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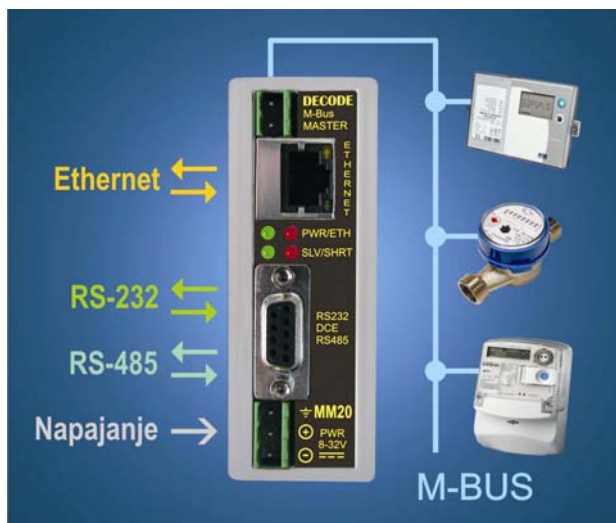
## Device description

MM20 is an interface converter intended for feeding and transparent readout of M-Bus slave devices. Converter has RS-232, RS-485 and Ethernet interfaces, where the lowest priority is dedicated to RS-232 and the highest to Ethernet interface. It is designed to withstand short circuit on M-Bus line. LED indicators show status and activity of M-Bus line, slave devices and Ethernet port. Power supply has wide range, from 10 up to 28Vdc. Device is suitable for 35mm DIN rail mounting. The device is being manufactured in three basic configurations:

jMM20-2 - RS232 interface

MM20-24 - RS232/RS485 interfaces

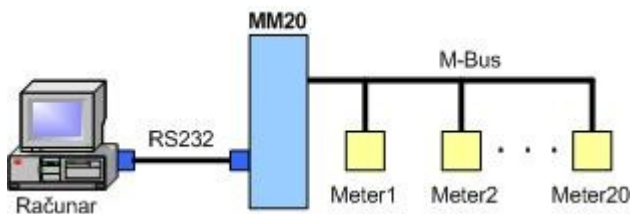
MM20-24E - RS232/RS485/Ethernet interfaces



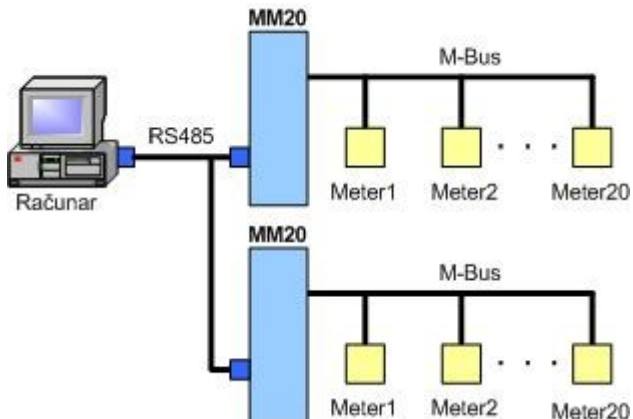
M-Bus master MM20 converter

## Application

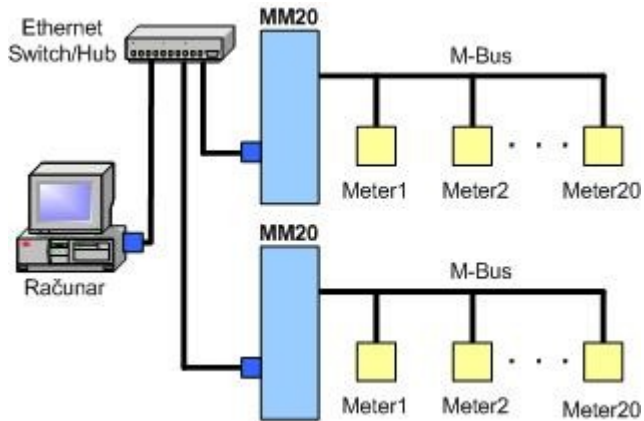
DECODE MM20 acts on M-Bus line as standard M-Bus master device which can sustain up to 20 M-Bus slave devices. It can be used for local or remote reading of calorimeters, water meters, electricity meters and other devices which fulfil M-Bus protocol. Converter is fully adjusted for industrial communications, automation processes and telemetry. For increasing system capacity, it is possible to connect more than one MM20 converter in parallel.



