DANAK
PROD Reg. nr 7026

FORCE Certification

EU Type Examination Certificate

No. 0200-NAWI-04921

Matrix PRO / Fox PRO

NON-AUTOMATIC WEIGHING INSTRUMENT

Issued by **FORCE Certification**
EU - Notified Body No. 0200

In accordance with the requirements in Directive 2014/31/EU of the European Parliament and Council.

Issued to **BCI Ingenieria SAS**
CR 88A No. 64D – 90 Bodega 23,
Bogota D.C.
COLOMBIA

In respect of Non-automatic weighing instrument designated Matrix PRO / Fox PRO with variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class: III and IIII
Maximum capacity, Max: From 15 kg up to 3000 kg
Verification scale interval: e = Max / n
Maximum number of verification scale intervals: n = 3000 for single-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 45501:2015 and OIML R76:2006.

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

The annex comprises 16 pages.

Issued on **2018-10-15**
Valid until **2028-10-15**

Jens Hovgård Jensen
2018-10-15

Digitally signed by Jens Hovgård Jensen
jhje@force.dk
Certification Manager

FORCE Certification references:
Task no.: 118-32531.90.10 and ID no.: 0200-NAWI-04921 **Signatory: J. Hovgård Jensen**

Descriptive annex

Contents

1. Name and type of instrument and modules

The weighing instrument is designated Matrix PRO / Fox PRO. 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, a DC power supply, an external AC mains adapter and an internal rechargeable battery (optional).

The name of the instrument may be followed by alphanumeric characters for technical, legal or commercial characterization of the instrument.

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 Sections 3.1 and 3.2; the principle of the composition of the modules is set out in Sections 5.2.

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 enclosures made of ABS plastic or steel.

The front panels of the indicator comprise of:

- A 6 digits, 7-segments LED display with appropriate state indicators.
- A keyboard containing 7 keys used to turn indicator ON, OFF and enter commands or data into the weight indicator. Each key is identified with a name and/or pictograph.

Electronics

The instruments Matrix PRO / Fox PRO uses a single printed circuit board, which contains all of the instrument circuitry.

All instrument calibration and metrological setup data are contained in non-volatile memory. The power supply accepts an input voltage of 7.5 VDC from the external power supply or adaptor with input from 100-240 VAC, 50/60 Hz. The indicator can have an internal rechargeable 6V battery.

Models

Indicator	Platform		Metrology specifications			Load cell		
MODEL	SIZE	MATERIAL	Max	e=	Min	Any certified OIML C3 load cell		
	(mm)		(kg)	(g)	(kg)	No.	Vmin (g)	Emax (kg)
MATRIX PRO, FOX PRO	300*400	CARBON STEEL	250	100	2	1	≤ 100	500
	300*300	CARBON OR STAIN-LESS STEEL	15	5	0,1	1	≤ 5	30
	300*300		30	10	0,2		≤ 10	50
	300*400		30	10	0,2		≤ 10	50
	300*400		60	20	0,4		≤ 20	100
	400*400		30	10	0,2		≤ 10	50
	400*400		60	20	0,4		≤ 20	100
	400*500		60	20	0,4		≤ 20	100
	400*500		150	50	1		≤ 50	200 up to 250
	500*500		60	20	0,4		≤ 20	100
	500*500		150	50	1		≤ 50	200 up to 250
	500*600		150	50	1		≤ 50	200 up to 250
	500*600		300	100	2		≤ 100	500
	600*600		150	50	1		≤ 50	200 up to 250
	600*600		300	100	2		≤ 100	500
	600*600		600	200	4		≤ 200	750 up to 1000
	600*800		300	100	2		≤ 100	750 up to 1000
	600*800		600	200	4		≤ 200	750 up to 1000
	800*800		300	100	2		≤ 100	750 up to 1000
	800*800		600	200	4		≤ 200	750 up to 1000
	1000*1000	CARBON OR STAIN-LESS STEEL	600	200	4	4	≤ 100	200 up to 500
	1000*1000		1500	500	10		≤ 167	500 up to 1000
	1200*1200		1500	500	10		≤ 167	500 up to 1000
	1200*1200		3000	1000	20		≤ 500	1000 up to 2000
	1500*1500		3000	1000	20		≤ 500	1000 up to 2000

Other models are allowed, if they fulfil the requirement in section 5.2.

