

# PW50

M-Bus Level Converter for 50 meters  
to Ethernet, USB and RS232C



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## 1. Main features

- M-Bus Level Converter for 50 (maximum 60) devices
- Transparent level converting of several interfaces to M-Bus
- Ethernet 10/100BaseT and USB 2.0 with driver for virtual serial port
- 1 x RS232C with terminals (TXD, RXD, GND)
- Galvanic isolation of all interfaces from M-Bus
- External power supply with wide range input for worldwide use
- Housing for rail mounting

## 2. Installation

### 2.1 Functional principle



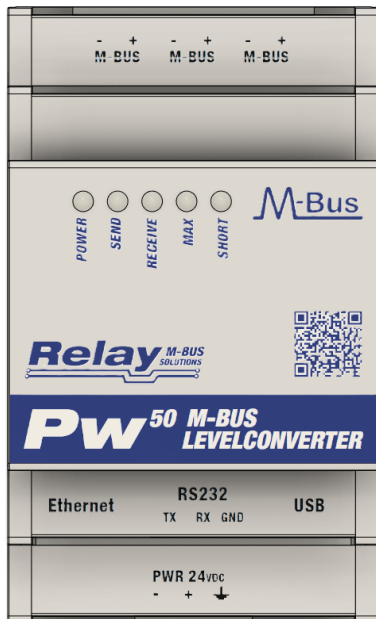
### 2.2 Mounting

The PW50 housing is mounted on a TS35 top-hat rail. The width of the housing is 3 horizontal pitches (3 HP) on the rail and, due to the low height of 60 mm, not only fits into a control cabinet, but also in a meter cabinet under the covers.

The device requires an external regulated power supply of 24VDC  $\pm$  5%. Standard power supply units are available on the market. Of course, we also offer suitable power supply units for DIN rail mounting or for the socket. See also chapter 4.3 „Ordering information“.

## 2.3 Connectors

The following figure shows the top view of the connectors on the top view:



All terminals are pluggable and thus make wiring and replacement of the PW50 easier in the event of a fault

**Attention:** Please make sure to put the clamps back in the correct place after removing them. Incorrectly positioned terminals can lead to defects.

Upper terminals:

Type	Signal	Description
M-BUS	- / +	M-Bus output, wires to the M-Bus meters, 3 pairs of parallel connections

Lower terminals (from left to right):

Type	Signal	Description
ETHERNET		10/100MBit RJ45 Ethernet socket for network connection
RS232	TX / RX / GND	RS232C interface, TX = PC transmits, RX = PC receives, GND
USB		USB connector of the internal USB-to-RS232 converter (FTDI)
PWR 24VDC	- / +	Power supply output voltage 24VDC $\pm$ 5% (pay attention to polarity)
	$\perp$	Protective conductor (earth) for symmetry and protection of the M-Bus

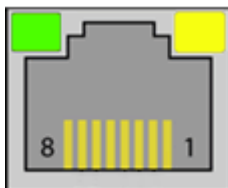
## 2.4 LED indicators

There are in total five LEDs in the front part showing the status of the M-Bus. A lighted LED has the following meaning:



<b>POWER</b>		The M-Bus output voltage is switched on
<b>SEND</b>		The Master transmits data.
<b>RECEIVE</b>		Minimum one meter replies with data.
<b>MAX</b>		The maximum number of connectable meters is exceeded (warning)
<b>SHORT</b>		M-Bus over current / short circuit (2 Hz flashing)

Two LEDs in the RJ45 Ethernet socket show the state of the network and the virtual comport. The LEDs have a reduced intensity of 20% of the normal value without a connected network cable. Once a network is connected, the brightness changes to 100%. The most important flash patterns have the following meaning:



	No connection established
	A connection is active
	A connection is established, and a communication is active
	Device Server performs a restart

You can find all other patterns in the online help of the DS Manager (F1-button) in the chapter “Firmware Manuals / Device Server Application Firmware / Status LED Signals (Red = Green / Green = Yellow).

### 3. Description of functions

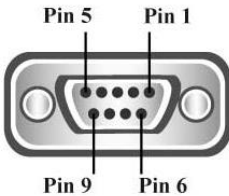
The PW50 is a transparent Level Converter from several interfaces to M-Bus for up to 50 meters. The device enables external connected controllers such as a building control, a DDC or a PC to read the connected meters by use of an M-Bus software (not in scope of delivery).

