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Protocol description:
PENKO SGM740/840 PROFIBUS-DP
For firmware V1.6.1.9.0.2 and above



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PENKO PROFIBUS-DP protocol

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Introduction

PROFIBUS (Process Field Bus) is a standard for fieldbus communication in automation technology. PROFIBUS is openly published as part of IEC 61158.

This document describes the PENKO PROFIBUS-DP implementation for the PENKO SGM PROFIBUS-DP devices, the SGM740 and SGM840.

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1 Basics

The GSD information and PENKO devices that support the protocol.

1.1 GSD

This document describes the General Station Description, or GSD, for the SGM740 (revision 1.03) and the SGM840 (revision 1.03)

GSD filename SGM740 (indicator): **PSG70E28.GSD**

GSD filename SGM840 (indicator / controller): **PSG80E28.GSD**

The SGM740 is always an indicator. The SGM840 is also available as controller with a predefined program for a check weigher, belt weigher or mono filler.

1.2 Devices

The following PENKO devices support PROFIBUS-DP:

Device	PROFIBUS-DP
SGM740	Yes, starting at first firmware version*
SGM840	Yes, starting at first firmware version*

* This manual applies for firmware V1.6.1.9.0.2 and above, for older versions check comments in GSD file

1.3 Supported baudrates

The following baudrates are supported:

Baudrate (bps)	Max Tsdr (Station delay of responder Time)
9k6	60
19k2	60
45k45	60
93.75	60
187k5	60
500k	100
1M5	150
3M	250
6M	450
12M	800

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2 Addresses

The following addresses are used:

2.1 Inputs

SGM740/840 indicator:

Name	Data type	Word offset
Weight register	Double Word, 32 bit signed integer/float	00
Weigher status	Word	02
Weigher control	Byte	03 - high byte
Weight register selector	Byte	03 - low byte
Inputs 1...16*	Word	04
Outputs 201...216*	Word	05
Preset Tare	Double Word, 32 bit signed integer	06
Gross x 10	Double Word, 32 bit signed integer/float	08
Net x 10	Double Word, 32 bit signed integer/float	10
Tare x 10	Double Word, 32 bit signed integer/float	12
Multi-range weight	Double Word, 32 bit signed integer/float	14

* Inputs 4 - 16 are virtual inputs generated by the software

* Outputs 205 - 216 are virtual outputs generated by the software

SGM840 controller:

Name	Data type	Word offset
Weight register	Double Word, 32 bit signed integer/float	00
Weigher status	Word	02
Weigher control	Byte	03 - high byte
Weight register selector	Byte	03 - low byte
Inputs 1...16*	Word	04
Outputs 201...216*	Word	05
Markers 401...416	Word	06
Markers 417...432	Word	07
Ext register 1 - 5 - 9 - 13*	Double Word, 32 bit signed integer	08
Ext register 2 - 6 - 10 - 14*	Double Word, 32 bit signed integer	10
Ext register 3 - 7 - 11 - 15*	Double Word, 32 bit signed integer	12
Ext register 4 - 8 - 12 - 16*	Double Word, 32 bit signed integer	14

* Inputs 4 - 16 are virtual inputs generated by the software

* Outputs 205 - 216 are virtual outputs generated by the software

* Extended register number depend on channel (0, 1, 2, 3) set with control bit 7 and 8, see [control bits](#)

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2.2 Outputs

SGM740/840 indicator:

Name	Data type	Word offset
Weigher control	Byte	00 - high byte
Weight register selector	Byte	00 - low byte
Preset Tare*	Double Word, 32 bit signed integer	01
Level 1*	Double Word, 32 bit signed integer	03
Level 2*	Double Word, 32 bit signed integer	05
Level 3*	Double Word, 32 bit signed integer	07
Level 4*	Double Word, 32 bit signed integer	09

* At rising edge of control bit 4, preset tare is activated with the value in this register, see [control bits](#)

* Levels can only be written when control bit 6 and 7 are set, see [control bits](#)

SGM840 controller:

Name	Data type	Word offset
Weigher control	Byte	00 - high byte
Weight register selector	Byte	00 - low byte
Markers 969...984	Word	01
Markers 985...1000	Word	02
Ext register 85 - 89 - 93 - 97*	Double Word, 32 bit signed integer/float	03
Ext register 86 - 90 - 94 - 98*	Double Word, 32 bit signed integer/float	05
Ext register 87 - 91 - 95 - 99*	Double Word, 32 bit signed integer/float	07
Ext register 88 - 92 - 96 - 100*	Double Word, 32 bit signed integer/float	09

* Extended register number depend on channel (0, 1, 2, 3) set with control bit 6 and 7, see [control bits](#)

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2.3 Status bits

Status bit #	Description
0	Hardware overload detected
1	Overload detected
2	Stable signal
3	In stable range
4	Zero corrected
5	Center of zero
6	In zero range
7	Zero tracking possible
8	Tare active
9	Preset tare active
10	New sample available
11	Calibration invalid
12	Calibration enabled
13	User certified operation
14	Invalid weight
15	Register function mode indication

2.4 Control bits

Control bit #	Description
0	Zero reset command
1	Zero set command
2	Tare off
3	Tare on
4	Preset tare command
5	Freeze*
6	Indicator channel 2^0 *
7	Indicator channel 2^1 *
0 + 1	Rising edge changes mode to Register Functions . Reset of bit #0 or #1 changes mode back to normal operation.
6 + 7	Enable writing level 1 - 4

* Freeze weigher registers at rising edge of bit for selected weigher. If bit is 0 registers will be updated. Use this bit to read out all necessary weigher registers without any interruption of the weigher.

* Bit 6 and 7 set the channel for the extended registers. This is only applicable for the SGM840. Channel 0 selects the first extended register number, channel 1 the second, channel 2 the third and channel 3 the fourth. See table:

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Bit 7	Bit 6	Channel
0	0	0
0	1	1
1	0	2
1	1	3

2.5 Weight register

The indicator shown in the weight register can be selected with the weight register selector.

