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CERTIFICATE
of
EU TYPE-APPROVAL
No. DK 0199.165 Revision 3

BW / BWS / VW / CW / KW

NON-AUTOMATIC WEIGHING INSTRUMENT

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

In accordance with the requirements for the non-automatic weighing instrument of EC Council Directive 2009/23/EC.

Issued to **Taiwan Scale Mfg. Co., Ltd.**
282, Sec. 3, Hoping W. Road,
Taipei
TAIWAN

In respect of Non-automatic weighing instrument designated BW / BWS / VW / CW / KW with variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class III and IIII
Maximum capacity, Max: From 1 kg up to 199 950 kg
Verification scale interval: e = Max / n
Maximum number of verification scale intervals: $n \leq 6000$ for single-interval and $n \leq 2 \times 3000$ for multi-interval (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 annex 1 of the Directive is met by the application of the European Standard EN 45501:1992/AC:1993 and WELMEC 2.1:2001.

Note: This certificate is a revised edition which replaces previous revisions.

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

The annex comprises 17 pages.

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Signatory: J. Hovgård

DELTA
Danish Electronics,
Light & Acoustics

Venlighedsvej 4
2970 Hørsholm
Denmark

Tel. (+45) 72 19 40 00
Fax (+45) 72 19 40 01
www.delta.dk
VAT No. DK 12275110

Descriptive annex

Contents

1. Name and type of instrument and modules

The weighing instrument is designated BW / BWS / VW / CW / KW. It is a system of modules consisting of an electronic indicator, connected to a separate load receptor and peripheral equipment such as printers or other devices, as appropriate. The instrument is a Class III or IIII, self-indicating weighing instrument with single-interval or multi-interval, an external AC mains adapter, and an internal rechargeable battery (optional).

The indicators 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.

The modules appear from the sections 3.1, 3.2.1 and 3.2.2; the principle of the composition of the modules is set out in the sections 6.1 and 10.

2. Description of the construction and function

2.1 Construction

2.1.1 Indicator

The indicator is specified in section 3.1.

Enclosures and keyboard

The indicators are housed in an enclosure made of either ABS plastic (model BW / VW / CW / KW) or stainless steel (Model BWS).

The front panels of the indicator comprise:

- An LCD display with appropriate state indicators and 5½ digits (model BW / BWS / VW / CW) or 6 digits (model KW).
- A keyboard containing 6 keys used to enter commands or data into the weight indicator, plus a key for turning the indicator on/off. Each key is identified with a name and/or pictograph.

Electronics

The instruments use a single printed circuit board, which contains all of the instrument circuitry. The metrological circuitry for the models of weight indicator is identical.

All instrument calibration and metrological setup data are contained in non-volatile memory.
The power supply accepts an input voltage of 9 VDC from the external power adapter, with input from 230 VAC 50 Hz. The indicator produces a load cell excitation voltage of 5 VDC.

2.1.2 Load receptors, load cells and load receptor supports

Set out in section 3.2.

2.1.3 Interfaces and peripheral equipment

Set out in section 4.

2.2 Functions

The weight indicating instruments are microcontroller based electronic weight indicators that require the external connection of strain gauge load cell(s). The weight information appears in the digital dis-

play located on the front panel and may be transmitted to peripheral equipment for recording, processing or display.

The primary functions provided are detailed below.

2.2.1 Display range

The weight indicators will display weight from –Max to Max (gross weight) within the limits of the display capacity.

2.2.2 Zero-setting

Pressing the "ZERO" key causes a new zero reference to be established and ZERO annunciator to turn on indicating the display is at the centre of zero.

Semi-automatic zero-setting range: ±2% of Max.
Automatic zero-tracking range: ±2% of Max.
Initial zero-setting range: ±10% of Max.

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

2.2.3 Zero-tracking

The indicators are equipped with a zero-tracking feature which operates over a range of 4% of Max and only when the indicator is at gross zero and there is no motion in the weight display.

2.2.4 Tare

The instrument models are provided with a semi-automatic subtractive tare feature activated using the "TARE" key.

When the tare function is active the "G/N" key will toggle the display between showing Net and Gross value.

2.2.5 Printing

A printer may be connected to the optional serial data port. The weight indicator will transmit the current to the printer when the "PRINT" key is pressed.

The printing will not take place if the load receptor is not stable, if the gross weight is less than zero, or if the weight exceeds Max.

