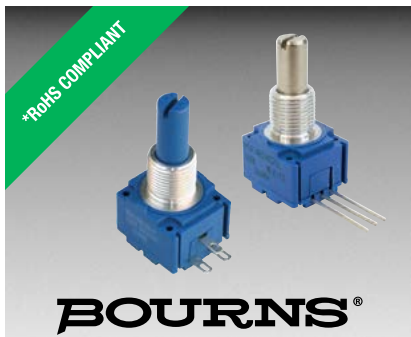




Features

- Available in a variety of pin-out configurations
- Virtually infinite electrical circuit isolation
- Metal or plastic shaft options
- RoHS compliant*

Model 91, 92, 93, 94 & 95 – 5/8" Square Single-Turn Panel Control

Initial Electrical Characteristics ¹	Conductive Plastic Element	Cermet Element
Standard Resistance Range		
Linear Tapers (A, B, E, & H).....	(B & E) 1 K ohms to 1 megohm.....	(A & H) 100 ohms to 1 megohm
Audio Tapers (C, D, F, G, S, & T).....	(D, G, S, & T) 1 K ohms to 1 megohm	(C & F) 1 K ohms to 1 megohm
Total Resistance Tolerance.....	10 % or 20 %.....	5% or 10%
Independent Linearity.....	±5 %	±5 %
Absolute Minimum Resistance	2 ohms maximum	2 ohms maximum
Effective Electrical Angle	(Linear tapers) 240 ° ± 5 °	(Linear tapers) 240 ° ± 6 °
	(Audio tapers) 225 ° ± 5 °	(Audio tapers) 225 ° ± 6 °
Contact Resistance Variation	±1 %	±1 % or 3 ohms (whichever is greater)
Dielectric Withstanding Voltage (MIL-STD-202, Method 301)		
Sea Level	1,500 VAC minimum.....	1,500 VAC minimum
70,000 Feet.....	500 VAC minimum.....	500 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum.....	1,000 megohms minimum
Power Rating (Voltage Limited By Power Dissipation or 350 VAC, Whichever Is Less)		
+70 °C Single Section Assembly	(Linear tapers) 1 watt	(Linear tapers) 2 watts
	(Audio tapers) 0.5 watt	(Audio tapers) 1 watt
+70 °C Multiple Section Assembly	(Linear tapers) 0.5 watt/section	(Linear tapers) 1 watt/section
	(Audio tapers) 0.25 watt/section.....	(Audio tapers) 0.5 watt/section
+125 °C	0 watt	0 watt
Theoretical Resolution.....	Essentially infinite.....	Essentially infinite
Environmental Characteristics ¹		
Operating Temperature Range	-40 °C to +125 °C.....	-40 °C to +125 °C
Storage Temperature Range	-55 °C to +125 °C.....	-55 °C to +125 °C
Temperature Coefficient Over Storage		
Temperature Range	±1,000 ppm/°C	±150 ppm/°C
Vibration (Single Section)	15 G	15 G
Total Resistance Shift.....	±2 % maximum	±2 % maximum
Voltage Ratio Shift.....	±5 % maximum	±5 % maximum
Shock (Single Section).....	30 G	30 G
Total Resistance Shift.....	±2 % maximum	±2 % maximum
Voltage Ratio Shift.....	±5 % maximum	±5 % maximum
Load Life.....	1,000 hours	1,000 hours
Total Resistance Shift.....	±10 % maximum	±5 % maximum
Rotational Life (No Load)	100,000 cycles	100,000 cycles
Total Resistance Shift.....	(Linear tapers) 10 ohms or ±15 % TRS max.	(All tapers) ±5 % TRS max.
	(whichever is greater)	
	(Audio tapers) ±20 % maximum	
Contact Resistance Variation		
@ 50,000 cycles.....	(Linear tapers) ±2 %.....	±2 %
	(Audio tapers) ±3 %	±3 %
Moisture Resistance (MIL-STD-202, Method 103, Condition B)		
Total Resistance Shift.....	(Linear tapers) ±10 % TRS maximum	(All tapers) ±5 % TRS maximum
	(Audio tapers) ±20 % TRS maximum	
Insulation Resistance (500 VDC).....	100 megohms minimum.....	100 megohms minimum
IP Rating	IP 40	IP 40
Moisture Sensitivity Level	1.....	1
ESD Classification (HBM).....	N/A.....	N/A



