="" flow="" set="" value=""> and <pilot %="" -="" 2="" fan="" flow="" set="" value=""> (using a mix might get confusing) Pilot - Main switch - State</pilot></pilot></pilot></pilot></pilot></pilot></pirlot>					Airflow – Fan 2 flow - Val	ue> are set to 0,			
The intention is to control the HVAC using one of the following group objects: use <pilot -="" main="" switch=""> or <pilot -="" 1="" fan="" off="" on="" speed="" switch="">. Pilot - Fan speed 3 on/off - Switch> or <pilot %="" -="" speed="" value=""> or <pilot %="" -="" sepeed="" value=""> or <pilot -="" 1="" fan="" off="" on="" speed="" switch<="" td=""><td>1</td><td>then the fans are started in the mode that</td><td>is configu</td><td>rea.</td><td></td><td></td></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot></pilot>	1	then the fans are started in the mode that	is configu	rea.					
us <pitot -="" main="" switch=""> or <pitot -="" 1="" fan="" off="" on="" speed="" switch=""> or <pitot -="" 1="" fan="" off="" on="" speed="" switch=""> or <pitot %="" -="" speed="" value=""> or <pitot -="" 1="" fan="" off="" on="" speed="" switch<="" td=""><td></td><td>The intention is to control the HVAC using</td><td>one of th</td><td>e following grou</td><td>ın ohiocte:</td><td></td></pitot></pitot></pitot></pitot></pitot></pitot></pitot></pitot></pitot></pitot></pitot></pitot>		The intention is to control the HVAC using	one of th	e following grou	ın ohiocte:				
or <pilot -="" 1="" fan="" off="" on="" speed="" switch="">.<pilot -="" 3="" fan="" off="" on="" speed="" switch=""> or <pilot %="" -="" speed="" value=""> and <pilot %="" -="" 1="" fan="" flow="" set="" value=""> or <pilot %="" -="" 1="" fan="" flow="" set="" value=""> and <pilot %="" -="" 2="" fan="" flow="" set="" value=""> (using a mix might get confusing) Pilot - Main switch - State</pilot></pilot></pilot></pilot></pilot></pilot>			One or un	e following grou	ip objects.				
or <pilot %="" -="" speed="" value=""> or <pilot %="" -="" 1="" fan="" flow="" set="" value=""> and <pilot %="" -="" 2="" fan="" flow="" set="" value=""> (using a mix might get confusing) Pilot - Main switch — State</pilot></pilot></pilot>			Pilot - Fan	speed 3 on/off	- Switch>				
(using a mix might get confusing) Pilot - Main switch - State									
Pilot - Main switch — State		or <pilot %="" -="" 1="" fan="" flow="" set="" value=""> and</pilot>	<pilot -="" se<="" td=""><td>et Fan 2 flow %</td><td>- Value></td><td></td></pilot>	et Fan 2 flow %	- Value>				
Shows if HVAC unit is currently On or Off. 'On' means fans running. Is always sent on start up. Pilot - Fan speed 1 on'off - Switch I 1 bit DPT 1.001 C-W-U Select fans speed 1. Writing value 1 activates speed 1 and resets the other <pilot %="" 'constant="" 'on'="" (low="" (medium="" *="" -="" 0="" 0%="" 0100%="" 1="" 1.001="" 100%="" 2="" 2.="" 3="" 33%="" 40="" 5.001="" 66%="" 69%:="" 9%:="" <airflow="" <pilot="" a="" activates="" airflow="" airflow'="" and="" are="" as="" bit="" buttons.="" byte="" c-w-u="" control="" cr-t-="" current="" d="" dpt="" dpt_scalling="" fan="" fan's="" fans="" fans.="" flow="" flow.="" for="" forces="" group="" high="" i="" if="" ii="" iii="" independent="" is="" low="" max="" medium="" mode="" normal="" object="" objects.="" of="" off="" off,="" on="" on'off="" or="" other="" overrides="" percentage="" percentage:="" pilot="" resets="" running="" scalling="" select="" set="" set:="" setpoints="" shows="" speed="" speed)="" speed,="" speed.="" state="" stops="" switch="" the="" this="" value="" value.="" via="" viewer="" with="" writing=""> or <airflow -="" 2="" fan="" flow="" value=""> is changed and both are set to a value > 0, then the 'constant airflow' mode is terminated and the fans are started. If group object <airflow -="" 1="" fan="" flow="" value=""> or <airflow -="" 2="" fan="" flow="" value=""> is changed and both are set to 0, then the 'constant airflow' mode is</airflow></airflow></airflow></pilot>									
Is always sent on start up. Pilot - Fan speed 1 on/off - Switch						CR-T-			
Pilot - Fan speed 1 on/off - Switch	2		'On' mea	ns fans running					
Select fans speed 1. Writing value 1 activates speed 1 and resets the other <pilot *="" -="" fan="" off="" on="" speed="" switch=""> group objects. Writing 0 stops fans. Pilot - Fan speed 2 on/off - Switch</pilot>				4.1.9	DDT 4 004	0.147.11			
Switch> group objects. Writing 0 stops fans. Pilot - Fan speed 2 on/off - Switch Pilot - Fan speed 2. Writing value 1 activates speed 2 and resets the other <pilot *="" -="" fan="" off="" on="" speed="" switch=""> group objects. Writing 0 stops fans. Pilot - Fan speed 3 on/off - Switch Pilot - Fan speed 3 on/off - Switch Pilot - Fan speed 3. Writing value 1 activates speed 3 and resets the other <pilot *="" -="" fan="" off="" on="" speed="" switch=""> group objects. Writing 0 stops fans. Pilot - Fan speed 1 on/off - State O 1 bit DPT 1.001 CR-T- Is 'On' if fans are running with speed 1 (LOW speed) Pilot - Fan speed 2 on/off - State O 1 bit DPT 1.001 CR-T- Is 'On' if fans are running with speed 2 (MEDIUM speed) Pilot - Fan speed 3 on/off - State O 1 bit DPT 1.001 CR-T- Is 'On' if fans are running with speed 2 (MEDIUM speed) Pilot - Speed % - Value I 1 byte DPT 5.001 C-W-U DPT_Scaling Select fans speed with a percentage value. 0 - 9%: Fans OFF 40 - 69%: MEDIUM speed 10 - 39%: LOW speed 70 - 100%: HIGH speed Pilot - Speed % - State O 1 byte DPT 5.001 CR-T- DPT_Scaling Shows the current fans speed as a percentage: 0% if fans are OFF, 33% for LOW speed, 66% for MEDIUM speed, 100% for HIGH speed. Pilot - Set Fan 1 flow % - Value I 1 byte DPT 5.001 C-W-U DPT_Scaling Set fan 1 flow as 0100% of the fan's max flow. If set: forces 'constant airflow' mode with independent airflow setpoints for fans 1 and 2. If group object https://winchestantairflow/mode is changed and either is set to a value > 0, then the 'constant airflow' mode is activated and the fans are started. If group object https://winchestantairflow/mode is changed and both are set to 0, then the 'constant airflow' mode is terminated and the fans are started. Pilot - Set Fan 1 flow - Value > 0.255 means 0100%). Pilot - Set Fan 1 flow - Value - 0.255 means 0100%). Pilot - Set Fan 1 flow - Value - 0.255 means 0100%).</pilot></pilot>	2		 						
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If group object < <i>Airflow – Fan 1 flow - Value</i> > or < <i>Airflow – Fan 2 flow - Value</i> > is changed and both are set to 0, then the 'constant airflow' mode is terminated and the fans are stopped. Normal control via the viewer is resumed. (DPT 5.001: Value 0255 means 0100%). Pilot - Set Fan 1 flow % - State O 1 byte DPT 5.001 CR-T- DPT_Scaling Feedback of group object < <i>Airflow – Fan 1 flow - Value</i> > Pilot - Set Fan 2 flow % - Value I 1 byte DPT 5.001 C-W-U									
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resumed. (DPT 5.001: Value 0255 means 0100%). Pilot - Set Fan 1 flow % - State O 1 byte DPT 5.001 CR-T- DPT_Scaling Feedback of group object < Airflow - Fan 1 flow - Value> Pilot - Set Fan 2 flow % - Value I 1 byte DPT 5.001 C-W-U									
Pilot - Set Fan 1 flow % - State O 1 byte DPT 5.001 CR-T- DPT_Scaling Feedback of group object < Airflow - Fan 1 flow - Value> Pilot - Set Fan 2 flow % - Value I 1 byte DPT 5.001 C-W-U					sopped. Normal control	via tile viewel is			
12 DPT_Scaling Feedback of group object < <i>Airflow – Fan 1 flow - Value></i> 13 Pilot - Set Fan 2 flow % - Value I 1 byte DPT 5.001 C-W-U					DPT 5 001	CR-T-			
Feedback of group object < <i>Airflow - Fan 1 flow - Value></i> Pilot - Set Fan 2 flow % - Value I 1 byte DPT 5.001 C-W-U	12			. 27.0		<u> </u>			
Pilot - Set Fan 2 flow % - Value I 1 byte DPT 5.001 C-W-U		Feedback of group object < Airflow - Fan	1 flow - Va	alue>					
DPT_Scaling	12					C-W-U			
	13				DPT_Scaling				

N.	Name	I/O	Size	Type (DPT)	Flags CRWTU			
		F	unction					
	Set fan 2 flow as 0100% of the fan's max flow. This overrides the normal control via the viewer OFF/I/II/III buttons. If set: forces 'constant airflow' mode with independent airflow setpoints for fans 1 and 2. If group object <airflow -="" 1="" fan="" flow="" value=""> or <airflow -="" 2="" fan="" flow="" value=""> is changed and either is set to a value > 0, then the 'constant airflow' mode is activated and the fans are started. If group object <airflow -="" 1="" fan="" flow="" value=""> or <airflow -="" 2="" fan="" flow="" value=""> is changed and both are set to 0, then the 'constant airflow' mode is terminated and the fans are stopped. Normal control via the viewer is resumed. (DPT 5.001: Value 0255 means 0100%).</airflow></airflow></airflow></airflow>							
14	Pilot - Set Fan 2 flow % - State	0	1 byte	DPT 5.001 DPT_Scaling	CR-T-			
	Feedback of group object < Airflow - Fan 2	? flow - Va	alue>					
	Pilot - Fans Running - State	0	1 bit	DPT 1.002	CR-T-			
15	Shows that all fans (that should be running Is always sent on start up.	g) are runi	ning. Is 1 (True)) if fans are running.				
16	Pilot - Working hours - State	0	2 byte unsigned	DPT 7.007	CR-T-			
10	Shows the number of working hours of the If the number of working hours internally is			be reported as 65535 hou	urs in KNX.			
17	Pilot - Reset working hours - Trigger	I	1 bit	DPT 1.015 DPT Reset	C-W-U			
	Reset Fans working hours to zero 0 = no a	action. 1 =	reset. Is turned	d off automatically.				
40	Pilot - Reset pending alarms - Trigger	I	1 bit	DPT 1.015 DPT Reset	C-W-U			
18	Perform a RESET to clear pending alarms 0 = no action. 1 = reset. Is turned off auton		me normal worl	king.				
	Pilot - Working mode - State	o Î	1 byte	DPT 5	CR-T-			
19	Value that shows the current working mod This is an enumeration. Each value repres 0 = Off (OFF) 1 = Constant airflow mode (CA) 2 = Linked system mode (LS) 3 = Constant air pressure mode (CPf)		4 = C(CPs) 5 = In 6 = C	onstant air pressure mode				

Table 8 SAT KNX Group objects – Drive category for TAC5 SC, F

4.2.2 Mode and functions Category for TAC5 SC, F

The SAT KNX group objects of the Mode and functions category are listed and detailed in table 9:

