

Scale electronic unit (NAWI)

WE2108... (P83...P85)

WE2108S



WE2108



WE2108M



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Safety instructions

In cases where a breakage would cause injury to persons or damage to equipment, the user must take appropriate safety measures (such as fall protection, overload protection, etc.). For safe and trouble-free operation, weighing modules must not only be correctly transported, stored, sited and installed but must also be carefully operated and maintained.

It is essential to comply with the relevant accident prevention regulations. In particular you should take into account the limit loads quoted in the specifications.

Functional overview

The scale electronic unit WE2108 is a measuring amplifier for connection to commercially available strain gauge load cells or scales. The load cell signal is amplified and digitally converted, all further processing steps are performed digitally in a microprocessor.

The electronic unit is set and parameterized via keyboard or interface. The setup program *WE2108Panel* serves for this purpose. It is contained together with this documentation on the HBM CD-ROM with the Order No. 1-WE2108/DOC.

Use in accordance with the regulations

The scale electronic unit WE2108 is to be used exclusively as component of a non-automatic scale. Any use extending beyond this is considered to be not as intended.

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

General dangers due to non-observance of the safety instructions

- In the normal case the product causes no dangers, provided the notes and instructions for configuring, installation, operation as intended and maintenance are complied with.
- The safety and accident prevention regulations applicable corresponding to the application must be observed without fail.
- Installation and commissioning may be performed exclusively by qualified personnel.
- Avoid the penetration of dirt and moisture into the interior of the unit when connecting the cables.
- When connecting the cables take measures against electrostatic discharges which can damage the electronic unit.

- An extra low voltage (10 – 35 V) with safe isolation from the mains is required for the power supply of the unit.
- When connecting additional devices, the safety regulations according to EN61010¹⁾ must be complied with.
- Observe the maximum voltage level when connecting external control systems to the process input and process outputs of the WE2108.
- The ground connections of the supply, of the process inputs and process outputs, of the interface and the shield of the load cell cable are connected with one another in the unit. In the case of potential differences of the devices to be connected, isolate the signals in a suitable manner (e.g. by optocoupler).
- Shielded cables are required for all connections, except for power supply. The shield must be connected flatly with ground at both ends.
- The use of unscreened voltage supply cables is permissible only for cables with a length of up to 30 m max., which are laid within a building. In the case of greater cable lengths, or installation outside buildings, a screened cable must be used. In order to compensate for potential differences, the metal housing of WE2108M / WE2108S has to be connected via a low ohmic compensation conductor with the scale components as well as with the ground potential of the connected units. This is not necessary if a potential difference of 35 V is not exceeded.
In the unit, the reference ground (GND) for all signals and the supply voltage is connected directly to the cable screen connection, but not to the housing.
- The front foil is manufactured from high quality materials and offers a service life appropriate for the external conditions. The keys may be operated only by hand, under no circumstances may pointed objects be used to press the keys.

1) "Safety regulations for electrical measuring, control and laboratory equipment" 

Residual dangers

The scope of supply and performance of the scale electronic unit covers only a small area of weighing technology. In addition, equipment planners, installers and operators should plan, implement and respond to the safety engineering considerations of weighing technology in such a way as to minimise residual dangers. Prevailing regulations must be complied with at all times. There must be reference to the residual dangers connected with weighing technology.

In these mounting instructions residual dangers are pointed out using the following symbols:

Symbol:  **DANGER**

Meaning: **Highest level of danger**

Warns of a **directly** dangerous situation in which failure to comply with safety requirements **will** lead to death or serious physical injury.

Symbol:  **WARNING**

Meaning: **Possibly dangerous situation**

Warns of a **potentially** dangerous situation in which failure to comply with safety requirements **can** lead to death or serious physical injury.

Symbol:  **ATTENTION**

Meaning: **Possibly dangerous situation**

Warns of a **potentially** dangerous situation in which failure to comply with safety requirements **could** lead to damage to property, slight or moderate physical injury.

Symbols indicating application notes and useful information:

Symbol:  **NOTE**

Refers to the fact that important information is being given about the product or its use.

Symbol: 

Meaning: **CE mark**

The CE mark signals a guarantee by the manufacturer that his product meets the requirements of the relevant EC directives. You'll find the Declaration of conformity in the up-to-date version of **HBMdoc**, available at www.hbm.com :

- Choose your country
- SUPPORT
- Documentation

Environmental conditions

In the context of your application, please note that all materials which release chlorine ions will attack all grades of stainless steel and their welding seams. In such cases the operator must take appropriate safety measures.

Prohibition of own conversions and modifications

The scale electronic unit must not be modified from the design or safety engineering point of view except with our express agreement. Any modification shall exclude all liability on our part for any damage resulting therefrom.

Qualified personnel

This weighing electronic is only to be installed by qualified personnel strictly in accordance with the technical data and with the safety rules and regulations which follow. It is also essential to observe the appropriate legal and safety regulations for the application concerned. The same applies to the use of accessories.

Qualified personnel means persons entrusted with the installation, fitting, commissioning and operation of the product who possess the appropriate qualifications for their function.

Maintenance and cleaning

The WE2108 is maintenance-free. Observe the following points when cleaning the housing:

- Separate the connection to the power supply before cleaning.
- Clean the housing with a soft, slightly moistened (not wet!) cloth. Under no circumstances may you use cleaners containing scouring agents or solvents, since these can attack the front panel lettering and the display!

1 Typographic Conventions

The present Reference Manual provides detailed information on the operation as well as on the setting possibilities of the WE2108.

For more clarity the following formats are used in this document:

Meaning	Examples	
Key	ENTER UP CE NEXT	
Menu, Sub-Menu	InFO CAL Fun	InFO
		CAL
		Func
Parameter	<i>"CAL-1"</i> <i>"LOAd1"</i> <i>"unit"</i> <i>"Point"</i>	
Display	<u>DonE</u> <u>BuSY</u> <u>Err44</u>	

2 Commissioning

The permissible supply voltage for the WE2108 is in the range from +10...35 V DC and must be filtered sufficiently (rms value less residual ripple > 10 V).

As an accessory component, a power supply unit 100 ... 240 V is available (HBM order no. 1-AC/DC15V/550mA).

With correct connection with shielded cables the WE2108 corresponds to the relevant European standards and bears the CE mark.

2.1 Notes on cabling

The use of unscreened voltage supply cables is permissible only for cables with a length of up to 30 m max., which are laid within a building. In the case of greater cable lengths, or installation outside buildings, a screened cable must be used.

In order to compensate for potential differences, the metal housing of WE2108s and WE2108M has to be connected via a low ohmic compensation conductor with the scale components as well as with the ground potential of the connected units. This is not necessary if a potential difference of 35 V is not exceeded.

In the unit, the reference ground (GND) for all signals and the supply voltage is connected directly to the cable screen connection, but not to the housing.

3 Short description

3.1 Scope of supply

The original packaging contains:

WE2108:

- Scale electronic unit WE2108 (ABS housing) with four PG glands
- 2 countersunk head screws + wall plugs for wall mounting
- Adhesive mark for closing and sealing the opening for calibration button and lettering strips
- 6 lettering strips for calibration data

WE2108M:

- Scale electronic unit WE2108M... (Panel mounting) with 5 grommets
- Adhesive mark for closing and sealing the opening for calibration button and lettering strips
- 6 lettering strips for calibration data

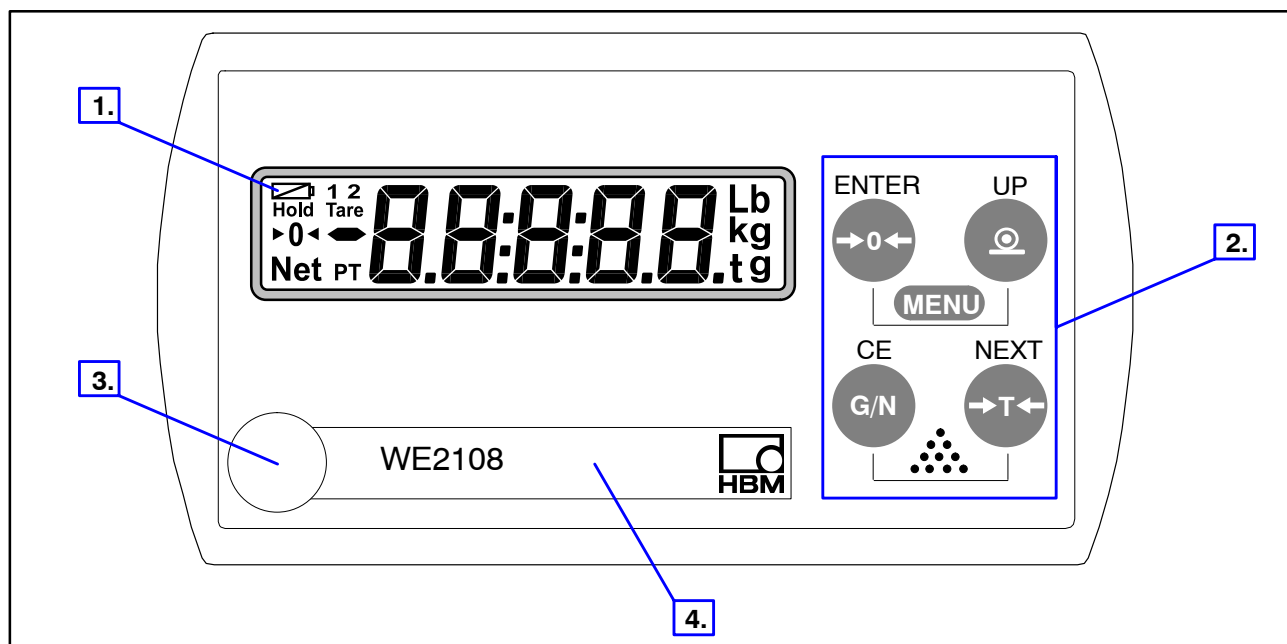
WE2108S:

- Scale electronic unit WE2108S... (Stainless steel housing)
- 2 countersunk head screws + wall plugs for wall mounting
- Adhesive mark for closing and sealing the opening for calibration button and lettering strips
- 6 lettering strips for calibration data

The CD-ROM available as accessory with the Order No. 1-WE2108/DOC contains apart from the complete documentation (Reference Manual) of the unit also the setup program WE2108Panel. This PC software serves for measured value display and configuration of the WE2108 through the serial interface.

3.1.1 WE2108 unit view

The front of the WE2108 consists of the following elements:



1. Display window with 5–digit numerical display and special symbols.
2. Keys for scale and menu functions.
3. Concealed button for access to the calibration menu. The button is accessible with a pointed object (with the mark removed). The opening must be closed after calibration with the enclosed adhesive mark or in the case of a legal for trade application with the official calibration mark. In operation the calibration of the unit is protected and can be changed only after actuating this button.
Please also refer to Sections 4.7 "Information on achievable type of protection" and 6.6 "Access authorization".
4. Viewing window for inserting a lettering strip (for calibration data, unit name etc.).

The PG glands resp. grommets for the connection cables are located on the back of the unit.

3.1.2 Operating elements

Each of the four keys has a basic function for scale operation which is indicated on the key with a large symbol.

- Key  = Zeroing the display
- Key  = Printing the display measured value / or summing function
- Key  = Switching over between gross and net display
- Key  = Taring and switching over into net display

The inscriptions above the keys state the second function of the keys during parameter input (menu guidance).

Activating the functions

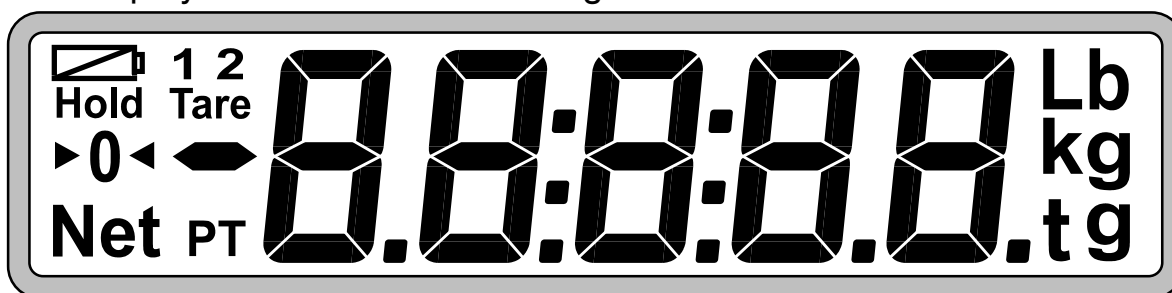
MENU: simultaneously pressing of **ENTER** + **UP**

 (Counting scale): simultaneously pressing of **CE** + **NEXT**

- Concealed button for access to the calibration menu (see **WE2108 unit view**).

3.1.3 Display

The display consists of the following elements:



- **0.0000** 5-digit numerical display with decimal points for the weight value and for menu guidance in the parameter input.
- Symbol  (= Battery): appears if the supply voltage is inadmissibly low.
- Symbols **1** and **2**: Their meaning depends upon the scale type.
One-range scale: Symbol shows exceeding the set limit 1 or 2.
Two-range scale: Symbol shows the range at present valid.
- The symbols have a further special function during parameter setting (see Section 5.2.1 "Menu Overview")
- Symbol *Hold*: only for filter 8 (see Section 6.1.2 "Special filter for animal scales")
- Symbol *Tare*: appears on display of the net value (simultaneously with *Net*).
- Symbol **►0◄** ("exact zero"): indicates that the measured value is in the range of $\pm \frac{1}{4}$ d.
- Symbol *Net*: appears on display of the net value.
- Symbol *PT* (Preset Tare): appears if a stored manual tare value is used.
- Symbols *g*, *kg*, *t*, *Lb*: indicate the valid dimensional unit.

3.2 Connections

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

The connection terminals are identified on the PC board with short text or numbers.



NOTE

All ground connections are connected with one another on the PC board!

Load cell connection	1. Sense + 2. Sense - 3. Signal + 4. Signal - 5. Excitation + 6. Excitation -
Process outputs	Pout3 not used GND Ground Pout2 Process output 2 GND Ground Pout1 Process output 1 GND Ground
Supply	+DC Supply voltage GND Ground
Process inputs	Pin1 Process input 1 GND Ground Pin2 Process input 2 GND Ground
Interface	GND Ground Ta TxD Data output to ext. unit Tb DTR Data Terminal Ready Ra RxD Data input from ext. unit Rb not used GND Ground

Abb.3.1: Position of the connections (open housing, rear view)

3.2.1 Cable entry

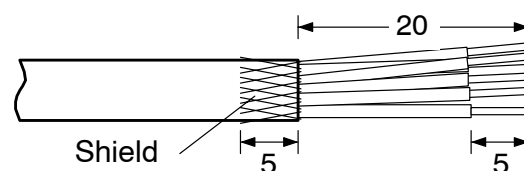
Four PG glands are provided in the back part of the housing for the sealed entry of the cables. They enable round cables with a diameter of 5 to 7 mm to be used. The PG glands serve solely for sealing and strain relief. The shield of the cable must therefore not be contacted to the PG gland (as in other HBM units), but to the screw clips in front of the connection terminals.

