DANAK
PROD Reg. nr 7026

FORCE Certification

EU Type Examination Certificate

No. 0200-MID-09479

FT-10 Fill

AUTOMATIC GRAVIMETRIC FILLING INSTRUMENT

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

In accordance with the requirements in Directive 2014/32/EU of the European Parliament and Council.

Issued to **Kalibratie Bureau Nederland**
Rijthoek 12
4175 LM Haaften
Nederlands

In respect of An automatic gravimetric filling instrument designated **FT-10 Fill** with variants of modules of load receptors, load cells and peripheral equipment.
Reference class 0.2
Maximum capacity, Max = n × e
Verification scale interval: e ≥ 1 g
Number of verification scale intervals: n ≤ 10 000 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 and the specific requirements in Annex MI-006, chapter I & III of the Directive 2004/22/EC is met by the application of OIML R61-1:2004, section 12 & 13 of OIML D11:2004, WELMEC Guide 7.2, and WELMEC Guide 8.16-2:2014.

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

The annex comprises 14 pages.

Issued on **2020-11-13**
Valid until **2030-11-13**

Jens Hovgård Jensen
2020-11-13

Digitally signed by Jens Hovgård Jensen
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FORCE Certification references:
Task no.: 120-34350.90.10 and ID no.: 0200-MID-09479

Signatory: Jens Hovgård Jensen

Descriptive annex

Contents

1. Name and type of instrument and modules

The automatic weighing instrument designated FT-10 Fill is an automatic gravimetric filling instrument consisting of the electronic weighing indicator connected to a separate load receptor, to the feeding control, and peripheral equipment such as printers or other devices, as appropriate.

The instrument is a self-indicating filling instrument with single-interval.

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 FT-10 Fill weighing indicator

The weighing indicator of the FT-10 Fill gravimetric filling instrument scale is the indicator type FT-10 Fill.

The indicator consists of analogue to digital conversion, microprocessor control circuitry, power supply, keyboard, non-volatile memory for storage of calibration and metrological setup data, option boards, and a weight display contained within a single enclosure.

The FT-10 Fill indicator is housed in an enclosure intended for panel mount with a front of stainless steel, while the body is made of aluminium.

The front panels of the indicator comprise of

- LED display having appropriate state indicators and 6 digits
- A keyboard containing 5 keys used to enter commands or data into the weight indicator. Each key is identified with a name and/or pictograph.

The module is specified in Section 3.2.

2.1.2 Load cells

Set out in Section 3.3.

2.1.3 Load receptor

Set out in Section 3.4.

2.1.4 Interfaces and peripheral equipment

Set out in Section 4.

2.2 Functions

The weighing indicator is microcontroller based electronics that requires the external connection of strain gauge based analogue load cells. The weight information appears in the digital display located on the front of the instrument and may be transmitted to peripheral equipment for recording, processing or display. There are available data output options such as binary data output, analogue output, Modbus, Ethernet etc.

The primary functions provided are detailed below. The key functions can – in addition to the keyboard - be provided via opto-isolated inputs, serial interfaces, BSI interface, Modbus RTU, profibus, profinet, CANopen and/or Ethernet.

The main functions are described below.

2.2.1 Test function

On power up the indicator will test all memory functions and cause all display elements to illuminate so that a visual verification of their operation can be made.
In case of error, appropriate error messages are given.

2.2.2 Zero setting

The indicator has the following zero-setting functions.

Initial zero-setting with range: ±10% of Max.
Semi-automatic zero-setting with range: ±2% of Max.
Zero-tracking with range: ±2% of Max.
Automatic zero-setting with range: ±2% of Max.

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

Zero setting can only take place when the weight signal is stable.

2.2.2.1 Semi-automatic zero-setting

Pressing the ZERO key causes a new zero reference to be established and the ZERO annunciator to be illuminated at the centre of zero.
This function is not enabled when the weighing instrument is in automatic mode.

2.2.2.2 Zero-tracking

The indicators are equipped with a zero-tracking feature, which operates when the indicator is at gross zero and the weight signal is stable.

