Saving Energy with SIMATIC S7 PROFlenergy with ET200S (STEP 7 V5.5) Application • November 2011

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# SIEMENS

SIMATIC

PROFlenergy

Application of PROFINET profile "PROFIenergy"

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## Preface

This application is part of our series

"Saving Energy with SIMATIC S7".

Applications realized with STEP 7 V5.5 that have already been published:

- PROFlenergy with ET 200S
- PROFlenergy with the I-Device
- PROFlenergy with measuring devices PAC3200 / PAC4200

or with SCOUT:

PROFlenergy with SIMOTION

The following applications have already been configured with TIA Portal:

- PROFlenergy with ET 200SP
- PROFlenergy with Comfort panel

The procedure and parameterization can also be used to migrate your PROFIenergy applications from STEP 7 V5.5 to TIA Portal.

Further information on the topic of energy efficiency is available on our website:

• Energy-efficient production

#### Validity

Valid for STEP 7 V5.5 and WinCC flexible 2008.

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1.1 Overview

# 1 Automation task

## 1.1 Overview

#### Introduction

The importance of energy management will grow in the future. To cut costs by saving energy in the production is an approach that has been used for quite some time already. Recently, short production-free times become center of the focus - from short pauses up to shifts off work.

Main switch turned off - the complete production stops and the lights in the hall go out. This is the common way in nearly each plant all over the world in production-free times like weekends or during plant vacation shutdown. But what happens during shorter pauses? Here, the plant proceeds and consumes energy without delivering productive results.

Is it not possible to put smaller units of the plant that are not needed over a certain period of time into an energy saving mode while the rest of the plant keeps on producing?

All this might considerably improve the energy balance of a production unit.

The currently used technology which isolates the production components from the mains via one or more main switches is inappropriate for that purpose as it deactivates production units in an undifferentiated way. Hard-wired switching paths for firmly defined production units are not flexible enough to make the grade concerning energy efficiency.

The decision for PROFINET already lays the foundations for a new and futureoriented energy management.

Future-oriented energy management means: Units are no longer switched off via the conventional method which uses the main switch, but in a better defined way via the network!

In doing so, the general power supply of the components remains activated and the components enter a defined energy-saving state - initiated by a command.

PROFlenergy is a profile defined by the PROFINET user organization which provides the prerequisites for a vendor-independent system that can be generally used to switch off individual consumers or complete production units in a flexible and intelligent way on a short-term base.

SIEMENS already supports PROFIenergy <u>/1/</u> with first implementations into the automation system SIMATIC.

The following application shows step by step how such an application can be realised using the ET 200S with integrated PROFlenergy functionality.

#### Overview of the automation task

The following figure gives an overview of the automation task.



This application describes the switch-off of automation components using an example from production - here a production line with robots.

This plant consists of one feeding and one discharging conveyor belt and a processing unit. The belts are connected to an ET 200S; each with an own PROFlenergy-enabled power module. For reasons of clarification the processing unit is a "black box" that is switched on/off via an own ET 200S.

In terms of energy saving the PROFlenergy does not focus on the drive motors since these are switched off in case of a production stop. It rather concentrates on the numerous sensors and further electronic components.

#### 1.2 Scenarios

#### Description of the automation task

During a pause the components of the automation component shall be switched off. The spontaneous or regularly planned pause can be initiated by the user via the control system. After the production has stopped parts of the decentral periphery are switched off via applicable PROFIenergy commands. Before the production is started again the necessary automation components are switched on again.





A variable table and an optional control panel serve to visualize and control.

## 1.2 Scenarios

#### Requirements of the automation task

This application example shall present the following switch-on and switch-off scenarios.

Table 1-1

| Problem description                               | Explanation   |
|---|---|
| Switch off the first components of the plant      | If no staggered switch-off is required; which means that all parts are switched off at once           |
| Switch off further components of the plant        | Staggered switch-off<br>Coordinated shut-down, i.e. necessary<br>because of the technological process |
| Switch on individual components of the plant      | Staggered switch-on   |
| Switch on all / remaining components of the plant | Components of the plant that are not subject to a special switch-on sequence.                         |

2.1 Overview of the overall solution

# 2 Automation solution

## 2.1 Overview of the overall solution

#### Layout

The following figure shows a layout of the most important components of the solution:



#### Structure

The plant described above is based in a decentral design. Via two ET 200S with several I/O groups (load groups) each, the CPU controls the plant. PROFIenergyenabled power modules separate the I/O groups. The respective I/O modules have to supply the sensors and actuators with voltage to achieve appropriate energy savings. The energy is saved by switching off the supply voltage via the power modules.

A direct supply of the sensors and actuators via a "24V bus" would impede a selective switch-off and by that the saving of energy.

Input / visualization via HMI is offered as an option. The same information and input fields are available in a variable table. The panel itself can also be simulated on the PG via the WinCC flexible Runtime.

#### Topics not covered by this application

This application does not contain a description of how to switch off a plant. This is already implemented into existing plants and differs too much from plant to plant.

#### 2.1 Overview of the overall solution

For the same reason there is no staggered switch-off of the components with PROFlenergy.

Hereafter, the basic functionality of the PROFIenergy profile and the respective function blocks for SIMATIC will be explained.

#### Required knowledge

It is assumed that the user has basic knowledge in automation, SIMATIC, PROFINET and project planning with STEP 7.

2.2 Description of the core functionality

## 2.2 Description of the core functionality

Overview and description of the user interface

| Figure 2-2 |   |  |                |
|------------|---|--|----------------|
| SIEMENS    |   | SIMATIC  | MULTI PANEL    |
| PROF       | Tenergy with SIM  | ATIC S7-300 and ET 20  | <u>os</u>      |
|            | onfirm 1000<br>Inbound<br>conveyor Man<br>Assembly<br>station | 0       ms       ET 200S-101 : Conveyor<br>Inbound & Outbound         0       ms       ET 200S-102 : Assembly         ual Start / Stop | Ĭ              |
|            | Outbound<br>conveyor  | US<br>Inbound<br>conveyor Assembly Out<br>station Con  | bound<br>veyor |

All used command bits refer directly to one or both instance data blocks (FB53 / FB815 for PROFlenergy device 1 and 2).

**Selection** determines the function of the power modules in the ET 200S. Confirm initiates the parameter transfer.

**Pause Time** determines the planned pause interval individually for each PROFlenergy device.

**Manual Start/Stop** initiates the start or stop command for both PROFlenergy devices.

Status shows the feedback of the DI modules.

2.3 Hardware and software components used

## 2.3 Hardware and software components used

The application was created with the following components:

## Hardware components

| Tal | ble | 2-1      |
|-----|-----|----------|
|     | 510 | <u> </u> |

| Component  | Qty. | MLFB/order number  | Note  |
|--|------|--------------------|---|
| SIMATIC S7 -300,<br>Profile rail   | 1    | 6S7 390-1AE80-0AA0 |   |
| SIMATIC S7-300 reg.<br>power supply PS307,<br>input : AC 120/230 V<br>output DC 24 V/5 A                       | 1    | 6ES7307-1EA01-0AA0 |   |
| SIMATIC S7-300 CPU<br>317-2 PN/DP,<br>PROFINET   | 1    | 6ES7317-2EK14-0AB0 | For all S7 CPU available as an option                   |
| SIMATIC S7, MMC<br>Micro Memory<br>CardS7-300, 2<br>MBYTE  |      | 6ES7953-8LL20-0AA0 |   |
| Profile rail<br>EN60715  | 1    | 6ES5710-8MA11      |   |
| SIMATIC DP, interface<br>module IM151-3 PN<br>HF for ET 200S   | 2    | 6ES7151-3BA23-0AB0 | firmware level V7.0 or higher required                  |
| ET 200SPower<br>module PM-E<br>DC24V/8A RO   | 3    | 6ES7138-4CA80-0AB0 |   |
| SIMATIC DP,<br>electronic modules for<br>ET 200S, 2 DI<br>standard DC 24V, 5<br>pcs. per packaging<br>unit     | 1(3) | 6ES7131-4BB00-0AA0 | Alternative I/O<br>modules according to<br>availability |
| SIMATIC DP,<br>electronic modules for<br>ET 200S, 2 DO<br>standardDC 24V/0,5A,<br>5 pcs. per packaging<br>unit | 1(3) | 6ES7132-4BB01-0AA0 | Alternative I/O<br>modules according to<br>availability |

| 2.3 Hardware | and | software | components | used |
|--------------|-----|----------|------------|------|
|--------------|-----|----------|------------|------|

| Component   | Qty. | MLFB/order number  | Note                                   |
|---|------|--------------------|--|
| SIMATIC DP, terminal<br>module TM-P15C23-<br>A0 for power modules,<br>clamp terminals                                       | 3    | 6ES7193-4CD30-0AA0 | Alternative types<br>available         |
| SIMATIC DP, terminal<br>module TM-E15S24-<br>01 for electronic<br>modules, screw<br>terminals, 5 pcs. per<br>packaging unit | 2(6) | 6ES7193-4CB20-0AA0 | Alternative types<br>available         |
| SIMATIC Field PG M2   | 1    | Configurator       | Compatible PC                          |
| SIMATIC PROFINET cable and connectors   |      |                    | As alternative<br>Ethernet patch cabel |

## Standard software components

Table 2-2

| Component           | Qty. | MLFB/order number  | Note     |
|---------------------|------|--------------------|----------|
| STEP 7 V5.5         | 1    | 6ES7810-5CC10      |          |
| WinCC flexible 2008 | 1    | 6AV6613-0AA51-3CA5 | Optional |

#### Example files and projects

The list below includes all files and projects used in this example.

Table 2-3

| Component                                    | Note                                      |
|--|---|
| 41986454_PROFIenergy_ET200S_CODE_V12.zip     | This zip file contains the STEP 7 project |
| 41986454_PROFlenergy_ET200S _DOKU_V12_de.pdf | This document.                            |

3.1 PROFlenergy profile

# 3 Basic information

This chapter explains the functions of PROFlenergy, especially the relation between the functional modules and the hardware.

## 3.1 **PROFlenergy profile**

The PROFlenergy profile presents methods and techniques for implementing energy-saving functions into PROFINET IO devices. And not only manufacturer-independently into simple I/O devices but also into intelligent and complex devices.

PROFlenergy consists of a group of methods that serve for parameter setting, the start and stop commands as well as registration of the energy consumption.

PROFlenergy is based on existing PROFINET mechanisms - changes are not necessary. This way users of PROFINET are able to integrate PROFlenergy into existing plants without basic changes of the plant.

PROFlenergy controller: This means a SPS, in this case the SIMATIC S7 CPU 317-2PN/DP. The user can decide whether to integrate the PROFlenergy management into an existing control or into an additional control.

PROFIenergy device: A PROFINET IO device with integrated PROFIenergy functionality. In this case a SIMATIC ET 200S consisting of a head module (IM151-3PN HF V7.0) and a switchable power module (PM-E DC24V/8A RO).

PROFlenergy is basically designed for several energy-saving states of the PROFlenergy devices. In the presented application the states OFF ("PAUSE") and ON ("READY") are realised. The state "OFF" provides the complete PROFINET communication ability. This is achieved as the interface module IM151 induces the selected power modules to switch off the supply voltage for the following electronic modules (here DI/DO).

## 3.2 Available hardware

#### **PROFlenergy controller**

There are blocks available that can be executed on all SIMATIC S7 CPUs. The Step7 project which belongs to this application contains these blocks.

#### PROFlenergy device

#### ET 200S:

Head modules to process the profile

IM 151-3 PN IO High Feature: 6ES7 151-3BA23-0AB0, from firmware level V7.0 IM 151-3 PN IO High Feature, FO: 6ES7 151-3BB23, from firmware level V7.0 Can be upgraded from firmware level V6.0. The latest firmware is available under the following link:

http://support.automation.siemens.com/WW/view/en/35934244

A head module that is compatible with PROFlenergy is required to process the PROFlenergy profile.

Switchable power module to switch off the sensor and load supply:

PM-E DC24V/8A RO: 6ES7 138-4CA80-0AB0

Up to 8 of these switchable PM-E can be plugged into an ET 200S.

Additional PM-E without PROFlenergy can be plugged at any number - of course according to the assembly guidelines ET 200S. These are recommended for F-modules for instance that shall not be switched off.

Switchable PM-E can be operated without PROFlenergy. Nevertheless, they occupy an address in the process image.

## 3.3 Required software

All required Step7 blocks are available for being downloaded. The following chapters describe their function and application.

The software STEP 7 V 5.5 is required for engineering the ET 200S and the power module.

4.1 Program overview

## 4 Function mechanisms of this application

## 4.1 **Program overview**

The following figure shows the basic structure of the program of this application.



The function block FB 10 "GreenIT" bundles the actual PROFIenergy block calls and provides a comfortable interface for the HMI via its instance data block.

FB53 "DS3\_Write": Sends the basic settings concerning the switching behavior of the power modules to the addressed ET 200S. This block is not part of the PROFlenergy profile but completes the SIMATIC-specific functions.

FB815 "PE\_Start\_End": Starts and stops the pause at the selected ET 200S and transmits the wished pause time simultaneously. The reaction of the PM-E in this ET 200S was determined with the FB53.

FB816 "PE\_CMD": Executes all PROFlenergy commands. In this application the status values are read examplarily.

The selection display, the parameters, and the function of the individual PROFlenergy blocks are described in detail in the following chapters.

4.2 Functionality FB53 "DS3\_Write"

## 4.2 Functionality FB53 "DS3\_Write"



With the FB53 the switching behavior for up to 8 slots (here power modules) in a PROFINET IO device (here ET 200S) can be determined.

## 4.2 Functionality FB53 "DS3\_Write"

## 4.2.1 Program details for block FB53 "DS3\_WRITE"



|      | DB53 "idb_FB53   | _1"                                    |                               |
|------|--|--|-------------------------------|
|      | FB53<br>"DS3_Write"  |  |                               |
| BOOL | EN<br>enable<br>ID<br>Slot_No_1<br>Func_1<br>Slot_No_2<br>Func_2<br>Slot_No_3<br>Func_3<br>Slot_No_4<br>Func_4<br>Slot_No_5<br>Func_5<br>Slot_No_6<br>Func_6<br>Slot_No_7<br>Func_7<br>Slot_No_8<br>Func_8 | busy<br>done<br>error<br>status<br>FNO | BOOL<br>BOOL<br>DWORD<br>BOOL |
|      |  |  |                               |

#### Input parameters

Table 4-1

| Parameters | Data type | Initial value   | Description  |  |
|------------|-----------|---|--|--|
| EN         | BOOL      | 1   | Enable Input   |  |
| enable     | BOOL      | 0 A positive edge initiates the transfer of t<br>data set. The data set must be transfer<br>again after voltage OFF/ON. |  |  |
| ID         | DWORD     | 8178  | Address of the PROFINET IO device (ET 200S, to be taken from the hardware configuration)       |  |
| Slot_No_x  | INTEGER   | 1(4)  | Slot number of the x. switchable power module  |  |
| Func_x     | INTEGER   | 0   | Function of the module in this slot<br>Determination of the switching behavior of<br>the PM-E: |  |
|            |           |   | FALSE :<br>PAUSE_START - does not influence PM-<br>E, - PM-E remains ON                        |  |
|            |           |   | PAUSE_STOP- switches PM_E ON again   |  |
|            |           |   | TRUE:<br>PAUSE_START - switches PM_E OFF,<br>PAUSE STOP - switches PM-E ON again               |  |

#### **Output parameters**

## 4.2 Functionality FB53 "DS3\_Write"

#### Table 4-2

| Parameters | Data type | Initial value | Description                           |
|------------|-----------|---------------|---------------------------------------|
| busy       | BOOL      | 0             | Transfer DS3 not completed            |
| done       | BOOL      | 0             | Transfer DS3 completed without errors |
| error      | BOOL      | 0             | Transfer DS3 completed with error     |
| status     | DWORD     | 0             | Error ID, see FB815                   |
| ENO        | BOOL      | 0             | Enable output                         |

4.3 Functionality FB815 "PE\_START\_END"

## 4.3 Functionality FB815 "PE\_START\_END"



With the FB815 "PE\_START\_END" the pause is started or stopped for the determined PROFINET IO device, here ET 200S. The switchable blocks behave according to the settings of the FB53 "DS3\_WRITE". The parameter PAUSE\_TIME provides the switchable block with the planned pause time for control. The following applies: PAUSE\_TIME >= PM-E\_Pause\_Min There is no automatic switch-on after the pause time is over; the module remains in

There is no automatic switch-on after the pause time is over; the module remains in the state OFF until the "END" command. This avoids uncontrolled switch-ons which finally might lead to unwanted load peaks.