2.1.2 Load receptors, load cells and load receptor support

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 analogue strain gauge load cell(s). The weight information appears in the digital display located on the front panel and may be transmitted to peripheral equipment for recording, processing or displaying.

The primary functions provided are detailed below.

2.2.1 Power-up

On power-up, the indicator will perform a test for visual check of the display, display the software identification number, and automatically establish the current weight as a new zero reference.

2.2.2 Display range

The weight indicators will display weight from –Max (net weight) to Max+9e (gross weight) within the limits of the display capacity.

2.2.3 Zero setting

Zero-settings are performed within the following ranges,

Initial zero-setting range: ≤ 20 % of Max around the calibrated zero point.
Semi-automatic zero-setting range: ≤ 4 % of Max around the initial zero point.
Automatic zero-tracking range: ≤ 4 % of Max around the initial zero point.

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

2.2.3.1 Semi-automatic zero-setting

Pressing the ZERO key () causes a new zero reference to be established and the ZERO annunciator () to be illuminated, if the no-motion indicator is on.

2.2.3.2 Zero tracking

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

2.2.4 Semi-automatic subtractive tare

Pressing the TARE key () will enter the current weight as a tare weight and turn on the NET indicator, if no tare device is active, equilibrium is stable and the indication is positive and within Max.

Pressing the ”TARE key, while a tare device is active, will deactivate the tare device and turn off the NET indicator.

2.2.5 Manual accumulation

The indicator can manually add the current weight to an accumulated sum pressing the  key.
The accumulated weight is a calculated value and shall be marked as such, if printed.

2.2.6 Manual checkweighing

The indicator has facilities for manual checkweighing.

2.2.7 Extended resolution (×10)

Pressing the  key will display the current weight with ×10 resolution for 5 seconds.

2.2.8 Operator information messages

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

2.2.9 Software version

The approved software version is: Ver21.3

2.2.10 Battery operation

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

3. Technical data

The weighing instruments are composed of separate modules, which are set out as follows:

3.1 Indicator

The Matrix PRO / Fox PRO indicators have the following characteristics:

Type:	Matrix PRO / Fox PRO
Accuracy class:	III and IIII
Weighing range:	Single-interval
Maximum capacity (Max):	15 kg to 3000 kg
Verification scale interval (e_i =):	≥ 5 g
Maximum number of Verification Scale Intervals (n_i):	≤ 3000 (class III), ≤ 1000 (class IIII)
Maximum subtractive 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:	not present
Minimum input impedance:	87 ohm
Maximum input impedance:	1220 ohm
Mains power supply:	7.5 VDC supplied from an external AC/DC adapter Internal rechargeable 6V battery (optional).
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(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 without a junction box.

3.1.1.2 6-wire system

Not present.

3.2 Load receptors, load cells, and load receptor supports

Movable platforms shall be equipped with level indicators or tilt switches.

3.2.1 General acceptance of analogue load cells

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

1) There is a respective Part / Evaluation / Test Certificate (EN 45501) or an OIML Certificate of Conformity (R60:2000) issued for the load cell by a Notified Body responsible for type examination under 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.

3.2.2 Platforms

Construction in brief:	Steel
Reduction ratio:	1
Junction box:	Mounted in or on the platform, if the platform contains more than 1 load cell.
Load cells:	Load cell according to Section 3.2.1
Drawings:	Various

3.3 Composition of modules

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

3.4 Documents

The documents filed at FORCE Technology (reference No. 118-32531) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

4.1 Interfaces

The indicator is equipped with a RS232 interface.

The interface is characterised “Protective interfaces” according to paragraph 8.4 in annex I of the Directive.

4.2 Peripheral equipment

The instrument may be connected to any simple peripheral device with a CE mark of conformity. Connection between the indicator and peripheral equipment shall be done using screened cable.

5. Conditions for certification

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 examination.

5.2 Compatibility of modules

Composition of modules, EN 45501:2015, Annex F shall be satisfied

6. Special conditions for verification

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.

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 or 4 of the Directive 2014/31/EU.

7.1.1 Indicator

Access to the configuration and calibration facility is protected by an adjustment lock on the mainboard.

Sealing of the indicator - to prevent access to the adjustment lock and to secure the electronics against dismantling/adjustment - is accomplished with either wire and seal or using brittle stickers.

