DANAK
PROD Reg. nr 7026

FORCE Certification

EU Type Examination Certificate

No. 0200-NAWI-06873

X708 / X708E / X708S / X722 / X722E / X722S / X7PC / X7PCS

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 X708 / X708E / X708S / X722 / X722E / X722S / X7PC / X7PCS 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: $n \leq 4200$ for single-interval and $n \leq 2 \times 4200$ for multi-range (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 examination conditions are set out in the descriptive annex to this certificate.

The annex comprises 17 pages.

Issued on **2019-11-28**
Valid until **2029-11-28**

Jens Hovgård Jensen
2019-11-28

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

FORCE Certification references:
Task no.: 119-26561.40.10 and ID no.: 0200-NAWI-06873

Signatory: J. Hovgård Jensen

Descriptive annex

Contents

1. Name and type of instrument and modules

The weighing instrument is designated X708 / X708E / X708S / X722 / X722E / X722S / X7PC / X7PCS. 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 dual-range, an external AC mains adapter, and an internal rechargeable battery (optional).
The X7PC and X7PCS is a price-computing weighing 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, 3.2.1 and 3.2.2; 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 indicator is specified in Section 3.1.

Enclosures and keyboard

The indicators X708 / X708E / X722 / X722E / X7PC are housed in an enclosure made of ABS plastic.
The indicators X708S / X722S / X7PCS are housed in an enclosure made of stainless steel.

The front panels of the indicator comprise:

- Either a LCD display with appropriate state indicators and 6 digits (model X708 / X722 / X708S / X722S) or 3×6 digits (model X7PC / X7PCS), or
  a LED display with 6 digits and appropriate LED state indicators (model X708E / X722E).
- A keyboard containing 8 keys (model X708 / X708E / X708S) or 22 keys (model X722 / X722E / X722S) or 33 keys (model X7PC / X7PCS) used to enter commands or data into the weight indicator, including one key for turning the indicator on and one key for turning it off. Each key is identified with a name and/or pictograph.

Electronics

The instruments use the same mainboard, which contains all analog, A/D, microprocessor, and memory circuitry. It has a separate PCB for RS232 and one for display.

All instrument calibration and metrological setup data are contained in non-volatile memory. The power supply accepts an input voltage of 12 VDC from the external power adapter, with input from 100 - 240 VAC 50/60 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 display 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.
Initial zero-setting range: ±10% of Max.

Zero-setting is only possible 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.

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

2.2.4 Pre-set Tare

The X722 / X722E / X722S models are provided with a pre-set tare function activated using the "PT" key.

When the pre-set tare function is active the PT indicator will be on.

2.2.5 Units

The UNITS key on models X708 / X708E / X708S / X722 / X722E / X722S is used to toggle between the configured weight units, if more than one.

2.2.6 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.

2.2.7 Display test

A self-test routine is initiated by pressing the off key to turn the instrument off, then pressing the on key to turn the instrument on again. 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 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 software version can be displayed on X708 / X722 / X708E / X722E / X708S / X722S as part of the turning off sequence.
On X7PC / X7PCS it can be displayed by pressing the "Tare" and "5" keys simultaneously.

The approved software versions are,

X708 / X722 / X708S / X722S	version	100115
X708E / X722E	version	100314
X7PC / X7PCS	version	200115

2.2.10 Totalisation

The X722 /X722E /X722S / X7PC / X7PCS models have a totalisation function, adding actual weight display values to the memory when pressing "M+" key if the equilibrium is stable.

Pressing "MR"/"RECALL" key displays the total accumulated weight.
Pressing "MC" key will clear the totalised value.

On X7PC / X7PCS this function shall be disabled, if the indicator is not connected to an operational printer.

2.2.11 Battery operation

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

3. Technical data

The X708 / X708E / X708S / X722 / X722E / X722S / X7PC / X7PCS weighing instruments are composed of separate modules, which are set out as follows:

3.1 Indicator

The indicators have the following characteristics:

Type:	X708 / X708E / X708S / X722 / X722E / X722S / X7PC / X7PCS
Accuracy class:	III and IIII
Weighing range:	Single-interval or multi-range (2 ranges)
Maximum number of Verification Scale Intervals:	≤ 4200 (class III), ≤ 1000 (class IIII)
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 using 6-wire connection
Minimum input impedance:	87 ohm
Maximum input impedance:	1100 ohm
Mains power supply:	100-240 VAC, 50/60 Hz using external AC to 12 VDC 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

Cable between indicator and junction box:	6 wires, shielded
Maximum length:	21913 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 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, 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 45501:2015 annex F shall be satisfied.

