PROFIBUS

Communication Protocol

DGT4 PB/DGTQ PB

WEIGH INDICATORS

DGT-DGTQ_APPENDIX_PROFIBUS_07.15_19.09_EN

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1. Generalities

The Profibus communication protocol defines the structure of the messages and the communication mode between one or more "master" devices which manage the system and one or more "slave" devices which respond to the interrogations of a master (technical master-slave, of the multi-master type).
The masters, called also active devices, define the data traffic on the bus and periodically scan the slaves; when a master has an access permit (token), it can transmit data without external requests. The slaves, defined also as passive devices, do not have the access permit to the bus, but can only either confirm the received messages or transmit messages when requested by a master.
A master can either address single slaves or transmit a broadcast message to all (in the multi-master case each slave is linked to a master).

1.1 Selection of the PROFIBUS serial communication mode

To select the Profibus communication protocol one should enter the *SET-UP ENVIRONMENT* of the instrument (see Figure 1):

Input in the Set-up Environment

- Turn on the indicator, press the ZERO key or the TARE key during the countdown (the display shows the "tYPE" menu).
- Select "SEtuP" (using the ZERO or TARE keys) ⇨ press PRINT to confirm the parameter.
- Select "SEr iAL" (using the ZERO or TARE keys) ⇨ press PRINT to confirm the parameter.
- Select "Pc .SEL" (using the ZERO or TARE keys) ⇨ press PRINT to enter in the
  Selection menu of the PC port
  - Select "485" with DGT4PB indicator or "COM i" with DGTQPB indicator and press PRINT to confirm.
- Select "Con.PC" (using the ZERO or TARE keys) ⇨ press PRINT to enter in the:

  Set-up menu of the Communication Parameters of the PC port:

  - The "PCModE" item appears ⇨ press PRINT to enter in this submenu and select the "FLdbuS" item ⇨ press PRINT again to confirm.

    Now the setting of the instrument's serial address is requested (buS.tYP). Press PRINT and:
    - Selezionare " ProF ib " (tramite i tasti ZERO o TARE) e premere PRINT per entrare nel:

  Set-up menu of the Profibus parameters:

  Instrument serial address

  ⇨ for a few instants the "nodE. id" message is displayed ⇨ then type the serial address of the instrument (or slave) ⇨ confirm the entered value with PRINT.
  - Now the parameter "t iN.out" is visible.
    Setting this parameter to "YES" you enable the timeout and closed connection errors.
    Leaving it on "no" these errors are disabled.
    Confirm with PRINT.

- Press one time the C key. The parameter "Compat" is now visible.

Setting this parameter to " YES" you enable the compatibility of the profibus module communication with "GSD.V.1"file. Leaving it on " no" the profibus communications is compatible with "GSD.V.2" file.

- Press various times the C key until the message "SAUEP" appears on the display
- Press PRINT to confirm the changes made or another key for not saving.
- While turning on, check that the display shows "P.buS. in" then "P.buS.OK";
- After profibus start-up, the display shows the version of GSD file to use (GSD.V.1 or GSD.V.2), downloadable from www.diniargeo.com

CAREFUL: If you have made some changes to profibus communication parameters of DGT, it's necessary remove the power supply and restart the instrument.

1.2 Communication parameters between the indicator and the Profibus

Baudrate and Data Format

The communication speed (baud rate) and the serial word format, between the indicator and the Profibus, are not modifiable in the SET-UP ENVIRONMENT, but by default are set at:

- **Baud Rate** (*or transmission speed*): **9600 bit / sec**

- **Data Format** (*or serial word format*): **n - 8 - 1** (no parity – 8 data bits – 1 stop bit)

