DANAK
PROD Reg. nr 7026

FORCE Certification

EU Type Examination Certificate

No. 0200-NAWI-06875

X2 / X2SS

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 **Moorange Electronics MFG (Shanghai) Co., Ltd.**
Rm 202, Building 5, No. 59 Shennan Road,
Shanghai 201108
CHINA

In respect of Non-automatic weighing instrument designated X2 / X2SS with variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class III, single-interval or multi-interval or multi-range
Maximum capacity, Max_i: 1 kg to 300 000 kg
Verification scale interval: $e_i = Max_i / n_i$
Minimum input voltage per VSI: 1.0 µV
Number of verification scale intervals: $n \leq 6000$ or $n_i \leq 2 \times 4000$
(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, WELMEC 2.1:2001 and OIML R76:2006.

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

The annex comprises 11 pages.

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Valid until **2029-08-20**

Jens Hovgård Jensen
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Digitally signed by Jens Hovgård Jensen
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FORCE Certification references:
Task no.: 119-26561.60.10 and ID no.: 0200-NAWI-06875

Signatory: J. Hovgård Jensen

Descriptive annex

Contents

1. Name and type of instrument and modules

The non-automatic weighing instrument is designated X2 or X2SS. It is an electronic weighing indicator, connected to a separate load receptor and peripheral equipment such as printers or other devices, as appropriate. The instrument is Class III. The electronic is the same for both models.

The indicator consists of an analogue to digital conversion circuitry, microprocessor, control circuitry, non-volatile memory for storage of calibration and setup data, all contained within a single enclosure.

The modules appear from Sections 3.1, 3.2, and 3.3; 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 Indicator

The electronic indicator consists of an electronic board bearing the microcontroller and the analog to digital converting electronic and an electronic board for the RS323 interface.

The enclosure of the X2 model is made of plastic and with the possibility to be mounted on a bracket. Connectors for power supply, load cell, and RS232 interface are on the rear side.

The enclosure of the X2SS model is made of stainless steel.
Connectors for power supply and RS232 interface is on the back side. Cable from load cell is going via a cable gland also on the rear side.

Display and keys on the indicator are on the front.

The display is a 7-segment LCD type with 6 digits. There is also indicators for Stable, Zero, Net, Gross, R2 (only multi-range setup), and Hold.

There are 6 keys which are used to enter commands in operation or setup. Each key is identified with name and/or a pictograph.

All instrument calibration and metrological setup data are stored in the non-volatile memory.

The indicator is power supplied with 10 VDC via an external power supply with input 110-240 VAC 5060 Hz. The indicator can optionally be equipped with an internal rechargeable 6 V battery.

2.1.2 Load receptors, load cells and load receptor supports

Set out in Section 3.3.

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

2.2.2.1 Initial zero-setting

If the selected Zero mode permits initial Zero-setting it will operate within a range of ± 10 % of Max. Zero-setting is possible only when the load receptor is not in motion.

2.2.2.2 Zero-tracking

If the selected Zero mode permits the zero-tracking feature, it operates over a range of ±2 % of Max and only when the display show zero (gross or net) and the load receptor is not in motion.

2.2.2.3 Semi-automatic zero-setting

If the selected Zero mode permits semi-automatic zero setting the following procedure applies: Pressing the "ZERO" key causes a new zero reference to be established and turn on ZERO indicator.

The semi-automatic zero-setting feature operates over a range of ±2 % of Max and only when the load receptor is not in motion.

2.2.3 Tare

The instrument models are provided with a semi-automatic subtractive tare feature activated using the "TARE" key. Tare is possible only when the load receptor is not in motion.

2.2.4 Operator information messages

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

2.2.5 Software version

The software version can be displayed by pressing the M+ key during the countdown sequence after power up.

The approved software version is 100913.

3. Technical data

The X2 / X2SS weighing instrument is composed of separate modules, which are set out as follows:

3.1 Indicator

The indicators have the following characteristics:

Type:	X2 or X2SS
Accuracy class:	III
Weighing range:	Single-interval, multi-interval or multi-range
Maximum number of verification scale intervals (n):	≤ 6000 for single-interval ≤ 2×4000 for multi-interval and multi-range
Minimum input voltage per VSI:	1.0 µV
Maximum capacity of interval or range (Max):	$n_i \times e_i$
Verification scale interval, e_i =	Max_i/n_i
Initial zero-setting range:	±10 % of Max
Maximum tare effect:	-Max within display limits
Fractional factor (pi):	0.5
Excitation voltage:	5 VDC
Minimum input impedance:	87 ohm
Maximum input impedance:	1100 ohm
Circuit for remote sense:	Present
Connecting cable to load cell(s):	See Section 3.1.1
Supply voltage:	10 VDC via external power supply with input 110-240 CAC 50/60 Hz, 6 V internal rechargeable battery (optional).
Operating temperature range:	-10 °C/+40 °C
Peripheral interface(s):	See Section 4