This also applies to the versions in a steel housing (WE2108M / WE2108S) and is essential for the EMC characteristics of the units.

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

3.2.2 Preparation of the cables

1. Remove the outer sheath to around 20 mm.
2. Shorten the shield braiding to 5 mm and fold over to the back.
3. If necessary remove the inner sheath.
4. Strip wire ends to approx. 5 mm.
5. Run cable through the PG gland.
6. Push cable under the connecting clip and screw this down so that the area of the folded over shield is clamped firmly.
7. Connect wires to the terminals.



3.2.3 Load cell connection

Terminal	PC board legend	Function	Funktion
1	1.	<i>Sense +</i>	Fühlerleitung +
2	--	<i>Sense -</i>	Fühlerleitung -
3	--	<i>Signal +</i>	Messsignal +
4	--	<i>Signal -</i>	Messsignal -
5	--	<i>Excitation +</i>	Brückenspeisespannung +
6	6.	<i>Excitation -</i>	Brückenspeisespannung -

3.2.4 Process Outputs

Terminal	PC board legend	Function	Example of connection
7	Pout3	not used	The diagram shows a terminal block with six pins: Pout3, GND, Pout2, GND, Pout1, and GND. Pout3 is connected to a diode. The other end of the diode is connected to a supply for switched loads. Pout2 is connected to a diode. The other end of the diode is connected to a supply for switched loads. Pout1 is connected to a diode. The other end of the diode is connected to a supply for switched loads.
8	GND	Ground	
9	Pout2	Process output 2 ¹⁾	
10	GND	Ground	
11	Pout1	Process output 1 ¹⁾	
12	GND	Ground	

¹⁾ open-collector to ground, (external) $U_{\max} = 45 \text{ V}$, $I_{\max} = 200 \text{ mA}$ typ. (electronically protected). When connecting magnetic articles (e.g. relays), a free wheeling diode must be connected parallel to the coil.

3.2.5 WE2108 operating voltage

Terminal	PC board legend	Function	Remarks
13	+DC	Operating voltage	+10–35 V DC ²⁾
14	GND	Ground	

²⁾ The supply voltage must be filtered sufficiently (rms value less residual ripple > 10V).

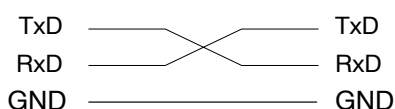
3.2.6 Process Inputs

Terminal	PC board legend	Function	Example of connection
15	Pin1	Process input 1 ³⁾	The diagram shows a terminal block with six pins: +DC, GND, Pin1, GND, Pin2, and GND. Pin1 is connected to a diode. The other end of the diode is connected to a supply for switched loads. Pin2 is connected to a diode. The other end of the diode is connected to a supply for switched loads.
16	GND	Ground	
17	Pin2	Process input 2 ³⁾	
18	GND	Ground	

³⁾ Actuate by switching to ground, max. voltage 35 V.

3.2.7 RS-232 interface (only RS-232 versions)

Terminal	PC board legend	Function	Standard assignment of external unit	
			RS-232 DB25	RS-232 DB9
19	GND	Ground	Pin7	Pin5
20	Ta TxD	Data output to the external unit (TxD)	RxD, Pin3	RxD, Pin2
21	Tb DTR	do not connect !		
22	Ra RxD	Data input from the external unit (RxD)	TxD, Pin2	TxD, Pin3
23	Rb	do not connect !		
24	GND	Ground		



For the communication with an external device its TxD line must be connected with RxD of the WE2108 and vice versa.

3.2.8 RS-485 interface (only RS-485 versions)

See Reference Manual Part 2 (Description of the commands for computer integration)

3.2.9 Remarks

For all housing variants, the reference ground (GND) for all signals and the supply voltage is connected directly to the cable screen connection in the unit, but not to the housing.

The metal housing of WE2108M / WE2108S is not connected to reference ground. In order to compensate for potential differences, the metal housing of WE2108s and WE2108M has to be connected via a low ohmic compensation conductor with the scale components as well as with the ground potential of the connected units. This is not necessary if a potential difference of 35 V is not exceeded.

Up to four load cells of 350 ohms (≥ 87 ohms burden) can be connected to the WE2108. HBM offers junction boxes of the types **VKK1-4** or **VKK2-6** for connecting the cables as well as for corner balancing ("corner load adjustment") for scales with several load cells.

Only high quality, flexible cables with shield may be used for connecting the load cells. HBM recommends the use of these cables for all connections of the WE2108. For connection satisfying EMC requirements (EMC = electromagnetic compatibility), the cable shield of all cables must have a low-resistance contact to the unit ground, for this purpose the shield must be stripped to approx. 5 mm and the cable must be fastened with the strain relief clips.

Electrical and magnetic fields frequently cause coupling of interference voltages into the measuring circuit. Use only shielded, low-capacitance measuring cables (measuring cables from HBM fulfil these conditions). Do not run the measuring cables parallel to power current and control cables. If this is not possible, protect the measuring cable (e.g. by steel conduits). Avoid stray fields of transformers, motors and contactors.

The WE2108 is designed for six-wire connection of the load cell. When connecting four-wire load cells, in each case connect the terminals **1 with 5** and **2 with 6** using cable jumpers. In the case of faulty load cell connection or leaving the sensor lines open (terminal 1 and 2) the message Err44 appears on the display.

4 Installation

4.1 Wall mounting (WE2108 in a plastic housing)

The housing design of the WE2108 permits wall mounting without visible mounting elements. For this purpose the finally assembled unit must be set against the wall and snapped in as in Abb. 4.2 Since the wall screws are not visible in this case, the mounting base of the housing has lead-in bevels for tactile determination of the screw position.

Two screws are required (countersunk head screws in the scope of supply) at a spacing of 86 mm. In this type of mounting the housing is secured against lifting off by forces occurring in everyday use by the screws snapping in.

A prerequisite is the use of one of the following types of screw:

- Cheese-head screws, shank without thread with 4 mm diameter.
- Countersunk head screws, diameter under the head max. 3.5 mm. For mounting with wall plugs, 4.0 x 50 mm chipboard screws, the thread of which ends approx. 10 mm under the head, for instance, are suitable.

Please observe the correct distance of the screw heads from the wall (in mm):

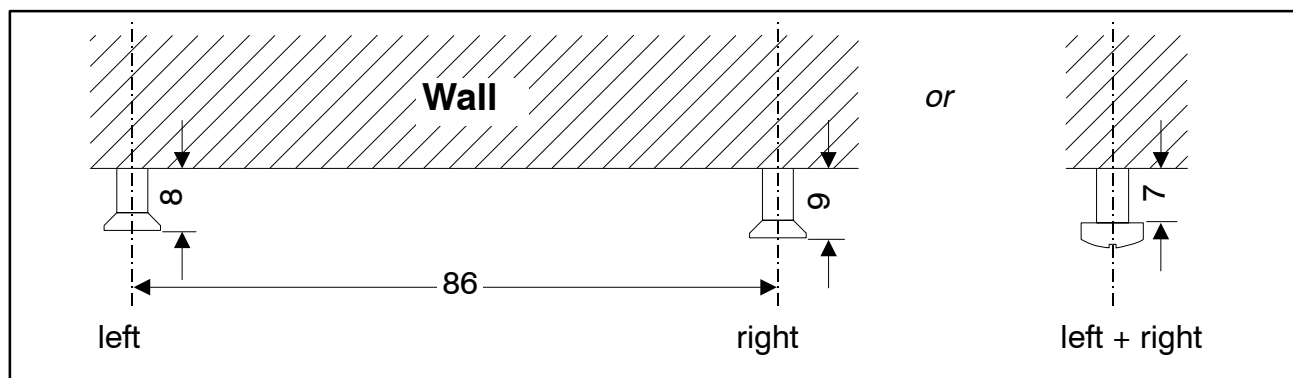


Abb. 4.1: Distances

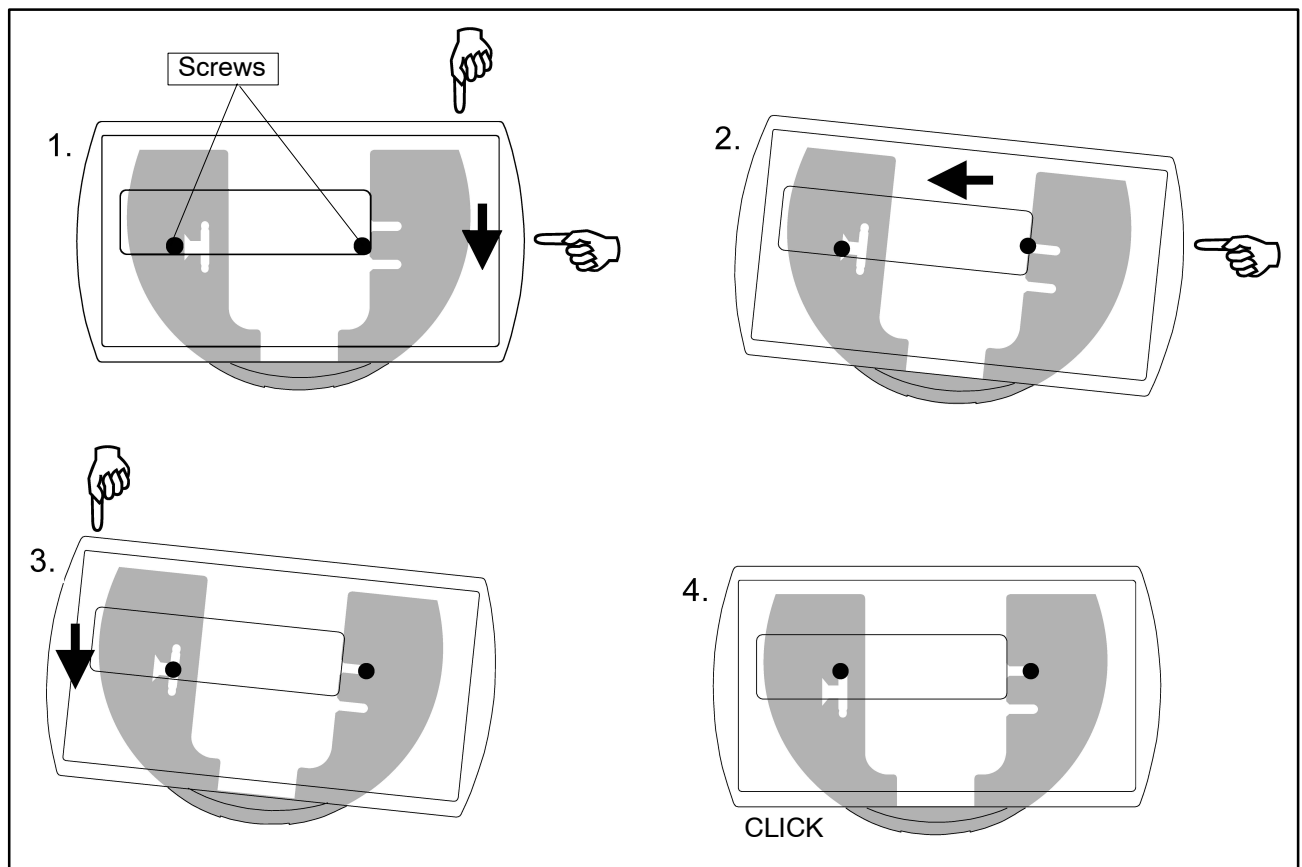


Abb. 4.2: Movement sequence of the wall mounting

4.2 Mounting on a stand (WE2108 in a plastic housing)

Mounting on a stand is possible for free standing scales. This must have a plate for four holes according to Abb. 4.3 for fastening the WE2108. With corresponding design, a concealed cable run inside the stand is possible. For better stability the plate should fit in the space between the rubber feet, or these should be removed.

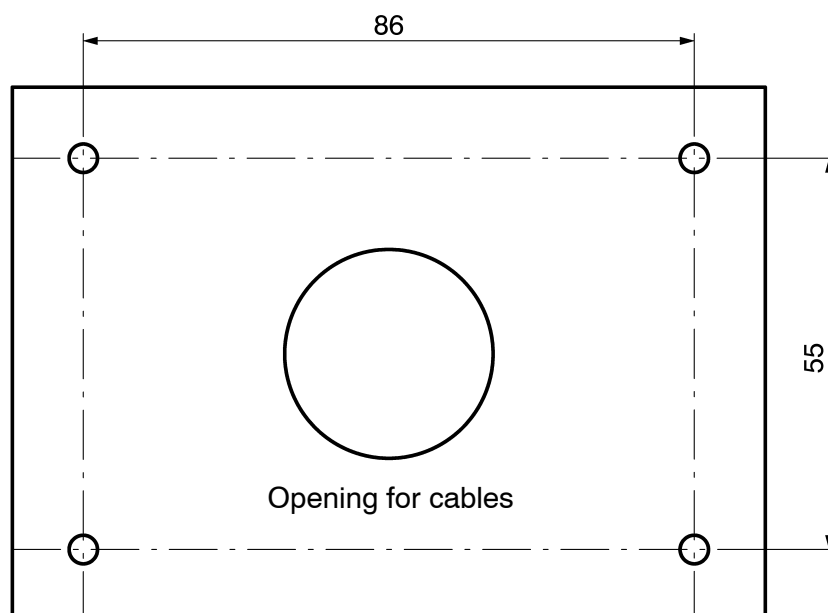


Abb. 4.3: Mounting on a stand

The unit is mounted in the following steps:

1. Remove the mounting base from the back of the housing after loosening two screws.
2. Fasten the mounting base to the stand plate with four screws with a diameter of 4 mm.
3. Run cables through the PG glands and connect to the electronic unit.
4. Close the housing halves and connect with two screws. In this case pull the cables still a little out from the PG glands.
5. Fasten the closed housing to the mounting base with two screws. In this case possibly run the cables into the inside of the stand tube.

4.3 Use as desktop unit (WE2108 in a plastic housing)

The WE2108 is provided with four rubber feet for installing on horizontal surfaces. These generally guarantee safe standing and prevent slipping away when operating the keys.

Moreover fastening in the same way as in wall mounting is possible. If the mounting surface is accessible from below, the holes for stand mounting can also be used. If the feet remain on the unit in this case, take care that the mounting base is not stressed by tightening the screws too firmly.

For inclination of the operating area towards the user, the mounting base must be installed with the curved part upwards.