3.4 Documents

The documents filed at FORCE (reference No. T201760) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

4.1 Interfaces

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

4.1.1 Load cell input

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

4.1.2 RS-232C interfaces (optional)

The indicator may be equipped with a RS-232C interfaces located on a separate interface board.

4.1.3 Bluetooth interfaces (optional)

The indicator may be equipped with a Bluetooth interface located on a separate interface board.

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. Examination 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 examination.

5.2 Counting operation is not approved for NAWI

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

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, EN45501:2015 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 5.4.

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, 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 jumper on the main board is put in position unlocked.

Sealing of the cover of the enclosure - to prevent access to the calibration jumper and to secure the electronics against dismantling/adjustment - is accomplished either using wire and seal (see Figure 9 and 11) or with two brittle plastic stickers placed on opposite sides of the enclosure across the assembly of the enclosure (see Figure 10 and 12) or by a brittle sticker placed so access to one of the screws of the enclosure is prohibited.

7.1.2 Indicator - load cell connector - load receptor

Securing of the indicator, load receptor and load cell combined is done the following way:

- Sealing of the load cell connector with the indicator 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 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

CE mark and supplementary metrological marking shall be applied to the scale 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_i, Min_i, e_i =, accuracy class

On the inscription plate:

- Manufacturer's name and/or logo, manufacturer's postal address, model no., serial no., type-examination certificate no., accuracy class, 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

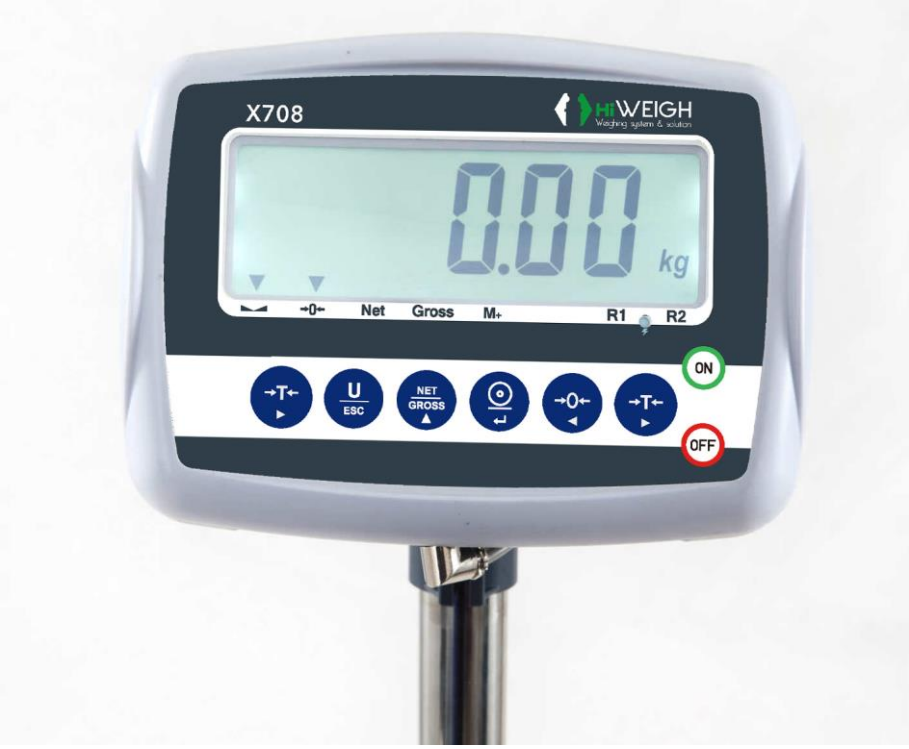

Figure 1 X708 indicator.

