



Australian Government

National Measurement
Institute

Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 6/9C/284

Issued by the Chief Metrologist 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 instruments herein described.

CAS Model DB-II Weighing Instrument

submitted by CAS Corporation
482-841, 19 Ganap-Ri, Gwangjoek-myeon
Yangju-si, Gyeonggi-do
Republic of Korea

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.

This approval has been granted with reference to document NMI R 76, *Non-automatic weighing instruments, Parts 1 and 2*, dated July 2004.

This approval becomes subject to review on 1/08/15, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variant 1 approved – interim certificate issued	26/07/05
1	Pattern & variant 1 approved – certificate issued	9/09/05
2	Variant 2 approved – variant 1 amended – certificate issued	26/02/09
3	Variants 3 & 4 approved – certificate issued	22/09/09
4	Pattern & variants 1 to 4 reviewed – notification of change issued	1/04/11
5	Pattern & variants 1 to 4 updated – variants 5 & 6 approved – certificate issued	30/07/13

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 6/9C/284' and only by persons authorised by the submitter.

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 National Measurement Institute (NMI) 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 document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificates Nos S1/0A and S1/0B.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

A handwritten signature in black ink that reads "C Davies". The signature is written in a cursive style with a large, looped 'C' and a distinct 'Davies'.

Mr C Davies

TECHNICAL SCHEDULE No 6/9C/284

1. Description of Pattern **approved on 26/07/05**

A CAS model DB-II class **III** non-automatic self-indicating weighing instrument (Table 1 and Figure 1) with a maximum capacity of 150 kg and a verification scale interval of 0.05 kg.

Instruments are powered by an integral rechargeable battery or by a DIPOS model ACK-2309300 (9 V DC, 300 mA) mains adaptor; the submitter should be consulted regarding the acceptability of alternatives.

1.1 Basework

CAS model DB-II basework (Figure 2) has the load receptor directly supported by a single load cell. The load receptor has maximum nominal dimensions of 400 × 520 mm (nominal).

1.2 Load Cell

A CAS model OPT load cell of 150 kg maximum capacity is used.

1.3 Indicator

A CAS model DB-II digital indicator with a single liquid crystal display is used.

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

1.3.1 Additional Management Functions

The instrument also has provision for additional management functions such as the setting of target values and limits ('HI OK LO' display), percentage, counting, etc. and has buttons and displays associated with these functions.

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.

NOTE: If an alternative unit (lb/kg) function is fitted it must be inoperative.

1.3.2 Zero

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

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

The instrument has a semi-automatic zero-setting device with a nominal range of not more than 4% of the maximum capacity of the instrument.

1.3.2 Tare

A semi-automatic subtractive taring device of up to the 149.95 kg capacity may be fitted.

1.3.3 Display Check

A display check is initiated whenever power is applied.

1.4 Levelling

The instrument is provided with adjustable feet and adjacent to the level indicator is a notice advising that the instrument must be level when in use.

1.5 Sealing Provision

Provision is made for the application of a verification mark.

Provision is made for access to the calibration adjustments to be prevented by sealing the access cover on the rear of the indicator by either a destructible adhesive label or a wire and lead seal (Figure 3).

1.6 Verification Provision

Provision is made for the application of a verification mark.

1.7 Descriptive Markings and Notices

(a) Instruments are marked with the following data, together in one location, in the form shown at right:

Manufacturer's mark, or name written in full	CAS, Corporation
Indication of accuracy class	Ⓜ
Pattern approval mark for the instrument	NMI 6/9C/284
Maximum capacity	Max kg #
Minimum capacity	Min kg #
Verification scale interval	e = kg #
Tare capacity	T = - kg
Serial number of the instrument

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

(b) 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.

2. Description of Variant 1

approved on 26/07/05

Certain other capacities of the DB-II series as listed in Table 1. A typical small capacity instrument is shown in Figure 4.

TABLE 1 – Approved Capacities of DB-II Series Instruments

Instrument maximum capacity, kg	6	15	30	60	150
Value of verification scale interval, kg	0.002	0.005	0.01	0.02	0.05
Maximum platform size, #A or #B	#A	#A	#A	#B	#B
Maximum tare capacity, kg	5.998	14.995	29.99	59.98	149.95
Load cell model numbers: CAS:	BCA	BCA	BCA	OPT	OPT

Note: Platform size #A = up to and including 280 x 280 mm

Platform size #B = up to and including 400 x 520 mm

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.

