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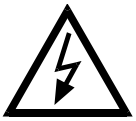
User Manual
version 1.04b

LCB
LCB3A

SYMBOLS

Here are the symbols used in the manual to draw the reader's attention:



Caution! Risk of electric shock.

Caution! This operation must be performed by skilled personnel.

Pay particular attention to the following instructions.

Further information.

WARRANTY

24 months from the date of the delivery note. Warranty covers only failures of defective components (due to construction defects or defects in materials) and includes replacement or repair of the components and related labor costs.
Warranty is automatically forfeited in the event of:
- tampering, deletion, removal of the identification label and/or serial number of the product
- misuse, transformation, alteration, repair of products not carried out by Laumas personnel

Laumas provides a 1-year warranty from the date of the delivery note on defects in material or manufacture of the battery.

GUIDELINES FOR PROPER DISPOSAL

Sealed Lead Acid Battery Must be recycled Properly

This symbol on the product or packaging indicates that:
- This is electrical/electronic equipment and cannot be disposed of as municipal solid waste, but must be delivered to a recycling center
- Improper use or disposal can pollute the environment or damage human health
- Non-compliance with these guidelines will be penalized in accordance with the regulations in force in the country of destination
- It is recommended to dispose of the packing and packaging as required by local regulations

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INTRODUCTION TO THE USER MANUAL

This manual explains the operation of the LCB instrument through the use of the communication interface.
For example, **DIVISION** section: the first part explains what the division is and the second part (`COMMUNICATION INTERFACE`) explains how to modify it by using the communication interface commands.

The instrument can also be configured through the Instrument Manager software (see section **INSTRUMENT MANAGER**).

For a better understanding of the contents, it is assumed the knowledge of the following topics:
- management of weight values via the communication interface (see section **DIVISION**);
- alarm identification (see section **ALARMS**);
- registers and data of the communication interface (see section **COMMUNICATION INTERFACE**);

COMMUNICATION INTERFACE

Data exchanged by the instrument can be input data or output data. For specific information regarding the communication interface used, see section **FIELDBUSES**.

Output data from instrument (reading)	Abbreviation*	Dimension (byte)
Gross weight	GW	4
Net weight	NW	4
Exchange register R1	R1	4
Exchange register R2	R2	2
Status Register 1	SR1	2
Status Register 2	SR2	1
Instrument status	IS	1
Execution register	EXR	2
Digital inputs status	INS	1
Digital outputs status	OUTS	1

Input data to instrument (writing)	Abbreviation*	Dimension (byte)
Command Register	CMDR	2
Digital outputs command	CMDOUT	2
Exchange register W1	W1	4
Exchange register W2	W2	2

***In the user manual, the abbreviation of the registers will be used instead of the extended name.**

GROSS WEIGHT (GW) - NET WEIGHT (NW)

The weight values are expressed as positive integer numbers, including decimal figures, but without decimal point. Read the Status Register to obtain information about sign and possible errors on the weight.

EXCHANGE REGISTERS (R1, R2, W1, W2)

These registers are used for instrument management operations. Two read and two write exchange registers are available.

STATUS REGISTER 1 (SR1)

Bit 0	Load cell error	**Bit 8**	Net weight negative sign
Bit 1	AD converter malfunction	**Bit 9**	Peak weight negative sign
Bit 2	Maximum weight exceeded by 9 divisions	**Bit 10**	Net indication
Bit 3	Gross weight higher than 110% of full scale	**Bit 11**	Weight stability
Bit 4	Gross weight beyond 999999 or less than -999999	**Bit 12**	Weight within ±¼ of a division around ZERO
Bit 5	Net weight beyond 999999 or less than -999999	**Bit 13**	
Bit 6		**Bit 14**	
Bit 7	Gross weight negative sign	**Bit 15**	

STATUS REGISTER 2 (SR2)

Bit 0	Preset tare enabled	**Bit 4**	
Bit 1	Instrument ready	**Bit 5**	
Bit 2		**Bit 6**	Checksum error
Bit 3		**Bit 7**	Bus Er error

INSTRUMENT STATUS (IS)

This register is used for the LOAD program only.

0	Instrument in idle condition (weight indication)	**13**	SLAVE alarm
1	Batching not possible/programming mode	**14**	EMPtY alarm
2	Batching phase	**15**	MASFOr alarm
3	Waiting phase	**16**	------ alarm
4	Cycle end phase	**17**	tArEP alarm
5	Batching paused	**18**	LOAd alarm
6	UnLOAd alarm	**19**	PArSEr alarm
7	FALL alarm	**20**	
8	tOL alarm	**21**	
9		**22**	
10	ErUEI G alarm	**23**	
11		**24**	Temporary notice tOtAL
12			

EXECUTION REGISTER (EXR)

This register allows you to monitor the progress of a command previously sent to CMDR.
For further information, see section **COMMAND EXECUTION STATUS**.

It may take several seconds to execute some commands.

INPUTS (INS) AND OUTPUTS (OUTS) STATUS

DIGITAL INPUTS STATUS (INS)

Bit 0	INPUT 1 status
Bit 1	INPUT 2 status
Bit 2	
Bit 3	
Bit 4	
Bit 5	
Bit 6	
Bit 7	

Bit=1: high input; Bit=0: low input

DIGITAL OUTPUTS STATUS (OUTS)

Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	
Bit 4	
Bit 5	
Bit 6	
Bit 7	

Bit=1: output is closed; Bit=0: output is open

DIGITAL OUTPUTS COMMAND (CMDOUT)

This register is used for the BASE program only; it allows to control the outputs set to PLC mode (see section **OUTPUTS AND INPUTS CONFIGURATION (BASE program)**).

Bit 0	OUTPUT 1 status	**Bit 4**		**Bit 8**		**Bit 12**	
Bit 1	OUTPUT 2 status	**Bit 5**		**Bit 9**		**Bit 13**	
Bit 2	OUTPUT 3 status	**Bit 6**		**Bit 10**		**Bit 14**	
Bit 3		**Bit 7**		**Bit 11**		**Bit 15**	Force outputs

Bit=1: output is closed; Bit=0: output is open

Setting bit 15 to 1 on the PLC, the *master* takes control of all the outputs, whatever their setting.

COMMAND EXECUTION STATUS

The register EXR allows you to monitor the progress of a command previously sent to CMDR.

EXR	
Value	**Description**
Command code sent to CMDR	Command executed correctly
0	No command running
1	Command running
0xFFFA	Command not recognized
0xFFFB	Command not available in the current configuration
0xFFFC	Command requires a qualified access
0xFFFD	Execution error
0xFFFE	Parameter value outside the allowed limits

AEXR lets you read the error details, where applicable.

AEXR	
Value	**Description**
0	No details
1	Sample weight equal to zero
2	Maximum number of calibration points reached
3	Sample weight already used in the current calibration
10	Preset tare equal to zero
11	Semiautomatic tare active: preset tare not allowed
12	Gross weight equal to zero
19	Unstable weight
20	Gross weight greater than the maximum capacity
25	Start contact closed on batching

READING

- Send command 1999 to CMDR.
- Read EXR* in the two H byte of R1.
- Read AEXR** in the two L byte of R1.

*see table EXR
**see table AEXR

The execution register EXR is also available in the instrument output data and can be read without sending a command to CMDR (see section **COMMUNICATION INTERFACE**).

This command also provides the details of an error, if any.
Example: the table shows the content of R1 in the event of exceeding the maximum number of calibration points

	H (2 byte)	L (2 byte)	Total
Hexadecimal	0xFFFD	0x0002	0xFFFD0002
Decimal	-3	2	-196606

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER (CMDR)

Instrument information			
1220	SW, HW and REV reading	1221	Year of production and serial number reading

Calibration and system parameters			
7	Semi-automatic tare activation	6025	Filter reading
8	Semi-automatic zero	6026	Filter writing
9	Semi-automatic tare deactivation	6027	Automatic zero setting at power on reading
87	Preset tare reading	6028	Automatic zero setting at power on writing
88	Preset tare writing	6029	Unit of measure reading
100	Zero-setting for calibration	6030	Unit of measure writing
101	Sample weight storage	6033	Coefficient reading
102	Sample weight reading	6034	Coefficient writing
103	Sample weight writing	6043	Theoretical zero reading
104	Real calibration deleting	6044	Theoretical zero writing
106	Acquisition of multiple real calibration points	6045	Recalculated full scale reading
107	Sample weight mVV reading	6101	Resettable weight for small weight changes reading
108	Sample weight mVV writing	6102	Resettable weight for small weight changes writing
109	Calibration point acquisition via characterization values	6103	Zero tracking reading

112	Calibration zero point acquisition via characterization values	6104	Zero tracking writing
113	Total reset weight reading	6127	Anti-peak activation reading
130	Preset tare application	6128	Anti-peak activation writing
1999	EXR and AEXR reading	6129	Coefficient activation reading
6000	Theoretical full scale writing	6130	Coefficient activation writing
6001	Theoretical full scale reading	6131	Peak activation and peak weight reading
6007	Sensitivity reading	6132	Peak activation writing
6008	Sensitivity writing	6579	Stability mode writing
6009	E/divisions reading	6580	Stability mode reading
6010	E/divisions writing	6581	Stability time writing
6015	Maximum capacity reading	6582	Stability time reading
6016	Maximum capacity writing		

Inputs/outputs settings and test			
1122	Inputs configuration reading	1125	Outputs configuration writing
1123	Inputs configuration writing	6137	Start mV test
1124	Outputs configuration reading		

Setpoint and hysteresis			
90	Setpoint 1 reading	162	Hysteresis 1 reading
91	Setpoint 2 reading	163	Hysteresis 2 reading
92	Setpoint 3 reading	164	Hysteresis 3 reading
93	Setpoint 1 writing	165	Hysteresis 1 writing
94	Setpoint 2 writing	166	Hysteresis 2 writing
95	Setpoint 3 writing	167	Hysteresis 3 writing
99	Data storage to EEPROM		

Batching operation, constants and formulas			
1000	Maximum weight reading	1032	No product load time reading
1001	Maximum weight writing	1033	No product load time writing
1002	Minimum weight reading	1034	No product unload time reading
1003	Minimum weight writing	1035	No product unload time writing
1004	Safe emptying time reading	1042	Fall mode reading
1005	Safe emptying time writing	1043	Fall mode writing
1006	Waiting time reading	1044	Fall divisions reading
1007	Waiting time writing	1045	Fall divisions writing
1012	Manual fall reading	1052	Consumption activation reading
1013	Manual fall writing	1053	Consumption activation writing
1016	Tolerance reading	1062	Slave configuration reading
1017	Tolerance writing	1063	Slave configuration writing
1020	Slow reading	1096	No comparison time reading
1021	Slow writing	1097	No comparison time writing
1022	Slow ON reading	2030	Formula number and cycles to be batched reading
1023	Slow ON writing	2031	Formula number and cycles to be batched writing

1024	Slow OFF reading	2035	Formula set reading
1025	Slow OFF writing	2036	Formula set writing
1026	Autotare reading	2037	Formula preset reading
1027	Autotare writing	2038	Formula preset writing
1028	Autotare delay reading	2040	Formulas deleting
1029	Autotare delay writing	6560	Operation settings reading
1030	Stable tare reading	6559	Operation settings writing
1031	Stable tare writing		

Commands and data related to the batching in progress			
201	Batching start	1085	Totals deleting
202	Batching pause	1114	Batching data status reading
203	Batching resume	2020	Totals reading
204	Batching stop	2032	Running cycle reading
205	Accept alarm during the batching	2100	Batching data reading
206	Cancel tArEr alarm	2101	Batching data reading: actual batched
207	Cancel tOL alarm	2102	Batching data reading: theoretical batched
209	Continue batching	2103	Batching data reading: starting tare
250	Batching data reading complete	2105	Batching data reading: alarms

Certain data, when specifically indicated, will be written directly in the EEPROM type memory. This memory has a limited number of writing operations (100000), therefore it is necessary to pay particular attention to not execute useless operations on said locations. The instrument in any case makes sure that no writing occurs if the value to be memorised is equal to the value in memory.

INSTRUMENT COMMISSIONING

Check that when loading the load cells there is an increase in weight. If there is not check and verify the connections and correct positioning of the load cells.

- **If the instrument has already been theoretical CALIBRATED** (plant system identification tag present on the instrument and on the cover: load cell's rated data already entered):
  - reset to zero (see section **TARE WEIGHT ZERO SETTING**);
  - check the calibration with sample weights and correct the indicated weight if necessary (see section **REAL CALIBRATION (WITH SAMPLE WEIGHTS)**).

- **If the instrument HAS NOT BEEN CALIBRATED** (missing plant system identification tag) proceed with calibration:
  - if load cells data are unknown, follow the procedure in section **REAL CALIBRATION (WITH SAMPLE WEIGHTS)**;
  - if the characterization values of the load cells are known, follow the procedure in section **CALIBRATION VIA CHARACTERIZATION VALUES OF THE LOAD CELL**;
  - enter the rated data of load cells following the procedure given in section **THEORETICAL CALIBRATION**;
  - check the calibration with sample weights.

- If you use the analog output, set the desired analog output type and the full scale value (see section **ANALOG OUTPUT**).

BASE PROGRAM ONLY

- If setpoint are used, set the required weight values and the relevant parameters (see sections **SETPOINT PROGRAMMING** and **OUTPUTS AND INPUTS CONFIGURATION**).

LOAD PROGRAM ONLY

Required settings for the first batching:

- set the minimum weight value (see section **MINIMUM WEIGHT**);
- set the P55 parameter (see section **OPERATION SETTINGS**);
- set the formula 01 (see section **FORMULAS PROGRAMMING**);
- start the batching by closing the START contact or remotely.

INSTRUMENT INFORMATION

COMMUNICATION INTERFACE

Command sent to CMDR	Register to read	Register contents
1220	R1 (16 most significant bit)	software code
	R1 (16 least significant bit)	firmware version
	R2	hardware code
1221	R1 (16 most significant bit)	year of production
	R1 (16 least significant bit)	serial number
	R2	program code*

*0=BASE; 13=LOAD

THEORETICAL CALIBRATION

This function allows the load cell rated values to be set.

To perform the theoretical calibration, set in sequence the values of theoretical full scale, sensitivity and division.

By modifying the theoretical full scale, the sensitivity or the division:
- the real calibration is cancelled and the theoretical calibration only is considered valid;
- the system parameters containing a weight value will be set to default values.

THEORETICAL FULL SCALE

[THEORETICAL FULL SCALE - FS-tEO (default: 10000)]: the **system full scale** is given by one cell capacity multiplied by the number of cells used. Example: 4 cells of 1000 kg → FULL SCALE = 1000 x 4 = 4000. The instrument is supplied with a theoretical full scale value corresponding to 10000.
To restore factory values, set 0 as full scale.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 6000 to CMDR.	• Send command 6001 to CMDR. • Read the value in R1.

SENSITIVITY

[SENSITIVITY - SEnSI b (default: 2.00000 mV/V)]: the **sensitivity** is a load cell rated parameter expressed in mV/V. Set the average sensitivity value indicated on the load cells. It's possible to set a value between 0.50000 and 7.00000 mV/V. Example: 4-cell system with sensitivity 2.00100, 2.00150, 2.00200, 2.00250; enter 2.00175, calculated as (2.00100 + 2.00150 + 2.00200 + 2.00250) / 4.

COMMUNICATION INTERFACE

WRITING	READING
• Multiply the value by 100000. • Write the value in W1. • Send command 6008 to CMDR.	• Send command 6007 to CMDR. • Read the value in R1. • Divide the value by 100000.

