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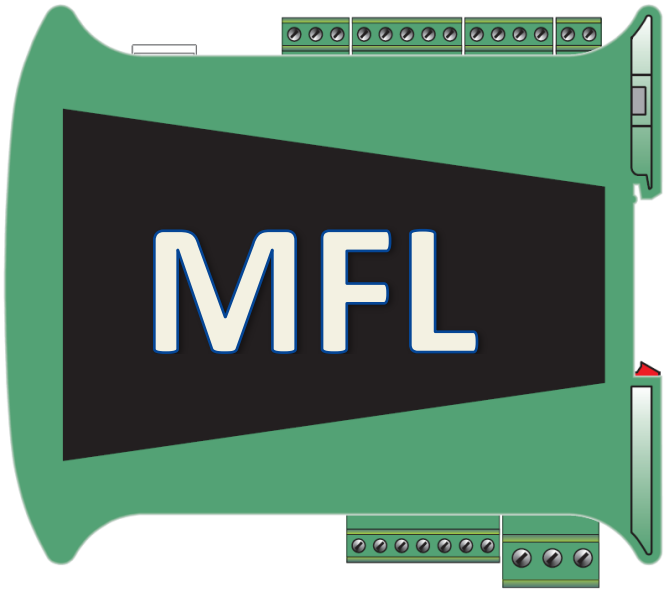

Manual:
SGM800 Supplement Mono Filler Controller

PENKO
an ETC Company

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1 Introduction

This manual is applicable for the following Mono Filler devices:

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

To configure and control the Mono Filler, 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 mono filler 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 Mono Filler, 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/Support/Software/

USB driver and user manual are included in the download

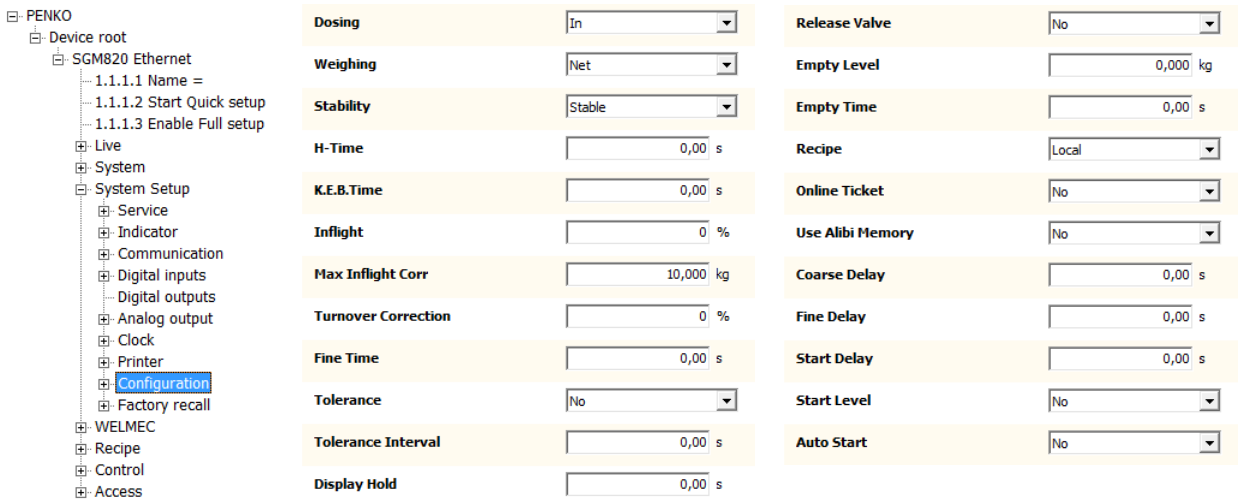
Pi Mach II supports USB and Ethernet connection. PDI Client is USB only.

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

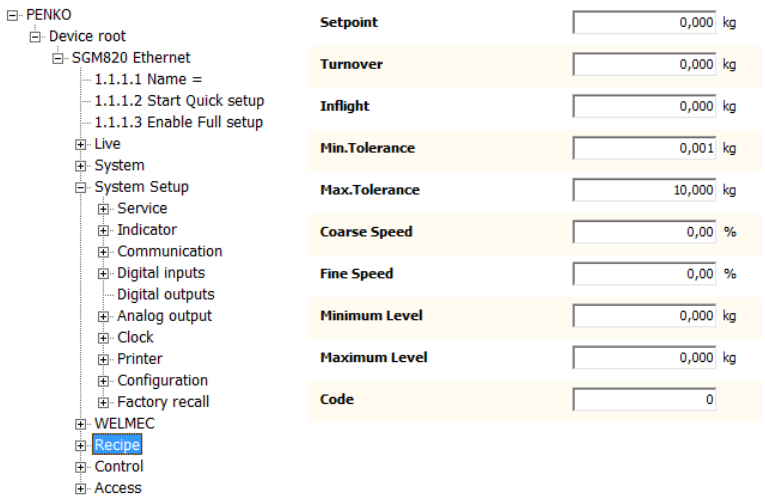


The parameters are explained in chapter parameter

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 chapter parameter

5 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, 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 configuration is manually changed, all configuration parameters are changed back to the value that were last set manually in the configuration.