4.4 Wall mounting / desktop unit (WE2108S in a stainless steel housing)

The unit is wall-mounted by means of two bolts, or it can be used as a desktop unit. See "Dimensions WE2108S / WE2108M (Stainless steel housing)" on page 72.

4.5 Control panel assembly (WE2108M in a stainless steel housing)

The unit is assembled into a control panel by means of six bolts. See "Dimensions WE2108S / WE2108M (Stainless steel housing)" on page 72.



WARNING

The protection class IP65 for type WE2108M only applies to the front!

4.6 Sealing / calibration ability

According to the scale application, the scale electronic unit must be labelled and sealed. Different lettering strips are enclosed for use as non-automatic scale of class III and IIII.

The following data must be stated on the lettering strip as a minimum:

Max	Maximum load of the scale
Min	Minimum load of the scale
e	Scale interval
Type	Name of the scale
S.N.	Individual serial number of the scale

In the case of legal for trade scales, the calibration must be performed according to the applicable laws by a notified body. The seal marks and calibration marks must be fastened according to the approval.

4.7 Information on achievable type of protection

Observe that the tightness of the housing is guaranteed only if:

- The opening for calibration button and lettering strip on the front of the unit is closed (by a calibration mark or with the enclosed adhesive mark).
- All PG glands are screwed tight and round cables with suitable diameter are used.
- PG glands which are not used are closed with the enclosed blind plugs.
- The housing halves are assembled correctly.

5 Operation

All unit functions can be controlled in one or several of the following ways:

- Operating front with 4 short stroke keys
- Two programmable switching inputs
- Coupling an external computer through the serial interface

The keyboard controls directly the essential scale functions (gross/net **G/N**, taring **→T←**, zeroing **→0←** and printing **🖨**). A menu is called up for calibration and further unit settings. During parameter input up to exiting the menu no weight value is displayed. The currently measured value, however, affects the limit value outputs in this operating mode as well. When controlling via computer commands, the measurement runs on without interruption as a rule. Exceptions are the transient condition after filter switch-over and the non-volatile storage in the EEPROM.

When the electronic unit is switched on, all segments of the display are activated initially for 2 seconds (only in legal for trade applications). The check counter is then displayed. Automatic zeroing occurs during this time if this function is activated.



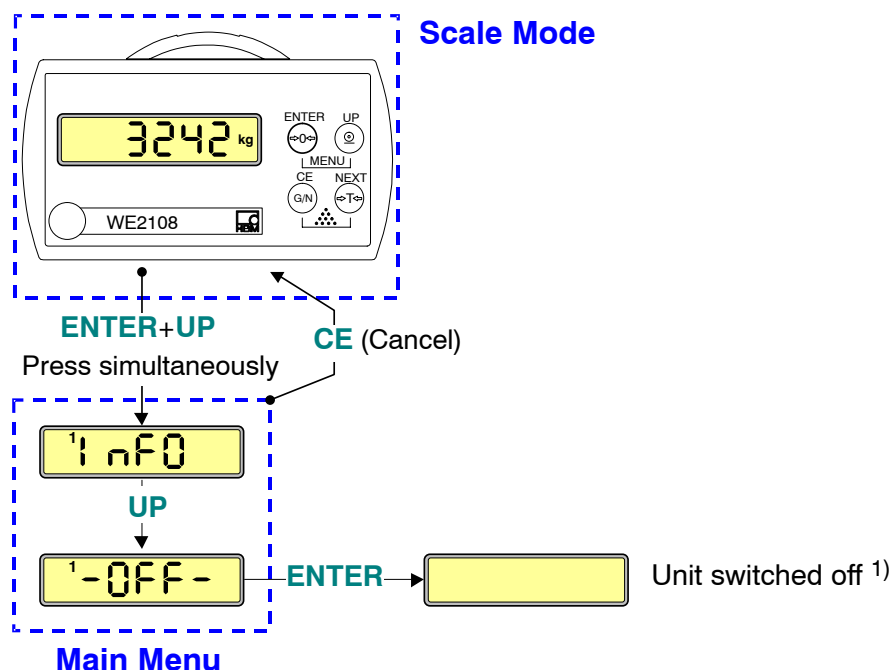
NOTE

The WE2108 does not check whether the performed settings are permissible according to OIML R76!

5.1 Basic functions

5.1.1 Switching on and off

The unit is switched on after the supply voltage is applied. To switch off proceed as follows:



1) Switching back on with arbitrary key



NOTE

In the *ioSEt* menu (see 5.2.3 "Complete menu structure") the Auto-OFF function can be activated (Parameter "OFF_t"). This switches the WE2108 off automatically if no weight is applied on the unloaded scale during a predetermined time.

5.1.2 Zeroing (→0←)

By pressing the →0← key with the scale unloaded, a remaining weight value is set to zero. In this way small errors, e.g. due to soiling the scale platform, can be corrected. This zeroing is permitted only in a limited range according to the scale standard and is otherwise not performed by the WE2108. Use the tare function for subtracting larger loads (e.g. transport containers).

5.1.3 Taring (→T←)

The current gross value is stored by pressing the →T← key and deducted from all following weight values. The displayed (net) value is therefore zero directly after taring. The tare value can be read off in the *Info* menu item under "tArE". According to OIML taring is possible only at a gross value >0.

5.1.4 Gross/Net (G/N)

Every pressing of the G/N key switches between gross and net display. When switching over to net display, the last valid tare value is reused (exception see under 5.1.6 "Preset tare"). Switching over to net is possible if the scale has already been tared.

5.1.5 Printing (🖨)

The just displayed weight value can be printed on a connected printer by pressing the 🖨 key. The value is printed only when the measured value is stable ("Standstill"). Different formats (e.g. weight with time or a user defined text) can be selected beforehand in the parameter menu.

The key also controls the summing function (see Section 7.7).



NOTE

There is no printout if no print format is selected or the interface is occupied with another function. See Section 5.2.3 "Complete menu structure".

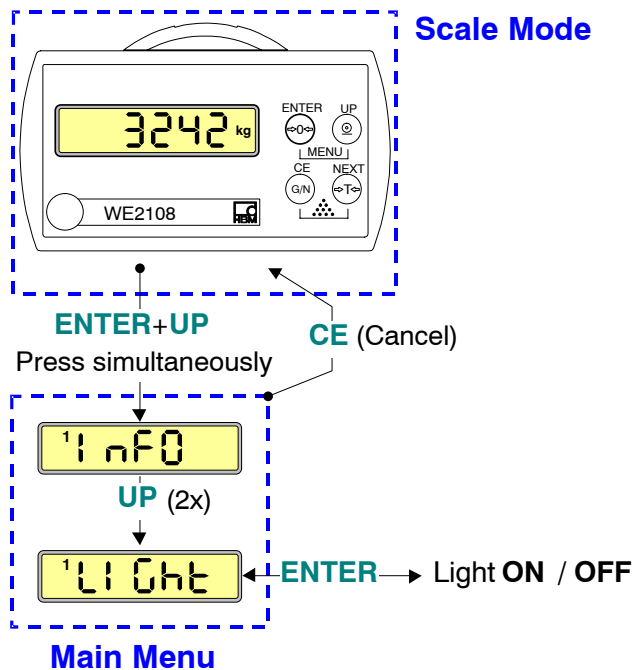
5.1.6 Preset tare

With the "Preset tare" function active, the net value is formed by deducting a fixed tare value. This value as well as the Preset tare ON/OFF setting is entered in the parameter menu. However, the current value can continue to be tared with the tare key (→T←). This value is lost when switching over to the gross display, subsequent switching over to net with the G/N key again activates the entered preset tare value.

The *PT* symbol in the display indicates that the net value has been formed by deducting the preset tare value. This disappears after taring with the tare key (→T←).

5.1.7 Display lighting

Proceed as follows to switch the LCD background lighting on and off:



5.1.8 External operating elements

According to the configuration of the scale, the gross / net switch-over, taring and printing functions can also be operated by external switches (e.g. for operating from the vehicle). The parameter menu is used for the assignment of the required function (see section 7.3 "Inputs").

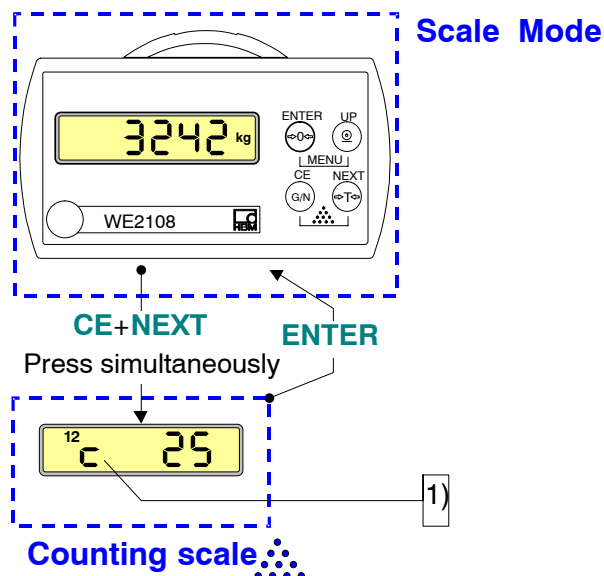
5.1.9 Counting scale (🔴🔴🔴)

In use as counting scale (when weighing many parts of the same weight), the number of the parts placed on the scale is displayed instead of the weight. This function is **not** legal for trade and is available only on corresponding setting in the parameter menu ("tYPE" = 0 in the **Func** menu).

After the scale has been switched on, a weight value is indicated first. During switchover to counting scale mode a reference measurement is carried out. To this end, a specific quantity is to be placed on the scale which is indicated for a second after the function has been activated (see below). For modifying the reference quantity, several preset values are shown in the menu **Count** (selection by means of the keys **UP** and **NEXT**, press **ENTER** to accept). The menu item "other" permits any other values to be input.

Operation:

1. (Optional): Placing a container on the scale and taring.
2. Placing the reference quantity of the parts to be counted on the scale. This number is predetermined or must be changed in the parameter menu. Then activate the counting scale function as follows:



- 1) To identify the active counting scale function, a "c" appears to the left of the counting value in the display at standstill (not for 5-digit numerical values).
3. When other quantities are placed on the scale, the new number is now displayed. Due to the accuracy limits of the scale and possible spreads of the individual weights (e.g. for fruit weighing) the display can deviate from the actual quantity.
4. Ending the counting scale function and switching back to weight display is possible at any time by pressing **ENTER**.

5.1.10 Parameter setting

You reach the parameter menu (**MENU**) of the WE2108 by pressing the **ENTER** + **UP** keys simultaneously. Here you can set unit functions, limits, printing logs etc. and calibrate the scale. It is also possible to switch the unit off manually.

There is an explanation of the menu structure and the complete description of all parameters in Section 5.2 "Menu operation".



HINWEIS

The major part of the parameters can also be entered through the PC-interface (RS-232 / RS-485). The CD-ROM available as accessory with the Order No. 1-WE2108/DOC contains apart from the complete documentation (Reference Manual) of the unit also the setup program WE2108 Panel. This PC software serves for measured value display and configuration of the WE2108 through the serial interface.

5.1.11 Error displays

The permissible range of the display depends upon the nominal value of the scale and the set operating mode (scale standard).

The following error appears in the display if the measured value is

- above the max. display limit:  (Striche oben)
- below the min. display limit:  (Striche unten)

(Please also refer to Section 5.3.1 "Troubleshooting")

Further errors are displayed as two-digit code numbers (e.g. *Err44*). They should not occur in normal operation.

For rectification refer to Section 8 "Troubleshooting".

5.1.12 Stillstand

The zeroing, taring, summing and printing functions are performed only if a stable value stands in the display. This is designated as standstill and is displayed by the appearance of the unit of measurement. The standstill condition is that the value changes maximally by a specific variation range per time unit. In the case of fluctuating (wind) loads or a very high scale resolution, possibly no standstill is reached. In this case a more strongly damping filter or a lower resolution must be selected in the parameter setting.

Different options for standstill indication can be selected in the menu *Func*, see also Section 5.3.3 .

5.2 Menu operation

5.2.1 Menu Overview

You reach the parameter menu (**MENU**) of the WE2108 by **simultaneously** pressing the **ENTER** + **UP** keys. Here you can set unit function, limits, printing logs etc. and calibrate the scale characteristic. For better overview the parameters are grouped in several submenus, which can be called up using the main menu. This also offers the "Power Off" function (see 5.1.1 "Switching on and off") and parameter printing (only with active printer interface). Certain parameters are not accessible in every operating mode of the unit, or can only be read. In the case of legal for trade units, a concealed button which is accessible only with the calibration mark removed must be activated for calibration.

