

NTPM 100 – Smart Energy Sensor

Installation and Operation Manual



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SAFETY INSTRUCTIONS

This equipment must be mounted only by professionals.

The manufacturer shall not be held responsible for failure to comply with the instructions in this manual.

Risk of electrocution, burns or explosion

- The device must be installed and serviced only by qualified personnel
- Prior to any work on or in the device, isolate the voltage inputs and power supply inputs and short-circuit the secondary winding of all current transformers
- Always use an appropriate voltage detection device to confirm the absence of voltage
- Always supply the device with the correct rated voltage

Failure to take these precautions could cause serious injuries.

Risk of damaging the device

Check the following:

- The voltage of the power supply
- The frequency of the distribution system (50 or 60 Hz)
- The maximum voltage across the voltage-input terminals (V1, V2, V3 and VN) 520V AC phase-to-phase or 300V AC phase-to-neutral
- A maximum current of 10A on the current-input terminals (I1, I2 and I3)



2 General

2.1 NTPM Series

Devices from NTPM series are Smart Energy Sensors for use in three-phase voltage systems. All models have integrated WEB server functionality that serves as a modern user interface to the user. Also, all the models have integrated support for Modbus TCP and Modbus RTU communication protocols for integration in a SCADA system.

2.2 Technical data

	Electrical characte	ristics		
Power supply	AC	85-265 V AC/ 90-300 V DC		
	DC	18-36 V DC, 24 V DC nominal		
Power consumption		max 2,5 W		
Type of Measurement		1P+N,3P,3P+N		
Accuracy Class		0,5 S		
Rated Input Current (IB)		5A		
		(supported external current transformers with ratio of 1-1000)		
Permissible Current Overload		6A continuous		
		20A 10S		
Starting Current		0,001 IB		
Line Frequency Range (configurable)		47-53 Hz(50 Hz nominal)		
		57-63Hz(60Hz nominal)		
ADC Sampling Rate		3,2 ksps		
Measured Voltage (Un)		Up to 300V AC (P-N)		
		(supported external transformers with ratio of 1-350)		
Permissible Voltage Overload		1,15 Un		
Active Power Measurement Precision Cla	SS	0,5		
Reactive Power Measurement Precision (Class	0,5		
Power Factor (PF) Precision Class		0,5		
Frequency Measurement Precision Class		0,5		
Harmonic Component Measurement of Voltage Input (200 series)		2ND-31ST Harmonic		
Harmonic Component Measurement of C	urrent Input (200 series)	2ND-31ST Harmonic		
Relay outputs (NO)	Rated voltage	250 V AC/30 V DC		
	Rated current	3A		

Communication						
Interfaces	10/100Mbps Ethernet	Modbus TCP, ICMP Server, DHCP				
	IEEE 802.11b (Wi-Fi)	Client, Lan Discovery, Web server				
RS 485		Modbus RTU				
Protocols		Modbus TCP				
1		Modbus RTU				

Construction and Mechanical properties					
Dimensions		71 x 90 x 58 mm (4 modules)			
Weight		0,3 Kg			
Case	Material	Plastic, PC (UL 94 V-0)			
	Mounting	DIN Rail			
	Protection	<ip 40<="" td=""></ip>			

Ambient conditions				
Operating temperature	-10 do 50 °C			
Relative humidity (non-condensing)	5 do 95 %			
Altitude	2000 m			

Safety: Category III - 300 V AC. / 520 AC. EN-61010-1:2010 Class II double insulation against electric shock Standards: EN 61000-6-2:2008, EN 55011:2011 + A1:2011 (Group1, Class B), EN 61000-4-2:2009, EN 61000-4-3:2008+2008/A1:2009, EN 61000-4-4:2008+2008/A1:2012+2013, EN 61000-4-5:2008, EN 61000-4-5:2008, EN 61000-4-6:2010, EN 61000-4-11:2008

3 Installation

This manual contains information and warnings that must be followed by the user to ensure the safe operation of the equipment and to maintain it in a safe condition. The device must not be switched on until it is finally attached to the electrical board.

When it is likely that the equipment has lost its protection (with visible damage), it must be disconnected from the auxiliary supply. In this event, contact a qualified technical service representative.

3.1 Pre-installation Check

Check the following points before switching the equipment on:

- a) Power supply voltage.
- b) Maximum voltage in the measurement circuit.
- c) Maximum admissible current.
- d) Relay output maximum current
- e) Operating conditions.
- f) Safety.

3.2 Mounting the Device

Installation of the devices is by DIN rails, EN 50 022 (TS 35).



Figure 1: TS35 DIN Rail

3.3 Connection



Label	Terminal Description				
S1-S2 (I1)	Current input 5A (Line 1)				
S1-S2 (I2)	Current input 5A (Line 2)				
S1-S2 (I3)	Current input 5A (Line 3)				
V1,V2,V3,VN	Voltage inputs - Up to 300V AC (P-N)				
L,N	Power supply voltage input 85-265V AC				
÷	Ground				
A,B,COM	RS485				
RST	Reset to default settings (press for 100ms)				
REL1, REL2	Relay outputs (250 V AC/30 V DC - 3A)				

4 Configuration

The device has an embedded Web server that is used to host configuration pages. These web pages can be accessed from a Web Browser such as Microsoft Internet Explorer or Mozilla Firefox. HTML5 compliant browser must be used in order to get full functionality.

NOTE: Depending on the Ethernet infrastructure, the device TCP/IP settings may need to be reconfigured for the working environment. To obtain required parameters such as IP address, Gateway address etc., please contact local network administrator.

If the device has never been configured, follow the procedure described in <u>First Time Configuration</u> section. If the device has been previously configured and there already exists IP connectivity to the device, <u>First Time Configuration</u> step can be skipped and configuration pages can be accessed with current device settings. Details on configuration options can be found in <u>Configuration</u> section of this document.

4.1 First Time Configuration

For the first time configuration it is advised for both the device and configuration PC to be in an Ethernet LAN. Reset device settings to default, and set the PC IP configuration to correct LAN settings. To reset device settings to default, hold **Reset** button for 5 seconds and then release it. The device will reboot with default settings. Information about the default IP settings and user authentication data can be found on the device enclosure, as shown on Figure 2.



Figure 2: Sticker with default device settings information

Default configuration:

- The device IP Address: 192.168.1.100
- The device Network mask: 255.255.255.0
- The device Web access username: admin
- The device Web access password: admin

To connect to the NTPM via Ethernet port, you will need the following items:

- 1. A NTPM device with an Ethernet port (any of the NTPM XX0 models);
- 2. Appropriate power supply for the NTPM device;
- 3. One Ethernet cable (crossover, Cat 5 or 6);
- 4. A PC computer with working Ethernet interface.

To connect to the NTPM device follow these steps:

- 1. Connect one end of the Ethernet cable to the Ethernet interface of the NTPM device, and the other end of the cable to the PC Ethernet interface (Figure 3).
- 2. Configure the PC Ethernet interface IP address and network mask:
 - PC IP address: 192.168.1.1
 - PC network mask: 255.255.255.0
- 3. Reset the NTPM device settings to the default.
- 4. Test IP connectivity from the PC. This can be done by using the PING tool:
 - On Windows OS start CMD.EXE from Start menu, on Linux start terminal software;
 - Type "ping 192.168.1.100" in the terminal.
 - If IP connectivity exists, PING utility will report how much time it takes for a message to go to the NTPM device and to return to the PC (Figure 4).

- Ethernet Cable

 Image: Display the second s
- If there is no connectivity check cables and that correct Ethernet interface of the PC is used, and go to step
 1 to repeat the procedure.

Figure 3: Default Ethernet network configuration

Administrator: C:\Windows\system32\cmd.exe	
Microsoft Windows [Version 6.1.7601] Copyright <c> 2009 Microsoft Corporation. All rights reserved.</c>	^
C:\Users\Novel>ping 192.168.5.100	
Pinging 192.168.5.100 with 32 bytes of data: Reply from 192.168.5.100: bytes=32 time=8ms TTL=99 Reply from 192.168.5.100: bytes=32 time=12ms TTL=99 Reply from 192.168.5.100: bytes=32 time=8ms TTL=99 Reply from 192.168.5.100: bytes=32 time=8ms TTL=99	
Ping statistics for 192.168.5.100: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in mill: seconds: MiniMum Pro Maximum = 1000, Average = 9ms	
C:\Users\Novel>_	
	÷
	:

Figure 4: Successful Ping IP connectivity test

4.2 Web Configuration

Before accessing the configuration pages, make sure that:

- The device power supply is connected properly.
- The device is physically connected to Ethernet network.
- IP connectivity exists between the device and PC that is running the web browser.

NOTE: IP connectivity can be tested with "ping" tool from the host PC.

To access web configuration pages, start a Web browser on the host PC and type the IP address of the device in the URL box of the Web browser. The pages require user authentication (username and password) to be entered before they can be accessed (Figure 5). When a dialogue requesting user information appears in the browser, enter current username and password.

NTPM Web Interface ×			×
← → C □ 192.168.1.205		<u>ک</u>	Ξ
	Username Password CRemember login credentials Log In	X	_

Figure 5: Login page

Once correct username and password are entered, a homepage with a dashboard will be displayed (Figure 6).



Figure 6: Home Page

From here on, various device settings can be changed, and measured electrical parameters can be monitored from the web pages. For details on Web Interface see <u>Configuration Pages</u> chapter of this document.

5 NTPM

5.1 Measured Electrical and Environmental Parameters

Current measured data parameters can be accessed in one of three ways:

- by Web interface (section Web Interface);
- by Web service (section <u>Web service</u>),
- or by Modbus communication protocol (section <u>Modbus Protocol Support</u>).

5.1.1 Trend Data

The device records these parameters with one second resolution. The data recorded in this way is available for maximum of 31 days in the past. These parameters are stored in the internal memory and can be accessed by Web interface or by Web service.

5.1.2 History Data

The device also records historical data of the measured parameters. This historical data is stored on the device in the internal memory with a capacity to record 5 years history. The data can be retrieved by Web interface or Web service. History Data consists of minimum, maximum and average values recorded at: 5 minute, 15 minute, 1 hour, 1 day and 1 month periods.

5.2 Web interface

Netico Power Meter web interface is used for: device configuration and measurement analysis. In order to use full potential of the device web client application, you need to have a HTML5 compliant browser (IE9 and above supported) installed on your PC/Tablet and enable JavaScript functionality. Some specific features like Hostname will only work under specific operating systems that support NetBIOS name resolution method. If you experience problems when using Internet Explorer, try disabling Compatibility mode.

Home Page	
MEASUREMENTS	
Real-Time View	
Trend View	
History View	
Table View	
Harmonics View	
Digital Outputs	

Figure 7 : Regular user menu



Figure 8: Admin user menu

Depending on user level access (regular or admin) main menu will have different options available. Also some of the same items from the menu will have different features displayed.

5.2.1 Measurements pages

5.2.1.1 Home page

This page displays real-time measurements using gauges and numeric fields.



Figure 9: Home page

By clicking on "Configure Layout" button you are presented with screen where you can configure which measurements will be displayed. These settings are saved into browser's local storage.

NOTE: In order to use home page configuration functionality, you need to address the device from a browser either by using NetBIOS hostname (suitable if device uses dynamic IP address) or set a fixed IP address to the device. Local configuration is tied to the NetBIOS hostname or the IP Address of the device, and will be lost if these change (for example if the device uses dynamic IP address).

NETICO		Host Name: Log NTPM_TEST Add	gged in as: Time: min 14:47:05		Lo
me Page	Dashboard				
ASUREMENTS eal-Time View fistory View able View armonics View armonics View igital Outputs	GAUGE 1 CONFIGURATION Measure: Votage A v Scale min: 0 Scale max: 300 Reset to default	GAUGE 2 CONFIGURATION Measure: Voltage B v Scale min: 0 Scale max 300 Reset to default	GAUGE 3 CONFIGURATION Measure: Voltage C v Scale min: 0 Scale max: 300 Reset to default	GAUGE 4 CONFIGURATION Measure: Active Power Total v Scale min: 0 Scale max: 4500 Reset to default	GAUGE 5 CONFIGURATION Measure: Reactive Power Total V Scale min: 4500 Scale max: 0 Reset to default
TTINGS ser Settings DC Configuration PC Configuration lodbus Memory Map Jale Engine ariff Configuration TC Configuration Stem	GAUGE 6 CONFIGURATION Measure: Demond Total v Scale min: 0 Scale max: 200 Reset to default	GAUGE 7 CONFIGURATION Measure: Gauge min: Scale min: Reset to default	GAUGE & CONFIGURATION Measure Gaussee	GAUGE 9 CONFIGURATION Messure Scale min: Cale mac Reset to default	GAUGE 10 CONFIGURATION Measure: Scale min: Scale max Reset to default

Figure 10: Configuration of the home page

For each gauge you can configure:

- displayed measurement
- scale minimum value
- scale maximum value

"Reset to default" button resets scale ranges to recommended ones, using set values for voltage transformer and current transformer ratios (ADC Configuration page). If you leave blank dropdown for measure (---) that gauge will not be displayed. "Reset" button on the bottom will reset gauge configuration to recommended default layout. "Save" button saves configuration into browsers local storage and returns to gauge display.

5.2.1.2 Real-Time View

Measurements refreshed in one second interval can be monitored on this page. The page shows selected measured (or calculated) values in real-time, as soon as the device records them.



Figure 11: Real-Time View

There is only one graph displayed by default, more (up to three total) are added by clicking on the plus button . Up to 4 measurements can be displayed on one graph. Each graph can be stretched over the entire screen for better viewing experience by clicking on double window icon . You can select between: 1, 5, 15 or 60 minutes time window. By clicking on "Refresh" button cy you are applying new settings (graph is then being reset – starts to draw new values from scratch). Graph can be zoomed by dragging mouse while holding left mouse button pressed. By double clicking on a graph you can reset the graph zoom to the initial setting.

5.2.1.3 Trend View

This page displays any 5-minute interval from last 31 days of recorded measurements, with one second resolution. Interface options are similar to Real-Time View with addition of date and time picker.



Figure 12: Trend View

Events can also be viewed on the Trend View page. You select a date from which you would like to load events. Events are loaded and displayed from newest to the oldest. You can also click on any listed event, and you will be taken to the trend graph, which will automatically load data from the time when the clicked event was triggered.

