

PENKO Engineering B.V.

Your Partner for Fully Engineered Factory Solutions



Omega manual

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SYSTEM OVERVIEW

An Omega rack consists of:

| Order Code | Product name | Description | PCB number (for identification) |
|------------|---------------------------|--|------------------------------------|
| 7600K1037 | OMEGA BUS BOARD BASE ASSY | Base unit | 7600B4726 |
| 7600K1038 | OMEGA PSU MODULE | Power supply and interface module | 7600B4736 |
| 7600K1039 | OMEGA CPU MODULE | Main processor for single and first rack in multi-rack systems | 7600B4725 |
| 7600K1036 | OMEGA CPU BLANK MODULE | or Dummy modules for Rack 2 and up | 7600B4738 |
| 7600K1035 | OMEGA LOCKING BRACKET | Locks cards to the base unit. | - |
| | | Up to 8 IO modules. See below | |

The 8 module slots can contain any of the following modules:

| Order Code | Product Name | Description | PCB Number (for identification) |
|------------|------------------------------|--|------------------------------------|
| 7600K1040 | OMEGA SLOT 3-10 BLANK MODULE | Unused slots can be covered with a blank module. | 7600B4738 |
| 7600K1041 | OMEGA ADC+DIO MODULE | 2 loadcells, 4 digital in, 6 digital out | 7600B4727 |
| 7600K1042 | OMEGA ADC+AIO MODULE | 2 loadcells, 3 digital in, 3 digital out, 2 analog out | 7600B4739 |
| 7600K1043 | OMEGA DIO MODULE | 8 digital in, 12 digital out | 7600B4737 |
| 7600K1044 | OMEGA AIO MODULE | 4 analog in, 4 analog out | 7600B4748 |

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

Unused slots are covered by a dummy module.

The locking brace is used to secure the plugin cards, close off the Micro-SD slot and can also provide sealing of the unit when used in certified installations.

Up to 8 Omega units can be daisy chained to a single controller module.

CARD ADDRESSING

Each I/O module has 2 internal ethernet connections to the main CPU. This way, one module can be accessed as two independent weighing systems. A full rack can contain 8 cards resulting in up to 16 weighing channels per rack. By daisy chaining up to 16 racks a full system can expand up to 128 weighing channels. When using multiple racks, only Rack 1 should contain a controller module.

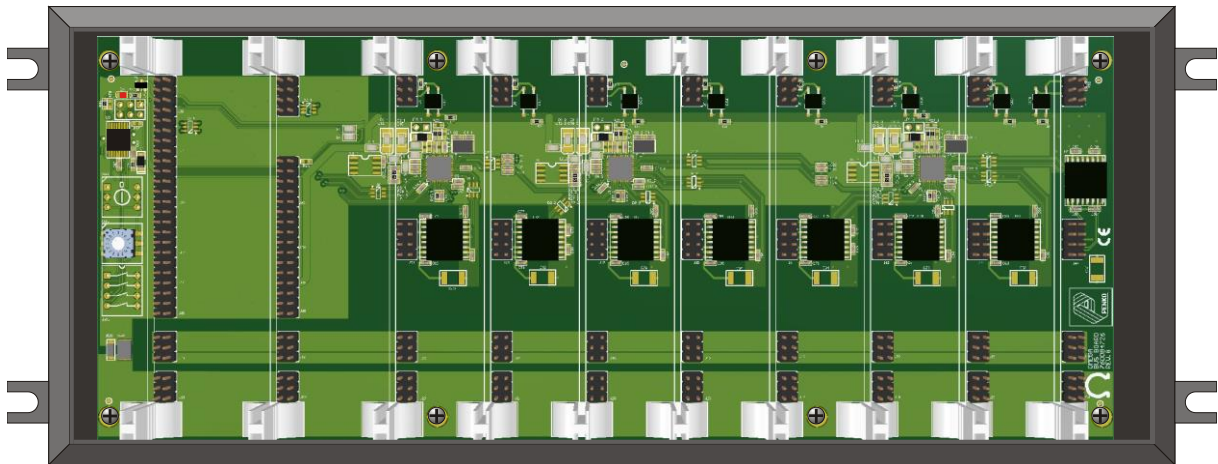
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BUS BOARD

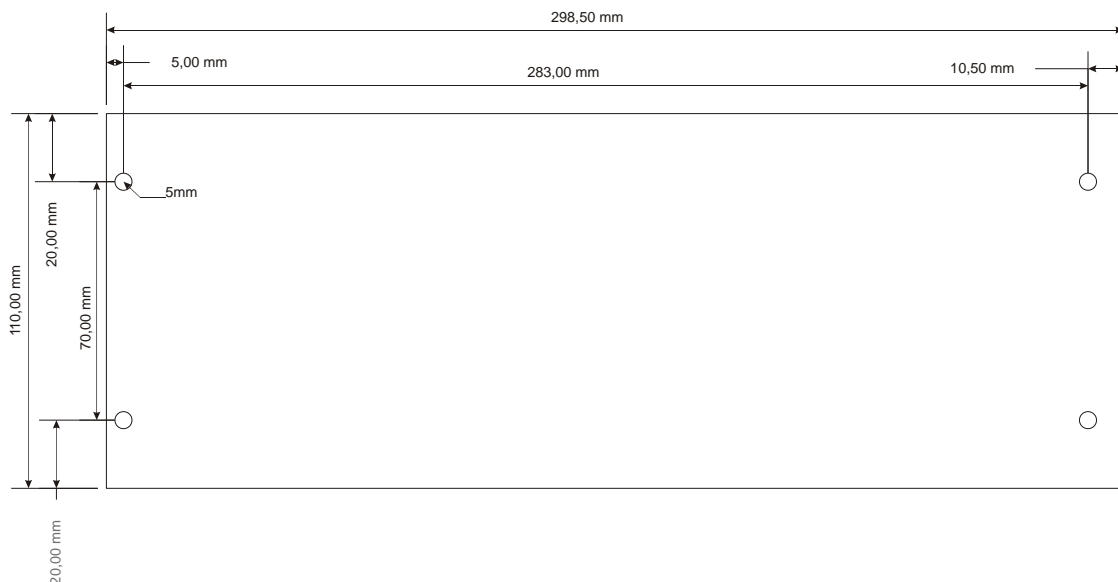
The bus board is the base module into which the different cards slot. The board contains connectors, communication circuitry and an address selector switch. A LED is used to show the selected rack number.

- The first slot is reserved for the Power supply and interface module.
- The second slot is reserved for the Controller module or a dummy controller.
- Slots 3-10 are used for I/O modules.

Warning: Do not plug I/O modules into the first two slots on the left side of the bus. These two slots have more connections and a different spacing compared to the I/O modules.

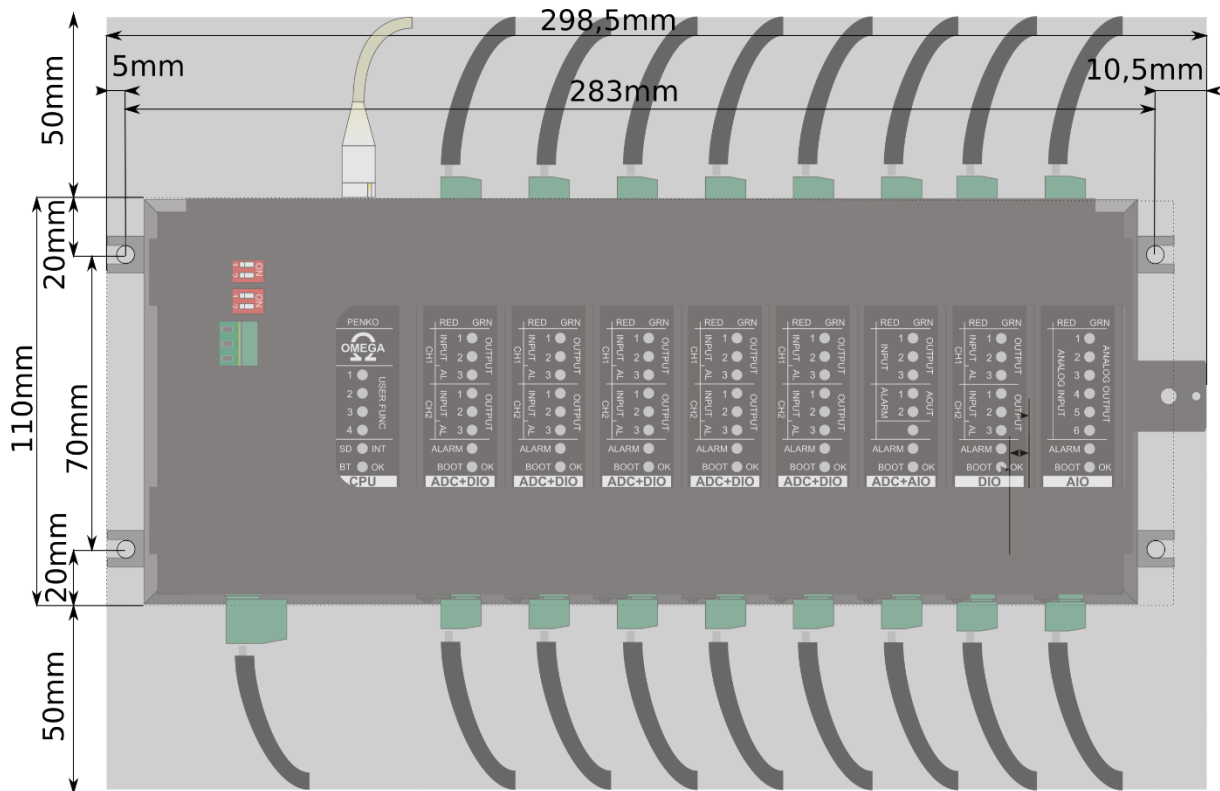


MOUNTING HOLES

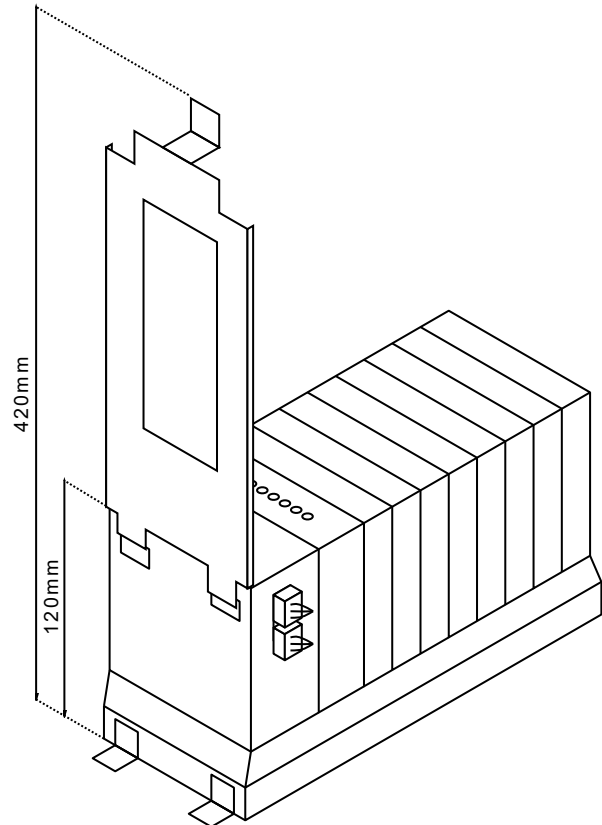


Unit size is 298,5x110x120mm (hxbxd).

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Allow for room for cables above and below. USB and ethernet connectors could use up to 50mm or more if easy access is needed.



Allow for room for the front brace which hinges up to 300mm in front of the unit.

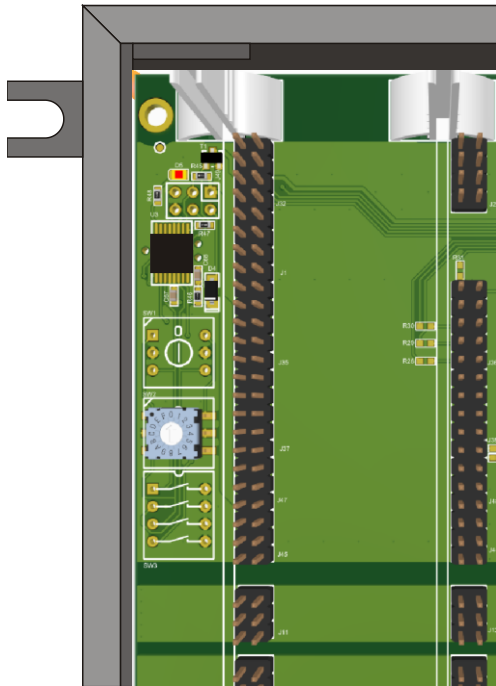
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SETTING THE UNIT ADDRESS

When multiple racks are used, each rack needs a unique address. To set this, the bus board contains an address selection switch. The factory default setting is '0' to indicate that it is the first unit in the system.

When powered on, the red LED on the top left of the bus board blinks to indicate the selected rack number. The LED can be seen from the left side of the rack through the hole left above the mounting point or through the gap between the PSU and the bus housing.

Warning: Only rack unit 0 should contain an Omega CPU module. For all other racks this slot should contain a dummy module to cover the unused slot.



| Address Switch | Rack number | LED Number of blinks |
|----------------|-------------|----------------------|
| 0 | 1 | 1 |
| 1 | 2 | 2 |
| 2 | 3 | 3 |
| 3 | 4 | 4 |
| 4 | 5 | 5 |
| 5 | 6 | 6 |
| 6 | 7 | 7 |
| 7 | 8 | 8 |
| 8 | 9 | 9 |
| .. | .. | .. |
| 15 | 16 | 16 |

POWER REQUIREMENTS

The Omega system uses a 24VDC nominal power supply. The applied voltage should be between 18 to 36Volts. Current consumption and power dissipation depend on processor activity, number of loadcells per channel, connected peripherals and applied voltage. At power up the system can require up to 3 times nominal power for 20ms to charge its internal power filters and circuitry.

| Component | Nominal power (W) | Peak power (W) |
|--|-------------------|----------------|
| Bus + Power supply and interface module | 3 | 9 |
| CPU/Controller module | 6 | 12 |
| 2 Channel Weighing Digital IO Card (ADC+DIO) | 2 | 6 |
| 2 Channel Weighing Analog IO Card (ADC+AIO) | 2 | 6 |
| Digital IO Card (DIO) | 2 | 6 |
| Analog IO Card (AIO) | 2 | 6 |
| Full rack with 8 IO cards | 25 | 75 |

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OMEGA MODULES

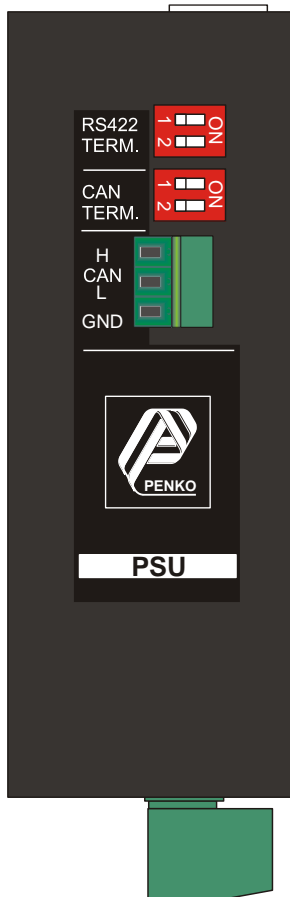
POWER SUPPLY AND INTERFACE MODULE.

The power supply module (PSU) provides regulated power to the bus board and controller module.

It also provides the fuse, overvoltage protection and power filtering for the I/O modules and contains the Ethernet connections to the Omega bus.

Warning: Omega Bus Ethernet connections should only be used to connect multiple Omega units together since this bus uses fixed IP addresses. Connecting an office or factory network can cause communication failures or reduce system performance.

This unit also provides Galvanically isolated RS232, RS422 and CAN interfaces for the controller module



Both switches of the top switch block (SW2) can be switched ON to terminate the TX and RX pairs of the RS422 interface with a 120 Ohm resistor. This is normally done only on the first and last connection on the cable.

The CAN connector is located on the front of the unit.

Both switches of the bottom switch block (of SW1) can be switched ON to terminate the CAN interface with a 120 Ohm resistor. This is normally done only on the first and last connection on the cable.

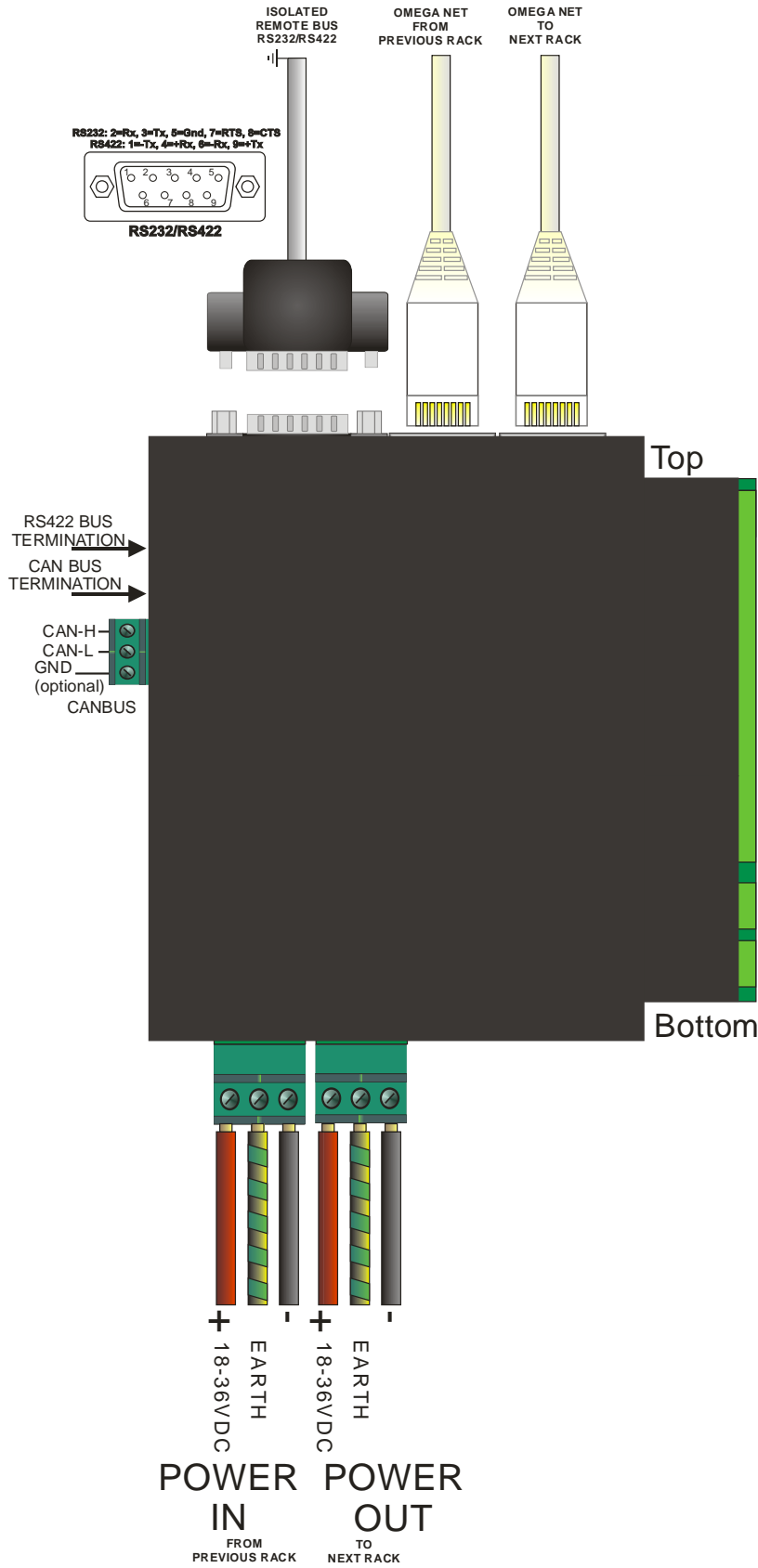
Two power connections are provided. Both connections are wired identically to provide power to the next unit in a multiple unit system.

Warning: When using one of the power connectors as a power outlet, it is not fused but directly connected to the input terminals. Make sure the entire system is protected by a fuse rated for the total expected current.

Two Omega bus ethernet connections are provided. Both connections are wired identically to provide communication to the next unit in a multiple unit system.

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PSU CONNECTIONS



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CPU/CONTROLLER MODULE.

The CPU/Controller module handles:

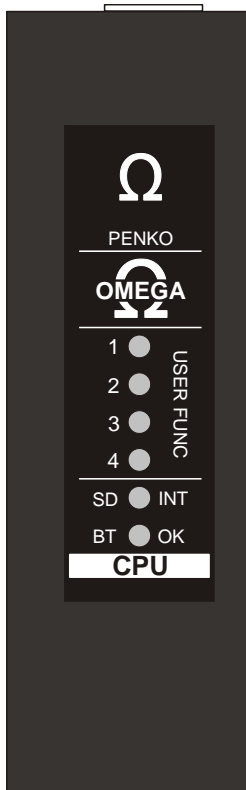
- Web interface
- Network access
- I/O Card data processing and distribution
- CODESYS PLC function
- Result storage

The module has the following features:

- 6 bicolor LED indicators
- 2 100mb Ethernet connectors
- 2 USB Host connections
- 1 USB Mini connector for software update and PC connection
- 1 real time clock with battery
- Non-volatile RAM storage
- RS232 interface
- RS422 interface
- CAN interface

FRONTPANEL INDICATORS

The front panel indicators each consist of a red and a green LED. When both the red and the green LED are on then the colors mix to show yellow. Examples show this as “Combined”.



| LED | Green Function | Red Function | Yellow Function |
|-----|----------------------------|----------------------------|-----------------|
| 1 | User defined function * | User defined function * | Combined |
| 2 | User defined function * | User defined function * | Combined |
| 3 | User defined function * | User defined function * | Combined |
| 4 | User defined function * | User defined function * | Combined |
| 5 | mmc1 (external storage) ** | mmc0 (internal storage) ** | Combined |
| 6 | Alarm | Heartbeat/Wink | Combined |

* These LED's are switched on at startup but can be changed under CODESYS PLC control

** Blinks on activity

During software update LED's 1-4 signal the update status:

- Nightrider/moving up and down: Updating
- all blinking: Waiting for USB to be removed
- Snake/moving down: rebooting

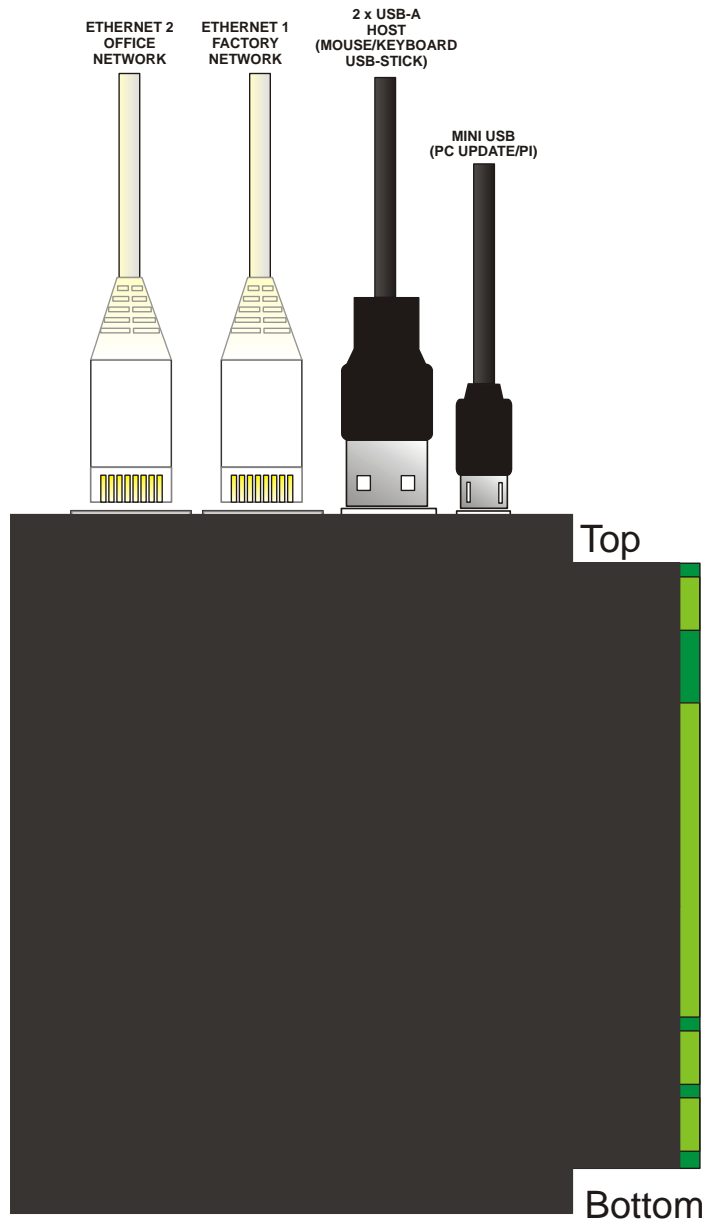
Wink mode, triggered by command: all red LED's 1/2s on followed by all green LED's 1/2s on, total 6 cycles = 18s.

Example:

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 1 second | 1 second | 1 second | 1 second | 1 second | 1 second |
|----------|----------|----------|----------|----------|----------|

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CPU/CONTROLLER CONNECTIONS



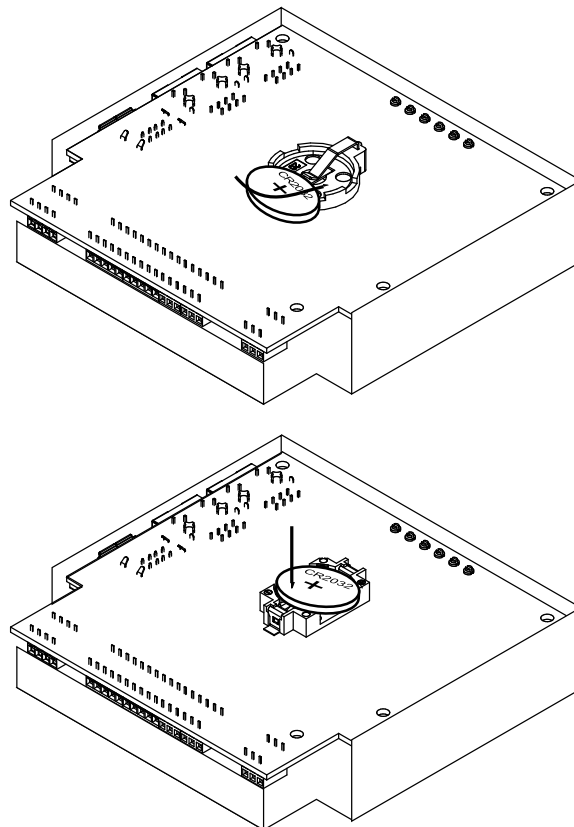
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REPLACING THE BATTERY.

Each of the weighing cards has an optional 11mAh rechargeable battery to store process data.

