IndustrialBOX Current 2 / 4 / 8 / 12

Industrial Actuator with 4 Current-Metering Outputs, Mechanical Manual Control and KNX Secure

ZIOINBC2
ZIOINBC4
ZIOINBC8
ZIOINBC12

Application programme version: [2.1]
User manual edition: [2.1]_a

www.zennio.com

USER MANUAL

CONTENTS

1 INTRODUCTION

1.1 INDUSTRIALBOX CURRENT 2, 4, 8, 12

IndustrialBOX Current 2 / 4 / 8 / 12 from **Zennio** is a versatile **KNX Secure industrial actuator** featuring a wide variety of functions:

- **2 / 4 / 8 / 12 relay outputs**, configurable as up to **2 / 4 / 8 / 12 individual ON/OFF outputs**.
- **Measurement of current, power and energy** in each of the relays, plus an extra instance that monitors the global consumption.
- **Current, power and energy metering** with each of the relays, plus an extra instance for overall control over consumption.
- **20 customisable, multi-operation logic functions**.
- **2 master light control modules** for an easy, out-of-the-box control of a set of luminaires (or functionally equivalent devices) one of which acts as a general lamp and the others as secondary lamps.
- **Scene-triggered action control**, with an optional delay in the execution.
- **Manual operation** of the relay outputs through the on-board **operable switches independently of the power supply**.
- **Heartbeat** or periodic “still-alive” notification.
- **Relay Switches Counter**.
- **KNX Security**.

For detailed information about the functionality and configuration of KNX security, consult the specific user manual “KNX Security”, available in the product section of the Zennio web portal (www.zennio.com).

1.2 START-UP AND POWER LOSS

During the start-up of the device, the Prog./Test LED will blink in blue colour for a few seconds before the device is ready. External orders will not be executed during this time, but afterwards.

Depending on the configuration, some specific actions will also be performed during the start-up. For example, the integrator can set whether the output channels should switch to a particular state and whether the device should send certain objects to the bus after the power recovery. Please consult the next sections of this document for further details.

On the other hand, when a bus power failure takes place, the device will interrupt any pending actions, and will save its state so it can be recovered once the power supply is restored.

If a power loss takes place, while the individual outputs will switch to the specific state configured in ETS (if any).

1.3 MANUAL CONTROL

The device allows manually switching its output relays through the respective **switches on the top of the device**. A specific switch is therefore available per output.

This manual control is **purely mechanic,** meaning that **can always be performed**, regardless of whether the outputs are enabled, or whether the device is powered. Due to this feature, **the device cannot know the state of the relay**, no objects related to the states of the outputs will be transmitted when switching them manually.

Important: *it is strongly recommended not to mix control through communication objects at runtime and manual control in order to avoid inconsistencies between the state indicated by the device and its actual state.*

Notes:

- *In block/alarm state, the state of an output can be manually switched.*
- *If after using manual control is wanted to synchronize the states, it is most advisable to perform a bus power failure o send an On/Off order via object.*

2 CONFIGURATION

2.1 GENERAL

After importing the corresponding database in ETS and adding the device into the topology of the desired project, the configuration process begins by entering the Parameters tab of the device.

ETS PARAMETERISATION

The only parameterisable screen that is always available is “General”. From this screen it is possible to activate/deactivate all the required functionality.

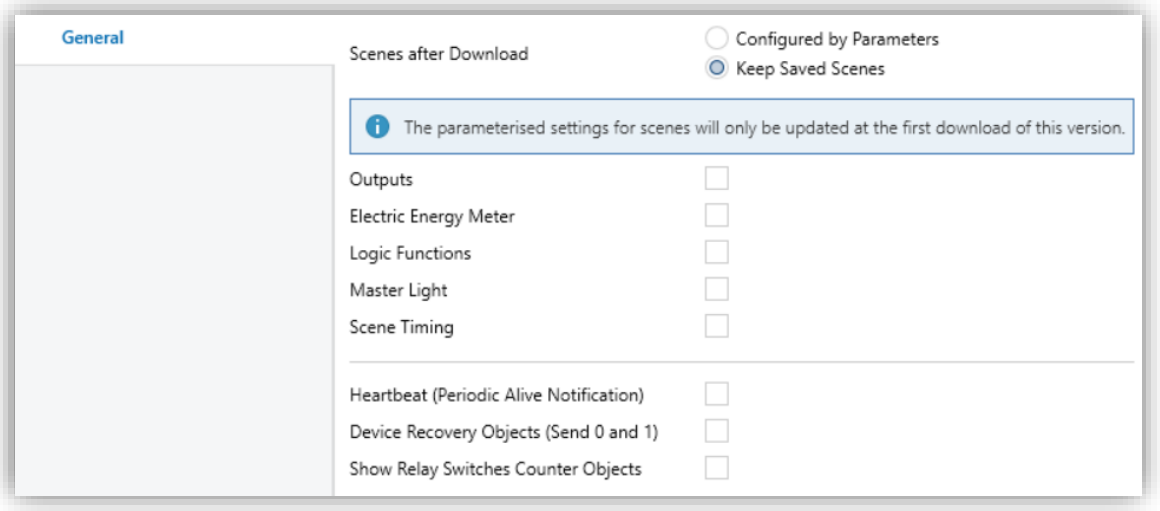

Figure 1. General.

