PENKO Engineering B.V.

Your Partner for Fully Engineered Factory Solutions

Manual:
EU-800d

PENKO
an ETC Company

IMPORTANT SAFETY INFORMATION

READ THIS PAGE FIRST!

PENKO Engineering B.V. manufactures and tests its products to meet all applicable national and international standards. It is vital that this instrument is correctly installed, used, and maintained to ensure it continues to operate to its optimum specification.

The following instructions must be adhered to and incorporated into your safety program when installing, using, and maintaining PENKO products. Failure to follow the recommended instructions can affect the system's safety and may increase the risk of serious personal injury, property damage, damage to this instrument and may invalidate the product's warranty.

• Read the instructions fully prior to installing, operating, or servicing the product. If this Instruction Manual is not the correct manual for the PENKO product you are using, call 0031(0)318-525630 for a replacement copy. Keep this Instruction Manual in a safe place for future reference.

• If you do not fully understand these instructions, contact your PENKO representative for clarification.

• Pay careful attention to all warnings, cautions, and instructions marked on and supplied with the product.

• Inform and educate your personnel about the correct installation, operation, and maintenance procedures for this product.

• Install your equipment as specified in the installation instructions of the appropriate Instruction Manual and as per applicable local and national codes. Connect all products to the proper electrical sources.

• To ensure correct performance, use qualified personnel to install, operate, update, program, and maintain the product.

• When replacement parts are required, ensure that qualified technicians use replacement parts specified by PENKO. Unauthorized components and procedures can affect the product's performance and may affect the continued safe operation of your processes. The use of non-specified 'look-alike' substitution parts may result in the risk of fire, electrical hazards, or improper operation.

• Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

WARNING

ELECTRICAL SHOCK HAZARD

Installing cable connections and servicing this instrument require access to shock hazard level voltages which can cause death or serious injury.

Disconnect separate or external power sources to relay contacts before commencing any maintenance.

The electrical installation must be carried out in accordance with CE directions and/or any other applicable national or local codes.

Unused cable conduit entries must be securely sealed by non-flammable blanking plates or blind grommets to ensure complete enclosure integrity in compliance with personal safety and environmental protection requirements.

To ensure safety and correct performance this instrument must be connected to a properly grounded, three-wire power source.

Proper relay use and configuration is the responsibility of the user.

Do not operate this instrument without the front cover being secured. Refer any installation, operation or servicing issues to qualified personnel.

WWW.PENKO.COM

PENKO Engineering B.V. is an ETC Company

Email: info@PENKO.com

Table of Contents

Introduction

The PENKO EU-800d is an IP68 Measurement Device.

In the box

The box contains the following items:

- 1 x PENKO EU-800d
- 1 x quick start manual

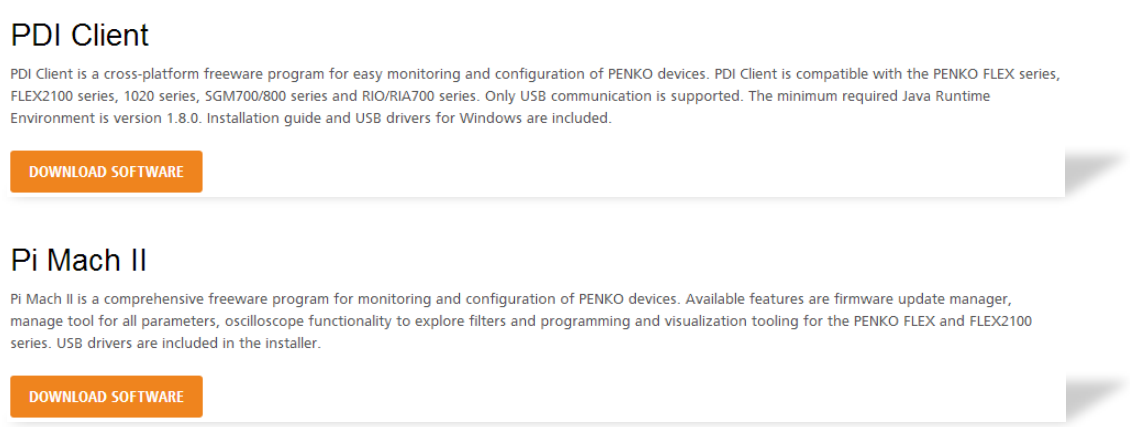
Needed for use

To use the EU-800d the following items are needed:

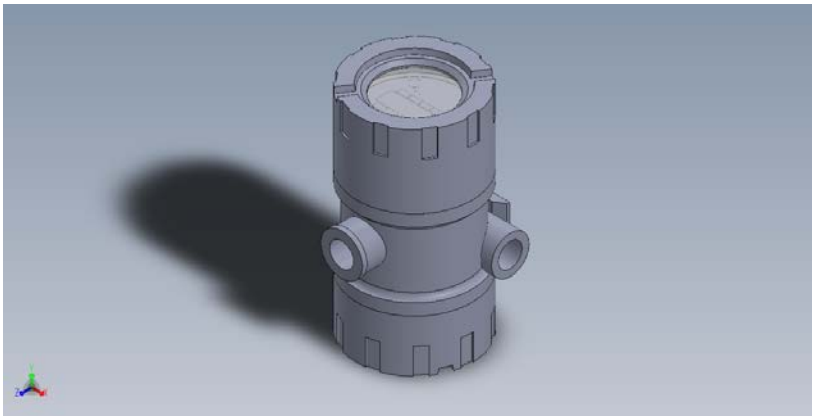
- Class 2 or Limited Power Source, rate 18 - 32 VDC, 0.4A@24VDC
- Load cell
- USB A - B cable for configuration with PC software (optional)

For easy configuration, two PC applications are available as download.

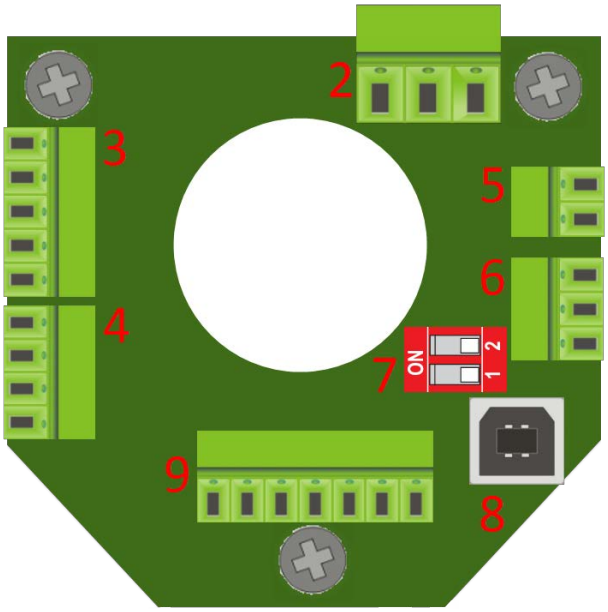
www.penko.com/software



1 Overview



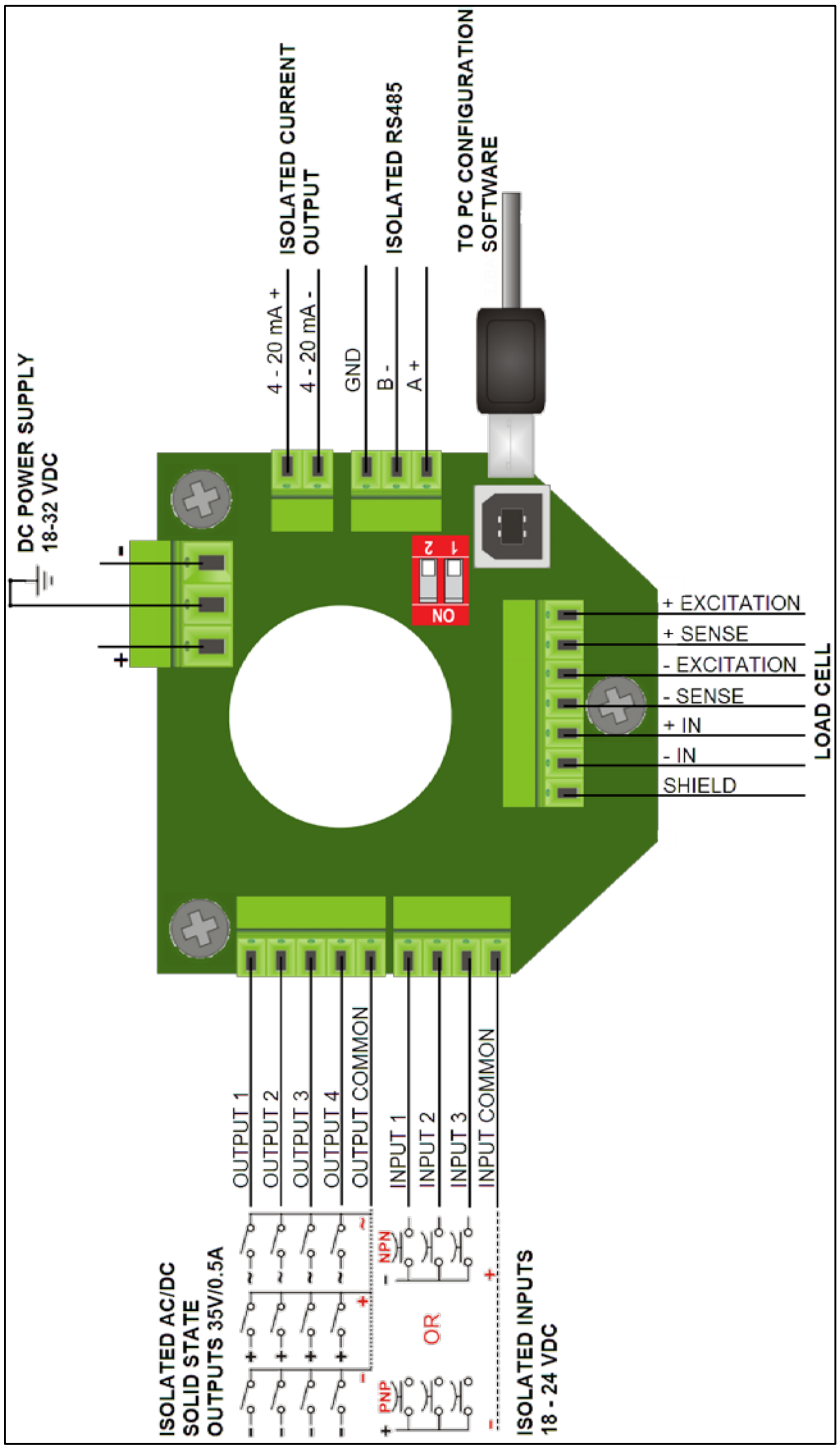
Front **Rear**



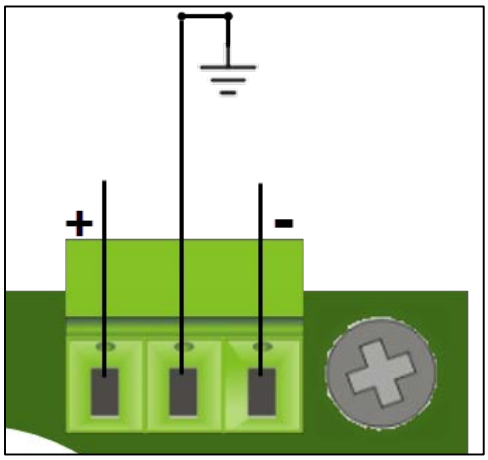
Number	Description
1	Front with LED display, LED indications and optical keys
2	24VDC power supply
3	Digital outputs (4)
4	Digital inputs (3)
5	Analog output
6	RS485 connection
7	RS485 bus termination
8	USB connection
9	Load cell connection

2 Connections

This chapter describes the connections of the EU-800d.

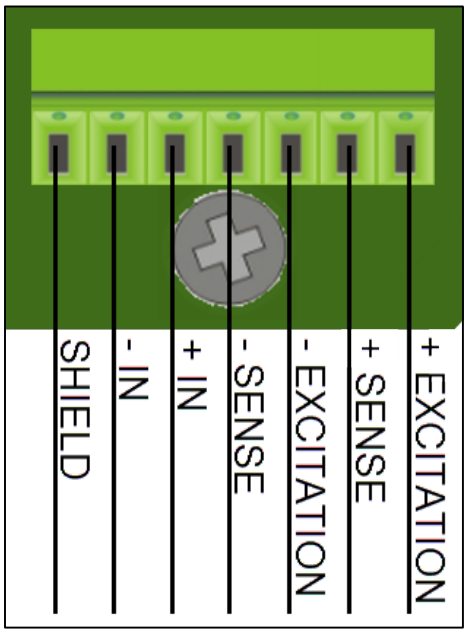


2.1 Power supply



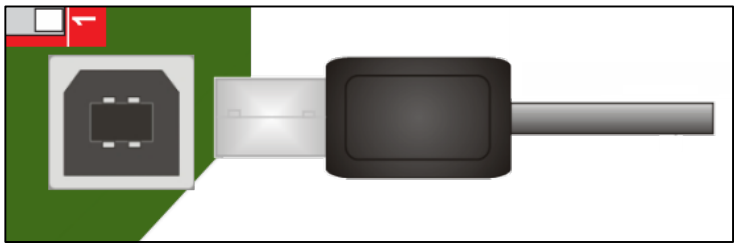
Power the device using a Class 2 or Limited Power Source, rate 18 – 32 VDC, 0.4A@24VDC

2.2 Load cell



Property	Description
Wiring	With sense
Type of sense	Passive
Excitation voltage	5 VDC
Sensitivity	0.1 µV/d
Selectable ranges	1 mV/V | 1,5 mV/V | 2 mV/V | 2,5 mV/V | 3 mV/V
Input voltage unipolar @3mV/V	-1 mV to 16 mV
Input voltage bipolar @3mV/V	-16 mV to 16 mV
A/D Conversion speed	1600/s
Max. load cell impedance	1200 Ω
Min. Load cell impedance	43,75 Ω
Max. no. of load cells 350 Ω	8
Max. no. of load cells 1000 Ω	22

2.3 USB



Connect the device to a computer using an A - B USB cable. The USB interface is used for communication with PENKO configuration software.

Before connecting the device to a computer using USB, make sure the USB driver is installed. The driver is included in the PENKO configuration PC applications, see chapter PC applications.

Only 1 protocol is supported over USB:

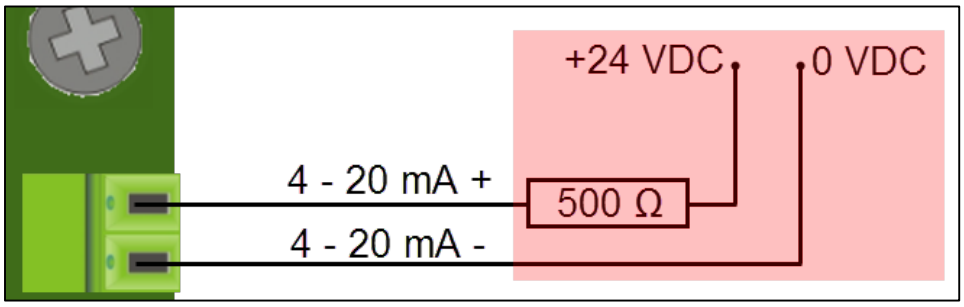
Protocol	Description
Penko TP	PENKO protocol used for configuration software

⚠ Before connecting the device to a computer using USB, make sure the USB driver is installed.

