Manual

PENKO
an ETC Company

System | Loss In Weight | ⬤ Started

1,784 kg

Setpoint
3,00 kg/h
0,83 g/s

7,44%

Actual
3,00 kg/h
0,83 g/s

Gravimetric

Stop

PENKO

INDICATOR / CONTROLLER
FLEX

INDUSTRIAL INSTRUMENTATION

Table of contents.

Explanation of production screen.

Possible Indicator Errors:
```
------------    : Indicator not available.
= = = = =       : Maximum display value exceeded.
UUUUU           : Hardware Under load (loadcell defect?).
OOOOO           : Hardware Over load (loadcell defect?).
CCCCC           : No valid calibration available
```

System Button

Fast Selection Button

Run mode

Actual Weight

Wanted Flow kg/h

Wanted Flow g/s

Actual Flow kg/h

Actual Flow g/s

Show the Screw run when started

Analogue speed

Gravimetric or Volumetric mode

System   <<   Loss In Weight   Started

1,784 kg

Setpoint
3,00 kg/h
0,83 g/s

Actual
3,00 kg/h
0,83 g/s

7,44 %

Gravimetric

Stop

PENKO

INDICATOR / CONTROLLER
FLEX
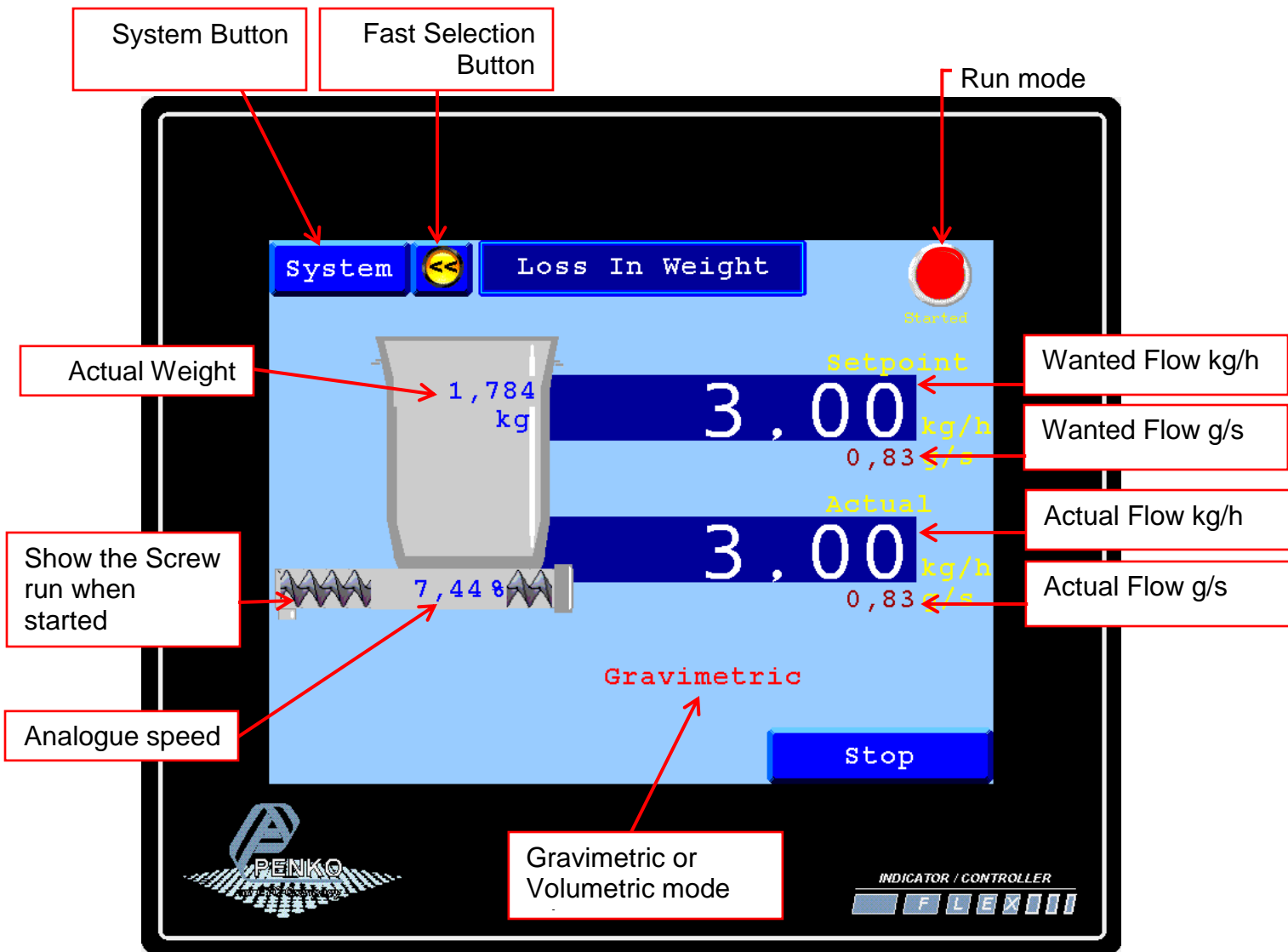
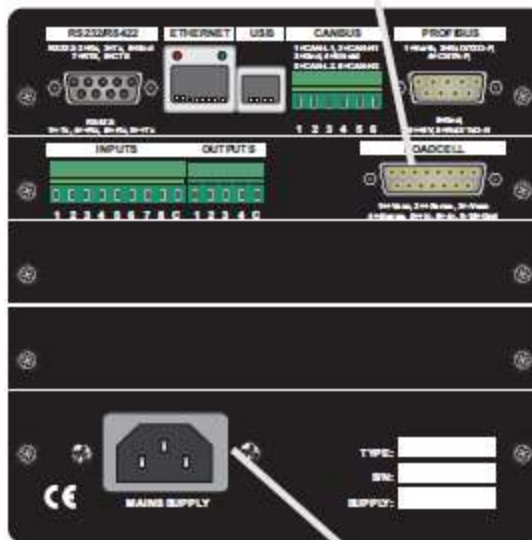## wiring connection for Flex-LIW model Flex.