- **Scenes after Download** [*Configured by Parameters / Keep Saved Scenes*][1]: allows defining whether the value of the scenes is the configured by parameter or whether the previously saved value is kept after download.

  Note: *if “Keep Saved Scenes” option has been configured, but it is the first download of the device or a different version from the current one, the values configured by parameter will be adopted. If new scenes are added in successive downloads, it will be necessary to perform a download by checking the option “Configured by Parameters” to ensure the correct operation of these scenes.*

[1] The default values of each parameter will be highlighted in blue in this document, as follows: [*default* / rest of options].

- **Outputs** [*disabled / enabled*]: enables or disables the "Outputs" tab on the left menu. See section 2.2 for more details.

- **Electric Energy Meter** [*disabled / enabled*]: enables or disables the "Electric Energy Meter" tab on the left menu. See section 2.3 for more details.

- **Logic Functions** [*disabled / enabled*]: enables or disables the "Logic Functions" tab on the left menu. See section 2.2 for more details.

- **Master Light** [*disabled / enabled*]: enables or disables the "Master Light" tab on the left menu. See section 2.5 for more details.

- **Scene Temporization** [*disabled / enabled*]: enables or disables the "Scene Temporization" tab on the left menu. See section 2.6 for more details.

- **Heartbeat (Periodic Alive Notification)** [*disabled / enabled*]: this parameter lets the integrator incorporate a one-bit object to the project ("**[Heartbeat] Object to Send '1'**") that will be sent periodically with value "1" to notify that the device is still working (*still alive*).

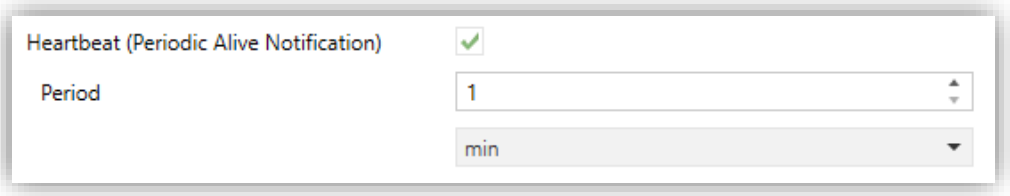

Figure 2. Heartbeat (Periodic Alive Notification).

Note: *the first sending after download or bus failure takes place with a delay of up to 255 seconds, to prevent bus overload. The following sendings match the period set.*

- **Device Recovery Objects (Send 0 and 1)** [*disabled / enabled*]: this parameter lets the integrator activate two new communication objects ("**[Heartbeat] Device Recovery**"), which will be sent to the KNX bus with values "0" and "1" respectively whenever the device begins operation (for example, after a bus power failure). It is possible to parameterise a certain **delay** [*0…255*] to this sending.

Figure 3. Device Recovery Objects.

Note: *after download or bus failure, the sending takes place with a delay of up to 6,35 seconds plus the parameterised delay, to prevent bus overload.*

- **Show Relay Switches Counter Objects** [*disabled / enabled*]: enables two communication objects to keep track of the number of switches performed by each of the relays ("**[Relay X] Number of Switches**") and the maximum number of switches carried out in a minute ("**[Relay X] Maximum Switches per Minute**").

  Note: *manually performed switching operations are not taken into account when indicating the number of switches operations and the maximum switches per minute of a given relay by object.*

2.2 OUTPUTS

The device incorporates **relay outputs**, configurable as **individual outputs**, which allows an independent control of loads. Please refer to the "**Individual Binary Outputs**" user manual, available under the product section at www.zennio.com.

2.3 ELECTRIC ENERGY METER

Each of the relays of the device incorporates the functionality of **electrical energy measurement**, which allows the electrical consumption of each of the outputs to be measured independently. In addition, an extra instance is included to **calculate the combined consumption** of the desired outputs.

Within this tab the frequency of the local mains power supply is configured to ensure correct measurement:

- **Frequency** [*50Hz / 60Hz*]: frequency value used for current measurement at the device outputs.

