## MX-9 USER MANUAL

# VILTRUS ELECTRONICS

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## 1. Introduction

This Manual will show you how to configure datalogger by using the MX-9 configurator software.

Figure 1. MX-9 Configurator

## 2. Setting up connection to the device

In order to configure the controller, user must connect its PC to the device by using any of the following interfaces:

- 1. USB port
- 2. ETHERNET interface
- 3. Through a GPRS connection (only accessible after configuring GPRS APN, user and password inside the controller)

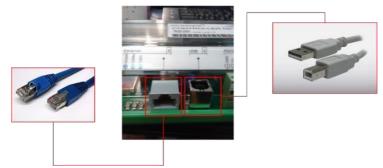


Figure 2. MX-9 connection interfaces

NOTE: Not all the models support above interfaces. Check your ordering code first.

## 2.1 USB connection

Steps to be followed:

-

-

- Connect an USB cable class B to the correspondent port
- Open MX-9 Configuration Tool
- Set up "Connection Parameters" frame
- Select "ModBus RTU" option under "Connection type"
  - Configure "Bode" and "Parity" parameters; default values are:"19200", "none"
  - Select COM port number asigned by your PC to the USB port
- Click on "Get all" to establish connection with controller.

Discrete inputs	Communication	Archives	Alerts	Time parameters	Start					
User identific [65535 2 Set	Cet	Archives	Alerts	Float numb © E M1 M3 © M3 M2 M © M1 E M3 Last restart	er format M3 M1 H1 E M2 nformation	Set		Save co Open co Write co Get all at com n parameters in type	Set all onfiguration onfiguration onfiguration nection C Modbus C 9600 C 19200 C 38400 C Even	s TCP/IP
Firmware versi	Set	14-11-20)				Restart	COM Port	COM4	•	
Reg: 325 Ans	w: 189	TOut:0		Except 14					7.1 %	

Figure 3. USB connection set up

#### **2.2 ETHERNET Connection**

#### Steps to be followed:

- Connect a RJ45 Ethernet cable to the correspondent port.
- Open MX-9 Configuration Tool
- Set up "Connection Parameters" frame
- Select "ModBus TCP/IP" option under "Connection type"
- Add controller IP address and TCP port in "Host or IP" and "Port" text boxes respectively
- Select "Ethernet" option under "Connection through"
- Click on "**Connect**" to establish connection with controller.

Code:     9       Get     Connect	Discrete inputs Communication Archives Alerts	Time parameters       Start         Float number format       •         •       E M1 M2 M3         •       M2 M3 E M1         •       M3 M2 M1 E         •       M1 E M3 M2         •	Get all         Save configuration         Open configuration         Write configuration         Write configuration         ✓ Get all at connection         ✓ Get all at connection         ✓ Get all at connection         ✓ Modbus RTU         Modbus TCP/IP         Modbus TCP/IP connection         Host or IP       192 168.1.100         Port       502         Connection through         Ethermet       GPRS         Timeout (ms)       500
	79638 1	Last restart information Time: 01\07\2015 11:47:43 Code: 9 Get	Connection through CEthernet CGPRS Timeout (ms) 5000

Figure 4. Ethernet connection set up

#### 2.3 GPRS connection

Steps to be followed:

-

- Check GPRS antenna is properly connected to the device.
- Open MX-9 Configuration Tool
- Set up "Connection Parameters" frame
  - Select "ModBus TCP/IP" option under "Connection type"
    - Add controller IP address and TCP port in "Host or IP" and "Port" text boxes, respectively
  - -
  - Select "GPRS" option under "Connection through" Click on "**Connect**" to establish connection with controller. -

screte inputs Communication Archives Ale	Time parameters Start	
		Get all
		Save configuration
		Open configuration
		Write configuration
		Get all at connection
		Connection parameters
65535	Float number format © E M1 M2 M3	Modbus RTU     Modbus TCP/IP  Modbus TCP/IP  Connection
Set Get	C M2 M3 E M1 C M3 M2 M1 E C M1 E M3 M2	Host or IP 10.243.1.56 Port 502
Number of controller	Last restart information	Connection through
79638	Time: 01\07\2015 11:47:43 Code: 9	Timeout (ms) 15000
Set rmware version 2.46 rrsion of this software 1.200 (2014-11-20)	Get	
159 Answ: 63 TOut: 0	Except 5	282.8

Figure 6. GPRS connection set up

#### 2.4 MX-9 connection diagrams

In the following Figure, the most typical connection schemes of MX-9 with PC are shown. The Configuration Tool described in this document or any other Modbus complaint software can establish a communication link making use of **Modbus RTU** and/or **Modbus TCP** protocols.

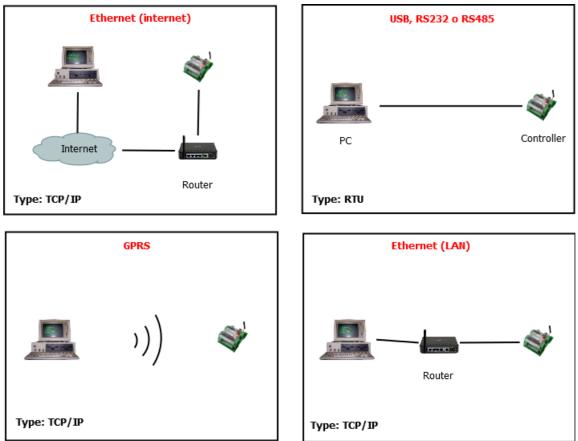


Figure 7. MX-9 typical connection diagrams

## 3. "Start" tab

## 3.1 MX-9 Basic Information

Once user has established communication with MX-9, basic information such as "User identificator", "Serial number", "Last restart", "Firmware version", "Software version", etc. is shown in the left frame

			Get all
		Save	configuration
		Oper	n configuration
		Write	configuration
		Get all at c	
User identificator		Connection type	
65535	Float number format	Modbus RTU	Modbus TCP/IP
(CCCC0	• E M1 M2 M3	Bode C 1200	C 9600
	C M2 M3 E M1	C 2400	· 19200
Set Get	C M3 M2 M1 E	C 4800	○ 38400
	C M1 E M3 M2	Parity	
	Last restart information	<ul> <li>None</li> </ul>	C Even
> Number of controller		O Odd	
79638	Time: 01\07\2015 11:47:43		
	Code: 9		

Figure 8. "Start" tab. MX-9 basic information

#### 3.2 Configuration files

This feature enables user to save and load configuration files so that programming a number of controllers with the same configuration becomes an easy process. Steps to be followed are:

- 1. Set up all the configuration parameters making use of MX-9 Configuration Tool.
- 2. Then, under "Start" tab, click on **"Save configuration"** button. A dialog will be shown requesting user to select folder destination.
- 3. Once the file has been stored, connect a new controller to the PC and then click on "**Open configuration**" and select the file previously stored.
- 4. Then, click on **"Write configuration"** button to load such configuration into the new controller.
- 5. A restart will be needed so that controller can start using the loaded configuration.
- 6. Repeat from step 3 with all the controllers that need the same configuration.

			Get all
			onfiguration
		> Open o	configuration
		Write o	onfiguration
Jser identificator 665535	Float number format • E M1 M2 M3 • M2 M3 E M1 • M3 M2 M1 E • Set	Connection parameters Connection type Modbus RTU Bode C 1200 C 2400 C 4800	<ul> <li>Modbus TCP/IP</li> <li>9600</li> <li>19200</li> <li>38400</li> </ul>
Number of controller 79638	Last restart information Time: 01/07/2015 11:47:43 Code: 9 Get	Parity None Odd	C Even

Figure 9. "Start" tab. Configuration files management

#### 3.3 Status indicators

Several status indicators are shown in the MX-9 configuration tool in order to inform user about current performance of Modbus communication:

- 7. Req: number of Modbus requests performed.
- Answ: Number of Modbus answers received.
   Tout: number of Modbus requests not answered (time outs raised).
- 10. Except: number of Modbus errors.

Discrete inputs Communication Archives Alerts Time parameters Start	
Discrete inputs Communication Actives Arens Inne parameters Statt	
	Get all
	Save configuration
	Ouve conliguration
	Open configuration
	Write configuration
	Get all at connection
	Connection parameters
User identificator	Connection type
Float number format	C Modbus RTU C Modbus TCP/IP
65535 C E M1 M2 M3	Modbus TCP/IP connection
C M2 M3 E M1	Host or IP 192.168.1.100
Set Get C M3 M2 M1 E Set	Port 502 1
C M1 E M3 M2	Connection through
Last restart information	C Ethernet C GPRS
Number of controller	
79638 Time: 02/07/2015 12:33:33	Timeout (ms) 5000
Code: 11	Disconnect
Get	IP: 192.168.1.100
Firmware version 2.46	
Firmware version 2.46 Version of this software 1.200 (2014-11-20)	
Reg: 336 Answ: 327 TOut:0 Except: 9 🗲	

Figure 10. "Start" tab. Status indicators

## 4. "Discrete inputs" tab

Discrete inputs can be configured within this tab. They are shown organized in columns and configuration parameters are shown in rows as follows:

- "Current State": Graphical representation of current status (open/closed).
- "Impulse quantity": Number of pulses counted from last reset.
- "Value": Calculated from multiplying number of pulses counted (Impulse quantity) and user-defined multiplier (Impulse multiplier).
- "Enabled": user enable/disable discrete inputs to be used. In order to save memory, it is recommend to only enable inputs in use.
- "Mode":
- "Discrete Input": input works as a standard discrete input detecting its current state (1 / 0)
- "Impulse counter": input is used as a standard pulse counter, storing the amount of pulses raised.
- "Alarm signal": input is used as an alarm input.
- "Alarm state": If "Alarm signal" option is selected, controller will raised an alarm when one of the following state is reached: "Open", "Close", "Both cases".
- "Enable archiving": If enabled, events produced by discrete inputs are stored in the datalogging archive.
- "Debounce time": only pulses received within one or more "Debounce time" intervals are registered.
- "Impulse multiplier": user-defined multiplier. Values can be set from 1 to 1000. "Set initial amount of pulses": initial value for pulse counter can be set here.

	Chan. 1	Chan. 2	Chan. 3	Chan. 4	Chan. 5	Chan. 6	Chan. 7	Chan. 8
Current state	JL	JL.	JL	JL	JL.	JL.	JL.	JL
mpulse quantity	15	0	0	0	0	0		
alue	15,000	0,000	0,000	0,000	0,000	0,000		
Enabled	1	<b>v</b>	<b>v</b>	<b>v</b>				
lode	C Discrete inp. Impulse count Alarm signal	· Impulse count	Discrete inp.     Impulse count     Alarm signal	· Impulse counter	<ul> <li>Impulse count</li> </ul>	Discrete inp.     Impulse counter     Alarm signal	Impulse count	Discrete. inp.     Impulse count     Alarm signal
Varm state	<ul> <li>Open</li> <li>Close</li> <li>Close</li> <li>Both cases</li> </ul>		<ul> <li>Open</li> <li>Close</li> <li>Cloth cases</li> </ul>	Close	Open Close Both cases	Close	<ul> <li>Open</li> <li>Close</li> <li>Cloth cases</li> </ul>	<ul> <li>Open</li> <li>Close</li> <li>Cloth cases</li> </ul>
Enable archiving	Γ	<b>F</b>	<b>F</b>	Γ	<b>F</b>	F	TR.	F
State to archive	Close Close Both cases		<ul> <li><sup>€</sup> Open</li> <li><sup>C</sup> Close</li> <li><sup>C</sup> Both cases</li> </ul>	Close	Open Close Both cases	Close	Open Close Both cases	<ul> <li>Open</li> <li>Close</li> <li>Close</li> <li>Both cases</li> </ul>
Debounce time (ms)	50	50	50	50	257	257	257	257
mpulse multiplier	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000
Set	Get							
mpulse multiplier	1,0000	- 7		2.2	200 March 1997			
Set the initial amount of	impulses							
	Chan. 1	Chan. 2	Chan. 3	Chan. 4	Chan. 5	Chan. 6		
mpulse quantity							-	
	Set	Set	Set	Set	Set	Set		

Figure 11. "Discrete inputs" tab

## 5. "Communication" tab

#### 5.1 Communication > Ethernet

Ethernet interface parameters can be configured within this tab:

- "MAC number": Media Access Control address
  - "IP address"
  - "Gateway IP"
  - "Mask"

AC number 00004C013716 Set unique MAC	
address     192 4, 168 4, 1 4, 100 4       ateways IP     192 4, 168 4, 1 4, 1 4, 1 4       ask     255 4, 255 4, 255 4, 0 4       Imp data       Enabled       Send to address     255 4, 255 4, 255 4, 255       Time interval(sec.)     1 4, 1 4, 1 4, 1 4, 1 4, 1 4, 1 4, 1 4,	
Set Get	Time before restart if no packets receive 600 📩 sec.

Figure 12. "Ethernet" Configuration tab

#### 5.2 Communication > GPRS

As previously described, MX-9 can be configured through a GPRS link. In order to do so, user must enable GPRS connection as shown below. Then, click on "**Set**" button in order to save changes.

