

PENKO Engineering B.V.

Your Partner for Fully Engineered Factory Solutions



Manual:
1020 Supplement Mono Filler Controller



PENKO

an ETC Company

1020 Mono Filler

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1 Introduction

This manual is applicable for the following Mono Filler devices:

- 1020 MFL
- 1020 CAN-RS232-RS422 MFL
- 1020 Profibus MFL

To configure and control the Belt Weigher, the following options are available:

Full control:

- PENKO Pi Mach II software
- PENKO PDI Client software
- Modbus protocol
- Profibus protocol
- EtherNet/IP protocol
- ASCII protocol

Basic control:

- Fins protocol*
- PENKO TP protocol*

** Register functions not available*


Note:


This manual does not describe the basic functionality of the device. Consult the device manual for this.


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Status Indications:





 Programme running

 Course – course dosing valve active

 Fine – fine dosing valve active

 Busy – filling in progress

 Release – release valve active

 Alarm – alarm output active

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3 Configure and control

To configure and control the Mono Filler, the following options are available:

- PENKO configuration software
- Device
- Industrial protocols

3.1 PENKO configuration software

PENKO Pi Mach II and PENKO PDI Client can be downloaded from www.penko.com



USB driver and user manual are included in the download

Pi Mach II supports USB and Ethernet connection. PDI Client is USB only.

Consult the manuals on how to install and connect to the device.

In the tree structure of the device, the configuration parameters are found at:

PENKO - PENKO 1020 - System Setup - Configuration

Configuration parameters

	PENKO	Dosing	In	Release Valve	No
	PENKO 1020	Weighing	Net	Empty Level	0,000 kg
	1.1.1 Name =	Stability	Stable	Empty Time	0,00 s
	1.1.2 Start Quick setup	H-Time	0,00 s	Recipe	Local
	1.1.3 Enable Full setup	K.E.B.Time	0,00 s	Online Ticket	No
	Live	Inflight	0 %	Use Alibi Memory	No
	System	Max Inflight Corr	10,000 kg	Coarse Delay	0,00 s
	System Setup	Turnover Correction	0 %	Fine Delay	0,00 s
	Service	Fine Time	0,00 s	Start Delay	0,00 s
	Indicator	Tolerance	No	Start Level	No
	Communication	Tolerance Interval	0,00 s	Auto Start	No
	Analog output	Display Hold	0,00 s		
	Passwords				
	Screen				
	Clock				
	Printer				
	Configuration				
	Factory recall				
	Recipe				
	Control				
	Access				

The parameters are explained in [chapters 4](#)



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In the tree structure of the device, the recipe parameters are found at:

PENKO - PENKO 1020 - Recipe

Recipe parameters

[-] PENKO	Setpoint	<input type="text" value="0,000"/> kg
[-] PENKO 1020	Turnover	<input type="text" value="0,000"/> kg
1.1.1 Name =	Inflight	<input type="text" value="0,000"/> kg
1.1.2 Start Quick setup	Min.Tolerance	<input type="text" value="80,000"/> kg
1.1.3 Enable Full setup	Max.Tolerance	<input type="text" value="0,000"/> kg
[-] Live	Coarse Speed	<input type="text" value="0,00"/> %
[-] System	Fine Speed	<input type="text" value="0,00"/> %
[-] System Setup	Minimum Level	<input type="text" value="0,000"/> kg
[-] Service	Maximum Level	<input type="text" value="10,000"/> kg
[-] Indicator	Code	<input type="text" value="2000"/>
[-] Communication		<input type="button" value="Save Turnover/Inflight"/>
[-] Analog output		
[-] Passwords		
[-] Screen		
[-] Clock		
[-] Printer		
[-] Configuration		
[-] Factory recall		
[-] Recipe		
[-] Select Recipe		
[-] Edit Recipe		
[-] Control		
[-] Access		

