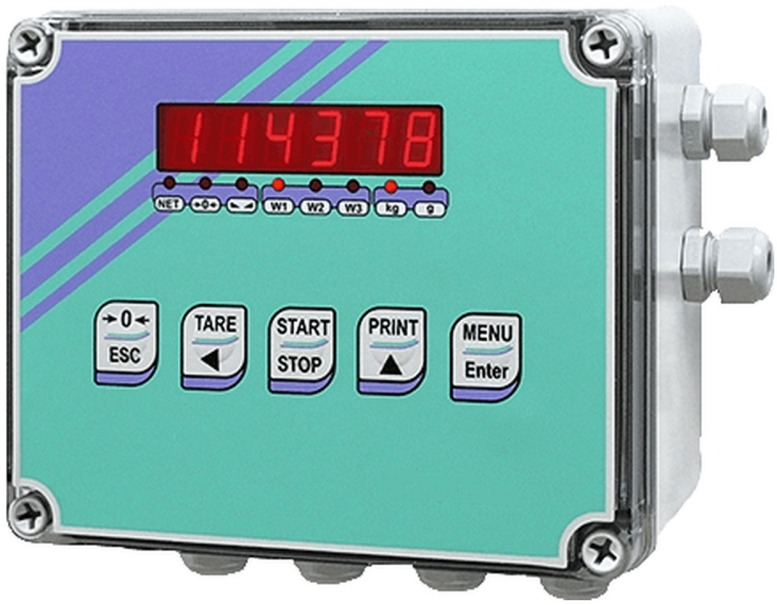
OCTOGON

MANUAL

EILC

BATCHING UNIT IN A FIELD HOUSING

Installation and user manual – Program 3, 6 or 14 products (3-6-14)



Document	Version	Date	Applies to
Installation and user manual	V00x	10/2026	EILC, program 3-6-14, wall box IP67

This manual describes installation, connection and operation of the EILC with the batching program for 3, 6 or 14 products: mixtures of several products on one scale, up to 99 formulas, fall calculation, tolerance, slow function, consumption, analog output and the serial protocols of this program. The BASE, loading (C) and unloading (S) programs have manuals of their own.

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1 About this manual

Display texts are set in a fixed-width typeface, as they appear on the display, for example **`CALIb`**. Keys are written in square brackets (section 8.2). A menu path is a sequence of keys and display texts, for example:

Menu **`000000`** › **[ENTER]+[ESC]** › **`CALIb`** › **[ENTER]** › **`FS-tEO`** › **[TARE] [PRINT]** › **`SEnSIb`**

`000000` stands for the weight display. "[ENTER]+[ESC]" means: press [ENTER] immediately followed by [ESC]. "[TARE] [PRINT]" means: scroll to the next menu item with the arrow keys. In the menus changes are applied right after pressing [ENTER]; no further confirmation is required.

1.1 Symbols

Notice	Meaning
Caution	Risk of electric shock, or: this operation must be performed by skilled personnel.
Important	Pay particular attention to the following instructions.
Note	Further information.

1.2 Scope

The EILC is supplied with one of several programs; the instrument shows the program at switch-on (chapter 9). This manual applies to the batching programs for 3, 6 or 14 products (display **`3PROD`**, **`6PROD`** or **`14PROD`**). The three versions differ in the number of products and in how the product relays are switched: with 3 products directly at the instrument, with 6 and 14 products through supplied relay modules (sections 5.3 and 7.3 ... 7.5). The BASE, loading (C) and unloading (S) programs, the Multiprogram version and the approved (legal for trade) version have manuals of their own; they are available from octogon.

Of the options, this manual describes the analog output (chapter 13) and the E/EC option (formula selection, section 7.8). Connection and setup of the other options of the data sheet – fieldbuses, additional RS485, USB, alibi memory, weight inputs – are provided by octogon on request.

2 Safety, warranty and disposal

2.1 Recommendations for proper use

- Keep away from heat sources and direct sunlight.
- Protect the instrument from rain (except special IP versions).
- Do not wash with water jets (except special IP versions).
- Do not dip in water.
- Do not spill liquid on the instrument.
- Do not use solvents to clean the instrument.
- Do not install in areas subject to explosion hazard (except special Atex versions).

2.2 Recommendations for correct installation of the instrument

- The terminals indicated on the instrument's wiring diagram to be connected to earth must have the same potential as the weighed structure (same earthing pit or earthing system). If this cannot be ensured, connect the terminals of the instrument (including the terminal –SUPPLY) to the weighed structure with an earthing wire.
- Lead the cell cable individually to its panel input, do not share a conduit with other cables, and connect it directly to the instrument terminal strip without breaking its route with support terminal strips.
- Use "RC" filters on the instrument-driven solenoid valve and remote control switch coils.
- Avoid inverters in the instrument panel; if inevitable, use special filters for the inverters and separate them with sheet metal partitions.
- The panel installer must provide electric protections for the instruments (fuses, door lock switch etc.).
- It is advisable to leave the equipment always switched on to prevent the formation of condensation.

2.3 Maximum cable lengths

Connection	Length
RS485	1000 m with AWG24, shielded and twisted cables
RS232	15 m for baud rates up to 19200
Analog current output	up to 500 m with 0.5 mm^2 cable
Analog voltage output	up to 300 m with 0.5 mm^2 cable

2.4 Warranty

24 months from the date of the delivery note. The 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 labour costs.

The 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 the manufacturer.

A 1-year warranty from the date of the delivery note applies to defects in material or manufacture of the battery.

2.5 Guidelines for proper disposal

- This is electrical/electronic equipment and cannot be disposed of as municipal solid waste, but must be delivered to a recycling centre.
- Improper use or disposal can pollute the environment or damage human health.
- Non-compliance with these guidelines will be penalised in accordance with the regulations in force in the country of destination.
- Dispose of the packing and packaging as required by local regulations.

3 Installation of the load cells

3.1 Sizing of load cell capacity

For safety reasons, in case of static weighing, it is advisable to use the load cells at a maximum of 70–80 % of their nominal capacity (assuming that the load is uniformly distributed over the entire weighed structure); depending on the handling mode of the load (e.g. forklifts, bridge cranes), consider reducing the share of the nominal capacity further. With dynamic loads the installer has to estimate thrust speed, acceleration, frequency, etc.

3.2 Installing load cells

The load cells must be placed on rigid, stable in-line structures; use the mounting modules for load cells to compensate for misalignment of the support surfaces.

3.3 Connecting several cells in parallel

Connect several cells in parallel by using – if necessary – a watertight junction box with terminal box. The cell extension cables must be shielded, led individually into their piping or conduit and laid as far as possible from the power cables (with 4-wire connections use cables of at least 4 × 1 mm^2).

3.4 Protection of the cell cable

Use water-proof sheaths and joints in order to protect the cell cables.

3.5 Mechanical restraints (pipes, etc.)

When pipes are present, use hoses and flexible couplings with open mouthpieces with rubber protection; with hard pipes, place the pipe support or anchor bracket as far as possible from the weighed structure (at a distance of at least 40 times the pipe diameter).

3.6 Welding

Avoid welding with the load cells already installed. If this cannot be avoided, place the welder ground clamp close to the welding point to prevent sending current through the load cell body.

3.7 Windy conditions, knocks, vibrations

The use of weigh modules is strongly recommended for all load cells to compensate for misalignment of the support surfaces. The system designer must ensure that the plant is protected against lateral shifting and tipping relating to: shocks and vibration; windy conditions; seismic conditions in the installation setting; stability of the support structure.

3.8 Earthing the weighed structure

By means of a copper wire with suitable cross-section, connect the upper support plate of each cell with its lower support plate, then connect all the lower plates to a single earthing system. Electrostatic charges accumulated by the product rubbing against the pipes and the container walls are discharged to the ground without going through or damaging the load cells. Without a proper earthing system the weighing system may still work, but future damage to the cells and the connected instrument cannot be ruled out. Earthing continuity must not be ensured by using metal parts of the weighed structure.

Important Failure to follow the installation recommendations will be considered a misuse of the equipment.

4 Load cell testing

4.1 Load cell input test (quick access)

Menu **000000** › **[PRINT] 3 s** › **MU-CEL**

From the weight display, press [PRINT] for 3 seconds: the response signal of the load cells is displayed, expressed in mV with four decimals.

4.2 Load cell resistance measurement (digital multimeter)

– Disconnect the load cells from the instrument and check that there is no moisture in the cell junction box caused by condensation or water infiltration. If so, drain the system or replace it if necessary.
– The value between the positive and the negative signal wire must be equal or similar to the output resistance indicated in the load cell data sheet.
– The value between the positive and the negative excitation wire must be equal or similar to the input resistance indicated in the load cell data sheet.
– The insulation value between the shield and any other cell wire and between any other cell wire and the body of the load cell must be higher than 20 MΩ.

4.3 Load cell voltage measurement (digital multimeter)

– Take out the load cell to be tested from underneath the container, or alternatively lift the container support.
– Make sure that the excitation of the two wires of the load cell connected to the instrument is 5 VDC ± 3 %.
– Measure the response signal between the positive and the negative signal wire by directly connecting them to the tester, and make sure that it is between 0 and ± 0.5 mV.
– Apply load to the cell and make sure that there is a signal increment.

Note If one of the above conditions is not met, please contact octogon.

5 Product description

5.1 Main specifications

– Weight indicator with 6-wire load cell input.
– 6-digit semi-alphanumeric red LED display, 14 mm height.
– 8 signalling LEDs, 5-key keyboard.
– Real-time clock/calendar with buffer battery.
– Two serial ports (RS485 and RS232) for PC/PLC – up to 32 instruments (max. 99 with line repeaters) by Modbus RTU –, remote display and printer.
– Optional: integrated Profibus DP, DeviceNet, CANopen, Profinet IO, Ethernet/IP, Ethernet TCP/IP, Modbus TCP output.
– Can be connected to an intelligent junction box (e.g. octogon ETLB) or to a weight transmitter.

5.2 Version and dimensions

Item	Value
Manufacturer designation	W200BOX
Housing	polycarbonate box for wall mounting
Dimensions	170 × 140 × 95 mm
Fixing	four fixing holes Ø 4 mm, centre distance 152 × 122 mm
Degree of protection	IP67

Caution The EILC is not compatible with the optional 115/230 VAC power supply; it is supplied with 12/24 VDC only.

