PENKO Engineering B.V.

Your Partner for Fully Engineered Factory Solutions

Manual:

FLEX Mono Filler Controller V10.6

PENKO
an ETC Company

IMPORTANT SAFETY INFORMATION

READ THIS PAGE FIRST!

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

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

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

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

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

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

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

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

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

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

FLEX Mono Filler Weigher Controller

WARNING

ELECTRICAL SHOCK HAZARD

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

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

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

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

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

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

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

WWW.PENKO.COM

PENKO Engineering B.V.is an ETC Company

Email: info@PENKO.com

FLEX Mono Filler Weigher Controller

Table of Contents

FLEX Mono Filler Weigher Controller

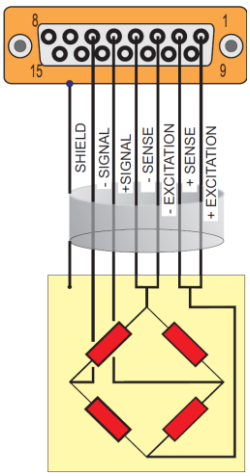
Wiring connection for FLEX with MFL software

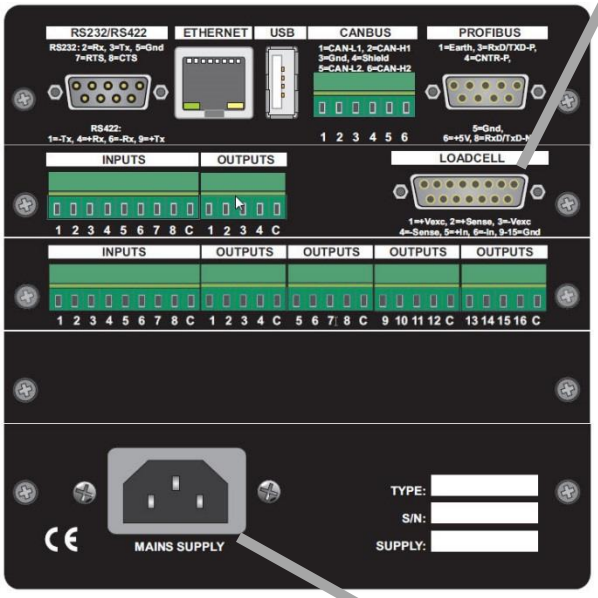
Loadcell connection

15p sub-D Female:

1. + Excitation
2. + Sense
3. – Excitation
4. – Sense
5. + Signal
6. – Signal

Housing. Shield

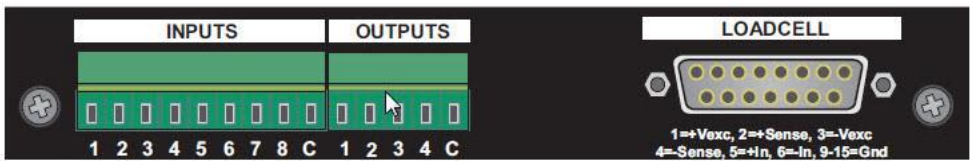




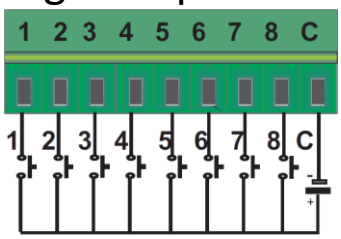
Loadcell connector

AC Power supply
230 Vac 50/60Hz

8 input 4 output ADC board:

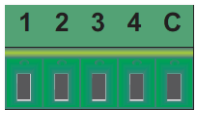


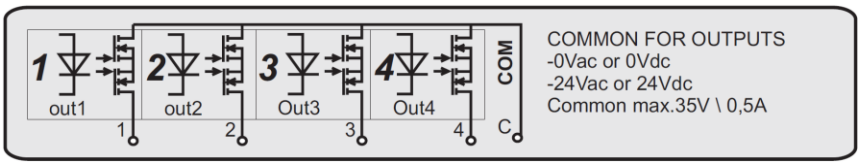
Digital Inputs:



Input 1: Start (option)
Input 2: Stop (option)
Input 3: Start dosing
Input 4: Accept tolerance
Input 5: Release valve
Input 6: Not used
Input 7: Not used
Input 8: Not used

Digital Outputs:

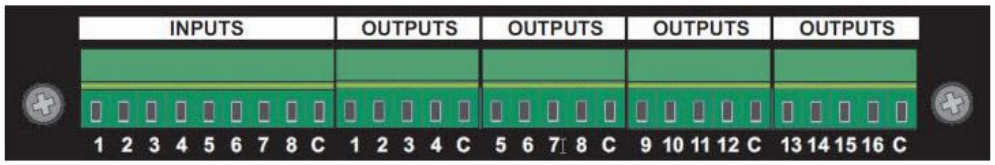




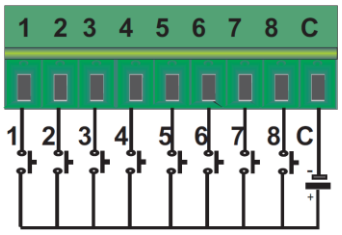
Output 1: Fine
Output 2: Coarse
Output 3: Ready
Output 4: Busy

FLEX Mono Filler Weigher Controller

8 input 16 output board:

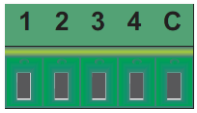


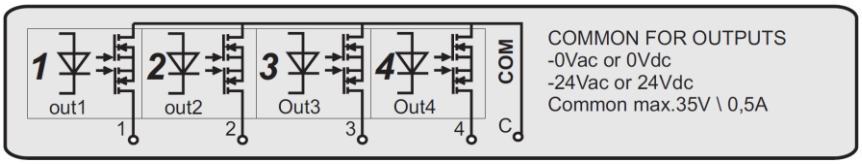
Digital Inputs:



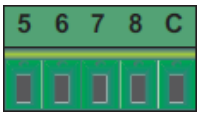
Input 1: Not used
Input 2: Not used
Input 3: Not used
Input 4: Not used
Input 5: Not used
Input 6: Not used
Input 7: Not used
Input 8: Not used

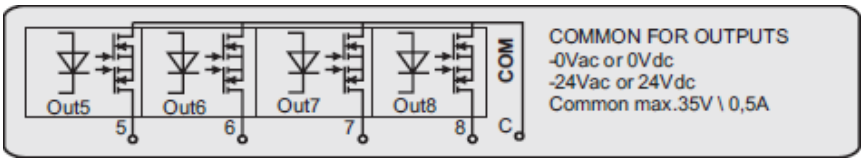
Digital Outputs:



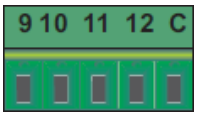


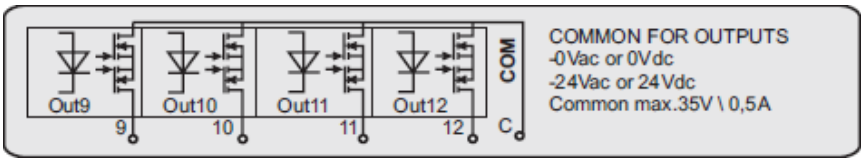
Output 1: Tolerance high
Output 2: Release valve
Output 3: Not used
Output 4: Not used





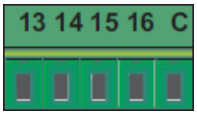
Output 5: Not used
Output 6: Not used
Output 7: Not used
Output 8: Not used

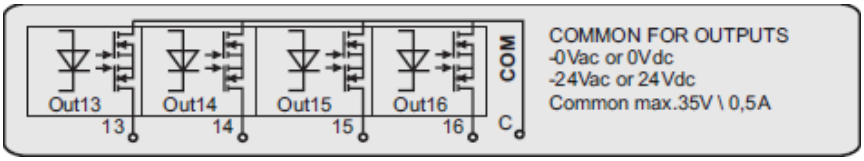




Output 9: Not used
Output 10: Not used
Output 11: Not used
Output 12: Not used

FLEX Mono Filler Weigher Controller





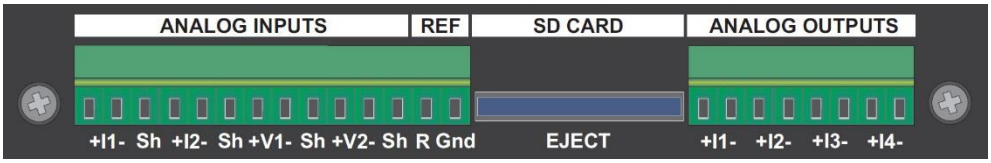
Output 13: Not used

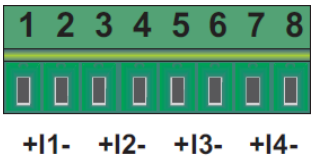
Output 14: Not used

Output 15: Not used

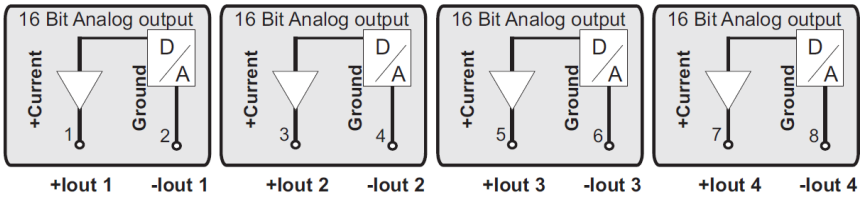
Output 16: Not used

Analog Output: (optional)