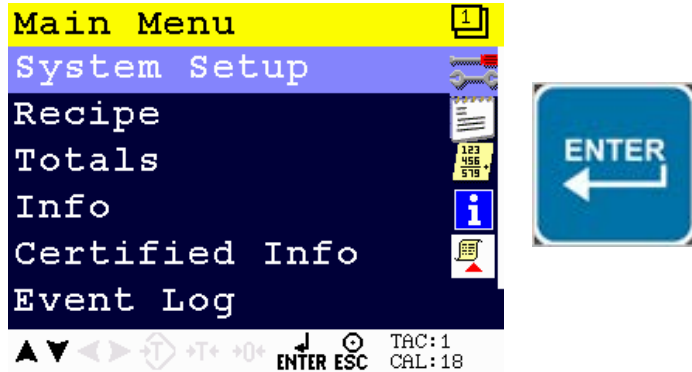
The parameters are explained in [chapters 4](#)

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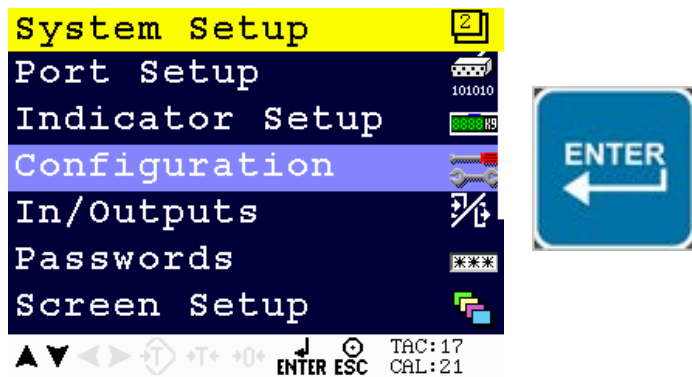
3.2 Device

Configuration

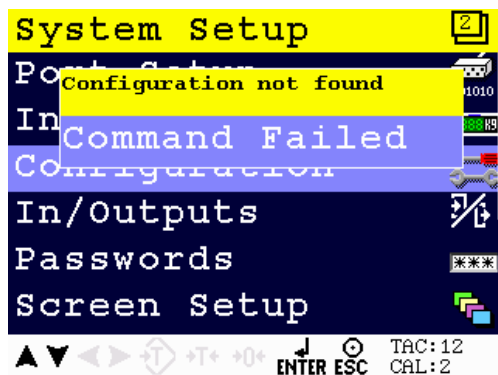
Select **System Setup** from the **Main Menu** and press **Enter**



Select **Configuration** from the **System Setup Menu** and press **Enter**

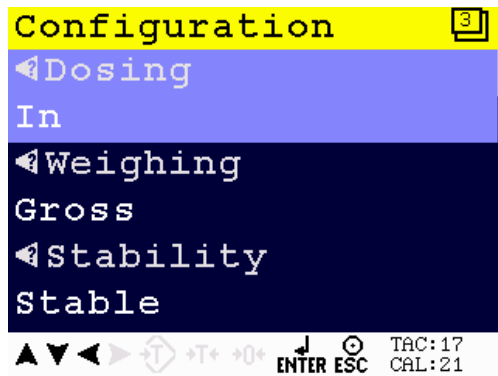


The following error is visible if no configuration is present.

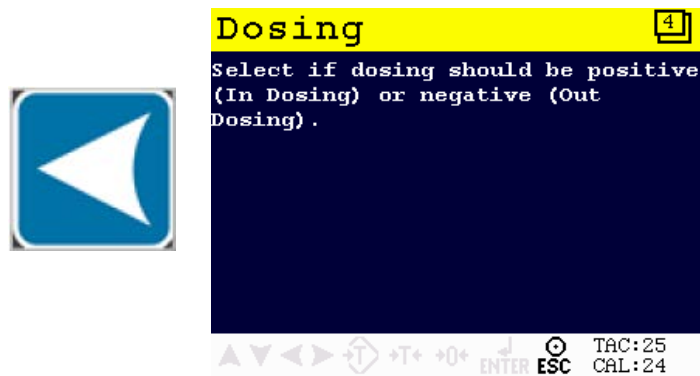


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Press **Enter** to start with default values.



When pushing the LEFT key, the help text of the parameter is shown. Below the example for of the help text for the parameter Dosing.