7.1.2 Indicator - load cell connector - load receptor

Securing of connection between the indicator and the load receptor / load cell combined is done the following way:

- The load cell connector on the rear of the indicator shall be sealed using brittle stickers or by wire and seal.

In special cases where the place of installation makes it impossible to use the above sealing:

- 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 Junction box

A junction box for load cells – if any – shall be sealed against opening using wire and seal or brittle stickers.

8. Location of CE mark of conformity and inscriptions

8.1 Indicator

8.1.1 CE mark

CE mark and supplementary metrological marking shall be applied to the indicator according to article 16 of Directive 2014/31/EU

8.1.2 Inscriptions

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

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

- Max, Min, e =

On the inscription plate:

- Manufacturer's name and/or logo
- postal address of manufacturer
- model no.
- serial no.
- type examination certificate no.
- Max, Min, e =
- accuracy class
- supply voltage.

In special cases as provided in Section 7.1.2:

- Serial no. of the load receptor

8.1.2.1 Load receptors

On a data plate:

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

In special cases as provided in Section 7.1.2:

- Serial no. of the indicator

9. Pictures

Figure 1 ABS enclosure of Matrix PRO / Fox PRO indicator.

Figure 2 Steel enclosure of Matrix PRO / Fox PRO indicator.

Figure 3 Front layout for Matrix PRO indicator.

Figure 4 Front layout for Fox PRO indicator.

Figure 5 Bench scale.

Figure 6 Health scale with optional height rod.

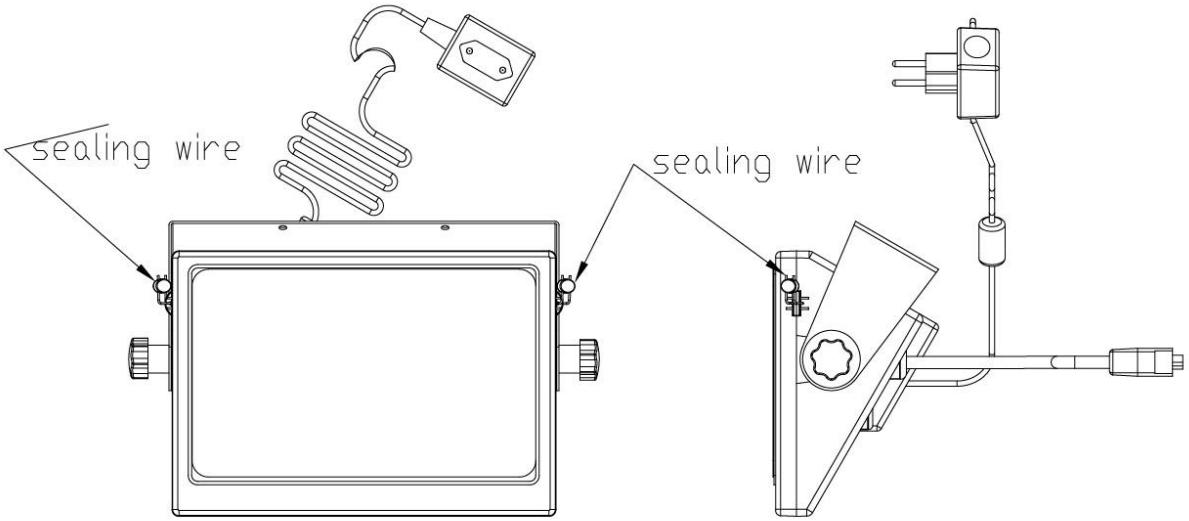

Figure 7 Sealing of steel enclosure with wire and seal.