DDMS     GSM     GPRS transpar.     C     Periodically     Get       APN     ac.vodafone.es     GPRS login     Enabled     User name     VODAFONE       Number of connection failures before restart     20     Image: Connection failures before restart     Set     Get		GPRS-GSM mode	0000 000	Signal level measuren	nent Signal level	Set
Arway     ac.vodafone.es     Number of connection failures before restart     20     Time before restart if no packets received     7200   sec.     Incoming IP filter   Filter enabled:   IP 1   255	bled 🖂 🦟					Get
umber of connection failures before restart     20     ime before restart if no packets received     7200   sec.   Incoming IP fiter     Filter enabled:     IP 1   255 </td <td></td> <td></td> <td></td> <td> 0000 1</td> <td></td> <td></td>				 0000 1		
Jumber of connection failures before restart :       20 2         Time before restart if no packets received       720 2         Incoming IP filter       525 2         IP 1       255 2       255 2         IP 2       255 2       255 2         IP 3       255 2       255 2         IP 4       255 2       255 2         IP 5       255 2       255 2	PN ac vodafone	es			<b>_</b>	
Incoming IP filter     Filter enabled:     Image: Set Get       IP 1     255 (1)     255 (1)     255 (1)       IP 2     255 (1)     255 (1)     255 (1)       IP 3     255 (1)     255 (1)     255 (1)       IP 4     255 (1)     255 (1)     255 (1)       IP 5     255 (1)     255 (1)     255 (1)				User name	VODAFONE	
Set     Get       Incoming IP filter     Filter enabled:       IP 1     255     255     255     255       IP 2     255     255     255     255       IP 3     255     255     255     255       IP 4     255     255     255     255       IP 5     255     255     255     255	Jumber of connection	failures before restart :	20	Password	VODAFONE	
Incoming IP filter     Filter enabled:       IP 1     255     <				Set	10	Get
Filter enabled         IP 1       255 4       255 4       255 4       255 4         IP 2       255 4       255 4       255 4       255 4         IP 3       255 4       255 4       255 4       255 4         IP 4       255 4       255 4       255 4       255 4         IP 5       255 4       255 4       255 4       255 4	ime before restart if n	p packets received	7200 🏒 sec.			
Filter enabled:         IP 1       255 2       255 2       255 2       255 2         IP 2       255 2       255 2       255 2       255 2         IP 3       255 2       255 2       255 2       255 2         IP 4       255 2       255 2       255 2       255 2         IP 5       255 2       255 2       255 2       255 2						
Filter enabled:         IP 1       255 2       255 2       255 2       255 2         IP 2       255 2       255 2       255 2       255 2         IP 3       255 2       255 2       255 2       255 2         IP 4       255 2       255 2       255 2       255 2         IP 5       255 2       255 2       255 2       255 2						
IP 1       256 1       256 1       256 1       256 1         IP 2       256 1       256 1       256 1       256 1         IP 3       256 1       256 1       256 1       256 1         IP 4       256 1       256 1       256 1       256 1         IP 5       256 1       256 1       256 1       256 1	Incoming IP filter					
IP 2       255 1,		-				
IP 3       255	Filter enabled:					
IP 3       255			55 🔀			
IP 4 255 4 255 4 255 4 255 4	IP 1 255 🔥	255 255 25				
IP 5 255 2 255 2 255 2 255 2	IP 1 255	255 2 255 2 25	55 🔀			
	IP 1 255 2 IP 2 255 2 IP 3 255 2	255 2 255 2 25 255 2 255 2 25 255 2 255 2 25	55 🛃			
Set Get	IP 1 255 1 IP 2 255 1 IP 3 255 1 IP 4 255 1	255 2 255 2 25 255 2 255 2 25 255 2 255 2 25 255 2 255 2 25 255 2 255 2 25	55 🔀			
Set Get	IP 1 255 1 IP 2 255 1 IP 3 255 1 IP 4 255 1	255 2 255 2 25 255 2 255 2 25 255 2 255 2 25 255 2 255 2 25 255 2 255 2 25	55 🔀			
Set Get	IP 1 255 1 IP 2 255 1 IP 3 255 1 IP 4 255 1	255 2 255 2 25 255 2 255 2 25 255 2 255 2 25 255 2 255 2 25 255 2 255 2 25	55 🔀			
	IP 1 255 1 IP 2 255 1 IP 3 255 1 IP 4 255 1	255 2 255 2 25 255 2 255 2 25 255 2 255 2 25 255 2 255 2 25 255 2 255 2 25	55 🔀			

Figure 13. "GPRS" Tab. Enabling communication

Within this tab, different services can be configured or checked.

1. GPRS connection parameters:

• "APN": access point name provided by Internet Service Provider (ISP).

If needed by ISP, credentials can also be configured here:

- "Username": provided by ISP.
- "Password": provided by ISP.

NOTE: After configuration is completed, click on "Set" button in order to save changes.

6.01	S-GSM mode	GPRS-GSM		Signal level measure	ment Signa	l level	Set
abled 🔽 🗘 GS		GPRS transpar.		<ul> <li>Periodically</li> </ul>			Get
RS DDNS setting				GPRS login			
APN ac.vodafone.es			←	Enabled		☞ 🔶 🗕	-
				User name	VODAFON	E	
Number of connection failure:	s before restart :	20 🍾		Password	VODAFON	E	
ime before restart if no pack				Se	t 🔥 🗌	Get	
Time before restart if no pack		7200 🔀 sec.		Se	* 🔶 🗌	Get	
Time before restart if no pack				Se	*	Get	
Time before restart if no pack				Se	a 👔 🚺	Get	
				Se	*	Get	
Incoming IP filter Filter enabled:	ets received	7200 🧐 sec.		Se	*	Get	
Incoming IP filter Filter enabled IP 1 255	ets received	7200 🔥 sec.		Se	a 🕇	Get	
Incoming IP filter Filter enabled: IP 1 255 1 255 IP 2 255 1 255	ets received	7200 🔥 sec.		Se	a <u>↑</u>	Get	
Incoming IP filter Filter enabled: IP 1 255 (1) 255 IP 2 255 (1) 255 IP 3 255 (1) 255	ets received	7200 🔥 sec. 5 🐪 5 🛀 5 🛀		Se	<sup>∗</sup> ↑	Get	
Incoming IP filter Filter enabled: IP 1 255 (1) 255 IP 2 255 (1) 255 IP 3 255 (1) 255	ets received	7200 🔪 sec. 5 🗐 5 🗐 5 🗐		Se	• <b>↑</b>	Get	

Figure 14. "GPRS" tab. Internet Service Provider access data configuration

2. <u>Connection status</u>. Once GPRS connection is established, status will be shown as below:

-GPRS-GSM mode	
GPRS GSM Set	Get Signal level -73 dBm
GPRS DDNS setting	
Enabled P	GPRS login
Enabled 14	Enabled 17
APN lopen.nextm2m.com	User name guest
	Password guest
Number of connection failures before restart : 5	Set Get
Time before restart if no packets received 7200 1/2 sec.	Set
	Status of GPRS connection
	Status Connected to GPRSs
	Connecting to GPRS time: 2015-06-18 01:37:51
	Disconnecting from GPRS time: 2015-06-18 01:36:02 Connections 1
	Socket Port IP
	1 502 192.168.254.20 🔶
Set Get	

Figure 15. "GPRS" tab. Connection status

- 3. <u>DynDNS account configuration</u>: in order to avoid the need to have a fixed IP address to be able to remotely access the device, it is possible to set up a DynDNS account under the "DDNS setting". Steps to be followed are:
  - Select "Enable"
  - Fill in information according to your DynDNS account
  - Click on "Load from file" and select "dyndns.org\_Register\_String.txt " which contains the connection string to be sent to DynDNS servers.

	GPRS-GSM mode		Signal level measurement	Signal level	Set
Enabled 🔽	C GSM C GPRS transj	par.	<ul> <li>Periodically</li> </ul>		Get
PRS DDNS setting	<del>~ ~</del>				
Enabled 🛛 📿 🔶		Sta	us: Passive		
Periodical DDNS regis	tration 🗂				
Server URL	members dyndns.com			<del>~</del>	
Client Host Name	YourDomainName.dyndns.org			<del>~ -</del>	
User Name	YourUserName			<del>~</del>	
User Password	YourPass			<del>~</del>	
F5-Show/Hide DDNS	registration string				
Registration string	stname=advanticdemo.dyndns.org&myip=-	<ipaddress></ipaddress>			
GET /nic/update?ho					
	<authonization></authonization>				
GET /nic/update?ho Host: members.dyn Authorization: Basic	<authorization> SYS - MPC333 Controller - 2.46</authorization>				
GET /nic/update?ho Host: members.dyn Authorization: Basic					
GET /nic/update?ho Host: members.dyn Authorization: Basic		Load from file	Set	Get	_

Figure 16. "GPRS" tab. DynDNS configuration

NOTE: After configuration is completed, click on "**Set**" button in order to save changes. NOTE: It is recommended to disable GPRS connection if not used.

## 5.3 Communication > UARTs

Each UART can be configured individually. It is recommended to check peripheral devices UART constraints before setting up parameters in the controller configuration tool.

NOTE: All devices connected to the same MX-9 UART must have the same communication parameters.

- "Bode": Transmission rate (bauds per second).
- "Parity": Communication Parity.
- "Data bits": Number of data bits within the communication packet.
- "Stop bits": Number of stop bits within the communication packet.
- "Packetization":
- "time": One packet time has been reached, it is considered that the packet has been properly sent.
- "Symbol". Every time a "packet symbol" is received, it is considered that the packet has been properly sent.
- "Length". Once the "packet byte count" has been reached, it is considered that the packet has been properly sent.
- "Packet time": Transmission duration.
- "Packet symbol": Symbol which defines packet ending.
- "Packet byte count": Length which defines packet size
- "Mode": Full duplex or half duplex
- "Destination of DTR": bit which defines the "Data ready" state has been reached. It must be configured following peripheral devices connected to MX-9 UARTs vendor information. By default, if this information is not available, it is recommended to select "OFF when send" option.

NOTE: After configuration is completed, click on "Set" button in order to save changes.

				bus devices		
	UART 1	UART 2	UART 3	UART 4		
Bode	300 600 1200 2400 4800 9600 19200 38400	300 600 1200 2400 4800 9600 19200 38400	300 600 1200 2400 4800 9600 19200 38400	300 600 2400 4800 9600 19200 38400		
Parity	Ceven Odd Mark Space None	Even     Odd     Mark     Space     None	Even Odd Mark Space None	Even Odd Mark Space None		
Data bits	5 6 7 • 8	5 6 7 • 8	5 6 7 8	5 6 7 8		
Stop bits	• 1 - 1.5 - 2	* 1 1.5 2	1 15 2	1 15 2		
Packetization	<ul> <li>Time</li> <li>Symbol</li> <li>Length</li> </ul>	Time     Symbol     Length	Time     Symbol     Length	• Time Symbol Length		
Packet time (msec.)	100	100	100	100		
Packet symbol(Hex)	0D	FF	00	FF		
Packet byte count	65535	65535	1	85535		
Mode	Full duplex     Half duplex	Full duplex     Half duplex	Full duplex Haif duplex	Full duplex Half duplex		
Destination of DTR	<ul> <li>Always OFF</li> <li>Always ON</li> <li>OFF when send</li> <li>ON when send</li> </ul>	Always OFF     Always ON     OFF when send     ON when send	Always OFF Always ON OFF when send ON when send	Always OFF Always ON OFF when send ON when send	Set	Get

Figure 17. "UARTs" tab

#### 5.4 Communication > Virtual interfaces

The MX-9 can perform as communication gateway Modbus server/client and datalogger simultaneously. In order to set up these options, different virtual interfaces are needed as shown below

Discrete inputs	Communic	atio 🗲 Arch	ives Ale	erts Time pa	arameters	Start	
						evices Mo	dbus devices Modbus register grouping
COM Client			nenace a				
COM Cherk	COM 1	COM 2	COM	3 COM 4	COM 5	COM 6	
Enabled							
UART	UART 3	UART 1	UART 1	UART 1	UART 1	UART 1	
Stack depth	2	1	1	1	1	1	
Timeout	65535	65535	65535	65535	65535	65535	
Number of	4	2	2	2	2	2	
Set	~		Get				
Modbus RTU (	Client			0			1
Enabled		~	1	2			
UART		UAR	1 2 1	UART 1			
Stack depth		1		1			
Timeout (msec		1000		1000			
Number of repe		2		2			
Delay before ne				100			
Set		_	Get				
							,
Modbus RTU	Server						1
	1		2				
Enabled		Γ					
UART	UART 1	UART	1				
Address	255	255					
Set			Get				
Reg: 166 Answ	157	TO	ut:0	Ew	cept: 9		P

Figure 18. "Virtual interfaces" tab

- <u>"COM Client"</u>. It is needed to configure a COM Client every time a "transparent" communication mode or M-Bus compatibility is needed. This is mandatory in order to read devices not compatible with Modbus RTU/TCP protocols. Configuration parameters are:
- "Enable": Do not enable any COM client if not needed.

• "UART": Select the UART number in which a COM Client will be configured. NOTE: Once a given UART is selected to be a COM client, it cannot be used with any other configuration such as Modbus client/server.

- "Stack depth": number of parallel executions that can be done in parallel by the COM client.
- "Timeout": it defines the amount of milliseconds defined as time out.
- "Number of repeats": number of retries defined in case of transmission error. NOTE: COM Client must always be used when peripheral devices connected to a given UART use protocols such as M-Bus, IEC-102, DLMS, etc.
   NOTE: After configuration is completed, click on "Set" button in order to save changes.
- <u>"Modbus RTU Client"</u>. This mode working mode must be used when the MX-9 behaves as master in a Modbus RTU network (it sends Modbus requests to the slaves connected to the Modbus RTU network). These requests will be defined under the "Modbus devices" tab. Parameters to be configured are:
- "Enable": Do not enable any Modbus RTU client if not needed.
- "UART": Select the UART to be associated to the Modbus RTU client.
- NOTE: Once a given UART is selected to be a Modbus RTU client, it cannot be used with any other configuration such as COM client.
- "Stack depth": number of requests that can be stacked in the UART buffer. It is recommended to set this value to 1 by default.
- "Timeout": it defines the amount of milliseconds defined as time out.
- "Number of repeats": number of retries defined in case of transmission error.

