PENKO Engineering B.V. Your Partner for Fully Engineered Factory Solutions

Omega QuickStart manual



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SYSTEM OVERVIEW

The Omega system can consist of multiple rack units. Each rack unit consists of:

- A Bus unit.
- One power supply.
- One CPU module.
- Up to 8 weigher or I/O modules.
- Unused slots are covered by a dummy module.

CONNECTING POWER

The Omega system uses a 24VDC nominal power supply. The applied voltage should be between 18 and 36Volts.



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



CONNECTING A LOADCELL

Each ADC+DIO or ADC+AIO module has two loadcell connections. The loadcell connects as following:





CONNECTING A LAPTOP

A laptop for initial setup can be connected to the USB3 connection of the CPU module. This requires a USB-A to Mini USB-B cable.



Alternately, a laptop can be connected to Ethernet 2.





CONNECTING TO THE FACTORY NETWORK



FIRST POWER UP

After applying power, the unit starts up. The OK led on the CPU lights up RED while in boot mode.

After a few seconds this LED blinks green in a heartbeat pattern to show that the application is running. After approximately 1,5 minutes the SD/INT LED stops flashing, and the unit is ready.

CONNECTING TO THE OMEGA

ETHERNET

When the laptop is connected to the Ethernet 2 port, the Omega will supply an IP address. Open your web browser (Edge, Chrome, Safari or Firefox) and type the address 10.1.2.1. This will open the Omega web interface.

When connected to the Ethernet 1 port, the factory LAN must supply an IP address through DHCP.

USB

When the laptop is connected to the USB3 port, the PC will add a network adapter device over USB. Open your web browser (Edge, Chrome, Safari or Firefox) and type the address 10.54.32.1. This will open the Omega web interface.





The default login is:

Username: administrator Password: administrator

Then click LOGIN

After successful login the dashboard is shown:

Penko Omega	Controller			administrator ~
Dashboard	Dashboard			
Settings	Information	My Omega	Option cards overview	
	CODESYS WebVisu	CODESYS Downloads		
«				

Click on "My Omega" to show an overview of the installed components.



Penko Omega	Controller										
Dashboard Dashboard Tools Settings	Dasht	Rack	- My Om	nega	_						
						Ω	Ω	Ω	Ω		
	Rack	Slot	Channel	Туре		Name			Firmwan	e version	Boot version
						Omega Main Bo					
				Dual Channel Loadcell Digital Outpu Dual Channel Loadcell Digital Outpu	its its	Dual Channel Lo Dual Channel Lo	adcell Digital O adcell Digital O	utputs utputs			
				Digital I/O Digital I/O		Digital I/O Digital I/O					
				Analog I/O Analog I/O		Analog I/O Analog I/O					
				Analog I/O Analog I/O 		Analog I/O Analog I/O 					
				Analog I/O Analog I/O 		Analog I/O Analog I/O 					
				Analog VO Analog VO 		Analog I/O Analog I/O 					
				Analog VO Analog VO 		Analog I/O Analog I/O 					

Click on "option cards overview" To shows a quick overview of all available channels. All weight, input output and status indicators are live values.

Penko Omega Controller						
A Dashboard	Dashboard - Optic	on cards overview				
🗙 Tools 💿 Settings	Dual Channel Loadcell Digital Outputs	Digital I/O	Analog I/O			
🛣 Service	Weigher					
	Fast Gross					
	stable weight tare	input 1 input 2	analog input 1 0%			
	preset tare Zero center	Input 3 Input 4	analog input 2 0%			
	output 1 output 2	output 3 output 4	analog output 7 0%			
	output 3	output 5 output 6				
		counter 1 0 counter 2 0				
	Dual Channel Loadcell Digital Outputs	Digital I/O	Analog I/O			
	Weigher 0.898 kg					
	Fast Gross 0.898 kg					
	stable weight tare	input 1 input 2	analog input 1 0%			
	preset tare zero center	input 3 input 4	analog input 2 0%			
	input 1 input 2	output 1 output 2	analog output 1 0%			
	output 1 output 2	output 3 output 4	analog output 2 0%			
	output 3	output 5 output 6				
		counter 1 0 counter 2 0				

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This example contains:

- dual loadcell and digital io module
- Digital I/O module
- Analog I/O module

Only the loadcell inputs are used to show a weight.

When a weigher is shown as "-----" the following things can be wrong:

- No loadcell is connected.
- The loadcell is Wired wrong.
- Weight is above the maximum load.
- Weight is below the minimum load.
- The channel is not calibrated.

