



## **Application Descriptions**

**7**

### **Metering**

**60**

### **Metering E-Mode Channels**

**11**

#### **Summary**

This document provides the specification of the Metering E-Mode Channels.

Version 01.00.02 is a KNX Approved Standard.

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

## Document updates

Version	Date	Modifications
01.00.00	2013.07.16	Document creation based on AN130 "Realisation of Submetering application with tariff".
01.00.01	2013.07.18	Editorial review in view of publication.
01.00.02	2013.10.29	Editorial updates for the publication of KNX Specifications 2.1.

## References

[01] Chapter 7/60/1 "Metering M-Bus Data Collector Functional Blocks"

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# 1 Introduction

## 1.1 Motivation

In the future, the “smart metering” subject will play an increasingly important role in the residential as well as in the commercial buildings.

One of the main reasons for that is the monitoring of the electricity consumption, in order to reduce the energy bills or optimize the distribution of energy.

## 1.2 Electrical metering and tariff: generalities

If the consumers are able to see their electrical consumption, and moreover when they are able to see the energy costs associated to this consumption, they are able to take the measures to reduce their consumption (turn off appliances, shift use of devices to cheaper tariff time ...).

There are also legal requirements that stipulate the use of energy meters in order to inform the customer about his consumption during the year and not having to wait for the annual energy billing.

The “smart metering”, often used as a generic term for applications, must at least refer to the following needs.

- A precise measurement of electrical energy consumption.
- A support of several tariffs (defined by the energy provider).
- A clear display of the consumption.
- A repartition of the consumption on the different tariff time zones.
- A possibility to compare the consumption of a selectable interval with the one of a similar interval (day, week, month...).
- A possibility to display a partial energy consumption value that can be reset by the consumer.
- A display of the instantaneous power (for example with two modes : one with a quick refresh of data like the fuel consumption in a car, and another with a slower refresh)

The recently opened competition between electricity energy providers will surely grow the number of available tariffs, like what has been observed in the telecommunication domain.

Moreover, with the growth of renewable energies, new tariffs, dedicated to renewable energies will surely appear.

The production of domestic energies (block-unit heating and power plant, photovoltaic, wind energy...) is also in a great development.

## 1.3 Difference between electrical metering and Submetering

### Metering

Electrical metering concerns the measurement of the total quantity of electrical energy consumed by a consumer or produced by a provider. This is done using an electrical counter (installed directly on the 230 V mains line) that is certified by standards organisation and on which the electrical energy bill is based.

Electrical meter equipment has strong legal constraints. Moreover, this equipment provides strong guarantee on the data.

M-Bus is a standard bus for the metering applications.

## Submetering

Electrical Submetering concerns the measurement of energy consumption inside the electrical installation, within particular areas of the site, or used by a piece of equipment or a device. The electrical bill is not based on this information. The Submetering data are used to inform the customer about his energy consumption.

The current application only concerns the Submetering domains.

The purpose of the Submetering is to provide information for displays, with less legal constraints than for the metering equipment.

**NOTE 1** It is possible to have a difference between the total amount of energy given by the metering counter and the value given by subcounter equipment that measures the energy on the main switch circuit, just behind the metering counter. This is due to the accuracy of measurement on the Submetering equipment.

## 1.4 Difference to Chapter 7/60/1 “Metering M-Bus Data Collector Functional Blocks” ([01])

The metering Functional Blocks existing today concern the M-Bus gateway (or Data Collector) specification, which defines the mapping of available M-Bus data to the KNX bus.

The main purpose of this specification is to access the metering data for billing applications.

The characteristics of the M-Bus specification are the following.

- Generic metering Functional Blocks (water, heat...), no electrical specific devices.
- Mostly defined for a Property Client/Server communication (reduced S-Mode Group Objects communication).
- Use of a generic metering value Datapoint.
- No use of Group Object for tariff information.
- No support of the existing energy - and power Datapoint Types.
- Not dedicated to the Submetering application.

The aim of the current document is to define a set of very simple and generic Functional Blocks concerning Submetering that can model an electrical metering sensor device and the associated display.

Moreover, no E-Mode Channel is today defined concerning the electrical Submetering application.

## 1.5 Consistency between energy and tariff

There is no existing E-Mode Channel today that provides the energy information together with the tariff information, as needed for “smart metering” application devices (sensor, display,...). The problem is then to create one.

The first solution was to define one energy Datapoint for each supported tariff, which limits the amount of supported tariff and so is not interesting for the future. Moreover it needs a great number of Connection Codes.

Advantages	Drawbacks
Use the existing energy Datapoint Type One transmission for each tariff	Not interesting for future Needs many Connection Codes

A second solution is to use only one energy Datapoint for all possible tariffs and another Datapoint for the tariff.

Advantages	Drawbacks
Solution interesting for the future	No guaranty of data integrity between

Only two associations in table.	energy and tariff related to this energy, especially on RF media. Two Datapoint transmission for each tariff (growth the RF traffic) Loss of consistency Only the energy of the current active tariff can be communicated
---------------------------------	--

A third solution consists in creating a new Datapoint Type that combine both energy and tariff together.

Advantages	Drawbacks
Solution interesting for the future Only one association in table. Only one Datapoint transmission for each tariff. Guaranty of the data integrity between energy and tariff.	New Datapoint Type.

In conclusion, the third solution is the best one, taking care of the future evolution of the electrical provider market.

## 1.6 Tariff

The customers need to know the current tariff used by the energy provider, but need also the next tariff that will be used in order to optimize their consumption

EXAMPLE 1      Use the washing machine today instead of tomorrow when the tariff will be more expensive.

This information of the next tariff is today available in some countries through the metering counter and is already used in some non KNX products.

The solution described in this document consists in defining two Functional Blocks and two E-Mode channels that provides and consumes the following information.

- The tariff Datapoint Type.
- A Datapoint Type that combines the next tariff with the timed duration (in minutes) until the change from the current to the next tariff (like the HVAC\_ModeNext Datapoint Type).

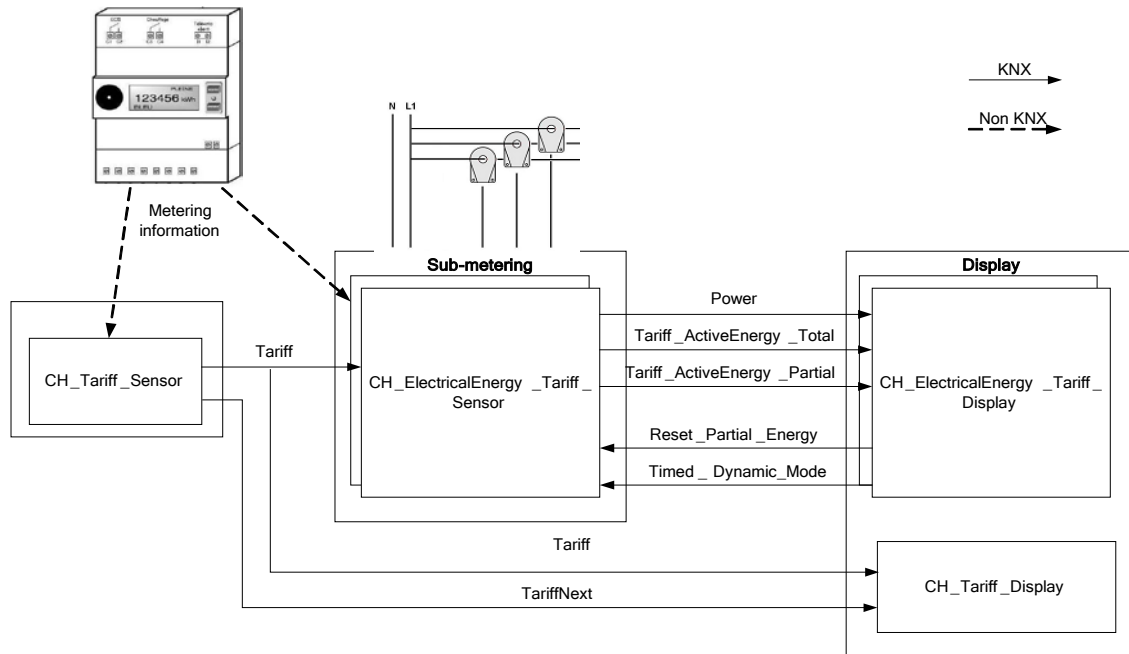
## 1.7 Abbreviations

Abbreviation	Description
COV	Change of Value
cs	company specific
EETD	Electrical Energy Tariff Display
EETS	Electrical Energy Tariff Sensor
FB	Functional Block
RPE	Reset Partial Energy
TAEP	Tariff Active Energy Partial
TAET	Tariff Active Energy Total
TD	Tariff Display
TDM	Timed Dynamic Mode
TN	Tariff Next
TS	Tariff Sensor

## 2 E-Mode Channels

### 2.1 General

They are fully compliant with the “Flexible E-mode Channels”, as they define a set of mandatory Datapoints and parameters and some optional ones that may be defined or not in KNX products.

