

BreakerVisu – Software

NZM-XMC-MDISP35-MOD

NZM-XMC-MDISP35-SWD

NZM-XMC-MDISP70



Powering Business Worldwide

All brand and product names are trademarks or registered trademarks of the owner concerned.

Emergency On Call Service

Please call your local representative:

<http://www.eaton.eu/aftersales>

or

Hotline of the After Sales Service:

+49 (0) 180 5 223822 (de, en)

AfterSalesEGBonn@eaton.com

Original Operating Instructions

The German-language edition of this document is the original operating manual.

Translation of the original operating manual

All editions of this document other than those in German language are translations of the original German manual.

1st published 2012, edition date 04/12

2nd edition, edition date 05/2014

3rd edition, edition date 06/2016

See revision protocol in the "About this manual" chapter

© 2012 by Eaton Industries GmbH, 53105 Bonn

Production: René Wiegand

Translation: globaldocs GmbH

All rights reserved, including those of the translation.

No part of this manual may be reproduced in any form (printed, photocopy, microfilm or any other process) or processed, duplicated or distributed by means of electronic systems without written permission of Eaton Industries GmbH, Bonn.

Subject to alteration without notice.



Danger! **Dangerous electrical voltage!**

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighbouring units that are live.
- Follow the engineering instructions (AWA/IL) of the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalisation. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the low voltage for the 24 volt supply. Only use power supply units complying with IEC 60364-4-41 (VDE 0100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.
- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).

Contents

0	About this manual	5
0.1	Target group.....	5
0.2	List of revisions	5
0.3	Writing conventions	6
0.3.1	Hazard warnings of material damages	6
0.3.2	Hazard warnings of personal injury	6
0.3.3	Tips.....	6
1	Introduction	7
1.1	Scope of this document	7
1.2	Introduction	7
1.3	BreakerVisu variants.....	7
1.4	Devices compatible with BreakerVisu.....	8
2	Operator interface.....	9
2.1	Welcome screen/selecting a language	9
2.2	Main menu	10
2.2.1	7" variant.....	10
2.2.2	3.5" variant.....	12
2.3	"Start" window	12
2.3.1	7" variant.....	13
2.4	"Device overview" window.....	16
2.5	"Device details" screen	18
2.5.1	7" variant.....	19
2.5.2	3.5" variant.....	21
2.6	"Energy Logging" screen	25
2.6.1	7" variant.....	25
2.6.2	3.5" variant.....	26
2.7	"Extras" screen	26
2.7.1	7" variant.....	26
2.7.2	3.5" variant.....	31
3	Connecting devices to Modbus	39
3.1	Modbus RTU communication parameters	39
3.2	Discover devices	39
4	Connecting devices to SmartWire-DT.....	40
5	System Settings.....	41
5.1	WinCE configuration	41
5.1.1	Ethernet/IP settings	41
5.1.2	Setting Clock	42
5.2	Security settings	42

6	Languages	43
6.1	General Information	43
6.2	Language selection	43
6.3	Adding a language package	43
7	Measured value logging	44
7.1	Event logging	44
7.2	Energy logging	44
7.3	Device data logging	45
7.3.1	Logged parameters	45
7.3.2	Setting a scan rate	45
7.3.3	“Fast logging” option	46
7.3.4	How to find the log files	46
8	Licensing	47
9	Importing 3rd party Modbus devices	48
9.1	Device-specific bytes	49
9.2	Device-specific image file	49
9.3	XML configuration file contents	49
10	Available data transfer interfaces	52
10.1	Modbus TCP	52
10.2	OPC DA	52
11	Remote access via Ethernet	53
12	Updates	54
13	Velocity mode	55
14	Bug Fix	56
14.1	General	56
14.2	Configuring 3rd party devices	56
15	Appendix	57
15.1	Notifications	57
15.2	Modbus/TCP Register Map	58
15.3	Format for measured value files	64
15.4	XML configuration for 3rd party devices	68
15.4.1	Example 1	68
15.4.2	Example 2	77
15.5	License certificate	86

0 About this manual

This installation manual explains how to configure and install a BreakerVisu system. BreakerVisu systems are designed to visualize and log the operational data of low-voltage switchgears in connection with circuit-breakers.

0.1 Target group

The content of the manual is written for engineers and electricians. A specialist knowledge of electrical engineering is needed for commissioning.

0.2 List of revisions

Edition date	Page	Subject	New	Modifi- cation	Deleted
06/16	47	Licenses LIC-OPT-1ST-LEVEL, LIC-OPT-2ND-LEVEL	✓		
05/14	All	General revision		✓	
04/12	–	First edition			

0.3 Writing conventions

The symbols used in this manual have the following meanings:

0.3.1 Hazard warnings of material damages

NOTICE

Warns about the possibility of material damage.

0.3.2 Hazard warnings of personal injury



CAUTION

Warns of the possibility of hazardous situations that may possibly cause slight injury.



WARNING

Warns of the possibility of hazardous situations that could result in serious injury or even death.



DANGER

Warns of hazardous situations that result in serious injury or death.

0.3.3 Tips



Indicates useful tips.

1 Introduction

1.1 Scope of this document

This manual goes over the BreakerVisu device and its main characteristics. It focuses mainly on how to configure and commission the device, as well as on how to use the program menu and view measured values.

This manual makes reference to other Eaton BreakerVisu products and devices as well. For detailed information on these devices, please refer to the corresponding documentation.

1.2 Introduction

BreakerVisu is a device that features a touch panel and software for displaying and measuring low-voltage system parameters. It is designed to acquire operational data from multiple power distribution devices. In addition, it is ready for operation right out of the box, as it requires no programming or configuration skills on behalf of operators. Instead, the only steps required for commissioning are setting up the relevant system and network configurations.

The main tasks performed by BreakerVisu are acquiring data from connected devices and carrying out measurements. Users can search for newly connected devices and navigate to these devices in order to start a variety of measurements at the device and system levels. The system's user interface also features additional integrated system functions that make it possible to import new device types, configure system parameters, license additional functionalities, establish configuration locks if required due to security reasons, display and manage permissions, and select user interface languages. These functions are described in greater detail in this manual.

1.3 BreakerVisu variants

BreakerVisu features a touch panel that is available in two sizes: 3.5" and 7". The available communication interfaces on the cards will depend on the specific BreakerVisu variant being used.



For more details on the hardware, please refer to the corresponding hardware manual, MN048013EN.

Table 1: BreakerVisu device variants

BreakerVisu device variant	Article no.	Screen size	Number of Modbus RTU devices	Number of SmartWire-DT devices
NZM-XMC-MDISP35-MOD	172764	3.5"	8	–
NZM-XMC-MDISP35-SWD	172765	3.5"	–	8
NZM-XMC-MDISP70	172766	7"	32	16

1 Introduction

1.4 Devices compatible with BreakerVisu

1.4 Devices compatible with BreakerVisu

BreakerVisu can be connected to specific Eaton devices (please refer to the table below) based on the network being used. In addition, BreakerVisu allows for up to four device types from other manufacturers to be imported, provided these device types have a Modbus RTU interface. This latter function requires a license and needs additional configuration (→ Chapter 8, “Licensing”). Please note that SmartWire-DT is used exclusively for Eaton devices.



For more information on SmartWire-DT, please visit Eaton’s website at: www.eaton.eu

Table 2: Devices compatible with BreakerVisu

Device	Article no.	Description	Protocol
IZMX-MCAM	122892	Modbus card for NRX series	Modbus RTU
IZM-MMINT	124236	INCOM-to-MODBUS translator module for IZM26 circuit-breakers	Modbus RTU
NZM2-XMC-MB	129961	XMC measuring and communication module up to 300 A	Modbus-RTU
NZM3-XMC-MB	129962	XMC Measuring and communication module up to 500 A	Modbus RTU
NZM2-4-XMC-MB	129965	XMC measuring and communication module for currents of up to 300 A, 4-pole	Modbus RTU
NZM3-4-XMC-MB	129966	XMC measuring and communication module for currents of up to 500 A, 4-pole	Modbus RTU
NZM3-XMC-KIT-630	153141	XMC measuring and communication module up to 630 A	Modbus RTU
NZM2-XMC-MB-250	156641	XMC measuring and communication module up to 250 A	Modbus RTU
NZM2-4-XMC-MB-250	156642	XMC measuring and communication module for currents of up to 250 A, 4-pole	Modbus RTU
NZM-XMC-TC-MB	169832	Power consumption meter, three-phase, DIN-rail	Modbus RTU
NZM-XSWD-704	135530	SmartWire-DT card for NZM circuit-breakers	SmartWire-DT
PKE-SWD-SP	150614	SmartWire-DT module for PKE with XTUA or XTUWA trip block	SmartWire-DT
PKE-SWD-CP	172735	SmartWire-DT module for PKE with XTUACP or XTUWACP trip block	SmartWire-DT
MCB-HK-SWD	177175	SmartWire-DT auxiliary contacts for RCCBs, MCBs and RCBOs	SmartWire-DT

Some of the devices compatible with BreakerVisu are gateways designed to make it possible to connect other devices to the network.



For detailed information on the devices in → Table 2, please refer to the Eaton online catalog.

http://www.moeller.net/de/support/online_catalogue/index.jsp

Make sure to use the article no. for the device you want when searching.

2 Operator interface

2.1 Welcome screen/selecting a language

The BreakerVisu program starts with a welcome screen in which you can select the program language you want. Once you select a language, the program will open the BreakerVisu home screen. Please note that the welcome screens for the 7" and 3.5" variants of the BreakerVisu program are identical. Also note that you can open the welcome screen from the BreakerVisu home screen if you want to change languages later on.



For detailed information on the languages that are supported and on how to use language files in the BreakerVisu program, please refer to → Chapter 6, "Languages".







Figure 1: Welcome screen – with program language options

2 Operator interface

2.2 Main menu

Table 3: Welcome screen controls

Control	Action
	Tap the XML icon to load a language file from the SD card onto the BreakerVisu program. Once the file is successfully loaded, a message saying "OK, Click languages" will appear next to the icon. You will then be able to select any one of the three languages shown.
	Language selection button A language file will always include English and two other languages. The default languages are English, German, and French. Additional information → Section 6, "Languages", page 43
	Icon showing which language is selected When you select a language by tapping a language button, a check mark will appear next to that button.
	As soon as you select a language, you can tap the double arrow icon to open the BreakerVisu home screen and its main menu.

2.2 Main menu

You can use the main menu to navigate through the entire program. In most screens, this menu will be found at the very top.

The main menu can be used to access the home screen, the **Energy Logging** screen, the **Extras** screen, and the various device overview screens. The **Start**, **Energy Logging**, and **Extras** buttons are identical in all BreakerVisu variants and will perform the exact same actions. However, the way in which device overviews (**Devices**) are opened will vary.

2.2.1 7" variant






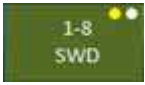

Both Modbus RTU and SmartWire-DT devices can be connected to the 7" variant, which can handle a total of up to 48 devices (32 Modbus RTU devices + 16 SmartWire-DT devices). This variant's main menu features buttons that can be used to access device overviews based on the network and the network segments being used, with each button opening a network segment with eight devices. Accordingly, there are two SmartWire-DT buttons for accessing SmartWire-DT devices and four Modbus RTU buttons for accessing Modbus RTU devices.

When a network segment is accessed, the corresponding button will be highlighted. Moreover, every button features two status indicators that show whether any devices are connected to the corresponding segment and, if so, whether there are any warnings for those devices: The first one is a white circle, which indicates that there are devices connected to the segment. The second is a yellow circle, which indicates that there are one or more warnings for one or more devices. To get more specific information regarding these warnings, simply open the corresponding device overview.