⚠ The USB interface is intended for use before installation and can only be connected when the housing is open. This must only be allowed outside the explosion hazard zone.

⚠ The USB interface cannot be used for printers, memory sticks etc.

2.4 Analog output

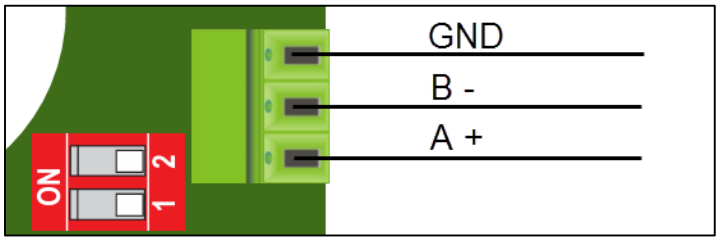


The analog output must be powered by an external power supply as shown in the above picture. The analog output can follow an indicator value and output the following range:

Range	Description
4 - 20 mA	The minimum and maximum output of the analog output

See chapter 6.3.6 for all available settings.

2.5 RS485



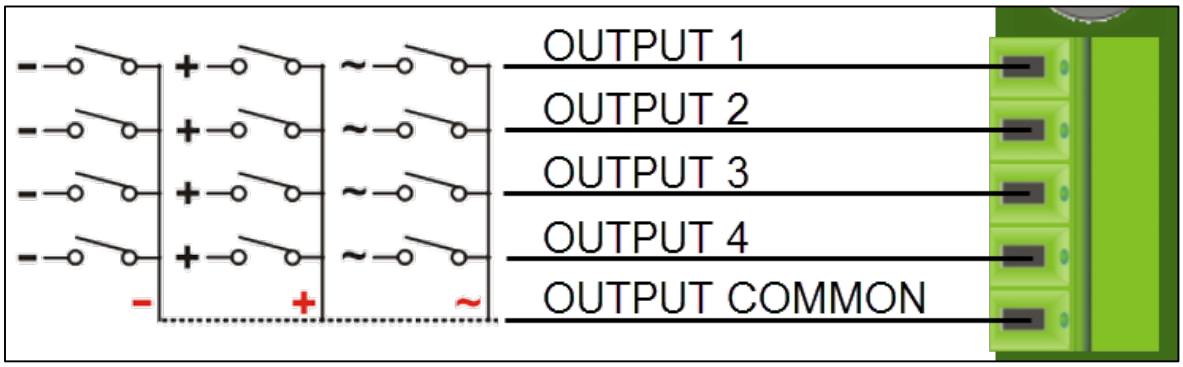
The following protocols are supported over RS485:

Protocol	Description
Modbus-RTU	Protocol to connect to SCADA/PLC
Modbus-ASCII	Protocol to connect to SCADA/PLC
ASCII	PENKO protocol for ASCII communication
NPV Slave	PENKO Protocol used for follow displays

For best performance the RS485 must be terminated at the first and last device on the bus. This ensures proper impedance matching. Use the dipswitch to terminate the bus.

See chapter 6.3.3 for all available settings.

2.6 Digital outputs

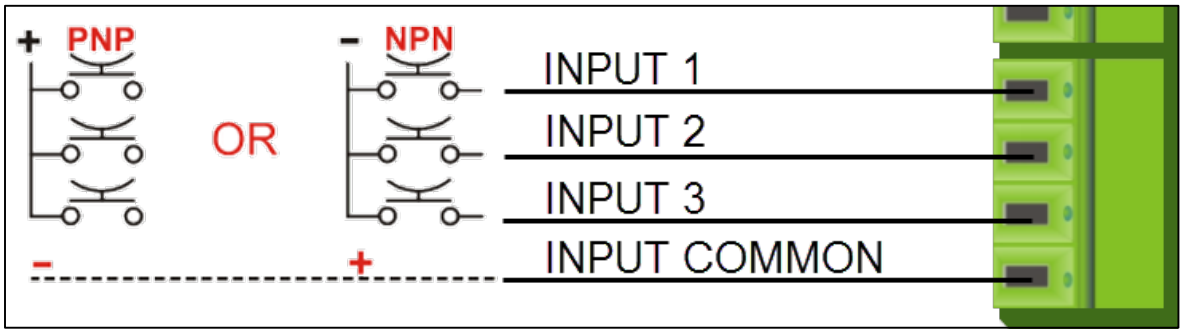


The device has 4 digital outputs that can be used for an AC and DC power circuit up to 35V/0.5A.

The outputs can be programmed as setpoints with a programmable hysteresis and function like Weight, Gross, Peak etc.

See chapter 6.3.5 for all available settings.

2.7 Digital inputs



The device has 3 digital. The inputs can be switched PNP or NPN with 18 - 28 VDC.

The inputs can be programmed as Hold, Peak Hold, Key Lock etc.

See chapter 6.3.4 for all available settings.

3 Display and keypad

The display contains the following indications:

►0◄ ZERO - Zero is active

NET - Tare is active

STABLE - Indicator in stable range

MENU - Device is in menu mode

COMM - Reserved

KEY - Optical keys enabled - goes momentary off while a key is active

LBS - Active unit of measurement (LBS or KG)

KG - Active unit of measurement (LBS or KG)

Press keys simultaneously for unlocking the keyboard (step 1)

Press keys simultaneously for unlocking the keyboard (step 2)

The optical keys have the following functions:

	**Press short**	Weighing mode: create a new zero level Menu mode: increase value by 1 or move up in menu
	**Press long**	Weighing mode: reset zero level to original zero level
	**Press short**	Weighing mode: set/reset tare and reset preset tare Menu mode: move cursor 1 position to the left
	**Press long**	Weighing mode: set preset tare
	**Press short**	Weighing mode: --- Menu mode: confirm
	**Press long**	Weighing mode: enter configuration menu Menu mode: ---
	**Press short**	Weighing mode: --- Menu mode: escape
	**Press long**	Weighing mode: enter setpoint menu Menu mode: ---

Unlocking the keyboard

By default, the optical keys are disabled to prevent accidental operation. The KEY indication is off to indicate this state. The keys are enabled with an unlock code.

Press MENU and TARE/P simultaneously until KEY starts blinking

Press ZERO and SETP simultaneously until KEY Stays on

The optical keys can now be used. The KEY indication turns off when a key is operated as feedback to the user.

Locking the keyboard

Performing one of the two above described actions will directly lock the optical keys. The KEY indication turns off to indicate this state.

In menu mode, the optical keys are always enabled. In weighing mode, when no key operations are detected within five minutes, the optical keys are disabled automatically. The KEY indication turns off to indicate this state.

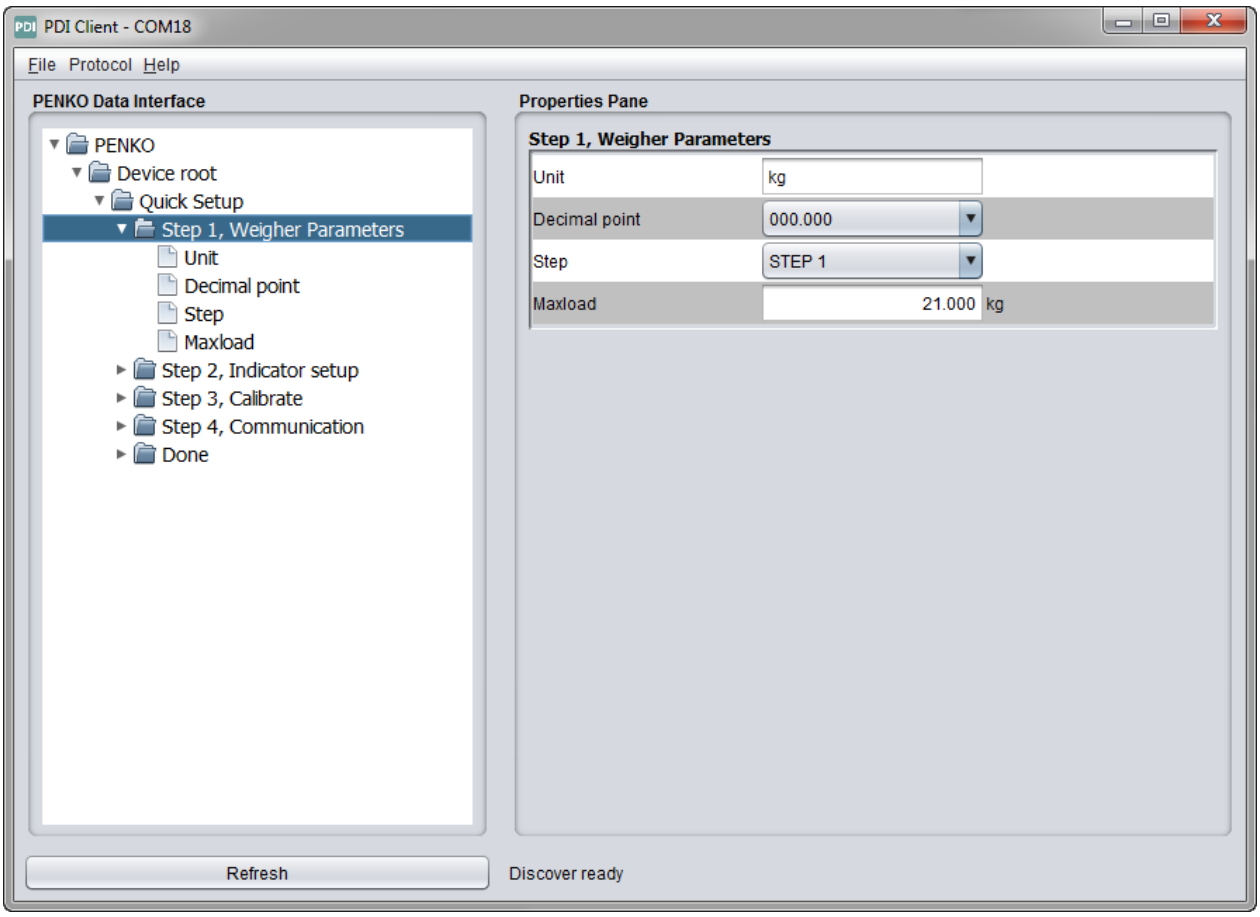
4 PC applications

For easy configuration and monitoring, two PC applications are available as download. PDI Client and Pi Mach II. In the following chapters, Pi Mach II is used to explain the EU-800d functionality.

www.penko.com/software

4.1 PDI Client

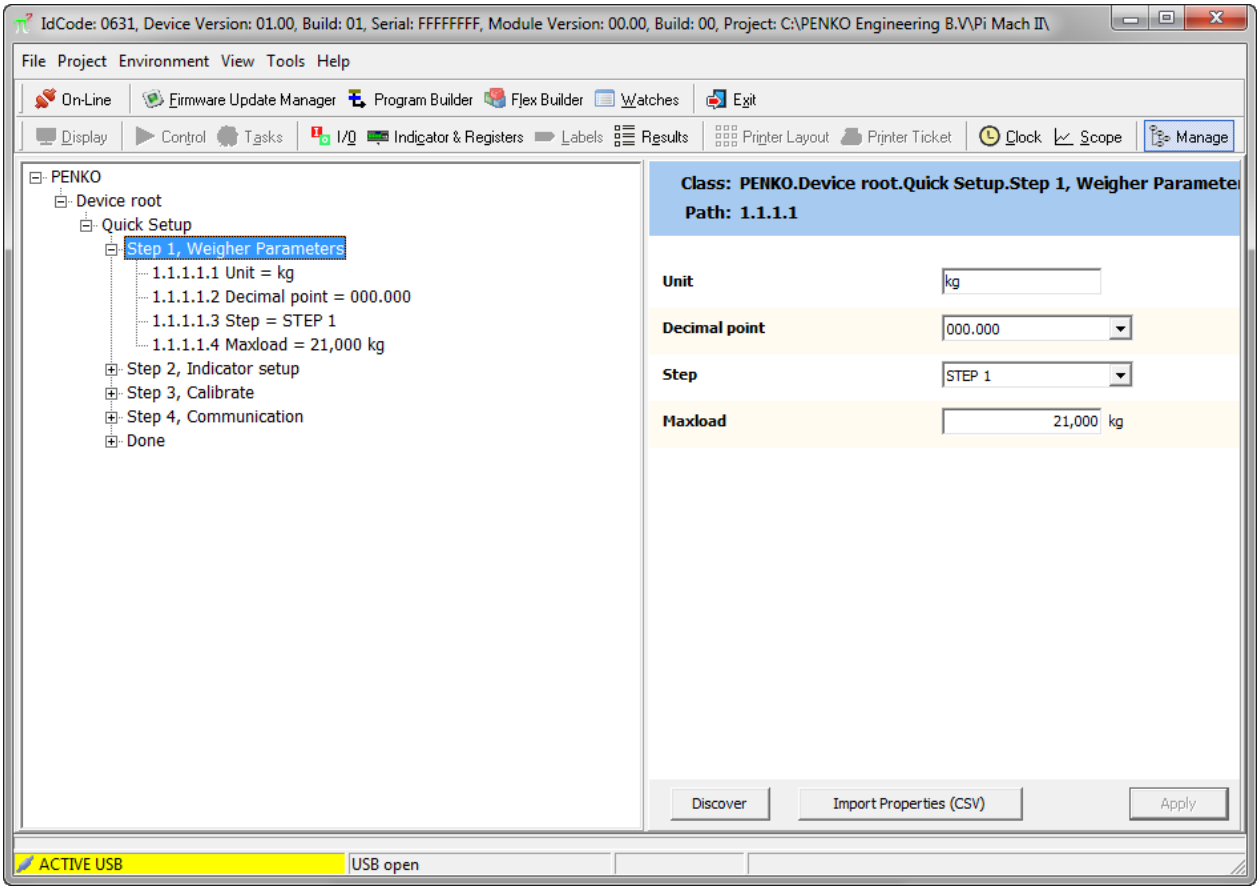
PDI client is a small cross-platform application that only works with USB communication. It can run on any operating system that runs Java Runtime Environment (JRE). All device properties are shown in a tree structure and can easily be edited.



USB driver and user manual are included in the download

4.2 Pi Mach II

Pi Mach II is a comprehensive Windows application that works with USB communication and has more functionality compared to PDI Client. The tree structure configuration of PDI Client is available in this program. Other features are backup and restore, firmware updates and a build in oscilloscope to analyze signals for different filter settings.