The parameters are explained in [chapters 4](#)

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Recipe

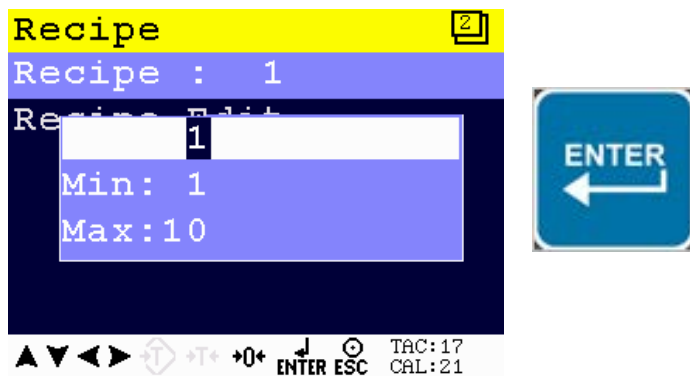
Select **Recipe** from the **Main Menu** and press **Enter**.



Select recipe and press **Enter**.



Enter the recipe that needs to be edited and press **Enter**.



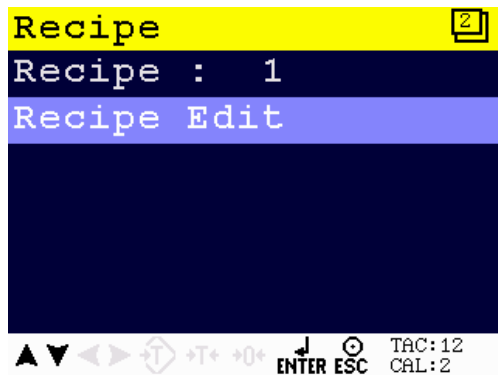
A maximum of 10 recipe can be stored.

If the selected recipe does not exist, the following error will accrue.

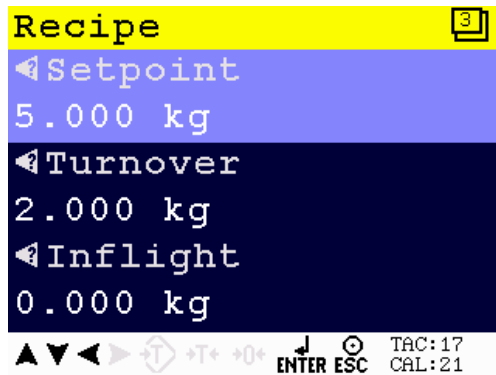
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To edit current selected recipe parameters, select Recipe Edit and press **Enter**.



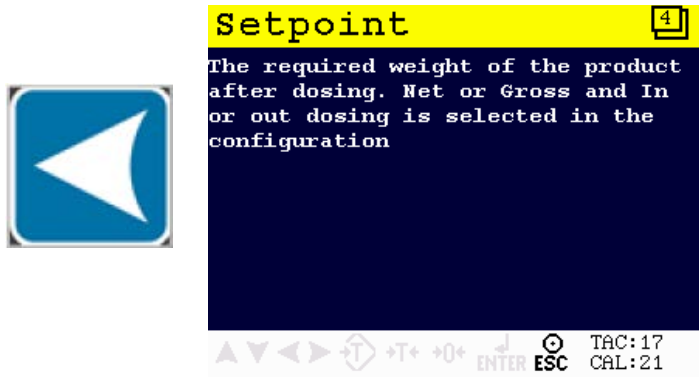
The following screen is visible:



When pushing the LEFT key, the help text of the parameter is accessed.

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Below a help text example of the parameter "Setpoint".

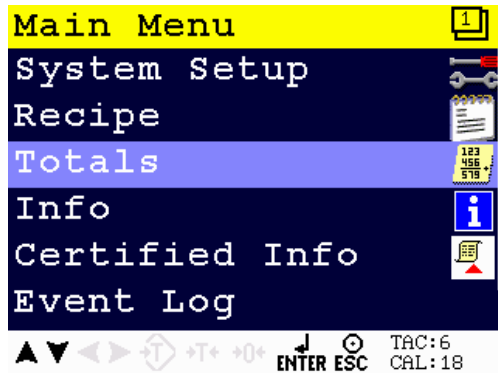


The parameters are explained in [chapters 4](#)

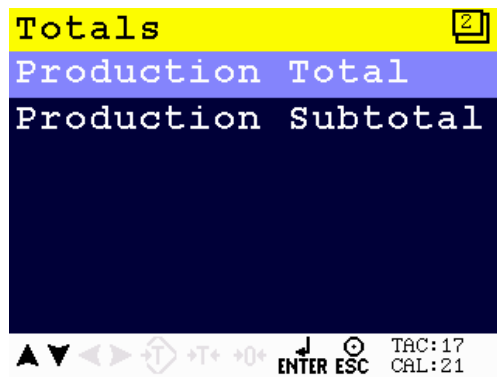
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Totals

