

## TELEBOX PLC

### Technical Manual



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## Safety instructions

### TO NOTE

- Device may only be opened by a specialist!
- Device must be protected from heat and moisture!



### IMPORTANT SAFETY INSTRUCTIONS



To avoid the risk of electric shock, do not remove the two side covers. There are no user-repairable parts inside the unit. Leave repairs to qualified EHP customer service. There is a risk of contact with non-insulated parts inside the device, which can lead to electric shocks.

#### Operating environment

Avoid installing this device in an insufficiently ventilated, humid or hot place.

#### Warning:

To disconnect the device completely from the mains, the mains plug must be pulled out of the mains socket. To avoid the risk of fire, the mains plug should be disconnected from the mains socket before the device is not used for a longer period of time, for example during the company vacations.

#### Disposal:

If you wish to dispose of this product, do not mix it with ordinary household waste. There is a separate collection system for used electronic products through which proper treatment, recovery and recycling is ensured in accordance with existing legislation.

## Scope of delivery

- • Telebox PLC



*Figure 1- Telebox SPS*



*Figure 2- Telebox SPS connections*

The following connections are located on the back of the Telebox SPS:

1. RS-232 interface
2. USB port
3. Power connection

### **NOTE**

The Telebox PLC is configured according to customer specifications before delivery. User-specific changes can be made at any time via the setup of the Telebox PLC

**The following accessories are included as standard:**

- Interface cable RS 232
- 24 Volt power supply 110V-240V AC
- Antenna
- Terminal block with strain relief and contact protection
- Assembly tool for terminal block

**Optional accessories for the Telebox SPS:**

- BNC extension cable for antenna mounting outside the control cabinet
- Separate handheld transmitter configured only to the Telebox PLC.
- Profibus converter
- SD card

## System requirement

To ensure the functionality of the Telebox PLC, the following requirements apply:

- Firm state of the scales:
  - LAH 12.15 or higher (relay drivers are disabled at lower firmware levels)
  - LAH 11.04 or LAH 12.03 (tare & remote function are deactivated with lower firmware version)
- Parameterization of the scale:
  - Set parameter P17 to value 3 to activate relay ports
- Set EHP data set type 3 to store tare in flash memory.
- 24 volt power supply
  - SD card with maximum storage capacity of 2GB

## Driver installation

① The installation of the device drivers can only be performed with administration rights.

Connect the device to a free USB 2.0 port. The driver is installed automatically under Windows 10. An active Internet connection is required for loading the installation data.

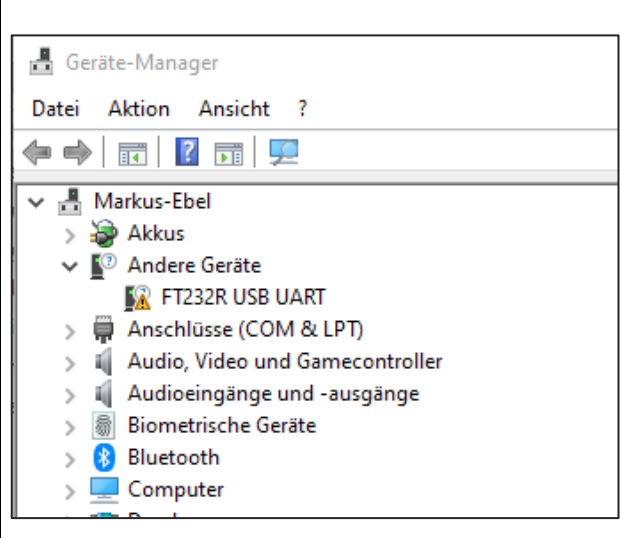
The successful installation can be checked under "Windows Device Manager" in the tab "Ports (COM&LPT)". Here is a new entry "COMxx" (xx= COM port no., is assigned automatically).

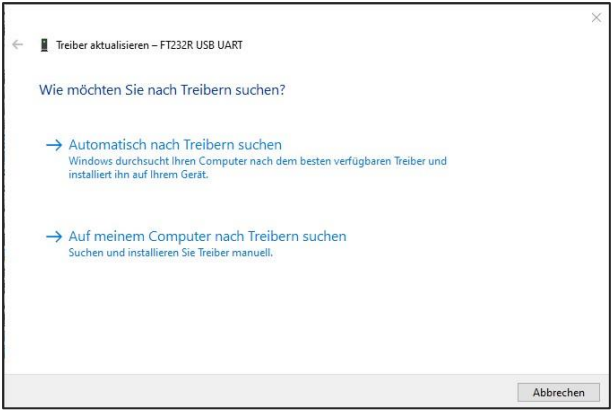
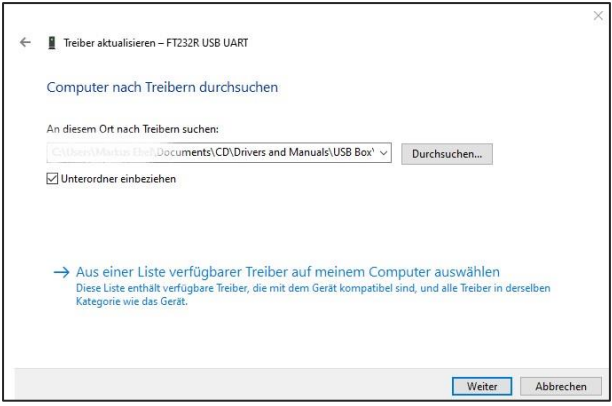
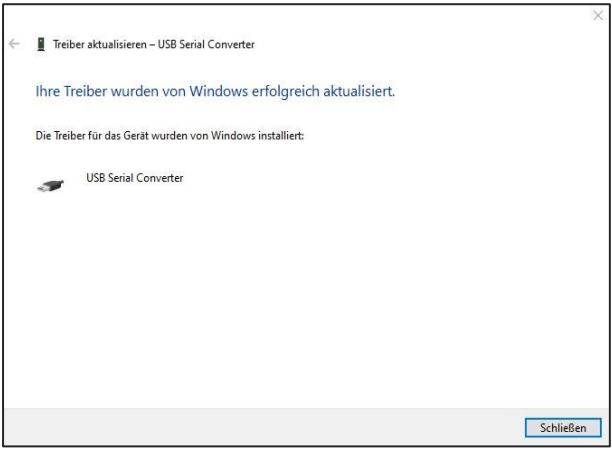

### Manual driver installation

If the automatic installation fails, the driver can also be installed manually:

