OCTOGON

MANUAL

EILD

BATCHING UNIT WITH A SELECTOR SWITCH

Installation and user manual – Program Loading (C)



Document	Version	Date	Applies to
Installation and user manual	V00x	10/2026	EILD, Program Loading (C)

This manual describes installation, connection and operation of the EILD with the Loading program (C): a settable amount of product is loaded onto the scale through the PRESET and SET contacts – also at two speeds – with up to 99 formulas, automatic fall, tolerance control, consumption storage and resume after a power cut. The other programs of the instrument have manuals of their own.

Contents

1 About this manual 4
1.1 Symbols 4
1.2 Scope 4
2 Safety, warranty and disposal 5
2.1 Recommendations for proper use 5
2.2 Recommendations for correct installation of the instrument 5
2.3 Maximum cable lengths 5
2.4 Warranty 5
2.5 Guidelines for proper disposal 5
3 Installation of the load cells 6
3.1 Sizing of load cell capacity 6
3.2 Installing load cells 6
3.3 Connecting several cells in parallel 6
3.4 Protection of the cell cable 6
3.5 Mechanical restraints (pipes, etc.) 6
3.6 Welding 6
3.7 Windy conditions, knocks, vibrations 6
3.8 Earthing the weighed structure 6
4 Load cell testing 7
4.1 Load cell input test (quick access) 7
4.2 Load cell resistance measurement (digital multimeter) 7
4.3 Load cell voltage measurement (digital multimeter) 7
5 Product description 7
5.1 Main specifications 7
5.2 Version 7
5.3 Buffer battery 8
6 Technical specifications 8
6.1 UL version 8
7 Electrical connections 9
7.1 Basic information 9
7.2 Terminals 9
7.3 Outputs and inputs 9
7.4 4-wire load cell 10
7.5 E/EC option 10
7.6 Power supply 115/230 VAC 10
8 Display, keys and menu map 10
8.1 Signalling LEDs 10
8.2 Keys 10
8.3 System parameters menu 10
8.4 Formulas, consumption and batching constants menu 11
9 Instrument commissioning 11
9.1 Required settings for the first batching 11
10 Calibration 12
10.1 Programming of system parameters 12
10.2 Theoretical calibration 12
10.3 Tare weight zero setting 12
10.4 Zero value manual entry 12
10.5 Real calibration (with sample weights) 12
10.6 Units of measure 13
11 Filter on the weight and zero parameters 13
11.1 Filter on the weight 13
11.2 Zero parameters 14
12 Outputs, inputs, tare and zero 14
12.1 Outputs 14
12.2 Inputs 14
12.3 Semi-automatic tare (net/gross) 14
12.4 Preset tare (subtractive tare device) 14
12.5 Semi-automatic zero 15
13 Analog output (option) 15

14 Serial communication 16
14.1 Setting 16
14.2 Parameters 16
14.3 RS232 and RS485 16
14.4 Weight reading via serial port 16
14.5 WEIMOD and WEIRIP modes 17
15 Alarm relay, test, date, operation and info 18
15.1 Alarm relay closure 18
15.2 Test 18
15.3 Date and time setting 18
15.4 Operation settings 18
15.5 Info menu 19
16 Batching constants 19
16.1 Programming 19
16.2 Weights and times 19
16.3 Fall 19
16.4 Tolerance 20
16.5 Slow phase and tapping function 20
16.6 Autotare 20
16.7 Consumption, printing and PC 20
16.8 ALARM and TOLERANCE relay on weight 20
17 Formulas 20
17.1 Formulas programming 20
17.2 Deleting formulas 21
18 Optional functions 21
18.1 Quantity to be batched greater than the scale capacity 21
18.2 Batching data on remote displays 21
19 Batching 22
19.1 Batching start from external contact 22
19.2 Displaying during batching 22
19.3 Batching stop 23
19.4 Resume batching after a power cut 23
20 Consumption 23
20.1 Displaying consumption 23
20.2 Consumption deletion 23
21 Alarms 24
21.1 Serial protocol alarms 25
22 Printing examples 25
23 Reserved for the installer 27
23.1 Menu locking 27
23.2 Menu unlocking 27
23.3 Temporary menu unlocking 27
23.4 Setting unlock password 27
23.5 Data deletion and program selection 27
23.6 Enabling optional functions 28
23.7 Keypad or display locking 28
24 Remote display and continuous transmission protocols 28
24.1 Continuous transmission to remote displays 28
24.2 Batching data on remote displays 28
24.3 Continuous transmission YHL 29
25 Modbus RTU protocol 29
25.1 Data format and functions 29
25.2 Broadcast requests and communication errors 29
25.3 List of available registers 30
25.4 Status, inputs, outputs, divisions 30
25.5 Commands to the command register 40006 31
25.6 Analog output 32
25.7 Real calibration commands 32
25.8 Formulas, consumption and cycles 32
25.9 Batching data reading 33
25.10 Communication example 34
26 Directives and standards 34

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]** › **UEIGHt**

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 EILD is supplied with one of several programs; the instrument shows the program at switch-on (chapter 9). This manual applies to the Loading program (display **LOAd**). The other programs 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), the E/EC option for the formula selection (section 7.5) and the optional functions of the program (chapter 18). Connection and setup of the other options of the data sheet – fieldbuses, additional RS485, USB, external relay modules, weight inputs, data transfer to PC, labelling machine – 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

Manufacturer type: W200BOXEC

– 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 connection to: PC/PLC up to 32 instruments (max. 99 with line repeaters) by ASCII or Modbus RTU protocol, remote display, printer
– Optional: integrated Profibus DP, DeviceNet, CANopen, Profinet IO, Ethernet/IP, Ethernet TCP/IP, Modbus TCP output

The instrument can be connected to an intelligent junction box (e.g. octogon ETLB) or to a weight transmitter.

5.2 Version

Item	Value
Housing	polycarbonate box, IP64 protection rating
Dimensions	170 × 140 × 95 mm
Fixing	four fixing holes Ø 4 mm, centre distance 152 × 122 mm
Power supply	12/24 VDC
Controls	selector switch for the formula selection (EC option) and START and STOP buttons on the front

Caution The EILD is not compatible with the optional 115/230 VAC power supply.

The selector switch selects one of the first 12 formulas (section 7.5); the selected formula can be checked in the menu **tESt** › **EC** (section 15.2).

5.3 Buffer battery

The instrument is equipped with an internal battery that keeps the internal clock running even in the event of power failure.

Important 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 (standard)
No. of load cells in parallel and 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 (measurement range ± 10 mV = sens. 2 mV/V)	± 999999
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 / x1 x2 x5 x10 x20 x50 x100
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 ... +80 °C
Working temperature	–20 ... +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 source states instead: relay outputs 5 – max. 30 VAC, 60 VDC; 150 mA (4 with analog output); working temperature –20 ... +50 °C. Equipment to be powered by 12–24 VDC LPS or Class 2 power source.

7 Electrical connections

7.1 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 7.4).
– 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 an RS485 network with several devices, provide a 120 Ω termination resistance on the two devices located at the ends of the network (section 14.3).
– Option E/EC: selects the first 12 formulas (section 7.5).

