OCTOGON

# MANUAL

# EILE

## WEIGHT INDICATOR, LCD

Installation and user manual – Program Unloading (S)




| Document | Version | Date | Applies to |
|---|---|---|---|
| Installation and user manual | V00x | 10/2026 | EILE, Program Unloading (S), versions P, Q, D, X |

This manual describes installation, connection and operation of the EILE weight indicator with the unloading program: extraction of a settable amount of product from the weighed structure with up to 99 formulas, fall correction, tolerance control, consumption storage and automatic loading. The other programs and the approved (legal for trade) version 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 9.1). 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 EILE is supplied with one of several programs; the instrument shows the program at switch-on (chapter 10). This manual applies to the unloading program (display **UnLOAd**): the instrument automatically extracts a settable amount of product from the weighed structure (chapter 8). 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 15) and the E/EC option (formula selection, section 7.5). Connection and setup of the other options of the data sheet – fieldbuses, WiFi, additional RS485, USB, external relay modules, alibi memory, weight inputs, data transfer to PC, battery – and of the additional functions enabled during program selection 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: WDESK-L

– Weight indicator with 6-wire load cell input, installable on table, front panel, wall or column
– 6-key keyboard
– Real-time clock/calendar with buffer battery
– Two serial ports (RS232 and RS485) 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

Versions P and D: switching power supply plug included, 24 V 450 mA, input 100 ... 240 VAC, 3 m cable. The instrument can be connected to an intelligent junction box (e.g. octogon ETLB) or to a weight transmitter.

**Caution** Version D is not compatible with the optional 115/230 VAC power supply.

## 5.2 Display

| Display | Digit height | LED or symbols |
|---|---|---|
| backlit LCD, 6 digits, 7 segments, semi-alphanumeric | 20 mm | max. 46 symbols |

## 5.3 Versions and dimensions

| Version | Max. encumbrance | Drilling |
|---|---|---|
| P – M16 × 1.5 cable glands · IP67 protection rating · power supply included | 122 × 226 × 164 mm (connectors included) | 96 × 186 mm |
| Q – removable terminal strip (panel front) · front panel IP67 | 122 × 226 × 152 mm (connectors included) | 92 × 186 mm |
| D – D-Sub connector · IP40 protection rating, front panel IP67 · power supply included | 122 × 226 × 189 mm (connectors included) | 96 × 186 mm |
| X – Atex cable glands · Atex II 3GD (zones 2-22) · IP67 protection rating | 122 × 226 × 164 mm (connectors included) | 96 × 186 mm |
| Wall installation with bracket (can also be installed on table) | approx. 122 × 230 × 250 mm (bracket included) | – |

The source gives the dimensions in the order height × width × depth.

## 5.4 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.

## 5.5 After a blackout

After a blackout the instrument does NOT come on again automatically; [ON/OFF] has to be pressed. To guarantee an automatic restart after a blackout, disable the ON key as follows:

- disconnect power supply and open the instrument;
- identify the flat connectors coming from the keypad on the main board;
- extract the 4-pole connector;
- short-circuit the two pins further in compared to the main board using the unused jumper inside the instrument;
- connect the 4-pole flat cable to the two pins still free, complying with the initial orientation.

# 6 Technical specifications

| Item | Value |
|---|---|
| Power supply and consumption (VDC) | 12/24 VDC ± 10 %; 6 W (standard) |
| Power supply and consumption (VAC) | 115/230 VAC; 50–60 Hz; 6 VA (optional) |
| 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 (version D: connect the earthing system to the dedicated external terminal).
– 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 optoisolated 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 16.3).
– E/EC option: selects the first 12 formulas (section 7.5).

## 7.2 Outputs, inputs and power supply

– Outputs: No. 1 PRESET, No. 2 SET, No. 3 CYCLE END, No. 4 LOAD, No. 5 ALARM/TOLERANCE (section 13.1).
– Inputs: No. 1 START, No. 2 STOP, No. 3 selectable as APPROVAL, SEMI-AUTOMATIC ZERO (default), NET/GROSS WEIGHT or AUTOMATIC LOAD during batching (section 13.2).
– With the analog output (option) the IN3 input, the ALARM/TOLERANCE output and the E/EC options are no longer available.

**Caution** Connect the power supply specified on the plate on the back of the instrument. In the 115 V and 230 V versions, terminals +SUPPLY and –SUPPLY generate a continuous voltage of 24 VDC, only to be used as power supply for the instrument inputs.

## 7.3 Terminals of versions P, Q and X

| Terminal | Signal |
|---|---|
| 1 | – |
| 2 | INPUT No. 3: selectable (+VDC min. 5 V, max. 24 V) · otherwise: +ANALOG OUTPUT (0 ... 20 or 4 ... 20 mA) |
| 3 | OUTPUT No. 5: ALARM/TOLERANCE · otherwise: +ANALOG OUTPUT (0 ... 10 V) |
| 4 | E/EC OPTION · otherwise: –ANALOG OUTPUT COMMON |
| 5 | RS485: – |
| 6 | RS485: + |
| 7 | +SUPPLY (12/24 VDC) · 115/230 VAC version: +OUTPUT (24 VDC)* |
| 8 | –SUPPLY (12/24 VDC) · RS232, RS485: SHIELD, GND · E/EC OPTION: GND · 115/230 VAC version: –OUTPUT (24 VDC)* |
| 9 | RS232: TXD |
| 10 | RS232: RXD |
| 11 | OUTPUT No. 1: PRESET |
| 12 | OUTPUT No. 2: SET |
| 13 | OUTPUT No. 3: CYCLE END |
| 14 | OUTPUT No. 4: LOAD |
| 15 | OUTPUT COMMON |
| 16 | INPUT No. 1: START (+VDC min. 5 V, max. 24 V) |
| 17 | INPUT No. 2: STOP (+VDC min. 5 V, max. 24 V) |
| 18 | INPUT COMMON (–VDC 0 V) |
| 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) |