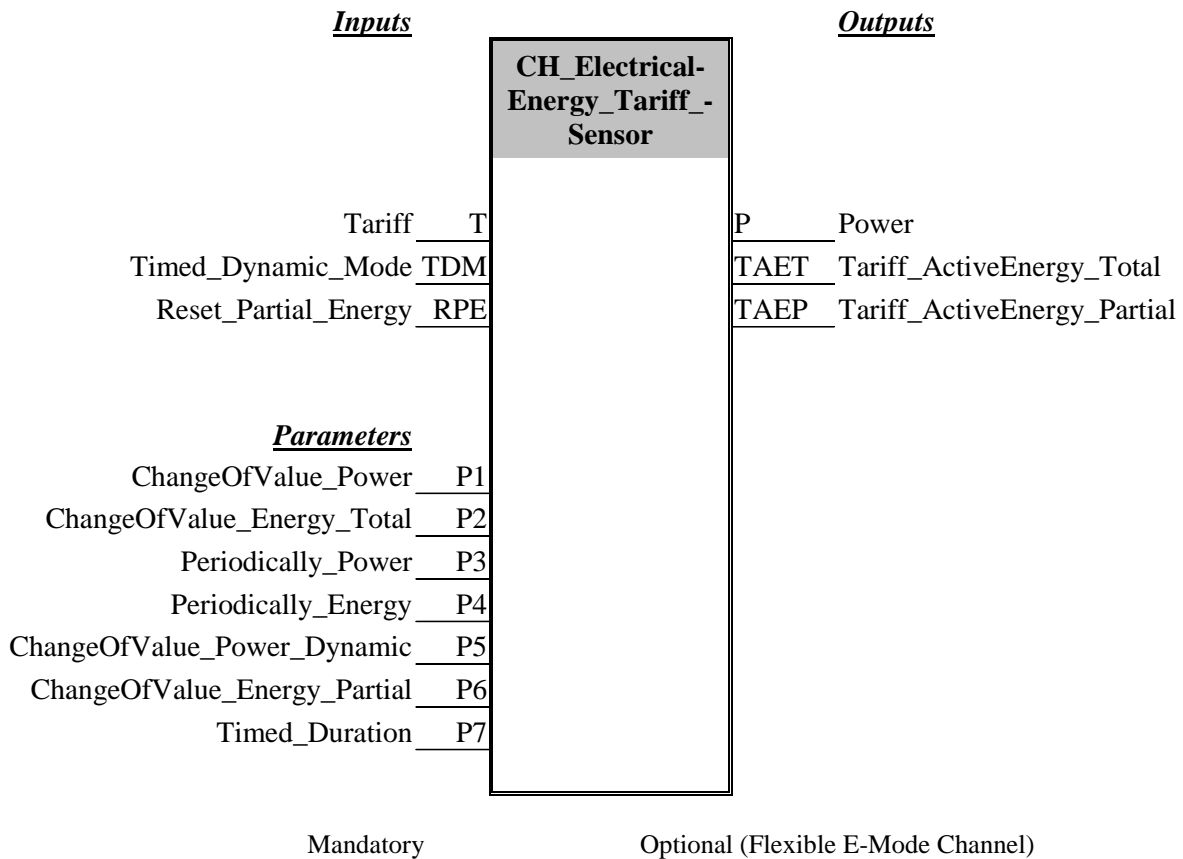


**Figure 1 – Overview of the introduced E-Mode Channels**



## 2.2 CH\_ElectricalEnergy\_Tariff\_Sensor (Channel Code 0580h)

- **Name:** CH\_ElectricalEnergy\_Tariff\_Sensor
- **ID:** 0580h
- **Classification:** Sensor
- **Functional Block:**
  - 1120 - FB Electrical Energy Tariff Sensor
- **Graphical representation:**



- **Datapoint list:**

Index	FB / Datapoint ID	Name	Sub- unit	Main CC	Additional CCs	Flags (i/o,x,v,...)	O/M DPT
1	EETS/T	Tariff	1	CC_Tariff (100)		I	M 5.006
2	EETS/P	Value_Power	1	CC_Value_Power (110)		O	M 14.056
3	EETS/ TAET	Tariff_ActiveEnergy_- Total	1	CC_Tariff_Active- Energy_Total (111)		O	M 235.001
4	EETS/ TDM	Timed_Dynamic_Mode	1	CC_Timed (03)		I	O 1.010

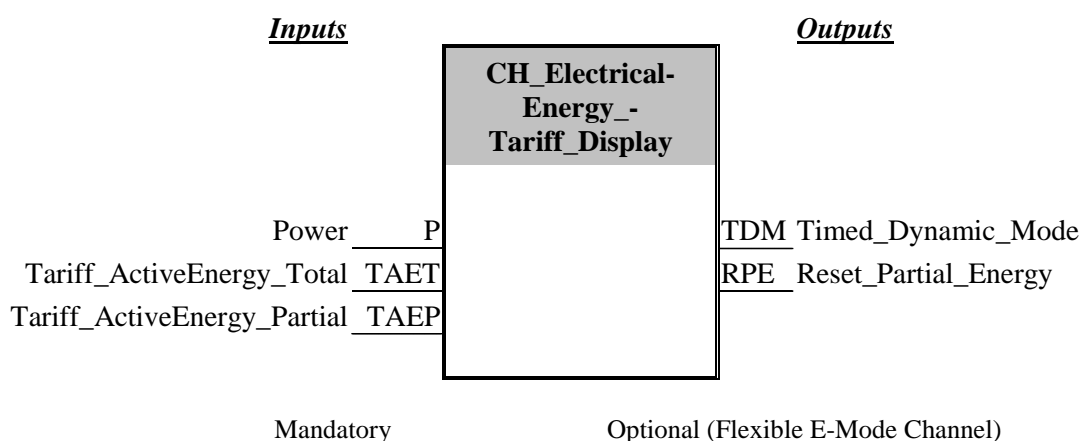
Index	FB / Datapoint ID	Name	Sub-unit	Main CC	Additional CCs	Flags (i/o,x,v,...)	O/M DPT
5	EETS/RP E	Reset_Partial_Energy	1	CC_Reset (XX)		I	O 1.015
6	EETS/TAEP	Tariff_ActiveEnergy_Partial	1	CC_Tariff_Active-Energy_Partial (112)		O	O 235.001

• **Parameter table:**

Index	Identifier	Name	Type	Recommended default Value	Bit-Offset	O/M
1	P1	ChangeOfValue_Power	PART_COV_Power	500 W	-	M
2	P2	ChangeOfValue_Energy-Total	PART_COV_Energy	1000 Wh	-	M
3	P3	Periodically_Power	PART_Time_Delay	5 min	-	M
4	P6	Periodically_Energy	PART_Time_Delay	5 min	-	M
5	P2	ChangeOfValue_Power_Dynamic	PART_COV_Power	50 W	-	O
6	P4	ChangeOfValue_Energy-Partial	PART_COV_Energy	100 Wh	-	O
7	P7	Timed_Duration	PART_Time_Delay	15 min	-	O

## 2.3 CH\_ElectricalEnergy\_Tariff\_Display (Channel Code 0581h)

- **Name:** CH\_Energy\_Tariff\_Display
- **ID:** 0581h
- **Classification:** Metering
- **Functional Block:**
  - 1121 - FB Electrical Energy Tariff Display
- **Graphical representation:**

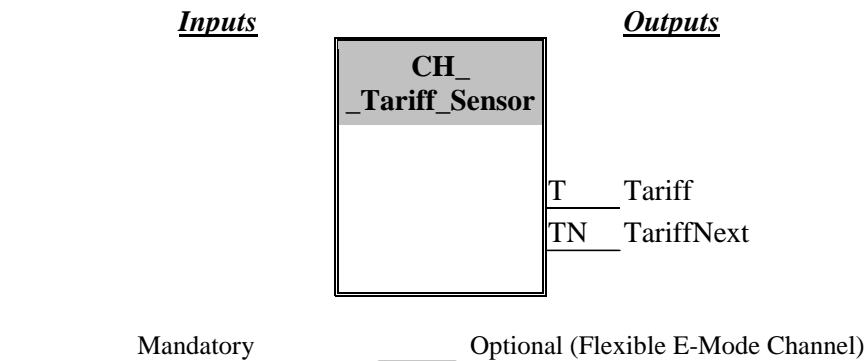


- **Datapoint list:**

Index	FB / Datapoint ID	Name	Sub unit	Main CC	Additional CCs	Flags (i/o,x,v,...)	O/M DPT
1	EETD/P	Power	1	CC_Value_Power (110)		I	M 14.056
2	EETD/TAET	Tariff_Active-Energy_Total	1	CC_Tariff_Active-Energy_Total (111)		I	M 235.001
3	EETD/TAEP	Tariff_ActiveEnergy_Partial	1	CC_Tariff_Active-Energy_Partial (112)		I	O 235.001
4	EETD/TDM	Timed_Dynamic_Mode	1	CC_Timed (03)		O	O 1.010
5	EETD/RPE	Reset_Partial_Energy	1	CC_Reset (XX)		O	O 1.015

## 2.4 CH\_Tariff\_Sensor (Channel Code 0582h)

- **Name:** CH\_Tariff\_Sensor
- **ID:** 0582h
- **Classification:** Metering
- **Functional Block:**
  - 1122 - FB Tariff Sensor
- **Graphical representation:**