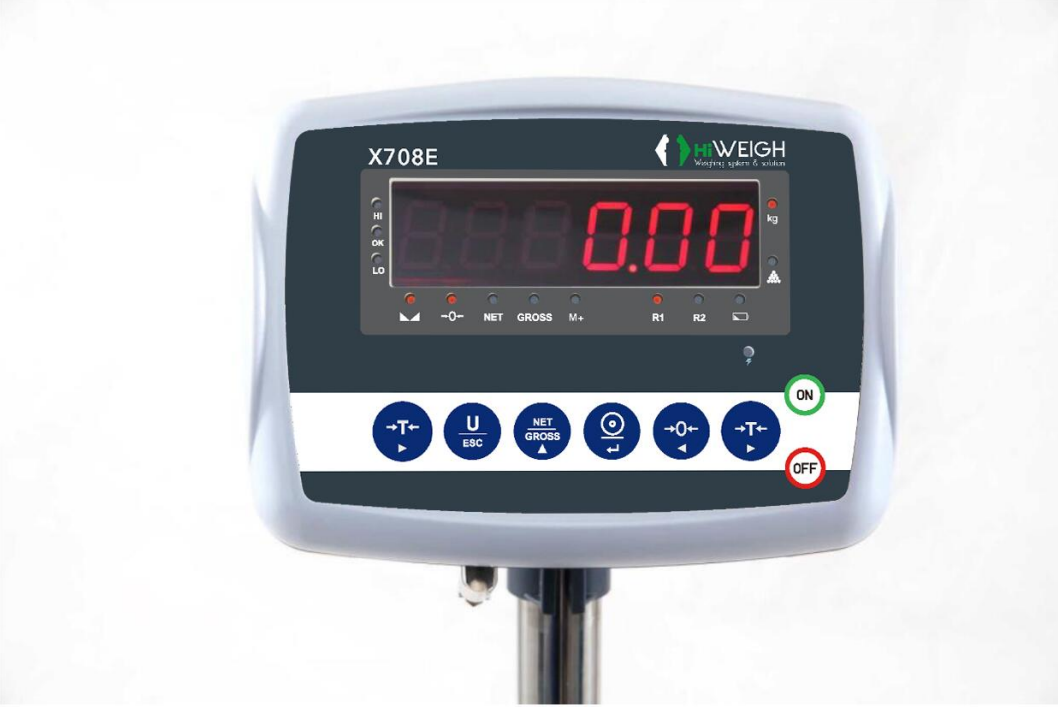

Figure 2 X708E indicator.

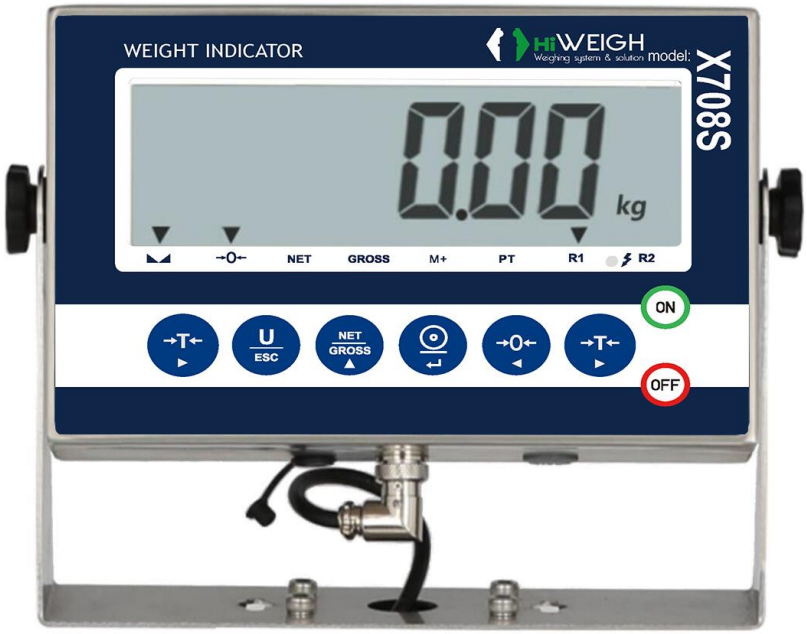

Figure 3 X708S indicator.