| Terminal | Signal |
|---|---|
| 24 | +LOAD CELL SIGNAL (+Sig) |
| L · N · earth | PHASE · NEUTRAL · GROUND (115/230 VAC version) |

*) Use only as power supply for instrument inputs. Terminal 1 has no signal in the source legend.

**Note** To access the terminal strip on the versions with cable glands, remove the bottom of the instrument by unscrewing the six screws.

## 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 22).

## 7.5 E/EC option

With the E option (buttons, not included in the supply) or the EC option (selector switch) one of the first 12 formulas is selected, which is batched with the START contact (section 20.3). Connection to terminal 4 (E/EC OPTION) and terminal 8 (GND). With the analog output the option is not available.

## 7.6 Connectors of version D

| Connector | Pin | Signal | Internal terminal | Internal colour |
|---|---|---|---|---|
| P1 power supply | – | +SUPPLY (12/24 VDC) | 7 | red |
| P1 power supply | – | –SUPPLY (12/24 VDC) | 8 | black |
| D1 female, load cell | 1 | –LOAD CELL EXCITATION (–Exc) | 19 | black |
| | 2 | –LOAD CELL REF/SENSE | 22 | yellow |
| | 5 | LOAD CELL SHIELD | 19 | – |
| | 6 | +LOAD CELL EXCITATION (+Exc) | 20 | red |
| | 7 | +LOAD CELL REF/SENSE | 21 | blue |
| | 8 | –LOAD CELL SIGNAL (–Sig) | 23 | white |
| | 9 | +LOAD CELL SIGNAL (+Sig) | 24 | green |
| D3 male, I/O, analog output, E/EC option | 1 | OUTPUT No. 1: PRESET (max. 24 V) | 11 | yellow |
| | 2 | OUTPUT No. 2: SET (max. 24 V) | 12 | blue |
| | 3 | OUTPUT No. 3: CYCLE END (max. 24 V) | 13 | white |
| | 4 | OUTPUT No. 4: LOAD (max. 24 V) | 14 | green |
| | 5 | OUTPUT No. 5: ALARM/TOLERANCE (max. 24 V) · otherwise: +ANALOG OUTPUT (0 ... 10 V) | 3 | orange |
| | 6 | OUTPUT COMMON (max. 24 V) | 15 | purple |
| | 7 | INPUT No. 1: START (+VDC min. 5 V, max. 24 V) | 16 | grey |
| | 8 | INPUT No. 2: STOP (+VDC min. 5 V, max. 24 V) | 17 | pink |
| | 9 | INPUT No. 3: selectable (+VDC min. 5 V, max. 24 V) · otherwise: +ANALOG OUTPUT (0 ... 20 or 4 ... 20 mA) | 2 | brown |
| | 10 | INPUT COMMON (–VDC 0 V) | 18 | white/blue |
| | 11 | E/EC OPTION · otherwise: –ANALOG OUTPUT COMMON | 4 | red |
| | 12 | E/EC OPTION: GND · ANALOG OUTPUT: SHIELD | 8 | black |
| D4 male, RS232 serial port | 2 | RS232: RXD | 10 | yellow |
| | 3 | RS232: TXD | 9 | blue |
| | 5 | RS232: SHIELD, GND | 8 | black |
| D5 male, RS485 serial port with 24 VDC output | 1 | +OUTPUT (24 VDC)** | 7 | red |
| | 2 | –OUTPUT (24 VDC)** | 8 | black |
| | 4 | RS485: + | 6 | yellow |
| | 5 | RS485: SHIELD, GND | 8 | black |
| | 6 | RS485: – | 5 | blue |
| | 7 | RS485: – | 5 | blue |

| Connector | Pin | Signal | Internal terminal | Internal colour |
|---|---|---|---|---|
| | 9 | RS485: + | 6 | yellow |

Pins not listed have no signal in the source (D1: 3, 4; D3: 13 ... 15; D4: 1, 4, 6 ... 9; D5: 3, 8). **) Not available if the instrument is battery powered; use only if the instrument is connected to the provided 24 VDC power supply; maximum load 5 W.

### 7.7 Changing voltage 115/230 VAC

Applies to versions P, Q and X with the 115/230 VAC option (not to version D).

Access the instrument board by removing the six bottom screws and work on the welding side: join the marked points using a stiff wire – for 230 VAC one bridge at the position marked 230, for 115 VAC one bridge at each of the two positions marked 115.

