

# PENKO Engineering B.V.

Your Partner for Fully Engineered Factory Solutions



Alpha manual



**PENKO**

*an ETC Company*

# ALPHA manual

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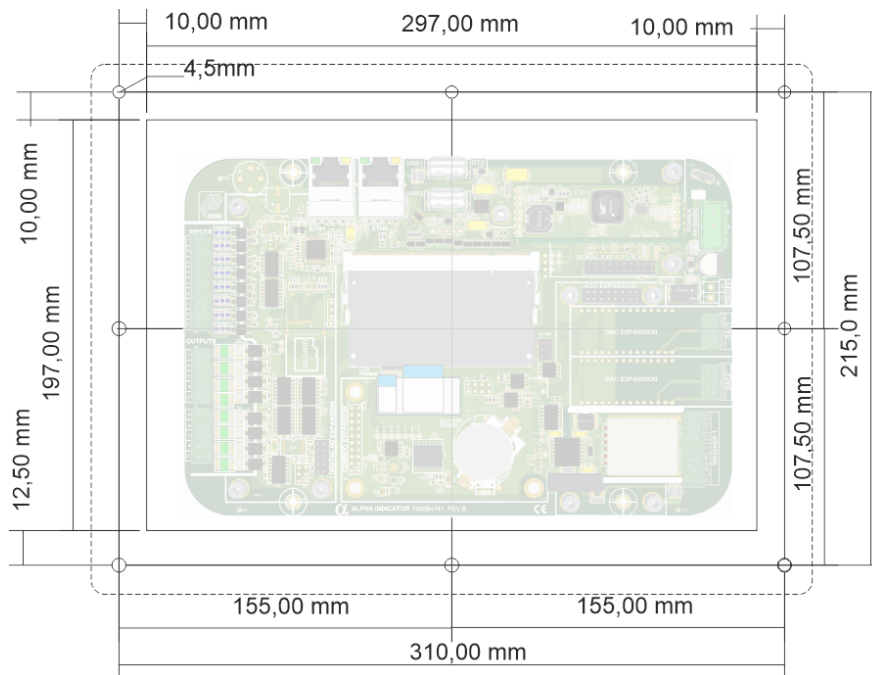
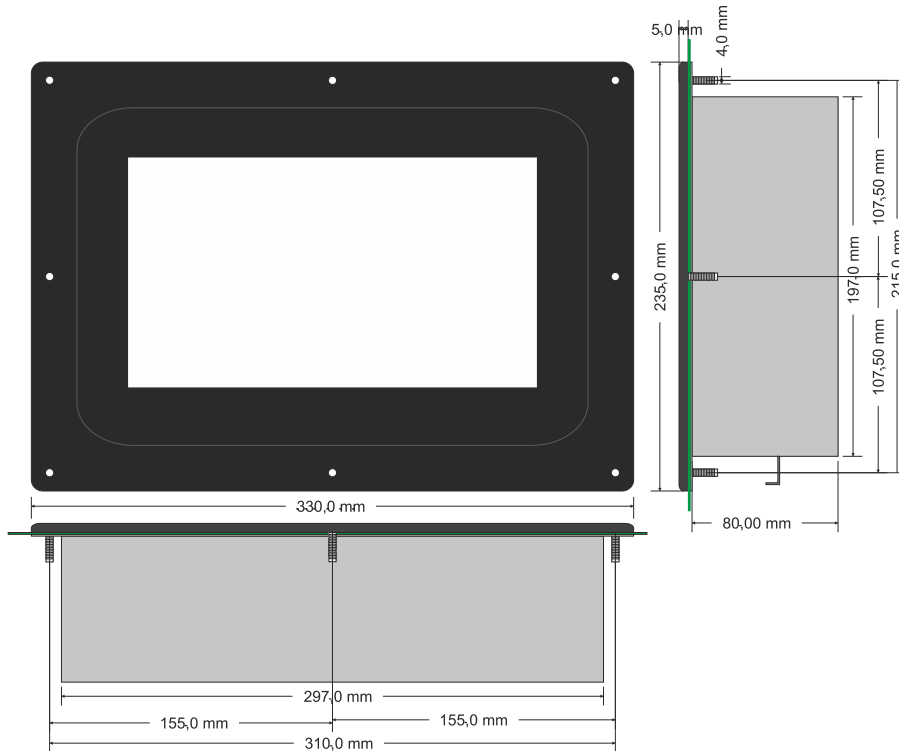
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## 10 INCH PANEL MOUNT

Unit size is 330 x 235 x 86mm (hwxwd), excluding panel thickness.

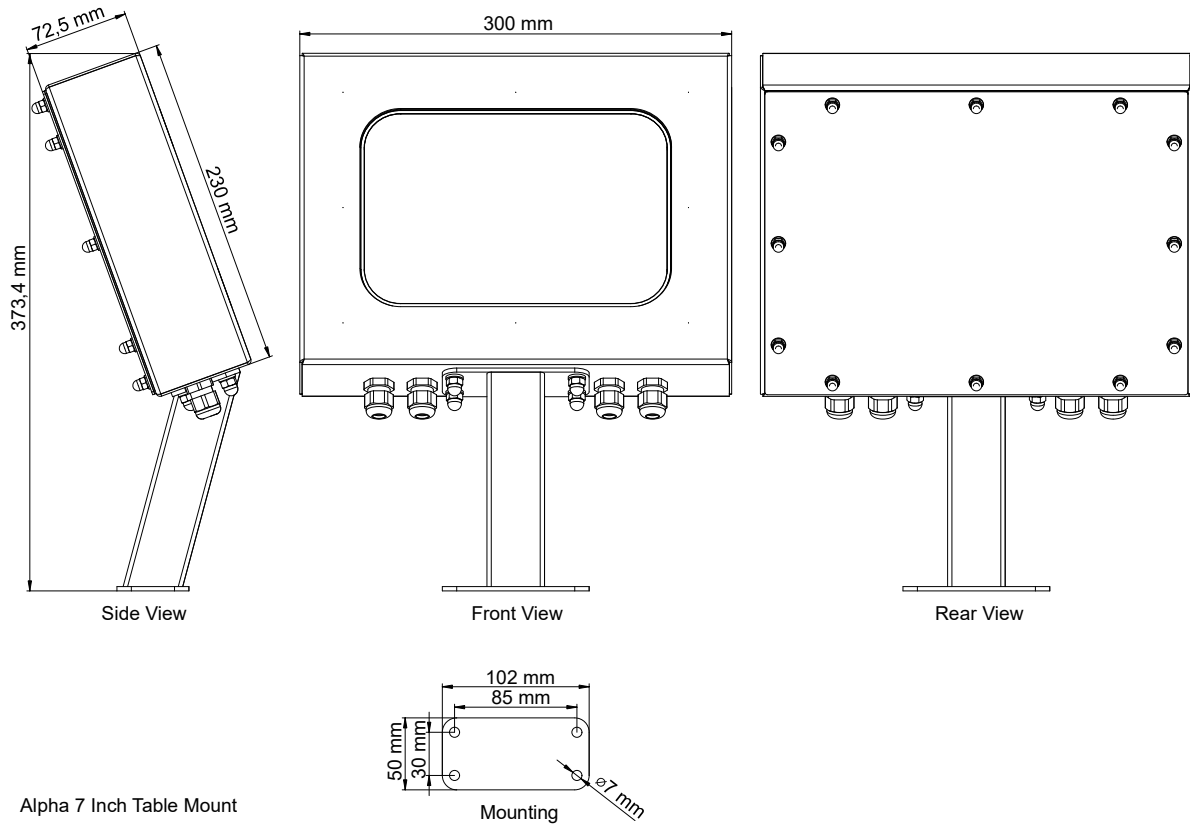


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## 7 INCH TABLE MOUNT

The main unit size is 300 x 230 x 72,5mm (hwxwd), excluding stand, screws and grommets. With stand, the total height is 373,4mm.

The stand can be attached using 4 M6 screws.



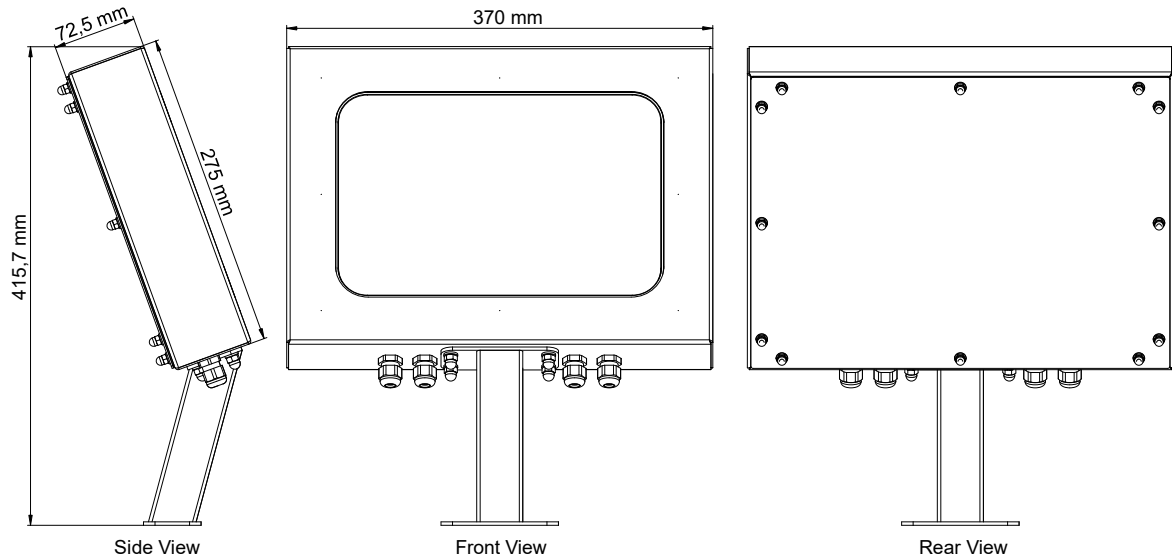
Alpha 7 Inch Table Mount

# ALPHA manual

## 10 INCH TABLE MOUNT

The main unit size is 370 x 275 x 72mm (hxwxd), excluding stand, screws and grommets. With stand, the total height is 415,7mm.

The stand can be attached using 4 M6 screws.

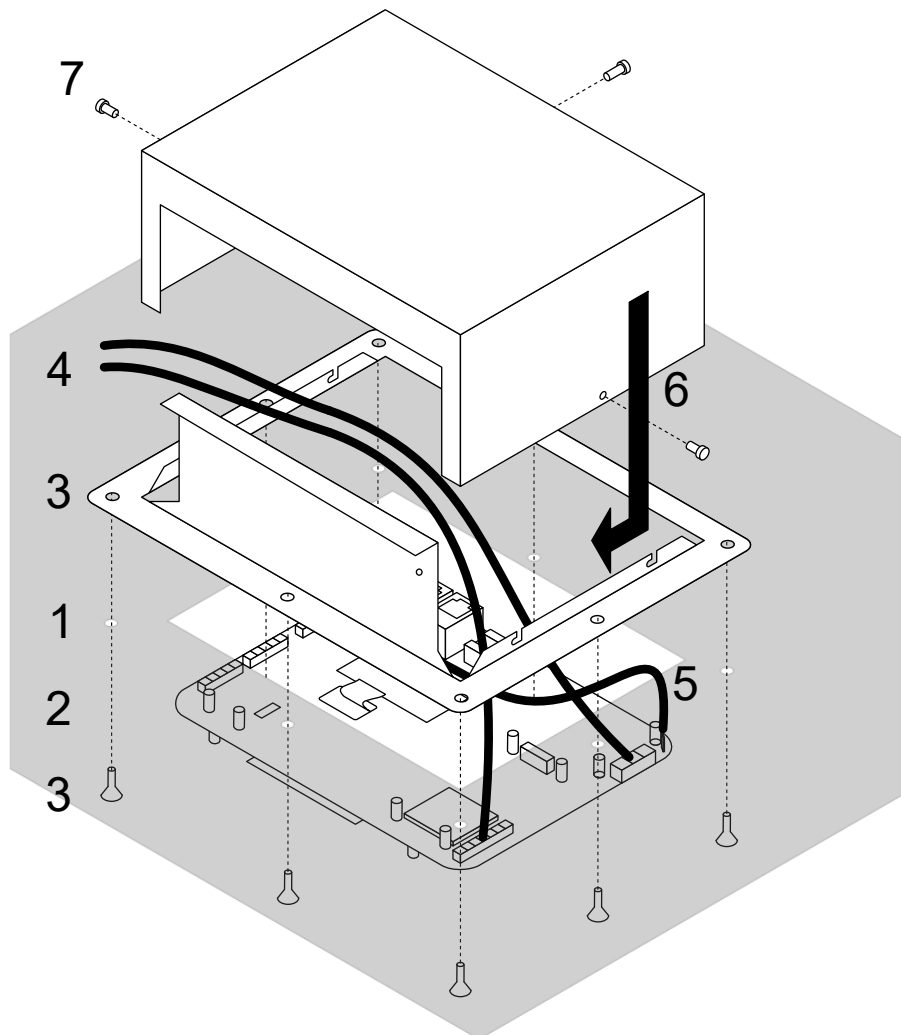


Alpha 10 Inch Table Mount

# ALPHA manual

## PANEL MOUNT ASSEMBLY

- 1 The square panel cutout can have up to 5mm tolerance, but the holes must be drilled accurate to within 0.5mm.
- 2 After drilling the holes, the front panel with sealing ring and electronics is placed from the outside of the panel.
- 3 The mounting collar is placed on the inside of the panel and fixed with eight M4 screws. Now the unit is fixed to the panel.
- 4 Connect the required cables.
- 5 Connect the earth strap from the mounting collar to the PCB.
- 6 The back cover can be placed after wiring of the unit is complete. This provides easy access to all connections while installing the system. The back cover has 4 pegs on the inside which slide into slots in the mounting collar. When the pegs slide into the L-shaped slot, the back cover lowers into place and locks. When the unit is installed in a closed steel housing with sufficient cable management, the back cover can be omitted
- 7 For structural strength, up to three M3 screws can be used to lock the cover in place.