Loadcell connection

Loadcell connection,
15p sub-D Female:

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

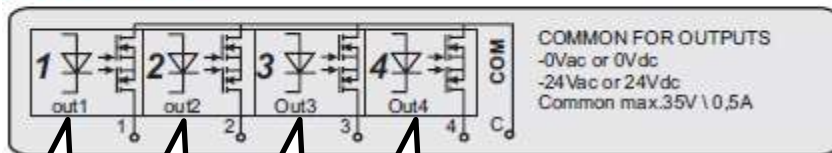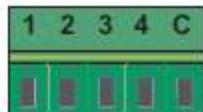### Digital Outputs:

COMMON FOR OUTPUTS
- 0Vac or 0Vdc
- 24Vac or 24Vdc
Common max.35V \ 0,5A

| Output Filling | Output Alive / Enable Screw | Output Low Level | Output Volu/Gravi metric |

AC Power supply
230 Vac   50/60 Hz

Digital Inputs:
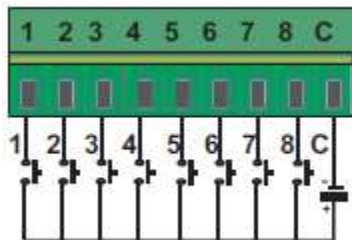
Input 1: Start / Stop (option)
Input 2: Stop (option)
Input 3: Always Volumetric
Input 4: Analogue Setpoint
Input 5-8 : Not used

Analog Outputs: (option)

Current outputs, 0/4 - 20/24mA

16 Bit Analog output

Analog output 1:
Screw Speed
Analog output 2:
Weigher level

Screw Speed

Weigher Level (option)

Wiring connection for Flex-LIW model Flex-2100.

Loadcell connection,
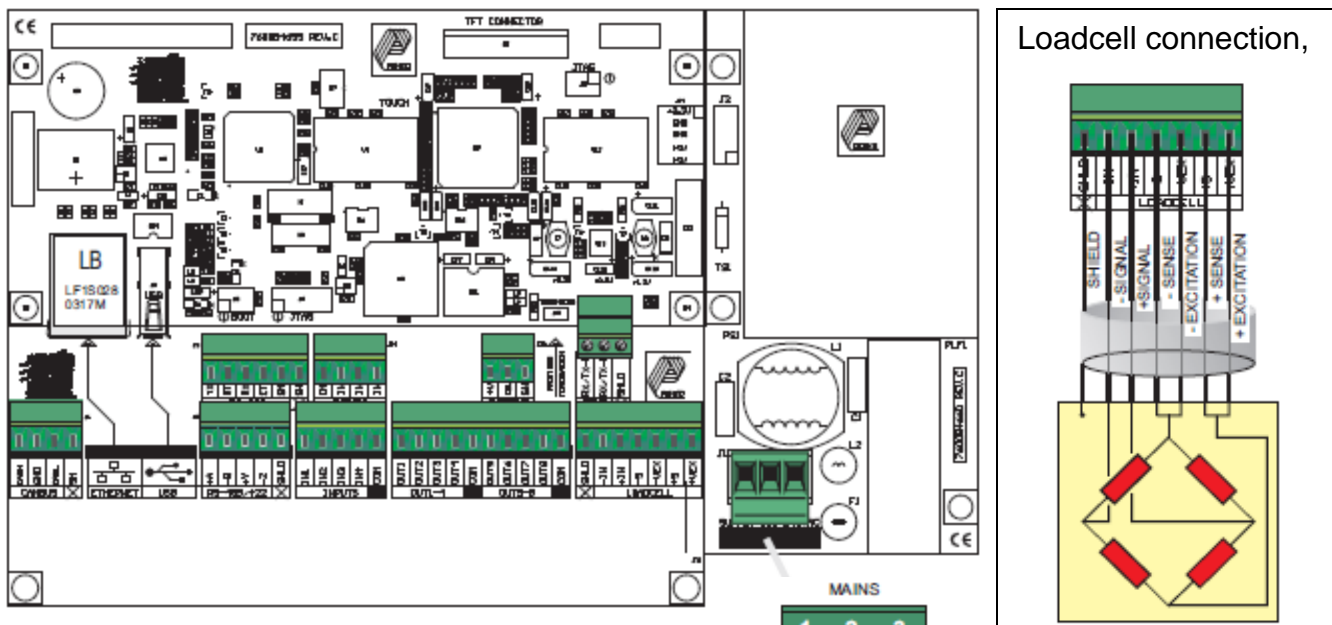
Digital Outputs:

AC Power supply
230 Vac   50/60 Hz

1	2	3

PH.   N.   PE.