Figure 2: Main menu (7" variant)

Table 4: Main menu controls (7" variant)

Control	Description
	Tap the Start button to open the BreakerVisu program's home screen.
	Buttons used to access the screens with overviews of the devices connected via SmartWire-DT. Device overview screens provide basic information regarding the corresponding device groups.
	Buttons used to access the screens with overviews of the devices connected via Modbus RTU. Device overview screens provide basic information regarding the corresponding device groups.
	Button used to access the power monitoring settings and status functions.
	Button used to access various system settings, the BreakerVisu program configuration, the user management functions, and the licensing functions.
 	The circles on the buttons indicate whether the device in the corresponding device overview screen is online (white) or whether a problem is being signaled (yellow).

2 Operator interface

2.3 "Start" window





2.2.2 3.5" variant

The main menu in the 3.5" BreakerVisu variant only has one button for accessing the device overview. The reason for this is that the 3.5" variant comes with either a Modbus RTU or a SmartWire-DT communication interface, meaning that it is not necessary to distinguish between networks when accessing the overview. This BreakerVisu variant allows for up to eight devices to be configured. Also, please note that the main menu will not appear in the device details screen in the 3.5" variant.



Figure 3: Main menu (3.5" variant)

Table 5: Main menu controls (3.5" variant)

Control	Action
	Tap the Start button to open the BreakerVisu program's home screen.
	Button used to access the device overview screen. Device overview screens provide basic information regarding the corresponding device groups.
	Button used to access the power monitoring settings and status functions.
	Button used to access various system settings, the BreakerVisu program configuration, the user management functions, and the licensing functions.

2.3 "Start" window

The home screen shows the date and time and provides an overview of the BreakerVisu system in terms of connected devices, warnings, measurement settings, and when measurements start. In both BreakerVisu size variants, this screen includes not only the main menu, but also buttons that can be used to access the available languages and an overview of notifications.

2.3.1 7" variant

The home screen overview in 7" devices is subdivided into three panes: one on the left for SmartWire-DT devices, one on the right for Modbus RTU devices, and one in the center (**BreakerVisu Statistics**) with a system overview and basic information.








Figure 4: BreakerVisu home screen (7" variant)

2 Operator interface

2.3 "Start" window

Table 6: Home screen controls (7" variant)

Control	Action
 	<p>The SmartWire-DT Statistics and Modbus-RTU Statistics boxes provide basic statistics regarding the connected SmartWire-DT and Modbus RTU devices. The number after Devices online indicates the number of connected devices that are running, Devices logging indicates the number of devices with a configured logging function, and Warnings indicates the number of devices that are signaling a problem.</p> <p>Tap one of the statistics panes to open the corresponding device overview screen (SmartWire-DT: 1 - 8, Modbus RTU: 1 - 8).</p>
	<p>This button is part of the Modbus RTU Statistics pane. It will be shown when no Modbus RTU devices are detected (after the first time the BreakerVisu system is started, for example). When you tap this button, the device will start scanning for Modbus RTU devices. Make sure that all Modbus RTU communication parameters are configured correctly before scanning for Modbus RTU devices.</p> <p>Note: In contrast to Modbus RTU device scanning, the BreakerVisu system will automatically start scanning for SmartWire-DT devices after starting. The reason for this is that the BreakerVisu system does not need for any SmartWire-DT communication parameters to be configured.</p>
	<p>The BreakerVisu Statistics pane shows basic statistical information, such as: the current BreakerVisu program version, information regarding system resource availability, the date and time when the system was last started, and the system time.</p> <p>To set the BreakerVisu system's date and time, tap the System time area inside the pane.</p> <p>A yellow box will appear in the upper left corner whenever a BreakerVisu program notification is generated. This box will show the number of notifications, and tapping it will display a list of them.</p>
	<p>The notifications list ("Notifications") will show the last 10 notifications generated by the BreakerVisu system. Normally, these notifications will refer to the BreakerVisu system's status and to the use of external system resources (SD card, USB).</p> <p>To delete these notifications, tap the Clear all button.</p>
	<p>Tapping the languages button will take you back to the welcome screen, where you can change the system language.</p>

2.3.1.1 3.5" variant


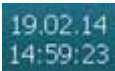




The home screen in 3.5" device variants only has one single overview pane with information regarding connected devices:

- Number of connected devices
- Number of devices measuring operational data
- Number of warnings



Figure 5: BreakerVisu home screen (3.5" variant)

Table 7: Home screen controls (3.5" variant)

Control	Action
	<p>The Connected Devices OVERVIEW pane shows information regarding the number of connected devices, their measurements, the total number of warnings for all connected devices, and the system time.</p>
	<p>To set the BreakerVisu system's date and time, tap the System time area.</p>
	<p>A yellow box will appear in the upper left corner whenever a BreakerVisu program notification is generated. This box will show the number of notifications, and tapping it will display a list of them.</p>
	<p>The Discover devices text will only appear in the Modbus RTU variant of the 3.5" device. Tapping this text will make the system scan the Modbus RTU network. Make sure that all Modbus RTU communication parameters are configured correctly before scanning the network.</p> <p>The BreakerVisu system will automatically start scanning for SmartWire-DT devices after starting. The reason for this is that the BreakerVisu system does not need for any SmartWire-DT communication parameters to be configured.</p> <p>If you need to scan the Modbus RTU network again, go to the Extras screen, then tap Modbus-RTU, and then tap Discover Devices.</p>
	<p>The notifications list will show the last 10 notifications generated by the BreakerVisu system.</p> <p>Normally, these notifications will refer to the BreakerVisu system's status and to the use of external system resources (SD card, USB flash drive). To delete these notifications, tap the Clear all button.</p>
	<p>Tapping the languages button will take you back to the welcome screen, where you can change the system language.</p>

2.4 "Device overview" window

The device overview can be accessed from the main menu. This overview provides quick information regarding all the devices connected to the network, with the parameters shown for each connected device varying based on the device type in question. All this information will be shown in a device box. In addition to alphanumeric information such as the device number (address on the bus), the device's location (this value can be configured), the device type, the current for each phase, and/or the total real power, this box will show device status information in the form of graphic images and symbols.

These images and symbols consist of a picture of the device, a warning and overload indicator, and a general device status (open, closed, tripped) indicator. In the case of Modbus RTU networks, device x will have slave address x on the Modbus RTU network in which the BreakerVisu device is functioning as a master.



Figure 6: Device overview – Modbus RTU (7" variant)

Table 8: Navigation controls (7" variant)


Control	Action
	Tap the arrows to move through the device overview screens. The appropriate arrow icons will be shown based on the screen currently being displayed (there will not be an arrow pointing to the left on the first screen, for example).



Figure 7: Device overview (3.5" variant)

2 Operator interface

2.4 "Device overview" window

Table 9: Navigation controls (3.5" variant)


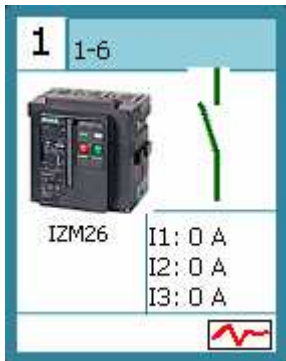

Control	Action
	<p>Tap the arrows to move through the device overview screens. The appropriate arrow icons will be shown based on the screen currently being displayed (there will not be an arrow pointing to the left on the first screen, for example).</p>

Table 10: Overview of the controls on the screen







Control	Action
	<p>Tapping on an individual device box will take you to the details screen for that device so that you can view/access the remaining parameters for the device.</p>
	<p>The devices' location name will be location name by default. To enter a name of your choice instead, tap the location name text field.</p>

The device boxes shown by the system will contain a picture of the device, as well as symbols meant to describe the device's status. These symbols may vary depending on the specific device type being used, and in some cases can be configured by using the device tabs (Table 2, page 8).

2 Operator interface

2.5 "Device details" screen

Table 11: Device status symbols

Symbol	Description
	Example of a device picture (an Eaton NZM2 circuit-breaker in this case)
	Open
	Closed
	Tripped
	Logging enabled
	<p>Tripped circuit-breaker with warning points (there are two warning points for each device) and early overload warning (temperature bar). Depending on the specific operating conditions in question, warnings can appear both for tripped and closed circuit-breakers. In addition, please note that early overload warnings will not be available for all device types.</p> <p>Note: The Device details screen describes what the warning points mean in detail.</p>

2.5 "Device details" screen

The **Device details** screen is made up of four sub-screens:

- Primary data,
- More data
- History,
- Protocol.

In addition to the information shown on the device box in the corresponding device overview screen, the "Main data" screen shows additional information regarding the device (device connection, device type, serial number, firmware variant (if applicable), current device operating conditions (voltage, current, power, events), and two warning indicators (alarm in the 3.5" variant)). The warnings/alarms can be configured at the device level (please refer to the corresponding device documentation).

2.5.1 7" variant



Figure 8: Device details – Main data (7" variant)

Table 12: "Device details" controls (7" variant)

Control	Action
	<p>There are no special controls in the "Main data" screen. You can use the general controls shown on all device details screens in order to go back to any option in the main menu or use the tabs to access one of the sub-screens.</p>
<p>Idle for 15 minutes</p>	<p>If the user does not perform any action on one of the device details screens for more than 15 minutes, the BreakerVisu program will automatically switch back to the BreakerVisu home screen.</p>

The **More data** sub-screen shows additional information regarding the device's operating conditions. In the case of third-party devices, you will be able to add additional device parameters.

➔ ➔ Chapter 9, "Importing 3rd party Modbus devices" explains how to configure third-party devices in detail.



Figure 9: "Device details" – "More data" (7" variant)

The **History** sub-screen lists the device's most recent events. In the case of trip blocks that feature internal memory containing lists of events, a log of these events can be stored in a data file on an external storage device (SD card, USB flash drive) plugged into the BreakerVisu device.

2 Operator interface

2.5 "Device details" screen

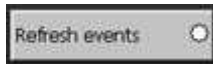
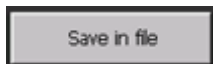

The **WEAR INDICATION** pane shows information regarding the device's lifespan (the availability of this information will depend on the specific device being used) and will explicitly indicate when the maximum number of mechanical or electrical trips is close to being reached.



Figure 10: Device details – "History"
Device-supporting events (7" variant)

The controls described in the following table will only be available for devices that feature internal memory containing lists of events (for details, please refer to Table 2, page 8). If the list of events is managed by the BreakerVisu program, the **EVENTS HISTORY** will be limited to 10 entries.

Table 13: "Device details" (event history) controls
(not available for all devices) (7" variant)

Control	Action
	Tap this button to refresh the information shown in the EVENTS HISTORY list. The circle will flash while the information is being refreshed.
	Tap this button to store the data in a file on an external storage device plugged into the BreakerVisu device.
	Use the arrows to the sides of the EVENTS HISTORY label to browse through the events measured by the device. In order for this to work, the events must have been stored in the corresponding trip blocks.

The **Logging** sub-screen can be used to monitor, set up, start, and stop the selected device's data measuring function. While data measuring for the selected device is running, the **Logging** sub-screen will show the **Data logging status** (flashing circle), the date and time when measuring started, and the name of the corresponding data file.



Figure 11: Device details – "Logging" (7" variant)

Table 14: Device details - Measuring controls (7" variant)

Control	Action
	<p>To set the data acquisition scan rate, tap on the minutes and seconds fields and enter the values you want. The minimum scan rate is 720 min (= 12 h) and the maximum one is 10 s. If you need faster data acquisition, enable the Fast Logging option. Additional information → Section 7.3, "Device data logging", page 45</p>
	<p>Once you have set a data scan rate, you can start the data acquisition function by tapping the START button. To stop it, tap the STOP button. When the data acquisition function is running, the display will show a flashing circle next to Data logging status, as well as a start date and time and a data file name.</p>
	<p>When the data acquisition function is not running, you can make the system use the maximum scan rate by tapping the Fast Logging checkbox. Please note that this option can only be used for two devices at the same time and that it will overwrite the scan rate you entered for the next start/stop measuring period. To return to the scan rate you selected, you will first have to stop the measuring function (by tapping the STOP button) before being able to disable the checkbox. When the Fast Logging option is enabled, the scan rate will be 2 s.</p>

2.5.2 3.5" variant

The **DEVICE PROPERTIES** screen in the 3.5" BreakerVisu variant may be different for devices without initialization (i.e., in which the maximum device current has not been set) and for devices for which the maximum device current has been specified in the register and which have values that the BreakerVisu device can read.