#### 3.1 Interface switching

The PW50 does not offer automatic switching between the available interfaces. With the level converter, the three interfaces Ethernet, RS232C and USB are basically equally authorised to send telegrams to the M-Bus. The telegrams received from the M-Bus meters are then sent in parallel to all three interfaces. Please ensure that only one interface communicates at a time, as otherwise overlapping and interference may occur.

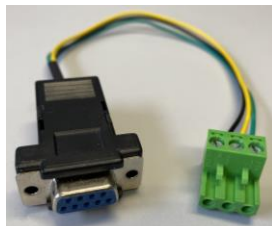
#### 3.2 RS232C interface

The PW50 offers an RS232C interface, which is connected via a 3-pin screw terminal. The assignment is as follows: TX = PC receives from M-Bus, RX = PC sends to M-Bus, GND = signal ground. If you wish to connect a D-SUB cable, please use the additional, optional KA006 cable with 3 open wires. To connect to a PC (1:1 connection), connect the 3 wires as follows:



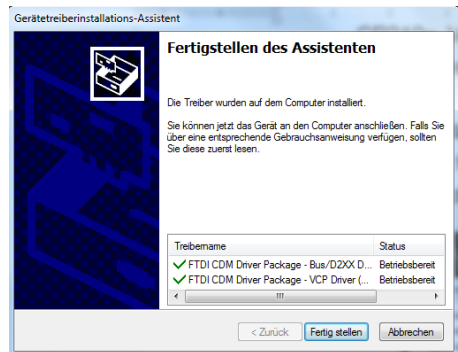
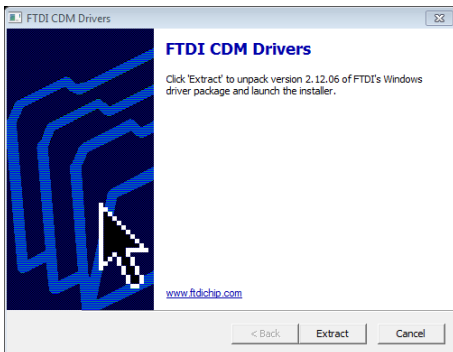
D-SUB	Signal	Function PW50	Colour (terminal)
Pin 1	DCD (data carrier detect)	unused	
Pin 2	RXD (PC receives data)	M-Bus sends data to PC	Green (TX)
Pin 3	TXD (PC transmits data)	PC receives data from M-Bus	Yellow (RX)
Pin 4	DTR (data terminal ready)	unused	
Pin 5	GND (signal ground)	GND	Black (GND)
Pin 6	DSR (date set ready)	unused	
Pin 7	RTS (request to send)	unused	
Pin 8	CTS (clear to send)	unused	
Pin 9	RI (ring indicator)	unused	

Cable KA006:

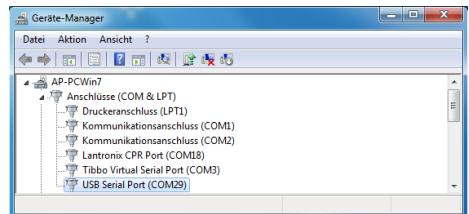
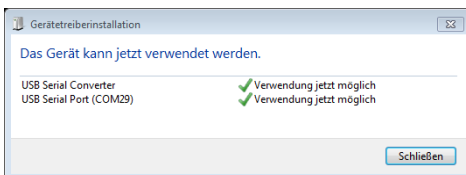


### 3.3 USB Interface

The USB device port of the PW50 is as a USB 2.0 connector type B available on the front of the housing. Please use a USB cable with a type A plug on one end and a type B plug on the other side (not supplied) to connect a PC. You must install the software driver for the virtual COM port before you can use the USB interface. This simulates a serial port that you can use as usual in your M-Bus software. You can find the driver on our CD "Tools & Docs", on our homepage [www.relay.de](http://www.relay.de) or directly from FTDI Chip, the manufacturer of the used USB chip: <https://ftdichip.com/drivers/vcp-drivers> (here you will also find drivers for Linux and Mac OS). Please unpack the ZIP file after download. Install the drivers by clicking on the unzipped file in the File Explorer with the right mouse button and select the menu item "Run as administrator" (example file name is: CDM212364\_Setup.exe).