MAINS
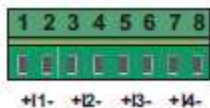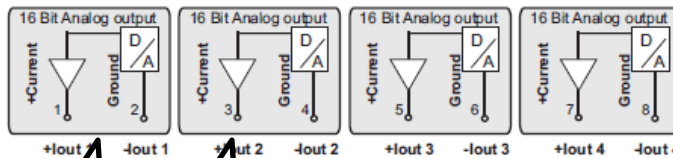
Output Filling	Output Alive / Enable Screw	Output Low Level	Output Volu/Gravi metric	Not Used	Not Used	Not Used	Not Used

COMMON FOR OUTPUTS
-0Vac or 0Vdc
-24Vac or 24Vdc
Common max.35V \ 0,5A

Digital Inputs:
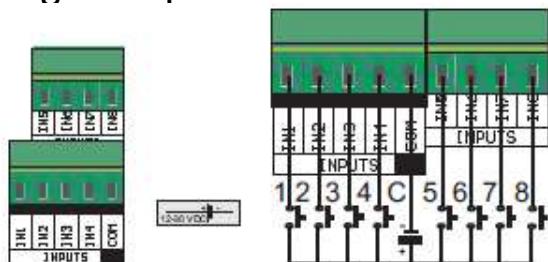
Analog Output: (option)

Analog output 1:
Screw Speed

Screw Speed

16 Bit Analog output
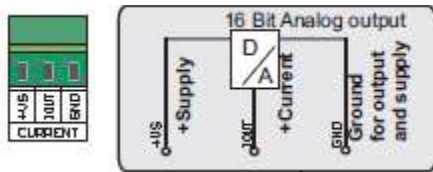
Power supply
for analog output
18-30Vdc

Input 1: Start / Stop (option)
Input 2: Stop (option)
Input 3: Always Volumetric
Input 4: Analogue Setpoint
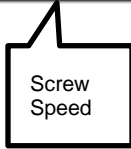
Selection Menu.

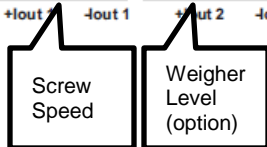When you press on the system button the selection buttons on the screen below appear.

The Configuration and System setting can get locked by a password. If so you see the screen right.

To log on press on the Settings button and press here on the Log On Button. Enter the password and the Main menu button get enabled as well.

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".

```
┌─────────────────────────┐
│ Enter the System settings. │
└─────────────────────────┘
```