⇒ G [] 192.168.1	.205/trend.ntml			¥
NETICO	Host Name: NTPMLJUBA	Logged in as: Ti Admin 09	me: 9:38:43	Log Out
Home Page	Trend View Graph	Alarms		
EASUREMENTS	2014-04-01	00 • : 00 •		
Table View	Disalara All			
Real-Time View	Display: All	Load alarms		
rend View	Time	Туре	State	
History View	1 2014/04/14 13:36:42	Relay 1	ON	
Harmonics View	2 2014/04/14 13:36:41	Relay 2	ON	
	3 2014/04/14 13:19:09	Relay 2	OFF	
Tariff View	4 2014/04/14 13:19:08	Relay 2	ON	
Digital Outputs	5 2014/04/14 13:19:07	Relay 1	OFF	
	6 2014/04/14 13:19:06	Relay 1	ON	
ETTINGS	7 2014/04/10 10:13:07	Relay 1	OFF	
User Settings	8 2014/04/10 10:13:06	Relay 2	OFF	
ADC Configuration	9 2014/04/10 10:13:05	Relay 2	ON	
TCP Configuration	10 2014/04/10 10:13:04	Relay 1	ON	
Modhur				
widdbus				
Modbus Memory Map				
Rule Engine				
Tariff Configuration	Load more alarms			
RTC Configuration				

Figure 13: Display of events

5.2.1.4 History View

History data can be viewed from this page. There are two preview options available: "single" and "compare" mode. In the "single" mode, you can only view one, selected, time period, while in the "compare" mode you can preload two periods and display them both on one graph, thus allowing comparison of measured values from these two periods.



Figure 14: History View - single mode



Figure 15: History View – compare mode

History measurements are recorded at 5 minute, 15 minute, 1 hour, 1 day and 1 month resolutions. You can choose to display average, minimum or maximum values of measured parameters for the selected resolution. By clicking on any point displayed on the graph, you can jump to a finer resolution around that point timeframe (from 1 hour to 15 minute, from 15 minute to 5 minute... etc.). When you click on the 5-minute points, you will be transferred to the Trend view if the clicked point is within the last 31 days of the trend history. In this way, you are able to analyze instantaneous measurement values (with one second resolution) around the clicked 5-minute point.

5.2.1.5 Table View

This page displays real-time measurements (per-phase, total, line and demand) as numerical data. Displayed data is being automatically refreshed every 5 seconds.

NTPM Web Interface ×							- 🗆 🗙		
← → C 🗋 192.168.1.204/datadetails.html 🔂 \Xi									
NETICO	Host Name: NTPM	Logged in as: Admin	Tim 13:	ie: 18:05			Log Out		
Home Page	Detail Measurement	S							
MEASUREMENTS Table View	Reset Energy Counters								
Real-Time View		Der	nhace me	acurements					
Trend View	Phase	Δ	phaseme	B		C			
History View	Voltage [V]	228,895		228.84	14	228,857			
Thistory view	Current [A]	0		0		0			
Harmonics View	Active Power [W]	0.000		0.000)	0.000			
Tariff View	Reactive Power [VAr]	0.000		0.000)	0.000			
Digital Outputs	Apparent Power [VA]	0.000		0.000)	0.000			
	Active Energy[Wh]	148.457		253.15	51	474.635			
SETTINGS	Reactive Energy[VArh]	-1.604		-102.0	73	-318.761			
User Settings	Power Factor	1		1		1			
ADC Configuration		1							
TCP Configuration		Line Voltager							
Modbus		ΔB	cine vo	BC		CA			
Madaus Managa Man	Line Voltage [V]	0		0.55	5	0.553			
Modbus Memory Map					-		_		
Kule Engine					1				
Tariff Configuration	To	otal measurements							
RTC Configuration	Active Power [W]	Active Power [W]		0.000					
System	Reactive Power [VAr]		0.000						
	Apparent Power [VA]			1					
	Frequency [Hz]			40.077					
	O1 Reactive Energy (VArb)		49.977						
	Q2 Reactive Energy [VArh]		0.561						
	O3 Reactive Energy [VArh]			-1.853					
	O4 Reactive Energy [VArh]		-	437.867					
	Forward Reactive Energy [VA	.rh]	17.280						
	Backward Reactive Energy [V	Arh]	-439.720						
	Forward Active Energy [Wh]		880.149						
	Backward Active Energy [Wh]	-3.904						
	Total Active Energy [Wh]	Total Active Energy [Wh]		876.244					
	Energy Reset Time		09:42	25 2/4/2014					
Temperature [C]			26.298	1					
		Demand[W]			1		Click hara ta		
	Demand A	o cinana[w]		0.000			show/hide Help		
	Demand A			5.500			•		

Figure 16: Table View

5.2.1.6 Harmonics View

Netico Power Meter measures up to 31-st Voltage and Current harmonic. Both numerical and graphic representations are available on this page. Values here are displayed in real-time, along with the calculated total harmonic distortion (THD) for voltages and currents.



Figure 17: Harmonics View - graph



Figure 18: Harmonics View - table

5.2.1.7 Tariff View

On this page you can view tariffs (active energies, reactive energies and demand) for the chosen month. Netico power sensor can be configured to record energy consumption for four separate tariffs, which are configured based on different times of day (see tariff configuration below).



Figure 19: Tariff View

5.2.1.8 Digital Outputs

Relay outputs of the device can be manually controlled through this page. Status of the outputs is shown, and can be changed by clicking on appropriate buttons corresponding to each output (only admin can change states). Soft alarms current status is also displayed below.

NTPM Web Interface ×		_ 🗆 🗙
← → C 🗋 ntpm_test	'dout.html	☆ =
	Host Name: Logged in as: Time: NTPM_TEST Admin 16:29:14	Log Out
Home Page	Digital Outputs	
MEASUREMENTS	Dialed Outwork Stellur	
Real-Time View	Digital Outopuis status	
Trend View	DO1 ON OFF	
History View	DO2 ON OFF	
Table View		
Harmonics View	Soft Alarms Status	
Tariff View	Alam 1	
Digital Outputs		
SETTINGS	Alarm 2	
User Settings	Alarm 3	
ADC Configuration		
TCP Configuration		
Modbus		
Modbus Memory Map		
Rule Engine		
Tariff Configuration		
RTC Configuration		
System		Click here to show/hide Help

Figure 20: Digital Outputs

5.2.2 Configuration Pages

5.2.2.1 User Settings

The username and password for access to the Web Pages can be changed within the User Settings page. The default values are:

For administrator:

Username: admin Password: admin

For regular user: Username: reader Password: reader

Changes to the user settings can be saved by clicking on the appropriate "Submit" button. New configuration will be stored in the device and the device will reboot after few seconds.

NTPM Web Interface ×		- • ×
← → C 🗋 192.168.1.	205/admin.html	☆ 〓
1 NETICO	Host Name: Logged in as: Time: NTPM_TEST Admin 13:23:38	Log Out
Home Page	Admin credentials	
MEASUREMENTS Real-Time View	User Name: admin	
Trend View History View	Password:	
Table View Harmonics View Digital Outputs	Submit	
SETTINGS	User credentials	
ADC Configuration TCP Configuration Modbus Modbus	User Name: reader Password:	
Rule Engine RTC Configuration	Submit	
System		Click here to show/hide Help

Figure 21: User Settings

5.2.2.2 ADC Configuration

This page allows setting transformer ratios for the external voltage and current transformers. When the voltage or current levels of the monitored system exceed the device nominal values, external transformers can be used to lower the values to acceptable ranges. The device needs to be configured with the correct transformer ratios in order to show correct values for the measured electrical parameters. Nominal frequency of the electrical line and Maximum Demand period are also set on this page.

<u>Power and energy display metric</u> option allows to change display format of all measurements (Power, Apparent Power, Reactive Power, Energy). It is possible to select if the device will display measured parameters in native units or in kilo or mega amounts.

NTPM Web Interface ×		- • ×
← → C 192.168.1.20	15/adcconfig.html	☆ =
(1) NETICO	Host Name: Logged in as: Time: NTPM Admin 10:12:22	Log Out
Home Page	ADC Configuration	
MEASUREMENTS		
Real-Time View	CI Ratio 1	
Trend View	VT Ratio 1	
History View Table View	Line Frequency [Hz] 50 🔻	
Harmonics View	Maximum Demand Period: 15 min. 🔻	
Tariff View Digital Outputs	Power and energy display metric: x1000000(M-mega) V	
SETTINGS User Settings ADC Configuration TCP Configuration Modbus Modbus Memory Map Rule Engine Tariff Configuration RTC Configuration	Submit	
System		Click here to show/hide Help

Figure 22: ADC Configuration

Changes to the ADC configuration settings can be saved by clicking on the "Save" button on the bottom of the page. New configuration will be stored in the device and the device will reboot after few seconds.

TCP Configuration depends on the Ethernet network settings to which the device will be connected. For help on configuring TCP settings contact local network administrator. Figure 2 shows the TCP configuration page. Parameters that are supplied in the TCP configuration page are standard parameters necessary for configuring TCP end points.

		Host Name: NTPM_TEST	Logged in as: Admin	Time: 13:25:15	Log Out
Home Page	TCP Configuration				
EASUREMENTS					
Real-Time View	MAC Address:	00:04:A3:4C:D2:3F			
Trend View	Host Name:	NTPM_TEST			
History View	ID.	192 168 1 100			
Table View	15	192.100.1.100			
Harmonics View	Mask:	255.255.255.0			
Digital Outputs	Gateway:	192.168.1.1			
ETTINGS	DNS 1	192 168 1 1			
Jser Settings	5101	132.100.1.1			
ADC Configuration	DNS 2:	0.0.0			
CP Configuration	Enable DHCP	~			
Nodbus					
Modbus Memory Map					
Rule Engine		Submit			
RTC Configuration					
System					

Figure 23: TCP Configuration Page

Option	Default value	Description
MAC Address	Varies	Read-only, set during device assembly.
Host Name	NTPOWERMETER	Host name for the device.
IP	192.168.1.100	The device IP address.
Mask	255.255.255.0	IP subnet mask.
Gateway	192.168.164.1	Gateway address.
DNS 1	192.168.164.1	DNS Server address
DNS 2	192.168.164.1	DNS Server address
Enable DHCP	Not checked	Check to enable DHCP client on the device.

Changes to the TCP settings can be saved by clicking on the "Save" button on the bottom of the page. New configuration will be stored in the device and the device will reboot after few seconds.

NOTE: Depending on the new TCP settings, web interface may no longer be accessible from the same LAN.

5.2.2.4 Modbus

Modbus communication settings (both TCP and RS485) can be configured from this page.

NTPM Web Interface ×					- 🗆 ×
← → C 🗋 192.168.1.2	205/modbus.html				☆ =
		Host Name: NTPM_TEST	Logged in as: Admin	Time: 13:25:57	Log Out
Home Page	Modbus Configuration				
MEASUREMENTS Real-Time View	Modbus TCP Port:	502			
Trend View	Modbus TCP Timeout [x10 ms]:	100			
History View Table View	Modbus Device Address:	1			
Harmonics View	RS485 Bitrate:	1200 🗸			
Digital Outputs	RS485 Parity:	None 🗸			
SETTINGS User Settings	RS485 Stop Bits:	1 🗸			
ADC Configuration TCP Configuration		Submit			
Modbus					
Modbus Memory Map					
Rule Engine					
RTC Configuration					
System					
					Click here to show/hide Help

Figure 24: Modbus

5.2.2.5 Modbus Memory Map

The device supports Modbus communication protocol, and functions as a Modbus Slave device. To be able to use this feature, one must know the Modbus memory map of the Modbus slave device. The page shows layout of the device Modbus memory map.

Memory map consists of separate tables depending on the object type (Input Registers, Holding Registers and Coils). More details on the Modbus protocol are available on http://www.modbus.org .

NTPM Web Interface ×			- • ×
← → C 🗋 192.168.1.	205/modbusmm.html		☆ =
		Host Name: Logged in as: Time: NTPM_TEST Admin 13:27:00	Log Out
Home Page	Modbus Memory Ma	ap	
MEASUREMENTS	Input Registers		
Real-Time View			
Trand View	Address	Description	
	0x0000	Frequency. 32b Float.*	
History View	0x0002	Phase A Voltage. 32b Float.*	
Table View	0x0004	Phase B Voltage. 32b Float.*	
Harmonics View	0x0006	Phase C Voltage. 32b Float.*	
Digital Outputs	0x0008	Phase A Current. 32b Float.*	
	0x000a	Phase B Current. 32b Float.*	
SETTINGS	0x000c	Phase C Current. 32b Float.*	
User Settings	0x000e	Line Voltage L12. 32b Float.*	
ADG G I G I I	0x0010	Line Voltage L23. 32b Float.*	
ADC Configuration	0x0012	Line Voltage L31. 32b Float.*	
TCP Configuration	0x0014	Phase A Active Power. 32b Float.*	
Modbus	0x0016	Phase A Reactive Power. 32b Float.*	
Modbus Memory Map	0x0018	Phase A Apparent Power. 32b Float.*	
Pula Facilita	0x001a	Phase A Power Factor. 32b Float.*	
Kule Engine	0x001c	Phase B Active Power. 32b Float.*	
RTC Configuration	0x001e	Phase B Reactive Power. 32b Float.*	
System	0x0020	Phase B Apparent Power. 32b Float.*	
	0x0022	Phase B Power Factor. 32b Float.*	Click here to
	0x0024	Phase C Active Power, 32b Float.*	show/hide Help

Figure 25: Modbus Memory Map

5.2.2.6 Rule Engine

NTPM built in "Rule Engine" functionality allows for setting actions, which are triggered when set condition is met. Every rule can be enabled or disabled. Two actions can be set for every rule, based on weather condition of the rule is true or false.

