

EVALUATION CERTIFICATE

No. 0200-WL-03388 Revision 1

Object name **EM100-G**

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| Object type | Analog data processing device |
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Issued by **Force Certification A/S**

Issued in accordance with the requirements in WELMEC Guide 8.8:2017” Guide on General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments”.

In accordance with EN 45501:2015, OIML R76:2006 and WELMEC Guide 8.8:2017.

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| In respect of | An analog data processing device tested as a module for a weighing instrument. |
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| Characteristics | Suitable for non-automatic weighing instruments with the following characteristics: | |
| | Weighing range: | Single-interval or multi-range or multi-interval |
| | Accuracy class: | III or IIII |
| | Number of VSIs: | $n \leq 10,000$ |
| | Minimum input voltage per VSI: | $\geq 0.3 \mu\text{V}$ |
| | The essential characteristics are described in the annex. | |

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| Description and documentation | The analog data processing device is described and documented in the annex to this certificate. |
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| Remarks | Summary of tests involved: see annex. |
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The annex comprises 5 pages.

Issued on **2025-01-16**

FORCE Certification references:

Task no.: 124-34253.90.10 and ID no.: 0200-WL-03388-2

Signatory: Jens Hovgård Jensen

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Descriptive annex

1. Name and type of instrument

The analog data processing device is designated EM100-G and suitable to be incorporated in a non-automatic weighing instrument, class III or IIII, with single-interval, multi-range or multi-interval.

2. Description of the construction and function

2.1 Construction

The electronic device consists of a single circuit board, SMD populated and housed in a tinned mild steel shielding enclosure.

The top of the enclosure carries a non-detachable inscription plate. Through the enclosure below the circuit board are two connectors, one for load cell connection and for power and i/o.

The load cell connector consists of 12 terminals, as dual row pins 2.54 mm pitch: 6 terminals for the load cell wires, and 6 terminals for the cable shield / ground.

The power and I/O connector consists of 20 terminals, as dual row pins 2.54 mm pitch: 4 terminals for power supply, 4 terminals for logic level I/O and 8 terminals for serial communication in form of RS485, RS232 and CANopen.

All instrument calibration and metrological setup data are held in the non-volatile memory.

Identification

The model number may be viewed by sending "FPN" to the unit, which responds with 'P:xxxxxxx'. The tested model number is 'P:EM100-G'

The serial number of the unit may be viewed by sending "RS" to the unit, which responds with 'S+xxxxxxx'.

Software

The software version may be viewed by sending "FFV" to the unit, which responds with 'Vxx.yy' or 'V:xx.yy.zz'.

where xx denotes the legally relevant code, yy denotes the major non-legally relevant code, and zz denotes the minor non-legally relevant code.

The tested software version is: 'V01.01'.

The software changes from V01.01 to V02.00.00 have been examined.

Access to metrological characteristics and span adjustment

Access to the configuration and calibration facility is achieved by sending a Traceable Access Code (TAC), which is a non-volatile number that automatically incremented each time the calibration modulus is left by the operator. The TAC may be reviewed by sending CE to the unit, which responds the status code as CExxxx. The code increments up to 65535.

Securing of metrological characteristics and span adjustment

Access to the configuration and calibration facility is secured by the TAC.

2.2 Function.

The EM100-G is a microprocessor based electronic digitising unit for a load cell signal, which enables the production of a weight indicating instrument that requires the external connection of strain gauge load cells and a weight display unit. Furthermore, the weight information may be transmitted to peripheral equipment for recording, processing, or display. The EM100-G digitising unit is available for operation from a coarsely regulated DC-supply 9 - 32 VDC

The primary groups of functions provided are as follows,

- Power monitoring
- System diagnostics
- Calibration functions
- Motion detection functions
- Filter settings
- Taring & Zeroing functions
- Output configuring
- Auto transmit
- External input/output control
- Setpoint controlled logic output
- Communication set-up
- Identification number
- Legal setup consecutive number
- Save calibration and setup parameters
- Trigger functions
- Re-trigger functions

The legally functions provided are,

- Initial zero-setting
- Semi-automatic zero-setting
- Zero tracking
- Semi-automatic subtractive tare
- Preset tare
- Automatic tare
- Event counter (TAC)

