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EC Type-Approval Certificate

No. DK 0199.535

CUC-Ex MKIV

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 **Kosan Crisplant A/S**
P. O. Pedersens Vej 22
8200 Aarhus N
Denmark

In respect of Non-automatic weighing instrument designated CUC-Ex MKIV using CUC digital weighing indicator, LCM load cell module and variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class III
Maximum capacity, Max: From 1 kg up to 150 000 kg
Verification scale interval: e = Max / n
Maximum number of verification scale intervals: n = 3000 (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 EN 45501:2015, OIML R76:2006 and WELMEC 2.1:2001.

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 CUC-Ex MKIV (Crisplant Universal Controller), which is a system consisting of a control unit (CUC) and an load cell interface module (LCM) connected to a separate load receptor, see Figure 1.

The instrument is a Class III, self-indicating weighing instrument with single-interval. The instrument is powered by either the CPI-Ex (Crisplant Power Interface) or the CBP-Ex (Crisplant Battery Pack). The system is for use in hazardous areas.

The modules appear from Sections 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 CUC (display module)

The module is specified in Section 3.1.

Enclosures and keyboard

The CUC module is housed in a plastic enclosure 125 mm wide 245 mm high 90 mm deep. It is designed primarily for industrial use, but may also be used in an office environment. This enclosure is designed to meet an IP65 rating and can be exposed to water and dust.
See Figure 2.

The front panel comprises:

- LCD display
- 16 key sealed membrane keypad (12 keys for encoding and 4 function keys).
  Each key is identified with a name and / or pictograph.
- Push button

The bottom of the enclosure contains:

- A power/communication cord attached to the instrument via a gland connector.
- A load cell module cord attached to the instrument via a gland connector.
- A gland connector for cable to digital inputs.
- A gland connector for cable to digital outputs.

Electronics

The CUC module consists of microprocessor control circuitry with volatile and non-volatile memory, keyboard, and display. The function of it is to control the weighing sequence and receive weight information from the load cell interface module (LCM) and show the digital represented weight in the display.

2.1.2 LCM module

The LCM module is housed in aluminium enclosure approximately 80 mm wide, 75 mm high, and 60 mm deep. The enclosure is designed to meet an IP66 rating and can be exposed to water and dust.

The side of the enclosure contains:

- A 4 pin female connector for connecting the CUC Ex MKIV.
- A gland connector for access to the load cell input terminal block inside the enclosure.

Electronics

The LCM module comprises a microprocessor circuitry, analogue to digital conversion circuitry, a 4 wire interface for load cell input and a serial communication interface to the CUC, non-volatile memory for storage of calibration data within a single enclosure. The function of the LCM module is to convert the load cell signal into a digitized representation and send information to the CUC. All the configuration parameters for the weight that are under legal metrology control are stored in the non-volatile memory of the LCM module.

2.1.3 Power supply box / junction box

The CPI-Ex power supply for the instrument is of universal switching type and can accept an input voltage from mains from 100 to 240 VAC 50 or 60 Hz.

Alternatively the instrument can be supplied from the CPB-Ex battery pack.

When the instrument is powered, a junction box is inserted between the CUC and power source. The power supply includes an interface to a bi-directional RS485 serial interface.

The CUC produces a voltage of 5 VDC for powering the LCM module.

2.1.4 Platform (load receptor)

The platform has a lower part and an upper part with the load cell mounted in between. The lower part is made of a steel plate and the upper part (load receptor) is made of steel profiles. The LCM is normally mounted on the lower part of the platform.

2.1.5 Interfaces and peripheral equipment

Set out in Section 4.

2.2 Function

The primary functions provided are detailed below.

2.2.1 Power up / reset

On power up or reset, the weight indicator will show a logo, then the instrument model number and the software revision followed by a test. Hereafter the indicator will show ready (if no errors detected) and finally the current weight using either the previously established zero reference or, if configured to do so, will automatically establish the current weight as a new zero reference.

2.2.2 Test function

On power up or reset, the weight indicator will test all memory functions followed by a display test. Each test takes about ½ second. At the conclusion of the test, the indicator displays “ready”.

2.2.3 Display range

The weight indicators will display weight from –99,999e to Max +9e (gross weight) within the limits of the display capacity.

2.2.4 Zero-setting

Pressing the ZERO key causes a new zero reference to be established.

Zero-setting range: 4 % of Max.
Initial zero-setting range: 20 % of Max.

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

2.2.5 Zero-tracking

The indicator is 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.

2.2.6 Units

The selected unit of measure is indicated in the weight display. Available units of measure include kilogram or pound.

2.2.7 Tare

The instrument models are provided with keyboard preset tare feature.