Selector Byte	Indicator	Description
0x00	WEIGHT	Multi range net weigher value
0x01	FAST GROSS	Unfiltered gross weigher value
0x02	FAST NET	Unfiltered net weigher value
0x03	DISPLAY GROSS	Filtered gross weigher value
0x04	DISPLAY NET	Filtered net weigher value
0x05	TARE	Tare value
0x06	PEAK	Highest reached weigher value
0x07	VALLEY	Lowest reached weigher value
0x08	HOLD*	Stores weight value
0x09	WEIGHTx10	Multi range net weigher value shown with extra decimal
0x0A	FAST GROSSx10	Unfiltered gross weigher value shown with extra decimal
0x0B	FAST NETx10	Unfiltered net weigher value shown with extra decimal
0x0C	DISPLAY GROSSx10	Filtered gross weigher value shown with extra decimal
0x0D	DISPLAY NETx10	Filtered net weigher value shown with extra decimal
0x0E	TAREx10	Tare value shown with extra decimal
0x0F	PEAKx10	Highest reached weigher value shown with extra decimal
0x10	VALLEYx10	Lowest reached weigher value shown with extra decimal
0x11	HOLDx10*	Stores weight value shown with extra decimal
0x12	mV signal	Direct mV value from the load cell(s)
0x13...0x77	INDICATOR REGISTERS	Indicator register 1...100
0x78...0xFF	RESERVED	Reserved

*Hold and Holdx10 are added in the SGM7xx/SGM8xx series firmware version V1.6.1.9.0.3 and above.

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3 Register functions

By using register functions, all device parameters can be read and/or written.

The following parameters are used:

Parameter	Data type	Word offset
Input - parameter 1	Double Word	03
Input - parameter 2	Double Word	05
Input - parameter 3	Double Word	07
Input - parameter 4	Double Word	09
Output - result 1	Double Word	08
Output - result 2	Double Word	10
Output - result 3	Double Word	12
Output - result 4	Double Word	14
Enable register command mode	Byte	00 high byte (bit 0 + 1)
Status register command mode	Word	02 (bit 14)

Input:

Parameter	Data type	Description
1	Double Word	Low word = function code High word = 0
2	Double Word	Input parameter, depending on function code
3	Double Word	Input parameter, depending on function code
4	Double Word	Input parameter, depending on function code

Output:

Result	Data type	Description
1	Double Word	Low word = function code High word = error code
2	Double Word	Result, depending on function code
3	Double Word	Result, depending on function code
4	Double Word	Result, depending on function code

Activating:

The register command mode is activated at the rising edge of control bit 0 + 1. Status bit 14 indicates that the register command mode is active. Reset bit 0 or 1 to go back to normal operation mode.

Usage:

First write parameter 2, 3 and 4. Write parameter 1 as last because this parameter triggers the action.

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3.1 Function codes

The following function codes are present:

Name	Code	Description
NOP	0	No Operation
CAL_ZERO	1	Calibrate zero by weight
CAL_SPAN	2	Calibrate span by weight
CAL_MV	3	Calibrate in mV/V
CAL_DEADLOAD	4	Calibrate dead load by measuring weight
CAL_INSERT	5	Calibrate multipoint insert by measuring weight
CAL_POINT	6	Calibrate multipoint read point at parameter index
CAL_DELETE	7	Calibrate multipoint delete point at parameter index
CAL_GEOGRAPHIC_ORIGIN_SET	8	Calibrate set geographic origin calibration
CAL_GEOGRAPHIC_ORIGIN_GET	9	Calibrate get geographic origin calibration
CAL_GEOGRAPHIC_LOCAL_SET	10	Calibrate set geographic local calibration
CAL_GEOGRAPHIC_LOCAL_GET	11	Calibrate get geographic local calibration
IND_MAXLOAD_SET	101	Indicator set maximum load
IND_MAXLOAD_GET	102	Indicator get maximum load
PDI_PATH_SET	201	PDI path set
PDI_PROPERTY_SET	202	PDI property set
PDI_PROPERTY_GET	203	PDI property get
PRINT	301	Print ticket or line to printer
PRINT_SUBTOTAL	302	Subtotals to printer not supported by SGM series
PRINT_TOTAL	303	Totals to printer
PRINT_DAYTOTAL	304	Day totals to printer not supported by SGM series
PRINT_BATCHTOTAL	305	Batch totals to printer not supported by SGM series
PRINT_LAYOUT	306	Custom total layout to printer not supported by SGM series and 1020
PRINT_ALIBI	307	Print to Alibi memory not supported by SGM700 series
PRINT_ALIBIMEMORY	308	print full alibi memory to printer not supported by SGM700 series
PRINT_EVENTMEMORY	309	print full event memory to printer not supported by SGM700 series
TOTAL_TOTALIZE	401	Totalize actual stable weight
TOTAL_SUBTOTAL	402	Read or reset actual subtotal
TOTAL_TOTAL	403	Read or reset actual totals
TOTAL_DAYTOTAL	404	Read or reset actual day totals
TOTAL_BATCHTOTAL	405	Read or reset actual batch totals



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RFN_PROCESS_RECIPES_GET	501	Read MFL/CHK/BLT recipe
RFN_PROCESS_RECIPES_SET	502	Write MFL/CHK/BLT recipe
RFN_PROCESS_CONFIG_GET	601	Read MFL/CHK/BLT configuration
RFN_PROCESS_CONFIG_SET	602	Write MFL/CHK/BLT configuration
RFN_PROCESS_DATA	701	Read MFL/CHK/BLT process data

3.2 Error codes

The following error codes are present:

