

GB

Users manual

MiSMART v4.0

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1 MiSMART - a brief description

MiSMART represents a software solution which is part of a broader group of Iskra Sistemi solutions for centralized data collection from various measurement instruments with the principal aim of monitoring power quality of the electrical power grid. At the same time the system is also meant to be used for remote logging of utility consumption installed on counters with pulse outputs. (e.g. gas, water consumption or consumption of other reagents) MiSMARTv3.0 represents the third improved system version and is primarily intended for use in the electrical distribution business vertical.

The aim of this manual is to show how the system is used. The system comprises two different applications:

- **MiSMART data monitor** for monitoring and simple manipulation of data transmitted from devices within the grid. This part is normally available to all users and consists of the following modules:
 - Measurement reviewing and their displaying by meter point in graphic and table form,
 - Alarm reviewing enabling displaying of alarms at various meter points in table form,
 - Quality reviewing which enables power quality analysis in graphic and table form in accordance with the EN50160 standard,
 - Measurement and alarm system statistical analysis.
- **MiSMART configuration tools** is a tool for settings configuration within the MiSMART system and is primarily meant for system administrators. A particular system administrator can be using the data monitor application at the same time. This application consists of 2 modules:
 - Measurement nodes, enabling creating of an organizational structure seen in tree topology view which consists of groups (nodes) and meter points where instruments are attached. This module enables functions such as attaching and configuring instruments to meter points, monitoring basic instrument diagnostics, monitoring meter point change history, basic data monitoring (measurements and alarms) and some basic meter point statistics,
 - Measurement Idents, enabling simple grouping of measurement quantities within the system. Apart from this, measurement descriptions, units, chart types and simple data operations can also be defined.

1.1 Normal operation requirements

MiSMART operates as a web based application from a web browser. For optimal user experience it is recommended to use the latest version of any modern web browser.

The following limitations regarding web browsers are known at this point:

- Internet Explorer 9 or newer
- Firefox 3.5 or newer

The recommended screen resolution should be at least1280x1024.

1.2 System access:

Application can be accessed by using the Internet Explorer, Mozilla Firefox, Chrome, Safari or Opera web browser. The user experience is the same in any of these browsers. All screens in this manual were produced with the Firefox browser.

To access the application please entered a proper URL into the browser which has been given to you by your system administrator.

After entering the URL the login screen appears:

	x
(⇐) ⇐ http://localhost:55846, ♀ ▾ ♂ 🧔 localhost	×
Log On	^
Please enter your user name and password.	
Account Information	
Username	
Password	
Remember me	
Log on	
	~

Figure 1: Login screen

The username in entered into the *Username* field and the password next to the *Password* field. Please confirm the login by *Log On*.

Important:

The login credentials should be received from the system administrator. Please report any credential issues to her/him.

1.3 MiSMART main navigation window

After logging in successfully the main navigation window appears. On top two main navigation buttons are located. The first is *Configuration Tools*, which is intended for MiSMART administrators who can change various system settings. The other button is *DataMonitor* enabling users to monitor instrument data.

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http://localhost:55846/Account/LogOff		>

Figure 2: MiSMART web application

2 MiSMART data monitor

The MiSMART DataMonitor application enables reviewing of data which are sent by all supported network attached devices. It consists of the following content modules:

- Measurement monitoring *Measurements*
- Alarm monitoring Alarms
- Quality monitoring- Quality

The current navigation point can be determined from the upper part of the screen showing which application and which content module is currently selected.

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Figure 3: The navigation part of the screen

In the following chapters the use of all available modules will be explained.

2.1 Measurement monitoring module – Measurements

After clicking the *DataMonitor* button the measurements module for monitoring and reviewing measurement data is displayed.

Instrument remote monitoring MiSmart Development v3.3	Iskra Sistemi
Measurements larms Quality	Welcome, admin! [Log off]

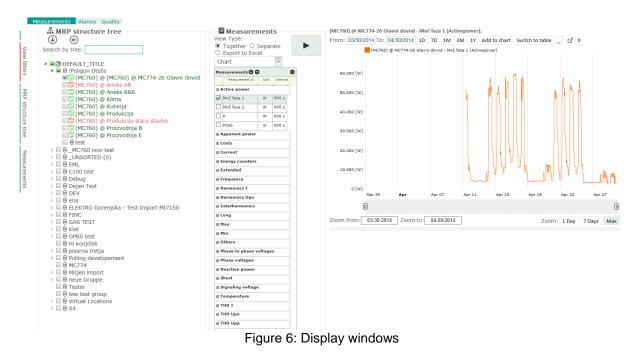
Figure 4: Navigating to the Measurements module



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Image: Source Sources Image: Source Sources Image: Source Sources Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Source Image: Source Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source Image: Source Source <				
Image: set of the set of th	E Rever Angre	III I neue Gruppe	Measurements	S View type
	Power factor	Berester Structure		view type
■ We The View ■ With a Look of the State		e tew test group u c tur c	E Temperature	
Virtual measurements E THD Upn			E THD I	
≥ ▼	Virtual measurements		≘ THD Upn	
a X4 mentve	🖻 🔜 📣 Voltage		E THO Upp	

Figure 5: The measurements module before choosing the desired measurements for displaying

The three left-most views in the upper figure (filters, structure tree and measurements) can also be seen from a tab-separated ribbon at the left side of the screen. These can be show nor hidden either by clicking on the upper tab (e.g. $\[ensuremath{\square}\] view filters\]$) or from the tab-separated ribbon on the left side. The currently hidden views are colored in red as in the case below where the »View filters« tab is hidden from view:



It is important to properly define which measurements will be viewed in the display window. At the left-most side the filtering criteria are first defined, after this a desired measurement point from the structure tree is selected, after which a suitable measurement quantity from this point can be selected for displaying.

Every one of the four segments is accurately described below.



2.1.1 Filter (Filter resources view) –Setting up the measurement quantities for display

In the left part of the screen the filtering section appears which refreshes the tree structure on the right side upon pressing the button. The filter enables filtering data according to date, certain predefined filters and text searching.

Y	Vie	w fil	ers			
		0				
By ti	mesp	an.				
<	1D		1M	3M	1Y	>
Fron	n:		То			
03/3	0/201	4 00:00	04	4/30/20	14 00	00:00
By c	tatus					
_	filter					Ŧ
110	meer					
By to	ext:					
No	searc	h pati	ern			Ψ.
		remer tree:		e:		
Seal	CIT Dy	uee.				
4 👻	(C) M	easure	ment	aroun	s	
		Alarm				
Þ	🖌 💌	Analo	gue I/	0		
⊳		Curre				
₽		Digita				
		Energ		nters		
Þ		Flicke				
Þ		Frequ Harm				
		Interl		nics		
		Napal				
⊳		OTHE				
⊳		Phase		е		
⊳		Powe				
⊳		Powe				
⊳		Powe				
⊳		Signa				
Þ		Temp	eratu	e		
Þ					ante	
Þ		Virtua Volta		surem	ients	
		X4 m				
P	11 60	A4 IT	entve			

Figure 7: Filters – choosing measurement quantities for displaying

The lowermost filter part is intended for filtering out meter points with only the selected measurement quantities. Upon clicking *Available measurements groups* a list of all quantities which are configured within the system are displayed (to see how they are configured please see chapter Configuration Tools/Measurement idents). Every one of the quantities can be expanded and selected/deselected upon request.

Important:

Upon changing quantities for displaying the topological tree structure – data nodes at the right is NOT refreshed automatically. It is only refreshed with the requested quantities after clicking on the free icon. A reload indicator can appear for a short period of time.

2.1.1.1 Filter (Filter resources view) – setting up the timespan for displaying data

In the upper part of the *Filter resources view*, a suitable timespan for displaying data can be configured:

By t	imesp	an:					
<	1D	1W	1M	3M	1Y	>	
From: To:							
03/30/2014 00:00				04/30/2014 00:00			

Figure 8: Filters – choosing the timespan

✓ <u>Important:</u>

After logging into the system both dates are read from a cookie which if available on the current computer makes the start and end timestamps the same as they were when the user last used the system.

By directly entering the date into the text field ^{03/30/2014 00:00} or by clicking into this date entry field a calendar appears where a required date and hour can be set.



Figure 9: Calendar for setting the required date

At the topmost part of the calendar there are sliders to change the month with days, hours and minutes underneath. The requested time which is set through the slider mechanism below is shown next to the Time tag. To set the system current time the user can select the *Now* option and to confirm the date selection *Done* is pressed.

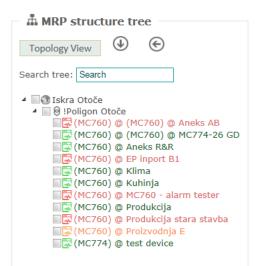
By clicking the shortcut icons $\langle 1D | 1W | 1M | 3M | 1Y \rangle$ a period of 1 day (1D), last 7 days (7D), last one month (1M), last 3 months (3M) and last year (1Y) as an offset from the currently set *End Timestamp* is selected. The corresponding arrows can also be used to add or subtract the currently entered timespan.

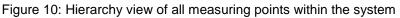
✓ *Important*:

When changing the timespan the Data nodes tree is NOT reloaded automatically. It is refreshed upon request after pressing the button. A reloading icon may appear when this happens.

2.1.2 Data nodes – reviewing and interpreting the MRP structure tree

The hierarchy view tree in the Data nodes view shows the grid distribution configuration as a logical tree of groups and MRPs (To see how they are configured please see chapter Configuration Tools/Measurement nodes):





Clicking <u>Topology View</u> icon, switches the MRP structure tree from hierarchy view to topology view which provides a topology insight into the system:

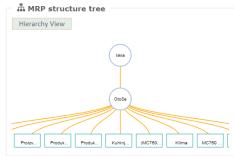


Figure 11: Topology view

(If the topology tree isn't displayed entirely, you can navigate through it by left clicking and holding on the blank spot and dragging tree to desired direction)

Clicking Hierarchy View icon, switches back to hierarchy view.

Inside the both tree types two icon types can be found (for each view):

• • • • • • • • • • An icon denoting a group with a corresponding name. The group represents a logical node with no devices attached. There can be an arbitrary number of groups and their hierarchical levels are defined within the system. A typical user scenario would be a location-based topological structure such as the one below:

Ø KN KRANJ
 Ø T0293 Elektro
 Ø NNR1 T0293 Elektro Ostalo

• Feeder Station / MCTEO - An icon denoting a measuring point (MRP) with a corresponding name to which a certain number of measurements is attached in the database. To every measuring point up to one or no measuring instruments can be attached at a certain point in time. The configuration of this can be done through Configuration Tools (see chapter (Configuration Tools/Measurement nodes).



When clicking on a particular measuring point all historic measurement data which is available at this measuring point is displayed.

To easier manage the opening and closing of the structure tree the icons can be used where the left icon expands the tree structure and the right icon collapses it relative to the currently selected node.

Under these icons there is a search field Search by tree: through which searching through the MRP structure tree can be done more effectively.

✓ *Important:*

A meter point is not directly connected to a particular instrument but represents some sort of a point where measuring equipment can be attached. At every meter point only one or no devices can be attached at a certain moment. The measuring point hence includes historic data from all instruments which have ever been attached to this point in the past even if some instruments may no longer be operational.

2.1.3 Multi MRP selection

In the MRP tree structure multiple Meter Reference Points (MRPs) can be selected at the same time. The resulting group of measurements (within the measurements view) is an intersection of all measurements on the currently selected MRPs.

Search by tree:	Measurements View Type: Together Separate Export to Excel			
▲ ■③ DEMO	Chart 🔻			
AMR_Loggers	Measurements O O O			
🔲 🔀 (?) @ X4-CSS-kuhinja Testni	Measurement id Unit Interva			
(?) @ X4G_Dom1	Flickers harmonics			
(?) @ X4G_KSkL1				
(?) @ X4W_En1				
	OTHERS			
(MC750) @ Testna naprava	THDs			
O Mostviertel Energie Weidegans				
✓ I I I I I I I I I I I I I I I I I I I				
■ 0 00000 ■ 0 00000 ■ 0 00000 ■ 0 00000 ■ 0 00000 ■ 0 00000 ■ 0 00000				
✓ (MC774) @ Main Line				
▲ 🔲 🖗 Substation				
(MC760) @ Feeder #2				
Figure 12: Multi	MPP selection			

Figure 12: Multi MRP selection

In the upper figure two MRPs were selected. Within the Measurements view (Measurements) only measurements which are common to both selected MRPs are shown.

2.1.4 Measurements – selecting the required measurements for displaying

After selecting a certain measuring point (MRP) from the topology tree a list of all corresponding measurement historic data which is available in the database is displayed.



View Type:	ment	s			
 Together C Export to E 		rate			
Chart		*			
Measurements C	0		0		
Search	×				
Current			*		
Energy counter	rs				
Extended					
Frequency					
Phase voltage	s				
🔲 U1 avg	Volt	60 s	=		
🔲 U1 avg	Volt	900 s			
🔲 U2 avg	Volt	60 s			
U2 avg	U2 avg Volt 900 s				
🔲 U3 avg	Volt	60 s			
🔲 U3 avg	Volt	900 s			
m Reactive nowe					

Figure 13: An example of measurements available for a particular measuring point

By clicking on ^I icon, all measurements within each particular group can be accessed.

🖉 Measur	ement	s	
View Type:	_		
 Together (Export to E 		rate	
	Excel		
Chart		¥	
Measurements	90		0
Search	×		
Apparent pov	ver		*
S	VA	300 s	
S1	VA	300 s	
S2	VA	300 s	E
S3	VA	300 s	
Current			
Current phase	e 1 A	300 s	
Current phase	82 A	300 s	
Current phase	83 A	300 s	
I	Α	300 s	
Inc Inc	Α	300 s	
Energy count	ers		
📃 E1 števec kW	h Wh	300 s	
E4	varh	300 s	
🔲 števec E2	varh	300 s	
🔲 števec E3	Wh	300 s	*

Figure 14: Available measurements by group for a selected MRP

You can return to the group-based view by clicking the ¹ icon.

By clicking on the 🖻 icon measurements from every particular group can be accessed.

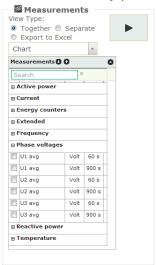


Figure 15: Available measurements for a particular group



A measurement group is then collapsed by clicking on \square .

Specific measurements can be found via search window Search

The measurements view is divided into two parts. The upper part is the View Type selection part where the data display form is determined whereas the lower part consists of the measurement list table. The list table can be hidden or shown by subsequently pressing the o icon at the top right corner of the selector table.

2.1.4.1 View Type

In ViewType the data display form can be determined.

The Chart selection charts the selected measurements as either a line or a bar plot (depending on how a selected measurement is configured to be displayed).

View Type: Together
 Separate Export to Excel Chart Figure 16: View Type

When chart or Excel for are selected the data can be displayed together or separately by choosing options *Together* or *Separate*.

By clicking on the dropdown menu within view type all available view types can be seen:

- View Type
 - Chart
 - Table
- Pqdif
 - Pqdif file
 - Pqdif folder
 - Statistical options
 - Histogram
 - Procentile
 - Phase load
 - Peak power

View Type: • Together O Separa • Export to Excel	
Chart	*
Table	
Pqdif:	
Pqdif file	
Pqdif folder	
Statistical options:	
Histogram	
Percentile	
Phase load	
unsymmetry	
Peak power	•
🗉 Long	
🗉 Max	

Figure 17: View Type with all available functions

All these view type options are further explained in the next sections.

2.1.4.2 Measurements list table

A table of all historic measurements is displayed in the measurements list table. Clicking on any table header enables sorting data according to that particular column. The table columns have the following meanings:

- <u>Measurement Id</u> measurement name for displaying
- <u>Unit</u> measurement unit for displaying
- <u>Interval</u>- the time interval within which a certain measurement is evaluated on the instrument side and sent to the server



Measurements 🔮 🖸 🔹 😜					
Measurement id	Unit	Interva			
Current			•		
Tok faza 1	Α	900 s			
🔲 Tok faza 2	Α	900 s			
Tok faza 3	Α	900 s			
Inc	Α	900 s			
Energy counters	5				
f	varh	900 s			
E1 Ident descript	Wh	900 s			
Extended			1		
ePF1	?	900 s			
ePF2	?	900 s			
ePF3	?	900 s			
Extended Power	?	900 s			
Frequency			1		
f	Hz	900 s			
Harmonics I			1		
I1h02	Α	600 s			
I1h03	Α	600 s			
I1h05	Α	600 s			
I1h07	Α	600 s			
I1h09	Α	600 s			
Harmonics Upn			1		
🔲 U1 - 3 harmonik	Volt	600 s			
U1h05	Volt	600 s			
U1h07	Volt	600 s			
U1h09	Volt	600 s			
U1h02	Volt	600 s			
U1h11	Volt	600 s			
U1h25	Volt	600 s			
U1613	Volt	600 s	Ŧ		

Figure 18: The measurements list table

A particular measurement is selected for displaying by clicking on a line or selecting an empty checkbox at the beginning of the line. More than one measurement can be selected by selecting a required number of lines. All selected measurements can then be displayed as

a chart, as a table or in excel by clicking on an action icon

Displaying data at the right side of the application in display view can now be arbitrarily composed by displaying measurement data from many selected measuring points. Apart from creating new charts data plots can also be added to existing charts as it will be described later.

✓ *Important*:

If an interval for a particular measurement quantity is short this may result in longer loading of charts since the data quantity may be far larger.

2.1.5 User scenarios – MEASUREMENTS

Every one of the available display forms will be described in the following sections.

2.1.5.1 Viewing measurements – Reload/Delete all items

Reload all items – enables you to reload measurements (in all forms) that have been previously displayed. These measurements have previously been closed due to different reasons such as:

- switching between tabs (example: measurements alarms quality),
- browser restart,
- browser refresh.

To reload all items simply click Reload all items icon and all closed measurements will be reopened.

To reopen a specific measurement display, hover over Reload all items icon and below the icona list of all previously closed measurement displays will appear:

Reload all items	Delete all items	
	:05:00 AM (UTC +01:00) To: 1/21/2015 8:05:00 AM (UTC +01:00) olt] (Phasevoltages)	
	:05:00 AM (UTC +01:00) To: 1/21/2015 8:05:00 AM (UTC +01:00) hasevoltages) [60s];	
Percentile From: 1/20/2015 8	:05:00 AM (UTC +01:00) To: 1/21/2015 8:05:00 AM (UTC +01:00)	
Fig	ure 10: Polood specific measurement	

Figure 19: Reload specific measurement

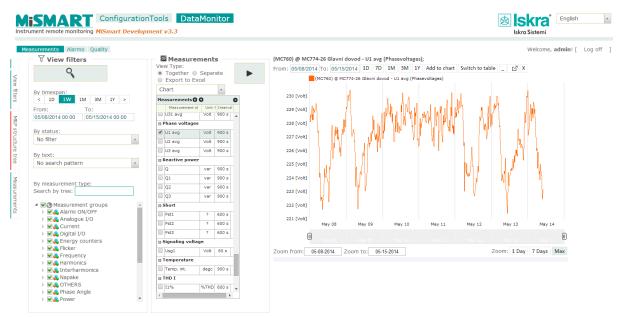
Select measurement you would like to reopen and click on it.

Delete all items – clicking Delete all items deletes all measurements saved under Reload all items.

2.1.5.2 Viewing measurements in graphic form

After selecting a measurement from the measurements table list they can be displayed as a chart by selecting the Chart option in dropdown menu and executing the desired

action with . The new chart will now be displayed underneath all currently displayed charts or tables. If more than one measurement is selected it is important whether all measurements should be displayed *Together* in one chart (by choosing the • Together option) or separately as a one separate chart for every one selected measurement (by choosing the • Separate option).