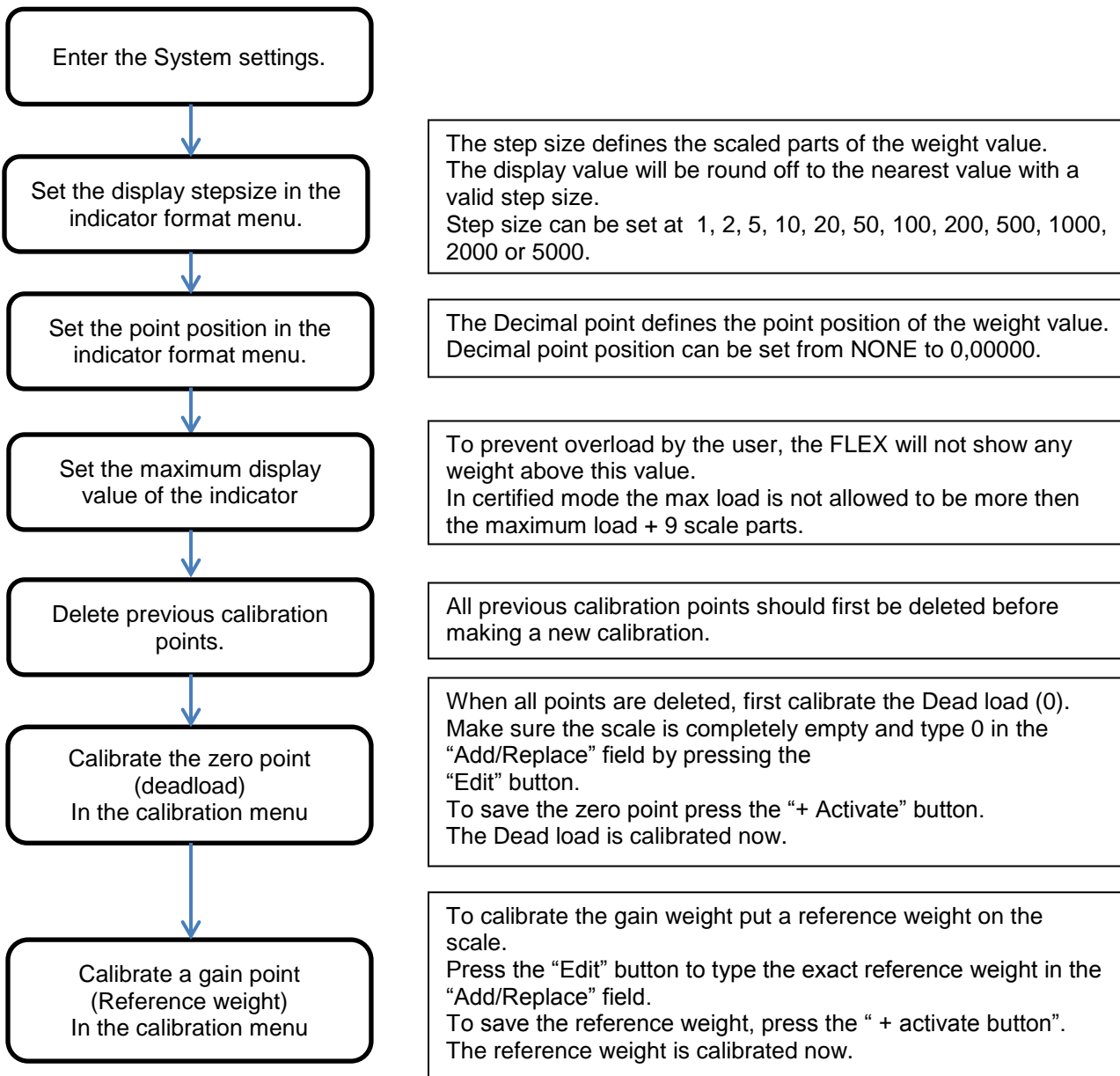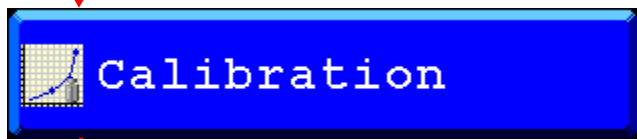| Set the display stepsize in the indicator format menu.	The step size defines the scaled parts of the weight value. The display value will be round off to the nearest value with a valid step size. Step size can be set at 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000 or 5000.
Set the point position in the indicator format menu.	The Decimal point defines the point position of the weight value. Decimal point position can be set from NONE to 0,00000.
Set the maximum display value of the indicator	To prevent overload by the user, the FLEX will not show any weight above this value. In certified mode the max load is not allowed to be more then the maximum load + 9 scale parts.
Delete previous calibration points.	All previous calibration points should first be deleted before making a new calibration.
Calibrate the zero point (deadload) In the calibration menu	When all points are deleted, first calibrate the Dead load (0). Make sure the scale is completely empty and type 0 in the "Add/Replace" field by pressing the "Edit" button. To save the zero point press the "+ Activate" button. The Dead load is calibrated now.
Calibrate a gain point (Reference weight) In the calibration menu	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. To save the reference weight, press the " + activate button". The reference weight is calibrated now.

Calibration.

To calibrate the indicator, follow the next steps:

System settings

↓

System Setup

↓

Indicator Setup

↓

Calibration

↓

Enter CAL code → TAC:00000004 / CAL:00000001
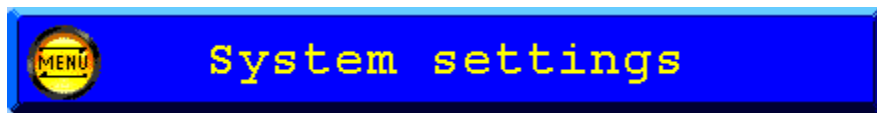
Enter the "CAL" code and press OK.
This "CAL" code is shown in the right upper corner.

↓

Points

↓
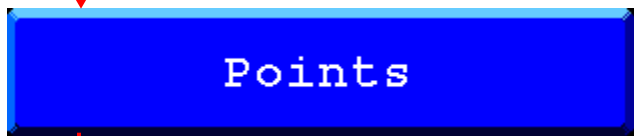
— Delete

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

↓

+ Activate

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

↓

→ EDIT

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

↓

+ Activate

To save the second point, press the "+Activate" button.

System Selection structure:

Login first to enter the System settings,
Default no password is selected.
The overall password is "25630".
To change from screen to screen you must use the system button in the left upper corner.
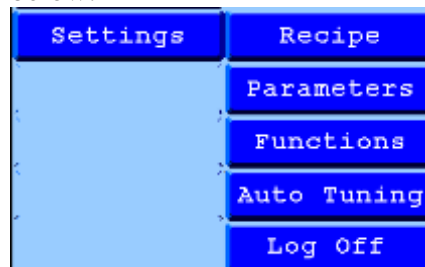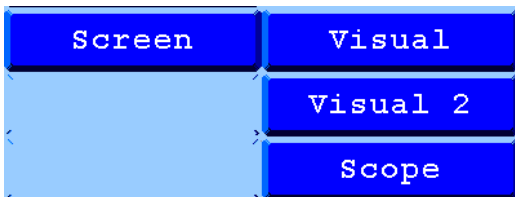If you press the button you get the drop down list with the option below.