USB driver and user manual are included in the download

5 First use

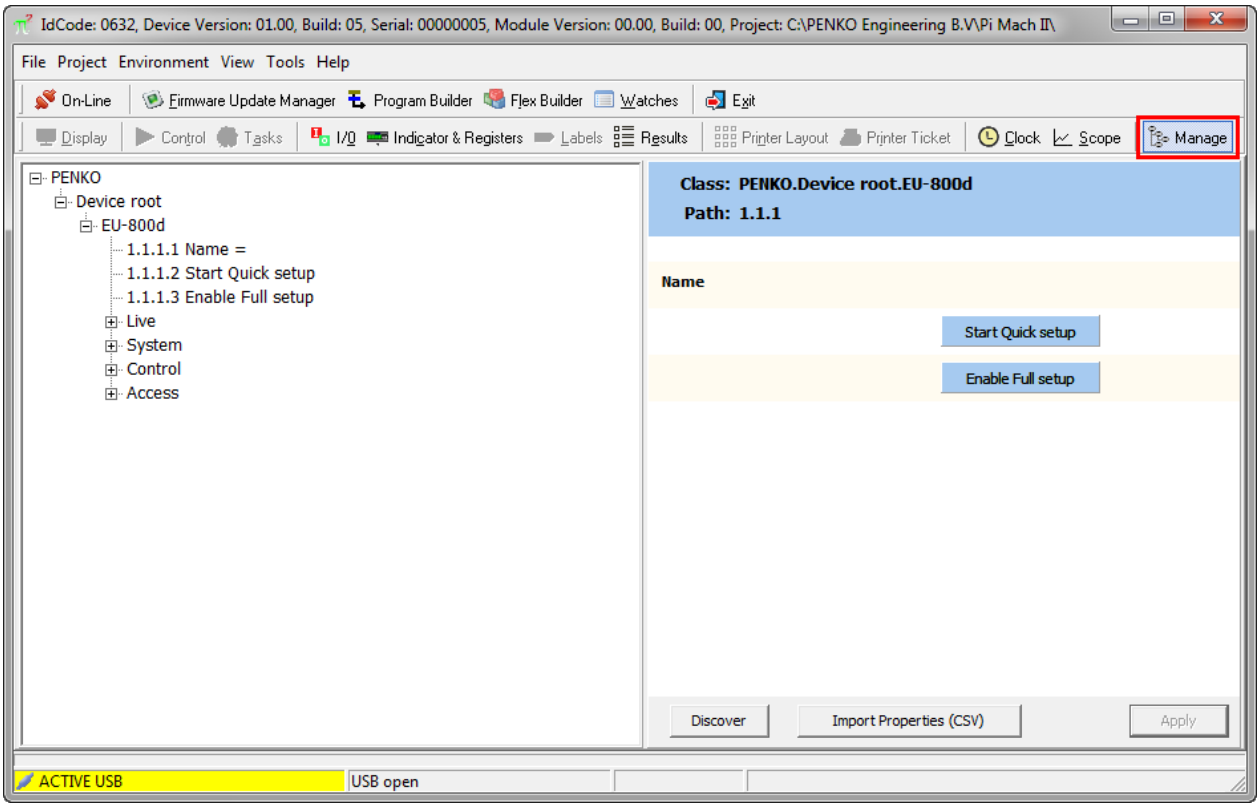
For first use, the following settings are important:

- Unit indication
- Decimal point position
- Step size
- Maximum load
- Calibration
- Communication

This chapter describes how to adjust these settings with the configuration software and on the device itself.

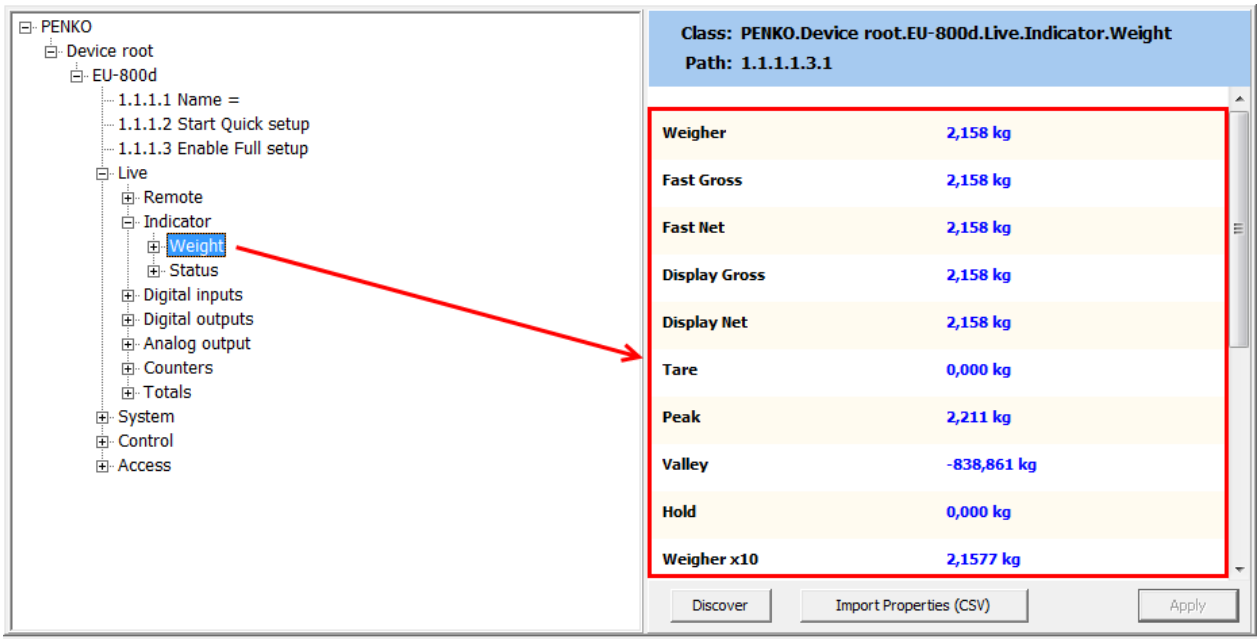
5.1 Using the configuration software

Make sure Pi Mach II and the USB driver are installed properly as described in the Pi Mach II user manual. Open Pi Mach II and open Manage.

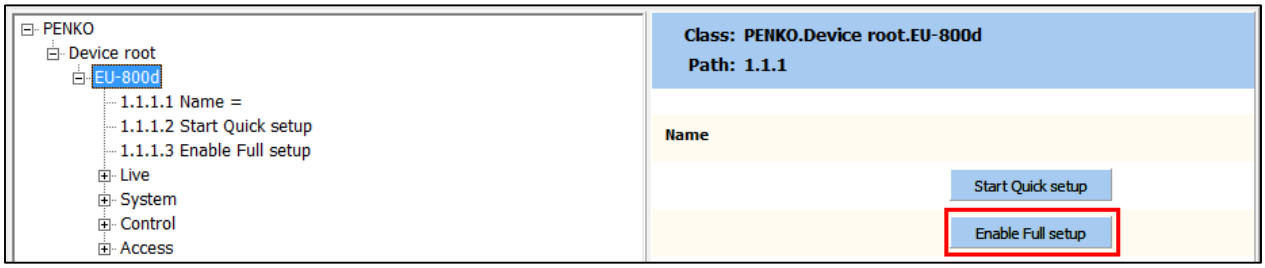


These configurations can also be made with the PDI Client software

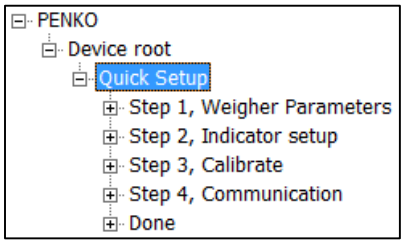
The left screen shows the device configuration in a tree structure. The right screen shows the properties of the selected item in the left screen. For example the live weight information:



In the tree, select **EU-800d**. The properties of this tree node are shown in the right screen.

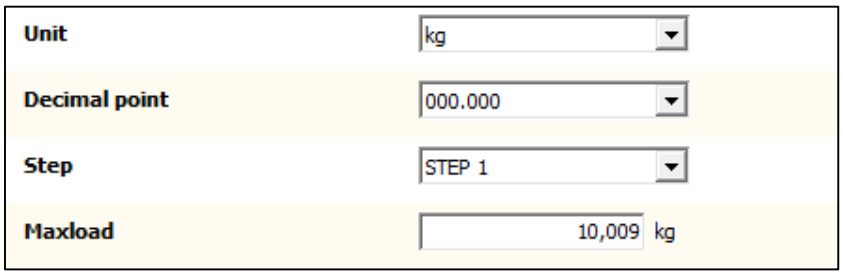


The first use settings are available under **Start Quick setup**



To confirm a setting press enter or click the Apply button

Select **Step1, Weigher Parameters**



Unit

Set the unit of measurement. This will be shown everywhere the measured weight is displayed or printed. The corresponding KG or LBS indication on the device is on.

Available options
lbs
kg

Decimal point

Select the position of the decimal point. This setting will be used everywhere the measured weight is displayed or printed.

Available options
000000
00000.0
0000.00
000.000
00.0000
0.00000

Step
Select the step size. This setting defines the scaled parts of the weigher value. The display value will be rounded to the nearest value with a valid step size. Available options:

Available options
1
2
5
10
20
50
100
200
500

→ Example:

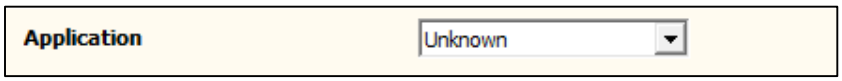
Measured value is 2317 kg.

Step size	Displayed value
1	2317
2	2318
5	2315
10	2320
20	2320
50	2300
100	2300
200	2400
500	2500

Maxload
Set the weight the indicator will use as maximum. If the measured weight is higher than the maximum load, the display will show **======**

More weigher parameters are available in the Full setup

Select **Step2, Indicator setup**



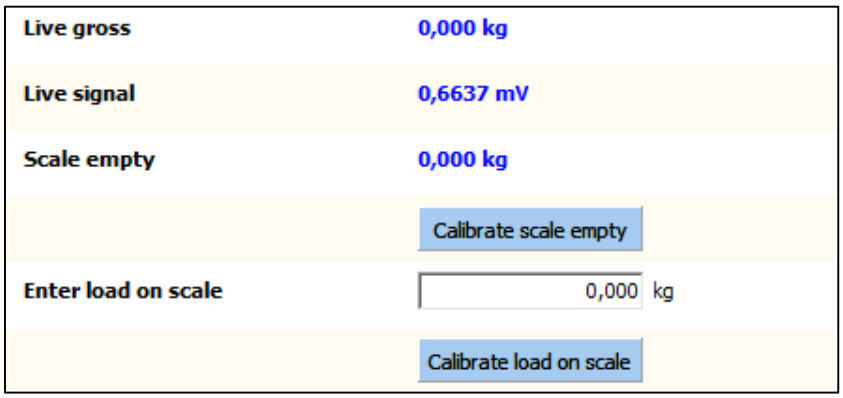
Application
A number of predefined configurations with specific filter settings are available. These configurations don't affect the settings made in step 1. They only affect the filter settings.

Available options
Unknown
Standard indicator
Fast indicator
Silo
Platform
Belt slow
Belt fast
Filling slow
Filling fast
Checkweigher slow
Checkweigher fast

When setting up an installation, select the appropriate configurations and start fine tuning it with the options available in the Full setup.

Filter settings are explained in the Full setup chapter

Select **Step 3, Calibrate**



With this step a two-point calibration can be made. The unit indication and decimal point position are a result of the settings in step 1.

Live gross
This shows the gross indicator value. When no calibration is available this will show **cccccc**

Live signal
This shows the voltage generated by the connected load cell.

Scale empty
The calibration of the “zero” point.

Make sure the load cell is not loaded and is stable.

Click Calibrate scale empty and the zero point is saved.

Enter load on scale
The calibration of the “gain” point.

Make sure the load cell is loaded with the reference weight and is stable.

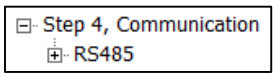
Set the reference weight.

Click Calibrate load on scale and the gain point is saved.

The device is now calibrated.

More calibration options are available in the Full setup

Select **Step 4, Communication**



All communication options use the RS485 connection.

RS485

Protocol	MODBUS-RTU
Address	1
Stopbits	2
Parity	None
Baudrate	9600
Indicator	0

Number of data bits is fixed at 8

Protocol
Select the protocol for the RS485 port.

Available options
None
MODBUS-RTU
MODBUS-ASCII
ASCII
NPV Slave

Address
Set the address of the port for identification in the network.

Range
0…255

Stopbits
Set the number of stop bits needed for the selected protocol.

Range
1…2

Parity
Set the parity needed for the selected protocol.

Available options
None
Odd
Even
Mark
Space

Baudrate
Set the baud rate needed for the selected protocol.

Available options
1200
2400
4800
9600
19200
38400
57600
115200

Indicator
This option is only active when ASCII is selected as protocol. The value of the selected indicator will be sent out over the communication port.

Range
1…30

5.2 Using the device

The menu structure in the device has no quick setup like the configuration software. The first use items can be set along with all other settings. First the interaction with the device is explained.

5.2.1 Device interaction

This chapter describes the device interaction using the optical keys.

How to open the Main Menu

From the main screen, press the Enter/Menu button for 5 seconds to enter the Main Menu.

Press long (5 seconds)

The MENU indication lights up to indicate that the device is in menu mode.

How to navigate through the menu

Use the Up button to navigate through the menus. Use the Enter button to enter a menu item. Use the Escape button to step back a level.

Next menu item		**Press short**
Open menu item		**Press short**
Back to previous level		**Press short**

Available menu items

The following menu items are available:

Setpoint function settings

Setpoint action settings

Analog output settings

RS485 settings

Indicator settings

Multi range/interval settings

Filter settings

Digital filter settings

Pre-calibration settings

Calibration settings

Theoretic calibration

Geographic calibration

Date / time

Recall

How to edit a menu setting

In case of changing a setting with a fixed number of options, the current option is shown. With the following keys the option can be changed.

Next option		**Press short**
Confirm option		**Press short**
Cancel		**Press short**

Example

		**Press long** To open the main menu
		**Press short** To open the Function menu
		**Press short** To edit the option of setpoint 1
	The “1” on the right is the selected option. Change this option with the UP key, confirm with ENTER or cancel with ESC. *Note: the full menu structure and available options can be found in appendix I.*	

How to edit a menu value

In case of changing a setting with a value, the current value is shown and the last digit is blinking. With the following keys the value can be changed.

Select previous digit		**Press short**
Increase selected digit		**Press short**
Confirm whole value		**Press short**
Cancel		**Press short**

Example

		**Press long**	To open the main menu
		**Press short**	To go to the Action menu
		**Press short**	To open the Action menu
		**Press short**	To edit the action of setpoint 1

The last digit is blinking. Change its value with the UP key. Select another digit with the LEFT key. Confirm with ENTER or cancel with ESC.
Note: the full menu structure and available options can be found in appendix I.

5.2.2 First use parameters

This chapter describes the weigher settings for first use.

Set the weigher parameters for first use

The weigher parameters from the quick setup can be set as follows:

Press long (5 seconds) To open the main menu

Press short (3 x) To go to the Indicator menu

Press short To open the Indicator menu

Press short To edit the ***Maxload*** setting

Set Maxload, see description below

Maxload

Set the weight the indicator will use as maximum. If the measured weight is higher than the maximum load, the display will show **======**

After setting the max load, menu item Ind 2 is shown.