Current outputs, 0/4 - 20/24mA



Output 1: Fine/Coarse speed

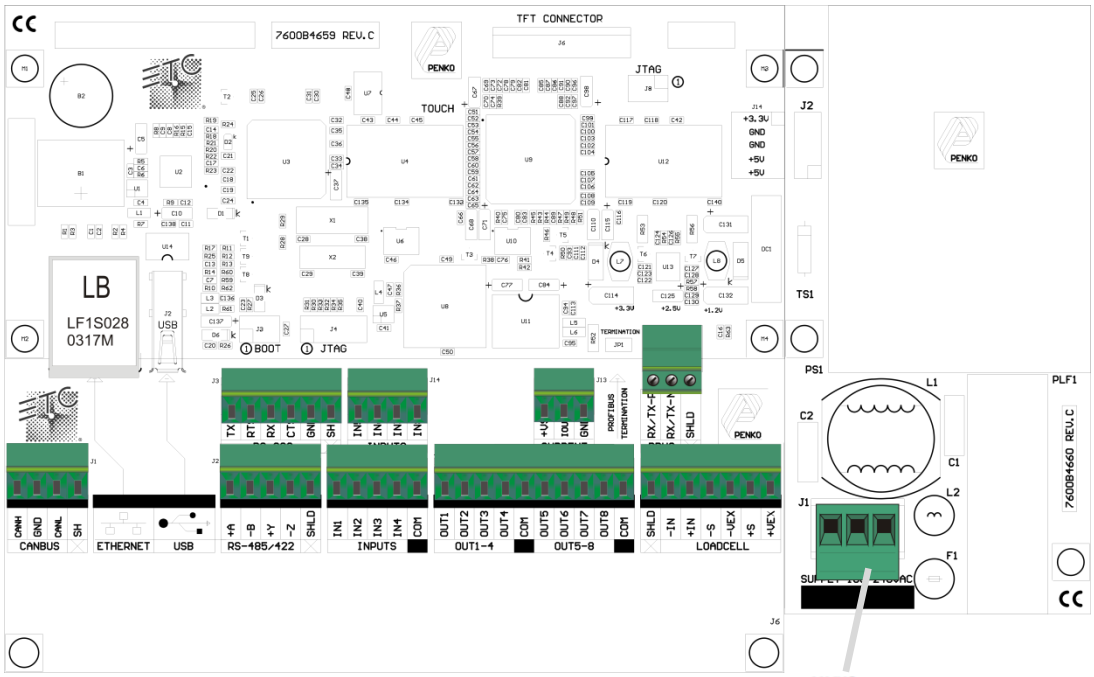
Output 2: Not used

Output 3: Not used

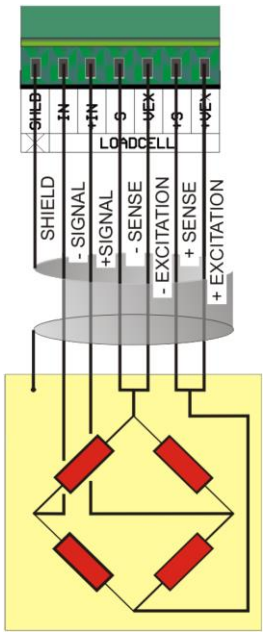
Output 4: Not used

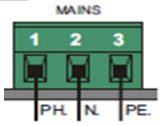
FLEX Mono Filler Weigher Controller

Wiring connection for FLEX 2100 with MFL software



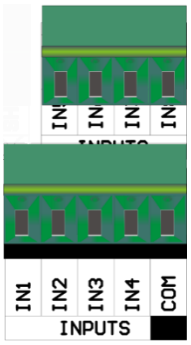
Loadcell Connection

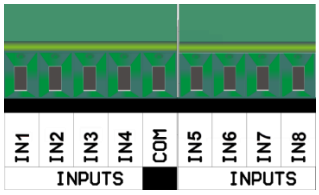




AC Power supply
230 Vac 50/60 Hz

Digital Inputs:





Input 1: Start (option)

Input 2: Stop (option)

Input 3: Start dosing

Input 4: Accept tolerance

Input 5: Release valve

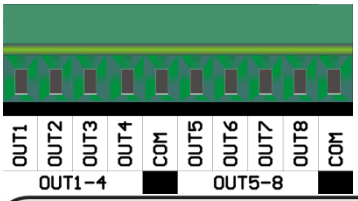
Input 6: Not used

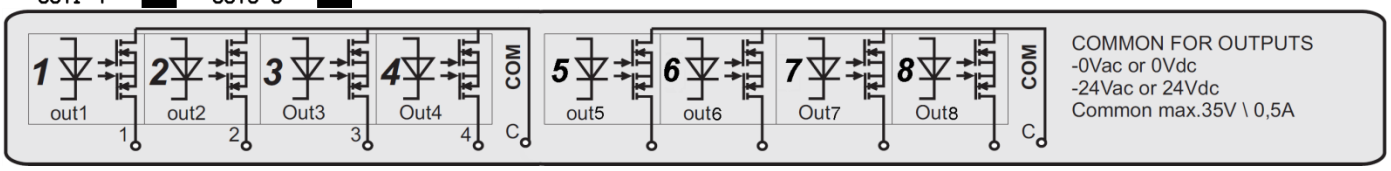
Input 7: Not used

Input 8: Not used

FLEX Mono Filler Weigher Controller

Digital Outputs:





Output 1: Fine

Output 2: Coarse

Output 3: Ready

Output 4: Busy

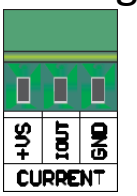
Output 5: Tolerance high

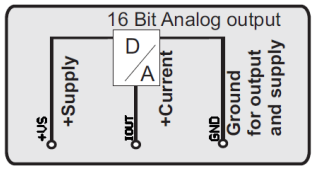
Output 6: Release valve

Output 7: Not used

Output 8: Not used

Analog Output: (optional)





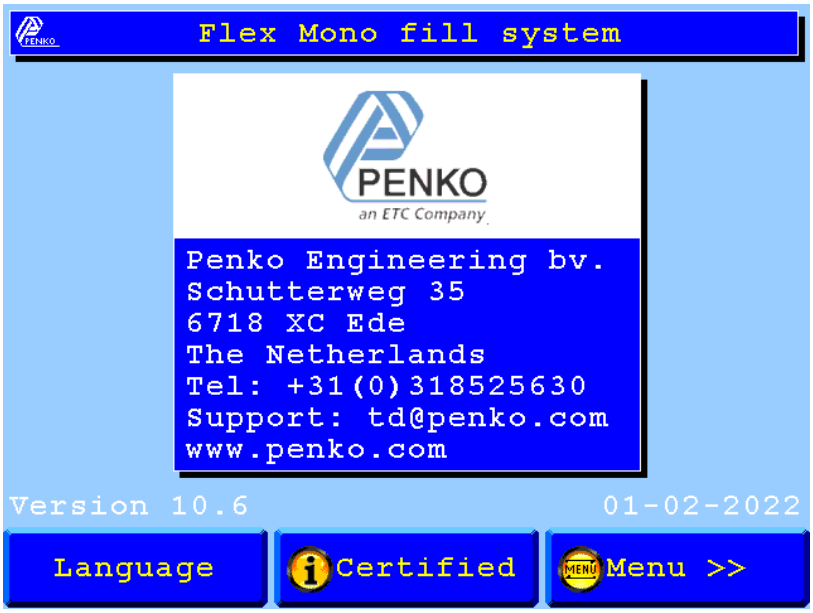
Power supply
For analog output
18-30Vdc

Output: Fine / Coarse speed

FLEX Mono Filler Weigher Controller

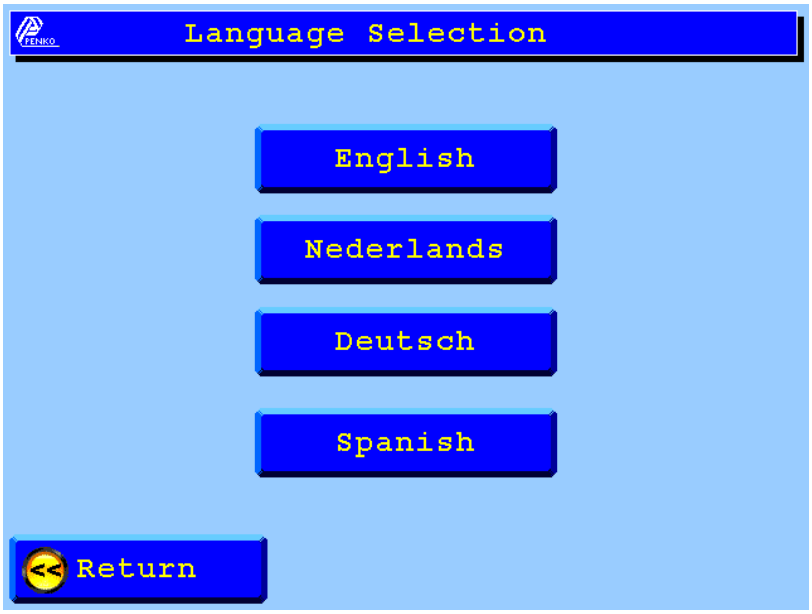
Information

When the FLEX is started up, it will show the information screen. On this screen the PENKO information and the program version is shown. After 5 seconds the “Production” screen is shown or when the “Menu” button is pressed the “Selection Menu” is shown.



