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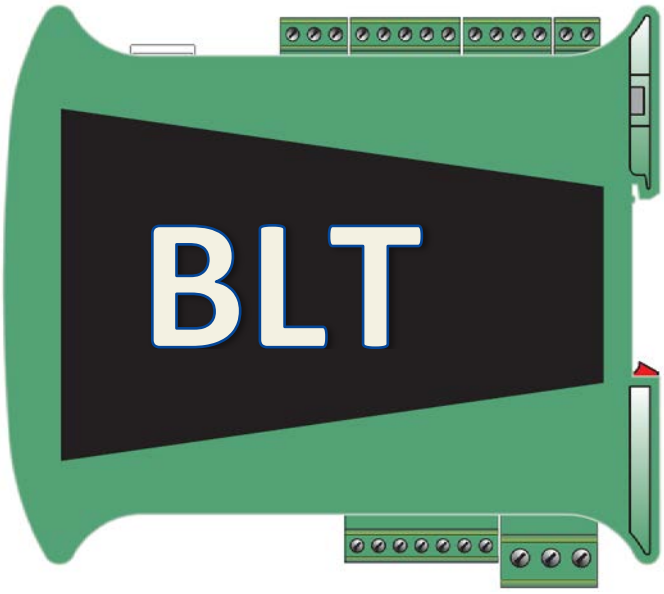


Manual:
SGM800 Supplement Belt Weigher Controller

PENKO
an ETC Company

Table of Contents

1 Introduction

This manual is applicable for the following Belt Weigher devices:

- SGM820 Ethernet BLT
- SGM830 CAN BLT
- SGM840 Profibus BLT
- SGM850 Serial BLT

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.

2 Indication of display

The SGM with closed cover:

1	Weigher stable	**4**	Output active 1 - 4
2*	Zero active	**5**	Weigher value
3*	Tare active		

** When the belt weigher program is active, LED 2 and 3 are blinking*

The SGM with open cover:

1	key 1 press <2sec.=	1 SHORT	**3**	key 3 press <2sec.=	3 SHORT
	key 1 press >2sec.=	1 LONG		key 3 press >2sec.=	3 LONG
2	key 2 press <2sec.=	2 SHORT			
	key 2 press >2sec.=	2 LONG			

Function of these keys are described on the next page

3 Explanation of front keys

All keys have different functions depending on weighing, menu or program mode.

Pressing key 1 "short".
In Weighing mode: create a new zero level
In Menu mode: increase value by 1 or move up in menu
In running mode: disabled

Pressing key 1 "long".
In Weighing mode: reset zero level to the original zero level
In Menu mode: decrease value by 1 or move down in menu
In running mode: disabled

Pressing key 2 "short".
In Weighing mode: set/ reset tare and reset preset tare
In Menu mode: go into sub-menu or move cursor 1 position to the left
In running mode: disabled

Pressing key 2 "long".
In Weighing mode: set preset tare
In Menu mode: move cursor 1 position to the right
In running mode: disabled

Pressing key 3 "short".
In Weighing mode: enter menu
In Menu mode: escape move back in menu without saving changes
In running mode: disabled

Pressing key 3 "long".
In Weighing mode: enter configuration menu
In Menu mode: Confirm made changes
In running mode: disabled

Menu will jump back one level every 30 seconds of inactivity

4 Configure and control

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

- PENKO configuration software
- Industrial protocols

4.1 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

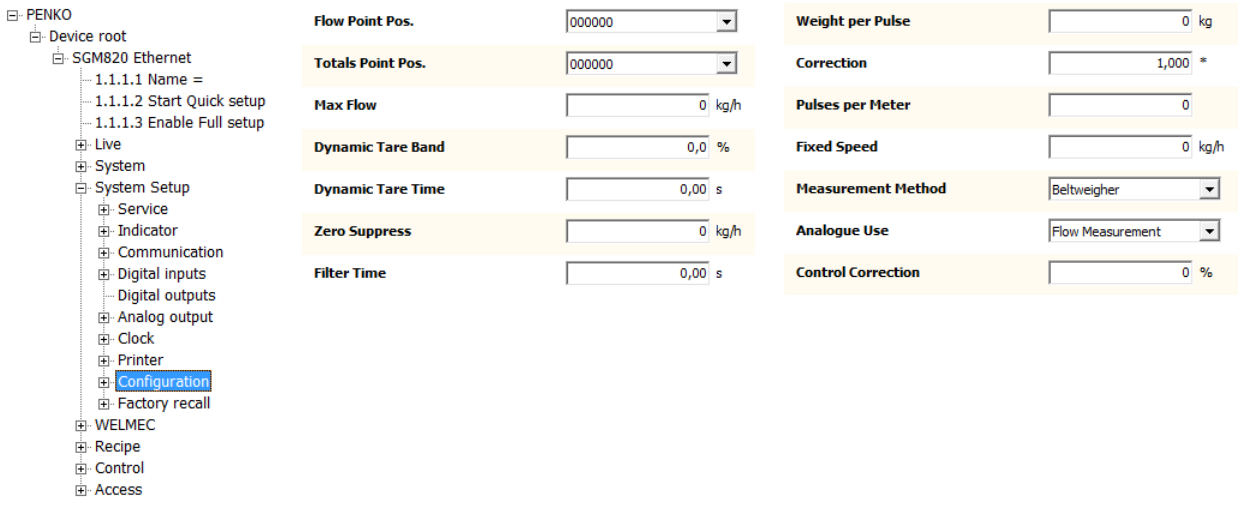
Pi Mach II supports USB and Ethernet connection. PDI Client is USB only.