Press short (3 x) To go to IND 5

Press short To edit the ***Step Size*** setting

Set Step Size, see description below

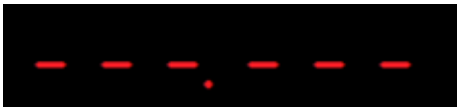
Step size

Select the step size. This setting defines the scaled parts of the weigher value. The display value will be rounded to the nearest value with a valid step size. Available options:

Available options
1
2
5
10
20
50
100
200
500

After setting the step size, menu item Ind 6 is shown.

Press short To edit the ***Decimal Point*** *position*



Set Decimal Point Position, see description below

Decimal point
Select the position of the decimal point. This setting will be used everywhere the measured weight is displayed or printed.

Available options
000000
00000.0
0000.00
000.000
00.0000
0.00000

After setting the decimal point position, menu item Ind 7 is shown.

Press short To go to IND 8

Press short To set the ***Unit of measurement***

Set Unit of measurement, see description below

Unit
Set the unit of measurement. This will be shown everywhere the measured weight is displayed or printed. The corresponding KG or LBS indication on the device is on.

Available options
lbs
kg

The full menu structure and available options can be found in appendix I

The predefined settings of step 2 in the quick setup are not available in the configuration menu of the device

Calibrate the device for first use

The calibration from the quick setup can be performed as follows:

		**Press long (5 seconds)**	To open the main menu
		**Press short (8 x)**	To go to the Calibration menu
		**Press short**	To open the Calibration menu
		**Press short (2 x)**	To go to CAL 3
		**Press short**	To check and delete existing calibration points
	Use Up to step through the calibration points. Use ENTER to delete every existing calibration point.		

After deleting the calibration points, menu item CAL 4 is shown.

Press short (2 x) To go to CAL 1

Press short To add new calibration points

CP1 is shown for a second to indicate this is Calibration Point 1 (zero point calibration)

Make sure the load cell is not loaded and is stable. Press ENTER and the zero point is saved.

CP2 is shown for a second to indicate this is Calibration Point 2 (gain point calibration)

Make sure the load cell is loaded with the reference weight and is stable. Enter the reference weight. Press ENTER and the gain point is saved.

The full menu structure and available options can be found in appendix I

Set communication options for first use

The communication from the quick setup can be performed as follows:

Press long (5 seconds) To open the main menu

Press short (3 x) To go to the RS485 menu

Press short To open the RS485 menu

Press short To select the protocol

Set protocol, see description below

Protocol
Select the protocol for the RS485 port.

Available options	Description
1	None
2	MODBUS-RTU
3	MODBUS-ASCII
4	ASCII
5	NPV Slave

After setting the protocol, menu item 485 2 is shown.

Press short To set the address

Set address, see description below

Address
Set the address of the port for identification in the network.

Range
0…255

After setting the address, menu item 485 3 is shown.

Press short To set the stopbits

Set stopbits, see description below

Stopbits
Set the number of stop bits needed for the selected protocol.

Range
1…2

After setting the stop bits, menu item 485 4 is shown.

Press short To set the parity

Set parity, see description below

Parity
Set the parity needed for the selected protocol.

Available options	Description
1	None
2	Odd
3	Even
4	Mark
5	Space

After setting the parity, menu item 485 5 is shown.

Press short To set the baudrate

Set baudrate, see description below

Baudrate
Set the baud rate needed for the selected protocol.

Available options	Description
1	1200
2	2400
3	4800
4	9600
5	19200
6	38400
7	57600
8	115200

After setting the baudrate, menu item 485 6 is shown.

Press short To set the indicator

Set indicator, see description below

Indicator
This option is only active when ASCII is selected as protocol. The value of the selected indicator will be sent out over the communication port.

Range
1…30

The full menu structure and available options can be found in appendix I

How to use the Setpoint Menu

The setpoint function and action can only be set via the configuration software. The value of the setpoints however, can be set in the device setpoint menu.

From the main screen, press the Escape/Setpoint button to enter the Setpoint Menu.

Press long (5 seconds) To open the setpoint menu

Press short To go to the first setpoint

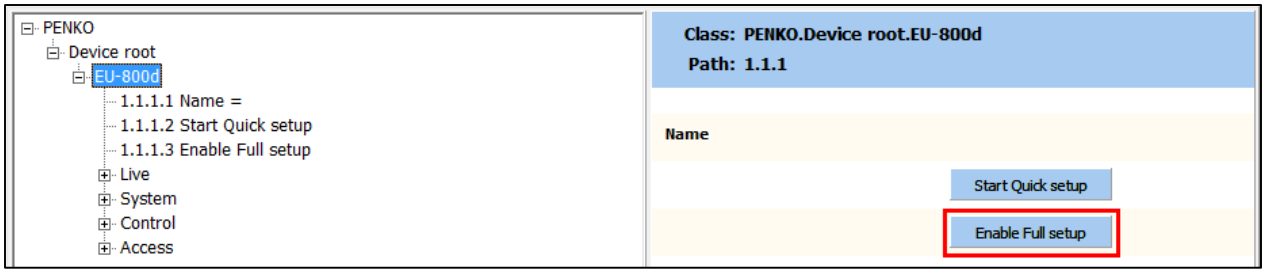
Press short To set the value

Set the value and confirm with ENTER. This way all 4 setpoints can be changed.

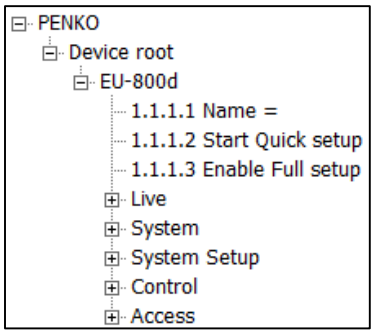
6 Full setup

The full setup is described with use of the configuration software. Most settings are also available in the device menu. A full menu structure can be found in appendix I.

In the tree, select **EU-800d**. The properties of this tree node are shown in the right screen.

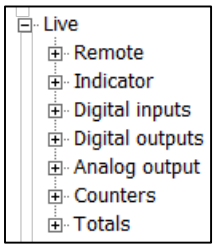


The full settings are available under **Enable Full setup**



To confirm a setting press enter or click the Apply button

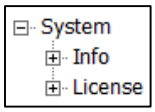
6.1 Live



Live shows various live parameters of the device.

Node	Description
Remote	Buttons to remotely control the device
Indicator	Live indicator values and indicator status
Digital inputs	Live status of the 3 digital inputs (0 = OFF, 1 = ON)
Digital outputs	Live status of the 4 digital outputs (0 = OFF, 1 = ON)
Analog output	Live output percentage of the analog output
Counters	Live counter status of the 3 digital inputs
Totals	Live status of the totals

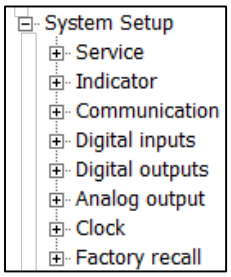
6.2 System



System shows the system information.

Node	Description
Info	Hardware and software information of the device
License	License information of the device

6.3 System Setup



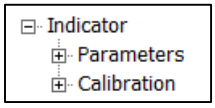
System Setup contains the full device configuration.

6.3.1 Service

Service is for PENKO employees only.

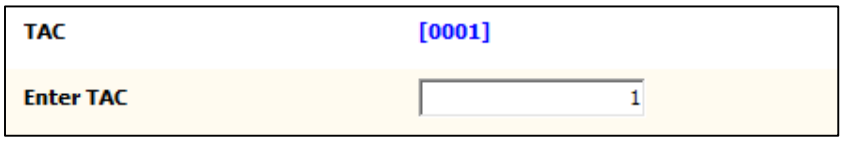
6.3.2 Indicator

Indicator contains the indicator parameters and calibration.

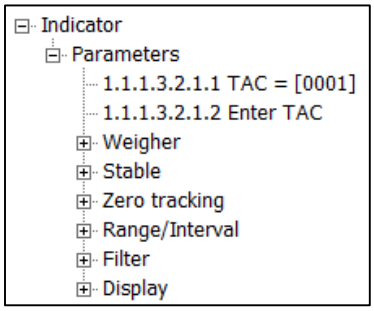


PARAMETERS

To enter the parameters, enter the shown TAC and confirm with Enter or the Apply button:

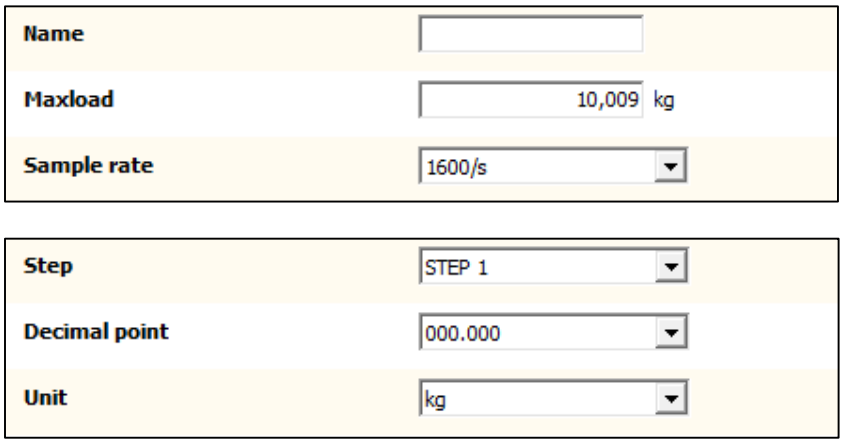


The parameters are now shown in the tree:



Weigher

Weigher contains the basic weigher parameters.



Name
Set a name to identify the device in a multiple device setup (optional).

Maxload
Set the weight the indicator will use as maximum. If the measured weight is higher than the maximum load, the display will show **======**

Sample rate
Select the sample rate for measuring.

Available options
10/s
20/s
25/s
50/s
100/s
200/s
400/s
800/s
1600/s

Step

Select the step size. This setting defines the scaled parts of the weight value. The display value will be rounded to the nearest value with a valid step size. Available options:

Available options
1
2
5
10
20
50
100
200
500

→ Example:

Measured value is 2317 kg.

Step size	Displayed value
1	2317
2	2318
5	2315
10	2320
20	2320
50	2300
100	2300
200	2400
500	2500

Decimal point
Select the position of the decimal point. This setting will be used everywhere the measured weight is displayed or printed.

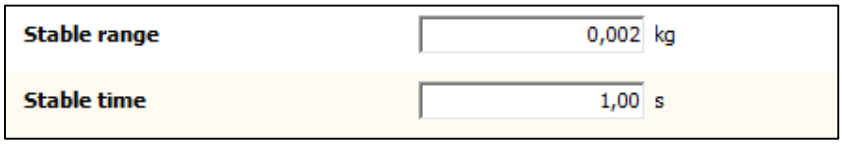
Available options
000000
00000.0
0000.00
000.000
00.0000
0.00000

Unit
Set the unit of measurement. This will be shown everywhere the measured weight is displayed or printed. The corresponding KG or LBS indication on the device is on.

Available options
lbs
kg

Stable

The stable settings determine when the indicator accepts the current value as stable.



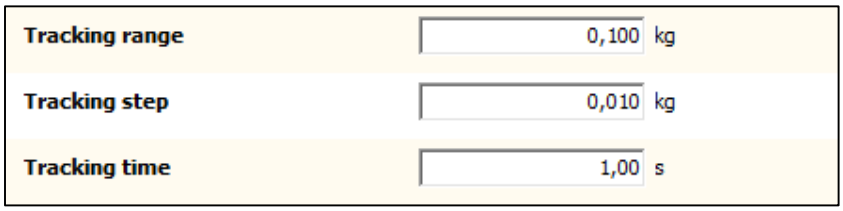
Stable range
Set the range the indicator has to be in for the set time to give a stable signal.

Stable time
Set the time the weigher has to be within the range to give the stable signal.

With these values, the indicator has to be within the range of 0.002kg over the time of 1.00 second to indicate stable. When stable, the stable indication on the display will light up.

Zero tracking

Zero tracking is able to tune the zero point back to zero when the scale becomes dirty.



Tracking range
Set the maximum offset to tune back to zero.

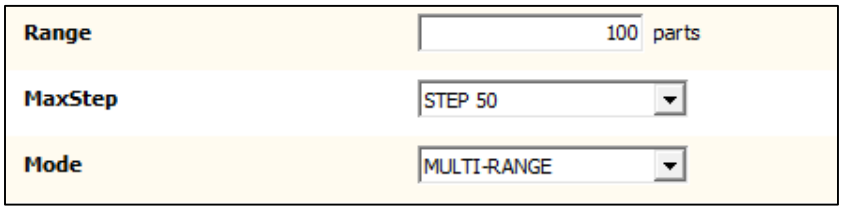
Tracking step
Set the step size that will be tuned every time the weight is within the tracking range.

Tracking time
Set the time that the weight has to be within the tracking range to tune 1 step back to zero.

With these values, the indicator will step back 0.010kg towards zero every 1.00 second as soon as the measured weight gets below 0.100kg.

Range/Interval

Set the indicator to change its step size when the measured weight reaches a certain value.



Range
Set the number of divisions when the indicator has to display with the next step size. Auto ranging is disabled when range is set to 0.

MaxStep
Select the biggest allowed step size.

Available options
Step 1
Step 2
Step 5
Step 10
Step 20
Step 50
Step 100
Step 200
Step 500

Mode
Select the mode. In multi-range mode the step size is reset when the indicator has been lower or equal to zero. In multi-interval mode the step size is reset when the value reached the previous range.

Available options
Multi-Range
Multi-Interval

→ Example:

With the shown values, the ranges are as follows:

Range No.	Displayed range	Step size
Range: 1	0 - 100	1
Range: 2	100 - 200	2
Range: 3	200 - 500	5
Range: 4	500 - 1000	10
Range: 5	1000 - 2000	20
Range: 6	2000 - 5000+	50

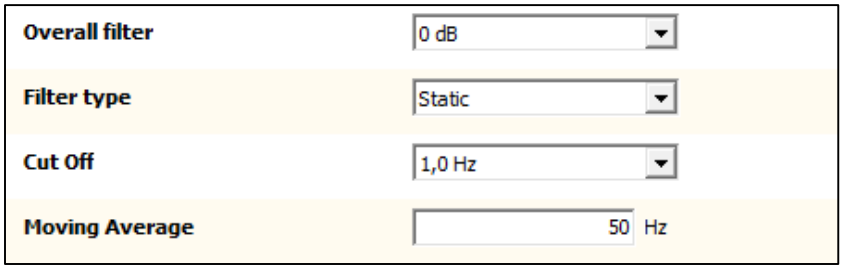
The number of ranges depends on the selected max step size. In this case there are 6 possible ranges.

In multi-range mode, the range will only get back to range 1 when the indicator has been lower or equal to zero. In this case, when the value goes down, range 4 will remain active until the indicator reaches zero.

