DANAK
PROD Reg. nr 7026

FORCE Certification

EU Type Examination Certificate

No. 0200-NAWI-14274

FT-150

NON-AUTOMATIC WEIGHING INDICATOR

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

In accordance with the requirements for the non-automatic weighing instrument of the EU Council Directive 2014/31/EU.

Issued to **Flintec Transducers (Pvt) Ltd.**
P.O: Box 24
K.E.P.Z. Phase I
Spure Road 2
Katunayake
Sri Lanka

In respect of Non-automatic weighing instrument designated FT-150 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: $e_i = Max_i / n_i$
Maximum number of verification scale intervals: $n_i \leq 10000$ for single-interval / multi-range / 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 45501:2015 and OIML R76:2006.

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

The annex comprises 14 pages.

Issued on **2023-02-13**
Valid until **2033-02-13**

Jens Hovgård Jensen
2023-02-13

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

FORCE Certification references:
Task no.: 123-22618.90.10 and ID no.: 0200-NAWI-14274-1

Signatory: Jens Hovgård Jensen

Descriptive annex

Contents

1. Name and type of instrument and modules

The weighing instrument is designated FT-150. 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, multi-range or multi-interval, supplied directly from AC mains.

The indicators use the same weighing board for analogue or digital load cells, PC board, display and power supply unit within a single enclosure. The indicator may have touch panel on the display and/or digital input/output board and/or interface boards.

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

The weighing board in the indicator consist of analogue to digital conversion circuitry or digital load cell interface, microprocessor control circuitry, non-volatile memory for storage of calibration and setup weighing related data, serial interface for PC connection and power supply circuitry.

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 stainless steel.

The front panels of the indicator comprise of:

- Display with backlight and with or without touch panel on the display. The weight indication is located on the upper part of the display. The middle part of the display is used as a information display and/or human- machine interface. The soft keys are located at the bottom of the display. Soft alphanumeric or numeric keys appears to enter any data, if need be.
- A soft keys' selection and their locations are programmable for easy usage. Each key is identified with a name and/or pictograph. Furthermore the PC keyboard can be connected to the indicator.
- Max, min and e are indicated in the header bar, on the top of the display.

Electronics

The indicators contain a mainboard with microcontroller, display/touch panel, weighing board(s) for analogue and/or for digital load cells and switching power supply unit in a single enclosure. The indicator may have optional digital input/output board and/or interface boards.

The calibration switch and all instrument calibration, metrological setup data which are contained in non-volatile memory are on the weighing board.

Alibi memory data is saved in the memory card on the PC board.

The power supply accepts an input voltage directly from 90-240 VAC, 50/60 Hz. The weighing board produces a load cell excitation voltage of 5 VDC for analogue load cells or 12VDC for digital load cells. Digital load cells can be supplied from external power source, if need be.

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 equipped with the microcontroller based electronic weight board(s) that require the external connection of strain gauge load cell(s) or digital load cell(s). The weight information appears on the upper part of the display located on the front panel and may be transmitted to peripheral equipment for recording, processing or displaying.
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 (net weight) to Max+9e (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. Zero setting might be done via any protected digital interface or digital input instead of pressing key.

Semi-automatic zero-setting range: ≤ 4 % of Max.
Automatic zero-tracking range: ≤ 4 % of Max.
Initial zero-setting range: ≤ 20 % 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 up to 4 % of Max and only when the indicator is at gross zero and there is no motion in the weight display, if activated.

2.2.4 Tare

Instruments are provided with subtractive tare. Maximum tare capacity corresponds to the maximum indication of the scale.

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

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. Taring might be done via any protected digital interface or digital input instead of pressing key.

2.2.4.2 Automatic tare

As an alternative to semi-automatic tare the indicator can be configured to automatic taring, when a load is placed on the empty load receptor.

2.2.4.3 Auto clear tare

As an alternative to clear the tare via key, the indicator can be configured to automatic clear the tare, when the load is removed from the load receptor.

2.2.4.4 Preset tare

Instrument has the possibility for preset tare.

2.2.4.5 Temporary gross indication

When the tare function is active the Gross weight can be displayed temporarily, if the indicator is configured to it.

2.2.5 Printing

A printer may be connected to the serial data port. The weight indicator will transmit the current weight value to the printer, PC or to any other peripheral 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.

Printing might be done by digital input or by receiving a command from any protected digital interface or automatically instead of pressing key.

