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EVALUATION CERTIFICATE

No. DK0199-R61-12.06 Revision 1

Object name TLB..

Object type Family of weighing transmitter for automatic gravimetric filling instrument

Issued by DELTA Danish Electronics, Light & Acoustics

Issued in accordance with the requirements in WELMEC Guide 8.8:2011" Guide on General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments".

In accordance with OIML R61:2004,
OIML D11:2004 section 12 and 13 with severity level 3
WELMEC Guide 8.8:2008.
WELMEC Guide 7.2:2011

Issued to Laumas Elettronica SRL.
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Manufacturer Laumas Elettronica SRL.

Characteristics A weighing transmitter suitable for supplying the digitized weight signal to the controller of an automatic gravimetric filling instrument.

Description and documentation The weighing transmitter is described and documented in the annex to this certificate.

Remarks Summary of tests involved: see annex.
This evaluation certificate cannot be quoted in a MID EC type examination certificate without permission of the holder of the certificate mentioned above.

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Descriptive annex

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1. Name and type of instrument

The weighing transmitter is designated TLB... It is an electronic non-automatic weighing indicator to be connected to a separate load receptor and transmitting the instant weight using RS232, RS485, Profibus, DeviceNet, CANopen, Ethernet TCP/IP, Ethernet/IP, Modbus/TCP, Profinet IO, EtherCAT, POWERLINK, SERCOSIII, CC-Link or USB. The transmitter can be configured to single-interval, multi-range or multi-interval.

The name of the transmitters may have the designation “JOLLY” put in front and may be followed by alphanumeric characters for technical, legally or commercial characterisation of the instrument.

The transmitters consist of analogue to digital conversion circuitry, microprocessor control circuitry, power supply, keyboard, non-volatile memory for storage of calibration and setup data, and a weight display contained within a single enclosure.

2. Description of the construction and function

2.1 Construction

2.1.1 TLB.. weighing transmitter

TLB.. transmitters can be supplied either in desk type enclosure, stainless steel enclosure or panel type enclosure.

The obtainable specifications for a TLB.. controlled automatic gravimetric filling instrument is specified in Section 3.1.

The TLB.. transmitter is specified in Section 3.2.

2.1.2 Load cells

Requirements to connected load cell(s) are set out in Section 3.3.

2.1.3 Load receptor

Requirements to connected load receptor are 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 microcontroller based electronic weight transmitter that requires the external connection of strain gauge load cell(s). The weight information that is transmitted will also appear in the digital display located on the front panel and can be used for service purposes.

The primary functions provided are detailed below.

2.2.1 Zero-setting

The weight transmitter has the following zero-setting functions:

Semi-automatic zero-setting range: 4% of Max.

Automatic zero-tracking range: 4% of Max.

Initial zero-setting range: 20% of Max.

Zero-setting is only possible when the load receptor is not in motion.

2.2.2 Zero-tracking

The weight transmitter is equipped with a zero-tracking feature, which operates over a range of 4% of Max and only when the transmitter is at zero and the weight is stable.

2.2.3 Operator information messages

The weight transmitter has a number of general and diagnostic messages, which are described in detail in the user's guide.

2.2.4 Software version

The software version is displayed during the start-up of the transmitter.

The version format is xx.yy.zz, where xx is the legal version no., while yy and zz are major and minor version numbers for changes and corrections not influencing the legal function of the software. The approved software version is 1.yy.zz.

The tested software versions are 1.09.15 and 1.02.00.

3. Technical data

The following technical data apply for automatic gravimetric filling instruments based on the TLB.. weight transmitter:

3.1 TLB.. based automatic gravimetric filling instrument

Reference class:	0.2
Accuracy class:	0.2 or 0.5 or 1 or 2
Maximum capacity (Max):	$= n \times d$
Minimum capacity (Min):	= Minfill
Minimum filling (MinFill):	See tables below
Verification scale interval (d):	$\geq 0.1 \text{ g}$
Minimum input voltage per verification scale interval:	$0.2 \mu\text{V}$
Weighing range:	Single-interval, multi-range or multi-interval
Number of verification scale intervals:	≤ 10000 for $d = 0.2 \mu\text{V}$ ≤ 3000 for $d = 1.0 \mu\text{V}$
Number of loads per fill:	1
Maximum tare effect:	$\leq 100 \%$ of Max
Temperature range:	-10° to 40° C