In multi-interval mode, the range number will follow the table above. In this case, when the value gets lower than 500, range 3 will become active, etc.

Filter

Filters are used to filter vibrations present in an industrial environment.



Overall filter
Select an overall filter. This will affect all indicator signals in the device. 0dB is no filtering. -48dB gives the strongest damping.

Available options
0 dB
-6 dB
-12 dB
-18 dB
-24 dB
-30 dB
-36 dB
-42 dB
-48 dB

To prevent a loss of information or accuracy, don't set the overall filter higher than 24dB. When no accuracy is needed, a higher filter setting is allowed to enable extreme filtering.

Filter type
Select the type of filtering. This is a 2nd order filter. This filter affects all signals up to and including the cutoff frequency.

Available options	Description
None	No filter
Dynamic	Used when the signal is changing fast
Static	Used when the signal is changing slow

Cut Off
Select the cutoff frequency for the selected filter type.

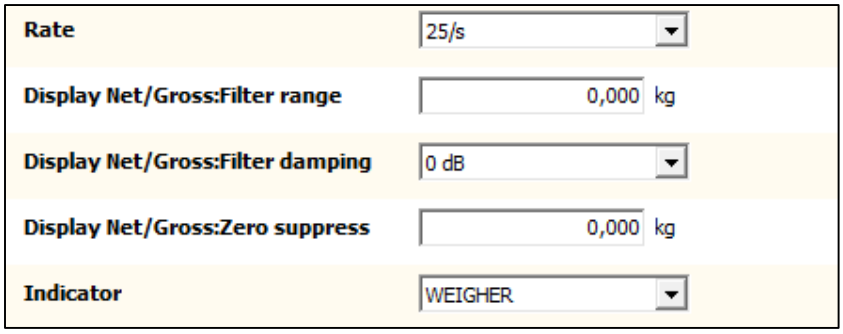
Available options
1,0 Hz
1,4 Hz
2,5 Hz
5,0 Hz
10 Hz
20 Hz
40Hz

Moving Average
Set the moving average frequency for the selected filter.

Range
0…50

Display

The display filter will damp the indicator signal to the display to get a calm display view.



Rate
Select the refreshment speed of the display.

Available options
1/s
2/s
3/s
5/s
10/s
25/s
50/s

Display Tracking: Filter range
Set the range where the filter is active.

Display Tracking: Filter damping
Select the strength of the filter. 0dB is no filtering. -48dB gives the strongest damping.

Available options
0 dB
-6 dB
-12 dB
-18 dB
-24 dB
-30 dB
-36 dB
-42 dB
-48 dB

Display Tracking: Zero suppress
Set the band within the indicator will show 0.

Indicator
Select the indicator that is shown in the display.

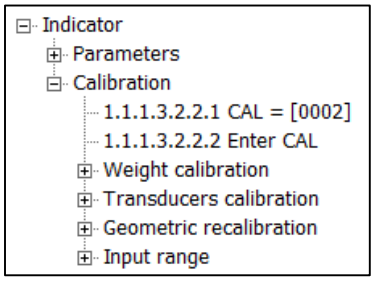
Available options	Description
Weigher	Filtered net weigher value that can react on multi range/interval
Fast Gross	Unfiltered gross weigher value
Fast Net	Unfiltered net weigher value
Display Gross	Filtered gross weigher value
Display Net	Filtered net weigher value
Tare	Tare value
Peak	Peak hold value - the highest measured value
Valley	Valley hold value - the lowest measured value
Hold	Hold value - stored with zero button in hold mode, or with hold input
Weigher x10	Weight with extra decimal for more accuracy
Fast Gross x10	Fast Gross with extra decimal for more accuracy
Fast Net x10	Fast Net with extra decimal for more accuracy
Display Gross x10	Display Gross with extra decimal for more accuracy
Display Net x10	Display Net with extra decimal for more accuracy
Tare x10	Tare with extra decimal for more accuracy
Peak x10	Peak with extra decimal for more accuracy
Valley x10	Valley with extra decimal for more accuracy
Hold x10	Hold with extra decimal for more accuracy
Signal	mV signal from the load cell(s)

CALIBRATION

To enter the calibration, enter the shown CAL and confirm with Enter or the Apply button:

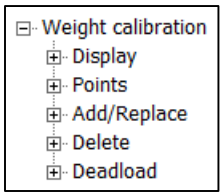
CAL	**[0002]**
Enter CAL	0

The parameters are now shown in the tree:



Weight calibration

Weight calibration contains the calibration settings.



→ **Display** shows the current display values.

Gross	**0,804 kg**
Gross x10	**0,8043 kg**
Signal	**0,4046 mV**
ADC	**076607 ADC**

Gross
The current displayed gross value.

Gross x 10
The current displayed gross value with extra digit for more accuracy.

Signal
The current signal, from the load cell, in millivolts.

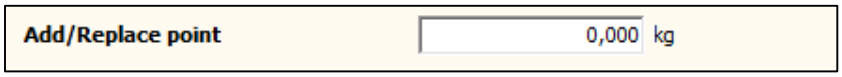
ADC
The current ADC value.

→ **Points** show the stored calibration points.

Point 1	848941ADC 9,9869mV 20,000kg
Point 2	044243ADC 0,0030mV 0,000kg
Point 3	not used
Point 4	not used
Point 5	not used
Point 6	not used
Point 7	not used
Point 8	not used
Point 9	not used
Point 10	not used

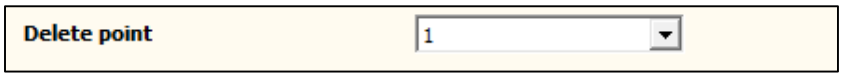
Up to 10 calibration points can be stored to realize a multi-point calibration.

→ **Add/Replace** point is used to add a calibration point.



When a point is added with a value that already exists, the existing point will be replaced. When a point is added with a new value, it will be stored as a new point.

→ **Delete point** is used to delete a calibration point.

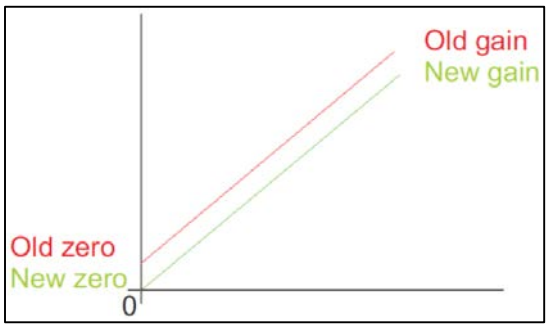


Select the number of the calibration point (see Points) and confirm with Enter or the Apply button. The calibration point will be deleted.

→ **Deadload** can be set to pull the whole measuring line back to zero. The zero point could be different because of some modification on the scale or dirt.

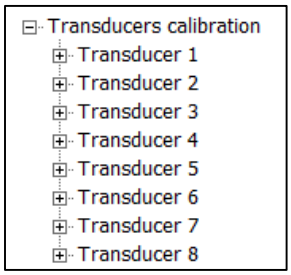
Deadload	0,000	kg

Normally, the dead load is zero, but it's possible to change the line position if there's weight on the scale. To do so, edit the actual weigh value to the new known value.



Transducers calibration

Transducer calibration is used for a theoretic calibration, using the datasheet of the load cell. Up to 8 transducers can be set.



For each load cell the following data can be set.

Output	0,00000	mV/V
Zero balance	0,00000	mV/V
Type	None	
Max load	10,000	kg

Output
Set the output value as mentioned on the datasheet.

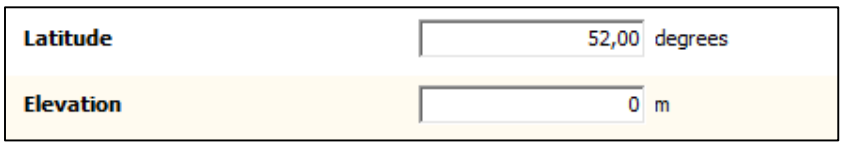
Zero balance
Set the zero balance value as mentioned on the datasheet.

Type
Set a name for the load cell.

Max load
Set the maximum load as mentioned on the datasheet. The max load is automatically copied to all transducers because all transducers must have the same max load. The total max load is the sum of the max load of all active transducers.

Geometric calibration

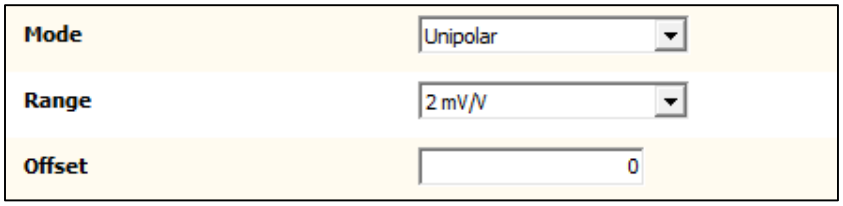
After calibrating with the Transducer menu, the geometric location and height of the place where the load cells are fabricated and the recent location must be filled in.



Set both values for Origin *(load cell origin)* and Location *(load cell current location)*.

Input range

Input range is used to set the range for the connected load cell.



Mode
Set the polarity of the input.

Available options	Description
Unipolar	Input range between -0.2mV/V and value set at Range *(default 2mV/V)*
Bipolar	Input range between minus Range and Range *(default -2mV/V to 2mV/V)*

Range
Select the input range.

Available options	Description
1mV/V	
1,5 mV/V	
2 mV/V	Calibrated range*
2,5 mV/V	
3 mV/V	Calibrated range*

* When using a theoretic calibration, note that these two ranges are officially calibrated

Offset
Set an ADC value offset. This can be used when the indicator gets out of its ADC range.

6.3.3 Communication

The only communication port is the RS485 port.

RS485

Protocol	None
Address	0
Stopbits	1
Parity	None
Baudrate	9600
Indicator	0

Number of data bits is fixed at 8

Protocol

Select the protocol for the serial port.

Available options
None
MODBUS-RTU
MODBUS-ASCII
ASCII
NPV Slave

Address

Set the address of the port for identification in the network.

Range
0…255

Stopbits
Set the number of stop bits needed for the selected protocol.

Range
1…2

Parity
Set the parity needed for the selected protocol.

Available options
None
Odd
Even
Mark
Space

Baudrate
Set the baud rate needed for the selected protocol.

Available options
1200
2400
4800
9600
19200
38400
57600
115200

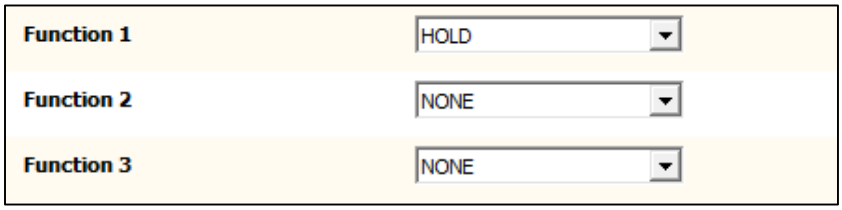
Indicator

This option is only active when ASCII is selected as protocol. The value of the selected indicator will be sent out over the communication port.

Available options	Description
Weigher	Filtered net weigher value that can react on multi range/interval
Fast Gross	Unfiltered gross weigher value
Fast Net	Unfiltered net weigher value
Display Gross	Filtered gross weigher value
Display Net	Filtered net weigher value
Tare	Tare value
Peak	Peak hold value - the highest measured value
Valley	Valley hold value - the lowest measured value
Hold	Hold value - stored with zero button in hold mode, or with hold input
Weigher x10	Weight with extra decimal for more accuracy
Fast Gross x10	Fast Gross with extra decimal for more accuracy
Fast Net x10	Fast Net with extra decimal for more accuracy
Display Gross x10	Display Gross with extra decimal for more accuracy
Display Net x10	Display Net with extra decimal for more accuracy
Tare x10	Tare with extra decimal for more accuracy
Peak x10	Peak with extra decimal for more accuracy
Valley x10	Valley with extra decimal for more accuracy
Hold x10	Hold with extra decimal for more accuracy
Signal	mV signal from the load cell(s)

6.3.4 Digital inputs

The digital inputs can execute a function.



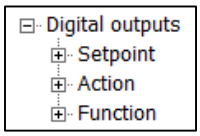
Function

Select a function for the input.

Available options	Description
None	No function
Zero Set	Set indicator to zero
Zero Reset	Reset indicator from zero
Tare On	Set tare
Tare Off	Reset tare
Tare Toggle	Toggle between tare and net
Preset Tare On	Tare on configured preset tare
Print (reserved)	-
Print Subtotal/Event (reserved)	-
Print Total/Alibi (reserved)	-
Print Day Total (reserved)	-
Print Batch Total (reserved)	-
Totalize	Add current weight to total
Subtotal (reserved)	-
Total Reset	Reset totals
Day Total (reserved)	-
Batch Total (reserved)	-
Peak Reset	Reset peak hold value
Valley Reset	Reset valley hold value
Hold	Store current value as hold value
Keyboard Lock	Disable the device keyboard
Start Stop (reserved)	-
Print Layout (reserved)	-

6.3.5 Digital outputs

The digital outputs can respond to the value of an indicator.



Setpoint

Level 1	0,000	kg
Level 2	1,000	kg
Level 3	2,000	kg
Level 4	3,000	kg

Level

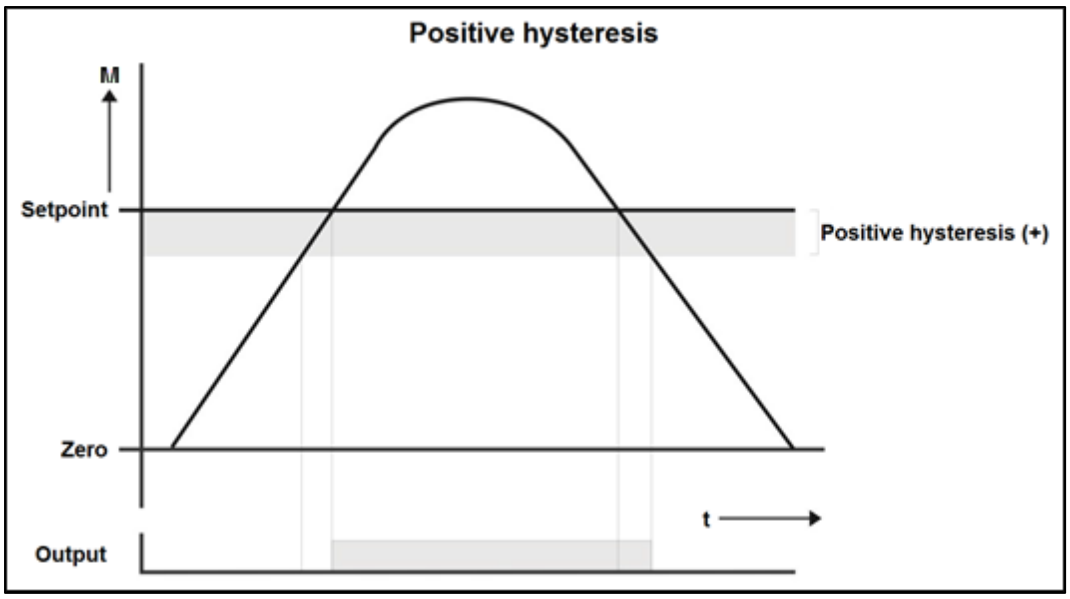
Set the level for each output when it has to turn on.