• "Delay before next request": In case peripheral devices need some "extra time" to answer after a received request

NOTE: After configuration is completed, click on "Set" button in order to save changes.

- <u>"Modbus RTU Server"</u>. This mode is used when the MX-9 will be used as Modbus slave in a network. Requests from a Modbus server will be received and answered.
- "Enable": Do not enable any Modbus RTU server if not needed.
- "UART": Select the UART to be associated to the Modbus RTU server.
- NOTE: Once a given UART is selected to be a Modbus RTU server, it cannot be used with any other configuration such as COM client.
- "Address": Define Modbus address for MX-9. Modbus master must send requests to the given address.
- NOTE: After configuration is completed, click on "Set" button in order to save changes.

#### 5.5 Communication > Data transfer

Data collected by MX-9 can be sent in two different ways: FTP and MQTT protocols. In both cases, parameters to be sent must be configured by setting up the data structure following the next steps:

- Go to *Communication>Data transfer>Common parameters>* and configure the following parameters:
- "Amount of group of registers": Number of registers or group of registers to be stored in the CSV file.
- "Set user archive". If selected, it enables automatic storage of selected registers in the internal memory. It is recommended to always select this option so that in case of file transmission failure, data can be retrieved and resent when communication is reestablished.
- "Parameter". It is filled in automatically.
- "Register/Coil" Initial Modbus register address.
- "Amount of registers". Number of registers to be stored from the initial Modbus registers address.
- "Format": Data type of registered parameter.
- "Header": Fixed column header to be written in CSV file.
- "Dimension": Extra column in which data units can be stored.

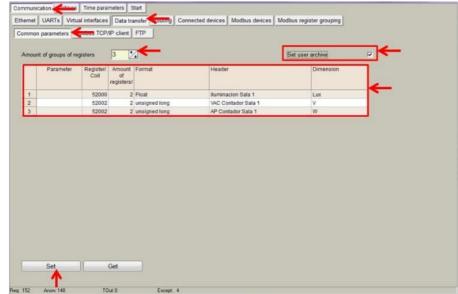


Figure 19. "Data transfer" tab. CSV file structure definition

NOTE: Go to *Archives>Configuration* and specify 'User archive (min)' value to set the datalogging period as shown in the following figure.

Heat account (min.)	Period 60	Delay		Records	
	60			A CONTRACTOR OF A	
		0	Heat account	24	Clear
as account (min.)	60	0	Gas account	24	Clear
Nater account (min.)	60	0	Water account	24	Clear
Electricity account (min.)	60	0	Electricity account	24	Clear
Jser archive (min.)	5	0	User archive	0	Clear
Set	Get				
<b>1</b>					

#### Figure 20. Setting up Datalogging period

NOTE: After configuration is completed, click on "**Set**" button in order to save changes.

After configuring data structure, user can select in which way the device will send data. It can be sent in a csv file to a remote FTP server or in a JSON formatted message to an MQTT Broker.

1. <u>Configure FTP client:</u> Go to *Communication>Data transfer>FTP>* and configure the following parameters:

- "FTP server": Up to 4 different FTP connections to remote FTP servers can be configured.
- "Enabled": Select it to enable an FTP connection
- "FTP Port": By default, 21 but can be changed.
- "Transfer period": It defines interval between CSV file sending tasks.
- "Number of last records to be read": It defines maximum number of previous data stored and not sent due to communication error. These data will be sent in a CSV file when communication is restored.
- "Transmission channel": It can be Ethernet or GPRS
- "URL and directory of FTP servers": It defines the complete FTP server URL where CSV file will be hosted.
- Username and password of FTP server: to be configured in case credentials are requested by FTP server.

met GPR	RS UARTs	Virtual interfa	ces Data t	transfer	FTP server	Routing (	Connec	ted devices	Modbus devices	Modbus register grouping	
mmon parar	meters Mod	bus TCP/IP cli	ent FTP								
			FTP serv	er 1	FTP server 2	FTP ser	rver 3	FTP server	4		
Enabled			7		Г	F		Г	Name tem	plate of the file to be sent	
FTP port			21	2	21	21		21	YYYY_M	A_DD_HH_NN.csv	_
Transfer peri	od (min.)		10	2	2	15		10			
Repeat trans	fer if failure (r	nin.)	5	1	16	5		5			
Max number	of last record	is to be sent	10	1	and the second se	10		10			
Transmission	n channel		C Ethernet ∉ GPRS		Ethernet	C Etherne GPRS	et .	Ethernet GPRS			
	ctory of FTP	servers									
FTP server						URL and	d direct	ory			
1	192.168.1.1/										
2	192.168.1.1/										
2	192.168.1.1/										
3 4											
3 4 Username of								ETD conner	Chatring	Successful/attemptil	Int
3 4	FTP server		er name					FTP server	Status	Successful/attempt/la	
3 4 Username of			er name					FTP server	Status		
3 4 Username of FTP server 1 2	FTP server		er name					FTP server	Status File transmitted	09/08/2016 12:13:19	
3 4 Username of FTP server 1 2 3	FTP server		er name							09/08/2016 12:13:19 09/08/2016 12:13:20	
3 4 Username of FTP server 1 2 3 4	FTP server		er name					1	File transmitted	09/08/2016 12:13:19 09/08/2016 12:13:02 09/08/2016 12:13:02	
3 4 Username of FTP server 1 2 3 4 Password of	FTP server	U.								09/08/2016 12:13:19 09/08/2016 12:13:02 09/08/2016 12:13:02 09/08/2016 12:13:00 01/01/1998 00:00:00	
3 4 Username of FTP server 1 2 3 4 Password of FTP server	FTP server user1 FTP server	U.	er name					1	File transmitted	09/08/2016 12:13:19 09/08/2016 12:13:02 09/08/2016 12:13:02	
3 4 Username of FTP server 1 2 3 4 Password of FTP server 1	FTP server	U.						1	File transmitted	record transfer time     0910812016 12:13:19     0910812016 12:13:02     0910812016 12:13:02     0910812016 12:13:00     0110111988 00:00:00     0110111988 00:00:00	
3 4 Username of FTP server 1 2 3 4 Password of FTP server 1 2	FTP server user1 FTP server	U.						1	File transmitted	ecord transfer time 09/08/2016 12:13:19 09/08/2016 12:13:02 09/08/2016 12:13:02 09/08/2016 12:13:00 01/01/1989 00:00:00 01/01/1989 00:00:00 03/08/2016 10:08:00 01/01/1989 00:00:00 01/01/1980 00:00 01/01/1980 00:00 01/01/1980 00:00 01/01/1980 00:00 01/01/1980 00:00 01/00 01/01/1980 00:00 01/01/1980 00:00 01/00 01/01/1980 00:00 01/00 01/01/1980 00:00 01/00	
3 4 Username of FTP server 1 2 3 4 Password of FTP server 1	FTP server user1 FTP server	U:						1	File transmitted	record transfer time 09/08/2016 12:13:19 09/08/2016 12:13:02 09/08/2016 12:13:02 01/01/1988 00:00:00 03/08/2016 10:08:00 01/01/1988 00:00:00	

Figure 21. "Data transfer" tab. FTP client configuration

NOTE: In order to synchronize user archive storage and csv sending file through FTP link, the following constraints must be taken into account:

"User archive sample time" must be equal or below the FTP "transfer period"

FTP "Repeat transfer if failure" time is recommended to be about half time of FTP "transfer period".

- 2. <u>Configure MQTT publisher</u>: Go to *Communication>Data transfer>MQTT>* and configure the following parameters:
- "Topic": A topic is a UTF-8 string, which is used by the broker to filter messages for each connected client. A topic consists of one or more topic levels. Each topic level is separated by a forward slash (topic level separator). Example: "building1/zoneA/room2"
- "What type of data to be transferred": It defines the functionality the device will have with regard to MQTT data sending:
- "Disabled": if selected, the device will not send anything through MQTT port.
- "Current values": MX-9 will send real time values of parameters configured in Common Parameters tab. In this case, sampling/sending period can be set from 1 to 86400 seconds.
- "User Archive records": this feature sends data every datalogging period set in *Archives>Configuration>* User archive (min) ' value.
  - NOTE: After configuration is completed, click on "**Set**" button in order to save changes and "**RESTART**" (start menu>restart).

Communication Archives Limits verification Alerts Time parameters Start	
Ethernet GPRS UARTs Virtual interfaces Data transfer FTP server MQTT Subscriber Routing Connected devices Modbu	s devices Modbus register grouping
Common parameters Modbus TCP/IP client FTP MQTT	
······································	
What type of data to be transferred	
What type of data to be transferred     building1/zoneA/room2	
C Current values	
User archive records	
Count of last records to be sent 5	
Connection state Not connected	
Last record transfer time: 06/02/2017 17:44:00 Clear	
Set Get	
leg: 385 Answ. 377 TOut:0 Except: 7	

Figure 22. "Data transfer" tab. MQTT configuration

Once properly configured both this tab and *Communication>MQTT Subscriber* one, JSON formatted messages will be sent to the MQTT Broker (for example, RabbitMQ) In the following example, a "user archive records" message with a discrete input status is sent:

```
"SN":"86004",
"name":"MX-9",
"header":{
"startTime":"2016-02-07T15:06:00.000Z",
"endTime":"2016-02-07T15:06:00.000Z",
"recordCount":2,
"columns":{
"0":{
"id":"0",
"name":"relay1",
"dataType": "NUMBER",
"format": "unsigned short"
}
},
"data":[
{
"ts":"2016-02-07T15:06:00.000Z",
"f":{
"0":{"v":0}
}
}
1
```

#### 5.6 Communication > FTP Server

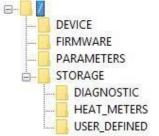
If the MX-9 has a micro SD card installed, it can act as FTP server. In this tab, user can configure both user and password to be used as credentials to enter into the internal file system through an FTP connection.

Communi	ication Ar	chives	Time parameters	Start					
Ethernet	GPRS	UARTs	Virtual interfaces	Data transfer	FTP server	Routing	Connected devices	Modbus devices	Modbus register grouping
User N	lame	J	user						
User F	assword	Ī	pass						
	Set		Get						
Req: 202	Answ: 19	18	TOut:0	Ехсер	t 4				

Figure 23. "Communication > FTP server" tab.

Once properly configured, user can access the internal file system making use of any FTP client (such as Filezilla).

The file system structure is as follows:



In the root, a "CURRENT\_DATA.csv" file is stored. You will find all the data generated by the MX-9 configured in "Communication > Data Transfer > Common parameters" tab and not yet sent to the remote FTP server.

Moreover, under "Storage" folder, files for each of the archives set in the "Archives" tab can be found. They are created on a daily basis.

Nombre de archivo	Tamaño de archivo	Última modificación	Permisos	Propietario
	2.890	29/07/2016	-rw-rr	mpc mpc
2016_08_01ud.csv	119.023	01/08/2016	-rw-rr	mpc mpc
A 2016_08_02ud.csv	114.908	02/08/2016	-rw-rr	mpc mpc
图 2016_08_03ud.csv	36.858	03/08/2016	-rw-rr	mpc mpc
2016_08_05ud.csv	21.896	05/08/2016	-rw-rr	mpc mpc
2016_08_08ud.csv	196.026	08/08/2016	-rw-rr	mpc mpc
2016_08_09ud.csv	233.450	09/08/2016	-rw-rr	mpc mpc

#### 5.7 Communication > MQTT Subscriber

If the MX-9 supports MQTT protocol, within this tab, user will need to configure MQTT Broker (remote server towards data will be sent). it can act as FTP server. In this tab, user can configure both user and password to be used as credentials to enter into the internal file system through an FTP connection.

Our second sectors Arethings Lin	mits verification Alerts Time parameters Start
	Virtual interfaces Data transfer FTP server MQTT Subscriber Routing Connected devices Modbus devices Modbus register grouping
Ethemet GPRS OARTS	Virtual internaces Data transier PTP server   MUTT Subscriber Routing Connected devices   Modbus devices   Modbus register grouping
	Transmission channel
Enabled 🔽	Ethernet     GPRS
MQTT Broker URL	192 168 252 254
MQTT Broker Port	
Subscriber Identifier	mpc330
User Name	mpc
User Password	mpc
Session keep alive	60 💆 sec.
Set	Get
Reg: 448 Answ: 441	TOut:0 Except 7

Figure 24. "Communication > MQTT Subscriber" tab.

This protocol needs to have a central server that will collect all the data sent by the MX-9. Thus, first of all, user must enable this mode. In addition, the following parameters must be configured:  $\circ$  "MQTT Broker URL": This is the server URL where data will be sent to

- "MQTT Broker Port": By default, MQTT protocol is 1883 but it can be change in this box.
- "Subscriber identifier": This is the device identifier.
- "User name": Broker user with credentials to publish messages.
- "User password": Broker password.
- "Session keep alive": number of seconds the session is kept alive after message has been sent. By default, 60 secons.

NOTE: After configuration is completed, click on "**Set**" button in order to save changes.