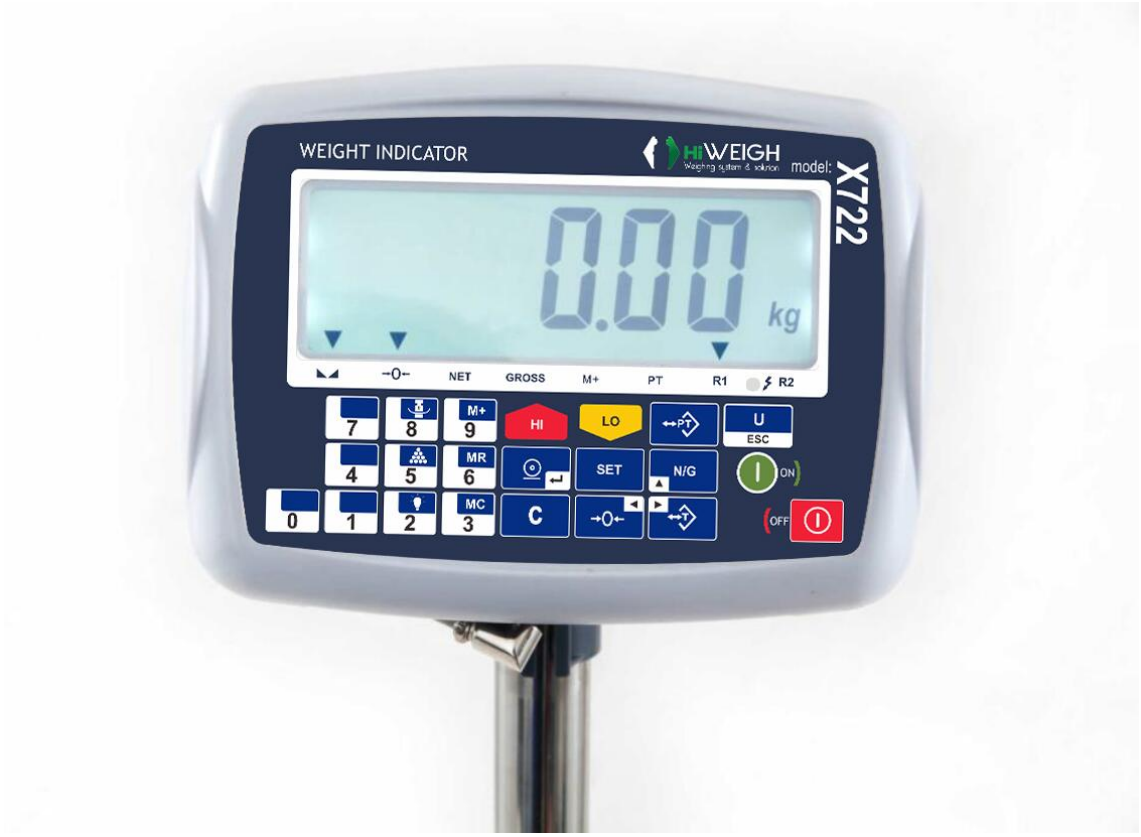

Figure 4 X722 indicator.