7.2 Terminals

Terminal	Signal
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 No. 1: PRESET
6	OUTPUT No. 2: SET
7	OUTPUT No. 3: CYCLE END
8	OUTPUT No. 4: ALARM
9	OUTPUT COMMON
10	INPUT No. 1: START (+VDC min. 5 V, max. 24 V)
11	INPUT No. 2: STOP (+VDC min. 5 V, max. 24 V)
12	INPUT COMMON (–VDC 0 V)
13	not used
14	INPUT No. 3: selectable (+VDC min. 5 V, max. 24 V) · otherwise: +ANALOG OUTPUT (0 ... 20 or 4 ... 20 mA)
15	OUTPUT No. 5: TOLERANCE · otherwise: +ANALOG OUTPUT (0 ... 10 V)
16	E/EC OPTION · otherwise: –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)

Caution Connect the power supply specified on the plate found on the back of the instrument.

7.3 Outputs and inputs

– Outputs (relays, max. 115 VAC, 150 mA, common terminal 9): 1 PRESET, 2 SET, 3 CYCLE END, 4 ALARM, 5 TOLERANCE (section 12.1).
– Inputs (5 ... 24 VDC, common terminal 12): 1 START, 2 STOP, 3 selectable as APPROVAL, SEMI-AUTOMATIC ZERO (default) or NET/GROSS WEIGHT (section 12.2).
– With the analog output (option, terminals 14 ... 16) input 3, output 5 (TOLERANCE) and the E/EC options are no longer available.

Analog output: current output + 0 ... 20 / 4 ... 20 mA at terminal 14 (max. load 300 Ω), voltage output + 0 ... 10 V at terminal 15 (min. load 10 kΩ), common at terminal 16.

7.4 4-wire load cell

With a 4-wire load cell, jumper EX– with REF– (terminals 19 and 22) and EX+ with REF+ (terminals 20 and 21). Without these jumpers the instrument reports **ErCEL** (chapter 21).

7.5 E/EC option

With the E option (buttons at the option module, not included in the supply) or the EC option (selector switch with 12 positions) one of the first 12 formulas is selected. Connection to terminals 16 (E/EC OPTION) and 2 (GND) of the instrument. With the analog output the option is not available. The selected formula applies to the batching start via the START input (section 19.2).

On the EILD the EC option is built in, with the selector switch on the front.

7.6 Power supply 115/230 VAC

The EILD is not compatible with the optional 115/230 VAC power supply; it is powered with 12/24 VDC.

8 Display, 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 unIt**	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

Main item	Sub-items	Section
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 FALL SLAuE**	15.1
Out-In	**In 3**	12
tESt	**In Out AnALOG** (option) **EC** (option)	15.2
dAtE	date and time	15.3
PSUbLC	unlock password	23.4
SEttIn	**nEHt P PSS EndnEt bLACH**	15.4
InFO	**GEnrIC OP2**	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, consumption and batching constants menu

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

Main item	Sub-items	Section
FOrP	**FOrP01 FOrP02** ... (up to 99 formulas) › **PrESEt SEt**	17.1
CAnCFO	formula number, **FOrP00** = all › **SUrE**	17.2
tOtAL*	**123456** › **01.10.10** › **COn 1 COn 2** ...	20.1
CAnCtO*	**SUrE**	20.2
COnSt	**MIn MASS tSIC tIMEAt tnCOMP tnLOAd tnUnLO MOdFAL FALdIu FALL tOL SLOU SLOUOn SLOUOF AtArE tIMEtA StAbtA tOtAL PrInt nCOPY PC SLAuE rALArM rtOLEr**	16

*) Only if **tOtAL** = **YES** in the constants.

9 Instrument commissioning

Upon switch-on, the display shows in sequence:

- **111111** › **999999** (only in case of approved program);
- instrument model (e.g. **U200**);
- **SU** followed by the software code (e.g. **SU 5**);
- program type: **bASE** (base); **LOAd**; **UnLOAd**; **3PrOd**; **6PrOd**; **14PrOd**; **MULtI** (no active program) – for this manual **LOAd**;
- **r** followed by the software version (e.g. **r 1.12.00**);
- **HU** followed by the hardware code (e.g. **HU 104**);
- serial number (e.g. **100515**).

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

- Instrument already theoretically calibrated (plant identification tag on the instrument and on the cover, load cell rated data entered): reset to zero (section 10.3), then check the calibration with sample weights and correct the indicated weight if necessary (section 10.5).
- Instrument not calibrated (no plant identification tag): load cell data unknown – real calibration (section 10.5); known – theoretical calibration (section 10.2); then reset to zero (section 10.3) and check with sample weights (section 10.5).
- Analog output: set type and full scale (chapter 13).
- Serial communication: set the parameters (chapter 14).
- Set the clock to the current date and time (section 15.3).

9.1 Required settings for the first batching

1. In the batching constants menu set the minimum weight **MIn** (section 16.2).
2. In the system parameters menu set the parameter **PSS** (section 15.4).
3. In the formulas menu set formula 01 (section 17.1).

4. Start the batching 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** › **[ENTER]** › **SEnSIb** › **[ENTER]** › **dIUIS**

This function allows the load cell rated values to be 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 1000 × 4 = 4000. The instrument is supplied with a theoretical full scale **dEMO**, corresponding to 10000. To restore factory values, set 0 as full scale.

– **SEnSIb** (default 2.00000 mV/V): load cell rated sensitivity; enter the average value of the cells, settable 0.50000 ... 7.00000 mV/V. Example 4 cells with 2.00100, 2.00150, 2.00200, 2.00250 › 2.00175 = (2.00100 + 2.00150 + 2.00200 + 2.00250) / 4.

– **dIUIS**: division (resolution), the minimum weight increment which can be displayed. It is calculated automatically after the calibration to 1/10000 of full scale; it can be changed between 0.0001 and 100 with x1 x2 x5 x10 increments.

Important By modifying full scale or sensitivity, the real calibration is cancelled and only the theoretical calibration is valid. If theoretical full scale and the full scale recalculated in real calibration are equal, the theoretical calibration is in use, otherwise the real one. By modifying the theoretical full scale, the system 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**

This menu may also be accessed directly from the weight display by holding [ESC] for 3 seconds. Perform it after the theoretical calibration. Use it to set to zero the weight of the empty system after commissioning and later to compensate zero variations due to product residues.

– Confirm **ZErO** with [ENTER]; the weight value to be set to zero is displayed, all LEDs are flashing.
– Confirm again: the weight is set to zero and stored to the permanent memory.
– Press [PRINT] to display the total weight reset by the instrument, the sum of all previous zero settings.

10.4 Zero value manual entry

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

Caution Perform this procedure 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 the theoretical calibration and the tare weight zero setting, calibrate with weights of known value and correct the display if necessary. Load a sample weight of at least 50 % of the maximum quantity to be weighed. Confirming **UEIGHt**, the current weight is displayed flashing, all LEDs are off; adjust the value with the arrow keys if necessary and confirm – the new weight appears with all LEDs flashing. After a further confirmation **UEIGHt** is shown again; pressing [ESC] repeatedly returns to the weight display.

