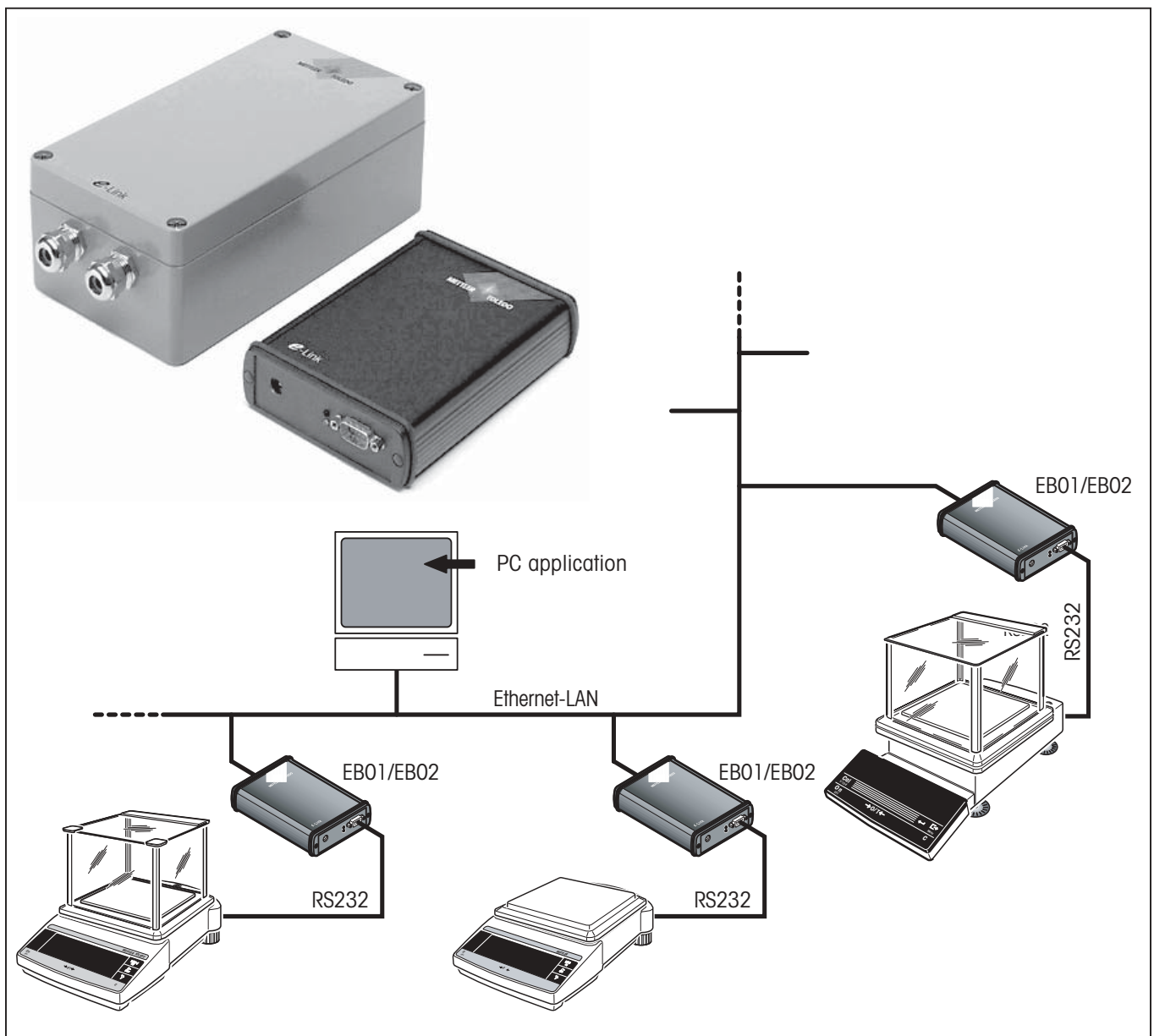


Installation and Operating Instructions

METTLER TOLEDO e-Link system solutions

e-Link Pro network interface EB01 & EB02 e-Link IP network interface EB01



Contents

1	Introduction	5
1.1	Before we begin	5
1.2	Safety first	5
2	Introducing the e-Box	6
2.1	General	6
2.2	Items delivered	6
2.3	Device description e-Link Pro	7
2.4	Description of the e-Link IP device and its installation	9
2.4.1	Preparing for installation	10
2.4.2	Country-specific settings	12
2.4.3	Installing the cables	12
2.4.4	Configuration for connection to the network	15
2.4.5	Operating elements	15
2.5	Functional description of the software	17
2.5.1	Communication module	17
2.5.2	Command interpreter	19
2.5.3	Web server	19
3	Basic configuration	20
3.1	Collecting network information	20
3.2	Switch on e-Box	20
3.3	Reset e-Box to factory settings	21
3.4	Basic configuration via RS232 interface	21
4	Calling up and operating the web server	25
4.1	Calling up the web server	25
4.2	Menu structure and operation	26
5	Device and application settings	27
5.1	Device settings	27
5.1.1	Specify network parameters	27
5.1.2	Specify RS232-1 interface parameters	28
5.1.3	RS232-2 installation of barcode / scanner (EB02 only)	29
5.1.4	Event Logging	30
5.1.5	Specify identification characteristics	31
5.1.6	Date and Time	32
5.2	Application settings	32

4		
5.2.1	Custom	33
5.2.2	FreeWeigh.Net	38
5.2.3	Freeweigh9001	41
5.3	Integration of the e-Box into the network	45
6	System status	46
6.1	Activity Overview	46
6.2	Settings for the Event History	47
6.3	Event History	48
6.4	System Parameters List	49
6.5	Terminal Settings	50
6.6	Terminal	51
7	Additional information	52
7.1	Installation Instruction Short	52
7.2	Inquire software version	53
7.3	Establish communication with the e-Link website	53
8	Updating the software	54
9	What do I do if ... ?	56
10	Appendix	58
10.1	Technical data	58
10.2	System parameters	59
10.3	System commands	60
10.4	A short ABC of networks	61
10.5	Accessories	67

1 Introduction

1.1 Before we begin

Thank you for choosing the **METTLER TOLEDO e-Link system solution**. e-Link is available in two different models: **e-Link Pro** and **e-Link IP**. **e-Link Pro** is also available in two versions: EBO1 and EBO2 (with a second interface). e-Link IP, which has an IP65 housing, is only available in the EBO1 version. Both EBO1 and EBO2 ("e-Box" for short) provide you with an easy means of integrating METTLER TOLEDO measuring instruments which have a serial RS232 interface into a TCP/IP-based network.

Please read these installation and operating instructions right through before you start working with the e-Box, so you know how to operate the e-Box safely and correctly and can make use of all its capabilities.

If you still have questions which the documentation does not answer, or only partially, please contact your local METTLER TOLEDO dealer who will be pleased to assist you.

1.2 Safety first



So you can operate your e-Box safely and without problems, please observe the following:

- To install and configure the e-Box you need to have basic knowledge of TCP/IP-based networks, and of network technology in general.
- Before you work with the e-Box you must have **read through and understood these installation and operating instructions**.
- **You must observe and follow** these installation and operating instructions.
- It is **not allowed** to operate the e-Box **in hazardous environments**.
- The e-Box **must not be used in wet areas or where there is a hazard of spraying water**. For such applications the e-Box with IP65 protection must be used.
- The e-Box has no power supply switch. The only way to switch it on and off is to connect and disconnect the AC adapter to/from the power supply. For this reason, make sure that the AC adapter is easily visible and always accessible.
- **On heavy-current installations with different groundings, the electrical installation must ensure that no grounding currents flow over the shielding of the network cable or of the RS232 cables.**
- To connect your e-Box to the power supply, **always use the AC adapter delivered with it (only by e-Link Pro)**. Before you connect it to the power supply, check that the voltage printed on it is the same as your local power supply voltage and that the AC adapter is not damaged.
- **Electrical installations are generally subject to legal regulations. When installing network devices, the regulations of the respective country must always be observed and always have priority over these Installation Instructions.**
- The e-Box does not contain any parts which can be serviced, repaired, or replaced by the user. If the e-Box is opened, the guarantee will be voided.

2 Introducing the e-Box

2.1 General

The purpose of the **e-Link network interface EB01 or EB02** (e-Box) is to integrate METTLER TOLEDO measuring instruments which have a serial RS232 interface into a TCP/IP-based network.

Every e-Box contains a **web server** (HTTP server) which can be addressed by any standard **Internet browser**. There is no need to install special driver software. Configuring and monitoring the e-Box is done via the Internet browser (see Chapters 4 through 7).

The e-Box with its built-in web server is a so-called addressable network node with server services for the serially connected measuring instrument. Product- and process-specific functions, as well as system settings for application support, depend on the software used in the e-Box.

2.2 Items delivered

The standard delivery comprises the following items:

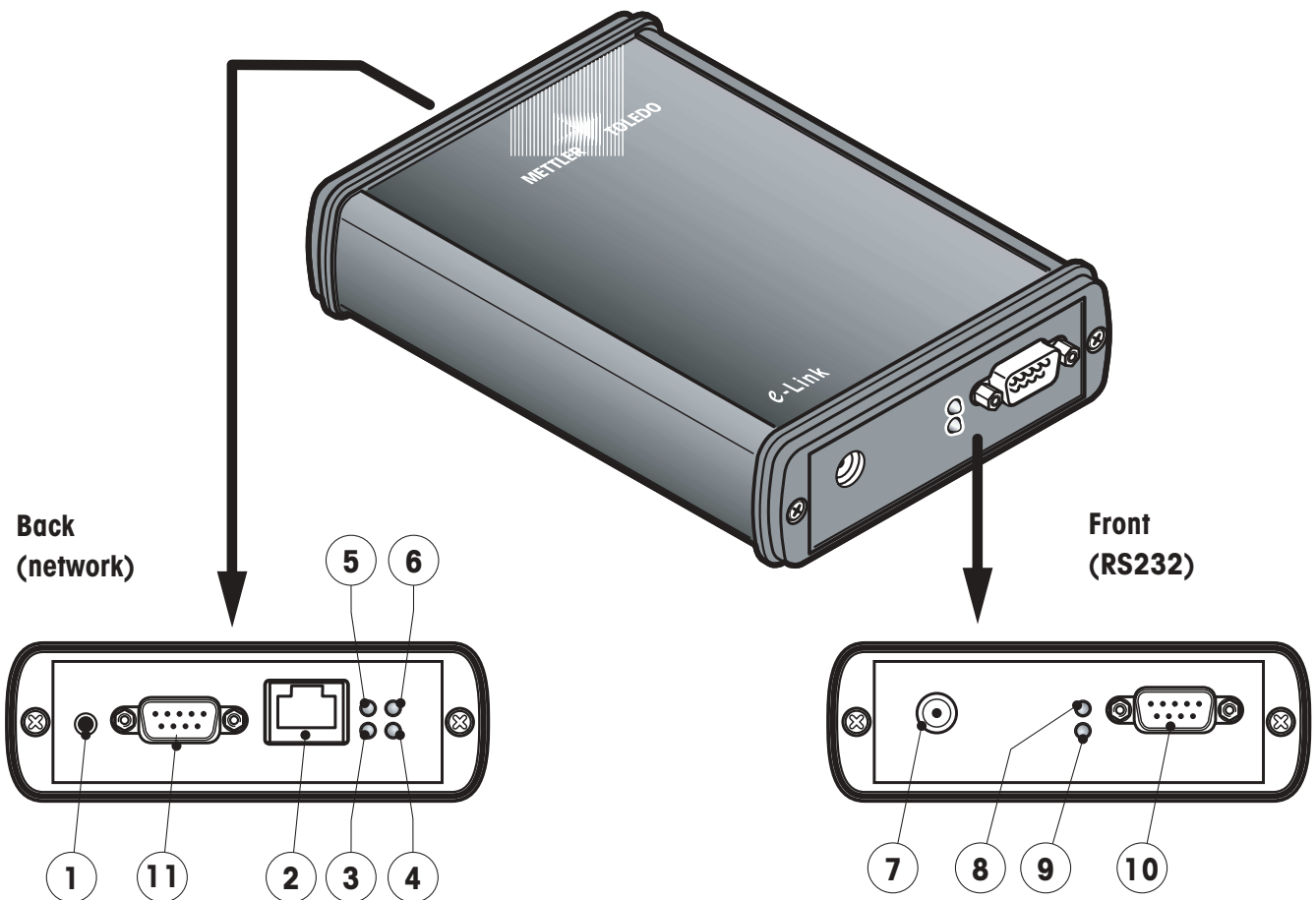
- e-Link network interface
- AC adapter (country-specific) (only with e-Link Pro)
- Installation instructions short (only with e-Link Pro)
- Set of brackets for wall mounting (only with e-Link Pro)
- Plastic bag containing fuses for operation at 110V and 220V (only with e-Link IP)
- Installation and operating instructions (only with e-Link IP)

Items not included in the standard delivery, but available as accessories are:

- RS232 cable (D-Sub9, f/m, 1:1) for connecting measuring instruments to the e-Box
- Ethernet cable (RJ45, 1:1, Cat. 5 UTP/STP) for connecting the e-Box to the Ethernet
- Installation and operating instructions, article no. 11780458: downloadable from **www.mt.com/elink**
- RS232 cable (D-Sub9, f/f, crossover) for the basic configuration

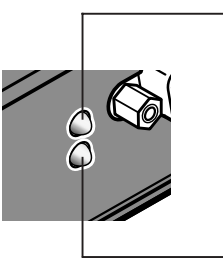
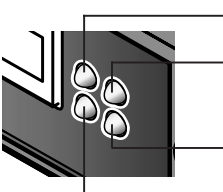
2.3 Device description e-Link Pro

Device overview



- 1 Reset key
- 2 Ethernet connection (RJ45 socket)
- 3 "Rx" indicator (receiving data), green LED
- 4 "Link" indicator (connected to local network), green LED
- 5 "Tx" indicator (transmitting data), red LED
- 6 "Collision" indicator (data collision on the network), red LED
- 7 Connection for AC adapter
- 8 Status indicator, red LED
- 9 Ready indicator, green LED
- 10 RS232 serial interface (D-Sub9/m)
- 11 Second interface RS232 (only by EB02)

Meaning of LEDs

Meaning of LED	Color	Status	Meaning
LEDs on front (RS232) 	Red	On Flashing	While switching on Initializing (on for about 10 secs) Self test (flashes for about 10 secs)
LEDs on back (network) 	Red	Flashing	e-Box is transmitting data
	Red	Flashing	Two devices both attempted to transmit data simultaneously
	Green	On	Device is connected to local network
	Green	Flashing	e-Box is receiving data

Power supply

The e-Box does not have a power switch. To switch the e-Box on and off, the AC adapter supplied with it has to be plugged into / unplugged from the power supply.

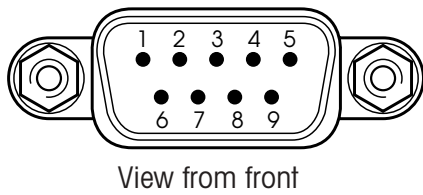
After the e-Box has been plugged in, it starts up with the currently defined system settings. After about 5 seconds, the red LED lights up for about 10 seconds and then flashes for about 10 seconds. When the red LED goes off, the e-Box is ready for operation. You will find further information about the startup procedure in Chapter 3.

Important! A system application (PC program) can only communicate with a METTLER TOLEDO measuring instrument via the e-Box if the e-Box is **connected to the power supply and correctly configured**.

RS232 interface

The **RS232 interface of the e-Box (D-Sub9, male)** matches the connections of the COM interface of a PC. The RS232 interface of the e-Box serves two functions:

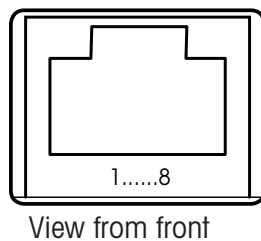
- As means of communication to the COM interface of a PC for the **basic configuration of the e-Box**. For this purpose, an RS232 cable with crossed-over data connections (D-sub9, f/f, crossover) must be used: article number 11600394.
- As means of communication to METTLER TOLEDO measuring instruments with a serial interface. A commercial RS232 cable (D-Sub9, f/m, 1:1) can be used for this purpose (available as accessory). The second RS232 interface (EBO2 only) is used for the transmission of additional information, such as identification data from a barcode reader. All input data is transmitted via the same socket connector to which the instrument is also connected (RS232-1). For setting this interface, refer to Chapter 5.1.3.



Pin	Function
1	Not used
2	RxD
3	TxD
4	DSR
5	Signal ground
6	DTR
7	RTS
8	CTS
9	Not used

Ethernet interface (RJ45)

The e-Box is connected to the local network via the RJ45 socket. A corresponding RJ45 category 5 cable is available as an accessory.