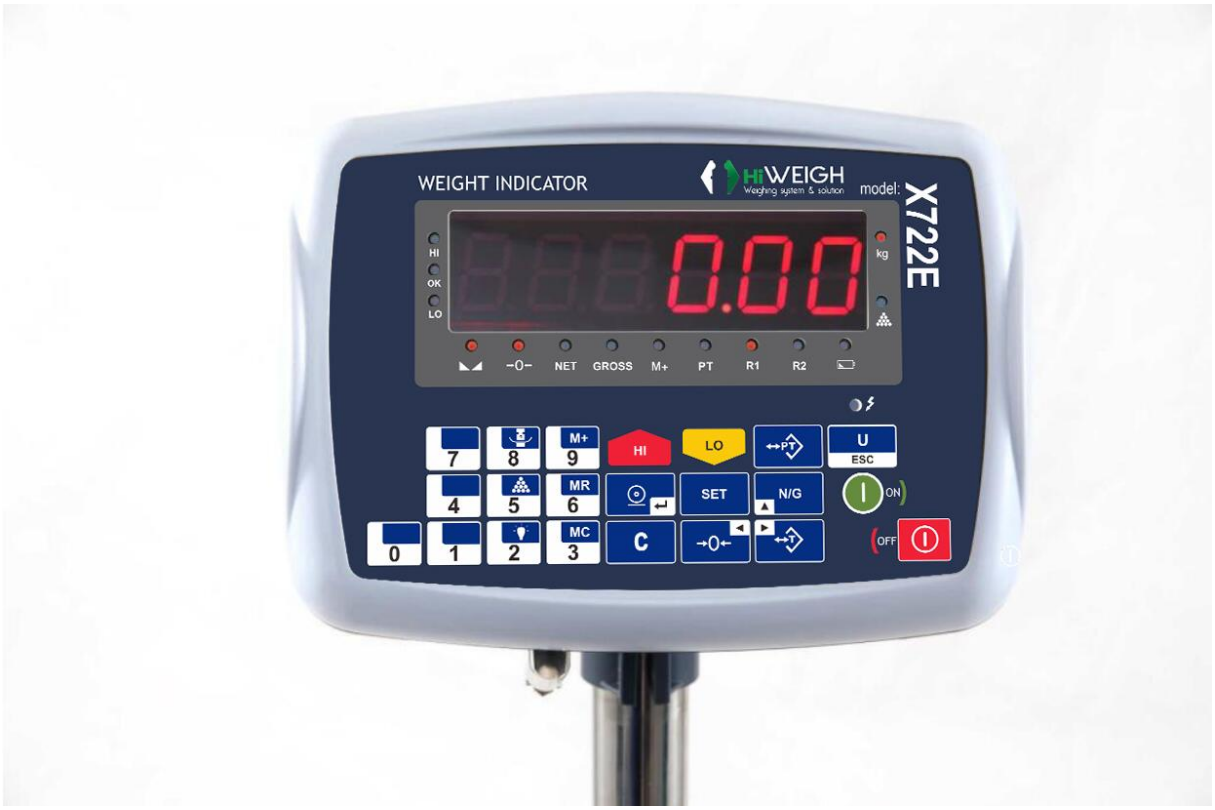

Figure 5 X722E indicator.

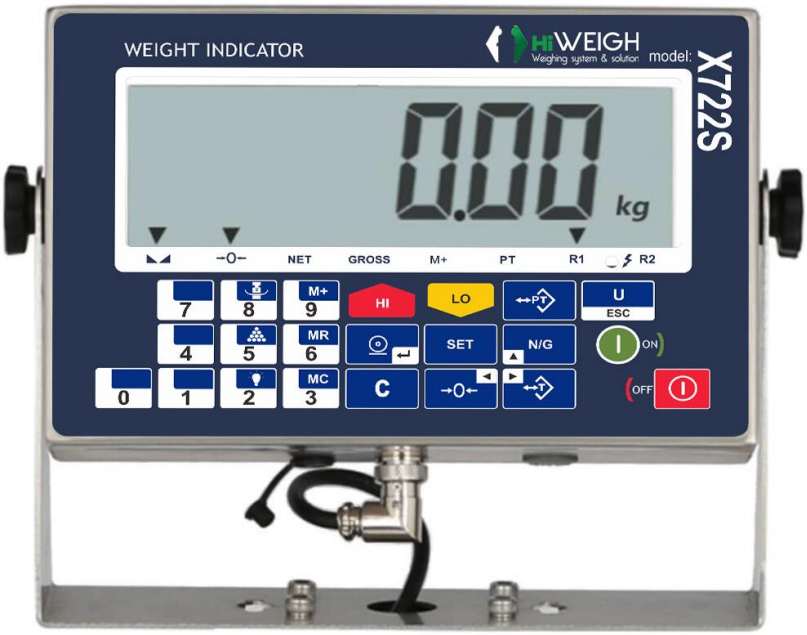

Figure 6 X722S indicator.