Language selection

Press on “Language” in the Information screen, now you can choose a language or press on Return to return to the Information screen.



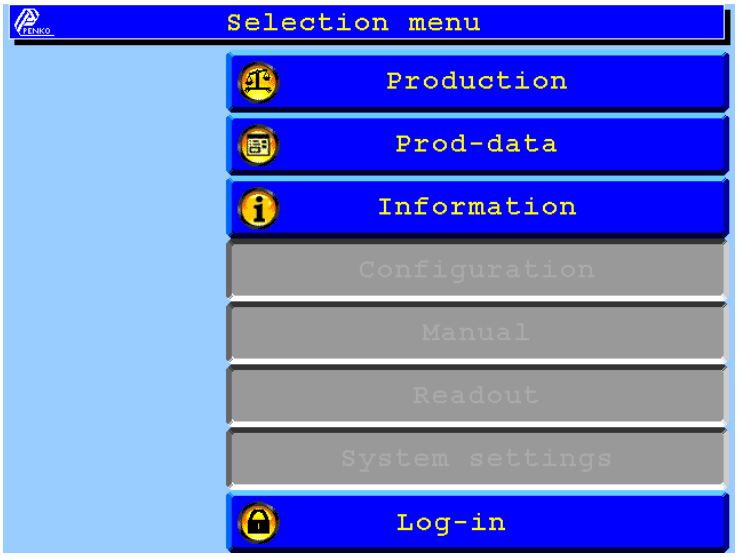
Selection Menu

From the Selection menu it's possible to enter several Screens.

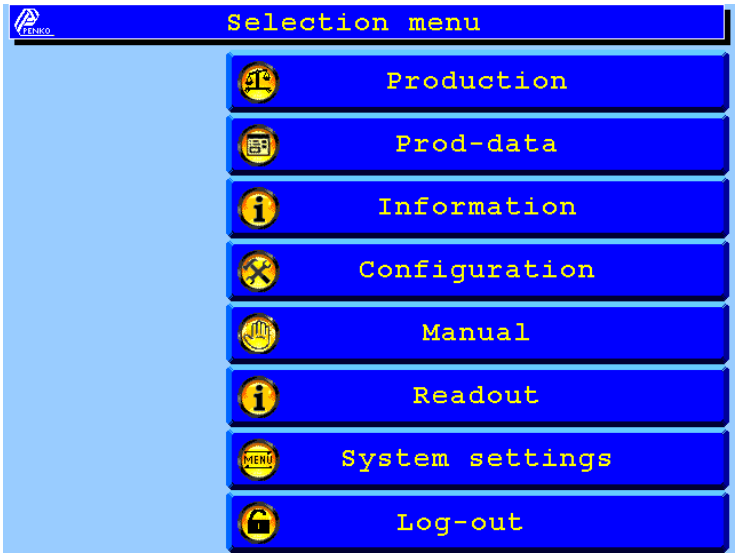
The Configuration, Manual, Readout, System setting and the ability to change the recipe parameters are locked by a password, log-in with the Log-in button first. To log-out, press the Log-out button.

Note: It's only possible to enter the Manual screens when the program is stopped and the user is logged in.

Screen if Configuration, Manual, Readout and System settings are disabled:



Screen if Configuration, Manual, Readout and System settings are enabled:

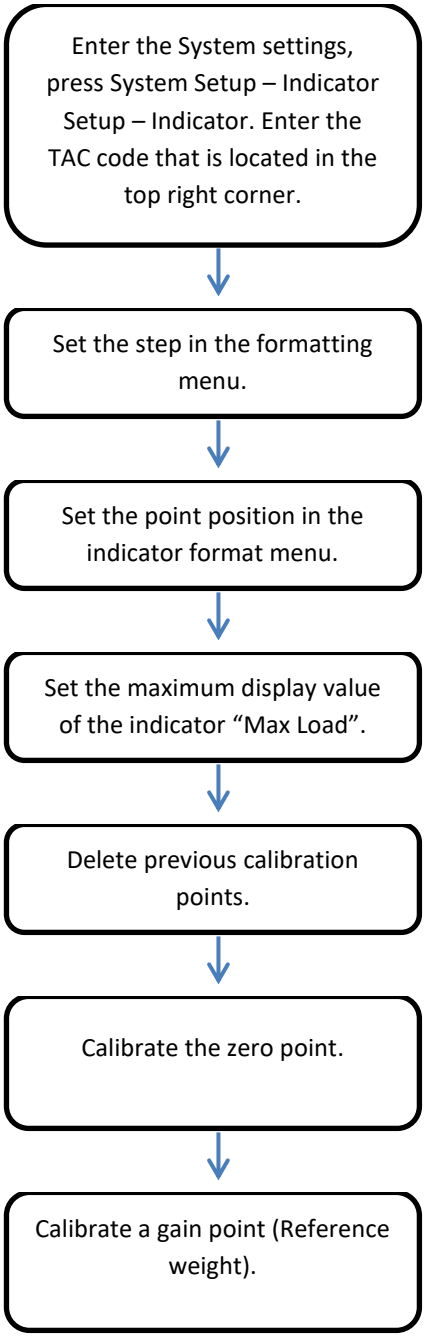


First use of the indicator

Before using the controller, please setup the internal indicator first.

Login first to enter the System settings, default no password is selected.

The overall password is “25630”.



The size of the step defines the scaling of the weight value.
The weight will be rounded off to the nearest value with a valid step size. The step size depends on the specifications of the loadcells that are used.

The Decimal point defines the point position of the weight value.
Decimal point position can be set from NONE to 0,00000.
The decimal point depends on the specifications of the loadcells that are used.

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

Go to Calibration in the Indicator Setup, enter the CAL code that is located in the top right corner.
Delete all previous calibration points before starting a new calibration.

When all points are deleted, first calibrate the zero point.

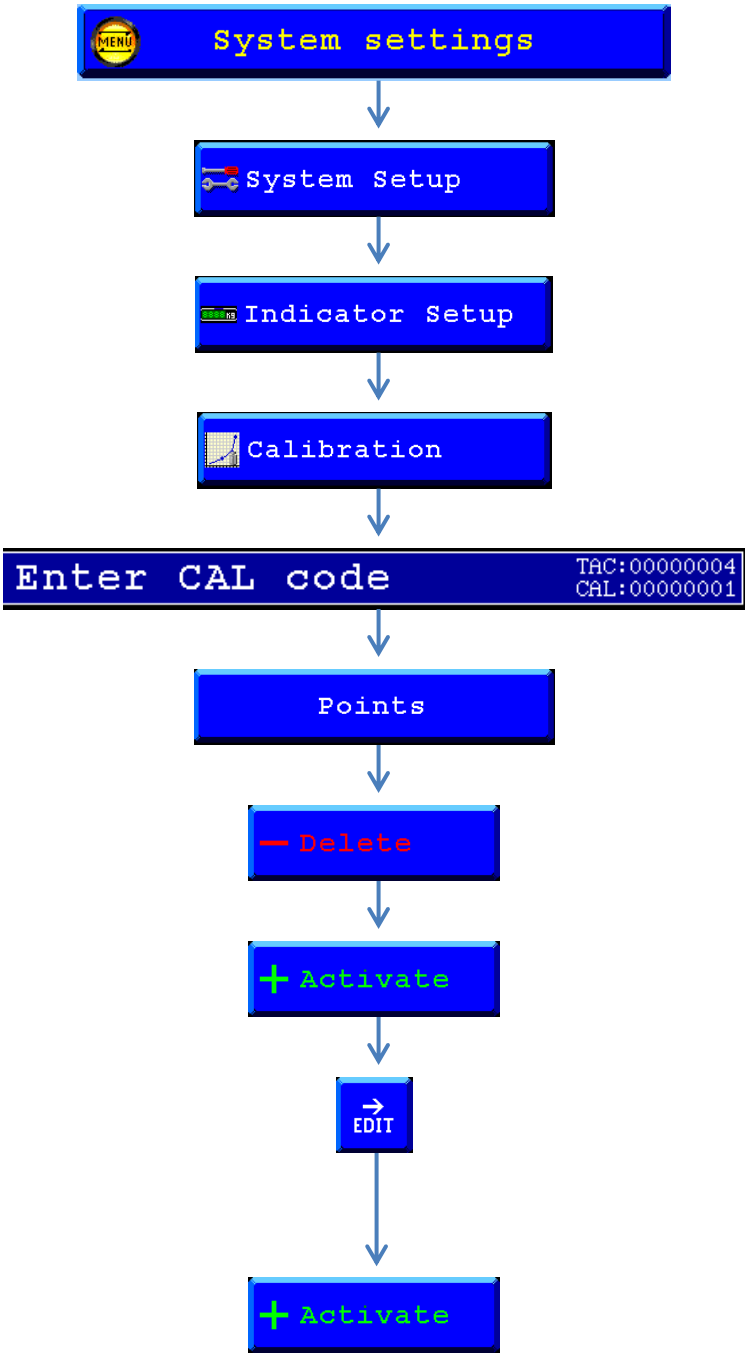
Make sure the scale is completely empty and type 0 in the “Add/Replace” field by pressing the “Edit” button. Then press on the Activate button.

To calibrate the gain weight put a reference weight on the scale.

Press the “Edit” button to type the exact reference weight in the “Add/Replace” field. Then press on the Activate button, the calibration is now complete.