3. Description of Variant 2 **approved on 25/02/09**

Certain other instruments of the DB-II series as listed in Table 2.

TABLE 2 – Additional Approved Capacities of DB-II Series Instruments

Instrument maximum capacity, kg	60	150
Value of verification scale interval, kg	0.02	0.05
Maximum platform size, #C	#C	#C
Maximum tare capacity, kg	59.98	149.95
Load cell model numbers: CAS:	OPT	OPT

Note: Platform size #C = up to and including 460 × 510 mm

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.

4. Description of Variant 3 **approved on 22/09/09**

Certain instruments of the DB-II series using model BCO load cells instead of the model OPT load cells mentioned in the descriptions of the pattern and in the descriptions of variants 1 and 2.

5. Description of Variant 4 **approved on 22/09/09**

Certain baseworks of this approval used with a compatible approved (by Supplementary Certificate) indicator (including multi-interval and/or multiple range operation, if approved) provided the conditions set out below are met. In this case instruments may be known according to the basework model number.

In addition to the markings specified in clause **1.7 Markings and Notices**, instruments are marked with the NMI approval number for the indicator used, together in the same location.

The baseworks and their limiting characteristics are given in Table 3 below.

The conditions to be met are given below, and include calculations using the following terms:

Ex = Excitation from indicator (V)

LC_Sens = Load cell sensitivity (mV/V)

E_{max} = Load cell maximum capacity (kg)

Indicator Sensitivity = Minimum sensitivity value per verification scale interval for the indicator (μ V)

e = verification scale interval of the instrument (kg). ***In the case of multi-interval or multiple range instruments, any reference to 'e' refers to the smallest verification scale interval (i.e. e_1).***

e_1, e_2, \dots = verification scale interval of each range for multiple range instruments (or partial weighing ranges for multi-interval instruments), e_1 refers to the smallest verification interval.

Max = the maximum capacity of the instrument. This refers to the maximum capacity of the highest range (i.e. Max_r for multiple range instruments).

Max_r = the maximum capacity of the instrument for a multiple range instrument, i.e. the maximum capacity of the highest range.

$Max_1 Max_2 \dots$ = the maximum capacity of the instrument for a multiple range instrument, i.e. the maximum capacity of the highest range.

n_{LC} = the maximum number of verification intervals for which the load cell or basework is approved (e.g. 3000 for a 'class C3' load cell).

DR = dead load return value for the load cell. Note: Many load cells do not have a specified DR value.

The conditions are:

- The excitation voltage used is within the range approved for the baseworks.
- The platform used shall be as shown in Figures 1 and 2, or 4. Platforms which result in additional dead load (e.g. rollers) are not acceptable.
- The verification scale interval is not less than the minimum value specified. ***In the case of multi-interval or multiple range instruments, the verification scale interval refers to the smallest verification scale interval (i.e. e_1).***
- The number of verification scale intervals is less than or equal to the n_{max} value specified. ***In the case of multi-interval or multiple range instruments, the number of verification scale intervals refers to the largest number in any weighing range or partial weighing range (i.e. the largest of Max_1/e_1 , Max_2/e_2 etc).***
- The signal voltage per verification scale interval is not less than the minimum sensitivity value per verification scale interval for the indicator (as specified in the approval documentation for the indicator), i.e.

$$\text{Indicator Sensitivity} \leq 1000 \times Ex \times LC_Sens \times e / E_{max}$$

Additional requirement for multi-interval operation:

In the case of indicators which are configured to form a multi-interval weighing instrument the instrument shall comply with one of the following conditions:

- (i) The smallest verification scale interval (e_1) shall satisfy the following:**

$$e_1 \geq Max/n_{LC}$$

- (ii) Or, the smallest verification scale interval (e_1) shall satisfy the following:**

$$e_1 \geq 2 \cdot DR \cdot Max/E_{max}$$

Of course (ii) cannot apply where a value of 'Deadload return' DR is not given.

