Operating Manual

WE2107

Weighing indicator

I1866-2.0 en

HBM

Contents

Typographical conventions

For clear identification and improved legibility, the following conventions have been used in this documentation:

Important paragraphs are marked with an attention symbol (Caution) to draw attention to them.

Italics	Indicates external documents and files.
“AdJ → SEtUP”	All menus and menu commands appear in quotes, here the “AdJ” main menu and the “SEtUP” second menu level.
“ENTER”	Quotes and italics are used for keys, input fields and user input.
[Tilt]	All displays are shown in square brackets.
EDP	Bold is used for communication commands.
Er125	Underlined normal print is used for error messages.

Important information

Neither the design of the device nor any technical safety aspects may be modified without the express permission of Hottinger Baldwin Messtechnik GmbH. Any modification excludes Hottinger Baldwin Messtechnik GmbH from any and all liability for any damage resulting therefrom.

It is strictly forbidden to carry out any repairs and soldering work on the motherboards or to replace any components. Repairs may only be carried out by persons authorized by Hottinger Baldwin Messtechnik GmbH.

The production number set at the factory must not be changed.

The transducer connection must always be assigned. It is essential for a transducer or a bridge model to be connected up for operation.

When replacing the battery for the real-time clock, the device must be disconnected from the power supply (→ Chapter 25, (page 117)).

When connecting the cables, the device must be disconnected from the voltage supply.

Safety instructions

- There are not normally any hazards associated with the product, provided the notes and instructions for project planning, installation, appropriate operation and maintenance are observed.
- It is essential to comply with the safety and accident prevention regulations specific to the particular application.
- Installation and start-up must only be carried out by suitably qualified personnel.
- Do not allow damp and dirt to get inside the device when connecting the cables.
- When connecting the cables, take action to prevent electrostatic discharge as this may damage the electronics.
- The required power supply for the device is an extra-low voltage (12 … 30 V) with safe disconnection from the mains.
- When connecting additional devices, comply with the safety requirements.
- Do not exceed maximum voltage levels when connecting external controls to the process inputs and process outputs of the WE2107.
- The ground connections of the supply, the process inputs and process outputs, the interface and the load cell cable shield must be interconnected in the device. If the potentials of the devices to be connected are different, suitable steps must be taken to isolate the signals (such as using an optocoupler).
- Shielded cables must be used for all connections apart from the supply voltage (see note below). The shield must be connected extensively to ground on both sides.
- The use of unshielded cables for the voltage supply is only permissible for cables with a maximum length of 30 m, laid inside buildings. If cables are longer or are installed outside buildings, shielded cables must be used (as per EN 61 326).
- To compensate for potential differences, the metal housing of the WE2107M must be connected to the scale structures as well as to the ground potential of the connected devices by a low-resistance equalizing conductor. This is unnecessary if the potential difference does not exceed 35 V.
- In the device, the reference ground (GND) of all the signals and the supply voltage is connected directly to the cable shield connection but not to the housing.
- Connection to a wide-ranging supply network is not permitted as this often causes interfering voltage peaks to be coupled into the electronics. Instead, a local supply must be provided for the WE2107 (even when grouped).
- The front foil is made from high-quality materials, providing a service life appropriate to the external conditions. The keys must only be operated by hand; under no circumstances must pointed objects be used to press them.

1 Introduction and appropriate use

This Operating Manual contains detailed information both on operation and on the setting options of the WE2107 weighing indicator.

The WE2107 is designed exclusively for use in industrial applications, for example

- As a component of a non-automatic scale (NAWI) [1)]
- As a component of a non-automatic counting scale (not legal-for-trade applications)
- As a component for a process control system with 4 limit value switches
- As a component of a dosing/filling control system (filling, dosing, emptying)
- As a component of an application for fill level systems (filling, dosing, emptying)

Use for any purpose other than the above is deemed to be non-designated use.

In the case of legal-for-trade use, national legal and safety regulations must be complied with.

1) NAWI – non automatic weighing instrument

2 Special features

The WE2107 weighing indicator is a measuring amplifier for connection to commercially available strain gage load cells or scales. The load cell signal is amplified and digitally converted; all further processing steps then follow digitally in a microprocessor.

The WE2107 has available:

- Load cell connection: Up to six load cells of 350 Ω or up to eight load cells of 58 Ω
- COM port for serial communication with a PC / PLC (RS232 or RS485)
- COM port for a printer or an external large-scale display (RS232)
- 2 digital control inputs
- 4 digital outputs (limit value switches or filling / dosing control)
- One analog output (4 … 20 mA)
- Two function keys (user-defined)

The electronics are set and parameterized via keyboard or interface. The setup program *WE2107_Panel* is used for this and is contained on the HBM CD-ROM, order no. *1-WE2107-DOC*, together with this documentation (a description of the command set is also included).

Additional features:

- Accuracy in legal-for-trade applications up to 6000e (0.8 µV/e)
- Use as 1, 2 or 3-range scale
- Disabling/enabling of menu functions
- Filter selection
- Maximum capacity adjustment, partial capacity adjustment, mV/V calibration
- Zero on start-up
- Automatic zero tracking
- Weighing range linearization
- 4 limit value switches with hysteresis
- Alibi memory for adjustment parameters and weighing results
- Different print functions with summation memory
- Numerous monitoring and error detection functions

3 Mechanical construction and scope of supply

WE2107 (scope of supply):

- WE2107 weighing indicator in a **plastic housing** (ABS) with four PG glands
- 2 countersunk head bolts + plugs for wall-mounting
- Adhesive label for closing and sealing the opening for the calibration pushbutton and labeling strips
- 8 labeling strips for scale data
- 2 COM ports (RS232):
  - COM1 for serial communication with a computer
  - COM2 for a printer or external large-scale display

Fig. 3.1: View of the WE2107

WE2107M (scope of supply):

- Weighing indicator WE2107M (**panel-mounted device, stainless steel front**)
- Adhesive label for closing and sealing the opening for the calibration pushbutton and labeling strips
- 8 labeling strips for scale data
- 2 COM ports:
  - COM1 (RS485, 2-wire) for serial communication with a computer
  - COM2 (RS232) for a printer or external large-scale display

Fig. 3.2: View of the WE2107M

4 Scale commissioning overview

The permissible supply voltage for the WE2107 is in the range +12 (18) … 30 V_{DC} and must be adequately smoothed (rms value less residual ripple <1 V).

If the analog output (4 … 20 mA) is used, the minimum supply voltage is 18 V_{DC}.

A 100 … 240 V power supply unit is available as an accessory (HBM order no.: 1-AC/DC15 V / 550 mA). This unit is suitable as long as the analog output is not used.

When properly connected with shielded cables, the WE2107 complies with the relevant European standards and carries the CE mark.

Mechanical dimensions and mounting information are described in Chapter 26 (page 118).

Subsequent sub-chapters provide an overview of the sequence of steps that needs to be taken to commission the scale, depending on the application:

- As a component of a non-automatic scale (NAWI, [1]) → Chapter 4.1 (page 15)
- As a component of a non-automatic counting scale (not legal-for-trade applications) → Chapter 4.2 (page 16)
- As a component for a process control system with 4 limit value switches → Chapter 4.1 (page 15)
- As a component of a dosing/filling control system (filling, dosing, emptying) → Chapter 4.3 (page 17)
- As a component of an application for fill level systems (filling, dosing, emptying) → Chapter 4.3 (page 17)

This overview includes information on the respective chapters in this Operating Manual.

1) NAWI – non automatic weighing instrument

4.1 NAWI application (with / without limit values)

- Opening the device
- Connecting the load cell(s), Chapter 5 (page 18) and 5.4 (page 20)
- Connecting the supply voltage, Chapter 5 (page 18) and 5.6 (page 21)
- Connecting the digital inputs/outputs, Chapter 5 (page 18), 5.5 (page 21) and 5.7 (page 22)
- Connecting the serial connections, Chapter 5 (page 18), 5.8 (page 23) or 5.9 (page 23)
- Inserting the enclosed battery (type: CD2032) into the battery holder, Chapter 25 (page 117)
- Close the device
- Mounting the device, Chapter 26 (page 118)
- Switching on the device, Chapter 7.2 (page 30)
- Calling the parameter menu via the hidden key, Chapter 8 (page 34)
- Enabling all menu functions, Chapter 8.5.10 (page 54)
- Setting the weighing range, Chapter 8.5.11 (page 56)
- Setting the correct filters, Chapter 9 (page 60)
- Adjusting the weighing range, Chapter 10 (page 61)
- Linearization (only when necessary), Chapter 11 (page 68)
- Settings for legal-for-trade applications, Chapter 12 (page 70)
- Setting parameters for the serial interfaces, Chapter 8.5.5 (page 45), 15(page79) or 16 (page 88)
- Setting the date and time, Chapter 15.7 (page 86)
- Setting function keys F1 and F2, Chapter 13 (page 74)
- Setting the digital input functions, Chapter 17 (page 91)
- Setting the digital output functions, Chapter 18 (page 94), 19 (page 95)
- Disabling menu functions (if necessary), Chapter 8.5.10 (page 54)
- Filling out the labeling strip, securing the labeling strip, Chapter 12 (page 70)
- Checking settings and functions

4.2 NAWI application (counting scale function)

- Opening the device
- Connecting the load cell(s), Chapter 5 (page 18) and 5.4 (page 20)
- Connecting the supply voltage, Chapter 5 (page 18) and 5.6 (page 21)
- Connecting the digital inputs/outputs, Chapter 5 (page 18), 5.5 (page 21) and 5.7 (page 22)
- Connecting the serial connections, Chapter 5 (page 18), 5.8 (page 23) or 5.9 (page 5.9)
- Inserting the enclosed battery (type: CD2032) into the battery holder, Chapter 25 (page 117)
- Close the device
- Mounting the device, Chapter 26 (page 118)
- Switching on the device, Chapter 7.2 (page 30)
- Calling the parameter menu via the hidden key, Chapter 8 (page 34)
- Enabling all menu functions, Chapter 8.5.10 (page 54)
- Setting the weighing range, Chapter 8.5.11 (page 56)
- Setting the correct filters, Chapter 9 (page 60)
- Adjusting the weighing range, Chapter 10 (page 61)
- Linearization (only when necessary), Chapter 11 (page 68)
- Setting the counting scale function, Chapter 14 (page 76)
- Setting parameters for the serial interfaces, Chapter 8 (page 34), 15 (page 79) or 16 (page 88)
- Setting the date and time, Chapter 15.7 (page 86)
- Setting function keys F1 and F2, Chapter 13 (page 74)
- Setting the digital input functions, Chapter 17 (page 91)
- Setting the digital output functions, Chapter 18 (page 94), 19 (page 95)
- Disabling menu functions (if necessary), Chapter 8.5.10 (page 54)
- Filling out the labeling strip, securing the labeling strip
- Checking settings and functions

4.3 Dosing and fill level applications

- Opening the device
- Connecting the load cell(s), Chapter 5 (page 18) and 5.4 (page 20)
- Connecting the supply voltage, Chapter 5 (page 18) and 5.6 (page 21)
- Connecting the digital inputs/outputs, Chapter 5 (page 18), 5.5 (page 21) and 5.7 (page 22)
- Connecting the serial connections, Chapter 5 (page 18), 5.8 (page 23) or 5.9 (page 23)
- Inserting the enclosed battery (type: CD2032) into the battery holder, Chapter 25 (page 117)
- Close the device
- Mounting the device, Chapter 26 (page 118)
- Switching on the device, Chapter 7.2 (page 30)
- Calling the parameter menu via the hidden key, Chapter 8 (page 34)
- Enabling all menu functions, Chapter 8.5.10 (page 54)
- Setting the weighing range, Chapter 8.5.11 (page 56)
- Setting the correct filters, Chapter 9 (page 60)
- Adjusting the weighing range, Chapter 10 (page 61)
- Linearization (only when necessary), Chapter 11 (page 68)
- Setting parameters for the serial interfaces, Chapter 8 (page 34), 15 (page 79) or 16 (page 88)
- Setting the date and time, Chapter 15.7 (page 86)
- Setting function keys F1 and F2, Chapter 13 (page 74)
- Setting the digital input functions, Chapter 17 (page 91)
- Setting the dosing function, Chapter 20 (page 96)
- Disabling menu functions (if necessary), Chapter 8.5.10 (page 54)
- Filling out the labeling strip, securing the labeling strip
- Checking settings and functions

5 Electrical connections

5.1 Notes

Please comply with the safety instructions at the start of this description.

The load cell and all the control and supply cables are connected by means of screw terminals inside the housing. The terminals are fitted with wire protection and the use of end sleeves is recommended, particularly for the load cell cables.

Connection terminals are identified on the motherboard by a short text or numbers.

All the ground connections are interconnected on the motherboard.

5.2 Cable entry

Four PG glands are available at the back of the housing to provide sealed cable entry. Round cables, between 5 and 7 mm in diameter, can be used. The PG glands are used purely for sealing and strain relief. The cable shielding therefore does not have to come into contact with the PG gland (as it does in other HBM devices), but with the screw clamps in front of the connection terminals.

This also applies to versions with a steel housing (WE2107M) and is important for device EMC properties.

To minimize EMC problems, the individual wires should be as short as possible from the end of the shield to the terminal. So avoid making cross-connections, e. g. from the interface cable to a switching input, and instead use separate cables in accordance with the terminal arrangement. A common cable should be used for the supply and the switching inputs.

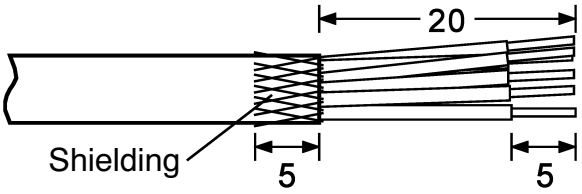
5.3 Cable preparation

Remove the outer sheath to about 20 mm.

Shorten the braided shield to 5 mm and fold it back.

If necessary, remove the inner sheath.

Strip the wire ends to about 5 mm.



Run the cable through the gland.

Push the cable under the terminal clamp and screw it down, so that the folded over shield area is firmly held.

Connect the wires to the terminals.

Load cell connection	1.	Bridge excitation voltage +
	2.	bridge excitation voltage –
	3.	Signal +
	4.	Signal –
	5.	Sense line +
	6.	Sense line –
Process outputs	Out4	Process output 4
	Out3	Process output 3
	Out2	Process output 2
	Out1	Process output 1
	Uext	Supply voltage Out 1 … 4
	GND	Ground, Out 1 … 4
Supply	GND	Ground
	UB	Supply voltage WE2107
Current output	I–	Current output, 4 … 20 mA
	I+	Current output, 4 … 20 mA
Process inputs	IN2	Process input 2
	IN1	Process input 1
COM1/2 interface	Rx1	COM1: RxD (RS232) or TRb (RS485)
	Tx1	COM1: TxD (RS232) or TRa (RS485)
	GND	Ground
	Rx2	COM2 (RS232): RxD or DTR
	Tx2	COM2 (RS232): TxD
	GND	Ground

Fig. 5.1: Connection positions (open housing, rear view)

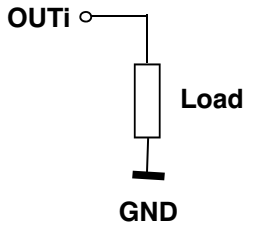
5.4 Load cell connection

Terminal	Motherboard imprint	Function
1	Ex+	Bridge excitation voltage +
2	Ex–	bridge excitation voltage –
3	In+	Signal +
4	In–	Signal –
5	Se+	Sense line +
6	Se–	Sense line –

Up to six load cells, each of 350 Ω (≥ 58 Ω loading) can be connected to the WE2107. HBM provides type **VKK** junction boxes for connecting cables and for corner load adjustment for scales with several load cells.

The WE2107 is designed for a six-wire load cell configuration. When connecting four-wire load cells, use cable jumpers to connect terminals **1 with 5** and **2 with 6** in each case. If the load cell connection is incorrect or the sense lines are left open (terminals 1 and 2) the message **Er 68** will appear on the display (see Chapter 24, page 113).

5.5 Process outputs

Terminal	Motherboard imprint	Function	Connection example
7	OUT4	Process output 4 [1]	
8	OUT3	Process output 3 [1]	
9	OUT2	Process output 2 [1]	
10	OUT1	Process output 1 [1]	
11	Uext	Operating voltage (+12 … 30 V_{DC}) Process outputs	
12	GNDext	Ground, process outputs	

[1] High-side switch, high voltage = active (true logic)
I_{max} = typically 500 mA (electronically protected)

5.6 Operating voltage

Terminal	Motherboard imprint	Function	Comments
13	GND	Ground	
14	U_B	Operating voltage	+12 … 30 V_{DC} [1] without analog output (4 … 20 mA) +18 … 30 V_{DC} [1] with analog output (4 … 20 mA)

[1] The supply voltage must be sufficiently smoothed (residual ripple <1 V)

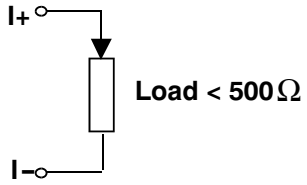
Connection to a wide-ranging supply network is not permitted as this often causes interfering voltage peaks to be coupled into the electronics. Instead, a local supply must be provided for the WE2107 (even when grouped).

5.7 Process inputs / Analog output

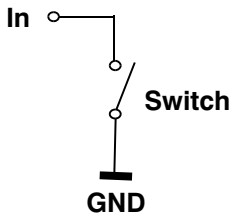
Terminal	Motherboard imprint	Function
15	I+	Analog output 4 … 20 mA
16	I–	Analog output 4 … 20 mA
17	IN2	Process input 2 [1)]
18	IN1	Process input 2 [1)]

1) Actuate by switching to ground, max. voltage 30 V
Level: Low = 0 … 1 V, High = 3 V … U_B

Analog output assignment:



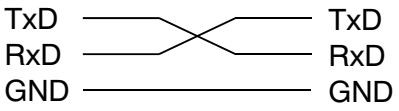
Process input assignment:



5.8 WE2107 – RS232 interfaces

Terminal	Motherboard imprint	Function		Standard assignment of external device
				RS232, DB9
19	Rx1	Receiver	COM1	Pin 3
20	Tx1	Transmitter	COM1	Pin 2
21	GND	Ground	COM1	Pin 5
22	Rx2 / DTR [1]	Receiver	COM2	Pin 3 / Pin 4
23	Tx2	Transmitter	COM2	Pin 2
24	GND	Ground	COM2	Pin 5

[1] Defined by the COM2 protocol (parameter menu)



For communication with an external device, the TxD line must be connected to the RxD of the WE2107 and vice versa.

5.9 WE2107M – RS232 and RS485 serial interfaces (2-wire)

Terminal	Motherboard imprint	Function	
19	Rx1 / TRb	RS485 line B	COM1
20	Tx1 / TRa	RS485 line A	COM1
21	GND	Ground	COM1
22	Rx2 / DTR [1]	Receiver	COM2
23	Tx2	Transmitter	COM2
24	GND	Ground	COM2

[1] Defined by the COM2 protocol (parameter menu)

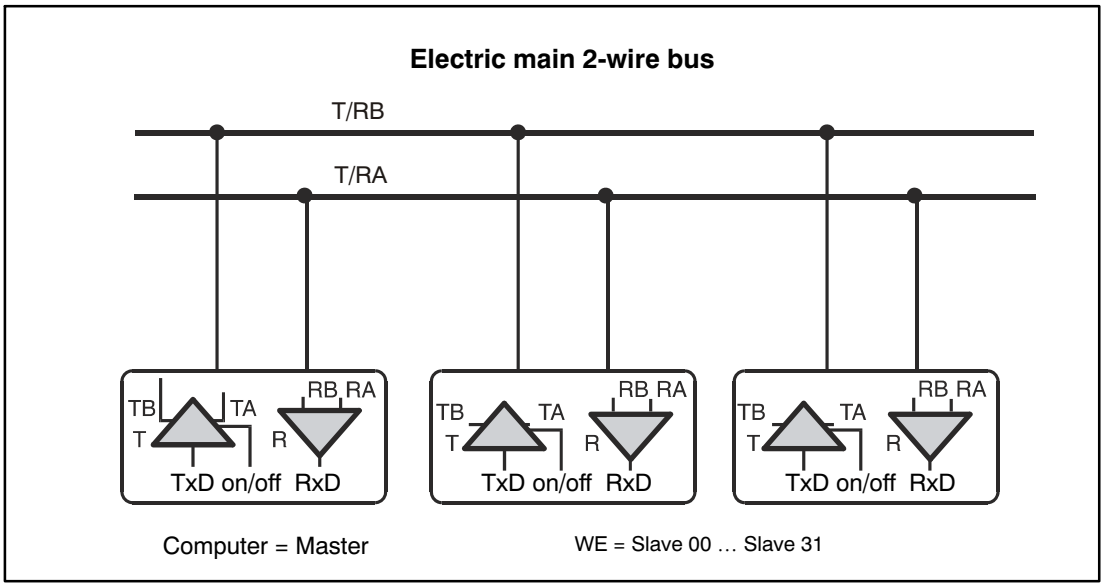


Fig. 5.2: RS485 2-wire bus

The interface signals T/RA and T/RB are switched in parallel for all AEDs and the Master.