#### 5.8 Communication > Routing

Since MX-9 can work as a communication gateway, several routing modes can be implemented in it. When used as gateway, all the information received by MX-9 is forwarded following the chosen configuration, not storing any of these data in its memory:

#### • TCP/IP - serial (request)

Making use of this mode, two devices can be connected between a TCP/IP port and a UART. In this case, the TCP/IP device must initiate communication and the RS485/RS232 will answer under "request".

Parameters to be configured are:

- "Enabled": Mode enabling/disabling.
- "Socket live time": Duration in which socket is kept active. When the device initiating communication sends a request command to the slave device, communication will be shut down when this time is reached.
- Routing 1,2,3,4,5,6:
- "TCP port": Routing is done through this port.
- "COM client": Previously configured under "Communication > Virtual interfaces" tab

Discrete inputs	Commun	ication Arc	hives Ale	rts Time p	arameters	Start
Ethernet GPR	SUART	s Virtual	interfaces	Routing	Connected	devices Modbu
TCP/IP-serial(re	equest	TCP/IP-seri	al(transpar	ent) Modt	ous TCP/IP	- Modbus RTU
TCP/IP server Enabled Socket live	<b>⊽ ←</b> time	65535		sec.		•
	1	2	3	4	5	6
TCP port	6666	0	0	0	0	0
COM Client	COM 1	COM 1	COM 1	COM 1	COM 1	COM 1
s	et		Get			

Figure 25. "Communication > Routing" tab. TCP/IP - serial (request) routing configuration

#### • TCP/IP - serial (transparent)

- Making use of this mode, two or more devices can be connected between a TCP/IP port and a UART. In this case, any device can initiate communication. The MX-9 manages several communications seamlessly. Parameters to be configured are:
- Routing 1,2,3,4,5,6:
- "Enabled": Mode enabling/disabling.
- "TCP port": Routing is done through this port.
- "UART": Previously configured under "Communication > UARTs" tab.
- "Stack depth": Number of concurrent transmissions.
- "Connections count": Number of devices to be connected.
- "Socket live time": Duration in which socket is kept active. When the device initiating communication sends a request command to the slave device, communication will be shut down when this time is reached.

	I CE ME Seriado	ransparent)	CP/IP -	Modbus RTU	Ethernet<->GPRS	GSM<->UART (request
	<b>Y</b>	2	3	4	5	6
Status	6	1.000				Concession in the local division of the loca
Enabled		E.	E	<b>C</b>	<b></b>	E
TCP port	3333	65535	0	0	0	515
UART	UART 1	UART 3	UART 4	UART 3	UART 2	UART 2
Stack depth	2	1	1	1	2	2
Connections count	4	1	1	1	1	1
Socket live time	65535	65535	2000	65535	65535	65535
Set		iet				

Figure 27 "Communication > Routing" tab. TCP/IP - serial (transparent) routing configuration

#### • Modbus TCP/IP - ModBus RTU

The MX-9 can also forward Modbus packets from a TCP port to an Modbus RTU client. In order to do so, Modbus TCP/IP server mode must be always enabled as shown in the figure. Also "Socket live time" parameter must be configured given that it is the duration in which socket is kept active. When the device initiating communication sends a request command to the slave device, communication will be shut down when this time is reached.

This routing mode can be done in two ways:

- Destination "TCP port": This mode enables assignment of a TCP port to each Modbus RTU device as previously configured under *Communication>Virtual interfaces>Modbus RTU Client* tab.
- Destination "Modbus address": Within this mode, user can identify Modbus addresses to each Modbus RTU device as previously configured under *Communication>Virtual interfaces>Modbus RTU Client* tab. With this configuration, Modbus commands can be sent to devices within the network making use of the specific device Modbus address and the MX-9 IP address and TCP port 502.

	devices Modbus devices	THE REAL PROPERTY OF		
P/IP-serial(request) TCP/IP-serial(transparent) Modbus TCP/IP	Modbus RTU	GPRS GSM<->UART	(request)	
dbus TCP/IP server				
Enabled 🖓				
Socket live time 65535 5 sec.				
Set Get				
uter Modbus TCP/IP to Modbus RTU				
	Route	er Modbus TCP/IP to Mod	Rus RTU	
Which parameter describe destination				
Which parameter describe destination		Which parameter describe		
Which parameter describe destination		Which parameter describe	destination	
Which parameter describe destination		Which parameter describe	destination	
Which parameter describe destination  Modbus address  TCP port  First Modbus RTU  Second Modbus		Which parameter describe Modbus address	destination	
Which parameter describe destination Modbus address TCP port		Which parameter describe	destination	
Which parameter describe destination  Modbus address  TCP port  First Modbus RTU  Second Modbus	×	Which parameter describe Modbus address	destination TCP port	
Which parameter describe destination  Modbus address  TCP port  First Modbus RTU  Glient  Second Modbus  RTU Client.	×	Which parameter describe Modbus address odbus address First Modbus R Client rom	to destination TCP port	
Which parameter describe destination  Modbus address  TCP port  First Modbus RTU  Glient  Second Modbus  RTU Client.	M.	Which parameter describe Modbus address odbus address First Modbus R Client rom	destination TCP pert TU Second Modbus RTU Client 1 101	
Which parameter describe destination  Modbus address  TCP port  First Modbus RTU  Glient  Second Modbus  RTU Client	M.	Which parameter describe Modbus address odbus address First Modbus R Client rom	destination TCP pert TU Second Modbus RTU Client 1 101	

Figure 28. "Communication > Routing" tab. Modbus TCP/IP – Modbus RTU routing configuration

#### 5.9 Communication > Connected devices

Within this section, both M-Bus and Wireless M-Bus communication can be configured given that MX-9 is able to collect data from up to 8 M-Bus and up to 50 Wireless MBus devices. In the following pages, a detailed description of each M-Bus and Wireless M-Bus meter configuration step is done.

#### 5.9.1 M-Bus devices

Steps to be followed are:

- Enable COM Client under Communication>Virtual interfaces>COM Client tab.
- Go to Communication > Connected devices > Mbus devices > Configuration and configure the following parameters:
- "Enabled": Select which MBus interface will be active.
- "COM Client": Select COM Client previously configured.
- "Amount of meters": Configure the number of M-Bus devices to be read.
- "Read Period": Reading interval in minutes.

				es Modbus devi	ces Mo	odbus re	gister g	rouping		
eat meters Gas me	MBus devices	s (water, electri	ity meters) Ele	ctricity meters						
Configuration Curren	t values									
	1			Fir	st group					
	MBus interf. 1	MBus interf. 2	1	Pol	Water	Electr.	Heat Ind.	Gas ind.	Address	
Enabled	7	1	-	110	and.	ing.	inu.	ina.	FEFFFFFFFFFFFFF	
COM Client	1	2		-					anaturnut	
Amount of meters	1	7								
Read period (min.)	1	1								
Set	Get									
Set	Get									
Meters search										
Meters search										
Meters search										
Meters search										
Meters search										
Meters search										
Meters search										
Meters search										

Figure 29. "M-Bus devices" tab. Communication configuration

NOTE: After configuration is completed, click on "**Set**" button in order to save changes. Also, perform a <u>hardware reset</u>.

Once MX-9 has been restarted, go to Communication>Connected devices>Mbus devices>Configuration and click on "Search devices in 1st line" button.

After a few seconds, a list including all the M-Bus devices connected to the network will appear:

thernet G	9	1		
leat meters	New founded devices	Previuos founded devices		
Configuratio	Pos Address 1 696454062D2C0F0D	Pos Address No	Data position	
nabled	7	1 01138299496468816	1	
OM Client			$\sim$	
nount of me	Found new device			
niod dimen			Previously stored de	evice
nod dimen				
5				
Search beg				
<ul> <li>From th</li> </ul>				
S Aeters sea Search beg • From th From th				
<ul> <li>From th</li> </ul>				
From th				
earch beg From th From th ddressing				
earch beg From th From th ddressing Primary				
From th From th From th ddressing Primary				Finish and send
From th From th From th ddressing Primary				Finish and send Finish without sendir

Figure 30. MBus devices Self-discovery and steps to be followed.

Once a new device is discovered, it must be added to the Mbus client, the following steps must be followed:

- Click on "Include newly found"
- Click on "delete missing" if you want to delete old meters which are not needed.
- Click on "Finish and send"

If several new devices are discovered, the following steps should be done:

- Click on "Merge all"
- Click on "Finish and send"

All devices online appear in green and the ones offline in red. An step-by-step guide is shown in the

following figures:

STEP 1: Including new devices

ernet G	jā .							- 0
at meters	New fo	ounded devices		Prevé	uos founded devices			
nfiguratio	Pos	Address		Pos	Address	Data		
ſ	1	695464062D2C0F0D		No		position		
			 	and the second second	0113829949848816	1	100	
bled				2	696464062D2C0F0D	2	<b>J</b>	
Client								
unt of me								
f period								
d dimer								
s								
S lers sea arch ber								
arch beg								
arch beg From th								
arch beg From th From th								
arch beg From th From th dressing								
S ters sea arch bei From th From th dressing Primary								
arch beg From th From th dressing								
arch beş From th From th dressing Primary								Einish and send
arch beş From th From th dressing Primary								Finish and send
arch beş From th From th dressing Primary								Finish and send

Figure 31. New device included in the M-bus client.

ew f	ounded devices		Previ	uos founded devices				
os	Address		Pos No	Address	Data position			
1	696464062D2C0F0D			696464062D2C0F0D	2	1		
						1		
							Finish and	send
							Finish and Finish without	

Figure 32. After delete missing

#### STEP 3: Finish and send

	AND AND AND A	interfaces Data transf	er FTP server	MOTT S	ubscriber Ro	outing Connected	devices Modbus devic	es Modb	is register grouping	10		
leat metera MBus	devices											
Configuration Curr	ent values											
				6	rst group							
	1	2						In successi	25			
nabled	P	F			Type	Addressing mode	Address	Data	Device number	Manufacturer	Medium	
OM Client	1	1						position				-
mount of meters	1	1		×	Unknown	Prim /ª Secon	696464062D2C0F0D	2	69646408	KAM	Water Mode 2	1.0
ead period	5	50										
enod dimension	17 sec.	# sec F min.										
	C B	C.h										
Set		Get										
Meters search		Get										
Veters search Search begins	conternet deal											
Veters search Search begins From the least s		in the address										
Meters search Search begins		in the address										
Meters search Search begins From the least s From the most i Addressing mode	significant digit	in the address in the address										
Meters search Search begins From the least s From the most s	significant digit	in the address										
Meters search Search begins From the least s From the most i Addressing mode Primary address	significant digit s. 🤉 Secon	in the address in the address dary address										
Meters search Search begins From the least s From the most s Addressing mode Primary address	significant digit	in the address in the address dary address										
Meters search Search begins From the least s From the most i Addressing mode Primary address Search devi	significant digit a                          Secon ces in 1st line	in the address in the address dary address										
Meters search Search begins From the least s From the most i Addressing mode Primary address Search devi	significant digit s. 🤉 Secon	in the address in the address dary address										

Figure 33. After finish and send

Once the new device is added to the M-bus client, it is recommended to modify the data position count in order to optimize the internal memory of the controller (from 2 to 1 in the example above). Once updated, click on "SET":

or rear	UARTs Vinu	al interfaces	Data transfer	FTP server	MQTT St	bscriber Ro	uting Connected	devices Modbus devic	es Modbe	rs register groupie	9		
loat meters MBu	is devices												
Configuration Cur	rent values												
					Fig	It group							
	1	2							n successio	00			
Enabled	9	1				Type	Addressing	Address	Data	Device number	Manufacturer	Medium	
COM Client	1	1					mioda		position				
Amount of meters	1	1			1	Unknown	Phim * Becon	696464062D2C0F0D	1	69646406	KAM	Water Mode 2	
Read period	5	60							/				
eriod dimension	# sec.	# sec.				-							
	C min.	C min.				Change	d from "2" to "	11.					
	1 0	· n					taded, click or						
Set	-	Del	-			Once ap	naucu, ciick oi						
Moters search	-	0श				Once ap	abed, click of						
Motors search Search begins	-					Once ap	naucu, ciick ui						
Motors search Search begins (• From the least	CO. 20000000000	it in the adds				Cince ap	naucu, ciick o						
Motors search Search begins	CO. 20000000000	it in the adds				Circe de	nation, circle of						
Motors search Search begins · From the least · From the most	significant dig	it in the adds				Circe de							
Motors search Search begins (* From the least	significant dig	it in the adds	rst			Circe at							
Motors search Search begins From the least From the most Addressing mode Primary addres	significant dig us. 🕞 Seco	it in the adds of in the adds indary addre	rst			Unce al							
Moters search Search begins From the least From the most Addressing mode Primary addres	significant dig	it in the adds of in the adds indary addre	rst			Unce al							
Moters search Search begins From the least From the most Addressing mode Primary addres	significant dig Is (+ Seco Aces in 1st Br	nt in the addo at in the addo indary addre	197			once at							
Moters search Search begins From the least From the most Addressing mode Primary addres	significant dig us. 🕞 Seco	nt in the addo at in the addo indary addre	197			Unce of	Hadeu, Carok o						
Moters search Search begins From the least From the most Addressing mode Primary addres Search dev	significant dig Is (+ Seco Aces in 1st Br	nt in the addo at in the addo indary addre	197			Circe of	nord, care o						
Moters search Search begins From the least From the most Addressing mode Primary addres	significant dig ss (+ Seco rices in 1st in NBus Mart 1	nt in the addo at in the addo indary addre	197			Load from C		10 CSV					