3.1.1 Connecting cable between the indicator and the junction box for load cells

3.1.1.1 4-wire system

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

3.1.1.2 6-wire system

Line:	6 wires, screened
Maximum length:	335 m/mm^2
Maximum resistance per wire:	5.7 ohm

3.2 Load receptors, load cells and load receptor supports

Movable 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 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 or 2017) 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, 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 and hopper

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 45501:2015 annex F shall be satisfied.

3.4 Documents

The documents filed at FORCE (reference No. T211676) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

4.1 Interfaces

4.1.1 Load cell input

The connector terminals for load cell connection are located on the rear of the enclosure.

4.1.2 Other interfaces

- RS232

The interface is characterised “Protective interfaces” according to paragraph 8.4 in the Directive and do not have to be secured.

4.2 Peripheral equipment

Connection between the indicator and peripheral equipment is allowed by a shielded 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 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 calculation of compatibility of modules 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, module F or D of the Directive 2014/31/EU.

7.1.1 Indicator

Access to the configuration and calibration facility requires that a calibration switch connected to the main board is activated.
Sealing of the cover of the enclosure - to prevent access to the calibration switch and to secure the electronics against dismantling/adjustment - is accomplished differently on the two models.

X2: Wires with metal or plastic seal in two metal rods mounted in one part of the enclosure and sticking out through holes in the other part of the enclosure. Furthermore, a tamperproof label is covering a small plastic cover over the access hole to the calibration switch (see Figure. 5).

X2SS: Wire with metal or plastic seal in two of the screws holding the enclosure together. Calibration switch is inside the enclosure and cannot be accessed without removing the wire (see Figure 6).

7.1.2 Indicator - load cell connector - load receptor

Sealing of the connection between the X2 indicator and the load receptor and load cell(s) is accomplished by sealing the connector with brittle plastic sticker(s) or with wire and seal.

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.

8. Location of CE mark of conformity and inscriptions

8.1 Indicator

8.1.1 CE mark

The CE mark of conformity with year of production is found at the identification section, which is printed directly at the enclosure of the weight indicator.

8.1.2 Inscriptions

Near the display:

- Max, Min, e =

The following details are found at the identification section, which is printed directly at the enclosure of the weight indicator:

- Manufacturer’s name, model no., serial no., type-approval certificate no., supply voltage, and accuracy class.

8.1.2.1 Load receptor

On a data plate:

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

9. Pictures

Figure 1 X2 indicator seen from front.

Figure 2 X2 indicator seen from rear.

Figure 3 X2SS indicator seen from front.

Figure 4 X2SS indicator seen from the rear

Figure 5 Sealing of X2 indicator

Figure 6 Sealing of X2SS indicator

Figure 7 Alternative trademark, which may be used on the scales instead of HiWEIGH.

10. Composition of modules - example

COMPATIBILITY OF MODULES

Ref.: WELMEC 2

Non-Automatic Weighing Instrument, single-interval.

Certificate of EU Type-Approval N°: TAC: 0200-NAWI-06875

INDICATOR	A/D (Module 1)	Type:	X2			
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}		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]		
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]	20	
Non uniform distribution of the load:	(NUD = 0 is acceptable)		NUD	[% of Max]	0	
Correction factor:	$Q = 1 + (DL + T^+ + IZSR^+ + NUD) / 100$				1,3	
LOAD CELL	ANALOG (Module 3)	Type:			L6D	
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]	20	
Minimum dead load, relative:			$(E_{min} / E_{max}) * 100$	[%]	5	
Temperature range:			T_{min} / T_{max}	[°C]	-10 / 40	
Test report (TR) or Test Certificate (TC/OIML) as appropriate:					TC7868	
COMPLETE WEIGHING INSTRUMENT					Single-interval	
Manufacturer:		Type:			GMB VT300 with platform	
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]	6	
Number of verification scale intervals:			n		3000	
Verification scale interval:			e	[kg]	0,002	
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 =	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} =	0,2
$v_{min} * \sqrt{N} / R$	<=	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}) * (√N/ R)) =	
Δu_{min}	<=	Δu	(WELMEC 2: 8)	Δu – Δu_{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) =	12,2

Signature and date:

Conclusion . . . . . *PASSED*

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