

E3METER Monitoring Software User Manual

Data Concentrator 6.2 revA

Riedo Networks Ltd

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CHAPTER 1

Introduction

Dear user, thank you for having chosen the E3METER® Monitoring System. E3 stands for Energy, Environment and Efficiency with the goal to increase productivity for your data center monitoring.

The aim of the E3METER® products is to provide the following main functionalities:

- Capacity management
- Billing
- Safety

1.1 How to read this User Manual

This User Manual provides information about the configuration options of the E3METER® Monitoring System. For those who want to create a basic configuration it is recommended to read the following chapters in the sequence presented hereafter:

- Introduction
- Accessing your Data Concentrator (CTR)
- Initial setup
- Adding meters
- Data Concentrator pages

For those interested in all details, we recommend reading through the entire user manual and considering the table of contents and index in order to navigate to the specific area of interest.

1.2 Capacity management

Capacity management provides information about the remaining power capacity of a specific rack or data center element. By consulting historic data, this allows the user to forecast by when the available power capacity will be reached and when or where it makes sense to add further data center resources. This information allows you to optimize the installation / maintenance of your system and the involved costs.

1.3 Billing

Electrical power consumption in an average data center represents more than 50% of the running costs. The billing functionality allows you to know how much energy was consumed by which participant and to accurately bill the respective amount of energy to each participant. The billing functionality provides the exact number of kWh consumed per unit of time.

1.4 Safety

A fully configured E3METER® Monitoring System provides Alarm functionality. Alarm functionality can be configured on the measured parameters: current, temperature and humidity. When the observed parameter reaches the configured alarm threshold, the system immediately notifies the user with an event. One additional safety function consists in phase balancing. Since individual phases can be monitored and analyzed, this information can be used during commissioning or maintenance. You use this information in order to add new devices without exceeding a safety limit for a phase current, preventing from impacting on the system.

1.5 Easy installation

The communication with the meters and Data Concentrator is done via powerline which does not require for additional cabling. Devices can be automatically paired with the Data Concentrator and parameters can be configured for multiple elements at once (bulk configuration/edit). The software comes pre-configured and can be upgraded automatically for both the Data Concentrator and the meters.

These elements make it a plug and play system and allow to get started quickly.

CHAPTER 2

Accessing your Data Concentrator (CTR)

In order to access your Data Concentrator for the first time you need to read the IP address of the Data Concentrator on the display on the front panel. First check how your Data Concentrator is connected. It is either connected into a network using DHCP or via static address or not yet connected to a network but directly connected to your PC. By default the Data Concentrator is configured to use DHCP / AutoIP. When the Data Concentrator is connected per AutoIP, make sure to wait for one minute after connection until you read the IP address of the Data Concentrator.

Two different network connections are shown below.

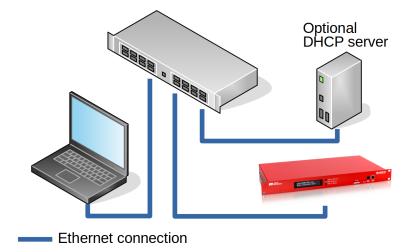


Fig. 1: Connection method 1 in a network with optional DHCP server.



Ethernet connection

Fig. 2: Connection method 2 in a setup with direct connection using Auto IP.

Note: If the Data Concentrator is connected directly to the PC, make sure to configure *Link Local* in the network configuration of your Linux PC or Mac network card. On your windows PC stick to the option *Automatic* to get an IP address.

Caution: The Ethernet Port of the Data Concentrator is not compatible with Power over Ethernet. Please deactivate Power over Ethernet on the port of the switch / router that will be connected to the Data Concentrator **before** connecting the Ethernet cable. PoE can cause the electronic of the Data Concentrator to malfunction or even destroy it.

2.1 Connect to Data Concentrator

Push the mode button on the front of the Data Concentrator until the IP address is being shown. Then, open your web browser and connect to your Data Concentrator using its IP address and a secure connection (HTTPS).

The following shows a possible URL to be entered in the navigation bar

• https://192.168.1.251

Note: When using Zero Configuration (Bonjour), it is also possible to resolve the address with the serial number of the Data Concentrator. For this you need to enter the URL https://serial#.local in the navigation bar. A possible URL would be https://ctr-005756.local.

2.2 Secure connection to web page

The connection to the web page of the Data concentrator is secured and encrypted using HTTPs. In order to achieve this, a self-signed SSL certificate needs to be accepted in your web browser. With this secured connection you can assure that your valuable data is not accessed maliciously by others. When connecting for the first time to your Concentrator web page, you will be asked to accept that SSL certificate. You need to navigate to the *advanced* section and accept the self signed SSL certificate. The following sections show

examples of how this looks like in the web browsers Chrome, Firefox, Microsoft Edge and Microsoft Internet Explorer.

Caution: When accepting the default certificate, make sure that it is issued from the Organization Riedo Networks Ltd.

Note: Customer certificates will come in a later version of the firmware.

2.2.1 Self-signed Certificates

The images below show the windows of the certificates for Chrome browser and Firefox.

2.2.1.1 Google chrome

When connecting to the IP address of the Data Concentrator, the chrome browser will notify you about a non private connection. You need to click on *ADVANCED*.

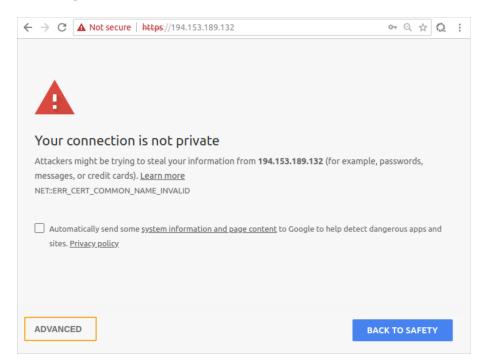


Fig. 3: Self-signed certificate in Chrome connecting via IP address to the Data Concentrator

After clicking on the Advanced button you will need to click on *Proceed to IP address* (*unsafe*) which will connect you to the web server of your Data Concentrator.

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$\leftrightarrow \ \ominus \ G$	A Not secure https	//194.153.189.132	• Q \$ Q :
		is 194.153.189.132 ; its security certificate is from or an attacker intercepting your connection.	*.riedo.com. This may
Proceed to	<u>194.153.189.132 (unsafe)</u>		
		-	
HIDE AD	VANCED		BACK TO SAFETY

Fig. 4: Self-signed certificate in Chrome showing advanced options

2.2.1.2 Firefox

When connecting to the IP address of the Data Concentrator, firefox browser will notify you about a non private connection. You need to click on *Advanced*.

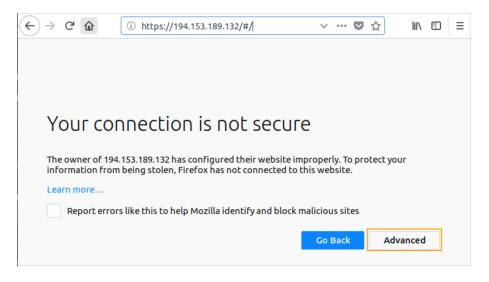


Fig. 5: Self-signed certificate in Firefox

After clicking on the *Advanced* button you will need to click on the *Add Exception*... button in order to proceed to the web page.

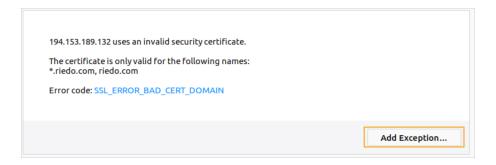


Fig. 6: Self-signed certificate in Firefox showing Advanced options

In the last step you need to confirm the security exception for the IP address of the web server of your Data Concentrator.

	Add Security Exception	8
	re about to override how Firefox identifies this site. imate banks, stores, and other public sites will not ask you to do this.	
Server		
Location:	https://194.153.189.132/#/	Get Certificate
Certificate S This site at Wrong Sit	tempts to identify itself with invalid information.	<u>V</u> iew
The certific	ate belongs to a different site, which could mean that someone is trying to im:	personate this site.
✓ Perman	ently store this exception	
Confirm Se	curity Exception	Cancel

Fig. 7: Security exception in Firefox

2.2.1.3 Microsoft Edge

When accessing the Data Concentrator within Microsoft Edge you will see the picture below and need to follow the steps similar to the web browsers Chrome and Firefox.

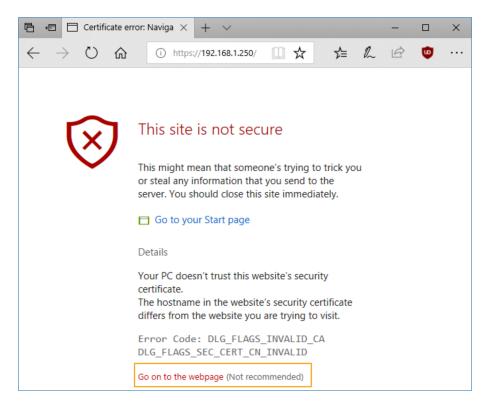


Fig. 8: Microsoft Edge security certificate

2.2.1.4 Microsoft Internet Explorer

When accessing the Data Concentrator within Microsoft Internet Explorer you will see the picture below and need to follow the steps similar to the web browsers Chrome and Firefox.

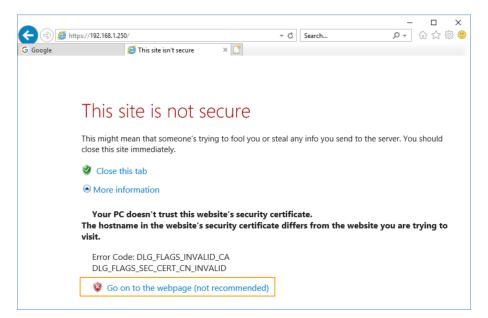


Fig. 9: Microsoft Internet Explorer security certificate

2.3 Welcome screen

The image below shows the start screen of the Data Concentrator, asking to log in.

-				
\leftrightarrow	C A Not secure https://194.153	189.132/#/	\$	Q :
≡	E3METER.com		21.07.2018 19:32	Login
DAT		ATION		
DAI	TA CONCENTRATOR INFORM	ATION		
	Serial number:	006912		
	Product number:	RN1401		
	Hostname:	ctr-006912		
	Firmware version:	5.4.0 (2018-06-29)		
	Uptime:	18 days, 8 hours, 32 minutes		

Fig. 10: Welcome screen of the Data Concentrator when no user is logged in.

As long as you are not logged into the Data Concentrator, the menus are not accessible. Once you are logged into the Data Concentrator, your user name is shown instead of the login button.

Note: The user interface runs on the following web browsers: Google Chrome, Firefox, Microsoft Internet Explorer (version 11), Microsoft Edge, Safari (version 7 or higher).

2.4 User login

Login is done by clicking on the Login button and specifying the user name and password.

The default login is **admin** and the default password is **admin** as well.

$\leftarrow \ \rightarrow$	C Not secure https://ctr-00575	6.local/#/		4	Q :
≡	ЕЗМЕТЕ .сом			21.06.2018 09:29	Login
DAT	A CONCENTRATOR INFORMA	Login	×		
	Serial number:	Login	· [
	Product number:	Password			
	Hostname:				
	Firmware version:		Login Cancel		
	Uptime:	37 minutes			

Fig. 11: Blank user login window with user name and password to be entered

After the first login please change the password in *User login* under *Modify* as shown in the pictures below:

							2
E3METER.co	Analyzer -	Events -	Reporting	24.07.2018 07 :	10 Settings	admin -	
						Modify	
ATA CONCENTRATOR IN	NFORMATION					Logout	
Serial number:	006912						
Product number:	RN1401						
Hostname:	ctr-006912						
Firmware version:	5.4.0 (2018-0	16-29)					
		hours, 11 minutes					

Fig. 12: Accessing User Login modification

	4.153.189.132/#/profile					☆	
ЕЗМЕТЕ .сом	Analyzer -	Events -	Reporting	24.07.2018 07:14	Settings	admin +	
PROFILE							
	Login	admin					
	Login	dumin					
	Name	Administrator					
		on the nassword fields	s blank to keep the current	password			
	Kee	op alle passificita lielat					
	Kee						
	Kee						

Fig. 13: Modification of user Login

Once a user is logged to the Data Concentrator, the name of the currently logged user is shown on top right and the Menu window shows the functions available to the recent user.

M	enu indow						User login
=	E3METER.com	Analyzer -	Reporting	Notifications	21.06.2018 09:56	Settings	admin 🖌 🌲
DAT	TA CONCENTRATOR INFORM	IATION					
	Serial number:	005756					
	Product number:	RN1400					
	Hostname:	ctr-005756					
	Firmware version:	5.3.1 (2018-03-2	29)				
	Uptime:	1 hour, 4 minute	es				

Fig. 14: Welcome screen with user admin currently logged in.

In order to change user rights you need to be logged in as Administrator. How to change user rights is indicated under advanced settings, see *Changing user rights*.

2.4.1 User rights

The user rights are summarized in the table below.

User role	view data	Generate quick report in Metering pages	Notifications/ Assignment/ Reporting	Configure system	Edit user
Administrator	YES	YES	YES	YES	YES
Super user	YES	YES	YES	NO	NO
User	YES	YES	NO	NO	NO

Table 1: User Roles

CHAPTER $\mathbf{3}$

Overview of Monitoring Software

This chapter provides information about the software features. Both the different menus of the software and the main elements of the software are explained in the next sections.

3.1 Software menu structure

The diagram below gives an overview of all the software menus and sub-menus which will be explained later on throughout the User Manual.