Other measurements can also be added to existing charts (<u>the already displayed</u> <u>measurements are not allowed</u>) by pressing the *Add to chart* Add to chart button which is located above the current plot. Every measurement will be displayed in different color and a corresponding legend is auto-generated which includes the color with the corresponding measuring point together with its measurement and measurement group.

Iskra®

urements Alarms Quality		Welcome, admin! [L
View filters	View Type: • Together • Separate • Export to Excel	(MC760) @ MC774-26 Glavni dovod - U1 avg (Phasevoltages); (MC760) @ MC774-26 Glavni dovod - U2 avg (Phasevoltages); From: 05/08/2014 To: 05/15/2014 TD: 7D: 1M: 3M: 1Y: Add to chartC ² X
By timespan: < 1D 1W 1M 3M 1Y >	Chart • Measurements © •	(MC760) ⊕ MC774-26 Glavni dovod - U1 avg (Phasevoltages) (MC760) ⊕ MC774-26 Glavni dovod - U2 avg (Phasevoltages)
From: To: 56:08/2014 00:00 05/15/2014 00:00 By status: No filter • By text: No search pattern • By measurement type: Search by tree: • Search by tree: • • By Measurement groups • • Search by tree: • • • • • • • • • • • • • •	U3 avg Vat 900 s Phase voltages 000 s Phase voltages U1 avg Volt 900 s U2 avg Volt 900 s U3 avg Volt 900 s U2 avg Volt 900 s U2 avg Volt 900 s U2 avg Volt 900 s Q var 900 s Short s s Pat3 7 600 s I sep1 remp.int. deg remp.int. Temp.int. deg remp.int. deg remp.int.	230 (vel) 237 (vel)

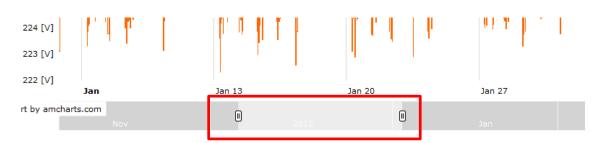
Figure 21: A chart with two displayed measurements

The following chart actions are also available:

• *Changing the chart time period* in a control above the plotted chart which enables quick and arbitrary time period settings. By clicking into the date field a popup calendar is displayed like in every other date control field. Buttons 1D, 7D, 1M ... enable shortcuts for quick timespan definition in regard to the currently selected end timestamp. When a new timespan is entered data is reloaded from the database.

From: 11/30/2010 To: 3/6/2013 1D 7D 1M 3M 1Y

• The timespan (zoom in/out factor) of the currently loaded dataset can also be changed by *manipulating the slider control underneath the chart*:



The currently selected timespan can also be moved by dragging the lighter ruler area left or right.

- A particular chart can also be shown in a new full screen window to make a more scrupulous data analysis by clicking the 🖾 button.
- *Data zoom-in*, which can be done by selecting a region on the chart with a mouse.



- The chart can be put into its original form by clicking *max*, at the lower right side of every chart.
- Data zoom in/out can also be done with the slider control underneath the chart by fine-tuning the begin and end slider.

	May 08	May 09	ма	May 11	May 12	May 13	May 14
Zoom from:	05-10-2014	Zoom to: 05-1	2-2014			Zoom: 1 Day	7 Days Max

- If there is only one measurement available in a chart the control bar above the chart also offers an option of switching data into a table by selecting the Switch to table button.
- A particular chart can be removed from the current view by clicking the close button x at the top right corner. All other currently shown charts or tables are then moved upwards.
- By clicking into the legend square button Produkcija Moč faza 1 (Activepower) a particular measurement can be hidden from a chart.
- A chart can be minimized by clicking the _ button to maximized by clicking the _ button at the top right corner of the cart
- Bar plots also have a grouping functionality which groups data according to a selected group period by selecting the *Group by dropdown option*. You can select the minute, hour, day, week or month grouping period when doing this:

Group b	y:
Min	
Hour	
Day	
Week	
Month	

2.1.5.3 Viewing data in table form

Measurements can be put into table view in two different ways. It can be selected by choosing an appropriate view type by selecting the button Table in dropdown menu

and confirming the action with . The table is then displayed at the right side under all currently already plotted charts or tables. If more than one measurement is selected as many tables as there are selected measurements are drawn one underneath the other. Every table

view can be switched into a chart by selecting the button Switch to chart above a particular table.

The alternative is to first plot a chart by selecting a particular measurement from a selected measurement point and then switching the view into a table with the ^{Switch to table} button above a particular chart.



surements Alarms Quality				Welcome, admin! [
View filters	Measurements	Produkcija - Tok faza 1 [A] (Current)		
°	View Type: Together Separate Export to Excel	From: 05/08/2014 To: 05/15/2014 1D 7D 1	M 3M 1Y Switch to chart _ C X	
	Table	Measurements	0	
By timespan:		Date 💠	Value	
< 1D 1W 1M 3M 1Y >	Measurements 0 0	5/8/2014 2:00:00 AM (UTC +02:00)	0.15	
From: To:	Measurement id Unit Interva	5/8/2014 2:01:00 AM (UTC +02:00)	0.1495	
05/08/2014 00:00 05/15/2014 00:00	Active power	5/8/2014 2:02:00 AM (UTC +02:00)	0.148	
By status:	Current	5/8/2014 2:03:00 AM (UTC +02:00)	0.169	
No filter *	Tok faza 1 A 60 s	5/8/2014 2:04:00 AM (UTC +02:00)	0.186	
No filter	Tok faza 1 A 900 s	5/8/2014 2:05:00 AM (UTC +02:00)	0.3175	
By text:	Tok faza 2 A 60 s	5/8/2014 2:06:00 AM (UTC +02:00)	0.258	
No search pattern v	Tok faza 2 A 900 s	5/8/2014 2:07:00 AM (UTC +02:00)	0.149	
	Tok faza 3 A 60 s	5/8/2014 2:08:00 AM (UTC +02:00)	0.148	
	Tok faza 3 A 900 s	5/8/2014 2:09:00 AM (UTC +02:00)	0.147	
By measurement type:	Energy counters	5/8/2014 2:10:00 AM (UTC +02:00)	0.1465	
Search by tree:	E1 Ident descript Wh 60 s	5/8/2014 2:11:00 AM (UTC +02:00)	0.148	
▲ ∑ Measurement groups	E1 Ident descript Wh 900 s	5/8/2014 2:12:00 AM (UTC +02:00)	0.148	
Alarmi ON/OFF		5/8/2014 2:13:00 AM (UTC +02:00)	0.1475	
🕨 🗹 🙏 Analogue I/O	E4 varh 60 s	5/8/2014 2:14:00 AM (UTC +02:00)	0.1485	
Element	E4 varh 900 s	5/8/2014 2:15:00 AM (UTC +02:00)	0.1865	
Digital I/O Second counters	f varh 60 s	5/8/2014 2:16:00 AM (UTC +02:00)	0.183	
Flicker	f varh 900 s	5/8/2014 2:17:00 AM (UTC +02:00)	0.1825	
Frequency	f Wh 60 s	5/8/2014 2:18:00 AM (UTC +02:00)	0.233	
▶ 🗑 🔔 Harmonics	f Wh 900 s	5/8/2014 2:19:00 AM (UTC +02:00)	0.1785	
🕨 🗹 👶 Interharmonics	Extended	14 <4 Page 1 Of 505	⇒ ►I 20 ▼ Data point 1 - 20 Of 10,081	
🖻 🔀 Napake	Phase voltages			
▶ 🗹 👶 OTHERS ▶ 🗹 💑 Phase Angle	Reactive power			
 Mase Angle Mase Angle Mase Power 	Temperature			
Power Angle				
🖻 🗹 🔔 Power factor				
🕨 🛃 😂 Signaling voltage				
Femberature				
FID FID FID FID FID				

Figure 22: A table showing one measurement

Due to a large amount of data the measurement data is loaded within multiple pages. The paging control is available from the control line under any table:



The following actions are available in a table:

• *Changing the chart time period* in a control above the plotted chart which enables quick and arbitrary time period settings. By clicking into the date field a popup calendar is displayed like in every other date control field. Buttons 1D, 7D, 1M,..enable shortcuts for quick timespan definition in regard to the currently selected end timestamp. When a new timespan is entered data is reloaded from the database.

```
From: 11/30/2010 To: 3/6/2013 1D 7D 1M 3M 1Y
```

- A particular chart can also be shown in in a new full screen window to make a more scrupulous data analysis by clicking the 🖸 button.
- A particular table can be removed from the current view by clicking the close button 🗴 at the top right corner. All other currently shown charts or tables are then moved upwards.
- A table can be minimized by clicking the \Box button to maximized by clicking the \Box button at the top right corner of the table
- In the table header there is a minimization option by clicking the icon at the top right corner of the table.

2.1.5.4 Exporting measurements into Excel

Measurements can also be viewed in Excel. Within Measurements under View Type the

Export to Excel [•] Export to Excel option is available. By selecting the excel action button an Excel is generated on the server and a link to the server located file appears in the view area at the right of the screen. By clicking this link this file is downloaded to a the users' computer and opened with Excel if or is installed on this computer:



Excel - Export data X From: 5/8/2014 12:00:00 AM To: 5/15/2014 12:00:00 AM Measurements: Produkcija: Tok faza 1 |

Download file

Figure 23: Exporting measurements into Excel

	A	В	С
1	Meter reference point name	Produkcija	
2	Measurement	Tok faza 1	
3	Unit	Α	
4	From:	8.5.2014 0:00:00 (UTC +02:00)	
5	To:	15.5.2014 0:00:00 (UTC +02:00)	
6			
7	Timestamp (in local time)	Time-zone offset from UTC	Values
8	8.5.2014 0:00:00	UTC +02:00	0,149000
9	8.5.2014 0:01:00	UTC +02:00	0,148000
10	8.5.2014 0:02:00	UTC +02:00	0,148000
11	8.5.2014 0:03:00	UTC +02:00	0,154500
12	8.5.2014 0:04:00	UTC +02:00	0,186000
13	8.5.2014 0:05:00	UTC +02:00	0,183500
14	8.5.2014 0:06:00	UTC +02:00	0,183500
15	8.5.2014 0:07:00	UTC +02:00	0,157000
16	8.5.2014 0:08:00	UTC +02:00	0,148500
17	8.5.2014 0:09:00	UTC +02:00	0,148500
18	8.5.2014 0:10:00	UTC +02:00	0,148500
19	8.5.2014 0:11:00	UTC +02:00	0,148000
20	8.5.2014 0:12:00	UTC +02:00	0,147500
21	8.5.2014 0:13:00	UTC +02:00	0,221000
22	8.5.2014 0:14:00	UTC +02:00	0,169500
23	8.5.2014 0:15:00	UTC +02:00	0,147500
24	8.5.2014 0:16:00	UTC +02:00	0,148500
25	8.5.2014 0:17:00	UTC +02:00	0,148000
26	8.5.2014 0:18:00	UTC +02:00	0,148000
27	8.5.2014 0:19:00	UTC +02:00	0,238000
28	8.5.2014 0:20:00	UTC +02:00	0,231500
29	8.5.2014 0:21:00	UTC +02:00	0,183500
30	8.5.2014 0:22:00	UTC +02:00	0,171500
31	8.5.2014 0:23:00	UTC +02:00	0,147500
32	8.5.2014 0:24:00	UTC +02:00	0,148000
33	8.5.2014 0:25:00	UTC +02:00	0,147000
34	8.5.2014 0:26:00	UTC +02:00	0,175000
35	8.5.2014 0:27:00	UTC +02:00	0,232000
36	8.5.2014 0:28:00	UTC +02:00	0,147500
37	8.5.2014 0:29:00	UTC +02:00	0,147500
38	8.5.2014 0:30:00	UTC +02:00	0,146500

Figure 24: An Excel table

2.1.5.5 PQdif - file export

PQdif - Power Quality Data Interchange Format is a binary format defined with the IEEE 1159.3 – 2003 standard, intended for measurement interchange (such as voltages, currents, power, energies,...).

MiSmart enables exporting data into the standardized PQdif file format (PQdif file) aswell as into a PQdif folder (PQdif folder) format. This file format can be viewed with a free Pqdiffractor viewer (please download it from - <u>http://www.pqview.com/pqdiffractor/</u>). The Pqdif folder on the other hand creates as many files as there are different time intervals selected and was introduced for later manipulation in the PQView SW package (<u>http://www.pqview.com/</u>).

To export data into PQdif file you should first select all desired measurements, select the

Padif file option from the dropdown menu and confirm the export action with the button on the right hand side. After the action has been executed a link to a server-created PQdif file is offered for download in the view area which can then be downloaded and opened for viewing in PQdiffractor, if this SW is installed on the users' computer:

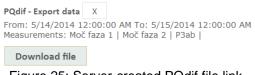


Figure 25: Server-created PQdif file link

X PQDiffractor® - [20140514T150338.pqd]		
🕌 <u>F</u> ile <u>E</u> dit <u>V</u> iew <u>T</u> ools <u>W</u> indow <u>H</u>	elp	_ <i>6</i> ×
	Use Multiple Axes	
Select Observation Record 2014-05-13 22:00:00	Produkcija Storage interval: 1 min	
201403-13 22:00:00	Scorage Interval: 1 min	
	400	
Trigger Method ID PERIODIC	350 -	
Select Quantity Type: ID_QT_VALUELOG	300	
Select Channel Instances O P1 - Produkcija	250 ≥ 250 ≥ 250	
[1] P2 - Produkcija [2] P3 - Produkcija	200 E	
	150-	
	100	
Start Date 13.5.2014 Finish Date 15.5.2014	50	
	0 3:00 6:00 9:00 12:00 15:00 18:00 21:00Wed 143:00 6:00 9:00 12:00 15 May Tue 13 2014 Time	00 18:00 21:00Thu 15
	Electrotek Concepts®	PQDiffractor®

Figure 26: Measurements as seen in the PQDiffractor SW package

2.1.5.6 PQdif - folder export

The Pqdif folder is intended to be used in relation to the PQView SW package (<u>http://www.pqview.com/</u>).

To export data into PQdif folder you should first select all desired measurements, select the Pqdif folder option from the dropdown menu and confirm the export action with the

button on the right hand side. After the action has been executed a link to a servercreated PQdif folder is offered for download in the view area which can then be downloaded and opened for viewing Windows Explorer. Within Windows Explorer you can then open every particular period related file in PQdiffractor, if this SW is installed on the users' computer:



Figure 27: Server-created PQdif folder link



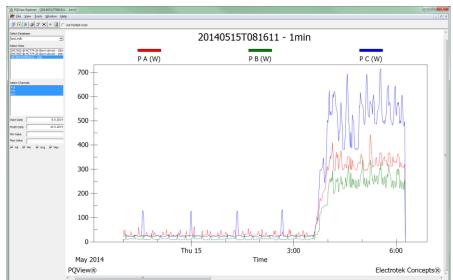


Figure 28: Measurements as seen in the PQView SW package

2.1.5.7 Statistical options: Analysing measurements in a histogram

A histogram is a view type which is used in statistical analysis to show a frequency distribution of a particular statistical variable. The horizontal axis displays measurement values while the vertical axis displays the normalized frequency as a percentage of the total number of available samples.

After selecting a particular measurement at a selected measurement point this option is available by selecting Histogram in dropdown menu and upon action request with the

button all selected measurements are added at the right side of the screen in a new chart together with a corresponding table.

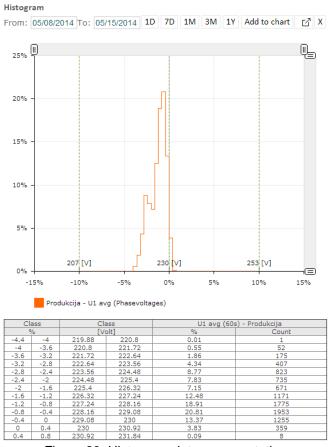


Figure 29: Histogram data representation

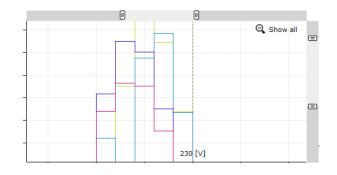
More than only one measurement can be added to a particular histogram under the confition that all displayed measurements have the same unit.

The following chart actions are also available:

• *Changing the chart time period* in a control above the plotted chart which enables quick and arbitrary time period settings. By clicking into the date field a popup calendar is displayed like in every other date control field. Buttons 1D, 7D, 1M,..enable shortcuts for quick timespan definition in regard to the currently selected end timestamp. When a new timespan is entered data is reloaded from the database.

```
From: 11/30/2010 To: 3/6/2013 1D 7D 1M 3M 1Y
```

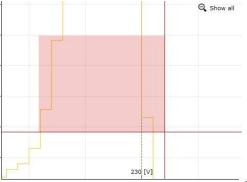
• The chart can *be zoomed in and out with two sliders* located at the top and right corners of the chart. With the horizontal slider you can adjust the zoom level of the value axis and with the vertical slider the zoom level of the percentage level axis.



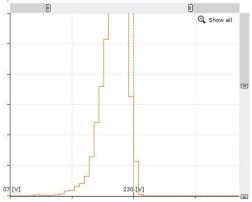


A selected vertical percentage or horizontal value area can also be dragged to a desired location by holding and moving the mouse in the light gray area of the ruler.

- *The histogram chart can also be shown in a new full screen window* to make a more detailed data analysis by clicking the 🖸 button.
- *Histogram data on the chart can also be zoomed in/out* by selecting a particular chart region with the mouse.



- The chart zoom level can be reset by clicking the Show all button Q Show all
- The *exact positioning of the start and end of data* which is displayed for both axes can be achieved by changing the borders of both slider control.



- A particular chart can be removed from the current view by clicking the close button x at the top right corner. All other currently shown charts or tables are then moved upwards.
- By *clicking into the legend square button* Feeder Station P1 (Activepowers) a particular measurement can be hidden from a chart.
- A chart can be minimized by clicking the _ button to maximized by clicking the _ button at the top right corner of the cart

2.1.5.8 Statistical options: Analyzing measurements in a percentile view

Percentiles are used for displaying sample frequency distribution for a particular statistical dataset. A percentile with the notification CPXX denotes the limit value where XX% of all samples in the dataset lie. Its' usage is similar to any other measurement displaying.

To access this functionality first go to DataMonitor /Measurements. Under View Type in a

dropdown menu Percentile while while while while the selected and then click on the click on the displays a table showing CP99, CP95, CP05, CP01, average, maximum and minimum values for all selected measurements.



Percentile							
From: 05/08/2014 To: 05/15/2	2014 1D 70	0 1M 3M	1Y Add to	table _ X			
Percentile							0
Measurements	Avg.Val.	Min.Val.	Max.Val.	CP99	CP95	CP05	CP01
Produkcija - U1 avg [Volt] (60s)	227.12	220.72	231.25	230.47	229.85	223.22	222

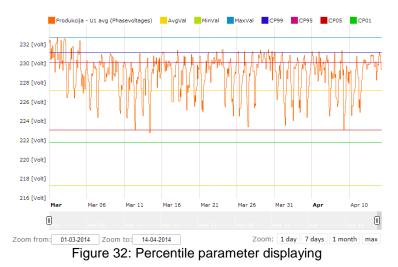
Figure 30: Showing only one measurement in a percentile table

To add measurements from the measurement table displayed on the left they can be selected and added to the table with the Add to table button.

Percentile							
From: 05/08/2014 To: 05/15/2	014 1D 7	D 1M 3M	1Y Add to	table _ X			
Percentile							
Measurements	Avg.Val.	Min.Val.	Max.Val.	CP99	CP95	CP05	CP01
Produkcija - U1 avg [Volt] (60s)	227.12	220.72	231.25	230.47	229.85	223.22	222
Produkcija - U2 avg [Volt] (60s)	227.53	222.35	231	230.45	229.87	224.67	223.52
Produkcija - U3 avg [Volt] (60s)	227.74	222.07	231.5	230.85	230.25	224.55	223.42
Produkcija - Tok faza 1 [A] (60s)	0.49	0.09	2.01	1.77	1.6	0.09	0.09
Produkcija - Tok faza 2 [A] (60s)	0.39	0.05	1.71	1.45	1.28	0.05	0.05
Produkcija - Tok faza 3 [A] (60s)	0.65	0.08	3.32	2.73	2.3	0.09	0.08

Figure 31: Multiple measurements in a percentile table

By clicking and table line a chart is drawn underneath the table. The chart includes lines indicating all 7 statistical parameters with a corresponding legend.



