

EU Type Examination Certificate

No. 0200-NAWI-08686

420

NON-AUTOMATIC WEIGHING INSTRUMENT

Issued by **FORCE Certification**
EU - Notified Body No. 0200

In accordance with the requirements in Directive 2014/31/EU of the European Parliament and Council.

Issued to **Cardinal Scale Manufacturing Company**
102 East Daugherty Street,
Webb City, Missouri 64870
USA

In respect of Non-automatic weighing instrument designated 420 with variants of modules of load receptors, load cells and peripheral equipment.
Accuracy class II, single-interval
Maximum capacity, Max: From 300 g up to 3000 g
Verification scale interval: $e_i = \text{Max}_i / n_i$
Maximum number of verification scale intervals: $n_i \leq 7500$.
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 of the Directive is met by the application of the European Standard EN 45501:2015 and OIML R76:2006

The principal characteristics and approval conditions are set out in the descriptive annex to this certificate.

The annex comprises 9 pages.

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FORCE Certification references:

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Descriptive annex

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1. Name and type of instrument

The non-automatic weighing instruments designated 420 are self-indicating weighing balances manufactured by Cardinal Scale Manufacturing Company.

The scale is Class II with single-interval, supplied from 12 VDC from an external power supply intended for 100-240 VAC and with an optional internal rechargeable battery.

The name of the instruments may be followed by alphanumeric characters for technical, legally or commercial characterization of the instrument.

The scales consist of analogue to digital conversion circuitry, microprocessor control circuitry, keyboard, non-volatile memory for storage of setup and calibration data.

2. Description of the construction and function

2.1 Construction

Enclosure

The scales are housed in a plastic enclosure with a stainless steel plate on top.

The load tray has a stainless steel cover.

A level indicator (gas bubble) is built into the enclosure in the rear.

Keyboard

The keyboard is containing 7 keys. The membrane keys are used to enter commands or to set up the instrument. Each key is identified with a name and/or pictograph.

Displays

A 7-segment LCD display with 6 digits for weight indication and a smaller digit for auxiliary or extended indication. Furthermore, it has status indicators for: Zero, Net weight, and Stable.

Electronics

The instruments have a main board with A/D conversion, microprocessor and non-volatile memory for storing of setup and calibration data. There is a board for display and connection to the membrane keyboard. There are some small boards for the serial communication and a real time clock with a battery.

Models

Models	Max capacity	Min capacity	e	d	n	Indication device	Load cell		
							No.	E _{max}	V _{min}
420-300	300 g	1 g	0.05 g	0.005 g	6000	Extended	HBM-SPL	600 g	≤ 0.05 g
420-600	600 g	0.2 g	0.1 g	0.01 g	6000	Auxiliary		600 g	≤ 0.1 g
420-1200	1200 g	10 g	0.2 g	0.02 g	6000	Extended		3 kg	≤ 0.2g
	6000 ct	50 ct	1 ct	0.1 ct				3 kg	≤ 0.2g
420-1500	1500 g	10 g	0.2 g	0.02 g	7500	Extended		3 kg	≤ 0.2g
	7500 ct	50 ct	1 ct	1 ct				3 kg	≤ 0.2g
420-3000	3000 g	25 g	0.5 g	0.05 g	6000	Extended	HBM-PW6C Class C6	5 kg	≤ 0.5 g

2.2 Function

The primary functions provided are detailed below.

2.2.1 Power-up

On power-up, the scale will perform a self-test, a display test and show the software version and the configuration.

After that it will automatically establish the current weight as a new zero reference.

2.2.2 Test function

On power-up, the weight indicator will test all memory functions followed by a display test.

2.2.3 Display range

The weight indicators will display weight from –Max (net weight) to Max (gross weight) within the limits of the display capacity.

2.2.4 Zero-setting

Zero-setting range: $\pm 2\%$ of Max.

Initial zero-setting range: $\leq \pm 10\%$ of Max.

Zero-setting is only possible when the load receptor is not in motion.

2.2.4.1 Semi-automatic zero-setting

Pressing the ZERO key causes a new zero reference to be established and ZERO annunciator to turn on, indicating that the display is at the centre of zero.

2.2.4.2 Zero-tracking

The scales are equipped with a zero-tracking feature, which operates over a range of $\pm 2\%$ of Max with a speed of ± 0.25 e/s and only when the indicator is at gross zero and the weight is stable.

2.2.5 Tare

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

When the tare function is active, the Net indicator is on.

2.2.6 Auxiliary indication

The model 420-600 may be configured with auxiliary indication with $d = 0.1 e$.

2.2.7 Extended indicating device

The balances – except model 420-600 – can be configured to have extended resolution ($d = 0.1 e$), where the weight is shown temporarily (for 5 seconds) upon a key press with the extended resolution.

2.2.8 Unit

On model 420-1200 and 420-1500 the unit of weight can be toggled between ‘g’ (gram) and ‘ct’ (metric carat).

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 Software version

The software revision level is displayed during the power-up sequence of the instrument. The approved software version is: 2.05.

2.2.11 Battery operation

The scale models can be operated from the internal 6 V rechargeable battery. The scale contains the circuitry necessary to recharge the battery when the scale is connected to the external power supply.