2.2.6 Automatic printing

The indicator can be configured to automatic print, when the load receptor is loaded and stable.

2.2.7 Inbound / Outbound weighing at weighbridge weighing (optional)

The indicator can – based on the truck ID – combine an inbound weighing of a vehicle with the outbound weighing of the same vehicle taking the smallest weight as a tare value and the other as a gross weight, if the option loaded and configured.
The Net value will not be shown in the display, but will be printed on the weighing ticket of vehicle.

2.2.8 Check weighing (optional)

The indicator can be set to check the actual weight against limits of item if the option loaded and configured. The target value of item is tared the indicator as PT. The net value is displayed to inform the deviation from the target of item to the user.

2.2.9 Classifying (optional)

The indicator can be set to classify actual weight against limits of item, if the option loaded and configured.

2.2.10 Filling (optional)

The indicator can be set to a non-automatic filling mode - filling the actual weight against limits of item, if the option loaded and configured.

2.2.11 Formulation / Recipe weighing (optional)

The indicator can be set to formulation mode, for weighing the components of the formula by operator, if the option loaded and configured.

2.2.12 Customized application (optional)

Free programming of the customer applications (eg data registration, stock keeping, customized weighing cycle etc.) software can be loaded in to the PC board of the instrument. The instrument has no any access to the legally related functions such as indicating of weighing results, storing data etc.

2.2.13 Statistical quality control (optional)

The indicator can be equipped with statistical control application for quality control of prepacked items by sampling, if the option loaded and configured.

2.2.14 Calculated volume (optional)

The indicator can be set to calculate the volume by preset density entry, if the option loaded and configured. The information part of the display announces the density and the calculated volume. If any, the calculated volume is marked and printed together with preset density value.

2.2.15 Memories

The indicator has memories for storing the identification data and limit values of items for usage at basic weighing, checkweighing, classifying, filling or formulation etc. depend on the application.

Furthermore, the instrument has PT memory for specified tare values.

2.2.16 Extended resolution

The indicator can - if configured to it - temporarily display the actual weight with extended resolution (d = 0.1e).

2.2.17 Operator information messages

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

2.2.18 Alibi memory

The indicators have a memory card on the PC board, which can store all the weighing results, when the instrument is set for usage in legal. The alibi memory is organized as a cyclic buffer of alibi records. The data in the alibi memory is checksum protected.

2.2.19 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.

2.3 Software versions

The format of the softwares are XX.YY, where XX is the revision of the legally relevant functionality of the software and YY is the sub-revision number for software changes related to error corrections and non-legal functionality of the software.

The approved versions are:

- Operating system (on the PC board) : 01.YY,
- Software version (on the PC board) : 01.YY,
- Scale software version (on weighing board(s)) : 01.YY.

3. Technical data

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

3.1 Indicator

The indicators have the following characteristics:

Type:	FT-150
Accuracy class:	III and IIII
Weighing range:	Single-interval, multi-interval (up to 3 intervals), multi-range (up to 3 ranges)
Maximum capacity (Max):	1 kg to 300 000 kg
Verification scale interval (e_i =):	≥ 0.1 g
Maximum number of Verification Scale Intervals (n_i):	≤ 10000 (class III), ≤ 1000 (class IIII)
Maximum tare effect:	-Max within display limits
Fractional factor:	p'i = 0.5 when used with analogue load cell(s), p'i = 0.0 when used with digital load cell(s).
Minimum input voltage per VSI:	0.4 µV
Excitation voltage:	5 VDC
Circuit for remote sense:	present on the model with 7-terminal connector for analog load cell(s)
Minimum input impedance:	43 ohms
Maximum input impedance:	1150 ohms
Mains power supply:	90-240 VAC, 50/60 Hz
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: 10514 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 = 0.0056 [% / 25K]
Coefficient of resistance for the wires in the J-box cable: Sx = 0.0001 [% / 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

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 Digital load cells

The digital load cells, which are listed below, are certified as modules in the weighing instrument.