When you press on the Mode button you can select the Start and the stop button

When you press on the Settings button you can select the option below.

When you press the screen button you can select which screen you want the have

Visual show the installation

Visual 2 show the installation with more details
Scope show the flow and the history flow in a bar graph.

When you press on the Menu Button you can choose the option below.
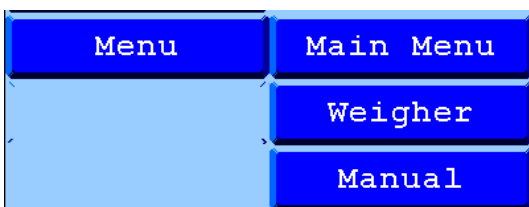
Main Menu enter the indicator setup (see manual Flex)
Weigher shows you the actual weight of the hopper.
Manual Shows al in /outputs when stopped you can test them here.

Select/Edit Recipe.

To select 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.
To return to the production screen without changes, press the "Return" button.
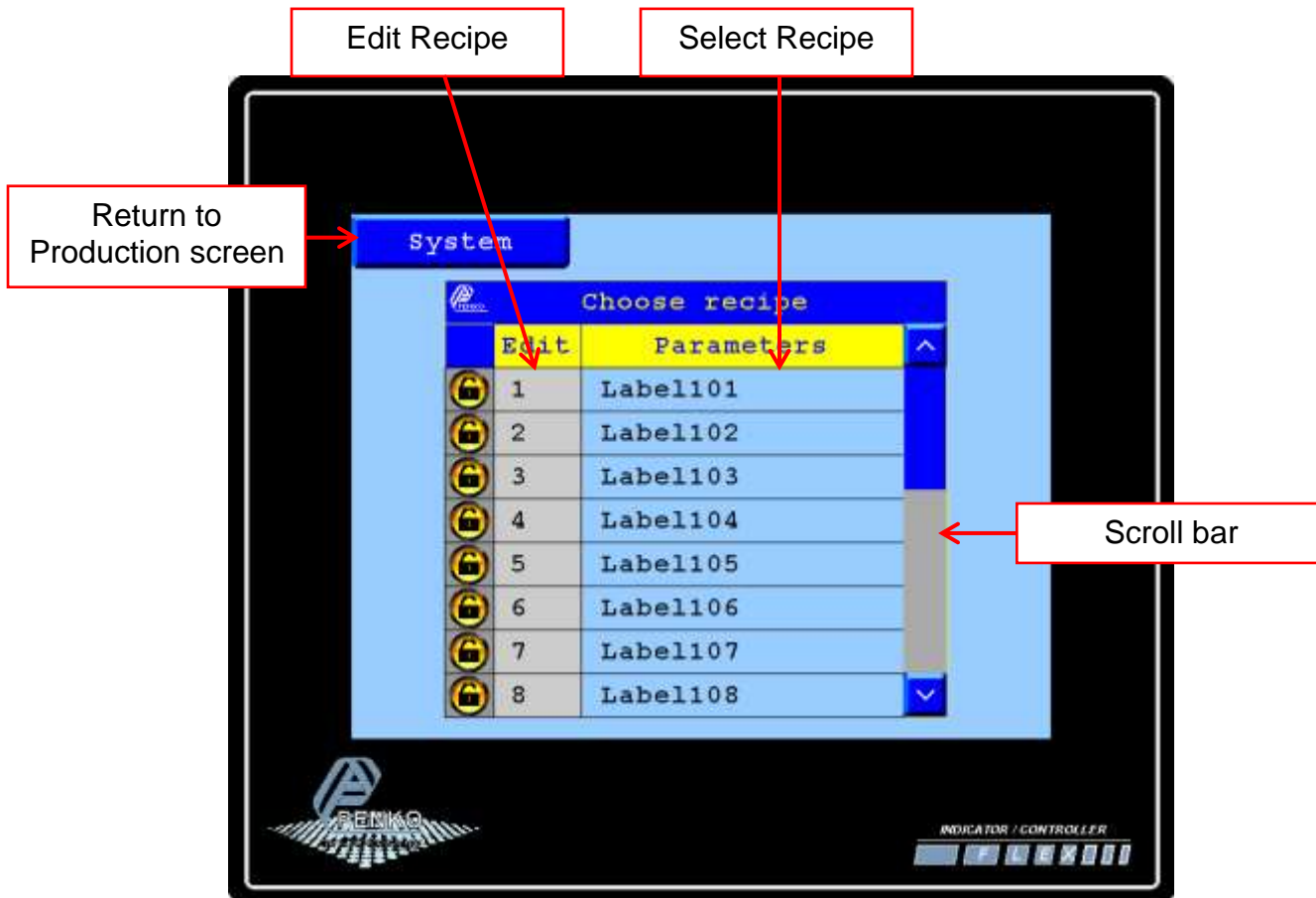
Edit Recipe parameters.

