



We help ideas meet the real world

CERTIFICATE of EU TYPE-EXAMINATION

No. DK 0199.156

TEKFA Beltweigher

CONTINUOUS TOTALISER

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

In accordance with the requirements of the automatic weighing instrument regulation No. 1033 of 17 October 2006, that implements in Denmark Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on Measuring Instruments (MID).

Issued to TEKFA A/S
Århusvej 201
8464 Galten
Denmark

In respect of Continuous totaliser designated TEKFA Beltweigher with variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class 1 and 2.
Maximum capacity, Max: ≥ 1 kg.
Maximum flow rate, Q_{\max} from 1 t/h to 20000 t/h.
Totalisation scale interval, $d \geq 10$ 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 2004/22/EC 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.

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

The annex comprises 11 pages.

Issued on 2008-10-21
Valid until 2018-10-21


Signatory: J. Hovgård

Descriptive annex

| Contents | Page |
|--|-----------|
| 1. Name and type of instrument and modules | 2 |
| 2. Description of the construction and function | 2 |
| 2.1 Construction | 2 |
| 2.2 Function | 3 |
| 3. Technical data | 3 |
| 3.1 Continuous totaliser | 3 |
| 3.2 Controller unit | 4 |
| 3.3 Connecting cable between the electronic controller and the junction box for load cells | 4 |
| 3.4 Load cells | 4 |
| 3.5 Load receptor | 5 |
| 3.6 Displacement transducer | 5 |
| 4. Interfaces and peripheral equipment | 5 |
| 4.1 Interfaces | 5 |
| 4.2 Peripheral equipment | 5 |
| 5. Approval conditions | 6 |
| 5.1 Connection of cables | 6 |
| 5.2 Data storage device | 6 |
| 5.3 Conveyor belt | 6 |
| 5.4 Compatibility of modules | 6 |
| 6. Special conditions for verification | 6 |
| 6.1 Composition of modules | 6 |
| 7. Securing and location of seals and verification marks | 6 |
| 7.1 Securing and sealing | 6 |
| 7.2 Verification marks | 7 |
| 8. Location of CE mark of conformity and inscriptions | 7 |
| 8.1 Identification plate | 7 |
| 9. Pictures | 8 |
| 10. Composition of modules – illustrated | 11 |

1. Name and type of instrument and modules

The continuous totaliser is designated TEKFA Beltweigher. It consists of an electronic weighing controller and indicator Intecont Plus variant VEG 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 3.3, 3.4, 3.5 and 3.6; 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 totaliser 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 with display and keyboard
- Peripheral devices

2.1.1 Controller unit

The controller unit Intecont Plus variant VEG is an electronic measuring and processing unit with display and keyboard mounted in a panel mount enclosure and functioning as the man-machine interface of the weighing instrument.

The front panel comprises:

- A 2 lines by 20 characters LED dot matrix display with 6 mm height of digits used as the primary weight display and for guidance texts to the operator
- Indicators. Among others for load below Min and above Max
- 22 keys keypad

The controller unit supplies the strain gauge load cell(s) with excitation voltage and amplifies, digitises 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.

2.1.2 Load cells

Set out in Section 3.4.

2.1.3 Load receptor

Set out in Section 3.5.

2.1.4 Displacement transducer

Set out in Section 3.6.

2.1.5 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
- Automatic zero-setting device, de-selectable
- Extended indicating device
- Hardware interface through which operations (such as zero setting, printing) can be initiated
- Detection of significant fault
- Displaying, printing and transmission of weights

2.2.2 Software identification

The software of the Intecont Plus variant VEG can not be exchanged, when the unit is sealed. The version of the software in conformity with the Directive is identified by the following designation: VBW 20620-001 yyyy, where 'yyyy' represents modifications which do not affect the metrologically relevant functionality. They may adopt any number on putting into service.

