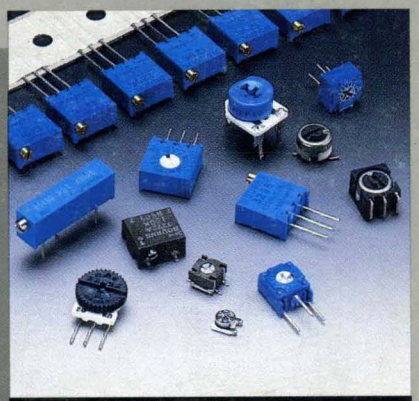
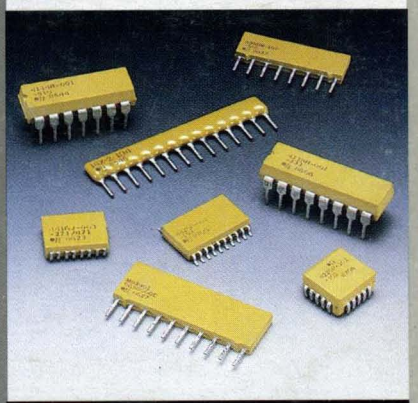
BOURNS

Resistive Components



TRIMMING POTENTIOMETERS



RESISTOR NETWORKS

PRECISIONS/CONTROLS

NEW!
COMMERCIAL & MILITARY
CHIP RESISTORS

...DUSTRIAL • MILITARY • SMD • TAPE & REEL • SEALED/OPEN STYLES

...OLDED SIPS/DIPS • CONFORMAL SIPS • COMMERCIAL • MILITARY • SMD

...RE...N POTENTIOMETERS • PANEL CONTROLS • ENCODERS • DIALS

BOURNS

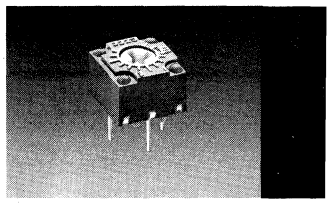
Resistive Components

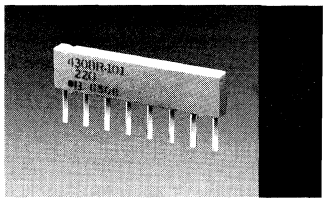
Bourns, Inc. leads the industry in quality resistive components. The breadth and scope of the Bourns resistive component product line is the direct result of the emphasis placed on innovative product design. A staff of skilled engineers develops and designs products to satisfy the technical requirements of our diversified customers in a wide variety of markets and applications.

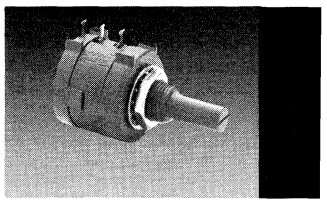
Bourns' dedication to quality is world renowned. Our quality assurance organization is involved in the entire manufacturing operation.

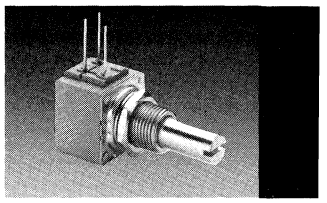
Bourns also has the capability to develop and undertake special inspection programs to meet specific testing requirements.

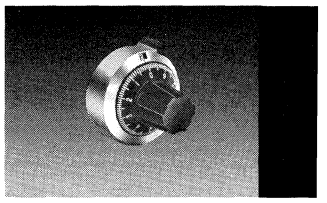
In every aspect, from innovation to component delivery, Bourns is the first choice for resistive components. Remember — There's Still No Equivalent.

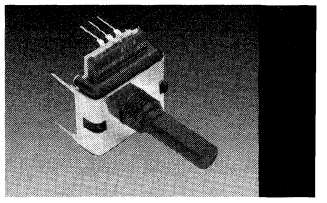


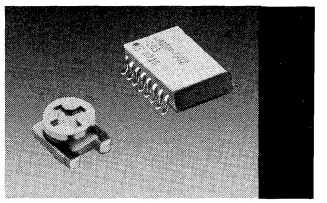


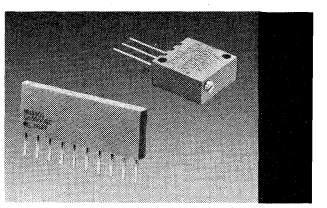












NEW!

Rotary Optical Encoders
See page 153 for specifications

4mm Sealed SMD Trimmers
See page 160 for specifications

Commercial Chip Resistors
See page 174 for specifications

Military Chip Resistors
See page 196 for specifications

Chip Resistor Lab Kits
See page 173 for specifications

Trimmer Lab Kits
See page 12 for specifications

Op Amp Offset Trimmers
See page 44 for specifications

Digital Contacting Encoders
See page 150 for specifications

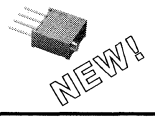
Open Frame Slide Potentiometers
See page 138 for specifications

Slimline Potentiometers
See page 141 for specifications

Stepped Attenuators
See page 135 for specifications

BOURNS INDEX TO PRODUCT CATEGORIES

SQUARE, MULTITURN, SEALED OP AMP OFFSET TRIMMERS

Board Space	Product	Model Number	Element Type	Turns	Grade	Pin Styles	Page Number
.375 (9.53)	 NEW!	3296 OT1	Cermet	25	Industrial	W, X	44

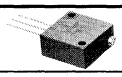
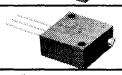
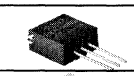
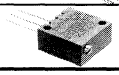
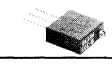
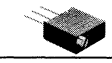
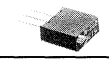
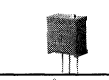
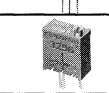
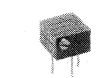
SQUARE, SINGLE-TURN, SEALED OP AMP OFFSET TRIMMING POTENTIOMETER

Board Space	Product	Model Number	Element Type	Grade	Pin Styles	Page Number
.375 (9.53)	 NEW!	3386 OT1	Cermet	Industrial	P	45

RECTANGULAR, MULTITURN, SEALED TRIMMERS

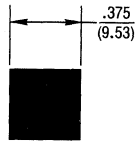
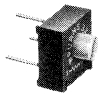
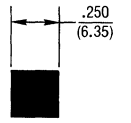
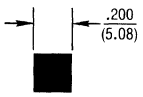
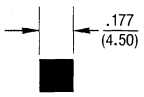
Board Space	Product	Model Number	Element Type	Turns	Grade	Pin Styles	Page Number
		RTR12	Wirewound	22	Military	L, P, Y	184
		RT12	Wirewound	22	Military	L, P, Y	184
1.250 (31.75)		3057	Wirewound	22	Industrial	L, P, J, Y	14
		RJR12	Cermet	22	Military	L, Y	188
		RJ12	Cermet	22	Military	L, P, Y	188
		3059	Cermet	22	Industrial	L, P, J, Y	22
.785 (20.00)		20	Cermet	15	Industrial	P	19
		3005	Wirewound	20	Industrial	P	13
.750 (19.05)		3006	Cermet	15	Industrial	P, W, Y	20
		3009	Cermet	15	Industrial	P, Y	21
		3099 (DIP)	Cermet	20	Industrial	P	24
.500 (12.70)		RJR28	Cermet	10	Military	P	192
		3082	Cermet	10	Industrial	P	23

SQUARE, MULTITURN, SEALED TRIMMERS

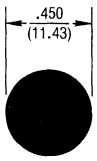
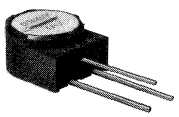
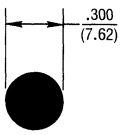
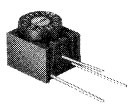
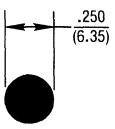
Board Space	Product	Model Number	Element Type	Turns	Grade	Pin Styles	Page Number
.500 (12.70)		RT22	Wirewound	25	Military	L,P,W,X	185
		RTR22	Wirewound	25	Military	L,P,W,X	185
		3250	Wirewound	25	Industrial	L,P,W W-66 (X)	15
		3252	Cermet	25	Industrial	L,P,W,X	25
		RJ22	Cermet	25	Military	L,P,W,X	189
.375 (9.53)		RTR24	Wirewound	25	Military	P,W,X	186
		RT24	Wirewound	25	Military	P,W,X	186
		3290	Wirewound	25	Industrial	H,P,W	17
		RJR24	Cermet	25	Military	P,W,X	190
		RJ24	Cermet	25	Military	L,P,W,X	190
		3292	Cermet	25	Industrial	L,P,W,X	28
		3299	Cermet	25	Industrial	P,W,X,Z,Y	30
		3296	Cermet	25	Industrial	P,W,X,Y,Z W,X (T&R)	29
.35 (8.89)		3272	Cermet	12	Industrial	A,C	158
.250 (6.35)		RT26	Wirewound	11	Military	W,X	187
		3260	Wirewound	11	Industrial	H,W	16
		RJR26	Cermet	12	Military	P,W,X	191
		3262	Cermet	12	Industrial	P,W,X	26
		3266	Cermet	12	Industrial	P,W,X Y,Z (T&R)	27
		RJ26	Cermet	12	Military	P,W,X	191
		3269	Cermet	12	Industrial	P,W,X	157

Specifications are subject to change without notice.

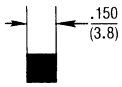
SQUARE, SINGLE-TURN, SEALED TRIMMING POTENTIOMETERS

Board Space	Product	Model Number	Element Type	Grade	Pin Styles	Page Number
		**3386**	Cermet	Industrial	H,X,S,B,W,C F,Y,P,R,M,T W (T&R)	36
		**3386 HV1**	Cermet	Industrial	N,U	35
		**3323**	Cermet	Industrial	P,W,X,S,U	31
		**3362**	Cermet	Industrial	H M,U (T&R)	34
	 SMD	**3335**	Cermet	Industrial	W,X	163
	NEW  SMD	**3314**	Cermet	Industrial	A,B,C G,H,J	160

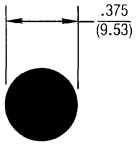
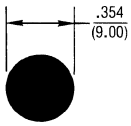
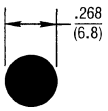
ROUND, SINGLE-TURN, SEALED TRIMMING POTENTIOMETERS

		**3345**	Wirewound	Industrial	W,P	18
		**3339 (4 Turns)**	Cermet	Industrial	H,P,S,W	33
		**RJR50**	Cermet	Military	P	193
		**RJ50**	Cermet	Military	P	193
	 SMD	**3325**	Cermet	Industrial	P,W,X	162
		**3329**	Cermet	Industrial	H,P,W,X,S, M,U (T&R)	32

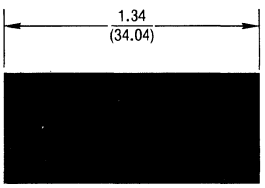
SQUARE, SINGLE-TURN, OPEN STYLE TRIMMING POTENTIOMETERS

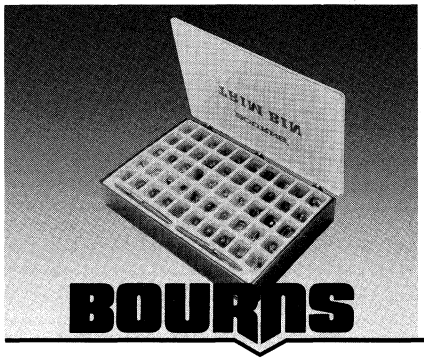
Board Space	Product	Model Number	Element Type	Grade	Pin Styles	Page Number
		**3304**	Cermet	Industrial	W,X	159

ROUND, SINGLE-TURN, OPEN STYLE TRIMMING POTENTIOMETERS

		**3352**	Cermet	Industrial	K,H,V,W,E,P,T	40
		**3359**	Cermet	Industrial	P,W	41
		**3309**	Cermet	Industrial	P,W	39
		**3306**	Cermet	Industrial	P,W	38

SWITCHABLE ATTENUATORS

Board Space	Product	Model Number	Pad Types	Range	Impedance Value	Page Number
		**3100**	O, T, π	150, 151, 241	600, 75	42



TRIMMER LAB DESIGN KITS

- Wide assortment of popular trimmers
- Convenient, easy-to-use packaging
- Single-turn and multiturn styles
- Many configurations in both cermet and wirewound element types

Model H-800

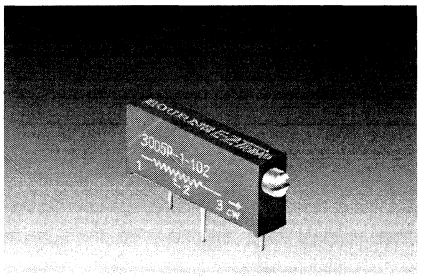
TrimBin™ Trimmer Kit

A complete assortment of the most popular styles from Bourns Trimpot is contained in one convenient package. The kit contains 126 parts representing 50 varieties of resistances and pin styles.

Select the size, shape, type of element, and method of adjustment to suit your application.

H-800 PART NUMBER MATRIX

MODEL	PIN STYLE	RESISTANCE VALUE & QUANTITY						
		-102 1,000	-202 2,000	-502 5,000	-103 10,000	-203 20,000	-503 50,000	-104 100,000
20	P	2						
3005	P			2	2			
3006	P	2		4			2	
3266	W			2	2			
	X	2						
3269	W				2			
3290	W	2		2				
	P		2		2			
3296	P				2			
	W					4		
	X	Y				2		
3304	X				6			
3306	P				2			
	W			2				
3309	P							2
	W		2					
3323	P	2			4			2
	W				2		2	
	W					2		2
3329	H	2			4		2	
	W		2			4		
3335	W				4			
3339	P	2			4		2	
3345	P			2				
3352	P	2			4			
	W			4			2	
	T				4			
3386	P	2			4		2	
	W		2		2	4		
H-90		Adjustment Tool						
H-91		Adjustment Tool						
Product Literature								



3/4" RECTANGULAR/MULTITURN WIREWOUND/INDUSTRIAL/SEALED

- Sealed to prevent contamination from fluxing, soldering and cleaning
- Low cost model
- Panel mount option available (see page 46 for details)

BOURNS

Model 3005P

Bourns® Trimming Potentiometer

Electrical Characteristics

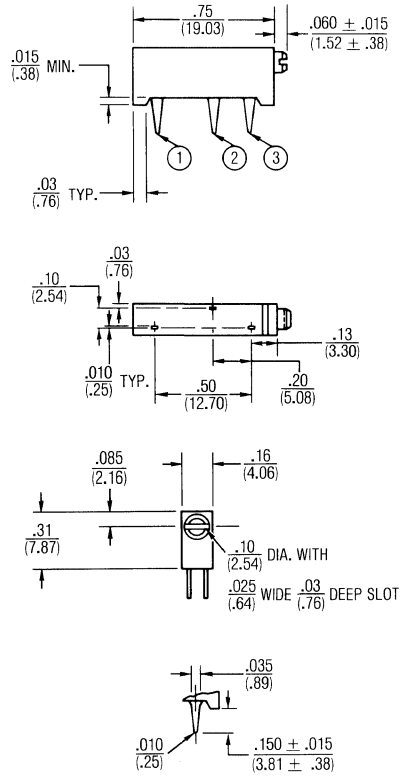
Standard Resistance Range
.....10 to 50,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....0.5% or 1 ohm
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution
.....See standard resistance table
Insulation Resistance.....500 vdc.
100 megohms min.
Dielectric Strength
Sea Level.....1,000 vac
80,000.....250 vac
Adjustment Travel....20 turns nom.

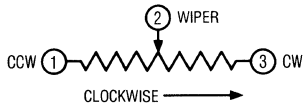
Environmental Characteristics

Power Rating
70°C.....1 watt
125°C.....0 watt
Temperature Range
.....–65°C to +125°C
Temperature Coefficient
.....±50ppm/°C max.
Seal Test ..... 85°C Fluorinert*
Humidity
.....MIL-STD-202 Method 106
(5% ΔTR, 20 Megohms IR)
Vibration...20G (2% ΔTR, 2% ΔVR)
Shock.....50G (2% ΔTR, 2% ΔVR)
Load Life
.....1,000 hours 1 watt @ 70°C
(2% ΔTR)
Mechanical Life.....200 cycles
(4% ΔTR)

Physical Characteristics

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.045 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Nominal Resolution (Percent)
10	100	1.7
20	200	1.5
50	500	1.0
100	101	0.8
200	201	0.7
500	501	0.5
1,000	102	0.5
2,000	202	0.4
5,000	502	0.3
10,000	103	0.3
20,000	203	0.2
50,000	503	0.2

Special resistances available from 10 to 50,000 ohms.

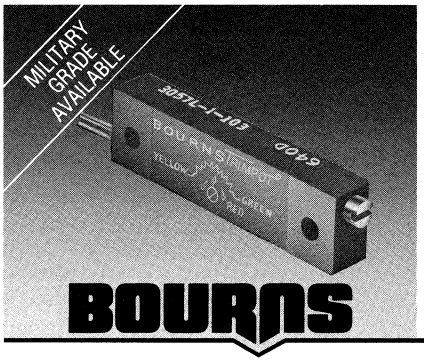
HOW TO ORDER

3005 P - 1 - 103 Z

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
Resistance Code
Optional Suffix Letter
Z = Panel Mount (Factory Installed)

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1¼" RECTANGULAR/MULTITURN WIREWOUND/INDUSTRIAL/SEALED

- Model 3057 is listed on the DESC QPL for style RT12 per MIL-R-27208 and RTR12 per High-Rel MIL-R-39015
- Bourns exclusive SILVERWELD® termination eliminates vulnerable single wire termination
- Panel mount option available (see page 46 for details)

Model 3057

Trimpot® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 50,000 ohms
(see standard resistance table)
Resistance Tolerance.....±5% std.
(closer tolerance available)
Absolute Minimum Resistance
.....0.1% or 1 ohm
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution
.....See standard resistance table
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....1,500 vac
80,000.....400 vac
Adjustment Travel....22 turns nom.

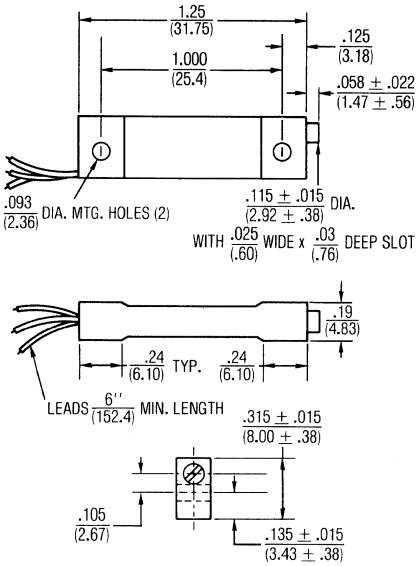
Environmental Characteristics

Power Rating
70°C.....1 watt
150°C.....0 watt
Temperature Range
.....–55°C to +150°C
Temperature Coefficient
.....±50ppm/°C max.
Seal Test.....85°C Fluorinert *
(pin styles only)
Humidity
.....MIL-STD-202 Method 106
(2% ΔTR, 100 Megohms IR)
Vibration.....30G (1% ΔTR, 0.5%
+ resolution ΔVR)
Shock.....100G (1% ΔTR, 0.5%
+ resolution ΔVR)
Load Life
.....1,000 hours 1 watt @ 70°C
(2% ΔTR)
Mechanical Life.....200 cycles
(2% ΔTR)

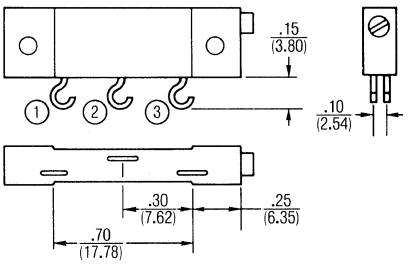
Physical Characteristics

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals..Solderable pins and lugs
Flexible leads (7 strands of 38 AWG)
Weight.....0.10 oz.
Marking.....Manufacturer's
trademark, resistance code,
wiring diagram, date
code, manufacturer's
model number and style

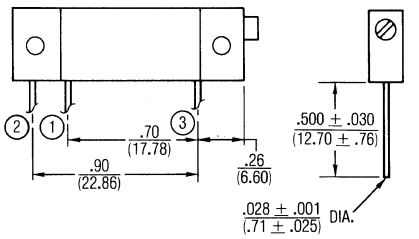
3057L



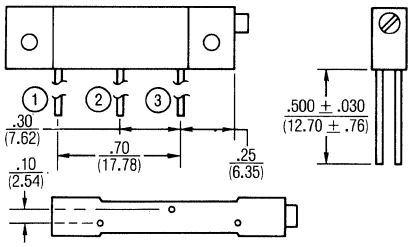
3057J

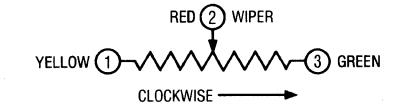


3057P



3057Y





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Nominal Resolution (Percent)
10	100	2.40
20	200	1.90
50	500	1.40
100	101	1.00
200	201	0.86
500	501	0.89
1,000	102	0.72
2,000	202	0.58
5,000	502	0.43
10,000	103	0.34
20,000	203	0.31
50,000	503	0.24

Special resistances available from 10 to 50,000 ohms on commercial model.

See Mil-Spec Section for qualified resistance values, terminal styles and failure rates where applicable.

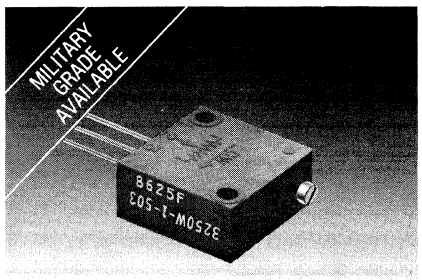
HOW TO ORDER

3057 L - 1 - 103 M

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-73 = 12" Leads
Resistance Code
Optional Suffix Letter
M = Panel Mount
(Factory Installed)

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1/2" SQUARE / MULTITURN / WIREWOUND SEALED

- Model 3250 is listed on the DESC QPL for style RT22 per MIL-R-27208 and RTR22 per High-Rel MIL-R-39015
- Bourns exclusive SILVERWELD® termination eliminates vulnerable single wire termination

BOURNS

Model 3250

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 50,000 ohms
(see standard resistance table)
Resistance Tolerance.....±5% std.
(closer tolerance available)
Absolute Minimum Resistance
.....0.1% or 1 ohm
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution
.....See standard resistance table
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....1,000 vac
80,000.....400 vac
Adjustment Travel....25 turns nom.

Environmental Characteristics

Power Rating
70°C.....1.0 watt
150°C.....0 watt
Temperature Range
.....-65°C to +150°C
Temperature Coefficient
.....±50ppm/°C max.
Seal Test ..... 85°C Fluorinert*
(pin styles only)
Humidity..MIL-STD-202 Method 106
(2% ΔTR, 100 Megohms IR)
Vibration 30G
(1% ΔTR, 0.5% + resolution ΔVR)
Shock 100G
(1% ΔTR, 0.5% + resolution ΔVR)
Load Life
.....1,000 hours 1.0 watt @ 70°C
(2% ΔTR, 500 ohms ENR)
Mechanical Life.....200 cycles
(2% ΔTR, 500 ohms ENR)

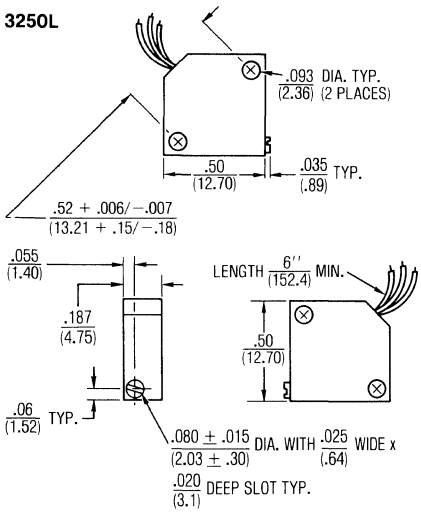
Physical Characteristics

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Flexible leads (7 strands of 38 AWG)
Weight.....0.06 oz.

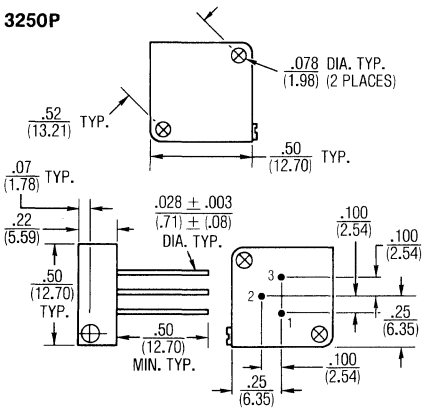
Machine Screw Mounting

Torque.....12 oz-in. max.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

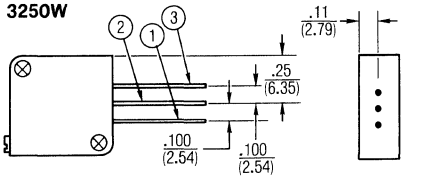
3250L



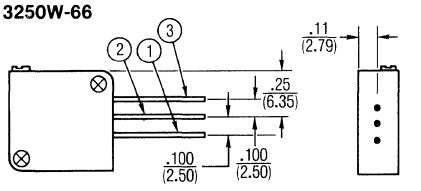
3250P

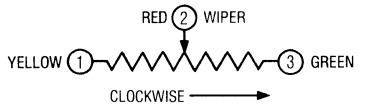


3250W



3250W-66





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED
DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Nominal Resolution (Percent)
10	100	1.30
20	200	1.00
50	500	0.80
100	101	0.90
200	201	0.70
500	501	0.60
1,000	102	0.40
2,000	202	0.30
5,000	502	0.25
10,000	103	0.19
20,000	203	0.16
25,000	253	0.14
50,000	503	0.13

Special resistances available from 10 to 50,000 ohms on commercial model.

See Mil-Spec Section for qualified resistance values, terminal styles and failure rates where applicable.

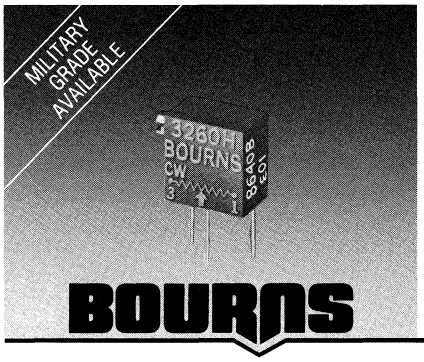
HOW TO ORDER

3250 L - 1 - 103 M

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-12 = 3% Tolerance
-73 = 12" Leads
Resistance Code
Optional Suffix Letter
M = Panel Mount (Factory Installed)

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1/4" SQUARE / MULTITURN / WIREWOUND INDUSTRIAL / SEALED

- Model 3260 is listed on the DESC QPL for style RT26 per MIL-R-27208
- All plastic case
- Bourns exclusive SILVERWELD® termination eliminates vulnerable single wire termination

Model 3260

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 25,000 ohms
(see standard resistance table)
Resistance Tolerance.....±5% std.
(closer tolerance available)
Absolute Minimum Resistance
.....0.1% or 1 ohm
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution
.....See standard resistance table
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000.....250 vac
Adjustment Travel....11 turns nom.

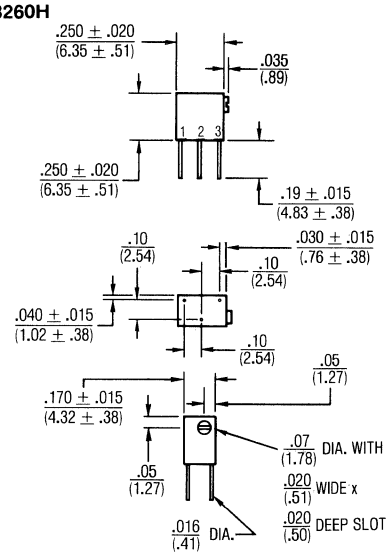
Environmental Characteristics

Power Rating
85°C.....0.25 watt
150°C.....0 watt
Temperature Range
.....-65°C to +150°C
Temperature Coefficient
.....±50ppm/°C max.
Seal Test ..... 85°C Fluorinert*
Humidity
.....MIL-STD-202 Method 106
(2% ΔTR, 100 Megohms IR)
Vibration.....30G
(1% ΔTR, 1% + resolution ΔVR)
Shock.....100G
(1% ΔTR, 1% + resolution ΔVR)
Load Life
....1,000 hours 0.25 watt @ 85°C
(2% ΔTR, 500 ohms ENR)
Mechanical Life.....200 cycles
(2% ΔTR, 500 ohms ENR)

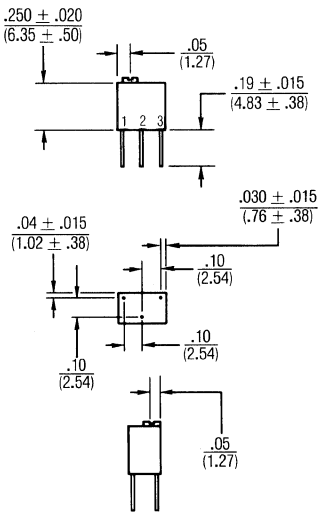
Physical Characteristics

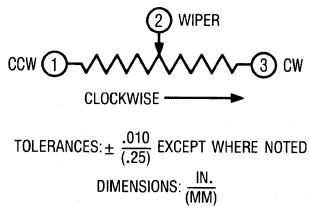
Torque.....3.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Weight.....0.015 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

3260H



3260W





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Nominal Resolution (Percent)
10	100	1.90
20	200	1.50
50	500	1.25
100	101	1.00
200	201	0.94
500	501	0.50
1,000	102	0.50
2,000	202	0.45
5,000	502	0.34
10,000	103	0.29
20,000	203	0.28
25,000	253	0.23

Special resistances available from 10 to 25,000 ohms on commercial model.

See Mil-Spec Section for qualified resistance and terminal styles.

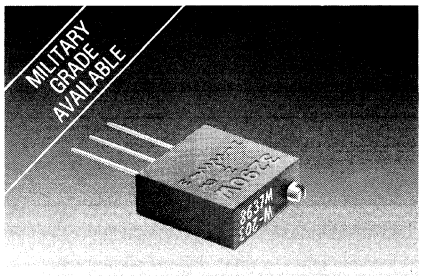
HOW TO ORDER

3260 H - 1 - 502

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-12 = 3% Tolerance
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



3/8" SQUARE / MULTITURN / WIREWOUND INDUSTRIAL / SEALED

- Model 3290 is listed on the DESC QPL for style RT24 per MIL-R-27208 and RTR24 per High-Rel MIL-R-39015
- Bourns exclusive SILVERWELD® termination eliminates vulnerable single wire termination
- Panel mount option available (see page 48 for details)

BOURNS

Model 3290

Trimpot® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 25,000 ohms
(see standard resistance table)
Resistance Tolerance.....±5% std.
(closer tolerance available)
Absolute Minimum Resistance
.....0.1% or 1 ohm
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution
(see standard resistance table)
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....1,000 vac
80,000.....350 vac
Adjustment Travel....25 turns nom.

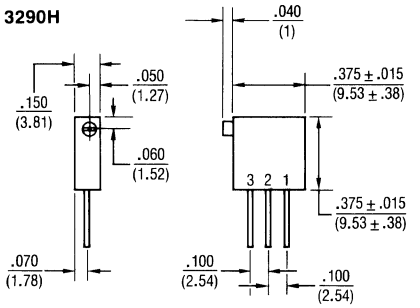
Environmental Characteristics

Power Rating
70°C.....1.0 watt
150°C.....0 watt
Temperature Range
.....-65°C to +150°C
Temperature Coefficient
.....±50ppm/°C max.
Seal Test.....85°C Fluorinert**
Humidity
.....MIL-STD-202 Method 106
(2% ΔTR, 100 Megohms IR)
Vibration.....30G
(1% ΔTR, 0.5% + resolution ΔVR)
Shock.....100G
(1% ΔTR, 0.5% + resolution ΔVR)
Load Life
.....1,000 hours 1.0 watt @ 70°C
(2% ΔTR, 500 ohms ENR)
Mechanical Life.....200 cycles
(2% ΔTR, 500 ohms ENR)

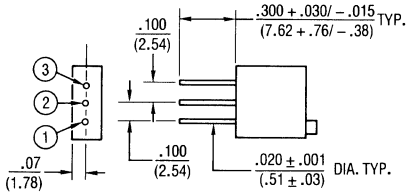
Physical Characteristics

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Weight.....0.025 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

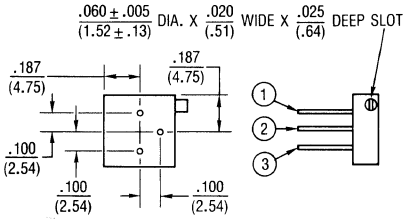
3290H

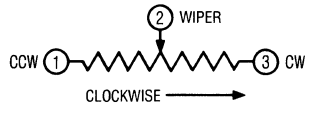


3290W



3290P





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Nominal Resolution (Percent)
10	100	1.11
20	200	0.93
50	500	0.62
100	101	0.60
200	201	0.54
500	501	0.42
1,000	102	0.33
2,000	202	0.26
5,000	502	0.20
10,000	103	0.17
20,000	203	0.14
25,000	253	0.13

Special resistances available from 10 to 25,000 ohms on commercial model.

See Mil-Spec Section for qualified resistance values, terminal styles and failure rates where applicable.

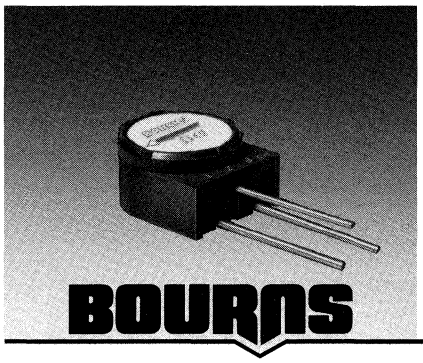
HOW TO ORDER

3290 H - 1 - 103 M

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-12 = 3% Tolerance
Resistance Code
Optional Suffix Letter
M = Panel Mount (Factory Installed)

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1/2" ROUND / SINGLE-TURN / WIREWOUND INDUSTRIAL / SEALED

- Industrial wirewound
- 1.0 watt power rating at 70°C
- Available with a thumbwheel and screwdriver slot adjustment

Model 3345

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 50,000 ohms
(see standard resistance table)
Resistance Tolerance.....±5% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1.0% or 0.5 ohms
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution
....(see standard resistance table)
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
70,000 feet.....350 vac
Adjustment Angle.....300° nom.

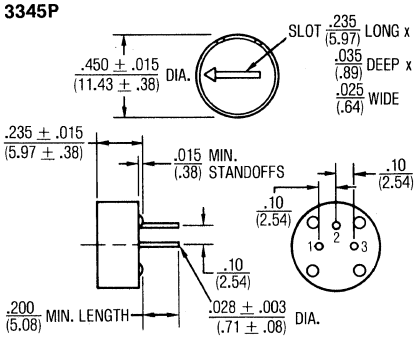
Environmental Characteristics

Power Rating
70°C.....1.0 watt
150°C.....0 watt
Temperature Range
.....–55°C to +150°C
Temperature Coefficient
.....±50ppm/°C max.
(100 ohms and up)
Seal Test ..... 85°C Fluorinert*
Humidity..MIL-STD-202 Method 106
(1% ΔTR, 10 Megohms IR)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 1.0 watt @ 70°C
Mechanical Life.....200 cycles
(2% ΔTR, 500 ohms ENR)

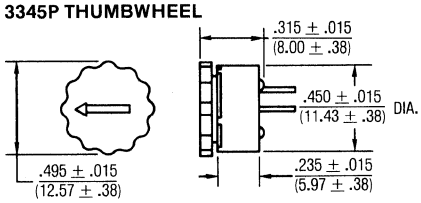
Physical Characteristics

Mechanical Angle.....310° nom.
Torque.....5.0 oz-in. max.
Stop Strength.....15 oz-in.
Terminals
.....Solderable printed circut pins
Weight.....0.04 oz.
Marking.....Manufacturer's
trademark, resistance code,
wiring diagram, date
code, manufacturer's
model number and style

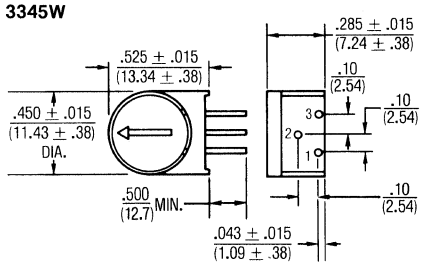
3345P



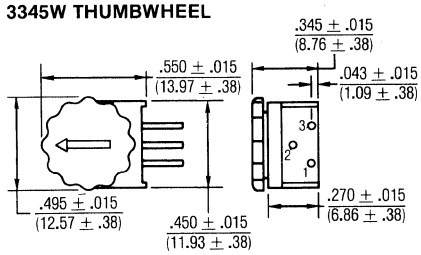
3345P THUMBWHEEL

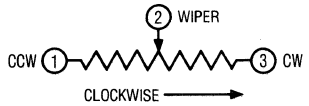


3345W



3345W THUMBWHEEL





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Nominal Resolution (Percent)
10	100	0.94
20	200	0.76
50	500	0.58
100	101	0.49
200	201	0.49
500	501	0.38
1,000	102	0.30
2,000	202	0.24
5,000	502	0.18
10,000	103	0.14
20,000	203	0.13
25,000	253	0.12
50,000	503	0.10

Special resistances available from 10 to 50,000 ohms.