Converter usage via RS232 interface



Converter usage via RS485 interface



Converter usage via Ethernet port into LAN

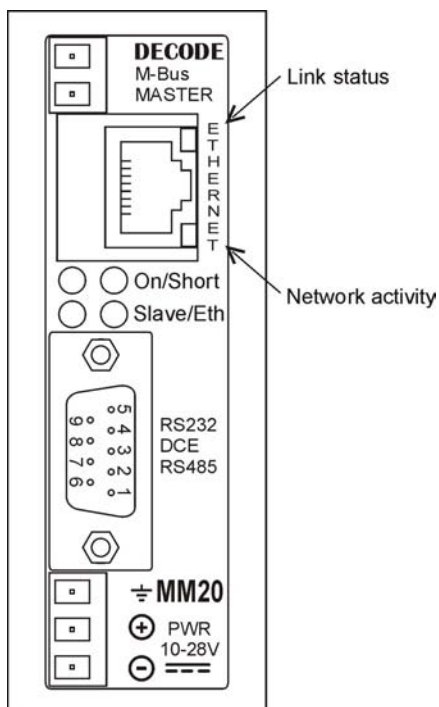
## Technical specification

<b>M-Bus interface</b>	M-Bus master, up to 20 M-Bus slave devices, transparent protocol, speed 300-9600Baud; Connection: Pluggable screw clamp, RM 5mm, 2.5mm <sup>2</sup>
<b>Serial interface</b>	RS-232 DCE, RS-485; Connection: DB9 female
<b>Ethernet interface</b>	IEEE 802.3, 10/100 Base-T, UDP and TCP/IP; Connection: RJ45
<b>LED indicators</b>	ON, Short, Slave, Ethernet
<b>Overvoltage protection</b>	tranzorb on RS-485 line and M-Bus line
<b>M-Bus port</b>	quiescent current: 0-30mA, overcurrent: 50-70mA with restart, line voltage: 30.5V ± 5%, internal resistance <100Ohm
<b>M-Bus line length</b>	max 12km@300Baud, min 1km@9600Baud, cable JYSTYnx2x0.8
<b>Power supply</b>	10 – 28VDC, 6Wmax
<b>Power supply connection</b>	Pluggable screw clamp, RM 5mm, 2.5mm <sup>2</sup>
<b>Working temperature</b>	0 to 55°C
<b>Dimension</b>	95x35x87mm
<b>Mounting</b>	35mm DIN rail

## Device installation and setup

MM20 converter is being supplied with 10 to 28VDC current supply. The device consumption is less than 6W. All connectors and LED indications are on the front panel of the device. LED indications have the following meaning:

- On – device is connected to the power supply line
- Short – M-Bus line is in short-circuit
- Slave – slave device is responding
- Eth – Ethernet port active, DTR raised



The layout of the MM20 converter

The polarity of M-Bus connector pins is irrelevant. Up to 20 M-Bus slave devices can be connected. The device has the short-circuit protection of M-Bus line with automatic line feed function. The following table shows recommended maximal M-Bus line lengths depending on the data transmission speed (cable type: JYSTY nx2x0.8).