WARNING
Cancer and Reproductive Harm
www.P65Warnings.ca.gov

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

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Model 91, 92, 93, 94 & 95 – 5/8" Square Single-Turn Panel Control**BOURNS®****Mechanical Characteristics¹**

Stop Strength (1/4" D shaft)	45.19 N-cm (4 lb.-in.)
(1/8" D shaft)	33.89 N-cm (3 lb.-in.)
Mechanical Angle	300° ±5°
Torque	
Starting	0.3 max. above average running torque
Running Torque	
Single or Dual Section (A & R Bushings)	0.21 to 1.06 N-cm (0.3 to 1.5 oz.-in.)
Single or Dual Section (C & U Bushings)	0.14 to 1.06 N-cm (0.2 to 1.5 oz.-in.)
Mounting	1.7-2.0 N-m (15-18 lb.-in.) maximum
Variation	0.35 N-cm (0.5 oz.-in.) maximum in 45° shaft travel
Weight (Single Section, Metal Bushing)	12.7 grams nominal
(Each Additional Section)	4 grams nominal
Terminals	Printed circuit terminals, J-Hooks or solder lugs
Soldering Condition	Recommended hand soldering using Sn95/Ag5 no clean solder, 0.025" wire diameter.
	Maximum temperature 399 °C (750 °F) for 3 seconds. No wash process to be used with no clean flux.
Marking	Manufacturer's trademark, date code, resistance, manufacturer's part number.
Ganging (Multiple Section Potentiometers)	2 cups maximum
Hardware	One lockwasher and one mounting nut is shipped with each potentiometer (Bushings A: H-37-2 & H-38-2; Bushings C: H-37-1 & H-38-1; Bushings R: H-37-4 & H-38-9; Bushings U: H-37-3 & H-38-8)

NOTE: Performance specifications do not apply to units subjected to printed circuit board cleaning procedures.

¹Electrical specifications tested at 200 RPM, at room ambient: +25 °C nominal.

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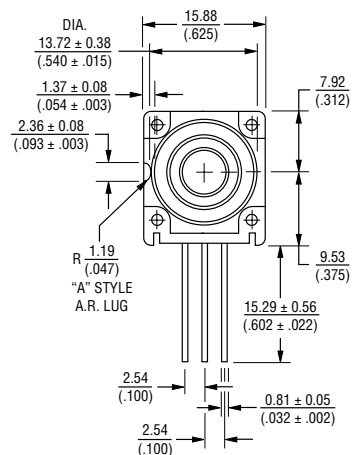
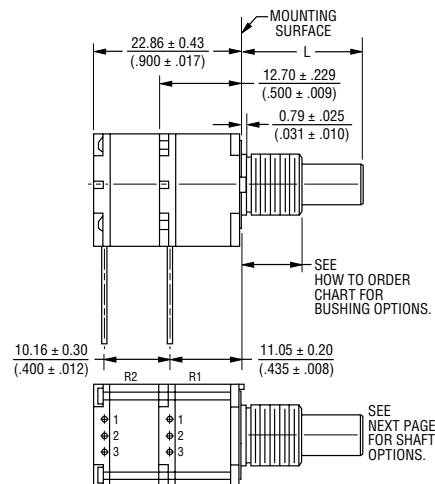
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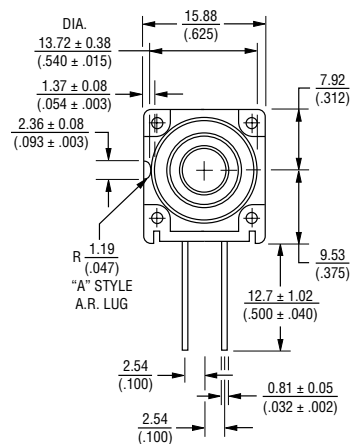
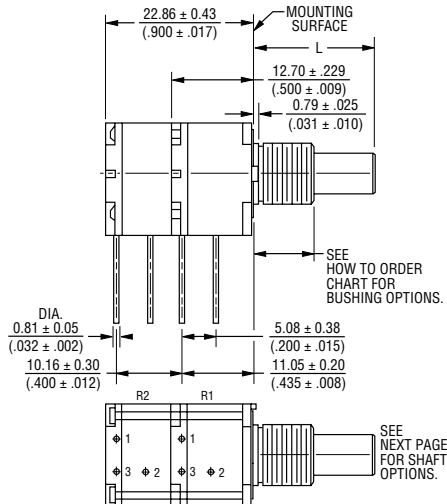
BOURNS®