4.3 Functionality FB815 "PE\_START\_END"

#### 4.3.1 Program details for block FB815 "PE\_START\_END"

#### Figure 4-5



#### Input parameters

#### Table 4-3

| Parameters     | Data type | Initial value   | Description  |  |
|----------------|-----------|---|--|--|
| EN             | BOOL      | 0   | Enable Input   |  |
| START          | BOOL      | 0   | Send "START PAUSE" to PROFINET IO device with address "ID"   |  |
| END            | BOOL      | 0 Send "END PAUSE" to PROFINET I<br>device with address "ID"  |  |  |
| ID             | DWORD     | 8184  | Address of the PROFINET IO device (ET 200S, to be taken from the hardware configuration)   |  |
| PAUSE_<br>TIME | TIME      | T#10000MS<br>range:<br>T#1MS<br>to<br>T#24D20H31<br>M23S647MS | Planned pause time.<br>The ET 200S checks whether the planned<br>pause time is longer or equal to the<br>minimum pause time that is saved on the<br>ET 200S. This is a fix time of 10s. If a<br>smaller pause is started the PM-E remain<br>switched on. |  |

#### **Output parameters**

#### Table 4-4

| Parameters     | Data type | Initial value Description   |                                      |
|----------------|-----------|-----------------------------|--------------------------------------|
| VALID          | BOOL      | 0                           | Command send successfully            |
| BUSY           | BOOL      | 0 Command still in progress |                                      |
| ERROR          | BOOL      | 0                           | An error occured during the process  |
| STATUS         | DWORD     | 0 block status/error number |                                      |
| PE_MODE<br>_ID | BYTE      | 0                           | Energy saving level during the PAUSE |
| ENO            | BOOL      | 0                           | Enable output                        |

#### 4.3 Functionality FB815 "PE\_START\_END"

#### Error code

The output parameter STATUS contains error information. If it is interpreted as ARRAY[1...4] OF BYTE the error information is structured as follows:

| Table | 4-5 |
|-------|-----|
|-------|-----|

| Array<br>element | Name         | Description  |  |
|------------------|--------------|--|--|
| STATUS[1]        | Function_Num | B#16#00: no error  |  |
|                  |              | B#16#DE: Read error in data set  |  |
|                  |              | B#16#DF: Write error in data set   |  |
|                  |              | B#16#C0: PE-FB or SFB 52/53 discovered errors  |  |
| STATUS[2]        | Error_Decode | Place of error detection   |  |
|                  |              | <b>80:</b> DPV1 - Error according to IEC 61158-6 or FB-specific  |  |
|                  |              | FE:DP/PNIO Profile - PROFlenergy-specific error  |  |
| STATUS[3]        | Error_Code_1 | (B#16#) / (B#16#): DPV1  |  |
|                  |              | Error_Decode 80:<br>- 80: At the same time a rising edge<br>at the input parameters "START" and "END"            |  |
|                  |              | - 81: Length conflict for the parameters<br>CMD_PARAM and CMD_PARAM_LEN  |  |
|                  |              | 82-8F: further error messages  |  |
|                  |              | Error_Decode FE:<br>- 01: Invalid "Service Request ID"   |  |
|                  |              | - 02: Wrong "Request_Reference"  |  |
|                  |              | - 03: Invalid "Modifier"   |  |
|                  |              | - 04: Invalid "Data Structure Identifier RQ"   |  |
|                  |              | - 05: Invalid "Data Structure Identifier RS"   |  |
|                  |              | - 06: "PE energy-saving modes" are not supported   |  |
|                  |              | - 07: "Response" takes too long.<br>The current "Response" exceeds the maximum<br>length that can be transferred |  |
|                  |              | - 08: invalid "Count"  |  |
|                  |              | - 50: No matching "energy mode" available  |  |
|                  |              | - 51: given time value is not supported  |  |
|                  |              | - 52: incorrect "PE_Mode_ID"   |  |
| STATUS[4]        | Error_Code_2 | manufacturer-specific extension of the error detection   |  |

4.4 Functionality FB816 "PE\_CMD"



4.4 Functionality FB816 "PE\_CMD"

FB816 "PE\_CMD" is a transparent block to illustrate the complete PROFlenergy standard. Due to its free parameter transfer the block is open for future extensions of the PROFlenergy profile. To use this block advanced knowledge of the PROFlenergy profile is required. That is why the reading of status information is shown exemplarily in this application.

#### 4.4 Functionality FB816 "PE\_CMD"

#### 4.4.1 Program details for block FB816 "PE\_CMD"





With this FB 816 PROFlenergy commands are transferred to a PROFlenergyenabled device. The input data are stored in the data range "CMD\_PARA" which is addressed by the ANY-pointer. The output data are stored in the data range RESPONSE\_DATA which is addressed by the ANY-pointer.

The commands are transferred to the modules without plausibility check where they are processed. The feedback of this module is provided at the input data without any changes.

This block can also be used after the PROFlenergy profile has been extended by further commands in the future.

The following commands can be executed in the current PROFlenergy profile. They will be explained in the following chapters: ("COMMAND")

- Query Modes
  - List of energy saving modes
  - Get mode
- PEM\_Status
- Identify
- Query Measurements (if appropriate modules are available)
  - Get measurement
  - Get measurement values

## 4.4 Functionality FB816 "PE\_CMD"

### Input parameters

| Table 4-6 |
|-----------|
|-----------|

| Parameters       | Data type | Initial value | Description   |  |
|------------------|-----------|---------------|---|--|
| EN               | BOOL      | 0             | Enable Input  |  |
| REQ              | BOOL      | 0             | Start job: Positive edge initiates the transfer of the command  |  |
| ID               | DWORD     | 0             | Address of the PROFINET IO device (ET 200S, to be taken from the hardware configuration)  |  |
| CMD              | BYTE      | 0             | Service RQ-ID from the PROFlenergy<br>profile<br>Commands:<br>01 Start_Pause<br>02 End_Pause<br>03 Query_Modes<br>04 PEM_Status<br>05 PE_Identify<br>16 Query_Measurement<br>After an extension of the PROFlenergy<br>profile further command IDs are available   |  |
| CMD_<br>MODIFIER | BYTE      | 0             | Start_Pause Modifier: 00<br>End_Pause Modifier: 00<br>Query_Modes Modifier:<br>- 01: List energy saving Modes<br>- 02: Get Mode<br>PEM_Status Modifier: 00<br>PE_Identify Modifier: 00<br>Query_Measurement Modifier:<br>- 01: Get_Measurement_List,<br>get all supported<br>Measurement_IDs<br>- 02: Get_Measurement_Values<br>After an extension of the PROFIenergy<br>profile further commands and modifiers<br>are available. |  |
| CMD_<br>PARA     | ANY       | 0             | Parameter for:<br>Get mode: PE_mode_ID<br>Get measurement values:<br>List of Measurement_Ids<br>Maximum length: = 234 Byte<br>The complete Service Data Request is<br>registered  |  |
| CMD_<br>PARA_LEN | INT       | 0             | Real parameter length of the command.<br><= lenght in CMD_PARAM (is checked by<br>the block)<br>Maximum: = 234  |  |
| RES-<br>PONSE    | ANY       | 0             | PROFlenergy information; according to the command complete Response   |  |

#### 4 Function mechanisms of this application

## 4.4 Functionality FB816 "PE\_CMD"

| Parameters | Data type | Initial value | Description  |
|------------|-----------|---------------|--|
| _DATA      |           |               | Telegram in good and error cases<br>including block header.<br>Note: If the buffer is to small, only the<br>number of bytes is registered that are<br>indicated in the ANY protocol. |

### **Output parameters**

Table 4-7

| Parameters | Data type | Initial value               | Description                            |
|------------|-----------|-----------------------------|--|
| VALID      | BOOL      | 0                           | Command sent successfully              |
| BUSY       | BOOL      | 0 Command still in progress |  |
| ERROR      | BOOL      | 0                           | An error occurred during the process   |
| STATUS     | DWORD     | 0                           | Block status / error number, see FB815 |
| ENO        | BOOL      | 0                           | Enable Output                          |

## 4.5 Response data

#### Table 4-8

| Block        | Attributes         | Value        | Data type  | Description  |
|--------------|--------------------|--------------|------------|--|
| definitions  |                    |              |            |  |
| BlockHeader  | BlockType          | 0x0801       | Unsigned16 |  |
|              | BlockLength        |              | Unsigned16 | without counting the<br>fields<br>BlockType and<br>BlockLength                           |
|              | BlockVersionHigh   | 0x01         | Unsigned8  |  |
|              | BlockVersionLow    | 0x00         | Unsigned8  |  |
| Response     | Service_Request_   | 0x01         | Unsigned8  | 0x01 Start_Pause   |
| Header       | ID                 | 0xFF         |            | 0x02 End_Pause   |
|              |                    |              |            | 0x03 Query_Modes   |
|              |                    |              |            | 0x04 PEM_Status  |
|              |                    |              |            | 0x05 PE_Identify   |
|              |                    |              |            | 0x060x09 reserved  |
|              |                    |              |            | 0x10<br>Query_Measurement  |
|              |                    |              |            | 0x110xCF reserved  |
|              |                    |              |            | 0xD00xFF<br>manufacturer_specific  |
|              | Request_Referen ce | 0x01<br>0xFF | Unsigned8  | unique identification<br>number  |
|              |                    |              |            | (mirrored in the response by server)   |
| Service      | State              | 0x01         | Unsigned8  | 0x00 - reserved  |
| Header       |                    | 0xFF         |            | 0x01 - ready   |
| Response     |                    |              |            | 0x02 -<br>ready_with_error   |
|              |                    |              |            | 0x03 - data incomplete   |
|              |                    |              |            | 0x04 0xCF -<br>reserved<br>0xD0 0xFF - depend<br>on                                      |
|              | Data Structuro Id  | 0v01         | Lineignod8 | 0x00 - reserved  |
|              | entifier_RS        | 0xFF         | опыдпеао   | 0x010xFF - Data<br>structures dependent<br>on the<br>Service_Request_IDs<br>0xFF - error |
| Service Data |                    |              |            | dependent on the   |
| Response     |                    |              |            | Service_Request_IDs  |

This table shows how the fed back data is basically structured according to the PROFlenergy profile  $\underline{/1/}$ . In the following chapters the individual commands and the resulting structure of the response data are listed.

#### 4.5.1 PE command Start\_Pause

#### Request

CMD = 1 CMD\_MODIFIER = 0 CMD\_PARA\_LEN = 4

CMD\_PARA = Any-Pointer on the value for Pause\_Time (unsigned32)

#### Service-Data-Response

| Parameters  | Value    | Data type |
|-------------|----------|-----------|
| PE_Mode_ID* | 0x010xFF | Unsigned8 |
| Reserved    | 0x00     | Unsigned8 |

\* identification number of the energy saving mode

#### 4.5.2 <u>PE command End Pause</u>

#### Request

CMD = 2 CMD\_ MODIFIER = 0 CMD\_PARA\_LEN = 0 CMD\_PARA = irrelevant

#### Service-Data-Response

| Parameters       | Value | Data type  |
|------------------|-------|------------|
| Time_to_operate* |       | Unsigned32 |

\* expected time for switching the PROFIenergy device to "ready\_to\_operate"

#### 4.5.3 PE command Query Modes - List of energy saving modes

#### Request

CMD = 3 CMD\_ MODIFIER = 1 CMD\_PARA\_LEN = 0 CMD\_PARA = irrelevant

#### Service-Data-Response

| Parameters             | Value | Data type  |
|------------------------|-------|--|
| Number_of_PE_Mode_IDs* | 0x01  | Unsigned8  |
| PE_Mode_IDs            |       | Unsigned8-Array of Number_of_PE_Mode_IDs<br>(Unique ID for mode) |

\* number of energy saving modes

## 4.5.4 PE command Query Modes - Get mode

#### Request

CMD = 3 CMD\_MODIFIER = 2 CMD\_PARA\_LEN = 1

CMD\_PARA = Any-Pointer on the value for PE\_MODE\_ID (unsigned8)

#### Service-Data-Response

| Parameters                    | Value     | Data type  |
|-------------------------------|-----------|------------|
| PE_Mode_ID                    | 0x01 0xFF | Unsigned8  |
| PE_Mode_Attributes            | 0x000x01  | Unsigned8  |
| Time_min_Pause                |           | Unsigned32 |
| Time_to_Pause                 |           | Unsigned32 |
| Time_to_operate               |           | Unsigned32 |
| Time_min_length_of_stay       |           | Unsigned32 |
| Time_max_length_of_stay       |           | Unsigned32 |
| Mode_Power_Consumption        |           | Float32    |
| Energy_Consumption_to_pause   |           | Float32    |
| Energy_Consumption_to_operate |           | Float32    |

#### 4.5.5 PE command PEM Status

Request

CMD = 4 CMD\_ MODIFIER = 0 CMD\_PARA\_LEN = 0 CMD\_PARA = irrelevant

#### Service-Data-Response

| Parameters                        | Value | Data type  |
|-----------------------------------|-------|------------|
| PE_Mode_ID_Source                 |       | Unsigned8  |
| PE_Mode_ID_Destination            |       | Unsigned8  |
| Time_to_operate                   |       | Unsigned32 |
| Remaining_time_to_destination     |       | Unsigned32 |
| Mode_Power_Consumption            |       | Float32    |
| Energy_Consumption_to_Destination |       | Float32    |
| Energy_Consumption_to_operate     |       | Float32    |

#### 4.5.6 PE command PE\_Identify

#### Request

CMD = 5 CMD\_ MODIFIER = 0 CMD\_PARA\_LEN = 0 CMD\_PARA = irrelevant

#### Service-Data-Response

| Parameters           | Value | Data type |
|----------------------|-------|-----------|
| Count *              | 6     | Unsigned8 |
| Start_Pause**        | 0x01  | Unsigned8 |
| End_Pause            | 0x02  | Unsigned8 |
| Query_Modes          | 0x03  | Unsigned8 |
| PEM_Status           | 0x04  | Unsigned8 |
| PE_Identify          | 0x05  | Unsigned8 |
| Query_Measurement*** | 0x10  | Unsigned8 |

\* number of supported PROFlenergy commands

\*\* first supported Service\_Request\_ID

\*\* last supported Service\_Request\_ID

#### 4.5.7 PE command Query Measurement – Get measurement list

#### Request

CMD = 16 CMD\_ MODIFIER = 1 CMD\_PARA\_LEN = 0 CMD\_PARA = irrelevant

#### Service-Data-Response

| Parameters        | Value | Data type  |
|-------------------|-------|------------|
| Count *           |       | Unsigned8  |
| reserved          |       | Unsigned8  |
| Measurement_ID**  |       | Unsigned16 |
| Accuracy_Domain   |       | Unsigned8  |
| Accuracy_Class    |       | Unsigned8  |
| Range             |       | Float32    |
|                   |       |            |
| Measurement_ID*** |       | Unsigned16 |
| Accuracy_Domain   |       | Unsigned8  |
| Accuracy_Class    |       | Unsigned8  |
| Range             |       | Float32    |

\* number of measurement\_IDs

\*\* first supported measurement\_ID

\*\* last supported measurement\_ID

## 4.5.8 PE command Query Measurement – Get measurement values

#### Request

CMD = 16

CMD\_MODIFIER = 2

CMD\_PARA\_LEN = length of the data structure in byte

CMD\_PARA = Any-Pointer on data structure which should be structured as follows

| Parameters        | Value | Data type  |
|-------------------|-------|------------|
| Count *           |       | Unsigned8  |
| reserved          | 0x00  | Unsigned8  |
| Measurement_ID**  |       | Unsigned16 |
|                   |       |            |
| Measurement_ID*** |       | Unsigned16 |

\* number of measurement\_IDs

\*\* first requested measurement value

\*\* last requested measurement value

#### Service-Data-Response

| Parameters                    | Value                                    | Data type               |
|-------------------------------|--|-------------------------|
| Count *                       |  | Unsigned8               |
| reserved                      |  | Unsigned8               |
| Lenght_of_Structure           | 0x00020xFFFF                             | Unsigned16              |
| Measurement_Data_Structure_ID | 1=simple value                           | Unsigned8               |
| Measurement_ID**              | 0FFFF                                    | Unsigned16              |
| Status_of_Measurement_Value   | 1=valid; 2=not<br>supported; 3=not valid | Unsigned8               |
| Transmission_Data_Type        |  | Float32                 |
| End_of_demand (optional)      |  | Unsigned32 + Unsigned16 |
|                               |  |                         |
| Lenght_of_Structure           | 0x00020xFFFF                             | Unsigned16              |
| Measurement_Data_Structure_ID | 1= simple value                          | Unsigned8               |
| Measurement_ID***             | 0FFFF                                    | Unsigned16              |
| Status_of_Measurement_Value   | 1=valid; 2=not<br>supported; 3=not valid | Unsigned8               |
| Transmission_Data_Type        |  | Float32                 |
| End_of_demand (optional)      |  | Unsigned32 + Unsigned16 |

\* number of measurement values

\*\* first supported measurement value

\*\* last supported measurement value

NOTE

See Annex A: Measurement list for the Measurement ID list.

## Energy saving data

| Parameters                       | Data type  | Value                |                           |   | Description   |
|----------------------------------|------------|----------------------|---------------------------|---|---|
| PE_MODE_ID                       | Unsigned8  | 0x00                 | PE_<br>F                  | POWER_OF  | Coherent ID of the<br>energy saving mode  |
| PE_MODE_ID_<br>SOURCE            |            | 0x01 –<br>0xFE       | manufacturer-<br>specific |   | Source and destination<br>of the PEM STATUS   |
| PE_MODE_ID_<br>DESTINATON        |            | 0xFF                 | РЕ <u></u><br>ТО          | _READY<br>_OPERATE  |   |
| PE_MODE_<br>ATTRIBUTES           | Unsigned8  | Bit 0                | 0                         | Only static<br>time and<br>consumption<br>values<br>available | Enum Byte   |
|                                  |            |                      | 1                         | Dynamic<br>time and<br>consumption<br>values<br>available     |   |
|                                  |            | Bit 1<br>to<br>Bit 7 |                           | reserved  |   |
| PAUSE_<br>TIME_1                 | Unsigned32 | Time int             | Time interval             |   | No absolute date  |
| TIME_MIN_<br>PAUSE_1             | Unsigned32 | Time interval        |                           |   | Minimum pause interval<br>for this PE-energy saving<br>mode.<br>It is the sum of the three<br>parameters:<br>- Time_to_Pause<br>-Time_to_operate<br>Time_min_length_of_<br>stay   |
| Time_to_Pause                    | Unsigned32 | Time int             | erval                     |   | Time interval from the<br>START edge until<br>reaching the requested<br>PE-energy saving mode   |
| Time_to_operat<br>e <sup>1</sup> | Unsigned32 | Time interval        |                           |   | Maximum time of switch-<br>on until<br>PE_ready_to_operate<br>Time_to_operate can be<br>used directly for the<br>respective calculations.<br>The value can be either<br>a static MAX value or<br>calculated dynamically<br>by the PE device |

#### 4 Function mechanisms of this application

#### 4.5 Response data

| Remaining_<br>time_to_<br>destination <sup>1</sup>     | Unsigned32 | Time interval | Optional: remaining time<br>until the requested PE<br>mode. Dynamic value or<br>static MAX value |
|--|------------|---------------|--|
| Time_min_<br>length_of_<br>stay <sup>1</sup>           | Unsigned32 | Time interval | Minimum time interval<br>the PE device must<br>remain in this PE mode.                           |
| Time_max_<br>length_of_<br>stay <sup>1</sup>           | Unsigned32 | Time interval | Maximum time interval<br>the PE device can<br>remain in this PE mode.                            |
| Mode_Power_<br>Consumption <sup>2</sup>                | Float32    |               | Energy consumption in<br>the current PE mode<br>[kW]   |
| Energy_<br>Consumption_<br>to_pause <sup>2</sup>       | Float32    |               | Energy consumption<br>from<br>PE_ready_to_operate<br>until the current PE<br>mode [kWh]          |
| Energy_<br>Consumption_<br>to_operate <sup>2</sup>     | Float32    |               | Energy consumption<br>from the current PE<br>mode until<br>PE_ready_to_operate<br>[kWh]          |
| Energy_<br>Consumption_<br>to_Destination <sup>2</sup> | Float32    |               | Energy consumption until<br>the requested PE mode<br>[kWh]                                       |

<sup>1</sup> The PROFlenergy profile does not specify an invalid time format.