2.2.6 Weighing unstable samples

The indicator has a function for weighing unstable samples. It is turned on/off by pressing the "ZERO" and "TARE" keys simultaneously.

2.2.7 Display test

A self-test routine is initiated by pressing the on/off key to turn the instrument off, then pressing it again to turn the instrument on. The test routine turns on and off all of the display segments and light indicators to verify that the display is fully functional.

2.2.8 Real time clock

If it is available in the instrument, the real time clock can be activated to get printout with day and time information.

2.2.9 Operator information messages

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

2.2.10 Software version

The software revision level is displayed during the power-up sequence of the instrument.

The approved software version is 1.07 for BW, BWS, VW and CW indicators, while KW indicator has software version 1.02.

2.2.11 Totalisation

The indicator can be configured with a totalisation function, adding actual weight display values to the memory when pressing "M+" key if the equilibrium is stable.

Pressing "MR" key displays the total accumulated weight.

Pressing "M+" and "MR" key will clear the totalised value.

2.2.12 Battery operation

The indicator can be operated from an internal rechargeable battery, if this option is installed.

3. Technical data

The BW / BWS / VW / CW / KW weighing instruments are composed of separate modules, which are set out as follows:

3.1 Indicator

The indicators have the following characteristics:

Type:	BW / BWS / VW / CW / KW
Accuracy class:	III and IIII
Weighing range:	Single-interval or multi-interval (2 partial intervals)
Maximum number of Verification Scale Intervals:	≤ 6000 (class III), ≤ 1000 (class IIII) for single-interval ≤ 3000 (class III), ≤ 1000 (class IIII) for multi-interval
Maximum tare effect:	-Max within display limits
Fractional factor:	p'i = 0.5
Minimum input voltage per VSI:	1 µV
Excitation voltage:	5 VDC
Circuit for remote sense:	present on the model with 7-terminal connector
Minimum input impedance:	87 ohm
Maximum input impedance:	1600 ohm
Mains power supply:	9 VDC / 230 VAC, 50 Hz using external adapter
Operational temperature:	-10 °C to +40 °C
Peripheral interface:	Set out in section 4

3.1.1 Connecting cable between the indicator and load cell / junction box for load cell(s)

3.1.1.1 4-wire system

Cable between indicator and load cell(s): 4 wires (no sense), shielded

Maximum length:	the certified length of the load cell cable, which shall be connected directly to the indicator.

3.1.1.2 6-wire system

Only to be used for indicator model with a 7-terminal connector for load cell.

Cable between indicator and junction box:	6 wires, shielded
Maximum length:	227 m / mm²

3.2 Load receptors, load cells and load receptor supports

Removable platforms shall be equipped with level indicators.

3.2.1 General acceptance of modules

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 OIML Certificate of Conformity (R60) respectively 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 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.

3.2.2 Platforms, weigh bridge platforms

Construction in brief	All-steel or steel-reinforced concrete construction, surface or pit mounted
Reduction ratio	1
Junction box	Mounted in or on the platform
Load cells	Load cell according to section 3.2.1
Drawings	Various

3.2.3 Bin, tank, hopper and non-standard systems

Construction in brief	Load cell assemblies each consisting of a load cell stand assembly to support one of the mounting feet bin, tank or hopper
Reduction ratio	1
Junction box	Mounted on dead structure
Load cell	Load cell according to section 3.2.1
Drawings	Various

3.3 Composition of modules

In case of composition of modules, EN 45501 paragraph 3.5 and 4.12 shall be satisfied.

4. Interfaces and peripheral equipment

4.1 Interfaces

The interfaces are characterised “Protective interfaces” according to paragraph 8.4 in the Directive.

4.1.1 Load cell input

A 5-terminal connector or 7-terminal connector for the load cell is positioned on the back of the enclosure.

4.1.2 Other interfaces

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

- RS-232C
- Analogue output (0 - 10V / 4 - 20 mA)
- Digital output
- Blue tooth

The interfaces do not have to be secured.

4.2 Peripheral equipment

Connection between the indicator and peripheral equipment is allowed by screened cable.

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

5. Approval conditions

5.1 Measurement functions other than non-automatic functions

Measurement functions that will enable the use of the instrument as an automatic weighing instrument are not covered by this type approval.