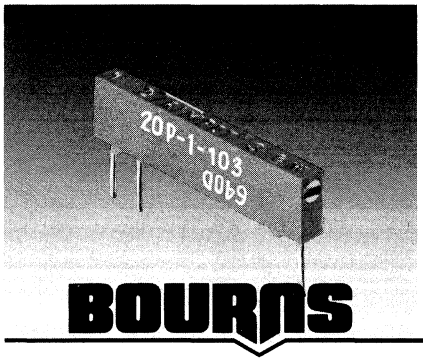
HOW TO ORDER

3345 P - 1 - 502 T

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
Resistance Code
Optional Suffix Letter
T = Thumb Wheel

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



.785" RECTANGULAR/SIP MULTITURN CERMET/SEALED

- Machine insertable SIP design provides extra cost savings
- .080" width allows side-by-side spacing on standard 0.100" grid
- Lower PC board profile - only 0.185" high

Model 20

Trimpot® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 5,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....3.0% or 3 ohms
(whichever is greater)
Contact Resistance Variation
.....1.0% or 1 ohm
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
100 megohms min.
Dielectric Strength
Sea Level.....1000 vac
70,000.....350 vac
Effective Travel.....15 turns nom.

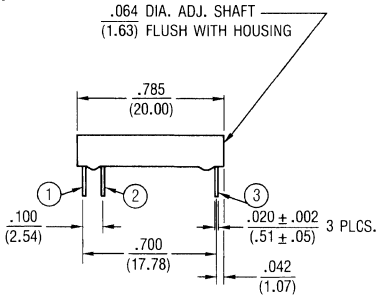
Environmental Characteristics

Power Rating (250 volts max.)
70°C.....0.25 watt
125°C.....0 watt
Temperature Range
.....−55°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
(50 ohms and up)
other values ±150ppm/°C
Seal Test ..... 85°C Fluorinert*
Humidity...MIL-STD-202 Method 103
96 hours
(3% ΔTR, 20 Megohms IR)
Vibration...20G (1% ΔTR, 1% ΔVR)
Shock.....50G (1% ΔTR, 1% ΔVR)
Load Life
...1,000 hours 0.25 watts @ 70°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(3% ΔTR, 3% CRV)

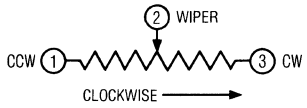
Physical Characteristics

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.015 oz.
Marking.....Manufacturer's trademark, resistance code, terminal numbers, date code, manufacturer's model number and style

20P



*BOURNS ADJUSTMENT TOOL H91
AVAILABLE FOR THIS MODEL



TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
50,000	503
100,000	104
200,000	204
500,000	504
1,000,000	105
2,000,000	205
5,000,000	505

Special resistances available from 10 to 5,000,000 ohms.

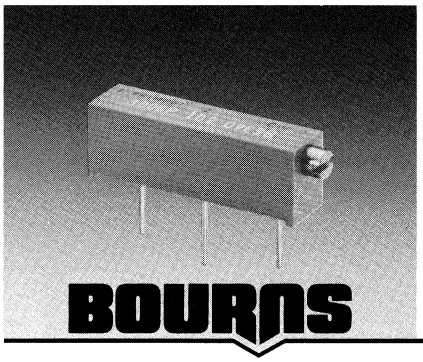
HOW TO ORDER

20 P - 1 - 103

Model
Style
Standard or Modified
Product Indicator
-1 = Standard Product
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



3/4" RECTANGULAR/MULTITURN CERMET/INDUSTRIAL/SEALED

- Low PC board profile - only 1/4" high
- Panel mount option available (see page 46 for details)
- Transparent housing available, allowing wiper setting visually without hook-up and instrumentation

Model 3006

Trimpot® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1.0% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1.0% or 1 ohm
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
100 megohms min.
Dielectric Strength
Sea Level.....1,000 vac
80,000.....250 vac
Adjustment Travel....15 turns nom.

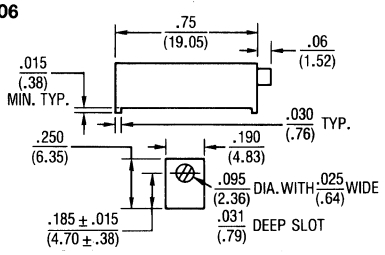
Environmental Characteristics

Power Rating (400 volts max.)
70°C.....0.75 watt
125°C.....0 watt
Temperature Range
.....–55°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test ..... 85°C Fluorinert*
Humidity
.....MIL-STD-202 Method 103
96 hours
(3% ΔTR, 20 Megohms IR)
Vibration...20G (2% ΔTR, 2% ΔVR)
Shock.....50G (2% ΔTR, 2% ΔVR)
Load Life
....1,000 hours 0.75 watt @ 70°C
(4% ΔTR)
Mechanical Life.....200 cycles
(3% ΔTR, 1% CRV)

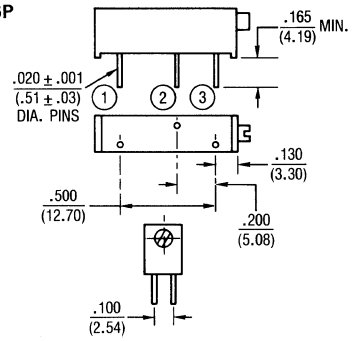
Physical Characteristics

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.04 oz.
Marking.....Manufacturer's trademark, resistance code, terminal numbers, date code, manufacturer's model number and style

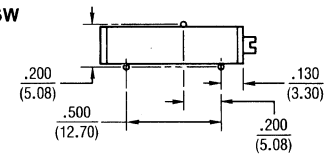
3006



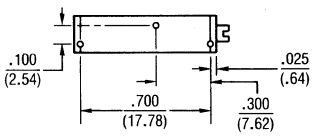
3006P

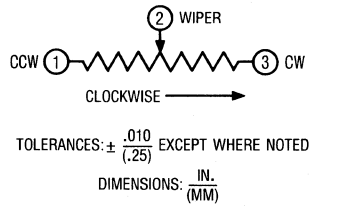


3006W



3006Y





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205

Special resistances available from 10 to 2,000,000 ohms.

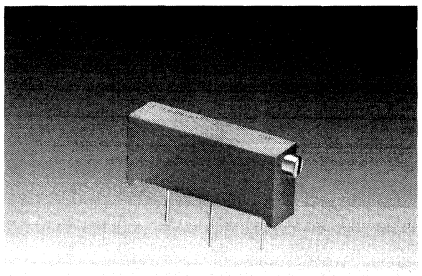
HOW TO ORDER

3006 P - 1 - 103 Z

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-7 = Transparent
-13 = 5% Tolerance
Resistance Code
Optional Suffix Letter
Z = Panel Mount (Factory Installed)

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



3/4" RECTANGULAR/MULTITURN CERMET/INDUSTRIAL/SEALED

- Low temperature coefficient: ±100ppm/°C
- Stable, infinite resolution cermet element
- CRV 1.0% or 1 ohm
- Panel mount option available (see page 46 for details)

BOURNS

Model 3009

Trimpot® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1.0% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1.0% or 1 ohm
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
100 megohms min.
Dielectric Strength
Sea Level.....1,000 vac
80,000.....250 vac
Adjustment Travel....15 turns nom.

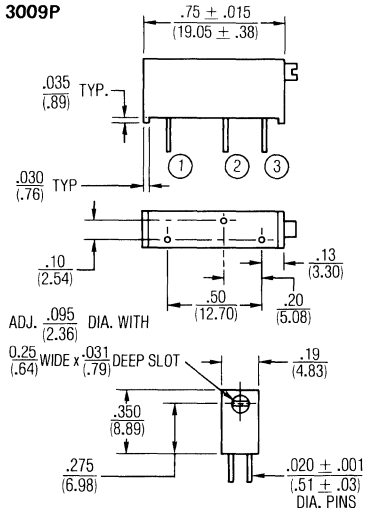
Environmental Characteristics

Power Rating (400 volts max.)
70°C.....0.75 watt
125°C.....0 watt
Temperature Range
.....−55°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test ..... 85°C Fluorinert*
Humidity
.....MIL-STD-202 Method 103
96 hours
(3% ΔTR, 20 Megohms IR)
Vibration...20G (2% ΔTR, 2% ΔVR)
Shock.....50G (2% ΔTR, 2% ΔVR)
Load Life
....1,000 hours 0.75 watt @ 70°C
(4% ΔTR)
Mechanical Life.....200 cycles
(3% ΔTR, 1% CRV)

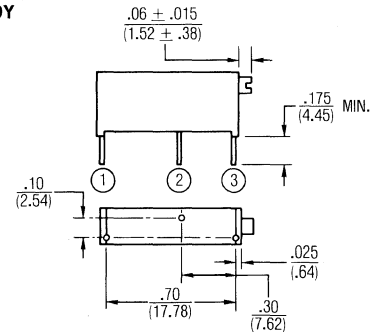
Physical Characteristics

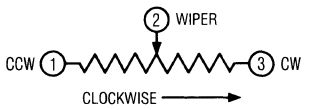
Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.05 oz.
Marking.....Manufacturer's trademark, resistance code, terminal numbers, date code, manufacturer's model number and style

3009P



3009Y





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205

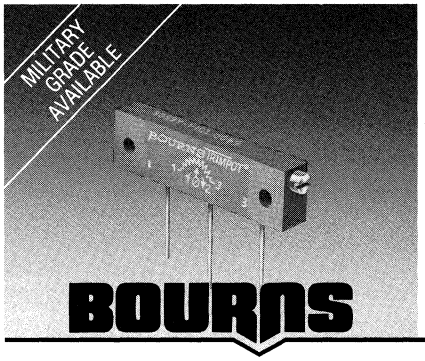
HOW TO ORDER

3009 P - 1 - 103 Z

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
Resistance Code
Optional Suffix Letter
Z = Panel Mount
(Factory Installed)

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1-1/4" RECTANGULAR/MULTITURN CERMET/INDUSTRIAL/SEALED

- Model 3059 is listed on the DESC QPL for style RJ12 per MIL-R-22097 and RJR12 per High-Rel MIL-R-39035
- Panel mount option available (see page 48 for details)

Model 3059

Trimpot® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1.0% or 1 ohm
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution..... Essentially infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
70,000.....350 vac
Effective Travel.....22 turns nom.

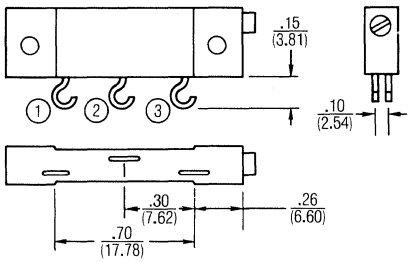
Environmental Characteristics

Power Rating (400 volts max.)
70°C.....1.0 watt
150°C.....0 watt
Temperature Range
.....–55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test .....85°C Fluorinert *
(pin styles only)
Humidity
.....MIL-STD-202 Method 106
(2% ΔTR, 10 Megohms IR)
Vibration...20G (1% ΔTR, 1% ΔVR)
Shock.....50G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 1.0 watt @ 70°C
(3% ΔTR, 1% CRV)
Mechanical Life.....200 cycles
(2% ΔTR, 1% CRV)

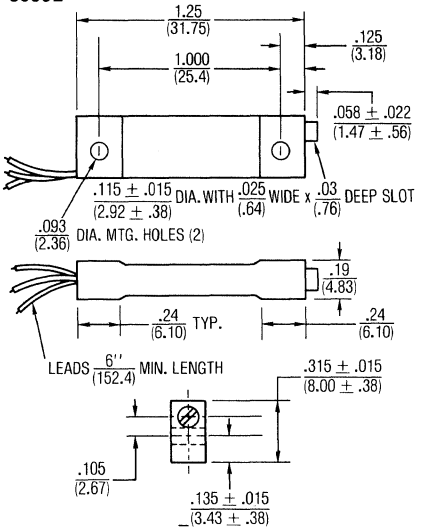
Physical Characteristics

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Flexible leads (7 strands of 38 AWG)
Weight.....0.1 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

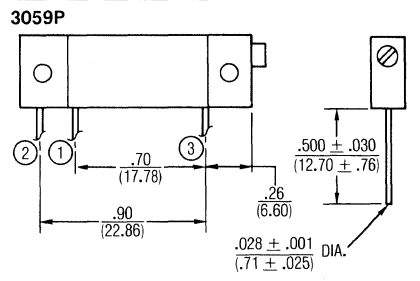
3059J



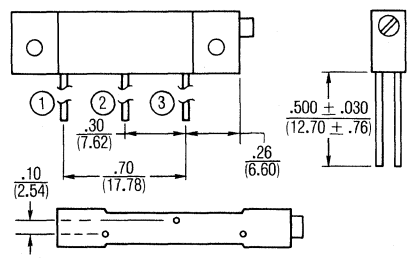
3059L

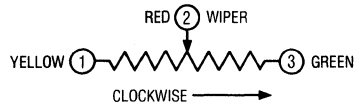


3059P



3059Y





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
750,000	754
1,000,000	105
2,000,000	205

Special resistances available from 10 ohms to 2 megohms on 3059.

See Mil-Spec Section for qualified resistance values, terminal styles, characteristics and failure rates where applicable.

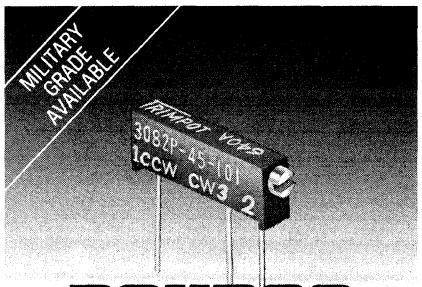
HOW TO ORDER

3059 L - 1 - 103 M

Model
Style
Standard or Modified
Product Indicator
-1 = Standard Product
-8 = 44 Turns
-11 = 5% Tolerance
-73 = 12" Leads
Resistance Code
Optional Suffix Letter
M = Panel Mount
(Factory Installed)

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1/2" RECTANGULAR/MULTITURN/CERMET INDUSTRIAL/SEALED

- Model 3082P-45 is listed on the DESC QPL for style RJR28 per MIL-R-39035
- Available with or without stand-offs
- Power rating of 0.3 watt at +85°C - derated to 0 at 150°C

BOURNS

Model 3082

Trimpot® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....3% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.03%
Resistance.....±.1%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000.....400 vac
Effective Travel.....10 turns nom.

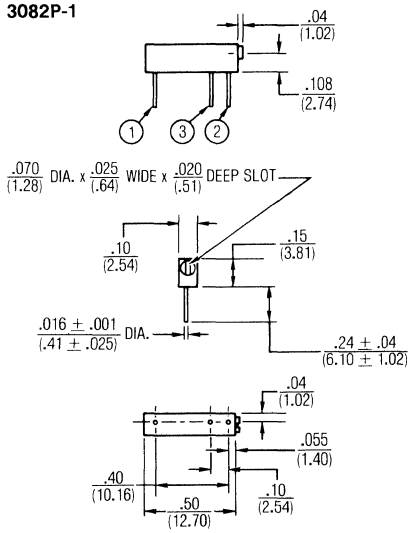
Environmental Characteristics

Power Rating (300 volts max.)
85°C.....0.3 watt
150°C.....0 watt
Temperature Range
.....-65°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85° C Fluorinert*
Humidity
.....MIL-STD-202 Method 103
96 hours
(2% ΔTR, 100 Megohms IR)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.3 watt @ 85°C
(2% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(2% ΔTR, 3% CRV)

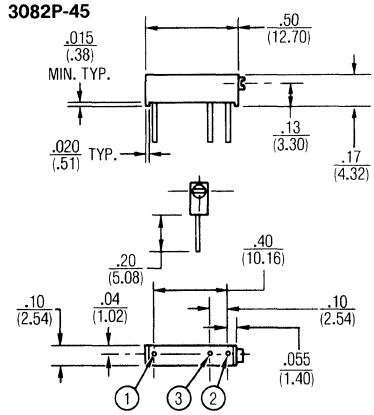
Physical Characteristics

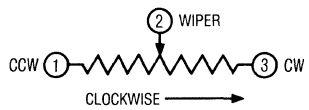
Torque.....2.0 oz-in. max.
Mechanical Stops.....Wiper idles
Weight.....Approximately .01 oz.
Marking.....Manufacturer's trademark, resistance code, terminal numbers, date code, manufacturer's model number and style

3082P-1



3082P-45





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
50,000	503
100,000	104
200,000	204
500,000	504
750,000	754
1,000,000	105
2,000,000	205

Special resistances available from 10 to 2,000,000 ohms on commercial model.

See Mil-Spec Section for qualified resistance values, terminal styles, characteristics and failure rates where applicable.

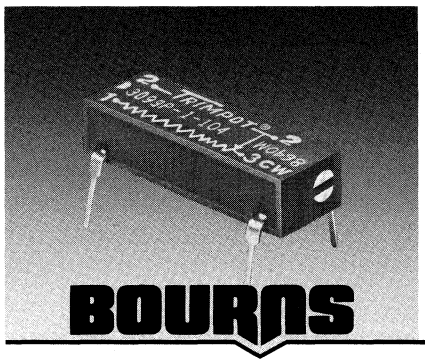
HOW TO ORDER

3082 P - 1 - 103

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-45 = Standoffs
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



3/4" RECTANGULAR/MULTITURN DIP CERMET/INDUSTRIAL/SEALED

- Standard DIP size (T0-116)
- Compatible with DIP automatic insertion equipment

Model 3099

Trimpot® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 5,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....2% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1% or 1 ohm
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
100 megohms min.
Dielectric Strength
Sea Level.....1,000 vac
80,000.....500 vac
Effective Travel.....20 turns nom.

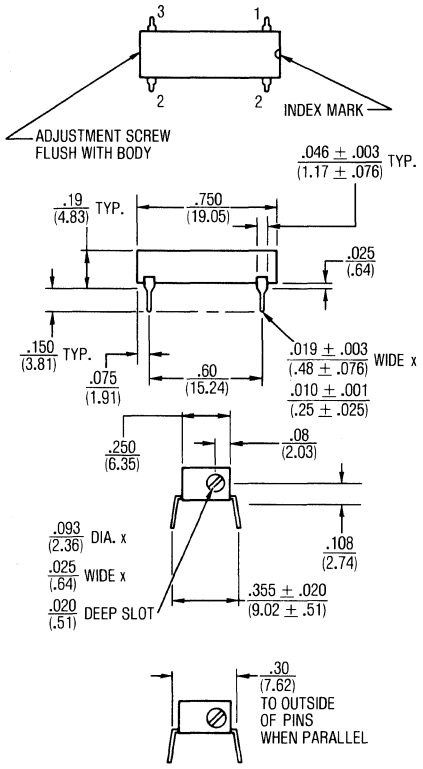
Environmental Characteristics

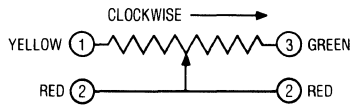
Power Rating (400 volts max.)
70°C.....1 watt
150°C.....0 watt
Temperature Range
.....–55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85° C Fluorinert*
Humidity
.....MIL-STD-202 Method 103
96 hours
(2% ΔTR, 100 Megohms IR)
Vibration...20G (2% ΔTR, 1% ΔVR)
Shock.....50G (2% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 1 watt @ 70°C
(3% ΔTR, 1% CRV)
Mechanical Life.....200 cycles
(2% ΔTR, 1% CRV)

Physical Characteristics

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.04 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

3099 P





TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ± .010 (.25), .XXX ± .005 (.13)

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
50,000	503
100,000	104
200,000	204
500,000	504
1,000,000	105
2,000,000	205
5,000,000	505

Special resistances available from 10 to 5,000,000 ohms.

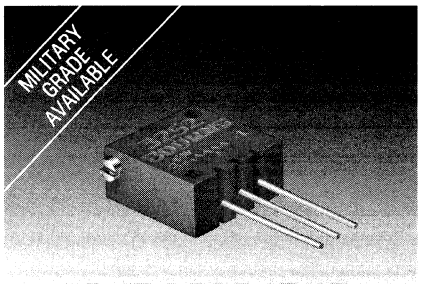
HOW TO ORDER

3099 P - 1 - 103

Model
Style
Standard or Modified
Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1/2" SQUARE / MULTITURN / CERMET INDUSTRIAL / SEALED

- Model 3252 is listed on the DESC QPL for style RJ22 per MIL-R-22097
- Panel mount option available (see page 50 for details)

BOURNS

Model 3252

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 1 ohm
(whichever is greater)
Contact Resistance Variation
.....1% or 2 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....1,000 vac
80,000.....400 vac
Effective Travel.....25 turns nom.

Environmental Characteristics

Power Rating (400 volts max.)
70°C.....1 watt
150°C.....0 watt
Temperature Range
.....-65°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85° C Fluorinert*
(pin styles only)
Humidity..MIL-STD-202 Method 103
96 hours
(1% ΔTR, 100 Megohms IR)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 1 watt @ 70°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(2% ΔTR, 3% CRV)

Physical Characteristics

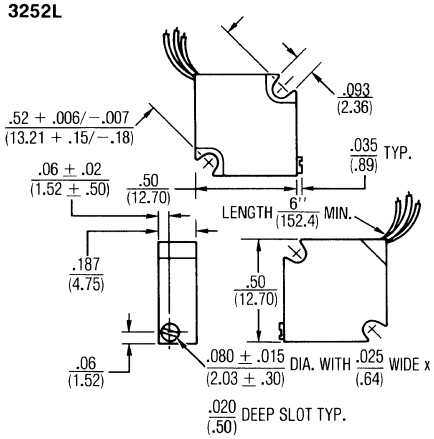
Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Flexible leads (7 strands of 38 AWG)
Weight.....0.065 oz.

Machine Screw Mounting

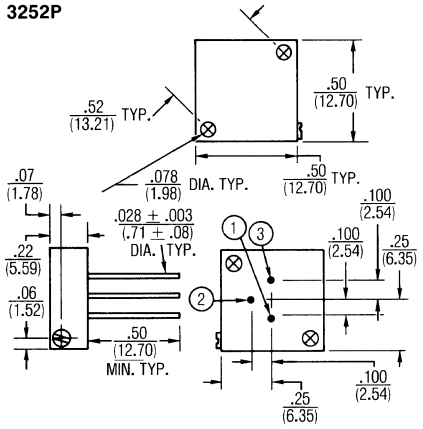
Torque.....12 oz-in. max.
Marking.....Manufacturer's
trademark, resistance code,
wiring diagram, date
code, manufacturer's
model number and style

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.

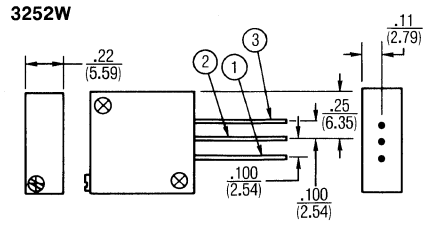
3252L



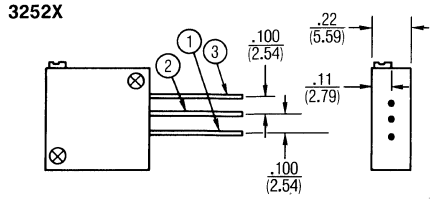
3252P

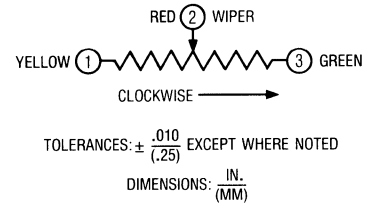


3252W



3252X





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
500,000	504
1,000,000	105
2,000,000	205

Special resistances available from 10 ohms to 2 megohms on commercial model.

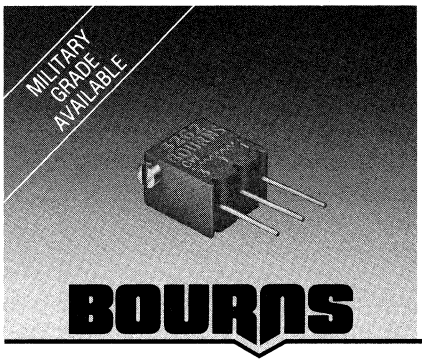
See Mil-Spec Section for qualified resistance values, terminal styles, characteristics and failure rates where applicable.

HOW TO ORDER

3252 L - 1 - 103 M

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
-73 = 12" Leads
Resistance Code
Optional Suffix Letter
M = Panel Mount (Factory Installed)

Consult factory for other available options.



1/4" SQUARE / MULTITURN / CERMET INDUSTRIAL / SEALED

■ Model 3262 is listed on the DESC QPL for style RJ26 per MIL-R-22097 and RJR26 per High-Rel MIL-R-39035

Model 3262

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 1,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.02%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000.....250 vac
Effective Travel.....12 turns nom.

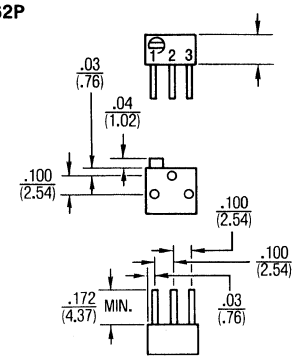
Environmental Characteristics

Power Rating (300 volts max.)
85°C.....0.25 watt
150°C.....0 watt
Temperature Range
.....-65°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test..... 85°C Fluorinert*
Humidity
.....MIL-STD-202 Method 103
96 hours
(2% ΔTR, 100 Megohms IR)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
....1,000 hours 0.25 watt @ 85°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(2% ΔTR, 3% CRV)

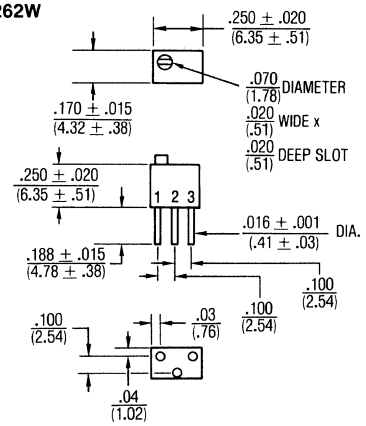
Physical Characteristics

Torque.....3.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.015 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

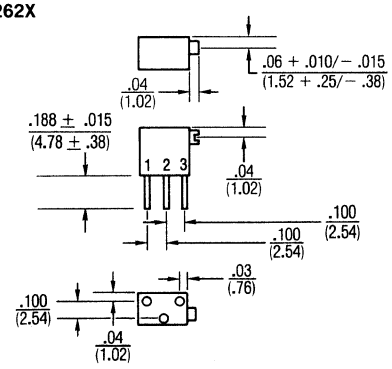
3262P

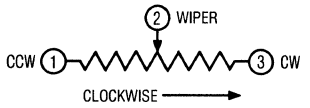


3262W



3262X





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105

Special resistances available from 10 ohms to 2 megohms on commercial model.

See Mil-Spec Section for qualified resistance values, terminal styles, characteristics and failure rates where applicable.

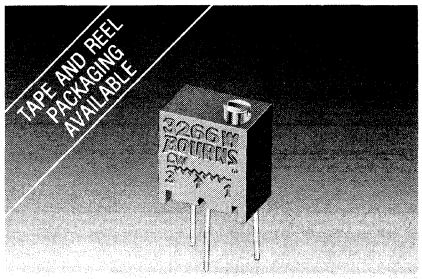
HOW TO ORDER

3262 P - 1 - 103

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
-99 = 5/8" Long Pins
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1/4" SQUARE/MULTITURN/CERMET INDUSTRIAL/SEALED

- Plasma etched body seal
- Standoffs allow thorough PC board washing
- Double chevron shaft seal
- Tape and reel packaging available (see page 46 for details)

Model 3266

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 1,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.02%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000.....250 vac
Effective Travel.....12 turns nom.

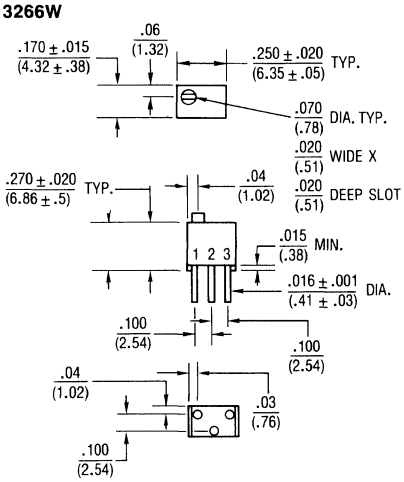
Environmental Characteristics

Power Rating (300 volts max.)
70°C.....0.25 watt
125°C.....0 watt
Temperature Range
.....–55°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85°C Fluorinert*
Humidity
.....MIL-STD-202 Method 103
96 hours
(2% ΔTR, 10 Megohms IR)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
....1,000 hours 0.25 watt @ 70°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(4% ΔTR, 3% CRV)

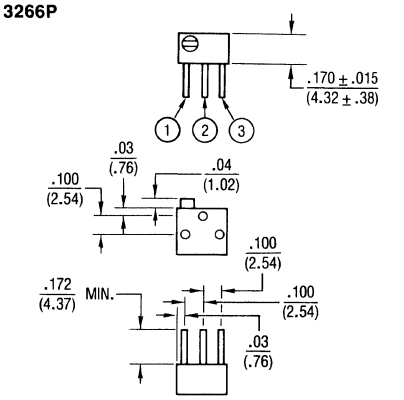
Physical Characteristics

Torque.....3.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.015 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

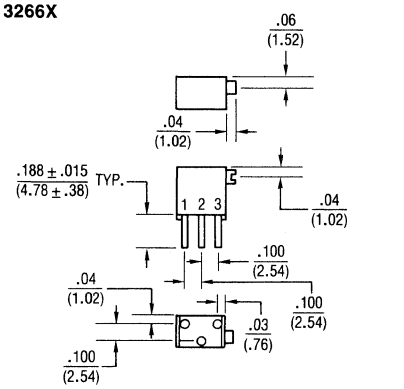
3266W

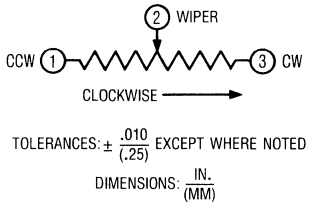


3266P



3266X





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105

Special resistances available from 10 ohms to 1,000,000 ohms.

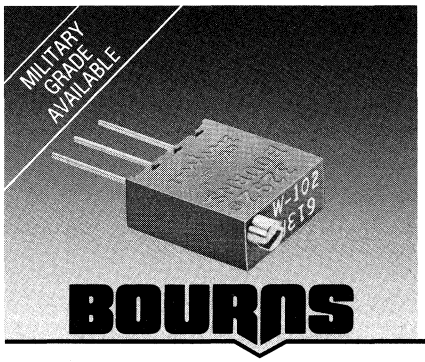
HOW TO ORDER

3266 W - 1 - 103

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



3/8" SQUARE / MULTITURN / CERMET INDUSTRIAL / SEALED

- Model 3292 is listed on the DESC QPL for style RJ24 per MIL-R-22097 and RJR24 per High-Rel MIL-R-39035
- Double chevron shaft seal
- Optional panel mount available (see page 50 for details)

Model 3292

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 1,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....1,000 vac
80,000.....400 vac
Effective Travel.....22 turns nom.

Environmental Characteristics

Power Rating (400 volts max.)
85°C.....0.5 watt
150°C.....0 watt
Temperature Range
.....–65°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85°C Fluorinert*
(pin styles only)
Humidity..MIL-STD-202 Method 103
96 hours
(1% ΔTR, 100 Megohms IR)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 85°C
(2% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(2% ΔTR, 3% CRV)

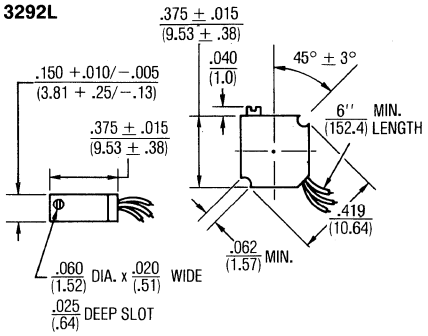
Physical Characteristics

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Flexible leads (7 strands of 38 AWG)
Weight.....0.025 oz.

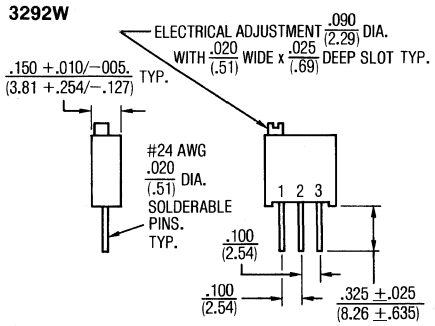
Machine Screw Mounting

Torque.....12 oz-in. max.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

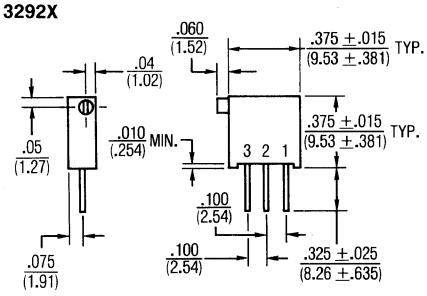
3292L



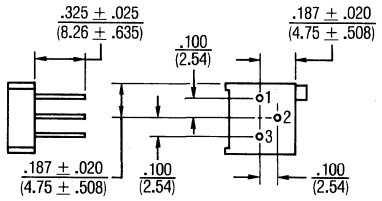
3292W

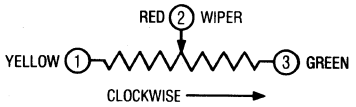


3292X



3292P





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
500,000	504
750,000	754
1,000,000	105

Special resistances available from 10 ohms to 1,000,000 ohms on commercial model.

See Mil-Spec Section for qualified resistance values, terminal styles and failure rates where applicable.

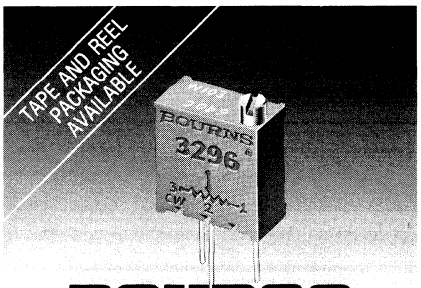
HOW TO ORDER

3292 L - 1 - 103 M

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
-73 = 12" L. Leads
Resistance Code
Optional Suffix Letter
M = Panel Mount (Factory Installed)

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



3/8" SQUARE/MULTITURN/CERMET INDUSTRIAL/SEALED

- 5 terminal styles
- Thin body profile
- Tape and reel packaging available (see page 46 for details)

BOURNS

Model 3296

Bourns® Trimming Potentiometer

Electrical Characteristics

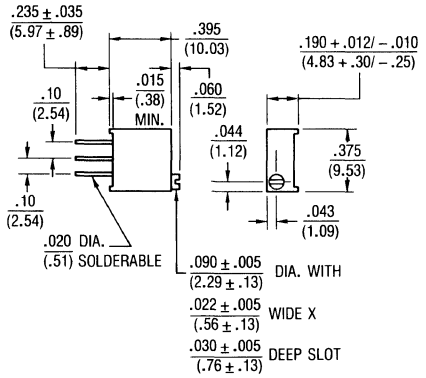
Standard Resistance Range
.....10 to 5,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
70,000.....350 vac
Effective Travel.....25 turns nom.

Environmental Characteristics

Power Rating (300 volts max.)
70°C.....0.5 watt
125°C.....0 watt
Temperature Range
.....–55°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test..... 85° C Fluorinert*
Humidity
.....MIL-STD-202 Method 103
96 hours
(2% ΔTR, 10 Megohms IR)
Vibration...20G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 70°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(4% ΔTR, 3% CRV)

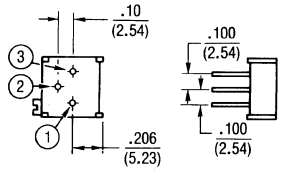
Physical Characteristics

Torque.....3.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.03 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

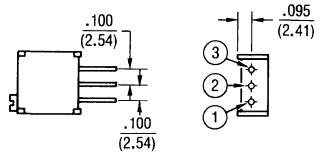


COMMON DIMENSIONS

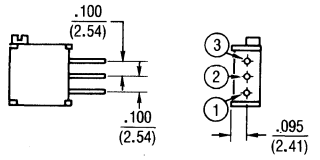
3296P



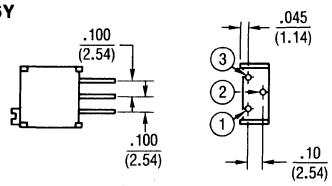
3296W



3296X



3296Y



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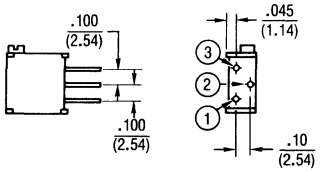
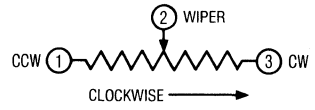




TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205
5,000,000	505

Special resistances available from 10 ohms to 5,000,000 ohms.