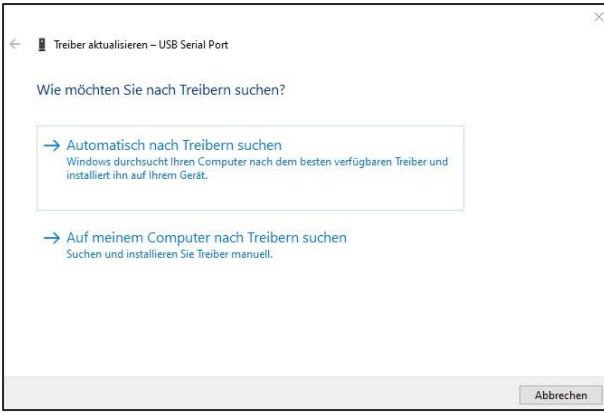
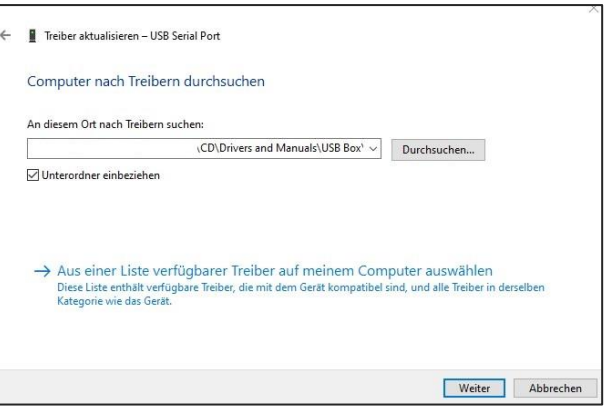
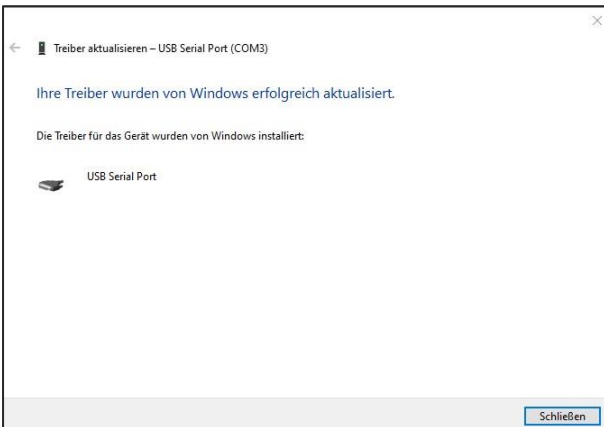
To do this, open the "Windows Device Manager". Under the tab "Other devices" there is an entry "FT232R USB UART", marked with a yellow "!".

Install the driver manually using the supplied "EHP Drivers and Manuals" CD:

	<p>Right-click the uninstalled device and select the "Update Driver" entry.</p>
---	---

	<p>Select the "Search for drivers on my computer" option.</p>
	<p>Select the driver - this can be found on the CD supplied. Then click on "Next" to start the installation.</p>
	<p>Confirm the successful driver installation with the "Close" button.</p>
	<p>There is now a new device "USB Serial Port" in the Device Manager with a yellow ! in the tab "Other devices". Click on this with the right mouse button and select the entry Update driver.</p>



	<p>6. select the tab "Search for drivers on my computer"</p>
	<p>Select the path for the driver, which is located on the supplied CD, then press "Next". Windows will now install the driver.</p>
	<p>Confirm the successful driver installation with the "Close" button.</p>

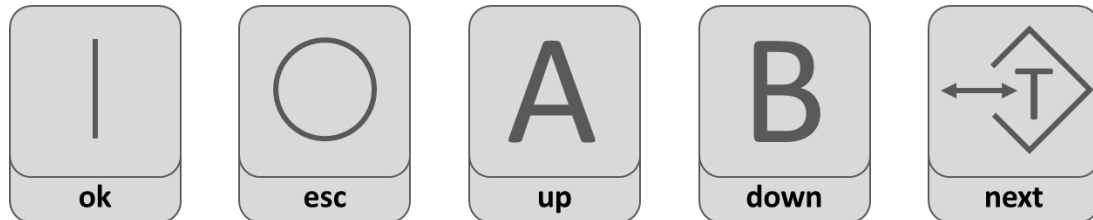
**Table 1 - Manual driver installation**

The successfully installed Telebox now has an entry in the Device Manager our the "Ports (COM&LPT)" tab. Here you will find an entry "USB Serial Port (COMxx) → XX=COM Port No..

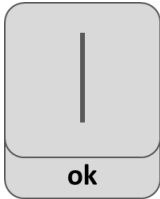
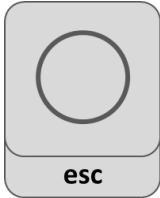
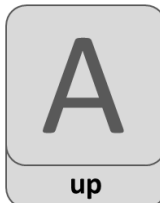
- ❗ Note the COM port number for your later application. Restart the PC after successful installation.
- ❗ If the Telebox is connected to a different USB port on the same computer, Windows automatically installs a new COM port.

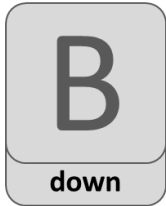
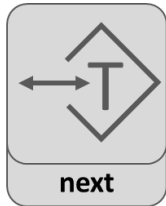
## Operation


The Telebox PLC starts automatically after the power supply.  
The Telebox SPS is operated using the five pushbuttons.



*Figure 3 - Operating keys Telebox PLC*

<b>Operating keys</b>	
	<p><b>Switch on Telebox PLC</b></p> <p>The display shows the start routine when the power is turned on and then the weight value of the weighing system A is displayed.</p> <p>Start routine:</p> <p>888888, (display test) Firmware version, e.g. 01.01.01 Firmware Date, e.g. 23.03.09 SEL A (only if the telebox is configured for 2 scales)</p>
	<p><b>Switch off Telebox PLC</b></p>
	<p><b>Select scales system A</b></p>

	<b>Select scales system B</b>
	<b>Scales tared</b>

<b>Display indication</b>	
	<b>Standstill display</b>
<b>NET</b>	<b>Balance tared</b>
<b>A</b>	<b>Scales system A active</b>
<b>B</b>	<b>Scales system B active</b>

Alternatively, the Telebox PLC can be operated with an EHP IR hand-held transmitter.

<b>Key 1 (Tare)</b>	Tares the scale
<b>Key 2 (Print)</b>	Saves the currently displayed value in flash
<b>Key 3 (→0←)</b>	Resets the scale to "0"
<b>Key 4 (Add)</b>	Adds the Current Weight and makes an intermediate storage
<b>Key 5 (½)</b>	Switches the scales selection
<b>Key 6 (Total)</b>	Calculates the last displayed weight value to the added values and stores it in Flash
<b>Key 7 (Test)</b>	Switches on the Telebox PLC. After that, the Telebox PLC performs the startup routine again.
<b>Key 8 (Off)</b>	Switches off the Telebox PLC.
<b>Key 9</b>	Without function for the Telebox PLC
<b>0 key (PreTare)</b>	Without function for the Telebox PLC
<b>Key (Shift)</b>	Without function for the Telebox PLC
<b>Key (Enter)</b>	Without function for the Telebox PLC

## Adding function and data storage

With the aid of the Telebox PLC, weight values can be recorded, added and stored in a verifiable form.

By pressing the "Print" key on the handheld transmitter, the current weight value is stored in the SD flash memory.

If, on the other hand, you want to add weight values (e.g. if several units are weighed with the crane scale and the total weight of all weighed units is relevant), use the "Add key" of the handheld transmitter. The weight is added to the previously stored weight. During the adding process, a light bar lights up in the lower left corner of the display. Each additional weight recorded with "Add" is added to the previous weight, and the total weight is displayed.

Press the "Total key" to finally save the total weight.

<b>Example: Data storage Telebox PLC</b>			
<b>Handheld transmitter button</b>	<b>Display scale</b>	<b>Display Telebox PLC</b>	<b>Memory value SD card</b>
PRINT	1000 kg	PRINT, 1000 kg	1000 kg
Add	5005 kg	Add, _ 5005 kg	
Add	1500 kg	Add, _ 6505 kg	
Add	2000 kg	Add, _ 8505 kg	
Total	2255 kg	Total, _ 8505 kg	8505 kg
Print	7564 kg	Print, ^ 7564 kg	7564 kg
Total	5500 kg	Total, ^ 5500 kg	5500 kg

The stored data records can either be called up in the setup, forwarded to evaluation devices via RS 232 or RS485 interface or read directly from the SD card.