5.1 Configuration parameters

No.	Name	Description
1	Dosing	Select the type of dosing. • In => positive dosing (in-dosing) • Out => negative dosing (out-dosing)
2	Weighing	Select the type of weighing. • 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. **Δ** *Not used if out-dosing is selected. In that case weighing is always Net.*
3	Stability	Select the type of stability to determine the end value after dosing. This parameter works together with the H-Time parameter. • Stable => wait for Stable • H-Time => wait for H-Time • H-Time + Stable => wait for H-time then Stable • H-Time / Stable => wait for H-time or Stable • Stable + H-Time => wait for Stable then H-time
4	H-time	The time the controller waits before determine the end value. The H-time works together with the stability parameter.

		Δ *Not used if Stability parameter is set to Stable*
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. **Δ** *K.E.B. time must be less than the remaining Fine Time*
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. **Δ** *The remaining fine time must be more than the K.E.B. time*
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. • 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. **Δ** *Not used if no release valve is selected*
15	Empty time	The time it will take to close the release valve. The time will start when the empty level is reached. **Δ** *Not used if no release valve is selected*
16	Recipe	Select the used recipe. • 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. **Δ** *Not used if out-dosing or release valve is selected*
23	Auto start	Automatically start dosing. **Δ** *Not used if out-dosing or release valve is selected or if start level is turned off*

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, Profinet 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	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.
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. **Δ** *The remaining fine time must be more than the K.E.B. time*
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.

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. **Δ** *Not used if no tolerance is selected*
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. **Δ** *Not used if no tolerance is selected*
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.
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.

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	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.

6 Inputs and outputs

The following inputs and outputs are used.

6.1 Inputs

Input	Name	Description
1	Start/Stop	Input must be high to run the program
2	Accept tolerance	Input to accept the dosing when the end value is out of tolerance.
3	Start dosing or start release	Input to start dosing or release (depends on the configuration parameters) when the ready output is ON.