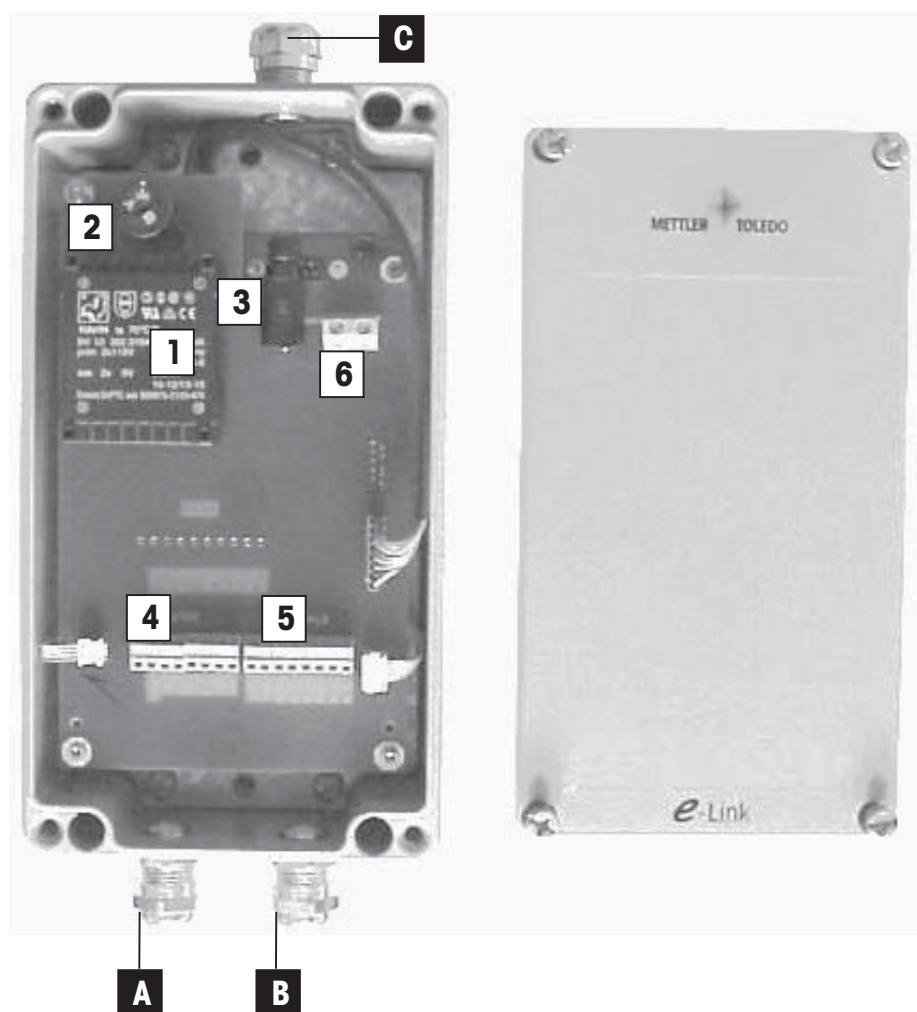


Pin	Function
1	Tx+
2	Tx-
3	Rx+
6	Rx-

2.4 Description of the e-Link IP device and its installation

The e-Link IP differs from the e-Link Pro as follows:

- encapsulated IP65 housing
- built-in AC adapter
- not country-customized – voltage must be set locally
- data and network cables must be prepared locally
- reset button and LEDs are not accessible with the housing closed



The IP version of the EB01 platform is constructed to include a built-in AC adapter (1), a voltage-selector (2), and a fuse (3).

To set up the data and network connections there are terminal strips (4) (5) (6) to which the cables led in through the screwed glands (A) (B) (C) can be fastened.

Provided these Operating Instructions are correctly followed, the installed device is protected to IP65.

2.4.1 Preparing for installation

Draw an outline plan of the system to be constructed, showing the locations and functions of the e-Box devices. Note the subnet within which your devices should communicate, as well as the default gateway and domain name server addresses if you have also received these from the network administrator. Find out the operating modes of the individual e-Box devices. Are the devices being used for:

- communication with a TCP/IP-capable host application (e.g. FreeWeigh.net)
- communication in multiplexer mode with a master e-Box on a serial port of the PC (e.g. FreeWeigh9000)
- serial cable extension over the Ethernet

Note an IP address to be assigned to each device. In multiplexer mode, all slave devices also require a unique MUX-ID. Assign a unique name to each device. You can already transfer all this information from your plan onto the type plates of the devices.

Connections at installation location

Connection sockets of the correct type for the power supply and the network must be accessible close to the installation location. Disconnection of the EB01/IP from the power supply must be possible at all times.

Cable preparation

Cables can be assembled from raw cable ("meterware") and parts. Alternatively, commercially available cables with connectors at both ends can be used, but in this case one connector must always be remote off as described below:

Cable Type	Designation	External Ø
Connection to Weighing Instrument (RS232)		
9-wire shielded data cable	Connector DSub9 (m/f), connections 1:1 ¹⁾	5 - 7mm
Connection to Network (Ethernet)		
Patch cord	Cat.5, STP, with two RJ45 connectors ²⁾	5 - 7mm
Power Supply		
3-wire power supply cable	Power supply cable, 3-wire (N, P + E)	5 - 7mm

Table 1

¹⁾ The Dsub9 (f) connector must be remote off for installation.

²⁾ One RJ45 connector must be remote off for installation.

IMPORTANT: If standard cables are used, the connector at one end must be remote off and the individual wires for connection to the terminal strips of the EB01/IP must be exposed. Standard cables are listed in the annex under accessories. Alternatively they can be obtained from any cable supplier.

Materials and tools required

- EB01/IP
- Prepared cables (power supply cable, RS232 cable, patch cord)
- Computer on the network with free serial port and terminal program
- Null-modem cable or null-modem adapter (DB9/f-DB9/f) for the configuration
- A further free network connection
- Cross-head screwdriver for screws of housing cover and grounding connector
- Small screwdriver for screws of terminal strip and voltage selector
- Phase tester
- Continuity tester
- Open-end wrench for cable glands

Where should the EB01/IP be configured?

It is easiest to configure and test the e-Box devices at a central location, so that at the place where they will be used they can just be connected and put into operation.

2.4.2 Country-specific settings

Unplug any power supply cable which may be connected to the power supply, so that the EB01/IP is free of current. Then remove the housing cover.

Operating voltage



Check that the voltage selector is correctly set to the local voltage. If necessary, change the setting with a screwdriver.

Fuse rating



The rating of the fuse to be inserted in the fuse carrier must correspond to the setting of the voltage selector as shown in the table 2.



A 0.032 A slow-blow fuse is installed at the factory as standard for operation on a 220-240V power supply.

If the e-Box will be operated on a 100-120V power supply, this fuse must be changed.

One fuse of each rating is included in the delivery.

Supply Voltage	Fuse Rating
220-240V	0.032 A slow
100-120V	0.063 A slow

Table 2

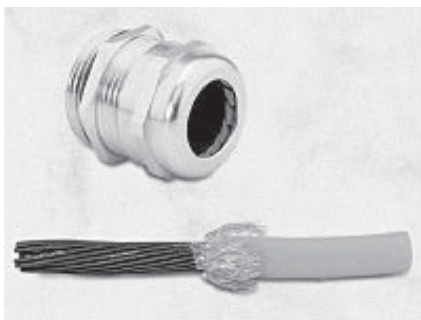
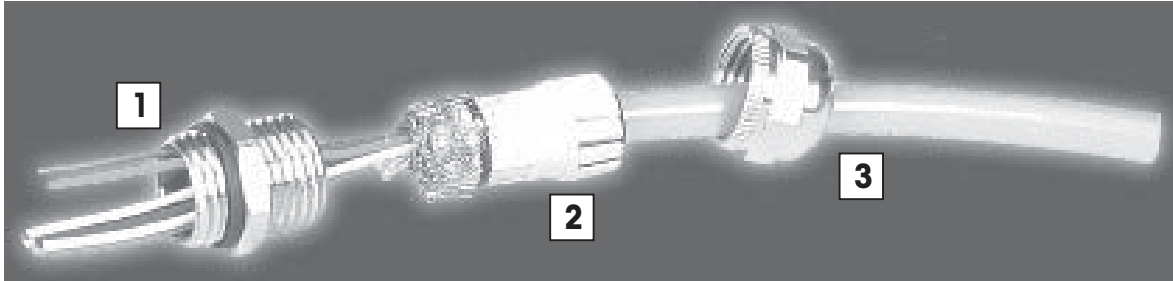
2.4.3 Installing the cables

Only cables of the types stated in Table 1 may be used for the cabling.

IMPORTANT: Installation of the cables must always be done in the sequence described. For safety reasons, the power supply cord must be connected last.

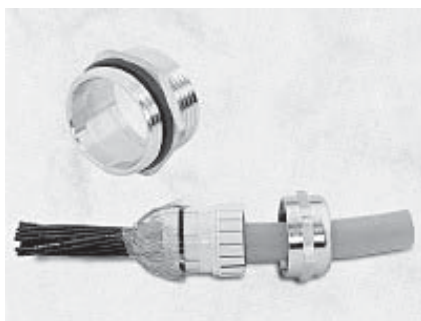
Installing the cable glands

Each cable gland consists of an externally threaded gland (1) fastened in the housing, a compression sleeve (2), and an internally threaded cap nut (3).



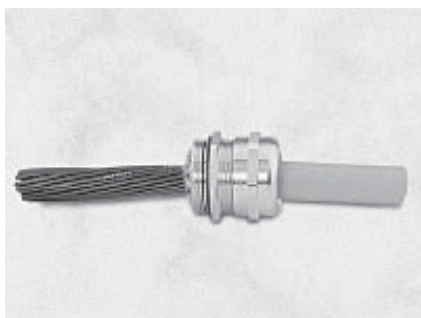
Step 1:

- Strip approximately 8 cm of the outer sheath of the cable
- Expose the shielding braid and cut back to about 2 cm
- Cut back any aluminum foil around the conductor pair
- Strip approximately 5 mm of the individual conductors



Step 2:

- Pass the cable through the cap nut
- Insert the cable into the compression sleeve
- Slide the shielding braid over the compression sleeve
- The shielding braid must cover approx. 2 mm of the O-ring



Step 3:

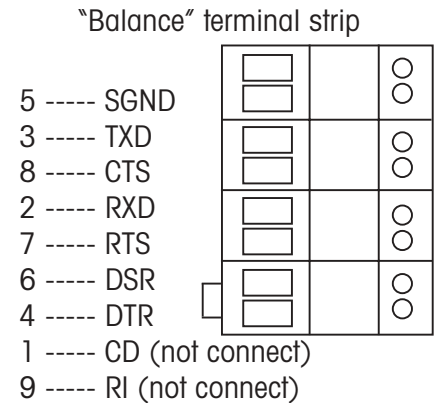
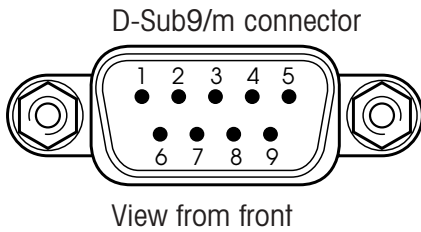
- Insert the compression sleeve into the threaded gland in the housing
- Press the cap nut into position and screw on tight

RS232 cable

For the RS232 cable, a shielded, 9-wire signal cable with a D-Sub9/male connector at one end must be used. A weighing instrument can be connected to this cable after the e-Box has been configured.

The loose end of the cable must be inserted through the cable gland (A) in the housing and connected to the **“Balance” terminal strip**.

The stripped conductors of the RS232 signal cable must be connected to the terminal strip as follows:



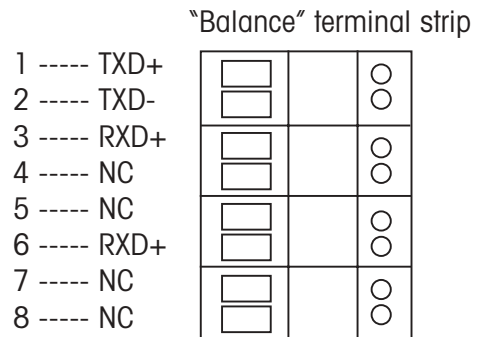
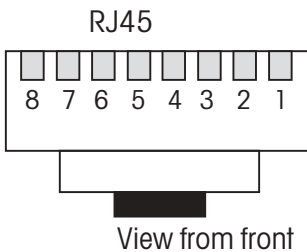
The two conductors which are not required (CD and RI) must be shortened and insulated.

IMPORTANT: Since the color coding of 9-wire data cables is not always the same, the connections between the connector and the terminal strip must be tested with a continuity tester. The connections at the connector end are numbered.

Network cable (LAN)

For connection to the network (LAN), a shielded patch cord (with RJ45 connector at one end) must be used. This cord must be inserted through the cable gland (B) in the housing and fastened.

The stripped conductors of the patch cord must be connected to the **"Ethernet" terminal strip** as follows:



Only four wires are required for operational purposes. The wires not designated here can be fastened to any of the free connections (NC).

IMPORTANT: Since the color coding of patch cords is not always the same, the connections between the connector and the terminal strip must be tested with a continuity tester. The colors of the wires are visible at the connector end.

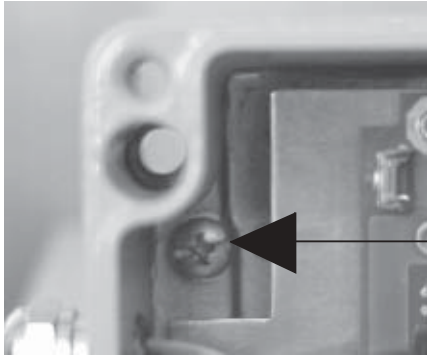
Network cable (110/115/220/230/240V)

For connection to the power supply (115V/230V), a three-wire power cord must be used. This power cord must be fitted with a plug as the only means of disconnecting the EBO1/IP from the power supply.

With the power cord disconnected from the power supply, the loose three-wire power cord must be inserted through the cable gland (C) in the housing.

Grounding wire

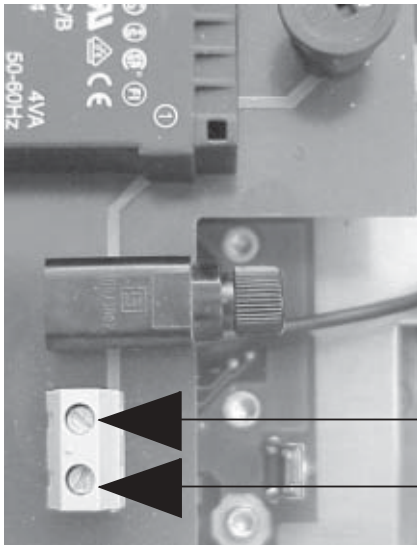
To first ensure that the housing of the EB01/IP is at ground potential, the stripped grounding wire yellow/green of the power cord must be fastened to the fastening screw marked as the grounding point.



Fastening screw for ground wire

Neutral / Phase

The other two stripped wires of the power cord are then connected to the power supply terminal strip as follows:



Phase

Neutral

2.4.4 Configuration for connection to the network

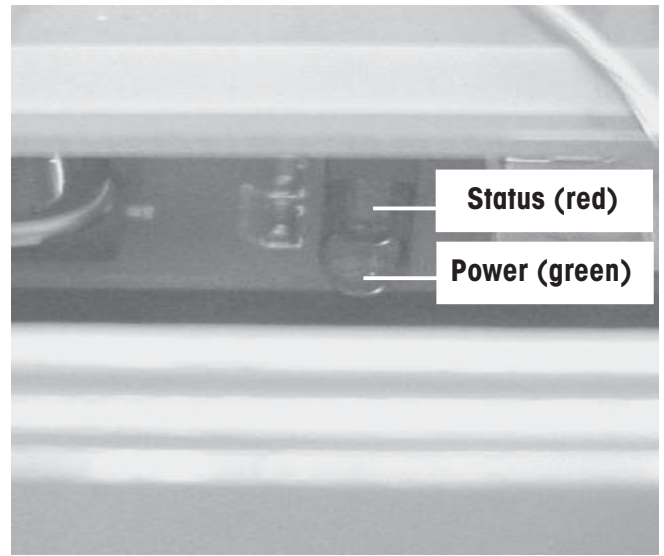
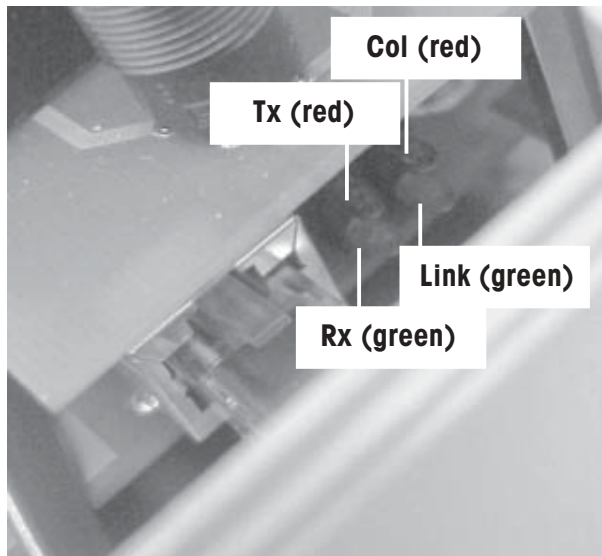
When all the cables have been installed and the connections checked for correctness, configuration of the EB01/IP for connection to the network can be started.

IMPORTANT: For safety, place the cover on the device. This will prevent accidental contact with parts carrying high voltages.

2.4.5 Operating elements

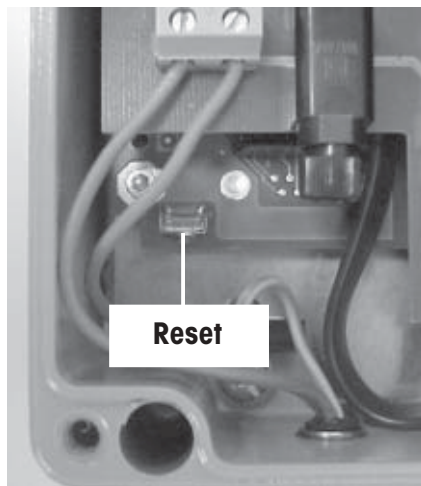
For reasons of protection, the operating elements of the IP65 version, such as the reset button and LEDs, are not accessible from outside. They can be seen and operated during installation with the cover removed. They are accessible as follows:

LED displays



LED designation	Color	Meaning
Power	Green	On: power supply OK
Status	Red	At startup: On: booting in process (1) Flashing: ready for operation (2) In operation: Off: operation OK Flashing: error
Link	Green	On: link to local network OK
Rx	Green	Flashing: the e-Box is receiving data
Tx	Red	Flashing: the e-Box is sending data
Collision (Col.)	Red	Flashing: an error occurred while transmitting IP packets

Reset button



The reset button can be used to reset the parameters of the e-Box to the factory settings as described in the Installation Instructions.

Resetting may help if the e-Box is no longer addressable, or no longer responds, because of an incorrect input during installation.

The reset button is only active during a time window when the e-Box is starting up. This time window lasts approx. 10 seconds and is indicated by flashing of the red status LED shortly after plugging in.

2.5 Functional description of the software

The e-Box software comprises the following main components:

- A **communication module** which controls initiation of communication on the network side and is responsible for data transmission by the serial terminal from and to the network, and for controlling the data flow (see Section 2.5.1).
- A **command interpreter** for processing the e-Box system commands (see Section 2.5.2).
- A **web server** with HTML pages for configuring the e-Box and visualizing events and data traffic (see Section 2.5.3).

2.5.1 Communication module

Connection / operating modes

To be able to send data from one network subscriber (PC, e-Box, etc.) to another, communication must be established between the two subscribers and be open for data transfer. For this to be possible, the system must have rules as to which subscriber takes on the **active (client)** role, and which takes on the **passive (server)** role.