Weighing mode: static
 Electromagnetic class: E2
 Humidity: Non-condensing
 Extra warm-up time: 41 min for $d = 0.2 \mu V$
 18 min for $d = 1.0 \mu V$
 Maximum time between automatic zero-setting: 103 minutes

Minimum filling's (MinFill) dependency of verification scale interval (d) and accuracy class X(x) for a verification scale interval of $0.2 \mu V$.

d [g]	Accuracy class							
	X(0.2)		X(0.5)		X(1)		X(2)	
	d	[kg]	d	[kg]	d	[kg]	d	[kg]
0.1	67	0.0067	27	0.0027	14	0.0014	7	0.0007
0.2	67	0.0134	27	0.0054	14	0.0028	7	0.0014
0.5	67	0.0335	27	0.0135	14	0.0070	7	0.0035
1	133	0.133	27	0.027	14	0.014	7	0.007
2	200	0.400	54	0.108	14	0.028	7	0.014
5	399	1.995	80	0.400	27	0.135	7	0.035
10	399	3.99	160	1.60	40	0.40	14	0.14
20	399	7.89	160	3.20	80	1.60	20	0.40
50	599	29.95	160	8.00	80	4.00	40	2.00
100	599	59.9	240	24.0	80	8.0	40	4.0
200	599	119.8	240	48.0	120	24.0	40	8.0
≥ 500	599		240		120		60	

Minimum filling's (MinFill) dependency of verification scale interval (d) and accuracy class X(x) for a verification scale interval of $1.0 \mu V$.

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	0.0280	22	0.0110	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	0.110	6	0.030
10	333	3.33	133	1.33	33	0.33	11	0.11
20	333	6.66	133	2.66	67	1.34	17	0.34
50	500	25.00	133	6.65	67	3.35	33	1.65
100	500	50.0	200	20.0	67	6.7	33	3.3
200	500	100.0	200	40.0	100	20.0	33	6.6
≥ 500	500		200		100		50	

3.2 Weight transmitter

The weight transmitter has the following characteristics:

Type:	TLB..
Accuracy class:	III
Weighing range	Single-interval, multi-range or multi-interval (2 or 3)
Maximum number of verification scale intervals (n)	10000
Minimum input voltage per VSI	0.2 μ V
Maximum capacity of interval or range (Max_i):	$n_i \times e_i$
Verification scale interval, $e_i =$	Max_i/n_i
Initial zero-setting range:	$\pm 10\%$ of Max
Maximum tare effect:	100 % of Max
Fractional factor (ρ_i)	0.5
Excitation voltage	5 VDC
Circuit for remote sense	Active, (see below)
Minimum input impedance	43 ohm
Maximum input impedance	1200 ohm
Connecting cable to load cell(s):	See Section 3.1.1
Supply voltage:	12 - 24 VDC, or 230 VAC
Operating temperature range:	-10° C to +40° C
Peripheral interface:	Set out in section 4

3.2.1 Connecting cable between the Weight transmitter and a junction box for load cell(s), if any

3.2.1.1 4-wire system

Line	4 wires, shielded
Maximum length	The certified length of the load cell cable, which shall be connected directly to the Weight transmitter.

3.2.1.2 6-wire system

Line	6 wires, shielded
Maximum length	1315 m/mm ²
Maximum resistance per wire	22.2 ohm

3.3 Load cells

The TLB.. weighing transmitter may only be used with load cell(s) that fulfil the following general acceptance of load cells.

3.3.1 General acceptance of load cells

Any load cell(s) may be used for instruments under this certificate of type approval provided the following conditions are met:

- 1) A test certificate (EN 45501) or a respective OIML Certificate of Conformity (R60) is issued for the load cell by a Notified Body responsible for type examination under the Directive 2009/23/EC.
- 2) The certificate contains the load cell types and the necessary load cell data required for the manufacturer's declaration of compatibility of modules (WELMEC 2, Issue 5, 2009), and any particular installation requirements. A load cell marked NH is allowed only if humidity testing to EN 45501 has been conducted on this load cell.
- 3) The compatibility of load cells and Weight transmitter is established by the manufacturer by means of the compatibility of modules form, contained in the above WELMEC 2 document, or the like, at the time of EC verification or declaration of EC conformity of type.
- 4) The load transmission must conform to one of the examples shown in the WELMEC 2.4 Guide for load cells.

