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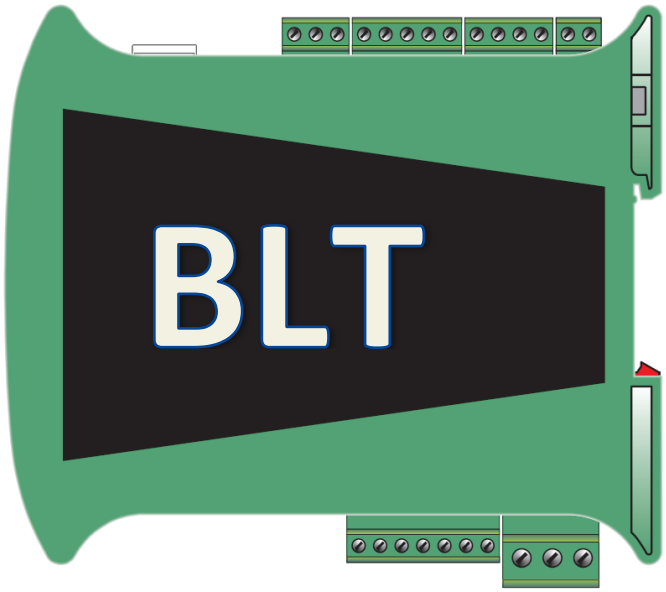

Manual:
SGM800 Supplement Belt Weigher Controller

PENKO
an ETC Company

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1 Introduction

This manual is applicable for the following Belt Weigher devices:

- SGM820 Ethernet BLT
- SGM840 Profibus BLT
- SGM850 Serial BLT
- SGM860 Profinet 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
- Profinet 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			

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

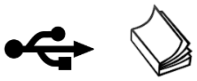
4 Configure and control

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

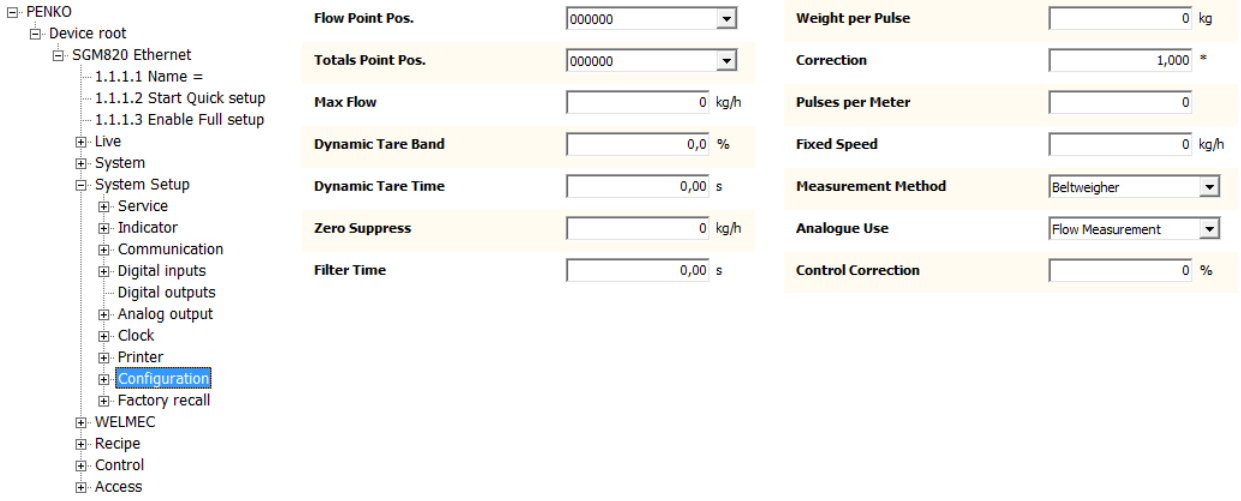
Pi Mach II supports USB and Ethernet connection. PDI Client is USB only.