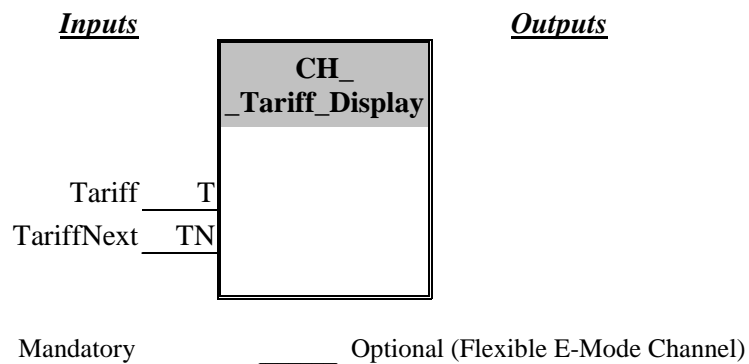


- **Datapoint list:**

Index	FB / Datapoint ID	Name	Subunit	Main CC	Additional CCs	Flags (i/o,x,v.....)	O/M DPT
1	TS/T	Tariff	1	CC_Tariff (108)		O	M 5.006
2	TS/TN	TariffNext	1	CC_TariffNext (109)		O	O 225.00 3

## 2.5 CH\_Tariff\_Display (Channel Code 0583h)

- **Name:** CH\_Tariff\_Display
- **ID:** 0583h
- **Classification:** Metering
- **Functional Block:**
  - 1123 - FB Tariff Display
- **Graphical representation:**



- **Datapoint list:**

Index	FB / Datapoint ID	Name	Subunit	Main CC	Additional CCs	Flags (i/o,x,v,.....)	O/M DPT
1	TD/T	Tariff	1	CC_Tariff (108)		I	M 5.006
2	TD/TN	TariffNext	1	CC_TariffNext (109)		I	O 225.003

### 3 Functional Blocks

#### 3.1 Application model

Figure 2 sketches the model of the application, combining the Functional Blocks.

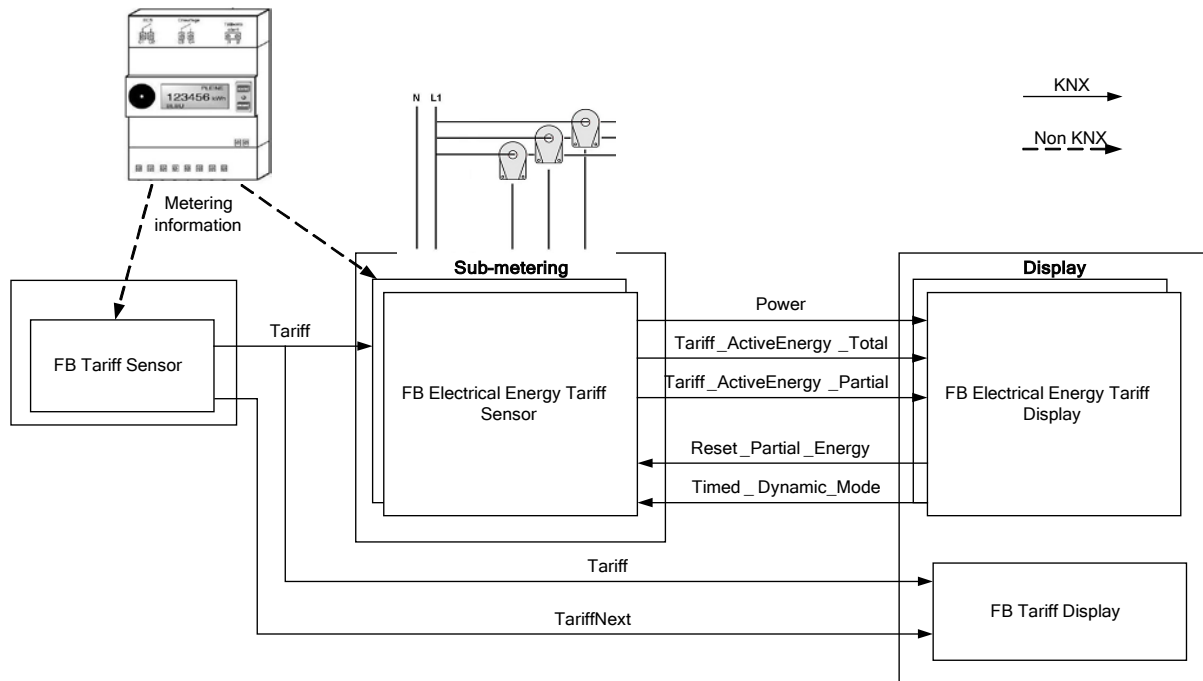


Figure 2 – Electrical submetering application model

#### 3.2 FB Electrical Energy Tariff Sensor (Object Type 1120)

##### 3.2.1 Aims and objectives

The FB Electrical Energy Tariff Sensor (FB EETS) shall measure the power and the energy on an electrical circuit and provide them to the KNX system.

##### 3.2.2 Functional specification

###### 3.2.2.1 Basic functionality

The FB EETS shall be able to measure power and energy. This Functional Block sends information to a display.

This Functional Block is foreseen for electrical energy consumption. It may also be used for electrical energy production.

##### Outputs

The output Datapoints of this FB shall at least contain the electrical power data (P) and the total energy data (TAET) measured by the equipment because they are considered as the minimum requirement for such a display concerning smart metering.

An optional Output may send the partial energy data (TAEP), in order to be able to give the amount of energy consumed between the last reset (the last time the RPE input Datapoint has been received) and the current time. This allows the user to see the consumption of any period of time (day, week, month...).

All these output Datapoints are sent using the corresponding Parameter values for the repetition time and the change of value.

## Inputs

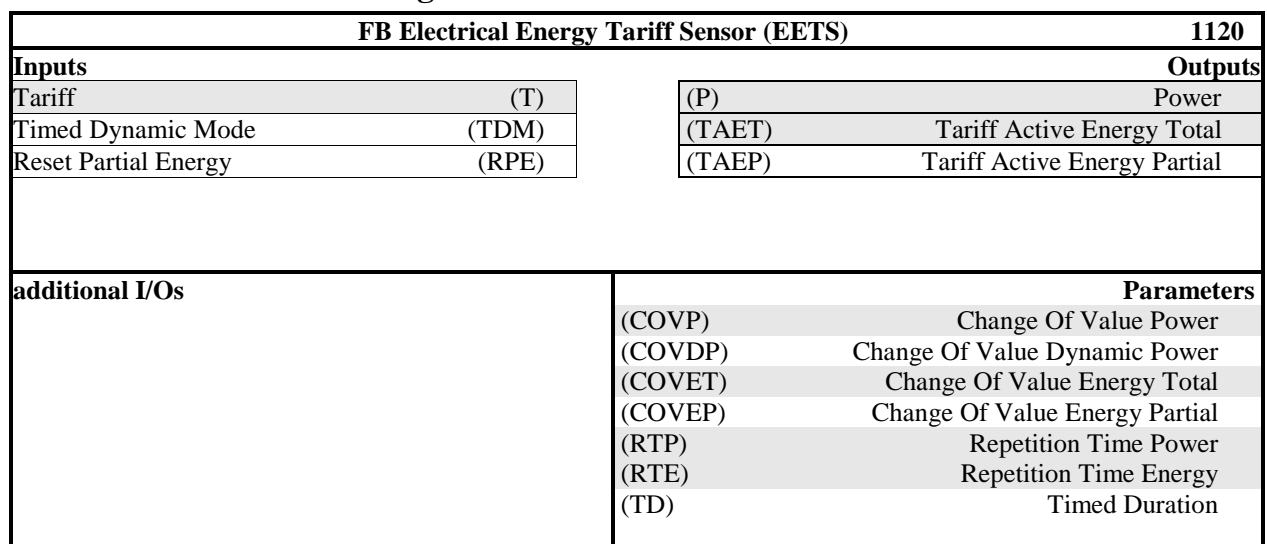
The input Datapoint RPE shall be used to reset the output Datapoint TAEP and so start a new time period for the measurement of energy.

The input Datapoint Timed Dynamic Mode (TDM) shall be used by a display to start a special mode that shows more dynamically the values of power (for example when the user enters a dedicated menu of the display). This is due to the existence of a special parameter called Change Of Value Dynamic Power (COVDP) that may define a smaller value than COVP in order to emit the Power output Datapoint more often when the power measures are changing. The end user may then see the evolution of the power data, refreshing the display with a higher frequency. The Dynamic mode is started for the period that is defined in the parameter Timed Duration (TD). This mode is automatically ended at the end of this period if no Start is received on the input TDM during the period. The period may be stopped using the value Stop of the input TDM. In order to stay in this dynamic mode for a period longer than defined by TD, the value Start may be sent regularly on the input Datapoint TDM.

The input Datapoint Tariff shall be used to know the current tariff used for consumption or production. This information shall be sent together with the energy data in the two output Datapoints TAET and TAEP. It is recommended to use a time-out mechanism for the Input Tariff.

As soon as a new value is received on the Tariff input Datapoint, the two outputs TAET and TAEP shall be sent using the latest measured values of energy (total and partial) for this newly received tariff.