Now you can connect the PC. The USB driver for the PW50 is installed automatically and generates a new, virtual COM port. The new COM port number of the USB serial port is displayed after the installation is finished (here: COM29). You can look up this number at any time in the Device Manager under ports (USB Serial Port) and - if desired - change it in the advanced settings of the driver. Please select the appropriate comport number in your M-Bus software.



## 3.4 Ethernet interface

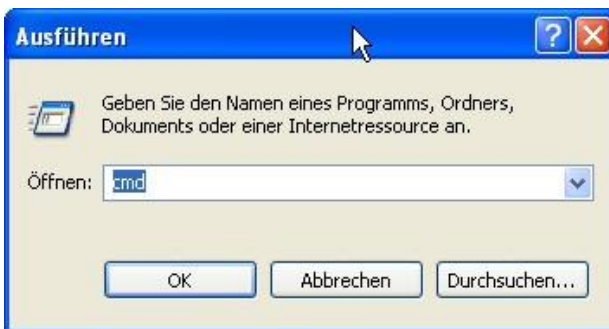
The Ethernet interface of the PW50 converts the physical interface Ethernet 10/100BaseT to M-Bus and the TCP / IP protocol to the serial protocol. The Ethernet interface is available in the front panel as an 8-pin RJ45 socket. The PW50 can be integrated into an existing local network and the M-Bus meters can be read from one or more PCs in that network. This requires the so-called "Tibbo Device Server Toolkit" to be installed on that PC. With this software the Ethernet interface is configured in the PW50 and a virtual COM port is set up. This simulated serial interface enables the use of the usual M-Bus software designed for normal serial interfaces. Please perform the following steps of installation:

### 3.4.1 IT preparations

The IT division of the network containing the PW50 must define the following items:

- Fixed IP address must be identical to the IP range of the reading computer. Only the last number must be different. (e.g. 192.168.1.239)
- You need also the subnet mask and IP address of the gateway if the IP addresses are reassigned by a gateway.
- The converter uses the port 1001 by default for the TCP protocol. This port must not be blocked by any firewall.

You can find your own IP address in your network this way:



Start – Run: cmd <OK>

Start – Ausführen: cmd <OK>



Input: ipconfig <enter>

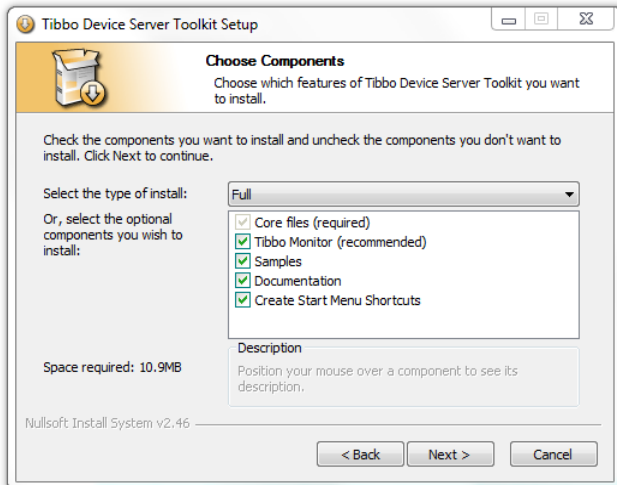
Own IP address and subnet mask will be shown

### 3.4.2 Software installation

You can find the driver software on our CD "Tools&Docs", on our homepage [www.relay.de](http://www.relay.de) or directly at the manufacturer's site: <https://tibbo.com/support/downloads/tdst.html>. Please start depending on your operating system either the 32 bit or 64 bit version of the installation program as an administrator:

tdst\_5-14-00-x86.exe (32-Bit Windows) or tdst\_5-14-00-x64.exe (64-Bit Windows)