2.2.7.1 Preset (numeric) tare

A preset or numeric tare feature, which allows entry of a known tare value, is available in the instrument. Press the appropriate numeric keys to enter the known tare weight, then press the ENTER key. When the ENTER key is pressed, the numeric value entered will be accepted as the new tare weight and the display will automatically enter the net weight display mode as indicated by turning the NET symbol on. The tare value entered must agree with the verification scale interval, e. Entered tare values with more than one decimal are rounded to the e-value.

2.2.8 Net / Gross indication

Once a valid tare weight other than zero has been stored, the display can be switched from gross weight display mode to net-weight display mode by pressing a service key number. Each time the service key is pressed, the display will alternate between the net and gross display modes. The selected mode is indicated with a symbol in the display. If net mode display is on the letter N appears in the CUC display.

2.2.9 Operator information messages

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

2.2.10 Software version

The approved software versions are:

for CUC: 3.xx.yy
for LCM: 1.01.zz

[xx],[yy],[zz]: The letters represent numbers between [01..99].

The non-volatile memory of the LCM module holds a serial number and an event counter.
S/N [YYMMDD-XXXX]
where YY=year, MM=month, DD=date followed by a number in succession XXXX.

EVT CNT [kkkkk] is the LCM event counter value. The counter is a non-resettable value that increments once each time special operational mode of the weighing instrument is entered and one or more changes are made to the configuration parameters of the weighing instrument.

The CUC software number is shown during start-up of the instrument, alternatively all software revision levels can be displayed upon request. Refer to owner's user manual.

3. Technical data

3.1 CUC-Ex MKIV

The CUC-Ex MKIV non-automatic weighing instrument has the following characteristics:

Type:	CUC-Ex MKIV
Temperature range:	-10° to 55° C
Accuracy class:	III
Weighing range:	Single-interval
Maximum capacity (Max):	1 kg to 150 000 kg
Maximum number of Verification Scale Intervals(n):	3000 (class III)
Verification scale interval (e =):	Max/n
Maximum tare effect:	-Max within display limits
Humidity:	Non-condensing
Electromagnetic class:	E2
External mains power supply:	100 to 240 Vac (50/60 Hz) or 12 Vdc battery
Peripheral interface:	Set out in Section 4

3.2 LCM - analogue data processing device

Type:	LCM
Temperature range:	-10 °C to 55 °C
Accuracy class:	III
Weighing range:	Single-interval
Maximum number of Verification Scale Intervals:	3000 (class III)
Internal resolution:	> 30,000 counts
Maximum tare effect:	-Max within display limits
Fractional factor:	pi = 0.5
Minimum input-voltage per VSI:	1 µV
Minimum signal voltage for dead load:	1 mV
Excitation voltage:	5 Vdc
Analogue range:	0 to 10 mV
Circuit for remote sense:	None
Minimum input-impedance:	175 ohm
Maximum input-impedance:	1200 ohm
Supply voltage:	5 Vdc

3.2.1 Connecting cable between the LCM module and load cell

Line:	4 wires (no sense), shielded
Maximum length:	The certified length of the load cell cable

3.3 Load receptors, load cells and load receptor supports

The platform is designed for fix mounting.

3.3.1 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) There is a respective OIML Certificate of Conformity (R60) or a test certificate (EN 45501) 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.

3.3.2 Platforms,

Construction in brief:	All-steel platform
Reduction ratio:	1
Junction box:	Mounted in or on the platform – if applicable
Load cells	Load cell according to Section 3.3.1
Drawings:	Various

3.4 Composition of modules

In case of composition of modules, EN 45501: 2015 annex F shall be satisfied.

3.5 Documents

The documents filed at DELTA (reference No. T211102) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

The interfaces are characterised "Protective interfaces" according to paragraph 8.4 in the Directive.

4.1.1 Load cell interface

A 4-terminal connector for the load cell is positioned inside the LCM and is accessed through a gland connector on the load cell module enclosure.

4.1.2 Power supply / junction box

The power supply includes electronics to convert the main power supply to appropriate supply voltage for the weighing system.
The junction box includes connectors for distributing the supply voltage. Figure 1 shows an example of one particular configuration of the weighing equipment.

4.1.3 Serial I/O interface

The serial connection to the CUC-Ex is always done through the power supply, which has a RS485 channel that also Ex protects the device.
A 2-terminal connector providing a bi-directional RS485 compatible interface is positioned on the power supply and is accessed through a gland connector on the side panel of the instrument enclosure.

The interfaces do 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.

5.2 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 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 CUC display unit

Sealing of the cover of the enclosure - to secure the electronics against dismantling/exchange - is accomplished with a brittle plastic sticker. The sticker is placed so access to one of the screws of the enclosure is prohibited.