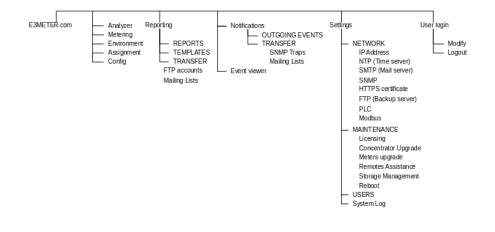


Fig. 1: Data Concentrator overall menu structure

3.2 Basic elements

Serial number: 006912 Product number: RN1401 Hostname: ctr-006912 Firmware version: 5.4.0 (2018-06-29) Uptime: 6 days, 21 hours, 29 minutes	/lenu	ЕЗМЕТЕ .сом	Data Concentrator pages Config -	Events & Notifications Events	- Reporting] (Time 10.07.2018 08:29	Settings	Login admin -	User Notifica
Product number: RN1401 Hostname: ctr-006912 Firmware version: 5.4.0 (2018-06-29)	DAT/	CONCENTRATOR INFORM	ATION							
Hostname: ctr-006912 Firmware version: 5.4.0 (2018-06-29)										
	Hostname: ctr-006912									

Fig. 2: Software basic menus

Note: The picture above depicts what a user with Admin user rights will see. User access rights are defined in the previous section *User rights*.

In the picture above the basic menus of the Software are indicated after having gained access via login. Depending on your user rights, you won't see all of the above mentioned menus and details. Starting from left to right a short overview of the menus and functionalities is given with a reference to the corresponding chapters.

Menu: Will provide you with the detailed informations or group possibilities, see Groups.

Data Concentrator pages: Provides the detailed information of the Data Concentrator to analyse data or configure the system, see *Data Concentrator pages*.

Events and Notifications: Allows configuring the events and how to be notified. Furthermore allows browsing all the events from historical data with the event viewer, see *Events and Notifications*.

Reporting: Provides all the details on report generation and management of templates, see *Reporting*.

Time window: Provides the time selection window for analysis of historical data.

Settings: In this menu, the different settings of the system can be edited. The settings are split into *Initial setup* and *Advanced setup*.

Login: The Login window allows to log into the system and is explained in User login.

Notification panel: Shows the last 30 events, see Notification panel.

CHAPTER 4

Initial setup

This chapter provides information about how to get to the initial setup of a running system. The information present in this chapter will guide you through the configuration parameters which are mandatory for running a basic system.

For editing parameters explained within this chapter, you need to click on settings first (1.) and second click on the left menu (2.), which will reveal the different configuration parameters.

2. ЕЗМЕТЕК.сом	Config -	Notifications	; .	Reporting	10.07.2018 09:23	1. Settings	admin 🗸	30
NETWORK	NETWORK							
IP Address NTP (Time Server) SMTP (Mail Server) SNMP HTTPS Certificate	IP Add _{Config}	TESS uration mode IP address	DHCF 194.15	Manual				
FTP (Backup Server) PLC MAINTENANCE		Subnet mask Gateway		5.255.240 3.189.129			_	
Licensing Concentrator Upgrade Meters Upgrade Remote Assistance		DNS server 1 DNS server 2	194.15					
Storage Management Reboot USERS						Save	& apply	eset
SYSTEM LOG								

Fig. 1: Steps to follow to access initial setup

Note: The advanced configuration parameters will be shown in the section Advanced setup.

4.1 Configure IP address

The IP address Configuration mode of the Data Concentrator can either be configured as DHCP (automatic) or Manual (static).

If the IP address Configuration mode is set to DHCP, the received parameters will be displayed.

≡	ЕЗМЕТЕ В. СОМ	Analyze	r •	Reporting	Notifications			05.06.2018 14:45	Settings	thomas -	
NET					NETWORK						
	NTP (Time Server)				IP A	ddress					
	SMTP (Mall Server) SNMP					Configuration mode	DHCP Markaal				
	HTTPS Certificate					IP address	194.153.189.132				
	TP (Backup Server)										
F	PLC					Subnet mask	255.255.255.240				
MAI	ITENANCE					Gateway	194.153.189.129				
L											
	Concentrator Upgrade					DNS server 1	194.153.189.2				
	Meters Upgrade Remote Assistance					DNS contor 2	194.153.188.2				
	Remote Assistance Storage Management					DI43 301401 2	194, 133, 100,£	-			
	Reboot										
USE							Sav	e & apply Reset			
USE											
SYS											

Fig. 2: IP address settings

If the IP address Configuration mode is set to Manual, all the following parameters need to be configured:

- IP address
- Subnet mask
- Gateway address (optional)
- DNS server 1 (optional)
- DNS server 2 (optional)

Please ask these parameters from your network administrator.

Caution: If no DNS server is configured, as a consequence the host-names won't be resolved and the IP addresses (instead of host-names) need to be entered for NTP (Time Server), FTP (Backup Server), etc...

4.2 Configure NTP (Time Server)

The Data Concentrator uses a global time base (NTP) for the time base of the historical data. Without any valid NTP server, no historic data will be logged. Due to this fact it is recommended to configure multiple NTP servers so that in case one is not reachable the system will be able to switch to another time server. The NTP server can be configured either as url or IP address.

≡	ЕЗМЕТЕ В. сом	Environment -	Events	•	Reporting	10.07.2018 09:55	Settings	admin -	30
NET	WORK	NETWORK							
	IP Address								
	NTP (Time Server)		ime Ser	ver)					
	SMTP (Mail Server)			_					
	SNMP		Enable	On	Off				
	HTTPS Certificate								
	FTP (Backup Server)		Server 1	0.europ	e.pool.ntp.org			۵	
	PLC								
			Server 2	1.europ	e.pool.ntp.org			8	
MAI	NTENANCE								
	Licensing		Server 3	2.europ	e.pool.ntp.org			۵	
	Concentrator Upgrade							_	
	Meters Upgrade		Server 4	3.europ	e.pool.ntp.org			•	
	Remote Assistance								
	Storage Management			O Add	Server				
	Reboot								

Fig. 3: NTP settings

Important: If the NTP server tick box is selected to be off or none is configured, the Data Concentrator won't store historic data. Only the data currently in the RAM will be shown in the Analyzer window, which is roughly the last 4 hours available in the volatile memory. When installing a Data Concentrator from scratch, ntp servers are pre-configured. Depending on your network infrastructure, these time servers that need to be reached via the internet, might be blocked. In that case, configure your own ntp server, that you can reach based on your network infrastructure.

4.3 Add license

E3METER® devices provide two types of license.

- CAL (Client Access License)
- Feature license

Both types of licenses can be purchased from Riedo Networks Ltd.

4.3.1 CAL

CAL are required, one per meter that is interfaced. CAL license can be purchased for 10, 50 and 100 meters.

4.3.2 Feature license

Feature licenses are available for two different features, Reporting and Alarm.

The Report license allows to generate the reports with the configured templates and get the results.

Note: You can configure the entire Reporting feature to validate the formatting of your report, but the data values in the report will all be zero as long as you have no valid license for *Reporting*.

The Alarm license allows to generate alarms. Without a valid Alarm license, Alarms won't show the detailed information in the notification panel. Furthermore Alarms won't be sent per email neither per SNMP trap without a valid license.

E3METER.com	Assignment - Reporting	Notific	cations					14.06.2018	16:07	Settings	thomas -	Ĵ
NETWORK		MAIN	ITENANCE									
IP Address												
NTP (Time Server)			Overview									
SMTP (Mail Server) SNMP			Access Licenses for Meter	rs :		100 Meters a	llowed (70 used)					
HTTPS Certificate												
FTP (Backup Server)			PDF Reporting			PDF Repo Perpetual lice	rt Generator enabled nse					
			Alarms			🗸 Alarms en	abled					
						Perpetual lice						
Licensing												
Concentrator Upgrade												
Meters Upgrade												
Remote Assistance			Installed Licen	ses								
Storage Management Reboot			License ID A	Issue Date	Туре		Description	Action				
Repool			DVGP-CDC7-FGDQ	05.05.2017	CAL - E3METER	(100)	Access License for 100 E3METER devices					
			ERLC-0WJQ-HQ1F	05.05.2017	FEATURE - PDF	Reporting	Enables PDF Report Generator					
			SV6Q-DTPR-0B1T	21.06.2017	FEATURE - Alarn	ns	Enables Alarms notifications	۵				
			Install / Replac		ense Key							
			Install license key with a lice	nse file								
			Please select a file				Install license key					
			Or alternatively, install a lice	nse by pasting	the key text content							

Fig. 4: License management of Data Concentrator

4.4 Firmware upgrade of Data Concentrator

It is possible to either automatically or manually check whether the current firmware is the latest. In the same section the Data Concentrator can be upgraded to a specific revision of the firmware. For a manual check, simply click on the Check for updates now button.

← → C 🗎 Secure https://lab3.riedo.	com/#/settings/r	maintena	ince/concentrate	or-upgrade					
ЕЗМЕТЕР .сом	Analyzer	•	Reporting	Notifications					14.06.2018 11:53
NETWORK				MAINTENAN	ICE				
IP Address NTP (Time Server) SMTP (Mail Server) SNMP HTTPS Certificate FTP (Backup Server)				Con	centrator Upg Firmware file	rade Please select a file	h	() Upgrade	
PLC					Current version	5.3.1 (2018-03-29)			
MAINTENANCE				New fin	mware version check				
Licensing				Ch	eck for firmware updates	Automatically (at logon, once per day)	•	Check for updates now	
Concentrator Upgrade Meters Upgrade Remote Assistance Storage Management Reboot				The /		x will send the Data Concentrator serial number, t eters via https to the update Server. No user data			amount
USERS								Sav	e & apply Reset

Fig. 5: Firmware upgrade of Concentrator

4.5 Firmware upgrade of Meters

The Data Concentrator provides the functionality to automatically upgrade the Firmware of all paired meters if this functionality is configured. Clicking on the link to *Meters configuration* allows getting an overview of the meters paired to your system with information about each specific meter and the different versions and furthermore whether the Firmware is currently being updated.

$\overleftarrow{\leftarrow} \rightarrow$	C 🕜	i 🔒	https://lab	3.riedo.c	om/#/s	ettings/mai	intenance/m	rs-upgrade				0 ¢		± II\ (⊐≡
≡	E3METER.com	,	Config		Re	porting	Notificatio	5			06.06.2018	19:39	Settings	thomas -	P
NETWO							MAINTEI	INCE							
NT SM SN HT	TPS Certificate P (Backup Server)							ters Upgrade de mode:		Disabled Meters upgrade disabled Anto Meters will be automatically upgraded The poling fault between will be downatically set to exactinuum while Meters are updat buts in the user series dimension.	ed and reverted				
	ENANCE ensing							CIN	lck or	the following link to see the upgrade status: <u>Meters configuration</u>					
Co	ncentrator Upgrade														
Re Sto	ters Upgrade mote Assistance vrage Management boot										ve & apply Rese				
USERS															
SYSTE	MLOG														

Fig. 6: Firmware upgrade of meters

Attention: It is highly recommended to set the Meters Upgrade to Auto. This functionality will save you a lot of time and assure that the meters firmware is up to date. By upgrading the meters firmware automatically, you benefit from bug fixes and from new features.

4.6 Remote Assistance

The following image indicates, the connection for remote assistance.

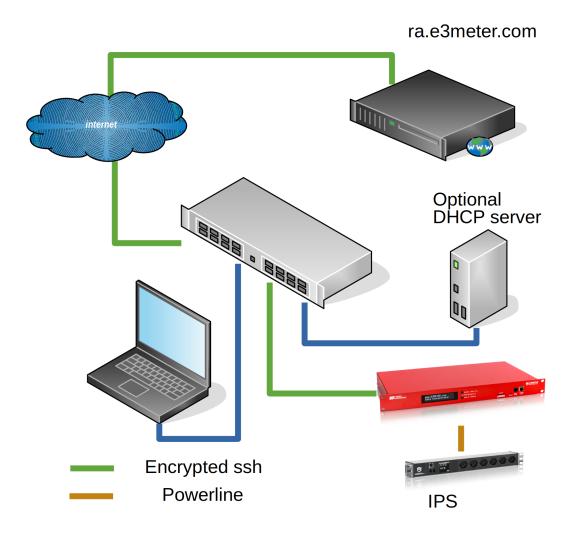
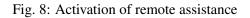


Fig. 7: Secured connection from ra.e3meter.com to the Data Concentrator for remote assistance

It is possible to get remote assistance from Riedo Networks Ltd in case of a problem. The advantage of the remote assistance is that Riedo Networks Ltd can access the Data Concentrator while the latter operates in the normal environment.

	Analyzer -	Events	- Reporting		19.07.2018 07:01	Settings	admin -	
NETWORK	MAINTENANCE							
IP Address NTP (Time Server) SMTP (Mail Server) SNMP HTTPS Certificate FTP (Backup Server) PLC	Should yo By activat server ra.o If a Remo	ting the Remote Ass e3meter.com. Once	r question with yo istance, an encry your issue is rese ection should not	ur setup you can ask a support enginu sted ssh connection will be establishe lvved you can deactivate the Remote / pe possible, we kindly ask you to cont rom.	d from your Data Concer Assistance.	ntrator to the		
MAINTENANCE Licensing Concentrator Upgrade		Status	e Inactive				Activate 🗸	
Meters Upgrade Remote Assistance Storage Management								
Reboot								



For this you have to activate the Remote Assistance option. This allows Riedo Networks Ltd to establish a secure connection over the internet to the Data Concentrator. This will only work if the necessary ports for the secure, encrypted connection are open. If for security reasons opening the access is not possible, the user can provide the logs to Riedo Networks Ltd, see *System Log*.