5.3 Relay modules of the 6 and 14 products versions

Version	Supplied with
3 products	no relay module – the products switch the relays of the instrument (section 7.3)
6 products	1 relay module with 8 relays for products 1 ... 6 (marked RELE6PROD), 80 × 160 × 60 mm, available with 12/24 VDC, 115 VAC or 230 VAC power supply
14 products	the relay module for products 1 ... 6 as above and 1 relay module with 8 relays for products 7 ... 14 (marked RELE14PROD), 80 × 120 × 60 mm

Below they are called "relay module 1–6" and "relay module 7–14". The instrument drives them binary coded through its outputs 1 ... 4 (tables in sections 7.4 and 7.5).

5.4 Buffer battery

An internal battery keeps the internal clock running even in the event of power failure. At the first start and after long periods of inactivity, leave the instrument on for at least 12 hours to fully charge the battery.

6 Technical specifications

Item	Value
Power supply and consumption (VDC)	12/24 VDC ± 10 %; 5 W
Load cells in parallel, supply	max. 8 (350 Ω); 5 VDC / 120 mA
Linearity / analog output linearity	< 0.01 % F.S. / < 0.01 % F.S.
Thermal drift / analog output thermal drift	< 0.0005 % F.S./°C / < 0.003 % F.S./°C
A/D converter	24 bit (16000000 points)
Max. divisions	± 999999 (with measurement range ± 10 mV = sens. 2 mV/V)
Measurement range	± 39 mV
Max. sensitivity of usable load cells	± 7 mV/V
Max. conversions per second	300
Display range	± 999999
No. of decimals / display increments	0 ... 4 / × 1 × 2 × 5 × 10 × 20 × 50 × 100
Digital filter / readings per second	10 levels / 5 ... 300 Hz
Relay outputs	5 – max. 115 VAC; 150 mA (4 with analog output)
Digital inputs	3 – optoisolated 5 ... 24 VDC PNP (2 with analog output)
Serial ports	RS485, RS232
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 115200
Humidity (non condensing)	85 %
Storage temperature	–30 °C ... +80 °C
Working temperature	–20 °C ... +60 °C
Optoisolated analog output (optional), 16 bit – 65535 divisions	0 ... 20 mA; 4 ... 20 mA (max. 300 Ω); 0 ... 10 V; 0 ... 5 V; ± 10 V; ± 5 V (min. 10 kΩ)

6.1 UL version

For the UL version the following applies instead: relay outputs 5 – max. 30 VAC, 60 VDC; 150 mA (4 with analog output); working temperature –20 °C ... +50 °C. Equipment to be powered by 12-24 VDC LPS or Class 2 power source.

6.2 Relay module 1–6

Item	Value
Power supply and consumption (VDC)	12/24 VDC (standard) ± 10 %; 2 W
Power supply and consumption (VAC)	115/230 VAC (optional); 50–60 Hz; 1.5 VA
Relay outputs	8 – max. 115 VAC; 2 A
Humidity (non condensing)	85 %
Storage temperature	–30 °C ... +80 °C
Working temperature	–20 °C ... +60 °C

For relay module 7–14 the source gives no technical data of its own apart from the dimensions (section 5.3).

7 Electrical connections

7.1 Terminals legend

Terminal	Assignment
1	+SUPPLY (12/24 VDC)
2	–SUPPLY (12/24 VDC) · RS232, RS485: shield, GND · E/EC option: GND
3	RS232: TXD
4	RS232: RXD
5	OUTPUT 1: product 1 (3 products) · to the relay module (6/14 products)
6	OUTPUT 2: product 2 (3 products) · to the relay module (6/14 products)
7	OUTPUT 3: product 3 (3 products) · to the relay module (6/14 products)
8	OUTPUT 4: cycle end (3 products) · to the relay module (6/14 products)
9	OUTPUT COMMON · to the relay module (6/14 products)
10	INPUT 1: START (+VDC min 5 V, max 24 V)
11	INPUT 2: STOP (+VDC min 5 V, max 24 V)
12	INPUT COMMON (–VDC 0 V)
13	–
14	INPUT 3: selectable (+VDC min 5 V, max 24 V); with analog output: +ANALOG OUTPUT (0 ... 20 or 4 ... 20 mA)
15	OUTPUT 5: slow/alarm (3/14 products), alarm (6 products); with analog output: +ANALOG OUTPUT (0 ... 10 V). With 6/14 products output 5 supplies +5 VDC only if the relay is closed.
16	E/EC OPTION; with analog output: –ANALOG OUTPUT COMMON
17	RS485: –
18	RS485: +
19	–LOAD CELL EXCITATION (–Exc) · LOAD CELL SHIELD
20	+LOAD CELL EXCITATION (+Exc)
21	+LOAD CELL REF/SENSE
22	–LOAD CELL REF/SENSE
23	–LOAD CELL SIGNAL (–Sig)
24	+LOAD CELL SIGNAL (+Sig)

Terminal 13 is not used; it is listed so that the numbering is not read one place out. Outputs 1 ... 5: max. 115 VAC, 150 mA. Inputs 1 ... 3: supply 5 ... 24 VDC against terminal 12.

7.2 Basic information

– It is recommended that the power supply negative pole be grounded.
– It is possible to supply up to eight 350 Ω load cells or sixteen 700 Ω load cells.
– For 4-wire load cells, make a jumper between EX– and REF– and between EX+ and REF+ (section 7.7).
– Connect terminal –SUPPLY to the RS485 common of the connected instruments in the event that these receive alternating current input or that they have an optically isolated RS485.
– In case of an RS485 network with several devices it is recommended to activate the 120 Ω termination resistance on the two devices located at the ends of the network (section 14.2).
– E/EC option: selects the first 12 formulas (section 7.8).

Caution Connect the power supply specified on the plate of the instrument (12/24 VDC).

7.3 3 products version

The three products and the cycle end switch the relays of the instrument directly:

Terminal	Relais	Function
5	R1	product 1
6	R2	product 2
7	R3	product 3
8	R4	cycle end
9	–	common contact of outputs 1 ... 4
15	R5	slow or alarm (section 12.1)
10 / 11	–	START / STOP input
14	–	input 3 (section 7.6)
12	–	input common

7.4 6 products version

The products, the cycle end and the slow function switch the relays of relay module 1–6. The instrument drives the module through its outputs:

Instrument	Relay module 1–6
5 (R1)	5 (IN1)
6 (R2)	6 (IN2)
7 (R3)	7 (IN3)
8 (R4)	8 (IN4)
9 (output common, 5 VDC)	4 (IN COM)
–	L: + 12/24 VDC, N: – (24 V version); L, N: 115/230 VAC (115 V/230 V version)

Module terminals	Contact
9 / 10	product 1, NO / COM
11 / 12	product 2, NO / COM
13 / 14	product 3, NO / COM
15 / 16	product 4, NO / COM
17 / 18	product 5, NO / COM
19 / 20	product 6, NO / COM
21 / 22	cycle end, NO / COM
23 / 24	slow, NO / COM (6 products only)

In this version output 5 (terminal 15) is the alarm output (5 VDC with the relay closed). Coding of the outputs (I = closed, 0 = open, X = any):

R1	R2	R3	R4	Relay on the module
I	I	I	0	product 1
0	I	I	0	product 2
I	0	I	0	product 3
0	0	I	0	product 4
I	I	0	0	product 5
0	I	0	0	product 6
I	0	0	0	cycle end
X	X	X	I	slow

7.5 14 products version

Relay module 1–6 is connected as in section 7.4 and switches products 1 ... 6 and the cycle end; relay module 7–14 is connected to the connector of relay module 1–6 and switches products 7 ... 14. In this version slow/alarm is on output 5 of the instrument (terminal 15, 5 VDC with the relay closed), not on the module.

Terminals module 7–14	Contact
1 / 2	product 7, NO / COM
3 / 4	product 8, NO / COM
5 / 6	product 9, NO / COM
7 / 8	product 10, NO / COM
9 / 10	product 11, NO / COM
11 / 12	product 12, NO / COM
13 / 14	product 13, NO / COM
15 / 16	product 14, NO / COM

Coding: products 1 ... 6 and cycle end as in section 7.4 (without the slow row), products 7 ... 14:

R1	R2	R3	R4	Relay on module 7–14
0	0	0	I	product 7
I	0	0	I	product 8
0	I	0	I	product 9
I	I	0	I	product 10
0	0	I	I	product 11
I	0	I	I	product 12
0	I	I	I	product 13
I	I	I	I	product 14

The relays of the modules can be switched with the output test (section 15.2).

7.6 Input 3 and analog output

Input 3 (terminal 14, contact against the input supply 5 ... 24 VDC, common terminal 12) has one of these functions (section 12.2): approval (default), semi-automatic zero, net/gross weight.

With the analog output option, terminals 14 (+ 0 ... 20 / 4 ... 20 mA), 15 (+ 0 ... 10 V) and 16 (– common) carry the analog signals; current output max. load 300 Ω, voltage output min. load 10 kΩ. Then the following are no longer available: input 3, the slow/alarm output (alarm with 6 products) and the E/EC options.

7.7 4-wire load cell

Load cell to 19 (excitation –), 20 (excitation +), 23 (signal –) and 24 (signal +); jumpers 19–22 (EX– to REF–) and 20–21 (EX+ to REF+). Without these jumpers the instrument reports **ERCEL**.

7.8 E/EC option – formula selection

The E/EC option selects one of the first 12 formulas; the START contact then runs it (section 19.2). Both options are connected to terminals 2 (GND) and 16 of the instrument:

- E option: terminal block with 16 terminals for 12 external contacts (buttons not included in the supply).
- EC option: selector switch with 12 positions.

The selected formula can be shown in the test (**EC**, section 15.2). The E/EC option is not possible together with the analog output.

8 LEDs, keys and menu map

8.1 Signalling LEDs

LED	Function
NET	net weight (semi-automatic tare or preset tare)
>0<	zero (deviation from zero not more than ± 0.25 divisions)
stability symbol	stability
kg	unit of measure: kg
g	unit of measure: g
W1 · W2 · W3	the source gives no function for this program

Into menus the LEDs light up in sequence to indicate that no weight is displayed.