7.1.2 LCM load cell module

Access to the configuration and the calibration facility requires that the LCM module is unlocked. The command for lock and unlock can be send from the CUC. This is done via the CUC menu system. If the unlock command for LCM is activated and/or legal parameters is changed, a non resettable audit trail counter is incremented in the LCM module.

Sealing of the cover of the enclosure – to prevent exchange of load cell and to secure the electronics against dismantling/adjustment - is accomplished with a brittle plastic sticker. The sticker is placed so access to one of the screws of the enclosure is prohibited.

7.1.3 Peripheral interfaces

All peripheral interfaces are “protective”; they neither allow manipulation with weighing data or legal setup, nor change of the performance of the weighing instrument in any way that would alter the legality of the weighing.

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 CE mark

The CE mark is located on the front panel overlay or placed on a metalized label on the enclosure.

8.1.1 CUC module inscriptions

Manufacturer’s trademark and name and the type designation is located on the front panel overlay.

- Type name
- Other electrical data and inscriptions.

Indelibly printed on a plastic sticker or a non-removable metalized label located on the front panel overlay:

- Max, Min, e =
- Serial number: S/N yymmdd-xxx (year,month,day – number in succession).
- Humidity: Non-condensing
- Temperature range
- EMC Class
- Certificate No., Accuracy class
- Serial number of LCM
- Audit trail counter

8.1.1.1 Load receptors

On a data plate:

- Manufacturer's name, type, serial number, capacity

9. Pictures

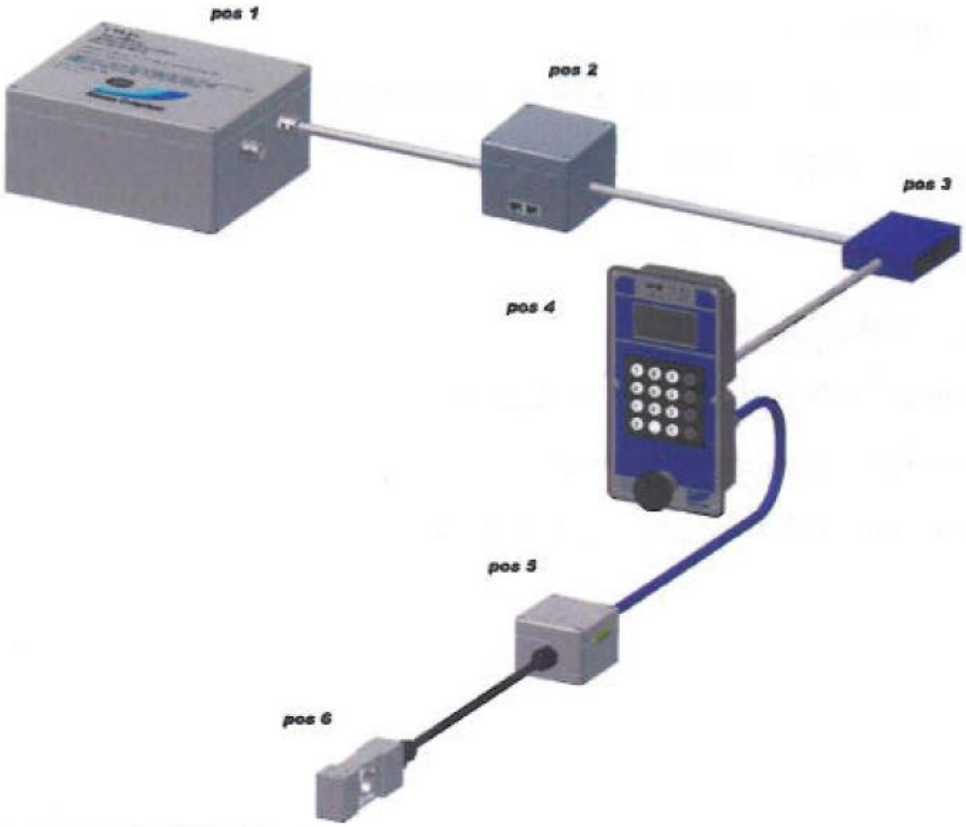

FIG. 1 CUC-Ex MKIV System configuration
pos.1: CPI power supply
pos.2: Connection box
pos.3: T-connection box (optional)
pos.4: CUC
pos.5: LCM module
pos.6:load cell/load receptor