Figure 34. Updating data position

Once the M-bus client is configured, it is possible to read data available in the meter:

	unerial entra	l interfaces Du	ita transfer   FT	P server MQTT :	Subscriber R	connected de	vices Modbus devic	es Modb	is register groupi	10		
teat meters MB	us devices											
Configuration Cu	ment values											
				1	rst group						C	ick he
	1	2						n succéssi	20 C			1
nabled	P	F			Type	Addressing mode	Address	Data	Device number	Manufacturer	Medium	
ON Cherk	1	4						position		KAM	Water Node 2	¥.
mount of meters	1	1			Unknown	Pitm # Secon 61	6454052D2C0F9D	1.	69645406	KAM	Water Mode 2	
boried beet	5	60										
eriod dimension	17 Sec.	# Sec.										
	C min.	<ul> <li>min.</li> </ul>										
	C n	1.8										
Set		Get										
Meters search		Get										
Meters search Search begins												
Meters search Search begins	t significant digi											
Meters search Search begins From the lease	t significant digi	t in the address										
Meters search Search begins From the lass From the mos	t significant digi	t in the address										
Meters search Search begins From the load From the most Addressing mode	t significant digi	t in the address t in the address										
Meters search Search begins From the least From the mos	t significant digi	t in the address										
Meters search Search begins • From the lease From the mos Addressing mode • Primary addre	t significant digi sa. 👎 Secor	t in the address t in the address idary address.										
Meters search Search begins From the least From the most Addressing mode Primary addressing	t significant digi	t in the address t in the address idary address.										
Meters search Search begins From the least From the most Addressing mode Primary addressing	t ogrificant dig sa. 🔸 Secor vices in 1st in	t in the address t in the address idary address.										
Meters search Search begins + From the lease From the nease Addressing mode Primary addre Search de	t ogrificant dig sa. 🔸 Secor vices in 1st in	in the address t in the address idary address e										
Meters search Search begins From the lease From the mos Addressing mode Primary addres	t ogsificant dig sa. • Secor vices in 1st in MBus intert 1	in the address t in the address idary address e										

Figure 35. Click on "data/parameters" button

#### STEP 4: Click on "Read available parameters"

Ethemet GPRS 1	JARTs Virtu	al interfaces	Duta transfer	FTP server	MOTT 5	ubscriber	Routing	Connected	devices Modbus devi	ices Modb	us register groupi	ng		
Heat meters MBs	s devices													
Configuration   Cur	rent values													
					1	rst group								
	1	2			10.00					In successi	on a			
Enabled	P	1				Typ		Addressing	Address	Data	Device number	Manufacturer	Medium	
COM Client	8	1				Uninew		mode		position	08046405	KAM	Water Mos' *	_
Amount of meters	1	1			2	Uninow	n. (6)	Prim .# Secon.	696464062D2C8F0D	1	69646405	кам	Water Moc	Wew/Edit list of param
Read period	5	60												Read available parame
Period dimension	17 58C	IF SEC												Read current data
	C 8	r h												
Set		Get												
Meters search Search begins From the least From the most	1.500.000.C													
Addressing mode	s 🕫 Seco	ndary addres												
Search dev	ices in 1st lir	e :												
	MDus interf. 1	MBus interf.	2											
	Completed	111	11											
Status	Congresso													

Figure 36. Read available parameters

A list of parameters will be shown. User must select which parameters provided by the M-Bus devices should be stored in the internal MX-9 memory.

		Paramete	ers in de	мсе							Selecte	d parameters					
Pos	Parameter	Storage number	Tadiff	BubUnit	Type of parameter	^	Pos No	Parameter	Storage	Tariff	SubUnit	Type of parameter	Double fical index	Double long	Float Index	Long	
1	Identification Nr.	1	1	1	Instantaneous		-						-	inder		-	
2	Manufacturet Medium,	11	1	1	Instantaneous		1	Identification Nr.	1	1	1	Instantaneous					
3	Fabrication No	1	1	1	Instantaneous		2	Manufacturer, Medium,	1	1	1	Instantaneous			_	_	
4	Energy(Wh)	3	1	1	Instantaneous		3	Fabrication No	1	1	1	Instantaneous	_				
5	Volume(m3)	1	1	1	Instantaneous		4	Energy(Wh)	48	1	1	Instantaneous				_	
6	On Time(hours)	4	1	1	Instantaneous		5	Volume(m3)	1	1	1	Instantaneous					
7	Flow Temperature(C)	1	1	1	Instantaneous		5	On Time(hours)	1	1	1	Instantaneous	_				
8	Return Temperaturo(C)	1	1	1	Instantaneous		7	Flow Temperature(C)	4	1	1	Instantaneous					
2	Temperature Difference(K)	1	1	1	Instantaneous		8	Return Temperature(C)	1	1	1	Instantaneous			_		
10	Power(W)	4	1	1	Instantaneous		9	Temperature	1	1	1	Instantaneous					
11	Power(W)	1	1	1	Maximum value		10	Power(W)	1	1	1	Instantaneous					
12	Volume Flow(m3/b)	1		1	Instantaneous		11	Power(W)	1	1	1	Maximum value					
13	Voluma Flow(m3/h)	1	1	1	Maximum value		12	Volume Flow(m3/h)	1	1	1	Instantaneous					
14	Energy(Wh)	1	2	1	Instantaneous		1.3	Volume Flow(m3/h)	1	1	1	Maximum value					
15	Energy(Wh)	1	3	1	Instantaneous		14	Energy(Wh)	1	2	1	Instantaneous					
16	Volume(m3)	1	1	2	Instantaneous		15	Energy(Wh)	1	3	1	Instantaneous					
17	Volume(m3)	4	1	3	Instantaneous		15	Volume(m3)	1	1	2	Instantaneous					

Figure 37. List of available parameters

STEP 5: Select M-Bus meter parameters to be stored

Each selected parameter must be configured with an ordering index according to the data format that the meter presents in its datasheet. This index will order the stored data in the internal memory map.

		Device nu Paramete			546406						Selecte	d parameters				
Pos No	Parameter	Storage	Tariff	SubUnit	Type of parameter	^	Pos No	Parameter	Storage	Tariff	SucUnit	and the second second second	Double float index	Double long	Float	Long
1	Identification Nr.	1	1	1	Instantaneous				100000000	1				index	1.0.0000	
2	Manufacturer, Medium,	1	1	1	Instantaneous		1	Identification Nr.	1	1	1	Instantaneous				
3	Fabrication No	1	1	1	Instantaneous		2	Manufacturer, Medium,	1	1	1	instantaneous				
4	Energy(Wh)	1	1	1	Instantaneous		3	Fabrication No	1	1	1	Instantaneous				
5	Volume(m3)	1	1	1	Instantaneous		4	Energy(Wh)	1	1	1	instantaneous			1 ←	
8	On Time(hours)	1	1	1	Instantaneous		5	Volume(m3)	1	1	1	Instantaneous			2 ←	
7	Flow Temperature(C)	1	1	1	Instantaneous		6	On Time(hours)	1	1	1	Instantaneous				
8	Return Temperature(C)	1	1	1	Instantaneous		7	Flow Temperature(C)	1	1	1	Instantaneous				
9	Temperature Difference(K)	1	1	1	Instantaneous		8	Return Temperature(C)	1	1	1	Instantaneous				
10	Power(W)	1	1	1	Instantaneous		9	Temperature	1	1	1	Instantaneous			3 ←	
11	Power(W)	1	1	1	Maximum value		10	Power(W)	1	1	1	instantaneous				
12	Volume Flow(m3/h)	1	1	1	Instantaneous		11	Power(W)	1	1	1	Maximum value				
13	Volume Flow(m3/h)	1	1	1	Maximum value		12	Volume Flow(m3/h)	1	1	1	Instantaneous				
14	Energy(Wh)	1	2	1	Instantaneous		13	Volume Flow(m3/h)	1	1	1	Maximum value				
15	Energy(Wh)	1	3	1	Instantaneous		14	Energy(Wh)	1	2	1	Instantaneous			4 ←	
15	Volume(m3)	1	1	2	Instantaneous		15	Energy(Wh)	1	3	1	Instantaneous				
17	Volume(m3)	1	1	3	Instantaneous		16	Volume(m3)	1	1	2	Instantaneous				

Figure 38. List of parameters indexes.

After indexing parameters, it is needed to save the configuration. Click on "Save As" and give it a name so that user can reuse this configuration for similar meters in the future

	Unknown (	Device nu Paramet	07700		546406						Colorto	d parameters					
Pos No	Parameter	Storage number	Tanif	SubUnit	Type of parameter	1	Pos	Parameter	Storag	r Taniff		Type of parameter	Double float index		Float	Long	
	Identification Nr.	1	1	1	Instantaneous	12					-			kndex			
2	Manufacturer, Medium,	1	1	1	Instantaneous		1	Identification Nr.	1	1	1	instantaneous					
3	Fabrication No	1	1	1	Instantaneous		2	Manufacturer, Mediu		1	1	Instantaneous					
	Energy(Wh)	1	1	1	Instantaneous		3	Fabrication No	1	1	4	Instantaneous					
5	Volume(m3)	1	1	1	Instantaneous		4	Energy(Wh)	1	1	1	Instantaneous			1		
5	On Time(hours)	1	1	1	Instantaneous		5	Volume(m3)	1	1	1	Instantaneous			2		
,	Flow Temperature(C)	1	1	1	Instantaneous		6	On Time(hours)	1	1	1	Instantaneous					
-	Return Temperature(C)	1	1	1	Instantaneous		7	Flow Tempera New 1	ype of Mbu	device			×				
,	Temperature Difference(K)	1	1	1	Instantaneous		8	Return Temps									
10	Power(W)	1	1	1	Instantaneous		8	Temperature				-			3		
1	Power(W)	1	1	1	Maximum value		10	Power(W) N	ame		MULTICAL	502					
12	Volume Flow(m3/h)	1	1	1	Instantaneous		11	Power(W)									
13	Volume Flow(m3/h)	1	1	1	Maximum value		12	Volume Flow(	- F	ŰK.	Cance						
4	Energy(Wh)	1	2	1	Instantaneous		13	Volume Flow(									
15	Energy(Wh)	1	3	1	Instantaneous		14	Energy(Wh)	1	2	1	Instantaneous			4		
16	Volume(m3)	4	-	2	Instantaneous		15	Energy(Wh)	1	3	1	Instantaneous					
17	Volume(m3)	1	1	-	Instantaneous		16	Volume(m3)	1	1	2	Instantaneous					

Figure 39. Saving the configuration.

Once the configuration is saved, it appears in the "Type" list. By clicking over the list you can select the current online configurations. After making the selection, click on SET:

Communication An	chives Limits	verification A	Jerts Time pa	rameters Sta	n										
Ethemat GPRS	UARTs Virts	al interfaces	Data transfer	FTP server	MOTT SU	bscriber R	outing	Connected	d devices Mor	dbus devices	Modbu	is register groupi	9		
Heat meters MB	is devices														
Configuration Cu	rent values														
1/					Firs	t group									
	1	2								in s	uccessio	n			
Enabled	<b>F</b>	1				Tjpe		Addressing mode	Addre		Data	Device number	Manufacturer	Medium	
COM Client	1	1	1			Linkpown	the second		695454062D0		2	59645405	KAM	Water Mode 2	
Amount of matera	1	1			-	Unstown	122	Phm - Secor	1 000404002D4	courre		03040400		water word z	
Read period	5	60	1			MC-4									
Period dimension	r sec r min. r h	if sec. if min. if h				PKE Weser Zenner test1									
Set	*	Get				VULTICAL									
Meters search Search begins		2						1							
From the least	t significant dig	pt in the addre	12.0												
From the mos	t significant dig	pit in the addre	188												
Addressing mode															
C Primary addre	ss. 4 Sect	ondary addres	16.												
Search de	vices in 1st li	ne													
	MBus intert. 1	MDus interf	2												
Status	Completed														
Stroked devices	1														
					1	.oad from (	CSV	Sav	e to CSV						

Figure 40. Saved configurations

#### STEP 6: Check current values

Heat meters MBus devices										
Configuration Current values										
Device/Parameter	Lastreadtime	Storage number	Tarif	SubUnit	Type of parameter	Double ficat	Double long	Float	Long	^
2 - NULTICAL 602 (69646406)	28/02/2017 18:08:40									
Identification No		1	1.1	1.5	Instantaneou					
Nanufacturet, Medium, Clatua		1	t		Instantaneou					
Fabrication No		18	1	1	Instantancou					
Energe(Mh)		1	1	1	Instantaneou			55420000.000		
Volume(m3)		1	1	3	Instantaneou			20547 000		
On Time(hours)		1	1	1	Instantancou					
Flow Temperature(C)		1	1	. 1	Instantanaou			28 570		
Return Temperature(C)		1	1	1	Instantaneou			27.150		
Temperature Difference(K)		1	1	1	Instantaneou			0 590		
Powen(W)		1	1	1	Instantaneou					
Fower(W)		1	1	. 1	Maximum					
voluma Flow(m3th)		1	1.1	1	Instantanaou					
Volume Flow(m3h)		1	1	4	Meximum					
Energy(Wh)		1	2	3	Instantancou			0.000		
Eneros(Mh)		1	3	1	Instantaneou					
Volume(m3)		1	1	2	Instantaneou					
(volume(m3)		1	1	3	Instantancou					
Energe(Wh)		1	1	4	Instantaneou					

Figure 41. Mbus Current values

#### STEP 7: Configuring data logging

These data will be included into its corresponding MX-9 Modbus register. The MX-9 has a Modbus array structure to store M-Bus parameters. Thus, in order to collect specific parameters, user must select them by numbering within the array as shown in previous steps. There are different arrays for different data format as shown in the following table:

Registers	Mbus meters data (150)	Data format	R/W
	1-st Mbus counter's data		
24000	Status (0-not read, 0xffffread)	Int16	R
24001- 24002	Reading time (UNIX time)	Int32	R
24003- 24082	Double data[20]	F64	R
24083- 24098	Long data[4]	Int64	R
24099- 24158	Float data[30]	F32	R
24159- 24178	Int data[10]	Int32	R
	2-nd Mbus counter's data		
24179- 24357			R
	50-th Mbus counter's data		
32771- 32949			R

In the previous example, we have given float index "1" to "Energy(Wh)" parameter. Thus, we will find it in Modbus register 24099 while "Fabrication number" has been given double float index "1" being stored in Modbus register 24003.