Please refer to the "**Electric Energy Meter**" user manual, available within the device product section at the Zennio homepage, www.zennio.com, for detailed information about the functionality and the configuration of the related parameters.

2.4 LOGIC FUNCTIONS

This module makes it possible to perform numeric and binary operations to incoming values received from the KNX bus, and to send the results through other communication objects specifically enabled for this purpose.

The device can implement **up to 20 different and independent functions**, each of them entirely customisable and consisting in **up to 4 consecutive operations each**.

The execution of each function can depend on a configurable **condition**, which will be evaluated every time the function is **triggered** through specific, parameterisable communication objects. The result after executing the operations of the function can also be evaluated according to certain **conditions** and afterwards sent (or not) to the KNX bus, which can be done every time the function is executed, periodically or only when the result differs from the last one.

Please refer to the "**Logic Functions**" user manual, available within the device product section at the Zennio homepage, www.zennio.com, for detailed information about the functionality and the configuration of the related parameters.

2.5 MASTER LIGHT

The device implements **two Master Light** which can be enabled and configured independently.

The Master Light function brings the option to monitor the state of up to 30 light sources (or even more, if the Master Light controls from multiple Zennio devices are linked together) or of any other elements whose state is transmitted through a binary object and, depending on those states, perform a ***master order*** every time a certain trigger signal (again, a binary value) is received through a specific object.

Such master order will consist in:

- A **general switch-off** order, if at least one of the up to thirty status objects is found to be on.
- A **courtesy switch-on** order, if none of the up to thirty status objects is found to be on.

Note that the above switch-off and switch-on orders are not necessarily a binary value being sent to the bus – it is up to the integrator the decision of what to send to the KNX bus in both cases: a shutter order, a thermostat setpoint or mode switch order, a constant value, a scene… Only the trigger object and the thirty status objects are required to be binary (on/off).

The most typical scenario for this Master Light control would be a hotel room with a master pushbutton next to the door. When leaving the room, the guest will have the possibility of pressing on the master pushbutton and make all the lamps turn off together. Afterwards, back on the room and with all the lamps off, pressing on the same master pushbutton will only make a particular lamp turn on (e.g., the closest lamp to the door) – this is the courtesy switch-on.

Besides, it is possible to concatenate two or more Master Light modules by means of a specific communication object which represents the general state of the light sources of each module. Thereby, it is possible to expand the number of light sources by considering the general state of one module as an additional light source for another.

ETS PARAMETERISATION

Once the Master Light function has been enabled, a specific tab will be included in the menu on the left. This new parameter screen contains the following options:

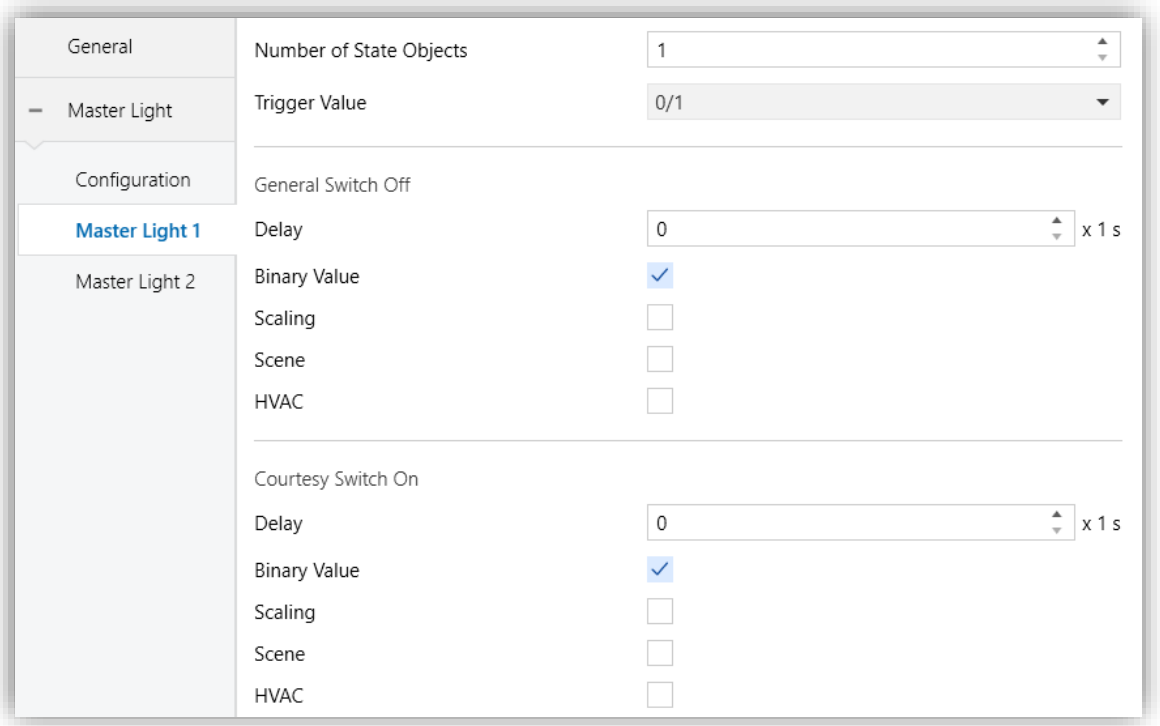

Figure 4. Master Light.