Example: to set SEnSI b to 2.00175, write 200175 in W1 and send command 6008 to CMDR.

DIVISION

[DIVISIONS - dI UI S]**:** the **division** is the minimum weight increment value which can be managed. It is automatically calculated by the system according to the performed calibration, so that it is equal to 1/10000 of full scale. It can be changed and be variable between 0.0001 and 100 with x1 x2 x5 x10 increments.

DIVISIONS					
Index	**Division**	**Active decimals**	**Index**	**Division**	**Active decimals**
0	100	0	10	0.05	2
1	50	0	11	0.02	2
2	20	0	12	0.01	2
3	10	0	13	0.005	3
4	5	0	14	0.002	3
5	2	0	15	0.001	3
6	1	0	16	0.0005	4
7	0.5	1	17	0.0002	4
8	0.2	1	18	0.0001	4
9	0.1	1			

COMMUNICATION INTERFACE

WRITING

- Write the index* in W1.
- Send command 6010 to CMDR.

*see DIVISIONS table

READING

- Send command 6009 to CMDR.
- Read the index* in R1.

WARNING: when a parameter is expressed in weight value, it is necessary to consider the number of divisions and active decimals set on the instrument: the value must be multiplied or divided by 10^n (n=active decimals, see DIVISIONS table) and rounded to the set divisions.

Examples: writing a value

Weight value to set	**Division**	**Active decimals**	**Value to write in the register**	**Value rounded to the division**
100	0.1	1	1000 given by $100x10^1$	100.0
12.00	0.05	2	1200 given by $12.00x10^2$	12.00
33	5	0	33 given by $33x10^0$	35
20.123	0.002	3	20123 given by $20.123x10^3$	20.122

Examples: reading a value

Weight value read by the instrument	**Division**	**Active decimals**	**Corresponding weight value**
1000	0.1	1	100.0 given by $1000/10^1$
1200	0.05	2	12.00 given by $1200/10^2$
35	5	0	35 given by $35/10^0$
20122	0.002	3	20.122 given by $20122/10^3$

MAXIMUM CAPACITY (BASE program)

[MAXIMUM WEIGHT - MASS (from 0 to full scale; default: 0)]: when the gross weight exceeds this value by 9 divisions, the ------ alarm is activated. To disable this function, set 0.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 6016 to CMDR.	• Send command 6015 to CMDR. • Read the value in R1.

TARE WEIGHT ZERO SETTING

Perform this procedure after having set the THEORETICAL CALIBRATION data.

Use this function to set to zero the weight of the empty system after commissioning and then later on to compensate zero variations due to the presence of product residues.

COMMUNICATION INTERFACE

TARE WEIGHT ZERO SETTING	READING OF TOTAL RESET WEIGHT VALUE
• Send command 100 to CMDR.	• Send command 113 to CMDR. • Read the value in R1.

ZERO VALUE MANUAL ENTRY

WARNING: perform this procedure only if it's not possible to reset the weighed structure tare, for example because it contains product that cannot be unloaded.

Set in this parameter the estimated zero value (from 0 to 999999; default: 0).

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 6044 to CMDR.	• Send command 6043 to CMDR. • Read the value in R1.

REAL CALIBRATION (WITH SAMPLE WEIGHTS)

After having performed the THEORETICAL CALIBRATION and the TARE WEIGHT ZERO SETTING, this function allows correct calibration to be done using sample weights of known value and, if necessary, any deviations of the indicated value from the correct value to be corrected.

Example: for a system of maximum capacity 1000 kg and 1 kg division, two sample weights are available, one of 500 kg and the other one of 300 kg. Load both weights onto the system and correct the indicated weight to 800. Now remove the 300 kg weight, the system must show 500; remove the 500 kg weight too; the system must read zero. If this does not happen, it means that there is a mechanical problem affecting the system linearity.

WARNING: identify and correct any mechanical problems before repeating the procedure.

- If theoretical full scale and recalculated full scale in real calibration are equal, it means that the theoretical calibration is currently in use; otherwise, the real calibration based on sample weights is in use.
- If the correction made changes the previous full scale for more than 20%, all the parameters with settable weight values are reset to default values.

LINEARISATION OPTION ON MAX 8 POINTS:
It is possible to perform a linearisation of the weight by inserting up to a maximum of eight points, using eight different sample weights.

In order to correctly set a sample weight of negative value, it is necessary to consider the contents of the register you write in as a 32-bit signed number. If the development system does not handle signed numbers, enter the values in two's complement.
Example: to set the sample weight to -56 kg, enter the value indicated in the table into the register.

DECIMAL VALUE	*HEXADECIMAL VALUE*
-56	0xFFFFFFC8

ACQUISITION OF A SINGLE CALIBRATION POINT

- Load onto the weighing system a sample weight equal to at least 50% of the maximum quantity to be weighed.
- Write the weight value in W1.
- Send command 103 to CMDR.
- Send command 101 to CMDR.

ACQUISITION OF MULTIPLE CALIBRATION POINTS

- Load onto the weighing system a sample weight.
- Write the loaded weight value in W1.
- Send command 103 to CMDR.
- Send command 106 to CMDR.
- Repeat the procedure up to a maximum of 8 weights.

- When acquiring a single calibration point, the instrument replaces the existing calibration with the new one.
- Before performing a multi-point calibration again, reset the value of all calibration points by sending command 104 to CMDR.

FULL SCALE READING RECALCULATED IN REAL CALIBRATION

- Send command 6045 to CMDR.
- Read the value in R1.

CALIBRATION VIA CHARACTERIZATION VALUES OF THE LOAD CELL

After performing the THEORETICAL CALIBRATION, this function enables performing calibration using the values given by the characterization values of the load cell in use (certificate of calibration or linearity test). The necessary values are the pairs of Force-mV/V defined on the first load cycle with growing loads.

The instrument manages a single type of calibration at a time: calibration via characterization values of the load cell deletes and replaces the real calibration present.

EXAMPLE OF CHARACTERIZATION VALUES OF THE LOAD CELL	
Force [kgf]	**mV/V**
0.00	0.001752
393.71	0.391151
793.65	0.794584
1193.58	1.197985
1593.61	1.601605
1993.65	2.005155

The first row of the table corresponds to the zero point. To obtain calibration via characterization values of the load cell it is first necessary to enter the pair Force-mV/V of the zero point and then the pairs of the points recorded during the characterization of the load cell.
If the values of Force are in Newton on the load cell characterization document, they must be converted into kgf by using the formula kgf=N/g, where:

kgf: value of force in kilogram force
N: value of force in Newton
g: gravity acceleration equal to 9.80665 ms^{-2}, unless otherwise specified on the characterization document

To verify the success of the calibration, load a known weight on the system and check the reading, then remove the weight and verify that the system goes back to zero; if this does not happen then there is a mechanical kind of issue on the system altering its linearity.

WARNING: identify and correct any mechanical problems before repeating the procedure.

- If theoretical full scale and recalculated full scale in calibration via characterization values of the load cell are equal, it means that the theoretical calibration is currently in use; otherwise, the calibration via characterization values is in use.
- If the correction made changes the previous full scale for more than 20%, all the parameters with settable weight values are reset to default values.

In order to correctly set a negative value, it is necessary to consider the contents of the register you write in as a 32-bit signed number. If the development system does not handle signed numbers, enter the values in two's complement.

Example: to set a Force value to -400.00 kgf, enter the value indicated in the table into the register.

DECIMAL VALUE	***HEXADECIMAL VALUE***
-40000 given by -400.00x100	0xFFFF63C0

Example: to set a value of mV/V of CC1 to -0.001234 mV/V, enter the value indicated in the table into the register.

DECIMAL VALUE	***HEXADECIMAL VALUE***
-1234 given by -0.001234x1000000	0xFFFFFB2E

ZERO POINT WRITING

- Multiply the Force value in 0 by 100.
- Write the value in W1.
- Send command 103 to CMDR.
- Multiply the mV/V value in 0 by 100000.
- Write the value in W1.
- Send command 108 to CMDR.
- Send command 112 to CMDR.

CALIBRATION POINTS WRITING

- Multiply the value of Force of the first characterization point by 100.
- Write the value in W1.
- Send command 103 to CMDR.
- Multiply the value of mV/V of the first characterization point by 1000000.
- Write the value in W1.
- Send command 108 to CMDR.
- Send command 109 to CMDR.
- Repeat the sequence for all the points in the characterization document of the load cell.

Example: writing the Force and mV/V values to acquire the calibration zero point via characterization values of the load cell.

Operation	Value to set	Value to write in W1	Command to send to CMDR
Force* writing	0.00	0 given by 0x100	103
mV/V* writing	0.001752	1752 given by 0.001752x1000000	108
Calibration zero point acquisition	-	-	112

*see table EXAMPLE OF CHARACTERIZATION VALUES OF THE LOAD CELL

Example: writing the Force and mV/V values to acquire the calibration point via characterization values of the load cell.

Operation	Value to set	Value to write in W1	Command to send to CMDR
Force* writing	393.71	39371 given by 393.71x100	103
mV/V* writing	0.391151	391151 given by 0.391151x1000000	108
Calibration point acquisition	-	-	109

*see table EXAMPLE OF CHARACTERIZATION VALUES OF THE LOAD CELL

Repeat the calibration point writing sequence for all the points in the characterization document of the load cell.

Before performing a calibration again, reset the value of all calibration points by sending command 104 to CMDR.

READING THE FULL SCALE RECALCULATED IN THE CALIBRATION VIA CHARACTERIZATION VALUES OF THE LOAD CELL

- Send command 6045 to CMDR
- Read the value in R1

FILTER ON THE WEIGHT

[FILTER SCALE - *FLYPE* (default: type 0, level 4)]: setting this parameter allows a stable weight indication to be obtained.
Available filter scales:

- Type 0: Laumas standard filter
- Type 1: stable moving average filter (better noise absorption, see table FILTER ON THE WEIGHT)
- Type 2: fast moving average filter (faster settling time, see table FILTER ON THE WEIGHT)

FILTER ON THE WEIGHT								
TYPE 0		TYPE 1			TYPE 2			
LEVEL	SETTLING TIME [ms]	FC ID	FC [Hz]	SETTLING TIME [ms]	FC ID	FC [Hz]	SETTLING TIME [ms]
0	12	0	0.1	6400	0	0.1	4500
1	150	1	0.2	3200	1	0.2	2300
2	260	2	0.3	2200	2	0.3	1600
3	425	3	0.5	1300	3	0.5	1100
4	850	4	0.8	800	4	0.8	700
5	1700	5	1	650	5	1	550
6	2500	6	2	320	6	2	260
7	4000	7	3	220	7	3	180
8	6000	8	5	130	8	5	120
9	7000	9	10	65	9	10	60
		10	20	35	10	20	27
		11	30	20	11	30	18
		12	50	12	12	50	11
		13	NO FILTER	2500/WPS	13	NO FILTER	2500/WPS

WEIGHT REFRESH FREQUENCY			
TYPE 0		TYPE 1 and TYPE 2	
LEVEL	WPS [loads/s]	WPS ID	WPS [loads/s]
0	300	0	5
1	100	1	10
2	50	2	12.5
3	25	3	25
4	12.5	4	50
5	12.5	5	100
6	12.5	6	250
7	10	7	300
8	10	8	500
9	5	-	-

TYPE 0

- Select the parameter LEVEL (*FLP 1*) (see table FILTER ON THE WEIGHT).
- The weight refresh frequency, WPS, is determined by the selected LEVEL (see WEIGHT REFRESH FREQUENCY table)
- To increase the effect (weight more stable) increase the value LEVEL.

TYPE 1

- Select the cut-off frequency of the filter FC (from 0.1 to 50 Hz, or NO FILTER) and the weight refresh frequency WPS (from 5 to 500 loads/s - see FILTER ON THE WEIGHT and WEIGHT REFRESH FREQUENCY tables)
- Not all WPS and FC combinations are allowed (see TYPE 1 FILTER CONFIGURATIONS table).

TYPE 1 FILTER CONFIGURATIONS

		FC													
		0.1	0.2	0.3	0.5	0.8	1	2	3	5	10	20	30	50	NO FILTER
WPS	5	•	•	•	•	•	•	-	-	-	-	-	-	-	•
	10	•	•	•	•	•	•	•	-	-	-	-	-	-	•
	12.5	•	•	•	•	•	•	•	-	-	-	-	-	-	•
	25	-	•	•	•	•	•	•	•	•	-	-	-	-	•
	50	-	-	•	•	•	•	•	•	•	•	-	-	-	•
	100	-	-	-	•	•	•	•	•	•	•	•	-	-	•
	250	-	-	-	-	-	-	•	•	•	•	•	•	•	•
	300	-	-	-	-	-	-	•	•	•	•	•	•	•	•
	500	-	-	-	-	-	-	-	•	•	•	•	•	•	•

• allowed; - not allowed

Example 1: if you want a weight refresh frequency WPS of 100 loads/s, the available cutoff frequencies range from 0.5 to 20 Hz.
Example 2: if you want a cutoff frequency FC of 0.1 Hz, the available weight refresh frequencies WPS range from 5 to 12.5 loads/s.

TYPE 2

- Select the cut-off frequency of the filter FC (from 0.1 to 50 Hz, or NO FILTER) and the weight refresh frequency WPS (from 5 to 500 loads/s - see FILTER ON THE WEIGHT and WEIGHT REFRESH FREQUENCY tables)
- Not all WPS and FC combinations are allowed (see TYPE 1 FILTER CONFIGURATIONS table).

TYPE 2 FILTER CONFIGURATIONS															
		FC													
		0.1	0.2	0.3	0.5	0.8	1	2	3	5	10	20	30	50	NO FILTER
WPS	5	•	•	•	•	•	•	-	-	-	-	-	-	-	•
	10	•	•	•	•	•	•	•	-	-	-	-	-	-	•
	12.5	•	•	•	•	•	•	•	•	-	-	-	-	-	•
	25	-	•	•	•	•	•	•	•	•	-	-	-	-	•
	50	-	-	-	•	•	•	•	•	•	•	-	-	-	•
	100	-	-	-	-	•	•	•	•	•	•	•	-	-	•
	250	-	-	-	-	-	-	•	•	•	•	•	•	•	•
	300	-	-	-	-	-	-	-	•	•	•	•	•	•	•
	500	-	-	-	-	-	-	-	-	•	•	•	•	•	•

• allowed; - not allowed

Example 1: if you want a weight refresh frequency WPS of 100 loads/s, the available cutoff frequencies range from 0.8 to 20 Hz.
Example 2: if you want a cutoff frequency FC of 0.1 Hz, the available weight refresh frequencies WPS range from 5 to 12.5 loads/s.

WRITING

- Write FILTER SCALE* in the two H byte of W1.
- Write level or FC ID* in the two L byte of W1.
- Write WPS ID** in W2.
- Send command 6026 to CMDR.

*see FILTER ON THE WEIGHT table

** see WEIGHT REFRESH FREQUENCY table
If type=0 this register is meaningless

READING

- Send command 6025 to CMDR.
- Read the type* in the two H byte of W1.
- Read level or FC ID* in the two L byte of W1.
- Read WPS ID** in W2.