Click on "Settings", followed by "Easy Setup"





USING EASY SETUP TO CALIBRATE WEIGHERS

Penko Omega	Controller								ad	iministrator ~
Dashboard Tools Constructed C	Settings - Ea	asy setur	þ							
				Name Dual Channel Loadcell Digital Outputs (1-1-1) Type Dual Channel Loadcell Digital Outputs SETTINGS Name Dual Channel Loadcell Digital Outputs (1-1-2) Type Dual Channel Loadcell Digital Outputs (1-2) SETTINGS		Ω	Ω	Ω	Ω	Ω

Now click on the "SETTINGS" for the "Dual Channel Loadcell Digital Outputs(1-1-1)" to start the setup for channel 1 of the first card.

The display tab shows that this channel has no valid weight "------"



The Weigher settings tab allows changing the maximum load, display step, decimal point position and the weight unit. The weigher can be configured to show up to 3000 counts for certified installation or up to 10.000 counts for non-certified installations. Step sizes larger than 1 can be used to reduce the number of counts. Set the maxload and decimal point accordingly.



$\langle \rangle >$						
Display	Weigher settings	Weigher filters	Calib	pration		
Basic weigher settings • Maxload: to prevent overload by the user, the Omega will not show any weight above this value • Step: defines the step size and the rounding of the weight value • Decimal point: defines the point position of the weight value • Unit: defines the unit of measurement Warning: Changing parameters under TAC (Traceable Access Code) will increase the TAC value. This can have consequences for a certified system. For more weigher settings, go to the Advanced settings page: link						
Gross		cccccc kg		Maxload		10.009 kg
Gross x10)	cccccc kg		Step	STEP 1	~
				Decimal point	000.000	~
				Unit	kg	

This tab shows the weight as "cccccc" which indicates the weigher is not correctly calibrated.

The Weigher filters tab allows fine tuning the weigher for different uses. Under "Filter preset selector" several standard use cases can be selected which fill in the appropriate parameters.

Display Weigher settings Wei	gher filters C	alibration				
Basic filter settings and presets • Sample rate: defines the refreshment speed of the weighing signal • Cut Off: cut off frequency • Moving Average: moving average filter • Overall filter: amount of damping for the signal which is used in the device • Rate: defines the refreshment speed of the display value Warning: Changing parameters under TAC (Traceable Access Code) will increase the TAC value. This can have consequences for a certified system.						
For more filter settings, go to the Advanced	d settings page: link					
Gross Co	cccc kg	Sample rate	1600/s ~			
Gross x10 Cr	cccc kg	Cut Off	2,5 Hz ~			
		Moving Average	50 Hz			
Filter preset selector	Ŷ	Overall filter	0 dB v			
		Rate	25/s ~			

The filter parameters influence the reaction of the loadcell so this must be selected before calibrating the loadcell.

Filter preset selector
user defined
user defined
standard indicator
fast indicator
silo
platform
belt slow
belt fast
filling slow
filling fast
checkweigher slow
checkweigher fast
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The Calibration tab is used to do a simple two-point calibration. The signal is at 0.0031mV which is close to 0mV. When a weight is applied to the loadcell this number will increase. The maximum loadcell output will be 20mV.

The frame "Current calibration points" shows that there are no calibration points yet, so we must enter these first.

Display	Weigher settings	Weigher filters	Calibration
Basic calib Use these Warning: C For more c	ration options steps to perform a two po hanging parameters unde alibration options, go to tl	int calibration r CAL (Calibration Co ne Advanced settings	unter) will increase the CAL value. This can have consequences for a certified system. page: link
Cross		aaaaaa ka	current calibration points
Gross		CCCCCC Kg	no calibration points
Gross x1	0	cccccc kg	step 1: zero point calibration
Signal		0.0031 mV	Make sure the scale is empty. Click the button to save the zero point.
			CALIBRATE ZERO POINT
			0.000 kg
			CALIBRATE GAIN POINT

With the loadcell mounted to the weigher and no load on the scale, wait until the signal is stable and then click "Calibrate zero point" to store the signal at no load.

After a few seconds one calibration point will be shown.

After this, load the scale to close to its maximum load. Less weight can be used but this reduces the accuracy.

Enter the actual load placed on the scale. Leaving this value as 0 will overwrite the zero point calibration!

Wait until the signal is stable again and click "Calibrate gain point"

Display	Weigher settings	Weigher filters	Calibration
Basic calibr Use these s Warning: C For more c	ation options steps to perform a two po hanging parameters unde alibration options, go to th	int calibration r CAL (Calibration Cou e Advanced settings p	nter) will increase the CAL value. This can have consequences for a certified system. bage: link
Gross Gross x1 Signal	0	cccccc kg cccccc kg 9.9897 mV	current calibration points • 0.0031mV 0.000kg step 1: zero point calibration Make sure the scale is empty. Click the button to save the 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. 10.000 kg CALIBRATE GAIN POINT



When the two points are too close together in either weight or signal, the message "Gain overflow" will be shown.

After a few seconds the gross will show the actual weight and gross x10 shows the higher resolution internal weight before rounding. Calibration for this channel is now complete.