- **Number of State Objects** [*1…30*]: defines the number of 1-bit status objects required. These objects are called "**[ML] Status Object *n***."

  In addition, the general status object ("**[ML] General status**") will always be available in the project topology. It will be sent to the bus with a value of "1" whenever there is at least one of the above state objects with such value. Otherwise (i.e., if none of them has a value of "1"), it will be sent with a value of "0".

- **Trigger Value** [*0 / 1 / 0/1*]: sets the value that will trigger, when received through "**[ML] Trigger**", the master action (the general switch-off or the courtesy switch-on).

- **General Switch-Off**.

  - **Delay** [*0…255*] [*x 1 s*]: defines a certain delay (once the trigger has been received) before the execution of the general switch-off. The allowed range is 0 to 255 seconds.

  - **Binary Value** [*disabled / enabled*]: if checked, object "**[ML] General Switch-off: Binary Object**" will be enabled, which will send one "0" whenever the general switch-off takes off.

  - **Scaling** [*disabled / enabled*]: if checked, object "**[ML] General Switch-off: Scaling**" will be enabled, which will send a percentage value (configurable in **Value** [*0…100*]) whenever the general switch-off takes off.

  - **Scene** [*disabled / enabled*]: if checked, object "**[ML] General Switch-off: Scene**" will be enabled, which will send a scene run / save order (configurable in **Action** [*Run / Save*] and **Scene Number** [*1…64*]) whenever the general switch-off takes off

  - **HVAC** [*disabled / enabled*]: if checked, object "**[ML] General Switch-off: HVAC mode**" will be enabled, which will send an HVAC thermostat mode value (configurable in **Value** [*Auto / Comfort / Standby / Economy / Building Protection*) whenever the general switch-off takes off.

  Note: *the above options are not mutually exclusive; it is possible to send values of different nature together*.

- **Courtesy Switch-On**:

  The parameters available here are entirely analogous to those already mentioned for General Switch-Off. However, in this case the names of the objects start with "**[ML] Courtesy Switch-On (…)**." On the other hand, sending **scene save orders** is not possible for the courtesy switch-on (only orders to play scenes are allowed).

  Note: *object "**[ML] Courtesy Switch-On: Binary Object**" sends the value "1" (when the courtesy switch-on takes place), in contrast to object "**[ML] General Switch-Off: Binary Object**", which sends the value "0" (during the general switch-off, as explained above)*.

2.6 SCENE TEMPORISATION

The scene temporisation allows imposing **delays over the scenes of the outputs**. These delays are defined in parameters and can be applied to the execution of one or more scenes that may have been configured.

Please bear in mind that, as multiple delayed scenes can be configured for each individual output, in case of receiving an order to execute one of them when a previous temporisation is still pending for that output, such temporisation will be interrupted and only the delay and the action of the new scene will be executed.

ETS PARAMETERISATION

Prior to setting the **scene temporisation**, it is necessary to have one or more scenes configured in some of the outputs. When entering the Configuration window under Scene Temporization, all configured scenes will be listed, together with a few checkboxes to select which of them need to be temporised, as shown in Figure 5.

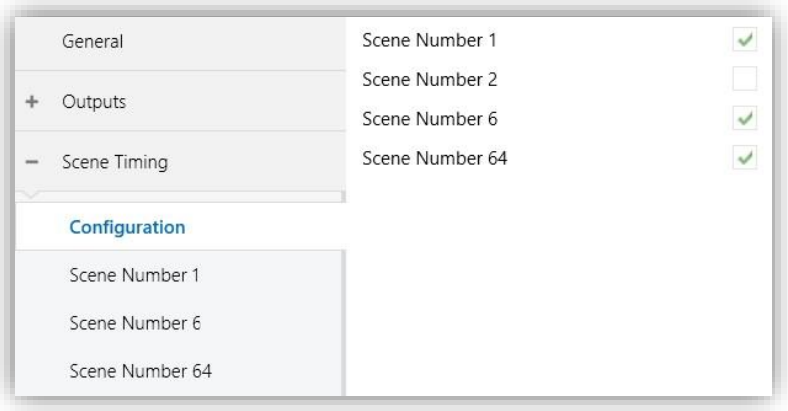

Figure 5. Scene temporisation.