If the time interval is not limited, 0xFFFFFFF can be indicated as maximum value. If the time interval is "Zero", the value 0x00 can be used.

 $^{2}$  If an energy consumption value is not defined, the value 0.0 (Float32) can be indicated.

5.1 Configuration of the ET 200S head module

# 5 Configuration and settings

At the moment only the head and power modules named above can be delivered with PROFlenergy functionality. You can adapt and change the delivered example program according to your needs and your hardware equipment. In the following chapters the crucial steps of the hardware configuration are described. If you want to integrate the PROFlenergy blocks into an existing software, you can rename them.

## 5.1 Configuration of the ET 200S head module

#### HW Config - [SIMATIC 300 (Configuration) -- PeV5\_M\_1] D 😂 💱 🖉 🗞 🎒 🛍 💼 🏙 🏜 🚯 🗔 💥 😥 ٠ Eind: ntni ⇒ (O) F PS 307 2A PU 317-2PN/DP MPI/DP PN-10-100 Point 1 Point 2 Profile: Standard • Control Contro Control Control Control Control Control Control Control Control C 2 X1 X2 X2P1 R X2P2 R . (2) IM151-3 2005 1 G5D 1 M151-3 PN 1 M151-3 PN 1 M151-3 PN F0 V4.0 1 M151-3 PN F0 V4.1 1 M151-3 PN F0 V5.1 1 M151-3 PN F0 V7.0 1 M151-3 PN HF V4.0 1 M151-3 PN HF V5.0 1 M151-3 PN HF V5.0 (1) IM151-3PN-Conveyor-IP101 0 MIDI-3PN-Conveyor-IP101 6ES7 151-38A23-0AB0 8184 6ES7 138-4CA80-0AB( 6ES7 131-4BB00-0AA( 6ES7 132-4BB00-0AA( 6ES7 138-4CA80-0AB( 6ES7 131-4BB00-0AA( 6ES7 131-4BB00-0AA) PM-F 1/1151-3 PN HE V6.0 0.0...0.1 DC24V Belt1 Inbound PM-E 181 1.0...1.1 51-38A23-04P IET ID conce interface module IM 151-3 PN 2000) for ET 200S electronic modules, s packing; PROFINET interface and 2 ports; ₹ś 2D0 DC24V Belt2 Outbound ES7 132-48800-0AA ess F1 to get Help IM TO PO EN HE Y D. 1 IM151-3 PN HF V7.0 A ÷.

Select one of the PROFIenergy-enabled head modules (V7.0) and add it to the PROFINET thread.

Figure 5-2

Figure 5-1

| ⇒    | (1) IM151-3PN-Conveyor-IP101 |                     |           |          |                    | Pa         | ick <u>A</u> ddress | ses |
|------|------------------------------|---------------------|-----------|----------|--------------------|------------|---------------------|-----|
| ot [ | Module                       | Order number        | I address | Q addres | Diagnostic address | <b>Т</b> о | Access              |     |
| 7    | IN151-3PN-Conveyor-IP101     | 6ES7 151-38A23-0AB0 |           |          | 8184"              |            | Full                | 4   |
| 7    | FN+10-101                    |                     | 0         |          | 91 <i>83</i> *     |            | Full                | 1   |
| 1    | Port1-101                    |                     | 0         | 8        | 8186×              |            | Full                | ۰.  |
|      | D -0.101                     | 0                   | 122       | 13       | 01.05              |            |                     | -9  |

Later you will need the diagnosis address of the IM151 for setting the software.

5.2 Configuration of the ET 200S power module

## 5.2 Configuration of the ET 200S power module

#### Figure 5-3

| HW Config - [SIMATIC 300 (Configural | ion) PettS_M_1]       |              |              |                         |                  |            | يلم.<br>الم                             |
|--------------------------------------|-----------------------|--------------|--------------|-------------------------|------------------|------------|---|
| Station Edit Insert PLC View Option  | ns Window Help        |              |              |                         |                  |            | ئلم.                                    |
| - 101 Barts (201)                    |                       |              |              |                         | í                | End        | 0                                       |
| 1 PS 307 2A                          |                       |              |              |                         |                  | Profes     | Studied                                 |
| 2 CPU 317-2PN/                       | 0P                    |              |              |                         |                  | Frome      | standard                                |
| X7 MPV/DP<br>X2 PN-IO-100            |                       | PROF         | Tenergy, PRO | OFINET-IO-System (10    | 010              |            | E- AI                                   |
| X2P1R Port1                          |                       | 25.03        | BA151.3      | 3 (21M15)               | a l              |            | 8 A0                                    |
| 3                                    |                       |              | 1010         | Concerning of the light | 1                |            | 8 0                                     |
| 4                                    |                       | -            |              |                         |                  |            | 8 🚍 0/00                                |
| 5                                    |                       | <u> </u>     | -            |                         |                  |            | 8-00<br>R-01 PM                         |
| 1° +                                 |                       |              |              |                         |                  |            | E - Frequency converter                 |
|                                      |                       |              |              |                         |                  |            | B ID-Link master modules                |
|                                      |                       |              |              |                         |                  |            | R- Motor states                         |
|                                      | -                     |              |              |                         |                  | 1          | 8 🛄 PM                                  |
|                                      |                       |              |              |                         | 2                |            | - PME DC24.49V                          |
| (1) IM151-3PN-Conveyor-IP101         |                       |              |              |                         | Pack, 6ddesses   |            | PM-E DC24_48V/ AC24_230                 |
| al B man                             | L Outre and an        | ( trade or 1 | O address 1  | I Provention address    |                  |            | - PM-E DC24_40V/AC24_230                |
| e Moose                              | 65.57 151.384.23.0480 | 1 a00/e11    | Q address    | RIR/*                   | Lo., Access      |            | PM-E DC24V                              |
| 7 FN-10-101                          |                       |              |              | 8183*                   | Fill             |            | PME DC24V //SA RD                       |
| 7 Aut 101                            |                       |              |              | 8186*                   | Full             |            | PM E DC24V /6A RD S                     |
| 74 AM2/07                            | CES7 128-40409-0480   |              |              | 8185*                   | Fid              |            | A Martin Contraction                    |
| 2010C24V ST                          | GES7131-48800-04A0    | 0.001        |              | 0105                    | Ful              |            | - PML CC2W                              |
| 200 DC2NV Belt1 Inbound              | GES71324E800-0AA0     |              | 0.00.1       |                         | Fut              |            | PM-E F pm DC24V                         |
| PMEDC24V                             | 6ES7138-4CA80-0480    | 10.11        |              | 8181*                   | Ful              | 1          |   |
| 200 DC24/ Bel2 Outbound              | 6ES713248800-0440     | 1.01.1       | 1.01.1       |                         | Full             | 9E\$71     | CARO-GARO                               |
|                                      |                       |              |              |                         |                  | nda        | postics and load voltage disconnection. |
| 1                                    |                       |              | _            |                         |                  | supports   | PROFlenergy                             |
| F1 to get Help.                      |                       |              |              |                         |                  |            |   |
|                                      |                       |              |              |                         |                  |            |   |
|                                      |                       |              |              |                         | <u> </u>         |            |   |
|                                      |                       | -            | 3.2.3        | 21023300                |                  |            |   |
|                                      | 1 St                  |              | PM           | -F DC2                  | 240              |            |   |
|                                      |                       |              | 1 14         | LDUZ                    | - <b>T</b> Y     |            |   |
|                                      | 10 10 100             |              | DL 4         | E DOG                   | 101 104          | DO         |   |
|                                      | 1                     |              | PM           | -E DU2                  | (47 /89          | RU         | 8                                       |
|                                      | 10 N 10               | 8            | 10100242     | Aprilla Orașe           | Shire Contractor | Contractor |   |
|                                      | 1 St                  |              | PM           | -F DC2                  | AV 186           | BO         | IS I                                    |
|                                      |                       |              | 1.14         | 2 002                   |                  | 110        | -                                       |
|                                      |                       |              | DL4          | E DCC                   | 71150            |            |   |
|                                      | T. Steens             |              | PM           | -E ULZ                  | AV HE            |            |   |
|                                      | 1 1 1                 | 1.22         |              |                         |                  |            |   |

Equip the ET 200 S with at least one PROFenergy-enabled power module. You are free to select the further equipment. You can either select further PROFlenergy power modules or any other modules.

| Note    | Power module 6ES7 138-4CA80-0AB0  |
|---------|---|
|         | Record without "S": PM-E works according to the PROFlenergy standard<br>and does not occupy any addresses                           |
|         | Record with "S": PM-E is located in the process image and can be switched directly via I/O  |
|         |   |
| WARNING | All electronic modules that you plug after a PROFlenergy power module are switched off for this power module via the PAUSE command. |

5.3 Setting of the PROFIenergy program

## 5.3 Setting of the PROFlenergy program

The FB 10 "Green IT" contains all PROFIenergy functions. Figure 5-4

| ■ FB10 "GreenIT" Pe¥5_M_  | 1\5                 | IMATIC 300\CPU 317-2PN/DP\\FB10   | - D ×    |
|---------------------------|---------------------|-----------------------------------|----------|
|                           | Cor                 | ntents Of: 'Environment\Interface | 2'       |
| - () Interface            |                     | Name                              |          |
|                           | <b>P</b>            | IN                                |          |
| TTO 💶                     | <b>.</b>            | OUT                               |          |
| TU_OUT                    | Þ                   | IN_OUT                            |          |
| 🕂 🖅 STAT                  | <b>-</b>            | STAT                              |          |
|                           | -                   | TEMP                              |          |
| P                         | ,                   |                                   |          |
| FB10 - Green IT           |                     |                                   | -        |
|                           |                     |                                   |          |
| Call of PROFIenergy Func  | tio:                | ns                                |          |
|                           |                     |                                   |          |
| Network 1: Parameter ET   | 2009                | 5 Conveyors                       |          |
| Comment:                  |                     |                                   |          |
|                           |                     |                                   |          |
|                           |                     |                                   |          |
| T. 9194                   |                     |                                   |          |
| T "idb FB53 1"            | . ID                | DB53.DBD2                         |          |
| T "idb_FB815_1            | ".II                | DB815.DBD2                        |          |
| L 1                       |                     |                                   |          |
| T "idb_FB53_1"            | . 510               | ot_No_1 DB53.DBW6                 |          |
| ь 4<br>Т "idb FB53 1"     | . \$14              | ot No 2 DB53.DBW10                |          |
|                           |                     |                                   |          |
|                           |                     |                                   |          |
|                           |                     |                                   |          |
| Network 2 : DS3_WRITE for | the                 | e first PROFIenergy-Device        |          |
| Comment:                  |                     |                                   |          |
|                           |                     |                                   |          |
|                           | _                   |                                   |          |
| CALL "DS3 METTE"          |                     | idb #853 1" #853 ( D853           |          |
| enable :=                 |                     |                                   |          |
| ID :=                     |                     |                                   |          |
| Slot_No_1:=               |                     |                                   |          |
| Func_1 :=                 |                     |                                   |          |
| Func 2 :=                 |                     |                                   |          |
| Slot_No_3:=               |                     |                                   |          |
| Func_3 :=                 |                     |                                   |          |
| Siot_No_4:=               |                     |                                   |          |
| Slot No 5:=               |                     |                                   |          |
| Func_5 :=                 |                     |                                   |          |
| Slot_No_6:=               |                     |                                   |          |
| Func_6 :=                 |                     |                                   |          |
| Func 7 :=                 |                     |                                   |          |
| Slot_No_8:=               |                     |                                   |          |
| Func_8 :=                 |                     |                                   |          |
| busy :=                   |                     |                                   |          |
| aone :=<br>error :=       |                     |                                   |          |
| status :=                 |                     |                                   |          |
|                           |                     |                                   |          |
| Network 3 : PROFIenerov P | E SI                | TART END PROFIenerov-Device 1     |          |
|                           |                     |                                   |          |
| comment:                  |                     |                                   |          |
|                           |                     |                                   |          |
|                           | <b>T</b> . <i>U</i> |                                   |          |
| CALL "PE_START_EN         | , "ע                | , "1db_FB815_1" FB815 / DB815     |          |
| END :=                    |                     |                                   |          |
| ID :=                     |                     |                                   |          |
| PAUSE_TIME: =             |                     |                                   |          |
| VALID :=                  |                     |                                   |          |
| BUSY :=                   |                     |                                   |          |
| STATUS :=                 |                     |                                   |          |
| PE_MODE_ID:=              |                     |                                   |          |
|                           |                     |                                   |          |
|                           |                     |                                   | <b>_</b> |
|                           |                     |                                   |          |

The following passages contain an explanation.

#### 5 Configuration and settings

#### 5.3 Setting of the PROFlenergy program

| Figure 5-5                             |                        |            |  |  |  |  |  |  |  |
|--|------------------------|------------|--|--|--|--|--|--|--|
| FB10 : Gree                            | m IT                   |            |  |  |  |  |  |  |  |
| Call of PROFIenergy Functions          |                        |            |  |  |  |  |  |  |  |
| Network 1: Parameter ET 2008 Conveyors |                        |            |  |  |  |  |  |  |  |
| Comment:                               |                        |            |  |  |  |  |  |  |  |
|  |                        |            |  |  |  |  |  |  |  |
| L                                      | 8184                   |            |  |  |  |  |  |  |  |
| Т                                      | "idb_FB53_1".ID        | DB53.DBD2  |  |  |  |  |  |  |  |
| Т                                      | "idb_FB815_1".ID       | DB815.DBD2 |  |  |  |  |  |  |  |
| L                                      | 1                      |            |  |  |  |  |  |  |  |
| Т                                      | "idb_FB53_1".Slot_No_1 | DB53.DBW6  |  |  |  |  |  |  |  |

L 4 T "idb\_FB53\_1".Slot\_No\_2 DB53.DBW10

The selection of the FB53 "DS3\_WRITE" is set via the instance data block DB53 "idb\_FB53\_1" for the first PROFIenergy device.

The selection of the FB815 "PE\_START\_END" is set via the instance data blockDB815 "idb\_FB815\_1" for the first PROFIenergy device.

DB54 and DB817 are the instance data blocks for the second PROFIenergy device which are explained under FB10.

In network 1 the static and the dynamic values are recorded consistently in the iDB. ID: Diagnosis address of the PROFlenergy device from the hardware configuration. Here 8184 for the first ET 200S



| (1) IM151-3PN-Conveyor-IP101 |                          |                     |           |          |                    |           |        |   |
|------------------------------|--------------------------|---------------------|-----------|----------|--------------------|-----------|--------|---|
| it [                         | Module                   | Order number        | I address | Q addres | Diagnostic address | <u>то</u> | Access |   |
| ī                            | IN151-3PN-Conveyor-IP101 | 6ES7 151-38A23-0AB0 | 8         |          | 8184*              | 1         | Full   |   |
|                              | FN-101                   |                     | 3         | с. — С.  | a183*              |           | Full   |   |
| 1                            | Part1-101                |                     | 8         | ¢        | 8186*              |           | Full   | _ |
|                              |                          |                     | 10        | 25       |                    |           |        | - |

#### 5.3 Setting of the PROFlenergy program

Slot\_No\_x : Slot number of a PROFlenergy-enabled power module. Here 1 and 4.

| IN151-3PN-Conveyor-IP101<br>FN-10-101<br>Fort1-101<br>D-+22101 |
|--|
| FN-10-101<br>Foxt1-101   |
| Fort1-101  |
| D-43 101   |
| FUNZ-101   |
| PM-E DC 24V  |
| 2DI DC24V ST   |
| 2D0 DC24V Belt1 Inbound  |
| PM-E DC 24V  |
| 2DI DC24V ST   |
| 2D0 DC24V Belt2 Outbound                                       |
|  |

#### 5.3 Setting of the PROFlenergy program

#### FB 53 "DS3\_WRITE"

In network 2 the FB53 is selected for the first PROFlenergy device (first ET 200S).

Figure 5-8

Comment:

Network 2: DS3\_WRITE for the first PROFIenergy-Device

```
CALL "DS3_WRITE" , "idb_FB53_1"
                                 FB53 / DB53
enable :=
ID
        :=
Slot_No_1:=
Func_1 :=
Slot_No_2:=
Func_2 :=
Slot_No_3:=
Func 3 :=
Slot_No_4:=
Func_4 :=
Slot_No_5:=
Func_5
        :=
Slot_No_6:=
Func_6 :=
Slot_No_7:=
Func 7 :=
Slot_No_8:=
Func_8 :=
busy
       :=
error
done
         :=
         :=
 status :=
```

Setting and operation via the corresponding instance data block DB53 "idb\_FB53\_1" for the first PROFIenergy device.

#### 5.3 Setting of the PROFIenergy program

#### Figure 5-9

| IX (@D | @DB53 Pe¥5_M_1\SIMATIC 300\CPU 317-2PN/DP_ONLINE |             |           |       |               |                 |              |         |   |  |
|--------|--|-------------|-----------|-------|---------------|-----------------|--------------|---------|---|--|
|        | Address  | Declaration | Name      | Туре  | Initial value | @Actual value   | Actual value | Comment |   |  |
| 1      | 0.0  | in          | enable    | BOOL  | FALSE         | FALSE           | FALSE        |         |   |  |
| 2      | 2.0  | in          | ID        | DWORD | DVV#16#0      | DVV#16#00001FF8 | DV/#16#0     |         |   |  |
| 3      | 6.0  | in          | Slot_No_1 | INT   | 0             | 1               | 0            |         |   |  |
| 4      | 8.0  | in          | Func_1    | INT   | 0             | 1               | 0            |         |   |  |
| 5      | 10.0   | in          | Slot_No_2 | INT   | 0             | 4               | 0            |         |   |  |
| 6      | 12.0   | in          | Func_2    | INT   | 0             | 1               | 0            |         |   |  |
| 7      | 14.0   | in          | Slot_No_3 | INT   | 0             | 0               | 0            |         |   |  |
| 8      | 16.0   | in          | Func_3    | INT   | 0             | 0               | 0            |         |   |  |
| 9      | 18.0   | in          | Slot_No_4 | INT   | 0             | 0               | 0            |         |   |  |
| 10     | 20.0   | in          | Func_4    | INT   | 0             | 0               | 0            |         |   |  |
| 11     | 22.0   | in          | Slot_No_5 | INT   | 0             | 0               | 0            |         |   |  |
| 12     | 24.0   | in          | Func_5    | INT   | 0             | 0               | 0            |         |   |  |
| 13     | 26.0   | in          | Slot_No_6 | INT   | 0             | 0               | 0            |         |   |  |
| 14     | 28.0   | in          | Func_6    | INT   | 0             | 0               | 0            |         |   |  |
| 15     | 30.0   | in          | Slot_No_7 | INT   | 0             | 0               | 0            |         |   |  |
| 16     | 32.0   | in          | Func_7    | INT   | 0             | 0               | 0            |         |   |  |
| 17     | 34.0   | in          | Slot_No_8 | INT   | 0             | 0               | 0            |         |   |  |
| 18     | 36.0   | in          | Func_8    | INT   | 0             | 0               | 0            |         |   |  |
| 19     | 38.0   | out         | busy      | BOOL  | FALSE         | FALSE           | FALSE        |         |   |  |
| 20     | 38.1   | out         | done      | BOOL  | FALSE         | FALSE           | FALSE        |         |   |  |
| 21     | 38.2   | out         | error     | BOOL  | FALSE         | FALSE           | FALSE        |         |   |  |
| 22     | 40.0   | out         | status    | DWORD | DVV#16#0      | DVV#16#00700000 | DV/#16#0     |         | - |  |
|        |  |             |           |       |               |                 |              |         |   |  |

The structure can be read better via the corresponding variable table.

