DANAK
PROD Reg. nr 7026

FORCE Certification

EU Type Examination Certificate

No. 0200-MID-05548 Revision 1

WBC-G

AUTOMATIC CATCHWEIGHING INSTRUMENT

Issued by **FORCE Certification**
EU - Notified Body No. 0200

In accordance with the requirements in Directive 2014/32/EU of the European Parliament and Council.

Issued to **BEUMER Group A/S**
P. O. Pedersen Vej 10
8200 Aarhus N
Denmark

In respect of Automatic catch weighing instrument designated WBC-G for dynamic or static weighing with variants of modules of load receptors and peripheral equipment.
Accuracy class Y(a) or Y(b)
Maximum capacity, Max: ≤ 60 kg.
Verification scale interval: $e_1 \geq 10$ g
Maximum number of verification scale intervals per interval: n = 3000
Variants of modules and conditions for the composition of the modules are set out in the annex.

The conformity with the essential requirements in Annex 1 and the specific requirements in Annex VIII (MI-006), chapter I & IV of the Directive 2014/32/EU is met by the application of OIML R51-1:2006, WELMEC Guide 7.2, and WELMEC Guide 8.16-1:2006.

Note: This certificate is a revised edition replacing earlier revisions.

The principal characteristics and approval conditions are set out in the descriptive annex to this certificate.

The annex comprises 20 pages.

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Valid until **2029-02-27**

Jens Hovgård Jensen
2022-10-07

Digitally signed by Jens Hovgård Jensen
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FORCE Certification references:
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Descriptive annex

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1. Name and type of instrument and modules

The instrument is an automatic weighing instrument, designated WBC-G (Weighing Belt Conveyor), for dynamic or static weighing and consisting of a Display unit (see below), mounted in a steel enclosure and a load receptor equipped with 4 digital load cells.

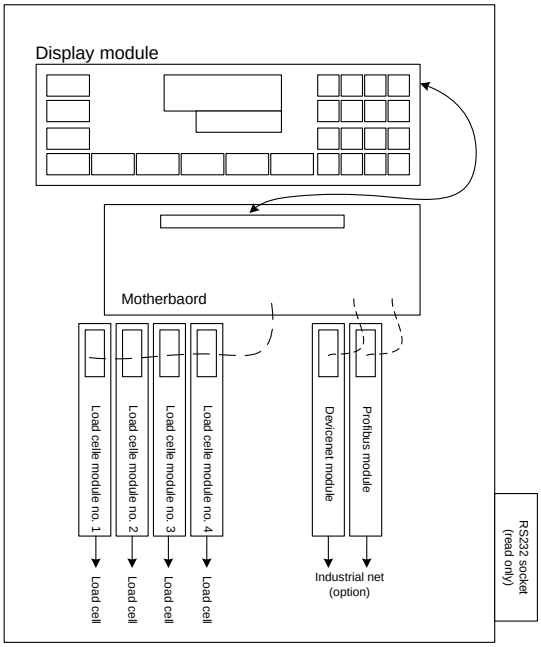
The Display unit consists of a Display module, Digital load cell module(s) and a Motherboard.

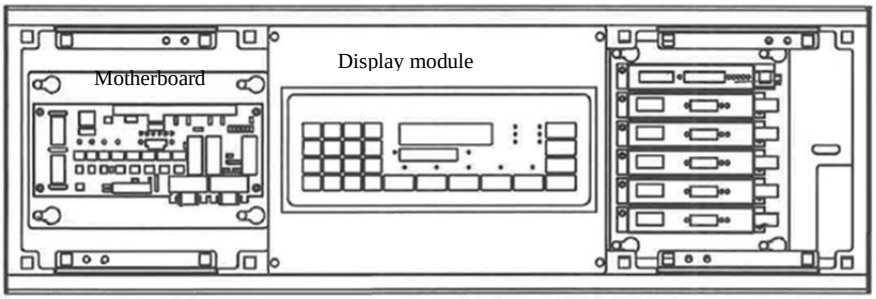
Each load cell communicates with the Display module MCE9625 (see figure 3) through Digital load cell module(s) MCE9610 or MCE2010 (see figure 4).

The digital load cell module(s) are connected to a dedicated RS485 port at the Display module.

The peripheral interfaces are assembled on the motherboard MCE 9627 (see figure 5), which coordinates all signals from the Display module and the Digital load cell module(s) as well as the communication with external equipment.

The instrument may optionally be connected to an industrial network. In such cases, a Profibus module MCE9635 or MCE2035 (see figure 6) or a Device net module MCE9637 (see figure 7) may be connected to the motherboard.





Display unit – alternatives

The instrument is a 24 Vdc powered, self-indicating weighing instrument with single-interval or multi-interval.

The weighing instrument is composed of separate modules and units that are listed in Section 2.1.

The modules appear from Sections 3.1, 3.2 and 3.3; the principle of the composition of the modules is set out in Sections 6.1 and 10.
Note: Components or complete instrument may be branded as Beumer or Crisplant (Crisplant A/S is a member of the Beumer Group).