8.2 Keys

Key	Short press	Long press (3 s)	Into menus
[ESC] (>0<)	semi-automatic zero	tare resetting	cancel or return to previous menu
[TARE] (left arrow)	gross › net	net › gross	select figure to be modified or go to previous menu item
[START] (START/STOP)	batching start/stop	–	–
[PRINT] (up arrow)	print menu	mV load cell test	modify selected figure or go to next menu item
[ENTER] (MENU/ENTER)	setting formulas and batching constants	formula selection for START input (EC not present)	confirm or enter in submenu
[ENTER]+[ESC]	setting general parameters (press [ENTER] immediately followed by [ESC])	–	–
[ENTER]+[TARE]	setting preset tare (press [ENTER] immediately followed by [TARE])	–	–

8.3 System parameters menu

[ENTER]+[ESC] opens **CALIb**; [TARE] [PRINT] scroll to the other main items, [ENTER] opens the submenu.

Main item	Sub-items	Section
CALIb	**FS-tEO SEnSIb dIUIS ZErO IMP 0 UEIGHt vnIt**	10
FILtEr	value 0 … 9, then **ANTpOn** / **AntPOF**	11.1
PArA 0	**0 SEt AUtO 0 trAC 0**	11.2
AnALOG (option)	**tYPE MOdE AnA 0 AnA FS COr 0 COr FS**	13
SErIAL	**rS485** / **rS232** › **nOnE ModbUS rIP HDrIP HdrIPn YHL PrIntr UEIMOD UEIRIP** › **bAUd Addr dELAY PArItY StOP**	14
ALArM	**COnS EMPtY MASFOr tArE LOAd UnLOAd tOL FALL SLAvE**	15.1
Ovt-In	**In 3**; **OUt 5** (3 and 14 products only)	12
tESt	**In Ovt AnALOG** (option) **EC** (option)	15.2
dAtE	date and time	15.3
PSUBLC	unlock password	23.4
SEttIn	**MAXPr FStEP nEXt P bLACH**	15.4
InFO	**GEnrIC OPZ**	15.5

Direct access from the weight display: [ESC] 3 s › **ZErO** (tare weight zero setting); [PRINT] 3 s › **MU-CEL** (mV test); [ENTER]+[TARE] › **P-tArE** (preset tare).

8.4 Formulas and batching constants menu

[ENTER] opens **FOrP**; [TARE] [PRINT] reach the other main items.

Main item	Sub-items	Section
FOrP	**FOrP01** ... › **PrOd01 PrOd02** ...	17.1
CAnCFO	**FOrP00** › **SUrE**	17.2
tOtAL *	total quantity › deletion date › **COn 1 COn 2** ...	20
CAnCtO *	**SUrE**	20.2
COnSt	**MIn MASS tSIC tIMEAt tnLOAd tnUnLO MOdFAL FALL tOL SLOU SLOUOn SLOUOF AtArE tOtAL PrInt nCOPY PC SLAvE rALArM**	16

* appears only if in constants **tOtAL** = **YES**.

9 Instrument commissioning

Upon switch-on, the display shows in sequence:

- **111111** ... **999999** (only in case of approved program);
- the instrument model (e.g. **U200**);
- **SU** followed by the software code (e.g. **SU 5**);
- the program type: **base**, **LOAD**, **UNLOAD**, **3PROD**, **6PROD**, **14PROD** or **MULTI** (no active program) – for this manual **3PROD**, **6PROD** or **14PROD**;
- **r** followed by the software version (e.g. **r 1.12.00**);
- **HU** followed by the hardware code (e.g. **HU 104**);
- the serial number (e.g. **100515**).

Check that the display shows the weight and that the weight increases when loading the load cells. If not, check the connections and the correct positioning of the load cells.

9.1 Instrument already theoretically calibrated

Plant system identification tag present on the instrument and on the cover, load cell rated data already entered: reset to zero (section 10.3), then check the calibration with sample weights and correct the indicated weight if necessary (section 10.5).

9.2 Instrument not calibrated

- If load cell data are unknown: real calibration with sample weights (section 10.5).
- If they are known: theoretical calibration (section 10.2), reset to zero (10.3), check the calibration with sample weights and correct it if necessary (10.5).

9.3 Further settings and first batching

- Analog output: set the type and the full scale value (chapter 13).
- Serial communication: set the related parameters (chapter 14).
- Set the instrument clock to the current date and time (section 15.3).
- For the first batching: in the batching constants menu set the minimum weight (section 16.2), in the formulas menu program formula 01 (chapter 17), then start with [START] or by closing the START contact (chapter 19).

10 Calibration

10.1 Programming of system parameters

From the weight display, press [ENTER] immediately followed by [ESC]. [ENTER]: enter a menu or confirm the data entry; [PRINT]: modify the displayed figure or menu item; [TARE]: select a new figure or modify the displayed menu item; [ESC]: cancel and return to the previous menu.

10.2 Theoretical calibration

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[ENTER]** › **FS-tEO** › **SEnSIb** › **dIUIS**

This function allows the load cell rated values to be set. Set in sequence:

– **FS-tEO** (default **dEMO**): system full scale = capacity of one cell × number of cells. Example: 4 cells of 1000 kg › full scale 4000. The instrument is supplied with the theoretical full scale **dEMO** corresponding to 10000; setting 0 as full scale restores the factory values.

– **SEnSIb** (default 2.00000 mV/V): sensitivity, average of the values indicated on the load cells, settable 0.50000 … 7.00000 mV/V. Example 4 cells with 2.00100, 2.00150, 2.00200, 2.00250 › 2.00175.

– **dIUIS**: division (resolution), the minimum weight increment that can be displayed. It is calculated automatically as 1/10000 of full scale and can be changed between 0.0001 and 100 with × 1, × 2, × 5, × 10 increments.

– By modifying the full scale or the sensitivity, the real calibration is cancelled and only the theoretical calibration is valid.

– If the theoretical full scale and the full scale recalculated in real calibration are equal, the theoretical calibration is in use; otherwise the real calibration is in use.

– By modifying the theoretical full scale, the parameters containing a weight value are set to default values.

10.3 Tare weight zero setting

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[ENTER]** › **FS-tEO** › **[TARE] [PRINT]** › **ZErO**

Also directly from the weight display: hold [ESC] for 3 seconds. Perform it after the theoretical calibration; it sets the weight of the empty system to zero after commissioning and later compensates zero variations due to product residues. Confirm **ZErO** with [ENTER]: the weight to be zeroed is displayed and all LEDs flash; confirm again: the weight is set to zero and stored permanently. [PRINT] displays the total of all previous zero settings.

10.4 Zero value manual entry

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[ENTER]** › **FS-tEO** › **[TARE] [PRINT]** › **IMP 0**

Use only if it is not possible to reset the weighed structure tare, for example because it contains product that cannot be unloaded: set the estimated zero value (–999999 … 999999; default 0).

10.5 Real calibration (with sample weights)

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[ENTER]** › **FS-tEO** › **[TARE] [PRINT]** › **UEIGHt**

After theoretical calibration and tare weight zero setting, calibrate with sample weights of known value and correct the indicated value. Load a sample weight of at least 50 % of the maximum quantity to be weighed. Confirm **UEIGHt**: the current weight flashes, all LEDs are off; adjust the value with the arrow keys and confirm: all LEDs flash; confirm again: **UEIGHt** is shown again, pressing [ESC] repeatedly returns to the weight display.

Example: system 1000 kg, division 1 kg, sample weights 500 kg and 300 kg. Load both, correct the display to 800; remove 300 kg: display 500; remove 500 kg: display 0. Otherwise there is a mechanical problem affecting the linearity – correct it before repeating the procedure.

– If the correction changes the previous full scale by more than 20 %, all parameters with settable weight values are reset to default values.

– Linearisation on max. 8 points: repeat the procedure with up to eight different sample weights. It ends with [ESC] or after the eighth value (**max-pu**); afterwards only a new real calibration is possible (return to the weight display and re-enter the calibration menu).

– [PRINT] after confirming a sample weight shows the full scale recalculated from the maximum sample weight entered and the sensitivity **SEnSIb**.

10.6 Units of measure

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[ENTER]** › **FS-tEO** › **[TARE] [PRINT]** › **vnIt**

Display	Unit
kILOG	kilograms
G	grams
t	tons
LB	pounds
Neuton	newtons
LItre	litres
Bar	bars
Atm	atmospheres
PIECe	pieces
NEU-M	newton metres
KILO-m	kilogram metres
OTHER	other generic unit not included in the list

If the print function is enabled, the symbol of the selected unit is printed after the value.

11 Filter on the weight and zero parameters

11.1 Filter on the weight and anti peak

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[ENTER]** › **FILtEr**

The filter stabilises the weight display; a higher value has a stronger effect (0 ... 9, default 4). Confirm **FILtEr**: the current value is displayed; change and confirm it: the weight is displayed and its stability can be verified; confirming again returns, until the result is satisfactory. The filter stabilises a weight as long as its variations are smaller than the response time; set it according to the application and the full scale.

Filter value	Response time [ms]	Display and serial port refresh [Hz]
0	12	300
1	150	100
2	260	50
3	425	25
4 (default)	850	12.5
5	1700	12.5
6	2500	12.5
7	4000	10
8	6000	10
9	7000	5

Anti peak: when the weight is stable, the filter removes sudden disturbances with a maximum duration of 1 second. After the filter value select with [ENTER]: **ANTpOn** anti peak enabled (default) or **AntPOF** disabled.

11.2 Zero parameters

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **PArA 0**

– **0 SEt** (0 ... full scale; default 300, depending on decimals 300 – 30.0 – 3.00 – 0.300): maximum weight resettable by external contact, keypad or serial protocol.

– **AUtO 0** (0 ... 10 % of full scale; default 0): if the weight at switch-on is lower, it is reset; 0 disables the function.

– **trAC 0** (1 ... 5; default **NONE**): when the stable weight deviates from zero after one second by no more divisions than set, it is set to zero; **NONE** disables. Example: **dIUIS** = 5, **trAC 0** = 2 › zero tracking for variations up to 10.