## 8 Introduction to the operation

The instrument automatically extracts a settable amount of product from the weighing structure, driving the batching organ (including two-speed) through the PRESET and SET contacts. Features:

- maximum 99 settable formulas (chapter 19);
- batching resume after blackout (section 20.6);
- automatic fall calculation (section 18.7);
- tolerance error control (section 18.8);
- precision batching through slow function (section 18.9) and tapping function (section 18.10);
- consumption storage (chapter 21);
- print of batching data (section 18.12);
- management of batching with big bags (section 18.16);
- alarm contact (section 13.3);
- automatic loading of product into the weighed structure (section 20.2).
- Batching start: via keypad, setting formula and number of cycles, or via external contact (section 20.3); batching sequence: chapter 20.
- Consumption: at the end of every batching the instrument stores the consumed amount for each formula; the values can be viewed directly on the display in standby mode.
- Automatic loading: if minimum and maximum weight are set, the LOAD contact is closed when the weight reaches the minimum and remains closed until the weight reaches the maximum.
- Calibration: theoretical with full scale and load cell sensitivity (section 11.2) or real with sample weights (section 11.5).
- Alarms: if an alarm occurs during batching, the instrument shows it on the display, closes the related contact (if enabled) and waits for the operator to abort or continue the batching (chapter 22).

## 9 Keys, display and menu map

### 9.1 Keys

| Key | Short press | Long press (3 s) | Into menus |
|---|---|---|---|
| [ON/OFF] | power-on | power-off | – |
| [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/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 |

| Key | Short press | Long press (3 s) | Into menus |
|---|---|---|---|
| [ENTER]+[ESC] | setting general parameters (press [ENTER] immediately followed by [ESC]) | – | – |

## 9.2 Symbols of the LCD display

| No. | Marking | Function |
|---|---|---|
| – | LED POWER | power supply available |
| 1 | PT | not used |
| 2 | G | gross weight |
| 3 | NET | net weight (semi-automatic tare) |
| 4 | stability symbol | stability |
| 5 | >0< | zero (deviation from zero not more than ± 0.25 divisions) |
| 6 | PEAK | not used |
| 7 | AUTO | batching in progress |
| 8 | asterisk | value displayed is not a weight |
| 9 | M (box) | not used |
| 10 | M (box, crossed out) | not used |
| 11 | COEFF | not used |
| 12 | HR | not used |
| 13 | t · kg · lb · pcs | unit of measure reading |
| 14 | IN 1 2 3 | the number displayed indicates that the corresponding input is closed |
| 15 | OUT 1 2 3 4 5 | the number displayed indicates that the corresponding output is closed |
| 16 | W1 W2 W3 | not used |

The numbers are those of the symbol map of the source. Into menus symbol 8 is on to indicate that no weight is displayed.

## 9.3 Formulas and batching constants menu

Menu **000000** › **[ENTER]** › **FOrP** › **[ENTER]** › **FOrP01, FOrP02 …** › **[ENTER]** › **PrESEt / SEt**

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

| Item | Content | Section |
|---|---|---|
| **FOrP** | formulas **FOrP01**, **FOrP02** …, **PrESEt** and **SEt** each | 19.1 |
| **CAnCFO** | deleting formulas: formula number, **FOrP00** for all, **SUrE** | 19.2 |
| **tOtAL*** | consumption: total quantity **123456**, deletion date **01.10.10**, per formula **COn 1 COn 2** … | 21 |
| **CAnCtO*** | consumption deletion, **SUrE** | 21.1 |
| **COnSt** | **MIn MASS tSIC tIMEAt tnUnLO MOdFAL FALdIv FALL tOL SLOU SLOUOn SLOUOF tOtAL PrInt nCOPY PC SLAvE rALArM bIGbAG** | 18 |

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

## 9.4 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** | 11 |
| **FILtEr** | value 0 … 9, then **ANTpOn** / **AntPOF** | 12.1 |
| **PArA 0** | **0 SEt AUtO 0 trAC 0** | 12.2 |
| **AnALOG** (option) | **tYPE MOdE AnA 0 AnA FS COr 0 COr FS** | 15 |
| **SErIAL** | **rS485** / **rS232** › **nOnE ModbUS rIP HDrIP HdrIPn YHL PrIntr UEIMOD UEIrIP** › **bAUd Addr dELAY PArItY StOP** | 16 |
| **ALArM** | **COnS EMPtY UnLOAd PrOd?? tOL FALL SLAvE** | 13.3 |
| **Ovt-In** | **In 3** | 13.2 |
| **EnErGY** | **bLIGHt** | 17.1 |
| **tESt** | **In Ovt AnALOG** (option) **EC** (option) | 13.4 |
| **dAtE** | date and time | 17.2 |
| **PSUBLC** | unlock password | 24.4 |
| **SEttIn** | **nEXt P PSS EndnEt bLACH** | 17.3 |
| **InFO** | **GEnrIC OPZ** | 17.4 |

Direct access from the weight display: [ESC] 3 s › **ZErO** (tare weight zero setting); [PRINT] 3 s › **MU-CEL** (mV test); [ENTER] 3 s › **FESt00** (formula for the START input, section 20.3).

# 10 Instrument commissioning

Turn the instrument on with [ON/OFF]. To turn it off press [ON/OFF] for about 3 seconds: when **OFF** appears, release the key. After a blackout the instrument does not come on again automatically (remedy: section 5.5).