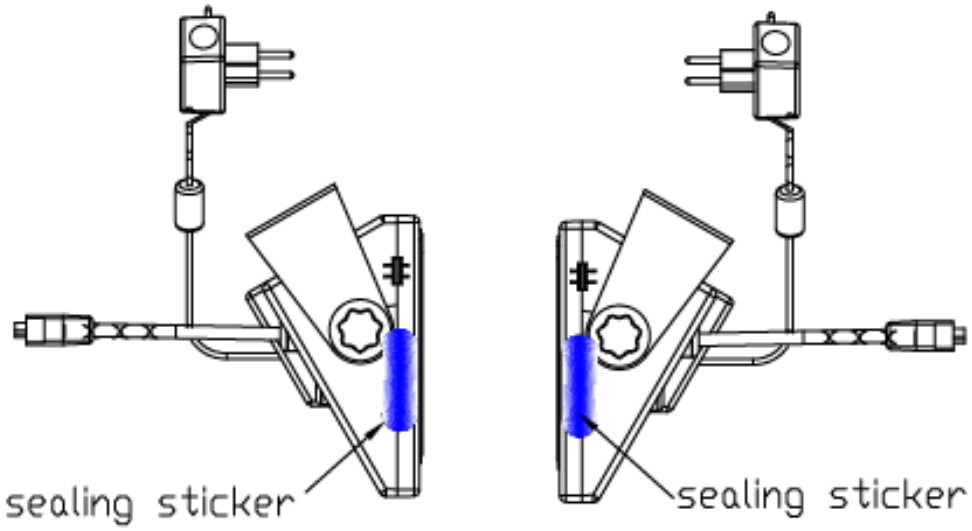

Figure 8 Sealing of steel enclosure with brittle stickers.

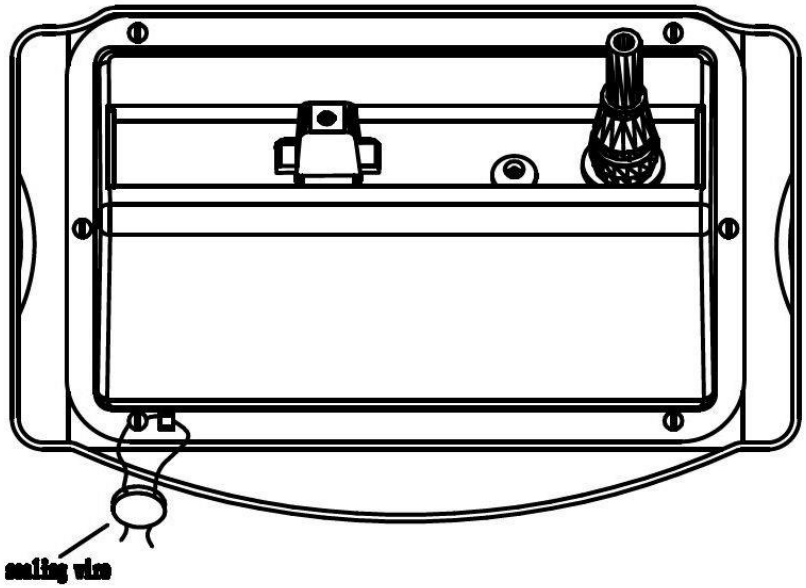

Figure 9 Sealing of ABS enclosure with wire and seal.

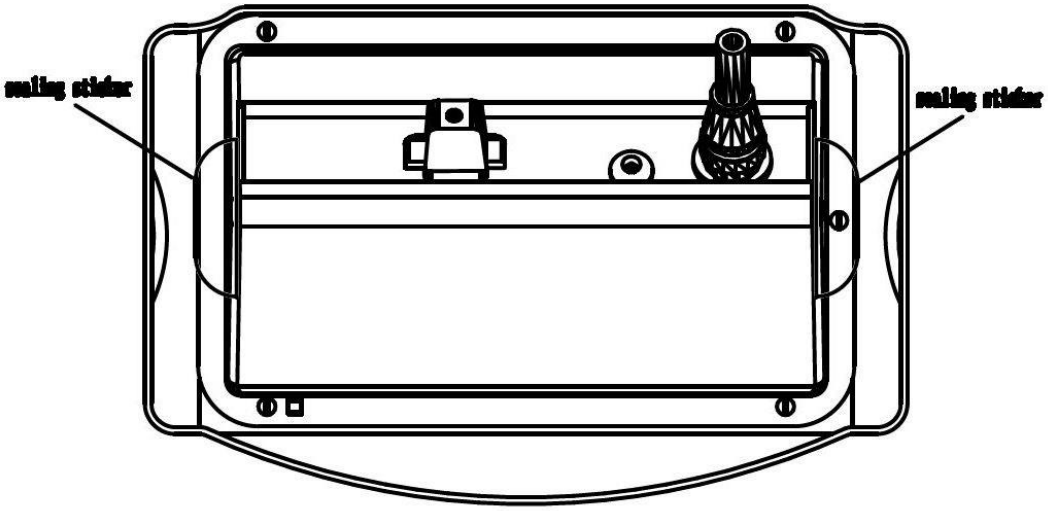

Figure 10 Sealing of ABS enclosure with brittle stickers.