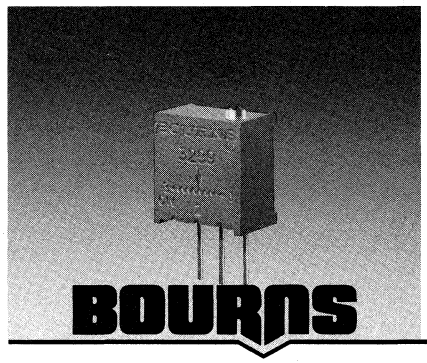
HOW TO ORDER

3296 W - 1 - 103

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



3/8" SQUARE / MULTITURN / CERMET INDUSTRIAL / SEALED

- Low noise, high performance
- High power rating
- Five popular terminal styles

Model 3299

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 5,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
70,000.....350 vac
Effective Travel.....25 turns nom.

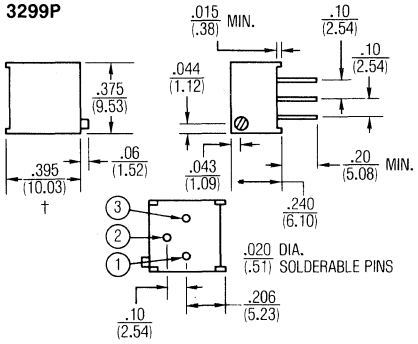
Environmental Characteristics

Power Rating (300 volts max.)
70°C.....0.5 watt
125°C.....0 watt
Temperature Range
.....-55°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test..... 85° C Fluorinert*
Humidity..MIL-STD-202 Method 103
96 hours
(2% ΔTR, 10 Megohms IR)
Vibration...20G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 70°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(4% ΔTR, 3% CRV)

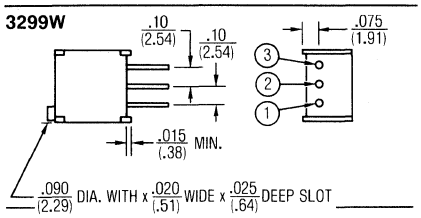
Physical Characteristics

Torque.....3.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.035 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

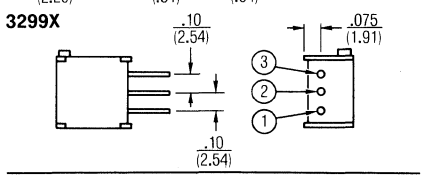
3299P



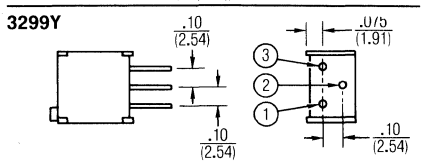
3299W



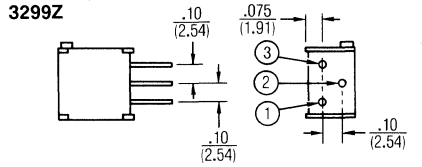
3299X

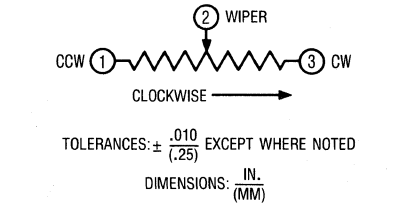


3299Y



3299Z





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205
5,000,000	505

Special resistances available from 10 ohms to 5,000,000 ohms.

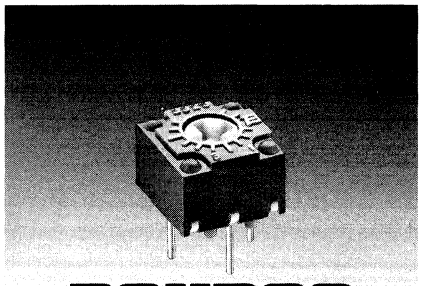
HOW TO ORDER

3299 W - 1 - 103

Model
Style
Standard or Modified
Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1/4" SQUARE / SINGLE-TURN / CERMET INDUSTRIAL / SEALED

- Miniature industrial single-turn
- 5 standard terminal styles
- Vertical and horizontal adjust types available
- Rotor designed for automatic machine adjust interface
- For tape and reel, see Model 3362

Model 3323

BOURNS® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....20 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance.... ±20% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.05%
Resistance..... ±0.15%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000.....350 vac
Adjustment Angle.....240° nom.

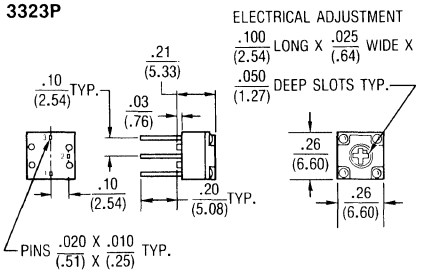
Environmental Characteristics

Power Rating (300 volts max.)
70°C.....0.5 watt
125°C.....0 watt
Temperature Range
.....-55°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test..... 85° C Fluorinert*
Humidity..MIL-STD-202 Method 103
96 hours
(2% ΔTR, 10 Megohms IR)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 70°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(4% ΔTR, 3% CRV)

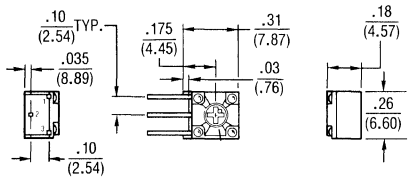
Physical Characteristics

Mechanical Angle.....270° nom.
Torque.....5.0 oz-in. max.
Stop Strength.....10.0 oz-in. min.
Terminals.....Solderable pins
Weight.....0.02 oz.
Flammability UL94V-0
Marking..... Manufacturer's trademark, resistance code, terminal numbers, date code on packaging, manufacturer's model number and style

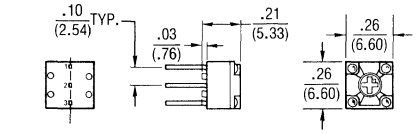
3323P



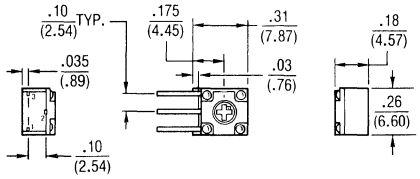
3323S



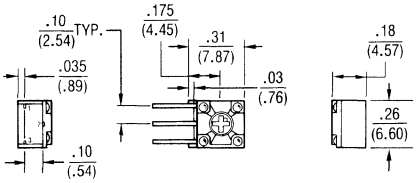
3323U

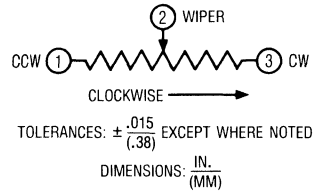


3323W



3323X





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205

Special resistances available from 20 ohms to 2,000,000 ohms.

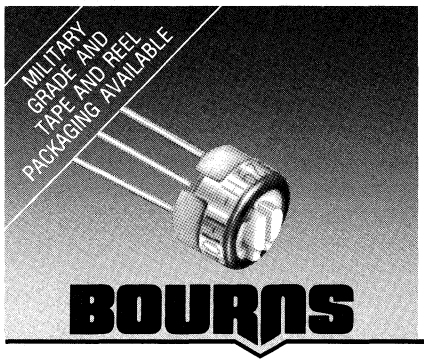
HOW TO ORDER

3323 W - 1 - 103

Model
Style
Standard or Modified
Product Indicator
-1 = Standard Product
-10 = 10% Tolerance
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1/4" ROUND / SINGLE-TURN / CERMET INDUSTRIAL / SEALED

- Model 3329 is listed on the DESC QPL for style RJ50 per MIL-R-22097 and RJR50 per High-Rel MIL-R-39035
- 5 standard terminal styles
- Vertical and horizontal adjust types available
- Tape and reel packaging available (see page 45 for details)

Model 3329

Ⓑ® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 1,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.05%
Resistance..... ±0.15%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000.....250 vac
Adjustment Angle.....240° nom.

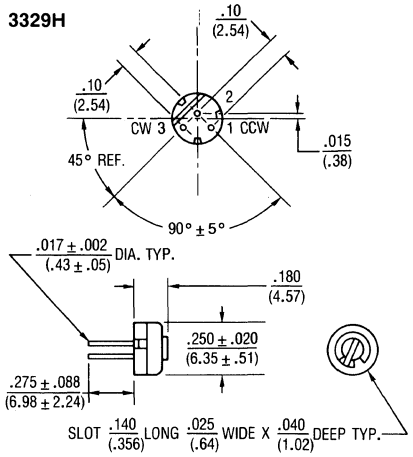
Environmental Characteristics

Power Rating (300 volts max.)
85°C.....0.5 watt
150°C.....0 watt
Temperature Range
.....–55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85°C Fluorinert*
Humidity (Commercial Model)
.....MIL-STD-202 Method 103
96 hours
(3% ΔTR, 10 Megohms IR)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 85°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(4% ΔTR, 4% CRV)

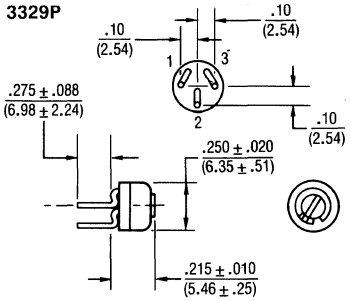
Physical Characteristics

Mechanical Angle.....260° nom.
Torque.....5.0 oz-in. max.
Stop Strength.....5.0 oz-in. min.
Terminals.....Solderable pins
Weight.....0.02 oz.
Marking.....Manufacturer's trademark, resistance code, date code, manufacturer's model number and style

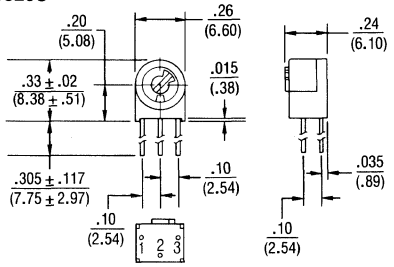
3329H



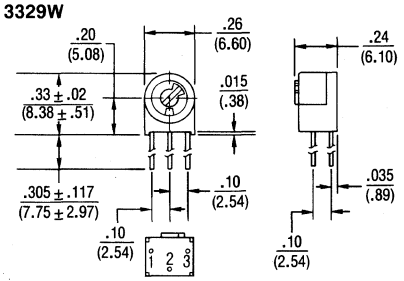
3329P



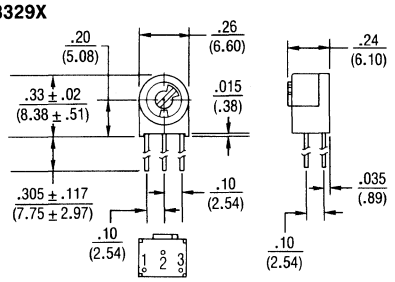
3329S

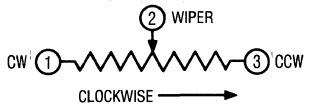


3329W



3329X





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105

Special resistances available from 10 ohms to 1,000,000 ohms on commercial model.
See Mil-Spec Section for qualified resistance values, terminal styles, characteristics and failure rates where applicable.

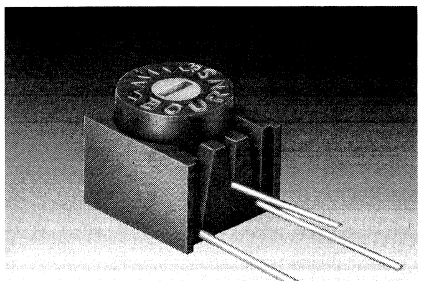
HOW TO ORDER

3329 P - 1 - 103

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
-99 = 5/8" L. Leads
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



5/16" ROUND/FOUR-TURN/CERMET INDUSTRIAL/SEALED

- Unique planetary drive offers precise wiper setting of a multiturn in a single-turn package size
- Meets requirements of MIL-R-22097 performance
- Top and side adjust styles

BOURNS

Model 3339

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 1,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.03%
Resistance..... ±0.1%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
100 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000.....250 vac

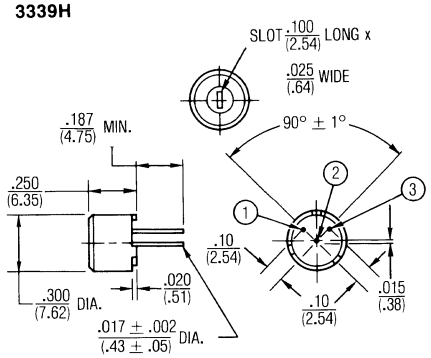
Environmental Characteristics

Power Rating (300 volts max.)
85°C.....0.5 watt
150°C.....0 watt
Temperature Range
.....–55°C to +150°C
Temperature Coefficient
..... ±100ppm/°C max.
Seal Test..... 85° C Fluorinert*
Humidity..MIL-STD-202 Method 103
96 hours
(3% ΔTR, 10 Megohms IR)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 85°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(3% ΔTR, 3% CRV)

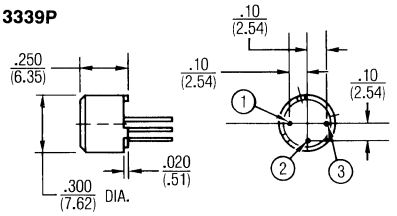
Physical Characteristics

Mechanical Adjustment
.....4 turns nom.
Torque.....3 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.02 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

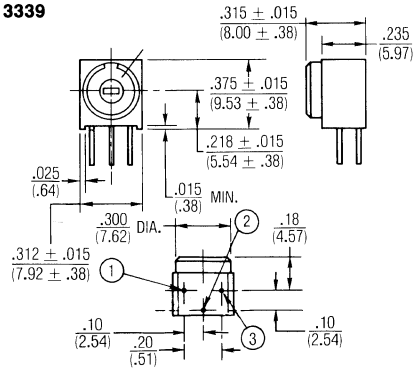
3339H



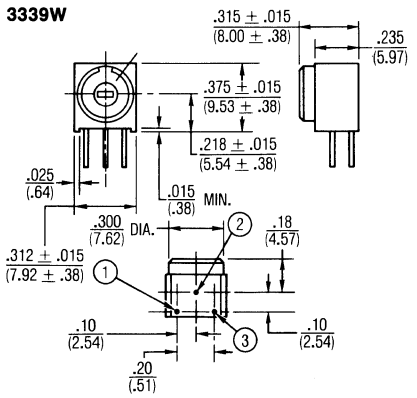
3339P

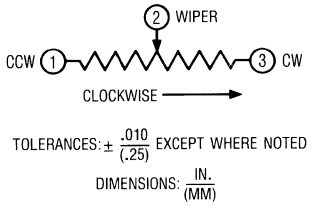


3339



3339W





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
500,000	504
1,000,000	105

Special resistances available from 10 ohms to 1,000,000 ohms on commercial model.

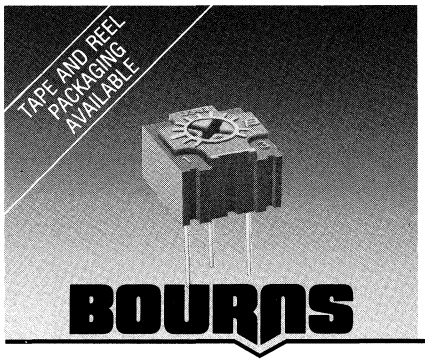
HOW TO ORDER

3339 H - 1 - 103

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-11 = 5% Tolerance
-99 = 5/8" L. Leads
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



1/4" SQUARE / SINGLE-TURN / CERMET INDUSTRIAL / SEALED

- Miniature package
- Rotor designed for automatic machine adjust interface
- Multi-wire wiper to minimize CRV
- Withstands harsh environments and immersion cleaning processes
- Available on tape and reel packaging (see page 47 for details)

Model 3362

3® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....20 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance.... ±20% std.
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.05%
Resistance..... ±0.15%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000 Feet.....350 vac
Adjustment Angle.....240° nom.

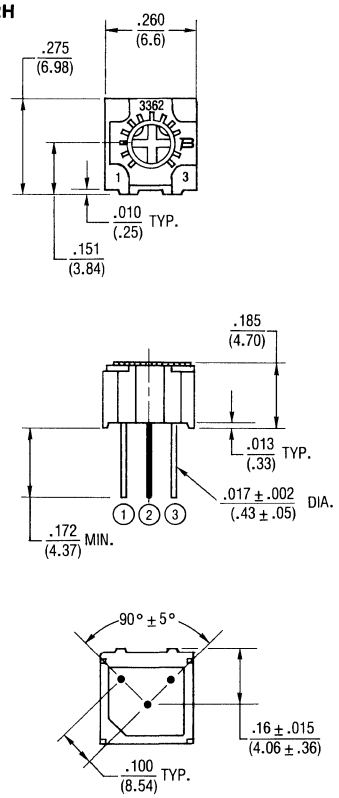
Environmental Characteristics

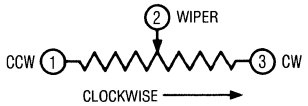
Power Rating (300 volts max.)
70°C.....0.50 watt
125°C.....0 watt
Temperature Range
.....–55°C to +125°C
Temperature Coefficient
..... ±100ppm/°C max.
Seal Test.....85°C Fluorinert*
Humidity..MIL-STD-202 Method 103
96 hours
(2% ΔTR, 10 Megohms IR)
Vibration.....30G
(1% ΔTR, 1% ΔVR)
Shock.....100G
(1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 70°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(4% ΔTR, 3% CRV)

Physical Characteristics

Mechanical Angle.....270° nom.
Torque.....3.0 oz-in. max.
Stop Strength.....7.0 oz-in. min.
Terminals.....Solderable pins
Weight.....0.02 oz.
Marking.....Manufacturer's trademark, resistance code, terminal numbers, manufacturer' model number and style. Date code on packaging.

3362H





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED
DIMENSIONS: IN. (MM)

Note: Tape and reel packaging available for "M" and "U" pin styles only. See page 47 for details.

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205

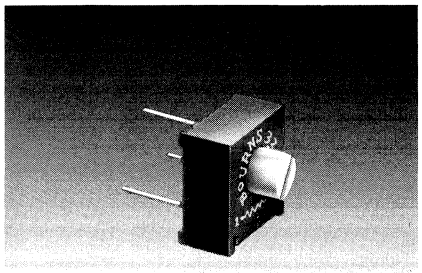
HOW TO ORDER

3362 H - 1 - 502

Model
Style
Standard or Modified
Product Indicator
-1 = Standard Product
-10 = 10% Tolerance
Resistance Code

Consult factory for other available options.

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



3/8'' SQUARE / SINGLE-TURN / CERMET INDUSTRIAL / SEALED HIGH VOLTAGE FOCUS CONTROL

- Designed for electrostatic focus control application on monochrome or color CRTs
- Rated at 1 KV D.C. input voltage
- High stability, low tempco cermet element
- Available with optional red knob

BOURNS

Model 3386-HV1

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Values ..... 2.5 and 5 megohms
Resistance Tolerance .... +20%/−0
Contact Resistance Variation ..... 1% max.
Adjustability
Voltage Divider ..... ±0.05%
Rheostat ..... ±0.15%
Insulation Resistance @1 KV D.C. ..... 1,000 megohms min.
Dielectric Strength (5,000 foot altitude) ..... 1.5 KV A.C. min.
Adjustment Angle ..... 280° nom.

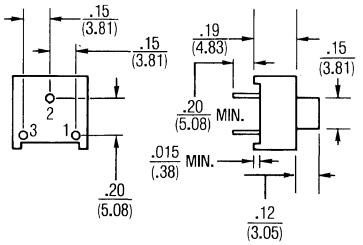
Environmental Characteristics

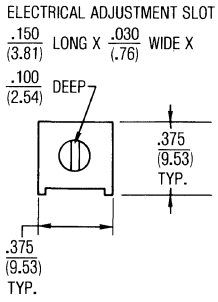
Power Rating (1 KV D.C. max. input)
85°C ..... 0.5 watt
125°C ..... 0 watt
Temperature Range ..... −55°C to +125°C
Temperature Coefficient ..... ±150ppm/°C max.
Humidity . . MIL-STD-202 Method 103
240 hours (100 megohms min. IR)
Load Life .... 1,000 hours 1 KV D.C.
60°C, 90% R.H. (3% max. ΔTR)
Voltage Breakdown (5,000 foot altitude) ..... 1.5 KV min.
Seal Test ..... 85° C Fluorinert*
Vibration 30G
Shock 100G
Rotational Life ..... 200 cycles min.

Physical Characteristics

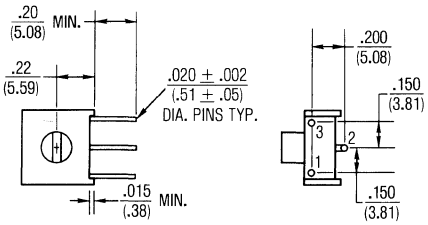
Mechanical Angle ..... 310° nom.
Torque ..... 5.0 oz-in. max.
Stop Strength ..... 15 oz-in. min.
Terminals ..... Solderable PC pins
Weight ..... Approximately 0.04 oz.
Marking ..... Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

3386N





3386U



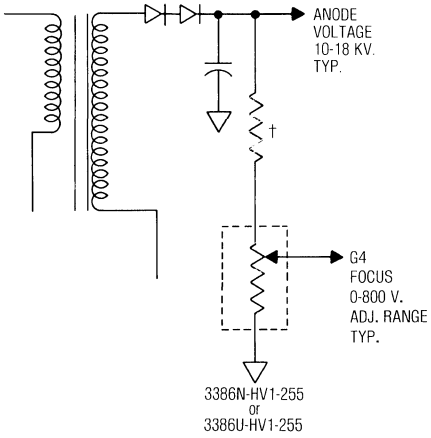
HOW TO ORDER

3386 N - HV1 - 505 T

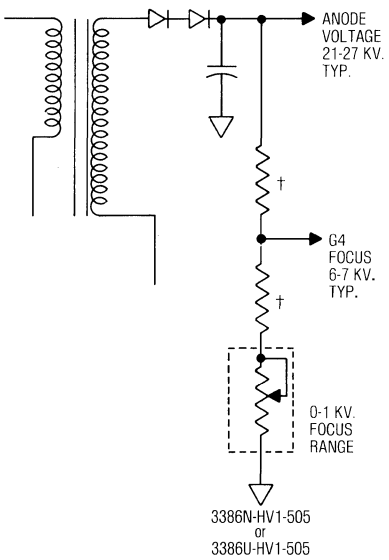
Model
Style
High Voltage Construction Indicator
Resistance Code
-255 and -505 Available
Optional Suffix Letter
T = Red Knob

TYPICAL FOCUS CONTROL CIRCUITS

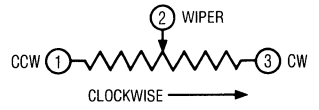
MONOCHROME



COLOR

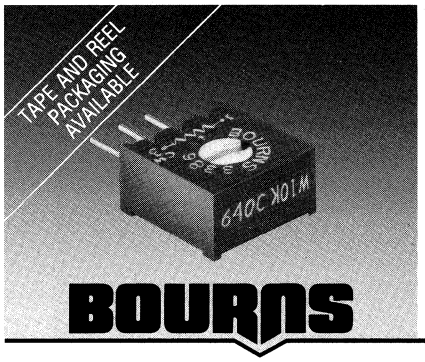


† VALUES DETERMINED BY CIRCUIT VOLTAGES



TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED
DIMENSIONS: IN. (MM)

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



3/8 INCH SQUARE/SINGLE-TURN/ CERMET INDUSTRIAL/SEALED

- Available on tape and reel (see page 45 for details)
- Available with a knob for finger adjust
- 12 standard terminal styles
- Top and side adjust types
- High voltage type HV1 available (see page 35 for details)

Model 3386

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance.... ±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1.0% or 1 ohm
(whichever is greater)
Adjustability
Voltage ..... ±0.05%
Resistance..... ±0.15%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
70,000 Feet.....350 vac
Adjustment Angle.....280° nom.

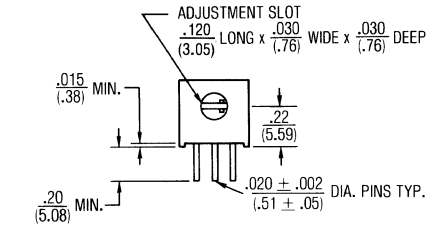
Environmental Characteristics

Power Rating (300 Volts Max.)
70°C.....0.5 watt
125°C.....0 watt
Temperature Range
.....–55°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85°C Fluorinert*
Humidity.....MIL-STD-202
Method 103 (96 hours)
(2% ΔTR, IR 10 megohms min.)
Vibration.....30G
(1% ΔTR, 1% ΔVR)
Shock.....100G
(1% ΔTR, 1% ΔVR)
Load Life.....1,000 hours
0.5 watt @70°C
(3% ΔTR, 1% CRV)
Mechanical Life.....200 cycles
(4% ΔTR, 1% CRV)

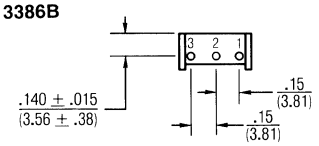
Physical Characteristics

Mechanical Angle.....310° nom.
Torque.....5.0 oz-in. max.
Stop Strength.....15.0 oz-in. min.
Terminals.....Solderable pins
Weight.....0.03 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

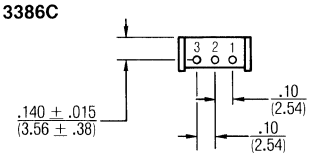
SIDE ADJUST



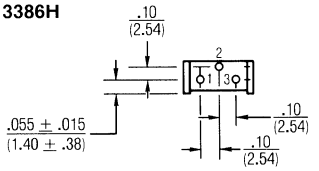
3386B



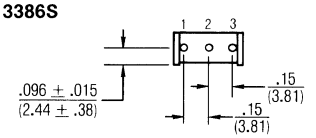
3386C



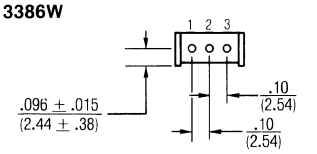
3386H



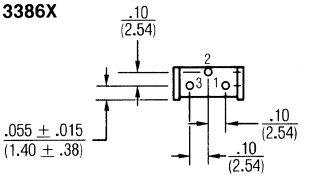
3386S



3386W



3386X



HOW TO ORDER

3386 P - 1 - 103 - T

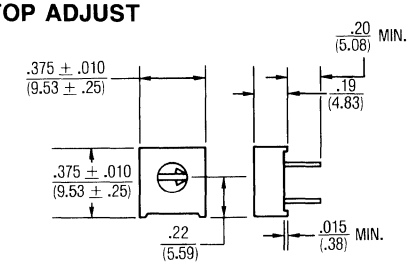
- Model: 3386
- Style: P
- Standard or Modified Product Indicator: 1
  - -1 = Standard Product
  - -11 = 5% Tolerance
  - -99 = 5/8" L. Pins
- Resistance Code: 103
- Optional Suffix Letter: T = Knob

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.

Model 3386

Bourns® Trimming Potentiometer

TOP ADJUST



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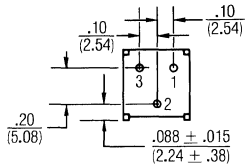
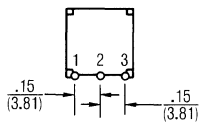
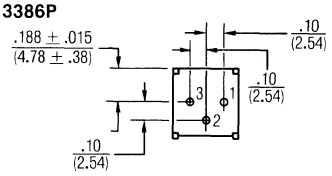


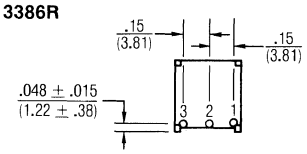
3386M



3386P



3386R



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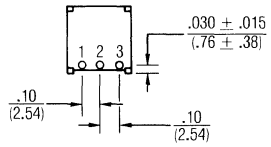
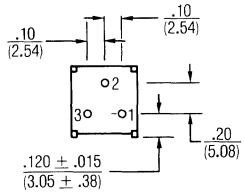
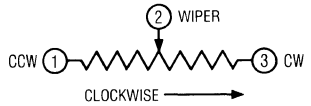


3386Y



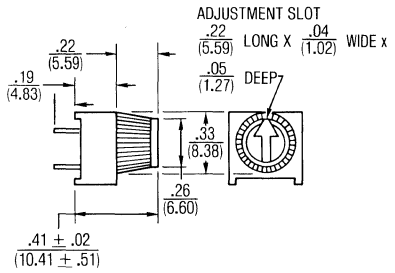
*PREFERRED PIN STYLES FOR NEW DESIGNS



TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

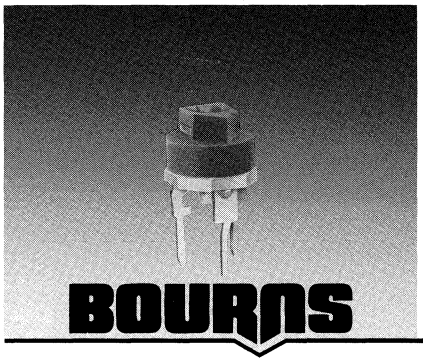
The Model 3386 terminal styles P, X and F are available with a knob for finger adjustment.



STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205

Special resistances available from 10 to 2,000,000 ohms.



6MM ROUND/SINGLE-TURN/CERMET INDUSTRIAL/OPEN FRAME

- Automatic machine adjustable
- Accessible from front and rear, or top and bottom
- Dust resistant/splash resistant cover
- PC board stand-offs

Model 3306

Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....100 to 1,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±25% std.
Absolute Minimum Resistance
.....2% max. (≤2K = 30 ohms)
Contact Resistance Variation
.....3% max.
Resolution.....Infinite
Adjustment Angle.....160° nom.

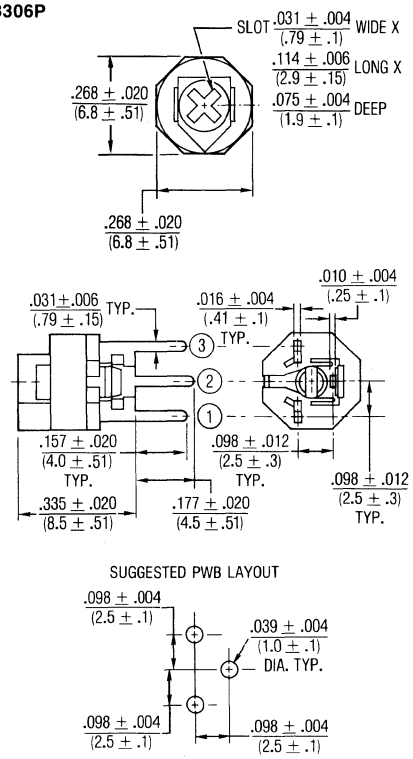
Environmental Characteristics

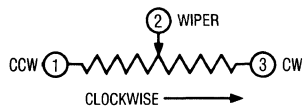
Power Rating (100 volts max.)
70°C.....0.3 watt
Temperature Range
.....-30°C to +70°C
Temperature Coefficient
.....±200ppm/°C max.
Load Life
.....1,000 hours 0.3 watt @ 70°C
(5% ΔTR)

Physical Characteristics

Torque (Operating)
.....3.47 oz-in. max.
Stop Strength
.....4.0 oz-in. min.
Terminals.....Solderable pins
Marking.....Manufacturer's trademark, resistance code, manufacturer's model number and style

3306P





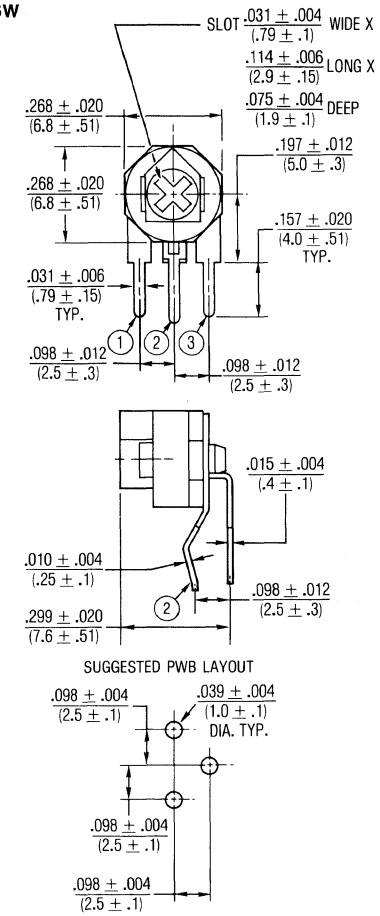
TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105

3306W

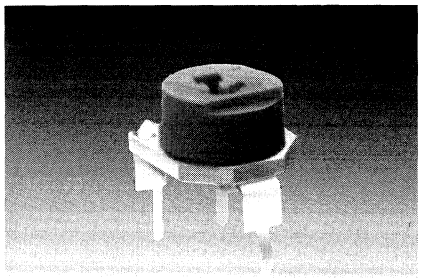


HOW TO ORDER

3306 W - 1 - 103

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
Resistance Code

Product modifications not available on this model.



9MM ROUND / SINGLE-TURN / CERMET INDUSTRIAL / OPEN FRAME

- Automatic machine adjustable
- Accessible from front and rear, or top and bottom
- Dust resistant/splash resistant cover
- PC board stand-offs

BOURNS

Model 3309

3® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....100 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±25% std.
Absolute Minimum Resistance
.....2% max. (≤2K = 30 ohms)
Contact Resistance Variation
.....3% max.
Resolution.....Infinite
Adjustment Angle.....220° nom.

Environmental Characteristics

Power Rating (350 volts max.)
70°C.....0.5 watt
Temperature Range
.....-30°C to +70°C
Temperature Coefficient
.....±200ppm/°C 500K
.....±300ppm/°C 500K
Load Life
.....1,000 hours 0.5 watt @ 70°C
(5% ΔTR)

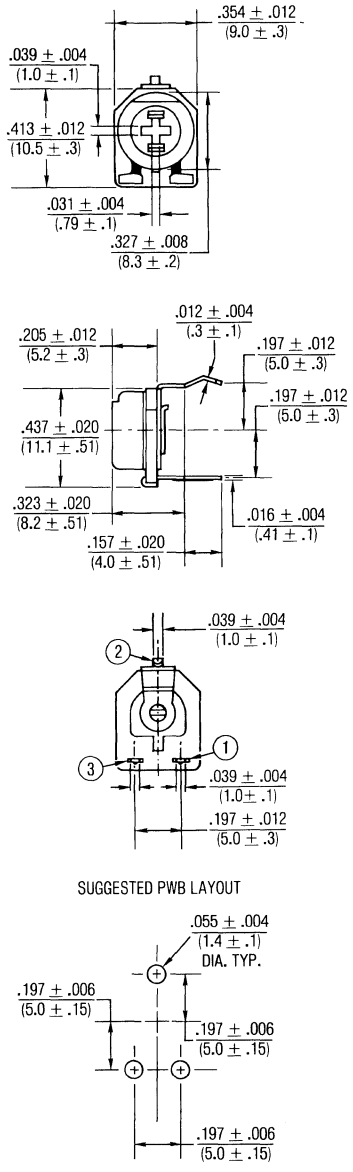
Physical Characteristics

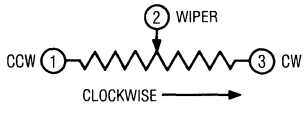
Torque (Operating)
.....4.8 oz-in. max.
Stop Strength
.....11.1 oz-in. min.
Terminals.....Solderable pins
Marking.....Manufacturer's trademark, resistance code, manufacturer's model number and style

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205

3309P

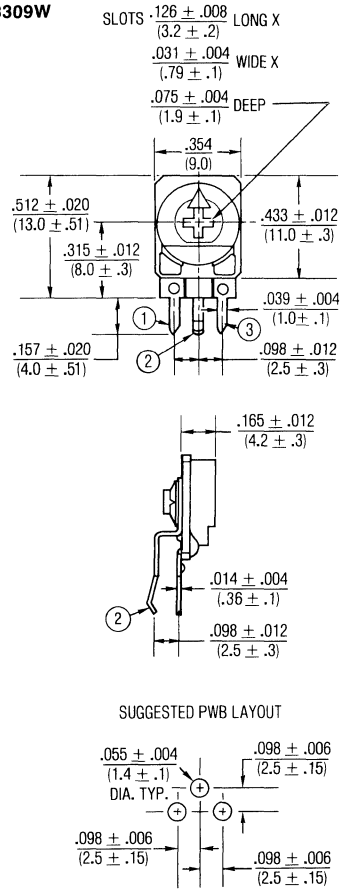




TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

3309W



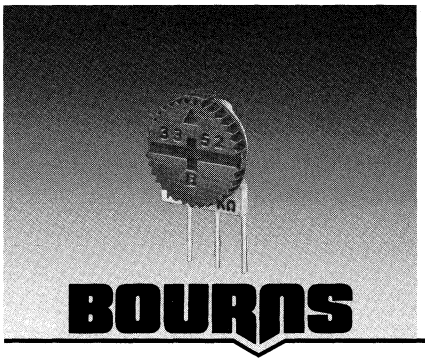
HOW TO ORDER

3309 W - 1 - 103

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
Resistance Code

Product modifications not available on this model.

