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EC Type Examination Certificate

DK0199.601

SV1x

AUTOMATIC CHECKWEIGHING INSTRUMENT

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

In accordance with the requirements for the automatic weighing instrument of Directive 2004/22/EC of the European Parliament and Council on Measuring Instruments (MID).

Issued to **Scanvaegt Systems A/S**
Johann Gutenbergs vej 5-9
DK-8200 Århus N
DENMARK

In respect of Automatic checkweigher/catchweigher designated SV1x with variants of modules of load receptor and load cell.
Accuracy class XIII(1) / Y(a)
Maximum capacity: 1 kg to 99 999 kg
Verification scale interval: e = ≥ 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 & II of the Directive 2004/22/EC is met by the application of OIML R51-1:2006, OIML D11:2013 section 12 & 13 with severity level 3, WELMEC Guide 7.2:2015, and WELMEC Guide 8.16-1:2013.

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 automatic checkweigher/catchweigher is designated SV1X intended for automatic static weighing and manufactured by Scanvaegt Systems A/S. The instrument is performing a static automatic weighing operation. The system may consist of any separate control cabinet containing electrical input/output, PLC's, air valves and means to control the transport mechanism like conveyors, hopper scales, platform with lifting devices or overhead track scales.

2. Description of the construction and function

2.1 Construction

The check/catch weigher uses a SV1x weighing indicator.

The SV1x indicator is housed in an enclosure made of stainless steel.
The front panels and the indicator comprise of:

- 6 digits 7-segment LED display for primary indication
- 2 digits 7-segment LED display
- Appropriate state indicators
- A three colored LED indication for check weighing
- A keyboard containing 9 function keys plus a numerical keyboard with 12 keys. Each key is identified with a name and/or pictograph.

The indicator consist of analogue to digital conversion circuitry , microprocessor controller circuitry, power supply , keyboard, non-volatile memory for storage of calibration, alibi and setup data, and weight display contained within a single enclosure.
The instrument is software wise of Type P and Risk Class B with extension T according to WELMEC Guide 7.2:2015

2.1.1 Indication

The SV1x weighing indicator is used for all communication between checkweigher/catchweigher and the operator concerning the weighing operations. Other communication or operation is performed by connected equipment.

2.1.2 Electronics

The automatic check-/catchweigher SV1x has a dedicated SV1x weighing indicator module installed, in which all setup and configuration parameters are stored. This module handles all weighing functions and the communication concerning the weighing function to the operator.
All other operations of the checkweigher and communication to the operator are controlled via the connected equipment.

The indicator uses a single printed circuit board , which contains all of the instrument circuitry.
All instrument calibration and metrological setup data are contained in non-volatile memory. The indicator is powered from a AC mains accepting 100 -230 VAC, 50-60 Hz.
The indicator produces a load cell excitation voltage of 5VDC. The SV1X handle all weighing functions and has external interfaces of the type "protective interfaces".

2.1.3 Load cell

Set out in Section 3.2.1.

2.1.4 Load receptor

Set out in Section 3.2.2 to 3.2.7.

2.1.5 Interfaces and peripheral equipment

Set out in Section 4.

2.2 Function

The 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 Test mode

Pressing the ZERO key for more than 2 seconds will activate the test mode, where the following information can be displayed similar to the information shown in the power-up sequence:

no	Test	Test key	Power up
1.	Number of calibrations made	S	NS
2.	Number of changes to the legal setup	S	NS
3.	Software version	S	S
4.	CRC number calculated over the legal setup and calibration	S	S
5.	Indicator identification	S	S
6.	Display test	S	S
7.	Keypad test	S	NS

NS: Not Shown. S: Shown

2.2.3 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.

2.2.4 Zero-tracking

The indicators are equipped with a zero-tracking feature, which operates over a range of ±2% of Max and only when the indicator is at gross zero and there is no motion in the weight display.

2.2.5 Tare

When the tare function is active one of the function keys can display the gross weight temporary, if the indicator is configured to it. Likewise can one of the function keys be configured to show the tare weight.

2.2.5.1 Semi-automatic tare

The instrument models are provided with a semi-automatic subtractive tare feature activated using the "TARE" key.

2.2.5.2 Preset tare

A long press (> 2 sec.) on the TARE key will active preset tare, where the tare weight is to be entered from the keyboard.

2.2.6 Check weighing

The indicator can be set to check the actual weight against a high and a low limit with the possibility of doing it as a NET weighing using a preset tare value.

SV1x has a Product Look-Up table with 100 product memories for storage of high limit / low limit / preset tare pairs for the manual check weighing.

