

Descriptive annex

1. Name and type of instrument

The analog data processing device is designated EM100-F and suitable to be incorporated in an automatic gravimetric filling instrument, reference class Ref(0.2), 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-F'

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

Software

The software version may be viewed by sending "FFV" to the unit, which responds with 'Vxx.yy'. The tested software version is: 'V01.01'.

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 CExxxxx. 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-F 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-F 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

Type:	EM100-F load cell digitizing unit.
Reference class:	Ref(0.2)
Accuracy class:	0.2 or 0.5 or 1 or 2
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
Maximum time between automatic zero-setting:	100 minutes ¹⁾
Minimum warm-up time:	15 minutes 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

MinFill's dependency of accuracy class and d in g for d = 0.3 μ V. ¹⁾

d [g]	Accuracy class							
	X(0.2)		X(0.5)		X(1)		X(2)	
	d	[kg]	d	[kg]	d	[kg]	d	[kg]
0.1	56	0.0056	22	0.0022	11	0.0011	6	0.0006
0.2	56	0.0112	22	0.0044	11	0.0022	6	0.0012
0.5	56	0.028	22	0.011	11	0.0055	6	0.0030
1	111	0.111	22	0.022	11	0.011	6	0.006
2	167	0.334	22	0.044	11	0.022	6	0.012
5	333	1.665	67	0.335	22	0.11	6	0.030
10	333	3.33	133	1.33	33	0.33	11	0.110
20	333	6.66	133	2.66	67	1.34	17	0.340
50	500	25	133	6.65	67	3.35	33	1.65
100	500	50	200	20	67	6.7	33	3.3
200	500	100	200	40	100	20	33	6.6
≥ 500	500		200		100		50	

¹⁾ Values applies for single fill only.

4.2 Peripheral interfaces

Serial I/O interface

EM100-F has three serial interfaces,

- RS485
- RS232
- CANopen

Logic Level Inputs and Outputs

EM100-F 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-F in an automatic weighing instrument is not covered by this Evaluation certificate.

The model number (returned by command FPN) shall be ‘EM100-F’.

The software version (returned by command FFV) shall be V01.xx, where $xx \geq 01$.

6. Tests

The EM100-F load cell digitising unit has been tested according to EN 45501:2015, OIML R76-1:2006, WELMEC 2.1:2001 annex 5 and OIML D11:2013 for electromagnetic class E2.

The test results have afterwards been re-examined against the requirements in MID - Directive 2014/32/EU Annex I and Annex VIII (MI-006) chapter 1 and 3, OIML R61:2004, and WELMEC Guide 2.8:2012. The software has been examined against the requirements in WELMEC Guide 7.2:2015.

The tested EM100-F has the following version number:

Hardware (model): EM100-F

Software: V01.01

Examination / tests

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

OIML R61 report no. DANAK-1918824