Example: system of maximum capacity 1000 kg and 1 kg division, sample weights of 500 kg and 300 kg. Load both and correct the indicated weight to 800. Remove the 300 kg weight – the system must show 500; remove the 500 kg weight too – the system must read zero. If not, a mechanical problem affects the linearity; correct it before repeating the procedure.

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

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

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 unit of measure not included in the list

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

11 Filter on the weight and zero parameters

11.1 Filter on the weight

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

The filter stabilises the weight display; a higher value increases the effect (0 ... 9, default 4). Confirming **FILtEr** shows the current value; after changing and confirming, the weight is displayed to check its stability. If it is not satisfactory, confirming brings back **FILtEr**. The filter stabilises a weight as long as its variations are shorter 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 anti peak filter removes sudden disturbances with a maximum duration of 1 second. After the filter value select with [ENTER]: **AntPOn** enabled (default), **AntPOF** disabled.

11.2 Zero parameters

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

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

– **AUtO 0** (0 to 10 % of full scale; default 0): if at switch-on the weight is lower than this value, it is reset; set 0 to disable.

– **trAC 0** (1 ... 5, default **nOnE**): when the weight is stable and after a second deviates from zero by a number of divisions smaller or equal to this value, it is set to zero; **nOnE** disables. Example: **dIUIS** = 5, **trAC 0** = 2 › zero tracking for variations up to 10 (**dIUIS** × **trAC 0**).

12 Outputs, inputs, tare and zero

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **Out-In** › **[ENTER]** › **In 3**

12.1 Outputs

Output	Function
1 PRESET	operation according to **PSS** (section 15.4)
2 SET	operation according to **PSS** (section 15.4)
3 CYCLE END	the relay closes when the cycle end is reached
4 ALARM	the relay closes when an alarm is present (section 15.1)
5 TOLERANCE	the relay closes when the weight is out of tolerance (section 16.4)

With the optional function for quantities above the scale capacity, output 5 can signal the end of product transfer instead of TOLERANCE (section 18.1).

12.2 Inputs

Input 1: START; input 2: STOP. Input 3 (**In 3**, default **ZErO**) is selectable:

– **nE-LO** (NET/GROSS): close the input for no more than one second › semi-automatic tare, net weight displayed; back to gross: hold the input closed for 3 seconds.

– **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 instrument displays the net weight (just set to zero), NET lights up. Back to gross: keep the NET/GROSS input closed or press [TARE] for 3 seconds. The operation can be repeated many times, e.g. to load several products. Example: put the box on the scale, [TARE] – display zero net; introduce the product – display product weight.

– While the net weight is displayed, keep [PRINT] pressed to display the gross weight.

– Not allowed if the gross weight is zero (**InZErO**).

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

12.4 Preset tare (subtractive tare device)

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

A tare value is set manually and subtracted from the display, provided that **P-tArE** ≤ max. weight. The last programmed value is shown; to apply it press [PRINT] and then [ENTER]. Back in the weight display the net weight is shown and NET lights up. To delete and return to gross: hold [TARE] for about 3 seconds or keep the NET/GROSS input closed for 3 seconds; the preset tare is set to zero, NET goes off.

– While the net weight is displayed, keep [PRINT] pressed to display the gross weight.

– 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 tares are added.

– Both types of 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‾‾‾‾‾** (upper dashes) appears and the weight is not set to zero.

13 Analog output (option)

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

– **tYPE**: analog output type: 4 ... 20 mA, 0 ... 20 mA, 0 ... 10 V, 0 ... 5 V, ± 10 V, ± 5 V (default 4 ... 20 mA).

– **MOdE**: **GrOSS** follows the gross weight, **nEt** the net weight, **PLC** remote control via protocol (section 25.6).

– **AnA 0**: weight for the minimum analog output value. Only set a value other than zero 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 value; it must correspond to the value in the PLC program (default: calibration full scale). Example 4 ... 20 mA with 20 mA = 8000 kg › 8000.

– **COr 0**: zero correction so that the PLC indicates 0; "–" can be set on the last digit on the left. Example: with 4 ... 20 mA the PLC reads 4.1 mA at minimum › set 3.9 to obtain 4.0.

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

Caution For the ± 10 V and ± 5 V outputs the soldered jumper SW1 must be closed: open the instrument (release with a screwdriver the locking tabs that hold together the two sides of the case), locate the soldered jumper SW1 on the printed circuit board and short the pads with a drop of tin.

Analog 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 output can also be used in the opposite manner: **AnA 0** may be greater than **AnA FS**; the output then increases as the weight decreases. Example 0 ... 10 V with **AnA 0** = 10000 and **AnA FS** = 0: 0 kg › 10 V, 5000 kg › 5 V, 10000 kg › 0 V.

Important All analog outputs are ACTIVE and SINGLE ENDED and can only be connected to PASSIVE receiver devices. Voltage output: minimum load 10 kΩ; current output: maximum load 300 Ω.

14 Serial communication

14.1 Setting

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **SErIAL** › **[ENTER]** › **rS485 / rS232**

First select the port (**rS485** or **rS232**), then the protocol:

Protocol	Meaning
nOnE	no communication (default)
MOdbUS	Modbus RTU, addresses 1 … 99 (chapter 25)
rIP	continuous transmission to remote displays; the remote display shows net or gross weight according to its settings (**bAUd** = **9600**, **PArItY** = **nOnE**, **StOP** = **1**; section 24.1)
HdrIP	as **rIP**, for remote displays with decimal point (section 24.1)
HdrIPn	as **HdrIP**; if the remote display is set to gross and the instrument shows net, the remote display shows net alternated with **nEt**
YHL	continuous weight transmission (section 24.3)
PrIntr	printer (chapter 22)
UEIMOd / **UEIrIP**	weight reception (section 14.5)

With the optional function batching data on remote displays, the protocol **rIPLAU** is added (section 18.2).

14.2 Parameters

Parameter	Meaning
bAUd	transmission speed 1200, 2400, 4800, 9600, 19200, 38400, 115200 (default 9600)
Addr	instrument address 1 … 99 (default 1)
dELAY	delay of the reply 0 … 200 ms (default 0)
PArItY	**nOnE** no parity (default), **EUEn** even, **Odd** odd parity
StOP	stop bits 1 or 2 (default 1)
EMPtY	number of blank lines between one printout and the next
HEAdEr	printing of a custom heading from PC: **YES** / **nO** (default **nO**)
LbLPAr	configuration parameters of the **LbLPrt** label printer (manual of its own)
PrtMOd	connected printer type: **P190**, **StAuP**, **StAut**, **tMt203**, **LbLPrt**

The number of batching printouts is set by **nCOPY** in the batching constants (section 16.7).