N	Name	I/O	Size	Type (DPT)	Flags				
N.					CRWTU				
	Function								
	CPs mode – Fan 1 setpoint - Value		2 byte float	DPT 9.020	C-W-U				
31	Set voltage setpoint for CPs mode for fan 1. Range 0 (voltage is internally stored with 0.1V resolution)	. 10000	mV.						
32	CPs mode – Fan 1 setpoint – State	0	2 byte float	DPT 9.020	CR-T-				
32	Feedback of group object < CPs mode - Fan 1 setpoint	t - Value	>						
	CPs mode – Fan 2 setpoint – Value [TAC5 F]	ı	2 byte float	DPT 9.020	C-W-U				
33	Set voltage setpoint for CPs mode for fan 2. Range 0	10000	mV.						
	(voltage is internally stored with 0.1V resolution)								
34	CPs mode – Fan 2 setpoint – State [TAC5 F]	0	2 byte float	DPT 9.020	CR-T-				
34	Feedback of group object < CPs mode - Fan 2 setpoint	t - Value	>						
	CPf mode – Fan 1 setpoint - Value		2 byte float	DPT 9.006	C-W-U				
35	Set the pressure setpoint for CPf mode for Fan 1. Range 0 1999 Pa.								
	(pressure is internally stored with 1Pa resolution)								
36	CPf mode – Fan 1 setpoint – State	0	2 byte float	DPT 9.006	CR-T-				
30	Feedback of group object < CPf mode - Fan 1 setpoint	- Value:	>						
	CPf mode – Fan 2 setpoint – Value [TAC5 F]		2 byte float	DPT 9.006	C-W-U				
37	Set the pressure setpoint for CPf mode for fan 2. Rang	e 0 19	99 Pa.						
	(pressure is internally stored with 1Pa resolution)								
38	CPf mode – Fan 2 setpoint – State [TAC5 F]	0	2 byte float	DPT 9.006	CR-T-				
30	Feedback of group object < CPf mode - Fan 2 setpoint	Feedback of group object < CPf mode – Fan 2 setpoint - Value>							



N.	Name	I/O	Size	Type (DPT)	Flags CRWTU			
Function								
	Operation mode - Automatic on/off - Switch		1 bit	DPT 1.001	C-W-U			
39	Turn 'automatic' mode on or off. In automatic mode, the can only be used if a timetable is configured.	HVAC	is controlled usir	ng a timetable. Aut	tomatic mode			
40	Operation mode - Automatic on/off - State	0	1 bit	DPT 1.001	CR-T-			
40	Shows if 'automatic' mode is on							
41	Operation mode - Boost on/off - Switch	I	1 bit	DPT 1.001	C-W-U			
41	Force boost mode on (high air flow).							
42	Operation mode - Boost on/off – State	0	1 bit	DPT 1.001	CR-T-			
72	Shows if boost mode is on							
	Air inlet function - Valve open/close - State	0	1 bit	DPT 1.009	CR-T-			
46	Shows the status of the air inlet valve (CT-in option). (0=open, 1=closed)							
40	While the valve is opening, the status is reported as 'open'.							
	While the valve is closing, the status is reported as 'clo	sed'.						
47	MK3 function - MK3 on/off – Switch [TAC5 SC]	ı	1 bit	DPT 1.001	C-W-U			
	Force activation of MK3 (mixing cabinet). When this gro	oup obje						
	MK3 function - Current Status – State [TAC5 SC]	0	1 bit	DPT 1.001	CR-T-			
48	Shows if the MK3 function is on.							
	During the switchover from off to on, the status is repor							
	During the switchover from on to off, the status is report	ted as '	Off'.					

Table 9 SAT KNX Group objects - Mode and Function category for TAC5 SC, F

4.2.3 Flow, Pressure, Voltage Category for TAC5 SC, F

The SAT KNX group objects of the Flow, Pressure, Voltage, Temperature category are listed and detailed in table 10:

N.	Name	I/O	Size	Type (DPT)	Flags CRWTU				
	Function								
5 4	Airflow - Ratio fan 2/fan 1 flow - Value	I	1 byte	DPT 5.004 DPT Percent U8	C-W-U				
51	Set the desired fan 2 flow / fan 1 flow ratio. In c Range 5255%. (DPT 5.004: Value 0255 mea	Set the desired fan 2 flow / fan 1 flow ratio. In configuration with 2 dependents fans.							
50	Airflow - Ratio fan 2/fan 1 flow - State	0	1 byte	DPT 5.004 DPT Percent U8	CR-T-				
52	Shows the configured fan 2 flow / fan 1 flow rat Range 5255%. If the ratio is configured > 255								
50	Airflow - Sleep mode - Value	I	1 byte	DPT 5.001 DPT Scaling	C-W-U				
53	Set the desired sleep mode airflow reduction per (this value is internally stored with 1% resolution)			100%.					
54	Airflow - Sleep mode - State	0	1 byte	DPT 5.001 DPT_Scaling	CR-T-				
	Shows the configured sleep mode airflow reduction percentage. Range 10100%.								
	Fan 1 - Current airflow - State	0	2 byte float	DPT 9.009	CR-T-				
55	Shows the current airflow of fan 1. Range 019 Minimum time until next current airflow or air p				ameter				
	Fan 1 - Current airpressure - State	0	2 byte float	DPT 9.006	CR-T-				
56	Shows the current airpressure on fan 1. Range Minimum time until next current airflow/airpressure			• •	parameter				
	Fan 2 - Current airflow – State	0	2 byte float	DPT 9.009	CR-T-				
59	Shows the current airflow of fan 2. Range 019 -Minimum time until next current airflow/airpres				ameter				
	Fan 2 - Current airpressure - State	0	2 byte float	DPT 9.006	CR-T-				
60	Shows the current airpressure on fan 2. Range Airlinmum time until next current airflow/airpressure				rameter				
	Fan 1 - Current flow setpoint - State	0	2 byte float	DPT 9.009	CR-T-				
63	Shows the current flow setpoint of fan 1. Range One of these (m3/h, Pa or mV) will be used. Th								

	Transmission rate is controlled by parameter <	Minimur	n time until ne	xt fan setpoint transmission	>.
	Fan 1 - Current pressure setpoint - State	0	2 byte float	DPT 9.006	CR-T-
64	Shows the current pressure setpoint of fan 1. F	Range 0	1999 Pa.		
04	One of these (m3/h, Pa or mV) will be used. The				
	Transmission rate is controlled by parameter <	Minimur	n time until ne	xt fan setpoint transmission	
	Fan 1 - Current voltage setpoint - State	0	2 byte float	DPT 9.020	CR-T-
65	Shows the current voltage setpoint of fan 1. Ra	_			
	One of these (m3/h, Pa or mV) will be used. The				
	Transmission rate is controlled by parameter <	_			
	Fan 2 - Current flow setpoint - State	0	2 byte float	DPT 9.009	CR-T-
66	Shows the current flow setpoint of fan 2. Rango One of these (m3/h, Pa or mV) will be used. The				
	Transmission rate is controlled by parameter <			vt fan setnoint transmission	_
	Fan 2 - Current pressure setpoint – State	O	2 byte float	DPT 9.006	CR-T-
	[TAC5 F]	O	2 byte float	DI 1 3.000	OR I
67	Shows the current pressure setpoint of fan 2. F	Range 0	1999 Pa.		
	One of these (m3/h, Pa or mV) will be used. The				
	Transmission rate is controlled by parameter <	Minimur	n time until nex	xt fan setpoint transmission	>.
	Fan 2 - Current voltage setpoint – State	0	2 byte float	DPT 9.020	CR-T-
	[TAC5 F]				
68	Shows the current voltage setpoint of fan 2. Ra				
	One of these (m3/h, Pa or mV) will be used. The				
	Transmission rate is controlled by parameter <	iviinimur	n time untii ne	xt tan setpoint transmission	>.
	Temperature - T2 – State [TAC5 SC]	0	2 byte float	DPT 9.001	CR-T-
70	Shows the T2 temperature, in °C.		2 byte float	DI 1 3.001	OIX-1-
70	Transmission rate is controlled by parameter <	Minimur	n time until ne:	xt current temperature trans	smission>
	Transmission rate is sent enea by parameter		ir tiirrio taritii rior	nt our one tomporator o trains	
	Temperature - T5 – State [TAC5 SC]	0	2 byte float	DPT 9.001	CR-T-
73	Shows the T5 temperature, in °C.		j		
	Transmission rate is controlled by parameter <	Minimur	n time until ne	xt current temperature trans	smission>.
	Temperature – T7 – State [TAC5 SC]	0	2 byte float	DPT 9.001	CR-T-
74	Shows the T7 temperature, in °C.				
	Transmission rate is controlled by parameter <				
	Temperature – T8 – State [TAC5 SC]	0	2 byte float	DPT 9.001	CR-T-
75	Shows the T8 temperature, in °C.	A Alia iraa r		and an imposed to see a section of the sec	
	Transmission rate is controlled by parameter <	iviinimur	ri time untii ne	xi current temperature trans	STIISSION>.

Table 10 SAT KNX Group objects – Flow, Pressure, Voltage category for TAC5 SC, F

4.2.4 Heat/Cool exchanger Category for TAC5 SC

The SAT KNX group objects of the Heat/Cool exchanger category are listed and detailed in table 11:

N.	Name	I/O	Size	Type (DPT)	Flags (CRWTU)		
14.	Function						
	Postheating - On/Off - Switch	- 1	1 bit	DPT 1.001	C-W-U		
81	Switch the postheating on or off. Normally, postheat Postheating can be switched off by setting this group			n it is controlled au	tomatically.		
82	Postheating - On/Off - State	0	1 bit	DPT 1.001	CR-T-		
02	Feedback of group object < Postheating - On/Off - Sv	vitch>					
83	Postheating - Temperature setpoint - Value		2 byte float	DPT 9.001	C-W-U		
83	Sets the desired postheating temperature. In degrees Celsius. Range 0 99,9°C.						
84	Postheating - Temperature setpoint - State	0	2 byte float	DPT 9.001	CR-T-		
04	Feedback of group object < Postheating - Temperature setpoint - Value>						
	Postcooling - On/Off - Switch	- 1	1 bit	DPT 1.001	C-W-U		
85	Switch the postcooling on or off. Normally, postcooling is enabled. Then it is controlled automatically. Postcooling can be switched off by setting this group object to 'Off'.						
86	Postcooling - On/Off - State	0	1 bit	DPT 1.001	CR-T-		
00	Feedback of group object < Postcooling - On/Off - Switch>						
87	Postcooling - Temperature setpoint - Value	- 1	2 byte float	DPT 9.001	C-W-U		
07	Sets the desired postcooling temperature. In degrees Celsius. Range 0 99,9°C.						



N.	Name	I/O	Size	Type (DPT)	Flags (CRWTU)			
IN.	Function							
88	Postcooling - Temperature setpoint - State	0	2 byte float	DPT 9.001	CR-T-			
00	Feedback of group object < Postcooling - Temperature	re set _i	point - Value>					
89	Postheating/Postcooling - Antifreeze on/off - State	0	1 bit	DPT 1.001	CR-T-			
09	Shows if the antifreeze for the external postheating (BA+)	or postcooling	(BA-) units is activ	/ated.			
	Postheating/Postcooling - Heating/Cooling - Switch	- 1	1 bit	DPT 1.100	C-W-U			
				DPT_Heat/Cool				
90	Selects 'heating' or 'cooling'. 0 = cooling. 1 = heating.							
	If 'cooling' is selected, cooling is enabled and heating is disabled.							
	If 'heating' is selected, heating is enabled and cooling is disabled.							
	Postheating/Postcooling- Heating/Cooling - State	0	1 bit	DPT 1.100	CR-T-			
91				DPT_Heat/Cool				
	Shows if heating or cooling is selected. 0 = cooling. 1 = heating.							
92	Postheating/Postcooling - On/Off - State	0	1 bit	DPT 1.001	CR-T-			
92	Shows if heating or cooling is on.							
93	Postheating/Postcooling - Current setpoint - State	0	2 byte float	DPT 9.001	CR-T-			
93	Shows the current setpoint for heating/cooling setpoint	Shows the current setpoint for heating/cooling setpoint temperature. Range 0 99.9 °C.						