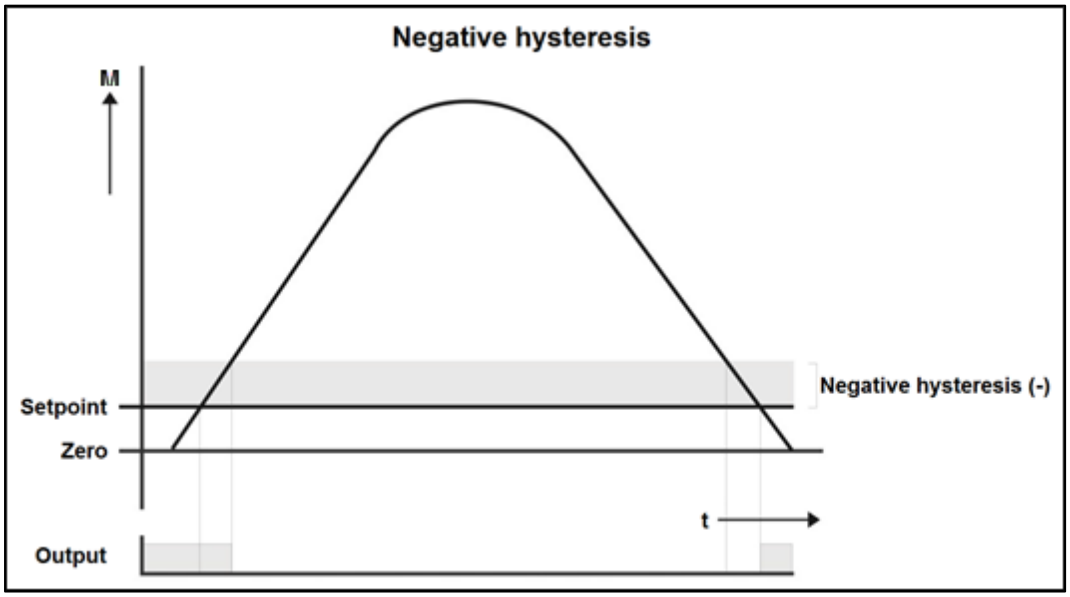
Action

Hysteresis 1	0,010	kg
Hysteresis 2	0,010	kg
Hysteresis 3	0,010	kg
Hysteresis 4	0,010	kg

Hysteresis

Set the hysteresis for each output. The hysteresis can be positive or negative.





Function

Function 1	WEIGHER
Function 2	WEIGHER
Function 3	WEIGHER
Function 4	WEIGHER

Function
Select the indicator the output has to react on.

Available options	Description
Weigher	Filtered net weigher value that can react on multi range/interval
Fast Gross	Unfiltered gross weigher value
Fast Net	Unfiltered net weigher value
Display Gross	Filtered gross weigher value
Display Net	Filtered net weigher value
Tare	Tare value
Peak	Peak hold value - the highest measured value
Valley	Valley hold value - the lowest measured value
Hold	Hold value - stored with zero button in hold mode, or with hold input
Weigher x10	Weight with extra decimal for more accuracy
Fast Gross x10	Fast Gross with extra decimal for more accuracy
Fast Net x10	Fast Net with extra decimal for more accuracy
Display Gross x10	Display Gross with extra decimal for more accuracy
Display Net x10	Display Net with extra decimal for more accuracy
Tare x10	Tare with extra decimal for more accuracy
Peak x10	Peak with extra decimal for more accuracy
Valley x10	Valley with extra decimal for more accuracy
Hold x10	Hold with extra decimal for more accuracy
Signal	mV signal from the load cell(s)

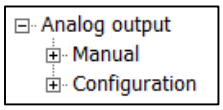
→ Example:

Output	Setpoint	Action	Function	Description
1	1,000 kg	0,100 kg	Weight	*Positive hysteresis - output will turn on at setpoint*
2	1,000 kg	-0,100 kg	Weight	*Negative hysteresis - output will turn off at setpoint*

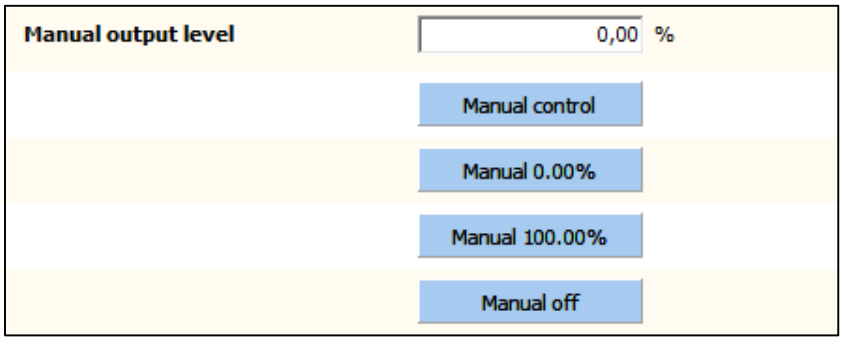
- Output **1** will turn **on** when the tracking value reaches **1,000 kg**
- It will turn **off** again when the tracking value drops below **0,900 kg** (1,000 - 0,100)
- Output **2** will turn **off** when the tracking value reaches **1,100 kg** (1,000 + 0,100).
- It will turn **on** again when the tracking value drops below **1,000 kg**

6.3.6 Analog output

The settings for the analog output.



Manual



Manual output level
Set the percentage for the output when manual control is enabled.

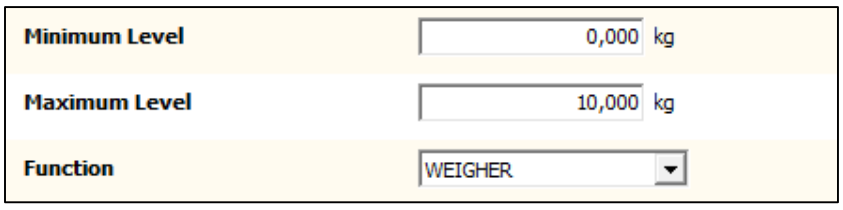
Manual control
Enable manual control of the output.

Manual 0.00%
Set the output to 0%

Manual 100.00%
Set the output to 100%

Manual off
Disable manual control of the output.

Configuration



Minimum level
Set the indicator value the analog output will set as 0.00% output.

Maximum level
Set the indicator value the analog output will set as 100.00% output.

Function
Select the indicator the output has to react on.

Available options	Description
Weigher	Filtered net weigher value that can react on multi range/interval
Fast Gross	Unfiltered gross weigher value
Fast Net	Unfiltered net weigher value
Display Gross	Filtered gross weigher value
Display Net	Filtered net weigher value
Tare	Tare value
Peak	Peak hold value - the highest measured value
Valley	Valley hold value - the lowest measured value
Hold	Hold value - stored with zero button in hold mode, or with hold input
Weigher x10	Weight with extra decimal for more accuracy
Fast Gross x10	Fast Gross with extra decimal for more accuracy
Fast Net x10	Fast Net with extra decimal for more accuracy
Display Gross x10	Display Gross with extra decimal for more accuracy
Display Net x10	Display Net with extra decimal for more accuracy
Tare x10	Tare with extra decimal for more accuracy
Peak x10	Peak with extra decimal for more accuracy
Valley x10	Valley with extra decimal for more accuracy
Hold x10	Hold with extra decimal for more accuracy
Signal	mV signal from the load cell(s)

The range of the analog output is fixed at 4 - 20mA

6.3.7 Clock

The device date and time are used for printer tickets and for storing data in the alibi memory and event log. The device is equipped with a backup battery for the real time clock.

Current Time	**16:22:44**
Current Date	**08-08-2014**
Set Time (HH:MM:SS)	16:22:40
Set Date (DD:MM:YYYY)	08-08-2014

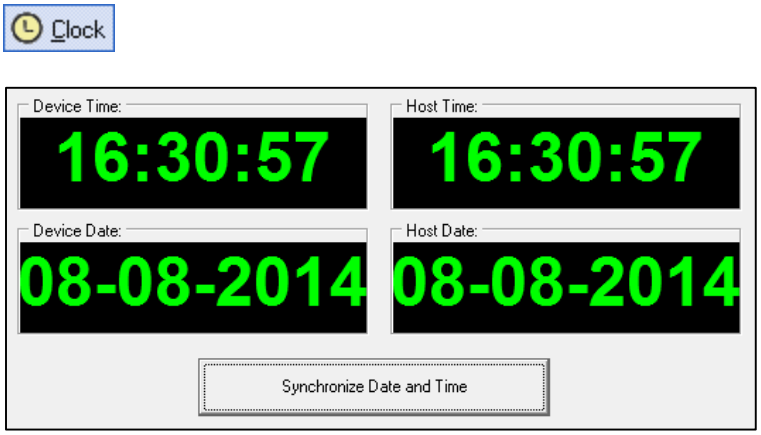
Current Time
The current device time in HH:MM:SS format.

Current Date
The current device date in DD-MM-YYYY format.

Set Time
Set the time in the indicated format to correct the device time.

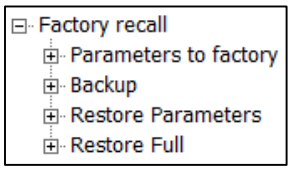
Set Date
Set the date in the indicated format to correct the device date.

An easy way to synchronize time and date is to use the Clock function in Pi Mach II.

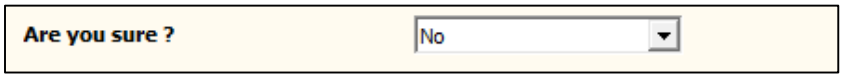


6.3.8 Factory recall

A factory recall can be performed. Also the device parameters can be backed up and restored.

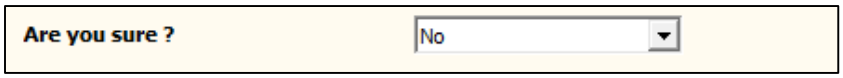


Parameters to factory



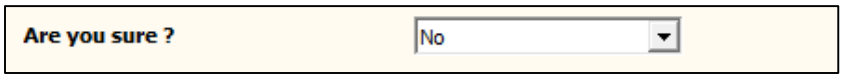
Select yes to set all parameters to factory. The device reboots after this action.

Backup



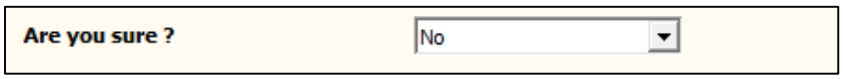
A backup of the device configuration can be made within the device. A password is required for the backup. Contact PENKO for this password. When using Pi Mach II manage to make a backup, enter this password in the service code field to enable the backup option.

Restore parameters



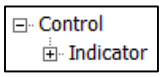
This option only restores the non-certified parameters.

Restore full



This option restores all parameters.

6.4 Control



Control has various functions to control the indicator.

Node	Description
Zero Set	Set the indicator value to zero
Zero Reset	Set the indicator value back to its original value
Tare Set	Set tare
Tare Reset	Reset tare
Tare Toggle	Toggle between tare and net
Preset Tare Value	Set the preset tare value
Peak Reset	Reset the stored peak hold value
Valley Reset	Reset the stored valley hold value

6.5 Access

Access contains the Alibi Memory and Event Log.

Node	Description
Alibi	Browse or clear the Alibi Memory
Event Log	Browse the Event Log

Also see the Alibi Memory and Event Log chapter

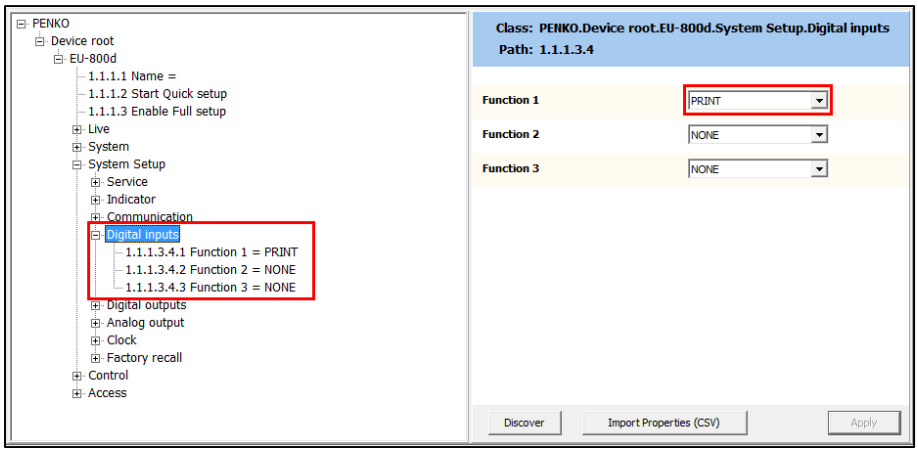
7 Alibi Memory and Event Log

The Alibi and Event Log support the following features:

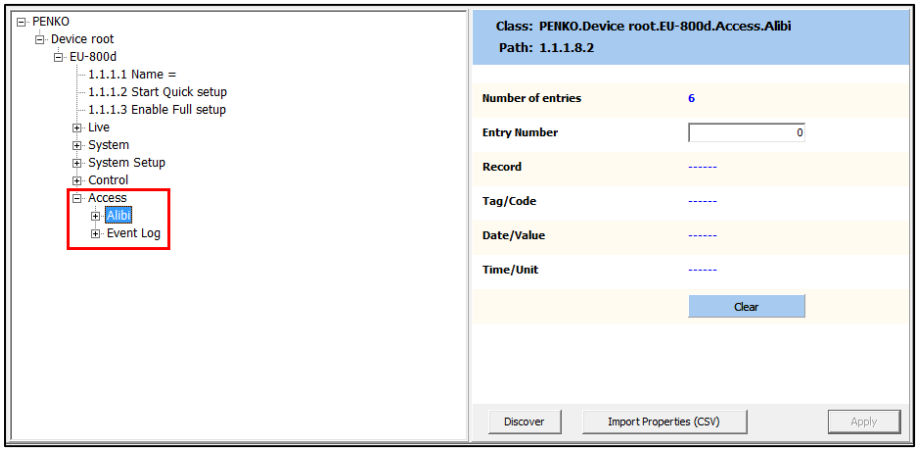
- Automatically store system events
- Create alibi records
- View alibi records and event logs

7.1 Alibi Memory

Alibi records are generated by a user action. To generate records, go to the Digital inputs settings menu and set an input action to Print.



Every time the input is activated, a new alibi record is created. To see the alibi records, go to the Access menu and select Alibi.



Number of entries

The total number of alibi records.

Entry Number
Enter the number of the desired record and conform with Enter or the Apply button. The record is shown.

Record
The type of record. A record can be a **Header** or a **Data** record. A header records is the title of the record and shows a tag, date and time. A header has several data records that show the code, value and unit of the stored value.