2. Description of the construction and function

2.1 Construction

2.1.1 Display unit

The Display module (figure 3) comprises

- A Primary Weight display: Six (6) digits, Seven (7) segment LED`s
- A Secondary Data and Parameter display: Six (6) digits, Seven (7) segment LED`s
- Weighing unit annunciator, “kg”
- Status annunciators for WN (weigh now), AZ (auto zero) and >0< (zero)
- Status annunciators for 3 digital inputs and 3 digital outputs
- Status annunciators for scale modes (F1-F5)
- Keypad and keys for >0< and AT functions

The Digital load cell module (figure 4) comprises

- Sockets for connections of Load cell (BNC)
- Sockets for connections of Load cell module(s) (10 pol)
- DIP switch SW1 (SW 1-4 type of filter)
- DIP switch SW1 (SW 5-8 address)

The Motherboard (figure 5) comprises

- On / off switch for power
- Terminals for power supply 24 VDC (P1 and 25)
- Socket for Load cell module(s) (10 pol)
- Socket for Display module (64 pol)
- Three digital output sockets (P9-P11)
- Three digital input sockets (P12-P14)
- Socket for RS232 (P15 download)
- Socket for RS232 (P16 test)

- Socket for RS485B (P17 spare)
- Socket for RS485 (P18 in and P19 out)
- Jumpers S8 (lock of keypad)

The WBC-G is approved with two versions of the enclosure box for the electronics, an integrated steel box and a MCE 968x scale box (figure 8).

2.1.2 Load cells

Set out in Section 3.3.

2.1.3 Load receptor

Set out in Section 3.4.

2.1.4 Interfaces and peripheral equipment

Set out in Section 4.

2.2 Functions

The instrument is a microprocessor-based electronic instrument for connection to load receptors with digital load cells having RS485 output utilising Eilersen Electric load cell protocol.

Each digital load cell has its own address, keyed in on DIP switches on the Digital load cell module to match. The ID of the relevant load cell, which is part of the parameter list, may be exported to a Laptop PC.

The software is downloaded in EEPROM.

The functions provided are detailed below.

2.2.1 Power up

During power up, the Display module first displays the number 8 on all seven-segment displays and all annunciators are illuminated. Then the download bios version is shown followed by an indication on whether the checksum is correct.

If OK, “Start” is followed by installed program version with compilation date and time.

Next, after initial zero setting, the Primary Weight display is switched off, and in the secondary display “ready” is displayed.

2.2.2 Zero setting

The initial zero setting range is ± 10% of Maximum capacity.

The zero setting range is ± 2% of Maximum capacity.

The annunciator besides the AT-key illuminates, when the no-load measurement is within ±0.25 e1 of the zero point.

2.2.2.1 Zero tracking

Instruments configured to use protocol B20.
The weighing instrument has an automatic zero tracking device. This will allow the instrument to check and track the zero, when the weighing belt is empty. When the weight signal is zero (within $\pm 0.5 \times e_1$), zero tracking will operate in order to maintain the instrument at zero within $\pm 0.25 \times e_1$. When the no-load weighing signal is not zero (exceeds $\pm 0.5 \times e_1$), the weighing instrument reports “Not able to zero” with a digital output to the CMC (Crisplant Machine Controller) and error code 3 "Zero error" is displayed as well as added to the transmitted record with weighing result.

The CMC, which can control the flow of parcels over the belts, ensures that the weighing belt runs empty and sends a semi-automatic zero-setting command to the weighing instrument.

If the zero setting fails, the weighing belt is stopped, and an alarm is sent to the CSC (Crisplant System Controller).

Instruments configured to use protocol P30.
The weighing instrument has an automatic zero tracking device. This will allow the instrument to check and track the zero, when the weighing belt is empty. When the weight signal is zero (within $\pm 0.5 \times e_1$), zero tracking will operate in order to maintain the instrument at zero within $\pm 0.25 \times e_1$. When the no-load weighing signal is not zero (exceeds $\pm 0.5 \times e_1$), error code 56/57 "Unable to zero" is displayed as well as added to the transmitted record with weighing result.

If a number of parcels in a row having an error code exceeded a limit, The CMC (Crisplant Machine Controller), which can control the flow of parcels over the belts, ensures that the weighing belt runs empty and sends a semi-automatic zero-setting command to the weighing instrument.

If the zero setting fails, the weighing belt is stopped, and an alarm is sent to the CSC (Crisplant System Controller).

2.2.2.2 Automatic zero setting

Instruments configured to use protocol B20.
The instrument has no automatic zero-setting.

Instruments configured to use protocol P30.
If the maximum time between automatic zero setting has elapsed since the last zero successful operation of the zero-tracking device, the weighing instrument report this to the CMC. The CMC lets the weighing belt run empty and the weighing instrument is set to zero by a semi-automatic zero setting command from the CMC.