The main CPU module also stores data in battery backed-up memory and keeps the time and date. To provide power to the clock a CR2032 battery must be installed on the right side of the CPU module.

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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DUAL CHANNEL WEIGHING DIGITAL IO CARD (ADC+DIO)

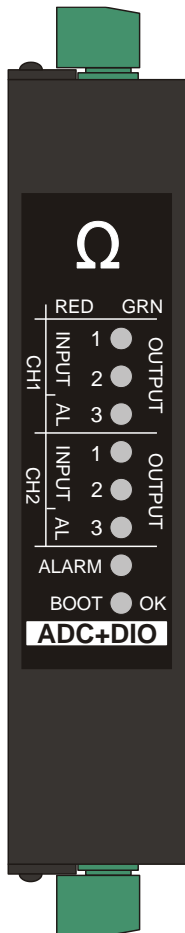
This module contains:

- 8 bicolor LED indicators
- 2 loadcell interfaces. 5VDC Excitation with passive sense for 2mV/V or 3mV/V loadcells.
- 4 galvanically isolated inputs. Two for each weighing channel. These accept up to 30 volts AC or DC.
- 6 galvanically isolated outputs. Three for each weighing channel. Can switch up to 50V/0,5A DC or AC. Each output has a resettable fuse and overvoltage protection.

Each loadcell interface has its own group of 2 inputs and 3 outputs. Both groups are isolated from each other and from the weighing circuit. The in- and outputs can be used for timing critical process control like controlling dosing valves or speed measurement.

FRONTPANEL INDICATORS

The front panel indicators each consist of a red and a green LED. When both the red and the green LED are on then the colors red and green are flashing. Examples show this as "Combined".



| LED | Red function | Green function | Flashing red/green |
|-----|---|--|--------------------------------|
| 1 | Channel 1 Input 1 on | Channel 1 Output 1 on | Combined |
| 2 | Channel 1 Input 2 on | Channel 1 Output 2 on | Combined |
| 3 | Alarm Weigher 1: hardware overload, underload, max load, calibration error | Channel 1 Output 3 on | Combined |
| 4 | Channel 2 Input 1 on | Channel 2 Output 1 on | Combined |
| 5 | Channel 2 Input 2 on | Channel 2 Output 2 on | Combined |
| 6 | Alarm Weigher 2: hardware overload, underload, max load, calibration error | Channel 2 Output 3 on | Combined |
| 7 | Alarm on | - | - |
| 8 | On, bootloader mode Off, ethernet receive data Result is a red blinking LED on data receive | On, application mode Off, ethernet receive data Result is a green blinking LED on data receive | Yellow, application is booting |

Wink mode is triggered by a wink command: all red LED's 1/2s on followed by all green LED's 1/2s on, total 6 cycles = 18s.

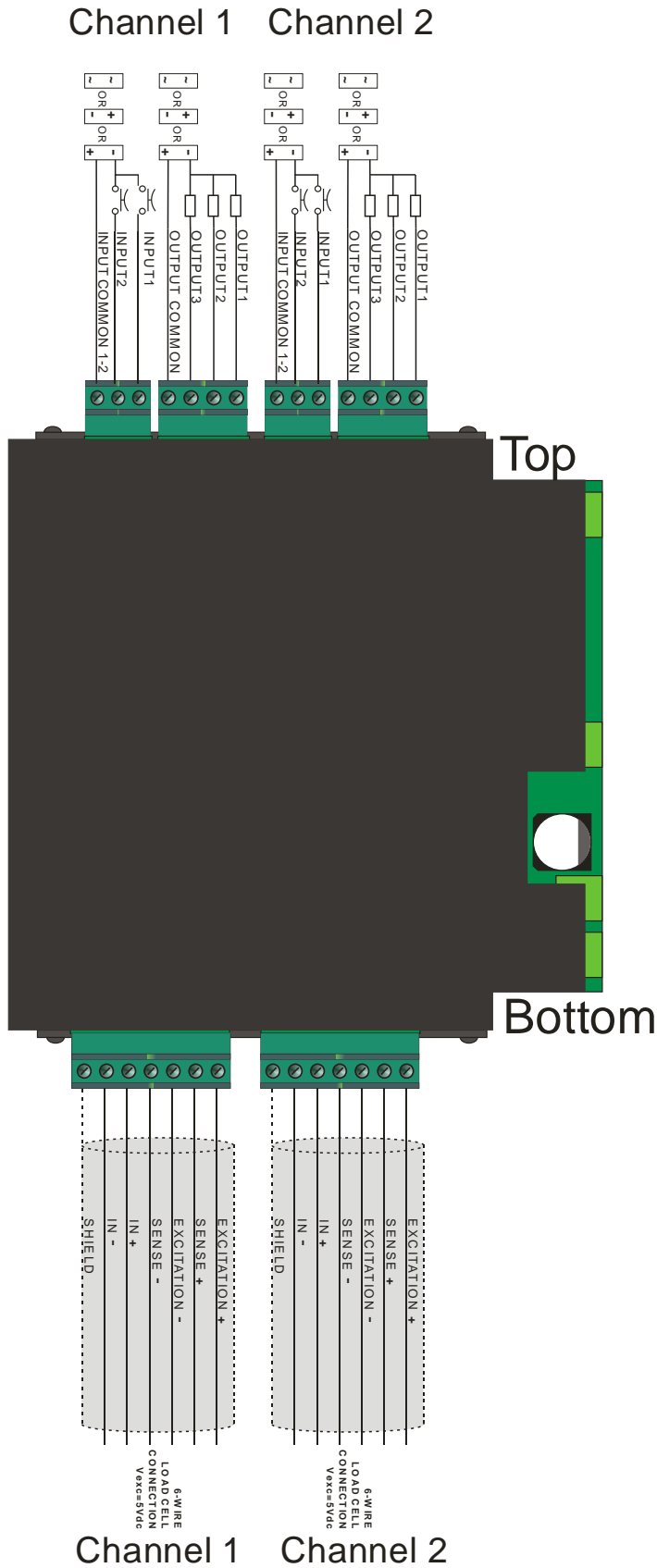
Card first IP address = Led 1-4. Card second IP address = Led 5-8

Example:



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DUAL CHANNEL WEIGHING DIGITAL IO CARD (ADC+DIO) CONNECTIONS



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DUAL CHANNEL WEIGHING ANALOG IO CARD (ADC+AIO)

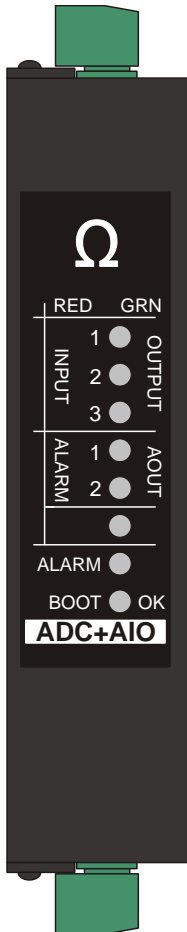
This module contains:

- 8 bicolor LED indicators
- 2 loadcell interfaces. 5VDC Excitation for 2mV/V or 3mV/V loadcells.
- 3 galvanically isolated inputs. These accept up to 30 volts AC or DC.
- 3 galvanically isolated outputs. Can switch up to 50V/0,5A DC or AC. Each output has a resettable fuse and overvoltage protection.
- 2 analog 0-24mA current output. Power for the current output driver must be supplied externally.

Each loadcell interface has its own 4-20mA output. The in- and outputs can be used for timing critical process control like dosing valves, speed measurement or speed control.

FRONTPANEL INDICATORS

The front panel indicators each consist of a red and a green LED. When both the red and the green LED are on then the colors red and green are flashing. Examples show this as “Combined”.



| LED | Red function | Green function | Flashing red/green |
|-----|---|--|--------------------------------|
| 1 | Digital input 1 on | Digital output 1 on | Combined |
| 2 | Digital input 2 on | Digital output 2 on | Combined |
| 3 | Digital input 3 on | Digital output 3 on | Combined |
| 4 | Alarm Weigher 1: hardware overload, underload, max load, calibration error | Analog output 1, PWM 1 -100% | Combined |
| 5 | Alarm Weigher 2: hardware overload, underload, max load, calibration error | Analog output 2, PWM 1 -100% | Combined |
| 6 | | - | - |
| 7 | Alarm | - | - |
| 8 | On, bootloader mode Off, ethernet receive data Result is a red blinking LED on data receive | On, application mode Off, ethernet receive data Result is a green blinking LED on data receive | Yellow, application is booting |

Wink mode is triggered by a wink command: all red LED's 1/2s on followed by all green LED's 1/2s on, total 6 cycles = 18s.

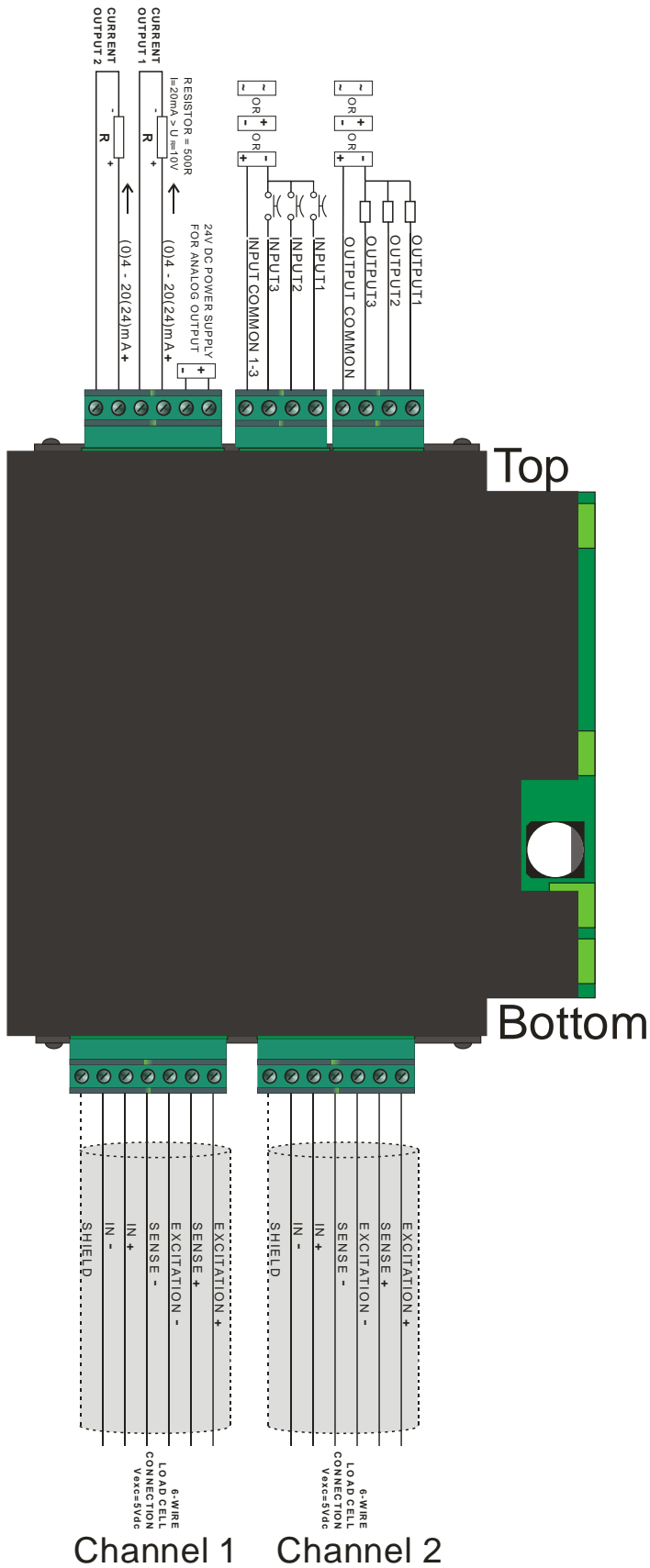
Card first IP address = Led 1-4. Card second IP address = Led 5-8

Example:



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DUAL CHANNEL WEIGHING ANALOG IO CARD (ADC+AIO) CONNECTIONS



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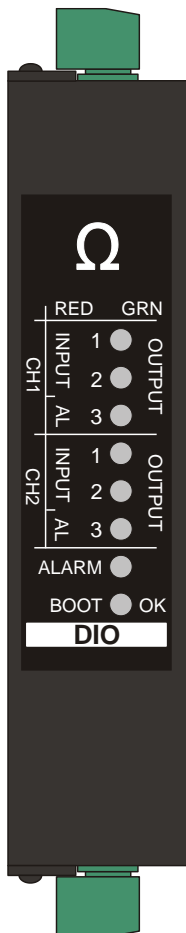
DIGITAL IO CARD (DIO)

- 8 bicolor LED indicators
- 8 galvanically isolated inputs. These accept up to 30 volts AC or DC.
- 12 galvanically isolated outputs. Can switch up to 50V/0,5A DC or AC. Each output has a resettable fuse and overvoltage protection.

The DIO connections are split into 4 groups with 2 inputs and 3 outputs each. Each group can be connected to a different circuit since these are isolated from the other groups.

FRONTPANEL INDICATORS

The front panel indicators each consist of a red and a green LED. When both the red and the green LED are on then the colors red and green are flashing. Examples show this as "Combined".



| LED | Red function | Green function | Flashing red/green |
|-----|---|--|--------------------------------|
| 1 | Channel 1 Digital input 1 on | Channel 1 Digital output 1 on | Combined |
| 2 | Channel 1 Digital input 2 on | Channel 1 Digital output 2 on | Combined |
| 3 | Channel 1 Digital input 3 on | Channel 1 Digital output 3 on | Combined |
| 4 | Channel 2 Digital input 1 on | Channel 2 Digital output 1 on | Combined |
| 5 | Channel 2 Digital input 2 on | Channel 2 Digital output 2 on | Combined |
| 6 | Channel 2 Digital input 3 on | Channel 2 Digital output 3 on | Combined |
| 7 | Alarm | | - |
| 8 | On, bootloader mode Off, ethernet receive data Result is a red blinking LED on data receive | On, application mode Off, ethernet receive data Result is a green blinking LED on data receive | Yellow, application is booting |

Wink mode is triggered by a wink command: all red LED's 1/2s on followed by all green LED's 1/2s on, total 6 cycles = 18s.

Card first IP address = Led 1-4. Card second IP address = Led 5-8

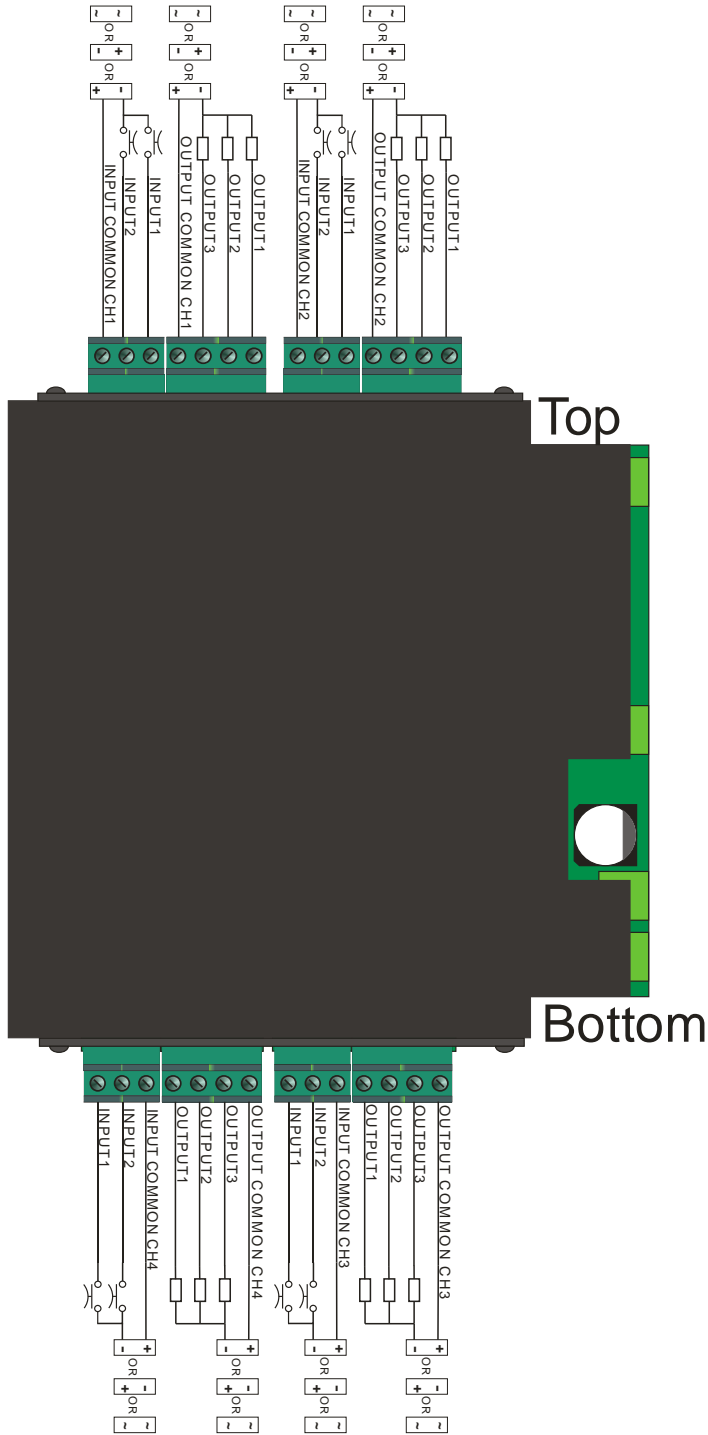
Example:



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DIGITAL IO CARD (DIO) CONNECTIONS

Channel 1 Channel 2



Channel 4 Channel 3

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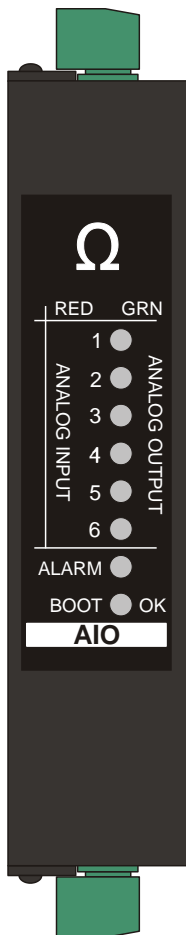
ANALOG IO CARD (AIO) MODULE

This module contains:

- 8 bicolor LED indicators
- 4 analog inputs. The 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.
- 4 analog current output. Power for the output driver must be supplied externally. Output can be (0)4 to 20(24)mA current or with a 500 Ohm resistor connected externally to provide 0-10V output.

FRONTPANEL INDICATORS

The front panel indicators each consist of a red and a green LED. When both the red and the green LED are on then the colors red and green are flashing. Examples show this as “Combined”.



| LED | Red function | Green function | Flashing red/green |
|-----|---|--|--------------------------------|
| 1 | Analog input 1 on | Analog Output 1 on | Combined |
| 2 | Analog input 2 on | Analog Output 2 on | Combined |
| 3 | Analog input 3 on | Analog Output 3 on | Combined |
| 4 | Analog input 4 on | Analog Output 4 on | Combined |
| 5 | - | - | - |
| 6 | - | - | - |
| 7 | Alarm | | - |
| 8 | On, bootloader mode Off, ethernet receive data Result is a red blinking LED on data receive | On, application mode Off, ethernet receive data Result is a green blinking LED on data receive | Yellow, application is booting |

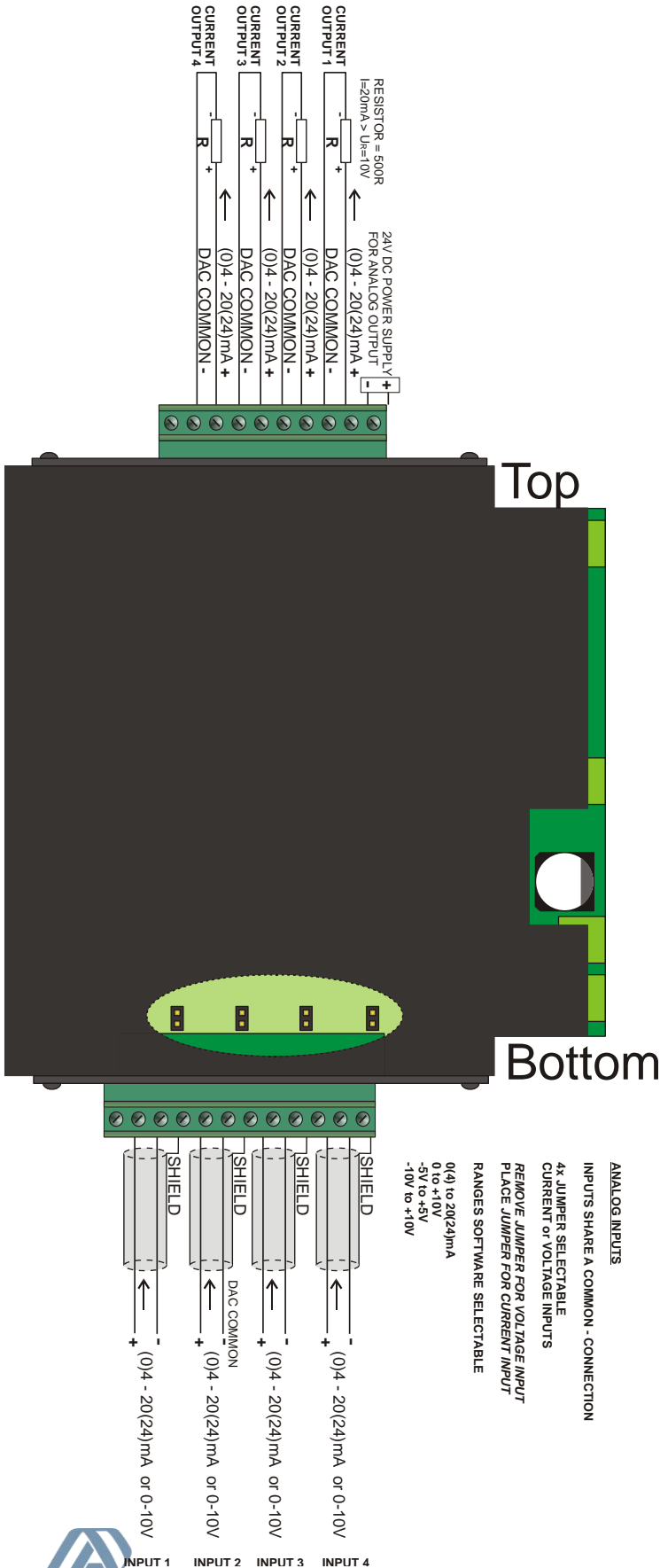
Wink mode is triggered by a wink command: all red LED's 1/2s on followed by all green LED's 1/2s on, total 6 cycles = 18s.

Card first IP address = Led 1-4. Card second IP address = Led 5-8

Example:



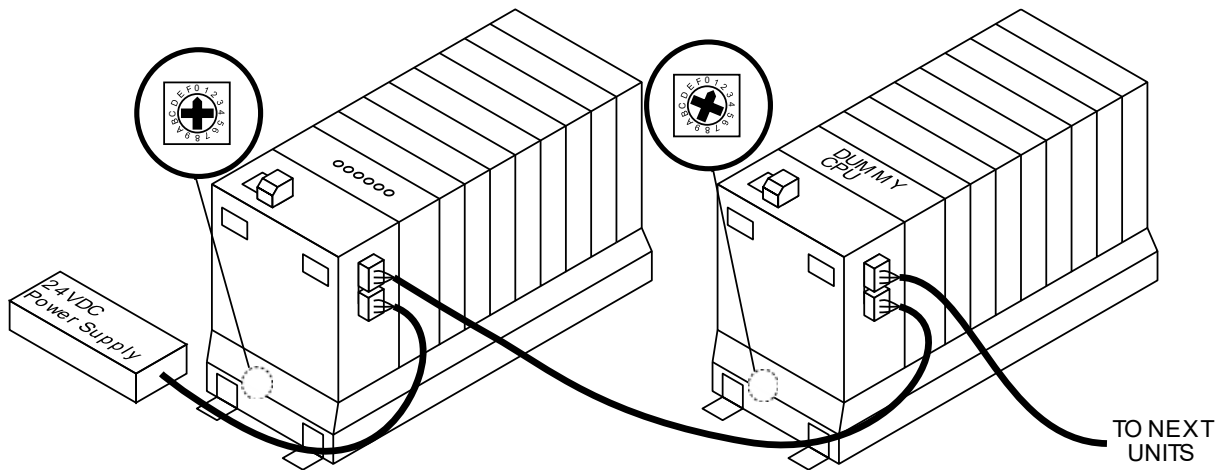
ANALOG IO CARD (AIO) CONNECTIONS



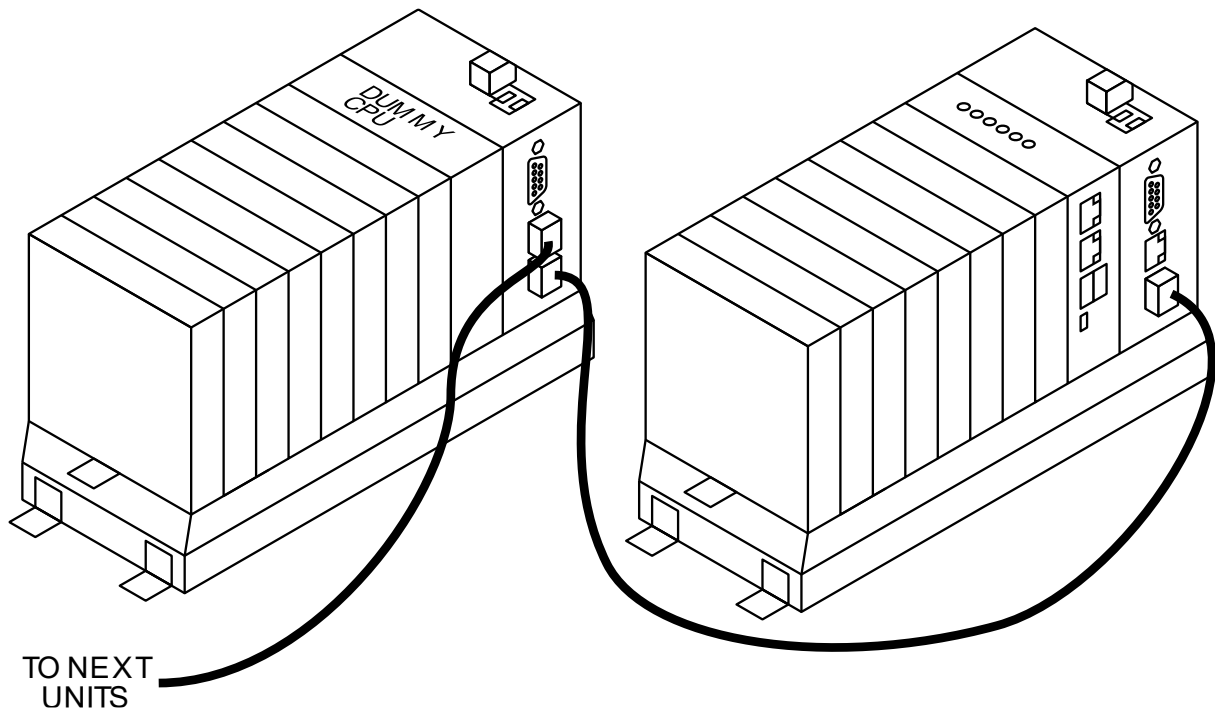
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CONNECTING MULTIPLE UNITS

When using on CPU module to control multiple Omega units, the Omega net connections are used to expand the network. Each unit must have a consecutive rack number and the unit containing the CPU module must be rack 1.