The following chart actions are also available:

• *Changing the chart time period* in a control above the plotted chart which enables quick and arbitrary time period settings. By clicking into the date field a popup calendar is displayed like in every other date control field. Buttons 1D, 7D, 1M,..enable shortcuts for quick timespan definition in regard to the currently selected end timestamp. When a new timespan is entered data is reloaded from the database.



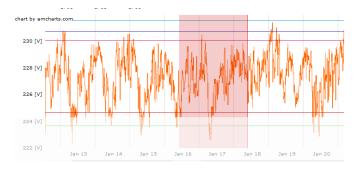
• The timespan (zoom in/out factor) of the currently loaded dataset can also be changed by *manipulating the slider control underneath the chart*:

Mar 17	Mar 19	Mari	21	Mar 23	Mar 25		Mar 27	
Mar Mar	06 Mar 11		Mar 21	0	Mar 31	Apr	Apr 10	



The currently selected timespan can also be moved by dragging the lighter ruler area left or right.

- A particular chart can also be shown in a new full screen window to make a more scrupulous data analysis by clicking the 🖾 button.
- *Data zoom-in*, which can be done by selecting a region on the chart with a mouse.



- The chart can be put into its original form by clicking the max, at the lower right side of every chart.
- A particular chart can be removed from the current view by clicking the close button x at the top right corner. All other currently shown charts or tables are then moved upwards.
- By clicking into the legend square button
 Produkcija UI avg (Phasevoltages) AvgVal MinVal MaxVal CP99 CP95 CP95 CP95 CP95 CP95 CP91 a particular measurement can be hidden from a chart.
- A chart can be minimized by clicking the _ button to maximized by clicking the _ button at the top right corner of the cart

2.1.5.9 Statistical options: Analysing measurements in a phase load symmetry view

Phase load symmetry describes how the load in all three phases is balanced. In an ideal case each phase would have one third of the total load so the aim of this statistical tool is aimed at quickly determining the amount of load unbalance.

The phase load symmetry function is located under *DataMonitor | Measurements*. Under *View*

Type in a dropdown menu Phase load unsymm... must be selected and then click on the action button displays data in pie-chart form at the right side of the screen underneath all currently drawn data.

Symmetry measurements 0 00					
Measurement	Unit				
🖻 I (60 s)					
Tok faza 1	A				
Tok faza 2	A				
Tok faza 3	A				
⊟ I (900 s)					
Tok faza 1	Α				
Tok faza 2	A				
Tok faza 3	Α				
⊡ P (60 s)					
Moč faza 1	w				
Moč faza 2	w				
P3ab	w				
⊡ P (900 s)					
Moč faza 1	w				
Moč faza 2	w				
P3ab	w				
□ Q (60 s)					
Q1	var				
Q2	var				
4					

Figure 33:A table showing all available load symmetry measurements from a selected measurement point



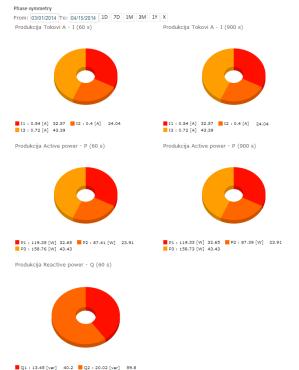
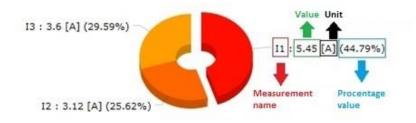


Figure 34: Phase load symmetry displayed as a pie-chart

When selecting a particular data point a table of all measurements which are subject to load symmetry analysis appear. They are divided into related groups – P, Q, S and I respectively. For every one of the available groups a pie-chart is drawn showing the absolute values and percentage parts for every phase load.



The following chart actions are also available:

• *Changing the time period* in a control above the plotted pie-charts which enables quick and arbitrary time period settings. By clicking into the date field a popup calendar is displayed like in every other date control field. Buttons 1D, 7D, 1M,..enable shortcuts for quick timespan definition in regard to the currently selected end timestamp. When a new timespan is entered data is reloaded from the database and recalculated.



- A particular chart can be removed from the current view by clicking the close button 🗴 at the top right corner. All other currently shown charts or tables are then moved upwards.
- By clicking on a particular pie-chart part the selected part is moved away from the central circle.



2.1.5.10 Statistical options: Analyzing the peak power

The peak power function is located under *DataMonitor |Measurements*. Under View Type in a dropdown menu Peak power should be selected. After that a measurement table including only P appears if available at the selected meter point. P should now be selected and the action button pressed to display the peak power relevant information at the right side:

rom: 05/07/2014 To: 05/08/2014	1D 7D 1M 3M 1Y Add to tak	ble _ X		
Peak value				
Start time	End time	Measurement	Value	CP99
5/7/2014 8:15:00 AM (UTC +02:00)	5/7/2014 8:30:00 AM (UTC +02:00)	P [W] (300s)	17923.33	13766.5

Figure 35: The peak power within the selected time period

The peak power is calculated as a maximum value of the measurement point total power which is calculated for 15 minute intervals.

2.2 Alarm monitoring module – Alarms

The alarm monitoring module is accessed by clicking at the Alarms tab through system navigation:

Mismart ConfigurationTools DataMonitor Instrument remote monitoring Mismart Development v3.3	Iskra Sistemi	٣
Measurements Alarms Quality	Welcome, admin! [Log off]

Figure 36: Navigating to the alarm monitoring module

2.2.1 Filter resources view - Setting the measurements for alarm monitoring

In the left part of the screen the desired set of meter points in the structure tree can be

filtered out by pressing the refresh button. By default all measurements are selected. All available measurement groups can then be filtered out by selecting the relevant ones:

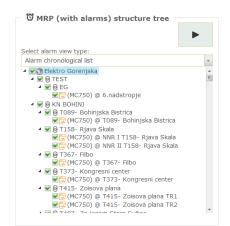


Figure 37: Filters – choosing relevant measurements

A tree of all measurements which are configured within the system appears (to see how measurements are configured please see chapter Configuration Tools/Measurement idents). Any group can be expanded and measurements selected by checkbox-ing the desired ones. The system will now consider only those alarms which have appeared on any of the selected measurements.

✓ <u>Important:</u>

Upon changing quantities for displaying the topological tree structure – data nodes at the right is NOT refreshed automatically. It is only refreshed with the meter points which include alarms on

requested quantities after clicking on the *icon*. A reload indicator can appear for a short period of time.

2.2.2 User scenarios- Alarms

There are three possible alarm view types – Alarm chronological list, active alarms and alarm system statistics which are all explained in the following chapters.

Select alarm view type: Alarm chronological list	*
Alarm chronological list	
Active alarms	
Alarm system statistics	
Figure 38: Selecting alarm vi	iew type

2.2.2.1 Reviewing alarms in table form - Alarms

This option is selected by clicking on Alarm chronological list

under View Type and

executed with the confirmation button . A chronological order table is then drawn at the right side of the screen which is sorted from newest to oldest alarms which appeared within the system.

Alarms received from meter points

R	Export	to	excel	

Meter point	Alarm Start Time	Alarm End Time 🖕	Duration	Measurement	Condition	ConditionValue	Function	Plan
								All
6.nadstropje	1/8/2014 9:36:58 AM (UTC +01:00)	1/8/2014 12:54:18 PM (UTC +01:00)	3:17:20	Internal Tem		70 °C	0	Not pla
6.nadstropje	1/8/2014 12:54:17 PM (UTC +01:00)	1/8/2014 12:54:18 PM (UTC +01:00)	0:00:01	U3	<u></u>	253 V	0	Not pla
6.nadstropje	1/8/2014 12:54:14 PM (UTC +01:00)	1/8/2014 12:54:18 PM (UTC +01:00)	0:00:04	U1		207 V	0	Not pla
6.nadstropje	1/8/2014 9:36:56 AM (UTC +01:00)	1/8/2014 12:54:17 PM (UTC +01:00)	3:17:21	U3		207 V	0	Not pla
6.nadstropje	1/8/2014 12:54:14 PM (UTC +01:00)	1/8/2014 12:54:17 PM (UTC +01:00)	0:00:03	PowerOff	-	0 STAT_ALM	0	Not pla
6.nadstropje	1/8/2014 9:36:55 AM (UTC +01:00)	1/8/2014 9:36:57 AM (UTC +01:00)	0:00:02	Internal Tem		70 °C	0	Not pla
6.nadstropje	1/8/2014 9:36:55 AM (UTC +01:00)	1/8/2014 9:36:56 AM (UTC +01:00)	0:00:01	U3		253 V	0	Not pla
6.nadstropje	1/8/2014 9:36:26 AM (UTC +01:00)	1/8/2014 9:36:56 AM (UTC +01:00)	0:00:30	U1	*	207 V	0	Not pla
6.nadstropje	1/8/2014 9:36:26 AM (UTC +01:00)	1/8/2014 9:36:55 AM (UTC +01:00)	0:00:29	PowerOff		0 STAT_ALM	O	Not pla

Figure 39: A chronological table showing alarms

Depending on the amount of data the table can be segmented through pages which can be navigated through with the paging control underneath the table:



Other available actions:

• *Sorting* by a particular column is done by clicking this particular column header.



Alarmi v časovni peri	odi, za izbrana merilna mesta							0
Merilno mesto	Časovna značka začetka 🚔	Časovna značka konca	Trajanje	Meritev	Pogoj	Vrednost pogoja	Funkcija	Planiran
								Vsi 💌
6.nadstropje	8.1.2014 9:36:26 (UTC +01:00)	8.1.2014 9:36:55 (UTC +01:00)	0:00:29	PowerOff	-	0 STAT_ALM	\odot	Neplaniran

Figure 41: Sorting by a particular column

In the last column you can see whether an alarm was planned or unplanned.

- In the table header there is a minimization option by clicking the \bigcirc icon at the top right corner of the table.
- The alarm table can be exported into Excel by pressing the Export to excel icon above the table. The Excel file is then generated on the server side and can be downloaded to the local computer by pressing *Download file*. After this the file is opened in Excel if installed.

2.2.2.2 Alarm statistics reviewing - Alarm statistics

The other alarm option is to show alarm statistics. In alarm structure under View Type the

option Alarm system statistics should be selected and confirmed with the button. The statistics will now be drawn in three parts at the right side of the screen for all selected meter points.

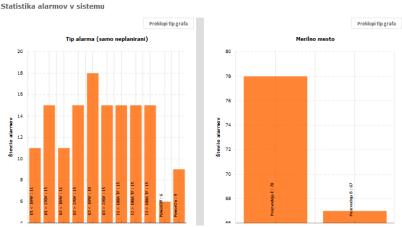


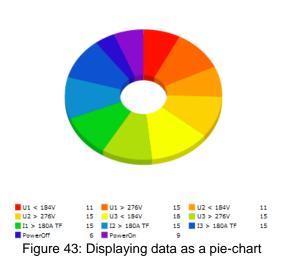
Figure 42: Showing general alarm data in bar chart form

The left bar chart sorts all unplanned alarms (planned alarms are excluded) by their type (by default all alarms are unplanned in the system unless they have been mar as planned). The vertical axis at the left bar chart shows the count for every alarm type while the right bar chart shows the unplanned alarm count by meter point. Alarm types and meter point names can be deduced from the charts by placing the mouse cursor over a particular bar.

The chart type can be changed into a pie-chart representation by pressing Switch chart type.



Preklopi tip grafa



Merilno mesto	Tip alarma	Št. alarmov	Planiranih alarmo	Neplaniranih alan
Proizvodnja E	U1 avg < 184V Actual value	6	0	6
Proizvodnja E	U1 avg > 276V Actual value	8	0	8
Proizvodnja E	U2 avg < 184V Actual value	6	0	6
Proizvodnja E	U2 avg > 276V Actual value	8	0	8
Proizvodnja E	U3 avg < 184V Actual value	10	0	10
Proizvodnja E	U3 avg > 276V Actual value	8	0	8
Proizvodnja E	Tok faza 1 > 180A Thermal function	8	0	8
Proizvodnja E	Tok faza 2 > 180A Thermal function	8	0	8
Proizvodnja E	Tok faza 3 > 180A Thermal function	8	0	8
Proizvodnja E	PowerOff	3	0	з
Proizvodnja E	PowerOn	5	0	5
Proizvodnja B	U1 avg < 184V Actual value	5	0	5
Proizvodnja B	U1 avg > 276V Actual value	7	0	7
Proizvodnja B	U2 avg < 184V Actual value	5	0	5
Proizvodnja B	U2 avg > 276V Actual value	7	0	7
Proizvodnja B	U3 avg < 184V Actual value	8	0	8
Proizvodnja B	U3 avg > 276V Actual value	7	0	7
Proizvodnja B	Tok faza 1 > 180A Thermal function	7	0	7
Proizvodnja B	Tok faza 2 > 180A Thermal function	7	0	7
Proizvodnja B	Tok faza 3 > 180A Thermal function	7	0	7
Proizvodnja B	PowerOff	3	0	3
Proizvodnja B	PowerOn	4	0	4

Figure 44: Alarm table

The alarm table shows the number of planned and unplanned alarms at a certain meter point for every particular alarm type. The table can be minimized by clicking the o icon.

Bar-charts below show unplanned alarm statistics by type at all meter points in the system which contain alarms.

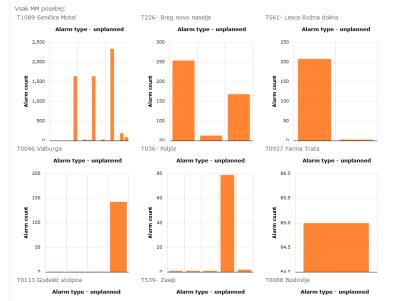


Figure 45: Bar charts depicting the number of alarms by type at all meter points

2.2.2.3 Active alarms

The points of interest should first be specified by selecting the desired MRPs. By clicking the

Active alarms option and confirming it with the button all active alarms fort he selected MRPs are displayed as a list. The table is sorted chronologically based on the alarm start time.

Active alarms in time period, for selected meter points							
- Auto reload table		Last reload	1/8/2014 3:10:45 PM (UTC +01:00)				
Meter point	Alarm Start Time 🖕	Measurement	Condition	ConditionValue	Function		
6.nadstropje	1/8/2014 12:54:20 PM (UTC +01:00)	Internal Tem		70 °C	0		
6.nadstropje	1/8/2014 12:54:18 PM (UTC +01:00)	U3		207 V	0		
6.nadstropje	1/8/2014 9:36:55 AM (UTC +01:00)	U2		207 V	0		

Figure 46: A table of active alarms showing only alarms for one MRP

A pager is added to the table if there are many entries:



Three actions are possible from the table:

• *Changing the alphabetical or number order* – click on the suitable column header.

Active alarms in time period, for selected meter points								
Auto reload table		Last reload	1/9/2014 7:59:59 AM (UTC +01:00)					
Meter point	Alarm Start Time 🖕	Measurement	Condition	ConditionValue	Function			
6.nadstropje	1/8/2014 12:54:20 PM (UTC +01:00)	Internal Tem	₹	70 °C	0			

Figure 48: Changing the alphabetical and number sorting

- The table can be maximized/minimized by clicking on the \bigcirc icon at the upper right corner.
- By clicking the 🔲 icon in the upper left table corner automatic table reloading is enabled. The icon is then changed to 🗹.

2.3 Power quality module – Quality

The power quality module can be accessed by clicking at the Quality tab through system navigation:



2.3.1 Data nodes - reviewing and interpreting the topological tree

The topological tree in Data nodes shows grid distribution with only those meter points with attached power quality analyzing instruments (e.g. MC760 instruments).



Figure 50: A topological tree showing all meter points with attached power quality analyzing instruments

2.3.2 User scenarios – Quality

There are two ways in which system power quality data can be displayed. Under data nodes you can select *System power quality (in EN50160 format)* where you can get insight into power quality according to meter point with a particular meter point analysis option. The second option offers System power quality (weekly overview) where all quality related data is seen in one comprehensive aggregated table. Both scenarios will be described in the following sections.

2.3.2.1 Reviewing power quality data in EN50160 format

This option is available through *DataMonitor / Quality* where a Data nodes tree appears showing all meter points which have quality analyzer instruments attached to them. To select this option choose the ENSOIGO system power quality - (MRP based view) is button in a dropdown menu, select the desired meter points and execute the action by pressing the button. Two tables will now appear at the right side of the screen where the upper table gives a system quality general overview by selected meter point.

	tem quality o											
Export to Exc	cel											
			,	von-compliant week	5						Total	
Measurement point	Weeks under supervision	Non-compliant voltage variations	Non-compliant harmonics	Non-compliant flickers	Non-compliant voltage unbalances	Non-compliant signaling voltages	Non-compliant frequancy variations	Voltage swells	Voltage dips	Compliant	non-compliant weeks	
T0067 Šenči	1	0	0	0	0	0	0	0	33	1	0	8
T0008 RP HE	1	0	0	0	0	0	0	1	18	1	0	8
T1053 Planir	1	0	0	0	0	0	0	0	27	1	0	8
T0162 Kidrič	1	0	0	0	0	0	0	0	14	1	0	8
T1223 Drago	1	0	0	0	0	0	0	0	22	1	0	8
T0522 Komu	1	0	0	0	0	0	0	3	10	1	0	8
T0046 Valbu	1	0	0	0	0	0	0	2	26	1	0	8
T0261 Predo	1	0	0	0	0	0	0	2	35	1	0	8
T1054 MC75	1	0	0	0	0	0	0	0	27	1	0	8
T1185 Lusko	1	0	0	0	0	0	0	1	33	1	0	8
T348 Tavčar	1	0	0	1	0	0	0	0	42	0	1	8
T122 Stolpni	1	1	1	0	0	0	0	0	54	0	1	8
Sum	12	1	1	1	0	0	0	9	341	10	2	

Figure 51: Complete system quality overview by meter point

The first table column includes previously selected meter point names whereas the other columns give information on compliance of all relevant parameters which are specified with the EN50160 standard

Important:

- The last table column enables deleting a particular line from the table by clicking the 8 button.
- *The last line Sum is added to the table automatically and cannot be removed from the table*
- By pressing the Export to Excel button at the upper left table corner an Excel is created on the server and the link to this file appears
- In the table header there is a minimization option by clicking the icon at the top right corner of the table.

The table underneath indicates *Constant monitoring state indices* and is determined according to values in the upper table. The values in this table are dynamically calculated if content of the table above changes.

Constant mo	nitoring state	e indices	0
Ih[%] harmonic volt. state ind.	IKEE[%] volt. quality state ind.	Iu[%] volt. amplitude state ind.	Iplt[%] flicker state ind.
91.51	71.7	91.51	80.19

Figure 52: A table with monitoring state indices

Important:

• To export both these tables together (Complete system quality overview by meter point in Constant monitoring state indices) or all tables which are currently shown on screen into Excel the Export to Excel Better button which is located above the "Complete system quality overview by meter point" table should be pressed.

By clicking a particular line (select in a meter point) in the table *Complete system quality overview by meter point* table a new table with all available reports within the selected time period is shown.