### **Evaluation of the measurement data on the SD card**

There are several possibilities to evaluate the flash memory. Select one of the suitable possibilities here.

#### **Variant 1**

The flash memory is called up in the display of the telebox.

#### **Procedure:**

Press the OK and NEXT keys simultaneously, 00000 is displayed, press OK again within one second. You are now in the setup menu and the display shows "P 0".

Press UP key until "P 21" is displayed> Activate OK parameter. The smallest possible measurement number is shown in the display, e.g. "00012". Select the desired measured value with the "UP"- "Down"- "Next" keys:

- Next key "→Display shows the weight".
- Next key "→Display shows date DD MM".
- Next key "→Display shows year YYYY".
- Next key "→Display shows time SS MM".
- Next key "→Display shows second SS".
- Next key "→Display shows the selected measuring number"→ Select the next measuring number with UP/Down key.

Exit the selected parameter with the ESC key. Pressing the ESC key again terminates the setup. After the reboot, the Telebox PLC is ready for operation again.

## **Variant 2**

The stored measured values are sent manually via RS 232 interface to a PC or an evaluation device. Here you have the option to output one or more data sets serially. In addition, the scope of the sent data can also be limited. If, for example, 2000 data records are available, it is possible to send selected measured values 00455-08645.

### **Procedure:**

Prepare your PC for data reception (terminal program firmware etc.). Press the OK and NEXT keys simultaneously, 00000 is displayed, press OK again within 1 second. You are now in the setup and "P 0" is shown in the display. press UP key until "P 22" is shown > activate OK parameter.

The smallest possible measurement number is shown in the display, e.g. "00001".

Use the "Up/Down/Next" keys to set the first of the measurement numbers to be output, e.g. "00012".

OK → key "Display shows the highest possible measurement number" e.g. "99999".

Use the "Up/Down/Next" keys to set the last of the measurement numbers to be output, e.g. "07812".

OK → key The measurement data are now output serially. During the output, the top and bottom light bars of the first display segment flash on the display. After successful data output, the Telebox PLC changes back to the parameter level. P 22" is shown in the display.

Exit setup by pressing the ESC key. After the reboot, the Telebox PLC is ready for operation again.

**Variant 3**

The measurement data is read out via PC Remote. All measurement data available on the memory card are output here. A selection according to specific measurement numbers is not possible. Furthermore, you have the option to irrevocably delete the measurement data after data output.

**Procedure:**

Prepare your PC for the data transfer. Use the two commands for data output and for deleting the data.

<b>Command HEX</b>	<b>Function</b>
A5 5A C8 00 00 37 03	Measurement data on the SD card are deleted
A5 5A C7 00 00 38 03	Read out measurement data SD card, activates data transfer from SD card to RS 232 interface

The control commands to the Telebox PLC are confirmed by a return command from the Telebox PLC. Depending on the amount of data, some time may elapse between the return command from the Telebox PLC and the data transfer from the SD card to the RS 232 interface. The successful sending of the measurement data is confirmed by the same command at the end of the data records.

Telebox PLC return command	Meaning
4F 4B 03 0D 0A	ASCII = OK ETX CR LF positive response Telebox PLC command was recognized and is executed. Sending of the SD card data was successful and has been completed.
45 52 xx xx xx 03 0D 0A	ASCII = ERRxxxx ETX CR LF negative response Telebox PLC command was not recognized or an error occurred during data processing. Where xx or x stands for the error number. See table error handling

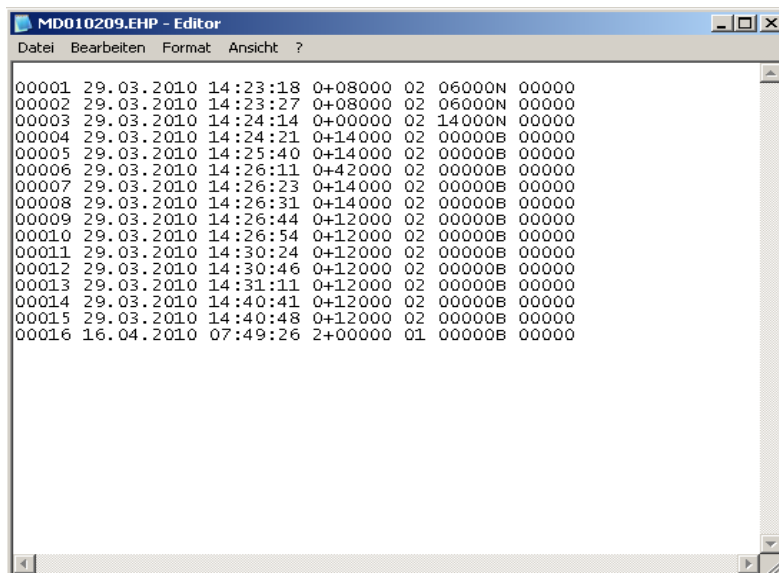
For more information on the control commands, refer to Chapter 6. "Transparent Mode".

#### Variant 4

The measurement data are evaluated with the PC via the SD card.

#### Procedure:

Switch off the Telebox PLC. The SD card is located on the right side of the Telebox SPS, protected under a metal cover. You can remove the SD card by tapping on it. Using an SD card reader, the data can be transferred to a PC. The MD010106.EHP file contains the stored weighing data. Open the file with the text editor.



```

MD010209.EHP - Editor
Datei Bearbeiten Format Ansicht ?
00001 29.03.2010 14:23:18 0+08000 02 06000N 00000
00002 29.03.2010 14:23:27 0+08000 02 06000N 00000
00003 29.03.2010 14:24:14 0+00000 02 14000N 00000
00004 29.03.2010 14:24:21 0+14000 02 00000B 00000
00005 29.03.2010 14:25:40 0+14000 02 00000B 00000
00006 29.03.2010 14:26:11 0+42000 02 00000B 00000
00007 29.03.2010 14:26:23 0+14000 02 00000B 00000
00008 29.03.2010 14:26:31 0+14000 02 00000B 00000
00009 29.03.2010 14:26:44 0+12000 02 00000B 00000
00010 29.03.2010 14:26:54 0+12000 02 00000B 00000
00011 29.03.2010 14:30:24 0+12000 02 00000B 00000
00012 29.03.2010 14:30:46 0+12000 02 00000B 00000
00013 29.03.2010 14:31:11 0+12000 02 00000B 00000
00014 29.03.2010 14:40:41 0+12000 02 00000B 00000
00015 29.03.2010 14:40:48 0+12000 02 00000B 00000
00016 16.04.2010 07:49:26 2+00000 01 00000B 00000
    
```

Figure 4 -Format of the MD010106 file

Byte	Meaning
1	Memory number tens of thousands place
2	Memory number thousands digit



Byte	Meaning
3	Memory number hundreds digit
4	Memory number tens digit
5	Memory Number One Digit
-	Space
3	Date / Day
1	Date / Day
.	Point / Date
1	Date / Month
2	Date / Month
.	Point / Date
2	Date / Year
0	Date / Year
1	Date / Year
0	Date / Year
-	Space
1	Time / Hour
2	Time / Hour
:	Colon / Time
5	Time / minute
9	Time / minute
:	Colon / Time
3	Time / second
0	Time / second
-	Space
0/1/2	Decimal place weight
+/-	Sign weight
1	Weight: Ten thousand digit 0-9
2	Weight: thousands digit 0-9
3	Weight: Hundreds digit 0-9
4	Weight: tens digit 0-9
5	Weight: One digit 0-9
-	Space
9	Scale number, tens digit 0-9
9	Scale number, tens digit 0-9
-	Space
1	Tare weight, ten thousand digit 0-9
2	Tare weight, thousands digit 0-9
3	Tare weight, hundreds digit 0-9

<b>Byte</b>	<b>Meaning</b>
4	Tare weight, tens digit 0-9
5	Tare weight, one digit 0-9
B/N	Gross/net scale
-	Space
1	Ten thousand, digit EHP code
2	Thousands digit, EHP code
3	Hundreds digit, EHP code
4	Tens digit, EHP code
5	One digit, EHP code
03	ETX
0D	CR
0A	LF

**Notice:**

- It is not possible to delete the SD card in calibrated systems. The card slot is sealed by a calibration mark to prevent removal of the SD card.
- If the maximum capacity of the file 010106.EHP with 99999 records is reached, another file with consecutive number will be generated automatically.