### 3.2.3 Functional Block diagram



 mandatory  optional

Figure 3 – Functional Block Diagram for FB Electrical Energy Tariff Sensor

### 3.2.4 Datapoints

Datapoint	Abbr.	Description	Datapoint Type
<b>Outputs</b>			
Power	P	Value of the measured power	14.056 DPT_Value_Power
Tariff Active Energy Total	TAET	Total value of electrical energy and tariff of this energy	235.001 DPT_Tariff_ActiveEnergy
Tariff Active Energy Partial	TAEP	Partial value of electrical energy and tariff of this energy	235.001 DPT_Tariff_ActiveEnergy

Datapoint	Abbr.	Description	Datapoint Type
<b>Inputs</b>			
Tariff	T	Sets the current tariff value	5.006 DPT_Tariff
Timed Dynamic Mode	TDM	Starts or stops the Timed Dynamic Mode for a better accuracy of the visualisation of the power	1.010 DPT_Start
Reset Partial Energy	RPE	Resets all partial electrical energy values for all tariffs	1.015 DPT_Reset
<b>Parameters</b>			
Change Of Value Power	COVP	Change of value in W for sending the power output	14.056 DPT_Value_Power
Change Of Value Dynamic Power	COVDP	Change of value in W for sending the power output in the timed dynamic mode	14.056 DPT_Value_Power
Change Of Value Energy Total	COVET	Change of value in Wh for sending tariff active energy value total	13.010 DPT_ActiveEnergy
Change Of Value Energy Partial	COVEP	Change of value in Wh for sending tariff active energy value partial	13.010 DPT_ActiveEnergy
Repetition Time Power	RTP	Repetition time value for sending the power	7.005 DPT_TimePeriodSec
Repetition Time Energy	RTE	Repetition time value for sending the electrical energy for each tariff	7.005 DPT_TimePeriodSec
Timed Duration	TD	Timed duration of the Timed Dynamic mode for Power	7.005 DPT_TimePeriodSec

### Runtime Interworking – FB Profiles for EETS

Features and options	Basic FB	Standard Mode
		EETS FB Profile 1
//Outputs		
Output P	M	GO
Output TAET	M	GO
Output TAEP	O	(GO)
// Inputs		
Input T	M	GO
Input TDM	O	(GO)
Input RPE	M	(GO)



### 3.2.5 Detailed specification of the Datapoints

#### 3.2.5.1 Output Power (P)

DP Name:	Power	Abbr.:	P	Mandatory	<input checked="" type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Sensor (EETS)	Can be internal	<input type="checkbox"/>		
<b>Description</b>					
<p>This Datapoint shall represent the physical power measured by the device.</p> <p>If the variation (in absolute value) of the measured power changes more than COVP then the newly measured value shall be transmitted on the bus. If the power doesn't change more than COVP, then the current calculated value shall be transmitted periodically, according to RTP.</p> <p>If the Timed Dynamic Mode is active, the COVDP is used as change of value parameter instead of the COVP.</p>					
<b>Datapoint Type</b>					
DPT_Name:	DPT_Value_Power				
DPT Format:	F <sub>32</sub>	DPT_ID:	14.056		
Field		Supp.	Range	Unit	Default
FloatValue	The power value in F <sub>32</sub>	M	Full	W	None
<b>Output</b>					
this → M	<input checked="" type="checkbox"/>	this → 1	<input type="checkbox"/>		
Spontaneous	<input checked="" type="checkbox"/>	COV:	<input checked="" type="checkbox"/>	Δ-Value	COVP / COVDP
		Cyclic	<input checked="" type="checkbox"/>	Period:	RTP
Request	<input type="checkbox"/>				
<b>Communication Type</b>					
Group Object Datapoint					Mandatory: <input checked="" type="checkbox"/>
Default Group Address:	---				
<b>Dynamics</b>					
Power down:	Save:	<input type="checkbox"/>			
Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
		Saved value:	<input type="checkbox"/>	Actual value (not for input):	<input type="checkbox"/>
	Transmit on bus (only for output):			<input checked="" type="checkbox"/>	Read from bus (only for input): <input type="checkbox"/>
<b>Exception Handling</b>					
---					
<b>Special Features</b>					
---					

### 3.2.5.2 Output Tariff Active Energy Total (TAET)

DP Name:	Tariff Active Energy Total	Abbr.:	TAET	Mandatory	<input checked="" type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Sensor (EETS)			Can be internal	<input type="checkbox"/>
<b>Description</b>					
<p>This Datapoint shall represent the total active energy produced (if negative) or consumed (if positive) for this tariff.</p> <p>For the current tariff</p> <p>If the variation (in absolute value) of the energy for the tariff changes more than COVET, then the new value shall be transmitted on the bus.</p> <p>For the all tariffs, including the current tariff</p> <p>If the energy for the tariff does not change more than COVET, then the current value shall be transmitted periodically, according to RTE.</p>					
<b>Datapoint Type</b>					
DPT_Name:	DPT_Tariff_ActiveEnergy				
DPT Format:	$V_{32}U_8B_8$	DPT_ID:	235.001		
Field		Supp.	Range	Unit	Default
Active Electrical Energy	The total electrical energy in $V_{32}$	M	Full	Wh	None
Tariff	The tariff currently used for the energy in $U_8$	M	Full	None	None
Validity	The validity of tariff and energy data	M	Full	None	None
<b>Output</b>					
this → M	<input checked="" type="checkbox"/>	this → 1	<input type="checkbox"/>		
Spontaneous	<input checked="" type="checkbox"/>	COV:	<input checked="" type="checkbox"/>	Δ-Value	COVET
		Cyclic	<input checked="" type="checkbox"/>	Period:	RTE
Request	<input type="checkbox"/>				
<b>Communication Type</b>					
Group Object Datapoint				Mandatory:	<input type="checkbox"/>
Default Group Address:		---			
<b>Dynamics</b>					
Power down:	Save:	<input checked="" type="checkbox"/>			
Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
		Saved value:	<input checked="" type="checkbox"/>	Actual value (not for input):	<input type="checkbox"/>
	Transmit on bus (only for output):			<input checked="" type="checkbox"/>	Read from bus (only for input):
	<input type="checkbox"/>				
<b>Exception Handling</b>					
---					
<b>Special Features</b>					
<p>If the Datapoint is configured to be readable (S-Mode) and the value is by a Client, then the energy of the currently valid tariff shall be responded.</p> <p>If no value is received on the Input Datapoint Tariff (and until a valid value has been received), then the energy measured shall be classified under "No tariff" (value 0 for field Tariff).</p>					

### 3.2.5.3 Output Tariff Active Energy Partial (TAEP)

DP Name:	Tariff Active Energy Partial	Abbr.:	TAEP	Mandatory	<input type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Sensor (EETS)			Can be internal	<input type="checkbox"/>
<b>Description</b>					
<p>This Datapoint shall represent the partial active energy produced (if negative) or consumed (if positive) for this tariff.</p> <p>For the current tariff</p> <p>If the variation (in absolute value) of the energy for the tariff changes more than COVEP then the new value shall be transmitted on the bus.</p> <p>For the all tariffs, including the current tariff</p> <p>If the energy for the tariff doesn't change more than COVEP, then the current value shall be transmitted periodically, according to RTE.</p> <p>Moreover, this partial energy can be reset to zero value using the Input RPE.</p>					
<b>Datapoint Type</b>					
DPT_Name:	DPT_Tariff_ActiveEnergy				
DPT Format:	$V_{32}U_8B_8$	DPT_ID:	235.001		
Field		Supp.	Range	Unit	Default
Active Electrical Energy	The partial electrical energy in $V_{32}$	O	Full	Wh	None
Tariff	The tariff currently used for the energy in $U_8$	O	Full	None	None
Validity	The validity of tariff and energy data	O	Full	None	None
<b>Output</b>					
this → M	<input checked="" type="checkbox"/>	this → 1	<input type="checkbox"/>		
Spontaneous	<input checked="" type="checkbox"/>	COV:	<input checked="" type="checkbox"/>	Δ-Value	COVEP
		Cyclic	<input checked="" type="checkbox"/>	Period:	RTE
Request	<input type="checkbox"/>				
<b>Communication Type</b>					
Group Object Datapoint				Mandatory:	<input type="checkbox"/>
Default Group Address:		---			
<b>Dynamics</b>					
Power down:	Save:	<input checked="" type="checkbox"/>			
Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
		Saved value:	<input type="checkbox"/>	Actual value (not for input):	<input type="checkbox"/>
	Transmit on bus (only for output):			<input checked="" type="checkbox"/>	Read from bus (only for input):
	<input type="checkbox"/>				
<b>Exception Handling</b>					
---					
<b>Special Features</b>					
<p>If the Datapoint is configured to be readable (S-Mode) and the value is by a Client, then the energy of the currently valid tariff shall be responded.</p> <p>If no value is received on the Input Datapoint Tariff (and until a valid value has been received), then the energy measured shall be classified under "No tariff" (value 0 for field Tariff).</p>					