Calibration

To calibrate the indicator, follow the next steps:



Enter the “CAL” code and press OK. This “CAL” code is shown in the right upper corner.

Delete all old calibration points. Make sure all points are deleted.

Make sure the weigher is empty and press the “+Activate” button to save the zero point

Press “EDIT” and put a reference weight on the weigher. Enter the weight of the reference weight and press OK.

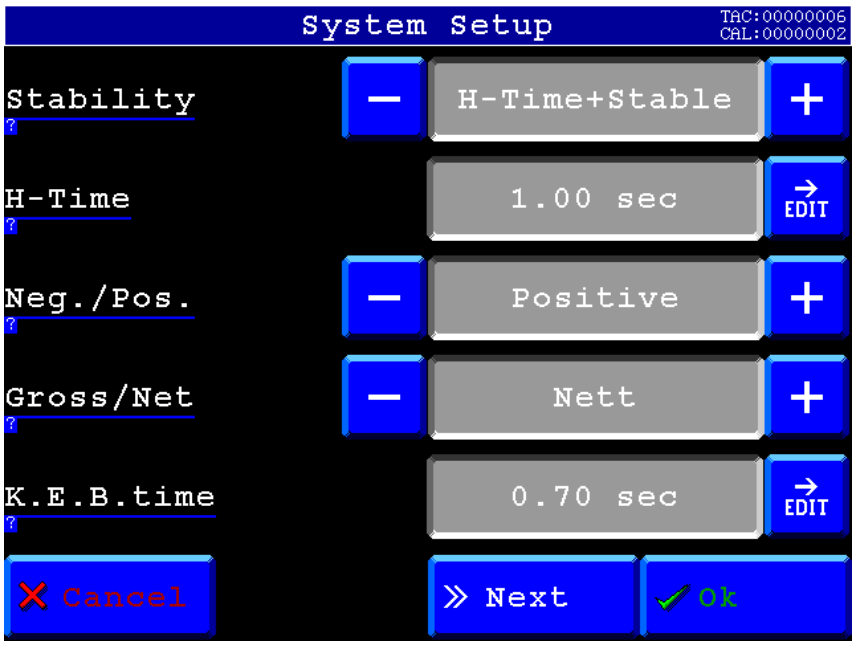
To save the second point, press the “+Activate” button.

Configuration

Before using the controller, please setup the configuration for your application first.

Login first to enter the Configuration, the default password is “0” this means that no password is needed. If the password is forgotten, the overall password is “25630”.

Button	Explanation
Cancel	Return to the “Selection Menu” without saving the parameters.
Next	Go to the next set of parameters.
Ok	Return to the “Selection Menu” and save the parameters.
Edit, -, +	Edit the parameter.



Default settings:	
Stability	H-Time + Stable
H-Time	1.00 sec
Neg./Pos.	Positive
Gross/Net	Net
K.E.B.time	0.70 sec
Max inflight	0.00 kg
Inflight corr.	10%
Dosing speed	On
Tolerance	On
Tol. interval	1.00 sec
Release valve	Off
Manual next dose	Off
Display hold	5.00 sec
Coarse delay	0.00 sec
Fine delay	0.00 sec
Password	0

Configuration Parameters

Stability

Weigher stability (Check delay time) can be switched on or off.
-
This parameter works together with the H-Time.
-
OFF = No Stability
H+S = First H-Time then Stable
H = Only H-Time
H/S = H-Time or Stable
S+H = First Stable then H-Time

H-Time

This is the time after dosing that the controller waits before calculating the real dosed value.
-
The H-Time works together with the stability parameter.

Neg./Pos.

Select if dosing is negative (Out dosing) or positive (In dosing).

Gross/Net

Select Gross when no Tare should be taken before the start of a dosing or select Net when a Tare should be taken before the start of a dosing.

K.E.B.time

This is the time in which the kinetic energie, dissapears when switching from coarse dosing to fine dosing.
This will avoid premature reaching of the setpoint.
The weigher will continue to dose blind in this time.

Max inflight

Set the maximum inflight that can be used to correct the inflight after each dosing.
-
Set Max inflight to 0 for no maximum inflight.

Inflight corr.

Inflight is the amount of product, which is falling on/into the weigher after the fine output is switched off.
-
The correction value indicates the strenght of the correction.
0 means fixed inflight.

Dosing speed

Select if the optional analog output is used to control the coarse and fine speed.

Tolerance

Select if the tolerance is used after the dosing is completed.

Tol. interval

The time is used when the dosed weight was dosed under min tolerance.
The fine output is switched on and off with this interval until the dosed weight is within the tolerance.
Tol. interval is disabled when tolerance is turned off.

Release valve

Select if a release valve is used to release the dosed weight after dosing.

Manual next dose

Select to enable the "Next-dos." button on the production screen.
The Next dos. allows to manually start a next dosing.

Display hold

After dosing is finished the display hold time starts.
The dosed value will be frozen on the screen for this time.
After the time is elapsed the display will be "Live" again.
When a new dosing starts during this time the display hold time will be aborted.

Coarse delay

This is the time that the coarse output is delayed after a dosing starts.

Fine delay

This is the time that the fine output is delayed after dosing starts.

Password

Password to protect the system settings, configuration settings and recipe edit.
-
When set to 0, no password is active.

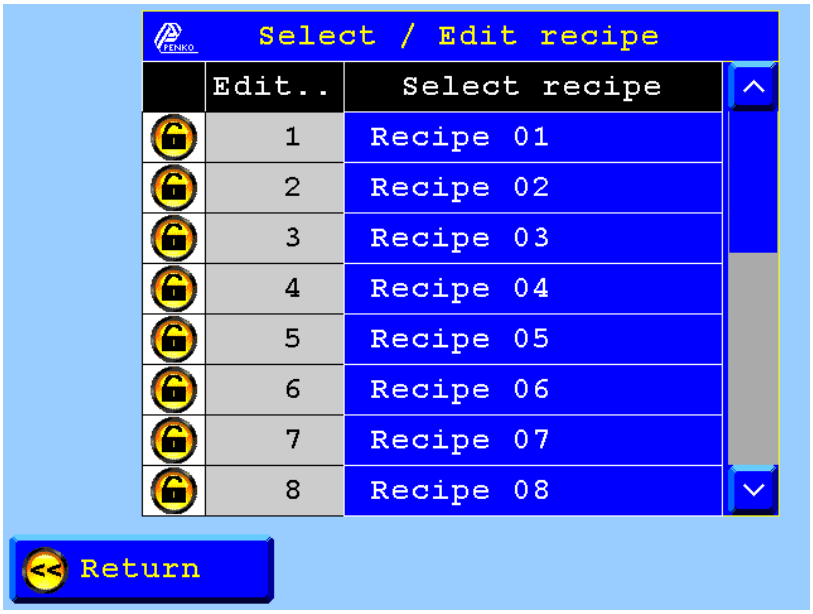
Select / Edit Recipe

Select recipe

To select or edit a recipe, press the “Recipe” button from the Production screen. Select a recipe by pressing on the recipe name in the blue fields. Use the scroll bar to select the next recipes. The screen will automatically return to the Production screen after selection.

To edit a recipe Press the recipe number in the gray fields.

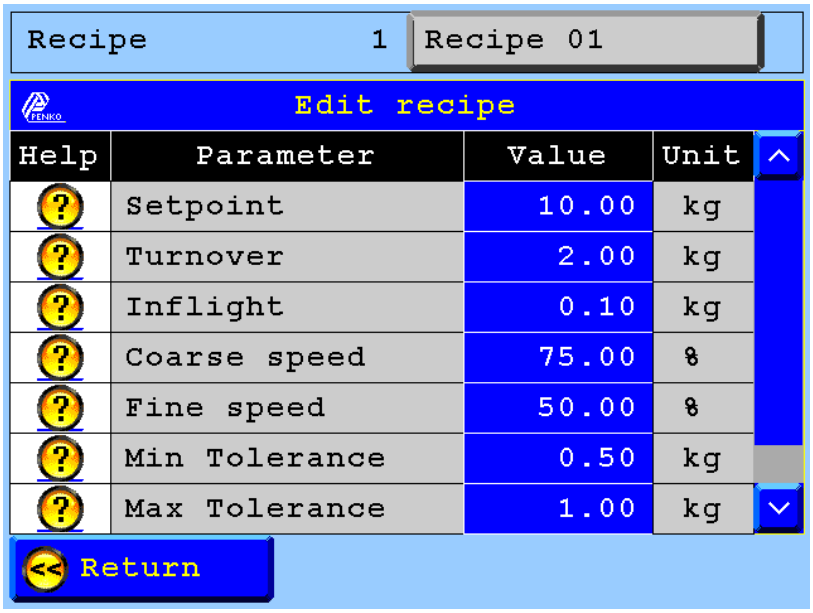
To enter the recipe edit screen the user must be logged in.



Edit recipe

To edit a parameter, press on the blue field under “Value”. To view more information about a parameter, press the question mark before the parameter.

If you want to change the recipe name, press on the gray field in the top right corner.



FLEX Mono Filler Weigher Controller

Information about the parameters:

Setpoint

Setpoint is the amount of product that you want to dose.
-
The selection Gross or Net and Neg. or Pos. dosing is made in the configuration menu.

Fine speed

During the fine dosing mode this value is used for the analogue output.
Min = 0.00%
Max = 100.00%

Turnover

Coarse dosing stops when the setpoint "turnover" is reached. The dosing continues in fine mode.
The fine dose time must be greater then K.E.B.Time.
Turnover = setpoint - Turnover value.