Name	Code	Description
SUCCESS	0	Function successful
WRN_WARNING	1000	System warnings:
WRN_TIMEOUT	1001	Generic time-out warning
WRN_TOLOW	1002	Generic parameter to low warning
WRN_TOHIGH	1003	Generic parameter to high warning
WRN_ZERO	1004	Generic parameter/result is zero warning
WRN_NOTZERO	1005	Generic parameter/result is not zero warning
WRN_POSITIVE	1006	Generic parameter is positive warning
WRN_NEGATIVE	1007	Generic parameter is negative warning
WRN_FULL	1008	Generic something is full warning
WRN_EMPTY	1009	Generic something is empty warning
WRN_NOTFOUND	1010	Generic search not found warning
WER_WARNING	1100	Weigher warnings:
WER_NO_TARE	1101	Zero tare level, tare rst
ERR_ERROR	2000	System errors:
ERR_PARAMETER_INCORRECT	2001	Generic parameter error
ERR_TIMEOUT	2002	Generic time-out error
ERR_TOLOW	2003	Generic parameter to low error
ERR_TOHIGH	2004	Generic parameter to high error
ERR_ZERO	2005	Generic parameter/result is zero error
ERR_NOTZERO	2006	Generic parameter/result is not zero error
ERR_POSITIVE	2007	Generic parameter is positive error
ERR_NEGATIVE	2008	Generic parameter is negative error
ERR_FULL	2009	Generic something is full error
ERR_EMPTY	2010	Generic something is empty error
ERR_NOTFOUND	2011	Generic search not found error
ERR_FILE_NOT_FOUND	2012	Generic file not found error
WER_ERROR	2100	Weigher errors:
WER_NOT_STABLE	2101	Weigher not stable



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WER_ABOVE_MAXLOAD	2102	Parameter above max load
WER_BELOW_ZERO	2103	Parameter below zero
WER_NOT_IN_ZERO_RANGE	2104	Not in zero range
WER_ARITHMIC_OVERFLOW	2105	Arrhythmic overflow occurred
WER_ADC_OVERFLOW	2106	A/D reads all 1's
WER_ADC_UNDERFLOW	2107	A/D reads all 0's
WER_GAIN_NEGATIVE	2108	Gain ref. < zero ref.
WER_GAIN_OVERFLOW	2109	Gain limit
WER_SAVE	2110	Save errors:
WER_SAVE_FLASH_EXHAUSTED	2111	Flash ROM exhausted
WER_SAVE_CREATE_HEADER	2112	Error on header creation
WER_SAVE_DATA_WRITE	2113	Error on data write
WER_SAVE_HEADER_VALIDATE	2114	Header validation failed
WER_SAVE_DEACTIVATE	2115	Deactivate old data fail
WER_LOAD	2116	Load errors
WER_LOAD_NOT_FOUND	2117	Item not found in store
WER_LOAD_DATA_ERROR	2118	Error in stored data
WER_BAD_CALIBRATION	2119	No calibration available
WER_NOT_ENABLED	2120	Action not enabled
WER_MCAL_NOT_FOUND	2121	Multi-point not found
WER_MCAL_OVERFLOW	2122	Calibration table full
WER_TARE_ACTIVE	2123	Not allowed, tare active
WER_NOT_ALLOWED	2124	Action is not allowed
WER_ADC_NOPOWER	2125	ADC has no power
ERR_DOSER	2200	Doser errors
ERR_POSITION	2300	Position errors
ERR_SPCAPP	2400	SPC-application errors
ERR_SCOPE	2500	Scope errors
ERR_INTERPRETER	2600	Interpreter errors
ERR_USB	3000	USB errors - use USB routines for returning error texts
ERR_FLASH	3100	FLASH file system errors

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3.3 Calibration functions

This chapter describes the calibration function codes.

3.3.1 CAL_ZERO

Calibrate zero by weight. Function code = 1.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
1	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
1	Not used	Not used	Not used

3.3.2 CAL_SPAN

Calibrate span by weight. Function code = 2.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
2	Span weight	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
2	Not used	Not used	Not used

Example - calibrate span on 1.200kg:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
2	1200	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
2	Not used	Not used	Not used

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Example - calibrate span without loading scale - will result in **error**:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
2	1200	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
138215426	Not used	Not used	Not used

The result is **138215426**

- The function code (low word) is **2**
- The error code (high word) is **2109 - WER_GAIN_OVERFLOW, Gain limit**

3.3.3 CAL_MV

Theoretic calibration by millivolts. Function code = 3.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
3	Fixed point mV/V value	Maximum weight at mV/V	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
3	Not used	Not used	Not used

Example - theoretic calibration of load cell 200kg @ 2.0012mV/V:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
3	20012	200	Not used

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3.3.4 CAL_DEADLOAD

Calibrate dead load by measuring weight. Function code = 4.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
4	Actual weight on scale	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
4	Not used	Not used	Not used

Example - calibration of dead load with 12kg on the scale:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
4	12	Not used	Not used

3.3.5 CAL_INSERT

Multipoint calibration up to 10 points. Insert or replace a calibration point. Function code = 5.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
5	Actual weight on scale	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
5	Not used	Not used	Not used

Example - add calibration point of 10.000kg - if the point already exists, its ADC value is replaced:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
5	10000	Not used	Not used

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3.3.6 CAL_POINT

Multipoint calibration up to 10 points. Read the calibration point at index (1...10). Function code = 6.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
6	Index (1...10)	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
6	Index	Calibration reference weight	Calibration in mV

Example - read calibration point 1 (10.000kg @ 9.9975mV/V):

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
6	1	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
6	1	10000	9.9975

3.3.7 CAL_DELETE

Multipoint calibration up to 10 points. Delete the calibration point at index (1...10). Function code = 7.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
7	Index (1...10)	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
7	Index	Not used	Not used

Example - delete calibration point 1:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
7	1	Not used	Not used

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3.3.8 CAL_GEOGRAPHIC_ORIGIN_SET

Geographic correction. Set the origin calibration location. Function code = 8.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
8	Fixed point latitude degrees	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
8	Not used	Not used	Not used

Example - set origin latitude to 50.00 degrees:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
8	5000	Not used	Not used

3.3.9 CAL_GEOGRAPHIC_ORIGIN_GET

Geographic correction. Get the origin calibration location. Function code = 9.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
9	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
9	Fixed point latitude degrees	Not used	Not used

Example - get origin latitude (50.00 degrees):

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
9	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
9	5000	Not used	Not used

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3.3.10 CAL_GEOGRAPHIC_LOCAL_SET

Geographic correction. Set the actual scale location. Function code = 10.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
10	Fixed point latitude degrees	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
10	Not used	Not used	Not used

Example - set actual latitude to 50.00 degrees:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
10	5000	Not used	Not used

3.3.11 CAL_GEOGRAPHIC_LOCAL_GET

Geographic correction. Get the actual scale location. Function code = 11.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
11	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
11	Fixed point latitude degrees	Not used	Not used

Example - get location latitude (50.00 degrees):

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
11	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
11	5000	Not used	Not used

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3.4 Indicator functions

This chapter describes the indicator function codes.