Upon switch-on, the display shows in sequence:

- **111111** › **999999** (only in case of approved program);
- instrument model (**UdSK**);
- **SU** followed by the software code (e.g. **SU 5**);
- program type – for this manual **UnLOAd** (otherwise **bASE**, **LOAd**, **3PrOd**, **6PrOd**, **14PrOd**, **MULtI** = no active program);
- **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 11.3), then check the calibration with sample weights and correct the indicated weight if necessary (section 11.5).
- Instrument not calibrated (no plant identification tag): load cell data unknown – real calibration (section 11.5); known – theoretical calibration (section 11.2); then reset to zero (section 11.3) and check with sample weights (section 11.5).
- Analog output: set type and full scale (chapter 15).
- Serial communication: set the parameters (chapter 16).
- Set the clock to the current date and time (section 17.2).

Required settings for the first batching:

- access the system parameters menu and set the **PSS** parameter (section 17.3);
- access the formulas menu and set the formula 01 (section 19.1);
- start the batching by pressing [START/STOP] or by closing the START contact (chapter 20).

# 11 Calibration and weight parameters

## 11.1 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.

## 11.2 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 parameters containing a weight value are set to default.

## 11.3 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.

## 11.4 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).

## 11.5 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**.

## 11.6 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 unit not included in the list |

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

# 12 Filter on the weight and zero parameters

## 12.1 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.

## 12.2 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**).

# 13 Outputs, inputs, alarm relay and test

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

## 13.1 Outputs

| Output | Function |
|---|---|
| 1 PRESET | for operation see operation settings (section 17.3) |
| 2 SET | for operation see operation settings (section 17.3) |
| 3 CYCLE END | the relay is closed when the cycle end is reached |
| 4 LOAD | the relay is closed to perform the automatic loading of the scale |
| 5 ALARM/TOLERANCE | the relay is closed when an alarm is present or the weight is out of tolerance |

## 13.2 Inputs

Input 1: START; input 2: STOP. Input 3 (default **ZErO**) takes one of the following functions:

- **nE-LO** (NET/GROSS): closing this input for no more than one second performs a semi-automatic tare and the display shows the net weight; to display the gross weight again, hold the input closed for 3 seconds.
- **ZErO** (SEMI-AUTOMATIC ZERO): closing the input for no more than one second sets the weight to zero (section 14.2).
- **COnS** (APPROVAL): the instrument starts the batching only after verifying that this input is closed.
- **LOAd** (LOAD): if the minimum (**MIn**) and maximum (**MASS**) weight values are set, the automatic loading is performed during the batching (section 20.2).

## 13.3 Alarm relay closure

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

The ALARM relay closing can be enabled or disabled for each of the following alarms: approval contact (**COnS?**), formula not programmed (**EMPtY**), insufficient product (**PrOd??**), no decrease in weight (**UnLOAd**), tolerance (**tOL**), fall (**FALL**), the PC did not read the batching data (**SLAvE**).

- **YES**: in presence of the alarm, the relay is closed (default);
- **nO**: the relay is not closed even in the presence of the alarm.

## 13.4 Test

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

| Test | Meaning |
|---|---|
| **In** | inputs: open input **0**, closed input **1** |
| **Ovt** | outputs: **0** › the output must open; **1** › the output must close |
| **EC** | E/EC option: formula selected by the option; without or with inactive option **EC-ER** |
| **AnALOG** | analog output option: the signal ranges from minimum to maximum; **MA** current, **VOLT** voltage |
| **MU-CEL** | millivolt: load cell response signal in mV with four decimals ([PRINT] 3 s from the weight display) |

# 14 Tare and zero

## 14.1 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. Unload the desired product; the display shows the weight actually extracted. The operation can be repeated many times. Back to gross: keep the NET/GROSS input closed or press [TARE] for 3 seconds.

- 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.

## 14.2 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 12.2); otherwise **t‾‾‾‾‾** (upper dashes) appears and the weight is not set to zero.

# 15 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 26.6).

– **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, locate the soldered jumper SW1 on the analog board mounted perpendicular to the main 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.

# 16 Serial communication

## 16.1 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 26) |
| **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 25.1) |
| **HDrIP** | as **rIP**, for remote displays with decimal point (section 25.1) |
| **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 25.2) |
| **PrIntr** | printer |
| **UEIMOD** / **UEIrIP** | weight reception (section 16.5) |

## 16.2 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** |

## 16.3 RS232 and RS485

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

– Terminals: RS485 – 5, RS485 + 6, GND 8; RS232 TXD 9, RXD 10, GND 8 (version D: connector D5 or D4, section 7.6).

– 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.

## 16.4 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 24.5).

## 16.5 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 24.6).

**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 **vnIt** 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 +, RS485 – and –SUPPLY, or RS232 TX › RX, RX › TX and –SUPPLY (terminals section 16.3).

# 17 Energy saving, date, operation and info

## 17.1 Energy saving

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

– **On**: back-lighting on;
– **OFF**: back-lighting off;
– **CHAnGE**: back-lighting goes off after about one minute of no activity; pressing a key or a weight change turns it on again.