Tag/Code
Tag shows a tag the header record belongs to. By default this is “Alibi 001” and cannot be changed. Code shows the type of value stored in the data record.

Date/Value
Date shows the date of the header record. Value shows the stored measurement of the data record.

Time/Unit
Time shows the time of the header record. Unit shows the stored unit of the data record.

UID
Every record has a Unique ID number, the UID.

Clear
This will clear the total alibi memory.

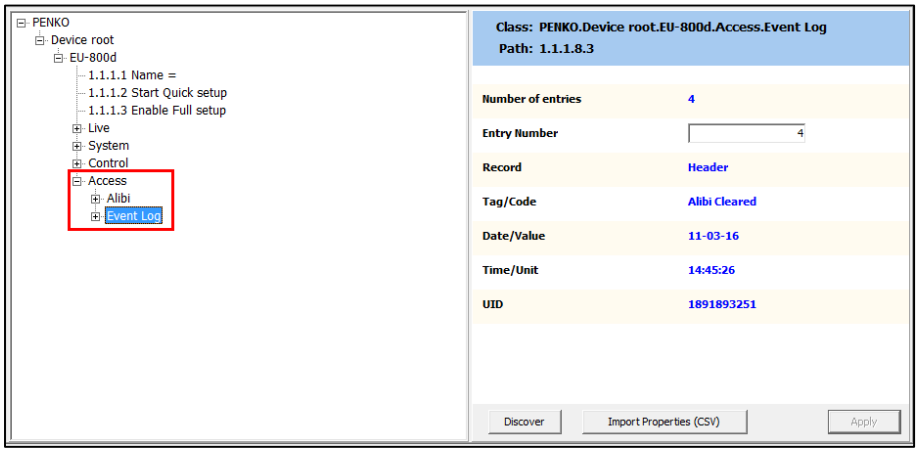
When the inut with the print function is activated, 2 records are added to the alibi memory. This is 1 header and 1 data record. Example:

Number	Record	Tag/Code	Date/Value	Time/Unit	UID
1	Header	Alibi 001	15-03-16	09:43:20	3298435072
2	Data	Gross	0.732	kg	1755848705

7.2 Event Log

System events are generated automatically by the system. These events can be seen but cannot be erased. Erasing of the records can only be performed by PENKO. Events are created for logging software updates, calibration changes, parameter changes, clearing the alibi memory, etc.

To see the event log, go to the Access menu and select Event Log.



Number of entries
The total number of event logs.

Entry Number
Enter the number of the desired record and conform with Enter or the Apply button. The record is shown.

Record
The type of record. An event log is always a **Header** record.

Tag/Code
This shows the stored event, like Software Update, Set Clock, etc.

Date/Value
This shows the date of the event.

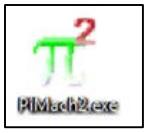
Time/Unit
This shows the time of the event.

UID
Every record has a Unique ID number, the UID.

8 Firmware update

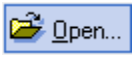
Update the application firmware by USB connection.

Connect the EU-800d to the computer through USB. Start PI Mach II. Set communication to USB. Also see the Pi Mach II manual.

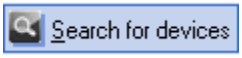


Start the Firmware Update Manager.

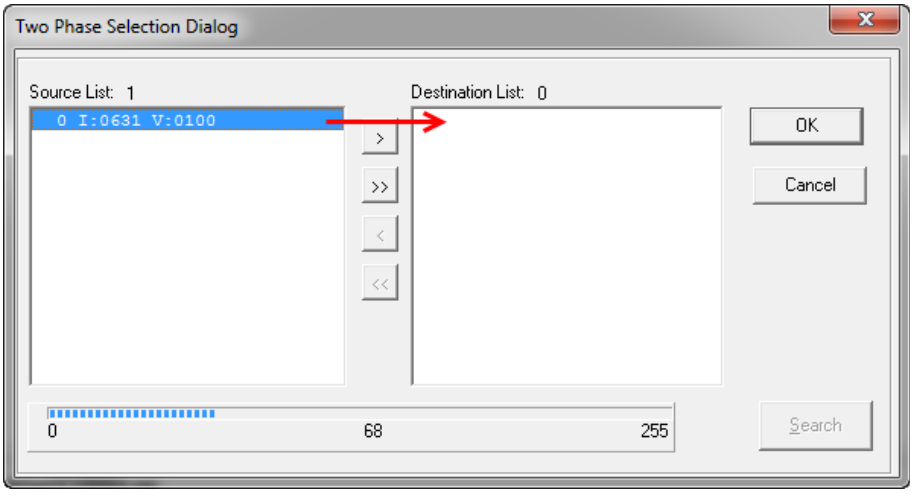
Click Open and select the PIP file.



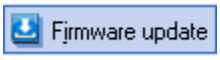
Click Search for devices and select the device with source “0”.



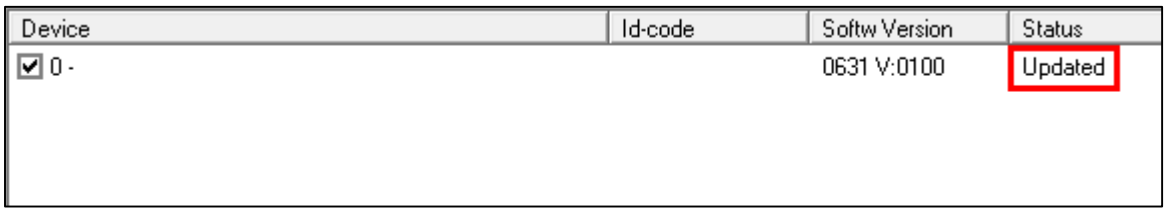
Use double click or the arrow button to move the device from the Source List to the Destination List and click OK.



Now click Firmware Update to start the update.



The EU-800d will reboot automatically and the Firmware Update Manager will show Updated.



9 Backup and restore

With the EU-800d it's possible to make a backup of the software as it's installed in the device. The software will be saved as an FDI file which stands for Flex Data Image. The Backup data assures that if the device fails, a replacement device can be programmed as a copy of the original device. In case of multiple devices which have to be configured similarly, one device can be programmed, and a backup of this device can be used to program the other device.

9.1 Backup

To back up the device, open Pi Mach II. Go to MENU → ENVIRONMENT → BACKUP DEVICE.

A save dialog is shown. Choose a destination and filename, and click SAVE. The image will be created and saved to this destination.

9.2 Restore

To restore the device, open Pi Mach II. Go to MENU → ENVIRONMENT → RESTORE DEVICE.

An open dialog is shown. Select the backup file, and click OPEN. The image will be programmed into the device, and the device will restart.

9.3 Progress

The progress of reading and writing is shown in a progress bar. The action can fail by a loss in communication between the PC and the controller. In that case the progress bar will be stuck somewhere between 0 and 100 %. In this case, check the communication and retry.


Erasing the Flash takes a while.
Do not close the application until ready.
Restore progress 30 %
Abort
Close

10 Standard factory settings

Description	Display	Value	Your setting
Weigher	Name	…	
	Max Load	10.009 kg	
	Sample Rate	1600/s	
	Step	1	
	Decimal point	000.000	
	Unit label	kg	
Stable condition	Range	0.002 kg	
	Time	1.00 s	
Zero tracking	Range	0.000 kg	
	Step	0.000 kg	
	Time	0.00 s	
Range / Interval	Range	0 Parts	
	Max Step	1	
	Mode	Multi Range	
Filter	Overall Filter	0 dB	
	Filter type	Dynamic	
	Cutoff Frequency	2.5 Hz	
	Moving average	50 Hz	
Display	Display Rate	25/s	
	Filter Range	0.000 kg	
	Filter Damping	0 dB	
	Zero Suppress	0.000 kg	
	Indicator	WEIGHER	
Transducer calibration	Max load	10.000 kg	

	Output (1…8)	0.00000 mV/V	
	Zero balance (1…8)	0.00000 mV/V	
Geometric recalibration	Latitude	52.00 degrees	
	Elevation	0 m	
Input range	Mode	Unipolar	
	Range	2 mV/V	
	Offset	0	
RS485	Protocol	MODBUS-RTU	
	Address	0	
	Stopbits	1	
	Parity	None	
	Baudrate	9600	
	Indicator	0	
Digital inputs	Function (1…3)	None	
Digital outputs	Level 1	0.000 kg	
	Level 2	1.000 kg	
	Level 3	2.000 kg	
	Level 4	3.000 kg	
	Hysteresis (1…8)	0.010 kg	
	Function (1…8)	Weigher	
Analog output	Minimum level	0.000 kg	
	Maximum level	10.000 kg	
	Function	Weigher	

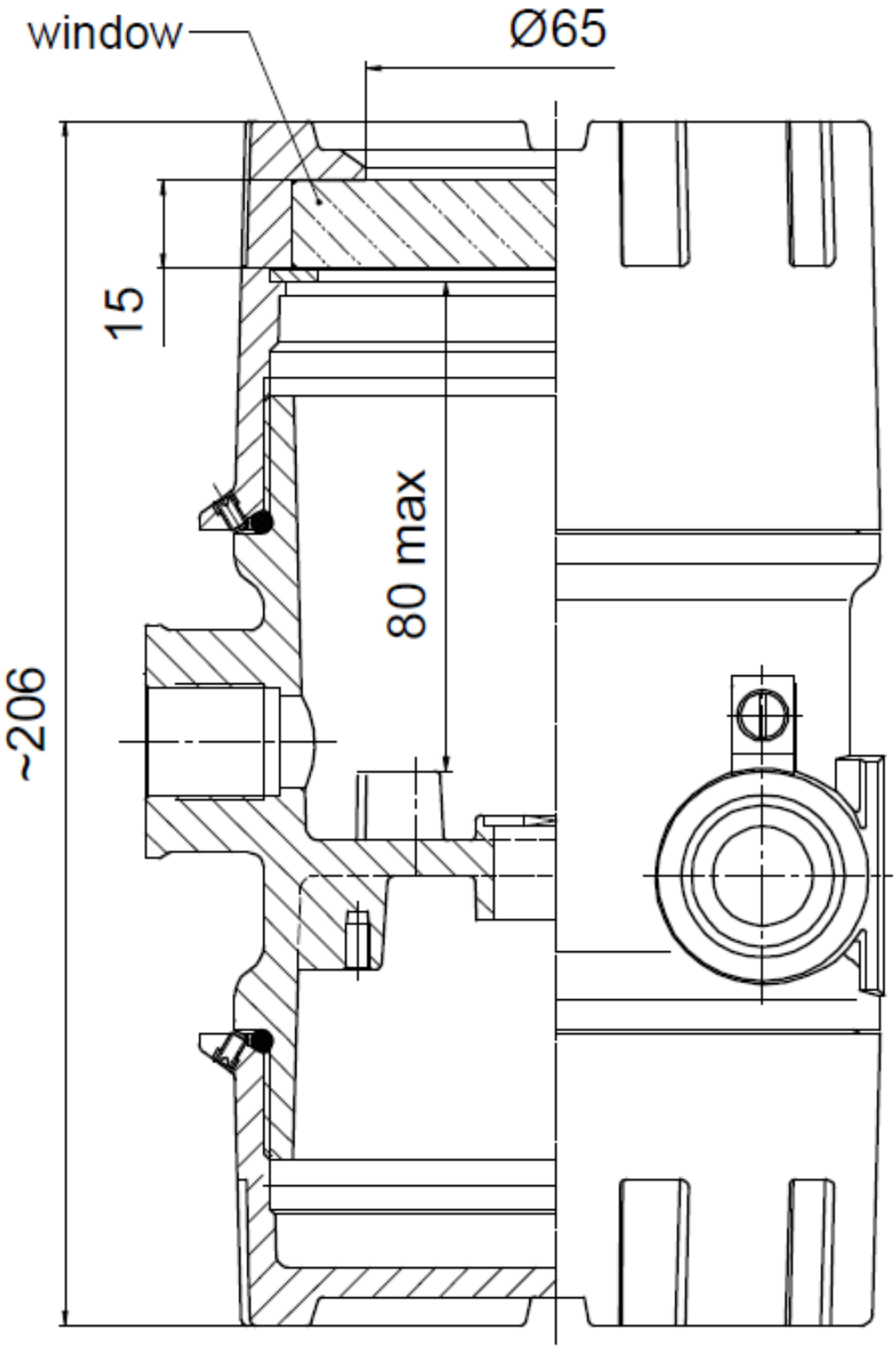
11 Error codes

Error code	Description	Solution
2001	Parameter error	Invalid entry, choose valid value
2005	Input value is not valid	Invalid entry, choose value within range
2101	Weigher not stable	Wait for stable and try again
2102	Parameter exceeds maxload	Remove load / edit max load setting
2103	Parameter below zero	Check if scale is blocked
2104	Not in zero range	Remove load
2105	Arithmetic overflow occurred	Change calibration levels
2106	A/D reads all 1's	Check load cell connection
2107	A/D reads all 0's	Check load cell connection
2108	Gain ref. < zero ref.	Change calibration levels
2109	Gain > 0.99984741211	Change calibration levels
2110	Save error	Contact PENKO
2111	Flash ROM exhausted	Contact PENKO
2112	Error on header creation	Contact PENKO
2113	Error on date write	Contact PENKO
2114	Header validation failed	Contact PENKO
2115	De-active old data fail	Contact PENKO
2116	Load errors	Contact PENKO
2117	Item not found in store	Contact PENKO
2118	Error in stored data	Contact PENKO
2119	Bad calibration	Change calibration levels
2120	Action not enabled	-
2121	Multi-point not found	Add multi-point calibration
2122	Calibration table full	Remove calibration points
2123	Not allowed, tare active	Deactivate tare
2124	Action not allowed	-
2125	ADC no power	Check power supply
CCCCCC	No proper calibration available	Check calibration setting
UUUUUU	Underflow	Check load cell Check platform construction
OOOOOO	Overflow	Check load cell Check platform construction
======	Display overflow; Exceed maximum display value (max. load)	Reduce load on platform