The Rack power can be connected from the power output connection of the first rack to the power input of the next rack and so on. When racks are mounted more than 1 meter apart, it is advisable to power each rack with its own power supply. Each fully populated rack requires 3.1A startup current and 1A continuous so cables and power supplies should be rated accordingly.



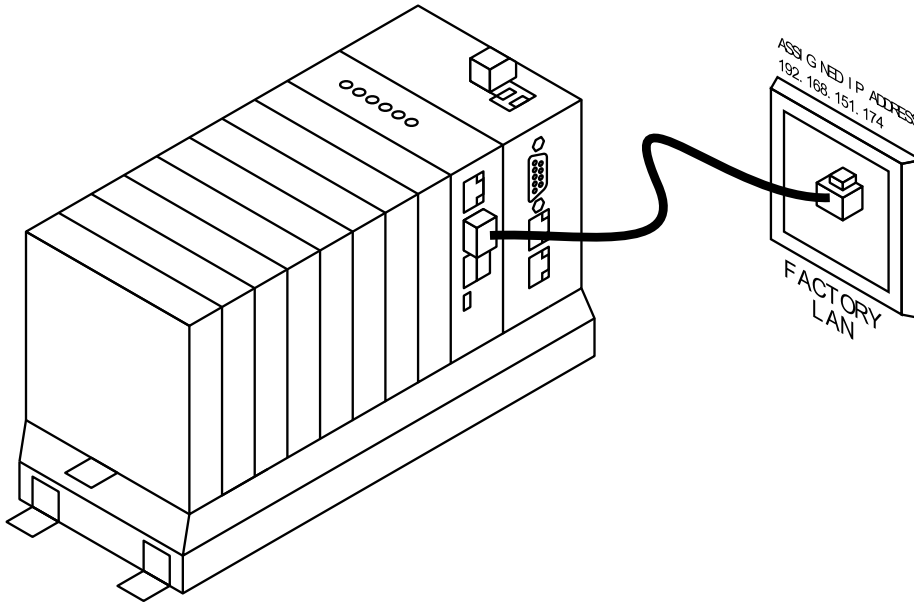
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CONNECTING THE OMEGA

The Omega provides several ports to connect to a computer or external devices.

ETHERNET 1: FACTORY NETWORK PORT

The ethernet 1 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 Omega 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 Omega is set to, for example, address 192.168.151.174 then the Omega user interface can be shown on any web browser on the same network by typing the following address:

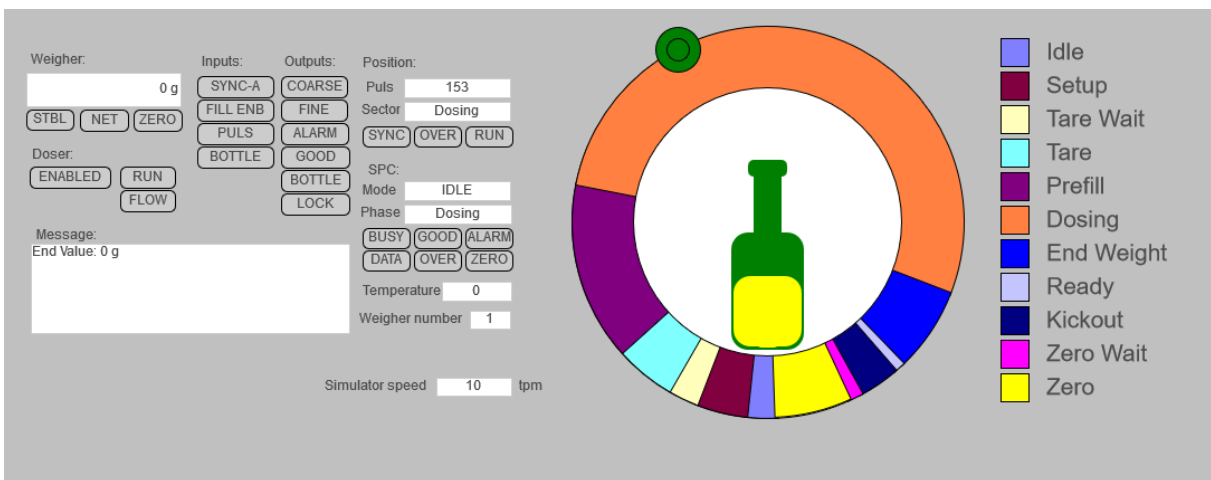
<http://192.168.151.174>

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

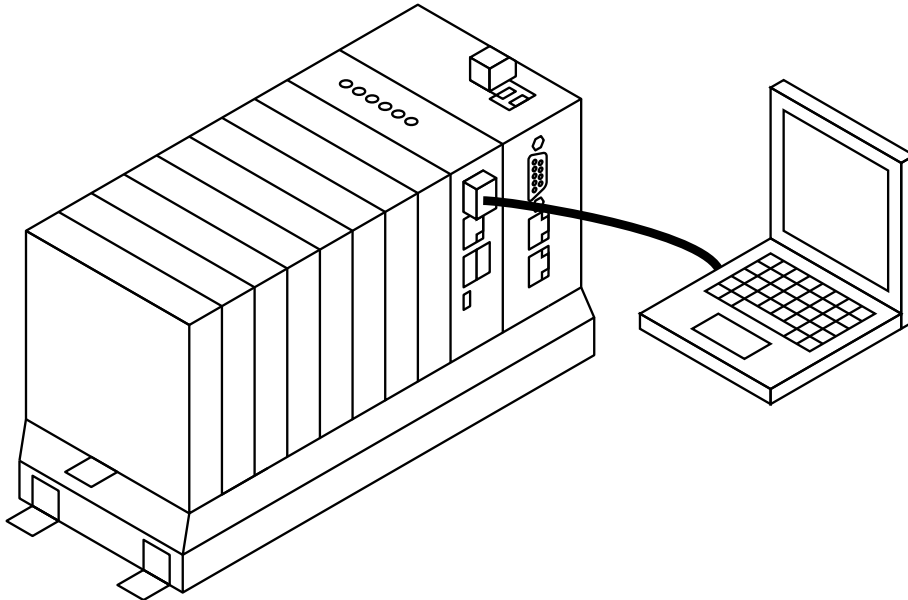
<http://192.168.151.174:8080>



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ETHERNET 2: OFFICE NETWORK PORT

The ethernet 2 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 Omega user interface |
| Web Server | 8080 | Presents the CODESYS visualisation |
| DNS Server | 53 | DNS server gives an IP address to a connected laptop. |

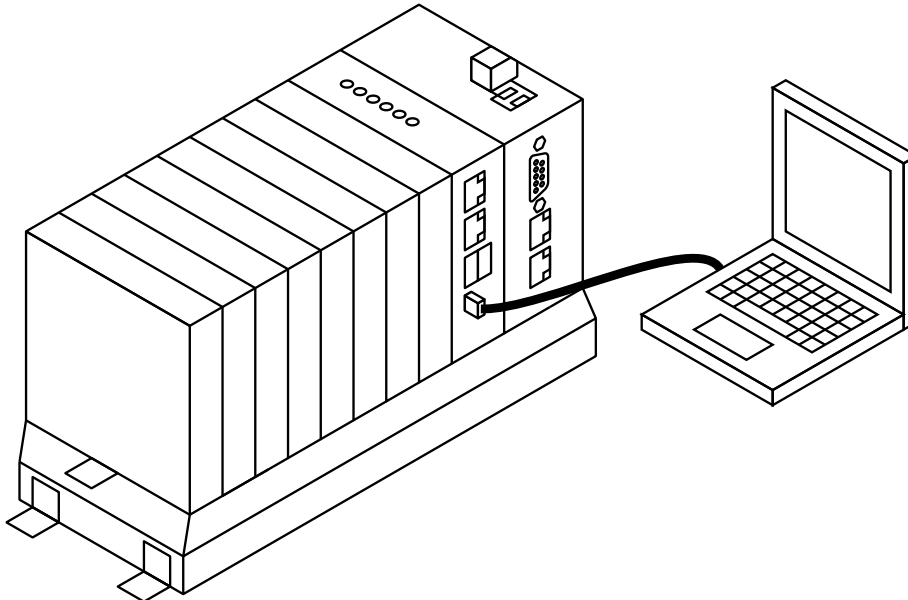
To access the Omega user interface, open a web browser like Google Chrome, Mozilla Firefox or Microsoft Edge and type the address:

<http://10.1.2.1>

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USB-OTG PORT

This port is reserved for system setup and diagnostics and can be connected to a laptop. Upon activation of the driver it presents an ethernet adapter and a serial port.



The serial port gives access to a Linux terminal after providing a username and password.

The ethernet port is connected to IP address 10.54.32.1 By default, the following services are available:

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

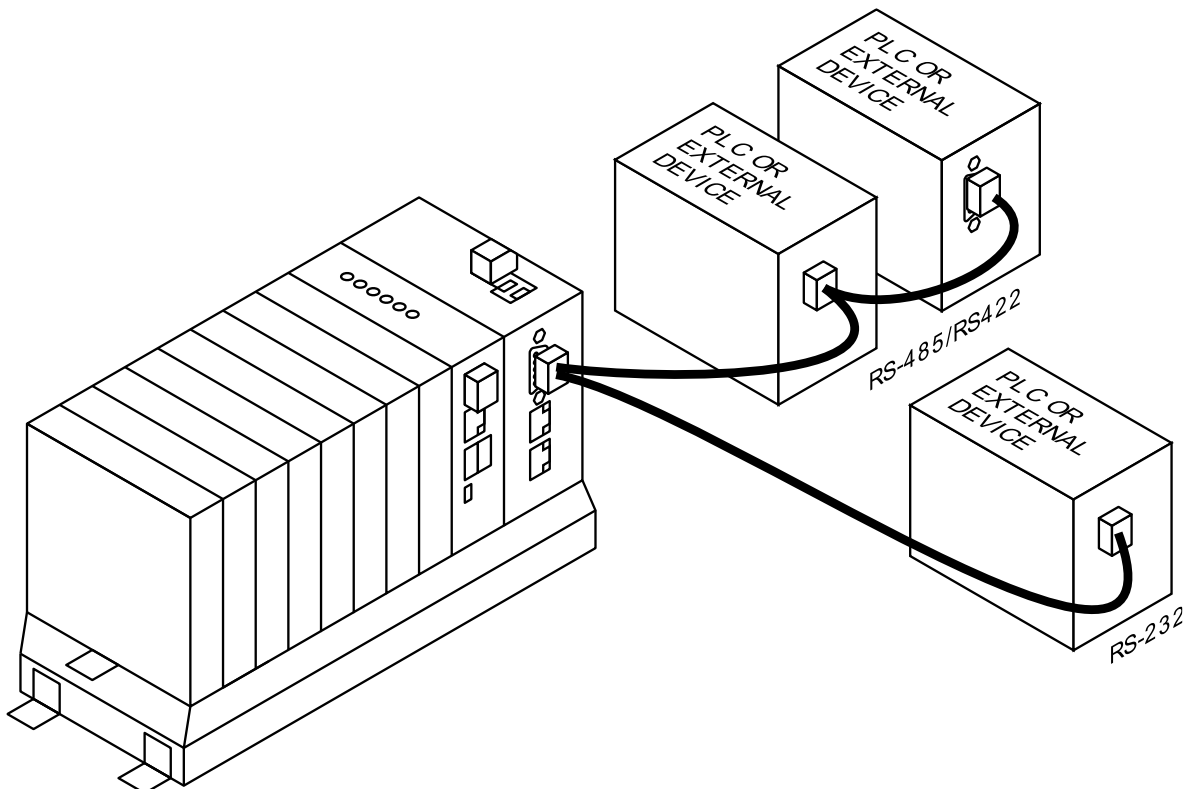
To access the Omega user interface, open a web browser like Google Chrome, Mozilla Firefox or Microsoft Edge and type the address: <http://omega.myiocloud.com> (internet connection required) or use <http://10.54.32.1>.

Omega manual

SERIAL RS232 PORT

This port can be used as a point-to-point connection to a single device and can be used for several protocols like:

- Modbus
- ASCII
- Penko Twophase
- Barcode scanner



This port is shared with the RS422 port.

For RS-232 the following pins are used

| PIN | Name | Function |
|-----|------|-------------------------|
| 2 | RX | Data receive input |
| 3 | TX | Data transmit output |
| 5 | GND | Common ground reference |
| 7 | RTS | RTS input |
| 8 | CTS | CTS output |

Omega manual

SERIAL RS422 PORT

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 Omega unit has dipswitches on the front to switch the built-in termination resistors on.

This port can be used for several protocols like:

- Modbus
- ASCII
- Penko Twophase

For RS-422 the following pins are used

| PIN | Name | Function |
|-----|------|------------------------|
| 1 | -TX | Transmit data output - |
| 4 | +RX | Receive data input + |
| 6 | -RX | Receive data input - |
| 9 | +TX | Transmit data output + |

For RS-485, the RX+ and TX+ are connected. Also, the RX- and TX- are connected resulting in two wire, half duplex, communication.

Omega manual

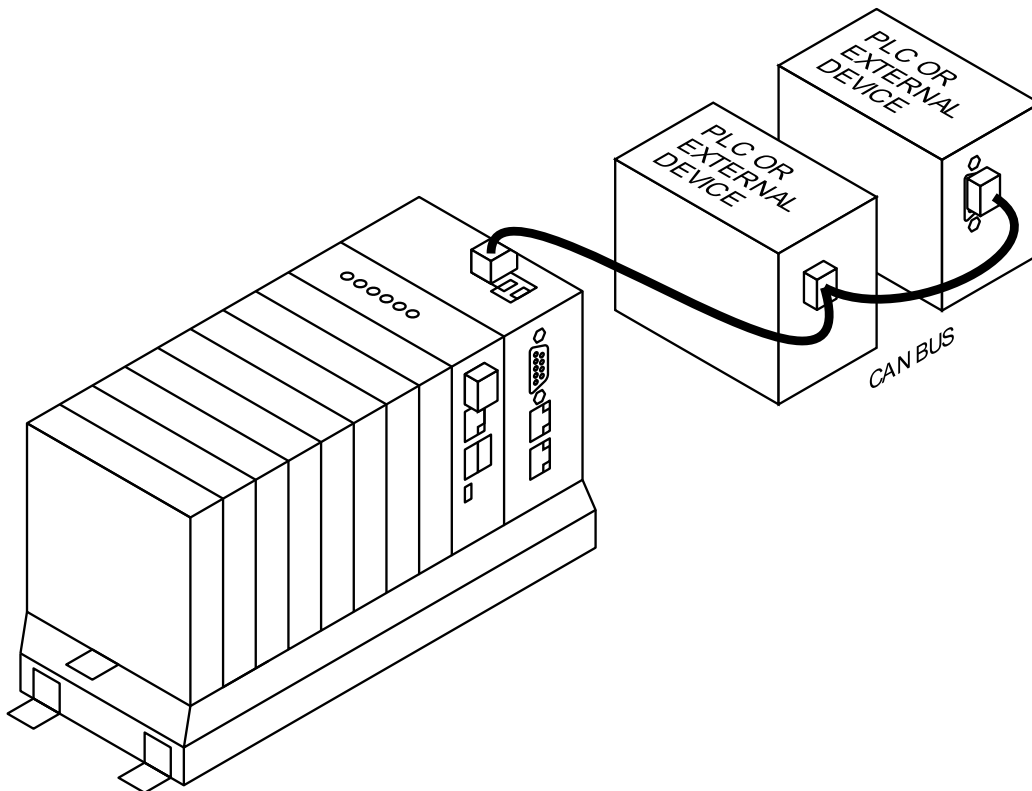
CAN PORT

This port can be used as a multi-drop network with multiple devices. Both ends of the cable must be terminated by a 120 Ohms resistor to suppress reflections and improve signal integrity. The Omega unit has dipswitches on the front to switch the built-in termination resistors on.

This port can be used for several protocols like:

- CanOpen*

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

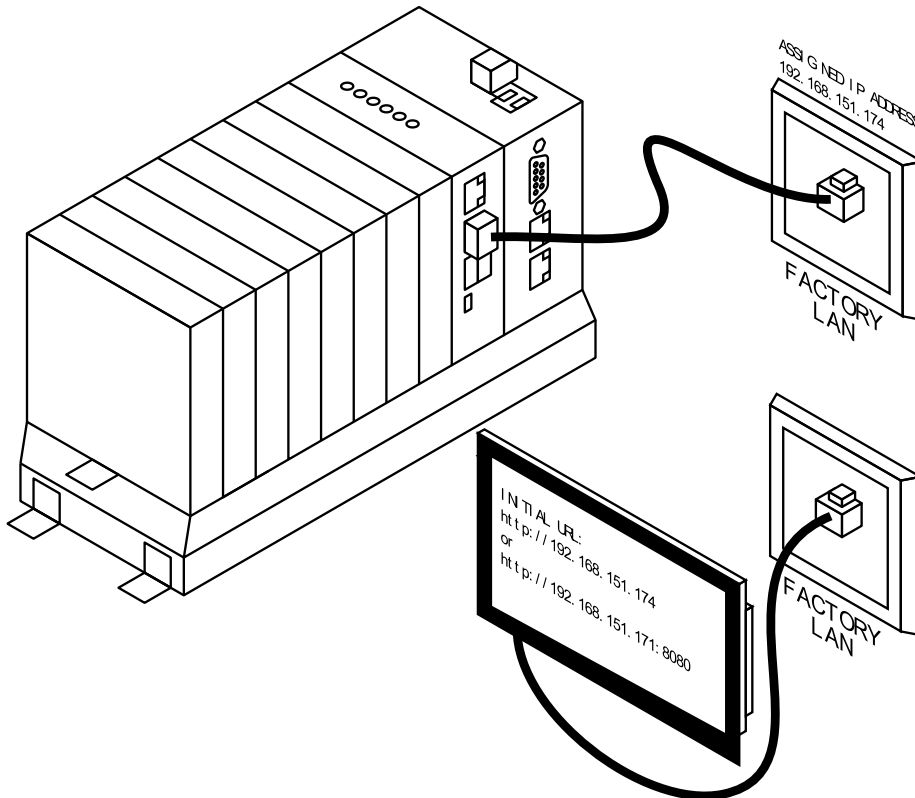


Omega manual

CONNECTING A TOUCHSCREEN

The Omega system can be connected to any screen with a modern web browser using the WebVisu feature of the CODESYS PLC.

The panel can connect through the factory LAN to the “Ethernet 1” port of the Omega.



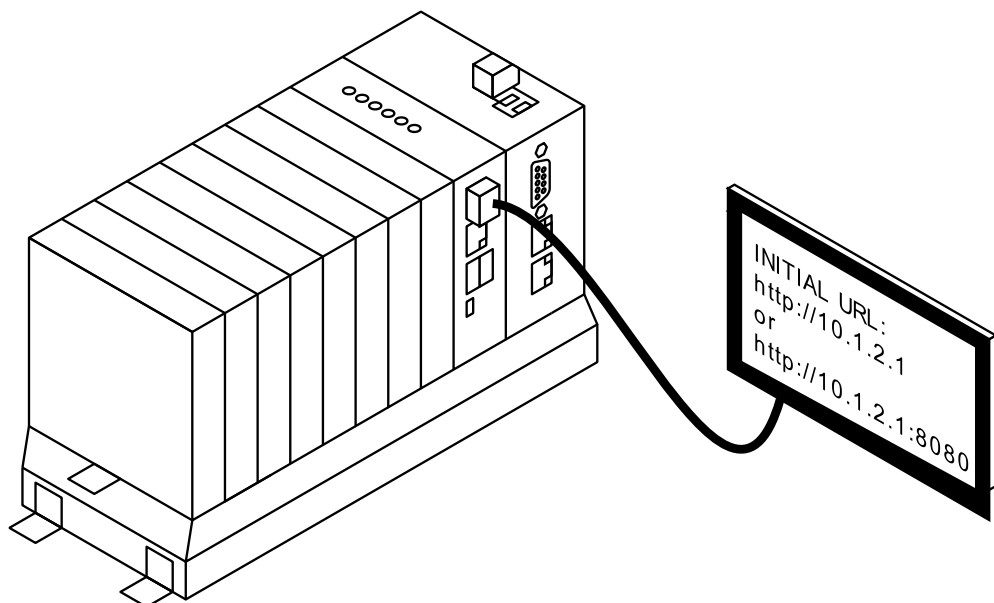
In the above example the factory network has assigned IP address 192.168.151.174 to the Omega.

When the initial URL on the panel is set to [HTTP://192.168.151.174](http://192.168.151.174) then the Omega user interface is shown at startup. The CODESYS visualization can be reached through Dashboard-> CODESYS WebVisu.

When the initial URL on the panel is set to [HTTP:// 192.168.151.174:8080](http://192.168.151.174:8080) then the CODESYS visualisation is shown at startup.

Or directly to “Ethernet 2” port of the Omega.

Omega manual



When the initial URL on the panel is set to [HTTP://10.1.2.1](http://10.1.2.1) then the Omega user interface is shown at startup. The CODESYS visualization can be reached through Dashboard-> CODESYS WebVisu.

When the initial URL on the panel is set to [HTTP://10.1.2.1:8080](http://10.1.2.1:8080) then the CODESYS visualisation is shown at startup.

Omega manual

UPDATING THE CPU MODULE VIA USB

The CPU module can be updated using a USB stick or the web interface. For the web interface, see chapter Update at page 47. The update files have the extension “.swu”, e.g. “omega-update.swu”.

Note: make sure that the USB drive only contains the Omega update file and no other files and folders. Otherwise the Omega will not be updated.

Use a USB drive that is formatted in the FAT or ext4 format containing the update files or using the omega web updater in the web interface.

- Place the USB stick in one of the USB-A connectors of the CPU module
- The Omega checks if the update file is valid.
- The LED's 1-4 light up in the “Knight rider” pattern. Blinking green/red and moving up and down (1-2-3-4-3-2-1) to show the system is updating.
- After a couple of minutes LED's 1-4 blink red to signal the update is complete.
- Remove the USB stick
- The LED's 1-4 light up in the “snake” pattern. Blinking green/red and moving down (1-2-3-4-1-2-3-4) to show the system is rebooting.
- After reboot LED's 1-4 are on and can be controlled by the CODESYS program.

To check if the Omega has been updated, logon into the web interface (see page 32) and go to the Dashboard – My Omega menu item. The Firmware version of the Omega Main Board is showing the installed version number.

Omega manual

CONTROLLING THE OMEGA THROUGH THE WEB INTERFACE

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

- Connect the Mini-USB connector to your PC. The USB connection will install as a network port. Open a web browser like Google Chrome, Mozilla Firefox or Microsoft Edge and type the address: <http://omega.myiocloud.com> (internet connection required) or use <http://10.54.32.1>.
- Connect a computer using an ethernet cable directly to Ethernet 2, the Office Network port and enter the address 10.1.2.1.
- Connect a computer using an ethernet cable directly to Ethernet 1, the Factory Network port. Default configured as DHCP client and the omega should get an IP address from the router.

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.

Omega manual

GUEST LOGIN

The guest login can be used to get a quick overview of all available channels and omega configuration. 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 screenshot displays the 'Penko Omega Controller' interface in 'Guest' mode. The main heading is 'Dashboard - Option cards overview'. The dashboard is organized into a grid of control panels for different channels:

- Top Row:**
 - Channel 1 (Digital):** Weigher: 0.669 kg, Fast Gross: 0.669 kg. Includes buttons for 'stable weight', 'tare', 'preset tare', 'zero center', and input/output controls.
 - Channel 2 (Analog):** Weigher: -----, Fast Gross: -----.
 - Channel 3 (Digital):** Weigher: 1.121 kg, Fast Gross: 1.121 kg. Includes buttons for 'stable weight', 'tare', 'preset tare', 'zero center', and input/output controls.
- Bottom Row:**
 - Channel 4 (Digital):** Weigher: 4.987 kg, Fast Gross: 4.987 kg.
 - Channel 5 (Analog):** Weigher: -----, Fast Gross: -----.
 - Channel 6 (Digital):** Weigher: 1.358 kg, Fast Gross: 1.358 kg.

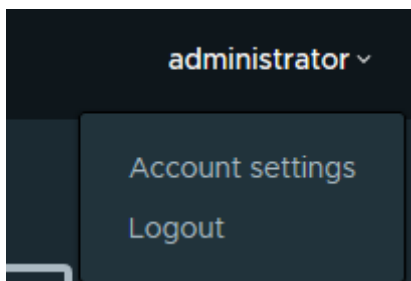
To view the omega configuration, go to dashboard -> My omega.


The first screenshot shows the 'Dashboard - Option cards overview' with a red arrow pointing to the 'Digital I/O' section. The second screenshot shows the 'Dashboard' menu with three options: 'Information', 'My Omega', and 'Option cards overview'. A red arrow points to the 'My Omega' option, indicating the navigation path.