2.2.3 Keypad

The keypad has 25 keys with the inscriptions: Mode, Param., Print, Shift, F1 to F5, >0<, AT, +/-, Enter, Del, decimal point and the numerals 0 to 9.

By operating the Shift key 5 extra functions keys, 4 arrow keys, Ins key, Esc key and the Hex - numbers A to F may be obtained for use in a variety of application programs.

The >0<, AT and +/- keys are for the basic weighing functions and the numerical, decimal point and plus-minus keys are for entering data. The rest of the keys have functions, which depend on the actual application program.

2.2.4 Photocells

The weighing instrument is fitted with photocell units, which hold one or more photocells. The unit forms a vertical / horizontal light beam, depending on the parcel shape. If one or more photocells are dimmed then the signal status changes.

The weigh-now photocell unit is positioned close to the inlet of the weighing belt and the weight-control photocell unit close to the outlet of the weighing belt or at the inlet of the succeeding belt (both with configurable position).

The photocell signal named, “weigh-now” starts a weighing sequence. The weight-control signal ensures that only one (1) parcel is weighed at a time. Both signals are sent directly to the weighing instrument and at the same time to the control system CMC (Crisplant Machine Controller), which ensures that the photocell unit works correctly.

2.2.5 Calibration

The weighing instrument is calibrated both statically and dynamically. First, a static calibration is performed, next a dynamic calibration. In this way, the weighing accuracy for normal automatic operation is optimised. After the dynamic calibration, the static weighing accuracy has altered so much that static weighing tests are not applicable. Consequently, the weighing instrument is not applicable neither for check weighing or any other legal weighing when the weighing belt is stopped.

2.2.6 High resolution of the weight value

Higher resolution can be accessed. This feature is only intended as an aid during evaluation and testing. When high resolution is active, the indicator will not change weighing ranges but uses the same resolution from zero to max.

2.2.7 Verification

For each test series, the individual errors of the weighings shall be calculated.

In the CMC (Crisplant Machine Controller), a functional mode is included in which the test items are conveyed forwards and backwards over the weighing section. Weighing and recording are limited to the forward transportation. The function is approved for use when determining the accuracy of the weighing instrument.

The below procedures are optional:

(a) Visual reading of the weighing instrument’s primary display using the high resolution every time an item is weighed and written down the individual result.

or

(b) By connection of a PC to the test plug (RS232) on side of the display unit. The individual weighing results can be recorded.

2.2.8 Fault detecting

When a weighing result is displayed in the primary weight display, there is a status code displayed on the secondary display.

The status conditions monitored are:

No.	Description of operational errors:	Action
	Common for the protocols	
0	No error	
	B20 protocol	
1	Negative weight value. Weight is sign reversed and returned.	
2	Overweight item. Item is heavier than the protocol maximum weight.	S
3	Zero error. Scale is unable to zero.	
4	No WEIGH_NOW signal detected. There is no weight value present for this index, because the scale has not seen a transition of the WEIGH_NOW signal.	
5	Measuring not finished. There is no weight value present for this index.	
6	Weight calculation not finished. There is no weight value present for this index.	
7	Scale is in calibration-mode or test-mode. Scale has to be in normal mode in order to weigh.	
8	Item too long.	S
9	More than one item on the scale belt. This error is returned when an item cannot be weighed because an item has been seen in the PEC while another parcel is being weighed. This error can only be returned when the scale is configured to weigh single parcels, i.e. not allowing more than one item on the scale belt at the same time (weighing single parcels).	
10	Underweight item detected. The item is below the protocol minimum weight.	
11	Reserved.	
12	Calibration constant(s) or specific gravity are invalid - The scale has lost its calibration or has never been calibrated before. This can be caused by a deficient battery in the scale.	
13	Load cell error. One or more load cells are not connected correctly or are deficient.	
14	Weight buffer error. The weight values needed to calculate the weight were not present in the scale's internal weight buffer.	
15	Power up error. This status code signals that the scale has one or more power-up errors. Most likely the number of load cells or the presence of an accelerometer is configured wrong. Also the power up zeroing range could have been exceeded during power up, so the scale did not zero during power-up.	
16	Weight integration period too short. This error is returned when the calculated weighing time for an item is lower than the set minimum weighing time.	
17	Item missing. This status code indicates that an item did not arrive in PEC 2 in the calculated time window. This status code is only returned when the scale is configured to use 2 PECs.	
18	Too many items detected in PEC. This error is returned when an item cannot be weighed because three or more items has been seen in the PEC and all 3 items are still present on the weighing plate (therefore the middle item can not be weighed). This error can only be returned when the scale is configured to allow more than one item on the scale-belt at the same time (weighing multiple/several parcels).	
19	Unknown index. The scale has been requested for data for an index not present in its buffer.	
20	Warm-up delay. This error code signals that power has been applied to the scale recently and the scale is not yet ready to make correct weighings.	
21	Item outside weighing belt. This error code signals that the parcel is not placed correctly on the weighing belt.	
22-23	Reserved	
24-39	Spare	
	P30 protocol	