Example: set the filter on the weight as TYPE 1, WPS 25 and FC 1 Hz:

	W1			W2
	H (2 byte)	L (2 byte)	Total	(2 byte)
Hexadecimal	0x0001	0x0005	0x00010005	0x0003
Decimal	1	5	65541	3

Example: set the filter on the weight as TYPE 0 and level 6:

	W1			W2
	H (2 byte)	L (2 byte)	Total	(2 byte)
Hexadecimal	0x0000	0x0006	0x00000006	-
Decimal	0	6	6	-

ANTI-PEAK

[ANTI-PEAK - AntP (default: enabled)]: when the weight is stable, the anti-peak filter removes any sudden disturbances with a maximum duration of 1 second.

COMMUNICATION INTERFACE

WRITING

- Write the enabling status* in W1.
- Send command 6128 to CMDR.

*1= enabled; 0= disabled

READING

- Send command 6127 to CMDR.
- Read the enabling status* in R1.

RESETTABLE WEIGHT SETTING FOR SMALL WEIGHT CHANGES

[MAXIMUM RESETTABLE WEIGHT - 0 SEt (from 0 to full scale; default: 300; considered decimals: 300 – 30.0 – 3.00 – 0.300)]: this parameter indicates the maximum weight value resettable by external contact or protocol.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 6102 to CMDR.	• Send command 6101 to CMDR. • Read the value in R1.

AUTOMATIC ZERO SETTING AT POWER-ON

[AUTO ZERO - AUtO 0 (from 0 to 10% of full scale; default: 0)]: if at switch-on the weight value is lower than the value set in this parameter, the weight is reset. To disable this function, set 0.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 6028 to CMDR.	• Send command 6027 to CMDR. • Read the value in R1.

ZERO TRACKING

[ZERO TRACKING - trAC 0 (from 1 to 5, default: 0)]: when the weight value is stable and, after a second, it deviates from zero by a figure in divisions smaller or equal to the figure in divisions set in this parameter, the weight is set to zero. To disable this function, set 0.
Example: if the parameter div 5 is set to 5 and trAC 0 is set to 2, the weight will be automatically set to zero for variations smaller than or equal to 10 (div 5 x trAC 0).

COMMUNICATION INTERFACE

WRITING	READING
• Write the value* in W1. • Send command 6104 to CMDR. *0= function disabled	• Send command 6103 to CMDR. • Read the value* in R1.

STABILITY

[MODO - StYPE (default: MODE0)]: select how the weight is considered stable.
- MODE0: the weight value must remain within the same division for a time greater than or equal to that specified in parameter TIME (tIME).
- MODE1: the variation of the weight value must be less than or equal to a division for a time greater than or equal to that specified in parameter TIME (tIME).

COMMUNICATION INTERFACE

WRITING	READING
• Write the value* in W1. • Send command 6579 to CMDR. *0=MODE0; 1=MODE1	• Send command 6580 to CMDR. • Read the value* in R1.

[TIME - tIME (from 0.1 to 3.0 s; default: 1.0 s)]: time needed to consider the weight stable.

The time required to consider the weight stable is expressed in tenths of a second.
Example: to set up TIME to 2.2 seconds, write 22 in W1.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value* in W1. • Send command 6581 to CMDR.	• Send command 6582 to CMDR. • Read the value* in R1.

SETTING UNITS OF MEASURE

[UNIT OF MEASUREMENT - Unit (default: 0)]:

UNITS OF MEASURE		
Unit of measure index	**Description**	**Effect of coefficient on weight**
0	Kilograms	No effect
1	Grams	No effect
2	Tons	No effect
3	Pounds	Multiplies
4	Newton	Multiplies
5	Litres	Divides
6	Bar	Multiplies
7	Atmospheres	Multiplies
8	Pieces	Divides
9	Newton metres	Multiplies
10	Kilogram metres	Multiplies
11	Other	Multiplies

COMMUNICATION INTERFACE

WRITING

- Write the unit of measure index* in W1.
- Send command 6030 to CMDR.

*see UNITS OF MEASURE table

READING

- Send command 6029 to CMDR.
- Read the unit of measure index* in R1.

DISPLAY COEFFICIENT (BASE program)

[COEFFICIENT - COEFF (max settable value: 99.9999; default: 1.0000)]: will have different meanings according to the value set in unit, i.e. the selected unit of measure. (see section **SETTING UNITS OF MEASURE**); the indication of the weight is modified based on this value.

If one of the inputs is set to CoEFF mode (see section **OUTPUTS AND INPUTS CONFIGURATION (BASE program)**) with the input closed the indication of the weight is modified based on the coefficient CoEFF; with the input open you return to the normal weight indication.

WARNING: All other settings (setpoint, hysteresis, calibration ...) are expressed in weight value. If you want to convert them to the new unit of measurement, perform one of the following procedures for changing the system calibration.
The parameter CoEFF must remain set to 1.0000.

THEORETICAL CALIBRATION'S CHANGE FOR OTHER UNITS OF MEASURE

Set in the parameter FS-tEO the F.SCALE value divided by the conversion coefficient from kg to the new unit of measure.
Example: the 4 load cells of 1000 kg are placed under a scale for olive oil, which has a specific gravity of 0.916 kg/l. Setting the F.SCALE = (4 x 1000) / 0.916 = 4367, the system works in liters of olive oil.

REAL CALIBRATION'S CHANGE FOR OTHER UNITS OF MEASURE

Load a known quantity of product litres on the scale (equal to at least 50% of the maximum amount that you must weigh) and acquire a single real calibration point by entering the value in litres of the loaded product (see section **REAL CALIBRATION (WITH SAMPLE WEIGHTS)**).

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 6034 to CMDR.	• Send command 6033 to CMDR. • Read the value in R1.
• Write the enabling status* in W1. • Send command 6130 to CMDR.	• Send command 6129 to CMDR. • Read the enabling status* in R1.

*1= enabled; 0= disabled

OUTPUTS

Possible operation modes:

[NORMAL STATE - OStAtE (default: OPEn)]:

- OPEN (normally open) [OPEn]: the relay is de-energised and the contact is open when the weight is lower than the programmed setpoint value; it closes when the weight is higher than or equal to the programmed setpoint value.
- CLOSE (normally closed) [CLOSE]: the relay is energised and the contact is closed when the weight is lower than the programmed setpoint value; it opens when the weight is higher than or equal to the programmed setpoint value.

[MODE - OnodE (default: SEt)]:

- SETPOINT [SEt]: the contact will switch on the basis of weight, according to setpoint (see section **SETPOINT PROGRAMMING (BASE program)**).
- PLC [PLC]: the contact will not switch on the basis of weight, but it is managed remotely via CMDOUT.
- STABLE [StAbLE]: relay switching occurs when the weight is stable.

If the operation mode SEt is selected, the following options are also active:

[WEIGHT - OUtYPE (default: GrOSS)]:

- GROSS [GrOSS]: the contact will switch on the basis of gross weight.
- NET [nEt]: the contact will switch on the basis of net weight (If the net function is not active, the contact will switch on the basis of gross weight).

[POSITIVE/NEGATIVE - OUPOL (default: POSnEG)]:

- POSITIVE AND NEGATIVE [POSnEG]: relay switching occurs for both positive and negative weight values.
- POSITIVE [POS]: relay switching occurs for positive weight values only.
- NEGATIVE [nEG]: relay switching occurs for negative weight values only.

Select the setpoint operation on 0 value:

[ZERO - O2SEt (default: OFF)]:

- ZERO OFF [OFF]: relay switching will not occur if the setpoint value is 0.
- ZERO ON [On]:
    - setpoint = 0 and switching = POSnEG: relay switching occurs when the weight is 0; the relay will switch again when the weight is different from zero, taking hysteresis into account (both for positive and for negative weights).
    - setpoint = 0 and switching = POS: relay switching occurs for a weight higher than or equal to 0, the relay will switch again for values below 0, taking hysteresis into account.
    - setpoint = 0 and switching = nEG: relay switching occurs for a weight lower than or equal to 0, the relay will switch again for values above 0, taking hysteresis into account.

OCR (OUTPUTS CONFIGURATION REGISTER)					
Bit 7	Bit 6÷5	Bit 4	Bit 3	Bit 2÷1	Bit 0
0 - OFF 1 - On	00 - POSnEG 01 - POS 10 - nEG 11 - not used	0 - GrOSS 1 - nEt	not used	00 - SEt 01 - PLC 10 - StAbLE 11 - not used	0 - OPEn 1 - CLOSE

WRITING

- Write the OCR value in W1.
- Write the output number (1÷3) in W2.
- Send command 1125 to CMDR.

READING

- Write the output number (1÷3) in W2.
- Send command 1124 to CMDR.
- Read the output number in R2.
- Read the OCR value in R1.

Examples: outputs configuration

OCR CONTENTS			OUTPUT CONFIGURATION
Binary	Hexadecimal	Decimal	
00000000	0x00	000	OPEn / SEt / GrOSS / POSnEG / OFF
10110001	0xB1	177	CLOSE / SEt / nEt / POS / On

INPUTS

Possible operation modes:

[MODE - I nodE (default: input 1=2Er0 input 2=nE-LO)]:

- NET/GROSS [nE-LO]: by closing this input for no more than one second, it's making an operation of SEMI-AUTOMATIC TARE and the instrument indicates the net weight. To go back to the gross weight indication keep the input closed for 3 seconds.
- ZERO [2Er0]: by closing the input for no more than one second, the weight is set to zero (see section **WEIGHT ZERO-SETTING FOR SMALL VARIATIONS (SEMI-AUTOMATIC ZERO)**).
- PEAK [PEAH]: keeping the input closed displays the peak weight value reached. Opening the input displays the current weight (see section **PEAK (BASE program)**).
- PLC [PLC]: closing the input no operation is performed, the input status may however be read remotely by way of the communication protocol.
- COEFFICIENT [COEFF]: when the input is closed the weight is indicated based on the set coefficient (see section **SETTING UNITS OF MEASURE**), otherwise the weight is indicated.
- CONTIN [COntI n]: closing the input for max one second the weight is transmitted over the serial connection according to the fast continuous transmission protocol only once (only if the COntI n protocol is set, see section **SERIAL PROTOCOLS**).

COMMUNICATION INTERFACE

INPUTS CONFIGURATION						
Index	1	2	3	4	5	6
Function	nE-LO	2Er0	PEAH	PLC	CONtIn	COEFF

WRITING

- Write the function index in W1.
- Write the input number (1÷2) in W2.
- Send command 1123 to CMDR.

READING

- Write the input number (1÷2) in W2.
- Send command 1122 to CMDR.
- Read the input number in R2.
- Read the function index in R1.

OUTPUTS AND INPUTS CONFIGURATION (LOAD program)

In the LOAD program, inputs and outputs are not configurable but they work as follows:

- OUTPUT 1: PRESET (for operation see **OPERATION SETTINGS**)
- OUTPUT 2: SET (for operation see **OPERATION SETTINGS**)
- OUTPUT 3: CYCLE END (the relay is closed to the achievement of cycle end)
- INPUT 1: START
- INPUT 2: STOP

SEMI-AUTOMATIC TARE (NET/GROSS)

THE SEMI-AUTOMATIC TARE OPERATION IS LOST UPON INSTRUMENT POWER-OFF.

To perform a net operation (SEMI-AUTOMATIC TARE), close the NET/GROSS input or activate the function through the communication interface; the instrument indicates the net weight (just set to zero). To return to the gross weight indication, keep the NET/GROSS input closed or deactivate the function through the communication interface. This operation can be repeated many times by the operator to allow the loading of several products.

Example: put the container on the scale, the instrument indicates the container weight; close the NET/GROSS input, the instrument indicates the net weight to zero; introduce the product in the container, the instrument indicates the product weight. This operation can be repeated several times.

The semi-automatic tare operation is not allowed if the gross weight is zero.

COMMUNICATION INTERFACE

To activate the semi-automatic tare, send command 7 to CMDR; the value in NW is updated.
To deactivate the semi-automatic tare, send command 9 to CMDR.

PRESET TARE (SUBTRACTIVE TARE DEVICE)

It is possible to set, through the communication interface, a preset tare value to be subtracted from the weight indication, provided that the P-tAr-E ≤ MASS condition is verified.

In case of BASE program, to delete a preset tare and return to gross weight indication keep the NET/GROSS input (if any) closed for 3 seconds.

IF A PRESET TARE IS ENTERED, IT'S STILL POSSIBLE TO ACCESS THE SEMI-AUTOMATIC TARE (NET) FUNCTION. THE TWO DIFFERENT TYPES OF TARE ARE ADDED.

ALL THE SEMI-AUTOMATIC TARE (NET) AND PRESET TARE FUNCTIONS WILL BE LOST WHEN THE INSTRUMENT IS TURNED OFF.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 88 to CMDR.	• Send command 87 to CMDR. • Read the value in R1.

To activate the preset tare, send command 130 to CMDR.
To deactivate the preset tare, send command 9 to CMDR.

SEMI-AUTOMATIC ZERO (WEIGHT ZERO-SETTING FOR SMALL VARIATIONS)

Close the SEMI-AUTOMATIC ZERO input (only for BASE program) or carry out the operation via the communication interface, the weight is set to zero.
This function is only allowed if the weight is lower than the 0 SEt value (see section **RESETTABLE WEIGHT SETTING FOR SMALL WEIGHT CHANGES**) otherwise the weight is not set to zero.

THE ZERO-SETTING IS LOST UPON INSTRUMENT POWER-OFF.

COMMUNICATION INTERFACE

To reset the weight, send command 8 to CMDR.

PEAK (BASE program)

By keeping the PEAK input closed or activating the function via the communication interface, the peak gross weight value reached stays indicated. By opening the input or deactivating the function via the communication interface, the current weight is indicated.

If you want to use this input to indicate a peak in sudden changes, set a filter with a short settling time.

COMMUNICATION INTERFACE

WRITING

- Write the enabling status* in W1.
- Send command 6132 to CMDR.

READING

- Send command 6131 to CMDR.
- Read the enabling status* in R2.
- Read the peak weight value** in R1.

*1=enabled; 0=disabled. It is lost at power-off.
**It remains available until the next activation of the function.

ANALOG OUTPUT

- [TYPE - AOtYPE (4÷20 mA, 0÷20 mA, 0÷10 V, 0÷5 V; default: 4÷20 mA)]: it selects the analog output type.
- [WEIGHT - AUtYPE]: choice of a weight followed by the analog output: GROSS (GrOSS) or NET (nEt). If the net function is not active, the analog output varies according to gross weight.
- [ZERO - AnA 0]: set the weight value for which you wish to obtain the minimum analog output value.

Only set a value different from zero if you wish to limit the analog output range; for instance: for a full scale value of 10000 kg you require an 4 mA signal at 5000 kg and 20 mA at 10000 kg, in this case, instead of zero, set 5000 kg.

- [FULL SCALE - AnA FS]: set the weight value for which you wish to obtain the maximum analog output value; it must correspond to the value set in the PLC program (default: calibration full scale). E.g.: if I am using a 4÷20 mA output and in the PLC program I wish to have 20 mA = 8000 kg, I will set the parameter to 8000.
- [ZERO CORRECTION - ACOr 0]: analog output correction to zero: if necessary adjust the analog output, allowing the PLC to indicate 0. The sign "-" can be set for the last digit on the left. E.g.: if I use a 4÷20 mA output and, with the minimum analog setting, the PLC or tester read 4.1 mA, I must set the parameter to 3.9 to obtain 4.0 on the PLC or tester.
- [FULL SCALE CORRECTION - ACOr FS]: correction of analog output to full scale: if necessary permit modification of the analog output by allowing PLC to indicate the value set in the parameter AnA FS. E.g. if I am using a 4÷20 mA output with the analog set to full scale and the PLC or tester reads 19.9 mA, I must set the parameter to 20.1 to get 20.0 on the PLC or tester.

