



Australian Government

National Standards Commission

12 Lyonpark Road, North Ryde NSW 2113 Australia

Supplementary Certificate of Approval

No S433

Issued under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the

Cardinal Model 220 Digital Indicator

submitted by Cardinal Scale Manufacturing Co
203 East Daugherty Street
Webb City MO 64870
USA.

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 April 2009, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked NSC No S433 and only by persons authorised by the submitter.

Instruments incorporating a digital indicator purporting to comply with this approval shall be marked NSC No S433 in addition to the approval number of the instrument.

It is the submitter's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the Commission and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with the Commission's Document NSC P 106.

The values of the performance criteria (maximum number of scale intervals etc.) applicable to an instrument incorporating the pattern approved herein shall be within the limits specified herein and in any approval documentation for the other components.

The Commission reserves the right to examine any instrument or digital indicator of an instrument purporting to comply with this approval.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0/A.

DESCRIPTIVE ADVICE

Pattern: approved 2 March 2004

- A Cardinal model 220 digital indicator.

Variants: approved 2 March 2004

1. Model 200 digital indicator.
2. Model 205 digital indicator.
3. Model 210 digital indicator.

Technical Schedule No S433 describes the pattern and variants 1 to 3.

FILING ADVICE

The documentation for this approval comprises:

Supplementary Certificate of Approval No S433 dated 12 May 2004
Technical Schedule No S433 dated 12 May 2004 (incl. Table 1 and Test Procedure)
Figures 1 to 6 dated 12 May 2004

Signed by a person authorised under Regulation 60 of the National Measurement Regulations 1999 to exercise the powers and functions of the Commission under this Regulation.



TECHNICAL SCHEDULE No S433

Pattern: Cardinal Model 220 Digital Indicator

Submittor: Cardinal Scale Manufacturing Co
203 East Daugherty Street
Webb City MO 64870 USA

1. Description of Pattern

A Cardinal model 220 digital mass indicator (Table 1 and Figure 1) which may be configured to form part of:

- A weighing instrument with a single weighing range of up to 10 000 verification scale intervals; or
- A multi-interval weighing instrument with two partial weighing ranges (each with its own verification scale interval) in which case it is approved for use with up to 10 000 verification scale intervals per partial weighing range.

Instruments may be fitted with output sockets (output interfacing capability) for the connection of auxiliary and/or peripheral devices.

Instruments are powered directly by mains AC power.

This approval does not include the use of the indicator as an automatic weighing instrument, unless specifically mentioned in a certificate of approval for such an instrument.

TABLE 1 – Specifications

| | |
|--|----------------------------|
| Maximum number of verification scale intervals | 10 000 or 10 000 per range |
| Minimum sensitivity | 0.9 μ V/scale interval |
| Excitation voltage | 12 V DC |
| Maximum excitation current | 480 mA |

1.1 Zero

Zero is automatically corrected to within $\pm 0.25e$ whenever the instrument comes to rest within $0.5e$ of zero.

Note: For multi-interval operation, zero is automatically corrected to within $\pm 0.25e_1$ whenever the instrument comes to rest within $0.5e_1$ of zero.

The instrument has a semi-automatic zero-setting device (to set the instrument to within $\pm 0.25e$ of zero) with a nominal range of not more than 4% of the maximum capacity of the instrument.

The instrument has an initial zero-setting device with a nominal range of not more than 20% of the maximum capacity of the instrument.

1.2 Tare

A semi-automatic subtractive taring device of up to the maximum capacity of the instrument may be fitted. A pre-set taring device of up to the maximum capacity (or of up to the Max_1 for multi-interval instruments) may also be fitted.

1.3 Display Check

A display check is initiated whenever power is applied.

1.4 Additional Features

The pattern also has certain additional functions (totalising, counting, set point controls (including for filling purposes), under/over checkweighing, weight grading, batching). However this approval does not include the use of the indicator as an automatic weighing instrument, unless specifically mentioned in a certificate of approval for such an instrument.