3.4.1 IND_MAXLOAD_SET

Set the indicator maximum load. Function code = 101.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
101	Max load	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
101	Not used	Not used	Not used

Example - set the maximum load to 10.020kg:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
101	10020	Not used	Not used

3.4.2 IND_MAXLOAD_GET

Get the indicator maximum load. Function code = 102.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
102	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
102	Max load	Not used	Not used

Example - get the maximum load (10.020kg):

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
102	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
102	10020	Not used	Not used

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3.5 PDI functions

This chapter describes the PDO function codes.

3.5.1 PDI_PATH_SET

Set the PDI path to perform the action on. Function code = 201.

Request:

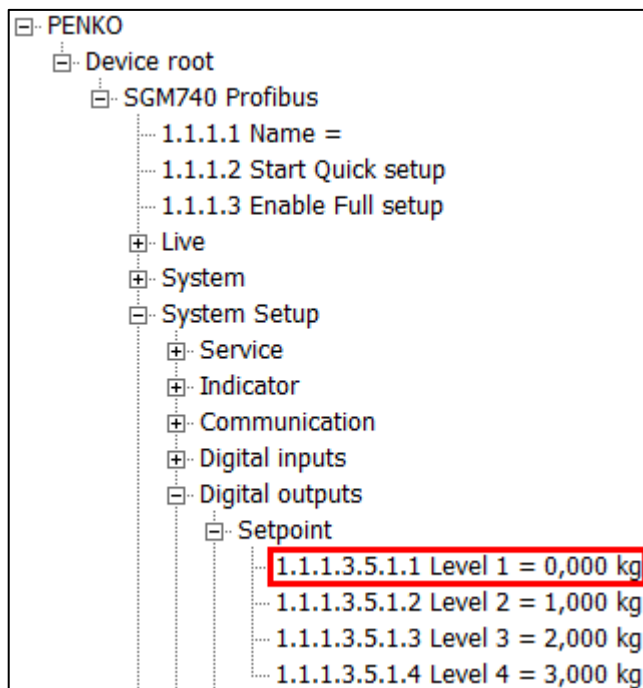
Parameter 1	Parameter 2	Parameter 3	Parameter 4
201	Path no. 1,2,3,4	Path no. 5,6,7,8	Path no. 9,10,11,12

Reply:

Result 1	Result 2	Result 3	Result 4
201	Path no. 1,2,3,4	Path no. 5,6,7,8	Path no. 9,10,11,12

PDI (PENKO Device Interface) represents the device configuration in a tree structure. Every property has its own unique path number. The tree is used in the PENKO configuration tools Pi Mach II and PDI Client, both available at www.penko.com/software

For example, a part of the PENKO SGM840 looks like this:



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Setpoint 1 has path number 1.1.1.3.5.1.1. This results in the following input parameters:

Fill the path with zeros to make 12 numbers: 1.1.1.3.5.1.1.0.0.0.0.0

Parameter 1	PDI_PATH_SET	201
Parameter 2	0x01 0x01 0x01 0x03	16843011
Parameter 3	0x05 0x01 0x01 0x00	83951872
Parameter 4	0x00 0x00 0x00 0x00	0

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
201	16843011	83951872	0

Reply:

Result 1	Result 2	Result 3	Result 4
201	16843011	83951872	0

The PDI path is now set.

If the path is not found, all zeros are returned.

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3.5.2 PDI_PROPERTY_SET

Set a PDI property for the selected PDI path. Function code = 202.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
202	Property value	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
202	Not used	Not used	Not used

Example - set setpoint 1 to 0.500kg (path must be selected with PDI_PATH_SET):

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
202	500	Not used	Not used

3.5.3 PDI_PROPERTY_GET

Get a PDI property from the selected PDI path. Function code = 203.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
203	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
203	Property value integer/string	Property value string optional	Property value string optional

Example - get setpoint 1 (0.500kg) (path must be selected with PDI_PATH_SET):

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
203	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
203	500	Not used	Not used

PENKO PROFIBUS-DP protocol

Example - get the software version number (1.4.3.9.0.1) (path must be selected with PDI_PATH_SET):

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
203	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
203	825111598	858667310	808333568

The result is a string containing the version number:

Result 2	825111598	0x31 0x2E 0x34 0x2E	1.4.
Result 3	858667310	0x33 0x2E 0x39 0x2E	3.9.
Result 4	808333568	0x30 0x2E 0x31 0x00	0.1

1.4.3.9.0.1

PENKO PROFIBUS-DP protocol

3.6 Printer functions

This chapter describes the printer function codes.

3.6.1 PRINT

Print ticket or line layout, depending on set layout in device. Function code = 301.

For the SGM series printing is only available at the SGM720/820 and SGM750/850.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
301	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
301	Gross weight	Net weight	Tare weight

Example - print:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
301	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
301	699	620	79

Device printer layout setting: **ticket**

```
-----  
DATE                03-09-14  
TIME                11:02.51  
TICKET NUMBER:      42  
  
NET                 0,620 kg  
Tare                0,079 kg  
                   ----- +  
GROSS               0,699 kg  
-----
```

Device printer layout setting: **line**

```
-----  
NR      (PRESET)TARE kg    NET kg  
75      0,079             0,620  
76      0,079             0,620  
77      0,079             0,620  
-----
```

PENKO PROFIBUS-DP protocol

3.6.2 PRINT_SUBTOTAL

Print subtotal to printer. Function code = 302.

Not applicable for the SGM7xx/8xx series.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
302	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
302	Subtotal gross weight	Subtotal net weight	Subtotal tare weight

Example - print subtotal:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
302	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
302	3078	2742	336

Printed ticket:

DATE	03-09-14
TIME	13:53.25
TICKET NUMBER:	3
SUBTOTAL NET	2,742 kg
SUBTOTAL TARE	0,336 kg
	----- +
SUBTOTAL GROSS	3,078 kg

PENKO PROFIBUS-DP protocol

3.6.3 PRINT_TOTAL

Print total to printer. Function code = 303.