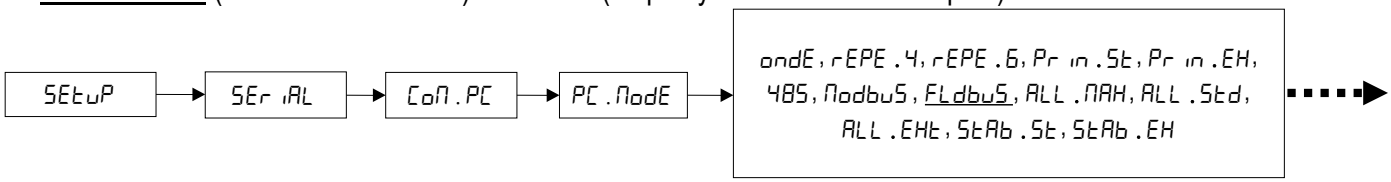

Figure 1*: Selection from the SET-UP ENVIRONMENT of the MODBUS communication.*

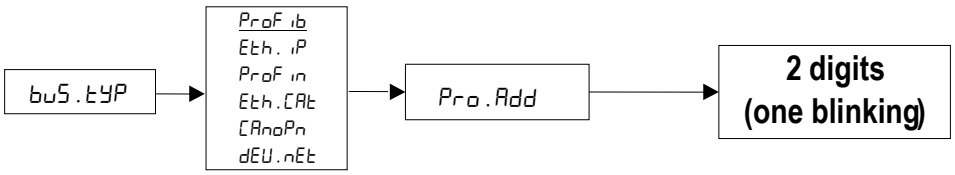

Figure 2*: Setting the instrument's serial address (or slave).*

2. Input and Output data areas

There are two data areas, an input and an output one, defined in this way due to the master's point of view: while the input area is read by this device, the output one is written.
Both the areas are organised in registers (input and output ones), on which the Profibus protocol functions operate.
All the numeric values have the Big Endian format (the 1st byte is the most significant one) for the Input Data Area and the Output Data Area, while these have the Little Endian format (the 1st byte is the least significant one) for the SET-UP area.

2.1 Input Data Area

The input data area is read by the master (is therefore read by the instrument) and is made up of 16 registers, each of 2 bytes (32 bytes overall).

Table 1: Input Data Area (if tYPE >> " ind.Ch" or "dEP.Ch")

N°Reg.	Input Registers		N° bytes
0	Gross Weight Value	(byte 3)	0
	Gross Weight Value	(byte 2)	1
1	Gross Weight Value	(byte 1)	2
	Gross Weight Value	(byte 0)	3
2	Net Weight Value	(byte 3)	4
	Net Weight Value	(byte 2)	5
3	Net Weight Value	(byte 1)	6
	Net Weight Value	(byte 0)	7

4	Input Status Register	(MSB)	8
	Input Status Register	(LSB)	9
5	Command Status Register	(MSB)	10
	Command Status Register	(LSB)	11
6	Output Status Register	(MSB)	12
	Output Status Register	(LSB)	13
7	N°last page read or written	(MSB)	14
	N°last page read or written	(LSB)	15
8	1st set-up page word		16
			17
	– – – – – – – – – – – – – – – –		
15	8th set-up page word		30
			31

Table 2: Input Data Area (if TYPE >> "trANSM")

N°Reg.	Input Registers		N° bytes
0	Channel 1 Status Register	(MSB)	0
	Channel 1 Status Register	(LSB)	1
1	Channel 2 Status Register	(MSB)	2
	Channel 2 Status Register	(LSB)	3
2	Channel 3 Status Register	(MSB)	4
	Channel 3 Status Register	(LSB)	5
3	Channel 4 Status Register	(MSB)	6
	Channel 4 Status Register	(LSB)	7
4	Input Status Register	(MSB)	8
	Input Status Register	(LSB)	9
5	Command Status Register	(MSB)	10
	Command Status Register	(LSB)	11
6	Output Status Register	(MSB)	12
	Output Status Register	(LSB)	13
7	N° last page read or written	(MSB)	14
	N° last page read or written	(LSB)	15
8	1st set-up page word		16
			17
	– – – – – – – – – – – – – – – –		
15	8th set-up page word		30
			31

NOTE: ***GROSS WEIGHT and NET WEIGHT value format (0-3 registers)***
Whole in absolute value (without decimals)
Example: if 3 decimals are set, the 3.000 value is read 3000
If 2 decimals are set, the 3.00 value is read 300

