



**Australian Government**  
**Department of Industry, Science,  
Energy and Resources**

## **National Measurement Institute**

36 Bradfield Road, West Lindfield NSW 2070

### **Certificate of Approval NMI 6/4C/263**

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.

Teraoka Model Digi DS-561 Weighing Instrument

submitted by W W Wedderburn Pty Ltd  
101 Williamson Road  
Ingleburn NSW 2565

**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 is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

#### DOCUMENT HISTORY

<b>Rev</b>	<b>Reason/Details</b>	<b>Date</b>
0	Pattern & variants 1 to 10 approved – interim certificate issued	11/06/10
1	Pattern & variants 1 to 6 approved – certificate issued	19/07/10
2	Pattern & variants 1 to 6 <b>reviewed</b> , updated & amended ( <b>Tables 2 &amp; 4</b> ) – certificate issued	10/11/16
3	Variants 3 & 4 amended (platform size corrected) – certificate issued	28/01/21

## CONDITIONS OF APPROVAL

### General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 6/4C/263' 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 No S1/0/A or No S1/0B.

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



**Darryl Hines**  
Manager  
Policy and Regulatory Services

TECHNICAL SCHEDULE No 6/4C/263

**1. Description of Pattern** **approved on 11/06/10**

A Teraoka model Digi DS-561 (\*) class  $\text{\textcircled{III}}$  single interval self-indicating non-automatic weighing instrument (Figure 1 and Table 1) of 15 kg maximum capacity with a verification scale interval of 0.005 kg.

The instrument is fitted with one LED display for display of the weight value.

Instruments shall be marked 'NOT FOR TRADING DIRECT WITH THE PUBLIC' (or similar wording).

Power for the model Digi DS-561 instrument may be supplied by:

- an AC/DC mains adaptor; and/or
- an internal 6 V rechargeable battery.

Note: The AC/DC mains adaptor supplied for the instrument was an ENG model 3A-183WP12 (12 V DC, 1.5 A) adaptor – the submittor should be consulted regarding the acceptability of alternative power supply units.

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

The pattern is fitted with a Teraoka model DS-561 indicator and a Teraoka model S-GE basework having a load receptor of 340 x 285 mm. The basework uses a single Teraoka model JW (G) load cell of 22.5 kg maximum capacity. The indicator may be connected directly to the basework or may be mounted on a column.

(\*) The instrument model number may include an alpha suffix indicating the basework fitted, e.g. a variant 1 instrument may be known as either a model DS-561 or a model DS-561GE.

**1.1 Zero**

The initial zero-setting device 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.

A zero-tracking device may be fitted.

**1.2 Tare**

A semi-automatic subtractive tare device of up to 7.495 kg may be fitted.

**1.3 Levelling**

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

**1.4 Display Check**

A display check is initiated whenever power is applied.

**1.5 Verification Provision**

Provision is made for the application of a verification mark.

## 1.6 Sealing Provision

Provision is made for access to the calibration switch within the instrument to be sealed, either using a 'lead and wire' type seal as shown in Figure 2, or use of destructible adhesive labels across the join in the indicator housing on two sides of the indicator.

## 1.7 Descriptive Markings and Notices

Instruments carry the following markings:

Manufacturer's mark, or name written in full	Teraoka
Name or mark of manufacturer's agent	WEDDERBURN
Indication of accuracy class	Ⓜ
Pattern approval mark for the instrument	NMI 6/4C/263
Maximum capacity	<i>Max</i> ..... g or kg #1
Minimum capacity	<i>Min</i> ..... g or kg #1
Verification scale interval	<i>e</i> = ..... g or kg #1
Maximum subtractive tare	<i>T</i> = - ..... g or kg #2
Serial number of the instrument	.....

#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*.

In addition, instruments shall carry a notice stating NOT FOR TRADING DIRECT WITH THE PUBLIC, or similar wording.

Note: For multi-interval instruments the markings shall be as above, with the exception that the 'Maximum capacity' and 'Verification scale interval' shall be marked for both interval ranges, e.g. as follows:

Maximum capacity	<i>Max</i> ...../..... g or kg
Verification scale interval	<i>e</i> = ...../..... g or kg

## 2. Description of Variant 1

approved on 13/07/10

The Digi DS-561 series of single interval instruments in certain capacities (one of which is the pattern) using model S-GE or S-BD baseworks (Figure 1). In each case the instrument may be known according to a combination of the indicator model number and a 'suffix' comprising part of the basework model (e.g. DS-561GE, which uses the DS-561 indicator and S-GE basework).