Figure 12: Device details – "Main data" (at the beginning) (3.5" variant)

2 Operator interface

2.5 “Device details” screen

Table 15: “Device details” controls (3.5” variant)






Control	Action
	To access one of the sub-screens, use the corresponding tab.
	To go back to the device overview, tap the “back” arrow.
	The Introduce maximum device current box indicates that the value cannot be read directly from the device, but instead must be entered by the user. To enter this value, tap on the box. As soon as you set a value, the box will disappear from the screen.
	Tap Change I-Max to change the device’s maximum current. This box will not be shown on the screen if the value can be read directly from the connected device.
	Tap this button to switch to “classic” view (multimeter). Additional information → Section 2.5.2.1, “Classic view”, page 24.
Idle for 15 minutes	If the user does not perform any action on one of the device details screens for more than 15 minutes, the BreakerVisu program will automatically switch back to the BreakerVisu home screen.



Figure 13: Device details – “Main data” (3.5” variant)

If the maximum device current for the BreakerVisu program is found in the device’s memory or if you have entered it already, you will be able to get a diagram of the current currents, based on the data provided by the connected device, in the “Device details” screen.



Figure 14: Device details – “More data” (3.5” variant)



Figure 15: Device details – "History" (3.5" variant)

Table 16: Device details – "History"
(not available for all devices) (3.5" variant)

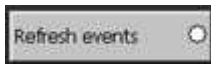



Control	Action
	Tap the Refresh events button to update the data in the history sub-screen. The circle will flash while data is being refreshed.



Figure 16: Device details – "Logging" (3.5" variant)

Table 17: "Device details" controls (3.5" variant)

Control	Action
	To set the data acquisition scan rate, tap on the minutes and seconds fields and enter the values you want. The minimum scan rate is 720 min (= 12 h) and the maximum one is 10 s. If you need faster data acquisition, enable the Fast Logging option. Additional information → Section 7.3, "Device data logging", page 45.
	Once you have set a data scan rate, you can start the data acquisition function by tapping the START button. To turn it off, tap the STOP button. When the data acquisition function is running, the display will show a flashing circle next to Data logging status , as well as a start date and time and a data file name.
	When the data acquisition function is not running, you can make the system use the maximum scan rate by tapping the Fast Logging checkbox. Please note that this option can only be used for two devices at the same time and that it will overwrite the scan rate you entered for the next start/stop measuring period. To return to the scan rate you selected, you will first have to turn off the measuring function (by tapping the STOP button) before being able to disable the checkbox. When the Fast Logging option is enabled, the scan rate will be 2 s.

2 Operator interface
 2.5 "Device details" screen

The **More data** sub-screen shows additional information regarding the device's operating conditions. In the case of third-party devices, you will be able to add additional device parameters.

➔ ➔ Chapter 9, "Importing 3rd party Modbus devices" explains how to configure third-party devices in detail.

2.5.2.1 Classic view

Classic view features a number of screens that resemble a multimeter. Tap the green arrows to move through the screens, which show current voltage, current, power, and reactive power values.

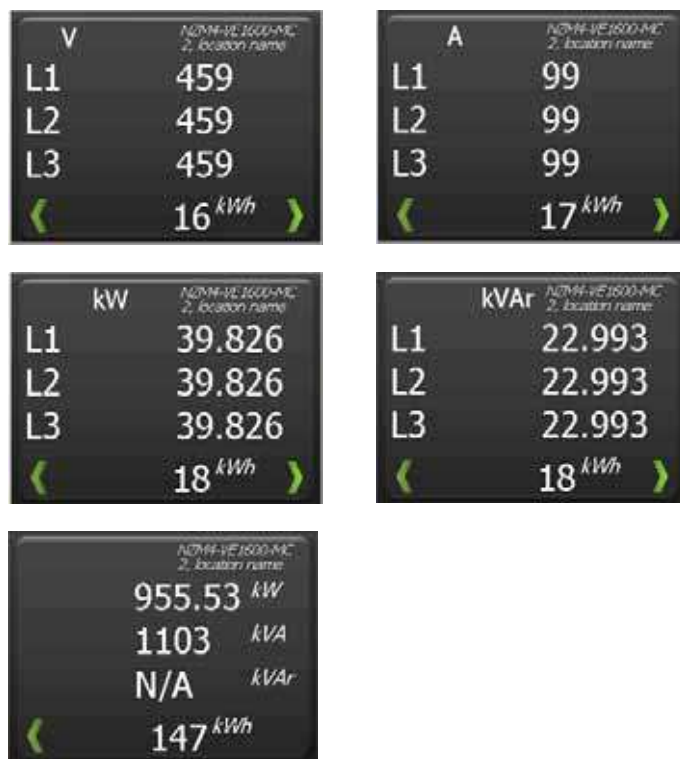



Figure 17: Device details screens – Classic view (3.5" variant)

Table 18: Classic view controls (3.5" variant)

Control	Action
	<p>Tap the green arrows to move between the classic view screens. Tapping the left arrow in the first classic view screen will take you back to the "Device details" screen. When you reach the last classic view screen, the right arrow will disappear, indicating that there are no further screens to access.</p>

2.6 "Energy Logging" screen

This screen can be used to activate the power monitoring function. Please note that data will only be acquired for devices with trip blocks that output power data (Table 2, page 8). When the power monitoring function is running, the **Energy logging status** circle will flash. Also note that the power monitoring function can only be configured when the BreakerVisu console is unlocked (→ Section 2.7, " "Extras" screen").






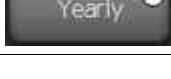
2.6.1 7" variant



Figure 18: "Energy Logging" screen (7" variant)

The status information in → Figure 18 shows a BreakerVisu system with an unlocked panel lock (see the **Help** pane: "Entries active. Please select logging rate"). In it, the power monitoring function is turned on, with green circles indicating the selected scan rate. The screen also shows that data has been stored in the EV_energy_15m.csv file and that the first day value is waiting for the next measuring interval.

Table 19: Overview screen controls (7" variant)

Control	Action
	Tapping this button will make the system store the trip block's power value at 15-minute intervals starting the moment an hour starts (for example: 00:00, 00:15, 00:30, 00:45, etc.). A green circle indicates that the measuring function is running.
	Tapping this button will make the system store the trip block's power value at the beginning of every hour.
	Tapping this button will make the system store the trip block's power value every day at 00:00 (12:00 a.m.).
	Tapping this button will make the system store the trip block's power value at 00:00 the first day of every week. A white circle indicates that the measuring function is turned off; a green circle indicates that it is running.
	Tapping this button will make the system store the trip block's power value at 00:00 the first day of every month.
	Tapping this button will make the system store the trip block's power value at 00:00 the first day of every year.

2 Operator interface

2.7 "Extras" screen





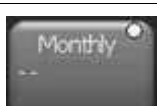
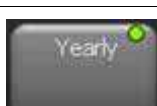
2.6.2 3.5" variant



Figure 19: Power monitoring screen (3.5" variant)

The information in → Figure 19 shows a BreakerVisu system with a locked panel lock; in it, the power monitoring function is activated (as indicated by the green circle next to the selected scan times).

Table 20: Overview screen controls (3.5" variant)

Control	Action
	Tapping this button will make the system store the trip block's power value at 15-minute intervals starting the moment an hour starts (for example: 00:00, 00:15, 00:30, 00:45, etc.). A green circle indicates that the measuring function is running.
	Tapping this button will make the system store the trip block's power value at the beginning of every hour.
	Tapping this button will make the system store the trip block's power value every day at 00:00 (12:00 a.m.).
	Tapping this button will make the system store the trip block's power value at 00:00 the first day of every week. The white circle indicates that the monitoring function is turned off.
	Tapping this button will make the system store the trip block's power value at 00:00 the first day of every month.
	Tapping this button will make the system store the trip block's power value at 00:00 the first day of every year.

2.7 "Extras" screen

2.7.1 7" variant

There are two screens called **Extras** that can be used to configure the BreakerVisu program's parameters and settings.



Figure 20: "Extras" screen 1 (7" variant)

Table 21: Controls in "Extras" screen 1 – Navigation (7" variant)







Control	Action
	There are two Extras screens. To get to the second screen, tap the Next page button.

Table 22: Controls in "Extras" screen 1 – Networks (7" variant)

Control	Action
	Tap the Discover Devices button to search for SmartWire-DT devices. The SWD Settings will show basic information regarding the connected devices and the SmartWire-DT network's status (number of active measuring devices on the network and actual SmartWire-DT status).
	Tap the Discover Devices button to start scanning the Modbus RTU network for connected devices.
	The Modbus RTU information pane features buttons that you can use to configure basic communication parameters: the number of stop bits (1 bit / 2 bits button), the baud rate (9600 / 19200 / 38400 button), and the parity (no / odd / even button). The selected values will be shown to the right of the corresponding buttons.
	Tap the Discover Devices button to start scanning the Modbus RTU network for connected devices.
	Tap the Available Device Types button to open a table listing the device types supported by the BreakerVisu program. This table will contain four Eaton device types and four configurable device types that can be used for 3rd party devices.
	<p>Note: The ability to use configurable device types is an optional BreakerVisu program feature that requires a license.</p> <p>Additional information → Chapter 8, "Licensing".</p>

2 Operator interface

2.7 "Extras" screen



Figure 21: Available device types (7" variant)

Table 23: Controls – Available device types (7" variant)




Control	Action
	<p>The License needed box indicates that the system is missing the license required for managing configurable device types. Accordingly, the corresponding controls will be disabled. As soon as the license is provided, this box will disappear.</p> <p>Additional information → Chapter 8, "Licensing".</p>
	<p>The AUX TYPE box contains basic information regarding the custom devices defined by the user: name, type, and number of device parameters.</p> <p>Tap the Select button to select a third-party device.</p> <p>To delete a selected third-party device, tap the DELETE DEVICE button.</p>
	<p>Tap the IMPORT NEW button to start reading and configuring custom device types. The Help message box will show a flashing circle to indicate that an import process is in progress. The system will also display help messages to provide you with instructions or with the process' progress. Finally, "Last error" will show the process' result.</p> <p>Additional information → Chapter 9, "Importing 3rd party Modbus devices".</p>

Table 24: Controls – "Ethernet settings" (7" variant)



Control	Action
	<p>In order to be able to use the IP connection, the network configuration must be correctly set up in the BreakerVisu console.</p> <p>Tap the Configure IP and Mask button to open the WinCE "Network Connections" folder, where you will be able to configure the required network settings.</p> <p>Once you are done configuring the network settings, close the folder and go back to the Extras screen.</p> <p>The Ethernet Settings box will display the BreakerVisu console's current network configuration (IP address, subnet mask, and MAC address).</p>
	<p>For more information, please refer to → Section 5.1.1, "Ethernet/IP settings", page 41 and manual MN048013EN.</p>

Table 25: Controls – Location name settings (7" variant)