The WE2107M is connected to a PC COM port via an interface converter. This interface converter can be ordered from HBM (order no. 1-SC232/422A).

The HBM interface converter contains bus termination resistors.

When connecting several WE2107Ms to a COM port, connect as shown in Figure 5.2. The WE2107M connections are switched in parallel.

5.10 Notes

In all the housing variants, the reference ground (GND) of all the signals and the supply voltage is connected directly to the cable shield connection in the device, but not to the housing.

The metal housing of the WE2107M is not connected to the reference ground. To compensate for potential differences, the metal housing of the WE2107M must be connected to the scale structures as well as to the ground potential of the connected devices by a low-resistance equalizing conductor. This is unnecessary if the potential difference does not exceed 35 V.

Only high-quality, flexible cables with a shield must be used to connect the load cells. HBM recommends using these cables for all the WE2107 connections. For a connection that meets EMC requirements (EMC = electromagnetic compatibility), the cable shield contact of all the cables to the device ground must be low-resistance. The shield must be stripped to about 5 mm and the cable must be secured with the strain relief clamp for this purpose.

Electrical and magnetic fields often induce interference voltages in the measuring circuit. Use shielded, low-capacitance measurement cables only (HBM measurement cables meet these conditions). Do not route the measurement cables parallel to power lines and control circuits. If this is not possible, protect the measurement cable (e. g. with a rigid steel conduit). Avoid stray fields from transformers, motors and contact switches.

Connection to a wide-ranging supply network is not permitted as this often causes interfering voltage peaks to be coupled into the electronics. Instead, a local supply must be provided for the WE2107 (even when grouped).

6 Control and display functions

6.1 Device view

The front of the WE2107 comprises the following elements:

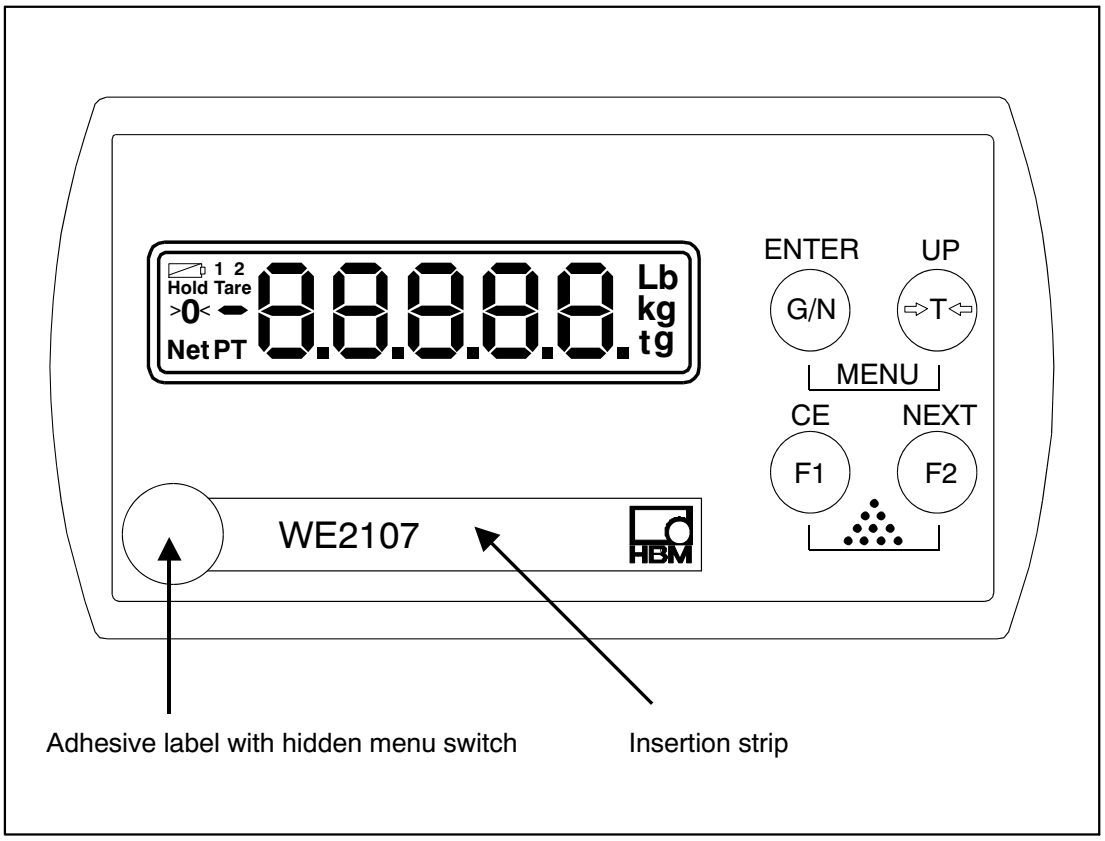


Fig. 6.1: WE2107 front

- Display window with a 5-figure digital display and special symbols.
- Four control keys for the scale and menu functions (“*G/N*”, “*>T<*”, “*F1*”, “*F2*”).
- Hidden pushbutton for access to the calibration menu. The pushbutton can be accessed with a pointed object (when the label is removed). After calibration, the opening is sealed with the enclosed adhesive label or, for legal-for-trade applications, with the calibration label. Device calibration is protected in operation and can only be changed when this pushbutton is actuated.
- Inspection window for inserting a labeling strip (for calibration data, device name, etc.).

The PG glands and the bushings for the connection cables are located on the back of the device.

6.2 Control elements

Each of the four keys has a basic function for scale operation, which is identified by a symbol on the key.

- *"G/N"* Key for toggling between the gross and net display.
- *">T<"* Key for taring and switching to the net display or zeroing (press key > 5 s).
- *"F1"* Function key, which is defined by the user in the parameter menu.
- *"F2"* Function key, which is defined by the user in the parameter menu.

The labeling above the keys indicates the second function of the keys during parameter input (menu guidance).

MENU function activation:

- Press the *"ENTER"* + *"UP"* keys simultaneously
- Hidden pushbutton for access to the Adjustment menu.

6.3 Display

The display consists of the following elements:

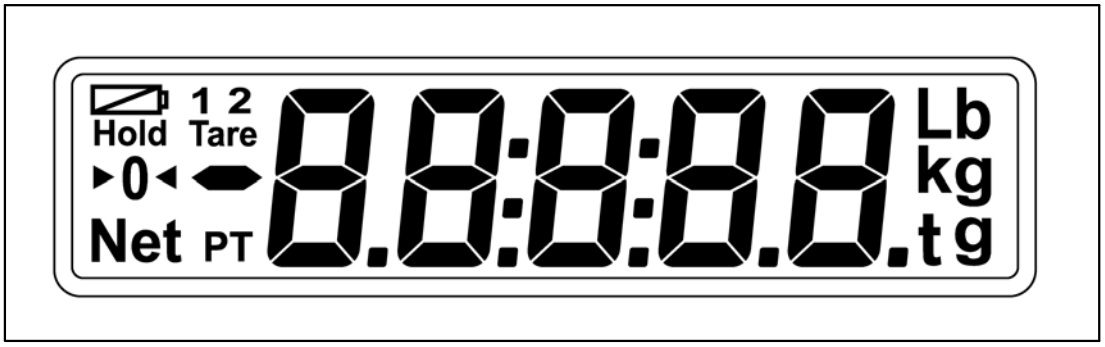


Fig. 6.2: Display

8.8.8.8.8.	5-figure digital display with decimal points for the weight value and for menu guidance during parameter input.
Symbol 1 and Symbol 2	The meaning depends on the type of scale: **Single-range scale:** Symbol indicates an active limit value 1 or 2. **Multi-range scale:** Symbol indicates the current weighing range: Range 1: Symbol 1 Range 2: Symbol 2 Range 3: Symbols 1 and 2 **Parameter setup:** The symbols indicate the menu level: 1 = level1, 2 = level2, 1/2 = level3, 1/2 (flashing) = parameter input/selection.
Hold	Hold function is activated.
tArE	Appears when the net value is displayed (simultaneously with Net).
▸0◂	(“True zero”): indicates that the measured value is in the +1/4 d range.
NEt	Appears when the net value is displayed.
Pt	(Preset Tare): Appears when a stored manual tare value is used.
g, kg, t, Lb:	Indicates the valid unit of measurement (during standstill conditions).

Display illumination

LCD backlighting is always on once the power is connected.

7 Basic scale functions

All device functions can be controlled in one or more of the following ways:

- Front control with four short-stroke keys (of which two, *"F1"* and *"F2*", can be defined by the user)
- Two programmable switching inputs (IN1/2)
- Connecting an external computer via the COM1 serial interface

The keyboard directly controls the essential scale functions (Gross/Net, Tare, Set to Zero). A menu is called for calibration and for additional device settings. Scale operation is **not** interrupted during parameter input, right up to exiting the menu. When computer commands are used for control, measurement generally continues without interruption. The exceptions to this are settling after filter selection and power failsafe storage to the EEPROM.

7.1 Zero setting the scale

If the Tare key (">T<") is pressed for longer than five seconds, it activates the zero setting function.

So immediately after zero setting, the displayed gross value is zero. The zero value can be read in the "InFo → ZErO" menu item.

LEGAL setting	**Range of zero setting, lower limit**	**Range of zero setting, upper limit**
Not legal-for-trade [1)]	–20 %	+20 %
OIML, NTEP	–2 %	+ 2 %

1) ± 2 % up to software version P72, ± 20 % from software version P73

The % figures relate to the nominal weighing range ("AdJ → CAP" parameter).

Execution is dependent on standstill recognition (Chapter 7.8, page 33).

The net display is deactivated.

7.2 Switching on and off

The device is switched on once the supply voltage is applied.

When the electronics are switched on, first all the display segments are triggered for 5 s. Then the software version (P7x) or the calibration counter (“check counter”, only for legal-for-trade applications) are displayed. During this time, if the function is activated, zero is automatically set.

The scale must not be loaded when it is being switched on.

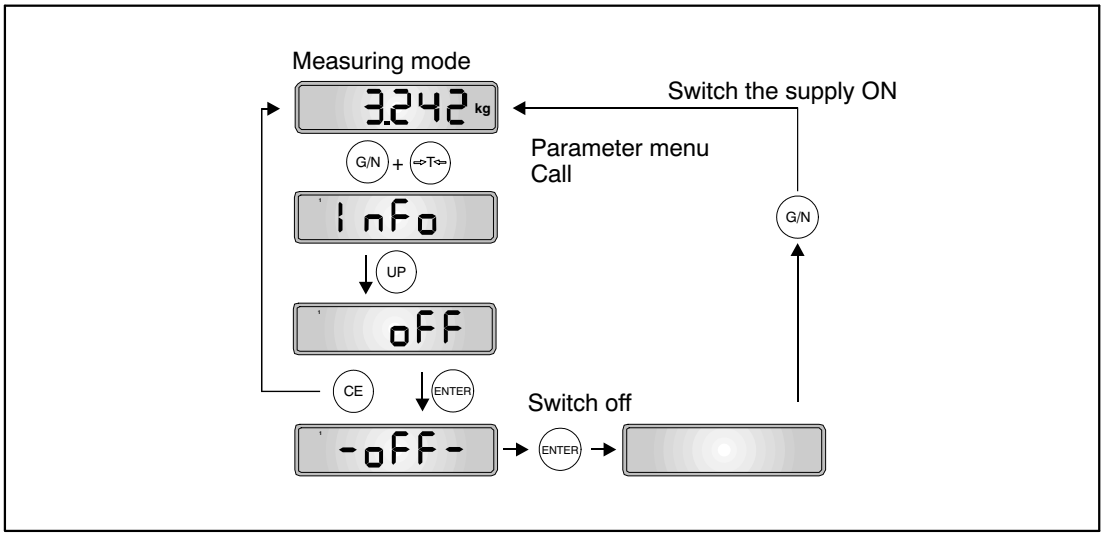


Fig. 7.1: Switching on and off

7.3 Gross/net selection

Every time the *“G/N”* key is pressed, the selection changes between gross and net. When selecting the net display, the last valid tare value is re-used. It is only possible to select net after taring.

7.4 Taring

Pressing this key stores the current gross value and deducts it from all the subsequent weight values. The displayed (net) value is zero immediately after taring. The tare value can be read in the “InFo → tArE” menu item.

LEGAL setting	Tare range, lower limit	Tare range, upper limit
Not legal-for-trade	–100 %	100 %
OIML, NTEP	>0	100 %

The % figures relate to the nominal weighing range (“AdJ → CAP” parameter)

Execution is dependent on standstill recognition (Chapter 7.8, page 33).

Taring with this key overwrites any manual tare value that may have been entered previously (PT symbol is switched off).

7.5 Manual tare function

A manual tare value can be entered and manual tare value calculation activated/deactivated with function key *“F1”* or *“F2”*, if these functions have been activated (see Chapter 8.5.8 (page 51) and 13 (page 74)).

When the “Manual tare” function is active, the net value is formed by deducting a fixed tare value.

The *“G/N”* key does not change the entered manual tare value.

The PT symbol in the display indicates that the net value has been formed by deducting the manual tare value. This disappears after taring with the Tare key *(”>T<”)*.

If the tare function was activated, it will also be activated once the device is switched back on.

7.6 Zero on start-up

If this function is activated (“AdJ → SEtuP → AZEro” parameter menu), the unloaded scale is automatically set to zero when the WE2107 is switched on (range of zero setting device ± 2...20%). This takes into consideration the set standstill condition.

7.7 Error displays

The permissible display range depends on the nominal (rated) value of the scale and the set mode of operation (not legal for trade / OIML / NTEP).

Operating mode	**Lower display limit**	**Upper display limit**
not legal-for-trade	–160%	+160%
OIML	–20 d as from firmware P74 (–2% in older versions)	Nominal (rated) value + 9 d
NTEP	–2%	Nominal (rated) value + 5%

The percentage figures relate to the nominal weighing range (“CAP” parameter).

The following error message appears in the display when the measured value is

above the maximum display range: (marks above)

below the minimum display range: (marks below)

Additional errors are shown as three-digit code numbers (e.g. Er128). They should not occur in normal operation (see also Chapter 24, page 113).

7.8 Standstill recognition

The zeroing, taring, summing and printing functions are only executed if the value in the display is stable. This is known as standstill and is indicated by showing the unit of measurement. The condition for standstill is that the value changes by no more than a specific fluctuation range per time unit. With fluctuating (wind) loads or a very high scale resolution, it is quite possible that standstill will never be achieved. In this case, a more strongly damping filter or a lower resolution must be selected in the parameter setting.

The various options for standstill indication are selected in the “AdJ → SEtUP” menu, see also Section 8.5.11 (page 56).

It is also possible to switch off the standstill conditions (but not for legal-for-trade applications).

The zeroing, taring and printing functions are not executed if standstill is still not achieved 5 s after activation.

7.9 Function keys *“F1”*/*“F2”*

The user can define the function of both these keys (parameter menu / keys). Each key can be assigned two functions (short and long keystroke, see Chapter 8.5.8 (page 51) and 13 (page 74)).

7.10 External operator controls

Depending on the configuration of the scale, the gross / net selection, taring and printing functions can also be controlled by external switches (for actuation from the vehicle, for example). The required function is assigned in the parameter menu (see Chapter 8.5.7 (page 50) and 17 (page 91)).

8 Parameter menu

8.1 Calling the parameter menu

There are two ways to activate the parameter menu:

- Press the “*G/N”* and *“>T<”* **keys simultaneously or**
- Press the hidden pushbutton

The difference is the access to the legal / scale adjustment parameters:

Pressing the hidden pushbutton gives access to the legal parameters of the first menu level (“ScALE”, “AdJ” and “F_AdJ”), otherwise these parameters are only displayed.
You are prevented from calling the parameter menu if input IN2 has been activated accordingly (see Chapter 8.5.7 (page 50) and 17 (page 91)).

8.2 Disabling / enabling menu functions

The parameter menu has so-called access levels (0...4). This feature is used to enable or disable user access to the parameters. Only those menu items that are enabled are displayed.

Access to change parameters is defined in the “ScALE → ACCES” menu. The lowest level is zero. The “ScALE → ACCES” menu is protected by the hidden pushbutton.

ACCES parameter	Access levels
0	0 only
1	0 and 1
2	0 to 2
3	0 to 3
4	All

8.3 The Main Menu

To make things clearer, the parameters are grouped into several sub-menus, which can be called from the main menu. It is also possible to manually switch off the device (see Chapter 7, page 29) and print out the parameters (but only if the printer interface is active). Certain parameters are not accessible in every mode of device operation, or are read-only. To make adjustments for legal-for-trade devices, it is necessary to actuate a hidden pushbutton, which is only accessible once the calibration label has been removed.

The parameter menu contains the following items:

Access level	Main menu level	Explanation	Legal for trade parameter [1]
0	“InFo”	Information	–
1	“Print”	Printing	–
2	“SEtPt”	Limit values / filling parameters	–
2	“SEtuP”	Filters / manual tare value / counting scale	–
3	“UArt1”	COM1 for the PC interface	–
3	“UArt2”	COM2 for the printer / external display	–
3	“Prt_S”	Real time setting, print protocol settings	–
3	“inPut”	IN1/2 digital inputs function	–
3	“buttn”	Function for setting function keys F1/2	–
3	“tESt”	WE2107 test functions	–
0	“ScALE”	Basic scale functions	yes
4	“AdJ”	Adjustment parameters	yes
4	“F_AdJ”	Restore the factory settings	yes
0	“oFF”	Switch off the device	–

[1] Access only via hidden pushbutton

8.4 Navigation in the parameter menu

The parameter menu has three levels. The first two levels are used for structuring the menu. Parameters are displayed and entered in the third level. All four keys are used for navigation in the parameter menu.