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 - Device root - SGM8xx - System Setup - Configuration

Configuration parameters

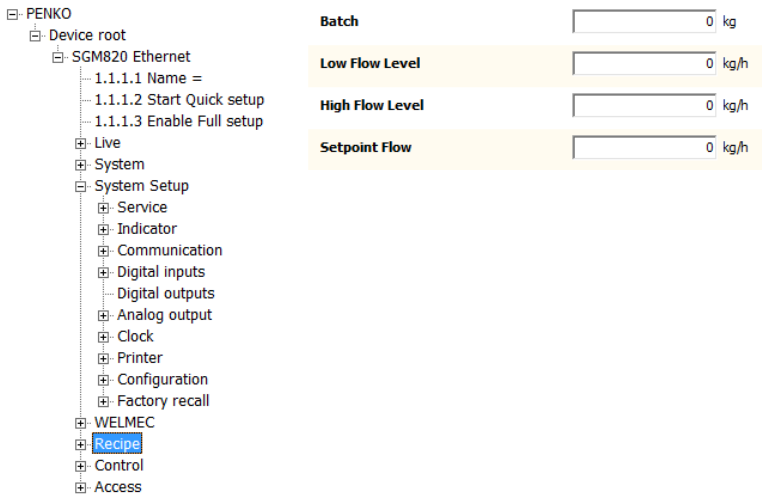


The parameters are explained in chapters 5

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

PENKO - Device root - SGM8xx - Recipe

Recipe parameters



The parameters are explained in chapters 5

4.2 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.

	SGM800	SGM810	SGM820	SGM830	SM840	SGM850
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.

The parameters are explained in chapters 5

5 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.

5.1 Configuration parameters

No.	Name	Description
1	Flow point position	The decimal point position for the flow indications.
2	Totals point position	The decimal point position for the totals indications.
3	Max flow	The maximum allowed flow. The analog output can signal the flow as a percentage of the maximum flow.
4	Dynamic tare band	Within this range a Dynamic Tare Measurement is allowed. This range is entered as a percentage of the maximum flow. For instants if there is a piece of product sticking to the belt. A new tare point can be set and it will show “0” again. If the new tare is outside the dynamic tare band range, alarm (output 1) is turned off.
5	Dynamic tare time	During this time the weight of the empty belt is sampled. The average weight is subtracted to correct the displayed weight. For best result, enter the number of seconds the belt takes to complete one revolution.
6	Zero suppression	The lowest allowed flow on the belt. Below this level, the flow is forced to zero and it will show that there is nothing on the belt. For example; if zero suppress is set to 1.000kg, every weight below 1.000kg will show as 0.000kg and every weight above 1.000kg will show as the actual weight.
7	Filter time	Time for filling the filter with one new value. 10 values are averaged to stabilize the flow display value.

8	Weight per Pulse	Weight indicated by one pulse of the PLC pulse output (Output 4). The pulse duration is 0.5s. For example; when set to 5.000kg, the device will send out a pulse after every 5.000kg. The fastest pulse time is 1Hz (0.5 sec high and 0.5 sec low).
9	Correction	Used to correct deviations in the total dosed amount by compensating for mechanical variations. When the final dosed amount is checked by weighing the resulting weight, the device can recalculate this factor by calculating: $new\ correction = checked\ batch\ total \times \frac{correction}{last\ batch\ total}$ After the calculation, both totals are equal.
10	Pulses per Meter	The number of pulses the tachometer generates per meter.
11	Fixed speed	When 0 is entered, the tachometer input is used to calculate the belt speed. When a fixed speed is entered, the tachometer input is used as a belt on signal.
12	Measurement method	The used flow measurement system. • Beltweigher => configure with the above settings • Impact flow meter => this has no moving parts so a fixed speed setting of 1 m/s and no pulse input are used.
13	Analog use	Select if the flow is measured or that the flow is regulated using the DAC. • Flow measurement => no regulation by the DAC • Flow regulation => the flow is regulated by the DAC
14	Control correction	When flow regulation is selected, this is the percentage that the analog control signal can be influenced by the flow regulation.
15	Use alibi memory	Select if a result must be written to the internal alibi memory.