12 Outputs, inputs, tare and zero

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **Ovt-In**

12.1 Outputs

– 3 products: outputs 1 ... 3 = products 1 ... 3, output 4 = cycle end.
– 6 and 14 products: outputs 1 ... 4 drive the relay modules (coding in sections 7.4 and 7.5).
– 3 and 14 products: output 5 (**OUt 5**, default **SLOU**) selectable: **ALArM** – the relay is closed when an alarm is present; **SLOU** – slow function for a precision batching.
– 6 products: output 5 = alarm (the relay is closed when an alarm is present).

With the optional function "quantity greater than the scale capacity" **End tH** is added (section 18.2).

12.2 Inputs

– Input 1: START; input 2: STOP.
– Input 3 (**In 3**, default **CONS**): **ne-LO** net/gross – close the input for no more than one second: semi-automatic tare, net weight displayed; hold it closed for 3 s: back to the gross weight.
– **ZERO** semi-automatic zero – close the input for no more than one second: the weight is set to zero (section 12.5).
– **CONS** approval – the instrument starts the batching only after verifying that this input is closed.

12.3 Semi-automatic tare (net/gross)

Close the net/gross input or press [TARE] for less than 3 seconds: the display shows the net weight (just set to zero) and the NET LED lights up. Back to gross: keep the input closed or press [TARE] for 3 seconds. The operation can be repeated many times, e.g. put the box on the scale, press [TARE], introduce the product: the display shows the product weight. While the net weight is displayed, keep [PRINT] pressed to display the gross weight. The semi-automatic tare is not allowed if the gross weight is zero.

Important The semi-automatic tare operation is lost upon instrument power-off.

12.4 Preset tare (subtractive tare device)

Menu **000000** › **[ENTER]+[TARE]** › **P-tArE**

Manually set a preset tare value **P-tArE** (not greater than the maximum weight) to be subtracted from the displayed value. The last programmed value is offered; to apply it press [PRINT] and then [ENTER]. Back in the weight display the net weight is shown and the NET LED lights up. To delete it, hold [TARE] for about 3 seconds or keep the net/gross input closed for 3 seconds; the value is set to zero and the NET LED turns off. Keeping [PRINT] pressed shows the gross weight temporarily.

– If a semi-automatic tare is entered, the preset tare function cannot be accessed.
– If a preset tare is entered, the semi-automatic tare is still possible; the two are added.
– Semi-automatic and preset tare are lost when the instrument is turned off.

12.5 Semi-automatic zero

Close the semi-automatic zero input – the weight is set to zero; or press [ESC] for less than 3 seconds: **STORE?** is displayed for 3 seconds, [ENTER] sets the weight to zero. Only allowed if the weight is lower than **0 SEt** (section 11.2), otherwise **t‾‾‾‾‾** appears and the weight is not set to zero.

13 Analog output (option)

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **AnALOG**

– **tYPE**: output type – 4 ... 20 mA, 0 ... 20 mA, 0 ... 10 V, 0 ... 5 V, ± 10 V, ± 5 V (default 4 ... 20 mA). For ± 10 V and ± 5 V the soldered jumper SW1 on the circuit board must be closed: open the instrument (release the locking tabs with a screwdriver), locate SW1 and short the pads with a drop of tin. The source shows the position of SW1 on a photo; octogon provides it on request.

– **MOdE**: **GROSS** – the output varies with the gross weight; **NET** – with the net weight; **PLC** – remote control by protocol (section 25.6).

– **AnA 0**: weight for the minimum output value. Set a value other than 0 only to limit the range – e.g. full scale 10000 kg, 4 mA at 5000 kg and 20 mA at 10000 kg › 5000.

– **AnA FS**: weight for the maximum output value; it must correspond to the value in the PLC program (default: calibration full scale). Example 4 ... 20 mA, 20 mA = 8000 kg › 8000.

– **COr 0**: zero correction so that the PLC indicates 0; the sign "–" can be set for the last digit on the left. Example: the PLC reads 4.1 mA › set 3.9 to obtain 4.0.

– **COr FS**: full scale correction so that the PLC indicates the value set in **AnA FS**. Example: the PLC reads 19.9 mA › set 20.1 to get 20.0.

Output type	Minimum	Maximum
0 ... 10 V	–0.150	10.200
0 ... 5 V	–0.150	5.500
± 10 V	–10.300	10.200
± 5 V	–5.500	5.500
0 ... 20 mA	–0.200	22.000
4 ... 20 mA	–0.200	22.000

The table gives the settable limits of the zero and full scale corrections. The output can also be used the opposite way (**AnA 0** > **AnA FS**): e.g. **AnA 0** = 10000, **AnA FS** = 0, 0 ... 10 V › 0 kg = 10 V, 5000 kg = 5 V, 10000 kg = 0 V.

Important All analog outputs are ACTIVE and SINGLE ENDED; connect PASSIVE receiver devices only. Voltage output min. load 10 kΩ, current output max. load 300 Ω.

14 Serial communication

14.1 Setting

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **SErIAL**

Setting	Meaning
rS485 / **rS232**	communication port
nOnE	no communication (default)
ModbUS	Modbus RTU protocol, addresses 1 ... 99 (chapter 25)
rIP	continuous weight transmission to remote displays, e.g. octogon EDLD; the remote display shows the net or gross weight according to its settings (chapter 24)
HDrIP	as **rIP**, for remote displays e.g. octogon EDLF, EDLG (chapter 24)
HdrIPn	as **HDrIP**; if the remote display is set to gross and the instrument shows net, the remote display shows the net weight alternated with **NET**
YHL	continuous weight transmission (chapter 24)
PrIntr	printer
UEIMOD / **UEIrIP**	weight reception via serial port (section 14.3)
bAUd	baud rate 1200, 2400, 4800, 9600, 19200, 38400, 115200 (default 9600)
Addr	instrument address 1 ... 99 (default 1)
dELAY	delay before the instrument replies 0 ... 200 ms (default 0)
PArItY	**nOne** no parity (default), **Euen** even, **Odd** odd
StOP	stop bit 1 or 2 (default 1)
EMPTY	printer: number of blank lines between one printout and the next
HEADER	printer: print a custom heading set from the PC, **YES** / **nO** (default **nO**)
PrtMOD	connected printer type: **P190**, **STAuP**, **STAut**, **TMT203**

For the remote display protocols set **bAUd** = **9600**, **PArItY** = **nOnE**, **StOP** = **1**. With the optional function "batching data on remote displays" **RIPLAU** is added (section 18.6).

14.2 RS232 and RS485

Connection	Instrument	Counterpart
RS232 to PC (DB9-F connector)	3 TXD · 4 RXD · 2 GND	2 · 3 · 5
RS485 (bus, several instruments)	18 RS485+ · 17 RS485– · 2 GND	RS485+ · RS485– · GND
RS485 directly to RS232 (no converter)	17 RS485– · 18 RS485+	RXD · GND

– RS232: the source connects TXD (3) to pin 2, RXD (4) to pin 3 and GND to pin 5 of the DB9-F connector at the PC.
– RS485: an RS485/RS232 converter for the PC; the source shows the bus line up to max. 500 m to the converter.
– If the RS485 network exceeds 100 metres or baud rates over 9600 are used, connect two 120 Ω terminating resistors between the "+" and "–" terminals of the line on the terminal strip of the furthest instruments. With other instruments or converters refer to their manuals.
– Direct connection RS485 to RS232: A SINGLE instrument only, in ONE WAY mode only.

14.3 Weight reading via serial port

The instrument can read the weight from another instrument (the transmitting one, connected to the load cell) instead of from a load cell, via RS485 or RS232. Outputs, serial ports and analog output continue to work as described, using the received weight. Requirement: weight reading mode **SERIAL** (section 23.5). The function can only be enabled on one serial port; in case of conflict the serial port set last remains active.

Instrument terminals	RS485	RS232
Signal	17 RS485– · 18 RS485+	3 TXD · 4 RXD
Shield, GND	2	2

Transmitting and receiving instrument: RS485 + to +, – to –; RS232 TX to RX and RX to TX; connect –SUPPLY of both instruments.

14.4 WEIMOD mode

The instrument works as if it were directly connected to the load cell; calibrations and zero settings can be done. Protocol Modbus (receiving instrument master, transmitting one slave).

– Transmitting instrument: select the serial port, set **Modbus** protocol, set the serial parameters and the filter value (transmitting instrument manual).
– Receiving instrument: select the serial port, set **UEIMOD**, set the parameters as on the transmitting instrument: **bAUd**, **SLAUE** (transmitting instrument address 1 … 99, default 1), **dELAY**, **PArItY**, **StOP**.
– The transmitting instrument display is locked and shows the instrument model. To unlock it, disconnect the receiving instrument and release the keypad/display lock of the transmitting one (its manual).

14.5 WEIRIP mode

The instrument receives the gross weight; calibrations and zero settings must be performed on the transmitting instrument.

– Transmitting instrument: select the serial port, set **RIP** protocol, set the serial parameters.
– Receiving instrument: select the serial port, set **UEIRIP**, **bAUd**, **dELAY**, **PArItY**, **StOP** as on the transmitting instrument; then the unit (**UNIT**) and the decimals (**DECIM**) of the received gross weight – both items appear in the main menu after setting **UEIRIP**.

15 Alarm relay, test, date, operation settings, info

15.1 Alarm relay closure

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **ALArM**

Only available if **Ovt 5** = **ALArM**. For each of these alarms the closing of the ALARM relay can be enabled (**Yes**, default) or disabled (**NO**): approval contact (**CONS?**), formula not programmed (**EMPTY**), maximum weight exceeded (**MASFOR**), minimum weight (**TARE**), no increase in weight (**LOAD**), no decrease in weight (**UNLOAD**), tolerance (**TOL**), fall (**FALL**), the PC did not read the batching data (**SLAVE**).

15.2 Test

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **tESt**

– **IN**: **0** must be displayed for each open input, **1** for each closed input.

– **OVT**: **0** – the output must open; **1** – it must close. With 6 and 14 products the relays of the modules are switched with the coding of section 7.4/7.5.

– **EC**: shows the formula selected by the E/EC option; without active option **EC-ER**.

