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1020
Supplement Belt Weigher Controller

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1020 Belt Weigher Controller

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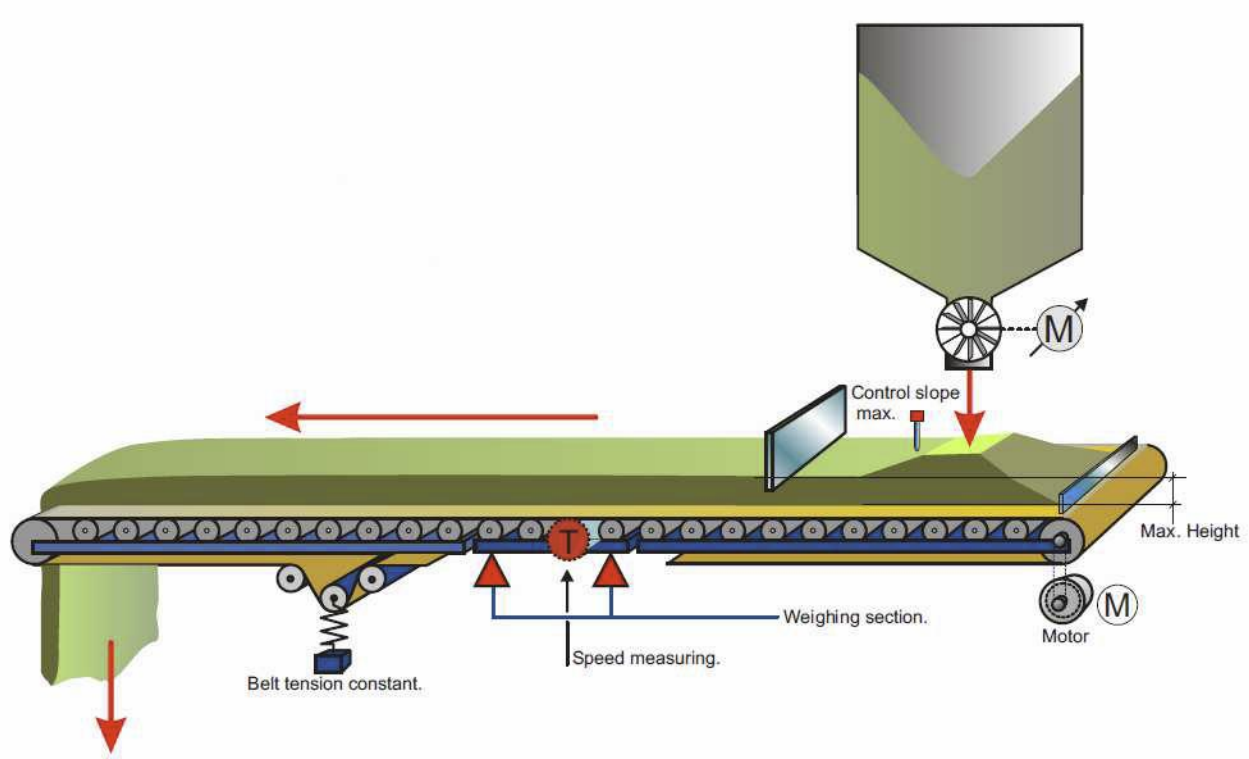
1 Application

A typical Belt Weigher application.



2 Introduction

This manual is applicable for the following belt weigher devices:

- 1020 BLT
- 1020 CAN-RS232-RS422 BLT
- 1020 Profibus BLT
- 1020 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.

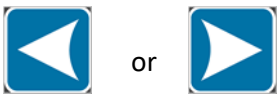
3 Indication of Display

1. Current selected recipe
2. Measured Flow
3. Weigher stable
4. Inputs 1, 2, 3
5. Current/actual total dosed product
6. Measured weight on the belt
7. Current belt speed
8. Status Indications, see chapter 2

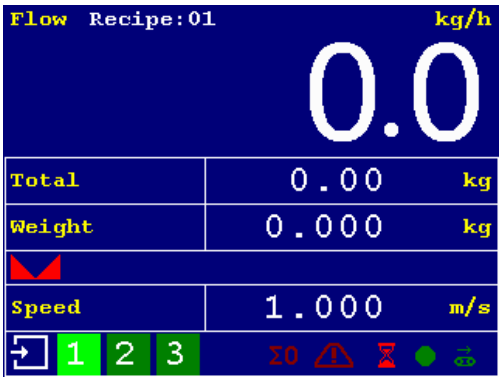
Options for indication 2nd screen

Use the LEFT of RIGHT key to switch between the four main screens.