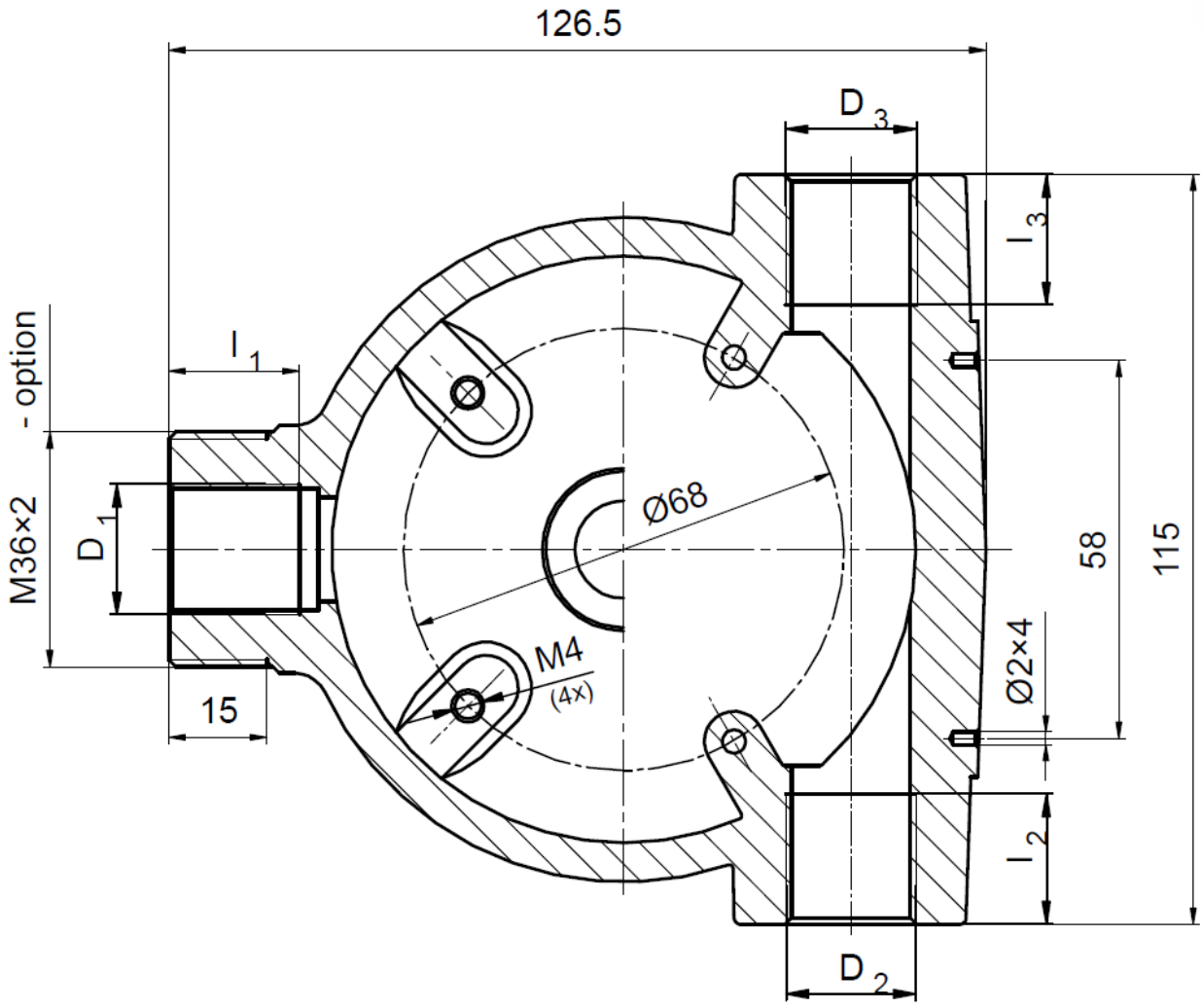
12 Specifications

Type	Description
Wiring	With sense
Type of sense	Passive
Power supply	18-32 VDC; 4 W max.
Excitation voltage	5 VDC
Sensitivity	0.1 µV/d
Selectable ranges	1 mV/V | 1,5 mV/V | 2 mV/V | 2,5 mV/V | 3 mV/V
Input voltage @3mV/V	-16 mV to 16 mV
A/D Conversion speed	1600/s
Max. load cell impedance	1200 Ω
Min. Load cell impedance	43,75 Ω
Max. no. of load cells 350 Ω	8
Max. no. of load cells 1.000 Ω	22
Max. number of d	10.000
Display resolution	100.000
Internal resolution	24 bits
Display steps	1,2,5,10,20,50,100,200
Display size	6 x 7 segments red LED 0.4 inch (10.2 mm)
Digital inputs (3)	18 - 28 VDC, PNP or NPN
Digital outputs (4)	Max. 35V/0.5A, PNP or NPN
Analog output	4 - 20 mA, 10.000 d
Operating temperature	-10°C to +40°C
Storage temperature	-20°C to +70°C
Relative Humidity	Max. 85 % non-condensing
Protection class	See table below
Weight	2150 g

Side view



Top view

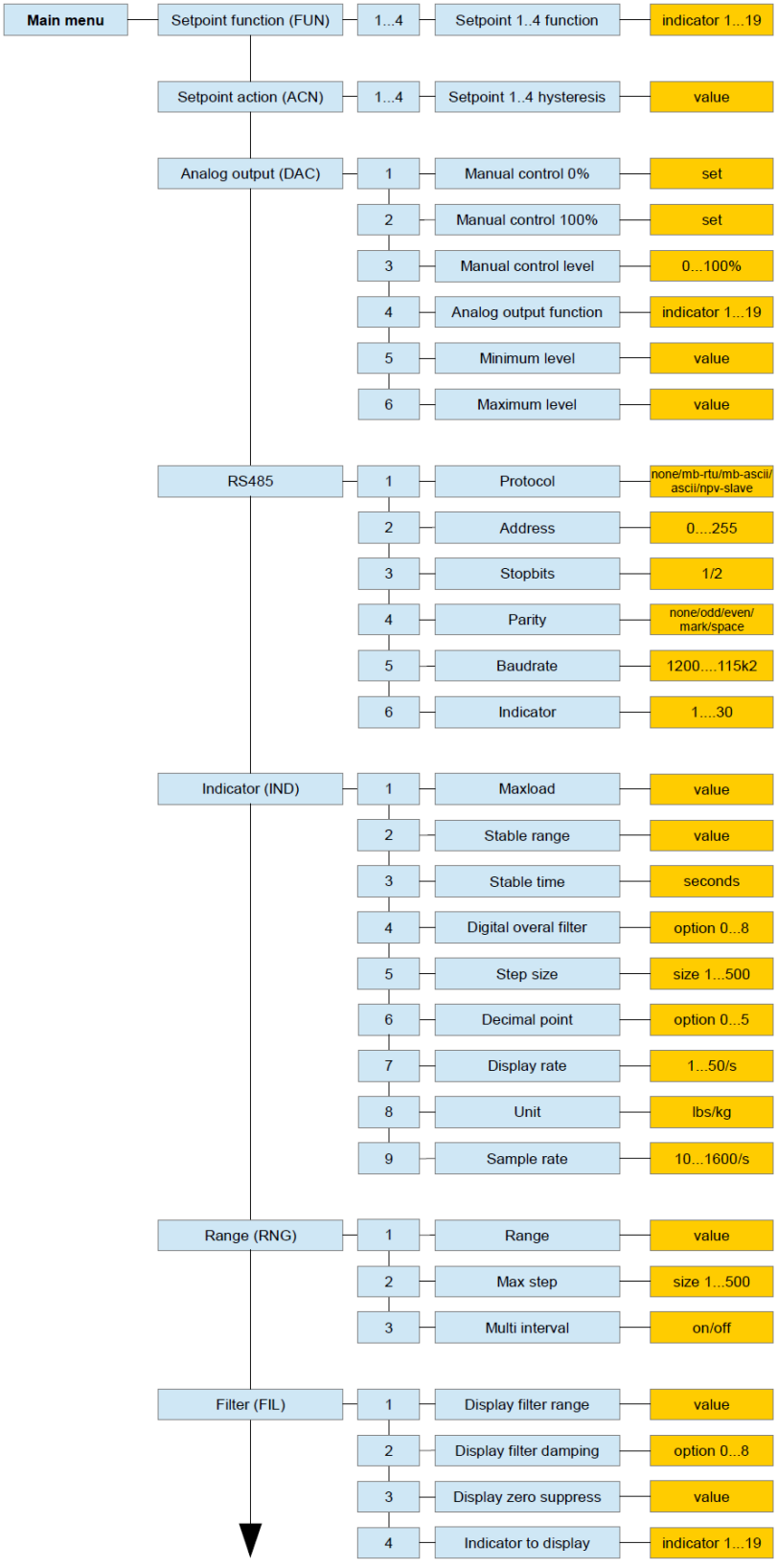


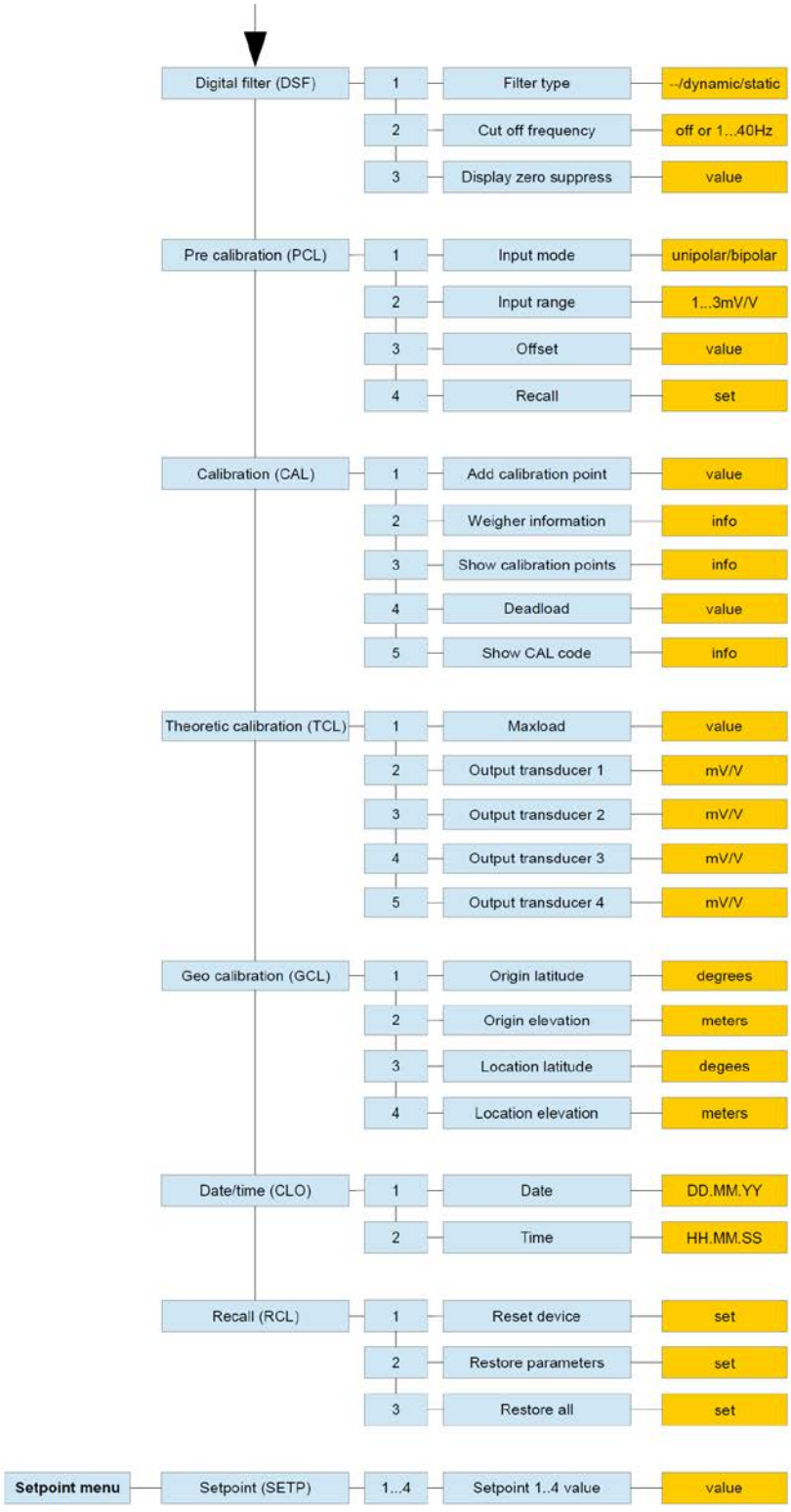
Protection degree

IP	D_3	D_2	D_1
54	plugged – IP 68	plugged – IP 68	sensor connection – thread without sealing – IP 54
	ATEX cable gland IP66	ATEX cable gland IP66	
68	closed – IP 68	closed – IP 68	sensor connection – sealed thread – IP 68
	ATEX cable gland IP68	ATEX cable gland IP68	

Index

Appendix I - Menu structure




Digital filter (DSF)
1
Filter type
--/dynamic/static
2
Cut off frequency
off or 1...40Hz
3
Display zero suppress
value
Pre calibration (PCL)
1
Input mode
unipolar/bipolar
2
Input range
1...3mV/V
3
Offset
value
4
Recall
set
Calibration (CAL)
1
Add calibration point
value
2
Weigher information
info
3
Show calibration points
info
4
Deadload
value
5
Show CAL code
info
Theoretic calibration (TCL)
1
Maxload
value
2
Output transducer 1
mV/V
3
Output transducer 2
mV/V
4
Output transducer 3
mV/V
5
Output transducer 4
mV/V
Geo calibration (GCL)
1
Origin latitude
degrees
2
Origin elevation
meters
3
Location latitude
degees
4
Location elevation
meters
Date/time (CLO)
1
Date
DD.MM.YY
2
Time
HH.MM.SS
Recall (RCL)
1
Reset device
set
2
Restore parameters
set
3
Restore all
set
Setpoint menu
Setpoint (SETP)
1...4
Setpoint 1..4 value
value

Appendix II - Communication protocols

The following communication protocols are available:

Protocol	Available on port	Description
Modbus ASCII/RTU	RS485	Modbus protocol over RS485 used to connect to PLC.
PENKO ASCII	RS485	PENKO protocol over RS485.
PENKO TP / PDI	USB	PENKO protocol over USB connection used for communication between the device and the configuration software.

Protocol descriptions and needed files can be downloaded from the PENKO website.

www.penko.com

Remarks:

About PENKO

At PENKO Engineering we specialize in weighing. Weighing is inherently chemically correct, independent of consistency, type or temperature of the raw material. This means that weighing any kind of material guaranties consistency and thus, it is essential to sustainable revenue generation in any industry. As a well-established and proven solution provider, we strive for the ultimate satisfaction of custom design and/or standard applications, increasing your efficiencies and saving you time, saving you money.

Whether we are weighing raw materials, components in batching, ingredients for mixing or dosing processes, - or weighing of static containers and silos, or - in-motion weighing of railway wagons or trucks, by whatever means required during a process, we are essentially forming vital linkages between processes and businesses, anywhere at any time. We design, develop and manufacture state of the art technologically advanced systems in accordance with your strategy and vision. From the initial design brief, we take a fresh approach and a holistic view of every project, managing, supporting and/or implementing your system every step of the way. Curious to know how we do it? www.penko.com

Certifications

PENKO sets high standards for its products and product performance which are tested, certified and approved by independent expert and government organizations to ensure they meet – and even – exceed metrology industry guidelines. A library of testing certificates is available for reference on:
http://penko.com/nl/publications_certificates.html

PENKO Professional Services

PENKO is committed to ensuring every system is installed, tested, programmed, commissioned and operational to client specifications. Our engineers, at our weighing center in Ede, Netherlands, as well as our distributors around the world, strive to solve most weighing-system issues within the same day. On a monthly basis PENKO offers free training classes to anyone interested in exploring modern, high-speed weighing instruments and solutions.
Training sessions on request: **www.penko.com/training**

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A complete overview you will find on: **www.penko.com/dealers**

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