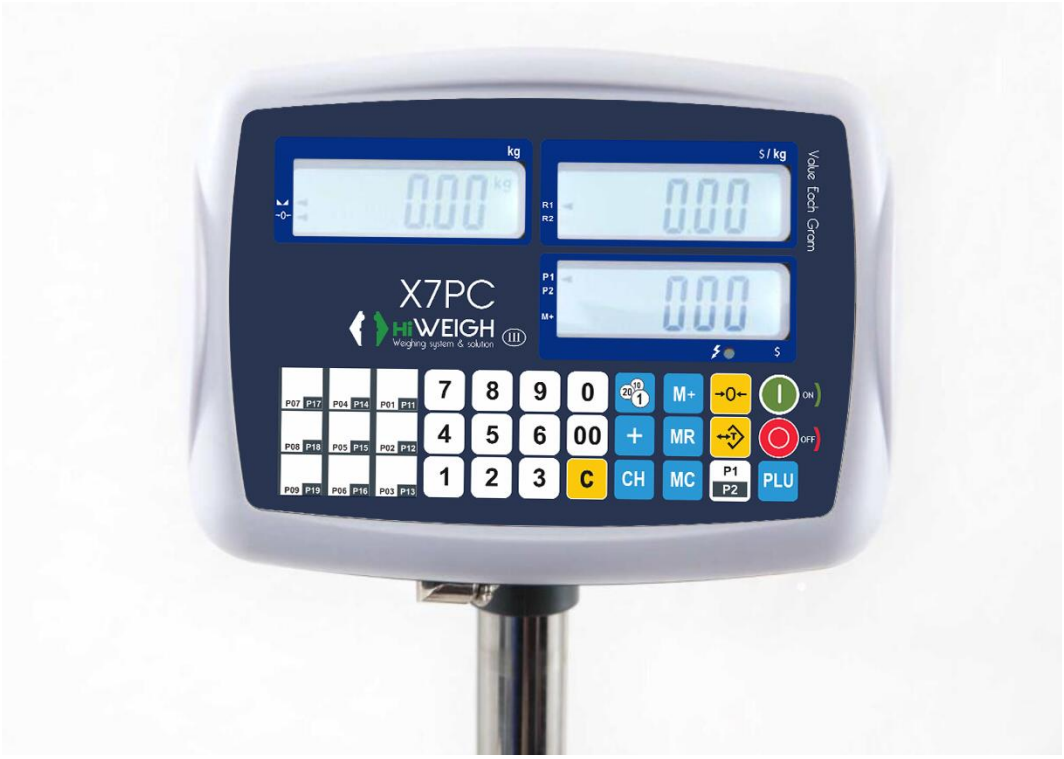

Figure 7 X7PC indicator

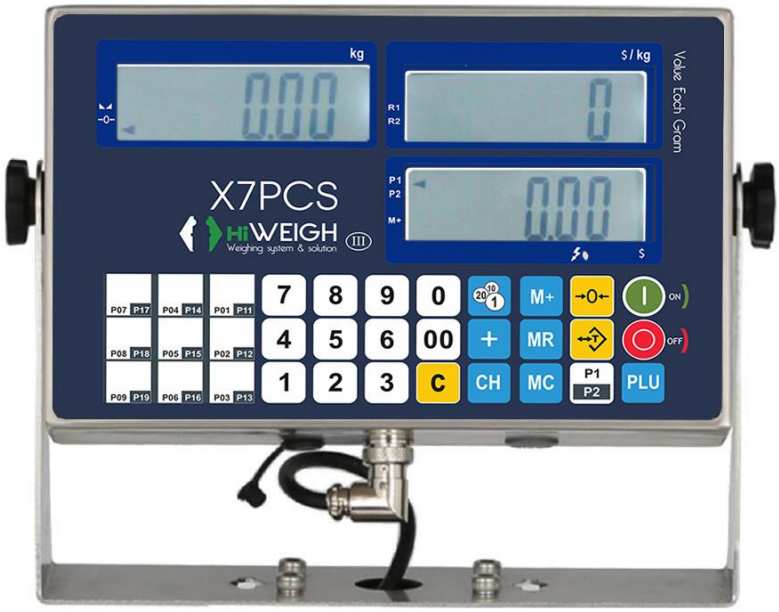

Figure 8 X7PCS indicator.

Moorange

Figure 9 Alternative trademark, which may be used on the scales instead of HiWEIGH.