#### Figure 5-10

|    | Addres:    | :         | Symbol                   | Display format | Status value    | Modify value |
|----|------------|-----------|--------------------------|----------------|-----------------|--------------|
| 1  | // Datase  | t 3 writ  | e                        |                |                 |              |
| 2  | // enable  |           |                          |                |                 |              |
| 3  | DB53.DB    | X 0.0     | "idb_FB53_1".enable      | BOOL           | false           |              |
| 4  | // Diagno  | sticAdd   | Iress PROFlenergy-Device |                |                 |              |
| 5  | DB53.DB    | D 2       | "idb_FB53_1".ID          | DEC            | L#8184          |              |
| 6  | // Slot-No | imber fi  | rst PROFlenergy-Powermo  | odul           |                 |              |
| 7  | DB53.DB    | W 6       | "idb_FB53_1".Slot_No_1   | DEC            | 1               |              |
| 8  | // Functio | n first l | Power-Modul              |                |                 |              |
| 9  | DB53.DB    | W 8       | "idb_FB53_1".Func_1      | DEC            | 1               | 1            |
| 10 | // Slot-No | imber s   | econd PROFlenergy-Powe   | ermodul        |                 |              |
| 11 | DB53.DB    | W 10      | "idb_FB53_1".Slot_No_2   | DEC            | 4               |              |
| 12 | // Functio | n seco    | nd Power-Modul           |                |                 |              |
| 13 | DB53.DB    | W 12      | "idb_FB53_1".Func_2      | DEC            | 1               | 1            |
| 14 |            |           |                          |                |                 |              |
| 15 | //up to    | 8 Mod     | ules                     |                |                 |              |
| 16 |            |           |                          |                |                 |              |
| 17 | // busy    |           |                          |                |                 |              |
| 18 | DB53.DB    | X 38.0    | ) "idb_FB53_1".busy      | BOOL           | false           |              |
| 19 | // done    |           |                          |                |                 |              |
| 20 | DB53.DB    | X 38.1    | l "idb_FB53_1".done      | BOOL           | false           |              |
| 21 | // error   |           |                          |                |                 |              |
| 22 | DB53.DB    | X 38.2    | 2 "idb_FB53_1".error     | BOOL           | false           |              |
| 23 | // status  |           |                          |                |                 |              |
| 24 | DB53.DB    | D 40      | "idb_FB53_1".status      | HEX            | DVV#16#00700000 |              |
| 25 |            |           |                          |                |                 |              |

Here you can see the firmly recorded address (8184) and the slot numbers (1;4) as well as the variable commands:

#### 5 Configuration and settings

#### 5.3 Setting of the PROFIenergy program

Func\_1 : Function of the first PROFIenergy power module. Here "1" for participating in the pause. Insert "0" if the module shall not participate in a pause. enable: is the start bit which transfers the data set to the PROFIenergy device.

You can change the variable commands here in the variable table or via the HMI.

5.3 Setting of the PROFlenergy program

#### FB815 "PE\_START\_END"

In network 3 the FB815 is selected for the first PROFlenergy device (first ET 200S).

Figure 5-11

Network 3 : PROFIenergy PE\_START\_END PROFIenergy-Device 1

Comment:

```
CALL "PE_START_END" , "idb_FB815_1"
                                   FB815 / DB815
START
         :=
END
          :=
ID
         :=
PAUSE_TIME: =
VALID
         :=
BUSY
          :=
       :=
ERROR
STATUS
          :=
PE_MODE_ID: =
```

Setting and operation via the corresponding instance data block DB815 "idb\_FB815\_1" for the first PROFlenergy device.

| IX (@D | @0b815 PeV5_M_1\SIMATIC 300\CPU 317-2PN/DP_ONLINE |             |            |       |               |                 |              |             |   |  |
|--------|---|-------------|------------|-------|---------------|-----------------|--------------|-------------|---|--|
|        | Address   | Declaration | Name       | Туре  | Initial value | @Actual value   | Actual value | Comment     |   |  |
| 1      | 0.0   | in          | START      | BOOL  | FALSE         | FALSE           | FALSE        | START PAUSE |   |  |
| 2      | 0.1   | in          | END        | BOOL  | FALSE         | FALSE           | FALSE        | END_PAUSE   |   |  |
| 3      | 2.0   | in          | ID         | DWORD | DV/#16#0      | DVV#16#00001FF8 | DV/#16#0     |             |   |  |
| 4      | 6.0   | in          | PAUSE_TIME | TIME  | T#0MS         | T#10S           | T#0MS        |             |   |  |
| 5      | 10.0  | out         | VALID      | BOOL  | FALSE         | FALSE           | FALSE        |             |   |  |
| 6      | 10.1  | out         | BUSY       | BOOL  | FALSE         | FALSE           | FALSE        |             |   |  |
| 7      | 10.2  | out         | ERROR      | BOOL  | FALSE         | FALSE           | FALSE        |             |   |  |
| 8      | 12.0  | out         | STATUS     | DWORD | DV/#16#0      | DVV#16#00000000 | DV/#16#0     |             |   |  |
| 9      | 16.0  | out         | PE_MODE_ID | BYTE  | B#16#0        | B#16#01         | B#16#0       |             | - |  |
|        |   |             |            |       |               |                 |              |             | ▶ |  |

#### 5.3 Setting of the PROFIenergy program

The structure can be read better via the corresponding variable table.

| Figure | 5-13 |
|--------|------|
| riyure | 0-10 |

| ×  | VAI | [_PE_START     | END    | )_1 @PeV5_M_1\5IMA1         | FIC 300\CPU 3: | 17-2PN/DP\S7 Prog | a <mark>_ 🗆 X</mark> |
|----|-----|----------------|--------|-----------------------------|----------------|-------------------|----------------------|
|    | 1   | Address        |        | Symbol                      | Display format | Status value      | Modify value         |
| 1  |     | // Start_Paus  | e / En | d_Pause with FB 815 "PE_ST/ | ART_END"       |                   |                      |
| 2  |     | // Start_Paus  | e      |                             |                |                   |                      |
| 3  |     | DB815.DBX      | 0.0    | "idb_FB815_1".START         | BOOL           | false             |                      |
| 4  |     | //End_Pause    |        |                             |                |                   |                      |
| 5  |     | DB815.DBX      | 0.1    | "idb_FB815_1".END           | BOOL           | false             |                      |
| 6  |     | // Diagnostic/ | Addre  | ss PROFlenergy-Device       |                |                   |                      |
| 7  |     | DB815.DBD      | 2      | "idb_FB815_1".ID            | DEC            | L#8184            |                      |
| 8  |     | // PAUSE_TIM   | 1E     |                             |                |                   |                      |
| 9  |     | DB815.DBD      | 6      | "idb_FB815_1".PAUSE_TIME    | DEC            | L#10000           | L#10000              |
| 10 |     |                |        |                             |                |                   |                      |
| 11 |     | // valid       |        |                             |                |                   |                      |
| 12 |     | DB815.DBX      | 10.0   | "idb_FB815_1".VALID         | BOOL           | false             |                      |
| 13 |     | // busy        |        |                             |                |                   |                      |
| 14 |     | DB815.DBX      | 10.1   | "idb_FB815_1".BUSY          | BOOL           | false             |                      |
| 15 |     | // error       |        |                             |                |                   |                      |
| 16 |     | DB815.DBX      | 10.2   | "idb_FB815_1".ERROR         | BOOL           | false             |                      |
| 17 |     | // Status      |        |                             |                |                   |                      |
| 18 |     | DB815.DBD      | 12     | "idb_FB815_1".STATUS        | HEX            | DVV#16#00000000   |                      |
| 19 |     | // PE_MODE_    | D      |                             |                |                   |                      |
| 20 |     | DB815.DBB      | 16     | "idb_FB815_1".PE_MODE_ID    | HEX            | B#16#01           |                      |
| 21 |     |                |        |                             |                |                   |                      |

Here you can see the firmly recorded address (8184) and the variable commands:

- **START**: Command bit for starting the pause. The rising edge is analysed.
- **END:** Command bit for stopping the pause. The rising edge is analysed.
- **PAUSE\_TIME:** The value must be higher than or equal to the minimum pause interval of the PROFlenergy device. Here 10 seconds each time (specification in milliseconds)
- Tip Tip: If you change the display format in the variable table to TIME you can insert the value directly in i.e. minutes. T#10S, value range: T#1MS to T#24D20H31M23S647MS.

#### FB816 PE\_CMD "open interface"

In network 7 the FB816 is selected. The addresses for additional command parameters CMD\_PARA and for the Response\_Data are default. The address for the PROFIenergy device is configured seperately for each job.

#### 5.3 Setting of the PROFlenergy program

Figure 5-14

Network 7 : PROFIenergy PE\_CMD

Comment:

```
CALL "PE_CMD" , "idb_FB816"
REQ :=
                                           FB816 / DB816
ID
             :=
CMD
             :=
CMD MODIFIER :=
CMD_PARA :=P#M 240.0 BYTE 16
CMD_PARA_LEN :=
VALID
             :=
BUSY
              :=
ERROR
             :=
STATUS
            :=
RESPONSE_DATA: =P#DB400.DBX0.0 BYTE 200
```

Configuration and operation via the corresponding instance data block DB816 "idb\_FB816".

| (@DB816 PE_ET2005_V11\SIMATIC 300\CPU 317-2PN/DP_ONLINE) |         |             |               |       |                |                 |                |               |         |
|--|---------|-------------|---------------|-------|----------------|-----------------|----------------|---------------|---------|
|  | Address | Declaration | Name          | Туре  | Initial value  | @Actual value   | Actual value   | Comment       | <b></b> |
| 1  | 0.0     | in          | REQ           | BOOL  | FALSE          | FALSE           | FALSE          | Start-Auftrag |         |
| 2  | 2.0     | in          | ID            | DWORD | DVV#16#0       | DVV#16#00001FF8 | DVV#16#0       |               |         |
| 3  | 6.0     | in          | CMD           | BYTE  | B#16#0         | B#16#01         | B#16#0         |               |         |
| 4  | 7.0     | in          | CMD_MODIFIER  | BYTE  | B#16#0         | B#16#00         | B#16#0         |               |         |
| 5  | 8.0     | in          | CMD_PARA      | ANY   | P#P 0.0 ∨OID 0 |                 | P#P 0.0 ∨OID 0 |               |         |
| 6  | 18.0    | in          | CMD_PARA_LEN  | INT   | 0              | 0               | 0              |               |         |
| 7  | 20.0    | out         | VALID         | BOOL  | FALSE          | FALSE           | FALSE          |               |         |
| 8  | 20.1    | out         | BUSY          | BOOL  | FALSE          | FALSE           | FALSE          |               |         |
| 9  | 20.2    | out         | ERROR         | BOOL  | FALSE          | FALSE           | FALSE          |               |         |
| 10   | 22.0    | out         | STATUS        | DWORD | DVV#16#0       | DVV#16#00000000 | DVV#16#0       |               |         |
| 11   | 26.0    | in_out      | RESPONSE_DATA | ANY   | P#P 0.0 VOID 0 |                 | P#P 0.0 VOID 0 |               | -       |
|  | ,       |             |               |       |                |                 |                |               | Þ       |

#### 5.3 Setting of the PROFIenergy program

The query's result is saved in the DB400 "Response\_Data". The requested data are stored starting from data byte 10. Structure and interpretation of this data area depend on the job. See Chapter <u>4.4</u>.

| @DB4U   | <u>0 "Response_Data" Pe¥5_M_</u> : | I\SIMAT | TC 300\CPU 317 | -2PN/DP\\DB | 400 ONLINE |        |
|---------|------------------------------------|---------|----------------|-------------|------------|--------|
| Address | Name                               | Туре    | Initial valu   | Actual valu | Comment    |        |
| 0.0     | header.Blocktype                   | WORD    | W#16#0         | W#16#0801   |            |        |
| 2.0     | header.Blocklength                 | WORD    | W#16#0         | W#16#0028   |            |        |
| 4.0     | header.Blockversion                | WORD    | W#16#0         | W#16#0100   |            |        |
| 6.0     | header.Service_Request_ID          | BYTE    | B#16#0         | B#16#03     |            |        |
| 7.0     | header.Request_Reference           | BYTE    | B#16#0         | B#16#CC     |            |        |
| 8.0     | header.Status                      | BYTE    | B#16#0         | B#16#01     |            |        |
| 9.0     | header.Data_Structure_Ident        | BYTE    | B#16#0         | B#16#02     |            |        |
| 10.0    | Data[0]                            | BYTE    | B#16#0         | B#16#01     | vorläufige | Platzł |
| 11.0    | Data[1]                            | BYTE    | B#16#0         | B#16#00     |            |        |
| 12.0    | Data[2]                            | BYTE    | B#16#0         | B#16#00     |            |        |
| 13.0    | Data[3]                            | BYTE    | B#16#0         | B#16#00     |            |        |
| 14.0    | Data[4]                            | BYTE    | B#16#0         | B#16#27     |            |        |
| 15.0    | Data[5]                            | BYTE    | B#16#0         | B#16#10     |            |        |
| 16.0    | Data[6]                            | BYTE    | B#16#0         | B#16#00     |            |        |
| 17.0    | Data[7]                            | BYTE    | B#16#0         | B#16#00     |            |        |
| 18.0    | Data[8]                            | BYTE    | B#16#0         | B#16#00     |            |        |
| 19.0    | Data[9]                            | BYTE    | B#16#0         | B#16#00     |            |        |
| 20.0    | Data[10]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 21.0    | Data[11]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 22.0    | Data[12]                           | BYTE    | B#16#0         | B#16#27     |            |        |
| 23.0    | Data[13]                           | BYTE    | B#16#0         | B#16#10     |            |        |
| 24.0    | Data[14]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 25.0    | Data[15]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 26.0    | Data[16]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 27.0    | Data[17]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 28.0    | Data[18]                           | BYTE    | B#16#0         | B#16#FF     |            |        |
| 29.0    | Data[19]                           | BYTE    | B#16#0         | B#16#FF     |            |        |
| 30.0    | Data[20]                           | BYTE    | B#16#0         | B#16#FF     |            |        |
| 31.0    | Data[21]                           | BYTE    | B#16#0         | B#16#FF     |            |        |
| 32.0    | Data[22]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 33.0    | Data[23]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 34.0    | Data[24]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 35.0    | Data[25]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 36.0    | Data[26]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 37.0    | Data[27]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 38.0    | Data[28]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 39.0    | Data[29]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 40.0    | Data[30]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 41.0    | Data[31]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 42.0    | Data[32]                           | BYTE    | B#16#0         | B#16#00     |            |        |
| 43.0    | Data[33]                           | BYTE    | B#16#0         | B#16#00     |            |        |

#### 5.3 Setting of the PROFlenergy program

The structure can be read better via the corresponding variable table. We prepared variable tables (VAT) for some sample jobs; here the PROFlenergy command "Query Modes - Get mode" is explained.