TDST = Tibbo Device Server Toolkit, 5-14-00 = Version 5.14.00 dated August 2021

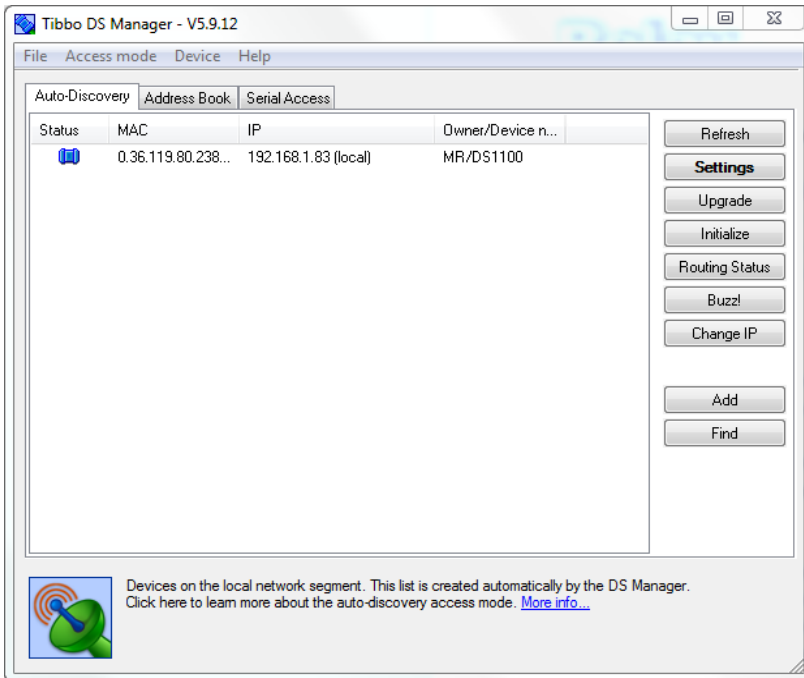


After a reboot of the PC the installation of the drivers and software tools is completed.

### 3.4.3 Setup of the device server

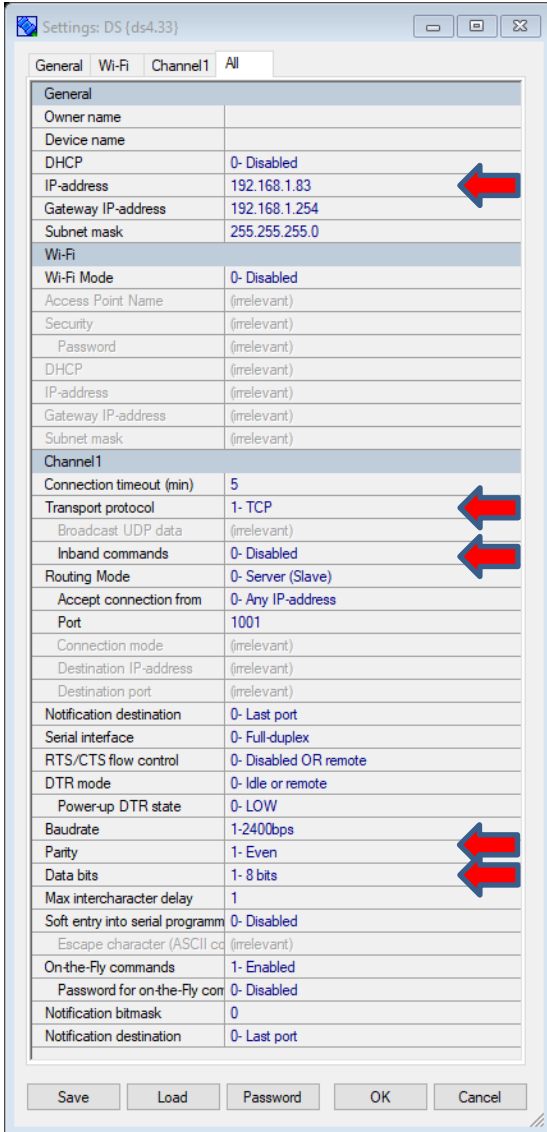
Please start the Tibbo – DS Manager (Start – Programs – Tibbo – Tibbo Device Server Toolkit -

**Tibbo DS Manager.**



The DS Manager (DS = **D**evice **S**erver) shows all by broadcast detectable device servers in the sheet „AutoDiscovery“. Device servers which are not in the same IP address range will not be found and must be manually added into the sheet “Address Book” (button “Add”). Please select the device which you want to configure and click on the button “Settings”. Then you see the settings of the device which you shall change according to the following pictures. You can get help for the DS Manager with F1 key.