Channel Status Register

Bit	Description	Bit Meaning 0	1
(LSB)			
0	Weight Polarity	+	--
1	Weight Stability	NO	YES
2	Underload Condition	NO	YES
3	Overload Condition	NO	YES
4	Gross weight zone	Out of Zone 0	In Zone 0
5	*Not used*		
6	*Not used*		
7	*Not used*		
(MSB)			
8	*Not used*		
9	*Not used*		
10	*Not used*		
11	*Not used*		
12	*Not used*		
13	*Not used*		
14	*Not used*		
15	*Not used*		

2.1.1 Input Status Register

(Table 2.1.1) (if tYPE >> " ind.ch" or "dEP.ch")

It is the input register number 4; two bytes defined in the following manner:

Bit	Description	Bit Meaning 0	1
(LSB)			
0	Net Weight Polarity	+	--
1	Gross Weight Polarity	+	--
2	Weight Stability	NO	YES
3	Underload Condition	NO	YES
4	Overload Condition	NO	YES
5	Entered Tare Condition	NO	YES
6	Manual Tare Condition	NO	YES
7	Gross ZERO zone	Out of Zone 0	In Zone 0
(MSB)			
8	Input 1	DISABLED	ENABLED
9	Input 2	DISABLED	ENABLED
10	*Not used*		
11	*Not used*		
12	*Not used*		
13	*Not used*		
14	Displayed Channel (low bit) **(1)**		
15	Displayed Channel (high bit)(from 0 to 3) **(1)**		

Input Status Register (if TYPE >> "trANSM")

It is the input register number 4; two bytes defined in the following manner:

Bit	Description	Bit Meaning 0	1
(LSB)			
0	*Not used*		
1	*Not used*		
2	*Not used*		
3	*Not used*		
4	*Not used*		
5	*Not used*		
6	*Not used*		
7	*Not used*		
(MSB)			
8	Input 1	DISABLED	ENABLED
9	Input 2	DISABLED	ENABLED
10	*Not used*		
11	*Not used*		
12	*Not used*		
13	*Not used*		
14	Displayed Channel (low bit) **(1)**		
15	Displayed Channel (high bit)(from 0 to 3) **(1)**		

(1): ***High bit, Low Bit:*** *0 0* → Channel 1 *0 1* → Channel 2
(15) (14) *1 0* → Channel 3 *1 1* → Channel 4

2.1.2 Output Status Register (Table 2.1.2)

It is input register number 6; two bytes defined in the following way:

Bit	Description	Bit meaning 0	1
(LSB)			
0	RELAY 1	NOT EXCITED	EXCITED
1	RELAY 2	NOT EXCITED	EXCITED
2	*Not used*		
3	*Not used*		
4	*Not used*		
5	*Not used*		
6	*Not used*		
7	*Not used*		
(MSB)			
8	*Not used*		
9	*Not used*		
10	*Not used*		
11	*Not used*		
12	*Not used*		
13	*Not used*		
14	*Not used*		
15	*Not used*	Bit that changes each second, in order to report the communication between module and indicator	

2.1.3 Command Status Register

It is input register number 5; two bytes defined in the following way:

High Byte → ***Last command received*** (see Table 2.2.1)
Low Byte: low nibble → ***Counting of processed commands*** (module 16)
high nibble → ***Result of last command received***

In which ***Result of last command received*** can take on the following values:

- OK = 0 Correct command and carried out
- ExceptionCommandWrong = 1 Wrong command
- ExceptionCommandData = 2 Wrong data in the command
- ExceptionCommandNotAllowed = 3 Not allowed command
- ExceptionNoCommand = 4 Inexistent command

2.2 Output Data Area

The output data area is written by the master (is therefore read by the instrument) and is made up of 16 registers, each of 2 bytes (32 bytes overall).