	Priority 1 Errors	
40	Scale is in warm-up condition.	S
41	Not finished with initialization (Init not received or not finished executing init).	S
42-47	Spare	
	Priority 2 Errors	
48	No index telegram received before weighing, index 9999 is used in telegram.	
49	Multiple indexes received before detective an item in the "Weigh_now" photocell. The error code is sent on all received indexes.	S
50	Index already in use. Is send on 1st index, 2nd index is not used (deleted by scale).	S
51	Index telegram error detected. (framing/parity or length/ context).	S
52	Index buffer overflow.	S
53-55	Spare	
	Priority 3 Errors	
56	Unable to zero, the gross weight too small.	
57	Unable to zero, the gross weight too large.	
58	Invalid measurement. (Intern over- or under load while measured)	
59	Out of weighing range	
60-62	Spare	
63	Internal scale error.	
	Priority 4 Errors	
64	Overweight parcel detected. The parcel is above the maximum weight (range 2).	S
65	Overweight parcel detected. The parcel is above the maximum weight (range 1 = legal range).	
66	Parcel too long.	S
67	More than one parcel on the weighing belt. This error is returned when a parcel cannot be weighed because the distance to the subsequent parcel is too short.	
68	No WEIGH_NOW signal detected. There is no weight value present for this index, because the Scale has not seen a transition of the WEIGH_NOW signal. The parcel is maybe too low.	
69-71	Spare	
	Priority 5 Errors	
72	Weight integration period too short. This error is returned when the calculated weighing time for a parcel is lower than the minimum weighing time set.	
73	Too many parcels detected in PEC. This error is returned when a parcel cannot be weighed because three or more parcels have been seen in the PEC (therefore the middle parcel can not be weighed).	
74	Unknown parcel detected (stray item). This error code indicates that a parcel was not seen in the inlet PEC only in the outlet PEC.	
75	Parcel missing. This error code indicates that a parcel did not arrive at the outlet PEC.	
76	Parcel outside weighing belt. This error code signals that the parcel is not placed correctly on the weighing belt (non-automatic weighing only).	
77-79	Spare	
	Priority 6 Errors	

80	Underweight parcel detected. The parcel is below the minimum weight.	
81-85	Spare	
86	Scale is in calibration/test mode. Scale has to be in normal mode in order to weigh.	
87	Scale is not sealed	
88-127	Spare	
>128	Are not defined.	

If an error code different from 0 is shown, a valid weighing result cannot be obtained until the faulty condition is removed.

At the error codes marked with Action S the induction incl. the weighing belt is stopped, and items are to be removed manually. Other items with an error code different from 0 are inducted onto the sorter and discharged at the hospital chute.

In case of a series of similar status codes (default configured to 3 items) different from status code 0, the induction including scale is stopped as well.

2.2.9 Software version

Identification of the software version is performed during power-up (see Section 2.2.1).

The approved software versions are CCWD.010201.1v7 and CCWD.090204.1v0x.
Version CCWD.010201.1v7 uses protocol B020 for communication to the CSC (Crisplant System Controller), while CCWD.090204.1v0x uses protocol P30.

2.3 Options

2.3.1 Alibi system

The WBC-G may be connected to an external alibi system with an Evaluation certificate (Test certificate) from a notified body for type examination according to directive 2014/32/EU (MID).

The instrument transmits the legal measuring data to an external alibi system. The transmitted data is protected with a CRC-16 checksum.

Usually the external alibi system is implemented as part of the CSC (Crisplant System Controller).

2.3.2 Communication Device

The instrument may be supplied with a device, which can be used for communication with external equipment.

One of the following devices may be connected to the Motherboard:

A Profibus module, which comprises (figure 6)

- RS485 socket for communication with the Display module
- DIP switch SW1 (reserved)
- DIP switch SW2 (SW1-7 address)
- DIP switch SW2 (SW8 data rate)

A Device net module, which comprises (figure 7)

- RS485 socket for communication with the Display module
- DIP switch SW1 (reserved)
- DIP switch SW2 (SW1-2 data rate)
- DIP switch SW2 (SW3-8 address)

3. Technical data

The automatic weighing instruments and its modules are set out as follows:

3.1 WBC-G Automatic catchweighing instrument

Type:	WBC-G
Accuracy class:	Y(a) or Y(b)
Weighing mode:	Dynamic or static
Weighing range:	Single-interval or multi-interval (2 or 3 intervals)
Maximum capacity (Max):	≤ 60 kg
Minimum capacity (Min):	≥ 5×e_1
Verification scale interval (e):	e ≥ 10 g
Number of Verification Scale Intervals (n):	≤ 3000
Maximum tare effect:	≤ 100 % of Max
Temperature range:	+5 °C to 40 °C
Power Supply:	230 Vac, or 24 Vdc +/- 10%
Electromagnetic class:	E2
Humidity:	Non-condensing
Maximum time between automatic zero-setting:	7 minutes for e_1 = 10 g 15 minutes for e_1 ≥ 20 g
Belt speed:	≤ 2.2 m/sec for e_1 = 10 g ≤ 2.5 m/sec for e_1 ≥ 20 g
Warm-up time:	5 minutes for e_1 = 10 g 4 minutes for e_1 ≥ 20 g