The additional functions (other than the indications of measured mass, i.e. gross, tare, net, totals, displayed either on the indicator or on an auxiliary or peripheral device) are not approved for trade use.

1.5 Markings and Notices

Instruments carry the following markings:

| | |
|--|---------------------------------|
| Manufacturer's mark, or name written in full | Cardinal Scale Manufacturing Co |
| Name or mark of manufacturer's agent | |
| Indication of accuracy class | Ⓜ |
| Maximum capacity | <i>Max</i> kg #1 |
| Minimum capacity | <i>Min</i> kg #1 |
| Verification scale interval | <i>e</i> = kg #1 |
| Maximum subtractive tare | <i>T</i> = - kg #2 |
| Serial number of the instrument | |
| Pattern approval mark for the indicator | NSC No S433 |
| Pattern approval mark for other components | #3 |

#1 These markings are also shown near the display of the result if they are not already located there.

#2 This marking is required if *T* is not equal to *Max*.

#3 May be located separately from the other markings.

In addition, instruments not greater than 100 kg capacity shall carry a notice stating NOT TO BE USED FOR TRADING DIRECT WITH THE PUBLIC, or similar wording.

Note:

For multi-interval instruments the markings shall be as above, with the exception of the following:

| | |
|-----------------------------|-----------------------------|
| Maximum capacity | <i>Max</i>/..... kg * |
| Verification scale interval | <i>e</i> =/..... kg * |

1.6 Verification/Certification Provision

Provision is made for the application of a verification/certification mark.

1.7 Sealing Provision

Provision is made for the calibration adjustments to be sealed by use of a lead and wire seal to prevent removal of the calibration access screw on the back of the indicator (Figure 2).

2. Description of Variants

2.1 Variant 1

The Cardinal model 200 indicator is a single interval instrument (Figure 3). This model is similar to the pattern but has basic functions only and is in a different style enclosure. This model does not have the pre-set tare facility.

2.1.1 Sealing Provision

Provision is made for the calibration adjustments to be sealed by use of one or more lead and wire seals to prevent removal of the two calibration access screws on the back of the indicator (Figure 4).

2.2 Variant 2

The Cardinal model 205 indicator (Figure 5) is a single interval instrument which is similar to the pattern but has basic functions only. This model does not have the pre-set tare facility.

2.2.1 Sealing Provision

As described in clause 1.7 for the model 220 (the pattern).

2.3 Variant 3

The Cardinal model 210 indicator (Figure 6) is a single interval instrument which is similar to variant 2 (model 205) but has a different keypad including numeric keys, and has some additional functions (e.g. counting, time).

2.3.1 Sealing Provision

As described in clause 1.7 for the model 220 (the pattern).

TEST PROCEDURE

Instruments should be tested in conjunction with any tests specified in the approval documentation for the instrument to which the pattern is connected, as appropriate, and in accordance with any relevant tests specified in the Uniform Test Procedures.

Maximum Permissible Errors at Verification/Certification

For single range instruments, the maximum permissible errors for increasing and decreasing loads on initial verification/certification for loads, m , expressed in verification scale intervals, e , are:

- $\pm 0.5e$ for loads $0 \leq m \leq 500$;
- $\pm 1.0e$ for loads $500 < m \leq 2\,000$; and
- $\pm 1.5e$ for loads $2\,000 < m \leq 10\,000$.

For multi-interval instruments with verification scale intervals of e_1, e_2, \dots , apply e_1 for zero adjustment, and for maximum permissible errors apply e_1, e_2, \dots , as applicable for the load.

