

EU Type Examination Certificate

No. 0200-MID-13147

Jesbelt xx / VIB xx

CONTINUOUS TOTALIZING AUTOMATIC WEIGHING 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 **Jesma Vejeteknik A/S**
Helsingørvej 18
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Denmark

In respect of A continuous totalizing automatic weighing instrument designated 'Jesbelt xx' or 'VIB xx' with variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class 0.5, 1 and 2
Maximum capacity, Max: ≥ 1 kg.
Maximum flow rate, Q_{\max} from 1 kg/h to 100,000 t/h
Totalisation scale interval, $d \geq 0.1$ g
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 & V of the Directive 2014/32/EU is met by the application of OIML R50-1:1997, WELMEC Guide 8.16-4:2006, WELMEC Guide 7.2:2007, and OIML D11:2004 section 12 & 13 level 3.

Note: This certificate is a revised edition which replaces DK0199.135 revision 2.

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

The annex comprises 19 pages.

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Descriptive annex

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1. Name and type of instrument and modules

The continuous totalizer is designated “Jesbelt xx” or “VIB xx”. It consists of an electronic controller WC9604-80, a display unit DMK9603 and a belt conveyor with built-in load receptor.

The Instrument is Type P and Risk Class C according to WELMEC Guide 7.2 (2007).

The modules appear from the sections 3.4, 3.5, 3.6 and 3.7; the principle of the composition of the modules is set out in the sections 6.1 and 10.

2. Description of the construction and function

2.1 Construction

The continuous totalizer consists of,

- A conveyor belt having a spring or dead load belt tensioner
- A load receptor with roller(s)
- Strain gauge load cell(s)
- A displacement transducer
- An electronic measuring and processing unit
- A display unit
- Peripheral devices.

2.1.1 Display unit

The display unit is a digital unit in a panel mount enclosure and functioning as the man-machine interface of the weighing controller.

The front panel comprises:

- A 6 digits LED display. This display is used as the primary weight display.
- A 2 lines alphanumeric LCD display used for guidance texts to the operator.
- Indicators for load: **Zero**, below **20 %**, and above **100 %**.
- Sixteen keys keypad (“0” to “9”, decimal point, Clear, Zero-setting, Mode, Step and Enter).

2.1.2 Electronic unit

The electronic measuring and processing unit designated WC9604-80 supplies the strain gauge load cell(s) with excitation voltage and amplifies, digitizes and converts the output signal of the load cell(s) into a weight value. Simultaneously the pulses from the displacement transducer are processed to determine the belt length that has passed over the load receptor. Based on this, the mass of the material passing over the load receptor is determined.

The software of the WC9604-80 can only be modified by exchanging the memory chip that contains the program. Exchange cannot take place, when the unit is sealed.

The software performs a self-test at start up.

2.1.3 Load cells

Set out in section 3.5.

2.1.4 Load receptor

Set out in section 3.6.

2.1.5 Displacement transducer

Set out in section 3.7.

2.1.6 Interfaces and peripheral equipment

Set out in section 4.

2.2 Function

2.2.1 Functions and devices

The automatic weighing instrument has the following permitted functions and devices that are subject to the Measuring Instrument Directive:

- Power up test
- Semi-automatic zero setting device
- Extended indicating device
- Detection of significant fault
- Alibi function (data logging)

2.2.2 Software identification

The approved firmware version is 50075-12.xx, where xx designated the non-legally relevant part of the version no.

The tested firm ware version was 50075-12.14.

3. Technical data

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

3.1 Continuous totaliser

Type:	Jesbelt xx / VIB xx
Accuracy class:	0.5 or 1 or 2
Maximum capacity (Max):	0.1 kg to 400 t
Minimum capacity (Min):	≥ 20 % of Max
Maximum flow rate (Q_{max}):	1 kg/h to 100,000 t/h
Minimum flow rate (Q_{min}):	≥ 20 % of Q_{max} for single speed Min ≥ 20 % of Max shall be fulfilled at all speeds for multi-speed and variable-speed
Totalisation scale interval (d):	≥ 0.1 g and ≥ $Q_{max} / (90000 \text{ h}^{-1})$
Scale interval for test:	$d / 100$
Belt velocity type:	single-speed, multi-speed, or variable-speed
Maximum belt speed, v_{max} :	0.01 m/s to 10 m/s
Minimum belt speed, v_{min} :	≥ 20 % of v_{max}
Weigh length, L:	0.1 m to 30 m
Temperature range:	-25 °C to 40 °C
Electromagnetic class:	E2
Humidity:	Non-condensing

3.2 Display unit

Type:	DKM9603
Connection to Electronic Controller:	Fibre optic cable
Temperature range:	-25 °C to 40 °C
Power supply:	18 VAC, 50/60 Hz (from electronic controller)

3.3 Electronic controller

The WC9604-80 electronic controller has the following characteristics:

Type:	WC9604-80
Accuracy class:	0.5
Fractional factor:	$\pi = 0.7$
Excitation voltage:	10 VDC
Minimum span range:	2 mV
Minimum input voltage per totalisation scale interval	2.5 μ V
Circuit for remote sense:	Remote sensing using 6-wires in the load cell cable
Minimum load cell input impedance:	43 Ohm
Maximum load cell input impedance:	1100 Ohm
Maximum cable length to junction box:	210 m/mm ² in a 6-wire system
Maximum pulse frequency:	1000 Hz
Minimum pulse frequency:	20 Hz
Operating temperature range:	-25 °C to +40 °C
Power requirements:	230 VAC, 50/60 Hz, or 24 VAC, 50/60 Hz
Peripheral interface:	Set out in section 4

3.4 Connecting cable between the electronic controller and the junction box for load cells

3.4.1 6-wire system

Maximum length:	210 m / mm ² (equivalent to 3.5 Ohm)
Line:	6 wires, shielded

3.5 Load cells

3.5.1 General acceptance of modules

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

- 1) There is a respective part / evaluation / test certificate (EN 45501) or an OIML Certificate of Conformity (R60) issued for the load cell by a Notified Body responsible for type examination under the 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.