3. Technical data

3.1 Scales

Accuracy class:	II
Weighing range:	Single-interval
Maximum number of Verification Scale Intervals:	≤ 7500
Maximum capacity (Max):	From 300 g to 3000 g
Verification Scale Interval:	$e \geq 0.05$ g
Maximum tare effect:	$\leq -\text{Max}$
Excitation voltage:	5 VDC
Minimum load cell input impedance:	350 ohm
Maximum input impedance:	1050 ohm
Mains power supply:	12 VDC from external power supply intended for 100-240 VAC, 50-60 Hz, Optional from 6 V internal battery
Operational temperature:	5 °C to +40 °C
Peripheral interface:	Set out in Section 4

3.2 Load cells

3.2.1 Accepted load cells

3.2.2 Accepted load cells

The following load cell types are to be used according to the table of models in Section 2.1.
HBM SPL or HBM PW6C, class C6.

3.3 Documents

The documents filed at FORCE (reference No. 120-28285.90.20) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

4.1 RS-232 interface

The instrument has a RS232 interface connection to a peripheral equipment. The interface is characterised “Protective interfaces” according to paragraph 8.4 in the Directive and do not have to be secured.

5. Approval conditions

5.1 Measurement functions other than non-automatic functions

Measurement functions that will enable the use of the instrument as an automatic weighing instrument are not covered by this type approval.

6. Special conditions for verification

None.

7. Securing and location of seals and verification marks

7.1 Securing and sealing

Seals shall bear the verification mark of a notified body or alternative mark of the manufacturer according to ANNEX II, module F or D of the Directive 2014/31/EU.

7.1.1 Scale

Access to the configuration and calibration facility requires that the internal calibration switch is set in position 'unlocked'. The calibration switch is accessed through a hole at the bottom of the enclosure. Access to this switch is sealed by a brittle sticker covering the hole above the calibration switch.

Sealing of the enclosure is accomplished by an additional sticker covering one of the assembling screws of the enclosure, or with two stickers across the assembly of the enclosure on opposite sides.

8. Location of CE mark of conformity and inscriptions

8.1 Scale

8.1.1 CE mark

CE mark and supplementary metrological marking shall be applied to the scale according to article 16 of Directive 2014/31/EU.

8.1.2 Inscriptions

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

Indelibly printed on a brittle plastic sticker located on the front panel overlay: Max, min, e =, d = (in case of auxiliary indicating device)

On a label located on the side of the scale enclosure:

- Manufacturer's name and/or trademark
- Postal address of manufacturer
- Type examination number
- Accuracy class
- Type designation
- Max, min, e =
- d = (in case of auxiliary indicating device)
- Model no., serial no., electrical data and other inscriptions
- Other inscriptions are allowed

9. Pictures



Figure 1 420 scale

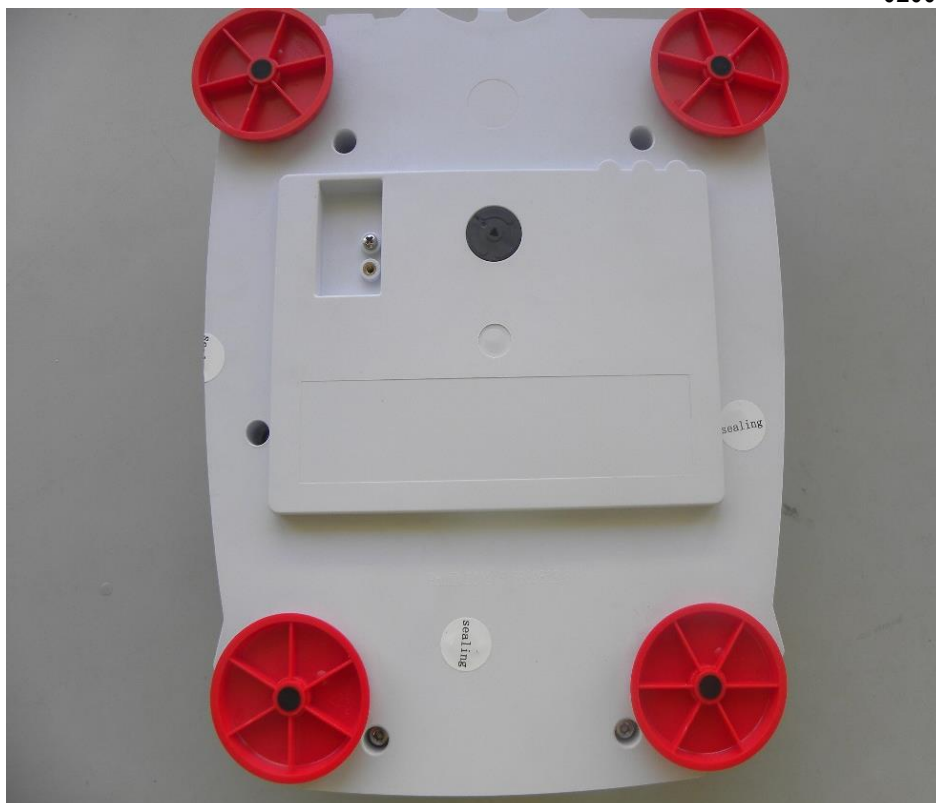


Figure 2 Sealing of access to calibration switch and screw for the enclosure.



Figure 3 Sealing of scale enclosure with brittle sticker.