This configuration can be saved by clicking on the "Save as" button.

It is possible to send these data automatically to the user archive memory (for datalogging) by clicking on "All values to archive"

					number and the	song [] connected	dences moor	us devices Mo	noo regiorei	groupe
leat meters MBus devices										
Configuration Current values Device/Parameter	Last read time	Clauran	Tariff	SubUnit	Type of	Double float	Double long	Float	Long	
Devicemarameter	Lascreagine	Storage number	1 ACIE	SUDURIE	parameter	Double noat	Double long	Pipat	Long	
MULTICAL 602 (69646406)	28/02/2017 18:08:40						1			
dentification Nr.		1	1	1	Instantaneou					
Ianufacturer, Medium, Status		1	1	1	Instantaneou					
abrication No		1	1	1	Instantaneou					
inergy(Wh)		1	1	1	Instantaneou			55420000.000		
olume(m3)		1	1	1	Instantaneou			20547.000		
In Time(hours)		1	1	1	Instantaneou					
low Temperature(C)		1	1	1	Instantaneou			26.570		
Return Temperature(C)		1	1	1	Instantaneou			27.160		
emperature Difference(K)		1	1	1	Instantaneou			0.590		
Power(W)		1	1	1	Instantaneou					
ower(W)		1	1	1	Maximum					
olume Flow(m3/h)		1	1	1	Instantaneou					
olume Flow(m3/h)		1	1	1	Maximum					
inergy(Wh)		1	2	1	Instantaneou			0.000		
Energy(Wh)		1	3	1	Instantaneou					
(blume(m3)		1	1	2	Instantaneou					
olume(m3)		1	1	3	Instantaneou					
inergy(Wh)		1	1	4	Instantaneou					¥

Figure 42. All values to user archive

NOTE: If there are some registers configured previously in "common parameters" to be stored in the user archive they <u>will be deleted</u> by using this function. In case of using user archive memory it is recommended to configure first the Mbus client module.

After click in "All values to archive" all selected parameters will be automatically configured in "Common parameters" list, which will be stored in "User archive". In order to update changes, click in "SET" button".

	GPRS UART	s Virtual i	nterfaces	Data transfer FTP server	MQTT Subscriber Routing	Connected d	levices	Modbus devices	Modbu
Commo	n parameters M	odbus TCP	/IP client	FTP MQTT					
Amour	nt of groups of reg	gisters	6	2		Set user a	rchive		
	Parameter	Register/ Coil	Amount of registers/	Format	Header	1	Dimensio	n	
1		124278	1	Float (32b)	Energy(Wh)	-			
2		124280		Float (32b)	Volume(m3)				
3		124282	1	Float (32b)	Flow Temperature(C)				
4		124284	1	Float (32b)	Return Temperature(C)				
5		124286	1	Float (32b)	Temperature Difference(K)				
6		124288	1	Float (32b)	Energy(Wh)				
	1								

Figure 43. Common parameters configuration for MBus data storage

eat Events User	archive Diagnost	BC				
Time	Energy(Wh)	Volume(m3)	Flow Temperature(C)	Return Temperature(C)	Temperature Difference(K)	Energy(Wh)
28\02\2017 18:14:00	55420000.0000	20547.0000	23.9900	23.5200	0.4700	0.0000
28\02\2017 18:13:00	55420000.0000	20547.0000	23.9900	23.5200	0.4700	0.0000
28\02\2017 18:12:00	55420000.0000	20547.0000	24.2400	23.8500	0.3900	0.000
28\02\2017 18:11:00	55420000.0000	20547.0000	24,3900	24.0800	0.3100	0.000

Figure 44. Mbus parameters in user archive module

#### 5.9.2 Wireless M-Bus devices

The MX-9 automatically detects standard Wireless M-Bus devices. In the following pages, a detailed description of each configuration step is done:

• Go to *Communication* > *Connected devices* > *WMBUS* > *Configuration* and click on "Refresh" to scan wireless spectrum.

- Click on "+" to add each meter to the "Selected WMbus devices" list in the right side frame.
- If your meter data is encrypted, enter decryption key and click on "Set".
- Click on right button and select "Read available parameters".

Comm	unication Archives	Time parameter	s Start									
Etherr	et GPRS UARTs	Virtual interfa	ces Dat	a transfer	FTP serve	r Routing	Connect	ted devices	Modbus devices	Modbus regi	ster grouping	
Heat	meters MBus device	wimbus										
Conf	iguration											
"Vis	ible" WMbus devices							WMbus dev	ices			
Pos No	Scan time	Identifier	Receiv. packet count	Manufact urer	Signal level		Pos No	Туре	Identifier	Data position	Decryption key (Hex)	
-						_	1	Unknown	697131	77 1	414C36060272F716448EA5266D77	View/Edit list of parameter
1	19\12\2016 12:04:51	69713177	4	KAM	189							Read available parameters
								Set		Get		
	Clear	Refres	sh									

Figure 45. WMBus self-discovery

A list of parameters will be shown. User must select which parameters provided by the WM-Bus devices should be stored in the internal MX-9 memory. Each selected parameter must be configured with an ordering index according to the data format that the meter presents in its datasheet. This index will order the stored data in the internal memory map.

After indexing parameters, it is needed to save the configuration. Click on "Save As" and give it a name so that user can reuse this configuration for similar meters in the future

		Paramete	ers in de	vice							Selecte	d parameters				
Pos	Parameter	Storage number	Tariff	SubUnit	Type of parameter	î	Pos No	Parameter	Storage number	Tariff	SubUnit	Type of parameter	Double float index	Double long	Float index	Long index
1	FE 00	1	1	1	Instantaneous				1					index	-	
2	FE 01	1	1	1	Instantaneous		1	FE 00	1	1	1	Instantaneous				1
3	F9 FF 15	1	1	1	Instantaneous		2	FE 01	1	1	1	Instantaneous				2
1	Energy(Wh)	1	1	1	Instantaneous		3	F9 FF 15	1	1	1	Instantaneous				3
5	EE FF 07	1	1	1	Instantaneous		4	Energy(Wh)	1	1	1	Instantaneous			1	
;	EE FF 08	1	1	1	Instantaneous		5	EE FF 07	1	1	1	Instantaneous				
	Volume(m3)	1	1	1	Instantaneous		6	EE FF 08	1	1	1	Instantaneous				
3	Volume(m3)	1	1	2	Instantaneous		7	Volume(m3)	1	1	1	Instantaneous			2	
,	Volume(m3)	1	1	3	Instantaneous		8	Volume(m3)	1	1	2	Instantaneous			3	
10	FD 17	1	1	1	Instantaneol New	. her	n n of h	Matuma (m3)	4	4	3 ×	Instantaneous			4	
11	Time Point	1	1	1	Instantaneoi	1.71		nous derice				nstantaneous				
12	Time Point	2	1	1	Instantaneo							nstantaneous			5	
13	Energy(Wh)	2	1	1	Instantaneo	Nar	ne	KAM				nstantaneous			6	
14	Volume(m3)	2	1	1	Instantaneou			Trend				nstantaneous				
15	Volume(m3)	2	1	2	Instantaneor							nstantaneous				
16	Volume(m3)	2	1	3	Instantaneor			OK Can	cel			nstantaneous				
7	Volume Flow(m3/h)			178	Instantaneous	1	16	Volume(m3)	2	1	3	Instantaneous				

Figure 46. List of available parameters

Once the configuration is saved, it appears in the "Type" list. By clicking over the list you can select the current online configurations. After making the selection, click on SET:

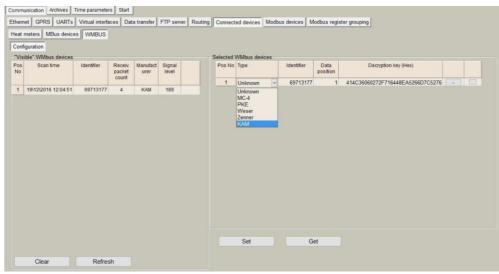


Figure 47. Saved configurations

Next step is to check current values by going to *Communication* > *Connected devices* > *MBus devices* > *Current values* 

themet GPRS UARTs	Virtual interfaces Data t	ransfer FT	P server	Routing	Connected de	evices Modbus	devices Modbu	is register grouping	1
leat meters MBus devices	WMBUS								
Configuration Current value	s								
Device/Parameter	Last read time	Storage number	Tariff	SubUnit	Type of parameter	Double float	Double long	Float	Long
1 - KAM (69713177)	19\12\2016 12:13:17								
FE 00		1	1	1	Instantaneou				69713177
FE 01		1	1	1	Instantaneou				757859328
F9 FF 15		1	1	1	Instantaneou				4881
Energy(Wh)		1	1	1	Instantaneou			1844690048.0	
EE FF 07		1	1	1	Instantaneou				
EE FF 08		1	1	1	Instantaneou				
Volume(m3)		1	1	1	Instantaneou			21786.699	
Volume(m3)		1	1	2	Instantaneou			21 0.000	
Volume(m3)		1	1	3	Instantaneou			0.000	
FD 17		1	1	1	Instantaneou				
Time Point		1	1	1	Instantaneou			1482105600.0	
Time Point		2	1	1	Instantaneou			1469923200.0	
Energy(Wh)		2	1	1	Instantaneou				
Volume(m3)		2	1	1	Instantaneou				
Volume(m3)		2	1	2	Instantaneou				
Volume(m3)		2	1	3	Instantaneou				
Volume Flow(m3/h)		1	1	1	Instantaneou			24.720	
Flow Temperature(C )		1	1	1	Instantaneou				
Datura Tamparatura(C)					Instantonau				

Figure 48. Mbus Current values

After click in "All values to archive" all selected parameters will be automatically configured in "Common parameters" list, which will be stored in "User archive". To update changes, click in "SET" button".

	All val	lues to arch	ive		
q: 1239	Answ	1238	TOut 0	Except: 1	
		188		20205-00-01	Mhus registers to grahive

Figure 49. Mbus registers to archive

Moreover, these data will be included into its corresponding MX-9 Modbus register. As in MX series, the MX-9 has a Modbus array structure to store M- Bus parameters. Thus, in order to collect specific parameters, user must select them by numbering within the array as shown in previous steps. There are different arrays for different data format as shown in the following table:

Registers	Mbus meters data (150)	Data format	R/W
	1-st Mbus counter's data		
24000	Status (0-not read, 0xffffread)	Int16	R
24001-	Reading time (UNIX time)	Int32	R
24002			
24003-	Double data[20]	F64	R
24082			
24083-	Long data[4]	Int64	R
24098			
24099-	Float data[30]	F32	R
24158			
24159-	Int data[10]	Int32	R
24178			
	2-nd Mbus counter's data		

24179- 24357		R
	50-th Mbus counter's data	
32771-		R
32949		

## 5.10 Communication > Modbus devices

There are two methods for reading Modbus devices connected to the MX-9.

• By using the MODBUS RTU client to request data from MODBUS RTU devices: Communication>Modbus devices>Configuring Modbus devices> Modbus RTU client

The MX-9 can read up to 50 Modbus RTU devices through each UART. In order to configure Modbus RTU

client list, follow the next steps:

- Go to Communication>Virtual interfaces>Modbus Devices.
- Once the virtual interface has been enabled under Modbus RTU client- 'UART x', the list of requests for the Modbus client must be configured. For this purpose go to *Communication>Modbus devices>Configuring modbus devices> Modbus RTU client*. It must be configured as much lines as Modbus RTU requests required. The number of requests can be configured in "Amount of requests", where:
- "Address": Slave device Modbus Address.
- "Function": Modbus RTU function.
- "Registers/coils ":Register/s address to be requested.
- "Amount of registers/coils": number of registers to be read from the register address configured in "Register/coils"
- MX- Reg. index: Internal MX-9's RAM memory index where data is recorded. In case of MX-9 it starts in the address 52000 (index =0 => RAM Modbus address=52000@DEC).
- Priority: It configures the request management priority.

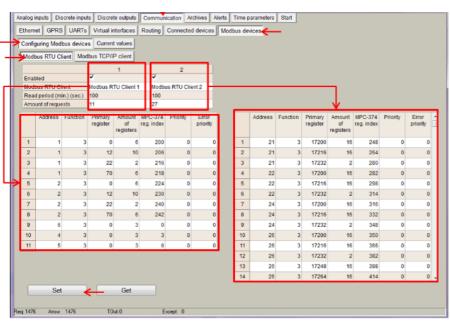


Figure 50. "Modbus devices" tab. Modbus RTU client parameters list configuration

NOTE: Maximum number of requests per each Modbus RTU Client is 50 NOTE: There exist 2 Modbus RTU clients. In case that both must work together 2 different UARTs must be used, one per each Modbus RTU client.