NETICO		Host Name: NTPM_TEST	Logged in as: Time: Admin 13:37:01		Log Ou
Home Page	No	Condition	True Action	False Action	Enabled
EASUREMENTS	۲		nothing	nothing	
Real-Time View	0		nothing	nothing	
Trend View	0		nothing	nothing	
History View	0		nothing	nothing	
Table View	0		nothing	nothing	
Harmonics View	0		nothing	nothing	
Digital Outputs	0		nothing	nothing	
ETTINGS	0		nothing	nothing	
User Settings	0		nothing	nothing	
ADC Configuration	0		nothing	nothing	
TCP Configuration Modbus Modbus Memory Map Rule Engine RTC Configuration	Edit	Delete Apply	1		

Figure 26: Rule engine - rules list

"Edit" button takes you to Condition editor, where you can set rule condition and action. Once you set expression in the editor, you can check validity by clicking on "Check" button.

NTPM Web Interface ×								- • ×
← → C 🗋 192.168.1.20	05/rule.html							☆ =
			Host Name: NTPM_TEST	Logged in as: Admin	Time: 13:39:37			Log Out
Home Page	Prefix	Variable 1		Operation		Variable2	Value	Logic Operation
MEASUREMENTS	~	Temperature	*	< 🗸	Constant	~	30	V
Real-Time View	🗸							
Trend View	🗸							
Table View	🗸							
Harmonics View	🗸							
Digital Outputs	V							
SETTINGS	V							
ADC Configuration	V							
TCP Configuration								
Modbus								
Modbus Memory Map								
RTC Configuration	V							
System	🗸							
	🗸							
	🔻							
	•							
	Check							
	CONDITION: Temperature < 30							
	When True : Relay1 Of	V Vhe	n False : Relay1 OFF	v				
	Submit							Click here to show/hide Help

Figure 27: rule engine - condition editor

5.2.2.7 Tariff Configuration Tariffs can be set on this page. Up to four different tariffs can be configured.

NTPM Web Interface ×		_ _ ×
← → C 🗋 ntpm_test	/tariffconfig.html	☆ =
NETICO	Host Name: Logged in as: NTPM_TEST Admin Time:	Log Out
Home Page	Tariff Configuration	
MEASUREMENTS Real-Time View Trend View History View Table View Harmonics View Tariff View Digital Outputs SETTINGS User Settings ADC Configuration TCP Configuration Modbus Modbus Memory Map Rule Engine Tariff Configuration STC Configuration System	Tariff time ①:00 Tariff 1 14 ① Tariff 2 23:59 + Save	
		Click here to show/hide Help

5.2.2.8 RTC Configuration

Real Time Clock settings can be configured on this page. "Set" button sets devices clock based on the manual setting of date and time in the calendar and time controls. "Sync" button synchronizes your devices date and time to your client machines date and time (PC/Tablet). Time zone settings are also supported with option to use DST (Daylight Saving Time). NTPM also supports time synchronization over SNTP server.

▶ NTPM Web Interface ×		- • ×
← → C 🗋 192.168.1.	205/rtcc.html	☆ =
	Host Name: Logged in as: Time: NTPM_TEST Admin 13:40:37	Log Out
Home Page	RTCC	
MEASUREMENTS Real-Time View Trend View History View Table View Harmonics View	Date: 2013-12-04 (YYYY-mm-dd) Time: 13 : 40 : 11 : (hour, minute, second)	
Digital Outputs SETTINGS User Settings ADC Configuration	Time Zone: (UTC +01:00) Europe/Belgrade	
TCP Configuration Modbus Modbus Memory Map Rule Engine	Use SNTP: pool.ntp.org (server name)	
RTC Configuration System	Apply	Click here to
		show/hide Help

Figure 28: RTC configuration

5.2.2.9 System page

The page displays device information like Hardware and Firmware version. The device can also be rebooted from this page by clicking on the "Reboot" or "Save and Reboot" button.

Measurement data recorded on device's SD card can be erased by clicking on "Erase" button found under "Manage Recorded Data" section on the page. Erasing process takes a while and status is indicated with progress bar at bottom of the screen.

NTPM Web Interface ×		- • ×
← → C 🗋 192.168.1.	205/system.html	\$
NETICO	Host Name: Logged in as: Time: NTPM_TEST Admin 13:41:03	Log Out
Home Page	System information	
MEASUREMENTS Real-Time View	Web Version: 1.0.1	
History View Table View	Hardware Version: 2.0 Firmware Version: 1.0.15	
Harmonics View Digital Outputs	Tcp Stack Version: v5.42 Build Date: Nov 19 2013 12:41:15	
SETTINGS		
User Settings ADC Configuration TCP Configuration	Reboot	
Modbus Modbus Memory Map		
Rule Engine RTC Configuration	Manage Recorded Data	
System	Erase recorded data.	
	Erase	Click here to show/hide Help

Figure 29: System Page

5.3 Web service

NTPM100 offers a robust web service interface for access to measurement data stored in the device. Data can be obtained by sending HTTP POST request to the devices web server.

Host: <device IP address>

Path: custom.xml

Parameters used in request:

type : [current|by_second|by_5min|by_15min|by_hour|by_day|by_month]

- current currently measured data
- by_second data measured and saved every second
- **by_5min** history data calculated every 5 minutes
- by_15min history data calculated every 15 minutes
- **by_hour** history data calculated every hour
- **by_day** history data calculated every day
- **by_month** history data calculated every month

start : [DD-MM-YYYY-hh-mm-ss] - beginning time

stop : [DD-MM-YYYY-hh-mm-ss] - ending time

When using this format for start and stop parameters [DD-MM-YYYY-hh-mm-ss] do not omit leading zeroes. Format fields are:

- DD : day (01-31)
- o MM : month (01-12)
- o YYYY : year (2000-2100)
- o hh : hour (00-23)
- o mm : minutes (00-59)
- o ss : seconds (00-59).

user : username for authentication

pass : password for authentication

tags : [tag1-tag2-tag3-....] measurement tags separated by dash

Following tags are available:

Full Name	Tag Name							
time stamp	Time							
time slice	TimS	current (0)	1 second (1)	5 minutes (2)	15 minutes (3)	1 hour (4)	1 day (5)	1 month (6)
Frequency minimum	FreL		X	Х	Х	X	X	X
Frequency average	FreA	х	Х	Х	Х	Х	Х	X
Frequency maximum	FreH		Х	Х	Х	Х	Х	X
Power Factor A minimum	PFaL		х	Х	Х	Х	Х	x
Power Factor A average	PFaA	х	х	х	Х	Х	х	x
Power Factor A maximum	PFaH		х	х	Х	Х	х	x
Power Factor B minimum	PFbL		х	х	Х	Х	х	x
Power Factor B average	PFbA	х	х	х	Х	Х	х	x
Power Factor B maximum	PFbH		х	х	Х	Х	х	х
Power Factor C minimum	PFcL		х	х	Х	Х	х	x
Power Factor C average	PFcA	х	х	Х	Х	Х	х	x
Power Factor C maximum	PFcH		х	х	Х	Х	х	x
Power Factor Total minimum	PFtL		х	х	Х	Х	х	x
Power Factor Total average	PFtA	х	х	х	Х	Х	х	x
Power Factor Total maximum	PFtH		х	Х	Х	Х	х	x
Phase Voltage A minimum	VPaL		х	х	Х	Х	х	x
Phase Voltage A average	VPaA	х	х	х	Х	Х	х	x
Phase Voltage A maximum	VPaH		х	х	Х	Х	х	x
Phase Voltage B minimum	VPbL		х	х	Х	Х	х	x
Phase Voltage B average	VPbA	х	х	Х	Х	Х	х	x
Phase Voltage B maximum	VPbH		х	Х	Х	Х	х	x
Phase Voltage C minimum	VPcL		х	Х	Х	Х	х	x
Phase Voltage C average	VPcA	х	х	Х	Х	Х	х	x
Phase Voltage C maximum	VPcH		х	х	Х	Х	х	x
Line Voltage AB minimum	VabL		х	Х	Х	Х	х	X
Line Voltage AB average	VabA	х	х	х	Х	Х	х	x
Line Voltage AB maximum	VabH		х	х	х	х	х	x
Line Voltage BC minimum	VbcL		х	Х	Х	Х	х	x
Line Voltage BC average	VbcA	х	х	х	х	х	х	x
Line Voltage BC maximum	VbcH		х	Х	Х	Х	х	X
Line Voltage CA minimum	VcaL		х	Х	Х	Х	х	x
Line Voltage CA average	VcaA	х	х	х	х	х	х	x
Line Voltage CA maximum	VcaH		х	Х	Х	Х	х	x
Phase Current A minimum	IPaL		х	Х	Х	Х	х	x
Phase Current A average	IPaA	х	х	Х	Х	Х	х	x
Phase Current A maximum	IPaH		х	Х	Х	Х	х	x
Phase Current B minimum	IPbL		х	Х	Х	Х	х	X
Phase Current B average	IPbA	х	х	Х	Х	Х	х	X
Phase Current B maximum	IPbH		х	х	X	X	х	X
Phase Current C minimum	IPcL		х	х	х	х	x	X
Phase Current C average	IPcA	х	X	X	X	X	х	X
Phase Current C maximum	IPcH		X	X	X	X	х	X
Phase Current Average minimum	IPtL		X	Х	х	х	х	X
Phase Current Average average	IPtA	х	X	X	X	X	х	X
Phase Current Average maximum	IPtH		х	х	X	X	х	X
Power Active A minimum	PPaL		х	Х	Х	Х	х	x

	1							
Power Active A average	PPaA	Х	Х	Х	Х	Х	X	Х
Power Active A maximum	PPaH		Х	Х	Х	Х	Х	Х
Power Active B minimum	PPbL		Х	Х	Х	Х	Х	Х
Power Active B average	PPbA	Х	Х	Х	Х	Х	Х	Х
Power Active B maximum	PPbH		Х	Х	Х	Х	Х	Х
Power Active C minimum	PPcL		Х	Х	Х	Х	Х	Х
Power Active C average	PPcA	Х	Х	Х	Х	Х	Х	Х
Power Active C maximum	PPcH		Х	Х	Х	Х	Х	Х
Power Active Total minimum	PPtL		Х	Х	Х	Х	Х	Х
Power Active Total average	PPtA	Х	Х	Х	Х	Х	Х	Х
Power Active Total maximum	PPtH		Х	Х	Х	Х	Х	Х
Power Reactive A minimum	PQaL		Х	Х	Х	Х	Х	Х
Power Reactive A average	PQaA	Х	Х	Х	Х	Х	Х	Х
Power Reactive A maximum	PQaH		Х	Х	Х	Х	х	Х
Power Reactive B minimum	PQbL		Х	Х	Х	Х	Х	Х
Power Reactive B average	PQbA	Х	Х	Х	Х	Х	х	Х
Power Reactive B maximum	PQbH		Х	Х	Х	Х	Х	Х
Power Reactive C minimum	PQcL		Х	Х	Х	Х	Х	Х
Power Reactive C average	PQcA	Х	Х	Х	Х	Х	Х	Х
Power Reactive C maximum	PQcH		х	Х	Х	Х	х	Х
Power Reactive Total minimum	PQtL		Х	Х	Х	Х	Х	Х
Power Reactive Total average	PQtA	Х	Х	Х	Х	Х	Х	Х
Power Reactive Total maximum	PQtH		Х	Х	Х	Х	Х	Х
Power Apparent A minimum	PSaL		Х	Х	Х	Х	Х	Х
Power Apparent A average	PSaA	Х	Х	Х	Х	Х	Х	Х
Power Apparent A maximum	PSaH		Х	Х	Х	Х	Х	Х
Power Apparent B minimum	PSbL		Х	Х	Х	Х	Х	Х
Power Apparent B average	PSbA	Х	Х	Х	Х	Х	Х	Х
Power Apparent B maximum	PSbH		Х	Х	Х	Х	Х	Х
Power Apparent C minimum	PScL		Х	Х	Х	Х	Х	Х
Power Apparent C average	PScA	Х	Х	Х	Х	Х	Х	Х
Power Apparent C maximum	PScH		Х	Х	Х	Х	Х	Х
Power Apparent Total minimum	PStL		Х	Х	Х	Х	Х	Х
Power Apparent Total average	PStA	Х	Х	Х	Х	Х	Х	Х
Power Apparent Total maximum	PStH		Х	Х	Х	Х	Х	Х
Energy Active A Period	EPaP		Х	Х	Х	Х	Х	Х
Energy Active B Period	EPbP		Х	Х	Х	Х	Х	Х
Energy Active C Period	EPcP		Х	Х	Х	Х	Х	Х
Energy Active Total Period	EPtP		Х	Х	Х	Х	Х	Х
Energy Reactive A Period	EQaP		Х	Х	Х	Х	Х	Х
Energy Reactive B Period	EQbP		Х	Х	Х	Х	Х	Х
Energy Reactive C Period	EQcP		Х	Х	Х	Х	Х	Х
Energy Reactive Total Period	EQtP		Х	Х	Х	Х	Х	Х
Energy Active A Counter	EPaC	Х	Х	Х	Х	Х	Х	Х
Energy Active B Counter	EPbC	х	х	Х	Х	х	х	Х
Energy Active C Counter	EPcC	Х	Х	Х	Х	Х	х	х
Energy Active Total Counter	EPtC	Х	Х	Х	Х	Х	х	х
Energy Reactive A Counter	EQaC	Х	Х	х	Х	х	х	х
Energy Reactive B Counter	EQbC	X	X	X	X	X	X	X
Energy Reactive C Counter	EQcC	Х	Х	Х	Х	Х	х	х
Energy Reactive Total Counter	EQtC	Х	Х	Х	Х	Х	х	х
Tariff Active Energy 0	TPE0	Х	Х	Х	Х	Х	х	Х
				-				