The baseworks mentioned have capacity ranges, maximum platform sizes and use a single model JW(G) load cell as follows:

- S-GE: from 6 kg up to 30 kg (inclusive), 340 × 285 mm, model JW(G)
- S-BD: from 6 kg up to 30 kg (inclusive), 240 × 200 mm, model JW(G)

The baseworks are available with certain capacities, within the ranges mentioned above, each of which has certain parameters, and uses a load cell of the capacity as shown in Table 1. **Note that even if shown in Table 1, capacities below and above the range indicated above do not apply to this variant.**

TABLE 1

Maximum Capacity ( <i>Max</i> )	Verification Scale Interval ( <i>e</i> )	Maximum Subtractive Tare Capacity ( <i>T</i> = - ...)	Load Cell Capacity
6 kg	0.002 kg	2.998 kg	9 kg
<b>15 kg</b>	<b>0.005 kg</b>	<b>7.495 kg</b>	<b>22.5 kg</b>
30 kg	0.01 kg	14.99 kg	45 kg

**3. Description of Variant 2** **approved on 13/07/10**

The Digi DS-561 series of multi-interval instruments in certain capacities (one of which is the pattern) using model S-GE or S-BD baseworks (Figure 1). In each case the instrument may be known according to a combination of the indicator model number and a 'suffix' comprising part of the basework model (e.g. DS-561GE, which uses the DS-561 indicator and S-GE basework).

The baseworks mentioned have capacity ranges, maximum platform sizes and use a single model JW(G) load cell as follows:

- S-GE: from 6 kg up to 30 kg (inclusive), 340 × 285 mm, model JW(G)
- S-BD: from 6 kg up to 30 kg (inclusive), 240 × 200 mm, model JW(G)

The baseworks are available with certain capacities, within the ranges mentioned above, each of which has certain parameters, and uses a load cell of the capacity as shown in Table 2. **Note that even if shown in Table 2, capacities below and above the range indicated above do not apply to this variant.**

TABLE 2

Maximum Capacity ( <i>Max</i> <sub>1</sub> / <i>Max</i> <sub>2</sub> )	Verification Scale Interval ( <i>e</i> <sub>1</sub> , <i>e</i> <sub>2</sub> )	Maximum Subtractive Tare Capacity ( <i>T</i> = - ...)	Load Cell Capacity
3/6 kg	0.001/0.002 kg	2.999 kg	9 kg
6/15 kg	0.002/0.005 kg	5.998 kg	22.5 kg
15/30 kg	0.005/0.01 kg	14.995 kg	45 kg

**4. Description of Variant 3** **approved on 13/07/10**  
**amended on 28/01/21**

The Digi DS-561 series of single interval interval instruments in certain capacities using model S-WP, S-QAS, S-YA, S-YB, S-YC, S-YD, S-YE, S-GA, S-GB, S-GC, S-GD, S-GH, S-YFA, S-YFB or S-YFC baseworks (see Figure 3 for typical instruments). In each case the instrument may be known according to a combination of the indicator model and a 'suffix' comprising part of the basework model #WP, #QAS, #A, #B, #C, #D, #E, #GA, #GB, #GC, #GD, #GH, #YFA, #YFB or #YFC, where # represents the indicator model. An additional suffix 'P' may be used to indicate a column (pole) mounted display. For example DS-561AP, which uses a column mounted DS-561 indicator and an S-YA basework.

The baseworks mentioned have capacity ranges, maximum platform sizes and use a single load cell of the model of the model as mentioned below:

- S-WP: from 3 kg up to 30 kg (inclusive), 336 × 246 mm, model P
- S-QAS: from 30 kg up to 300 kg (inclusive), 350 × 500 mm, model PMB
- S-YA: from 30 kg up to 150 kg (inclusive), 380 × 380 mm, model P
- S-YB: from 30 kg up to 300 kg (inclusive), 480 × 480 mm, model PMB
- S-YC: from 6 kg up to 60 kg (inclusive), 341 × 284 mm, model P
- S-YD: from 30 kg up to 300 kg (inclusive), 400 × 400 mm, model PDP
- S-GA: from 60 kg up to 300 kg (inclusive), 360 × 480 mm, model PS
- S-GB: from 60 kg up to 300 kg (inclusive), 500 × 600 mm, model PMB
- S-GC: from 150 kg up to 600 kg (inclusive), 700 × 800 mm, model PMD
- S-GD: from 30 kg up to 150 kg (inclusive), 350 × 400 mm, model P
- S-GH: from 60 kg up to 300 kg (inclusive), 450 × 500 mm, model PS
- S-YFA: from 150 kg up to 600 kg (inclusive), 700 × 800 mm, model PMD
- S-YFB: from 150 kg up to 600 kg (inclusive), 700 × 800 mm, model PMD
- S-YFC: from 150 kg up to 600 kg (inclusive), 700 × 800 mm, model PMD