For the SGM series printing is only available at the SGM720/820 (Ethernet) and SGM750/850 (serial).

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
303	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
303	Total gross weight	Total net weight	Total tare weight

Example - print total:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
303	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
303	7182	6398	784

Printed ticket:

DATE	03-09-14
TIME	14:02.04
TICKET NUMBER:	7
TOTAL NET	6,398 kg
TOTAL TARE	0,784 kg
	----- +
TOTAL GROSS	7,182 kg

PENKO PROFIBUS-DP protocol

3.6.4 PRINT_DAYTOTAL

Print day total to printer. Function code = 304.

Not applicable for the SGM7xx/8xx series.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
304	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
304	Day total gross weight	Day total net weight	Day total tare weight

Example - print day total:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
304	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
304	3454	3118	336

Printed ticket:

DATE	03-09-14
TIME	14:09.36
TICKET NUMBER:	3
DAY TOTAL NET	3,118 kg
DAY TOTAL TARE	0,336 kg
	----- +
DAY TOTAL GROSS	3,454 kg

PENKO PROFIBUS-DP protocol

3.6.5 PRINT_BATCHTOTAL

Print batch total to printer. Function code = 305.

Not applicable for the SGM7xx/8xx series.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
305	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
305	Batch total gross weight	Batch total net weight	Batch total tare weight

Example - print batch total:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
305	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
305	10636	9516	1120

Printed ticket:

DATE	03-09-14
TIME	14:12.08
TICKET NUMBER:	10
BATCH TOTAL NET	9,516 kg
BATCH TOTAL TARE	1,120 kg
	----- +
BATCH TOTAL GROSS	10,636 kg

PENKO PROFIBUS-DP protocol

3.6.6 PRINT_LAYOUT

Print to Printer function custom layout 1-n. Function code = 306.

Not supported by 1020 and SGM series.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
306	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
306	Layout number 1-n	Not used	Not used

Example - print with custom layout:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
306	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
306	1	Not used	Not used

PENKO PROFIBUS-DP protocol

3.6.7 PRINT_ALIBI

Print to Alibi memory function. Store the actual stable weight in Alibi memory. Function code = 307.

For the SGM series Alibi memory is only available at the SGM8xx series.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
307	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
307	UID*	Gross/Net	Preset (Tare)

* UID can exceed the maximum positive value of the LONG data type (signed). Use the DWORD data type (unsigned).

Example - write to Alibi memory, with active tare:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
307	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
307	1944985600	1315	112

Corresponding Alibi records:

Entry	Code	Date/Value	Time/Unit	UID
00001/00004	Alibi 001	03-09-14	15:00:46	1944985600
00002/00004	Net	1.315	kg	3803586561
00003/00004	Tare	0.112	kg	1269178371
00004/00004	Gross	1.427	kg	0718544901

Example - write to Alibi memory, without active tare:

Reply:

Result 1	Result 2	Result 3	Result 4
307	1660428288	1711	0

Corresponding Alibi records:

Entry	Code	Date/Value	Time/Unit	UID
00001/00002	Alibi 001	03-09-14	15:02:34	1660428288
00002/00002	Gross	1.711	kg	1133518849

PENKO PROFIBUS-DP protocol

3.6.8 PRINT_ALIBIMEMORY

Print the complete Alibi memory to a printer. Function code = 308.

For the SGM series Alibi/printing is only available at the SGM820 and SGM850.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
308	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
308	Not used	Not used	Not used

Example - print the complete Alibi memory:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
308	Not used	Not used	Not used

Printed ticket:

```
Device: 1020
Serial Number FFFFFFFF
Date : 03-09-14   Time : 15:19:19
Alibi Memory
Number UID      Code      Date/Value      Time/Unit
  1 1660428288 Alibi 001      03-09-14      15:11:28
  2 1133518849 Gross      1.711         kg
  3 1941708803 Alibi 001      03-09-14      15:19:08
  4 3786547204 Net        1.162         kg
  5 3158056966 Tare       0.350         kg
  6 0510926856 Gross      1.512         kg
  7 1941708810 Alibi 001      03-09-14      15:19:08
  8 3786547211 Net        1.162         kg
  9 3158056973 Tare       0.350         kg
 10 0510926863 Gross      1.512         kg
```


PENKO PROFIBUS-DP protocol

3.6.9 PRINT_EVENTMEMORY

Print the complete Event log to a printer. Function code = 309.

For the SGM series Event/printing is only available at the SGM820 and SGM850.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
309	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
309	Not used	Not used	Not used

Example - print the complete Event log:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
309	Not used	Not used	Not used

Printer ticket:

```
Device: 1020
Serial Number FFFFFFFF
Date : 03-09-14   Time : 15:33:59
Event Log
Number UID      Code                Date/Value      Time/Unit
  1 0841613312 TAC Changed        30-06-14       11:43:48
  2 1371668481 Events Cleared     30-06-14       11:43:48
  3 1251344386 System Default   30-06-14       12:08:50
  4 1182662659 SoftwareUpdate   30-06-14       12:10:10
  5 4005953540 Alibi Cleared     30-06-14       13:50:20
  6 4005953541 Alibi Cleared     30-06-14       13:50:20
  7 2012479494 CAL Changed  30-06-14       13:58:34
  8 1503395847 CAL Changed  30-06-14       13:58:42
  9 4230086664 Alibi Cleared     30-06-14       14:29:58
 10 3949592585 SoftwareUpdate   31-07-14       09:11:28
```

PENKO PROFIBUS-DP protocol

3.7 Total functions

This chapter describes the total function codes.

3.7.1 TOTAL_TOTALIZE

Totalize actual stable weight. Function code = 401.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
401	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
401	Added gross weight	Added net weight	Added tare weight

Example - add actual stable weight to total:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
401	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
401	1512	1162	350

PENKO PROFIBUS-DP protocol

3.7.2 TOTAL_SUBTOTAL

Get the subtotal weights. Function code = 402.

Not applicable for the SGM7xx/8xx series.

Leave parameter 2 empty to read the subtotal weights.