Selected time p	eriod report(s)	for: (T0008 R	P HE Standard	1)
Export to Excel				
Report start	Report end 🔶	Compliance	Status	Monitoring duration
2013-04-14	2013-04-20	•	Completed	Monitoring time: 7days Ohours Ominutes O seconds
2013-04-21	2013-04-27	•	Completed	Monitoring time: 6days 23hours 50minutes 0 seconds
2013-04-28	2013-05-04	Ø	Completed	Monitoring time: 7days Ohours Ominutes O seconds
2013-05-05	2013-05-11	•	Completed	Monitoring time: 7days Ohours Ominutes O seconds
2013-05-12	2013-05-18	Ð	Completed	Monitoring time: 7days Ohours Ominutes O seconds
2013-05-19	2013-05-25	Ø	Completed	Monitoring time: 7days Ohours Ominutes O seconds
2013-05-26	2013-06-01	 Image: A start of the start of	Completed	Monitoring time: 6days 23hours 50minutes 0 seconds
2013-06-02	2013-06-08	 Image: A start of the start of	Completed	Monitoring time: 7days Ohours Ominutes O seconds
2013-06-09	2013-06-15	Ø	Completed	Monitoring time: 7days Ohours Ominutes O seconds

Figure 53: Selected time period reports for one meter point

Important:

- By clicking table column headers data within the table is sorted accordingly.
- By pressing the Export to Excel button at the upper left table corner an Excel is created on the server and the link to this file appears
- In the table header there is a minimization option by clicking the icon at the top right corner of the table.

By clicking on a desired line within *the Selected time period report* table a new table with the EN50160 report is displayed below.

Export to Excel								
Parameter	Compliance	L1	L2	L3	Multi phase	Required quality	Limit	Details
Freq. var.1		100.00 %	-	-		99.50 % / Week	±1%	No details
Freq. var.2	Ø	100.00 %	-	-		100.00 % / Week	+4%/-6%	No details
Voltage var.1	Ø	100.00 %	100.00 %	100.00 %		95.00 % / Week	±10%	No details
Voltage var.2	Ø	100.00 %	100.00 %	100.00 %		100.00 % / Week	+10%/-15%	No details
Voltage unbl.	Ø	100.00 %	%	%		95.00 % / Week	±2%	No details
Rapid volt. ch.	Ø	0	0	0		20 / Week	5	No details
Flicker pst		94.05 %	89.68 %	87.50 %		Info Only	±1%	Details available
Flicker plt		-	-	-	-	No Monitoring	-	Details available
Voltage dips	Ø	0 / 14	0 / 13	0 / 49		50 / Year	90	No details
Voltage swells	Ø	0/0	0 / 0	0 / 0		50 / Year	110	No details
Short inter.	Ø	0 / 2	0 / 2	0 / 2		100 / Year	1%	No details
Long int.	Ø	0 / 2	0 / 1	0 / 1		10 / Year	%	No details
THD	Ø	100.00 %	100.00 %	100.00 %		95.00 % / Week	±8%	No details
Harmonics	Ø	100.00 %	100.00 %	100.00 %		95.00 % / Week		No details

Figure 54: EN50160 compliant report for a selected meter point

The last table column – Details - shows whether or not anomalies are present for a particular parameter. If a particular line indicates "Details available" in the last column a new table with a list of these anomalies will appear underneath upon clicking this parameter line. Lines which have no detail cannot be further analyzed.

Important:

- By pressing the Export to Excel button at the upper left table corner an Excel is created on the server and the link to this file appears
- In the table header there is a minimization option by clicking the icon at the top right corner of the table.

A table *Details-list of anomalies (anomaly type),* showing a list of this type anomalies together with start and end timestamps appears.

kport to Excel				
Anomaly start time 📥	Anomaly end time	Duration [h:m:s,ms]	Phase	Average [-]
4/30/2013 5:20:00.000 AM (UTC +02:00)	4/30/2013 5:30:00.000 AM (UTC +02:00)	0:10:00	3	2.97
5/1/2013 5:10:00.000 AM (UTC +02:00)	5/1/2013 5:20:00.000 AM (UTC +02:00)	0:10:00	2	2.44
5/1/2013 5:40:00.000 PM (UTC +02:00)	5/1/2013 5:50:00.000 PM (UTC +02:00)	0:10:00	1	2.35
5/1/2013 5:40:00.000 PM (UTC +02:00)	5/1/2013 6:00:00.000 PM (UTC +02:00)	0:20:00	3	2.67
5/1/2013 6:10:00.000 PM (UTC +02:00)	5/1/2013 6:20:00.000 PM (UTC +02:00)	0:10:00	3	3.15
5/1/2013 6:30:00.000 PM (UTC +02:00)	5/1/2013 6:40:00.000 PM (UTC +02:00)	0:10:00	3	3.45
5/1/2013 7:10:00.000 PM (UTC +02:00)	5/1/2013 7:20:00.000 PM (UTC +02:00)	0:10:00	1	2.53
5/1/2013 7:10:00.000 PM (UTC +02:00)	5/1/2013 7:30:00.000 PM (UTC +02:00)	0:20:00	3	3.13
5/1/2013 7:40:00.000 PM (UTC +02:00)	5/1/2013 8:00:00.000 PM (UTC +02:00)	0:20:00	1	2.46
5/1/2013 7:40:00.000 PM (UTC +02:00)	5/1/2013 8:10:00.000 PM (UTC +02:00)	0:30:00	3	2.97
5/1/2013 8:30:00.000 PM (UTC +02:00)	5/1/2013 8:40:00.000 PM (UTC +02:00)	0:10:00	3	2.69
5/1/2013 8:50:00.000 PM (UTC +02:00)	5/1/2013 9:10:00.000 PM (UTC +02:00)	0:20:00	3	2.69
5/1/2013 9:30:00.000 PM (UTC +02:00)	5/1/2013 9:40:00.000 PM (UTC +02:00)	0:10:00	3	2.74
5/1/2013 9:50:00.000 PM (UTC +02:00)	5/1/2013 10:10:00.000 PM (UTC +02:00)	0:20:00	1	2.39
5/1/2013 9:50:00.000 PM (UTC +02:00)	5/1/2013 10:20:00.000 PM (UTC +02:00)	0:30:00	3	2.69
5/1/2013 10:30:00.000 PM (UTC +02:00)	5/1/2013 11:00:00.000 PM (UTC +02:00)	0:30:00	2	2.58
5/1/2013 10:40:00.000 PM (UTC +02:00)	5/1/2013 11:00:00.000 PM (UTC +02:00)	0:20:00	3	2.94
5/1/2013 11:40:00.000 PM (UTC +02:00)	5/1/2013 11:50:00.000 PM (UTC +02:00)	0:10:00	3	2.9
5/2/2013 12:10:00.000 AM (UTC +02:00)	5/2/2013 12:20:00.000 AM (UTC +02:00)	0:10:00	2	2.35
5/2/2013 12:20:00.000 AM (UTC +02:00)	5/2/2013 12:30:00.000 AM (UTC +02:00)	0:10:00	3	2.32

Figure 55: A list of anomalies of type "Flicker pst"

Important:

- By pressing the Export to Excel button at the upper left table corner an Excel is created on the server and the link to this file appears
- In the table header there is a minimization option by clicking the icon at the top right corner of the table.
- Depending on the amount of data the table can be segmented through pages which can be navigated through with the paging control underneath the table:

I ≪ Page 1 of 4 → → 20 → Anomalies 1 - 20 Of 77

2.3.2.2 Reviewing system power quality by week

This option is available through *DataMonitor / Quality* where a Data nodes tree appears showing all meter points which have quality analyzer instruments attached to them. To select this option choose the EN50160 system power quality - (as an aggregated list) - button, select the desired meter points (MRPs) and execute the action by pressing the button. All available power quality data will now appear in one aggregated table indicating the failed reports in red color and the passed ones in green:

uality weekly ove	rview for selected tir	ne period	0
how details			
Report start	Report end	Meter point name	Compliance
4/14/2013	4/20/2013	Klima	Failed
4/21/2013	4/27/2013	Klima	Failed
4/28/2013	5/4/2013	Klima	ОК
5/5/2013	5/11/2013	Klima	Failed
5/12/2013	5/18/2013	Klima	Failed
5/19/2013	5/25/2013	Klima	Failed
5/26/2013	6/1/2013	Klima	Failed
6/2/2013	6/8/2013	Klima	Failed
6/9/2013	6/15/2013	Klima	Failed
6/16/2013	6/22/2013	Klima	Failed
6/23/2013	6/30/2013	Klima	Failed
6/30/2013	7/7/2013	Klima	Failed
7/7/2013	7/14/2013	Klima	Failed
7/14/2013	7/21/2013	Klima	Failed
7/21/2013	7/28/2013	Klima	Failed
7/28/2013	8/4/2013	Klima	Failed
8/4/2013	8/11/2013	Klima	Failed
8/11/2013	8/18/2013	Klima	Failed
8/18/2013	8/25/2013	Klima	Failed
9/1/2013	9/3/2013	Klima	Failed
9/3/2013	9/8/2013	Klima	Failed
9/8/2013	9/15/2013	Klima	Failed
9/15/2013	9/22/2013	Klima	Failed
9/22/2013	9/29/2013	Klima	Failed
9/29/2013	10/6/2013	Klima	Failed
10/6/2013	10/13/2013	Klima	Failed
10/13/2013	10/20/2013	Klima	Failed
10/20/2013	10/27/2013	Klima	Failed
10/27/2013	11/3/2013	Klima	Failed
11/3/2013	11/10/2013	Klima	Failed

System power quality - (weekly overview)

Figure 56: Aggregated power quality table by week

The Quality weekly overview for selected time period tables shows the compliance of all parameters which are monitored within a particular power quality report. The first two columns (Report start in Report end) indicate the start and the end time period of the generated report. (this timespan can be longer than only one week depending on how this is configured within the instrument)

The compliance column determines whether the report is compliant with the EN50160 standard.

Above the table there is a desired timespan control. By clicking the < and > beside the date entry fields the date is changed by a 7 day interval. When changing the date the table below refreshes automatically.

System power quality - (weekly overview) Week range from: < 06/10/2013 > Week range to: < 07/10/2013 > Figure 57: Timespan control

When clicking on a line in the *Quality weekly overview for selected time period* table a new table named *List of anomalies + meter point name + data timespan* appears underneath. This table shows a list of all anomalies which have appeared within the selected time period.



D anomalije	Začetni čas anomalije 🚖	Končni čas anomalije	Trajanje [h:m:s,ms]	Faza	Vrednost	Vrednost [%]	Тір	Enota
Flicker Plt	27.4.2014 12:00:00.000 (UTC +02:00)	27.4.2014 5:50:00.000 (UTC +02:00)	5:50:00	1	1.31	N/A	Average	-
Flicker Plt	27.4.2014 12:00:00.000 (UTC +02:00)	27.4.2014 7:50:00.000 (UTC +02:00)	7:50:00	3	1.38	N/A	Average	-
Flicker Plt	27.4.2014 12:00:00.000 (UTC +02:00)	28.4.2014 12:00:00.000 (UTC +02:00)	1:0:00:00	1	1.21	N/A	Average	-
Flicker Plt	27.4.2014 12:00:00.000 (UTC +02:00)	28.4.2014 12:00:00.000 (UTC +02:00)	1:0:00:00	2	1.44	N/A	Average	-
Flicker Plt	27.4.2014 12:00:00.000 (UTC +02:00)	28.4.2014 12:00:00.000 (UTC +02:00)	1:0:00:00	3	1.38	N/A	Average	-
Flicker Pst	27.4.2014 12:00:00.000 (UTC +02:00)	27.4.2014 12:20:00.000 (UTC +02:00)	0:20:00	1	1.45	N/A	Average	-
Flicker Pst	27.4.2014 12:00:00.000 (UTC +02:00)	27.4.2014 12:20:00.000 (UTC +02:00)	0:20:00	2	1.71	N/A	Average	-
Flicker Pst	27.4.2014 12:00:00.000 (UTC +02:00)	27.4.2014 12:20:00.000 (UTC +02:00)	0:20:00	3	1.64	N/A	Average	
Flicker Pst	27.4.2014 12:30:00.000 (UTC +02:00)	27.4.2014 1:20:00.000 (UTC +02:00)	0:50:00	1	1.53	N/A	Average	-
Flicker Pst	27.4.2014 12:30:00.000 (UTC +02:00)	27.4.2014 1:20:00.000 (UTC +02:00)	0:50:00	2	1.77	N/A	Average	-
Flicker Pst	27.4.2014 12:30:00.000 (UTC +02:00)	27.4.2014 1:20:00.000 (UTC +02:00)	0:50:00	3	1.56	N/A	Average	
Flicker Pst	27.4.2014 1:30:00.000 (UTC +02:00)	27.4.2014 2:20:00.000 (UTC +02:00)	0:50:00	1	1.42	N/A	Average	-
Flicker Pst	27.4.2014 1:30:00.000 (UTC +02:00)	27.4.2014 2:20:00.000 (UTC +02:00)	0:50:00	2	1.68	N/A	Average	-
Flicker Pst	27.4.2014 1:30:00.000 (UTC +02:00)	27.4.2014 2:20:00.000 (UTC +02:00)	0:50:00	3	1.56	N/A	Average	
Flicker Pst	27.4.2014 2:40:00.000 (UTC +02:00)	27.4.2014 2:50:00.000 (UTC +02:00)	0:10:00	1	1.51	N/A	Average	-
Flicker Pst	27.4.2014 2:40:00.000 (UTC +02:00)	27.4.2014 2:50:00.000 (UTC +02:00)	0:10:00	3	1.75	N/A	Average	-
Flicker Pst	27.4.2014 2:40:00.000 (UTC +02:00)	27.4.2014 3:20:00.000 (UTC +02:00)	0:40:00	2	1.61	N/A	Average	
Flicker Pst	27.4.2014 3:00:00.000 (UTC +02:00)	27.4.2014 3:20:00.000 (UTC +02:00)	0:20:00	1	1.29	N/A	Average	-
Flicker Pst	27.4.2014 3:00:00.000 (UTC +02:00)	27.4.2014 3:20:00.000 (UTC +02:00)	0:20:00	3	1.57	N/A	Average	
Flicker Pst	27.4.2014 3:40:00.000 (UTC +02:00)	27.4.2014 4:20:00.000 (UTC +02:00)	0:40:00	1	1.46	N/A	Average	-

Figure 58: List of all anomalies for a particular report

Important:

- In the table header there is a minimization option by clicking the \circ icon at the top right corner of the table.
- Depending on the amount of data the table can be segmented through pages which can be navigated through with the paging control underneath the table:

i⊲ << Stran 1 Od 28 ▶> ▶i 20 ▼	Anamolije 1 - 20 Od 557

2.3.2.3 Reviewing system power quality – PQ anomaly list

This option is available through *DataMonitor / Quality* where a Data nodes tree appears showing all meter points which have quality analyzer instruments attached to them. To select this option choose the All PQ anomaly list button, select the desired meter points and execute the action by pressing the button. All available power quality anomaly data will now appear in one aggregated chronologically ordered table:

All PQ anomaly list

leasurement point	Description	Anomaly start time 🐥	Anomaly end time	Duration [h:m:s,ms]	Phase	∨alue [%]	Value
All 💌 X	All 💌 ×						
Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	1	4.17	4.17
Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	2	4.08	4.08
Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	3	4.71	4.71
Kuhinja	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	1	9.55	9.55
Kuhinja	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	2	9.34	9.34
Kuhinja	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	3	10.78	10.78
Kuhinja	Voltage Dip	12/28/2014 12:19:46.000 PM (UTC +01:00)	12/28/2014 12:19:48.000 PM (UTC +01:00)	0:00:02	1	0	0
Kuhinja	Voltage Dip	12/28/2014 12:19:46.000 PM (UTC +01:00)	12/28/2014 12:19:48.000 PM (UTC +01:00)	0:00:02	2	0	0
Kuhinja	Voltage Dip	12/28/2014 12:19:46.000 PM (UTC +01:00)	12/28/2014 12:19:48.000 PM (UTC +01:00)	0:00:02	3	0	0
Kuhinja	Short Interruption	12/28/2014 12:19:46.000 PM (UTC +01:00)	12/28/2014 12:19:48.000 PM (UTC +01:00)	0:00:02	1	0.16	0.37
Kuhinja	Short Interruption	12/28/2014 12:19:46.000 PM (UTC +01:00)	12/28/2014 12:19:48.000 PM (UTC +01:00)	0:00:02	2	0.82	1.89
Kuhinja	Short Interruption	12/28/2014 12:19:46.000 PM (UTC +01:00)	12/28/2014 12:19:48.000 PM (UTC +01:00)	0:00:02	3	0.22	0.51
Kuhinja	Rapid Voltage Change	12/28/2014 12:19:46.000 PM (UTC +01:00)	12/28/2014 12:19:48.000 PM (UTC +01:00)	0:00:02	1	80.14	184.32
Kuhinja	Rapid Voltage Change	12/28/2014 12:19:46.000 PM (UTC +01:00)	12/28/2014 12:19:48.000 PM (UTC +01:00)	0:00:02	2	-58.84	-135.33
Kuhinja	Rapid Voltage Change	12/28/2014 12:19:46.000 PM (UTC +01:00)	12/28/2014 12:19:48.000 PM (UTC +01:00)	0:00:02	3	-87.71	-201.73
Kuhinja	Flicker Pst	12/28/2014 8:00:00.000 PM (UTC +01:00)	12/28/2014 8:10:00.000 PM (UTC +01:00)	0:10:00	1	1.31	1.31
Kuhinja	Flicker Pst	12/28/2014 8:00:00.000 PM (UTC +01:00)	12/28/2014 8:10:00.000 PM (UTC +01:00)	0:10:00	2	1.29	1.29
Kuhinja	Rapid Voltage Change	12/28/2014 8:02:09.000 PM (UTC +01:00)	12/28/2014 8:02:11.000 PM (UTC +01:00)	0:00:02	1	-5.03	-11.57
Kuhinja	Flicker Pst	12/28/2014 8:20:00.000 PM (UTC +01:00)	12/28/2014 8:30:00.000 PM (UTC +01:00)	0:10:00	1	1.06	1.06
Kuhinja	Flicker Pst	12/28/2014 8:20:00.000 PM (UTC +01:00)	12/28/2014 8:30:00.000 PM (UTC +01:00)	0:10:00	2	1.1	1.1

Figure 59: List of all anomalies

If multiple meter points are selected and presented in the table, a specific one can be sorted out by means of a corresponding drop-down menu control:

All PQ anomaly list

-				Duration			
Measurement point	Description	Anomaly start time 🚖	Anomaly end time	[h:m:s,ms]	Phase	Value [%]	Value
All 💌 × .	All 💌 ×						
(MC760) @ MC774-26 0	D Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	1	4.15	4.15
Klima Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	2	4.08	4.08
Produkcija	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	3	4.67	4.67
Klima	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	1	4.15	4.15
Klima	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	2	4.07	4.07
Klima	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	3	4.69	4.69
Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	1	4.17	4.17
Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	2	4.08	4.08
Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	3	4.71	4.71
Produkcija	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	1	4.18	4.18
Produkcija	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	2	4.11	4.11
Produkcija	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	3	4.7	4.7
1C760) @ MC774-26	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	1	9.49	9.49
1C760) @ MC774-26	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	2	9.33	9.33
1C760) @ MC774-26	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	3	10.7	10.7
Klima	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	1	9.5	9.5
Klima	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	2	9.31	9.31
Klima	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	3	10.74	10.74
Kuhinja	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	1	9.55	9.55
Kuhinja	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	2	9.34	9.34

Figure 60: List of all anomalies – sort by meter point

Also, a sort control for filtering by PQ parameter description (i.e. type) is available:

All PQ anomaly list

/se anamolije							
Measurement point	Description	Anomaly start time 🔶	Anomaly end time	Duration [h:m:s,ms]	Phase	∨alue [%]	Value
All 💌 ×	All						
MC760) @ MC774-26		12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	1	4.15	4.15
1C760) @ MC774-26		12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	2	4.08	4.08
1C760) @ MC774-26	Rapid Voltage Change Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	3	4.67	4.67
Klima	Flicker Pit	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	1	4.15	4.15
Klima	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	2	4.07	4.07
Klima	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	3	4.69	4.69
Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	1	4.17	4.17
Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	2	4.08	4.08
Kuhinja	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	3	4.71	4.71
Produkcija	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	1	4.18	4.18
Produkcija	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	2	4.11	4.11
Produkcija	Flicker Plt	12/28/2014 12:00:00.000 PM (UTC +01:00)	12/28/2014 2:00:00.000 PM (UTC +01:00)	2:00:00	3	4.7	4.7
MC760) @ MC774-26	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	1	9.49	9.49
MC760) @ MC774-26	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	2	9.33	9.33
MC760) @ MC774-26	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	3	10.7	10.7
Klima	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	1	9.5	9.5
Klima	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	2	9.31	9.31
Klima	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	3	10.74	10.74
Kuhinja	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	1	9.55	9.55
Kuhinja	Flicker Pst	12/28/2014 12:10:00.000 PM (UTC +01:00)	12/28/2014 12:20:00.000 PM (UTC +01:00)	0:10:00	2	9.34	9.34

Figure 61: List of all anomalies – sort by PQ parameter

Important:

- In the table header there is a minimization option by clicking the \circ icon at the top right corner of the table.
- Depending on the amount of data the table can be segmented through pages which can be navigated through with the paging control underneath the table:
 Anomalies 1 20 Of 5,551

3 MiSMART configuration tools - a tool for system configuration

MiSMART configuration tools is an application for making the complete system configuration and is primarily intended for system administrators. It consists of following content modules:

- Measurement nodes, •
- measurement Idents,
- devices. •
- user management. •

Under Configuration Tools it is possible to create and manipulate the topological tree, configure meter point settings, group meter points, add new instruments into the system etc. Some simple tools for measurement and alarm reviewing are also available. For more thorough data analysis please use the Data Monitor application as described in the previous chapter of this manual.