5.2 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	Batch total	Required batch total to dose. When the set amount is reached output 2 turns off.	PB-R85 EIP-R11
2	Low flow	When the Flow is above 'Low level' and below 'High Level', the Flow is OK and Output 3 is on.	PB-R87 EIP-R13
3	High flow	When the Flow is above 'Low level' and below 'High Level', the Flow is OK and Output 3 is on.	PB-R86 EIP-R12
4	Setpoint flow	Setpoint for the Flow regulation. Only available when Flow regulation is selected.	PB-R88 EIP-R14

5.3 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	Net weight value	Get the actual filtered and net weight of the belt
2	Total	Get the actual total weight of the batch
3	Flow in kg/h	Get the actual flow of the product
4	Flow/Control	When analog use is set to flow measurement, the actual flow is shown as a percentage of the maximum flow.

		When analog use is set to flow regulation, the analog output is shown in a percentage. This percentage is used to control the flow per hour, to get the flow per hour as close as possible to the setpoint flow.
5	Net weight value * 10	Get the actual filtered and net weight * 10 of the belt
6	Reserved	
7	Reserved	
8	Reserved	
9	Reserved	
10	Reserved	
11	Reserved	
12	Reserved	
13	Reserved	
14	Reserved	
15	Reserved	
16	Reserved	
17	Reserved	
18	Reserved	
19	Reserved	
20	Reserved	
21	Max flow	Get the maximum allowed flow
22	dynamic tare band	Get the dynamic tare band
23	dynamic tare time	Get the dynamic tare time
24	Flow point position	Get the decimal point position for the flow indications
25	Totals point position	Get the decimal point position for the totals indications
26	Batch total	Get the batch total
27	High flow	Get the high flow
28	Low flow	Get the low flow
29	Setpoint flow	Get the setpoint flow
30	Reserved	
31	Speed in m/s	Get the speed of the belt
32	Reserved	

6 Inputs and outputs

The following inputs and outputs are used.

6.1 Inputs

Input	Name	Description	Profibus marker	EtherNet/IP marker
1	Start/Stop or Tachometer	The tachometer input which is used to measure the belt speed. When the belt speed is not used, a preset speed is entered and this input is used to start and stop dosing.	969	433
2	Dynamic tare	Start the Dynamic tare level measurement. During this measurement the average weight of the empty belt is determined.	970	434
3	Zero	Reset the total to zero.	971	435
	Total	The controller reads the batch total it receives from Profibus or EtherNet/IP.	972	436
	Flow OK	The controller reads the flow (low and high level) it receives from Profibus of EtherNet/IP.	973	437
	Setpoint	The controller reads the setpoint for the flow regulation it receives from Profibus or EtherNet/IP (only when flow regulation is selected).	974	438

6.2 Outputs

Output	Name	Description
1	Live/Alarm	Active when the controller is on. The output is turned off when an alarm situation occurs like overload, underload or dynamic zero fail.
2	Busy	Turned off when the batch total amount is reached.
3	Flow OK	Indicate if the flow is within its limits. The high and low limits can be set in the recipe.
4	Weight Pulse	Pulsed high for 0.5 seconds when a preset amount has been dosed. The dosed amount per pulse can be set in the configuration menu.

Analog out	Flow/Control	Depending on the configuration, this output can indicate or regulate the flow from 0.00% to 100.00% The DAC source can also be changed as described in the SGM manual. This way the output can also be used to signal dosed amount or belt weight.

