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EC Type-Approval Certificate

No. DK 0199.492

FT-10 / FT-10 Fill / FT-10 Flow

NON-AUTOMATIC WEIGHING INSTRUMENT

Issued by **DELTA Danish Electronics, Light & Acoustics**
EU - Notified Body No. 0199

In accordance with the requirements for the non-automatic weighing instrument of EC Council Directive 2009/23/EC.

Issued to **Flintec GmbH**
Bemannsbruch 9
74909 Meckesheim
GERMANY

In respect of Non-automatic weighing instrument designated FT-10 / FT-10 Fill / FT-10 Flow 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 150 000 kg
Verification scale interval: e = Max / n
Maximum number of verification scale intervals: $n \leq 10000$
(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 45501:1992/AC:1993 and OIML R76:2006.

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

The annex comprises 13 pages.

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Descriptive annex

Contents

1. Name and type of instrument and modules

The weighing instrument is designated FT-10 / FT-10 Fill / FT-10 Flow. 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 and supplied from 12 – 28 VDC.

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 indicators are housed in an enclosure intended for panel mount with a front of stainless steel or plastic (only available at FT10 as variant), 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.

Electronics

The instrument uses three printed circuit boards,

- one for microcontroller, load cell interface, power supply, and some standard I/O
- one for the remaining I/O (several versions depending on the I/Os)
- one for display and keyboard.

All instrument calibration and metrological setup data are contained in non-volatile memory. The power supply accepts an input voltage of 12 to 28 VDC.
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 (FT-10), in kg (FT-10 Fill) or in kg or t (FT-10 Flow).

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 "G/N" key displays the Gross weight temporarily (FT-10).

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.

2.2.5 Printing

If configured to it a printer may be connected to one of the serial data ports (RS 232/RS 485/Ethernet). 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.

2.2.6 Extended resolution

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

2.2.7 Display test

A self-test routine is initiated after energizing the instrument. 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 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 2.YY.

2.2.10 Totalisation

The indicator has a totalisation function – if configured to it – adding the individual weight values to the memory. The total can be displayed by pressing "F" key.

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

3. Technical data

3.1 Indicator

The indicators have the following characteristics:

Type:	FT-10 / FT-10 Fill / FT-10 Flow
Accuracy class:	III and IIII
Weighing range:	Single-interval
Maximum capacity (Max):	1 kg to 150 000 kg
Minimum capacity (Min):	$20 \times e_1$
Verification scale interval (e =):	$\geq$ 0.1 g
Maximum number of Verification Scale Intervals:	$\leq$ 10 000 (class III), $\leq$ 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
Minimum input impedance:	43 ohm
Maximum input impedance:	1100 ohm
Mains power supply:	12 -28 VDC
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: 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/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.

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

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 approval provided the following conditions are met:

1) A test certificate (EN 45501) or OIML Certificate of Conformity (R60) respectively 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, Issue 6, 2014), and any particular installation requirements). A load cell marked NH is allowed only if humidity testing to EN 45501 has been conducted on this load cell.

3) The compatibility of load cells and indicator is established by the manufacturer by means of the compatibility of modules form, contained in the above WELMEC 2 document, or the like, at the time of EC verification or declaration of EC conformity of type.

4) The load transmission must conform to one of the examples shown in the WELMEC 2.4 Guide for load cells.

3.2.2 Platforms, weigh bridge platforms

Construction in brief:	All-steel or steel-reinforced concrete construction, surface or pit mounted
Reduction ratio:	1
Junction box:	Mounted in or on the platform
Load cells:	Load cell according to Section 3.2.1
Drawings:	Various

3.2.3 Bin, tank, and hopper 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 paragraph 3.5 and 4.12 shall be satisfied.

3.4 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

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.

4.1.2 Communication and I/O interfaces

- Serial interface RS 232C
- Digital input / output
- Serial interface RS 485 (optional)
- Profibus DPV1 interface (optional)
- Profinet interface (optional)
- CANopen interface (optional)
- Ethernet interface (optional)
- Modbus RTU (optional)
- Modbus TCP (optional)
- Analogue output (optional)

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

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. Approval conditions

5.1 Measurement functions other than non-automatic functions

Measurement functions that will enable the use of the instrument as an automatic weighing instrument are not covered by this type approval certificate.