3.1 Accessing system Configuration Tools

The application is accessed with a web browser by entering a suitable URL.

()) (http://localhost:55846, P - C) (localhost ×
Log On A
Please enter your user name and
password.
Account Information
Username
Password
Remember me
Log on
×
Figure 62: System login

The username is entered into the Username field and the password next to the Password field. Please confirm the login by Log On. To remember the credentials for next login check the Remember me option.

3.2 Configuration tools – main window

eter reference points Measurement ide	_	Welcome, admin! [Log off
View filters Q By timespan: < 1D 1W Y 1W From: To: 05/15/2014 05/16/2014 By status: No filter By text: No search pattern	 MRP structure tree DEFAULT_TITLE IPoligon Otoče IPoligon Otoče IPOLISORTED (0) IPOLISORTED (

Figure 63: Configuration tools - main window

After logging into the system a screen consisting out of three sections appears:

- 1. The uppermost screen part includes two lines with navigation control buttons. The upper one switches between applications and the lower one between different application modules.
- 2. A topology structure tree of meter points is displayed on the left side.
- 3. Upon clicking a node in the topology tree structure its' properties appear at the right side depending on the node type.



3.3 Application navigation

To switch between various MiSMART parts and for logging on and off the system the upper navigation part of the window is used:



3.3.1 Switching between MiSMART Data Monitor and MiSMART Configuration Tools

Switchover between the MiSMART Data Monitor and Configuration Tools applications is done by navigating through buttons in the upper navigation bar.



3.3.2 Logging off from the Configuration Tools application

The Log off button appears at the upper right corner of tge application:



3.3.3 Switching between application module *Measurement nodes* and *Measurement Idents*

In MiSmart Configuration tools four tools are included:

- A tool for editing MRPs Meter reference point,
- A tool for setting up measurement idents Measurement Idents,
- a tool for setting up devices *Devices* as well as
- a user management tool User management.

A description of these is in the following chapters:



3.4 User Management

This tool enables creating user accounts as well as editing existing user accounts.



3.4.1 Window navigation

This tool is divided into three parts – *Users, User access* and *Group Functionalities* which are described in the next chapters.

ter referei	nce points Me	easurement idents	User management MODB	US Polling Welco	ome, iskra !	[Log o
Users	Use	r access	Group funcionality			
			1 /			
Add u	sor					
Auu u	301					
sers						Locked
	Username	Email address	Creation date	Last login	Approved	Locked
	admin		4/23/2013 4:45:57 PM (UTC +02:00)	1/22/2015 0-27-00 AM (UEC +01-00)	<i>I</i>	
 X	admin	andrej.dolar@gmail.d	4/23/2013 4:45:57 PM (01C +02:00)	1/22/2015 8:37:09 AM (UTC +01:00)	4	
, ×	avinash	avinash.waghambare	12/16/2014 3:42:47 PM (UTC +01:00)	12/16/2014 3:42:47 PM (UTC +01:00)	1	
	babu	babu.atur@gmail.con	10/9/2014 12:06:22 PM (UTC +02:00)	10/9/2014 12:48:24 PM (UTC +02:00)	1	
≡! ¥			1/22/2015 8:35:57 AM (UTC +01:00)	1/22/2015 8:37:58 AM (UTC +01:00)	a	
	Iskra	iskra@iskra.com				
j ×		-				
₿× ₿×	Iskra matej	matej.roblek@iskra-r	10/14/2014 3:15:22 PM (UTC +02:00)	10/14/2014 3:20:16 PM (UTC +02:00)	I.	
₿× ₿×		matej.roblek@iskra-r		10/14/2014 3:20:16 PM (UTC +02:00)	¢	
i x i x i x i x	matej	matej.roblek@iskra-r miran.sturm@iskra-n	10/14/2014 3:15:22 PM (UTC +02:00)	10/14/2014 3:20:16 PM (UTC +02:00) 11/6/2014 11:52:39 AM (UTC +01:00)		
	matej	matej.roblek@iskra-n miran.sturm@iskra-n rahul.eghe@iskra.eu	10/14/2014 3:15:22 PM (UTC +02:00)	10/14/2014 3:20:16 PM (UTC +02:00) 11/6/2014 11:52:39 AM (UTC +01:00) 11/22/2014 2:45:44 PM (UTC +01:00)	1	
J × J × J ×	matej miran Rahul	matej.roblek@iskra-r miran.sturm@iskra-n rahul.eghe@iskra.eu Shrikant.Yeole@relia	10/14/2014 3:15:22 PM (UTC +02:00) 10/9/2014 12:04:59 PM (UTC +02:00) 10/14/2014 1:59:30 PM (UTC +02:00)	10/14/2014 3:20:16 PM (UTC +02:00) 11/6/2014 11:52:39 AM (UTC +01:00) 11/22/2014 2:45:44 PM (UTC +01:00) 1/14/2015 6:15:13 AM (UTC +01:00)	¢	

Figure 68: User Management

3.4.2 Users

Under the Users tab a new user account can be created or an existing one edited.

3.4.2.1 Creating a new user

By clicking the Add User button (Add user) a window for new user account creation is opened:



MiSMAR Instrument remote monitor	ConfigurationToc Add user	DataMonitor	English 🔻
Meter reference points	Username: Enter Email address: Enter Password: Confirm password:		ne, Admin! [Log off]
Add user Users Username	Comment:		Approved Locked
admin	Group functionality	Description	
guest	Functionality data monitor	Data monitor	
MiSmart	admin	admin	
	configuration tools		Data point 1 - 3 Of 3
-		Add user Ca	ancel

Figure 69: Add user account

A new Username, Email, Password (at least 6 characters which should include at least one capital letter and one number) as well as *Group functionalities* which the new user will have access to are defined.

Group functionality					
	Functionality	Description			
	data monitor	Data monitor			
	admin	admin			
	configuration tools				
	usermanagement				

Figure 70: Group functionalities

The process of adding a new user is finished by clicking on the Add user (Add user (Add user)) button.

The newly added user can then be seen from the Users table.

Users	Users						
		Username	Email address	Creation date	Last login	Approved	Locked
	×	admin	admin@mismart.org	4/23/2013 4:45:57 PM (UTC +02:00)	6/3/2014 7:50:52 AM (UTC +02:00)	S	
	×	guest	guest@iskra-mis.si	5/15/2014 8:57:11 PM (UTC +02:00)	5/15/2014 9:02:17 PM (UTC +02:00)	1	
E,	×	MiSmart	mismart@mismart.or	5/13/2014 4:05:34 PM (UTC +02:00)	5/15/2014 2:23:08 PM (UTC +02:00)	4	
	t≼ << Page 1 Of 1 ⇒ ⇒ 20 ▼ Data point 1 - 3 Of 3						

Figure 71: Users table

A user can be searched through the name or email:

	Username	Email address	
Fig	gure 72: Sea	rching for a us	er

A user can be removed by selecting the \mathbf{X} button.

3.4.2.2 Editing existing user accounts

By clicking on *Edit* button a window where user account settings can be manipulated is displayed:

	ConfigurationToo		English v
Meter reference points	Edit user		ne, Admin! [Log off]
Lusers G Add user Users Lusers Luserame Admin Comparison Strategy Strategy Mismart	Username: admin Email address: admin@misr Password: Confirm password: Comment: Group functionality Punctionality data monitor data monitor configuration tools	mart.org	Approved Locked
	usermanagement		
	Last login date 6/3	:3/2013 4:45:57 PM /2014 7:50:52 AM /2014 7:50:52 AM 3/2014 4:02:55 PM	
-		Save changes	Cancel

Figure 73: Editing an existing users' account

Email and Group functionalities can be changed for every particular user.

The process is finished by clicking on the Save Changes (Save changes) button.

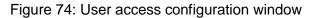
3.4.3 User access

Users with access to User management can define user's rights to access certain meter groups.

3.4.3.1 Add/remove meter group access

Clicking on User access tab opens User access configuration window:

L Users	User access	Group funcionality
Users		Pravice uporabnikov:
Username	Comment	► STATE ►
admin		Administratications Administratic conductors Administratic conductors
avinash		🖻 🗹 🤗 Azra poultry equipment
babu		▷ 👿 🙆 IBC knowledge park #1
Iskra		IBC knowledge park #2
matej		ITC hotel
miran		 ▷ □ Ø Mahindra & Mahindra ▷ ♥ Ø Subadrah textile factory
Rahul		 Subadran textile factory
reliance		
Satish		—
tim		



User access window is divided into two parts:

- Select user for edit on the left side:

Users		Pravice uporabnikov:
Username	Comment	A BOSTEM
	comment	Aluminum cables and conductors
admin		Associate Capsule
avinash		Azra poultry equipment
babu		▷ 🗑 🙆 IBC knowledge park #1
Iskra		▷ 🗑 BC knowledge park #2
matej		🕨 🗹 🖯 ITC hotel
miran		Pahindra & Mahindra
Rahul		▷ Subadrah textile factory
reliance		🕨 🗹 🖯 Sunrise industries casting

Figure 75: User access configuration window – User select

- Then chose to which meter groups the currently selected user will have access:

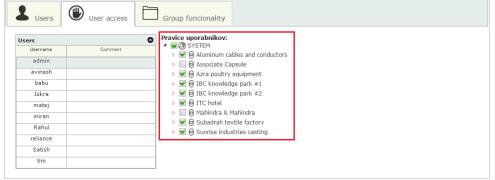


Figure 76: User access configuration window – Add/remove meter group access

In the left part the user whos' user access we would like to edit is selected while in part two, meter groups that we would like to add to that certain user, are selected via check boxes.

Changes will be updated at next refresh.

3.4.4 Group functionalities

Under the *Group functionalities* tab a new functionality group can be created or an existing Group Functionality can be edited.

	SM		gurationTools DataMonitor System v3.5.3 (December 2014)	≥ Iskra [®]	English •
Meter	reference	points Measurement in	dents User management MODBUS Po	lling Welcome	, iskra ! [Log off]
1	Users	User access	Group funcionality		
	Add grou	up funcionality	0		
Grou	prenetional	Name	Description		
	×	data monitor	Data monitor		
Ē		admin	admin		
Ē		configuration tools			
Ē		usermanagement			
		QRMailing	Quality Report Mailing List		
	1	ra <a 1<="" page="" td=""><td>Of 1 → → 20 ▼ Data point 1 - 6 Of 6</td><td></td><td></td>	Of 1 → → 20 ▼ Data point 1 - 6 Of 6		

Figure 77: Group functionalities



3.4.4.1 Creating a new group functionality

A new group functionality can be added by clicking on: Add group functionality

A new window appears where a *Name* and *Description* of the new functionality can be entered:

	ConfigurationTools DataMonitor	English •
	Measurement idents Devices User management	Welcome, Admin! [Log off]
Add group funci		K
Group functionality	Name: Description: Functionality	
Image: Second se	Description Data monitor - Alarms Configuration tools - Devices	
userma	Configuration tools - Measurement idents Data monitor - Measurements Configuration tools - Meter reference points	
	Data monitor - PaDif Data monitor - Quality Data monitor - Statistika Configuration tools - User management	
	Users in group functionalities	
	Add group funcional	Ty Cancel

Figure 78: Creating new group functionality

The process is concluded by clicking on the confirmation button in the lower right corner of the screen - Add group funcionality.

3.4.4.2 Editing a group functionality

A group functionality can be edited by clicking on the *Edit* 💷 button:



	ConfigurationTools DataMonitor	English ×
Meter reference points	leasurement idents Devices User management	Welcome, Admin! [Log off]
Users Gr	oup funcionality	
Add group funci	Edit group functionality Name: data monitor Description: Data monitor Functionality Image: Configuration tools - Alarms Configuration tools - Devices Configuration tools - Devices Configuration tools - Measurement idents Image: Configuration tools - Measurements Configuration tools - Measurements Image: Configuration tools - Measurements Configuration tools - Meter reference points Image: Data monitor - Quality Image: Data monitor - Quality Image: Data monitor - Statistika Configuration tools - User management Statistika Vsers in group functionalities Image: Data monitor context and the statistika	
	Save group functionality	Cancel

Figure 79: Editing a group functionality

You can change the name as well as the description of the selected group functionality.

The process is then concluded by clicking on the Save group functionality button in the lower-right corner of the window.



3.5 A tool for editing meter reference points (MRP) – measurement nodes

This tool, which opens up automatically after logging into the Configuration Tools and enables creating, editing, and managing metering nodes. The following chapter describes how to work with the tool together with its possibilities.

3.5.1 Window appearance

On the left hand side of the window the MRP structure tree opens, which shows a picture of the complete system in which metering nodes and the group of metering nodes are located. When logging into the system for the first time the tree structure contains only the main group. All the MRPs need to be added to the tree later.

The right side of the window is intended for editing data from a particular selected object within the tree structure.

Inst	UNIT SMART Configuration						English	v	r
View filters MRP	eter reference points Measurement idents View filters By timespan: < 10 1w 1M 3M 1Y > From: To: 05/08/2013 00:00 05/08/2014 00:00	Devices User management	Status Measurements delay status () Ala Meter reference point (MRP) i Meter reference point name User tag 1 Us HVAC () Configure meter reference point	nformation		Welco	me, Admin! [Log off	1
structure tree	By status: No filter * By text: No search pattern *	 ▶ Ø virtual group 	Attached data sources Data source identification Data source dear MC004486 Detach device from this MRP Last measurements Last measurements	MC760 Disable upload	10/14/2013 9:50:08		Is data upload al	lowed	
			Last received measurements	Page [0f 1 >> Messurement +02:00	ast reload 5/15/201 100 V Dat	%THD 600			

Figure 80: The MRP structure tree

3.5.2 General system overview

By clicking on the uppermost node of the MRP structure tree a General system overview of the system is given. This overview gives an overall statistics of the installed system with all relecant data:

ment remote monitoring MiSmart System	ionTools DataMonitor m v3.5 (May 2014)							Eng	glish
er reference points Measurement idents			eral system overvie					Welcome, Admin	n! [Log o
View filters String By timespan: < 1D		Last Tota Numi Numi Numi Numi	data refresh: 5/15/ I number of devices: per of attached devic per of devices commu- per of delayed devices per of offline devices:	2014 10:43:55 19 :es: 8 unicating OK: 2 :s: 3 : 3					
From: To: 05/08/2013 00:00 05/08/2014 00:00		Num	per of devices with n	o measurement	s: u				
05/08/2013 00:00 05/08/2014 00:00			per of devices with n	o measurement	s: u				
				Data source type	Attached to location	p	НАС	Alarms present	Communicati
05/08/2013 00:00 05/08/2014 00:00 By status:			ched devices			p 10.120.4.156	нас	Alarms present	Communicati
05/08/2013 00:00 05/08/2014 00:00 By status:			ched devices Data source identification 👳	Data source type	Attached to location		Мас	Alarma present	
05/08/2013 00:00 05/08/2014 00:00 By status: No filter By text:		Atta	Data source identification MC014626	Data source type MC774	Attached to location Otoče@Main Line	10.120.4.156	НАС	Alarms present	
05/08/2013 00:00 05/08/2014 00:00 By status: No filter By text:		Atta 1 2	ched devices Data source Mentification MC014626 MC004486	Data source type MC774 MC760	Attached to location Otoče@Main Line Otoče@HVAC	10.120.4.156 10.120.4.152	NAC	Alams present	
05/08/2013 00:00 05/08/2014 00:00 By status: No filter By text:		Atta 1 2 3	ched devices Data source identification & MC014626 MC004486 MC004488	Data source type MC774 MC760 MC760	Atteries to location Oto5e@Main Line Oto5e@HVAC Oto5e\Substation@Feeder #2	10.120.4.156 10.120.4.152	NAC	Alarms present	Communicati Commun
05/08/2013 00:00 05/08/2014 00:00 By status: No filter By text:		Atta 1 2 3 4	ched devices Data source identification & MC014626 MC004486 MC004488 AQUADISDN15	Data source type MC774 MC760 MC760 ?	Allacted b toolion Otoče@Main Line Otoče@HVAC Otoče\Substation@Peeder #2 AMR_Logger@X4W_En1	10.120.4.156 10.120.4.152	MAC	Alarms present	
05/08/2013 00:00 05/08/2014 00:00 By status: No filter By text:		Atta- 1 2 3 4 5	ched devices Data source identification MC014626 MC004486 MC004488 AQUADISDN15 5262/090a1-rem	Data source type MC774 MC760 MC760 ? ? ?	Attached to loadion Otoče@Main Line Otoče@MVAC Otoče@Substation@Feeder #2 AMR_Loggers@X4W_En1 AMR_Loggers@X40_Dom1	10.120.4.156 10.120.4.152	Нас	Alarms present	

Figure 81: General system overview



3.5.3 Group of metering nodes - Group node

Group nodes are used to build a good and user friendly MRP structure tree structure. By using group nodes an unlimited number of sub-levels can be created for each group and also metering nodes with measurement instruments (MRP nodes) can be configured at the bottom-most level.

Example: A parent group node would typically contain sub-levels named after places where measuring equipment is locally installed. Each local sub-levels is then named after an electrical substation to which a suitable measurement instrument is attached.

3.5.3.1 Creating group nodes

Group nodes at which metering nodes with *Meter Reference Points* are attached are created by marking the parent group, right-clicking on it and selecting command *Group of items* in the *Create* group.

In tree structure at the appropriate location a new empty group named *New node* appears, after which a name can be assigned to the MRP. The process of creation is completed by pressing the *Enter* key.

An unlimited number of top level group can be created within the system together with an unlimited number of subgroups:



Figure 82: Creating group nodes

3.5.3.2 Renaming, deleting, and moving group nodes

It is possible to carry out various operations on a particular group node by right-clicking on a selected group node.

3.5.3.3 Renaming group nodes

Group nodes can be renamed by choosing the command *Rename*. After selecting the command the name field of the group node turns blue and it is possible to enter a different name or edit the existing one. The operation is confirmed by pressing *Enter* key.