3.2 Display module

The Display module has the following characteristics:

Type:	MCE 9625
Accuracy Class:	III
Weighing ranges:	Single-interval or multi-interval
Maximum number of verification scale intervals:	≤ 6000 (depends on load cells used)
Internal resolution:	24 bit
Maximum tare effect:	-Max
Operating temperature range:	-10 °C / +40 °C
Power supply:	24 Vdc ± 10 %, 2 A
Peripheral interfaces:	Set out in Section 4

3.3 Load cells

3.3.1 Digital load cell type SD

The digital load cell SD is a capacitive measuring cell (figure 2) that belongs together with one specific Digital load cell module.

Four SD C3 50 kg or SD C3 100 kg load cells are used for the WBC-G.

3.3.2 Digital load cell module MCE9610 / MCE2010

The Digital load cell module (figure 4) is connected to the Digital load cell by a standard RG58 coaxial cable incorporating a standard BNC connector at the module end. The digital load cell module converts the coded pulse signal from the load cell so that the actual load on the load cell is expressed in, "g" with an exponent of 10.

The MCE2010 load cell module is similar to the MCE 9610 module but with a faster processor.

3.4 Load receptors

The weighing belt rests directly on four load cells. Shock absorbers are placed between the load cells and the weighing belt (figure 1).

The load cells are mounted to the support under-structure and positioned under each of the corners of the weighing belt. The support under-structure section incorporates adjustable feet for levelling; however, the instrument is intended for fixed installation (figure 1).

The weighing belt motor is positioned under one (1) of the load cells. The motor is either a standard motor utilising a remote frequency inverter of various makes or an integrated motor combining the motor and inverter into a single unit (figure 1).

The weighing belt can vary depending on the parcel size of the system, whereas the weighing belt length is dependent upon maximum parcel length and weighing belt speed. However, the design ensures that a minimum weighing time is always obtained.

The weighing belt speed is fixed.

4. Interfaces and peripheral equipment

4.1 Interfaces

4.1.1 Peripheral interfaces

The Display unit has a RS232 interface [with two channels] and a RS485 interface, which permits the connection of peripheral equipment.

These interfaces are characterised as "Protective interfaces".

In case the RS485 interface is connected, the weight data is sent together with a checksum (CRC 16) from the instrument to external equipment to avoid the risk of manipulation of the weight data in non-verified environments.

4.1.2 Profibus module (option)

A Profibus module may be connected to the RS485 interface for communication with external equipment (see Section 2.3.2).

4.1.3 Device net module (option)

A Device net module may be connected to the RS485 interface for communication with external equipment (see Section 2.3.2).

4.2 Peripheral equipment

Connection between the Display unit and peripheral equipment is allowed as follows:

- For the RS485 connection, the cable must be a shielded 2x2 twisted pair with a cross section corresponding to the actual distance.
- For the RS232 connection, the cable must be shielded, 0.22 to 0.5 mm².

5. Approval conditions

5.1 Connection of cables

All cables shall be shielded, and the shield shall be properly EMC wise connected to the housing / connector in both ends.

5.2 Alibi system

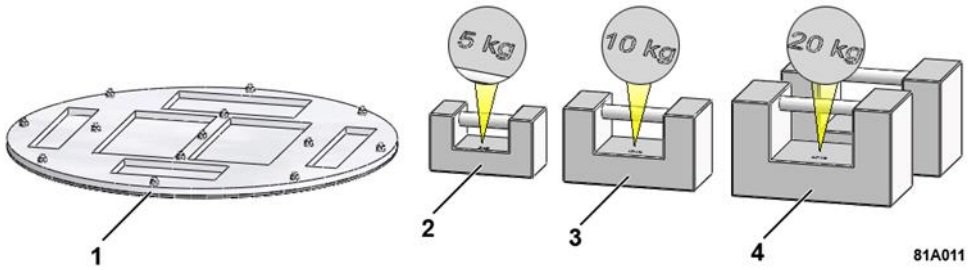
As the WBC-G is intended for weighing parcels where one of the transaction parties is absent and since the parcel can not be weighed again in case of a complaint, the WBC-G must be connected to an externally alibi system with an Evaluation Certificate / Test Certificate issued by a notified body for type examination according to MID.