Product Dimensions

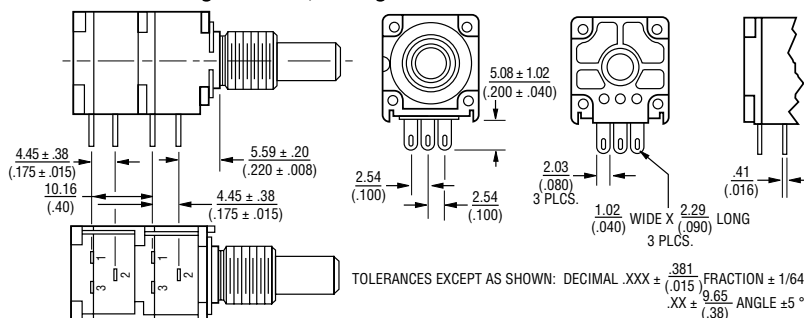
Model 91 PC Pin Terminals, In-Line



Model 93 PC Pin Terminals, "L" Pattern

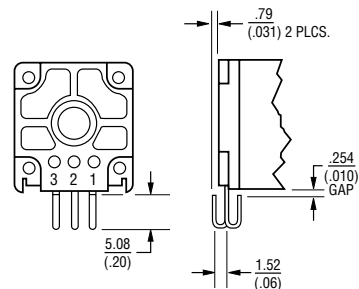


Model 95 Solder Lug Terminals, "Triangular" Pattern

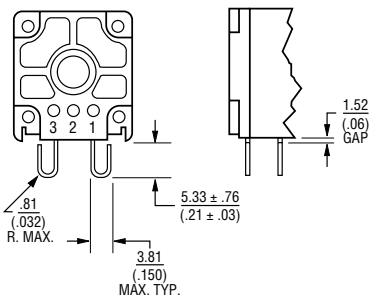


TOLERANCES EXCEPT AS SHOWN: DECIMAL .XXX ± $\frac{.381}{(.015)}$ FRACTION ± 1/64
 .XX ± $\frac{9.65}{(.38)}$ ANGLE ± 5°

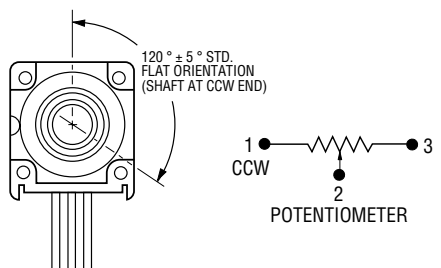
Model 92 J-Hooked Terminals, In-Line



Model 94 J-Hooked Terminals, "L" Pattern



Shaft Flat Orientation



DIMENSIONS: $\frac{\text{MM}}{(\text{INCHES})}$

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Plastic Shaft Styles

Technical drawing of a shaft with the following dimensions and tolerances:

- Length: $1.60 + .38 / -.00$
- Inner diameter: $(.063 + .015 / -.000)$
- Outer diameter: 1.19 ($.047$)
- Step diameter: $6.32 + .000 / -.152$ ($.249 + .000 / .006$) DIA.