**3.2.5.4 Input Tariff (T)**

DP Name:	Tariff		Abbr.:	T	Mandatory	<input checked="" type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Sensor (EETS)				Can be internal	<input checked="" type="checkbox"/>
<b>Description</b>						
This Input shall set or modify the current tariff that will be associated to the currently measured energy.						
<b>Datapoint Type</b>						
DPT_Name:	DPT_Tariff					
DPT Format:	U <sub>8</sub>		DPT_ID:	5.006		
Field	Description	Supp.	Range	Unit	Default	
Tariff	The tariff currently used (0 = no tariff available)	M	Full	None	none	
<b>Access Type</b>						
Input						
<input type="checkbox"/>	N → this	<input type="checkbox"/>	<input type="checkbox"/>	1 → this	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Spontaneous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cyclically:	<input checked="" type="checkbox"/>	Time-out: 31 min
<input type="checkbox"/>	Request	<input type="checkbox"/>	<input type="checkbox"/>	Polling:	<input type="checkbox"/>	Period:
<b>Communication Type</b>						
Group Object Datapoint					Mandatory:	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Default Group Address:		---			
<b>Dynamics</b>						
<input type="checkbox"/>	Power down:	Save:	<input type="checkbox"/>			
<input type="checkbox"/>	Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
<input type="checkbox"/>			Saved value:	<input type="checkbox"/>	Current value (not for in input):	<input type="checkbox"/>
<input type="checkbox"/>		Transmit on bus (only for output):		<input type="checkbox"/>	Read from bus (only for input):	<input checked="" type="checkbox"/>
<b>Exception Handling</b>						
--						
<b>Special Features</b>						
--						

**3.2.5.5 Input Timed Dynamic Mode (TDM)**

DP Name:	Timed Dynamic Mode		Abbr.:	TDM	Mandatory	<input type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Sensor (EETS)				Can be internal	<input type="checkbox"/>
<b>Description</b>						
This Input shall allow for starting and stopping the Timed Dynamic Mode in which the output Power is sent with a higher frequency.						
<b>Datapoint Type</b>						
DPT_Name:	DPT_Start					
DPT Format:	B <sub>1</sub>		DPT_ID:	1.010		
Field	Description		Supp.	Range	Unit	Default
b	0 : shall be used to stop the Timed Dynamic Mode 1 : shall be used to start the Timed Dynamic Mode		O	{0, 1}	None	none
<b>Access Type</b>						
Input						
<input type="checkbox"/>	N → this	<input type="checkbox"/>	<input type="checkbox"/>	1 → this	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Spontaneous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cyclically:	<input type="checkbox"/>	Time-out: NO
<input type="checkbox"/>	Request	<input type="checkbox"/>	<input type="checkbox"/>	Polling:	<input type="checkbox"/>	Period:
<b>Communication Type</b>						
Group Object Datapoint					Mandatory:	<input checked="" type="checkbox"/>
Default Group Address:		---				
<b>Dynamics</b>						
<input type="checkbox"/>	Power down:	Save:	<input type="checkbox"/>			
<input type="checkbox"/>	Power up:	Value:	No initialisation:	<input checked="" type="checkbox"/>	Default value:	<input type="checkbox"/>
<input type="checkbox"/>			Saved value:	<input type="checkbox"/>	Current value (not for in input):	<input type="checkbox"/>
<input type="checkbox"/>		Transmit on bus (only for output):		<input type="checkbox"/>	Read from bus (only for input):	<input type="checkbox"/>
<b>Exception Handling</b>						
--						
<b>Special Features</b>						
--						

**3.2.5.6 Input Reset Partial Energy (RPE)**

DP Name:	Reset Partial Energy	Abbr.:	RPE	Mandatory	<input type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Sensor (EETS)			Can be internal	<input type="checkbox"/>
<b>Description</b>					
This Input shall allow for resetting all partial energy values (output TAEP).					
<b>Datapoint Type</b>					
DPT_Name:	DPT_Reset				
DPT Format:	B <sub>1</sub>	DPT_ID:	1.015		
Field	Description	Supp.	Range	Unit	Default
b	0: shall be ignored 1: shall be used to reset the partial energy values	O	{0, 1}	None	none
<b>Access Type</b>					
Input					
N → this	<input checked="" type="checkbox"/>	1 → this	<input type="checkbox"/>		
Spontaneous	<input checked="" type="checkbox"/>	Cyclically:	<input type="checkbox"/>	Time-out:	NO
Request	<input type="checkbox"/>	Polling:	<input type="checkbox"/>	Period:	
<b>Communication Type</b>					
Group Object Datapoint				Mandatory:	<input checked="" type="checkbox"/>
Default Group Address:		---			
<b>Dynamics</b>					
Power down:	Save:	<input type="checkbox"/>			
Power up:	Value:	No initialisation:	<input checked="" type="checkbox"/>	Default value:	<input type="checkbox"/>
		Saved value:	<input type="checkbox"/>	Current value (not for in input):	<input type="checkbox"/>
	Transmit on bus (only for output):		<input type="checkbox"/>	Read from bus (only for input):	<input type="checkbox"/>
<b>Exception Handling</b>					
--					
<b>Special Features</b>					
--					

**3.2.5.7 Parameter Change of Value Power (COVP)**

FB:	EETS	Property Name (Server):	Change of Value Power	Mandatory	<input checked="" type="checkbox"/>
				Optional	<input type="checkbox"/>
<b>Description:</b>					
This represents the minimal change of the measurement of Power that sends a new value on the Output Power.					
DPT:	Name	DPT_Value_Power	DPT_ID	14.056	Datatype format: F <sub>32</sub>
Field	Description	Sup.	Range	Unit	Resol.: Default
FloatValue	0: no COV, only heart-beat other values in range: Delta value used for resending power information	O	{0}, [10..1000]	W	1 W cs
<b>Communication:</b>					
DP Address: (in the server)	Object Type:	1120	Property ID:	110	
	Start-Index:	1	N° of elements	1	
Property access:	Read only	<input type="checkbox"/>	Read/Write	<input checked="" type="checkbox"/>	
Protection	Read level	-	Write level	-	
Exception Handling:	Value after Power-up:	Stored Value	<input checked="" type="checkbox"/>	Curr Value	<input type="checkbox"/> Default Value
<b>Special Features:</b>					

**3.2.5.8 Parameter Change of Value Dynamic Power (COVDP)**

FB:	EETS	Property Name (Server):	Change of Value Dynamic Power		Mandatory	<input type="checkbox"/>	Optional	<input checked="" type="checkbox"/>
<b>Description:</b>								
This represents the minimal change of the measurement of Power that sends a new value on the Output Power, in the timed dynamic mode.								
DPT:	Name	DPT_Value_Power	DPT_ID	14.056	Datatype format:	F <sub>32</sub>		
Field	Description		Sup.	Range	Unit	Resol.:	Default	
FloatValue	0: no COV, only heart-beat other values in range: Delta value used for resending power information if dynamic mode is active.		O	{0}, [5...1000]	W	1 W	cs	
<b>Communication:</b>								
DP Address:		Object Type:	1120		Property ID:	111		
(in the server)		Start-Index:	1		N° of elements	1		
Property access:		Read only <input type="checkbox"/>	- Read/Write <input checked="" type="checkbox"/>					
Protection		Read level	-		Write level	-		
Exception Handling: Value after Power-up: Stored Value <input checked="" type="checkbox"/> Curr Value <input type="checkbox"/> Default Value <input type="checkbox"/>								
<b>Special Features:</b>								

**3.2.5.9 Parameter Change of Value Energy Total (COVET)**

FB:	EETS	Property Name (Server):	Change of Value Energy Total		Mandatory	<input checked="" type="checkbox"/>	Optional	<input type="checkbox"/>
<b>Description:</b>								
This represents the minimal change (in absolute value) of the measurement of Energy Total that sends a new value on the Outputs TAET.								
Please note that only positive values in the range are accepted. If the absolute delta value of energy is greater or equal than the current parameter value, then TAET is resent. If the absolute delta value is less than the current parameter value, TAET is not resent.								
DPT:	Name	DPT_ActiveEnergy	DPT_ID	13.010	Datatype format:	V <sub>32</sub>		
Field	Description		Sup.	Range	Unit	Resol.:	Default	
ActiveEnergy	0: no COV, only heart-beat other values in range: Delta value used for resending electrical energy information on TAET		O	{0}, [10 ... 50 000]	Wh	1 Wh	cs	
<b>Communication:</b>								
DP Address:		Object Type:	1120		Property ID:	112		
(in the server)		Start-Index:	1		N° of elements	1		
Property access:		Read only <input type="checkbox"/>	- Read/Write <input checked="" type="checkbox"/>					
Protection		Read level	-		Write level	-		
Exception Handling: Value after Power-up: Stored Value <input checked="" type="checkbox"/> Curr Value <input type="checkbox"/> Default Value <input type="checkbox"/>								
<b>Special Features:</b>								

**3.2.5.10 Parameter Change of Value Energy Partial (COVEP)**

FB:	EETS	Property Name (Server):	Change of Value Energy Partial			Mandatory	<input type="checkbox"/>	Optional	<input checked="" type="checkbox"/>
<b>Description:</b>									
This represents the minimal change of the measurement of Energy Partial that sends a new value on the Outputs TAEP.									
Please note that only positive values in the range are accepted. If the absolute delta value of energy is greater or equal than the current parameter value, then TAEP is resent. If the absolute delta value is less than the current parameter value, TAEP is not resent.									
DPT:	Name	DPT_ActiveEnergy	DPT_ID	13.010	Datatype format:		V <sub>32</sub>		
Field	Description		Sup	Range		Unit	Resol.:	Default	
ActiveEnergy	0: means no COV, only heart-beat; other values in range: Delta value used for resending electrical energy information on TAEP		O	{0}, [5 ... 50 000]		Wh	1 Wh	cs	
<b>Communication:</b>									
DP Address: (in the server)		Object Type:	1120		Property ID:		113		
		Start-Index:	1		N° of elements		1		
<b>Property access:</b>		Read only	<input type="checkbox"/>	-	Read/Write	<input checked="" type="checkbox"/>			
<b>Protection</b>		Read level	-		Write level	-			
Exception Handling: Value after Power-up: Stored Value <input checked="" type="checkbox"/> Curr Value <input type="checkbox"/> Default Value <input type="checkbox"/>									
<b>Special Features:</b>									