Table 11 SAT KNX Group objects - Heat/Cool exchanger category for TAC5 SC

4.2.5 Alarms Category for TAC5 SC, F

The SAT KNX group objects of the Alarms category are listed and detailed in table 12:

Name Name	I/O	Size	Type (DPT)	Flags CRWTU
	Fu	nction		
Alarm - Pressure - Trigger	ı	1 bit	DPT 1.005	C-W-U
	nal overpr	essure detecto	r. 0 = no alarm. 1 = ala	
	l	1 bit	DPT 1.005	C-W-U
1	_			CR-T-
Alarm - Fatal - State	0	1 bit	DPT 1.005	CR-T-
Alarm number is in group object < Alarm - N				
Alarm - Number - State	0	1 byte	DPT 5	CR-T-
This is an enumeration. Each value represe 0 = No alarm 1 = Software alarm: The program code in file has a checksum error. Fatal. 2 = Fan alarm: a fan is defective. Fatal. 3 = Pressure alarm: overpressure. 4 = Not used. 5 = Setpoint alarm: can't reach the request 6 = Service warning alarm. 7 = Stop-for-service alarm. Fatal. 8 = Fire Alarm. Fatal. 9 = Not used. 10 = Not used. 11 = Comfort temperature alarm (postheating 12 = Not used. 13 = Not used. 14 = SAT-BA module does not respond. Fatal.	ash has a ed setpoir ng, postco	nt.		data in eeprom
Is always sent on start up.				
	Force a pressure alarm. Intended for external Alarm - Fire - Trigger Set the fire alarm on. Intended for external Alarm - State Shows that an alarm (non-fatal or fatal) is part Alarm number is in group object < Alarm - Nalarm - Fatal - State Shows that a fatal alarm is pending. Ventila Alarm number is in group object < Alarm - Nalarm - Number - State Value that shows the pending alarm. This is an enumeration. Each value repress of a checksum error. Fatal. 2 = Fan alarm: The program code in final fatal alarm: a fan is defective. Fatal. 3 = Pressure alarm: overpressure. 4 = Not used. 5 = Setpoint alarm: can't reach the request of a Service warning alarm. 7 = Stop-for-service alarm. Fatal. 8 = Fire Alarm. Fatal. 9 = Not used. 10 = Not used. 11 = Comfort temperature alarm (postheating a Not used.) 12 = Not used. 13 = Not used. 14 = SAT-BA module does not respond. Fatal. 15-255: reserved.	Alarm - Pressure - Trigger Force a pressure alarm. Intended for external overpressure alarm - Fire - Trigger Set the fire alarm on. Intended for external fire alarm Alarm - State Oshows that an alarm (non-fatal or fatal) is pending. Oshows that an alarm (non-fatal or fatal) is pending. Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm number is in group object < Alarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that an alarm is pending. Ventilation is stocklarm - Number - State Oshows that a fatal alarm is pending. Ventilation is stocklarm - Number - State Oshows that an alarm is pending. Ventilation is stocklarm - Number - State Oshows that an alarm is pending. Ventilation is stocklarm - Number - State Oshows that an alarm is pending. Ventilation is stocklarm - Number - State Oshows that an alarm is pending. Oshows that an alarm is pending. Oshows that an alarm is pending. Oshows that alarm is pending. Oshows that an alarm is pending. Oshows that an alarm is pending. Oshows that alarm is	Alarm - Pressure - Trigger I 1 bit Force a pressure alarm. Intended for external overpressure detector. Alarm - Fire - Trigger I 1 bit Set the fire alarm on. Intended for external fire alarm I. 0 = no alarm. Alarm - State O 1 bit Shows that an alarm (non-fatal or fatal) is pending. 0 = no alarm, 1. Alarm number is in group object <alarm -="" number="" state=""> Is alway. Alarm - Fatal - State O 1 bit Shows that a fatal alarm is pending. Ventilation is stopped. 0 = no a. Alarm number is in group object <alarm -="" number="" state=""> Is alway. Alarm - Number - State O 1 byte Value that shows the pending alarm. This is an enumeration. Each value represents a certain alarm. 0 = No alarm 1 = Software alarm: The program code in flash has a checksum error has a checksum error. Fatal. 2 = Fan alarm: a fan is defective. Fatal. 3 = Pressure alarm: overpressure. 4 = Not used. 5 = Setpoint alarm: can't reach the requested setpoint. 6 = Service warning alarm. 7 = Stop-for-service alarm. Fatal. 8 = Fire Alarm. Fatal. 9 = Not used. 11 = Comfort temperature alarm (postheating, postcooling) [TAC5 St. 12 = Not used. 11 = Comfort temperature alarm (postheating, postcooling) [TAC5 St. 13 = Not used. 14 = SAT-BA module does not respond. Fatal. [TAC5 SC]. 15-255: reserved.</alarm></alarm>	Alarm - Pressure - Trigger I 1 bit DPT 1.005 Force a pressure alarm. Intended for external overpressure detector. 0 = no alarm. 1 = alar Alarm - Fire - Trigger I 1 bit DPT 1.005 Set the fire alarm on. Intended for external fire alarm I. 0 = no alarm. 1 = alarm. Alarm - State O 1 bit DPT 1.005 Shows that an alarm (non-fatal or fatal) is pending. 0 = no alarm, 1 = alarm. Alarm number is in group object <alarm -="" number="" state=""> Is always sent on start up. Alarm number is in group object <alarm -="" number="" state=""> Is always sent on start up. Alarm number is in group object <alarm -="" number="" state=""> Is always sent on start up. Alarm number is in group object <alarm -="" number="" state=""> Is always sent on start up. Alarm - Number - State O 1 byte DPT 5 Value that shows the pending alarm. This is an enumeration. Each value represents a certain alarm. 0 = No alarm 1 = Software alarm: The program code in flash has a checksum error, or the configuration has a checksum error. Fatal. 2 = Fan alarm: a fan is defective. Fatal. 3 = Pressure alarm: overpressure. 4 = Not used. 5 = Setpoint alarm: can't reach the requested setpoint. 6 = Service warning alarm. 7 = Stop-for-service alarm. Fatal. 9 = Not used. 10 = Not used. 11 = Comfort temperature alarm (postheating, postcooling) [TAC5 SC] 12 = Not used. 13 = Not used. 14 = SAT-BA module does not respond. Fatal. [TAC5 SC]. 15-255: reserved.</alarm></alarm></alarm></alarm>

Table 12 SAT KNX Group objects – Alarms category for TAC5 SC, F

4.2.6 Analogue Input/Output Category for TAC5 SC, F

The SAT KNX group objects of the Analogue Input/Output category are listed and detailed in table 13:

N.	Name	I/O	Size	Type (DPT)	Flags CRWTU			
		Function						
111	Analog input - K2 – State	0	1 byte	DPT 5.001 DPT_Scaling	CR-T-			
111	Shows the actual level on analogue input K2. Ratransmission rate is controlled by parameter <							
112	Analog input - K3 – State	0	1 byte	DPT 5.001 DPT_Scaling	CR-T-			
112	Shows the actual level on analogue input K3. Ra Transmission rate is controlled by parameter < <i>N</i>							
445	Analog output - OUT7 – State [TAC5 SC]	0	1 byte	DPT 5.001 DPT Scaling	CR-T-			
115	Shows the actual level on analogue output OUT7. In %. (DPT 5.001: Value 0255 means 0100%). Transmission rate is controlled by parameter < Minimum time until next output status transmission>.							
440	Analog output - OUT8 – State [TAC5 SC]	0	1 byte	DPT 5.001 DPT Scaling	CR-T-			
116	Shows the actual level on analogue output OUT8. In %. (DPT 5.001: Value 0255 means 0100%). Transmission rate is controlled by parameter < Minimum time until next output status transmission>.							
4.40	Analog output - KWext – State [TAC5 SC]	0	1 byte	DPT 5.001 DPT_Scaling	CR-T-			
119	Shows the actual level on analogue output KWe Transmission rate is controlled by parameter <							

Table 13 SAT KNX Group objects - Analogue Input/Output category for TAC5 SC, F

4.2.7 Constant Torque Category for TAC5 SC, F

The SAT KNX group objects of the Constant Torque category are listed and detailed in table 14:

N.	Name	I/O	Size	Type (DPT)	Flags CRWTU		
IN.		F	unction				
131	Fan 1 - Current torque - State	Output	1 byte	DPT 5.001 DPT_Scaling	CR-T-		
131	Shows the torque on fan 1. Range 0100%. Transmission rate is controlled by parameter < Minimum time until next current airflow or air pressure transmission>.						
133	Fan 2 - Current torque - State	Output	1 byte	DPT 5.001 DPT_Scaling	CR-T-		
133	Shows the torque on fan 2. Range 0100%. Transmission rate is controlled by parameter < Minimum time until next current airflow or air pressure transmission>.						

Table 14 SAT KNX Group objects - Constant Torque category for TAC5 SC, F



4.3 Control and optimization parameters of the KNX bus

These parameters are not group objects and enable to control and to optimize the use of the KNX bus. They are listed in table 15:

N.	Name	Size /Type	Default value				
IN.	Function						
	Delay before sending group objects (0 - 255 sec)	Byte	2				
1	Delay before any group object is transmitted to the KNX bus after start up. Grochange value. Range 0 255 seconds.	oup objects are	sent only if they				
	Maximum number of messages sent per second (1 - 255)	Byte	10				
2	To control KNX bus load. Limit the number of group objects transmitted per se of messages sent per second is reached, further messages will be delayed un Range 1255.						
	Minimum time until next fan setpoint transmission (0 - 255 sec)	Byte	5				
3	To control KNX bus load. Sometimes fan setpoint values may change frequen minimum delay time before the same group object is sent again. Range 0258		eter defines a				
4	Minimum time until next current airflow/airpressure/torque transmission (0 - 255 sec)	Byte	5				
4	To control KNX bus load. The fan's current airflow and airpressure will change frequently. This parameter defines a minimum delay time before the same group object is sent again. Range 0255 seconds.						
	Minimum time until next input status transmission (0 - 255 sec)	Byte	5				
5	To control KNX bus load. Sometimes input values (mainly analogue inputs) m	ay change freq	uently. This				
	parameter defines a minimum delay time before the same group object is sent	t again. Range	0255 seconds.				
	Minimum time until next current temperature transmission (0 - 255 sec)	Byte	30				
6	To control KNX bus load. Sometimes temperature inputs may change frequently. This parameter defines a minimum delay time before the same group object is sent again. Range 0255 seconds.						
	Minimum time until next output state transmission (0 - 255 sec)	Byte	5				
7	To control KNX bus load. Sometimes output values 'mainly analogue outputs) parameter defines a minimum delay time before the same group object is sen						

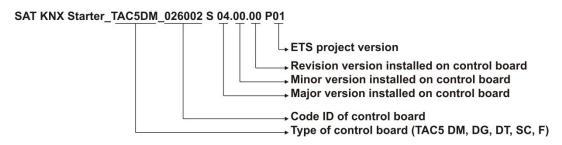
Table 15 Control and Optimization parameters of the KNX bus

5. INTEGRATION OF THE SAT KNX IN A ETS™ PROJECT (4 OR MAJOR)

The integration of the SAT KNX presumes and requires from the user the necessary knowledge of ETS™ software, version 4 or major provided by the KNX organization (see the site www.knx.org).

5.1 SAT KNX start up project

Download from Lemmens website (www.Lemmens.com) the last SAT KNX Starter project matching the control board of the unit and the software version installed on it. In fact, the SAT KNX project are differentiated by TAC control board (TAC5 DG, TAC5 DM, TAC5 DT, TAC5 SC and TAC5 F), by the software version installed on these boards and by the project version itself. The nomenclature of the projects on the site is as follows:



Unless stated otherwise, select the file with the highest project version and with the regulation software version identical to the one running on the board. If no matching regulation software version is available, take the one directly below in the order of the revision number, then minor version and finally major version.

Example:

The installed unit on site is HR MURAL 450 with TAC5 DM control board where software version 4.0.5 is running.