6.2 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%

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

  ------------------------------------
---

  Programmable footer 1

  Programmable footer 2
```

8 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.

8.1 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

8.2 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

- 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

8.3 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

- 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

9 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

SGM800 Mono Filler

DAC

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

Weigher

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

Stable

Stable Condition	Setting
Range	0.03 kg
Time	0.50 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/Support/Software/

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	Zero	3x	139	300139
21	Not used	3x	141	300141
22	SGM820 actual display value	3x	143	300143

1) Read Inputs (3 bits)

Inputs		Address		
		Code	Address	Combined
1	Start/stop program	1x	1	100001
2	Accept tolerance	1x	2	100002
3	Start dosing	1x	3	100003

2) Read Outputs (4 bits)

Outputs		Address		
		Code	Address	Combined
1	Coarse	1x	201	100201
2	Fine	1x	202	100202
3	Ready	1x	203	100203
4	Release or alarm	1x	204	100204

3) Read Markers (32 bits)

Markers		Address		
		Code	Address	Combined
1	Alarm	0x	401	000401
2	Not used	0x	402	000402
3	Stop tolerance	0x	403	000403
4	Release busy	0x	404	000404
5	Sec alive bit	0x	405	000405
6	Release to display	0x	406	000406
7	Alarm high tolerance	0x	407	000407
8	Enable alarm	0x	408	000408
9	Not used	0x	409	000409
10	Not used	0x	410	000410
11	Display hold	0x	411	000411
12	SGM820 online	0x	412	000412
13	Not used	0x	413	000413
14	Not used	0x	414	000414
15	Reset sub totals	0x	415	000415
16	Reset totals	0x	416	000416
17	Coarse	0x	417	000417
18	Fine	0x	418	000418
19	Ready	0x	419	000419

20	Release or alarm	0x	420	000420
21	Busy	0x	421	000421
22	Alarm	0x	422	000422
23	Not used	0x	423	000423
24	Not used	0x	424	000424
25	Not used	0x	425	000425
26	Enable DAC	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	Start / Stop	0x	433	000433
2	Accept tolerance	0x	434	000434
3	Start dosing	0x	435	000435
4	Not used	0x	436	000436
5	Not used	0x	437	000437
6	Not used	0x	438	000438
7	Not used	0x	439	000439
8	Not used	0x	440	000440

5) Read Ext. Registers (dint)

Ext. Registers		**Address**		
		Code	Address	Combined
1	Net weight	3x	1001	301001
2	Tare weight	3x	1003	301003
3	Turnover value	3x	1005	301005
4	Inflight value	3x	1007	301007
5	Registration	3x	1009	301009
6	Alibi Nr	3x	1011	301011
7	DAC value	3x	1013	301013
8	Gross	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	Setpoint	4x	1021	401021
12	Turnover	4x	1023	401023
13	Inflight	4x	1025	401025
14	Min tolerance	4x	1027	401027
15	Max tolerance	4x	1029	401029
16	Coarse speed	4x	1031	401031
17	Fine speed	4x	1033	401033
18	Min level	4x	1035	401035
19	Max level	4x	1037	401037
20	Code	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.

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 Start/stop
		Bit 1 = Input 2 Accept tolerance
		Bit 2 = Input 3 Start dosing
		Bit 3 - 15 = Input 4 – 16 Not used

Word 16 bit	Read outputs	Bit 0 = Output 1 Coarse
		Bit 1 = Output 2 Fine
		Bit 2 = Output 3 Ready
		Bit 3 = Output 4 Release or Alarm
		Bit 4 – 15 = Output 5 – 16 Not used
Word 16 bit	Read markers 401 - 416	Bit 0 = Alarm to display
		Bit 1 = Not used
		Bit 2 = Stop tolerance
		Bit 3 = Release busy
		Bit 4 = Sec alive bit
		Bit 5 = Release to display
		Bit 6 = Alarm high tolerance
		Bit 7 = Enable alarm
		Bit 8 = Not used
		Bit 9 = Not used
		Bit 10 = Display hold
		Bit 11 = SGM840 online
		Bit 12 = Not used
		Bit 13 = Not used
		Bit 14 = Reset sub totals
		Bit 15 = Reset totals
Word 16 bit	Read markers 417 - 432	Bit 0 = Coarse
		Bit 1 = Fine
		Bit 2 = Ready
		Bit 3 = Release or alarm
		Bit 4 = Busy
		Bit 5 = Alarm
		Bit 6 = Not used
		Bit 7 = Not used
		Bit 8 = Not used
		Bit 9 = Enable DAC
		Bit 10 -15 = Not used
Double word 32 bit signed integer	Read register 1	Net weight (only active when program is started)
Double word 32 bit signed integer	Read register 2	Tare
Double word 32 bit signed integer	Read register 3	Turnover value
Double word 32 bit signed integer	Read register 4	Inflight value

Write data structure to the SGM840:

Data type	Description	
Byte 8 bit	Write command	Bit 0 = Zero reset
		Bit 1 = Zero set
		Bit 2 = Tare off
		Bit 3 = Tare on
		Bit 4 = Reserved
		Bit 5 = Freeze Weight value
		Bit 6 = Indicator channel 2^0
		Bit 7 = Indicator channel 2^1
Byte 8 bit	Write weight select register	Not used
Word 16 bit	Write markers 969 - 984	Bit 0 = Start / stop program
		Bit 1 = Accept tolerance
		Bit 2 = Start dosing
		Bit 3 – 15 = Not used
Word 16 bit	Write markers 985 - 1000	Bit 0 – 15 = Not used
Double word 32 bit signed integer	Write register 85	Setpoint value from Profibus
Double word 32 bit signed integer	Write register 86	Turnover value from Profibus
Double word 32 bit signed integer	Write register 87	Inflight value from Profibus
Double word 32 bit signed integer	Write register 88	Not used