3.4 Load receptors

The TLB.. weighing Weight transmitter may only be used with a load receptor that has a load transmission device in accordance with the standard solutions shown in WELMEC Guide 2.4:2001.

3.5 Composition of modules

Composition of modules to an automatic gravimetric filling instrument using TLB.. shall satisfy WELMEC 2 (Issue 5) 2009, paragraph 11.

4. Interfaces and peripheral equipment

4.1 Interfaces

The weight transmitter is equipped with one or more of the following protective interfaces:

- RS485, Profibus, DeviceNet and CANopen
- Ethernet TCP/IP, Ethernet/IP, Modbus/TCP, Profinet IO, EtherCAT, POWERLINK, and SERCOSIII
- CC-Link
- USB
- Digital output
- Digital input
- Analogue output

The interfaces are characterised “Protective interfaces” according to Section 8.1 in the Directive 2004/22/EC annex I and do not have to be secured.

5. Approval conditions

5.1 Compatibility of modules

In case of composition of modules, WELMEC 2 (Issue 5) 2009, paragraph 11 shall be satisfied.

6. Special conditions for verification

6.1 Composition of modules

The environmental conditions should be taken into consideration by the composition of modules for a complete weighing instrument, for example instruments with load receptors placed outdoors and having no special protection against the weather.

The composition of modules shall agree with Section 5.1.

An example of a declaration of conformity document is shown in Section 10.

7. Securing and sealing of TLB.. transmitter

7.1 Securing and sealing

Seals shall bear the verification mark of a notified body or alternative mark of the manufacturer according to ANNEX F & D of the Directive 2004/22/EC.

7.1.1 Transmitter

Access to the configuration and calibration facility requires that a calibration jumper is installed on the main board, or that the operator types first a password and the key looked up on a special key card delivered by the manufacturer.

The Weight transmitters have also an event counter, which increments each time the configuration is changed.

Sealing of the cover of the enclosure - to prevent access to the calibration jumper and to secure the electronics against dismantling/adjustment - is accomplished with brittle plastic stickers. The sticker is placed so access to opening the enclosure is prohibited.

7.1.2 Weight transmitter - load cell connector - load receptor

Securing of the Weight transmitter, load receptor, and load cell combined is done in one of the following ways:

- Inserting the serial number of the load receptor as part of the principal inscriptions contained on the Weight transmitter identification label.
- The load receptor bears the serial number of the Weight transmitter on its data plate.

7.1.3 Junction box for load cells

A junction box for load cells shall be sealed against opening with wire and seal or brittle plastic sticker(s).

8. Tests performed

Tests carried out by DELTA for this evaluation certificate on Laumas Elettrica's weight transmitter.

Test
Temperature effect on sensitivity with minimum weighing range and input impedance of 43 / 350 Ohm (20, 40, -10, 5 and 20 °C)
Temperature effect on no-load indication with minimum weighing range and input impedance of 43 Ohm (20, 40, -10, 5 and 20 °C)
Damp heat, steady state
Repeatability
Warm-up time
Span stability
Cable length between the Weight transmitter and junction box
Stability of equilibrium
EMC immunity tests are performed with a load cell of 350 Ohm
Voltage variations (OIML D11:2004, severity level 3)
Electrical bursts (OIML D11:2004, severity level 3)
Surge (OIML D11:2004, severity level 3)
Electrostatic discharge (OIML D11:2004, severity level 3)
Radiated electromagnetic fields (OIML D11:2004, severity level 3)
Conducted electromagnetic fields (OIML D11:2004, severity level 3)
WELMEC Guide 2.8 re-examination to OIML R61:2004

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

9. Documentation

Contents of the technical documentation held by the notified body in technical file T201644: