DANAK
PROD Reg. nr 7026

FORCE Certification

EU Type Examination Certificate

No. 0200-NAWI-07137

FT-107 / FT-107S

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 **Flintec GmbH**
Bemannsbruch 9,
74909 Meckesheim,
GERMANY

In respect of Non-automatic weighing instrument designated FT-107 / FT-107S 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 300 000 kg
Verification scale interval: e = Max / n
Maximum number of verification scale intervals: n ≤ 6000 for single-interval and 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 conditions for certification are set out in the descriptive annex to this certificate.

The annex comprises 15 pages.

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Valid until **2029-09-24**

Jens Hovgård Jensen
2019-09-24

Digitally signed by Jens Hovgård Jensen
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FORCE Certification references:
Task no.: 119-31728.90.10 and ID no.: 0200-NAWI-07137

Signatory: J. Hovgård Jensen

Descriptive annex

Contents

1. Name and type of instrument and modules

The weighing instrument is designated FT-107 or FT-107S. 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-range, an external AC mains adapter – if not supplied directly from AC mains - and an internal rechargeable battery (optional).

The indicators use two generations of the same electronic PCB. All legal relevant electronic is the same on the two boards.
Model FT-107 uses the standard mainboard.
Model FT-107S uses a slightly modified main board
The board have been modified for connection of peripheral equipment.
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, 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 indicator is housed in an enclosure made of either ABS plastic or stainless steel (SS).

The front panels of the indicator comprise of:

- LCD display with backlight having appropriate state indicators and 6 digits.
- A keyboard containing 8 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.
- Colours of the front panel, front panel design, key shapes, and key names and/or pictographs can be changed due to market demands.

Electronics

The instrument 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 12 VDC from the external power adapter, with input from 100-240 VAC, 50/60 Hz or directly from 100-240 VAC, 50/60 Hz depending of model. The indicator has an internal rechargeable battery.
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 indicator can be configured to show the weight in either g, kg, or t (metric ton).

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

When the tare function is active the "*" key or the "F" key displays the Gross weight temporary, if the indicator is configured to it.

2.2.4.1 Semi-automatic tare

The instrument models are provided with a semi-automatic subtractive tare feature activated using the "TARE" key. Consecutive tare operations are allowed – if configured.

2.2.4.2 Automatic tare and clear

As an alternative to semi-automatic tare the indicator can be configured to automatic taring, when a load > 20e is placed on the empty load receptor.
The indicator has an automatic tare clear function which is activated when gross weight is below 10e.

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 "ENTER" 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.

2.2.5.1 Automatic Print

As an alternative the print device is activated automatically when a load > 20e is placed on the load receptor.

2.2.6 Piece counting

The indicator has - if configured to it - a mode for piece counting. If configured the "*" key or the "F" key is used to enter the mode, while the "ESC" key is used to leave the mode.

FT-107 has a CLU table with 100 memories for storage of part weight.

NOTE: The result of the piece counting is not a legal value,

2.2.7 Check weighing

The indicator can be set to check the actual weight against a high and a low limit by the user pressing "H-L" key for more than one second.

The indicator has a PLU table with 100 memories for storage of check weighing high/low limit pairs.

2.2.8 Weighing unstable samples

The indicator has - if configured to it - a special mode for weighing unstable samples like living animals. If configured the "*" key or the "F" key is used to enter the mode, while the "ESC" key is used to leave the mode.

2.2.9 Extended resolution

The indicator can - if configured to it - temporary display the actual weight with extended resolution (d = 0.1e). If configured the "*" key or the "F" key is used to select the function.

2.2.10 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.

2.2.11 Operator information messages

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

2.2.12 Software version

The format of the software is X.YY, where X is the revision of the legally relevant functionality of the software and YY is the sub-revision number for software changes not related to the legal functionality of the software.

The approved version is:
Model FT-107: 1.YY.

2.2.13 Totalisation

The indicator has a totalisation function, adding actual weight display value to the memory when pressing "M+" key, if the equilibrium is stable.

The totalised value is a calculated value and shall be marked as such when printed.

2.2.14 Battery operation

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

2.2.15 Gravity compensation

The indicators have a gravity compensentation function making it possible to perform the verification at a place with another gravity constant than the place of use.
The function is sealed.

3. Technical data

The FT-107 and FT-107S weighing instruments are composed of separate modules, which are set out as follows:

3.1 Indicator

The indicators have the following characteristics:

Type:	FT-107 / FT-107S
Accuracy class:	III and IIII
Weighing range:	Single-interval, multi-range (2 ranges)
Maximum capacity (Max):	1 kg to 300 000 kg
Minimum capacity (Min):	$20 \times e_1$
Verification scale interval (e =):	≥ 0.1 g
Maximum number of Verification Scale Intervals:	≤ 6000 (class III), ≤ 1000 (class IIII)
Maximum tare effect:	-Max within display limits
Fractional factor:	p'i = 0.5
Minimum input voltage per VSI:	0.4 µV
Excitation voltage:	5 VDC
Circuit for remote sense:	present on the model with 7-terminal connector
Minimum input impedance:	85 ohm
Maximum input impedance:	1200 ohm
Mains power supply:	100-240 VAC, 50/60 Hz, or 12 VDC / 100-240 VAC, 50/60 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

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: 2059 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 = 0.0012 [% / 25K]
Coefficient of resistance for the wires in the J-box cable: Sx = 0.0016 [% / ohm]
L/A_{max} = 295.86 / Sx * (emp / n - Es) [m / mm²] 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.

Reference: See Section 10.

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 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 or R60:2017) 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, 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. T204953) 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.

4.1.1 Load cell input

A 7-terminal connector for the load cell is positioned on the lower side of the enclosure of model FT-107
A 7-terminal connector for the load cell is positioned on the main board for the model FT-107S.

4.1.2 RS-232

The indicator is equipped with a 2 pcs of RS-232 interface for connection to a printer or external equipment.

The interface is protective and does not have to be secured.

4.1.3 Optional interfaces

Optional interfaces are Bluetooth and Wi-Fi, which are protective and do not have to be secured. The indicator can be equipped with only one of these options.

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. 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 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.

5.3 Counting operation is not approved for NAWI

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

5.4 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 5.4.

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 or 4 of the Directive 2014/31/EU.

7.1.1 Indicator

Access to the configuration and calibration facility requires that a calibration switch is depressed.
On the ABS model the switch is accessed through a hole in the rear side of the enclosure.
On the stainless steel model the switch is below a sealable cover inside the enclosure.

Sealing of the indicator - to prevent access to the calibration jumper and to secure the electronics against dismantling/adjustment - and sealing of load cell connection are accomplished with either wire and seal or using brittle stickers.

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

The peripheral interface is “protective”; it neither allows 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

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 supplementary metrological marking 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

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 = , and d = (if d < 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 =, d = (if d < e), accuracy class.

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 FT-107 indicator – ABS model.

Figure 2 FT-107S indicator.

Figure 3 Example of logo for front panel of indicator.