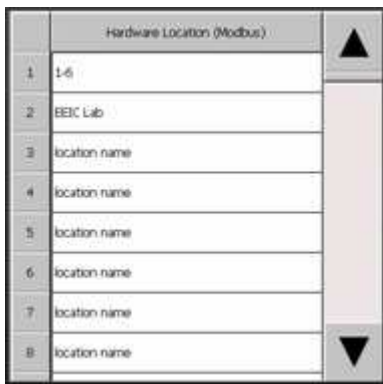



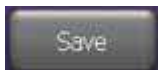
Control	Action
	<p>The devices shown in the device overview screen feature a configurable parameter called Location name. This parameter can be configured in the Device Overview screen (Table 10, page 17).</p>
	<p>Tap the List of Locations button to view and edit all location names, both for Modbus RTU and SmartWire-DT devices, in two hardware location lists.</p>
	<p>To open and edit a device location name, tap on the row with the number corresponding to the device you want in the location lists. The number represents the device's hardware address in the corresponding network.</p>
	<p>To go back to the Extras screen, tap the Extras option in the main menu.</p>
	<p>To have the system overwrite the names in the device overview with the values you entered in the location lists, tap the Apply button in the Locations names pane.</p>
	<p>After a bit, the button text will change to Done! in order to indicate that the action has been completed.</p>

Table 26: Controls – User password (7" variant)

Control	Action
	<p>A user password can be used to lock and unlock all of the BreakerVisu program's configuration functions. The password, which is case-sensitive, can have a maximum of six characters. The default password is 123456.</p> <p>Note: Tap the old password field to enter the current password Then tap the new password field to enter a new password.</p>
	<p>If you enter the old password correctly and the values in the New and Re-type fields match, you will be able to save the new password by tapping the Save button. If there is a problem when you try to enter a new password, the system will show a message, including a description of the problem, in the corresponding fields.</p>

2 Operator interface

2.7 "Extras" screen

Table 27: 7" controls – Panel lock



Control	Action
	Tap the Panel Lock pane to enter the current user password.
	After you enter the right password, you will be able to lock and unlock all BreakerVisu program configuration functions by tapping the Lock or Unlock button as applicable (the button is the same for both, with the text changing depending on the system's current status). If you enter the wrong password, the button will show a warning. As soon as you enter the right password, the lock will be lifted and the password you entered will be deleted from the text field, meaning that it will have to be entered again before the next user action.



Figure 22: "Extras" screen 1 with locked configuration function (7" variant)



Figure 23: "Extras" screen 2 (7" variant)

Table 28: Controls in "Extras" screen 2 – Navigation (7" variant)


Control	Action
	There are two Extras screens. To access the first Extras screen, tap the Back button.

Table 29: Controls in "Extras" screen 2 – Logging memory (7" variant)






Control	Action
	<p>The Logging Memory pane can be used to define the location where power and data measurement files will be stored. Tap the SD / USB button to switch between the two types of external storage devices. A green circle will indicate which type of memory device is currently selected. In addition, the panel will show basic information regarding the external storage device's status.</p>
	

Table 30: Controls – "License other features" (7" variant)

Control	Action
	<p>The LICENSE OTHER FEATURES pane makes it possible to manage the BreakerVisu functions that require a license: integrating 3rd party devices and activating the device's gateway functionality (making it possible to read device parameters from the BreakerVisu program via Modbus/TCP or an OPC server). The pane will show information regarding the current status of the BreakerVisu program account (number of points), as well as the status of the licensed functions (to the right of the corresponding feature buttons). For example, in the screenshot to the left, the 3rd party device integration function has already been licensed, while the Gateway Functionality function can be selected and enabled ("licensed") by tapping the corresponding button. Please note that the following prerequisite must be met: The available credit on the account must be enough to acquire the desired license. Each feature requires 40 license points.</p>
	<p>To enable a feature, tap the License button for it (Gateway Functionality in our example). After you do so, the text to the right of the feature button will change to "licensed."</p>
	<p>Tapping the Add more points button will take you to the WinCE form used to add license points.</p>
	<p>Additional information → Chapter 8, "Licensing".</p>

2.7.2 3.5" variant

The 3.5" variant's configuration features the same options as the 7" variant. However, the user interface is a little different:



Figure 24: "Extras" screen (3.5" variant)

2 Operator interface

2.7 "Extras" screen

Table 31: "Extras" screen controls (3.5" variant)







Control	Action
	Tapping this button will take you to the Logging, Locations screen. This screen points out running measuring functions and shows an overview of how much memory is being used by the measurement results (→ Figure 25).
	Tap this button to access the Ethernet Settings screen (→ Figure 26).
	Tap the Modbus RTU button to configure the Modbus RTU parameters (→ Figure 28).
	Tap the Security Settings button to lock/unlock the BreakerVisu program's configuration elements. You can change the user password in the Security Settings screen (→ Figure 31).
	Tap the Licensing button to access the license management screen (→ Figure 32).
	Tap the About button to find out more about the BreakerVisu program software variant and the last time the program was started and closed (→ Figure 34).



Figure 25: "Logging memory" screen (3.5" variant)

Table 32: Controls – Location name settings (3.5" variant)







Control	Action
	<p>The devices shown in the Device Overview screen feature a configurable parameter called Location name. This parameter can be configured in the Device Overview screen (Table 17, page 23).</p>
	<p>Tap the List of Locations button to view and edit all location names, both for Modbus RTU and SmartWire-DT devices, in two hardware location lists.</p>
	<p>To open and edit a device location name, tap on the row with the number corresponding to the device you want in the location lists. The number represents the device's hardware address in the corresponding network.</p>
	<p>To go back to the Extras screen, tap the Extras option in the main menu.</p>
	<p>To have the system overwrite the names in the device overview with the values you entered in the location lists, tap the Apply button in the Locations names pane.</p>
	<p>After a bit, the button text will change to Done! in order to indicate that the user action has been completed.</p>



Figure 26: "Extras" screen for Ethernet settings (3.5" variant)

2 Operator interface

2.7 "Extras" screen

Table 33: "Ethernet settings" controls (3.5" variant)



Control	Action
	In order to be able to use the IP connection, the network configuration must be correctly set up in the BreakerVisu console.
	Tap the Configure IP and Mask button to open the WinCE "Network Connections" folder, where you will be able to configure the required network settings. Once you are done configuring the network settings, close the folder and go back to the Extras screen. The Ethernet Settings pane will display the BreakerVisu console's current network configuration (IP address, subnet mask, and MAC address). Further information → Section 5.1.1, "Ethernet/IP settings", page 41.



Figure 27: "Extras" screen – Location list (3.5" variant)

Table 34: Controls – Location list (3.5" variant)




Control	Action
	Tap on the individual list entries to give a location name of your choice to the corresponding devices. The number of entries in the list will depend on the 3.5" device BreakerVisu variant (Modbus RTU or SmartWire-DT) you are using.
	Use the up and down arrows to move through the location names.
	Once you are done making changes to the list, and provided you want to apply those changes to the device overview screen, tap Extras in the main menu, then tap the Logging, Locations button, and then tap the Apply button found in the Location names pane (Table 34, page 34).



Figure 28: "Extras" screen for Modbus RTU (3.5" variant)

Table 35: Controls in "Extras" screen 1 – Networks (7" variant)

Control	Action
	<p>The Modbus-RTU Settings pane features buttons that you can use to configure basic communication parameters: the number of stop bits (1 bit / 2 bits button), the baud rate (9600 / 19200 / 38400 button), and the parity (no / odd / even button). The selected values will be shown to the right of the corresponding buttons.</p>
	<p>Tap the Discover Devices button to start scanning the Modbus RTU network for connected devices.</p>
	<p>Tap the Available Device Types button to open a table listing the device types supported by the BreakerVisu program. This table will contain four Eaton device types and four configurable device types that can be used for 3rd party devices.</p> <p>Note The ability to use configurable device types is an optional BreakerVisu program feature that requires a license.</p> <p>Additional information → Chapter 8, "Licensing".</p>



Figure 29: Existing device types (3.5" variant)

2 Operator interface

2.7 "Extras" screen

Table 36: Controls – Available device types (3.5" variant)



Control	Action
	The License needed box indicates that the system is missing the license required for managing configurable device types. Accordingly, the Add more device types button will be disabled. As soon as the license is provided, this text will disappear. Additional information → Chapter 8, "Licensing".
	Tap the Add more device types button to open the corresponding screen. The feature must be licensed in order for this to work – otherwise, the button will be disabled.



Figure 30: Add more device types (3.5" variant)

Table 37: Controls – "Add more device types" (3.5" variant)



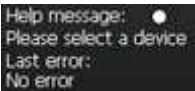


Control	Action
 	The AUX TYPE boxes contain basic information regarding the custom devices defined by the user: name, type, and number of device parameters. Tap the checkmark button to select a 3rd party device. To delete the selected 3rd party device, tap the DELETE DEVICE button.
 	Tap the Import New button to start reading and configuring custom device types. The Help message box will show a flashing circle to indicate that an import process is in progress. The system will also display help messages to provide you with instructions or with the process' progress. Finally, "Last error" will show the process' result. Additional information → Chapter 9, "Importing 3rd party Modbus devices".
	Tap the "back" button to go back to the overview of available device types.



Figure 31: "Extras" screen – Security (3.5" variant)

Table 38: Controls – Security settings (3.5" variant)



Control	Action
	<p>A user password can be used to lock and unlock all of the BreakerVisu program's configuration functions. The password, which is case-sensitive, can have a maximum of six characters. The default password is 123456.</p> <p>Tap the old password field to enter the current password. Then tap the new password field to enter a new password.</p>
	<p>If you enter the old password correctly and the values in the New and Re-type fields match, you will be able to save the new password by tapping the Save button.</p> <p>If there is a problem when you try to enter the new password, the system will show a description of the problem in the corresponding fields.</p>

Table 39: Controls – Console lock (3.5" variant)



Control	Action
	<p>Tap the Panel Lock pane to enter the current user password.</p>
	<p>After you enter the right password, you will be able to lock and unlock all BreakerVisu program configuration functions by tapping the Lock or Unlock button as applicable (the button is the same for both, with the text changing depending on the system's current status). If you enter the wrong password, the button will show a warning. As soon as you enter the right password, the lock will be lifted and the password you entered will be deleted from the field, meaning that it will have to be entered again before the next user action.</p>



Figure 32: "Extras" screen – License other features (3.5" variant)

2 Operator interface
2.7 "Extras" screen

Table 40: Controls – License other features (7" variant)




Control	Action
	<p>The LICENSE OTHER FEATURES pane makes it possible to manage the BreakerVisu functions that require a license: integrating 3rd party devices and activating the device's gateway functionality (making it possible to read device parameters from the BreakerVisu program via Modbus/TCP or an OPC server). The pane will show information regarding the current status of the BreakerVisu program account (number of points), as well as the status of the licensed functions (to the right of the corresponding feature buttons). For example, in the screenshot to the left, the 3rd party device integration function has already been licensed, while the Gateway Functionality function can be selected and enabled ("licensed") by tapping the corresponding button. Please note that the following prerequisite must be met: The available credit on the account must be enough to acquire the desired license. Each feature requires 40 license points.</p>
	<p>To enable a feature, tap the License button for it (Gateway Functionality in our example). After you do so, the text to the right of the feature button will change to licensed.</p>
	<p>Tapping the Add more points button will take you to the WinCE form used to add license points.</p> <p>→ Chapter 8, "Licensing" goes over Eaton licensing in greater detail.</p>



Figure 33: Licensing – Adding points (3.5" variant)



Figure 34: "Extras" screen – About (3.5" variant)

The About screen does not feature any controls. Instead, it displays the BreakerVisu program software variant and the date and time when the system was last started.

3 Connecting devices to Modbus

For all devices connected to the same network, the Modbus communication parameters need to be set to the exact same values. In addition, the corresponding Modbus addresses must match. Once these prerequisites are met, the BreakerVisu program will be able to detect these devices and graphically display and log the corresponding data.



Please consult the installation manual for each device and follow the corresponding configuration instructions.

The “Eaton Modbus Configurator” program is available for configuring the Modbus parameters for NZM-XMC devices. It is available from the Eaton website at www.eaton.eu.