3.6 Load receptor

The following types of load receptors are approved for the continuous totaliser:

- A weighing frame suspended in three or more load cells, mounted with one or more sets of weighing rollers for belt transportation over the weigh table, and equipped with guidance in the longitudinal direction of the belt.
- Made by one or more identical weighing modules placed immediately after each other in a distance of 0.5 - 2 times the width of the belt. Each weighing module consists of one set of weighing rollers suspended in one or two single-point load cell(s).
- Made by one or more identical weighing modules placed immediately after each other in a distance of 0.5 - 2 times the width of the belt. Each weighing module consists of one set of weighing rollers flexible suspended in a shear-beam load cell such that only the vertical force on the rollers can be transferred to the load cell.
- A weighing frame hinged in one end and suspended in one or more load cells in the other end, mounted with one, two, three, four or more sets of weighing rollers for belt transportation over the weigh table, and equipped with guidance in the longitudinal direction of the belt.
- A belt conveyor fixed by hinges to the chassis and with the inlet just above this hinging point. The opposite end of the belt conveyor is suspended in one or two load cells.

3.7 Displacement transducer

The displacement transducer can either be a tacho encoder or an inductive switch placed on one of the end-rollers of the belt conveyor or on a trailing arm.

The following tacho encoders may be used,

Manufacturer Siemens	type: MD256-Speed sensor
Manufacturer Scancon	type: 2REX-H, 2REX-H-SA 2REX-H-SR, 2RHI, and 2RHIF-SR SCH50IF-SR SCH50I

The following inductive switches may be used,

Manufacturer IFM

Type	Max frequency
IF5200	1000 Hz
IF5251	1400 Hz
IF5305	800 Hz
IF5321	800 Hz
IF5337	400 Hz
IF5353	400 Hz
IF5492	300 Hz
IF5505	700 Hz
IF5541	1000 Hz
IF5544	1400 Hz
IF5619	800 Hz
IF5623	400 Hz
IF5770	1400 Hz
IF5781	800 Hz
IF5798	400 Hz
IF5860	800 Hz
IF5862	800 Hz
IF5864	400 Hz

Manufacturer Telemecanique

Type	Max frequency
XS2D12NA140	1500 Hz
XS2D18NA140	500 Hz
XS612B1NAM12	2500 Hz
XS612B1NAL2	2500 Hz
XS2M12KN340	2500 Hz
XS2M12KN340D	2500 Hz
XS212AANAL2	2500Hz
XS212AANAM12	2500Hz
XS218AANAL2	1000Hz
XS218AANAM12	1000Hz

The wheel of a trailing arm may only be driven by the inner side of the belt that is not getting in contact with the material to be weighed.

4. Interfaces and peripheral equipment

4.1 Interfaces

The weight control unit has the following interfaces, which all interfaces are characterised “Protective interfaces” according to paragraph 8.1 in annex I of the Directive.

- RS422 / RS485 serial communication
- Current loop serial communication
- Digital inputs
- Relay outputs
- Impulse output (max. 25 pulses/sec)
- Analogue input, 0/4 - 20 mA
- Analogue output, 0/4 - 20 mA

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 (e.g. a printer) with a CE mark of conformity.

5. Approval conditions

5.1 Connection of cables

All cables shall be shielded, and the shield shall be properly EMC wise connected to the housing / connector in both ends.

5.2 Log printer

A log printer can be connected to the WC9604-80 weight controller.

5.3 Conveyor belt

Exchange of the conveyor belt will require a new legal metrological test of the instrument.

5.4 Compatibility of modules

Compatibility of modules for continuous totalizers - an Excel worksheet developed by DELTA based on the principles in WELMEC 2, Issue 4, July 2004, paragraph 11 shall be satisfied.

An Excel file for calculation of “Compatibility of Modules” can be obtained from FORCE upon email request to weighing@force.dk.

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 according to ANNEX F of the Directive 2014/32/EU or alternative mark of the manufacturer according to ANNEX D of the Directive 2014/32/EU.

7.1.1 Mechanical sealing

The identification plate shall be secured against removal with a brittle plastic sticker.

7.1.2 Electronic Controller sealing

The enclosure of the electronic controller shall be sealed against opening with brittle plastic stickers (see figure 11).

The connector of the load cell cable and the cable from the displacement sensor shall be sealed against disconnection of them (see figure 11 & 12).

7.1.3 Junction box for load cells

Access to the junction box, if any, is prevented by means of sealing by plastic stickers or lead seals.

7.2 Verification marks

A sticker with verification marks is to be placed on or partly 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 on a visible place on the measuring instrument.

8.1.1 CE mark

CE mark and supplementary metrological marking shall be applied to the inscription plate according to article 21 of Directive 2014/32/EU.