The 2nd screen shows the flow as the largest indication.

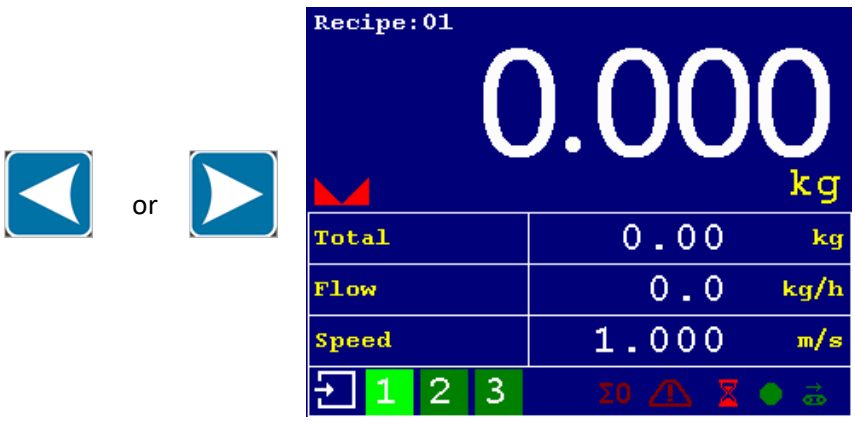


or



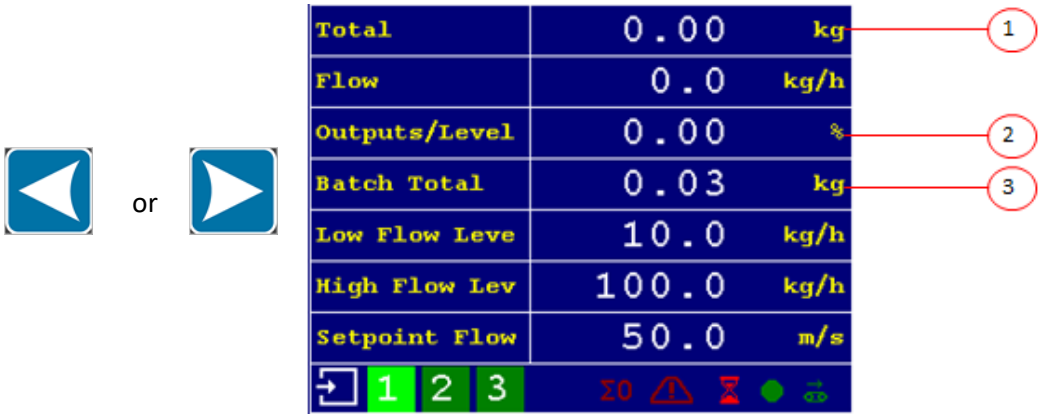
Options for indication 3rd screen

The 3rd screen shows the weight on the belt as the largest indication.



Options for indication 4th screen

The 4th screen shows the selected recipe values and output drive level.



1. Current/actual total dosed products
2. Indication or control signal for the flow
3. Wanted total dosed product/recipe setting

4 Status Indication

Measuring dynamic zero level

Live/Alarm active (The output is on when the indicator is on. The output is switched off when an alarm situation occurs)

Busy (This output is switched off when the Batch total amount is reached.)

Flow OK (output 3) Flow in kg/h. Flow OK is on when the Flow Level is in between Low and High Level.