Data transmission speed	9600Baud	2400Baud	300Baud
Maximal M-Bus line length	> 1000m	> 4000m	> 12000m

The voltage drop on M-Bus line depends on the quiescent current of the connected slave devices and on the resistance of the cable. Using the JYSTY nx2x0.8 cable, the following distances are attainable:

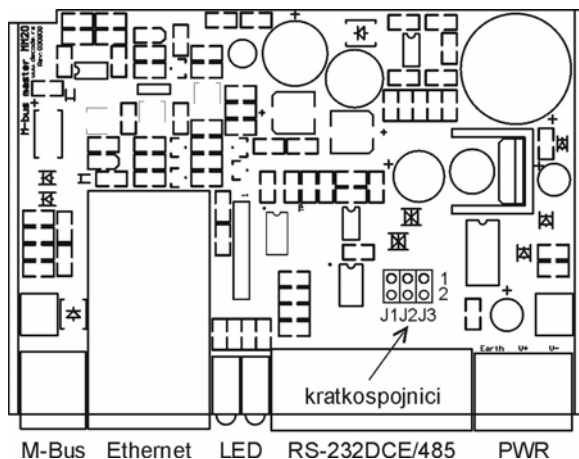
Maximal length with 5 slave devices	6900m
Maximal length with 10 slave devices	5100m
Maximal length with 20 slave devices	3200m

The power connector also has a earthing connection to balance the M-Bus line and protection from peak voltages. This contact ought to be connected to the earthing of the DC power supply. Connecting the flipped polarity of this contact will not induce device overheating.

The connection to the serial RS-232 interface is via 9-pin female DB9F connector. The following table shows the connector pin-out:

<b>DB9F connector PIN</b>	<b>RS-232 signals</b>		<b>RS-485 signals</b>
1	-	-	-Tx/Rx
2	RD	output	
3	TD	input	
4	-	-	
5	GND	-	GND
6	DSR	output	
7	RTS	output	
8	CTS	input	
9	-	-	+Tx/Rx

The RS-485 interface signals are available on the same physical connector by setting the jumpers J1, J2 and J3, on the device circuit board, to the appropriate state. The following figure depicts the layout of the jumpers on the MM20 circuit board, while the table shows their settings.



Jumper	Position	RS-485 Serial interface
J1	1-2	+Tx/Rx
J2	1-2	termination 120Ω
J3	1-2	-Tx/Rx

The serial RS-485 interface may be used if the distance to the acquisition center is greater than the one attainable with RS-232 interface. The Master software handles the switching of the communication direction (i.e. data transmit and receive).

When the MM20 device is the receiving state and it receives data from the connected M-Bus slave devices, it becomes the transmitter on the RS-485 line and returns to the receiving state within 37ms from the last data send. The RS-485 serial interface is not addressable. If the RS-485



line is to be terminated on the side of MM20 device, the J2 must be set into 1-2 position.

## Ethernet communication setup

**NOTE:** When using the Ethernet interface, the DTR signal must be enabled in order to activate the MM20 Ethernet port. This enables the remote priority readout of the M-Bus slave devices.

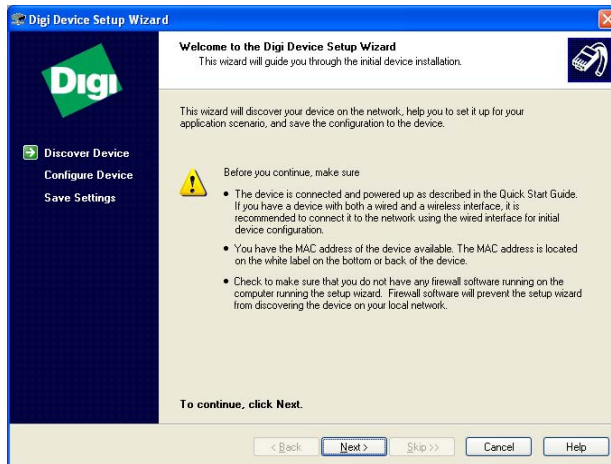
First, connect the MM20 device to the LAN (via straight-through cable) or directly to PC (via cross-over cable). Connect the power supply to the device.

The setup of the communication parameters can be achieved two-folded:

- by using the wizard program to easily choose and setup the basic parameters of the connections, and/or
- by using the user web interface to setup a wider range of connection parameters.