8.4.1 Navigation in levels 1 and 2

Button	Explanation
"UP"	Previous parameter
"NEXT"	Next parameter
"ENTER"	Go to sub-menu / change parameter
"CE"	Back to the higher menu level or back to measurement

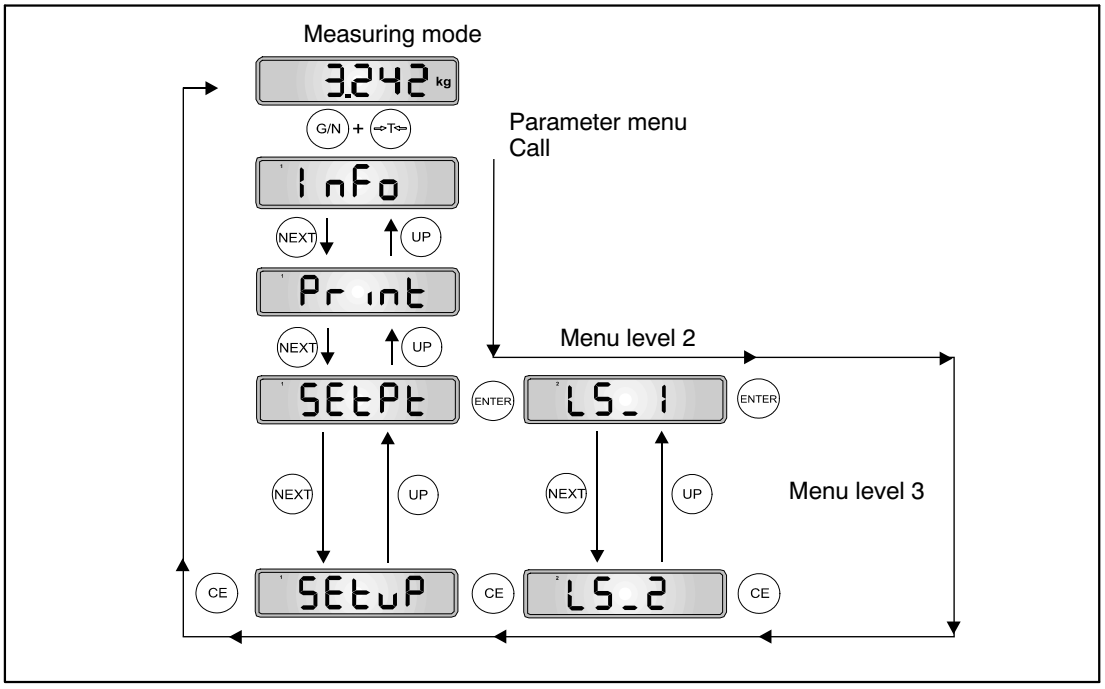


Fig. 8.1: Example of navigation in levels 1 and 2

8.4.2 Navigation in the third parameter level

There are four types of parameter access: D / S / M / I. The menu descriptions below explain each type.

Parameter or information display only (D = display**):**

Button	Explanation
"CE" or *"ENTER"*	No change → Next parameter

Parameter selection (S = select**):**

Button	Explanation
"UP"	Previous feature
"NEXT"	Next feature
"ENTER"	Stores new value → Next parameter
"CE"	No change → Next parameter

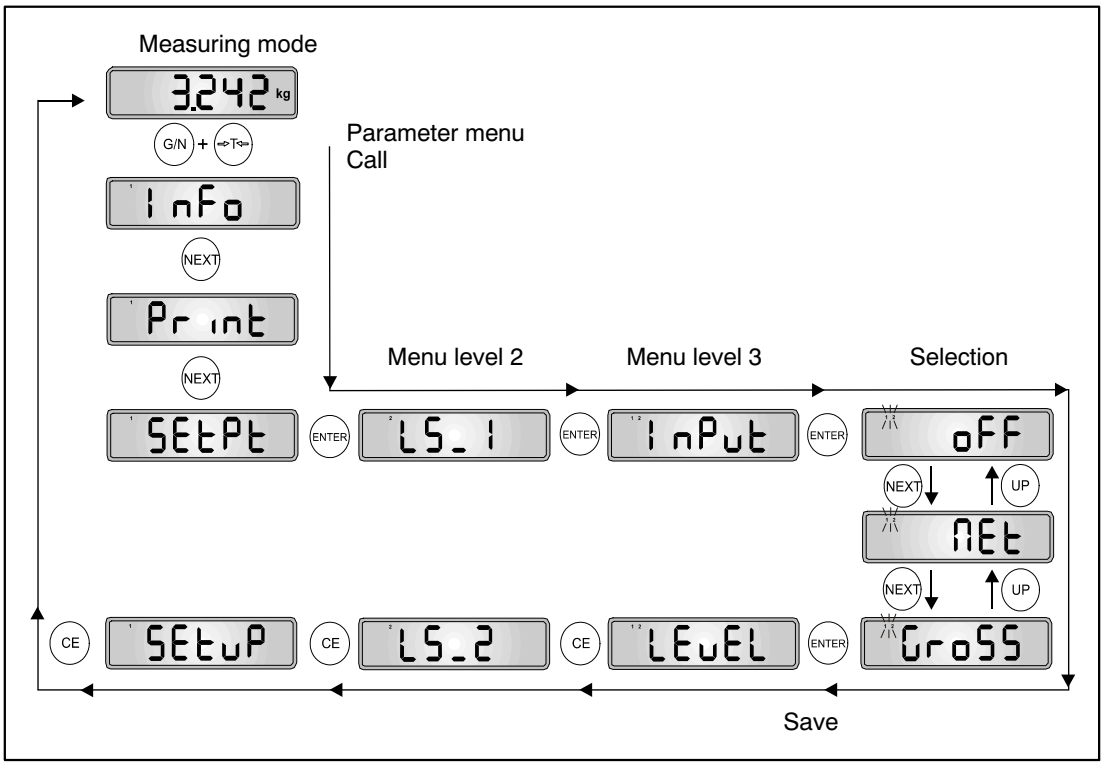


Fig. 8.2: Example – Parameter selection

Measurement function (M = measure**):**

Button	Explanation
"ENTER"	Stores new value → Next parameter
"CE"	No change → Next parameter

This measurement function is only implemented in the Adjustment menu ("AdJ → MEAS").

Parameter input (I = input**):**

Button	Explanation
"U"	Next number 0 → 9 → 0 ...
"NEXT"	Next digit position (from right to left)
"ENTER"	Stores new value → Next parameter
"CE"	No change → Next parameter

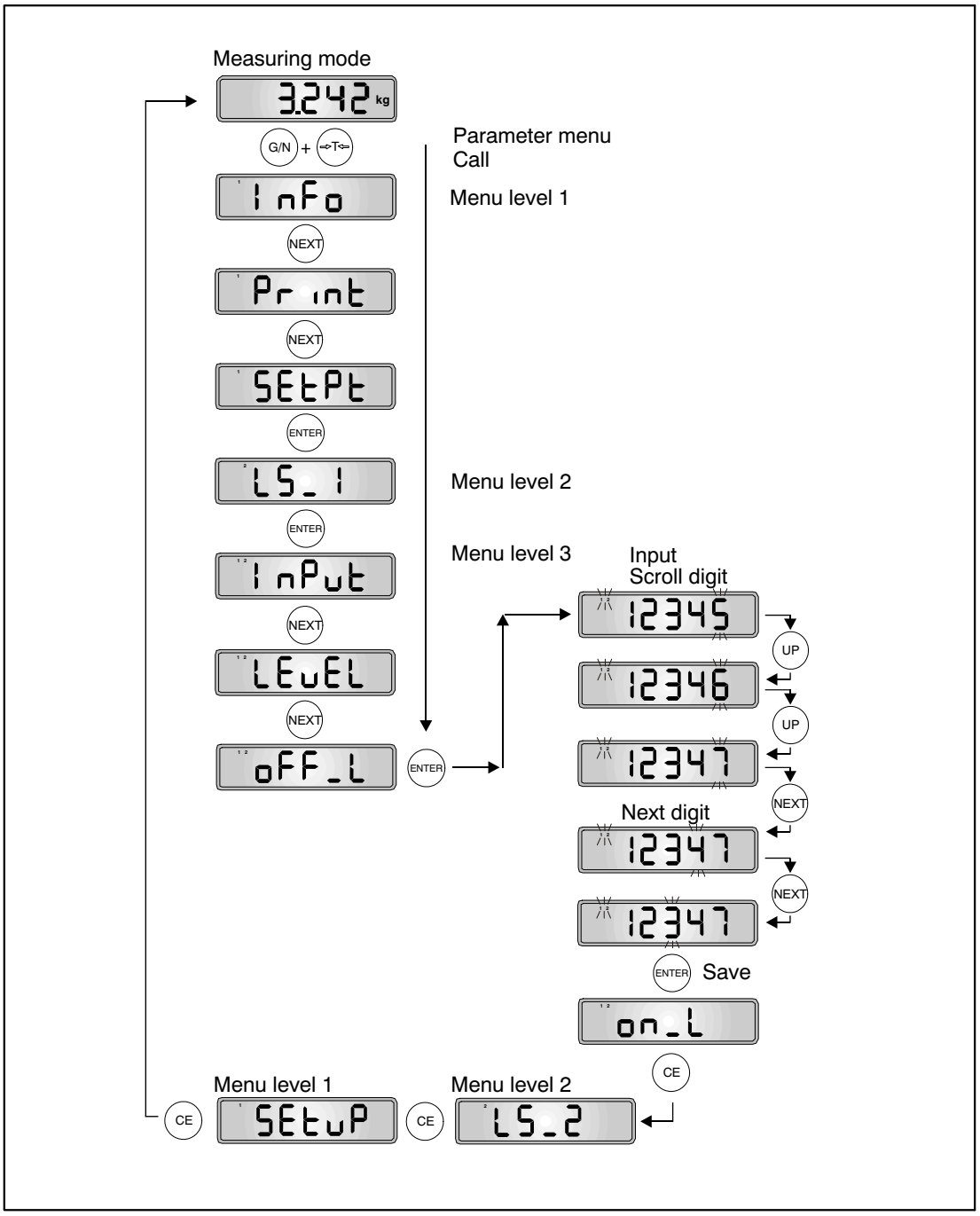


Fig. 8.3: Example – Parameter input (current input position flashes)

8.5 Full menu structure

The description follows the main menu sequence (for the first level, see Chapter 8.3 (Page 35)).

8.5.1 Information submenu

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
0	"InFo →				**Information display**
		VAL →			Internal values display
			CALC"	D	Legal-for-trade counter Is incremented if the scale/legal parameter changes.
			tArE"	D	Current tare value
			ZEro"	D	Zero value
			totAL"	D	Total weight (cumulative value) [1)]
			FILL"	D	Filling result
			Sv_nb"	D	Software version (7x, x = 0...9)
			F_nb"	D	WE2107 production number
		Error →			Error display
			AdC"	D	ADC overflow counter (see Chapter 24, page 113)
			SEnS"	D	Sensor overflow counter (see Chapter 24)
			Error"	D	Last error code (see Chapter 24)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

1) The total weight has more than five digits. This display function first shows the first part (without the decimal point), followed 3 s later by the last part (5 digits with the decimal point).

8.5.2 Selecting a print protocol and starting printing

The print function is only accessible if COM2 is activated for printing.

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
1	"Print →				**Printing**
		rESLt →			Results
			Prt"	S	Selects a print protocol (1 ... 9) [1] and starts printing. This parameter is also valid for digital inputs IN1/2 and for printing via function keys "*F1/2*".
		PAr →			Parameters
			ALL"		Print out all parameters

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

[1] 1…9 as from software version P74

The menu is needed to start a printout if no function key has been activated for printing. It is also needed to select the relevant print function for a function key.

The print function is described in Chapter 15 (Page 79).

8.5.3 Limit value switches and dosing/filling parameters

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
2	“SEtPt →				**Limit values / filling parameters**
		LS_1 →			Limit value switch 1
			inPut”	S	Limit value switch 1, input value: OFF/NET/GROSS
			LEvEL”	S	Limit value switch 1, output: truE / InvErt
			oFF_L”	I	Limit value switch 1, OFF level: ±99999
			on_L”	I	Limit value switch 1, OFF level: ±99999
		LS_2 →			Limit value switch 2
			inPut”	S	Limit value switch 2, input value: OFF/NET/GROSS
			LEvEL”	S	Limit value switch 2, output: truE / InvErt
			oFF_L”	I	Limit value switch 2, OFF level: ±99999
			on_L”	I	Limit value switch 2, OFF level: ±99999
		LS_3 →			Limit value switch 3
			inPut”	S	Limit value switch 3, input value: OFF/NET/GROSS
			LEvEL”	S	Limit value switch 3, output: truE / InvErt
			oFF_L”	I	Limit value switch 3, OFF level: ±99999
			on_L”	I	Limit value switch 3, OFF level: ±99999

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation **1 2** (flashing) = parameter input / selection
		LS_4 →			Limit value switch 4
			inPut”	S	Limit value switch 4, input value: OFF/NET/GROSS
			LEvEL”	S	Limit value switch 4, output: truE / InvErt
			oFF_L”	I	Limit value switch 4, OFF level: ±99999
			on_L”	I	Limit value switch 4, OFF level: ±99999
		FiLL →			Filling time parameters
			idoS_t”	I	Maximum dosing time 0 = OFF; 1...99999 * 0.1 s
			EtY_t”	I	Emptying time 0 = OFF; 1...99999 * 0.1 s
			rES_t”	I	Residual flow time 0 = OFF; 1...99999 * 0.1 s
			tar_t”	I	Tare time 0 = OFF; 1...99999 * 0.1 s

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

The ON/OFF levels are relative to the set weighing range.

The process outputs are described in Chapter 18 (page 94).

The limit value function is described in Chapter 19 (Page 95).

The filling time parameters are only displayed if the “ScALE → Func” parameter is set to the dosing functions (FILL1/2/3).

If the dosing function is active, the limit value switch parameters are assigned to new functions. The limit value functions are switched off.

The dosing and filling functions are described in Chapter 20 (page 96).

8.5.4 Filter settings, manual tare value and counting function

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection	
2	"SEtuP →				**Filters** / **manual tare value** / **counting scale**	
		FILt1"		S	Filter mode: 0 = Standard filter 1 = Fast settling filter 2…4 = Livestock filter (as from firmware P74)	
		FILt2"		S	Standard filter: 0 = 25 Hz 1 = 8 Hz 2 = 4 Hz 3 = 2 Hz 4 = 1 Hz 5 = 0.5 Hz 6 = 0.25 Hz 7 = 0.125 Hz 8 = 0.062 Hz	Fast-settling filter: 0 = 10 Hz 1 = 8 Hz 2 = 7 Hz 3 = 7 Hz 4 = 5 Hz 5 = 4 Hz 6 = 3 Hz 7 = 2.5 Hz 8 = 2 Hz
		PtArE"		I	Manual tare value: 1...Maximum capacity (CAP) 0 = OFF (see also Chapter 7.5, page 31)	
		count →		I	Counting scale	
			Nb"	I	Reference number of pieces: 0 = counting scale OFF 1...999 pieces = ON	

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

Parameter FILt2 selects the filter bandwidth. A low bandwidth has a long settling time and should be selected for greater accuracy (see Chapter 9, page 60).

For dosing/filling applications, the bandwidth should be in the range 0.5...4 Hz (depending on accuracy and filling speed).

Parameters for the counting scale function:

The counting scale function is controlled by function key *“F1”* or *“F2”*. This function is only valid for non legal-for-trade applications (”ScALE → LEGAL” = OFF) and can only be used with non-automatic scales (“ScALE → Funct” = Standard).

The counting scale function is described in Chapter 14 (Page 76).

The filter functions are described in Chapter 9 (page 60).

8.5.5 Settings for the COM1/2 communications port

Port COM1 is used for PC or PLC communication.

This interface works with one stop bit and 8 data bits.

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation **1 2** (flashing) = parameter input / selection
3	“UArt1 →				**COM1 for the PC interface** (network)
		Addr”		I	Network address: 0...31 (Standard value: 31)
		bAudr”		S	Baud rate: 1200 / 2400 / 4800 / 9600 / 19200 / 38400 Bd (Standard value: 9600)
		PArit”		S	Parity bit: nonE (no parity), EvEn (even parity, standard value)

Port COM2 is used for printer or external display communication.

This interface works with one stop bit and 8 data bits.

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation **1 2** (flashing) = parameter input / selection
3	"UArt2 →				**COM2 for printer or external display**
		Funct"		S	Function selection: OFF – COM2 deactivated/ P_dtr – Print, control via DTR / P_dc1– Print, Protocol DC1/DC3 / E_no – External display, No protocol, output only E_dtr – External display, control via DTR / E_dc1 – External display, Protocol DC1/DC3
		bAudr"		S	Baud rate: 1200 / 2400 / 4800 / 9600 Bd
		PArit"		S	Parity bit: nonE (no parity), EvEn (even parity)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

The print function is described in Chapter 15 (Page 79).

This menu item is only visible if the external display has previously been activated for port COM2.

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
3	"UArt2 →				**COM2 for printer or external display**
		...			
		EdSPL →			External display ON
			St_Ch"	I	Start character: 0...31 (0 = OFF)
			Prot"	S	Protocol selection 0...7: 0 = OFF/ 1 ...7 [1)]
			E_Ch1"	I	End character 1: 0...31 (0 = OFF)
			E_Ch2"	I	End character 2: 0...31 (0 = OFF)
			CrC"	S	Checksum: OFF/ON (OFF/ON)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

[1)] 1…5 up to software version P72, 1…7 as from software version P73

The output string for the external display is transmitted about 3 times per second.

The function for the external display is described in Chapter 16 (page 88). The string content is described in *Command part 2* (**EDP** command).

8.5.6 Print protocol settings, adjusting the real-time clock

This menu is only needed if the Print function is activated:
“UArt2 → Funct” = P_dtr / P_dc1

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
3	“Prt_S →				**Print protocol settings**
		timE”		I	xx:xx (real-time clock Hours : Minutes)
		modE”		S	Time mode selection: 24 h / 12 h am / 12 h pm
		dAtE →			Date, real-time clock
			dAY”	I	Day: xx
			month”	I	Month: xx
			YEAr”	I	Year: xx
		Init →			Print protocol settings, ESC sequences
			ESC11”	I	ESC sequence 1, byte 1: 0...255 (0 = OFF)
			ESC12”	I	ESC sequence 1, byte 2: 0...255
			ESC13”	I	ESC sequence 1, byte 3: 0...255
			ESC14”	I	ESC sequence 1, byte 4: 0...255
			ESC15”	I	ESC sequence 1, byte 5: 0...255
			ESC21”	I	ESC sequence 2, byte 1: 0...255 (0 = OFF)
			ESC22”	I	ESC sequence 2, byte 2: 0...255
			ESC23”	I	ESC sequence 2, byte 3: 0...255
			ESC24”	I	ESC sequence 2, byte 4: 0...255
			ESC25”	I	ESC sequence 2, byte 5: 0...255

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

Escape sequences (ESC) are used to control the printer format. These are output automatically before each print protocol. The meaning of the ESC sequences can be found in the respective *operating manual of the printer*.

The first ESC sequence comprises parameters ESC11...ESC15.
When ESC11 = 0, the first ESC sequence is not transmitted.
The second ESC sequence comprises parameters ESC21...ESC25.
When ESC21 = 0, the second ESC sequence is not transmitted.

Setting the time:

- Setting the time mode with the parameter “modE”
- Setting the time with the parameter “timE”
- Setting the date with the parameter “dAtE”

The division of parameter “modE” into 12 h modes is only relevant for setting the clock.

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
3	“Prt_S →				**Print protocol settings**
		IdEnt →	Nb”	I	Print protocol counter: 0...99999 (0 = OFF)
		Frt →			Format settings for the print protocol
			E_Ch”	I	Number of spaces in each line: 0...99
			E_Ln1”	I	Number of empty lines before printing: 0...99
			E_Ln2”	I	Number of empty lines after the protocol: 0...99

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

The print function is described in Chapter 15 (Page 79).

8.5.7 Function of digital inputs IN1 and IN2

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
3	“inPut →				**Function of digital inputs IN1/2,** when “ScALE → Funct” = StAnd
		inP_1”		S	Input 1: oFF – No function / tArE – Performs taring and switching to NET display / Prt – Prints a protocol, selected via the “Print → Result → Prt” parameter / tilt – Input of digital tilt sensor (display of [tilt], when activated)
		inP_2”		S	Input 2: oFF – No function / tArE – Performs taring and switching to NET display / Prt – Prints a protocol, selected via the “Print → Result → Prt” parameter / Loc_P – No access for changing parameters (display only) Input for a key-operated switch
		t_dLY”		I	Tilt delay time (0...99) × 100 ms

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

The functions of the process inputs are described in Chapter 17 (page 91).

InP_1/InP_2 = tArE (function of inputs IN1/2 with tare function):

This function is only active if the scale function is not set to the dosing function (see basic scale functions sub-menu, see also Chapter 17 (page 91)).

InP_2 = Lock Parameter:

If this function is set and the input is activated, keys “*G”/“N”* and Tare are locked. This also locks the entire parameter menu. Function keys *“F1”/”F2*” can be executed.

8.5.8 Functions of keys F1 and F2

Each function key can have two different functions:

Short keystroke or

Long keystroke (>5 s).