Min Tolerance

When the dosed weight is below the setpoint - min tolerance, the fine output will switch on with the duration of the tol. interval to reach the weight within tolerance.

Inflight

Inflight is the weight which is falling on the scale after the Fine output is swichted off.
The inflight correction strenght is set in the configuration menu.

Max Tolerance

When the dosed weight is above the setpoint + max tolerance, the weight needs to be accepted to continue.

Coarse speed

During the coarse dosing mode this value is used for the analogue output.
Min = 0.00%
Max = 100.00%

Empty Level

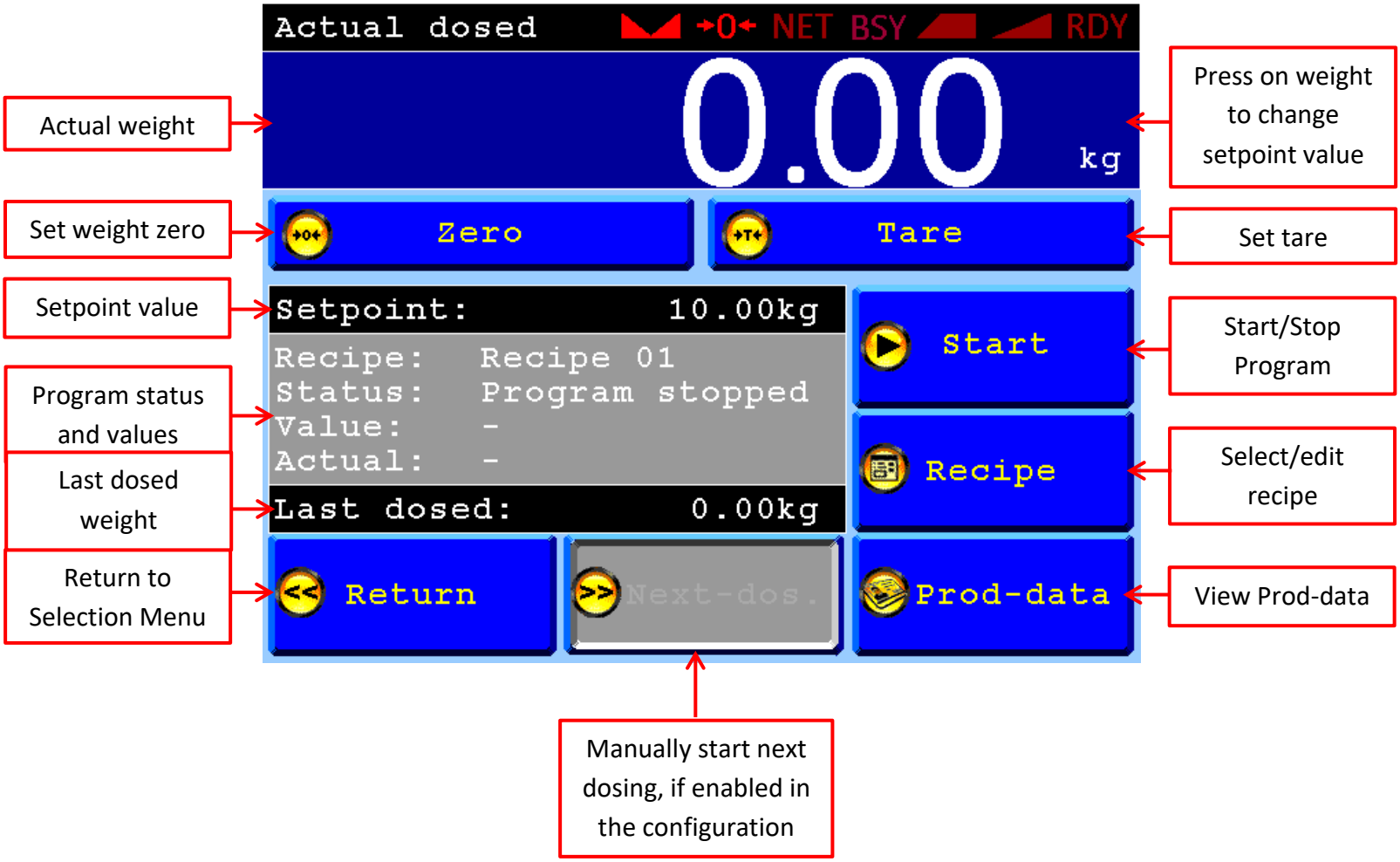
When the release valve is selected, the weight must be below this level to start a new dosing.

FLEX Mono Filler Weigher Controller

Production

To go to the production screen, press the “Production” button from the Selection Menu screen.

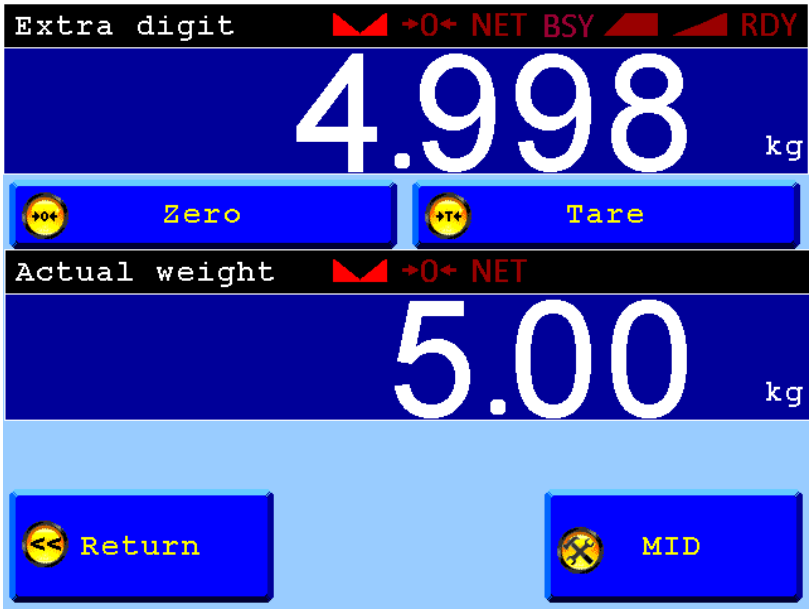
Icon:	Discription:
	Weight stable
→0←	Weight is zero
NET	Tare active
BSY	Program busy
	Coarse dosing
	Fine dosing
RDY	Program ready



Readout

To go to the Readout screen, press the “Readout” button from the Selection Menu screen. After 5 seconds the “Selection Menu” screen is shown again.

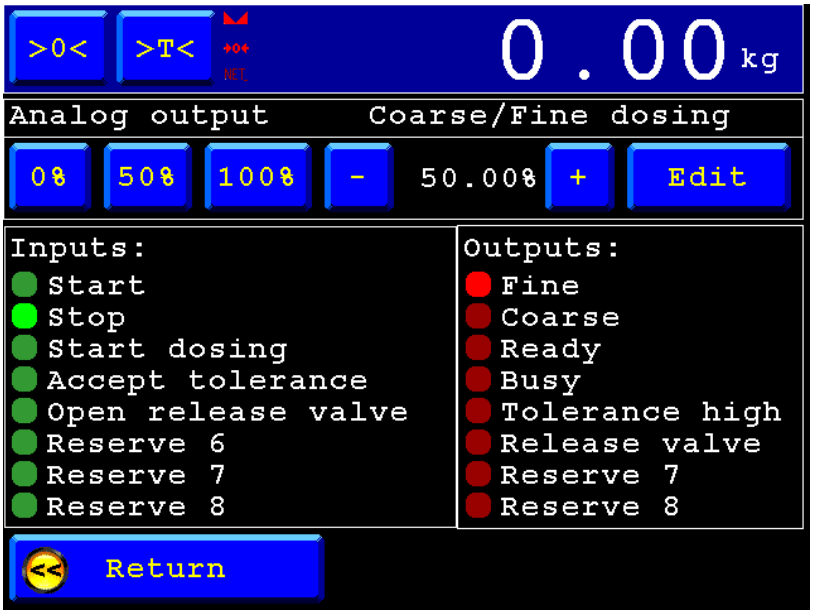
Press on “MID” to view the Certified information.



Manual

When logged in and the program is stopped, you can press on “Manual” in the Selection menu. Here you can see the status of the inputs and switch on the outputs. Press on “Next” to proceed to the next screen.

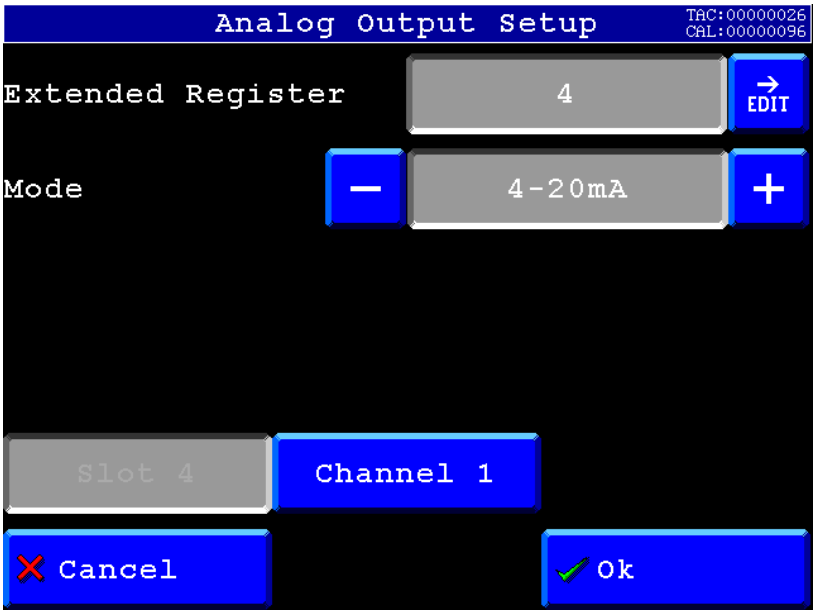
Here you can set a value in the analog output. Press return to go back to the Selection menu. When returned to the Selection menu the outputs will switch off and the analog value will go back to 0.00%.