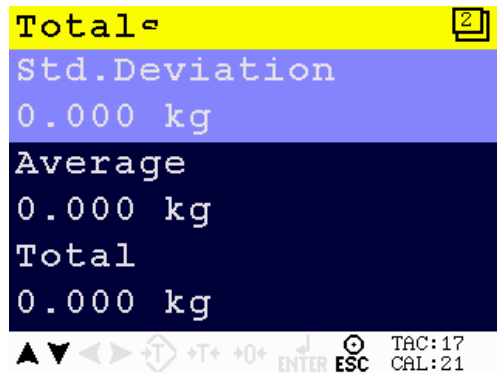
Select **Totals** from the **Main Menu** and press **Enter**.



In the Totals menus, you can choose between Production Total and Production Subtotal.



Production total.



Totals and subtotals can be printed by pressing Enter.

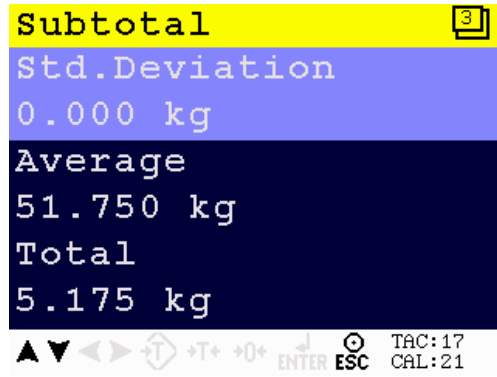


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Totals and subtotals can be reset by pressing Zero.



Production Subtotal.



Totals and subtotals can be printed by pressing Enter.



Totals and subtotals can be reset by pressing Zero.



3.3 Industrial protocols

The PENKO protocols Modbus, Profibus, EtherNet/IP and ASCII have a function set called register functions. These functions allow the user to configure and control the device.

Protocol descriptions can be downloaded from www.penko.com

Consult these on how to connect the device and use the register functions.

	1020	1020 CAN-RS232/422	1020 Profibus
Modbus TCP	✓	✓	✓
Modbus SERIAL		✓	
Profibus			✓
EtherNet/IP	✓	✓	✓
ASCII TCP	✓	✓	✓
ASCII SERIAL		✓	

Note: the FINS and PENKO TP protocol do not support register functions, only basic read and write operations for markers and registers.



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The parameters are explained in [chapters 4](#)

4 Parameters

These parameters correspond with the parameters in the tree structure of the device configuration. When using the industrial protocol register functions, each parameter can be reached using its number.

Some parameters can be reached directly using ASCII, TP protocol, Modbus RTU, Modbus TCP, Fins, Profibus or EtherNet/IP. The parameters for Profibus or EtherNet/IP are prefixed with **PB** or **EIP**.

Note: when the device is rebooted or the configuration is manually changed, all configuration parameters are changed back to the value that were last set manually in the configuration.

4.1 Configuration parameters

No.	Name	Description
1	Dosing	Select the type of dosing. <ul style="list-style-type: none">In => positive dosing (in-dosing)Out => negative dosing (out-dosing)
2	Weighing	Select the type of weighing. <ul style="list-style-type: none">Net => the indicator is automatically set to zero before the dosing starts.Gross => the indicator is not set to zero before the dosing starts. The product will be added to the scale. <p><i>Δ Not used if out-dosing is selected. In that case weighing is always Net.</i></p>
3	Stability	Select the type of stability to determine the end value after dosing. This parameter works together with the H-Time parameter. <ul style="list-style-type: none">Stable => wait for StableH-Time => wait for H-TimeH-Time + Stable => wait for H-time then StableH-Time / Stable => wait for H-time or StableStable + H-Time => wait for Stable then H-time