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
3	"buttn →				**Function keys *"F1"*/*"F2"***
		F1"		S	*"F1"* (short), see below
		F1_L"		S	*"F1"* (long), see below
		F2"		S	*"F2"* (short), see below
		F2_L"		S	*"F2"* (long), see below

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

If the function is activated, the corresponding function is briefly displayed when the relevant "*F1"*/"*F2*" key is pressed in measuring mode.

Function F1 or F2 (short keystroke)	
Description	**Display**
No function	---
Display actual measured value total (gross, net, counting)	totAL
Counting scale ON/OFF	C_on
Counting scale: Input number of reference pieces and measure reference pieces	C_inP
Print protocol PRT01...09, defined in parameter menu "Print → rESLt → Prt"	Prt_x
Displays ten-fold resolution of gross value, duration 5 s	rES10
Manual tare value input	PtArE
Hold display value ON/OFF	HoLd
Display / input filling weight (dosing function)	F_InP
Display / input filling result (dosing function)	FILL
Start/stop dosing (dosing function)	St_dO
Input parameters for limit value 1 (activation/deactivation level)	LS_1
Calculate sum (SUM:= SUM + gross value)	AddG
Calculate sum (SUM:= SUM + net value)	Addn
Calculate sum (SUM:= SUM + counting scale result)	AddC
Manual tare function ON/OFF	PT On / Pt oF

The summation function must not be used in the dosing/tank weighing operating mode. The summation function is carried out automatically here during checkweighing.

Function F1 or F2 (long keystroke, > 5 s)	
Description	**Display**
No function	–––
Display actual measured value total (gross, net, counting)	totAL
Counting scale ON/OFF	C_on
Counting scale: Input number of reference pieces and measure reference pieces	C_inP
Print protocol PRT01...09, defined in parameter menu “Print → rESLt → Prt”	Prt_x
Displays ten-fold resolution of gross value, duration 5 s	rES10
Manual tare value input	PtArE
Hold display value ON/OFF	HoLd
Display / input filling weight (dosing function)	F_InP
Display / input filling result (dosing function)	FILL
Start/stop dosing (dosing function)	St_dO
Start/stop tank filling	St_FL
Start/stop tank emptying	St_EP
Delete sum	CLr_S
Manual tare function ON/OFF	Pt_on / Pt_oF

8.5.9 Test functions

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
3	"tESt →				**Test functions**
		DiSPL"		S	Display, LCD segments ON/OFF, controlled by the "*NEXT*" button
		UArt"		S	Transmission of 55_{Hex} (with the ENTER key), display of received sign for both COM ports, display left two digits COM1, right two digits COM2.
		d_IO"		S	Digital inputs/outputs, left digit shows status of IN1 (0/1), digit 3 shows status of IN2 (0/1), right digit shows the output (1 ... 4) = 0/1, switched by the "*NEXT*" key
		EEPro"		S	Checksum check in EEPROM: Shows the result: 0 = error, 1 = OK
		buttn"		I	Four key test: Display 0/1 of 3 keys Left digit = "*G/N*", "*>T<*", "*F2*", "*F1*" = "*CE*" Abort test

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

Test functions are designed to check the WE2107.

While these functions are running, measured value processing and monitoring are switched off. The tests must only be performed by specially trained service personnel.

8.5.10 Basic scale function, menu access selection and legal-for-trade operation

This function can only be executed when the hidden pushbutton (for calling the parameter menu) is pressed.

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
3	"ScALE →				**Basic scale functions**
		Funct"		S	Basic scale function selection: StAnd – Non-automatic scale/ FILL1 – Dosing function/ FILL2 – Tank weighing / Fill 1 / FILL3 – Tank weighing / Fill 2 /
		ACCES"		S	Menu access level selection: 0 ... 4
		LEGAL"		S	Legal for trade operation: OFF / OIML / NTEP See Chapter 12 (page 70)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

Funct parameter:

Standard (StAnd): Non-automatic scale (NAWI) with/without limit value switches, counting scale

FILL1,2,3: Filling and dosing function (see Chapter 20, page 96)

ACCES parameter:

The various menu levels have so-called access levels. Access to change parameters is defined with the “ScALE → ACCES” parameter. The lowest level is zero. This feature is used to define user access to the parameters. The “ScALE → ACCES” parameter is protected by the hidden pushbutton. The first parameter description column shows the relevant access level of each item in the main menu.

ACCES parameter	Access levels
0	0 only
1	0 and 1
2	0 to 2
3	0 to 3
4	All

LEGAL parameter:

LEGAL setting	Display, lower limit value	Display, upper limit value
Not legal-for-trade	–160 %	+160 %
OIML	–20 d	CAP + 9 d
NTEP	–2 %	105 %

LEGAL setting	Tare range, lower limit value	Tare range, upper limit value
Not legal-for-trade	–100 %	100 %
OIML	> 0	100 %

The % figures relate to the nominal weighing range (”AdJ → CAP” parameter).

Each time this parameter is changed, the legal-for-trade counter is incremented. This is displayed in the Information sub-menu.

8.5.11 Setting and adjusting the scale

This function can only be executed when the hidden pushbutton (for calling the parameter menu) is pressed.

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
4	"AdJ →				**Scale adjustment parameters**
		SEtUP →			
			Unlt"	S	Unit selection: OFF / g / kg / t / lbs
			AZEro"	S	Zero on start-up: ±2 / 5 / 10 / 20 / 50 %
			ZtrAc"	S	Automatic zero tracking OFF / ON (0.5 d/s)
			StiLL"	S	Standstill monitoring: ±OFF / 0.5 / 1 / 2 / 5 d/s
			rES"	S	Increment: 1 / 2 / 5 / 10 / 20 / 50 d
			Point"	S	Decimal point: 0 = xxxxx. 1 = xxxx.x 2 = xxx.xx 3 = xx.xxx 4 = x.xxxx
			CAP"	I	Max. capacity (weighing range): 100 ... 99999
			rAnG1"	I	Changeover point for dual-range scale: 0 ... 99999 of nominal (rated) value, 0 = Single-range balance
			rAnG2"	I	Changeover point for three-range scale: 0 ... 99999 of nominal (rated) value, 0 = one/two-range balance

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
4	"AdJ →				**Scale adjustment parameters**
		SEtUP →			
			...		
			CAL"	I	Calibration weight: 100 ... 99999, CAL = CAP = 100 %
			EA_CL"	I	Gravitational acceleration at place of calibration: 9.7000 ... 9.9000
			EA_UL"	I	Gravitational acceleration at installation location: 9.7000 ... 9.9000
		InPut →			Input a known scale characteristic curve
			ZEro"	I	Value when scale is empty, but with initial load: ±99999 (0 = standard value = 0 mV/V)
			SPAn"	I	Value at calibration weight: ±99999 (2.0000 = standard value = 2 mV/V)
		MEAS →			Measure scale characteristic curve
			ZEro"	M	Actual display when scale is empty (OK with "*ENTER*" key)
			SPAn"	M	Actual display when calibration weight on scale (OK with "*ENTER*" key)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
4	“AdJ →				**Scale adjustment parameters**
		...			
		Lin →			Linearization correction between ZEro and SPAn [1]
			diSP1”	I	Display value 1, condition: 0 < diSP1 < diSP2
			VAL1”	I	Measured value 1 for diSP1 (0 < VAL1 < VAL2)
			diSP2”	I	Display value 2, condition: diSP1 < diSP2 < nom. resolution (CAP)
			VAL2”	I	Measured value 2 for diSP2 (0 < VAL1 < VAL2 < CAP)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

[1] Linearization is switched OFF, when diSP1 = diSP2 = VAL1 = VAL2 = 0, see Section 11 (page 68).

The WE2107 does **not** check whether the settings made are valid under OIML R76 or NTEP!

Scale adjustment is described in Chapter 10 (page 61).

The multi-range display is described in Chapter 10.

Taking gravitational acceleration into account is described in Chapter 19 (page 95).

The linearization function is described in Chapter 11 (Page 68).

8.5.12 Restore the factory settings

This function can only be executed when the hidden pushbutton (for calling the parameter menu) is pressed.

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
4	“F_AdJ →				**Restores the factory setting**
		dEFLt”		S	See Chapter 23 (page 111)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

8.5.13 Switch off the device

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
0	“oFF”				**Switch off the WE2107**

Many of the parameters can also be entered via the PC interface (RS232 / RS485). The CD-ROM available as an accessory under Order No. *1-WE2107-DOC* not only contains full device documentation (Operating Manual), it also includes the *WE2107_Panel* setup program. This PC software is used for measured value presentation and WE2107 configuration via the serial interface.

9 Filter selection

The WE2107 has two different filter stages. These are selected by the “SEtuP → FILt1” parameter:

- Standard filter (bandwidth: 25...0.06 Hz), FMD = 0
- Fast-settling filter (bandwidth: 10...2 Hz), FMD = 1
- Livestock filter (FMD = 2/3/4) (as from software version P74)

The particular application determines which filter mode is selected.

The bandwidth is set by the “SEtuP → FILt2” parameter.

A low bandwidth has a longer settling time and should be selected for greater accuracy.

Scale resolution (CAP parameter) and standstill recognition are interlinked. If standstill is not achieved, the filter bandwidth must be reduced.

For dosing/filling applications, the bandwidth should be in the range 0.5 ... 4 Hz (depending on accuracy and filling speed).

FMD2,3,4: Livestock filter (with various settling times); Recommended: ASF should be set to 5.

The livestock filters are only suitable for special applications in livestock scales (live animal weighing). They are unsuitable for platform scales, truck scales and dosing/filling scales (very long settling time). Livestock filters may not be used in legal for trade scales.

10 Scale adjustment

The scale is adjusted by setting the user characteristic curve on the WE2107, i.e. the weighing indicator is adapted to the actual output signals that the load cell supplies when the scale is not loaded or at nominal weight. Calibration weights are usually required for this, although the alternative is to input the measured values, if these are known.

The WE2107 is adjusted in the 0 and 2 mV/V range as what is called the factory characteristic curve (F_AdJ) (for the factory setting, see Chapter 8.5.12 (page 59) and Chapter 23 (page 111)).

10.1 Prerequisites for scale adjustment

Before the scale can be adjusted, the nominal (rated) range of the scale and other parameters must be set.

The prerequisites here are:

- The parameter menu must be called via the hidden pushbutton
- “ScALE → ACCES” parameter = 4 (access to all menus)
- “ScALE → LEGAL” parameter = oFF (legal-for-trade application switched off)
- Set the “AdJ → Unit...CAL” parameter
- Set the “EA_CL” parameter to the gravitational acceleration of the adjustment location
- “EA_UL” parameter = EA_CL (disable gravitational acceleration correction)
- Disable linearization (”AdJ → Lin”: VAL1 = VAL2 = diSP1 = diSP2 = 0)

See Chapter 8.5.10 (Page 54) and 8.5.11 (Page 56).

10.2 Partial load adjustment with the calibration weight (standard method, CAP = CAL)

In most scale applications, the adjustment is made at two points, that is to say, when the scale is not loaded and when a calibration weight is placed on it. Calibration is carried out as follows:

1. Call the “AdJ” menu.
2. Check that the calibration weight is the same as the maximum capacity (CAL == CAP).
3. Go to the “MEAS” (measurement) sub-menu.
4. Zero value:
   - Leave the scale unloaded
   - Call up sub-menu “ZEro”
   - The current measured value is displayed The value is displayed in mV/V (2.0000 = 2 mV/V)
   - Wait for a steady measured value display
   - Press the *“ENTER”* key to store the value
5. Calibration weight:
   - Place the calibration weight (= maximum scale capacity) on the scale
   - Call up the “SPAn” sub-menu
   - The current measured value is displayed The value is displayed in mV/V (2.0000 = 2 mV/V)
   - Wait for a steady measured value display
   - Press the *“ENTER”* key to store the value

Use the *“CE”* key to cancel at any time. This will reset the parameter that has just been called (and this one only!) to its former value. The former value is only deleted after storing.

The two values are stored internally at high resolution.

If the measured value display is too unsteady, reduce the filter bandwidth (Chapter 9, Page 60).

The other parameters must then be set.

10.3 Partial load adjustment with the calibration weight

If there is no calibration weight available to correspond to the maximum scale capacity, CAP, a partial calibration can be performed. The CAL parameter must be set to the value of the calibration weight used. This must be in the range 20 % to 120 % of the maximum scale capacity. CAL is scaled like the display value (e.g. 2 kg = 2.000, with 3 decimal places).

Until a calibration has been performed, CAL is equal to CAP.

Before calibration, the “AdJ → CAP” parameter must be set to the maximum scale capacity!

Calibration is carried out as follows:

1. Call the “AdJ” menu.
2. Set the calibration weight (CAL).
3. Go to the “MEAS” (measurement) sub-menu.
4. Zero value:
   - Leave the scale unloaded
   - Call up sub-menu “ZEro”
   - The current measured value is displayed The value is displayed in mV/V (2.0000 = 2 mV/V)
   - Wait for a steady measured value display
   - Press the *“ENTER”* key to store the value
5. Calibration weight:
   - Place the calibration weight (= CAL) on the scale
   - Call up the “SPAn” sub-menu
   - The current measured value is displayed The value is displayed in mV/V (2.0000 = 2 mV/V)
   - Wait for a steady measured value display
   - Press the *“ENTER”* key to store the value

Use the *“CE”* key to cancel at any time. This will reset the parameter that has just been called (and this one only!) to its former value. The former value is only deleted after storing.

The two values are stored internally at high resolution.

If the measured value display is too unsteady, reduce the filter bandwidth (Chapter 9, Page 60).

The other parameters must then be set.

10.4 Adjustment without a calibration weight (mV/V adjustment)

If there is no calibration weight available, an adjustment can be performed by entering the calculated values.

When scales have vast maximum capacities, it is often not possible to use calibration weights for adjustment. As the WE2107 is factory-calibrated to an input range of 2 mV/V, the user characteristic curve can also be determined using the known nominal value of the load cells. The zero value is defined by automatic measurement, but the nominal (rated) value is defined by manual entry.

1. Measuring the zero value of the characteristic curve when the scale is not loaded:

- Call the “AdJ” menu.
- Go to the “MEAS” (measurement) sub-menu.
- Zero value:
  - Leave the scale unloaded
  - Call up sub-menu “ZEro”
  - The current measured value is displayed The value is displayed in mV/V (2.0000 = 2 mV/V)
  - Wait for a steady measured value display
  - Make a note of the measured value (mw0) for later entry
  - Press the *“CE”* key to exit the measurement display

2. Calculating the nominal value of the scale:

As the WE2107 is factory-adjusted in mV/V, the nominal value can now be calculated in mV/V. The nominal value of the scale characteristic curve is composed of the zero value and the weighing range. As the zero value has already been measured, it only remains to define the weighing range.

$$\text{Weighing range} = \text{load cell sensitivity [mV/V]} \cdot \frac{\text{maximum scale capacity}}{\text{maximum load cell capacity}}$$

The load cell sensitivity is normally 2 mV/V (at maximum load cell capacity). The maximum load cell capacity is stated on the load cell type plate. The following applies:

Maximum scale capacity < Maximum load cell capacity

So the weighing range result is a value in mV/V.

3. Entering the characteristic curve

If you now add the value for the weighing range to the previously measured zero value, you obtain the nominal value of the scale (mw1). The characteristic curve can now be entered:

- Call the “AdJ” menu.
- Go to the “InPut” (input) sub-menu.
- Input the zero value (mw0) at ZEro.
- Input the nominal value (mw1) at SPAn.

Scales with several load cells supply the nominal output signal (2 mV/V), if the weight that is on is the sum of all the maximum load cell capacities.

Example:

4 load cells connected in parallel, each at 20 t, sensitivity 2 mV/V.

Maximum capacity of the scale is 60 t.

→ Maximum load cell capacity: = 4 ∗ 20 t = 80 t

→ Weighing range: = 2 mV/V ∗ 60 t / 80 t = 1.5 mV/V

Adjustment in mV/V does not achieve the same accuracy as adjustment with calibration weights and so is only used for non legal-for-trade applications, where required accuracy is less.

10.5 Multi-range weighing machine

The WE2107 can be operated as a single-range or multi-range scale.

Two parameters are available for this in the “AdJ → SEtuP” parameter menu. The weighing range (CAP) must be set before this setting.

Scale type	Parameters
Single-range balance	rAnG1 = rAnG2 = 0
Dual-range balance	0 < rAnG1 < CAP and rAnG2 = 0
Three-range scale	0 < rAnG1 < rAnG2 < CAP

The increment for two/three weighing ranges is automatically derived from the rES parameter, where this parameter always describes the increment of the first measuring range:

Examples:

“rES” = 1 d → Increment range 2 = 2 d → Increment range 3 = 5 d

“rES” = 2 d → Increment range 2 = 5 d → Increment range 3 = 10 d

10.6 Taking gravitational acceleration into account

The gravitational acceleration and thus the scale display, is dependent on the geographical data of the installation location. The maximum variation between the different regions within the Federal Republic of Germany is 0.1%; worldwide, it is 0.6%.

The function described below allows adjustment to take place on the scale manufacturer’s premises, even if the device is to be operated at a different geographical location.

If the error effect at the new installation location exceeds the scale accuracy limits, it is usually necessary to re-adjust. But instead of this, it is also possible to use an internal correction function in the WE2107 to compensate for the effect of the installation location.

To do this, in the “AdJ → SEtuP” menu, (access authorization required!), input:

- EA_CL = gravitational acceleration factor for the calibration location.
- EA_UL = gravitational acceleration factor for the destination location (where the scale is used).

This must be entered after scale adjustment.

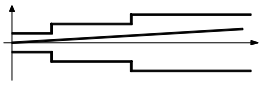
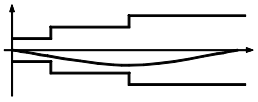
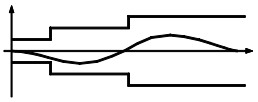
Use the EA_CL = EA_UL setting to deactivate the correction calculation. The display is then always related to the location of the last calibration.

This setting is not required if the scale is adjusted in situ!

11 Linearization

For most scale applications, standard adjustment with the zero and full scale values (inPut or MEAS) is sufficient. The signal only needs to be linearized (Lin) if unacceptable errors occur with this method. Linearization corrects errors when scale structures have an output signal that is not proportional to the weight (e.g. because there are mechanical transmission elements).

Correction selection via the “AdJ → Lin” menu:

Calibration steps	Zero value, full scale value[1)]	Two additional calibration weights	Two additional calibration weights
Recommended for:	Standard application	Structures with a linearity error	Structures with a linearity error
Possible to correct following errors:	Error proportional to the measured value	One maximum of the error char. curve	Two maximums of the error char. curve
Example: (Scale output signal error, as per OIML)			

1) Zero and full scale value adjustment is already described in Chapter 10.

For the linearization method, proceed as follows:

- Set the scale parameters
- Calibrate the scale at 2 points (zero weight and calibration weight, Chapter 10, page 61))
- Measure the linearity error in the weighing range with two additional calibration weights

Correction is only possible when performing measurements. It is not possible to input known values.

Linearization always takes place at two measurement points (actual values). First establish whether the error characteristic curve has one or two maximums (see above).

If the error characteristic curve has one maximum, the first measurement point is put at about 500 d = e (the narrowest part of the error characteristic curve). The second measurement point is put at the maximum of the error characteristic curve.

If the error characteristic curve has two maximums, the first measurement point is put at the first maximum. The second measurement point is put at the second maximum of the error characteristic curve.

The measurement points must fall within the weighing range (0...CAP).