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 - SGM800 - System Setup – Configuration

Configuration parameters

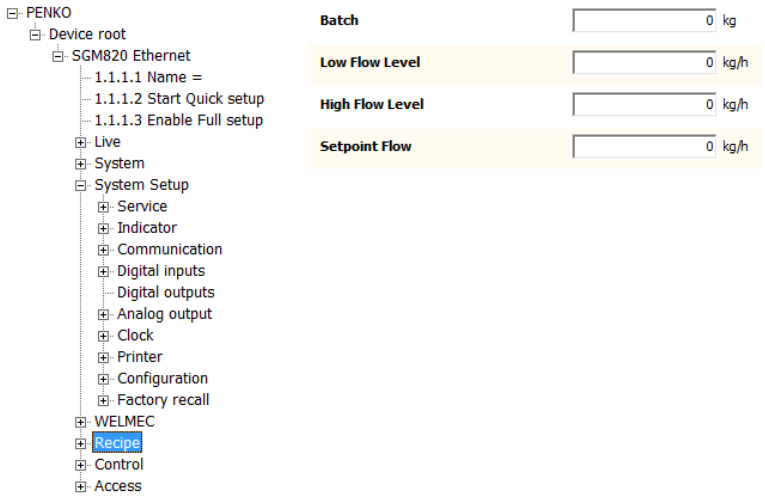


The parameters are explained in chapters 5

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

PENKO - Device root - SGM800 - Recipe

Recipe parameters



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, Profinet or EtherNet/IP.

The Profinet config parameters can be found in the PENKO Profinet Protocol manual.

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.

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
1	Batch total	Required batch total to dose. When the set amount is reached output 2 turns off.
2	Low flow	When the Flow is above 'Low level' and below 'High Level', the Flow is OK and Output 3 is on.
3	High flow	When the Flow is above 'Low level' and below 'High Level', the Flow is OK and Output 3 is on.
4	Setpoint flow	Setpoint for the Flow regulation. Only available when Flow regulation is selected.

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
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.
2	Dynamic tare	Start the Dynamic tare level measurement. During this measurement the average weight of the empty belt is determined.
3	Zero	Reset the total to zero.

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.

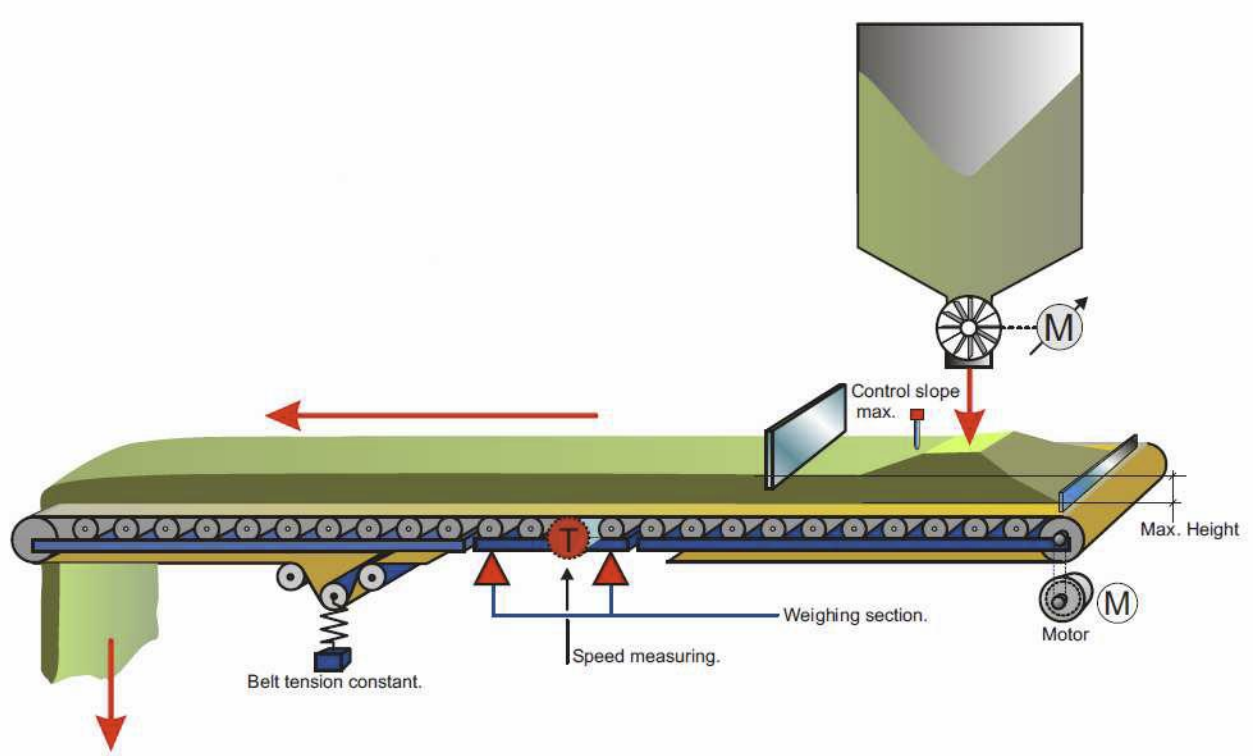
If you start the SGM for the first time you must follow these steps:

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**.