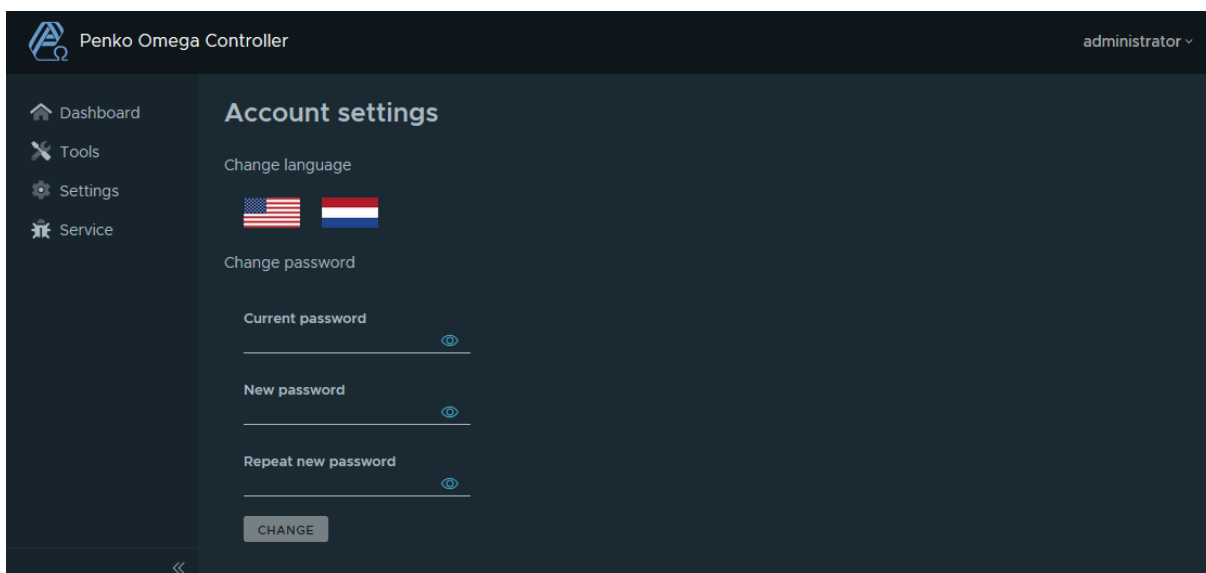
Omega manual

USER MENU

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



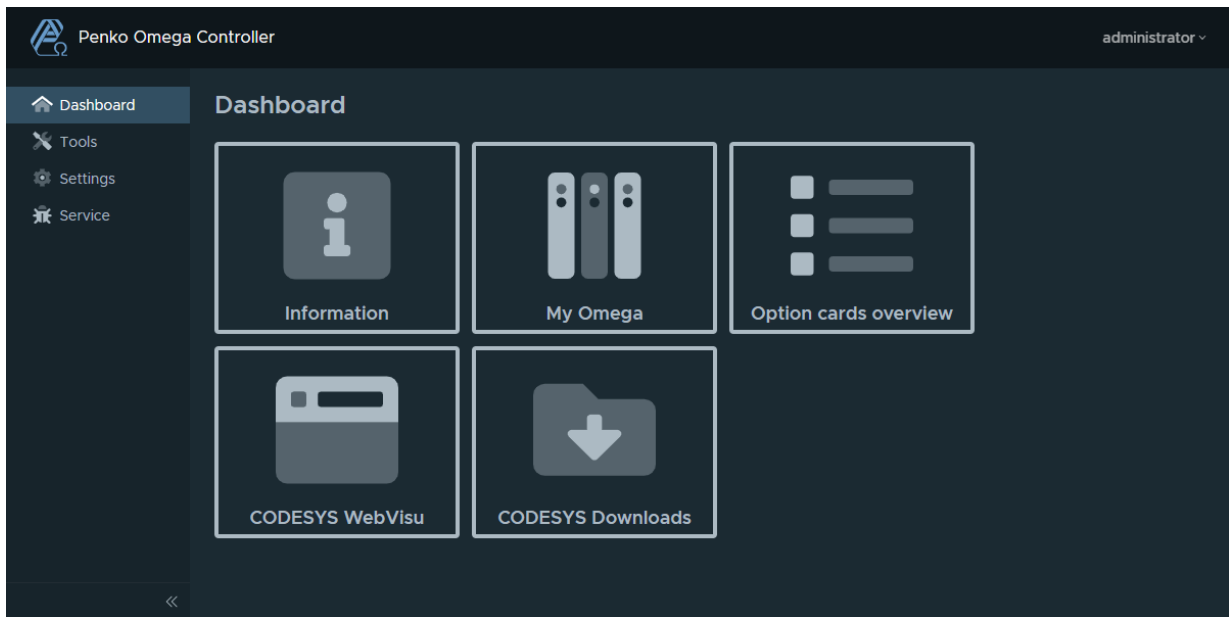
The account settings allow the user interface to be set to US English or Dutch and the user can change its password by entering the current password and the new password twice. The  icon enables displaying the entered text. When other people can read the screen, it is advisable to keep the entered passwords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

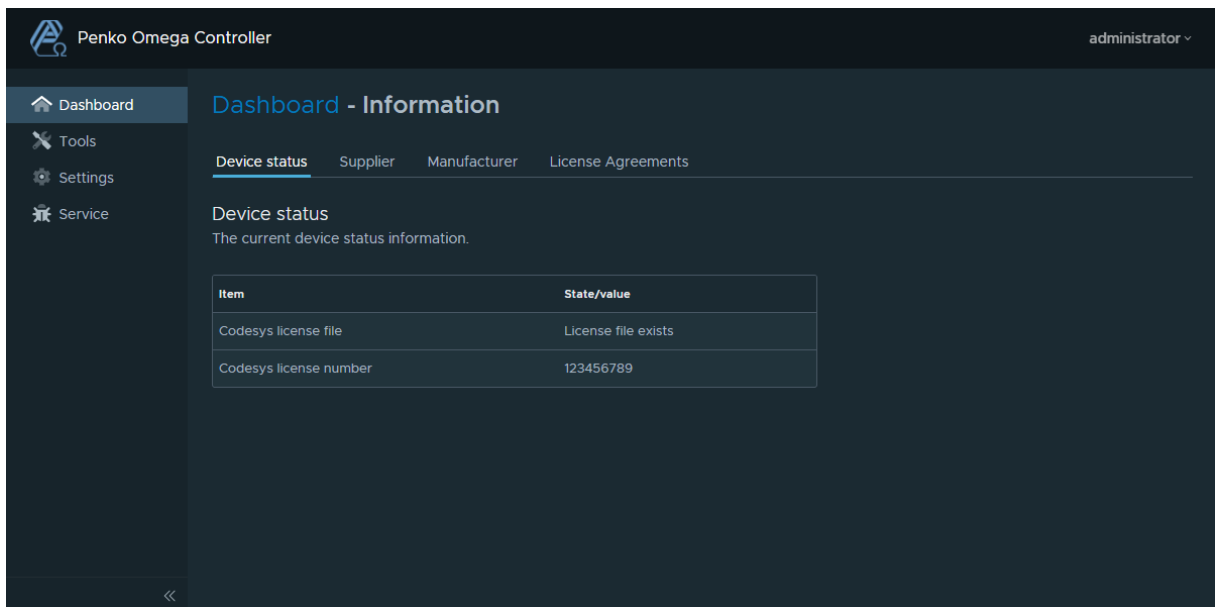
Omega manual

DASHBOARD MENU



INFORMATION

The "Information" tile shows the installed CODESYS license, supplier and manufacturer information and the used software licenses. The supplier information can be changed in the



Omega manual

MY OMEGA

The “My Omega” tile shows information of the Omega system and installed modules and their software versions.

The dashboard displays a rack of modules for 'Rack 1'. The modules are: Omega Main Board, ADC+DIO, ADC+AIQ, DIO, and AIO. Below the rack is a table with the following data:

| Rack | Slot | Channel | Type | Name | Firmware version | Boot version |
|------|------|---------|---------------------------------------|---------------------------------------|------------------|--------------|
| 1 | 0 | 1 | Omega Main Board | Omega Main Board | 1.0.4.9.0.0 | 1.0.3.9.0.0 |
| 1 | 1 | 2 | Dual Channel Loadcell Digital Outputs | Dual Channel Loadcell Digital Outputs | 1.0.5.9.0.9 | 1.0.2.9.0.2 |
| 1 | 2 | 2 | Dual Channel Loadcell Analog Outputs | Dual Channel Loadcell Analog Outputs | 1.0.5.9.0.10 | 1.0.2.9.0.2 |
| 1 | 3 | 2 | Digital I/O | Digital I/O | 1.0.5.9.0.11 | 1.0.2.9.0.2 |
| 1 | 4 | 2 | Analog I/O | Analog I/O | 1.0.5.9.0.11 | 1.0.2.9.0.3 |

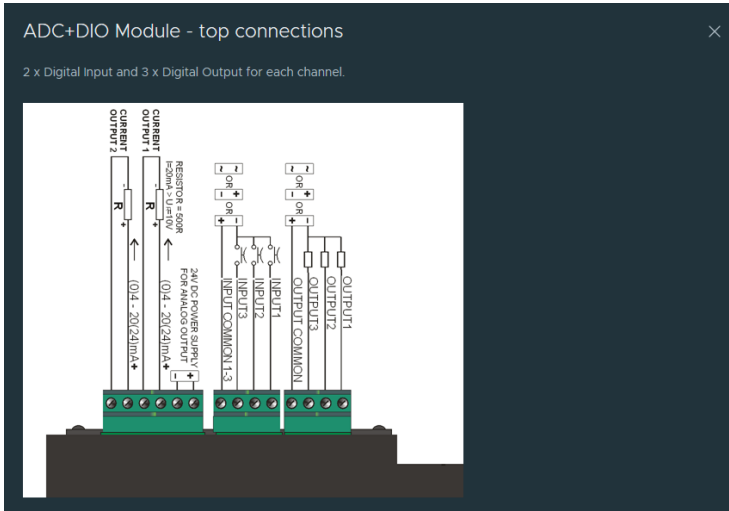
By clicking on the front sticker of any of the cards in the overview, a popup of the LED functions is shown.

The popup shows the following table for the ADC+DIO module:

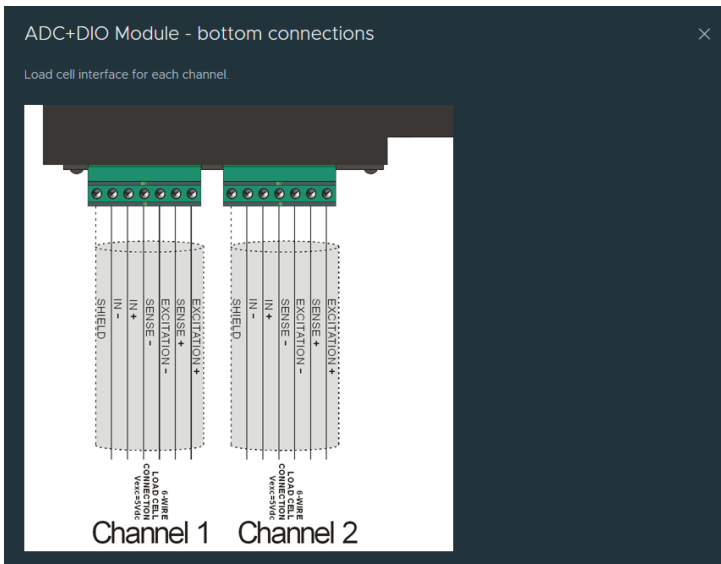
| LED | Red function | Green function | Yellow function |
|-----|---|--|--------------------------------|
| 1 | Channel 1 Input 1 on | Channel 1 Output 1 on | Combined |
| 2 | Channel 1 Input 2 on | Channel 1 Output 2 on | Combined |
| 3 | Alarm Weigher 1: hardware overload, underload, max load, calibration error | Channel 1 Output 3 on | Combined |
| 4 | Channel 2 Input 1 on | Channel 2 Output 1 on | Combined |
| 5 | Channel 2 Input 2 on | Channel 2 Output 2 on | Combined |
| 6 | Alarm Weigher 2: hardware overload, underload, max load, calibration error | Channel 2 Output 3 on | Combined |
| 7 | Alarm on | - | - |
| 8 | On, bootloader mode Off, ethernet receive data Result is a red blinking LED on data receive | On, application mode Off, ethernet receive data Result is a green blinking LED on data receive | Yellow, application is booting |

By clicking on the top connector of any of the modules in the overview, a popup of its connection diagram is shown.

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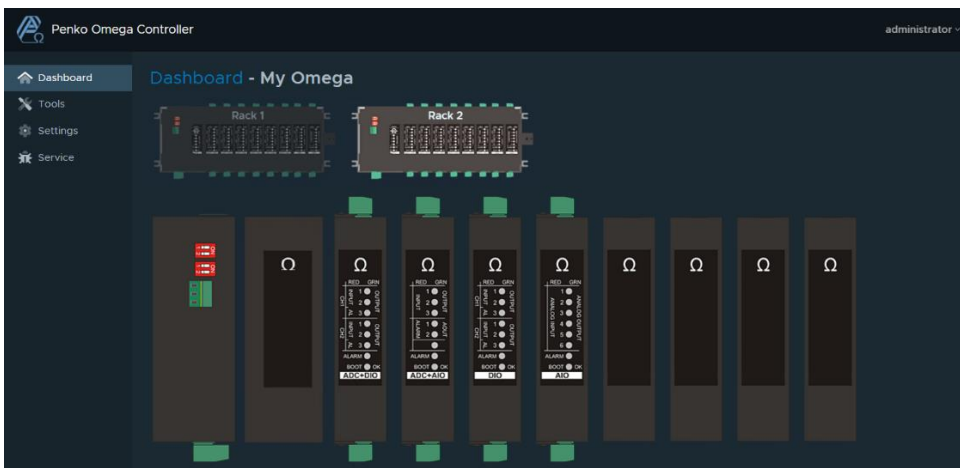


By clicking on the bottom connector of any of the cards in the overview, a popup of its connection diagram is shown.



If several racks are connected, the selected rack is highlighted.

Note: make sure that only rack 1 contains a CPU card.



Omega manual

OPTION CARD OVERVIEW

The option cards overview tile shows for each rack a quick overview of all available channels. All weight and status indicators are live values.

The screenshot shows the 'Penko Omega Controller' dashboard with the 'Option cards overview' for two racks. The interface is organized into a grid of cards for each rack. Each card displays the following information:

- Channel Type:** Dual Channel Loadcell Digital or Analog.
- Weight:** Weigher (e.g., 408.0 g, 0.927 kg) and Fast Gross (e.g., 407.9 g, 0.927 kg).
- Status Indicators:** Buttons for 'stable weight', 'tare', 'preset tare', and 'zero center'.
- I/O Status:** Input and output channels (e.g., input 1, output 1) with their respective status (e.g., 0%, 24.98%, 75.62%).
- Counters:** Counter 1 and Counter 2 values.

CODESYS WEBVISU

The "Information" tile shows the CODESYS WebVisu in full screen. Click on the "Penko Omega Controller" text to return to the web interface dashboard page.

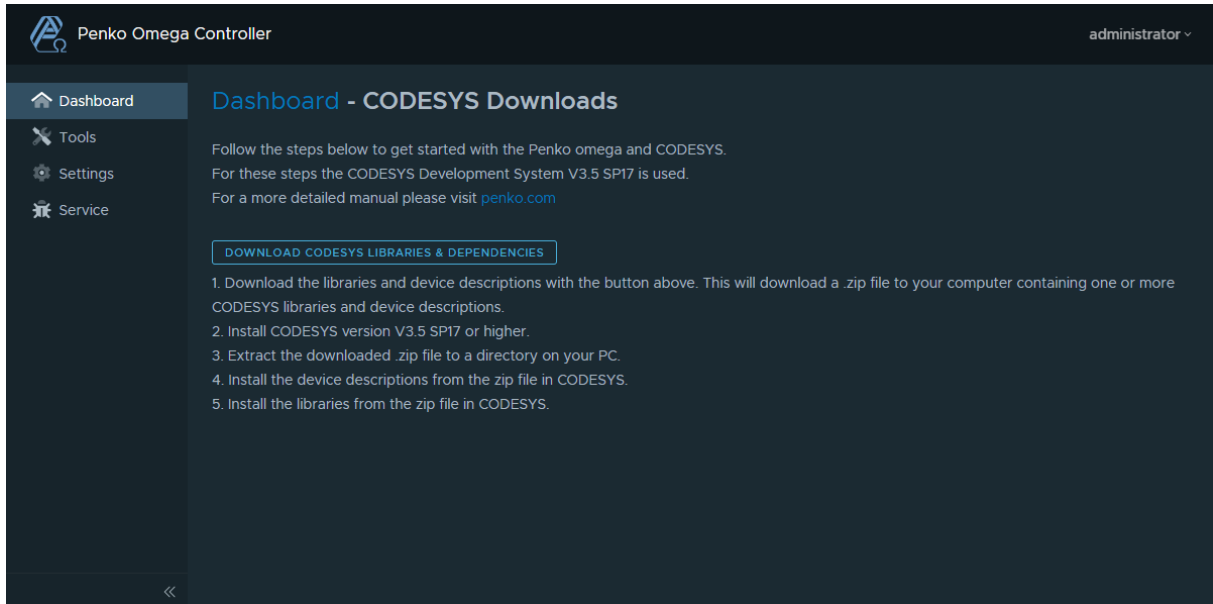
The screenshot shows the CODESYS WebVisu interface for the Penko Omega Controller. The interface includes the following elements:

- Header:** 'Penko Omega Controller'.
- Left Panel:** Weigher (0 g), Inputs (SYNC-A, FILL ENB, PULS, BOTTLE), Outputs (COARSE, FINE, ALARM, GOOD, BOTTLE, LOCK), Position (Puls: 153, Sector: Dosing, SYNC: OVER, RUN), SPC (Mode: IDLE, Phase: Dosing), and Temperature (0).
- Center:** A circular progress indicator with a bottle icon in the center. The progress bar is divided into segments of different colors, corresponding to the legend.
- Right Panel:** A legend for the progress bar segments: Idle (light blue), Setup (dark red), Tare Wait (yellow), Tare (cyan), Prefill (purple), Dosing (orange), End Weight (dark blue), Ready (light purple), Kickout (dark blue), Zero Wait (magenta), and Zero (yellow).
- Bottom:** Simulator speed (10 rpm).

Omega manual

CODESYS DOWNLOADS

The “CODESYS Downloads” tile shows a short description how to get started with the omega and CODESYS. The required files for the CODESYS development system are available for downloading. Install the files as indicated in the step-by-step plan.

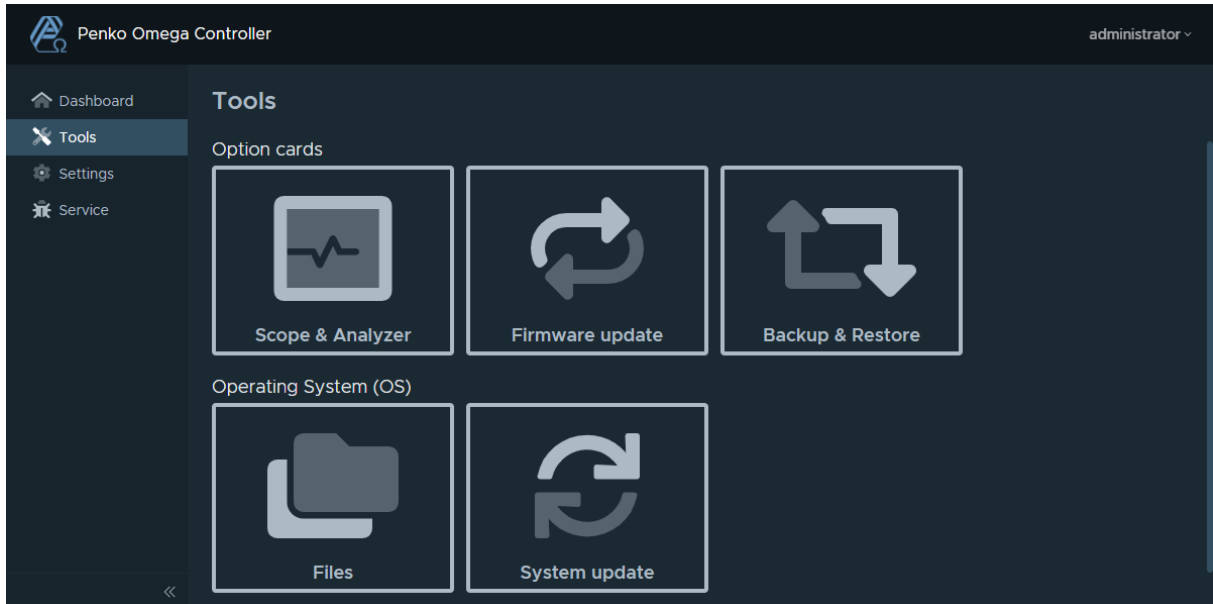


The screenshot shows the Penko Omega Controller interface. At the top left is the Penko logo and the text "Penko Omega Controller". At the top right is the user name "administrator" with a dropdown arrow. A left sidebar contains navigation options: "Dashboard" (selected), "Tools", "Settings", and "Service". The main content area is titled "Dashboard - CODESYS Downloads". It contains the following text: "Follow the steps below to get started with the Penko omega and CODESYS. For these steps the CODESYS Development System V3.5 SP17 is used. For a more detailed manual please visit penko.com". Below this is a button labeled "DOWNLOAD CODESYS LIBRARIES & DEPENDENCIES". Underneath the button is a numbered list of five steps: 1. Download the libraries and device descriptions with the button above. This will download a .zip file to your computer containing one or more CODESYS libraries and device descriptions. 2. Install CODESYS version V3.5 SP17 or higher. 3. Extract the downloaded .zip file to a directory on your PC. 4. Install the device descriptions from the zip file in CODESYS. 5. Install the libraries from the zip file in CODESYS. At the bottom left of the dashboard area is a double-left arrow icon.

Omega manual

TOOLS MENU

The tools menu can be selected from the menu on the left of the screen. This menu contains tools for system maintenance like updating, backup and restore, Scope & Analyzer.



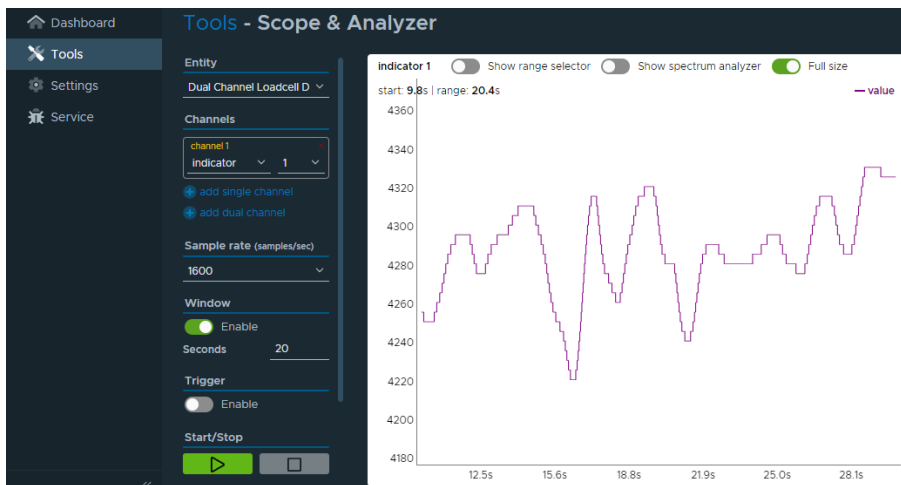
SCOPE & ANALYSER

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 and channel(s). By default, from the first option card, channel one is selected. The sample rate, window and trigger settings are optional.

| | |
|---|---|
| Only one entity can be selected. | A screenshot of the 'Tools - Scope & Analyzer' configuration panel. It includes a dropdown for 'Entity' (Dual Channel Loadcell D), a 'Channels' section with 'add single channel' and 'add dual channel' buttons, a 'Sample rate (samples/sec)' dropdown (1600), 'Window' and 'Trigger' sections with 'Enable' toggle switches, 'Start/Stop' buttons (play and stop), and an 'Options' section with a 'Synchronize zoom' toggle switch and icons for save, export, and reset. |
| Add one or more channels to scope. Dual channels can be configured in the Settings - General Settings page. | |
| Select a sample rate from 1 to 1600. Default 1600. | |
| Optional: select how long samples in seconds are visible in the scope. | |
| Optional: trigger on a specific channel with a minimum and/or maximum value. | |
| Start or stop the scope. The scope can also be started and stopped using the spacebar | |
| Optional: synchronize zoom between multiple scope channels. | |
| Optional: save and open scope views. Export scope to a CSV file. Reset this scope. | |

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Below an example of a scope view of the first ADC+DIO card from channel one.

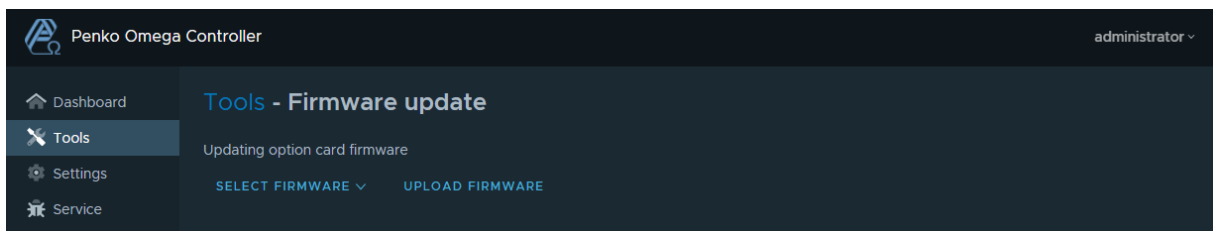


FIRMWARE UPDATE IO MODULE (OPTION CARDS)

The firmware update tile allows the updating of software of the system.

The Select firmware is button used to choose a card image that is already stored in the main processor of the Omega.

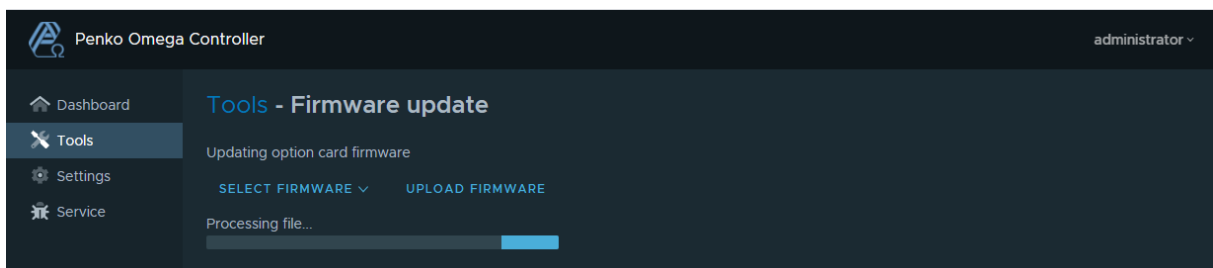
To install firmware from your computer, press **UPLOAD FIRMWARE**.



Then select a firmware image file to upload to the Omega.

| Name | Date modified | Type |
|--|-------------------|----------|
| ✓ BootreplacerDualLoadcellAnalog_V1.0.2.... | 29-Sep-2020 16:55 | PIP File |
| ✓ BootreplacerDualLoadcellDigital_V1.0.2.9.... | 29-Sep-2020 16:55 | PIP File |
| ✓ BootreplacerIOAnalog_V1.0.2.9.0.3.pip | 30-Sep-2020 12:17 | PIP File |
| ✓ BootreplacerIODigital_V1.0.2.9.0.2.pip | 29-Sep-2020 16:56 | PIP File |
| ✓ OmegaDualLoadcellAnalog_V1.0.5.9.0.2.... | 13-Jan-2021 13:31 | PIP File |
| ✓ OmegaDualLoadcellDigital_V1.0.5.9.0.2.pip | 13-Jan-2021 13:29 | PIP File |
| ✓ OmegaIOAnalog_V1.0.5.9.0.2.pip | 13-Jan-2021 13:33 | PIP File |
| ✓ OmegaIODigital_V1.0.5.9.0.2.pip | 13-Jan-2021 13:31 | PIP File |

After selecting, the Omega checks if the file is valid. This can take up to 30 seconds.



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Now the cards that are compatible with the selected firmware can be selected. In this example “OmegaDualLoadcellDigital.pip” is uploaded So “Dual Channel Loadcell Analog Outputs” cards can’t be selected for update. The checkmark at the top of the table selects all compatible cards.

Penko Omega Controller administrator

Dashboard Tools Settings Service

Tools - Firmware update

Updating option card firmware

SELECT FIRMWARE UPLOAD FIRMWARE

Selected file: OmegaDualLoadcellDigital_V1.0.5.9.0.2.pip

| <input checked="" type="checkbox"/> | Rack | Slot | Channel | Name | Current firmware version |
|-------------------------------------|------|------|---------|--|--------------------------------|
| <input type="checkbox"/> | 1 | 0 | 1 | CPU | 2021-02-01T18:16+00:00 atb5e77 |
| <input checked="" type="checkbox"/> | 1 | 1 | 1 2 | Dual Channel Loadcell Digital Outputs Dual Channel Loadcell Digital Outputs | 1.0.5.9.0.2 |
| <input type="checkbox"/> | 1 | 2 | 1 2 | Dual Channel Loadcell Analog Outputs Dual Channel Loadcell Analog Outputs | 1.0.4.9.0.6 |
| <input type="checkbox"/> | 1 | 3 | 1 2 | Digital I/O Digital I/O | 1.0.5.9.0.2 |
| <input type="checkbox"/> | 1 | 4 | 1 2 | Analog I/O Analog I/O | 1.0.4.1.0.7 |
| <input checked="" type="checkbox"/> | 1 | 5 | 1 2 | Channel 9 Channel 10 | 1.0.5.9.0.2 |
| <input checked="" type="checkbox"/> | 1 | 6 | 1 2 | Dual Channel Loadcell Digital Outputs Dual Channel Loadcell Digital Outputs | 1.0.5.9.0.2 |
| <input checked="" type="checkbox"/> | 1 | 7 | 1 2 | Dual Channel Loadcell Digital Outputs Dual Channel Loadcell Digital Outputs | 1.0.5.9.0.2 |
| <input checked="" type="checkbox"/> | 2 | 4 | 1 2 | Dual Channel Loadcell Digital Outputs Dual Channel Loadcell Digital Outputs | 1.0.5.9.0.2 |

UPDATE

Pressing the UPDATE button starts the process. The status for each card is shown and moves through the following stages:

- FBOOT
- ERASE
- WRITE
- TARGET
- READY
- SUCCEEDED

Penko Omega Controller administrator

Dashboard Tools Settings Service

Tools - Firmware update

Updating option card firmware

SELECT FIRMWARE UPLOAD FIRMWARE

Selected file: OmegaDualLoadcellDigital_V1.0.5.9.0.2.pip

| Rack | Slot | Channel | Name | State |
|------|------|---------|--|-----------|
| 1 | 1 | 1 2 | Dual Channel Loadcell Digital Outputs Dual Channel Loadcell Digital Outputs | succeeded |
| 1 | 5 | 1 2 | Channel 9 Channel 10 | succeeded |
| 1 | 6 | 1 2 | Dual Channel Loadcell Digital Outputs Dual Channel Loadcell Digital Outputs | succeeded |
| 1 | 7 | 1 2 | Dual Channel Loadcell Digital Outputs Dual Channel Loadcell Digital Outputs | succeeded |

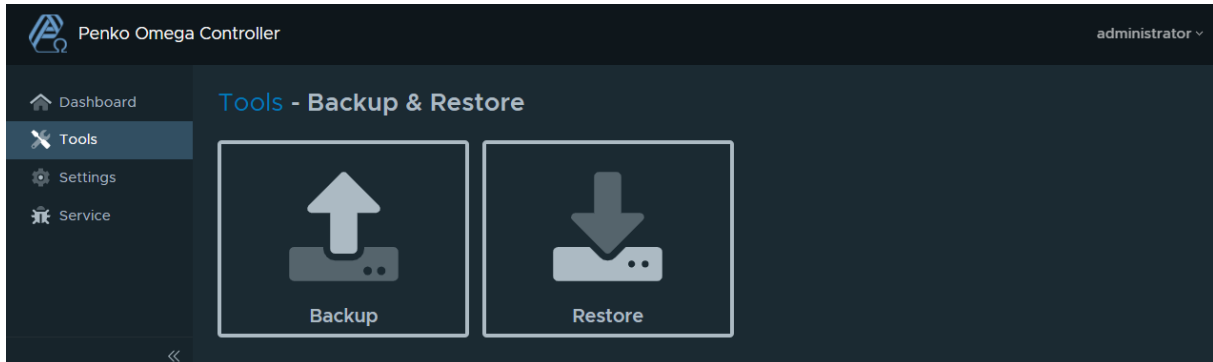
BACK

After updating has succeeded, the BACK button returns to the backup file selection.

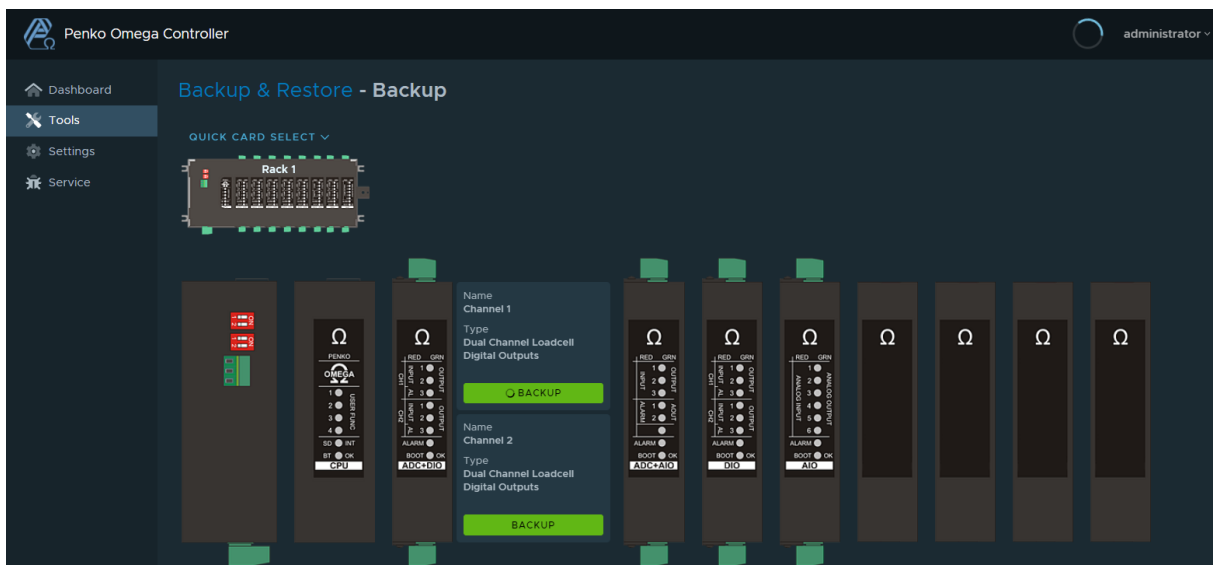
Omega manual

BACKUP & RESTORE

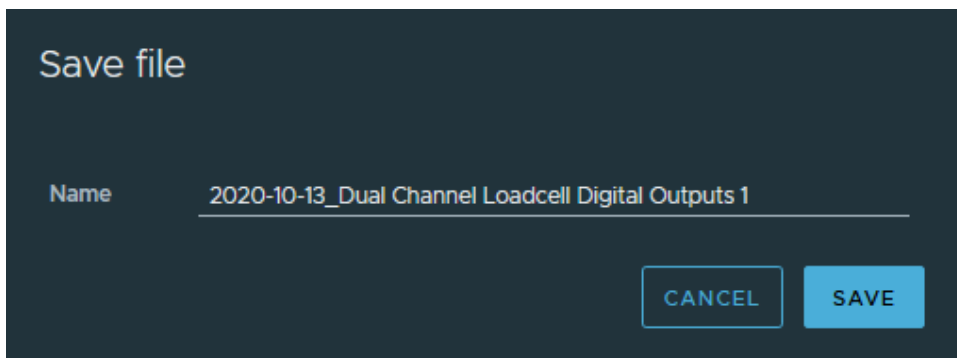
The Backup and restore screen allow for backups of each card's settings



After pressing Backup, a card and channel can be selected. Click the respective Backup button to save a backup from the selected channel to the CPU module storage.



After pressing backup, choose a file name to save the settings of this channel.

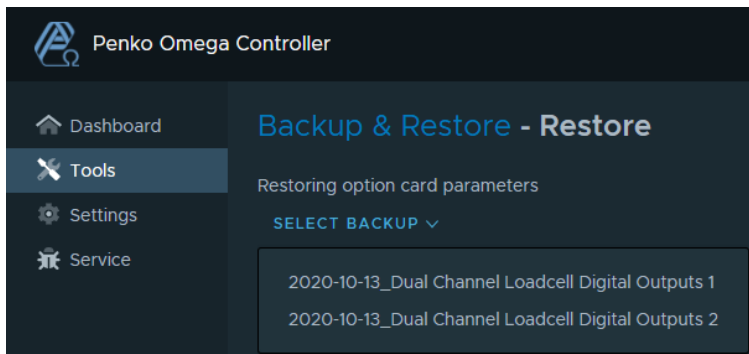


When the backup is stored, the screen returns to the card selection and on the top right the following is shown:



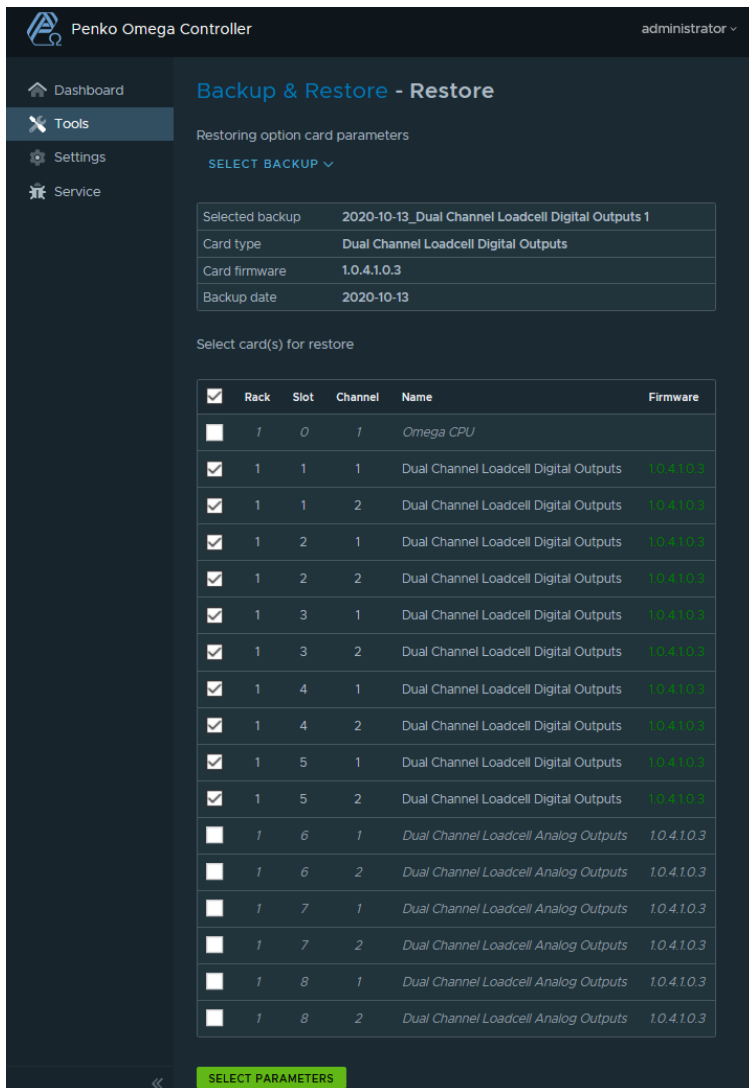
Omega manual

The restore tile is used to restore a previously saved backup.



Press Select backup and select one of the files from the dropdown menu.

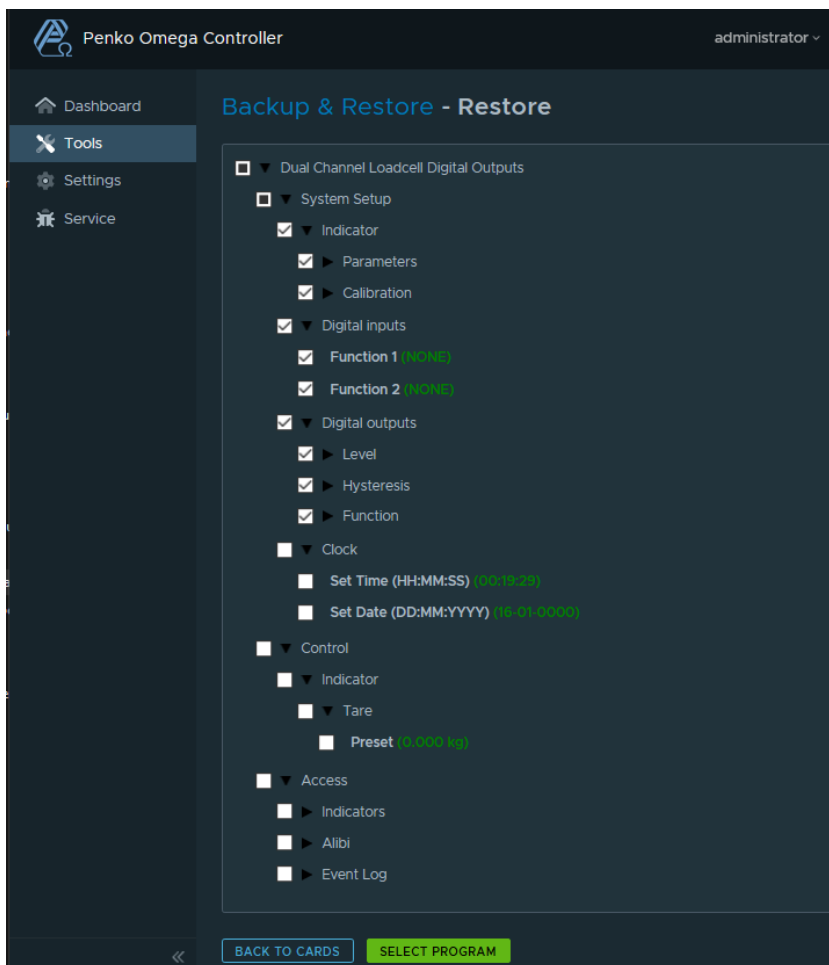
Then the cards to write the backup to can be selected. Only the same type of card as used for the backup can be selected.



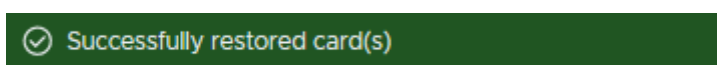
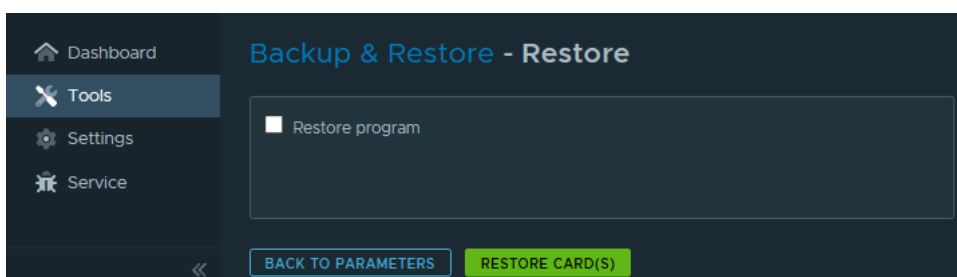
Press "SELECT PARAMETERS".

Omega manual

By selecting the top item, all parameters can be selected. To restore only some parameters, items can be expanded by pressing the right triangle symbol and selecting sub items. In the following example only Indicator Parameters, Calibration, Digital Input and digital output settings are selected.



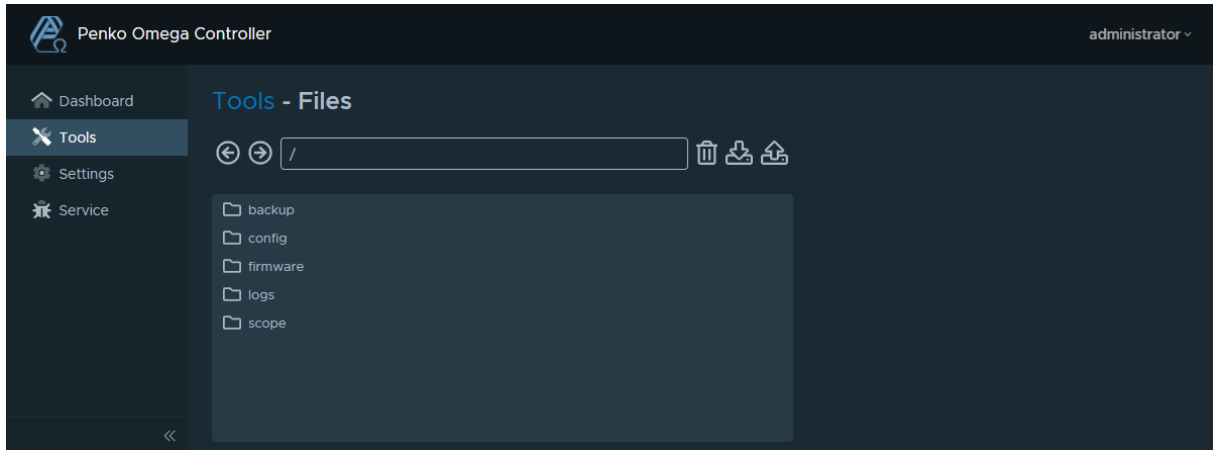
After selecting the parameters, press SELECT PROGRAM button to continue to the last step. Select the Restore program option and press RESTORE CARS(S) to restore the selected parameters for the selected card(s). When finished a success banner appears in the top right corner of the screen.



Omega manual




FILES

The files menu is used to upload and download files from the internal storage of the Omega CPU to an external computer. The following folders are used:

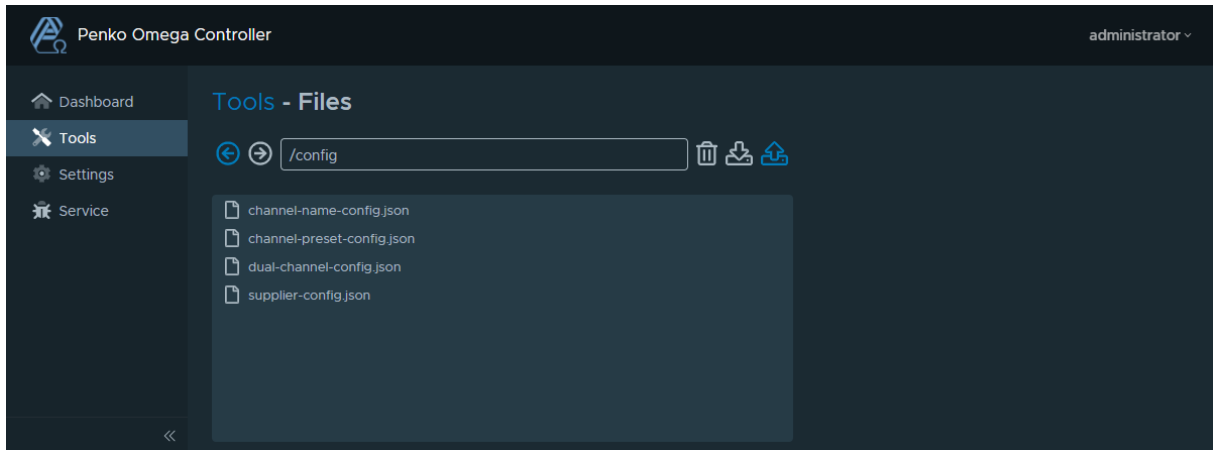


| Folder | Contains |
|----------|--|
| Backup | Previously stored configuration backups of cards in the system. |
| Config | When aliases are given to one or more cards in Advanced Setup, the file containing these aliases will be placed here. This file can be downloaded, edited, and uploaded again to easily name all cards |
| Firmware | Firmware images for the different cards can be stored here for easy updating or restoring of new or exchanged cards |
| Logs | Logging data captured by the service -> Task manager-> logger function. Can be used for diagnosing the CPU operating system. |
| Scope | Measurement data from the cards captured by the tools->scope function. Can be used for diagnosing weighing system instability or process performance. |

For example: The backup folder shows two backups of the channel settings we made earlier.

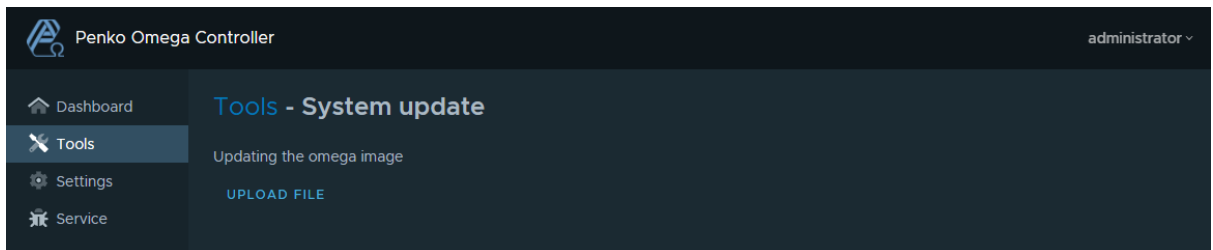
- The  icon deletes the backup.
- The  icon downloads the backup from the Omega CPU to the connected computer.
- The  icon uploads a backup file from the connected computer to the Omega CPU. After this, the “Backup & Restore” menu must be used to write the backup back to the cards.

Omega manual

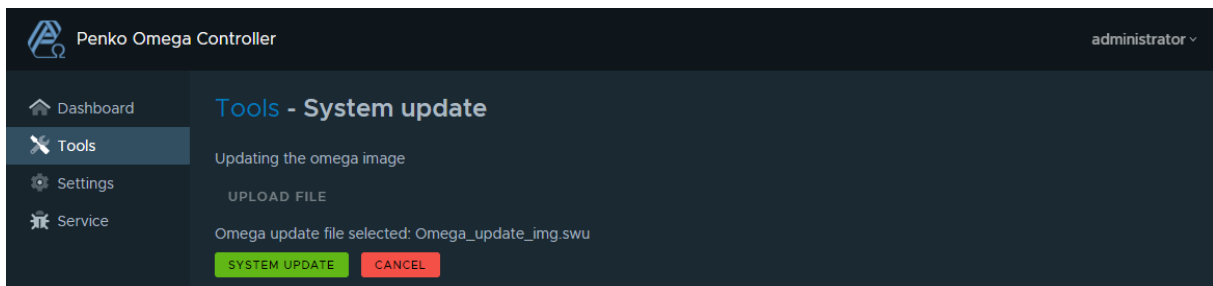


UPDATE THE CPU MODULE VIA WEB

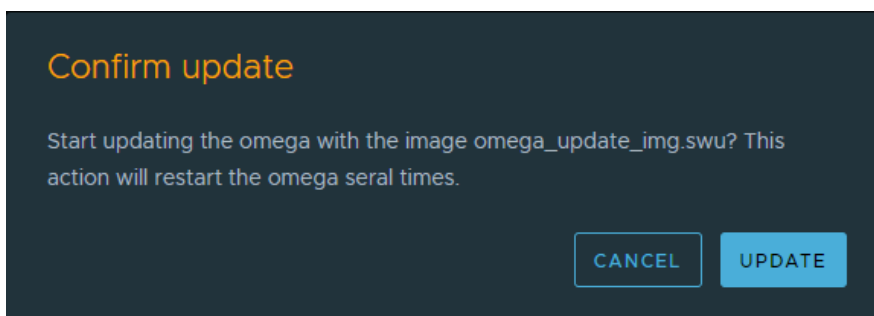
The update omega menu can be used to update the omega CPU Module. To start the update process, press the **UPLOAD FILE** button. Only files with the extension “.swu” are supported, e.g. “omega_update_img.swu”.



Uploading the file can take up to a minute. When finished the uploaded file is shown. To select another file press **CANCEL**.

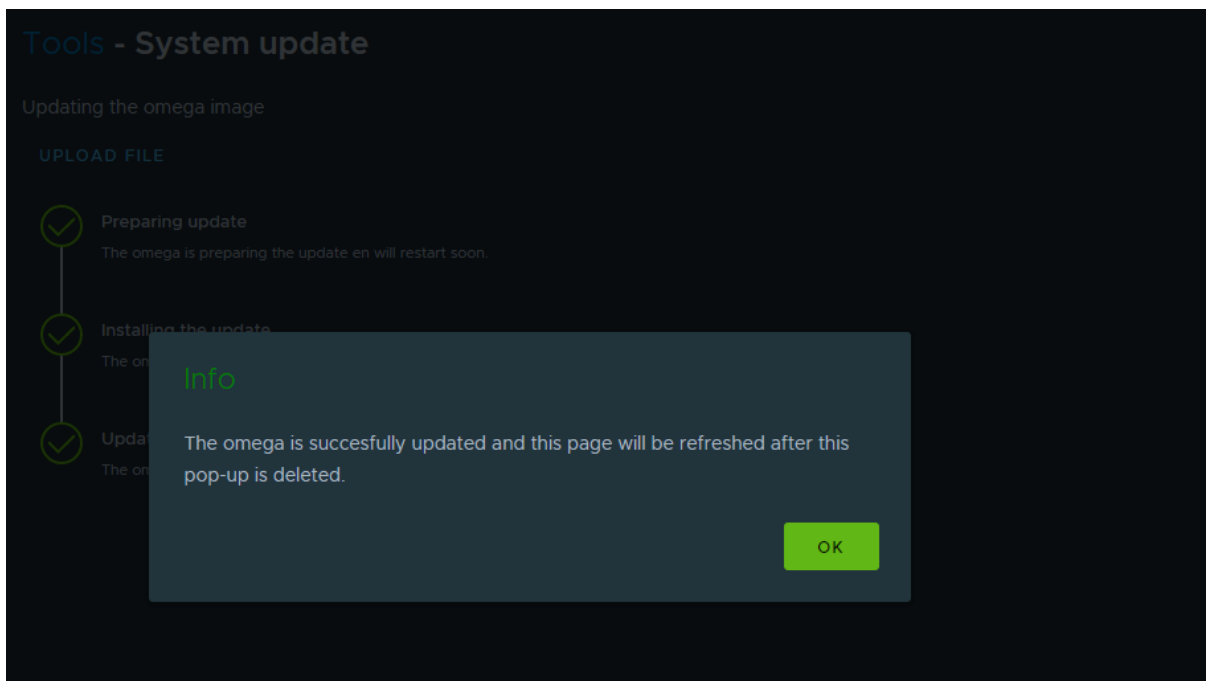
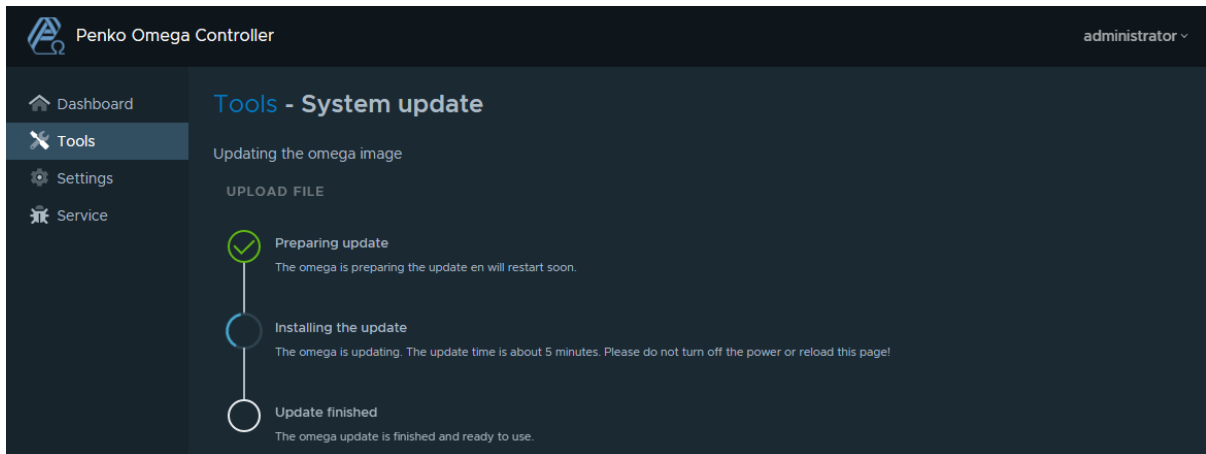


To start updating the CPU image press **UPDATE OMEGA**. A pop-up appears to confirm the update. When confirmed the update process starts and the progress is shown.



Omega manual

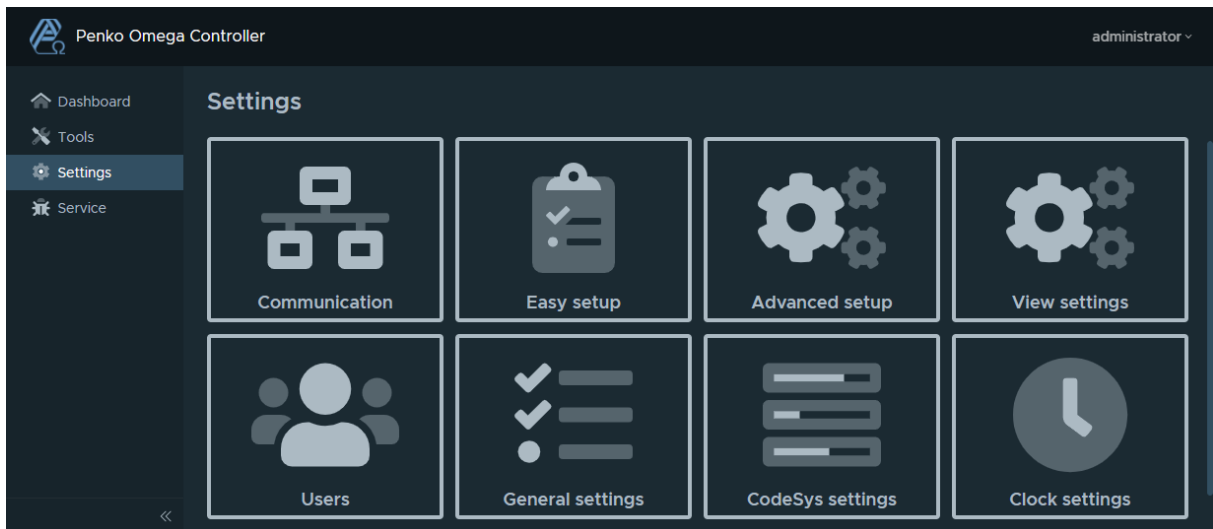
Updating the omega can take up to 5 minutes. Do not leave the page and wait till the update is finished. When finished a message appears to indicate that the update is finished. After confirming the page will be reloaded.



The omega CPU is now successfully updated and ready to use. In the My Omega page the new version number is shown.

Omega manual

SETTINGS MENU



COMMUNICATION

This menu controls the settings of the Ethernet ports on the Omega CPU. The factory defaults are:

| Item | Value | Function |
|-----------------|---------------|--|
| Factory Network | | |
| Select | DHCP Server | The Omega CPU sets its own IP address and provides network settings to connected network equipment. |
| IP | 10.1.2.1 | This is the address of the Omega CPU 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 the PenkoNet (internal) connection between the Omega cards and racks.

By default, the Office network is used for connecting a single PC. When changing this note the network address of the Omega or use the USB-Mini connection to IP address 10.54.32.1 to access the user interface. It is also possible to assign a static IP and netmask to make sure the connected network devices can always find Omega at the same Address. The green panels on the left side show the current network status.

Omega manual

Penko Omega Controller administrator

Dashboard Tools Settings Service

Settings - Communication

Office network (config) Factory network

Network settings for the office network

- **reset to factory:** back to factory default (dhcp server | ip:10.1.2.1 | netmask:255.255.255.0)
- **static:** give this device a fixed IP address
- **dhcp client:** this device is assigned an IP address
- **dhcp server:** this device provides a connected computers with an IP address

WARNING: Adjusting these settings may lead to loss of connection
For more office network settings, go to the Advanced settings page: [link](#)

| | |
|-----------------|---------------|
| state | activated |
| method | manual |
| static-ip | 10.1.2.1 |
| static-netmask | 255.255.255.0 |
| static-gateways | |

setup **RESET TO FACTORY**

mode dhcp server

ip 10 1 2 1

netmask 255 255 255 0

The same settings are available for the Factory network. Each of the networks can be set to

- DHCP server
- DHCP client
- Static

Penko Omega Controller administrator

Dashboard Tools Settings Service

Settings - Communication

Office network (config) Factory network

Network settings for the factory network

- **reset to factory:** back to factory default (dhcp client)
- **static:** give this device a fixed IP address
- **dhcp client:** this device is assigned an IP address

WARNING: Adjusting these settings may lead to loss of connection
For more factory network settings, go to the Advanced settings page: [link](#)

| | |
|-----------------|---------------|
| state | activated |
| method | manual |
| static-ip | 192.168.2.133 |
| static-netmask | 255.255.255.0 |
| static-gateways | 192.168.2.254 |

setup **RESET TO FACTORY**

mode static

ip 192 168 2 133

netmask 255 255 255 0

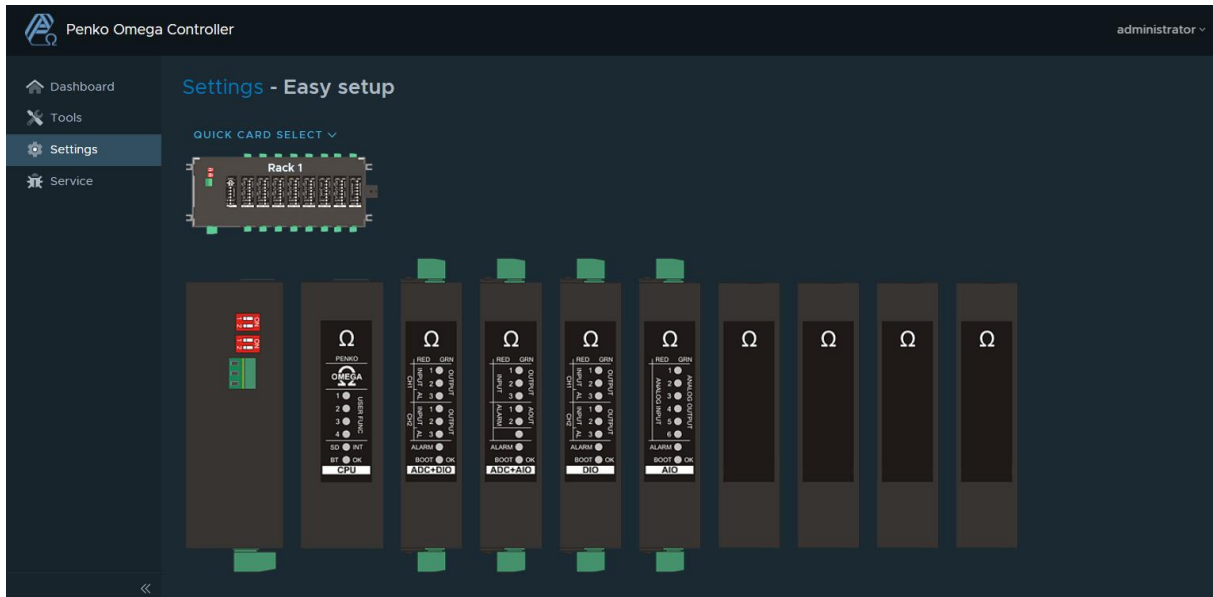
gateway 192 168 2 254

Easy Setup

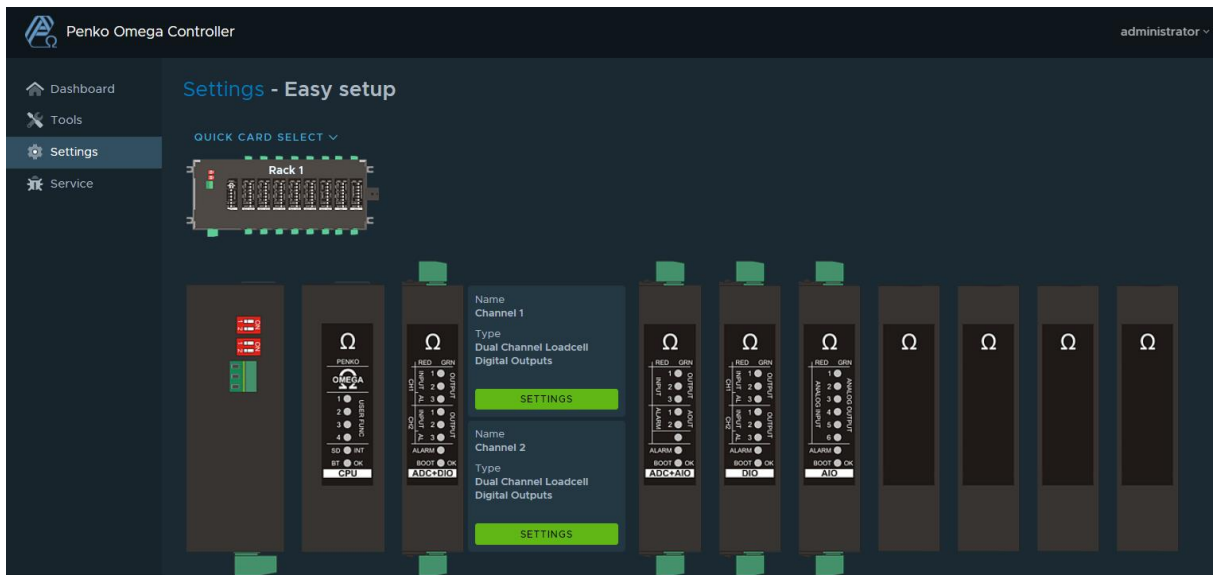
Note: Currently, only the ADC-DIO card is supported in Quick setup. When other cards are ready, support will be added.

After clicking the Easy setup tile, start by selecting a card. Click the picture of the card you want to control. The easy setup only provides the most used settings, for more specific settings not covered here the advanced Setup can be used.

Omega manual



After selecting the card, the required channel must be selected by clicking its settings button.



It can take several seconds before weigher data is shown and the page selection is enabled. When the page selectors are grey, the Omega CPU is still requesting data from the selected channel.

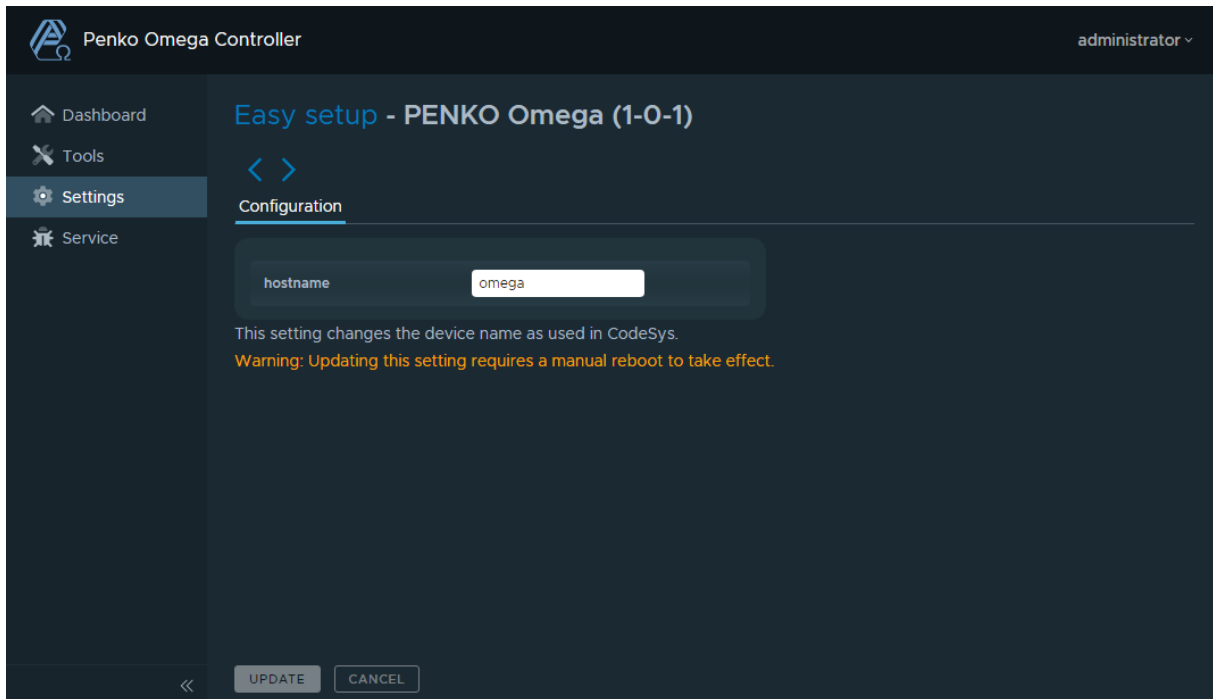
The easy setup is different options (pages) for each type of cards.

- CPU: Configuration (CODESYS PLC settings)
- ADC+AIO card: display, weigher settings, weigher filters and calibration
- ADC+DIO card: display, weigher settings, weigher filters and calibration
- DIO card: display
- AIO card: display, configuration, and manual

Omega manual

Configuration

Change the omega hostname as shown in the CODESYS IDE.



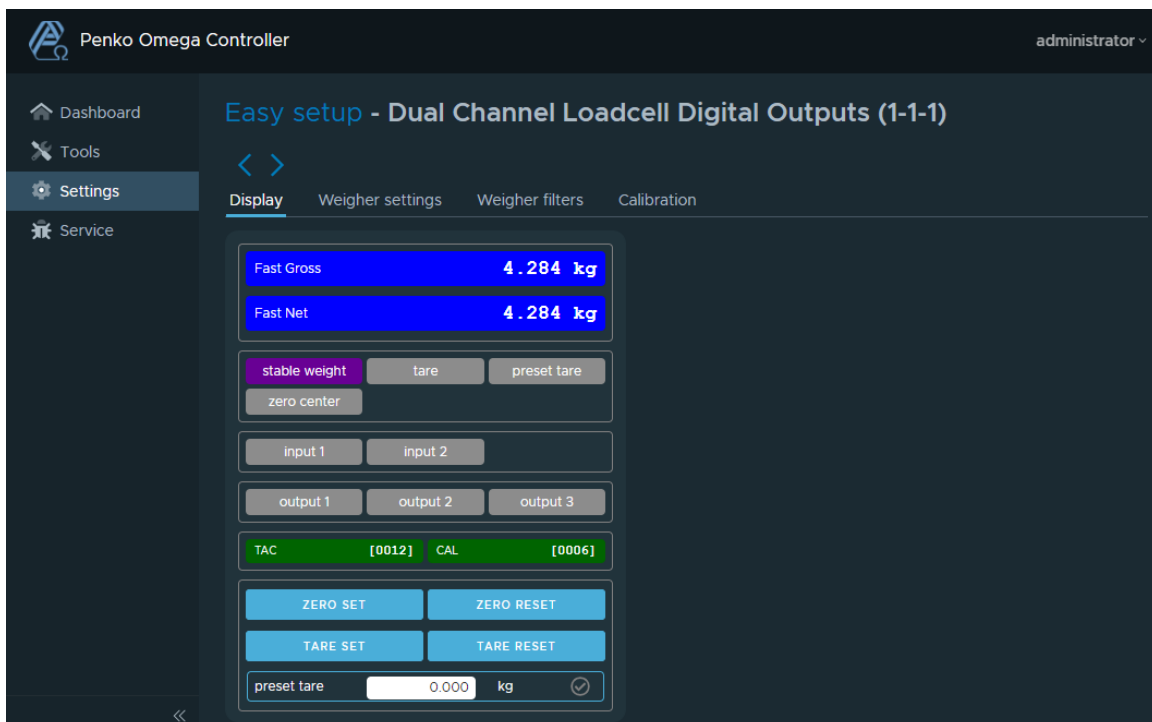
Display

Shows the weight indication and status of the channel.

The bottom shows an input field for manual control of Zero and Tare functions.

When the channel is not yet calibrated the weight is shown as "cccccc".

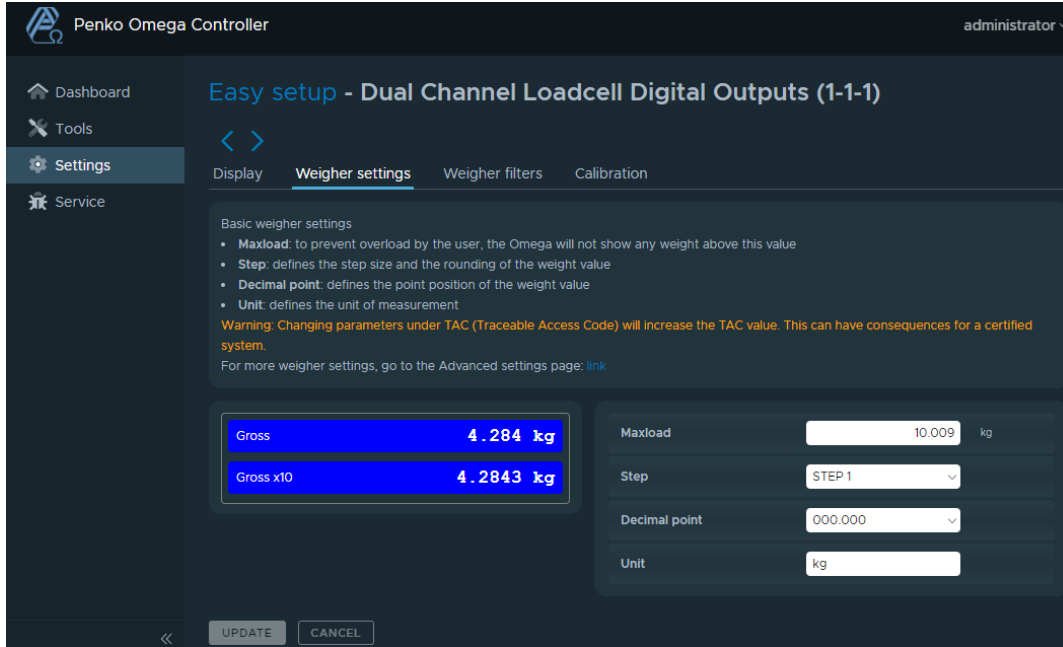
The blue arrows <> can be used to navigate to the next/previous channel and card.



Omega manual

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 Omega 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 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.

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.

Omega manual

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

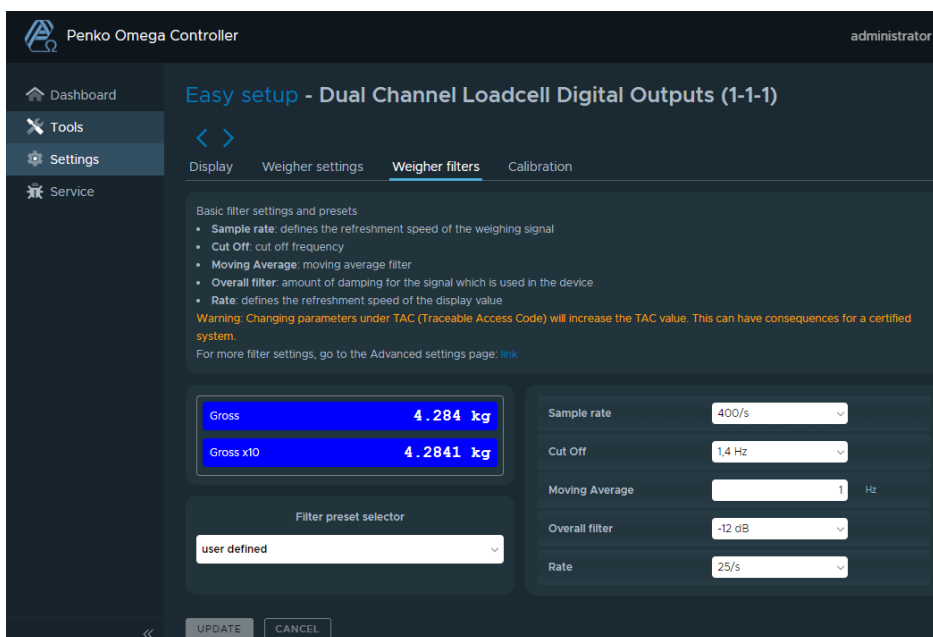
Filters are used because in an industrial environment there are always vibrations:

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

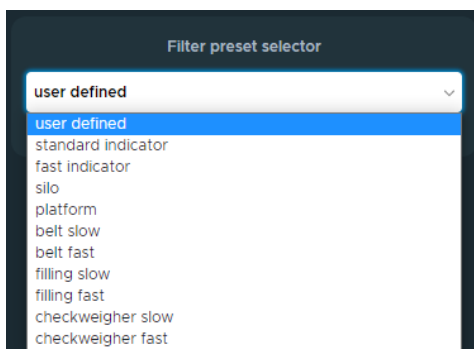
The purpose of a filter is to get the most steady and reliable weighing signal.

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.



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.

Omega manual

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 is able to 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 the halve 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.

Overall Filter:

The overall filter effects 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 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:

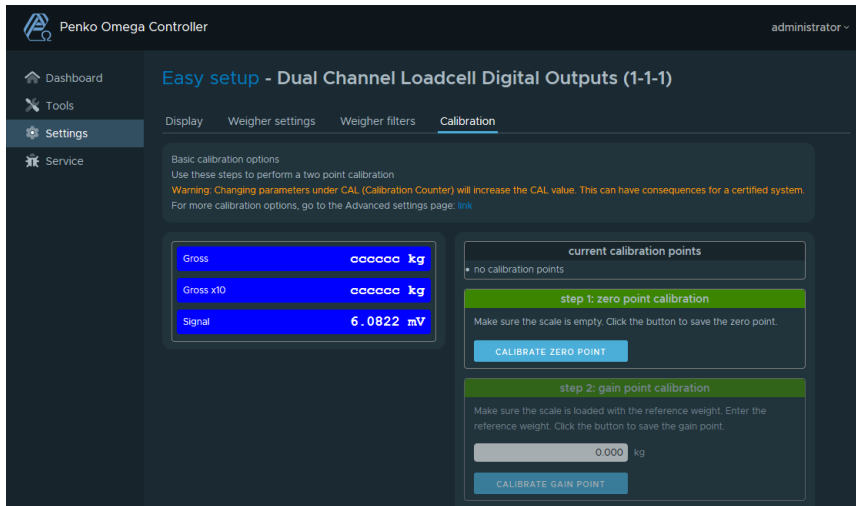
This selects the Display refreshment speed. The Display refreshment speed defines the times the weigher value is refreshed per second. Although the weighing system speed can be higher, when displaying a changing value which is updated too fast it can become unreadable. Options are: 1, 2, 3, 5, 10, 25,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

CALIBRATION

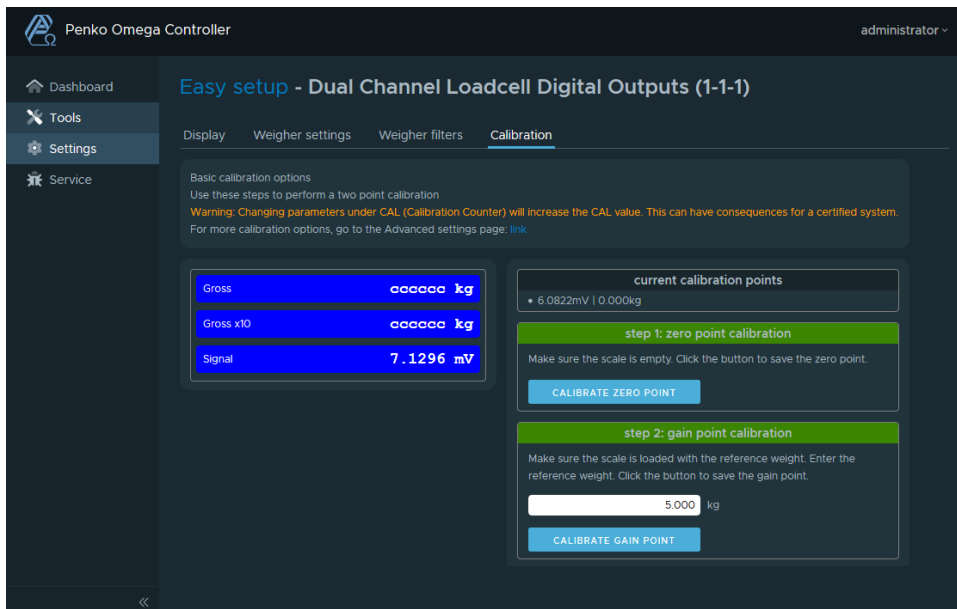
When performing a calibration, the CAL code is incremented to indicate a change in calibration. In systems certified for trade use this means the system certification needs to be updated.

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".

Omega manual



After storing the zero point, and 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

Omega manual

The screenshot displays the 'Penko Omega Controller' web interface. The top navigation bar includes the Penko logo, the text 'Penko Omega Controller', and a user profile 'administrator'. A left sidebar contains menu items: 'Dashboard', 'Tools', 'Settings' (highlighted), and 'Service'. The main content area is titled 'Easy setup - Dual Channel Loadcell Digital Outputs (1-1-1)' and has sub-tabs for 'Display', 'Weigher settings', 'Weigher filters', and 'Calibration' (selected). Below the tabs, there is a section for 'Basic calibration options' with a warning: 'Warning: Changing parameters under CAL (Calibration Counter) will increase the CAL value. This can have consequences for a certified system. For more calibration options, go to the Advanced settings page: link'. To the left, a table shows current values: Gross (5.026 kg), Gross x10 (5.0255 kg), and Signal (7.1302 mV). To the right, 'current calibration points' are listed: 6.0822mV | 0.000kg and 7.1249mV | 5.000kg. Below this, 'step 1: zero point calibration' includes instructions and a 'CALIBRATE ZERO POINT' button. 'step 2: gain point calibration' includes instructions, a weight input field set to '5.000 kg', and a 'CALIBRATE GAIN POINT' button.

| Parameter | Value |
|-----------|-----------|
| Gross | 5.026 kg |
| Gross x10 | 5.0255 kg |
| Signal | 7.1302 mV |

current calibration points

- 6.0822mV | 0.000kg
- 7.1249mV | 5.000kg

step 1: zero point calibration

Make sure the scale is empty. Click the button to save the zero point.

CALIBRATE ZERO POINT

step 2: gain point calibration

Make sure the scale is loaded with the reference weight. Enter the reference weight. Click the button to save the gain point.