The table below shows an extract from the parameter menu:

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
4	"AdJ →				**Scale adjustment parameters**
		...			
		Lin →			Linearization correction between ZEro and SPAn [1)]
			diSP1"	I	Display value 1, condition: 0 < diSP1 < diSP2
			VAL1"	I	Measured value 1 for diSP1 (0 < VAL1 < VAL2)
			diSP2"	I	Display value 2, condition: diSP1 < diSP2 < nom. resolution (CAP)
			VAL2"	I	Measured value 2 for diSP2 (0 < VAL1 < VAL2 < CAP)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

1) Linearization is switched OFF, when diSP1 = diSP2 = VAL1 = VAL2 = 0

Procedure for adjustment:

- The scale is already adjusted in its weighing range
- Any linearization that may exist is switched OFF (diSP1 = diSP2 = VAL1 = VAL2 = 0)
- The scale is loaded with calibration weight 1 (→ display value 1 diSP1)
- The measurement display is noted for later input (→ measured value 1 VAL)
- The scale is loaded with calibration weight 2 (→ display value 2 diSP2)
- The measurement display is noted for later input (→ measured value 2 VAL2)
- Input all four values in the "AdJ → Lin" menu

12 Legal-for-trade applications

Once the scale parameters are set and the scale adjusted in the “AdJ” menu, the WE2107 must be set to legal-for-trade applications (OIML or NTEP) using the “ScALE → LEGAL” menu commands. This protects the legal-for-trade parameters against further change and the legal-for-trade counter, which cannot be reset, increases by one.

The WE2107 does **not** check whether the parameter settings made are valid under OIML R76 or NTEP!

Basic scale functions menu:

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
4	“AdJ →				**Basic scale functions**
		Funct”		S	Basic scale function selection: StAnd – Non-automatic scale/ FILL1 – Dosing function/ FILL2 – Tank weighing / Fill 1 / FILL3 – Tank weighing / Fill 2 /
		ACCES”		S	Menu access level selection: 0 ... 4
		LEGAL”		S	Legal for trade operation: **OFF** / **OIML** / **NTEP** See Chapter 12 (page 70)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

Before exiting the “ScALE” menu, the two other parameters, “ScALE → Funct” and “ScALE → ACCES” must be set accordingly:

Funct parameter:

Standard (StAnd): Non-automatic scale (NAWI) with/without limit value switches, counting scale

FILL1, 2, 3: Filling and dosing function (see Chapter 20, page 96)

ACCES parameter:

The various menu levels have so-called access levels. Access to change parameters is defined with the “ScALE → ACCES” parameter. The lowest level is zero. This feature is used to define user access to the parameters. The “ScALE → ACCES” parameter is protected by the hidden pushbutton. The first parameter description column shows the relevant access level of each item in the main menu.

ACCES parameter	Access levels
0	0 only
1	0 and 1
2	0 to 2
3	0 to 3
4	All, HBM setting

The parameter menu comprises the following menu items and access levels:

Access level	Main menu level	Explanation	Legal for trade parameter [1]
0	“InFo”	Information	–
1	“Print”	Printing	–
2	“SEtPt”	Limit values / filling parameters	–
2	“SEtuP”	Filters / manual tare value / counting scale	–
3	“UArt1”	COM1 for the PC interface	–
3	“UArt2”	COM2 for the printer / external display	–
3	“Prt_S”	Real time setting, print protocol settings	–
3	“inPut”	IN1/2 digital inputs function	–
3	“buttn”	Function for setting function keys *”F1”/”F2”*	–
3	“tESt”	WE2107 test functions	–
0	“ScALE”	Basic scale functions	yes
4	“AdJ”	Adjustment parameters	yes
4	“F_AdJ”	Restore the factory settings	yes
0	“–oFF–”	Switch off the device	–

1) Access only via hidden pushbutton

Now when you exit the parameter menu, all the legal-for-trade parameters are protected (display only, changes cannot be made).

The legal-for-trade counter can be read in the Information menu (Chapter 8.5.1, page 40).

Fill out the supplied insertion strip in accordance with the set application and insert in the front foil. Attach the calibration label to secure the hidden switch and the insertion strip.

The calibration label is applied according to the applicable national legislation.

The parameter menu can now only be called using the two keys *“G/N”* and *“>T<”*.

If the scale has to be re-adjusted or new parameters have to be set that are relevant to verification, proceed as follows:

- Remove the calibration label and the insertion strip
- Call the parameter menu via the hidden key
- Change the “ScALE → LEGAL” parameter to OFF
- Set the “ScALE → ACCES” parameter to four.

Setting the parameter to legal-for-trade application produces the following display and tare ranges:

LEGAL setting	**Display, lower limit value**	**Display, upper limit value**
Not legal-for-trade	–160 %	+160 %
OIML	–20 d	CAP + 9 d
NTEP	–2 %	105 %

LEGAL setting	**Tare range, lower limit**	**Tare range, upper limit**
Not legal-for-trade	–100 %	100 %
OIML	> 0	100 %

LEGAL setting	**Range of zero setting, lower limit**	**Range of zero setting device, upper limit**
Not legal-for-trade [1)]	–20 %	+20 %
OIML, NTEP	–2 %	+2 %

The % figures relate to the nominal weighing range (“AdJ → CAP” menu).

The weighing indicator must be labeled and sealed in accordance with the scale application. Different labeling strips are included for use as a Class III and IIII non-automatic scale. The labeling strip must contain at least the following data:

Max Maximum scale loading

Min Minimum scale loading

e Increments

Type Scale name

S.No.: Individual scale serial number

In the case of legal-for-trade scales, verification must be performed by a Notified Body, in accordance with current national laws. The sealing and calibration labels must be attached in accordance with the approval.

13 Functions of keys F1 and F2

Each function key can have two different functions:

Short keystroke or

Long keystroke (> 5 s).

The functions are set in the “buttn →” parameter menu.

If the particular function is activated when the relevant *“F1“/”F2”* key is pressed in measuring mode, the corresponding function is briefly displayed. The summation function must not be used in the dosing/tank weighing operating mode. The summation function is carried out automatically here during checkweighing.

Function F1 or F2 (short keystroke)	
Description	**Display**
No function	–––
Display actual measured value total (gross, net, counting)	totAL
Counting scale ON/OFF	C_on
Counting scale: Input number of reference pieces and measure reference pieces	C_inP
Print protocol PRT01...09, defined in parameter menu “Print → rESLt → Prt”	Prt_x
Displays ten-fold resolution of gross value, duration 5 s	rES10
Manual tare value input	PtArE
Hold display value ON/OFF	HoLd
Display / input filling weight (dosing function)	F_InP
Display filling result (dosing function)	FILL
Start/stop dosing (dosing function)	St_dO
Input parameters for limit value 1 (activation/deactivation level)	LS_1
Calculate cumulative value (SUM:= SUM + gross value)	AddG
Calculate cumulative value (SUM:= SUM + net value)	Addn
Calculate cumulative value (SUM:= SUM + counting scale result)	AddC
Manual tare function ON/OFF	Pt_on / Pt_oF

Function F1 or F2 (long keystroke, > 5 s)	
Description	**Display**
No function	---
Display actual measured value total (gross, net, counting)	totAL
Counting scale ON/OFF	C_on
Counting scale: Input number of reference pieces and measure reference pieces	C_inP
Print protocol PRT01...06, defined in parameter menu “Print → rESLt → Prt”	Prt_x
Displays ten-fold resolution of gross value, duration 5 s	rES10
Manual tare value input	PtArE
Hold display value ON/OFF	HoLd
Display / input filling weight (dosing function)	F_InP
Display filling result (dosing function)	FILL
Start/stop dosing (dosing function)	St_dO
Start/stop tank filling	St_FL
Start/stop tank emptying	St_EP
Delete the summation memory	CLr_S
Manual tare function ON/OFF	Pt_on / Pt_oF

14 Counting scale

When used as a counting scale (when weighing many equally heavy parts), the number of parts put on is displayed instead of the weight. This is **not** a legal-for-trade function and is only available if the relevant setting is made in the parameter menu (“ScALE → Funct” = StAnd).

The decimal point of the right digit position shows the standstill conditions (the unit is not displayed).

Activating the counting scale control functions

The counting scale functions are activated using keys *“F1”* and *“F2”*. Two functions were implemented:

Function F1 or F2	
Description	**Display**
Counting scale ON/OFF	C_on
Counting scale: Input number of reference pieces and measure reference pieces	C_inP

It is advisable to assign the function C_inP (reference measurement) to a function key with a long keystroke.

Activating the counting scale function (reference measurement)

Operation:

1. (Option): Put a tank on and tare *“>T<”*.
2. Put the reference number of pieces of the parts to be counted into the tank (for example, 25 pieces).
3. Operate the machine accordingly Fig. 14.1. (The reference number of pieces is input in the same way as described in Chapter 8.4.2 (page 37), numeric input.) Numeric input is concluded with *“ENTER”* and the reference measurement is displayed (= weight of the parts put on). At standstill, store the reference measurement with the *“ENTER”* key and the device then goes to counting scale mode.

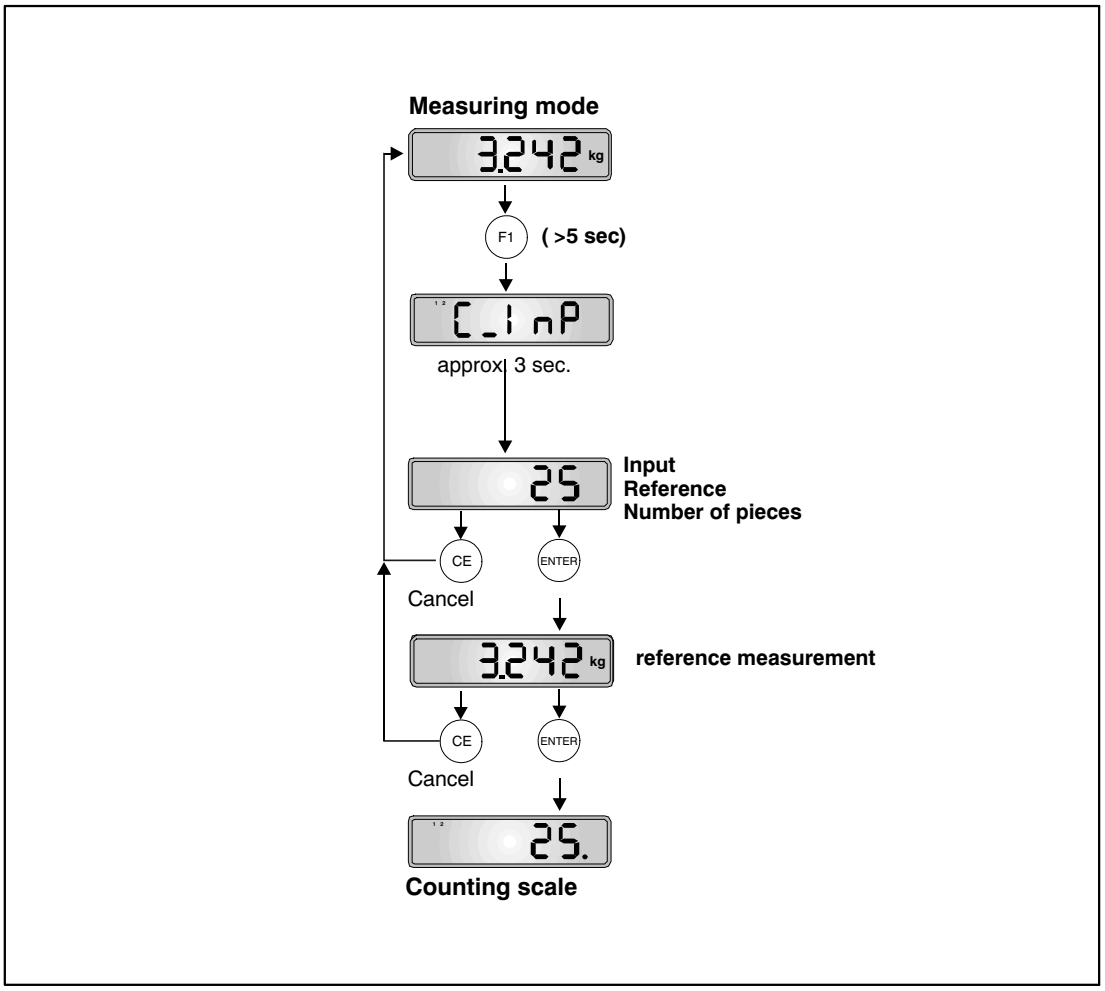


Fig. 14.1: Setting the counter scale (reference measurement)

To indicate that the counting scale function is active, the decimal point appears in the display to the left of the count value at standstill.

Then when other quantities are added, the new number is displayed. The accuracy of the scale is limited and there may be slight differences in the individual weights, so the display may not be the same as the actual number of pieces.

Switching the counting scale function on/off

The counting scale function can be switched on/off as shown in Fig. 14.2.

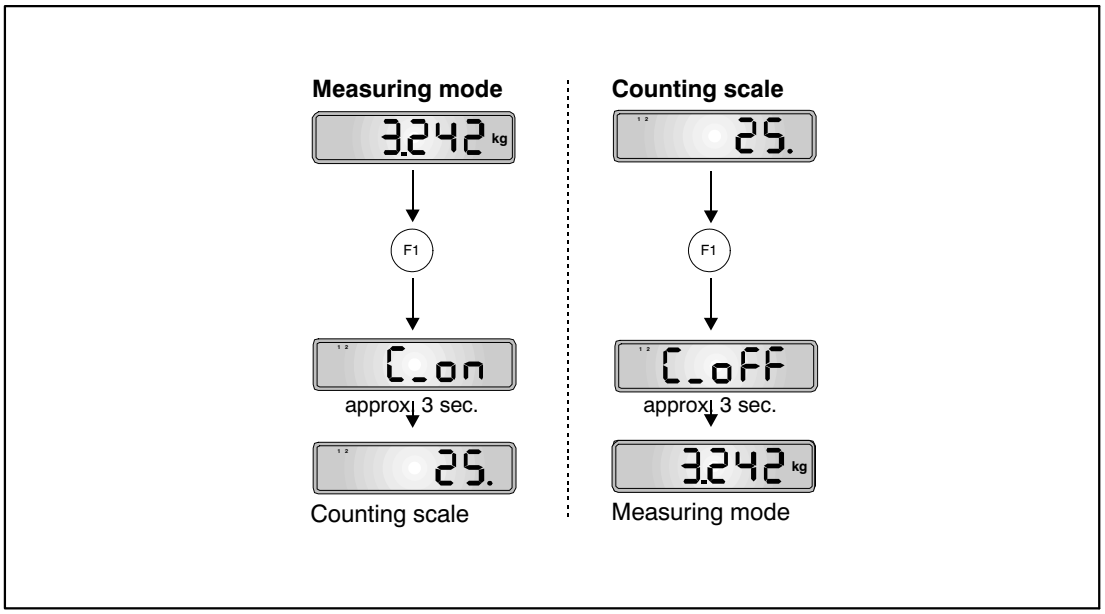


Fig. 14.2: Switching the counting scale function ON/OFF

15 Print function

A printer to print out the weight values can be connected to the COM2 serial interface (RS232) of the WE2107.

15.1 Activating COM2 for the print function

Port COM2 is activated in the UArt2 menu.

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
3	"UArt2 →				**COM2 for printer or external display**
		Funct"		S	Function selection: OFF – COM2 deactivated / P_dtr – Printing, DTR-driven / P_dc1 – Printing, DC1/DC3 protocol/ E_no – External display, no protocol, transmit only P_dtr – External display, DTR-driven / E_dc1 – External display, DC1/DC3 protocol
		bAudr"		S	Baud rate: 1200 / 2400 / 4800 / 9600 Bd
		PArit"		S	Parity bit: 0 = none, (no parity) 1 = even (even parity)

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

The WE2107 has two communications protocols to the printer:

- P_dtr = Hardware protocol, driven by the DTR signal
- P_dc1 = Software protocol, driven by DC1/DC3

Two escape sequences (ESC sequences) can be programmed to set the printer (“Prt_S” menu, Chapter 8.5.6 (page 48), see also *Part 2 of the WE2107 manual*).

ESC sequences are used to preset a printer and are transmitted before the actual printing information. What is in the ESC sequences will depend on the particular type of printer (see the printer manual).

15.2 Connecting the WE2107 to the printer

“Funct” function	**COM2 signals WE2107**	**Link**	**Printer signals**
P_dtr	TxD DTR GND	→ ← ← →	RxD CTS GND
P_dc1	TxD RxD GND	→ ← ← →	RxD TxD GND

COM2 connection is described in Chapter 5.8 (page 23) and Chapter 5.9 (page 23).

Function Funct = P_dc1:

DC1 (= 11 hex) enables transmission, DC3 (=13 hex) stops output.

15.3 Print protocol selection

The print function is only accessible if COM2 is activated for printing.

Access level	Main menu level **1**	Second menu level **2**	Third menu level **1 2**	Type	Sub-menu explanation **1 2** (flashing) = parameter input / selection
1	"Print →				**Printing**
		rESLt →			Results
			Prt"	S	Selects a print protocol (1...9) and starts printing. This parameter is also valid for digital inputs IN1/2 and for printing via function keys "*F1/2"*.
		Par →			Parameters
			ALL"		Print out all parameters

1) 1…9 as from software version P74

15.4 Start printing process

- Via the parameter menu "Print → rESLt" (see above)
- Via external input IN1 or IN2 (see "InPut" menu, Chapter 8.5.7, page 50 or Chapter 17, page 91)
- Via function keys *"F1"* or "*F2"* (see menu "buttn", Chapter 8.5.8, page 51 or Chapter 13, page 74)

What is printed out depends on the operating mode of the scale and always corresponds to what is shown on the display.

Printing only takes place when there is standstill, so the unit of measurement is always printed out. With non legal-for-trade applications, printing can take place as often as required.

With a legal-for-trade setting, the printout cannot be repeated. There must be a change in weight and a renewed standstill before there can be a new printout. There is no printing outside the display limits.

15.5 Different print protocols

- Prt1: Gross or NET and Tare
- Prt2: Gross or NET and Tare for counting scale
- Prt3: Gross or NET and Tare with total weight (also for counting scale)
- Prt4: Gross or NET and Tare with total weight (also for counting scale), the summation value is automatically deleted after printing
- Prt5: Portion weighing (dosing)
- Prt6: Portion weighing (dosing), the summation value is automatically deleted after printing
- Prt7: Print parameter
- Prt8: Gross or NET and Tare (without strings, date and time)
- Prt9: Gross or NET and Tare (without strings)

Protocol Prt1:

Identstring 1				
Identstring 2				
Identstring 3				
Date		**:**	**xx.xx.2xxx**	
Time		**:**	**xx.xx**	
Scale_Ident		**:**	**xxxxxxx**	
Print_No		**:**	**xxxxxxx**	
Weight	**G**	**:**	**xxx.xx**	**kg**
Weight	**N**	**:**	**xxx.xx**	**kg**
Tara		**:**	**xxx.xx**	**kg**
Tara PT		**:**	**xxx.xx**	**kg**

The first three lines (Identstring 1…3) can only be input via the COM1 computer interface (*see Part 2 of the Manual*, **PST** command). Any content, to a maximum of 30 characters in each case, can be deposited here. These strings are inactive at the factory and the lines are not printed out.

In the case of the Weight line, only the line with the gross value (G) or the net value (N) is printed out.

With the Tare line, only the tare value or the manual tare value (PT) is printed out.

If a counter number has been input in the “Prt_S → IdEnt → nb” menu, it will appear in an additional line above the measured value. To deactivate, set the counter number to 0.

Access level	Main menu level **1**	Second menu level **2**	Third menu level **1 2**	Type	Sub-menu explanation **1 2** (flashing) = parameter input / selection
2	“Prt_S →				**Print protocol settings**
		IdEnt →	Nb”	I	Print protocol counter: 0 ... 99999 (0 = OFF)

15.6 Formatting the printout

To print a specific area of a form, the entire text block can be shifted using the following parameters:

- E_Ch : Number of spaces before each line of print (= right indent)
- E_Ln1 : Number of blank lines before the start of the text block
- E_Ln2 : Number of blank lines at the end of the text block

With successive printouts, the gap between the text blocks is the same as the total of E_Ln1 and E_Ln2.