The parameter main menu consists of the following items:

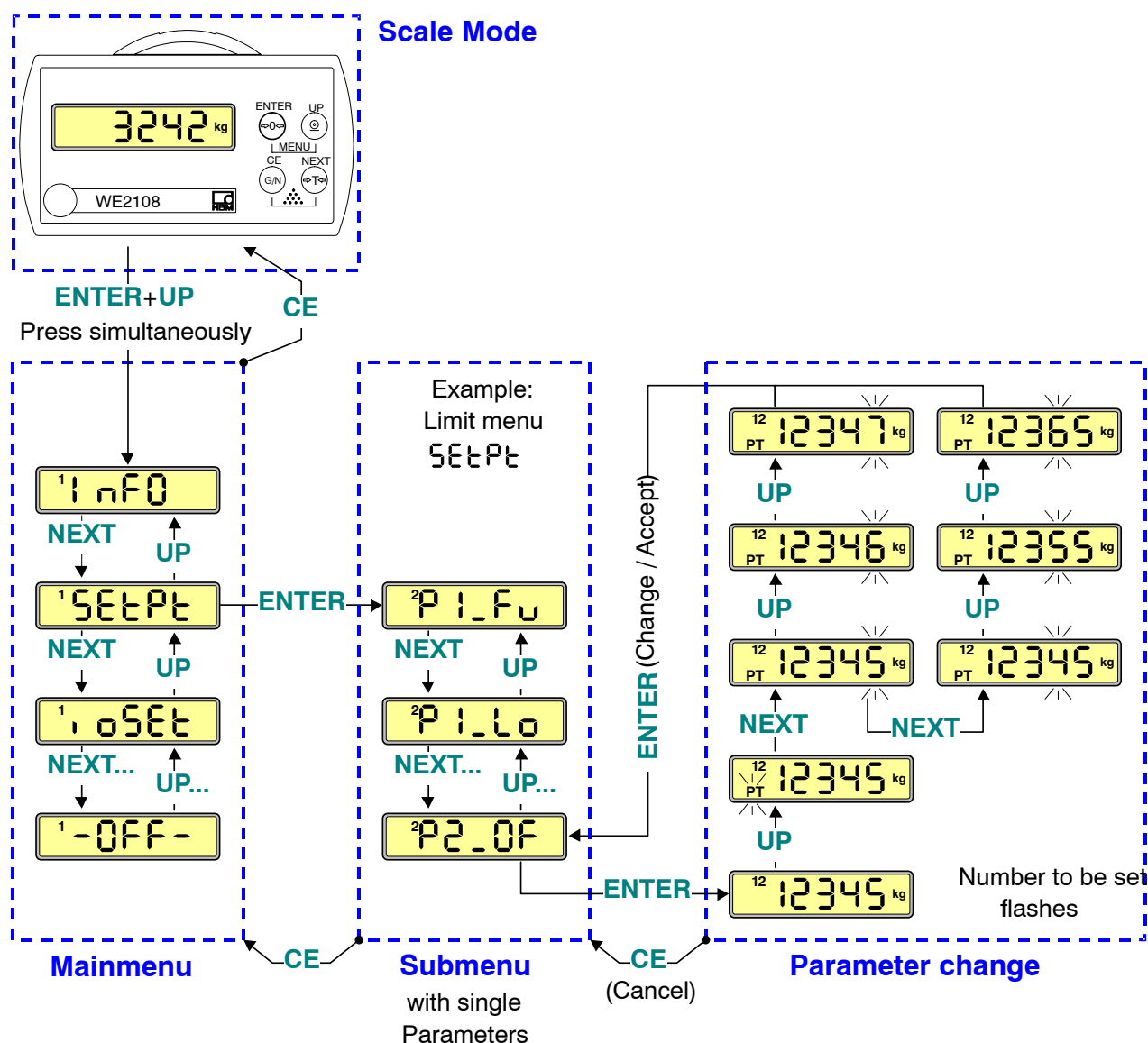
Main menu item	
Info	Info submenu
P_tAr	Preset tare value
SEtPt	Limit submenu
ioSEt	Unit setting submenu
Print	Printing submenu
FiL	Filter submenu
Func	Scale function and nominal values submenu
CAL	Calibration submenu
FACT	Factory setting submenu
PrtPA	Printout of the unit settings
tESt	Test function submenu
Count	Input of the reference quantity
Add	Summing function
LiGht	Display lighting
-OFF-	Power off

Basically a parameter setting runs as follows:

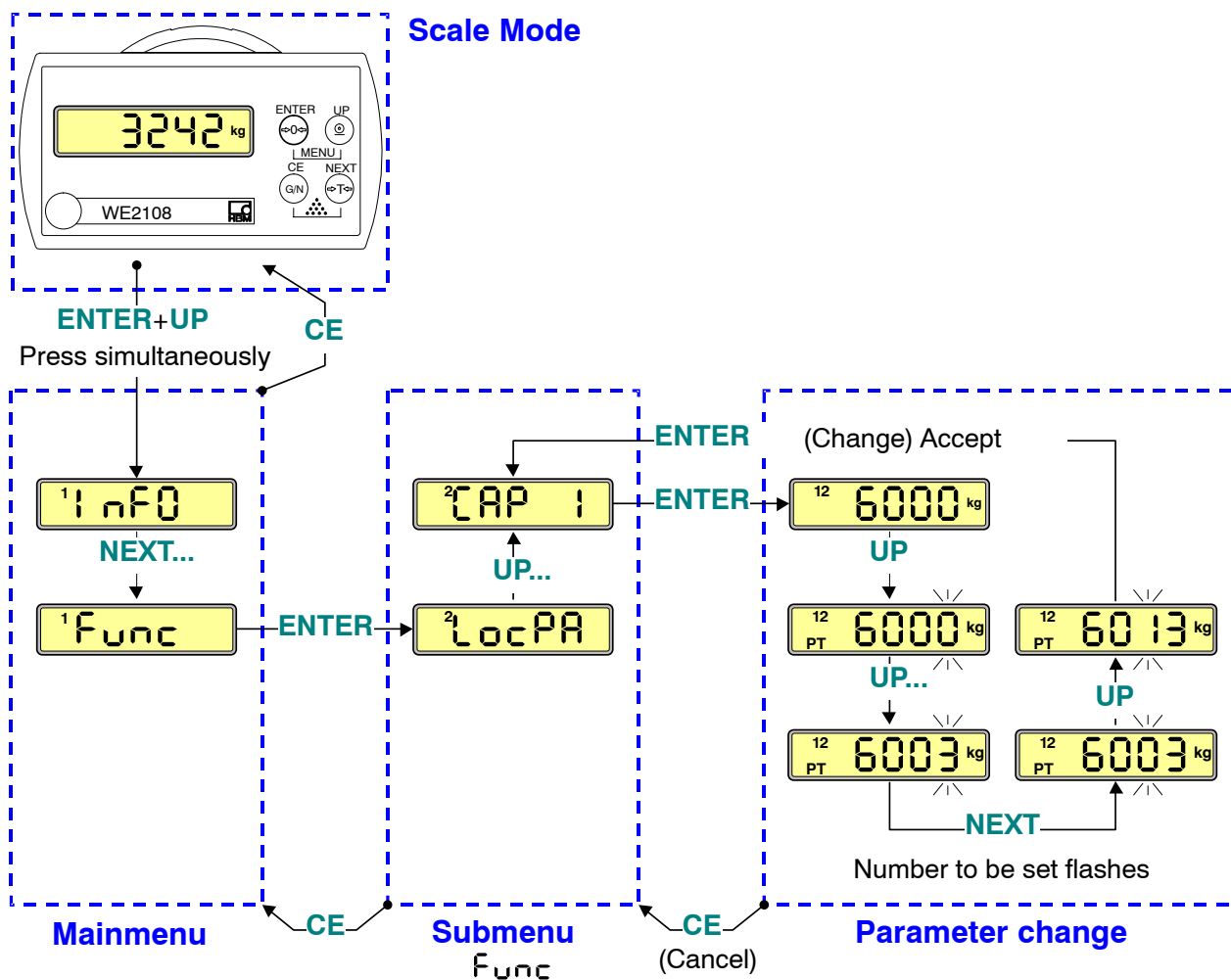
1. Activating the (main-) **MENU** function by simultaneously pressing **ENTER** + **UP**. You decide for a certain submenu in the main menu.
2. The required submenu is selected with **NEXT** or **UP** and appears as short text in the display. A small 1 on the left in the display indicates here that you are still in the main menu.
3. You reach the selected submenu with **ENTER**. The required parameter is selected with **NEXT** or **UP** and appears as short text in the display. The small 2 on the left in the display indicates that you are in a submenu. **CE** switches back to the main menu.
4. After pressing **ENTER** again the current numerical value of the parameter is displayed. The symbols 1 and 2 appear simultaneously.
5. Should the parameter not be changed, then press **CE** in order to reach the submenu again. To change the value press **UP**. The right number place starts to flash at second intervals.

6. Change the flashing place by pressing **UP** repeatedly. In the case of multi-digit values **NEXT** switches to the higher value digit, which can then also be changed with **UP**.
7. To accept the entered value now press **ENTER**. **The entered value is rejected with CE and the previous value restored.** In both cases the display changes back to the parameter name. To change further parameters proceed as in Item 3.
8. After inputting all required parameters press **CE** twice in order to return to the scale mode.

Menu structure overview



5.2.2 Example: Setting the parameter "CAP 1"



The major part of the parameters can be reached through the described structure of main and submenu. The following functions are exceptions:

- The *"-OFF-"* (Power off), *"LiGht"* (Light) and *"PrtPA"* (Print parameter) functions are performed directly from the main menu.
- The *"P_tAr"* (Preset tare value) and *"Count"* (Reference quantity) parameters can be reached without a submenu. *"Count"* provides optionally for the free input of any values or a selection from preset stages.

5.2.3 Complete menu structure

Info "Information" submenu				
	Parameter	Meaning	Value range	Remarks
↑ CE	CHEC	Calibration counter	0 ... 99999	only display
→ ENTER	tArE	Current tare value	0 ... 99999	Display of the current tare value. Change under "P_tAr"
↑ NEXT	S_Ver	Software version		only display
	F_nb	Production number		only display
	Err	Last occurring error code	0 ... 99	only display
↓ UP	OV_Ld	Scale counter overload (130% MAX)	0 ... 99999	only display

P_tAr	P_tAr	Preset tare value	0 ... 99999	Appears only with preset tare function activated (Func menu)
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SEtPt "Limits" submenu				
	Parameter	Meaning	Value range	Remarks
↑ CE	P1_Fu	Limit 1 function	0: off 1: limit related to gross 2: limit related to net	
→ ENTER	P1_Lo	Limit output 1 logic	0: active = open, 1: active = Ground	
↑ NEXT	P1_On	Switch-on value 1		
	P1_OF	Switch-off value 1		for setting a hysteresis
↓ UP	P2_Fu	Limit2 function	0: off 1: limit related to gross 2: limit related to net	
	P2_Lo	Limit output 2 logic	0: active = open, 1: active = Ground	only display
	P2_On	Switch-on value 2		
	P2_OF	Switch-off value 2		for setting a hysteresis

ioSEt "Unit setting" submenu				
	Parameter	Meaning	Value range	Remarks
↑ CE	OFF_t	Time for automatic switch-off (only with unloaded scale)	0: deactivated 1...99	Time = "OFF_t" * 20s
ENTER →	Fin 1	Switching input 1 function	0: no function 1: taring 2: print 3: gross / net 4: taring / gross alternatingly	Only if input not occupied by special function (see "F_InP" in the Func menu).
NEXT ↑ UP	Fin 2	Switching input 2 function	0: no function 1: taring 2: print 3: gross / net	Only if input not occupied by special function (see "F_InP" in the Func menu).
↓	bAud	serial interface baud rate	0: 1200 1: 2400, 2: 4800 3: 9600 baud with 8N1 4: 1200 5: 2400 6: 4800 7: 9600 baud with 8E1	8 data bits, no parity, 1 stop bit 8 data bits, even parity, 1 stop bit
	F_Ser	serial interface function	0: off 1: print 2: PC-connection 3: serial display (autom. output)	
	St_Ch	Start character	ASCII range (Standard value = 00)	00 → no Start character
	E_Ch1	End character 1	ASCII range (Standard value = 13)	For the use of own PC programs only
	E_Ch2	End character 2	ASCII range (Standard value = 10)	For the use of own PC programs only

Print "Print" submenu appears only if interface is set to printing ("F_SEr" = 1 in the ioSEt menu)				
	Parameter	Meaning	Value range	Remarks
↑ CE	F_Prt	Print function:	0: off 1 ... 9: Printing logs	see Section "Printing" 
ENTER →	SPACE	Number of spaces before each printed line		
NEXT ↑ UP	LnEF1	Number of blank lines before the printing lines		
↓	LnEF2	Number of blank lines after printing		
	A_nb	Article number	0 ... 99999	0: "A_nb" is not printed
	hour	Hours		Time is required only for printing function
	Min	Minutes		
	dAY	Day		Date is required only for printing function
	Mon	Month		
	YEAr	Year		

F, L		"Filter settings" submenu			
	Para- meter	Meaning	Value range	Remarks	
	<i>F_Fil</i>	Digital filter setting (3dB – cutoff frequency at " <i>Icr</i> " = 0)	0: 13,0Hz 1: 12,5Hz 2: 11,2Hz 3: 07,5Hz 4: 03,0Hz 5: 02,5Hz 6: 02,0Hz 7: 01,0Hz 8: Special filter for animal scales	Measurement/ rate [s ⁻¹] 0. 50 / 090 1. 50 / 100 2. 50 / 110 3. 50 / 120 4. 50 / 400 5. 40 / 475 6. 33 / 550 7. 28 / 625 8. not specif. / Signal (variable) dependant	Settling time [ms]
	<i>Icr</i>	Mean value formation	0 ... 99	The averaged values are output with unchanged mea- suring rate (moving average filter).	

Func		"Scale function" submenu (only with access authorization!)				
CE ENTER NEXT UP	Parameter	Meaning	Value range			Remarks
	LocPA	Protection of the calibration parameters	0: Access allowed 1: Access blocked ¹⁾			
	F_tAr	Taring function:	0: Normal 1: Preset tare			
	unit	Dimensional unit:	0: none 1: g 2: kg 3: t 4: lb			
	AutoZ	Switch-on zero	0: off 1: ±2% 2: ±5% 3: ±10% 4: ±20% 5: ±50% 6: -5...+15% 7: -2...+18%			of the nominal value
	ZtrAC	Automatic zero tracking	0: off 1: 0.5 d 2: 1 d 3: 2 d			/ sec.
	StiLL	Standstill monitoring	0...29 see Section 5.3.3			for Filter "F_FiL" = 8 only "StiLL" from 1...9 meaningfull
	F_InP	Special functions of the switching inputs	F_InP	PIN1	PIN2	PaSp = interlocking all calibration parameters by switching input 2 (e.g. key switch). lock = locking the control keys by switch input 2. "Fin 1"/"Fin 2" = as set in the ioSEt menu.
			0	Fin 1	Fin 2	
			1	tilt	Fin 2	
			2	Fin 1	PaSp	
			3	tilt	PaSp	
			4	Fin 1	tilt	
			5	tilt	lock	
			6	Fin 1	lock	
	ALt	Correction of gravity altimeter	0 ... 99 (x100) m			Relevant for calibration in changed installation location (see Section 6.5 "Influence of the geographical installation site")
	Lat	gravity latitude	0 ... 90			Relevant for calibration in changed installation location (see Section 6.5)
	trAdE	Calibration mode / scale standard	0: Industrial application 1: OIML: 100e..6000e 2: NTEP: 100e..6000e			
Point	Place after decimal point	0 ... 4				
tYPE	Scale type	0: Counting scale 1: One-range scale 2: Two-range scale 3: Two-interval scale				
rES 1	Scale interval 1 in d	01 ... 50				
CAP 1	Scale nominal value range 1	100 ... 99999			for one-range scales	
rES 2	Scale interval 2 in d	01 ... 50				
CAP 2	Scale nominal value range 2	100 ... 99999			for two-range scales / two-interval scales	

¹⁾ Zugriff nach Betätigung des verdeckten Tasters erlaubt. (Siehe hierzu auch Abschnitte 4.7 "Hinweise zur erreichbaren Schutzart" und 6.6 "Zugangsberechtigung")