14.3 RS232 and RS485

Connection	Instrument (terminal)	Counterpart
RS232 to PC (DB9 female)	TXD 3 · RXD 4 · GND 2	pin 2 · pin 3 · pin 5
RS485, several instruments	RS485 + 18 · RS485 – 17 · GND 2	RS485 + · RS485 – · GND of each instrument
RS485 directly to RS232 (no converter)	RS485 – 17 · RS485 + 18	RXD · GND

– If the RS485 network exceeds 100 m or baud rates over 9600 are used, connect two 120 Ω terminating resistors between "+" and "–" on the terminal strip of the furthest instruments. With other instruments or converters refer to their manuals.

– A two-wire RS485 output may be used directly on the RS232 input of a PC or remote display; this allows A SINGLE instrument to be used in a ONE WAY mode.

– For an RS485 converter at the PC, follow its wiring diagram.

14.4 Weight reading via serial port

The transmitting instrument is the one connected to the load cell, the receiving instrument the one which receives the weight via RS485 or RS232. Outputs, serial ports and analog output of the receiving instrument work as described, using the weight received.

Caution For this the weight reading mode must be set as **SErIAL** (section 23.5).

14.5 WEIMOD and WEIRIP modes

UEIMOd: the instrument works as if it were directly connected to the load cell; calibration and zero setting are possible. Protocol Modbus, the receiving instrument is master, the transmitting one slave. Transmitting instrument: select the port, **MOdbUS**, set the communication parameters and the filter value. Receiving instrument: select the port, **UEIMOd**, the same parameters as on the transmitting one: **bAUd**, **SLAuE** (address of the transmitting instrument, 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 (section 23.7).

UEIrIP: the instrument receives the gross weight; calibration and zero setting on the transmitting instrument. Transmitting instrument: select the port, **rIP**, set the parameters. Receiving instrument: select the port, **UEIrIP**, **bAUd**, **dELAY**, **PArItY**, **StOP** as on the transmitting one, plus unit **unIt** and decimals **dECIM** of the received weight; these two items appear in the main menu after setting **UEIrIP**.

UEIMOd and **UEIrIP** can only be enabled on one port; in case of conflict the port set last remains active. Connection transmitting › receiving instrument: RS485 + (18), RS485 – (17) and –SUPPLY (2), or RS232 TXD (3) › RXD, RXD (4) › TXD and –SUPPLY (2); terminating resistors as in section 14.3.

15 Alarm relay, test, date, operation and info

15.1 Alarm relay closure

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

For each of the following alarms the closing of the ALARM relay (output 4) can be enabled or disabled: approval contact (**COnS**), formula not programmed (**EMPtY**), maximum weight exceeded (**MASFOr**), minimum weight (**tArE**), no increase in weight (**LOAd**), no decrease in weight (**UnLOAd**), fall (**FALL**), the PC did not read the batching data (**SLAuE**). **YES**: in presence of the alarm the relay is closed (default); **nO**: the relay is not closed even in the presence of the alarm.

15.2 Test

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

- **In**: input test – ensure that **0** is displayed for each open input and **1** when the input is closed.
- **Out**: output test – setting **0** the corresponding output must open, setting **1** it must close.
- **EC**: E/EC option test – shows the formula selected by the E/EC option; if the option is not present or not active, **EC-Er** is displayed.
- **AnALOG**: analog output test (option) – the signal ranges from the minimum to the maximum value; **MA** current output, **uOLt** voltage output.
- **MU-CEL**: millivolt test – load cell response signal in mV with four decimals (also directly with [PRINT] 3 s, section 4.1).

15.3 Date and time setting

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

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

15.4 Operation settings

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

nEHt P – switch conditions from the SET opening to the CYCLE END closing

- **tIME** (default **YES**): the waiting time **tIMEAt** set in the constants has elapsed;
- **COMAnd** (default **nO**): START input closure or [ENTER] key pressure;
- **StAbLE** (default **nO**): stable weight.

PSS – operating mode of the PRESET and SET contacts (default 2)

PSS	Sequence
1	At the batching start only PRESET is closed. When the preset value is reached, PRESET opens and SET closes; when the final set value is reached, SET opens.
2	At the batching start SET and PRESET close simultaneously. When the preset value is reached, PRESET opens (beginning of the slow phase); when the set value is reached, SET opens as well. For single-speed batching set **PSS** = 2 and use only the SET contact.
3	At the batching start only PRESET is closed. When the preset value is reached, SET closes too; when the final set value is reached, both reopen.

EndnEt – display during the CYCLE END phase (default nO)

- **YES**: during the cycle end (unloading of the scale at the end of batching) the net weight is displayed, after the CYCLE END opening the gross weight;
- **nO**: during the cycle end the gross weight is displayed.

bLACH – batching resume mode after a power failure (default MAn)

- **AUt** (automatic): at the power restore **bLACH** appears for 3 seconds, after which the batching resumes from the point of interruption;
- **MAn** (manual): at the power restore **bLACH** appears; [ENTER] resumes the batching, [ESC] stops it.

15.5 Info menu

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

GEnrIC: identification data of the instrument — **InStrM** model, **SU COd** software code, **PrOGrM** program type, **FU UEr** software version, **SEr nu** serial number. **OP2**: active options.

16 Batching constants

16.1 Programming

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

From the weight display press [ENTER], then press [PRINT] several times until **COnSt** is displayed and confirm. [ENTER]: enter a menu or confirm the data entry; [PRINT]: modify the figure or menu item; [TARE]: select a new figure or modify the menu item; [ESC]: cancel and return.

16.2 Weights and times

Parameter	Range · default	Meaning
MIn	0 … full scale · 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 opens when the weight reaches this value and the safe emptying time is over.
MASS	0 … full scale · 0	settable and displayable maximum weight. If the displayed weight exceeds it by 9 divisions, ‾‾‾‾‾ (upper dashes) is displayed; if a greater value is set in a formula, **Error** is displayed and the value is not stored. Setting 0 disables the function.
tSIC	0.0 … 999.9 s · 5.0	safe emptying time: during the unloading phase (CYCLE END closed) the instrument waits for this time after reaching the minimum weight and before opening the CYCLE END contact, for a perfect emptying of the scale.
tIMEAt	0.0 … 999.9 s · 5.0	waiting time between the SET end of batching and the CYCLE END closing, to allow the weight to get steady. Only required with automatic fall, consumption, printing, tolerance, confirmation from PC, or with the USB or data transfer to PC option.
tnCOMP	0.0 … 999.9 s · 0.0	no comparison time: after the opening of PRESET the instrument waits for this time before comparing the weight with the set value.
tnLOAd	0.0 … 999.9 s · 0.0	no product load time: if no product is loaded during batching, the instrument activates the alarm **LOAd** after this time.
tnUnLO	0.0 … 999.9 s · 0.0	no product unload time: if no product is extracted during the unloading phase (cycle end), the instrument activates the alarm **UnLOAd** after this time. The control is only actuated after unloading has started (the weight must decrease by at least 10 divisions).

16.3 Fall

Fall is the amount of product still falling after the batching stop, which adds to the product already batched and causes inaccuracy. The instrument therefore anticipates the stop — with a fall calculated automatically or set by the operator.