STD. LENGTHS:			
$\frac{12.70}{(.500)}$	$\frac{15.88}{(.625)}$	$\frac{19.05}{(.750)}$	$\frac{22.23}{(.875)}$

Technical drawing of a shaft with dimensions:

- Top dimension: $11.18 \pm .38$
- Dimension below top: $(.440 \pm .015)$
- Bottom dimension: 5.49
- Dimension below bottom: $(.216)$
- Right side dimension: $6.30 + .000 / - .152$
- Dimension below right side: $(.248 + .000 / - .006)$
- Label: DIA.

STD. LENGTHS:	
$\frac{19.05}{(.750)}$	$\frac{22.23}{(.875)}$

3.16+.00/-.15
(.1245+.000/-.006) DIA.

STD. LENGTHS:		
$\frac{12.70}{(.500)}$	$\frac{15.88}{(.625)}$	$\frac{19.05}{(.750)}$

STD. LENGTHS:	
$\frac{16.0}{(.630)}$	$\frac{22.0}{(.866)}$

STD. LENGTHS	
$\frac{16.0}{(.630)}$	$\frac{22.0}{(.866)}$

Technical drawing of a 48-tooth gear. The drawing shows the gear profile with a hatched area indicating a specific material or treatment. Dimensions are provided for the outer diameter, inner diameter, and tooth thickness.

Dimensions:

- Outer Diameter: $14.27 \pm .25$ ($.562 \pm .010$)
- Inner Diameter: $6.31 + .025 / -.051$ ($.2485 + .001 / .002$)
- Tooth Thickness: 48 TOOTH

STD. LENGTHS
25.40
(1.00)

6.32+0.010/-0.025
(2.490+0.004/-0.010)
DIA

STD. LENGTHS:				
$\frac{12.70}{(.500)}$	$\frac{15.88}{(.625)}$	$\frac{19.05}{(.750)}$	$\frac{22.23}{(.875)}$	$\frac{25.4}{(1.000)}$

STD. LENGTHS:		
$\frac{12.0}{(.500)}$	$\frac{16.0}{(.625)}$	$\frac{19.0}{(.750)}$

Technical drawing of a shaft and hole assembly. The shaft has a diameter of $1.60 \pm .38 / -.00$ with a tolerance zone of $(.063 \pm .015 / -.000)$. The hole has a diameter of $6.32 \pm .010 / -.025$ with a tolerance zone of $(.2490 \pm .0004 / .0010)$. The hole is labeled "DIA.". The shaft is shown with a diameter of 1.194 and a tolerance zone of $(.047)$.

STD. LENGTHS:			
$\frac{12.70}{(.500)}$	$\frac{15.88}{(.625)}$	$\frac{19.05}{(.750)}$	$\frac{22.23}{(.875)}$

Technical drawing of a shaft with a step. The shaft has a diameter of 6.32 ± 0.010 inches (DIA) and a length of 5.486 ± 0.051 inches (216 ± .002 inches). The step is located 6.32 ± 0.010 inches from the right end. The drawing shows a cross-section of the shaft with a dashed line indicating the internal feature.

STD. LENGTHS:	
$\frac{19.05}{(.750)}$	$\frac{22.23}{(.875)}$

$\frac{7.95}{(.313)}$	$\frac{11.13}{(.438)}$
-----------------------	------------------------

Figure 10 illustrates the dimensioning of a hole and shaft. The hole diameter is specified as $6.000 +0.000/-0.035$ (DIA). The shaft diameter is specified as $3.988 \pm .076$ ($157 \pm .003$). The hole's position is dimensioned as $4.000 \pm .015$ ($F \pm .015$). The shaft's position is dimensioned as $2.362 \pm .000$ (0.014).