SGM800 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

SGM800 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

10 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	SGM840	SGM850	SGM860
Modbus TCP			✓			
Modbus SERIAL					✓	
Profibus				✓		
EtherNet/IP			✓			
ASCII TCP			✓			
ASCII SERIAL					✓	
Profinet IO						✓

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 chapter parameter

10.1 Modbus

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
0	Indicators	Read Input Registers (Function Code 04)	Cyclic, t#100ms	16#0064	44	Keep last value		
1	Inputs	Read Discrete Inputs (Function Code 02)	Cyclic, t#100ms	16#0000	3	Keep last value		
2	Outputs	Read Discrete Inputs (Function Code 02)	Cyclic, t#100ms	16#00C8	4	Keep last value		
3	Markers read	Read Coils (Function Code 01)	Cyclic, t#100ms	16#0190	32	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#0410	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	6

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

0) Read Indicators (dint)

Indicator		Address		
		Code	Address	Combined
1	Weight	3x	101	300101
2	Fast gross weight	3x	103	300103
3	Fast net weight	3x	105	300105
4	Display fast gross	3x	107	300107
5	Display fast net	3x	109	300109
6	Tare	3x	111	300111
7	Peak	3x	113	300113
8	Valley	3x	115	300115
9	Hold	3x	117	300117
10	Weight x10	3x	119	300119
11	Fast gross weight x10	3x	121	300121
12	Fast net weight x10	3x	123	300123
13	Display fast gross x10	3x	125	300125
14	Display fast net x10	3x	127	300127
15	Tare x10	3x	129	300129
16	Peak x10	3x	131	300131
17	Valley x10	3x	133	300133
18	Hold x10	3x	135	300135
19	Signal	3x	137	300137
20	Flow 0-100%	3x	139	300139
21	Corrected weight	3x	141	300141
22	Corrected weight *10	3x	143	300143
23	Speed	3x	145	300145
24	Flow	3x	147	300147
25	Totalizer	3x	149	300149
26	Control 0-100%	3x	151	300151

1) Read Inputs (3 bits)

Inputs		Address		
		Code	Address	Combined
1	Speed pulse / Running	1x	1	100001
2	External tare	1x	2	100002
3	Reset totalizer	1x	3	100003

2) Read Outputs (4 bits)

Outputs		Address		
		Code	Address	Combined
1	Alive / Alarm	1x	201	100201
2	Batch done	1x	202	100202
3	Flow OK	1x	203	100203
4	Weight pulse	1x	204	100204

3) Read Markers (32 bits)

Markers		Address		
		Code	Address	Combined
1	Speed / Running	0x	401	000401
2	Start tare	0x	402	000402
3	Reset totalizer	0x	403	000403
4	Belt stopped	0x	404	000404
5	Not used	0x	405	000405
6	Not used	0x	406	000406
7	Not used	0x	407	000407
8	Not used	0x	408	000408
9	Not used	0x	409	000409
10	Not used	0x	410	000410
11	Alive	0x	411	000411
12	Batch OK	0x	412	000412
13	Flow OK	0x	413	000413
14	Not used	0x	414	000414
15	Tare busy	0x	415	000415
16	Not used	0x	416	000416
17	Not used	0x	417	000417
18	Not used	0x	418	000418
19	Not used	0x	419	000419
20	Not used	0x	420	000420
21	Not used	0x	421	000421
22	Not used	0x	422	000422
23	Not used	0x	423	000423

24	Not used	0x	424	000424
25	Not used	0x	425	000425
26	Not used	0x	426	000426
27	Not used	0x	427	000427
28	Not used	0x	428	000428
29	Not used	0x	429	000429
30	Not used	0x	430	000430
31	Not used	0x	431	000431
32	Not used	0x	432	000432

4) Write Markers (8 bits)