## Transparent Mode (GreyBox Mode):

The Telebox PLC offers the possibility to be switched into the so-called "Transparent Mode". This gives the option to control all data of the scale with a PC remote. In addition, as described above, all data are stored with **Print**, **Add** and **Total**. By the calibrated flash a further processing of the data with the PC is possible. In addition, the scale can be controlled remotely via the remote commands. In addition, it is possible to perform a switchover between the two programmed scales. To set the Telebox to this state, parameterize P15 and P6 to 1 in the setup. Optionally, the Telebox PLC can also be set temporarily to this mode with the commands listed below.

The 7-byte control commands that intervene on the parameterization of the telebox are immediately confirmed by the telebox via return command. Positive, or after an error also negative.

With activated transparent mode it is possible to control the channel of the radio modem from outside. This gives you the option to temporarily select any radio channel in the telebox without any problems. Please note that data is only received here if the scale selected on this channel also has the identical carriage number as is stored in the Telebox PLC (parameters 2 and 13). The control commands for the channel change for High Range radio (500m) and Low Range radio (100m) are different and not compatible.

If you are working in the Grey Box Mode, you must ensure that weighing data from the scale is received immediately after a successful channel change. If this is not desired, the scale must be switched off for the channel change.

### Remote commands:

Command Hex	Function
xx 31 CE 03	Key 1 Tare *
xx 32 CD 03	Key 2 Print *
xx 33 CC 03	Key 3 0 digits *
xx 34 CB 03	Key 4 Add *
xx 35 CA 03	Key 5 ½ *
xx 36 C9 03	Key 6 Total *
xx 37 C8 03	Key 7 Test *
xx 38 C7 03	Key 8 Off *
xx 39 C6 03	Key 9 Activate peak value or pouring rate/sec., deactivate *.
xx 30 CF 03	Key 10 Pre Tare *

Command Hex	Function
xx 0C F3 03	Key 11 Shift *
xx 0D F2 03	Key 12 Enter *
A5 5A C1 00 00 3E 03	Activate transparent mode temporarily
A5 5A C2 00 00 3D 03	Disable transparent mode temporarily
A5 5A C3 00 00 3C 03	Select scale A
A5 5A C4 00 00 3B 03	Select scale B
A5 5A C5 00 00 3A 03	Activate RS 232 data transfer (=parameter 5)
A5 5A C6 00 00 39 03	Deactivate RS 232 data transfer (=parameter 5)
A5 5A C9 00 00 36 03	Activate RS 232 data transfer on command Print/Add/Total (=parameter 5)
A5 5A C7 00 00 38 03	Read out measurement data SD card, activates data transfer from SD card to RS 232 interface
A5 5A C8 00 00 37 03	Measurement data on the SD card are deleted
00 00 23 46 xx xx 03	ASCII 00#FxxETX Channel switching High Range radio (500m) where xx xx or ASCII xx is the channel number. E.g. channel change to channel 5 = 00#F05ETX Frequency list see table section 15.

**Notes:**

- xx corresponds to the set scale number that is to be remote controlled.
- Parameter 5 is rendered ineffective by the transparent mode.

## Interfaces to the terminal block:

The interface is located under the left cover, which can be pried open with a flat-blade screwdriver, for example.

Pin assignment (from top to bottom)	
1	Input 4-20 mA -
2	Output 4-20 mA +
3	Relay output overload / preload too high
4	Relay output setpoint no. 4
5	Relay output setpoint no. 3
6	Relay output setpoint no. 2
7	Relay output setpoint no. 1
8	RS 485 Bus B -
9	RS 485 Bus A +
10	Tare input (switch this pin to ground for approx. 1 second to set/release tare)
11	Mass
12	External power supply 10-28V

### Connection instructions

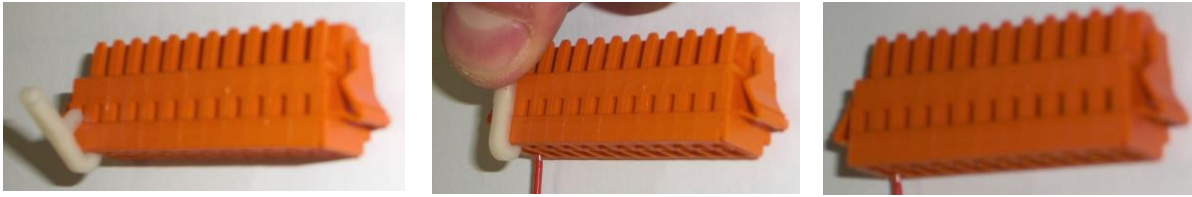
Basically, the setpoint outputs of the Telebox PLC must be wired via an additional relay. All commercially available relays with 24V coil voltage can be used. Connect the relays to the ground of the Telebox PLC.

You can supply the Telebox PLC with an external voltage source. This must be between 10-28 V DC. Important, the 4-20 mA current output only works correctly with 24V operating voltage. The direct voltage input is not protected by the built-in fuse. A carrier fuse (T1.6A) must be connected in front of the voltage source when using a direct voltage input. Failure to do so will result in loss of warranty.

**If the Telebox PLC is supplied with voltage via terminal blocks, the supplied 24V power supply unit must not be connected!**

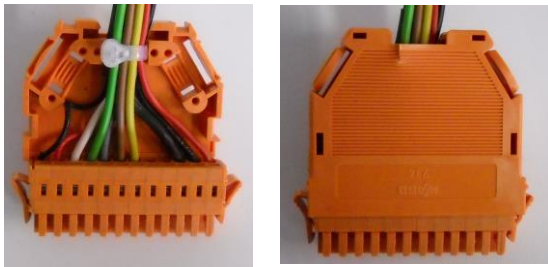
### Mounting the connecting cables

A mounting tool for the terminal block is included in the scope of delivery. Both rigid and flexible cables can be connected. The use of wire end ferrules is not necessary.



Please note that all connection work may only be carried out in a de-energized state. Failure to do so may result in damage to the interfaces.

After all cables have been properly connected, attach the protective hood. To do this, lay the cable harness in the desired outgoing direction, fix the cables using a cable tie and close the protective hood.



## 4-20mA interface

### Overview

To use the 4-20mA interface, first set the minimum value (4 mA) and then the maximum value 20mA. The resolution of the interface can represent up to 8000 digit steps of the scale. The connection to the PLC is made via PIN1 & PIN2 on the series interface.