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
- Accuracy class
- Maximum flow rate Q_{\max}
- Minimum flow rate Q_{\min}
- Minimum totalised load Σ_{\min}
- Scale interval for totalisation d
- Belt speed v for fixed speed,
 v_1, v_2, \dots for multi-speed, and
 v_{\max}, v_{\min} for variable-speed
- Temperature range: -25 °C to +40 °C
- Electromagnetic class: E2
- Humidity: Non-condensing
- Type examination certificate number

9. Pictures



Figure 1 Display Unit

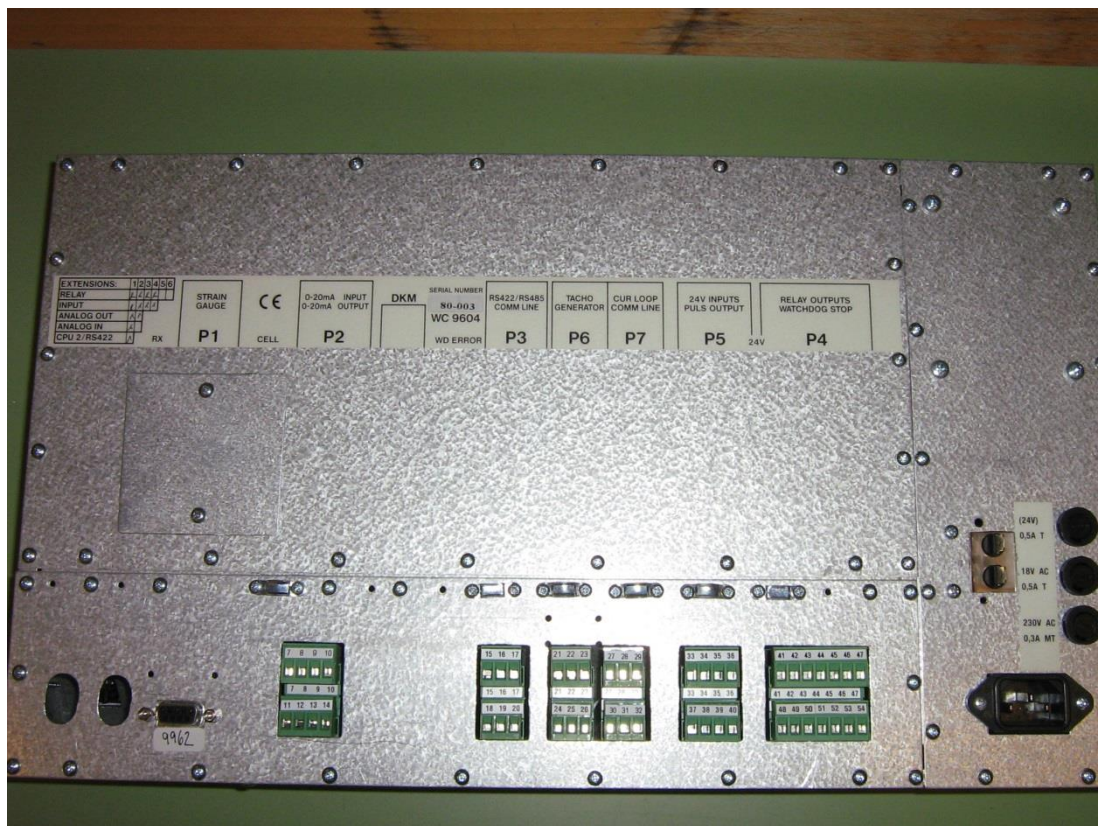


Figure 2 Electronic Controller