2.2.2.3 Automatic zero setting

Zero setting may take place during filling process, if programmed. The zero setting conditions are applied here.

The zeroing is performed automatically at the following filling after this time. The value entered here shall be less than or equal to the value calculated at the OIML R-61 section A.5.3.5 for approved usage and stated in Section 3.

2.2.3 Tare device

The FT-10 Fill is equipped with a subtractive tare device, whereby the maximum tare capacity corresponds to the maximum indication of the scale. The condition for tare operation is the equilibrium of the scale and positive indication. The status of tare is marked by the symbol “Net” on the display. Repeated pressing causes the tare to be cleared and new tare entered in its place.

2.2.4 Automatic tare device

Tare setting may take place during filling process, if programmed. All tare device conditions are applied in this device.

2.2.5 Increased display resolution (in weighing mode)

The weight indicator is equipped with increased resolution, which operates after pressing the related key and functioning shorter than 5 seconds. It is not possible to get print out in increased resolution.

2.2.6 Target (preset) value device

Value, expressed in units of mass, preset by the operator by means of the fill setting device, in order to define the nominal value of the fills.

2.2.7 Pre-act adjustment device

The setting of the fine feed cut-off value may be supplemented for minimizing the filling deviation.

2.2.8 Gross / Net indication device

If the instrument has Gross / Net key on it, the weight display can be switched from net indication to gross indication for five seconds by pressing the Gross / Net key.

2.2.9 Keyboard functions

According to the software of the instrument, the keys have various functions.

All key functions are described in the keyboard drawings in the manual of the FT-10 Fill indicator.

2.2.10 Printing

The instrument can be connected to serial printers with the proper interface. It can be programmed to print date and time of weighing, consecutive number of printing that may be required together with weight / filling results.

Printing is not possible when the indicator is not stable, or the display has a negative value.

2.2.11 Gravity acceleration

The gravity acceleration adjustment parameter can be used to compensate the weight difference between the place in which the instrument is calibrated and the place of usage. There is one parameter for this adjustment. The value entered into this parameter before calibration is considered as a reference value. After calibration, the value in the parameter is seen as 0. For gravity adjustment, the new value must be entered in to this parameter after calibration. After entering the new value, the calibration is automatically adjusted for the place of usage.

2.2.12 Adjusting device

Regarding the connection of the scale, the metrological relevant adjustment is filed in the memory of the evaluation electronics. The access to this adjusting mode or a change of these metrological adjustments is only possible after the short circuit of the calibration jumper.

2.2.13 Software

The software versions of the FT-10 Fill weighing indicator are displayed at start-up.

The software version of the FT-10 Fill firmware is 2.xx, where xx is a sub-revision numbers for software changes not related to the legal functionality of the software.

3. Technical data

The automatic weighing instruments and its modules are set out as follows:

3.1 FT-10 Fill Automatic gravimetric filling instrument

Type:	FT-10 Fill
Reference class Ref(x):	0.2
Accuracy class X(x):	0.2, 0.5, 1 or 2
Loads per fill:	Single-load or cumulative multi-load
Weighing range:	Single-interval
Rated minimum fill, MinFill:	≥ The value found in the tables below
Maximum capacity (Max):	= n × d
Minimum capacity (Min):	= MinFill for single load fill < MinFill for cumulative fillers
Verification scale interval (d):	≥ 1 g
Number of Verification Scale Intervals (n):	≤ 10 000
Maximum tare effect:	≤ 100 % of Max
Temperature range:	-10° to 40° C
Weighing mode:	Static
Electromagnetic class:	E2
Humidity:	Non-condensing
Maximum time between automatic zero-setting:	90 minutes
Extra warm-up time:	Not needed

Minimum filling's (MinFill) dependency of verification scale interval (d) in g and accuracy class X(x) for weighing controller FT-10 Fill for verification scale interval d = 0.4 µV.