The Telebox PLC is the current indicator and has an integrated reference resistor for determining the reference current. Thus it is possible to operate reference measuring amplifiers with different internal resistances. It is guaranteed that internal resistors of 250-500 Ohm work. If no reference resistor is integrated in the measuring amplifier to be connected, a 250 Ohm 3 Watt resistor must be connected into the measuring series. Connection see circuit diagram in the appendix

### Parameterization

Open the parameter menu as described in section 13.  
Structure P8 and P9

Parameter	Sign (1.)	Weight before decimal point (2.)	Weight after decimal point (3.)	Value inactive/active
P8	+/-	00000	.00	0/4mA
P9	+/-	00000	.00	0/20mA

1. Activate parameter 8 with "OK", the sign appears (+/-) parameterize the sign with the "up/down" keys and confirm with "NEXT". 00000 appears on the display.
2. Use the "up/down" and "NEXT" keys to parameterize the minimum weight 4mA before the decimal point. Confirm with "NEXT". The display shows .00.
3. Use the "up/down" and "NEXT" keys to parameterize the minimum weight 4mA after the decimal point. Confirm with "NEXT". 0, 4 or 20 is displayed.
4. Use the "up/down" keys to parameterize 4 for 4mA and confirm with "OK".
5. Activate parameter 9 with "OK", the sign appears (+/-) with the "up/down" keys parameterize the sign and confirm with "NEXT". 00000 appears on the display.
6. Use the "up/down" and "NEXT" keys to parameterize the maximum weight 20mA before the decimal point. Confirm with "NEXT". The display shows .00.
7. Use the "up/down" and "NEXT" keys to parameterize the maximum weight 20mA after the decimal point. Confirm with "NEXT". 0, 4 or 20 is displayed.
8. Use the "up/down" keys to parameterize 20 for 20mA and confirm with "OK".  
Activate P99 to save the settings.

### Configuration examples:

#### Example 1:

A 2t crane scale should be configured from 0 kg to 2000 kg on the 4-20 mA interface. 0 kg corresponds to 4 mA, 1550, 5 kg corresponds to 20 mA.

Parameter	Sign (1.)	Weight before decimal point (2.)	Weight after decimal point (3.)	Value
P8	+	00000	.00	4
P9	+	01550	.50	20

#### Example 2:

A 30 t scale is to be configured to empty, 0 kg equals 20 mA, -30000 kg equals 4 mA.

Parameter	Sign (1.)	Weight before decimal point (2.)	Weight after decimal point (3.)	Value
P8	-	30000	.00	4
P9	+	00000	.00	20mA

#### Example 3:

A 5 t scale is to be configured from -5000 kg to +5000 kg. In addition, it is to be switched off in the event of an overload. -5000 kg corresponds to 4 mA, +5000 kg corresponds to 20 mA.

Parameter	Sign (1.)	Weight before decimal point (2.)	Weight after decimal point (3.)	Value
P8	-	05000	.00	4
P9	+	05000	.00	20mA
In addition, assign the relay output pin 3, overload, via a relay to the PLC.				



## Configuration of the relay outputs

The configuration of the relay outputs 1-4 is done through the menu "Set weight values for automatic functions" (see the technical manual of the balance).

The setpoint for a relay output is programmed as follows: Press the Enter key on the handheld transmitter of the scale, AL is shown in the display. Press key 1 - 4, corresponding to the relay port to be programmed. The last programmed setpoint is displayed.

Use the 1 - 0 keys to enter the weight at which the relay port is to be switched. Confirm entry with "Enter". AL is shown in the display for approx. 15 seconds.

Two alternative configurations are possible. These are defined in setup parameter 10 of the Telebox PLC.

If parameter 10 is set to 0, all relay ports act separately. This means that as soon as one of the setpoints is reached, the corresponding relay driver switches to "high". If two or more setpoints are reached, they are switched on accordingly.

If parameter 10 is set to 1, only relay port 1 acts on all set setpoints.

Relay port 5 cannot be configured. This is used to signal the overload. If parameter 10 is configured to 1, relay port 1 takes over the function of the overload output.

### Special function "Secure radio connection"

If a secure radio connection to the overload relay is required, activate parameter 14 additionally.

Parameter Meaning:

0 =Secured radio connection deactivated  
1-4= Drop-out time safety output in seconds

Mode of operation:

If parameter 14 is set to value 2, the operation of relay port 4 is changed. This becomes High active as soon as the Telebox PLC and the scale are ready for operation and the radio connection has been established. If the radio connection is interrupted for more than 2 seconds, the relay port switches to Low without delay. This ensures that the scale has not been switched off or is out of radio range.

Parameter 33 can be used to configure the function of the relay outputs.

On the one hand, you can freely select whether an output is active low or high. Furthermore, you can set whether the output should react to positive or negative weight (or both).

This results in the following configuration option:

- 0 => high active positive weight
- 1 => high active negative weight
- 2 => high active positive and negative weight
- 3 => low active positive weight
- 4 => low active negative weight
- 5 => low active positive and negative weight

The following applies to the overload relay output 5:

- 0 => high active
- 1 => low active

If parameter 33 is called, the position of the digits corresponds as follows:

1	2	3	4	5
<b>Output overload relay</b>	<b>Output 4</b>	<b>Output 3</b>	<b>Output 2</b>	<b>Output 1</b>

During configuration, note the settings of parameters 10, 14 and 17. The settings are superordinate and, depending on the setting, restrict the configuration scope of parameter 33!

**Notice:**

The function of the relay outputs depends on the firmware version of the scale. It must be ensured that the scale firmware version 12.15 or higher is installed. The firmware version is displayed when the scale is started or by pressing the TEST key on the device.

## RS232 interface

The RS-232 interface may only be connected in a voltage-free state.

Non-observance can lead to the destruction of the V24 interface!

Either the RS-232 or the RS-485 interface can be used. Simultaneous operation of both interfaces is not possible. Please note the parameterization of parameter 3.

The data output of the interface is controlled via parameter 5.

0 = No data sets to the RS 232 interface, data from the flash is sent directly to the RS 232 interface on request.

1 = Data records are forwarded continuously to the RS 232 interface.

2 = Only data records containing control characters Print/Add/Tara are forwarded to the RS 232 interface.

There are 2 different data protocols available. Data protocol 1 corresponds to the data record of the balance. The length varies according to the data protocol that is set in the scale.

Data protocol 0 corresponds to the classic Telebox-Plus format and does not vary in length. This protocol type is not recommended for new projects.

### Data log 1, 28 byte data log (parameter 7=1)

The extended data protocol (28 bytes) has the following data format and is preset in the delivery state. This is the original protocol of the scale.

Byte #	ASCII	Meaning
1.	S	Start signal
2.	0	No comma (e.g. 19520)
	1	One decimal place (e.g. 1952.0)
	2	Two decimal places (e.g. 195.20)
	3	Three decimal places (e.g. 19,520)
4.	4	Four decimal places (e.g. 1.9520)
	Blank (20H)	No sign
3.	+	Plus
	-	Minus
4.	Digit 5	Ten-thousandths digit of the weight
5.	Digit 4	Thousands digit of the weight
6.	Digit 3	Hundreds digit of the weight

Byte #	ASCII	Meaning
7.	Digit 2	Decimal place of the weight
8.	Digit 1	Units digit of the weight specification
9.	B N	Scale tare OFF (gross weight) Scale tare ON (net weight)
10.	E 1 2	Single range scale in area I in area II
11.	0 1	No standstill Standstill
12.	0 1 2 3 4 5 6 7 8 A X E C	No key is pressed on the handheld transmitter  Key 2 (Print key)  Key 4 (Add- key)  Key 6 (Total key)  Scale was switched off manually Scale was switched off by automatic switch-off function Reception disturbance Test
13.	V H L	Accumulator of the scale charged Accumulator of the scale - forewarning Balance accumulator - Discharged/ Empty
14.	(1 - 99)	Digit 1 of the scale number
15.	(1 - 99)	Digit 2 of the scale number
16.	(X)	no setpoint =0, setpoint 1 =8 Setpoint 2=4, Setpoint 3=2 Setpoint 4=1 Values of the setpoints that overlap are added together.
17.	N J G	No overload Overloaded Preload too high

Byte #	ASCII	Meaning
18.	Digit 5	Most significant digit (left digit) during numeric code input
19.	Digit 4	
20.	Digit 3	
21.	Digit 2	
22.	Digit 1	Least significant digit (right digit) for numeric code input
23.	Digit 5	Ten thousand digit of the tare value
24.	Digit 4	Thousands digit of the tare value
25.	Digit 3	Hundreds digit of the tare value
26.	Digit 2	tens digit of the tare value
27.	Digit 1	Units digit of the tare value
28.	03 H	End of block - character (03 Hex)

#### Extended 23 byte data protocol

With the extended data protocol (23 bytes) the bytes #23...#27 (tare value) are missing compared to the 28 byte data protocol. Byte 23 is the end of block character (03 Hex).