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4	H-time	The time the controller waits before determine the end value. The H-time works together with the stability parameter. <i>Δ Not used if Stability parameter is set to Stable</i>
5	K.E.B. time	Kinetic Energy Blind time is the time in which the kinetic energy disappears after coarse dosing turns off. The indicator value will not be read out by the program during this time. <i>Δ K.E.B. time must be less than the remaining Fine Time</i>
6	Inflight correction	The amount of product that falls on/into the weigher after dosing is stopped. The correction value indicates the strength of the correction. 0% means fixed inflight.
7	Maximum inflight	The inflight correction is not able to correct more than the maximum inflight. If the calculated inflight is 0, the inflight will not be corrected.
8	Turnover correction	This correction will automatically correct the turnover value to reach the needed Fine Time. 0% means fixed turnover.
9	Fine time	This is the ideal fine time to reach a fast dosing cycle. <i>Δ The remaining fine time must be more than the K.E.B. time</i>
10	Tolerance	This checks if the dosed weight is within the tolerance. If the dosed weight is under the setpoint - min. tolerance, the fine output will turn on until the weight is correct. If the dosed weight is over the setpoint + max. tolerance, an alarm is given until it's accepted by input 2. The minimum and maximum tolerance can be set in the recipe.
11	Tolerance interval	The interval time of the fine output (On/Off) in case of a low tolerance. If the tolerance interval is 0, the fine output is on until the correct weight is reached.
12	Display hold	After the dosing is finished, the display hold time starts. The dosed value will be frozen for this time. When a new dosing starts before the display hold time is elapsed, the hold time will be cut off.
13	Release valve	Select if a release valve is used in the installation. <ul style="list-style-type: none"> • Yes => output 4 is used to activate the release valve • No => output 4 is used to activate the indicator alarm
14	Empty level	The value under which the weigher is seen as empty after release. <i>Δ Not used if no release valve is selected</i>

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15	Empty time	The time it will take to close the release valve. The time will start when the empty level is reached. <i>Δ Not used if no release valve is selected</i>
16	Recipe	Select the used recipe. <ul style="list-style-type: none">• Local => use the recipe selected on the device• Remote => use the recipe from a remote device (e.g. PLC)
17	Online ticket	Select if a printer ticket must be generated after each filling.
18	Use alibi memory	Select if a result must be written to the internal alibi memory.
19	Coarse delay	The coarse delay time at the start of dosing.
20	Fine delay	The fine delay time at the start of dosing.
21	Start delay	The delay time before dosing.
22	Start level	Check the level of the weigher at the start of dosing. The level must be within the minimum and maximum level set in the recipe. <i>Δ Not used if out-dosing or release valve is selected</i>
23	Auto start	Automatically start dosing. <i>Δ Not used if out-dosing or release valve is selected or if start level is turned off</i>

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4.2 Recipe parameters

These parameters correspond with the parameters in the tree structure of the device Recipe. When using the industrial protocol register functions, each parameter can be reached using its number.

Some parameters can be reached directly using ASCII, TP protocol, Modbus RTU, Modbus TCP, Fins, Profibus or EtherNet/IP. The parameters for Profibus or EtherNet/IP are prefixed with **PB** or **EIP**.

Note: when the device is rebooted or the recipe is manually changed, all recipe parameters are changed back to the value that were last set manually in the recipe.

No.	Name	Description	Location
1	Setpoint	The amount of product that is wanted on/into or out of the weigher. The selection net or gross and in or out is made in the configuration menu.	PB-R85 EIP-R11
2	Turnover	Coarse dosing stops when the setpoint minus the turnover is reached. The dosing continues in fine mode. The correction strength is set in the configuration menu. <i>Δ The remaining fine time must be more than the K.E.B. time</i>	PB-R86 EIP-R12
3	Inflight	The amount of product that falls on/into the weigher after the fine output is switched off. This value can be automatically corrected using the inflight correction in the configuration menu.	PB-R87 EIP-R13
4	Minimum tolerance	The allowed tolerance of the end value under the setpoint. The fine output will stay on until the weight is within this range. <i>Δ Not used if no tolerance is selected</i>	
5	Maximum tolerance	The allowed tolerance of the end value above the setpoint. An alarm will be generated until the weight is accepted by input 2. <i>Δ Not used if no tolerance is selected</i>	
6	Coarse speed	During coarse dosing mode this value is used for the analog output.	
7	Fine speed	During fine dosing mode this value is used for the analog output.	

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8	Minimum level	If start level is turned on in the configuration, the weight must be above this value to start dosing.	
9	Maximum level	If start level is turned on in the configuration, the weight must be below this value to start dosing.	
10	Code	Enter a Batch code for printing reports.	