- **MOdFAL** (0 … 99; default 0): 0 = MANUAL fall; other than 0 = AUTOMATIC fall, the value shows after how many batchings the fall value is updated (example **MOdFAL** = 3: every three batching cycles). In the cycles without update the waiting time is not applied, unless another function requires it (e.g. prints) — a high value therefore reduces the duration of batchings.
- **FALdIu** (only if **MOdFAL** ≠ 0; 0 … full scale; default 0): limit within which the automatic fall is updated according to **MOdFAL**; outside it, the fall is updated every cycle. A low value gives more accuracy but may lengthen the batchings. Setting 0 disables the function. Example: **MOdFAL** = 3, **FALdIu** = 5, weight 100 › update every batching until the batched weight falls within 95 … 105, then every 3 batchings.
- **FALL** (0 … maximum weight; default 0): set the fall value for each formula manually (only if **MOdFAL** = 0) or display and modify the value calculated automatically (if **MOdFAL** ≠ 0).

Caution Set a waiting time **tIMEAt** such that the weight is stable at the end of the batching, otherwise the update of the automatic fall is not correct.

16.4 Tolerance

tOL (0 … maximum weight; default 0), for each formula: how much the batched weight may deviate from the formula value. If the batched weight is lower or higher than the amount to be batched by more than the tolerance, the instrument closes the TOLERANCE contact; [ENTER] continues the batching. The contact remains closed until the weight reaches the minimum weight and the safe emptying time has elapsed. Example: SET = 1000, TOLERANCE = 100 › the batched weight must be between 900 and 1100. Setting 0 disables the function.

16.5 Slow phase and tapping function

– **SLOU** (0 … maximum weight; default 0): single value for all formulas in place of the preset value. The slow phase (via PRESET) starts when the weight reaches the set value minus this value; if the value is greater than the weight to batch, the whole batching is slow. Example: SET = 100, **SLOU** = 15 › the slow phase begins at 85. Setting 0 disables the function.

– Tapping function: if the batching organ has no slow speed, opening and closing cycles of the SET contact slow down the final phase and increase the accuracy. Set in **SLOU** the amount to be batched with tapping.

– **SLOUOn** (0 … 9.9; default 0): time in which the SET relay remains closed during the slow phase; **SLOUOF** (0 … 9.9; default 0): time in which it remains open. Setting 0 disables the function.

16.6 Autotare

– **AtArE** (0 … 999; default 0): automatic tare at batching start; it is updated every as many cycles of a batching sequence as set here. Setting 0 disables the function. Only possible if the gross weight is lower than the minimum weight **MIn**, otherwise **tArE?** is displayed.

– **tIMEtA** (only if **AtArE** ≠ 0; 0 … 99.9; default 0): the instrument waits for this time after the start of the formula before performing the autotare and starting the batching.

– **StAbtA** (only if **AtArE** ≠ 0; default **nO**): **YES** – zero setting at batching start after the delay time and only when the weight is stable; **nO** – right after the delay time.

16.7 Consumption, printing and PC

Parameter	Meaning
tOtAL	consumption memory (total batched quantity) for each formula: **YES** enabled, **nO** disabled (default)
PrInt	print batching data at cycle end: **YES** enabled, **nO** disabled (default)
nCOPY	number of copies of the batching printout 1 … 9 (default 1)
PC	**YES**: the instrument checks for a PC every 10 seconds; if no PC is detected, **PC** is displayed alternated with the weight. Active only with the Modbus protocol. **nO**: not active (default)
SLAuE	**YES**: before another batching the instrument waits for the PC to read the batching data; otherwise **SLAuE** is displayed. **nO**: no waiting (default)

16.8 ALARM and TOLERANCE relay on weight

– **rALArM** (0 … full scale; default 0): other than 0 – the ALARM contact no longer switches in case of alarm but behaves as a setpoint contact: the relay closes when the weight reaches this value.

– **rtOLEr** (0 … full scale; default 0): other than 0 – the TOLERANCE contact no longer switches on the basis of tolerance but behaves as a setpoint contact: the relay closes when the weight reaches this value.

17 Formulas

17.1 Formulas programming

Menu **000000** › **[ENTER]** › **FOrP** › **[ENTER]** › **FOrP01** › **[ENTER]** › **PrESEt** › **[ENTER]** › **SEt**

Select the formula to be programmed (**FOrP01** … with the arrow keys) and set **PrESEt** and **SEt**. A maximum of 99 formulas can be set.

– **PrESEt** is NOT displayed if a slow value (**SLOU**) has been set in the constants.

– If **PrESEt** or **SEt** is set higher than the maximum weight **MASS** of the constants, **Error** is displayed.

17.2 Deleting formulas

Menu **000000** › **[ENTER]** › **FOrP** › **[TARE] [PRINT]** › **CAnCFO** › **[ENTER]** › **FOrP00** › **[ENTER]** › **SUrE**

Confirm **CAnCFO** with [ENTER]; to delete one formula enter its number, to delete all formulas enter 00 (**FOrP00**), and confirm with [ENTER]. **SUrE** is displayed: [ENTER] again deletes, [ESC] cancels the command.

18 Optional functions

The optional functions are enabled during the program selection (section 23.6). For the Loading program the following two are available; they are compatible with each other.

18.1 Quantity to be batched greater than the scale capacity

Option OPZWQMC, display **qMc On**. It allows a batching sequence whose total quantity is 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); setting 0 disables the function.

– Output 5 (default TOLERANCE) can be changed in **Out-In**: **End tH** – END OF PRODUCT TRANSFER, the relay closes at the end of the last batching cycle; **tOL** – TOLERANCE.

– Formula: in **FOrP01** … set in sequence the total quantity to be batched **tOt Pr**, the preset value **PrESEt** and the set value **SEt**.

– Batching start: before starting (chapter 19), besides formula and number of cycles a total amount different from the formula can be set; in the following batching the formula value is proposed again. With the start from external contact the total amount of the formula is always used.

– Alarm **Er tOt**: the total quantity set is lower than the one set in the formula.

18.2 Batching data on remote displays

Display **rPL On**. Several remote displays, connected in parallel to the RS485 port of the instrument, show batching data – up to 4 pieces of information according to their address:

Address	Displayed information
A	state of instrument / formula and product being batched / error code
B	remaining quantity of product to be batched
L	gross weight on the scale
N	net weight on the scale

Menu **000000** › **[ENTER]+[ESC]** › **CALIb** › **[TARE] [PRINT]** › **SErIAL** › **[ENTER]** › **rS485** › **[ENTER]** › **rIPLAU**

Set **bAUd** = **9600**, **PArItY** = **nOnE**, **StOP** = **1**. Whether a remote display is compatible with the protocol and its address can be changed is stated in its manual; the string is given in section 24.2.