2.2.7 Extended resolution

The indicator can temporarily display the actual weight with extended resolution (d = 0.1e), but only in monitor mode.

2.2.8 Display test

A self-test mode is initiated by pressing the ZERO key for more than 2 seconds. In the self-test mode it is possible to select the display test by selecting “tst.dis” using the arrow up or down followed by “OK”. Pressing “OK” successively will alternate between display on and off.

2.2.9 Operator information messages

The weight indicator has a number of general and diagnostic messages, which are described in detail in the user’s guide.

2.2.10 Alibi memory (optional)

The weight indicator can be equipped with an internal µSD memory card working as an alibi memory.

2.2.11 Gravity compensation

The indicator is equipped with a gravity compensation algorithm function based on latitude in degrees and altitude in meter.

2.2.12 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.

3. Technical data

3.1 SV1x Automatic catchweigher/checkweigher

Type:	SV1x
Weighing mode:	Static
Accuracy class:	XIII(1) / Y(a) III in non-automatic mode
Weighing range:	single-interval or multi range (up to 3 ranges)
Maximum capacity (Max):	1 kg to 99 999 kg
Minimum capacity (Min):	XIII(1): ≥120 × e Y(a): ≥20 × e
Verification scale interval (e =):	≥ 0.1 g
Number of Verification Scale Intervals (n_i):	≤ 10000 for single interval, ≤ 3000 for multi range
Extra warm up time:	1 minutes
Maximum time between automatic zero setting:	75 minutes
Temperature range:	-10°C to 40°C
Electromagnetic class:	E2
Humidity:	Non-condensing
Power requirements:	100 to 240 VAC, 50/60 Hz
Peripheral interface:	Set out in Section 4

3.1.1.1 The SV1x indicator

Minimum input voltage per VSI:	0.5 µV
Excitation voltage:	5 VDC
Circuit for remote sense:	active
Minimum input impedance:	35 ohm
Maximum input impedance:	1100 ohm

3.1.2 Connecting cable between the indicator and load cell / junction box for load cell(s)

3.1.2.1 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.

3.1.2.2 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: 5129 m/mm² for n = 3000, 1389 m/mm^2 for n = 10000.

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 = 0.0010 [% / 25K]
Coefficient of resistance for the wires in the J-box cable: Sx = 0.0014 [% / 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. Description of possible solutions are set out in sect. 3.2.2 to 3.2.5

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 2:2015), 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.

3.2.2 Floor Scale Load Receptors Series 3000, 3100, 3300, 3800

Dimensions:	3020.XX.AA	: Maximum 2000 * 1500 mm
	3120.XX.AA	: Maximum 1400 * 900 mm
	3320.XX.AA	: Maximum 1400 * 900 mm
	3800.XX.AA	: Maximum 6000 * 3000 mm
	XX	: Dimension identification
Capacities:	3020.XX.AA	: From 300 kg up to 2000 kg (code replacing “AA”)
	3120.XX.AA	: From 300 kg up to 3000 kg (code replacing “AA”)
	3320.XX.AA	: From 300 kg up to 3000 kg (code replacing “AA”)
	3800.XX.AA	: From 150 kg up to 10000 kg (code replacing “AA”)
	AA	: Capacity identification
Construction , in brief	3020.XX.AA	Low profile floor scale with load cells firmly bolted to the attachment plate
	3120.XX.AA	U-shaped floor scale for pallets. Adjustable feet
	3320.XX.AA	Standard floor scale, opening and non-opening goods plate with optional load cell overload protection
	3800.XX.AA	Standard floor scale, opening and non-opening goods plate. Adjustable, self-aligning feet.
Reduction ratio	1	
Load cell	Load cell according to section 3.2.1	
Number of load cells	4	
Junction box	a sealable box normally occurs in the platform	
Drawings	Various	
Accessories	The load receptor can also be found with roller conveyor , conveyor belt, goods plate extension , back stops or bag holder.	

3.2.3 Vemag Floor Load Receptors Series 3200

Dimensions:	3220.XX.AA	: Maximum 900 * 700 mm
	XX	: Dimension identification
Capacities:	3220.XX.AA	: From 200 kg up to 800 kg (code replacing “AA”)
	AA	: Capacity identification
Construction, in brief	3220.XX.AA	Low profile Vemag floor scale with adjustable feet.
Reduction ratio	1	
Load cell	Load cell according to section 3.2.1	
Number of load cells	4	
Junction box	A sealable box normally occurs in the platform	
Drawings	Various	
Accessories	The load receptor can also be found with roller conveyor , conveyor belt, goods plate extension , back stops or bag holder.	

