EU Type Examination Certificate

No. DK 0199.604

ECI Hopper Scale

DISCONTINUOUS TOTALIZING AUTOMATIC WEIGHING INSTRUMENT

Issued by   **DELTA Danish Electronics, Light & Acoustics**
EU - Notified Body No. 0199

In accordance with the requirements in Directive 2014/32/EU of the European Parliament and Council of February 26, 2014 on Measuring Instruments (MID).

Issued to   ESiT Elektronik Sistemler Imalat ve Ticaret Ltd. Sti.
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In respect of   A discontinuous totalizing automatic weighing instrument designated ECI Hopper Scale with variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class: 0.2, 0.5, 1 or 2
Maximum capacity: $10 \text{ kg} \leq \text{Max} \leq 10000 \text{ kg}$
Verification scale interval: $d_t \geq 5 \text{ g}$
Number of verification scale intervals: $n \leq 6000$
(however, dependent on environment and the composition of the modules)
Variants of modules and conditions for the composition of the modules are set out in the annex.

The conformity with the essential requirements in Directive 2014/32/EC Annex 1 and the specific requirements in Annex XIII, chapter I & IV are met by the application of OIML R107-1:2007, OIML D11:2004 section 12 & 13 applying severity level 3, WELMEC Guide 7.2, and WELMEC Guide 8.16-3:2006.

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

The annex comprises 12 pages.

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Descriptive annex

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1. Name and type of instrument and modules

The automatic weighing instrument designated ECI Hopper Scale is an automatic discontinuously to-talizing weighing instrument consisting of an electronic weighing indicator connected to a separate load receptor and peripheral equipment such as printers or other devices, as appropriate.

The instrument is a self-indicating discontinuous totalizing automatic weighing instrument with sin-gle-interval.

The modules appear from Sections 3.2, 3.3, and 3.4; the principle of the composition of the modules is set out in Sections 6.1 and 10.

2. Description of the construction and function

2.1 Construction

2.1.1 ECI weighing indicator

The weighing controller of the ECI Hopper Scale automatic discontinuously totalizing weighing in-strument is Esit's indicator type ECI.

The indicator consists of analogue to digital conversion, microprocessor control circuitry, power sup-ply, keyboard, non-volatile memory for storage of calibration and weight data, option boards and a weight display contained within a single plastic enclosure intended for panel mount.

The module is specified in Section 3.2.

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 main functions are described below.

2.2.1 Functions and devices

The automatic weighing instrument has the following permitted functions and devices that are subject to the Measuring Instrument Directive:

- Power up test

- Initial zero setting device (max. 20 % of Max)

- Semiautomatic zero setting device (max 4 % of Max)

- Zero tracking device (max 4 % of Max)

- Automatic zero setting device (max 4 % of Max)

- No motion detection and indication

  - Tare weighing mode (full/empty weighing)

- Stop mode (for check and verification purpose)

- Detection of significant fault

2.2.2 Software version

The software version of the ECI weighing controller is displayed at start-up.
The approved software version is 1.4.x.

3. Technical data

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

3.1 Discontinuous totalizing automatic weighing instrument

Type:	ECI Hopper Scale
Accuracy class:	0.2 or 0.5 or 1 or 2
Maximum capacity (Max):	10 kg to 10000 kg
Minimum capacity (Min):	$\geq 20\%$ of Max
Verification scale interval (d_t):	≥ 5 g
Weighing speed:	≤ 10 discharges/min
Weighing range:	Single-interval
Number of Verification Scale Intervals (n):	≤ 6000
Maximum tare effect:	≤ 100 % of Max
Temperature range:	-10° to 40° C
Weighing mode:	static
Electromagnetic class:	E2
Humidity:	Non-condensing
Extra warm-up time:	4 minutes, if d < 1.2 µV

3.2 Weighing controller / indicator

The weighing controller / indicator has the following characteristics:

Type:	ECI
Accuracy class:	III
Weighing range:	Single interval
Maximum number of Verification Scale intervals:	10000
Maximum subtractive tare effect:	-Max,
Fractional factor:	p'i = 0.7
Minimum input voltage per VSI:	1.0 μV
Minimum input voltage:	0.5 mV
Excitation voltage:	10 VDC
Circuit for remote sense:	Active
Minimum input impedance:	87 ohm
Maximum input impedance:	1100 ohm
Operating temperature range:	-10 °C to +40 °C
Mains power supply:	12-24 VDC
Maximum cable length between junction box and ECI:	420 m/mm^2
Peripheral interface:	Set out in Section 4

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

3.2.1.1 4-wire system

Cable between Indicator and load cell(s):	4 wires (no sense), shielded
Cable length:	The certified length of the load cell cable.