The behavior of each e-Box in the network is defined by corresponding configuration of the server and client functions in the application settings (see Section 5.2). In principle, the e-Box can be configured for **three different operating modes (server, client, and client-server)**:

- **Server mode (passive)**

If the e-Box is configured as a server, it waits until a client initiates communication with it. Several clients can initiate communication with the server simultaneously, but only the first client that establishes communication receives data back.

Data transmission in both directions takes place asynchronously, i.e. all data is transmitted line-by-line or character-by-character according to the communication parameters which have been set, and independent of the data communication in the opposite direction.

- **Client mode (active)**

If the e-Box is configured as a client, and a host IP address is specified as well as a port number, the e-Box attempts to initiate communication with the host server (PC or e-Box configured as server) via the specified port and IP address. The attempt to establish communication with the host is made at a specified time interval (Host Retry Time) and is continued until communication is established.

The client only terminates communication if there is a transmission fault (e.g. host switched off), otherwise communication remains permanently established. If a host server terminates communication, the e-Box periodically attempts to re-establish communication.

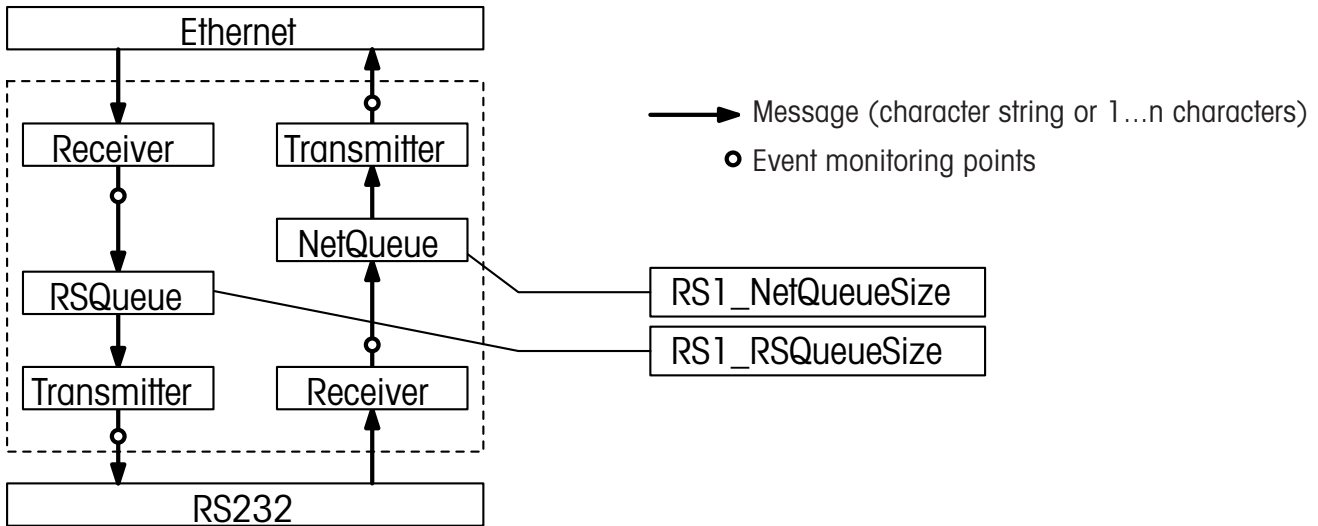
- **Combined server mode and client mode**

An e-Box can be configured both as a server and a client simultaneously. In this case, the e-Box behaves both as a server and a client as described above – i.e. both the e-Box client and the application on the host computer can establish communication.

The behavior of the e-Box in combined server and client mode depends on the respective application.

Data flow control

The deliverability of data (data flow) from the serial interface to the network, and in the opposite direction, is continuously monitored. If deliverability is interrupted, the data is buffered up to a certain quantity. The buffers take the form of so-called queues, one for the RS side (RSQueue) and one for the network side (NetQueue). The following diagram shows the data flow:



The number of messages which can be stored in the "RSQueue" and in the "NetQueue" (buffer size), as well as the definition of the message type (character string or individual characters), can be specified in the application settings (see Section 5.2).

– Behavior with overloaded network

If no more data can be fed into the network side (network overload), arriving messages are stored in the "NetQueue". If the buffer of the "NetQueue" is full, either of two things will happen, depending on the RS232 handshake *) that was chosen:

1. RS232 handshake on: To prevent further data arriving, communication on the serial side is stopped via RS232 handshake **).
2. RS232 handshake off: Further data arriving is accepted and read in (in string mode as complete strings), but then rejected internally.

*) For the RS232 handshake, both the software and the hardware handshake methods can be chosen.

***) Condition: The handshake method chosen is supported by the measuring instrument which is connected.

– Behavior with overloaded RS232

If the RS232 interface is overloaded (handshake stops), the RSQueue is filled. When the queue is full, no more data is read in from the network, i.e. the Ethernet automatically stops transmitting data.

Power-on behavior

The behavior of the e-Box after it is plugged in ("Power On") depends on which operating mode has been chosen (server, client, or client-server). Configuring it as client, for example, ensures that after a power outage the e-Box automatically attempts to contact the host system to re-establish communication.

2.5.2 Command interpreter

The built-in command interpreter checks all messages arriving across the two interfaces (RS232 or Ethernet) for whether they are system commands for configuring and inquiring system parameters.

Important: The command interpreter can only recognize and process system commands if the operating mode of the RS232 interface is set to **"String"** and **the end-of-line character is not set to "none"**. This is the configuration the e-Box is given before it leaves the factory (see also Section 5.2).

By using a terminal program (e.g. "Hyperterminal") the e-Box can be completely configured with system commands via the RS232 interface.

Structure of system commands

All system commands begin with the string **"sys://"** which is followed by the command itself, e.g. **"ip=146.21.157.6"**.

Examples:	sys://ip=146.21.157.6	(sets the IP address to 146.21.157.6)
	sys://ip	(inquires the IP address)
	sys://list	(lists all system parameters)
	sys://restart	(restarts the e-Box)

There is a list of system commands in Section 10.3.

2.5.3 Web server

The built-in web server makes it easy to configure all the parameters from an Internet browser at any point in the local network. (Requirement: direct Ethernet communication between the e-Box and the computer on which the Internet browser runs. "Java" must be activated in the browser.)

To protect the configuration pages (HTML pages) against unauthorized access, the web server is protected with a password made up from the **user name "ADMIN"** and the **password "fw9"**. The password is fixed and cannot be changed.

3 Basic configuration

3.1 Collecting network information

Before you can start with installation and basic configuration of the individual e-Box devices, you need to collect various items of information about the network which is to be created. The information needed is:

- A network overview (which has to be created) showing:
 - What components are present in the network?
 - Who communicates with whom?
 - Who can initiate communication via the network and who can terminate it?
 - Which e-Box is connected to which measuring instrument?
- Determination and input of the following data items for each e-Box:
 - IP address and subnet mask (request from network administrator).
 - If necessary, also the default gateway address and the domain name server address (request from network administrator).
 - If necessary, also a user name and password (request from network administrator).
 - The RS232 interface parameters to be used (matched to the measuring instrument).
 - If necessary, the MTCOM address (star address).
 - Additional information about the location, type, etc. of the connected measuring instrument.

Tip: Note all the above data on the label of the respective e-Box, so that each e-Box can be clearly identified.

- Check the availability of network connections at the locations of the measuring instruments. If necessary, arrange for them to be installed.
- Work out which department and/or person (IT, Quality Assurance, METTLER TOLEDO technician, etc.) will set up which system components, and configure, test, and release them.

Once you have collected all this information, you can get started.

3.2 Switch on e-Box

Check that the **power supply voltage matches the voltage printed on the AC adapter**, and that the **AC adapter is not damaged**. Then connect the e-Box to the power supply with the AC adapter. The **green LED lights up**.

About 5 seconds after power on, the following startup procedure runs, and is indicated by the red LED on the front:

Red status LED	Duration	Status
On	Approx. 10 secs	Initialization
Flashing	Approx. 10 secs	Self-test
Off		e-Box is ready for operation

Note: The e-Box always starts up with the last system settings that were saved.

3.3 Reset e-Box to factory settings

All e-Boxes are shipped from the factory with the same system settings. The factory settings for the Ethernet and RS232 interface are shown below. The factory settings of all the system parameters are shown in a table in Section 10.1.

System Parameter	Designation	Factory Setting
NET_IpAddress	IP address	192.168.0.1
NET_SubnetMask	Subnet mask	255.255.255.0
NET_DefaultGateway	"Default Gateway" address	<empty>
NET_DNS	"Domain Name Server" address	<empty>
RS1_Baud	Baud rate	9600
RS1_Parity	Parity	No
RS1_Databit	Number of data bits	8
RS1_Stopbit	Number of stop bits	1
RS1_Handshake	Handshake	No

If the e-Box no longer responds due to an incorrect input, it can be reset to the factory settings as follows:

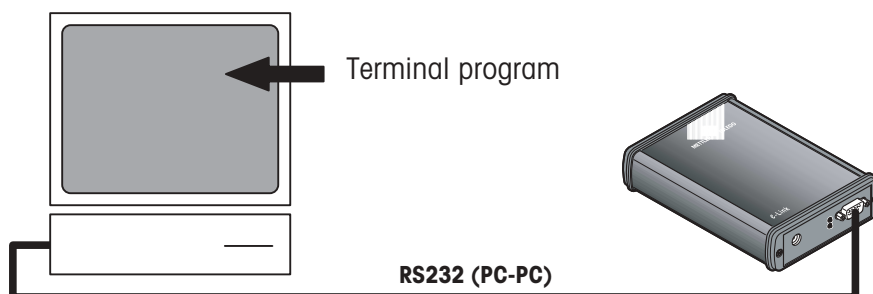
- Switch off the e-Box by unplugging the AC adapter.
- **While pressing the reset key**, switch on the e-Box by plugging in the AC adapter.
- **Keep the reset key pressed down until the red LED starts to flash.**

The e-Box is then reset to the factory settings and automatically performs a restart. When the red LED goes off, the e-Box is ready for operation.

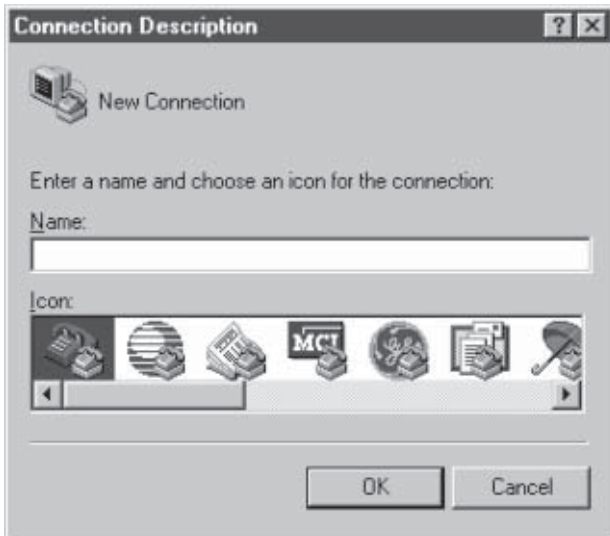
3.4 Basic configuration via RS232 interface

With the basic configuration you set the IP address and the subnet mask of the respective e-Box to the values defined for your company network. Proceed as follows:

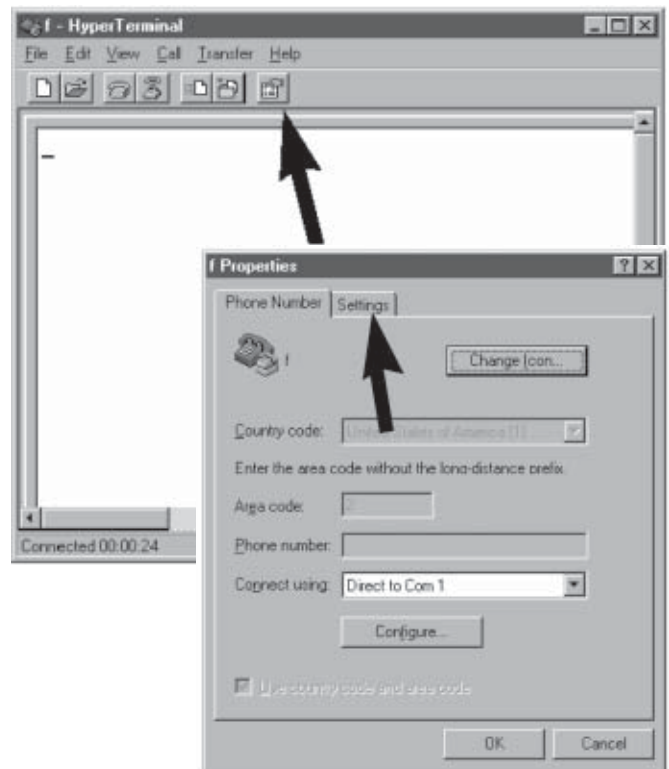
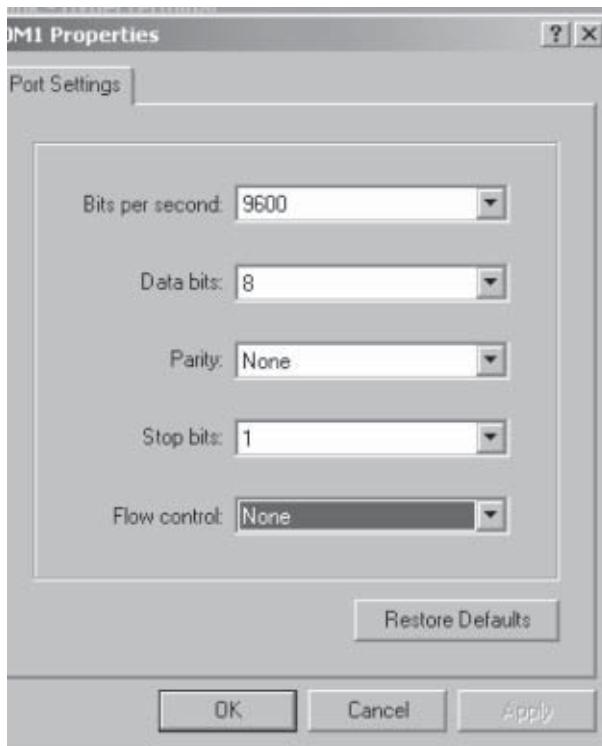
1. Use the **RS232 cable (D-Sub9, f/f, crossover)** included in the delivery to connect the serial RS232 interface of the e-Box to the COM port on your computer.



2. Start a terminal program on your computer e.g. Hyperterminal (under Windows at Start>Programs>Accessories>Communication>HyperTerminal). Before starting this program, make sure that the COM port it will use is not set for other devices.
3. When the program has started, enter a name to save your settings.
4. After this, select the COM port to which the e-Box is connected. Confirm with OK.



5. The port settings now appear. Set to Bits: 9600 / Data bits: 8 / Parity: None / Stop bit: 1 / Flow control: None. Confirm with OK. The connection is now set up.
6. To access the settings, go to "Properties" of the terminal and select "Settings".



7. Go to "ASCII Setup", and select the two settings for ASCII Transmit and ASCII Receive as shown in the illustration.



8. To activate these changes, first click on "Disconnect" and then on "Connect".



9. Switch on the e-Box by plugging in the AC adapter and wait until the e-Box is ready for operation (red LED goes off).
10. Now use the terminal program to enter the system commands for the desired IP address and the subnet mask (for a list of system commands, see Section 10.3).

Note: The addresses of the default gateways and domain name server, and the remaining system settings, are not required for the basic configuration and can be input later (as described in Section 5.1) via the HTML pages of the built-in web server.

Enter IP address (e.g. 146.21.157.6):
 Answer:
 Enter subnet mask (e.g. 255.255.255.0):
 Answer:

```
sys: //ip=146.21.157.6
NET_IpAddress="146.21.157.6" *
sys: //sn=255.255.255.0
NET_SubnetMask="255.255.255.0"
█
```


Note: It is not possible to correct typing errors (e.g. by backspacing) in the terminal program because all special characters are also transmitted and interpreted. If you make a typing error, quit the operation with Enter or Return and then re-enter the complete command.

11. The star after `NET_IpAddress="146.21.157.6" *` indicates that the IP address has been reset but is not yet active. To activate the changes and/or the basic configuration, the e-Box must be restarted via the terminal program with system command `sys://restart` or by unplugging the e-Box and plugging it in again.
12. With command `sys://backup` the system parameters are issued in a format which can be read into the e-Box again directly via the RS232 interface. This makes it easy to restore the settings if the e-Box is replaced. This function can also be used to configure several e-Boxes (clones) with identical settings (except for the IP address).
13. **Changing the user name and password:** The user name and the password can be changed via RS232 interfaces. The commands are as follows:

```
login://username <username>          e.g. login://username systemadmin2
login://password <password>          login://password example1
```

The user name and password only become active after switching on and off, or via the terminal program with the `sys://restart` command. If the user name or password has been forgotten, the **user name** and **password** can be reset to the original factory settings (`ADMIN` and `fw9`).

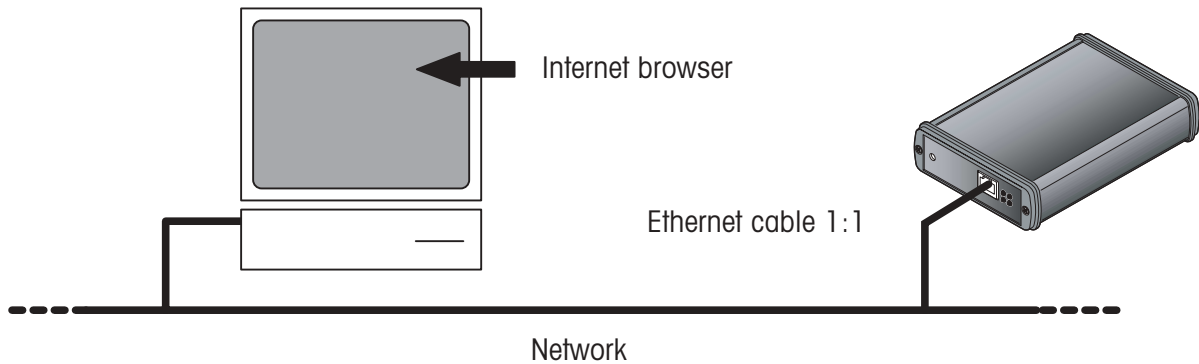
Perform the basic configuration described above for each e-Box which will be used in the network.

Note: All the system settings can also be set by means of system commands. The system commands are listed in Section 10.3.