Tabella 2: Output Data Area

Reg. Nr.	Output Registers		N° bytes
0	Command Register	(MSB)	0
	Command Register	(LSB)	1
1	Parameter 1	(byte 3)	2
	Parameter 1	(byte 2)	3
2	Parameter 1	(byte 1)	4
	Parameter 1	(byte 0)	5
3	Parameter 2	(byte 3)	6
	Parameter 2	(byte 2)	7
4	Parameter 2	(byte 1)	8
	Parameter 2	(byte 0)	9
5	*Not used*		10
	Not used		11
6	*Not used*		12
	Not used		13
7	*Not used*		14
	Not used		15
8	1st set-up page word		16
			17
	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _		
15	8th set-up page word		30
			31

2.2.1 Command Register

It is the output register number 0. It is made up of two bytes and can take on the following values, which correspond to the implemented commands described in the table.

Execution of a Command

The execution of a command is made when the contents of the Command Register vary (therefore in order to repeat the last command one should first set the Command register to the NO COMMAND value, and then to the command value).

The only exceptions are the READ_SETUP, WRITE_SETUP and CHANGE_PAGE commands, which are executed even upon just the varying of Parameter 1 (page nr. to be read/written). Therefore:

To read various set-up pages one just needs to set the READ_SETUP command with the first page that one intends to write in Param.1, then change each time Param.1 with the new page n° to be read.

To write various pages one should set the WRITE_SETUP command with the n° of the first page to be written in Param.1 and the data in registers 8-15 of the output area; then each time one varies the data of the registers 8-15 and the page n° in Param.1.

Table 2.2.1: Command Register

Implemented Command	Command Register Value	Description
COMMANDS FOR trAnSM MODE		
ZERO_CHANNEL_1	45 (002D Hex)	ZERO execution on channel 1
ZERO_CHANNEL_2	46 (002E Hex)	ZERO execution on channel 2
ZERO_CHANNEL_3	47 (002F Hex)	ZERO execution on channel 3
ZERO_CHANNEL_4	48 (0030 Hex)	ZERO execution on channel 4
TARE_CHANNEL_1	49 (0031 Hex)	TARE execution on channel 1
TARE_CHANNEL_2	50 (0032 Hex)	TARE execution on channel 2
TARE_CHANNEL_3	51 (0033 Hex)	TARE execution on channel 3
TARE_CHANNEL_4	52 (0034 Hex)	TARE execution on channel 4
ZERO_MASK_REQUEST	53 (0035 Hex)	ZERO execution on channel in Parameter 1
TARE_MASK_REQUEST	54 (0036 Hex)	TARE execution on channel in Parameter 1
COMMANDS FOR dEP.Ch OR ind.Ch MODE		
NET_SWITCH_REQUEST	4 (0004 Hex)	Display Switch on the NET WEIGHT **(3)**
GROSS_SWITCH_REQUEST	5 (0005 Hex)	Display Switch on the GROSS WEIGHT **(3)**
WRITE_SETPOINT_1	10 (000A Hex)	SETPOINT 1 writing (ON value in Param. 1; OFF value in Param. 2) **(2)**
WRITE_SETPOINT_2	11 (000B Hex)	SETPOINT 2 writing (ON value in Param. 1; OFF value in Param. 2) **(2)**
WRITE_SETPOINT_3	12 (000A Hex)	SETPOINT 3 writing (ON value in Param. 1; OFF value in Param. 2) **(2)**
WRITE_SETPOINT_4	13 (000B Hex)	SETPOINT 4 writing (ON value in Param. 1; OFF value in Param. 2) **(2)**
WRITE_SETPOINT_5	14 (000A Hex)	SETPOINT 5 writing (ON value in Param. 1; OFF value in Param. 2) **(2)**
WRITE_SETPOINT_6	15 (000B Hex)	SETPOINT 6 writing (ON value in Param. 1; OFF value in Param. 2) **(2)**