3.2.1.2 6-wire system

Cable between Indicator and load cell(s):	6 wires (sense), shielded

Maximum cable length between indicator and junction box (J-box) for load cell(s), if any:

- Option 1: 420 m/mm2

In case the (n) for the weighing instrument is less than (n) mentioned above, the following apply:

- Option 2:

Coefficient of temperature of the span error of the indicator: Es = 0.0005 [% / 25K].
Coefficient of resistance for the wires in the J-box cable: Sx = 0.0049 [% / ohm].

$$L/Amax = 295.86 / Sx * (emp / n - Es) \ [m / mm^2] \ \text{in which} \ emp = p'I * mpe * 100 / e$$

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

3.3 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) An evaluation / part / 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 2014/31/EU.

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 2:2015), 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 indicator 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

3.4.1 Bin, tank, and hopper load receptors

Construction in brief	Load cell assemblies each consisting of a load cell stand assembly to support one of the mounting feet or suspension points of bin, tank or hopper.
Reduction ratio	1
Junction box	Mounted in, on or near the dead load.
Load cell	Any R60 certified load cell according to Section 3.2.1.
Drawings	Various

3.5 Feeding

The feeding system is gravity feeding. The feeding system has coarse and fine feeding.

3.6 Composition of modules

In case of composition of modules, EN 45501:2015 annex F shall be satisfied.

3.7 Documents

The documents filed at DELTA (reference No. T209555) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

4.1 Interfaces

The ECI controller may be equipped with one or more of the following protective interfaces located on the main board or on separate interface boards.

- RS-232C
- RS-485 / RS-422
- USB
- Modbus (optional)
- Profibus (optional)
- Ethernet IP (optional)
- Analogue Output (optional)
- Digital I/O (optional)

The interfaces do not have to be secured.

4.2 Peripheral equipment

Connection between the controller and peripheral equipment shall be done by screened cables.

The instrument may be connected to any simple peripheral device with a CE mark of conformity.

5. Approval conditions

5.1 Zero drift correction

The instrument can be configured for automatic zero drift correction. The function is disabled when the SETUP menu shows "drift 0". When the function is disabled and the indicator is secured (see section 7.1.1) the function cannot be enabled.

This zero drift function is not covered by this type approval.

5.2 Compatibility of modules

In case of composition of modules, EN 45501:2015 annex F 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 5.2.

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

The calculation program is obtainable by downloading at www.delta.dk/weighing.

7. Securing and location of seals and verification marks

7.1 Securing and sealing

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

7.1.1 Weighing controller

Access to the configuration and calibration facilities is achieved by sealing the access to calibration switch with a sticker.

Sealing of the enclosure - to secure the electronics against dismantling/adjustment - is accomplished with a brittle plastic sticker across the assembly of the enclosure.

7.1.2 Weighing controller - load cell connector - load receptor

Securing of the load cell connector with the weighing controller is done by means of a brittle sticker.

7.1.3 Junction box for load cells

The junction box, if any, is sealed by means of brittle stickers or lead seals.

7.1.4 Peripheral interfaces

All peripheral interfaces are "protective"; they neither allow manipulation with weighing data or Legal Setup, nor change of the performance of the weighing instrument in any way, which would alter the legality of the weighing.

7.2 Verification marks

A metrological M-sticker and a sticker with verification mark are to be placed on the identification plate of the instrument.

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 display module.

8.1.1 CE mark

The CE mark of conformity and the supplementary metrological marking according to Directive 2014/32/EU shall be located on the identification plate.

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

- Accuracy class

- Max, Min and d_t (these shall additional be duplicated near the display unless the identification plate is located near the display)

- Temperature range: -10 °C / +40 °C

- Electromagnetic class: E2

- Humidity: Non-condensing

- Maximum weighing speed

- Type examination certificate number

9. Pictures

Figure 1. ECI Hopper Scale control with panel mounted ECI controller.

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RPRELOAD HOPPER

PRELOAD HOPPER

LOAD CELL

WEIGHING RECEPTOR

ECI

DESCRIPTION

MODEL:HS

ESİT ® LTD.