Specifications are subject to change without notice.



3/8" ROUND / SINGLE-TURN / CERMET INDUSTRIAL / OPEN-FRAME

- Stable cermet element offers infinite resolution
- Very low profile
- Seven standard pin styles
- Thumb and screwdriver rotor standard adjustment

Model 3352

Trimming Potentiometer

Electrical Characteristics

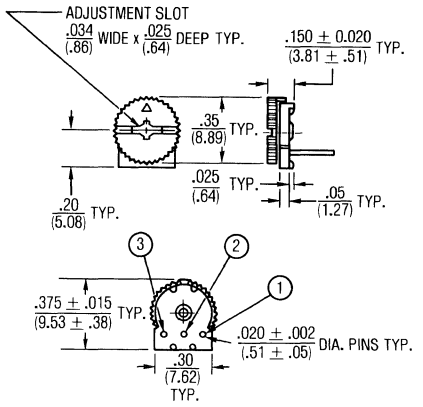
Standard Resistance Range
.....10 to 5,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±20% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....1.0% or 1 ohm
(whichever is greater)
Adjustability.....±0.1%
Resistance.....±0.25%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
10 megohms min.
Dielectric Strength
Sea Level.....500 vac
Adjustment Angle.....205° nom.

Environmental Characteristics

Power Rating (250 volts max.)
85°C.....0.5 watt
125°C.....0 watt
Temperature Range
.....−55°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
(1K and up)
Humidity..MIL-STD-202 Method 103
96 hours
(2% ΔTR, 10 Megohms IR)
Vibration.....30G
(2% ΔTR, 2% ΔVR)
Shock.....100G
(2% ΔTR, 2% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 85°C
(3% ΔTR)
Mechanical Life.....200 cycles
(10% ΔTR)

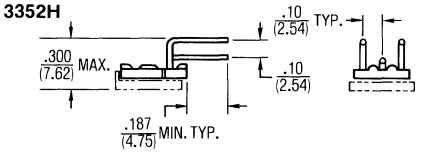
Physical Characteristics

Mechanical Angle.....250° nom.
Torque.....3.0 oz-in. max.
Stop Strength.....8 oz-in. min.
Terminals.....Solderable pins
Weight.....0.01 oz.
Flammability.....UL94V-1
Marking.....Manufacturer's trademark, resistance value, manufacturer's model number and style, and date code on packaging

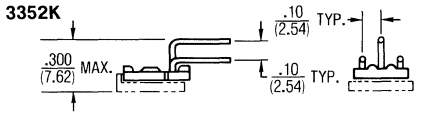


SIDE ADJUST

3352H



3352K



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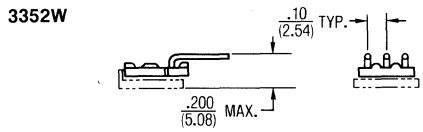
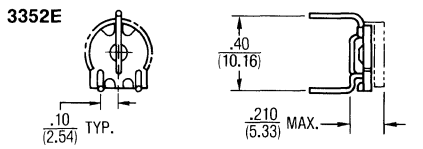
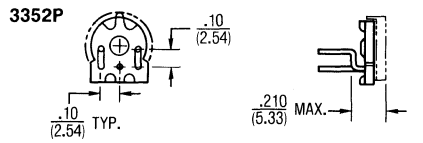


TOP ADJUST

3352E



3352P



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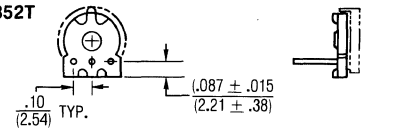
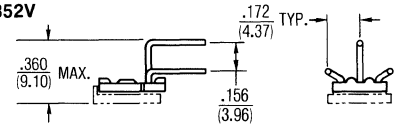
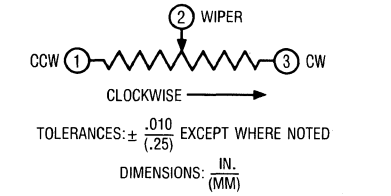


3352V





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105
2,000,000	205
5,000,000	505

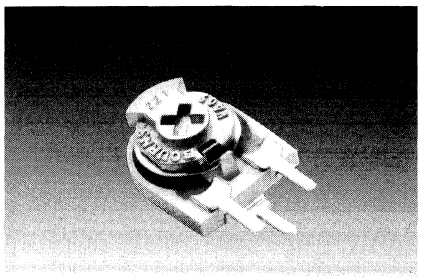
Special resistances available from 10 ohms to 5,000,000 ohms.

HOW TO ORDER

3352 W - 1 - 103

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
-10 = 10% Tolerance
-11 = 5% Tolerance
Resistance Code

Consult factory for other available options.
Specifications are subject to change without notice.



3/8'' ROUND/SINGLE-TURN/CERMET INDUSTRIAL/OPEN-FRAME

- Adjustable from front and rear, or top and bottom
- Carbon tip wiper for long life
- Durable metal construction

BOURNS

Model 3359/VA05*

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 to 2,000,000 ohms
(see standard resistance table)
Resistance Tolerance.... ±20% std.
Absolute Minimum Resistance
.....1.0% or 2 ohms
(whichever is greater)
Contact Resistance Variation
.....2% or 3 ohms
(whichever is greater)
Resolution.....Infinite
Adjustability
Voltage ..... ±0.1%
Resistance..... ±0.25%

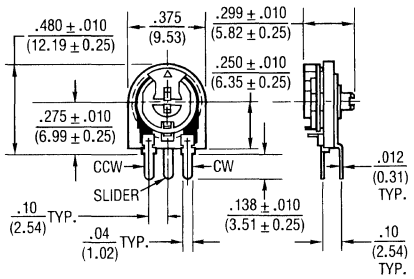
Environmental Characteristics

Power Rating (250 volts max.)
70°C.....0.5 watt
125°C.....0 watt
Temperature Range
.....–65°C to +125°C
Temperature Coefficient
.....±100ppm/°C max.
Humidity..MIL-STD-202 Method 103
504 hours (1% ΔTR)
Vibration.....30G
(2% ΔTR, 2% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 70°C
(2% ΔTR)
Mechanical Life.....500 cycles
(10% ΔTR)

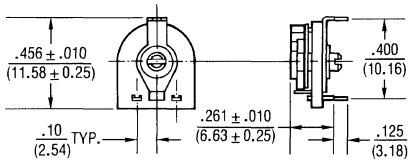
Physical Characteristics

Mechanical Angle.....270° nom.
Torque.....6.0 oz-in. max.
1.5 oz-in. min.
Stop Strength.....12 oz-in. min.
Terminals.....Solderable pins
Weight.....0.04 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

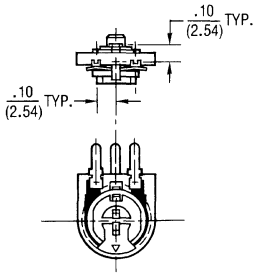
3359

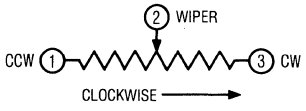


3359P/VA05H*



3359W/VA05V*





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
50,000	503
100,000	104
200,000	204
500,000	504
1,000,000	105
2,000,000	205

HOW TO ORDER/VA05H*

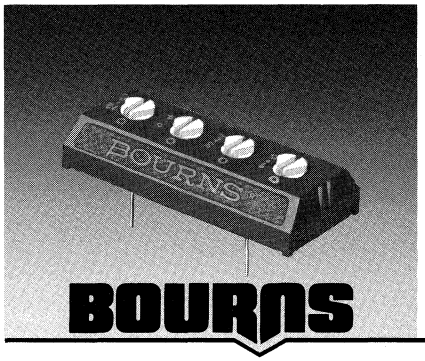
3359 P - 1 - 103

Model
Style
Standard or Modified
Product Indicator
-1 = Standard Product
-10 = 10% Tolerance
Resistance Code

Consult factory for other available options.

*Europe

Specifications are subject to change without notice.



1.34 INCH RECTANGULAR/SEALED PACKAGE

- Incorporates both the switching and attenuator functions in a single integrated sealed package
- Reduces component count, assembly costs, and PC board space
- Unbalanced ("T" and "π" pad) and balanced ("O" pad) are available

Model 3100

Bourns® Switchable Attenuator

Electrical Characteristics

Characteristic Impedance . . . . . 75 ohms ±5% or 600 ohms ±2%
Attenuation Tolerance . . . . . (per Table 2A)
Attenuation Temperature Stability . . . . . (per Table 2B)
Insertion Loss
600 ohms . . . . . 0.02 dB max.
75 ohms . . . . . 0.18 dB max.
Power Rating . . . . . +15 dBm continuous @ 70°C
Insulation Resistance (MIL-STD-202E, Method 302, Condition B) . . . . . 1,000 megohms min.

Table 1

ATTENUATOR CONFIGURATION & IMPEDANCE	ATTENUATOR RANGE/STEPS (dB)						
	1.5 / 0.1	3.75 / 0.25	7.5 / .5	15 / 1.0	24 / 1.6	30 / 2.0	37.5 / 2.5
T PAD 600 OHM	S	X	X	S	S	X	X
0 PAD 600 OHM	S	N	N	S	X	X	N
T PAD 75 OHM	X	X	X	S	X	N	X
π PAD 75 OHM	N	N	X	X	X	X	X

S = Standard N = Non-Standard X = Not Available

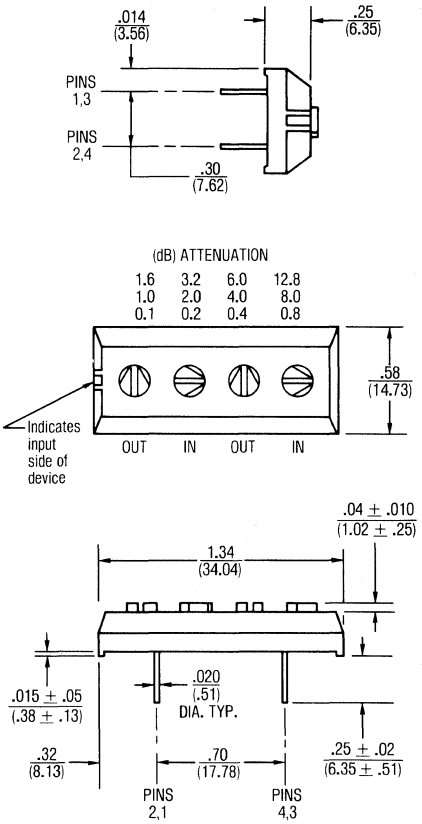
Physical Characteristics

Solderability (MIL-STD-202E, Method 208, 260°C) . . . . . 80% coverage
Resistance to Soldering Heat (MIL-STD-202E, Method 210A, Cond. C, Procedure 2 . . . . . (per Table 2C)
Switch Stop Strength . . . . . 20 oz-in. min.
Seal (Water Immersion at 80°C) . . . . . Three (3) bubbles maximum per rotor and 12 bubbles total
Switch Life (200 Cycles)
Insertion Loss . . . . . 75 ohms 0.2 dB max., 600 ohms 0.05 dB max.
Attenuation Shift . . . . . (per Table 2C)
Actuating Torque . . . . . 0.3 to 2.5 oz-in.

Environmental Characteristics

Dry Circuit Stability (1,000 hours @ 70°C)
Insertion Loss . . . . . 75 ohms 0.2 dB max., 600 ohms 0.05 dB max.
Attenuation Shift . . . . . (per Table 2C)
Humidity (MIL-STD-202, Method 103, 96 Hours)
Insertion Loss . . . . . 75 ohms 0.2 dB max., 600 ohms 0.05 dB max.
Attenuation Shift . . . . . (per Table 2C)
Shock (MIL-STD-202, Method 213)
Insertion Loss . . . . . 75 ohms 0.2 dB max., 600 ohms 0.05 dB max.
Attenuation Shift . . . . . (per Table 2C)
Contact Bounce . . . . . 0.1 ms max.
Vibration (MIL-STD-202E, Method 204)
Insertion Loss . . . . . 75 ohms 0.2 dB max., 600 ohms 0.05 dB max.
Attenuation Shift . . . . . (per Table 2C)
Contact Bounce . . . . . 0.1 milliseconds max.
Low Temperature Stability (24 hours @ −55°C)
Insertion Loss . . . . . 75 ohms 0.2 dB max., 600 ohms 0.05 dB max.
Attenuation Shift . . . . . (per Table 2C)
High Temperature Exposure (24 hours @ +125°C)
Insertion Loss . . . . . 75 ohms 0.2 dB max., 600 ohms 0.05 dB max.
Attenuation Shift . . . . . (per Table 2C)
Dielectric Strength (MIL-STD-202E, Method 105, 301)
Sea Level . . . . . 900 VRMS
70,000 Feet . . . . . 350 VRMS

DIMENSIONS



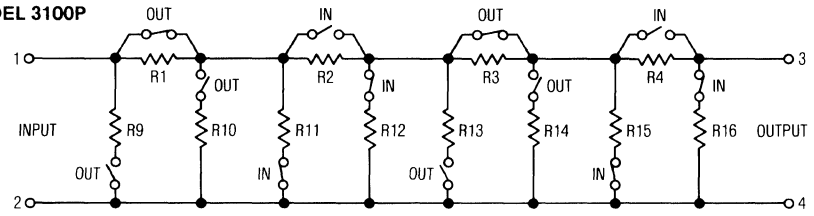
NOTES:
1. Switch positions shown correspond with schematic.
2. Dimensions are in inches (millimeters)
Tolerances:
.XX = ± 0.015 (0.38)
.XXX = ± 0.005 (0.13)
Angles = ± 3°

- Precious metal switch contacts assure low insertion loss, long-term operating stability and reliability
- Designed primarily for application in various types of transmission products used in the telephone and RF communications industry

Model 3100

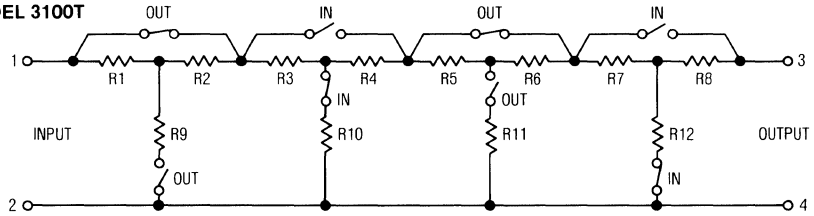
Bourns® Switchable Attenuator

MODEL 3100P



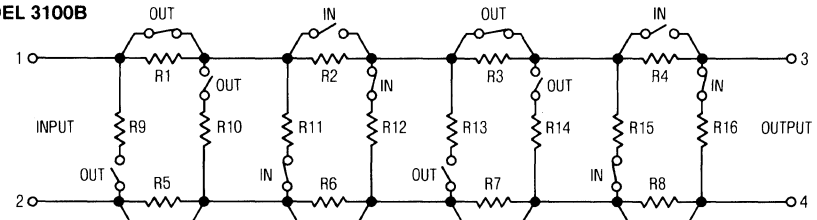
ATTENUATION = (dB)					
	0.25	0.5	1.0	2.0	3.75 dB MAX.

MODEL 3100T



ATTENUATION = (dB)					
	0.1	0.2	0.4	0.8	1.50 dB MAX.
	1.0	2.0	4.0	8.0	15.0 dB MAX.
	1.6	3.2	6.4	12.8	24.0 dB MAX.

MODEL 3100B



ATTENUATION = (dB)					
	0.1	0.2	0.4	0.8	1.50 dB MAX.
	1.0	2.0	4.0	8.0	15.0 dB MAX.

NOTE: IN/OUT INDICATE THE SWITCH CONDITION FOR THE ATTENUATOR PAD SECTION WHEN THE ROTOR IS AT THE NUMERICAL / "0" POSITION RESPECTIVELY.
0 = OUT Numerical = IN

TABLE 2
STOCKABLE P/N DATA

IMPEDANCE	NOMINAL ATTENUATION (dB)	A ATTENUATION TOLERANCE* (dB @ 25 C)	B ATTENUATION TEMPERATURE STABILITY (dB)	C ENVIRONMENTAL TEST STABILITY (dB)
600 OHM	0.1	±.010	±.005	±.015
	0.2	±.010	±.005	±.015
	0.4	±.015	±.005	±.015
	0.8	±.020	±.005	±.015
	1.0	±.020	±.010	±.025
	2.0	±.020	±.015	±.025
	4.0	±.030	±.025	±.035
	8.0	±.060	±.040	±.055
	1.6	±.020	±.015	±.025
	3.2	±.030	±.025	±.035
	6.4	±.060	±.040	±.055
	12.8	±.100	±.060	±.080
75 OHM	1.0	±.080	±.04	±.10
	2.0	±.090	±.05	±.10
	4.0	±.100	±.08	±.11
	8.0	±.130	±.09	±.12

*This is in addition to insertion loss.

Specifications are subject to change without notice.

HOW TO ORDER

3100 T - 150 - 601

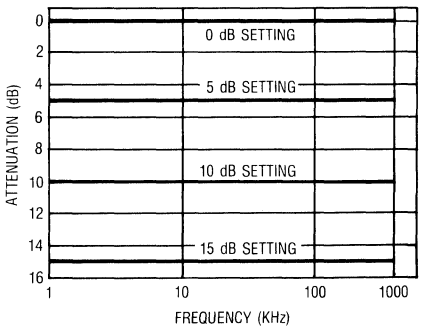
Basic Model Number
Refer to Table 1 for available p/n combinations

Attenuator Style
B = "O" Type
T = "T" Type
P = " " Type

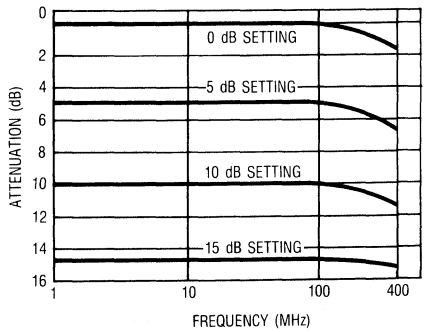
Attenuator Range (dB)
150 (0 to 1.5 dB)
0.1 dB steps
151 (0 to 15 dB)
1.0 dB steps
241 (0 to 24dB)
1.6 dB steps

Impedance Value
601-600 ohms
750-75 ohms

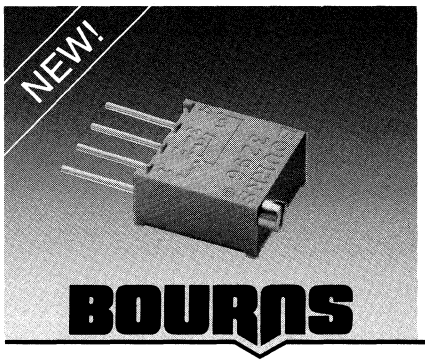
Consult factory for other impedance values or attenuation ranges.



FREQUENCY RESPONSE. 3100T-151-601 (600 OHMS)



FREQUENCY RESPONSE. 3100T-151-750 (75 OHMS)



.375" SQUARE / MULTITURN / CERMET / INDUSTRIAL / SEALED

- Designed for operational amplifier offset voltage adjustment applications
- Reduces power supply drift errors
- Unique center tapped trimming potentiometer
- Vertical and horizontal adjust types available

Model 3296-OT1

Bourns® Trimming Potentiometers

Electrical Characteristics

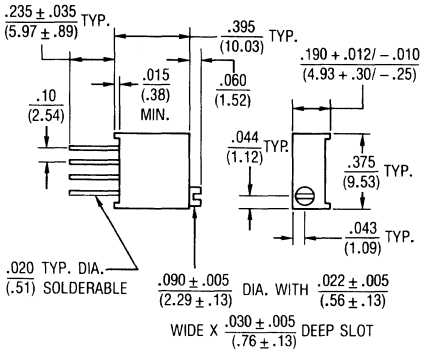
Standard Resistance Range (Pin 1 to Pin 3) . . . . . 100 ohms to 1 megohm (see standard resistance table)
Resistance Tolerance . . . . ±20% std.
Minimum Resistance . . 1% or 2 ohms (whichever is greater)
Voltage Output Variation . . . ±0.25%
Adjustability (VR) . . . . . ±0.025%
Insulation Resistance @ 500 VDC . . . . . 1,000 megohms min.
Dielectric Strength
Sea Level . . . . . 900 VAC
70,000 feet . . . . . 350 VAC
Effective Electrical Travel, Nom. . . . . 25 turns
Center Tap Resistance . 2 ohms max.
Center Tap Electrical Center . . ±5%
Center Tap Dead Band . . . . . 0.5 turn

Environmental Characteristics

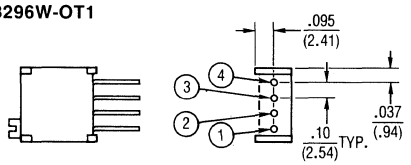
Power Rating
70°C . . . . . 0.5 watt
125°C . . . . . 0 watt
Temperature Range . . . . . −55°C to +125°C
Temperature Stability (DVR) . . . . . ±0.5% max.
Seal Test . . . . . 85°C Fluorinert*
Humidity . . . . . MIL-STD-202 Method 103
96 Hours . . . . . 10 megohms min.
Vibration, 20G . . . . . ±1% DTR
Shock, 100G . . . . . ±1% DTR
Load Life, 1,000 Hours . . . ±3% DTR
Mechanical Life, 200 cycles . . . . . ±4% DTR

Physical Characteristics

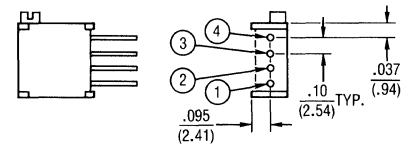
Torque . . . . . 3.0 oz-in. max.
Mechanical Stops . . . . . Wiper idles
Terminals . . . . . Solderable pins
Weight . . . . . 0.03 oz.
Marking . . . . . Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style

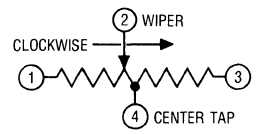


3296W-OT1



3296X-OT1





TOLERANCES: ± .010 (.25) OR LESS EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103•
20,000	203
50,000	503•
100,000	104•
200,000	204
500,000	504
1,000,000	105

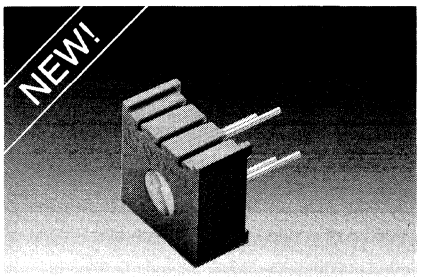
•Preferred Values
Special resistances available.

HOW TO ORDER

3296 X - OT1 - 103

Model
Style
Catalog Product
Resistance Code
First 2 significant digits of value
Third digit number of zeros

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.



.375" SQUARE / SINGLE-TURN / CERMET / INDUSTRIAL / SEALED

- Designed for operational amplifier offset voltage adjustment applications
- Reduces power supply drift errors
- Unique center tapped trimming potentiometer
- Vertical adjust type available

BOURNS

Model 3386-OT1

Bourns® Trimming Potentiometers

Electrical Characteristics

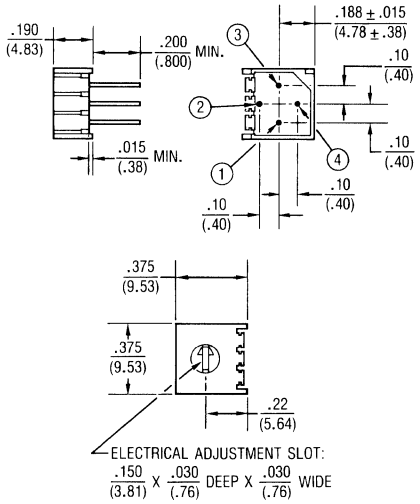
Standard Resistance Range
.....100 ohms to 1 megohm
(see standard resistance table)
Resistance Tolerance.... ±20% std.
Minimum Resistance..1% or 2 ohms
(whichever is greater)
Voltage Output Variation... ±0.25%
Adjustability (VR).....0.05%
Insulation Resistance @ 500 VDC
.....1,000 megohms min.
Dielectric Strength
Sea Level.....900 VAC
70,000 feet.....350 VAC
Effective Electrical Travel.280° nom.
Center Tap Resistance
.....2 ohms max.
Center Tap Electrical Center..±5%
Center Tap Dead Band.....6°±4°

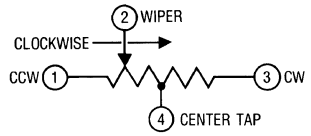
Environmental Characteristics

Power Rating
85°C.....0.5 watt
125°C.....0 watt
Temperature Range
.....–55°C to +125°C
Temperature Stability (DVR)
.....±0.5% max.
Seal Test.....85°C Fluorinert*
Humidity
.....MIL-STD-202 Method 103
96 Hours ±2%
.....DTR 10 megohms min.
Vibration, 20G.....±1% DTR
Shock, 100G.....±1% DTR
Load Life, 1,000 Hours...±3% DTR
Mechanical Life, 200 cycles
.....±4% DTR

Physical Characteristics

Torque.....0.1-5.0 oz-in. max.
Mechanical Stops.....Solid
Terminals.....Solderable pins
Weight..... 0.03 oz.
Marking.....Manufacturer's trademark, resistance code, wiring diagram, date code, manufacturer's model number and style





TOLERANCES: ± .010 (.25) OR LESS EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103•
20,000	203
50,000	503•
100,000	104•
200,000	204
500,000	504
1,000,000	105

•Preferred Values
Special resistances available.

HOW TO ORDER

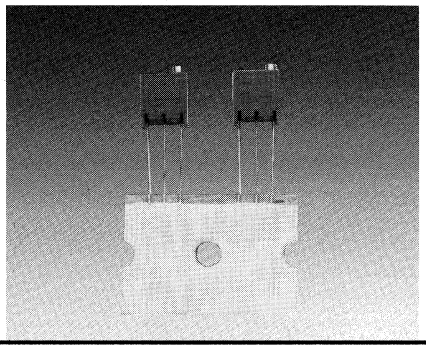
3386 P - OT1 - 103

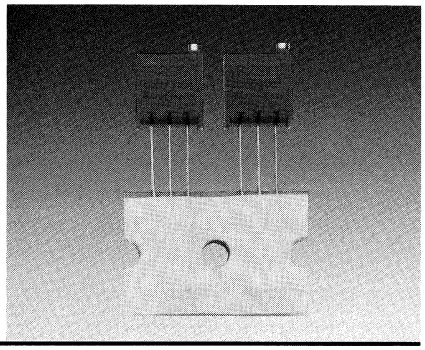
Model
Style
Catalog Product
Resistance Code
First 2 significant digits of value
Third digit number of zeros

Specifications are subject to change without notice.
*"Fluorinert" is a registered trademark of 3M Co.

BOURNS® POTENTIOMETER TAPE AND REEL PACKAGING OPTIONS

BOURNS





Model 3266

Model 3296*

Now there is a full assortment of Trimpot® Potentiometer models on tape and reel.

- Assembly speed is up to 10X faster because radial insertion equipment can place over 100 components a minute!
- Assembly cost reduction is up to 75% because automatic insertion eliminates errors.
- Tape and reel models are supplied on 18mm tape, packaged on 14" reels.
- All models are taped and packaged per EIA Standard RS-468 on 14" reels.
- All models have been tested for compatibility with all popular radial insertion machine models on the market today.

HOW TO ORDER

3362 M - 1 - 103 R

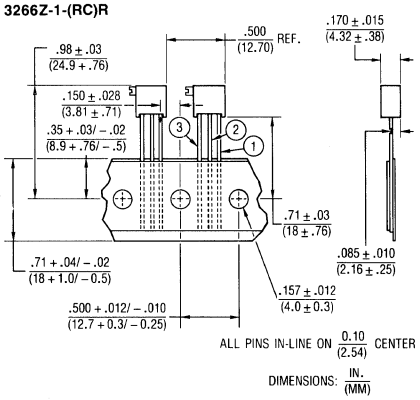
- Model
- Style
- Standard Product
- Resistance Code
- Tape & Reel Designator Use "A" for Ammo Pack.

1/4 INCH SQUARE MULTITURN/CERMET/ INDUSTRIAL/SEALED

Bourns® Trimming Potentiometer
For complete product specifications, see page 27.

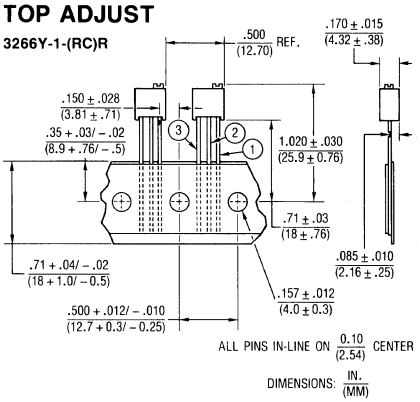
SIDE ADJUST

3266Z-1-(RC)R



TOP ADJUST

3266Y-1-(RC)R



STANDARD RESISTANCE TABLE

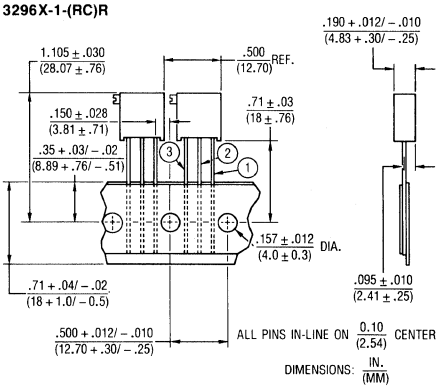
Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
100	101	20,000	203
200	201	25,000	253
500	501	50,000	503
1,000	102	100,000	104
2,000	202	200,000	204
5,000	502	250,000	254
10,000	103	500,000	504

3/8 INCH SQUARE MULTITURN/CERMET/ INDUSTRIAL/SEALED

Bourns® Trimming Potentiometer
For complete product specifications, see page 29.

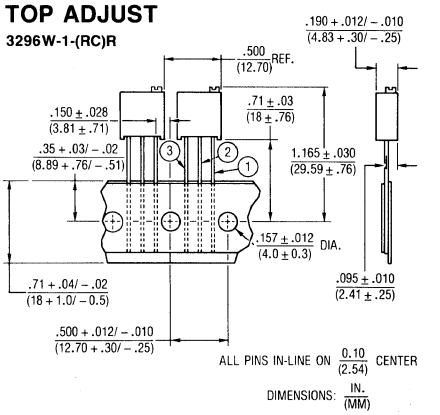
SIDE ADJUST

3296X-1-(RC)R



TOP ADJUST

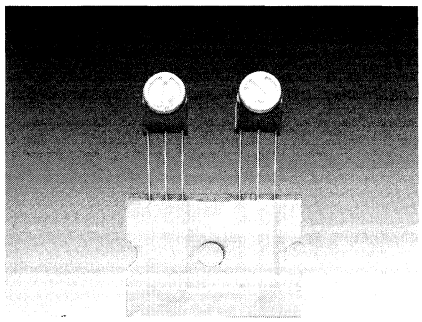
3296W-1-(RC)R

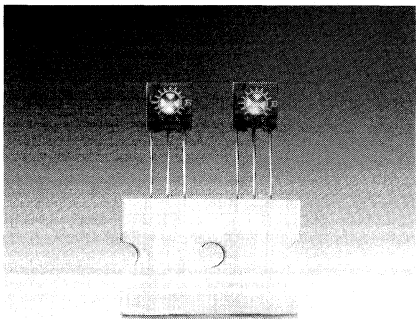


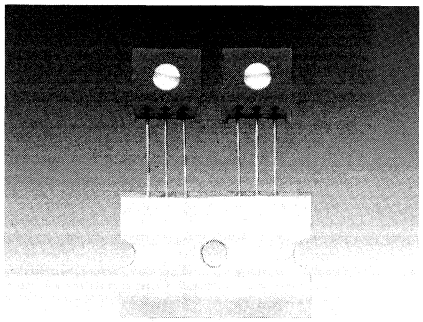
STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
10	100	20,000	203
20	200	25,000	253
50	500	50,000	503
100	101	100,000	104
200	201	200,000	204
500	501	250,000	254
1,000	102	500,000	504
2,000	202	1,000,000	105
5,000	502	2,000,000	205
10,000	103	5,000,000	505

*Ammo Pak available.
Specifications are subject to change without notice.







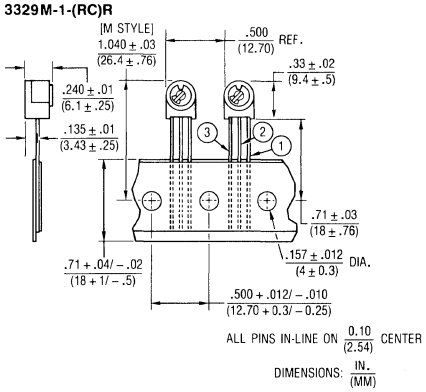
Model 3329

1/4 INCH DIAMETER SINGLE-TURN/CERMET/ INDUSTRIAL/SEALED

Bourns® Trimming Potentiometer
For complete product specifications, see page 32.

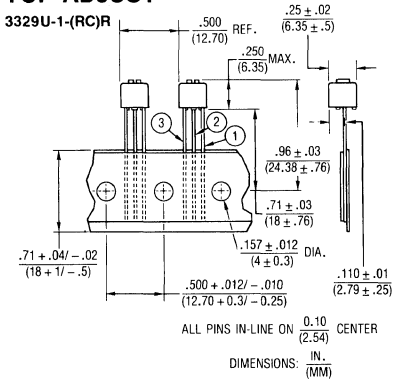
SIDE ADJUST

3329M-1-(RC)R



TOP ADJUST

3329U-1-(RC)R



STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
10	100	10,000	103
20	200	20,000	203
50	500	25,000	253
100	101	50,000	503
200	201	100,000	104
500	501	200,000	204
1,000	102	250,000	254
2,000	202	500,000	504
5,000	502	1,000,000	105

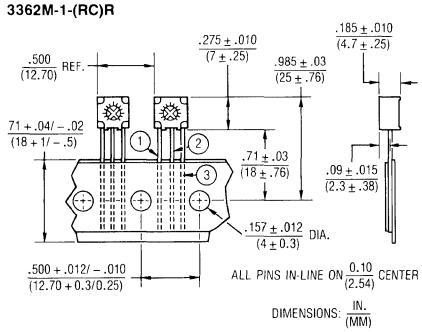
Model 3362

1/4 INCH SQUARE SINGLE-TURN/CERMET/ INDUSTRIAL/SEALED

Bourns® Trimming Potentiometer
For complete product specifications, see page 34.

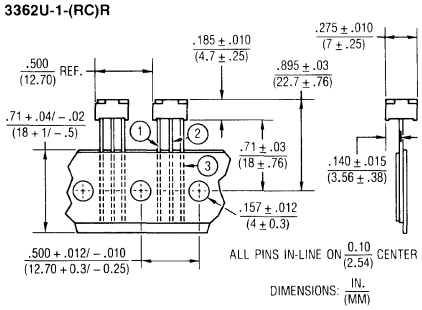
SIDE ADJUST

3362M-1-(RC)R



TOP ADJUST

3362U-1-(RC)R



STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
20	200	20,000	203
50	500	25,000	253
100	101	50,000	503
200	201	100,000	104
500	501	200,000	204
1,000	102	250,000	254
2,000	202	500,000	504
5,000	502	1,000,000	105
10,000	103	2,000,000	205

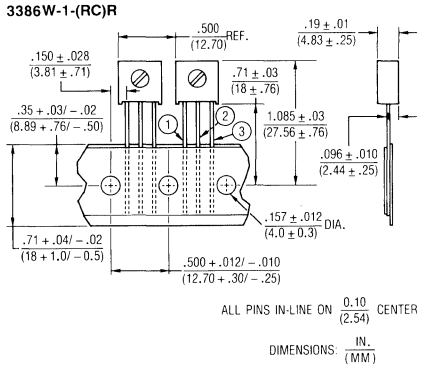
Model 3386*

3/8 INCH SQUARE SINGLE-TURN/CERMET/ INDUSTRIAL/SEALED

Bourns Trimming Potentiometer
For complete product specifications, see pages 36 and 37.