STD. LENGTHS:	
$\frac{16.0}{(.630)}$	$\frac{22.0}{(.866)}$

$\frac{6.99}{(.275)}$	$\frac{12.98}{(.511)}$
-----------------------	------------------------

STD. LENGTHS:	
$\frac{16.0}{(.630)}$	$\frac{22.0}{(.866)}$

Technical drawing of a shaft with the following dimensions and tolerances:

- Overall length: 1.50 ± 0.25 ($.059 \pm .010$)
- Left shoulder diameter: 0.79 ± 0.13 ($.031 \pm .054$)
- Right shoulder diameter: $3.99 + .000 / -.035$ ($.1571 + .0000 / .0010$) DIA

STD. LENGTHS.	
$\frac{16.0}{(.630)}$	$\frac{22.0}{(.866)}$

TOLERANCES EXCEPT AS SHOWN: .XX = $\pm \frac{.02}{(.050)}$
 .XXX = $\pm \frac{.005}{(.127)}$
 .XXXX = $\pm \frac{.0005}{(.0127)}$

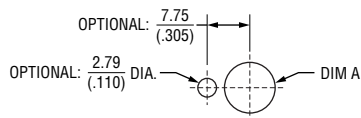
DIMENSIONS: $\frac{\text{MM}}{(\text{INCHES})}$

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Model 91, 92, 93, 94 & 95 – 5/8" Square Single-Turn Panel Control

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Suggested Panel Layout



BUSHING	DIM A
A	$\frac{9.91}{(.39)}$
C	$\frac{6.73}{(.265)}$
R	$\frac{10.5}{(.413)}$
U	$\frac{7.5}{(.295)}$

DIMENSIONS: $\frac{\text{MM}}{(\text{INCHES})}$

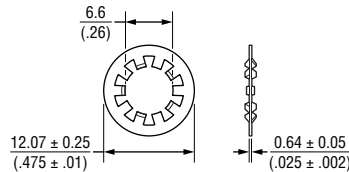
Date Code Description

YYWWMM

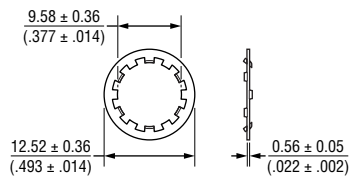
M = COUNTRY OF MANUFACTURE (MEXICO)
 WW = WEEK NUMBER
 YY = LAST TWO DIGITS OF YEAR MANUFACTURED