4 Calling up and operating the web server

4.1 Calling up the web server

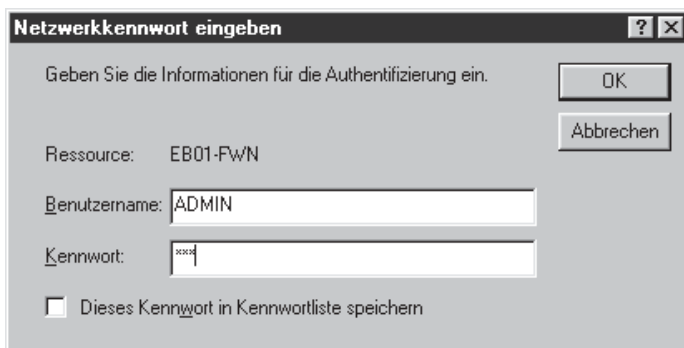
- Using a standard Ethernet cable (RJ45, 1:1), connect the e-Box to the network to which your computer is also connected.



- Switch the e-Box off and then on again by unplugging the AC adapter and plugging it in again to ensure that the basic configuration is active.
- Start the Internet browser on the computer and then enter the IP address of the connected e-Box (according to the basic configuration) in the address field.



- If a connection with the e-Box is successfully established, you will be prompted to log on to the system with your user name and password. Enter the specified user name and the password. If none have been specified, for the **user name** enter **"ADMIN"** and for the **password "fw9"**, and confirm these inputs with "OK".

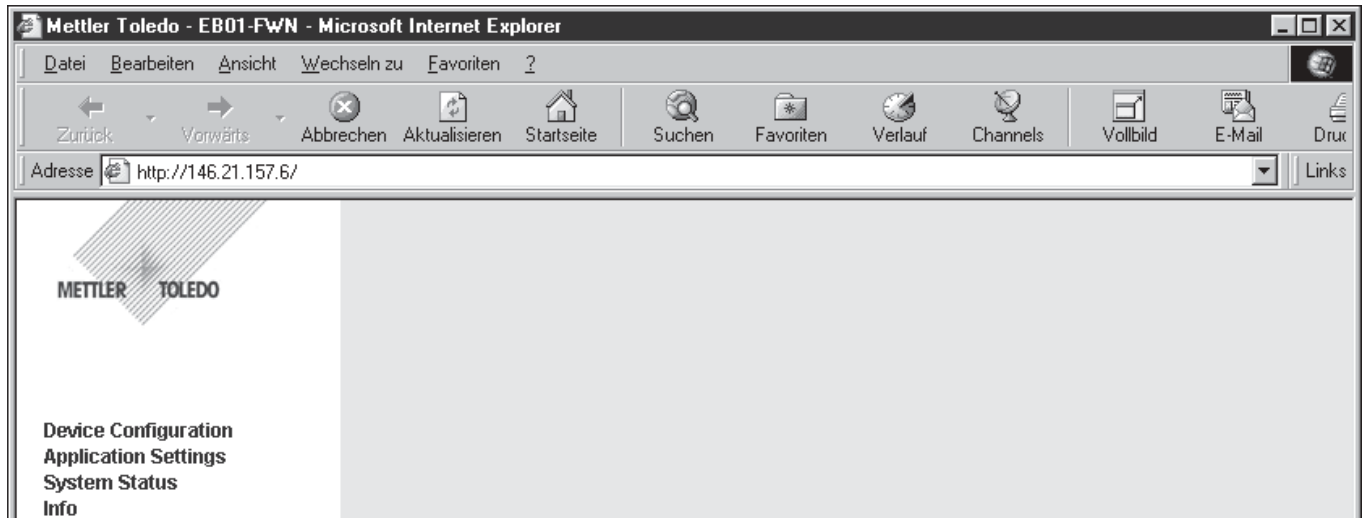


Note: If no connection can be established with the selected e-Box, check the system according to the instructions for fault correction in Chapter 9.

If logon is successful, the first page of the web server appears. The next section describes the structure and operation of the HTML pages.


4.2 Menu structure and operation

All the configuration pages of the web server (the illustration shows the first page) have the same structure:



- The **navigation menu** is displayed (at left) in the **navigation field**. Menu points in submenus are indicated by an arrow. Clicking on one of these menu points opens the corresponding submenu and clicking again closes it.

Device Configuration	---	5.1	Device settings
Ethernet	---	5.1.1	Specify network parameters
RS232-1	---	5.1.2	Specify RS232-1 interface parameters
RS232-2	---	5.1.3	RS232-2 install barcode / scanner (EB02 only)
Event Logger	---	5.1.4	Event Logging
Identification	---	5.1.5	Specify identification characteristics
Date & Time	---	5.1.6	Date and Time
Application Settings	---	5.2	Application settings
System Status	---	6	System status
Activity Overview	---	6.1	Activity overview
Event History Settings	---	6.2	Settings for the event history
Event History	---	6.3	Event history
System Parameter	---	6.4	Overview of system parameters
Terminal Settings	---	6.5	Terminal settings
Terminal	---	6.6	Terminal
Info	---	7	Supplementary information
Quick Installation Guide	---	7.1	Installation Instruction Short
Software Revision	---	7.2	Inquire software version
e-Link homepage	---	7.3	Establish e-Link to website

- The options for the individual menu points are displayed (at right) in the work field. Please note the following:
 - Changed parameter values are only accepted if they are confirmed with before leaving the HTML site.
 - Parameters marked with the  symbol only become active after the e-Box is restarted (unplug the e-Box and plug it in again, or click on the button).
 - Values marked with an asterisk have been changed but are not yet active. A restart is necessary to reactivate them (unplug the e-Box and plug it in again, or click on the button).

5 Device and application settings

5.1 Device settings

5.1.1 Specify network parameters

Select the submenu point "**Device Configuration > Ethernet**":

The screenshot displays the 'Configuration - Ethernet' page. On the left is a navigation menu with 'Device Configuration' selected. The main content area is divided into 'Hardware configuration' and 'Network configuration'. The MAC address is shown as 00:10:52:ff:a0:27. Network parameters include IP Address (146.21.157.6), Subnet Mask (255.255.255.0), Default Gateway, and Domain Name Server. There are 'Submit' and 'Submit & Restart' buttons. A warning message at the bottom states: 'parameter change will only take effect after restart'.

On this page you specify the network parameters. Displayed above the input fields for the network parameters is the so-called MAC address (physical address of the e-Box) which cannot be changed.

Parameter	Description
IP Address	Defines the IP address of the e-Box in format XXX.XXX.XXX.XXX. The IP address must be unique within a company network and conform to the conventions for IP addresses (see Chapter 10.4).
Subnet mask	Specifies the subnet within which the e-Box is addressable. Format "XXX.XXX.XXX.XXX" (see notes in Section 10.4).
Default gateway	If the network is connected via a router to another network, the address of the respective Default Gateway must be entered in this field. Format "XXX.XXX.XXX.XXX".
Domain name server	If the TCP/IP network supports domain names for calling up network subscribers, the address of the Domain Name Server must be entered here.

5.1.2 Specify RS232-1 interface parameters

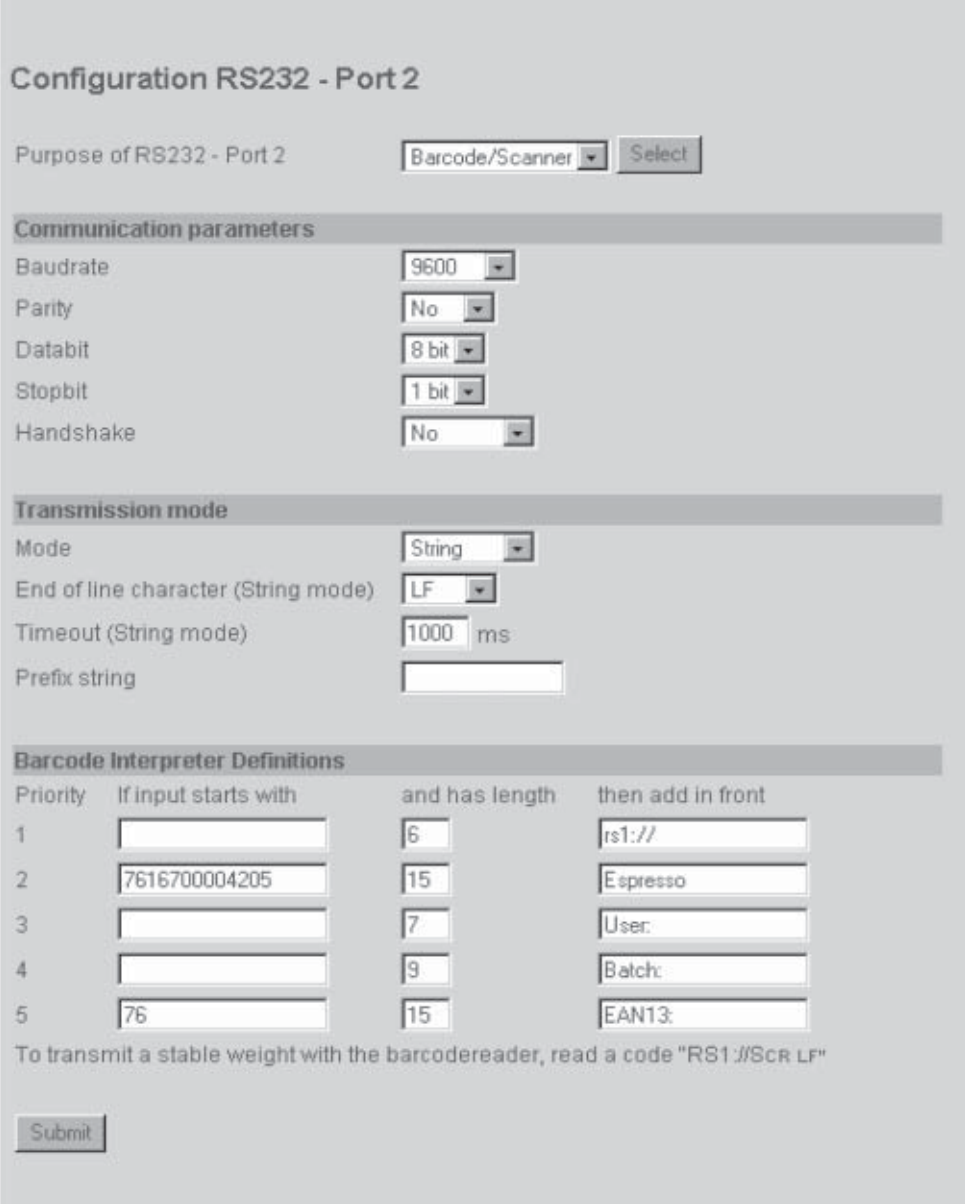
Select submenu point "**Device Configuration > RS232**":

On this page you specify the parameters for the RS232 interface of the e-Box.

To ensure fault-free communication between the e-Box and the serially connected end-device, the RS232 interface parameters on both devices must be identical. Before leaving the factory the interface parameters of the e-Box are set to **9600, No, 8, 1, No handshake**. The selection menu above the input fields can be used to call up predefined settings for various METTLER TOLEDO measuring instruments.

Parameter	Description
Baud rate	Baud rate: 150, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200 .
Parity	Parity: No, Even, or Odd
Data bit	Number of data bits: 7 or 8
Stop bit	Number of stop bits: 1 or 2
Handshake	Handshake: No, Hardware, or Xon/Xoff

5.1.3 RS232-2 installation of barcode / scanner (EB02 only)



Configuration RS232 - Port 2

Purpose of RS232 - Port 2: Barcode/Scanner

Communication parameters

Baudrate: 9600
 Parity: No
 Databit: 8 bit
 Stopbit: 1 bit
 Handshake: No

Transmission mode

Mode: String
 End of line character (String mode): LF
 Timeout (String mode): 1000 ms
 Prefix string:

Barcode Interpreter Definitions

Priority	If input starts with	and has length	then add in front
1	<input type="text"/>	6	rs1://
2	7616700004205	15	Espresso
3	<input type="text"/>	7	User:
4	<input type="text"/>	9	Batch:
5	76	15	EAN13:

To transmit a stable weight with the barcodereader, read a code "RS1://Scr LF"

The second RS232 interface is used for the transmission of additional information, such as identification information from a barcode reader. All input data is transmitted via the same socket connector to which the instrument is also connected (RS232-1).

The **barcode interpreter** interprets the bar code received with respect to its starting position and length. If the start ("If input starts with") and/or the length ("then add in front") of the bar code matches the input data, the corresponding prefix ("then add in front") is inserted in front of the bar code and transmitted.

If no start is specified, the bar code received is only compared with respect to its length. The length includes the characters at the end of the string, such as CR and LF.

If no length is specified, the bar code received is only compared with respect to its start.

If neither length nor start are specified, no comparison is made, i.e. if no interpretation should be performed, all "Start" and "Length" fields must be empty.

Interpretation proceeds according to the specified priority, i.e. Priority 1 is established first, then Priority 2. If a start and/or a length are correctly interpreted, the definitions which follow after are no longer considered.

Reading scale/balance commands

If a prefix `\rs1://` is entered, the bar code without the prefix is diverted to RS Interface 1. This makes it possible to read in commands to the scale/balance with the barcode reader: for example, transmit a weight value to the host, set to zero, open/close doors, etc. The commands must correspond to the syntax of the weighing instruments which are connected, and in the case of a scale/balance, the barcode reader must send a CR/LF after the bar code.

There are two ways of reading in scale/balance codes with the barcode reader:


1. The barcode reader reads in the respective scale/balance command prefixed by `\rs1://`, e.g. `\rs1://S CR LF`. The prefix `\rs1://` is recognized by the e-Box as a destination string, and therefore removed. The remaining string is diverted to the respective place, in this case to the RS1 interface, i.e. to the scale/balance, which with the remaining "S CR LF" sends a weight value to the RS1 interface. This method can also be used to read in system settings for the e-Box, by preceding them with a prefix of `\sys://`.
2. The barcode reader is used to read in the respective scale/balance command with a fixed length of always 6 characters. For example: "S" + 3 blanks + CR LF = 6 characters. As well as this, the following settings must be made in the bar code interpreter:

Priority	If input starts with	and has length	then add in front
1		6	\rs1://

This has the effect that every bar code string read in which has a length of 6 characters is diverted to the RS1 interface i.e. to the scale/balance.

If data should be transmitted from the host computer to the RS232-2 interface, a destination `\rs2://` must be inserted before each message. However, it must be ensured that the complete message, including the destination string, is received in a single IP packet. If this is not the case, an IP packet without a destination string will be automatically passed on to the RS232-1.

5.1.4 Event Logging



Device Configuration

- Ethernet
- RS232-1
- RS232-2
- Event logger
- Identification
- Date + Time

Application

System Status

Info

Configuration - Event Logger

Log Server Configuration

Server enabled

Server port

Log Client Configuration

If the client is enabled, the interface will try to connect as a client to the logger host every n seconds.

Client enabled

Host IP address Port

Host retry time s

Event Filter

System	<input checked="" type="checkbox"/> Error	<input checked="" type="checkbox"/> Info	<input checked="" type="checkbox"/> Parameter	<input checked="" type="checkbox"/> HTTP
Input	<input checked="" type="checkbox"/> RS232-1	<input checked="" type="checkbox"/> RS232-2	<input checked="" type="checkbox"/> NET	
Output	<input checked="" type="checkbox"/> RS232-1	<input checked="" type="checkbox"/> RS232-2	<input checked="" type="checkbox"/> NET	

parameter change will only take effect after restart

* only valid after restart

The events, which are also listed in the events list, can be transmitted to an external host and stored there. For this to be possible, there must be a permanent connection to a host computer. Establishment of communication can take place from either side, i.e. the e-Box can be the server, the client, or both. How communication is established is described in Chapter 2.5.1, Communication Module, and is exactly the same as for establishing communication for data transmission.

The transmitted data contains the date, time, type of event, and message. For the correct date and time to be transmitted, the date and time must be newly set every time the e-Box is started (Device Configuration / Date + Time).

With the "Event Filter", those events can be selected which should be stored on the host: any other events are not transmitted. This makes it possible to store, for example, only errors, or changes to parameters.

5.1.5 Specify identification characteristics

Select the submenu point "**Device Configuration > Identification**":



The screenshot shows the 'Identification' configuration page in the Mettler Toledo web interface. The sidebar on the left lists various configuration options, with 'Identification' highlighted. The main content area contains five text input fields for entering identifying information, labeled 'Info 1 (e.g. Box Name)', 'Info 2 (e.g. Box Location)', 'Info 3', 'Info 4', and 'Info 5'. A 'Submit' button is located below the input fields.

On this page you can enter additional identifying information for the e-Box and/or for the end-device connected to it. The **maximum input length** for each field is **80 characters**.

The information fields are stored under the corresponding system parameters (BOX_Info1 ... BOX_Info5) and can, for example, be inquired from a host application.

These information items do not affect the communication behavior of the e-Box. Their purpose is simply to provide additional differentiation if several e-Box devices are used.

5.1.6 Date and Time

The screenshot shows the 'Configuration - Date, Time' web interface. On the left is a navigation menu with 'Date + Time' selected. The main content area has a heading 'Configuration - Date, Time' and a sub-heading 'Manual'. Below this, there are two rows of input fields: 'Date (dd.mm.yyyy)' with values 14, 10, and 2002, and 'Time' with values 17, 32, and 24. Each row has a 'Set' button. Below these is a section titled 'Computer date and time' with two buttons: 'Set date from computer' and 'Set time from computer'.

Use this page to set the date and time. You can either enter the data and time manually, or copy them from the computer on which your browser is running. The date and time will be shown in the "Event History" list.

5.2 Application settings

You use the application settings to specify the operating mode and communication characteristics of the respective e-Box to suit the higher-level application.

The e-Box software package EBO1-FWN provides **predefined sets of settings for FreeWeigh systems**, in which only very few application-specific settings have to be made. To configure the e-Box for one of these applications, refer now to the corresponding chapter/section:

- For **FreeWeigh.Net** ---> see Section **5.2.2**
- For **FreeWeigh9001** ---> see Section **5.2.3**

If you wish to configure the e-Box for an application of your own, continue now with the next section, **5.2.1 "Custom"**, where you will find **detailed information about the individual application parameters**.

5.2.1 Custom

Select the main menu point **"Application Settings"**. In the menu, select **"Custom"** and confirm your selection with **«Select»**. You can then specify all relevant application settings to suit your application.