	Accuracy class							
d	**X(0.2)**		**X(0.5)**		**X(1)**		**X(2)**	
[g]	d	[kg]	d	[kg]	d	[kg]	d	[kg]
1	1865	1.865	373	0.373	125	0.125	32	0.032
2	1865	3.730	746	1.492	187	0.374	63	0.126
5	1865	9.325	746	3.73	373	1.865	94	0.470
10	2798	27.98	746	7.46	373	3.73	187	1.87
20	2798	55.96	1119	22.38	373	7.46	187	3.74
50	2798	139.9	1119	55.95	560	28	187	9.35
100	2798	279.8	1119	111.9	560	56	280	28
200	2798	559.6	1119	223.8	560	112	280	56
≥ 500	2798		1119		560		280	

Minimum filling's (MinFill) dependency of verification scale interval (d) in g and accuracy class X(x) for weighing controller FT-10 Fill for verification scale interval d = 1.0 µV.

d	Accuracy class							
	X(0.2)		X(0.5)		X(1)		X(2)	
[g]	d	[kg]	d	[kg]	d	[kg]	d	[kg]
1	373	0.373	50	0.050	25	0.025	13	0.013
2	745	1.490	100	0.20	25	0.050	13	0.026
5	745	3.725	298	1.49	75	0.375	25	0.125
10	745	7.45	298	2.98	149	1.49	38	0.38
20	1117	22.34	298	5.96	149	2.98	75	1.50
50	1117	55.85	447	22.35	149	7.45	75	3.75
100	1117	111.7	447	44.7	224	22.4	75	7.5
200	1117	223.4	447	89.4	224	44.8	112	22.4
≥ 500	1117		447		224		128	

3.2 Indicator

The indicator has the following characteristics:

Type:	FT-10 Fill
Weighing range:	Single interval
Maximum number of Verification Scale intervals:	10 000
Maximum subtractive 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
Minimum input impedance:	43 ohm
Maximum input impedance:	1200 ohm
Operating temperature range:	-10 °C to +40 °C
Mains power supply:	12 - 28 VDC
Peripheral interface:	Set out in Section 4

3.2.1 Connecting cable between the indicator and a junction box for load cell(s), if any

Cable between indicator and junction box: 6 wires (sense), shielded

Maximum cable length between indicator and junction box (J-box) for load cell(s), if any:

- Option 1: 4824 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 = 0.0044 [% / 25K].

Coefficient of resistance for the wires in the J-box cable: Sx = 0.0002 [% / ohm].

L/Amax = 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.

The calculation program is obtainable by downloading at www.delta.dk/weighing.

3.3 Load cells

3.3.1 General acceptance of load cells

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

1) A test certificate (EN 45501) or a respective OIML Certificate of Conformity (R60) is issued for the load cell by a Notified Body responsible for type examination under the Directive 2009/23/EC.

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.

3.4 Load receptors

Movable load receptors shall be equipped with level indicators.

3.4.1 Platforms

Construction in brief:	All-steel, aluminium, plastic, steel-reinforced concrete construction or hybrid construction of these materials. Bench, surface, pit or wall mounted.
Reduction ratio:	1
Junction box:	Mounted in, on or near the platform.
Load cells:	Any R60 certified load cell according to Section 3.3.1.
Drawings:	Various

3.4.2 Bin, tank, and hopper load receptors

Construction in brief:	Load cell assemblies each consisting of a load cell stand assembly to support one of the mounting feet bin, tank or conveyor etc.
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.
Drawings	Various

3.5 Feeding

The feeding system is gravity feeding. The feeding system has coarse and fine feeding.

3.6 Composition of modules

In case of composition of modules, EN 45501 annex F shall be satisfied.

3.7 Documents

The documents filed at DELTA (reference No. T207744) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

4.1 Interfaces

One or more of the following interfaces may be incorporated. The interfaces are protective and need not to be secured.

4.1.1 RS 232C serial interface

Indicator is equipped with a RS 232C interface. It is configurable as continuous output, fast continuous output, printer output, BSI interface or Modbus RTU.
Key functions can be performed via serial interfaces.

4.1.2 RS 485 serial interface

Indicator is equipped with a RS 485 interface. It is configurable as continuous output, fast continuous output, printer output, BSI interface or Modbus RTU.
Key functions can be performed via serial interfaces.