SIDE ADJUST

3386W-1-(RC)R



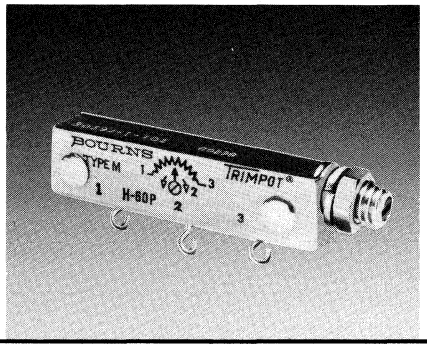
STANDARD RESISTANCE TABLE

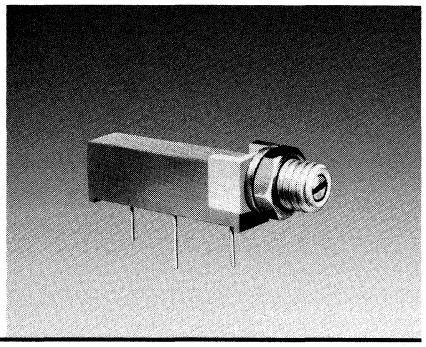
Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
10	100	20,000	203
20	200	25,000	253
50	500	50,000	503
100	101	100,000	104
200	201	200,000	204
500	501	250,000	254
1,000	102	500,000	504
2,000	202	1,000,000	105
5,000	502	2,000,000	205
10,000	103		

*Ammo Pak available.
Specifications are subject to change without notice.

TRIMPOT® POTENTIOMETER PANEL MOUNTING OPTIONS AND HARDWARE

BOURNS





Models 3057/3059

Models 3005/3006/3009

Many Trimpot® Potentiometers are available for panel mount application.

This product option provides for maximum design flexibility.

To order Trimpot® Potentiometers with panel mount hardware attached, simply select the part number you require from the standard part number table, and add "M" or "Z" after the complete part number, as required.

For the Models 3005, 3006 and 3009, a "Z" should be used instead of an "M".

Examples:
3057L-1-102M
3059J-1-503M
3006P-1-502Z
3292L-1-502M

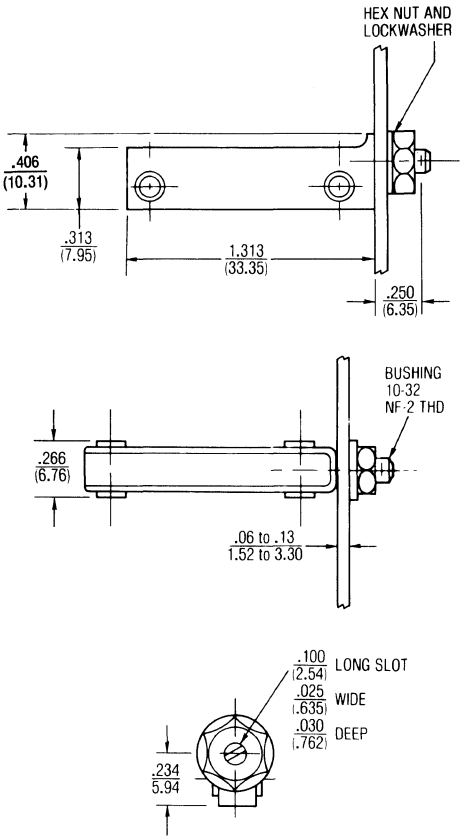
To order panel mounting accessories, simply use the part number.

Examples:
H83P (Adapter)
H-25 (Stacking Straps)
H-28 (Stacking Straps)
H-26 (Side Brackets)

1-1/4 INCH RECTANGULAR MULTITURN/CERMET/ WIREWOUND/INDUSTRIAL/ MILITARY MODELS

For complete product specifications, see pages 14 (3057) and 22 (3059).

FACTORY ASSEMBLED PANEL MOUNT



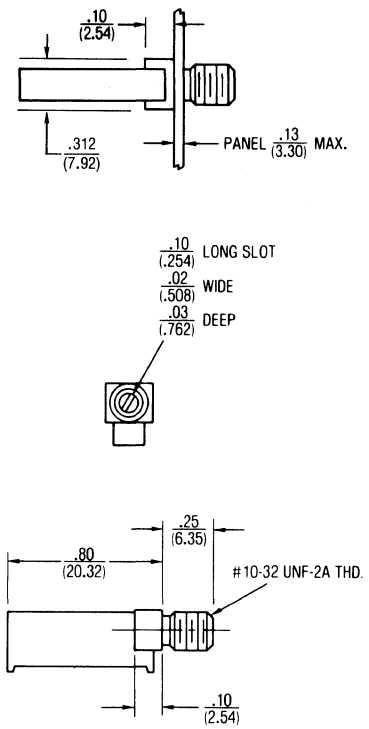
NOTES:
1. Provided with lockwasher and mounting nut.
2. Recommend panel holes.#10 drill (.194).

Use H-83P for customer assembled panel mount on Models 3005 and 3006.

3/4 INCH RECTANGULAR MULTITURN/CERMET/ WIREWOUND/INDUSTRIAL/ MILITARY MODELS

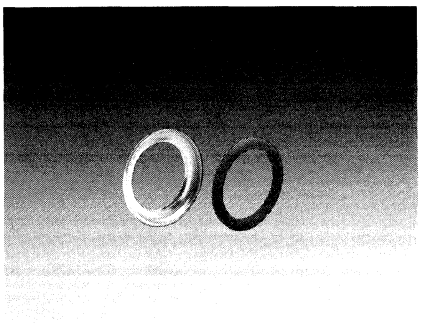
For complete product specifications, see pages 13 (3005), 20 (3006), and 21 (3009).

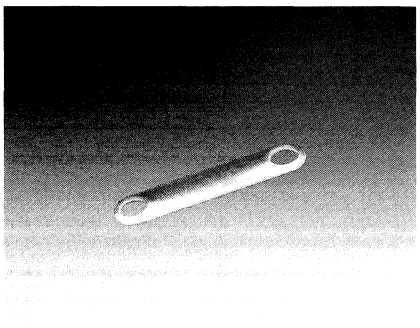
FACTORY ASSEMBLED PANEL MOUNT

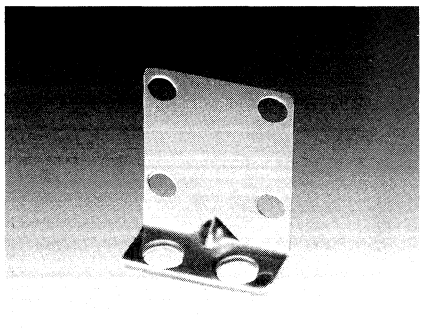


NOTES:
1. Provided with lockwasher and mounting nut.
2. Recommend panel hole size .200 dia. (#7 drill).

Customer installed panel mounts available for Models 3057/3059 and Mil-Spec styles. Consult factory for panel mount part numbers.



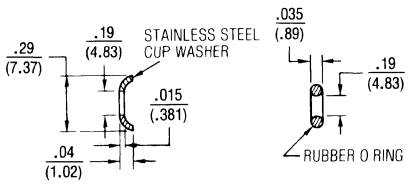




H-82

PANEL SEAL FOR ALL PANEL MOUNTS WITH SIZE 10-32 BUSHINGS

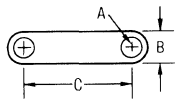
This hardware is available for special mounting applications.



H-25/H-28

STACKING STRAPS FOR MODELS 3250, 3252 (H-25) AND 3292 (H-28)

This hardware is available for special mounting applications.



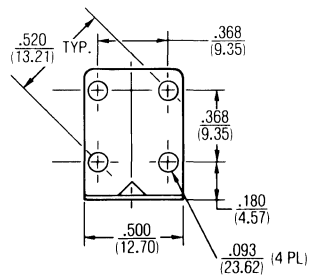
DIM.	H-25	H-28
A	.093 (.236)	.070 (.178)
B	.143 (.363)	.125 (.318)
C	.520 (1.321)	.419 (1.064)

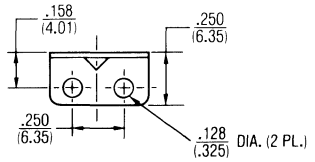
WARNING: DO NOT EXCEED 12 OZ-IN. OF MACHINE SCREW TORQUE WHEN MOUNTING UNITS WITH STACKING STRAPS OR SIDE BRACKETS.

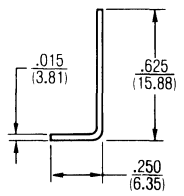
H-26

SIDE BRACKET FOR MODELS 3250 AND 3252

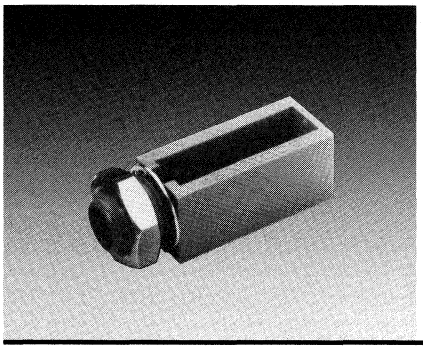
This hardware is available for special mounting applications.

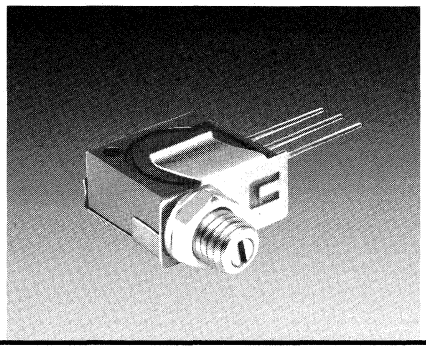


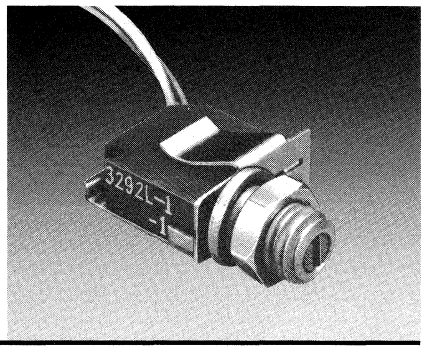




WARNING: DO NOT EXCEED 12 OZ-IN. OF MACHINE SCREW TORQUE WHEN MOUNTING UNITS WITH STACKING STRAPS OR SIDE BRACKETS.







H83P

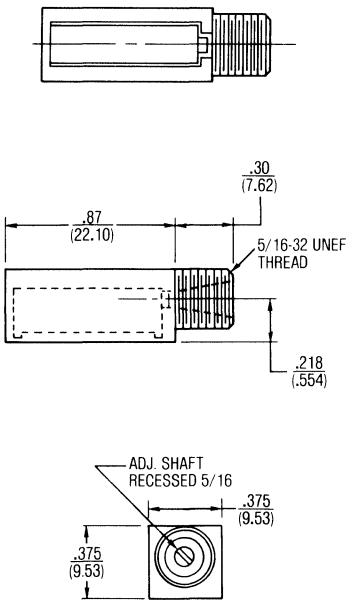
Models 3250/3252

Models 3290/3292

ADAPTER FOR MODELS 3005 AND 3006

The H-83P Adapter is used with Models 3005 (page 13) and 3006 (page 20). Simply select the part number you want and snap fit the unit in the plastic case. The H-83P with lockwasher and mounting nut is available in 50-piece lots.

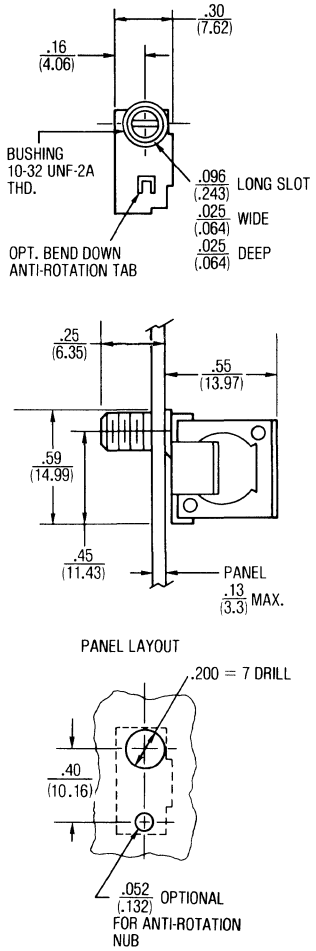
CUSTOMER ASSEMBLED



1/2 INCH SQUARE MULTITURN/CERMET/ WIREWOUND/INDUSTRIAL/ MILITARY MODELS

For complete product specifications, see pages 15 (3250) and 25 (3252).

FACTORY ASSEMBLED PANEL MOUNT



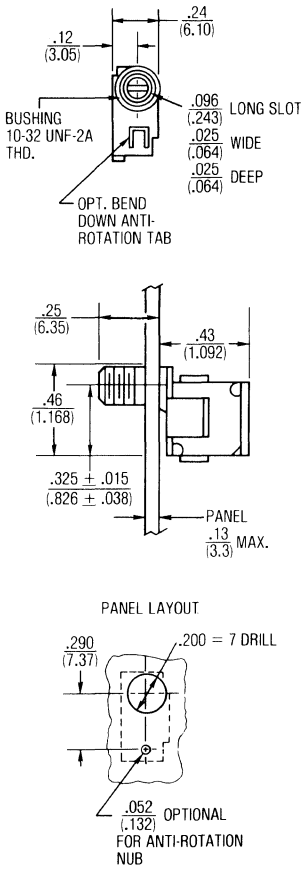
NOTES:
1. Provided with lockwasher and mounting nut.

Customer installed panel mounts available for Models 3250/3252 and Mil-Spec styles. Consult factory for panel mount part numbers.

3/8 INCH SQUARE MULTITURN/CERMET/ WIREWOUND/INDUSTRIAL/ MILITARY MODELS

For complete product specifications, see pages 17 (3290) and 28 (3292).

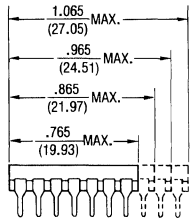
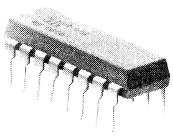
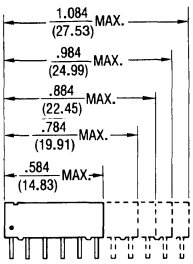
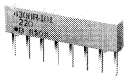
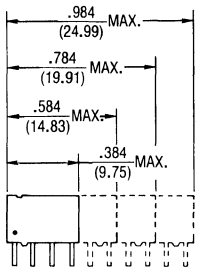
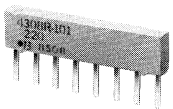
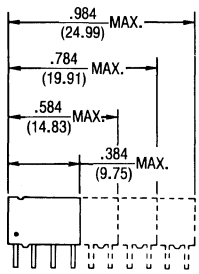
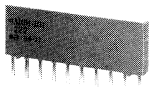
FACTORY ASSEMBLED PANEL MOUNT



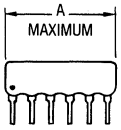
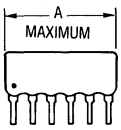
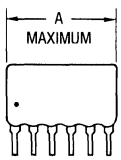
NOTES:
1. Provided with lockwasher and mounting nut.

Customer installed panel mounts available for Models 3290/3292 and Mil-Spec styles. Consult factory for panel mount part numbers.

MOLDED RESISTOR NETWORKS

Board Space	Product	Series Number	Pin Ct.	Isolated Resistors	Bussed Resistors	Dual Terminators	Page No.
 .185" (4.70mm) Seated Height	Molded DIP Low Profile 	**4100R**	14	4114R-001-RC	4114R-002-RC	4114R-003-RC/RC	54
			16	4116R-001-RC	4116R-002-RC	4116R-003-RC/RC	
			18	4118R-001-RC	4118R-002-RC	4118R-003-RC/RC	
			20	4120R-001-RC	4120R-002-RC	4120R-003-RC/RC	
		M83401-01	14	M8340101KXXXXGA M8340101MXXXXGA M8340101MXXXXJA	M8340101KXXXXGB M8340101MXXXXGB M8340101MXXXXJB		178
		M83401-02	16	M8340102KXXXXGA M8340102MXXXXGA M8340102MXXXXJA	M8340102KXXXXGB M8340102MXXXXGB M8340102MXXXXJB		
 .195" (4.96mm) Seated Height	Molded SIP Low Profile 	**4300R**	6	4306R-102-RC	4306R-101-RC	4306R-104-RC/RC	56
			8	4308R-102-RC	4308R-101-RC	4308R-104-RC/RC	
			9		4309R-101-RC	4309R-104-RC/RC	
			10	4310R-102-RC	4310R-101-RC	4310R-104-RC/RC	
			11		4311R-101-RC	4311R-104-RC/RC	
		M83401-07	6	M8340107KXXXXGG M8340107MXXXXGG M8340107MXXXXJG	M8340107KXXXXGC M8340107MXXXXGC M8340107MXXXXJC		180
		M83401-08	8	M8340108KXXXXGG M8340108MXXXXGG M8340108MXXXXJG	M8340108KXXXXGC M8340108MXXXXGC M8340108MXXXXJC		
		M83401-09	10	M8340109KXXXXGG M8340109MXXXXGG M8340109MXXXXJG	M8340109KXXXXGC M8340109MXXXXGC M8340109MXXXXJC		
 .250" (6.35mm) Seated Height	Molded SIP Medium Profile 	**4300M**	4	4304M-102-RC	4304M-101-RC	4304M-104-RC/RC	58
			6	4306M-102-RC	4306M-101-RC	4306M-104-RC/RC	
			8	4308M-102-RC	4308M-101-RC	4308M-104-RC/RC	
			10	4310M-102-RC	4310M-101-RC	4310M-104-RC/RC	
 .350" (8.89mm) Seated Height	Molded SIP High Profile 	**4300H**	4	4304H-102-RC	4304H-101-RC	4304H-104-RC/RC	60
			6	4306H-102-RC	4306H-101-RC	4306H-104-RC/RC	
			8	4308H-102-RC	4308H-101-RC	4308H-104-RC/RC	
			10	4310H-102-RC	4310H-101-RC	4310H-104-RC/RC	
		M83401-04	6	M8340104KXXXXGG M8340104MXXXXGG M8340104MXXXXJG	M8340104KXXXXGC M8340104MXXXXGC M8340104MXXXXJC		182
		M83401-05	8	M8340105KXXXXGG M8340105MXXXXGG M8340105MXXXXJG	M8340105KXXXXGC M8340105MXXXXGC M8340105MXXXXJC		
		M83401-06	10	M8340106KXXXXGG M8340106MXXXXGG M8340106MXXXXJG	M8340106KXXXXGC M8340106MXXXXGC M8340106MXXXXJC		

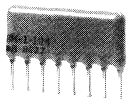
CONFORMAL RESISTOR NETWORKS

Board Space	Product	Series Number	Pin Ct.	Isolated Resistors	Bussed Resistors	Dual Terminators	Page No.
 .200" (5.08mm) Seated Height	Conformal SIP Low Profile	4600X	4	4604X-102-RC	4604X-101-RC	4604X-104-RC/RC	62
			5		4605X-101-RC	4605X-104-RC/RC	
			6	4606X-102-RC	4606X-101-RC	4606X-104-RC/RC	
			7		4607X-101-RC	4607X-104-RC/RC	
			8	4608X-102-RC	4608X-101-RC	4608X-104-RC/RC	
			9		4609X-101-RC	4609X-104-RC/RC	
			10	4610X-102-RC	4610X-101-RC	4610X-104-RC/RC	
			11		4611X-101-RC	4611X-104-RC/RC	
			12	4612X-102-RC	4612X-101-RC	4612X-104-RC/RC	
			13		4613X-101-RC	4613X-104-RC/RC	
			14	4614X-102-RC	4614X-101-RC	4614X-104-RC/RC	
 .250" (6.35mm) Seated Height	Conformal SIP Medium Profile	4600M	4	4604M-102-RC	4604M-101-RC	4604M-104-RC/RC	64
			5		4605M-101-RC	4605M-104-RC/RC	
			6	4606M-102-RC	4606M-101-RC	4606M-104-RC/RC	
			7		4607M-101-RC	4607M-104-RC/RC	
			8	4608M-102-RC	4608M-101-RC	4608M-104-RC/RC	
			9		4609M-101-RC	4609M-104-RC/RC	
			10	4610M-102-RC	4610M-101-RC	4610M-104-RC/RC	
			11		4611M-101-RC	4611M-104-RC/RC	
			12	4612M-102-RC	4612M-101-RC	4612M-104-RC/RC	
			13		4613M-101-RC	4613M-104-RC/RC	
			14	4614M-102-RC	4614M-101-RC	4614M-104-RC/RC	
 .350" (8.89mm) Seated Height	Conformal SIP High Profile	4600H	4	4604H-102-RC	4604H-101-RC	4604H-104-RC/RC	66
			5		4605H-101-RC	4605H-104-RC/RC	
			6	4606H-102-RC	4606H-101-RC	4606H-104-RC/RC	
			7		4607H-101-RC	4607H-104-RC/RC	
			8	4608H-102-RC	4608H-101-RC	4608H-104-RC/RC	
			9		4609H-101-RC	4609H-104-RC/RC	
			10	4610H-102-RC	4610H-101-RC	4610H-104-RC/RC	
			11		4611H-101-RC	4611H-104-RC/RC	
			12	4612H-102-RC	4612H-101-RC	4612H-104-RC/RC	
			13		4613H-101-RC	4613H-104-RC/RC	
			14	4614H-102-RC	4614H-101-RC	4614H-104-RC/RC	

Pin Count	A Maximum Inches (mm)
4	.398 (10.11)
5	.498 (12.65)
6	.598 (15.19)
7	.698 (17.73)
8	.798 (20.27)
9	.898 (22.81)
10	.998 (23.35)
11	1.098 (27.89)
12	1.198 (30.43)
13	1.298 (32.97)
14	1.398 (35.51)

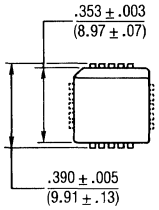
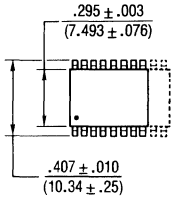
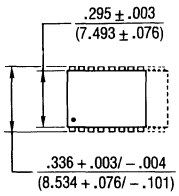
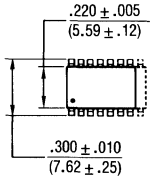
Industrial Grade

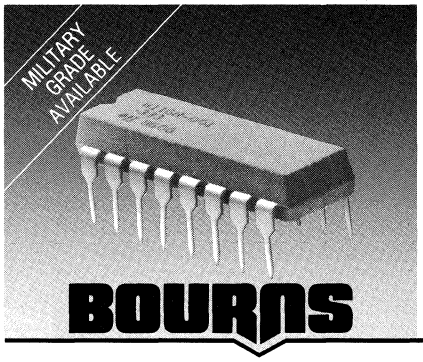
Industrial Grade



Industrial Grade

SURFACE MOUNTED RESISTOR NETWORKS

Board Space	Product	Series Number	Pin Ct.	Isolated Resistors	Bussed Resistors	Dual Terminators	Page No.
	Leaded Chip Carrier (PCC) 	**4200P**	10	4210P-102-RC	4210P-105-RC	4210P-104-RC/RC	164
			20	4220P-102-RC	4220P-105-RC		
	Wide Body (SOL) 	**4400P**	16	4416P-001-RC 4416P-004-RC	4416P-002-RC	4416P-003-RC/RC	166
			20	4420P-001-RC 4420P-004-RC	4420P-002-RC	4420P-003-RC/RC	
	Wide Body J-Lead (SOL-J) 	**4400J**	16	4416J-001-RC 4416J-004-RC	4416J-002-RC	4416J-003-RC/RC	168
			20	4420J-001-RC 4420J-004-RC	4420J-002-RC	4420J-003-RC/RC	
	Medium Body (SOM) 	**4800P**	14	4814P-001-RC	4814P-002-RC	4814P-003-RC/RC	170
			16	4816P-001-RC 4816P-004-RC	4816P-002-RC	4816P-003-RC/RC	



MOLDED DIPs
14, 16, 18 AND 20 PIN

- Compatible with automatic insertion equipment
- Copper leads for excellent heat dissipation
- High temperature design ensures compatibility with all popular board soldering techniques
- Trifurcated Krimp-Joint™ lead attachment for product reliability and strength

Model 4100R Series

Bourns® Resistor Networks

Electrical Characteristics

Standard Resistance Values
.....10 ohms to 10 megohms
Maximum Operating Voltage...100V
Temperature Coefficient of Resistance (TCR).....±100ppm/°C
±250ppm/°C for values less than 50 ohms and greater than 2.2 megohms
Voltage Coefficient.....±100ppm/V typical by decade values
TCR Tracking.....50ppm/°C maximum; equal values
Resistor Tolerance.....See circuits
Operating Temperature
.....–55°C to +125°C
Power Rating.....Derate to zero power from +70°C to +125°C

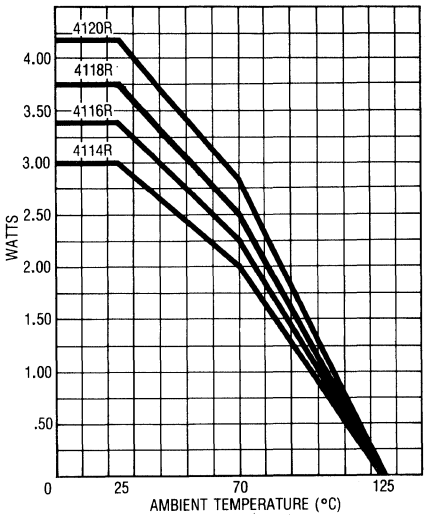
Environmental Characteristics

Tests per MIL-R-83401. ΔR maximum
Short Time Overload.....±0.25%
Load Life.....±1.00%
Mechanical Shock.....±0.25%
Moisture Resistance.....±0.50%
Resistance to Soldering Heat
.....±0.25%
Terminal Strength.....±0.25%
Thermal Shock.....±0.25%
Vibration.....±0.25%
Insulation Resistance
.....10,000 megohms minimum
Dielectric Withstanding Voltage
.....200 VRMS
Lead Solderability & Solvent Resistance
. Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material.....
Copper (OLIN 194) 90/10 electroplate
Body Material
.....Novolac epoxy

PACKAGE POWER TEMPERATURE DERATING CURVE



PACKAGE POWER RATING AT 70°C

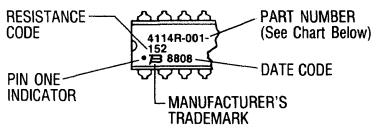
4114R	2.00 watts
4116R	2.25 watts
4118R	2.50 watts
4120R	2.80 watts

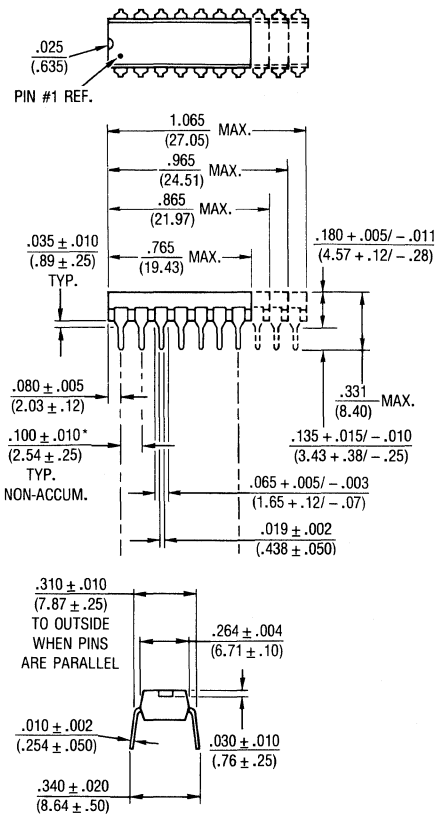
PACKAGE POWER RATING AT 25°C

4114R	3.00 watts
4116R	3.38 watts
4118R	3.75 watts
4120R	4.20 watts

TYPICAL PART MARKING

Represents total content. Layout may vary.





Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

HOW TO ORDER DIP NETWORKS

41 14 R - 001 - 152

- Model (41 = Molded DIP)
- Number of Pins
- Physical Configuration (R = Low Profile)
- Electrical Configuration
  - •001 = Isolated
  - •002 = Bussed
  - •003 = Dual Terminator
- Resistance Code
  - •First 2 digits are significant
  - •Third digit represents the number of zeros to follow.

- Superior package integrity to withstand moisture and contamination
- Laser marking on contrasting background for permanent identification
- Gold epoxy provides excellent marking contrast
- Laser marking for permanent identification

Model 4100R Series

BI® Resistor Networks

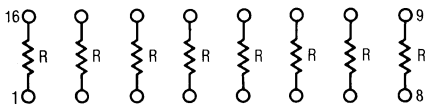
ISOLATED RESISTORS
(001 CIRCUIT)

Model 4114R-001-RC
(7 Isolated Resistors)

Model 4116R-001-RC
(8 Isolated Resistors)

Model 4118R-001-RC
(9 Isolated Resistors)

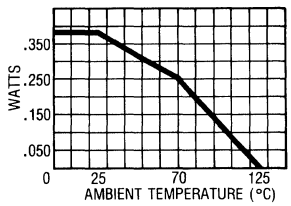
Model 4120R-001-RC
(10 Isolated Resistors)



Resistance Tolerance
10 ohms to 49 ohms.....±1 ohm
50 ohms to 5 megohms.....±2%
Above 5 megohms.....±5%

Power Rating per Resistor
At 70°C.....0.250 watt
At 25°C.....0.380 watt

POWER TEMPERATURE
DERATING CURVE



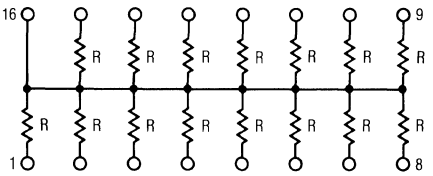
BUSSED RESISTORS
(002 CIRCUIT)

Model 4114R-002-RC
(13 Resistors, Pin 14 Common)

Model 4116R-002-RC
(15 Resistors, Pin 16 Common)

Model 4118R-002-RC
(17 Resistors, Pin 18 Common)

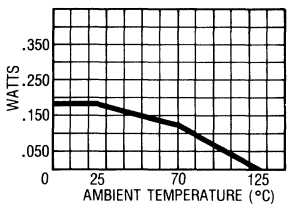
Model 4120R-002-RC
(19 Resistors, Pin 20 Common)



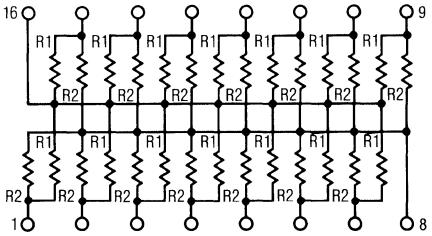
Resistance Tolerance
10 ohms to 49 ohms.....±1 ohm
50 ohms to 5 megohms.....±2%
Above 5 megohms.....±5%

Power Rating per Resistor
At 70°C.....0.125 watt
At 25°C.....0.188 watt

POWER TEMPERATURE
DERATING CURVE



DUAL TERMINATOR
(003 CIRCUIT)
Model 4114R-003-R1/R2
Model 4116R-003-R1/R2 (shown)
Model 4118R-003-R1/R2
Model 4120R-003-R1/R2



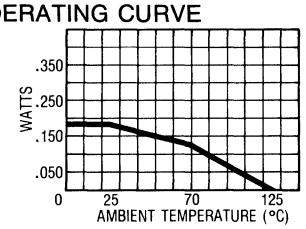
The dual terminators consist of 24 (4114R), 28 (4116R), 32 (4118R) or 36 (4120R) thick film resistors. Pins 7 and 14 (4114R), pins 8 and 16 (4116R), pins 9 and 18 (4118R), and pins 10 and 20 (4120R) are common for ground and power, respectively.

Each series pair of resistors is connected between the common lines. The center of these resistor pairs is connected to input terminals.

Resistance Tolerance
Below 100 ohms.....±2 ohms
100 ohms to 5 megohms.....±2%
Above 5 megohms.....±5%

Power Rating per Resistor
At 70°C.....0.125 watt
At 25°C.....0.188 watt

POWER TEMPERATURE
DERATING CURVE



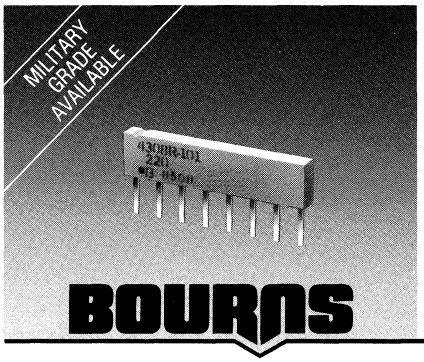
STANDARD RESISTANCE VALUES (001, 002 CIRCUITS)

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
10	100	330	331	4,700	472	68,000	683
22	220	390	391	5,600	562	82,000	823
27	270	470	471	6,800	682	100,000	104
33	330	560	561	8,200	822	120,000	124
39	390	680	681	10,000	103	150,000	154
47	470	820	821	12,000	123	180,000	184
56	560	1,000	102	15,000	153	220,000	224
68	680	1,200	122	18,000	183	270,000	274
82	820	1,500	152	20,000	203	330,000	334
100	101	1,800	182	22,000	223	390,000	394
120	121	2,000	202	27,000	273	470,000	474
150	151	2,200	222	33,000	333	560,000	564
180	181	2,700	272	39,000	393	680,000	684
220	221	3,300	332	47,000	473	820,000	824
270	271	3,900	392	56,000	563	1,000,000	105

STANDARD RESISTANCE TABLE
(003 CIRCUITS)

Resistance			
(Ohms)		Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.



MOLDED SIPs, LOW PROFILE 6, 8, 9, 10, AND 11 PIN

- Low profile provides compatibility with DIPs
- Compatible with automatic insertion equipment
- High temperature design ensures compatibility with all popular board soldering techniques
- Copper leads for excellent heat dissipation

Model 4300R Series

BOURNS® Resistor Networks

Electrical Characteristics

Standard Resistance Values
.....10 ohms to 10 megohms
Maximum Operating Voltage...100V
Temperature Coefficient of Resistance (TCR).....±100ppm/°C
±250ppm/°C for values less than 50 ohms and greater than 2.2 megohms
Voltage Coefficient.....±100ppm/V typical by decade values
TCR Tracking.....50ppm/°C maximum; equal values
Resistor Tolerance.....See circuits
Operating Temperature
.....–55°C to +125°C
Power Rating.....Derate to zero power from +70°C to +125°C

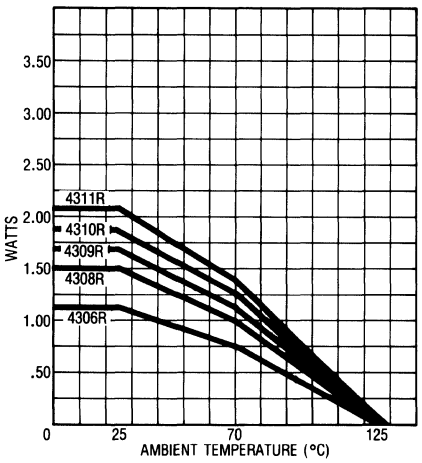
Environmental Characteristics

Tests per MIL-R-83401. ΔR maximum
Short Time Overload.....±0.25%
Load Life.....±1.00%
Mechanical Shock.....±0.25%
Moisture Resistance.....±0.50%
Resistance to Soldering Heat
.....±0.25%
Terminal Strength.....±0.25%
Thermal Shock.....±0.25%
Vibration.....±0.25%
Insulation Resistance
.....10,000 megohms minimum
Dielectric Withstanding Voltage
.....200 VRMS
Lead Solderability & Solvent Resistance
. Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material
Copper (OLIN 194) 90/10 electroplate
Body Material
.....Novolac epoxy

PACKAGE POWER TEMPERATURE DERATING CURVE

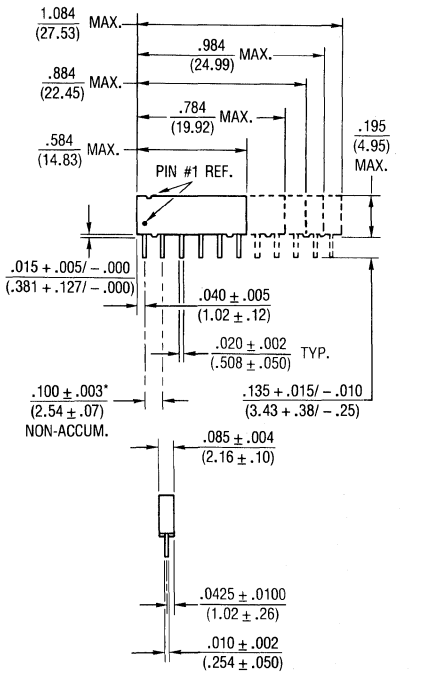


PACKAGE POWER RATING AT 70°C

4306R	0.75 watt
4308R	1.00 watt
4309R	1.13 watts
4310R	1.25 watts
4311R	1.38 watts

PACKAGE POWER RATING AT 25°C

4306R	1.13 watts
4308R	1.50 watts
4309R	1.69 watts
4310R	1.88 watts
4311R	2.06 watts

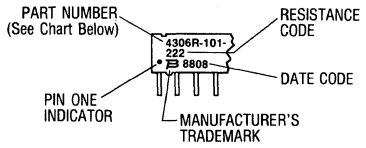


Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

TYPICAL PART MARKING

Represents total content. Layout may vary.