When the belt is running, this indication will blinks every time output 4 is activated. The output gives a pulse every X kg that is totalized (see configuration)

5 Button functions

Reset the total batch weight to 0

>0< Resets the weight to 0

T Starts the dynamic zero level measurement. During this measurement the average weight of the empty belt is determined

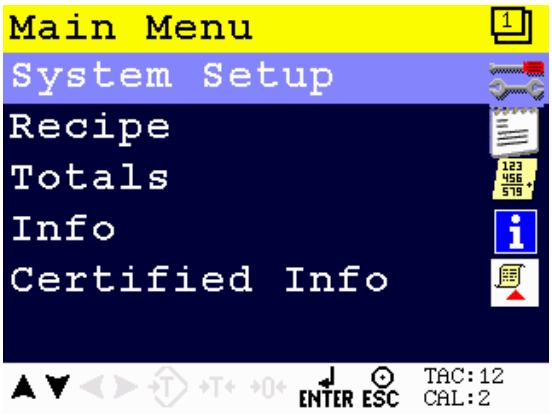
6 Configuration

To start the 1020, see chapter 'First use of indicator' of the 1020 manual.

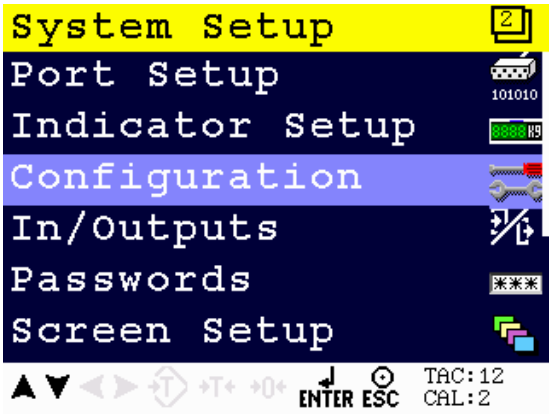
Hold the **Enter** button for 2 seconds to enter the **Main Menu.**

2 seconds

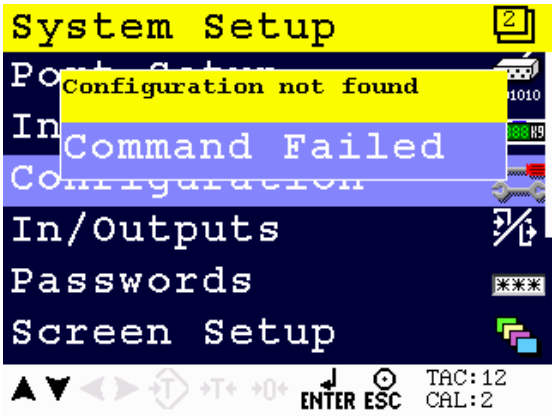
Select **System Setup** from the **Main Menu** and press **Enter**.



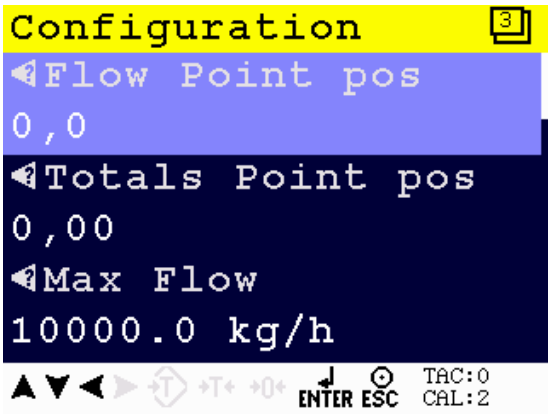
Select **Configuration** from the **System Setup Menu** and press **Enter**



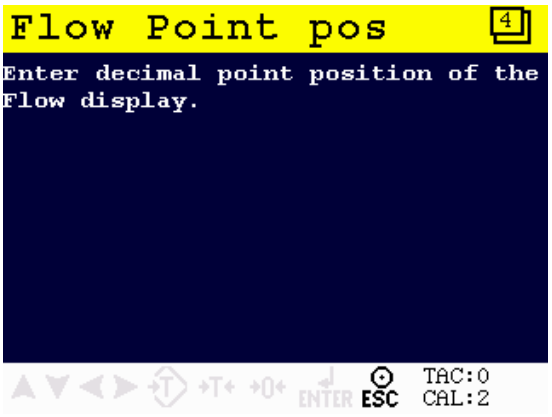
The following error is visible if no configuration is present