|    | VA | T_PE_CMD_Get  |                                     | SIMATIC 300         | CPU 317-2PN/DP\S | 7 Program 💶 🗖  |
|----|----|---|-------------------------------------|---------------------|------------------|----------------|
|    |    | Address   | Symbol                              | Display format      | Status value     | Modify value   |
| 1  |    | // FB816 PE_CMD   | open interface                      |                     |                  |                |
| 2  |    | // REQ enable   |                                     |                     |                  |                |
| 3  |    | DB816.DBX 0.0   | "idb_FB816".REQ                     | BOOL                | false            |                |
| 4  |    | // ID Diagnosticad  | dress PE-Device 1: "8184" or 2:"    | 8178"               |                  |                |
| 5  |    | DB816.DBD 2   | "idb_FB816".ID                      | DEC                 | L#8184           | L#8184         |
| 6  |    | // CMD  |                                     | <u>.</u>            |                  |                |
| 7  |    | //1 = Start Pause   | 2 = End Pause                       |                     |                  |                |
| 8  |    | // 3 = Query Mode   | es 4 = PEM Status                   |                     |                  |                |
| 9  |    | // 5 = PE Identify 1  | 6 = Query Measurment                |                     |                  |                |
| 10 |    | DB816.DBB 6   | "idb FB816".CMD                     | DEC                 | 3                | 3              |
| 11 |    | // CMD_MODIFIER   | Command Modifier                    | <u>.</u>            |                  |                |
| 12 |    | <br>DB816.DBB 7   | "idb FB816".CMD MODIFIER            | DEC                 | 2                | 2              |
| 13 |    | // CMD_PARA_Co  | mmand Parameter Pointer to Arra     | 1<br>av MB240 - 255 | -                | _              |
| 14 |    | //"1" for Mode 1  |                                     | .,                  |                  |                |
| 15 |    | MB 240  |                                     | DEC                 | 1                | 1              |
| 16 |    | CMD DARA LE   | N Command length                    | 1000                | •                | •              |
| 17 |    | DB916 DBA/ 19   | "ide EB916" CMD DARA LEN            | DEC                 | 4                | 4              |
| 10 |    |   |                                     |                     |                  | •              |
| 10 |    |   |                                     | BOOL                | falaa            |                |
| 19 |    | UB816.DBX 20.0  | 1 "100_F8816".VALID                 | BOOL                | Taise            |                |
| 20 |    | // BUSY   |                                     |                     |                  |                |
| 21 |    | DB816.DBX 20.1  | "Idb_F8816".BUSY                    | BOOL                | talse            |                |
| 22 |    | // ERROR  |                                     |                     |                  |                |
| 23 |    | DB816.DBX 20.2  | 2 idb_FB816".ERROR                  | BOOL                | false            |                |
| 24 |    | // STATUS   |                                     |                     |                  |                |
| 25 |    | DB816.DBD 22  | "idb_FB816".STATUS                  | HEX                 | DVV#16#00000000  | DVV#16#0000000 |
| 26 |    |   |                                     |                     |                  |                |
| 27 |    | // RESPONSE_DA  | TA                                  |                     |                  |                |
| 28 |    | // PE_MODE_ID   |                                     |                     |                  |                |
| 29 |    | D8400.D88 10  | "Response_Data".Data[0]             | DEC                 | 1                | 0              |
| 30 |    | // PE_MODE_Attri  | butes                               |                     |                  |                |
| 31 |    | DB400.DBB 11  | "Response_Data".Data[1]             | DEC                 | 0                | 0              |
| 32 |    | // Time_min_Paus  | e                                   |                     |                  |                |
| 33 |    | DB400.DBD 12  |                                     | DEC                 | L#10000          | L#0            |
| 34 |    | // Time_to_Pause  |                                     |                     |                  |                |
| 35 |    | DB400.DBD 16  |                                     | DEC                 | L#0              | L#0            |
| 36 |    | // Time_to_operat   | 8                                   | <u>.</u>            |                  |                |
| 37 |    | DB400.DBD 20  |                                     | DEC                 | L#10000          | L#0            |
| 38 |    | // Time_min_lengt   | h_of_stay                           | <u>.</u>            |                  |                |
| 39 |    | DB400.DBD 24  |                                     | DEC                 | L#0              | L#0            |
| 40 |    | //Time_max_leng   | th of stav                          | 1                   |                  |                |
| 41 |    | DB400 DBD 28  | ,                                   | HEX                 | D///#16#FFFFFFFF | DV/#16#0000000 |
| 42 |    | // Mode Power (   | <br>Consumption                     | <u>.</u>            |                  |                |
| 43 |    | DB400 DBD 32  | · - · · · · · · · · · · · · · · · · | FLOATING P          | 0.0              | 0.0            |
| 44 |    | //Epergy_Copeur   | inntion to Pause                    | [                   |                  |                |
| 45 |    | DB400 DBD 22  |                                     |                     | 0.0              | 0.0            |
|    |    | //Eperatu Coport  | i                                   |                     | 0.0              | 0.0            |
| 45 |    | AND A DESCRIPTION OF A |                                     |                     |                  |                |
| 46 |    | DB400 DPD 40  |                                     |                     | 0.0              |                |

Insert the address of the selected PROFIenergy device into line 5 "ID". Activate the control values. Response data are preassigned with "0". Start the query with an edge on line 3 "REQ".

See also Chapter 4.4

#### 5.3 Setting of the PROFIenergy program

#### Request data:

CMD = 3 "Query Mode" CMD\_ MODIFIER = 2 "Get Mode" CMD\_PARA\_LEN = 1 one further parameter in CMD\_PARA CMD\_PARA = 1 PE\_MODE

| Parameters                        | Value   | Data type  |
|-----------------------------------|---------|------------|
| PE_Mode_ID                        | 0x01    | Unsigned8  |
| PE_Mode_Attributes                | 0x00    | Unsigned8  |
| Time_min_Pause                    | 10000   | Unsigned32 |
| Time_to_Pause                     | 0       | Unsigned32 |
| Time_to_operate                   | 10000   | Unsigned32 |
| Time_min_length_of_stay           | 0       | Unsigned32 |
| Time_max_length_of_stay           | FFFFFFF | Unsigned32 |
| Mode_Power_<br>Consumption        | 0.0     | Float32    |
| Energy_<br>Consumption_to_pause   | 0.0     | Float32    |
| Energy_<br>Consumption_to_operate | 0.0     | Float32    |

#### Response\_Data in the DB400 starting from DW10:

# 6 Installation

## 6.1 Installation of the hardware

The figure below shows the hardware setup of the application.

Figure 6-1



**Note** The setup guidelines <u>/3/</u> for SIMATIC S7 and ET200S must generally be followed.

You need a MMC memory card to operate the S7 CPU; the ET200S can be operated without.

# **CAUTION** For multi-range power supplies you must pay attention to the correct setting of the selector switch for the input voltage.

Sensors and actuators can be connected to the I/O modules; additionally they can be connected to the respective inputs and outputs to serve as feedback. A power supply for the connected sensors and actuators has to be wired from the corresponding I/O module.

6.2 Installing the software

## 6.2 Installing the software

You need STEP 7 Version 5.5 to configure the ET 200S and the PROFlenergyenabled power module. Install them according to the delivered installation instructions. Further software packages or special settings for PROFlenergy are not required.

If you want to operate the system via a panel or the corresponding Runtime you should install the current WinCC flexible Version 2008. This is optional as PROFlenergy runs independently from WinCC flexible.

To integrate PROFlenergy the following blocks and corresponding SFBs are required:

- FB 815 "PE\_START\_END"
- FB 816 "PE\_CMD"
- FB 53 "DS3\_WRITE"

You find all blocks in the STEP 7 project of the application example. You can copy all delivered blocks into an user-specific project and, if required, rename them. You can use all PROFIenergy blocks without a licence.

## 6.3 Installing the application software

Download the application project from our Service & Support Portal. You find the link to the site at the beginning of this document. Copy the project (STEP 7 archive in zip-format) to the configuration computer (SIMATIC Field PG) and open it in the SIMATIC Manager via the menue "File->Retrieve...".

7.1 Preparation

# 7 Commissioning of the application7.1 Preparation

#### Table 7-1

| No. | Action  | Note   |
|-----|---|--|
| 1   | Make sure that the hardware structure and configuration correspond.   |  |
| 2   | Check the settings of the voltage supply. Switch on the plant.  | Pay attention to all necessary provisions and safety regulations.                        |
|     | If necessary, download the latest firmware for the CPU and the IM-151 from our Service & Support portal and update the modules. | In doing so, pay attention to the<br>corresponding manuals and<br>enclosed instructions. |
| 3   | Connect the SIMATIC Field PG to the plant and select the correct interface via the function "Select PG/PC interface".           | You find these settings, among others, under "Extras" in the main menu.                  |

## 7.2 Commissioning

Table 7-2

| No. | Action   | Note  |
|-----|--|---|
| 1   | Assign the device names and the IP addresses to the stations.  | For that purpose use the function in the hardware configuration |
|     | S7-CPU 317 X2 PN-IO:<br>Name: PN-IO-100, IP-Adr.: 192.168.1.100  | under "PLC" -> "Ethernet":<br>- edit Ethernet nodes             |
|     | ET 200S "Conveyor":<br>Device name: IM151-3PN-Conveyor-IP101 IP-Adr.:<br>192.168.1.101   | and<br>- assign device names                                    |
|     | ET200S "Assembly" :<br>Device name: IM151-3PN-Assembly-IP102 102, IP-Adr.:<br>192.168.1.102  |   |
| 2   | Download the hardware configuration to the CPU.  |   |
| 3   | Download the application program to the CPU.   |   |
| 4   | If no errors occured and the CPU is set to "RUN", two<br>outputs of the first ET200S "Conveyor" should blink and one<br>output of the second ET200S "Assembly" should be set to<br>"ON". |   |
| 5   | If you have WInCC flexible, open the SIMATIC HMI station and the WinCC flexible project, now.  |   |
| 6   | If you do not have a panel, you can directly start the Runtime.  | Via "Project"->"Generator"->"Start<br>Runtime"                  |
| 7   | If you have a panel, set "Ethernet" and the IP address, now. 192.168.1.103   | Via "Control Panel"->"Transfer"-<br>>"Advanced"->"LAN"          |
| 8   | Set the panel to "Transfer" and load the project from the PG to the panel.   |   |

8.1 Overview

# 8 Operating the application

## 8.1 Overview

There are three options for operating the plant:

- HMI Panel
- HMI Runtime (equivalent to the panel)
- Variable table in STEP 7

There are no functional differences; exclusively the way how control bits are set differs. In a real application a time- or event-controlled program would set the corresponding control bits.

Recall:

If we talk in the following about switching off the PROFlenergy power module or about the "Discharging" etc. this does not mean the drives of the plant, but via the DI/DO, the sensors and actuators, so actually the limit switches, monitors for beltmisalignment and secondary drives in neutral. As mentioned already the very functions (belt drive) have to be switched off regularly before.

## 8.2 Operation with HMI

Figure 8-1



#### Scenario "All OFF"

| Table 8-1 |  |
|-----------|--|
|-----------|--|

| No. | Action  | Note   |
|-----|---|--|
| 1   | Select a pause interval of 10,000 ms for both ET200S.               | The ET200S accept a minimum<br>pause time of 10 seconds (10,000<br>ms). Otherwise the power modules<br>remain switched on. |
| 2   | You select all three switches in the field "Select".                | All groups (PROFlenergy power module) shall participate in the pause.  |
| 3   | Click the "Confirm" button.   | The parameters are sent to the ET200S.   |
| 4   | Click the "Pause Start" button.                                     | The PROFlenergy command is triggered.  |
| 5   | The feedbacks in the field "Status" are permanently                 | It is pause!   |
|     | switched OFF; the in- and outputs at the ETs are also switched OFF. | The outputs of the IO groups are switched off, the LEDs go out.  |
| 6   | Click the "Pause End" button.                                       | The pause ends for all selected PM-E.  |
| 7   | The field "Status" now shows the feedbacks again                    | State of the DI/DO   |

## 8 Operating the application

#### 8.2 Operation with HMI

#### Scenario "Selective Switch-off"

| 1 able 8-2 |
|------------|
|------------|

| No. | Action  | Note   |
|-----|---|--|
| 1   | Select a pause interval of 10,000 ms for both ET200S.   | The ET200S currently only accept<br>a minimum pause time of 10<br>seconds (10,000 ms). Otherwise<br>the power modules remain<br>switched on.   |
| 2   | In the field "Select" you only activate the switch for the group<br>"feeding conveyor belt"; switch OFF the two other switches.                             | Only the first group<br>(PROFlenergy power module) of<br>the first ET 200S shall participate<br>in the pause.  |
|     |   | The feeding conveyor belt was<br>switched off (at another place);<br>now the corresponding I/O shall<br>be switched off.   |
| 3   | Click the "Confirm" button.   | The parameters are sent to the ET200S.   |
| 4   | Click the "Pause Start" button.   | The PROFlenergy command is triggered.  |
| 5   | In the field "Status" the feedback for the feeding and the procession is still switched on; only the discharging conveyor belt is permanently switched OFF. | Only the group Feeding pauses.<br>After the belt has been switched<br>off the remaining I/O of the belt<br>can be switched-off as well.  |
| 6   | In the field "Select" you activate now the switch for the group "Processing" as well.   | In addition, now the first group<br>(PROFlenergy power module) of<br>the second ET 200S shall<br>participate in the pause.   |
| 7   | Click the "Confirm" button.   | The parameters are sent to the ET200S.   |
| 8   | Click the "Pause Start" button.   | The PROFlenergy command is triggered.  |
| 9   | In addition there are no feedbacks of the "Processing"  | After the processing has been completed, the corresponding I/O can be switched off.  |
| 10  | Now, repeat steps 6 to 8 for "Discharging"  | Now the complete I/O is switched OFF   |
| 11  | You can switch on the I/O of the complete plant by pressing the button "Pause End"  | If you want to switch on the I/O<br>step by step analogously to the<br>switch-on sequence you omit this<br>step and go ahead with the next<br>scenario which is "Selective<br>switch-on" |

#### Scenario "Selective switch-on"

| Table 8 | 3-3 |
|---------|-----|
|---------|-----|

| No. | Action   | Note  |
|-----|--|---|
| 1   | Deactivate the switch for the group "Discharging" in the field "Select"; the two other switches remain active. | Then plant shall be switched on<br>against conveying direction; for<br>this purpose first of all the<br>sensors of the discharging<br>conveyer belt must be switched<br>on. |
| 2   | Click the "Confirm" button.  | The parameters are sent to the ET200S.  |
| 3   | Click the "Pause Start" button.  | The discharging conveying shall<br>no longer participate in the pause<br>and is switched on again.  |
| 5   | Now, repeat steps 1 to 3 for "Processing".   | The I/O of the "Processing" are switched on again.  |
| 6   | Either<br>- you repeat the steps 1 to 3 now for "Feeding"<br>or<br>- you click the "Pause End" button.         | <ul> <li>The last group is switched on as well</li> <li>or</li> <li>all groups that are still in the pause mode are switched on again.</li> </ul>                           |

#### Scenario "Pause interval too short"

| Tab  | le  | 8-4 |
|------|-----|-----|
| 1 UD | i C | 0 - |

| No. | Action   | Note  |
|-----|--|---|
| 1   | Change the pause interval for "Processing" to 5,000 ms.                                    | Due to its long heating time the<br>processing shall pause only for 5<br>seconds  |
| 2   | You select all three switches in the field "Select".                                       |   |
| 3   | Click the "Confirm" button.  |   |
| 4   | Click the "Pause Start" button.  |   |
| 5   | The two groups "Transport" are switched off; the group<br>"Processing" remains switched ON | The required pause interval of 5 seconds is shorter than the minimum pause interval that is default on the IM151-3 PN IO. This PROFIenergy device <u>cannot</u> participate in the pause. |

8.3 Operating with a variable table (VAT)

## 8.3 Operating with a variable table (VAT)

In the following the command bits of the variable tables are described that correspond to the commands triggered above.

#### Selection:

Click: idb\_FB53\_1.enable und idb\_FB53\_2.enable Feeding conveyor belt: idb\_FB53\_1.Func\_1 Edit: idb\_FB53\_2.Func\_1 Discharging conveyor belt: idb\_FB53\_1.Func\_2

#### Pause interval:

Belts: idb\_FB815\_1.PAUSE\_TIME Processing: idb\_FB815\_2.PAUSE\_TIME

#### Manual operation:

Pause Start: idb\_FB815\_1.START and idb\_FB815\_2.START Pause End: idb\_FB815\_1.END und idb\_FB815\_2.END