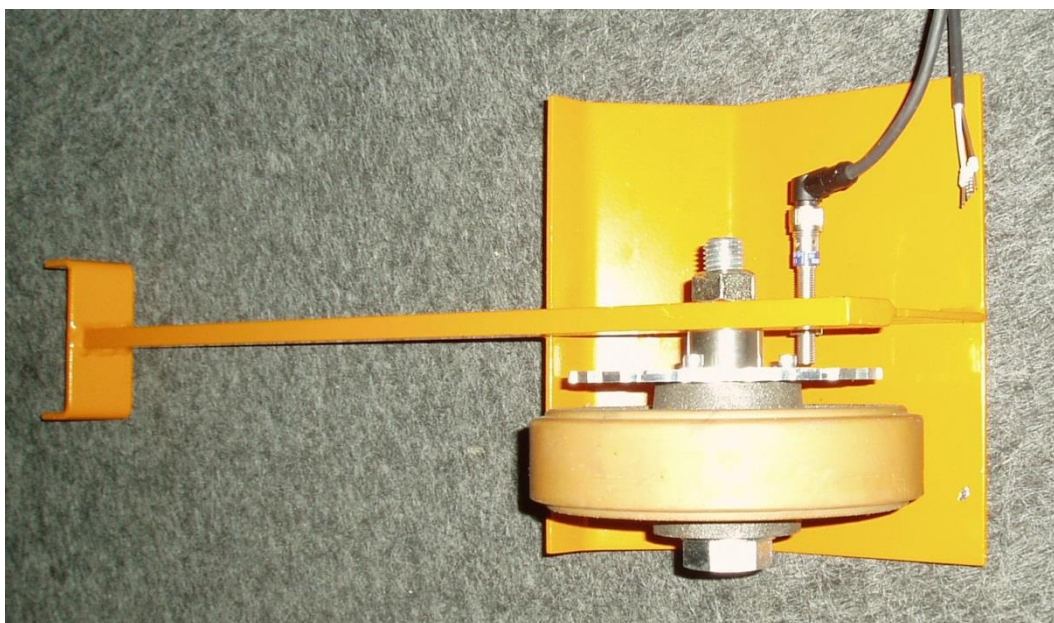


Figure 3 Trailing arm with wheel and inductive switch

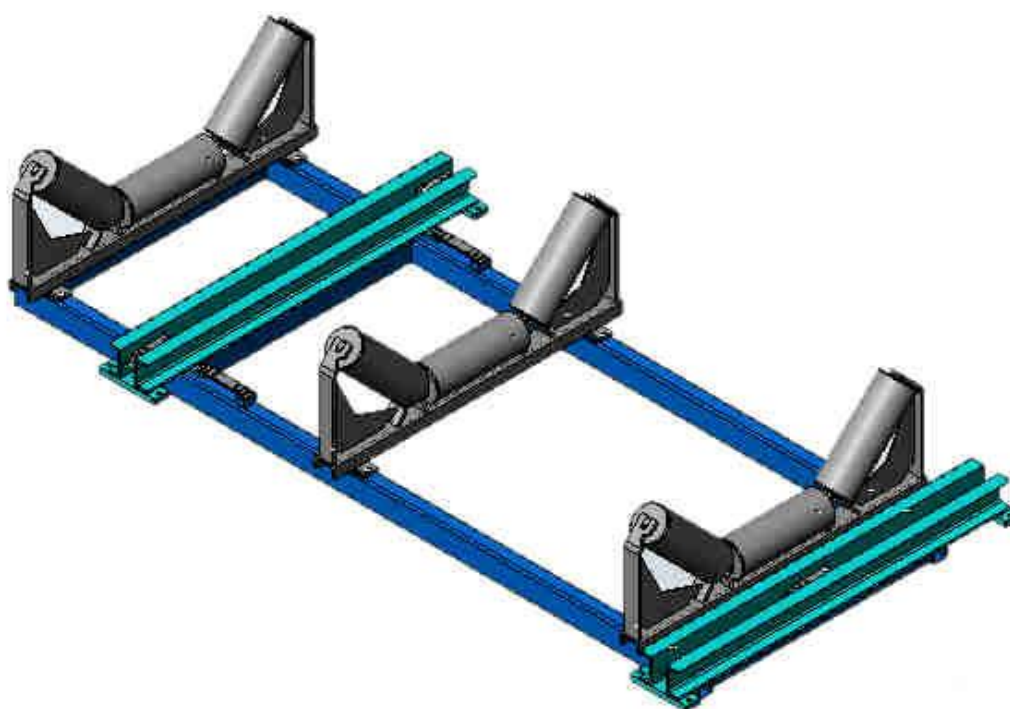


Figure 4 Weighing frame

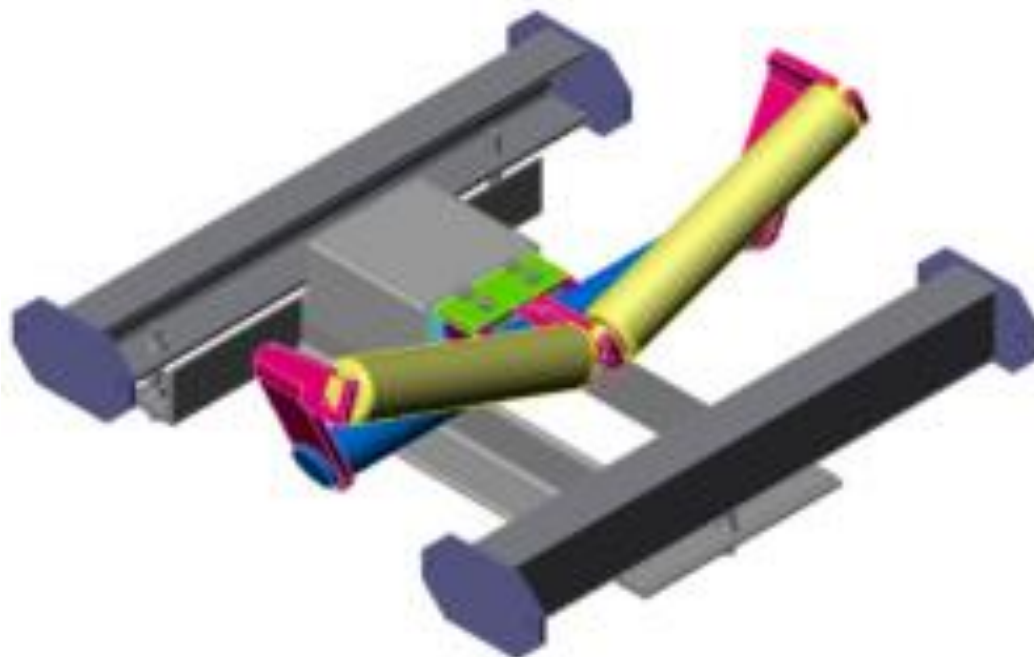


Figure 5a Weighing module

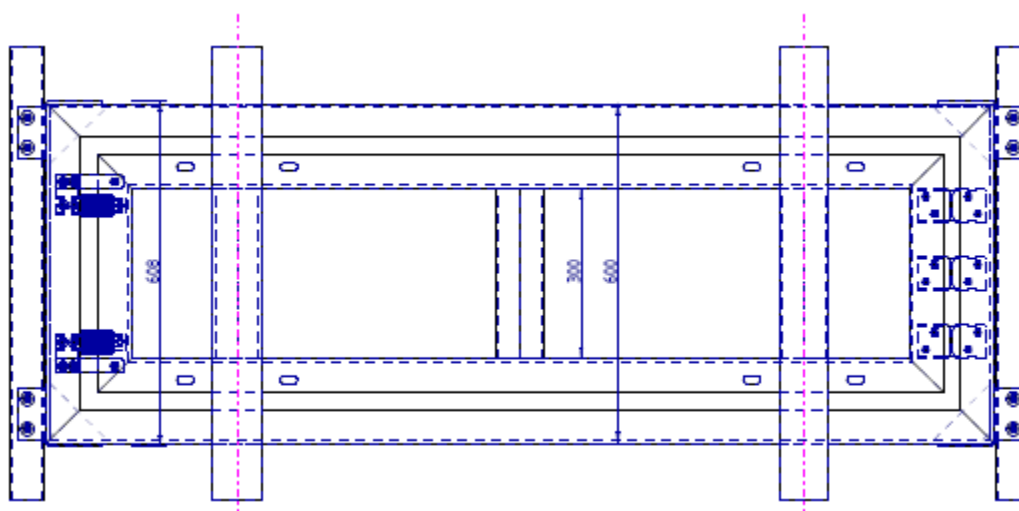


Figure 5b Weighing frame hinged in one end

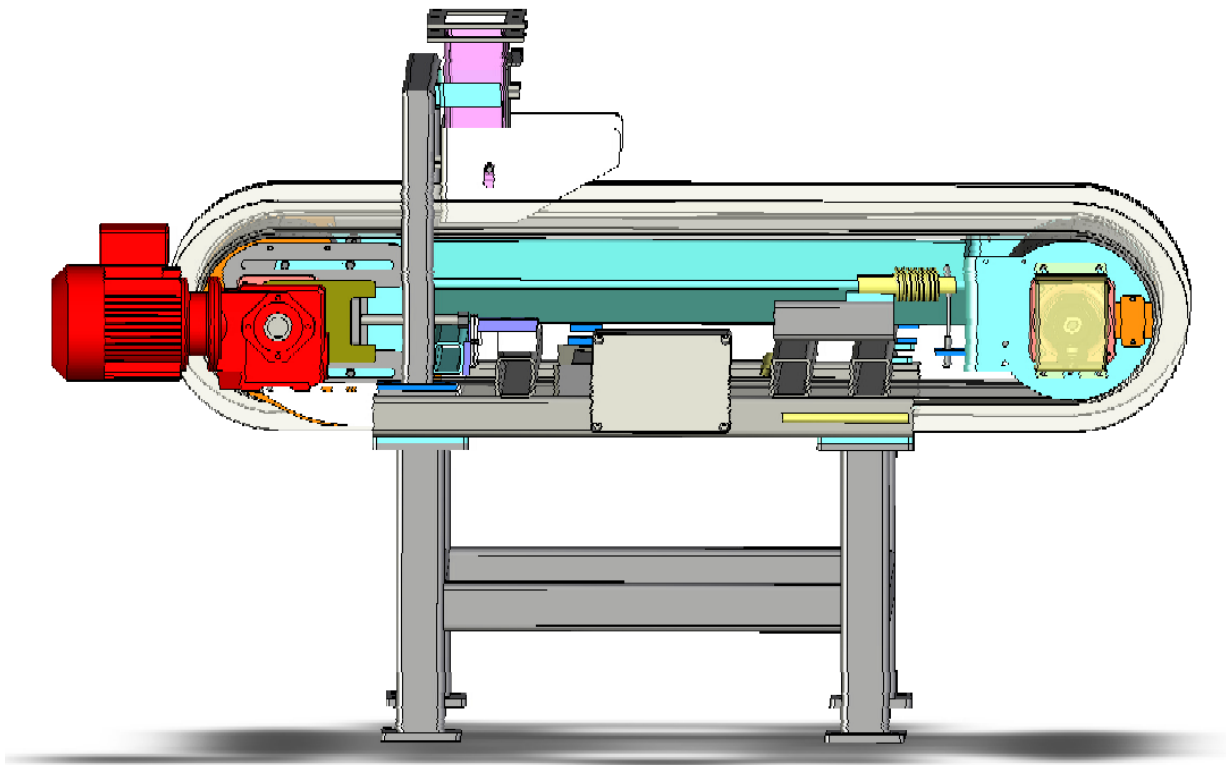


Figure 5c Belt conveyor hinged below inlet

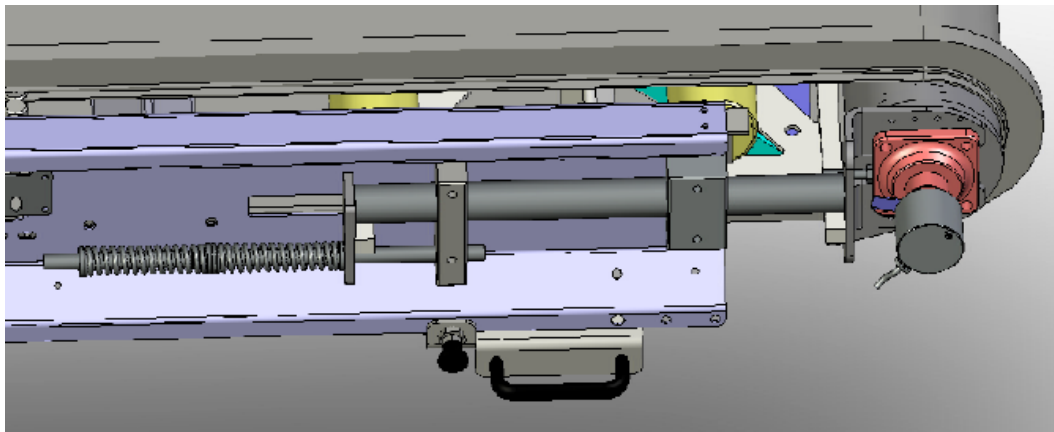


Figure 6 Spring arrangement for tightening of the belt

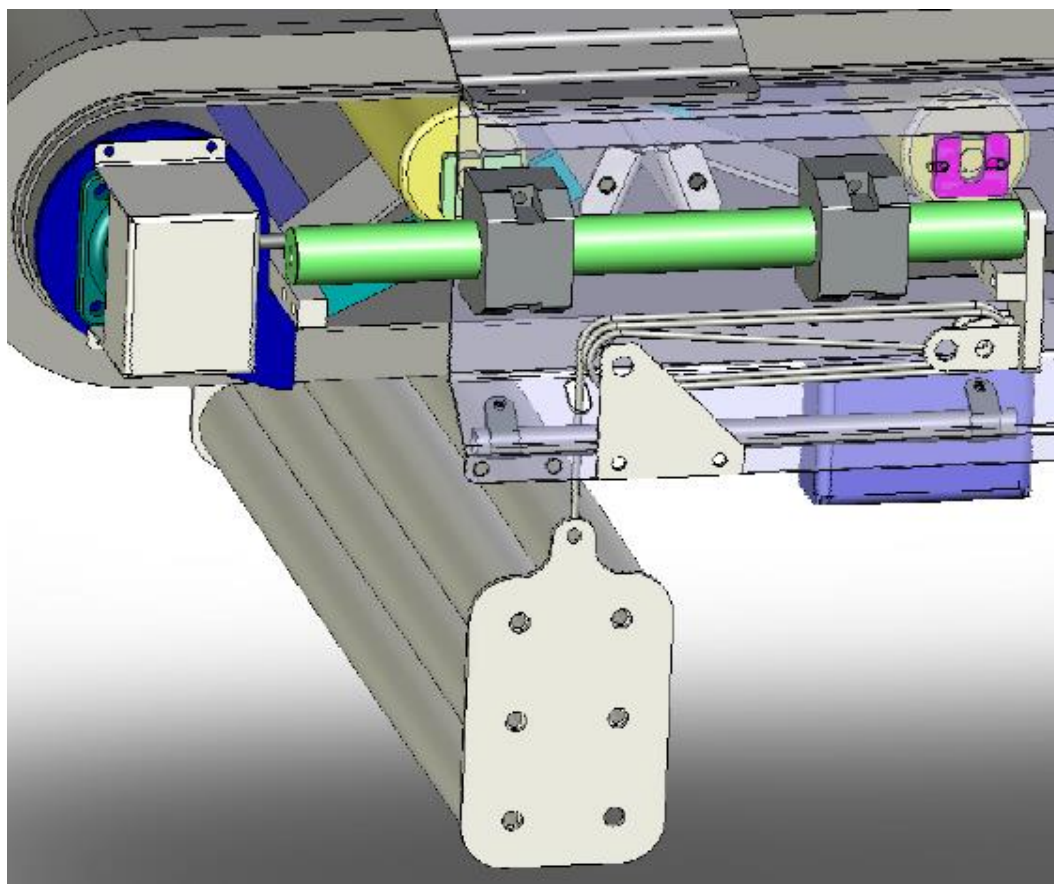