Analog output settings

When the optional analog output is used for Coarse/Fine speed, check if the DAC setup is correct.

To setup the analog output of the Flex, go to “System settings” in the Selection menu. Press on “System Setup” and “In/Outputs”, then press on “DAC Setup”. Select channel 1 if a FLEX is used (FLEX 2100 only has 1 analog output) and set the Extended Register on 4. Select the desired Mode and press on “OK”. Press “Home” to return to the Selection menu.



Start/Stop settings

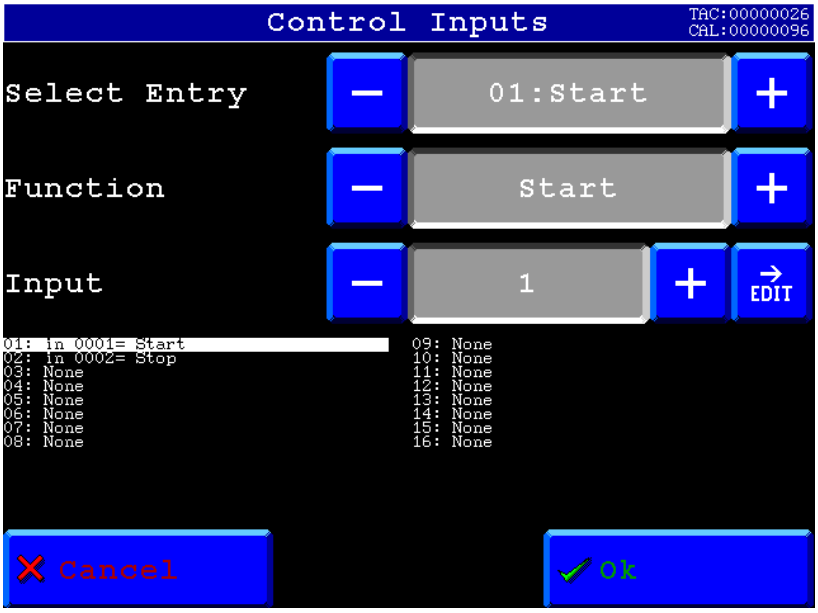
To start and stop the Controller with the inputs, you must set input 1 as “Start” and input 2 as “Stop” in the inputs. Go to “System settings” in the Selection menu. Press on “System Setup” and “In/Outputs”, then press on “Inputs”. Setup the inputs and press “OK”. Press “Home” to return to the Selection menu.

Note: You can only acces the System Setup when the program is stopped.

Note: Input 2 needs to be on and stay on as long as the program is running, when input 2 is switched off, the program will stop immediately. When input 2 is on you can start the program with a pulse on input 1.

Note: when input 2 is switched on, it’s also possible to start/stop the program with the touchscreen.

Input settings:

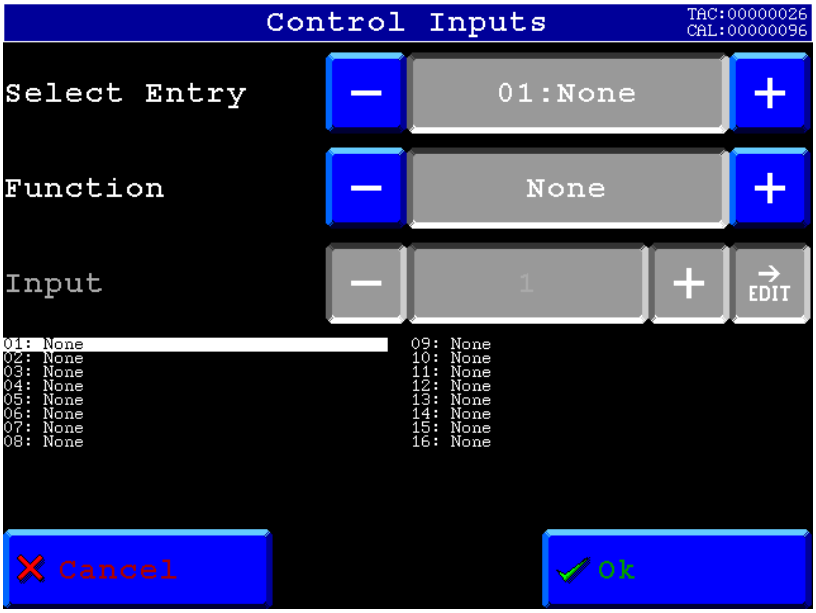


Start/Stop via touchscreen

To start and stop the Controller with the Start/Stop button on the touchscreen, check if all the inputs has no functions. Go to “System settings” in the Selection menu. Press on “System Setup” and “In/Outputs”, then press on “Inputs”. Setup the inputs and press “OK”. Press “Home” to return to the Selection menu.

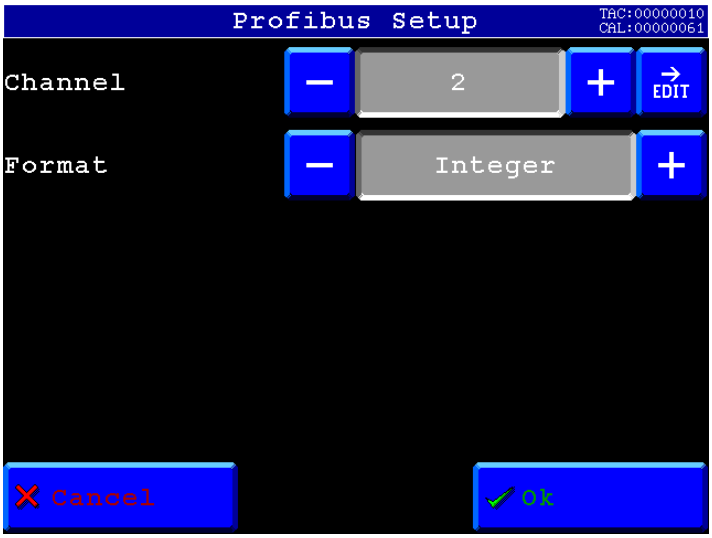
Note: You can only acces the System Setup when the program is stopped.

Touchscreen settings:



Profibus

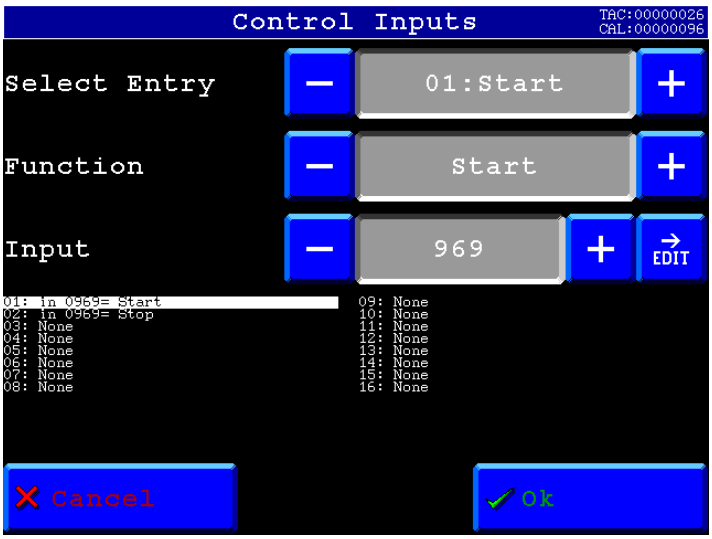
First set up the Channel and Format in the Profibus Setup. Go to “System settings” in the Selection menu. Press on “System Setup” and “Port Setup”, then press on “Profibus Setup”. Set up the Channel, Format and press “OK”. Press “Home” to return to the Selection menu.



To start and stop the Controller with Profibus, you must set marker 969 as “Start” and “Stop” in the inputs. Go to “System settings” in the Selection menu. Press on “System Setup” and “In/Outputs”, then press on “Inputs”. Setup the inputs and press “OK”. Press “Home” to return to the Selection menu.

Note: you can only acces the System Setup when the program is stopped.