CAL "Calibration" submenu (see Section 6 "Calibration") (only with access authorization!) Values can be changes manually or automatically measured with ENTER				
↑ CE → ENTER ↓ NEXT ↑ UP ↓	Para- meter	Meaning	Value range	Remarks
	Lin	Linearization	0: off (2 Points) 1: polynomial (3 points) 2: polynomial (4 points)	0: Part load calibration possible
	CAL-0	Internal value, unloaded	-20000...20000 (=2mV/V)	Optional input or automatic measurement
	LOAd1	Display for weight 1	0 ... 99999	e.g. half nominal value in 3-point calibration
	CAL-1	Internal value for weight 1	-20000...20000 (=2mV/V)	Optional input or automatic measurement
	LOAd2	Display for weight 2	0 ... 99999	Blocked for "Lin" = 0
	CAL-2	Internal value for weight 2	-20000...20000 (=2mV/V)	Blocked for "Lin" = 0
	LOAd3	Display for weight 3	0 ... 99999	Blocked for "Lin" = 0 or 1
	CAL-3	Internal value for weight 3	-20000...20000 (=2mV/V)	Blocked for "Lin" = 0 or 1

FACT Factory setting				
↑ CE → ENTER	Para- meter	Meaning	Value range	Remarks
	dEFLt	Resetting the settings (e.g. filter) to factory default	--	The scale calibration is deleted i.e. the WE2108 is set to the factory characteristic 0 ... 2 mV/V.
Further parameters are only for service purposes				

PrtPA Printing Parameters			
			Remarks
	Printing the parameters with ENTER		Appears only if the interface is set to printing ("F_SEr" = 1 in the ioSEt menu)

tESt	Test functions for Service purposes		
	Para-meter	Meaning	Remarks
	<i>t_LCd</i>	Display-Test	ENTER : Switching special segments on / off NEXT : Switch through test pattern (numbers) 00000, 12345, 1 3 5, 2 3, 8, 88888, -----
	<i>t_IO</i>	Switching inputs / outputs test	UP : Process output 1 on / off NEXT : Process output 2 on / off Display of the inputs: 01000 = basic state, xxx1x = Process input 1 activated, xx1xx = Process input 2 activated, x0xxx = concealed pushbutton activated
	<i>t_Ser</i>	Test of the interface	ASCII characters to sent to the WE2108 (only numbers, 30h..39h) are displayed in the display. UP : Output of the ASCII character 38h (number "8") NEXT : Output of the ASCII character 0Dh ("Carriage return") + 0Ah ("LineFeed"). An "8" is displayed in the display by connecting TxD and RxD (no computer connected) and activating "UP", if the interface driver and cable are not defective.
	<i>t_UtP</i>	Temperature measuring display	Internal values for service purposes
	<i>t_Uin</i>	Supply voltage	
	<i>t_Ubr</i>	Internal measured value 1	
	<i>t_AdU</i>	Internal measured value 2	Test of the measuring signal conversion. The display is in mV/V, refreshed every 0.5 seconds. The values serve for orientation concerning the load cell utilization. However, the values in the CAL menu should be read off for recording the user calibration, because they are more accurate.

Count	Reference quantity for counting scales ()		
		Value range	Remarks
	<i>Count</i>	Reference quantity	Selection 1, 5, 10, 20, 50, 100 or "other" (=Input 1 ... 99999)
			Appears only for activated counting scale ("tYPE" = 0 in the Func menu)

Add	Summing functions		
	Parameter	Meaning	Remarks
	<i>F_Add</i>	Switching the summing function on/off	See Section 7.7
	<i>total</i>	Indication of sum, if nec. in two display phases for values > 5 digits	
	<i>t_nbr</i>	Indication of summand counter	
	<i>clr_t</i>	Deletion of sum and summand counter	
	<i>Prtno</i>	Indication of running number for print output	See Section 7.4
	<i>clr_P</i>	Deletion of running number	See Section 7.4

Light	Display lightning ON / OFF		
	Switch light on / off with ENTER	--	see 5.1.7 "Display lightning"

-OFF-	Switch unit off with ENTER	--	see 5.1.1 "Switching on and off"
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5.3 Explanations for the settings

5.3.1 Display limits

The permissible range of the display depends upon the scale standard. The setting is made in the **Func** submenu, "trAdE" parameter.

<i>trAdE</i>	Scale standard	lower limit	upper limit
0	not legal for trade	-135 % nominal value	135 % of nominal value
1	OIML	-2 % nominal value	nominal value + 9d
2	NTEP	-2 % nominal value	105 % of nominal value

5.3.2 Tare value

A switchover in the net display by means of the **G/N**–key is only possible for a tare value (or manual tare value) > 0.

The operation of the tare key always triggers a taring of the applied load, that is, subsequently the tare value equals the current gross value. By means of the setting "F_tAr" = 1 (menu **Func**, parameter-protected) a manual tare function can be activated additionally. When the **G/N**–key is operated, the manual tare value, which was input in the menu "P_tAr", is used instead of the tared value.

The following table shows the different operating modes of the unit and the calculation of the respective net values:

Tare function "F_tAr"	Display mode	Tare value display (InFO menu)	Calculation of the net value
0 = normal	Gross	last tare value	–
0 = normal	Net after G/N key	last tare value	last tare value
0 = normal	Net after taring	new tare value	new tare value
1 = Preset tare	Gross	Preset tare value	–
1 = Preset tare	Net after G/N key	new tare value	new tare value
1 = Preset tare	Net after taring	new tare value	new tare value

New tare value: weight on the scale when activating the tare key

Last tare value: stored value of previously performed taring

Preset tare value: can be entered in the menu and is stored non-volatile

The value of the most recent taring process is stored in a non-volatile memory and is available even after a voltage failure. If necessary, use the **G/N**-key to change over to the net display. The manual tare function must not be active here ("F_tAr" = 0 in the menu **Func**). A renewed taring or input by means of the TAV command overwrites the stored value. When important parameters are changed, this also deleted automatically. In detail, these are:

- Changes in the menu **CAL**
- The commands CAP, LWT, LVA, (SFA, TMI, TMP)
- The command LGC and any subsequent storage with TDD1
- The "dEflT"-function in the menu **FAct**

Remarks:

- A tare value entered via the interface is always marked by the symbol **→T←**. If "F_tAr" = 0, then the value is deleted when the unit is switched off.
- If the function switch-on zero ("AutoZ") is activated, the tare value is deleted when scale operation starts (after standby operation or voltage failure). This applies independent of whether switch-on zero is successfully executed.
- The entered manual tare value has to be smaller than the nominal load for the scale. This applies to entries made via the menu (menu item "P_tAr") and via the interface (command TAV).

5.3.3 Standstill criterion

The condition for a standstill indication can be set by means of the parameter "*StiLL*" in the menu **Func**. The parameter values 00 to 29 are permitted in accordance with the following table

(First digit = time interval, second digit = step width).

Standstill is indicated when the measured value varies maximally by the pre-set step width within the time interval.

Parameter values (00...29):

		Time interval for standstill testing		
		1 second	0,5 seconds	0,2 seconds
max. step width	any	00	10	20
	1 d	01	11	21
	2 d	02	12	22
	3 d	03	13	23
	4 d	04	14	24
	5 d	05	15	25
	6 d	06	16	26
	7 d	07	17	27
	8 d	08	18	28
	9 d	09	19	29

- For specific filter settings (large "*lcr*"-values), the time interval cannot be smaller than the response time of the filter. This taken into account automatically, the parameter "*StiLL*" will then indicate only the minimum time period for the standstill criterion.
- The settings 0, 10 and 20 have the effect that no standstill testing takes place. Processes that depend on a standstill (taring, printing, summing) are always executed.
- With an activated special filter (setting "*F_FiL*" = 8 or asf8-command), the time interval has been significantly extended when compared to the filter settings 0..7, it depends on the parameter "*lcr*". Using the value of "*StiLL*" only the step width can then be set (e.g. the settings 04, 14 and 24 are of equal value). The standstill test is always active, the settings "*StiLL*" = 00, 10, or 20 are treated as "*StiLL*" = 01.
- The user must set a value in accordance with the calibration regulations.

6 Calibration

The scale is calibrated by setting the user characteristic on the WE2108, i.e. the scale electronics are adapted to the actual output signals which the load cell delivers with unloaded scale or at nominal weight. Calibration weights are required for this as a rule, as an alternative it is possible to enter the measured values if these are known.

6.1 Quick start without special functions

The following settings must be made on a new scale in any event. Further functions can be expedient according to the application and are described starting from section 5.2.3 "Complete menu structure".

6.1.1 Setting to the nominal data of the scale

Submenu	Parameter	Meaning	Values
Func	<i>unit</i>	Displayed dimensional unit	0: (= no unit) 1: g 2: kg 3: t 4: lb
	<i>Point</i>	Places after the decimal point of the display	z.B. 3 for "6.000 kg"
	<i>rES-1</i>	Scale interval	
	<i>CAP 1</i>	Nominal range of the scale	z.B. 6000 for "6.000 kg"

6.1.2 Calibration (standard method)

In most scale applications calibration is at two points, i.e. with the scale unloaded and after placing a calibration weight on the scale. Further possibilities are described starting from Section 6.3 "Calibration with linearization". Calibration is performed as follows:

1. Call up the **CAL** menu.
2. The parameter "*Lin*" has to be 0 (factory setting, check with **ENTER**).
3. Zero value:
 - Call up the "*CAL-0*" parameter, the previous calibration value is displayed with **ENTER**.
 - Leave the scale unloaded.
 - Pressing **ENTER** again starts the measurement. *buSY* appears in the display.
 - When the measured value is displayed, the measurement is completed. The value is displayed in mV/V (2,0000 = 2 mV/V).

- Press **ENTER** to store the value. donE appears as confirmation.

4. Calibration weight:

- To calibrate the nominal load, either a calibration weight equal to the scale nominal load "CAP 1" is used, or a part load calibration is performed (see next section).
- Check and if necessary change the "LOAd1" parameter: It must be equal to the calibration weight used.
- Place the calibration weight on the scale.
- Call up "CAL-1" parameter, the previous calibration value is displayed with **ENTER**.
- Pressing **ENTER** again starts the measurement. buSY appears in the display.
- When the measured value appears the measurement is completed. The value is displayed in mV/V (2,0000 = 2 mV/V).
- Press **ENTER** to store the value. donE appears as confirmation.

Cancellation is possible at any time with **CE**. In this way the just called up parameter (only this!) is reset to the previous value. The old value is deleted only after storage (donE display).

6.1.3 Part load calibration

A part load calibration can be performed if no calibration weight of the size of the scale nominal load "CAP 1" is available. For this purpose set the "LOAd1" parameter to the value of the calibration weight used. This may be in the range of 20%...120% of the scale nominal load. "LOAd1" is scaled like the display value, e.g. 2 kg = 2,000 (with 3 places after the decimal point).

If no calibration has been performed as yet, "LOAd1" is equal to "CAP 1". Before the calibration the "CAP 1" parameter (*Func* menu) must be set to the scale nominal load!

6.1.4 Setting for legal for trade

The following settings serve to protect the calibration performed: (see Section 6.6 "Access authorization" also)

Submenu	Parameter	Meaning	Values
<i>Func</i>	<i>trAdE</i>	Scale standard	0: Industrial mode 1: OIML 2: NTEP
	<i>LocPA</i>	Locking against unauthorized changes	0: All menus unlocked 1: Calibration menu locked

6.2 Special applications

Further functions having influence on the weight indication of the WE2108 are listed below. The settings can be relevant for legal for trade approval, therefore changes are not possible with the access lock activated (exception: filter setting). The parameters are set ex works to standard values. You therefore do not need to make any changes if the corresponding function should not be used.

Further scale types:

Submenu	Parameter	Meaning
Func	<i>tyPE</i>	0: Counting scale 1: One-range scale (set ex works) 2: Two-range scale 3: Two-interval scale

The following applies for two-range / two-interval scales:

Submenu	Parameter	Meaning
Func	<i>rES-1</i>	Range 1: Scale interval
	<i>CAP 1</i>	Range 1: Nominal load
	<i>rES-2</i>	Range 2: Scale interval
	<i>CAP 2</i>	Range 2: Nominal load

On calibration in the factory (before transporting to the installation site):

Submenu	Parameter	Meaning
Func	<i>ALt, LA_t</i>	Calculation of the acceleration due to gravity, see Section 6.5

For scale attachments with linearity errors:

Submenu	Parameter	Meaning
CAL	<i>Lin</i>	Characteristic linearization, see Section 6.3

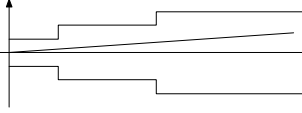
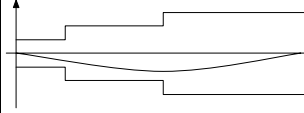
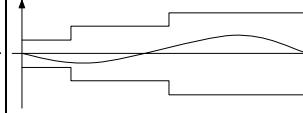
Further functions:

Submenu	Parameter	Meaning	Instructions see Section
FIL	<i>F_FiL, lcr</i>	Filter	7.1
Func	<i>F_tAr</i>	Preset tare function	5.1.6 + 5.3.2
In the main menu	<i>P_tAr</i>	Preset tare value	5.1.6 + 5.3.2
Func	<i>AutoZ</i>	Switch-on zero	5.2.3
	<i>ZtrAC</i>	Zero tracking	5.2.3
	<i>StiLL</i>	Standstill monitoring	5.2.3
	<i>F_InP</i>	Tilt monitoring	7.3

6.3 Calibration with linearization

The standard calibration with zero and final value is sufficient for the majority of scale applications ("*Lin*" = 0). Only if inadmissible errors occur in this process, the signal should be linearized ("*Lin*" = 1/2). Linearization corrects errors in scale attachments the output signal of which is not proportional to the weight (e.g. due to mechanical transmission elements).

6.3.1 Selection of the calibration method with the "*Lin*" parameter

" <i>Lin</i> " parameter	0	1	2
Calibration steps:	Zero value, final value ¹⁾	Zero value, 2 calibration weights	Zero value, 3 calibration weights
Part load calibration possible:	yes	no	no
Recommended for:	Standard application	Attachments with linearity errors	Attachments with linearity errors
Correction of following errors possible:	Error proportional to measured value	One maximum of the error curve	Two maximum of the error curve
Example: (error of the scale output signal according to OIML)			
Description in section	6.1.2	6.3.2	6.3.2

¹⁾ The zero and final value calibration is already described in 6.1.2 "Calibration (standard method)".

6.3.2 Calibration steps for linearization (3 or 4 points)

First set the scale data:

Submenu	Parameter	Meaning	Values
Func	<i>unit</i>	Displayed dimensional unit	0: none 1: g 2: kg 3: t 4: lb
	<i>Point</i>	Places after the decimal point of the display	e.g. 3 for "6,000 kg"
	<i>rES-1</i>	Scale interval	
	<i>CAP 1</i>	Nominal range of the scale	e.g. 6000 for "6,000 kg"

Required additional functions can be activated corresponding to section 5.2.3 "Complete menu structure".

Calibration is performed at several points, i.e. with unloaded scale as well as after placing different calibration weights on the scale. The part weights used must be entered in ascending order. A part load calibration is not possible, i.e. the last weight must be equal to the scale nominal value. The characteristic input with linearization replaces the zero and final value calibration, so this does *not* need to be performed previously.