To remove the back cover, remove the three M3 screws. Slide the back cover towards the top of the front panel and lift the cover off.

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## SYSTEM OVERVIEW

The Alpha indicator can consist of:

Order Code	Product name	Description	PCB number (for identification)
	Alpha Main Board	Base unit Optional 1 or 2 analog outputs	7600B4726

Possible expansion modules are:

Order Code	Product Name	Description	PCB Number (for identification)
	ALPHA SERIAL MODULE	Isolated RS232/RS422/CAN interfaces	7600B4738
	ALPHA ADC MODULE	1 loadcell input	7600B4727
	ALPHA AI MODULE	4 analog inputs	7600B4739
	ALPHA DIO MODULE	8 digital inputs, 8 digital outputs	7600B4737

Each I/O module is galvanically isolated from the power supply, controller module and the other I/O modules.

## ALPHA COMPONENTS

### Alpha Mainboard

The Mainboard handles:

- Web interface
- Network access
- I/O Card data processing and distribution
- CODESYS PLC function
- Result storage
- Graphical user interface with touchscreen

The Mainboard has the following features:

- 11-36VDC power input
- 2 x 100mb Ethernet connectors
- 2 x USB Host connections
- Real time clock with backup battery
- Non-volatile RAM storage
- 8 digital, galvanically isolated, inputs. Input 1 and 2 can count pulses up to 5kHz.
- 8 digital, galvanically isolated, outputs
- 1 Loadcell input.
- Optional up to 2 DAC outputs

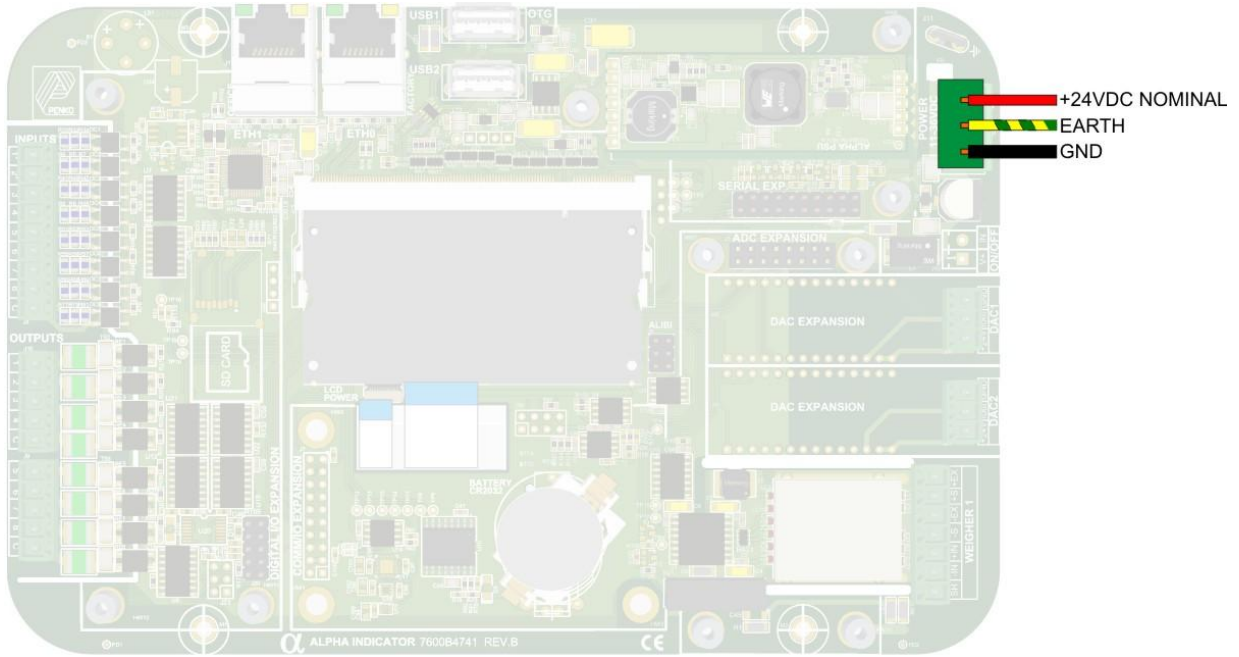
# ALPHA manual

## CONNECTING THE ALPHA

The ALPHA provides several ports to connect to a power supply, digital and analog inputs and outputs, serial communication ports, a computer or external devices.

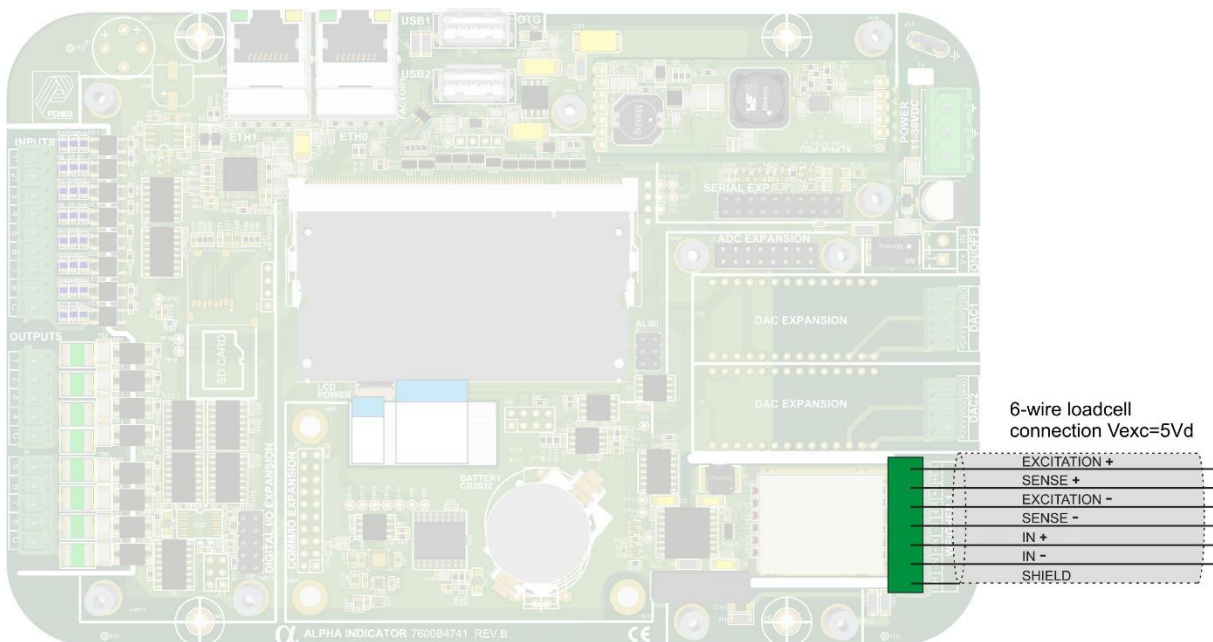
### POWER INPUT

The power input is designed for a nominal 24V DC input but accepts between 11V and 30V DC.



### LOADCELL INPUT

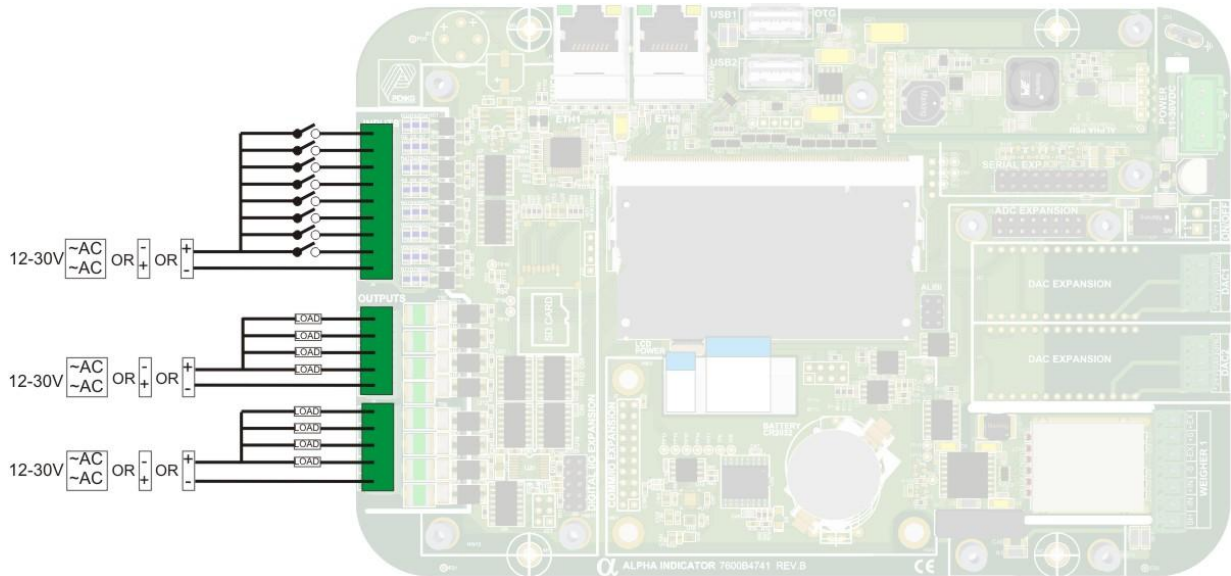
The loadcell input is galvanically isolated and provides 5V DC Excitation for 2mV/V or 3mV/V loadcells. Up to 4 loadcells of 350 Ohms can be connected in parallel.



# ALPHA manual

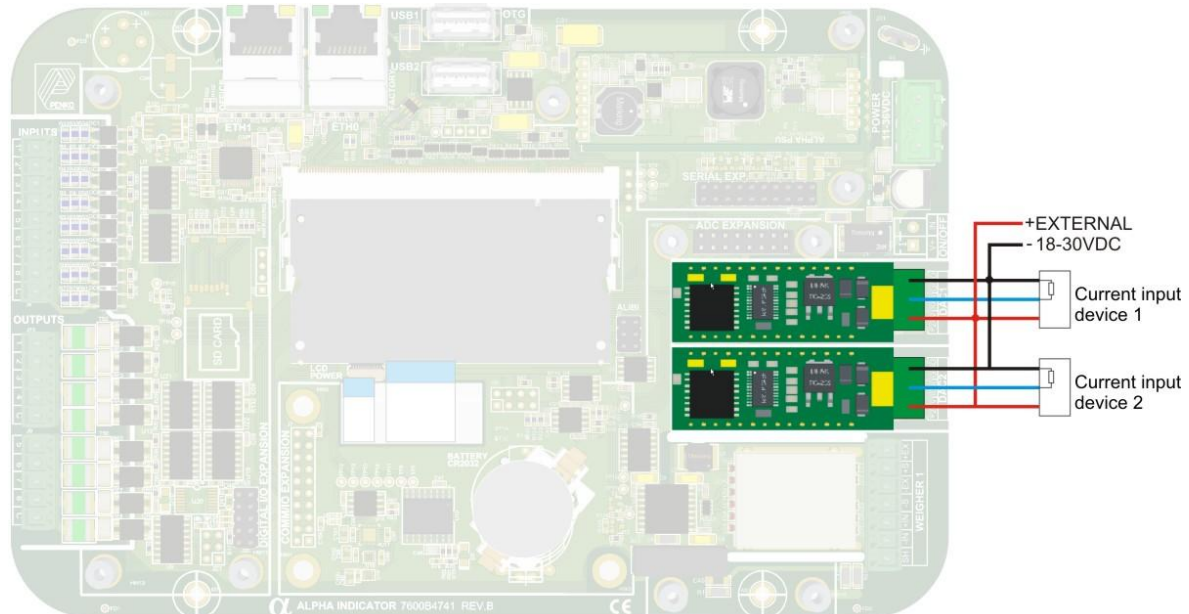
## DIGITAL IN AND OUTPUTS

- 8 galvanically isolated inputs. These accept up to 30 volts AC or DC.
- 8 galvanically isolated outputs. Can switch up to 50V/0,5A DC or AC. Each output has a resettable fuse and overvoltage protection.
- Input 1 and 2 can count pulses up to 5000 per second.



## ANALOG OUTPUTS

Depending on the version the ALPHA can be ordered with 0,1 or 2 analog outputs. When an analog output is present, a DAC board is mounted next to the analog output connector. These modules are soldered in during production and can't be added afterwards.