The baseworks are available with certain capacities, within the ranges mentioned above, each of which has certain parameters, and uses a load cell of the capacity as shown in Table 3. **Note that even if shown in Table 3, capacities below and above the range indicated above do not apply to this variant.**

TABLE 3 – Single-interval instruments

Maximum Capacity (Max)	Verification Scale Interval (e)	Maximum Subtractive Tare Capacity (T = - ...)	Load Cell Capacity
3 kg	0.001 kg	1.599 kg	4.5 kg
6 kg	0.002 kg	2.998 kg	9 kg
15 kg	0.005 kg	7.495 kg	22.5 kg
30 kg	0.01 kg	14.99 kg	45 kg
60 kg	0.02 kg	29.98 kg	90 kg
150 kg	0.05 kg	74.95 kg	225 kg
300 kg	0.1 kg	149.9 kg	450 kg
600 kg	0.2 kg	299.8 kg	900 kg

## 5. Description of Variant 4

**approved on 13/07/10  
amended on 28/01/21**

The Digi DS-561 series of multi-interval interval instruments in certain capacities using model S-WP, S-QAS, S-YA, S-YB, S-YC, S-YD, S-YE, S-GA, S-GB, S-GC, S-GD, S-GH, S-YFA, S-YFB or S-YFC baseworks (see Figure 3 for typical instruments).

In each case the instrument may be known according to a combination of the indicator model and a 'suffix' comprising part of the basework model #WP, #QAS, #A, #B, #C, #D, #E, #GA, #GB, #GC, #GD, #GH, #YFA, #YFB or #YFC, where # represents the indicator model. An additional suffix 'P' may be used to indicate a column (pole) mounted display. For example DS-561AP, which uses a column mounted DS-561 indicator and an S-YA basework.

The baseworks mentioned have capacity ranges, maximum platform sizes and use a single load cell of the model of the model as mentioned below:

- S-WP: from 3 kg up to 30 kg (inclusive), 336 × 246 mm, model P
- S-QAS: from 30 kg up to 300 kg (inclusive), 350 × 500 mm, model PMB
- S-YA: from 30 kg up to 150 kg (inclusive), 380 × 380 mm, model P
- S-YB: from 30 kg up to 300 kg (inclusive), 480 × 480 mm, model PMB
- S-YC: from 6 kg up to 60 kg (inclusive), 341 × 284 mm, model P
- S-YD: from 30 kg up to 300 kg (inclusive), 400 × 400 mm, model PDP
- S-GA: from 60 kg up to 300 kg (inclusive), 360 × 480 mm, model PS
- S-GB: from 60 kg up to 300 kg (inclusive), 500 × 600 mm, model PMB
- S-GC: from 150 kg up to 600 kg (inclusive), 700 × 800 mm, model PMD
- S-GD: from 30 kg up to 150 kg (inclusive), 350 × 400 mm, model P
- S-GH: from 60 kg up to 300 kg (inclusive), 450 × 500 mm, model PS
- S-YFA: from 150 kg up to 600 kg (inclusive), 700 × 800 mm, model PMD
- S-YFB: from 150 kg up to 600 kg (inclusive), 700 × 800 mm, model PMD
- S-YFC: from 150 kg up to 600 kg (inclusive), 700 × 800 mm, model PMD

The baseworks are available with certain capacities, within the ranges mentioned above, each of which has certain parameters, and uses a load cell of the capacity as shown in Table 4. **Note that even if shown in Table 4, capacities ( $Max_2$ ) below and above the range indicated above do not apply to this variant.**