To edit the recipe name, press the recipe name.
To edit a recipe parameter, press the value in the blue fields.
To return to the previous screen and save the recipe, press the "System" button.

Return to
Previous screen

Press on
Recipe name to
change

Edit Recipe
parameter

System	◄◄	LIW parameters

Recipe Name: RECIPE 1

Parameter	Value	Unit
Reserved	10,00	*
Fill Level	0,123	kg
Empty Level	0,010	kg
Error Band	1000	%
MAX.flow	12,00	kg/h
Kebtime	10,00	sec
Filter W	20	*
Filter kg/s	20	*
Filter kg/h	50	*
P gain	0,100	*
I gain	0,100	*
D gain	0,050	*
Planttime	20,00	sec
Scope min/max	1000	%
Scope low/high	5	%
Max.Flow Analoge	12,00	kg/h

Parameter name

Parameter Unit

Recipe parameters.

1) Reserved   : No function at the moment.
2) Fill Level   : The Fill till which the weigher get filled when the unit fill automatically. When the operator fills manual the weigher gives a output to indicate that refilling is needed.
3) Empty Level   : When the weigher is below this level an output is given to show system is out of product, when automatic filling is enabled the refilling starts.
4) Error Band   : When the actual flow is out of this band the System go to Volumetric mode.
5) Kebt time   : This is the time to stabilize the weight after a refill or after a disruption.
6) Filter Weight   : The Amount of samples to create a more stable weight (rolling average calculation)
7) Filter g/s   : The Amount of samples to create a more stable flow in g/s (rolling average calculation) is used for the PID calculation.
8) Filter kg/h   : The Amount of samples to create a more stable flow in kg/h (rolling average calculation).
9) P –gain   : Gain for the Proportional setting of the PID
10) I –gain   : Gain for the Integral setting of the PID
11) D –gain   : Gain for the Derivative setting of the PID
12) Plant time   : Reaction time for the PID calculation
13) Scope Min/Max   : To calculate the Max/Min value for the Bargraph
14) Scope High/Low   : To calculate the High/low value for the Bargraph
15) Max.Flow Analogue : If you get the Setpoint form an analogue input this is the max Flow when the analogue signal is 20mA/10Volt only possible with the flex controller.

Edit Recipe Functions.

To edit a recipe Function, press the value in the blue fields.
To return to the previous screen and save the recipe, press the "System" button.

Recipe Functions.
1) Gravimetric   : If select, the system does calculate the flow and correct the analogue to het the wanted flow. If this is not selected the system runs only in volumetric mode.
2) Manual Auto Tune   : If selected you must goto to the auto tuning to page to calculate the maximum capacity of the screw. Of not selected the system does the auto tuning always automatic when the system runs gravimetric for a least 30 seconds without any disruption.
3) Calc.Frozen Dac   : When Selected, the system calculate the analogue output by dividing the Max.Flow by the setpoint. Of not selected the last flow when the disruption appear is hold.
4) Automatic Fill?   : When selected the system refiil the hopper when the weight get below low level. Of not selected system need to get refilled manual.
5) Refill Enable   : When selected the system refill always. When not selected the system runs till empty.

Edit Max Flow with Auto tuning.

When the system has a disruption and it go to volumetric mode the installation recalculate the analogue speed of the Screw. When there is a big difference between the calculated speed and the real dosed flow then you can do an automatic Max flow calculation.

Press start tuning when the system is running, after a decent time you can press on the Stop tuning button.

The average flow during that time is calculated and this average is calculated to the maximum capacity of the screw.
When this value is ok you can use this value to take over in the recipe by pressing the accept button.
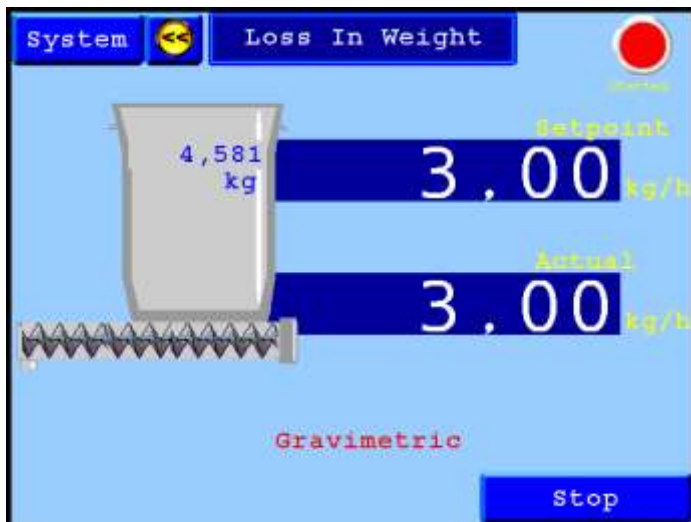
Edit Custom Password and Log on.

When you are logged off press on the button logon then you enter the screen right.
When you are logged On you are able to change the custom password.
The Master password is always 25630.

Possible Production screen.