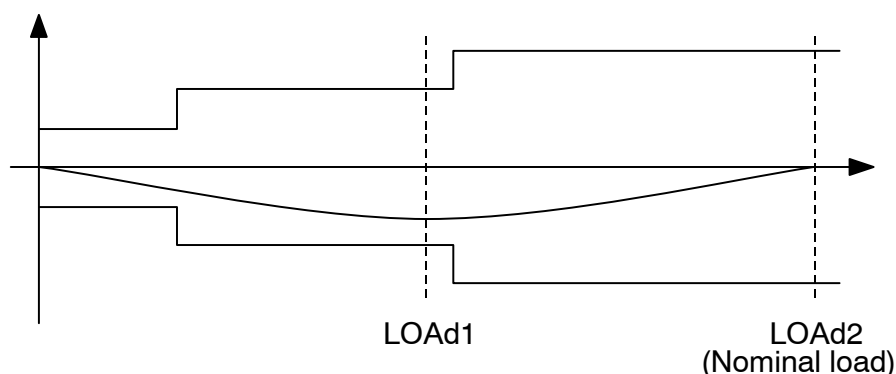
1. Call up the **CAL** menu.
2. Set the "Lin" parameter (see following tables).
3. Zero value:
 - Call up the parameter "CAL-0", the previous calibration value is displayed with **ENTER**.
 - Leave the scale unloaded.
 - Pressing **ENTER** again starts the measurement. buSY appears in the display.
 - When the measured value is displayed, the measurement is completed. The value is displayed in mV/V ($2,0000 = 2 \text{ mV/V}$).
 - Press **ENTER** to store the value. donE appears as confirmation.
4. Weight for the first calibration value:
 - Set the "LOAd1" parameter to the value of the calibration weight. "LOAd1" is scaled like the indicated value, e.g. 2 kg = 2,000 (with 3 places after the decimal point).
 - Place the calibration weight on the scale.
 - Call up "CAL-1" parameter, the previous calibration value is displayed with **ENTER**.
 - Pressing **ENTER** again starts the measurement. buSY appears in the display.
 - When the measured value is displayed, the measurement is completed. The value is displayed in mV/V ($2,0000 = 2 \text{ mV/V}$).
 - Press **ENTER** to store the value. donE appears as confirmation.

These operating steps must be performed for all weight values corresponding to the following table:

Calibration at 3 points

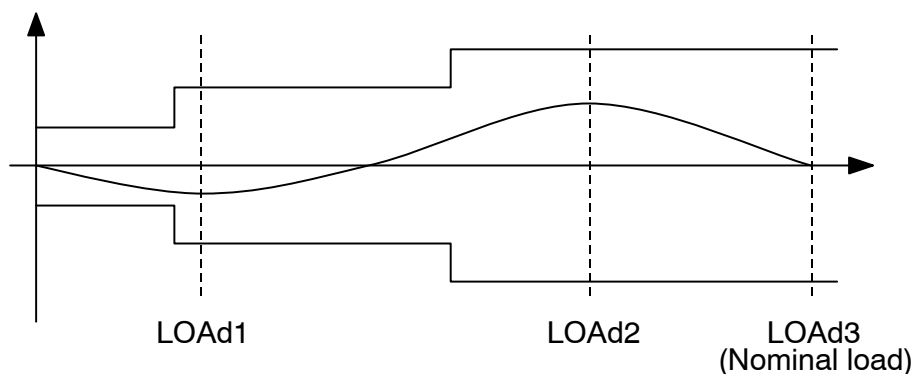
Parameter	Action	Value
Lin	Linearization	Set to "Lin" = 1
CAL-0	Measure (scale unloaded)	automatical measurement
LOAd1	Enter value (calibration weight 1)	"LOAd1" < "LOAd2"
CAL-1	Measure with calibration weight 1	automatical measurement
LOAd2	Enter value (calibration weight 2)	"LOAd2" = nominal load
CAL-2	Measure with calibration weight 2	automatical measurement

For an optimum correction the calibration weight 1 should be in the range in which the greatest deviations of the characteristic occur:



Calibration at 4 points

Parameter	Action	Value
<i>Lin</i>	Linearization	Set to " <i>Lin</i> " = 2
<i>CAL-0</i>	Measure (scale unloaded)	automatical measurement
<i>LOAd1</i>	Enter value (calibration weight 1)	" <i>LOAd1</i> " < " <i>LOAd2</i> "
<i>CAL-1</i>	Measure with calibration weight 1	automatical measurement
<i>LOAd2</i>	Enter value (calibration weight 2)	" <i>LOAd2</i> " < " <i>LOAd3</i> "
<i>CAL-2</i>	Measure with calibration weight 2	automatical measurement
<i>LOAd3</i>	Enter value (calibration weight 3)	" <i>LOAd3</i> " = Nominal load
<i>CAL-3</i>	Measure with calibration weight 3	automatical measurement



6.4 Direct entry of the characteristic values

The internal measured value processing of the WE2108 is adapted by the calibration to the values which actually arise at the zero and nominal value of the scale. These differ as a rule from zero and full deflection of the measuring electronics, because

- the load cell is also loaded by the weight of the empty platform
- the maximum load of the load cell is greater than the nominal range of the scale

(see also Section 6.1 "Quick start without special functions")

The internal values were measured automatically in the calibration instructions of the preceding chapter. Known values can also be entered directly instead of these.

The method is suitable:

- when building several equal scales,
- for restoring the calibration after inadvertent deletion. A prerequisite is that the original values have been noted,
- for calibrating with calculated values.

Proceed as follows:

- Select "CAL-..." parameter in the **CAL** menu and display with **ENTER**.
- Then do **not** press **ENTER** but **UP**. The value can then be changed with **UP** and **NEXT** (operating steps as in the other parameter entries). It must be stated in mV/V (2,0000 = 2 mV/V).
- Press **ENTER** to store the value. done appears as confirmation.

Cancellation is also possible with CE.

6.4.1 Calibrating with calculated values

In the case of scales for large nominal loads, calibration with calibration weights is frequently not possible. Since the WE2108 is calibrated in the factory to an input range of 2 mV/V, the user characteristic can also be determined by reference to the known nominal value of the load cells. For this purpose the zero value is determined by automatic measuring, but the nominal value by manual entry.

Calculating the signal span:

$$\text{Signal span} = \text{Load cell sensitivity} \cdot \frac{\text{Scale nominal load ("CAP 1")}}{\text{Load cell nominal load}}$$



CAUTION

The signal span obtained in this way (in mV/V) is the difference between the signals at unloaded scale and at nominal load. The measured value at dead load ("CAL-0", determined in the calibration with unloaded scale) must be added to this value before it is stored as "CAL-1".

"CAL-1" = calculated signal span + "CAL-0"

("CAL-1" is the actual measured value in mV/V, not the signal span).

Enter the nominal load of the scale as "LOAD1" parameter (= "CAP 1").

Scales with several load cells deliver the nominal output signal if the sum of all load cell nominal loads is placed on as weight.

Example:

Parallel connection of 4 load cells of 20 t, sensitivity 2 mV/V.

Nominal load of the scale 60 t, 6000 divisions, resolution step 0,01 t.

1. Setting the scale parameters in the **Func** menu:

- Display unit (tonnes): *"unit"* = 3
- Places after the decimal point: *"Point"* = 2
- One-range scale: *"tYPE"* = 1
- Resolution step: *"RES1"* = 1
- Scale nominal load 60 t: *"CAP 1"* = 60.00

2. Calibration of the user characteristic in the **CAL** menu:

- Perform zero point calibration.
- A nominal value of 4 x 20 t = 80 t (at 2mV/V) results from the parallel connection.

$$\text{Signal span} = 2 \text{ mV/V} \cdot \frac{60 \text{ t}}{4 \cdot 20 \text{ t}} = 1.5 \text{ mV/V}$$

- Read off dead load signal in the menu ("**CAL-0**" parameter)
Example: "**CAL-0**" = 0.3000 = 0.3 m V/V
Then exit the menu item with **CE**, since otherwise there is a new measurement!

- Signal at nominal load = Signal span + dead load signal
= [1.5 mV/V] + [0.3 mV/V]
= 1.8 mV/V

- Therefore enter 1.8000 under "**CAL-1**"

6.5 Influence of the geographical installation site

The function described below enables calibration at the scale manufacturer, even if the unit should be operated in another geographical position (height above sea level, latitude).

This setting is not required for calibration on site!

The acceleration due to gravity and thus the display of the scale depends upon the geographical data (latitude and height above sea level) of the installation site. The change between different regions is a maximum of 0.1 % within Germany, 0.6 % worldwide.

If this error influence at the new installation site exceeds the accuracy limits of the scale, a recalibration is required as a rule. Instead of this, the influence of the installation site can be compensated for by an internal correction function of the WE2108.

For this purpose enter in the **Func** menu (access authorization required !):

- "LAt" = the latitude
- "ALt" = the height above sea level in multiples of 100 m (e.g. 12 = 1200 m above sea level).

A prerequisite for the correction calculation is that the values of the calibration location are entered **before** the calibration with calibration weights.

The values for Darmstadt are set ex works: "LAt" = 50, "ALt" = 1.

When calibrating at another place, these values must be adapted correspondingly (**firstly set "LAt" and "ALt", then calibrate**).

On a change of location, then only the new values have to be entered. If "LAt" and "ALt" do not correspond to the actual location when calibrating, errors arise at the new location, even if the scale displays correctly in the calibration. The correction calculation cannot be used then, instead of this the scale must be calibrated with weights at the new location. The correct settings before and after the calibration are in the responsibility of the scale operator or installer.

The correction calculation can be deactivated with the setting "LAt" = 91. The display is then always related to the location of the last calibration.

6.6 Access authorization

Data relevant to calibration (e.g. the nominal load and load unit of the scale) as well as the calibration should be protected against unauthorized changing. For this purpose the corresponding menu items can be locked by setting the "LocPA" parameters in the **Func** menu to 1. When the menu is called up again, the corresponding subitems no longer appear or cannot be changed. In order to obtain access nevertheless, the concealed calibration button must be pressed **before** the parameter menu is called up. The button is accessible through the opening on the left below on the front of the unit (see 3.1.1) and can be activated with a pointed object. In operation the opening must be closed with the enclosed adhesive mark or in the case of legal for trade applications with the calibration mark. "LocPA" can also no longer be reset without activating the button.

If the scale is protected in this way, access to the data relevant to legal for trade applications is possible:

- after activating the concealed button
- or
- with a computer (serial interface) after entering the password

Independently of this, every change relevant to legal for trade applications causes the calibration counter to be incremented in the case of legal for trade applications (i.e. in the OIML or NTEP mode, "*trAdE*" parameter). In the industrial mode ("*trAdE*" = 0) the calibration counter remains unchanged. This is independent of the locking of the menu items by the "*LocPA*" parameter.



NOTE

The WE2108 offers the possibility of locking all parameter changes by a control input (e.g. with an external key switch). In this case activating the concealed button also has no effect.

<i>F_InP</i> parameter ¹⁾	Switch status Input 2	" <i>LocPA</i> " parameter	Concealed button pressed	Access to calibration parameters
2 or 3	active	--	--	no
	open	--	--	yes
others (not 2 or 3)	--	1	no	no
	--	1	yes (before menu call-up)	yes
	--	0	--	yes

¹⁾ For setting up the lock, the parameter "*F_InP*" is to be set to the function "parameter lock" as described in Section 7.3 "Inputs". This has the effect that the parameters are released by the external switch, irrespective of the concealed button. Therefore, setup with "*F_InP*" should be effected only, if the input is really used for parameter protection.

6.6.1 Pushbutton lock

With an appropriate setting of "*F_InP*" (see Section 7.3), all pushbuttons of the unit can be blocked by a control input (e.g. with an external key switch). This locks scale functions (e.g. taring) and the menu.

6.7 Selection of suitable load cells

6.7.1 Division number:

When configuring the scale in the parameter menu you set the nominal weight of the scale (display value at nominal load) and the numeral step. The division number results as quotient of these values and therefore cannot be set separately. Take care that it is not larger than the division number of the legal for trade approval.

6.7.2 Supply voltage and measuring signal:

The WE2108 works with 6.5 V direct voltage supply, a lower voltage can be present at the load cell due to losses in the cable and possibly existing Zener barrier. The output signal span of the load cell(s) must be in the range from 0.2 to 2.7 mV/V.

6.7.3 Dead load and nominal value:

Adaptation to the dead load and possible part utilization (user characteristic) of the load cell takes place in the calibration of the scale in the parameter menu. The WE2108 processes the measured values internally with a higher accuracy than the display requires. In the case of legal for trade applications, however, the minimum sensitivity of 1 μV / scale interval must be observed. Characteristics in which this value is not reached can result due to extreme values of dead load and part utilization. This must be taken into account in the design of the scale. The following formula applies for checking:

$$\text{Sensitivity } [\mu\text{V}/e] = \frac{1000 \cdot \text{Supply voltage [V]} \cdot \text{Nom. Sensitivity of the LC [mV/V]} \cdot \text{Nom. load of the Scale}}{\text{Nom. load of the LC} \cdot \text{Number of calibration steps}}$$

Example: Supply voltage 6.5 V;
 Load cell 100 kg = 2 mV/V;
 Scale with 60 kg and 6000 d

$$\Rightarrow \text{Sensitivity} = \frac{1000 \cdot 6.5 \text{ V} \cdot 2 \text{ mV/V} \cdot 60 \text{ kg}}{100 \text{ kg} \cdot 6000} = 1.3 \mu\text{V}/e$$

In the case of an application which is not legal for trade, the resolution and the load cell utilization can be freely selected. However, observe that with lower sensitivity greater unquiet and drift of the measured value must be expected.

In the calibration commands in the parameter menu, the WE2108 displays the output signals of the load cells in mV/V, so that a statement about the utilization of the load cell is possible.

7 Further functions

7.1 Filtering

The WE 2108 has flexible analog and digital filter functions, in order to obtain a stable measured value with a short transient time. The setting *ex* works is sufficient as a rule for scales with up to 6000 divisions at 1 $\mu\text{V/e}$. Changes are possible in the *FIL* menu:

- "*F_FIL*" sets the cut-off frequency of the filter, see menu table.
- "*lcr*" is an additional averaging over 1 ... 99 values. Use this function to obtain a quiet measured value with very slow fluctuations of the measured value (e.g. silo weighing under wind load). The measuring rate is not influenced by this (moving average filter).

Also with the slowest filter setting it is guaranteed that the display does not remain on the old value longer than one second after a load change (but see 7.1.2 "Special filter for animal scales").