Minimum and maximum values which can be set for zero and full scale corrections:

ANALOG OUTPUT TYPE	Minimum	Maximum
0÷10 V	0	10.200
0÷5 V	0	5.500
0÷20 mA	0	22.000
4÷20 mA	3.5	22.000

NOTE: the analog output may also be used in the opposite manner, i.e. the weight setting that corresponds to the analog zero (AnA 0) may be greater than the weight set for the analog full scale (AnA FS). The analog output will increase towards full scale as the weight decreases; the analog output will decrease as the weight increases.

Example:
AnA 0 = 10000 AnA FS = 0 analog output 0÷10 V

Weight = 0 kg analog output = 10 V
Weight =5000 kg analog output = 5 V
Weight =10000 kg analog output = 0 V

TEST

COMMUNICATION INTERFACE

- **Input test:**
  close the inputs to be tested and check that INS correctly reports their status.
- **Output test:**
  force the status of the outputs to be tested in CMDOUT and check that OUTS correctly reports their status.
- **Millivolt test:**
  send command 6137 to CMDR, read the value in R1 and divide it by 10000 to get the mV.

- [SETPOINT - SEt (from 0 to full scale; default: 0)]: relay switching occurs when the weight exceed the value set in this parameter. The type of switching is settable (see section **OUTPUTS AND INPUTS CONFIGURATION (BASE program)**).

- [HYSTERESIS - HYStE (from 0 to full scale; default: 0)]: value to be subtracted from the setpoint to obtain contact switching for decreasing weight. For example with a setpoint at 100 and hysteresis at 10, the switching occurs at 90 for decreasing weight.

These values are set to zero if the calibration is changed significantly (see sections **THEORETICAL CALIBRATION** and **REAL CALIBRATION (WITH SAMPLE WEIGHTS)**).

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command* to CMDR.	• Send command* to CMDR. • Read the value in R1.

*see section **POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER (CMDR)**.

WARNING: at the time of writing the hysteresis values are saved to RAM and to EEPROM, while the setpoint values are saved to RAM only and so they will be lost upon the next power-off; to store them permanently to EEPROM so that they are maintained at power-on, send command 99 to CMDR.

Example
READING: send command 90 “Setpoint 1 reading” to CMDR and read the value in R1.
WRITING: write the value in W1 and send command 93 “Setpoint 1 writing” to CMDR.
SAVING TO EEPROM: send command 99 “Data storage to EEPROM” to CMDR.

BATCHING (LOAD program)

INTRODUCTION TO THE OPERATION

The instrument is able to load automatically a settable amount of product on the weighing structure, driving the batching organ (including two-speed) through the PRESET and SET contacts.

The instrument has the following features:
- 99 settable formulas (see section **FORMULAS PROGRAMMING**);
- automatic fall calculation (see section **FALL**);
- autotare at batching start (see section **AUTOTARE**);
- tolerance error control (see section **TOLERANCE**);
- precision batching through slow function (see section **SLOW**);
- precision batching through tapping function (see section **TAPPING FUNCTION**);
- consumption storage (see section **CONSUMPTION FOR EACH FORMULA**).

BATCHING START:
Via external contact or remotely via fieldbus.

CONSUMPTION STORAGE:
The instrument, at the end of every batching, stores the consumed amount for each formula. Consumptions value can be read via the communication protocol when the instrument is in standby mode.

ALARM MANAGEMENT:
If an alarm occurs during the batching, the instrument activates it and waits for the operator in order to cancel or continue batching.

BATCHING SEQUENCE

The batching process consists of the following steps:
- batching sequence programming;
- batching start;
- batching execution;
- waiting phase;
- cycle end phase.

BATCHING SEQUENCE PROGRAMMING

Select the desired formula and the number of cycles to run.

COMMUNICATION INTERFACE

WRITING	READING
• Write the number of cycles in W1. • Write the formula number in W2. • Send command 2031 to CMDR.	• Send command 2030 to CMDR. • Read the number of cycles in R1. • Read the formula number in R2.

BATCHING START

Start the batching by closing the START external contact for at least 0.5 s or by sending command 201 to CMDR.

If at the end of the batching the START contact is closed, the same batching sequence is repeated.

The instrument will ensure that:
- the formula has been programmed, otherwise the EMPTY alarm is activated.
- the amount set in the formula does not exceed the set maximum weight (MASS), otherwise the MASFOr alarm is activated;
- the gross weight is lower than the minimum weight (MIn), otherwise the alarm tArE ? is displayed (however it is possible to force batching start by sending command 206 to CMDR);
- only if CONSUMPTION FOR EACH FORMULA (tOtAL) = YES:
  - if the consumed amount exceeds 999000, the tOtAL warning is activated for one second;
  - if the consumed amount exceeds 999999, it is automatically set to zero.

Once these conditions have been verified, the instrument proceed to the batching execution phase.

BATCHING EXECUTION

The batching consists of an initial FAST phase and a subsequent SLOW phase.

During the entire batching execution, the instrument:
- monitors the weight of the product's batched quantity;
- commands the PRESET and SET contacts according to the PSS parameter setting (see section **OPERATION SETTINGS**);
- if the EnLOAd time is set and the product is not loaded by at least 20 divisions within this interval of time, activates the LOAdP alarm.

The FAST phase ends when one of the following conditions occurs:
- only if SLOU is set: the batched quantity has reached the set value minus the slow value;
- the batched quantity has reached the preset value set in formula.

During the SLOW phase:
- only if EnCOMP is set: the instrument does not verify the reaching of set value until the **NO COMPARISON TIME** has elapsed;
- if a tapping value has been set, the SET contact performs opening and closing cycles according to the times set by SLOUOn and SLOUOF parameters.

When the batched quantity reaches the set value configured in the formula minus any fall value, the SLOW phase ends and the SET contact opens, interrupting the product flow.

WAITING PHASE

After opening the SET any enabled WAIT PHASE ENDING CONDITIONS are taken into consideration:
- only if TIME INTERVAL (tI nE) = enabled: the instrument waits for the waiting time has elapsed (tI nEAt);
- only if COMMAND (CONAnd) = enabled: the instrument waits for the START input has been closed or the command 209 has been sent to CMDR;
- only if STABLE WEIGHT (StAbLE) = enabled: the instrument waits for the weight is stable.

If the tolerance (tOL) is set, three conditions can occur:
- the batched quantity is less than the set quantity minus the tolerance value; the SLOW phase is performed again to improve the batching accuracy. If the error condition persists, the tOL alarm is activated;
- the batched quantity is greater than the set quantity plus the tolerance value; the tOL alarm is enabled;
- the batched quantity falls within the tolerance limits.

To cancel the tOL alarm and proceed, send command 207 to CMDR.

When all the set conditions are met, the waiting phase ends and the batching cycle continues.

CYCLE END PHASE

The system enters the cycle end phase:
- the CYCLE END contact is closed;
- only if CONSUMPTION FOR EACH FORMULA (tOtAL) = YES: consumption is stored;
- From the beginning of the product extraction, if the tnUnLO time is set and the product is not extracted for at least 20 divisions within this interval of time, the UnLOAd alarm is activated.

The instrument ends the batching, and opens the CYCLE END contact, only after verifying that:
- the weight is lower than the MINIMUM WEIGHT (MI n);
- the SAFE EMPTYING TIME has elapsed (tSI C).

Only if WAITING CONFIRMATION FROM PC (SLAvE) = enabled: the instrument waits for remote data reading, before being available for a new batching. To confirm the reading, send command 250 to CMDR.

If several batching cycles have been set, the instrument starts a new cycle.

OPERATION SETTINGS

nEHt P: select the WAIT PHASE ENDING CONDITIONS, the switch conditions from the SET opening to the CYCLE END closing.
- tI ME (default: YES): time set in constants (tI MEAt);
- CONAnd (default: nO): START input closure or command 209 sending to CMDR;
- StAbLE (default: nO): stable weight.

PSS (default: 2): select the operating mode of SET and PRESET contacts.
- PSS = 1: at the batching start, only the PRESET contact is closed; once reached the preset set value, the related contact is opened and the SET contact is closed; reached the final value of set, the related contact is opened;
- PSS = 2: at the batching start, the SET and PRESET contacts are closed simultaneously; once reached the preset value, the related contact is opened (beginning of the slow phase); once reached the set value, also the related contact is opened. For single-speed batching, program PSS = 2 and use only the SET contact;
- PSS = 3: at the batching start, only the PRESET contact is closed; once reached the preset value, also the SET contact is closed; once reached the final value of set, both are reopened.

EndnEt (default: NO): select the indicated weight to cycle end, the net/gross weight indicator type during the CYCLE END phase (unloading of the scale at the end of batching).
- YES: the net weight is indicated during the cycle end; after opening the CYCLE END the gross weight is indicated;
- NO: the gross weight is indicated during the cycle end.

BCR (BATCHING CONFIGURATION REGISTER)						
Bit 7	Bit 6	Bit 5÷4	Bit 3	Bit 2	Bit 1	Bit 0
EndnEt	not used	PSS	not used	nEHt P		
				StAbLE	CONAnd	tI ME
0 - NO 1 - SI	0	00 – not used 01 - 1 10 - 2 11 - 3	0	0 - NO 1 - SI	0 - NO 1 - SI	0 - NO 1 - SI

WRITING

- Write the BCR value in W1.
- Send command 1133 to CMDR.

READING

- Send command 1132 to CMDR.
- Read the OCR value in R1.

Examples: operation settings configuration

OCR CONTENTS			PARAMETERS CONFIGURATION				
			EndnEt	PSS	nEHt P		
Binary	Hexadecimal	Decimal			StAbLE	CONAnd	tI ME
00010010	0x12	018	NO	1	NO	SI	NO
10110001	0xB1	177	SI	3	NO	NO	SI
10100110	0xA6	166	SI	2	SI	SI	NO

WARNING: the time values of the batching constants are expressed in tenths of a second.
Example: to set up tSt C to 10.2 seconds via the communication interface, write 102 in W1 and send command 1005 to CMDR.

MINIMUM WEIGHT

[MINIMUM WEIGHT - MIn (from 0 to full scale; default: 10)]: minimum weight, value at which the scale is considered empty. Batching start is only allowed if the weight is lower than this value, during the unloading phase the CYCLE END contact will be opened when the weight reaches this value and after the safe emptying time is over.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1003 to CMDR.	• Send command 1002 to CMDR. • Read the value in R1.

MAXIMUM WEIGHT

[MAXIMUM WEIGHT - MASS (from 0 to full scale; default: 0)]: maximum weight that can be indicated and set. The indicated weight exceeding this value of 9 divisions activates the alarm ------; if in the formulas programming the weight value set is greater than this value, the Error alarm is activated and the value will not be stored. By setting 0, the function is disabled.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1001 to CMDR.	• Send command 1000 to CMDR. • Read the value in R1.

SAFE EMPTYING TIME

[SAFE EMPTYING TIME - tSI C (from 0.0 to 999.9 seconds; default 5.0)]: time that is necessary for a perfect emptying of the scale. The instrument waits for this time during the unloading phase (CYCLE END closed), after reaching the minimum weight and before opening the CYCLE END contact to obtain a perfect emptying of the scale.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1005 to CMDR.	• Send command 1004 to CMDR. • Read the value in R1.

WAITING TIME

[WAITING TIME - t1 nEAt (from 0.0 to 999.9 seconds; default 5.0)]: time elapsing between the SET end batching and the CYCLE END closing to allow the weight to get steady. This waiting time is only required if the automatic fall is programmed and/or consumption is enabled and/or a tolerance value has been programmed and/or the wait for remote confirmation is enabled.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1007 to CMDR.	• Send command 1006 to CMDR. • Read the value in R1.

NO COMPARISON TIME

[NO COMPARISON TIME - tnCOMP (from 0.0 to 999.9 seconds; default: 0.0)]: this is the instrument waiting time during batching, after the opening of PRESET, before comparing the weight with the programmed SET value.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1097 to CMDR.	• Send command 1096 to CMDR. • Read the value in R1.

NO PRODUCT LOAD TIME

[NO PRODUCT LOAD TIME - tnLOAd (from 0.0 to 999.9 seconds; default: 0.0)]: this parameter allows the product control during batching. if there is no product load, the instrument waits for a set duration of time before activating the alarm LOAd.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1033 to CMDR.	• Send command 1032 to CMDR. • Read the value in R1.

NO PRODUCT UNLOAD TIME

[NO PRODUCT UNLOAD TIME - tnUnLO (from 0.0 to 999.9 seconds; default: 0.0)]: this parameter allows the product control during the unloading phase (cycle end). If there is no product extraction, the instrument waits for a set duration of time before activating the alarm UnLOAd.
WARNING: The control is only actuated after unloading of the product has started (the weight must decrease by at least 10 divisions).

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1035 to CMDR.	• Send command 1034 to CMDR. • Read the value in R1.

FALL

By FALL it means the correction of the product amount in fall after the batching STOP. This amount is in addition to the product already batched causing inaccuracy. The instrument is able to anticipate the batching STOP, to reduce this uncertainty, with two possible ways:
- AUTOMATIC fall: the instrument automatically calculates the fall;
- MANUAL fall: the instrument applies the fall set by the operator;

WARNING: setting a value of **WAITING TIME** (tI MEAt) such that the weight is stable at the end of the batching, otherwise the update of the AUTOMATIC fall is not correct.

MODFAL

[MANUAL/AUTOMATIC - MODFAL (from 1 to 99; default: 0)]: it's possible to select the automatic or the manual fall.

- MODFAL = 0: MANUAL fall;
- MODFAL different from 0: AUTOMATIC fall (the set value shows how many batchings the fall value is updated).

Note: in the batching cycles in which the fall value is not updated, the **WAITING TIME** is not applied, unless there are no other functions that require the **WAITING TIME**. So, by setting a high value, it reduces the duration of batchings.

Example: if MODFAL = 3 the AUTOMATIC fall is calculated every three batching cycles.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1043 to CMDR.	• Send command 1042 to CMDR. • Read the value in R1.

FALdI u (only if MODFAL is different from 0)

[FALL TOLERANCE - FALdI u (from 0 to full scale; default: 0)]: this parameter indicates the limit within which the automatic fall is updated according to the parameter MODFAL .By setting a low value is obtained more accurately but the length of the batchings could increase, because, if necessary, the AUTOMATIC fall is updated every cycle regardless of MODFAL . By setting 0, the function is disabled.

Example: by setting MODFAL = 3, FALdI u = 5 and the weight equal to 100, the instrument updates the fall every batching, until the batched weight falls within the 95 to 105 range, and then it goes back to update the AUTOMATIC fall every 3 batchings.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1045 to CMDR.	• Send command 1044 to CMDR. • Read the value in R1.

FALL

FALL (from 0 to maximum weight; default: 0): in this parameter it is possible to set the fall value for each formula (only if MODFAL = 0) or indicate and/or to modify the fall value calculated automatically by the instrument (only if MODFAL is different from 0).

COMMUNICATION INTERFACE

WRITING	READING
• Write the formula number in W2. • Write the FALL value in W1. • Send command 1013 to CMDR.	• Write the formula number in W2. • Send command 1012 to CMDR. • Read the FALL value in R1.

TOLERANCE

tOL (from 0 to maximum weight; default: 0): Adjustable parameter for each formula that defines how much the batched weight value can deviate from the one set in formula. If the batched weight is higher or lower than the amount to be batched, for a value greater than the tolerance, the tOL alarm is activated.
Example: if a SET = 1000 value is set and a TOLERANCE = 100 value is set, the batched weight must not be lower than 900 or higher than 1100 to allow the instrument to continue the batching process. By setting 0, the function is disabled.