3.1 Modbus RTU communication parameters

The settings with Modbus BreakerVisu as a master can be configured in **Extras**, under **Modbus-RTU Settings**. → Figure 20 describes it for the 7” variant and → Figure 28 describes it for the 3.5” variant. These are the settings that the Modbus RTU master will use to communicate with all slaves.

3.2 Discover devices

The detection routine for connected devices needs to be run every time the BreakerVisu program is started (e.g., when the device is switched on, restarted, etc.) if new devices are connected to the network. Once the new device is detected and identified, all the corresponding device data will be read. If there are no devices on the Modbus RTU network, the home screen will display the “Press to discover Modbus-RTU devices” button in the 7” variant and the “Discover Devices” button in the 3.5” variant on the home screen. Simply tap the button to start scanning the Modbus RTU network with the actual Modbus RTU communication parameters. If you need to change the Modbus RTU communication parameters, or if there are any devices that are already in BreakerVisu and that require a new detection scan, go to **Extras** -> **Modbus-RTU Settings**. Then tap the **Discover Devices** button to start scanning. While the detection process is in progress, the scanning results will be shown directly in the **Discover Devices** button and in the home screen. Once it is completed, the total number of connected devices will be updated in the home screen.

If the connection to a device drops out during operation, it will be automatically removed from BreakerVisu after a certain time. If the device is connected to the network again, you will have to tap the **Discover Devices** button again in order to add the device back to the BreakerVisu program.

4 Connecting devices to SmartWire-DT

3.2 Discover devices

4 Connecting devices to SmartWire-DT

Since the communication parameters for SmartWire-DT networks do not need to be configured, the BreakerVisu program will automatically scan the network when it starts. You can also start the scan manually by tapping the **Discover Devices** button in the 7" variant. "SWD Status" will provide information regarding the scanning routine's progress and the SmartWire-DT status once scanning is complete.

5 System Settings

To configure the program settings, access the **Extras** screen using the BreakerVisu main menu.

→ Section 2.7, ““Extras” screen”, page 26 describes the corresponding screen and controls. This section instead provides detailed information regarding the WinCE system settings, as well as information regarding the security settings.

5.1 WinCE configuration

5.1.1 Ethernet/IP settings

In order to be able to establish an IP connection, the IP settings need to be configured in the BreakerVisu console. To open the WinCE folder for network connections and set up the network configuration there, tap the **Configure IP and Mask** button (→ Figure 20, page 27, for the 7” variant and → Figure 24, page 31, for the 3.5” variant).



Figure 35:Configuring the WinCE connection

Double-tap the **ONBOARD1** icon to open the dialog box used to configure the IP settings for BreakerVisu.



Figure 36:WinCE – Ethernet/IP settings

5 System Settings

5.2 Security settings

The actual configuration settings will depend on the specific network environment in which the BreakerVisu device is being run, i.e., the values in the figure above are provided only as an example. Please ask your network administrator for the right configuration parameters for your program.

5.1.2 Setting Clock

In order to ensure proper logging, it is important to set the BreakerVisu console's internal clock. Tap on the **System time** (date/time) area in the BreakerVisu home screen (→ Figure 4, page 13 for the 7" variant and → Figure 5, page 15 for the 3.5" variant) to open the **Date/Time Properties** dialog box, where you will be able to set the right date and time.



Figure 37: WinCE – Date and time settings

5.2 Security settings

All BreakerVisu functions are unlocked by default. We recommend setting up an admin password and locking BreakerVisu's configuration functions when initially configuring the system.

For more details on the controls used for the lock function and for setting a password, please refer to → Figure 20, page 27 for the 7" variant and → Figure 31, page 36 for the 3.5" variant. The default password is **123456**.

6 Languages

6.1 General Information

BreakerVisu has language packages that can be used to change the system language as required for the location where the device is being used. Every language package consists of three languages stored in the BreakerVisu program. Please note that the program language can be changed in the welcome screen. Also note that, while the user interface language is being changed, the program will continue to generate messages and notifications in the default language (English).

6.2 Language selection

You can select the language you want in the welcome screen. The welcome screen appears when the device is started, and can also be accessed from the home screen later on.

6.3 Adding a language package

All language packages are available at www.eaton.eu. Every single one of these language packages is in the form of a language file named `breakervisu_translation.xml`. This file will always contain a language group consisting of English and two additional languages. To add a language, download the relevant language package and copy it to the root directory of the SD card.

→ Section 2.1, "Welcome screen/selecting a language", page 9, explains how to import a new language file ("XML" icon).



Language packs are available for download at

www.eaton.eu/breakervisu

under the **Tools** tab (**Download multi language pack**).

7 Measured value logging

7.1 Event logging

7 Measured value logging

7.1 Event logging

Event logging is a BreakerVisu program routine that runs in the background and that is used to log the program's and all connected device's events. When the program is started, when a circuit-breaker's trip state changes, when a device changes status, or when a warning is issued for a device, the event will be recorded in the event file. This event file is calendar day-based. In other words, a day's events will be written to a file with the following name syntax: `BV_events_[year,month,day].csv`

Table 41: Event entry

Column	Parameter	Description	Example
1	Date	Date when the event occurred	2014-03-27
2	Time	Time when the event occurred	08:49:55
3	field bus	Network to which the device is connected	Modbus-RTU
4	HW Addr.	The device's HW address on the network	1
5	Billing Site	Location name As defined in the BreakerVisu configuration	Feeder #1
6	HW Type	Type of device	IZM26
7	Event	Type of event	Powered up
8	Trip Reason	Description of the event	Normal operating mode
9	State (Status)	The device's status	OPEN
10	I-L1 [A]	number	0.0
11	I-L2 [A]	number	0.0
12	I-L3 [A]	number	0.0
13	I-max [A]	number	""
14	I-N [A]	number	0.0
15	I-GRD [A]	number	0.0

The data that will be available in the event file will depend on the type of devices that are connected. If there is no data for a specific type of file, the corresponding placeholder will remain blank. Please note that event logging is automatic and cannot be manually started or stopped.

The event file's name will follow the syntax below:

`BV_events_[RTU oder SWD]_add[Geräteadresse]_[Jahr,Monat,Tag].csv`

7.2 Energy logging

You can select the energy logging intervals you want. The energy data (active power, in kWh) of all connected devices will be written to a file accordingly. The file name will vary according to the configured logging interval (→ Table 42).



→ Section 2.6, ““Energy Logging” screen”, page 25 explains how to configure the power monitoring data.

Table 42: Energy logging – File names

Measuring interval	File name
15 minutes	BV_energy_15m.csv
Hourly	BV_energy_h.csv
Daily	BV_energy_d.csv
Weekly	BV_energy_w.csv
Monthly	BV_energy_m.csv
Annually	BV_energy_y.csv

→ Section 15.3, “Format for measured value files”, page 64 provides an example of a power monitoring file. The actual format will depend on the BreakerVisu variant being used and will reflect the number of connected devices.

7.3 Device data logging

Data logging is carried out at the device level and needs to be started manually.

To start data logging at the device level, please follow the steps below:

- ▶ Go to the device details screen for the device you want (→ Figure 8, page 19 and → Figure 12, page 21).
- ▶ Go to the **Logging** screen (→ Figure 11, page 21 and → Figure 16, page 23).
- ▶ Set the measuring interval you want (scan rate).
- ▶ Start the measuring function.

Table 29, page 31 describes the corresponding user interface screen.

7.3.1 Logged parameters

Table 47, page 58 provides a list of the parameters being logged. The values in the log file will be calculated as the average value for the corresponding logging interval.

7.3.2 Setting a scan rate

To set the time interval for sampling, go to the **Logging** sub-screen in the device details screen. The minimum possible interval between two measurements is 10 s, i.e., logging data at measuring intervals shorter than 10 s is not possible. If you need faster logging for specific devices, enable the **Fast Logging** option (logging interval: 2 s).

7 Measured value logging

7.3 Device data logging

7.3.3 “Fast logging” option

If you enable the **Fast Logging** option for a device, you do not have to set a scan rate (as you usually would otherwise). Enabling this option will turn the device into a preferred device, meaning it will be put on the device priority list. After that, data will be logged every 2 seconds.

7.3.4 How to find the log files

All log files are stored on the external storage device selected in the **Extras** screen in the case of the 7” variant (SD card or USB flash drive) or on the SD card in the case of the 3.5” variant. These files can be used directly from the external storage devices or downloaded for further processing using an FTP client. BreakerVisu can generate deleted log files again.

The name syntax for the log file is as follows:

`BV_data_[RTU oder SWD]_add[Geräteadresse]_[Jahr,Monat,Tag].csv`

8 Licensing

BreakerVisu also has the following optional features, which require license points in order to be activated:

- Gateway functionality via Modbus/TCP and OPC servers
- Support for up to four 3rd party devices

As soon as you have a license certificate (→ Section 15.5, “License certificate”, page 86), the device’s serial number, and an e-mail address, you can validate the license by tapping **Start licensing** at the following Internet address:

There are two different licenses available for activating these features:

- LIC-OPT-1ST-LEVEL (40 points; article no. 140391): Can be used to activate **one** of the two optional features listed above
- LIC-OPT-2ND-LEVEL (80 points; article no. 140392): Can be used to activate **both** of the optional features listed above

As soon as you have a license certificate (→ Section 15.5, “License certificate”, page 86), the device’s serial number, and an e-mail address, you can validate the license by tapping “Start licensing” at the following Internet address:

www.eaton-automation.com/license

You can find the serial number on the nameplate at the back of the BreakerVisu device. To access the **License Administrator** dialog box, tap the **Add more points** button in the **Extras** screen (→ Figure 32, page 37 for the 3.5” variant):



Figure 38: License administrator

To change the information for a validated license, tap the **Change License** button. After you enter the corresponding information successfully, the number of available license points will be increased accordingly.

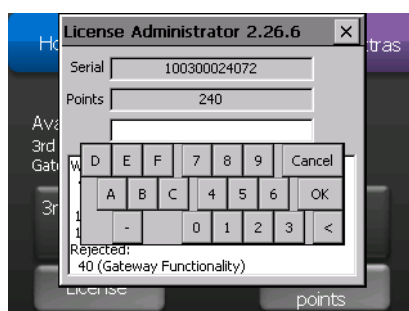


Figure 39: License administrator – Increasing the number of available license points
These license points can be used to activate additional features.

9 Importing 3rd party Modbus devices

You can specify up to four types of 3rd party Modbus devices.



Support for 3rd party Modbus devices

Once you have entered the corresponding license in the BreakerVisu system, you can follow the steps below in order to activate support for non-Eaton Modbus devices:

- ▶ The contents of the XML configuration file need to be updated using a defined XML structure (for more information, please refer to the sample XML configuration file in the appendix → Section 15.4, “XML configuration for 3rd party devices”, page 68).
- ▶ Copy the XML file to the BreakerVisu console’s \InternalStorage directory. The file name must correspond to the device type’s number; the syntax for the name of the file used to import device type x is `new_device_type_X.xml` (where X is a number between 1 and 4). You can store a thumbnail image of the 3rd party device in BMP format (with a size of 50 x 65 pixels) by copying it to the \InternalStorage\PlePrg directory. The image’s name must be `3rdparty-X.bmp` (where X is a number between 1 and 4).
- ▶ Open the screen showing the available device types (→ Section Figure 21: “Available device types (7” variant)”, page 28 for the 7” variant and → Section Figure 29: “Existing device types (3.5” variant)”, page 35 for the 3.5” variant).
This screen will show the available Eaton devices. If you have activated the license for importing third-party device types, you will be able to open the “Add more device types” screen. If not, the system will show a message indicating that you need a license for the feature. Once you activate the feature and open the “Add more device types” screen, you will be able to add additional device types.
- ▶ The “Add more device types” screen will display any other device types that have already been configured. If there are any third-party devices, the **AUX TYPE** header will be highlighted in blue and the corresponding text block will show the type’s data (name, family, parameters).
- ▶ To add a new device type, select an empty **AUX TYPE** box. If you do not select a device, the screen will show a message saying **Please select a device**. Once you do so, a message saying **Device selected** will appear. Please note that you can only select one single device type at a time.
- ▶ Tap the **IMPORT NEW** button after making your selection:
The message will change to **Reading in progress** and the yellow circle will flash. Please note that the import process will take some time. Once it is successfully completed, the message will change to **Device imported**. If, on the other hand, the process fails, the message will change to **Error during import** and a notification with a detailed cause (corrupted file, too few parameters, etc.) will be displayed. If you tap the **IMPORT NEW** button, the XML file for the selected device type number will be used (file `new_device_type2.xml` for AUX TYP 2, for example).