19 Batching

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

With [START] set the formula (**FOr 01**) and after [ENTER] the desired number of batching cycles (**C 0001**). Then the first batching cycle starts as follows:

1. The instrument ensures that: the formula has been programmed, otherwise **EMPtY**; the amount of the formula does not exceed the maximum weight **MASS**, otherwise **MASFOr**; input 3 (if set as approval) is closed, otherwise **COnS?** – close input 3 to start; the gross weight is lower than the minimum weight **MIn**, otherwise **tArE ?** (the start can be forced with [ENTER]). Only if **tOtAL** = **YES**: if the consumed amount exceeds 999000, **tOtAL** appears for a second; above 999999 it is automatically set to zero.
2. Once the conditions are met, the batching starts; PRESET and SET switch according to **PSS** (section 15.4). From now on **PSS** = 2 (default) is assumed: SET and PRESET are closed.
3. If **tnLOAd** is set and the product is not loaded by at least 20 divisions within this time, **LOAd?** is displayed.
4. PRESET opens as soon as one of these is reached: only if **SLOU** is set, the set value minus **SLOU**; otherwise the preset value of the formula.
5. If a tapping value has been set, SET opens and closes according to the **SLOUOn** and **SLOUOF** times.
6. Only if **tnCOMP** is set: the instrument does not verify the reaching of the set value until the NO COMPARISON TIME has elapsed.
7. As soon as the set value of the formula minus the possible fall value is reached, SET opens and the product flow is interrupted.
8. After the opening of SET the instrument shows the weight preceded by the letter **A** and waits: only if **tIME** = **YES** for the waiting time **tIMEAt**; only if **COMAnd** = **YES** for the START input closure or [ENTER]; only if **StAbLE** = **YES** for a stable weight.
9. If a tolerance **tOL** is set and the batched quantity is lower than the set quantity minus the tolerance, only one attempt of finishing re-start is made: SET closes and step 7 follows; otherwise **tOL** appears. If the quantity is greater than the set amount plus the tolerance, **tOL** appears. [ENTER] cancels the alarm and continues.
10. Cycle end: CYCLE END closes; the display shows the weight preceded by the letter **E**; only if **PrInt** = **YES** the batching data (with date and time) are printed; only if **tOtAL** = **YES** the consumption is stored.
11. If **tnUnLO** is set and, from the beginning of the extraction, the product is not extracted by at least 20 divisions within this time, **UnLOAd** is displayed.
12. The batching ends (CYCLE END opens) only when the weight is lower than the minimum weight **MIn** and the safe emptying time **tSIC** has elapsed.
13. Only if **SLAuE** = **YES**: the instrument waits for data recording on the PC before being available for a new batching.

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

– In case of alarm the batching may be cancelled with [ESC] or by closing the STOP input.

– With **AtArE** = 0 a preset tare or a requested semi-automatic tare is maintained at the start of the batching. (The source also names **AZErO** = 0; the menu of the program has no such parameter.)

19.1 Batching start from external contact

The formula can be selected via an external selector switch (E/EC option, section 7.5). Then close the external START contact for at least 0.5 seconds; when the conditions of chapter 19 are verified, the selected formula is batched.

Without the formula selection switch, the latest formula entered via the keypad is batched, or the formula is set as follows: press [ENTER] for 3 seconds, **FESt00** is displayed; set the formula number with the arrow keys and confirm with [ENTER]. 00 recalls the latest formula set via keypad.

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

19.2 Displaying during batching

During the batching the display shows the weight preceded by the letter **b**. [PRINT] shows the formula number, pressing it again the number of the running cycle.

19.3 Batching stop

– To stop the batching, open the START contact and close the STOP contact. If the START contact is closed, **StArt?** is displayed.

– To pause at any time, press [START] (STOP): **PAUSE** is displayed; [ENTER] resumes, pressing [START] (STOP) again cancels the batching definitely.

19.4 Resume batching after a power cut

If a blackout occurs during the batching (unloading phase included), **bLACH** appears when power comes back: [ENTER] resumes the batching from the point of interruption, [ESC] cancels it and returns to the weight display. With **bLACH** = **AUt** (section 15.4), **bLACH** appears and after 3 seconds the batching is automatically resumed. Power failures do not delete the cycles still to be performed.

20 Consumption

20.1 Displaying consumption

Menu **000000** › **[ENTER]** › **FOrP** › **[TARE] [PRINT]** › **tOtAL** › **[ENTER]** › **123456** › **[ENTER]** › **01.10.10** › **[ENTER]** › **COn 1**

If consumption is enabled in the constants (**tOtAL** = **YES**), the quantities batched for each formula are stored. **tOtAL** shows in sequence: the total quantity consumed for all formulas (divided by 100), the deletion date, the quantity consumed for each formula (**COn 1**, **COn 2** … with the arrow keys). The printout gives the quantities in full.

20.2 Consumption deletion

Menu **000000** › **[ENTER]** › **FOrP** › **[TARE] [PRINT]** › **CAnCtO** › **[ENTER]** › **SUrE**

Confirm **CAnCtO**; **SUrE** is displayed: [ENTER] again deletes, [ESC] cancels the command. If the printer is enabled (chapter 14), an operation receipt is printed.

21 Alarms

Display	Meaning
tArE?	at batching start the weight on the scale is higher than the minimum **MIn**. [ESC] returns to the weight display, [ENTER] cancels the alarm and continues the batching; if the weight comes back below the minimum, the batching starts
COnS?	at batching start the APPROVAL input is open (input 3 set to **COnS**). Close the input or cancel with [ESC]
tOL	at batching end the weight differs from the formula value by more than the tolerance. [ENTER] cancels the alarm and continues
FALL	at batching start the fall value is higher than the product quantity to be batched. [ESC] cancels the alarm and the batching
EMPtY	at batching start the formula recalled is not programmed. Press [ESC] to quit
MASFOr	at batching start the formula recalled exceeds the maximum weight. Press [ESC] to quit
PAUSE	STOP has been pressed during batching; [ENTER] starts again, STOP terminates completely
bLACH	power failure during batching: [ESC] cancels, [ENTER] resumes from the point of interruption
LOAd	during batching the product is not loaded; cancelled automatically when the weight increases. Press STOP twice to cancel the batching
UnLOAd	during the unloading (CYCLE END closed) the product is not extracted; cancelled automatically when the weight decreases. Press STOP twice to cancel the unloading
StArt?	displayed for 3 seconds when the batching is to be stopped (STOP twice or input) while the START input is closed; open the START input
PArSEr	batching is cancelled; press [ESC] to quit. If the alarm persists, contact octogon
ErUEIG	weight alarm, the current batching is cancelled; press [ESC] to go back to the weight display and check the alarm
ErCEL	load cell not connected or incorrectly connected; load cell signal exceeds 39 mV; conversion electronics (AD converter) malfunctioning; 4-wire cell without jumpers EX–/REF– and EX+/REF+
nO COM	communication problems between transmitter and receiver; check electrical connections and instrument configuration
Er OL	the weight display exceeds 110 % of full scale
EErOL	weight display on the transmitting instrument exceeds 110 % of full scale
Er Ad	internal converter failure; check load cell connections, if necessary contact octogon
‾‾‾‾‾ (upper dashes)	the weight exceeds the maximum weight **MASS** 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‾‾‾‾‾ (upper dashes)	weight too high: zero setting not possible
MAH-PU	in real calibration, after the eighth sample weight has been entered
Error	value beyond the permitted values; [ESC] quits the setting leaving the previous value (e.g. too many decimals for the full scale, value above the maximum, sample weight not matching the detected mV increase, analog output correction beyond the limits)
bLOC	lock active on menu item, keypad or display
nOdISP	number greater than 999999 or less than –999999, cannot be displayed
bAtrtC	buffer battery low, date and time lost; confirm with [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 closure or [ENTER] to continue the batching
PC	the PC is not connected
SLAuE	the PC has not read the batching data
InZErO	gross weight equal to zero: semi-automatic tare not possible
Er tOt	only with the optional function of section 18.1: total quantity lower than in the formula