METTLER TOLEDO

Device Configuration
Application
Application Settings
System Status
Info

Application Settings

Application settings for

Remote Host Communication

Server Configuration

Server enabled

Server port

Client Configuration

If the client is enabled, the interface will try to connect as a client to the remote host every <host retry time> seconds.

Client enabled

Host IP address Port

Host retry time s

Multiplexer Configuration

Multiplexer slaves must have a unique identification string, e. g. "1 ". This is the string that is added in front of all transferred data (strings). To replace the Mettler CL310 / MTC310 the trailing space must be defined.

Multiplexer ID

RS232 - Network Communication

RS232 Input to Network Output

Mode

End of line character (String mode)

Timeout (String mode) ms

Network output queue size messages

Prefix string

Network Input to RS232 Output

RS232 output queue size messages

© 2002, METTLER TOLEDO

Server configuration

The e-Box must be configured as a server if it is required to establish a connection to the e-Box from one or more external clients (e.g. a PC with an application program). Please note the following:

- Only the client that first establishes a connection receives any data back.
- Data transmission takes place asynchronously in the two directions, i.e. depending on the operating mode that has been set, the data is all transmitted either line-by-line or character-by-character, irrespective of the data transmission in the opposite direction.

Parameter	Description
Server enabled	Switches the internal server function on or off. With the server function switched on (factory setting), a port number must be specified (see next parameter) via which the internal server can be contacted.
Server port	Enter the port number of the built-in server. With the port number you specify the port via which an external client (e.g. a computer) can establish communication with the e-Box. Provided nothing else has been defined in the customer network, the internal port number 8000 (factory setting) can always be used. Normally, the server passes on all arriving data to the RS232 interface irrespective of the port number which has been selected.

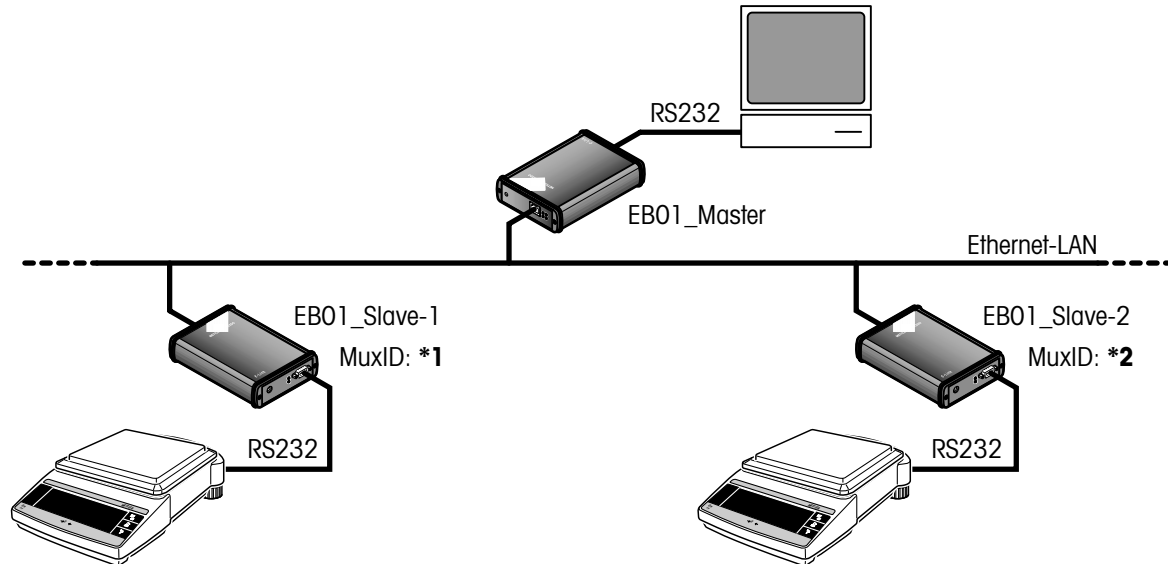
Client configuration

The e-Box must be configured as a client if it is required for the e-Box itself to establish a connection to a specified server (e.g. a host computer).

Parameter	Description
Client enabled	Switches the internal client function on or off. With the client function switched on, the IP address and port number of the host computer (server) must be specified via which a connection can be established. Specification is also required of the time interval at which the e-Box should attempt to establish a connection to the host computer, if none has been established yet.
Host IP address	Enter the IP address of the host computer (format XXX.XXX.XXX.XXX) or its domain name.
Host port	Enter the port number of the host computer. With the port number you specify the port via which the e-Box can establish contact with the host computer. Provided nothing else has been defined in the customer network, port number 8000 (factory setting) can always be used.
Host retry time	Enter the time interval for attempting to establish connection. "Host retry time" specifies the time interval at which the e-Box attempts to establish connection with the corresponding host server.

Multiplexer configuration

If an application is installed on the host computer which only supports communication via a serial interface and which cannot, or may not, be changed, **several e-Boxes can be used together with the Ethernet** to create a so-called RS232 multiplexer system.



One e-Box is used as a master and connected to the host computer via the RS232 interface. This e-Box is configured as a **server** and is **not given a multiplexer identification**.

The **remaining e-Boxes, to which measuring devices are connected, act as slaves**. These e-Boxes have their **client function activated**. The IP address of the master e-Box is input to each slave e-Box as the host IP address. Each e-Box also has assigned to it a **specific multiplexer identification (MuxID)**.

The specific MuxID is sent from each slave to the master after communication is established for the first time. The master maintains a table in which the IP addresses and MuxIDs of the slaves are entered.

Communication host application --> end-device: Every character string sent from the host application to an end-device must begin with the MuxID. The master e-Box uses the MuxID to search for the IP address entry in the table. The MuxID is then removed from the character string and the remaining character string is transmitted to the corresponding slave e-Box.

Communication end-device --> host application: If the master e-Box receives a character string from a terminal via the network, the MuxID is determined from the table by reference to the IP address of the transmitter and added to the front end of the character string. The augmented character string is then transmitted via the RS232 interface to the host application (PC).

Exception handling: If the table does not contain an entry for a searched-for MuxID (i.e. no slave e-Box with this MuxID has ever established contact) the character string is treated as a character string with no MuxID, i.e. it is sent to an existing connection which has no MuxID, if such a connection exists. If there is no such connection, the character string is rejected and a corresponding error is recorded in the event history.

Parameter	Description
Multiplexer ID	Enter the multiplexer identification (MuxID) for slave e-Boxes in multiplexer applications.

RS232 input to Network Output

Parameter	Description												
Operating mode *)	You use this setting to specify whether the data should be transmitted to the network as individual characters or as a string . A character string is delimited by the selected end-of-line character.												
End-of-line character	<p>You use this setting to specify the delimiting character (<LF>, <CR> or <ETX>) which should be used to mark the end of a string and transmit it. Please note the following:</p> <ul style="list-style-type: none"> – If the specified timeout time (timeout value > 0, see next parameter) expires before the end-of-line character (<LF>, <CR> or <ETX>) is read in, the characters which have been read in so far are transmitted without waiting for the end-of-line character. – If <none> *) is selected, so there is no end-of-line character, data transmission only starts when the maximum string length of 240 characters is reached. This setting can be used to transmit binary data including the ASCII <NUL> character. Important! If <none> is selected, a timeout value must be set which is >0, otherwise data packets with less than 240 characters will never be transmitted. 												
Timeout	<p>Specifies the time in ms after which a character string is transmitted even though there is no end-of-line character. This parameter only has meaning for operating mode String.</p> <p>Important! With a timeout value of 0, a character string is only transmitted when one of the end-of-line characters <LF>, <CR>, or <ETX> is read, or the maximum string length is reached.</p>												
Network output queue size	You use Network Output Queue Size to specify how many messages (individual characters or character strings) should be saved in the network output queue of the e-Box if there is no Ethernet connection, or if transmission is not possible. The network output queue is located before the transmitter of the Ethernet interface.												
Prefix string	<p>You use "Prefix String" to mark character strings transmitted by the connected terminal. This enables a receiving PC application to recognize the origin of an item of information. The prefix string is always added in front of the information to be transmitted.</p> <p>Example:</p> <table style="margin-left: 40px;"> <tr> <td>e-Box A</td> <td>Prefix string:</td> <td>#Ø1</td> </tr> <tr> <td></td> <td>Information:</td> <td>hello world</td> </tr> <tr> <td>e-Box B</td> <td>Prefix string:</td> <td>#Ø2</td> </tr> <tr> <td></td> <td>Information:</td> <td>hello world</td> </tr> </table> <p>The completed character strings form "#Ø1hello world" and "#Ø2hello world" which a receiver can uniquely identify to a device (e-Box or terminal).</p>	e-Box A	Prefix string:	#Ø1		Information:	hello world	e-Box B	Prefix string:	#Ø2		Information:	hello world
e-Box A	Prefix string:	#Ø1											
	Information:	hello world											
e-Box B	Prefix string:	#Ø2											
	Information:	hello world											

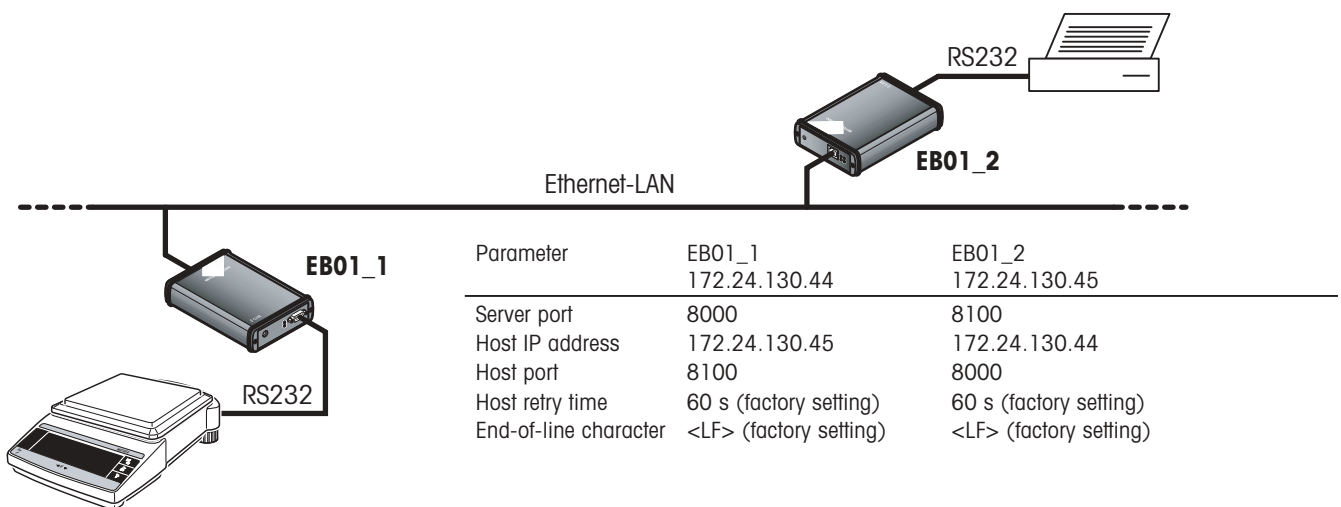
*) **Important!** In operating mode **"Character"** or **"String" with end-of-line character <none>**, the **command interpreter is deactivated** and the e-Box cannot process any more system commands (**sys://...**) which arrive via the serial or Ethernet interface. In this case, the e-Box can only be addressed and configured from the browser.

Network input to RS232 Output

Parameter	Description
RS232 output queue size	You use RS232 Output Queue Size to specify how many messages (individual characters or character strings) will be stored in the RS232 output queue of the e-Box if the interface is blocked by the handshake. The RS232 output queue is located before the transmitter of the RS232 interface.

Examples of customer-specific applications

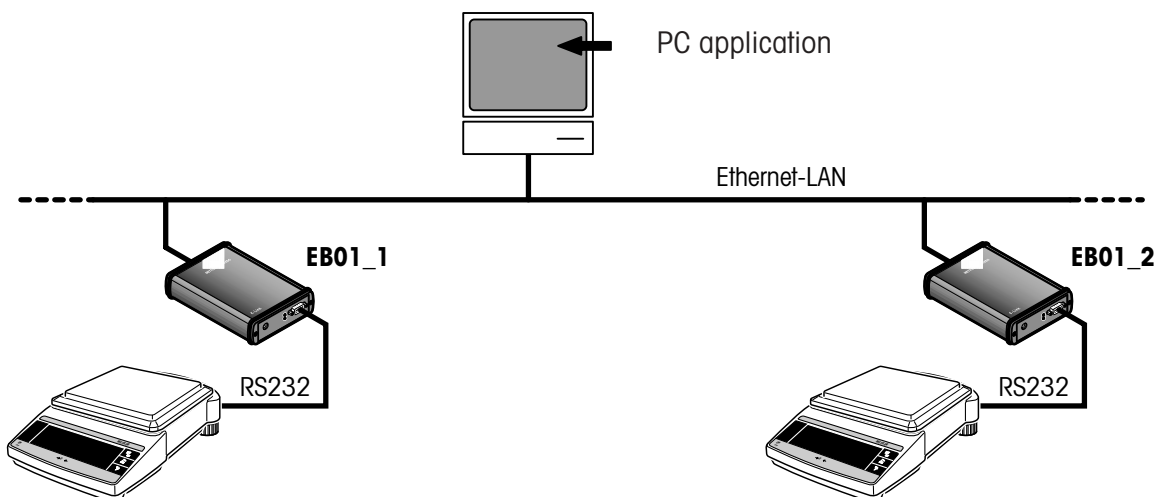
– RS232 extension



Two e-Boxes can be used to create an RS232 cable extension over the Ethernet (see illustration above). When this is done, the two connected serial terminals are permanently connected to each other. With the exception of the host IP address (**IP address** or domain name of the other e-Box) and the host port number (**server port number** of the other e-Box), the application settings for the two e-Boxes are identical.

In this application the two e-Boxes are configured as both server and client, i.e. both sides always attempt to establish a connection and can therefore be switched off and on again without problem.

– Host Application with / without networking capability



Any PC application with networking capability can communicate via the e-Box with the measuring instrument connected to it.

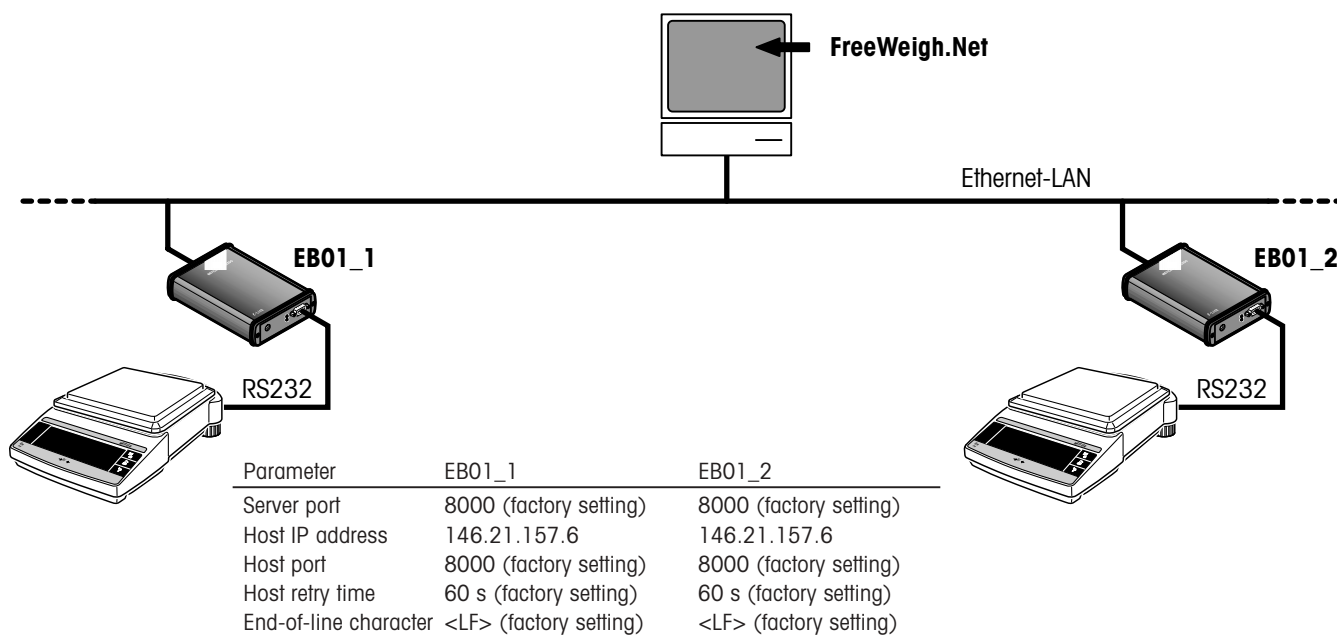
If the PC application does not support direct establishment of a connection to the e-Box via the Ethernet, a virtual COM port driver can be installed on the PC. The virtual COM port driver can be used to create several "virtual" COM ports to which an IP address can be assigned. The COM ports configured in this manner can be used by the PC application to establish contact with the respective e-Box via the Ethernet LAN.

Note: COM port drivers are offered by various manufacturers and some of them are available as freeware. Software tools are also available on our website at <http://www.mt.com/mlink>.

5.2.2 FreeWeigh.Net


FreeWeigh.Net is a METTLER TOLEDO software solution for the statistical quality control (SQC) area which provides methods for analyzing and controlling process deviations. It is operated as a host application which can communicate directly with the measuring instrument via an Ethernet network. For use with FreeWeigh.Net, all e-Box devices must be configured both as a server and as a client.

Example: FreeWeigh.Net with IP address 146.21.157.6, server port 8000, and host port 8000



FreeWeigh.Net has a predefined set of settings in which only a small number of application-specific parameters must be entered or can be changed.

Select the main menu point **"Application Settings"**. In the menu, select **"FreeWeigh.Net"** and confirm your selection with **«Select»**.



Application Settings

Application settings for FreeWeigh.Net Select

Remote Host Communication

Server Configuration

Server enabled ⚠ On

Server port ⚠

Client Configuration

If the client is enabled, the interface will try to connect as a client to the remote host every <host retry time> seconds.

Client enabled On

Host IP address Port

Host retry time s

Multiplexer Configuration

Multiplexer slaves must have a unique identification string, e. g. "1 ". This is the string that is added in front of all transferred data (strings). To replace the Mettler CL310 / MTC310 the trailing space must be defined.