Manufacturer	Load cell type	Cert. No.
Flintec	RC3D	TC6586

3.2.3 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 3.2.11 and 3.2.2
Drawings:	Various

3.2.4 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 or near the dead structure
Load cell:	Load cell according to Section 3.2.11 and 3.2.2
Drawings:	Various

3.2.5 Crane, hoist, mono-rail and other suspension type systems

Construction in brief	Load cell assembly(-ies) each consisting of a load cell depends on the system.
Reduction ratio	1
Junction box	Mounted in, on or near the dead load
Load cell	Any R60 certified load cell according to Section 3.2.1 and 3.2.2
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. T213077) 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

One or two 7-terminal connectors for the analogue load cell(s); or 4 or 6-terminal connector for digital load cell(s) is positioned inside the enclosure.

4.1.2 Communication and I/O interfaces

The indicator is equipped with the following communication and I/O interfaces,

- 2 RS-232
- RS485
- 2 USB
- Ethernet
- Optional: Digital input/outputs
- Optional : Parallel printer port

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 is allowed by 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 Lengths of digital input and output cables should be less than 3 meters.

The lengths of digital input and output cable(s) to the control cabinet should be maximum 3 meters.

5.3 Compatibility of modules

Composition of modules, EN 45501:2015, Annex F shall be satisfied. If more than one platform it shall be satisfied for each platform/scale.

6. Special conditions for verification

6.1 Approval parameter shall be set to OIML

The parameter related with approval shall be set as OIML. The alibi memory is activated automatically after this setting.

6.2 Third scale interface

If any, the third scale is connected via any serial interface to the indicator, and if it is realized using a weight transmitter then this module shall have an Evaluation Certificate according to WELMEC Guide 8.8 and EN 45501:2015.

6.3 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 5.3.

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 D or F of the Directive 2014/31/EU.

7.1.1 Indicator

Access to the configuration and calibration facility requires that a calibration switch is depressed. The switch is positioned on the weighing board below a sealable cover inside the enclosure.

Sealing of the indicator - to prevent access to the calibration switch 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:

- The load cell connector is positioned next to the calibration switch on the weighing board and therefore secured by the same cover 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 interfaces are “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.

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.

- Max_i, Min_i, e_i =, and d_i = (if d < e) are indicated in the header bar, on the top of the display.

On the inscription plate:

- Manufacturer's name and/or logo, postal address of manufacturer, model no., serial no., type examination certificate no., Max_i, Min_i, e_i =, d_i = (if d < e), accuracy class, supply voltage.

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-150 indicator – Desktop/wall hanging model.

Figure 2 FT-150 indicator –Harsh Desktop/wall hanging model.

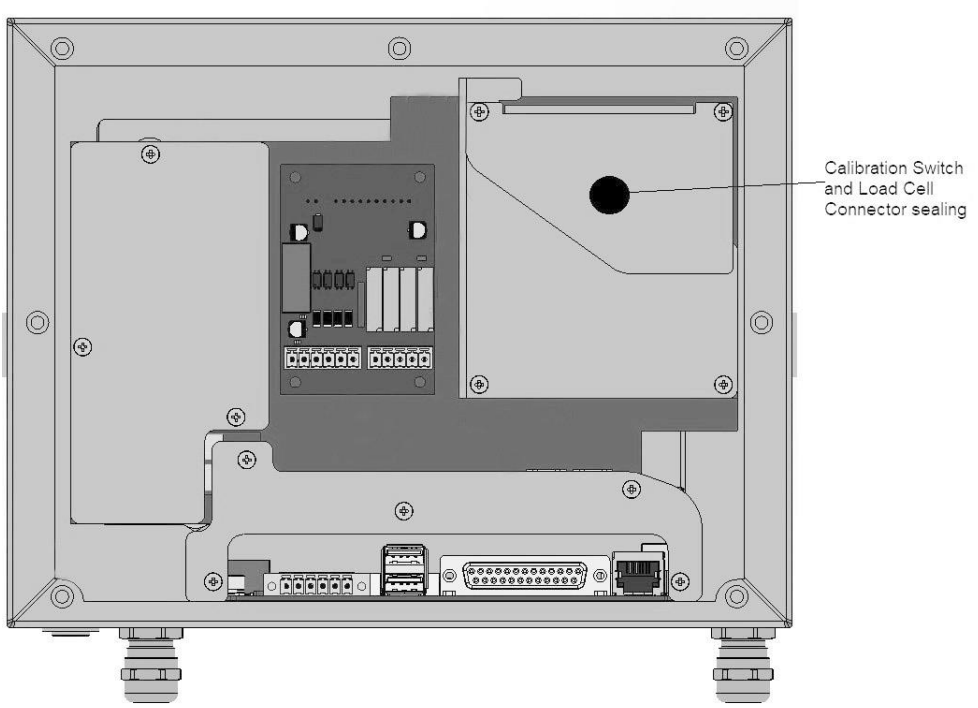

Figure 3 Sealing of FT-150 indicator Desktop/wall hanging model with brittle sticker.