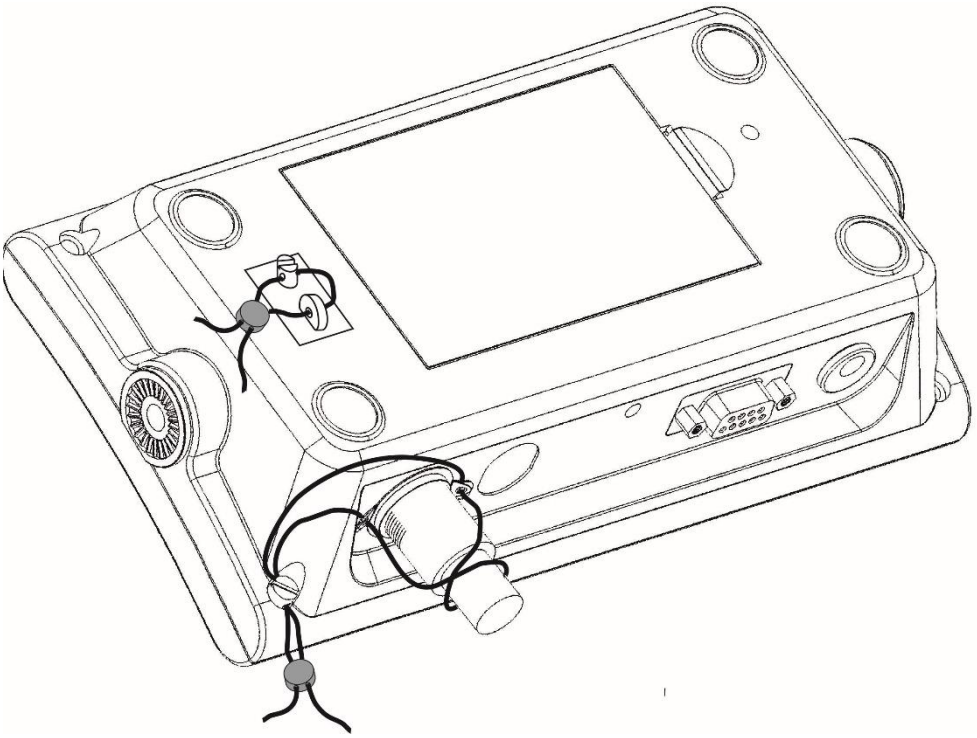

Figure 4 Sealing of FT-107 indicator with wire and seal – ABS model.

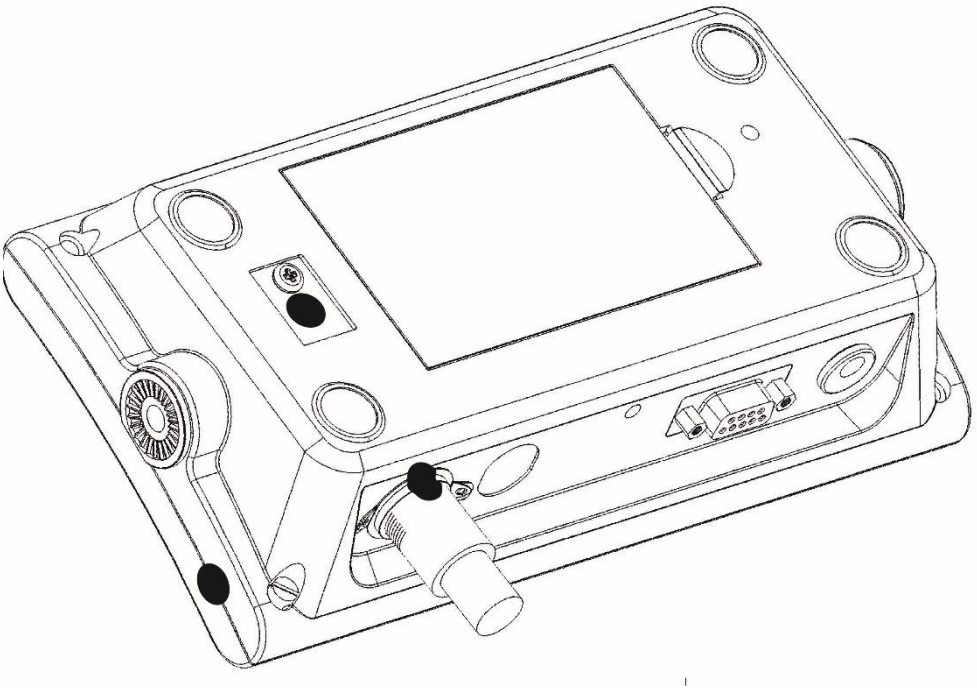

Figure 5 Sealing of FT-107 indicator with brittle stickers – ABS model.