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
3	“Prt_S →				**Print protocol settings**
		IdEnt →	Nb”	I	Print protocol counter: 0 ... 99999 (0 = OFF)
		Frt →			Format settings for the print protocol
			E_Ch”	I	Number of spaces in each line: 0 ... 99
			E_Ln1”	I	Number of empty lines before printing: 0 ... 99
			E_Ln2”	I	Number of empty lines after the protocol: 0 ... 99

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

PRT05	Dosing protocol						
Space (E_Ch)	Contents			value	Unit	Comments	Line
						Blank line (E_Ln1)	
	Identstring 1					max. 30 characters	1
	Identstring 2					max. 30 characters	2
	Identstring 3					max. 30 characters	3
						one blank line (fixed)	4
	Date		:	**xx.xx.2xxx**		Date	5
	Time		:	**xx.xx**		Time	6
	Scale_Ident		:	**xxxxxxx**		Production number	7
	Print_No		:	**xxxxxxx**		Print counter	8
						one blank line (fixed)	9
	Weight (one portion)	**D**	:	**xxx.xx**	**kg**		10
						one blank line, if gross	11
	Tare		:	**xxx.xx**	**kg**	if net	11
						one blank line (fixed)	12
	Quantity		:	**xxxxxx**		number of dosages	13
						one blank line (fixed)	14
	Total		:	**xxxxxxxx**	**kg**	Cumulative weight	15
						Blank line (E_Ln2)	
	Print width ≥ 30 characters						

This table shows the line structure of the printout using protocol 5 as an example.

The dosing result (actual value) is output in the Weight line.

The tare value is only printed when the actual value is a net value.

The Identstrings 1…3 are only printed if they were previously input via the serial interface (e.g. with assistance of the WE2107_Panel program).

15.7 Setting the date and time

The internal clock of the WE2107 is used to output the date and time when printing and has no significance for the remaining device functions. The settings are made in the “Prt_s” menu. The clock continues to work when the device is switched off (battery backup).

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
3	“Prt_S →				**Print protocol settings**
		timE”		I	xx:xx (real-time clock Hours : Minutes)
		modE”		S	Time mode selection: 24 h / 12 h am / 12 h pm
		dAtE →			Date, real-time clock
			dAY”	I	Day: xx
			month”	I	Month: xx
			YEAr”	I	Year: xx
		Init”			Print protocol settings, -ESC sequences
			...		

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

Setting the time:

- Setting the time mode with the parameter “modE”
- Setting the time with the parameter “timE”
- Setting the date with the parameter “dAtE”

The division of parameter “modE” into 12 h modes is only relevant for setting the clock.

15.8 Summation function

Calculating the total weight

- With function key F1/2 (short keystroke); (SUM:= SUM + gross/net value / counter result)
- With concluding measurement of dosing function (Portion weighing, SUM:= SUM + dosing result)

The summation function using function keys F1/2 must not be used in the dosing/tank weighing operating mode. The summation function is carried out automatically here during checkweighing.

Displaying the total weight

- Info parameter menu (see Chapter 8.5.1, page 40)
- Function key F1 or F2, Chapter 8.5.8 (page 51)

Printing the total weight (summation value)

- With print protocol prt03/4
- With print protocol prt05/6

Deleting the total weight

- With print protocol prt04
- With print protocol prt06
- With function key F1/F2 (long keystroke)
- With the command **CSN** (via the COM1 serial interface)

16 Interface for a second display

An external, second interface can be connected to COM port 2 (RS232). COM2 connection is described in Chapter 5.8 (page 23) and Chapter 5.9 (page 23).

16.1 Activating COM2 for the second display

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
3	”UArt2 →				**COM2 for printer or external display**
		Funct”		S	Function selection: OFF – COM2 deactivated / P_dtr – Printing, DTR-driven / P_dc1 – Printing, DC1/DC3 protocol/ E_no – External display, no protocol, transmit only P_dtr – External display, DTR-driven / E_dc1 – External display, DC1/DC3 protocol
		bAudr”		S	Baud rate: 1200 / 2400 / 4800 / 9600 Bd
		PArit”		S	Parity bit: 0 = none, (no parity) 1 = even (even parity)
		EdSPL”			External display ON
			...		

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

Three transmission protocols are available for communication:

- E_no = No protocol, transmit string only
- E_dtr = Hardware protocol, driven by the DTR signal
- E_dc1 = Software protocol, driven by DC1/DC3

DC1 (= 11 hex) enables transmission, DC3 (=13 hex) stops output.

16.2 Linking the WE2107 to the second display

“Funct” function	**COM2 signals WE2107**	**Link**	**Second display signals**
E_no	TxD GND	→ ← →	RxD GND
E_dtr	TxD DTR GND	→ ← ← →	RxD CTS GND
E_dc1	TxD RxD GND	→ ← ← →	RxD TxD GND

COM2 connection is described in Chapter 5.8 (page 23) and Chapter 5.9 (page 23).

16.3 Selecting the telegram content

Access level	**Main menu level** **1**	**Second menu level** **2**	**Third menu level** **1 2**	**Type**	**Sub-menu explanation** **1 2** (flashing) = parameter input / selection
3	"UArt2 →				**COM2 for printer or external display**
		...			
		EdSPL →			External display ON
			St_Ch"	I	**Start character:** 0...31 (0 = OFF)
			Prot"	S	Telegram selection: 0 = OFF / 1 ... 7
			E_Ch1"	I	**End character** 1: 0...31 (0 = OFF)
			E_Ch2"	I	**End character** 2: 0...31 (0 = OFF)
			CrC"	S	**Checksum:** OFF/ON

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

The content of the information string is described in *Part 2 of the Operating Manual*, **EDP** command.

Each telegram can start with a "St_Ch" start character. Then the information is transmitted. The end character and the checksum can be transmitted after this information, if desired.

The checksum is an XOR operation of all the transmitted characters (start character to end character 2).

Approximately 10 … 20 telegrams are sent per second.

17 Function of the digital inputs

The WE2107 has two digital inputs that can be assigned different functions.

- Operating the scale with external operator controls (on a vehicle scale, for example)
- PLC control
- Using a tilt switch to monitor scale installation
- Disabling all parameters

The input connection is described in Chapter 5.7 (page 22).

The menu to assign a function to each input is described in Chapter 8.5.7 (page 50). The function is also dependent on the mode of operation of the scale ("ScALE → Funct" parameter).

Digital input IN1:

Parameter "InPut → inP_1"	**Function for a non-automatic scale ("ScALE → Funct" = "StAnd")**
oFF	No function
tArE	Tare (→ net display)
Prt	Start printing
tiLt	Scale tilted (→ [tilt] display instead of the measured value)

Parameter "InPut → inP_1"	**Function for a non-automatic scale ("ScALE → Funct" = FILL1...3)**
oFF	No function
tArE	Stop batching
Prt	Start printing
tiLt	Scale tilted (→ [tilt] display instead of the measured value)

Digital input IN2:

Parameter “InPut → inP_2”	**Function for a non-automatic scale (“ScALE → Funct” = “StAnd”)**
oFF	No function
tArE	Taring (→ net display)
Prt	Start printing
LoC	Parameter lock

Parameter “InPut → inP_1”	**Function for a non-automatic scale (“ScALE → Funct” = FILL1...3)**
oFF	No function
tArE	Start batching
Prt	Start printing
LoC	Parameter lock

Input function – Taring:

Scale operating mode Standard:

The input acts like the tare key (see Chapter 7.4, page 31). A short high-low-high pulse is all that is needed to activate it (minimum length 10 ms).

In the Dosing mode of scale operation, this function is fixed as the stop input for the dosing and filling function. A short high-low-high pulse is all that is needed to activate it (minimum length 10 ms). As soon as it is activated, the relevant digital outputs become inactive.

Input function – Printing:

The print function must be set (Chapter 15, page 79) and the protocol to be printed selected in the “Print → rESLt → Prt” menu (Chapter 8.5.2, page 41) before this function can be used.

Input function – Scale tilted:

A tilt sensor can be connected here. If the scale tilts too far, this should activate the input, so that the measurement errors do not get too big. A delay time can be set for the display (Chapter 8.5.7 (page 50), “inPut → t_dLY” parameter).

Input function – Parameter lock:

A key-operated switch can be connected here. If this input is active, the two keys *“G/N”* and *“>T<”* are disabled, as is the parameter menu. Only the two function keys can be operated. If the function is deactivated, switch the WE2107 off and then back on again to cancel the deactivation.

17.1 Electrical properties and level assignment

The inputs must be connected to ground by a pushbutton/switch (see Chapter 5.7, page 22). An open input is an inactive input. The inputs are inactive when they leave the factory.

The input voltage range is described in the specifications (Chapter 27, page 125).

	“inactive” (high level)	**“active” (low level)**
Status when switch is connected	Input open (quiescent level approx. 5 V)	Input connected to ground
TAR, Print, Stop	No action	Function is executed
Parameter lock	can be changed	Parameter disabled
Tilt switch	Measurement display	Display [tilt]

The scale functions (TAR, Print, Stop) are performed once when the contact closes. Avoid undefined levels and vibrations at the inputs.

18 Function of the digital outputs

The WE2107 has four programmable switching outputs. The basic function is defined by the “ScALE → Funct” menu (see Chapter 8.5.10, page 54):

“ScALE → Funct” menu	**Function**	**see Chapter**
Status	Limit values with hysteresis	19 (page95)
FILL1/2/3	Filling / dosing control	20 (page96)

The control outputs of the device are implemented as high-side outputs, switching to the device ground. The table below explains the level assignment.

Output	**Output voltage level**
inactive	Low
active	High

Loads (relays, lamps, etc.), are to be switched to ground (see Chapter 5.5, page 21). A freewheeling diode must be switched in parallel for inductive loads (e.g. relay).

If there is excess current, the particular output switches off. The WE2107 detects this state and generates a relevant error message (see Chapter 24, page 113). To reset the thermal cut-out, switch off the WE2107 for about
30 … 60 s.

19 Limit values

The WE2107 has four programmable switching outputs. Each channel becomes active when the activation value is overrun and inactive when the deactivation value is underrun. The different values give a free choice of hysteresis. The values can be related to the gross or the net weight, as desired; this is not dependent on the current display mode.

The parameters for the limit value switches are described in Chapter 8.5.3 (page 42).

The active limit value channels are indicated on the display by the symbols *1* and *2* (only for single-range scales, as otherwise the symbols are used to display the range).

“LEvEL” parameter	**Actual weight**	**Limit value status**	**Output voltage level**
true	below deactivation value	inactive	Low
true	above activation value	active	High
false	below deactivation value	inactive	High
false	above activation value	active	Low
false	between activation and deactivation value	status is unchanged	

Loads (relays, lamps, etc.), are to be switched to ground (see Chapter 5.5, page 21). A freewheeling diode must be switched in parallel for inductive loads (e.g. relay).

If there is excess current, the particular output switches off. The WE2107 detects this state and generates a relevant error message (see Chapter 24, page 113). To reset the thermal cut-out, switch off the WE2107 for about
30 … 60 s.

20 Dosing and tank weighing

20.1 Overview

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
0	"ScALE →				**Basic scale functions**
		Funct"		S	Basic scale function selection: StAnd – Non-automatic scale/ FILL1 – Dosing function/ FILL2 – Tank dosing and filling / FILL3 – Tank dosing and filling /

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

20.2 Dosing (FILL1, portion weighing)

A portion is to be filled into a container. This container is connected to the scale. A tank contains the filling material. But the tank is not on the scale.

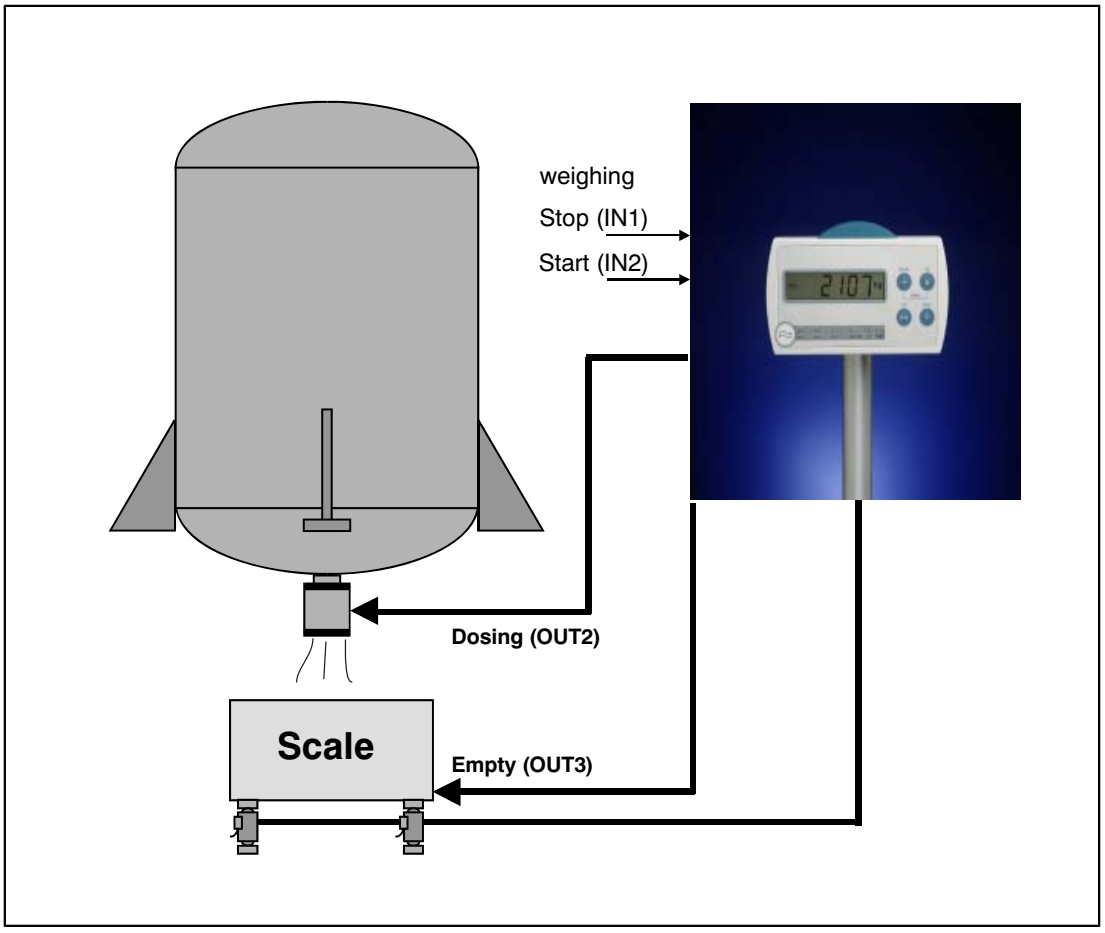


Fig. 20.1: FILL1, portion weighing

20.2.1 Digital inputs/outputs

Digital I/O	Function with FILL1
IN1	Stop dosing: Set “inPut → inP_1” = tArE parameters
IN2	Start dosing: Set “inPut → inP_2” = tArE parameters
OUT1	Ready signal
OUT2	Coarse flow control
OUT3	Emptying
OUT4	Error

Inputs IN1/2 can also be set to other functions, if the input functions described are not required (see Chapter 8.5.7 (page 50) and Chapter 17 (page 91)).

20.2.2 Parameters

Access level	Main menu level **1**	Second menu level **2**	Third menu level **1 2**	Type	Sub-menu explanation **1 2** (flashing) = parameter input / selection
2	“SEtPt →				**Filling parameters**
		LS_1 →			**Not in use**
			inPut”	S	No function
			LEvEL”	S	No function
			oFF_L”	I	Not in use
			on_L”	I	Not in use
		LS_2 →			**Target weight and changeover point when dosing**
			inPut”	S	No function
			LEvEL”	S	No function
			oFF_L”	I	Course flow cut-off point, ±99999
			on_L”	I	Dosing target weight, ±99999

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
		LS_3 →			**Dosing with tolerance weight**
			inPut”	S	No function
			LEvEL”	S	No function
			oFF_L”	I	Lower tolerance weight, ±99999
			on_L”	I	Upper tolerance weight, ±99999
		LS_4 →			**Maximum start weight**
			inPut”	S	No function
			LEvEL”	S	No function
			oFF_L”	I	Maximum start weight for dosing, ±99999
			on_L”	I	No function
		FiLL →			**Filling time parameters**
			doS_t”	I	Maximum dosing time 0 = OFF 1...99999 * 0.1 s
			EtY_t”	I	Emptying time 0 = OFF 1...99999 * 0.1 s
			rES_t”	I	Residual flow time 0 = OFF 1...99999 * 0.1 s
			tAr_t”	I	Tare time 0 = OFF 1...99999 * 0.1 s

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

If the target weight is changed, then “LS_2 → oFF_L” := “LS_2 → on_L” * 0.9.

20.2.3 Description of the dosing cycle

- Start the dosing process (external input / key / **RUN** command)
- Monitor the start weight Start is not executed if the actual gross weight exceeds a limit value (“LS_4 → oFF_level”)
- Start time monitoring (“SEtPt → FiLL → doS_t”)
- Tare (must be activated with (“SEtPt → FiLL → tar_t” > 0), change over to NET value monitoring. Taring takes place after this waiting time.
- Start coarse flow (activate OUT2)
- If the NET weight is the same or more than the coarse flow cut-off point (“LS_2 → oFF_L”), then stop coarse flow (deactivate OUT2)
- Residual flow time monitoring (“SEtPt → FiLL → rES_t”)
- Concluding measurement: If there is standstill, the filling result is stored (“InFo → FILL”), the total weight (**SUM**) is calculated, and the dosing counter (**NDS**) is incremented
- If the parameter is “SEtPt → FiLL → EtY_t” > 0, output OUT3 is activated for this emptying time
- Stop time monitoring (“SEtPt → FiLL → doS_t”), activate ready signal (OUT1)
- Quick message [READY] on the display (for 3 s)

If the dosing result is outside the tolerance (“LS_3 → on/oFF_L”), the alarm output (OUT4) is activated. The result (“InFo → FILL”) is OK, if the following equation is valid:

“LS_3 → oFF” ≤ “InFo → FiLL” ≤ “LS_3 → on_L”

If the dosing result (“InFo → FILL”) is outside the tolerance, the optimization function changes the cut-off point parameter (“LS_2 → oFF_L”):

Diff:= “LS_2 → on_L” – “InFo → FiLL” (target weight – dosing result)

Diff1 = Diff ∗ Correction factor

“LS_2 → oFF_L”:= “LS_2 → oFF_L” + Diff1 (new cut-off value)

The correction factor depends on:

|Target weight / FRS| ∗ 100	<2 %	2...4 %	>4 %
Correction factor	0.25	0.5	1.0

The new cut-off value is also stored protected against power failure.

If the dosing time exceeds the maximum filling/dosing time (“SEtPt → FiLL → doS_t”), the process is interrupted immediately and the alarm output (OUT4) becomes active.

During dosing, the process can be aborted via input IN1, a key (*“F1”/“F2”*) or by the **BRK** command.

20.3 Tank weighing (FILL2)

A portion is to be filled into a barrel / a container / a sack. This barrel / container / sack is not connected to the scale. The tank is mounted on the scale.