Enabling a certain **scene number n** brings a new tab with such name to the menu on the left, from which it is possible to configure the temporisation of that scene for each of the outputs where it has been configured.

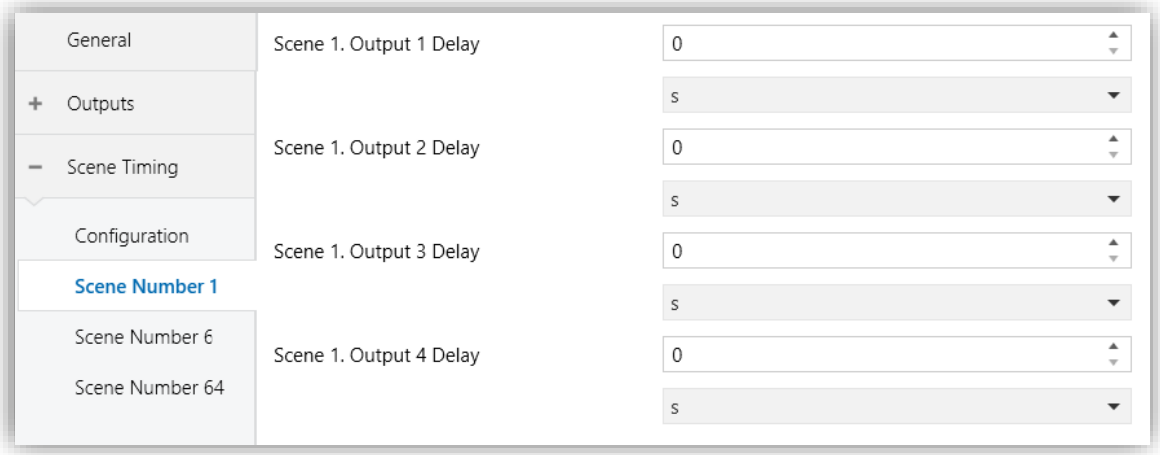

Figure 6. Configuration of the scene temporisation.

Therefore, parameter "**Scene m. Z Delay**" [*0…3600 [s] / 0…1440 [min] / 0…24 [h]*], defines the delay that will be applied to the action defined in Z for the execution of scene m (where Z may be a specific individual output).

Note: *in the configuration of a scene of an output it is possible to parameterize several scenes with the same scene number. This means that several delay parameters associated with the same output appear in the configuration tab of the delays of that scene. With this parameterization, the behaviour will be as follows: the action and delay of the first scene parameterized with the same scene number will always prevail, where the highest priority scene is 1 (the first in the scene configuration tab) and the lowest priority is the last.*

ANNEX I. COMMUNICATION OBJECTS

- **"Functional range"** shows the values that, with independence of any other values permitted by the bus according to the object size, may be of any use or have a particular meaning because of the specifications or restrictions from both the KNX standard or the application programme itself.

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name	Function
1	1 Bit	O	C R - T -	DPT_Trigger	0/1	[Heartbeat] Object to Send '1'	Sending of '1' Periodically
2	1 Bit	O	C R - T -	DPT_Trigger	0/1	[Heartbeat] Device Recovery	Send 0
3	1 Bit	O	C R - T -	DPT_Trigger	0/1	[Heartbeat] Device Recovery	Send 1
4, 44	1 Bit	I	C - W - -	DPT_Trigger	0/1	[MLx] Trigger	Trigger the Master Light Function
	1 Bit	I	C - W - -	DPT_Ack	0/1	[MLx] Trigger	0 = Nothing; 1 = Trigger the Master Light Function
	1 Bit	I	C - W - -	DPT_Ack	0/1	[MLx] Trigger	1 = Nothing; 0 = Trigger the Master Light Function
5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74	1 Bit	I	C - W - -	DPT_Switch	0/1	[MLx] Status Object x	Binary Status
35, 75	1 Bit	O	C R - T -	DPT_Switch	0/1	[MLx] General Status	Binary Status
36, 76	1 Bit	O	C - - T -	DPT_Switch	0/1	[MLx] General Switch Off: Binary Object	Switch Off Sending
37, 77	1 Byte	O	C - - T -	DPT_Scaling	0% - 100%	[MLx] General Switch Off: Scaling	0-100%
38, 78	1 Byte	O	C - - T -	DPT_SceneControl	0-63; 128-191	[MLx] General Switch Off: Scene	Scene Sending
39, 79	1 Byte	O	C - - T -	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[MLx] General Switch Off: HVAC mode	Auto, Comfort, Standby, Economy, Building Protection
40, 80	1 Bit	O	C - - T -	DPT_Switch	0/1	[MLx] Courtesy Switch On: Binary Object	Switch On Sending
41, 81	1 Byte	O	C - - T -	DPT_Scaling	0% - 100%	[MLx] Courtesy Switch On: Scaling	0-100%