CHAPTER 5

Adding meters

This chapter explains how to add meters to the system. The concept of the E3METER® consists of meters that are paired to the Data Concentrator. Pairing can be done either manually or automatically. A meter can only be paired to one Data Concentrator.

Note: One or multiple meters can be added. The *Add meter* button is only visible if Auto Admission is not active, see *Configure PLC*.

5.1 Adding IPS

5.1.1 Adding meters automatically

Adding meters with the auto admission method is a convenient method for pairing many meters to a Data Concentrator without having manually to enter their serial number. Automatic admission is enabled as explained in *Configure PLC* with the configuration option *Meters auto admission*.

E3METER.com	Config -	Reporting	Notifications			06.06.2018 10:44	Settings	thomas -	2
			NETWORK						
IP Address									
NTP (Time Server)			PLC						
SMTP (Mail Server)									
SNMP			м	ieters data polling period	15 minutes -				
HTTPS Certificate									
FTP (Backup Server)				Polling fault tolerance	1 period (default)				
PLC					If a Meter does not respond within the polling period its last received value is maintained according to fault tolerance. The default recommended value is 1 period.	the polling			
			1	Meters auto admission	O Disabled (default)				
Licensing					 You must add Meters manually. This is the default mode. 				
Concentrator Upgrade					Enabled New Meters will be automatically registered to this Data Concentrator. You can not manually add	new Meters.			
Meters Upgrade					This mode should not be used when you have more than 1 Data Concentrator in your network.				
Remote Assistance									
Storage Management					_				
Reboot					Save	& apply Reset			

Fig. 1: Adding Meters automatically using Meters auto admission functionality.

Caution: In the case where multiple Data Concentrators are used in the same system, you need to be careful that meters are not automatically added to the wrong Data Concentrator. Therefore it is recommended to disable the *Meters auto admission* function by default and only enable one Data Concentrator within the same system at once for this function, which prevents from adding meters to the wrong Data Concentrator.

5.1.2 Adding meters manually

≡	E	3MET	ER.com	Confi	g -	Notifications	•	Reporting
~	3/3	<u>unflag</u>	Bulk configure	<u>Delete</u>	O Add Mete	r		

Fig. 2: Select adding meters in the Config page

Via the Config menu you will have the possibility to pair meters manually by clicking on the Add Meter button. This opens up a new window where meters can be added by entering their serial numbers.

Add Meter	×	
Meter Type	IPS PRO	
Serial Number	14797-14800;100004,100001	•
	Serial numbers shall not exceed 6 digits Use , or ; as separator and - to define a range of Meters E.g. 1050-1060,2153;3725	
	Add	

Fig. 3: Adding meters manually by defining serial numbers

If you have multiple meters to be added you can either separate multiple ones with comma ',' or semicolon ';' or define a range of serial numbers with hyphen '-'.

5.2 Adding PRO meters manually

Within this chapter the two methods of adding PRO meters to the E3METER system are explained. All PRO meters use Modbus RTU for communication. Either the PRO meters are connected directly to the CTR using a USB to RS-485 converter or over a Modbus gateway. In the case when interfacing via the gateway, the PRO meters communicate via Modbus RTU to the gateway and the gateway via Modbus TCP to the CTR.

In order to add PRO meters first click to Add Meters and then select PRO as shown in the picture below. Then select the interface and Modbus address to be added.

Add Meter	×	
	Select PRO meter	
Meter Type	IPS PRO	
Modbus Interface	Select Interface •	
Modbus Address	Meter Modbus Address	
	Modbus addresses shall be in range [1:247] Use , or ; as separator E.g. 1,12,240	
	Add Cancel]

Fig. 4: Select to add PRO meter

Note: PRO meters are delivered with the Modbus address configured as the last 2 digit of their S/N, e.g. Meter with S/N 0257151203**98** is configured with Modbus address 98.

5.2.1 USB adapter

In the Data Concentrator installation guide, information is provided about how to connect the USB to RS-485 converter RN1079. If more than one converter need to be connected to the Data Concentrator it is required to connect a USB hub to the USB OTG connector and connect the multiple converters to the hub.

The PRO meters have to be connected on the USB adapter A to A (pin 22), B to B (pin 23). The hardware connection diagram is shown here below.



Fig. 5: PRO meter connection per USB adapter on CTR

5.2.2 Modbus TCP/RTU gateway

For the gateway connection with the Moxa MB3180 the PRO meters have to be connected on the Modbus RTU side R+ (pin 3) to A (pin 22), R- (pin 4) to B (pin 23). The hardware connection diagram is shown here below.

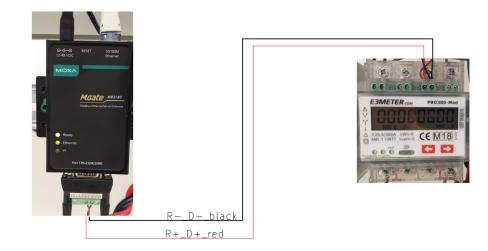


Fig. 6: PRO meter connection via gateway

Note: We currently only support Moxa MB3180 as a Modbus TCP/RTU gateway.

CHAPTER 6

Data Concentrator pages

The Data Concentrator pages provide information about the meter's data values and allow configuring system parameters. Depending on the section that is selected within the Monitoring Software, different visualization or configuration options are shown.

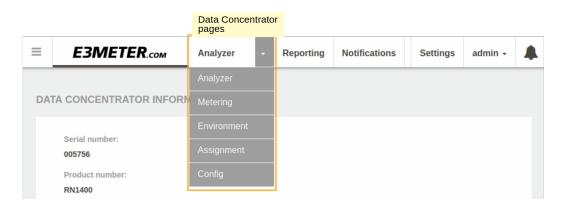


Fig. 1: Data Concentrator pages menu showing the different available pages

6.1 Visualization and configuration features

The following section explains the main features of the web page for visualization of data and configuration of the system.

6.1.1 Groups

Meters can be grouped based on different Categories and Groups. Categories contain Groups and Groups contain meters. One meter can only be part of one Group, one Group can only be part of one Category.

Menu	
≡	E3METER.com

Fig. 2: Menu icon

Groups are accessed by clicking on the Menu icon and visible on the left panel of your web browser as shown in the picture below.

Groups									
E3METER	Р .сом	Analyzer	+ Event	s -	Reporting			25.07.2018 16:59 Settin	ngs admin - 🗍
Groups	٥	Active	Power ((W)				23.07.2018 - 24.07.2018 👹 / 15 min	ê 0 F
e All 70 Meters		400 - 350 - 300 -							
Raviga Hooli	4 7	250 - 200 - 150 - 100 -							
Endframe systems Bachmanity	6 6	50 - 0 -	4:00 05:00 06:00 0	7.00 08.00 09.00 10:	00 11:00 12:00 13:00 14:00 1	500 16:00 17:00 18:00 19:00 20:0	0 21:00 22:00 23:00 J#24 01:00 02:00 03:00 04:00 05:00 06:00	07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17	00 18:00 19:00 20:00
Pied Piper	8						đ)	
		Last	25.07.2018 16:30 - 16:45	* ×				Grouped by Ung	rouped] -
Room 1	3								
Room 2	21	Contraction Processon Proc	ers Number 🛧	Product Numbe	r Average	Current (Amperes) Phase 1	Phase 2	Phase 3	Status
Room 3	0	PDU R S/N 10		RN1210	1'071 W average	49% L1: 4.900 A			~
POWER FEED	16	Rack A		RN1216	1'342 W average			13% L3: 6.140 A	~
Feed B	10	Rack A		RN1216	1'610 W average		48% L2: 7.370 A		-
		S/N 10	TER 100003	RN1216	1'713 W average			450 L3: 7.840 A	~
FLAGGED METERS	•		TER 100004	RN1216	1'342 W average	38%0 L1: 6.140 A			
onon nagged only		S/N 10	TER 100005	RN1216	1'610 W average	46% L1: 7.370 A			
		S/N 10	TER 100006	RN1216	1'713 W average			496 L3: 7.840 A	1

Fig. 3: Groups are shown on the left of the browser window

6.1.1.1 Edit groups

Note: When you configure a Data Concentrator from scratch, there are no categories defined. After adding new groups they are empty as well. Assigning meters to categories and groups needs to be done in the *Assignment* section.

Groups can be edited by clicking on the software setting symbol \square , which will open the following menu.

E3METER.com	Analyzer
✓ Done <u>Cancel</u>	Active
Add a new category:	
Power feed	400
	300 -
CUSTOMER	
😑 Raviga	1
😑 Hooli	1
Endframe systems	1
Bachmanity	1
Pied Piper	*
	•
New group under CUSTOMER	•
	70 Meter
ROOM	Carial Mu
	•
Room 1	+
Room 2	1
e Room 3	1
Add a new group	
nou a new group	1

Fig. 4: *Edit groups* window

In the *Edit groups* window shown here above, we can see a configured category *Customer* with the different groups *Hooli*, *Raviga* and so on.

Within the *Edit groups* window it is possible to:

- Add a category/group
- Rename category/group
- Reorganize the position of category/group
- Delete category/group

Add is done by entering the new information in the *Add a new category* respectively *Add a new group* field. You confirm your entry either with *Return* on your keyboard or by clicking

on the CONFIRM **Symbol**.

Rename is done by clicking on existing names and edit them.

Reorganize is done with the arrow symbols. Categories are moved either with the UP or

DOWN arrow symbol. Groups instead are moved by drag and drop of the UP-DOWN arrow symbol.

Delete is done by clicking on the MINUS symbol, which is possible for both category and group.

Changes are saved by clicking on the Done button. Changes can be canceled by clicking on the Cancel button. The following picture shows the result after adding a category Floor with three groups.

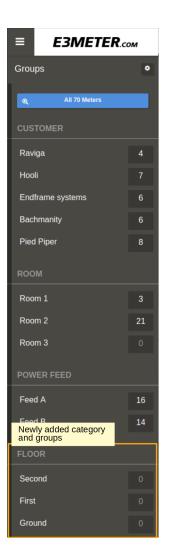


Fig. 5: Resulting window after having made changes in *Groups edit* window

6.1.1.2 Flags

Flags are a handy method for selecting individual meters. In the list of meters, there is a flag symbol for each individual meter. By clicking on the flag, the corresponding meter is flagged and indicated with the flag filled with blue color \frown . An active flag can be removed by clicking on the flag symbol resulting in a non-filled flag \frown . The picture below shows an example with three meters that have been flagged.

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۲¢	70 Meters A Serial Number	Product Number	Active Power Average	Current (Amperes) Phase 1	Phase 2	Phase 3	Status
-	E3METER 100003 S/N 100003		1'304 W average			37% Contraction Co	× .
	E3METER 100004 S/N 100004	RN1216	1'887 W average	59% L1: 8.638 A			
	E3METER 100005	RN1216	1'452 W average	4295 L1: 6.645 A			
	E3METER 100006 S/N 100006	RN1216	1'304 W average			37% L3: 5.968 A	
	E3METER 100009 S/N 100009		2'608 W average	37% L1: 11.936 A			
	E3METER 100010 S/N 100010	RN1210	1'180 W average		54% L2: 5.399 A		
-	E3METER 100011 S/N 100011		1'452 W average	42% Constant of Constant Constant of Const			
	E3METER 100012 S/N 100012	RN1216	1'304 W average	37% L1: 5.968 A			4

Fig. 6: Defining flags to meters

6.1.1.3 Group selection

Single or multiple groups can be selected thus reducing the number of meters to be shown for data visualization and configuration. The selection is done by clicking on one or multiple groups which adds them to the selection, respectively removes them from the selection if previously already selected. After applying changes to the group selection, the data shown is a subset of the overall data. In the following example only the 7 meters assigned to the *Hooli* group are shown.

	Analyzer - Ever	nts - Repo	rting			04.07.2018 13:2	1 Settings admin -
Groups	Active Power	(kW)				17.06.2018 - 20.06.2018	/1hour 🙆 😋 0 🕴
A Sense at 3 Moon CUSTOMER Range A Hond Customer A A A A A A A A A A A A A							
			Jun 18		20 مىڭ		Jun 20
				i i	1		
	Marker 18.05.2018 09:00 - 10:00	. * × *					d by [Ungrouped]
	Marker 18.05.2018 09.00 - 10.00 19.00 Seria Namber	p 🖈 🗙 🏚 Product Number		Current (Amperes) Phase 1	Phase 2		d by [Ungrouped] .
	CIMETER A Serial Number	Product Number	Average 1'456 W	Phase 1 42%		Groupe	
	ZMeters A Serial Number		Average 1'456 W			Groupe	Status
	ZMeters A Serial Namber EMETER 100013 SIN 10013 SIN 10019 SIN 100019 SIN 100019	Product Number RN1216	Average 1'456 W average 2'905 W average 3'803 W	Phase 1 42%	Plane 2	Groupe	Status
	ZMeters A Serial Number Serial Number SIN 100013 SIN 100013 SIN 100019 SIN 100019 E3METER 100012	Product Number RN1216 RN1228	Average 1456 W average 2905 W average 31803 W average 1162 W	Phase 1 225 L1: 6.663 A 36%	Plase 2 4% 12:1287A 30	Group Place 3	Status
	Image: Section Number	Product Number RN1216 RN1228 RN1250	Average 1456 W average 2905 W average 31903 W average 1162 W average 1466 W	Phase 1 42% L1: 6.053 A 11: 5.051 A 12: 5.051 A	Plase 2 4% 12:1287A 30	Group Place 3	Status
	Image: Sector Nation Sector Nation <th>Product Number RN1216 RN1228 RN1250 RN1210</th> <th>Average 1456 W average 2905 W average 31903 W average 1162 W average 1466 W</th> <th>Plase 1 2% 11 6 603 A 15 501 A 2% 15 518 A 2%</th> <th>Plase 2 4% 12:1287A 30</th> <th>Group Place 3</th> <th>588.5</th>	Product Number RN1216 RN1228 RN1250 RN1210	Average 1456 W average 2905 W average 31903 W average 1162 W average 1466 W	Plase 1 2% 11 6 603 A 15 501 A 2% 15 518 A 2%	Plase 2 4% 12:1287A 30	Group Place 3	588.5

Fig. 7: Group selection with customer group Hooli

The group selection can also be based on flagged meters. For this, you need to select *Show flagged only*. Next, to this group selection option, the number of flagged meters is indicated.