Markers		**Address**		
		Code	Address	Combined
1	Speed pulse	0x	433	000433
2	External tare	0x	434	000434
3	Reset totals	0x	435	000435
4	Use batch total from Modbus	0x	436	000436
5	Use high and low flow from Modbus	0x	437	000437
6	Use Setpoint from Modbus	0x	438	000438
7	Not used	0x	439	000439
8	Not used	0x	440	000440

5) Read Ext. Registers (dint)

Ext. Registers		**Address**		
		Code	Address	Combined
1	Weight	3x	1001	301001
2	Total	3x	1003	301003
3	Flow kg/h	3x	1005	301005
4	Flow / Control 0-100%	3x	1007	301007
5	Weight * 10	3x	1009	301009
6	Not used	3x	1011	301011
7	Control 0-100%	3x	1013	301013
8	Flow – 0-100%	3x	1015	301015
9	Not used	3x	1017	301017
10	Not used	3x	1019	301019

6) Write Ext. Registers (dint)

Ext. Registers		Address		
		Code	Address	Combined
11	Batch total	4x	1021	401021
12	High flow	4x	1023	401023
13	Low flow	4x	1025	401025
14	Setpoint flow	4x	1027	401027
15	Not used	4x	1029	401029
16	Not used	4x	1031	401031
17	Not used	4x	1033	401033
18	Not used	4x	1035	401035
19	Not used	4x	1037	401037
20	Not used	4x	1039	401039

7) Read Indicator status (16 bits)

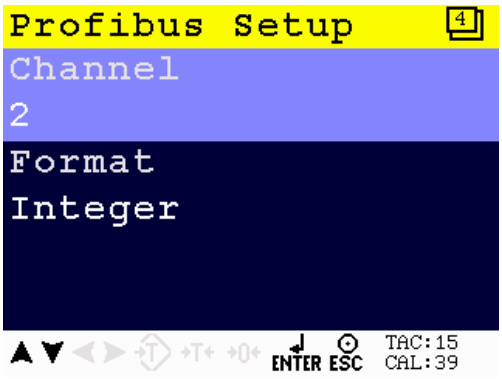
Indicator status		Address		
		Code	Address	Combined
1	Hardware overload	1x	1089	101089
2	Maximum load	1x	1090	101090
3	Stable weight	1x	1091	101091
4	Stable range	1x	1092	101092
5	Zero set	1x	1093	101093
6	Center of zero	1x	1094	101094
7	Zero range	1x	1095	101095
8	Zero track range	1x	1096	101096
9	Tare 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 (6 bits)

Indicator control		Address		
		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

10.2 Profibus

First set up the Channel and Format in the Profibus Setup. Press Enter for 3 seconds. Press on System Setup and Port Setup, then press on Profibus Setup. Set up the Channel, Format and press “ESC”. Keep pressing on the “ESC” button to return to the live weight screen.



GSD file data structure

Download the SGM840 controller GSD file (PSG80E28.GSD) from the Penko website www.penko.com/Support/Software/.

Read data structure from the SGM840:

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 Speed Pulse / Running
		Bit 1 = Input 2 External tare
		Bit 2 = Input 3 Reset Totalizer
		Bit 3 - 15 = Input 4 – 16 Not used
Word 16 bit	Read outputs	Bit 0 = Output 1 Alive / Alarm
		Bit 1 = Output 2 Batch done
		Bit 2 = Output 3 Flow OK
		Bit 3 = Output 4 Totalizer pulse
		Bit 4 – 15 = Output 5 – 16 Not used
Word 16 bit	Read markers 401 - 416	Bit 0 = Speed / Running
		Bit 1 = Start tare
		Bit 2 = Reset total
		Bit 3 = Belt stopped
		Bit 4 = Not used
		Bit 5 = Not used
		Bit 6 = Not used
		Bit 7 = Not used
		Bit 8 = Not used
		Bit 9 = Not used
		Bit 10 = Alive
		Bit 11 = Batch OK
		Bit 12 = Flow OK
		Bit 13 = Not used
		Bit 14 = Tare busy
		Bit 15 = Not used
Word 16 bit	Read markers 417 - 432	Bit 0 - 15 = Not used
Double word 32 bit signed integer	Read register 1	Weight
Double word 32 bit signed integer	Read register 2	Total
Double word 32 bit signed integer	Read register 3	Flow kg/h
Double word 32 bit signed integer	Read register 4	Flow / Control 0-100%