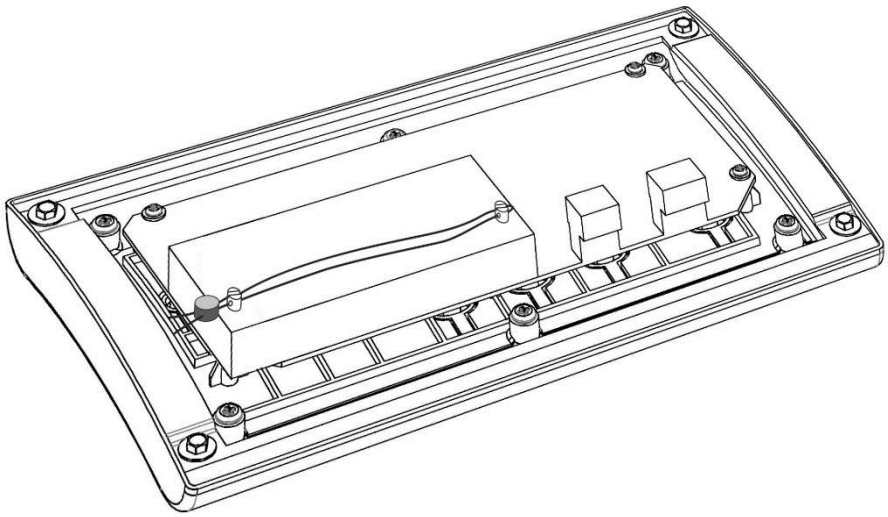

Figure 6 Sealing of FT-107S indicator with wire and seal.

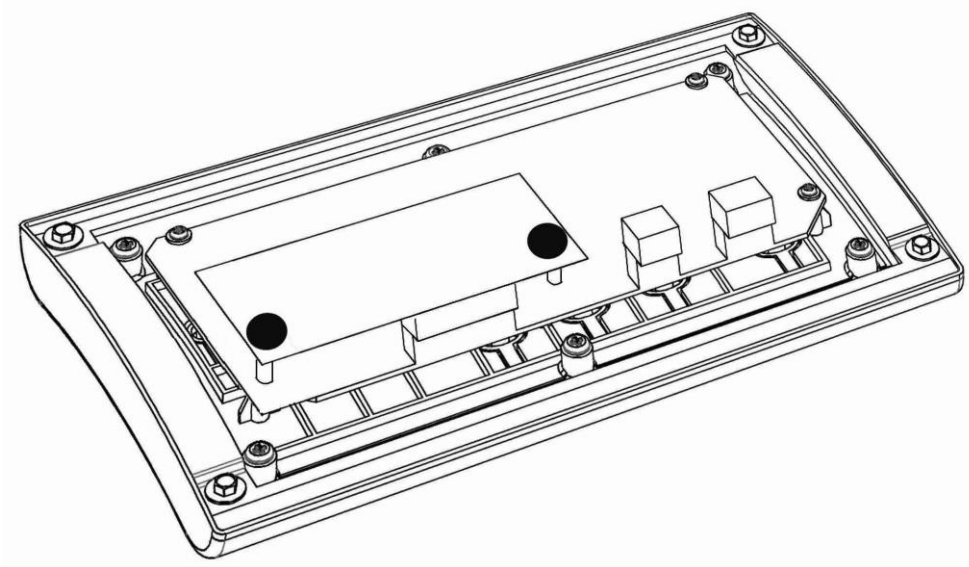

Figure 7 Sealing of FT-107S indicator with brittle stickers.

10. Composition of Modules – an example

COMPATIBILITY OF MODULES

Ref.: WELMEC 2

Non-Automatic Weighing Instrument, multi-range.