Set parameter 2 to **0x55AA55AA** to reset the subtotal weights.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
402	Optional	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
402	Subtotal gross weight	Subtotal net weight	Subtotal tare weight

Example - read the subtotal weights:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
402	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
402	12096	9296	2800

Example - reset the subtotal weights:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
402	1437226410	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
402	12096	9296	2800

When reading again, all subtotal weights are 0.

PENKO PROFIBUS-DP protocol

3.7.3 TOTAL_TOTAL

Get the total weights. Function code = 403.

Leave parameter 2 empty to read the total weights.

Set parameter 2 to **0x55AA55AA** to reset the total weights.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
403	Optional	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
403	Total gross weight	Total net weight	Total tare weight

Example - read the total weights:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
403	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
403	12096	9296	2800

Example - reset the total weights:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
403	1437226410	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
403	12096	9296	2800

When reading again, all total weights are 0.

PENKO PROFIBUS-DP protocol

3.7.4 TOTAL_DAYTOTAL

Get the day total weights. Function code = 404.

Not applicable for the SGM7xx/8xx series.

Leave parameter 2 empty to read the day total weights.

Set parameter 2 to **0x55AA55AA** to reset the day total weights.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
404	Optional	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
404	Day total gross weight	Day total net weight	Day total tare weight

Example - read the day total weights:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
404	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
404	12096	9296	2800

Example - reset the day total weights:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
404	1437226410	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
404	12096	9296	2800

When reading again, all day total weights are 0.

PENKO PROFIBUS-DP protocol

3.7.5 TOTAL_BATCHTOTAL

Get the batch total weights. Function code = 405.

Not applicable for the SGM7xx/8xx series.

Leave parameter 2 empty to read the batch total weights.

Set parameter 2 to **0x55AA55AA** to reset the batch total weights.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
405	Optional	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
405	Batch total gross weight	Batch total net weight	Batch total tare weight

Example - read the batch total weights:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
405	Not used	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
405	12096	9296	2800

Example - reset the batch total weights:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
405	1437226410	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
405	12096	9296	2800

When reading again, all batch total weights are 0.

PENKO PROFIBUS-DP protocol

3.8 Controller functions

This chapter describes the controller functions for the belt weigher, check weigher and mono filler.

3.8.1 RFN_PROCESS_RECIPES_GET

Get the value of the selected recipe parameter. Function code = 501.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
501	Recipe param	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
501	Recipe param	Value	Not used

Example - get the value of recipe parameter 1:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
501	1	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
501	1	2000	Not used

3.8.2 RFN_PROCESS_RECIPES_SET

Set the value of the selected recipe parameter. Function code = 502.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
502	Recipe param	Value	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
502	Recipe param	Not used	Not used

Example - set the value of recipe parameter 2 to 500:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
502	2	500	Not used

PENKO PROFIBUS-DP protocol

3.8.3 RFN_PROCESS_CONFIG_GET

Get the value of the selected configuration parameter. Function code = 601.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
601	Config param	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
601	Config param	Value	Not used

Example - get the value of configuration parameter 1:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
601	1	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
601	1	2000	Not used

3.8.4 RFN_PROCESS_CONFIG_SET

Set the value of the selected configuration parameter. Function code = 602.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
602	Config param	Value	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
602	Config param	Not used	Not used

Example - set the value of configuration parameter 2 to 500:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
602	2	500	Not used

PENKO PROFIBUS-DP protocol

3.8.5 RFN_PROCESS_DATA

Get the value of the selected process data parameter. Function code = 701.

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
701	Process param	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
701	Process param	Value	Not used

Example - get the value of process parameter 1:

Request:

Parameter 1	Parameter 2	Parameter 3	Parameter 4
701	1	Not used	Not used

Reply:

Result 1	Result 2	Result 3	Result 4
701	1	2000	Not used

PENKO PROFIBUS-DP protocol

4 Examples

These examples are made with an Omron CJ2M-CPU31 PLC and CJ1W-PRM21 Profibus module using the CX-One software suite. The outputs start at address CIO3200. The inputs start at address CIO3300.

4.1 Inputs

Read weight register

The weight registers is located at word offset 0, so in this case address CIO3300. The data type is double word, 32 bit signed integer. The weight register selector is located at word offset 3, low byte.

Selector 0x00 = multi range net weigher value. Value is 1156:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3300	0	1156	8396	0	8	771	0	0	0	11561
CIO3310	0	11561	0	0	0	1156	0	0	0	0
CIO3320	0	0	0	0	0	0	0	0	0	0
CIO3330	0	0	0	0	0	0	0	0	0	0

Selector 0x05 = tare value. Value is 452:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3300	0	452	8652	5	8	769	0	0	0	10146
CIO3310	0	5622	0	4524	0	562	0	0	0	0
CIO3320	0	0	0	0	0	0	0	0	0	0
CIO3330	0	0	0	0	0	0	0	0	0	0

Read weigher status

The weigher status is located at word offset 2, so in this case address CIO3302.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3302	0	0	1	0	0	0	0	1	1	1	0	0	1	1	0	0	21CC
CIO3303	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0005
CIO3304	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0008
CIO3305	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0301

This represents the following status:

Status bit #	Description
2	Stable signal
3	In stable range
6	In zero range
7	Zero tracking possible
8	Tare active
13	User certified operation

PENKO PROFIBUS-DP protocol

Read inputs

The device inputs are located at word offset 4, so in this case address CIO3304. Input 1 - 3 are the physical inputs. Inputs 4 - 16 are virtual inputs generated by the software.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3304	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	000B
CIO3305	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0303
CIO3306	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3307	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

Physical input 1 and 2 are active.

Read outputs

The device outputs are located at word offset 5, so in this case address CIO3305. Output 1 - 4 are the physical outputs. Outputs 5 - 16 are virtual outputs generated by the software.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3305	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0303
CIO3306	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3307	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3308	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

Physical output 1 and 2 are active.