TABLE 4 – Multi-interval instruments

Maximum Capacity ( $Max_1/Max_2$ )	Verification Scale Interval ( $e_1, e_2$ )	Maximum Subtractive Tare Capacity ( $T = - \dots$ )	Load Cell Capacity
3/6 kg	0.001/0.002 kg	2.999 kg	9 kg
6/15 kg	0.002/0.005 kg	5.998 kg	22.5 kg
15/30 kg	0.005/0.01 kg	14.995 kg	45 kg
30/60 kg	0.01/0.02 kg	29.99 kg	90 kg
60/150 kg	0.02/0.05 kg	59.98 kg	225 kg
150/300 kg	0.05/0.1 kg	149.95 kg	450 kg
300/600 kg	0.1/0.2 kg	299.9 kg	900 kg

**6. Description of Variant 5** **approved on 13/07/10**

The Digi DS-560 series of single and multi-interval instruments using any basework approved for the pattern and variants 1 to 4 but fitted with a model DS-560 indicator (\*). This indicator has a plastic housing and may be powered from mains supply (230 V AC) and/or by an internal 6 V rechargeable battery. (\*) Refer to Figures 3 and 4.

Access to the calibration switch within the instrument is to be sealed as shown in Figure 4 (see also the description for the pattern).

**7. Description of Variant 6** **approved on 13/07/10**

The model S-WP, S-QAS, S-YA, S-YB, S-YC, S-YD, S-YE, S-GA, S-GB, S-GC, S-GD, S-GH, S-YFA, S-YFB or S-YFC baseworks of variant 3 and 4, used with a compatible approved (by Supplementary Certificate) indicator **provided the conditions set out below are met**. In this case instruments may be known according to the basework model number. These baseworks and their limiting characteristics are given in Tables 1 to 4.

The resulting instrument may be single range, multiple range, or multi-interval (according to the indicator used), provided that the conditions given are met.

Characteristics of the load cells used are needed to determine that the required conditions are met. These characteristics are given in Table 5.

In addition to the markings specified in clause **1.7 Descriptive Markings and Notices**, instruments are marked with the NMI approval number for the indicator used, together in the same location. Where the resulting instrument is a multiple range instrument, appropriate markings regarding the ranges and scale intervals shall be provided in accordance with the Supplementary Certificate for the indicator.

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 ( $\mu$ 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.***



**$Max_1$   $Max_2$  ... = the maximum capacity of the various ranges for a multiple range instrument.  $Max_1$  refers to the maximum capacity of the smallest 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 maximum load applied to the basework (live load plus any dead load) does not exceed the load cell maximum capacity.
- 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:***

$$e_1 \geq 0.4 Max_i/n_{LC}, \text{ or}$$

(ii) **The smallest verification scale interval ( $e_1$ ) shall satisfy the following:**

$$e_1 \geq DR \cdot Max_r / E_{max}$$

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

TABLE 5 – Load Cell Data

Load cell model used	P	P	P	P PDP PMB	P PDP PMB PS	P PDP PMB PMD PS	PDP PMB PMD PS	PMD
Load cell max. capacity, $E_{max}$	4.5 kg	9 kg	22.5 kg	45 kg	90 kg	225 kg	450 kg	900 kg
Max. number of verification scale intervals ( $n_{LC}$ )	3000	3000	3000	3000	3000	3000	3000	3000
Min. value of verification scale interval ( $v_{min}$ of load cell) (kg)	0.001	0.001	0.002	0.005	0.01	0.02	0.05	0.1
Load cell sensitivity at $E_{max}$	1.5 mV/V	1.5 mV/V	1.5 mV/V	1.5 mV/V	1.5 mV/V	1.5 mV/V	1.5 mV/V	1.5 mV/V
Input impedance	1100 $\Omega$	1100 $\Omega$	1100 $\Omega$	1100 $\Omega$	1100 $\Omega$	1100 $\Omega$	1100 $\Omega$	1100 $\Omega$
Excitation voltage (max.)	20 V	20 V	20 V	20 V	20 V	20 V	20 V	20 V
Cable length ( $\pm 0.1m$ ) (#)	1 m	3 m	3 m	3 m	3 m	3 m	3 m	3 m
Number of leads (plus shield)	4	4	4	4	4	4	4	4

(#) Cable supplied with basework shall not be shortened.

### TEST PROCEDURE No 6/4C/263

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 the *National Trade Measurement Regulations 2009*.