**Recommended settings:**



Change values marked with an arrow

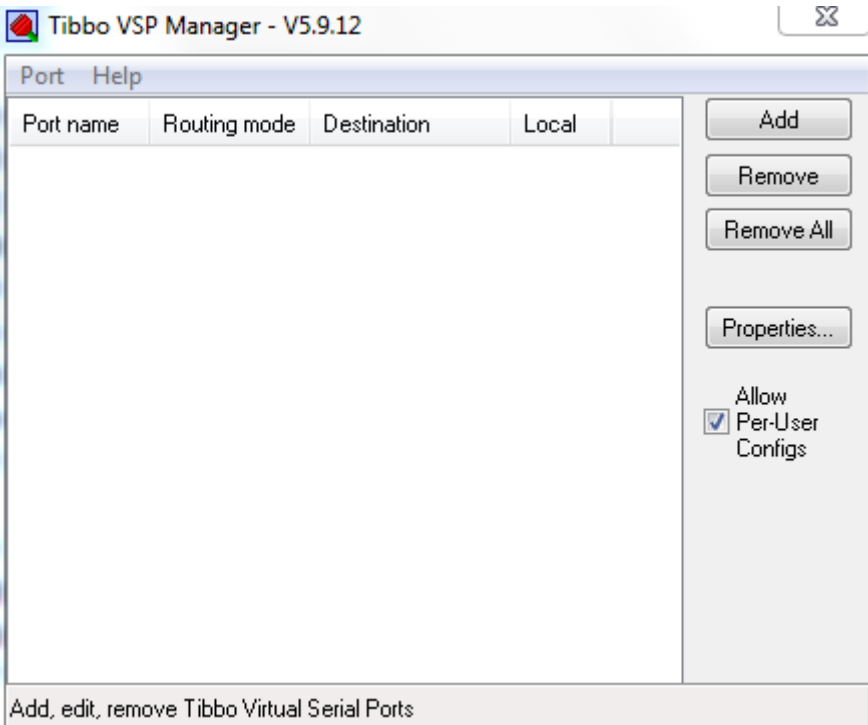
**OK:**

Stores settings and restarts the device

### 3.4.4 Setup of the virtual port

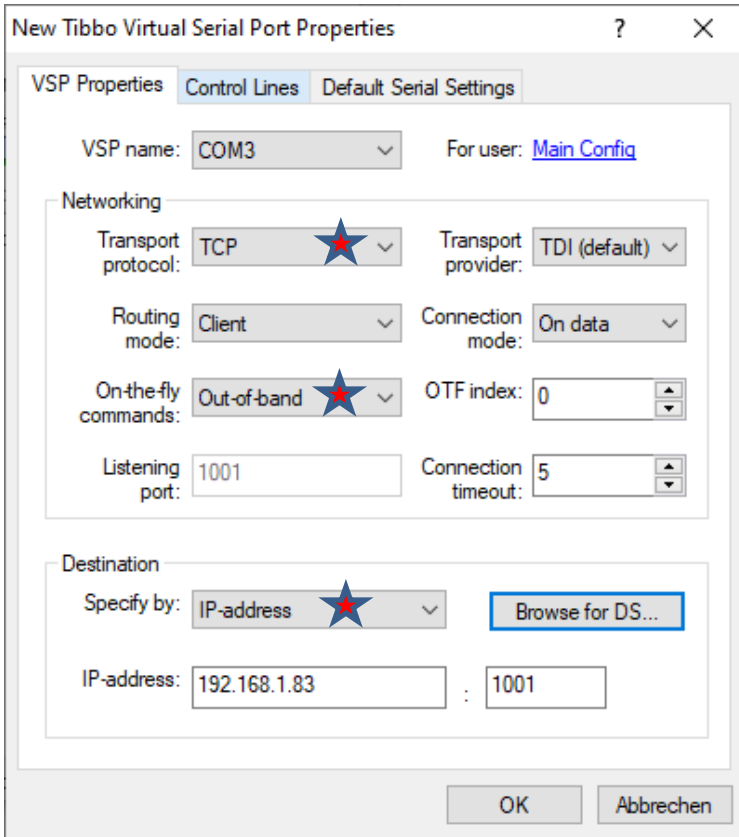
The next step is the setup of a virtual, serial port in your PC. You don't need the virtual port if the used software offers a TCP/IP port instead of serial ports. In this case you must correctly program all settings of the serial interface like baud rate, parity and data bits. You also don't need a virtual port in the bridge mode (two device servers connected together, i.e. one TCP001 (serial device server) to the PW50).