Multiplexer ID ⚠

RS232 - Network Communication

RS232 Input to Network Output

Mode String

End of line character (String mode)

Timeout (String mode) 0 ms

Network output queue size ⚠ 10 messages

Prefix string

Network Input to RS232 Output

RS232 output queue size ⚠ 10 messages

Submit
Submit & Restart

Device Configuration
Application
Application Settings
System Status
Info

When using the "FreeWeigh.Net" set of settings you need only enter the **IP address of the host computer** on which the FreeWeigh.Net application runs. All other settable parameters in this set can normally be used with the factory settings. The following parameters can be changed:

Parameter	Description
Server port	Port number of the server defined in FreeWeigh.Net as the default host port (factory setting 8000)
Host IP address	IP address of the host computer (format XXX.XXX.XXX.XXX) or its domain name
Host port	Port number of the host computer (factory setting 8000)
Host retry time	Time interval for establishing connection (factory setting 60 s)
End-of-line character	The character used by the terminal to indicate the end of a character string (factory setting <LF>)

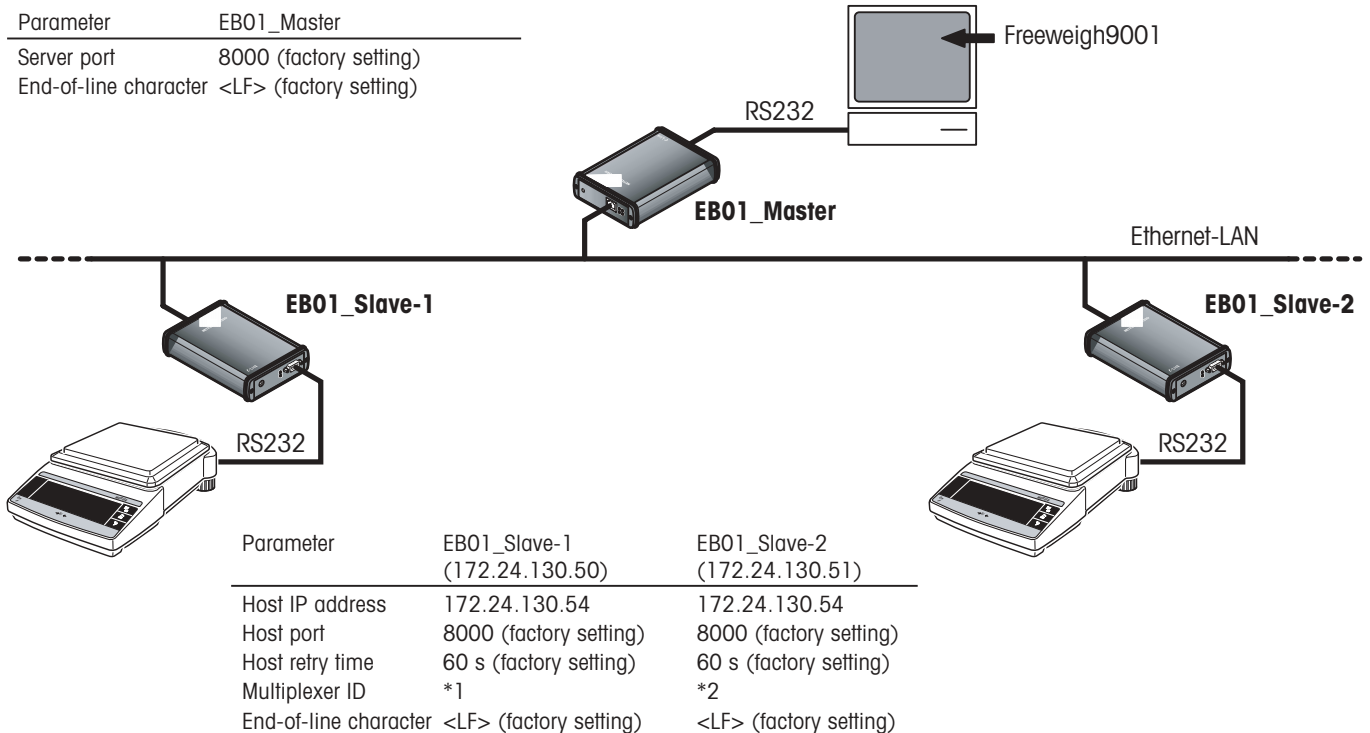
If the factory settings are used and the correct IP address for the host computer is entered, the following procedure will take place:

- The measuring instrument connected to the e-Box will be configured by FreeWeigh.Net over the Ethernet.
- When FreeWeigh.Net starts it establishes communication with all e-Boxes.
- If an e-Box is switched on after FreeWeigh.Net (e.g. after a restart or power outage), it initiates communication with the specified host computer. FreeWeigh.Net then initializes communication with the e-Box in question and closes down the communication that was initialized by the e-Box.
- FreeWeigh.Net holds the communication permanently open.
- The measuring instrument can transmit data to FreeWeigh.Net via the e-Box without being prompted.

5.2.3 Freeweigh9001

Freeweigh9001 is designed for operation with an RS232 Multiplexer system (MT ComBus) and, in contrast to FreeWeigh.Net, does not support direct addressing of measuring instruments in an Ethernet network. Correspondingly, FreeWeigh9001 has a built-in addressing system (*-addresses) and the nodes which were formerly used have taken on the task of routing i.e. have become a multiplexer.

Example: EB01_Master with IP address 172.24.130.54 and two slaves with IP addresses 172.24.130.50 and 172.24.130.51 respectively



By using several e-Boxes functioning as network nodes it is possible to construct a multiplexer system on an Ethernet network. When this is done, the e-Box which communicates with the host computer via the serial interface is operated as the master. All other e-Boxes which are connected upline of the end-devices function as so-called slaves.

– Master functions

The master e-Box maintains a table of the currently logged-on (connected) network nodes and their addresses, so that bidirectional addressing between the host application and the e-Box (and end-device) is guaranteed. The master e-Box is configured as a server.

– Slave functions

Each slave e-Box possesses an identification characteristic (multiplexer identification, or MuxID) which it communicates to the master e-Box when it initiates communication with it. The slave e-Boxes are configured as clients.

For the Freeweigh9001 master configuration and the Freeweigh9001 slave configuration there are predefined sets of settings in which only a small number of parameters must be entered or can be changed.

Freeweigh9001 – master configuration

Select the main menu point **"Application Settings"**. In the menu select **"Freeweigh9001 Master"** and confirm your selection with **«Select»**.

The screenshot shows the 'Application Settings' screen for the 'Freeweigh9001 Master' application. The interface is divided into several sections for configuring communication parameters.

Application Settings
Application settings for: FreeWeigh9001 Master Select

Remote Host Communication

Server Configuration

Server enabled	On
Server port	<input type="text" value="8000"/>

Client Configuration

If the client is enabled, the interface will try to connect as a client to the remote host every <host retry time> seconds.

Client enabled	Off
Host IP address	Port 8000
Host retry time	60 s

Multiplexer Configuration

Multiplexer slaves must have a unique identification string, e. g. **1 ". This is the string that is added in front of all transferred data (strings). To replace the Mettler CL310 / MTC310 the trailing space must be defined.

Multiplexer ID

RS232 - Network Communication

RS232 Input to Network Output

Mode	String
End of line character (String mode)	<input type="text" value="LF"/>
Timeout (String mode)	0 ms
Network output queue size	10 messages
Prefix string	

Network Input to RS232 Output

RS232 output queue size	10 messages
-------------------------	-------------

Submit Submit & Restart

When the master e-Box is configured with the "Freeweigh9001 Master" set of settings, all settable parameters can be accepted with the factory settings. The following parameters of the set of settings can be changed:

Parameter	Description
Server port	Port number of the built-in server (factory setting 8000)
End-of-line character	The character used by the end-device to indicate the end of a character string (factory setting <LF>)

If the factory settings are used, the following procedure will take place:

- After being plugged in (and after a restart or power outage) the master e-Box waits for the slave e-Box to contact it.
- As soon as a slave e-Box contacts it, the master e-Box makes an entry in the internal table with the MuxID of the slave.
- FreeWeigh9001 can then use the information from the master e-Box to initiate communication with the respective slave e-Box.
- The measuring instrument can transmit data unprompted to FreeWeigh9001 (and vice versa) via the multiplexer system comprising the slave e-Box and master e-Box.

Freeweigh9001 – slave configuration

Select the main menu point "**Application Settings**". In the menu, select "**Freeweigh9001 Slave**" and confirm your selection with "**Select**".

The screenshot shows the 'Application Settings' page for a 'FreeWeigh9001 Slave'. The interface is divided into several sections for configuring communication parameters.

Application Settings
Application settings for: FreeWeigh9001 Slave Select

Remote Host Communication

Server Configuration

Server enabled	Off
Server port	8000

Client Configuration

If the client is enabled, the interface will try to connect as a client to the remote host every <host retry time> seconds.

Client enabled	On	
Host IP address	<input type="text" value="146.21.157.1"/>	Port <input type="text" value="8000"/>
Host retry time	<input type="text" value="60"/> s	

Multiplexer Configuration

Multiplexer slaves must have a unique identification string, e. g. "1 ". This is the string that is added in front of all transferred data (strings). To replace the Mettler CL310 / MTC310 the trailing space must be defined.

Multiplexer ID	<input type="text" value="1"/>
----------------	--------------------------------

RS232 - Network Communication

RS232 Input to Network Output

Mode	String
End of line character (String mode)	<input type="text" value="LF"/>
Timeout (String mode)	0 ms
Network output queue size	10 messages
Prefix string	

Network Input to RS232 Output

RS232 output queue size	10 messages
-------------------------	-------------

When you configure the slave e-Box with the "Freeweigh9001 Slave" set of settings, you need only enter the **IP address of the master e-Box and the multiplexer identification**. All other settable parameters in this set can normally be accepted with the factory settings. The following parameters can be changed:

Parameter	Description
Host IP address	IP address of the master e-Box (format XXX.XXX.XXX.XXX) or its domain name
Host port	Port number of the master e-Box (factory setting 8000)
Host retry time	Time interval for initializing communication (factory setting 60 s)
Multiplexer ID	The specific multiplexer identification The multiplexer identification must be unambiguous, i.e. a MuxID may not form the start of another MuxID (e.g. *1 and *12 does not function!)
End-of-line character	The character used by the end-device to indicate the end of a character string (factory setting <LF>).

If the factory settings are used, and the correct IP address for the master e-Box and the correct multiplexer identification are entered, the following procedure will take place:

- The measuring instrument connected to the e-Box must be configured in FreeWeigh9001 as an MT ComBus device.
- At power-up (also when restarting, or after a power outage) the slave e-Box initiates communication with the specified master e-Box.
- The slave e-Box sends its MuxID to the master e-Box.
- Data transmission can take place unprompted from the measuring instrument via the multiplexer system (comprising slave e-Box and master e-Box) to FreeWeigh9001 (and vice versa).

5.3 Integration of the e-Box into the network

When the device and application settings have been completed, and after restarting, the e-Box can be integrated into the company network according to the network overview which was prepared.

The wall brackets included in the delivery can be used to mount the e-Box on a wall. For instructions how to mount the wall brackets, please refer to the installation instructions enclosed with the brackets.

6 System status

The functions described in this chapter serve to aid the installation process and assist in locating faults.

Note! Permanently displaying the "Activity Overview" and "Event History" pages can reduce the data throughput through the e-Box. For this reason, only use these two functions as aids during installation or when searching for faults.

6.1 Activity Overview

Select the submenu item "**System Status > Activity Overview**".

Activity Overview		
RS232-1		
Input Buffer		
Input	01.01.2002 06:37:14.950	M03_A CB LF
Output	01.01.2002 06:37:14.900	CB LF
RS232-2		
Input Buffer		
Input	01.01.2002 00:00:00.010	
Output	01.01.2002 00:00:01.270	CB LF
NET		
Input	01.01.2002 06:37:14.900	CB LF
Output	01.01.2002 06:37:14.950	M03_A CB LF
Client	01.01.2002 00:00:00.020	
Server	14.10.2002 18:02:30.540	Client 172.24.119.59 disconnected
Connections		
MuxId	IP-Address	Type

The "Activity Overview" page displays an overview of the most recent events on the two interfaces (RS232 and Ethernet). The Activity Overview is updated at the same time interval as specified with the "Refresh time" parameter under "Event History Settings". The individual tables show:

RS1

Input buffer: The content of the message is shown before it is transmitted

Input: The last message received over the RS232 interface

Output: The last message transmitted over the RS232 interface

The overview for the RS232-2 interface (EB02 only) is presented in the same format.

NET

Input: The last message received over the Ethernet interface

Output: The last message transmitted over the Ethernet interface

Client: The last activity of the client

Server: The last activity of the server

Connections

List of all existing connections with the following information for each connection: MuxID (in multiplexer operation only), IP address of the other network subscriber, IP port number of the other network subscriber, and type of connection (client or server).

Note: If the e-Box is configured as a multiplexer master, multiple connections can be listed. For each connection listed, the corresponding MuxID is also shown.

6.2 Settings for the Event History

Select the submenu item "**System Status > Event History Settings**".

You use this page to specify which events should be listed in the Event History (see next paragraph). The maximum number of events to be stored, the desired number of events to be displayed, and the updating interval for the Event History can also be specified here.

Event Filter

You use the "Event Filter" to specify which events should be listed in the Event History. This allows you to adapt the appearance of the Event History to your needs (e.g. only show error messages). These settings have no effect on the recordings themselves, because all events are always recorded irrespective of the filter settings. The following types of event can be selected:

Event Type	Description
System flags Error Info Parameter	List error messages List system information List changes in parameters
Input flags RS232 NET	List character strings which arrive via the RS232 interface List character strings which arrive via the Ethernet interface
Output flags RS232 NET	List character strings which leave via the RS232 interface List character strings which leave via the Ethernet interface

Sampling

The "Sampling" settings can be used to adapt the Event History even further. The following parameters are available:

Sampling Parameter	Description
Samples total	Specifies the maximum number of events stored
Samples listed	Specifies the number of lines shown in the event history
Refresh time	Specifies the number of seconds after which the page with the most recent events should be refreshed. Note: The "Refresh time" also applies for refreshing the activity overview.

Note! The greater the number of lines specified for display in the Event History (Samples listed) the more the data throughput through the e-Box is reduced. On the other hand, the number of items of information stored does not affect the data throughput.

6.3 Event History

Select the submenu item "**System Status > Event History**".



The screenshot shows the 'Event history' window. On the left is a navigation menu with the following items: METTLER TOLEDO logo, Device Configuration, Application, System Status (selected), Activity Overview, Event History Settings, Event History, System Parameter, Terminal Settings, Terminal, and Info. The main area displays a table with three columns: Time, Action, and Message.

Time	Action	Message
11.10.2002 09:59:16.560	PARAM-queue -> PARAM	RS1_Handshake = "No"
11.10.2002 09:59:16.550	PARAM-queue -> PARAM	RS1_Stopbit = "1"
11.10.2002 09:59:16.530	PARAM-queue -> PARAM	RS1_Databit = "8"
11.10.2002 09:59:16.520	PARAM-queue -> PARAM	RS1_Parity = "No"
11.10.2002 09:59:16.500	PARAM-queue -> PARAM	RS1_Baud = "9600"
11.10.2002 09:58:42.230	RS1 -> HTTP-queue	TI D 50.0996 g <u>CR LF</u>
11.10.2002 09:58:42.160	RS1-queue -> RS1	TI <u>LF</u>
11.10.2002 09:58:36.230	RS1 -> HTTP-queue	S D 50.0995 g <u>CR LF</u>
11.10.2002 09:58:36.140	RS1-queue -> RS1	SI <u>LF</u>
11.10.2002 00:01:45.140	.. INFO	Time set to 09:58:14
01.01.2002 00:01:44.200	.. INFO	Date set to 11.10.2002
01.01.2002 00:00:01.390	RS1 -> NET-queue	ES <u>CR LF</u>
01.01.2002 00:00:01.360	RS2-queue -> RS2	<u>CR LF</u>

The Event History lists the most recent events. Only those events are listed which have been specified with the event filter (see Section 6.2).

Note: Non-displayable characters (less than ASCII 32 and greater than ASCII 127) are shown in hexadecimal and underscored.

Time Elapsed time in hours, minutes, and seconds since the e-Box was switched on (plugged in).

Action Occurrence of an event. The following events (actions) are defined:

Event Type	Event	Description
PARAM	PARAM-queue → PARAM	System parameter was set/changed
INFO	NET-server INFO	Connection info of the internal server
INFO	NET-client INFO	Connection info of the internal client
INPUT/OUTPUT	NET-queue → NET	Data transmission from the NET queue to the Ethernet
INPUT/OUTPUT	NET → RS1-queue	Data transmission from Ethernet to RS1 queue
INPUT/OUTPUT	RS1 → NET-queue	Data transmission from RS1 into the NET queue
INPUT/OUTPUT	RS1-queue → RS1	Data transmission from the RS1 queue to RS1
INPUT/OUTPUT	MUX-queue → MUX	A multiplexer ID was set
ERROR	PARAM error	Incorrect parameter setting
ERROR	NET error	Fault on the network
ERROR	Dispatcher: net:// - Queue full, message deleted	Net queue full, message was deleted

Message Event message

6.4 System Parameters List

Select the submenu item "**System Status > System Parameters**".

System parameter

e-Link

Network

NET_IpAddress	172.24.113.4
NET_SubnetMask	255.255.248.0
NET_DefaultGateway	172.24.112.1
NET_DNS	172.24.112.20

RS232-1 Settings

RS1_Baud	9600
RS1_Parity	No
RS1_Databit	8
RS1_Stopbit	10 *
RS1_Handshake	No
RS1_Client	Off
RS1_HostIpAddress	
RS1_HostPort	8000
RS1_HostRetryTime	5
RS1_Server	On
RS1_ServerPort	8000
RS1_MuxID	
RS1_Mode	String
RS1_EolChar	LF
RS1_Timeout	0
RS1_NetQueueSize	10
RS1_Prefix	
RS1_RSQueueSize	10

© 2002, METTLER TOLEDO

The System Parameters List shows the current settings of all system parameters.

Note: Values marked with an asterisk were changed, but are not yet active. To activate them a restart is necessary (unplug the e-Box and plug it in again).

A complete list of system parameters and their possible settings is contained in Section 10.2.