The KNX Starter projects on the website are:

```
- SAT KNX Starter_TAC5DG_026000 S 02.05.16 P01
- SAT KNX Starter_TAC5DG_026000 S 02.05.16 P02
- SAT KNX Starter_TAC5DG_026000 S 02.05.17 P01
- SAT KNX Starter_TAC5DM_026002 S 04.00.04 P01
- SAT KNX Starter_TAC5DM_026002 S 04.00.04 P02
- SAT KNX Starter_TAC5DM_026002 S 04.00.06 P01
- SAT KNX Starter_TAC5DT_026001 S 02.06.14 P01
- SAT KNX Starter_TAC5DT_026001 S 02.06.18 P01
```

SAT KNX Starter_TAC5DM_026002 S 04.00.04 P02 project must be chosen.

5.2 Include the SAT KNX device in a ETS™ project

Open the SAT KNX start up project with the ETS™ (version 4 or major) software and select the device « SAT KNX Lemmens » in the devices window. Add it then to the favourite. Open the KNX project wherein the SAT KNX must be included and select the "SAT KNX Lemmens" device in the Favourite windows. Copy the device and paste it in the topology window at the desired row.

From now on, use the "SAT KNX Lemmens" device as any other KNX device with ETS™.

5.3 SAT KNX Commissioning

Once the project defined, the SAT KNX device can be commissioned by the ETS™ programming. Just push the SAT KNX programming button and the programming will begin. While programming, the red led will light.

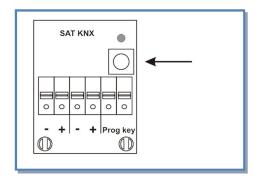


Figure 6 – Programming Button

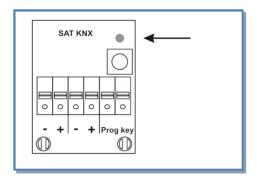


Figure 7 - Programming Led



6. KNX NETWORK SPECIFICATIONS

The KNX communication is based on the reference model OSI which define 7 layers characterized by their own functionalities. The transmitted data go from the highest layer to the lowest, each layers adding its specific information to build what is called the PDU (Protocol Data Unit). The received data go from the lowest layer to the highest, each layer using and withdrawing the data that are necessary for it and that have been added by the corresponding layer during the transmission.

The communication can be established in connected or unconnected mode.

- Connected mode: the message transmitting part first establishes a logical link for the connection with the addressed part. This link will be maintained during the entire communication.
- Unconnected mode: the transmitting part doesn't establish a connection and send its
 messages to all the devices on the network during the entire communication that will last until
 the addressed part acknowledges the messages that are destined for it.

The 7 layers are listed here below with their description and implementation in KNX:

6.1 Layer 7 – Application

That is the application support for sending and receiving useful data. In KNX, that means on one side the use of the group object in the participating modules in unconnected communication mode, on the other side the building and treatment of the configuration messages («management service») which are sent to the modules during the commissioning phase in connected communication mode.

6.1.1 Application layer PDU - A PDU

The different types of A_PDU in function of the 2 first bits of the T_PDU (transport layer PDU) are detailed in annex 3.

6.2 Layer 6 - Presentation

Not implemented in KNX

6.3 Layer 5 - Session

Not implemented in KNX

6.4 Layer 4 - Transport

6.4.1 In unconnected mode

Check the associations of the group objects in the bus devices with the group addresses:

6.4.1.1 During the transmission:

Ensure that the group address is sent with the value of the group object that has been modified.

6.4.1.2 During the reception:

Ensure that the values of all group objects whose group address is associated to the one received are updated.

6.4.2 In connected mode

To establish a communication in connected mode, the transmitter device will send a connection message using for destination address, the individual address of the receiving device.

During the connected mode established communication, the transport layer of each component will use the « ACK » and « NACK » messages of the transport layer to acknowledge or reject messages.

The rejected messages are repeated up to 3 times.

The communication is monitored by timers. If a telegram cannot be transmitted between a certain time interval or if neither a « ACK » nor a « NACK » have been received by the other part, the established communication is broken.

The connection is monitored by a sequence number that goes from 0 to 15 and if the sequence is not respected, the receiver will break the established communication.

6.4.3 Transport layer PDU - T_PDU

La T PDU contains:

- 2 bits to indicate the communication type at transport level (00=Unnumbered Data Packet-UDP, 01=Numbered Data Packet-NDP, 10=Unnumbered Control Data-UCD, 11=Numbered Control Data-NCD)
- 4 bits for the sequential number (only for «Numbered » communication type, otherwise meaningless and set to 0).
- The rest of the T PDU is the A PDU, Application PDU (see point 6.1.1).

6.5 Layer 3 - Network

Ensures the routing of the data through the network nodes which are interconnected by links. In a KNX network, the links are the segment while the nodes are the area and the line couplers.

Loops between 2 lines are not allowed.

The network layer will add to the transmitted telegram a routing counter whose value will be evaluated only by the network layer of the coupler and by the modules.

For a value of 7, the telegram will always be routed to the receiving coupler. This value is allowed only for ETS™.

For a value from 1 to 6, the telegram will be routed by the coupler when:

In connected mode: the individual address present in the telegram as destination address is the one of a component placed at the opposite side than the one of the line or the area of the receiving coupler. During routing, the coupler will decrement the value of the routing counter.

In unconnected mode: the group address used in the telegram as destination address is inside its filter table.

With a 0 value, the telegram will not be routed by the area or line coupler.

6.5.1 Network layer PDU - N_PDU

The N_PDU is composed by the data of the network and the higher layers. The specific data for the network layer are represented by:

- Tb (1 bit): it is a bit that indicates that the address of the receiver of the layer 2 data link PDU must be interpreted as an individual address or as a group address (see point 6.6.1.3).
- Rb (3 bits): routing counter.
- Lb (4 bits): useful length of the telegram
- T PDU: Transport PDU (see point 6.4.3).

6.6 Layer 2 - Data link

Ensures the transmission of a telegram between 2 network nodes. The errors control informations will be inserted at this level.



This layer ensures also the collisions control due to simultaneous transmission and uses here the CSMA/CA system (Carrier Sense Multiple Access with Collision Avoidance). The maximum delay for collision detection is $10 \mu s$.

6.6.1 Data link PDU - L PDU

KNX telegram structure of the link layer (L_PDU):

Control field (8	Source address	Receiver address (16		N_PDU	J	Check field
bits)	(16 bits)	bits)	8 bits		T_PDU	(8 bits)
				6 bits	A_PDU	

6.6.1.1 Control Field of the L PDU

Structure (D7 to D0 represent 1 bit and D0 is the first sent):

D7	D6	D5	D4	D3	D2	D1	D0
1	0	/R	1	Р	Р	0	0

The values 0 or 1 must be kept otherwise the telegram is rejected.

D0 and D1 serve as preamble to the telegram and avoid interpreting the tension spikes as start bit.

The 2 bits P set the priority (00= Priority 1-system functions; 10=Priority 2-alarms functions; 01=Priority 3-normal mode, high priority; 11=Priority 4-normal mode, low priority). This priority is referred to the ones defined at level 7 for group objects and is passed through the layers down to layer 2.

The bit /R indicates that a telegram is repeated when its value is 0.

The priority bits have this value because a telegram with the first bit to 0 has the priority in case of collision (see layer 1).

6.6.1.2 Source address of the L PDU

It is the individual address of the transmitter device. Structure (D15 to D0 represent 1 bit and D0 is the first sent):

D15 D14 D	D13 D	012	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Area 0=backbone 1 to 15=area	•			in line 5=line			0=cou	i4=dev	ice	o other	r line se	agmen	ł	

6.6.1.3 Receiver address of the L_PDU

It can be either the group address (in unconnected mode) or the individual address (in connected mode) of the receiver device. The indication will be done on the first bit of the N PDU field (see below).

If this bit is 0, then the receiver address is its individual address and the structure is the same as the individual source address.

If this bit is 1, then the receiver address is its group address (with 2 or 3 levels hierarchy) and the structure is the following (D15 to D0 represent 1 bit and D0 is the first sent):

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
	Main group			Sub g	group					•					
	Main group			Middl	e grou	р	Sub g	group							

6.6.1.4 N PDU field of the L PDU

See point 6.5.1.

6.6.1.5 Check field of the L PDU

The technic for the errors detection is the «Cross check » that is the combination between the vertical parity check (parity bit per character) and the horizontal parity check (a control character whose each bit value is the parity of the character obtained by taking the corresponding bits on each transmitted character).

6.6.2 Telegrams acknowledge

The telegrams acknowledge is also supported by the link layer. The bus device or the area/line coupler sends an acknowledge between a specified time (« IACK », « INACK »). The « BUSY » acknowledge type controls the data flow. If the layer 2 of the emitter receives an INACK or BUSY message or an incorrect message or no IACK message, then it sends again the telegram. The repeated telegrams are marked with the bit 5 of the control field.

6.7 Layer 1 - Physical

This layer is concerned by the physical nature of the signal and converts the received bits of layer 2 in electrical signal in this case. The specifications and protocols of the media are supported by this layer.

The KNX network uses a serial bus and a time multiplexing: TDM (Time Division Multiplexing). The data transmission type is the base band one where the binary information is transmitted as bipolar rectangular pulses for '0' bits, no pulse for '1' bits and this allows the collision detection during simultaneous transmission since a device will read a '0' on the bus while it is transmitting a '1'. The binary signals shape is illustrated in figure 8.



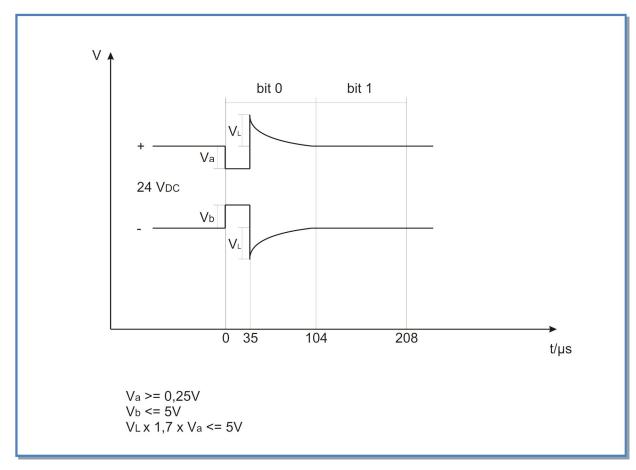


Figure 8 - KNX binary signals shape

The bus device transmits a half wave (Va-Vb) and the other half wave is produced in great part with the supply coil and that explains the maximum distance of 350 m between device and supply

The transmission speed on the KNX bus is so of $1/104 \, \mu s = 9600 \, bit/s$.

For a KNX TP network (Twisted pair) used by this application, the physical layer is characterized as follows:

- . The network has one or several electrical segment with each one or two supplies but without line coupler.
- . Random topology
- . Total capacitance of a segment (measured at 10 KHz):

Without bus device, line coupler, line repeater: 100 nF max

With bus device, line coupler, line repeater: 120 nF max

- . Bus line resistance between supply and device, line coupler or repeater: 25 Ω max.
- . Bus line resistance between two devices, line coupler or repeater: 50 Ω max.
- . Minimum resistance between two supplies: 15 $\ensuremath{\Omega}.$
- . Bus line minimum length between two supplies: 200 m.
- . Tension drop on bus line between supply and device or line coupler: 5 V.
- . Maximum length of a bus line segment: 1000 m
- . Maximum length between 2 devices: 700 m (due to maximum delay for the collision detection of $10 \mu s$)
- . Line maximum length between supply and device: 350 m
- . No terminal resistor needed.
- . The bus devices are fed with a supply of 24 V DC by the bus.
- . Maximum number of devices on a segment: 64.