Visualization

The light in the right upper corner show the system is started.
The weight in the hopper shows the actual filterd weight
The Setpoint value show the wanted setpoint in kg/s, press on it to change the setpoint.
The actual Flow show the flow which is measured when running gravimetric, when running volumetric it is calculated.
Press stop to stop the installation.

Visualization 2

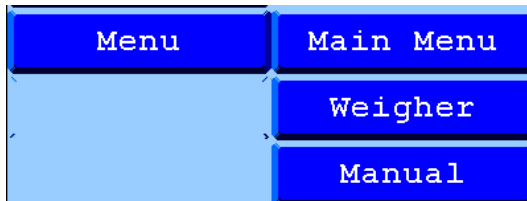Show the same as visualization but with more detailed information like screw speed and flow in g/s
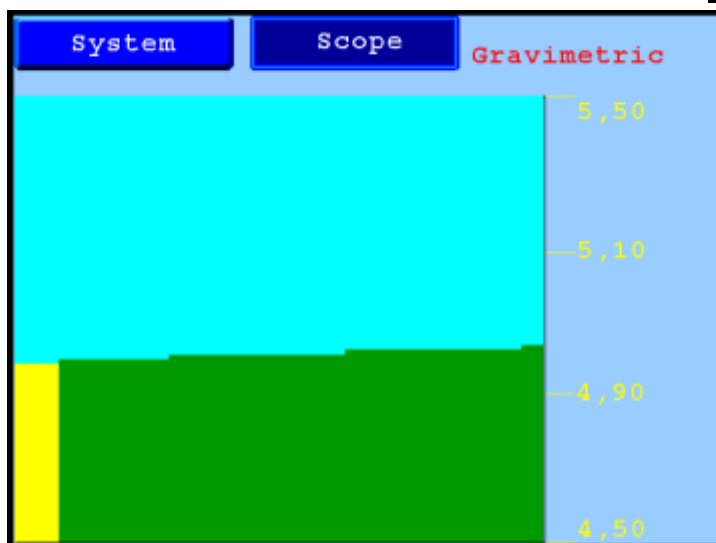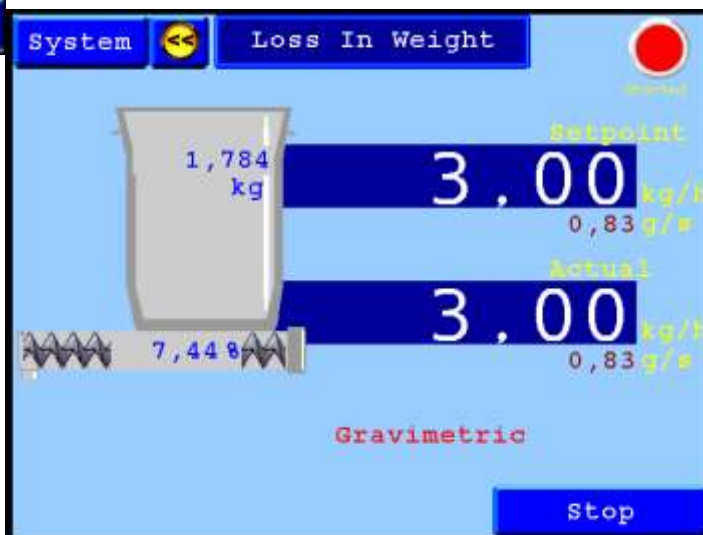
Scope

On this screen you see the scope of the history from the installation when the flow is between high and low level the bar graph is green.
If below low level the bar graph is yellow.
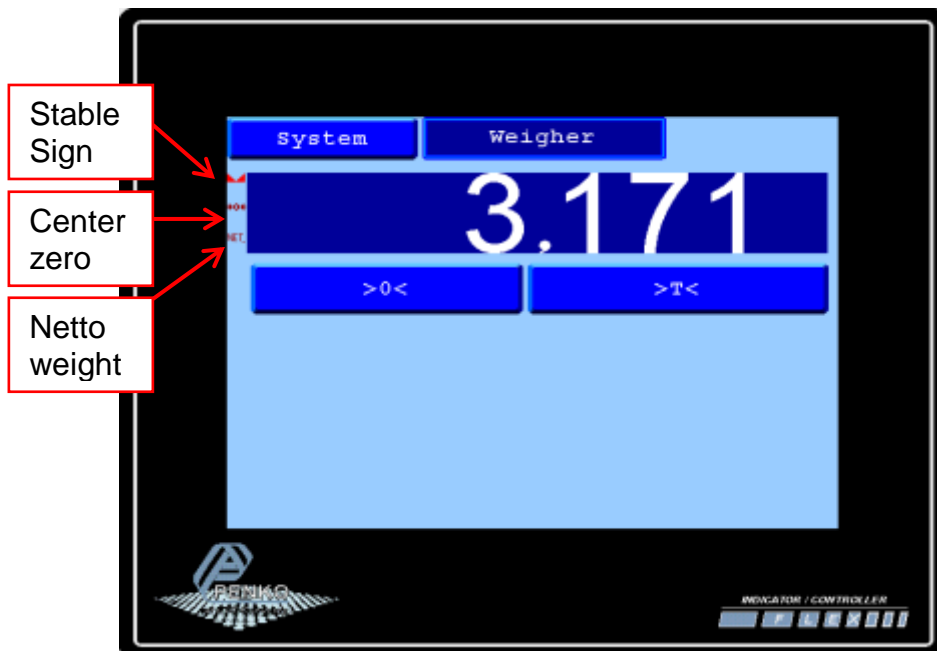If above high level the bar graph is red,