COMMUNICATION INTERFACE

WRITING	READING
• Write the formula number in W2. • Write the tOL value in W1. • Send command 1017 to CMDR.	• Write the formula number in W2. • Send command 1016 to CMDR. • Read the tOL value in R1.

SLOW

[SLOW - SLOU (from 0 to maximum weight; default: 0)]: single valid value for all the formulas in place of the preset value. When the weight has reached the SET value minus the value set in this parameter, the slow batching phase starts by the PRESET contact. If the set value is greater than the weight to batch, the batching will be in slow phase. By setting 0, the function is disabled.
Example: if SET = 100 and SLOW = 15, the slow phase begins when the weight reaches 85.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1021 to CMDR.	• Send command 1020 to CMDR. • Read the value in R1.

TAPPING FUNCTION

In the event that the batching instrument is not equipped with the speed “slow” it is possible to use this function to slow down the product batching in the final phase (through opening and closing cycles of the SET contact) and to increase the accuracy. Set in SLOU parameter the product amount you want to batch with the tapping function enabled.

SLOW ON

[SLOW ON - SLOUOn (from 0 to 9.9; default: 0)]: time in which the SET relay remains closed during the SLOW phase. By setting 0, the function is disabled.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1023 to CMDR.	• Send command 1022 to CMDR. • Read the value in R1.

SLOW OFF

[SLOW OFF - SLOUOF (from 0 to 9.9; default: 0)]: time in which the SET relay remains open during the SLOW phase. By setting 0, the function is disabled.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1025 to CMDR.	• Send command 1024 to CMDR. • Read the value in R1.

AUTOTARE

[AUTOTARE - AtArE (from 0 to 999; default: 0)]: autotare enabling (automatic tare at batching start); the autotare will be updated every as many cycles of a single batching sequence as are set in this parameter. By setting 0, the function is disabled.
This operation is possible only if the gross weight is lower than the minimum weight (MI n), otherwise the tArEP alarm is activated.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1027 to CMDR.	• Send command 1026 to CMDR. • Read the value in R1.

AUTOTARE DELAY

[AUTOTARE DELAY - tI MEtA (from 0 to 99.9; default: 0)]: the instrument waits for this time, after the starting of the formula, before performing the autotare and starting the batching.
This parameter is available only if AtArE is enabled.

COMMUNICATION INTERFACE

WRITING	READING
• Write the value in W1. • Send command 1029 to CMDR.	• Send command 1028 to CMDR. • Read the value in R1.

STABLE TARE

[STABLE TARE - StAbtA (default: disabled)]: autotare enabled at stable weight.
- ENABLED: if autotare enabled, zero-setting at batching start is done after a possible delay time and only when the weight is stable.
- DISABLED: if autotare enabled, zero-setting is done right after the delay time.

This parameter is available only if AtArE is enabled.

COMMUNICATION INTERFACE

WRITING	READING
• Write the enabling status* in W1. • Send command 1031 to CMDR. *1=enabled; 0=disabled. It is lost at power-off.	• Send command 1030 to CMDR. • Read the enabling status* in R1.

CONSUMPTION FOR EACH FORMULA

[CONSUMPTION FOR EACH FORMULA - totAL (default NO)]: enabling consumption memory (total batched quantity) for each formula.
- YES: consumption enabled
- NO: consumption disabled.

COMMUNICATION INTERFACE

WRITING	READING
• Write the enabling status* in W1. • Send command 1053 to CMDR. *1= enabled; 0= disabled. It is lost at power-off.	• Send command 1052 to CMDR. • Read the enabling status* in R1.

WAITING CONFIRMATION FROM PC (SLAVE)

[WAITING CONFIRMATION FROM PC - SLAVE (default: disabled)]: waiting for confirmation of record batching data from PC.

- ENABLED: check enabled; the instrument waits for the PC to read the batching data, before starting another batching. In case of recording failure, the instrument activates the SLAVE alarm.
- DISABLED: check disabled; at cycle end, the instrument will not wait for data recording on PC before performing another batching.

COMMUNICATION INTERFACE

WRITING	READING
• Write the enabling status* in W1. • Send command 1063 to CMDR. *1= enabled; 0= disabled. It is lost at power-off.	• Send command 1062 to CMDR. • Read the enabling status* in R1.

FORMULAS PROGRAMMING

Select the formula that you wish to program and set PRESET (PrESEt) and SET (SEt).
It is possible to set 99 formulas.

PrESEt is NOT available if a SLOW value has been set in the constants (SLOU).

In case of attempt in PRESET (PrESEt) or SET (SEt) to set a value higher than the maximum weight (MASS) set in the batching constants, the message ErrOr is displayed.

COMMUNICATION INTERFACE

WRITING	READING
• Write the formula number in W2. • Write the SEt value in W1. • Send command 2036 to CMDR.	• Write the formula number in W2. • Send command 2035 to CMDR. • Read the SEt value in R1.
• Write the formula number in W2. • Write the PrESEt value in W1. • Send command 2038 to CMDR.	• Write the formula number in W2. • Send command 2037 to CMDR. • Read the PrESEt value in R1.

DELETING FORMULAS

COMMUNICATION INTERFACE

Write the number of the formula to be deleted in W2 (to delete all formulas write 0) and send command 2040 to CMDR.

INSTRUMENT MANAGEMENT DURING THE BATCHING

INFORMATION ABOUT THE BATCHING IN PROGRESS

COMMUNICATION INTERFACE

Send command 2032 to CMDR and read the numbers of running cycle and formula in R1 and R2 respectively.

BATCHING STOP AND PAUSE

Open the START contact and close the STOP contact to stop the batching. If the START contact remains closed the batching is not stopped.

COMMUNICATION INTERFACE

To stop the batching, make sure the START contact is opened and send command 204 to CMDR.

If the START contact is closed the batching is not stopped; check the input status in the INS register before sending the command.

To pause the batching send command 202 to CMDR, to resume it send command 203 to CMDR.

ALARMS MANAGEMENT DURING THE BATCHING

COMMUNICATION INTERFACE

- Send command 206 to CMDR to cancel the tArE2 alarm and proceed with the batching.
- Send command 207 to CMDR to cancel the tOL alarm and proceed with the batching.
- Send command 205 to CMDR to accept the EMPtY, ErUEI G, FALL, MASFOr, PArSEr alarms and stop the batching.

For further information, see section **ALARMS**.

BATCHING DATA READING

COMMUNICATION INTERFACE

At the end of a batching, the instrument makes the relative data available.

DATA ACCESS

- Send command 1114 to CMDR;
- read the data processing status in R1 (1= data ready; 0= data not ready);
- if data are ready, send command 2100 to CMDR to make them available;
- read the data (see DATA READING);
- only if SLAuE = enabled: send command 250 to CMDR to confirm the data reading and proceed to a new batching.

DATA READING

ACTUAL BATCHED WEIGHT	- Send command 2101 to CMDR. - Read the value in R1. - Read the sign of the value in R2 (0=positive; 1=negative).
THEORETICAL SET WEIGHT	- Send command 2102 to CMDR. - Read the value in R1.
STARTING TARE	- Send command 2103 to CMDR. - Read the value in R1. - Read the sign of the value in (0=positive; 1=negative).
ALARM*	- Send command 2105 to CMDR. - Read the index in R1 (see BATCHING DATA ALARMS table).
* 32-bit value where each byte corresponds to a possible alarm occurring during the batching; the first alarm occupies the least significant byte.	

BATCHING DATA ALARMS

Index	Alarm	Description
0		No alarm
1		Generic alarm
2	EMPtY	Empty formula
3	MASFOr	The quantity set in formula is greater than the maximum weight
4	tArEP	The weight is greater than the minimum weight set
5		
6		
7	tOL	Out of tolerance
8	LOAd	The product is not being loaded
9	UnLOAd	The product is not being unloaded
10		
11		
12		Batching STOP
13	ErUEI G	Weight error
14	FALL	The fall is greater than the quantity to be batched
15	SLAvE	Waits for the confirmation of data reading from PC

CONSUMPTION MANAGEMENT

If in batching constants consumption is enabled (tOtAL = YES), the batched quantities for each formula are stored (see section **CONSUMPTION FOR EACH FORMULA**).

CONSUMPTION READING

By selecting tOtAL you can read the following information:
- total quantity consumed for all formulas (divided by 100);
- quantity consumed for each formula.

COMMUNICATION INTERFACE

Write the formula number in W2 and send command 2020 to CMDR; read the consumption related to the formula in R1.

CONSUMPTION DELETION

COMMUNICATION INTERFACE

Write the formula number of which consumption must be deleted in W2 (to delete the consumption of all formulas write 0) and send command 1135 to CMDR.

ALARMS

In the manual the error conditions are listed in the Alarms column; the corresponding messages via the communication interface are listed in the Protocol column.

Alarms	Protocol	Description
------	SR1 - Bit 2	The weight exceeds the maximum weight by 9 divisions
CONAnd	IS = 3	Waiting for START closure to continue the batching.
ENPtY	IS = 14	It is activated if, at batching start, the formula recalled for running is not programmed.
Er Ad	SR1 - Bit 1	Instrument internal converter failure; check load cell connections, if necessary contact technical assistance.
Er OF	SR1 - Bit 4÷5	The maximum displayable value has been exceeded (value higher than 999999 or lower than -999999).
Er OL	SR1 - Bit 3	The weight exceeds 110% of the full scale.
ErCEL	SR1 - Bit 0	The load cell is not connected or is incorrectly connected; the load cell signal exceeds 26 mV; the conversion electronics (AD converter) is malfunctioning.
ErUEI G	IS = 10	It is activated when there is a weight alarm and it cancels the current batching.
FALL	IS = 7	It is activated if at batching start the fall value is higher than the product quantity to be batched.
LOAd	IS = 18	During the batching it indicates that the product is not loaded. It is automatically cancelled if the product increases.
nASFOr	IS = 15	It is activated if, at batching start, the formula recalled for running exceeds the maximum weight.
PArSEr	IS = 19	The batching is cancelled. If the alarm persists, contact technical assistance.
PAUSE	IS = 5	The batching is paused.
SLAvE	IS = 13	The batching data were not read remotely.
tArEP	IS = 17	It is activated if, at batching start, the weight on the scale is higher than the minimum set in constants (nI n).If the weight comes back below to the minimum set, the batching starts.
tOL	IS = 8	It is activated if at batching end the weight is different from the value set in formula by a value higher than tolerance.
UnLOAd	IS = 6	It is activated, during the unload (cycle end contact closed), when the product is not extracted. It is automatically cancelled if the product decreases.

With an alarm the relays open and the analog outputs go to the lowest possible value according to the following table:

RANGE	0÷20 mA	4÷20 mA	0÷5 V	0÷10 V
Output value	0 mA	3.5 mA	0 V	0 V

FIELDBUSES

The configuration and use of fieldbuses are only possible when power is supplied to the SERVICE connector.
The fieldbuses configuration is done via configuration software.

MODBUS-RTU

INSTRUMENT SETUP

- [NONE - nonE (default)]: it disables any type of communication (default).
- [MODBUS - modbUS]: MODBUS-RTU protocol.
- [ASCII - ASCII]: ASCII bidirectional protocol.
- [CONTIN - CONtI n]: fast continuous weight transmission protocol.
- [RIP - rI P]: continuous weight transmission protocol to remote displays.
- [HDRIP - HdrI P]: continuous weight transmission protocol to remote displays.
- [HDRIPN - HdrI Pn]: continuous weight transmission protocol to remote displays.
    - [BAUD RATE - bAUd (2400, 4800, 9600, 19200, 38400, 115200; default: 9600)]: transmission speed.
    - [ADDRESS - Addr (from 1 to 99; default: 1)]: instrument address.
    - [DELAY - dELAY (from 0 to 200 ms; default: 0)]: delay in milliseconds which elapses before the instrument replies.
    - [PARITY - PArI tY]:
        - [NONE - nonE (default)]: no parity.
        - [EVEN - EUEn]: even parity.
        - [ODD - Odd]: odd parity.
    - [STOP - StOP (1-2; default: 1)]: stop bit.

For more information about ASCII , CONtI n, rI P, HdrI P and HdrI Pn protocols, see section **SERIAL PROTOCOLS**.

PC/PLC SETUP

The MODBUS-RTU protocol allows to manage the reading and writing of data listed in the following table according to the specifications contained in the reference document for this standard **Modicon PI-MBUS-300.**
Check if the *master* MODBUS-RTU in use (or the development tool) requires the disclosure of registers based on 40001 or 0. In the first case the registers numbering corresponds to the one in the table; in the second case the register must be determined as the value in the table minus 40001.
Example: the register 40018 shall be reported as 17 (= 40018-40001).

The data exchanged by the instrument are:

Output Data from instrument (reading)	**Addresses**
Gross weight (H – L)	40008-40009
Net weight (H – L)	40010-40011
Exchange register R1 (H - L)	40051-40052
Exchange register R2	40053
Status Register 1	40007
Status Register 2	40148
Instrument status	40179
Execution register	40147
Digital inputs status	40017
Digital outputs status	40018

Input Data to instrument (writing)	**Addresses**
Command Register	40006
Digital outputs command	40018
Exchange register W1 (H - L)	40051-40052
Exchange register W2	40053

The data received and transmitted via MODBUS-RTU protocol have the following characteristics:
- 1 start bit
- 8 bit of data, *least significant bit* sent first
- Settable parity bit
- Settable stop bit

FUNCTIONS SUPPORTED IN MODBUS

Among the commands available in the MODBUS-RTU protocol, only the following are utilised for management of communication with the instruments; other commands could be incorrectly interpreted and generate errors or blocks of the system:

FUNCTIONS	DESCRIPTION
03 (0x03)	READ HOLDING REGISTER (READ PROGRAMMABLE REGISTERS)
16 (0x10)	PRESET MULTIPLE REGISTERS (WRITE MULTIPLE REGISTERS)

Interrogation frequency is linked to the communication speed set (the instrument stands by for at least 3 bytes before starting calculations an eventual response to the interrogation query). The *dELAY* parameter allows the instrument to respond with a further delay and this directly influences the number of interrogations possible in the unit of time.
For additional information on this protocol refer to the general technical specifications PI_MBUS_300.

In general queries and answers toward and from one slave instrument are composed as follows:

FUNCTION 3: Read holding registers (READ PROGRAMMABLE REGISTERS)

QUERY

Address	Function	1st register address	No. registers	2 byte
A	0x03	0x0000	0x0002	CRC

Tot. byte = 8

RESPONSE

Address	Function	No. bytes	1st register	2nd register	2 byte
A	0x03	0x04	0x0064	0x00C8	CRC

Tot. byte = 3+2*No. registers+2

where: No. registers .number of Modbus registers to write beginning from the address no. 1
No. byte .....number of bytes of the following data

FUNCTION 16: Preset multiple registers (WRITE MULTIPLE REGISTERS)

QUERY

Address	Function	1st reg. add.	No. reg.	No. bytes	Val.reg.1	Val.reg.2	2 byte
A	0x10	0x0000	0x0002	0x04	0x0000	0x0000	CRC

Tot. byte = 7+2*No. registers+2

RESPONSE

Address	Function	1st reg. address	No. reg.	2 byte
A	0x10	0x0000	0x0002	CRC

Tot. byte = 8

where: No. registers .number of Modbus registers to read beginning from the address no. 1
No. byte .....number of bytes of the following data
Val.reg.1 .....contents of the register beginning from the first

The response contains the number of registers modified beginning from the address no. 1.