10.3 EtherNet IP

EDS data structure

Download the SGM820 Controller V1.5.0.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 DINT GROSS DINT NET DINT TARE DINT WEIGHERx10 DINT GROSSx10 DINT NETx10 DINT TAREx10 WORD FORMAT WORD STATUS	Display rate weigher data Fast Gross weight Fast Net weight Active Tare weight Display rate weigher data x10 Fast Gross weight x10 Fast Net weight x10 Active Tare weight x10 Format bits, see Weigher-Format word 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], SGM840 controller : Register 1 = Net weight Register 2 = Tare Register 3 = Turnover value Register 4 = Inflight value Register 5 = Registration Register 6 = Alibi Nr Register 7 = Analog value Register 8 = Gross Register 9 = Not used Register 10 = Not used

Markers Input	BYTE ARRAY[4]	Markers 4x8=32 default read at 401-432 Bit 0 = Alarm Bit 1 = Not used Bit 2 = Stop tolerance Bit 3 = Release busy Bit 4 = Sec alive bit Bit 5 = Release to display Bit 6 = Alarm high tolerance Bit 7 = Enable alarm Bit 8 = Not used Bit 9 = Not used Bit 10 = Display hold Bit 11 = SGM840 online Bit 12 = Not used Bit 13 = Not used Bit 14 = Reset sub totals Bit 15 = Reset totals Bit 16 = Coarse Bit 17 = Fine Bit 18 = Ready Bit 19 = Release or alarm Bit 20 = Busy Bit 21 = Alarm Bit 22 = Not used Bit 23 = Not used Bit 24 = Not used Bit 25 = Enable DAC Bit 26 = Not used Bit 27 = Not used Bit 28 = Not used Bit 29 = Not used Bit 30 = Not used Bit 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], SGM840 indicator : Register 11 = Setpoint Register 12 = Turnover Register 13 = Inflight Register 14 = Min tolerance* Register 15 = Max tolerance* Register 16 = Coarse speed* Register 17 = Fine speed* Register 18 = Min level* Register 19 = Max level* Register 20 = Code*
	Markers Output	BYTE ARRAY[4]	Markers 4x8=32 default write at 433-464 Bit 0 = Start/stop program Bit 1 = Accept tolerance Bit 2 = Start dosing Bit 3 - 31 = Not used

*The ability to change recipe values in register 14 – 20 is added in firmware version 1.7.2.9.0.4.

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 = Start/stop program Bit 1 = Accept tolerance Bit 2 = Start dosing Bit 3 – 32 = Not used
	DWord	Read outputs 1 - 4: Bit 0 = Coarse Bit 1 = Fine Bit 2 = Ready Bit 3 = Release or alarm Bit 4 – 32 = Not used
	DWord	Read markers 401 – 432: Bit 0 = Alarm Bit 1 = Not used Bit 2 = Stop tolerance Bit 3 = Release busy Bit 4 = Sec alive bit Bit 5 = Release to display Bit 6 = Alarm high tolerance Bit 7 = Enable alarm Bit 8 = Not used Bit 9 = Not used Bit 10 = Display hold Bit 11 = SGM840 online Bit 12 = Not used Bit 13 = Not used Bit 14 = Reset sub totals Bit 15 = Reset totals Bit 16 = Coarse Bit 17 = Fine Bit 18 = Ready Bit 19 = Release or alarm Bit 20 = Busy Bit 21 = Alarm

		Bit 22 = Not used Bit 23 = Not used Bit 24 = Not used Bit 25 = Enable DAC Bit 26 = Not used Bit 27 = Not used Bit 28 = Not used Bit 29 = Not used Bit 30 = Not used Bit 31 = Not used
	Cyclic output data	
	DWord	Write markers 969 – 1000: Bit 0 = Start/stop program Bit 1 = Accept tolerance Bit 2 = Start dosing Bit 3 - 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	Setpoint	10	0	Not used	Setpoint value	See list below
2	Turnover	10	1	Not used	Turnover value	See list below
3	Inflight	10	2	Not used	Inflight value	See list below
4	Coarse speed	10	3	Not used	Coarse speed value	See list below
5	Fine speed	10	4	Not used	Fine speed value	See list below
6	Min tolerance	10	5	Not used	Min tolerance value	See list below
7	Max tolerance	10	6	Not used	Max tolerance value	See list below
8	Min level	10	7	Not used	Min level value	See list below
9	Max level	10	8	Not used	Max level value	See list below
10	Code	10	9	Not used	Code value	See list below

Write recipe

Recipe		Cyclic output data			Cyclic input data	
Nr	Description	Command	Parameter	Exchange	Result data	Command result code
1	Setpoint	11	0	Setpoint value	Setpoint value	See list below
2	Turnover	11	1	Turnover value	Turnover value	See list below
3	Inflight	11	2	Inflight value	Inflight value	See list below
4	Coarse speed	11	3	Coarse speed value	Coarse speed value	See list below
5	Fine speed	11	4	Fine speed value	Fine speed value	See list below
6	Min tolerance	11	5	Min tolerance value	Min tolerance value	See list below
7	Max tolerance	11	6	Max tolerance value	Max tolerance value	See list below
8	Min level	11	7	Min level value	Min level value	See list below
9	Max level	11	8	Max level value	Max level value	See list below
10	Code	11	9	Code value	Code value	See list below

Register read

The register values can be read 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 registers

Recipe		Cyclic output data			Cyclic input data	
Nr	Description	Command	Parameter	Exchange	Result data	Command result code
1	Net	5	0	Not used	Net value	See list below
2	Tare	5	1	Not used	Tare value	See list below
3	Turnover	5	2	Not used	Turnover value	See list below
4	Inflight	5	3	Not used	Inflight value	See list below
5	Registration	5	4	Not used	Registration	See list below
6	Alibi number	5	5	Not used	Alibi number	See list below
7	DAC value	5	6	Not used	DAC value	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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