#### EHP- Standard data protocol

Compared to the extended 23 byte data protocol the bytes #18 to #22 (numeric code) are missing. Byte 18 is the end of block character (03 Hex).

**Data protocol 0, Telebox classic (parameter 7=0). This protocol is generated in the telebox and corresponds to the classic telebox format.**

Byte #:	ASCII:	Meaning:
1.	S	Start signal
2.	0	no comma (e.g.: 48905)
	1	one decimal place (e.g.: 4890,5)
	2	two decimal places (e.g.: 489.05)
	3	three decimal places (e.g.: 48.905)
	4	four decimal places (e.g.: 4.8905)
3.	Blank (20H)	no sign
	+	Plus
	-	Minus
4.	Digit 5	Most significant digit (left digit)
5.	Digit 4	
6.	Digit 3	
7.	Digit 2	
8.	Digit 1	Lowest digit (right digit)
9.	B	Scale tare OFF
	N	Libra Tare ON
10.	E	Single range scale
	1	in range I (only with verifiable II range version)
	2	in range II (only for calibratable II range version)
11.	0	No standstill
	1	Standstill
12.	0	No button pressed on the handheld transmitter
	1	
	2	Key 2 (PRINT)
	3	
	4	Key 4 (ADD)
	5	
	6	Key 6 (PRINT TOTAL)
	7	
8		

Byte #:	ASCII:	Meaning:
	A	Scale was switched off manually
	X	Scale was switched off by the automatic switch-off function
	Q	TELEBOX manually switched off
	E	Reception disturbance
	C	TEST
13.	V	Scale battery charged
	H	Prewarn /empty battery of the scale
	L	Battery of the scale discharged
14.	(1-99)	Digit 1 of the scale no.
15.	(1-99)	Digit 2 of the scale no.
16.	(0)	Command block (not used)
17.	N	No overload
	J	Overloaded
	G	Preload too high (only for calibratable version)
18.	V	Battery of the TELEBOX charged ( only simulated)
19.	0	Password 1st character (not active)
20.	0	Password 2nd character (not active)
21.	03 H	Block end character (03 Hex)

## RS 485 interface

The RS 485 bus operates in half-duplex mode. The connections A+ (Transmit/Receive+) and B- (Transmit/Receive-) must never be confused. The protocols of the RS 485 interface correspond to the RS 232 interface. Cable lengths of up to 1km are possible.

The RS 485 interface can be activated alternatively to the RS 232 interface. Simultaneous operation of both interfaces is not necessary. As soon as parameter 3 has been set to 1 in the setup, the RS 485 interface is active.

## Profibus

Optionally you can get an additional converter from EHP Wägetechnik. With this converter you have the possibility to connect the Telebox PLC with a Profibus network. A sample file (GDS file) with the basic configuration of the converter can be found on the supplied Driver & Manual CD.

## Setup menu

The Telebox PLC works with a completely revised menu and operating structure. A change of the parameters and their values is solved with a simple up/down menu.

### Explanation of the key functions:

<b>Key I / OK</b>	Confirm selection
<b>Key 0 / ESC</b>	Demolition
<b>Key A / Up</b>	Change value/parameter upwards
<b>Key B / Down</b>	Change value/parameter downwards
<b>Tare / Next key</b>	Next position in parameter

The setup is locked via a master password! You can reach the menu via the following key combination:

Press the OK and Next keys together, 00000 appears in the display.

With Up/Down change the value, with Next you reach the next position

Set the menu code 77815 and confirm it with OK. The position that can be changed is indicated by the number flashing.

Provided the code has been entered correctly, you can move freely in the setup. If it was entered incorrectly, no changes can be made. You only have access to some flash card functions. You can exit the parameter or the setup at any time by pressing the ESC key. No data will be saved.

Alternatively, it is also possible to operate the setup with the handheld transmitter.

Only the key combination OK and Next must be pressed on the telebox to reach the setup. 00000 appears in the display.



If you keep the Up/Down keys pressed for a longer time, the value to be set runs up or down automatically.

The values to be set, which can be changed, are signaled by flashing.

#### Explanation of the setup key functions on the handheld transmitter:

<b>Key 7 (TEST)</b>	OK, confirm selection
<b>Key 8 (OFF)</b>	ESC, abort
<b>Key 3 (→0←)</b>	Up, change value/parameter upwards
<b>Key 5 (1/2)</b>	Down, change value/parameter downwards
<b>Key 1 (Tare)</b>	Next, Next position in parameter

#### Changing the handheld transmitter number

You have the possibility to operate the Telebox SPS independently from the scale with a 2nd remote control. Another remote control is available as an accessory. The change of the hand transmitter number is to be changed by a simple key code which is typed into the remote control.

Press the following code within 5 seconds:

Enter   9   Enter   0     2     X     X   where XX stands for the handheld transmitter number (01-12).

e.g. handheld transmitter no. 5 = Enter   9   Enter   0     2     0     5  

If the input is correct, the transmit LED flashes 4 times.

#### Parameter list:

No. Parameter	Function Parameter
<b>P 0</b>	Date Time
<b>P 1</b>	Frequency channel scale A
<b>P 2</b>	Scale number Scale A
<b>P 3</b>	0 = RS 232 1 = RS485
<b>P 4</b>	Baud rate RS 232 interface 1 = 4800 2 = 9600 3 = 19200 4 = 28800 5 = 38400 6 = 57600 7 = 1200 8 = 2400
<b>P 5</b>	RTS RS 232/485 interface 2 = Data set comes only with Print/Add/Total 1 = On Data set transmits continuously 0 = Off Record off
<b>P 6</b>	Radio response scale (x) 0 = Off