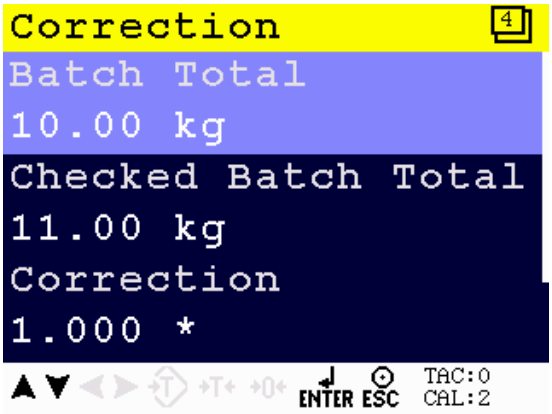
Press **Enter** to start with default values.

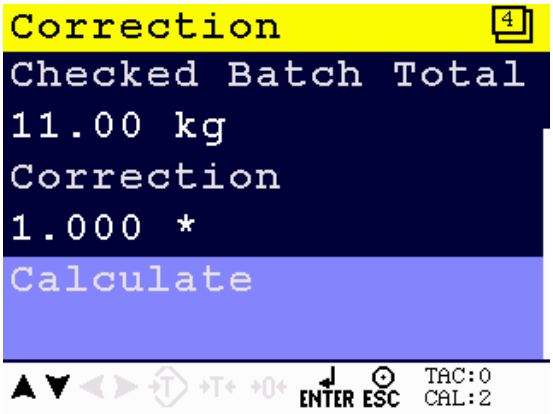


When pushing the LEFT key, the help text of the parameter is shown. Below the example for the help text for the parameter Flow Point Pos.

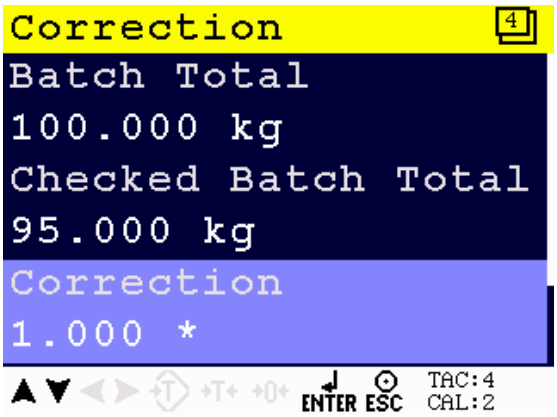


When selecting the Correction parameter, a new screen is shown.

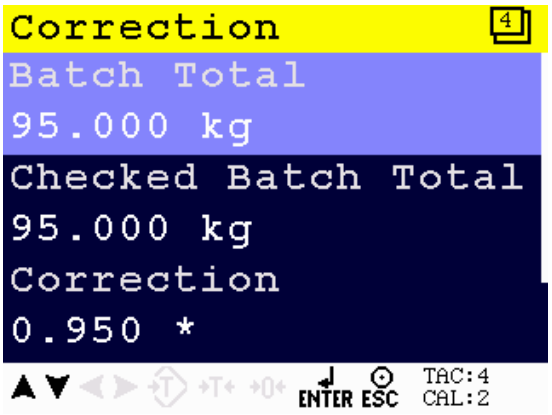




After a completed batch you can check if the Batch Total and the Checked Batch Total (the real value of the total batch) are the same. If not press on **Calculate** to calculate a new **Correction**. The next batch the Batch Total and Checked Batch Total should be closer together. In the example below the **Batch Total** is 100 kg and the **Checked Batch Total** is 95 kg.



Press on **Calculate** and the correction is calculated. After calculation both totals are equal.