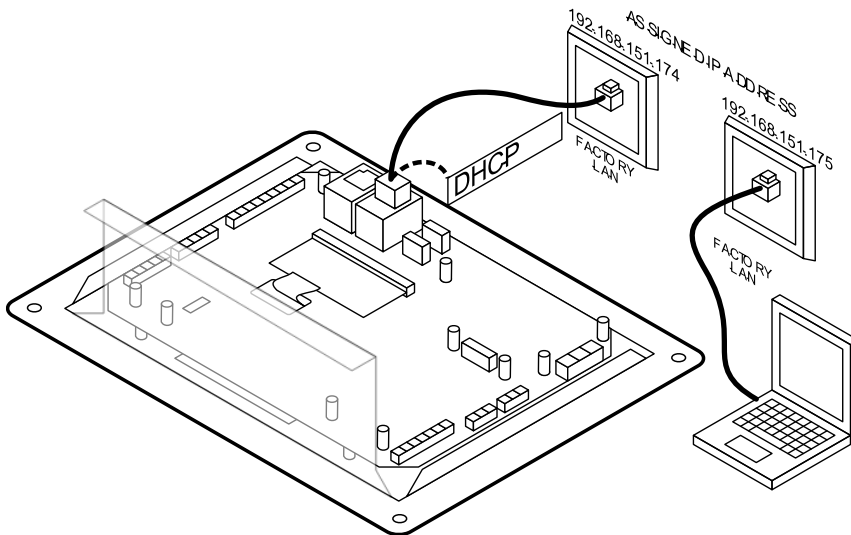


The analog outputs are galvanically isolated from the ALPHA electronics and must be powered by an external 12 or 24VDC power supply. The current output can supply up to 24mA and up to 10 volts. When a 500 Ohm resistor is used then 0 to 20mA through the resistor results in a voltage of 0 to 10V across this resistor.

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## ETH0: FACTORY NETWORK PORT

The eth0 port is for connection to the factory local area network.



Depending on the configuration several industrial ethernet protocols or features can be used like:

- Ethernet IP\*
- Modbus TCP\*
- Profinet\*
- Printer

\*Only available when buying protocol and USB dongle from CODESYS.

By default, the following services are available:

Service	Port	Function
Web Server	9010	Presents the ALPHA user interface
Web Server	8080	Presents the CODESYS visualization
DNS Client	53	DNS client gets an IP address from the factory network server

When the ALPHA is set to, for example, address 192.168.151.174 then the ALPHA user interface can be shown on any web browser on the same network by typing the following address:

<http://192.168.151.174>

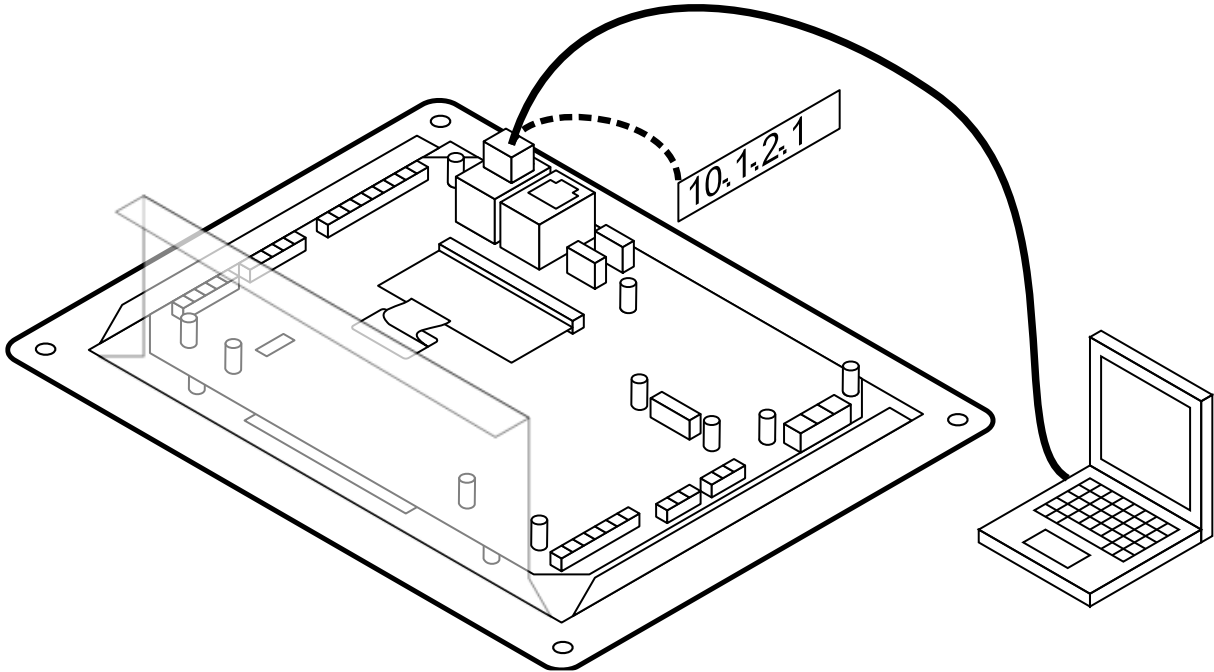
The CODESYS Visualization can also be shown by typing the following address:

<http://192.168.151.174:8080>

# ALPHA manual

## ETH1: OFFICE NETWORK PORT

The eth1 port is for connection to the office local area network or directly to a single computer for service and setup use.



By default, this port uses address 10.1.2.1 as its own address and the DHCP server will give any connected computer an IP address between 10.1.2.100 and 10.1.2.200.

By default, the following services are available:

Service	Port	Function
Web Server	9010	Presents the ALPHA user interface
Web Server	8080	Presents the CODESYS visualisation
DNS Server	53	DNS server gives an IP address to a connected laptop.

To access the ALPHA user interface, open a web browser like Google Chrome, Mozilla Firefox or Microsoft Edge and type the address:

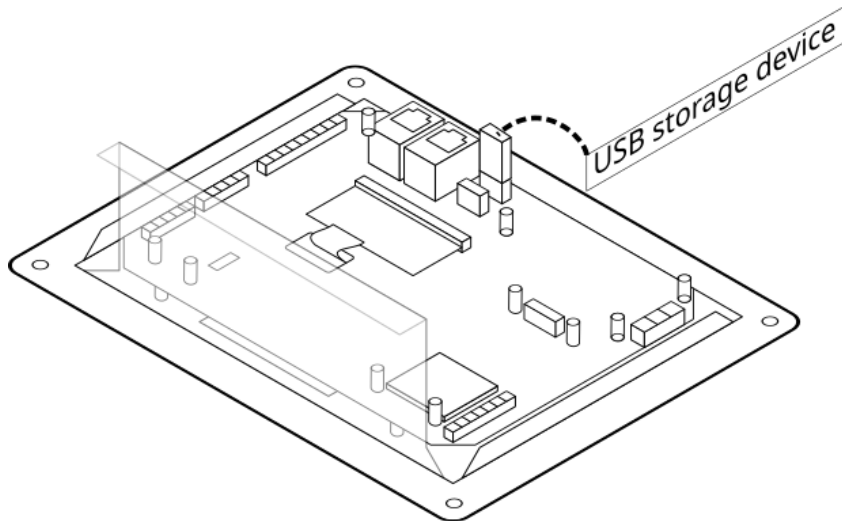
<http://10.1.2.1>

# ALPHA manual

## USB-PORT

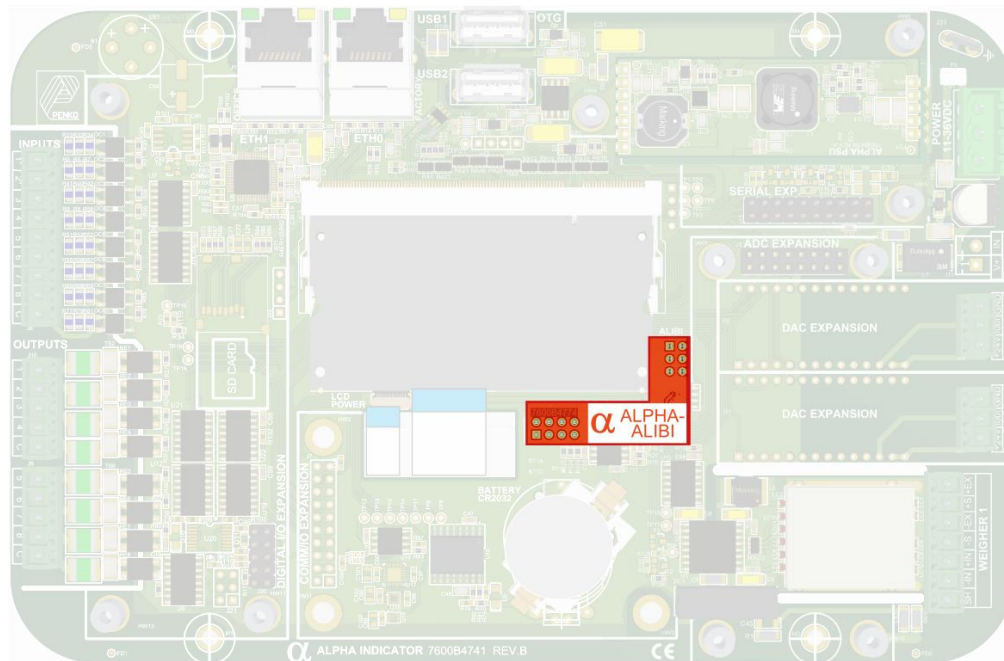
Both USB ports can also be used to connect USB devices such as:

- USB stick
- Mouse
- Keyboard
- Barcode scanner
- Printer



## ALPHA ALIBI MODULE

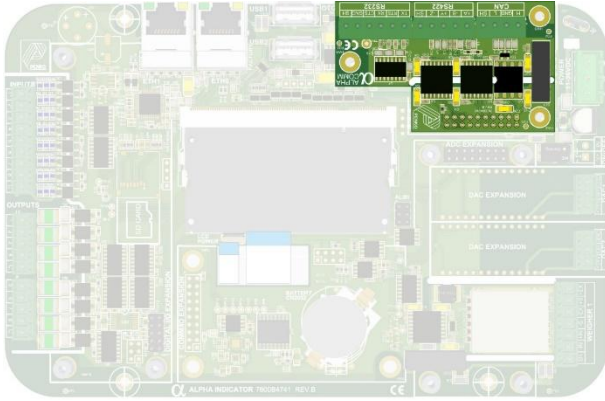
This module adds logfile and certified alibi memory to the Alpha.



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## ALPHA SERIAL MODULE

This module provides Galvanically isolated RS232, RS422 and CAN interfaces. The module is mounted using 3 M3 screws. Take care to align the connector and mounting holes correctly. Incorrect connection can damage the ALPHA.

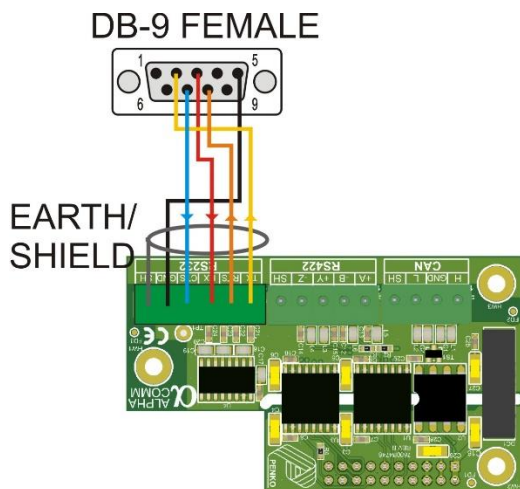


### RS-232

The RS-232 port is used as a point-to-point connection to a single device and can be used to connect to, for example, a PC, PLC, barcode scanner or printer. The function of this port is controlled by the Codesys PLC program.

Alpha connection	Device connection	
TX	RX	Data from ALPHA to device
RX	TX	Data from device to ALPHA
GND	GND	Common zero or GND connection
CTS	RTS	Used by device to signal ready
RTS	CTS	Used by ALPHA to signal ready

To use RS232 without CTS and RTS, connect these together on the connector or program the serial port for “no handshake” or “XON/XOFF”.



# ALPHA manual

## RS-422

This port can be used as a multi-drop network with multiple devices to a single controller. Both ends of the cable must be terminated by a 120 Ohms resistor to suppress reflections and improve signal integrity.

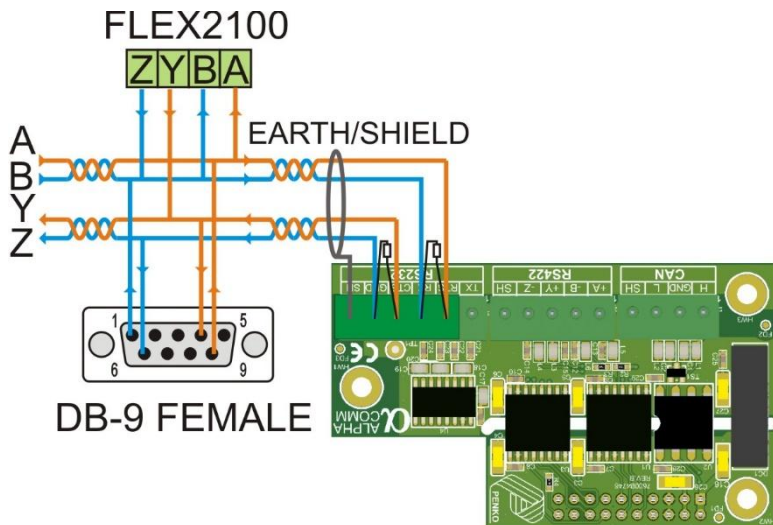
The function of this port is controlled by the Codesys PLC program. For protocols like MODBUS-RTU additional an additional Codesys license is required.

When the ALPHA is used as the network controller, the transmit outputs of the ALPHA are connected to the receive inputs of all devices. The receive inputs of the ALPHA are connected to the transmit outputs of all devices.

The A and B signals must be transported over a twisted pair. The Y and Z signals must also be transported over a twisted pair.

Each device must be configured to its own unique address since only one device can be active on the bus at a time.

