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Operating and Installation Instructions Digital weighing transmitter

KERN YKV-01/02

Version 1.1

2019-04

GB



YKV-01-02-BA_IA-e-1911



KERN YKV

Version 1.1 2019-04

Operating and installation instructions Digital weighing transmitter

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1 Technical data

KERN (type)	TYKV-01-A	TYKV-02-A
Model	YKV-01	YKV-02
Net weight (kg)	1.1	1.1
Dimensions of the housing (B x D x H) mm	100 x 127 x 28 mm	100 x 127 x 28 mm
Permissible ambient condition	- 10° C to +40° C	
Housing material	Synthetic material	
Humidity of air	80 % relative (not condensing)	
Input voltage Mains adapter	100 V - 240 V, 50 / 60 Hz	
Input tension Device	5 V, 500 mA	
Interfaces	USB-Host/Master (Standard)	USB-Host/Master (Standard)
	WLAN/WiFi-Module (factory option)	WLAN/WiFi-Module (factory option)
	RS 232 (standard)	RS 232 (standard)
	Bluetooth 4.0 (factory option)	Bluetooth 4.0 (factory option)
	-	Ethernet (Standard)

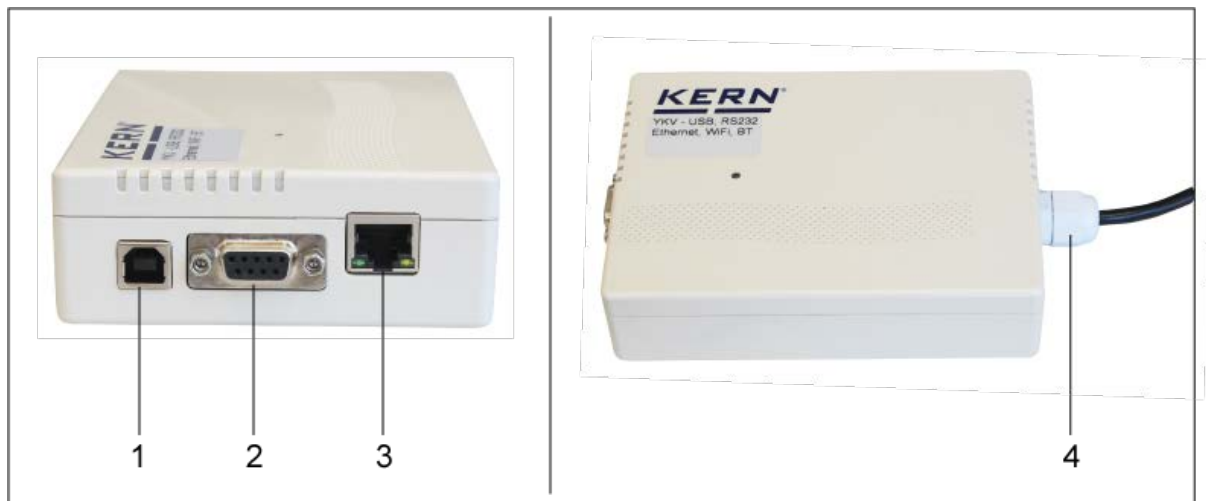
2 Declaration of conformity

The current EC/EU Conformity declaration can be found online in:

www.kern-sohn.com/ce

3 Appliance overview

Example YKV-02-A:



Pos.	Description
1	USB 2.0 type B
2	RS232
3	Ethernet
4	Connection to the load cell

4 Basic Information (General)

4.1 Proper use

The digital weighing transmitter acquired by you is used in combination with a platform and serves to determine the weighing value of material to be weighed. It is intended to be used as a "non-automatic weighing system", i.e. the material to be weighed is manually and carefully placed in the centre of the weighing plate. As soon as a stable weighing value is reached the weighing value can be read.

4.2 Improper Use

Do not use weighing system (YKV and platform) for dynamic weighing. In the event that small quantities are removed or added to the material to be weighed, incorrect weighing results can be displayed due to the "stability compensation" in the device. (Example: Slowly draining fluids from a container on the balance.)