3. Technical data

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

3.1 Continuous totaliser

| | |
|--|---------------------------|
| Type: | TEKFA Beltweigher |
| Accuracy class: | 1 or 2 |
| Maximum capacity (Max): | ≥ 1 kg |
| Minimum capacity (Min): | ≥ 20 % of Max |
| Maximum flow rate (Q_{\max}): | 1 t/h to 20000 t/h |
| Minimum flow rate (Q_{\min}): | ≥ 20 % of Q_{\max} |
| Totalisation scale interval (d): | ≥ 10 g |
| Scale interval for test: | $d / 100$ |
| Belt velocity type: | single-speed |
| Belt speed, v: | 0.01 m/s to 10 m/s |
| Weigh length, L: | 0.1 m to 30 m |
| Reduction ratio of the load transmitting device: | 1:1 to 1:20 |
| Temperature range: | -10 °C to 40 °C |
| Electromagnetic class: | E2 |
| Humidity: | Non-condensing |

3.2 Controller unit

| | |
|---|---|
| Type: | Intecont Plus variant VEG |
| Accuracy class: | 0.5 |
| Fractional factor: | $p'i = 0.7$ |
| Excitation voltage: | 32 VAC |
| Minimum span range: | 2 mV |
| Minimum input voltage per totalisation scale interval | 1 μ V |
| Circuit for remote sense: | Remote sensing using 6-wires in the load cell cable |
| Minimum load cell input impedance: | 80 Ohm |
| Maximum load cell input impedance: | 1100 Ohm |
| Maximum cable length to junction box: | 500 m/mm ² in a 6-wire system |
| Operating temperature range: | -10 °C to +40 °C |
| Power requirements: | 90 to 264 VAC, 50/60 Hz, or 24 VDC |
| Peripheral interface: | Set out in Section 4 |

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

3.3.1 6-wire system

| | |
|-----------------|--|
| Line: | 6 wires, shielded |
| Maximum length: | 667 m / mm ² (equivalent to 11.7 Ohm) |

3.4 Load cells

3.4.1 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 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 90/384/EEC.
- 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 4, 2004), 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.

3.5 Load receptor

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

- Two weighing frames with an identical number of sets of weighing rollers and placed immediately after each other. In the end, where they are adjacent, they are suspended in an arrangement balancing the dead load of the frames with weights. The suspension has a lever system with knives. In the other end the frames are hinged in cross-hinges (see figure 4).
- A weighing frame with three or more sets of weighing rollers. The frame is suspended in one end in one or two load cells and hinged between the other end and the mid-point of the frame in two cross-hinges. The construction of the weighing frame is so that the dead load on the load cell(s) is balanced (see figure 5).

3.6 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 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.

The following displacement transducers may be used:

Manufacturer: IFM Electronic type: NF5030

4. Interfaces and peripheral equipment

4.1 Interfaces

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

- One serial data interface RS-232
- One serial interface switchable between RS-232, RS-422, and RS-485 (2 or 4 wire) RS422 / RS485 serial communication
- 4 binary inputs
- 4 binary outputs (opto-isolated)
- 2 NAMUR inputs, one pulse output
- Analogue output, max. 20 mA
- Ethernet interface
- Profibus, Device-Net

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 Data storage device

When using the data storage devices in conformity with the Directive: Performing of five measurements with storage of measuring data. For later checking, these values should be noted additionally. Checking of the stored values whether they correspond with the noted measurement data (for procedure see operating instructions).

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 totalisers - 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 DELTA upon email request to legal@delta.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 5.3.

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 verification mark of a notified body according to ANNEX F of the Directive 2004/22/EC or alternative mark of the manufacturer according to ANNEX D of the Directive 2004/22/EC.

7.1.1 Identification plate

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

7.1.2 Controller sealing

The enclosure of the electronic controller shall be sealed against opening with brittle plastic stickers (see figure 3).

The connector of the load cell cable and the cable from the displacement sensor shall be sealed against disconnection of them (see figure 2).