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4.3 Live process parameters

When using the industrial protocol register functions, each parameter can be read using its number.

Example: to read the value of low level, Use the function code 701 and value 1.

No.	Name	Description
1	Setpoint	Get the setpoint value.
2	Turnover	Get the turnover value.
3	Subtotal std.dev	Get the standard deviation of the subtotal.
4	Subtotal average	Get the average value of the subtotal.
5	Subtotal (weight) ok	Get the weight of the accepted products of the subtotal.
6	Subtotal count ok	Get the number of accepted product of the subtotal.
7	Reserved	-
8	Reserved	-
9	Reserved	-
10	Total Std.dev	Get the standard deviation of the total batch.
11	Total average	Get the average value of the total batch.
12	Total (weight) ok	Get the weight of the accepted products of the total batch.
13	Total count ok	Get the number of accepted product of the total batch.
14	Reserved	-
15	Reserved	-
16	Reserved	-
17	Alibi number	Get the number of the Alibi record.

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5 Inputs and outputs

The following inputs and outputs are used.

5.1 Inputs

Input	Name	Description	Profibus marker	EtherNet/IP marker
1	Start/Stop	Input must be high to run the program	969	433
2	Accept tolerance	Input to accept the dosing when the end value is out of tolerance.	970	434
3	Start dosing or start release	Input to start dosing or release (depends on the configuration parameters) when the ready output is ON.	971	435

5.2 Outputs

Output	Name	Description
1	Coarse	Output to enable coarse dosing. The output turns on when the dosing starts and will turn off when the setpoint minus the turnover value is reached.
2	Fine	Output to enable fine dosing. The output turns on when the dosing starts and will turn off when the setpoint minus the inflight value is reached. The output also turns on if the end value is under the tolerance.
3	Ready	Output to enable the ready output. The output turns on when dosing is not busy.
4	Release or Alarm	When a release valve is selected in the configuration, this output is used to activate the release valve. When no release valve is selected in the configuration, this output is used to activate the indicator alarm. This alarm can be reset by switching off input 1.
Analog out	Dosing speed	Dosing speed for coarse/fine filling will be available from 0,00% to 100,00%

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6 Printer Ticket

Example of the 1020 Printer recipe when 'Ticket' layout is selected.

Programmable header 1	
Programmable header 2	
Programmable header 3	
Programmable header 4	

DATE	07-10-11
TIME	05:57.13
RECIPE	001
TICKETS	100
DOSED	00000.00 kg

Programmable footer 1	
Programmable footer 2	

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7 Program basics

This chapter describes a few basics of the Mono Filler program which can be used when starting the program for the first time.

7.1 Out dosing

Dosing out of the weigher:

- Start the program with input 1 (start/stop)
- A pulse on input 3 (start dosing) starts the dosing
 - Dosing starts and tare will be taken
 - Output 1 (coarse) and output 2 (fine) turn on
 - DAC is set to the coarse speed
- Turnover value is reached
 - Output 1 (coarse) turns off
 - DAC is set to fine speed
- Setpoint value is reached
 - Output 2 (fine) turns off
 - DAC is set to 0.00%
- Dosed weight within tolerance?
 - Output 3 (ready) turns on
 - Dosing is complete
- Dosed weight outside tolerance?
 - Option to pulse input 2 (accept tolerance) to accept
 - Output 3 (ready) turns on
 - Dosing is complete
- A pulse on input 3 (start dosing) starts a new dosing
- Turn off input 1 (start/stop) to stop the program

7.2 In dosing with release valve

Dosing into the weigher and using a release valve:

Note the setting of the Weighing parameter:

- If set to Net, a tare will be taken before every dosing
- If set to Gross, tare will not be taken



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- Start the program with input 1 (start/stop)
 - Dosing starts (tare will be taken depending on weigher mode)
 - Output 1 (coarse) and output 2 (fine) turn on
 - DAC is set to the coarse speed
- Turnover value is reached
 - Output 1 (coarse) turns off
 - DAC is set to fine speed
- Setpoint value is reached
 - Output 2 (fine) turns off
 - DAC is set to 0.00%
- Dosed weight within tolerance?
 - Output 3 (ready) turns on
 - Dosing is complete
 - A pulse on input 3 (start release) activates output 4 (release)
- Dosed weight outside tolerance?
 - Option to pulse input 2 (accept tolerance) to accept
 - Output 3 (ready) turns on
 - Dosing is complete
 - A pulse on input 3 (start release) activates output 4 (release)
- When weight is below value of Empty Level parameter a new dosing starts
- Turn off input 1 (start/stop) to stop the program