6.5 Terminal Settings

Function Key	Caption	Command
F1:	Calibrate	C1
F2:	Tare immediate	TI
F3:	Send immediate	SI
F4:	Open door	WS 1
F5:	Close door	WS 0

Submit

In the **Terminal Settings** form, each of the 5 function keys can have assigned to it a specific function such as, for example, zero setting, adjustment, etc. To assign a function, the description of the function must be entered under "Caption", and the corresponding command for the instrument must be entered under "Command". When the command is executed, a CR and LF are automatically added to the command and transmitted with it.

On an e-Box of type EB02, this form can also be used to select the interface, i.e. RS232-1 or RS232-2.

When the "Submit" key is pressed, the entries made in the form are stored in the e-Box.

6.6 Terminal

The screenshot displays a terminal window titled "Terminal". It is divided into two main sections. The top section, "RS232-1 input / output (last input on top)", shows a list of data entries: "I2 A \"AX204 Standard 220.0090 g\" CR LF", "I2 LF", "S D 0.0002 g CR LF", "SI LF", "WS A CR LF", "WS 1 LF", "WS A CR LF", "WS 0 LF", and "S D 0.0002 g CR LF". The bottom section, "Terminal command output to RS232-1", features a text input field containing "I2" and a "Send" button. Below these are five function buttons: "Calibrate", "Tare immediate", "Send immediate", "Open door", and "Close door".

The terminal can already be used in the installation phase to test the connection to an instrument connected to it, even if there is still no connection to an application.

Note: This only functions if the e-Box has not yet established communication with an application or another e-Box (master). This has been deliberately made impossible, so that no incorrect data can be transmitted to a running application.

A command can be typed into the input line, and then transmitted to the connected instrument by pressing the "Send" key. The command (green), and the corresponding response from the device (blue), appear in the terminal input/output display, with the most recently transmitted data at the top. Predefined commands can be executed with the five function keys.

7 Additional information

7.1 Installation Instruction Short

Select the submenu item "**Info > Quick Installation Guide**". The Quick Installation Guide for the e-Box is displayed, which you can print out using the browser if you wish to.

The screenshot shows a web browser window displaying the "Quick Installation Guide" for the e-Box. The page is divided into a sidebar on the left and a main content area on the right. The sidebar contains the METTLER TOLEDO logo and a menu with the following items: Device Configuration, Application, System Status, Info, Quick Installation Guide, Software Revision, and e-Link Homepage. The main content area is titled "Quick Installation Guide" and contains four sections: A. Powering the e-Box, B. Setting the IP-Address via RS232, C. Connecting to the LAN, and D. Device Configuration via HTTP-Server. Each section contains a list of numbered steps.

Quick Installation Guide

A. Powering the e-Box

- The e-Box has no power switch.
- Connecting the AC adapter is the only way to power the e-Box device.
- The e-Box is ready for communication access as soon as the red status LED has finished blinking and is off.

B. Setting the IP-Address via RS232

1. Connect the e-Box to your computer using the included RS232-Link-Cable
2. Use the supplied AC adapter to power the e-Box
3. Open any terminal program and select the COM-Port where you connected the e-Box
4. Set the terminal program COM-Port parameters to 9600 baud, 8 bit, no parity, no handshake
5. Verify that <CR> on the command line will be sent as <CR/LF>
6. Enter new IP-Address: `xyz: //ip=xxx.xxx.xxx.xxx` (ask network administrator)
7. Enter new Subnet-Address: `xyz: //sn=xxx.xxx.xxx.xxx` (ask network administrator)
8. Enter Domain Name Server: `xyz: //dns=xxx.xxx.xxx.xxx` (this step is optional)
9. Enter Default Gateway: `xyz: //dgr=xxx.xxx.xxx.xxx` (this step is optional)
10. Disconnect the AC adapter from the e-Box

C. Connecting to the LAN

11. Connect the e-Box to the LAN using a standard Network-Patch-Cable Cat.5
12. Power the e-Box to activate the new IP-Address settings
13. Start your browser and enter the IP-Address of your e-Box to get access to the e-Box HTTP-Server
14. When asked for a username and password enter "ADMIN" and "tw9". These are the factory settings.

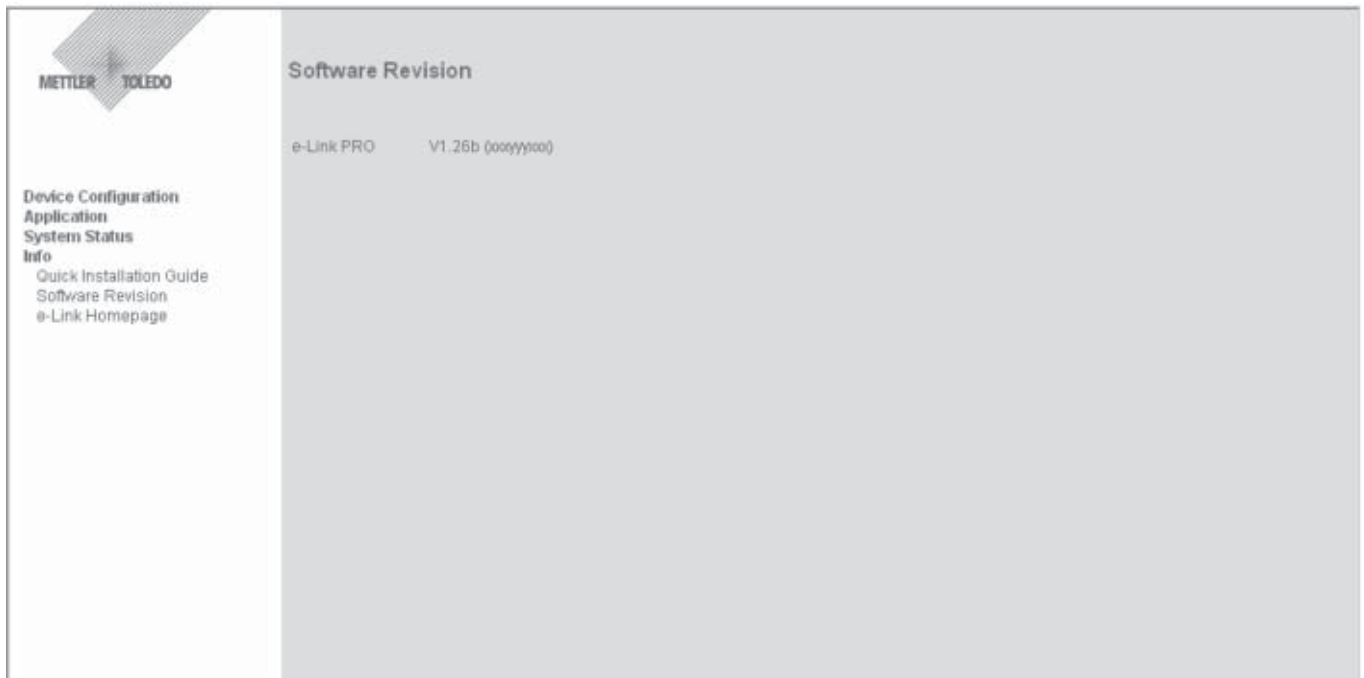
D. Device Configuration via HTTP-Server

15. Click on Device Configuration
16. Click on Ethernet, RS232 or Info to complete or adjust your settings
17. Choose one of the available presets or make individual entries
18. Be sure to "Submit" your changes before leaving the HTML page

© 2002, METTLER TOLEDO

7.2 Inquire software version

To inquire the software version of your e-Box, select the submenu item **"Info > Software Revision"**.



7.3 Establish communication with the e-Link website

METTLER TOLEDO has set up a special website for the e-Link products where you can obtain information about available software packages and download software updates and tools for the e-Box.

Note: You will find information about updating the software of the e-Box in Chapter 8.

Under **"Info > Mettler Toledo"** there is a link which can be used to call up the website **"<http://www.mt.com/elink>"** directly. To do this, however, there must be a connection to the Internet and the browser must be configured accordingly.

8 Updating the software

When a new version of the e-Box software becomes available it can be downloaded as a software package together with the "FTP Download Program" from our website at <http://www.mt.com/mlink>. (For instructions how to call up the website, see section 7.3). After the download, the software update itself is performed over the network using the "FTP Download Program". During the updating operation only the so-called "flash memory" of the e-Box is overwritten, whereas the system settings stored in the EAROM are retained and do not have to be reentered after the software has been updated.

Downloading the software update from the website

1. Note the serial number of the respective e-Box.
2. Call up website <http://www.mt.com/mlink> to obtain information about available software packages.
3. Select the desired software package and follow the instructions. If there are no specific instructions for the software package, download the corresponding file from the website onto your computer and save it in a separate directory (folder) (e.g. "C:\Program files\METTLER TOLEDO").

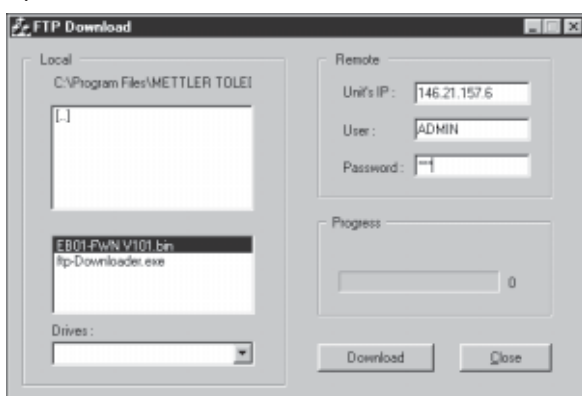
Note: If it is not possible to perform the software update from the computer onto which the file is downloaded, after downloading the file it must be transferred to the computer which has network access to the respective e-Box.

Performing the software update

Before starting the software update, the "FTP Download Program" and the software file must both be in the same directory on the computer which has network access to the respective e-Box.

Note! During the updating operation, the power supply and network connection to the e-Box must under no circumstances be interrupted, otherwise the e-Box will become unusable. If this happens, contact your METTLER TOLEDO service center.

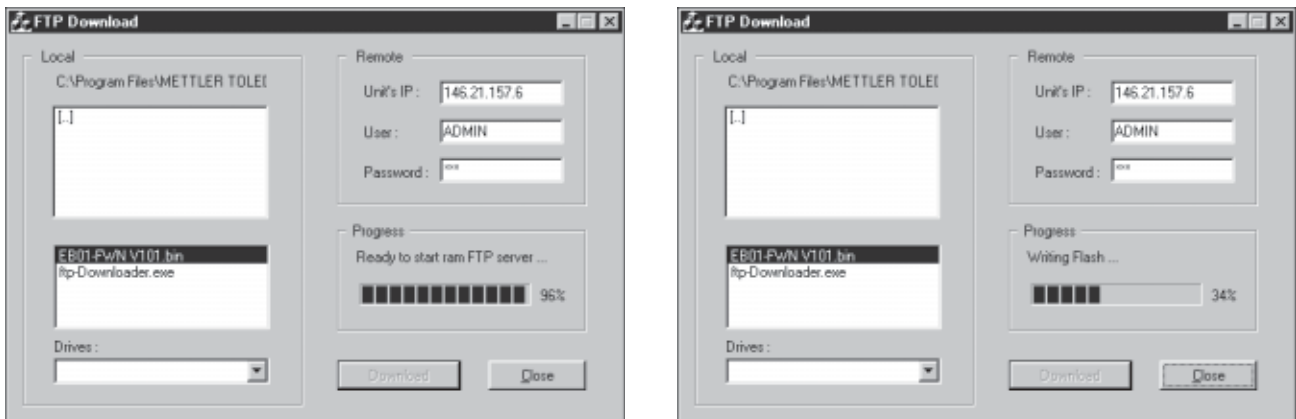
1. On the computer, start the "FTP Download Program".
2. Click on the software file (in the example, "EB01-FwN V101.bin"), if it has not already been selected.
3. Enter the IP address of the respective e-Box, followed by the specified **user name** and **password**. If no user name and/or password has been specified, enter the **user name "ADMIN"** and the **password "fw9"**, and confirm the input with "OK". Then click on the "Download" button.



Note: If the message "Cannot connect to server" appears, it means that no communication could be established with the e-Box. If this happens, refer to the instructions in Chapter 9 "Correcting faults".



The downloading process first starts the FTP server in the RAM, after which the software is written into the flash memory.



When the download process is complete, the message "Download Completed" appears.



4. Confirm this message. The e-Box then automatically performs a restart.

9 What do I do if ... ?

In the table below you will find a list of faults which may possibly occur while setting up, configuring, or operating the e-Box, as well as hints for isolating the cause of the fault.

Possible faults during installation and setup

Fault	Checks / Procedures / Remedies
After plugging in the e-Box, the red LED flashes or stays on	<p>Check whether the red reset button is jammed.</p> <p>Repeat the power-up procedure (unplug the e-Box and plug it in again).</p> <p>Note exactly how the red status LED flashes and contact your METTLER TOLEDO dealer.</p>
Communication is not possible between the PC and the e-Box via the RS232	<p>Is the e-Box plugged in and is the green power LED on?</p> <p>Is the e-Box ready for operation (red status LED off)?</p> <p>Is the serial PC-PC cable delivered with the e-Box being used?</p> <p>Is the cable correctly/firmly plugged into the PC and e-Box sockets?</p> <p>Is the e-Box connected to the correct COM port of the PC?</p> <p>Do the communication parameters of the terminal program match those of the e-Box?</p> <p>Are commands from the terminal program transmitted with CR/LF?</p> <p>Repeat power-up procedure (unplug the e-Box and plug it in again).</p>
Communication via the RS232 is faulty (unreadable/incorrect characters)	<p>Is the e-Box ready for operation (red status LED off)?</p> <p>Check the communication parameters in the terminal program.</p>
The network parameters have been set but the e-Box cannot be addressed via the LAN	<p>Is the e-Box plugged in and is the green power LED on?</p> <p>Is the e-Box ready for operation (red status LED off)?</p> <p>Is the e-Box correctly connected to the Ethernet network (green link LED on)?</p> <p>Have the network parameters been activated by a restart or by unplugging the e-Box and plugging it in again?</p> <p>Is the PC from which the inquiry is being made on the same subnet as the e-Box?</p> <p>If not, has a gateway address been specified?</p> <p>Has a free IP address been set which is valid in the LAN?</p> <p>If domain names are being used, is the respective domain name linked to the IP address set in the e-Box?</p>

Possible faults during operation

Fault	Checks / Procedures / Remedies
The e-Box (general case) can suddenly no longer be addressed and/or communication from the application to the end-device is no longer possible	<p>Is the e-Box plugged in and is the green power LED on?</p> <p>Is the e-Box ready for operation (red status LED off)?</p> <p>Is the e-Box correctly connected to the Ethernet network (green link LED on)?</p> <p>Has the e-Box been connected to a new/different subnet? If so, have the network settings been adjusted?</p> <p>Has the e-Box been replaced and if so, are the network parameters of the new e-Box the same as for the previous one?</p> <p>Has the network structure been changed?</p>
In a system with MuxID, communication is no longer possible between the host and the end-device	<p>Has a unique MuxID been entered?</p> <p>Repeat the power-up procedure (unplug the e-Box and plug it in again). The e-Box will log on to the master again.</p> <p>Has the IP address of the respective master e-Box been entered in the slave e-Box?</p>
One or more slave e-Boxes cannot log on to the master e-Box	<p>Can the master e-Box initiate communication with the slave e-Box? If not, see above: "The e-Box can suddenly no longer be addressed and/or communication from the application to the end-device is no longer possible".</p> <p>Are the slave e-Boxes correctly configured? Has the IP address of the master e-Box been entered in the "Host IP address" field of the slave e-Boxes?</p>
Serial communication from the PC to the master e-Box is faulty	<p>See above: "Communication is not possible between the PC and the e-Box via the RS232".</p>

Possible faults while updating software

Fault	Checks / Procedures / Remedies
The FTP download tool does not load the selected software over the LAN and into the e-Box – the tool never starts the download (error message "Cannot connect to server")	<p>Is the e-Box plugged in and is the green power LED on?</p> <p>Is the e-Box ready for operation (red status LED on)?</p> <p>Is the e-Box correctly connected to the Ethernet network (green link LED on)?</p> <p>Has the e-Box been connected to a new/different subnet? If so, have the network settings been adjusted?</p> <p>Has the e-Box been replaced and if so, are the network parameters of the new e-Box the same as for the previous one?</p> <p>Has the network structure been changed?</p> <p>Can the e-Box be addressed with Ping?</p> <p>Have the correct user name "ADMIN" and correct password "fw9" been entered?</p>

10 Appendix

10.1 Technical data

	e-Link PRO EB01	e-Link PRO EB02	e-Link IP EB01
Preset instruments			
Balances	AB-S, AG, AL, AM, AT, AX, CB, CG, GB, GG, MT, MX, PB, PB-S, PG, PG-S, PL, PL-S, PM, PR, SB, SG, SR, UMT, UMX		
Moisture analyzer	HB43, HG53, HR73		
Analytical instruments	DE4x, DE5x, DL3x, DL5x, DL7x, RE2x, RE4x, RE5x		
Industrial terminals and scales	ID1, ID2, ID3, ID5, ID7, ID10, Garvens, Spider, Viper		
Possible applications	<ul style="list-style-type: none"> – Compatible with FreeWeigh.Net / FreeWeigh9001 software – Replacement or system extension for MT Combus network nodes – Compatible with LabX Professional / LabX Multi software – Data management with networkable or serial application – Serial cable extension via Ethernet (Box-to-Box) – Configurable multiplexer modus 		
Software characteristics	<ul style="list-style-type: none"> – Webserver for easy installation – Client and/or server configuration (automatic initiation of communication) – Transmission selectably by character or by line (binary, text) – Integrated test and diagnostic functions – Extended password protection – e-Link software upgrade via Ethernet 		
Ethernet Interface	Connection and speed: RJ45, 10/100 Mbit/s		
	Protocols: TCP/IP, FTP, HTTP		
RS232C Interface	Connection: D-Sub9, male		
	Baud rate: 150...115200 baud		
	Handshake: XON/XOFF, RTS/CTS, none		
Miscellaneous data and accessories			
Temperature range / EMC	5° - 40°C / 10 volts/m		
Housing/ dimensions (mm)	Alu / 160x110x35		IP65/ Alu / 215x117x80
Power supply	External		Internal
Overvoltage category	II		
Pollution degree	2		
Part number	11120001	–	11120003
With second RS232 for barcode reader	–	11120005	–
Installation cable: RS232-9P f/f crossover	11600394		
Cable to instrument: RS232-9P f/m	11101051		
RJ45 cable, category 5UTP – 3m / 5m	11600395 / 11600396		
Serial-to-IP-driver software	Available		