7.1.3 Junction box for load cells

Access to the junction box, if any, shall be 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

A sticker with the CE mark of conformity and the supplementary metrology marking consisting of the capital letter “M”, surrounded by a rectangle, and the last two digits of the year of its affixing 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
- 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 (fixed speed)
- Temperature range: -10°C to $+40^{\circ}\text{C}$
- Electromagnetic class: E2
- Humidity: Non-condensing
- Type examination certificate number

9. Pictures



Figure 1 Electronic Controller with display and keyboard.

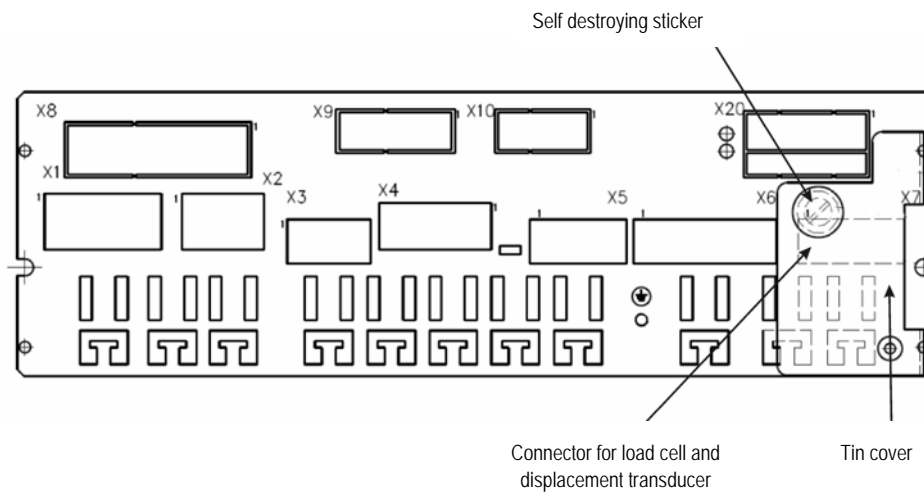


Figure 2 Sealing of transducer connections.

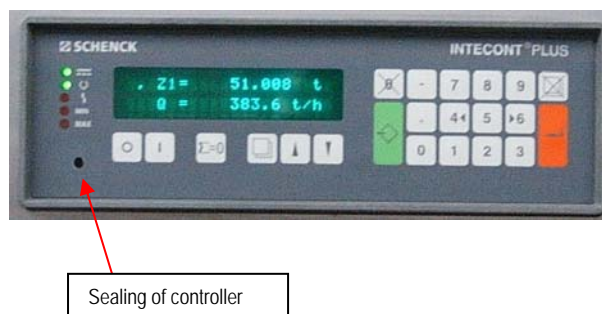


Figure 3 Sealing of controller against opening.

