EVALUATION CERTIFICATE

No. DK0199-R51-15.13

Object name	**SV0X**
Object type	**A weighing controller/transmitter for automatic catchweigher/checkweigher instruments**
Issued by	**DELTA Danish Electronics, Light & Acoustics**

Issued in accordance with the requirements in WELMEC Guide 8.8:2011" Guide on General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments".

In accordance with	OIML R51:2006, OIML D11:2004 section 12 and 13 applying severity level 3 WELMEC Guide 2.8:2012 WELMEC Guide 7.2:2011 WELMEC Guide 8.8:2008.
Issued to	**Scanvaegt Systems A/S** Johann Gutenbergs vej 5-9 DK-8200 Århus N DENMARK
Manufacturer	**Scanvaegt Systems A/S**
Characteristics	A weighing controller/transmitter for automatic catchweigher / checkweigher instruments.
Description and documentation	The weighing controller/transmitter is described and documented in the annex to this certificate.
Remarks	Summary of tests involved: see annex. This evaluation certificate cannot be quoted in an EC type examination certificate without permission of the holder of the certificate mentioned above.

The annex comprises 8 pages.

Issued on	**2015-10-19**	Signatory: **J. Hovgård**

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Descriptive annex

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1.　　Name and type of instrument

The weighing controller/transmitter is designated SV0X and is a module for automatic catchweighers / checkweighers. It can be used for both static and dynamic weighing.

It is an electronic weighing controller/transmitter to be connected to a separate load receptor and capable of transmitting the instant weight to an external display unit or to a digital indicator.

The SV0X consists 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.

2.　　Description of the construction and function

2.1　　Construction

2.1.1　　SV0X series of weighing controllers/transmitters

The SV0X controller/transmitter is supplied in an aluminium enclosure for DIN rail mounting.

The SV0X controller/transmitter is specified in Section 3.1.

2.1.2　　Load cells

Requirements to connected load cell(s) are set out in Section 3.2.

2.1.3　　Load receptor

Requirements to connected load receptor are set out in Section 3.3.

2.1.4　　Interfaces and peripheral equipment

Set out in Section 4.

2.2　　Functions

The instrument is a microcontroller based electronic weight transmitter that requires the external connection of strain gauge load cell(s).

The primary functions provided are,

- Power up test

- Initial zero setting device (max. 20 % of Max)

- Semi-automatic zero setting device (max. 4 % of Max and disabled in automatic mode)

- Zero tracking device (max 4 % of Max)

- Automatic zero setting device (max 4 % of Max)

- Extended indicating device (service mode only)

- Gravity compensation device

- Dynamic linearization device

- Non-resettable event counter

- Event logger

- Check number device

- Detection of significant fault

Event counter
The SV0X has a non-resettable event counter, which increments each time the legal configuration set-up or the calibration is changed.

The value of the event counter is displayed during start up in the format 'L.C.xxxx', where xxxx is the value of the counter.

Software version

The software version is displayed in the service display during the start-up of the transmitter.
The format of the software is X.YY.ZZ, where X is the revision of the legally relevant functionality of the software and YY is the sub-revision for major software changes, ZZ is the sub revision for minor software changes not related to the metrological parts of the software.

The approved version for SV0X is 1.XX.YY.

3. Technical data

3.1 Weight controller/transmitter

The SV0X has the following characteristics:

Type:	SV0X…
Accuracy class:	XIII(1) or Y(a)
Weighing mode:	Static or dynamic
Weighing range:	Single-interval
Maximum number of verification scale intervals (n):	≤ 10000
Minimum input voltage per VSI:	0.5 µV
Maximum capacity of interval or range (Max_i):	$n_i \times e_i$
Verification scale interval, $e_i =$:	Max_i / n_i
Initial zero-setting range:	± 10 % of Max
Maximum tare effect:	100 % of Max
Fractional factor (pi):	0.5
Excitation voltage:	5 VDC
Minimum input impedance:	87 ohm
Maximum input impedance per channel:	1200 ohm
Circuit for remote sense:	present
Electromagnetic class:	E2
Humidity:	non-condensing
Supply voltage:	12 - 24 VDC (not to be supplied from DC Mains)
Operating temperature range:	-10 °C / +40 °C
Maximum cable length between SV0X and junction box for load cells:	534 m/mm^2
Peripheral interface(s):	See Section 4

3.1.1 Connecting cable between the weight transmitter and the junction box for load cell(s), if any

3.1.1.1 4-wire system

Line: 4 wires, shielded

Maximum length: the certified length of the load cell cable, which shall be connected directly to the weight transmitter.