COMMON COMMANDS		
NO_COMMAND	0 (0000 Hex)	NO COMMAND
ZERO_REQUEST	1 (0001 Hex)	ZERO execution
TARE_REQUEST	2 (0002 Hex)	AUTOMATIC TARE execution
TAREMAN_REQUEST	3 (0003 Hex)	MANUAL TARE execution (the value will be entered in Parameter 1 **(²)**)
CHANNEL_1_REQUEST	6 (0006 Hex)	Switching on CHANNEL 1
CHANNEL_2_REQUEST	7 (0007 Hex)	Switching on CHANNEL 2
CHANNEL_4_REQUEST	9 (0009 Hex)	Switching on CHANNEL 4
CHANNEL_3_REQUEST	8 (0008 Hex)	Switching on CHANNEL 3
SET_OUTPUT	25 (0019 Hex)	Setting the RELAY **(⁴)**
READ_SETUP	26 (001A Hex)	SET-UP PAGE READING
WRITE_SETUP	27 (001B Hex)	SET-UP PAGE WRITING
WRITE_FLASH	28 (001C Hex)	SAVING THE SET-UP in FLASH
CHANGE_PAGE	29 (001D Hex)	ALIBI PAGE **(⁵)** or TRANSM PAGE **(⁷)**
READ_ALIBI	30 (001E Hex)	WEIGH READING ON ALIBI **(⁶)**
WRITE_ALIBI	31 (001F Hex)	STORAGE OF WEIGH ON ALIBI **(⁵)**
SET_ZERO_TIMEOUT	44 (002C Hex)	Set the maximum time to ZERO execution (value in Parameter 1)

(²) NOTE: ***Value format of Parameter 1 and Parameter 2:***

→ *For the MANUAL TARE (only Param1):*

→ *For SETPOINTS 1 and 2:*
Whole in absolute value (without decimals)

Example: If 3 decimals are set, in order to enter the value 3.000 → one should write 3000
If 2 decimals are set, in order to enter the value 3.00 → one should write 300

(³): active functions only in NTGS mode (net / gross switch).

(⁴) Setting of the RELAYS

The status of the relays is settable using Parameter 1:

Parameter 1:

Bit 0 → RELAY 1 in which bit 0 = 1 → RELAY 1 CLOSED; bit 0 = 0 → RELAY 1 OPEN
Bit 1 → RELAY 2 in which bit 1 = 1 → RELAY 2 CLOSED; bit 1 = 0 → RELAY 2 OPEN

OPTIONAL RELAYS (ONLY DGTQ PB)

Bit 2 → RELAY 3 in which bit 2 = 1 → RELAY 3 CLOSED; bit 2 = 0 → RELAY 3 OPEN
Bit 3 → RELAY 4 in which bit 3 = 1 → RELAY 4 CLOSED; bit 3 = 0 → RELAY 4 OPEN
Bit 4 → RELAY 5 in which bit 4 = 1 → RELAY 5 CLOSED; bit 4 = 0 → RELAY 5 OPEN
Bit 5 → RELAY 6 in which bit 5 = 1 → RELAY 6 CLOSED; bit 5 = 0 → RELAY 6 OPEN
Bit 6 ÷ 15 (not used)

NOTES:

- ***Value format of Parameter 1 and Parameter 2 for the RELAYS:***
  → Bit configuration
  In the case a relay is linked to a setpoint, the command, relative to that relay, is ignored.
- The writing of the setpoint values does not cause the automatic flash saving, but are set temporarily. In order to save these in flash one should execute the WRITE_FLASH command.

(5) ALIBI PAGE

To go to the ALIBI page set the value 1000 in Parameter 1. With the writing command, if one wants to fill the page with the values described in the table below, one must first use this command and then transmit the writing command.

Format of the Parameter 1 value:

Whole in absolute value (without decimals)

Table 2.2.1.1: CONTENTS OF ALIBI PAGE

	Input Data Area (N° Byte)	Description
ALIBI PAGE (16 bytes)	16	Stored gross weight value (byte 3)
	17	Stored gross weight value (byte 2)
	18	Stored gross weight value (byte 1)
	19	Stored gross weight value (byte 0)
	20	Stored tare weight value (byte 3)
	21	Stored tare weight value (byte 2)
	22	Stored tare weight value (byte 1)
	23	Stored tare weight value (byte 0)
	24	ID: Weigh number (byte 3)
	25	ID: Weigh number (byte 2)
	26	ID: Weigh number (byte 1)
	27	ID: Weigh number (byte 0)
	28	Alibi status register (MSB)
	29	Alibi status register (LSB)
	30	*Not used*
	31	*Not used*