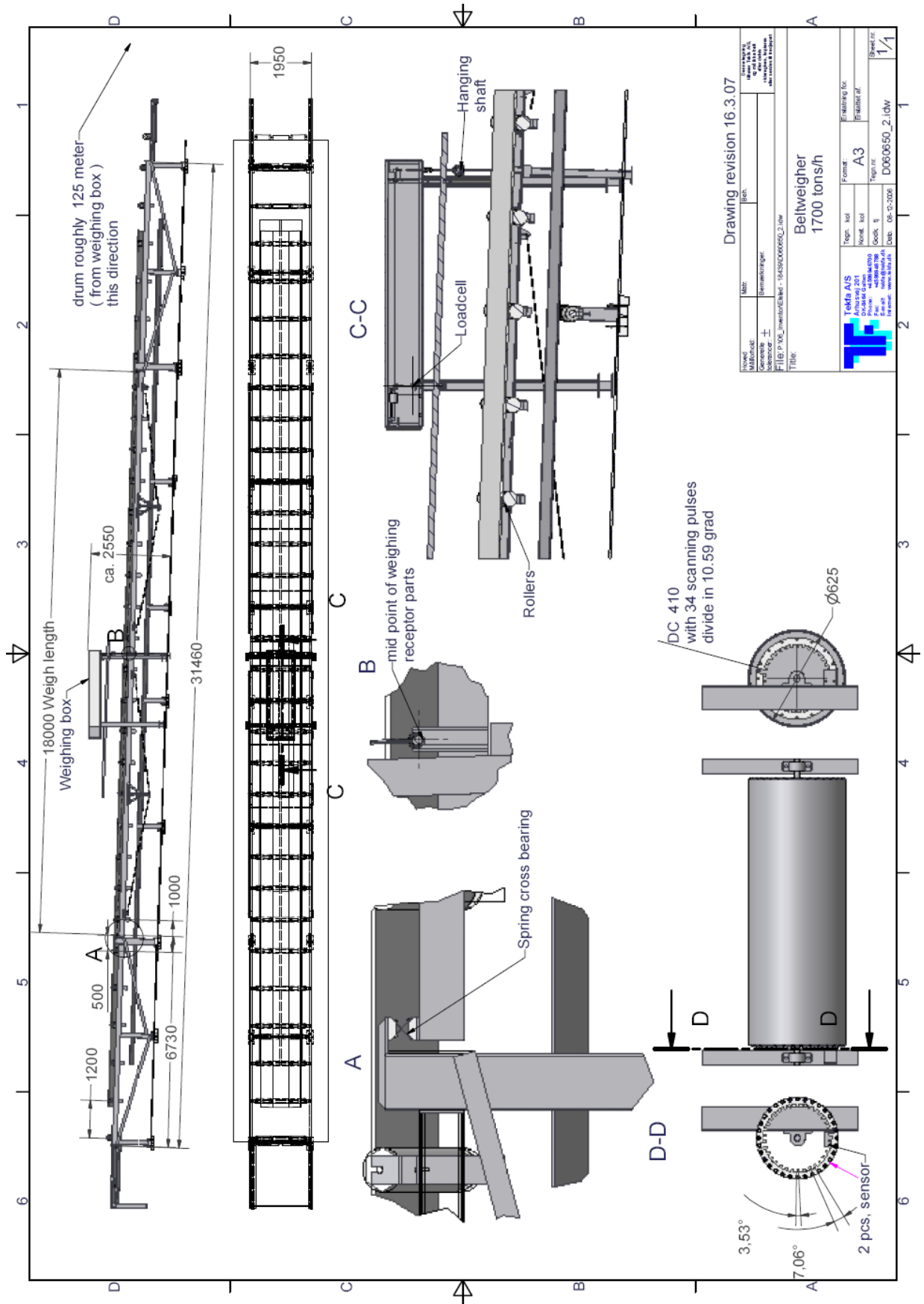