5.2 Compatibility of modules

In case of composition of modules, WELMEC 2 (Issue 65) 2014, paragraph 11 shall be satisfied.

6. Special conditions for verification

6.1 Composition of modules

The environmental conditions should be taken into consideration by the composition of modules for a complete weighing instrument, for example instruments with load receptors placed outdoors and having no special protection against the weather.

The composition of modules shall agree with Section 5.2.

An example of a 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 2.3 of the Directive 2009/23/EC.

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. 8).

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 Peripheral interfaces

The peripheral interface is "protective"; it neither allows manipulation with weighing data or legal set-up, 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

A green M-sticker shall be placed next to the CE mark on the inscription plate.

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 a separate green M-sticker 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

The CE mark of conformity and year of production is located on the identification plate, which is located on the enclosure of the weight indicator.

8.1.2 Inscriptions

Manufacturer's trademark and/or name and the type designation is located on the front panel overlay.

On the front panel overlay or indelibly printed on a brittle plastic sticker located there:

- Max, Min, e = , and d = (if d < e)

On the inscription plate:

- Manufacturer's name and/or logo, model no., serial no., type-approval 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-10 indicator with plastic front.

Figure 2 FT-10 indicator with stainless steel front.

Figure 3 FT-10 Fill indicator.

Figure 4 FT-10 Flow indicator.

Figure 5 Example of logo for front panel of indicator.

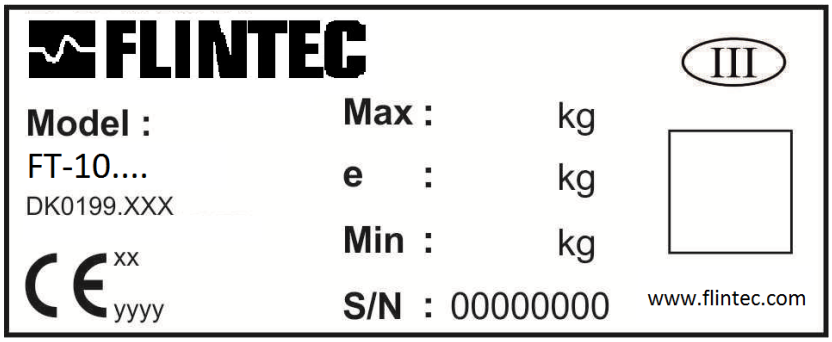

Figure 6 Example of inscription plate for single-interval.

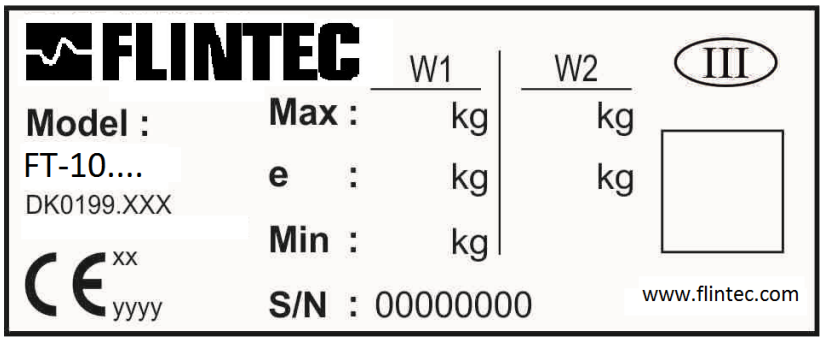

Figure 7 Example of inscription plate for multi-range.