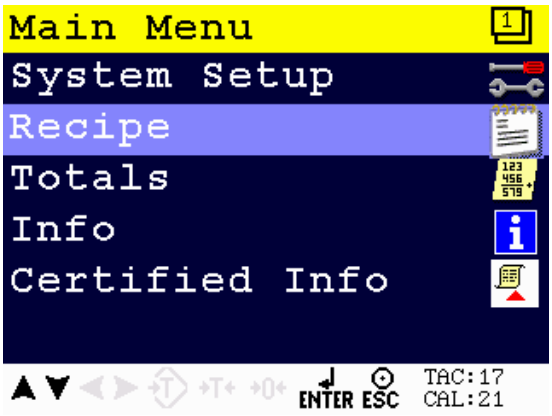


6.1 Configuration Parameters

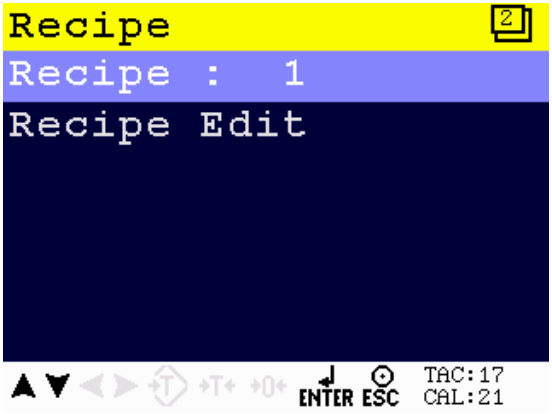
Configuration	Parameter information
Flow Point Position	Sets the decimal point position for the flow indications.
Totals Point Position	Sets the decimal point position for the totals indications.
Max Flow	Sets the maximum allowed flow. The analogue output can signal the flow as a percentage of the maximum flow.
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. You can set a new Tara point and it will show "0" again. If the new tare is outside the Dynamic Tare Band range, alarm (output 1) is turned off.
Dynamic Tare Time	During the Dynamic Tare 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.
Zero Suppress	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 1.0 kg every weight below 1.0 kg will show as 0.0 kg. And every weight above 1.0 kg will show as the actual weight.
Filter Time	Time for filling the filter with one new value. 10 values are averaged to stabilize the flow display value.
Weight per Pulse	Weight indicated by one pulse of the PLC pulse output (Output 4). Pulse duration is 0,5s. If you set Weight per Pulse to 5.0 kg the 1020 will send out a pulse after every 5.0 kg. The fastest Pulse time is 1Hz per second (0,5 sec high and 0,5 sec low).
Correction	Can be 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 1020 can recalculate this factor by calculating: New Correction = (Checked Batch Total / Last batch total) * Correction. After calculation both totals are equal.
Pulses per Meter	Enter the number of pulses the tachometer generates per meter.
Fixed Speed	Set the belt speed in m/sec. Or set the fixed speed to 0 to use a tachometer (input 1). Input 1 will act as a Start/Stop signal for the Belt weigher.
Measurement Method	Selects the flow measurement system used. Choose 'Belt Weigher' or 'Impact Flow Meter' Since an impact flow meter has no moving parts, this setting uses a fixed speed setting of 1.000 m/s pulse and no pulse input.
Analogue Use	Selects if the flow is regulated using the DAC or only measured. If the DAC is set to Regulation, the DAC function must be set on "Control".
Control Correction	When Flow regulation is selected, this is the percentage that the analog control signal can be influenced by the flow regulation.

7 Recipe

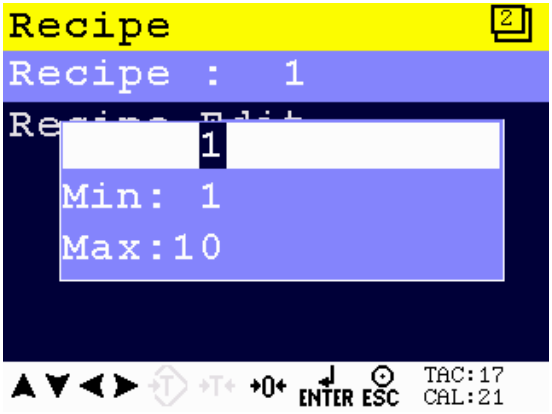
Select **Recipe** from the **Main Menu** and press **Enter**.



Select **Recipe** and press **Enter.**

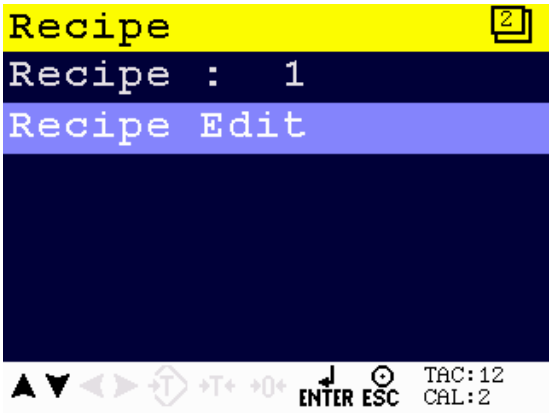


Enter the recipe that needs to be edited and press **Enter**.