Menu selections

The button Main Menu open the
System setup of the indicator.
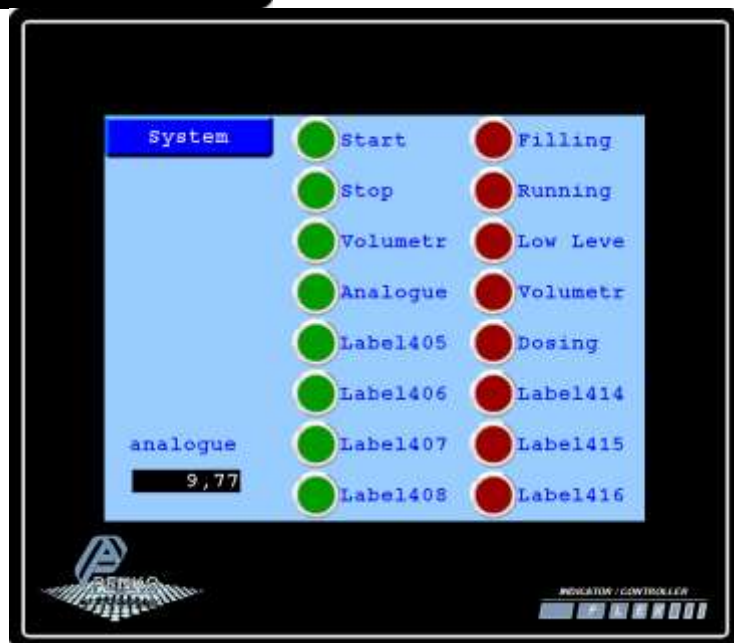For more information look in the
Manual of the flex controller.

Menu	Main Menu
	Weigher
	Manual

Weigher screen.

Stable Sign

Center zero

Netto weight

System	Weigher
	3,171
>0<	>T<

On this screen you see
the actual weight of
the hopper.
You can set the
weigher to zero and
press the tare button
for testing or ther
weigher work correct

Manual Screen.

On this screen you can see all in and
ouputs of the controller.
When the system is not running you can
simulate the outputs just bij pressing on
the light.
When you press on the name you can
change the name.
The analogue you can simulate here also.

System

● Start	● Filling
● Stop	● Running
● Volumetr	● Low Leve
● Analogue	● Volumetr
● Label405	● Dosing
● Label406	● Label414
● Label407	● Label415
● Label408	● Label416

analogue
9,77

Information.

To view the Penko contact information, press the "information" button from the selection menu.

Profibus Data Explanation.

Status Information from the Controller:

1) 32 bit signed Integer / float   Gross Weight
2) 16 bit status information
   - 1 = tare active
   - 2 = preset tare active
   - 3 = new sample available
   - 4 = calibration invalid
   - 5 = calibration enabled
   - 6 = user certified operation
   - 7 = reserved
   - 8 = reserved
   - 9 = hardware overload detected
   - 10 = overload detected
   - 11 = stable signal
   - 12 = in stable range
   - 13 = zero corrected
   - 14 = center of zero
   - 15 = in zero range
   - 16 = zero tracking posible
3) 16 bit command/Reserve bits
4) 16 bits input status
   - 1 = Start
   - 2 = Stop
   - 3 = Volumetric
   - 4 = Analogue setpoint
   - Others not use
5) 16 bits output status
   - 201 = Filling
   - 202 = Running / Enable Screw
   - 203 = Low Level
   - 204 = Volumetric / Gravimetric
   - 205 = Flowing
   - Others not use
6) 32 bits marker status
   - 401 = Manual / Automatic
   - 402 = Program Loaded
   - 403 = Screw state
   - 404 = Flow active
   - 405 = Stable
   - 406 = Center Zero
   - 407 = Tare Active
   - 410 = Master password
   - 411 = Custom Password

412 = Password OK
Others not in Use

7) 32 bits signed integer,   Flow kg/h
8) 32 bits signed integer,   Srew speed in %
9) 32 bits signed integer,   Weigher value in %
10) 32 bits signed integer,   Recipe Nr.

Status Information from the PLC:

1) 16 bits Command/ Reserved Bits
        1 = zero reset command
        2 = zero set command
        3 = tare off
        4 = tare on
        5 = free
        6 = free
        7 = free
        8 = free
2) 32 bits Control markers
        969 = Start
        970 = Stop (NC)
        971 = Volumetric
        972 = Sp from Dp
        Others not in use.

3) 32 bits Signed integer,   Setpoint
4) 32 bits Signed integer,   Fill Level
5) 32 bits Signed integer,   Refill Level
6) 32 bits Signed integer,   Flow kg/h