Tariff Active Energy 1	TPE1	Х	Х	Х	Х	Х	Х	х
Tariff Active Energy 2	TPE2	Х	Х	х	Х	Х	Х	х
Tariff Active Energy 3	TPE3	Х	Х	х	Х	Х	Х	х
Tariff Reactive Energy 0	TQE0	Х	Х	х	Х	Х	Х	Х
Tariff Reactive Energy 1	TQE1	Х	Х	Х	Х	Х	Х	Х
Tariff Reactive Energy 2	TQE2	Х	Х	Х	Х	Х	Х	х
Tariff Reactive Energy 3	TQE3	Х	Х	х	Х	Х	Х	х
Energy Reactive Q1	EQQ1	Х	Х	Х	Х	Х	Х	х
Energy Reactive Q2	EQQ2	Х	Х	Х	Х	Х	Х	Х
Energy Reactive Q3	EQQ3	Х	Х	Х	Х	Х	Х	Х
Energy Reactive Q4	EQQ4	Х	Х	Х	Х	Х	Х	х
Energy Active Forward	EPFw	Х	Х	Х	Х	Х	Х	х
Energy Active Reverse	EPRw	Х	Х	Х	Х	Х	Х	Х
Energy Reactive Forward	EQFw	Х	Х	Х	Х	Х	Х	х
Energy Reactive Reverse	EQRw	Х	Х	Х	Х	Х	Х	х
Energy Reset Time	ERTm	Х	Х	Х	Х	Х	Х	Х
Demand A	DemA	Х	Х	Х	Х	Х	Х	х
Demand B	DemB	Х	Х	Х	Х	Х	Х	х
Demand C	DemC	Х	Х	Х	Х	Х	Х	Х
Demand	DemT	Х	Х	Х	Х	Х	Х	х
Demant ResetTime	DemR	Х	Х	Х	Х	Х	Х	х
Demand Time (Procentage)	DemP	Х						
Valid Flag	Flag	Х	Х	Х	Х	Х	Х	х
THDI A minimum	HlaL		Х	Х	Х	Х	Х	х
THDI A average	HlaA	Х	Х	Х	Х	Х	Х	Х
THDI A maximum	HlaH		Х	Х	Х	Х	Х	Х
THDI B minimum	HIbL		Х	Х	Х	Х	Х	Х
THDI B average	HIbA	Х	Х	Х	Х	Х	Х	Х
THDI B maximum	HIbH		Х	Х	Х	Х	Х	х
THDI C minimum	HIcL		Х	Х	Х	Х	Х	Х
THDI C average	HIcA	Х	Х	Х	х	Х	Х	Х
THDI A maximum	HIcH		Х	Х	Х	Х	Х	х
THDU A minimum	HUaL		Х	Х	Х	Х	Х	Х
THDU A average	HUaA	Х	Х	Х	Х	Х	Х	Х
THDU A maximum	HUaH		Х	Х	Х	Х	Х	x
THDU B minimum	HUbL		Х	Х	Х	Х	Х	Х
THDU B average	HUbA	Х	Х	Х	Х	Х	Х	x
THDU B maximum	HUbH		Х	Х	Х	Х	Х	Х
THDU C minimum	HUcL		Х	Х	Х	Х	Х	Х
THDU C average	HUcA	Х	Х	Х	Х	Х	Х	Х
THDU A maximum	HUcH		Х	Х	Х	Х	Х	Х
Temperature minimum	TemL		Х	Х	Х	Х	Х	Х
Temperature average	TemA	Х	Х	Х	Х	Х	Х	Х
Temperature maximum	TemH		Х	Х	Х	Х	Х	Х
Harmonic Current Phase A 1-31	la01 - la31	x						
Harmonic Current Phase B 1-31	1b01 - 1b31	х						
Harmonic Current Phase C 1-31		X						
Harmonic Voltage Phase A 1-31	Ua01 - Ua31	X						
Harmonic Voltage Phase B 1-31	Ub31	х						
Harmonic Voltage Phase C 1-31	Uc31	Х						

Alormo		Alar	v	v				
Alaims		Aidi	^	^	I	l	I	
	Below is the example of the receive	ved custom.x	ml for the fo	ollowing requ	est parameter	rs:		
	start-2011-01-15 12 27 00							
	stan=2014-04-13-13-27-00 stop=2014-04-15-16-00-00							
	type=by 5min							
	tags=TemA							
	user=admin							
	pass=admin							
	xml version="1 0"?							
	Netico							
	<custom></custom>							
	<pre><data count="</th><td>31" error="none" type="by 5</pre></td><th>min"></data></pre>							
	<pre><point <="" pre="" seq="0" time="2014-0"></point></pre>	4-15-13-27-0	00" valid="tri	ue">				
	<tema>25.848</tema>							
	<pre></pre>	4-15-13-32-0	00" valid="tri	ue">				
	<tema>25.848</tema>							
	<point seq="2" time="2014-0</td><th>4-15-13-37-0</th><td>00" valid="tru</td><td>ue"></point>							
	<tema>25.878</tema>							
	<point seq="3" time="2014-0</td><th>4-15-13-42-0</th><td>00" valid="tro</td><td>ue"></point>							
	<tema>25.893</tema>							
	<point seq="4" time="2014-0</td><th>4-15-13-47-0</th><td>00" valid="tro</td><td>ue"></point>							
	<tema>25.919</tema>							
	<pre><point seq="5" time="2014-0</pre></td><th>4-15-13-52-0</th><td>00" valid="tri</td><td>ue"></point></pre>							
	<1emA>25.932 1emA							
		4 45 40 57 0)∩" volid "+	uo">				
	<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	4-15-13-57-(valid="tri	ue >				
	< 1 emA>20.944 1 emA							
		4-15-14 02 0)0" valid_"+r	uo">				
	<pulli seq= / time= 2014-0 $<$ Tem Δ > 25 055 $<$ /Tem Δ	94-10-14-02-(o valid= tri	ue >				
	<pre><pre>>/point</pre></pre>	4-15-14-07-0)0" valid="tri	ue">				
	<tema>25 963</tema>			40 /				
	<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	4-15-14-12-0)0" valid="tri	ue">				
	<tema>25.963</tema>							
	<pre><point seq="10" time="2014-</pre></td><th>04-15-14-17</th><td>-00" valid="t</td><td>true"></point></pre>							
	<tema>25.960</tema>							
	<point seq="11" time="2014-</td><th>04-15-14-22</th><td>-00" valid="t</td><td>true"></point>							
	<tema>25.966</tema>							
	<point seq="12" time="2014-</td><th>04-15-14-27</th><td>-00" valid="t</td><td>true"></point>							
	<tema>25.982</tema>							
	<point seq="13" time="2014-</td><th>04-15-14-32</th><td>-00" valid="t</td><td>true"></point>							
	<tema>26.000</tema>							
	<point seq="14" time="2014-</td><th>04-15-14-37</th><td>-00" valid="t</td><td>true"></point>							
	<tema>26.022</tema>							
	<point seq="15" time="2014-</td><th>04-15-14-42</th><td>-00" valid="t</td><td>true"></point>							
	<tema>26.032</tema>							

```
<point seg="16" time="2014-04-15-14-47-00" valid="false"></point>
  <point seg="17" time="2014-04-15-14-52-00" valid="false"></point>
  <point seq="18" time="2014-04-15-14-57-00" valid="false"></point>
  <point seq="19" time="2014-04-15-15-02-00" valid="false"></point>
  <point seq="20" time="2014-04-15-15-07-00" valid="false"></point>
  <point seq="21" time="2014-04-15-15-12-00" valid="false"></point>
  <point seq="22" time="2014-04-15-15-17-00" valid="false"></point>
  <point seq="23" time="2014-04-15-15-22-00" valid="false"></point>
  <point seq="24" time="2014-04-15-15-27-00" valid="false"></point>
  <point seq="25" time="2014-04-15-15-32-00" valid="false"></point>
  <point seg="26" time="2014-04-15-15-37-00" valid="false"></point>
  <point seq="27" time="2014-04-15-15-42-00" valid="false"></point>
  <point seq="28" time="2014-04-15-15-47-00" valid="false"></point>
  <point seq="29" time="2014-04-15-15-52-00" valid="false"></point>
  <point seq="30" time="2014-04-15-15-57-00" valid="false"></point>
</data>
```

</custom>

<!-- Netico -->

5.4 Modbus Protocol Support

This chapter describes Modbus communication protocol support on the device.

The device operates as a Modbus slave and supports Modbus TCP and Modbus RTU protocols. Details about memory map for the device can be found in <u>Modbus Memory Map</u> section. Modbus TCP is available on the Ethernet (Wi-Fi) interface, and Modbus RTU on the RS485 interface.

Following Modbus function codes are supported:

- 0x01 (Read Coils)
- 0x02 (Read Discrete Inputs)
- 0x03 (Read Holding Registers)
- 0x04 (Read Input Registers)
- 0x05 (Write Single Coil)
- 0x0F (Write Multiple Coils)
- 0x11 (Report Slave ID)

5.4.1 Modbus RTU Slave

Modbus RTU slave is available on the RS485 interface on the device. To configure the interface, following configuration parameters must be set:

- Device Address: unique numerical ID that identifies the device. As more than one Modbus slave device may be listening on the same RS485 line, Modbus RTU masters use this ID to identify the slave when communicating in unicast mode. The slave accepts broadcast messages too.
- Baud rate: defines rate at which data is transferred over the asynchronous RS485 serial port.
- Parity: Parity information used on serial line. Used for error detection on serial lines.
- Stop bits: number of stop bits used to terminate a symbol on the asynchronous serial line.

Device Address	Baud Rate	Parity	Stop Bits
	1200	NONE	1
	2400	EVEN	2
	4800	ODD	
1 047	9600	MARK	
1 – 247	19200	SPACE	
	28800		
	38400		
	57600]	

Table XXX: Modbus RTU configuration parameters

5.4.2 Modbus TCP Slave

Modbus TCP slave is available on the Ethernet (Wi-Fi) interface. Following configuration parameters must be set:

- IP address/mask/gateway address: these parameters are set in the Ethernet interface web page (see <u>Network</u> parameters);
- TCP port: TCP port on which Modbus TCP server listens. Default value is 502.
- Timeout: message reception timeout. This timeout is used as a safety feature. The server accepts only one connection at the time. If a connection is idle for time specified in the parameter, TCP connection will be closed from the server side, and will be ready to accept new requests. When a connection is closed, received data is discarded from the internal buffer.

5.4.3 Modbus Memory Map

Input registers (modbus type 04)				
			additional	
	address	type	conversion	Comment
	0	float 4 bytes (2 registers)	none	
Prequency	2	float 4 bytes (2 registers)	none	
Phase A Voltage	4	float 4 bytes (2 registers)	none	
Phase B Voltage	6	float 4 bytes (2 registers)	none	
Phase C Voltage	8	float 4 bytes (2 registers)	none	
Phase A Current	10	float 4 bytes (2 registers)	none	
Phase B Current	12	float 4 bytes (2 registers)	none	
Phase C Current	14	float 4 bytes (2 registers)	none	
Line Voltage L12	16	float 4 bytes (2 registers)	none	
Line Voltage L23	18	float 4 bytes (2 registers)	none	
Line Voltage L31	20	float 4 bytes (2 registers)	none	
Current total	22	float 4 bytes (2 registers)	none	
Phase A Active Power	24	float 4 bytes (2 registers)	none	
Phase A Reactive Power	26	float 4 bytes (2 registers)	none	
Phase A Apparent Power	28	float 4 bytes (2 registers)	none	
Phase A Power Factor	30	float 4 bytes (2 registers)	none	
Phase B Active Power	32	float 4 bytes (2 registers)	none	
Phase B Reactive Power	34	float 4 bytes (2 registers)	none	
Phase B Apparent Power	36	float 4 bytes (2 registers)	none	
Phase B Power Factor	38	float 4 bytes (2 registers)	none	
Phase C Active Power	40	float 4 bytes (2 registers)	none	
Phase C Reactive Power	42	float 4 bytes (2 registers)	none	
Phase C Apparent Power	44	float 4 bytes (2 registers)	none	
Phase C Power Factor	46	float 4 bytes (2 registers)	none	
Total Active Power	48	float 4 bytes (2 registers)	none	
Total Reactive Power	50	float 4 bytes (2 registers)	none	
Total Apparent Power	52	float 4 bytes (2 registers)	none	
Total Power Factor	54	float 4 bytes (2 registers)	none	
Phase A fundamental active power	56	float 4 bytes (2 registers)	none	
Phase B fundamental active power	58	float 4 bytes (2 registers)	none	
Phase C fundamental active power	60	float 4 bytes (2 registers)	none	
Phase A fundamental reactive power	62	float 4 bytes (2 registers)	none	
Phase B fundamental reactive	64	fleet 4 bytes (2 registers)		
Phase C fundamental reactive	04	nual 4 bytes (2 registers)	none	
power	66	float 4 bytes (2 registers)	none	
Phase A harmonic active power	68	float 4 bytes (2 registers)	none	
Phase B harmonic active power	70	float 4 bytes (2 registers)	none	
Phase C harmonic active power	72	float 4 bytes (2 registers)	none	
Phase A harmonic reactive power	74	float 4 bytes (2 registers)	none	
Phase B harmonic reactive power	76	float 4 bytes (2 registers)	none	
Phase C harmonic reactive power	78	float 4 bytes (2 registers)	none	
THD Voltage A	80	float 4 bytes (2 registers)	none	
THD Voltage B	82	float 4 bytes (2 registers)	none	
THD Voltage C	84	float 4 bytes (2 registers)	none	
THD Current A	86	float 4 bytes (2 registers)	none	
THD Current B	88	float 4 bytes (2 registers)	none	
THD Current C	90	float 4 bytes (2 registers)	none	