HOW TO ORDER MOLDED SIP NETWORKS

43 06 R - 101 - 222

- Model (43 = Molded SIP)
- Number of Pins
- Physical Configuration (R = Low Profile)
- Electrical Configuration
  - •101 = Bussed
  - •102 = Isolated
  - •104 = Dual Terminator
- Resistance Code
  - •First 2 digits are significant.
  - •Third digit represents the number of zeros to follow.

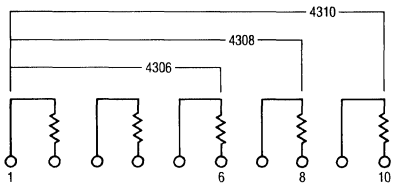
- Superior package integrity to withstand moisture and contamination
- Trifurcated Krimp-Joint™ lead attachment for product reliability and strength
- Laser marking on contrasting background for permanent identification

Model 4300R Series

BI® Resistor Networks

ISOLATED RESISTORS (102 CIRCUIT)

Model 4306R-102-RC (6 Pin)
Model 4308R-102-RC (8 Pin)
Model 4310R-102-RC (10 Pin)

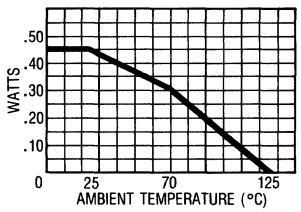


These models incorporate 3, 4 or 5 isolated thick-film resistors of equal value, each connected between two pins.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms..... ±2%
Above 5 megohms..... ±5%

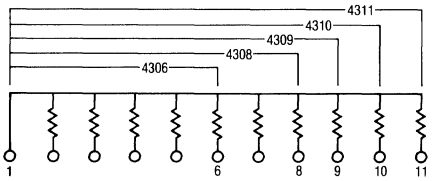
Power Rating per Resistor
At 70°C.....0.30 watt
At 25°C.....0.45 watt

POWER TEMPERATURE DERATING CURVE



BUSSED RESISTORS (101 CIRCUIT)

Model 4306R-101-RC (6 Pin)
Model 4308R-101-RC (8 Pin)
Model 4309R-101-RC (9 Pin)
Model 4310R-101-RC (10 Pin)
Model 4311R-101-RC (11 Pin)

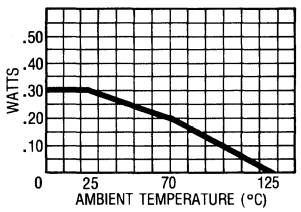


These models incorporate 5, 7, 8, 9 or 10 thick-film resistors of equal value, each connected between a common bus (pin 1) and a separate pin.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms..... ±2%
Above 5 megohms..... ±5%

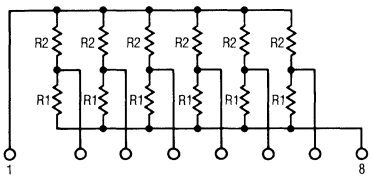
Power Rating per Resistor
At 70°C.....0.20 watt
At 25°C.....0.30 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATOR (104 CIRCUIT)

Model 4306R-104-R1/R2
Model 4308R-104-R1/R2 (shown)
Model 4309R-104-R1/R2
Model 4310R-104-R1/R2
Model 4311R-104-R1/R2

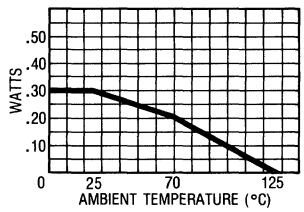


4308R-104 (shown above) is an 8-pin configuration and terminates 6 lines. Pins 1 and 8 are common for ground and power, respectively. Twelve thick-film resistors are paired in series between the common lines (pins 1 and 8).

Resistance Tolerance
Below 100 ohms..... ±2 ohms
100 ohms to 5 megohms..... ±2%
Above 5 megohms..... ±5%

Power Rating per Resistor
At 70°C.....0.20 watt
At 25°C.....0.30 watt

POWER TEMPERATURE DERATING CURVE



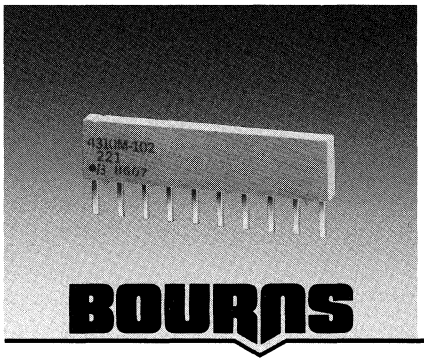
STANDARD RESISTANCE VALUES (101, 102 CIRCUITS)

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
10	100	330	331	4,700	472	68,000	683
22	220	390	391	5,600	562	82,000	823
27	270	470	471	6,800	682	100,000	104
33	330	560	561	8,200	822	120,000	124
39	390	680	681	10,000	103	150,000	154
47	470	820	821	12,000	123	180,000	184
56	560	1,000	102	15,000	153	220,000	224
68	680	1,200	122	18,000	183	270,000	274
82	820	1,500	152	20,000	203	330,000	334
100	101	1,800	182	22,000	223	390,000	394
120	121	2,000	202	27,000	273	470,000	474
150	151	2,200	222	33,000	333	560,000	564
180	181	2,700	272	39,000	393	680,000	684
220	221	3,300	332	47,000	473	820,000	824
270	271	3,900	392	56,000	563	1,000,000	105

STANDARD RESISTANCE VALUES (104 CIRCUITS)

Resistance			
(Ohms)		Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.



MOLDED SIPs, MEDIUM PROFILE
4, 6, 8, AND 10 PIN

- Medium profile offers increased power handling
- Compatible with automatic insertion equipment
- High temperature design ensures compatibility with all popular board soldering techniques
- Copper leads for excellent heat dissipation

Model 4300M Series

BOURNS® Resistor Networks

Electrical Characteristics

Standard Resistance Values
.....10 ohms to 10 megohms
Maximum Operating Voltage...100V
Temperature Coefficient of Resistance (TCR).....±100ppm/°C
±250ppm/°C for values less than 50 ohms and greater than 2.2 megohms
Voltage Coefficient.....±100ppm/V typical by decade values
TCR Tracking.....50ppm/°C maximum; equal values
Resistor Tolerance.....See circuits
Operating Temperature
.....–55°C to +125°C
Power Rating.....Derate to zero power from +70°C to +125°C

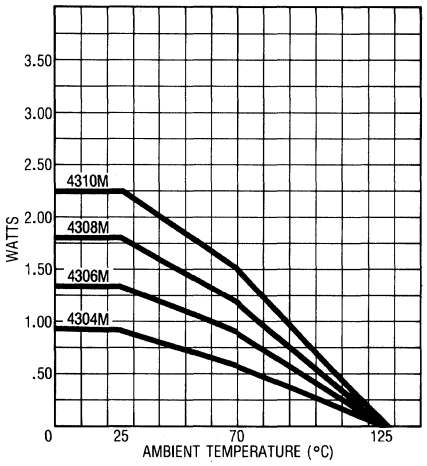
Environmental Characteristics

Tests per MIL-R-83401. ΔR maximum
Short Time Overload.....±0.25%
Load Life.....±1.00%
Mechanical Shock.....±0.25%
Moisture Resistance.....±0.50%
Resistance to Soldering Heat
.....±0.25%
Terminal Strength.....±0.25%
Thermal Shock.....±0.25%
Vibration.....±0.25%
Insulation Resistance
.....10,000 megohms minimum
Dielectric Withstanding Voltage
.....200 VRMS
Lead Solderability & Solvent Resistance
. Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material.....
Copper (OLIN 194) 90/10 electroplate
Body Material
.....Novolac epoxy

PACKAGE POWER TEMPERATURE DERATING CURVE



PACKAGE POWER RATING AT 70°C

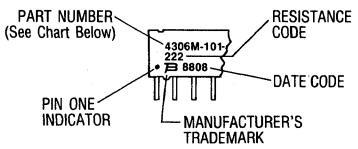
4304M.....0.60 watt
4306M.....0.90 watt
4308M.....1.20 watts
4310M.....1.50 watts

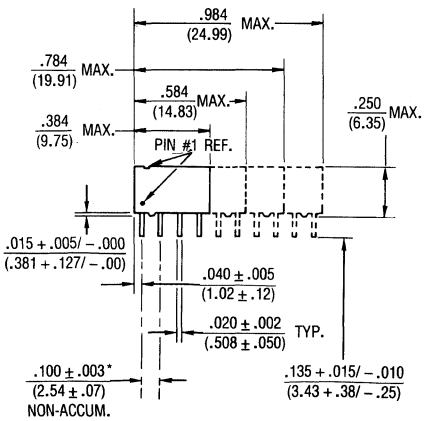
PACKAGE POWER RATING AT 25°C

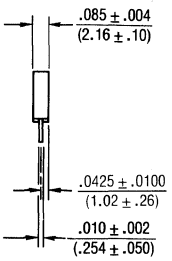
4304M.....0.90 watt
4306M.....1.35 watts
4308M.....1.80 watts
4310M.....2.25 watts

TYPICAL PART MARKING

Represents total content. Layout may vary.







Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

HOW TO ORDER MOLDED SIP NETWORKS

43 06 M - 101 - 222

Model
(43 = Molded SIP)

Number of Pins

Physical Configuration
(M = Medium Profile)

Resistance Code
- First 2 digits are significant.
- Third digit represents the number of zeros to follow.

Electrical Configuration
- 101 = Bussed
- 102 = Isolated
- 104 = Dual Terminator

Specifications are subject to change without notice.

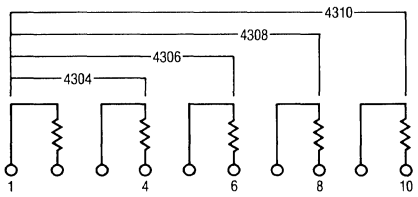
- Superior package integrity to withstand moisture and contamination
- Trifurcated Krimp-Joint™ lead attachment for product reliability and strength
- Gold epoxy provides excellent marking contrast
- Laser marking on contrasting background for permanent identification

Model 4300M Series

BI® Resistor Networks

ISOLATED RESISTORS (102 CIRCUIT)

Model 4304M-102-RC (4 Pin)
Model 4306M-102-RC (6 Pin)
Model 4308M-102-RC (8 Pin)
Model 4310M-102-RC (10 Pin)

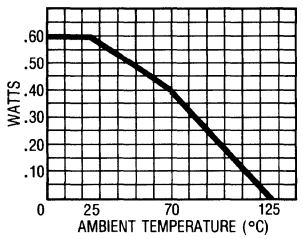


These models incorporate 2, 3, 4 or 5 isolated thick-film resistors of equal value, each connected between two pins.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms..... ±2%*
Above 5 megohms..... ±5%

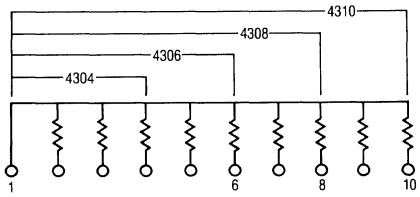
Power Rating per Resistor
At 70°C.....0.40 watt
At 25°C.....0.60 watt

POWER TEMPERATURE DERATING CURVE



BUSSED RESISTORS (101 CIRCUIT)

Model 4304M-101-RC (4 Pin)
Model 4306M-101-RC (6 Pin)
Model 4308M-101-RC (8 Pin)
Model 4310M-101-RC (10 Pin)

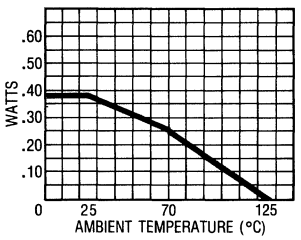


These models incorporate 3, 5, 7 or 9 thick-film resistors of equal value, each connected between a common bus (pin 1) and a separate pin.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms..... ±2%*
Above 5 megohms..... ±5%

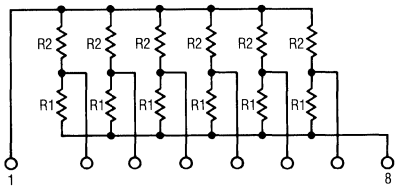
Power Rating per Resistor
At 70°C.....0.25 watt
At 25°C.....0.38 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATOR (104 CIRCUIT)

Model 4304M-104-R1/R2
Model 4306M-104-R1/R2
Model 4308M-104-R1/R2 (shown)
Model 4310M-104-R1/R2

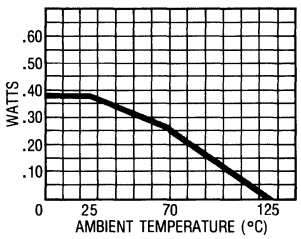


4308M-104 (shown above) is an 8-pin configuration and terminates 6 lines. Pins 1 and 8 are common for ground and power, respectively. Twelve thick-film resistors are paired in series between the common lines (pins 1 and 8).

Resistance Tolerance
Below 100 ohms..... ±2 ohms
100 ohms to 5 megohms..... ±2%*
Above 5 megohms..... ±5%

Power Rating per Resistor
At 70°C.....0.25 watt
At 25°C.....0.38 watt

POWER TEMPERATURE DERATING CURVE



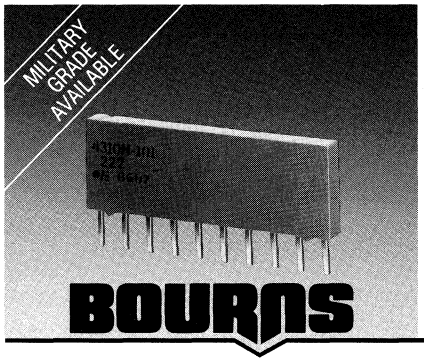
STANDARD RESISTANCE VALUES (101, 102 CIRCUITS)

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
10	100	330	331	4,700	472	68,000	683
22	220	390	391	5,600	562	82,000	823
27	270	470	471	6,800	682	100,000	104
33	330	560	561	8,200	822	120,000	124
39	390	680	681	10,000	103	150,000	154
47	470	820	821	12,000	123	180,000	184
56	560	1,000	102	15,000	153	220,000	224
68	680	1,200	122	18,000	183	270,000	274
82	820	1,500	152	20,000	203	330,000	334
100	101	1,800	182	22,000	223	390,000	394
120	121	2,000	202	27,000	273	470,000	474
150	151	2,200	222	33,000	333	560,000	564
180	181	2,700	272	39,000	393	680,000	684
220	221	3,300	332	47,000	473	820,000	824
270	271	3,900	392	56,000	563	1,000,000	105

STANDARD RESISTANCE VALUES (104 CIRCUITS)

Resistance			
(Ohms)		Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.
* ± 1% tolerance is available by adding suffix code "F" after the resistance code.



MOLDED SIPs, HIGH PROFILE 4, 6, 8, AND 10 PIN

- High profile offers increased power handling
- Compatible with automatic insertion equipment
- High temperature design ensures compatibility with all popular board soldering techniques
- Copper leads for excellent heat dissipation

Model 4300H Series

BOURNS® Resistor Networks

Electrical Characteristics

Standard Resistance Values ..... 10 ohms to 10 megohms
Maximum Operating Voltage... 100V
Temperature Coefficient of Resistance (TCR)..... ±100ppm/°C
±250ppm/°C for values less than 50 ohms and greater than 2.2 megohms
Voltage Coefficient..... ±100ppm/V typical by decade values
TCR Tracking..... 50ppm/°C maximum; equal values
Resistor Tolerance..... See circuits
Operating Temperature ..... −55°C to +125°C
Power Rating..... Derate to zero power from +70°C to +125°C

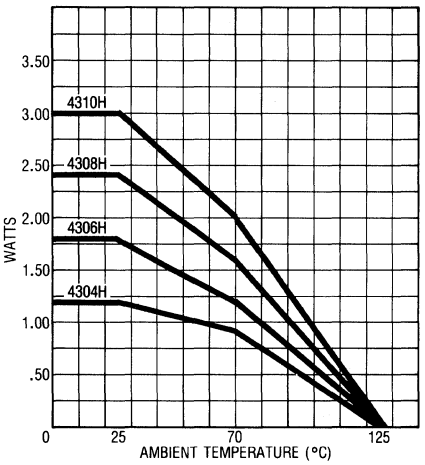
Environmental Characteristics

Tests per MIL-R-83401. ΔR maximum
Short Time Overload..... ±0.25%
Load Life..... ±1.00%
Mechanical Shock..... ±0.25%
Moisture Resistance..... ±0.50%
Resistance to Soldering Heat ..... ±0.25%
Terminal Strength..... ±0.25%
Thermal Shock..... ±0.25%
Vibration..... ±0.25%
Insulation Resistance ..... 10,000 megohms minimum
Dielectric Withstanding Voltage ..... 200 VRMS
Lead Solderability & Solvent Resistance. Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material
Copper (OLIN 194) 90/10 electroplate
Body Material
..... Novolac epoxy

PACKAGE POWER TEMPERATURE DERATING CURVE



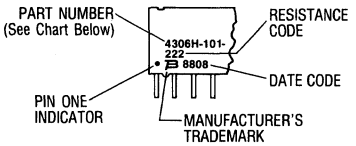
PACKAGE POWER RATING AT 70°C

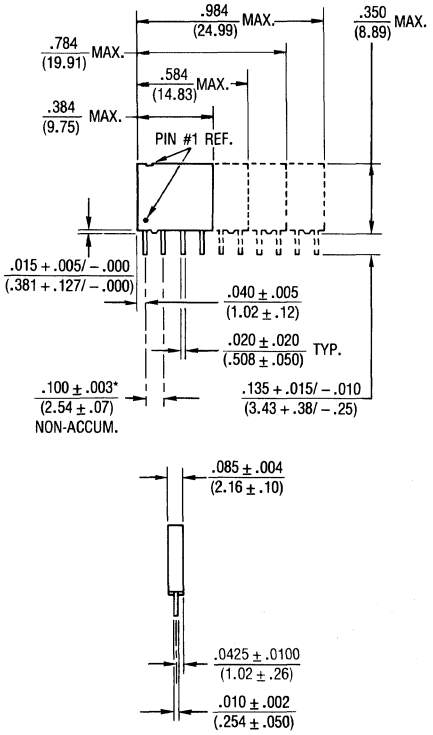
4304H	0.80 watt
4306H	1.20 watts
4308H	1.60 watts
4310H	2.00 watts

PACKAGE POWER RATING AT 25°C

4304H	1.20 watts
4306H	1.80 watts
4308H	2.40 watts
4310H	3.00 watts

TYPICAL PART MARKING
Represents total content. Layout may vary.





Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

HOW TO ORDER MOLDED SIP NETWORKS

43 06 H - 101 - 222

- Model (43 = Molded SIP)
- Number of Pins
- Physical Configuration (H = High Profile)
- Electrical Configuration
  - •101 = Bussed
  - •102 = Isolated
  - •104 = Dual Terminator
- Resistance Code
  - •First 2 digits are significant.
  - •Third digit represents the number of zeros to follow.

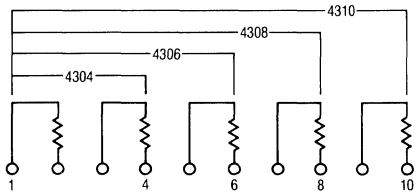
- Superior package integrity to withstand moisture and contamination
- Trifurcated Krimp-Joint™ lead attachment for product reliability and strength
- Laser marking on contrasting background for permanent identification

Model 4300H Series

Bussed® Resistor Networks

ISOLATED RESISTORS (102 CIRCUIT)

Model 4304H-102-RC (4 Pin)
Model 4306H-102-RC (6 Pin)
Model 4308H-102-RC (8 Pin)
Model 4310H-102-RC (10 Pin)

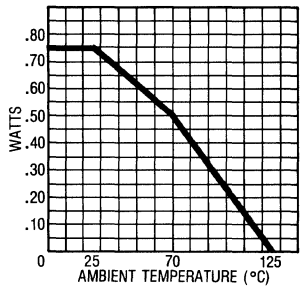


These models incorporate 2, 3, 4 or 5 isolated thick-film resistors of equal value, each connected between two pins.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms..... ±2%*
Above 5 megohms..... ±5%

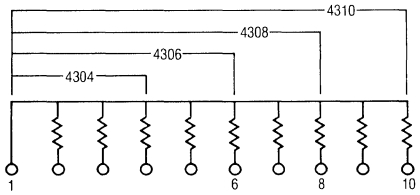
Power Rating per Resistor
At 70°C.....0.50 watt
At 25°C.....0.75 watt

POWER TEMPERATURE DERATING CURVE



BUSSED RESISTORS (101 CIRCUIT)

Model 4304H-101-RC (4 Pin)
Model 4306H-101-RC (6 Pin)
Model 4308H-101-RC (8 Pin)
Model 4310H-101-RC (10 Pin)

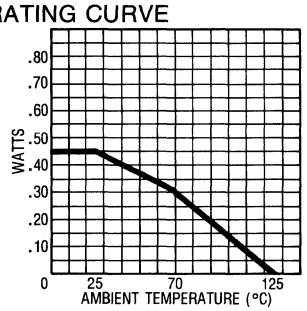


These models incorporate 3, 5, 7 or 9 thick-film resistors of equal value, each connected between a common bus (pin 1) and a separate pin.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms..... ±2%*
Above 5 megohms..... ±5%

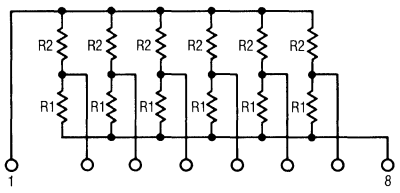
Power Rating per Resistor
At 70°C.....0.30 watt
At 25°C.....0.45 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATOR (104 CIRCUIT)

Model 4304H-104-R1/R2
Model 4306H-104-R1/R2
Model 4308H-104-R1/R2 (shown)
Model 4310H-104-R1/R2

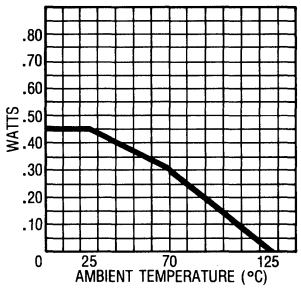


4308H-104 (shown above) is an 8-pin configuration and terminates 6 lines. Pins 1 and 8 are common for ground and power, respectively. Twelve thick-film resistors are paired in series between the common lines (pins 1 and 8).

Resistance Tolerance
Below 100 ohms..... ±2 ohms
100 ohms to 5 megohms..... ±2%*
Above 5 megohms..... ±5%

Power Rating per Resistor
At 70°C.....0.30 watt
At 25°C.....0.45 watt

POWER TEMPERATURE DERATING CURVE



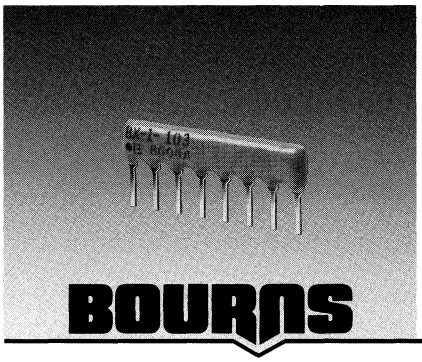
STANDARD RESISTANCE VALUES (101, 102 CIRCUITS)

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
10	100	330	331	4,700	472	68,000	683
22	220	390	391	5,600	562	82,000	823
27	270	470	471	6,800	682	100,000	104
33	330	560	561	8,200	822	120,000	124
39	390	680	681	10,000	103	150,000	154
47	470	820	821	12,000	123	180,000	184
56	560	1,000	102	15,000	153	220,000	224
68	680	1,200	122	18,000	183	270,000	274
82	820	1,500	152	20,000	203	330,000	334
100	101	1,800	182	22,000	223	390,000	394
120	121	2,000	202	27,000	273	470,000	474
150	151	2,200	222	33,000	333	560,000	564
180	181	2,700	272	39,000	393	680,000	684
220	221	3,300	332	47,000	473	820,000	824
270	271	3,900	392	56,000	563	1,000,000	105

STANDARD RESISTANCE VALUES (104 CIRCUITS)

Resistance			
(Ohms)		Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.
* ±1% tolerance is available by adding suffix code "F" after the resistance code.



CONFORMAL SIPs, LOW PROFILE 4 THROUGH 14 PIN

- Low profile is compatible with DIPs
- Wide assortment of pin packages enhances design flexibility
- High temperature design ensures compatibility with all popular board soldering techniques
- Copper leads for superior heat dissipation

Model 4600X

BOURNS® Resistor Networks

Electrical Characteristics

Standard Resistance Values ..... 10 ohms to 10 megohms
Maximum Operating Voltage... 100V
Temperature Coefficient of Resistance (TCR)..... ±100ppm/°C
±250ppm/°C for values less than 50 ohms and greater than 2.2 megohms
Voltage Coefficient..... ±100ppm/V typical by decade values
TCR Tracking..... 50ppm/°C maximum; equal values
Resistor Tolerance..... See circuits
Operating Temperature ..... −55°C to +125°C
Power Rating..... Derate to zero power from +70°C to +125°C

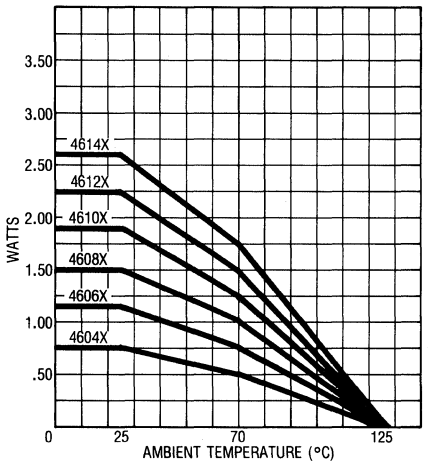
Environmental Characteristics

Tests per MIL-R-83401. ΔR maximum
Short Time Overload..... ±0.25%
Load Life..... ±1.00%
Mechanical Shock..... ±0.25%
Moisture Resistance..... ±0.50%
Resistance to Soldering Heat ..... ±0.25%
Terminal Strength..... ±0.25%
Thermal Shock..... ±0.25%
Vibration ..... ±0.25%
Insulation Resistance ..... 10,000 megohms minimum
Dielectric Withstanding Voltage ..... 200 VRMS
Lead Solderability & Solvent Resistance
. Meet requirements of MIL-R-83401

Physical Characteristics

Flammability.. Conforms to UL94V-0
Lead Frame Material .....
Copper (OLIN 194) 60/40 solder dip
Body Material .....
. Epoxy resin/anhydride disphenol A

PACKAGE POWER TEMPERATURE DERATING CURVE



PACKAGE POWER RATINGS (Watts)

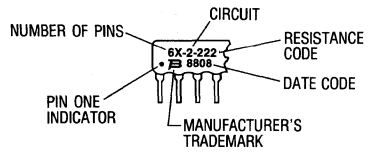
Pkg.	Ambient Temperature 70°C	25°C	Pkg.	Ambient Temperature 70°C	25°C
4604X	0.50	0.75	4610X	1.25	1.88
4605X	0.63	0.94	4611X	1.38	2.06
4606X	0.75	1.13	4612X	1.50	2.25
4607X	0.88	1.31	4613X	1.63	2.44
4608X	1.00	1.50	4614X	1.75	2.63
4609X	1.13	1.69			

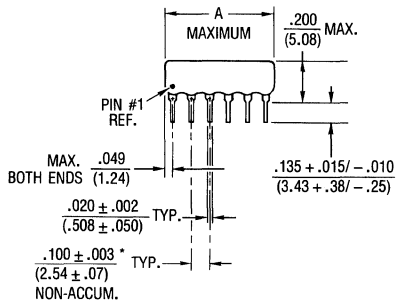
TYPICAL PART MARKING

Represents total content. Layout may vary.

Part Number	Part Marking
4606X-101-RC	6X-1-RC
4608X-102-RC	8X-2-RC
4610X-104-RC/RC	10X-4-RC/RC

RC = ohmic value, 3-digit resistance code.





Pin Count	A Maximum Inches (mm)
4	.398 (10.11)
5	.498 (12.65)
6	.598 (15.19)
7	.698 (17.73)
8	.798 (20.27)
9	.898 (22.81)
10	.998 (25.35)
11	1.098 (27.89)
12	1.198 (30.43)
13	1.298 (32.97)
14	1.398 (35.51)

Maximum package length is equal to .100" (2.54mm) times the number of pins, less .002" (.05mm).

Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

HOW TO ORDER CONFORMAL SIP NETWORKS

46 06 X - 101 - 222

- Model (46 = Conformal SIP)
- Number of Pins
- Physical Configuration (X = Low Profile)
- Electrical Configuration
  - •101 = Bussed
  - •102 = Isolated
  - •104 = Dual Terminator
- Resistance Code
  - •First 2 digits are significant.
  - •Third digit represents the number of zeros to follow.

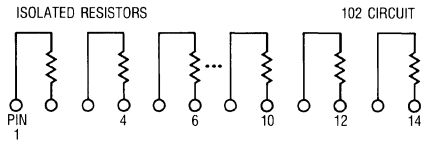
- Trifurcated Krimp-Joint™ lead attachment for product reliability and strength
- Gold epoxy provides excellent marking contrast
- Laser marking for permanent identification

Model 4600X

BI®Resistor Networks

ISOLATED RESISTORS (102 CIRCUIT)

Model 4600X-102-RC
4, 6, 8, 10, 12 or 14 Pin

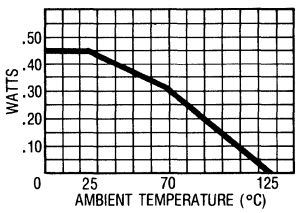


These models incorporate 2 to 7 isolated thick-film resistors of equal value, each connected between two pins.

Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 5 megohms. . . . . ±2%*
Above 5 megohms. . . . . ±5%

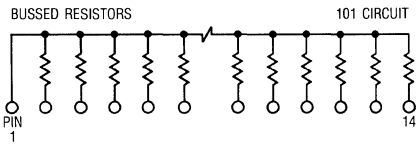
Power Rating per Resistor
At 70°C. . . . . 0.30 watt
At 25°C. . . . . 0.45 watt

POWER TEMPERATURE DERATING CURVE



BUSSED RESISTORS (101 CIRCUIT)

Model 4600X-101-RC
4 through 14 Pin

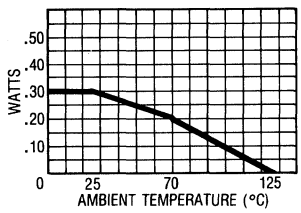


These models incorporate 3 to 13 thick-film resistors of equal value, each connected between a common bus (pin 1) and a separate pin.

Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 5 megohms. . . . . ±2%*
Above 5 megohms. . . . . ±5%

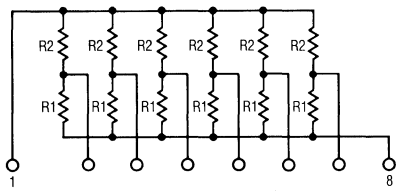
Power Rating per Resistor
At 70°C. . . . . 0.20 watt
At 25°C. . . . . 0.30 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATORS (104 CIRCUIT)

Model 4600X-104-R1/R2
4 through 14 Pin

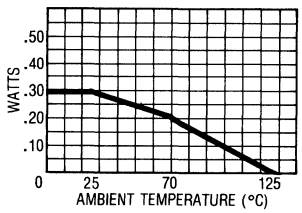


The 4608X-104 (shown above) is an 8-pin configuration and terminates 6 lines. Pins 1 and 8 are common for ground and power, respectively. Twelve thick-film resistors are paired in series between the common lines (pins 1 and 8).

Resistance Tolerance
Below 100 ohms. . . . . ±2 ohms
100 ohms to 5 megohms. . . . . ±2%*
Above 5 megohms. . . . . ±5%

Power Rating per Resistor
At 70°C. . . . . 0.20 watt
At 25°C. . . . . 0.30 watt

POWER TEMPERATURE DERATING CURVE



STANDARD RESISTANCE VALUES (101, 102 CIRCUITS)

Resistance (Ohms)	Resistance Code
10	100
22	220
27	270
33	330
39	390
47	470
56	560
68	680
82	820
100	101
120	121
150	151
180	181
220	221
270	271

Resistance (Ohms)	Resistance Code
330	331
390	391
470	471
560	561
680	681
820	821
1,000	102
1,200	122
1,500	152
1,800	182
2,000	202
2,200	222
2,700	272
3,300	332
3,900	392

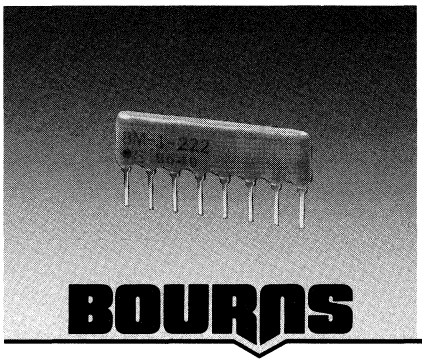
Resistance (Ohms)	Resistance Code
4,700	472
5,600	562
6,800	682
8,200	822
10,000	103
12,000	123
15,000	153
18,000	183
20,000	203
22,000	223
27,000	273
33,000	333
39,000	393
47,000	473
56,000	563

Resistance (Ohms)	Resistance Code
68,000	683
82,000	823
100,000	104
120,000	124
150,000	154
180,000	184
220,000	224
270,000	274
330,000	334
390,000	394
470,000	474
560,000	564
680,000	684
820,000	824
1,000,000	105

STANDARD RESISTANCE VALUES (104 CIRCUITS)

Resistance (Ohms)		Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.
* ±1% tolerance is available by adding suffix code "F" after the resistance code.



CONFORMAL SIPs, MEDIUM PROFILE 4 THROUGH 14 PIN

- Medium profile offers increased power handling
- Wide assortment of pin packages enhances design flexibility
- High temperature design ensures compatibility with all popular board soldering techniques
- Copper leads for superior heat dissipation

Model 4600M

BOURNS® Resistor Networks

Electrical Characteristics

Standard Resistance Values
.....10 ohms to 10 megohms
Maximum Operating Voltage...100V
Temperature Coefficient of Resistance (TCR).....±100ppm/°C
±250ppm/°C for values less than 50 ohms and greater than 2.2 megohms
Voltage Coefficient.....±100ppm/V typical by decade values
TCR Tracking.....50ppm/°C maximum; equal values
Resistor Tolerance.....See circuits
Operating Temperature
.....−55°C to +125°C
Power Rating.....Derate to zero power from +70°C to +125°C

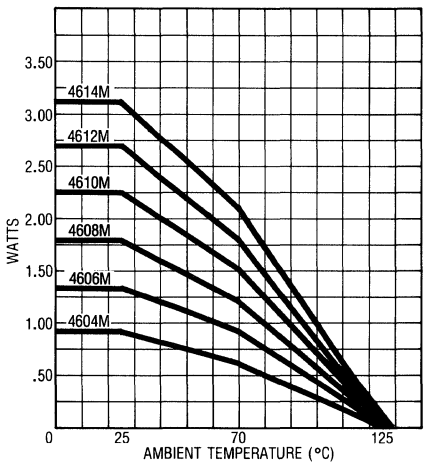
Environmental Characteristics

Tests per MIL-R-83401. ΔR maximum
Short Time Overload.....±0.25%
Load Life.....±1.00%
Mechanical Shock.....±0.25%
Moisture Resistance.....±0.50%
Resistance to Soldering Heat
.....±0.25%
Terminal Strength.....±0.25%
Thermal Shock.....±0.25%
Vibration.....±0.25%
Insulation Resistance
.....10,000 megohms minimum
Dielectric Withstanding Voltage
.....200 VRMS
Lead Solderability & Solvent Resistance
. Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material.....
Copper (OLIN 194) 60/40 solder dip
Body Material.....
. Epoxy resin/anhydride disphenol A

PACKAGE POWER TEMPERATURE DERATING CURVE



PACKAGE POWER RATINGS (Watts)

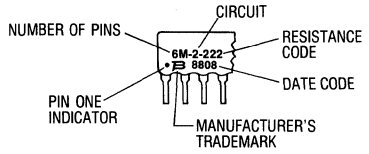
Pkg.	Ambient Temperature 70 °C	25 °C	Pkg.	Ambient Temperature 70 °C	25 °C
4604M	0.60	0.90	4610M	1.50	2.25
4605M	0.75	1.13	4611M	1.65	2.47
4606M	0.90	1.35	4612M	1.80	2.70
4607M	1.05	1.58	4613M	1.95	2.92
4608M	1.20	1.80	4614M	2.10	3.15
4609M	1.35	2.03			

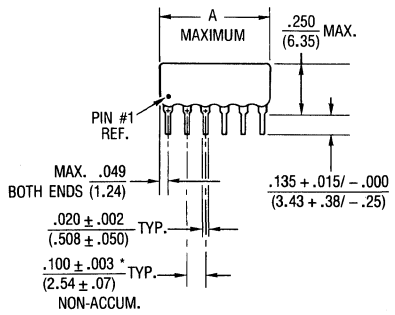
TYPICAL PART MARKING

Represents total content. Layout may vary.
RC = ohmic value, 3-digit resistance code.