3.2.4 Floor Load Receptors Series 3900

Dimensions:	3900.XX.AA	: Maximum 2000 * 1500 mm
	XX	: Dimension identification
Capacities:	3900.XX.AA	: From 600 kg up to 6000 kg (code replacing “AA”)
	AA	: Capacity identification
Construction, in brief	3900.XX.AA	Hybrid floor scale, opening and non-opening goods plate with flexures and interlevers. A tensile wire connects the lever system and the load cell
Reduction ratio	1:12	
Load cell	Load cell according to section 3.2.1	
Number of load cells	1	
Junction box	A sealable box normally occurs in the platform	
Drawings	Various	
Accessories	The load receptor can also be found with roller conveyor , conveyor belt, goods plate extension , back stops or bag holder.	

3.2.5 Overhead Track Scale Load receptor types 4200, 4300, 5200 and 5300

Dimensions:	4200.XY.AA	:
	4300.XY.AA	:
	5200.XY.AA	:
	5300.XY.AA	:
	X	: Length code, max 900 mm
	Y	: Rail code (single/twin and flat/round)
Capacities:	From 100 kg up to 1000 kg (code replacing “AA”)	
	AA	: Capacity identification
Construction, in brief	Fully electronical with one load cell in each end of the weigh rail. An adjustable counter weight is fitted to equilibrate the support brackets. Type 4200 and 5200 is non –motorized, type 4300 and 5300 is motorized.	
Reduction ratio	1	
Load cell	Load cell according to section 3.2.1	
Number of load cells	2	
Junction box	A sealable box normally occurs in the platform	
Drawings	Various	

3.3 Documents

The documents filed at DELTA (reference No. T212733) are valid for the weighing instruments described here.

4. Interfaces

4.1 Interfaces

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

4.1.1 Load cell input

The load cell cable must be shielded and the shield must be well connected to the enclosure at the cable inlet. The indicator is supplied with remote sense circuit.

4.1.2 Peripheral interfaces

The indicator may be equipped with one or more of the following interfaces,

- RS-232
- RS-485
- Current loop
- CAN
- Ethernet
- Digital I/O
- Analog output.

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

4.2 Peripheral equipment

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

The instrument may be connected to any periphal equiment for leagal transactions if the equipment has a Part or Evaluation Certificate according to WELMEC Guide 8.8:2011.

5. Approval conditions

SV1x is approved for fixed installation in indoor locations and only for static weighing.

6. Special conditions for verification

In stopped mode the SV1x can operate as a non-automatic weighing instrument and shall be tested as such during verification.

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 Indicator

The calibration and configuration data is protected by two non-resettable event counters – one for the number of calibrations and one for the number of times the configuration data of the legal setup have been changed. A 6 digit (16 bit) CRC checksum is calculated over all the calibration and configuration data **including** the two event counters ensuring a new checksum always occurs even if calibration or configuration data is changed back again.

At time of verification the checksum shall be written on the inscription plate or on a label placed on or next to the inscription plate and secured similar to the inscription plate.

0XXXXX

The actual values of the event counters and the checksum can be displayed as described in section 2.2.2 and also in the User Manual.

7.1.2 Indicator and load cell connector

Securing of the indicator and load receptor with load cell combined is done by inserting the serial number of the load receptor as part of the principal inscriptions contained on the indicator's inscription plate.

7.1.3 Junction box for load cells

Access to the junction box, if any, is prevented by use of wire and seal or by sealing with brittle plastic stickers.

7.1.4 Alibi Storage

Alibi data, if any, is stored on a µSD-card. A sealing mark is covering the both the µSD-card and the board connector in order to prevent removal of the card.

7.1.5 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.

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 placed on a visible place on the measuring instrument.

8.1.1 CE mark

The CE mark of conformity and the supplementary metrology marking consisting of the capital letter 'M' and the last two digits of the year of its affixing, surrounded by a rectangle, shall be located on the identification plate.

8.1.2 Inscriptions

Manufacturer's trademark and/or name and the type designation is located on the front panel overlay. Below the weight display there is a plastic sticker indicating at least the information:

- Max, Min and e =

8.1.3 Markings on inscription plate

The identification plate shall at least bear the following inscriptions:

- Manufacturer's trademark and / or name
- Type designation
- Serial number
- Max. belt speed
- Temperature range
- Electromagnetic class: E2
- Humidity: Non-condensing
- Supply voltage
- Check number
- Type examination certificate number

9. Pictures

Figure 1 SV1x indicator

Figure 2 Sealing of the µSD-card for Alibi memory data.