7.3 In dosing without release valve

Dosing into the weigher without using a release valve:

Note the setting of the Weighing parameter:

- If set to Net, a tare will be taken before every dosing
- If set to Gross, tare will not be taken

- Start the program with input 1 (start/stop)
- A pulse on input 3 (start dosing) starts the dosing
 - Dosing starts (tare will be taken depending on weigher mode)
 - Output 1 (coarse) and output 2 (fine) turn on
 - DAC is set to the coarse speed

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- Turnover value is reached
 - Output 1 (coarse) turns off
 - DAC is set to fine speed
- Setpoint value is reached
 - Output 2 (fine) turns off
 - DAC is set to 0.00%
- Dosed weight within tolerance?
 - Output 3 (ready) turns on
 - Dosing is complete
- Dosed weight outside tolerance?
 - Option to pulse input 2 (accept tolerance) to accept
 - Output 3 (ready) turns on
 - Dosing is complete
- A pulse on input 3 (start dosing) starts a new dosing
- Turn off input 1 (start/stop) to stop the program

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8 Default settings

Configuration

Parameter	Out dosing	In dosing with release valve	In dosing without release valve
Dosing	Out	In	In
Weighing	Net	Net	Net
Stability	Stable + H-Time	Stable + H-Time	Stable + H-Time
H-Time	1.00 sec	1.00 sec	1.00 sec
K.E.B.Time	0.70 sec	0.70 sec	0.70 sec
Inflight	0 %	0 %	0 %
Max Inflight Correction	1.00 kg	1.00 kg	1.00 kg
Turnover Correction	10 %	10 %	10 %
Fine Time	1.00 sec	1.00 sec	1.00 sec
Tolerance	Yes	Yes	Yes
Tolerance Interval	1.00 sec	1.00 sec	1.00 sec
Display Hold	1.00 sec	1.00 sec	1.00 sec
Release Valve	Yes	Yes	No
Empty Level	0.50 kg	0.50 kg	0.50 kg
Empty Time	1.00 sec	1.00 sec	1.00 sec
Recipe	Local	Local	Local
Online Ticket	No	No	No
Use Alibi Memory	No	No	No
Coarse Delay	No	No	No
Fine Delay	No	No	No
Start Delay	No	No	No
Start Level	No	No	No
Auto Start	No	No	No

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To access the DAC setup, select **In/Outputs** from the **System Setup Menu** and press **Enter**. Select **DAC Setup** and press **Enter**.

DAC setup	Setting
Indicator	Speed
Min	0.00%
Max	100.00%
Mode	4 – 20 mA

To access the Weigher setup, select **Indicator Setup** from the **System Setup Menu** and press **Enter**. Select **Indicator** and press **Enter**, enter the **TAC code** (the TAC code is visible in the bottom right corner of the LCD screen) and press **Enter**. Select **Weigher** and press **Enter**.

Weigher	Setting
Unit Label	Kg
Step	1
Decimal point	0.00
Operation Mode	Industrial
Max Load	1000.00

To access the Stable Condition setup, select **Indicator Setup** from the **System Setup Menu** and press **Enter**. Select **Indicator** and press **Enter**, enter the **TAC code** (the TAC code is visible in the bottom right corner of the LCD screen) and press **Enter**. Select **Stable Condition** and press **Enter**.

Stable Condition	Setting
Range	0.10 kg

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Time	0.50 sec
-------------	----------

To access the Stable Condition setup, select **Indicator Setup** from the **System Setup Menu** and press **Enter**. Select **Indicator** and press **Enter**, enter the **TAC code** (the TAC code is visible in the bottom right corner of the LCD screen) and press **Enter**. Select **Filter** and press **Enter**. Select **Digital** and press **Enter**.

Filter Digital	Setting
Digital Filter	Dynamic App.
Cutoff Frequency	1.0 Hz
Frequency	10 Hz



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 and Switzerland, Singapore. A complete overview you will find on: www.penko.com/dealers