3. Technical data

3.1 Analog Data Processing device

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| Type: | EM100-G load cell digitizing unit. |
| Accuracy class: | III or IIII |
| Weighing range: | Single-interval, multi-range or multi-interval |
| Maximum number of verification scale intervals (n): | 10,000 |
| Minimum input voltage per VSI (e_i): | 0.3 μ V |
| Maximum capacity of interval (Max_i): | $n_i \times e_i$ |
| Initial zero-setting range: | 20 % of Max |
| Maximum tare effect: | 100 % of Max |
| Fractional factor (p_i): | 0.5 |
| Excitation voltage: | 5 VDC |
| Minimum input voltage from load cell: | 0 mV |
| Maximum input voltage from load cell: | 15 mV |
| Circuit for remote sense: | Active (see below) |
| Minimum input impedance: | 58 Ohm |
| Maximum input impedance: | 1100 Ohm |
| Load cell linearization feature: | None |
| Connecting cable to load cell(s): | See Section 3.1.1 |
| Supply voltage: | 9 - 32 VDC, not to be supplied from DC Mains |
| Operating temperature range: | Min / Max = -15 °C / +55 °C |
| Peripheral interface(s): | See Section 4 |

3.1.1 Connecting cable between the indicator and the junction box for load cell(s), if any

3.1.1.1 4-wire system

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| Maximum length | The certified cable length for the load cell. |
| Line | 4 wires, shielded |

3.1.1.2 6-wire system

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| Line | 6 wires, shielded |
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Option 1:

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| Maximum length | 1132 m/mm ² |
| Maximum resistance per wire | 19.1 Ohm |

In case the (n) for the weighing instrument is less than (n_{max}) mentioned above, the following applies:

Option 2:

Coefficient of temperature of the span error of the indicator: $E_s = 0.003 \% / 25^\circ K$

Coefficient of resistance for the wires in the J-box cable: $S_x = 0.0012 \% / ohm$

$L/A_{max} = 295.86 / S_x * (emp / n - E_s) [m / mm^2]$ in which $emp = p_i * mpe * 100 / e$

From this, the maximum cable length for the weighing instrument may be calculated with regard to (n) for the actual configuration of the instrument.

Reference: WELMEC 2.10:2021.

4. Interfaces

4.1 Load cell interface

Refer to Section 3.1.1.

Any analogue load cell(s) can be used for instruments under this certificate provided the following conditions are met:

- There is an part, evaluation or test certificate (EN 45501) or respective an OIML Certificate of Conformity (R60:2000 or R60:2017 or R60:2021) issued for the load cell by a Notified Body responsible for type examination under the Directive 2014/31/EU.
- The certificate contains the load cell types and the necessary load cell data required for the manufacturer's declaration of compatibility of modules (EN 45501:2015 annex F), and any particular installation requirements. A load cell marked NH is allowed only if humidity testing to EN 45501 has been performed.
- The compatibility of load cells and indicator is established by the manufacturer by means of the compatibility of modules form, contained in the above EN 45501 document, or the like, at the time of EC verification or declaration of EC conformity of type.
- The load transmission must conform to one of the examples shown in the WELMEC 2.4 Guide for load cells.

4.2 Peripheral interfaces

Serial I/O interface

EM100-G has three serial interfaces,

- RS485
- RS232
- CANopen

Logic Level Inputs and Outputs

EM100-G has two logic level inputs and two open-drain outputs

The peripheral interfaces are characterised "Protective interfaces" according to paragraph 8.4 in the Directive.

5. Conditions for use

The use of the A/D module EM100-G in an automatic weighing instrument is not covered by this Evaluation certificate.

The model number (returned by command FPN) shall be 'EM100-G'.

The software version (returned by command FFV) shall be 01.yy, or 02.yy.zz, where yy and zz may be 00 to 99.

6. Tests

The EM100-G load cell digitising unit has been tested according to EN 45501:2015, OIML R76-1:2006 and OIML D11:2013 for electromagnetic class E2.

The tested EM100-G has the following version number:

Hardware (model): EM100-G

Software: V01.01

Examination / tests

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| Temperature tests: 20/55/-15/5/20 (tested at minimum input-voltage sensitivity) |
| Temperature effect on no-load indication |
| Temperature effect on span |
| Repeatability |
| Tare |
| Warm-up time |
| Voltage variations |
| Short time power reductions |
| Electrical bursts |
| Surge |
| Electrostatic discharges |
| Immunity to radiated electromagnetic fields |
| Immunity to conducted electromagnetic fields |
| Damp heat, steady state |
| Span stability |
| Examination of construction |
| Maximum load cell cable length and impedance of cable to load cell |

The test item fulfilled the maximum permissible errors at all tests.

7. Documentation

Contents of the technical documentation held by the notified body:

7.1 Product specification

- Manual
- Schematics
- PCB layout

7.2 Test & Examination report

OIML R76 report no. DANAK-1918640