Figure 7 Arrangement for gravimetric tightening of the belt

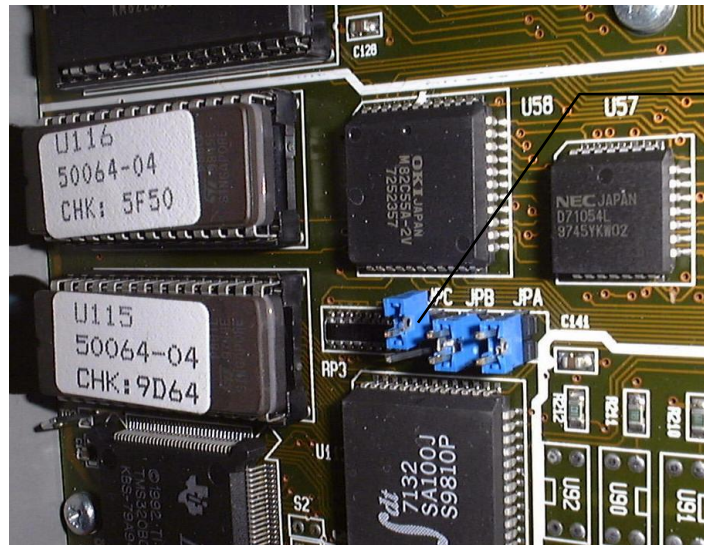
Electronic instrument		MID type approval nr.: DK0199.135
Type	<i>WC9604D/80</i>	Electromagnetic class: E2
Serial nr.	<i>80-003</i>	Temperature range: -25°C - +40°C, non condensing
Manufacture:	Jesma Vejeteknik A/S	Accuracy class: 0,5
SERIAL NUMBER WILL BE DISPLAYED BY PRESSING THE BUTTONS "CL" AND "Z"		Max. flow rate Q _{max} : [t/h] 50,0
		Min. flow rate Q _{min} : [t/h] 10,0
Weighing unit		
Manufacture:	Jesma Vejeteknik A/S	Belt speed: v [m/sec.] 0,14
Type	<i>Jesbelt-A</i>	Totalization scale interval: d [kg] 1
Serial nr.	<i>606187</i>	Scale interval during test: (d/100) [kg] 0,01
Load cell(s)		Max. Capacity (Max.): [kg] 123,00
4 pc Z6 load cell(s) each: [kg]	<i>50</i>	Min. Totalized load: Σ_{min} [kg] 1000,00
Displacement transducer		Belt revolutions for zero-setting: 4
SCANCON 2RHI: [Pulses/rev.]	<i>500</i>	Belt width: [mm] 1000
Supply voltage	<i>230Vac/50Hz</i>	Weigh length: L [mm] 1200
Product to be weighed	<i>Pellets</i>	Belt length endless: [mm] 6987
Zero setting must take place for every three hours of operation		CE M16