- ▶ To delete a 3rd party device, first select it and then tap the **DELETE DEVICE** button.
- ▶ To replace a 3rd party device, first delete it, then replace the corresponding XML configuration file, and finally import the new device.

If the import is completed successfully, you will then be able to connect and use the corresponding 3rd party devices.

If an error occurs during the import process, check the notification that appears, correct the XML configuration file, and try to import the device again.

9.1 Device-specific bytes

It is important for all devices to have their own device-specific identification data.

Two bytes, which are defined by their offset and value in the XML configuration file, are used for device identification purposes:

```
<device_specific_bytes>
  <LENGTH>2</LENGTH>
  <OFFSET>2</OFFSET>
  <FIRST_BYTE_VALUE>0</FIRST_BYTE_VALUE>
  <SECOND_BYTE_VALUE>5</SECOND_BYTE_VALUE>
</device_specific_bytes>
```

Pre-defined Eaton device types will be recognized before 3rd party devices. In other words, if the device-specific bytes match the bytes pre-defined by Eaton, the device will be recognized as an Eaton device.

9.2 Device-specific image file

An image file can be assigned to every supported third-party device. The image file's name must have the following syntax: `3rdparty_X.bmp`, where X is the number of the corresponding device type. Moreover, the BMP file must not exceed a size of 65 x 65 pixels. The image file needs to be stored in the console's `\InternalStorage\PlcPrg` directory. The device-specific image will replace the default file already found in the BreakerVisu console.

9.3 XML configuration file contents



Tables 43 and 44 describe the contents of the XML configuration file.

→ Section 15.4, "XML configuration for 3rd party devices", page 68 provides two sample configuration files.

9 Importing 3rd party Modbus devices

9.3 XML configuration file contents

Table 43: XML configuration file contents

Parameter	Subparameters	Description	Notes
Device designation		Description of the AUX TYPE device	
Device family		Description of the AUX TYPE device	
Device-specific words			Up to two consecutive words can be used for recognizing device types from other manufacturers.
	Length	No device-specific words should be read via Modbus RTU	
	Offset	Modbus RTU offset of the first device-specific word. The offset starts from 1; if the documentation for your device uses a zero-based offset, make sure to add 1 to the parameter.	
	Value of first byte	The expected value of the first device-specific word	
	Value of second byte	The expected value of the second device-specific word. If both the first and second (if defined) values match the device type, the type will be recognized.	Do not use this parameter if using a single byte for device type recognition purposes would be enough.
Group parameters			Device data is read from the device in defined data blocks (groups). Up to four groups can be used. If fewer than four groups are used for the device, the groups will still retain their structure in the XML file. Their specific length and offset need to be set to 0.
	Length	No bytes are read via Modbus RTU in the defined group.	Use a 0 for groups that are not used
	Offset	Modbus RTU offset for the first byte. The offset starts from 1. If the documentation for your device uses a zero-based offset, make sure to add 1 to the parameter.	Use a 0 for groups that are not used.
	Mod_fc	The Modbus RTU function code is used to read the group data.	Please consult your device documentation to find the value that needs to be set here.

9 Importing 3rd party Modbus devices

9.3 XML configuration file contents

Parameter	Subparameters	Description	Notes
Device parameter			The first 38 parameters in the XML configuration file template are set parameters and must be present even if they are not being used. In this case, the length and offset must be 0. You can add up to five parameters at the end of the XML configuration file for additional parameters (optional).
	Name	Name of the device parameter	
	Length	None of the bytes for the corresponding group contain device data. See Group parameters below.	Set to 0 if the parameter is not being used.
	Offset	Offset for the device data in the relevant group; the offset starts from 1.	Set to 0 if the parameter is not being used.
	Group	Name of the group that contains the data.	
	Sfactor	Scaling factor – A real number used to multiply the processed data before the value is shown on the BreakerVisu console.	Parameter data will be processed as required for the defined graphic representation. The result will be multiplied by the scaling factor.
	Application Style	Information regarding the parameter data's target format	→ Table 44

Table 44: Data word representation

Byte representation	Word sequence, coding	Note
1	WORD0 = Hi / WORD1 = Lo	First register with greater significance
2	WORD0 = Lo / WORD1 = Hi	Second register with greater significance
3	IEEE floating point WORD0 = Lo / WORD1 = Hi	Second register with greater significance
4	IEEE floating point WORD0 = Hi / WORD1 = Lo	First register with greater significance

10 Available data transfer interfaces

10.1 Modbus TCP

10 Available data transfer interfaces

External BreakerVisu interfaces will only be available if a license for the gateway functionality has been acquired.

10.1 Modbus TCP

A higher-level system can request data from BreakerVisu from the Modbus/TCP registers shown in the technical data for BreakerVisu.



→ Section 15.2, “Modbus/TCP Register Map”, page 58 describes these Modbus/TCP registers.

10.2 OPC DA

If you have a license for the gateway functionality, you can configure an OPC client that can connect to the CODESYS OPC server and request data from BreakerVisu. The standard method for establishing an OPC connection will be used in this case.

11 Remote access via Ethernet

The BreakerVisu system can be accessed through a web browser.

Following is an example of a URL that can be used for this purpose (please make sure to use your own IP address!):

`http://10.231.107.78:8080/WebVisu.htm`

In addition, the Java security settings will have to be configured as per your computer's configuration. If a Java security problem occurs while you are attempting to access the BreakerVisu device, go to

Start/Java/Configure Java

then open the "Security" tab, and then add the BreakerVisu URL to the list (click on the **Edit Site List...** button):

`http://10.231.107.78:8080`

12 Updates
10.2 OPC DA

12 Updates



Visit www.eaton.eu to find available program updates for BreakerVisu together with software update descriptions.

13 Velocity mode

The data corresponding to the connected devices will be updated at regular intervals.

The maximum update frequency will depend on several factors:

- Modbus RTU communication parameters,
- Number of devices in the priority queue (device details screen, web view),
- Number of devices with **Fast Logging**,
- Number of devices for which data is being logged.

14 Bug Fix

14.1 General

Follow the steps below if any problems occur while the BreakerVisu system is attempting to detect and recognize devices connected to it:

- ▶ Make sure that the Modbus RTU devices are using the same communication parameters as those configured in the BreakerVisu system.
- ▶ Configure the Modbus RTU addresses you want in such a way that there will not be any address conflicts.
- ▶ Consult the hardware manual (MN048013EN) to make sure that you have wired everything correctly as required for BreakerVisu.
- ▶ Use the data provided by the BreakerVisu system (e.g., SmartWire-DT network status).



If the system still does not detect and recognize your devices, please contact BreakerVisu Support by sending an e-mail to the following address:

LeistungsschalterEGBonn@eaton.com

14.2 Configuring 3rd party devices

If any problems occur while attempting to set up 3rd party devices, please check the following:

- ▶ Make sure to keep the size of the label so that it can be displayed properly in the BreakerVisu system.
- ▶ Remove all comments from the XML configuration files in order to make them smaller.
- ▶ Check whether required elements in the XML configuration file were deleted by mistake.
- ▶ Check the XML configuration files' names and storage locations in the BreakerVisu system.

15 Appendix

15.1 Notifications

BreakerVisu can store up to ten notifications, with the oldest being overwritten as necessary. These notifications are triggered by various events during the BreakerVisu program's runtime, including those involved in importing new device types, as well as those having to do with measurements, installed storage devices, and communications with higher-level systems.

Table 45: List of notifications

Information	Cause of event	Reason	Recommended course of action
XML import failed	How the device type was imported	Corrupted file, incorrect XML data structure	Repair the XML file and try importing the device type again
Error when closing measured value files, Unable to open files, Unable to write to files, Unable to close files	Measurement	A file operation error occurred during logging	Check the selected storage device and restart the program. If the error continues to occur, contact BreakerVisu Support.
Storage device not installed	Measurement	There is no SD card or USB flash drive plugged in	Check to make sure that the SD card or USB flash drive is plugged in properly
Unable to open successfully restored backup copy. Unable to read backup copy. MMC not connected. Unable to store new settings.	When the backup copy is restored when BreakerVisu is restarted	A message regarding the restore status is output during the restore process	Check the selected storage device and restart the program. If the error continues to occur, contact BreakerVisu Support.
Error when generating OPC file	OPC gateway (feature requiring license)	An error occurred when the OPC symbol file was being created.	Restart the BreakerVisu program. The license is still there and BreakerVisu will attempt to generate the symbol file again. If the error continues to occur, contact BreakerVisu Support

15.2 Modbus/TCP Register Map

Table 46: BreakerVisu Modbus/TCP register map

Offset	Parameter	Notes
0	Modbus RTU device 1-16 present	1 stands for a present device at a specific place. Dec 5 = 101 (bin) = Devices 1 and 3 present.
1	Modbus RTU device 17-32 present	
2	SWD device 1-16 present	
3	Wildcard	
...	...	
149	Wildcard	
150	Modbus RTU device 1	Start of first Modbus RTU device
300	Modbus RTU device 2	
450	Modbus-RTU device 3	
...	...	
4650	Modbus-RTU device 31	
4800	Modbus-RTU device 32	Last Modbus-RTU device
4950	SmartWire-DT device 1	Start of first SmartWire-DT device
5100	SmartWire-DT device 2	
...	...	
7200	SmartWire-DT device 16	Last SmartWire-DT device

Table 47: Modbus device parameters

$n = x * 150$, $x =$ Modbus- device number		Device	Notes
$n + 0$	Parameter 1-16 present	–	1 stands for a present parameter at a specific place. Dec 11 = 1012 (bin) = Parameters 1, 2, and 4 present.
$n + 1$	Parameter 17-32 present	–	
$n + 2$	Parameter 33-48 present	–	
$n + 3$	Circuit-breaker position	–	1 = Open, 2 = Closed, 3 = Tripped.
$n + 4$	Calculated circuit-breaker status	–	
$n + 5$	reserved	A	for imax
$n + 6$	reserved	BOOL	For existing circuit-breaker wear
$n + 7$	reserved	%	For mechanical circuit-breaker wear
$n + 8$	reserved	%	For electrical circuit-breaker wear
$n + 9$	reserved	–	
$n + 10$	STATUS (as per PNO)		
$n + 11$			
$n + 12$	CURRENT I1		The data has the same format as the data read from the device. This makes transparent data processing possible.