Alpha connection	Device connection	Function
A	Y or TX+	RX+ receive data input of ALPHA
B	Z or TX-	RX- receive data input of ALPHA
Y	A or RX+	TX+ transmit data output of ALPHA
Z	B or RX-	TX- Data output of ALPHA
EARTH/SHIELD	EARTH/SHIELD	Used to connect shield when shielded cable is used



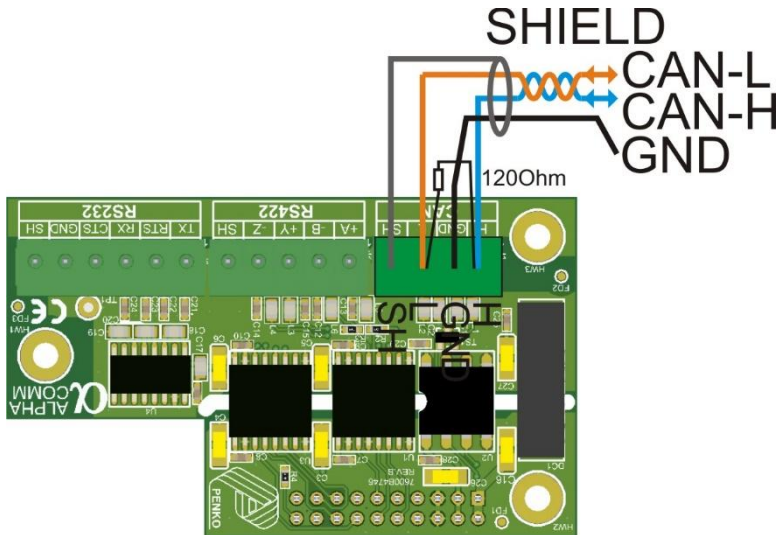
For RS-485, the RX+ and TX+ pins are connected. Also, the RX- and TX- pins are connected resulting in two wire, half duplex, communication over a single twisted pair.

# ALPHA manual

## CAN BUS

The CAN bus port can be used to create a network of multiple connected devices. The function of this port is controlled by the Codesys PLC program. For protocols like CANopen additional an additional Codesys license is required.

The CAN-H connection of all devices are connected. All CAN-L connections are connected. The CAN-H and CAN-L signals must be transported over a twisted pair. A GND line can be shared between devices to limit voltage differentials and improve signal quality.



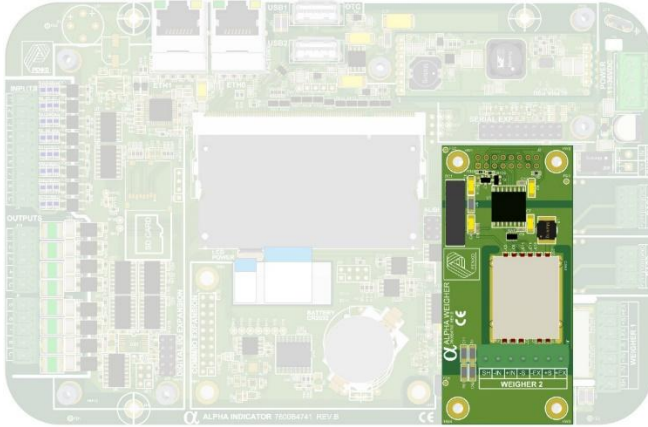
To terminate the CAN interface, add a 120 Ohm resistor. This is normally done only on the first and last connection of the cable to reduce interference and improve signal quality.

# ALPHA manual

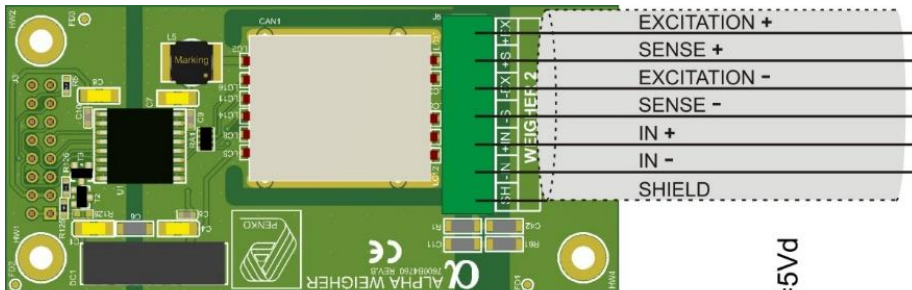
## WEIGHING INPUT MODULE

This module contains a galvanically isolated single loadcell interface. 5VDC Excitation with passive sense for 2mV/V or 3mV/V loadcells. Up to 4 loadcells of 350 Ohms can be connected in parallel. This expands the ALPHA to two independent weighers or can be used to add a loadcell with a reference weight for motion compensation of the mainboard weigher.

The weigher input uses the same connection as the analog input module. When the weigher input module is installed the analog input module can't be installed



The module is mounted using 4 M3 screws. Take care to align the connector and mounting holes correctly. Incorrect connection can damage the ALPHA.



6-wire loadcell  
connection Vexc=5Vd

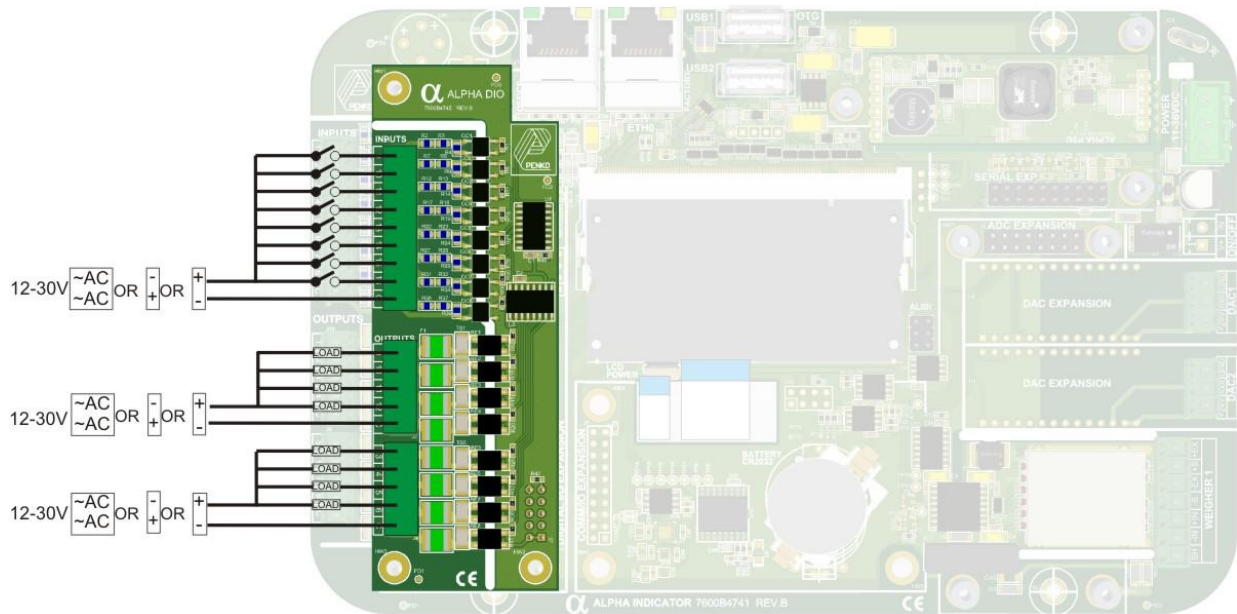
# ALPHA manual

## DIGITAL IO MODULE (DIO)

This expansion module provides

- 8 galvanically isolated inputs. These accept up to 30 volts AC or DC.
- 8 galvanically isolated outputs. Can switch up to 50V/0,5A DC or AC. Each output has a resettable fuse and overvoltage protection. The first 4 inputs share a common connection. The last 4 inputs are connected to a different common connection and can use a different power domain, voltage or polarity

This expands the Alpha to a total of 16 in and outputs. The module is mounted using 3 M3 screws. Take care to align the connector and mounting holes correctly. Incorrect connection can damage the ALPHA.



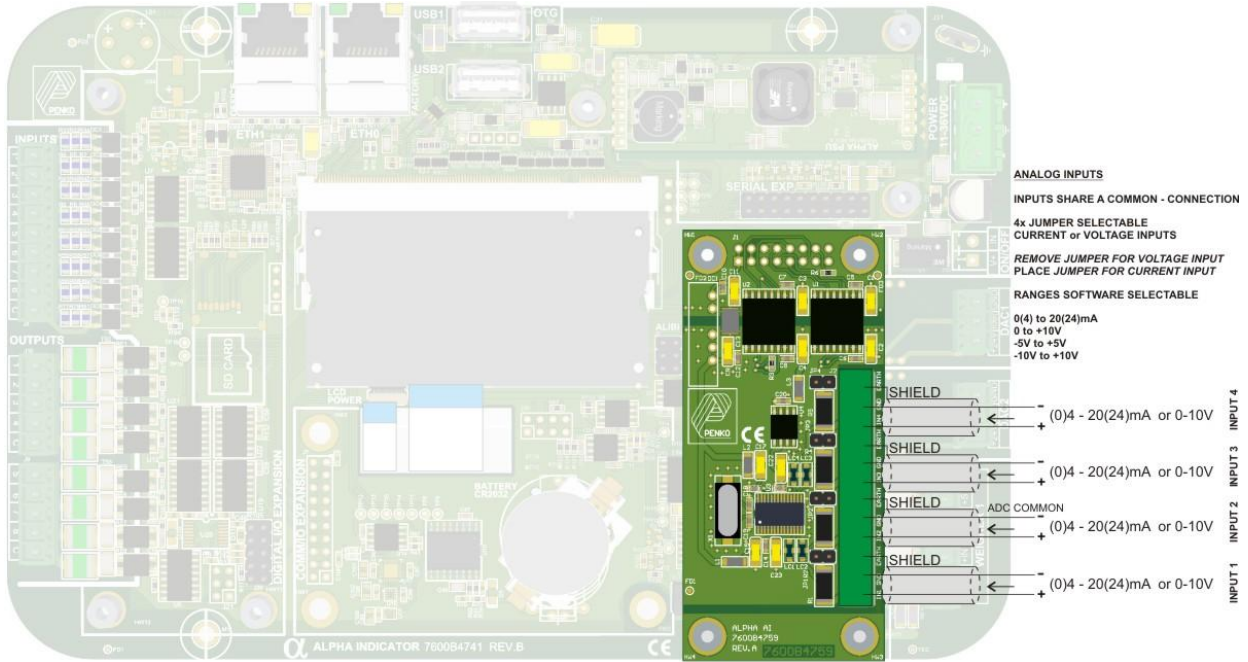
# ALPHA manual

## ANALOG INPUT (AI) MODULE

This module contains:

- 4 galvanically isolated analog inputs. Each input can measure 0-10V, -5V to +5V, -10V to +10V or, when the jumper is placed, (0)4 to 20(24) mA current input.

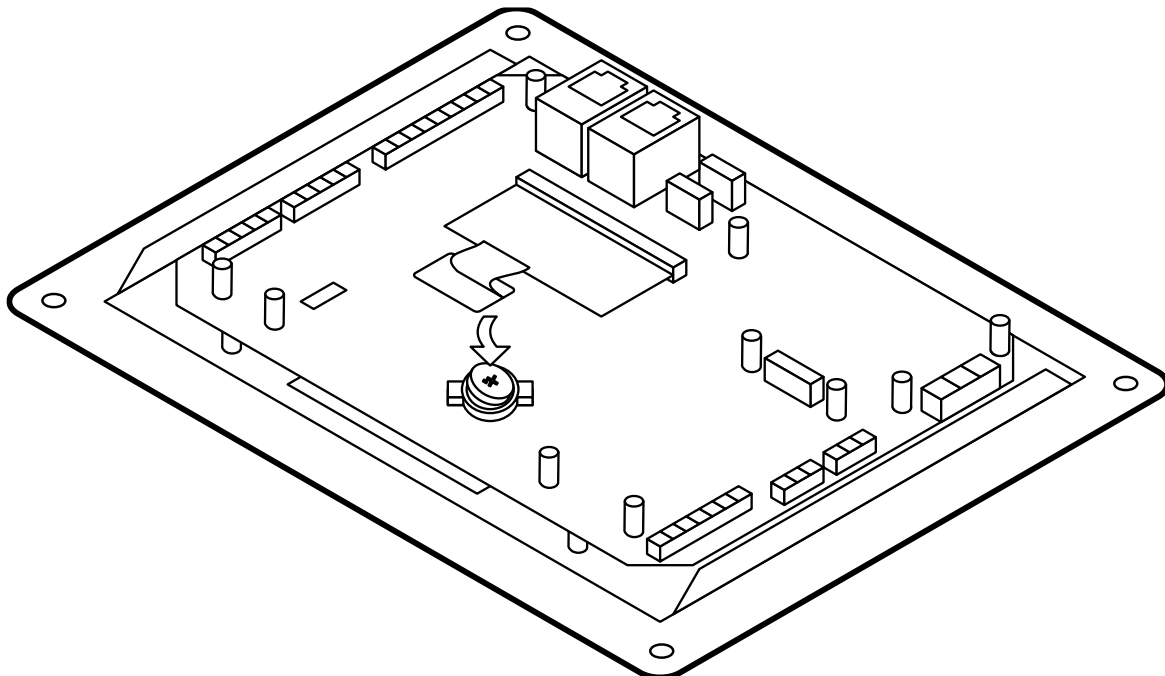
The analog input uses the same connection as the weigher module. When the analog input module is installed the weigher module can't be installed. The module is mounted using 3 M3 screws. Take care to align the connector and mounting holes correctly. Incorrect connection can damage the ALPHA.



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## REPLACING THE BATTERY.