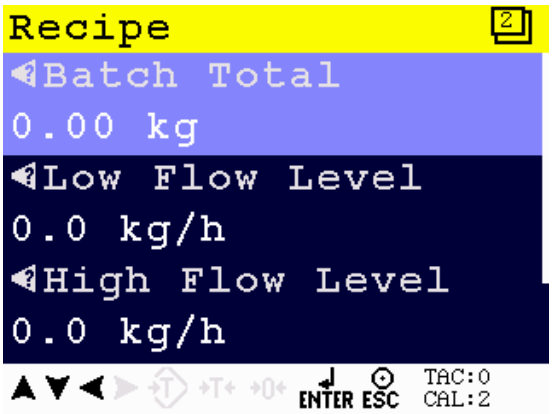


If the selected recipe does not exist, the following error is visible:

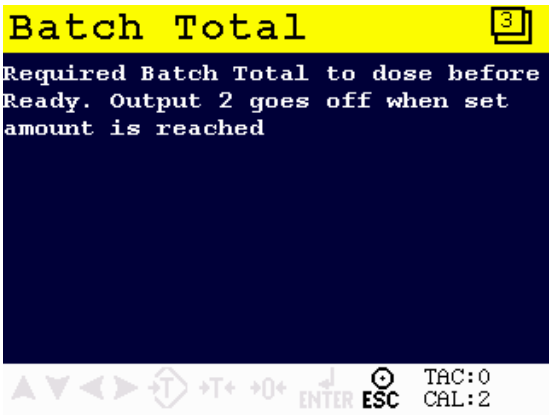
To edit currently selected recipe parameters, select **Recipe Edit** and press **Enter**.



The following screen is visible:



When pushing the LEFT key, the help text of the parameter is accessed. Below the example for the help text for the parameter Batch Total.



7.1 Recipe Parameters

Parameters	Parameter information
Batch Total	Required Batch Total to dose before Ready. Output 2 goes off when set amount is reached.
Low Flow Level	When the Flow is above 'Low Level' and below 'High Level', the Flow is OK and Output 3 is on.
High Flow Level	When the Flow is above 'Low Level' and below 'High Level', the Flow is OK and Output 3 is on.
Setpoint Flow	Setpoint for the Flow Regulation. Only available when Flow regulation is selected in the configuration.

7.2 Remote Process Values

Process value	Value information
Nett weight value	The actual filtered and nett weight of the belt.
Total	The actual total weight of the batch.
Flow in kg/h	The actual flow of the product.
Flow/Control	When the parameter "Analogue Use" is set to "Flow measurement", the actual flow is shown as a percentage of the max flow. When the parameter "Analogue Use" is set to "Flow regulation", the analogue 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".

8 Inputs and outputs

The following inputs and outputs are used.

8.1 Inputs

Input	Name	Explanation
1	Start/Stop or Tachometer	This is 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	Starts the Dynamic Tare level measurement. During this measurement the average weight of the empty belt is determined.
3	Reset totalizer	Resets the total to zero.

See chapter 'Load cell / power connection' of the 1020 manual for connecting the in- and outputs.

8.2 Outputs

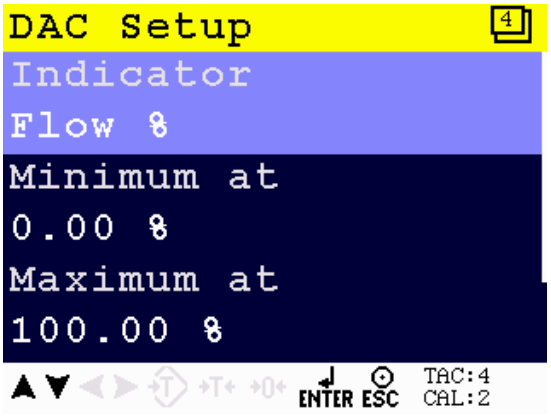
Output	Name	Explanation
1	Live/Alarm	The output is on when the indicator is on. The output is switched off when an alarm situation occurs like overload, underload or Dynamic Zero fail.
2	Busy	This output is switched off when the Batch total amount is reached.
3	Flow OK	This output is used to signal if the flow is within limits. The High and Low limits can be set in the recipe.
4	Weight Pulse	This output is pulsed high for 0,5 seconds for when a preset amount has been dosed. The dosed amount per pulse van be set in the Configuration menu.