Figure 8 Inscription plate

Jesma Vejeteknik A/S	
Type:	<i>Jesbelt-A</i>
Serial nr.	<i>606187</i>

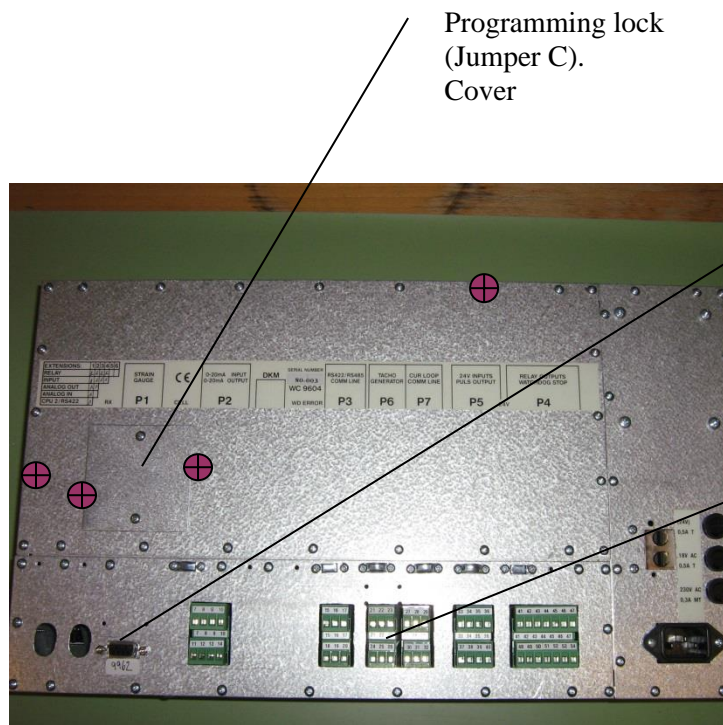
Figure 9 Mark to be placed on the load receptor

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Programming lock (Jumper C).
When the jumper makes contact, the program is locked.

Figure 10 Calibration jumper



Programming lock (Jumper C).
Cover

Load cell connector

Displacement transducer (tacho) connector

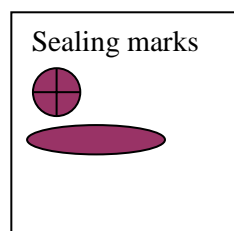


Figure 11 Sealing of electronic Controller

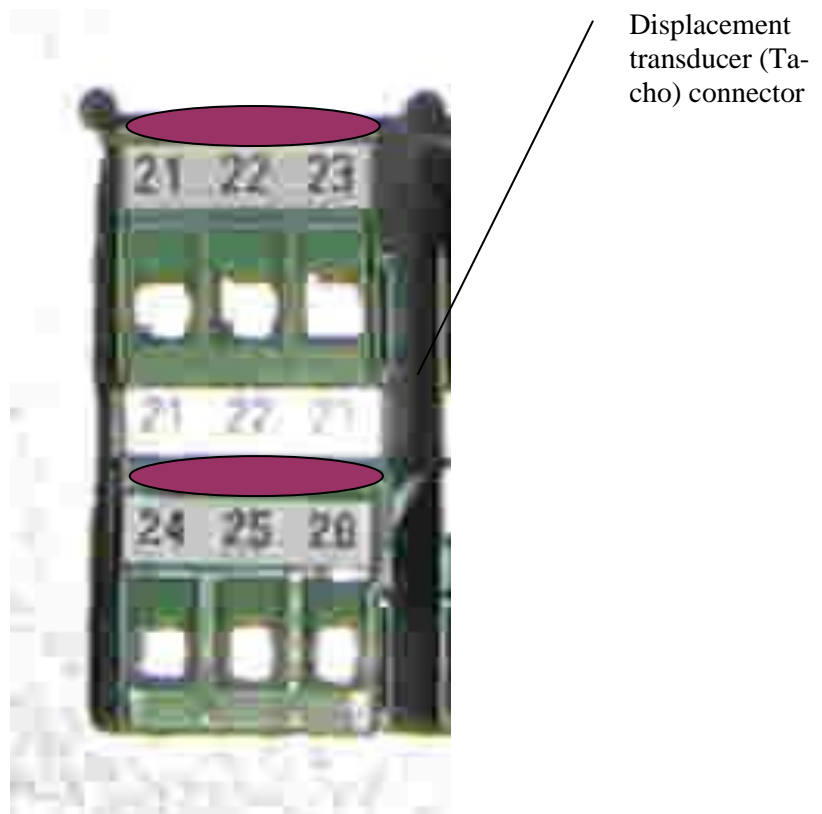
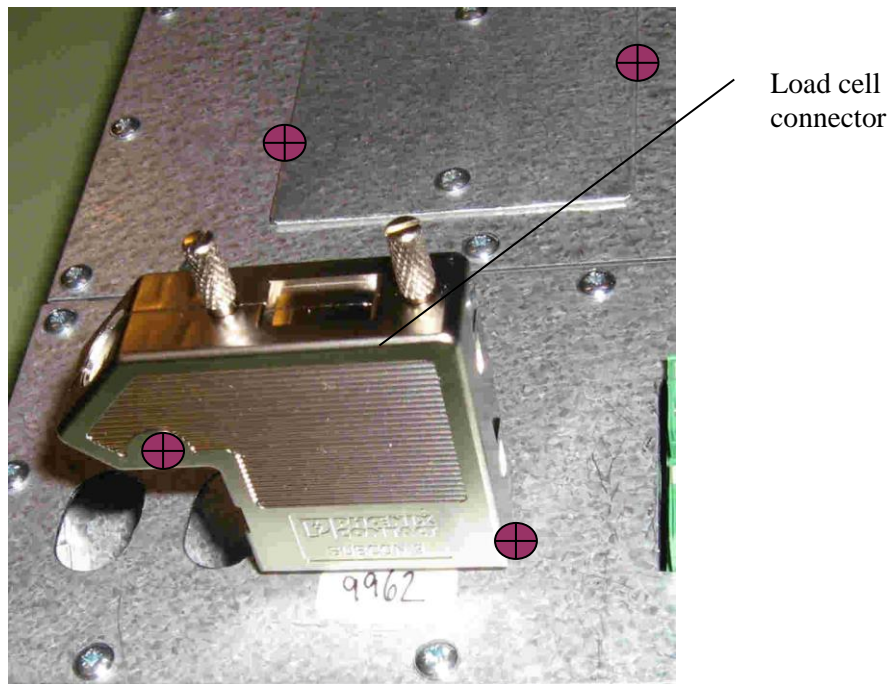