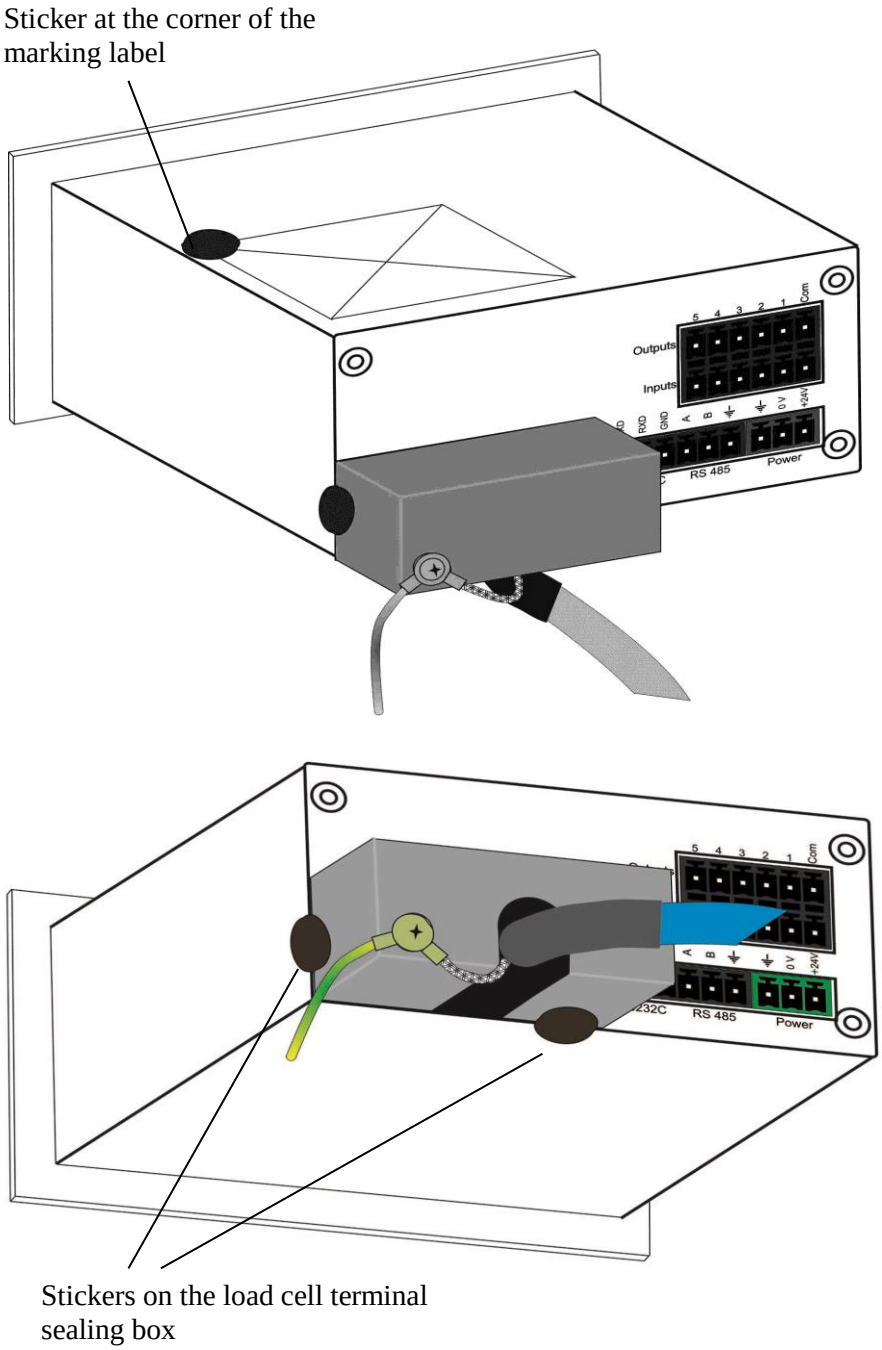

Figure 8 Sealing of FT-10.. indicator with brittle stickers.

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: DK0199.492

INDICATOR A/D (Module 1)		Type:	FT10			
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:	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]	358		
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		Type:	FT10 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]	60		
Number of verification scale intervals:		n		3000		
Verification scale interval:		e	[kg]	0,02		
Utilisation ratio of the load cell:		$\alpha = (Max / E_{max}) * (R / N)$		0,60		
Input voltage (from the load cells):		$\Delta_u = C * U_{exc} * \alpha * 1000 / n$	[µV/e]	2,00		
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} =	7,8
$v_{min} * \sqrt{N} / R$	<=	e	(R76: 4.12.3)	e - (v_{min} * $\sqrt{N}$ / R) =	0,010
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} =	1,60
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) =	26,2

Signature and date:

Conclusion . . . . . PASSED

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