## 17.2 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.

## 17.3 Operation settings

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

| Parameter | Meaning |
|---|---|
| **nEXt P** | switch conditions from the SET opening to the CYCLE END closing: **tIME** (default **YES**) – time set in constants **tIMEAt**; **COMAnd** (default **nO**) – START input closure or [ENTER] key pressure; **StAbLE** (default **nO**) – stable weight |
| **PSS** | operating mode of the SET and PRESET contacts (default **2**), see below |
| **EndnEt** | display during the CYCLE END phase (unloading of the scale at the end of batching), default **nO**: **YES** – net weight, after the CYCLE END opening gross weight; **nO** – gross weight |
| **bLACH** | batching resume mode after a power failure, default **MAn**: **AUt** (automatic) – at the power restore **bLACH** appears for 3 seconds, then the batching resumes from the point of interruption; **MAn** (manual) – **bLACH** appears, [ENTER] resumes, [ESC] stops |

| PSS | SET and PRESET contacts |
|---|---|
| **1** | at the batching start only PRESET is closed; once the preset value is reached, PRESET opens and SET closes; once the final set value is reached, SET opens |
| **2** | at the batching start SET and PRESET are closed simultaneously; at the preset value PRESET opens (beginning of the slow phase), at the set value SET opens too. For single-speed batching set **PSS** = **2** and use only the SET contact |
| **3** | at the batching start only PRESET is closed; at the preset value SET closes too; at the final set value both open |

## 17.4 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, **Fw wer** software version, **ser nV** serial number. **OPZ**: active options.

# 18 Batching constants

## 18.1 Programming

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 displayed figure or menu item; [TARE]: select a new figure or modify the displayed menu item; [ESC]: cancel and return to the previous menu.

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

## 18.2 Minimum weight

**MIn** (0 to full scale; default 10): minimum weight, value at which the scale is considered empty. If minimum and maximum weight are set, the automatic loading function is activated: the LOAD contact is closed when the weight is lower than the minimum weight and opened again once the maximum weight is reached.

## 18.3 Maximum weight

**MASS** (0 to full scale; default 0): maximum weight that the scale can load. Together with **MIn** it activates the automatic loading function (section 18.2).

## 18.4 Safe emptying time

**tSIC** (0.0 ... 999.9 s; default 3.0): the CYCLE END contact remains closed during this time to indicate that the batching is ended.

## 18.5 Waiting time

**tIMEAt** (0.0 ... 999.9 s; default 5.0): time elapsing between the SET batching end and the CYCLE END closing to allow the weight to become stable.

## 18.6 No product unload time

**tnUnLO** (0.0 ... 999.9 s; default 0.0): allows the product unload control during batching. If there is no product extraction, the instrument waits for the set time before activating the alarm **UnLOAd**.

## 18.7 Fall

Fall is the amount of product still falling after the batching STOP; it adds to the product already batched and causes inaccuracy. The instrument anticipates the batching STOP accordingly – with AUTOMATIC fall (calculated by the instrument) or MANUAL fall (set by the operator).

**Caution** 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 ... 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.
- **FALdIv** (only if **MOdFAL** is other than 0; 0 to full scale; default 0): limit within which the automatic fall is updated according to **MOdFAL**; outside it is updated every cycle. A low value is more accurate but may increase the length of the batchings; 0 disables. Example: **MOdFAL** = 3, **FALdIv** = 5, weight 100 › update every batching until the batched weight falls within 95 to 105, then again every 3 batchings.
- **FALL** (0 to maximum weight; default 0): set the fall value for each formula (only if **MOdFAL** = 0) or display and modify the fall value calculated by the instrument (only if **MOdFAL** is other than 0).

## 18.8 Tolerance

**tOL** (0 to maximum weight; default 0): adjustable for each formula; how much the batched weight may deviate from the value set in the formula. If it is higher or lower by more than the tolerance, the instrument closes the ALARM/TOLERANCE contact; press [ENTER] to continue the batching. Example: SET = 1000, tolerance = 100 › the batched weight must be between 900 and 1100 for the instrument to continue the batching. 0 disables the function.

## 18.9 Slow

**SLOU** (0 to maximum weight; default 0): single value for all formulas in place of the preset value. When the weight has reached the SET value minus this value, the slow batching phase starts by the PRESET contact. If the value is greater than the

weight to batch, the whole batching is in slow phase. 0 disables. Example: SET = 100, slow = 15 › the slow phase begins at 85.

### 18.10 Tapping function

If the batching organ has no slow speed, this function slows down the batching in the final phase by opening and closing the SET contact and so increases the accuracy. Set in **SLOU** the amount to be batched with the tapping function enabled.

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

### 18.11 Consumption for each formula

**tOtAL** (default **nO**): consumption memory (total batched quantity) for each formula – **YES** enabled, **nO** disabled (chapter 21).

### 18.12 Print at cycle end

- **PrInt** (default **nO**): print of batching data at cycle end – **YES** enabled, **nO** disabled.
- **nCOPY** (1 ... 9; default 1): number of copies of the batching printout.

### 18.13 Checking PC presence

**PC** (default **nO**): **YES** – the instrument checks for a PC every 10 seconds; if no PC is detected, it displays the alarm **PC** alternated with the weight. **nO** – check not active. The check is active only if the Modbus protocol is selected.

### 18.14 Waiting confirmation from PC (slave)

**SLAvE** (default **nO**): **YES** – the instrument waits for the PC to read the batching data before starting another batching; in case of recording failure the alarm **SLAvE** is displayed. **nO** – at cycle end the instrument does not wait for the PC.