ф (MRP structure tree	
⊿ 🕥	DEMO	
\triangleright	AMR_Loggers	
⊳	create	*
⊳	rename	
⊳	delete	
⊳	edit	»
	Expand all subnodes	
	Collapse all subnodes	

Figure 83: Renaming group nodes

3.5.3.4 Deleting group nodes

Group nodes can be deleted by choosing the command *Delete*. To perform this action the selected group should not contain any MRP nodes, or sub-groups containing MRP nodes. After executing this operation the user receives a notification of a successful deletion of group nodes.

ф (MRP structure tree		
⊿ 🕥	DEMO		
⊳	AMR_Loggers		
⊳	create	»	
⊳	rename		
⊳	delete		
⊳	edit	»	
	Expand all subnodes Collapse all subnodes		

Figure 84: Deleting group nodes

3.5.3.5 Moving group nodes

Group nodes together with its sub-groups and metering nodes can be moved to any other location in tree groups. To make a move, mark the group (only the parent element), right Click on it and select command *Cut* in the *Edit* group. Then move the mouse to the desired location, right-click on it and select command *Paste* in the *Edit* group.

Another possibility is to mark and drag (left-click on the highlighted group) measurement group to the desired location.

 create >> rename delete edit >> cut cut 		MRP structure tree DEMO @ AMR_Loggers			
delete edit	⊳	create	»		
edit » cut	⊳	rename			
edit » cut		delete			
Expand all subpodes CODV	⊳	edit	»	cut	
Expand an subhodes copy		Expand all subnodes	ĺ	сору	
Collapse all subnodes paste		Collapse all subnodes		paste	

Figure 85: Moving group nodes

3.5.4 Meter Reference Point (MRP)

Meter reference point (MRP) is the point at which a measurement instrument is attached. An instrument attached into the system always represents the lowest level in the tree structure hierarchy.

A Meter Reference Point can be created, moved to another group and renamed. Only one active measurement instrument can be attached at a MRP at any givem point in time (the description is given below in the document).

3.5.4.1 Creating Meter Reference Point

The process of creating a Meter Reference Point is similar to the process of creating group nodes. The group, in which a new meter reference point will be created, must be marked. Right-click on it and select command *Meter point* in the *Create* group.

From the tree structure at the appropriate location a new empty group named *New node* appears, which can be arbitrarily renamed. The process of creation is completed by pressing the *Enter* key.



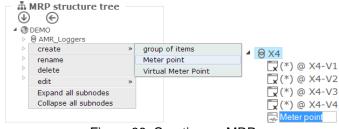


Figure 86: Creating an MRP

3.5.4.2 Renaming, deleting, and moving Meter Reference Points

It is possible to carry out various operations on an MRP, which are mostly accessible by right-clicking on a selected group node.

3.5.4.2.1 Renaming an MRP

An MRP can be renamed by choosing the command *Rename*. After selecting this command the name field of an MRP turns blue ant it is possible to enter a different name or edit the existing one. The operation is confirmed by pressing the *Enter* key.

MRP structure tree	
DEMO	
Ø AMR_Loggers	
Ø Kovis	
Ø Mostviertel Energie	
Otoče	
🔜 (MC760) @ HVAC	
🖾 (MC774) @ Main Line	
rename	
Ø delete	
edit	*

Figure 87: Renaming meter reference point

3.5.4.2.2 Moving MRPs to another location

An MRP can be arbitrarily moved to another group node. To make a move, mark the MRP, right-click on it and select command *Cut* in the *Edit* group. Then move the mouse to the desired destination location, right-click on it and select command *Paste* in the *Edit* group. Another possibility is to mark and drag (left-click on the highlighted meter reference point) the MRP to the desired location.

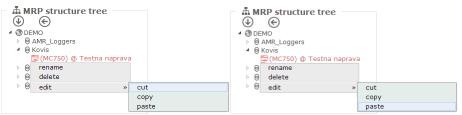


Figure 88: Moving an MRP

3.5.4.3 MRP status

The MRP status gives the information of what is happening to it and to attached measurement instruments in a given point in time. Indication of status is reflected by the color of the icons of the MRP in the tree structure. Detailed information and analysis on the status can be found in the central part of the application window when a certain MRP is selected. Below is a list of all possible statuses:

- Measurement instrument is not attached at MRP,
- Measurement instrument is attached and running OK,



- Measurement instrument is attached and it has history of alarms in the selected timeframe,
- Measurement instrument's pushing data is delayed,
- An instrument is attached to an MRP but no data has yet been received.

For more information on the MRP statuses and measurement instrument attached to it, a particular meter reference point must be chosen (left mouse click). This displays additional information in the center of the application window. The status is displayed in the top status section under *Status*.

In the status section two icons (wheels) indicate the activity, where their color corresponds to the current deice status.

3.5.4.3.1 Measurement instrument is not attached at an MRP

This status shows that currently at this MRP there is no measurement instrument attached. The history of attached measurement instruments and the latest data are visible under the status information in the central part of the program window.

The corresponding icon in tree structure is colored gray in this case: \square

In the status section (the central part of the application window) a gray icon and caption *No measuring device is currently attached* is displayed.

MRP structure tree	Status No data source (measuring device) is currently attached 🗳
 ▷ _MC760 novi test ▷ _UNSORTED (0) ▷ @ EML 	Meter reference point (MRP) information Meter reference point name User tag 1 User tag2 Nominal voltage Nominal frequency
 O C100 test O Debug O Dejan Test 	Grega test MC3633 230 50 Configure meter reference point
 ▷ Θ DEV ▷ Θ ena ▷ Θ ELEKTRO Gorenjska - Test Import MI71! ▷ Θ FINC 	Attached data sources No data source attached
 ▷ ⊕ GAS TEST ▷ ⊕ Klet ▷ ⊕ GPRS test 	Attach new device to this MRP 😟 Show data source history
 ⊖ Hi konjiček ■ Pisarna tretja □ (MC760) @ Grega miza5 	Itest measurements Itest alarms Itest alarms Itest received measurements Itest alarms
Grega test MC3633	Last received measurement table
Ø Kranj	Auto reload table Last reload 5/26/2014 2:29:16 PM (UTC +02:00)
 Ø Polling developement Ø MC774 	No record to view
 Ø MiQen import 	Late? Date 🔶 Measurement Value Unit Interval in s
 Ø neue Gruppe Ø Tester 	$ \begin{tabular}{lllllllllllllllllllllllllllllllllll$
© tew test group	
 ▷ Ø Virtual Locations ▷ Ø X4 	

Figure 89: Measurement instrument status

3.5.4.3.2 Measurement instrument is attached and running OK

This status shows that measurement instrument at this MRP is attached and it it regularly pushes data (data does not deviate for more than the specified number of pushing periods) and measurement instrument did not detect any alarms within the filter-specified timeframe.

Icon in tree structure is colored green in this case:

In the status section (the central part of the application window), the two icons (wheels) are colored green to indicate that everything is fine.



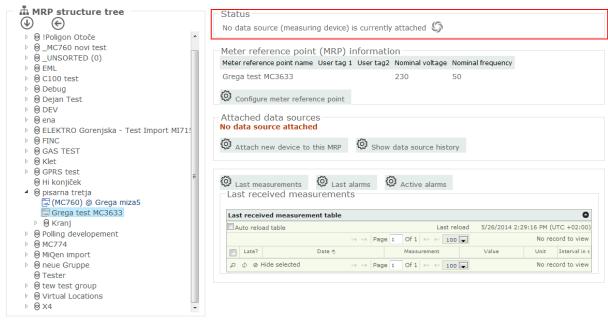


Figure 90: Measurement instrument status

3.5.4.3.3 Measurement instrument is attached and it has history of alarms in the selected timeframe

This status shows that a measurement instrument at this meter reference point is attached, it regularly pushes data (data does not deviate for more than the specified number of pushing periods) and that the measurement instrument has detected alarms in the selected timeframe.

Icon in tree structure is colored orange in this case:

If measurement instrument's pushing data is delayed at the same time, the icon turns red

because this information has display priority:

In the status section (the central part of the application window), there are two icons (wheels) in this case. The right one, which indicates information about the alarms, is colored orange:

Me	ter reference points Measurement idents	Devices User management	Status			Welcome, Ad	min! [Log off
≤	9	€	Measurements delay status 🚫	Alarm status 🕥 Is	online 🛱			
ew fi	By timespan:	AMR_Loggers	Meter reference point (MRF					
filter	< 1D 1W 1M 3M 1Y >	(?) @ X4G_Dom1	Meter reference point name User tag	-				
\$	From: To:	(?) @ X4G_KSkL1	Feeder #2	230	50			
MR	05/08/2013 00:00 05/08/2014 00:00	🔀 (?) @ X4W_En1	Configure meter reference poir	nt				
P s	By status:	 ✓ ⊗ Kovis □ (MC750) @ Testna naprava 	Attached data sources					
Tac la	No filter		Data source identification Data source	description Data source t	type Attached on	Is data upload allowed		
ture		🗔 Weidegans	MC004488	MC760	4/23/2013 2:24:40 PM (UTC +02:00)) 🥥		
e tree	By text:	▲ @ Otoče				-		
88	No search pattern	🛱 (MC760) @ HVAC 🛱 (MC774) @ Main Line	Detach device from this MRP	Disable upload	Show data source history			
		 Ø Substation 						
		 ○ (MC760) ○ Feeder #2 ④ virtual group □ meter point 1 ○ Virtual Meter Point 	Last measurements La Last received measurement		alarms			
			Last received measurement table					-

Figure 91: Measurement instrument status

3.5.4.3.4 Measurement instrument's data pushing is delayed

This status shows that a measurement instrument at this MRP is attached, but data pushing is delayed (data deviates for more than a specified number of pushing periods).

The icon in the tree structure is colored red in this case: \blacksquare



The icon remains red even in case of alarm within the specified timeframe, because this information has a higher priority.

In the status section (the central part of the application window), there are two icons (wheels) in this case. The left one which indicates information about regular pushing is colored red.

Status			
Measurements delay status 🗳	Alarm status 🌀 Is on	line 🚽	
Meter reference point (MRF) information		
Meter reference point name User tag	1 User tag2 Nominal voltag	e Nominal frequency	
X4W_En1	0	0	
Configure meter reference poir	nt		
Attached data sources			
Data source identification Data source	description Data source typ	e Attached on	Is data upload allowed
AQUADISDN15	?	6/10/2013 1:13:34 PM (U	JTC +02:00) 🤡
Detach device from this MRP	🔅 Disable upload	Show data source history	/

Figure 92: Measurement instrument status if data pushin is delayed

3.5.4.3.5 A measurement instrument is attached to an MRP but no data is received

This status shows that measurement instrument at this MRP is attached, but it has not been able to send any data yet.

Icon in tree structure is colored blue in this case: \Box

The last results and last alarms tables at bottom right are in fact empty, as shown below:

	Status Measurements delay status 🌀 Alarm status 🌀 Is online 🗟	
 ▶ Ø IPoligon Otoče ▲ Ø_MC760 novi test ➡ (MC760) @ KletMrp2 	Meter reference point (MRP) information Meter reference point name User tag 1 User tag2 Nominal voltage Nominal frequency	
 ▷ ⊖ _UNSORTED (0) ▷ ⊕ EML ▷ ⊕ C100 test 	KletMrp2 230 50	
 Ø Debug Ø Dejan Test 	Attached data sources	
▷ Ø DEV	Data source identification Data source description Data source type Attached on Is	data upload allowed
▷ 🛛 ena ▷ 🕲 ELEKTRO Gorenjska - Test Import MI7150 ▷ 🕲 FINC	MC003634 MC760 8/23/2013 1:45:41 PM (UTC +02:00))
 Ø GAS TEST Ø Klet 	Detach device from this MRP Disable upload O Show data source history	
 ▷ @ GPRS test ⊗ Hi konjiček ▷ @ pisarna tretja ▷ @ Polling developement 	Cast measurements Cast alarms Active alarms	
 	Last received measurement table	
Ø neue Gruppe	Auto reload table Last reload 5/26/2014 2:34:27 PM (UTC +02:00)	
0 Tester	No record to view	
 Ø tew test group Ø Virtual Locations 	Late? Date 🔶 Measurement Value Unit Interval in s	
 No virtual Eccadoris No X4 	ρ φ 0 Hide selected I Of 1 >>> >i 100 No record to view	

Figure 93: Measurement instrument status if no data is received

3.5.4.4 Additional information about meter reference point- Details

When an MRP is selected the *Details* section shows additional user information at central the part of the program window. There are two input fields for data input, icon on the right side indicates whether the MRP and corresponding measurement instrument are connected to the system inline or if the data is transferred into the system manually.

3.5.4.4.1 Editing additional MRP information



Additional information about a given MRP can be edited by clicking on the MRP. On the right side a window opens after clicking on *Configure meter reference point*, to open additional settings. A new section is where the MRP name can be changed and additional information related to an MRP can be entered to *User information 1* and *User information 2* fields. A checkbox *Is online*, tells that the device is connected to system via communication and automatic data pushing is enabled. Also Nominal voltage and frequency can be set.

Changes are confirmed by clicking the Save button.

Meter reference point (
Meter reference point name	User tag 1	User tag2	Nominal voltage	Nominal frequency
(MC760) @ MC774-26 Glavi	ni dovod		230	50
Configure meter reference Meter reference point	e point			
Name				
(MC760) @ MC774-26				
User information 1				
User information 2				
Is online				
V				
Nominal voltage				
230				
Nominal frequency				
50				
Save				

Figure 94: MRP setup window

3.5.4.5 Attaching measurement instrument to MRP

When the first data package arrives the MiSMART system registers a new measurement instrument, but meter reference point is nor assigned to it automatically. The measurement instrument will remain in an inactive state with the server refusing its data packages until theinstrument is attach to the desired meter reference point.

Attaching a measurement instrument to an MRP is divided into two steps. In the first step a measurement instrument is attached to an MRP while in the second one the proper permission to push data is assigned to the instrument.

3.5.4.5.1 Step 1 - Connecting measurement instrument to the MRP

When there is no measurement instrument attached to the MRP, *No device sources* caption can be seen in *Attached data sources* section. Underneath, there is *Attach new data sources to this meter reference point* button. By clicking on it a list for attaching measurement instrument opens up where all unattached measurement instruments are shown.

Attach new device to this MRP Show data source history	Attached data sources No data source attached	
	Attach new device to this MRP	Show data source history

Figure 95: No data sources attached to MRP

From the list of unattached measurement instruments, one instrument must be chosen, which will be then selected for a particular MRP. By right-clicking on *Attach device* of desired measurement instrument a new window opens, where setting up the instrument continues. If the measurement instrument is not on the list, refreshing is done by pressing *Reload unattached devices*.

-Attached dat	a sources			
No data source	attached			
Attach new d	levice to this MRP	Show data source histo	ry	
	ence point (MRP) i point name User tag 1 Us			
Reload unat	tached data sources			
		o this meter point— n Data source description I	Data source type	
W1100070	W1100070	1	X4W	Attach device
123456789	123456789		?	Attach device
08LA684177	08LA684177	1	?	Attach device
G1220236	G1220236	1	X4G	Attach device
G1300777	G1300777	1	X4G	Attach device
G1330014	G1330014	1	X4G	Attach device
MT005914	MT005914	1	UMT55	Attach device
MT005915	MT005915	1	UMT55	Attach device
MT005931	MT005931	1	UMT55	Attach device
MT005916	MT005916	1	UMT55	Attach device
MC011005	MC011005		?	Attach device

Figure 96: List of all measurement instruments

The process is completed by approving the selected unattached device by pressing the Yes or rejection by pressing *No* button in next step.

-Confirm Data	Source Attach to	this Meter Point	
Yes No			

Figure 97: Approval of setup

The attached measurement instrument now appears in *Attached data sources* section, where it can be activated to start data pushing. It also appears in *Data sources history* section, which is activated by clicking *Show Data source history*. This section shows accumulated history of all measurement instruments attached to this meter reference point. The date of attachment is added automatically, as well as date, when measurement instrument is removed from meter reference point.

Attached data source	ces				
Data source identification Da	ata source description Da	ata source type	Attached on		Is data upload allowed
MC004488	M	C760	4/23/2013 2:24:40 PM (U	JTC +02:00)	0
😳 Detach device from th	iis MRP 🛛 🙆 Disable	upload 🔘	Show data source history		
Data sources histo	pry				
Data source name	Data source identification	Attached on		Dettached on	
MC004488	MC004488	4/23/2013 2	2:24:40 PM (UTC+02:00)	5	

3.5.4.5.2 Step 2 - Activating and deactivating measurement instruments

Data pushing of a measurement instrument is enabled by clicking on the *Enable data upload* button in *Attached data source* section. This means that the server will be attached to the MRP at next pushed data (which comes from the measurement instruments at the next push data interval which is setup in the instrument) All data packages will be attached to this MRP from the point of activation all the way to the deactivation of a particular measurement instrument.



Attached data sources			
Data source identification Data source descri	iption Data source type	Attached on	Is data upload allowed
MC004488	MC760	4/23/2013 2:24:40 PM (UTC +02:0	00) 🚫
Detach device from this MRP	Enable data upload	O Show data source history	
Enable device upload			
Meter point info: Feeder #2, , Device info: MC004488 (MC004488)			
Enable data upload Yes No			

In the above case an icon for measurement instruments status, data pushing and information about alarms in the selected timeframe is colored green. Also in *Attached data source device* section a green button appears, which indicates that the measurement instrument is activated.

To deactivate measurement instrument, click *No* button at *Enable data upload*. After doing this the MiSMART server will stop accepting data packages from attached measurement instruments, and the user can detach the instrument from an MRP.

	Attached data sou	ILCOS			
	Data source identification		ription Data source t	ype Attached on	Is data upload allowed
	MC004488		MC760	4/23/2013 2:24:40 PM (U	FC +02:00) 🥥
ł	Oetach device from	this MRP	Disable upload	O Show data source history	
	Disable device	upload			
	Meter point info: Fee Device info: MC0044				
	Disable upload Yes	No			

Figure 98: Detaching an instrument from an MRP

3.5.4.6 Replacing measurement instrument at MRP

To attach a new measurement instrument to an MRP, the old one must first be deactivated and then detached. For the deactivation process, please see the previous chapter.

To attach a new measurement instrument use the procedure "Attaching measurement instrument to meter reference point" as described in one of the preceding chapters.

3.5.4.7 Information about measurements and alarms on selected MRPs

In the lower part of the central application window, additional information to assist in the quick analysis of the system is available.

3.5.4.7.1 Last Measurements

By clicking on *Last Measurements* button, last data, received from the attached measurement instrument is shown in a table. If no measurement instrument is attached to an MRP this list will remain empty. The displayed list contains the last data packages received from the instrument and is is automatically displayed if the selected MRP with the attached measurement instrument holds data.

The list includes the following information about recently obtained results:

- Time tag after UTC (for central Europe the local time is +1 in winter and +2 in summer)
- Measured idents (i.e. measurements)
- Value
- Unit



- pushing interval

ast	receiv	ved measurement table				0
		ad table	Last reload	5/15/2014 12:24	:48 PM (U	-
		ia <a pag<="" th=""><th>e 1 Of 1 → > 1 100 ▼</th><th>Da</th><th>ta point 1</th><th>- 48 Of 48</th>	e 1 Of 1 → > 1 100 ▼	Da	ta point 1	- 48 Of 48
	Late?	Date 📥	Measurement	Value	Unit	Interval in s
	0	5/15/2014 12:19:00 PM (UTC +02:00)	U1 #_max	228.47	V	60
	v	5/15/2014 12:19:00 PM (UTC +02:00)	U2 #_max	228.77	v	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	U3 #_max	228.05	v	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	U1 #_min	226.65	v	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	U2 #_min	226.9	v	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	U3 #_min	226.15	v	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	I1 #_max	242.3	А	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	I2 #_max	253.1	А	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	I3 #_max	312.3	А	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	I1 #_min	138.7	А	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	I2 #_min	142.8	А	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	I3 #_min	215.4	А	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	P #_max	172300	W	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	Q #_max	43400	var	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	S #_max	177000	VA	60
	0	5/15/2014 12:19:00 PM (UTC +02:00)	Inc #_max	96.4	А	60
	0	5/15/2014 12:20:00 PM (UTC +02:00)	Q	35800	var	300
	0	5/15/2014 12:20:00 PM (UTC +02:00)	S	131500	VA	300
	0	5/15/2014 12:20:00 PM (UTC +02:00)	I	577.2	А	300
	0	5/15/2014 12:20:00 PM (UTC +02:00)	Inc	70.7	A	300
	0	5/15/2014 12:20:00 PM (UTC +02:00)	Uu	0.04	%	300
	v	5/15/2014 12:20:00 PM (UTC +02:00)	ePF1	1.0494	?	300

Figure 99: Received data table showing last measurements which are up to date

If the measurement instrument is late in data pushing (status - measurement instrument's data pushing is delayed) the late results are colored red together with exclamation mark icons.