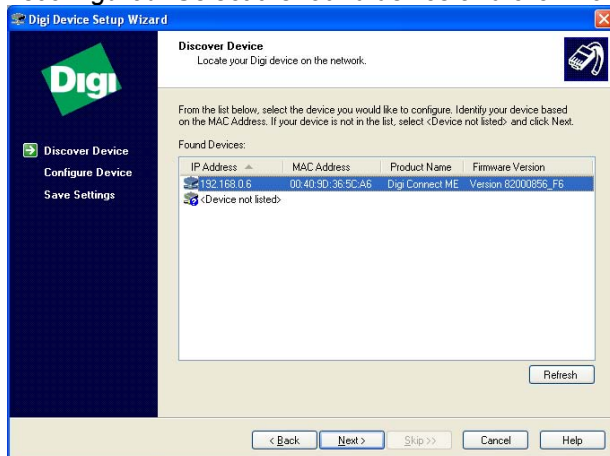
### Wizard program

The *Digi device setup wizard.exe* program is located on the CD included in the device package. After the program launch, the following window will appear:

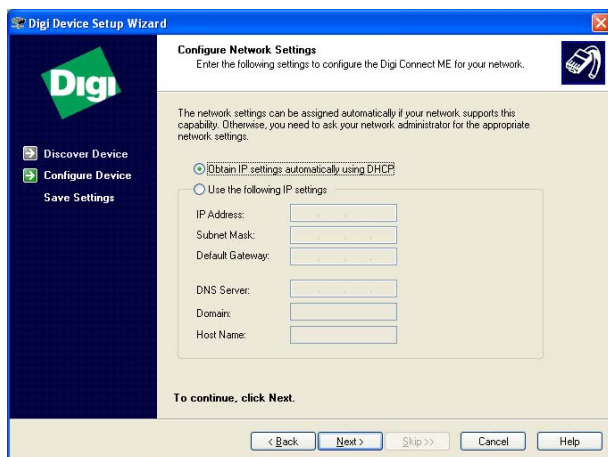


Click *Next* and the program will locate the MM20 converter.

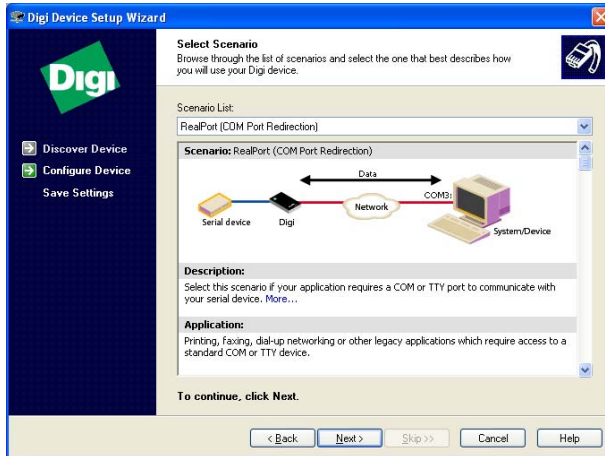
The following window shows the IP address of the device if the device is in the IP address range of the LAN. If not, the window will show the comment *misconfigured*. Select the found device and click *Next*.



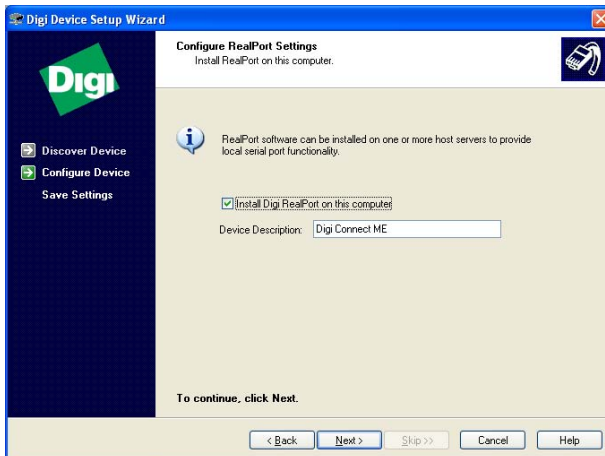
The window shown on the following figure is used to configure the network parameters. The IP addresses can be automatically assigned or entered manually. In the latter case, the IP address must fall within the LAN IP range.