5.2 Counting operation is not approved for NAWI

The count shown as result of the counting function is not covered by this NAWI approval.

5.3 Totalised weight is not a legal value.

When using the totalisation function creating a sum of several weighing results, this sum is only informative, as it is not a legal value.

5.4 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 5.4.

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

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, section 2.3 of the Directive 2009/23/EC.

7.1.1 Indicator

Access to the configuration and calibration facility requires that a calibration jumper is installed on the main board.

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 a brittle plastic sticker. The sticker is placed so access to one of the screws of the enclose is prohibited (see figure 2).

7.1.2 Indicator - load cell connector - load receptor

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

- Sealing of the load cell connector with the indicator by a lead wire seal
- Inserting the serial number of the load receptor as part of the principal inscriptions contained on the indicator identification label
- The load receptor bears the serial number of the indicator on its data plate.

7.1.3 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 that would alter the legality of the weighing.

7.2 Verification marks

7.2.1 Indicator

A green M-sticker shall be placed next to the CE mark on the inscription plate.

The sticker with verification marks may be placed on or next to the inscription plate or on the front of the indicator.

7.2.2 Printers used for legal transactions

Printers covered by this type approval and other printers according to section 4.2, which have been subject to the conformity assessment procedure, shall not bear a separate green M-sticker in order to be used for legal transactions.

8. Location of CE mark of conformity and inscriptions

8.1 Indicator

8.1.1 CE mark

A sticker with the CE mark of conformity and year of production is located on the identification plate which is located on the enclosure of the weight indicator.

8.1.2 Inscriptions

Manufacturer’s trademark and/or name and the type designation is located on the front panel overlay.

On the front panel of the weight indicator:

- Manufacturer’s name and/or logo

Indelibly printed on a brittle plastic sticker located on the front panel overlay:

- Max, Min, e =, accuracy class

On the inscription plate:

- Model no., serial no., type-approval certificate no., accuracy class, temperature range, electrical data and other inscriptions.

8.1.2.1 Load receptors

On a data plate:

- Manufacturer's name, type, serial number, capacity

Left to the manufacturer choice as provided in section 7.1.2:

- Serial no. of the indicator

9. Pictures

Figure 1 BW indicator.

Figure 2 BWS indicator.

Figure 3 VW indicator.

Figure 4 CW indicator.

Figure 5 KW indicator.