– **ANALOG**: the analog signal ranges from minimum to maximum; **MA** current output test, **VOLT** voltage output test.

– **Mu-CEL**: load cell response signal in mV with four decimals.

15.3 Date and time setting

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **dAtE**

[ENTER] scrolls through day, month, year, hours, minutes; [TARE] selects the figure, [PRINT] increases it, [ENTER] confirms and goes to the next item.

15.4 Operation settings

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **SEttIn**

– **MAXPr**: maximum number of products and steps per formula – 1 ... 3, 1 ... 6 or 1 ... 14 depending on the version. Example 6 products, value 4: products 1 ... 4 and at most 4 steps per formula. Changing the value deletes all formulas.

– **FStEP** (default **NO**): **YES** – variable steps, products and quantities in the desired order, a product also several times; **NO** – fixed steps, only the quantities can be set. Changing the value deletes all formulas.

– **nEXt P**: switch condition from the batched product to the following one or to the closing of CYCLE END – **TIME** (default **yes**): waiting time **TIMEAT**; **COMAND** (default **nO**): START input closed or [ENTER]; **STABLE** (default **nO**): stable weight.

– **bLACH** (default **MAN**): batching resume after a power failure – **AUT**: **bLaCk** appears for 3 seconds, then the batching resumes from the point of interruption; **MAN**: **bLACK** appears, [ENTER] resumes, [ESC] stops it.

15.5 Info menu

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **InFO**

GENRIC: identification data – **INSTRM** instrument model, **SU COD** software code, **PROGRM** program type, **Fw wer** software version, **ser nV** serial number. **OPZ**: active options.

16 Batching constants

16.1 Operation

Menu **000000** › **[ENTER]** › **FOrP** › **[TARE] [PRINT]** › **COnSt**

From the weight display press [ENTER], then press [PRINT] several times until **CONST** is displayed, and confirm. Keys as in section 10.1.

16.2 Minimum and maximum weight

– **MIN** (0 ... full scale; default 10): minimum weight, at which the scale is considered empty. Batching starts only below this value; during unloading CYCLE END opens when the weight reaches it and the safe emptying time is over.

– **MASS** (0 ... full scale; default 0): settable and displayable maximum weight. If the displayed weight exceeds it by 9 divisions, ‾‾‾‾‾ is displayed; a greater value in a formula is refused with **Error**. 0 disables the function.

16.3 Times

– **TSIC** (0.0 ... 999.9 s; default 5.0): safe emptying time – after reaching the minimum weight during unloading (CYCLE END closed) the instrument waits for this time before opening CYCLE END.

– **TIMEAT** (0.0 ... 999.9 s; default 5.0): waiting time between the end of one product and the next.

– **TNLOAD** (0.0 ... 999.9 s; default 0.0): no product load time – if the product is not loaded within this time, the alarm **LOAD** is activated.

– **TNUnLO** (0.0 ... 999.9 s; default 0.0): no product unload time – if no product is extracted during the unloading phase (cycle end) within this time, **unLOAd** is activated. The control is only actuated after the weight has decreased by at least 10 divisions.

16.4 Fall

The fall is the product amount still falling after the batching STOP, which adds to the product already batched. The instrument anticipates the STOP by this amount – calculated automatically or set by the operator. Set the waiting time **TIMEAT** so that the weight is stable at the end of the batching, otherwise the update of the automatic fall is not correct.

– **MODFAL** (0 ... 1; default 0): 0 = manual fall, 1 = automatic fall.

– **FALL** (0 ... maximum weight; default 0): for each product the manual fall value (**MODFAL** = 0) or display and modification of the automatically calculated one (**MODFAL** = 1).

16.5 Tolerance

TOL (0 ... maximum weight; default 0), for each product: how much the batched weight can deviate from the formula. If it is lower or higher by more, the instrument closes the ALARM contact; [ENTER] continues. Example: product 1000, tolerance 100 › allowed 900 ... 1100. 0 disables.

16.6 Slow and tapping function

– **SLOU** (0 ... maximum weight; default 0), for each product: slow amount. When the weight reaches set value – fall – slow, the SLOW contact closes. If the value is higher than the quantity, the whole batching runs in slow phase; 0 disables. Example: product 100, slow 15, fall 10 › slow from 75.

– Tapping function – for batching devices without a slow speed: in the final phase the PRODUCT contact opens and closes cyclically. Set in **SLOU** the amount to be batched with tapping; **SLOUOn** (0 ... 9.9; default 0) time closed, **SLOUOF** (0 ... 9.9; default 0) time open during the slow phase; 0 disables.

16.7 Autotare

ATARE (0 ... 1; default 1): automatic tare at the batching start, 0 disabled, 1 enabled. Only possible if the gross weight is lower than the minimum weight **MIN**, otherwise **TARE?** is displayed.

16.8 Consumption, printing and PC

– **tOtAL** (default **NO**): store the consumption for each product, **YES** / **NO** (chapter 20).

– **prInt** (default **NO**): print the batching data at cycle end, **YES** / **NO**.

– **nCOPY** (1 ... 9; default 1): number of copies of the batching printout.

– **pC** (default **NO**): **YES** – the instrument checks for a PC every 10 seconds; without PC **PC** is displayed alternated with the weight. Only with the Modbus protocol.

– **SLAVE** (default **NO**): **YES** – before another batching the instrument waits for the PC to read the batching data, otherwise alarm **SLAVE**; **NO** – no waiting.

16.9 Switching of the alarm/slow relay on weight

RALARM (0 ... full scale; default 0): a value other than zero makes the ALARM/SLOW contact behave as a setpoint contact – the relay closes when the weight reaches this value, instead of switching on alarm or slow.

17 Formulas

17.1 Formulas programming

Menu **000000** › **[ENTER]** › **FOrP** › **[ENTER]** › **FOrP01** › **[ENTER]** › **PrOd01**

Select the formula to program (up to 99 formulas). If a quantity higher than the maximum weight **MASS** is set, **ERROR** is displayed.

- Fixed steps (**FSTEP** = **NO**, section 15.4): only the quantity of each product can be set, the sequence is fixed: **PrOd01**, **PrOd02** ...
- Variable steps (**FSTEP** = **YES**): step, product and quantity can be set, e.g. **01)P03** = step 01, product 03.

17.2 Deleting formulas

Menu **000000** › **[ENTER]** › **FOrP** › **[TARE] [PRINT]** › **CAnCFO**

Confirm **CANCFO** with [ENTER], enter the formula number (00 = all, **FORP00**), confirm with [ENTER]; at **SURE** press [ENTER] again – or [ESC] to cancel.

18 Optional functions

18.1 Overview and enabling

The optional functions are enabled during program selection (section 23.5); the display shows whether a function is enabled or disabled. All five are compatible with the 3, 6 and 14 products programs.

Function	Display on / off	Section
Batching data on remote displays	**rpl ON** / **rpl OF**	18.6
Cycle end partial unloadings *	**SFC ON** / **SFC OF**	18.4
Intermediate unloadings *	**UNL ON** / **UNL OF**	18.5
Quantity greater than the scale capacity *	**qmc ON** / **qmc OF**	18.2
Formulas in percentages	**PER ON** / **PER OF**	18.3

* only available if approval status **nOtLEG** has been set. Not combinable: cycle end partial unloadings and intermediate unloadings with "quantity greater than the scale capacity"; "quantity greater than the scale capacity" with "formulas in percentages". All other pairs are combinable.

18.2 Quantity greater than the scale capacity

The total quantity to be batched may be greater than the scale capacity. The instrument calculates the number of cycles needed and redistributes the remaining quantity in equal shares over the last two cycles. **MASS** (0 ... max full scale; default 0): maximum weight that the scale can load (section 16.2); 0 disables.

- Output 5 gets the function **End tH** (end of product transfer – the relay is closed at the end of the last batching cycle): 3/14 products **End tH**, **aLaRm** or **SLOU** (default slow); 6 products **End tH** or **aLaRm** (default alarm).
- Formula: total quantity **TOT PR**, then for each product (e.g. **PROD01**) or step (e.g. **01]P01**) the quantity (e.g. **150**).
- Before starting, a total quantity different from the formula can be set; if the batching is started from the external contact, the total of the formula is always used. **ER TOT**: the total quantity set is lower than the one in the formula.

18.3 Formulas in percentages

The formula holds the product percentages and the total amount on which they are calculated: set **TOT PR**, then for each product or step the percentage with 1 decimal (e.g. **15.0** = 15.0 %). Before starting, a different total can be set; if started from the external contact, the total of the formula is used.

18.4 Cycle end partial unloadings

– Formula: after the quantities press [ESC] – **SETUNL** is displayed; with [ENTER] set the quantity to be unloaded for each partial unloading (0 = all at once).

– **s endC** (constants, default **0**): the SLOW contact closes when **SETUNL - s endC** has already been unloaded.

– Operation: after all products and the waiting time the display shows **?** followed by the gross weight. With quantity 0 everything is unloaded at once (**E** before the weight). Otherwise [ENTER] (or the START input) unloads the programmed quantity: **v** is displayed, CYCLE END closes; when it is reached CYCLE END and SLOW open. It can be repeated while the weight is greater than the quantity; below it **Prod??** is displayed: [ENTER] unloads the rest down to the minimum weight and after the safe emptying time, [ESC] finishes without unloading, STOP interrupts at any time.

18.5 Intermediate unloadings

– Formula: after the quantity of a product press [ENTER] – **UNL OF** is displayed; [PRINT] passes to the following product, [ENTER] sets an intermediate unloading: **OF** flashes, select **ON** with [PRINT], set the quantity to be unloaded with [ENTER] (0 = scale fully unloaded) and confirm. Possible after each product.

– **s endC** as in section 18.4.

– Operation: the display shows **V 0**, CYCLE END closes and the product is unloaded; when the quantity is reached CYCLE END and SLOW open, after the waiting time the next product follows.

18.6 Batching data on remote displays

Up to four remote displays connected in parallel to RS485 show, depending on their address: A – instrument state, formula and product being batched or error code; B – remaining quantity to be batched; L – gross weight; N – net weight. Whether a remote display understands the protocol and allows changing the address is stated in its manual. Setting: **CALIB** › **SERIAL** › **RS485** › **RIPLAU**, **bAUd** = **9600**, **PArItY** = **nOnE**, **StOP** = **1**; string in section 24.2.