Gross	10.000 kg
Gross x10	9.9999 kg
Signal	9.9897 mV

Using the buttons it is possible to switch directly between weighers so we can switch to channel 2.

Check and adjust the "weigher settings" and "weigher filters" and repeat the zero and gain calibration for this channel to overwrite the old calibration points.

Easy setup - Dual	Channel Loa	dcell Digital Outputs (1-1-2)
$\langle \rangle$		
Display Weigher settings	Weigher filters	Calibration
Basic calibration options Use these steps to perform a two p Warning: Changing parameters un For more calibration options, go to	point calibration der CAL (Calibration Cou the Advanced settings p	nter) will increase the CAL value. This can have consequences for a certified system. page: link
Gross	0.898 kg	current calibration points • 0.4439mV 0.000kg • 4.9975mV 2.000kg
Signal	2.4876 mV	step 1: zero point calibration
		Make sure the scale is empty. Click the button to save the 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.
		0.000 kg CALIBRATE GAIN POINT



Penko Omega	Controller		
A Dashboard	Dashboard - Optio	on cards overview	
≫ Tools ゆ Settings 斎 Service	Dual Channel Loadcell Digital Outputs Weigher 10.000 kg Fast Gross 10.000 kg	Digital I/O	Analog I/O
	stable weight tare preset tare zero center input 1 input 2 output 1 output 2 output 3 output 3	input 1 input 2 input 3 input 4 output 1 output 2 output 3 output 4 output 5 output 6 counter 1 0	analog input 1 0% analog input 2 0% analog output 1 0% analog output 2 0%
	Dual Channel Loadcell Digital Outputs Weigher 10.000 kg Fast Gross 10.000 kg	Digital I/O	Analog I/O
	stable weight tare preset tare zero center input 1 input 2 output 1 output 2 output 3	input 1 input 2 input 3 input 4 output 1 output 2 output 3 output 4 output 5 output 6 counter 1 0	analog input 1 0% analog input 2 0% analog output 1 0% analog output 2 0%

Return to "Dashboard->Option cards overview", there the correct weight values are now shown:

NEXT STEPS

The Omega system is modular and programmable for any weighing and PLC function. More features for each module are available under "Settings->Advanced setup". To use this please read "7600M1082-EN-R9 Manual Omega" which also describes all modules and their connections.

To check if the Omega system is shipped with a CodeSys license go to "Dashboard->information" and the "Device status" tab. The CPU module will have a silver CodeSys label with the same number on it.

Penko Omega	Controller	
Dashboard X Tools	Dashboard - Information	
Settings	Device status Supplier Manufacturer	License Agreements
🛣 Service	Device status The current device status information.	
	Item	State/value
	CODESYS license file	License file exists
	CODESYS license number	102497516

To install the CodeSys programming environment on your PC, see "7600M1083-EN-R2 Manual CODESYS".

UPDATING THE OMEGA FIRMWARE

If needed the omega system firmware can be updated. For this you need several files:

- An .swu file for the main processor
- A .pip file for each type of module.

These files can be provided on request by our Professional Services department.

The CPU module can be updated from the "tools" menu.

Penko Omega	Controller		
A Dashboard	Tools		
🗙 Tools	Option cards		
Settings			
Ĥ Service			
	Scope & Analyzer	Firmware update	Backup & Restore
	Operating System (OS)		
	Files	System update	

Then click "System update".

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Penko Omega	Controller administrator ~
Dashboard Tools Settings	Tools - System update Updating the omega image
🕱 Service	

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".

Penko Omega	a Controller adr	ninistrator ~
🏫 Dashboard	Tools - System update	
🗙 Tools	Updating the omega image	
Settings	UPLOAD FILE	
🛣 Service	Omega update file selected: Omega_update_img.swu SYSTEM UPDATE: CANCEL	

Uploading the file followed by "Validating file" can take up to a minute. When finished the uploaded file is shown.

Tools - System update			
Updating the Omega operating system			
Name	Size	Progress	Status
omega-1.0.8.9.0.1-bootloader_and_linux.swu	183 MB	100 %	file uploaded

To select another file press CANCEL.

The update process looks different between versions 1.0.8.9.0.1 and earlier versions. Both are shown here.

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

Older version	Version 1.0.8.9.0.1 and higher
Confirm update	Tools - System update
Start updating the omega with the image omega_update_img.swu? This	Updating the Omega operating system
action will restart the omega seral times.	Name Size Progress Status
CANCEL	omega-1.0.8.9.0.1-bootloader_and_linux.swu 183 MB 100 % (Reuploaded)
	START UPDATE CANCEL

Updating the omega can take up to 5 minutes. Do not leave the page and wait till the update is finished.