15 Appendix
15.2 Modbus/TCP Register Map

n = x * 150, x = Modbus- device number		Device	Notes
n + 13			
n + 14	CURRENT I2		
n + 15			
n + 16	CURRENT I3		
n + 17			
n + 18	CURRENT I-G		
n + 19			
n + 20	CURRENT I-N		
n + 21			
n + 22	U_L1_L2		
n + 23			
n + 24	U_L2_L3		
n + 25			
n + 26	U_L3_L1		
n + 27			
n + 28	U_L1_N		
n + 29			
n + 30	U_L2_N		
n + 31			
n + 32	U_L3_N		
n + 33			
n + 34	COS_PHI		
n + 35			
n + 36	ACTIVE_E_FWD*		
n + 37			
n + 38	S_TOTAL		
n + 39			
n + 40	SERIAL_NO		
n + 41			
n + 42	FIRMWARE		
n + 43			
n + 44	Frequency		
n + 45			
n + 46	Temperature / Temperature simula- tion		
n + 47			

15 Appendix

15.2 Modbus/TCP Register Map

n = x * 150, x = Modbus- device number		Device	Notes
n + 48	REACTIVE_E_FWD		
n + 49			
n + 50	REACTIVE_IND_E_FWD		
n + 51			
n + 52	REACTIVE_CAP_E_FWD		
n + 53			
n + 54	APPARENT_E_FWD		
n + 55			
n + 56	ACTIVE_E_REV		
n + 57			
n + 58	REACTIVE_E_REV		
n + 59			
n + 60	REACTIVE_IND_E_REV		
n + 61			
n + 62	REACTIVE_CAP_E_REV		
n + 63			
n + 64	APPARENT_E_REV		
n + 65			
n + 66	ACTIVE_POW_L1		
n + 67			
n + 68	ACTIVE_POW_L2		
n + 69			
n + 70	ACTIVE_POW_L3		
n + 71			
n + 72	ACTIVE_POW		
n + 73			
n + 74	REACTIVE_POW_L1		
n + 75			
n + 76	REACTIVE_POW_L2		
n + 77			
n + 78	REACTIVE_POW_L3		
n + 79			
n + 80	REACTIVE_POW		
n + 81			
n + 82	REACTIVE_POW_CAP		
n + 83			

15 Appendix
15.2 Modbus/TCP Register Map

n = x * 150, x = Modbus- device number		Device	Notes
n + 84	REACTIVE_POW_IND		
n + 85			
n + 86	I-MAX or ADDITIONAL PARAM		
n + 87			
n + 88	ADDITIONAL PARAM		
n + 89			
n + 90	ADDITIONAL PARAM		
n + 91			
n + 92	ADDITIONAL PARAM		
n + 93			
n + 94	ADDITIONAL PARAM		
n + 95			
n + 96	ADDITIONAL PARAM		
n + 97			
n + 98	ADDITIONAL PARAM		
n + 99			
n + 100	ADDITIONAL PARAM		
n + 101			
n + 102	ADDITIONAL PARAM		
n + 103			
n + 104	ADDITIONAL PARAM		
n + 105			
n + 106	ADDITIONAL PARAM		
n + 107			
n + 108	ADDITIONAL PARAM		
n + 109			
n + 110	ADDITIONAL PARAM		
n + 111			

15 Appendix

15.2 Modbus/TCP Register Map

Table 48: SmartWire-DT device parameters

n = (x * 150) + 4800, x = Smart- Wire-DT number		Device	Notes
n + 0	Parameter 1-16 present	-	1 stands for a present parameter at a specific place. Dec 11 = 1012 (bin) = Parameters 1, 2, and 4 present.
n + 1	Parameter 17-32 present	-	
n + 2	Parameter 33-48 present	-	
n + 3	Circuit-breaker position	-	
n + 4	Calculated circuit-breaker status	-	
n + 5	ir* Rated operational current	A	
n + 6	If there is circuit-breaker wear	BOOL	
n + 7	Mechanical circuit-breaker wear	%	
n + 8	Electrical circuit-breaker wear	%	
n + 9	reserved	-	
n + 10	Status SmartWire-DT		
n + 11	Status 0		
n + 12	Status 1		
n + 13	Status 2		
n + 14	Temperature simulation max.	%	
n + 15	Current I1		The data has the same format as the data read from the device. This makes transparent data processing possible.
n + 16	Current I2		
n + 17	Current I3		
n + 18	Current IN		
n + 19	Voltage L1-N/L1-L2		
n + 20	Voltage L2 - N/L2- L3		
n + 21	Voltage L3- N/L3 - L1		
n + 22	Ø Power factor		
n + 23	Active power L1		
n + 24			
n + 25	Active power L2		
n + 26			
n + 27	Active power L3		
n + 28			
n + 29	Reactive power L1		
n + 30			
n + 31	Reactive power L2		
n + 32			

15 Appendix
15.2 Modbus/TCP Register Map

n = (x * 150) + 4800, x = Smart- Wire-DT number		Device	Notes
n + 33	Reactive power L3		
n + 34			
n + 35	Apparent power, all phases		
n + 36			
n + 37	Active power, all phases		
n + 38			
n + 39	Reactive power, all phases		
n + 40			
n + 41	Apparent power		
n + 42			
n + 43	lr		
n + 44	li		
n + 45	tr		
n + 46	lsd		
n + 47	tsd		
n + 48	lg		
n + 49	tg		
n + 50	I ² t		
n + 51	Operating Hours		
n + 52	Switching cycles		
n + 53	Switching cycles under load		
n + 54	Relative maximum current		
n + 55	Thermal motor model		

15 Appendix

15.3 Format for measured value files

15.3 Format for measured value files

All BreakerVisu measured value files are in CSV format.

The headings in the measured value tables are described in the tables below.

Table 49: Format for measured value file, data heading, device event logging

Line	Position	Content – English	Content – German
1	1	Eaton Industries GmbH	Eaton Industries GmbH
1	4	BreakerVisu	BreakerVisu
1	5	Circuit Breaker Log Protocol	Leistungsschalter Messwerte
2	2	Data Logging from	Datenmessung von
2	3	Date	Datum
2	4	Time	Uhrzeit
3	2	File Name:	Dateiname:
4	2	Network:	Netzwerk:
5	2	HW Add.:	Hardwareadresse
6	2	Location:	Standort:
7	2	HW Type:	Geräteart:
8	2	Serial No.:	Seriennummer:

Table 50: Measured value file, event heading

Line	Position	Content – English	Content – German
1	1	Eaton Industries GmbH	Eaton Industries GmbH
1	4	BreakerVisu	BreakerVisu
1	7	Circuit Breaker Log Protocol	Leistungsschalter Messwerte
3	2	Data Logging from	Datenmessung von
3	4	Date	Datum
3	5	Time	Uhrzeit

Table 51: Measured value file, power heading

Line	Position	Content – English	Content – German
1	1	Eaton Industries GmbH	Eaton Industries GmbH'
1	4	BreakerVisu	BreakerVisu'
1	5	Circuit Breaker Log Protocol	Leistungsschalter Messwerte
2	2	Energy Logging	Leistungsmessung
3	2	File Name:	Dateiname:
4	2	Sample rate:	Abtastrate:

Table 52: Measured value file, data portion, data logging

Line	Position	Content – English	Content – German
10	2	Date	Datum
10	3	Time	Uhrzeit
10	4	I-L1[A]	I-L1[A]
10	5	I-L2[A]	I-L2[A]
10	6	I-L3[A]	I-L3[A]
10	7	U-L1[V]	U-L1[V]
10	8	U-L2[V]	U-L2[V]
10	9	U-L3[V]	U-L3[V]
10	10	P-3PH [VA]	P-3PH [VA]
10	11	P-3PH [var]	P-3PH [var]
10	12	P-3PH [W]	P-3PH [W]
10	13	P-L1 [W]	P-L1 [W]
10	14	P-L2 [W]	P-L2 [W]
10	15	P-L3 [W]	P-L3 [W]
10	16	Temperature	Temperatur
10	17	Power Factor	Leistungsfaktor
10	18	I-IG[A]	I-IG[A]
10	19	I-IN[A]	I-IN[A]
10	20	U-L12[V]	U-L12[V]
10	21	U-L23[V]	U-L23[V]
10	22	U-L31[V]	U-L31[V]
10	23	Reactive power L1	Blindleistung L1
10	24	Reactive power L2	Blindleistung L2
10	25	Reactive power L3	Blindleistung L3
10	26	Reactive pow. ind	Blindleistung ind
10	27	Reactive pow. cap	Blindleistung kap
10	28	Frequency	Frequenz
10	29	Reactive en. fwd	Reaktiv en. vorw
10	30	Reactive ind. en. fwd	Reactive ind. en. fwd
10	31	Reactive cap. en. fwd	Reactive cap. en. fwd
10	32	Apparent en. fwd	Apparent en. fwd
10	33	Active en. rev	Active en. rev
10	34	Reactive en. rev	Reactive en. rev
10	35	Reactive ind. en. rev	Reactive ind. en. rev
10	36	Reactive cap. en. rev	Reactive cap. en. rev
10	37	Apparent en. rev	Apparent en. rev

15 Appendix

15.3 Format for measured value files

Line	Position	Content – English	Content – German
10	38	Additional 1	Additional 1
10	39	Additional 2	Additional 2
10	40	Additional 3	Additional 3
10	41	Additional 4	Additional 4
10	42	Additional 5	Additional 5

Table 53: Measured value file, data portion, energy logging

Line	Position	Contents
10	2	Date
10	3	Time
10	4	I-L1[A]
10	5	I-L2[A]
10	6	I-L3[A]
10	7	I-N[A]
10	8	U-L1[V]
10	9	U-L2[V]
10	10	U-L3[V]
10	11	Power Factor
10	12	Active Power L1 [kW]
10	13	Active Power L2 [kW]
10	14	Active Power L3 [kW]
10	15	Reactive power L1
10	16	Reactive power L2
10	17	Reactive power L3
10	18	Apparent power
10	19	Reactive energy
10	20	Apparent energy
10	21	ir tripping
10	22	li tripping
10	23	lsd tripping
10	24	lg tripping
10	25	ITemp tripping
10	26	lr_N tripping
10	27	cycles
10	28	load cycles
10	29	Relative current
10	30	Thermal mot. img

Table 54: Format for measured value file, data portion, device event logging

Line	Position	Contents
10	2	Date
10	3	Time
10	4	Number
10	5	Reason
10	6	Location
10	7	Param_no
10	8	Param_setting
10	9	Param_value

Table 55: Format for measured value file, data portion, event logging

Line	Position	Contents
6	2	Date
6	3	Time
6	4	Fieldbus
6	5	HW Addr.
6	6	Location
6	7	HW Type
6	8	Event
6	9	Trip reason
6	10	State
6	11	I-L1 [A]
6	12	I-L2 [A]
6	13	I-L3 [A]
6	14	I-max [A]
6	15	I-N [A]
6	16	I-GRD [A]

15.4 XML configuration for 3rd party devices

15.4.1 Example 1

Only one specific byte is used: see the <device_specific_bytes> section below.

A specific structure must be used for group parameter sections; see <group_parameters id="1">, <group_parameters id="2">, <group_parameters id="3">, <group_parameters id="4">.

All groups – even if they are not being used – must be defined. The length and offset for the groups not being used must be set to 0. The offset values in the XML configuration file start from 1.

Specific structure for standard device parameters: The offset is used in a specific group; the offset starts from 1; 0 for length, offset, and groups for standard device parameters that are not used; see the <device_parameters> section.

The end of the device parameter section is indicated by the

```
<!-- end of standard parameters>
```

comment in the XML file.