42, 82	1 Byte	O	C - - T -	DPT_SceneNumber	0 - 63	[MLx] Courtesy Switch On: Scene	Scene Sending
43, 83	1 Byte	O	C - - T -	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[MLx] Courtesy Switch On: HVAC mode	Auto, Comfort, Standby, Economy, Building Protection
84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147	1 Bit	I	C - W - -	DPT_Bool	0/1	[LF] (1-Bit) Data Entry x	Binary Data Entry (0/1)
148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179	1 Byte	I	C - W - -	DPT_Value_1_Ucount	0 - 255	[LF] (1-Byte) Data Entry x	1-Byte Data Entry (0-255)
180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[LF] (2-Byte) Data Entry x	2-Byte Data Entry
	2 Bytes	I	C - W - -	DPT_Value_2_Count	-32768 - 32767	[LF] (2-Byte) Data Entry x	2-Byte Data Entry
	2 Bytes	I	C - W - -	9.xxx	-671088.64 - 670433.28	[LF] (2-Byte) Data Entry x	2-Byte Data Entry
212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227	4 Bytes	I	C - W - -	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] (4-Byte) Data Entry x	4-Byte Data Entry
228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247	1 Bit	O	C R - T -	DPT_Bool	0/1	[LF] Function x - Result	(1-Bit) Boolean
	1 Byte	O	C R - T -	DPT_Value_1_Ucount	0 - 255	[LF] Function x - Result	(1-Byte) Unsigned
	2 Bytes	O	C R - T -	DPT_Value_2_Ucount	0 - 65535	[LF] Function x - Result	(2-Byte) Unsigned
	4 Bytes	O	C R - T -	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] Function x - Result	(4-Byte) Signed
	1 Byte	O	C R - T -	DPT_Scaling	0% - 100%	[LF] Function x - Result	(1-Byte) Percentage
	2 Bytes	O	C R - T -	DPT_Value_2_Count	-32768 - 32767	[LF] Function x - Result	(2-Byte) Signed
	2 Bytes	O	C R - T -	9.xxx	-671088.64 - 670433.28	[LF] Function x - Result	(2-Byte) Float
248, 262, 276, 290, 304, 318, 332, 346, 360, 374, 388, 402	1 Byte	I	C - W - -	DPT_SceneControl	0-63; 128-191	[Ox] Scenes	0 – 63 (Execute 1 – 64); 128 – 191 (Save 1 – 64)
249, 263, 277, 291, 305, 319, 333,	1 Bit	I	C - W -	DPT_BinaryValue	0/1	[Ox] On/Off	N.O. (0 = Open Relay; 1 = Close