E3METER.	сом	Analyze	r - Ever	nts	- Rep	orting												24.0	7.2018 0	7:30	Settings	admin	n -
oups	۰	Act	ive Power ((kW)													23.07.20	18 - 24.07.	2018 (Last) 🗮 / 15	min 🔹	• •	0
All 70 Meters		40																					
		350	-																				Ľ.
viga	4	300																					
oli	7	200																					
dframe systems	6	200	-																				
chmanity	6	50	,																				
d Piper	8		08.00 09.00	10:00	11:00 1:	100 13.00	14:00	15.00	16:00	17:00 1	100 197	0 20	00 21:00	22:00	23.00	34 24	01:00	02:00	03:00	04.00	05:00 0	xe:00 01	07.00
			_													Ψ.							
micide Energy Drin	0	1	/3 unflag	Last	24.07.	2018	×												Gro	uned by	[Ungroupe	dl	
					07:00 -	07:15														apea oy		-,	-
oom 1	3		Meters arial Number A	Product N	lumber	Active Pow Average	rer	Current Phase 1	(Amperes)				Phase 2					Phase	3				St
om 2	21		DU R1-B	_		1'063 W			49%														
iom 3	0		N 100000	RN1210		average		L1: 4.865															
			ack A4-A N 100001	RN1216		1'709 W average												L3: 7.8	49% 24 A				
ed A	16		nck A4-B N 100002	RN1216		1'499 W average							L2: 6.861										
ed B	14		METER 100003	RN1216		1'701 W average												L3: 7.7	49% 85 A	-			
			METER 100004	RN1216		1'709 W		L1: 7.824	49%														
	I		METER 100005	PONIZIO		average			43%														
low flagged only	3		N 100005	RN1216		average		L1: 6.861															
			METER 100006	RN1216		1'701 W average												L3: 7.7	49% 85 A				
			A1-L-F256			1'709 W			49%														_

Fig. 8: Group selection for Show flagged only.

Attention: If clicking on the *Show flagged only* group selection, **only** the flagged meters are shown. All previously selected groups will be removed in the Groups menu.

Once the flagged meters are selected, the group entry for the flagged meters changes to *Toggle flagged only*. By clicking on it, the flagged meters will be removed from the group selection and the still active group selection will be shown.

Flagged meters and group selection can be combined. On top of the meter information window the number of flagged meters that are selected over the total of flagged meters are explained.

6.1.1.4 Grouped by

Within the Data Concentrator pages, it is possible to group meters by category. By clicking on the *Grouped by* button this will group the meters based on the selected group. For instance, they can be grouped by the customer as indicated in the picture shown below. First, all meters from customer *Raviga* are shown, second meters from customer *Hooli* and so on.

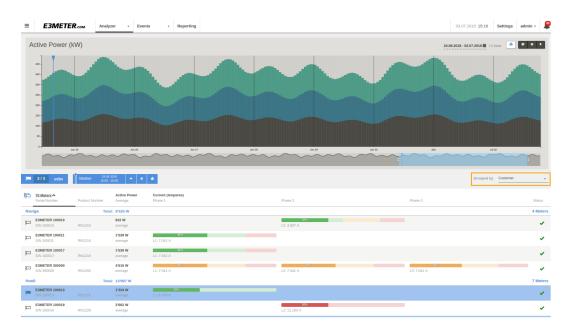


Fig. 9: Meters grouped by customer

6.1.2 Bar chart

In the bar chart, each bar indicates the power or energy measured per phase with a different color per phase.

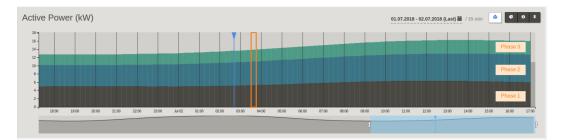


Fig. 10: Bar chart with bars indicating the measured values

6.1.3 Tooltip value

The tooltip value shows the value of the bar that you are currently pointing over in the bar chart. The tooltip value can be activated or deactivated by clicking on the info icon symbol in the Graph elements.

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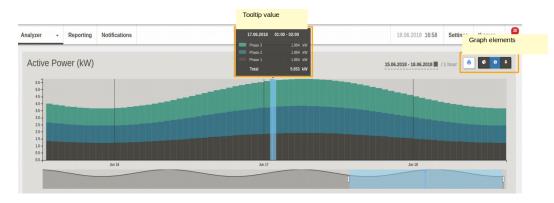


Fig. 11: Tooltip value

6.1.4 Marker

By clicking on the bar chart you activate the marker which provides the values for a specific time period of the historical data. The time period shown is based on the data polling period, see *Configure PLC* for how to configure the data polling period. In order to visualize a different time period, you can click on the bar chart which repositions the marker.



Fig. 12: Meter values corresponding to the marker position.

The marker status bar shows the time period to which the marker is associated and allows to do some operations. Clicking on the little arrow symbol pointing towards the right $\overset{\checkmark}{}$ makes jump the marker to the middle of the bar chart window. Clicking on the x icon symbol $\overset{\times}{}$ will move the marker to the last received value. The printer icon $\overset{\textcircled{}}{=}$ will open up an export window for the marker data. Information about how to generate reports is explained in section *Reporting*.

Note: Currently the printer icon is not available for the last received value.

6.1.5 Phase Balance viewer

The phase balance viewer provides the active power per phase for all selected meters over the specified time interval. The phase balance is expressed as a ratio of the phase power divided by the sum of the power of all three phases in percent (%). This value is expressed for the time period selected in the bar chart. If the time selection is changed, the phase balance values are recalculated. The phase balance viewer can be activated or removed by clicking

on the pie chart symbol within the Graph elements. By clicking on a phase in the phase balance viewer, the corresponding phase is shown or hidden in the bar chart.

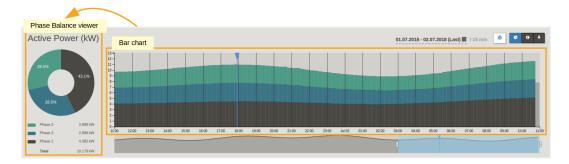


Fig. 13: Phase balance viewer and associated data

6.1.6 Navigation in time

When accessing historical data, one important element is the navigation in the time base. Multiple ways are possible depending on the user interface selected. The different options are explained more in detail in the following sections.

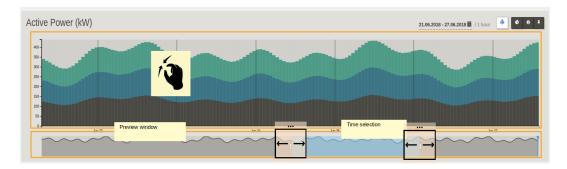


Fig. 14: Bar chart with navigation possibilities.

6.1.6.1 User interface

Navigation is achieved both by mouse interface or with touch gestures. In the table below you find an overview of the different functions and their respective user interface.

Function	Mouse interface	Touch gestures			
Navigate in time with	Scroll mouse wheel	Pinch / spread			
zoom through bar chart					
Navigate in time by sliding	Click and hold to move the bar	Select and slide bar			
bar chart	chart right and left	chart right and left			
Navigate in time with time	Click and move border(s) of time	Select and Pan			
selection window	selection window				
Move around time selec-	Select the time selection window	Select time selection			
tion window	and and move it around	window and Pan			

6.1.6.2 Navigation in bar chart

As a first option for navigation in time, the time base can be squeezed or extended within the bar chart. This can be achieved either with the mouse or with touch gestures. Scrolling with the mouse wheel for the mouse interface, respectively pinching and spreading for the touch interface. While acting on the time base, the result is updated in the preview window accordingly. The portion of historical data shown in the bar chart is shown in the preview window.

6.1.6.3 Navigation in preview window

As a second option for navigation in time, the time selection window can be moved around within the preview window. This is achieved by moving around the entire time selection window towards the left for older data values or towards the right for newer data values. Furthermore, you can define the start and stop of the time shown in the bar chart by moving the left and right extremity of this time selection.

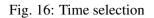


Fig. 15: Time selection within the preview window.

6.1.6.4 Time selection

As a third option for navigation in time, you have the possibility to click on the time selection at the top right of the bar chart and enter the time of interest for the start and stop as shown in the picture below. The basic usage is to click once on the calendar to select the start date and click a second time to select the stop date. When clicking twice on the same date, this date is selected to be shown. When clicking on a month the selection start is from the first of the month to the last day of the month available in the historical data. Dates can be entered by inserting a start date manually e.g. 1.1.2016 and 30.05.2018 on the top of the time selection window. The shortcuts on the right of the time selection window allow to select in a convenient way the predefined time periods. Once the date is selected you need to click on Apply Apply Apply Apply Apply

nalyzer 👻	Reporting	Notifications															12.06.2018 14:45	Settings	thomas -	
Active Pov	ver (kW)			П	ime se	lection	_										08.06.2018 - 11.06.2018 🗃	/ 1 hour 🛛 🚔	© 0	
		400-]			08.06	.2018				<u>m</u> 1	1.06.	2018					Apply Cancel			
31.6%	36.2%	350 -			<		y 2018						n 201				Today			1
		300 -			lo Tu	We	Th I		a Su			We		Fr			Yesterday			
		200 -		3	30 1	2	3	4 5		28	29	30	31	1		3	Last Week			
32,3%		150 -			7 8	9	10	1 13	2 13	4	5	6	7	8	9	10	Last Month			
32.3%		100 -		1	L4 15	16	17 1	18 19	20	11	12	13	14	15	16	17	Last 7 Days			
		50 -		2	21 22	23	24 2	25 20	5 27	18	19	20	21	22	23	24	Last 30 Days			
Phase 3	115.927 kW	0	Jun 09	2	28 29	30	31	1 2	3	25	26	27	28	29	30	1				۰.,
Phase 2 Phase 1	118.486 KW 132.810 KW				4 5	6	7	8 9	10	2	3	4	5	6	Ŧ	8				
Total	367.224 KW																			



Note: Navigation in historical data can take some processing time because the Data Concentrator needs to load the selected data from the internal storage.

6.2 Analyzer

The Analyzer page main usage is for capacity management of your system. It shows the Active Power and phase current(s) of the meters over the selected time interval. This page allows you to analyze the power and current as well as the phase balance. For a specific rack with a maximum allowed power rating it is important to know the current situation and whether there is still some margin.

Power measured is the average (RMS) Active Power. By clicking on the horizontal bargraph of the current, the thresholds for the Alarms can directly be configured. More details about Alarm configuration are explained in the *Alarms* section.

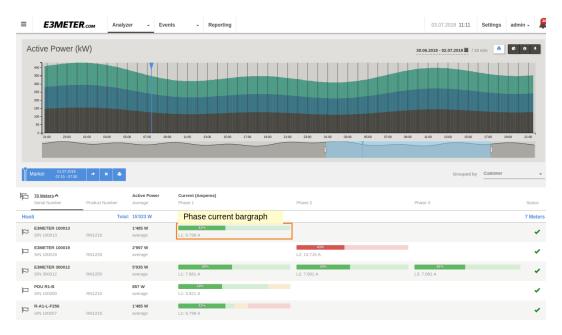


Fig. 17: Bargraph showing value of current and the alarm thresholds

All information that is visualized can be exported. For more information consult the Report-

ing section.

6.2.1 Residual Current Monitoring

For selected meters with Residual Current Monitoring feature (RCM), their peak residual current values both for DC and AC RMS are shown underneath the bar chart. The residual current monitoring indicates whether there is a leakage current between the supply and the return. The thresholds are fix values and set to 6mA DC and 30mA AC RMS. If the residual current monitoring exceeds these values an alarm is generated which is shown both on the *Notification panel* and the *Event viewer*.

The information of the Residual Current Monitoring is also retrievable via SNMP as explained under *Accessing data per SNMP*, this information field was added to the MIB starting from software version 5.5.

Below an example of RCM is shown with the value shown underneath the bar graph, the event in the Notification panel as well as the event in the Event viewer.