COMMUNICATION ERROR MANAGEMENT

The communication strings are controlled by way of the CRC (Cyclical Redundancy Check).
In case of communication error the slave will not respond with any string. The master must consider a time-out for reception of the answer. If it does not receive an answer it deduces that there has been a communication error.
In the case of the string received correctly but not executable, the slave responds with an EXCEPTIONAL RESPONSE. The "Function" field is transmitted with the msb at 1.

EXCEPTIONAL RESPONSE

Address	Function	Code	2 byte
A	Funct + 0x80		CRC

CODE	DESCRIPTION
1	ILLEGAL FUNCTION (the function is not valid or is not supported)
2	ILLEGAL DATA ADDRESS (the specified data address is not available)
3	ILLEGAL DATA VALUE (the data received has an invalid value)

COMMUNICATION EXAMPLES

The numerical data below are expressed in hexadecimal notation with prefix h.

EXAMPLE 1
Command for multiple writing of registers (command 16, h10 hexadecimal).
Assuming that we wish to write the value 0 to the register 40051 and the value 2000 to the register 40052, the string to generate must be:

h01 h10 h00 h32 h00 h02 h04 h00 h00 h07 hD0 h72 hCE

The instrument will respond with the string:

h01 h10 h00 h32 h00 h02 hE0 h07

Query field name	hex	Response field name	hex
Instrument address	**h01**	Instrument address	**h01**
Function	**h10**	Function	**h10**
Address of the first register H	**h00**	Address of the first register H	**h00**
Address of the first register L	**h32**	Address of the first register L	**h32**
Number of registers H	**h00**	Number of registers H	**h00**
Number of registers L	**h02**	Number of registers L	**h02**
Byte count	**h04**	CRC16 L	**hE0**
Datum 1 H	**h00**	CRC16 H	**h07**
Datum 1 L	**h00**		
Datum 2 H	**h07**		
Datum 2 L	**hD0**		
CRC16 L	**h72**		
CRC16 H	**hCE**		

EXAMPLE 2
Multiple commands reading for registers (command 3, h03 hexadecimal).
Assuming that we wish to read the gross weight value (e.g.: 4000) and net weight value (e.g.: 3000), reading from address 40008 to address 40011 must be performed by sending the following string:

h01 h03 h00 h07 h00 h04 hF5 hC8

The instrument will respond with the string:

h01 h03 h08 h00 h00 h0F hA0 h00 h00 h0B hB8 h12 h73

Query field name	hex	Response field name	hex
Instrument address	**h01**	Instrument address	**h01**
Function	**h03**	Function	**h03**
Address of the first register H	**h00**	Byte count	**h08**
Address of the first register L	**h07**	Datum 1 H	**h00**
Number of registers H	**h00**	Datum 1 L	**h00**
Number of registers L	**h04**	Datum 2 H	**h0F**
CRC16 L	**hF5**	Datum 2 L	**hA0**
CRC16 H	**hC8**	Datum 3 H	**h00**
		Datum 3 L	**h00**
		Datum 4 H	**h0B**
		Datum 4 L	**hB8**
		CRC16 L	**h12**
		CRC16 H	**h73**

For additional examples regarding the generation of correct control characters (CRC16) refer to the manual **Modicon PI-MBUS-300.**

INSTRUMENT SETUP

- [ADDRESS - nOdEI d (default: 1)]: set the instrument address in the CANopen network
- [BAUD RATE - bAUd (default: 10 kb/s)]: set the instrument baud rate in the CANopen network
- [SWAP - SUAP (default: disabled)]: it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - ENABLED: BIG ENDIAN
  - DISABLED: LITTLE ENDIAN
- [OUTPUT RATE - OUtr (from 5 to 250 Hz; default: 10 Hz)]: set the data refresh frequency on the CANopen network.

PC/PLC SETUP

The instrument works as *slave* in a CANopen network and features a dual port that allows to exchange the weight and the main parameters with a CANopen *master*. Load the eds file attached to the instrument to the development system and configure the device.
The data exchanged by the instrument are:

Output Data from instrument (reading)	Addresses
Gross weight	0x0000-0x0003
Net weight	0x0004-0x0007
Exchange register R1	0x0008-0x000B
Exchange register R2	0x000C-0x000D
Status Register 1	0x000E-0x000F
Status Register 2	0x0010
Instrument status	0x0011
Execution register	0x0012-0x0013
Digital inputs status	0x0014
Digital outputs status	0x0015

Input Data to instrument (writing)	Addresses
Command Register	0x0000-0x0001
Digital outputs command	0x0002-0x0003
Exchange register W1	0x0004-0x0007
Exchange register W2	0x0008-0x0009

STATUS LED

LED	Status	Description
L6 red	off	Bus OK
	on	Bus error

INSTRUMENT SETUP

[OUTPUT RATE - OUtr (10 Hz)]: data refresh frequency on the IO-LINK network

PC/PLC SETUP

The instrument works as *device* in an IO-Link network and allows to exchange the weight and the main parameters with an IO-Link *gateway*.

The IO-Link protocol uses point-to-point network connections between *gateway* and *device*; use only one communication interface connector (see the Installation Instructions manual).

The data exchanged by the instrument are:

Output Data from instrument (reading)	Addresses
Gross weight	0x0000-0x0003
Net weight	0x0004-0x0007
Exchange register R1	0x0008-0x000B
Exchange register R2	0x000C-0x000D
Status Register 1	0x000E-0x000F
Status Register 2	0x0010
Instrument status	0x0011
Execution register	0x0012-0x0013
Digital inputs status	0x0014
Digital outputs status	0x0015

Input Data to instrument (writing)	Addresses
Command Register	0x0000-0x0001
Digital outputs command	0x0002-0x0003
Exchange register W1	0x0004-0x0007
Exchange register W2	0x0008-0x0009

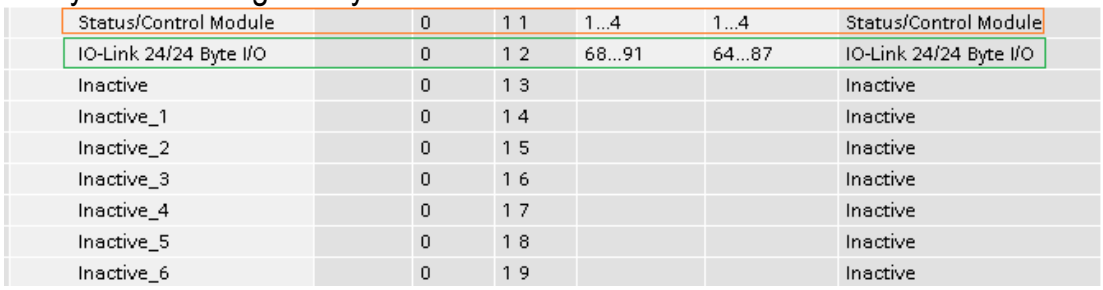
To communicate with LCB IO-LINK:
- Import the description file of the IO-LINK gateway used in the development system;
- Include the IO-LINK gateway in the project;
- Configure the gateway and set a size consistent with the number of data exchanged by the LCB instrument for the memory area associated with the IO-LINK port to which the instrument is connected.

Starting with firmware revision 1.04.05, use the revision 1.1 description file

The IO-Link gateway used could add additional bytes to those exchanged with the LCB instrument.

Example: the following figure represents a project in which we have:

- *IO-Link 24/24 Byte I/O*: 48 bytes, 24 for reading data and 24 for writing data, set for the memory area associated with the gateway port to which the LCB instrument is to be connected;
- *Status/Control Module*: 8 bytes, 4 for reading data control and 4 for writing data control, added by the IO-Link gateway.



Status/Control Module		0	1 1	1...4	1...4	Status/Control Module
IO-Link 24/24 Byte I/O		0	1 2	68...91	64...87	IO-Link 24/24 Byte I/O
Inactive		0	1 3			Inactive
Inactive_1		0	1 4			Inactive
Inactive_2		0	1 5			Inactive
Inactive_3		0	1 6			Inactive
Inactive_4		0	1 7			Inactive
Inactive_5		0	1 8			Inactive
Inactive_6		0	1 9			Inactive

STATUS LED

LED	Status	Description
L3 red	blinking	Bus error
L4 green	blinking	Bus OK

INSTRUMENT SETUP

[OUTPUT RATE - OUtr (from 5 to 500 Hz; default: 10 Hz)]: set the data refresh frequency on the Ethercat network

PC/PLC SETUP

The instrument works as *slave* in an EtherCAT network and features a dual port that allows to exchange the weight and the main parameters with an EtherCAT *master*.
The instrument is a standard *slave* EtherCAT. The BUS OUT connector of the EtherCAT *slave* must be connected from the EtherCAT *master* side.
Load the xml file attached to the instrument to the development system and configure the device.
The data exchanged by the instrument are:

Output Data from instrument (reading)	Addresses
Gross weight	0x0000-0x0003
Net weight	0x0004-0x0007
Exchange register R1	0x0008-0x000B
Exchange register R2	0x000C-0x000D
Status Register 1	0x000E-0x000F
Status Register 2	0x0010
Instrument status	0x0011
Execution register	0x0012-0x0013
Digital inputs status	0x0014
Digital outputs status	0x0015

Input Data to instrument (writing)	Addresses
Command Register	0x0000-0x0001
Digital outputs command	0x0002-0x0003
Exchange register W1	0x0004-0x0007
Exchange register W2	0x0008-0x0009

STATUS LED

LED	Status	Description
L1 green	off	BUS IN - Ethernet link not established
	on	BUS IN - Ethernet link established
	blinking	BUS IN - Ethernet activity detected
L3 red	blinking	general configuration error
	single blinking	local error
	double blinking	timeout error
L4 green	off	INIT status
	blinking	Pre-Operational status
	single blinking	Safe-Operational status
	on	Operational status
L5 green	off	BUS OUT - Ethernet link not established
	on	BUS OUT - Ethernet link established
	blinking	BUS OUT - Ethernet activity detected

INSTRUMENT SETUP

- [SWAP - SWAP (default: disabled)]: it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - ENABLED: BIG ENDIAN
  - DISABLED: LITTLE ENDIAN
- [IP ADDRESS - I PAddr (default: 10.2.0.170)]: set instrument IP address
- [SUBNET MASK - SUbnEt (default: 255.255.255.0)]: set instrument Subnet Mask
- [GATEWAY - GAtWAY (default: 10.2.0.254)]: set Gateway address of Ethernet network
- [OUTPUT RATE - OUtr (from 5 to 500 Hz; default: 10 Hz)]: set the data refresh frequency on the Ethernet/IP network

PC/PLC SETUP

The instrument works as *adapter* in an Ethernet/IP network and features a dual port that allows to exchange the weight and the main parameters with an Ethernet/IP *scanner*.
Use one of the following communication types.

CLASS 1 CONNECTION (implicit messages)
Refer to one of the following procedures to configure the communication with the instrument:
- load the eds file attached to the instrument to the Ethernet/IP *scanner* development system (see table “32-BIT RUN/IDLE HEADER” for the output data interface);
- use a generic Ethernet/IP module: configure it with the parameters of the table “Parameters for class 1 communication” and choose the real-time transfer format from instrument to scanner (Target to Originator – T2O) between “32-BIT RUN/IDLE HEADER” and “PURE DATA” (see the respective tables for the output data interface).

Parameters for class 1 communication			
Assembly	**Assembly Instance**	**Size [Byte] 32-bit run/idle header**	**Size [Byte] Pure data**
Input	101	22	26
Output	100	10	10
Configuration	128	0	0

CLASS 3 CONNECTION (explicit messages)
Manually generate the request to be sent to the PLC using the parameters shown in the table "Manual settings for communication" (see table "PURE DATA" for the output data interface).

Manual settings for communication		
Field	**Read**	**Write**
Service	0x0E	0x10
Class	0x04	0x04
Instance	0x65	0x64
Attribute	0x03	0x03
Data	NO	Byte array to be written

The data exchanged by the instrument are:

32-BIT RUN/IDLE HEADER

Output Data from instrument (reading)	Addresses input assembly
Gross weight	0x0000-0x0003
Net weight	0x0004-0x0007
Exchange register R1	0x0008-0x000B
Exchange register R2	0x000C-0x000D
Status Register 1	0x000E-0x000F
Status Register 2	0x0010
Instrument status	0x0011
Execution register	0x0012-0x0013
Digital inputs status	0x0014
Digital outputs status	0x0015

PURE DATA

Output Data from instrument (reading)	Addresses input assembly
Ethernet/IP Header*	0x0000-0x0003
Gross weight	0x0004-0x0007
Net weight	0x0008-0x000B
Exchange register R1	0x000C-0x000F
Exchange register R2	0x0010-0x0011
Status Register 1	0x0012-0x0013
Status Register 2	0x0014
Instrument status	0x0015
Execution register	0x0016-0x0017
Digital inputs status	0x0018
Digital outputs status	0x0019

* registers used by the ETHERNET/IP *scanner* to manage the communication.

Input Data to instrument (writing)	Addresses – output assembly
Command Register	0x0000-0x0001
Digital outputs command	0x0002-0x0003
Exchange register W1	0x0004-0x0007
Exchange register W2	0x0008-0x0009

STATUS LED

LED	Status	Description
L1 green	off	BUS IN - Ethernet link not established
	on	BUS IN - Ethernet link established
L2 yellow	off	BUS IN - Ethernet activity not detected
	blinking	BUS IN - Ethernet activity detected
L3 red	blinking	timeout error
	on	duplicate IP address
L4 green	blinking	IP address assigned but no communication
	on	communication established
L5 green	off	BUS OUT - Ethernet link not established
	on	BUS OUT - Ethernet link established
L6 yellow	off	BUS OUT - Ethernet activity not detected
	blinking	BUS OUT - Ethernet activity detected

INSTRUMENT SETUP

- [DHCP ENABLE - dHCP (default: enabled)]: enables the acquisition of parameters I PAddr, SUbnEt and GAtUAY via DHCP protocol. If YES the menu items corresponding to these parameters are not visible
- [SWAP - SUAP (default: disabled)]: it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - ENABLED: LITTLE ENDIAN
  - DISABLED: BIG ENDIAN
- [IP ADDRESS - I PAddr (default: 10.2.0.170)]: set instrument IP address
- [SUBNET MASK - SUbnEt (default: 255.255.255.0)]: set instrument Subnet Mask
- [GATEWAY ENABLE - GAtUEn (default: disabled)]: enables the management of parameter GAtUAY. If NO the MODBUS/TCP interface does not use the parameter GAtUAY during operation
- [GATEWAY - GAtUAY (default: 10.2.0.254)]: set Gateway address of Ethernet network
- [OUTPUT RATE - OUtr (from 5 to 50 Hz; default: 10 Hz)]: set the data refresh frequency on the Modbus/TCP network

PC/PLC SETUP

The instrument works as *slave* in a Modbus/TCP network and features a dual port that allows to exchange the weight and the main parameters with a Modbus/TCP *master*. Use port 502 for the communication.
The supported Function Codes are:

- 04: Read Input Registers
- 06: Preset Single Register
- 16: Preset Multiple Registers

The data exchanged by the instrument are:

Output Data from instrument (reading)	Addresses
Gross weight	0x0000-0x0001
Net weight	0x0002-0x0003
Exchange register R1	0x0004-0x0005
Exchange register R2	0x0006
Status Register 1	0x0007
Status Register 2 (H) Instrument status (L)	0x0008
Execution register	0x0009
Digital inputs status (H) Digital outputs status (L)	0x00104

Input Data to instrument (writing)	Addresses
Command Register	0x0000
Digital outputs command	0x0001
Exchange register W1	0x0002-0x0003
Exchange register W2	0x0004

STATUS LED

LED	Status	Description
L1 green	off	BUS IN - Ethernet link not established
	on	BUS IN - Ethernet link established
L2 yellow	off	BUS IN - Ethernet activity not detected
	blinking	BUS IN - Ethernet activity detected
L3 red	blinking	system error
	on	communication error
L4 green	off	not ready
	blinking (1 Hz)	ready but not configured yet
	blinking (5 Hz)	configured but waiting for connection
	on	communication established
L5 green	off	BUS OUT - Ethernet link not established
	on	BUS OUT - Ethernet link established
L6 yellow	off	BUS OUT - Ethernet activity not detected
	blinking	BUS OUT - Ethernet activity detected

INSTRUMENT SETUP

- [ADDRESS - nOdEI d (default: 1)]: set the instrument address.
- [OUTPUT RATE - OUtr (from 5 to 100 Hz; default: 10 Hz)]: set the data refresh frequency on the Powerlink network.