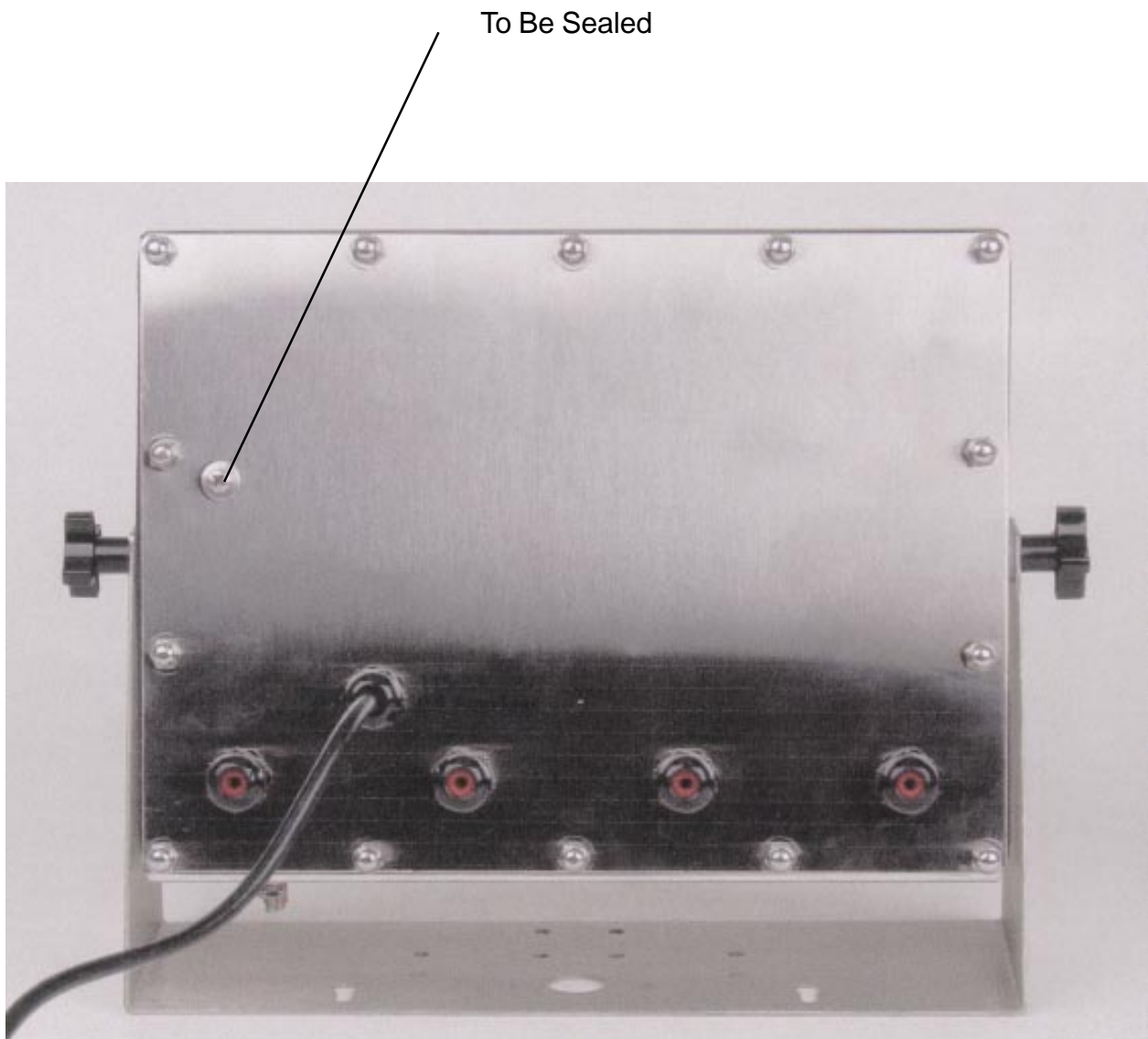
FIGURE S433 – 1



Cardinal Model 220 Digital Indicator

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FIGURE S433 – 2



Sealing of Cardinal Model 220 Digital Indicator

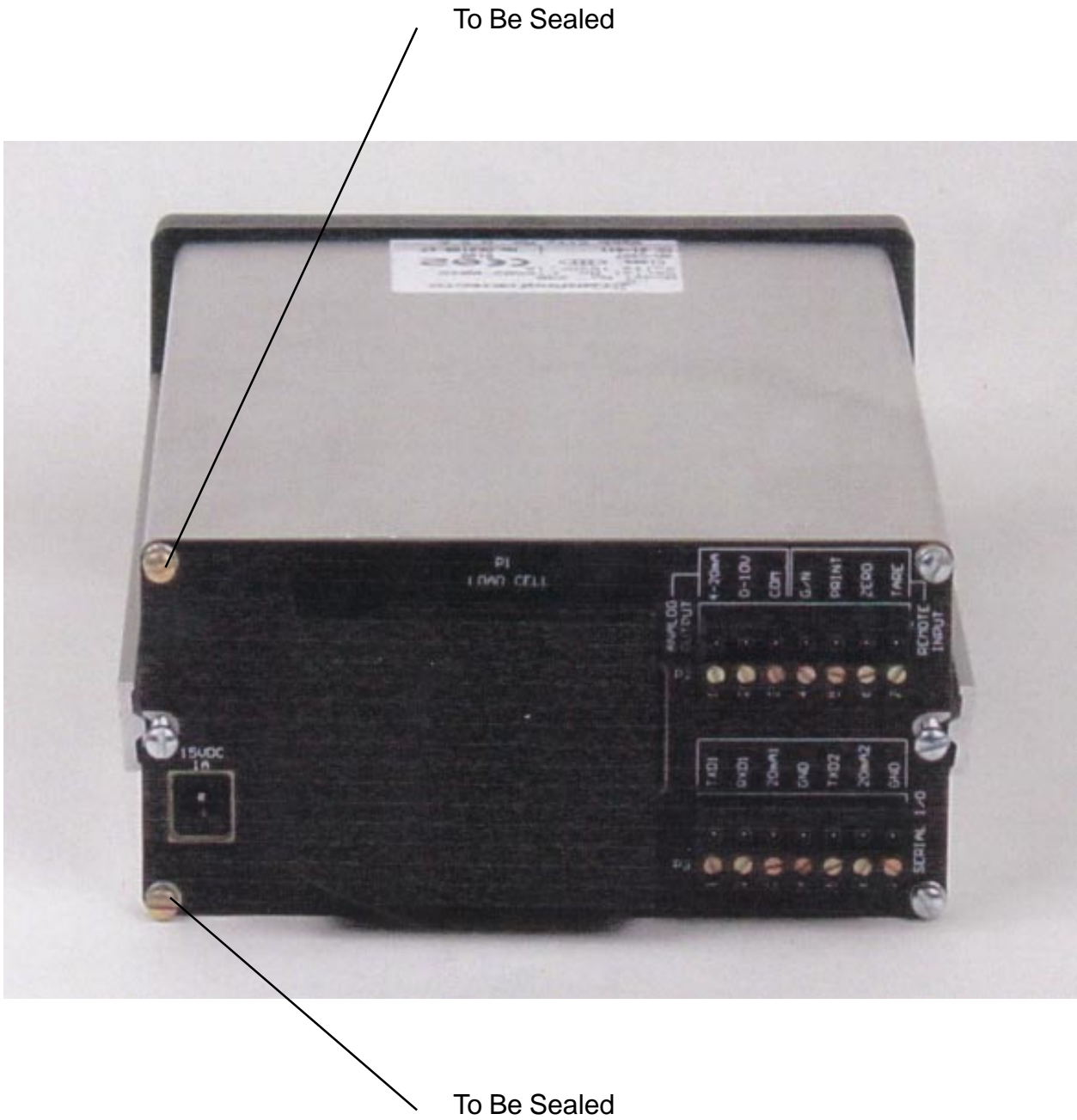
FIGURE S433 – 3



Cardinal Model 200 Digital Indicator

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FIGURE S433 – 4



Sealing of Cardinal Model 200 Digital Indicator

FIGURE S433 – 5



Cardinal Model 205 Digital Indicator

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FIGURE S433 – 6



Cardinal Model