E3METER	.сом	Anal	yzer - Events	s - Re	porting			24.1	0.2018 16:41 Settings admin -
Groups	۰	陷	18 Meters Serial Number A	Product Number	Active Power Average	Current (Amperes) Phase 1	Phase 2	Phase 3	RCM AC - DC Status
All 18 Meters CUSTOMER		q	E3METER 000006	RN1200	53 W average		6% L2: 0.943 A		
Migros	4		E3METER 000007 S/N 000007	RN1200	65 W average		6% L2: 1.020 A		
	4	p	E3METER 000008 S/N 000008	RN1200	47 W average			5% L3: 0.834 A	
UBS Post Finance	1		E3METER 000009 S/N 000009	RN1200	49 W average	3% L1: 0.869 A			*
	0		E3METER 000025 S/N 000025	RN1200	8 W average		1% L2: 0.171 A		*
			OVERLOAD S/N 000150	RN1200	26 W average	0% L1: 0.113 A			*
	5		E3METER 001259 S/N 001259	RN1218	40 W average	4% L1: 0.718 A			~
Feed B	5	P	E3METER 001269 S/N 001269		3 W average	0% L1: 0.072 A			-
	-	P	3 phases S/N 002681	RN1231	0 W average	0% L1: 0.000 A	0% L2: 0.000 A	0% L3: 0.000 A	
Show flagged only	1	P	Switch me S/N 006187	RN1208	6 W average	1% L1: 0.119 A			RCM values
		-	RCM S/N 022040		o w average	0% L1: 0.000 A	_		AC: 15.7 mA DC: 9.9 mA
		R	E3METER 022471 S/N 022471	RN1290	o w average	0% L1: 0.000 A	0% L2: 0.000 A	0% L3: 0.000 A	
			E3METER 022903 S/N 022903	RN1291	7 W average	1% L1: 0.202 A	0% L2: 0.000 A	0% L3: 0.000 A	
		R	S/N 000021						×
			S/N 777777						×

Fig. 18: RCM values underneath bar graph

018 16 :3	37 Set	ttings	admin 🗸	2
All	8	R	•	6
	RCM residu .6:36 Today		it normal	
Residu S/N 02	ual Current D0 22040	C : 0.0 mA		4
	RCM residu .6:36 Today	al currer	it high alert	
Residu S/N 02	ual Current D0 22040	C : 9.9 mA		4
0	Sensor 1 of		R 022471	×
S/N 02	.6:20 Today 2 2471			¥
	Meter E3ME .6:20 Today	TER 022	903 reconnec	ted
S/N 02	2903			×
	Meter E3ME .6:20 Today		471 reconnec	
S/N 02	22471			¥
۱ ۱	E3METER 0 varning)7:20 Today	00003 te	mperature hiç	jh
Senso S/N 00	r 2: 25.0 °C (a 00003			U
	3METER 0 17:18 Today		mperature no	rmal
Senso S/N 00	r 2: 24.9 °C (0 00003			
Ň	E 3METER 0 warning ^{17:08} Today	00003 te	mperature hiç	jh
Senso S/N 00	r 2: 25.1 °C (∂ 00003			×J
	E3METER 0 17:02 Today	00003 te	mperature no	rmal
Senso S/N 00	r 2: 24.9 °C (0 10003	DK)		ı):

Fig. 19: Notification of RCM alarm message

≡	E3ME	TER .coм	Analyzer	-	Events	•	Reporting	31.10.2018 10:48	Settings	admin 🗸	30
	no date range set										
	ENTS > 1-6 / 6										
2	5.10.2018 16:38:47	A RCM curre	nt low alert							ALA	RM
2	5.10.2018 14:10:00	A Meter RCM	1 disconnected							CONNECTIV	ITY
24	1.10.2018 16:36:35	_	ual current high ale current DC : 9.9 mA 0		mA)					ALA	RM
18	3.10.2018 15:10:32	A RCM resid	ual current high ale	rt						ALA	RM
1	7.10.2018 11:32:00	A Meter RCM	1 disconnected							CONNECTIV	ITY
10	5.10.2018 11:27:50	A E3METER	022040 residual cu	irrent hi	igh alert					ALA	RM

Fig. 20: RCM current high alert as seen in Event Viewer

6.3 Metering

The Metering page provides an overview of the total Active Energy, Reactive Energy (L) and Reactive Energy (C). The Energy shown is the total of the Energy consumed since the meter has been installed and up to the time selected. The phase balance viewer is useful in terms of analyzing the energy consumption per phase.

E3METE	R.com N	etering - Ev	ents	- F	Reporting															14.08.2018	12:04	Settings	admin	-
Active Energy ((kWh)																	13	08.2018 - 1	4.08.2018 (L	ast) 🎬 / 1	5 min 🧶	• •	•
172% 31.1%	14- 12- 10- 08- 06- 04- 02-																							
Phase 3 0.342 Phase 2 0.617 Phase 1 1.027 Total 1.995	7 kwh 12:00	13:00 14:00	15:00	16:00	17.00	18:00	19:00	20:00	21.00	22.00	23:00	Aug 14	01.00	02:00	03.00	04.00	95.00	06.00	67.00	08.00	09.00	10:00	11.00	Ð
Last 14.08.2018 11:30 - 11:45	* ×																			G	rouped by	Customer		
4 Meters Serial Number	Product Numbe	Active Energy Total (kWh)	_						Reactive En Total (kvarh)	ergy (L)	1						tive Energy (kvarh)	/ (C)						Statu
aviga		Total: 91'418 kWh							1'016 kvart							1'016	kvarh							4 Met
3 E3METER 100010 S/N 100010	RN1210	10'182.036 KWh							113.134 kvar	ħ						113.1	34 kvarh							•
3 E3METER 100011 S/N 100011	RN1216	16'250.258 KWh							180.558 kva	th						180.5	58 kvarh							•
5/N 100017	RN1216	16'259.894 kWh							180.665 kva	th						180.6	65 kvarh							•
5/N 300000	RN1250	48725.523 kWh							541.395 kva	n						541.3	95 kvarh							•
looli																								
ndframe systems																								
achmanity																								
ed Piper																								
nassigned																								

Fig. 21: Metering showing the energy consumption for the selected meters

With metering it is possible to bill the corresponding amount of energy to each specific customer.

Note: For PRO meters only the active Energy is available within the Data Concentrator software.

6.4 Environment

The Environment page provides an overview of the environmental data which are temperature and relative humidity per meter. In the preview window the temperatures maximum and minimum are shown for the selected meters. As a result the temperature minimum and maximum envelope is shown. Underneath the diagram for each meter the calculated average values for the defined period are shown both for temperature and relative humidity. By clicking on horizontal bargraph of the temperature or relative humidity, the thresholds for the Alarms can directly be configured. More details about Alarm configuration are explained in the *Alarms* section.

The analysis of the temperature envelope is useful in terms of safety, since the difference between the indicated minimum an maximum values compared with the thresholds, shows the margin in terms of the temperature.

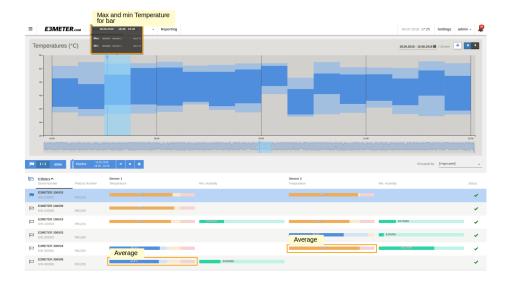


Fig. 22: Environment showing maximum and minimum temperatures for selected meters and the corresponding average values of the meters in the selected time frame

Within the temperature envelope curve, a color code is used. In case two or more sensors are selected, light blue is the indication for the maximum and minimum of only one sensor, dark blue for the remaining sensors.

Note: In case there is only one single temperature sensor selected, the envelope is indicated in dark blue.

Attention: It is not possible to visualize a graph of the relative humidity. Only the computed average values per sensor are indicated in the bar graph.

6.5 Assignment

The Assignment page shows the assignment of meters to the categories and groups. Here it is also possible to edit the assignment for each individual meter.

≡ E3ME	TER.com	Assi	ignment - Repo	orting Notification	IS				20.06.2018 15:32	Settings	thomas -	2
Groups	۰								Grouped I	by [Ungroupe	ŋ	•
Q All 70 Mete	n	阳白	70 Meters A Serial Number	Product Number	Customer	Room	Power Feed	Building		Floor		
CUSTOMER Coop		p	E3METER 300008	RN1250	Lidl •	[Unassigned]	Feed B +	[Unassigne	d] •	[Unassigned]		*
Migros		p	E3METER 300009 S/N 300009	RN1264	Biedronka -	[Unassigned]	Feed A *	[Unassigne	d] ~	[Unassigned]		*
Aldi	6	p	E3METER 300010 S/N 300010	RN1250	Biedronka -	[Unassigned] -	Feed A +	[Unassigne	d] ~	[Unassigned]		×
Biedronka		p	E3METER 300011 S/N 300011	RN1264	Aldi	Room 2 +	Feed B +	(Unassigne	d] v	[Unassigned]		
wwz		p	E3METER 300012 S/N 300012	RN1250	Coop *	Room 2 +	Feed B +	BMR	•	Assign	ment to ategory	-
ROOM		p	E3METER 300013 S/N 300013	RN1264	[Unassigned] -	[Unassigned]	[Unassigned] -	[Unassigne	d]	First	alogory	-
Room 1 Room 2	3	p	E3METER 300014 S/N 300014	RN1250	[Unassigned] -	[Unassigned] -	[Unassigned] -	[Unassigne	d] ~	Second		-
Room 3	0	p	E3METER 300015 S/N 300015	RN1264	[Unassigned] +	[Unassigned] -	[Unassigned]	(Unassigne	d) 👻	Ground		•

Fig. 23: Assigning meters to exemplary category Floor

This assignment is shown in the *Groups* menu where it can be used to create a group selection according to Group information.

It is possible to assign multiple meters at once. For detailed information please consult *Bulk Assignment*.

6.6 Configuration

Under the Config page, the status of each meter is indicated with the detailed information. More importantly in the Config page, it is possible to delete specific sensors, set relay status and assign the phase for the measurement. For a mono-phase meter, it is possible to configure which phase it is connected to (L1, L2 or L3).

Config - Events	- Reporting			31	.10.2018 13:39	Settings	thomas -
O Add Meter					Grouped b	y Customer	-
70 Meters Label	Serial Number Product Number	Hardware Connection 🛧	Firmware Progress	Sensor 1	Sensor 2	Relay Status	Phase
Raviga		Conne	ction				4 Meters
E3METER 100010	S/N 100010 RN1210	E type	1)	Delete	Delete sensor		L2 -
E3METER 100011	S/N 100011 RN1216	E PLC	4.2 (sim)		Delete		L1 *
E3METER 100017	S/N 100017 RN1216	E PLC	4.2 (sim)				L1 *
E3METER 300000	S/N 300000 RN1250	E PLC	4.2 (sim) Upgrading to version new-firmware bin		Delete		3-phase
Hooli							7 Meters
E3METER 100013	S/N 100013 RN1216	E PLC	4.2 (sim)	Delete	Delete		Assign phase
E3METER 100019	S/N 100019 RN1228	E PLC	4.2 (sim)	Delete			L2 -
E3METER 300012	S/N 300012 RN1250	E PLC	4.2 (sim) Upgrading to version 2.5		Delete	Relay status	3-phase
PDU R1-B	S/N 100000 RN1210	E PLC	4.2 (sim) Upgrading to version new-firmware bin	Delete		On Off	<u>н</u> •
R-A1-L-F256	S/N 100007 RN1216	E PLC	4.2 (sim)	Delete	Delete		L1 *
R-A1-R-F230	S/N 100008 RN1216	E PLC	4.2 (sim) Upgrading to version new-firmware bin				L2 -
Rack A4-A	S/N 100001 RN1216	E PLC	4.2 (sim)	Delete			L3 -
Endframe systems							6 Meters
E3METER 100004	S/N 100004 RN1216	E PLC	4.2 (sim) Upgrading to version 2.5	Delete	Delete		L1 -

Fig. 24: Configuration of meters

Hint: When removing a sensor from a meter, the system generates an event. Under the Config page, you have the possibility to delete a specific sensor which has the effect that no event will be generated if this specific sensor is removed from the meter. This method allows removing intentionally a sensor and not generating an event, whereas a broken sensor connection to the meter will be signaled with an event.

It is possible to configure multiple meters at once. For detailed information please consult *Bulk Configuration*.

In the configuration page under the Hardware column, starting with software version 5.5, the Connection information was added which indicates how a meter is connected to the Data Concentrator. A meter can be connected either via PLC, Ethernet or Modbus physical connection where the latter is only possible for PRO meters.

Note: In the case of Modbus connection we have the information #01:006 for example. Where the first 2 digits after the '#' indicate the Modbus interface as explained under *Modbus TCP/RTU gateway*. The 3 digits after the ':' indicate the Modbus address. This is indicated in the picture shown here below.

≡	ЕЗМЕТЕ .сом	Config -	Events	Reporting		
 	4 / 4 unflag Bulk configure	Delete • Add Mete	r			
۲Ņ	76 Meters Label	Serial Number Product Number ٨	Hardware Connection	Firmware Progress		
	PRO025496389656	S/N 025496389656 PRO1-Mod	1 Modbus conn Modbus #01:003	ection details		
	PRO025728299290	S/N 025728299290 PRO380-Mod	1.04 Modbus #01:051	1.18 (sim)		
	PR0025742626362	S/N 025742626362 PRO380-Mod	1.04 Modbus #01:050	1.18 (sim)		

Fig. 25: Modbus Connection information shown under the configuration page

6.7 Alarms

Alarms are configured under the Analyzer or Environment page within the bar graph by clicking on it. You will find detail information about Alarm configuration in the *Alarms* chapter.

CHAPTER 7

Reporting

The Reporting feature allows generating customized reports as PDF or CSV export, based on the recorded values of the meters. Information about energy consumption, peak power and other parameters will be reported over a user specified time interval.

This concept is shown in the picture below.