Additional requirement for multiple range operation:

In the case of indicators which are configured to form a multiple range weighing instrument the instrument shall comply with one of the following conditions:

(i) The smallest verification scale interval (e_1) shall satisfy the following:

$$e_1 \geq 0.4 \text{ Max}_r/n_{LC}$$

(ii) Or, the smallest verification scale interval (e_1) shall satisfy the following:

$$e_1 \geq DR. \text{ Max}_r/E_{max}$$

Of course (ii) cannot apply where a value of 'Deadload return' DR is not given.

TABLE 3 – DB-II Series Baseworks and Their Limiting Characteristics

Instrument model	DB-II	DB-II
Basework model	DB-II	DB-II
Platform size (mm x mm)	400 x 520	400 x 520
Basework maximum capacity	60 kg	150 kg
Typical verification scale interval	0.02 kg	0.05 kg
Max. number of verification scale intervals (n_{max})	3000	3000
Load cell model used	BCO	BCO
Load cell classification	C3	C3
Load cell max. capacity, E_{max}	60 kg	150 kg
Load cell sensitivity (at E_{max})	1.5 mV/V	1.5 mV/V
Min. value of verification scale interval for basework (v_{min} of load cell)	0.008 kg	0.02 kg
DR value of load cell	0.0024 kg	0.006 kg
Input impedance	350 ohm	350 ohm
Excitation voltage (max.)	15 V DC	15 V DC
Cable length (± 0.1 m)	1.5 m	1.5 m
Number of leads (plus shield)	4 #	4 #

6. Description of Variant 5 **approved on 30/07/13**

CAS models DBB-360 and DBB-460 weighing instruments (similar to the instrument shown in Figure 5) having the model DB-II indicator of the pattern (including as an LED type display) and using the model BCO load cell (variant 3). The DBB-360 and DBB-460 models are multi-interval instruments and have platform sizes and other specifications as listed below in Table 4.

TABLE 4 – Approved Capacities of DBB Series Instruments

Instrument model	DBB-360		DBB-460	
	Maximum capacity (kg)	30/60	60/150	30/60
Minimum capacity (kg)	0.2	0.4	0.2	0.4
Verification scale interval (kg)	0.01/0.02	0.02/0.05	0.01/0.02	0.02/0.05
Maximum tare (kg)	-29.99	-59.98	-29.99	-59.98
Display type	DB-II (LCD or LED)			
Platform size	360 mm x 460 mm		460 mm x 570 mm	
Load cell model	BCO			

7. Description of Variant 6 **approved on 30/07/13**

Certain DB-II models (similar to the instrument shown in Figure 1) having the same specifications and functions as the pattern and variant 3, except they are the multi-interval instruments.

The specifications of this variant are given in the Table 5 below.

TABLE 5 – Approved Capacities of DB-II Series Multi-interval Instruments

Instrument model	DB-II	
	Maximum capacity (kg)	30/60
Minimum capacity (kg)	0.2	0.4
Verification scale interval (kg)	0.01/0.02	0.02/0.05
Maximum tare (kg)	-29.99	-59.98
Display type	DB-II (LCD or LED)	
Platform size	420 mm x 510 mm	
Load cell model	BCO	