**3.2.5.11 Parameter Repetition Time Power (RTP)**

FB:	EETS	Property Name (Server):	Repetition time Power			Mandatory	<input checked="" type="checkbox"/>	Optional	<input type="checkbox"/>
<b>Description:</b>									
This represents the period of emission of Power (P) when no change of value is detected.									
DPT:	Name	DPT_TimePeriodSec	DPT_ID	7.005	Datatype format:		U <sub>16</sub>		
Field	Description		Sup.	Range		Unit	Resol.:	Default	
UnsignedValue	0: no heart-beat, only COV other values in range: Else : period in s of emission of P		O	{0}, [20 ... 65 535]		s	1 s	cs	
<b>Communication:</b>									
DP Address: (in the server)		Object Type:	1120		Property ID:		114		
		Start-Index:	1		N° of elements		1		
<b>Property access:</b>		Read only	<input type="checkbox"/>	-	Read/Write	<input checked="" type="checkbox"/>			
<b>Protection</b>		Read level	-		Write level	-			
Exception Handling: Value after Power-up: Stored Value <input checked="" type="checkbox"/> Curr Value <input type="checkbox"/> Default Value <input type="checkbox"/>									
<b>Special Features:</b>									
In channel code PART_Cycle_Time is used									



**3.2.5.12 Parameter Repetition Time Energy (RTE)**

<b>FB:</b>	EETS	Property Name ( <u>Server</u> ):	Repetition time Energy			Mandatory	<input checked="" type="checkbox"/>
						Optional	<input type="checkbox"/>
<b>Description:</b>							
This represents the period of emission of outputs energy (TAET and TAEP) when no change of value is detected.							
<b>DPT:</b>	Name	DPT_TimePeriodSec	DPT_ID	7.005	Datatype format:	U <sub>16</sub>	
<b>Field</b>	<b>Description</b>		Sup.	Range	Unit	Resol.:	Default
UnsignedValue	0: no heart-beat, only COV other values in range: period in s of emission of TAET and TAEP		O	{0}, [20 ...65 535]	s	1 s	cs
<b>Communication:</b>							
DP Address: (in the server)		Object Type:	1120	Property ID:		115	
		Start-Index:	1	N° of elements		1	
Property access:		Read only <input type="checkbox"/>	-	Read/Write <input checked="" type="checkbox"/>			
Protection		Read level	-	Write level	-		
Exception Handling:		Value after Power-up:	Stored Value <input checked="" type="checkbox"/>	Curr Value <input type="checkbox"/>	Default Value <input type="checkbox"/>		
<b>Special Features:</b>							
In channel code PART_Cycle_Time is used							

**3.2.5.13 Parameter Timed Duration (TD)**

<b>FB:</b>	EETS	Property Name ( <u>Server</u> ):	Timed Duration			Mandatory	<input type="checkbox"/>
						Optional	<input checked="" type="checkbox"/>
<b>Description:</b>							
This represents the duration of the Timed Dynamic Mode where the output Power is sent more frequently.							
<b>DPT:</b>	Name	DPT_TimePeriodSec	DPT_ID	7.005	Datatype format:	U <sub>16</sub>	
<b>Field</b>	<b>Description</b>		Sup.	Range	Unit	Resol.:	Default
UnsignedValue	Duration of the Timed Dynamic Mode		O	[30 ... 65 535]	s	1 s	cs
<b>Communication:</b>							
DP Address: (in the server)		Object Type:	1120	Property ID:		116	
		Start-Index:	1	N° of elements		1	
Property access:		Read only <input type="checkbox"/>	-	Read/Write <input checked="" type="checkbox"/>			
Protection		Read level	-	Write level	-		
Exception Handling:		Value after Power-up:	Stored Value <input checked="" type="checkbox"/>	Curr Value <input type="checkbox"/>	Default Value <input type="checkbox"/>		
<b>Special Features:</b>							
In channel code PART_Cycle_Time is used							

### 3.3 FB Electrical Energy Tariff Display (Object Type 1121)

#### 3.3.1 Aims and objectives

The FB Electrical Energy Tariff Display (FB EETD) shall display the power and the energy. This information may be sent by the FB Electrical Energy Tariff Sensor (FB EETS).

#### 3.3.2 Functional specification

##### 3.3.2.1 Basic functionality

The FB EETD shall be able to display power and energy.

The input Datapoint Power (P) shall receive the current power measured by a sensor.

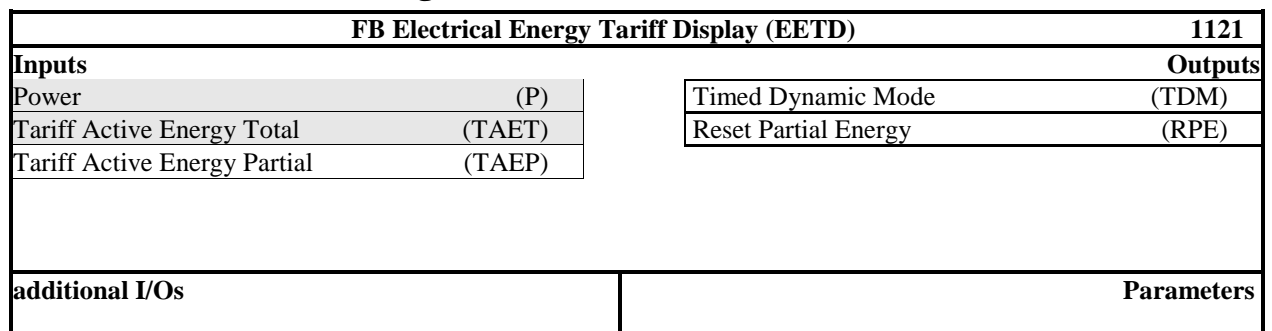
The input Datapoint Tariff Active Energy Total (TAET) shall receive the consumed or produced total energy for each supported tariff. This means that this input shall be capable of supporting multiple energy registers in parallel.

The input Datapoint Tariff Active Energy Partial (TAEP) may optionally receive the consumed or produced partial energy for each supported tariff. This means that this input shall be capable of supporting multiple energy registers in parallel.

The output Datapoint Timed Dynamic Mode (TDM) may optionally be defined in order to start and stop a special mode where the Power is supposed to be received with a higher frequency.

The output Datapoint Reset Partial Energy (RPE) may optionally be defined in order to reset the Tariff Active Energy Partial of the sensor and then be able to measure energy on an interesting period (day, week, month...).

#### 3.3.3 Functional Block diagram



 mandatory  optional

**Figure 4 – Functional Block Diagram for FB Electrical Energy Tariff Display**

#### 3.3.4 Datapoints

Datapoint	Abbr.	Description	Datapoint Type
<b>Outputs</b>			
Timed Dynamic Mode	TDM	Starts or stops the dynamic mode for the a better accuracy of the visualisation of the power	1.010 DPT_Start
Reset Partial Energy	RPE	Resets all partial energy values for all tariffs	1.015 DPT_Reset

Datapoint	Abbr.	Description	Datapoint Type
<b>Inputs</b>			
Power	P	Value of the measured power	14.056 DPT_Value_Power
Tariff Active Energy Total	TAET	Total value of electrical energy and tariff of this energy	235.001 DPT_Tariff_ActiveEnergy
Tariff Active Energy Partial	TAEP	Partial value of electrical energy and tariff of this energy	235.001 DPT_Tariff_ActiveEnergy

#### Runtime Interworking – FB Profiles for EETD

Features and options	Basic FB	Standard Mode
		EETD FB Profile 1
<b>// Outputs</b>		
Output TDM	O	(GO)
Output RPE	O	(GO)
<b>// Inputs</b>		
Input P	M	GO
Input TAET	M	GO
Input TAEP	O	(GO)

### 3.3.5 Detailed specification of the Datapoints

#### 3.3.5.1 Output Timed Dynamic Mode (TDM)

DP Name:	Timed Dynamic Mode		Abbr.:	TDM	Mandatory	<input type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Display (EETD)			Can be internal	<input checked="" type="checkbox"/>	
<b>Description</b>						
This Output shall allow for starting the Timed Dynamic Mode in which the corresponding sensor sends Power with a better accuracy.						
<b>Datapoint Type</b>						
DPT_Name:	DPT_Start					
DPT Format:	B <sub>1</sub>	DPT_ID:	1.010			
Field		Supp.	Range	Unit	Default	
b	0: shall stop the Timed Dynamic Mode in the sensor	O	{0, 1}	None	None	
	1: shall start or restart the Timed Dynamic Mode in the sensor					
<b>Output</b>						
this → M	<input checked="" type="checkbox"/>	this → 1	<input type="checkbox"/>			
Spontaneous	<input checked="" type="checkbox"/>	COV:	<input type="checkbox"/>	Δ-Value	Min repetition period:	
		Cyclic	<input type="checkbox"/>	Period:		
Request	<input type="checkbox"/>					
<b>Communication Type</b>						
Group Object Datapoint					Mandatory:	<input type="checkbox"/>
Default Group Address:		---				
<b>Dynamics</b>						
Power down:	Save:	<input type="checkbox"/>				
Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>	
		Saved value:	<input type="checkbox"/>	Actual value (not for input):	<input type="checkbox"/>	
	Transmit on bus (only for output):			<input type="checkbox"/>	Read from bus (only for input): <input type="checkbox"/>	
<b>Exception Handling</b>						
---						
<b>Special Features</b>						
---						