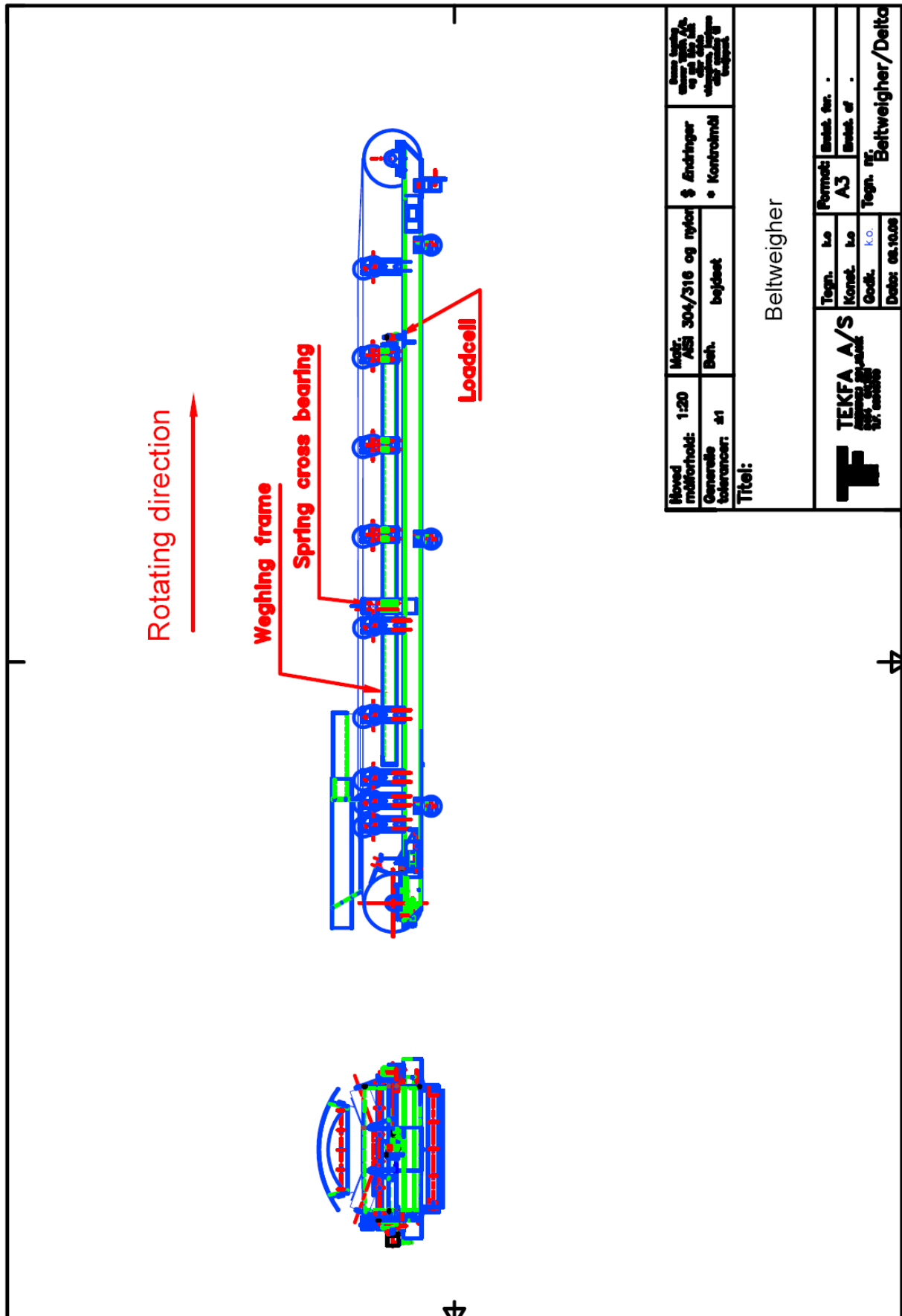