TEST PROCEDURE No 6/9C/284

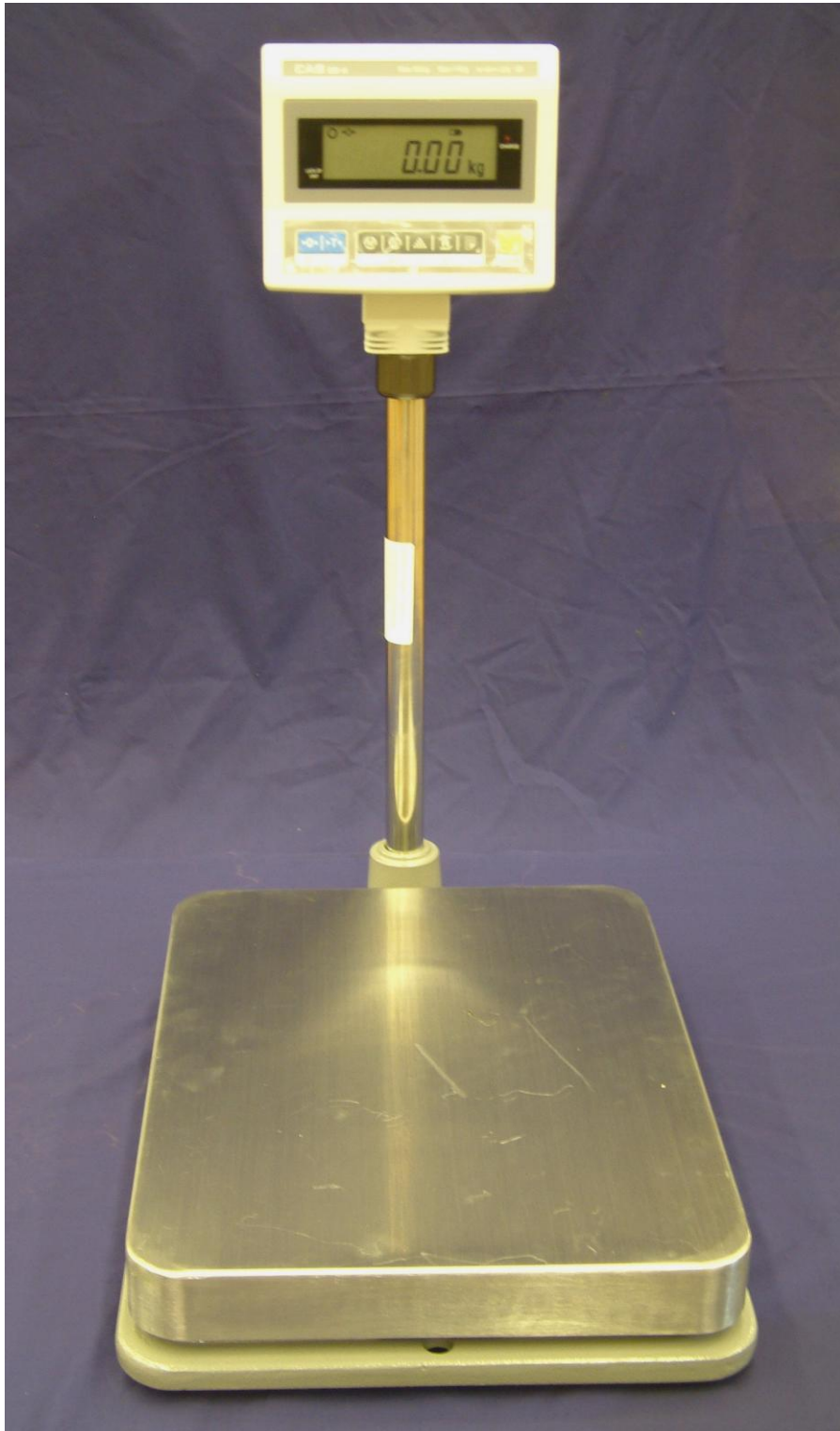
Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

FIGURE 6/9C/284 – 1



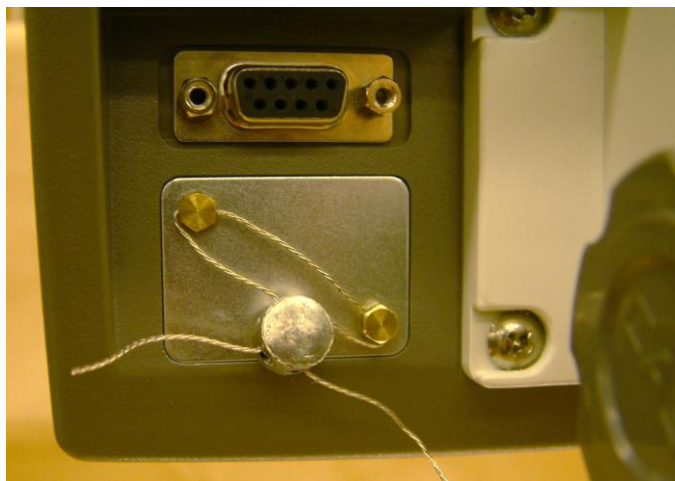
CAS Model DB-II Weighing Instrument

FIGURE 6/9C/284 – 2



Typical CAS Model DB-II Basework

FIGURE 6/9C/284 – 3



Showing Sealing of The Calibration Access Cover

FIGURE 6/9C/284 – 4



CAS Model DB-II (6 kg) Weighing Instrument

FIGURE 6/9C/284 – 5



CAS Model DBB-360 Weighing Instrument

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