There are three main tasks:

- Filling the tank
- Weighing portions (dosing) from the large tank into a smaller tank
- Emptying the tank (for maintenance)

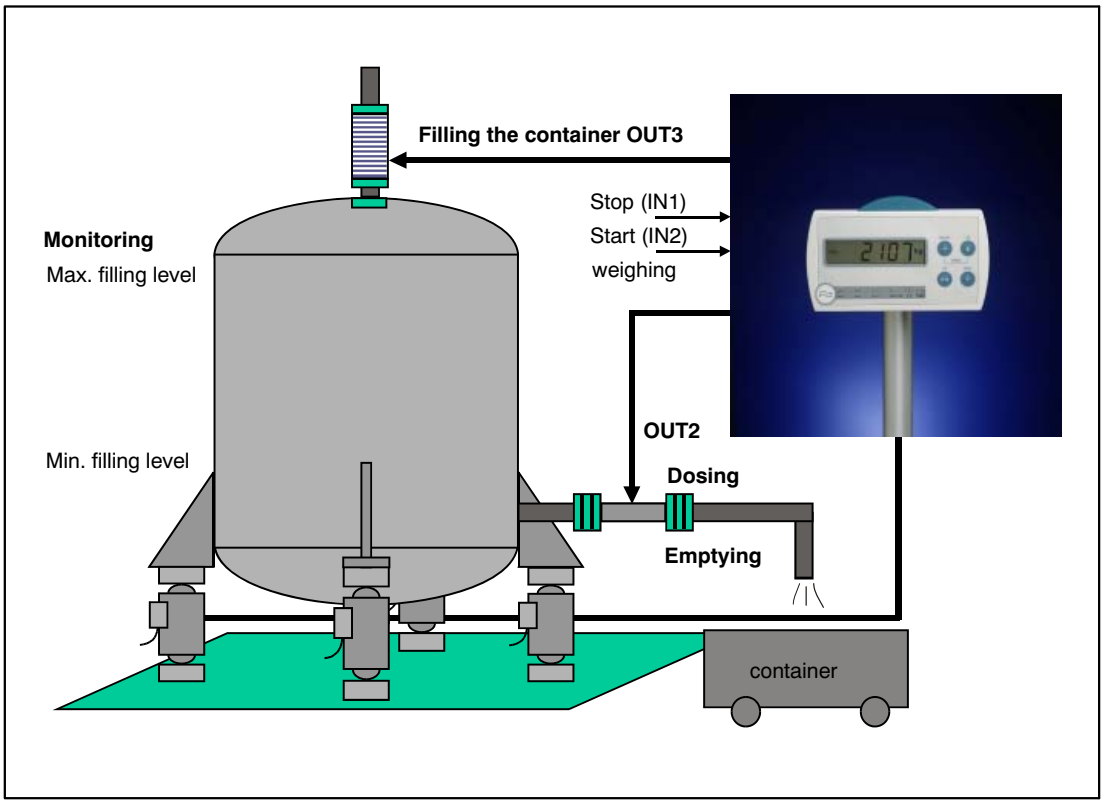


Fig. 20.2: Filling

20.3.1 Digital inputs/outputs

Digital I/O	Function with FILL2
IN1	Stop process (filling/dosing/emptying) Set “inPut → inP_1” = tArE parameters
IN2	Start dosing: Set “inPut → inP_2” = tArE parameters
OUT1	Done
OUT2	Coarse flow control (dosing) / emptying the tank
OUT3	Tank filling
OUT4	Error

Inputs IN1/2 can also be set to other functions, if the input functions described are not required (see Chapter 8.5.7 (page 50) and Chapter 17 (page 91)).

20.3.2 Parameters

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
2	“SEtPt →				**Filling parameters**
		LS_1 →			**Tank filling**
			inPut”	S	No function
			LEvEL”	S	No function
			oFF_L”	I	Tank filling: Cut-off value, ±99999
			on_L”	I	Tank filling: Target value, ±99999
		LS_2 →			**Target weight and changeover point when dosing**
			inPut”	S	No function
			LEvEL”	S	No function
			oFF_L”	I	Course flow cut-off point, ±99999
			on_L”	I	Dosing target weight, ±99999

Access level	Main menu level 1	Second menu level 2	Third menu level 1 2	Type	Sub-menu explanation 1 2 (flashing) = parameter input / selection
		LS_3 →			**Dosing with tolerance weight**
			inPut”	S	No function
			LEvEL”	S	No function
			oFF_L”	I	Lower tolerance weight, ±99999
			on_L”	I	Upper tolerance weight, ±99999
		LS_4 →			**Max./min. filling weight of the tank**
			inPut”	S	No function
			LEvEL”	S	No function
			oFF_L”	I	Minimum filling weight of the tank, ±99999
			on_L”	I	Maximum filling weight of the tank, ±99999
		FiLL →			**Filling time parameters**
			doS_t”	I	Maximum dosing time 0 = OFF 1...99999 * 0.1 s
			EtY_t”	I	Emptying time 0 = OFF 1...99999 * 0.1 s
			rES_t”	I	Residual flow time 0 = OFF 1...99999 * 0.1 s
			tAr_t”	I	Tare time 0 = OFF 1...99999 * 0.1 s

Parameter access types: D – display only, S – individual item selection, I – parameter input; M – measurement

If the target weight is changed, then “LS_2 → oFF_L” := “LS_2 → on_L” * 0.9.

20.3.3 Description of the dosing cycle (portion weighing)

- Start the dosing process (external input / key / **RUN** command)
- Start is not executed if the actual gross weight exceeds a limit value (“LS_4 → oFF_L” = min. tank level)
- Deactivate ready signal (OUT1)
- Start time monitoring (”SEtPt → FiLL → doS_t”)
- Tare (must be activated with (“SEtPt → FiLL → tar_t” > 0), change over to NET value monitoring. Taring takes place after the waiting time.
- Start coarse flow (activate OUT2)
- If the NET weight is the same or more than the coarse flow cut-off point, then stop coarse flow (deactivate OUT2)
- Residual flow time monitoring (“SEtPt → FiLL → rES_t”)
- Concluding measurement: If there is standstill, the filling result is stored (“InFo → FILL”), the total weight (SUM) is calculated, and the dosing counter (NDS) is incremented
- End time monitoring (“SEtPt → FiLL → doS_t”)
- Quick message [READY] on the display (for 3 s), activate ready signal (OUT1)

The target weight of the dosing process is defined in parameter “LS_2 → on_L”.

The coarse flow cut-off point is parameter “LS_2 → oFF_L”.

If the dosing result is outside the tolerance (“LS_3 → on/oFF_L”), the alarm output (OUT4) is activated. The result is OK, if the following equation is valid:

“LS_3 → oFF” ≤ “InFo → FiLL” ≤ “LS_3 → on_L”

If the dosing result (“InFo → FILL”) is outside the tolerance, the optimization function changes the cut-off point parameter (“LS_2 → oFF_L”):

Diff:= “LS_2 → on_L” – “InFo → FiLL” (target weight – dosing result)

Diff1 = Diff ∗ Correction factor

“LS_2 → oFF_L”:= “LS_2 → oFF_L” + Diff1 (cut-off value)

The new cut-off value is also stored protected against power failure.

The correction factor depends on:

|Target weight / FRS| * 100	<2 %	2...4 %	>4 %
Correction factor	0,25	0,5	1,0

If the dosing time exceeds the maximum filling/dosing time, the process is interrupted immediately and the alarm output (OUT4) becomes active.

During dosing, the process can be aborted via input IN1, a key (*"F1"/"F2"*) or by the **BRK** command.

20.3.4 Description of tank filling

- Start the filling process with keys *"F1"* or *"F2"* (long keystroke)
- Deactivate ready signal (OUT1)
- Start time monitoring ("SEtPt → FiLL → doS_t"), switch to net value monitoring
- Activate output OUT3
- If the weight is the same or more than the target filling weight, abort the filling process (deactivate OUT3)
- Residual flow time monitoring ("SEtPt → FiLL → rES_t")
- End time monitoring ("SEtPt → FiLL → doS_t")
- Quick message [READY] on the display (for 3 s), activate ready signal (OUT1)

The target weight of the filling process is defined in parameter "LS_1 → ON_level".

If the filling time exceeds the maximum filling/dosing time ("SEtPt → FiLL → doS_t"), the process is interrupted immediately and the alarm output (OUT4) becomes active.

During filling, the process can be aborted via input IN1, a key (*"F1"/"F2"*) or by the **BRK** command.

Start is not executed if the actual gross weight exceeds a limit value ("LS_4 → ON_level" = max. tank filling weight).

20.3.5 Description of the emptying function

- Start the emptying process with keys *“F1”* or *“F2”* (long keystroke)
- Start time monitoring (“SEtPt → FiLL → doS_t”), switch to net value monitoring
- Activate output OUT2
- If the gross weight is equal to or less than zero or if the emptying time (EtY_t) has expired, abort the process (deactivate OUT2)
- Residual flow time monitoring (“SEtPt → FiLL → rES_t”)
- End time monitoring (“SEtPt → FiLL → doS_t”)
- Quick message [READY] on the display (for 3 s)

20.4 Tank weighing (FILL3)

A portion is to be filled into a barrel / a container / a sack. This barrel / container / sack is not connected to the scale. The tank is mounted on the scale.

The functions in connection with FILL3 are the same as for FILL2. The only difference is that function FILL3 controls the emptying of a tank with a separate valve (output OUT4).

20.4.1 Digital outputs

Digital I/O	**Function with FILL3**
IN1	Stop process (filling/dosing/emptying) Set “inPut → inP_1” = tArE parameters
IN2	Start dosing: Set “inPut → inP_2” = tArE parameters
OUT1	Done
OUT2	Coarse flow control (dosing)
OUT3	Tank filling
OUT4	Emptying the tank

Inputs IN1/2 can also be set to other functions, if the input functions described are not required (see Chapter 8.5.7 (page 50) and Chapter 17 (page 91)).

20.4.2 Parameters

See Chapter 20.3.2 (page 102)

20.4.3 Description of the dosing cycle (portion weighing)

See Chapter 20.3.3 (page 104)

20.4.4 Description of tank filling

See Chapter 20.3.4 (page 105)

If the filling time exceeds the maximum filling/dosing time (doS_t), the process is aborted immediately (no alarm output).

20.4.5 Description of the emptying function

- Start the emptying process with keys “*F1”* or *“F2”* (long keystroke)
- Start time monitoring (“SEtPt → FiLL → doS_t”), switch to net value monitoring
- Activate output OUT4
- If the gross weight is equal to or less than zero or if the emptying time (EtY_t) has expired, abort the process (deactivate OUT4)
- Residual flow time monitoring (“SEtPt → FiLL → rES_t”)
- End time monitoring (“SEtPt → FiLL → doS_t”)
- Quick message [READY] on the display (for 3 s)

21 Analog output (4...20 mA)

The analog output connection is described in Chapter 5.7 (page 22).

The burden (load resistance) is in the range 100...500 Ω. The WE2107 supply voltage UB must be at least 18 V.

The analog output has a resolution of 10 bits and an accuracy of 8 bits.

After scale adjustment, the weighing range of the WE2107 is output as follows:

Load	Output current
no load	4 mA
maximum capacity	20 mA

The input value of the current output is the gross value. Switching to the net value is not planned. The input current is updated approx. every 300 ms.

There is no need to make a setting. This is implemented by HBM in the factory settings.

22 Alibi and calibration memory

The WE2107 is equipped with a large EEPROM in which to store the legal-for-trade parameters. Each time there is a printout, this EEPROM also stores the most important information of the print protocol (alibi memory; only in legal-for-trade applications: LEGAL parameter = OIML / NTEP).

Calibration date and calibration time or print date and print time are only correct if the real time clock has previously been set.

22.1 Calibration memory

The calibration memory contains up to 32 records of the last adjustment data (legal-for-trade parameters):

Parameters	Menu item in the ADJ menu
Legal-for-trade counter	InFo \ CALC
Calibration date	–
Calibration time	–
Legal-for-trade	ScALE \ LEGAL
Factory characteristic curve, zero	–
Factory characteristic curve, full scale	–
Scale characteristic curve, initial load	ZEro
Scale characteristic curve, full scale	SPAn
Linearization, point 1	diSP1
Linearization, point 1	VAL1
Linearization, point 2	diSP2
Linearization, point 2	VAL2
maximum capacity	CAP
Grav. acceleration, calibration site	EA_CL
Grav. acceleration, installation site	EA_CU
Partial load weight	CAL
Unit	UnIt
Zero on start-up	AZEro
Zero tracking	ZtrAc
Motion detection	StiLL
Digit / increment	rES
Decimal marker	Point
Multi-range, switch point 1	rAnG1
Multi-range, switch point 2	rAnG2”

Each time there is a new adjustment, a new data set is written to the EEPROM.

It is possible to read this information with the WE2107 panel program. A special read command is needed for access to these data sets within the EEPROM.

The parameter set No. 0 contains the HBM factory settings. Parameter sets No. 1...32 are used during every storage in the parameter menu (application parameter set). Parameters not relevant to verification are stored in the internal data memory and are not part of the calibration data.

22.2 Alibi memory

The alibi memory contains up to 8,000 records of the last printouts. A record contains the following data:

- Print number
- Date
- Time
- Gross value
- Tare value
- Unit
- Decimal sign

The entire memory is organized as a FIFO memory (First in / First out). Each time there is a printout (apart from a parameter printout), a new data set is stored.

It is possible to read this information with the WE2107 panel program. A special read command is needed for access to these data sets within the EEPROM.

This function is useful, as it allows you to compare a printed sheet with this information.

23 Parameter factory settings

When the WE2107 is delivered, it comes with specific factory settings:

- The internal factory characteristic curve is adjusted to 0 and 2 mV/V
- The (5 digit) production number is entered

As the WE2107 has undergone certain tests during production, the following information can deviate from zero:

- Legal-for-trade counter (“InFo → VAL → CALC” menu)
- ADC overflow counter (“InFo → VAL → AdC” menu)
- Sensor overflow counter (“InFo → VAL → SEnS” menu)

Parameters	Default	Explanation
Limit values 1...4		switched off
Dosing time parameters	0	switched off
Filter mode	0	standard filter
Filter	4	1 Hz
Manual tare value	0	switched off
Reference number of pieces	0	counting scale deactivated
COM1, address	31	
COM1, baud rate	9600	
COM1, parity bit	even	
COM2, function	OFF	switched off
COM2, baud rate	9600	
COM2, parity bit	even	
Printing, ESC sequences	0	switched off
Digital inputs IN1/2	OFF	no function
Function keys F1/2	OFF	no function
Basic scale function	Standard	non-automatic weighing instrument
Menu access	4	all menus
Legal-for-trade operation	OFF	switched off
Unit	OFF	no unit of measurement
Zero on start-up	OFF	switched off
Zero tracking	OFF	switched off
Standstill monitoring	OFF	switched off
Digit / increment	1d	
Decimal point	0	right
maximum capacity	6000	
Multi-range weighing machine	0	switched off
Calibration weight	6000	max. capacity adjustment
Gravitational acceleration correction	9.8102	switched off
Scale char. curve, zero	0.0000 mV/V	
Scale char. curve, nom. value	2.0000 mV/V	
Linearization		switched off

When restoring to the factory settings (“F_AdJ → dEFLt” menu), the parameters described above are set to their default values.

24 Monitoring functions and error messages

24.1 Monitoring functions

The following monitoring functions are implemented for load cell connection:

- Detecting an open sensor input
- Monitoring the excitation voltage (nominal value 5 V, error if <3 V)
- Sensor input signal exceeds the range −160 %...+160 % of the maximum capacity (CAP)

There are also other monitoring functions available:

- Short−circuit of one or more digital outputs
- ADC overflow
- Error when communicating with the EEPROM (parameter storage)
- External supply voltage too low
- Internal supply voltage too low

Error message display:

To indicate an error, [Erxxx] appears on the display for 3 s (xxx is the error code). The last two errors can also be read in the parameter menu (“InFo”).

Error message	Significance	Remedy
(Marks above, Error code 36)	Measured value above the max. display range (depending on the set scale standard)	Reduce the scale loading. Check set maximum capacity: CAP parameter in “AdJ” menu.
(Marks below, Error code 38)	Measured value below the min. display range (depending on the set scale standard)	For net display: Change over to gross, zero balance or possibly re-adjusting the scale
(Marks center, Error code 68)	Open analog input	Check load cell connections
Tilt	External tilt sensor became active.	Reduce tilt of the whole scale.

24.2 Error messages

The error code is subdivided into different sections:

- Hardware errors
- Load cell errors
- Parameter errors
- Communication errors

Hardware errors:

Error code	Description	Remedy
128	Several hardware errors simultaneously	
129	Internal EEPROM	→ Repair
130	External EEPROM	→ Repair
131	ADC overflow	→ Repair
132	ADC underflow	→ Repair
133	External supply voltage too low for analog output (4 – 20 mA)	Check external voltage supply
134	Digital output overload	Eliminate short-circuit
135	Internal supply voltage too low	→ Repair

Load cell errors:

Error code	Description	Remedy
64	Several load cell errors simultaneously	
65	Input signal > 160 % (> 3.2 mV/V)	Check load cell / load cell connection
66	Input signal < –160 % (< –3.2 mV/V)	Check load cell / load cell connection
67	Bridge excitation voltage too small (< 3V)	Check load cell / load cell connection

Parameter errors:

Error code	Description	Remedy
32	Several errors simultaneously	
33	**SFA** – **SZA**< 2000 d (10 %), internal factory characteristic curve too sensitive	→ Repair
34	**LWT** – **LDW**< 2000 d, scale characteristic curve too sensitive	New scale adjustment
35	Faulty linearization parameter: LIN1 > LIN2 or LIM1 > LIM2	Check parameters, see Chapter 11 (page 68)
36	Gross value overflow	Reduce load
37	Faulty linearization adjustment	Repeat, Chapter 11
38	Gross value underflow	Set to zero, re-adjust scale
39	Faulty zero on start-up (outside range or no standstill)	Do not load scale before switching on
40	Faulty zeroing	Check steadiness of measured value (poss. set a higher filter), new scale adjustment
41	Faulty taring	Check steadiness of measured value (poss. set a higher filter)
42	Dosing time exceeded	Check flow of material when dosing
43	Dosing start weight too high	Empty scale beforehand
44	Tank filling too low (not enough material for next dosing)	Top up with material
45	Cumulative weight overflow	Use print function to clear sum (Prt4 or 6, see Chapter 15.5, page 82)
46	Print error	No standstill within 5s, print command cleared
Err_P	Parameter error display when values entered	Note valid input range

Communication errors:

Error code	Description	Remedy
16	Several errors simultaneously	
17	Input parameter outside input range	See *Description Part 2*
18	Unknown command	
19	Incorrect password (**DPW** command)	See *Description Part 2*
20	Write-protected parameter	Mandatory calibration switched on
21	Print time timeout	No standstill within 5s, print command deleted
22	LFT counter overflow (**TCR** command)	→ Repair
23	COM1 parity / framing error	Check COM interface setting

The battery is only important for the real-time clock function and for saving the current parameters if there is a loss of voltage.

If the battery voltage is too low (flat battery) and the external voltage supply has been switched off, it may be that the WE2107 does not start (only the background lighting is on, the program does not start up). In this case, replace the battery.

The device does not display when the battery voltage is too low.

25 Maintenance and cleaning

Please note the following points when cleaning the housing:

- Before cleaning, disconnect the device from the power supply
- Clean the housing with a soft, slightly damp (not wet!) cloth! Under no circumstances use cleaners that contain scouring agents or solvents, as these can attack the front panel labeling and the display!

The WE2107 contains a battery (type: CR2032, lithium, not rechargeable), to back up the integrated real-time clock. It is recommended that the battery is replaced during service or subsequent verifications.

At normal ambient temperatures (–10...+40 ¿C), the battery will last for about 3 years.

To replace the battery, proceed as follows:

- Disconnect the WE from the voltage supply
- Open the housing
- Remove the old battery and dispose of it in an environmentally sound manner
- Insert the new battery (positive pole at the top, “+” marking is visible)
- Close the device
- Set the date and time (see Chapter 8.5.6 (page 48) and Chapter 15 (page 79))

The battery is only important for the real-time clock function and for saving the current parameters if there is a loss of voltage.

If the battery voltage is too low (flat battery) and the external voltage supply has been switched off, it may be that the WE2107 does not start (only the background lighting is on, the program does not start up). In this case, replace the battery.

The device does not display when the battery voltage is too low.