.ast rece	ived measurement table				0
Auto re	load table	Last reload	5/15/2014 1:14	:33 PM (U	TC +02:00
	14 KA Page	1 Of 1 →> > > 100 ¥	Da	ta point 1	- 54 Of 54
Late	P Date 🔶	Measurement	Value	Unit	Interval in s
•	1/22/2014 8:20:00 AM (UTC +01:00)	Q	0	var	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	S	0	VA	300
	1/22/2014 8:20:00 AM (UTC +01:00)	I	0	Α	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	Inc	0.003	Α	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	Uu	0	%	300
	1/22/2014 8:20:00 AM (UTC +01:00)	ePF1	1	?	300
	1/22/2014 8:20:00 AM (UTC +01:00)	ePF2	1	?	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	ePF3	1	?	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	PF	1	?	300
	1/22/2014 8:20:00 AM (UTC +01:00)	PF1	1	?	300
	1/22/2014 8:20:00 AM (UTC +01:00)	PF2	1	?	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	PF3	1	?	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	E1	40	Wh	300
	1/22/2014 8:20:00 AM (UTC +01:00)	E2	160	varh	300
	1/22/2014 8:20:00 AM (UTC +01:00)	E3	0	Wh	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	E4	20	varh	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	Voltage phase 1	0	v	300
	1/22/2014 8:20:00 AM (UTC +01:00)	U2	0	v	300
	1/22/2014 8:20:00 AM (UTC +01:00)	U3	0	v	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	I1	0	Α	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	12	0	A	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	I3	0	Α	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	Phase 1 power	0	W	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	P2	0	W	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	P3	0	w	300
•	1/22/2014 8:20:00 AM (UTC +01:00)	Q1	0	var	300
	1/22/2014 8:20:00 AM (UTC +01:00)	Q2	0	var	300

Figure 100: Received data table showing last measurements which are not up to date



List data items are colored red where data is not up to date (delayed). Status is set to "measurement instrument's data pushing is delayed" and remains in this condition until the data does not synchronize with the server again. An example of this is when the user sets new Measurement idents in memory of a particular measurement instrument. (see the setting up measurement instrument chapter later in this document)

If the user is aware of these changes and knows that certain idents (measurements) will no longer be received by the server, he should hide this information manually by pressing the *"Hide selected"* button underneath the table.

3.5.4.7.2 Last alarms

By clicking the *Last alarms* button all alarms, which were detected by the measurement instrument on an MRP are shown. This may also be seen from the tree structure by observing the MRP status.

The last alarm list includes following information about alarms:

- Time tag after UTC (for central Europe the local time is +1 in winter and +2 in summer)
- Measured idents (i.e. measurements)
- Set condition (higher or lower)
- Idents limit
- Unit
- On\off thermal function on alarm
- Alarm status (On\Off or interruption and return of supply)
- Alarm duration

	-		Last alarms								
A	arm	15									
lar	ms in t	time period, for sele	cted meter points								
lar	m Tag	ging: Not planned	d 🔻 Select Alarm Description 🔻 Ta	ag Alarm Edit Descriptions							
		Meter point	Alarm Start Time	Alarm End Time 🛬	Duration	Measurement	Condition	ConditionValue	Function	Planned	User description
										×	
1		Feeder #2	2/17/2014 11:58:38 AM (UTC +01:00)	2/17/2014 12:21:11 PM (UTC +01:00)	0:22:33	Voltage phas		200 V	O	Not planned	
2		Feeder #2	2/17/2014 11:58:38 AM (UTC +01:00)	2/17/2014 12:21:11 PM (UTC +01:00)	0:22:33	U2		200 V	0	Not planned	
3		Feeder #2	2/17/2014 11:58:38 AM (UTC +01:00)	2/17/2014 12:21:11 PM (UTC +01:00)	0:22:33	U3		200 V	0	Not planned	
4		Feeder #2	2/17/2014 11:56:05 AM (UTC +01:00)	2/17/2014 12:20:50 PM (UTC +01:00)	0:24:45	PowerOff	Ŧ	0 STAT_ALM	O	Not planned	
5		Feeder #2	2/17/2014 11:56:05 AM (UTC +01:00)	2/17/2014 11:58:38 AM (UTC +01:00)	0:02:33	PowerOff		0 STAT_ALM	0	Not planned	
6		Feeder #2	2/13/2014 6:42:52 PM (UTC +01:00)	2/13/2014 6:43:12 PM (UTC +01:00)	0:00:20	Voltage phas		200 V	O	Not planned	
7		Feeder #2	2/13/2014 6:42:52 PM (UTC +01:00)	2/13/2014 6:43:12 PM (UTC +01:00)	0:00:20	U2	Ŧ	200 V	O	Not planned	
в		Feeder #2	2/13/2014 6:42:52 PM (UTC +01:00)	2/13/2014 6:43:12 PM (UTC +01:00)	0:00:20	U3		200 V	0	Not planned	
9		Feeder #2	2/13/2014 6:42:19 PM (UTC +01:00)	2/13/2014 6:42:52 PM (UTC +01:00)	0:00:33	PowerOff		0 STAT_ALM	0	Not planned	

Figure 101: A chronological list of all alarms at a selected MRP

3.5.4.7.3 Setting planned and unplanned alarms

From the *Last alarms* table it is also possible to setup whether a particular alarm is unplanned or planned. This is important for statistics, because an alarm event which is marked as planned is excluded from the statistical dataset. By default all alarms are set to be unplanned. This can, however, be changed upon the users' request.

This is done in the upper part of *last alarm* table:



lar	ms									
me i	in time neriod for	selected meter points		1						
rm Ta	agging: Not pla	nned 🔻 Select Alarm Description 🔻	Fag Alarm Edit Descriptions							
				Duration	Measurement	Condition	ConditionValue	Function	Planned	User description
									× v A	
	Feeder #2	2/17/2014 11:58:38 AM (UTC +01:00)	2/17/2014 12:21:11 PM (UTC +01:00)	0:22:33	Voltage phas		200 V	O	Not planned	
	Feeder #2	2/17/2014 11:58:38 AM (UTC +01:00)	2/17/2014 12:21:11 PM (UTC +01:00)	0:22:33	U2		200 V	0	Not planned	
	Feeder #2	2/17/2014 11:58:38 AM (UTC +01:00)	2/17/2014 12:21:11 PM (UTC +01:00)	0:22:33	U3		200 V	0	Not planned	
	Feeder #2	2/17/2014 11:56:05 AM (UTC +01:00)	2/17/2014 12:20:50 PM (UTC +01:00)	0:24:45	PowerOff		0 STAT_ALM	0	Not planned	
	Feeder #2	2/17/2014 11:56:05 AM (UTC +01:00)	2/17/2014 11:58:38 AM (UTC +01:00)	0:02:33	PowerOff		0 STAT_ALM	0	Not planned	
	Feeder #2	2/13/2014 6:42:52 PM (UTC +01:00)	2/13/2014 6:43:12 PM (UTC +01:00)	0:00:20	Voltage phas		200 V	0	Not planned	
	Feeder #2	2/13/2014 6:42:52 PM (UTC +01:00)	2/13/2014 6:43:12 PM (UTC +01:00)	0:00:20	U2		200 V	0	Not planned	
	Feeder #2	2/13/2014 6:42:52 PM (UTC +01:00)	2/13/2014 6:43:12 PM (UTC +01:00)	0:00:20	U3		200 V	0	Not planned	
	Eeeder #2	2/13/2014 6:42:19 PM (UTC +01:00)	2/13/2014 6:42:52 PM (UTC +01:00)	0:00:33	PowerOff		0 STAT_ALM	0	Not planned	

Figure 102: Setting planned and unplanned alarms at an MRP

First you should select the desired alarms on the left side of section by clicking on the checkmarks a next to these alarms. If necessary a description can be edited by choosing the *Edit Descriptions* option. Following dialog window appears:

Alarm Descriptions		
+/ @ ₽ \$	I ≪ Page 1 of 1 ⇒ ⇒ 20 ▼	No record to vie
	Alarm description 🚖	Usage count
+ / = 0 \$	IN A Page 1 of 1 IN IN 20 V	No record to vie

Figure 103: Add description for planed alarm dialog box

After confirming selection with OK button, added description can be selected and tagged in a dropdown menu [Select Alarm Description * Tag Alarm].

3.6 Virtual locations

This tool enables creating operations on existing idents (measurements) coming from one one or multiple MRPs.

The operators for creating operations are:

- addition,
- subtraction,
- multiplication,
- division,
- brackets (precedence operators).

This tool is accessible within Configuration Tools/Meter reference points.

3.6.1 Creating a new virtual location

A new virtual location can be created by right-clicking on a MRP within the MRP structure tree. In the menu you should select the option – *Add to Virtual Location*.



Me	ter reference points Measurement idents	Devices User ma	inagement		
View filters	View filters	↓	power plant		
MRP	05/08/2013 00:00 05/08/2014 00:00	create		»	group of items
	By status:	rename			Meter point
structure	No filter	delete			Virtual Meter Point
Ę		edit		*	
e tree	By text: No search pattern		d all subnodes se all subnodes		

Figure 104: Creating a new virtual location

A newly added virtual location then appears within the MRP structure tree at the desired location.

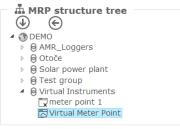


Figure 105: Virtual location

By left-clicking the virtual location settings of the virtual location can be accessed at the right side of the screen:

Merilna mesta Tipi meritev Naprave Uporabniško or						Pozdravljen, Ad	lmin! [Odjavi se
	Strukturno drevo MM Status	S						
Q (4)	DEMO Virtualr	Ina lokac	ija 🔽					
Po časovnem območju:	Solar power plant Solar power plant Brest Poligon Brest proup Brest proup Brest proup Brest proup Dirtual Instruments Bielektro Primorska - test Cjunattached meter point Birtual Meter Point 1 Birtual Meter Point 1 Bi	rilnega mes I Meter P Infiguriraj I Ina mest EMO Test Pol C (MC7) (MC7) tualne me ualne m	merilno mesto a za vključitev v virtualne meritvo ligon 60) @ HVAC 74) @ Main Line urtve		nca			
		0						
	Virtual	alne merity	ve					0
	Osve	ežuj tabelo		Zadnja os				UTC +01:00)
			Formula	Datum 🖕	Meritev	Vrednost	Enota	Interval v sek
		X	Main Line.P #_max.60 + HVAC.P #_max.60	22.1.2015 14:37:00 (UTC +01:00)	sum_P	136400	w	60
		×	Main Line.P #_max.60 + HVAC.P #_max.60	22.1.2015 14:37:00 (UTC +01:00)	P_vsota	136400	w	60
				14 Stran 1 Od 1 30 -			Podatel	k 1 - 2 Od 2

Figure 106: Settings related to a virtual location

All the virtual location-related settings are described within the following chapters.

3.6.1.1 Status

Status Virtual Location

Figure 107: Virtual location status

3.6.1.2 Meter reference point (MRP) information

This section shows the basic information of the selected virtual location.



By clicking on *Configure meter reference point* ^{Configure meter reference point} information related to the virtual location can be accessed:

Meter reference point (MRP) information
Neter reference point name User tag 1 User tag2 Nominal voltage Nominal frequency
Virtual Meter Point
Configure meter reference point
Meter reference point
Name
Virtual Meter Point
User information 1
User information 2
Is online
Nominal voltage
Nominal frequency
Save

Figure 108: Configuring a meter reference point

The Virtual Location can have the following information: *Name, User information 1, User information 2, Is online, Nominal voltage and Nominal frequency.*

The process of setting up a virtual location is then concluded by pressing the Save button -

3.6.1.3 MRPs to be included into a virtual location

This section shows all MRPs which can be manipulated within this virtual location.

Meril	lna mesta za vključitev v vir	tualne meritve		
4 🕥 [DEMO			
i	🛛 Test Poligon			
	🔜 (MC760) @ HVAC			
	(MC774) @ Main Line			

Figure 109: MRPs to be added to a virtual location

The process of adding MRPs with attached devices is described in the section 3.6.2.

3.6.2 Adding existing MRPs into a virtual location

By left-clicking on a previously created virtual location its details can be accessed.

MRPs are then added to the selected virtual location by right-clicking on a MRP from the MRP structure tree and selecting the option *Add to virtual location*.

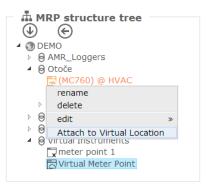


Figure 110: Adding an existing MRP into a virtual location



The selected MRP can now be seen under the section *MRP*(*s*) to be included in virtual measurement:

 ▲ ③ DEMO ▲ ③ Test Poligon □ (MC760) @ HVAC □ (MC774) @ Main Line 	Merilna mesta za vključitev v virtualne meritve
	✓ Ø Test Poligon □ (MC760) @ HVAC

3.6.2.1 Virtual measurements

This is a tool for creating new virtual measurements within a selected virtual location.

The Add new virtual measurement should be clicked after which a new window appears:

t remote monitoring MiSmart System	n v3.5 (May 2014)	Add new Virtual Mea	surement		×					
ference points Measurement idents View filters O	₩ MRP structu	1 Measure		ula Formula				Welco	me, Admi	in![Log
1	O DEMO O AMR_Logger	Measurement								
timespan: 10 1W 1M 3M 1Y >	 Ø Otoče Ø Solar power 	Ident	Select an Ident	*		requency				
: To:	 Ø Test group Ø Virtual Instru 	Unit	Select an Unit	Ψ.						
2013 00:00 05/08/2014 00:00	Treter poli	Dataset operation	Select a result operation	*						
itus: Iter *		Time Interval [min]	Select a time interval	*						
t:										
earch pattern										
							Last reload	6/3/2014 8:	15:53 AM (U	O TC +02:00)
							Messurement	Value	Unit	Interval in s
						JTC +02:00)	sum_P	175820	W	60
						JTC +02:00)	P_vsota	175820	W	60

Figure 111: A new virtual measurement

The tool for creating a new virtual measurement appears which consists out of 2 parts – *Measurement* and *Formula*

Measurement:

1 Measure	
Measurement	
Ident	P_vsota *
Unit	W (W) *
Dataset operation	None v
Time Interval [min]	1 *

Figure 112: A new virtual measurement – Measurement



An arbitrary new *Ident name* (or an existing one) should first be selected as well as the *Unit*, *Operation* and *Time interval*. The time interval depends on the intersection of the selected unit as well as the MRPs which are included.

Then the button *Next* should be pressed.

Formula:

ld new Virtual Measurement	:	
Formula		
Add operator or constant	Add measurement (from MRP)	
Main Line	• P #_max [W] •	++ ×
+	v	*+ ×
HVAC	• P #_max [W] •	★+ ×
	Previous Next	Finish

Figure 113: A new virtual measurement – Formula

First the Add measurement (from MRP) should be selected Add measurement (from MRP) which offers all available MRPS already included to this virtual location. After a desired MRP has been selected the measurement dropdown menu appears on the right side where an appropriate measurement from this MRP should be selected.

Add operator or constant	Add measurement (from MRP)	
Select a MRP		++ ×
Main Line HVAC		

Figure 114: Select an MRP

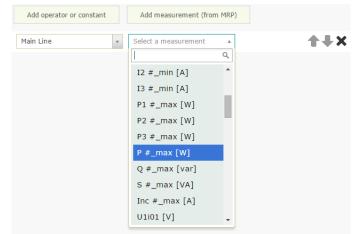


Figure 115: Select a measurement

The current selection can be deleted with $|\mathbf{X}|$.

By clicking on the *Add operator or constant* button a dropdown menu with all available operators is shown:

Add operator or consta	ant	Add measurement (f	rom MRP)	
Main Line	Ŧ	P #_max [W]	*	★↓ ×
Enter an operator	*			↑+× ↑+×
+	Q			
-				
*				
/				
(
)				

Figure 116: Selecting the addition operator

Measurements and operators can be moved up and down by pressing \clubsuit .

The procedure should then be repeated for as long as the desired formula is created.

The process is concluded with the **Finish** button.

A new virtual measurement should then appear in the list of available virtual measurements:

Virtual	Measu	ements							0
Auto	reload t	able			L	ast reload	1/23/2015 8:54:11 AM (UTC +01:00		
			Formula		Date 🖕	Measurement	Value	Unit	Interval in se
	×	Main Line.P #	_max.60 + HVAC.P	#_max.60	1/23/2015 8:56:00 AM (UTC +01:00)	P_vsota	209040	W	60
					I < < Page 1 Of 1 ⇒ ⇒I 30 ▼			Data poin	nt 1 - 1 Of 1

Figure 117: Existing virtual measurements

3.6.2.2 Edit virtual measurement

To edit an existing virtual measurement click icon next to the measurement you would like to edit:



Status Virtual Location 🔁					
Meter reference point (MRP) information Meter reference point name User tag 1 User tag2 Nominal voltage Virtual Meter Point Ornfigure meter reference point	Nominal frequency				
- MRP(s) to be included in virtual measurement					
Virtual Measurements Virtual Measurements					
Virtual Measurements					0
Auto reload table		ast reload	1/23/2015 8:		
Formula Main Line.P #_max.60 + HVAC.P #_max.60	Date - 1/23/2015 8:56:00 AM (UTC +01:00)	Measurement P_vsota	Value 209040	Unit	Interval in se 60
	H < Page 1 Of 1 → > 30 ▼	_		Data poir	nt 1 - 1 Of 1

Figure 118: Edit virtual measurement

New window will open where you edit chosen measurement:

dit Virtual Measurem	ent		
1 Measure Select/add measure		2 Formula Compose Formula	
Formula			
Add operator or co	nstant	Add measurement (from MRP)	
Main Line	v	P #_max [W] v	*+ ×
+	v		* +×
HVAC	v	P #_max [W]	*+ ×
Enter an operator	A		★↓ ×
+	٩		
-			
*			
(
)			
		Previous	lext Finish

Figure 119: Edit virtual measurement formula

Edit options:

- Add operator or constant
- Add measurement (from MRP)
- Delete operator/measurement X
- Move operator/measurement ⁺

The process is concluded with the **Finish** button.

3.7 A tool for editing the display of measurement parameters (idents)

This tool is aimed at editing the display of measurement parameters in the program MiSMART. With this tool the user can freely link to measurements to measurement groups, and can simplify searching and filtering for a specific measuring parameter in MiSMART Data tools browser.