10.2 System parameters

Parameter	Parameter name	Factory setting	Setting range
Ethernet			
IP address	IP	192.168.0.1	IP address format check
Subnet mask	SN	255.255.255.0	IP address format check
Default gateway	DGW	<empty>	IP address format check
Domain name server	DNS	<empty>	IP address format check
RS232			
Baud rate	RS1_Baud	9600	150, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200
Parity	RS1_Parity	No	No, Even, or Odd
Number of data bits	RS1_Databit	8	7 or 8
Number of stop bits	RS1_Stopbit	1	1 or 2
Handshake	RS1_Handshake	No	No, Hardware, or Xon/Xoff
Application settings			
Client enabled	RS1_Client	Off	Off or On
Host IP address	RS1_HostIpAddress	<empty>	IP number or domain name
Host port number	RS1_HostPort	8000	0..65535
Host retry interval [s]	RS1_HostRetryTime	60	1..28800 s
Server enabled	RS1_Server	On	Off or On
Port number for RS232	RS1_ServerPort	8000	0..65535
Multiplexer identification	RS1_MuxID	<empty>	String, max. 15 characters
Operating mode	RS1_Mode	string	String, character
End-of-line character	RS1_EolChar	LF	CR or LF
Timeout in string mode [ms]	RS1_Timeout	0	0 = off, 1..30000 ms
Network output queue size	RS1_NetQueueSize	10	2..100
Prefix string	RS1_Prefix	<empty>	String, max. 15 characters
RS output queue size	RS1_RSQueueSize	10	2..100
Event viewer			
Event filter	EVT_Filter	1023 *)	0 = off, 1 = error on 0 = off, 2 = info on 0 = off, 4 = RS1 input on 0 = off, 8 = for future use 0 = off, 16 = NET input on 0 = off, 32 = RS1 output on 0 = off, 64 = for future use 0 = off, 128 = NET output on 0 = off, 256 = for future use 0 = off, 512 = for future use
Display interval [s]	EVT_RefreshTime	5	0 = off, 1..3600 s
Total number of events	EVT_HistorySize	500	1..2000
Displayed number of events	EVT_ListSize	30	1..2000

*) Sum of all "on" filters

10.3 System commands

Commands to trigger defined events

System command	Action
sys://list	Lists all system parameters with their current settings
sys://help	Returns a short help text
sys://revision	Returns the current software version
sys://restart	Restarts the e-Box
sys://rs_config	Sets RS232 parameters to the changed values
sys://net_config	Sets the network parameters to the changed values
sys://backup	For restoring and cloning e-Boxes

Commands for setting system parameters

System command	Action
sys://ip=XXX	Sets IP address
sys://sn=XXX	Sets subnet mask
sys://dgw=XXX	Sets default gateway address
sys://dns=XXX	Sets domain name server address
sys://RS1_Baud=XXX	Sets baud rate
sys://RS1_Parity=XXX	Sets parity
sys://RS1_Databit=XXX	Sets number of data bits
sys://RS1_Stopbit=XXX	Sets number of stop bits
sys://RS1_Handshake=XXX	Sets handshake function
sys://RS1_Client=XXX	Client function on/off
sys://RS1_HostIpAddress=XXX	Sets host IP number or IP name
sys://RS1_HostPort=XXX	Sets host port number
sys://RS1_HostRetryTime=XXX	Sets interval time for attempting communication
sys://RS1_Server=XXX	Server function on/off
sys://RS1_ServerPort=XXX	Sets server port number
sys://RS1_MuxID=XXX	Sets multiplexer identification
sys://RS1_Mode=XXX	Sets RS operating mode
sys://RS1_EolChar=XXX	Sets end-of-line character for character string
sys://RS1_Timeout=XXX	Sets timeout
sys://RS1_NetQueueSize=XXX	Sets size of Net queue
sys://RS1_Prefix=XXX	Sets prefix string
sys://RS1_RSQueueSize=XXX	Sets size of RS queue
sys://EVT_Filter=XXX	Sets event filter
sys://EVT_RefreshTime=XXX	Sets display interval
sys://EVT_HistorySize=XXX	Sets total number of events
sys://EVT_ListSize=XXX	Sets number of events listed
XXX = for setting values of the respective parameters, see section 10.2	

Note: By omitting the equal sign and the setting value, the system commands listed above can be used to inquire the settings of the respective system parameters.

10.4 A short ABC of networks

10BaseT / 100BaseT	<p>10BaseT refers to an <u>Ethernet</u> cabling system with twisted-pair copper cables capable of transmitting up to 10 Mbps.</p> <p>100BaseT refers to a group of <u>Ethernet</u> cabling systems with twisted-pair copper cables capable of transmitting 100 Mbps.</p>
Browser	Software that enables a client PC to call up information on the Internet. Netscape and Microsoft Internet Explorer are the most commonly used browsers.
Client	A computer in a network (<u>LAN</u> or WAN, e.g. Internet) which uses data, services, or resources of a <u>server</u> .
Default gateway	The computer that receives all packets which are not addressed to computers in the local <u>network</u> .
DHCP	The D ynamic H ost C onfiguration P rotocol is used to automatically assign to client PCs a currently unused <u>IP address</u> from an address pool. Other information such as the name of the <u>domain</u> , the standard <u>gateway</u> , and the responsible <u>DNS server</u> can also be transferred to the <u>client</u> .
DNS	DNS (D omain N ame S ervice) is a database available on a names server for converting computer names into IP addresses and vice versa. Each server and each LAN which is connected to the Internet must have its information stored on a DNS server. When a server in the network (Internet or intranet) is addressed, the browser first asks a Domain Name Server. This replies with the corresponding numerical address, which enables the browser to set up direct communication with the IP address.
Domain	An individual computer or several computers on a network which are grouped together under a single name.
Download	Downloading means copying data over a network from a computer which is acting as a server (e.g. downloading a new software version from an Internet site).
Ethernet	<p>A networking standard under which all computers connected to the network can communicate with each other directly. The Ethernet standard was developed by the Intel and Xerox corporations. Its purpose is to make data and peripherals (printers, servers, etc.) available to other users.</p> <p>The transmission speed is limited to 10 Mbits/s, in contrast to its successor Fast-Ethernet which can handle speeds of around 100 Mbits/s (but which uses a different sort of cable).</p> <p>The enormous advantage of an Ethernet network is that further computers or peripherals can be added at any time which can use the same services as the other computers.</p>
Firewall	A computer located on the Internet side of a local area network and over which access to the Internet has to pass. Firewalls can be used by companies or organizations to allow connected computers to access the Internet, but to completely prevent access to the network from the Internet.

FTP (File Transfer Protocol) technologies enable direct, password-protected communication with an external server to which data packets can be directly transmitted without third parties being able to gain access to the data while it is being transported on the web.

Gateway A gateway is an interface between two networks. A gateway computer is a special computer which is connected to both networks. These may use different protocols. A gateway can also be an interface from one logical (frequently purely organizational) network to another, both of which use the same protocol. For example, two LANs can be connected by a gateway. All messages from one LAN to the other must pass through the gateway computer.

Handshake Method of synchronizing data transmission with irregular occurrence of data. The transmitter signals when he can/wishes to send new data and the receiver when he can/wishes to process new data.

1. If the synchronization is effected by means of electric cables, it is referred to as a hardware handshake.
2. Synchronization by transmission of control characters is referred to as a software handshake.

A hardware handshake is faster than a software handshake because it does not require any characters to be transmitted.

Host A general term for a computer or server (on which generally services of some sort are made available for users). The term is frequently used for the computer to which a data connection has been established.

HTML (Hypertext Markup Language) is a script programming language with which documents on the WWW are programmed. One of the most important features of HTML is that hypertext links can be inserted in documents. Hypertext links allow another WWW document to be loaded into the WWW browser simply by clicking on the (hyper)link. One document may contain links to many other related documents. These documents may be on the same computer as the original document, or on another computer which may be on the other side of the world.

HTTP (HyperText Transfer Protocol) is a protocol interacting with TCP/IP with which WWW servers and WWW clients communicate to call up efficiently information which is linked via hypermedia links. HTTP, which is the abbreviation for "Hypertext Transmission Protocol", is responsible for handling HTML documents within the World Wide Web (WWW).

HTTP server See web server.

Hub A network device to which several computers of a network are connected to create a star-shaped, structured topology of LAN nodes, which has connections for data stations and further hubs. Hubs serve to distribute data flows within and between LANs.

Intranet

An internal network which uses the same technology as the Internet to interconnect users. Browsers are used to create a common user interface. An Intranet can be used all over the world.

IP address

A classical IP address consists of four bytes (IPv4) or four quads which are separated from each other by dots.

Example: **130.5**.18.26.

The left-hand (bold) part of the IP address represents the network number, the right-hand part the address of the computer or network device. Depending on the class (A, B, C) of the IP address, more or less blocks belong to the network number. Example: In a class B network up to 65,536 computers can be addressed, but in a class C network only up to 256.

Private IP addresses:

In contrast to public IP addresses, private IP addresses are not assigned to an organization by the IANA (Internet Assigned Numbers Authority). They can therefore be used internally by any organization. However, this requires that these addresses are not routed anywhere in the world. Because of this, any computers which have a private IP address are only addressable within their own organization. The ranges reserved by the IANA for this purpose are:

10.0.0.0 - 10.255.255.255

172.16.0.0 - 172.31.255.255

192.168.0.0 - 192.168.255.255

Specially reserved IP addresses:

0.0.0.0	Own address which is still unknown
127.xxx.xxx.xxx	Address for computer-internal loopback tests
xxx.xxx.xxx.255	Broadcast addresses
xxx.xxx.xxx.0	Host address, network designation
xxx.xxx.0.0	Host address, network designation
xxx.0.0.0	Host address, network designation

The IP address is used for addressing computers, web servers, or printers in a TCP/IP network. Normally however, IP numbers are only used for addressing within programs. On the user interface clear-text names are normally used - for example, domain names. The allocation of names to addresses is handled by the DNS (see also network classes).

Local area network (LAN)

A network within a limited area, e.g. within a company. It is protected against access from the outside world (Internet) by a firewall.

MAC (address)

Media Access Control is a protocol according to IEEE-802 (OSI Layer 2) specially for Ethernet network cards. The MAC address is also referred to as the hardware address. Essentially, it is the unique serial number of a network card or a network device. An address is represented by 6 hexadecimal pairs: e.g. 00-30-67-34-00-1A.

Network classes

IP/Internet: The network class depends on the number of computers within the company or other organization which are connected to the Internet. Subnets of the Internet are divided into classes A, B, or C. Subnets of classes A and B are often divided internally into further subnets.

Class A network: A class A network contains up to 16.7 million computers. A class A network is only provided to really large companies or organizations. IP addresses for class A networks are in the range from 0.xx.xx.xx to 27.xx.xx.xx.

Class B network: A class B network contains up to 65,000 computers. IP addresses for class B networks are in the range from 128.00.xx.xx to 191.255.xx.xx.

Class C network: A class C network contains up to 256 computers. IP addresses for class C networks are in the range from 192.00.00.xx to 223.255.255.xx. There can therefore be 2 million class C networks.

All IP addresses whose first number is greater than or equal to 224.xx.xx.xx are reserved for technical purposes.

Node/network node

Each individual computer or other device on the network.

OSI model

Model for data transmission between computer systems. It describes seven layers of abstraction which serve each other and each of which has defined tasks and interfaces:

Layer 7	Application Layer
Layer 6	Presentation Layer
Layer 5	Session Layer
Layer 4	Transport Layer
Layer 3	Network Layer
Layer 2	Data Link Layer
Layer 1	Physical Layer

Ping

A program which is started from the DOS input prompt and can be used to test whether a particular computer can be reached with IP packets: e.g. PING 192.168.0.1 or PING yahoo.com.

Port number

The port number is a means of identification used for calling up a specific process, e.g. an application, on a server which is addressed by an IP address.

Valid port numbers are in the range from 0 to 65535. Ports 0 to 1023 are reserved for special services. The remaining port numbers are referred to as dynamic or private ports.

Examples: telnet (23), ftp (21 tcp), smtp (25), http (80), pop3 (110)

Proxy

A network service which deputizes for a client to set up network connections. For example, an HTTP proxy deputizing for a display program obtains HTML pages when it is requested to do so. This principle can be used to implement intermediate storage and data flow control.

RFC	Request For Comments: A complete series of documents from the IAB in which the standards by which communication in the Internet will take place are laid down. For example, RFC822 describes the specification for electronic mail addresses. Since all technical standards on the Internet are published in these RFCs, any manufacturer of software or hardware can use these standards for their products.
Router	Routers are important for Internet traffic between different networks. They inspect the destination addresses of data packets and send the packets on by the best route to the next router on their way to their destination. Routers are nothing other than small computers with a special program for deciding the optimal routing of information.
Server	A computer or other device (e.g. measuring instrument) within a network (<u>LAN</u> or <u>WAN</u> , e.g. the Internet). When requested to do so, the server provides data, services, or resources to other computers (<u>clients</u>). The converse of a server is a <u>client</u> .
SMTP	Simple Mail Transfer Protocol: A transmission protocol according to RFC 821 applying specially to the exchange of electronic mail messages. It is the standard protocol used on the <u>Internet</u> for this purpose. <u>SMTP</u> specifies how two mail systems interact, and defines the structure of the control messages used for this purpose.
SNMP	The Simple Network Management Protocol is used to manage <u>TCP/IP</u> networks. <u>SNMP</u> can be used to inquire and change the properties of computers. In certain exceptional situations a computer can send an alarm signal (<u>SNMP trap</u>) to the management station.
Subnet mask	<p>The subnet mask is used to indicate to the routers within a network which bits in the four quads of the IP address must be used to seek the addressed computer in the respective network.</p> <p>255.255.255.0 in relation to the (class B) IP address 130.5.18.26 means seek in network 130.5, and within that network in subnet 18, the computer which is number 26.</p>
Switch	A switch analyzes the data traffic and establishes a connection between devices on different sections of a LAN which exchange information.
TCP/IP	<p>TCP/IP (Transmission Control Protocol/Internet Protocol) manages the transportation of data packets on the Internet. IP is the agreement as to how the individual data packets should be formulated and dispatched. TCP then handles setting up the communication and safely delivering the data packet. The TCP/IP protocols have become the de facto standard for data transmission. Examples of services based on the TCP/IP family are the following:</p> <ul style="list-style-type: none">• remote login (<u>Telnet</u>)• file transfer (<u>FTP</u>)• mail (<u>SMTP</u>)

- Telnet** The standard protocol on the Internet for remote logging on. This allows a user to establish interactive communication to another host via the Internet as if there were a direct connection to it from the user's terminal.
- Tunneling** A method of transmitting data packets which uses one protocol to transmit data packets which have a different protocol. For example, a protocol with MT-SICS commands can be packed into IP packets and transported over the Internet.
- Upload** Uploading is the opposite of downloading, i.e. sending data to a computer or, for example, a measuring instrument, in a network (intranet or Internet). Uploading frequently makes use of FTP.
- URL** **Uniform Resource Locator:** The unique address of an Internet computer or of a specific item of information on the computer: e.g. <http://www.cisco.com/ch>.
- Web server** A server which when requested to do so uses HTTP to transmit HTML pages to an HTML browser.
- Winsock** On PCs running under Windows, a software interface (Windows socket) which enables programs to access network functions and the Internet. When a winsock program (e.g. Netscape Navigator) starts, it looks in the system directories for the file WINSOCK.DLL and loads it to gain access to the Internet.
Problem: Many online services gain access to the Internet by means of a special Winsock library. If a LAN is simultaneously operating network services with TCP/IP it is possible that the WINSOCK.DLL which is active is not the right one.
Solution: All winsock programs must be terminated before the online service is called up.
These problems obviously do not occur if access to the Internet takes place via a central server.

Communication using TCP/IP

Communication between different devices and software on the Internet is only possible because there is a common “language”, a transmission and communication protocol, for this purpose. This common language is called TCP/IP and is an important component for the success of the Internet. The abbreviation stands for **T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol. The protocol can be understood by all computers which are equipped with special software to interpret and analyze it. However, TCP/IP is more than just a common language analogous to English for humans of different nationality. TCP/IP is a standard which takes care of the technical details for transmitting data. TCP splits up the data into digital packets ready for transmission. Each packet is put into the equivalent of an envelope which bears the address of the sender and recipient as well as the timeframe within which the packet should be forwarded. The packets are then sent individually via different routes to the recipient where they are reassembled. The sequence in which reassembly must take place is also noted on the envelope or in the so-called header. It is the responsibility of the Internet protocol (IP) to ensure that data packets are correctly delivered, which means ensuring that they find the correct path through the Internet.

How is data transported?

Irrespective whether a user sends an e-mail or calls up a website – the data is always split up into digital packets which have a header containing all the information necessary for transportation. Various devices process this information as the packets travel through the Internet and send them on their way. The most important devices which communicate between networks are bridges, gateways, routers, and switches.

Bridges link local (area) networks (LANs) to each other and ensure that data which is addressed by one LAN to another is passed on. Bridges also hold back any data which should not be passed on. Gateways function in a similar manner to bridges, except that they can also interpret data from other types of network. Gateways are used, for example, to connect online services to the Internet.

10.5 Accessories

Accessory	Part no.
Data cables For connecting the e-Box to a PC: – RS232 cable D-Sub9 f/f, 3.0 m For connecting a serial end-device: – RS232 cable D-Sub9 f/m, 3.0 m For connecting the e-Box to a LAN: – RJ45 patch cable cat. 5 UTP, 3.0 m – RJ45 patch cable cat. 5 UTP, 5.0 m	 11600394 11101051 11600395 11600396
Fuses (only for e-Link IP) For 115V operation – 0.032 mAT slow Für 230V operation – 0.063 mAT slow	 89169 87155

**To protect your METTLER TOLEDO product's future:
METTLER TOLEDO Service assures the quality, measuring accuracy
and preservation of value of all METTLER TOLEDO products for
years to come.**

**Please send for full details about our attractive terms of service.
Thank you.**



P11780458

Subject to technical changes and to changes in the accessories
supplied with the instruments.

Printed on paper produced by a chlorine-free process.
Because we care.