8.3 Analog output

Output	Name	Explanation
Analog	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 1020 manual page 58. This way the output can also be used to signal dosed amount or belt weight.

8.4 DAC setup

Select **In/Outputs** from the **System Setup Menu** and press **Enter**. Select **DAC Setup** and press **Enter**.



Set the Function of the analog output

Indicator	Explanation
Flow%	The Flow in kg/h. The maximum Flow is the same as configured in the 'Max Flow' parameter.
Corrected weight	The real weight corrected with the taken Tare belt
Corrected weight*10	The real weight corrected with the taken Tare belt, with an extra digit.
Speed	The speed of the belt. The maximum is the same as the Max Level.
Flow value	The Flow in kg/h. The maximum Flow is the max level in kg.
Control %	For Flow Regulation (selected in Configuration), Analog use

9 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

COUNT                         100

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

Programmable footer 1

Programmable footer 2
```

10 Starting the program for the first time

With input 1 you can **Start** (input high) and **Stop** (input low) the 1020. If you use a tachometer the 1020 will start if the tachometer starts.

The 1020 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 1020 for the first time you must do the following 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 1020 run without any product on the belt for a couple om minutes, the total should stay zero.
3. Let the 1020 run with product on the belt and preform a correction (see page 7 – 8).

The analog output can sent 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**.

11 Default settings

To access the Configuration setup, select **System Setup** from the **Main Menu** and press **Enter**.

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%

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

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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
Name	1020 Belt
Unit Label	Kg
Step	1
Decimal point	0.000
Operation Mode	Industrial
Max Load	100.000

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	0.010 kg
Time	1.00 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

12 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.

	1020	1020 CAN-RS232/422	1020 Profibus	1020 Profinet
Modbus TCP	✓	✓	✓	✓
Modbus SERIAL		✓		
Profibus			✓	
EtherNet/IP	✓	✓	✓	✓
ASCII TCP	✓	✓	✓	✓
ASCII SERIAL		✓		
Fins	✓	✓	✓	✓
Penko TP	✓	✓	✓	✓
Profinet				✓

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

12.1 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)

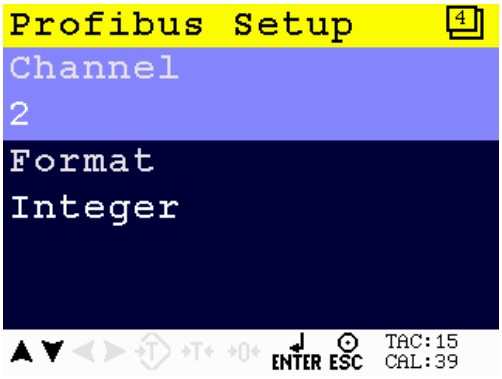
Indicator status		Address		
		Code	Address	Combined
1	Hardware overload	1x	1089	101089
2	Maximum load	1x	1090	101090
3	Stable weight	1x	1091	101091
4	Stable range	1x	1092	101092
5	Zero set	1x	1093	101093
6	Center of zero	1x	1094	101094
7	Zero range	1x	1095	101095
8	Zero track range	1x	1096	101096
9	Tare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

12.2 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 1020 controller GSD file (PTEC0E02.GSD) from the Penko website www.penko.com/Support/Software/.

Read data structure from the 1020:

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 1020:

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

12.3 EtherNet IP

EDS data structure

Download the 1020 EDS file from the Penko website www.penko.com/Support/Software/.

Control in (884)

Read data structure from the 1020: 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], 1020 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 1020: 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], 1020 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

12.4 Profinet

GSDML data structure

Download the 1020 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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