7.1.1 Filter and standstill

Large values of "*lcr*" increase the transient time. The standstill display (if activated) is adapted automatically. The dimensional unit or the C-character for counting scale operation is displayed only if a stable value stands in the display as long as it corresponds to the transient time. With an abrupt change, the dimensional unit therefore appears only after double the transient time.

7.1.2 Special filter for animal scales

This filter provides for a quiescent indication even in the case of animals moving on the scale platform. **Shunt forces, e.g. by an animal supporting itself on a fixedly mounted gate, must be avoided however.**

Required settings

The filter is activated by means of the setting "*F_FIL*" = 8 (or the interface command ASF8). By varying the parameter "*lcr*" the time behaviour of the filter can be adapted to the application:

Large values for "*lcr*" provide for the filtration of major weight variations, but also extend the duration up to the standstill display. The smallest meaningful value for "*lcr*" is 16. Smaller values are permitted but they lead to the same filter behaviour as the setting 16.

For the animal filter, a standstill criterion must always be active. The step width can be freely selected (Parameter "*StiLL*" = 1...9) from 1d to 9 d, the pre-set time interval (1 / 0.5 / 0.2 seconds) does not have any influence. The settings 0, 10 and 20 are treated as a setting 1 (test for 1d).

Indication behaviour

The measuring time can be a few seconds. As soon as a valid measured value was formed, this is displayed together with the measurement unit. Even if the animals continue to move the value continues to be displayed. The filter determines the weight which the platform would be subjected to in the case of non-moving animals. If no plausible value can be formed from the measuring signal, the symbol *Hold* is initially shown as an indication, after a few seconds the measured value is discarded.

This may be for the following reasons:

- the total weight has changed
- the animal is held by a person not standing on the platform
- the animal is tethered outside the platform
- other shunt forces



NOTE

The settings with regard to number of parts, standstill step width etc. are to be made by the owner with due consideration for the relevant scale approval.

7.2 Limit outputs

The WE2108 has two programmable switching outputs. Each channel becomes active on exceeding the switch-on value and inactive when dropping below the switch-off value. A freely selectable hysteresis results from different values. The values can be related optionally to the gross or net weight, this is independent of the current display mode. Active limit channels are indicated in the display by the 1 or 2 symbols (only for one-range scales, since the symbols are otherwise used for the range display).

The control outputs of the unit are open-collector outputs which switch to the unit ground. The assignment of the levels to the limit status can be selected via the "P1_Lo" or "P2_Lo" parameter and is explained in the following table. Loads (relays, lamps) must be switched to a positive supply voltage (max. 40 V).

Logical levels can also be output by using a pull-up resistor. Connect a free wheeling diode parallel to inductive loads (e.g. relays).

Parameter <i>Px_Lo</i>	Weight	Limit status	o. C. – switch	Output level
0	under switch–off value	inactive	closed	Low
0	over switch–on value	activ	open	High
1	under switch–off value	inactive	open	High
1	over switch–on value	activ	closed	Low
	between switch–on and switch–off value	Status remains unchanged		

The relevant output switches off on overcurrent. To reset the fuse switch off the output for around 30 seconds (according to logic by exceeding or dropping below the limit). Alternatively the WE2108 can also be switched off.

7.3 Inputs

The switching inputs of the WE2108 can be assigned the following functions:

- Operating the scale with external buttons (e.g. on a vehicle scale)
- Control by a PLC
- Monitoring the scale structure by an inclination switch
- Blocking all calibration parameters against change (menu and interface)
- Locking the control keys

The inputs are inactive ex works, the functions are assigned in two steps:

1. Activating the parameter locking device or inclination monitoring with the "*F_InP*" parameter. This setting (in the *Func* menu) is relevant to legal for trade applications. It can be protected like the calibration (access only after activating the concealed button), changes are registered with the calibration counter.
2. The inputs which are not assigned one of the listed functions can be assigned to a scale function in the *ioSet* menu ("*Fin 1*", "*Fin 2*" parameter). This is also permissible at any time with legal for trade applications.

The following combinations can be set with the "*F_InP*" parameter:

<i>F_InP</i>	Input 1	Input 2
0	free for Scale functions	free for Scale functions
1	Inclination switch	free for Scale functions
2	free for Scale functions	Parameter locking device
3	Inclination switch	Parameter locking device
4	free for Scale functions	Inclination switch
5	Inclination switch	Pushbutton lock
6	free for Scale functions	Inclination switch

Scale function for Input 1 ("*Fin 1*" parameter)

<i>F_InP</i>	<i>Fin 1</i>	Function
0; 2; 4; 6	0	None
	1	Taring
	2	Print
	3	Gross / Net
	4	Alternatingly for each activation: – Taring – Switching over to gross
1; 3; 5	--	no Scale function (input occupied with inclination switch)

Scale function for Input 2 ("*Fin 2*" parameter)

<i>F_InP</i>	<i>Fin 2</i>	Function
0; 1	0	None
	1	Taring
	2	Print
	3	Gross / Net
2; 3	--	no Scale function (input for parameter locking device)
4	--	no Scale function (input occupied with inclination switch)
5; 6	--	no Scale function (input for pushbutton lock)

Electrical properties and level assignment:

Connect a switch / button between the Pin1 and GND terminals (input 1) or Pin2 and GND (input 2) to activate an input. An additional power supply is not required. Alternatively control voltages which are related to unit ground (GND) can also be applied to Pin 1 / Pin 2. In this case the level limits stated below must be observed.

	"inactive"	"active"
Status when connecting a switch	Input open (quiescent level approx. 5 V)	Input connected with ground
Status when controlled by means of an external voltage	min. 3.5 V max. 35 V	min. –30 V max. 0.4 V
TAR, Print, G/N	no action	Function is performed
Parameter locking device	Change possible	Change locked
inclination switch	Measuring mode	<i>tilt</i> displayed
pushbutton lock	Release control keys	Control keys locked

The scale functions (TAR, Print, G/N) are performed once on closing the contact. If both contacts are closed after one another permanently, only the function of the first activated input is performed. Undefined levels and oscillations at the inputs must be avoided.

7.4 Printing function

A printer can be connected to the serial interface of the WE2108 for outputting the weight values. The communication uses the XON / XOFF protocol. The interface must previously be set to the "Printing" mode ("F_Ser" = 1 in the **ioSet** menu). The **Print** menu is then accessible.

The printing process is released manually by pressing the  key (Print).

Further information can be printed in addition to the weight value. You select the type of the information to be output corresponding to the following table with the "F_Prt" parameter (printer function):

F_Prt	Print output (one line for each component)
0	Printing function deactivated
1	Measured value
2	Date; Measured value
3	Date; Time; Measured value
4	Text line; Measured value
5	Running number; Measured value
6	Date; Running number; Measured value
7	Text line; Date; Running number; Measured value
8	Text line; Date; Time; Running number; Measured value
9	Date; Time; Running number; Measured value

Tab. 6.1

The "Text line" is user-defined. The input is possible only through a PC, for this purpose the interface must be set to the "Computer coupling" function (**ioSet** / "F_Ser" = 2). Afterwards change this setting back to "Printing".

The running number (counting range 0 ... 99999) is increased with each printout and is maintained even after the unit is switched off (from P83). A reset is possible in the menu **Add** / "Clr_P".

The printing output depends upon the operating state of the scale and always corresponds to the display. For example for printing function 2 there results:

Gross:

Date: 05.12.98

G 34,65 kg

Net:

Date: 05.12.98

N 34,65 kg

T 9,80 kg

Net (Preset tare):

Date: 05.12.98

N 34,65 kg

T 10,00 kg PT

Counting scale (Gross):

Date: 05.12.98

CG 43 Pcs

The printout occurs only at standstill, therefore the dimensional unit is always printed. It is possible to print as frequently as desired in an application which is not legal for trade.

In the case of a legal for trade setting, the printout cannot be repeated. There is a new printout only at weight change and renewed standstill. There is no printing outside the displayed limits.

If an article number was entered in the **Print** menu, it appears in an additional line above the measured value. Set the article number to 0 to switch off.

7.5 Formatting of the printing output

The above listed components are printed out in each case one line below the other. To print a certain area of a form, the entire block can be shifted by the following parameters:

- **"SPACE"**: Number of spaces before each component
(= indenting to the right)
- **"LnEF1"**: Number of blank lines before starting the text block
- **"LnEF2"**: Number of blank lines after the printout. This parameter serves for feeding **"LnEF2"**: Number of blank lines after the printout. This parameter serves for feeding entire pages instead of a form feed function. The lines are counted starting at the first line of the printout. With consecutive printouts the distance between the text blocks is equal to the sum of **"LnEF1"** and **"LnEF2"**, independently of how many lines the printout itself consists of. **"LnEF2"** therefore does not have to be adapted when changing the print protocol. This applies under the prerequisite that **"LnEF2"** corresponds at least to the number of printed lines.

The factory setting is **"F_Prt"** = 1

"SPACE" = 0

"LnEF1" = 0

"LnEF2" = 2

7.5.1 Example

```
"F_Prt"           =      2 (Date; Measured value)
"Art_No"          =      1234
"SPACE"           =      4
"LnEF1"           =      2
"LnEF2"           =      6
```

>

>

>>>>Date: 05.12.98

>>>>Art-No: 1234

>>>>G 34,65 kg

>

>

>

(The characters ">" and "-" are not printed.)

Printer-specific control codes can be automatically inserted prior to or after printing (e. g. cutting the paper or inserting an internal printer time).

Programming is carried out one time using the PCA and PCB commands, see part 2 of the manual on the computer commands.

7.6 Setting the time

The internal clock of the WE2108 serves for outputting date and time when printing and is of no importance for the other unit functions. The setting is made in the **Print** menu. The clock runs on with the unit switched off as long as the operating voltage is applied. After a power interruption the last valid date is retained, the clock starts to run at 00:00:00.

7.7 Summing function

7.7.1 Overview

For summing the key "Print" () is also used. Operation of this key triggers the following:

- Add the current display value to the total sum memory, if the summing function has been activated.
- Printing the measured value, if the interface is set to "Printing" and a print protocol has been activated. If, in addition, the summing function is active, then the sum and the number of the summed values is printed out.

After summing has been effected, the text AddEd appears in the display for 1 second.

If there is no standstill condition when the key is operated, the request is stored and executed after the standstill has been reached (summing and, if nec., printing).

In the case of legal for trade applications, summing behaves like printing, that is, a second addition is only possible after a change and a renewed standstill of the value.

Summing is not executed if the maximum values for sum or count are exceeded, as well as in weight mode with an activated counting scale (see below).

Sum and count are stored in **non-volatile memory** and will be available even after the supply has been interrupted.

The following commands are available for controlling the print function via the interface:

- add
- sum
- csn

See Reference Manual Part 2 (Description of the commands for computer integration).

7.7.2 Functions in the menu **Add** (new)

"F_Add"	Switching the summing function on / off
"totAL"	Display of the sum ¹⁾
"t_nbr"	Display of the summand counter
"cLr_t"	Deletion of sum and summand counter
"Prtno"	Display of running number for print output
"cLr_P"	Deletion of running number

1) Sum values with more than 5 digits are indicated in two steps:

- Indication of the higher value digits (marked by the symbol 1 in the top left corner of the display) **without** measurement unit
- Indication of the lower value digits (marked by the symbol 2 in the top left corner of the display) **with** measurement unit

7.7.3 Permitted range

The value added is always the display value, switchover gross/net is possible between several summands! The sum of all values as well as the number of summands is stored.

It is not possible to subtract the most recent value!

A maximum of 21000 values are added. This ensures that even for the maximum value of each summand (99999) no overflow of the sum is possible.

Individual values as well as sums may be negative, but only for values with up to 9 digits (due to printout requirements: 15 characters * -123456,789 kg).

When the limits are exceeded, adding stops. Instead of the sum, the following note is printed:

```
Sum Overflow
Not added
```

Instead of AddEd the error message Err15 appears in the display.

7.7.4 Deletion of the sums

For deletion there are two options:

- in the menu **Add**, menu item "cLr_t", deletion must be confirmed again by pressing **ENTER**. With an active print function, the sum is printed again before deletion (without the current measured value).
- via the interface (command csn)

Also, the sum is always deleted if by any changes in the scale parameters the values to be added no longer fit the existing sum.

This occurs in the following cases (without any repeat printout of the sum):

- Changes in the menu **CAL**
- The commands CAP, LWT, LVA, (SFA, TMI, TMP)
- The command LGC and subsequent storage with TDD1
- The "dEfLt"-function in the menu **FAcT**

7.7.5 Summing function during counting scale operation

If the function "counting scale" in the WE2108 has been generally approved (parameter "tYPE" = 0, menu **Func**), the summing function only acts on the counting results. Weight values cannot be added. However, even in this mode of operation, the scale can indicate weight values, only by referencing (double key operation) will the display change over to the number of pieces / items.

For the summing function, the following applies:

If "tYPE" is set to 0, only quantities (number of pieces) are added which are also indicated in the display. If a summing is requested during a weight indication, the following occurs:

- Sum and counter remain unchanged
- The display does not show the note added

- If the print function is active, the current weight value is printed, plus the note

No count value
not added

For adding weight values, the counting scale function must be generally deactivated. ("tYPE" > 0)

7.7.6 Print

Printed Data:

- Current value with G/N symbol, further data according to the preset protocol ("F_Prt", see Section 7.4 "Printing function")
- In addition: summand counter and sum value **without G/N (!)**

Example (Printing function 2):

Date: 05.12.98

N = 34,65 kg

T = 9,80 kg

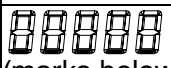
Total:

4 weighings

* 416,85 kg

The sum is marked by an asterisk and can be composed of gross and net values (even mixed).