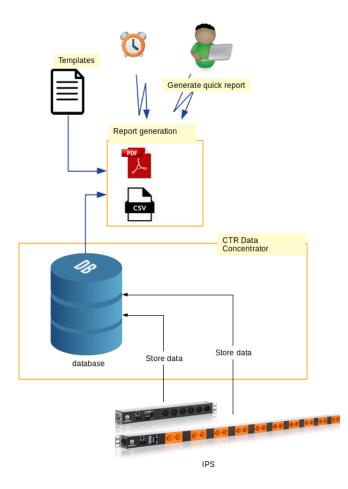


Fig. 1: Reporting concept showing the data flow

Other than scheduled reports, a user can generate a quick report. When the report is scheduled, the CSV export or the PDF output is sent automatically to the defined mailing list and / or FTP server.

7.1 Generating Quick reports

In the *Analyzer*, *Metering* and *Environment* pages *quick reports* can easily be generated. Below is explained how go generate a quick report for data of the displayed time period and marker data.

- Quick report of the data corresponding to the displayed time period in the graph
 - 1. Click on the printer button 🚔 on top of the bar chart
 - 2. In the opened window chose a template
 - 3. The report can be previewed or directly downloaded
- Quick report of the data corresponding to the marker position
 - 1. Place the marker
 - 2. Click on the printer button 🚊 on top of the meters list
 - 3. In the opened window chose a template

4. The report can be previewed or directly downloaded

Note: The Quick reports contain all the visible meters (i.e. Group filters are taken into account).

7.2 Templates

All the existing templates are listed in the Templates window. You can copy, edit or delete PDF templates.

E3METER.com	Analyzer 👻	Events	•	Reporting		12.07.2018 08:38	Settings	admin 🗸	30
REPORTS	TEMPLATES								
TEMPLATES	TEMPLATES	,							
TRANSFER							• Add new to	emplate	
FTP Accounts	Name 4	^			Туре	Creation date			
Mailing Lists	Default	t PDF template			PDF	24.02.2016 01:00:00	6		
	Default	tEnergyConsumpti	on		PDF	26.06.2018 08:31:19			

Fig. 2: Templates window

When you click either on Add new template or edit for an existing template the template editor will open which will look as in the image shown below.

E3METER Monitoring Software User Manual, Data Concentrator 6.2 revA

01					
General					
	Name	DefaultEnergyConsumption			
Logo					
		the line	_		
	Logo	Hooli.jpg	<u> </u>		
		NOOT			
Table					
	Column 1	Phase			
	Column 2	Meter Label		-	a
	Column 3	Meter start		-	a
	Column 4	S/N		-	
	Column 5	Peak Power		-	•
		O Add column			
Tourstate					
Template in	Tormation				
		Creation user	admin		
		Creation date and time	26.06.2018 08:31:19		
		Modification user	admin		
		Modification date and time	12.07.2018 08:38:02		

Fig. 3: Edit of a template for PDF report

The template editor allows adding new customized PDF templates with:

- Uploading a custom logo (.jpg or .jpeg format)
- Selecting the columns of the template report

Note: CSV export provides all available fields. The CSV template can't be customized.

7.3 Transfer

Within Transfer all FTP accounts and mailing lists are available. It is possible to add, edit and remove FTP accounts and mailing lists.

E3METER.com	Analyzer -	Events	-	Reporting	11.07.2018 1	5:45 Setting	js admin -	2
REPORTS	EDITION OF RIE	DO						
TEMPLATES								
TRANSFER	,	Account name	riedo				~	
FTP Accounts Mailing Lists	FTP cont	figuration						
		Host	ftp://	riedo.com				
		Use SSL	Yes	No				
		User	user					
		Password				~ [Show	
	FTP co	onnection test	Test					
					Save	e Save & close	Reset Car	cel

Fig. 4: Configuration of FTP account

Note: Only one single FTP account can be added.

≡	E3METER.com	Analyzer	•	Events	÷	Reporting		11.07.2018	15:51	Settings	admin +	20
	RTS	MAILING	LISTS									
	LATES									O Add	I mailing list	
	ISFER	Lis	t name 🗸		_	ecipients						
N	ailing Lists	ried	loSuppo	it	the	omas roccaro@	vahoo.com				/ 0	

Fig. 5: Configuration of mailing list

Note: A mailing list can contain one or several email addresses.

The mailing list is accessed either by clicking on **Add Mailing list** or clicking on the edit symbol of the mailing list that will be edited.

In the opened edit window for the mail list you have to enter the individual email address(es) for your mailing list.

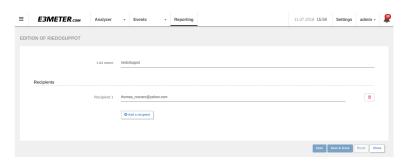
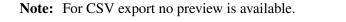


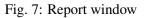
Fig. 6: Edit email parameters for a new email list.

7.4 Reports

All the existing reports are listed in the Reports window and their status is shown in the column **Enabled**. You can add new reports, preview, copy, edit or remove reports. When adding a new report, you have to fill in the Report settings and the Report contents. In the Report contents you can select meters, categories or groups. When disabling a report, it won't be scheduled and sent.



E3METER .com	Analyzer - Events - R	eporting				27.03.	2019 15:32	Settings	thomas +	20
REPORTS	REPORTS									
TEMPLATES								O Ar	ld new report	
TRANSFER	Name	Contents	Template	Scheduling	Transfer	Creation date	Enabled			
FTP Accounts Mailing Lists	CSV Export	Raviga 😰	CSV - Default CSV template	Daily	Email	27.03.2019 12:13:55		± Ø	/ •	
	PDF Export	Raviga 😰	PDF - DefaultEnergyConsumption	Daily	Email	27.03.2019 15:32:46		e ø	/ 0	



All the enabled reports will be generated automatically according to the configured Scheduling interval and sent to the recipients defined in Transfer. These reports are called **scheduled reports**.

Note: For PDF reports, a separate page is generated for each group, with the total calculated per group.

A report is based on settings which define the scheduling and transfer as shown below.

E3METER Monitoring Software User Manual, Data Concentrator 6.2 revA

	Analyzer -	Events -	Reporting		11.07.2018 16:25	Settings admin -	30
REPORTS	EDITION OF ENE	RGYCONSUMPT	IONHOOLI				
TEMPLATES	Report setting	gs * 🛛 Report com	tents *			A Preview	
TRANSFER FTP Accounts	General set	tings					
Mailing Lists	Na	me EnergyConsum	ptionHooli	Report enabled	On Off		
	Templ	ate PDF - Default F	PDF template	¥			
	Scheduling						
	Peri	iod Daily - from 00	00:000 to 23:59:59	¥			
	Report	will be generated ev	ery day at 01:00				
	Transfer						
	Transfer mo	de Email FTP	Email + FTP				
	Mailing L	ist riedoSuppot		*			
	Report infor	mation					
		Creation user Creation date Modification o Modification o	and time Iser	admin 26.06.2018 08:36:40 admin 11.07.2018 14:54:32			
					Save Sav	re & close Reset Cancel	

Fig. 8: Example for settings of report

The content of a report needs to be defined stating which categories and groups are used for the report.

E3METER Monitoring Software User Manual, Data Concentrator 6.2 revA

E3METER.com	Analyzer 🗸	Events	- Reporting	11.07.2018 16:28	Settings	admin -
REPORTS	EDITION OF EN	IERGYCONSUM	MPTIONHOOLI			
TEMPLATES	Report setting	ngs * 📀 Report	contents *			Preview
TRANSFER						
FTP Accounts	Select a gr	oup				
Mailing Lists						
		lf yo	You can select indiv ou select a category, all cor			
	All Meter	s				
	Custome	r				
	Hooli					
	Raviga	ı		 		
	Endfra	me systems		 		
	Bachm	anity				
	Room					
	Room	A				
	Room	В				
	Room	с				
	Power fe	ed				
	Feed A	A.				
	Feed B	3				
	Floor					
	Ground	d				
	First					
	Second	d				
				Save	e & close 🛛 R	eset Cancel

Fig. 9: Example for content of report

CHAPTER 8

Alarms

8.1 Setting thresholds

Alarm thresholds can be configured on current, temperature and relative humidity.

Click directly on a meter's bar chart in the meters list (in *Analyzer* or in *Environment*) to configure alarms.

	E3METER 002680 S/N 002680	RN1231	0 W average	0% L1: 0.000 A 🖑	0% L2: 0.000 A	0% L3: 0.000 A	
	Show IECLock		5 W	1%	0%	0%	
μ	S/N 002685	RN1239	average	L1: 0.129 A	1.2: 0.000 A	L3: 0.000 A	× .

The alarm configuration dialog is opened (example of a 16A meter):

Alert Lo	Warn Lo			Warn Hi	Alert H
0.2	0.5		7	8	
AlWa	ок	Warn Hi	Aler	t Hi	
0A		8A			16
C Alarms er	nabled 💽 Confi	gure all phases		Γ	Clear fields

In this dialog the alarms for each meter can be configured:

- Setting up to 4 thresholds:
 - Alert Lo (low)
 - Warn Lo (low)
 - Warn Hi (high)
 - Alert Hi (high)
- Alarms can be enabled or disabled.

- In case of 3-phase meters the configuration can be done for each phase individually or for all 3 phases together.
- With *Clear fields* the alarms are removed.
- Save alarms saves the new or changed configuration.

Alarm configuratio	n of Sensor 1 for M	eter E3METER 300011					×
Alert Lo	Warn Lo				Warn Hi	Alert I	Hi
10	20			50		75	_
Alert Lo Warr	n Lo	ОК	W	/am Hi		Alert Hi	
0%RH		50)%RH			100%R	Н
Alarms enabled	d					Clear fields	
					Sa	we alarms	

Fig. 1: Alarm levels and where the defined threshold is associated

Note: If you want to omit a specific alarm threshold, simply don't fill in the value which leaves that alarm threshold unconfigured.

Alert Lo Warn Lo		Warn Hi	
		www.iiiiii	Alert F
		810	
ОК	Warn Hi	Alert Hi	
0A	8A		16
Alarms enabled Configure all ph	lases		Clear fields

Fig. 2: Alarm threshold levels Alert Lo and Warn Lo not set

Compared to when all alarm thresholds are set

Alert Lo	Warn Lo				Warn Hi	Alert Hi
2	4			8	10	
		_				
Alert Lo	Warn Lo	ОК	Warn Hi		Alert Hi	
0A			8A			16A

Fig. 3: All four alarm threshold levels set

By flagging several meters, you can perform a bulk configuration for all flagged meters. See *Bulk alarm setting*.

CHAPTER 9

Events and Notifications

9.1 Concept

The system generates events and notifications when pre-configured thresholds are reached. The main concept is summarized in the picture shown below.

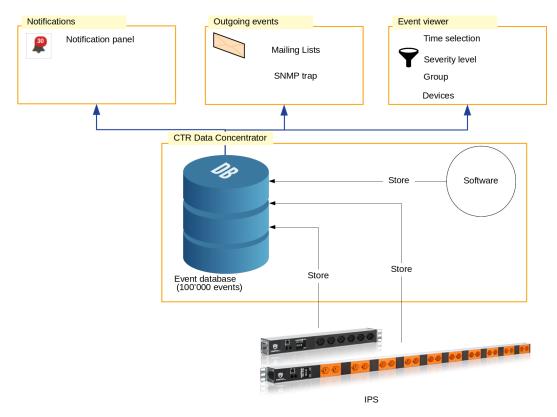


Fig. 1: Event and notification concept.

The Data Concentrator software and each meter generate events which are stored in the data

base of the Data Concentrator for a maximum of 100'000 events. The oldest events will be overwritten with the newest ones, once the data base is completely filled. Based on the event database you can either get event information on the notification panel, configure outgoing events or have a look on all events in the event viewer. Details will be explained in the following sections.

9.2 Notification panel

Clicking on the notification icon k opens the notification panel (see example below) which displays a list of the latest events.

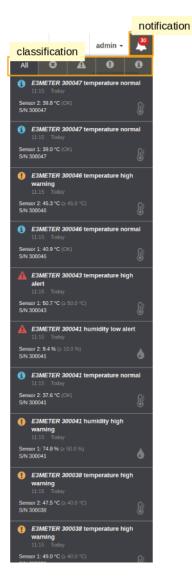


Fig. 2: Notification panel with events classification

The number in red above the notification icon is called event counter and indicates the quantity of new events. All the new events appear with a darker background color in the notification panel.

Clicking on the notification icon again closes the notification panel and clears the event

counter.

The following event types can occur and will be displayed in the notification panel:

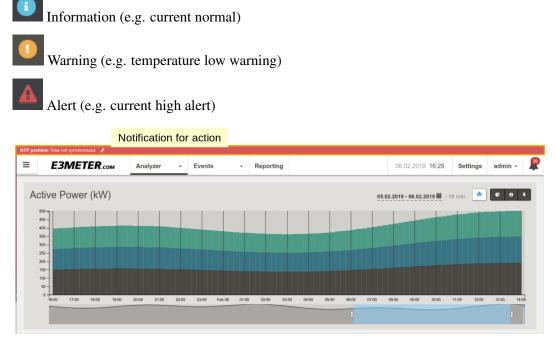


Fig. 3: Action notification explaining the actions that need to be taken.

If the system detects a problem that requires an action to resume proper function, the problem is described in the top of the web-interface. It also provides direct links where the problem can be solved.

9.3 Notifications

Notifications will send automatically events based on the selected type of events and method of transfer.

9.3.1 Outgoing Events

All the existing Outgoing Events are listed in the window shown below. You can copy, edit or delete templates. Also it is possible to Enable/Disable an outgoing event.