R00

www.esitscale.com

Figure 2. ECI Hopper Scale

Hologram Seal
(Case)

Hologram Seal
(Calibration Switch Hole)

Loadcell Connector
Screw

ECI CASE

Hologram Seal
(Loadcell Connector)

Loadcell Connector
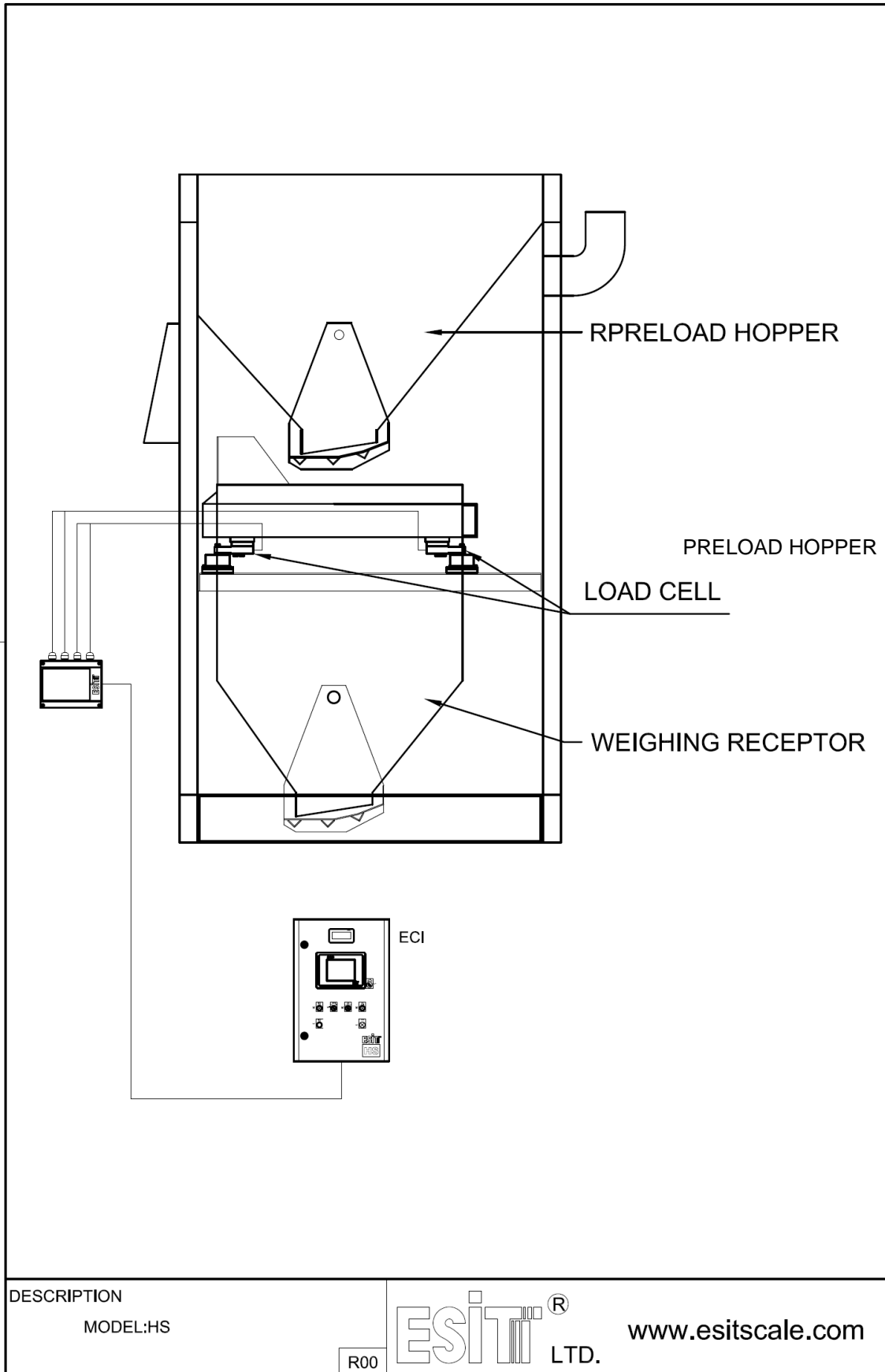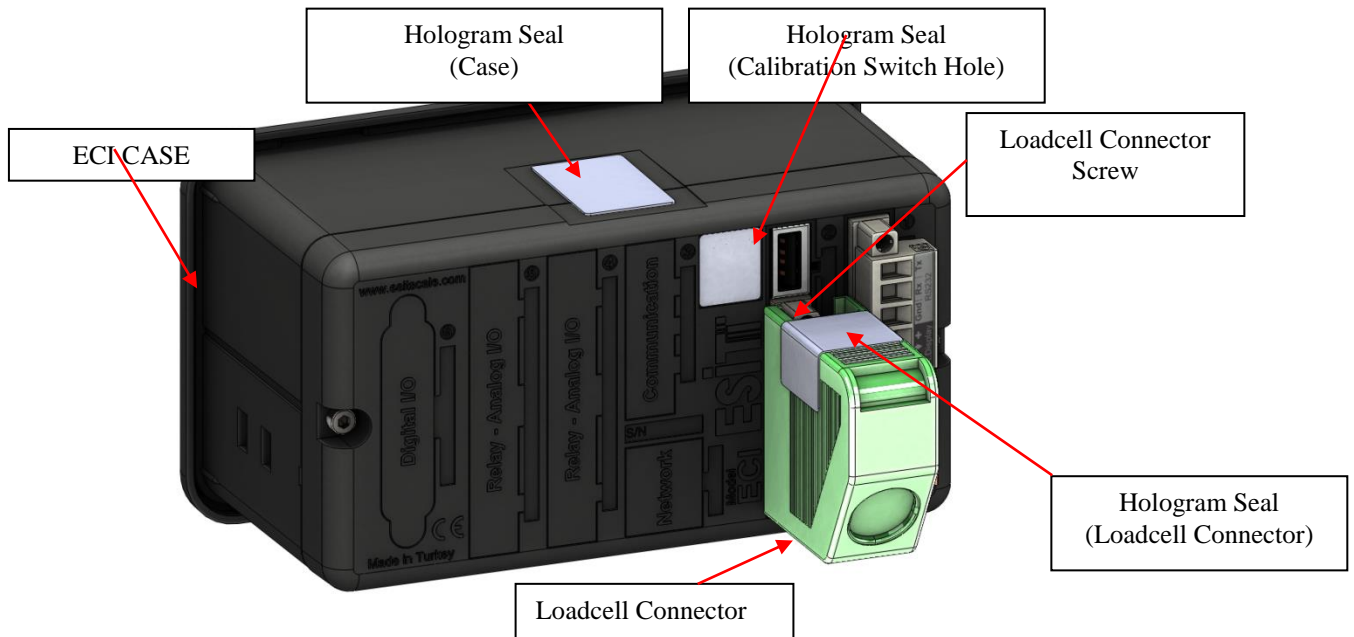
Figure 3 Sealing of ECI.