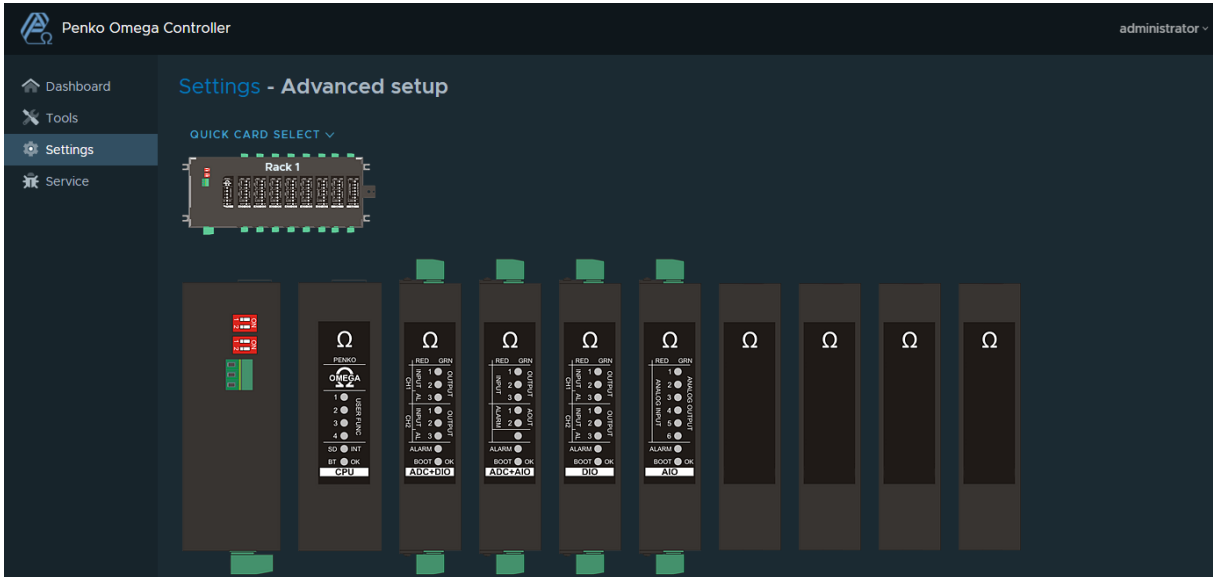
5.000 kg

CALIBRATE GAIN POINT

Omega manual

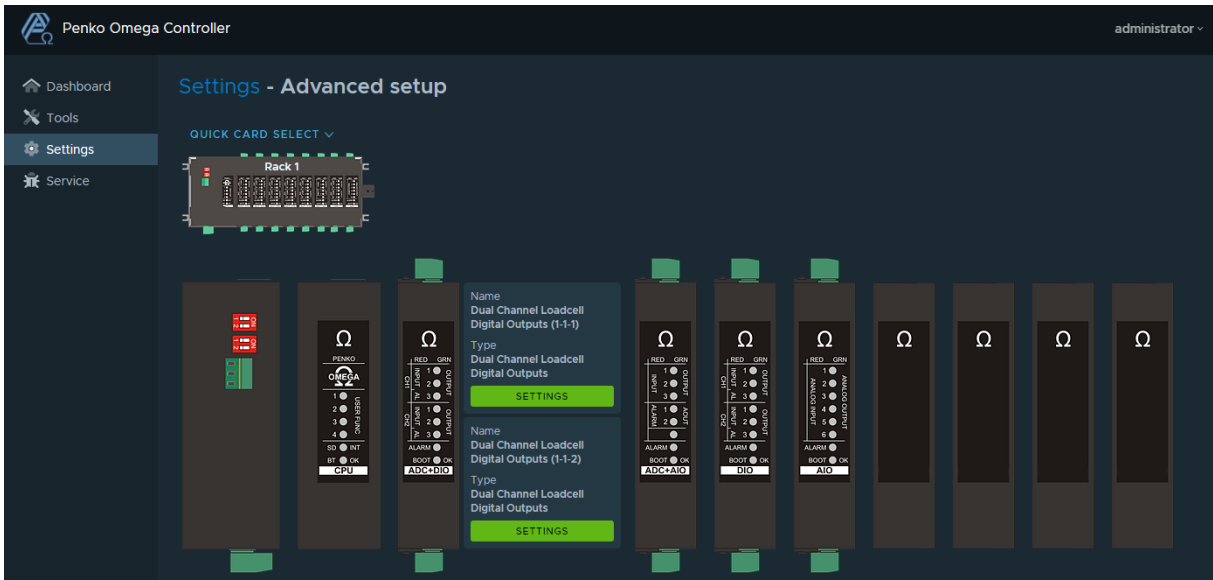
ADVANCED SETUP

This menu gives access to all settings of all Omega cards. When logged in as administrator it is possible to change the setup. Operators can only view the setup but not change it. To access and change some settings, a service code, TAC or CAL code is required to enable settings that influence the calibration or weighing system configuration.



Each omega modules contains its own advanced settings. To access the advanced settings, press on the desired card. For each channel of the selected card an option appears to access the settings. The top block is channel 1 and the bottom block is channel 2.

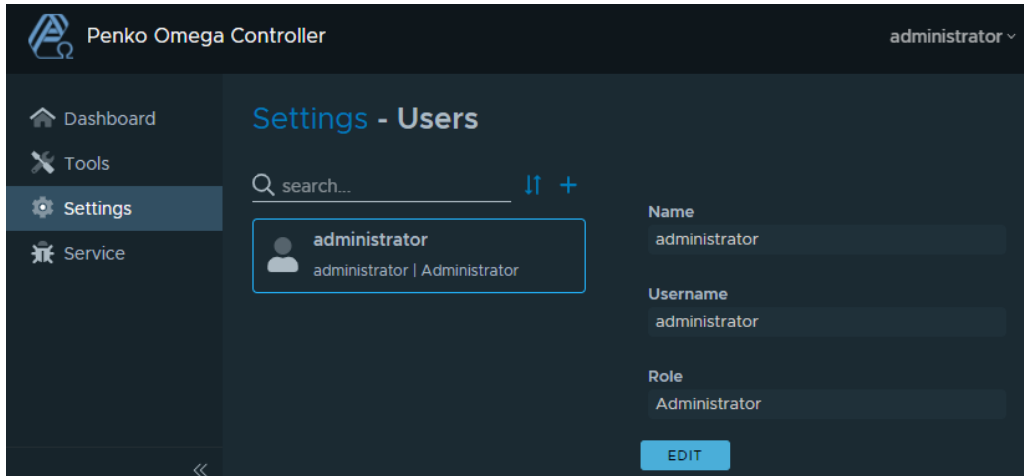
The CPU module is the only module that is having only one settings button.



Omega manual

USERS

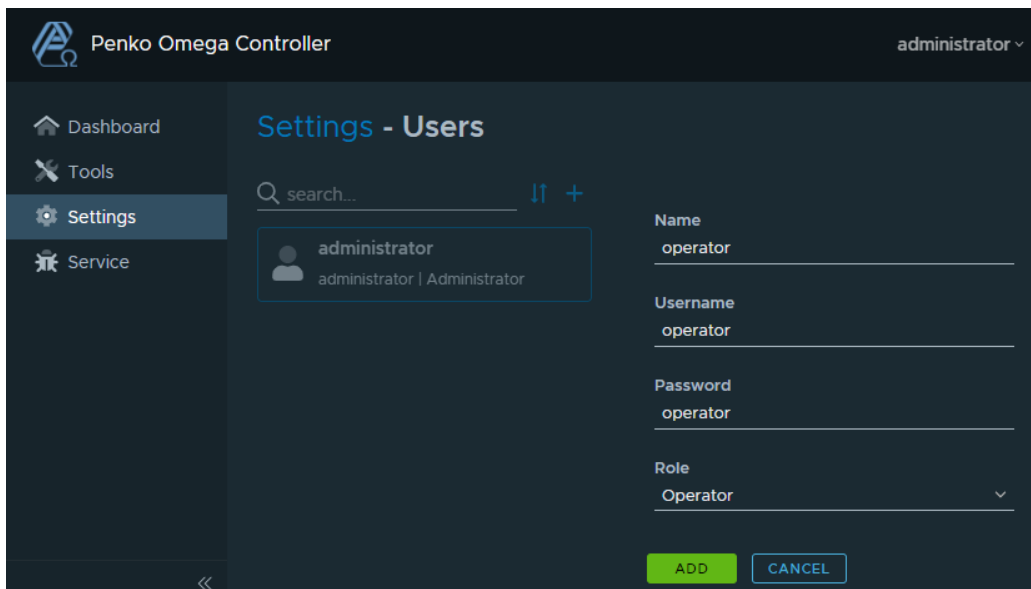
This menu is only available after logging in as administrator. This menu is used to add, delete, or change user access to the system.



By Pressing the + symbol, a new user can be added.

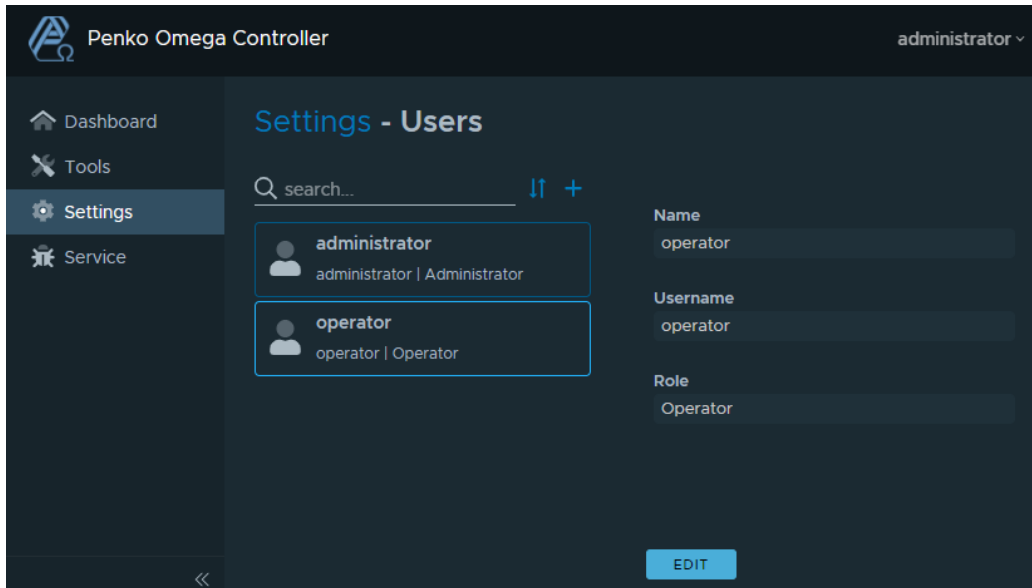
The following roles are defined:

| 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 |

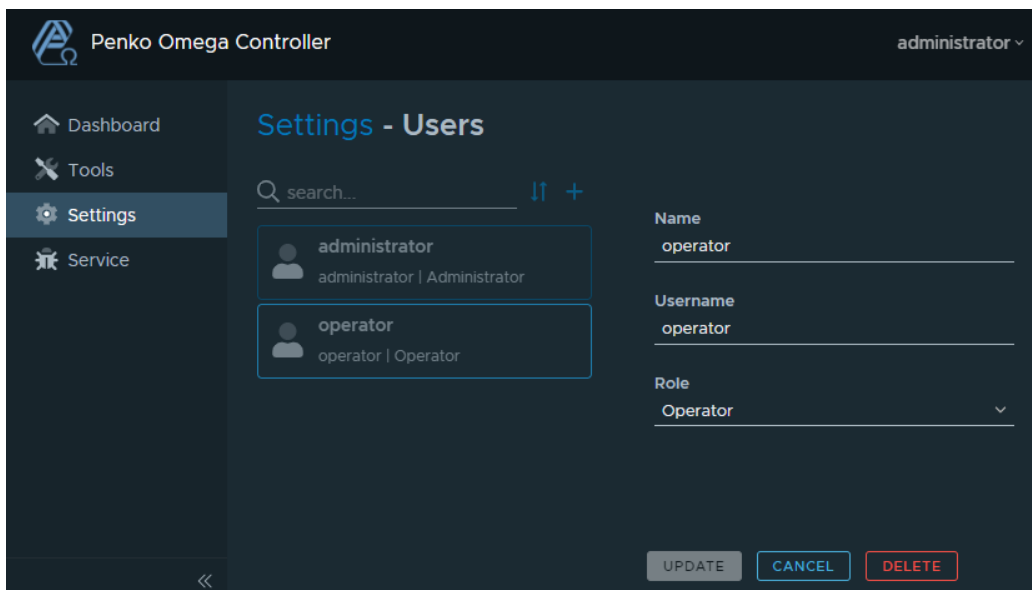


After pressing "ADD" the new user is shown in the list.

Omega manual



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 its own user settings.



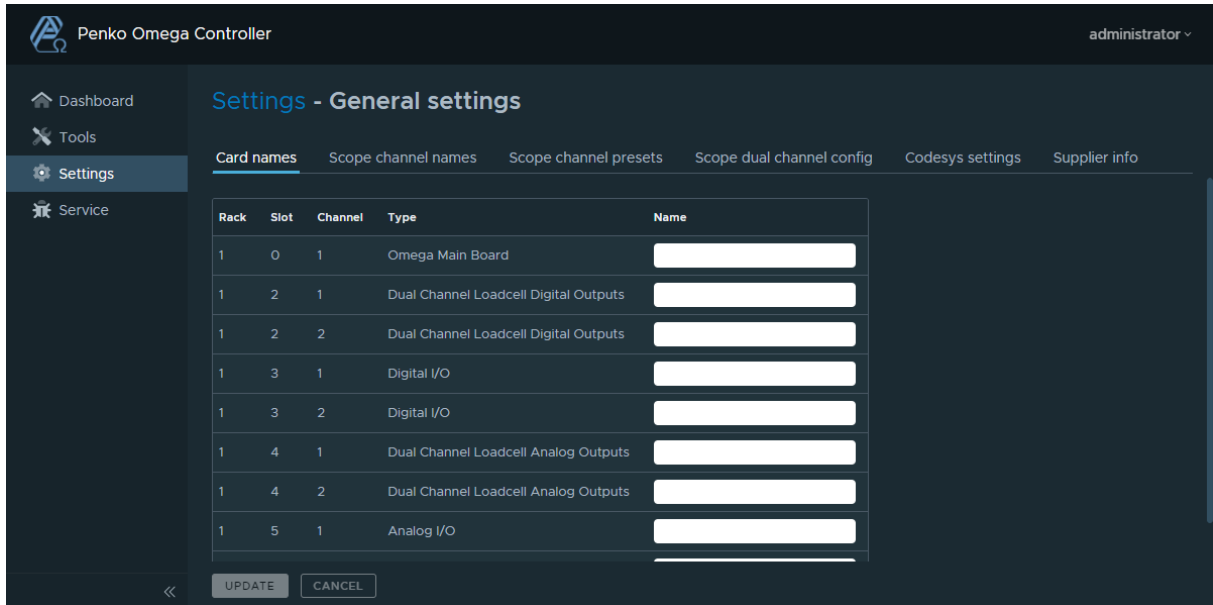
Omega manual

GENERAL SETTINGS

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

CARD NAMES

All cards currently inserted are listed, for all connected racks. The listed names can be changed to user preferences. Default name for a module is the card type. These names are stored on the Omega main board by slot and channel number. Switching cards order e.g. after maintenance doesn't affect these labels.



Penko Omega Controller administrator

Settings - General settings

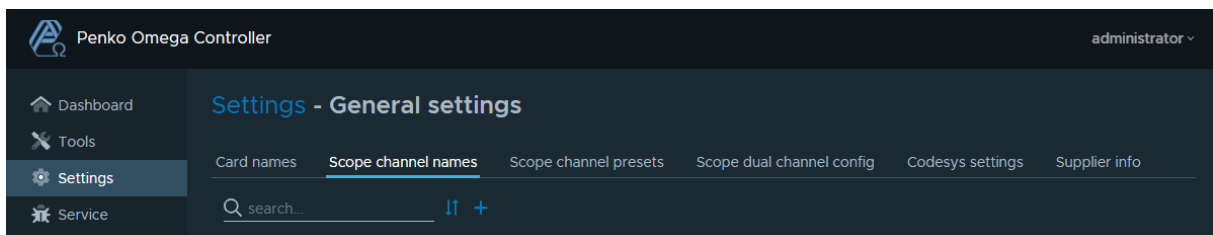
Card names | Scope channel names | Scope channel presets | Scope dual channel config | Codesys settings | Supplier info

| Rack | Slot | Channel | Type | Name |
|------|------|---------|---------------------------------------|----------------------|
| 1 | 0 | 1 | Omega Main Board | <input type="text"/> |
| 1 | 2 | 1 | Dual Channel Loadcell Digital Outputs | <input type="text"/> |
| 1 | 2 | 2 | Dual Channel Loadcell Digital Outputs | <input type="text"/> |
| 1 | 3 | 1 | Digital I/O | <input type="text"/> |
| 1 | 3 | 2 | Digital I/O | <input type="text"/> |
| 1 | 4 | 1 | Dual Channel Loadcell Analog Outputs | <input type="text"/> |
| 1 | 4 | 2 | Dual Channel Loadcell Analog Outputs | <input type="text"/> |
| 1 | 5 | 1 | Analog I/O | <input type="text"/> |

UPDATE CANCEL

SCOPE CHANNEL NAMES

In this menu item it is possible to manage pre-defined channel names (aliases).



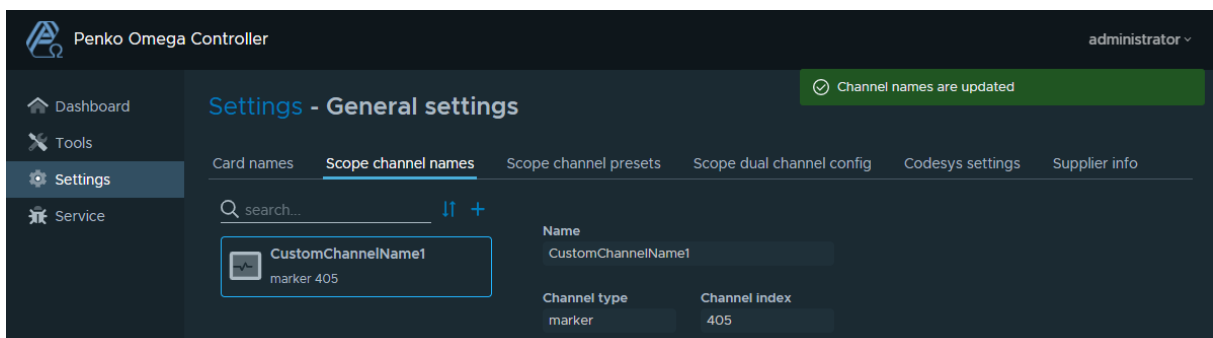
Penko Omega Controller administrator

Settings - General settings

Card names | **Scope channel names** | Scope channel presets | Scope dual channel config | Codesys settings | Supplier info

search... **+**

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.



Penko Omega Controller administrator

Settings - General settings **Channel names are updated**

Card names | **Scope channel names** | Scope channel presets | Scope dual channel config | Codesys settings | Supplier info

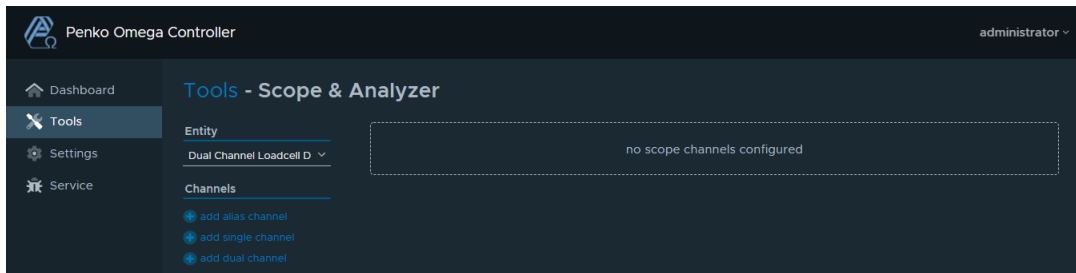
search... **+**

CustomChannelName1
marker 405

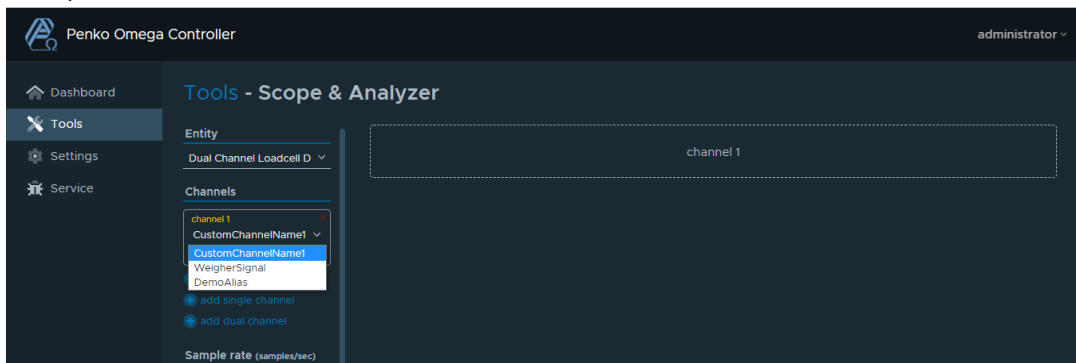
Name: CustomChannelName1
Channel type: marker
Channel index: 405

Omega manual

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.

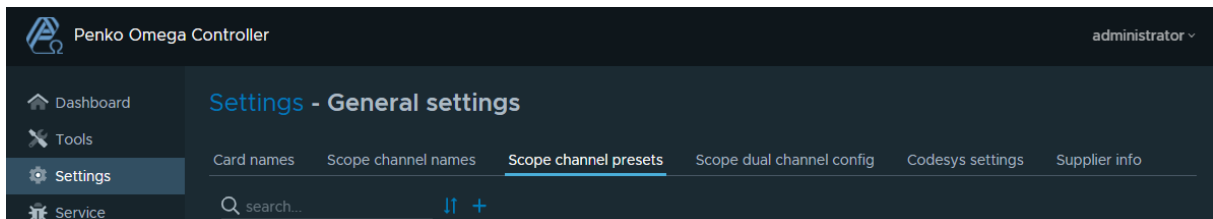


The option "add alias channel" shows the list of known aliases.



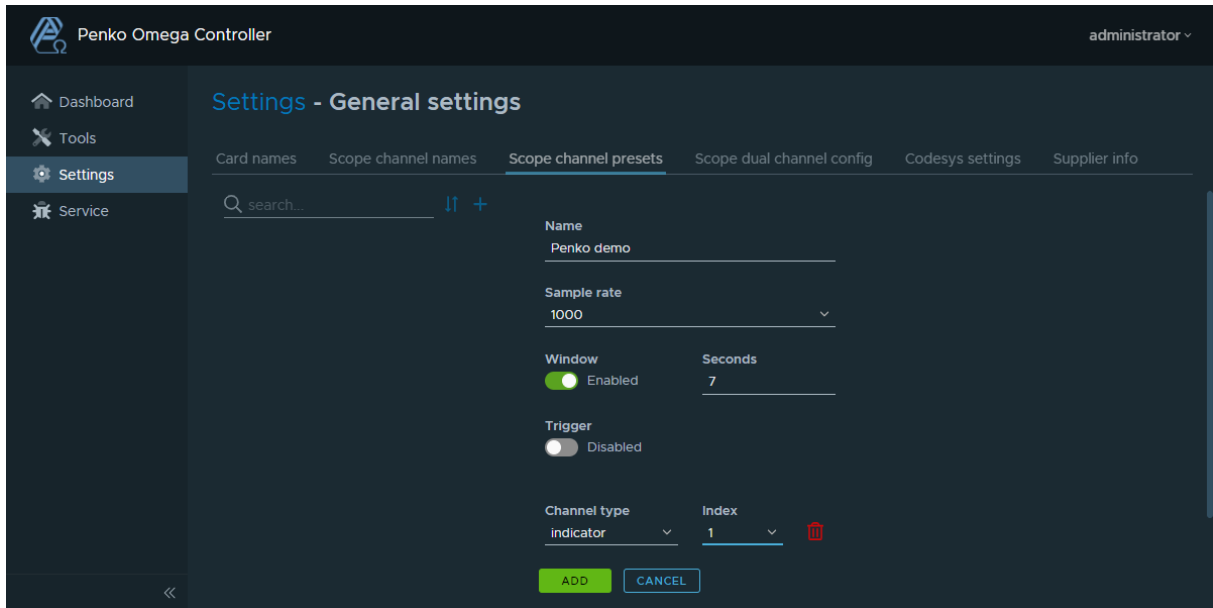
SCOPE CHANNEL PRESETS

In this menu item pre-defined channel configurations can be managed.

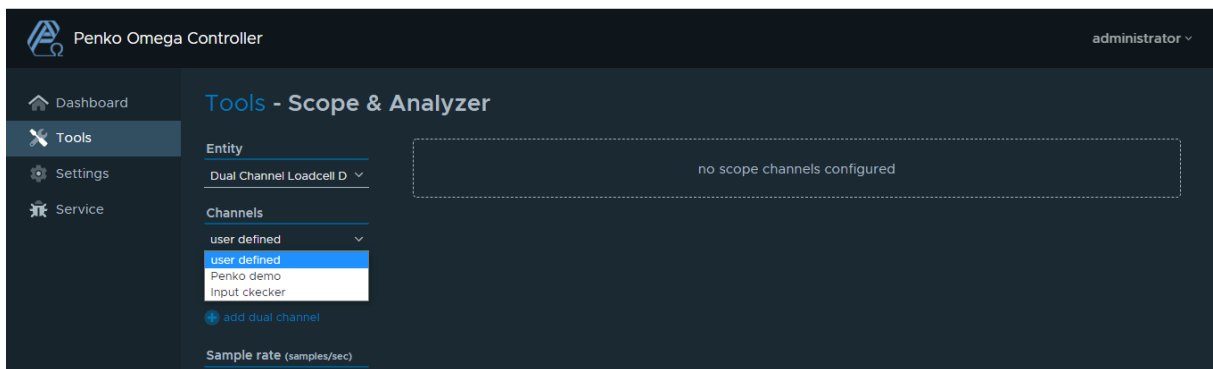


To create a new preset, press the + symbol. Fill-in the name, select the channel type and channel index. The index range varies for each channel type. Add multiple channel types using the green + symbol. To remove an added channel, press the red garbage can. When done, press ADD. Now the channel preset has been created. To change a created preset, select the preset you would like to change or delete, and press EDIT.