- ***Format of the* Alibi status register value:**

  2 bytes defined in the following way:

  BIT MEANING

  Bit from 7 to 0 → Number of rewritings (from 0 to 255).
  Bit from 10 to 8 → Number of scale (from 1 to 4).
  Bit 11 → Type of tare; bit 11 = 1 → manual tare; bit 1 = 0 → null or semiautomatic tare
  Bit 12 → Not used
  Bit 13 → Not used
  Bit 14 → Not used
  Bit 15 → Not used

(6) WEIGH READING ON ALIBI

To read a weigh stored in the ALIBI set the rewriting number in Parameter 1 and the weigh number (ID) in Parameter 2. The command automatically executes the change on the ALIBI page: see table 2.2.1.1.

Format of the Parameter 1 and Parameter 2 values:

Whole in absolute value (without decimals)

(7) TRANSM PAGE (only if TYPE >> TRANSM)

To go to the TRANSM page set the value 2000 in Parameter 1. With the writing command, if one wants to fill the page with the values described in the table below, one must first use this command and then transmit the writing command; after the start-up of the indicator, the value 2000 is set automatically as last page read.

Format of the Parameter 1 value:

Whole in absolute value (without decimals)

Table 2.2.1.2: CONTENTS OF TRANSM PAGE

	Input Data Area (N° Byte)	Description
TRANSM PAGE (16 bytes)	16	Channel 1 weight value (byte 3)
	17	Channel 1 weight value (byte 2)
	18	Channel 1 weight value (byte 1)
	19	Channel 1 weight value (byte 0)
	20	Channel 2 weight value (byte 3)
	21	Channel 2 weight value (byte 2)
	22	Channel 2 weight value (byte 1)
	23	Channel 2 weight value (byte 0)
	24	Channel 3 weight value (byte 3)
	25	Channel 3 weight value (byte 2)
	26	Channel 3 weight value (byte 1)
	27	Channel 3 weight value (byte 0)
	28	Channel 4 weight value (byte 3)
	29	Channel 4 weight value (byte 2)
	30	Channel 4 weight value (byte 1)
	31	Channel 4 weight value (byte 0)

2.3 SET-UP area

The set-up area is the one stored in flash (1024 bytes) and is made up of 64 pages (from 0 to 63).
In the case of an approved instrument it's not possible to write the metric parameters which are between page 0 and the first half of page 38. It is possible to write only the data between the second half of page 38 and page 63.
By writing one of the pages between 0 and 37 when the instrument is approved, the result of the command is ExceptionCommandNotAllowed, by writing instead the others one obtains CommandOk. In any case page 38 is not copied completely, but only the second half.

	Input Data Area (Byte Nr)	Output Data Area (Byte Nr)	Description
Area Setup: PAGE 5 (16 bytes)	16	16	
	17	17	
	18	18	
	19	19	
	20	20	
	21	21	RANGE 1 channel 1 (LSB)
	22	22	RANGE 1 channel 1
	23	23	RANGE 1 channel 1
	24	24	RANGE 1 channel 1 (MSB)
	25	25	RANGE 2 channel 1 (LSB)
	26	26	RANGE 2 channel 1
	27	27	RANGE 2 channel 1
	28	28	RANGE 2 channel 1 (MSB)
	29	29	*Not used*
	30	30	*Not used*
	31	31	*Not used*

	Input Data Area (N° Byte)	Output Data Area (N° Byte)	Description
Area Setup: PAGE 6 (16 bytes)	16	16	*Not used*
	17	17	RANGE 1 channel 1 Division (LSB)
	18	18	RANGE 1 channel 1 Division (MSB)
	19	19	RANGE 2 channel 1 Division (LSB)
	20	20	RANGE 2 channel 1 Division (MSB)
	21	21	*Not used*
	22	22	*Not used*
	23	23	Channel 1 decimals
	24	24	Channel 1 Unit of Measure **([5])**
	25	25	
	26	26	
	27	27	
	28	28	
	29	29	
	30	30	
	31	31	