The ALPHA indicator stores data in battery backed-up memory and keeps the time and date. To provide power to the clock and memory, a CR2032 battery must be installed on the mainboard near the LCD ribbon cable.



When placing the battery make sure the side marked '+' is visible on top. Two possible battery holders can be used. With the first type, the battery slides underneath the large metal tab. With the second type the far end of the battery hooks into the holder and then the other side can be pushed in until the battery clicks into the holder.

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## CONTROLLING THE ALPHA THROUGH THE USER INTERFACE

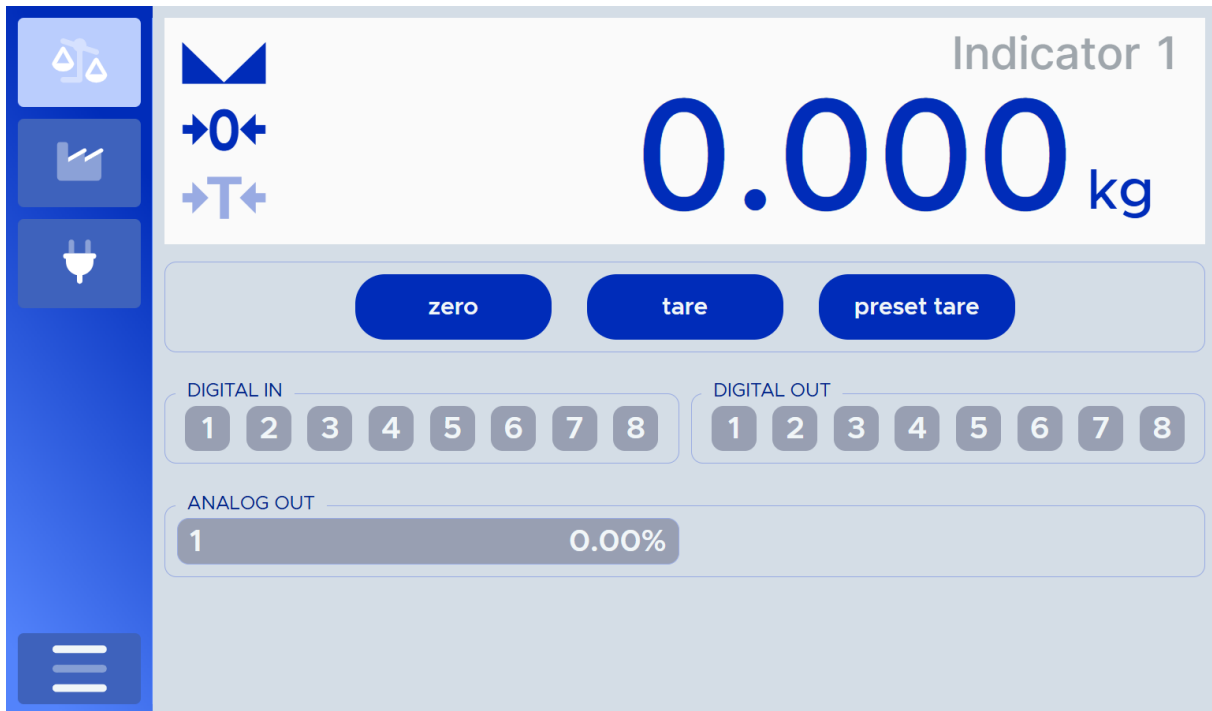
The user interface is divided in two menu's, operational and settings-menu. The operational menu is for showing the indicator, CodeSys webvisu and hardware information. The settings menu can be used for adjusting system and weigher settings.

### OPERATIONAL MENU

The operational menu has the following items, indicator, CodeSys webvisu and hardware information. In the settings menu – General – Display, you can select the startup page that will be shown when the device is booted. At the same page the shown operational menu items can be adjusted to show for example only the CodeSys webvisu.

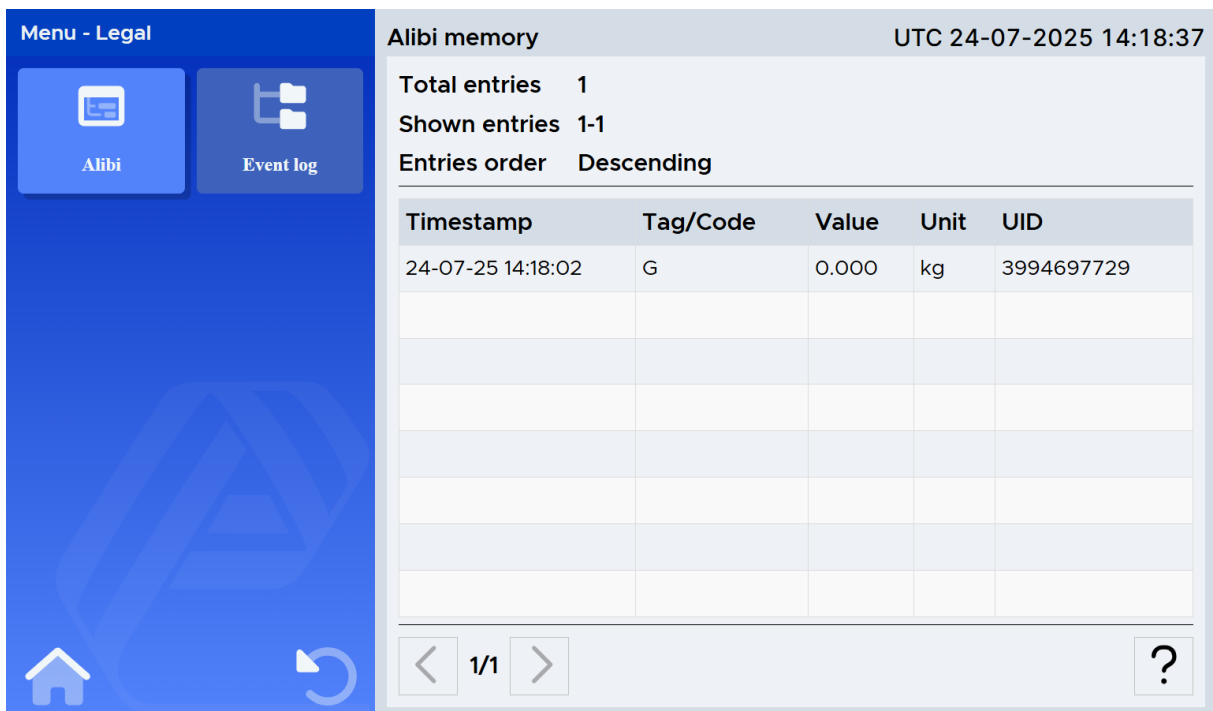
### INDICATOR DISPLAY

By default, the indicator display is shown at startup. At this page the current weight, digital IO and optional analog IO is shown. The buttons zero, tare and preset tare can also be used to control the shown indicator.



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When the indicator is in certified mode, a print button is also shown. When pressed, data is logged to the alibi. To view the alibi, go to the settings menu – legal – alibi.



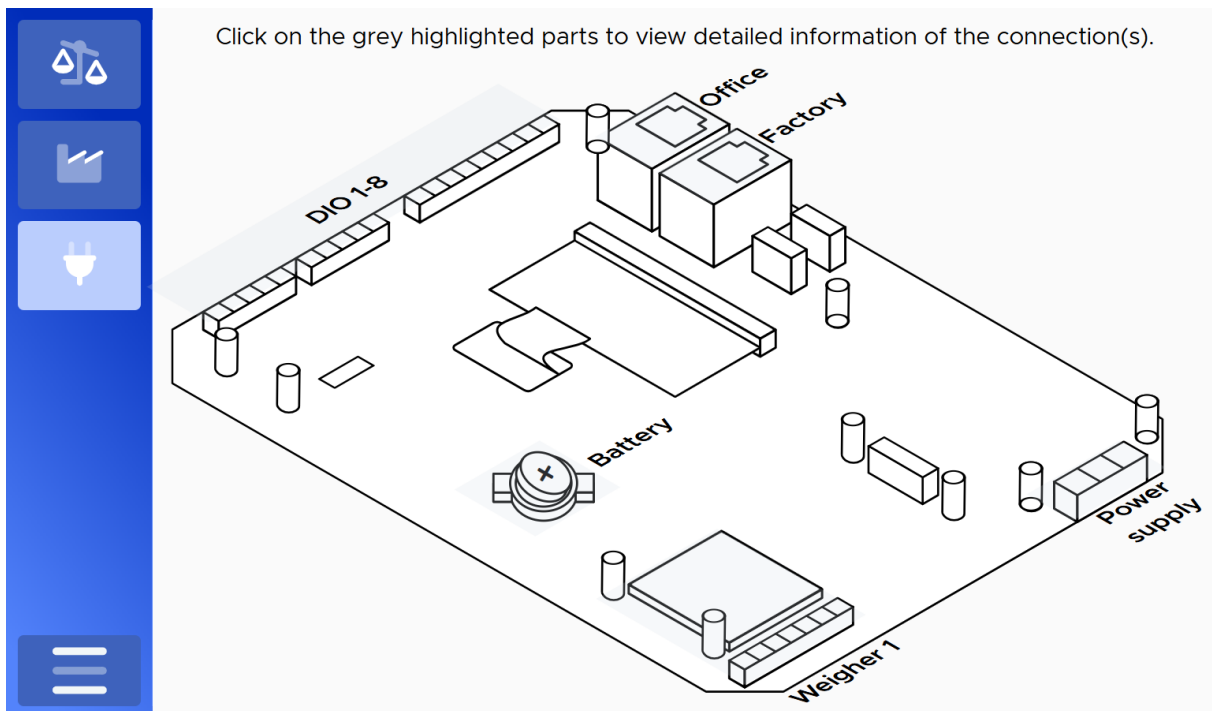
# ALPHA manual

## CODESYS WEBVISU

A (custom) CodeSys Webvisu can be shown by pressing the factory icon. This visualization can be made with the CodeSys IDE (Integrated Development Environment). In the CodeSys IDE, add the visualization object the application. Download the application to the Alpha and then the visualization will be shown.

## HARDWARE INFORMATION

The image below shows the standard Alpha components, based on the version more components may be installed. To show connection information, press on the grey area above the connectors to show the detailed information.



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## SETTINGS MENU

To enter the settings menu, press the settings icon at the bottom left of the screen. There are three main menu items to choose from, general, indicator and info.

### Authentication

By default, all the settings in the settings menu are read-only (guest user). In the client it is possible to create and manage users. Users with administrator rights can edit the settings on the user interface. Do this by pressing on the bottom right lock icon, see the image below.



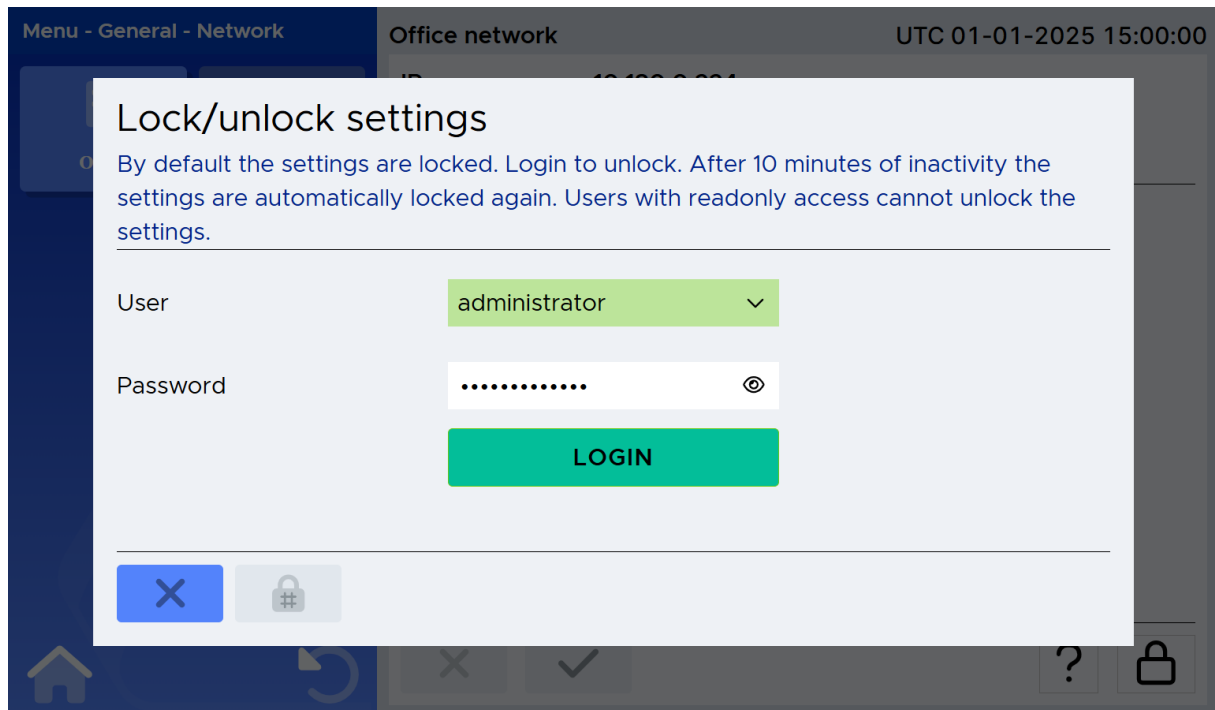
A dialog appears, select the user and fill-in the corresponding password. Click on the login button to login to the selected account. Now the settings are unlocked. After 10 minutes of inactivity, the settings are automatically locked again.

### Login

Default user credentials:

Ussr: administrator

Pass: administrator



### Logout

When logged-in, you can also manually lock the settings. Do this by pressing on the lock icon on the bottom right and in the dialog press the yellow highlighted lock icon.