26 Mechanical dimensions and mounting information

26.1 WE2107 dimensions (plastic housing, ABS)

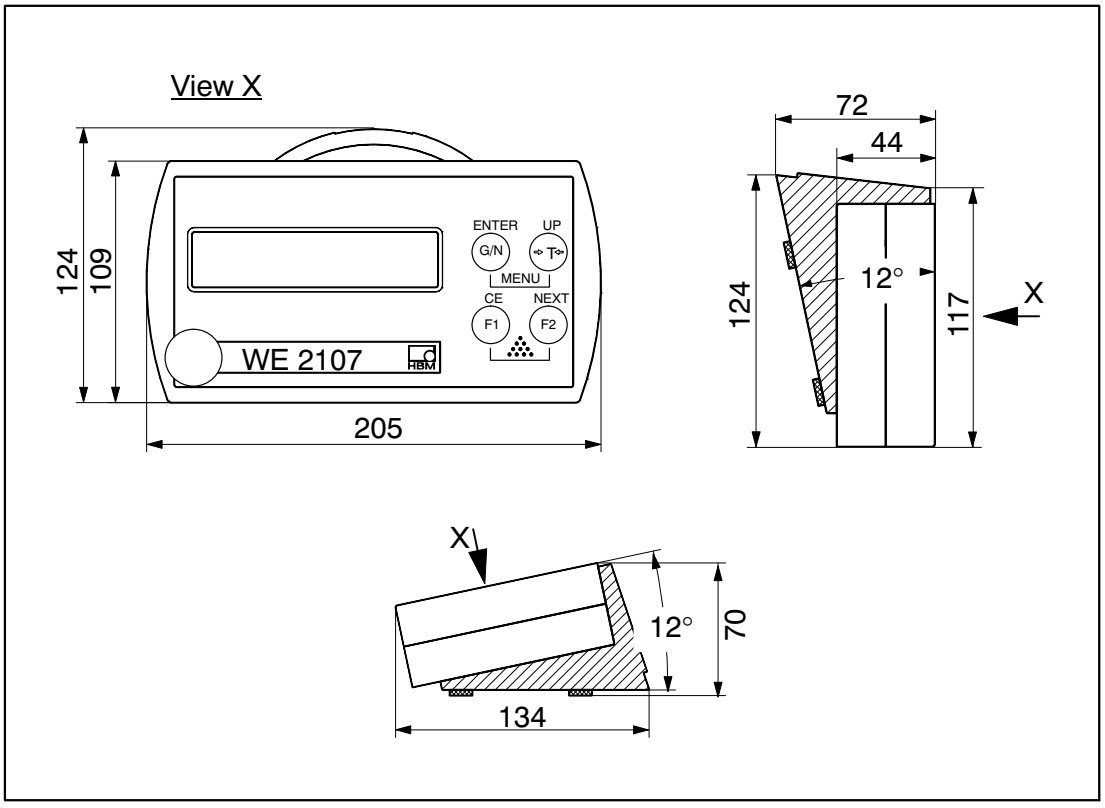


Fig. 26.1: WE2107 dimensions (plastic housing, ABS)

26.2 WE2107M dimensions (stainless steel front panel)

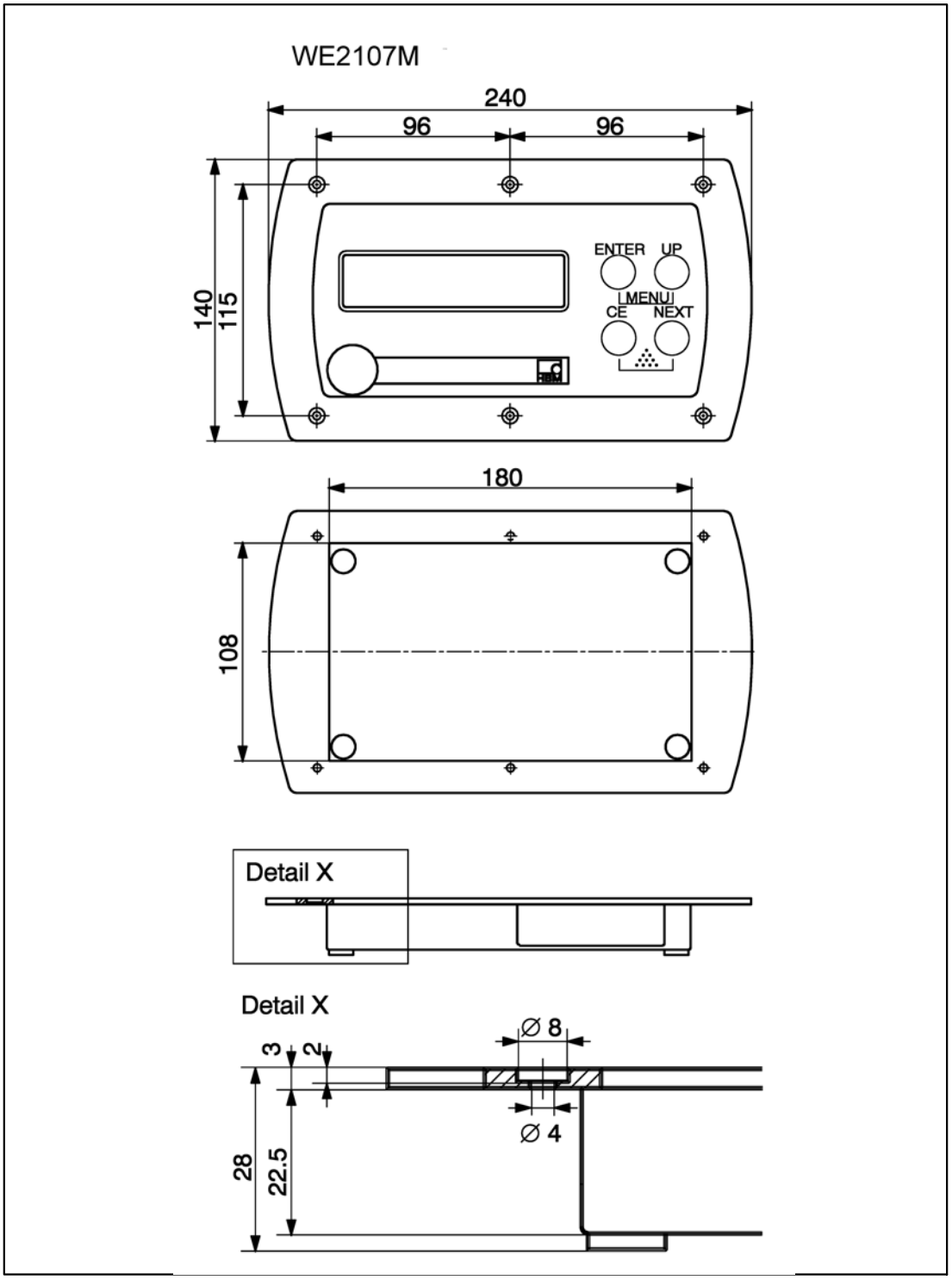


Fig. 26.2: WE2107M dimensions (stainless steel front panel)

26.3 Wall mounting (WE2107, plastic housing)

The housing of the WE2107 is designed to allow it to be fitted to the wall without the mounting elements being visible. The assembled device must be positioned and locked in place as shown in Fig. 26.3. As the wall bolts are not visible, the assembly base of the housing has sloping guides so that the bolt position can be determined by touch.

Two bolts are required (countersunk head bolts included among the items supplied) with an 86 mm gap. With this type of assembly, the bolts are locked in place to secure the housing and prevent the forces that occur in everyday use from lifting it off. Using one of the following types of bolt is a prerequisite:

- Cylinder head bolts, 4 mm diameter shaft, without thread
- Countersunk head bolts, diameter below the head max. 3.5 mm. When mounting with plugs, suitable bolts include 4.0 ∗ 50 mm chipboard bolts, with the thread finishing about 10 mm below the head.

Please make sure that the bolt heads are the correct distance from the wall (in mm):

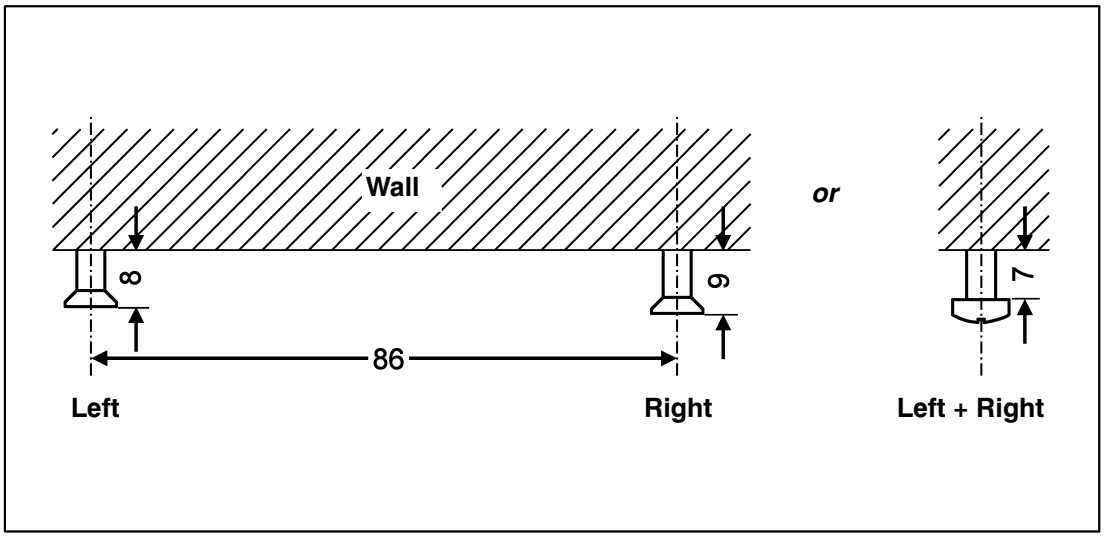


Fig. 26.3: Wall mounting – bolt head distances

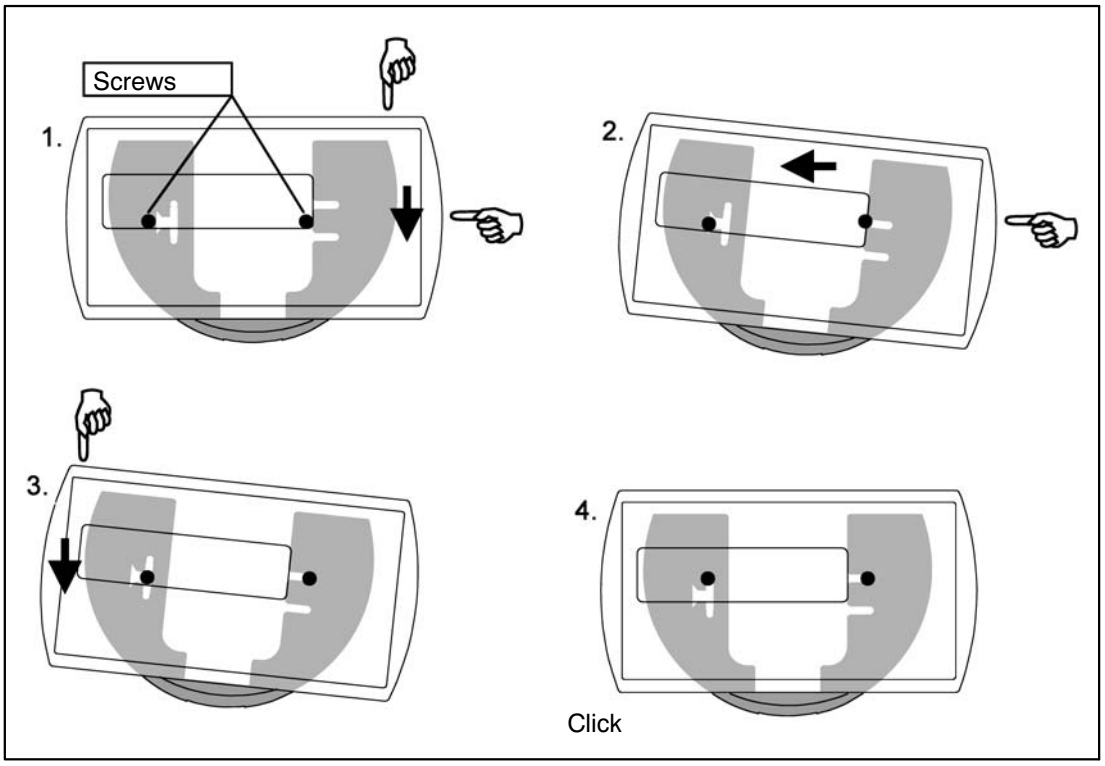


Fig. 26.4: Movement sequence for wall mounting

26.4 Mounting on a stand (WE2107 in plastic housing)

Free-standing scales can be mounted on a stand. This must have a plate with four holes as shown in Fig. 26.5 for attaching the WE2107. If the design allows, the cables can be routed invisibly inside the stand. To make it more stable, the plate should fit in the space between the rubber feet, or these should be removed.

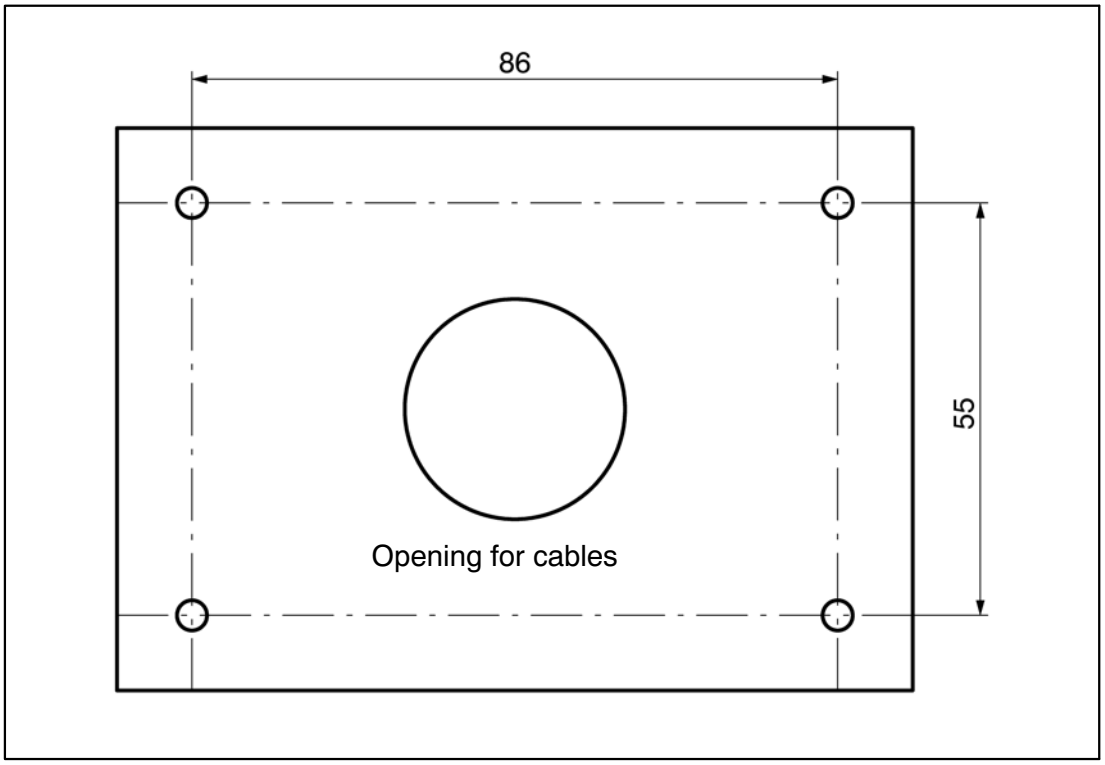


Fig. 26.5: Mounting on a stand – attaching the WE2107

Take the following steps to mount the device:

1. Remove the mounting base from the back of the device by loosening the two bolts.
2. Attach the mounting base to the stand plate with the four M4 bolts.
3. Run the cables through the PG glands and connect them to the electronics.
4. Close the two halves of the housing and join them together with the two bolts. Pull the cables a little way out of the PG glands.
5. Attach the closed housing to the mounting plate with the two bolts. If applicable, run the cables into the conduit inside the stand.

26.5 Using as a desktop device (WE2107 in plastic housing)

The WE2107 is equipped with four rubber feet to allow it to be located on horizontal surfaces. These generally ensure that it stays securely in place and stop it sliding away when the keys are operated.

It is also possible to attach it in the same way as for wall-mounting. If there is access to the mounting surface from underneath, the holes for the stand mounting can also be used. If you leave the feet on the device for this, make sure that you do not over-tighten the bolts and warp the mounting base.

To tilt the control panel towards the user, fit the mounting base with the curved part upward.

26.6 Panel mounting (WE2107M with stainless steel front panel)

The device is mounted in a panel with six bolts.
See Chapter 26.2 (page 119).

The IP65 degree of protection for the WE2107M type only applies to the front!

26.7 Sealing/legal-for-trade capability

The weighing indicator must be labeled and sealed in accordance with the scale application. Different labeling strips are included for use as a Class III and IIII non-automatic scale.

The labeling strip must contain at least the following data:

Max Maximum scale loading

Min Minimum scale loading

e Increments

Type Scale name

S.N. Individual scale serial number

In the case of legal-for-trade scales, verification must be performed by a Notified Body, in accordance with current national laws. The sealing and calibration labels must be attached in accordance with the approval.

26.8 Notes on the achievable degree of protection

Note that the housing can only be guaranteed to be leak-proof if:

- The opening for the calibration pushbutton and the labeling strip on the front of the device are sealed (by a calibration label or by the enclosed adhesive label)
- All the PG glands are tight and round cables of a suitable diameter have been used
- Any unused PG glands are sealed with blanking plugs
- The two halves of the housing fit properly

27 Specifications

Property	Unit	Area
Type		**WE2107, WE2107M**
Precision		
OIML R76, Class III or IIII	d = e	6000
Multi-range application	d = e	2 * 3000, 3 * 2000
Sensitivity	µV/e	≥ 0.6 *)
Load cell connection		6-wire connection
Excitation voltage	V_{DC}	5
Minimum resistance	Ω	58
Maximum resistance	Ω	4000
Nominal input signal	mV/V	± 2.0
Maximum input signal	mV/V	± 3.2
Maximum cable length	m	100 (206 m/mm^2) *)
ADC		
Resolution	Bit	24
Maximum data transfer rate (data rate)	1/s	200
Display		
LCD with backlighting and status display symbols		5 digit
Character height	mm	20
Keys		
Number		4
Function keys		2
Analog output	mA	4 … 20
Burden	Ω	100 … 500
Resolution	Bit	10

*)in accordance with OIML R76, legal for trade

Property	Unit	Area
Type		**WE2107, WE2107M**
Digital I/O		
Number of digital inputs		2
Input voltage IN1/2, Low	V	0 … 1.0
Input voltage IN1/2, High	V	3 … 30
Input resistance IN1/2	kΩ	10
Number of digital outputs		4
Type		High side switch
Max. output current / output	A	0.6
Voltage supply, outputs	V	12 … 30, 24 nominal
Outputs are protected against short-circuits		
Serial interface (COM1)		
Baudrate	Bd	1200, …, 38400
Parity bit		none / even
Data bits	Bit	8
Stop bit	Bit	1
Type for WE2107		RS232
RS232, signals		RxD, TxD, GND
Max. cable length RS232	m	25
Type for WE2107M		RS485 (2-wire)
RS485, 2-wire, signals		TRxA, TRxB
Max. cable length RS485	m	500
Interface functions COM2 RS232		Print, serial display (automatic output), PC connection via RS 232
Voltage supply U_B		
Range (without connected analog output)	V_{DC}	12 … 30, 24 nominal
Range (with analog output)	V_{DC}	18 … 30, 24 nominal
Power consumption	W	6
Current (with 58 Ω load)	mA	300
Peak current on startup	mA	450

Property	Unit	Area
Type		**WE2107, WE2107M**
Ambient conditions		
temperature range		
Nominal (rated) temperature range	°C	−10 … +50 (−10 … +40) *)
Operating temperature range	°C	−20 … +60
Storage temperature range	°C	−40 … +85
Interference immunity (EMC) as per EN 45 501 (3 V/m)		Additionally tested to 10 V/m
Housing, WE2107		
Degree of protection per EN 60 529 (IEC 529)		IP65
Material		ABS, halogen-free
Dimensions (W * H * D)	mm	205 * 124 * 72
Weight, approx.	kg	1
Connections		4xPG7
Housing, WE2107M		
Degree of protection per EN 60 529 (IEC 529) for front panel when installed		IP65
Material (front)		Stainless steel
Dimensions (W * H * D)	mm	240 * 140 * approx. 28
Weight, approx.	kg	1

*) in accordance with OIML R76, legal for trade

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