• By using the Modbus TCP client to collect data from Modbus TCP devices: Communication>Modbus devices>Configuring Modbus devices> Modbus TCP client

In order to configure Modbus TCP client list, follow the next steps:

- Go to Communication>Virtual interfaces>Modbus Devices>Configuring Modbus devices> Modbus TCP client.
- User must configure as much lines as Modbus TCP requests required. The number of requests can be configured in "Amount of requests", where:
- Type: Ethernet/GPRS
- IP: Slave Modbus TCP IP Address
- Port: Slave Modbus TCP port
- "Address": Slave device Modbus Address.
- "Function": Modbus function (3,4,16,...).
- "Registers/coils ": Register/s address to be requested.
- "Amount of registers/coils": number of registers to be read from the register address configured in "Register/coils"
- MX- Reg. index: Internal MX-9's RAM memory index where data is recorded. In case of MX-9 it starts in the address 52000 (index =0 => RAM Modbus address=52000@DEC).
- Priority: It configures the request management priority.
  - NOTE: In order to remove any request previously set, write '0' in its "Address" column.

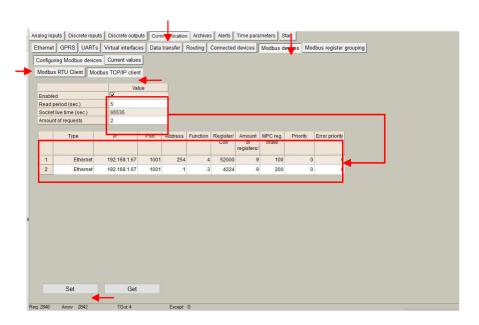


Figure 51. "Modbus devices" tab. Modbus TCP client parameters list configuration

After any of the previous method has been configured, it is possible to check the received information through the Modbus RTU/TCP client in "Current values" tab, also enabling correct performance testing.

		and (	Ibus TCP/										/rtual interfaces   Routing   Connected devices   Modbus devices	
				A.,	-	2				Configuring	Modbus de	NICES	Current values	
nat	bed		2		1									
	DUS RTU CE			TU Client 1		ts RTU CI	Sert 2			Pos	Register	Amoun		
	5 penod (m)		100		100					1	52200	6	08BF 0000 0000 0000 0000	
mo	unt of reque	150	11		27		-			2	52206	10	0000 0000 0000 0000 0000 0000 0000 0000 0000	
	Address	Function	Primary	Amount	MPC-374	Priority	Error		Address	3	52216	2	0000 0000	
			register		reg index.		priority			4	52210	6	0001 0000 0000 0000 0000	
				registers						5	52224	6	08AC 0000 0000 0000 0000	
	1	3	0	6	200		0 0	1	21	6	52230	10	0000 0000 0000 0000 0000 0000 0000 0000 0000	
	1	3	12	10	205		o d	2	21	1	62240	2.	0000 0000	
	1	3	22	2	216	3	a a	3	21	8	52242	6	0000 0000 0000 0000 0000	
	4		70	6	218			4	20	9	52000	3	and box and	
					224			1000			52003	3		
	2								~	11	52008 52248	3		
	- 2	3	32		230	4		0	24	12	52248	10		
	2	3	22	2	240	1	0	7	24	13	52280	2		
	2	3	70	6	242	1	9 0	8	24	14	52280	15		
1	8	3	0	3	0			9	24	16	52298	15		
<u>0</u>	4	3	0	3	3		0	10	26	17	52314	2		
1					6			11	20	18	52316	16		
-								12		19	52332	16		
									-	20	52348	2		
								13	20	21	52350	16		
								- 14	26	22	52366	15		
	Set			Get						23	52382	2		
										24	52398	15	and what have more play provided and and and and and and and and and an	
										25	52414	56		
475	Aran	1475	10	ue ()	L	Koept 0			-			- 10		

Figure 52. "Modbus devices" tab. Current values

### 5.11 Communication > Modbus register grouping

It is also possible to apply data formats or conversions to the MX-9 Modbus registers. For this purpose, go to Communication > Modbus register grouping > Configuration.

In this section, user can configure registers which data need to be converted somehow. Following parameters need to be filled in:

- "Amount of registers": Number of MX-9 Modbus registers to be converted
- "Multiplier": Conversion factor to be applied to the Modbus register value
- "Format": Register data format.

NOTE: Format must be the Input register data format, not the format after conversion.

As an example, if register 52000-52001 corresponds to a pulse counter reading which data format is "int 32", "integer" option must be selected. Data converted is always stored in "float" format.

Ethern	at G	PRS U	ARTs	Virtual interfaces	Data transfer	FTP server	MQTT Subscriber	Routing	Connected devices	Modbus devices	Modbus register grou
Config	uring (	Modbus o	levices	Current values							
	Pas	Register	Amour	t.			)	/alue			
	1	52000	10	0000 012C 0000	0004 0000 000	8 0000 0002 0	000 0008				
	2	52010	10	0000 0002 0000	0005 0000 0000	0 3000 0000 0	000 0002				
	3	52020	10	8000 8000 0008	8004 9800 000	0 8000 0000	000 8002				
	4	52930 10 0000 0000 0018 0000 0008 0000 0008 0000 0005									
	5	52040	10	8000 0004 0008	0004 0000 0003	8 0000 0002 0	000 0008				
	6	5/2050	10	0000 0003 0000	0005 0000 0003						
	7	52060	4	0000 0005 0000	0001						

#### Figura 53. Modbus Client Current values (Without conversion)

Ethernet GPRS UARTs Virtual interfaces	Data transfer	FTP server	MQTT Subscrib	er Routing	Connected d	levices	Modbus d
Configuration Current values							
Amount of register 32	-	Regis	ter A		Multiplier		Format
	1		52000	1,2	0.100000	Float #	Integer
	2		52001	3,4	100.000000	Float #	Integer
	3		52002	5,6	100.000000	Float #	Integer
	4		52003	7,8	100.000000	Float #	Integer
	5		52004	9,10	100.000000	Float 4	Integer

Figura 54.Configuring Modbus register grouping: Register, Multiplier and data format

Once parameters are properly configured, user will be able to check if conversion is correctly done by visiting *Current values* tab where float-formatted data will be shown in hexadecimal notation.

ommunication	Archives	: u	mits venticab	on /	Verts	Time par	ameters	Star	1				
themet GPR	SUAR	Ts	Virtual interf	aces	Data	a transfer	FTP se	iver	MQTT Subscnl	er Routing	Connected devices	Modbus devices	Modbus register grouping
Configuration	Current v	value	15										
					-								
				Pos		Value							
				1		41F0							
				2		0000	_						
				3		4308							
				4		0000							
				5		4448							
				6		0000							
				7		4348							
				8	2	0000							
				9		4416							
				10		0000							
				11		4348							
				12		0000							
				13		43FA							
				14		0000							
				15		0000							
				16		0000							
				17		4416							
				18		0000							
				19	8	4348							
				20	6	0000							
				21		4448							
				22	8	0000							
				23	6	4308							
				24		0000							
				25		447A							

Figure 55. Modbus register grouping current values

The Modbus registers converted by the Modbus register group functionality are storage from the **Modbus register: 50875:** 

Ethernet GPRS UARTs Virtual	interfaces Da	ita transfer   F	TP server MQT	Subscriber Rout	ting Cont	nected deve	ces Modbus	devices Modbus re	gister grouping
Configuration Current values				Modbus test					
	Pos	Value		Rest Contractory of the	17.				
	1	41F0	101	Addr.	254	7 Pe	gister 5	0875 N	I. Regs 32 % • 3 • 4 • 1
	2	0000		Addi.	2042	•	giater   c	10010[2+]	. nogs ve 🕰
	3	43C8			H.				
	4	0000		AEGISTER	BYTE	BYTE	INTEGER	FLOAT	READ
	5	4448		50875	41	F0	16880		
	6	0000		50876	00	00	0	00,00000	
	7	4348						100.00000	
	B	0000		50877	43	C8 00	0		
	9	4416		50878					
	10	0000		50879	44	48	17480	800,0000	Request
	11	4348		50880	00	00	0		FE 03 C6 88 00 20 1C 80
	12	43FA		50881	43	48	17224	200,00000	
	14	0000		50882	00	00	0		
	15	0000		50883	44	16	17430	600,00000	
	16	0000		50884	00	00	0		
	17	4415		50885	43	48	17224	200,00000	J
	18	0000		50886	00	00	0		
	19	4348		50887	43	FA	17402	500,00000	Answer
	20	0000		50888	00	00	0	Sec. 1	FE 03 40 41 F0 00 00 43 C8 00 00 44 48 00 00 4
	21	4448		50889	00	00	0	0.00000	48 00 00 44 16 00 00 43 48 00 00 43 FA 00 00 0
	22	0000		50890	00	00	0	1.000	00 00 00 44 16 00 00 43 48 00 00 44 48 00 00 4 CB 00 00 44 7A 00 00 44 89 90 00 43 48 00 00 4
	23	4308		50891	44	16	17430	600,00000	A2 80 00 2A D6
	24	0000		50892	00	00	0		
	25	447A	*	50893	43	48	17224	200.00000	
	and a state of the	1000		50894	00	00	0	2.00,000000	
				50895	44	48	17480	800,00000	
				50896	00	00	0	000,00000	
				the second se	43	C8	17352	400.00000	
				50897				400,00000	
				50898	00	00	0	1000 00000	
				50899	44	7A	17530	1000,00000	
				50900	00	00	0		
				50901	44	89	17545	1100,00000	
				50902	80	00	-32768	4	

Figure 56. Converted Data from Modbus register grouping

# 6. "Archives" tab

The MX-9 has an internal 8MB flash memory. In case, the device is used as datalogger, the following steps must be done:

- Go to Archives>Configuration
- In "Storage parameters" frame, configure the following:
- "Period": It defines storage interval. Internal memory is organized in different blocks depending on the devices nature which are connected to the MX-9.

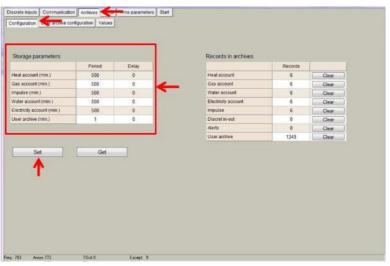


Figure 57. "Archives" tab. Storage frequency configuration

- In case user needs to customize storage blocks, signals acquisition must be configured accordingly. Memory block used will be defined as "User Archive" (see next step).
- Go to Archives>User Archive Configuration
- Under this tab, user can configure datalogging following his own requirements. In the next pages, a configuration example is given by setting the following parameters:
- *"Count of parameters"*: number of registers to be stored.
- *"Register"*: Specific register to be stored. NOTE: Timestamp is registered automatically.

05 140	Parameter	Register			
1	Register52000	52000			
2	Register52001	52001			
3	Register52002	52002			
4	Register52003	52003			
5	Register52004	52004			
6	Register52005	52005			
7	Register52006	52006			
8	Register52007	52007			
9	Register52008	52008			
10	Register52009	52009			
11	Register52010	52010			
12	Register52011	52011			
13	Register52012	52012			
14	Register52013	52013			
15	Register52014	52014			
16	Register52015	52015			

Figure 58. "Archives" tab. User archive configuration

In order to check current data logged in the internal memory, go to *Archives > Values > User archive* tab. This is only a test feature in order to ensure datalogging is performing correctly.

onfigu	ration	User an	chive con≦gu	ration Valu	105	-						
feat	Gas	Electric	oity meters	Water meter	s Impulse	Discrete input	s Events User	archive	be			
	Time		Parameter	1 Para	umeter 2	Parameter 3	Parameter 4	Parameter 5	Parameter 6	Parameter 7	Parameter 8	Parar.
19:08	2015 1	3.02:00	14979(3A83	Hex) 4719	(126FHex)	17203(4333Hex)	62718(F4FEHex)	17248(4360Hex)	8520(2148Hex)	0(0000Hex)	1(0001Hex)	00
19:08	2015 1	3.01.00	14979(3A83	Hex) 4719	(126FHex)	17203(4333Hex)	62718(F4FEHex)	17248(4360Hex)	22282(570AHex)	0(0000Hex)	1(0001Hex)	Oliv

Figure 59. "Archives" tab. User archive current values

NOTE: Internal datalogging memory is organized as a file system accessible through the use of standard Modbus function 20 "File register".