	Input Data Area (N° Byte)	Output Data Area (N° Byte)	Description
Area Setup: PAGE 14 (16 bytes)	16	16	RANGE 1 channel 2 (LSB)
	17	17	RANGE 1 channel 2
	18	18	RANGE 1 channel 2
	19	19	RANGE 1 channel 2 (MSB)
	20	20	RANGE 2 channel 2 (LSB)
	21	21	RANGE 2 channel 2
	22	22	RANGE 2 channel 2
	23	23	RANGE 2 channel 2 (MSB)
	24	24	*Not used*
	25	25	*Not used*
	26	26	*Not used*
	27	27	*Not used*
	28	28	RANGE 1 channel 2 Division (LSB)
	29	29	RANGE 1 channel 2 Division (MSB)
	30	30	RANGE 2 channel 2 Division (LSB)
	31	31	RANGE 2 channel 2 Division (MSB)

	Input Data Area (N° Byte)	Output Data Area (N° Byte)	Description
Area Setup: PAGE 15 (16 bytes)	16	16	*Not used*
	17	17	*Not used*
	18	18	Channel 2 decimals
	19	19	Unit of Measure channel 2 **(5)**
	20	20	
	21	21	
	22	22	
	23	23	
	24	24	
	25	25	
	26	26	
	27	27	
	28	28	
	29	29	
	30	30	
	31	31	

	Input Data Area (N° Byte)	Output Data Area (N° Byte)	Description
Area Setup: PAGE 22 (16 bytes)	16	16	
	17	17	
	18	18	
	19	19	
	20	20	
	21	21	
	22	22	
	23	23	
	24	24	
	25	25	
	26	26	
	27	27	RANGE 1 channel 3 (LSB)
	28	28	RANGE 1 channel 3
	29	29	RANGE 1 channel 3
	30	30	RANGE 1 channel 3 (MSB)
	31	31	RANGE 2 channel 3 (LSB)

	Input Data Area (N° Byte)	Output Data Area (N° Byte)	Description
Area Setup: PAGE 23 (16 bytes)	16	16	RANGE 2 channel 3
	17	17	RANGE 2 channel 3
	18	18	RANGE 2 channel 3 (MSB)
	19	19	*Not used*
	20	20	*Not used*
	21	21	*Not used*
	22	22	*Not used*
	23	23	RANGE 1 channel 3 Division (LSB)
	24	24	RANGE 1 channel 3 Division (MSB)
	25	25	RANGE 2 channel 3 Division (LSB)
	26	26	RANGE 2 channel 3 Division (MSB)
	27	27	*Not used*
	28	28	*Not used*
	29	29	Channel 3 decimals
	30	30	Channel 3 unit of measure **(5)**
	31	31	

	Input Data Area (N° Byte)	Output Data Area (N° Byte)	Description	
Area Setup: PAGE 31 (16 bytes)	16	16		
	17	17		
	18	18		
	19	19		
	20	20		
	21	21		
	22	22	RANGE 1 channel 4	(LSB)
	23	23	RANGE 1 channel 4	
	24	24	RANGE 1 channel 4	
	25	25	RANGE 1 channel 4	(MSB)
	26	26	RANGE 2 channel 4	(LSB)
	27	27	RANGE 2 channel 4	
	28	28	RANGE 2 channel 4	
	29	29	RANGE 2 channel 4	(MSB)
	30	30	*Not used*	
	31	31	*Not used*	

	Input Data Area (N° Byte)	Output Data Area (N° Byte)	Description	
Area Setup: PAGE 32 (16 bytes)	16	16	*Not used*	
	17	17	*Not used*	
	18	18	RANGE 1 channel 4 Division	(LSB)
	19	19	RANGE 1 channel 4 Division	(MSB)
	20	20	RANGE 2 channel 4 Division	(LSB)
	21	21	RANGE 2 channel 4 Division	(MSB)
	22	22	*Not used*	
	23	23	*Not used*	
	24	24	Channel 4 decimals	
	25	25	Channel 4 unit of measure	**(5)**
	26	26		
	27	27		
	28	28		
	29	29		
	30	30		
	31	31		