**3.3.5.2 Output Reset Partial Energy (RPE)**

DP Name:	Reset Partial Energy	Abbr.:	RPE	Mandatory	<input type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Display (EETD)			Can be internal	<input checked="" type="checkbox"/>
<b>Description</b>					
This Output shall allow for resetting all partial energy values (for all supported tariffs) of the linked sensor.					
<b>Datapoint Type</b>					
DPT_Name:	DPT_Reset				
DPT Format:	B <sub>1</sub>	DPT_ID:	1.015		
Field		Supp.	Range	Unit	Default
b	0: shall be ignored 1: shall reset all partial energy values	O	{0, 1}	None	None
<b>Output</b>					
this → M	<input checked="" type="checkbox"/>	this → 1	<input type="checkbox"/>		
Spontaneous	<input checked="" type="checkbox"/>	COV:	<input type="checkbox"/>	Δ-Value	Min repetition period:
		Cyclic	<input type="checkbox"/>	Period:	
Request	<input type="checkbox"/>				
<b>Communication Type</b>					
Group Object Datapoint				Mandatory:	<input type="checkbox"/>
Default Group Address:		---			
<b>Dynamics</b>					
Power down:	Save:	<input type="checkbox"/>			
Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
		Saved value:	<input type="checkbox"/>	Actual value (not for input):	<input type="checkbox"/>
	Transmit on bus (only for output):		<input type="checkbox"/>	Read from bus (only for input):	<input type="checkbox"/>
<b>Exception Handling</b>					
---					
<b>Special Features</b>					
---					

**3.3.5.3 Input Power (P)**

DP Name:	Power	Abbr.:	P	Mandatory	<input checked="" type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Display (EETD)			Can be internal	<input type="checkbox"/>
<b>Description</b>					
This Input shall represent the physical power measured by the device.					
<b>Datapoint Type</b>					
DPT_Name:	DPT_Value_Power				
DPT Format:	F <sub>32</sub>	DPT_ID:	14.056		
Field	Description	Supp.	Range	Unit	Default
FloatValue	The power value in F <sub>32</sub>	M	Full	W	None
<b>Access Type</b>					
Input					
	N → this	<input type="checkbox"/>	1 → this	<input checked="" type="checkbox"/>	
	Spontaneous	<input checked="" type="checkbox"/>	Cyclically:	<input type="checkbox"/>	Time-out: NO
	Request	<input type="checkbox"/>	Polling:	<input type="checkbox"/>	Period:
<b>Communication Type</b>					
Group Object Datapoint				Mandatory:	<input checked="" type="checkbox"/>
	Default Group Address:	---			
<b>Dynamics</b>					
	Power down:	Save:	<input type="checkbox"/>		
	Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:
			Saved value:	<input type="checkbox"/>	Current value (not for in input):
		Transmit on bus (only for output):	<input type="checkbox"/>	Read from bus (only for input):	<input checked="" type="checkbox"/>
<b>Exception Handling</b>					
--					
<b>Special Features</b>					
--					

**3.3.5.4 Input Tariff Active Energy Total (TAET)**

DP Name:	Tariff Active Energy Total		Abbr.:	TAET		Mandatory	<input checked="" type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Display (EETD)					Can be internal	<input type="checkbox"/>
<b>Description</b>							
This Input shall represent the total active energy produced (if negative) or consumed (if positive) for this tariff.							
<b>Datapoint Type</b>							
DPT_Name:	DPT_Tariff_ActiveEnergy						
DPT Format:	V <sub>32</sub> U <sub>8</sub> B <sub>8</sub>			DPT_ID:	235.001		
Field	Description	Supp.	Range	Unit	Default		
Active Electrical Energy	The partial electrical energy in V <sub>32</sub>	M	Full	Wh	None		
Tariff	The tariff currently used for the energy in U <sub>8</sub>	M	Full	None	None		
Validity	The validity of tariff and energy data	M	Full	None	None		
<b>Access Type</b>							
Input							
<input type="checkbox"/>	N → this	<input type="checkbox"/>	1 → this	<input checked="" type="checkbox"/>			
<input type="checkbox"/>	Spontaneous	<input checked="" type="checkbox"/>	Cyclically:	<input type="checkbox"/>	Time-out:	NO	
<input type="checkbox"/>	Request	<input type="checkbox"/>	Polling:	<input type="checkbox"/>	Period:		
<b>Communication Type</b>							
Group Object Datapoint					Mandatory:	<input checked="" type="checkbox"/>	
Default Group Address:		---					
<b>Dynamics</b>							
<input type="checkbox"/>	Power down:	Save:	<input type="checkbox"/>				
<input type="checkbox"/>	Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>	
<input type="checkbox"/>			Saved value:	<input type="checkbox"/>	Current value (not for in input):	<input type="checkbox"/>	
<input type="checkbox"/>		Transmit on bus (only for output):	<input type="checkbox"/>	Read from bus (only for input):	<input checked="" type="checkbox"/>		
<b>Exception Handling</b>							
--							
<b>Special Features</b>							
--							

**3.3.5.5 Input Tariff Active Energy Partial (TAEP)**

DP Name:	Tariff Active Energy Partial		Abbr.:	TAEP	Mandatory	<input type="checkbox"/>
FB Name:	FB Electrical Energy Tariff Display (EETD)				Can be internal	<input type="checkbox"/>
<b>Description</b>						
This Input shall represent the partial active energy produced (if negative) or consumed (if positive) for this tariff.						
<b>Datapoint Type</b>						
DPT_Name:	DPT_Tariff_ActiveEnergy					
DPT Format:	V <sub>32</sub> U <sub>8</sub> B <sub>8</sub>			DPT_ID:	235.001	
Field	Description	Supp.	Range	Unit	Default	
ActiveElectrical-Energy	The partial electrical energy in V <sub>32</sub>	<input type="radio"/>	Full	Wh	None	
Tariff	The tariff currently used for the energy in U <sub>8</sub>	<input type="radio"/>	Full	None	None	
Validity	The validity of tariff and energy data	<input type="radio"/>	Full	None	None	
<b>Access Type</b>						
Input						
<input type="checkbox"/>	N → this	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1 → this	<input type="checkbox"/>	
<input type="checkbox"/>	Spontaneous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cyclically:	<input type="checkbox"/>	Time-out: NO
<input type="checkbox"/>	Request	<input type="checkbox"/>	<input type="checkbox"/>	Polling:	<input type="checkbox"/>	Period:
<b>Communication Type</b>						
Group Object Datapoint					Mandatory:	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Default Group Address:		---			
<b>Dynamics</b>						
<input type="checkbox"/>	Power down:	Save:	<input type="checkbox"/>			
<input type="checkbox"/>	Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
<input type="checkbox"/>			Saved value:	<input type="checkbox"/>	Current value (not for in input):	<input type="checkbox"/>
<input type="checkbox"/>		Transmit on bus (only for output):		<input type="checkbox"/>	Read from bus (only for input):	<input checked="" type="checkbox"/>
<b>Exception Handling</b>						
--						
<b>Special Features</b>						
--						



## 3.4 FB Tariff Sensor (Object Type 1122)

### 3.4.1 Aims and objectives

The FB Tariff Sensor (FB TS) shall provide the tariff information: the current tariff and the next one.

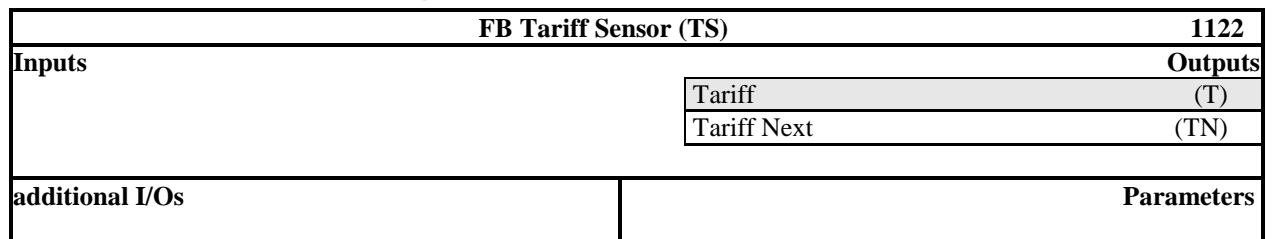
### 3.4.2 Functional specification

#### 3.4.2.1 Basic functionality

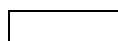
The FB TS shall be able to provide the current tariff. This information shall be sent with a heart-beat in order to be able to have a time-out mechanism in the receiver.

Optionally, it shall also be able to provide the next tariff that will be used and the timed duration until the change to that tariff. This Datapoint is interesting for a display or a load scheduler in order to delay or advance any action that consumes energy, if the next tariff is cheaper or more expensive.