Figure 8-2

| and call-adurate and and a  | Man Onlines Medan   | tale.  |  |   |   |  |                |
|---|---|--|--|---|---|--|----------------|
| THE REPORT OF THE PART OF THE |   | el MOL Calco ant d   | action for the   |   |   |  |                |
|   |   |  |  |   |   |  |                |
| VAT_PE_DS3_WRITE_1  | @PeV5_M_I\SIMATIC 300   | CPU 317-2PN/DP\S7 Proc   | - LOX 😫  | VAT_PE_DS3_WRITE_2 @I   | PeV5_M_1\SIMATIC 300  |  |                |
| Address Symbol  | Display forma   | t Status value Mod   | ify value  | Address Symbol  | Display format  | Status value M   | odity value    |
| 1 // Dataset 3 write  |   |  | 1  | // Dataset 3 write  |   |  |                |
| 2 li'enable   |   |  | 2  | ll enable   |   |  |                |
| 3 DB53.08X 0.0 %db_FB5  | 3_1*.enable BOOL  | false  | 3  | DB54.DBX 0.0 %sb_FB53   | _2".enable BOOL   | false  |                |
| 4 // DiagnosticAddress PROF   | lenergy-Device  |  | 4  | // DiagnosticAddress PROFile  | mergy-Device  | -  |                |
| 5 DB53.080 2 *idb_FB5   | 3_1*JD DEC  | L#8184   | 5  | 0854.080 2 %sb_FB53   | _2".ID DEC  | L#8178   |                |
| 6 // Slot-Number first PROFile  | hergy-Powermodul  |  | 6  | # Slot-Number first PROFiere  | argy-Powermodul   | -  |                |
| / DB53.DBVV 6 1db_FB5   | 3_1*SI0E_N0_1 DEC   | 1  | /  | Desk Dev 6 hob_FB53   | _2".Si01_N0UEC  | 1  |                |
| 8 //Function Trist Power-Mod  | u<br>0.44 Days 4 - 1000   |  | 8  | # Function first Power-Modu   | 210 m 4 000   |  |                |
| Dest bert a lide Per  | S_FFUNC_F DEC   |  |  | DB54.DBvV 8 IBB_FB53  | _z runc_i _ucc  |  |                |
| TO DECEMBER SECOND PRO  | a di cint als la proc   |  |  | DOCADON 40 Ref COCO   | anergy-Powernidea   | 0  |                |
| 12 (Euction second Rower  | ioni  |  |  | 2 //Function second Prover M  | _a _ma_mo_ DDc  | U U  |                |
| 13 DBS3 DBW 12 14b EBS  | 3.1*Euro. 2 DEC   | 1 1  | 12   | DBS4 DBW 12 Tab EBS3  | 2"Func 2 DEC  | 0  |                |
| 14  |   |  | 14   | 1   |   |  |                |
| 15 // up to 8 Modules   |   |  | 15   | / up to 8 Modules   |   |  |                |
| 16  |   |  | 16   | 5   |   |  |                |
| 17 Øbusy  |   |  | 17   | / Nbuty   |   |  |                |
| 18 DB53.DBX 38.0 146 FB5  | 3 1*busy BOOL   | false  | 18   | 0854.08X 38.0 %b FB53   | 2".busy BOOL  | false  |                |
| 19 // done  |   |  | 15   | 9 // done   |   |  |                |
| 20 DB53.08X 38.1 1tdb FB5   | 3 1*.done BOOL  | false  | 20   | 0 DB54.DBX 38.1 16b FB53  | 2".done BOOL  | false  |                |
| 21 // error   |   |  | 21   | 1 Nerror  |   |  |                |
| 22 DB53.08X 38.2 1db_FB5  | 3_1*error BOOL  | false  | 22   | 2 DB54.DBX 38.2 %b_FB53   | 2".error BOOL   | false  |                |
| 23 0 status   |   |  | 22   | 3 V \$100.48  |   |  |                |
| 24 DB53.08D 40 *idb_F85   | 3_1*.status HEX   | DVV#16#00700000  | 24   | 4 DB54.DBD 40 %b_FB53   | _2".status HEX  | DVV#16#00700000  |                |
| 25  |   |  | 25   | 5   |   |  |                |
|   |   |  |  |   |   |  |                |
| VAT_PE_START_END_1 @  | PeVS_M_1\SIMATIC 300\   |  | - LOX 崔  | VAT_PE_START_END_2 @I   |   |  | ogra 🔲 🗙       |
| Address Symbol  | Display 1   | ormat Status value   | Modify value   | Address Symbol  | Display   | formet Status value  | Modify yok as  |
| 1 // Start_Pause / End_Pause  | with FB 815 "PE_START_END"  |  | 1  | // Start Pause / End Pause /  | with FB 815 TFE, START, END   |  | mounty rates   |
| 2 / Chart Day you   |   |  |  |   |   |  | I notaty rates |
| <ul> <li>a prost horizon</li> </ul>   |   |  | 2  | // Start_Pause  |   |  | mostly rate    |
| 3 Dest5.Dex 0.0 "ido_Fe   | BI5_1".START BOOL   | 1alse  | 2  | // Start_Pause<br>D6617.08X 0.0 *idb_F88  | 15_2"START BOOL   | faise  | Thomas Table   |
| OB015.DBX 0.0 "ldb_FB     WEnd_Pause  | BI5_1"START BOOL  | talse  | 3  | // Start_Pause<br>D6817.08X 0.0 11db_F88<br>// End_Pause  | 15_2"START BOOL   | false  |                |
| N         Start_Proce           3         D6915DEX         0.0         "ido_F8           4         //End_Pouse         5         D6915DEX         0.1         "ido_F8   | BI5_1"START BOOL<br>BI5_1"END BOOL  | talse  | 2<br>3<br>4<br>5   | // Start_Pause<br>06817.06X 0.0 11db_F88<br>// End_Pause<br>06817.06X 0.1 11db_F88  | 15_2"START BOOL<br>15_2"END BOOL  | false  |                |
| N State,maxtee           3         DB915.DBX         0.0         *ido_FB           4         // End_Pouse         5         DB915.DBX         0.1         *ido_FB           6         WDisgnosticAddress PNOF   | 815_1"START BOOL<br>815_1"END BOOL<br>lenergy-Device  | talse  | 2<br>3<br>4<br>5<br>6  | V Start_Pause<br>D6817.05X 0.0 "ido_F88<br>V End_Pause<br>D6817.05X 0.1 "ido_F88<br>VDiagnosticAddress PROFix   | 15_2*START BOOL<br>15_2*END BOOL<br>mergy-Device  | false<br>false   |                |
| Norm_make           3         D8915 D8X 0.0         1do_F8           4         //End_Pause         5         D8915 D8X 0.1         1do_F8           5         D8915 D8X 0.1         1do_F8         R00         1do_F8           6         //D89notticAddrdss PR0/         7         D8915 D8D 2         1do_F8  | B15_1*.START BOOL<br>B15_1*.END BOOL<br>Intergy-Device<br>B15_1*.ID DEC   | talse<br>talse<br>Lø8184   | 2<br>3<br>4<br>5<br>6<br>7   | V Stert_Peuse<br>D6817.05X 0.0 "ide_F88<br>V End_Peuse<br>D6817.05X 0.1 "ide_F88<br>VDisgnosticAddrose PROFic<br>D6817.05D 2 "ide_F88   | 15_2*START BOOL<br>15_2*END BOOL<br>mergy-Device<br>15_2*D DEC  | false<br>false<br>L#8178   |                |
| N Same_made           3         D6915.D6X 0.0 "Ido_F6           4         //End_Pause           5         D6915.D6X 0.1 "Ido_F6           6         WDiagnosticAddress PROF           7         D6915.D6D 2 "Ido_F6           8         WPAUSE_TME  | 815_1*START BOOL<br>815_1*END BOOL<br>lenergy-Device<br>815_1*D DEC   | talse<br>talse<br>L#0184   | 2<br>3<br>4<br>5<br>6<br>7<br>8<br>8   | // Stert_Peuse<br>D6617.06X 0.0 "ido_F68<br>// End_Peuse<br>D6617.06X 0.1 "ido_F68<br>// Degroot5A43005 PROFM<br>D6617.06D 2 "ido_F68<br>// PAUSE_TIME  | 15_2*START BOOL<br>15_2*BND BOOL<br>mergy-Device<br>15_2*D DBC  | false<br>false<br>L#8178   |                |
|   | B15_1**START         BOOL           B15_1**END         BOOL           B15_1**D         BOOL           B15_1**D         DEC           B15_1**PAUSE_TIME         DEC  | taise<br>taise<br>L#0184<br>L#10000  | 23<br>4<br>5<br>6<br>7<br>8<br>8<br>1,410000<br>9  | // Stert_Peuce<br>D6817.DBX 0.0 *do_FB8<br>// End_Peuce<br>D6817.DBX 0.1 *do_FB8<br>// DegrottLAdades PROFM<br>D6817.DBD 2 *do_FB8<br>// PAUSE_TME<br>D6817.DBD 6 *do_FB8   | 15_2" START BOOL<br>15_2" BND BOOL<br>mergy-Device<br>15_2" D DEC<br>15_2" PAUSE_TIME DEC   | Talos<br>Talos<br>L#10000  | Let 0000       |
| Your you of the provided t     | BI5_1*START         BOOL           BI5_1*BND         BOOL           energy-Device         BI5_1*D           DI5_1*D         DEC           BI5_1*PAUSE_TME         DEC   | talse<br>talse<br>L#0184<br>L#10000  | 2<br>3<br>4<br>5<br>6<br>7<br>7<br>8<br>8<br>10000<br>1000   | V Start_Peuse<br>Deet7 Dex 0.0 http://exe<br>Deet7 Dex 0.1 http://exe<br>Deet7 Dex 0.1 http://exe<br>VDagnosticAders PROFM<br>Deet7 Dex 0.1 http://exe<br>VDagnosticAders PROFM<br>Deet7 Dex 0.1 http://exe<br>Deet7 Dex 0.1 http://exe<br>Dex 0.1 http://e | 15_2" START         BOOL           15_2" END         BOOL           inergy-Device         BEC           15_2" PAUSE_TIME         DEC  | false<br>L#8178<br>L#10000   | L#10000        |
| 1   | B15_1**START         BOOL           B15_1**END         BOOL           B15_1**END         BOOL           B15_1**END         DOC           B15_1**D         DEC           B15_1**PAUSE_TIME         DEC   | talse<br>false<br>L#8184<br>L#10000  | 2<br>3<br>4<br>5<br>6<br>7<br>7<br>7<br>8<br>8<br>10<br>10<br>10<br>11<br>11<br>11   | // Start_Peuse           Deet7.0EX_0.0           Vicing_Peuse           Deet7.0EX_0.0           Deet7.0EX_0.1           Vicing_Peuse           Deet7.0EX_0.1           Deet7.0EX_0.1           Vicing_Peuse           Deet7.0EX_0.1           Vicing_Peuse           Deet7.0EX_0.2           Vicing_Peuse           Deet7.0EX_0.2           Vicing_Peuse           Deet7.0EX_0.6           No           Deet7.0EX_0.6           Vicing_Peuse           Deet7.0EX_0.6           No           Deet7.0EX_0.6           No           Deet7.0EX_0.6           No           Deet7.0EX_0.6           No  | 15_2" START BOOL<br>15_2" END BOOL<br>Intrgy-Device<br>15_2" D DEC<br>15_2" PAUSE_TIME DEC<br>16_2" VAUSE_TIME DEC  | 14500<br>14500<br>L#173<br>L#10000   | L#10000        |
| n         aster_presset           0         DestsDext 0.0         1%b_FB           2         DestsDext 0.1         1%b_FB           5         DestsDext 0.1         1%b_FB           6         // VisignottCAddreps PMob         1%b_FB           7         DestsDext 0.1         1%b_FB           8         // VisignottCAddreps PMob         1%b_FB           9         DestsDeX 0.1         1%b_FB           10         1         / visid         12           12         DestSDEX 10.0         1%b_FB           7         DestSDEX 10.0         1%b_FB  | BI5_1**START         BOOL           B15_1**END         BOOL           B15_1**END         BOOL           B15_1**D         DEC           B15_1**D         DEC           B15_1**D         DEC           B15_1**D         DEC           B15_1**PAUSE_TIME         DEC           B15_1**VALID         BOOL   | taise<br>taise<br>Life184<br>Life10000   | 23<br>4<br>5<br>6<br>7<br>7<br>10000<br>8<br>10<br>111<br>111<br>112<br>112<br>112   | // Start_Pause           OB017.0EX         0.0         "hdp_FB8           //End_Pause         De817.0EX         0.1         "hdp_FB8           //Edd_Pause         De817.0EX         0.1         "hdp_FB8           //Deanottakastige         Production         De817.0EX         0.1         "hdp_FB8           //Deanottakastige         Production         1         hdp_FB8         De817.0EX         0.0         "hdp_FB8           0         De917.0EX         0.0         "hdp_FB8         N valid         De917.0EX         10.0         "hdp_FB8           1         N valid         De917.0EX         10.0         "hdp_FB8         Harm   | 15_2*START BOOL<br>15_2*END BOOL<br>Intergr-Device<br>15_2*D DBC<br>15_2*PAUSE_TME DBC<br>15_2*YAUD BOOL  | false<br>false<br>L#8178<br>L#10000  | L#10000        |
| 1   | BI5_1**START         BOOL           BI5_1**END         BOOL           BI5_1**END         BOOL           BI5_1**D         DEC           BI5_1**D         DEC           BI5_1**AUSE_TIME         DEC           BI5_1**AUSE_TIME         DEC           BI5_1**AUSE_TIME         DEC  | talse<br>talse<br>L#0184<br>L#10000<br>talse   | 23<br>34<br>5<br>6<br>7<br>7<br>8<br>8<br>8<br>10<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11  | // Start_Pause           Deet7.0EX_0.0_14b_FB8           VEnd_Pause           Deet7.0EX_0.1_14b_FB8           Deet7.0EX_0.1_14b_FB8           VEnd_Pause           Deet7.0EX_0.1_14b_FB8           VEnd_Pause           Deet7.0EX_0.1_14b_FB8           VENDS_TME           VENDS_TME           Deet7.0EX_0.0_14b_FB8           Vends           Deet7.0EX_10.0_14b_FB8           Vends           Deet7.0EX_10.0_14b_FB8           Vends           Deet7.0EX_10.0_14b_FB8  | 15_2*START BOOL<br>15_2*END BOOL<br>mergy-Device<br>15_2*D DEC<br>16_2*PAUSE_THE DEC<br>15_2*VALID BOOL<br>15_2*DISY BOOL   | false<br>false<br>L#8178<br>L#10000  | L#10000        |
|   | BIS_1**START         BOOL           BIS_1**BND         BOOL           BIS_1**DND         DOOL           BIS_1**D         DEC           BIS_1**PAUSE_TIME         DEC           BIS_1**VALD         BOOL           BIS_1**VALD         BOOL           BIS_1**EUSY         BOOL   | talse<br>talse<br>L#8184<br>L#10000<br>talse<br>talse  | 2<br>3<br>4<br>5<br>6<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1   | // Start_Pause     Oetr/DEX_00_1%46_P68     Oetr/DEX_00_1%46_P68     Oetr/DEX_01_%46_P68     Oetr/DEX_01_%46_P68     Oetr/DEX_01_%46_P68     Oetr/DEX_01_%46_P68     Oetr/DEX_00_6_1%46_P68     Oetr/DEX_00_1%46_P68     Oetr/DEX_01_%46_P68     Oetr/DEX_01_%46_P68     Oetr/DEX_01_%46_P68     Oetr/DEX_01_%46_P68     Oetr/DEX_01_%46_P68  | 15_2*START BOOL<br>15_2*END BOOL<br>netry-Device<br>15_2*D DBC<br>15_2*PAUSE_TME DBC<br>15_2*VALID BOOL<br>15_2*BUSY BOOL   | false<br>false<br>L#8178<br>L#10000<br>false   | L#10000        |
| " # "Sim_maxe     " # "Sim_maxe     " * "Sim_maxe     " * Sim_maxe        | BIS_1*START         BOOL           BIS_1*BND         BOOL           BIS_1*BND         BOOL           BIS_1*DND         DEC           BIS_1*PAUSE_TIME         DEC           BIS_1*VALID         BOOL           BIS_1*EUSY         BOOL  | taise taise L#8184 L#10000 taise taise taise   | 2<br>3<br>3<br>5<br>6<br>7<br>7<br>8<br>7<br>7<br>8<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1  | # / Start Jawae     # Start Jawae     # Edit Jawae     @edit / Deix / Deix / Deix     @edit / Deix / Dei     @edit / Deix / Di     @edit / Deix / Di     @edit / Deix / Di     @edit / Deix     @edit     @edit / Deix     @edit / Deix     @ed   | 15_2*START BOOL<br>15_2*BND BOOL<br>15_2*DD BOOL<br>15_2*D DBC<br>15_2*PAUSE_TME DBC<br>15_2*VAUD BOOL<br>15_2*VAUD BOOL<br>15_2*BUSY BOOL<br>15_2*BUSY BOOL  | false<br>false<br>L#178<br>L#10000<br>false<br>false   | L#10000        |
| ************************************  | BIS_1**START         BOOL           BIS_1**START         BOOL           BIS_1**BHD         BOOL           BIS_1**D         DEC           BIS_1**D         DEC           BIS_1**PAUSE_TIME         DEC           BIS_1**PAUSE_TIME         DEC           BIS_1**PAUSE_TIME         DEC           BIS_1**PAUSE_TIME         DEC           BIS_1***D         BOOL           BIS_1*****         BOOL           BIS_1************************************  | taise<br>LAG104<br>LAG104<br>LAG104<br>LAG1040<br>LAG1040<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>LAG104<br>L | 2<br>3<br>3<br>6<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7  | #/Start_Pause           #/Start_Pause           #/End_Pause           #/End_Pause           Dest726K           Dest726K           1/End_Pause           Control           Dest726K           1/End_Pause           Control           Dest726K           1/End_Pause           Control           Contro<   | 15_2* START         BOOL           15_2* END         BOOL           15_2* END         BOOL           15_2* D         DEC           15_2* D         DEC           15_2* ZND         DEC           15_2* ZND         BOOL           15_2* ZNLD         BOOL           15_2* ZNLD         BOOL           15_2* ZNLD         BOOL           15_2* ZNLD         BOOL   | 1400<br>1400<br>1.49178<br>1.91000<br>1400<br>1400<br>1400   | Let0000        |
| * *******************************   | BIS_1*START         BOOL           BIS_1*START         BOOL           BIS_1*BID         BOOL           BIS_1*D/DOVIDE         BOOL           BIS_1*PAUSE_TIME         DEC           BIS_1*PAUSE_TIME         DEC           BIS_1*PAUSE_TIME         DEC           BIS_1*PAUSE_TIME         DEC           BIS_1*PAUSE_TIME         DEC           BIS_1*PAUSE_TIME         BOOL           BIS_1*BROR         BOOL           BIS_1*DEROR         BOOL  | taise taise taise La0184 L01000 taise taise taise taise taise taise  | 2<br>3<br>3<br>6<br>6<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7  | # Start Pause           # Start Pause           Dest Dex Ao           Dest Dex No.           Cest T26K           TougnottcAading a Pelorik           Dest T26K           TougnottcAading a Pelorik           Dest T26K  | 15_2*START         BOOL           15_2*END         BOOL           nergy-Device         BOOL           15_2*D         DEC           15_2*D         DEC           15_2*PAUSE_TIME         DEC           15_2*PAUSE_TIME         BOOL           15_2*PAUSE_TIME         BOOL           15_2*PAUSE_TIME         BOOL           15_2*ERROR         BOOL           15_2*ERROR         BOOL  | felee<br>felee<br>L99178<br>L910000<br>felee<br>felee<br>felee<br>felee  | L#10000        |
| " ********************************  | 915_1**START         800L           915_1**DR         800L           915_1**DR         800L           915_1**D         0EC           915_1**         0EOC           915_1***         0EOC           915_1****         0EOC           915_1***********************************   | tase tase tase Let164 Let1000 fase fase fase fase fase fase fase fase  | 2<br>3<br>3<br>6<br>6<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1  | // Start_Pause           // Start_Pause           // End_Pause           // End_Pause           Delt7 DEX_011_*bb_PBB           // End_Pause           Delt7 DEX_011_*bb_PBB           // End_Pause           Delt7 DEX_011_*bb_PBB           // End_Pause           Delt7 DEX_011_*bb_PBB           // Pause           Delt7 DEX_100_*bb_PBB           // Vad           2           // Pause           // Pause      / Pause   | 15_2*START         800L           15_2*Bib         800L           15_2*Bib         800L           15_2*D         800L           15_2*D         800L           15_2*PAUSE_IME         800L           15_2*PAUSE_IME         800L           15_2*PAUSE_IME         800L           15_2*PAUSE_IME         800L           15_2*STAUS         800L   | False           False           False           La9178           La9178           False           False           False           False           False           False           False           False                  | L#10000        |
| *********************************   | M5_T*START         BOOL           M5_T*DAD         BOOL           M5_T*DAD         BOOL           M5_T*DAD         BOOL           M5_T*DAD         DEC           M5_T*PAUSE_TIME         DEC           M5_T*PAUSE_TIME         BOOL           M5_T*PAUSE_TIME         BOOL           M5_T*PAUSE_TIME         BOOL           M5_T*PAUSE_TIME         BOOL           M5_T*PAUSE_TIME         BOOL           M5_T*STATT         BOOL           M5_T*STATT         BOOL           M5_T*STATT         BOOL           M5_T*STATT         BOOL | Table Table Left 64 Left 64 Left 64 Left 64 Table Table Table Devent serococcoc Barrison   | 2<br>3<br>4<br>5<br>6<br>7<br>7<br>8<br>8<br>7<br>8<br>9<br>10<br>11<br>11<br>12<br>13<br>14<br>13<br>14<br>14<br>15<br>15<br>14<br>15<br>15<br>15<br>16<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17 | #/Start_Pures           #/Start_Pures           06471_DEX.01           06471_DEX.01           Deart           Deart <td>15_2*START         900L           15_2*START         900L           15_2*Datio         900L           15_2*Datio         900L           15_2*Datio         900L           15_2*Pallis         900L</td> <td>Felse           Felse           L28178           L29178           L21000           Felse           Felse           Felse           Felse           Felse           Felse           Felse           Felse           Felse</td> <td>L#10000</td>   | 15_2*START         900L           15_2*START         900L           15_2*Datio         900L           15_2*Datio         900L           15_2*Datio         900L           15_2*Pallis         900L   | Felse           Felse           L28178           L29178           L21000           Felse           Felse           Felse           Felse           Felse           Felse           Felse           Felse           Felse | L#10000        |
| 1         Rest/Face           2         Rest/Face         Rest/Face           3         Rest/Face         Rest/Face           5         Rest/Face         Rest/Face           6         Rest/Face         Rest/Face           7         Cold 5202         Rest/Face           8         Cold 5202         Rest/Face           10         Rest/Face         Rest/Face           10         Rest/Face         Rest/Face           11         Rest/Face         Rest/Face           12         Rest/Face         Rest/Face           13         Rest/Face         Rest/Face           14         Cold 5202         Rest/Face           15         Rest/Face         Rest/Face           16         Cold 5202         Rest/Face           17         Cold 5202         Rest/Face           18         Rest/Face         Rest/Face           10         Cold 5202         Rest/Face           10         Rest/Face         Rest/Face           10         Cold 5202         Rest/Face           10         Rest/Face         Rest/Face           10         Rest/Face         Res/Face           10  | HS_1**START         BOOL           HS_1**D         BOOL           HS_1**D         DOOL           HS_1**D         DEC           HS_1**D         DEC           HS_1**D         DEC           HS_1**D         DEC           HS_1**DAUSE_TME         DEC           HS_1***RUSY         BOOL           HS_1***RUSY         BOOL           HS_1***RUSY         BOOL           HS_1**STATUS         HEX           HS_1**STATUS         HEX   | tate<br>tate<br>Lette 4<br>Lette 4<br>tate<br>tate<br>tate<br>tate<br>tate<br>tate<br>tate<br>tate<br>tate<br>tate<br>tate<br>tate   | 2<br>3<br>4<br>5<br>6<br>6<br>7<br>7<br>8<br>10<br>11<br>11<br>12<br>13<br>13<br>14<br>15<br>15<br>14<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15<br>15  | // Start_Pause           // End_Pause           // End_Pause           // End_Pause           // End_Pause           Celer Zolk 0.1 "ab_P88           (Celer Zolk 0.1 "ab_P88           (Celer Zolk 0.1 "ab_P88           (Celer Zolk 0.1 "ab_P88           Celer Zolk 0.1 "ab_P88           (Celer Zolk 0.1 "ab_P88           (Celer Zolk 0.1 "ab_P88           (Celer Zolk 1.0 "ab_P88  | 15.2° START         800L           15.2° START         800L           15.2° PRO         800L           15.2° PAUSE_TME         08C           15.2° PAUSE_TME         08C           15.2° PAUSE_TME         08C           15.2° PAUSE_TME         08CL           15.2° PAUSE_TME         08OL           15.2° PAUSE_TME         08OL | Teles<br>Teles<br>Last78<br>Last78<br>Last7000<br>Teles<br>Teles<br>Drvet isconoco<br>Bert skot  |                |