PC/PLC SETUP

The instrument works as *slave* in a POWERLINK network and features a dual port that allows to exchange the weight and the main parameters with a POWERLINK *controller*. Load the xdd file attached to the instrument to the development system and configure the device.
The data exchanged by the instrument are:

Output Data from instrument (reading)	Addresses
Gross weight	0x0000-0x0003
Net weight	0x0004-0x0007
Exchange register R1	0x0008-0x000B
Exchange register R2	0x000C-0x000D
Status Register 1	0x000E-0x000F
Status Register 2	0x0010
Instrument status	0x0011
Execution register	0x0012-0x0013
Digital inputs status	0x0014
Digital outputs status	0x0015

Input Data to instrument (writing)	Addresses
Command Register	0x0000-0x0001
Digital outputs command	0x0002-0x0003
Exchange register W1	0x0004-0x0007
Exchange register W2	0x0008-0x0009

STATUS LED

LED	Status	Description
L1 green	off	BUS IN - Ethernet link not established
	on	BUS IN - Ethernet link established
	blinking	BUS IN - Ethernet activity detected
L3 red	on	communication error
L4 green	off	initialization status
	blinking	stop status
	single blinking	Pre-Operational 1 status
	double blinking	Pre-Operational 2 status
	triple blinking	ReadyToOperate status
	on	Operational status
L5 green	off	BUS OUT - Ethernet link not established
	on	BUS OUT - Ethernet link established
	blinking	BUS OUT - Ethernet activity detected

INSTRUMENT SETUP

- [SWAP - SWAP (default: disabled)]: it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - ENABLED: LITTLE ENDIAN
  - DISABLED: BIG ENDIAN
- [OUTPUT RATE - OUtr (from 5 to 500 Hz; default: 10 Hz)]: set the data refresh frequency on the Profinet-IO network

PC/PLC SETUP

The instrument works as *device* in a Profinet-IO network and features a dual port that allows to exchange the weight and the main parameters with a Profinet-IO *controller*.
The instrument supports the MRP Client functionality.
Load the gsdml file attached to the instrument to the development system and configure the device. Assign a name to the device (function *Assign Device Name*) using case letters (a-z), numbers (0-9), minus character (-) and set at least 1 ms as Profinet's I/O refresh time.
The data exchanged by the instrument are:

Output Data from instrument (reading)	Addresses	Type
Gross weight	0x0000-0x0003	20 byte output
Net weight	0x0004-0x0007	
Exchange register R1	0x0008-0x000B	
Exchange register R2	0x000C-0x000D	
Status Register 1	0x000E-0x000F	
Status Register 2	0x0010	
Instrument status	0x0011	
Execution register	0x0012-0x0013	
Digital inputs status	0x0014	2 byte output
Digital outputs status	0x0015	

Input Data to instrument (writing)	Addresses	Type
Command Register	0x0000-0x0001	2 byte input
Digital outputs command	0x0002-0x0003	8 byte input
Exchange register W1	0x0004-0x0007	
Exchange register W2	0x0008-0x0009	

STATUS LED

LED	Status	Description
L1 green	off	BUS IN - Ethernet link not established
	on	BUS IN - Ethernet link established
L2 yellow	off	BUS IN - Ethernet activity not detected
	blinking	BUS IN - Ethernet activity detected
L3 red	off	communication established
	blinking (2 Hz)	no communication
	on	no or slow Ethernet connection
L4 green	blinking (1 Hz 3 s)	device identification
L5 green	off	BUS OUT - Ethernet link not established
	on	BUS OUT - Ethernet link established
L6 yellow	off	BUS OUT - Ethernet activity not detected
	blinking	BUS OUT - Ethernet activity detected

INSTRUMENT SETUP

- [IP ADDRESS - I PAddr (default: 192.168.0.1)]: set instrument IP address
- [SUBNET MASK - SUbnEt (default: 255.255.255.0)]: set instrument Subnet Mask
- [GATEWAY - GAtUAY (default: 192.168.0.254)]: set Gateway address of Ethernet network
- [OUTPUT RATE - OUtr (from 5 to 50 Hz; default: 10 Hz)]: set the data refresh frequency on the CCLINK IE FIELD BASIC network

PC/PLC SETUP

The instrument works as *slave* in a CCLINK IE Field Basic network, occupies 1 station and features a dual port that allows to exchange the weight and the main parameters with a CCLINK IE Field Basic *master*.
Load the csp file attached to the instrument to the development to the CCLINK IE Field Basic *master*.
The data exchanged by the instrument are divided into:
- Registers managed by bit: RX/RY
- Registers managed by word: RWr/RWw

RX/RY

RX

Output Data from instrument (reading)	Device No. bit
-	RXn0
-	RXn1
-	RXn2
-	RXn3
-	RXn4
-	RXn5
Correct operation of the instrument[3]	RXn6
-	RXn7
Decimal point 1[4]	RXn8
Decimal point 2[4]	RXn9
Decimal point 4[4]	RXnA
Gross weight negative sign[5]	RXnB
Net weight negative sign[5]	RXnC
-	RXnD - RXnF

RY

Input Data to instrument (writing)	Device No. bit
-	RYn0
-	RYn1
-	RYn2
-	RYn3
-	RYn4
-	RYn5
-	RYn6
-	RYn7
-	RYn8
-	RYn9
-	RYnA
-	RYnB
-	RYnC
-	RYnD - RYnF

Weight within ±¼ of a division around ZERO[6]	RX(n+1)0
SET contact[19]	RX(n+1)1
PRESET contact[20]	RX(n+1)2
Tapping function[21]	RX(n+1)3
Tolerance[22]	RX(n+1)4
-	RX(n+1)5
-	RX(n+1)6
Weight stability[7]	RX(n+1)7
Cycle end[23]	RX(n+1)8
Maximum gross weight exceeded by 9 divisions[8]	RX(n+1)9
-	RX(n+1)A
-	RX(n+1)B
-	RX(n+1)C
-	RX(n+1)D
-	RX(n+1)E
-	RX(n+1)F
Net indication[9]	RX(n+2)0
Load cells references not connected[10]	RX(n+2)1
AD converter malfunction[11]	RX(n+2)2
Load cell error[12]	RX(n+2)3
Net weight over the maximum displayable value[13]	RX(n+2)4
Gross weight over the maximum displayable value[13]	RX(n+2)5
-	RX(n+3)0 - RX(n+3)7
-	RX(n+3)8
-	RX(n+3)9
-	RX(n+3)A
System ready[14]	RX(n+3)B
-	RX(n+3)C - RX(n+3)F

SEMI-AUTOMATIC ZERO[15]	RY(n+1)0
-	RY(n+1)1
SEMI-AUTOMATIC TARE enabling (Net indication)[16]	RY(n+1)2
SEMI-AUTOMATIC TARE disabling (Gross indication)[17]	RY(n+1)3
-	RY(n+1)4
-	RY(n+1)5
-	RY(n+1)6
Batching start[24]	RY(n+1)7
Batching pause[25]	RY(n+1)8
Batching resume[26]	RY(n+1)9
Batching stop[27]	RY(n+1)A
Accept batching alarm[28]	RY(n+1)B
Ignores tArEP [29]	RY(n+1)C
Ignores tOL [30]	RY(n+1)D
-	RY(n+1)E
-	RY(n+1)F
-	RY(n+2)0
-	RY(n+2)1
-	RY(n+2)2
-	RY(n+2)3
-	RY(n+2)4
-	RY(n+2)6
-	RY(n+3)0 - RY(n+3)7
-	RY(n+3)8
-	RY(n+3)9
-	RY(n+3)A
-	RY(n+3)B
-	RY(n+3)C - RY(n+3)F

RWr

Output Data from instrument (Reading)	Sigla	Dimension (byte)	Addresses
Gross weight	GW	4	Wr0000 – Wr0001
Net weight	NW	4	Wr0002 – Wr0003
R1 Exchange Register	R1	4	Wr0004 – Wr0005
R2 Exchange Register	R2	2	Wr0006
-		2	Wr0007
Status Register 1	SR1	2	Wr0008
Status Register 2 + Instrument Status*	SR2 + IS	2	Ww0009
Execution register	EXR	2	Wr000A
Digital Inputs Status + Digital Outputs Status**	INS + OUTS	2	Wr000B
-			
-			

* Status Register 2 16 most significant bit, Instrument Status 16 least significant bit

** Digital Inputs Status 16 most significant bit, Digital Outputs Status 16 least significant bit

RWw

Input Data to instrument (writing)	Sigla	Dimension (byte)	Addresses
Command Register	CMDR	2	Ww0000
Digital outputs command	CMDOUT	2	Ww0001
W1 Exchange Register	W1	4	Ww0002 – Ww0003
W2 Exchange Register	W2	2	Ww0004

STATUS LED

LED	Status	Description
L1 green	off	station not connected to Ethernet network
	blinking	station connected with sending/receiving Ethernet packets
	on	station connected but does not send/receive Ethernet packets
L3 red	on	station disconnected and cyclic transmission off
	blinking	communication error
L4 green	on	station in operational and cyclic transmission on
	blinking	station in operational and cyclic transmission off
	off	station disconnected

INSTRUMENT SETUP

- [ADDRESS - Addr (default: 1)]: set the instrument address.
- [OUTPUT RATE - OUtr (from 5 to 100 Hz; default: 10 Hz)]: set the data refresh frequency on the SERCOSIII network.

PC/PLC SETUP

The instrument works as *slave* in a SERCOSIII network and features a dual port that allows to exchange the weight and the main parameters with a SERCOSIII *master*. Load the sddml file attached to the instrument to the development system and configure the device.
The data exchanged by the instrument are:

Output Data from instrument (reading)	Addresses
AT Connection Control*	0x0000-0x0001
AT IO Status*	0x0002-0x0003
Gross weight	0x0004-0x0007
Net weight	0x0008-0x000B
Exchange register R1	0x000C-0x000F
Exchange register R2	0x0010-0x0011
Status Register 1	0x0012-0x0013
Status Register 2	0x0014
Instrument status	0x0015
Execution register	0x0016-0x0017
Digital inputs status	0x0018
Digital outputs status	0x0019

Input Data to instrument (writing)	Addresses
MDT Connection Control*	0x0000-0x0001
MDT IO Control*	0x0002-0x0003
Command Register	0x0004-0x0005
Digital outputs command	0x0006-0x0007
Exchange register W1	0x0008-0x000B
Exchange register W2	0x000C-0x000D

* registers used by the SERCOSIII *master* to manage the communication.

STATUS LED

LED	Status	Description
L1 green	off	BUS IN - Ethernet link not established
	on	BUS IN - Ethernet link established
	blinking	BUS IN - Ethernet activity detected
L3 red	on	communication error
L4 green	off	no communication (NRT-Mode)
	on	communication established (CP4 phase)
L5 green	off	BUS OUT - Ethernet link not established
	on	BUS OUT - Ethernet link established
	blinking	BUS OUT - Ethernet activity detected

SERIAL PROTOCOLS

The configuration and use of serial protocols are only possible when power is supplied to the SERVICE connector.
The serial protocols configuration is done via the configuration software.

SERIAL COMMUNICATION SETTING

- [NONE - nonE (default)]: it disables any type of communication.
- [MODBUS - ModbUS]: MODBUS-RTU protocol (see section **FIELDBUSES**).
- [ASCII - ASCII]: ASCII bidirectional protocol; possible addresses: from 1 to 99.
    - [MODEW60/MODE T - MOdU60].
    - [MODE TD - MOd td].
- [CONTIN - CONtIn (from 10 to 300)]: fast continuous weight transmission protocol at the frequency set in HErt2 item.
    - [MODEW60/MODE T - MOd t (set: PArIty = NONE, StOP = 1)].
    - [MODE TD - MOd td (set: PArIty = NONE, StOP = 1)].
- [RIP - rIP (set: bAUd = 9600 bps, PArIty = NONE, StOP = 1)]: continuous weight transmission protocol to RIP5/20/60, RIP50SHA, RIPLED series remote displays.
- [HDRIP - HdrIP (set: bAUd = 9600 bps, PArIty = NONE, StOP = 1)]: continuous weight transmission protocol to remote displays.
- [HDRIPN - HdrIPn (set: bAUd = 9600 bps, PArIty = NONE, StOP = 1)]: continuous weight transmission protocol to remote displays.

When the remote display is set to gross weight:
- if the instrument indicates the gross weight, the remote display shows the gross weight.
- if the instrument indicates the net weight, the remote display shows the net weight alternated with the message nEt.

  - [BAUD RATE - bAUd (2400, 4800, 9600, 19200, 38400, 115200; default: 9600)]: transmission speed.
  - [ADDRESS - Addr (from 1 to 99; default: 1)]: instrument address.
  - [HERTZ - HErt2 (10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 100 – 200 – 300; default: 10)]: maximum transmission frequency; to be set when the CONtI n transmission protocol is selected. Maximum setting frequency **(**HErt2**)**:
    - 20 Hz with minimum baud rate 2400 baud.
    - 40 Hz with minimum baud rate 4800 baud.
    - 80 Hz with minimum baud rate 9600 baud.
    - 100 Hz with minimum baud rate 19200 baud.
    - 200 Hz with minimum baud rate 38400 baud.
    - 300 Hz with minimum baud rate 38400 baud.
  - [DELAY - dELAY (from 0 to 200 ms; default: 0)]: delay in milliseconds which elapses before the instrument replies.
  - [PARITY - PAr I tY]:
    - [NONE - nOnE]: no parity (default).
    - [EVEN - EUEn]: even parity.
    - [ODD - Odd]: odd parity.
  - [STOP BIT - StOP: stop bit (1 – 2; default: 1)].

FAST CONTINUOUS TRANSMISSION PROTOCOL

This protocol allows the continuous transmission of the weight at high update frequencies. Up to 300 strings per second are transmitted with a minimum transmission rate of 38400 baud.
Following communication modes availables (see section **SERIAL COMMUNICATION SETTINGS**):

- *MOd t*: communication compatible with TX RS485 instruments.
- *MOd td*: communication compatible with TD RS485 instruments.