Do not leave permanent load on the weighing pan. This may damage the measuring system.

Impacts and overloading exceeding the stated maximum load (max) of the weighing plate, minus a possibly existing tare load, must be strictly avoided. The weighing system could be damaged.

Never operate the weighing system in explosive environment. The serial version is not explosion protected.

Changes to the weighing system's design are not permitted. This may lead to incorrect weighing results, safety-related faults and destruction of the weighing system.

The weighing system may only be operated in accordance with the described default settings. Other areas of use must be released by KERN in writing.

4.3 Warranty

Warranty claims shall be voided in case

- Our conditions in the operation manual are ignored
- The appliance is used outside the described uses
- The appliance is modified or opened
- Mechanical damage or damage by media, liquids, natural wear and tear
- The appliance is improperly set up or incorrectly electrically connected
- The measuring system is overloaded

4.4 Monitoring of Test Resources

In the framework of quality assurance the measuring-related properties of the weighing system and, if applicable, the testing weight, must be checked regularly. The responsible user must define a suitable interval as well as type and scope of this test. Information is available on KERN's home page (www.kern-sohn.com) with regard to the monitoring of display units' test substances and the test weights required for this. In KERN's accredited DKD calibration laboratory test weights and digital weighing platforms may be calibrated (return to the national standard) fast and at moderate cost.

5 Basic Safety Precautions

5.1 Pay attention to the instructions in the Operation Manual



⇒ Carefully read this operation manual before setup and commissioning, even if you are already familiar with KERN balances.

5.2 Personnel training

The appliance may only be operated and maintained by trained personnel.

6 Transport and storage

6.1 Testing upon acceptance

When receiving the appliance, please check packaging immediately, and the appliance itself when unpacking for possible visible damage.

6.2 Packaging / return transport



- ⇒ Keep all parts of the original packaging for a possibly required return.
- ⇒ Only use original packaging for returning.
- ⇒ Prior to dispatch disconnect all cables and remove loose/mobile parts.

7 Unpacking and placing

7.1 Installation Site, Location of Use

The weighing system is designed to achieve reliable weighing results under normal conditions of use.

You will work accurately and fast, if you select the right location for your weighing system.

On the installation site observe the following:

- Place the weighing system on a firm, level surface;
- Avoid extreme heat as well as temperature fluctuation caused by installing next to a radiator or in the direct sunlight;
- Protect the weighing system against direct draughts due to open windows and doors;
- Avoid jarring during weighing;
- Protect the weighing system against high air humidity, vapours and dust;
- Do not expose the weighing system to extreme dampness for longer periods of time. Non-permitted condensation (condensation of air humidity on the appliance) may occur if a cold appliance is taken to a considerably warmer environment. In this case, acclimatize the disconnected appliance for ca. 2 hours at room temperature.
- Avoid static charge of weighed items or weighing container.

Major display deviations (incorrect weighing results) may be experienced, should electromagnetic fields (e.g. due to mobile phones or radio equipment), static electricity accumulations or instable power supply occur. Change location or remove source of interference.

7.2 Unpacking and checking

Take the weighing transmitter out of the packaging, remove the packaging material and install at the designated workstation. Check if that there has been no damage and that all packing items are present.

Scope of delivery / serial accessories:

- Weighing transmitter
- Net adapter EU/UK/US
- USB A to USB B cable
- These installation instructions
- Software KERN BalanceConnection
in the downloads area on <http://www.kern-sohn.com>

7.3 Transport Securing

Please note: if the YKV is used together with platform with transportation lock, this transportation lock must be released prior to use.

7.4 Installation Weighing transmitter - Platform

i Installation / configuration of a weighing system must be carried out by a well acquainted specialist with the workings of weighing balances.

7.4.1 Weighing system design

The digital weighing transmitter is suitable for connection to any analogue load cell in compliance with the required specifications.