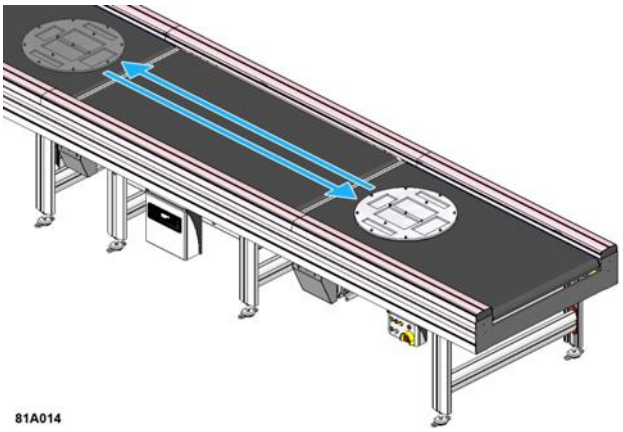
The CSC (Crisplant System Controller) or CSS (Crisplant System Server) incorporates normally an alibi system, which then has to have an Evaluation Certificate / Test Certificate in order to be used as an alibi system.

6. Special conditions for verification

The software version and checksums of the alibi system shall be checked against the Evaluation Certificate / Test Certificate of the alibi system.

The manufacturer can as an option deliver a PVC plate intended for placement of standard weights together with the weighing instrument. The plate can be used to make the tests of the verification officer easier as well as for the self control performed of the instrument owner.





7. Securing and location of seals and verification marks

7.1 Securing and sealing

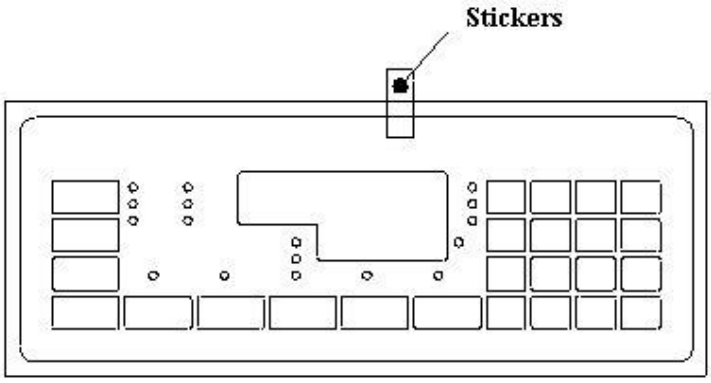
Seals shall bear the verification mark of a notified body or alternative mark of the manufacturer according to ANNEX II, module F or D of Directive 2014/32/EU.

7.1.1 Integrated steel box enclosure

7.1.1.1 Display module

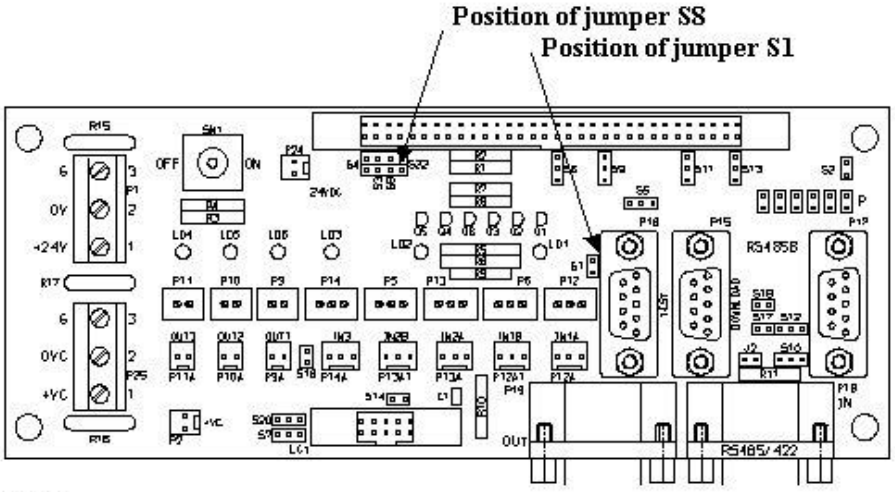
The Display module is to be sealed against exchange by means of brittle plastic sticker placed over the edge of the Display module. Any attempt to remove the Display module will result in damage to the seal.

Alternatively, the sealing may be achieved by means of a lead wire seal placed through the hole in a screw on the back side of the Display module.