### 18.15 Switching of the alarm/tolerance relay on weight

**rALArM** (0 to full scale; default 0): with a value other than zero, the ALARM/TOLERANCE contact no longer switches in case of alarm/tolerance but behaves as a setpoint contact: the relay closes when the weight reaches this value.

### 18.16 Big bag unloading

**bIGbAG**: enable it when the scale has to be fully unloaded during batching (e.g. big bags or containers already prepared). It only works if minimum and maximum weight are set. Batching is allowed even if less than the formula quantity is on the scale: when the weight has reached the minimum and the safe emptying time **tSIC** has elapsed, batching is interrupted and automatic loading is enabled (the operator replaces the container or the big bag). Then press [ENTER] or close the START contact to resume from the point of interruption, or press [START/STOP] to cancel the batching.

## 19 Formulas

### 19.1 Formulas programming

Menu **000000** › **[ENTER]** › **FOrP** › **[ENTER]** › **FOrP01, FOrP02 …** › **[ENTER]** › **PrESEt / SEt**

Select the formula and set **PrESEt** and **SEt**; max. 99 formulas. **PrESEt** is NOT displayed if a slow value **SLOU** has been set in the constants. A value in **PrESEt** or **SEt** higher than the maximum weight **MASS** of the batching constants is rejected with **ErrOr**.

### 19.2 Deleting formulas

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

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

# 20 Batching

## 20.1 Sequence

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

Select the formula and set the number of batching cycles; the first cycle runs as follows. In case of alarm the batching may be cancelled with [ESC] or by closing the STOP input.

– 1. The instrument checks: the formula has been programmed (otherwise **EMPtY**); the IN3 input is closed if it is set as approval (otherwise **COnS?** – close IN3 to start); there is enough product on the scale (otherwise **PrOd??**). Only if **tOtAL** = **YES**: if the consumed amount exceeds 999000, **tOtAL** appears for a second; above 999999 it is set to zero. An automatic loading in progress is interrupted.

– 2. The batching starts; PRESET and SET switch according to **PSS** (section 17.3). In the following **PSS** = 2 (default): SET and PRESET are closed.

– 3. If **tnUnLO** is set and the product is not extracted by at least 20 divisions within this time, the alarm **UnLOAd** is displayed.

– 4. PRESET opens as soon as – only if **SLOU** is set – the set value minus the slow value is reached, or as soon as the preset value of the formula is reached.

– 5. If a tapping value has been set, SET opens and closes according to **SLOUOn** and **SLOUOF**.

– 6. Once the set value of the formula minus the fall is reached, SET opens and the product extraction stops.

– 7. Then the instrument shows the weight preceded by the letter **A** and waits – if **tIME** = **YES** for the waiting time **tIMEAt**, if **COMAnd** = **YES** for the START input to close or [ENTER], if **StAbLE** = **YES** for a stable weight.

– 8. If **tOL** is set and the batched quantity is lower than the set quantity minus the tolerance, only one finishing re-start is made (SET closes, back to step 6); otherwise **tOL** appears. If the quantity is greater than the set quantity plus the tolerance, **tOL** appears. [ENTER] cancels the alarm and continues.

– 9. Cycle end: the CYCLE END contact closes; the display shows the weight preceded by the letter **E**; if **PrInt** = **YES** the batching data are printed with date and time; if **tOtAL** = **YES** the consumption is stored.

– 10. CYCLE END opens only after the safe emptying time **tSIC** has elapsed.

– 11. Only if **SLAvE** = **YES**: the instrument waits for the data recording on the PC before being available for a new batching.

If several cycles have been set, the instrument starts a new cycle. If **bIGbAG** = **YES** and the weight reaches the minimum weight **MIn** during the batching, the instrument pauses the batching and starts the automatic loading of the plant; at the end it is paused – [ENTER] or the START input resumes, [START/STOP] cancels.

## 20.2 Automatic loading

The automatic loading puts product into the weighed structure by closing the LOAD contact; the display shows **LOAd** alternated with the weight. Set the minimum **MIn** and the maximum weight **MASS** to enable this function.

– Started manually by the operator (closing the IN3 input, if set as **LOAd**) or automatically by the instrument (only if at the end of the batching the weight is lower than the minimum weight).

– It ends when the weight reaches the maximum weight **MASS**, the operator closes the IN3 input (**LOAd**) again or presses [START/STOP].

– To start a loading manually during a batching, first pause the batching with [START/STOP] (SET and PRESET open); at the end of the loading the instrument is paused – [ENTER] resumes, [START/STOP] cancels.

**Caution** Only if **bIGbAG** = **YES**: if the weight reaches the minimum weight **MIn** during the batching, the instrument waits for the safe emptying time **tSIC**, pauses the batching (SET and PRESET open) and starts the automatic loading (LOAD contact closes). The display shows **LOAd** alternated with the weight; the operator replaces the big bag or container. Then the instrument is paused – [ENTER] resumes, [START/STOP] cancels.

## 20.3 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; if the conditions of section 20.1 are met, the instrument batches the selected formula. Without selector 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.

## 20.4 Displaying during batching

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

## 20.5 Batching stop

- Open the START contact and close the STOP contact to stop the batching; if START 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 completely.