Figure 4 Example on Beltweiger with two weighing frames and lever system.



| | | | |
|---|-------------------------------|------------------------------|-----------------------------|
| Hoved målforskel: 1:20 Generelle tolerancer: ±1 | Mål: AISI 304/316 og nylon | \$ Andringer • Kontrolmid | Tekn. nr. 304/316 og nylon |
| | Beh. bejledet | | |
| Titel: Beltweigher | | | |
| F TEKFA A/S Tekn. og kontrol af vægtemåling | Tegnr. k.o. Konstr. k.o. | Formelt A3 | Tekn. nr. Beltweigher/Delta |
| | Dato: 08.10.08 | Tekn. nr. | Tekn. nr. |

Figure 5 Example of Beltweigher with one weighing frame.

10. Composition of modules – illustrated

COMPOSITION OF MODULES

Ref.: WELMEC 2 (Issue 4), July 2004, paragraph 11.

Belt weigher.

EC Type-Examination Certificate No.: (In conformity with OIML R50, 1997:)

DK0199.156

ELECTRONIC DEVICE (Module 1)

| | | |
|--|-------------------------------------|-----------------------|
| Type: | Schenck | Intecont Plus |
| 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} [VAC] | 12 |
| Minimum span range for G_{min} : | sp_{min} [mV] | 0,8 |
| Minimum input-voltage per totalization scale interval: | $I_n = sp_{min} / n_i$ [μ V] | 1 |
| Load cell interface: | | 6-wire (remote sense) |
| Minimum load cell impedance | R_{LCmin} [Ω] | 80 |
| Data communication interface: | | Protective interface |
| Temperature range: | T_{min} / T_{max} [$^{\circ}$ C] | -10 / 40 |
| Test report or Test Certificate as appropriate: | | |

LOAD RECEPTOR (Module 2)

| | | |
|--|-----------------|----------|
| Type: | Tekfa | D060650 |
| Weigh length: | [mm] | 18000 |
| Fraction of mpe: | p_2 | 0,14 |
| Number of load cells: | N | 1 |
| Dead load: | DL [kg] | 0 |
| Reduction ratio of the load transmitting device: | $R = F_M / F_L$ | 0,055556 |
| Correction factor: | Q | 1 |

LOAD CELLS (Module 3)

| | | |
|---|-------------------------------------|----------|
| Type: | Vishay | 355 |
| Accuracy class according to OIML R60 | | C |
| Maximum accuracy class certified | | C4 |
| Maximum number of load cell intervals: | n_{LC} | 4000 |
| Fraction of mpe: | p_3 | 0,7 |
| Sensitivity: | S [mV / V] | 2 |
| Impedance: | R_{LC} [Ω] | 380 |
| Minimum load cell verification interval: | v_{min} [% of E_{max}] | 0,0075 |
| Rated capacity: | E_{max} [kg] | 100 |
| Minimum measuring range for G_{min} : | $v_{min} * n$ [% of E_{max}] | 3,000075 |
| Temperature range: | T_{min} / T_{max} [$^{\circ}$ C] | -10 / 40 |
| Test report or Test Certificate as appropriate: | | |

COMPLETE BELT WEIGHER

| | |
|---------------|-------------------|
| Manufacturer: | Tekfa |
| Type: | Tekfa Beltweigher |
| Serial no.: | |

| | | |
|---|--------------------------------------|----------|
| Accuracy class according to OIML R50 | | 1 |
| Fractions: $p_i = p_1^2 + p_2^2 + p_3^2 =$ (R76 clause 3.5.4.1) | | |
| Maximum capacity: | Max [kg] | 1653 |
| Number of totalization scale intervals for Σ min: | n | 400 |
| Totalization interval for Q_{min} | $(0.2 * Max) / n = x$ [kg] | 0,827 |
| Utilisation of the load cells | $\alpha = (Max * R) / (E_{max} * N)$ | 0,92 |
| Output-voltage of the load cells: | $E_{out} = S * E_{ex} * \alpha$ [mV] | 22,04 |
| Max resistance of each wire in the cable to the junction box for load cells | [Ω] | 11 |
| Specific cable-length to the junction box for load cells, if any | [m / mm ²] | 667 |
| Sectional area of each wire in the cable: | [mm ²] | 0,5 |
| Maximum permissible length of the cable: | [m] | 334 |
| 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 |
|-------------------------------------|--|
| $p_i \leq 1$ | $1 - p_i = 0$ |
| $n \leq n_i$ | $n_i - n = 400$ |
| $(v_{min} / R) * \sqrt{N} \leq x$ | $x - (v_{min} / R) * \sqrt{N} = 0,691$ |
| $sp_{min} \leq 0.2 * E_{out}$ | $E_{out} - 5 * sp_{min} = 18,04$ |
| $R_{LCmin} \leq R_{LC} / N$ | $R_{LC} / N - R_{LCmin} = 300$ |
| $Q * (Max+DL) * R / N \leq E_{max}$ | $E_{max} - Q * (Max+DL) * R / N = 8,17$ |

Signature and date:

COMPATIBILITY: SATISFIED