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## GENERAL

In the general menu there are four menu items, network, clock, language and display.

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## NETWORK

There are two network connections on the Alpha, office and factory network.

The available network modes are:

Unmanaged	CodeSys controls the network settings.
Static	Static IP
DHCP-client	Get IP, netmask and gateway address from the router.
DHCP-server	Set the Alpha as DHCP server (router).

### Office network

The office network has unmanaged, static, DHCP-client, and DHCP-server as modes available. The office network connector is the one the most far away from the USB-connectors.

### Factory network

The factory network has unmanaged, static and DHCP-client as modes available. The office network connector is the one the closest to the USB-connectors. By default the mode is set to DHCP-client.

---

## CLOCK

### Enabled

When the NTP-mode is enabled, the Alpha will receive the date and time from a timestamp server.

### Disabled

When the NTP-mode is disabled, the date and time must be set manually. Daylight saving time is not applied automatically.

---

## LANGUAGE

Set the language that is used across the system.

# ALPHA manual

---

## DISPLAY

### **Show pages**

Set the items that are shown in the operation menu. By default all the items are shown and minimal one item must be selected.

### **Startup page**

Set the operational menu item that is shown at the startup of the device.

### **Screen brightness**

Set the screen brightness between 1 and 100%.

### **Decimal character**

Set the decimal character to a comma or a dot. By default it is a dot.

### **Weigher indicator**

There are different indicators that can be shown at the indicator menu item. Choose the one that will be shown. By default the weigher indicator is shown.

# ALPHA manual

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## INDICATOR

Change the indicator specific settings. This includes the parameters, calibration and analog config.

---

## PARAMETERS

Adjust for each indicator their parameters. The parameters are grouped into weigher, stability, zero tracking, range/interval and filters. For more (advanced) parameters, go to the web interface.

---

## WEIGHER

### Name

Change the weigher name. This name will be shown in the indicator screen.

### Max Load

To prevent overload by the user, the weigher will not show any weight above this value. In certified mode the max load is not allowed to be more than the maximum load+ 9 scale parts.

### Operation mode

Set the operation mode to industrial or certified. In certified mode, a certified display and weigher will be used. The checksums can be found in the menu – info – OIML screen.

### Step

Most loadcells are certified for up to 3000 parts. When the display resolution is too high for the loadcell, the step size can be set higher than 1 to reduce the number of display parts.

Step size can be set at 1, 2, 5, 10, 20, 50, 100, 200. The step size defines the scaled parts of the weight value.

Example: Weigher value is 2003 kg

Step size	Display value
1	2003 kg
2	2004 kg
5	2005 kg
10	2000 kg

The display value will be rounded off to the nearest value with a valid step size

### Decimal Point

The decimal point can be set from 0 to 5 decimals.

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## Unit

The unit defines the unit of measurement. The unit is the value of a quantity, chosen by convention as a reference for measuring quantities of the same kind. For example: t (ton) kg (kilo gram), g (gram), but can also be L (liter), lbs. (pounds), etc.

The unit can be set to any text up to 16 characters. No conversion between Imperial or Metric units is available so the unit remains fixed for each weigher channel.

## STABILITY

---

### Stable range

Set the range the weigher has to be within for the given stable time to give a stable signal.

### Stable time

Set the time the weigher has to be for the given stable range to give a stable signal. Choose a time between 0,00s and 100,00s.

## ZERO TRACKING

---

Set the zero tracking range, step and time. 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. Choose a value between 0 and 8388607.

### Tracking step

Set the step size that will be tuned every time when the offset is within the maximum range. Choose a value between 0 and 8388607.

### Tracking time

Set the time in seconds that the signal has to be within the range to tune 1 step back to zero. Choose a value between 0,00s and 10,00s.

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## RANGE/INTERVAL

---

Set the indicator to change its step size when the weigher signal 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 size is set to 0. Choose a value between 0 and 8388607.

### Max step

Set the biggest step size allowed. Choose between 1, 2, 5, 10, 20, 50, 100 and 200.

If the settings are: Step size = 1, Range = 100 and Max. Step = 50, the table on the right shows the accompanying step size with which the weigher values reduces within the displayed ranges.

When the indicator is set to certified, the maximum preset tare is equal to the first level of the auto range. In this example the preset tare is valid to 100.

Displayed range	Step size
0-100	1
100-200	2
200-500	5
500-1000	10
1000-2000	20
2000-5000+	50

### Mode

Multi Range = the highest shown step size will be reset after the signal has been lower or equal to zero.

Multi Interval = the highest shown step size will be reset after the signal reaches the previous range.

## FILTERS

---

### Select preset

Select one of the predefined presets according to the machine.

### Sample rate

Defines the refreshment speed of the weighing signal.

### Cut off

Determines the range used for filtering the signal. Choose between OFF, 1.0Hz, 1.4Hz, 2.5Hz, 5.0Hz, 10.0Hz, 20.0Hz and 40Hz.

# ALPHA manual

## Moving average

The moving average cutoff frequency. Choose a value between 0-320 Hz.

## Overall filter

Set the overall filter to effect all indicator signals used in the device. 0dB means no effect and -50dB is the strongest damping. Choose between -: 0dB, 1: -6dB, 2: -12dB, 3: -24dB, 4: -30dB, 5: -36dB, 6: -42dB and 7: -50dB.

---

## CALIBRATION

The indicator can be calibrated for two points on the user interface. Start with the zero calibration and the the gain.

### ZERO

---

Calibrate the zero point of the scale. Before you start, make sure the scale is empty.

#### How to calibrate

1. Make sure the scale is unloaded.
2. Wait a few seconds to make sure the signal is stable.
3. Press the "Calibrate zero" button to zero point.
4. When pressed, a point is added to the current calibration points list.

#### Calibration error: ADC underflow or ADC overflow

Check the loadcell and platform. An invalid signal, show as "uuuuuu" or "oooooo", is read in by the Alpha.

### GAIN

---

Calibrate the gain point of the scale. For a multi-point calibration, go to the advanced settings in alpha web portal.

#### How to calibrate

1. Place the load on the scale
2. Wait a few seconds to make sure the signal is stable.
3. Fill-in the weight of the load
4. Press the "Calibrate gain" button to add the gain point.
5. When pressed, a point is added to the current calibration points list.

#### Calibration error: ADC underflow or ADC overflow

Check the loadcell and platform. An invalid signal, show as "uuuuuu" or "oooooo", is read in by the Alpha.

# ALPHA manual

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## ANALOG

When a DAC (Digital to analog) or AI (Analog In) is installed, the Analog menu item is visible.

## DAC

---

The installed DAC can be configured, manually controlled and calibrated.

## CONFIG

---

Choose one of the following options to set the DAC range.

0-24mA: Input value 0 to 24mA will be calculated from 0 to 100,00%.

0-20mA: Input value 0 to 20mA will be calculated from 0 to 100,00%.

4-20mA: Input value 4 to 20mA will be calculated from 0 to 100,00%

4-24mA: Input value 4 to 24mA will be calculated from 0 to 100,00%.

## MANUAL

---

Use the manual control to test the DAC. A custom output percentage can be set with the manual control. For testing the minimal and maximum output levels, the manual 0,00% and 100.00% buttons can be used.

Make sure to turn off the manual control before leaving this phase so the DAC can be used by e.g. the CodeSys application.

## CALIBRATION

---

Calibrate the DAC using a mA meter connected to the DAC output.

Start with the 0mA calibration. Set the output of the DAC to 0mA by pressing the button "output 0mA". Enter the reference value in the minimum output field.

Next the 24mA. Set the output of the DAC to 24mA by pressing the button "output 24mA". Enter the reference value in the maximum output field.

When done, save the calibration using the save button.

---

## ADC

Configure the range of the ADC signal. Depending on the selected range, a jumper must be placed or removed. By default all the four jumpers are placed and the 0-20mA option is selected.

### **Jumper placed**

When the jumper is placed, the ADC can be used to measure current.

### **Jumper removed**

When the jumper is removed, the ADC can be used to measure voltage.

# ALPHA manual

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## LEGAL

The legal menu is shown in the certified Alpha.

### **Alibi**

All the records from the alibi memory are shown in descending order (latest to oldest).

### **Event log**

All the records from system events like system update, TAC/CAL change are shown in this menu item in descending order (latest to oldest).

---

## INFO

The info menu is showing the device information and OIML data.

### **Device information**

The device information page is showing the installed CodeSys license, Alpha software version and installed option boards.

### **OIML**

The system update counter shows how many time a software update has been installed. The weigher and indicator version including checksum and date & time are also shown on this page.

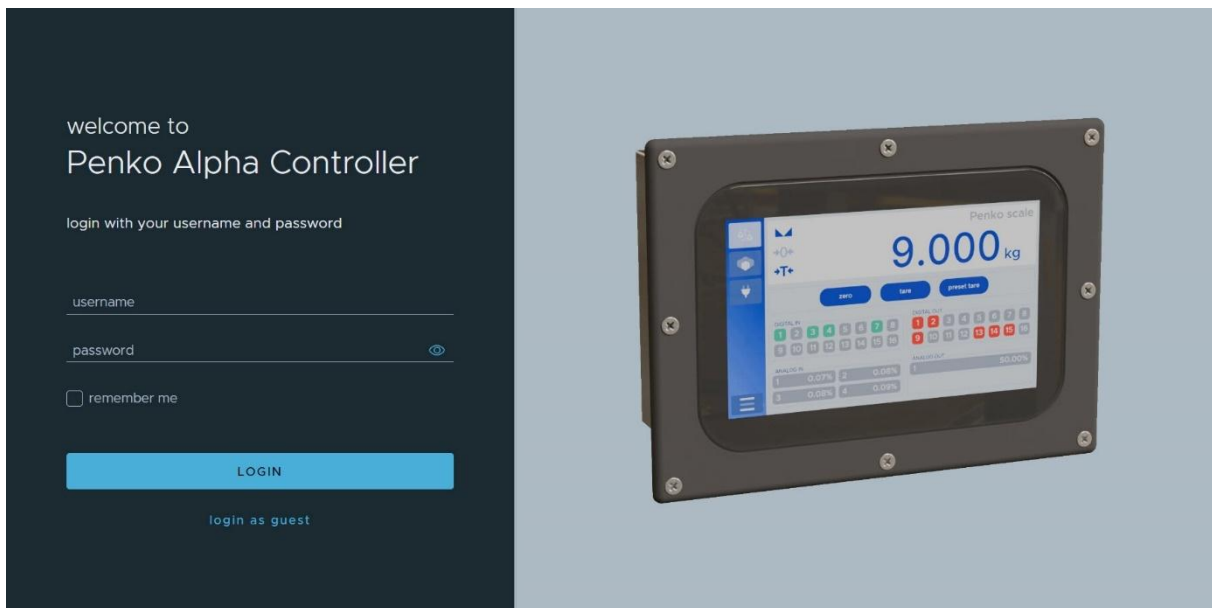
# ALPHA manual

## CONTROLLING THE ALPHA THROUGH THE WEB INTERFACE

There are two ways to connect to the web interface. Use one of the options described below.

- Connect a computer using an ethernet cable directly to Ethernet 1, the Factory Network port. Default configured as DHCP client, and the ALPHA should get an IP address from the router.
- Connect a computer using an ethernet cable directly to Ethernet 2, the Office Network port and enter the address 10.1.2.1.

When connected, the following page is shown.



The default login is:

Username: **administrator**

Password: **administrator**

Then click **LOGIN**

After successful login the dashboard is shown.

**Note:** besides the guest login the administrator user is used in this manual.

# ALPHA manual

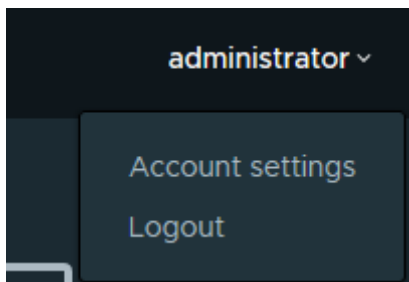
## GUEST LOGIN

The guest login can be used to get a quick overview of the ALPHA configuration, IO status and CodeSys webvisu. After hitting the “Login as guest” button on the login screen the option cards overview page is shown. To switch (back) to another account, click on “Guest” in the top-right corner and logout.

The guest user cannot edit system and weighing settings.

## USER MENU

At the top right of the screen, the username is shown. Clicking on the name shows the following dropdown menu.

