



TEST CERTIFICATE

No. **DK 0199-R76-03.06**

Instrument type: ICAN Series

Test item device: A/D device

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 Scale Manufacturing Company**
 Address: 203 East Daugherty, P.O.Box 151, Webb City, MO 64870, USA

Manufacturer: Cardinal Scale Manufacturing Company

In respect of: The model of an A/D device, 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

Accuracy class	III	IIII	
Maximum capacity	n * e	n * e	[count]
Verification scale interval, e =	Maxi / n	Maxi / n	[count]
n _{max} =	10000	1000	[count]
Minimum input-voltage per VSI:	1.2	1.2	[µV]

The essential characteristics are described in the annex.

Description and documentation The A/D device is described and documented in the annex to this certificate.

Remarks: Summary of tests involved: Test report no. DANAK-197062
 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 **2003-08-01**

Signatory *P. Bengtsen*
P. Bengtsen



1 NAME AND TYPE OF INSTRUMENT

The A/D device is designated ICAN Series suitable to be incorporated in a non-automatic weighing instrument.

Class III or Class IIII, Single-interval.

2 DESCRIPTION OF THE CONSTRUCTION AND FUNCTION

2.1 Construction

The weighing instrument is designated the ICAN series which is a system of modules consisting of an Model 788 electronic indicator serving as the display controller which is connected via a CAN serial bus to one or more ICAN load cell junction boxes each of which is connected to two or more load cells supporting the load receptor(s) and peripheral equipment. The ICAN Load Cell Junction Box is housed in a stainless steel enclosure designed for mounting to a flat surface on the load receiver. The junction box is 457 mm long x 243 mm wide x 87 mm high and has a hinged top cover equipped with a gasket to prevent the entry of moisture into the box. The top is secured in place with two spring latches. The junction box is equipped with eight metal gland connectors on one end for entry and shielding of up to eight load cell cables. Gland connectors are also provided for mains power input and for input of optical fibers.

The ICAN Load Cell Junction Box contains one load cell input board for each load cell connected to it. Each ICAN Load Cell Junction Box will accept the inputs from up to eight individual load cells.

Each load cell input board contains a 24-bit sigma-delta analog to digital converter used to convert the load cell signal into a digital value. The load cell input board provides an excitation voltage of 12 VDC to power the strain gauge load cell connected to it.

SOFTWARE

The software revision level is displayed during the power up sequence of the instrument.

ACCESS TO METROLOGICAL CHARACTERISTICS AND SPAN ADJUSTMENT

788 Weight Display Unit:

Access to the configuration and calibration facility is achieved by pressing the MENU key then selecting the SETUP from the displayed menu. The calibration screw must be removed from the rear panel of the weight display unit before the setup function can be accessed. A security seal can be installed to prevent access to the switch. The wire is passed through the hole in the head of the calibration switch screw, the adjacent rear panel retaining screw and an adjacent screw on the enclosure end cap.

ICAN Load Cell Junction Box:

The ICAN Load Cell Junction Box is secured by threading a lead-wire security seal through a post in the junction box enclosure and an adjacent clamp that secures the cover to the box. As an alternative, a brittle plastic sticker may be used to secure the cover to the load cell junction box.

CE MARK AND INSCRIPTIONS

A sticker with the CE mark of conformity followed by the last two digits of the year the device was certified along with a serial number containing a date code of production are located on the identification plate which is located on the back of the 788 weight display unit.

This same information is also located on the identification plate located on the front edge of the ICAN Load Cell Junction Box between the two cover retaining clamps.

Manufacturer's trademark and name and the type designation is located on the front panel overlay.

On a single brittle plastic sticker located on the back of the weight display unit enclosure.

- Certificate No. and the accuracy class

On a single brittle plastic sticker located on the front panel overlay:

- Max, Min, e=

On a label located on the back of the weight display unit enclosure and on the front surface of the ICAN Load Cell Junction Box:

- Model No., Serial No., electrical data and other inscriptions.

2.2 Function

The ICAN device is a microprocessor based electronic unit for load cell signal(s) which, together with the model 788 electronic indicator serving as the display controller, make up a non-automatic weighing instrument. Furthermore, the weight information may be transmitted to peripheral equipment by a protective bi-directional serial RS 232C / RS485 interface.

Setting devices:

Zero-setting devices:	Semi-automatic,	Initial zero-setting	range: 4 % Max
Tare device(s):	Subtractive tare,	Tare range:	100 [% of Max]

3 TECHNICAL DATA

3.1 A/D device

Manufacturer:	Cardinal Scale Manufacturing Company		
Type:	ICAN Series		
Accuracy class:	III	&	IIII
Maximum number of VSI's (n_{max}):	10000		1000
Minimum input-voltage per VSI (Δ_{umin}):	1.2 [μ V]		1.2 [μ V]
Weighing range:	Single-interval		
Number (i) of Intervals / ranges specified:	1		
Maximum capacity of partial ranges (Maxi):	$n * e$		[count]
Verification scale interval, e =	Maxi / n		[count]
Internal resolution:	16777216		
Initial zero-setting range:	4 [% of Max]		
Maximum tare effect:	100 [% of Max]		
Fractional factor (p_i):	0.5		
Minimum dead load (D_{min}):	1 [mV]		
Maximum input range:	± 11 [mV]		
Excitation voltage:	12 [Vdc]		
Circuit for remote sense:	Active (see below)		
Minimum input-impedance:	120 [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:	16.7 [ppm/K]	range:	-10 / 39.2 [°C]
Temperature effect on span confirmed:	0.6 [ppm/K]	range:	-10 / 39.2 [°C]
Peripheral Interface(s):	See section 4		
AC power supply:	115 - 230 [Vac]		
	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
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Option 1:

Maximum length	564 [m/mm ²]
Maximum resistance per wire	9.5 [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: $E_s =$	0.0005	[% / 25K]
Coefficient of resistance for the wires in the J-box cable: $S_x =$	0.0037	[% / ohm]

$$(L/A)_{max} = 295.86 / S_x * (emp / n - E_s) [m / mm^2] \text{ in which } emp = p_i * mpe * 100 / e$$

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

1:	RS 232 / RS485	Security:	Connected cable:
2:	CAN bus connected to 788 instrument	Protective	shielded
		Protective	shielded

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:

See 2.1

Inscriptions:

See 2.1.

7 TESTS

The A/D device type ICAN Series has been tested according to EN 45501 and WELMEC 2.1 Guide for testing of indicators.

Tests and Examinations			
	Input impedance:	High	Low
Temperature tests: 19/39/-10/6/21 (tested at minimum input-voltage sensitivity)		X	X
Temperature effect on no-load indication			X
Temperature effect on span		X	X
Repeatability			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	
Damp heat, steady state			X
Span stability			X
Examination of the construction			
Checklist			
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-197062

8.3 Test results

Report No. DANAK-197062