Figure 12 Sealing of load cell and displacement transducer (tacho) connector

10. Composition of modules – an example

COMPOSITION OF MODULES

Ref.: WELMEC 2 (Issue 2), July 1996, paragraph 11.

Belt weigher.

Certificate of Type-Approval No.:

In conformity with OIML R50, 1997:

DK0199.135

ELECTRONIC DEVICE (Module 1)

Type: JESMA

WC9604-80

Accuracy class according to OIML R50

0,5

Number of totalization scale intervals for Σ min:

n_i

800

Fraction of maximum permissible error (mpe):

p_1

0,7

Excitation voltage:

E_{ex}

[VDC]:

10

Minimum span range for Q_{min} :

sp_{min}

[mV]:

2

Minimum input-voltage per totalization scale interval:

$I_n = sp_{min} / n_i$

[μ V]:

2,5

Load cell interface:

R_{LCmin}

[Ω]:

6-wire (remote sense)

43

Minimum load cell impedance

Data communication interface:

Protective interface

Temperature range:

T_{min} / T_{max}

[$^{\circ}$ C]:

-25 / 40

Test report or Test Certificate as appropriate:

LOAD RECEPTOR (Module 2)

Type: Jesma Vejeteknik:

JesBelt-A

Weigh length:

[mm]:

1600

Fraction of mpe:

p_2

0,14

Number of load cells:

N

4

Dead load:

DL

[kg]:

62

Reduction ratio of the load transmitting device:

$R = F_M / F_L$

1

Correction factor:

Q

1

LOAD CELLS (Module 3)

Type: HBM

Z6FC3

Accuracy class according to OIML R60

C

Maximum accuracy class certified

C3

Maximum number of load cell intervals:

n_{LC}

3000

Fraction of mpe:

p_3

0,7

Sensitivity:

S

[mV / V]:

2

Impedance:

R_{LC}

[Ω]:

350

Minimum load cell verification interval:

v_{min}

[% of E_{max}]:

0,009

Rated capacity:

E_{max}

[kg]:

50

Minimum measuring range for Q_{min} :

$v_{min} * n$

[% of E_{max}]:

7,2

Temperature range:

T_{min} / T_{max}

[$^{\circ}$ C]:

-10 / 40

Test report or Test Certificate as appropriate:

NMI:

TC2207

COMPLETE BELT WEIGHER

Manufacturer: Jesma Vejeteknik

Type:

JesBelt-A

Serial no.:

606187

Accuracy class according to OIML R50

0,5

Fractions: $p_i = p_1^2 + p_2^2 + p_3^2 = (R76 \text{ clause } 3.5.4.1)$

Maximum capacity:

Max

[kg]:

123

Number of totalization scale intervals for Σ min:

n

800

Totalization interval for Q_{min}

$(0,2 * Max) / n = x$

[kg]:

0,031

Utilisation of the load cells $\alpha = (Max * R) / (E_{max} * N)$

0,62

Output-voltage of the load cells:

$E_{out} = S * E_{ex} * \alpha$

[mV]:

12,30

Max resistance of each wire in the cable to the junction box for load cells:

[Ω]:

4

Specific cable-length to the junction box for load cells, if any

[m / mm²]:

210

Sectional area of each wire in the cable:

[mm²]:

0,5

Maximum permissible length of the cable:

[m]:

105

Temperature range allowed:

T_{min} / T_{max}

[$^{\circ}$ C]:

-10 / 40

Peripheral Equipment subject to legal control:

Requirements for compatibility	Satisfied, provided that all calculations below are ≥ 0
$p_i \leq 1$	$1 - p_i = 0$
$n \leq n_i$	$n_i - n = 0$
$(v_{min} / R) * \sqrt{N} \leq x$	$x - (v_{min} / R) * \sqrt{N} = 0,022$
$sp_{min} \leq 0,2 * E_{out}$	$E_{out} - 5 * sp_{min} = 2,30$
$R_{LCmin} \leq R_{LC} / N$	$R_{LC} / N - R_{LCmin} = 45$
$Q * (Max + DL) * R / N \leq E_{max}$	$E_{max} - Q * (Max + DL) * R / N = 3,75$

Signature and date:

COMPATIBILITY:

SATISFIED