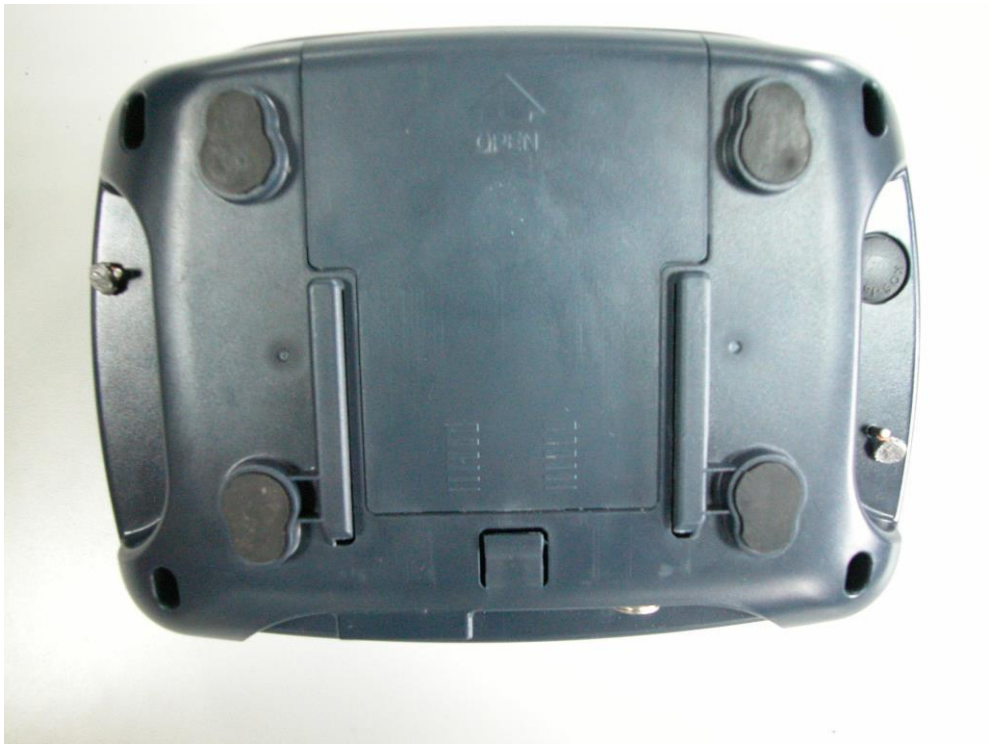

Figure 10 Sealing of indicator in plastic housing with wire and seal.

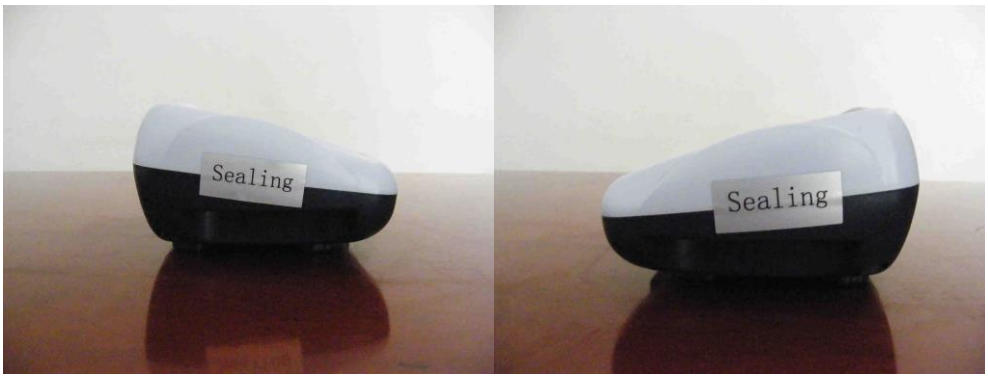

Figure 11 Sealing of indicator in plastic housing with stickers

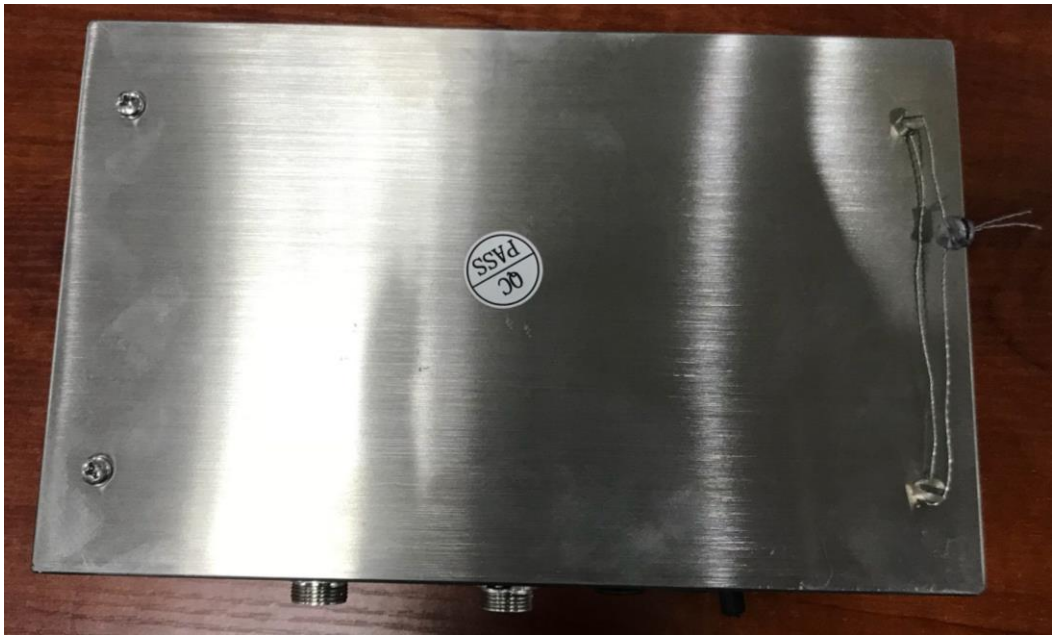

Figure 12 Sealing of indicator in stainless steel housing with wire and seal.