Figure 9 shows the dimension limitations of the KNX network:

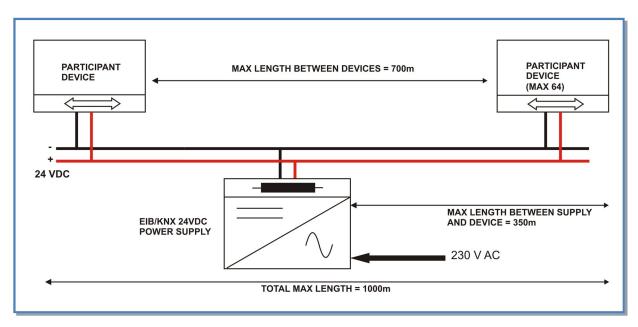


Figure 9 – maximum dimensions in KNX network

For more information, see the documentation provided by the KNX association on the web site $\ensuremath{\mathsf{WWW.KNX.ORG}}$

7. CABLE SPECIFICATIONS

They result from the physical layer characteristics of the physical layer seen above. Use KNX green cable or a cable that match these criteria:

- Twisted pair, 2 pairs. Use one pair to connect and +.
- Load resistance per line: max 37 Ω /km (loop 74 Ω /km)
- Load capacitance per line: max 100 nF/km (800 Hz)
- Shielded
- Twist numbers: min. 5/m
- Section 0.5 mm²
- Place this cable far from power cable of the installation
- If the unit is installed outside, take care to use an adapted cable (weather and UV protected, ...).



8. ANNEXES

8.1 Annex 1: Datapoints types

Symbol	Field
Α	Character
A[n]	Character string
В	Boolean / Bit set
С	Control
Е	Exponent
F	Float value
N	eNumerator
r	Reserved bit or field
U	Unsigned value
V	2 nd complement signed value
Z8	Standardized status/B8 command. Encoded as DPT_StatusGen

8.2 Annex 2: most used datapoints

DDT ID	Former	DDT Name
1.001	Format B1	DPT_Name DPT Switch
1.002	B1	DPT_Bool
1.003	B1	DPT Enable
1.004	B1	DPT_Ramp
1.005	B1	DPT_Alarm
1.006	B1	DPT_BinaryValue
1.007	B1	DPT_Step
1.008	B1	DPT UpDown
1.009	B1	DPT_OpenClose
1.010	B1	DPT_Start
1.011	B1	DPT_State
1.012	B1	DPT Invert
1.013	B1	DPT DimSendStyle
1.014	B1	DPT_InputSource
1.015	B1	DPT_Reset
1.016	B1	DPT_Ack
1.017	B1	DPT_Trigger
1.018	B1	DPT_Occupancy
1.019	B1	DPT_Window_Door
1.021	B1	DPT_LogicalFunction
1.022	B1	DPT_Scene_AB
1.023	B1	DPT_ShutterBlinds_Mode
1.100	B1	DPT_Heat/Cool
2.001	B2	DPT_Switch_Control
2.002	B2	DPT_Bool_Control
2.003	B2	DPT_Enable_Control
2.004	B2	DPT_Ramp_Control
2.005	B2	DPT_Alarm_Control
2.006	B2	DPT_BinaryValue_Control
2.007	B2	DPT_Step_Control
2.008	B2	DPT_Direction1_Control
2.009	B2	DPT_Direction2_Control
2.010	B2	DPT_Start_Control
2.011	B2	DPT_State_Control
2.012	B2	DPT_Invert_Control
3.007	B1U3	DPT_Control_Dimming
3.008	B1U3	DPT_Control_Blinds
4.001	A8	DPT_Char_ASCII
4.002	A8	DPT_Char_8859_1
5.001	U8	DPT_Scaling
5.003	U8	DPT_Angle
5.004	U8	DPT_Percent_U8
5.005	U8	DPT_DecimalFactor
5.006	U8	DPT_Tariff



DPT ID	Format	DPT_Name
5.010	U8	DPT_Value_1_Ucount
6.001	V8	DPT_Percent_V8
6.010	V8	DPT_Value_1_Count
6.020	B5N3	DPT_Status_Mode3
7.001	U16	DPT_Value_2_Ucount
7.002	U16	DPT_TimePeriodMsec
7.003	U16	DPT_TimePeriod10MSec
7.004	U16	DPT_TimePeriod100MSec
7.005	U16	DPT_TimePeriodSec
7.006	U16	DPT_TimePeriodMin
7.007	U16	DPT_TimePeriodHrs
7.010	U16	DPT_PropDataType
7.011	U16	DPT_Length_mm
7.012	U16	DPT_UEICurrentmA
7.013	U16	DPT_Brightness
8.001	V16	DPT_Value_2_Count
8.002	V16	DPT_DeltaTimeMsec
8.003	V16	DPT_DeltaTime10MSec
8.004	V16	DPT_DeltaTime100MSec
8.005	V16	DPT_DeltaTimeSec
8.006	V16	DPT_DeltaTimeMin
8.007	V16	DPT_DeltaTimeHrs
8.010	V16	DPT_Percent_V16
8.011	V16	DPT_Rotation_Angle
9.001	F16	DPT_Value_Temp
9.002	F16	DPT_Value_Tempd
9.003	F16	DPT_Value_Tempa
9.004	F16	DPT_Value_Lux
9.005	F16	DPT_Value_Wsp
9.006	F16	DPT_Value_Pres
9.007	F16	DPT_Value_Humidity
9.008	F16	DPT_Value_AirQuality
9.010	F16	DPT_Value_Time1
9.011	F16	DPT_Value_Time2
9.020	F16	DPT_Value_Volt
9.021	F16	DPT_Value_Curr
9.022	F16	DPT_PowerDensity
9.023	F16	DPT_KelvinPerPercent
9.024	F16	DPT_Power
9.025	F16	DPT_Value_Volume_Flow
9.026	F16	DPT_Rain_Amount
9.027	F16	DPT_Value_Temp_F
9.028	F16	DPT_Value_Wsp_kmh
10.001	N3N5r2N6r2N6	DPT_TimeOfDay
11.001	r3N5r4N4r1U7	DPT_Date