Profibus settings:



GSD file data structure

Download the PFLX053D.GSD GSD file from the Penko website:
www.penko.com/Support/Software/

Read data structure from the Flex or Flex 2100:

Data type	Description	
Double word 32 bit signed integer/float	Read weight value	
Word 16 bit	Read indicator status	Bit 0 = Hardware overload
		Bit 1 = Maximum overload
		Bit 2 = Stable weight
		Bit 3 = Stable range
		Bit 4 = Zero set
		Bit 5 = Center of zero
		Bit 6 = Zero range
		Bit 7 = Zero track range
		Bit 8 = Tare active
		Bit 9 = Preset tare active
		Bit 10 = New sample available
		Bit 11 = Calibration invalid
		Bit 12 = Calibration enabled
		Bit 13 = Industrial mode
		Bit 14 = Invalid weight
		Bit 15 = Reserved
Byte 8 bit	Read command	Bit 0 = Zero reset
		Bit 1 = Zero set
		Bit 2 = Tare off
		Bit 3 = Tare on
		Bit 4 = Reserved
		Bit 5 = Freeze Weight value
		Bit 6 = Indicator channel 2^0
		Bit 7 = Indicator channel 2^1
Byte 8 bit	Read weight select register	Not used
Word 16 bit	Read inputs	Bit 0 = Input 1 Start
		Bit 1 = Input 2 Stop
		Bit 2 = Input 3 Start dosing
		Bit 3 = Input 4 Accept tolerance
		Bit 4 = Input 5 Open release valve
		Bit 5 - 15 = Input 6 – 16 Not used

Word 16 bit	Read outputs	Bit 0 = Output 1 Fine
		Bit 1 = Output 2 Coarse
		Bit 2 = Output 3 Ready
		Bit 3 = Output 4 Busy
		Bit 4 = Output 5 Tolerance high
		Bit 5 = Output 6 Release valve
		Bit 6 – 15 = Output 7 – 16 Not used
Word 16 bit	Read markers 401 - 416	Bit 0 = Negative dosing selected
		Bit 1 = Positive dosing selected
		Bit 2 = Nett dosing selected
		Bit 3 = Stability H+S selected
		Bit 4 = Stability H selected
		Bit 5 = Stability H/S selected
		Bit 6 = Stability S+H selected
		Bit 7 = Stability off selected
		Bit 8 = Not used
		Bit 9 = Program running
		Bit 10 – 15 = Not used
Word 16 bit	Read markers 417 - 432	Bit 0 = Dosed weight OK
		Bit 1 = Tolerance high
		Bit 2 – 15 = Not used
Double word 32 bit signed integer	Read register 1	Nett weight (only active when program is started)
Double word 32 bit signed integer	Read register 2	Last dosed weight
Double word 32 bit signed integer	Read register 3	Setpoint value
Double word 32 bit signed integer	Read register 4	Analog output value

Write data structure to the Flex or Flex 2100:

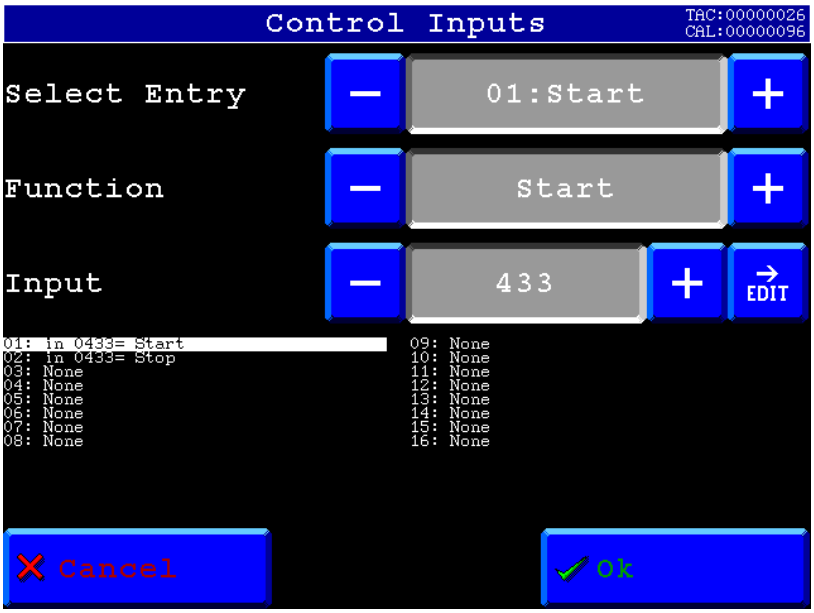
Data type	Description	
Byte 8 bit	Write command	Bit 0 = Zero reset
		Bit 1 = Zero set
		Bit 2 = Tare off
		Bit 3 = Tare on
		Bit 4 = Reserved
		Bit 5 = Freeze Weight value
		Bit 6 = Indicator channel 2^0
		Bit 7 = Indicator channel 2^1
Byte 8 bit	Write weight select register	Not used
Word 16 bit	Write markers 969 - 984	Bit 0 = Start / stop program
		Bit 1 = Start dosing
		Bit 2 = Accept tolerance
		Bit 3 = Not used
		Bit 4 = Use setpoint value from Profibus
		Bit 5 = Use turnover value from Profibus
		Bit 6 = Use inflight value from Profibus
		Bit 7 = Use analog value from Profibus
		Bit 8 – 15 = Not used
Word 16 bit	Write markers 985 - 1000	Bit 0 – 15 = Not used
Double word 32 bit signed integer	Write register 97	Setpoint value from Profibus
Double word 32 bit signed integer	Write register 98	Turnover value from Profibus
Double word 32 bit signed integer	Write register 99	Inflight/Coarse speed value from Profibus
Double word 32 bit signed integer	Write register 100	Fine speed value from Profibus

Ethernet IP

To start and stop the Controller with Ethernet IP, you must set marker 433 as “Start” and “Stop” in the inputs. Go to “System settings” in the Selection menu. Press on “System Setup” and “In/Outputs”, then press on “Inputs”. Setup the inputs and press “OK”. Press “Home” to return to the Selection menu.

Note: you can only acces the System Setup when the program is stopped.

Ethernet IP settings:



EDS data structure

Download the Flex EDS file or Flex 2100 EDS file from the Penko website:
www.penko.com/Support/Software/

Control in (884)

Read data structure from the Flex or Flex 2100: In the example the instance 0x0374 (884) Control in is used.

Access	Name	Data type	Description
Get	Control In	STRUCT OF	
	Weigher	DINT WEIGHER	Display rate weigher data
		DINT GROSS	Fast Gross weight
		DINT NET	Fast Net weight
		DINT TARE	Active Tare weight
		DINT WEIGHERx10	Display rate weigher data x10
		DINT GROSSx10	Fast Gross weight x10
		DINT NETx10	Fast Net weight x10
		DINT TAREx10	Active Tare weight x10
		WORD FORMAT	Format bits, see Weigher-Format word
		WORD STATUS	Status bits, see Weigher-Status word
	Indicator	ARRAY[10] OF INDICATOR	Read indicators, default start read at 1
	Register read	ARRAY OF DINT[10]	External Registers [10], default start read at 1 Register 1 = Netto weight Register 2 = Last dosed Register 3 = Setpoint Register 4 = Analog output Others not used
	Markers Input	BYTE ARRAY[4]	Markers 4x8=32 default read at 401-432 401 = Negative weighing 402 = Positive weighing 403 = Nett 404 = H+S 405 = H 406 = H/S 407 = S+H 408 = Stability off 411 = Fine Maker 412 = Coarse marker. 417 = Dosed weight OK 418 = Tolerance high Others not used

Weigher-Format word

Bit number	Description
#15	Signed/unsigned
	0 = Unsigned
	1 = Signed
#14	Zero suppressing
	0 = Nonzero suppressing
	1 = Zero suppressing
#11 - #8	Display step size
	0000 = Step 1
	0001 = Step 2
	0010 = Step 5
	0011 = Step 10
	0100 = Step 20
	0101 = Step 50
	0110 = Step 100
	0111 = Step 200
	1000 = Step 500
	1001 = Step 1000
	1010 = Step 2000
	1011 = Step 5000
#2 - #0	Decimal point position
	000 = 000000
	001 = 00000.0
	010 = 0000.00
	011 = 000.000
	100 = 00.0000
	101 = 0.00000

Weigher-Status word

Bit #	Called	Definition
0	HARDWARE OVERLOAD	Hardware overload/underload detected on loadcell
1	MAXIMUM LOAD	Overload detected on loadcell
2	STABLE WEIGHT	Weigher signal is stable
3	STABLE RANGE	Weigher signal is in stable range
4	ZERO SET	Weigher zero is corrected
5	ZERO CENTER	Weigher in center of zero range
6	ZERO RANGE	Weigher is in zero range, zero is possible

7	ZERO TRACK Range	Weigher signal is in zero tracking range, zero tracking is possible
8	TARE	Weigher tare is active
9	PRESET TARE	Weigher preset tare is active
10	NEW SAMPLE	Used by internal process handling
11	BAD CALIBRATION	Calibration is bad, invalid, not available
12	CALIBRATION ENABLED	Calibration is enabled, used by internal process handling
13	INDUSTRIAL MODE	If set weigher runs in industrial mode, if reset weigher runs certified operation mode
14	INVALID WEIGHT	Weigher system in blocking, warming up or scale is not level
15	RESERVED	Reserved mode always 0

Control out (888)

Write data structure to the Flex or Flex 2100: In the example the instance 0x0378 (888) Control out is used.