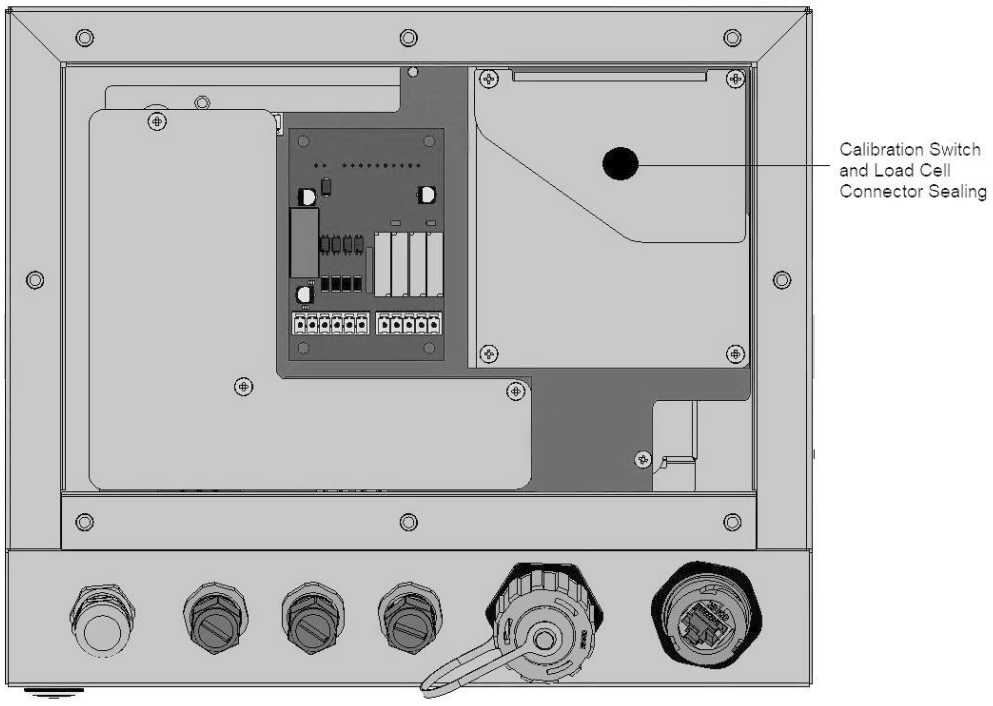

Figure 4 Sealing of FT-150 indicator Harsh Desktop/wall hanging model with brittle sticker.

10. Composition of modules – an example

COMPATIBILITY OF MODULES

Ref.: WELMEC 2

Non-Automatic Weighing Instrument, single-interval.

Certificate of EU Type-Approval N°: TAC: 0200-NAWI-14274

INDICATOR A/D (Module 1)		Type:	FT-150			
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}		10000	
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]		
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]	10514	
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:	PC30			
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]	385	
Minimum load cell verification interval:	($v_{min\%}$ = 100 / Y)		$v_{min\%}$	[% of Emax]	0,01	
Rated capacity:			E_{max}	[kg]	100	
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:			D09-08.08			
COMPLETE WEIGHING INSTRUMENT			Single-interval			
Manufacturer: Flintec GmbH		Type:	FT-150 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]	30	
Number of verification scale intervals:			n		3000	
Verification scale interval:			e	[kg]	0,01	
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]	0,22	
J-box cable-Length:			L	[m]	5	
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 =	7000
n	<=	n_{LC}	(R76: 4.12.2)	n_{LC} - n =	0
E_{min}	<=	DL * R / N	(WELMEC 2: 6d)	(DL * R / N) - E_{min} =	3,9
$v_{min} * \sqrt{N} / R$	<=	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)	$\Delta u - \Delta u_{min}$ =	0,60
R_{Lmin}	<=	R_{LC} / N	(WELMEC 2: 9)	(R_{LC} / N) - R_{Lmin} =	298
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)	$(L / A)_{max}^{WI}$ - (L / A) =	10491
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) =	63,1

Signature and date:

Conclusion . . . . . PASSED

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