12.001	DPT ID	Format	DPT Name
13.010	_		
13.011	13.001	V32	DPT_Value_4_Count
13.012	13.010	V32	DPT_ActiveEnergy
13.013	13.011	V32	DPT_ApparantEnergy
13.014	13.012	V32	DPT_ReactiveEnergy
13.015	13.013	V32	DPT_ActiveEnergy_kWh
13.100	13.014	V32	DPT_ApparantEnergy_kVAh
14.000	13.015	V32	DPT_ReactiveEnergy_kVARh
14.001	13.100	V32	DPT_LongDeltaTimeSec
14.002 F32 DPT_Value_Activation_Energy 14.003 F32 DPT_Value_Activity 14.004 F32 DPT_Value_Mol 14.005 F32 DPT_Value_Amplitude 14.006 F32 DPT_Value_AngleRad 14.007 F32 DPT_Value_AngleDeg 14.008 F32 DPT_Value_Anguar_Momentum 14.009 F32 DPT_Value_Anguar_Velocity 14.010 F32 DPT_Value_Area 14.011 F32 DPT_Value_Capacitance 14.012 F32 DPT_Value_Capacitance 14.013 F32 DPT_Value_Charge_DensitySurface 14.014 F32 DPT_Value_Charge_DensityVolume 14.014 F32 DPT_Value_Conductance 14.015 F32 DPT_Value_Conductance 14.016 F32 DPT_Value_Conductance 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value	14.000	F32	DPT_Value_Acceleration
14.003 F32 DPT_Value_Activity 14.004 F32 DPT_Value_Mol 14.005 F32 DPT_Value_Amplitude 14.006 F32 DPT_Value_AngleRad 14.007 F32 DPT_Value_AngleDeg 14.008 F32 DPT_Value_AngleIndemontum 14.009 F32 DPT_Value_Angular_Momentum 14.010 F32 DPT_Value_Angular_Velocity 14.011 F32 DPT_Value_Charge_DensitySurface 14.012 F32 DPT_Value_Charge_DensitySurface 14.013 F32 DPT_Value_Compressibility 14.014 F32 DPT_Value_Compressibility 14.015 F32 DPT_Value_Density 14.016 F32 DPT_Value_Density 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Charge 14.020 F32 DPT_Value_Electric_Current 14.021 F32 DPT_Value_Electric_DippleMoment 14.022 F32 DPT_Value_Electric_DippleMoment 14.023 F32 DPT_Value_Electric_DippleMoment 14.024 F32 DPT_Value_Electric_DippleMoment 14.025 F32 DPT_Value_Electric_Flux 14.026 F32 DPT_Value_Electric_PluxDensity 14.027 F32 DPT_Value_Electric_PluxDensity 14.028 F32 DPT_Value_Electric_Potential 14.029 F32 DPT_Value_Electric_Potential 14.029 F32 DPT_Value_Electric_Potential 14.029 F32 DPT_Value_Electric_Potential 14.030 F32 DPT_Value_Electric_Potential 14.031 F32 DPT_Value_Electric_Potential 14.032 F32 DPT_Value_Electric_Potential 14.033 F32 DPT_Value_Electric_Potential 14.034 F32 DPT_Value_Electric_Potential 14.037 F33 DPT_Value_Electric_Potential 14.039 F32 DPT_Value_Electric_Potential 14.030 F32 DPT_Value_Electric_Potential 14.031 F32 DPT_Value_Electric_Potential 14.032 F32 DPT_Value_Electric_Potential 14.033 F32 DPT_Value_Electric_Potential 14.034 F32 DPT_Value_Electric_Potential	14.001	F32	DPT_Value_Acceleration_Angular
14.004 F32 DPT_Value_Mol 14.005 F32 DPT_Value_Amplitude 14.006 F32 DPT_Value_AngleRad 14.007 F32 DPT_Value_AngleDeg 14.008 F32 DPT_Value_Angular_Momentum 14.009 F32 DPT_Value_Angular_Velocity 14.010 F32 DPT_Value_Angular_Velocity 14.011 F32 DPT_Value_Angular_Velocity 14.012 F32 DPT_Value_Angular_Velocity 14.013 F32 DPT_Value_Angular_Velocity 14.014 F32 DPT_Value_Capacitance 14.013 F32 DPT_Value_Charge_DensitySurface 14.014 F32 DPT_Value_Charge_DensityVolume 14.015 F32 DPT_Value_Compressibility 14.016 F32 DPT_Value_Compressibility 14.015 F32 DPT_Value_Electric_Cloarce 14.016 F32 DPT_Value_Electric_Conductivity 14.017 F32 DPT_Value_Electric_Charge 14.018 F32 DPT_Value_Electric_Current 1	14.002	F32	DPT_Value_Activation_Energy
14.005	14.003	F32	DPT_Value_Activity
14.006	14.004	F32	DPT_Value_Mol
14.007 F32 DPT_Value_AngleDeg 14.008 F32 DPT_Value_Angular_Momentum 14.009 F32 DPT_Value_Angular_Velocity 14.010 F32 DPT_Value_Area 14.011 F32 DPT_Value_Capacitance 14.012 F32 DPT_Value_Charge_DensitySurface 14.013 F32 DPT_Value_Charge_DensityVolume 14.014 F32 DPT_Value_Compressibility 14.015 F32 DPT_Value_Conductance 14.016 F32 DPT_Value_Electrical_Conductivity 14.016 F32 DPT_Value_Density 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_DipoleMoment 14.023 F32 DPT_Value_Electric_Filux 14.024 F32 DPT_Value_Electric_Polarization <t< td=""><td>14.005</td><td>F32</td><td>DPT_Value_Amplitude</td></t<>	14.005	F32	DPT_Value_Amplitude
14.008 F32 DPT_Value_Angular_Momentum 14.009 F32 DPT_Value_Angular_Velocity 14.010 F32 DPT_Value_Area 14.011 F32 DPT_Value_Capacitance 14.012 F32 DPT_Value_Charge_DensitySurface 14.013 F32 DPT_Value_Charge_DensityVolume 14.014 F32 DPT_Value_Conductance 14.015 F32 DPT_Value_Conductance 14.016 F32 DPT_Value_Electrical_Conductivity 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_Flux 14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_Potential 14.026 F32 DPT_Value_Electric_Potential <td>14.006</td> <td>F32</td> <td>DPT_Value_AngleRad</td>	14.006	F32	DPT_Value_AngleRad
14.009 F32 DPT_Value_Angular_Velocity 14.010 F32 DPT_Value_Area 14.011 F32 DPT_Value_Capacitance 14.012 F32 DPT_Value_Charge_DensitySurface 14.013 F32 DPT_Value_Charge_DensityVolume 14.014 F32 DPT_Value_Compressibility 14.015 F32 DPT_Value_Conductance 14.016 F32 DPT_Value_Electrical_Conductivity 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Density 14.019 F32 DPT_Value_Electric_Conductivity 14.019 F32 DPT_Value_Electric_Conductivity 14.020 F32 DPT_Value_Electric_Conductivity 14.021 F32 DPT_Value_Electric_Conductivity 14.022 F32 DPT_Value_Electric_Conductance 14.023 F32 DPT_Value_Electric_Displacement 14.024 F32 DPT_Value_Electric_Displacement 14.025 F32 DPT_Value_Electric_Flux 14.026 F32 DPT_Value_Electric_FluxDensi	14.007	F32	DPT_Value_AngleDeg
14.010 F32 DPT_Value_Area 14.011 F32 DPT_Value_Capacitance 14.012 F32 DPT_Value_Charge_DensitySurface 14.013 F32 DPT_Value_Charge_DensityVolume 14.014 F32 DPT_Value_Conductance 14.015 F32 DPT_Value_Electrica_Conductivity 14.016 F32 DPT_Value_Density 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Density 14.019 F32 DPT_Value_Density 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_CurrentDensity 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_Displacement 14.024 F32 DPT_Value_Electric_FluxDensity 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Potential 14.027 F32 DPT_Value_Electric_PotentialDifference	14.008	F32	DPT_Value_Angular_Momentum
14.011 F32 DPT_Value_Capacitance 14.012 F32 DPT_Value_Charge_DensitySurface 14.013 F32 DPT_Value_Charge_DensityVolume 14.014 F32 DPT_Value_Compressibility 14.015 F32 DPT_Value_Conductance 14.016 F32 DPT_Value_Electric_Conductivity 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Density 14.019 F32 DPT_Value_Density 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_FledStrength 14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Potential 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_PotentialDif	14.009	F32	DPT_Value_Angular_Velocity
14.012 F32 DPT_Value_Charge_DensitySurface 14.013 F32 DPT_Value_Charge_DensityVolume 14.014 F32 DPT_Value_Compressibility 14.015 F32 DPT_Value_Conductance 14.016 F32 DPT_Value_Electrical_Conductivity 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_DipoleMoment 14.023 F32 DPT_Value_Electric_FluxSensity 14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_Potential 14.026 F32 DPT_Value_Electric_Potential 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DP	14.010	F32	DPT_Value_Area
14.013 F32 DPT_Value_Charge_DensityVolume 14.014 F32 DPT_Value_Compressibility 14.015 F32 DPT_Value_Conductance 14.016 F32 DPT_Value_Electrical_Conductivity 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_DipoleMoment 14.023 F32 DPT_Value_Electric_FieldStrength 14.024 F32 DPT_Value_Electric_FieldStrength 14.025 F32 DPT_Value_Electric_Flux 14.026 F32 DPT_Value_Electric_Potential 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_ElectromagneticMoment 14.031 F32	14.011	F32	DPT_Value_Capacitance
14.014 F32 DPT_Value_Compressibility 14.015 F32 DPT_Value_Conductance 14.016 F32 DPT_Value_Electrical_Conductivity 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_DipoleMoment 14.023 F32 DPT_Value_Electric_Displacement 14.024 F32 DPT_Value_Electric_Displacement 14.024 F32 DPT_Value_Electric_FieldStrength 14.025 F32 DPT_Value_Electric_FieldStrength 14.026 F32 DPT_Value_Electric_FluxDensity 14.027 F32 DPT_Value_Electric_Polarization 14.028 F32 DPT_Value_Electric_Potential 14.029 F32 DPT_Value_Electric_PotentialDifference 14.030 F32 DPT_Value_Electromostive_Force 14.031 <t< td=""><td>14.012</td><td>F32</td><td>DPT_Value_Charge_DensitySurface</td></t<>	14.012	F32	DPT_Value_Charge_DensitySurface
14.015 F32 DPT_Value_Conductance 14.016 F32 DPT_Value_Electrical_Conductivity 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_FieldStrength 14.024 F32 DPT_Value_Electric_FieldStrength 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_FluxDensity 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_Potential 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Energy 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Frequency 14.033 F32 DPT_Value_Angular_Frequ	14.013	F32	DPT_Value_Charge_DensityVolume
14.016 F32 DPT_Value_Electrical_Conductivity 14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_FieldStrength 14.024 F32 DPT_Value_Electric_FieldStrength 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Potantiaton 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_PotentialDifference 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Frequency 14.033 F32 DPT_Value_Angular_Frequency	14.014	F32	DPT_Value_Compressibility
14.017 F32 DPT_Value_Density 14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_FieldStrength 14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Polarization 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_PotentialDifference 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Frequency 14.033 F32 DPT_Value_Angular_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.015	F32	DPT_Value_Conductance
14.018 F32 DPT_Value_Electric_Charge 14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_FieldStrength 14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Polarization 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_PotentialDifference 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Frequency 14.033 F32 DPT_Value_Angular_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.016	F32	DPT_Value_Electrical_Conductivity
14.019 F32 DPT_Value_Electric_Current 14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_FieldStrength 14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Polarization 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_Potential 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Frequency 14.033 F32 DPT_Value_Angular_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.017	F32	DPT_Value_Density
14.020 F32 DPT_Value_Electric_CurrentDensity 14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_FieldStrength 14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_Flux 14.026 F32 DPT_Value_Electric_Polarization 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_Potential 14.029 F32 DPT_Value_Electric_PotentialDifference 14.030 F32 DPT_Value_ElectromagneticMoment 14.031 F32 DPT_Value_Electromotive_Force 14.032 F32 DPT_Value_Energy 14.033 F32 DPT_Value_Force 14.034 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.018	F32	DPT_Value_Electric_Charge
14.021 F32 DPT_Value_Electric_DipoleMoment 14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_FieldStrength 14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Polarization 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_Potential 14.029 F32 DPT_Value_Electric_PotentialDifference 14.030 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Fnergy 14.033 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Frequency	14.019	F32	DPT_Value_Electric_Current
14.022 F32 DPT_Value_Electric_Displacement 14.023 F32 DPT_Value_Electric_FieldStrength 14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Polarization 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_PotentialDifference 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_ElectromagneticMoment 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Energy 14.033 F32 DPT_Value_Force 14.034 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Frequency	14.020	F32	DPT_Value_Electric_CurrentDensity
14.023F32DPT_Value_Electric_FieldStrength14.024F32DPT_Value_Electric_Flux14.025F32DPT_Value_Electric_FluxDensity14.026F32DPT_Value_Electric_Polarization14.027F32DPT_Value_Electric_Potential14.028F32DPT_Value_Electric_PotentialDifference14.029F32DPT_Value_ElectromagneticMoment14.030F32DPT_Value_Electromotive_Force14.031F32DPT_Value_Energy14.032F32DPT_Value_Force14.033F32DPT_Value_Frequency14.034F32DPT_Value_Angular_Frequency	14.021	F32	DPT_Value_Electric_DipoleMoment
14.024 F32 DPT_Value_Electric_Flux 14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Polarization 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_PotentialDifference 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Energy 14.033 F32 DPT_Value_Force 14.034 F32 DPT_Value_Frequency 14.034 P32 DPT_Value_Angular_Frequency	14.022	F32	DPT_Value_Electric_Displacement
14.025 F32 DPT_Value_Electric_FluxDensity 14.026 F32 DPT_Value_Electric_Polarization 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_PotentialDifference 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Energy 14.033 F32 DPT_Value_Force 14.034 F32 DPT_Value_Frequency	14.023	F32	DPT_Value_Electric_FieldStrength
14.026 F32 DPT_Value_Electric_Polarization 14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_PotentialDifference 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Force 14.033 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.024	F32	DPT_Value_Electric_Flux
14.027 F32 DPT_Value_Electric_Potential 14.028 F32 DPT_Value_Electric_PotentialDifference 14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Force 14.033 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.025	F32	DPT_Value_Electric_FluxDensity
14.028F32DPT_Value_Electric_PotentialDifference14.029F32DPT_Value_ElectromagneticMoment14.030F32DPT_Value_Electromotive_Force14.031F32DPT_Value_Energy14.032F32DPT_Value_Force14.033F32DPT_Value_Frequency14.034F32DPT_Value_Angular_Frequency	14.026	F32	DPT_Value_Electric_Polarization
14.029 F32 DPT_Value_ElectromagneticMoment 14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Force 14.033 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.027	F32	DPT_Value_Electric_Potential
14.030 F32 DPT_Value_Electromotive_Force 14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Force 14.033 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.028	F32	DPT_Value_Electric_PotentialDifference
14.031 F32 DPT_Value_Energy 14.032 F32 DPT_Value_Force 14.033 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.029	F32	DPT_Value_ElectromagneticMoment
14.032 F32 DPT_Value_Force 14.033 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.030	F32	DPT_Value_Electromotive_Force
14.033 F32 DPT_Value_Frequency 14.034 F32 DPT_Value_Angular_Frequency	14.031	F32	DPT_Value_Energy
14.034 F32 DPT_Value_Angular_Frequency	14.032	F32	DPT_Value_Force
	14.033	F32	DPT_Value_Frequency
14.035 F32 DPT_Value_Heat_Capacity	14.034	F32	DPT_Value_Angular_Frequency
	14.035	F32	DPT_Value_Heat_Capacity