Access	Name	Data type	Description
Set	Control Out	STRUCT OF	
	Weigher control	ARRAY OF BYTE[2]	Weigher control word, see also Weigher-Control word
	Reserved control	ARRAY OF BYTE[2]	Set to 0x0000
	Register write	ARRAY OF DINT[10]	External Registers [10] , default start write at 11 Register 1 = Setpoint Register 2 = Turnover Register 3 = Inflight Register 4 = Coarse speed Register 5 = Fine speed Register 6 = Min tolerance Register 7 = Max tolerance Register 8 = Empty level Register 9 = Not used Register 10 = Not used
	Markers Output	BYTE ARRAY[4]	Markers 4x8=32 default write at 433-464 433 = Start/Stop program 434 = Start dosing 435 = Accept tolerance 436 = Use recipe from EIP Others not used

Weigher-Control word

Bit #	Called	Definition
0	ZERO_RESET*	Reset the actual zero weight, condition only possible in noncertified mode
1	ZERO_SET*	Activate new zero weight, condition stable signal
2	TARE_OFF*	Switch actual tare weight off
3	TARE_ON*	Activate new tare weight, condition stable signal
4	TARE_TOGGLE*	Toggle the Tare weight on condition stable signal, off condition none
5-16	RESERVED	Reserved bits always 0

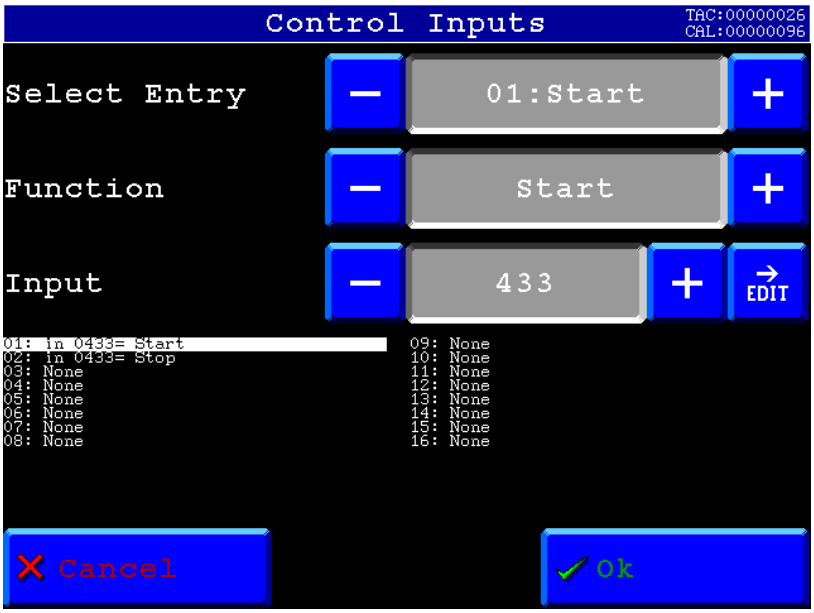
** Remark: action on rising edge of bit*

Modbus TCP

To start and stop the Controller with Modbus TCP, you must set marker 433 as “Start” and “Stop” in the inputs. Go to “System settings” in the Selection menu. Press on “System Setup” and “In/Outputs”, then press on “Inputs”. Setup the inputs and press “OK”. Press “Home” to return to the Selection menu.

Note: you can only acces the System Setup when the program is stopped.

Modbus TCP settings:



FLEX Mono Filler Weigher Controller

Below you will find a list with the data offset to read and write the data. When writing data, don't exceed the length of the data. This will cause a negative effect in the program.

	Name	Access Type	Trigger	READ Offset	Length	Error Handling	WRITE Offset	Length	Comment
0	Indicators	Read Input Registers (Function Code 04)	Cyclic, t#100ms	16#0064	6	Keep last Value			
1	Inputs	Read Discrete Inputs (Function Code 02)	Cyclic, t#100ms	16#0000	8	Keep last Value			
2	Outputs	Read Discrete Inputs (Function Code 02)	Cyclic, t#100ms	16#00C8	8	Keep last Value			
3	Markers read	Read Coils (Function Code 01)	Cyclic, t#100ms	16#01A0	8	Keep last Value			
4	Markers write	Write Multiple Coils (Function Code 15)	Cyclic, t#100ms				16#01B0	8	
5	Read Ext. Registers	Read Input Registers (Function Code 04)	Cyclic, t#100ms	16#03E8	20	Keep last Value			
6	Write Ext. Registers	Write Multiple Registers (Function Code 16)	Cyclic, t#100ms				16#03FC	20	
7	Indicator status	Read Discrete Inputs (Function Code 02)	Cyclic, t#100ms	16#0440	15	Keep last Value			
8	Control	Write Multiple Coils (Function Code 15)	Cyclic, t#100ms				16#03E8	8	

In the lists below the addresses are appointed without the offset. If you use the above list, you can use the lists below as stuctures.

0) Read Indicators (dint)

Indicator		Address		
	Description	Code	Address	Combined
1	Gross weight	3x	101	300101
2	Gross weight	3x	103	300103
3	Net weight	3x	105	300105

1) Read Inputs (8 bits)

Inputs		Address		
	Description	Code	Address	Combined
1	Start	1x	1	100001
2	Stop	1x	2	100002
3	Start dosing	1x	3	100003
4	Accept tolerance	1x	4	100004
5	Open release valve	1x	5	100005
6	Not used	1x	6	100006
7	Not used	1x	7	100007
8	Not used	1x	8	100008

2) Read Outputs (8 bits)

Outputs		Address		
	Description	Code	Address	Combined
1	Fine	1x	201	100201
2	Coarse	1x	202	100202
3	Ready	1x	203	100203
4	Busy	1x	204	100204
5	Tolerance high	1x	205	100205
6	Release valve	1x	206	100206
7	Not used	1x	207	100207
8	Not used	1x	208	100208

3) Read Markers (8 bits)

Markers		Address		
	Description	Code	Address	Combined
1	Dosed weight OK	0x	417	000417
2	Tolerance high	0x	418	000418
3	Not used	0x	419	000419
4	Not used	0x	420	000420
5	Not used	0x	421	000421
6	Not used	0x	422	000422
7	Not used	0x	423	000423
8	Not used	0x	424	000424

4) Write Markers (8 bits)

Markers		Address		
	Description	Code	Address	Combined
1	Start / Stop	0x	433	000433
2	Start dosing	0x	434	000434
3	Accept tolerance	0x	435	000435
4	Copy recipe parameters	0x	436	000436
5	Not used	0x	437	000437
6	Not used	0x	438	000438
7	Not used	0x	439	000439
8	Not used	0x	440	000440

5) Read Ext. Registers (dint)

Ext. Registers		Address		
	Description	Code	Address	Combined
1	Net weight	3x	1001	301001
2	Last gedosed weight	3x	1003	301003
3	Copy setpoint	3x	1005	301005
4	Analog output value	3x	1007	301007
5	Not used	3x	1009	301009
6	Not used	3x	1011	301011
7	Not used	3x	1013	301013
8	Not used	3x	1015	301015
9	Not used	3x	1017	301017
10	Not used	3x	1019	301019

6) Write Ext. Registers (dint)

Ext. Registers		Address		
	Description	Code	Address	Combined
1	Setpoint	4x	1021	301021
2	Turnover	4x	1023	301023
3	Inflight	4x	1025	301025
4	Coarse speed	4x	1027	301027
5	Fine speed	4x	1029	301029
6	Min tolerance	4x	1031	301031
7	Max tolerance	4x	1033	301033
8	Empty level	4x	1035	301035
9	Not used	4x	1037	301037
10	Not used	4x	1039	301039

7) Read Indicator status (16 bits)

Indicator status		Address		
	Description	Code	Address	Combined
1	Hardware overload	1x	1089	101089
2	Maximum load	1x	1090	101090
3	Stable weight	1x	1091	101091
4	Stable range	1x	1092	101092
5	Zero set	1x	1093	101093
6	Center of zero	1x	1094	101094
7	Zero range	1x	1095	101095
8	Zero track range	1x	1096	101096
9	Tare active	1x	1097	101097
10	Preset tare active	1x	1098	101098
11	New sample available	1x	1099	101099
12	Calibration invalid	1x	1100	101100
13	Calibration enabled	1x	1101	101101
14	Industrial mode	1x	1102	101102
15	Invalid weight	1x	1103	101103
16	Reserved	1x	1104	101104

8) Write Indicator control (8 bits)

Indicator control		Address		
	Description	Code	Address	Combined
1	Zero reset	0x	1001	001001
2	Zero set	0x	1002	001002
3	Tare off	0x	1003	001003
4	Tare on	0x	1004	001004
5	Toggle tare	0x	1005	001005
6	Preset tare	0x	1006	001006
7	Reserved	0x	1007	001007
8	Reserved	0x	1008	001008

Notes

About PENKO

Our design expertise include systems for manufacturing plants, bulk weighing, check weighing, force measuring and process control. For over 35 years, PENKO Engineering B.V. has been at the forefront of development and production of high-accuracy, high-speed weighing systems and our solutions continue to help cut costs, increase ROI and drive profits for some of the largest global brands, such as Cargill, Sara Lee, Heinz, Kraft Foods and Unilever to name but a few.

Whether you are looking for a simple stand-alone weighing system or a high-speed weighing and dosing controller for a complex automated production line, PENKO has a comprehensive range of standard solutions you can rely on.

Certifications

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

PENKO Professional Services

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

PENKO Alliances

PENKO's worldwide network: Australia, Belgium, Brazil, China, Denmark, Germany, Egypt, Finland, France, India, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Syria, Turkey, United Kingdom, South Africa, Slovakia Sweden, Switzerland and Singapore.
A complete overview you will find on: **www.penko.com/dealers**

PENKO Engineering B.V. ▪ Schutterweg 35, NL 6718XC Ede ▪ Tel +31 (0) 318525630 ▪ Fax +31 (0) 31852971 ▪ info@penko.com
Web ▪ www.penko.com