### 3.4.3 Functional Block diagram



mandatory



optional

Figure 5 – Functional Block Diagram for FB Tariff Sensor

### 3.4.4 Datapoints

Datapoint	Abbr.	Description	Datapoint Type
<b>Outputs</b>			
Tariff	T	Sends the current tariff	5.006 DPT_Tariff
Tariff Next	TN	Sends the next tariff with the timed duration until the change	225.003 DPT_TariffNext

### Runtime Interworking – FB Profiles for TS

	Basic FB	Standard Mode
		TS FB Profile 1
// <b>Outputs</b>		
Output T	M	GO
Output TN	O	(GO)

### 3.4.5 Detailed specification of the Datapoints

#### 3.4.5.1 Output Tariff (T)

DP Name:	Tariff		Abbr.:	T	Mandatory	<input checked="" type="checkbox"/>
FB Name:	FB Tariff Sensor (TS)			Can be internal	<input type="checkbox"/>	
<b>Description</b>						
This Output shall represent the current tariff.						
<b>Datapoint Type</b>						
DPT_Name:	DPT_Tariff					
DPT Format:	U <sub>8</sub>			DPT_ID:	5.006	
Field		Supp.	Range	Unit	Default	
Tariff	The tariff currently used (0 = no tariff available)		M	Full	None	none
<b>Output</b>						
	this → M	<input checked="" type="checkbox"/>	this → 1	<input type="checkbox"/>		
	Spontaneous	<input checked="" type="checkbox"/>	COV:	<input type="checkbox"/>	Δ-Value	Min repetition period: 15 min
			Cyclic	<input checked="" type="checkbox"/>	Period:	
	Request	<input checked="" type="checkbox"/>				
<b>Communication Type</b>						
Group Object Datapoint				Mandatory:	<input type="checkbox"/>	
	Default Group Address:	---				
<b>Dynamics</b>						
	Power down:	Save:	<input type="checkbox"/>			
	Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
			Saved value:	<input type="checkbox"/>	Actual value (not for input):	<input checked="" type="checkbox"/>
	Transmit on bus (only for output):			<input checked="" type="checkbox"/>	Read from bus (only for input):	<input type="checkbox"/>
<b>Exception Handling</b>						
---						
<b>Special Features</b>						
---						

**3.4.5.2 Output Tariff Next (TN)**

DP Name:	Tariff Next		Abbr.:	TN	Mandatory	<input type="checkbox"/>
FB Name:	FB Tariff Sensor (TS)				Can be internal	<input type="checkbox"/>
<b>Description</b>						
This Output shall represent the next tariff with the timed duration until the change.						
<b>Datapoint Type</b>						
DPT_Name:	DPT_TariffNext					
DPT Format:	U <sub>16</sub> U <sub>8</sub>		DPT_ID:	225.003		
Field				Supp.	Range	Unit
Tariff	The next active Tariff after expiration of the delay time.			M	Full	None
Delay time	Delay time until next change of tariff			M	Full	min
<b>Output</b>						
<input type="checkbox"/>	this → M	<input checked="" type="checkbox"/>	this → 1	<input type="checkbox"/>		
<input type="checkbox"/>	Spontaneous	<input checked="" type="checkbox"/>	COV:	<input type="checkbox"/>	Δ-Value	Min repetition period:
<input type="checkbox"/>			Cyclic	<input type="checkbox"/>	Period:	
<input type="checkbox"/>	Request	<input type="checkbox"/>				
<b>Communication Type</b>						
Group Object Datapoint					Mandatory:	<input type="checkbox"/>
<input type="checkbox"/>	Default Group Address:		---			
<b>Dynamics</b>						
<input type="checkbox"/>	Power down:	Save:	<input checked="" type="checkbox"/>			
<input type="checkbox"/>	Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
<input type="checkbox"/>			Saved value:	<input type="checkbox"/>	Actual value (not for input):	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Transmit on bus (only for output):			<input checked="" type="checkbox"/>	Read from bus (only for input):	<input type="checkbox"/>
<b>Exception Handling</b>						
---						
<b>Special Features</b>						
---						

### 3.5 FB Tariff Display (Object Type 1123)

#### 3.5.1 Aims and objectives

The FB Tariff Display (FB TD) shall display the tariff information: the current tariff and the next one.

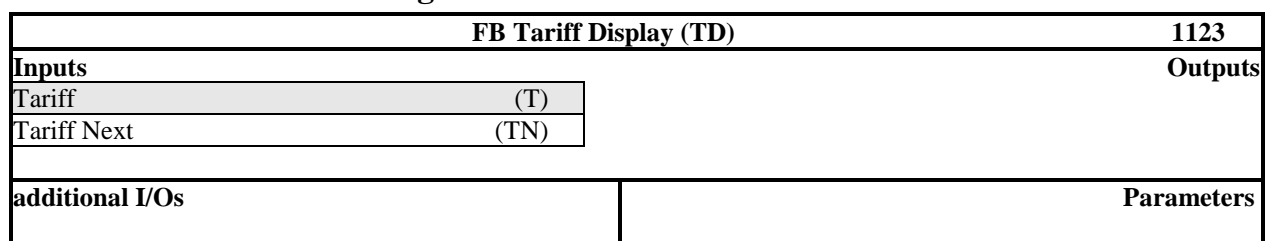
#### 3.5.2 Functional specification

##### 3.5.2.1 Basic functionality

The FB TS shall be able to display the current tariff. It is recommended to use a time-out mechanism for the Input Tariff.

Optionally, it shall also be able to display the next tariff that will be used and the timed duration until the change to that tariff.

#### 3.5.3 Functional Block diagram




 mandatory       optional

Figure 6 – Functional Block Diagram for FB Tariff Sensor

#### 3.5.4 Datapoints

Datapoint	Abbr.	Description	Datapoint Type
<b>Inputs</b>			
Tariff	T	Sends the current tariff	5.006 DPT_Tariff
Tariff Next	TN	Sends the next tariff with the timed duration until the change	225.003 DPT_TariffNext

#### Runtime Interworking – FB Profiles for TD

Features and options	Basic FB	Standard Mode
		TS FB Profile 1
// Inputs		
Input T	M	GO
Input TN	O	(GO)

### 3.5.5 Detailed specification of the Datapoints

#### 3.5.5.1 Input Tariff (T)

DP Name:	Tariff		Abbr.:	T	Mandatory	<input checked="" type="checkbox"/>
FB Name:	FB Tariff Display (TD)			Can be internal	<input type="checkbox"/>	
<b>Description</b>						
This Input shall represent the current tariff.						
<b>Datapoint Type</b>						
DPT_Name:	DPT_Tariff					
DPT Format:	U <sub>8</sub>	DPT_ID:	5.006			
Field	Description	Supp.	Range	Unit	Default	
Tariff	The tariff currently used (0 = no tariff available)	M	Full	None	none	
<b>Access Type</b>						
Input						
<input type="checkbox"/>	N → this	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1 → this	<input type="checkbox"/>	
<input type="checkbox"/>	Spontaneous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cyclically:	<input checked="" type="checkbox"/>	Time-out: 31 min
<input type="checkbox"/>	Request	<input type="checkbox"/>	<input type="checkbox"/>	Period:	<input type="checkbox"/>	
<b>Communication Type</b>						
Group Object Datapoint					Mandatory:	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Default Group Address:		---			
<b>Dynamics</b>						
<input type="checkbox"/>	Power down:	Save:	<input type="checkbox"/>			
<input type="checkbox"/>	Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
<input type="checkbox"/>			Saved value:	<input type="checkbox"/>	Current value (not for in input):	<input type="checkbox"/>
<input type="checkbox"/>	Transmit on bus (only for output):			<input type="checkbox"/>	Read from bus (only for input):	<input checked="" type="checkbox"/>
<b>Exception Handling</b>						
--						
<b>Special Features</b>						
--						

**3.5.5.2 Input Tariff Next (TN)**

DP Name:	Tariff Next		Abbr.:	TN	Mandatory	<input type="checkbox"/>
FB Name:	FB Tariff Display (TD)				Can be internal	<input type="checkbox"/>
<b>Description</b>						
This Input shall represent the next tariff with the timed duration until the change.						
<b>Datapoint Type</b>						
DPT_Name:	DPT_TariffNext					
DPT Format:	U <sub>16</sub> U <sub>8</sub>		DPT_ID:	225.003		
Field	Description	Supp.	Range	Unit	Default	
Tariff	The next active Tariff after expiration of the delay time	M	Full	None	None	
Delay time	Delay time until next change of tariff	M	Full	min	None	
<b>Access Type</b>						
Input						
<input type="checkbox"/>	N → this	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1 → this	<input type="checkbox"/>	
<input type="checkbox"/>	Spontaneous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cyclically:	<input type="checkbox"/>	Time-out: NO
<input type="checkbox"/>	Request	<input type="checkbox"/>	<input type="checkbox"/>	Polling:	<input type="checkbox"/>	Period:
<b>Communication Type</b>						
Group Object Datapoint					Mandatory:	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Default Group Address:		---			
<b>Dynamics</b>						
<input type="checkbox"/>	Power down:	Save:	<input type="checkbox"/>			
<input type="checkbox"/>	Power up:	Value:	No initialisation:	<input type="checkbox"/>	Default value:	<input type="checkbox"/>
<input type="checkbox"/>			Saved value:	<input type="checkbox"/>	Current value (not for in input):	<input type="checkbox"/>
<input type="checkbox"/>		Transmit on bus (only for output):		<input type="checkbox"/>	Read from bus (only for input):	<input checked="" type="checkbox"/>
<b>Exception Handling</b>						
--						
<b>Special Features</b>						
--						