Accumulated Q2 Energy 94 float 4 bytes (2 registers) none Accumulated Q3 Energy 96 float 4 bytes (2 registers) none Accumulated Q4 Energy 96 float 4 bytes (2 registers) none Accumulated Q4 Energy 100 float 4 bytes (2 registers) none Accumulated Forward Reactive 100 float 4 bytes (2 registers) none Energy 104 float 4 bytes (2 registers) none Accumulated Active Energy A 106 float 4 bytes (2 registers) none Accumulated Active Energy A 108 float 4 bytes (2 registers) none Accumulated Active Energy A 111 float 4 bytes (2 registers) none Accumulated Active Energy A 116 float 4 bytes (2 registers) none Accumulated Reactive Energy A 118 float 4 bytes (2 registers) none Accumulated Reactive Energy A 118 float 4 bytes (2 registers) none Accumulated Reactive Energy A 118 float 4 bytes (2 registers) none Accumulated Reactive Energy A 118 float 4 bytes (2 reg	Accumulated Q1 Energy	92	float 4 bytes (2 registers)	none	
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Accumulated Q4 Energy P8 float A bytes (2 registers) none Accumulated Reverse Reactive 100 float A bytes (2 registers) none Accumulated Forward Active 104 float A bytes (2 registers) none Accumulated Forward Active 104 float A bytes (2 registers) none Accumulated Reverse Active 106 float A bytes (2 registers) none Accumulated Active Energy A 108 float A bytes (2 registers) none Accumulated Active Energy A 108 float A bytes (2 registers) none Accumulated Active Energy A 112 float A bytes (2 registers) none Accumulated Reactive Energy B 118 float A bytes (2 registers) none Accumulated Reactive Energy A 118 float A bytes (2 registers) none Accumulated Reactive Energy A 118 float A bytes (2 registers) none Accumulated Reactive Energy A 112 float A bytes (2 registers) none Accumulated Reactive Energy A 124 float A bytes (2 registers) none Demand D 122 <td< td=""><td>Accumulated Q3 Energy</td><td>96</td><td>float 4 bytes (2 registers)</td><td>none</td><td></td></td<>	Accumulated Q3 Energy	96	float 4 bytes (2 registers)	none	
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Accumulated Reverse Reactive 102 float 4 bytes (2 registers) none Accumulated Reverse Active 104 float 4 bytes (2 registers) none Accumulated Active Energy A 106 float 4 bytes (2 registers) none Accumulated Active Energy A 106 float 4 bytes (2 registers) none Accumulated Active Energy A 100 float 4 bytes (2 registers) none Accumulated Active Energy A 1101 float 4 bytes (2 registers) none Accumulated Reactive Energy A 1186 float 4 bytes (2 registers) none Accumulated Reactive Energy A 1186 float 4 bytes (2 registers) none Accumulated Reactive Energy A 112 float 4 bytes (2 registers) none Accumulated Reactive Energy A 122 float 4 bytes (2 registers) none Demand A 124 float 4 bytes (2 registers) none Demand C 128 float 4 bytes (2 registers) none Demand C 128 float 4 bytes (2 registers) none Demand C 128 float 4 bytes (2 registers) n	Accumulated Forward Reactive Energy	100	float 4 bytes (2 registers)	none	
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Endingy 10b Incal 4 bytes (2 registers) none Accumulated Active Energy B 110 float 4 bytes (2 registers) none Accumulated Active Energy B 110 float 4 bytes (2 registers) none Accumulated Active Energy C 112 float 4 bytes (2 registers) none Accumulated Reactive Energy A 116 float 4 bytes (2 registers) none Accumulated Reactive Energy C 120 float 4 bytes (2 registers) none Accumulated Reactive Energy C 120 float 4 bytes (2 registers) none Accumulated Reactive Energy C 120 float 4 bytes (2 registers) none Demand A 124 float 4 bytes (2 registers) none Demand Total 130 float 4 bytes (2 registers) none Demand Time (s) 134 float 4 bytes (2 registers) none Harmonics Voltage A 315 unsigned integer 2 bytes (1 /10.0 Harmonics Voltage A 314 unsigned integer 2 bytes (1 /10.0 Harmonics Voltage B 132 float 4 bytes (2 registers) none </td <td>Accumulated Reverse Active</td> <td>400</td> <td></td> <td></td> <td></td>	Accumulated Reverse Active	400			
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Accumulated Reactive Energy 120 float 4 bytes (2 registers) none Accumulated Total Reactive Energy 122 float 4 bytes (2 registers) none Demand A 124 float 4 bytes (2 registers) none Demand B 126 float 4 bytes (2 registers) none Demand C 128 float 4 bytes (2 registers) none Demand Total 130 float 4 bytes (2 registers) none Peak Demand In Month 132 float 4 bytes (2 registers) none RESERVED FOR 1 SECOND AND 134 float 4 bytes (2 registers) none Harmonics Voltage A 1.31 350-380 register) ////////////////////////////////////	Accumulated Reactive Energy B	118	float 4 bytes (2 registers)	none	
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Demand B 126 float 4 bytes (2 registers) none Demand C 128 float 4 bytes (2 registers) none Peak Demand In Month 132 float 4 bytes (2 registers) none Demand Time (s) 134 float 4 bytes (2 registers) none RESERVED FOR 1 SECOND AND HISTORY BUFFER TRANSFER 135-349 none none Harmonics Voltage A 1-31 350-380 register) /10.0 none Harmonics Current A 1-31 382-412 register) /10.0 nusigned integer 2 bytes (1 register) /10.0 THD Voltage B 413 register) /10.0 nusigned integer 2 bytes (1 register) /10.0 Harmonics Current A 413 register) /10.0 nusigned integer 2 bytes (1 register) /10.0 Harmonics Current B 445 register) /10.0 /10.0 /10.0 Harmonics Voltage C 1-31 446-476 register) /10.0 /10.0 /10.0 Harmonics Voltage C 1-31 478-508 register) /10.0 /10.0 /10.0 /10.0	Demand A	124	float 4 bytes (2 registers)	none	
Demand C 128 float 4 bytes (2 registers) none Demand Total 130 float 4 bytes (2 registers) none Peak Demand in Month 132 float 4 bytes (2 registers) none Demand Time (s) 134 float 4 bytes (2 registers) none RESERVED FOR 1 SECOND AND HISTORY BUPFER TRANSFER 135-349 unsigned integer 2 bytes (1 //10.0 Harmonics Voltage A 1-31 350-380 register) //10.0 //10.0 THD Voltage A 381 register) //10.0 //10.0 Harmonics Current A 1-31 382-412 register) //10.0 //10.0 Harmonics Voltage B 1-31 414-444 register) //10.0 //10.0 Harmonics Voltage B 1-31 414-444 register) //10.0 //10.0 Harmonics Current B 1-31 446-476 register) //10.0 //10.0 Harmonics Voltage C 1-31 478-508 register) //10.0 //10.0 Harmonics Current B 477 register) //10.0 //10.0 //10.0	Demand B	126	float 4 bytes (2 registers)	none	
Demand Total 130 float 4 bytes (2 registers) none Peak Demand in Month 132 float 4 bytes (2 registers) none Demand Time (s) 134 float 4 bytes (2 registers) none RESERVED FOR 1 SECOND AND HISTORY BUFFER TRANSFER 135-349 unsigned integer 2 bytes (1 register) /10.0 Harmonics Voltage A 381 register) /10.0 /10.0 Harmonics Current A 135-349 unsigned integer 2 bytes (1 register) /10.0 Harmonics Current A 413 se2412 register) /10.0 Harmonics Voltage B 145 register) /10.0 //10.0 Harmonics Voltage B 445 register) /10.0 //10.0 Harmonics Current B 446-476 register) /10.0 //10.0 Harmonics Voltage C 1-31 446-476 register) /10.0 //10.0 Harmonics Voltage C 1-31 478-508 register) /10.0 //10.0 Harmonics Voltage C 1-31 476-508 register) /10.0 //10.0 //10.0 //10.0 <td>Demand C</td> <td>128</td> <td>float 4 bytes (2 registers)</td> <td>none</td> <td></td>	Demand C	128	float 4 bytes (2 registers)	none	
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Demand Time (s) 134 float 4 bytes (2 registers) none RESERVED FOR 1 SECOND AND HISTORY BUFFER TRANSFER 135-349	Peak Demand in Month	132	float 4 bytes (2 registers)	none	
RESERVED FOR 13ECOND AND HISTORY BUFFER TANSFER 135-349 135-349 Harmonics Voltage A 1-31 350-380 register) /10.0 THD Voltage A 381 register) /10.0 Harmonics Current A 1-31 382-412 register) /10.0 THD Voltage A 381 register) /10.0 Harmonics Current A 413 register) /10.0 THD Voltage B 414-444 register) /10.0 Harmonics Voltage B 1-31 414-444 register) /10.0 THD Voltage B 445 register) /10.0 Harmonics Current B 1-31 446-476 register) /10.0 THD Voltage B 445 register) /10.0 Harmonics Current B 1-31 446-476 register) /10.0 THD Voltage C 1-31 477 register) /10.0 Harmonics Current B 509 register) /10.0 Harmonics Current C 1-31 510-540 register) /10.0 Harmonics Current C 1-31 510-540 register)	Demand Time (s)	134	float 4 bytes (2 registers)	none	
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Harmonics Current A 1-31382-412register)/10.0THD Current A413register)/10.0Harmonics Voltage B 1-31414-444register)/10.0Harmonics Voltage B415register)/10.0THD Voltage B445register)/10.0Harmonics Current B 1-31446-476register)/10.0Harmonics Current B477register)/10.0THD Current B477register)/10.0Harmonics Current B509register)/10.0THD Voltage B509register)/10.0Harmonics Current C 1-31510-540unsigned integer 2 bytes (1 register)/10.0Harmonics Current C 1-31510-540unsigned integer 2 bytes (1 register)/10.0Harmonics Current C541register)/10.0Harmonics Current C541register)/10.0Harmonics Current C541register)/10.0Harmonics Current C541register)/10.0Harmonics Current C541register)/10.0THD Current C541register)/10.0FPI_EVENT_START_YEAR543register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_MONTH547register)noneFP	THD Voltage A	381	unsigned integer 2 bytes (1 register)	/10.0	
THD Current Aunsigned integer 2 bytes (1) register)/10.0Harmonics Voltage B 1-31414-444 414-444 register)unsigned integer 2 bytes (1) register)/10.0THD Voltage B445unsigned integer 2 bytes (1) register)/10.0Harmonics Current B 1-31446-476unsigned integer 2 bytes (1) register)/10.0Harmonics Current B477register)/10.0THD Current B477register)/10.0Harmonics Voltage C 1-31478-508register)/10.0Harmonics Voltage B509register)/10.0THD Voltage B509register)/10.0THD Voltage B509register)/10.0THD Voltage B509unsigned integer 2 bytes (1) register)/10.0THD Current C541register)/10.0THD Current C541register)/10.0THD Current C541register)noneFPL_EVENT_TYPE542unsigned integer 2 bytes (1) register)The type of the event: 0 - invalid, 1 register)FPL_EVENT_START_YEAR543register)noneFPL_EVENT_START_MONTH544register)noneFPL_EVENT_START_HOUR546register)noneFPL_EVENT_START_MIN547register)noneFPL_EVENT_START_SEC548register)none	Harmonics Current A 1-31	382-412	unsigned integer 2 bytes (1 register)	/10.0	
Harmonics Voltage B 1-31414-444register)/10.0THD Voltage B445register)/10.0THD Voltage B445register)/10.0Harmonics Current B 1-31446-476register)/10.0THD Current B477register)/10.0THD Current B477register)/10.0Harmonics Voltage C 1-31478-508register)/10.0THD Voltage B509register)/10.0THD Voltage B509register)/10.0Harmonics Current C 1-31510-540register)/10.0Harmonics Current C541register)/10.0Harmonics Current C541register)/10.0FPL_EVENT_TYPE542register)none-warning, 2 - alarmFPL_EVENT_START_YEAR543register)none-warning, 2 - alarmFPL_EVENT_START_DAY545register)nonenoneFPL_EVENT_START_HOUR546register)nonenoneFPL_EVENT_START_MIN547register)nonenoneFPL_EVENT_START_SEC548register)nonenoneFPL_EVENT_START_SEC544register)nonenoneFPL_EVENT_START_SEC545register)nonenoneFPLEVENT_START_SEC546register)nonenoneFPLEVENT_START_SEC545register)nonenoneFPLEVENT_START_SEC546register)nonenoneFPLEVENT_ST	THD Current A	413	unsigned integer 2 bytes (1 register)	/10.0	
THD Voltage B445unsigned integer 2 bytes (1 register)/10.0Harmonics Current B 1-31446-476register)/10.0THD Current B477register)/10.0THD Current B477register)/10.0Harmonics Voltage C 1-31478-508register)/10.0THD Voltage B509register)/10.0THD Voltage B509register)/10.0THD Voltage B509register)/10.0THD Current C541register)/10.0THD Current C541register)/10.0THD Current C541register)/10.0THD Current C541register)/10.0THD Current C541register)/10.0FPL_EVENT_TYPE542register)noneFPL_EVENT_START_YEAR543register)noneFPL_EVENT_START_MONTH544register)noneFPL_EVENT_START_HOUR546register)noneFPL_EVENT_START_MIN547register)noneFPL_EVENT_START_MIN547register)noneFPL_EVENT_START_SEC548register)none	Harmonics Voltage B 1-31	414-444	unsigned integer 2 bytes (1 register)	/10.0	
THD Voltage B1430register)110.0Harmonics Current B1-31446-476register)1/10.0THD Current B477register)1/10.0Harmonics Voltage C 1-31478-508register)1/10.0Harmonics Voltage B509register)1/10.0THD Voltage B509register)1/10.0Harmonics Current C 1-31510-540unsigned integer 2 bytes (1 register)1/10.0THD Current C541register)1/10.0THD Current C541register)1/10.0THD Current C541register)noneTHD Current C541register)noneTHD Current C541register)noneTHE EVENT_START_YEAR543register)noneFPL_EVENT_START_MONTH544register)noneFPL_EVENT_START_MONTH545register)noneFPL_EVENT_START_HOUR545register)noneFPL_EVENT_START_MONTH546register)noneFPL_EVENT_START_HOUR546register)noneFPL_EVENT_START_MONTH547register)noneFPL_EVENT_START_MIN547register)noneFPL_EVENT_START_SEC548register)none	THD Voltage B	115	unsigned integer 2 bytes (1	/10.0	
Trainfolities Guilent B 1511440-470register)710.0THD Current B477register)/10.0Harmonics Voltage C 1-31478-508register)/10.0Harmonics Voltage C 1-31478-508register)/10.0THD Voltage B509register)/10.0Harmonics Current C 1-31510-540register)/10.0Harmonics Current C541register)/10.0THD Current C541register)/10.0FPI_EVENT_TYPE542register)/10.0FPI_EVENT_START_YEAR543register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_DAY545register)noneFPI_EVENT_START_HOUR546register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_SEC548register)none	Harmonics Current B 1 31	445	unsigned integer 2 bytes (1	/10.0	
THD Culterin B477Tegister)710.0Harmonics Voltage C 1-31478-508register)/10.0THD Voltage B509register)/10.0Harmonics Current C 1-31510-540register)/10.0Harmonics Current C541register)/10.0THD Current C541register)/10.0THD Current C541register)/10.0FPI_EVENT_TYPE542register)/10.0FPI_EVENT_START_YEAR543register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_DAY545register)noneFPI_EVENT_START_HOUR546register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_SEC548register)none		440-470	unsigned integer 2 bytes (1	/10.0	
Harmonics Voltage C 1-31478-508register)/10.0THD Voltage B509register)/10.0Harmonics Current C 1-31510-540register)/10.0Harmonics Current C5110-540register)/10.0THD Current C541register)/10.0THD Current C541register)/10.0FPI_EVENT_TYPE542register)/10.0FPI_EVENT_START_YEAR543register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_MONTH545register)noneFPI_EVENT_START_MONTH546register)noneFPI_EVENT_START_HOUR546register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_SEC548register)none		4//	unsigned integer 2 bytes (1	/10.0	
THD Voltage B509register)/10.0Harmonics Current C 1-31510-540unsigned integer 2 bytes (1 register)/10.0THD Current C541register)/10.0THD Current C541register)/10.0FPI_EVENT_TYPE542register)/10.0FPI_EVENT_START_YEAR543register)noneFPI_EVENT_START_YEAR543register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_DAY545register)noneFPI_EVENT_START_HOUR546register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_MIN548register)noneFPI_EVENT_START_SEC548register)none	Harmonics Voltage C 1-31	478-508	register)	/10.0	
Harmonics Current C 1-31unsigned integer 2 bytes (1 register)/10.0THD Current C541unsigned integer 2 bytes (1 register)/10.0FPI_EVENT_TYPE542register)noneFPI_EVENT_TYPE542register)noneFPI_EVENT_START_YEAR543register)noneFPI_EVENT_START_YEAR543register)noneFPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_DAY545register)noneFPI_EVENT_START_HOUR546register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_SEC548register)none	THD Voltage B	509	unsigned integer 2 bytes (1 register)	/10.0	
THD Current Cunsigned integer 2 bytes (1 register)/10.0FPI_EVENT_TYPE541unsigned integer 2 bytes (1 register)The type of the event: 0 - invalid, 1 - warning, 2 - alarmFPI_EVENT_START_YEAR542register)none- warning, 2 - alarmFPI_EVENT_START_YEAR543unsigned integer 2 bytes (1 register)The time when the overcurrent fault happenedFPI_EVENT_START_MONTH544register)noneHappenedFPI_EVENT_START_DAY545register)noneInsigned integer 2 bytes (1 register)FPI_EVENT_START_HOUR546register)noneInsigned integer 2 bytes (1 register)FPI_EVENT_START_HOUR546register)noneInsigned integer 2 bytes (1 register)FPI_EVENT_START_MIN547register)noneInsigned integer 2 bytes (1 register)FPI_EVENT_START_SEC548register)noneInsigned integer 2 bytes (1 register)	Harmonics Current C 1-31	510-540	unsigned integer 2 bytes (1 register)	/10.0	
The current C 341 register) 710.0 FPI_EVENT_TYPE 542 unsigned integer 2 bytes (1 register) The type of the event: 0 - invalid, 1 - warning, 2 - alarm FPI_EVENT_START_YEAR 543 unsigned integer 2 bytes (1 register) The time when the overcurrent fault happened FPI_EVENT_START_MONTH 544 register) none FPI_EVENT_START_DAY 545 register) none FPI_EVENT_START_HOUR 546 register) none FPI_EVENT_START_MIN 547 register) none FPI_EVENT_START_SEC 548 register) none		5/1	unsigned integer 2 bytes (1	/10.0	
TPI_EVENT_TTPL 342 register) none warning, 2 - aratin FPI_EVENT_START_YEAR 543 register) none The time when the overcurrent fault happened FPI_EVENT_START_MONTH 544 register) none happened FPI_EVENT_START_MONTH 544 register) none happened FPI_EVENT_START_DAY 545 register) none none FPI_EVENT_START_HOUR 546 register) none none FPI_EVENT_START_HOUR 546 register) none none FPI_EVENT_START_MIN 547 register) none none FPI_EVENT_START_SEC 548 register) none none		542	unsigned integer 2 bytes (1	nono	The type of the event: 0 - invalid, 1
TPT_EVENT_START_TEAR 343 register) none nappened FPI_EVENT_START_MONTH 544 register) none none FPI_EVENT_START_DAY 545 register) none none FPI_EVENT_START_DAY 545 register) none none FPI_EVENT_START_HOUR 546 register) none none FPI_EVENT_START_HOUR 546 register) none none FPI_EVENT_START_HOUR 546 register) none none FPI_EVENT_START_MIN 547 register) none none FPI_EVENT_START_SEC 548 register) none none	EDI EVENT STADT VEAD	542	unsigned integer 2 bytes (1	nono	The time when the overcurrent fault
FPI_EVENT_START_MONTH544register)noneFPI_EVENT_START_DAY545unsigned integer 2 bytes (1 register)noneFPI_EVENT_START_HOUR546register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_MIN547register)noneFPI_EVENT_START_SEC548register)none		543	unsigned integer 2 bytes (1	none	парренеа
FPI_EVENT_START_DAY 545 register) none FPI_EVENT_START_HOUR 546 unsigned integer 2 bytes (1 register) none FPI_EVENT_START_HOUR 546 register) none unsigned integer 2 bytes (1 register) none unsigned integer 2 bytes (1 register) FPI_EVENT_START_MIN 547 register) none unsigned integer 2 bytes (1 register) none unsigned integer 2 bytes (1 register)	FPI_EVENT_START_MONTH	544	register) unsigned integer 2 bytes (1	none	
FPI_EVENT_START_HOUR 546 register) none Unsigned integer 2 bytes (1 unsigned integer 2 bytes (1 FPI_EVENT_START_MIN 547 register) none Unsigned integer 2 bytes (1 unsigned integer 2 bytes (1 none FPI_EVENT_START_MIN 547 register) none Unsigned integer 2 bytes (1 unsigned integer 2 bytes (1 none FPI_EVENT_START_SEC 548 register) none	FPI_EVENT_START_DAY	545	register)	none	
FPI_EVENT_START_MIN 547 register) none unsigned integer 2 bytes (1 unsigned integer 2 bytes (1 FPI_EVENT_START_SEC 548 register) none	FPI_EVENT_START_HOUR	546	unsigned integer 2 bytes (1 register)	none	
Unsigned integer 2 bytes (1 FPI_EVENT_START_SEC 548 register) none	FPI_EVENT_START_MIN	547	unsigned integer 2 bytes (1 register)	none	
	FPI EVENT START SEC	548	unsigned integer 2 bytes (1 register)	none	