14.036	DPT ID	Format	DPT Name
14.038 F32 DPT_Value_Impedance 14.039 F32 DPT_Value_Length 14.040 F32 DPT_Value_Light_Quantity 14.041 F32 DPT_Value_Luminous_Flux 14.042 F32 DPT_Value_Luminous_Intensity 14.043 F32 DPT_Value_Magnetic_FieldStrength 14.044 F32 DPT_Value_Magnetic_Flux 14.045 F32 DPT_Value_Magnetic_Flux 14.046 F32 DPT_Value_Magnetic_Flux 14.047 F32 DPT_Value_Magnetic_Moment 14.048 F32 DPT_Value_Magnetic_Folarization 14.049 F32 DPT_Value_Magnetic_Polarization 14.049 F32 DPT_Value_Magnetic_Polarization 14.050 F32 DPT_Value_Magnetic_Polarization 14.051 F32 DPT_Value_Magnetic_Polarization 14.052 F32 DPT_Value_Magnetic_Polarization 14.053 F32 DPT_Value_Magnetic_Polarization 14.054 F32 DPT_Value_Magnetic_Polarization 14.055 F32 DPT_Value_Polariza			
14.039	14.037	F32	DPT_Value_Heat_Quantity
14.040 F32 DPT_Value_Light_Quantity 14.041 F32 DPT_Value_Luminance 14.042 F32 DPT_Value_Luminous_Flux 14.043 F32 DPT_Value_Luminous_Intensity 14.044 F32 DPT_Value_Magnetic_Flux 14.045 F32 DPT_Value_Magnetic_FluxDensity 14.046 F32 DPT_Value_Magnetic_Moment 14.047 F32 DPT_Value_Magnetic_Moment 14.048 F32 DPT_Value_Magnetic_Moment 14.049 F32 DPT_Value_Magnetic_Moment 14.050 F32 DPT_Value_MagneticondiveForce 14.051 F32 DPT_Value_Magnetication 14.052 F32 DPT_Value_Magnetication 14.053 F32 DPT_Value_Magnetication 14.054 F32 DPT_Value_Magnetication 14.053 F32 DPT_Value_Magnetication 14.054 F32 DPT_Value_Magnetication 14.055 F32 DPT_Value_Magnetication 14.066 F32 DPT_Value_Phase_AngleRad 14.0	14.038	F32	DPT_Value_Impedance
14.041 F32 DPT_Value_Luminance 14.042 F32 DPT_Value_Luminous_Flux 14.043 F32 DPT_Value_Luminous_Intensity 14.044 F32 DPT_Value_Magnetic_FieldStrength 14.045 F32 DPT_Value_Magnetic_Flux 14.046 F32 DPT_Value_Magnetic_FluxDensity 14.047 F32 DPT_Value_Magnetic_FluxDensity 14.048 F32 DPT_Value_Magnetic_FluxDensity 14.049 F32 DPT_Value_Magnetic_FluxDensity 14.049 F32 DPT_Value_Magnetic_FluxDensity 14.050 F32 DPT_Value_Magnetic_FluxDensity 14.051 F32 DPT_Value_Magnetic_FluxDensity 14.052 F32 DPT_Value_Magnetic_FluxDensity 14.053 F32 DPT_Value_Magnetic_FluxDensity 14.054 F32 DPT_Value_Magnetic_FluxDensity 14.055 F32 DPT_Value_PasseLux 14.066 F32 DPT_Value_Passe_AngleRad 14.067 F32 DPT_Value_Passe_AngleRad 14.068 F32 DPT_Value_P	14.039	F32	DPT_Value_Length
14.042	14.040	F32	DPT_Value_Light_Quantity
14.043 F32 DPT_Value_Luminous_Intensity 14.044 F32 DPT_Value_Magnetic_FieldStrength 14.045 F32 DPT_Value_Magnetic_Flux 14.046 F32 DPT_Value_Magnetic_Flux 14.047 F32 DPT_Value_Magnetic_FluxDensity 14.048 F32 DPT_Value_Magnetic_Moment 14.049 F32 DPT_Value_Magnetic_Polarization 14.050 F32 DPT_Value_Magneticom 14.051 F32 DPT_Value_Magneticom 14.052 F32 DPT_Value_Magneticom 14.053 F32 DPT_Value_Magneticom 14.054 F32 DPT_Value_Magneticom 14.055 F32 DPT_Value_Magneticom 14.056 F32 DPT_Value_Magneticom 14.057 F32 DPT_Value_Momentum 14.058 F32 DPT_Value_Phase_AngleRad 14.059 F32 DPT_Value_Power 14.059 F32 DPT_Value_Power 14.060 F32 DPT_Value_Power 14.061 F32 DPT_Value_Reactance 14.061 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Selfinductance 14.063 F32 DPT_Value_Selfinductance 14.064 F32 DPT_Value_SolidAngle 14.065 F32 DPT_Value_SolidAngle 14.066 F32 DPT_Value_SolidAngle 14.066 F32 DPT_Value_Sufface_Tension 14.067 F32 DPT_Value_Sufface_Tension 14.068 F32 DPT_Value_Sufface_Tension 14.069 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Common_Temperature 14.070 F32 DPT_Value_Temperature Difference 14.071 F32 DPT_Value_Temperature Difference 14.072 F32 DPT_Value_Temperature Difference 14.073 P32 DPT_Value_Temperature Difference	14.041	F32	DPT_Value_Luminance
14.044 F32 DPT_Value_Magnetic_FieldStrength 14.045 F32 DPT_Value_Magnetic_Flux 14.046 F32 DPT_Value_Magnetic_FluxDensity 14.047 F32 DPT_Value_Magnetic_Moment 14.048 F32 DPT_Value_Magnetic_Polarization 14.049 F32 DPT_Value_Magnetization 14.050 F32 DPT_Value_MagnetomotiveForce 14.051 F32 DPT_Value_MagnetomotiveForce 14.052 F32 DPT_Value_MagnetomotiveForce 14.053 F32 DPT_Value_MagnetomotiveForce 14.054 F32 DPT_Value_MagnetomotiveForce 14.053 F32 DPT_Value_MagnetomotiveForce 14.054 F32 DPT_Value_MagnetomotiveForce 14.055 F32 DPT_Value_MagnetomotiveForce 14.064 F32 DPT_Value_Phases 14.055 F32 DPT_Value_Phases 14.065 F32 DPT_Value_Phase_AngleRad 14.066 F32 DPT_Value_Phase_AngleDeg 14.067 F32 DPT_Value_Phase_AngleDeg	14.042	F32	DPT_Value_Luminous_Flux
14.045 F32 DPT_Value_Magnetic_Flux 14.046 F32 DPT_Value_Magnetic_FluxDensity 14.047 F32 DPT_Value_Magnetic_Moment 14.048 F32 DPT_Value_Magnetic_Polarization 14.049 F32 DPT_Value_Magnetic_Polarization 14.050 F32 DPT_Value_Magnetic_Polarization 14.051 F32 DPT_Value_Magnetic_Polarization 14.051 F32 DPT_Value_Magnetic_Polarization 14.052 F32 DPT_Value_Magnetic_Polarization 14.053 F32 DPT_Value_Magnetic_Polarization 14.053 F32 DPT_Value_Magnetic_Polarization 14.054 F32 DPT_Value_Magnetic_Polarization 14.053 F32 DPT_Value_Magnetic_Polarization 14.054 F32 DPT_Value_Magnetic_Polarization 14.055 F32 DPT_Value_Power 14.056 F32 DPT_Value_Power 14.056 F32 DPT_Value_Power 14.060 F32 DPT_Value_Reactance 14.061 F32 DPT_Value_Resistanc	14.043	F32	DPT_Value_Luminous_Intensity
14.046 F32 DPT_Value_Magnetic_FluxDensity 14.047 F32 DPT_Value_Magnetic_Moment 14.048 F32 DPT_Value_Magnetic_Polarization 14.049 F32 DPT_Value_Magnetic_Polarization 14.050 F32 DPT_Value_Magnetic_Polarization 14.051 F32 DPT_Value_Magnetic_Polarization 14.051 F32 DPT_Value_Magnetic_Polarization 14.052 F32 DPT_Value_Magnetic_Polarization 14.053 F32 DPT_Value_Magnetic_Polarization 14.053 F32 DPT_Value_Magnetic_Polarization 14.054 F32 DPT_Value_Magnetic_Polarization 14.055 F32 DPT_Value_Magnetic_Polarization 14.055 F32 DPT_Value_Power 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power 14.058 F32 DPT_Value_Power_Factor 14.059 F32 DPT_Value_Power_Factor 14.060 F32 DPT_Value_Reactance 14.061 F32 DPT_Value_Resistance	14.044	F32	DPT_Value_Magnetic_FieldStrength
14.047 F32 DPT_Value_Magnetic_Moment 14.048 F32 DPT_Value_Magnetic_Polarization 14.049 F32 DPT_Value_Magneticzetion 14.050 F32 DPT_Value_MagnetomotiveForce 14.051 F32 DPT_Value_Mass 14.052 F32 DPT_Value_MassFlux 14.053 F32 DPT_Value_Momentum 14.054 F32 DPT_Value_Momentum 14.055 F32 DPT_Value_Phase_AngleRad 14.055 F32 DPT_Value_Phase_AngleDeg 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power 14.058 F32 DPT_Value_Power_Factor 14.059 F32 DPT_Value_Pressure 14.060 F32 DPT_Value_Reactance 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_Resistivity 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_SolidAngle 14.065 F32 DPT_Value_Sound_Intensity	14.045	F32	DPT_Value_Magnetic_Flux
14.048 F32 DPT_Value_Magnetic_Polarization 14.049 F32 DPT_Value_Magnetic_Toolarization 14.050 F32 DPT_Value_MagnetomotiveForce 14.051 F32 DPT_Value_Mass 14.052 F32 DPT_Value_MassFlux 14.053 F32 DPT_Value_Momentum 14.054 F32 DPT_Value_Phase_AngleRad 14.055 F32 DPT_Value_Phase_AngleDeg 14.056 F32 DPT_Value_Power 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power_Factor 14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_Resistivity 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_SolidAngle 14.065 F32 DPT_Value_Sound_Intensity 14.066 F32 DPT_Value_Sound	14.046	F32	DPT_Value_Magnetic_FluxDensity
14.049 F32 DPT_Value_Magnetization 14.050 F32 DPT_Value_MagnetomotiveForce 14.051 F32 DPT_Value_Mass 14.052 F32 DPT_Value_MassFlux 14.053 F32 DPT_Value_Momentum 14.054 F32 DPT_Value_Phase_AngleRad 14.055 F32 DPT_Value_Phase_AngleDeg 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power 14.058 F32 DPT_Value_Power_Factor 14.059 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Resistance 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Stress 14.066 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature <td>14.047</td> <td>F32</td> <td>DPT_Value_Magnetic_Moment</td>	14.047	F32	DPT_Value_Magnetic_Moment
14.050 F32 DPT_Value_MagnetomotiveForce 14.051 F32 DPT_Value_Mass 14.052 F32 DPT_Value_MassFlux 14.053 F32 DPT_Value_Momentum 14.054 F32 DPT_Value_Phase_AngleRad 14.055 F32 DPT_Value_Phase_AngleDeg 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power 14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Resistance 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Stress 14.066 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature<	14.048	F32	DPT_Value_Magnetic_Polarization
14.051 F32 DPT_Value_Mass 14.052 F32 DPT_Value_MassFlux 14.053 F32 DPT_Value_Momentum 14.054 F32 DPT_Value_Phase_AngleRad 14.055 F32 DPT_Value_Phase_AngleDeg 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power_Factor 14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_Selfinductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Stress 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_Thermal_Capacity 14.071 F32 DPT_Value_Thermal_Cond	14.049	F32	DPT_Value_Magnetization
14.051 F32 DPT_Value_Mass 14.052 F32 DPT_Value_MassFlux 14.053 F32 DPT_Value_Momentum 14.054 F32 DPT_Value_Phase_AngleRad 14.055 F32 DPT_Value_Phase_AngleDeg 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power_Factor 14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_Selfinductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Common_Temperature 14.068 F32 DPT_Value_Absolute_Temperature 14.069 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_	14.050	F32	DPT_Value_MagnetomotiveForce
14.053 F32 DPT_Value_Momentum 14.054 F32 DPT_Value_Phase_AngleRad 14.055 F32 DPT_Value_Phase_AngleDeg 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power_Factor 14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistivity 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Surface_Tension 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_Thermal_Capacity 14.071 F32 DPT_Value_Thermal_Conductivity 14.073 F32	14.051	F32	
14.054 F32 DPT_Value_Phase_AngleRad 14.055 F32 DPT_Value_Phase_AngleDeg 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power_Factor 14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistivity 14.061 F32 DPT_Value_SelfInductance 14.062 F32 DPT_Value_SolidAngle 14.063 F32 DPT_Value_Sound_Intensity 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Stress 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Common_Temperature 14.068 F32 DPT_Value_Common_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.052	F32	DPT_Value_MassFlux
14.055 F32 DPT_Value_Phase_AngleDeg 14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power_Factor 14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistivity 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.053	F32	DPT_Value_Momentum
14.056 F32 DPT_Value_Power 14.057 F32 DPT_Value_Power_Factor 14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.054	F32	DPT_Value_Phase_AngleRad
14.057 F32 DPT_Value_Power_Factor 14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistivity 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_Thermal_Capacity 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.055	F32	DPT_Value_Phase_AngleDeg
14.058 F32 DPT_Value_Pressure 14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.056	F32	DPT_Value_Power
14.059 F32 DPT_Value_Reactance 14.060 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.057	F32	DPT_Value_Power_Factor
14.060 F32 DPT_Value_Resistance 14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.058	F32	DPT_Value_Pressure
14.061 F32 DPT_Value_Resistivity 14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.059	F32	DPT_Value_Reactance
14.062 F32 DPT_Value_SelfInductance 14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.060	F32	DPT_Value_Resistance
14.063 F32 DPT_Value_SolidAngle 14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.061	F32	DPT_Value_Resistivity
14.064 F32 DPT_Value_Sound_Intensity 14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 P32 DPT_Value_Thermal_Conductivity	14.062	F32	DPT_Value_SelfInductance
14.065 F32 DPT_Value_Speed 14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.063	F32	DPT_Value_SolidAngle
14.066 F32 DPT_Value_Stress 14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 P32 DPT_Value_ThermoelectricPower	14.064	F32	DPT_Value_Sound_Intensity
14.067 F32 DPT_Value_Surface_Tension 14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 P32 DPT_Value_ThermoelectricPower	14.065	F32	DPT_Value_Speed
14.068 F32 DPT_Value_Common_Temperature 14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 P32 DPT_Value_ThermoelectricPower	14.066	F32	DPT_Value_Stress
14.069 F32 DPT_Value_Absolute_Temperature 14.070 F32 DPT_Value_TemperatureDifference 14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.067	F32	DPT_Value_Surface_Tension
14.070F32DPT_Value_TemperatureDifference14.071F32DPT_Value_Thermal_Capacity14.072F32DPT_Value_Thermal_Conductivity14.073F32DPT_Value_ThermoelectricPower	14.068	F32	DPT_Value_Common_Temperature
14.071 F32 DPT_Value_Thermal_Capacity 14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.069	F32	DPT_Value_Absolute_Temperature
14.072 F32 DPT_Value_Thermal_Conductivity 14.073 F32 DPT_Value_ThermoelectricPower	14.070	F32	DPT_Value_TemperatureDifference
14.073 F32 DPT_Value_ThermoelectricPower	14.071	F32	DPT_Value_Thermal_Capacity
	14.072	F32	DPT_Value_Thermal_Conductivity
14.074 F32 DPT_Value_Time	14.073	F32	DPT_Value_ThermoelectricPower
	14.074	F32	DPT_Value_Time
14.075 F32 DPT_Value_Torque	14.075	F32	DPT_Value_Torque
14.076 F32 DPT_Value_Volume	14.076	F32	DPT_Value_Volume
14.077 F32 DPT_Value_Volume_Flux	14.077	F32	DPT_Value_Volume_Flux
14.078 F32 DPT_Value_Weight	14.078	F32	DPT_Value_Weight
14.079 F32 DPT_Value_Work	14.079	F32	DPT_Value_Work
15.000 U4U4U4U4U4B4N4 DPT_Access_Data	15.000	U4U4U4U4U4U4B4N4	DPT_Access_Data