FIG. 2 CUC module

FIG. 3 LCM module

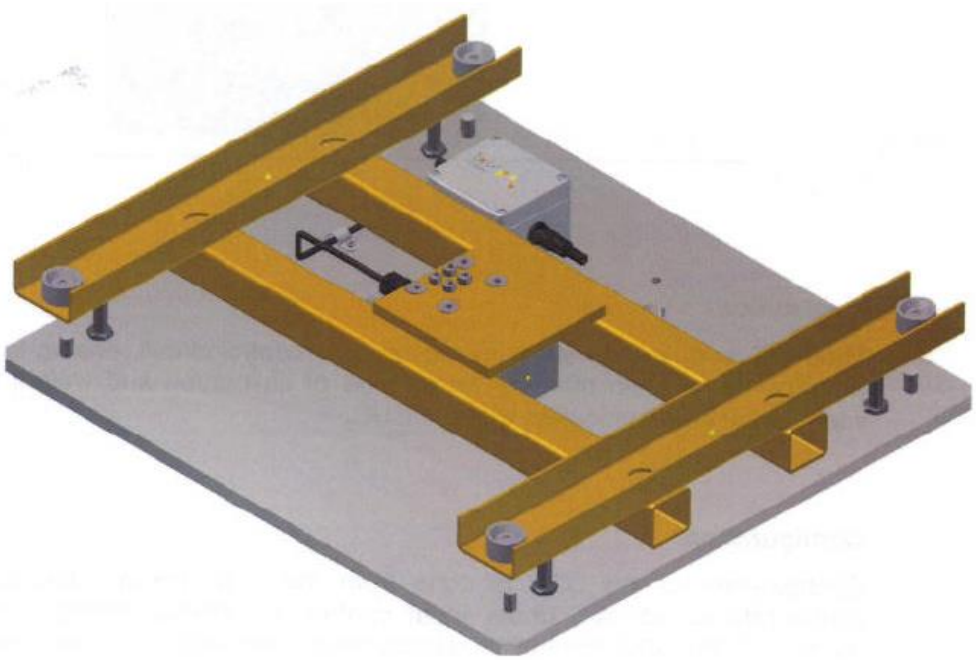

FIG. 4 Load receptor

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: DK0199.535

INDICATOR A/D (Module 1)	Type:	LCM with CUC display unit				
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}		3000		
Fraction of maximum permissible error (mpe):		p_1		0,5		
Load cell excitation voltage:		U_{exc}	[Vdc]	5		
Minimum input-voltage per verification scale interval:		Δu_{min}	[µV]	1		
Minimum load cell impedance:		R_{Lmin}	[Ω]	175		
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]			
Load cell interface:				4-wire (no 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	/	55
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]	10		
Non uniform distribution of the load:	(NUD = 0 is acceptable)	NUD	[% of Max]	0		
Correction factor:	$Q = 1 + (DL + T^+ + IZSR^+ + NUD) / 100$			1,2		
LOAD CELL ANALOG (Module 3)	Type:	Flintec PC6				
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]	350		
Minimum load cell verification interval:	($v_{min\%}$ = 100 / Y)	$v_{min\%}$	[% of Emax]	0,01		
Rated capacity:		E_{max}	[kg]	200		
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:				D09-00.02		
COMPLETE WEIGHING INSTRUMENT				Single-interval		
Manufacturer: Kosan Crisplant	Type:	CUC-Ex MKIV				
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]	120		
Number of verification scale intervals:		n		2400		
Verification scale interval:		e	[kg]	0,05		
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]	2,50		
Cross-section of each wire in the J-box cable:		A	[mm²]			
J-box cable-Length:		L	[m]			
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 =	7600
n	<=	n_{ind}	(WELMEC 2: 4)	n_{ind} - n =	600
n	<=	n_{LC}	(R76: 4.12.2)	n_{LC} - n =	600
E_{min}	<=	DL * R / N	(WELMEC 2: 6d)	(DL * R / N) - E_{min} =	12
$v_{min} \cdot \sqrt{N} / R$	<=	e	(R76: 4.12.3)	e - (v_{min} * $\sqrt{N}$ / R) =	0,030
or (if v_{min} is not given)				Alternative solutions: ↑ ↓	
$(E_{max} / n_{LC}) \cdot (\sqrt{N} / R)$	<=	e	(WELMEC 2: 7)	e - ((E_{max} / n_{LC}) * ($\sqrt{N}$/ R)) =	
Δu_{min}	<=	Δu	(WELMEC 2: 8)	$\Delta u - \Delta u_{min}$ =	1,50
R_{Lmin}	<=	R_{LC} / N	(WELMEC 2: 9)	(R_{LC} / N) - R_{Lmin} =	175
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)	$(L / A)_{max}^{WI}$ - (L / A) =	Not applicable
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) =	56,0

Signature and date:

Conclusion . . . . . PASSED

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