## 7. "Limits verification" tab

This tab enables users to set up limits verification raising events for issuing alerts when condition is met. To create the list, follow the next steps:

- 1. Choose "Count of limits" in order to start creating the number of positions desired;
- 2. Choose "Type of limit" (this must to be done first) among the following options:
  - i. Over H: event will be generated when the value is above the high limit.  $\circ$
  - Under L: event will be generated when the value is below the low limit. ii. Over H & Under L: event will be generated when the value is out of the range between high and low limit.
  - iii. Under H & Over L: event will be generated when the value is within the range between high and low limit.
  - iv. Equal L: event will be generated when the value is equal to the low limit.
- 3. Enter register number you want to control or choose from Main fields list (To create and/or edit list of limit's values use file limits.csv, that is in program's folder.);
- 4. Enter data type, corresponding to data type of used register;
- 5. Choose limits;
- 6. Delay time (in seconds), if you want to filter accidental ar short time events;
- 7. Finally, add a code of event (value must to be from 0 to 99 and will be used for alerts SMS/email/MQTT message sending)

nalog inpi Count of li		te outputs Co		r address and Type			fregiste	ers
Pos No	Main fields	Register	Туре	Type of limit	Low limit (L)	High limit (H)	Delay	Code of event
1	Doors closed (on Din 1)	4200	unsigned char	Equal L	0		10	2
2	Doors opened (on Din 1)	4248	unsigned char	Equal L	<b>D</b> +		10	1
3	(Ain1) temperature	0	Float	Over H & Under L	L 0,000	40,000	120	3
4		-		None	0,000	40,000		
	List	is in limit.	csv file	None Over H Under L Over H & Under L Under H & Over L Equal L				

Figure 60. "Limits verification" tab

# 8. "Alerts" tab

MX-9 is able to send short SMS text messages, emails and MQTT messages based on events generated by limits verification feature.

## 8.1 SMS Alerts on Limit verification

SMS alerts for limits is used for sending SMS alerts when alert conditions is set in "Limit verification" tab. Codes of events are used in this screen to configure alert messages as shown in the following figure.

os No	Main fields	Register	Format	1	Type of limit	Low limit	High limit	Delay	Code of event
1 Doors c	losed (on Din 1)	4200	unsigned char	Equal L		0		10	2
2 Doors o	pened (on Din 1)	4248	unsigned char	Equal L		1		10	1
3 (Ain1) te	mperature	0	Float	Over H &	Under L	0.000	49.000	1000	3
				_					
	Analog inputs D	iscrete inputs	Discrete outputs	Communi	ation Archives	Limits verification	Alerts Time parar	neters Star	1
	Configuration	SMS Status	of alerts and reports						
					SMS texts for o	liscrete input: SMS tex	ats for limits		
	Enabled				Event's code		Te	at of messag	8
					0				200
	How many phon	es are used to	receive messages (	1 1	1	Doors Opened			
	there instry priori	co die doed to	lecene messages	. 24	2	Doors Closed			
					3	Temperature out of ran	ige (range 0-40)		***************************************
	SMS blocking di	screte input	2	•	4				
	1.00			_	5				
					6				
					7				
					8				
	1.0	Phone	e number		9				
	1	+370373333	333		10				
		-d.			11				
					12				
Cat					13				
Set	-				14				
					15				
38 Answ	3 5	Set	Get		16				
				_	17				
					18				

Figure 61. SMS alerts for limits configuration

#### 8.2 Email Alerts on Limit verification

MX-9 can also send email alerts based on codes of events in a similar way it is explained in previous chapter. In order to configure the email sending feature, the following parameters must be set: SMTP server, e-mail address, user name and password. Finally, user can configure up to 5 email accounts to which alerts will be sent.

onfiguration Transmission method Status of alerts and reports			
MS Email MQTT	Texts for discrete inputs	Texts for limits	
Cinabled	Events code	Text of messag	je
Transmission channel	0 Valor po	r debajo de 2256	
Ethernet C GPRS	1 Valor po	or encima de 2230	
SMTP server	2		
mtp.gmx.com	3		
Controller e-mail address	4		
mympc330@gmx.com	5		
Authentication settings	6		
Enabled	7		
User name	8		
mympc330@gmx.com	9		
Password	10		
mpc330mpc	11		
Repeat time if fail to send 10 📝 min.	12		
iow many e-mail addresses to send	13		
E-mail addresses	14		
interest com	15		
	16		
	17		
	18		
	19		
			Clear All
Set Get			
	Set	Get	

Figure 62. Email alerts for limits configuration

#### 8.3 MQTT Alerts on Limit verification

Finally, MX-9 is able to send JSON formatted messages through MQTT protocol by configuring the following parameters:

- "Enabled": it is recommended to uncheck this box if this feature is not used.
- *"Topic":* A topic is a UTF-8 string, which is used by the MQTT broker to filter messages for each connected client. A topic consists of one or more topic levels. Each topic level is separated by a forward slash (topic level separator).
- *"Repeat time if failed":* if message is not properly received by broker, the device will repeat it after seconds configured in this box.

Finally, if configuration is properly done, a message containing the *"text of message"* written in the right column will be inserted into the JSON formatted message according to the event code previously set.

Communication Archives Limits verification Alerts Time parameters Start	
Configuration Transmission method Status of alerts and reports	
SMS Email MQTT	Texts for discrete inputs Texts for limits
The second se	Event's code Text of message
Enabled	0 Room temperature too high
Topic	1 Room temperature below threshold
building1/zoneA/room2	2
	3
Use header in message	4
Use neader in message	5
Repeat time if fail to send 30 🔀 sec.	6
	7
	8
	9
Set Get	10
	11
	12
	13
	14
	15
	16
	17
	18
	19
	Clear All
	Set Get
Reg: 0 Answ: 0 TOut 0 Except: 0	

# 9. "Time parameters" tab

This tab enables users to set up time synchronization between MX-9 Real Time Clock (RTC) and external time references. Several parameters can be configured under this tab:

• "Set PC time" It synchronizes internal RTC with PC time.

ommunication Archives	Time parameters	-		2015 13:23:40 *C time
			PC ime:	20108/2015 13 26 53
Set	Get			
4073 Array 4069	10+0	front 4		

Figure 64. "Time Parameters" tab. Set PC time

 "Clock synchronization": It must be enabled if synchronization between MX-9 and any Network Time Protocol (NTP) server is requested. This option is particularly accurate since, every given period ("Synchronization period" parameter), device connects to an NTP server to get current UTC time. Also automatic summertime is adjusted.

ype GPS SEL-2401 Time of GSM → 256 2 256 2 256 2 256 2	2010812015 13:19:50
NTP Server     Interface through which to synchronize     CPRS     CPR	PC time: 20108/2015 13 23 03
Set Cet	

Figure 65. "Time Parameters" tab. NTP server configuration

# **10.** Abbreviations and explanations

- Xn is a number of socket. This information are provided for manufacturer's purpose and used in data schemas and connection diagrams.
- **GSM Global Standart for Mobile Communications.** This interfaces is prepared for remote connections and data bidirectional data transfer over Global Standart Mobile network.
- **GPRS** a packet oriented mobile data service on the 2G and 3G cellular communication system's global system for mobile communications (GSM).
- Ethernet a family of computer networking technologies for local area networks (LANs) commercially introduced in 1980. Standardized in IEEE 802.3, Ethernet has largely replaced competing wired LAN technologies. This interfaces is prepared for connection LAN (Local Area Network).
- IP address An Internet Protocol (IP) address is a numerical label that is assigned to devices participating in a network that uses the Internet Protocol for communication between its nodes.
- **TCP/IP** Transmission Control Protocol is for communication between computers, used as a standard for transmitting data over networks and as the basis for standard Internet protocols.
- MAC address Media Access Control address is a unique identifier assigned to most network adapters.
- UART An Universal Asynchronous Receiver/Transmitter is a type of "asynchronous receiver/transmitter, a part of computer hardware that translates data between parallel an serial forms. UART are commonly used in conjunction with communication standards such as EIA RS-232, RS-422 or RS-485. Record (UARTx) on top of enclosure also are used as serial interface number.
- **GND** ground wire contact
- **RS232** the traditional name for a series of standards for serial binary single-ended data and control signals connecting between a DTE (Data Terminal Equipment) and a DCE (Data Circuit-terminating Equipment). It is commonly used in computer serial ports. The standard defines the electrical characteristics and timing of signals, the meaning of signals, and the physical size and pin out of connectors. RS232 interfaces are prepared for connection of pheripherical devices (example energy meters, controllers, machines and etc.).
- TD contact for transfer data wire of RS232 socket
- RD contact for read data wire of RS232 socket
- DTR contact for Data Transmit Ready wire of RS232 socket
- RS485 standard defining the electrical characteristics of drivers and receivers for use in balanced digital multipoint systems. The standard is published by the ANSI Telecommunications Industry Association/Electronic Industries Alliance (TIA/EIA). Digital communications networks implementing the EIA-485 standard can be used effectively over long distances and in electrically noisy environments. Multiple receivers may be connected to such a network in a linear, multi-drop configuration. RS485 interfaces are prepared for connection of pheripherical devices (example energy meters, controllers, machines and etc.).
- **A+ –** contact for positive wire of RS485 socket
- **B-** –contact for negative wire of RS485 socket
- USB Universal Serial Bus is an industry standard, that defines the cables, connectors and protocols used for connection, communication and power supply between computer and electronic devices. USB type B socket is prepared for connection to PC(Personal Computer). USB type A socket is prepared for connection to pheripherical devices (example memory stick's and etc.).
- **M-Bus** a European standard (EN 13757-2 physical and link layer, EN 13757-3 application layer) for the remote reading of gas or electricity meters. The M-Bus interface is made for communication on two wire, making it very cost effective.
- **MBUS+** contact for M-Bus positive wire

- **MBUS-** contact fot M-Bus negative wire
- **Socket** is an endpoint of a bidirectional inter-process communication flow across an Internet Protocol-based computer network, such as the Internet.
- Data contact for data wire
- Req contact for request wire
- **CL+ –** contact for current loop positive wire
- CL- contact for current loop negative wire
- Status device status indicating LED
- Uoutput status of power for external device indicating LED
- TX/RX data transfer/receive indicating LED
- TXD data transferring LED indicator
- **RXD –** data receiving LED indicator
- 100Mbs Ethernet High speed connection indicating LED
- Central computer server or a computer, where data can be sent.

## **12. Safety instructions**

To install and setup device, special technical knowledges are needed. Call to seller or certified professionals to connect and setup device!

#### Before connecting to power supply, be sure that:

- 1. Controller is not damaged (no cracks, melted, broken or exposed areas)
- 2. Controller is used with right and correct thickness cables.
- 3. Controller and antenna are installed indoor.
- 4. The controller is intended for supply from a Limited Power Source (LPS) with current rating of overcurrent protective device not greater than 2A
- 5. The highest transients on the DC secondary circuit of LPS, derived from AC main supply, shall be less then 71V peak.
- 6. The associated equipment (AE): PC and PSU (LPS) shall comply with the requirements of Standard EN 60950-1.
- 7. Controller is dry.
- 8. Ambient temperature and humidity is in normal range;
- 9. Other types of devices (counters, etc.) are connected correctly by using manufacturer 's regulations.
- 10. The end of stranded conductor shall not be consolidated by soft soldering and must be terminated
- 11. Device, PC and other pheripherical devices are strictly connected through one double pole breaker (current break less than 5A and space between breaker contacts more than 3mm.) Pole breaker has to be in building 's wiring and in reachable place with markings

#### Don't use:

- 1. Device under open water (in rain and if water are spalshing on controller or connected devices;
- 2. Device if enclosure, connected cables, or other connected devices are damaged;
- 3. External Back-Up batterys for powering of controller.



Use device by manufacturer's regulations otherwise you can damage controller or other devices. In that cace munufacturer's warranty could not be obtained.



**If you suspect that device doesn't operate correctly** or has visible violations, please contact manufacturer or your distributor to check or run maintanance.



**Manufacturer** does not affect and is not responsible for GSM/GPRS/Internet operators' provided network service pricing and costs.

# 13. Technical Data

## **13.1Communication interfaces**

Interfaces	Technical data
RS485	Up to 1.2 km, max 32 transceivers, speed up to 57600 bps
RS232	Up to 15m, speed up to 57600 bps
M-Bus	Up to 8 devices
Wireless M-Bus	Up to 50 devices
GPRS	Transmission frequency bands: Quad-band 850, 900, 1800, 1900 Transmission Power: Class 4 (2W) at GSM850 and EGSM 900 Class 1 (1W) at DCS1800 and PCS1900 Receiver sensitivity (typical) -109dBm, (Max) -107dBm Modulation type: GSMK
Ethernet	10/100 Mb twisted pair, up to 100m
USB	Type B, version 2.0

# 13.2 Galvanic insulation

Insulation voltage between power supply and second circuits	1500 V	
Insulated interfaces	B, C	

### 13.3 Indication

Indication type	LED's
Indicated parameters	Status of each Serial interface GSM/GPRS modem status GSM/GPRS modem transfer and receive Ethernet Duplex mode status Ethernet High speed connection status Ethernet Transfer/Receive status

### 13.4 Power supply

Power supply	9 ÷ 36 V / 12 ÷ 50 V		
Power consumption	300mA max		
13.5 Construction			
Mounting	DIN rail		
Dimensions	147 mm x 128 mm x 50 mm		
Tightness	IP20		
13.6 Climate conditions			
Operating temperature	From - 25 °C to + 60°C		
Storage temperature	From - 40 °C to + 60°C		
Relative humidity	From 5 % to 95 % non-condensing		
13.7 Safety parameters			
Safety requirements	Meets requirements: LST EN 60950-1:2006 LST EN 60950-1:2006/A11:2009		
Electromagnetic compatibility	Meets requirements: EN 55022:2000+A1+AC:2002+A2:2003 EN 55024:2000+A1:2003+A2:2003 EN 61000-4-5:2002+A1:2003 EN 61000-4-6:2002+A1:2003 EN 61000-4-2+A1+A2:2002 EN 61000-4-3+A1:2004 EN 61000-4-4:2005		
13.8 Other parameters			
Storage memory	8 MB		

Storage memory	8 MB
Remote firmware loading	Yes. Through USB or/and Ethernet and GSM/GPRS.