19 Batching

19.1 Sequence

Menu **000000** › **[START]** › **FOr 01** › **[ENTER]** › **C 0001**

Select the formula and set the number of cycles; then the first cycle starts. In case of alarm, [ESC] or the STOP input cancels the batching. With **ATARE** = 0 and **AZERO** = 0 a preset or semi-automatic tare is maintained at the start of the batching.

– 1. Checks: formula programmed (otherwise **EMPTY**); quantity not above **mass** (otherwise **MasfOr**); input 3, if set as approval, closed (otherwise **CONS?**); only with **ATARE**: gross weight lower than **MIN** (otherwise **tArE ?** – [ENTER] forces the start); only with **TOTAL** = **YES**: above 999000 consumption **TOTAL** appears for a second, above 999999 it is set to zero.

– 2. The first product of the formula starts. If **tnLOad** is set and the product is not loaded by at least 20 divisions within this time, **LOAD?** is displayed.

– 3. The product number (e.g. **P1**) is displayed for 1 second, then the net weight; the product relay closes.

– 4. Only with **SLOU**: at set value – fall – slow the SLOW contact closes; with tapping values the product contact opens and closes according to **sLOUOn** and **SLOUOF**.

– 5. At set value – fall the product contact opens.

– 6. The display shows **A** before the weight and waits – according to **nEXt P**: waiting time **TIMEAT** (**TIME** = **YES**), START input or [ENTER] (**COmand** = **YES**), stable weight (**STAbLE** = **YES**).

– 7. With **TOL**: if the quantity is lower by more than the tolerance, one finishing re-start is made (back to point 5), otherwise **TOL**; if it is higher, **TOL**. [ENTER] cancels the alarm and continues.

– 8. With **TOTAL** = **YES**: the consumption of the product is stored.

– 9. If another product follows, continue at point 3.

– 10. Cycle end: CYCLE END closes, the display shows **E** before the weight, if printing is enabled the batching data are printed.

– 11. If **TNUNLO** is set and the product is not extracted by at least 20 divisions within this time after the start of the extraction, **unLOAD** is displayed.

- 12. CYCLE END opens only when the weight is lower than **MIN** and **TSIC** has elapsed.
- 13. Only with **SLAVE** = **YES**: the instrument waits for the PC to read the data. If several cycles are set, the next one starts.

19.2 Batching start from external contact

Select the formula with the external selector switch (E/EC option), then close the START contact for at least 0.5 seconds; if the conditions of 19.1 are met, the formula is batched. Without selector switch the formula last entered via keypad is batched, or it is set: press [ENTER] for 3 seconds, **FEST00** is displayed, set the formula number with the arrow keys, [ENTER]; 00 recalls the formula last set via keypad. If the START contact is closed at the end of the batching, the same batching sequence is repeated.

19.3 Single product with automatic stop

[START], formula **FOR 00**, select the product (e.g. **PROD 01**), set its amount, [ENTER]: the product is batched without a special formula. Consumption is updated (if enabled), the data are sent to the printer (if enabled).

19.4 Single product with stop by keyboard

As 19.3, but amount 0: [ENTER] closes the product relay and starts, STOP ends the batching.

19.5 Unloading start with automatic stop

[START], formula **FOR 00**, product **PROD 00**, [ENTER]: CYCLE END closes and the scale is unloaded down to the minimum weight and after the safe emptying time.

19.6 Displaying during batching

The display shows the net weight preceded by the letter **B**. [TARE] shows the product number, [PRINT] the formula number, pressing it again the running cycle.

19.7 Batching stop

- Open the START contact and close the STOP contact to stop the batching. If the START contact is closed, **START?** is displayed.
- Press STOP: **PAUSE** is displayed; [ENTER] resumes, STOP again cancels it completely.

19.8 Resume batching after a power cut

If a blackout occurs during the batching (unloading phase included), **bLACK** appears when power comes back: [ENTER] resumes from the point of interruption, [ESC] cancels. With **bLaCk** = **AUt** (section 15.4) the batching resumes automatically after 3 seconds. Cycles still to be performed are not deleted.

20 Consumption

20.1 Consumption displaying

Menu **000000** › **[ENTER]** › **FOrP** › **[TARE] [PRINT]** › **tOtAL**

With **tOt** = **YES** (constants) the instrument stores the quantities batched for each product. **tOtAL** shows in sequence: total consumed for all products (divided by 100), deletion date, consumption for each product (**COn 1**, **COn 2** ...). The printout shows the quantities in full.

20.2 Consumption deletion

Confirm **CANCtO**, at **SURE** press [ENTER] again – or [ESC] to cancel. If the printer is enabled (section 14.1) an operation receipt is printed.

21 Alarms

Display	Meaning and remedy
tArE?	(only if **AtArE** = 1) at batching start the weight is higher than the minimum **MIn**. [ESC] returns to the weight display, [ENTER] cancels the alarm and continues; if the weight comes back below the minimum, the batching starts.
COnS?	at batching start the approval input is open (**In 3** = **CONS**). Close the input or cancel with [ESC].
tOL	at batching end the weight differs from the formula by more than the tolerance. [ENTER] cancels and continues.
FALL	at batching start the fall is higher than the product quantity. [ESC] cancels alarm and batching.
EMPtY	the formula recalled for running is not programmed. [ESC].
MASFOr	the formula recalled for running exceeds the maximum weight. [ESC].
PAUSE	STOP was pressed during batching. [ENTER] resumes, STOP terminates completely.
bLACK	power failure during batching. [ESC] cancels, [ENTER] resumes from the point of interruption.
LOAd	the product is not loaded; cancelled automatically when the weight increases. STOP twice cancels.
UnLOAd	during unloading (CYCLE END closed) no product is extracted; cancelled automatically when the weight decreases. STOP twice cancels.
StArt?	3 seconds, when trying to stop with the START input closed. Open the START input.
PARSER	batching is cancelled. [ESC]; if the alarm persists, contact octogon.
ERweIG	weight alarm, the current batching is cancelled. [ESC] and check the alarm.
ERCEL	load cell not connected or incorrectly connected; signal exceeds 39 mV; AD converter malfunctioning; 4-wire cell without jumpers EX–/REF– and EX+/REF+.
NO COM	communication problems between transmitting and receiving instrument; check connections and configuration.
ER OL	the weight exceeds 110 % of full scale.
EEROL	the weight on the transmitting instrument exceeds 110 % of full scale.
ER AD	internal converter failure; check the load cell connections, if necessary contact octogon.
‾‾‾‾‾	the weight exceeds the maximum weight by 9 divisions.
ER OF	maximum displayable value exceeded (higher than 999999 or lower than –999999).
eErOF	maximum displayable value exceeded on the transmitting instrument.
t‾‾‾‾‾	weight too high: zero setting not possible.
max-pu	real calibration: the eighth sample weight has been entered.
Error	value beyond the permitted values; [ESC] leaves the setting, the previous value is kept. E.g. too many decimals for the full scale, value above the maximum, sample weight does not match the detected mV increase, analog output correction beyond the limits.
bLOC	lock active on menu item, keypad or display.
NODISP	the number is greater than 999999 or less than –999999 and cannot be displayed.
BATrtC	buffer battery low, date and time lost. [ENTER]; leave the instrument on for at least 12 hours; if the alarm persists, contact octogon.
DATE?	incorrect date detected; check and correct it in the date menu.
COMAND	waiting for START or [ENTER] to continue the batching.
PC	PC is not connected.
sLaVe	the PC has not read the batching data.
InZErO	gross weight equal to zero: the semi-automatic tare cannot be performed.

21.1 Serial protocol alarms

Display	Status register Modbus RTU	RIP *	HDRIP-N
ERCEL	bit 0 (xxxxxxx1)	__O-F_	_ERCEL
ER OL	bit 3 (xxxx1xxx)	__O-L_	_ER_OL
ER AD	bit 1 (xxxxxx1x)	__O-F_	_ER_AD
‾‾‾‾‾	bit 2 (xxxxx1xx)	__O-L_	######
ER OF	gross bit 4 (xxx1xxxx), net bit 5 (xx1xxxxx)	__O-F_	_ER_OF
t‾‾‾‾‾	response to the zero command: 'value not valid' error (code 3)	__O-F_	O__SET

* remote display protocol **rIP**: if the message exceeds 5 digits the display reads ‾‾‾‾‾. With an alarm the relays open and the analog output goes to the lowest possible value:

Range	0 ... 20 mA	4 ... 20 mA	0 ... 5 V	0 ... 10 V	± 10 V	± 5 V
Output value	–0.2 mA	3.5 mA	–0.5 V	–0.5 V	0 V	0 V

22 Printing examples

If the printer has been set (section 14.1), [PRINT] in the weight display opens the print menu: **UEIGHT** displayed weight; **CONST** constants; **FORP** one or all formulas ([ENTER], then **fOrp01**: formula number or 00 for all); **tOtAL** consumption (only if **TOTAL** = **YES**). The heading of each printout gives model, program and address.

Batching in gross weight (atarE = 0)

```
:::::::::::::::::::::
‹model›   14PROD   Addr:01
FORMULA:             01
CYCLE:       1/       1
DATE: 01/10/11 08:30:01
INIT.WEIGHT       10 kg
P01 G    301:    300 kg
P02 N    714:    700 kg
P05 N   1025:   1000 kg
TOT G   2040:   2000 kg
```

Batching in net weight (atarE = 1)

```
:::::::::::::::::::::
‹model›   14PROD   Addr:01
FORMULA:             01
CYCLE:       1/       1
DATE: 01/10/11 08:30:01
TARE              10 kg
P01 N    301:    300 kg
P02 N    714:    700 kg
P05 N   1025:   1000 kg
TOT N   2040:   2000 kg
```

Batching with semi-automatic tare from keyboard (atarE = 0, azerO = 0)

```
:::::::::::::::::::::
‹model›   14PROD   Addr:01
FORMULA:             01
CYCLE:       1/       1
DATE: 01/10/11 08:30:01
N                 10 kg
INIT.C             3 kg
TOT C            208 kg
P01 N    301:    300 kg
P02 N    714:    700 kg
P05 N   1025:   1000 kg
TOT N   2040:   2000 kg
TOT C           2037 kg
```

Batching with predetermined tare set (atarE = 0, azerO = 0)

```
:::::::::::::::::::::
‹model›   14PROD   Addr:01
FORMULA:             01
CYCLE:       1/       1
DATE: 01/10/11 08:30:01
PT                10 kg
INIT.N             3 kg
P01 N    301:    300 kg
TOT C            208 kg
P02 N    714:    700 kg
P05 N   1025:   1000 kg
TOT N   2040:   2000 kg
TOT C           2037 kg
```

Constants printout

```
:::::::::::::::::::::::
‹model›   14PROD   Addr:01
DATE: 01/10/11 08:30:01
      CONSTANTS
MIN                   10
MASS                   0
TIME SIC             5.0
TIME WAIT            5.0
TIME NLOAD           0.0
TIME NUNLOAD         0.0
FALL              MANUAL
TIME SLOWON          0.0
TIME SLOWOF          0.0
AUTOTARE             YES
TOTAL                 NO
PRINT                 NO
PC                    NO
SLAVE                 NO
BLACKOUT          MANUAL
PR   FALL  TOLER   SLOW
02      0      0    200
03     52      0      0
06      0    100      0
```

Consumption printout (after zeroing, "CONSUMPTION ERASED" is printed as well)

```
:::::::::::::::::::::::
‹model›   14PROD   Addr:01
DATE: 01/10/11 08:30:52
      CONSUMPTION
P01             2596 kg
P03             1066 kg
P04              487 kg
TOTAL           4149 kg
FROM: 01/09/11 09:16:45
```

Formula printout

```
:::::::::::::::::::::::
‹model›   14PROD   Addr:01
DATE: 01/10/11 08:30:01
FORMULA:              01
P01              300 kg
P04              400 kg
P07             1000 kg
P11              400 kg
```

Weight printout

```
:::::::::::::::::::::::
‹model›   14PROD   Addr:01
DATE: 12/09/11 14:48:12
GROSS           1204 kg
NET              831 kg
TARE             373 kg
```

23 Reserved for the installer

23.1 Menu locking

Select the menu item to lock (e.g. **CALIb**) and press [ESC] and [PRINT] simultaneously for 3 seconds: **C.ALIb** is displayed, the left point indicates that the item is locked. If the operator tries to enter it, **bLOC** is displayed.

23.2 Menu unlocking

At the locked menu item press [ENTER] and [PRINT] simultaneously for 3 seconds; the unlock password is requested (if enabled), then **CALIb** is displayed without the point.

23.3 Temporary menu unlocking

Press [TARE] and [PRINT] simultaneously for 3 seconds; after the password (if enabled) all menus can be entered and modified. Returning to the weight display restores the lock.

23.4 Setting unlock password

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **PSUBLC**

6 characters; to change a customised password the current one is required. **000000** (default) disables the unlock password.

23.5 Data deletion and program selection

Caution Only perform after contacting octogon. After each operation **DONE** is displayed, [ENTER] continues; [ESC] cancels without changes.

Upon power-on hold down [ESC] until **PROG** is displayed, then:

– Constants restore (does not erase the calibration): confirm **PROG**, select **PASSu** with the arrow keys, set code 6935 and confirm.

– Program selection: confirm **PROG** and select with the arrow keys – **base** basic program (setpoints only), **rip** weight remote display with setpoint, **LOAD** loading, **UNLOAD** unloading, **3PROD** / **6PROD** / **14PROD** batching 3 / 6 / 14 products, **MULTI** no program.

– Weight reading mode (not with **rip**): **CELL** – weight from load cells, an intelligent junction box or a transmitter; **SERIAL** – via serial port (WEIMOD or WEIRIP).

– Approval status (not with **rip**): **nOtLEG** not approved, **LEGAL** approved, single interval, **LEGMI** multi-interval, **LEGMR** multiple range. For approved programs request the documents and procedures from octogon (give hardware code and serial number, chapter 9).

– Active regulation (not with **nOtLEG**): **OIML**, **NTEP**, **INMETR** (BASE program only). When used with an intelligent junction box or a weight transmitter, the approval status set on both devices must be the same.

– Connection to an intelligent junction box or transmitter (not with **SERIAL** or **rip**): **EStYES** connected, **EStnO** not connected.

– Enable the optional functions (not with **bASE** or **rip**): chapter 18.

Important By confirming, the instrument is restored to default and data is erased. The manual for a newly set program is available from octogon.

23.6 Keypad or display locking

Press [ESC] immediately followed by [PRINT] and hold them for about 5 seconds (also possible via the Modbus protocol): **FREE** no lock; **KEY** keypad lock – when a key is pressed **BLOC** is displayed for 3 seconds; **DISP** keypad and display lock – the display shows the instrument model instead of the weight, pressing a key shows **BLOC** for 3 seconds.

24 Continuous transmission protocols

The checksum ckck is the XOR of the 8-bit ASCII codes of the characters between "&" and "\" (both excluded), as two hexadecimal digits 0 … 9, A … F in ASCII. In case of error or alarm the weight is replaced by the messages of section 21.1.

24.1 Continuous transmission to remote displays

The string is transmitted 10 times per second; **bAUd** = **9600**, **PArItY** = **nOnE**, **StOP** = **1**. **rIP**: remote displays e.g. octogon EDLD; **HDrIP** and **HdrIPn**: remote displays e.g. octogon EDLF, EDLG.

```
&NxxxxxxLyyyyyy\ckckCR
```

Character	Meaning
&	start (ASCII 38)
N	net weight identification (ASCII 78)
xxxxxx	6 characters of net weight or PEAK if present (ASCII 48 … 57)
L	gross weight identification (ASCII 76)
yyyyyy	6 characters of gross weight (ASCII 48 … 57)
\	separation (ASCII 92)
ckck	2 checksum characters
CR	end (ASCII 13)

– With negative weight the first character from the left is "–" (ASCII 45); below –99999 "–" is sent alternated with the most significant figure.

– **HDrIP**: the decimal point at the position shown on the instrument display can also be transmitted; if the value exceeds 5 digits, only the 5 most significant digits are transmitted, if negative no more than the 4 most significant; the decimal point shifts accordingly.

– **HdrIPn**: in addition the instrument transmits **NET** every 4 seconds in the gross weight field if a net operation has been carried out.

24.2 Batching data on remote displays

With the optional function of section 18.6 and **RIPLAU** the instrument sends to the remote displays connected in parallel (addresses A, B, L, N):

```
&AsxxxxxBsyyyyy\ckckCR
```

Character	Meaning
&	start (ASCII 38)
A, B	remote display identification character (A, B, L, N)
s	minus sign "-" or other character with a decimal point "."
xxxxx, yyyyy	5 alphanumeric characters each (may include ".")
\	separation (ASCII 92)
ckck	2 checksum characters
CR	end (ASCII 13)

24.3 Continuous transmission YHL

The string is transmitted 5 times per second; after a net operation the net weight, otherwise the gross weight.

```
=xxxxxxxxx
```

Character	Meaning
=	start (ASCII 62)
xxxxxxxxx	9 characters of net or gross weight (ASCII 48 ... 57), LITTLE ENDIAN sorting

With negative weight the first character from the right is "–"; the decimal point is transmitted at the position given by the calibration. Example gross weight –20.7 kg: "=7.02000-". In case of error or alarm "999999999" is sent.

25 Modbus RTU protocol

The Modbus RTU protocol allows the reading and writing of the registers listed below according to the Modicon PI-MBUS-300 specification. Selection: section 14.1. Check whether the Modbus master (or the development tool) numbers the registers from 40001 or from 0; in the second case the register is the table value minus 40001 (e.g. 40028 › 27).

Some data are written directly to the EEPROM, whose writing operations are limited (100000); avoid useless writings. The instrument does not write if the value equals the stored one. Numbers without prefix are decimal, with 0x hexadecimal.

25.1 Data format and functions

1 start bit; 8 data bits, least significant bit sent first; settable parity bit and stop bit. Use only the following functions – others could be incorrectly interpreted and generate errors or blocks of the system:

Function	Description
03 (0x03)	READ HOLDING REGISTER (read programmable registers)
16 (0x10)	PRESET MULTIPLE REGISTERS (write multiple registers)

The interrogation frequency depends on the baud rate (the instrument stands by for at least 3 bytes before calculating a response); **dELAY** (section 14.1) adds a further delay.

	Address	Function	Content	CRC	Bytes
Function 3 query	A	0x03	1st register 0x0000 · no. registers 0x0002	2 byte	8
Function 3 response	A	0x03	no. bytes 0x04 · 1st register 0x0064 · 2nd register 0x00C8	2 byte	3 + 2 × no. registers + 2
Function 16 query	A	0x10	1st register 0x0000 · no. registers 0x0002 · no. bytes 0x04 · value 1 0x0000 · value 2 0x0000	2 byte	7 + 2 × no. registers + 2
Function 16 response	A	0x10	1st register 0x0000 · no. registers 0x0002	2 byte	8

25.2 Broadcast requests and communication errors

– Broadcast (address 0): read requests are not executed and not answered; write requests are executed but not answered.

– The strings are checked by CRC. In case of communication error the slave does not respond; the master must consider a time-out.

– If a correctly received string is not executable, the slave responds with an exceptional response: address, function + 0x80, code, CRC – code 1 ILLEGAL FUNCTION (function not valid or not supported), 2 ILLEGAL DATA ADDRESS (data address not available), 3 ILLEGAL DATA VALUE (invalid value).

25.3 List of available registers

A maximum of 32 registers per query or response. R = read only, R/W = read and write; H/L = high/low half of the DOUBLE WORD. Listed are the registers that apply to the 3/6/14 program.

Register	Description	EEPROM	Access
40001	firmware version	–	R
40002	instrument type	–	R
40003	year of manufacture	–	R
40004	serial number	–	R
40005	program type	–	R
40006	command register (section 25.5)	no	R/W
40007	status register (section 25.4)	–	R
40008 / 40009	gross weight H / L	–	R
40010 / 40011	net weight H / L	–	R
40012 / 40013	peak weight H / L	–	R
40014	divisions and units of measure (section 25.4)	–	R
40017	inputs	–	R
40018	outputs (read only in this program)	no	R
40050	instrument status (section 25.4)	–	R
40051 ... 40060	register 1 ... 10 (exchange registers)	no	R/W
40065 / 40066	sample weight for instrument calibration H / L (with command 101)	–	R/W
40067 / 40068	weight value corresponding to zero of the analog output H / L	yes	R/W
40069 / 40070	weight value corresponding to full scale of the analog output H / L	yes	R/W
40073 / 40074	preset tare H / L (with command 130)	–	R/W

25.4 Status, inputs, outputs, divisions

Status register 40007	Meaning
Bit 0	load cell error
Bit 1	AD converter malfunction
Bit 2	maximum weight exceeded by 9 divisions
Bit 3	gross weight higher than 110 % of full scale
Bit 4	gross weight beyond 999999 or less than –999999
Bit 5	net weight beyond 999999 or less than –999999
Bit 7	gross weight negative sign
Bit 8	net weight negative sign
Bit 9	peak weight negative sign
Bit 10	net display mode
Bit 11	weight stability
Bit 12	weight within ± ¼ of a division around zero

Instrument status 40050	Meaning (3/6/14 program)
0	instrument in idle condition (weight displaying)
1	formulas displaying
2	batching constants displaying
3	consumption displaying
4	system parameters displaying
5	setting of formula number and cycles to batch
6	instrument in batching condition
7	**EMPtY** alarm
8	‾‾‾‾‾‾ alarm
9	**COnS?** alarm
10	**tArE?** alarm
11	**LOAd** alarm
12	phase between the opening of the batched product contact and the next product or the closing of CYCLE END
13	batching pause
14	cycle end
15	**UnLOAd** alarm
16	**bLACH** alarm
18	**FALL** alarm
25	**tOL** alarm
26	instrument waits for the printing to complete
27	operating menu displaying
33	**ERUEIG** alarm
36	partial unloading at cycle end phase (according to the source with intermediate unloadings)
37	waiting for confirmation by the operator to run the partial unloading at cycle end
38 / 39	the operator is starting an automatic / a manual batching
40	**SLAUE** alarm
41	partial unloading at cycle end phase (with cycle end partial unloadings)

Inputs 40017: bit 0 ... 2 = input 1 ... 3. Outputs 40018: bit 0 ... 4 = output 1 ... 5, read only in the batching programs. Register 40014: L byte = division (0 ... 18 › divisor 100, 50, 20, 10, 5, 2, 1, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01, 0.005, 0.002, 0.001, 0.0005, 0.0002, 0.0001), H byte = unit of measure (0 kg, 1 g, 2 t, 3 lb, 4 newton, 5 litres, 6 bar, 7 atmospheres, 8 pieces, 9 newton metres, 10 kilogram metres, 11 other).

25.5 Commands to the command register 40006

Command	Description
0	no command
7	semi-automatic tare enabling (net weight displaying)
8	semi-automatic zero
9	semi-automatic tare disabling (gross weight displaying)
21	keypad lock
22	keypad and display unlock

Command	Description
23	keypad and display lock
99	save data in EEPROM
100	tare weight zero setting for calibration
101	save first sample weight for calibration
104	real calibration cancellation
106	add sample weight for calibration
130	preset tare enabling
131	reserved
201	batching: START
202	batching: PAUSE
203	batching: resumes from PAUSE
204	batching: STOP
205 **	batching: accepts alarm and stop
206 **	batching: ignores the alarm **tArE?**
207 **	batching: ignores the alarm **tOL**
209	batching: continues when the message **COMAND** appears or if instrument status = 12 (only if **COMAND** = **YES**)
250	confirmation of batching data reading
2000 ... 2999	constants and formulas (section 25.8)
6811 / 6812	writing / reading the current value requested at the analog output
6813 / 6814	writing / reading the voltage value requested at the analog output

** In case of alarm during batching: 205 accepts the alarm and stops; with **tOL** command 207 continues the batching, with **tArE?** command 206. To execute the same command twice consecutively, send command 0 between them.

25.6 Analog output

– **MOdE** = **GROSS** or **NET** (chapter 13): write or read the weight for zero and full scale in registers 40067/40068 and 40069/40070.

– **MOdE** = **PLC**: the output is set directly. Multiply the value by 10000, write the H bytes into REGISTER 1 (40051) and the L bytes into REGISTER 2 (40052) and send command 6811 (current, value in mA) or 6813 (voltage, value in V). Reading: send command 6812 or 6814, read 40051/40052 and divide by 10000.

Example	REGISTER 1 (H)	REGISTER 2 (L)	Total
write current 14 mA, hexadecimal	0x0002	0x22E0	0x000222E0
decimal	2	8928	140000
read voltage, hexadecimal	0x0000	0xCF76	0x0000CF76
decimal	0	53110	53110 › 5.3110 V

25.7 Real calibration commands

– Unload the system and reset the displayed weight with command 100 (tare weight zero setting for calibration).

– Load a sample weight and write its value to registers 40065/40066.

– Command 101 saves the first sample weight and removes the previously saved values; command 106 adds a sample weight and keeps the previous ones.

– Up to 8 different sample weights for a linearisation; the same sample weight only once per calibration, no sample weights of value zero. If successful, 40065/40066 are set to zero.

– Command 104 cancels the real calibration and returns to the theoretical one; the tare reset is not cancelled.

Enter the sample weight in divisions (register 40014): 100 kg with division 0.001 › 100000. 40065/40066 are a 32-bit signed number; negative values in two's complement if necessary: –56 kg › 40065 = 0xFFFF (–1), 40066 = 0xFFC8 (–56).

25.8 Constants and formulas reading and writing

Values are exchanged through the exchange registers 40051 ... 40060 together with the command register. Reading: first set the registers marked * in the table, send the read command (CMD R) to 40006, read 40060 until it holds the command echo ("data ready") or 0xFFFF ("error in the command"), then read 40051 ... 40060. Writing: set the registers and send the write command (CMD W).

Variable	CMD R	CMD W	Register
Formulas programming	2000	2001	40051/40052 quantity H/L · 40053 product no. * · 40054 step no. * · 40055 formula no. *
Total set by formula (options quantity greater than scale capacity, formulas in percentages)	2002	2003	40051/40052 quantity H/L · 40053 formula no. *
Totals management (consumption per product)	2020	–	40051/40052 quantity H/L · 40053 product no. * · 40054 1 = consumption *
Totals deletion date and time	2022	–	40051 day · 40052 month · 40053 year · 40054 hours · 40055 minutes · 40056 seconds · 40057 1 = consumption *
Formula no. and cycles no. to run	2030	2031	40051 formula no. · 40052/40053 cycles H/L
Current cycle	2032	–	40051/40052 cycle H/L · 40053/40054 step H/L · 40055/40056 product H/L · 40057/40058 set H/L
Batching data reading	2100	–	section 25.9

– Formula writing: quantity in 40051/40052, product number in 40053, step number in 40054 (only if **FSTEP** = **YES**, otherwise 1), formula number in 40055; command 2001.

– Formula reading: product number in 40053, step number in 40054 (only if **FSTEP** = **YES**, otherwise 1), formula number in 40055; command 2000; read 40060 until it is different from 2000 (echo) or 0xFFFF (error); then read 40051/40052.

– Batching start: formula and number of cycles in 40051 ... 40053, command 2031, then command 201. Stop: command 204.

25.9 Batching data reading

At the end of the batching the instrument makes the data available. Send command 1114 and read 40051: 1 = data ready. Unlike other commands there is no echo here – wait for bit 7 of 40060 to be 1. Then send one of the queries (command 2100 in 40006, parameter in 40051) and read 40051 ... 40060:

Query (40051)	Response 40051 ... 40060
Batching step: step no.	real batched H/L · theoretic batched H/L · alarm H/L · alibi ID H/L · product number · value detail
Initial tare: 1005	value H/L · – · – · alarm H/L (40055/40056) · value detail (40060)
Final gross weight: 1003	value H/L · – · – · alarm H/L (40055/40056) · alibi ID H/L (40057/40058) · value detail (40060)

Value detail: bit 0 = negative value (refers only to "real batched"), bit 7 = data ready. After reading send command 250; the instrument thereby accepts the alarm **SLAVE** and continues the batching sequence. Alarm codes in 40055/40056 (one byte per alarm, up to 4 in chronological order): 0 no alarm, 1 general alarm, 2 **EMPtY**, 3 **MASFOr**, 4 **tArE?**, 5 **COnS?**, 6 **bLACH**, 7 **tOL**, 8 **LOAd**, 9 **UnLOAd**, 12 batching STOP, 13 **ERUEIG**, 14 **FALL**, 15 **SLAUE**, 24 **ER TOT** (option quantity greater than scale capacity).

25.10 Communication example

Function 3: read the gross weight (4000) and net weight (3000) from 40008 ... 40011; values in hexadecimal with prefix h, instrument address h01.

Query	Response
h01 h03 h00 h07 h00 h04 hF5 hC8	h01 h03 h08 h00 h00 h0F hA0 h00 h00 h0B hB8 h12 h73

Query structure: address, function, first register H/L (h00 h07 = 40008), number of registers H/L, CRC16 L/H; response: address, function, byte count, data 1 ... 4 H/L, CRC16 L/H. Further CRC16 examples: Modicon PI-MBUS-300.

26 Directives and standards

According to the manufacturer's declarations of conformity (EU and United Kingdom, 03/12/2024; they apply to EILB, EILC and EILD):

Directive	Standards
2014/35/EU Low Voltage	EN 61010-1:2010+A1:2019 – not applicable for the VDC type (only for 230/115 VAC type)
2014/30/EU EMC	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
2014/31/EU NAWI (only if the M mark is applied)	EN 45501:2015 · OIML R76-1:2006
United Kingdom	Electrical Equipment (Safety) Regulations 2016, Electromagnetic Compatibility Regulations 2016, Non-automatic Weighing Instruments Regulations 2016 (only if the M mark is applied) – with the corresponding BS EN standards

The declarations of conformity are available from octogon on request.