The mode of operation can be chosen through the following window. This example shows the option of adding the virtual serial (COM) port on the PC.



Click Next.



Click *Next* again and wait for the settings to be stored onto MM20 and the virtual serial port to be installed.

In this stage, if the IP address is misconfigured in the previous steps, the error will be reported. This is because, after the device is restarted, the new IP settings become effective. In this case, the wizard program should be restarted and the newly acquired IP address should be used.



After the wizard has completed, the option *Log on to web user interface of device* can be chosen if the additional settings are to be made.

By clicking the *Finish* button the window will close and the wizard program terminates.

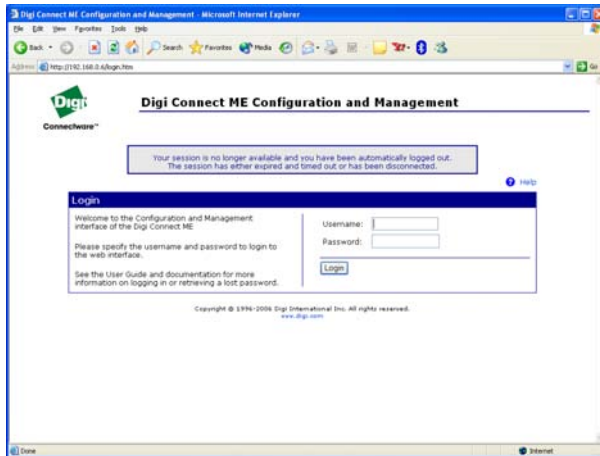
The virtual serial port configuration and port number can be altered within the *Device Manager* of the PC (e.g. Digi Connect ME – Port 1 (COM3)). This port can be used in the same manner as other standard serial ports of the PC (COM1, COM2).

## The user web interface

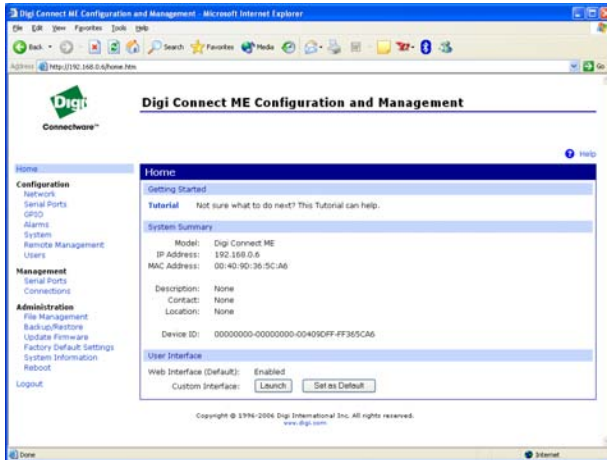
The MM20 converter can be set up via the user web interface. Using the standard web browser (e.g. Internet Explorer) the device can be accessed, provided that the IP address of the device is known. You may find the IP address of the device by using the first two steps of the previously described wizard program.

The following figure shows the access window of the user web interface. The default access parameters are:

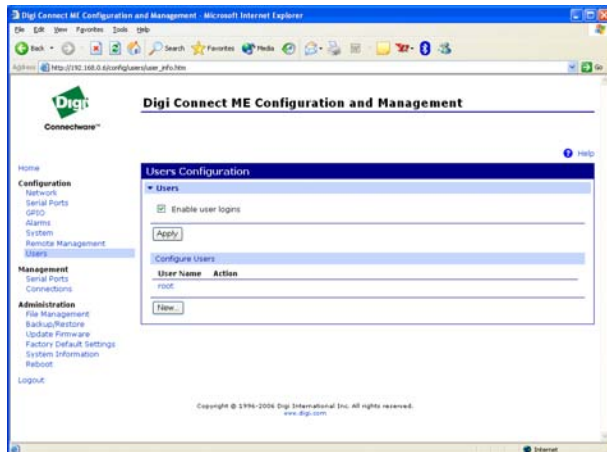
- Default IP address: 192.168.0.110
- Username: root
- Password: dbps