Write data structure to the SGM740:

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 = Speed pulse
		Bit 1 = External tare
		Bit 2 = Reset totals
		Bit 3 = Use batch total from Profibus
		Bit 4 = Use high and low flow from Profibus
		Bit 5 = Use Setpoint from Profibus
		Bit 6 – 15 = Not used
Word 16 bit	Write markers 985 - 1000	Bit 0 – 15 = Not used
Double word 32 bit signed integer	Write register 85	Batch total value from Profibus
Double word 32 bit signed integer	Write register 86	High flow value from Profibus
Double word 32 bit signed integer	Write register 87	Low flow value from Profibus
Double word 32 bit signed integer	Write register 88	Setpoint flow value from Profibus

10.3 EtherNet IP

EDS data structure

Download the SGM820 EDS file from the Penko website www.penko.com/Support/Software/.

Control in (884)

Read data structure from the SGM820: 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[20] OF STRUCT OF INDICATOR	Read indicators, default start read at 1
	Register read	ARRAY OF DINT[10]	Registers [10], SGM820 controller : Register 1 = Weight Register 2 = Total Register 3 = Flow kg/h Register 4 = Flow / Control 0-100% Register 5 = Weight *10 Register 6 = Not used Register 7 = Control 0-100% Register 8 = Flow 0-100% Register 9 = Not used Register 10 = Not used
	Markers Input	BYTE ARRAY[4]	Markers 4x8=32 default read at 401-432 Bit 0 = Speed / Running Bit 1 = Start tare Bit 2 = Reset total Bit 3 = Belt stopped Bit 4 = Not used Bit 5 = Not used Bit 6 = Not used Bit 7 = Not used Bit 8 = Not used Bit 9 = Not used Bit 10 = Not used

	Bit 11 = Alive Bit 12 = Batch OK Bit 13 = Flow OK Bit 14 = Tare busy Bit 15 = Reset totals Bit 16 - 31 = Not used

Control out (888)

Write data structure to the SGM820: 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]	Registers [10], SGM820 indicator : Register 11 = Batch total Register 12 = High flow Register 13 = Low flow Register 14 = Setpoint flow Register 15 = Not used Register 16 = Not used Register 17 = Not used Register 18 = Not used Register 19 = Not used Register 20 = Not used
	Markers Output	BYTE ARRAY[4]	Markers 4x8=32 default write at 433-464 Bit 0 = Speed Bit 1 = External tare Bit 2 = Reset total Bit 3 = Use total value form EIP Bit 4 = Use flow value form EIP Bit 5 = Use Setpoint value form EIP Bit 6 - 31 = Not used

Weigher-Status word

Bit #	Called	Definition
0	OVERLOAD	Hardware overload/underload detected on loadcell
1	MAXLOAD	Overload detected on loadcell
2	STABLE	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	Weigher signal is in zero tracking range, zero tracking is possible
8	TARE	Weigher tare is active
9	PTARE	Weigher preset tare is active
10	SAMPLE	Used by internal process handling
11	BAD CAL	Calibration is bad, invalid, not available
12	CAL ENABLED	Calibration is enabled, used by internal process handling
13	INDUSTRIAL	If set weigher runs in industrial mode, if reset weigher runs certified operation mode
14	NOT LEVEL	Weigher system in blocking, warming up or scale is not level
15	RESERVED	Reserved mode always 0

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

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

10.4 Profinet

GSDML data structure

Download the SGM860 GSDML file from the Penko website www.penko.com/Support/Software/.

Module	Data type	Provided data (channels)
Weigher Input Module	**Cyclic input data**	
	DInt	Net
	DInt	Gross
	DInt	Tare
	DInt	Preset Tare
	Byte	Status 0 = Weight is valid 1 = Stable weight 2 = Net weight 3 = Center of zero 4 = Zero is set 5 = Floating point 6 = Command is ready 7 = Command is in execution mode
	Byte	Decimal point position in non floating point mode
	Byte	Range, active multiple range/multi interval, 0 is none. i.e. 1 = e1, 2 = e2, etc
Remote Command Module	**Cyclic input data**	
	DInt	Result data
	Byte	Command Result Code
	Bool	Status 0 = Weight is valid 1 = Stable weight 2 = Net weight 3 = Center of zero 4 = Zero is set 5 = Floating point 6 = Command is ready 7 = Command is in execution mode
	Cyclic output data	
	DWord	Command