PPL_EVENT_RIP_VEAR Display Indegrad Product Product Register PPL_EVENT_TRIP_MONTH 550 register none production powered down the line PPL_EVENT_TRIP_MONTH 551 register none none production powered down the line PPL_EVENT_TRIP_MONTH 551 register none none none FPL_EVENT_TRIP_MOUR 553 register none none none FPL_EVENT_TRIP_MOUR 553 register none none none FPL_EVENT_TRIP_SEC 555 register none none none none FPL_EVENT_TRIP_MIS 556 register none none none none Product Apres (2 register)	EDI EVENT STADT MS	540	unsigned integer 2 bytes (1	2020	
FPL_EVENT_TRIP_YEAR 550 register) none protection powered down the line FPL_EVENT_TRIP_MONTH 551 register) none none none FPL_EVENT_TRIP_MONTH 551 register) none none none FPL_EVENT_TRIP_MON 553 register) none none none FPL_EVENT_TRIP_MIN 554 register) none none none FPL_EVENT_TRIP_MIN 554 register) none none none FPL_EVENT_TRIP_MS 5566 register) none FPL_EVENT_TRIP_MS 5567 float 4 bytes (2 register) none FPL_EVENT_TRIP_MS 5677		549	unsigned integer 2 bytes (1	none	The time when the overcurrent
FPL_EVENT_TRIP_MONTH 551 Unsigned integer 2 bytes (1 none none FPL_EVENT_TRIP_DAY 652 register) none none FPL_EVENT_TRIP_DAY 653 register) none none FPL_EVENT_TRIP_MOR 553 register) none none FPL_EVENT_TRIP_SEC 555 register) none none FPL_EVENT_TRIP_MS 5565 register) none none FPL_EVENT_TRIP_MS 5565 float 4 bytes (2 registers) none none FPL_EVENT_LIS_PEAK 563 float 4 bytes (2 registers) none none FPL_EVENT_LIC_PEAK 563 float 4 bytes (2 registers) none none FPL_EVENT_LIC_PEAK 563 float 4 bytes (2 registers) none none - FPL_CONFIG_IS_ENABLED 569 float 4 bytes (2 registers) none - disabled, 1 - enabled FPL_CONFIG_TRIG_ALARM 571 register) none - disabled, 1 - enabled none FPL_CONFIG_TRIG_ALARM 571	FPI_EVENT_TRIP_YEAR	550	register)	none	protection powered down the line
FPL EVENT_TRIP_DAY 652 unsigned integer 2 bytes (1 none none FPL EVENT_TRIP_HOUR 553 register) none none FPL EVENT_TRIP_MIN 554 register) none none FPL EVENT_TRIP_MS 556 register) none none FPL EVENT_TRIP_MS 556 food bytes (2 registers) none none FPL EVENT_TRIP_MS 556 food bytes (2 registers) none none FPL EVENT_IG_RMS 5561 food bytes (2 registers) none none FPL EVENT_IG_RMS 5651 food bytes (2 registers) none none FPL EVENT_IG_RMS 5651 food bytes (2 registers) none 0 disabled, 1enabled FPL EVENT_IG_RENABLED 569 unsigned integer 2 bytes (1 none none 0 disabled, 1enabled FPL CONFIG_IS_ENABLED 569 unsigned integer 2 bytes (1 none none Trigger, 0 integer a bytes (2 registers) none None 0 disabled, 1enabled voltage, 2 curren, 3 - protocion nota bytes (2 registers	FPI_EVENT_TRIP_MONTH	551	register)	none	
PPL_EVENT_TRIP_HOUR sss unsigned integer 2 bytes (1 unsigned integer 2 bytes (1 unsigned integer 2 bytes (1 unsigned integer 2 bytes (1 register) none FPL_EVENT_TRIP_SEC 555 register) none	FPI_EVENT_TRIP_DAY	552	unsigned integer 2 bytes (1 register)	none	
Int_Entry Initial Dots Data project integer 2 bytes (1 none PPL EVENT_TRIP_NIIN 554 register) none PPL EVENT_TRIP_SEC 555 register) none PPL EVENT_TRIP_SEC 555 register) none PPL EVENT_TRIP_MS 566 register) none PPL EVENT_IS_RMS 557 float 4 bytes (2 registers) none PPL EVENT_IS_RMS 556 float 4 bytes (2 registers) none PPL EVENT_IS_RMS 565 float 4 bytes (2 registers) none PPL EVENT_IS_RMS 565 float 4 bytes (2 registers) none PPL EVENT_IS_PEAK 565 float 4 bytes (2 registers) none PPL CONFIG_IS_ENABLED 569 register) none 0-disabled, 1-enabled register) none maigned integer 2 bytes (1 register) none PEAK_3 = both FPL CONFIG_TRIG_ALARM 571 register) none Reford 0-invelid, 1-enabled register) none register) none Tegister) none		553	unsigned integer 2 bytes (1	none	
FPI_EVENT_TRIP_MIN 654 register) register) none FPI_EVENT_TRIP_SEC 555 register) none FPI_EVENT_TRIP_MS 556 float dytes (2 registers) none FPI_EVENT_TRIP_MS 556 float dytes (2 registers) none FPI_EVENT_IR_RMS 557 float dytes (2 registers) none FPI_EVENT_IC_RMS 661 float dytes (2 registers) none FPI_EVENT_IC_RMS 565 float dytes (2 registers) none FPI_EVENT_IC_PEAK 565 float dytes (2 registers) none FPI_EVENT_IC_PEAK 565 float dytes (2 registers) none FPI_CONFIG_IS_ENABLED 569 register) none 0-disabled, 1enabled register) none register) none PlacKerL Ack 3- both Trigger 0-line (3, 1, RMS, 2- FPI_CONFIG_IS_ENABLED 570 register) none PlacKerL Ack 3- both Trigger 0-line (3, 1, RMS, 2- FPI_CONFIG_FRIG_ALARM 571 register) none PlacKerL Ack 3- both Trigger 0-line (3, 1, RMS, 2-		555	unsigned integer 2 bytes (1	TIONE	
FPI_EVENT_TRIP_SEC 555 Image 1 (note) none FPI_EVENT_TRIP_MS 556 register) none none FPI_EVENT_IR_RMS 557 float 4 bytes (2 registers) none none FPI_EVENT_IR_RMS 559 float 4 bytes (2 registers) none none FPI_EVENT_IR_RMS 561 float 4 bytes (2 registers) none none FPI_EVENT_IR_PEAK 565 float 4 bytes (2 registers) none - FPI_EVENT_IC_PEAK 566 float 4 bytes (2 registers) none - FPI_EVENT_IC_PEAK 566 float 4 bytes (2 registers) none - FPI_CONFIG_IS_ENABLED 568 unsigned integer 2 bytes (1 none none - - FPI_CONFIG_TRIG_ALARM 571 register) none Trigger line voltaule for selected trigger alm, When TRIG_ALARM are 3, this value is in gener 4 bytes (2 registers) none - FPI_CONFIG_FRC_TRIG_ALARM 577 float 4 bytes (2 registers) none - - FPI_CONFIG_FRC_TRIME 576 register) none </td <td>FPI_EVENT_TRIP_MIN</td> <td>554</td> <td>register)</td> <td>none</td> <td></td>	FPI_EVENT_TRIP_MIN	554	register)	none	
FPI_EVENT_TRIP_MS 656 unsigned integer 2 bytes (1 register) none FPI_EVENT_LA_RMS 557 float 4 bytes (2 registers) none FPI_EVENT_LB_RMS 559 float 4 bytes (2 registers) none FPI_EVENT_LC_RMS 561 float 4 bytes (2 registers) none FPI_EVENT_LB_PEAK 565 float 4 bytes (2 registers) none FPI_EVENT_LB_PEAK 565 float 4 bytes (2 registers) none FPI_EVENT_LB_PEAK 565 float 4 bytes (2 registers) none FPI_CONFIG_IS_ENABLED 569 register) none -disabled, 1enabled FPI_CONFIG_METHOD 570 register) none Trigger 0enabled Trigger 0enabled FPI_CONFIG_TRIG_ALARM 571 register) none Trigger 0enabled Trigger 0enabled FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none TRIG_ALARM == 3, this value is ignored. FPI_CONFIG_FRR_TIME 576 register) none - Tregister) FPI_MEAS_UBG 571 float 4 bytes (2 registers) </td <td>FPI_EVENT_TRIP_SEC</td> <td>555</td> <td>register)</td> <td>none</td> <td></td>	FPI_EVENT_TRIP_SEC	555	register)	none	
FPI_EVENT_LA_RMS 557 float 4 bytes (2 registers) none FPI_EVENT_LB_RMS 559 float 4 bytes (2 registers) none FPI_EVENT_LC_RMS 561 float 4 bytes (2 registers) none FPI_EVENT_LC_RMS 565 float 4 bytes (2 registers) none FPI_EVENT_LC_RMS 567 float 4 bytes (2 registers) none FPI_EVENT_LC_PEAK 567 float 4 bytes (2 registers) none FPI_CONFIG_IS_ENABLED 569 unsigned integer 2 bytes (1 register) none 0 - disabled, 1 - enabled FPI_CONFIG_TRIG_ALARM 571 register) none Trigger 0 integer 1 bytes (1 register) none FPI_CONFIG_TRIG_ALARM 571 register) none Trigger 0 integer 1 bytes (1 register) none FPI_CONFIG_TRIG_ALARM 571 register) none Trigger 0 integer 2 bytes (1 registers) none FPI_CONFIG_TRIG_ALARM 572 float 4 bytes (2 registers) none Trigger 0 integer 2 bytes (1 registers) none FPI_CONFIG_ZERO_DEADBAND 572 float 4 bytes (2 registers) none Fri	FPI_EVENT_TRIP_MS	556	register)	none	
FPI_EVENT_IB_RMS 559 float 4 bytes (2 registers) none FPI_EVENT_IC_RMS 661 float 4 bytes (2 registers) none FPI_EVENT_IB_PEAK 563 float 4 bytes (2 registers) none FPI_EVENT_IC_PEAK 565 float 4 bytes (2 registers) none FPI_EVENT_IC_PEAK 565 float 4 bytes (2 registers) none FPI_CONFIG_IS_ENABLED 669 unsigned integer 2 bytes (1 register) none 0 - disabled, 1 - enabled FPI_CONFIG_TRIG_ALARM 571 register) none 0 - disabled, 1 - enabled FPI_CONFIG_TRIG_ALARM 571 register) none 2ero deab dua value for selectical trigger 2 - current, 3 - protection mode FPI_CONFIG_TRIG_ALARM 572 float 4 bytes (2 registers) none 2ero deab dua value for selectical trigger alarm. When TRIO_ALARM = 3, this value is ignoried. FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none 7ero deab dua value for selectical trigger alarm. FPI_MEAS_UBC 579 float 4 bytes (2 registers) none 7ero deab dua value for selectical trigger alarm. FPI_MEAS_UBA 577	FPI_EVENT_IA_RMS	557	float 4 bytes (2 registers)	none	
FPI_EVENT_LC_RMS 561 float 4 bytes (2 registers) none FPI_EVENT_LA_PEAK 563 float 4 bytes (2 registers) none FPI_EVENT_LB_PEAK 565 float 4 bytes (2 registers) none FPI_EVENT_LD_PEAK 565 float 4 bytes (2 registers) none FPI_CONFIG_IS_ENABLED 569 unsigned integer 2 bytes (1 register) none 0 - disabled, 1 - enabled FPI_CONFIG_METHOD 570 register) none Trigger.0 - line voltage, 1 - phase FPI_CONFIG_TRIG_ALARM 571 float 4 bytes (2 registers) none Trigger.0 - line voltage, 1 - phase FPI_CONFIG_ZERO_DEADBAND 572 float 4 bytes (2 registers) none Trigger alem, When FPI_CONFIG_FR_TIME 574 float 4 bytes (2 registers) none ignored. FPI_CONFIG_FR_TIME 576 float 4 bytes (2 registers) none FPI_MEAS_UAB FPI_MEAS_UAB 577 float 4 bytes (2 registers) none FPI_MEAS_UAB FPI_MEAS_UAB 583 float 4 bytes (2 registers) none FPI_MEAS_UAB 583 <td< td=""><td>FPI_EVENT_IB_RMS</td><td>559</td><td>float 4 bytes (2 registers)</td><td>none</td><td></td></td<>	FPI_EVENT_IB_RMS	559	float 4 bytes (2 registers)	none	
FPI_EVENT_IA_PEAK 563 float 4 bytes (2 registers) none FPI_EVENT_IG_PEAK 565 float 4 bytes (2 registers) none FPI_EVENT_IC_PEAK 567 float 4 bytes (2 registers) none FPI_EVENT_IC_PEAK 567 float 4 bytes (2 registers) none 0 - disabled.1 - enabled FPI_CONFIG_IS_ENABLED 569 unsigned integer 2 bytes (1 register) none PRAK, 3 - both FPI_CONFIG_TRIG_ALARM 571 unsigned integer 2 bytes (1 register) none Tred/size FPI_CONFIG_TRIG_ALARM 571 register) none Zero dead band value for seletocted trigger alarm, When TRIG_ALARM == 3, this value is ignored. FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none FPI_MEAS_UGB 581 float 4 bytes (2 registers) none FPI_MEAS_UB 583 float 4 bytes (2 registers) none FPI_MEAS_UB 583 float 4 bytes (2 registers) none FPI_MEAS_UB 583 float 4 bytes (2 registers) <td< td=""><td>FPI_EVENT_IC_RMS</td><td>561</td><td>float 4 bytes (2 registers)</td><td>none</td><td></td></td<>	FPI_EVENT_IC_RMS	561	float 4 bytes (2 registers)	none	
FPI_EVENT_IB_PEAK 565 float 4 bytes (2 registers) none FPI_EVENT_IC_PEAK 567 float 4 bytes (2 registers) none FPI_CONFIG_IS_ENABLED 569 register) none 0 - disabled, 1 - enabled FPI_CONFIG_IS_ENABLED 569 register) none 0 - disabled, 1 - enabled FPI_CONFIG_METHOD 570 register) none Trigger: 0 - line voitage, 1 - phase voitage, 2 - current, 3 - protection mode FPI_CONFIG_TRIG_ALARM 571 register) none Zero deab band value for seletected trigger alarm. When TRIG_ALARM = 3, this value is ignored. FPI_CONFIG_FR_TIME 574 float 4 bytes (2 registers) none None FPI_CONFIG_FRA_ULT_CURRENT 574 float 4 bytes (2 registers) none FRIGALARM = 3, this value is ignored. FPI_CONFIG_FRA_ULT_CURRENT 574 float 4 bytes (2 registers) none FRIGALARM = 3, this value is ignored. FPI_CONFIG_FRA_ULT_CURRENT 576 float 4 bytes (2 registers) none FRIGALARM = 3, this value is ignored. FPI_CONFIG_FRA_ULT_CURRENT 577 float 4 bytes (2 registers) none FRIMEAS_UCB	FPI_EVENT_IA_PEAK	563	float 4 bytes (2 registers)	none	
FP1_EVENT_IC_PEAK 567 float 4 bytes (2 registers) unsigned integer 2 bytes (1 register) none - disabled, 1 - enabled FP1_CONFIG_IS_ENABLED 569 unsigned integer 2 bytes (1 register) none 0 - disabled, 1 - enabled FP1_CONFIG_METHOD 570 unsigned integer 2 bytes (1 register) none PEAK, 3 - both FP1_CONFIG_TRIG_ALARM 571 register) none none voltage, 1 - phase voltage, 1 - phase FP1_CONFIG_TRIG_ALARM 571 register) none register) none FP1_CONFIG_TRIG_ALARM 572 float 4 bytes (2 registers) none register) none FP1_CONFIG_FRA_TIME 576 float 4 bytes (2 registers) none register) none FP1_MEAS_UBE 577 float 4 bytes (2 registers) none FP1 FP1 <td>FPI_EVENT_IB_PEAK</td> <td>565</td> <td>float 4 bytes (2 registers)</td> <td>none</td> <td></td>	FPI_EVENT_IB_PEAK	565	float 4 bytes (2 registers)	none	
FPI_CONFIG_IS_ENABLED unsigned integer 2 bytes (1 register) none 0 - disabled, 1 - enabled FPI_CONFIG_METHOD 570 unsigned integer 2 bytes (1 register) none TPEAK, 3 - both FPI_CONFIG_TRIG_ALARM 571 register) none TPEAK, 3 - both FPI_CONFIG_TRIG_ALARM 571 register) none TPEAK, 3 - both FPI_CONFIG_TRIG_ALARM 571 float 4 bytes (2 registers) none Tradication of the set	FPI_EVENT_IC_PEAK	567	float 4 bytes (2 registers)	none	
Intervent Observent Observent Observent FPI_CONFIG_METHOD 570 register) Insigned integer 2 bytes (1 register) Method: 0 - Invalid, 1 - RMS, 2 - PEAK, 3 - both FPI_CONFIG_TRIG_ALARM 571 register) Insigned integer 2 bytes (1 register) FPI_CONFIG_ZERO_DEADBAND 572 float 4 bytes (2 registers) register) none Insigned integer 2 bytes (1 register) FPI_CONFIG_FR_TIME 576 register) none Insigned integer 2 bytes (1 register) none FPI_CONFIG_FR_TIME 576 float 4 bytes (2 registers) none Insigned integer 2 bytes (1 register) none FPI_MEAS_UAB 577 float 4 bytes (2 registers) none Insigned bytes (2 registers) none FPI_MEAS_UAB 577 float 4 bytes (2 registers) none Insigned bytes (2 registers) none FPI_MEAS_UAB 583 float 4 bytes (2 registers) none Insigned bytes (2 registers) none FPI_MEAS_RMS_IA 589		560	unsigned integer 2 bytes (1	none	0 - disabled 1 - enabled
FPI_CONFIG_METHOD 570 register) none PEAK, 3 - both FPI_CONFIG_TRIG_ALARM 571 register) none Trigger: 0 - line voltage, 1 - phase FPI_CONFIG_TRIG_ALARM 571 register) none Zero dead band value for seletected trigger alarm, When TRIG_ALARM = 3, this value is ignored. FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none Ignored. FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none ignored. FPI_MEAS_UAB 577 float 4 bytes (2 registers) none FIGNORED. FIGNETHINE FPI_MEAS_UBC 579 float 4 bytes (2 registers) none FIGNETHINE FIGNETHINE FPI_MEAS_UBC 579 float 4 bytes (2 registers) none FIGNETHINE FIGNETHINE FPI_MEAS_UB 583 float 4 bytes (2 registers) none FIGNETHINE FIGNETHINE FPI_MEAS_UB 584 float 4 bytes (2 registers) none FIGNETHINE FIGNETHINE FPI_MEAS_UB 585 float 4 bytes (2 registers) none FIGNETHINE FIGNETHINE FPI_MEAS_RMS_IA 589 float		503	unsigned integer 2 bytes (1	TIONE	Method: 0 - invalid, 1 - RMS, 2 -