All the four required variable tables fit into one window. You can also delete not required lines and combine the variables in one table.

In the following paragraphs the individual tables are explained.

8.3 Operating with a variable table (VAT)

#### VAT\_PE\_DS3\_WRITE\_1 for the first PROFlenergy device

| Figure | 8-3 |
|--------|-----|
| riguic | 00  |

|    | VA | T_PE_DS3_W        | VRITE_1 @PeV5_M_        | 1\SIMATIC 300\0 | CPU 317-2PN/DP\57 | Progr 🗆 🗙    |
|----|----|-------------------|-------------------------|-----------------|-------------------|--------------|
|    | 1  | Address           | Symbol                  | Display format  | Status value      | Modify value |
| 1  |    | // Dataset 3 wi   | rite                    |                 |                   |              |
| 2  |    | // enable         |                         |                 |                   |              |
| 3  |    | DB53.DBX 0        | .0 "idb_FB53_1".enable  | BOOL            | false             |              |
| 4  |    | // DiagnosticAd   | ddress PROFlenergy-Dev  | ice             |                   |              |
| 5  |    | DB53.DBD 2        | "idb_FB53_1".ID         | DEC             | L#8184            |              |
| 6  |    | // Slot-Number    | first PROFlenergy-Power | rmodul          |                   |              |
| 7  |    | DB53.DBVV 6       | 6 "idb_FB53_1".Slot_No  | o_1 DEC         | 1                 |              |
| 8  |    | // Function first | t Power-Modul           |                 |                   |              |
| 9  |    | DB53.DBW 8        | 3 "idb_FB53_1".Func_1   | DEC             | 1                 | 1            |
| 10 |    | // Slot-Number    | second PROFlenergy-Po   | wermodul        |                   |              |
| 11 |    | DB53.DBW 10       | 0 "idb_FB53_1".Slot_No  | p_2 DEC         | 4                 |              |
| 12 |    | // Function sec   | cond Power-Modul        |                 |                   |              |
| 13 |    | DB53.DBVV 1:      | 2 "idb_FB53_1".Func_2   | 2 DEC           | 1                 | 1            |
| 14 |    |                   |                         |                 |                   |              |
| 15 |    | //up to 8_Mo      | odules                  |                 |                   |              |
| 16 |    |                   |                         |                 |                   |              |
| 17 |    | // busy           |                         |                 |                   |              |
| 18 |    | DB53.DBX 38       | 3.0 "idb_FB53_1".busy   | BOOL            | false             |              |
| 19 |    | // done           |                         |                 |                   |              |
| 20 |    | DB53.DBX 38       | 3.1 "idb_FB53_1".done   | BOOL            | false             |              |
| 21 |    | // error          |                         |                 |                   |              |
| 22 |    | DB53.DBX 38       | 3.2 "idb_FB53_1".error  | BOOL            | false             |              |
| 23 |    | // status         |                         |                 |                   |              |
| 24 |    | DB53.DBD 40       | ) "idb_FB53_1".status   | HEX             | DVV#16#00700000   |              |
| 25 |    |                   |                         |                 |                   |              |
|    |    |                   |                         |                 |                   |              |

You change the values Func\_x via the field "Select" in the HMI. If the module shall participate in the pause, you enter "1"; otherwise you enter "0". "idb\_FB53\_1".Func\_1 is the feeding conveyor belt, "idb\_FB53\_1".Func\_2 is the discharging conveyor belt, "idb\_FB53\_2".Func\_1 (in VAT\_PE\_DS3\_WRITE\_2) is processing.

The button "Confirm" corresponds to the commands "idb\_FB53\_1".enable and "idb\_FB53\_2".enable. Of course, you only have to trigger the command "enable" if you wish to change this device. The block reacts to a positive edge which means that you should reset the command immediately.

8.3 Operating with a variable table (VAT)

#### VAT\_PE\_START\_END\_1 for the first PROFlenergy device

#### Figure 8-4

| 욻  | VA | T_PE_STAR1     | T_ENI   | )_1 @PeV5_M_1\SIMA1         | FIC 300\CPU 3  | 17-2PN/DP\57 Prog | a 💶 🗙        |
|----|----|----------------|---------|-----------------------------|----------------|-------------------|--------------|
|    | 1  | Address        |         | Symbol                      | Display format | Status value      | Modify value |
| 1  |    | // Start_Paus  | :e / En | d_Pause with FB 815 "PE_ST/ | ART_END"       |                   |              |
| 2  |    | // Start_Paus  | e       |                             |                |                   |              |
| 3  |    | DB815.DBX      | 0.0     | "idb_FB815_1".START         | BOOL           | false             |              |
| 4  |    | // End_Pause   | •       |                             |                |                   |              |
| 5  |    | DB815.DBX      | 0.1     | "idb_FB815_1".END           | BOOL           | false             |              |
| 6  |    | // Diagnostic/ | Addre   | ss PROFlenergy-Device       |                |                   |              |
| 7  |    | DB815.DBD      | 2       | "idb_FB815_1".ID            | DEC            | L#8184            |              |
| 8  |    | // PAUSE_TIN   | ИE      |                             |                |                   |              |
| 9  |    | DB815.DBD      | 6       | "idb_FB815_1".PAUSE_TIME    | DEC            | L#10000           | L#10000      |
| 10 |    |                |         |                             |                |                   |              |
| 11 |    | // valid       |         |                             |                |                   |              |
| 12 |    | DB815.DBX      | 10.0    | "idb_FB815_1".VALID         | BOOL           | false             |              |
| 13 |    | // busy        |         |                             |                |                   |              |
| 14 |    | DB815.DBX      | 10.1    | "idb_FB815_1".BUSY          | BOOL           | false             |              |
| 15 |    | // error       |         |                             |                |                   |              |
| 16 |    | DB815.DBX      | 10.2    | "idb_FB815_1".ERROR         | BOOL           | false             |              |
| 17 |    | // Status      |         |                             |                |                   |              |
| 18 |    | DB815.DBD      | 12      | "idb_FB815_1".STATUS        | HEX            | DVV#16#00000000   |              |
| 19 |    | // PE_MODE_    | JD      |                             |                |                   |              |
| 20 |    | DB815.DBB      | 16      | "idb_FB815_1".PE_MODE_ID    | HEX            | B#16#01           |              |
| 21 |    |                |         |                             |                |                   |              |

Enter the pause interval via "idb\_FB815\_1".PAUSE\_TIME. You can enter larger intervals easily via the display "Time".

"idb\_FB815\_1".START initiates the pause.

"idb\_FB815\_1".END stops the pause

Always via a positive edge for the first PROFIenergy device "belts".

The second PROFIenergy device "Processing" is controlled via the variable table "VAT\_PE\_START\_END\_2" with the "idb\_FB815\_2".

## 8.4 Reading parameters with the FB816 "PE\_CMD"

As the interpretation of the read data depends on the PROFIenergy command here the open command interface is operated exclusively via variable tables. All commands that are currently available are listed in chapter 4. In the STEP 7 project for the application example you find some prepared variable tables (VAT) for the PROFIenergy commands; here the PROFIenergy command "Query Modes - Get mode" is explained.

Figure 8-5

| *  | VA | T_PE_CMD_Get         | _Mode @PE_ET2005_V11             | SIMATIC 300    | CPU 317-2PN/DP\5 | 7 Program 💶 🖂 🗙 |
|----|----|----------------------|----------------------------------|----------------|------------------|-----------------|
|    | 1  | Address              | Symbol                           | Display format | Status value     | Modify value    |
| 1  |    | // FB816 PE_CMD      | open interface                   | •              |                  |                 |
| 2  |    | // REQ enable        |                                  |                |                  |                 |
| 3  |    | DB816.DBX 0.0        | "idb_FB816".REQ                  | BOOL           | false            |                 |
| 4  |    | // ID Diagnosticado  | tress PE-Device 1: "8184" or 2:" | 8178"          |                  |                 |
| 5  |    | DB816.DBD 2          | "idb_FB816".ID                   | DEC            | L#8184           | L#8184          |
| 6  |    | // CMD               |                                  | <u> </u>       |                  |                 |
| 7  |    | //1 = Start Pause    | 2 = End Pause                    |                |                  |                 |
| 8  |    | // 3 = Query Mode    | s 4 = PEM Status                 |                |                  |                 |
| 9  |    | // 5 = PE Identify 1 | 6 = Query Measurment             |                |                  |                 |
| 10 |    | DB816.DBB 6          | "idb_FB816".CMD                  | DEC            | 3                | 3               |
| 11 |    | // CMD_MODIFIER      | Command Modifier                 | <u>.</u>       |                  |                 |
| 12 |    | DB816.DBB 7          | "idb_FB816".CMD_MODIFIER         | DEC            | 2                | 2               |
| 13 |    | // CMD_PARA Con      | mand Parameter Pointer to Arra   | y MB240 - 255  |                  |                 |
| 14 |    | // "1" for Mode 1    |                                  |                |                  |                 |
| 15 |    | MB 240               |                                  | DEC            | 1                | 1               |
| 16 |    | // CMD_PARA_LEN      | N Command length                 | <u>.</u>       |                  |                 |
| 17 |    | DB816.DBW 18         | "idb_FB816".CMD_PARA_LEN         | DEC            | 1                | 1               |
| 18 |    | // VALID             |                                  | <u>.</u>       |                  |                 |
| 19 |    | DB816.DBX 20.0       | "idb_FB816".VALID                | BOOL           | false            |                 |
| 20 |    | // BUSY              |                                  | <u>.</u>       |                  |                 |
| 21 |    | DB816.DBX 20.1       | "idb_FB816".BUSY                 | BOOL           | false            |                 |
| 22 |    | // ERROR             |                                  | <u>.</u>       |                  |                 |
| 23 |    | DB816.DBX 20.2       | "idb_FB816".ERROR                | BOOL           | false            |                 |
| 24 |    | // STATUS            |                                  | <u>.</u>       |                  |                 |
| 25 |    | DB816.DBD 22         | "idb_FB816".STATUS               | HEX            | DVV#16#00000000  | DVV#16#00000000 |
| 26 |    |                      |                                  |                |                  |                 |
| 27 |    | // RESPONSE_DA1      | FA                               | <u>.</u>       |                  |                 |
| 28 |    | // PE_MODE_ID        |                                  |                |                  |                 |
| 29 |    | DB400.DBB 10         | "Response_Data".Data[0]          | DEC            | 1                | 0               |
| 30 |    | // PE_MODE_Attrib    | utes                             | <u>.</u>       |                  |                 |
| 31 |    | DB400.DBB 11         | "Response_Data".Data[1]          | DEC            | 0                | 0               |
| 32 |    | // Time_min_Pause    | )                                | <u>.</u>       |                  |                 |
| 33 |    | DB400.DBD 12         |                                  | DEC            | L#10000          | L#0             |
| 34 |    | // Time_to_Pause     |                                  | <u>.</u>       |                  |                 |
| 35 |    | DB400.DBD 16         |                                  | DEC            | L#0              | L#0             |
| 36 |    | // Time_to_operate   | ;                                | <u>.</u>       |                  |                 |
| 37 |    | DB400.DBD 20         |                                  | DEC            | L#10000          | L#0             |
| 38 |    | // Time_min_length   | _of_stay                         |                |                  |                 |
| 39 |    | DB400.DBD 24         |                                  | DEC            | L#0              | L#0             |
| 40 |    | // Time_max_lengt    | h_of_stay                        | <u>.</u>       |                  |                 |
| 41 |    | DB400.DBD 28         |                                  | HEX            | DV/#16#FFFFFFFF  | DV/#16#00000000 |
| 42 |    | //Mode_Power C       |                                  | <u>.</u>       |                  |                 |
| 43 |    | DB400.DBD 32         |                                  | FLOATING P     | 0.0              | 0.0             |
| 44 |    | //Energy Consum      |                                  |                |                  |                 |
| 45 |    | DB400.DBD 36         |                                  | FLOATING P     | 0.0              | 0.0             |
| 46 |    | //Energy Consum      |                                  |                |                  |                 |
| 47 |    | DB400.DBD 40         |                                  | FLOATING_P     | 0.0              |                 |
| 48 |    |                      |                                  |                |                  |                 |
| ĽЧ |    | L                    |                                  | <u>.</u>       |                  |                 |

See also Chapter 4.4

Insert the address of the selected PROFIenergy device into line 5 "ID". Activate the control values; response data are set to "0". Start the query with a positive edge on line 3 "REQ".

#### 8.4 Reading parameters with the FB816 "PE\_CMD"

#### Request data:

CMD = 3 "Query Mode" CMD\_ MODIFIER = 2 "Get Mode" CMD\_PARA\_LEN = 1 one further parameter in CMD\_PARA CMD\_PARA = 1 PE\_MODE

## Response\_Data in the DB400 starting from DW10:

| Parameters                    | Value   | Data type  |
|-------------------------------|---------|------------|
| PE_Mode_ID                    | 0x01    | Unsigned8  |
| PE_Mode_Attributes            | 0x00    | Unsigned8  |
| Time_min_Pause                | 10000   | Unsigned32 |
| Time_to_Pause                 | 0       | Unsigned32 |
| Time_to_operate               | 10000   | Unsigned32 |
| Time_min_length_of_stay       | 0       | Unsigned32 |
| Time_max_length_of_stay       | FFFFFFF | Unsigned32 |
| Mode_Power_Consumption        | 0.0     | Float32    |
| Energy_Consumption_to_pause   | 0.0     | Float32    |
| Energy_Consumption_to_operate | 0.0     | Float32    |

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## 9.1 Annex A: Measurement list

The supported measurement values are hardware specific. This list is taken from Technical Specification PROFIenergy (Table 10-1).