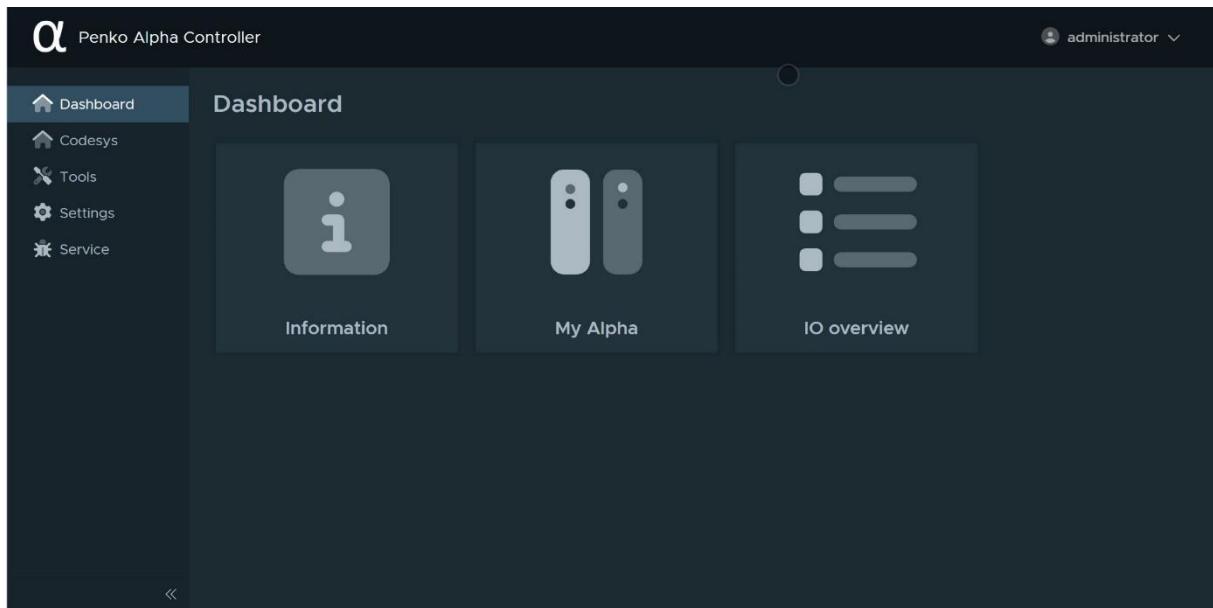


The account settings allow the user interface to be set to US English or Dutch and the user can change its password by entering the current password and the new password twice. The eye icon enables displaying the entered text. When other people can read the screen, it is advisable to keep the entered passwords hidden.

The logout option logs the user out of the system and returns to the login screen so no further changes can be made and allow a different user to log into the system.

# ALPHA manual

## DASHBOARD MENU



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### INFORMATION

The information page shows the installed CodeSys license, supplier & manufacturer information and the used license agreements. The supplier information can be changed in the settings menu – general settings.

---

### MY ALPHA

The current firmware and bootloader version are shown. The alpha can be expanded with multiple expansion boards. All available extension boards are listed with a status of installed or not installed.

*Note: the second weigher and analog inputs 1-4 cannot be installed at the same time.*

---

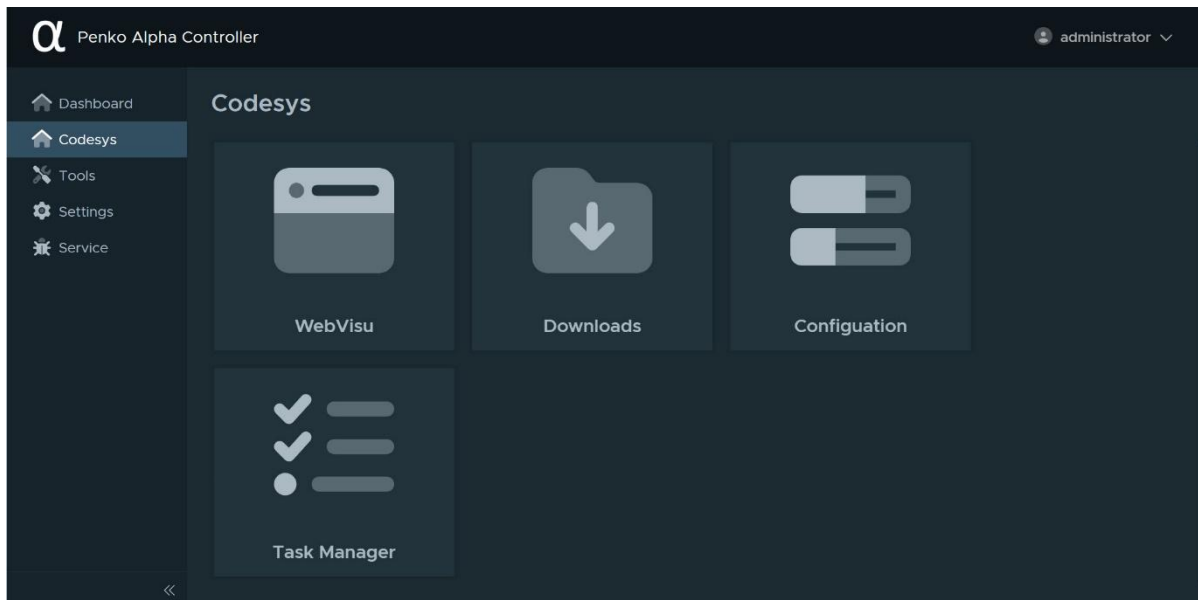
### IO OVERVIEW

The IO (inputs/outputs) overview page shows the live status or value of all installed analog and digital IO. When two weighers are installed, both are displayed, and the IO is split across both weighers.

# ALPHA manual

## CODESYS MENU

All CodeSys related items can be found on this menu. From showing the CodeSys web visualization to removing applications due to exceptions, for example.



---

## WEBVISU

When a visualization has been added to the application, it will be shown here. The visualization can also be viewed by going to the IP address of the alpha followed by :8080, e.g. <http://192.168.0.55:8080>.

Return to the web portal by clicking on the text “Penko Alpha Controller” in the back bar at the top of the screen.

---

## DOWNLOADS

Download the Penko CodeSys libraries and dependencies here, including the device descriptions. Install the downloaded files in the CodeSys IDE (Programming Environment) before you start programming.

---

## CONFIGURATION

Enable or disable the CodeSys user management and set the hostname that is shown in the CodeSys IDE while scanning for devices to connect to.

---

## TASK MANAGER

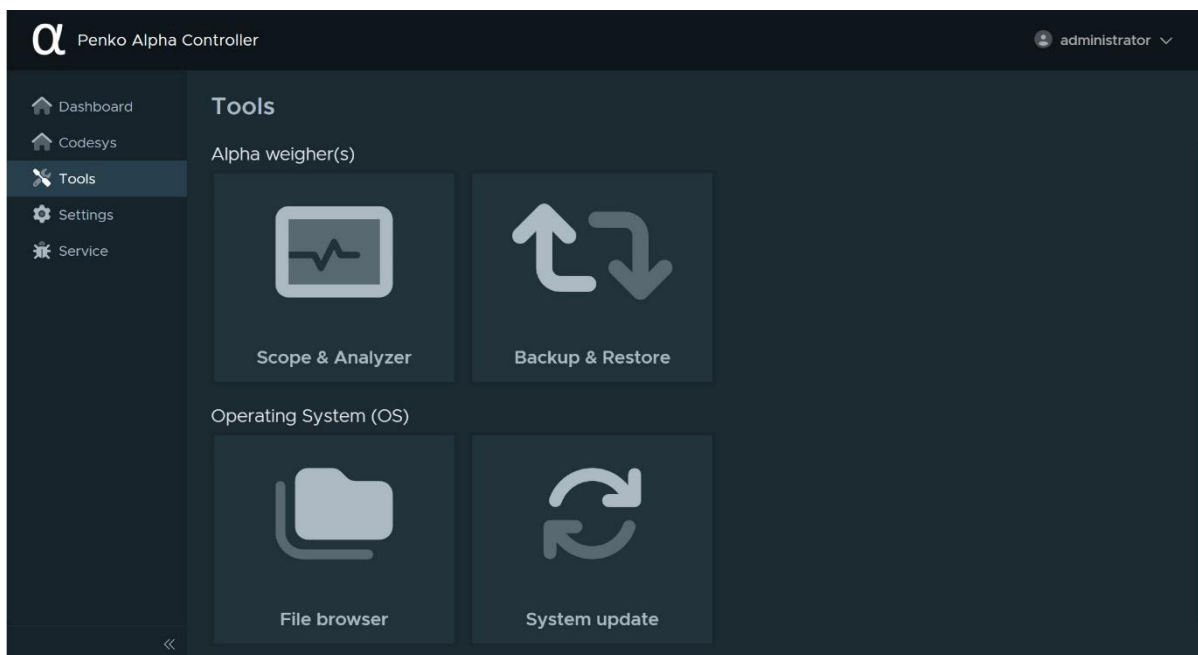
Use the CodeSys task manager to remove the downloaded application on the device. This is useful to use when the CodeSys application has crashed, or an exception has occurred.

**Note: do not use this in production environments, this could cause harm to the production line.**

# ALPHA manual

## TOOLS

All the system and Alpha weigher tools can be found in this menu. The tools



## SCOPE & ANALYZER

The “scope & Analyzer” tile shows the scope. This can be used to display weight measurements and process values over time. A spectrum analysis can be performed to find vibrations in the weighing system and optimize filter settings. Before starting the scope, select the desired entity. Weigher 1 = Alpha weigher (127.0.0.1:7000) and weigher 2 = Alpha weigher (127.0.0.1:7001) (only available when extension board is installed)

Only one entity (weigher) can be selected.	Entity: Alpha Weigher (127.0.0.1)
Add one or more channels to scope.	Channels: user defined
Select a sample rate from 1 to 1600. Default 1600.	Sample rate (samples/sec): 1600
Optional: select how long samples in seconds are visible in the scope.	Window: Enable
Optional: trigger on a specific channel with a minimum and/or maximum value.	Trigger: Enable
Start or stop the scope. The scope can also be started and stopped using the spacebar	Start/Stop: Play, Stop
Optional: synchronize zoom between multiple scope channels.	Options: Synchronize zoom
Optional: save and open scope views. Export scope to a CSV file. Reset this scope.	Options: Save, Open, CSV, Reset

# ALPHA manual

---

## BACKUP & RESTORE

The Backup and restore screen allow for backups of the alpha weigher(s) settings. After pressing Backup, select the weigher. After pressing backup, choose a file name to save the settings of the selected weigher.




The backup is stored on the alpha. This can be downloaded to the computer via the file browser.

---

## FILE BROWSER

The files menu is used to upload and download files from the internal storage of the Alpha to an external computer. The following folders are available: backup, config, logs and scope.

Folder	Contains
Backup	Previously stored configuration backups of the weigher(s).
Config	When aliases are given in Advanced Setup, the file containing these aliases will be placed here. This file can be downloaded, edited, and uploaded again to easily name all cards
Logs	Logging data captured by the service -> Task manager-> logger function. Can be used for diagnosing the Alpha operating system.
Scope	Measurement data from the weigher(s) captured by the tools->scope function. Can be used for diagnosing weighing system instability or process performance.

- The  icon deletes the backup.
- The  icon downloads the backup from the Alpha to the connected computer.
- The  icon uploads a backup file from the connected computer to the Alpha. After this, the "Backup & Restore" menu must be used to write the backup back to the cards.

---

## SYSTEM UPDATE

The alpha can be updated using the system update. To start the update process, press the UPLOAD FILE button. Only files with the extension ".swu" are supported, e.g. "alpha\_update.swu".

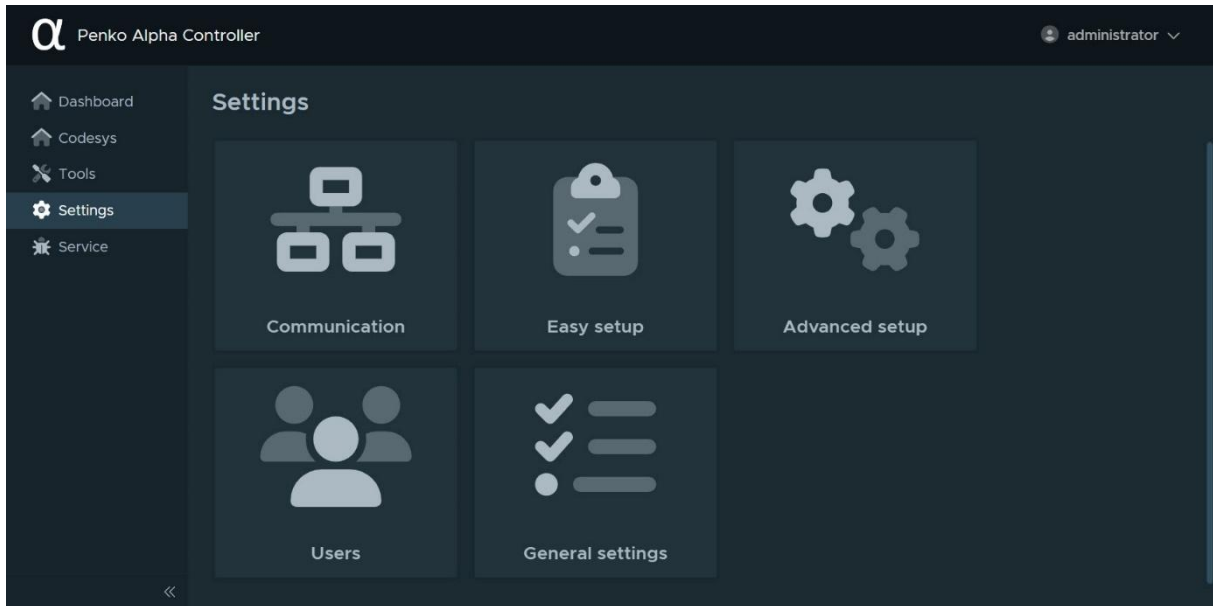
Uploading the file can take up to a minute. When finished the uploaded file is shown. To select another file press CANCEL. To start the update press, START UPDATE.

Updating the omega can take up to 5 minutes. After the update is successful, the device will restart automatically. When restarting, the portal disappears and the text "connection to Alpha lost - please wait" appears at the top left of the screen.

After restarting, the web portal is automatically displayed again.

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## SETTINGS



## COMMUNICATION

This menu controls the settings of the Ethernet ports. The defaults are:

Item	Value	Function
Factory Network		
Select	DHCP Server	The Alpha sets its own IP address and provides network settings to connected network equipment.
IP	10.1.2.1	This is the address of the Alpha on this connection
Netmask	255.255.255.0	The network mask shows what part of the address is used to identify the network. The 255. Numbers show that the entire number is used while 0 shows that the last number identifies a device on this network. Valid addresses for this network are from 10.1.2.0 to 10.1.2.255
Office Network		
Select	DHCP Client	IP number and netmask are set by another network device like a router or server.