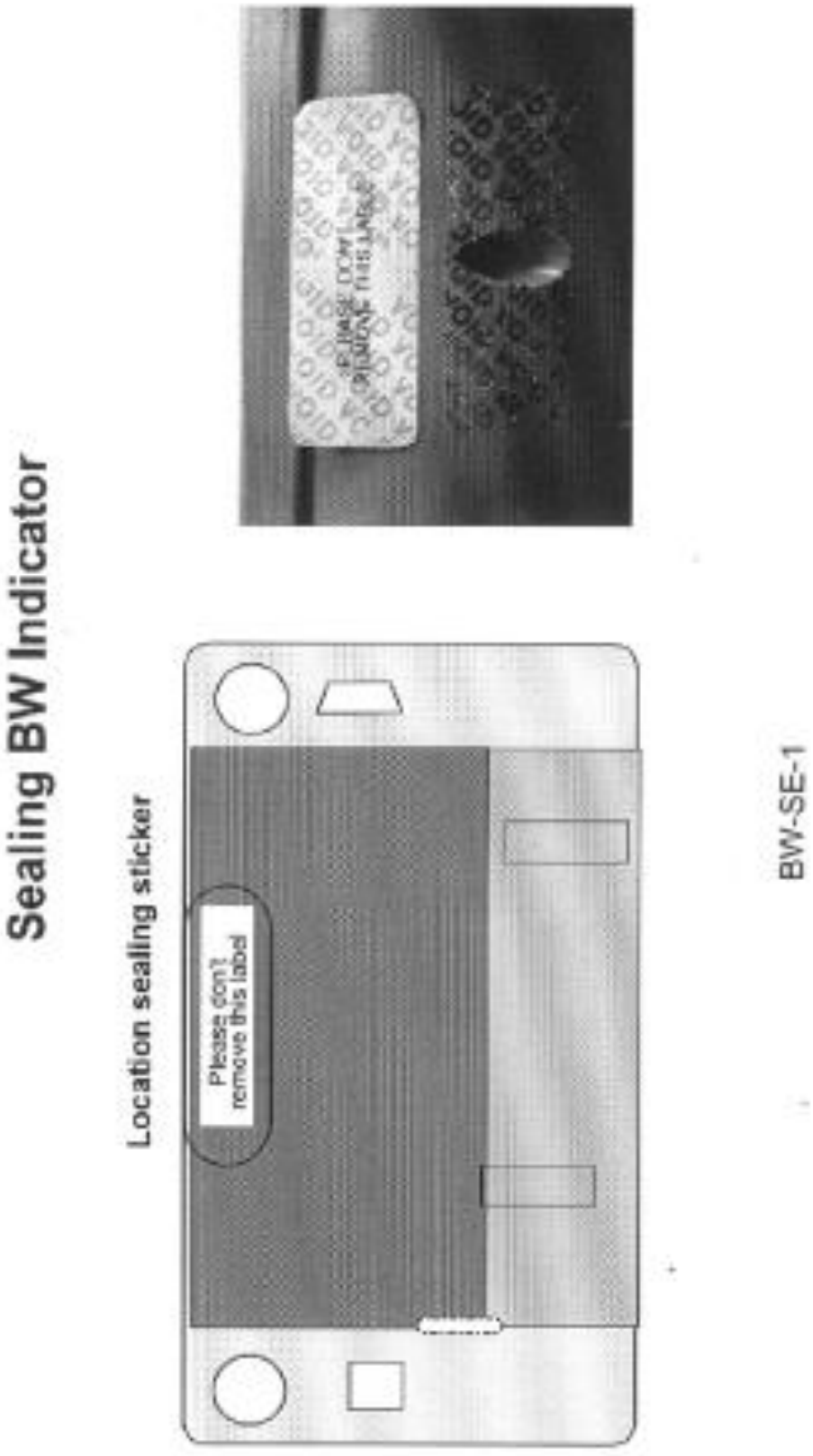


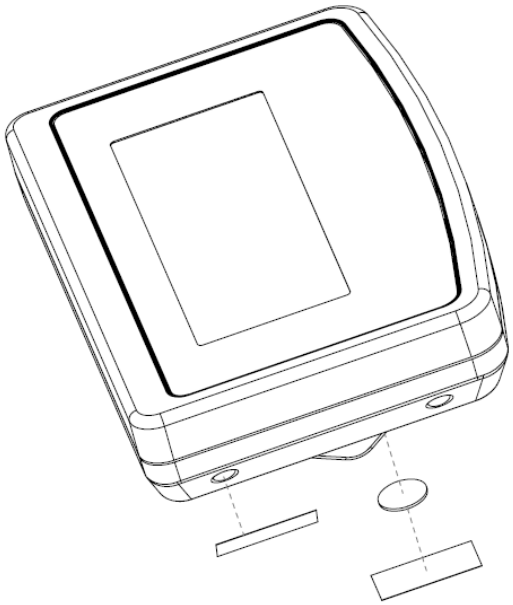
Figure 6 Sealing of BW.

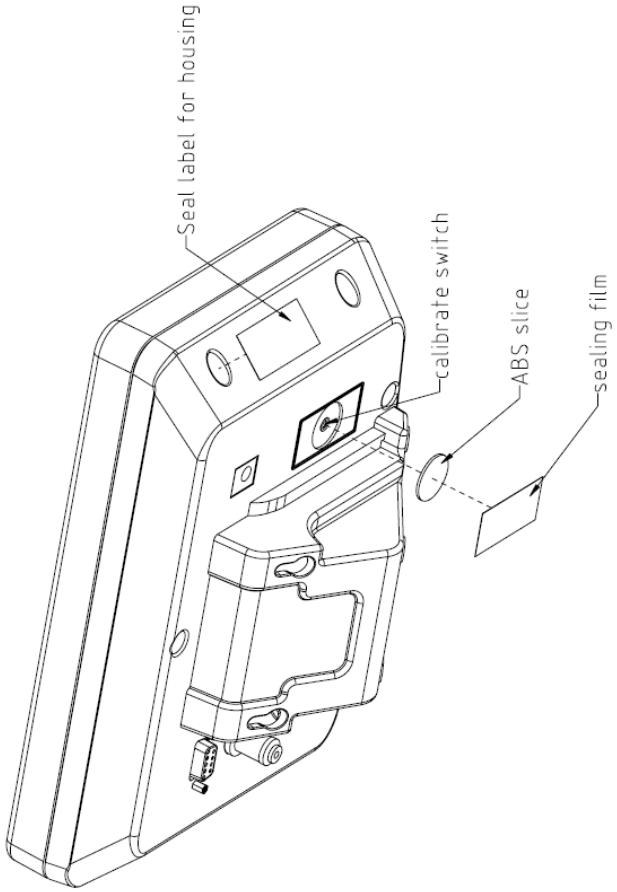
Sealing BWS Indicator

BWS-SE-1

(after remove the label, you will find "VOID" on housing)