FPI_CONFIG_TRIG_ALARM 571 register) none register) FPI_CONFIG_TRIG_ALARM 571 register) none zero dead band value for seletected trigger alarm. When TRIG_ALARM == 3, this value is ignored. FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none register) none FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none register) none FPI_MEAS_UAB 577 float 4 bytes (2 registers) none register) none FPI_MEAS_UBC 579 float 4 bytes (2 registers) none register) none FPI_MEAS_UBC 579 float 4 bytes (2 registers) none register) none FPI_MEAS_UB 581 float 4 bytes (2 registers) none register) none FPI_MEAS_RMS_UC 687 float 4 bytes (2 registers) none register) none FPI_MEAS_RMS_IA 589 float 4 bytes (2 registers) none register) none FPI_MEAS_RMS_IC 593 float 4 bytes (2 registers) none register) none FPI_MEAS_RMS_IC 599	FPI_CONFIG_METHOD	570	register)	none	PEAK, 3 - both
PPI_CONFIG_ZERO_DEADBAND 572 float 4 bytes (2 registers) unsigned integer 2 bytes (1 register) zero dead band value for seletected trigger alarm, When TRIG_ALARM == 3, this value is ignored. FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none TRIG_ALARM == 3, this value is ignored. FPI_CONFIG_FPR_TIME 576 float 4 bytes (2 registers) none register) FPI_MEAS_UBB 577 float 4 bytes (2 registers) none register) FPI_MEAS_UBC 579 float 4 bytes (2 registers) none register) FPI_MEAS_UBC 581 float 4 bytes (2 registers) none register) none FPI_MEAS_UCB 581 float 4 bytes (2 registers) none register) none FPI_MEAS_UC 587 float 4 bytes (2 registers) none register) none FPI_MEAS_RMS_IB 591 float 4 bytes (2 registers) none register) none FPI_MEAS_RMS_IC 593 float 4 bytes (2 registers) none register) none FPI_MEAS_PEAK_IA 599 float 4 bytes (2 registers) none<	FPI CONFIG TRIG ALARM	571	unsigned integer 2 bytes (1 register)	none	voltage, 2 - current, 3 - protection mode
FPI_CONFIG_ZERO_DEADBAND 572 float 4 bytes (2 registers) none TRG_ALARM == 3, this value is ignored. FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none FPI_CONFIG_FPR_TIME 576 float 4 bytes (2 registers) none FPI_MEAS_UAB 577 float 4 bytes (2 registers) none FPI_MEAS_UBC 579 float 4 bytes (2 registers) none FPI_MEAS_UBC 577 float 4 bytes (2 registers) none FPI_MEAS_UBC 579 float 4 bytes (2 registers) none FPI_MEAS_UB 581 float 4 bytes (2 registers) none FPI_MEAS_UB 585 float 4 bytes (2 registers) none FPI_MEAS_UC 587 float 4 bytes (2 registers) none FPI_MEAS_UC 587 float 4 bytes (2 registers) none FPI_MEAS_RMS_IA 589 float 4 bytes (2 registers) none FPI_MEAS_RMS_IC 593 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IB 597 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IB 597 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IB 597 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IC 599 float 4 bytes					Zero dead band value for
FPI_CONFIG_ZERO_DEADBAND 572 float 4 bytes (2 registers) none ignored. FPI_CONFIG_FAULT_CURRENT 574 float 4 bytes (2 registers) none FPI_CONFIG_FPR_TIME 576 register) none FPI_MEAS_UAB 577 float 4 bytes (2 registers) none FPI_MEAS_UBC 579 float 4 bytes (2 registers) none FPI_MEAS_UB 581 float 4 bytes (2 registers) none FPI_MEAS_UB 583 float 4 bytes (2 registers) none FPI_MEAS_UB 585 float 4 bytes (2 registers) none FPI_MEAS_UB 585 float 4 bytes (2 registers) none FPI_MEAS_UB 585 float 4 bytes (2 registers) none FPI_MEAS_RMS_IA 589 float 4 bytes (2 registers) none FPI_MEAS_RMS_IA 595 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IA 595 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IB 597 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IC 599 float 4 bytes (2 registers) none Otigital outputs - Coils (modb					TRIG ALARM == 3, this value is
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FPI_CONFIG_FPR_TIME 576 register) none FPI_MEAS_UAB 577 float 4 bytes (2 registers) none FPI_MEAS_UBC 579 float 4 bytes (2 registers) none FPI_MEAS_UCB 581 float 4 bytes (2 registers) none FPI_MEAS_UCB 581 float 4 bytes (2 registers) none FPI_MEAS_UCB 583 float 4 bytes (2 registers) none FPI_MEAS_UC 583 float 4 bytes (2 registers) none FPI_MEAS_UC 585 float 4 bytes (2 registers) none FPI_MEAS_RMS_IA 589 float 4 bytes (2 registers) none FPI_MEAS_RMS_IA 595 float 4 bytes (2 registers) none FPI_MEAS_RMS_IC 593 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IA 595 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IB 597 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IC 599 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IC 599 float 4 bytes (2 registers) none FPI_MEAS_UPEAK_IC 599 float 4 bytes (2	FPI_CONFIG_FAULT_CURRENT	574	float 4 bytes (2 registers)	none	
FPI_MEAS_UAB577float 4 bytes (2 registers)noneFPI_MEAS_UBC579float 4 bytes (2 registers)noneFPI_MEAS_UCB581float 4 bytes (2 registers)noneFPI_MEAS_UA583float 4 bytes (2 registers)noneFPI_MEAS_UB585float 4 bytes (2 registers)noneFPI_MEAS_UB585float 4 bytes (2 registers)noneFPI_MEAS_UC587float 4 bytes (2 registers)noneFPI_MEAS_UC587float 4 bytes (2 registers)noneFPI_MEAS_RMS_IA589float 4 bytes (2 registers)noneFPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_RMS_IC593float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneGigital outputs - Coils (modbus type010inary 0-1noneRelay output 10binary 0-1nonesoftware Alarm 13Software Alarm 13binary 0-1nonesoftware Alarm 2Abinary 0-1nonesoftware Alarm 35binary 0-1noneReset FPI6binary 0-1nonesoftware Alarm 4software Alarm 2software Alarm 2software Alarm 2Holding Registers (modbus type 03) <td< td=""><td>FPI_CONFIG_FPR_TIME</td><td>576</td><td>unsigned integer 2 bytes (1 register)</td><td>none</td><td></td></td<>	FPI_CONFIG_FPR_TIME	576	unsigned integer 2 bytes (1 register)	none	
FPI_MEAS_UBC579float 4 bytes (2 registers)noneFPI_MEAS_UCB581float 4 bytes (2 registers)noneFPI_MEAS_UA583float 4 bytes (2 registers)noneFPI_MEAS_UB585float 4 bytes (2 registers)noneFPI_MEAS_UC587float 4 bytes (2 registers)noneFPI_MEAS_RMS_IA589float 4 bytes (2 registers)noneFPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneDigital outputs - Coils (modbus type 01)0binary 0-1noneRelay output 10binary 0-1noneReset Energy Counters2binary 0-1noneSoftware Alarm 13binary 0-1noneSoftware Alarm 24binary 0-1noneReset FPI6binary 0-1noneHolding Registers (modbus type 03)Image d Integer 2 bytes (1year 1B -Image d Integer 2 bytes (1year 1B -	FPI_MEAS_UAB	577	float 4 bytes (2 registers)	none	
FPI_MEAS_UCB581float 4 bytes (2 registers)noneFPI_MEAS_UA583float 4 bytes (2 registers)noneFPI_MEAS_UB585float 4 bytes (2 registers)noneFPI_MEAS_UC587float 4 bytes (2 registers)noneFPI_MEAS_RMS_IA589float 4 bytes (2 registers)noneFPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_RMS_IC593float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneCollad uptus - Colls (modbus type10binary 0-1noneRelay output 10binary 0-1noneRelay output 21binary 0-1noneSoftware Alarm 13binary 0-1noneSoftware Alarm 24binary 0-1noneReset FPI6binary 0-1noneHolding Registers (modbus type 03)1noneLotare 4 Targeters (modbus type 03)1none	FPI_MEAS_UBC	579	float 4 bytes (2 registers)	none	
FPI_MEAS_UA583float 4 bytes (2 registers)noneFPI_MEAS_UB585float 4 bytes (2 registers)noneFPI_MEAS_UC587float 4 bytes (2 registers)noneFPI_MEAS_RMS_IA589float 4 bytes (2 registers)noneFPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_RMS_IC593float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneCollar100binary 0-1nonePoigital outputs - Coils (modbus type 01)1noneRelay output 10binary 0-1noneRelay output 21binary 0-1noneSoftware Alarm 13binary 0-1noneSoftware Alarm 24binary 0-1noneSoftware Alarm 35binary 0-1noneHolding Registers (modbus type 03)1noneUnsigned integer 2 bytes (1year 1B -Holding Registers (modbus type 03)1none	FPI_MEAS_UCB	581	float 4 bytes (2 registers)	none	
FPL_MEAS_UB585float 4 bytes (2 registers)noneFPL_MEAS_UC587float 4 bytes (2 registers)noneFPL_MEAS_RMS_IA589float 4 bytes (2 registers)noneFPL_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPL_MEAS_RMS_IC593float 4 bytes (2 registers)noneFPL_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPL_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPL_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPL_MEAS_PEAK_IC599float 4 bytes (2 registers)nonePoligital outputs - Coils (modbus type 01)0binary 0-1noneRelay output 10binary 0-1noneReset Energy Counters2binary 0-1noneSoftware Alarm 13binary 0-1noneSoftware Alarm 35binary 0-1noneReset FPI6binary 0-1noneHolding Registers (modbus type 03)unsigned integer 2 bytes (1year 1B -	FPI_MEAS_UA	583	float 4 bytes (2 registers)	none	
FPI_MEAS_UC587float 4 bytes (2 registers)noneFPI_MEAS_RMS_IA589float 4 bytes (2 registers)noneFPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_RMS_IC593float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneDigital outputs - Coils (modbus type 01)	FPI_MEAS_UB	585	float 4 bytes (2 registers)	none	
FPI_MEAS_RMS_IA589float 4 bytes (2 registers)noneFPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_RMS_IC593float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneDigital outputs - Coils (modbus type 01)	FPI_MEAS_UC	587	float 4 bytes (2 registers)	none	
FPI_MEAS_RMS_IB591float 4 bytes (2 registers)noneFPI_MEAS_RMS_IC593float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneDigital outputs - Coils (modbus type 01)	FPI_MEAS_RMS_IA	589	float 4 bytes (2 registers)	none	
FPI_MEAS_RMS_IC593float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IA595float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneDigital outputs - Coils (modbus type01) </td <td>FPI_MEAS_RMS_IB</td> <td>591</td> <td>float 4 bytes (2 registers)</td> <td>none</td> <td></td>	FPI_MEAS_RMS_IB	591	float 4 bytes (2 registers)	none	
FPI_MEAS_PEAK_IA 595 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IB 597 float 4 bytes (2 registers) none FPI_MEAS_PEAK_IC 599 float 4 bytes (2 registers) none Digital outputs - Coils (modbus type 01) 0 binary 0-1 none Relay output 1 0 binary 0-1 none Reset Energy Counters 2 binary 0-1 none Software Alarm 1 3 binary 0-1 none Software Alarm 2 4 binary 0-1 none Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03)	FPI_MEAS_RMS_IC	593	float 4 bytes (2 registers)	none	
FPI_MEAS_PEAK_IB597float 4 bytes (2 registers)noneFPI_MEAS_PEAK_IC599float 4 bytes (2 registers)noneDigital outputs - Coils (modbus type 01)Relay output 10binary 0-1noneRelay output 21binary 0-1noneReset Energy Counters2binary 0-1noneSoftware Alarm 13binary 0-1noneSoftware Alarm 24binary 0-1noneReset FPI6binary 0-1noneHolding Registers (modbus type 03)Holding Registers (modbus type 03)	FPI_MEAS_PEAK_IA	595	float 4 bytes (2 registers)	none	
FPI_MEAS_PEAK_IC 599 float 4 bytes (2 registers) none Digital outputs - Coils (modbus type 01) Image: Coils (modbus type 01) Relay output 1 0 binary 0-1 none Relay output 2 1 binary 0-1 none Reset Energy Counters 2 binary 0-1 none Software Alarm 1 3 binary 0-1 none Software Alarm 2 4 binary 0-1 none Software Alarm 3 5 binary 0-1 none Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03) Image: Coils (modbus type 03) Image: Coils (modbus type 03)	FPI_MEAS_PEAK_IB	597	float 4 bytes (2 registers)	none	
Digital outputs - Coils (modbus type 01)0binary 0-1noneRelay output 10binary 0-1noneRelay output 21binary 0-1noneReset Energy Counters2binary 0-1noneSoftware Alarm 13binary 0-1noneSoftware Alarm 24binary 0-1noneSoftware Alarm 35binary 0-1noneReset FPI6binary 0-1noneHolding Registers (modbus type 03)unsigned integer 2 bytes (1year 1B -	FPI_MEAS_PEAK_IC	599	float 4 bytes (2 registers)	none	
Digital outputs - Coils (modbus type 01) 0 binary 0-1 none Relay output 1 0 binary 0-1 none Relay output 2 1 binary 0-1 none Reset Energy Counters 2 binary 0-1 none Software Alarm 1 3 binary 0-1 none Software Alarm 2 4 binary 0-1 none Software Alarm 3 5 binary 0-1 none Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03) unsigned integer 2 bytes (1 year 1B -					
Relay output 1 0 binary 0-1 none Relay output 2 1 binary 0-1 none Reset Energy Counters 2 binary 0-1 none Software Alarm 1 3 binary 0-1 none Software Alarm 2 4 binary 0-1 none Software Alarm 3 5 binary 0-1 none Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03) unsigned integer 2 bytes (1 year 1B -	01)				
Relay output 2 1 binary 0-1 none Reset Energy Counters 2 binary 0-1 none Software Alarm 1 3 binary 0-1 none Software Alarm 2 4 binary 0-1 none Software Alarm 3 5 binary 0-1 none Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03)	Relay output 1	0	binary 0-1	none	
Reset Energy Counters 2 binary 0-1 none Software Alarm 1 3 binary 0-1 none Software Alarm 2 4 binary 0-1 none Software Alarm 3 5 binary 0-1 none Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03)	Relay output 2	1	binary 0-1	none	
Software Alarm 1 3 binary 0-1 none Software Alarm 2 4 binary 0-1 none Software Alarm 3 5 binary 0-1 none Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03) unsigned integer 2 bytes (1 year 1B -	Reset Energy Counters	2	binary 0-1	none	
Software Alarm 2 4 binary 0-1 none Software Alarm 3 5 binary 0-1 none Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03) - - - Alarm 4 Timesterm and 4 0 - - -	Software Alarm 1	3	binary 0-1	none	
Software Alarm 3 5 binary 0-1 none Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03) Holding A Timesterm and 4 0 unsigned integer 2 bytes (1) year 1B -	Software Alarm 2	4	binary 0-1	none	
Reset FPI 6 binary 0-1 none Holding Registers (modbus type 03)	Software Alarm 3	5	binary 0-1	none	
Holding Registers (modbus type 03) Unsigned integer 2 bytes (1 year 1B -	Reset FPI	6	binary 0-1	none	
Holding Registers (modbus type 03) Unsigned integer 2 bytes (1 year 1B -					
unsigned integer 2 bytes (1 year 1B -	Holding Registers (modbus type 03)				
Alarma Limestamp reganing U Liredister) I month 1B L	Alarm 1 Timestamp reg 1	0	unsigned integer 2 bytes (1 register)	year 1B - month 1B	

		unsigned integer 2 bytes (1	day 1B -	
Alarm 1 Timestamp reg 2	1	register)	hour 1B	
		unsigned integer 2 bytes (1	min 1B -	
Alarm 1 Timestamp reg 3	2	register)	sec 1B	
			src 1B -	
		unsigned integer 2 bytes (1	alarm	
Alarm 1 Trigger source	3	register)	state 1B	
		unsigned integer 2 bytes (1	year 1B -	
Alarm 2 Timestamp reg 1	4	register)	month 1B	
		unsigned integer 2 bytes (1	day 1B -	
Alarm 2 Timestamp reg 2	5	register)	hour 1B	
		unsigned integer 2 bytes (1	min 1B -	
Alarm 2 Timestamp reg 3	6	register)	sec 1B	
			src 1B -	
		unsigned integer 2 bytes (1	alarm	
Alarm 2 Trigger source	7	register)	state 1B	
		unsigned integer 2 bytes (1	year 1B -	
Alarm 3 Timestamp reg 1	8	register)	month 1B	
		unsigned integer 2 bytes (1	day 1B -	
Alarm 3 Timestamp reg 2	9	register)	hour 1B	
		unsigned integer 2 bytes (1	min 1B -	
Alarm 3 Timestamp reg 3	10	register)	sec 1B	
			src 1B -	
		unsigned integer 2 bytes (1	alarm	
Alarm 3 Trigger source	11	register)	state 1B	