The following data must be established before selecting a load cell:

- **Weighing balance capacity**
This usually corresponds to the heaviest load to be weighed.
- **Preload**
This corresponds to the total weight of all parts that are to be placed on the weighing cell such as upper part of platform, weighing pan etc.
- **Total zero setting range**
This is composed of the start-up zero setting range ($\pm 2\%$) and the zero setting range available to the user via the ZERO-function (2%). The total zero setting range equals therefore 4 % of the scale's capacity.

The addition of weighing scales capacity, preload and the total zero setting range give the required capacity for the weighing cell.

To avoid overloading of the weighing cell, include an additional safety margin.

7.4.2 How to connect the platform

⇒ Connection to power supply via USB



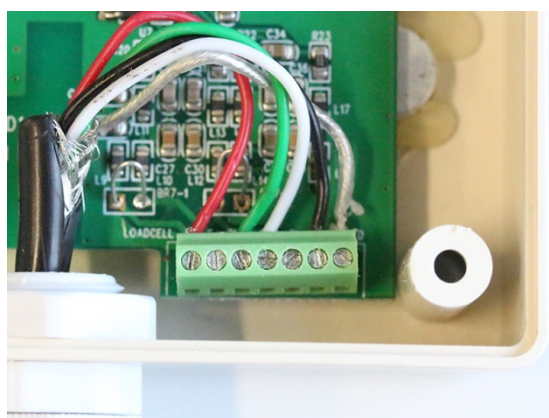
- For power supply we recommend to connect the YKV to the PC. For this purpose connect the USB coupling of the YKV to the PC.
- If another interface is used, power has to be supplied via the external power pack. For this purpose connect the power pack to the USB coupling of the YKV.



Prior to starting the assembly work, disconnect the digital weighing transmitter from the mains.

⇒ Weld the individual wires of the load cell cable to the printed circuit board.

Example of application:



Couplings from left to right described as follows:

E+	S+	OUT+	OUT-	S-	E-	Shield
----	----	------	------	----	----	--------



The strain relief of the load cell cable is between 4 mm and 8 mm.

7.5 Connect weighing transmitter to PC

Weighing data can be edited to connected networks or PCs via the interfaces. In reverse order, control commands and data inputs may be made via the connected devices (such as PC).

Every interface has to be configured according to the peripheral device and the desired function.

For data transfer a transfer software is required. Our optionally available transfer software Balance Connection SCD 4.0 gives you a lot of possibilities for transfer and recording.

Available interfaces:

	YKV-01	YKV-02
USB	Standard	Standard
WLAN/WiFi	Factory option	Factory option
RS232	Standard	Standard
Bluetooth 4.0	Factory option	Factory option
Ethernet	-	Standard

8 Configuration

Description	Sent to balance	Answer of balance
Define maximum load (exp.: 60 kg) and unit (exp.: kg)	JDC 60.00 kg	JDC A
Resolution (decimal digits and readability) Exp.: 0.05 kg	JDD 0.05 kg	JDD A
Determine overload (exp. 60.45 kg):	JDO 60.45 kg	JDO A
Define Adjustment weight (Bsp.: 60.00 kg)	JDA 60.00 kg	JDA A

Further linearization points can be defined with the **JDL** command.

i	• Please observe the sequence; the same unit must be used for all parameters. • The configuration can also be carried out using the BalanceConnection software. Please refer to the corresponding chapter down below.
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9 Adjustment

As the acceleration value due to gravity is not the same at every location on earth, every digital weighing platform must be coordinated - in compliance with the underlying physical weighing principle - to the existing acceleration due to gravity at its place of location (only if the weighing system has not already been adjusted to the location in the factory). This adjustment process must be carried out for the first commissioning, after each change of location as well as in case of fluctuating environment temperature. To receive accurate measuring values it is also recommended to adjust the digital weighing platform in weighing operation.