10. Composition of modules – examples

COMPATIBILITY OF MODULES

Ref.: WELMEC 2

Non-Automatic Weighing Instrument, single-interval.

Certificate of EU Type-Approval N°: TAC: 0200-NAWI-04921

INDICATOR A/D (Module 1)		Type:	Matrix Pro		
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}		3000
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]	
Load cell interface:			4-wire (no 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		1
Reduction ratio of the load transmitting device:			$R=F_M / F_L$		1
Dead load of load receptor:			DL	[% of Max]	5
Non uniform distribution of the load:	(NUD = 0 is acceptable)		NUD	[% of Max]	0
Correction factor:	$Q = 1 + (DL + T^+ + IZSR^+ + NUD) / 100$				1,15
LOAD CELL ANALOG (Module 3)		Type:	Vishay 3410		
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]	0,01
Rated capacity:			E_{max}	[kg]	1000
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:				TC2353	
COMPLETE WEIGHING INSTRUMENT				Single-interval	
Manufacturer: BCI Inginieria SAS		Type:	Matrix Pro platform 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]	300
Number of verification scale intervals:			n		3000
Verification scale interval:			e	[kg]	0,1
Utilisation ratio of the load cell:			$\alpha = (Max / E_{max}) * (R / N)$		0,30
Input voltage (from the load cells):			$\Delta_u = C * U_{exc} * \alpha * 1000 / n$	[µV/e]	1,00
Cross-section of each wire in the J-box cable:			A	[mm²]	
J-box cable-Length:			L	[m]	
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 =	0
n	<=	n_{LC}	(R76: 4.12.2)	n_{LC} - n =	0
E_{min}	<=	DL * R / N	(WELMEC 2: 6d)	(DL * R / N) - E_{min} =	15
$v_{min} * \sqrt{N} / R$	<=	e	(R76: 4.12.3)	e - (v_{min} * √N / R) =	0,000
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)	$\Delta u - \Delta u_{min}$ =	0,00
R_{Lmin}	<=	R_{LC} / N	(WELMEC 2: 9)	(R_{LC} / N) - R_{Lmin} =	263
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)	$(L / A)_{max}^{WI}$ - (L / A) =	Not applicable
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) =	655,0

Signature and date:

Conclusion . . . . . *PASSED*

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

COMPATIBILITY OF MODULES

Ref.: WELMEC 2

Non-Automatic Weighing Instrument, single-interval.

Certificate of EU Type-Approval N°: TAC: 0200-NAWI-04921

INDICATOR	A/D (Module 1)	Type:	Matrix Pro		
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}		3000	
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]		
Load cell interface:			4-wire (no 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]	5	
Non uniform distribution of the load:		NUD	[% of Max]	0	
Correction factor:	$Q = 1 + (DL + T^+ + IZSR^+ + NUD) / 100$			1,15	
LOAD CELL	ANALOG (Module 3)	Type:			
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]	0,025	
Rated capacity:		E_{max}	[kg]	2000	
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:	BCI Inginieria SAS	Type:	Matrix Pro platform 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]	3000	
Number of verification scale intervals:		n		3000	
Verification scale interval:		e	[kg]	1	
Utilisation ratio of the load cell:		$\alpha = (Max / E_{max}) * (R / N)$		0,38	
Input voltage (from the load cells):		$\Delta_u = C * U_{exc} * \alpha * 1000 / n$	[µV/e]	1,25	
Cross-section of each wire in the J-box cable:		A	[mm²]		
J-box cable-Length:		L	[m]		
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 =	0
n	<=	n_{LC}	(R76: 4.12.2)	n_{LC} - n =	0
E_{min}	<=	DL * R / N	(WELMEC 2: 6d)	(DL * R / N) - E_{min} =	37,5
$v_{min} * \sqrt{N} / R$	<=	e	(R76: 4.12.3)	e - (v_{min} * $\sqrt{N}$ / R) =	0,000
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)	$\Delta u - \Delta u_{min}$ =	0,25
R_{Lmin}	<=	R_{LC} / N	(WELMEC 2: 9)	(R_{LC} / N) - R_{Lmin} =	1
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)	$(L / A)_{max}^{WI}$ - (L / A) =	Not applicable
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) =	1137,5

Signature and date:

Conclusion . . . . . **PASSED**

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