Figure 7 Sealing of BWS.





After calibration, assemble the seal cover (ABS) on the hole, then fix the seal film (self destroyed type), if you want to enter the calibration mode, the calibration switch must be pressed, so the sealing must be destroyed.

Figure 8 Sealing of VW.

Figure 9 Sealing of CW.

Figure 10 Sealing of KW.

10. Composition of modules - illustrated

COMPATIBILITY OF MODULES

Ref.: WELMEC 2

Non-Automatic Weighing Instrument, single-interval

Certificate of EU Type-Approval N°: TAC: DK0199.165

INDICATOR A/D (Module 1)		Type:	KW			
Accuracy class according to EN 45501 and OIML R76:		$Class_{ind}$ (I, II, III or IIII)		III		
Maximum number of verification scale intervals (t_{max}):		n_{ind}		6000		
Fraction of maximum permissible error (mpe)		p_1		0,5		
Load cell excitation voltage:		U_{exc}	[Vdc]	5		
Minimum input-voltage per verification scale interval:		Δu_{min}	[µV]	1		
Minimum load cell impedance:		R_{Lmin}	[Ω]	87		
Coefficient of temperature of the span error:		Es	[% / 25°C]			
Coefficient of resistance for the wires in the J-box cable:		Sx	[% / Ω]			
Specific J-box cable-Length to the junction box for load cells		$(L/A)_{max}$	[m / mm²]	227		
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:			Platform			
Fraction of mpe:		p_2		0,5		
Number of load cells:		N		4		
Reduction ratio of the load transmitting device:		$R=F_M / F_L$		1		
Dead load of load receptor		DL	[% of Max]	10		
Non uniform distribution of the load		NUD	[% of Max]	20		
Correction factor:	$Q = 1 + (DL + T^+ + IZSR^+ + NUD) / 100$			1,4		
LOAD CELL ANALOG (Module 3)		Type:	L6E			
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]	406		
Minimum load cell verification interval:	$(v_{min\%} = 100 / Y)$	$v_{min\%}$	[% of Emax]	0,02		
Rated capacity:		E_{max}	[kg]	150		
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			D09-03.21 rev.1			
COMPLETE WEIGHING INSTRUMENT			Single-interval			
Manufacturer:		Type:	KW			
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]	300		
Number of verification scale intervals:		n		3000		
Verification scale interval		e	[kg]	0,1		
Utilisation ratio of the load cell		$\alpha = (Max / E_{max}) * (R / N)$		0,50		
Input voltage (from the load cels):		$\Delta_u = C * U_{exc} * \alpha * 1000 / n$	[µV/e]	1,67		
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 =	3000
n	<=	n_{LC}	(R76: 4.12.2)	n_{LC} - n =	0
E_{min}	<=	DL * R / N	(WELMEC 2: 6d)	(DL * R / N) - E_{min} =	7,5
$v_{min} * \sqrt{N} / R$	<=	e	(R76: 4.12.3)	e - (v_{min} * $\sqrt{N}$ / R) =	0,040
or (if v_{min} is not given)				Alternative solutions ↑ ↓	
$(E_{max} / n_{LC}) * (\sqrt{N} / R)$	<=	e	(WELMEC 2: 7)	e - ((E_{max} / n_{LC}) * ($\sqrt{N}$/ R)) =	
Δu_{min}	<=	Δu	(WELMEC 2: 8)	$\Delta u - \Delta u_{min}$ =	0,67
R_{Lmin}	<=	R_{LC} / N	(WELMEC 2: 9)	(R_{LC} / N) - R_{Lmin} =	15
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)	$(L / A)_{max}^{WI}$ - (L / A) =	182
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) =	45,0

Signature and date:

Conclusion . . . . . PASSED

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