347, 361, 375, 389, 403			-				Relay)
	1 Bit	I	C - W - -	DPT_BinaryValue	0/1	[Ox] On/Off	N.C. (0 = Close Relay; 1 = Open Relay)
250, 264, 278, 292, 306, 320, 334, 348, 362, 376, 390, 404	1 Bit	O	C R - T -	DPT_BinaryValue	0/1	[Ox] On/Off (Status)	0 = Output Off; 1 = Output On
251, 265, 279, 293, 307, 321, 335, 349, 363, 377, 391, 405	1 Bit	I	C - W - -	DPT_Trigger	0/1	[Ox] Switched Control	0/1 = On/Off Depending on the Last Status
252, 266, 280, 294, 308, 322, 336, 350, 364, 378, 392, 406	1 Bit	I	C - W - -	DPT_Enable	0/1	[Ox] Lock	0 = Unlock; 1 = Lock
253, 267, 281, 295, 309, 323, 337, 351, 365, 379, 393, 407	1 Bit	O	C R - T -	DPT_Enable	0/1	[Ox] Lock (Status)	0 = Unlock; 1 = Lock
254, 268, 282, 296, 310, 324, 338, 352, 366, 380, 394, 408	1 Bit	I	C - W - -	DPT_Start	0/1	[Ox] Timer	0 = Switch Off; 1 = Switch On
255, 269, 283, 297, 311, 325, 339, 353, 367, 381, 395, 409	2 Bytes	I	C - W - -	DPT_TimePeriodSec	0 - 65535	[Ox] On Duration Time (s)	0 - 3600 s
	2 Bytes	I	C - W - -	DPT_TimePeriod100Msec		[Ox] On Duration Time (ds)	0 - 600 ds
	2 Bytes	I	C - W - -	DPT_TimePeriodMin	0 - 65535	[Ox] On Duration Time (min)	0 - 1440 min
	2 Bytes	I	C - W - -	DPT_TimePeriodHrs	0 - 65535	[Ox] On Duration Time (h)	0 - 24 h
256, 270, 284, 298, 312, 326, 340, 354, 368, 382, 396, 410	1 Bit	O	C R - T -	DPT_State	0/1	[Ox] Warning Countdown (Status)	0 = Normal; 1 = Warning
257, 271, 285, 299, 313, 327, 341, 355, 369, 383, 397, 411	1 Bit	I	C - W - -	DPT_Start	0/1	[Ox] Flashing	0 = Stop; 1 = Start
258, 272, 286, 300, 314, 328, 342, 356, 370, 384, 398, 412	1 Bit	I	C - W - -	DPT_Alarm	0/1	[Ox] Alarm	0 = No Alarm; 1 = Alarm
	1 Bit	I	C - W - -	DPT_Alarm	0/1	[Ox] Alarm	0 = Alarm; 1 = No Alarm
259, 273, 287, 301, 315, 329, 343, 357, 371, 385, 399, 413	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Ox] Alarm (Status)	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Ox] Alarm (Status)	0 = Alarm; 1 = No Alarm
260, 274, 288, 302, 316, 330, 344, 358, 372, 386, 400, 414	1 Bit	I	C - W - -	DPT_Ack	0/1	[Ox] Unfreeze Alarm	Alarm = 0 + Unfreeze = 1 => End Alarm
261, 275, 289, 303, 317, 331, 345, 359, 373, 387, 401, 415	4 Bytes	I/O	C R W T -	DPT_LongDeltaTimeSec	-2147483648 - 2147483647	[Ox] Operating Time (s)	Time in Seconds
	4 Bytes	I/O	C R W T -	1.xxx	0/1	[Ox] Operating Time (h)	Time in Hours
416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438	4 Bytes	O	C R - T -	DPT_Value_4_Ucount	0 - 4294967295	[Relay x] Number of Switches	Number of Switches
417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439	2 Bytes	O	C R - T -	DPT_Value_2_Ucount	0 - 65535	[Relay x] Maximum Switches per Minute	Maximum Switches per Minute
440	4 Bytes	O	C R - T -	DPT_Value_Electric_Current	-3.4E+38 A - 3.4E+38 A	[EEM][Global] Current	Electrical Current (A)

	2 Bytes	O	C R - T -	DPT_Value_Curr	-671088.64 mA - 670433.28 mA	[EEM][Global] Current	Electrical Current (mA)
441	4 Bytes	I	C - W - -	DPT_Value_Electric_Potential	-3.4E+38 V - 3.4E+38 V	[EEM][Global] Voltage	Set Voltage (V)
	2 Bytes	I	C - W - -	DPT_Value_Volt	-671088.64 mV - 670433.28 mV	[EEM][Global] Voltage	Set Voltage (mV)
442	4 Bytes	I	C - W - -	DPT_Value_Power_Factor	-3.4E+38 cos F - 3.4E+38 cos F	[EEM][Global] Power Factor	Set Power Factor
443	4 Bytes	O	C R - T -	DPT_Value_Power	-3.4E+38 W - 3.4E+38 W	[EEM][Global] Active Power	Active Power (W)
	2 Bytes	O	C R - T -	DPT_Power	-671088.64 - 670433.28 kW	[EEM][Global] Active Power	Active Power (kW)
444	4 Bytes	I/O	C R W T -	DPT_ActiveEnergy	0 - 2147483647	[EEM][Global] Consumed Active Energy	Active Energy Consumption (Wh)
	4 Bytes	I/O	C R W T -	DPT_ActiveEnergy_kWh	0 - 2147483647	[EEM][Global] Consumed Active Energy	Active Energy Consumption (kWh)
445, 449, 453	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Upper Limit	Set Upper Limit Value (mA)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Upper Limit	Set Upper Limit Value (A)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Upper Limit	Set Upper Limit Value (W)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Upper Limit	Set Upper Limit Value (kW)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Upper Limit	Set Upper Limit Value (Wh)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Upper Limit	Set Upper Limit Value (kWh)
446, 450, 454	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Lower Limit	Set Lower Limit Value (mA)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Lower Limit	Set Lower Limit Value (A)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Lower Limit	Set Lower Limit Value (W)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Global] Alarm x: Set Lower Limit	Set Lower Limit Value (kW)
447, 451, 455	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Global] Alarm x: High Current	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Global] Alarm x: High Current	1 = No Alarm; 0 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Global] Alarm x: High Power	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Global] Alarm x: High Power	1 = No Alarm; 0 = Alarm
	1 Bit	O	C R - T	DPT_Alarm	0/1	[EEM][Global] Alarm x:	0 = No Alarm; 1 = Alarm