DPT ID	Format	DPT Name
16.000	A112	DPT_String_ASCII
16.001	A112	DPT_String_8859_1
17.001	r2U6	DPT_SceneNumber
18.001	B1r1U6	DPT_SceneControl
19.001	U8[r4U4][r3U5][U3U5][r2U6][r2U6]B16	DPT_DateTime
20.001	N8	DPT_SCLOMode
20.002	N8	DPT_BuildingMode
20.003	N8	DPT_OccMode
20.004	N8	DPT_Priority
20.005	N8	DPT_LightApplicationMode
20.006	N8	DPT_ApplicationArea
20.007	N8	DPT_AlarmClassType
20.008	N8	DPT_PSUMode
20.011	N8	DPT_ErrorClass_System
20.012	N8	DPT_ErrorClass_HVAC
20.013	N8	DPT_Time_Delay
20.014	N8	DPT_Beaufort_Wind_Force_Scale
20.017	N8	DPT_SensorSelect
20.100	N8	DPT_FuelType
20.101	N8	DPT_BurnerType
20.102	N8	DPT_HVACMode
20.103	N8	DPT_DHWMode
20.104	N8	DPT_LoadPriority
20.105	N8	DPT_HVACContrMode
20.106	N8	DPT_HVACEmergMode
20.107	N8	DPT_ChangeoverMode
20.108	N8	DPT_ValveMode
20.109	N8	DPT_DamperMode
20.110	N8	DPT_HeaterMode
20.111	N8	DPT_FanMode
20.112	N8	DPT_MasterSlaveMode
20.113	N8	DPT_StatusRoomSetp
20.600	N8	DPT_Behaviour_Lock_Unlock
20.601	N8	DPT_Behaviour_Bus_Power_Up_Down
201.000	N8	DPT_CommMode
201.001	N8	DPT_AddInfoTypes
201.002	N8	DPT_RF_ModeSelect
201.003	N8	DPT_RF_FilterSelect
21.001	B8	DPT_StatusGen
21.002	B8	DPT_Device_Control
21.100	B8	DPT_ForceSign
21.101	B8	DPT_ForceSignCool
21.102	B8	DPT_StatusRHC
21.103	B8	DPT_StatusSDHWC
21.104	B8	DPT_FuelTypeSet



DPT ID	Format	DPT_Name
21.105	B8	DPT_StatusRCC
21.106	B8	DPT_StatusAHU
211.000	B8	DPT_RF_ModeInfo
211.001	B8	DPT_RF_FilterInfo
211.010	B8	DPT_Channel_Activation_8
22.100	B16	DPT_StatusDHWC
22.101	B16	DPT_StatusRHCC
221.000	B16	DPT_Media
221.010	B16	DPT_Channel_Activation_16
23.001	N2	DPT_OnOff_Action
23.002	N2	DPT_Alarm_Reaction
23.003	N2	DPT_UpDown_Action
23.102	N2	DPT_HVAC_PB_Action
24.001	A[n]	DPT_VarString_8859_1
251.000	U4U4	DPT_DoubleNibble
26.001	r1b1U6	DPT_SceneInfo
27.001	B32	DPT_CombinedInfoOnOff
28.001	A[n]	DPT_UTF-8
29.010	V64	DPT_ActiveEnergy_V64
29.011	V64	DPT_ApparantEnergy_V64
29.012	V64	DPT_ReactiveEnergy_V64
301.010	B24	DPT_Channel_Activation_24
31.101	N3	DPT_PB_Action_HVAC_Extended
200.100	B1Z8	DPT_Heat/Cool_Z
200.101	B1Z8	DPT_BinaryValue_Z
201.100	N8Z8	DPT_HVACMode_Z
201.102	N8Z8	DPT_DHWMode_Z
201.104	N8Z8	DPT_HVACContrMode_Z
201.105	N8Z8	DPT_EnablH/Cstage_Z DPT_EnablH/CStage
201.107	N8Z8	DPT_BuildingMode_Z
201.108	N8Z8	DPT_OccMode_Z
201.109	N8Z8	DPT_HVACEmergMode_Z
202.001	U8Z8	DPT_RelValue_Z
202.002	U8Z8	DPT_UCountValue8_Z
203.002	U16Z8	DPT_TimePeriodMsec_Z
203.003	U16Z8	DPT_TimePeriod10Msec_Z
203.004	U16Z8	DPT_TimePeriod100Msec_Z
203.005	U16Z8	DPT_TimePeriodSec_Z
203.006	U16Z8	DPT_TimePeriodMin_Z
203.007	U16Z8	DPT_TimePeriodHrs_Z
203.011	U16Z8	DPT_UFlowRateLiter/h_Z
203.012	U16Z8	DPT_UCountValue16_Z
203.013	U16Z8	DPT_UEICurrentµA_Z
203.014	U16Z8	DPT_PowerKW_Z
203.015	U16Z8	DPT_AtmPressureAbs_Z

DPT ID	Format	DPT Name
203.017	U16Z8	DPT_PercentU16_Z
203.100	U16Z8	DPT_HVACAirQual_Z
203.101	U16Z8	DPT_WindSpeed_Z DPT_WindSpeed
203.102	U16Z8	DPT_SunIntensity_Z
203.104	U16Z8	DPT_HVACAirFlowAbs_Z
204.001	V8Z8	DPT_RelSignedValue_Z
205.002	V16Z8	DPT_DeltaTimeMsec_Z
205.003	V16Z8	DPT_DeltaTime10Msec_Z
205.004	V16Z8	DPT_DeltaTime100Msec_Z
205.005	V16Z8	DPT_DeltaTimeSec_Z
205.006	V16Z8	DPT_DeltaTimeMin_Z
205.007	V16Z8	DPT_DeltaTimeHrs_Z
205.100	V16Z8	DPT_TempHVACAbs_Z
205.101	V16Z8	DPT_TempHVACRel_Z
205.102	V16Z8	DPT_HVACAirFlowRel_Z
206.100	U16N8	DPT_HVACModeNext
206.102	U16N8	DPT_DHWModeNext
206.104	U16N8	DPT_OccModeNext
206.105	U16N8	DPT_BuildingModeNext
207.100	U8B8	DPT_StatusBUC
207.101	U8B8	DPT_LockSign
207.102	U8B8	DPT_ValueDemBOC
207.104	U8B8	DPT_ActPosDemAbs
207.105	U8B8	DPT_StatusAct
209.100	V16B8	DPT_StatusHPM
209.101	V16B8	DPT_TempRoomDemAbs
209.102	V16B8	DPT_StatusCPM
209.103	V16B8	DPT_StatusWTC
210.100	V16B16	DPT_TempFlowWaterDemAbs
211.100	U8N8	DPT_EnergyDemWater
212.100	V16V16V16	DPT_TempRoomSetpSetShift[3]
212.101	V16V16V16	DPT_TempRoomSetpSet[3]
213.100	V16V16V16	DPT_TempRoomSetpSet[4]
213.101	V16V16V16	DPT_TempDHWSetpSet[4]
213.102	V16V16V16	DPT_TempRoomSetpSetShift[4]
214.100	V16U8B8	DPT_PowerFlowWaterDemHPM
214.101	V16U8B8	DPT_PowerFlowWaterDemCPM
215.100	V16U8B16	DPT_StatusBOC
215.101	V16U8B16	DPT_StatusCC
216.100	U16U8N8B8	DPT_SpecHeatProd
217.001	U5U5U6	DPT_Version
218.001	V32Z8	DPT_VolumeLiter_Z
219.001	U8N8N8N8B8B8	DPT_AlarmInfo
220.100	U16V16	DPT_TempHVACAbsNext
221.001	N16U32	DPT_SerNum



DPT_ID	Format	DPT_Name		
222.100	F16F16F16	DPT_TempRoomSetpSetF16[3]		
222.101	F16F16F16	DPT_TempRoomSetpSetShiftF16[3]		
223.100	V8N8N8	DPT_EnergyDemAir		
224.100	V16V16N8N8	DPT_TempSupply AirSetpSet		
225.001	U16U8	DPT_ScalingSpeed		
225.002	U16U8	DPT_Scaling_Step_Time		
229.001	V32N8Z8	DPT_MeteringValue		
230.1000	U16U32U8N8	DPT_MBus_Address		
231.001	A8A8A8A	DPT_Locale_ASCII		
232.600	U8U8U8	DPT_Colour_RGB		
234.001	A8A8	DPT_LanguageCodeAlpha2_ASCII		
234.002	A8A8	DPT_RegionCodeAlpha2_ASCII		

8.3 Annex 3: A_PDU type

A_PDU is the PDU (Protocol Data Unit) of the application layer and is meaning depends on the 2 first bits of the T_PDU (transport layer PDU)

- 1- The 2 first bits of T PDU are of UCD type (Unnumbered Control Data) = 00,
 - a. The first 2 bits of A_PDU are 00: by mean of this telegram, a point to point connection of the transport layer is established from the indicated emitter to the receiver.
 - b. The first 2 bits of A_PDU are 00: by mean of this telegram, a point to point connection of the transport layer is terminated/broken from the indicated emitter to the receiver.
- 2- 2 first bits of T_PDU are of NCD type (Numbered Control Data) = 11,
 - a. The first 2 bits of A_PDU are 10: by mean of this telegram, the transport layer of the emitter confirms to the receiver the reception of a previous telegram.
 - b. The first 2 bits of A_PDU are 11: by mean of this telegram, the transport layer of the emitter does not confirm to the receiver the reception of a previous telegram.
- 3- The 2 first bits of T_PDU are of UDP type (Unnumbered Data Packet) = 00 or NDP type (Numbered Data Packet) = 01. In this case, the bits of A_PDU form the APCI which is a 4 bits code for differentiating the services of the application layer.

APCI encoding

The application layer manages the group objects values in function of the application program. It treats the group telegrams and the management functions that ensure the bus configuration. For those functions, a communication in connected mode (point to point) or broadcast (group address = 0/0) is used. The APCI used during configuration are shown in table 16.

APCI	Name			
0011	IndividualAddrWrite			
0100	IndividualAddrRequest			
0101	IndividualAddrResponse			
0110	AdcRead			
0111	AdcResponse			
1000	MemoryRead			
1001	MemoryResponse			
1010	MemoryWrite			
1011	UserMessage			
1100	MaskVersionRead			
1101	MaskVersionResponse			
1110	Restart			
1111	Escape			

Table 16 APCI used during configuration

After configuration, during the communication in execution, the most used APCI are shown in table 17.

APCI	Name
0000	GroupValueRead
0001	GroupValueResponse
0010	GroupValueWrite

Table 17 APCI used during execution

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