3.1.1.2 6-wire system

Line: 6 wires, screened

Option 1:

Maximum length: 534 m/mm^2 (for n = 10,000)

Maximum resistance per wire: 9.0 ohm

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 transmitter: Es = 0.0045 [%/25K]

Coefficient of resistance for the wires in the J-box cable: Sx = 0.0017 [%/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.

3.2 Load cells

The SV0X weighing controller/transmitter may only be used with load cell(s) that fulfil the following general acceptance of load cells.

3.2.1 General acceptance of load cells

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 a respective OIML Certificate of Conformity (R60) is 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 weight transmitter 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 Load receptors

The SV0X weighing controller/transmitter may only be used with a load receptor that has a load transmission device in accordance with the standard solutions shown in WELMEC Guide 2.4:2001.

3.4 Composition of modules

Composition of modules to a non-automatic weighing instrument using SV0X shall satisfy OIML R76-1:2006 annex F.

4. Interfaces and peripheral equipment

4.1 Interfaces

The weighing controller/transmitter may be equipped with one or more of the following protective interfaces,

- Serial interface RS 232C, 2 isolated ports

- Serial interface RS 485

- Ethernet

- CAN bus

- USB

- Digital input, 12 isolated

- Relay output, 12 isolated

- Analog output, 0-20 mA

The interfaces are characterised "Protective interfaces" according to paragraph 8.4 in the Directive and do not have to be secured.

5. Approval conditions

5.1 Compatibility of modules

In case of composition of modules OIML R76-1:2006 annex F 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 5.1.

7. Securing and sealing of SV0X controller/transmitter

7.1 Securing and sealing

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

7.1.1   SV0X controller/transmitter

The legal configuration and calibration setup are secured using a checksum (CRC16) calculated over both the legal settings and the internal running event counter (see Section 2.2.5). The checksum is shown in the display at power up. (C. XXXX)

The load-cell connector is sealed with a sticker covering part of the terminal screw area.

The load-cell is connected to a separate weighing PCB board (SV-AD), which is internal connected to the SV0x main board. Additionally, all legal settings are stored on the weighing module. This makes it possible to replace the main SV0x PCB board without verifying again because it can be done without breaking the load-cell sealing and without losing legal settings.

7.1.2   Weight controller/transmitter- load cell connector - load receptor

Sealing of the connection between the SV0X weighing controller/transmitter and the load receptor and load cell(s) is accomplished by sealing the connector(s) with brittle plastic sticker(s) or with wire and seal.

In the rare cases where this is not possible the connection can be secured in one of the following ways:

- Inserting the serial number of the load receptor as part of the principal inscriptions contained on the SV0X weighing controller/transmitter identification label.

- The load receptor bears the serial number of the SV0X weighing controller/transmitter on its data plate.

7.1.3   Junction box for load cells

A junction box for load cells shall be sealed against opening with wire and seal or brittle plastic sticker(s).

8. Tests performed

Tests carried out by DELTA for this evaluation certificate on Scanvaegt System's SV01 weighing controller/transmitter.