#### Tests

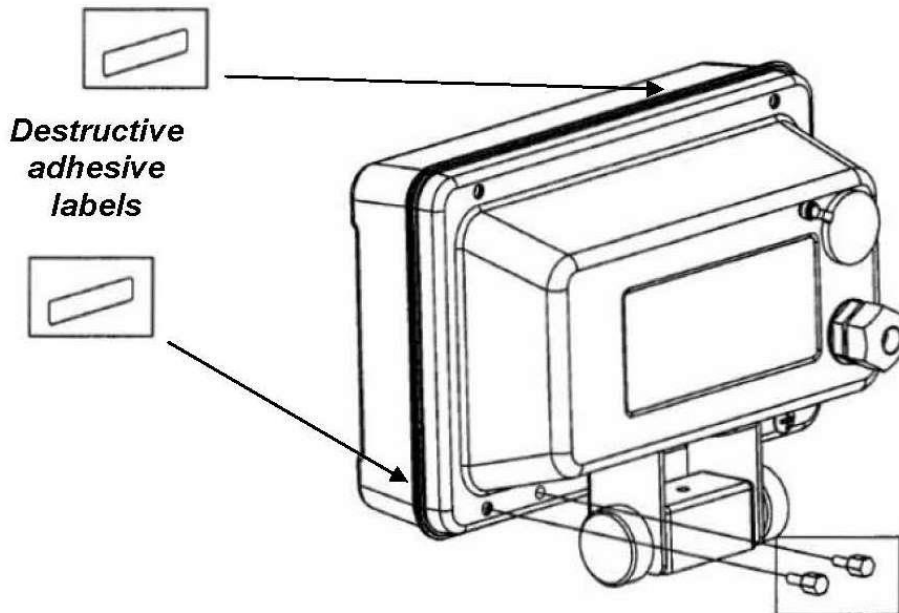
For multi-interval and multiple range instruments with verification scale intervals of  $e_1, e_2 \dots$ , apply  $e_1$  for zero adjustment, and maximum permissible errors apply  $e_1, e_2 \dots$ , as applicable for the load.

FIGURE 6/4C/263 – 1



Teraoka Model Digi DS-561 (DS-561GE and DS-561BD) Weighing Instrument

FIGURE 6/4C/263 – 2



Teraoka Model Digi DS-561 – Typical sealing arrangements

FIGURE 6/4C/263 – 3



(a) DS-560 indicator



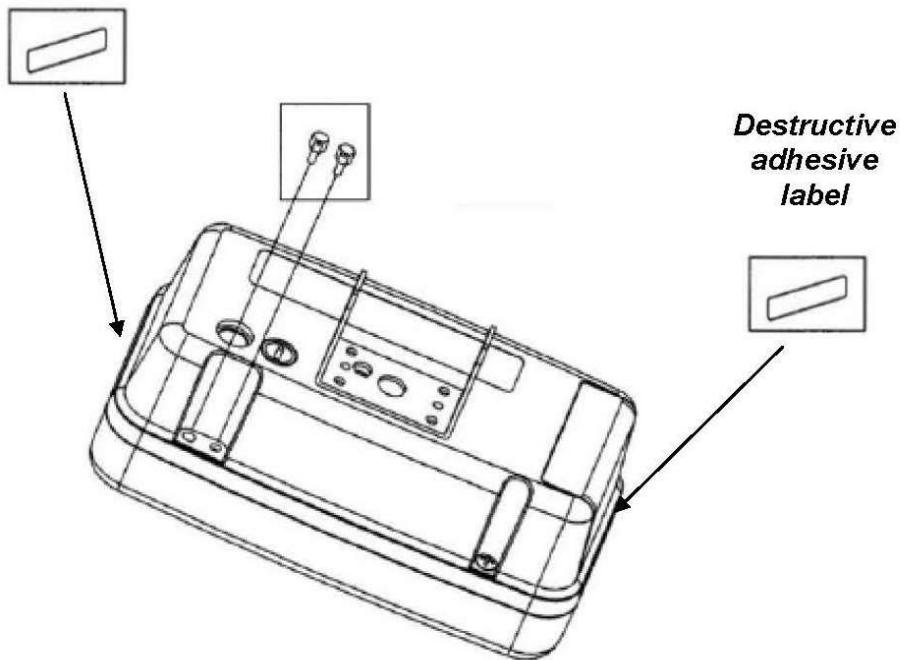
(a) DS-560 (DS-560GD) with S-GD basework



(c) DS-560 (DS-560YFB) with S-YFB

Various Digi DS-560 Series Weighing Instruments

FIGURE 6/4C/263 – 4



Teraoka Model Digi DS-560 – Typical sealing arrangements