Part Number	Part Marking
4606M-101-RC	6M-1-RC
4608M-102-RC	8M-2-RC
4610-104-RC/RC	10M-4-RC/RC

RC = ohmic value, 3-digit resistance code.





Pin Count	A Maximum Inches (mm)
4	.398 (10.11)
5	.498 (12.65)
6	.598 (15.19)
7	.698 (17.73)
8	.798 (20.27)
9	.898 (22.81)
10	.998 (25.35)
11	1.098 (27.89)
12	1.198 (30.43)
13	1.298 (32.97)
14	1.398 (35.51)

Maximum package length is equal to .100" (2.54mm) times the number of pins, less .002" (.05mm).

Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

HOW TO ORDER CONFORMAL SIP NETWORKS

46 06 M -101 - 222

- Model (46 = Conformal SIP)
- Number of Pins
- Physical Configuration (M = Medium Profile)
- Electrical Configuration
  - •101 = Bussed
  - •102 = Isolated
  - •104 = Dual Terminator
- Resistance Code
  - •First 2 digits are significant
  - •Third digit represents the number of zeros to follow.

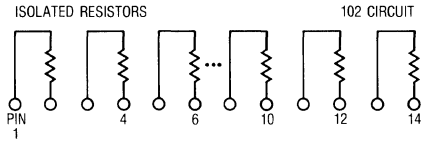
- Trifurcated Krimp-Joint™ lead attachment for product reliability and strength
- Gold epoxy provides excellent marking contrast
- Laser marking for permanent identification

Model 4600M

Bourns® Resistor Networks

ISOLATED RESISTORS (102 CIRCUIT)

Model 4600M-102-RC
4, 6, 8, 10, 12 or 14 Pin

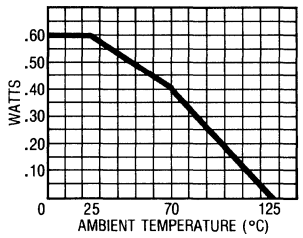


These models incorporate 2 to 7 isolated thick-film resistors of equal value, each connected between two pins.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms.....±2%*
Above 5 megohms..... ±5%

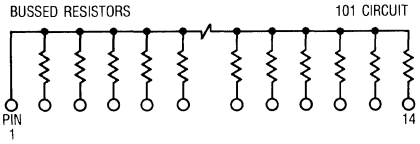
Power Rating per Resistor
At 70°C.....0.40 watt
At 25°C.....0.60 watt

POWER TEMPERATURE DERATING CURVE



BUSSED RESISTORS (101 CIRCUIT)

Model 4600M-101-RC
4 through 14 Pin

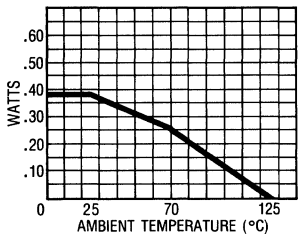


These models incorporate 3 to 13 thick-film resistors of equal value, each connected between a common bus (pin 1) and a separate pin.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms.....±2%*
Above 5 megohms..... ±5%

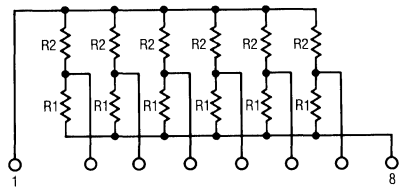
Power Rating per Resistor
At 70°C.....0.25 watt
At 25°C.....0.38 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATORS (104 CIRCUIT)

Model 4600M-104-R1/R2
4 through 14 Pin

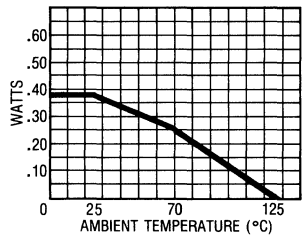


For example, the 4608M-104 (shown above) is an 8-pin configuration and terminates 6 lines. Pins 1 and 8 are common for ground and power, respectively. Twelve thick-film resistors are paired in series between the common lines (pins 1 and 8).

Resistance Tolerance
Below 100 ohms..... ±2 ohms
100 ohms to 5 megohms.....±2%*
Above 5 megohms..... ±5%

Power Rating per Resistor
At 70°C.....0.25 watt
At 25°C.....0.38 watt

POWER TEMPERATURE DERATING CURVE



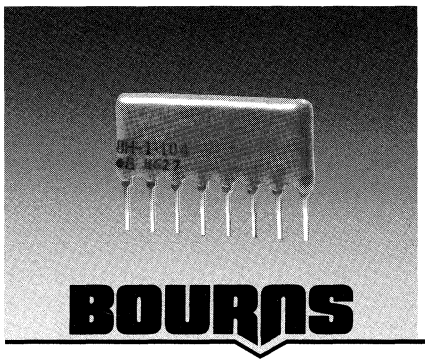
STANDARD RESISTANCE VALUES (101, 102 CIRCUITS)

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
10	100	330	331	4,700	472	68,000	683
22	220	390	391	5,600	562	82,000	823
27	270	470	471	6,800	682	100,000	104
33	330	560	561	8,200	822	120,000	124
39	390	680	681	10,000	103	150,000	154
47	470	820	821	12,000	123	180,000	184
56	560	1,000	102	15,000	153	220,000	224
68	680	1,200	122	18,000	183	270,000	274
82	820	1,500	152	20,000	203	330,000	334
100	101	1,800	182	22,000	223	390,000	394
120	121	2,000	202	27,000	273	470,000	474
150	151	2,200	222	33,000	333	560,000	564
180	181	2,700	272	39,000	393	680,000	684
220	221	3,300	332	47,000	473	820,000	824
270	271	3,900	392	56,000	563	1,000,000	105

STANDARD RESISTANCE VALUES (104 CIRCUITS)

Resistance (Ohms)		Resistance Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.
*±1% tolerance is available by adding suffix code "F" after the resistance code.



CONFORMAL SIPs, HIGH PROFILE 4 THROUGH 14 PIN

- High profile offers increased power handling
- Wide assortment of pin packages enhances design flexibility
- High temperature design ensures compatibility with all popular board soldering techniques
- Copper leads for superior heat dissipation

Model 4600H

Bourns® Resistor Networks

Electrical Characteristics

Standard Resistance Values
.....10 ohms to 10 megohms
Maximum Operating Voltage...100V
Temperature Coefficient of Resistance (TCR).....±100ppm/°C
±250ppm/°C for values less than 50 ohms and greater than 2.2 megohms
Voltage Coefficient.....±100ppm/V typical by decade values
TCR Tracking.....50ppm/°C maximum; equal values
Resistor Tolerance.....See circuits
Operating Temperature
.....–55°C to +125°C
Power Rating.....Derate to zero power from +70°C to +125°C

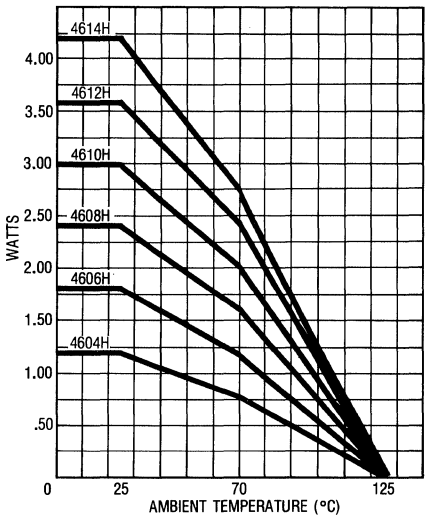
Environmental Characteristics

Tests per MIL-R-83401. ΔR maximum
Short Time Overload.....±0.25%
Load Life.....±1.00%
Mechanical Shock.....±0.25%
Moisture Resistance.....±0.50%
Resistance to Soldering Heat
.....±0.25%
Terminal Strength.....±0.25%
Thermal Shock.....±0.25%
Vibration.....±0.25%
Insulation Resistance
.....10,000 megohms minimum
Dielectric Withstanding Voltage
.....200 VRMS
Lead Solderability & Solvent Resistance
. Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material.....
Copper (OLIN 194) 60/40 solder dip
Body Material.....
Epoxy resin/anhydride disphenol A

PACKAGE POWER TEMPERATURE DERATING CURVE



PACKAGE POWER RATINGS (Watts)

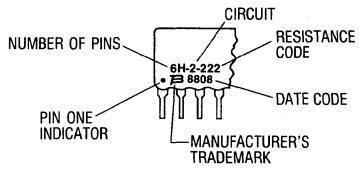
Pkg.	Ambient Temperature 70 °C	25 °C	Pkg.	Ambient Temperature 70 °C	25 °C
4604H	0.80	1.20	4610H	2.00	3.00
4605H	1.00	1.50	4611H	2.20	3.30
4606H	1.20	1.80	4612H	2.40	3.60
4607H	1.40	2.10	4613H	2.60	3.90
4608H	1.60	2.40	4614H	2.80	4.20
4609H	1.80	2.70			

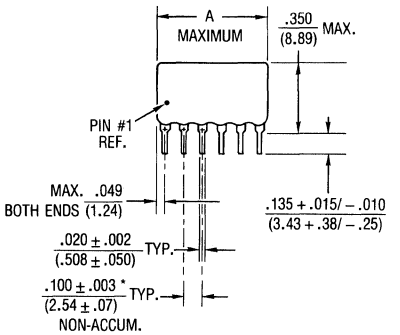
TYPICAL PART MARKING

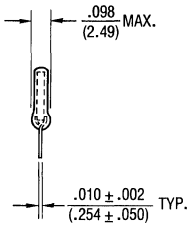
Represents total content. Layout may vary.

Part Number	Part Marking
4606H-101-RC	6H-1-RC
4608H-102-RC	8H-2-RC
4610H-104-RC/RC	10H-4-RC/RC

RC = ohmic value, 3-digit resistance code.







Pin Count	A Maximum Inches (mm)
4	.398 (10.11)
5	.498 (12.65)
6	.598 (15.19)
7	.698 (17.73)
8	.798 (20.27)
9	.898 (22.81)
10	.998 (25.35)
11	1.098 (27.89)
12	1.198 (30.43)
13	1.298 (32.97)
14	1.398 (35.51)

Maximum package length is equal to .100" (2.54mm) times the number of pins, less .002" (.05mm).

Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

HOW TO ORDER CONFORMAL SIP NETWORKS

46 06 H - 101 - 222

- Model (46 = Conformal SIP)
- Number of Pins
- Physical Configuration (H = High Profile)
- Electrical Configuration
  - •101 = Bussed
  - •102 = Isolated
  - •104 = Dual Terminator
- Resistance Code
  - •First 2 digits are significant
  - •Third digit represents the number of zeros to follow.

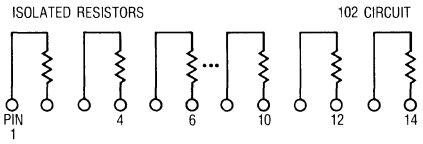
- Trifurcated Krimp-Joint™ lead attachment for product reliability and strength
- Gold epoxy provides excellent marking contrast
- Laser marking for permanent identification

Model 4600H

Bourns® Resistor Networks

ISOLATED RESISTORS (102 CIRCUIT)

Model 4600H-102
4, 6, 8, 10, 12 or 14 Pin

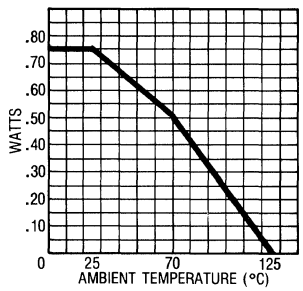


These models incorporate 2 to 7 isolated thick-film resistors of equal value, each connected between two pins.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms.....±2%*
Above 5 megohms..... ±5%

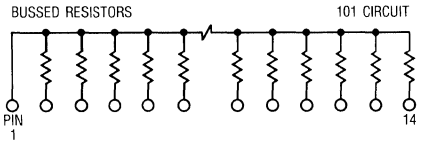
Power Rating per Resistor
At 70°C.....0.50 watt
At 25°C.....0.75 watt

POWER TEMPERATURE DERATING CURVE



BUSSED RESISTORS (101 CIRCUIT)

Model 4600H-101
4 through 14 Pin

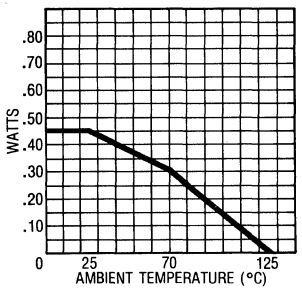


These models incorporate 3 to 13 thick-film resistors of equal value, each connected between a common bus (pin 1) and a separate pin.

Resistance Tolerance
10 ohms to 49 ohms..... ±1 ohm
50 ohms to 5 megohms.....±2%*
Above 5 megohms..... ±5%

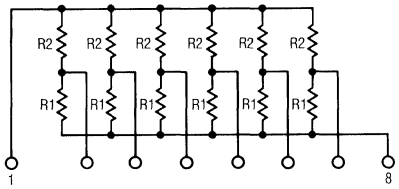
Power Rating per Resistor
At 70°C.....0.30 watt
At 25°C.....0.45 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATORS (104 CIRCUIT)

Model 4600H-104-R1/R2
4 through 14 Pin

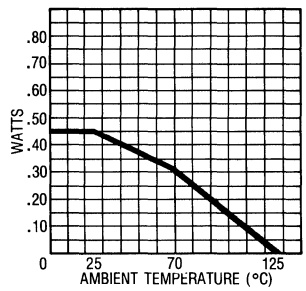


For example, the 4608H-104 (shown above) is an 8-pin configuration and terminates 6 lines. Pins 1 and 8 are common for ground and power, respectively. Twelve thick-film resistors are paired in series between the common lines (pins 1 and 8).

Resistance Tolerance
Below 100 ohms..... ±2 ohms
100 ohms to 5 megohms.....±2%*
Above 5 megohms..... ±5%

Power Rating per Resistor
At 70°C.....0.30 watt
At 25°C.....0.45 watt

POWER TEMPERATURE DERATING CURVE



STANDARD RESISTANCE VALUES (101, 102 CIRCUITS)

Resistance (Ohms)	Resistance Code
10	100
22	220
27	270
33	330
39	390
47	470
56	560
68	680
82	820
100	101
120	121
150	151
180	181
220	221
270	271
330	331
390	391
470	471
560	561
680	681
820	821
1,000	102
1,200	122
1,500	152
1,800	182
2,000	202
2,200	222
2,700	272
3,300	332
3,900	392
4,700	472
5,600	562
6,800	682
8,200	822
10,000	103
12,000	123
15,000	153
18,000	183
20,000	203
22,000	223
27,000	273
33,000	333
39,000	393
47,000	473
56,000	563
68,000	683
82,000	823
100,000	104
120,000	124
150,000	154
180,000	184
220,000	224
270,000	274
330,000	334
390,000	394
470,000	474
560,000	564
680,000	684
820,000	824
1,000,000	105

STANDARD RESISTANCE VALUES (104 CIRCUITS)

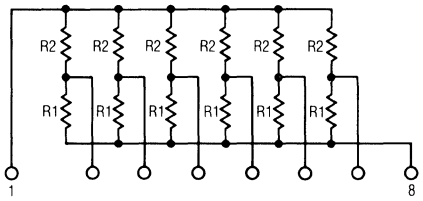
Resistance (Ohms)		Resistance Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.
* ± 1% tolerance is available by adding suffix code "F" after the resistance code.

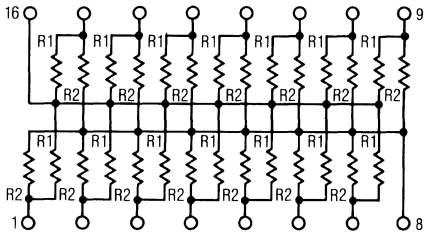
DUAL TERMINATOR RESISTOR NETWORKS

The Dual Terminator (or Thevenin equivalent) Network is commonly used for TTL dual-line termination and pulse squaring or ECL line terminations. In ECL line terminator, R2 functions as an emitter pull-down resistor and is normally tied to the most negative supply voltage to provide proper line currents. R1 is normally tied to ground functions as the termination resistor and in parallel with R2 provides the characteristic impedance of the transmission line. This results in a zero reflection coefficient of this line to eliminate reflections.

The Dual Terminator circuit is available in both SIP and DIP configurations, as shown below.



SIP



DIP

Testing of Dual Terminators

Since the Dual Terminator circuit has many resistors in parallel, a direct pin-to-pin measurement for the values of R1 and R2 can be made using an ohmmeter with guard capabilities.

The function of the guard pin is to apply an equal voltage across the adjacent (parallel) resistance path. When applied, current flow is eliminated allowing an accurate measurement of the resistor under test.

Using the 8-pin SIP network shown, the testing method would be as follows:

Test R1 Values

To test the first resistor, connect the ohmmeter measurement leads between pin 8 and pin 2. Connect the guard lead to pin 1. R1 is now guarded and an accurate measurement can be made.

To test the second R1 resistor, connect the measurement leads between pin 8 and pin 3. Connect the guard to pin 1 and make the resistance measurement.

Continue this testing scheme for the remainder of the R1 resistors, always guarding pin 1.

Test R2 Values

To test the first R2 resistor, connect the ohmmeter measurement leads between pin 1 and pin 2. Connect the guard lead to pin 8. The first R2 resistor is now guarded and an accurate measurement can be made.

To test the second R2 resistor, connect the ohmmeter measurement leads between pin 1 and pin 3. Connect the guard lead to pin 8 and make the resistance measurement.

Continue this testing scheme for the remainder of the R2 resistors, always guarding pin 8.

An example of the type of ohmmeter to be utilized that incorporates a guarded measurement capability is the RACAL-DANA Model 6000 where the guard pin is the "analog low" lead. An additional ohmmeter is ESI Model 1700 where the guard pin is labeled "Guard." It must be noted that guarded measurements using ohmmeters of these types are satisfactory for measurements up to a ratio of about 10:1 between R1 and R2. Above a 10:1 ratio, accuracy is degraded and measurements can be incorrect because of inadequate guarding capability of the equipment.

Unguarded Resistance Measurements

In the case where no guarded ohmmeter is available, the individual resistors can be evaluated by comparing the unguarded resistance measurement to the theoretical value of the equivalent series-parallel circuit and determining the percent error of each resistor.

Example:

Network 4608X-104-221/331 where R1 values are 220Ω and R2 values are 330Ω.

R_P = Parallel Resistance of Remaining Circuit (See diagram below.)

RE = Equivalent Series - Parallel Resistance Seen by Unguarded Meter

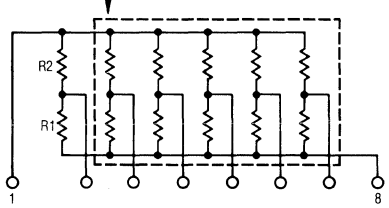
$$RE_{R1} = (P8\text{-}P2) = \frac{R1(R2+R_P)}{R1+(R2+R_P)} = \frac{220(330+110)}{220+(330+110)} = 146.67\Omega$$

2% Tolerance ≈ ±1.96Ω*

$$RE_{R2} = (P1\text{-}P2) = \frac{R2(R1+R_P)}{R2+(R1+R_P)} = \frac{330(220+110)}{330+(220+110)} = 165\Omega$$

2% Tolerance ≈ ±1.65Ω

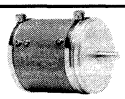
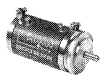
$$R_P = \frac{550}{5} = 110\Omega$$



Utilization of these formulas will enable you to determine the equivalent unguarded resistance to be expected from any values of R1 and R2 for a Dual Terminator Network.

*2% tolerance ≈ $\frac{(RE_{R1})^2}{R1}$ X .02 = 1.96Ω

Multiturn Precision Potentiometers

Product	Model No.	Turns	Element Type	Resistance Tolerance	Resistance Range (Ohms)	Standard Linearity	Pkg. Dia.	Pkg. Depth	Shaft Dia./Length	Mount	Page No.
	**3070**	10	Wirewound	±5%	100-500K	NA	5/16" (Sq.)	1-1/16"	N/A	Bushing/ PC	72
	**3400**	10	Wirewound	±3%	100-500K	±0.15%	1-13/16"	1-3/4"	1/4"x13/16"	Bushing	74
	**3450**	10	Wirewound	±3%	100-500K	±0.15%	2"	2-1/4"	1/4"x5/8"	Servo	75
	**3500**	10	Wirewound	±3%	50-200K	±0.20%	7/8"	1"	1/4"x13/16"	Bushing	76
	**3501**	10	Hybritron®	±10%	1K-100K	±0.25%	7/8"	1"	1/4"x13/16"	Bushing	76
	**3510**	3	Wirewound	±3%	25-100K	±0.5%	7/8"	9/16"	1/8"x11/16"	Bushing	77
	**3511**	3	Hybritron®	±10%	500-20K	±0.3%	7/8"	9/16"	1/8"x11/16"	Bushing	77
	**3520**	5	Wirewound	±3%	20-75K	±0.3%	7/8"	11/16"	1/4"x13/16"	Bushing	78
	**3521**	5	Hybritron®	±10%	500-50K	±0.3%	7/8"	11/16"	1/4"x13/16"	Bushing	78
	**3540**	10	Wirewound	±5%	100-100K	±0.25%	7/8"	3/4"	1/4"x13/16"	Bushing	79
	**3541**	10	Hybritron®	±10%	1K-100K	±0.25%	7/8"	3/4"	1/4"x13/16"	Bushing	79
	**3543**	3	Wirewound	±5%	20-50K	±0.25%	7/8"	3/4"	1/4"x13/16"	Bushing	80
	**3545**	5	Wirewound	±5%	50-50K	±0.25%	7/8"	3/4"	1/4"x13/16"	Bushing	80
	**3550**	10	Wirewound	±3%	100-200K	±0.2%	7/8"	1-9/16"	1/8"x3/8"	Servo	81
	**3551**	10	Hybritron®	±10%	1K-100K	±0.25%	7/8"	1-9/16"	1/8"x3/8"	Servo	81
	**3560**	3	Wirewound	±3%	50-50K	±0.25%	7/8"	1-1/16"	1/8"x3/8"	Servo	82
	**3561**	3	Hybritron®	±10%	500-20K	±0.25%	7/8"	1-1/16"	1/8"x3/8"	Servo	82

Specifications are subject to change without notice.

Multiturn Precision Potentiometers

Product	Model No.	Turns	Element Type	Resistance Tolerance	Resistance Range (Ohms)	Standard Linearity	Pkg. Dia.	Pkg. Depth	Shaft Dia./Length	Mount	Page No.
	**3570**	5	Wirewound	±3%	50-50K	±0.25%	7/8"	1 3/16"	1/8"x3/8"	Servo	83
	**3571**	5	Hybritron®	±10%	500-50K	±0.25%	7/8"	1-3/16"	1/8"x3/8"	Servo	83
	**3590**	10	Wirewound	±5%	200-100K	±0.25%	7/8"	3/4"	Various	Bushing	84
	**3700**	10	Wirewound	±5%	100-100K	±0.25%	1/2"	1"	3/32"x11/16"	Bushing	85
	**3701**	10	Hybritron®	±10%	1K-100K	±0.25%	1/2"	1"	3/32"x11/16"	Bushing	85
	**3750**	10	Wirewound	±5%	100-100K	±0.25%	1/2"	1-3/16"	3/32"x3/8"	Servo	86
	**3751**	10	Hybritron®	±10%	1K-100K	±0.25%	1/2"	1-3/16"	3/32"x3/8"	Servo	86

Knobpot® Precision Potentiometers

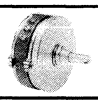
Product	Model No.	Turns	Element Type	Resistance Tolerance	Resistance Range (Ohms)	Accuracy	Pkg. Dia.	Pkg. Depth	Shaft Dia./Length	Mount	Page No.
	**3600**	10	Wirewound	±5%	100-100K	See Data Sheet	3/4"	See Data Sheet	N/A	Bushing	98
	**3610**	10	Wirewound	±5%	100-100K	See Data Sheet	7/8"	See Data Sheet	N/A	Snap-In	99
	**3640**	10	Wirewound	±3%	100-250K	See Data Sheet	1-1/4"	See Data Sheet	N/A	Bushing	100
	**3650**	10	Wirewound	±3%	100-100K	See Data Sheet	1-1/4"	See Data Sheet	N/A	Single-Hole	101

Digital Pushbutton Potentiometers

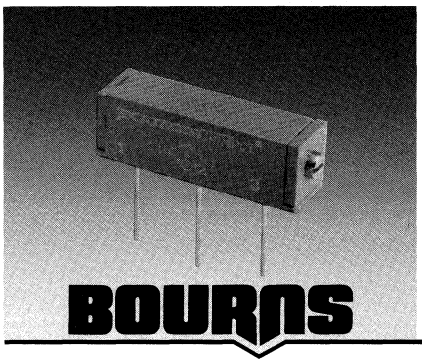
Product	Model No.	Turns	Element Type	Resistance Tolerance	Resistance Range (Ohms)	Accuracy	Pkg. Dia.	Pkg. Depth	Shaft Dia./Length	Mount	Page No.
	**3680**	N/A	Cerment	±3%	10-1 MEG	See Data Sheet	See Data Sheet	See Data Sheet	N/A	Snap-In	102

Specifications are subject to change without notice.

Single-Turn Precision Potentiometers

Product	Model No.	Element Type	Resistance Tolerance	Resistance Range (Ohms)	Standard Linearity	Pkg. Dia.	Pkg. Depth	Shaft Dia./Length	Mount	Page No.
	**3415**	Wirewound	±3%	50-100K	±0.3%	2"	27/32"	1/4"x7/8"	Bushing	88
	**3435**	Wirewound	±3%	50-50K	±0.5%	1-1/16"	11/16"	1/8"x7/8"	Bushing	88
	**3437**	Wirewound	±5%	50-50K	±0.5%	1 1/16"	23/32"	1/4"x7/8"	Bushing	87
	**3438**	Hybritron®	±10%	200-20K	±0.5%	1-1/16"	23/32"	1/4"x7/8"	Bushing	87
	**3465**	Wirewound	±3%	50-100K	±0.3%	2"	13/16"	1/4"x5/8"	Servo	89
	**3485**	Wirewound	±3%	50-50K	±0.5%	1-1/16"	11/16"	1/8"x7/8"	Servo	89
	**3535**	Wirewound	±3%	50-20K	±0.5%	7/8"	11/16"	1/8"x1/2"	Bushing	88
	**3585**	Wirewound	±3%	50-20K	±0.5%	7/8"	11/16"	1/8"x1/2"	Servo	89
	**6534**	Conductive Plastic	±10%	1K-100K	±0.5%	7/8"	15/32"	1/8"x1/2"	Servo	90
	**6537**	Conductive Plastic	±10%	1K-100K	±1.0%	7/8"	1/2"	1/8"x1/2"	Servo	91
	**6538**	Conductive Plastic	±10%	1K-100K	±1%	7/8"	19/32"	1/8"x1/2"	Servo	91
	**6544**	Conductive Plastic	±10%	1K-100K	±0.5%	1-1/16"	1/2"	1/8"x1/2"	Servo	92
	**6574**	Conductive Plastic	±10%	1K-100K	±0.25%	2"	3/5"	1/4"x5/8"	Servo	93
	**6634**	Conductive Plastic	±10%	1K-100K	±0.5%	7/8"	15/32"	1/8"x1/2"	Bushing	94
	**6637**	Conductive Plastic	±10%	1K-100K	±1%	7/8"	9/16"	1/8"x7/8"	Bushing	95
	**6638**	Conductive Plastic	±10%	1K-100K	±1%	7/8"	21/32"	1/8"x7/8"	Bushing	95
	**6657**	Conductive Plastic	±10%	1K-100K	±1%	1-5/16"	25/32"	1/4"x7/8"	Bushing	96
	**6674**	Conductive Plastic	±10%	1K-100K	±0.25%	2"	3/5"	1/4"x7/8"	Bushing	97

Specifications are subject to change without notice.



5/16" RECTANGULAR/10-TURN WIREWOUND

- Exceptional resolution (8X better than standard adjustment potentiometers)
- 6.5" element in a 1" body length
- 1.5 watt power rating at 70°C

FOR ORDERING INFORMATION SEE PAGE 104

Model 3070

Bourns® Precision Potentiometer

Electrical Characteristics[1]

Standard Resistance Range	100 to 50KΩ
Resistance Tolerance*	±5%
Absolute Minimum Resistance*	0.1% or 1Ω, whichever is greater
Noise During Adjustment*	100Ω maximum
Insulation Resistance*	1,000 megohms minimum
Resolution (See Table Page 108)	.117 to .022%

Environmental Characteristics[1]

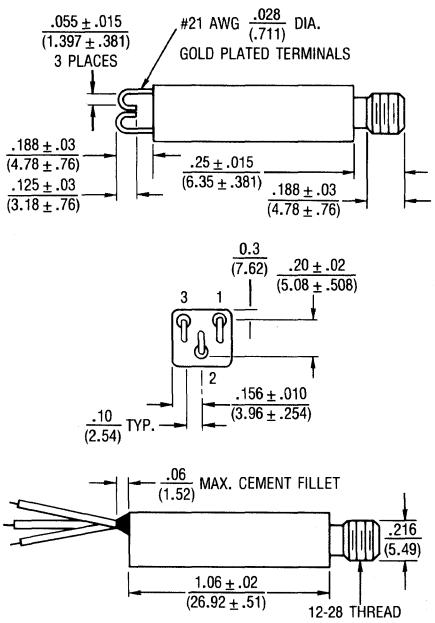
Power Rating	
70°C Ambient	1.5 watts
175°C Ambient	0 watt
Operating Temperature Range	−65°C to +175°C
Temperature Coefficient (MIL-R-27208)	±50ppm/°C maximum
Moisture Resistance (MIL-R-27208)	100 megohms minimum after removal from chamber
Vibration (MIL-R-27208)	30G
Contact Bounce	0.1 millisecond maximum
Wiper Shift	±0.2% maximum
Shock (MIL-R—27208	100G
Contact Bounce & Wiper Shift	Same as Vibration
Sand & Dust	MIL-E-5272, Procedure 1
Salt Spray	MIL-R-27208
Fungus	MIL-E-5272
Load Life (MIL-R-27208)	1,000 hours
Resistance Shift	2% maximum
Mechanical Life	500 cycles without discontinuity
Dielectric Strength	MIL-R-27208
Room Conditions	1,000 VAC
80,000 Feet (0.8" Hg)	400 VAC

Physical Characteristics[1]

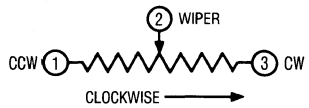
Immersion Leak Test*	No leaks
Shaft Torque*	5.0 oz-in. maximum
Mechanical Adjustment	10 turns nominal
Mechanical Stops	Wiper assembly idles
Weight	Approximately 0.2 oz.
Terminals	
L	Teflon insulated leads
S	Gold plated solder lugs
P, H	Gold plated, grade A nickel, printed circuit pins
Mounting Styles	Panel Mount, Eyelet Mount & Printed Circuit Pins

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.

3070 PANEL MOUNT L-S



NOTE:
PANEL MOUNT SUPPLIED WITH .030 (.762) THICK SPRING LOCKWASHER AND #12-28 HEX NUT .073 (1.85) THICK .28 ± .015 (7.11 ± .381) ACROSS FLATS



TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ± .010 (.25), .XXX ± .005 (.13)
DIMENSIONS: IN. (MM)

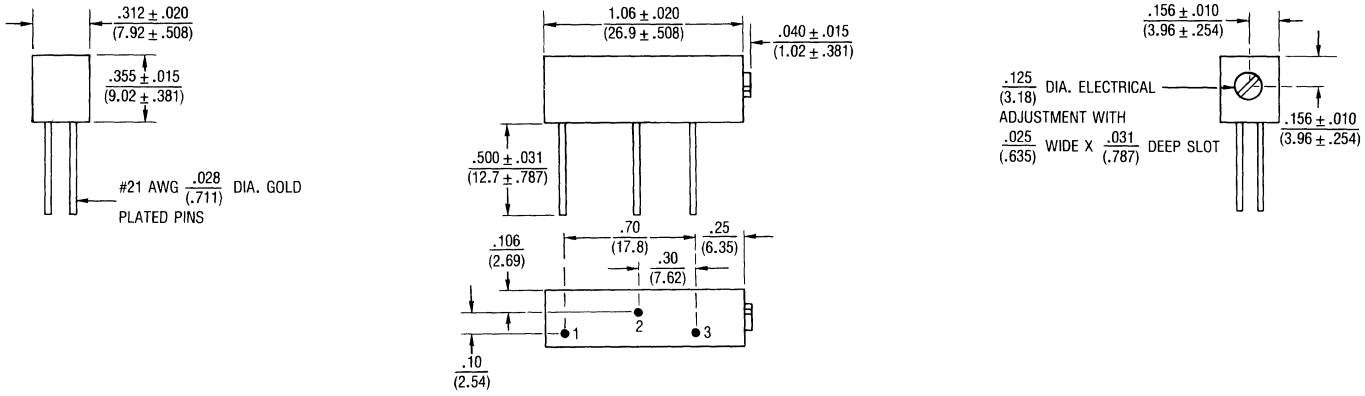
Specifications are subject to change without notice.

- Slip clutch action
- Versatile configurations - 3 mounting styles
- Moisture resistant
- Non-standard features and specifications available

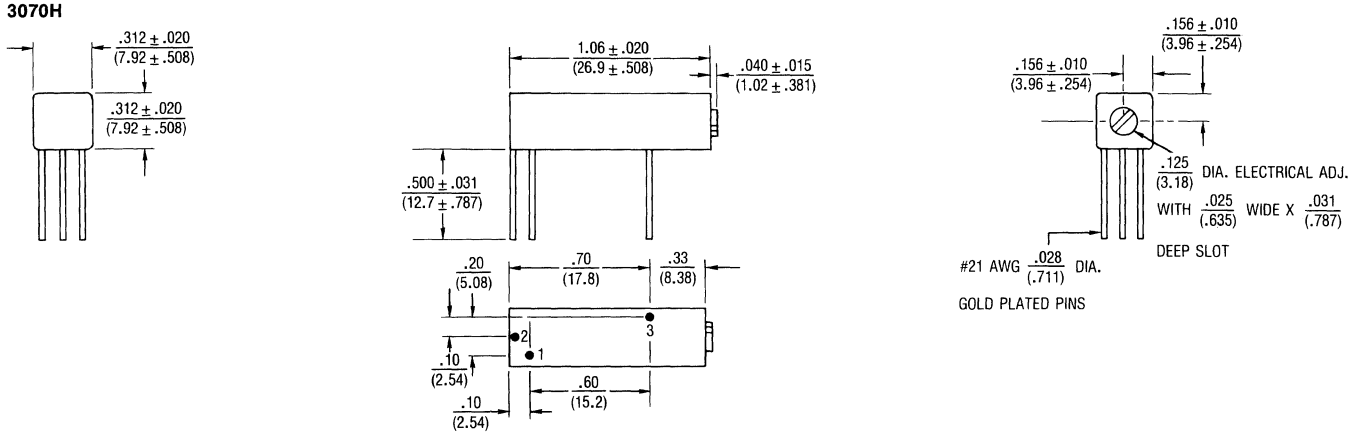
Model 3070

Bourns® Precision Potentiometer

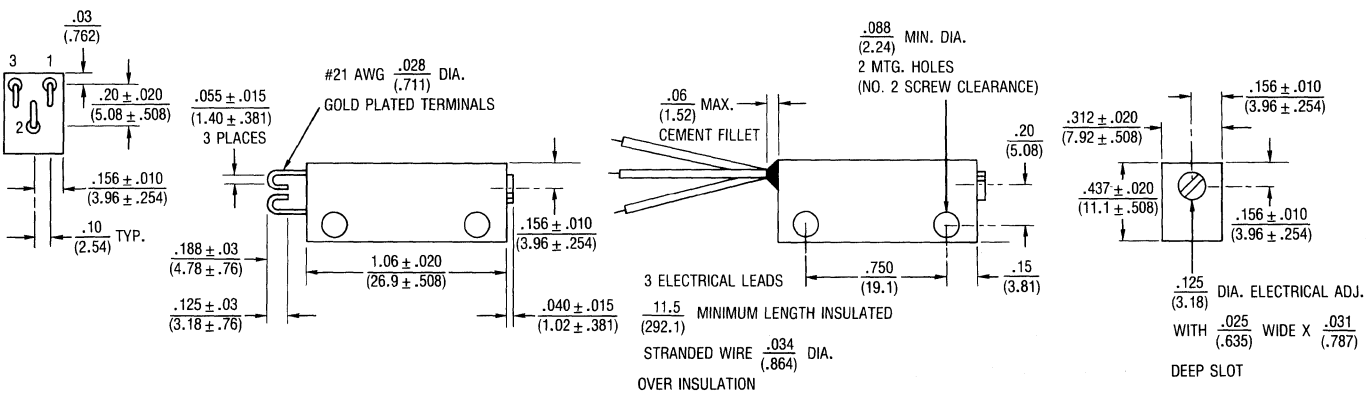
3070P



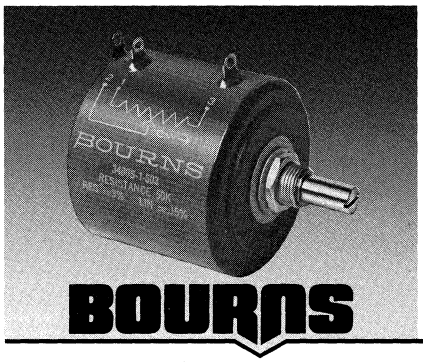
3070H



3070L-S



Specifications are subject to change without notice.