Hardware

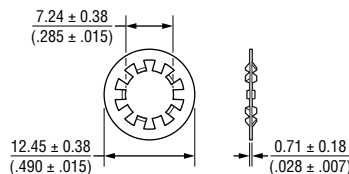
LOCKWASHER H-37-1



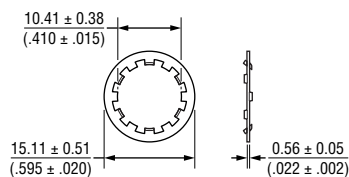
LOCKWASHER H-37-2



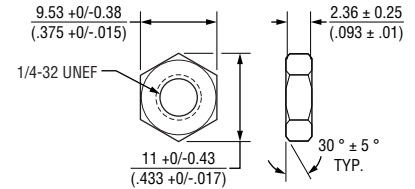
LOCKWASHER H-37-3



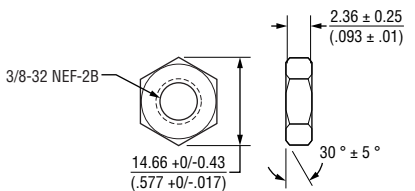
LOCKWASHER H-37-4



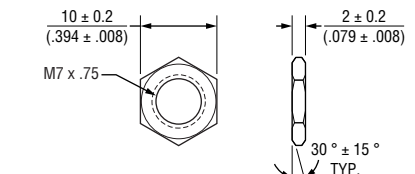
NUT H-38-1



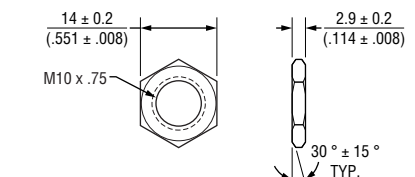
NUT H-38-2



NUT H-38-8



NUT H-38-9



DIMENSIONS: $\frac{\text{MM}}{(\text{INCHES})}$

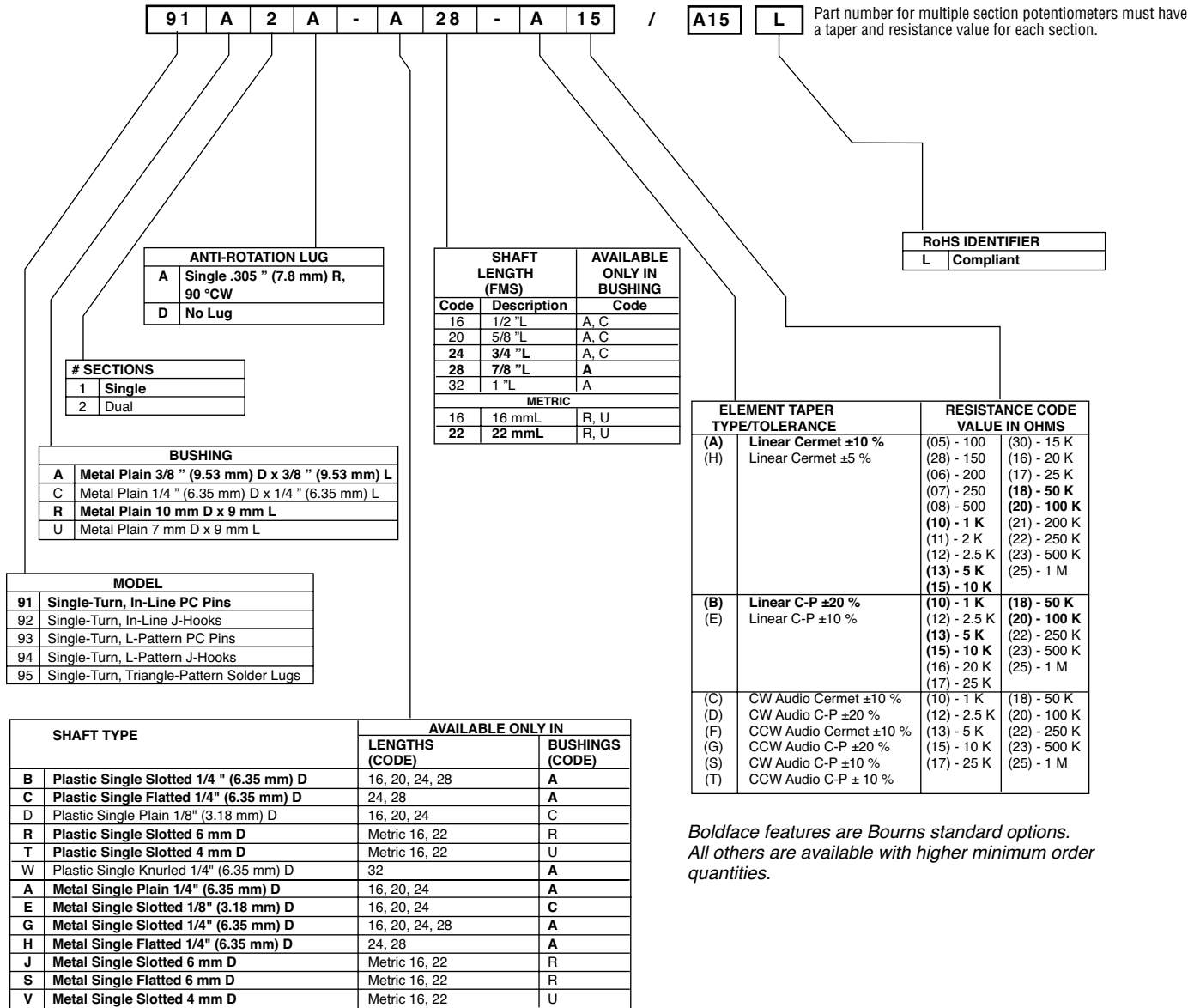
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How to Order Model 91, 92, 93, 94 & 95 Panel Controls

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Boldface features are Bourns standard options. All others are available with higher minimum order quantities.

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Asia-Pacific: Tel: +886-2 2562-4117 • Email: asiacus@bourns.com

EMEA: Tel: +36 88 885 877 • Email: eurocus@bourns.com

The Americas: Tel: +1-951 781-5500 • Email: americus@bourns.com

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REV. 10/20

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