Read predefined weigher values (indicator only)

The following values are available:

Name	Data type	Word offset
Preset Tare	Double Word, 32 bit signed integer	06 -> CIO3306
Gross x 10	Double Word, 32 bit signed integer/float	08 -> CIO3308
Net x 10	Double Word, 32 bit signed integer/float	10 -> CIO3310
Tare x 10	Double Word, 32 bit signed integer/float	12 -> CIO3312
Multi-range weight	Double Word, 32 bit signed integer/float	14 -> CIO3314

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3306	0	0	0	22941	0	18417	0	4524	0	1842
CIO3316	0	0	0	0	0	0	0	0	0	0
CIO3326	0	0	0	0	0	0	0	0	0	0
CIO3336	0	0	0	0	0	0	0	0	0	0

CIO3306 = Preset Tare 0
 CIO3308 = Gross x 10 22941
 CIO3310 = Net x 10 18417
 CIO3312 = Tare x 10 4524
 CIO3314 = Multi-range weight 1842



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Read markers (controller only)

The device markers are located at word offset 6 and 7, so in this case address CIO3306 and CIO3307.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3306	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0810
CIO3307	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0008
CIO3308	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3309	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

CIO3306 = markers 401...416 marker 5 and 12 are active

CIO3307 = markers 417...432 marker 20 is active

Read extended registers (controller only)

The following extended registers are available:

Name	Data type	Word offset
Ext register 1 - 5 - 9 - 13	Double Word, 32 bit signed integer	08 -> CIO3308
Ext register 2 - 6 - 10 - 14	Double Word, 32 bit signed integer	10 -> CIO3310
Ext register 3 - 7 - 11 - 15	Double Word, 32 bit signed integer	12 -> CIO3312
Ext register 4 - 8 - 12 - 16	Double Word, 32 bit signed integer	14 -> CIO3314

The number depends on the channel set with control bits 6 and 7. The control bits are located at word offset 3, high byte.

Bit 7	Bit 6	Channel
0	0	0
0	1	1
1	0	2
1	1	3

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3300	0	2294	8332	16384	11	516	2048	8	0	5555
CIO3310	0	6666	0	7777	0	8888	0	0	0	0
CIO3320	0	0	0	0	0	0	0	0	0	0
CIO3330	0	0	0	0	0	0	0	0	0	0

Bit 6 is set to 1 so channel 1 is selected.

CIO3308 = Extended register 5 5555

CIO3310 = Extended register 6 6666

CIO3312 = Extended register 7 7777

CIO3314 = Extended register 8 8888

PENKO PROFIBUS-DP protocol

4.2 Outputs

Control weigher

The control bits are located at word offset 0, high byte, so in this case address CIO3200.

Zero is set at the rising edge of control bit 1:

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3200	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0200
CIO3201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

Set bit 6 and 7. For an indicator this enables writing the levels. For a controller this selects channel 3 for writing or reading extended registers:

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3200	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C000
CIO3201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

The register functions are enabled on the rising edge of bit 0 and 1:

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3200	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0300
CIO3201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

Select weight register

The weight register select bits are located at word offset 0, low byte, so in this case address CIO3200.

Select preset tare = 0x05:

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3200	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0005
CIO3201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

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Set preset tare value (indicator only)

The preset tare value is located at word offset 1, so in this case address CIO3201.

Set preset tare value to 200:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3200	0	200	0	0	0	0	0	0	0	0
CIO3210	0	0	0	0	0	0	0	0	0	0
CIO3220	0	0	0	0	0	0	0	0	0	0
CIO3230	0	0	0	0	0	0	0	0	0	0

This value is activated at the rising edge of control bit 4, the preset tare command.

Write levels (indicator only)

The following levels are available:

Name	Data type	Word offset
Level 1	Double Word, 32 bit signed integer	03 -> CIO3203
Level 2	Double Word, 32 bit signed integer	05 -> CIO3205
Level 3	Double Word, 32 bit signed integer	07 -> CIO3207
Level 4	Double Word, 32 bit signed integer	09 -> CIO3209

Control bit 6 and 7 must be set to enable writing the levels:

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3200	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C000
CIO3201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

Set level 1 to 200:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3200	0	0	0	0	200	0	0	0	0	0
CIO3210	0	0	0	0	0	0	0	0	0	0
CIO3220	0	0	0	0	0	0	0	0	0	0
CIO3230	0	0	0	0	0	0	0	0	0	0

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Write markers (controller only)

The device markers are located at word offset 1 and 2, so in this case address CIO3201 and CIO3202.

CIO3301 = markers 969...984 set marker 969 and 973:

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3201	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0011
CIO3202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

Write extended registers (controller only)

The following extended registers are available:

Name	Data type	Word offset
Ext register 85 - 89 - 93 - 97	Double Word, 32 bit signed integer/float	03 -> CIO3203
Ext register 86 - 90 - 94 - 98	Double Word, 32 bit signed integer/float	05 -> CIO3205
Ext register 87 - 91 - 95 - 99	Double Word, 32 bit signed integer/float	07 -> CIO3207
Ext register 88 - 92 - 96 - 100	Double Word, 32 bit signed integer/float	09 -> CIO3209

The number depends on the channel set with control bits 6 and 7. The control bits are located at word offset 0, high byte.

Bit 7	Bit 6	Channel
0	0	0
0	1	1
1	0	2
1	1	3

Set channel to 2 (control bit 7) to set extended register 43 to value 200 and 44 to value 300:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3200	32768	0	0	0	200	0	300	0	0	0
CIO3210	0	0	0	0	0	0	0	0	0	0
CIO3220	0	0	0	0	0	0	0	0	0	0
CIO3230	0	0	0	0	0	0	0	0	0	0

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4.3 Register functions

To enable the register function mode, set control bit 0 and 1 at the same time:

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3200	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0300
CIO3201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
CIO3203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

Status bit 15 indicates the register function mode is active:

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
CIO3302	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8000
CIO3303	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0300
CIO3304	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0004
CIO3305	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000

Reset control bit 0 or 1 to disable the register function mode and return to normal mode.

Use the following registers:

Parameter	Data type	Word offset
Input - parameter 1	Double Word	03 -> CIO3203
Input - parameter 2	Double Word	05 -> CIO3205
Input - parameter 3	Double Word	07 -> CIO3207
Input - parameter 4	Double Word	09 -> CIO3209
Output - result 1	Double Word	08 -> CIO3308
Output - result 2	Double Word	10 -> CIO3310
Output - result 3	Double Word	12 -> CIO3312
Output - result 4	Double Word	14 -> CIO3314

Calibrate zero

The function code is 1. The other parameters are not used.