Test
Temperature effect on sensitivity with minimum weighing range and input impedance of 87 / 350 Ohm (20, 40, -10, 5 and 20 °C)
Temperature effect on no-load indication with minimum weighing range and input impedance of 87 Ohm (20, 40, -10, 5 and 20 °C)
Temperature effect on sensitivity during dynamically weighing with minimum weighing range and input impedance of 350 Ohm (20, 40, 0, 5 and 20 °C)
Damp heat, steady state
Repeatability
Warm-up time
Voltage variations
Span stability
Cable length between SV0X and a junction box for load cells
EMC immunity tests are performed with a load cell of 350 Ohm
Voltage dips and interruption
Electrical bursts (OIML D11:2004, severity level 3)
Surge (OIML D11:2004, severity level 3)
Electrostatic discharge
Radiated electromagnetic fields
Conducted electromagnetic fields

The test item fulfilled the maximum permissible errors at all tests.

Surge was tested on the AC side of the external AC/DC adapter. SV0X is not to be supplied from DC Mains.

9. Documentation

Test reports
DANAK-1915285 dated 27 May 2015, 68 pages.
DANAK-1915372 dated 15 June 2015, 90 pages.

Technical file
Contents of the technical documentation held by the notified body in technical file T210297.
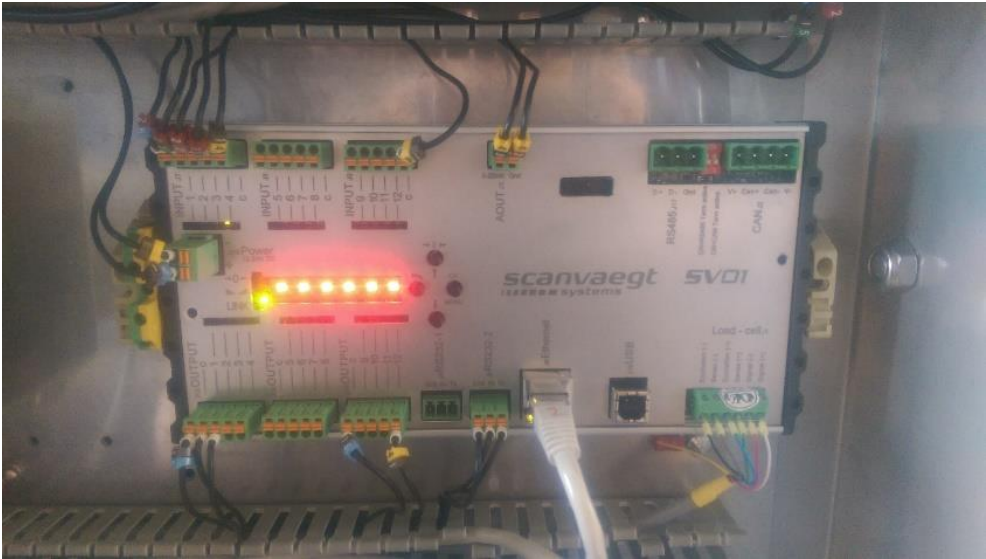
10. Pictures

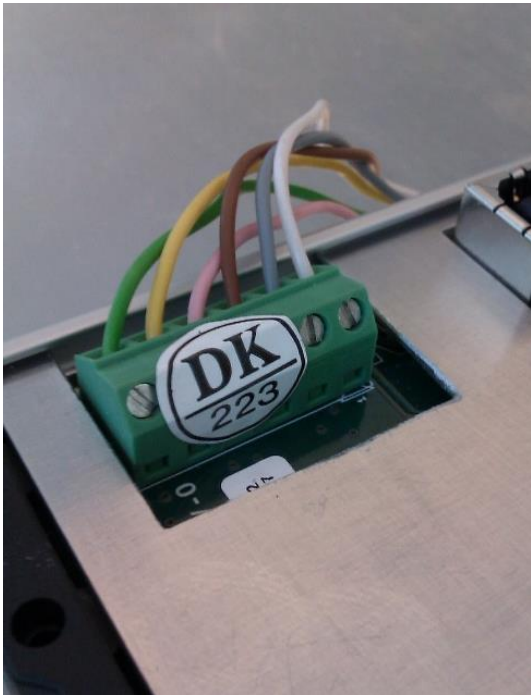**Figure 1** SV0X weighing controller / transmitter.

Figure 2 Sealing of SV0X's load cell connection with brittle sticker.