Omega manual

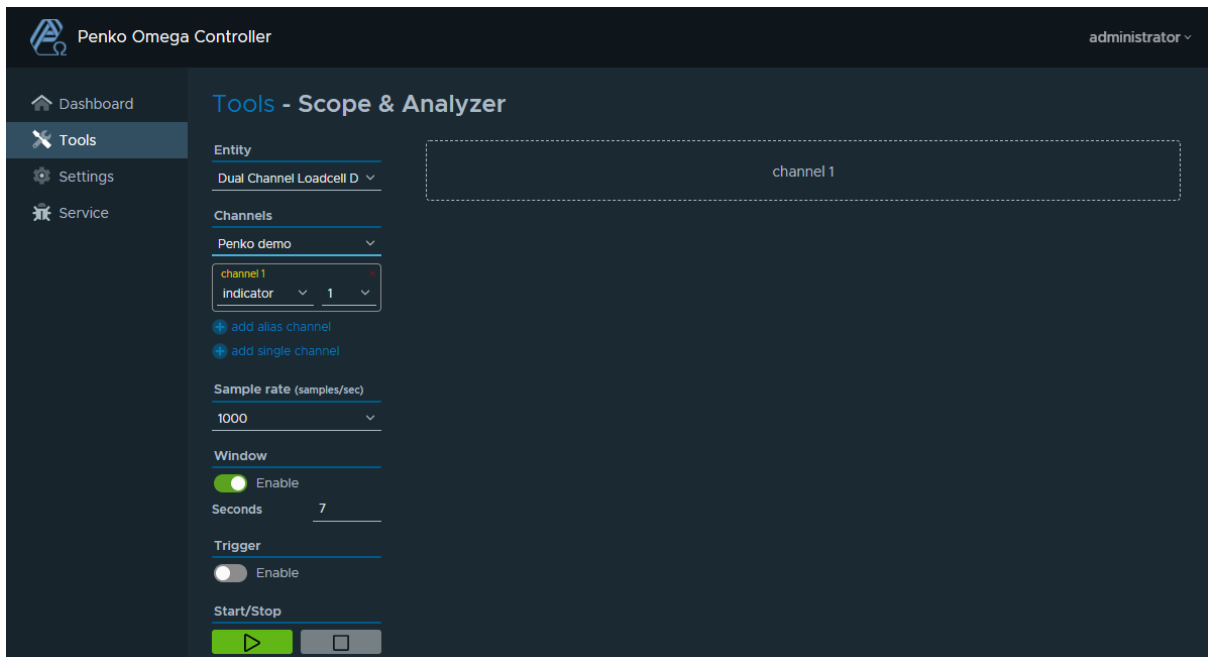


After one or more presets has been created, they can be selected in the scope interface. Go to the Scope & Analyzer menu item.



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.

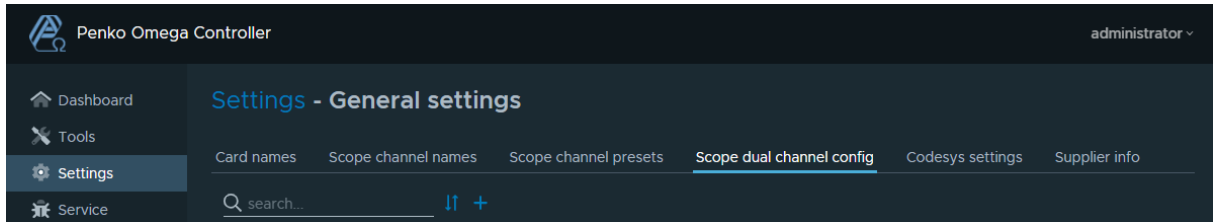
Omega manual



Omega manual

SCOPE DUAL CHANNEL CONFIG

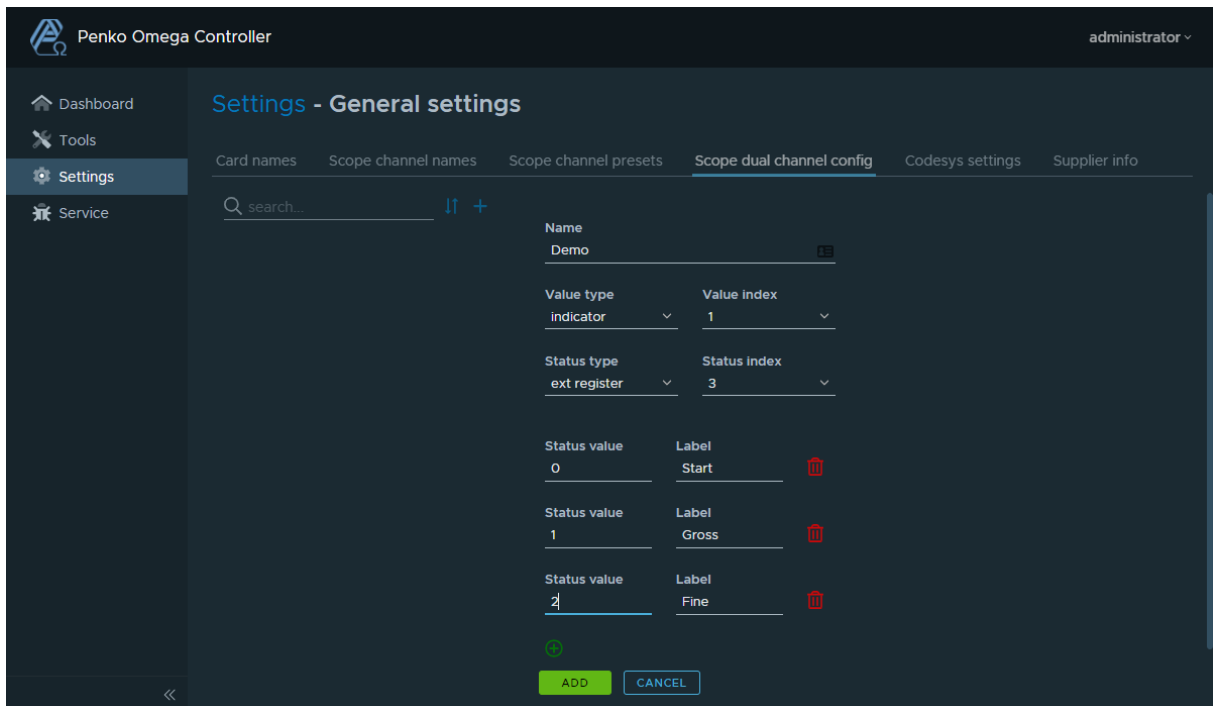
In this menu item pre-defined dual channel configurations can be managed. By default, a demo configuration is shown.



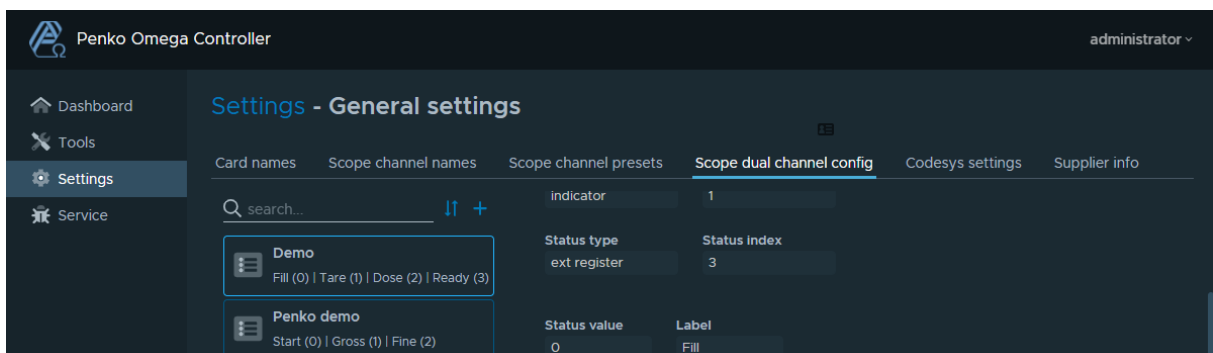
To create a new dual channel preset, press the + symbol. Fill-in the name, select the value type and index. The status type is index is used for the label identification. One or more status values can be created using the green + icon. After creating all the status values, press the ADD button to save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



To change an existing preset, select the preset and press the EDIT button. The selected preset is highlighted with a lighter blue border, in this case the demo preset.



Omega manual

Add a new value or change an existing one. In the example below the status type is changed to ext. register 3 and status value 0 fill has been added. Press UPDATE to save the changes.

| indicator | 1 |
|--------------|--------------|
| Status type | Status index |
| ext register | 3 |
| Status value | Label |
| 0 | Fill |
| 1 | Tare |
| 2 | Dose |
| 3 | Ready |

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 current status value. In the example below all four states (0 = Fill, 1 = tare, 2= dose and 3 = ready) are shown.

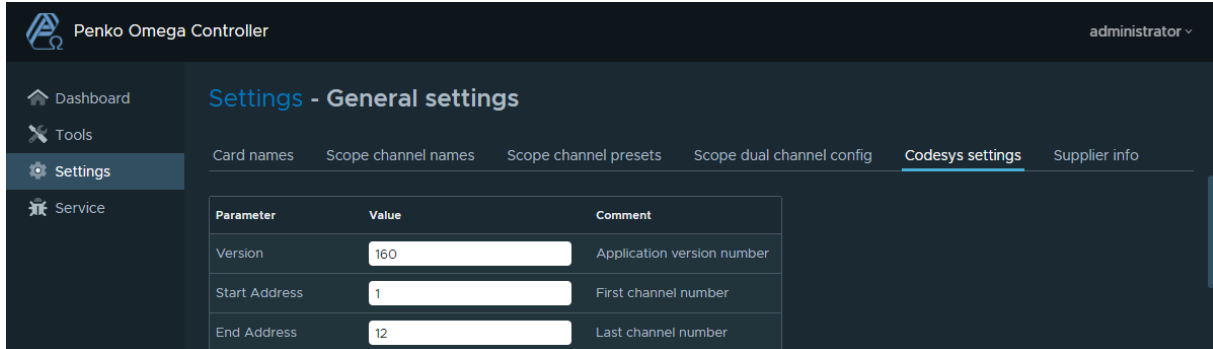
indicator 1 Show range selector Show spectrum analyzer Full size start: 0.0s | range: 16.2s — Fill — tare — dose — ready — ?

| Time (s) | Status | Indicator Value |
|----------|-----------|-----------------|
| 0.0 | Fill (0) | 0 |
| 3.15 | Tare (1) | ~250 |
| 6.3 | Dose (2) | ~450 |
| 9.4 | Ready (3) | ~600 |
| 12.5 | Ready (3) | ~650 |
| 15.6 | Ready (3) | ~650 |

Omega manual

CODESYS SETTINGS

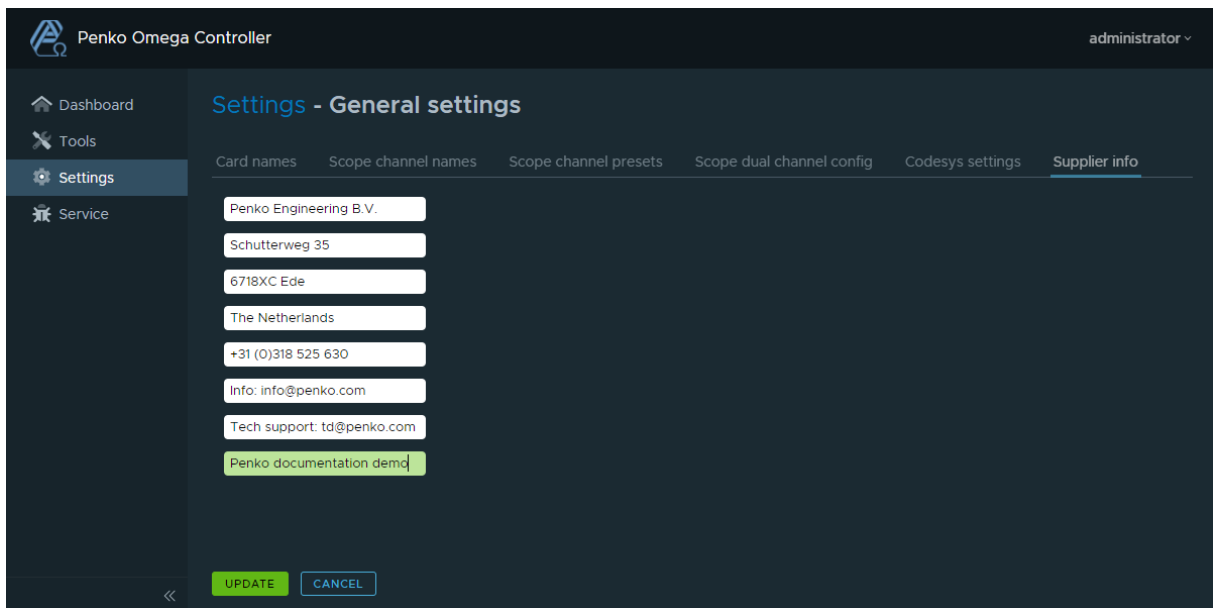
The CODESYS application can have external variables. These variables can be modified through the portal and change the behavior of the PLC software. E.g. adjust filter settings for a channel. These parameters can only be created by the Penko Professional Services department.



| Parameter | Value | Comment |
|---------------|-------|----------------------------|
| Version | 160 | Application version number |
| Start Address | 1 | First channel number |
| End Address | 12 | Last channel number |

SUPPLIER INFO

The shown supplier info under dashboard – information – supplier can be updated in this page. The maximum number of characters is 40 for each field. After editing a field, the background color turns green. To save the changes press the UPDATE button.



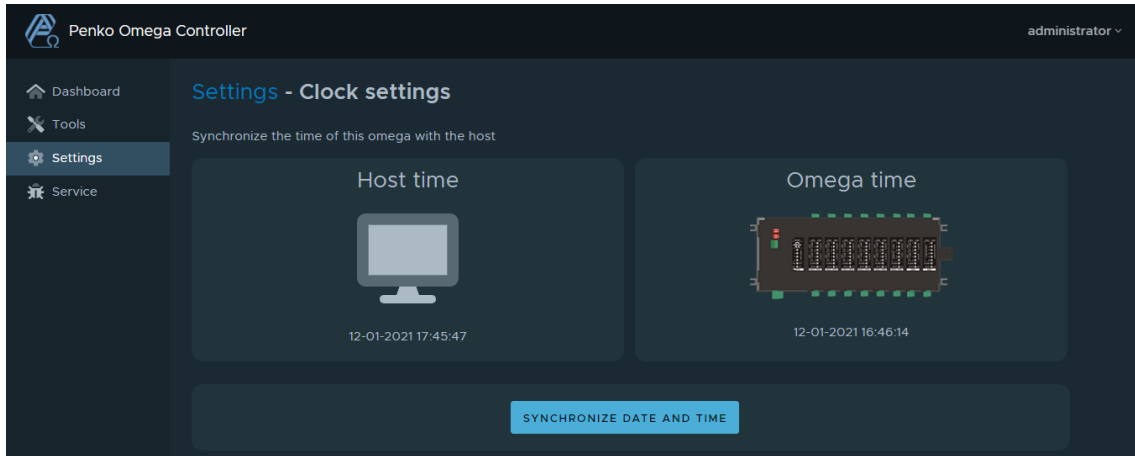
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Tech support: td@penko.com
Penko documentation demq

UPDATE CANCEL

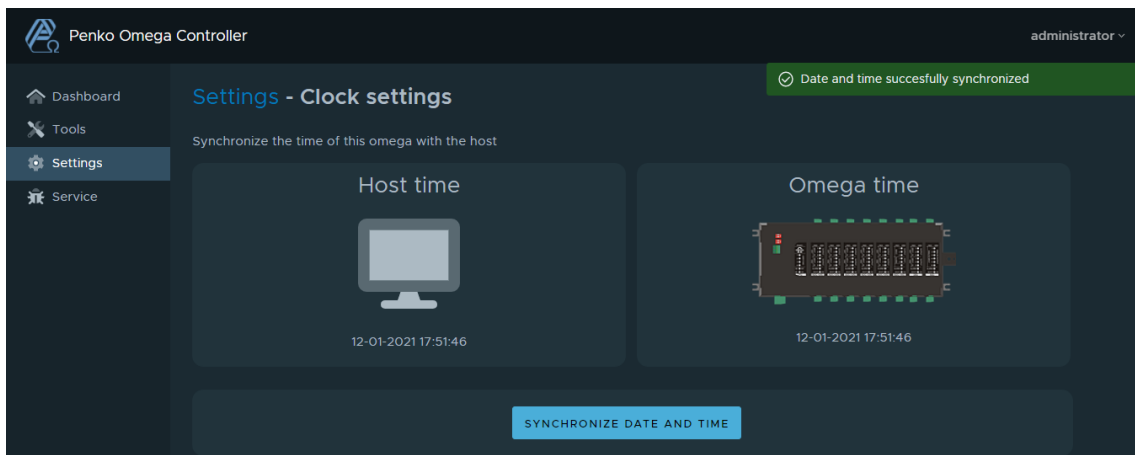
Omega manual

CLOCK SETTINGS

This item can be used to synchronize the Omega clock with the time on the host (device that you are now using). To synchronize the omega time, press the SYNCHRONIZE DATE AND TIME button.



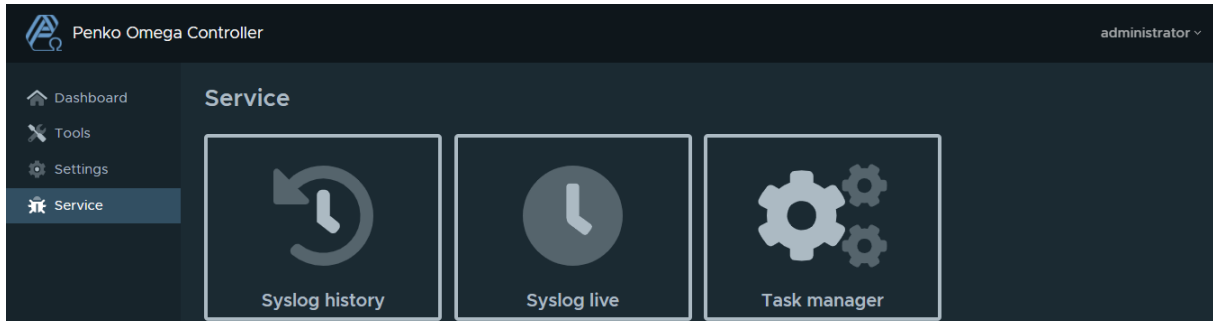
After the button has been pressed, the omega time is the same as the host time. A message in the top right corner is shown when the time is saved.



Omega manual

SERVICE MENU

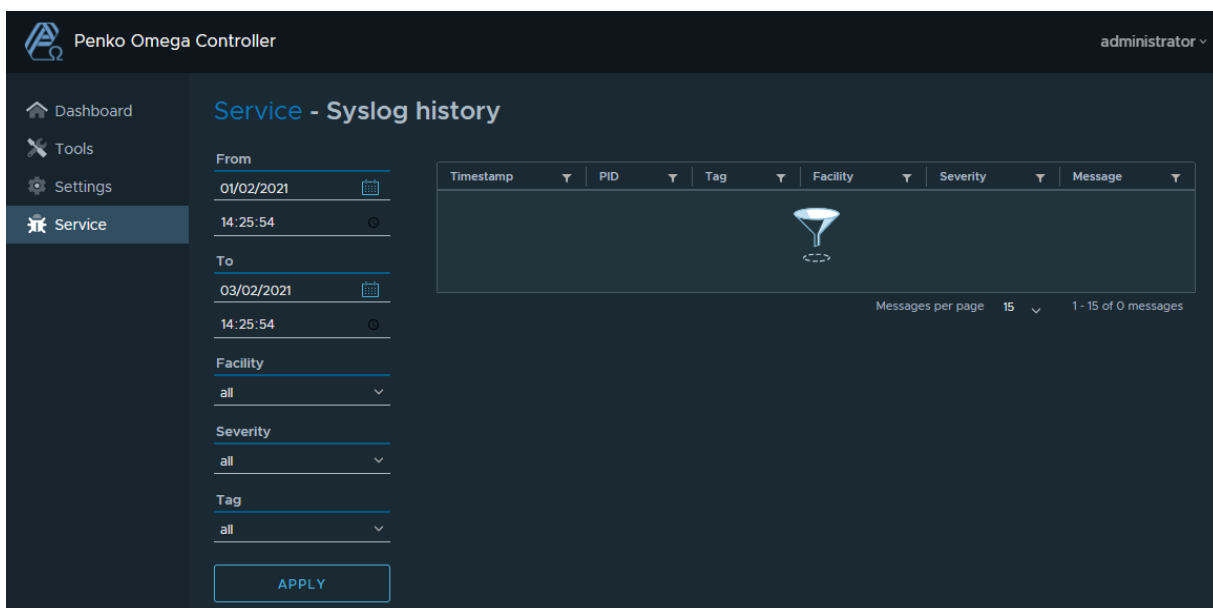
This menu is only available for users with administrator privileges. It is used to follow messages and perform specific tasks within the Omega system.



SYSLOG HISTORY

Syslog shows the logs of the system software running on the Omega operating system. This can be valuable source for information when investigating system problems.

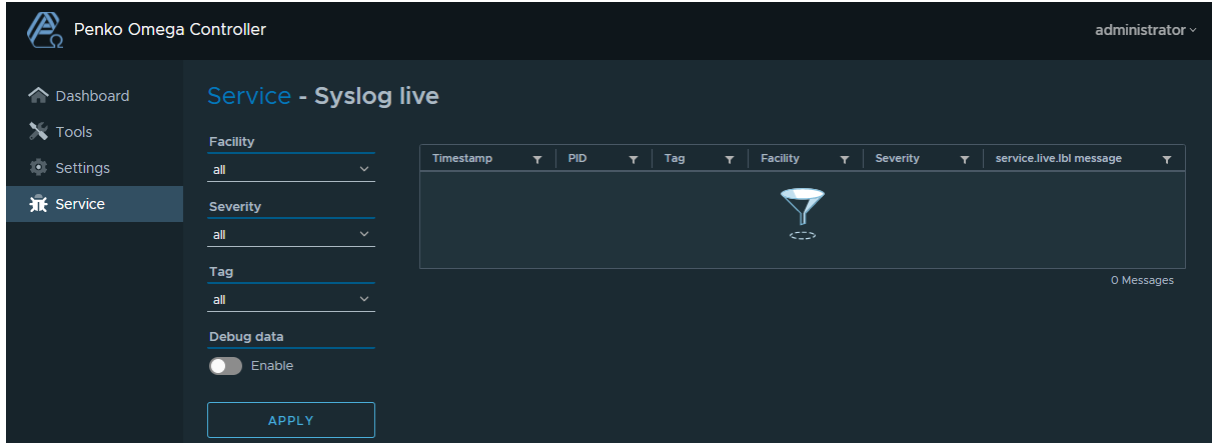
Select the software part (Facility) you want to check or “all”, the severity or “all”, the tag or “all” and click “APPLY” to search the log for error messages.



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SYSLOG LIVE

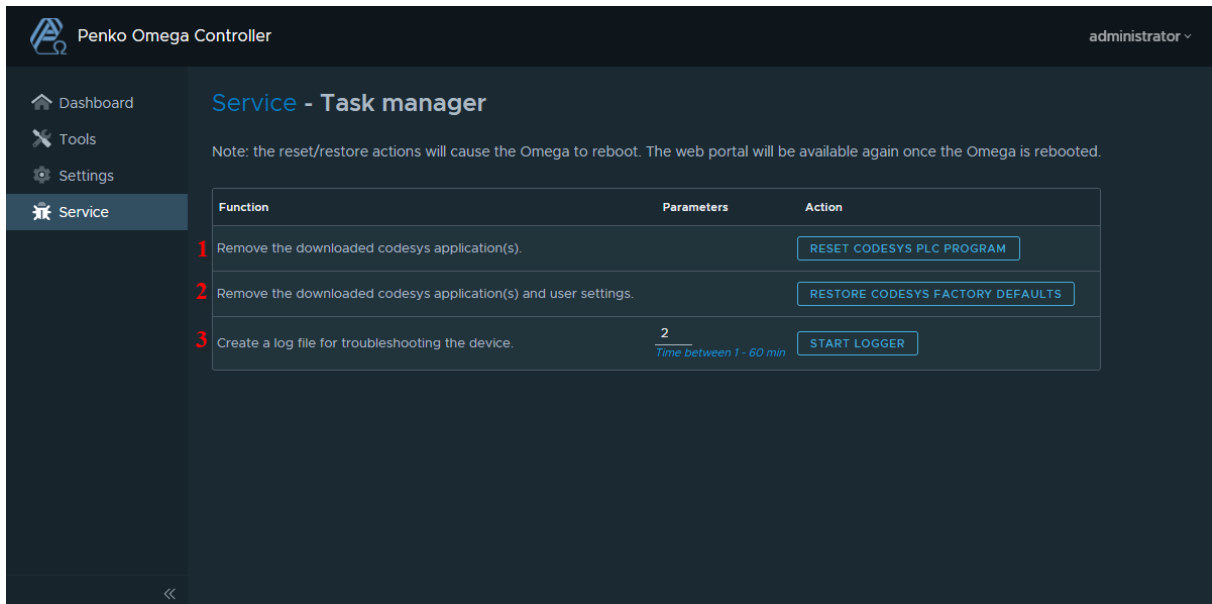
To search for specific system messages while using the Omega, this menu shows system messages as they are generated. Select the software part you want to check or “all”, the severity or “all” and enable the slider and click “APPLY” to start showing system messages.



TASK MANAGER

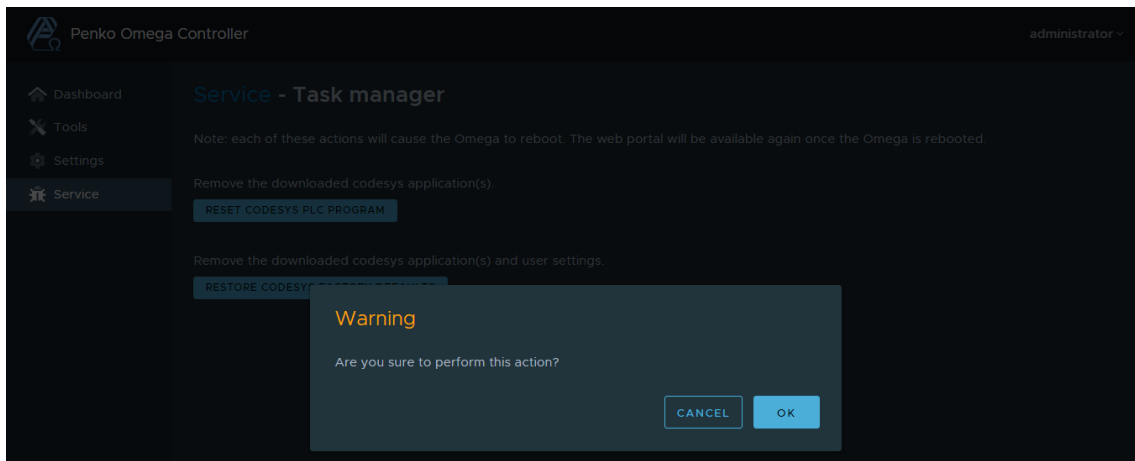
The task manager can be used to reset the CODESYS application and CODESYS user settings to their factory defaults. Only for administrator’s level users. The actions in the task manager cannot be reversed, so be careful! After using one of the actions the omega will automatically be rebooted.

- 1) Reset the CODESYS application from the omega.
- 2) Reset the CODESYS application and corresponding settings and data from the omega.
- 3) Create a logfile with system diagnostics and network communication information.



After pressing an action, a pop-up will appear to confirm the action to prevent an accidental removal of the CODESYS application. After confirmation (OK), the action will be performed.

Omega 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

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

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

PENKO Distributor

A complete overview you will find on: www.penko.com/Find-A-Dealer