Request:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3200	768	0	0	0	1	0	0	0	0	0
CIO3210	0	0	0	0	0	0	0	0	0	0
CIO3220	0	0	0	0	0	0	0	0	0	0
CIO3230	0	0	0	0	0	0	0	0	0	0

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Reply:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3300	0	0	24812	768	8	0	0	0	0	1
CIO3310	0	0	0	0	0	0	0	0	0	0
CIO3320	0	0	0	0	0	0	0	0	0	0
CIO3330	0	0	0	0	0	0	0	0	0	0

Calibrate span

The function code is 2. Parameter 2 is used for the span weight. Calibrate span at 2000:

Request:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3200	768	0	0	0	2	0	2000	0	0	0
CIO3210	0	0	0	0	0	0	0	0	0	0
CIO3220	0	0	0	0	0	0	0	0	0	0
CIO3230	0	0	0	0	0	0	0	0	0	0

Reply:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3300	0	2000	24716	768	8	0	16	0	0	2
CIO3310	0	0	0	0	0	0	0	0	0	0
CIO3320	0	0	0	0	0	0	0	0	0	0
CIO3330	0	0	0	0	0	0	0	0	0	0

In case an error occurs (for example calibrate span without entering a value) the error code is shown in the high word of result register 1:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3300	0	0	24812	768	8	0	0	0	2108	2
CIO3310	0	0	0	0	0	0	0	0	0	0
CIO3320	0	0	0	0	0	0	0	0	0	0
CIO3330	0	0	0	0	0	0	0	0	0	0

In this case the error is 2108: *The gain reference is smaller than the zero reference.*

PENKO PROFIBUS-DP protocol

Get indicator max load

Get the indicator maximum load. The function code is 102. The value is returned in reply register 2.

Request:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3200	768	0	0	0	102	0	0	0	0	0
CIO3210	0	0	0	0	0	0	0	0	0	0
CIO3220	0	0	0	0	0	0	0	0	0	0
CIO3230	0	0	0	0	0	0	0	0	0	0

Reply:

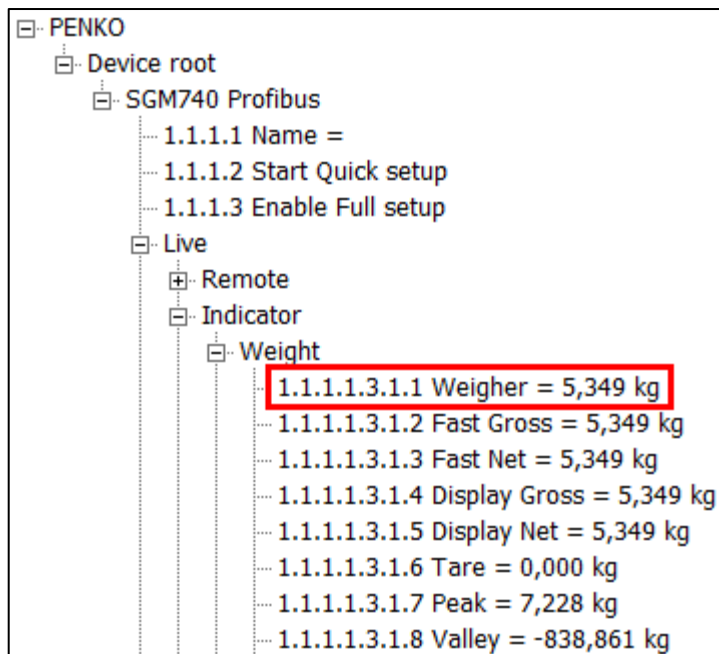
	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3300	0	0	24812	768	8	0	16	0	0	102
CIO3310	0	10008	0	0	0	0	0	0	0	0
CIO3320	0	0	0	0	0	0	0	0	0	0
CIO3330	0	0	0	0	0	0	0	0	0	0

The max load is 10008.

Get weigher x 10 value using PDI

PDI (PENKO Device Interface) represents the device configuration in a tree structure. Every property has its own unique path number. The tree is used in the PENKO configuration tools Pi Mach II and PDI Client, both available at www.penko.com/software

Screenshot of PENKO Pi Mach II software with SGM840 PDI configuration:



PENKO PROFIBUS-DP protocol

Weigher has path number 1.1.1.1.3.1.1. This results in the following input parameters:

Fill the path with zeros to make 12 numbers: 1.1.1.1.3.1.1.0.0.0.0.0

Parameter 1	PDI_PATH_SET	201
Parameter 2	0x01 0x01 0x01 0x01	16843009
Parameter 3	0x03 0x01 0x01 0x00	50397440
Parameter 4	0x00 0x00 0x00 0x00	0

Request:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3200	768	0	0	0	201	257	257	769	256	0
CIO3210	0	0	0	0	0	0	0	0	0	0
CIO3220	0	0	0	0	0	0	0	0	0	0
CIO3230	0	0	0	0	0	0	0	0	0	0

Reply:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3300	0	5349	41164	768	8	783	0	0	0	201
CIO3310	257	257	769	256	0	0	0	0	0	0
CIO3320	0	0	0	0	0	0	0	0	0	0
CIO3330	0	0	0	0	0	0	0	0	0	0

The PDI path is now set. If the path is not found, all zeros are returned.

Use function code 203 to get the PDI property at the selected path:

Request:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3200	768	0	0	0	203	0	0	0	0	0
CIO3210	0	0	0	0	0	0	0	0	0	0
CIO3220	0	0	0	0	0	0	0	0	0	0
CIO3230	0	0	0	0	0	0	0	0	0	0

Reply:

	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
CIO3300	0	364	24780	768	8	0	16	0	0	203
CIO3310	0	3644	0	0	0	0	0	0	0	0
CIO3320	0	0	0	0	0	0	0	0	0	0
CIO3330	0	0	0	0	0	0	0	0	0	0

The weigher x 10 value is 3644.



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