**Warning:** Both networks should use a different IP range, otherwise data transport to the correct ethernet port is no longer possible. Also, the range 172.15.5.0 to 172.15.5.255 is in use for internal use.

# ALPHA manual

---

## EASY SETUP

The easy setup is split into two parts, namely main board and weigher. In case of two installed weighers there are three items to choose from.


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## MAIN BOARD

For the main board it is possible to set the hostname as shown in the CodeSys IDE. After changing the hostname, a manual reboot is required to apply the change.

---

## WEIGHER

The easy setup of the weigher is divided into several tabs. Depending on the installed extension boards, tabs may or may not be visible. The blue arrows  can be used to navigate to the next/previous channel and card.

---

## DISPLAY

Shows the weight indication and status. The bottom shows an input field for manual control of Zero and Tare functions. When the weigher is not yet calibrated the weight is shown as "cccccc".

---

## WEIGHER SETTINGS

This page sets the maximum load, step size, decimal point, and weight unit. When changing these values, the TAC code is incremented to indicate a change in certified system settings. In systems certified for trade use this means the system certification needs to be updated.

### Max Load

To prevent overload by the user, the weigher will not show any weight above this value. In certified mode the max load is not allowed to be more than the maximum load+ 9 scale parts.

### Step

Most loadcells are certified for up to 3000 parts. When the display resolution is too high for the loadcell, the step size can be set higher than 1 to reduce the number of display parts.

Step size can be set at 1, 2, 5, 10, 20, 50, 100, 200. The step size defines the scaled parts of the weight value.

Example: Weigher value is 2003 kg

Step size	Display value
1	2003 kg
2	2004 kg
5	2005 kg
10	2000 kg

The display value will be rounded off to the nearest value with a valid step size

# ALPHA manual

## Decimal Point

The decimal point can be set from 0 to 5 decimals.

## Unit

The unit defines the unit of measurement. The unit is the value of a quantity, chosen by convention as a reference for measuring quantities of the same kind. For example: t (ton) kg (kilo gram), g (gram), but can also be L (liter), lbs. (pounds), etc.

The unit can be set to any text up to 16 characters. No conversion between Imperial or Metric units is available so the unit remains fixed for each weigher channel.

## WEIGHER FILTERS

---

Filters are used because in an industrial environment there are always vibrations:

- From machines in the building
  - Motors on the weighing device
  - Mixers
  - vibrators
  - screws
  - Etc.
- -From the buildings themselves.

The purpose of a filter is to get the most steady and reliable weighing signal.

**Note:** be aware that filters are not a miracle. Good mechanics are very important

When changing these values, the TAC code is incremented to indicate a change in certified system settings. In systems certified for trade use this means the system certification needs to be updated.

## Filter preset selector

On the left, predefined filter settings for a specific use can be selected. When set to “user defined”, all settings can be tuned for a specific setup.

## Sample Rate

The sample rate defines the refresh speed of the weighing signal. For example: If a weighing unit is filling bottles of milk with 1600 gram and the Sample rate is set to 1600 samples/sec the unit can fill this bottle in 1 second and see every gram of it, so an accuracy of +/- 1 gram has become possible. If the same unit is set to a sample rate of 800 samples/sec the unit is still able to fill the bottle in 1 second but it now will see only half of the grams, so now an accuracy of +/-2 gram has become possible. To get the same accuracy with 800 sample/sec as with 1600 samples/sec the machine should be set to fill the bottles within 2 seconds. Sample rate can be set at 10, 20, 25, 50, 100, 200, 400, 800 or 1600 samples/sec. Note: The accuracy of a weigher is always depending on the chosen load cells and the mechanical construction.

## Cutoff

This sets the digital filter cut off frequency. Higher frequencies will be dampened. The Cutoff frequency can be set at 1,0Hz, 1,4Hz, 2,5Hz, 5,0Hz, 10Hz, 20Hz or 40Hz.

## Moving Average

The moving average filter can be used to suppress vibrations in the system and can be set from 0 (off) to 50Hz.

# ALPHA manual

## Overall Filter

The overall filter affects the signal which is used in the device. The overall filter can be set at 0db, -6db, -12db, -18db, -24db, -30db, -36db, -42db and -50db, where 0 means no effect and -50 is the strongest damping. The sample rate has an effect on the filter strength. For fast dosing switch off this filter and use the Digital filter. To prevent a loss of information or accuracy, don't set the overall filter higher than 24dB. When no accuracy is acceptable, a higher filter setting is possible to enable extreme filtering.

## Rate

This selects the Display refreshment speed. The Display refreshment speed defines the times the weigher value is refreshed per second. Although the weighing system speed can be higher, when displaying a changing value which is updated too fast it can become unreadable. Options are: 1, 2, 3, 5, 10, 25, 50.

## CALIBRATION

---

When performing a calibration, the CAL code is incremented to indicate a change in calibration. In systems certified for trade use this means the system certification needs to be updated.

When no calibration has been stored, the system shows "No calibration points" and the Gross and Gross x 10 readouts show "cccccc". Make sure a loadcell is connected to the selected channel. The scale should be empty and stable, then click "CALIBRATE ZERO POINT".

After storing a zero point, the Gross and Gross x 10 readouts still show "cccccc". The scale should be loaded with a known weight preferably near its maximum weight. Wait until the weight is stable and click "CALIBRATE GAIN POINT".

After storing the gain point, two calibration points are shown, and the Gross and Gross x 10 values should be visible.

When an error message "Gain overflow" appears then the signal difference between the zero and gain weights is less than 0,4uV per display part and the calibration remains invalid. Use a larger weight difference or set the decimal point to less digits or select a higher step size to reduce the number of display parts.

## ANALOG IO CONFIGURATION

---

Configure each analog input the range of the ADC-signal. Depending on the selected range, a jumper must be placed or removed. By default, all the four jumpers are placed and the range is set to 0-20mA.

## MANUAL ANALOG OUT

---

Use this to manually test the analog output. Start by pressing the MANUAL CONTROL button. When finished, press MANUAL OFF.

# ALPHA manual

---

## ADVANCED SETUP

This menu gives access to all settings of the main board and weigher(s). Be careful when changing the settings, this could cause problems on the production line. For support contact Penko.

---

## USERS

This menu is only available after logging in as an administrator. This menu is used to add, delete, or change user access to the system. By Pressing the + symbol, a new user can be added.

The following roles are defined:

Role	Access to
Administrator	Access to all menus and settings
Operator	Can change settings but has no access to the users menu, general settings, and service page
Read-Only	This user level can only view settings but not make any changes

Clicking on a name on the left side shows the settings for that user on the right side. The edit button allows changing the name, username, and role but this is only available for administrators. This menu can also be used to delete the selected user. The current user can't delete their own account

# ALPHA manual

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## GENERAL SETTINGS

This menu gives access to the general settings. The settings are divided over different tabs to keep it clear.

---

### CLOCK

This item can be used to synchronize the clock with the time on the host (device that you are now using). To synchronize the omega time, press the SYNCHRONIZE TIME button. The host time will be saved on the Alpha as UTC.

---

### DEVICE NAMES

Use this to set a name to the main board and weigher(s). Those names will be used across the portal. The device

---

### SUPPLIER

Adjust the supplier information to show another company name on the information screen in the portal and device.

---

### LOG CONFIG

By default, the system logs are stored for 30 days. Logs older than that will automatically be deleted. The minimal log time is 1 day, and maximum is 365 (1 year).

---

### SCOPE CHANNEL NAMES

In this menu item it is possible to manage pre-defined channel names (aliases). To create a new channel name, press the + symbol. Fill in the name, select the channel type and channel index. The index range varies for each channel type. To change a created alias, select the alias you would like to change or delete, and press EDIT. Select the alias and edit to modify an alias. After one or more channel names/aliases has been created, they can be selected in the scope interface. Go to the Scope & Analyzer menu item.

---

### SCOPE CHANNEL PRESETS

In this menu item pre-defined channel configurations can be managed. To create a new preset, press the + symbol. Fill in the name, select the channel type and channel index. The index range varies for each channel type. Add multiple channel types using the green + symbol. To remove an added channel, press the red garbage can. When done, press ADD. Now the channel preset has been created. To change a created preset, select the preset you would like to change or delete, and press EDIT. After one or more presets have been created, they can be selected in the scope interface. Go to the Scope & Analyzer menu item. Drop down box Channels list the available presets. The "User defined" preset is active by default. Other presets are added by users. Select the preset that fits your purses and press start icon to activate the scope.

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## SCOPE DUAL CHANNEL CONFIG

In this menu item pre-defined dual channel configurations can be managed. By default, a demo configuration is shown.

To create a new dual channel preset, press the + symbol. Fill-in the name, select the value type and index. The status type is index is used for the label identification. One or more status values can be created using the green + icon. After creating all the status values, press the ADD button to save the dual channel preset.

Note: after adding/changing the dual preset the status value list is automatically sorted from status value low to high.

In this example indicator one is used as value. The status indication is read from extended register 3.

**Settings - General settings**

Clock settings   Device names   Supplier   Log config   Scope channel names   Scope channel presets   **Scope dual channel config**

no dual channel configs  
click to add dual channel config

Name  
Demo

Value type: indicator   Value index: 1

Status type: ext register   Status index: 3

Status value	Label	
0	Start	🗑️
1	Gross	🗑️
2	Fine	🗑️

+ ADD   CANCEL

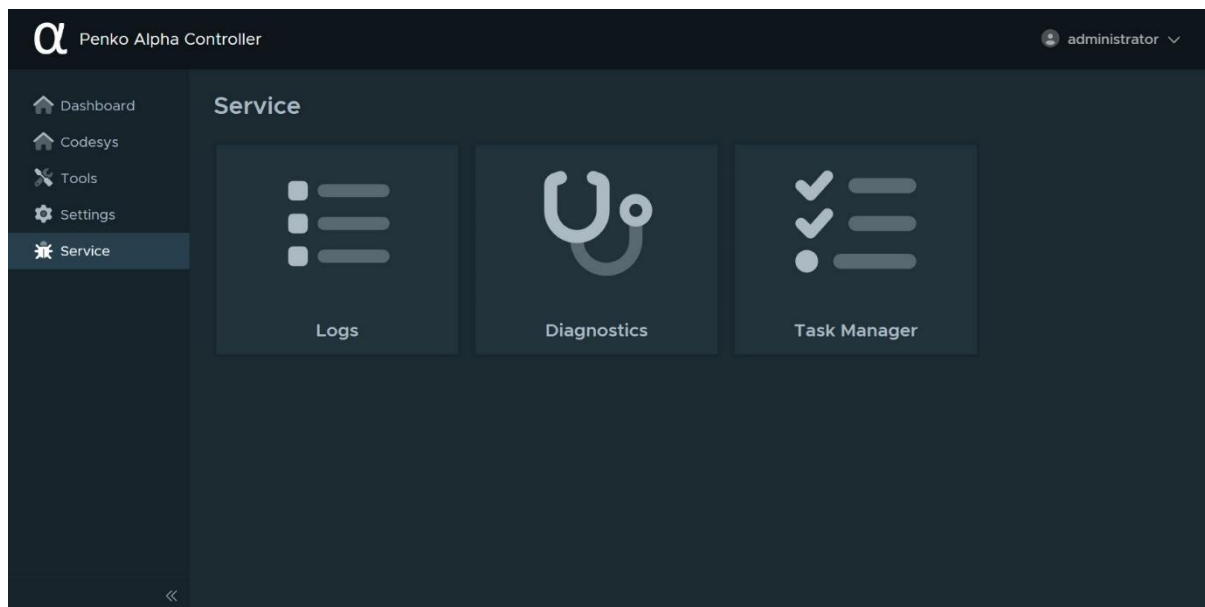
After one or more presets has been created, they can be selected in the scope interface. Go to the Scope & Analyzer menu item.

Use the “add dual channel” option to add the created dual channel preset and start the scope. During data capture, the line color is based on the status value. In the example below all four states (0 = Fill, 1 = tare, 2= dose and 3 = ready) are shown.

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## SERVICE MENU

This menu is only available for users with administrator privileges. It is used to follow messages and perform specific tasks within the system.



---

## LOGS

Here are all the system logs available sorted on timestamp. Logs can be manually deleted if needed. The default time that logs are stored is 30 days and can be changed in the settings – general settings page.

---

## DIAGNOSTICS

Generate a detailed diagnostics file of the system. The log time must be between 1 and 60 minutes. This can be used for detailed investigation by Penko when a problem occurs. When the logger is finished a file will be automatically downloaded to the computer that initiated the logger.

---

## TASK MANAGER

Use this menu with care. When the RESTORE ALPHA button has been pressed and confirmed, all settings and CodeSys applications will be permanently deleted.

When there is a problem with the CodeSys application it is recommended to use the Task Manager in the CodeSys menu. That one only removed the CodeSys application.

# ALPHA manual



## 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 guarantees 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](http://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:

[www.penko.com/nl/publications\\_certificates.html](http://www.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](http://www.penko.com/training)

## PENKO Distributor

A complete overview you will find on: [www.penko.com/Find-A-Dealer](http://www.penko.com/Find-A-Dealer)



PENKO Engineering B.V. • Schutterweg 35, NL 6718C Ede • Tel +31 (0) 318525630 • [info@penko.com](mailto:info@penko.com)  
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