- Prepare the required adjustment weight. The adjustment weight to be used depends on the capacity of the weighing system. Carry out adjustment as near as possible to the weighing system's maximum weight. Info about test weights can be found on the Internet at: <http://www.kern-sohn.com>.
- Observe stable environmental conditions. Stabilisation requires a certain warm-up time.
- Make sure that the balance data are input correctly

10 Linearization / first adjustment

The linearity indicates the largest deviation of the weight display of a balance to the value of the respective test weight for plus and minus over the entire weighing range. If a linearity deviation is detected during test equipment monitoring, this can be improved by linearization.



- A linearization is absolutely necessary after changing the weighing parameters with **JDC**, **JDD**, etc.
- For scales with a resolution > 15,000 division steps, it is recommended to carry out a linearization.
- For scales with a resolution of <15,000 divisions, an single-point adjustment is recommended. **Only with display devices.**
- The linearization may only be carried out by a specialist with profound knowledge in the handling of balances.
- The test weights to be used must be adapted to the specifications of the balance.
- Observe stable environmental conditions. A warm-up time for stabilization is required.
- After linearization, calibration is recommended.

10.1 Carrying out the linearization

For adjustment connect the weighing transmitter to the PC via the USB-interface as described in chap. 7.4.

Linearization can be initiated using the commands **JALZ**, **JALL** as well as **JAS** in the KCP protocol.

	Sent to balance	Received from balance
Unload the weighing plate		
Send the max. capacity of the scale JDC . Balance sends a confirmation.	JDC 60 kg	JDC A
Send the readability of the scale JDD . Balance sends a confirmation.	JDD 0.02 kg	JDD A
Send the max. overload of the scale JDO . Balance sends a confirmation.	JDO 60 kg	JDO A
Optional: Send more linearization points JDL x (x = 0 to 7)	JDL 0 30 kg JDL 1 60 kg	JDL A JDL A
Start linearization JALZ	JALZ	JALZ A 60 kg
• Put on the indicated load.		
• Continue linearization JALL	JALL	JALL B 30 kg
• Put on the indicated load.		
• Continue linearization JALL	JALL	JALL A
Save linearization JAS	JAS	JAS A

The linearization is thus successfully completed. If errors occur, repeat linearization.

10.2 Performance of a single point adjustment

For adjustment connect the weighing transmitter to the PC via the USB-interface as described in chap. 7.4.

Adjustment can be initiated using the commands **JAGZ**, **JAGL** as well as **JAS** in the KCP protocol.

	Sent to balance	Answer of balance
Unload weighing plate		
Sending the command to adjust the zero point JAGZ . The balance sends a confirmation JAGZ A specifying the adjustment weight to be placed upon	JAGZ	JAGZ A 15.00 kg
Loading the balance with the adjustment load		
Send the command to import the adjustment load JAGL . The balance sends a confirmation JAGL A .	JAGL	JAGL A
Save the adjustment using the command JAS .	JAS	JAS A

Now the process of adjustment is successfully completed. Should errors occur, repeat adjustment.

i	Observe the sequence: • JZ - JL - JS - o Before and after changing the weighing parameters, perform a linearization, only then does the one-point adjustment work.
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11 Configuration using the KERN Balance Connection software

The BalanceConnection software (expert mode) includes a dialog for configuring the device. You can download the BalanceConnection software from the following URL:

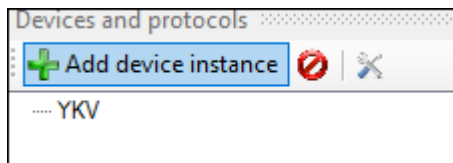
<http://balanceconnection.kern-sohn.com/dl>

You can find the manual at:

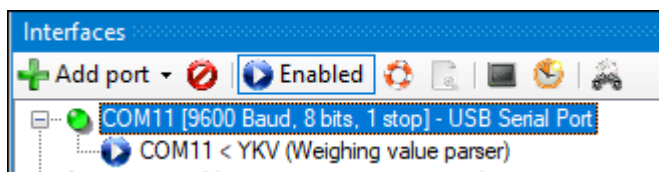
<http://balanceconnection.kern-sohn.com/manual.pdf>

To configure the device with the BalanceConnection software, please follow the instructions below (according to the instructions of the software):

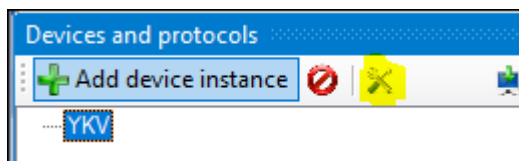
- 1) Switch to expert mode.
- 2) Select the desired device from the list.