A certain new ident (measurement) will appear on the list of all idents, as soon as any of the system attached measurement instruments sends such an ident into the system. By clicking on any Measurement ident in the Measurement group tree structure, a Measurement information window opens up at the right side with list of measurements in this group:

Meter reference points Measurement ide	ents Devices	User management			
ပ် Measurement groups	Measur	ements configura	tion		
Search tree:	Group desc	ription Phase voltages		Save	
Measurement groups	List of Meas	urements in this group			0
Alarmi ON/OFF		Measurement	Unit	Chart type	Operation
🕨 👶 Analogue I/O	+ 📑	U1 avg	Volt	Line chart	No operation
🖻 💑 Current		U2 avg	Volt	Line chart	
🖻 👶 Digital I/O	+ 🗐	U2 avg	Voit	Line chart	No operation
🖻 🐥 Energy counters	+ 💷	U3 avg	Volt	Line chart	No operation
🖻 👶 Flicker					
🖻 👶 Frequency					
Harmonics					
🖻 👶 Interharmonics					
🖻 💑 Napake					
OTHERS					
🖻 👶 Phase Angle					
🖻 📥 Power					
Power Angle					
Power factor					
🕨 🜲 Signaling voltage					
Temperature					
🕨 📥 THD					
🕨 嶤 Virtual measurements					
4 👶 Voltage					
Others					
A Phase to phase voltages					
🔺 🚕 Phase voltages					
Þ 👶 Max					
🖻 👶 Min					
🛛 U1 avg, V					
🖄 U2 avg, V					
🛛 U3 avg, V					
🖻 💑 X4 meritve					

Figure 120: Measurement idents

Clicking + icon on the left side of measurement ident, reveals *List of MRP's with this measurement*.

	Measurement		Unit	Chart type			Operation				
5	U1 avg		Volt	Line chart		No operation					
List of MRP's with this measurment											
Measurements			Timestamp	Value	Interval in s	Meas. id	Meas. desc.	Unit id.	Unit	Visible	Late
	Kurnik	10/28/2012	4:00:00 AM (UTC +01:00)	108	900	U1	U1 avg	V	Volt		0
Klet Produkcija3a 7 Klet Produkcija3a 7 MRP4472abcde 1		8/30/2012 1	1:06:00 AM (UTC +02:00)	148.85	60	U1	U1 avg	V	Volt		0
		7/26/2012	9:21:00 AM (UTC +02:00)	227.85	60	U1	U1 avg	V	Volt	V	0
		7/26/2012	9:15:00 AM (UTC +02:00)	227.17	900	U1	U1 avg	V	Volt	1	0
		12/24/2011	6:00:00 AM (UTC +01:00)	228.95	900	U1	U1 avg	v	Volt	\checkmark	
		3/31/2012 1	2:25:00 PM (UTC +02:00)	230.4	300	U1	U1 avg	v	Volt	\checkmark	
	serial push test	12/27/2011	11:30:00 PM (UTC +01:00)	229.9	900	U1	U1 avg	v	Volt		
	serial push test	4/1/2012	:10:00 PM (UTC +02:00)	230.3	300	U1	U1 avg	v	Volt		•
	Kurnik	7/24/2012	4:03:00 AM (UTC +02:00)	228.67	60	U1	U1 avg	v	Volt		•
	Grega miza5	8/30/2012 1	1:00:00 AM (UTC +02:00)	149.45	600	U1	U1 avg	v	Volt		•
	Proizvodnja E	1/23/2015 1	2:40:00 PM (UTC +01:00)	222.2	600	U1	U1 avg	v	Volt	1	e
	Proizvodnja E	1/23/2015 1	2:30:00 PM (UTC +01:00)	221.8	900	U1	U1 avg	v	Volt	1	C
	(MC760) @ Aneks AB	4/8/2013 1	0:12:00 AM (UTC +02:00)	225.32	60	U1	U1 avg	v	Volt	1	•
	(MC760) @ Aneks AB	4/8/2013 1	2:00:00 PM (UTC +02:00)	224.42	900	U1	U1 avg	v	Volt	1	•
	MM 764	1/1/2010 1	2:00:00 AM (UTC +01:00)	123	60	U1	U1 avg	v	Volt	V	•
	Produkcija	1/23/2015 1	2:40:00 PM (UTC +01:00)	224.1	60	U1	U1 avg	v	Volt	V	e
Produkcija 1/23/		1/23/2015 1	2:30:00 PM (UTC +01:00)	221.82	900	U1	U1 avg	v	Volt	V	e
	TPOtoče 7/1/2005		:00:00 PM (UTC +02:00)	224.27	600	U1	U1 avg	V	Volt		•
	TEST ALARMI	1/2/2014 7	:49:00 PM (UTC +01:00)	225.35	60	U1	U1 avg	V	Volt	V	•
	EG L	8/29/2012 1	2:20:00 PM (UTC +02:00)	0	600	U1	U1 avg	v	Volt	V	•
	U2 avg Volt		Volt	Line chart		No operation					
Ĩ.	U3 avg		Volt	Line chart				No operation			

Figure 121: List of MRP's with this measurement

To close *List of MRP's with this measurement* click on <u>-</u> icon.



3.7.1 Window Appearance

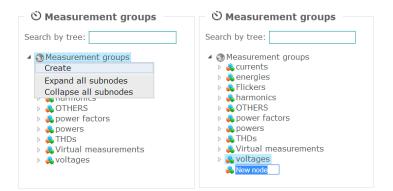
On the left side of the window, the tree structure of the measured parameters (idents) is shown. These are at the start of the program all gathered in a group Others. In this window it is possible to add new groups and to move measurements idents from one group to another. The middle part of the window is intended to provide information about each measurement ident and possibility of adapting every particular ident's parameters.

3.7.2 Creation of measuring quantity node

Measuring node, to which measured idents – *Measurements* can be attached is created by right mouse click on the parent group. This opens the drop-down menu where you select the option *Create*.

In the tree structure at the appropriate location a new empty group named *New node* appears, which can be arbitrarily renamed. The process of creation is completed by pressing the *Enter key*.

The user can create a tree structure of group on larger number of levels of subgroups.



3.7.3 Renaming, deleting and moving measurement groups

Over a measurement group it is possible to carry out various operations, which are mostly accessible by right-clicking on a selected measurement group.

ම Measurement groups
Search by tree:
Measurement groups
A currents
Create
Rename
Delete
Expand all subnodes
Collapse all subnodes
🕨 👶 THDs
🕨 🚑 Virtual measurements
🕨 🚕 voltages

3.7.4 Renaming measurement groups

Measurement groups can be renamed by choosing the command *Rename*. After the selected command, the name field of the measurement group turns blue and it is possible to enter a different name or edit the existing one. The operation is confirmed by pressing the *Enter* key.

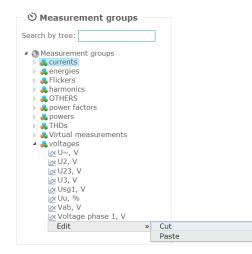


3.7.5 Deleting measurement groups

Measurement groups can be deleted by choosing the command *Delete*. To perform this action the group should not contain any measurement idents or a subset of the measurement idents. After the execution of the operation a notice of a successful deletion of the measurement idents is given.

3.7.6 Moving measurement groups

Measurement groups together with its sub-groups and measuring idents can be moved to any other location in the tree groups. To make a move, mark the group (only the parent element), right-click on it and select command *Cut* in the *Edit* group. Then move the mouse to the desired location, right-click on it and select command *Paste* in the *Edit* group. Another possibility is to mark and drag (left-click on the highlighted group) measurement group to the desired location.



3.7.7 Moving a measurement idents to measurement groups

Measurement idents or measurement groups, together with its sub-groups and measuring idents can be moved to any other location in the tree groups. To make a move, mark the group (only the parent element), right-click on it and select command *Cut* in the *Edit* group. Then move the mouse to the desired location, right-click on it and select command *Paste* in the *Edit* group.

Another possibility is to mark and drag (left-click on the highlighted group) measurement group to the desired location.

💛 Measurement groups	
Search by tree:]
 ✓ Measurement groups ▷ currents 	
Edit >> ∠ U23, V ∠ ∠ U3, V ∠ ∠ U3, J, V ∠ ∠ U3, J, V ∠ ∠ U3, J, V ∠ ∠ Vab, V ∠ ∠ Vab, V ∠ ∠ Voltage phase 1, V	Cut Paste

3.7.8 List of measurements in this group

3.7.9 Details edit of the individual measurement idents

The user has the option to set his own names for the measurement idents, as well as the type of graph, on which it is shown in MiSMART Data tools.

ර Measurement groups	Measureme	ents config	uration			
Search by tree:	Group descriptio	n	Sa	ve		
 Measurement groups Acurrents 	List of Measuremer	Measuremen	ts details		×	Operation
<u>∞</u> I1, A <u>∞</u> I2, A ∞ I3, A	+	Ident name:	I1 (I1)		,	No operation
Inc, A ▶ ♣ energies ▶ ♣ Flickers		Unit	A (A)	- -		
Armonics		Chart type	LINE	Ŧ		
 A OTHERS A power factors 		Operation	None	Ŧ		
 A powers A THDs A Virtual measurements 						
voltages			Sa	ve changes	Cancel	

Figure 122: Details edit idents



3.7.10 Changing the name and unit of the measurement idents

Each measurement ident that appears in the system has its own identifiable name (*Measurement description*) and unit (*Unit description*). Since the default name in some cases, does not suit user, he can change name and description of the unit for each measurement ident:

Ident name:	PowerOff (Power Supply Interr	Ŧ	o,
Unit	STAT_ALM (STAT_ALM)	Ψ	o,
Chart type	LINE	Ψ	
Operation	None	Ŧ	

Figure 123: Edit idents name and unit description

3.7.11 Graphical presentation of measurement idents

For each measurement ident the type of graph can be set, line, bar graph or a special graph to display *Power Factor*.

3.7.12 Recalculating the displayed values - Daily Energy consumption graph

For some measurement idents it makes sense to display data as a consumption graph. Consumption represents the difference between the new value and the last sent value and thus only shows the differential between neighboring values.

When all the desired parameters are set, save the changes by clicking the Save button.

4 Setting up measurement instruments to connect into the system by using the MiQEN Setting Studio SW

To connect measurement instruments into the MiSMART system it is first necessary to setup all necessary measurements (e.g. current and voltage shifts, energy settings,...) together with some other parameters which is described in the following pages.

4.1 Ways to set up and communicate to the measurement instruments

A user can communicate with a measurement instrument in multiple ways, via the MMC/SD card or any of the built-in communication options. The procedures to do this are described in the instrument instruction manual of a swell as in the "Help" file of the MiQen configuration SW, which is the main tool for setting up measurement instrument.

When installing many new measurement instruments into the system it is recommended to create setting files (.msf files) for every particular instrument type which can then be cloned into other instruments within a larger group. A typical example for this could be a standardized transformer station with a standard set of measurements, alarms, and communication parameters ... In this case the user should first transfer these settings into all instruments, and then make other changes manually (e.g. gear settings, location,...)

4.1.1 MMC/SD card

MMC/SD card is a memory card which can be used for different purposes. In addition to storing data from the device memory and updating measurement instrument SW, it can also be used to transfer settings from and to the measurement instrument. Detailed procedures are described in the instruction manual for every measuring instrument.

4.1.2 USB communication

Users can connect to the measurement instrument via USB communication. Using this option is most appropriate when the user is physically near the instrument and can connect directly to it directly. Settings can be read and properly configured by using the MiQen configuration SW. Before the first USB connection to the measurement instrument, the user should first install the USB driver on their computer.

4.1.3 Ethernet communication

Ethernet communication is used if you want to access a measurement instrument from a remote location. Prerequisites for this to work are proper communication infrastructure, appropriate measurement instrument communication settings where one should know all these parameters (Measurement instrument IP, port).

4.2 Setting the instrument step-by-step

To include the measurement instrument into the system and to correctly display the information, the following parameters should be correctly set:

- Time zone and summer/winter time settings
- Communication settings for the server
- Setting up measurements for sending to the server



4.2.1 Time, time zone, summer/winter time

Correct setting of the time zone and the transition between summer and winter time is needed for correct operation. If time settings are done properly data timestamp on the server side have the correct time stamp, and also correct local time is shown in the measurement instrument. All data packages which are transmitted to the MiSMART system are equipped with a time stamp in UTC (Universal Time Code), which gets stored directly into the database. When interpreting the data with MiSMART this time is localized to the users local computer time.

For example the following instrument settings would typically apply for Slovenia: Time zone: GMT + 1:00 European Central Time (Brussels) Auto summer/winter time: Yes

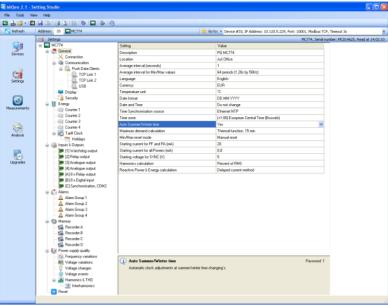


Figure 124: Time related settings

Time synchronization of measurement instruments and its settings are described in the next chapter "Communication settings for data transfer and measurement instrument time synchronization"

4.2.2 Communication settings for data pushing and measurement instrument time synchronization

To push data to the server, an IP address and port (to which data is transmitted) setup is required. The measurement instrument can push data to two different IP addresses, while the synchronization is set to one of these.

4.2.2.1 Communications settings for data transfer - IP server

A user can set two different TCP addresses to which data is transmitted (i.e. pushed). In addition to configuring communication parameters such as IP addresses and communication ports the user should also setup a proper data format of pushed packages and response times.

IP address and ports depend on the settings of each individual server that receives the data.

Data format for the measurement instrument which are included in the MiSMART system, must be set to: XML – Smart.



Response time in systems with fast communication should be set to less than 10s. For systems with slow communication, this setting can be higher.

This setting affects the transmission speed when there are large amounts of data in the measurement instrument memory. For response time settings under 10s, measurement instruments send data one by one. For settings over response times over 10s, each data package is automatically delayed for 10% of the set value. To see more details on this mechanism please see the appropriate instrument users' manual.

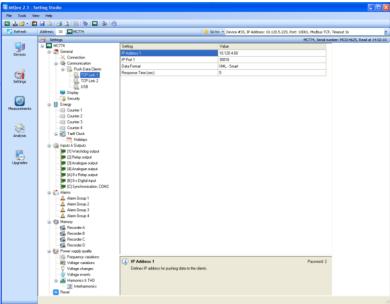


Figure 125: Communication settings

4.2.2.2 Measurement instrument time synchronization

For automatic time synchronization, you must setup through which server the device will be synchronized. In this process the device is synchronized to the server clock during every successful push package sending to the server. The setting is made in the Push data clients node under Communication:

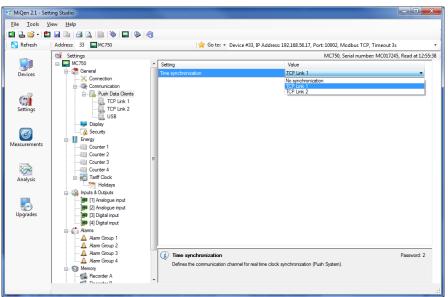


Figure 126: Automatic time synchronization



4.2.3 Settings for measurements and alarms pushing

Measuring center MC7xx can push measurements and alarms data, which are stored in the internal device memory. The data are equipped with the same time tags as in the internal memory. For each part of the memory the user can set to which of the servers the data will be pushed. For each of the servers and memory parts, the measurement instrument also keeps a record of which data have already been pushed to the server successfully.

4.2.3.1 Setting up measurements pushing

To push the measurements the user can set which particular part of the memory will be sent which server (either TCP1 or TCP2), the pushing period and the pushing time delay.

The pushing period can be set to:

- Each record
- Hourly
- Daily
- Weekly

If each record is selected as pushing period, the interval is equal to the interval at which data are recorded inside the memory.

Pushing time delay can be set in seconds. Increasing this delay is a useful feature when the system has a large number of measurement instruments which could cause overload of communication lines otherwise.

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Refresh	Address: 33 M355	🔶 Go bar	 Device #33, IP Address: 10.120.5.218, Port: 10001, Modbus TCP, 	Timeout 3s
1	Settings	Setting	Value	umber: MC015983, Read at 7:36:11
<u>- 7</u>	B Push Data Clients			<u>^</u>
Devices	TCP Link 1	Storage interval (min)	10 🗸	
	TCP Link 2	MD Time constant 1-8 (min)	15	
	USB	MD Time constant 9-16 (min)	15	
()	Display	Push data to link	No pushing	
Settings	- Ca Security	Pushing period	Each record	
	B- 🚺 Energy	Pushing time delay	No delay	
_		1. Recorded parameter	Voltage U1, Average	
	@ Counter 2	2. Recorded parameter	Voltage U2, Average	
Measurements		3. Recorded parameter	Voltage U3, Average	
	Tailf Clock	4. Recorded parameter	Current I1, Average	
	Holdaye	5. Recorded parameter	Current I2, Average	
503	Inputs & Outputs	6. Recorded parameter	Current 13, Average	
Apalysis	I] Watchdog output	7. Recorded parameter	Active Power P1, Average	
мықую	- J Relay output	8. Recorded parameter	Active Power P2, Average	
	📁 [3] Analogue input	9. Recorded parameter	Active Power P3, Average	
	- J [4] Analogue input	10. Recorded parameter	Reactive Power Q1, Average	
<u>.</u>	[A] 8 x Relay output	11. Recorded parameter	Reactive Power Q2, Average	
Upgrades	[B] 8 x Digital input	12. Recorded parameter	Reactive Power Q3, Average	
	[C] Synchronisation, COM2	13. Recorded parameter	Counter E1	
	Alamo	14. Recorded parameter	Counter E2	
	Alarm Group 2	15. Recorded parameter	Counter E3	
	Alarm Group 3	16. Recorded parameter	Counter E4	
	Alarm Group 4	17. Recorded parameter		
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	🚰 Recorder A	19. Recorded parameter		
	1 Recorder B	20. Recorded parameter		
	- Seconder C	21. Recorded parameter		
	- Seconder D	22. Recorded parameter		
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Figure 127: Setting up measurement pushing parameters

4.2.3.2 Setting up alarms pushing

The user can configure into which of the servers alarm data will be pushed.

Alarm data is pushed from the instrument as soon as the alarm appears. If the measurement instrument can't establish a communication link with the server and successfully submit an alarm data package, the data will be pushed at the next alarm or data transmission interval. Depending on which of the above events occurs first.



In addition to configured alarms, some in-built status alarms containing power failure interruption information (when the auxiliary power supply has been activated) is also pushed to the server.

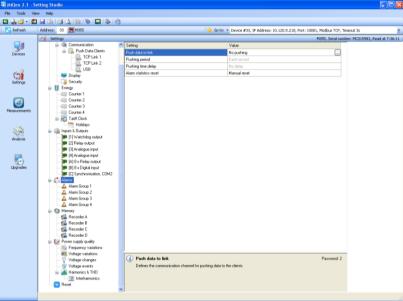


Figure 128: Alarm pushing configuration

4.3 Activating the pushing mechanism and data transfer logic

As already mentioned earlier in the document, measurements which are stored in the memory as well as configured alarms are being pushed to servers. A measurement instrument starts pushing data to the selected server at the first pushing period under the condition that data pushing to a chosen link is selected.

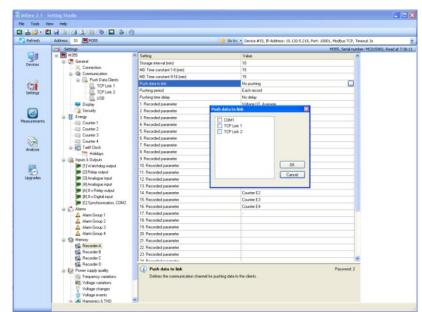


Figure 129: Instrument pushing activation (shown for measurement recorder)

In cases when the selected link is not active, communication link to the server has not yet been established or when the measurement instrument can't push data, the instrument will always make new attempts and try to do so at the next pushing period. When the server connection is established after link setup, all data that has appeared since setup will be



pushed to the server. If in the meantime, the link is removed and then re-added, data will be pushed from the last added link.

If the user wants to add older data from the memory to the system, he/she can transfer it from the memory to MMC/SD card or via remote communication. For the import of these historic data into the MiSMART server a dedicated Data importer tool can be used, which is a separate software tool, and is not the subject of this document.