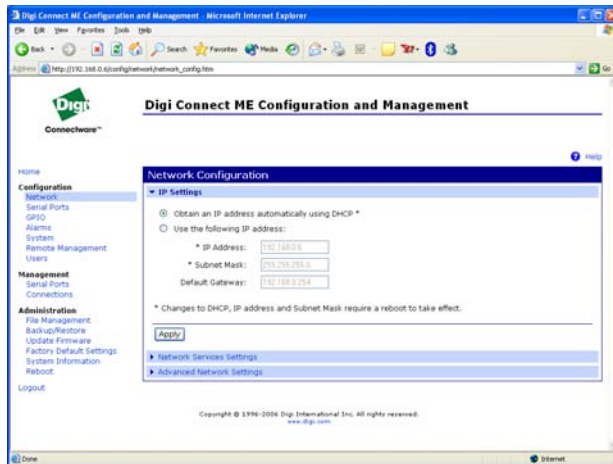
The following figure shows the default setup window of the user web interface. On the left side of the window, the navigation menu can be found. Through this menu, the parameters that ought to be altered can be chosen.



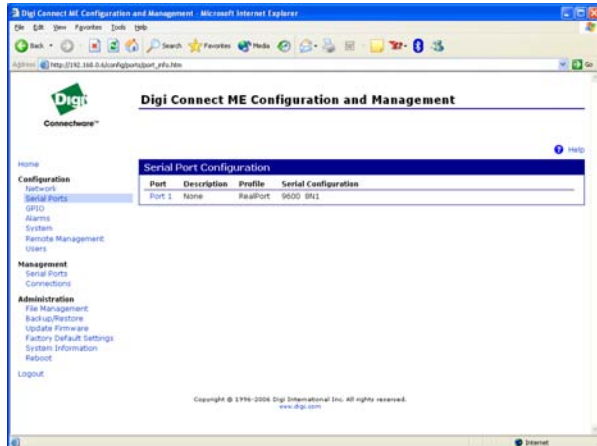
The *Users* option allows the change of the access parameters. Click on the existing *User Name* (*root*). Alter the parameters and click apply. New access parameters can be added by clicking the *New* option.



The *Network* option allows the change of the network parameters.

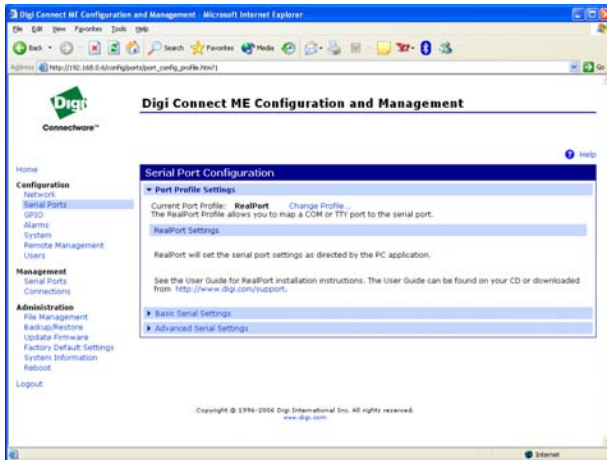


The *Serial Ports* option allows the change of the serial port parameters.



Click on *Port 1*.





The currently applied profile can be altered by clicking the *Change Profile*. The following profiles are available:

*Real Port* – enables the communication with M-Bus devices by adding the virtual serial port

*TCP Sockets* – enables the communication with M-Bus devices via TCP/IP protocol

*UDP Sockets* – enables the communication with M-Bus devices via UDP protocol

After the MM20 parameter setup is completed, click *Reboot*, wait for the device to restart and then click *Logout* to exit the user web interface.