#### 9.1.1 Instantaneous measurements

| T | ab | le | 9-1 |  |
|---|----|----|-----|--|
|   |    |    |     |  |

| Measurement<br>ID | Measurements         | Unit | Phase         | Aggregation    | Duration |
|-------------------|----------------------|------|---------------|----------------|----------|
| 1                 | Voltage              | V    | a-n           | rms            |          |
| 2                 | Voltage              | V    | b-n           | rms            |          |
| 3                 | Voltage              | V    | c-n           | rms            |          |
| 4                 | Voltage              | V    | a-b           | rms            |          |
| 5                 | Voltage              | V    | b-c           | rms            |          |
| 6                 | Voltage              | V    | c-a           | rms            |          |
| 7                 | Current              | А    | а             | rms            |          |
| 8                 | Current              | А    | b             | rms            |          |
| 9                 | Current              | А    | С             | rms            |          |
| 10                | Apparent Power       | VA   | а             | Sliding Demand | 200 ms   |
| 11                | Apparent Power       | VA   | b             | Sliding Demand | 200 ms   |
| 12                | Apparent Power       | VA   | С             | Sliding Demand | 200 ms   |
| 13                | Active Power         | W    | а             | Sliding Demand | 200 ms   |
| 14                | Active Power         | W    | b             | Sliding Demand | 200 ms   |
| 15                | Active Power         | W    | С             | Sliding Demand | 200 ms   |
| 16                | Reactive Power<br>Qn | var  | а             | Sliding Demand | 200 ms   |
| 17                | Reactive Power<br>Qn | var  | b             | Sliding Demand | 200 ms   |
| 18                | Reactive Power<br>Qn | var  | С             | Sliding Demand | 200 ms   |
| 19                | Power factor         | non  | а             | Sliding Demand | 200 ms   |
| 20                | Power factor         | non  | b             | Sliding Demand | 200 ms   |
| 21                | Power factor         | non  | С             | Sliding Demand | 200 ms   |
| 22                |                      |      |               |                |          |
|                   |                      |      |               |                |          |
| 29                |                      |      |               |                |          |
| 30                | Frequency            | Hz   | total         | Sliding Demand | 10 s     |
| 31                | Voltage              | V    | average-ph-n  | rms            |          |
| 32                | Voltage              | V    | average-ph-ph | rms            |          |
| 33                | Current              | Α    | average-abc   | rms            |          |
| 34                | Reactive Power<br>Qn | W    | total         | Sliding Demand | 200 ms   |
| 35                | Active Power         | var  | total         | Sliding Demand | 200 ms   |
| 36                | Apparent Power       | VA   | total         | Sliding Demand | 200 ms   |

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| 37 | Power factor                    | non | total        | Sliding Demand   | 200 ms |
|----|---------------------------------|-----|--------------|------------------|--------|
| 38 |                                 |     |              |                  |        |
| 39 |                                 |     |              |                  |        |
|    |                                 | Мах | kimum        |                  |        |
| 40 | Maximum                         | V   | a-n          | rms              |        |
|    | Voltage                         |     |              |                  |        |
| 41 | Maximum<br>Voltage              | V   | b-n          | rms              |        |
| 42 | Maximum<br>Voltage              | V   | c-n          | rms              |        |
| 43 | Maximum<br>Voltage              | V   | a-b          | rms              |        |
| 44 | Maximum<br>Voltage              | V   | b-c          | rms              |        |
| 45 | Maximum<br>Voltage              | V   | c-a          | rms              |        |
| 46 | Maximum<br>Current              | A   | а            | rms              |        |
| 47 | Maximum<br>Current              | A   | b            | rms              |        |
| 48 | Maximum<br>Current              | A   | С            | rms              |        |
| 49 | Maximum<br>Apparent Power       | VA  | а            | Sliding Demand   | 200 ms |
| 50 | Maximum<br>Apparent Power       | VA  | b            | Sliding Demand   | 200 ms |
| 51 | Maximum<br>Apparent Power       | VA  | С            | Sliding Demand   | 200 ms |
| 52 | Maximum Active<br>Power         | W   | а            | Sliding Demand   | 200 ms |
| 53 | Maximum Active<br>Power         | W   | b            | Sliding Demand   | 200 ms |
| 54 | Maximum Active<br>Power         | W   | С            | Sliding Demand   | 200 ms |
| 55 | Maximum<br>Reactive Power<br>Qn | var | а            | Sliding Demand   | 200 ms |
| 56 | Maximum<br>Reactive Power<br>Qn | var | b            | Sliding Demand   | 200 ms |
| 57 | Maximum<br>Reactive Power<br>Qn | var | С            | Sliding Demand   | 200 ms |
| 58 | Maximum Power<br>factor         | non | а            | Sliding Demand   | 200 ms |
| 59 | Maximum Power<br>factor         | non | b            | Sliding Demand   | 200 ms |
| 60 | Maximum Power<br>factor         | non | С            | Sliding Demand   | 200 ms |
| 61 | Maximum<br>Frequency            | Hz  | total        | Sliding Interval | 10 s   |
| 62 | Maximum<br>Voltage              | V   | average-ph-n | rms              |        |

| 63 | Maximum<br>Voltage              | V   | average-ph-ph | rms            |        |
|----|---------------------------------|-----|---------------|----------------|--------|
| 64 | Maximum<br>Current              | A   | average-abc   | rms            |        |
| 65 | Maximum Active<br>Power         | W   | total         | Sliding Demand | 200 ms |
| 66 | Maximum<br>Reactive Power<br>Qn | var | total         | Sliding Demand | 200 ms |
| 67 | Maximum<br>Apparent Power       | VA  | total         | Sliding Demand | 200 ms |
| 68 | Maximum Power<br>factor         | non | total         | Sliding Demand | 200 ms |
|    |                                 |     |               |                |        |
|    |                                 | Min | imum          |                |        |
| 70 | Minimum Voltage                 | V   | a-n           | rms            |        |
| 71 | Minimum Voltage                 | V   | b-n           | rms            |        |
| 72 | Minimum Voltage                 | V   | c-n           | rms            |        |
| 73 | Minimum Voltage                 | V   | a-b           | rms            |        |
| 74 | Minimum Voltage                 | V   | b-c           | rms            |        |
| 75 | Minimum Voltage                 | V   | c-a           | rms            |        |
| 76 | Minimum Current                 | А   | а             | rms            |        |
| 77 | Minimum Current                 | А   | b             | rms            |        |
| 78 | Minimum Current                 | А   | С             | rms            |        |
| 79 | Minimum<br>Apparent Power       | VA  | а             | Sliding Demand | 200 ms |
| 80 | Minimum<br>Apparent Power       | VA  | b             | Sliding Demand | 200 ms |
| 81 | Minimum<br>Apparent Power       | VA  | С             | Sliding Demand | 200 ms |
| 82 | Minimum Active<br>Power         | W   | а             | Sliding Demand | 200 ms |
| 83 | Minimum Active<br>Power         | W   | b             | Sliding Demand | 200 ms |
| 84 | Minimum Active<br>Power         | W   | С             | Sliding Demand | 200 ms |
| 85 | Minimum<br>Reactive Power<br>Qn | var | а             | Sliding Demand | 200 ms |
| 86 | Minimum<br>Reactive Power<br>Qn | var | b             | Sliding Demand | 200 ms |
| 87 | Minimum<br>Reactive Power<br>Qn | var | С             | Sliding Demand | 200 ms |
| 88 | Minimum Power<br>factor         | 1   | а             | Sliding Demand | 200 ms |
| 89 | Minimum Power<br>factor         | 1   | b             | Sliding Demand | 200 ms |
| 90 | Minimum Power<br>factor         | 1   | С             | Sliding Demand | 200 ms |

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|    |                 | r   |               |                |        |
|----|-----------------|-----|---------------|----------------|--------|
| 91 | Minimum         | Hz  | total         | Sliding Demand | 10 s   |
| •  | Frequency       |     |               | g              |        |
|    | Flequency       |     |               |                |        |
| 92 | Minimum Voltage | V   | average-ph-n  | rms            |        |
|    |                 |     | 01            |                |        |
| 93 | Minimum Voltage | V   | average-ph-ph | rms            |        |
| 94 | Minimum Current | Α   | average-abc   | rms            |        |
|    |                 |     |               |                |        |
| 95 | Minimum Active  | W   | total         | Sliding Demand | 200 ms |
|    | Power           |     |               | -              |        |
|    | TOWCI           |     | -             |                |        |
| 96 | Minimum         | var | total         | Sliding Demand | 200 ms |
|    | Peactive Power  |     |               | 0              |        |
|    | Reactive Fower  |     |               |                |        |
|    | Qn              |     |               |                |        |
| 97 | Minimum         | VA  | total         | Sliding Demand | 200 ms |
|    | Apparent Power  |     |               | 9              |        |
|    | Apparent Fower  |     |               |                |        |
| 98 | Minimum Power   | non | total         | Sliding Demand | 200 ms |
|    | factor          |     |               | <u>J</u>       |        |
|    | ractor          |     |               |                |        |

#### 9.1 Annex A: Measurement list

## 9.1.2 Demand measurements

Demand measurements are averages over a certain time.

Table 9-2

| Measurement ID | Measurements         | Unit | Phase             | Aggregation       | Duration <sup>1)</sup> | Subblock <sup>1)</sup> | End_time <sup>1)</sup> |
|----------------|----------------------|------|-------------------|-------------------|------------------------|------------------------|------------------------|
| 150            | Voltage              | V    | a-n               | Sliding<br>Demand | 3 s                    | not defined            | not defined            |
| 151            | Voltage              | V    | b-n               | Sliding<br>Demand | 3 s                    | not defined            | not defined            |
| 152            | Voltage              | V    | c-n               | Sliding<br>Demand | 3 s                    | not defined            | not defined            |
| 153            | Voltage              | V    | a-b               | Sliding<br>Demand | 3 s                    | not defined            | not defined            |
| 154            | Voltage              | V    | b-c               | Sliding<br>Demand | 3 s                    | not defined            | not defined            |
| 155            | Voltage              | V    | с-а               | Sliding<br>Demand | 3 s                    | not defined            | not defined            |
| 156            | Current              | А    | а                 | Sliding<br>Demand | 600 s                  | not defined            | not defined            |
| 157            | Current              | А    | b                 | Sliding<br>Demand | 600 s                  | not defined            | not defined            |
| 158            | Current              | A    | с                 | Sliding<br>Demand | 600 s                  | not defined            | not defined            |
|                |                      |      |                   |                   |                        |                        |                        |
|                |                      |      |                   |                   |                        |                        |                        |
| 160            | Voltage              | V    | average<br>-ph-n  | Sliding<br>Demand | 3 s                    | not defined            | not defined            |
| 161            | Voltage              | V    | average<br>-ph-ph | Sliding<br>Demand | 3 s                    | not defined            | not defined            |
| 162            | Current              | А    | average<br>-abc   | Sliding<br>Demand | 600 s                  | not defined            | not defined            |
| 163            | Active Power         | w    | total             | Sliding<br>Demand | 900 s                  | not defined            | not defined            |
| 164            | Reactive Power<br>Qn | var  | total             | Sliding<br>Demand | 900 s                  | not defined            | not defined            |
| 165            | Apparent Power       | VA   | total             | Sliding<br>Demand | 900 s                  | not defined            | not defined            |
| 166            | Power factor         | 1    | total             | Sliding<br>Demand | not defined            | not defined            | not defined            |
| 167            |                      |      |                   |                   |                        |                        |                        |
|                |                      |      |                   |                   |                        |                        |                        |
|                |                      |      |                   |                   |                        |                        |                        |
|                |                      |      |                   |                   |                        |                        |                        |

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| Maximum   |  |                                      |  |   |   |  |  |
|---|--|--------------------------------------|--|---|---|--|--|
| 170   | Maximum<br>Voltage   | V                                    | a-n  | Sliding<br>Demand   | 3 s   | not defined  | not defined  |
| 171   | Maximum<br>Voltage   | v                                    | b-n  | Sliding<br>Demand   | 3 s   | not defined  | not defined  |
| 172   | Maximum<br>Voltage   | v                                    | c-n  | Sliding<br>Demand   | 3 s   | not defined  | not defined  |
| 173   | Maximum<br>Voltage   | v                                    | a-b  | Sliding<br>Demand   | 3 s   | not defined  | not defined  |
| 174   | Maximum<br>Voltage   | v                                    | b-c  | Sliding<br>Demand   | 3 s   | not defined  | not defined  |
| 175   | Maximum<br>Voltage   | v                                    | c-a  | Sliding<br>Demand   | 3 s   | not defined  | not defined  |
| 176   | Maximum<br>Current   | А                                    | а  | Sliding<br>Demand   | 600 s   | not defined  | not defined  |
| 177   | Maximum<br>Current   | А                                    | b  | Sliding<br>Demand   | 600 s   | not defined  | not defined  |
| 178   | Maximum<br>Current   | А                                    | С  | Sliding<br>Demand   | 600 s   | not defined  | not defined  |
|   |  |                                      |  |   |   |  |  |
|   |  |                                      |  |   |   |  |  |
|   |  |                                      | Min  | imum  |   |  |  |
| 180   | Minimum<br>Voltage   | V                                    | Mir<br>a-n   | imum<br>Sliding<br>Demand   | 3 s   | not defined  | not defined  |
| 180   | Minimum<br>Voltage<br>Minimum<br>Voltage   | V<br>V                               | Mir<br>a-n<br>b-n  | imum<br>Sliding<br>Demand<br>Sliding<br>Demand  | 3 s<br>3 s  | not defined<br>not defined   | not defined<br>not defined   |
| 180<br>181<br>182   | Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage   | V<br>V<br>V                          | Mir<br>a-n<br>b-n<br>c-n                                     | imum<br>Sliding<br>Demand<br>Sliding<br>Demand<br>Sliding<br>Demand   | 3 s<br>3 s<br>3 s   | not defined<br>not defined<br>not defined  | not defined<br>not defined<br>not defined  |
| 180<br>181<br>182<br>183                                    | Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage   | V<br>V<br>V<br>V                     | Mir<br>a-n<br>b-n<br>c-n<br>a-b                              | imum<br>Sliding<br>Demand<br>Sliding<br>Demand<br>Sliding<br>Demand<br>Sliding<br>Demand  | 3 s<br>3 s<br>3 s<br>3 s  | not defined<br>not defined<br>not defined<br>not defined   | not defined<br>not defined<br>not defined<br>not defined   |
| 180<br>181<br>182<br>183<br>184                             | Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage   | V<br>V<br>V<br>V                     | Mir<br>a-n<br>b-n<br>c-n<br>a-b<br>b-c                       | imum<br>Sliding<br>Demand<br>Sliding<br>Demand<br>Sliding<br>Demand<br>Sliding<br>Demand  | 3 s<br>3 s<br>3 s<br>3 s<br>3 s<br>3 s                            | not defined<br>not defined<br>not defined<br>not defined<br>not defined  | not defined<br>not defined<br>not defined<br>not defined<br>not defined  |
| 180<br>181<br>182<br>183<br>184<br>185                      | Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage   | V<br>V<br>V<br>V<br>V                | Mir<br>a-n<br>b-n<br>c-n<br>a-b<br>b-c<br>c-a                | imum Sliding Demand  | 3 s<br>3 s<br>3 s<br>3 s<br>3 s<br>3 s<br>3 s                     | not defined<br>not defined<br>not defined<br>not defined<br>not defined  | not defined<br>not defined<br>not defined<br>not defined<br>not defined  |
| 180<br>181<br>182<br>183<br>184<br>185<br>186               | Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage                       | V<br>V<br>V<br>V<br>V<br>V           | Mir<br>a-n<br>b-n<br>c-n<br>a-b<br>b-c<br>c-a<br>a           | imum Sliding Demand   | 3 s<br>3 s<br>3 s<br>3 s<br>3 s<br>3 s<br>600 s                   | not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined                               | not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined                               |
| 180<br>181<br>182<br>183<br>184<br>185<br>186<br>186<br>187 | Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Current                       | V<br>V<br>V<br>V<br>V<br>V<br>A<br>A | Mir<br>a-n<br>b-n<br>c-n<br>a-b<br>b-c<br>c-a<br>a<br>b      | imum Sliding Demand                               | 3 s<br>3 s<br>3 s<br>3 s<br>3 s<br>3 s<br>600 s<br>600 s          | not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined                | not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined                |
| 180<br>181<br>182<br>183<br>184<br>185<br>186<br>187<br>188 | Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Voltage<br>Minimum<br>Current<br>Minimum<br>Current | V<br>V<br>V<br>V<br>V<br>A<br>A<br>A | Mir<br>a-n<br>b-n<br>c-n<br>a-b<br>b-c<br>c-a<br>a<br>b<br>c | imum Sliding Demand | 3 s<br>3 s<br>3 s<br>3 s<br>3 s<br>3 s<br>600 s<br>600 s<br>600 s | not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined | not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined<br>not defined |

#### 9.1 Annex A: Measurement list

| 190 | Apparent power                              | VA  | total | Fixed Block | 900 s | 1 | jj.mm.dd.hh.<br>min.sec |
|-----|---|-----|-------|-------------|-------|---|-------------------------|
| 191 | Active power<br>import                      | w   | total | Fixed Block | 900 s | 1 | jj.mm.dd.hh.<br>min.sec |
| 192 | Reactive power<br>import                    | var | total | Fixed Block | 900 s | 1 | jj.mm.dd.hh.<br>min.sec |
| 193 | Active power<br>export                      | W   | total | Fixed Block | 900 s | 1 | jj.mm.dd.hh.<br>min.sec |
| 194 | Reactive power<br>export                    | var | total | Fixed Block | 900 s | 1 | jj.mm.dd.hh.<br>min.sec |
| 195 | Maximum Active power with in demand         | W   | total | Fixed Block | 900 s | 1 | jj.mm.dd.hh.<br>min.sec |
| 196 | Minimum Active<br>power with in<br>demand   | W   | total | Fixed Block | 900 s | 1 | jj.mm.dd.hh.<br>min.sec |
| 197 | Maximum<br>Reactive power<br>with in demand | var | total | Fixed Block | 900 s | 1 | jj.mm.dd.hh.<br>min.sec |
| 198 | Minimum<br>Reactive power<br>with in demand | var | total | Fixed Block | 900 s | 1 | jj.mm.dd.hh.<br>min.sec |

 These are typical attributes for demand measurements. They may be defined vendor specific. The Transmission Data Type for all demand measurements will be Float32 in first step 9.1 Annex A: Measurement list

## 9.1.3 Energy measurements

Table 9-3

| Measurement ID | Measurements           | Unit | Phase | Tariff       |
|----------------|------------------------|------|-------|--------------|
| 200            | Active Energy Import   | V    | total | User defined |
| 201            | Active Energy Export   | V    | total | User defined |
| 202            | Reactive Energy Import | V    | total | User defined |
| 203            | Reactive Energy Export | V    | total | User defined |
| 204            | Apparent Energy        | V    | total | User defined |

# 10 Links & Literature

#### Literature

The following list is by no means complete and only provides a selection of appropriate sources.

Table 10-1

|     | Торіс                  | Title  |
|-----|------------------------|--|
| \1\ | PROFlenergy<br>profile | Common Application Profile PROFlenergy; Technical<br>Specification for PROFINET; Version 1.0;<br>January 2010; Order No: 3.802 |

#### **Internet Links**

The following list is by no means complete and only provides a selection of appropriate sources.

Table 10-2

|     | Торіс                                      | Title   |
|-----|--|---|
| \1\ | Reference to this entry                    | http://support.automation.siemens.com/WW/view/en/41986454 |
| \2\ | Siemens Industry<br>Online Support         | http://support.automation.siemens.com                     |
| \3\ | Decentral I/O<br>system ET200S -<br>Manual | http://support.automation.siemens.com/WW/view/en/1144348  |
| \4\ | FW download                                | http://support.automation.siemens.com/WW/view/en/35934244 |

# 11 History

Table 11-1

| Version | Date       | Changes                             |  |  |
|---------|------------|-------------------------------------|--|--|
| V1.0    | 10.08.2010 | First issue                         |  |  |
| V1.1    | 29.06.2011 | New PE-Block version, Annex A added |  |  |
| V1.2    | 01.09.2011 | Security note added                 |  |  |