	Analyzer -	Notifications	•	Reporting		12.07.201	.8 14:04	Settings	admin 🗸	
OUTGOING EVENTS		/ENTS								
TRANSFER SNMP Traps							I	• Add new out	joing event	
Mailing Lists	Name 🔨	Name A		Events Enabled			Enabled			
	MetersDi	sconnected	Con	nectivity / Me	ter / Dis	connected		B /	•	
	Tempera	TemperatureWarningHigh		Alarm / Temperature / Warning High 🛛 🌑				D / D		

An outgoing event can contain one or several events. If it contains more than one event you can see them by placing the mouse cursor on the indication (+1) as in the example below.



A new outgoing event can be easily configured. See events configuration example below:

OUTGOING	EVENI							
General settir	ngs							
	Name	Test Events		*	Enabled	On Off		
Events								
	Events	System	•	NTP	•	ALL	*	
		Alarm	*	Select Type Select Type	•	Select State	Ŧ	
		Add Events		ALL Current Temperature Humidity				
Transfer				· · ·				
	Transfer mode	SNMP Trap Email Email + SNMP Trap						
SNMP	Trap destination			Ŧ				

Events notification can be transferred by SNMP Traps, emails or both together.

9.3.2 Transfer

Before an event notification can be sent, the transfer needs to be configured here.

You can configure multiple SNMP Trap destinations and mailing lists. They are then all listed here. You can add edit and remove SNMP Trap destinations and mailing lists.

After configuration of a new SNMP Trap you can test it by sending a test trap.

NEW SNMP TRAP DESTINATION	
Name	Name
Destination Host	IP address or hostname
Community	Community
Version	v2c
Test	Send test trap

A mailing list can contain several recipients, see example below.

NEW MAILING LIST		
	List name	customer x
Recipients		
	Recipient 1	test@test.com
	Recipient 2	test2@test.ch
		Add a recipient

9.4 Event viewer

The event viewer allows to view all events of the Data Concentrator data base. It is possible to select a portion of events based on

- Severity level
- Group
- Devices
- Time range

	Analyzer v Events Reporting	12.07.2018 14:38	Settings admin •
Emergency	EVENTS < > 1-5/5		
Warning Info	25.06.2018 23.15:00 ▲ E3METER S00000 temperature high alert 25.06.2018 23:00:00 ▲ E3METER 100003 temperature high alert 25.06.2018 23:00:00 ▲ E3METER 100003 temperature high alert Sensor 1: 5.1.1 °C (s 50.0 °C) S/N 100003 S/N 100003 S/N 100003		ALARM
GROUP System Alarm	25.06.2018 23.00.00 <u>A</u> E3METER 100003 temperature high alert 25.06.2018 21.15.00 <u>M</u> Meter E3METER 300000 disconnected		ALARM
Connectivity	25.08.2018 21:15:00 A Sensor 2 of E3METER 300000 disconnected S/N 300000		CONNECTIVITY
	x x		

Fig. 4: Event viewer example with selection criteria applied

In the picture shown above different selection criteria is applied. Per event it is possible to click on it and see the detailed information. You find for instance the detailed temperature information as well as the temperature threshold level.

CHAPTER 10

Advanced setup

10.1 Configure SMTP (mail server)

The Data Concentrator is capable to send notifications per email hence the configuration of the mail server per SMTP is necessary.

SMTP can be enabled or disabled, Server can be configured insecure or secure.

For the detailed settings of the mail server please refer to your Internet service provider or IT administrator.

Once all parameters are set you have the possibility to test the SMTP configuration by clicking on the Test button for the Mail server test on the bottom of the SMTP (mail server) configuration page. This will open a window asking you to select an email address to which a test email will be sent. If you receive that email on the specified address this confirms that the settings are correct. Should you have trouble receiving the test mail, check first your SPAM folder and then check the mail server configuration again.

≡	E3METER.com	Analyzer -	Events -	Reporting	06.02.2019 15:34	Settings	admin +	P
NET	WORK	NETWORK						
	P Address							Т
	NTP (Time Server)	SMTP	(Mail Serve	er)				
	SMTP (Mail Server)	OMIT		··· /				
	SNMP		Enable	On Off				
	HTTPS Certificate FTP (Backup Server)							
	PLC	SMTP con	liguration					
	Modbus	Use 5	SMTP Secure (smtps)	Yes No				
MAI	NTENANCE		Server	smtp:// mail.senselan.ch				
	Licensing		GRIVER	SIII().// manadanadanadan				
	Concentrator Upgrade		Port	25				
	Meters Upgrade							
	Remote Assistance		User	SMTP User (optional)				
	Storage Management Reboot							
	Rebuol		Password	SMTP Password (optional)		Sho	ev.	
USE	RS							
eve	TEM LOG	Mail config	Juration					
313			Default mail from	lab3@riedo.com				
			Mall server test	Test				
						_	_	
https:/	/lab3 rindo com/#/settings/pab	unek laddenee				Save & ap	pply Reset	

Fig. 1: SMTP setting

10.2 Configure SNMP

SNMP is used to gather data from the E3METER® Monitoring System other than over the E3METER® Monitoring Software. It is necessary to download the MIB (Management Information Base) of the Data Concentrator which is the definition of the available data for the Data Concentrator.

With ACL (Access Control List) it is possible to define access restrictions per specific IP address or range of IP addresses as indicated in the picture below:

	Analyzer 🗸	Events -	Reporting		06.02.2019 15:41	Settings	admin 🗸	?
NETWORK	NETWORK							
IP Address NTP (Time Server) SMTP (Mail Server) SNMP	SNMF							
HTTPS Certificate FTP (Backup Server)		Enable System description	On Off	a Concentrator				
PLC Modbus		System contact	support@e3m					
MAINTENANCE		System name	CTR					
Concentrator Upgrade Meters Upgrade		System location	sysLocation					
Remote Assistance Storage Management		Community	One IP ac	Idracs			*	
Reboot		ACL 1	192.168.0.1				✓ 📋	
SYSTEM LOG		ACL 2	192.168.0.0/16				✓ 📋	
			O Add ACL					
						Save 8	apply Rese	ıt.

Fig. 2: SNMP setting

The first address for access control shows one single IP address, namely 192.168.0.1. The second example shows access control restriction for a range of IP addresses in the range of 192.168.0.0 to 192.168.255.255. The latter notation used is the CIDR Subnet Mask notation.

10.3 Configure FTP (Backup Server)

You have the possibility to backup data of the Data Concentrator over an FTP backup server. This has the big advantage that in case a Data Concentrator has a failure and needs to be restored or you have to restore data on a new Data Concentrator, you can restore it from a previous backup.

E3METER Monitoring Software User Manual, Data Concentrator 6.2 revA

€ →	C Secure https://lab3.riedo	.com/#/settings/nel	twork/bac	ckup					아 ☆	Q
≡	E3METER.com	Analyzer	• R	Reporting	Notifications		11.06.2018 08:52	Settings	thomas 🖌	Ĵ
			NETW	/ORK						
					3ackup Sei	n/er)				
					Juckup Oci					
						Backup starts every day at 02:00				
					Backup enabled	On of				
				Backup	files rotation (days)	7				
				FTP Backu	p					
					Use FTP Secure	Yes No				
					Server	ftp:// Your FTP server				
					User	FTP User				
					Password	FTP Password Show				
					Path	<i>I</i>				
					FTP Connection test	Test				
						Save & apply Reset				

Fig. 3: FTP (Backup Server) settings

10.4 Configure PLC

The PLC allows configuring some system parameters as shown in the picture below:

≡	E3METER.com	Analyzer -	Events -	Reporting			06.02.2019 15:48	Settings	admin 🗸	30
NET	WORK	NETWORK								
	IP Address NTP (Time Server) SMTP (Mail Server) SNMP	PL	C Meters data polling perio	d 15 minute	s	•				
	HTTPS Certificate FTP (Backup Server) PLC		Polling fault tolerand	If a Meter	default) does not respond within the po noce. The default recommende		ed value is maintained acco	rding to the pol	ing	
MAI	Modbus		Meters auto admissio	n Disa You Enal	oled (default) nust add Meters manually. Thi: Iled	s is the default mode.				
	Licensing Concentrator Upgrade Meters Upgrade			INEW	Meters will be automatically re mode should not be used when				eters.	
	Remote Assistance Storage Management Reboot							Save & appl	Reset	

Fig. 4: PLC setting

The Meters data polling period can be configured in what time interval data is being calculated. The allowed values are 5 minutes, 15 minutes, 30 minutes or 60 minutes. Each meter calculates the power and energy consumption instantly and provides the data after the completion of the configured data polling period. That way a user can assure that all meters provide data with the same data polling period.

The data polling period has an influence on the maximum number of meters that the system can interface with as indicated in the table here below:

Data polling period	maximum # of meters
5 min	50
15 min	200
30 min	400

rs

Attention: Changing the data polling period, deletes the complete history of the Data Concentrator. The concentrator warns about this fact and asks you for confirmation.

The polling fault tolerance is the number of periods the Data Concentrator tolerates not having received the data. Allowed values are 1, 2 and 3 periods. The default and suggested number for the polling fault tolerance is 1 period.

Note: Data polling period is used on all meters which defines what time period the different data is being calculated. This is basically the time tick where all of the values across different meters are based on.

Meters auto admission can be configured to be disabled or enabled. In the *Adding meters* chapter you find the different methods that exist and also how to use the Auto admission feature and why caution needs to be taken.

PLC frequency band can be configured to be either FCC or CENELEC-B

10.5 Configure Modbus

There exist multiple ways to interface PRO meters. They are explained within *Adding PRO meters manually*.

≡	E3ME	TER.com	Config	•	Events	•	Reporting		29.01.2019 13:43	Settings
		NETWORK								
		Modb	ous						O Add Gatewa	
		Name						Туре	Actions	
		modbus_	gw					TCP Gateway	/ •	
		USB adap	pter CT1XS5XJ					USB Adapter	/ 0	
		USB adap	pter CT1RF55B					USB Adapter	/	

Fig. 5: Modbus settings

10.5.1 USB adapter

Direct connection is established with a RN1079 USB to RS-485 adapter. The Data Concentrator will automatically detect an adapter connected to the CTR. It is only possible to remove

a USB Adapter from the configuration, when the adapter is not physically connected anymore to the CTR. By doing so all associated meters to the selected adapter will be removed from the Data Concentrator.

10.5.2 Modbus TCP/RTU gateway

In order to use a gateway one needs to click on the Add gateway button as shown in the previous picture here above. This opens the following configuration window. Enter the IP address of the gateway and give it a name. The default port for Modbus is 502.

≡	ЕЗМЕТЕ .сом	Config	•	Events	•	Reporting		29.01.2019 13:52	Setting
	NETWORK								
	Add	Modbu	IS Inte						
		Address	192.168.	1.239				*	
		Port	502						
							Save Save & close	Reset Cancel]

Fig. 6: Modbus Gatway Configuration window

10.5.3 Configuration parameters on the Moxa MB3180 gateway

On the gateway both the Modbus RTU and Modbus TCP parameters need to be configured. The Modbus RTU parameters need to be configured in a specific way. The Modbus TCP parameters need to reflect your network settings. The configuration can be done either by the Moxa MGate Manager or by the web interface of the MB3180 knowing it's IP address. The advantage of the MGate Manager is that it can discover any MB3180 when it is connected to the same network.

In the following section the necessary steps for configuring the Modbus TCP/RTU gateway are described.

- 1. Install and power gateway
- 2. Download reference configuration of Moxa gateway from Riedo Networks website

The reference configuration can be downloaded from our website under the section support: www.riedonetworks.com/support.

- 3. Start the MGate Manager
- 4. Click on Off-Line-Configuration, Select the MB3000 series and MB3180 model

	Name	Model	MAC	Address	IP/COM	Status	Firmware Version
-							
D	evice Identification	Device Funct	ion				
	Search	Config	uration	Load Mon	itor Log	ProCOM Mapping	Inport
	Locate	Load)eføyt	Dep		Upgrade Pinnware	Depart
			agement	Off-Line Cor			Det

Fig. 7: Click on Off-line Configuration

5. Load the existing configuration, downloaded previously from the Riedo Networks Ltd website

MGate MB3180	×
C Create new configuration	
Load exist configuration	
OK Cancel	

Fig. 8: Select and load the reference configuration

6. Edit the network parameters of the reference configuration and store it on your Computer.

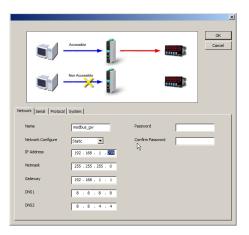


Fig. 9: Change the network parameters

7. Search for your MB3180 on the network by hitting Search, Broadcast search. Make sure you select your gateway by verifying the MAC address

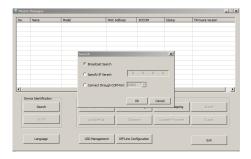


Fig. 10: Search your gateway

8. Select your gateway, previously identified

) .	Name	Model		NAC Addres		P/COM	Status	Firmware Vers	
1	modbus_gw	MGate	3180	00:90:88:69	1:10:42	192, 168, 1, 23	9 Looked	Ver.2.0 Build	17030713
n D	evice Identification		Device Function						
	Search		Configuration		Monitor		ProCOM Mapping	Impor	
	Locate		Load Default	1		- [Upgrade Firmware	e topor	e
		-			Une Config				

Fig. 11: Select your gateway, previously identified

9. Select import and the previously changed configuration file and confirm with OK

) 🚺 • mx • Downloads •		🔹 🗱 Search Downloa	ds
ganize 👻 New folder			18 · 🖬 (
Favorites	Name *	Date modified	Type
	🕌 Bedienungsanleitung Ofen	8/17/2015 4:37 PM	File folder
Desktop	Block-GWXUpdate 1516-159	10/17/2015 3:49 PM	File folder
California Libraries	3 C300 CD-Rom	9/2/2015 1:09 PM	File folder
Documents	CP210x_Windows_Drivers	4/19/2017 4:08 PM	File folder
Pictures	JE DUMS	10/14/2016 3:52 PM	File folder
Videos	dMAP110_setup_5312	10/14/2016 3:57 PM	File folder
🔏 mx	uc232a_windows_setup_v1.0.082	10/14/2016 4:00 PM	File folder
E Contacts	utility_psetup(v1.0.0.9)	6/1/2017 4:14 PM	File folder
🚂 Desktop	mb3000.cfg	1/31/2019 3:00 PM	CFG File
Lownloads	mb3002_changed.cfg	1/31/2019 4:15 PM	OFG File
Bedenungsanleitung Ofen Block-GWXUpdate 1516-159 C300 CD-Rom C9210x_Windows_Drivers	<u></u> v		
File game: mb3000	changed.cfg	 Cfg Format File 	es (*.cfg)
		Open -	Cancel

Fig. 12: Import the changed configuration on the gateway

10. Add the modbus TCP/RTU gateway in the Data Concentrator as explained in the above section *Modbus TCP/RTU gateway*.

Note: As previously mentioned, it is also possible to make the changes via the web interface. Please read the Moxa MB3180 user manual for the necessary configuration steps.