			-			Excess Energy	
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Global] Alarm x: Excess Energy	1 = No Alarm; 0 = Alarm
448, 452, 456	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Global] Alarm x: Low Current	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Global] Alarm x: Low Current	1 = No Alarm; 0 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Global] Alarm x: Low Power	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Global] Alarm x: Low Power	1 = No Alarm; 0 = Alarm
457, 474, 491, 508, 525, 542, 559, 576, 593, 610, 627, 644	4 Bytes	O	C R - T -	DPT_Value_Electric_Current	-3.4E+38 A - 3.4E+38 A	[EEM][Ox] Current	Electrical Current (A)
	2 Bytes	O	C R - T -	DPT_Value_Curr	-671088.64 mA - 670433.28 mA	[EEM][Ox] Current	Electrical Current (mA)
458, 475, 492, 509, 526, 543, 560, 577, 594, 611, 628, 645	4 Bytes	I	C - W - -	DPT_Value_Electric_Potential	-3.4E+38 V - 3.4E+38 V	[EEM][Ox] Voltage	Set Voltage (V)
	2 Bytes	I	C - W - -	DPT_Value_Volt	-671088.64 mV - 670433.28 mV	[EEM][Ox] Voltage	Set Voltage (mV)
459, 476, 493, 510, 527, 544, 561, 578, 595, 612, 629, 646	4 Bytes	I	C - W - -	DPT_Value_Power_Factor	-3.4E+38 cos F - 3.4E+38 cos F	[EEM][Ox] Power Factor	Set Power Factor
460, 477, 494, 511, 528, 545, 562, 579, 596, 613, 630, 647	4 Bytes	O	C R - T -	DPT_Value_Power	-3.4E+38 W - 3.4E+38 W	[EEM][Ox] Active Power	Active Power (W)
	2 Bytes	O	C R - T -	DPT_Power	-671088.64 - 670433.28 kW	[EEM][Ox] Active Power	Active Power (kW)
461, 478, 495, 512, 529, 546, 563, 580, 597, 614, 631, 648	4 Bytes	I/O	C R W T -	DPT_ActiveEnergy	0 - 2147483647	[EEM][Ox] Consumed Active Energy	Active Energy Consumption (Wh)
	4 Bytes	I/O	C R W T -	DPT_ActiveEnergy_kWh	0 - 2147483647	[EEM][Ox] Consumed Active Energy	Active Energy Consumption (kWh)
462, 466, 470, 479, 483, 487, 496, 500, 504, 513, 517, 521, 530, 534, 538, 547, 551, 555, 564, 568, 572, 581, 585, 589, 598, 602, 606, 615, 619, 623, 632, 636, 640, 649, 653, 657	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Upper Limit	Set Upper Limit Value (mA)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Upper Limit	Set Upper Limit Value (A)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Upper Limit	Set Upper Limit Value (W)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Upper Limit	Set Upper Limit Value (kW)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Upper Limit	Set Upper Limit Value (Wh)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Upper Limit	Set Upper Limit Value (kWh)
463, 467, 471, 480, 484, 488, 497, 501, 505, 514, 518, 522, 531, 535, 539, 548, 552, 556, 565, 569, 573, 582, 586, 590, 599, 603, 607, 616,	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Lower Limit	Set Lower Limit Value (mA)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Lower Limit	Set Lower Limit Value (A)

620, 624, 633, 637, 641, 650, 654, 658	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Lower Limit	Set Lower Limit Value (W)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[EEM][Ox] Alarm x: Set Lower Limit	Set Lower Limit Value (kW)
464, 468, 472, 481, 485, 489, 498, 502, 506, 515, 519, 523, 532, 536, 540, 549, 553, 557, 566, 570, 574, 583, 587, 591, 600, 604, 608, 617, 621, 625, 634, 638, 642, 651, 655, 659	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: High Current	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: High Current	1 = No Alarm; 0 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: High Power	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: High Power	1 = No Alarm; 0 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: Excess Energy	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: Excess Energy	1 = No Alarm; 0 = Alarm
465, 469, 473, 482, 486, 490, 499, 503, 507, 516, 520, 524, 533, 537, 541, 550, 554, 558, 567, 571, 575, 584, 588, 592, 601, 605, 609, 618, 622, 626, 635, 639, 643, 652, 656, 660	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: Low Current	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: Low Current	1 = No Alarm; 0 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: Low Power	0 = No Alarm; 1 = Alarm
	1 Bit	O	C R - T -	DPT_Alarm	0/1	[EEM][Ox] Alarm x: Low Power	1 = No Alarm; 0 = Alarm

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