TEST CERTIFICATE

No. **DK0199-R76-08.03**

Instrument type: 825

Test item device: Indicator

Issued by: DELTA Danish Electronics, Light & Acoustics
EU - Notified Body No. 0199
address: Venlighedsvej 4, DK-2970 Hørsholm, Denmark

In accordance with: Paragraph 8.1 of the European Standard EN 45501:1992
WELMEC Guide 2.1

Fractional factor (p_i): 0,5 (refer to 3.5.4 of the standard)

Issued to **Cardinal Detecto Scale Manufacturing Company**
Address: 203 East Daugherty Street, Webb City, Missouri 64870, USA

Manufacturer: Cardinal Detecto Scale Manufacturing Company

In respect of: The model of an Indicator, tested as a module of a weighing instrument.

Characteristics: Suitable for a non-automatic weighing instrument with the following characteristics:
Self indicating with Single-interval, Multi-interval

Accuracy class	III	IIII	
Maximum capacity	Maxi	Maxi	[count]
Verification scale interval, e =	Maxi / n	Maxi / n	[count]
n_{max} =	10000	1000	[count]
Minimum input-voltage per VSI:	0,25	0,25	[µV]

The essential characteristics are described in the annex.

Description and documentation: The Indicator is described and documented in the annex to this certificate.

Remarks: Summary of tests involved: Test report no. DANAK-1910305
This test certificate cannot be quoted in an EU type approval certificate without permission of the holder of the certificate mentioned above.

The ANNEX comprises 5 pages

Issued on **25-11-2008**

Signatory **J. Hovgård**

1 NAME AND TYPE OF INSTRUMENT

The Indicator is designated 825 suitable to be incorporated in a non-automatic weighing instrument.

Class III and Class IIII, Single-interval, Multi-interval.

2 DESCRIPTION OF THE CONSTRUCTION AND FUNCTION

2,1 Construction

The instrument consists briefly of a main circuit board with display and data transmission. The load cell interface is placed on a seperate interface board. Up to ten interface boards can be installed in the 825 weighing indicator of which maximum nine can be load cell interface boards.

Further, see the EU type-approval certificate no. DK0199.160

2,2 Function

The device is a microprocessor based electronic indicator / scale for external connection of strain gauge load cells. The system has two microprocessors, one for handling load cell interface(s), weighing information and I/O, and one for running the display. The weight information appears in the digital display on the front panel, and may be transmitted to connected equipment. The interface for connection of load cells has been tested and examined thoroughly. The maximum length and resistance of the connecting cable between the test item and a junction box for load cell(s) has been determined by testing and evaluation. The result appears from Summary of results. The weighing indicator has software seperation and examination of the software based on functional testing as well as examination of documentation was included in this type examination.

Setting devices:

Zero-setting devices:	Semi-automatic,	Initial zero-setting	range: 20 % Max
Tare device(s):	Subtractive tare,	Preset tare,	Tare range: 100 % of Max1

3 TECHNICAL DATA

3.1 Indicator

Manufacturer:	Cardinal Detecto Scale Manufacturing Company			
Type:	825			
Accuracy class:	III	&	IIII	
Maximum number of VSI's (n_{max}):	10000		1000	
Minimum input-voltage per VSI (Δumin):	0,25 [µV]		0,25 [µV]	
Weighing range:	Single-interval, Multi-interval			
Number (i) of Intervals / ranges specified:	3			
Maximum capacity of partial ranges (Maxi):	ni * ei		ni * ei	[count]
Verification scale interval, e =	Maxi / ni		Maxi / ni	[count]
Internal resolution:				
Initial zero-setting:	20 [% of Max]			
Maximum tare effect:	100 [% of Max1]			
Fractional factor (p_i):	0,5			
Minimum dead load (Dmin):	1 [mV]			
Maximum input range:	32,55 [mV]			
Excitation voltage:	10,85 [Vdc]			
Circuit for remote sense:	Active (see below)			
Minimum input-impedance:	25 [ohm]			
Nominal input-impedance:	350 [ohm]			
Maximum input-impedance:	1200 [ohm]			
Load cell linearizing feature:	None			
Connecting cable to load cell(s):	See 3.3.1			
Operating temperature range:	Min / Max = -10 °C / 40 [°C]			
Temperature effect on no-load confirmed:	0,2 [ppm/K]		range:	-10,1 / 40,3 [°C]
Temperature effect on span confirmed:	1,8 [ppm/K]		range:	-10,1 / 40,3 [°C]
Peripheral Interface(s):	See section 4			
AC power supply:	90 - 260 [Vac]		Built-in supply	
	none			

3.1.1 Connecting cable between the indicator and the junction box for load cells, if any

3.1.1.1 4-wire system

Maximum length	The certified cable length for the load cell.
Line	4 wires, shielded

3.1.1.2 6-wire system

Line	6 wires, shielded

Option 1:

Maximum length	491 [m/mm²]
Maximum resistance per wire	8,3 [ohm]

In case the actual (n) for the weighing instrument is less than (n_{max}), the following apply:

Option 2:

Coefficient of temperature of the span error of the indicator:	Es =	0,0043	[% / 25K]
Coefficient of resistance for the wires in the J-box cable:	Sx =	0,0019	[% / 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: WELMEC 2.1, annex 5.
The calculation program is obtainable by downloading at www.delta.dk/weighing.

4 INTERFACES

4,1 Load cell interface

Refer section 3.1.1.
Any load cell(s) can be used for instruments under this certificate, 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 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, paragraph 11), and any particular installation requirements).
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.

4,2 Peripheral interfaces

		Security:	Connected cable:
1:	RS232	Protective	shielded
2:	RS232	Protective	shielded
3:	RS232	Protective	shielded
4:	Ethernet	Protective	shielded
5:	Devicenet	Protective	shielded
6:	Digital Inputs	Protective	no shield
7:	Digital Outputs	Protective	no shield

5 CONDITIONS FOR USE

None

6 LOCATION OF SEALS AND INSCRIPTIONS

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 90/384/EEC.

Location of CE mark of conformity:
On inscription plate on the side of the indicator

Inscriptions on the overlay:
Max_i, Min_i, e_i =

Other inscriptions on the overlay:

Other inscriptions:
T = -Max_1, PT = MAX_1

7 TESTS

The Indicator type 825 has been tested according to EN 45501and WELMEC 2.1 Guide for testing of indicators.

Tests and Examinations		
Input impedance:	High	Low
Temperature tests: 20/40/-10/5/20 (tested at minimum input-voltage sensitivity)	X	X
Temperature effect on no-load indication		X
Temperature effect on span	X	X
Repeatability		X
Tare		X
Warm-up time		X
Voltage variations		X
Short time power reductions	X	
Electrical bursts	X	
Electrostatic discharges	X	
Immunity to radiated electromagnetic fields	X	
Span stability		X
Examination of the construction		
Maximum length and impedance of cable to the junction box for load cell(s), if any	X	X
Load cell interface measurements with interruptions of the sense circuit	X	X

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

8 DOCUMENTATION

Contents of the technical documentation held by the notified body:

8,1 Product specification
- description
- drawings
etc.

8,2 Examination report

OIML R76 report No. DANAK-1910305

8,3 Test results

Report No. DANAK-1910305
EMC Report no.: no seperate EMC report