No. Parameter	Function Parameter
	1 = On
<b>P 7</b>	Protocol telebox 0 = Telebox classic 1 = data set scale looped through
<b>P 8</b>	4-20 mA Minimum value (4 mA) e.g. 4 mA at 0 kg
<b>P 9</b>	4-20 mA Maximum value (20 mA) e.g. 20 mA at 5000 kg
<b>P 10</b>	Relay outputs 0= separated 1=parallel (relay output 1)
<b>P 11</b>	1= 1 weighing system / 2= 2 weighing systems
<b>P 12</b>	Frequency channel scale 2
<b>P 13</b>	Scale number Scale 2
<b>P 14</b>	Signaling radio connection to scale 0= off 1...4 Signaling time in seconds
<b>P 15</b>	Transparency Mode 0=Off 1=On
<b>P 16</b>	Error reset automatically
<b>P 17</b>	0= without function 1= PAT: Print, Add Total digital Out 3 = 2 seconds High
<b>P 18</b>	Handheld transmitter numbers Telebox SPS remote control
<b>P 20</b>	Calibratable memory (flash card) 0 = not present 1 = present
<b>P 21</b>	View stored value on flash card
<b>P 22</b>	Memory Send again via RS 232 interface
<b>P 30</b>	Key acknowledgement (beeper) 0 = Off // 1 = On
<b>P31</b>	0= Clock in standby off 1= Clock in standby on
<b>P32</b>	0= Clock in normal operation off 1= Clock is displayed after 15 minutes of standstill
<b>P 33</b>	Function of the relays: Setting low or high active Setting positive, negative or sign independent. For setting see section Relay settings.
<b>P 90</b>	Load factory settings
<b>P 91</b>	Restore last configuration (only if the configuration was not saved)
<b>P 92</b>	Load custom data from flash
<b>P 99</b>	Save configuration Activate parameter with OK, confirm 0 with OK. The telebox restarts automatically

## Radio channel frequencies

Please note which hardware you are using when selecting the frequency. The individual frequencies correspond to the transmitter unit used. Transmitter and receiver must be equipped with the same type of transmitting unit. The different transmitting units are not compatible with each other.

### Frequency Table High Range Radio IR500 (500m) 433 MHz Band

Channel no.	Frequency in MHz	Channel no.	Frequency in MHz
00	Not occupied		
01	433,075	15	434,000
02	433,125	16	434,075
03	433,175	17	434,150
04	433,225	18	434,225
05	433,275	19	434,300
06	433,325	20	434,375
07	433,400	21	434,425
08	433,475	22	434,475
09	433,550	23	434,525
10	433,625	24	434,575
11	433,700	25	434,625
12	433,775	26	434,675
13	433,850	27	434,725
14	433,925	28	434,775

## Change frequency and scale number of the scale

The Telebox SPS USB protocol requires that the scale and channel numbers match. You can only receive data from a scale, provided that both values of the scale are identical with the retrieval commands of the Telebox SPS USB.

By pressing the test key of the scale, a routine is shown in the display



88888 = Segment test

LAH= Release firmware

12.21= Version firmware

xx= Scale number (01-16, serves as identification number)



Cxx= Channel number (01 - 28, corresponds to the set radio frequency)



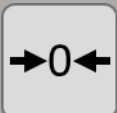



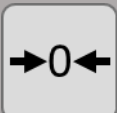


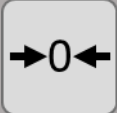
Hxx= Remote control number (01-12)


To change the scale, channel or remote control number, proceed as follows:

### NOTE

If a parameter value is not to be changed, it can be skipped by tapping the TEST key again.

1		<p>With the crane scale switched on, press the Power On and TEST keys simultaneously to open the SETUP menu.</p> <p>EEEE appears on the display.</p>
2		<p>Press the TEST key repeatedly until P13 appears in the display.</p> <p>Parameter P13 is used to set the radio frequency channel (Cxx).</p>

<p style="text-align: center;"><b>3</b></p>	 	<p>Press the TARA key to activate the parameter.</p> <p>Then use the TEST key to select a desired value between 01 - 28 (corresponds to channel 01 - 28).</p>
<p style="text-align: center;"><b>4</b></p>		<p>Confirm and close the parameter by pressing the ZERO key.</p> <p>The display alternately shows P13 and xx, where xx corresponds to the newly set channel number.</p>
<p style="text-align: center;"><b>5</b></p>		<p>Press the TEST key repeatedly until P14 appears in the display.</p> <p>Parameter P14 is used to set the scale number.</p>
<p style="text-align: center;"><b>6</b></p>	 	<p>Press the TARA key to activate the parameter.</p> <p>Then use the TEST key to select a desired value between 01 -16 (corresponds to scale number 01 - 16).</p>
<p style="text-align: center;"><b>7</b></p>		<p>Confirm and close the parameter by pressing the ZERO key.</p> <p>The display alternately shows P14 and xx, where xx corresponds to the newly set scale number.</p>
<p style="text-align: center;"><b>8</b></p>		<p>Press the TEST key repeatedly until P99 appears in the display.</p> <p>Parameter P99 is used to save the changed values.</p>
<p style="text-align: center;"><b>9</b></p>	 	<p>Press the TARA key to activate the parameter.</p> <p>Confirm and close the parameter by pressing the ZERO key.</p> <p>Sto (Store) flashes several times in the display. This symbolizes that the parameter change has been successfully stored.</p>

10		To exit the SETUP menu, press the Power On and Power Off keys simultaneously or briefly interrupt the power supply by disconnecting the round plugs on the battery.
----	---	---

## Setting / Date / Time

The time is set via the setup menu. Activate "P00" with the "OK" key.

Parameterize the date and time as follows:

Page 1: TT-MM (Day-Month)

Press the Next key.

Page 2: YYYY (year)

Press the Next key.

Page 3: SS-MM (Hour-Minute)

Press the Next key.

Page 4: SS (second)

The time is started with the OK key.

### Special functions date and time:

- By pressing the On/OK key on the device, the time is displayed for approx. 5 seconds.  
Format: HH-MM / DD-MM / YYYY
- If parameter P31 is activated, the time is displayed in the switched-off state.
- If the parameter P32 is activated, the time and date are shown in the display of the telebox after a standstill time of 15 minutes. Format: HH-MM / DD-MM / YYYY. This does not disable the functionality of the interfaces. By pressing a key or as soon as the weight data of the scale changes, the display is reset to the normal weight evaluation.

# EHP SETUP TOOL

With the help of the software, the functions and the radio connection of the Telebox can be tested safely.

## Installation

Copy the "USB Setup Tool" folder from the supplied CD to the computer (assuming unrestricted read and write rights). Then open the program "EHP Setup Tool.exe".

## Program overview



Figure 5- EHP Setup Tool

<b>User interface</b>	
1	"Weight" shows the current weight of the scale when the connection is active; if there is no connection, the display is empty.
2	Lights green when the connection is active, lights red when the scale is not in radio range or is off, lights orange when the scale has no stable weight.
3	Flashes red with each data packet received from the scale
4	"Connection - Port" Select the port of your telebox via scroll-down (see driver installation).
5	Connect/Disconnect" key establishes the connection between the software and the scale. Each time "Connect" is pressed, the current settings of the software are loaded into the Telebox.
6	"Channel" set the channel used by your scale. You can find out the channel setting of your scale by pressing the test key on the scale (or remote control) (see also chapter Changing the scale channel setting).
7	"Read data / Delete all records" these keys have no effect on the Telebox.
8	"Path" select the path where the Setup Tool should save weighing data.
9	Switches tare function of the scale on/off
10	Resets the scale to zero
11	Saves a single data record of a scale in the stored "path".
12	"Add" Adds up weights with each keystroke.
13	"Total" Adds up the weights that were entered with "Add".
14	"Log" monitor, here you can see information about weighing data exchanged between scale and PC.

**Table 2 - User interface**

<b>Menu tab</b>	
Settings	<ul style="list-style-type: none"> <li>• "Save current settings as default" Saves all settings of the Setup Tool as default, the tool will start with these settings in the future.</li> <li>• "Change unit" Changes the display between kg and t.</li> <li>• "End" ends the application</li> </ul>
Help	<ul style="list-style-type: none"> <li>• Displays EHP contact information</li> </ul>
Language	<ul style="list-style-type: none"> <li>• Change language (German/English)</li> </ul>

**Table 3 - Menu tab**



**Data format of the stored weighing data**

The output format of the software is a CSV file. This is automatically saved under the name EHP.csv in the path stored in the application.

The content is saved in follow format:

```
"2021-09-06";"14:42:50";"01";"0.0";"0.0"
```

```
"YYYY-MM-DD"; "HH:MM:SS"; "WW"; "NNNNN"; "DTTTT"
```

YYYY-MM-DD = date

HH:MM:SS = Time

**Data format of the stored weighing data:**

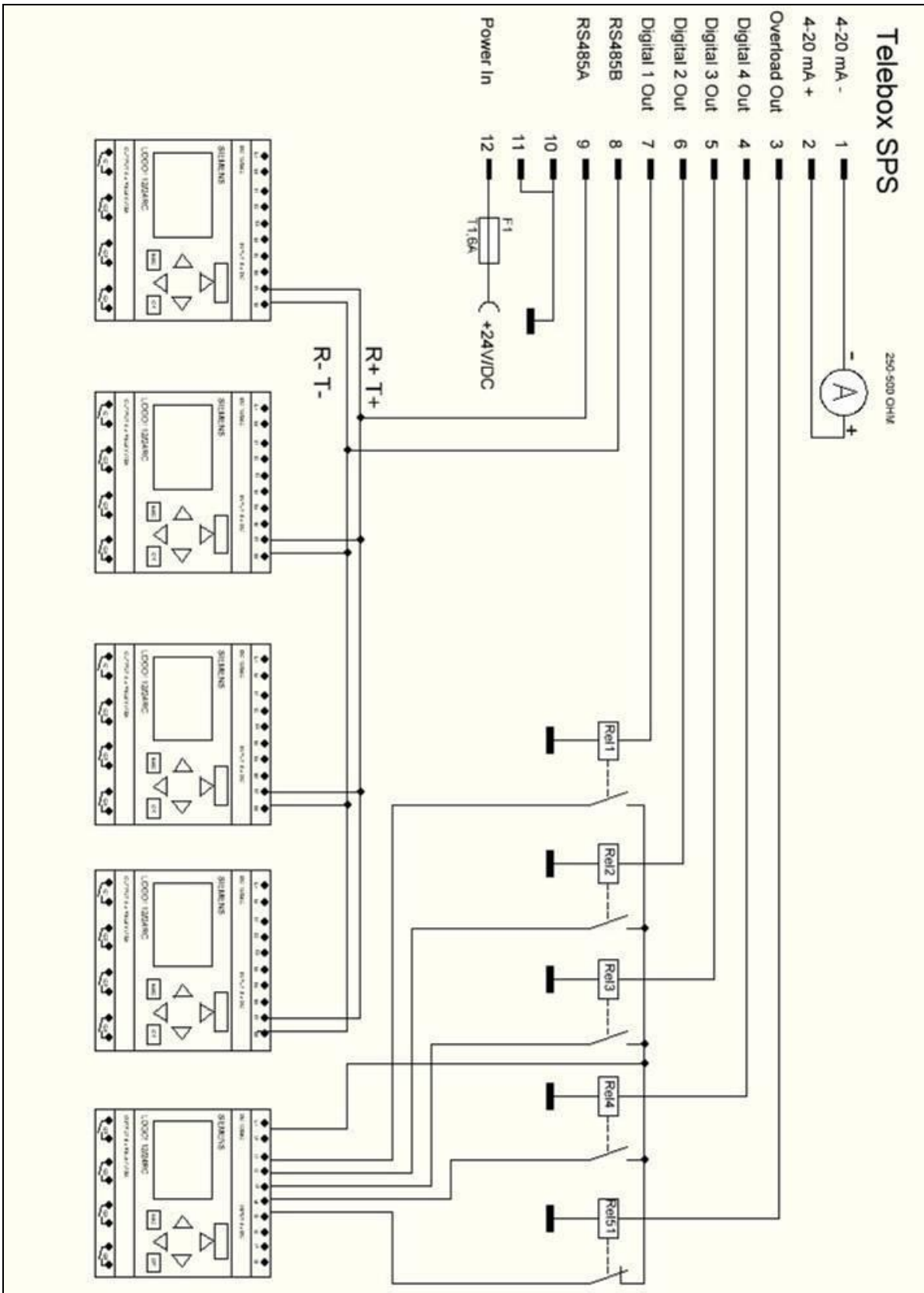
WW = Scale no.

NNNN = Net weight of the scale

TTTT = Tare weight of the scale

**Table 4 - Data format**

# Circuit diagram



## Error handling

Often, a malfunction or failure is caused by an operating error. If the device does not work properly, first go through the points below. Sometimes the malfunction could be caused by another device. Please check any additional devices that may be in use. The Telebox PLC works with error codes. We have listed the error codes that you may be able to correct yourself. If you get an extended system error that is not listed here, please contact the EHP service.

Problem	Remedy
The display shows "No."	The scale number was parameterized incorrectly in the setup.
No function	Check the built-in fuse T1,6A
The display shows E xxxx (xxxx corresponds to an error number)	Press the following key combination to acknowledge the error:  Keep OK key pressed, ESC key also pressed, NEXT. Error is acknowledged, if the error occurs again, please work through the error code list.
E 1.....9	Telebox SPS cannot be initiated.  SD card faulty or not formatted, short circuit on an interface.
E 100	Faulty connection of the relay outputs or short-circuit of the relay outputs.
E 1001	Faulty or invalid system state
E 1100, E1109...1117	Faulty radio protocol
E 1101	No start character included in the radio protocol
E 2301.....2322	Faulty Flash
E 3201, E 3202	Parameterization Telebox PLC, invalid
E 4001.....4008	IR processor error
E 5001	System clock time faulty, backup battery empty.
E 6000	SD card invalid, not formatted.
E 6001	SD card cannot be initiated.
E 6002	SD card not inserted
E 6003	SD card write protected
E 6010	Saved data set is lost
E 6101...6202	Read write error SD card

<b>Problem</b>	<b>Remedy</b>
<b>E 6223</b>	Incorrect measurement data, check the SD data with the PC.
<b>E 6224</b>	Measurement data file is missing, data was deleted by user, a new measurement data file is created automatically after a restart.
<b>E 6225</b>	Echo active parameter 5, sending of measurement data not possible, deactivate echo parameter 5.
<b>E 6226</b>	The measurement data number searched for is higher than the number in the measurement data file.
<b>E 7004 - 7006</b>	Faulty remote control, check hand-held transmitter number if necessary Reprogram hand-held transmitter number, see chapter Menu Setup.
<b>E 1170- 1181</b>	Error/defect Low Range radio. You may have selected a Low Range radio channel and installed High Range radio. See also frequency table.
<b>The display is choppy in master/slave mode.</b>	The telebox constantly switches back and forth between the two scales in master-slave mode, and the weight of the A scale is always stored in the buffer.
<b>The display of the scale constantly switches back and forth between 2 different weights.</b>	A 2nd EHP scale is in operation occupying the same channel or the mirror frequency of the set channel, switch to another channel.
<b>RS 232 interface does not work</b>	RS 485 Parameter 3 is enabled, echo disabled Parameter 5
<b>Parameter 5 does not respond</b>	Parameter 15 Grey Box Mode is activated, this is superior to parameter 5.

## **EHP service hotline**

**Do you need our support in the fastest way?**

**No problem - just call us free of charge.**



**Hotline: +49 7223 9366-0**

**You can reach us Monday through Thursday  
between 8:00 am and 4:00 pm and Friday  
between 8:00 am and 12:00 pm.**



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