10. Composition of modules – an example

COMPATIBILITY OF MODULES
Ref.: WELMEC 2
Non-Automatic Weighing Instrument, single-interval
Certificate of EU Type-Approval N°:   TAC: | DK0199.604

INDICATOR   A/D (Module 1)   Type: | ECI

Accuracy class according to EN 45501 and OIML R76:	Class$_{ind}$ (I, II, III or IIII)		III	
Maximum number of verification scale intervals (n$_{max}$):	n$_{ind}$		10000	
Fraction of maximum permissible error (mpe):	p$_1$		0,5	
Load cell excitation voltage:	U$_{exc}$ [Vdc]		10	
Minimum input-voltage per verification scale interval:	Δu_{min} [µV]		1	
Minimum load cell impedance:	R$_{Lmin}$ [Ω]		35	
Coefficient of temperature of the span error:	Es [% / 25°C]			0,0005
Coefficient of resistance for the wires in the J-box cable:	Sx [% / Ω]			0,0048
Specific J-box cable-Length to the junction box for load cells:	(L/A)$_{max}$ [m / mm²]			431
Load cell interface:	6-wire (remote sense)			
Additive tare, if available:	T$^+$ [% of Max]		0	
Initial zero setting range:	IZSR [% of Max]	-10	/	10
Temperature range:	T$_{min}$/ T$_{max}$ [°C]	-10	/	40
Test report (TR), Test Certificate (TC) or OIML Certificate of Conformity:				