21.1 Serial protocol alarms

Alarm	Modbus RTU, status register	RIP*	HDRIP-N
ErCEL	bit 0	**__0-F_**	**_ERCEL**
Er OL	bit 3	**__0-L_**	**_ER_OL**
Er Ad	bit 1	**__0-F_**	**_ER_AD**
‾‾‾‾‾ (upper dashes)	bit 2	**__0-L_**	**######**
Er OF	gross bit 4 · net bit 5	**__0-F_**	**_ER_OF**
t ‾‾‾‾‾ (upper dashes)	response to the zero command: 'value not valid' error (code 3)	**__0-F_**	**0__SET**

"_" stands for a space. *) With remote displays on the **rIP** protocol, the display reads ‾‾‾‾‾ (upper dashes) if the message exceeds 5 digits.

With an alarm the relays open and the analog outputs go 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 (chapter 14), [PRINT] in the weight display leads to: **UEIGHt** – displayed weight; **COnSt** – constants (minimum weight, maximum weight, etc.); **FOrP** – one or all formulas (after [ENTER] **FOrP01** is displayed; set the number, 00 prints all); **tOtAL** – consumption (only if **tOtAL** = **YES**, section 16.7). "‹Model›" stands for the model identification printed by the instrument.

Batching without tare (AtArE = 0)

```
::::::::::::::::::::::
‹Model›  LOAD     Addr:01
FORMULA:             01
CYCLE:       1/       1
DATE: 01/10/11 08:30:01
INIT.WEIGHT       10 kg
GROSS   1005:   1000 kg
```

Batching with predetermined tare set (AtArE = 0)

```
::::::::::::::::::::::
‹Model›  LOAD     Addr:01
FORMULA:             01
CYCLE:       1/       1
DATE: 01/10/11 08:30:01
PT                10 kg
INIT.N             3 kg
NET    1005:    1000 kg
TOT C            1002 kg
```

Batching with manual semi-automatic tare (AtArE = 0)

```
::::::::::::::::::::::
‹Model›  LOAD     Addr:01
FORMULA:             01
CYCLE:       1/       1
DATE: 01/10/11 08:30:01
N                 10 kg
INIT.N             3 kg
NET    1005:    1000 kg
TOT C            1002 kg
```

Batching with tare each cycle (AtArE = 1)

```
::::::::::::::::::::::
‹Model›  LOAD     Addr:01
FORMULA:             01
CYCLE:       1/       1
DATE: 01/10/11 08:30:01
TARE              34 kg
NET     1005:   1000 kg
```

Batching with reset every X cycles (AtArE = X)

```
:::::::::::::::::::::::
‹Model›  LOAD     Addr:01
FORMULA:             01
CYCLE:       2/       2
DATE: 01/10/11 08:30:01
INIT.WEIGHT        1 kg
GROSS   1070:   1000 kg
:::::::::::::::::::::::
‹Model›  LOAD     Addr:01
FORMULA:             01
CYCLE:       1/       2
DATE: 01/10/11 08:30:01
ZERO WEIGHT       12 kg
GROSS   1026:   1000 kg
```

Constants printout

```
:::::::::::::::::::::::
‹Model›  LOAD     Addr:01
DATE: 01/10/11 08:30:01
      CONSTANTS
MIN                  10
MASS                  0
TIME SIC            5.0
TIME WAIT           5.0
TIME NCOMP          0.0
TIME NLOAD          0.0
TIME NUNLOAD        0.0
FALL              MANUAL
SLOW                  0
TIME SLOWON         0.0
TIME SLOWOF         0.0
PSS                   2
AUTOTARE             NO
UNLOAD             GROSS
TOTAL                NO
PRINT                NO
PC                   NO
SLAVE                NO
BLACKOUT          MANUAL
RELAY ALARM           0
RELAY TOL.            0
FOR.      FALL    TOLER
05           0      100
48         178        0
```

Standard formula printout (SLOU = 0)

```
:::::::::::::::::::::::
‹Model›  LOAD     Addr:01
DATE: 01/10/11 08:30:01
FORMULA:             02
SET             2000 kg
PSET             200 kg
```

Formula with slow active printout (SLOU = 100)

```
:::::::::::::::::::::::
‹Model›  LOAD     Addr:01
DATE: 01/10/11 08:30:01
FORMULA:             02
SET             2000 kg
SLOW             100 kg
```

Consumption printout

```
:::::::::::::::::::::::
‹Model›  LOAD    Addr:01
DATE: 01/10/11 08:30:38
      CONSUMPTION
F01             1148 kg
F03             1456 kg
TOTAL           2604 kg
FROM: 01/09/11 09:11:13
```

Weight printout

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

If consumption is set to zero, "CONSUMPTION ERASED" is printed as well.

23 Reserved for the installer

23.1 Menu locking

Any menu can be locked. Select the menu (e.g. **CALIb**) and press [ESC] and [TARE] simultaneously for 3 seconds: the display shows **C.ALIb** (the left point indicates the lock). When the operator tries to enter this menu, **bLOC** is displayed.

23.2 Menu unlocking

With **C.ALIb** displayed press [ENTER] and [PRINT] simultaneously for 3 seconds; the unlock password is requested (if enabled) and the display shows **CALIb** without point.

23.3 Temporary menu unlocking

With **C.ALIb** displayed press [PRINT] and [TARE] simultaneously for 3 seconds; after the password (if enabled) all menus, including the locked ones, 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**

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

23.5 Data deletion and program selection

Caution Perform these operations only after contacting octogon. After each operation **dOnE** is displayed, press [ENTER] to continue; [ESC] cancels without changes.

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

- Constants restore (the calibration is not erased): 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 (setpoint management only), **rIP** weight remote display program with setpoint, **LOAd** single product loading (this manual), **UnLOAd** single product unloading, **3PrOd** / **6PrOd** / **14PrOd** batching of 3, 6 or 14 products, **MULtI** no program.
- Weight reading mode (not with **rIP**): **CELL** – from load cells, intelligent junction box or weight transmitter connected to the instrument; **SErIAL** – via serial port (WEIMOD or WEIRIP, section 14.5).
- Approval status (not with **rIP**): **nOtLEG** not approved; **LEGAL** approved, single interval*; **LEGMI** approved, multi-interval*; **LEGMr** approved, multiple range*.
- Active regulation (not with **nOtLEG**): **OIML**, **ntEP**, **InMEtr** (**bASE** program only).
- Connection of an intelligent junction box or weight transmitter (not with **SErIAL** or **rIP**): **EStYES** connected, **EStnO** not connected.
- Enable the optional functions (not with **bASE** or **rIP**; section 23.6).