Older version		
Penko Omega	a Controller	administrator ~
1 Dashboard	Tools - System update	
🗙 Tools	Updating the omega image	
Settings	UPLOAD FILE	
🕱 Service		
	Preparing update	
	The omega is preparing the update en will restart soon.	
	Installing the update	
	The omega is updating. The update time is about 5 minutes. Please do not turn off the power or reload this page!	
	Update finished	
	The omega update is finished and ready to use.	



Tools - System update	
Updating the omega image	
UPLOAD FILE	
Preparing update The omega is preparing the update en will restart soon. Installing the update	
The on Info Updat The on Expop-up is deleted.	
ана на селото на село На селото на	

Version 1.0.8.9.0.1 and higher
Tools - System update
Updating the Omega operating system
update info: state: updating info: update process started
Tools - System update
Updating the Omega operating system
update info:
state: updating info: update process started
state: updaung Finio: component: updater succeeded: true message: Finished: state: done info:
connection to omega lost - please wait

When finished a message appears to indicate that the update is finished. After confirming the page will be reloaded. If the update is not done after 6 minutes then the PC might have refused the connection. Disconnect the USB and reconnect and reload the page.



Penko Omega	a Controller	administrator ~
Cashboard	Tools - System update Updating the omega image	
😧 Service	UPLOAD FILE	

After a successful updated the browser returns to the system update page. Under Dashboard->My Omega the new version number is shown.

Now the cards can be updated.

Click on "Tools->Card update".

Then press "Upload firmware"

Tools - Card update		
Updating option card firmware		
SELECT FIRMWARE \vee	UPLOAD FIRMWARE	

In this example we select the "OmegaDualLoadcellDigital_V1.0.6.9.0.14.pip" file on our PC.

📙 🛛 🚽 🚽 F:\firmware					
File Home Share View					^ ?
Pin to Quick Copy Paste Paste Paste Paste shortcut	Move Copy to * to *	New item → The base of the ba	Properties	Select all Select none Nivert selection	
Clipboard	Organize	New	Open	Select	
\leftarrow \rightarrow \checkmark \uparrow \square \rightarrow This PC \rightarrow USB STICK	< (F:) → firmware		ڻ ~		
👝 USB STICK (F:)	^ Name	^ C	Date modified	Type Si	ze
firmware	📄 OmegaDualLoadce	IIAnalog_V1.0.6.9.0.14 7	7/24/2023 11:14 AM	PIP File	155 KB
	📄 OmegaDualLoadce	IIDigital_V1.0.6.9.0.14 7			157 KB
🛒 Network	OmegalOAnalog_V	1.0.6.9.0.14.pip 7	7/24/2023 11:15 AM	PIP File	130 KB
	OmegalODigital_V1	.0.6.9.0.14.pip 7	7/24/2023 11:15 AM	PIP File	126 KB
4 items 1 item selected 156 KB					::: 🖂

Then press "UPLOAD FIRMWARE".



After processing, the green color shows that this card already has this version installed.



Tools - Card update						
Updat	Updating option card firmware					
SEL				IPLOAD FIRMWARE		
Select	Selected file: OmegaDualLoadcellDigital_V1.0.6.9.0.14.pip					
	Rack	Slot	Channel	Name	Current firmware version	
				Omega Main Board (1-0-1)		
				Dual Channel Loadcell Digital Outputs (1-1-1) Dual Channel Loadcell Digital Outputs (1-1-2)		
				Digital I/O (1-2-1) Digital I/O (1-2-2)		
				Analog I/O (1-3-1) Analog I/O (1-3-2)		

Press "UPLOAD FIRMWARE" again.

Now select the "OmegalODigital_V1.0.6.9.0.14.pip" file on our PC.

Tools - Card update				
Updating option card firmware				
SELECT FIRMWARE \vee	UPLOAD FIRMWARE			
Processing file				

After processing, the orange version number shows that this card has an older version firmware and can be updated.

Tools - Card update						
Updat	Updating option card firmware					
	SELECT FIRMWAREY UPLOAD FIRMWARE					
Selected file: OmegalODigital_V1.0.6.9.0.14.pip						
	Rack	Slot	Channel	Name	Current firmware version	
				Omega Main Board (1-0-1)		
				Dual Channel Loadcell Digital Outputs (1-1-1) Dual Channel Loadcell Digital Outputs (1-1-2)		
				Digital I/O (1-2-1) Digital I/O (1-2-2)	1.0.6.9.0.1	
				Analog I/O (1-3-1) Analog I/O (1-3-2)		

Select the Digital I/O module(s) and click "Update". Checking the box in the column header will select all cards of this type



The file is uploaded from the CPU to the card and after the update "succeeded" is shown.

Rack	Slot	Channel	Name	State
			Digital I/O (1-2-1) Digital I/O (1-2-2)	Succeeded

This process can be repeated for the other card types.





About PENKO

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

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

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



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