If *MOd t* is set, the following string is transmitted to PC/PLC:
xxxxxxCRLF

where: **xxxxxx**.....6 characters of gross weight (48 ÷ 57 ASCII)
CR.....1 character return to the start (13 ASCII)
LF.....1 character on new line (10 ASCII)

In case of negative weight, the first character from the left of the weight characters takes on the value "-" (minus sign - ASCII 45).
In case of error or alarm, the 6 characters of the weight are substituted by the messages found in the table of the SERIAL PROTOCOLS ALARMS section.

If *MOd td* is set, the following string is transmitted to PC/PLC:
&TzzzzzzPzzzzzz\ckckCR

where: **&**.....1 initial string character (38 ASCII)
T.....1 character of gross weight identification
P.....1 character of gross weight identification
zzzzzz.....6 characters of gross weight (48 ÷ 57 ASCII)
****.....1 character of separation (92 ASCII)
ckck.....2 ASCII control characters or calculated considering the characters included between "&" and "\" excluded. The control value is obtained executing the XOR operation (exclusive OR) for the 8 bit ASCII codes of the characters considered. Therefore, a character expressed in hexadecimal is obtained with 2 numbers that may assume values from "0" to "9" and from "A" to "F". "**ckck**" is the ASCII code of the two hexadecimal digits
CR.....1 character of end string (13 ASCII)

In case of negative weight, the first character from the left of the weight characters takes on the value "-" (minus sign - ASCII 45).
In case of error or alarm, the 6 characters of the gross weight are substituted by the messages found in the table of the SERIAL PROTOCOLS ALARMS section.
FAST TRANSMISSION VIA EXTERNAL CONTACT: for BASE program, it's possible to transmit the weight, just once, even closing an input for no more than a second (see section **OUTPUTS AND INPUTS CONFIGURATION (BASE program)**).

CONTINUOUS WEIGHT TRANSMISSION TO REMOTE DISPLAYS PROTOCOL

This protocol allows the continuous weight transmission to remote displays. The communication string is transmitted 10 times per second.
Following communication modes availables (see section **SERIAL COMMUNICATION SETTINGS**):

- [RIP - rIP]: communication with RIP5/20/60, RIP50SHA, RIPLED series remote displays; the remote display shows the net weight or gross weight according to its settings (set: bAUd = 9600, PArITY = nonE, StOP = 1)
- [HDRIP - HdrIP]: communication with RIP6100, RIP6100N, RIP6100IP65, RIP675, RIP6125C series remote displays; the remote display shows the net weight or gross weight according to its settings (set: bAUd = 9600, PArITY = nonE, StOP = 1)
- [HDRIPN - HdrIPn]: communication with RIP6100, RIP6100N, RIP6100IP65, RIP675, RIP6125C series remote displays (set: bAUd = 9600, PArITY = nonE, StOP = 1)

The instrument sends the following string to the remote display:
&NxxxxxxLyyyyyy\ckckCR

where: **&**.....1 initial string character (38 ASCII)
N.....1 character of net weight identification (78 ASCII)
xxxxxx.....6 characters of net weight or PEAK if present (48 ÷ 57 ASCII)
L.....1 character of gross weight identification (76 ASCII)
yyyyyy.....6 characters of gross weight (48 ÷ 57 ASCII)
****.....1 character of separation (92 ASCII)
ckck.....2 ASCII checksum characters calculated considering the characters between "**&**" and "****" excluded. The checksum value is obtained from the calculation of XOR (exclusive OR) of the 8-bit ASCII codes of the characters considered. This obtains a character expressed in hexadecimals with two digits that can have the values from "0" to "9" and from "A" to "F". "**ckck**" is the ASCII code of the two hexadecimal digits
CR.....1 character of end string (13 ASCII)

In case of negative weight, the first character from the left of the weight characters takes on the value "-" (minus sign - ASCII 45).
If HdrIP has been set, the decimal point can also be transmitted. In this case, if the value exceeds 5 digits, only the 5 most significant digits are transmitted, while if the value is negative, no more than the 4 most significant digits are transmitted. In both cases, however, the decimal point moves consistently with the value to be indicated.
If HdrIPn has been set, in addition to what stated in HdrIP protocol, the instrument transmits the prompt nEt every 4 seconds in the gross weight field, if on the instrument, it has been carried out a net operation (see section **SEMI-AUTOMATIC TARE (NET/GROSS)**).
In case of weight value is under -99999, the minus sign "-" is sent alternated with the most significant figure.
In case of error or alarm, the 6 characters of the gross weight and net weight are substituted by the messages found in the table of the SERIAL PROTOCOLS ALARMS section.

ASCII BIDIRECTIONAL PROTOCOL

The instrument replies to the requests sent from a PC/PLC in the form of an ASCII string. It is possible to set a waiting time for the instrument before it transmits a response (see *dELAY* parameter in the **SERIAL COMMUNICATION SETTINGS** section).
Following communication modes availables (see section **SERIAL COMMUNICATION SETTINGS**):

- [MODEW60/MODE T - *MOdU60*]: communication compatible with instruments series W60000, WL60 Base, WT60 Base, TLA600 Base
- [MODO TD - *MOd td*]: communication compatible with TD RS485 instruments

Captions:

$.....Beginning of a request string (36 ASCII)
& or **&&** .....Beginning of a response string (38 ASCII)
aa.....2 characters of instrument address (48 ÷ 57 ASCII)
!.....1 character to indicate the correct reception (33 ASCII)
?.....1 character to indicate a reception error (63 ASCII)
#.....1 character to indicate an error in the command execution (23 ASCII)
ckck.....2 ASCII characters of Check-Sum (for further information, see section **CHECK-SUM CALCULATION**)
CR.....1 character for string end (13 ASCII)
****.....1 character of separation (92 ASCII)

- **SETPOINT PROGRAMMING**

Warning: the new values of setpoint are active immediately.

The PC transmits the ASCII string: **$aaxxxxxxyckckCR**

where: **xxxxxx**.....6 characters for the setpoint value (48 ÷ 57 ASCII)
y = A .....set the value in the setpoint 1
y = B .....set the value in the setpoint 2
y = C .....set the value in the setpoint 3

Possible instrument responses:

- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

Example: to set 500 in the setpoint no. 3, the PC must transmit the following command:
$01000500C47(Cr)

- **SETPOINT STORAGE IN EEPROM MEMORY**

The setpoint are stored in the RAM memory and lost upon instrument power off. It is necessary to send a special command to save them permanently in the EEPROM memory. Please note that the writing number allowed in the EEPROM memory is limited (about 100000).

The PC transmits the ASCII string: **$aaMEMckckCR**

Possible instrument responses:

- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

- **READING WEIGHT, SETPOINT AND PEAK (IF PRESENT) FROM PC**

The PC transmits the ASCII string: **$aajckckCR**

where: **j** = a.....to read setpoint 1
j = b.....to read setpoint 2
j = c.....to read setpoint 3
j = t.....to read gross weight
j = n.....to read net weight
j = p .....to read the gross weight peak if the ASCII parameter is set as MODBUS; if, instead, the ASCII parameter is set on MOd Ed the gross weight will be read. **To read the points, set the FS_tEO parameter equal to 50000.**

Possible instrument responses:

- correct reception: **&aaxxxxxxj\ckckCR**
- incorrect reception: **&&aa?\ckckCR**
- In case of peak not configured: **&aa#CR**

where: **xxxxxx**.....6 characters of the required weight value

Notes: in case of negative weight, the first character from the left of the weight characters takes on the value "-" (minus sign - ASCII 45). In case of weight value is under -99999, the minus sign "-" is sent alternated with the most significant figure.

Error messages:
in case of an instrument alarm for exceeding 110% of the full scale or 9 divisions above the value of the parameter MASS, the instrument sends the string:
&aassO-Lst\ckck

in case of faulty connection of the load cells or of another alarm, the instrument sends:
&aassO-Fst\ckck

where: **s**.....1 separator character (32 ASCII – space)

Generally refer to the **SERIAL PROTOCOLS ALARMS** section.

- **SEMI-AUTOMATIC ZERO (WEIGHT ZERO-SETTING FOR SMALL VARIATIONS)**

The PC transmits the ASCII string: **$aaZEROckckCR**

Possible instrument responses:
- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**
- the current weight is over the maximum resettable value: **&aa#CR**

- **SWITCHING FROM GROSS TO NET WEIGHT**

The PC transmits the ASCII string: **$aaNETckckCR**

Possible instrument responses:
- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

- **SWITCHING FROM NET TO GROSS WEIGHT**

The PC transmits the ASCII string: **$aaGROSSckckCR**

Possible instrument responses:
- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

- **READING OF DECIMALS AND DIVISION NUMBER**

The PC transmits the ASCII string: **$aaDckckCR**

Possible instrument responses:

- correct reception: **&aaxy\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

where: **x**.....number of decimals
y = 3.....for division value = 1
y = 4.....for division value = 2
y = 5.....for division value = 5
y = 6.....for division value = 10
y = 7.....for division value = 20
y = 8.....for division value = 50
y = 9.....for division value = 100

- **TARE ZERO-SETTING**

The PC transmits the ASCII string: **$aazckckCR**

where: **z**.....command of weight zero-setting (122 ASCII)

Possible instrument responses:

- correct reception: **&aaxxxxxxt\ckckCR**
- incorrect reception: **&&aa?\ckckCR**
- the instrument does not indicate the gross weight: **&aa#CR**

where: **xxxxxx**.....6 characters to indicate the required weight value
t.....character to indicate the weight (116 ASCII)

Example: zeroing the weight of the instrument with address 2
For the calibration you have to make sure that the system is unloaded or that the instrument measures a signal equal to the mV in the same condition:
query: **$02z78(Cr)**
response: **&02000000t\76(Cr)**

If the zeroing works correctly the instrument sends the zeroed weight value ("000000").

The calibration values are stored permanently in the EEPROM memory and the number of allowed writings is limited (about 100000).

- **REAL CALIBRATION (WITH SAMPLE WEIGHT)**

After the tare zero-setting, this function allow the operator to check the calibration obtained by using sample weights and correct automatically any change between the displayed value and the actual one.

Load onto the weighing system a sample weight, which must be at least 50% of the Full Scale, or make so that that the instrument measures a corresponding mV signal.

The PC transmits the ASCII string: **$aasxxxxxxckckCR**

where: **s**.....calibration command (115 ASCII)
xxxxxx.....6 characters to indicate the value of sample weight

Possible instrument responses:
- correct reception: **&aaxxxxxxt\ckckCR**
- incorrect reception or full scale equal to zero: **&&aa?\ckckCR**

where: **t**.....character of gross weight identification (116 ASCII)
xxxxxx.....6 characters to indicate the value of current weight

In case of correct reception, the read value has to be equal to the sample weight.

Example: calibration of the instrument no. 1 with a sample weight of 20000 kg:
query: **$01s02000070(Cr)**
response: **&01020000t\77(Cr)**

In case of correct calibration, the read value has to be “020000”.

- **CHECK-SUM CALCULATION**

The two ASCII characters (**ckck**) are the representation of a hexadecimal digit in ASCII characters. The check digit is calculated by executing the operation of XOR (exclusive OR) of 8-bit ASCII codes of only the string underlined.

The procedure to perform the calculation of check-sum is the following:
- Consider only the string characters highlighted with underlining
- Calculate the exclusive OR (XOR) of 8-bit ASCII codes of the characters

Example:

character	decimal ASCII code	hexadecimal ASCII code	binary ASCII code
0	48	30	00110000
1	49	31	00110001
t	116	74	01110100
XOR =	117	75	01110101

- The result of the XOR operation expressed in hexadecimal notation is made up of 2 hexadecimal digit (that is, numbers from 0 to 9 and/or letters from A to F). In this case the hexadecimal code is 0x75.
- The checksum is made up of the 2 characters that represent the result of the XOR operation in hexadecimal notation (in our example the character "7" and the character "5").

SERIAL PROTOCOLS ALARMS

	ErCEL	Er OL	Er Ad	------	Er OF
MODE					
ASCII	__O-F_	__O-L_	__O-F_	__O-L_	__O-F_
RIP *	__O-F_	__O-L_	__O-F_	__O-L_	__O-F_
HDRIP-N	_ERCEL	_ER_OL	_ER_AD	######	_ER_OF
CONTIN	_ERCEL	_ER_OL	_ER_AD	^^^^^^	_ER_OF

DATA DELETION AND PROGRAM SELECTION

Via the configuration software it is possible to carry out the following operations:

RESTORE DEFAULT VALUES

PROGRAM SELECTION:
BASE: basic program, setpoint management only.
LOAD: single product loading program.

By confirming, the instrument is restored to default and data is erased.

DECLARATION OF CONFORMITY - EU

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SISTEMA QUALITÀ CERTIFICATO UNI EN ISO 9001 - SISTEMA GESTIONE AMBIENTALE ISO 14001 - MODULO D: GARANZIA DELLA QUALITÀ DEL PROCESSO DI PRODUZIONE

I	Dichiarazione di conformità	Dichiariamo che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate.
GB	Declaration of conformity	We hereby declare that the product to which this declaration refers conforms with the following standards.
E	Declaración de conformidad	Manifestamos en la presente que el producto al que se refiere esta declaración está de acuerdo con las siguientes normas
D	Konformitäts-erklärung	Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt.
F	Déclaration de conformité	Nous déclarons avec cela responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-après.
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P	Declaração de conformidade	Declaramos por meio da presente que o produto no qual se refere esta declaração, corresponde às normas seguintes.
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RUS	Заявление о соответствии	Мы заявляем, что продукт, к которому относится данная декларация, соответствует перечисленным ниже нормам.

Models: RS485, RS485ANA, IO-LINK, CANOPEN, CC-LINK, CC-LINK IE Field Basic, PROFIBUS DP, MODBUS/TCP, ETHERNET TCP/IP, ETHERNET/IP, PROFINET IO, ETHERCAT, POWERLINK, SERCOS III

Mark Applied	EU Directive	Standards
CE	**2014/35/EU** Low Voltage Directive	*Not Applicable (N/A)* for VDC type EN 61010-1:2010+A1:2019 for 230/115 VAC type
CE	**2014/30/EU** EMC Directive	EN 55011:2016+A1+A11:2020 EN 61000-6-2:2019 EN 61000-6-4:2019 EN 61000-4-2:2009 EN 61000-4-3:2006+A2:2010 EN 61000-4-4:2012 EN 61000-4-5:2014+A1:2017 EN 61000-4-6:2014
CE M (only if "M" mark is applied)	**2014/31/EU** NAWI Directive	EN 45501:2015 OIML R76-1:2006

Montechiarugolo (PR), 02/09/2025

LAUMAS Elettronica s.r.l.
M. Consonni
(*Legal Representative*)

DECLARATION OF CONFORMITY - UKCA

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Mark Applied	UK legislation	Standards
UKCA	**Electrical Equipment (Safety) Regulations 2016**	*Not Applicable (N/A)* for VDC type BS EN 61010-1:2010+A1:2019 for 230/115 VAC type
UKCA	**Electromagnetic Compatibility Regulations 2016**	BS EN 55011:2016+A1+A11:2020 BS EN 61000-6-2:2019 BS EN 61000-6-4:2019 BS EN 61000-4-2:2009 BS EN 61000-4-3:2006+A2:2010 BS EN 61000-4-4:2012 BS EN 61000-4-5:2014+A1:2017 BS EN 61000-4-6:2014
UKCA M (only if "M" mark is applied)	**Non-automatic Weighing Instruments Regulations 2016**	BS EN 45501:2015

Montechiarugolo (PR), 02/09/2025

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M. Consonni
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On our website www.laumas.com there are videos on the guidelines for correct installation of weighing systems and video tutorials on configuring our transmitters and weight indicators.

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