## 20.6 Resume batching after a power cut

If a blackout occurs during the batching (unloading phase included), **bLACH** appears when power comes back: [ENTER] resumes from the point of interruption, [ESC] cancels the batching and returns to the weight display. If **bLACH** = **AUt** is set (section 17.3), **bLACH** appears and the batching resumes automatically after about 3 seconds. Cycles still to be performed are not deleted.

# 21 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**, section 18.11), 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 and the quantity consumed for each formula. The quantities are printed out in full.

## 21.1 Consumption deletion

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

Confirm **CAnCtO**; **SUrE** is requested: [ENTER] again deletes, [ESC] cancels. If the printer is enabled (chapter 16), an operation receipt is printed.

# 22 Alarms

| Display | Meaning |
|---|---|
| **PrOd??** | at batching start the weight on the scale is lower than the quantity to be batched; [ESC] returns to the weight display |
| **LOAd** | alternated with the weight: automatic loading in progress (activated below the minimum, cleared when the weight reaches the maximum weight) |
| **COnS?** | at batching start the APPROVAL input is open (input 3 = **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 quantity to be batched; [ESC] cancels alarm and batching |
| **EMPtY** | at batching start the formula recalled is not programmed; [ESC] to quit |
| **PAUSE** | [START/STOP] was pressed during batching, the cycle is paused; [ENTER] resumes, [START/STOP] terminates completely |
| **bLACH** | power failure during batching; [ESC] cancels, [ENTER] resumes from the point of interruption |
| **UnLOAd** | during batching the product is not extracted; cleared automatically when the product decreases; [START/STOP] twice cancels the batching |
| **StArt?** | for 3 seconds when trying to stop the batching (twice [START/STOP] or input) while the START input is closed; open the START input |
| **PArSEr** | batching is cancelled; [ESC] to quit; if the alarm persists, contact octogon |
| **ErUEIG** | weight alarm, the current batching is cancelled; [ESC] returns to the weight display, check the alarm |

| Display | Meaning |
|---|---|
| **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 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 |
| **max-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** | PC is not connected |
| **SLAvE** | PC has not read the batching data |
| **InZErO** | gross weight equal to zero: semi-automatic tare not possible |

## 22.1 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 |

# 23 Printing examples

If the printer has been set (chapter 16), [PRINT] from the weight display opens the print menu:

- **UEIGHt**: prints the displayed weight;
- **COnSt**: prints the constants (minimum weight, maximum weight, etc.);
- **FOrP**: prints one or all of the formulas – after [ENTER] **FOrP01** is displayed, set the formula number or 00 to print them all;
- **tOtAL**: prints the consumption (only if **tOtAL** = **YES**, section 18.11).

"‹Model›" stands for the model identification printed by the instrument.

**Batching printout**

```
‹Model›  UNLOAD   Addr:01
FORMULA:             01
CYCLE:       1/       1
DATE: 01/10/11 08:30:01
TARE            5680 kg
NET     1005:   1000 kg
```

**Constants printout**

```
‹Model›  UNLOAD   Addr:01
DATE: 01/10/11 08:30:01
       CONSTANTS
MIN                  10
MASS                  0
TIME SIC            3.0
TIME WAIT           5.0
TIME NLOAD          0.0
FALL              MANUAL
SLOW                  0
TIME SLOWON         0.0
TIME SLOWOF         0.0
PSS                   2
TOTAL                NO
PRINT                NO
PC                   NO
SLAVE                NO
BLACKOUT          MANUAL
RELAY ALARM           0
BIGBAG               NO
FOR.      FALL    TOLER
05           0      100
48         178        0
```

**Standard formula printout (SLOU = 0)**

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

**Formula printout with slow active (SLOU = 100)**

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

**Consumption printout**

```
‹Model›  UNLOAD   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
```

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

**Weight printout**

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

# 24 Reserved for the installer

## 24.1 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.

## 24.2 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.

## 24.3 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.

## 24.4 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.

## 24.5 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 – **UnLOAd** single product unloading (this manual); further **bASE** basic program, **rIP** weight remote display program with setpoint, **LOAd** single product loading, **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 16.5).

– 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.

– Enabling the optional functions (not with **bASE** or **rIP**); the functions available for the unloading program are provided by octogon on request.

*) For the approved version request the proper manual and procedure from octogon, stating hardware code and serial number (chapter 10). 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; the manual for a newly set program is available from octogon.

## 24.6 Keypad or display locking

Press [ESC] immediately followed by [PRINT] and hold them down for about 5 seconds (also possible via the protocol, section 26.5):

– **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; when a key is pressed **bLOC** is displayed for 3 seconds.

# 25 Continuous transmission protocols

Common to all strings: with negative weight the first character from the left is "–" (ASCII 45); in case of error or alarm the weight is replaced by the messages of section 22.1. 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.

## 25.1 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) |

– **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.

## 25.2 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 61) |
| 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.