After

```
<!-- end of standard parameters>
```

up to five additional parameters can be added.

```
<device_name>DC1</device_name>
<device_family>PowerXL</device_family>
<device_specific_bytes><!-- The device specific bytes are
read always with Modbus Function 3 -->
  <LENGTH>1</LENGTH>
  <OFFSET>19</OFFSET>
  <FIRST_BYTE_VALUE>0</FIRST_BYTE_VALUE>
</device_specific_bytes>
<group_parameters id="1">
  <LENGTH>25</LENGTH>
  <OFFSET>1</OFFSET>
  <MOD_FC>3</MOD_FC>
</group_parameters>
<group_parameters id="2">
  <LENGTH>0</LENGTH>
  <OFFSET>0</OFFSET>
  <MOD_FC>0</MOD_FC>
</group_parameters>
```

```
<group_parameters id="3">
  <LENGTH>0</LENGTH>
  <OFFSET>0</OFFSET>
  <MOD_FC>0</MOD_FC>
</group_parameters>
<group_parameters id="4">
  <LENGTH>0</LENGTH>
  <OFFSET>0</OFFSET>
  <MOD_FC>0</MOD_FC>
</group_parameters>
<group_parameters id="5">
  <LENGTH>0</LENGTH>
  <OFFSET>0</OFFSET>
  <MOD_FC>0</MOD_FC>
</group_parameters>
<device_parameters>
  <PARAM name="status">
    <LENGTH>0</LENGTH>
    <OFFSET>0</OFFSET>
    <GROUP>0</GROUP>
    <SFACTOR>1</SFACTOR>
    <REPRESENTATION>3</REPRESENTATION>
  </PARAM>
  <PARAM name="CURRENT_I1">
    <LENGTH>1</LENGTH>
    <OFFSET>8</OFFSET>
    <GROUP>1</GROUP>
    <SFACTOR>1</SFACTOR>
    <REPRESENTATION>3</REPRESENTATION>
  </PARAM>
  <PARAM name="CURRENT_I2">
    <LENGTH>0</LENGTH>
    <OFFSET>0</OFFSET>
    <GROUP>0</GROUP>
    <SFACTOR>1</SFACTOR>
    <REPRESENTATION>3</REPRESENTATION>
  </PARAM>
  <PARAM name="CURRENT_I3">
```

15 Appendix

15.4 XML configuration for 3rd party devices

```
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="CURRENT_IG">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="CURRENT_IN">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L1_L2">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L2_L3">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L3_L1">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
```



```
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L1_N">
<LENGTH>2</LENGTH>
<OFFSET>14</OFFSET>
<GROUP>1</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L2_N">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L3_N">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="COS_PHI">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_E_FWD">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
```

15 Appendix

15.4 XML configuration for 3rd party devices

```
<PARAM name="S_TOTAL">
  <LENGTH>0</LENGTH>
  <OFFSET>0</OFFSET>
  <GROUP>0</GROUP>
  <SFACOR>0</SFACOR>
  <REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="SERIAL_NO">
  <LENGTH>1</LENGTH>
  <OFFSET>17</OFFSET>
  <GROUP>1</GROUP>
  <SFACOR>1</SFACOR>
  <REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="FIRMWARE">
  <LENGTH>1</LENGTH>
  <OFFSET>15</OFFSET>
  <GROUP>1</GROUP>
  <SFACOR>1</SFACOR>
  <REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="FREQUENCY">
  <LENGTH>0</LENGTH>
  <OFFSET>0</OFFSET>
  <GROUP>0</GROUP>
  <SFACOR>0</SFACOR>
  <REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="INTERNAL_TEMPERATURE">
  <LENGTH>1</LENGTH>
  <OFFSET>24</OFFSET>
  <GROUP>1</GROUP>
  <SFACOR>1</SFACOR>
  <REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_E_FWD">
  <LENGTH>0</LENGTH>
  <OFFSET>0</OFFSET>
```

```
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACT_IND_E_FWD" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACT_CAP_E_FWD" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="APPARENT_E_FWD" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_E_REV" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_E_REV" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
```

15 Appendix

15.4 XML configuration for 3rd party devices

```
</PARAM>
<PARAM name="REACT_IND_E_REV">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACT_CAP_E_REV">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="APPARENT_E_REV">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_POW_L1">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_POW_L2">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>0</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_POW_L3">
<LENGTH>0</LENGTH>
```

```
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_POW">
<LENGTH>1</LENGTH>
<OFFSET>13</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW_L1">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW_L2">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW_L3">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
```

15 Appendix

15.4 XML configuration for 3rd party devices

```
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW_CAP">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<!-- end of standard parameters >
<PARAM name="REACTIVE_POW_IND">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="DC link V">
<LENGTH>1</LENGTH>
<OFFSET>23</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="Ref. inp. RPM">
<LENGTH>1</LENGTH>
<OFFSET>22</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="AI1 %">
<LENGTH>1</LENGTH>
<OFFSET>20</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
```

```

<PARAM name="Field bus Hz">
  <LENGTH>1</LENGTH>
  <OFFSET>7</OFFSET>
  <GROUP>1</GROUP>
  <SFACTOR>1</SFACTOR>
  <REPRESENTATION>3</REPRESENTATION>
</PARAM>
</device_parameters>

```

15.4.2 Example 2

Two device-specific bytes are used; see the <device_specific_bytes> section

There are no additional parameters.

```

<device_name>EPBMETER</device_name>
<device_family>ETN METER</device_family>
<device_specific_bytes>
  <LENGTH>2</LENGTH>
  <OFFSET>2</OFFSET>
  <FIRST_BYTE_VALUE>0</FIRST_BYTE_VALUE>
  <SECOND_BYTE_VALUE>5</SECOND_BYTE_VALUE>
</device_specific_bytes>
<group_parameters id="1">
  <LENGTH>60</LENGTH>
  <OFFSET>1</OFFSET>
  <MOD_FC>4</MOD_FC>
</group_parameters>
<group_parameters id="2">
  <LENGTH>10</LENGTH>
  <OFFSET>1</OFFSET>
  <MOD_FC>3</MOD_FC>
</group_parameters>
<group_parameters id="3">
  <LENGTH>0</LENGTH>
  <OFFSET>0</OFFSET>
  <MOD_FC>0</MOD_FC>
</group_parameters>
<group_parameters id="4">
  <LENGTH>0</LENGTH>

```

15 Appendix

15.4 XML configuration for 3rd party devices

```
<OFFSET>0</OFFSET>
<MOD_FC>0</MOD_FC>
</group_parameters>
<group_parameters id="5">
  <LENGTH>0</LENGTH>
  <OFFSET>0</OFFSET>
  <MOD_FC>0</MOD_FC>
</group_parameters>
<device_parameters>
  <PARAM name="status">
    <LENGTH>2</LENGTH>
    <OFFSET>1</OFFSET>
    <GROUP>2</GROUP>
    <SFACTOR>1</SFACTOR>
    <REPRESENTATION>3</REPRESENTATION>
  </PARAM>
  <PARAM name="CURRENT_I1">
    <LENGTH>2</LENGTH>
    <OFFSET>17</OFFSET>
    <GROUP>1</GROUP>
    <SFACTOR>1</SFACTOR>
    <REPRESENTATION>3</REPRESENTATION>
  </PARAM>
  <PARAM name="CURRENT_I2">
    <LENGTH>2</LENGTH>
    <OFFSET>19</OFFSET>
    <GROUP>1</GROUP>
    <SFACTOR>1</SFACTOR>
    <REPRESENTATION>3</REPRESENTATION>
  </PARAM>
  <PARAM name="CURRENT_I3">
    <LENGTH>2</LENGTH>
    <OFFSET>21</OFFSET>
    <GROUP>1</GROUP>
    <SFACTOR>1</SFACTOR>
    <REPRESENTATION>3</REPRESENTATION>
  </PARAM>
  <PARAM name="CURRENT_IG">
```



```
<LENGTH>2</LENGTH>
<OFFSET>23</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="CURRENT_IN">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>0</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L1_L2">
<LENGTH>2</LENGTH>
<OFFSET>9</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L2_L3">
<LENGTH>2</LENGTH>
<OFFSET>11</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L3_L1">
<LENGTH>2</LENGTH>
<OFFSET>13</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L1_N">
<LENGTH>2</LENGTH>
<OFFSET>1</OFFSET>
<GROUP>1</GROUP>
```

15 Appendix

15.4 XML configuration for 3rd party devices

```
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L2_N" >
<LENGTH>2</LENGTH>
<OFFSET>3</OFFSET>
<GROUP>1</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="U_L3_N" >
<LENGTH>2</LENGTH>
<OFFSET>5</OFFSET>
<GROUP>1</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="COS_PHI" >
<LENGTH>2</LENGTH>
<OFFSET>49</OFFSET>
<GROUP>1</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_E_FWD" >
<LENGTH>2</LENGTH>
<OFFSET>59</OFFSET>
<GROUP>1</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="S_TOTAL" >
<LENGTH>2</LENGTH>
<OFFSET>61</OFFSET>
<GROUP>1</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
```

```
<PARAM name="SERIAL_NO" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="FIRMWARE" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="FREQUENCY" >
<LENGTH>2</LENGTH>
<OFFSET>57</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="INTERNAL_TEMPERATURE" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_E_FWD" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACT_IND_E_FWD" >
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
```

15 Appendix

15.4 XML configuration for 3rd party devices

```
<GROUP>0</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACT_CAP_E_FWD">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="APPARENT_E_FWD">
<LENGTH>2</LENGTH>
<OFFSET>73</OFFSET>
<GROUP>1</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_E_REV">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_E_REV">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACT_IND_E_REV">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACTOR>1</SFACTOR>
<REPRESENTATION>3</REPRESENTATION>
```

```
</PARAM>
<PARAM name="REACT_CAP_E_REV">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="APPARENT_E_REV">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_POW_L1">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_POW_L2">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_POW_L3">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="ACTIVE_POW">
<LENGTH>2</LENGTH>
```

15 Appendix

15.4 XML configuration for 3rd party devices

```
<OFFSET>65</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW_L1">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW_L2">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW_L3">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW">
<LENGTH>2</LENGTH>
<OFFSET>69</OFFSET>
<GROUP>1</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW_CAP">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
```

15 Appendix

15.4 XML configuration for 3rd party devices

```
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<PARAM name="REACTIVE_POW_IND">
<LENGTH>0</LENGTH>
<OFFSET>0</OFFSET>
<GROUP>0</GROUP>
<SFACOR>1</SFACOR>
<REPRESENTATION>3</REPRESENTATION>
</PARAM>
<!-- end of standard parameters>
</device_parameters>
```

15.5 License certificate

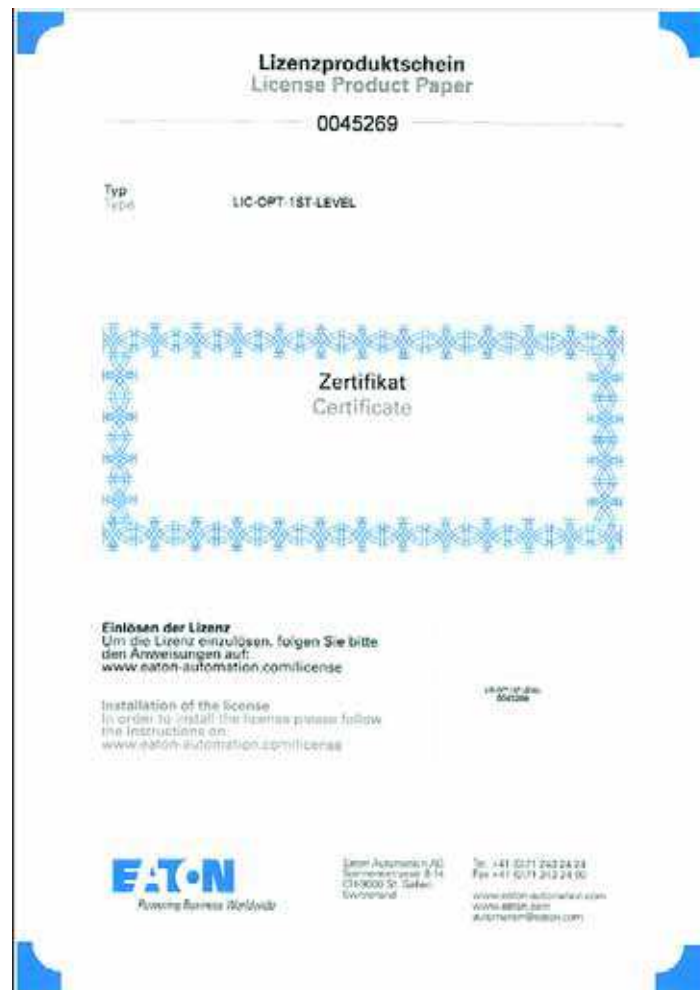


Figure 40: Sample license certificate (license product paper)