7.1.1.2 Motherboard

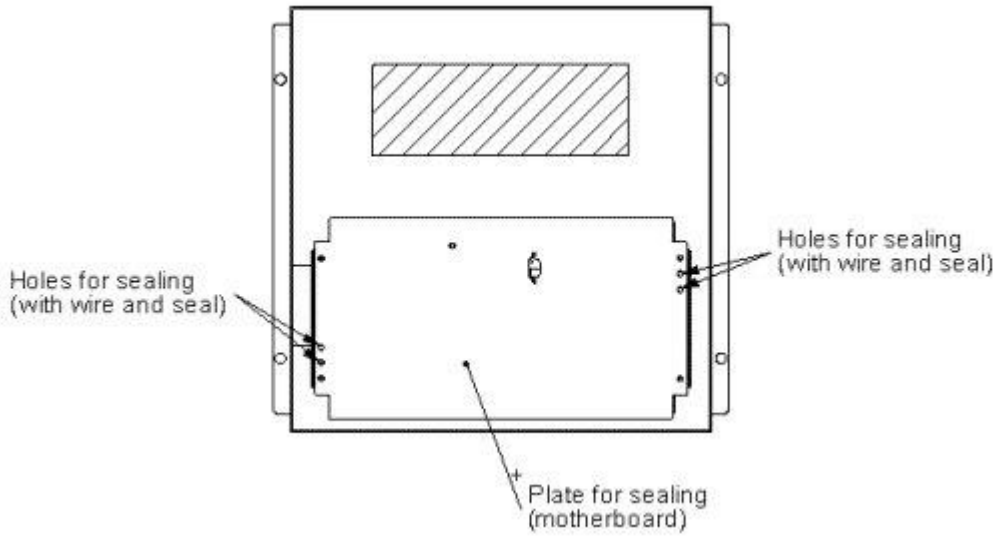
The motherboard is to be secured by sealing the Plexiglas. However, prior to the sealing, jumper S8 must be placed on the motherboard.



Note!
Before sealing of the motherboard the jumper S8 must be mounted on boths pins and the jumper S1 must not be mounted.

7.1.1.3 Load cell

The load cell(s) are to be secured by sealing a Plexiglas, which covers the Load cell module(s).



7.1.2 MCE 968x scale box enclosure

The Display unit is to be sealed against exchange by means of a lead wire seal placed through the hole in a screw on door and another screw on side of the Display unit. Any attempt to open the door will result in damage to the seal (see Figure 8).

Alternatively, the sealing may be achieved by means of a brittle plastic sticker placed over the door and the side of the Display unit.

7.2 Identification plate

The identification plate shall be secured against removal with a brittle plastic sticker.

8. Location of CE mark of conformity and inscriptions

8.1 Identification plate

All inscriptions for the instrument shall be placed on the identification plate, which is located on the box in which the display module is mounted.

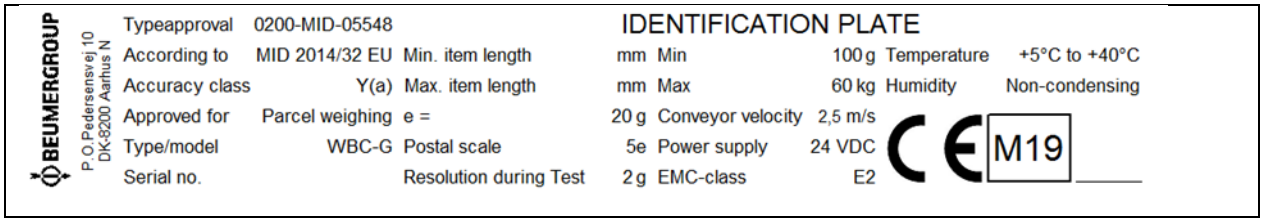
8.1.1 CE mark

CE mark and supplementary metrological marking shall be applied to the identification plate according to article 21 of Directive 2014/32/EU.

8.1.2 Inscriptions

The identification plate shall bear the following inscriptions:

- Manufacturer's trademark and / or name
- Postal address of manufacturer
- Type designation
- Serial number
- Max, Min and e= (these shall additional be duplicated near the display unless the description plate is located near the display)
- Maximum rate of operation (items/hour)
- Maximum belt conveyer speed
- Temperature range: +5 / +40 °C
- Electromagnetic class: E2
- Humidity: Non-condensing
- Type examination certificate number
- The text: “Approved for: Parcel weighing.”
- Electrical data and other inscriptions