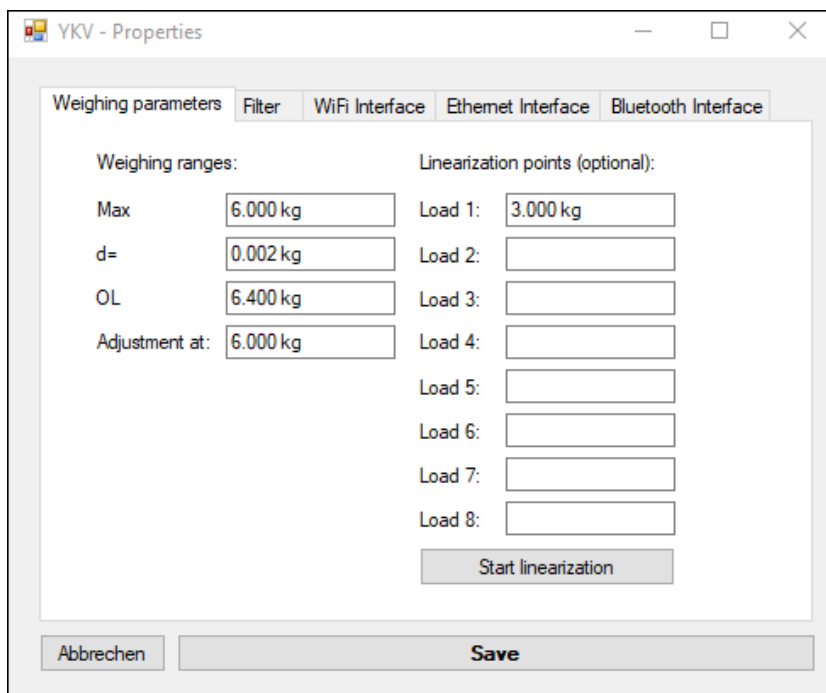
- 3) Connect the correct port to the selected device



- 4) Start the configuration dialog via the following button:



- 5) Complete the desired parameters and press the "Apply" button.



12 Connection to your system

Using and configuration of the digital weighing transmitter are made by the **KCP** communication log via the installed interfaces. KCP is described in the interface specification KCP-ZB (online available). The following sections describe how to connect the weighing platform to your system using your preferred communications interface.

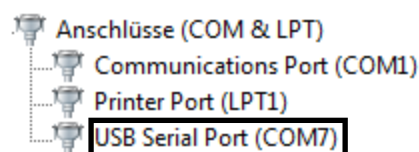
i KCP (KERN Communications Protocol):

KCP is a standardized set of interface commands for KERN balances and other appliances, which allows all of the relevant parameters and functions to be called up and controlled. KERN devices that have KCP can use it to connect easily to computers, industrial control systems and other digital systems.

12.1 USB

Connect the device to the host computer using the enclosed USB cable. It will be recognized as a virtual COM port and will be assigned a corresponding numbered connection.

Example (Microsoft Windows Device Manager):



In modern devices the USB driver required for the weighing transmitter has already been pre-installed. If the system is not recognized automatically, you can obtain the correct driver from the downloads area at <http://www.kern-sohn.com>.

12.2 Bluetooth

The weighing transmitter is optionally available with **Bluetooth Low Energy** (BLE) and will then be visible to Bluetooth Master devices using its serial number.

To access this, please use an appropriate software programme / app which supports Bluetooth Low Energy (BLE). Applications exclusively using Bluetooth Classic (BLC) will not work.

12.3 RS232

Use a suitable cable to connect the weighing transmitter to the interface of the computer. The fault-free operation is ensured either by the corresponding KERN-interface cable (KERN 572-926) or directly via the RS232-interface of the PC.