10.6 Storage Management

In the Storage Management you can have a look at the internal storage, the type, model and size as well as the status. You can format or check the storage.

Caution: If you want to check the storage, this will stop the storage of data into the internal memory (history and events) for the time of the check (about 30 seconds).

10.7 Reboot

In the Reboot menu you find the possibility to reboot the Data Concentrator.

Attention: Make sure you confirm a reboot only in the case you intentionally want to reboot. Only with user rights *Administrator* you have the possibility to reboot the Data Concentrator.

10.8 Changing user rights

Within the settings menu USERS only a user with the role Administrator can change user information.

- Add a user
- Remove a user
- Change the password or other information of a user
- Change the role of a user which changes the user rights

10.9 System Log

The system log shows the latest system events. It is possible to download the logs which can then be sent to Riedo Networks Ltd in case of an issue that might need analysis. In case *Remote Assistance* over a secured connection is not possible, still the system events can be

compressed and sent to Riedo Networks Ltd by clicking on the bottom right of the SYSTEM LOG page of the settings.

Bulk modification

Bulk modification is a useful feature to change configuration parameters of multiple meters at once.

Note: First, one needs to flag multiple meters to see the bulk modification possibility. Otherwise the bulk modification won't be shown.

Bulk modification is available for Assignment, Configuration and Alarm. In the following sections, the different possibilities are explained in detail. Bulk modification will be applied **only** on the flagged meters. It is not possible to bulk configure meters based on a category or group.

11.1 Bulk Assignment

Bulk assignment is done by clicking on Bulk assign the categories are greyed out and can't be edited individually anymore.

= E3METER	сом	Assi	gnment - Eve	nts - Rej	porting		12.0	7.2018 15:08	Settings	admin 🗸	30
Groups	٥	~	4/4 unflag	<u>Bulk assign</u>				Grouped by	Ungrouped		*
କୁ Show all 70 Meters		✔ Assign all flagged Meters (4)		(4)	[No change] 	[No change] - [N		[No change] •		[No change]	
CUSTOMER	4		4 Meters Serial Number	Product Number	Customer		Room		Power Feed		
Hooli	7	1	E3METER 100010 S/N 100010		Raviga	-	Room 2	-	Feed A		-
Endframe systems	6		E3METER 100011 S/N 100011			•		•	Feed A		.
Bachmanity Pied Piper	6 8		E3METER 100017 S/N 100017		Raviga	-	Room 2	•	Feed B		-
Homicide Energy Drin	0		E3METER 300000 S/N 300000		Raviga	•		•	Feed A		•

Fig. 1: Bulk assign of four flagged meters in the Assignment page.

11.2 Bulk Configuration

In the configuration window parameters like deleting a sensor or association of a phase to the meter can be done in a bulk operation. For this you need to click on Bulk configure which will then show the options of the parameters to be configured all at once.

≡	ЕЗМЕТЕ .сом	Config 🗸	Events	- Reporting		12.07.2018 15:11	Settings	admin 🗸 🙎
~	4 / 4 unflag Bulk configure	Delete • Add Mete	•			Grouped by	[Ungrouped]	· ·
					🛱 Delete	🛱 Delete	On Off	[No change]-
	4 Meters Label	Serial Number Product Number	Hardware 🔨	Firmware Progress	Sensor 1	Sensor 2	Relay Status	Phase
i ~	E3METER 100010	S/N 100010 RN1210	E	4.2	🗊 Delete			L2 👻
	E3METER 100011	S/N 100011 RN1216	E	4.2		Delete		<u>L1</u>
	E3METER 100017	S/N 100017 RN1216	E	4.2				L1 +
	E3METER 300000	S/N 300000 RN1250	E	4.2 Upgrading to version new-firmware.bin		Delete		3-phase

Fig. 2: Bulk configuration of four flagged meters.

11.3 Bulk alarm setting

Bulk alarm setting is done by clicking on any of the bar charts after having flagged multiple meters as shown in the picture below.

~	2/2 <u>unflag</u>	Last 12.07.2 09:45 - 3				Grouped by [Ungrouped]	•
	2 Meters Serial Number	Product Number	Active Power Average	Current (Amperes) Phase 1	Phase 2	Phase 3	Status
	E3METER 100004 S/N 100004		1'727 W average	49% L1: 7.902 A			×
	E3METER 100005		1'436 W average	41% L1: 6.573 A			

Fig. 3: Clicking on one alarm bargraph of two flagged meters in order to access bulk alarm setting

This opens the alarm configuration window which indicates that bulk alarm setting is done by stating how many meters are flagged; 2 flagged meters in the example shown below.

Alarm configuratio	n of all Phases fo <mark>r</mark> 2 flagged Meters					×
Alert Lo	Warn Lo				Warn Hi	Alert H
				8	10	
	ОК		Warn Hi		Alert Hi	
0A		8A				16/
Alarms enabled	Configure all phases					Clear fields
					Save ala	rms Cancel

Fig. 4: Setting alarms of two flagged meters in bulk alarm setting

11.3.1 Combination of different features

When configuring meters with different features like for for instance their rated current this will be indicated. In the example below three meters are selected with two different types of rated current 10A and 16A.

-	3/3 unflag	Last 12.07. 10.00 -				Grou	Iped by [Ungrouped]
1	3 Meters Serial Number	Product Number	Active Power Average	Current (Amperes) Phase 1	Phase 2	Phase 3	Status
1	E3METER 100004 S/N 100004	RN1216	1'739 W average	50% L1: 7.957 A			× .
1	E3METER 100005 S/N 100005		1'429 W average	41% L1: 6.538 A			× .
1	E3METER 100010 S/N 100010		1'087 W average		50% L2: 4.973 A		4

Fig. 5: Bulk alarm setting for meters with different current ratings

An example of how the bulk alarm setting looks like for two meters of type RN1216 and one meter of type RN1210 is shown in the picture below.

Alert Lo	Warn Lo	ок O Configure all phases	Warn Hi 8A		Alert Hi	16
Alert Lo	Warn Lo	ОК	Warn Hi		Alert Hi	
1	4			8	10	
Alert Lo	Warn Lo				Warn Hi	Alert H
Alarm coi	nfiguration of all Ph	ases for 2 flagged Meters				
10A	16A					

Fig. 6: Bulk alarm setting for meters with different current ratings, shown with separate windows for the different rated currents

The different parameters are shown in different windows for the configuration. You will have to configure the alarm for the two different types of meters in the separate windows and confirm with save.

Technical support

- Visit web page www.riedonetworks.com/support
- Call +41 26 505 50 00

Legal notice

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Riedo Networks Ltd Route de la Fonderie 6 1700 Fribourg Switzerland

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For the latest product updates, consult the Riedo Networks Ltd web site at www.riedonetworks.com.

Annex

14.1 Time granularity in bar chart

The granularity of the bars shown in the bar chart corresponds to the data polling period when showing data of a short time period. When showing longer time periods it shows the following granularities 1 hour, 1 day, 1 week depending on the overall time shown.

14.2 Synchronous polling

The E3METER® system allows to interface with meters either per PLC (Power Line Communication), Ethernet or via RS485. With the communication per PLC or Ethernet the Data Concentrator (CTR) synchronizes the time base and polls data from the meters (IPS). This allows making sure that the IPS is synchronized with the CTR and to the Epoch as symbolized in the picture below with the little clock symbol and the green check mark. The advantage of the E3METER® system lies in the fact, that each IPS aggregates data within the data polling period. Once the data polling period is over, e.g. with a period of 15 minutes, the CTR polls the aggregated data of all IPS from the last polling period. In the picture below this is shown for the interval from minutes 45 to 00. Per data polling period, the aggregated data provides the average values as well as the minimum and maximum occurred during the interval. All E3METER® use the proprietary communication protocol and poll data in a timely manner. Meters other than E3METER® are not synchronized and provide only instantaneous measurement values once they are polled.

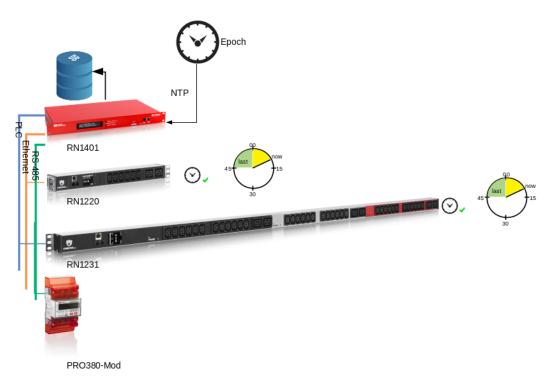


Fig. 1: Synchronous polling for E3METER® system

14.3 Accessing data per SNMP

The data provided by the Data Concentrator can be accessed either via the webpage of the Data Concentrator or access made to the Concentrator per SNMP. When accessing per SNMP the Meter data of the last polling period can be accessed. When accessing to data of the Data Concentrator via it's own web interface, the stored data is being accessed allowing to show the historic data. Within this chapter the latter option is described. This section covers how to the average power of the last data polling period of one specific Data Concentrator using SNMP.

14.3.1 Download MIB browser

Go to http://www.ireasoning.com/downloadmibbrowserfree.php and download a version of the MIB browser. There exist other tools but this user manual shows how to use the MIB browser.

The Data Concentrator Data structure is defined with MIB (Management Information Base). For more information go to https://en.wikipedia.org/wiki/Management_information_base. As a first step one needs to download the MIB information from the Data Concentrator as explained in *Configure SNMP*. The MIB shows the detailed structure of accessible data with the corresponding description.

14.3.2 Open MIB browser

After starting the MIB browser, select the MIB for the E3METER® 'e3meter-ctr.mib'.

Once the MIB for E3METER® is loaded, make sure the following basic MIB are already loaded when using iReasoning MIB Browser. For this, access Tool/Options/MIB Files and verify that you have the following MIB. Without these, the data structure won't be resolved properly.

Options 🙁					
General \Default Values \Agents MIB Files \					
MIB File Name					
home/thomas/temp/mibbrowser/mibs/RFC1213-MIB					
/home/thomas/temp/mibbrowser/mibs/e3meter-ctr.mib					
/home/thomas/temp/mibbrowser/mibs/HOST-RESOURCES-MIB					
Add Delete					
Ok Cancel					

Fig. 2: List of basic MIB and e3meter-ctr.mib in MIB browser

14.3.2.1 Connect to Data Concentrator

Please make sure to connect to the correct Data Concentrator and select the correct port and SNMP version as shown in the picture below.

			iReasoning MIB Browser			_ ~	r x
File Ed	Address of Concentrator	narks Help					
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Fig. 3: MIB browser showing detailed connection parameters

Caution: Make sure that you have enabled SNMP and that the Access Control Field (ACL) grants you with access to the Data Concentrator. For instance 192.168.1.0/24 in the SNMP ACL field in the example shown throughout the chapter.

14.3.2.2 Accessing average power

In order to access the average power of the last data polling period, select the 'e3IpsPAvg' and click on the Menu 'Operations/Get Bulk'. This will have the result to show the average power of the last polling period. In order to know the polling period duration, you can access 'e3IpsPeriodDuration' and in order to know the start of the polling period, access 'e3IpsPeriodStart'. In the picture below the average power values are indicated.

The average power per meter over the last data polling period is gathered in the picture shown below.

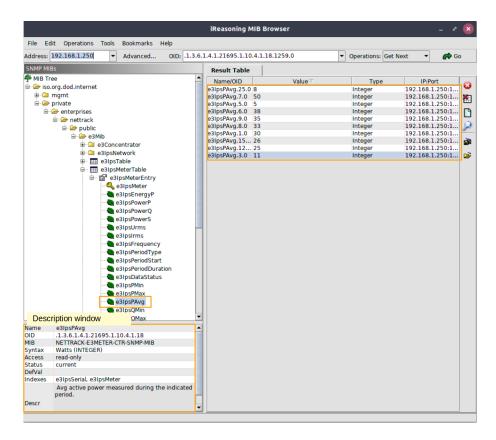


Fig. 4: Average power of all associated IPS accessed per SNMP

Revision log

Revision	Date	Changes
А	19.01.2021	New version for software version 6.2

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