9. Pictures

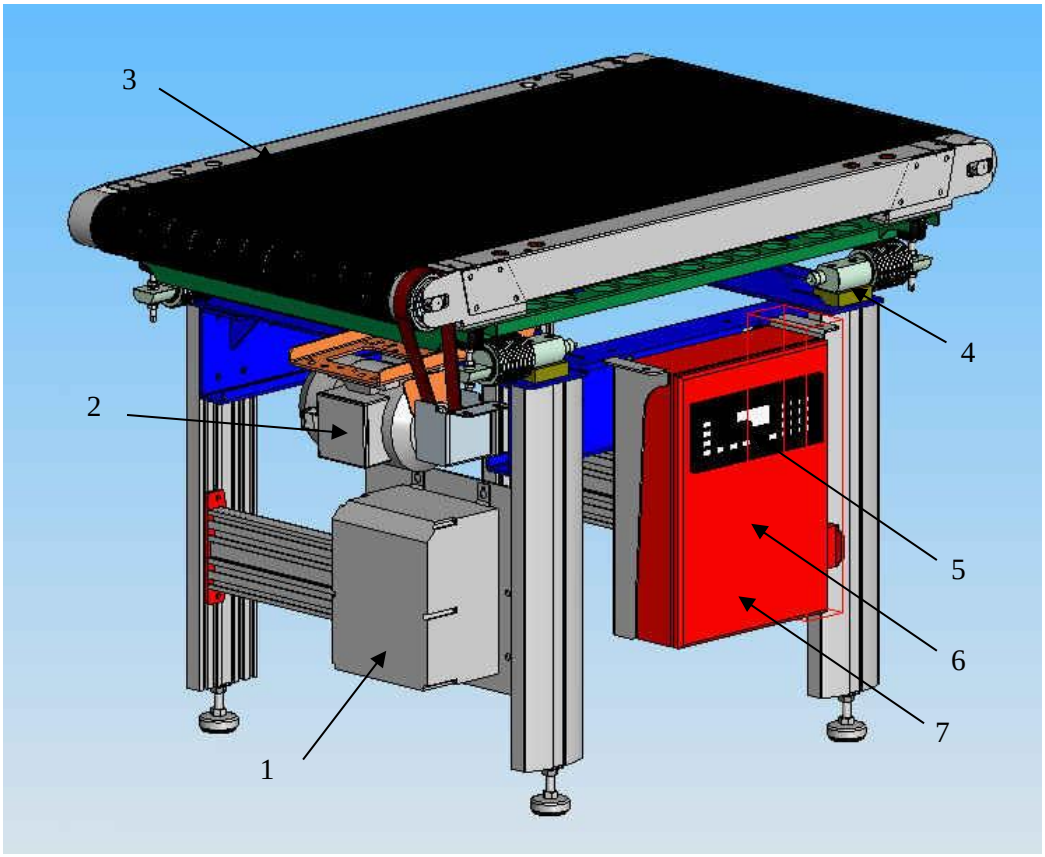


Figure 1
Mechanical Construction

1) Frequency inverter
2) Scale belt motor
3) Scale belt
4) Load cell
5) Display module
6) Scale unit
7) Load cell modules and motherboard (inside)

Sub frame and scale belt manufactured by BEUMER Group A/S.

Figure. 2
Digital Load Cell
Type: SD 50 kg

Figure 3
Display Module
Type MCE9625

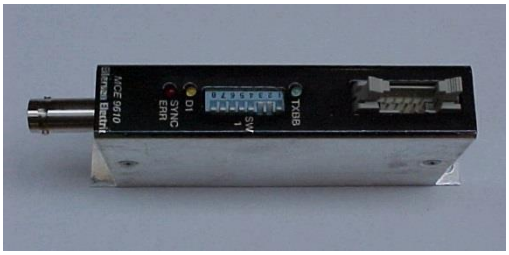


Figure 4
Digital Load Cell Module
Type: MCE9610 or MCE2010

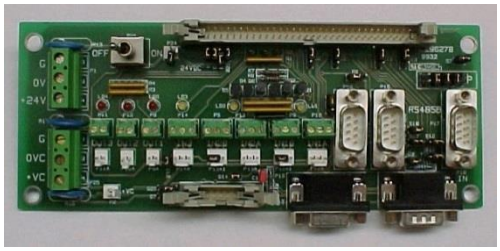


Figure 5
Motherboard
Type: MCE 9627

Fig. 6
Profibus module
Type: MCE9635 or MCE2035

Fig. 7
Device net module
Type: MCE9637

Figure 8
Sealing of Display Unit

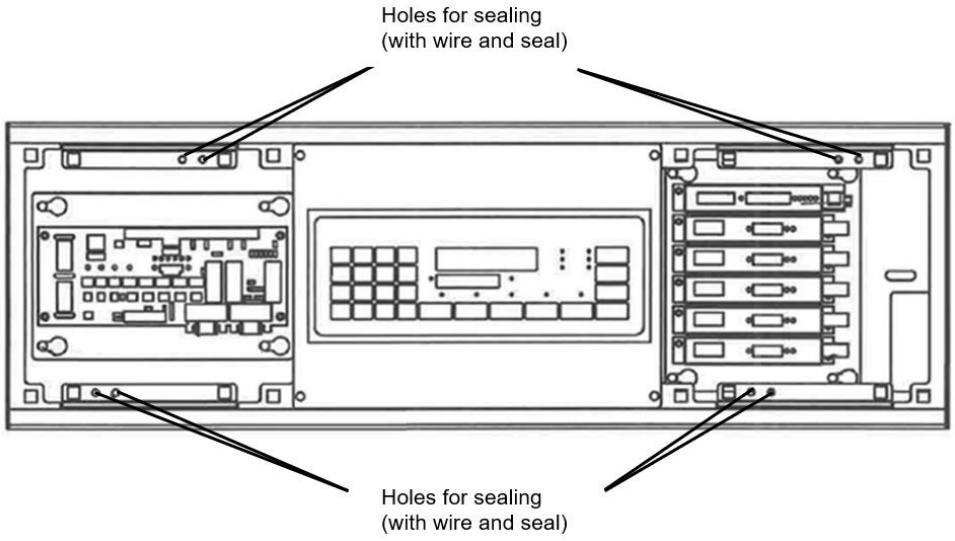


Figure 9 Sealing of Alternative Display Unit