LOAD RECEPTOR   (Module 2)   Type: |

Construction:	Hopper		
Fraction of mpe:	p$_2$		0,5
Number of load cells:	N		3
Reduction ratio of the load transmitting device:	R=F$_M$/ F$_L$		1
Dead load of load receptor:	DL [% of Max]		70
Non uniform distribution of the load:	NUD [% of Max]		20
Correction factor:	Q = 1 + (DL + T$^+$ + IZSR$^+$ + NUD) / 100		2

LOAD CELL   ANALOG (Module 3)   Type: | Esit BB

Accuracy class according to OIML R60:	Class$_{LC}$ (A, B, C or D)		C
Maximum number of load cell intervals:	n$_{LC}$		3000
Fraction of mpe:	p$_3$		0,7
Rated output (sensitivity):	C [mV / V]		2
Input resistance of single load cell:	R$_{LC}$ [Ω]		350
Minimum load cell verification interval: (v$_{min\%}$ = 100 / Y)	v$_{min\%}$ [% of Emax]		0,005
Rated capacity:	E$_{max}$ [kg]		100
Minimum dead load, relative: (E$_{min}$ / E$_{max}$) * 100	[%]		0
Temperature range:	T$_{min}$/ T$_{max}$ [°C]	-10	/ 40
Test report (TR) or Test Certificate (TC/OIML) as appropriate:			

COMPLETE WEIGHING INSTRUMENT   **Single-interval**

Manufacturer: | ESIT   Type: | ECI Hopper Scale

Accuracy class according to EN 45501 and OIML R76:	Class$_{WI}$ (I, II, III or IIII)		III
Fractions: p$_i$ = p$_1$² + p$_2$² + p$_3$²:	p$_i$		1,0
Maximum capacity:	Max [kg]		60
Number of verification scale intervals:	n		3000
Verification scale interval:	e [kg]		0,02
Utilisation ratio of the load cell:	α = (Max / E$_{max}$) * (R / N)		0,20
Input voltage (from the load cells):	Δ_u = C * U$_{exc}$ * α * 1000 / n [µV/e]		1,33
Cross-section of each wire in the J-box cable:	A [mm²]		0,22
J-box cable-Length:	L [m]		10
Temperature range to be marked on the instrument: Not required	T$_{min}$/ T$_{max}$ [°C]		
Peripheral Equipment subject to legal control:			

Acceptance criteria for compatibility				Passed, provided no result below is < 0	
Class$_{WI}$	<=	Class$_{ind}$ & Class$_{LC}$ (WELMEC 2: 1)		Class$_{WI}$:	**PASSED**
pi	<=	1 (R76: 3.5.4.1)		1 - pi =	0,0
n	<=	n$_{max}$ for the class (R76: 3.2)		n$_{max}$ for the class - n =	7000
n	<=	n$_{ind}$ (WELMEC 2: 4)		n$_{ind}$ - n =	7000
n	<=	n$_{LC}$ (R76: 4.12.2)		n$_{LC}$ - n =	0
E$_{min}$	<=	DL * R / N (WELMEC 2: 6d)		(DL * R / N) - E$_{min}$ =	14
v$_{min}$ • √N / R	<=	e (R76: 4.12.3)		e - (v$_{min}$ * √N / R) =	0,011
or (if v$_{min}$ is not given)				Alternative solutions:	↑ ↓
(E$_{max}$ / n$_{LC}$) • (√N / R)	<=	e (WELMEC 2: 7)		e - ((E$_{max}$ / n$_{LC}$) * (√N/ R)) =	
Δu_{min}	<=	Δu (WELMEC 2: 8)		Δu − Δu_{min} =	0,33
R$_{Lmin}$	<=	R$_{LC}$ / N (WELMEC 2: 9)		(R$_{LC}$ / N) - R$_{Lmin}$ =	82
L / A	<=	(L / A)$_{max}$^{WI} (WELMEC 2: 10)		(L / A)$_{max}$^{WI} - (L / A) =	1465
T$_{range}$	<=	T$_{max}$. T$_{min}$ (R76: 3.9.2.2)		(T$_{max}$ - T$_{min}$) - T$_{range}$ =	20
Q * Max * R / N	<=	E$_{max}$ (R76: 4.12.1)		E$_{max}$ - (Q * Max * R / N) =	60,0

Signature and date:

Conclusion . . . . .   **PASSED**
This is an authentic document made from the program:
"Compatibility of NAWI-modules version 3.2".

DELTA