Enter default values:

Baud rate	9600
Data bits:	8
Parity	none
Stop bits	1



12.4 Ethernet

In standard configuration the weighing transmitter uses the DHCP log to intrude into the network.

For inquiry of the configuration allocated via DHCP, as well as to the specific/static configuration of the IP-address, subnet-mask or the gateway, the KCP-commands **JNEx** can be used.

12.5 WLAN

- ⇒ After switching-on without configuration, the YKV creates first a WLAN access point named "AI-Thinker_xxxxxx".
- ⇒ Connect YKV to the computer via this access point.
- ⇒ In a webbrowser enter the IP-address 192.168.4.1 of the YKV. The configuration website will appear. The static IP will be assigned via the KCP-commands.

A	Select operating mode "apsta"
B	Enter WLAN-network name and the corresponding password
C	Save settings and restart target software (reboot button)

(s. fig.:)

The screenshot shows the 'ESP8266 WebConfig' interface. At the top right are 'Restore' and 'Reboot' buttons. The interface is divided into three main sections: 'Serial Setting', 'SoftAP', and 'Station'.
- 'Serial Setting' includes fields for Baud (115200), Databits (8), Parity (NONE), and Stopbits (1), with a 'Save' button at the bottom.
- 'SoftAP' includes fields for SSID (AI-THINKER_872B77), Passwd, Auth Mode (OPEN), IP addr (192.168.4.1), Subnet mask (255.255.255.0), Gateway (192.168.4.1), and Mac (be:dd:c2:87:2b:77), with a 'Save' button at the bottom.
- 'Station' includes fields for Mode (apsta), AP Name (PDWLAN), AP Password (12345678), IP address (0.0.0.0), Subnet mask (0.0.0.0), Gateway (0.0.0.0), and Mac (bc:dd:c2:87:2b:77), with a 'Save' button at the bottom.
Labels A, B, and C are placed on the right side of the 'Station' panel: A points to the 'Mode' dropdown, B points to the 'AP Name' and 'AP Password' fields, and C points to the 'Save' button.

D	Separate connection to the PC (access point) and disconnect power supply of the YKV.
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Should settings have been made on the device, make sure that afterwards the power supply to the YKV is disconnected.

Only then the settings will be imported.

Update (reboot-button) and saving (save-button) are not sufficient.

E

- Reconnect YKV to the power supply,
- Restore connection to the PC (access point),
- Invoke the configuration website and check the IP-address.

(s. fig.:)

The image shows the ESP8266 WebConfig interface. It has three main panels: Serial Setting, SoftAP, and Station. The Serial Setting panel has fields for Baud (115200), Databits (8), Parity (NONE), and Stopbits (1). The SoftAP panel has fields for SSID (AI-THINKER_872B77), Passwd, Auth Mode (OPEN), IP addr (192.168.4.1), Subnet mask (255.255.255.0), Gateway (192.168.4.1), and Mac (bc:dd:c2:87:2b:77). The Station panel has fields for Mode (apsta), AP Name (PDWLAN), AP Password (12345678), IP address (10.0.11.13), Subnet mask (255.255.0.0), Gateway (10.0.0.1), and Mac (bc:dd:c2:87:2b:77). There are 'Save' buttons at the bottom of each panel and 'Restore' and 'Reboot' buttons at the top right.

F

Close the configuration website, connect the PC to the selected network

G

Open the target software (e.g. KERN Balance Connection) and enter the IP-address and port 23.

(s. fig.:)

The image shows a dialog box titled 'TCP/IP -> 10.0.11.13:23 < 440 (Gewichtswert-Parser) - Eigenschaften'. It has three tabs: Allgemein, Bus, and IP Port Eigenschaften. The IP Port Eigenschaften tab is selected. It contains fields for Verbindungsart (TCP - Client - verbindend), Lokale IP Adresse, Port, Ziel Host/IP Adresse (10.0.11.13), and Port (23). There is a 'Keep-Alive' checkbox which is checked. At the bottom are 'Abbrechen' and 'Anwenden' buttons.

For inquiry of the configuration allocated via DHCP, as well as to the specific/static configuration of the IP-address, subnet-mask or the gateway, the KCP-commands **JNWx** can be used.

13 Carrying out measurements

13.1 Using your own software

Measurements may be requested using various KCP protocol commands.

13.1.1 Request weighing data

Central commands for the request are:

- „S“: Transmit the next stable value
- „SI“: Transmit the current value
- „SIR“: Transmit the current net weighing data continuously

13.1.2 Zeroing and taring

The device can be zeroed and tared using the following commands:

- „Z“: Zeroing the display on the balance
- „T“: Taring the balance
- „TA“: Setting or requesting the current tare value

13.2 Using the BalanceConnection software

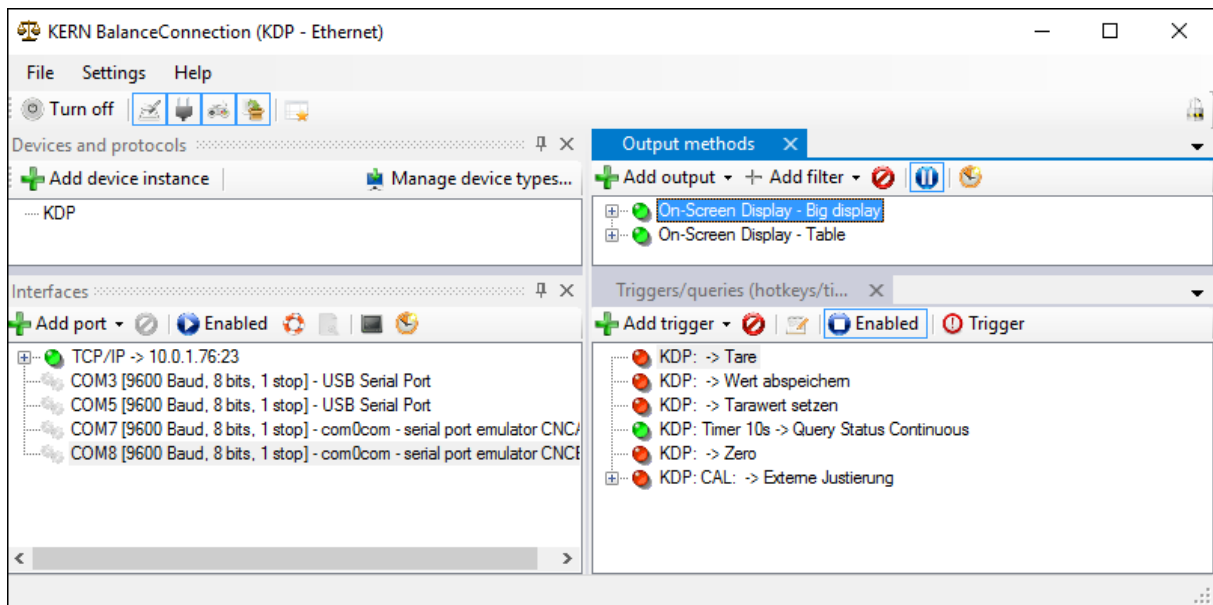
The enclosed "KERN BalanceConnection" software includes an example configuration for working with the KDP weighing platform. The example configuration switches the balance to continuous transmission, displays the current weight value on-screen and includes the most important commands (adjustment, zeroing, taring, printing).

To activate the example configuration, please select the "KDP" model from the list of models.



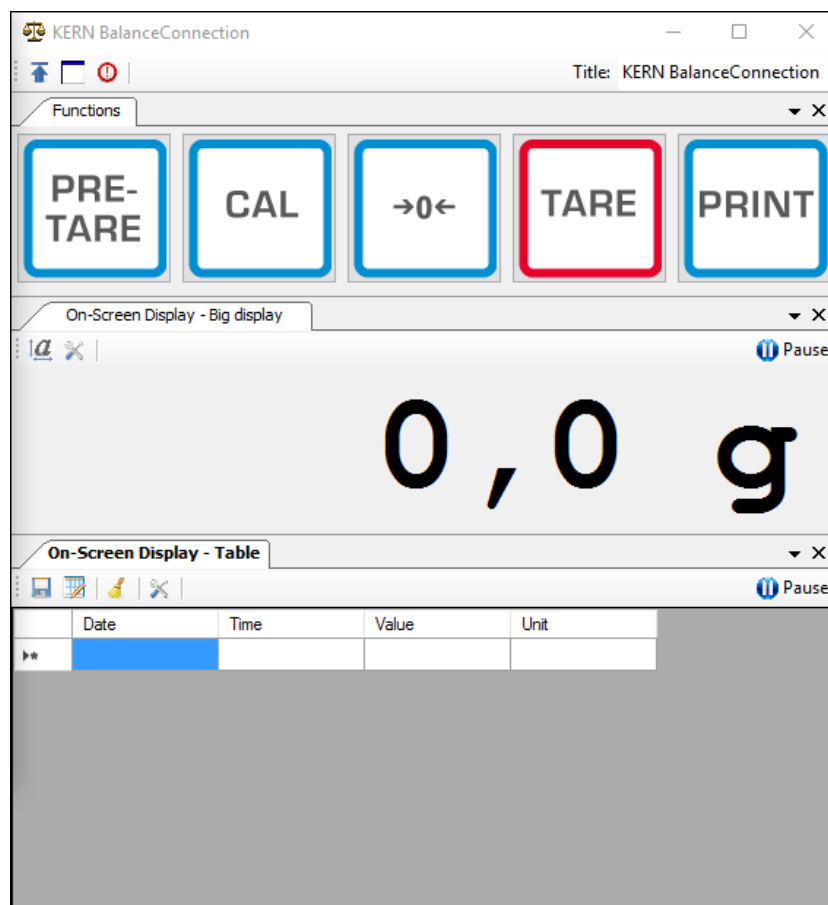
After confirmation the software loads the example configuration and restarts. You will see the following items (two windows):

1) Main window BalanceConnection:



2) On-screen display window with three areas:

- Main functions
- Current measuring value
- Table listing weight values, which can be requested using "PRINT".



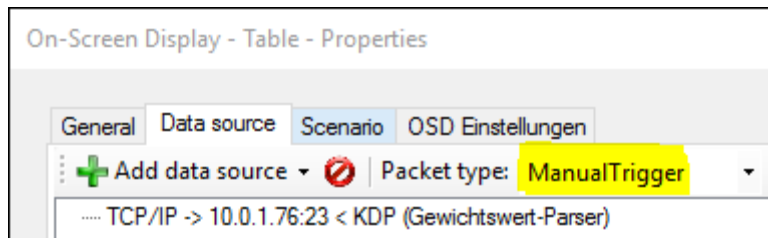
Important:

In the standard configuration COM1 is selected as the interface. Please adjust this on your balance. For access through Ethernet, WLAN or Bluetooth, please enter the relevant port in the software.

For details on changing the configuration please refer to the instructions for the BalanceConnection software.

i In the example configuration the weighing platform sends data constantly. The weight values would normally all be forwarded to the output methods.

If you only want to keep the current value, then please use the operation "Save value" to accept the value. In the output method, the package type must be set to manual trigger.



13.2.1 Functions

In the example configuration the following functions are pre-configured:



⇒ **Zeroing (→0←):**

The display on the balance is set to zero, the full weighing range is available.

⇒ **Taring (TARE):**

The current weight value is adopted as the tare value. The new net value is displayed.

⇒ **PRE-TARE:**

You can define a tare value (please specify in and with the weighing unit).

⇒ **PRINT:**

The current weight displayed on the balance is adopted as a value into the assigned output methods.

⇒ **Adjustment (CAL):**

Adjustment of the platform is illustrated in the example configuration by a sequence of commands, which corresponds to the adjustment procedure in the chapter 8. Please follow the instruction displayed on the screen.