Please start the Tibbo – DS Manager (Start – Programs – Tibbo – Tibbo Device Server Toolkit – **Tibbo VSP Manager**).



Please add a VSP (virtual serial port) by clicking on the “ADD” button.

Please do the following settings:



Change marked values

Browse for DS:  
Select the device server

Then you can program the values for the serial communication after startup in the sheet “Default Serial Settings” (baudrate, data bits, parity, flow control). A click at „OK“ generates the virtual port and then it can be used in your M-Bus software. Please select the respective port (VSP name) in your software as the communication interface. Now the installation is completed. You can change the settings of the device and the COM port using the DS manager respectively the VSP manager at any time. You can also change the settings of the device server and check its routing state after first setup using a web browser connected to the assigned IP address. The required password for the login is empty on delivery.

## 4. Technical data

### 4.1 General data

Operating voltage	23,5 .. 24,5 VDC
Power consumption	max. 9W
Operating temperature range	0 .. 50°C
M-Bus voltage	36 V (Mark), 24V (Space)
M-Bus basic current	max. 90 mA
Overcurrent threshold	> 130 mA
Internal bus resistance	5 Ohm
Communication speeds	300 .. 38400 Baud
Bit threshold	typ. 7,0 mA
Collision threshold	typ. 48 mA
Maximum cable length for recommended cable type JYSTY 1 x 2 x 0,8 mm	Total (all wires): 1km (9600 baud), 4km (2400 baud), 10km (300 baud) Max. distance to slave (50 slaves at the end of the cable):1000 m Max. distance to slave (50 slaves equally distributed): 2000 m
Galvanic isolation	All interfaces are isolated from M-Bus and power supply.
Housing	Light-grey and black PC plastic, protective class IP30 H x W x D: 90 x 53 x 60 mm (height without terminals) Mounting on a rail (width: 3 HP)
LED indicators	Power, communication master, slave, warning, short circuit M-Bus
Interfaces	10/100 Mbit Ethernet, USB device, RS232C (terminals)
Terminals (all pluggable)	3 pair screw terminals for M-Bus, 3-pin terminal fore RS232C, 3-pin screw terminals Klemme for power supply / protective ground

## 4.2 Interface data

RS232C	Driver load	Current max. 5mA, resistive: min. 3k $\Omega$ , capacity: max. 2,5 nF
	Voltage transmit (at 3k $\Omega$ )	Mark: +5V $\leq$ UT $\leq$ +15V Space: -15V $\leq$ UT $\leq$ -5V
	Voltage receive	Mark: +2,5V $\leq$ UR $\leq$ +15V Space: -15V $\leq$ UR $\leq$ -2,5V
USB	Type	USB 2.0 device, socket type B
	USB IC	FTDI Chip: FT232R, Vendor ID = 0403, Product ID = 6001
	Power supply	Bus powered, Low Power (max. 90mA)
	Max. cable length	3,0 m
Ethernet	Network interface	10/100BaseT (RJ45), auto-MDIX, with 2 LEDs
	Protocols / addressing	TCP and UDP / static IP or dynamic IP (DHCP)

## 4.3 Ordering information

Artikelnummer	Beschreibung
PW50	M-Bus Level Converter for 50 slaves
NT013	Power supply 24VDC, 15W, rail, input range 90 .. 264 VAC, 47 .. 63 Hz
NT005	Plug-in power supply 24VDC, 12W, input range 85 .. 264 VAC, 50 .. 60 Hz
KA USB AB	USB cable A to B plug/plug, length = 1m, grey
KA PATCH.5E RJ45 1M	Network patch cable CAT5E FTP, Length = 1m, grey
KA006	Serial D-SUB-9 female cable with 3 open wires