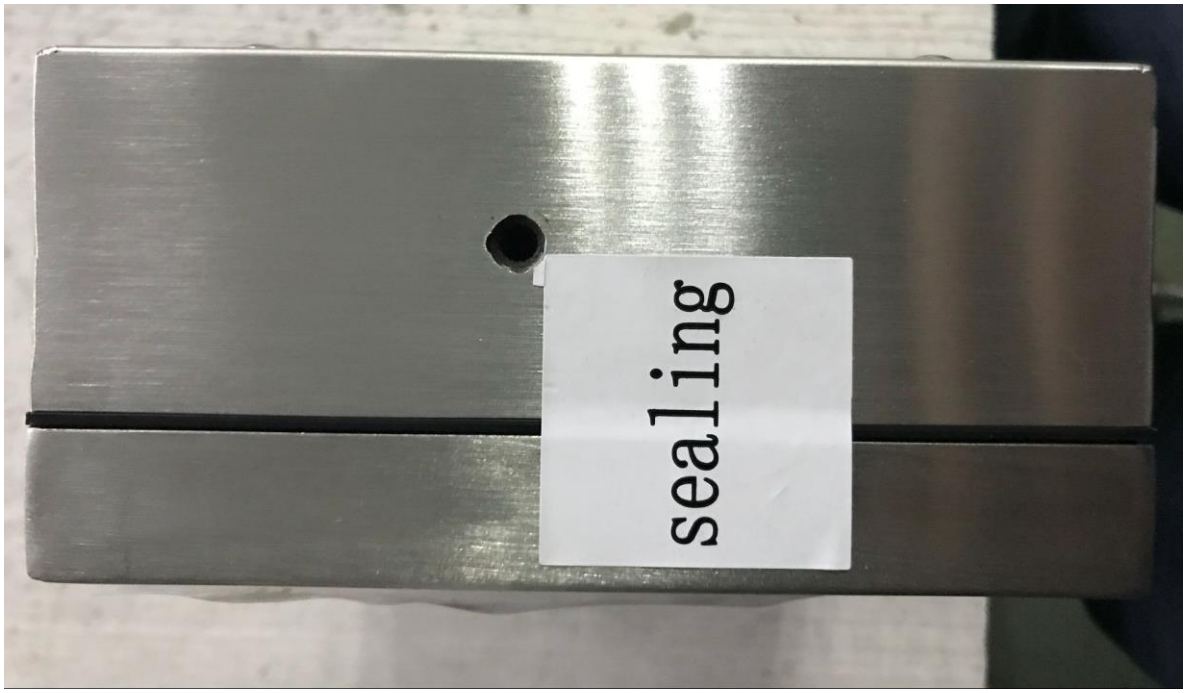

Figure 13 Sealing of indicator in stainless steel housing with stickers

10. Composition of modules – an example

COMPATIBILITY OF MODULES

Ref.: WELMEC 2

Non-Automatic Weighing Instrument, single-interval.

Certificate of EU Type Examination N°: TEC: 0200-NAWI-06873

INDICATOR	A/D (Module 1)	Type:	X708		
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}		4000	
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:		RL_{min}	[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]	21913	
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:	Moorange Electronics MFG	Type:	X708 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:	α = (Max / E_{max}) * (R / N)			0,50	
Input voltage (from the load cells):	$\Delta u = C * U_{exc} * \alpha * 1000 / n$		[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 =	1000
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} * √N / R	<=	e	(R76: 4.12.3)	e - (v_{min} * √N / R) =	0,040
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} =	0,67
RL_{min}	<=	R_{LC} / N	(WELMEC 2: 9)	(R_{LC} / N) - RL_{min} =	15
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)	$(L / A)_{max}^{WI}$ - (L / A) =	21868
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".