*) For the approved version request the proper manual and procedure from octogon, stating hardware code and serial number (chapter 9). When the indicator is used with an intelligent junction box or weight transmitter, the approval status set on both devices must be the same. By confirming, the instrument is restored to default and data is erased. A newly selected program has its own manual.

23.6 Enabling optional functions

During the program selection the display indicates whether an optional function is enabled or disabled; depending on the program and the functions already enabled, not all items may be available. In the Loading program:

Function	enabled	disabled	Section
Batching data on remote displays	**rPL On**	**rPL OF**	18.2
Quantity greater than the scale capacity (OPZWQMC)*	**qMc On**	**qMc OF**	18.1

*) Only available if the approval status **nOtLEG** has been set. Both functions can be enabled together. The other optional functions of the source do not apply to the Loading program.

23.7 Keypad or display locking

Press [ESC] immediately followed by [PRINT] and hold them down for about 5 seconds (also possible via the Modbus and ASCII protocols):

- **FrEE**: no lock;
- **HEY**: 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; when a key is pressed **bLOC** is displayed for 3 seconds.

24 Remote display and continuous transmission protocols

Common to all strings: 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).
- **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.
- Below –99999 "–" is sent alternated with the most significant figure.

24.2 Batching data on remote displays

With the optional function of section 18.2 and the protocol **rIPLAU** the instrument sends:

```
&AsxxxxxBsyyyyy\ckckCR
```

Character	Meaning
&	start (ASCII 38)
A	remote display identification character (A, B, L, N)
s	minus sign "–" or other characters, with a decimal point "."
xxxxx	5 alphanumeric characters (it may include ".")
B	remote display identification character (A, B, L, N)
yyyyy	5 alphanumeric characters (it 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)
xxxxxxxx	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. 40050 › 49).

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 14.2) 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 Loading 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 (reading only)	–	R
40018	outputs (reading only in this program)	no	R/W
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

Registers 40015/40016 (coefficient), 40019 ... 40048 (setpoints, classes, hysteresis) and 40063/40064 (number of pieces) belong to other programs or instruments.

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 (Loading 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

Instrument status 40050	Meaning (Loading program)
8	‾‾‾‾‾ (upper dashes) alarm
9	**COnS?** alarm
10	**tArE?** alarm
11	**LOAd** alarm
12	phase elapsing between the opening of SET and 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
30	**USb Er** alarm (only if DATAUSB option is present)
33	**ErUEIG** alarm
34 / 35	**MEMFUL** / **MEMOUr** alarm (only if DATAUSB or DATAPC options are present)
38	the operator is starting an automatic batching
39	the operator is starting a manual batching
40	**SLAuE** alarm

Inputs 40017: bit 0 ... 2 = input 1 ... 3. Outputs 40018: bit 0 ... 4 = output 1 ... 5; in the batching programs reading only (writing only in the BASE program).

Register 40014: L byte = division (**dIUIS**), H byte = unit of measure (**unIt**).

L byte	Divisor	Decimals	H byte	Unit
0	100	0	0	kilograms
1	50	0	1	grams
2	20	0	2	tons
3	10	0	3	pounds
4	5	0	4	newton
5	2	0	5	litres
6	1	0	6	bar
7	0.5	1	7	atmospheres
8	0.2	1	8	pieces
9	0.1	1	9	newton metres
10	0.05	2	10	kilogram metres
11	0.02	2	11	other
12	0.01	2		
13	0.005	3		
14	0.002	3		
15	0.001	3		
16	0.0005	4		
17	0.0002	4		
18	0.0001	4		

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
23	keypad and display lock
99	save data in EEPROM
100	tare weight zero setting for calibration
101	save first sample weight for calibration

Command	Description
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
1114	check whether the batching data are ready (section 25.9)
2000 ... 2100	formulas, totals, cycles and batching data (sections 25.8 and 25.9)
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 the batching, command 205 accepts the alarm and stops the batching; with the **tOL** alarm command 207, with the **tArE?** alarm command 206 ignores the alarm and continues the batching. 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 Formulas, consumption and cycles

The values are exchanged via the exchange registers 40051 ... 40060 together with the command register. Reading: first write the values marked "(set)" in the table, send the reading command (R) to 40006, read 40060 until the command echo ("data ready") or 0xFFFF ("error in the command") appears, then read 40051 ... 40060. Writing: write the values to 40051 ... and send the writing command (W). Example command 2002: write the formula number to 40053, send 2002 to 40006, read 40060 until the echo 2002, then read 40051/40052.

Data	R	W	Registers
Formula programming	2000	2001	40051/40052 quantity H/L · 40053 and 40054: 1 = set, 2 = preset (set) · 40055 formula no. (set)
Total set by formula (section 18.1)	2002	2003	40051/40052 quantity H/L · 40053 formula no. (set)
Consumption	2020	–	40051/40052 quantity H/L · 40053 formula no. (set) · 40054 1 = consumption (set)
Totals deletion date and time	2022	–	40051 day · 40052 month · 40053 year · 40054 hours · 40055 minutes · 40056 seconds · 40057 1 = consumption (set)
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	2100	–	section 25.9

– Writing a formula: write the quantity to be batched to 40051/40052, 1 for SET or 2 for PRESET to both 40053 and 40054, the formula number to 40055; send command 2001.

– Reading a formula: write 1 for SET or 2 for PRESET to both 40053 and 40054, the formula number to 40055; send command 2000; read 40060 until the echo 2000 or 0xFFFF appears; then read 40051/40052.

– Batching start: write formula and number of cycles to 40051 ... 40053, send command 2031, then command 201. Batching stop: command 204.

25.9 Batching data reading

At the end of the batching the instrument makes the data available. Send command 1114 and check that 40051 = 1 (data ready). This command does not give an echo; instead wait for bit 7 of 40060 to be equal to 1. Then send one of the queries to 40006 and read 40051 ... 40060:

Query	Set	Response
Batching step: 2100	40051 step no. = 1	40051/40052 real batched H/L · 40053/40054 theoretical batched H/L · 40055/40056 alarm H/L · 40057/40058 alibi ID H/L · 40059 product number · 40060 value detail
Initial tare: 2100	40051 = 1005	40051/40052 value H/L · 40055/40056 alarm H/L · 40060 value detail

– Value detail: bit 0 negative value (with the batching step only for the real batched value), bit 7 data ready.

– After reading, send command 250: the instrument accepts the **SLAuE** alarm and continues the batching sequence.

Batching data alarms (40055/40056)

Each alarm takes up one byte; with several alarms up to four bytes are sent in chronological order.

Code	Alarm
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** (optional function of section 18.1)
27	**USb Er** (only for DATAUSB option)
28 / 29	**MEMFUL** / **MEMOUr** (only for DATAUSB and DATAPC options)

25.10 Communication example

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

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

Structure of the query: address, function, first register H/L, number of registers H/L, CRC16 L/H; of the response: address, function, byte count, data (H/L each), 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), which apply to the EILD:

Directive	Standards
2014/35/EU Low Voltage	not applicable for the VDC type; the EILD is supplied with 12/24 VDC only
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.