8 Troubleshooting

Error message	Meaning	Remedy
 (marks above)	Measured value above the max. display range (depending upon the set scale standard)	Reduce load of the scale Test set nominal load: "CAP 1", "CAP 2" parameters in the Func menu
 (marks below)	Measured value below the min. display range (depending upon the set scale standard)	For net display: switching over to gross possible recalibration
Err 10	Zeroing unsuccessful	Remove disturbing influences on the scale (vibrations, wind). Set higher filter. Observe zero setting range (2% of the nominal weight).
Err 11	Taring unsuccessful	Taring is possible only with a gross weight within the display range
Err 12	For counting scale: weight of the reference quantity too low	Larger reference quantity, at least 1/10 000 of the nominal range
Err 15	1. Summing not possible 2. Sum overflow	1. Activate counting mode or change scale type (see Section 7.7.5) 2. Delete sums
Err 22	The entered value is larger than the setting range of the parameter	Repeat entry, observe setting range (see Section 5.2.3 "Complete menu structure")
Err 24	Error on new entry of the factory calibration (only with PC-connection)	Enter/measure values in the order sza, szu, sfa
Err 42	Internal software error	Report to manufacturer
Err 44	Analog-digital converter not working	Check contact and polarity of the load cell connections. All terminals must be connected, in four-wire connection observe Section 3.2.3 "Load cell connection".
Err 48	Load cell supply not constant	Test supply voltage for losses
Err 51	Error on writing into the non-volatile memory	Test supply voltage for losses
Err 60	Factory characteristic faulty	Repair or re-enter values
Err 61	Temperature compensation faulty	Repair
Err 62	Unusable values in calibration or linearization	– Repeat calibration – Place weights on scale on linearization in ascending order
Err 65	Part load calibration outside the allowed range	20 ... 120 % of the scale nominal load
Err 73	Overload of the scale (>130 % of the nominal load)	Overload can damage the load cells, possibly test display with calibration weights
Err 80	Internal setting of the interface faulty	Report to manufacturer
Err 81	Overrun of the interface	Test baud rate setting on WE2108 and connected unit
Err 82	Framing error of the interface	Test baud rate setting on WE2108 and connected unit

Err83	Parity error of the interface	Test parity setting (even/odd/none)
Err84	Error on output of the transmit buffer	Report to manufacturer
Err85	Overflow of the reception buffer on PC interfacing	Send commands from external software at larger interval
Err96	Overflow of the watchdog timer	Report to manufacturer
Err97	Inadmissible interrupt	Report to manufacturer
Err98	Loss of unit parameters in the non-volatile memory	Report to manufacturer
Err99	Overflow of the calibration counter	Repair
noAcc	= "no Access" 3. It was attempted to change a legal for trade relevant parameter without access authorization. 4. Parameters are locked by an external key switch.	1. Before calling up the parameter menu activate the concealed calibration button. 2. Release of the external locking device (see Section 6.6 "Access authorization")

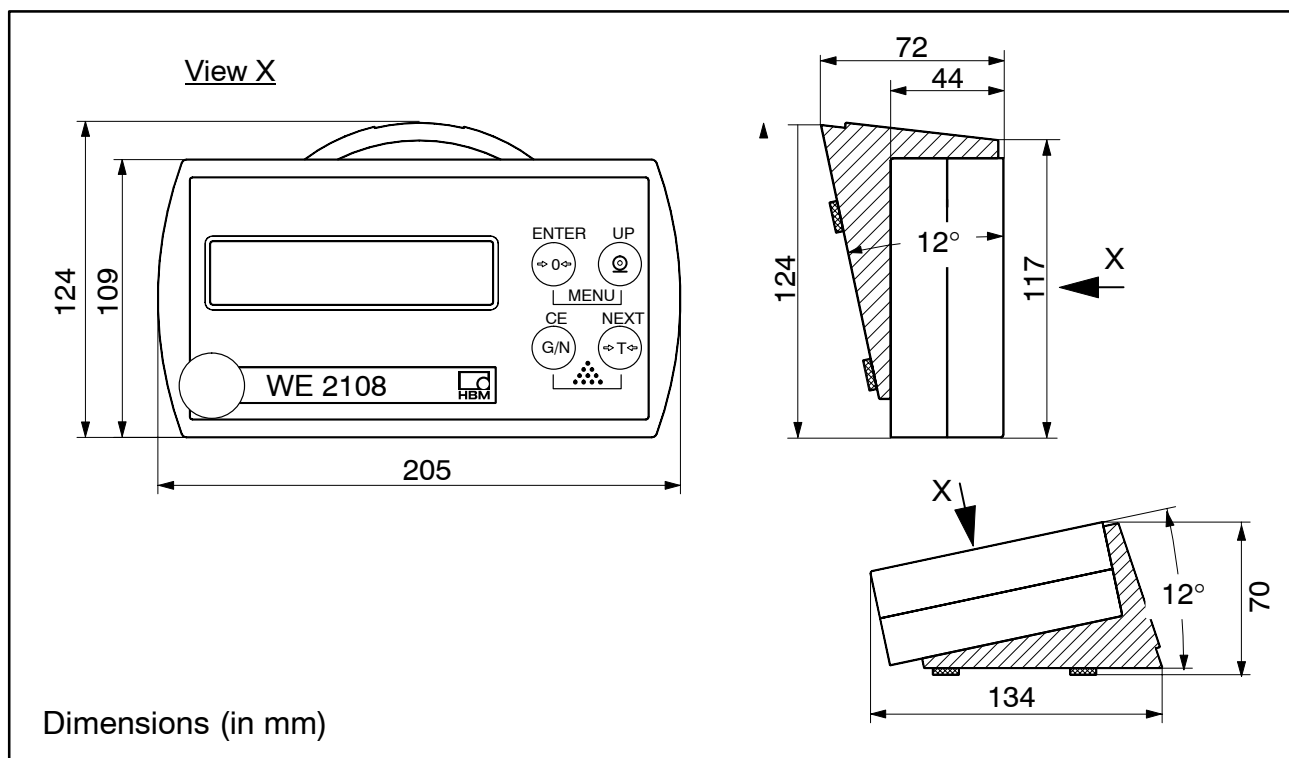
Error	Possible cause	Remedy
The unit switches itself on or consumes too much stand-by current	Undefined level at the process inputs (only if connected)	Level clearly high (>4 V) or low (<0,8 V)
	Supply voltage too low	$U_{(min)}$ = rms value less residual ripple > 10 V

9 Specifications

9.1 Specifications WE2108 in ABS-housing

Type		WE 2108
Max. number of scale intervals acc. to OIML R76 (Class III, IIII)	d	6000; 2x3000; Multi-Range; Multi-Interval
Input sensitivity	$\mu\text{V/e}$	≥ 1
Multi-Range	mV/V	0 ... 2,7
Min. input impedance of the load cell	Ω	87
Max. input impedance of the load cell	Ω	2000
Load cell excitation voltage	V_{DC}	6.5
Cable length between WE2108 and Load cell(s)	m	max. 100
Measuring rate	Meas./s	50 ... 28
Filter Cut-off frequency (-3 dB)	Hz	2 ... 12
Transient respond time	ms	90 ... 625
Power supply	V_{DC}	10 ... 35
Power consumption (incl. Display lighting)	W	2.5
Display	mm	LCD with back-lighting
Hight of display		20
Status symbols		Zero, Net, Motion, Unit, Range
Keys		Foil keybord (tactile feedback)
2 Digital inputs (e.g. for Gros, Tare, Net, Printer)	V	Active level $< 0.8 \text{ V}$, $R_i = 10 \text{ k}\Omega$
Permissible range of voltage		-30 ... +30
2 Digital outputs (e.g. for PLC)	V	max. 40 (Open Collector)
Max. current	A	0.2 typical
Serial interface	Bd	1 x RS-232 (Cable length $\leq 25 \text{ m}$)
Baud-rate, adjustable		1200 ... 9600
Serial interface functions		Print, serial display (autom. output), PC-connection
Nominal temperature range	$^{\circ}\text{C}$ [$^{\circ}\text{F}$]	-10 ... +40 [+14 ... +104]
Service temperature range	$^{\circ}\text{C}$ [$^{\circ}\text{F}$]	-10 ... +60 [+14 ... +140]
Storage temperature range	$^{\circ}\text{C}$ [$^{\circ}\text{F}$]	-30 ... +70 [-22 ... +158]
Connection / Fitting	kg	4 x PG 7
Weight, env.		1
Protection class acc. EN 60 529 (IEC 529)		IP65
Immunity level (EMC) acc. to EN 45 501 (3 V/m)		additional tested up to 10 V/m
Housing material		ABS, free of halogene

9.2 Dimensions WE2108 in ABS-housing

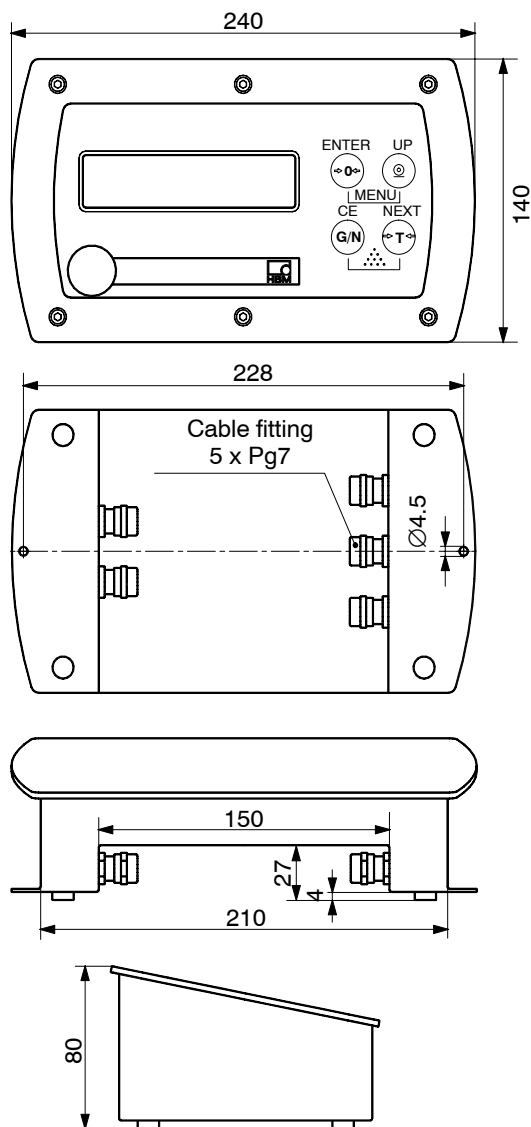


9.3 Specifications WE2108S/WE2108M in steel-housing

Types (with RS-232-Interface): (with RS-485-Interface):		WE2108S; WE2108M WE2108S-485; WE2108M-485
Max. of scale intervals acc. to OIML R76 (Class III, IIII)	d	6000; 2 x 3000;
Input sensitivity	$\mu\text{V/e}$	Multi-Range; Multi-Interval ≥ 1
Measuring range	mV/V	0 ... 2.7
Min. input impedance of the load cell	Ω	87
Max. input impedance of the load cell	Ω	2000
Load cell excitation voltage	V_{DC}	6.5
Cable length between WE2108 and Load cell(s)	m	max. 100
Measuring rate	Meas./s	50 ... 28
Filter Cut-off frequency (-3 dB)	Hz	2 ... 12
Transient respond time	ms	90 ... 625
Power supply	V_{DC}	10 ... 35
Power consumption (incl. display lighting)	W	2.5
Display	mm	LCD with back-lighting
Hight of display		20
Status symbols		Zero, Net, Motion, Unit, Range
Keys		Foil keyboard (tactile feedback)
2 Digital-Inputs (e.g. Gros, Tare, Net, Printer)	V	Aktive level $< 0.8 \text{ V}$, $R_i = 10 \text{ k}\Omega$ -30 ... +30
Permissible range of voltage		
2 Digital-Outputs (e.g. for PLC)	V	max. 40 (Open Collector)
max. current	A	0.2 typ.
Serial interface	Bd	1 x RS-232 or 1 x RS-485
Baud-rate, adjustable		1200 ... 9600
Serial interface functions		Print, serial display (autom. output), PC-connection via RS-232 or RS-485
Nominal temperature range	$^{\circ}\text{C}$ [$^{\circ}\text{F}$]	-10 ... +40 [+14 ... +104]
Service temperature range	$^{\circ}\text{C}$ [$^{\circ}\text{F}$]	-10 ... +60 [+14 ... +140]
Storage temperature range	$^{\circ}\text{C}$ [$^{\circ}\text{F}$]	-30 ... +70 [-22 ... +158]
Connection / Fitting WE2108S(-485): WE2108M(-485):	kg	5 x Pg 7 Screw terminal
Weight, env. WE2108S(-485): WE2108M(-485):		1.8 1
Protection class acc. to EN 60 529 (IEC 529)		IP65 (WE2108M only frontplate)
Immunity level (EMC) acc. to EN 45 501 (3 V/m)		additonal testet up to 10 V/m
Housing material		Stainless steel (WE2108M only frontplate)

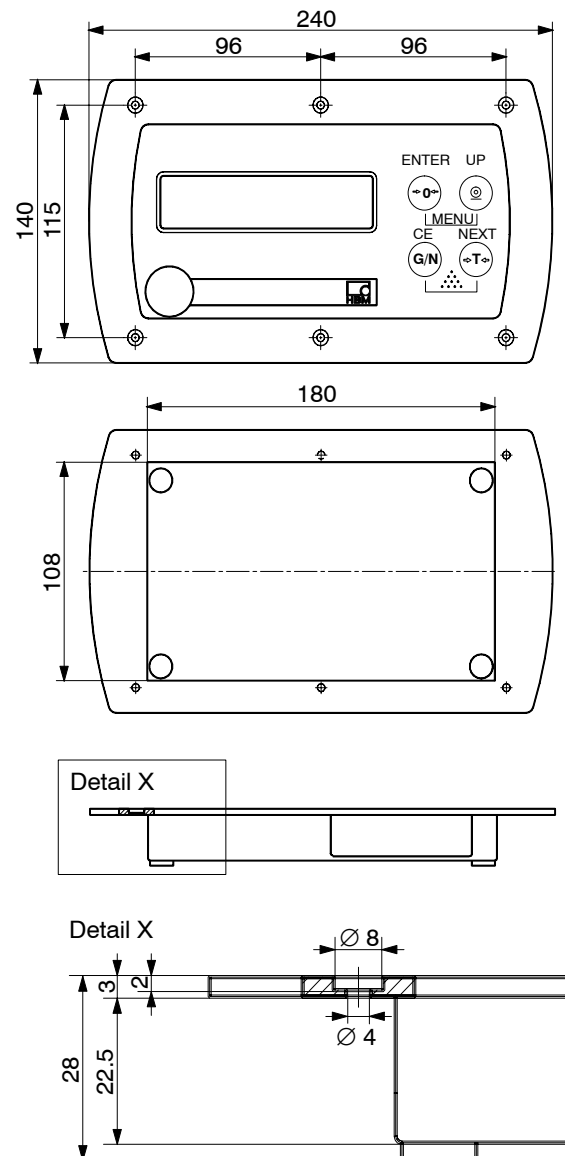
9.4 Dimensions WE2108S/WE2108M in steel-housing

WE2108S (Wall mounting or Desktop unit)



Dimensions (in mm)

WE2108M (Panel mounting)



Änderungen vorbehalten.
Alle Angaben beschreiben unsere Produkte in allgemeiner Form.
Sie stellen keine Eigenschaftszusicherung im Sinne des §459,
Abs. 2, BGB dar und begründen keine Haftung.

Hottinger Baldwin Messtechnik GmbH

Postfach 10 01 51, D-64201 Darmstadt
Im Tiefen See 45, D-64293 Darmstadt
Tel.: 06151 803-0 Fax: 06151 8039100

E-mail: support@hbm.com Internet: www.hbm.com



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