	DWord	Parameter
	DInt	Exchange
Inputs Outputs Markers Module	**Cyclic input data**	
	DWord	Read inputs 1 - 3: Bit 0 = Speed - Running Bit 1 = External tare Bit 2 = Reset totalizer Bit 3 – 32 = Not used
	DWord	Read outputs 1 - 4: Bit 0 = Alive / Alarm Bit 1 = Batch done Bit 2 = Flow OK Bit 3 = Weight pulse Bit 4 – 32 = Not used
	DWord	Read markers 401 – 432: Bit 0 = Speed / Running Bit 1 = Start tare Bit 2 = Reset total Bit 3 = Belt stopped Bit 4 = Not used Bit 5 = Not used Bit 6 = Not used Bit 7 = Not used Bit 8 = Not used Bit 9 = Not used Bit 10 = Not used Bit 11 = Alive Bit 12 = Batch OK Bit 13 = Flow OK Bit 14 = Tare busy Bit 15 = Reset totals Bit 16 - 31 = Not used
	Cyclic output data	
	DWord	Write markers 969 – 1000: Bit 0 = Speed Bit 1 = External tare Bit 2 = Reset total Bit 3 = Use total value form EIP Bit 4 = Use flow value form EIP Bit 5 = Use Setpoint value form EIP Bit 6 - 31 = Not used
Diagnostics Module	**Cyclic input data**	
	DInt	Slave sequence counter, integrated Profinet ASIC
	DInt	Master sequence counter, integrated Main CPU

Recipe read and write

The recipe values can be read or written using the Cyclic output data parameters.

Cyclic output data	
DWord	Command
DWord	Parameter
DInt	Exchange

The result data can be read using the Cyclic input data.

Cyclic input data	
DInt	Result data
Byte	Command Result Code

Read recipe

Recipe		Cyclic output data			Cyclic input data	
Nr	Description	Command	Parameter	Exchange	Result data	Command result code
1	Batch total	10	0	Not used	Batch total	See list below
2	Low flow level	10	1	Not used	Low flow level	See list below
3	High flow level	10	2	Not used	High flow level	See list below
4	Setpoint flow	10	3	Not used	Setpoint flow	See list below

Write recipe

Recipe		Cyclic output data			Cyclic input data	
Nr	Description	Command	Parameter	Exchange	Result data	Command result code
1	Batch total	11	0	Setpoint value	Batch total	See list below
2	Low flow level	11	1	Turnover value	Low flow level	See list below
3	High flow level	11	2	Inflight value	High flow level	See list below
4	Setpoint flow	11	3	Coarse speed value	Setpoint flow	See list below

Command result codes

When you try to read or write a recipe value, you will receive a Command result

ID	Code	Description
0	RPC_SUCCES	Command executed success
1	RPC_EXECUTING	Command is executing
2	RPC_UNKNOWN_COMMAND	Unknown Penko Profinet command
3	RPC_UNKNOWN_FUNCTION	Unknown function
4	RPC_NOTIDLE	Busy executing a command
5	RPC_FAILED	Command executing failed
6	RPC_ERROR	Command error
7	RPC_NOT_ALLOWED	Command executing not allowed
8-127	RESERVED	Reserved error codes
128	RPC_PARAMETER_ERROR	Invalid parameter set
129	RPC_NOTSTABLE	Weight not stable
130	RPC_NEGATIVE	Weight negative
131	RPC_NO_TARE	Tare not set
132	RPC_OUTOFRANGE	Weight out of range
134	RPC_NOT_STABLE	Weigher not stable
135	RPC_ABOVE_MAXLOAD	Weight is above maxload
136	RPC_BELOW_ZERO	Weigher below zero
137	RPC_NOT_IN_ZERO_RANGE	Weigher not in zero range
138	RPC_ARITMIC_OVERFLOW	Aritmic overflow
139	RPC_ADC_OVERFLOW	Overload by ADC conversion
140	RPC_ADC_UNDERFLOW	Underload by ADC conversion
141	RPC_GAIN_NEGATIVE	Weight should increase and not decrease
142	RPC_GAIN_OVERFLOW	Weight to low, value between zero and end weight required
143	RPC_ACCESSDENIED	Command executing denied first enter TAC or CAL code

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