4.1.3 Digital I/O interface

The instrument has 4 digital input and 7 digital output, which are used to control the filling and for key entry.

4.1.4 Ethernet interface (FT-10 Fill EN only)

The Ethernet interface can be used for all available data output facilities of the instrument including output to printer. Key functions can be performed via Ethernet interface.

4.1.5 Profibus (FT-10 Fill PB only)

The indicator can be connected to the process controllers via profibus interface. The key functions can be performed via profibus interface.

4.1.6 Profinet (FT-10 Fill PN only)

The indicator can be connected to the process controllers via profinet interface. The key functions can be performed via profinet interface.

4.1.7 CANopen (FT-10 Fill CO only)

The indicator can be connected to the process controllers via CANopen interface. The key functions can be performed via CANopen interface.

4.2 Peripheral equipment

Connection between the indicator and peripheral equipment shall be done by screened cables.

The instrument may be connected to any simple peripheral device with a CE mark of conformity.

5. Approval conditions

5.1 The legal metrology parameter (par. 200) must be adjusted as 1

The parameter 200 of the instrument must be adjusted as 1 for usage of the instrument in approved applications.

5.2 Compatibility of modules

For the 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 5.3.

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 mark of the manufacturer or alternative the verification mark of a notified body according to ANNEX II, module D or F of Directive 2014/32/EU.

7.1.1 Indicator

Access to the configuration and calibration facility requires that the calibration switch on the mainboard is in position ‘ON’.

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 using brittle stickers
(see Fig. 2).

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.

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 for load cells

Access to the junction box for analogue load cells, if any, is prevented by the use of lead wire seals or by sealing it with brittle plastic stickers.

7.1.4 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.

7.2 Verification marks

A sticker with verification mark is to be placed on the identification plate of the instrument.

8. Location of CE mark of conformity and inscriptions

8.1 Identification plate

All inscriptions for the instrument shall be placed on the identification plate, which is to be located visible on the instrument.

8.1.1 CE mark and metrological M

A CE mark of conformity followed by the metrological M and year of production within a rectangle shall be located on the identification plate.

8.1.2 Inscriptions

The identification plate shall bear the following inscriptions:

- Manufacturer's trademark and / or name
- Postal address of manufacturer
- Type designation
- Serial number
- Reference class
- Accuracy class
- Max, Minfill and d (these shall additional be duplicated near the display unless the description plate is located near the display)
- Temperature range: -10 °C / +40 °C
- Electromagnetic class: E2
- Humidity: Non-condensing
- Type examination certificate number.

9. Pictures

Figure 1 FT-10 Fill indicator.