# 26 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 16.1. 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.

## 26.1 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 16.2) 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 |

## 26.2 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).

## 26.3 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. The registers valid only for the BASE program (coefficient, setpoints, hysteresis, setpoint classes, number of pieces) are not listed.

| 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 26.5) | no | R/W |
| 40007 | status register (section 26.4) | – | 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 26.4) | – | R |
| 40017 | inputs | – | R |
| 40018 | outputs (unloading program: read only) | no | R |
| 40050 | instrument status (section 26.4) | – | 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 |

## 26.4 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 (unloading 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 |
| 9 | **COnS?** alarm |
| 10 | **tArE?** alarm |
| 11 | **UnLOAd** alarm |
| 12 | phase elapsing between the opening of SET and the closing of CYCLE END |
| 13 | batching pause |
| 14 | cycle end |
| 16 | **bLACH** alarm |
| 18 | **FALL** alarm |
| 24 | **PrOd??** alarm |
| 25 | **tOL** alarm |
| 26 | instrument waits for the printing to complete |
| 27 | operating menu displaying |
| 29 | AUTOMATIC LOADING phase |
| 30 | **USb Er** alarm (only with DATAUSB option) |
| 33 | **ErUEIG** alarm |
| 34 / 35 | **MEMFUL** / **MEMOUr** alarm (only with DATAUSB or DATAPC option) |
| 38 | the operator is starting an automatic batching |
| 39 | the operator is starting a manual batching |
| 40 | **SLAvE** alarm |

Values the source assigns only to other programs are omitted. Inputs 40017 (read only): bit 0 ... 2 = input 1 ... 3. Outputs 40018 (read only in the unloading program): bit 0 ... 4 = output 1 ... 5.

Register 40014: L byte = division, H byte = unit of measure.

| 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 | | |

## 26.5 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 |
| 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* |
| 207 | batching: ignores the alarm **tOL*** |
| 208 | interruption of the AUTOMATIC LOADING |
| 209 | batching continues when the message **COMAnd** appears or if INSTRUMENT STATUS = 12 (only if **COMAnd** = **YES**) |
| 250 | confirmation of batching data reading (section 26.9) |
| 2000 ... 2999 | formulas, consumption and cycles via the exchange registers (section 26.8) |
| 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 signals during the batching, command 205 accepts the alarm and stops the batching; with the **tOL** alarm, command 207 ignores the alarm and continues the batching. To execute the same command twice consecutively, send command 0 between them.

## 26.6 Analog output

– **MOdE** = **GrOSS** or **nEt** (chapter 15): 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 |

## 26.7 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).

## 26.8 Formulas, consumption and batching via protocol

Values are exchanged via the exchange registers 40051 … 40060 together with the command register. Reading: first set the selection registers (formula number, set/preset, 1 = consumption), send the reading command (CMD 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 into the exchange registers and send the writing command (CMD W). H/L = high/low half of the DOUBLE WORD.

| Variable | CMD R | CMD W | Register |
|---|---|---|---|
| Formulas (unloading program) | 2000 | 2001 | 40051 quantity H · 40052 quantity L · 40053 1 = set, 2 = preset · 40054 1 = set, 2 = preset · 40055 formula no. |
| Totals management | 2020 | – | 40051 quantity H · 40052 quantity L · 40053 formula no. · 40054 1 = consumption |
| Totals deletion date & 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 cycles H · 40053 cycles 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 26.9 |

– Writing a formula: quantity in 40051/40052, selection set (1) or preset (2) in 40053 and 40054 (as the source states for load and unload), formula number in 40055; send command 2001.

– Reading a formula: write the selection in 40053 and 40054, the formula number in 40055; send command 2000; read 40060 until it differs from 2000 (echo) or shows 0xFFFF (error); then read 40051/40052.

– Batching start: write formula number and number of cycles in 40051 … 40053 and set them with command 2031; then send command 201. Batching stop: command 204.

## 26.9 Batching data reading

At the end of the batching the instrument makes the data available. Check: send command 1114 and read 40051 – 1 = data ready. This command gives no echo; instead wait for bit 7 of 40060 to be equal to 1. Then send one of the following queries (CMD 2100, selection in 40051) and read the response in 40051 ... 40060:

| Query | 40051 | Response |
|---|---|---|
| Batching step | step no. (unloading program: 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 | 1005 | 40051/40052 value H/L · 40055/40056 alarm H/L · 40060 value detail |

Value detail (40060): bit 0 = negative value (refers only to the double word real batched), bit 7 = data ready. After reading send command 250; the instrument then accepts the alarm **SLAvE** and continues the batching sequence.

Batching data alarms (40055/40056): an alarm takes up one byte; if more than one alarm is present, up to four bytes are sent in chronological order.

| Code | Alarm |
|---|---|
| 0 | no alarm |
| 1 | general alarm |
| 2 | **EMPtY** |
| 3 | **MASFOr** |
| 5 | **COnS?** |
| 6 | **bLACH** |
| 7 | **tOL** |
| 8 | **UnLOAd** |
| 12 | batching STOP |
| 13 | **ErUEIG** |
| 14 | **FALL** |
| 15 | **SLAvE** |
| 22 | **PrOd??** |
| 23 | **LOAd**: AUTOMATIC LOADING function |
| 27 | **USb Er** (only with DATAUSB option) |
| 28 | **MEMFUL** (only with DATAUSB or DATAPC option) |
| 29 | **MEMOUr** (only with DATAUSB or DATAPC option) |

## 26.10 Communication example

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

| Direction | 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: address, function, first register H/L, number of registers H/L, CRC16 L/H; response: address, function, byte count, data, CRC16 L/H. Further CRC16 examples: Modicon PI-MBUS-300.

# 27 Directives and standards

According to the manufacturer's declarations of conformity (EU and United Kingdom, 12/12/2024):

| 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.