(5) NOTE: ***Meaning of the numeric value in the Unit of Measure field:***

0 → Grams
1 → Kilograms
2 → Tons
3 → Pounds

3. Calibration

Page 5000 for input data area. Map (byte index - value, in big endian format):

Byte	Description
17-18	unit of measure (g, kg, t, lb)
19-20	1st range division
21-22	2nd range division
23-24	decimals
25-28	1st range capacity
29-32	2nd range capacity

Page 5001 for input data area. Map (byte index - value, in big endian format):

Byte	Description
17-18	calibration points
19-22	1st calibration weight
23-26	2nd calibration weight
27-30	3rd calibration weight
31-32	calibration status (see Modbus Input Register 30116)

Page 5002 for input data area. Map (byte index - value, in big endian format):

Byte	Description
17-20	zero calibration ADC value
21-24	1st calibration point ADC value
25-28	2nd calibration point ADC value
29-32	3rd calibration point ADC value

Page 5003 for input data area. Map (byte index - value, in big endian format):

Byte	Description
17-18	Instrument type
	0 = Independent channels
	1 = Dependent channels
	2 = Transm
19-20	Number of channels

Specifics commands:

Number	Command	Notes
34 (22H)	RESTART INSTRUMENT	Allows to restart the instrument
35 (23H)	READ CALIBRATION	Copy of calibration data of the channel equal to parameter 1 into temporary area
36 (24H)	WRITE CALIBRATION	Parameter 1 = 0: store of temporary data into calibration data (non volatile memory) Parameter 1 = 5000: copy data output area values (bytes 17 to 32) into the temporary calibration area related to metrologic values Parameter 1 = 5001: copy data output area values (bytes 17 to 32) into the temporary calibration area related to calibration weights values Parameter 1 = 5002: copy data output area values (bytes 17 to 32) into the temporary calibration area related to calibration ADC values
37 (25H)	POINT_ACQUISITION	Parameter 1 is the point to acquire
38 (26H)	ABORT_CALIBRATION	Abort the calibration under way

37 (25H) POINT_ACQUISITION Parameter 1 is the point to acquire
38 (26H) ABORT_CALIBRATION Abort the calibration under way

Also command 34 (22H): restart instrument.

3.1 Calibration Sequence

a. Use command READ CALIBRATION with parameter 1 equal to the channel to calibrate (1st channel is zero). If type is equal to dependent channels parameter 1 can be equal to zero only.
b. If necessary set metrologic values in the page 5000
c. Set calibration points in the page 5001, bytes 17-18
d. Set calibration weight(s) in the page 5001, bytes 19 to 30
e. If a theoretical calibration is to be executed write directly the ADC values in the page 5002
f. Otherwise switch to page 5001 to read the calibration status register (bytes 31-32), then unload the platform and use the command POINT_ACQUISITION with parameter equal to 0
g. wait for calibration status is equal to CALIBRATION_ACQUISTION_OK or CALIBRATION_ACQUISTION_ERROR
h. on error repeart from step f
i. on success load the platform with 1st calibration weight and use command POINT_ACQUISITION with parameter equal to 1
j. wait for calibration status is equal to CALIBRATION_ACQUISTION_OK or CALIBRATION_ACQUISTION_ERROR
k. on error repeat from step i
l. un success repeat step i for other calibration points (if any)
m. use command WRITE_CALIBRATION with parameter 1 equal to zero to store the new calibration
n. wait for calibration status is equal to CALIBRATION_OK or CALIBRATION_ERROR
o. on error repeat from step a

Page 3000 to get ADC values. Map (byte index - value, in big endian format):

Byte	Description
17-20	Channel 0 ADC value
21-24	Channel 1 ADC value
25-28	Channel 2 ADC value
29-32	Channel 3 ADC value

In independent channels mode only the active channel will be different from zero.