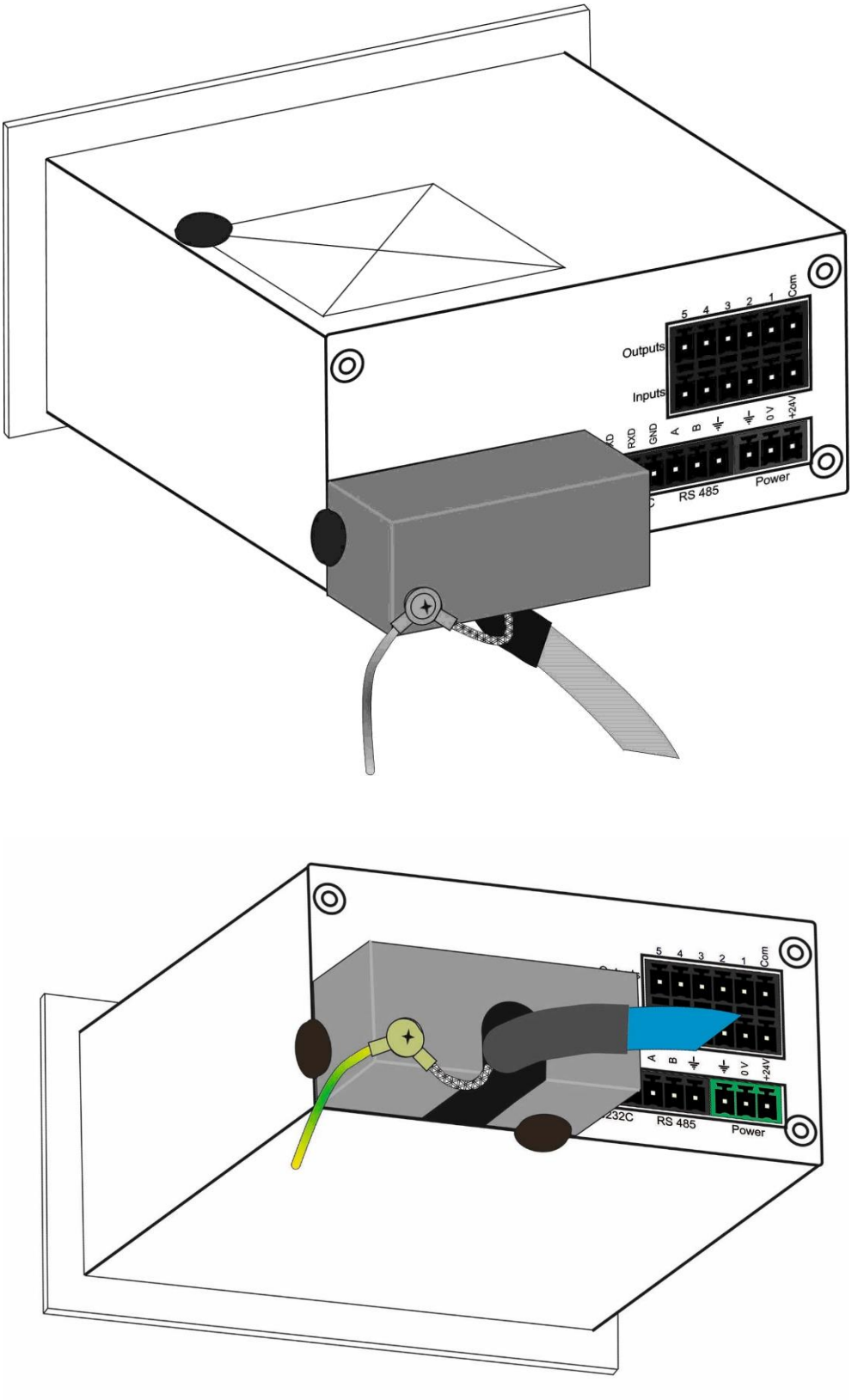

Figure 2 Sealing of FT-10 Fill indicator with brittle stickers.

Figure 3 FT-10 Fill AGFI with platform load receptor for mode net filling

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-MID-09479

INDICATOR A/D (Module 1)		Type:	FT-10 Fill		
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]	58	
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]	4824	
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:	Tedea-Huntleigh 1042		
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]	358	
Minimum load cell verification interval:	($v_{min\%}$ = 100 / Y)	$v_{min\%}$	[% of Emax]	0,00667	
Rated capacity:		E_{max}	[kg]	10	
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			TC2949		
COMPLETE WEIGHING INSTRUMENT			Single-interval		
Manufacturer: Kalibratie Bureau NL		Type:	FT-10 Fill		
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]	3	
Number of verification scale intervals:		n		3000	
Verification scale interval		e	[kg]	0,001	
Utilisation ratio of the load cell		$\alpha = (Max / E_{max}) * (R / N)$		0,30	
Input voltage (from the load cels):		$\Delta_u = C * U_{exc} * \alpha * 1000 / n$	[µV/e]	1,00	
Cross-section of each wire in the J-box cable:		A	[mm²]	0,22	
J-box cable-Length		L	[m]	3	
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} =	0,39
$v_{min} * \sqrt{N} / R$	<=	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)	Δu – Δu_{min} =	0,60
R_{Lmin}	<=	R_{LC} / N	(WELMEC 2: 9)	(R_{LC} / N) - R_{Lmin} =	300
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)	$(L / A)_{max}^{WI}$ - (L / A) =	4810
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) =	6,3

Signature and date:

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

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