7 Printer Ticket

Example of the SGM 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

  COUNT                         100

  ------------------------------------
---
```

8 Program basics

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

With input 1 you can **Start** (input high) and **Stop** (input low) the SGM. If you use a tachometer the SGM will start if the tachometer starts.

The SGM should start measuring the flow if the flow is above the **Zero Suppression**. If the weight is below the **Zero Suppression**, the weight will be set to zero.

The **Correction Factor** must be set to 1.000, this means that there is no correction.

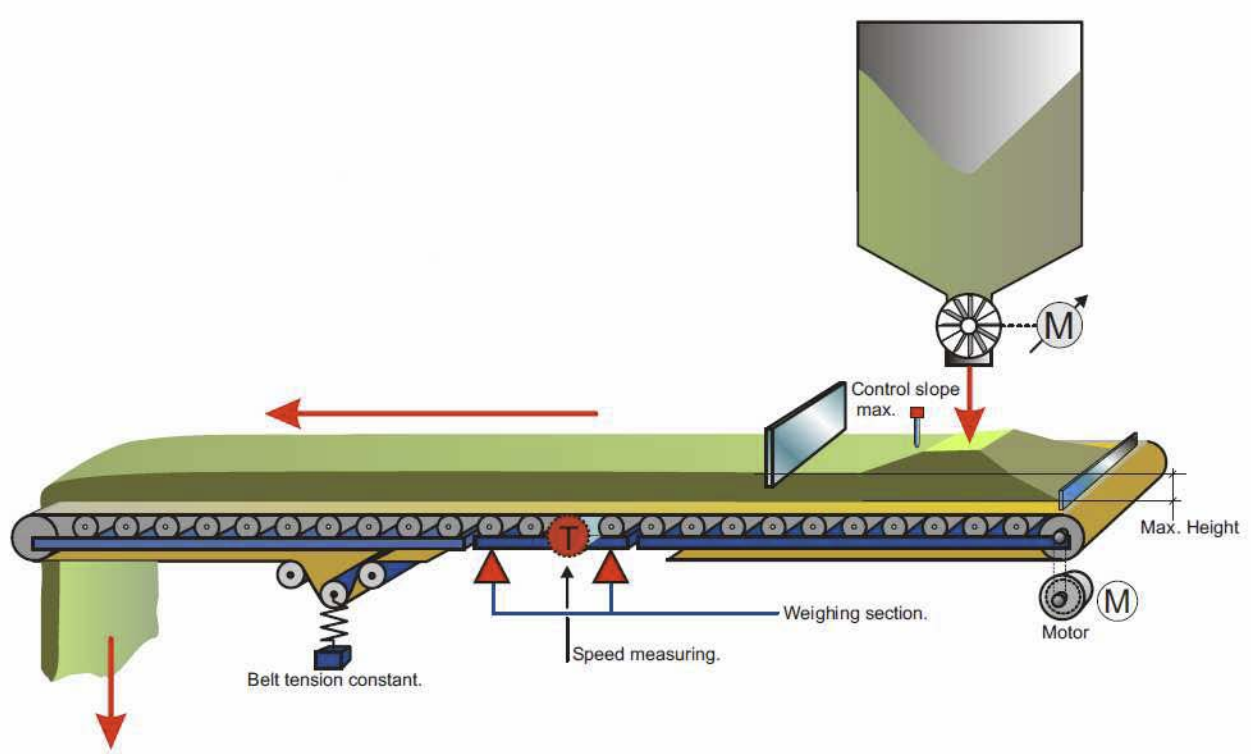
If you start the SGM for the first time you must follow these steps:

1. Start a Dynamic tare, if you get an alarm, set the weight to zero and start a new Dynamic tare. If the Dynamic tare went OK, proceed to step 2.
2. Let the SGM run without any product on the belt for a couple of minutes, the total should stay zero.
3. Let the SGM run with product on the belt and preform a correction (see page 12).

The analog output can send out the flow, or the weight, but the analog output can also be selected as a regulated output. The flow kg/h you have set is then maintained with the analog output.

You can set the ‘analog use’ to **Regulation** instead of **Measurement** in the **Configuration.** If you set the analog us to Regulation you can set the **Setpoint Flow** (in the Recipe) to the desired flow. The analog output must be set to **Control**.

SGM8xx Belt Weigher



9 Default settings

Configuration

Configuration	Setting
Flow Point Position	0.0
Totals Point Position	none
Max Flow	4000.0 kg/h
Dynamic Tare Band	10%
Dynamic Tare Time	30 sec
Zero Suppress	0.5 kg
Filter Time	1.0 sec
Weight per Pulse	10 kg
Correction	1.000
Pulses per Meter	0
Fixed Speed	1.000 m/sec
Measurement Method	Belt Weigher
Analogue Use	Flow Regulation
Control Correction	2%

DAC

DAC setup	Setting
Indicator	Control %
Min	0.00%
Max	100.00%
Mode	4 – 20 mA
Dynamic Tare Time	30 sec

SGM8xx Belt Weigher

Weigher

Weigher	Setting
Name	SGM Belt
Unit Label	Kg
Step	1
Decimal point	0.000
Operation Mode	Industrial
Max Load	100.000

Stable

Stable Condition	Setting
Range	0.010 kg
Time	1.00 sec

Filter

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.

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http://penko.com/nl/publications_certificates.html

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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**

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