Certificate of EU Type-Approval N°: TAC: 0200-NAWI-07137

INDICATOR	A/D (Module 1)	Type:	FT-107			
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} or lower):		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]	0,4		
Minimum load cell impedance:		R_{Lmin}	[Ω]	87		
Coefficient of temperature of the span error:		Es	[% / 25°C]			0,0012
Coefficient of resistance for the wires in the J-box cable:		Sx	[% / Ω]			0,0016
Specific J-box cable-Length to the junction box for load cells:		$(L/A)_{max}$	[m / mm²]			2090
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		1		
Reduction ratio of the load transmitting device:		$R=F_M / F_L$		1		
Dead load of load receptor:		DL	[% of Max]	13		
Non uniform distribution of the load:	(NUD = 0 is acceptable)	NUD	[% of Max]	0		
Correction factor:	$Q = 1 + (DL + T^+ + IZSR^+ + NUD) / 100$			1,23		
LOAD CELL	ANALOG (Module 3)	Type:	1042			
Accuracy class according to OIML R60:		$Class_{LC}$ (A, B, C or D)		C		
Maximum number of load cell intervals:		n_{Lc}		6000		
Fraction of mpe:		p_3		0,7		
Rated output (sensitivity):		C	[mV / V]	2		
Input resistance of single load cell:		R_{LC}	[Ω]	415		
Minimum load cell verification interval:	($v_{min\%}$ = 100 / Y)	$v_{min\%}$	[% of Emax]	0,00666		
Rated capacity:		E_{max}	[kg]	150		
Minimum dead load, relative:		$(E_{min} / E_{max}) * 100$	[%]	1		
Minimum dead load output return:	($DR_{\%}$ = 50 / Z)	$DR_{\%}$	[% of Emax]	0,01042		
Temperature range:		T_{min} / T_{max}	[°C]	-10	/	40
Test report (TR) or Test Certificate (TC/OIML) as appropriate:						
COMPLETE WEIGHING INSTRUMENT			Multi-range			
Manufacturer:	Flintec GmbH	Type:	FT-107 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]	>>>>>>>>>>>>>>>>>		80
Maximum capacity for each partial weighing range:		Max_1 / Max_2	[kg]	40		80
Number of verification scale intervals for each weighing range:		n_1 / n_2		4000		4000
Verification scale interval for each weighing range:		e_1 / e_2	[kg]	0,01		0,02
Utilisation ratio of the load cell:		$\alpha = (Max_i / E_{max}) * (R / N)$		0,27		0,53
Input voltage (from the load cells):		$\Delta_u = C * U_{exc} * \alpha * 1000 / n$	[µV / e]	0,67		1,33
Cross-section of each wire in the J-box cable:		A	[mm²]	>>>>>>>>>>>>>>>>>		0,22
J-box cable-Length to the junction box for load cells:		L	[m]	>>>>>>>>>>>>>>>>>		81
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			
$Class_{WI}$	<=	$Class_{ind}$ & $Class_{LC}$	(WELMEC 2: 1)
p_i	<=	1	(R76: 3.5.4.1)
n_i	<=	n_{max} for the class	(R76: 3.2)
n_i	<=	n_{ind}	(WELMEC 2: 4)
n_i	<=	n_{LC}	(R76: 4.12.2)
E_{min}	<=	DL * R / N	(WELMEC 2: 6d)
$v_{min} * \sqrt{N} / R$ or (if v_{min} is not given)	<=	e_i	(R76: 4.12.3)
$(E_{max} / n_{LC}) * (\sqrt{N} / R)$	<=	e_i	(WELMEC 2: 7)
Δu_{min}	<=	Δu	(WELMEC 2: 8)
R_{Lmin}	<=	R_{LC} / N	(WELMEC 2: 9)
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)
T_{range}	<=	$T_{max} - T_{min}$	(R76: 3.9.2.2)
Q * Max * R / N	<=	E_{max}	(R76: 4.12.1)
$DR_{\%}$ or (if DR% is not given)	<=	125 * e_1 / Max	(WELMEC 2: 6c)
0.4 * Max / e_1	<=	n_{Lc}	(WELMEC 2: 6c)

Passed, provided no result below is < 0		
$Class_{WI}$:	PASSED	
1 - p_i =	>>>>>>>>>>>>>>>>>	0,0
n_{max} for the class - n_i =	6000	6000
n_{ind} - n_i =	2000	2000
n_{LC} - n_i =	2000	2000
(DL * R / N) - E_{min} =	8,9	<<<<<<<<<<<<<<<<
e_i - (v_{min} * $\sqrt{N}$ / R) =	0,000	0,010
Alternative solutions: ↑ ↓		
e_i - ((E_{max} / n_{LC}) * ($\sqrt{N}$/ R)) =		
$\Delta u - \Delta u_{min}$ =	0,27	0,93
(R_{LC} / N) - R_{Lmin} =	>>>>>>>>>>>>>>>>>	328
$(L / A)_{max}^{WI}$ - (L / A) =	>>>>>>>>	2877
(T_{max} - T_{min}) - T_{range} =		20
E_{max} - (Q * Max * R / N) =	>>>>>>>>>>>>>>>>>	51,6
(125 * e_1 / Max) - $DR_{\%}$ =	0,0052	<<<<<<<<<<<<<<<<
Alternative solutions: ↑ ↓		
n_{LC} - (0.4 * Max / e_1) =		

Signature and date:

Conclusion . . . . . ***PASSED***

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