1-13/16" DIAMETER / 10-TURN / WIREWOUND

- Bushing mount
- Optional ±0.05 linearity option
- Excellent wiper stability
- High stop strength
- Sealable

FOR ORDERING INFORMATION SEE PAGE 104

Model 3400

Bourns® Precision Potentiometers

3400
1-13/16" Bushing Mount

Electrical Characteristics[1]

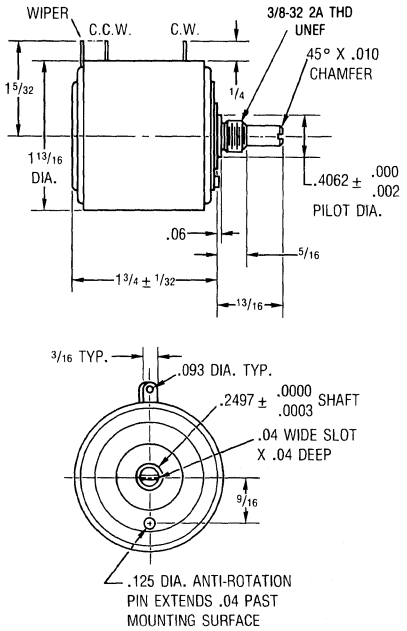
Standard Resistance Range	100 to 500KΩ
Resistance Tolerance	±3%
Independent Linearity	±0.15%
Resolution	See table page 104
Effective Electrical Angle	3600° +4°, −0°
Absolute Minimum Resistance	1Ω or 1.15% maximum (whichever is greater)
Noise	100Ω ENR maximum
Power Rating (Voltage Limited By Power Dissipation, or	(40°C) 5 watts
1,000 VAC, Whichever Is Less)	(105°C) 0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum
80,000 Feet	300 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

Environmental Characteristics[1]

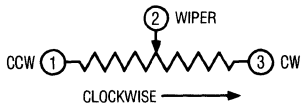
Operating Temperature	
Static Operation Temperature Range	−65°C to +125°C
Dynamic Temperature Range	+1°C to +125°C
Temperature Coefficient[2]	±20ppm/°C maximum/unit
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum
Vibration	10G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.1% maximum
Shock	50G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.1% maximum
Load Life	1,000 hours, 5 watts
Total Resistance Shift	±2% maximum
Rotational Life (No Load)	2,000,000 shaft revolutions
Total Resistance Shift	±5% maximum

Mechanical Characteristics[1]

Mechanical Angle	3600° +4°, −0°
Shaft Runout	0.002 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.
Shaft Radial Play	0.0025 in. T.I.R.
Pilot Diameter Runout	0.002 in. T.I.R.
Lateral Runout	0.005 in. T.I.R.
Stop Strength	550 oz-in. minimum
Torque (Starting & Running)	2.0 oz-in. minimum
Backlash	1.0° maximum
Weight	Approximately 4.2 oz.
Terminals	Gold-plated solder lugs
Markings	Manufacturer's name and part number, resistance value and tolerance, linearity tolerance, wiring diagram, date code
Ganging	2 cups maximum

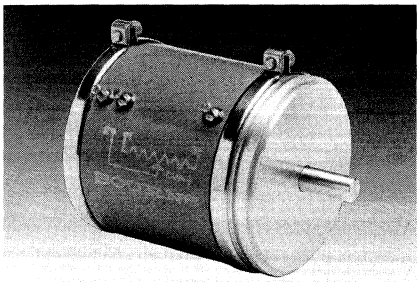


NOTE: LOCKWASHER AND HEX NUT TO BE SUPPLIED WITH EACH UNIT.



TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ± .010 , .XXX ± .005
FRACTIONS: ± 1/64

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult manufacturer for complete specification details for resistances below 500 ohms and above 100K ohms.



1-13/16" AND 2" DIAMETER/10-TURN WIREWOUND

- Servo mount and bushing mount
- Gangable
- High temperature, moisture resistant, thermosetting plastic housing
- Shaft supported front and rear by precision ball bearings
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGE 104

Model 3450

Bourns® Precision Potentiometers

3450
2" Servo Mount

Electrical Characteristics[1]

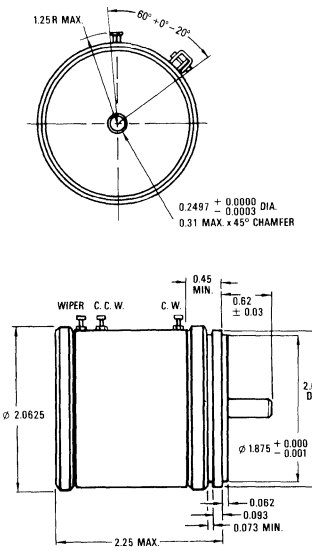
Standard Resistance Range	1KΩ to 500KΩ
Resistance Tolerance	±3%
Independent Linearity	±0.15%
Resolution	See table page 104
Effective Electrical Angle	3600° +3°, −0°
Absolute Minimum Resistance	1Ω or 0.1% maximum (whichever is greater)
Noise	100Ω ENR maximum
Power Rating (Voltage Limited By Power Dissipation, or	(70°C) 5 watts
1,000 VAC, Whichever Is Less)	(125°C) 0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum
80,000 Feet	300 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

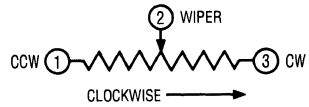
Environmental Characteristics[1]

Operating Temperature	
Static Operation Temperature Range	−65°C to +125°C
Dynamic Temperature Range	+1°C to +125°C
Temperature Coefficient[2]	±20ppm/°C maximum/unit
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum
Vibration	10G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.1% maximum
Shock	50G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.2% maximum
Load Life	1,000 hours, 5 watts
Total Resistance Shift	±2% maximum
Rotational Life (No Load)	2,000,000 shaft revolutions
Total Resistance Shift	±5% maximum

Mechanical Characteristics[1]

Mechanical Angle	3600° +10°, −0°
Shaft Runout	0.001 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.
Shaft Radial Play	0.001 in. T.I.R.
Pilot Diameter Runout	0.002 in. T.I.R.
Lateral Runout	0.002 in. T.I.R.
Stop Strength	800 oz-in. minimum
Torque (Starting & Running)	1.2/0.8 oz-in. minimum
Backlash	1.0° maximum
Weight	Approximately 4.2 oz.
Terminals	Gold-plated turret lugs
Markings	Manufacturer's name and part number, resistance value and tolerance, linearity tolerance, wiring diagram, date code
Ganging	3 cups maximum

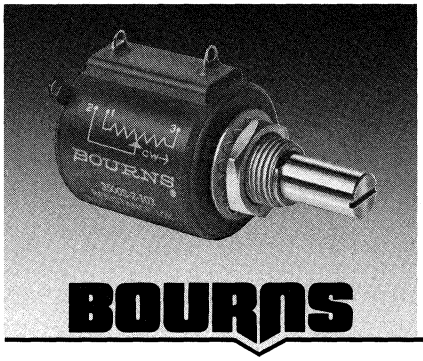




TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ± .010 , .XXX ± .005
FRACTIONS: ± 1/64

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details for resistances below 500 ohms and above 100K ohms.

Specifications are subject to change without notice.



7/8" DIAMETER / 10-TURN / WIREWOUND AND HYBRITRON® ELEMENT

- Bushing mount
- Sealable
- Non-standard features and specifications available
- Optional high torque feature
- Optional center tap feature
- Gangable

FOR ORDERING INFORMATION SEE PAGE 105

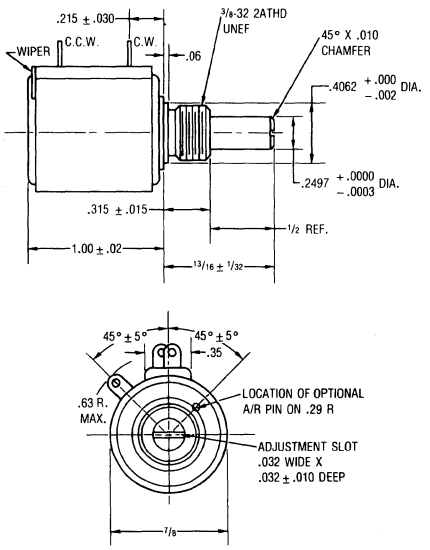
Models 3500/3501

Bourns® Precision Potentiometers

	3500 Wirewound Element	3501 Hybritron® Element
Electrical Characteristics[1]		
Standard Resistance Range	50 to 200KΩ	1K to 100KΩ
Resistance Tolerance	±3%	±10%
Independent Linearity	±0.20%	±0.25%
Resolution	See table page 105	Essentially infinite
Effective Electrical Angle	3600° +10°, −0°	3600° +10°, −2°
Absolute Minimum Resistance/ Minimum Voltage	1Ω or 0.1% maximum (whichever is greater)	Minimum voltage 0.2% maximum
Noise	100Ω ENR maximum	Output smoothness 0.1% maximum
Power Rating (Voltage Limited By Power Dissipation or 325 VAC, Whichever is Less)		
+70°C	2 watts	2 watts
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,500 VAC minimum	1,500 VAC minimum
70,000 Feet	400 VAC minimum	400 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−65°C to +125°C	−15°C to +105°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +105°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit	±100ppm°C maximum/unit
Vibration	20G	20G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.1% maximum	0.1% maximum
Shock	100G	100G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.1% maximum	±0.1% maximum
Load Life	1,000 hours, 2 watts	1,000 hours, 2 watts
Total Resistance Shift	±2% maximum	±5% maximum
Rotational Life (No Load)	2,000,000 shaft revolutions[2]	4,000,000 shaft revolutions
Total Resistance Shift	±5% maximum	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum	±5% maximum
Mechanical Characteristics[1]		
Mechanical Angle	3600° +10°, −0°	3600° +10°, −2°
Shaft Runout	0.002 in. T.I.R.	0.002 in. T.I.R.
Lateral Runout	0.005 in T.I.R.	0.005 in. T.I.R.
Pilot Diameter Runout	0.002 in. T.I.R.	0.002 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.	0.005 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.	0.003 in. T.I.R.
Stop Strength	96 oz-in. minimum	96 oz-in. minimum
Torque (Starting & Running)	0.6 oz-in. maximum	0.6 oz-in. maximum
Backlash	1.0° maximum	1.0° maximum
Weight	Approximately 1.0 oz.	Approximately 1.0 oz.
Terminals	Gold-plated solder lugs	Gold-plated turret lugs
Ganging	2 cups maximum	2 cups maximum

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult manufacturer for complete specification details for resistances below 500 ohms.

3500S-2/3501H-1



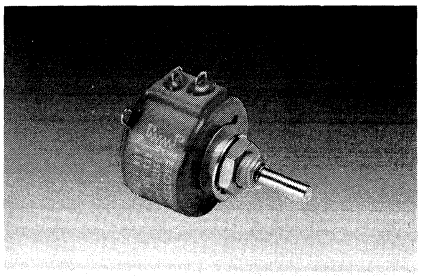
NOTE: LOCKWASHER AND HEX NUT TO BE SUPPLIED WITH EACH UNIT.

NOTE: SHAFT LENGTH VARIATIONS

3500S-1-RC	11/16"
3500S-2-RC	13/16"
3501H-1-RC	13/16"

TOLERANCES EXCEPT AS NOTED:
DECIMALS: .XX ± .010, .XXX ± .005
FRACTIONS: ± 1/64

Specifications are subject to change without notice.



7/8" DIAMETER/3-TURN/WIREWOUND AND HYBRITRON® ELEMENT

- Sealable
- Bushing mount
- Extended resistance range
- Long rotational life elements
- Gangable
- High temperature, moisture resistant, thermosetting plastic housing
- Outstanding resistance to humidity
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGE 105

Models 3510/3511

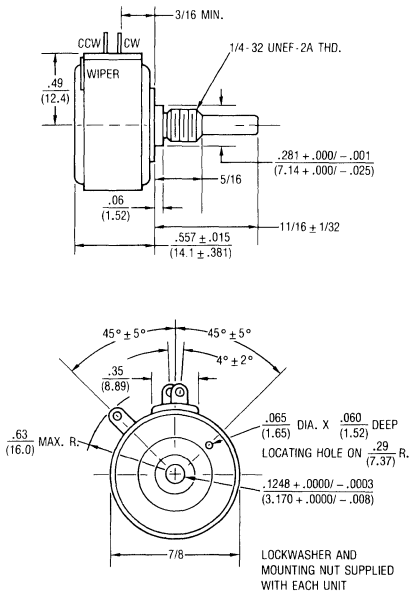
Bourns® Precision Potentiometers

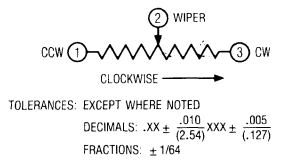
	3510 Wirewound Element	3511 Hybritron® Element
Electrical Characteristics[1]		
Standard Resistance Range	50 to 100KΩ	500 to 20KΩ
Resistance Tolerance	±3%	±10%
Independent Linearity	±0.3%	±0.3%
Resolution	See table page 105	Essentially infinite
Effective Electrical Angle	1080° +10°, −0°	1080° +10°, −0°
Absolute Minimum Resistance/ Minimum Voltage	1Ω or 0.1% maximum (whichever is greater)	1Ω or 0.1% maximum (whichever is greater)
Noise	100Ω ENR maximum	Output smoothness 0.05%
Power Rating (Voltage Limited By Power Dissipation or 325 VAC, Whichever is Less)		
+70°C	1 watt	1 watt
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,500 VAC minimum	1,000 VAC minimum
80,000 Feet	400 VAC minimum	300 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−65°C to +125°C	−65°C to +125°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +125°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit	±100ppm°C maximum/unit
Vibration	20G	20G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.1% maximum	0.1% maximum
Shock	100G	100G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.1% maximum	±0.1% maximum
Load Life	1,000 hours, 1 watt	1,000 hours, 1 watt
Total Resistance Shift	±2%	±5%
Rotational Life (No Load)	200,000 shaft revolutions[2]	4,000,000 shaft revolutions[2]
Total Resistance Shift	±5% maximum	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum	±5% maximum
Mechanical Characteristics[1]		
Mechanical Angle	1080° +10°, −0°	1080° +10°, −2°
Shaft Runout	0.002 in. T.I.R.	0.002 in. T.I.R.
Lateral Runout	0.005 in T.I.R.	0.005 in. T.I.R.
Pilot Diameter Runout	0.002 in. T.I.R.	0.002 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.	0.005 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.	0.003 in. T.I.R.
Stop Strength	48 oz-in. minimum	96 oz-in. minimum
Torque (Starting & Running)	0.6 oz-in. maximum	0.6 oz-in. maximum
Backlash	1.0° maximum	1.0° maximum
Weight	Approximately 0.7 oz.	Approximately 0.7 oz.
Terminals	Gold-plated solder lugs	Gold-plated solder lugs
Ganging	2 cups maximum	2 cups maximum

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.

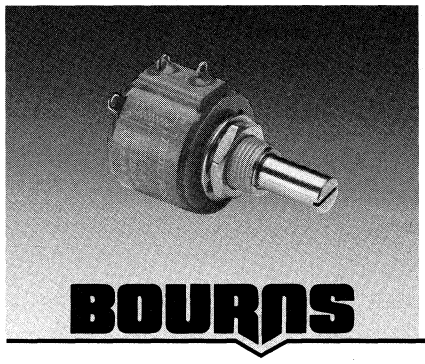
Specifications are subject to change without notice.

3510





TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ± .010 (2.54) XXX ± .005 (.127)
FRACTIONS: ± 1/64



7/8" DIAMETER/5-TURN/WIREWOUND AND HYBRITRON® ELEMENT

- Bushing mount
- Extended resistance range
- Long rotational life elements
- Non-standard features and specifications available
- Outstanding resistance to humidity
- Sealable
- High temperature, moisture resistant, thermosetting plastic housing
- Gangable

FOR ORDERING INFORMATION SEE PAGE 105

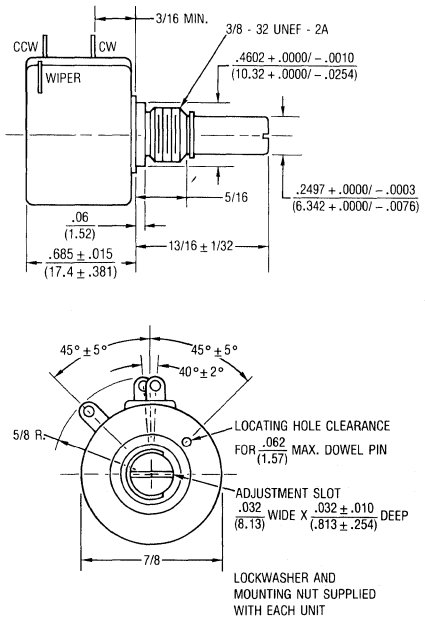
Models 3520/3521

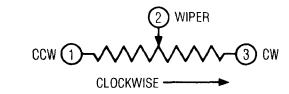
Bourns® Precision Potentiometers

	3520 Wirewound Element	3521 Hybritron® Element
Electrical Characteristics[1]		
Standard Resistance Range	20 to 75KΩ	500 to 50KΩ
Resistance Tolerance	±3%	±10%
Independent Linearity	±0.3%	±0.3%
Resolution	See table page 105	Essentially infinite
Effective Electrical Angle	1800° +10°, −0°	1800° +10°, −0°
Absolute Minimum Resistance/ Minimum Voltage	1Ω or 0.1% maximum (whichever is greater)	Minimum voltage 0.2% maximum
Noise	100Ω ENR maximum	Output smoothness 0.05%
Power Rating (Voltage Limited By Power Dissipation or 325 VAC, Whichever is Less)		
+70°C	1.5 watt	1.5 watt
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,500 VAC minimum	1,000 VAC minimum
70,000 Feet	400 VAC minimum	300 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−65°C to +125°C	−65°C to +125°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +125°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit	±100ppm°C maximum/unit
Vibration	20G	20G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.1% maximum	0.1% maximum
Shock	100G	100G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.1% maximum	±0.1% maximum
Load Life	1,000 hours, 1.5 watt	1,000 hours, 1.5 watt
Total Resistance Shift	±2%	±5%
Rotational Life (No Load)	200,000 shaft revolutions[2]	4,000,000 shaft revolutions[2]
Total Resistance Shift	±5% maximum	±5% maximum
Moisture Resistance	MIL-STD-202, Method 106,	MIL-STD-202, Method 106,
Total Resistance Shift	±2% maximum	±5% maximum
Mechanical Characteristics[1]		
Mechanical Angle	1800° +10°, −0°	1800° +10°, −2°
Shaft Runout	0.002 in. T.I.R.	0.002 in. T.I.R.
Pilot Diameter Runout	0.002 in. T.I.R.	0.002 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.	0.005 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.	0.003 in. T.I.R.
Stop Strength	48 oz-in. minimum	48 oz-in. minimum
Torque (Starting & Running)	0.6 oz-in. maximum	0.6 oz-in. maximum
Backlash	1.0° maximum	1.0° maximum
Weight	Approximately 0.7 oz.	Approximately 0.7 oz.
Terminals	Gold-plated solder lugs	Gold-plated solder lugs
Ganging	2 cups maximum	2 cups maximum

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.

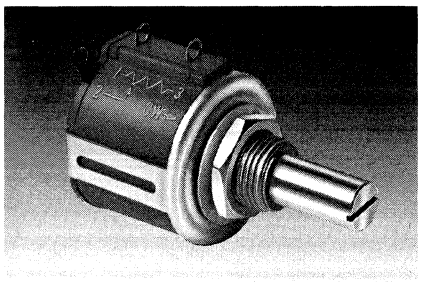
3520/3521





TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ± .010 (2.54) XXX ± .005 (.127)
FRACTIONS: ± 1/64

Specifications are subject to change without notice.



7/8'' DIAMETER/10-TURN/WIREWOUND AND HYBRITRON® ELEMENT

- Bushing mount
- Optional center tap and rear shaft extension
- Optional AR lug feature
- High torque available
- Optional 0.1% linearity
- Non-standard features and specifications available
- Gangable with common or concentric shafts

FOR ORDERING INFORMATION SEE PAGE 106

Models 3540/3541

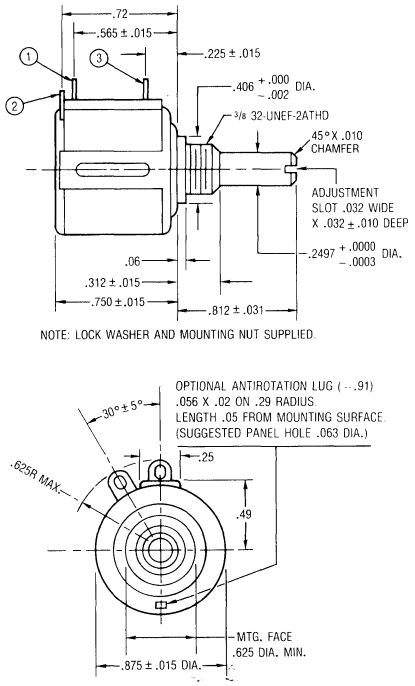
Bourns® Precision Potentiometers

	3540 Wirewound Element	3541 Hybritron® Element
Electrical Characteristics[1]		
Standard Resistance Range	100 to 100KΩ	1KΩ to 100KΩ
Resistance Tolerance	±5%	±10%
Independent Linearity	±0.25%	±0.25%
Resolution	See table page 106	Essentially infinite
Effective Electrical Angle	3600° +10°, −0°	3600° +10°, −0°
Absolute Minimum Resistance/ Minimum Voltage	1Ω or 0.1% maximum (whichever is greater)	Minimum voltage 0.2% maximum
Noise	100Ω ENR maximum	Output smoothness 0.1% maximum
Power Rating (Voltage Limited By Power Dissipation, or 447 VAC, Whichever is Less)		
+70°C	2 watts	2 watts
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum	1,000 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−55°C to +125°C	−55°C to +125°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +125°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit	±100ppm°C maximum/unit
Vibration	15G	15G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Shock	50G	50G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Load Life	1,000 hours, 2 watts	1,000 hours, 2 watts
Total Resistance Shift	±2% maximum	±5% maximum
Rotational Life (No Load)	1,000,000 shaft revolutions	5,000,000 shaft revolutions
Total Resistance Shift	±5% maximum	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum	±5% maximum
Mechanical Characteristics[1]		
Mechanical Angle	3600° +10°, −0°	3600° +10°, −0°
Shaft Runout	0.003 in. T.I.R.	0.003 in. T.I.R.
Lateral Runout	0.005 in. T.I.R.	0.005 in. T.I.R.
Pilot Diameter Runout	0.003 in. T.I.R.	0.003 in. T.I.R.
Shaft End Play	0.012 in. T.I.R.	0.010 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.	0.003 in. T.I.R.
Stop Strength	75 oz-in. minimum	75 oz-in. minimum
Torque (Starting & Running)	0.6 oz-in. maximum	0.5 oz-in. maximum
Backlash	1.0° maximum	1.0° maximum
Weight	Approximately 0.75 oz.	Approximately 0.80 oz.
Terminals	Gold-plated solder lugs	Gold-plated solder lugs
Ganging	2 cups maximum	2 cups maximum

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.

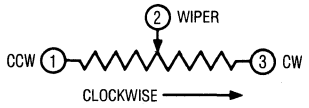
Specifications are subject to change without notice.

3540S-1/3541H-1



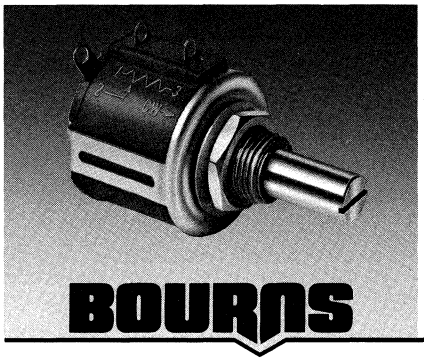
NOTE: LOCK WASHER AND MOUNTING NUT SUPPLIED.

TOLERANCES: EXCEPT WHERE NOTED
DECIMAL: .XX ± .010, .XXX ± .015



TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005



7/8'' DIAMETER/3- AND 5-TURN WIREWOUND

- Bushing mount
- Optional AR pin feature
- Non-standard features and specifications available
- Gangable

FOR ORDERING INFORMATION SEE PAGE 106

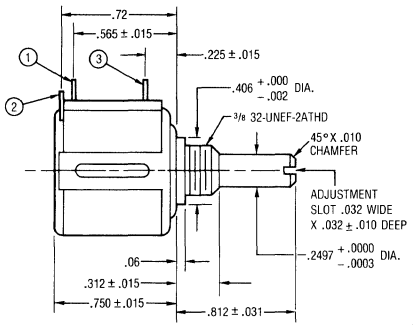
Models 3543/3545

Bourns® Precision Potentiometers

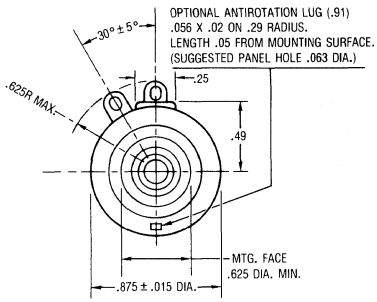
	3543 3-Turn	3545 5-Turn
Electrical Characteristics[1]		
Standard Resistance Range	20 to 50KΩ	50 to 50KΩ
Resistance Tolerance	±5%	±5%
Independent Linearity	±0.25%	±0.25%
Resolution	See table page 106	See table page 106
Effective Electrical Angle	1080° +10°, −0°	1800° +10°, −0°
Absolute Minimum Resistance/	1Ω or 0.1% maximum (whichever is greater)	1Ω or 0.1% maximum (whichever is greater)
Noise	100Ω ENR maximum	100Ω ENR maximum
Power Rating (Voltage Limited By Power Dissipation, or 224 VAC [3543] or 273 VAC [3545], Whichever is Less)		
+70°C	1 watt	1.5 watts
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum	1,000 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−55°C to +125°C	−55°C to +125°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +125°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit	±50ppm°C maximum/unit
Vibration	15G	15G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Shock	50G	50G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Load Life	1,000 hours, 1 watt	1,000 hours, 1.5 watts
Total Resistance Shift	±2% maximum	±2% maximum
Rotational Life (No Load)	300,000 shaft revolutions	500,000 shaft revolutions
Total Resistance Shift	±5% maximum	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum	±2% maximum
Mechanical Characteristics[1]		
Mechanical Angle	1080° +10°, −0°	1800° +10°, −0°
Shaft Runout	0.003 in. T.I.R.	0.003 in. T.I.R.
Lateral Runout	0.005 in. T.I.R.	0.005 in. T.I.R.
Pilot Diameter Runout	0.003 in. T.I.R.	0.003 in. T.I.R.
Shaft End Play	0.010 in. T.I.R.	0.010 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.	0.003 in. T.I.R.
Stop Strength	75 oz-in. minimum	75 oz-in. minimum
Torque (Starting & Running)	0.5 oz-in. maximum	0.5 oz-in. maximum
Weight	Approximately 0.75 oz.	Approximately 0.75 oz.
Terminals	Gold-plated solder lugs	Gold-plated solder lugs
Backlash	1.0° maximum	1.0° maximum
Ganging	2 cups maximum	2 cups maximum

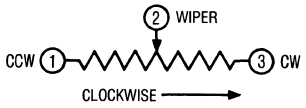
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.

3543S-1/3545S-1



NOTE: LOCK WASHER AND MOUNTING NUT SUPPLIED.





TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005

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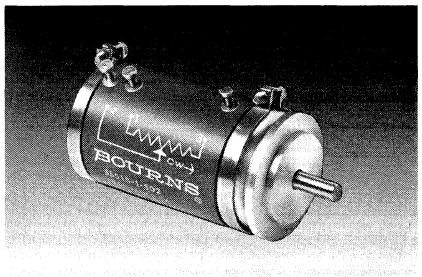


7/8'' DIAMETER/10-TURN/WIREWOUND AND HYBRITRON® ELEMENT

- Servo mount
- Gangable
- Excellent rotational life
- Excellent resolution
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGES 106 AND 107

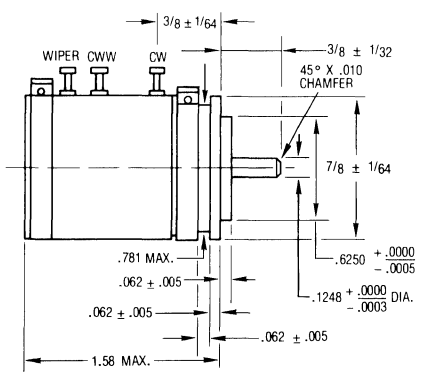
Models 3550/3551

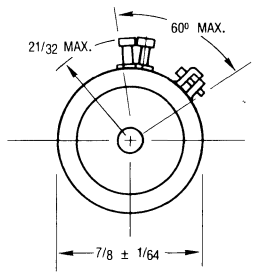
Bourns® Precision Potentiometers

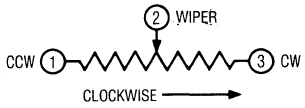
	3550 Wirewound Element	3551 Hybritron® Element
Electrical Characteristics[1]		
Standard Resistance Range	100 to 200KΩ	1K to 100KΩ
Resistance Tolerance	±3%	±10%
Independent Linearity	±0.2%	±0.25%
Resolution	See table page 106	Essentially infinite
Effective Electrical Angle	3600° +10°, −0°	3600° +10°, −2°
Absolute Minimum Resistance/ Minimum Voltage	1Ω or 0.1% maximum (whichever is greater)	Minimum voltage 0.2% maximum
Noise	100Ω ENR maximum	Output smoothness 0.1% maximum
Power Rating (Voltage Limited By Power Dissipation or 500 VAC [3550] or 325 VAC [3551], Whichever is Less)		
+70°C	2.5 watts	2 watts
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum	1,000 VAC minimum
80,000 Feet	300 VAC minimum	
70,000 Feet		300 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−65°C to +125°C	−55°C to +105°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +105°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit	±100ppm°C maximum/unit
Vibration	20G	20G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.2% maximum	0.2% maximum
Shock	100G	100G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.2% maximum	±0.2% maximum
Load Life	1,000 hours, 2.5 watts	1,000 hours, 2 watts
Total Resistance Shift	±2% maximum	±5% maximum
Rotational Life (No Load)	1,000,000 shaft revolutions	10,000,000 shaft revolutions
Total Resistance Shift	±5% maximum	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum	±5% maximum
Mechanical Characteristics[1]		
Mechanical Angle	3600° +10°, −0°	3600° +10°, −0°
Shaft Runout	0.001 in. T.I.R.	0.001 in. T.I.R.
Lateral Runout	0.003 in. T.I.R.	0.003 in. T.I.R.
Pilot Diameter Runout	0.0015 in. T.I.R.	0.0015 in. T.I.R.
Shaft End Play	0.003 in. T.I.R.	0.003 in. T.I.R.
Shaft Radial Play	0.002 in. T.I.R.	0.002 in. T.I.R.
Stop Strength	96 oz-in. minimum	96 oz-in. maximum
Torque (Starting)	0.4 oz-in. maximum	0.5 oz-in. maximum
Torque (Running)	0.3 oz-in. maximum	0.5 oz-in. maximum
Backlash	1.0° maximum	1.0° maximum
Weight	Approximately 1.1 oz.	Approximately 1.1 oz.
Terminals	Gold-plated turrets	Gold-plated turrets
Ganging	3 cups maximum	3 cups maximum

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.
Specifications are subject to change without notice.

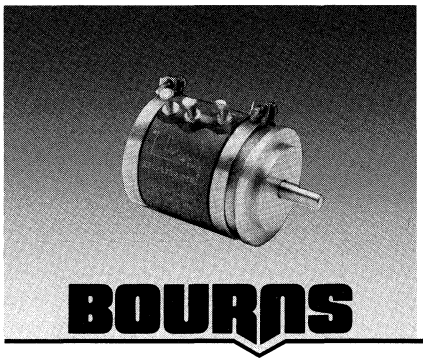
3550/3551







TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ± .010 , .XXX ± .005
FRACTIONS: ± 1/64



7/8" DIAMETER/3-TURN/WIREWOUND AND HYBRITRON® ELEMENT

- Servo mount
- Shaft supported front and rear by precision ball bearings
- High temperature, moisture resistant, thermosetting plastic housing
- Special rotor and slider design assures excellent wiper stability
- Non-standard features and specifications available
- Gangable

FOR ORDERING INFORMATION SEE PAGE 107

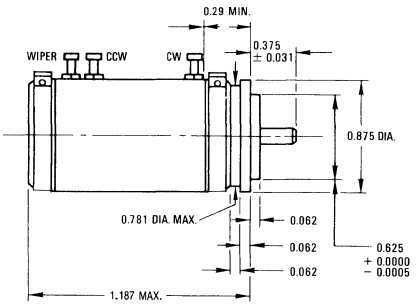
Models 3560/3561

Bourns® Precision Potentiometers

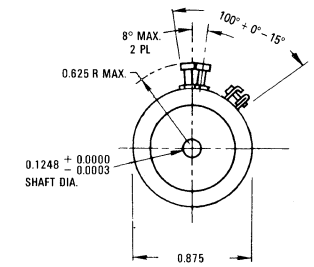
	3560 Wirewound Element	3561 Hybritron® Element
Electrical Characteristics[1]		
Standard Resistance Range	50 to 50KΩ	500 to 20KΩ
Resistance Tolerance	±3%	±10%
Independent Linearity	±0.25%	±0.25%
Resolution	See ordering information	Essentially infinite
Effective Electrical Angle	1080° +10°, −0°	1080° +10°, −0°
Absolute Minimum Resistance/ Minimum Voltage	1Ω or 0.1%, (whichever is greater)	0.1% maximum
Noise	100Ω ENR maximum	Output smoothness 0.05%
Power Rating (Voltage Limited By Power Dissipation or 325 VAC, Whichever is Less)		
+70°C	1.5 watt	1.5 watt
+125°C	0 watt	0 watt
Dielectric Strength	MIL-R-12934	MIL-R-12934
Sea Level	1,000 VAC minimum	1,000 VAC minimum
80,000 Feet	300 VAC minimum	300 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature Range	−65°C to +125°C	−65°C to +125°C
Temp. Coefficient of Wire	20ppm/°C maximum	100ppm/°C maximum
Humidity	MIL-R-12934	MIL-R-39023
	Humidity Cycling	Humidity Cycling
Vibration	MIL-R-12934, 20G	MIL-R-39023, 20G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Wiper Shift	0.2% maximum	0.1% maximum
Shock	MIL-R-12934, 100G	MIL-R-39023, 100G
Wiper Bounce and Wiper Shift	Same as vibration	Same as vibration
Load Life MIL-R-12934	1,000 hours	1,000 hours
Resistance Shift	2% maximum	5% maximum
Sand, Dust, Fungus	MIL-E-5272	MIL-E-5272
Salt Spray	MIL-R-12934	MIL-R-39023
Mechanical Characteristics[1]		
Mechanical Angle	1080° +10°, −0°	1080° +10°, −0°
Shaft Runout	0.001 in. T.I.R.	0.001 in. T.I.R.
Lateral Runout	0.003 in. T.I.R.	0.003 in. T.I.R.
Pilot Diameter Runout	0.0015 in. T.I.R.	0.0015 in. T.I.R.
Shaft End Play	0.003 in. T.I.R.	0.003 in. T.I.R.
Shaft Radial Play	0.002 in. T.I.R.	0.002 in. T.I.R.
Rotational Life, Shaft Revolutions	600,000	4,000,000
Stop Strength	96 oz-in. minimum	96 oz-in. minimum
Torque	0.4 oz-in. maximum starting/ 0.3 oz-in. maximum running	0.4 oz-in. maximum
Moment of inertia	0.25 g cm²	0.25 g cm²
Ganging	3 cups maximum	3 cups maximum
Weight	Approximately 23 g	Approximately 23 g
Terminals	Gold plated turret type	Gold plated turret type
Markings	Manufacturer's name and part number, resistance value and tolerance, linearity tolerance, wiring diagram and date code.	

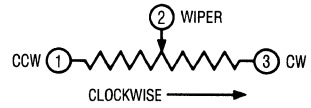
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.

3560/3561



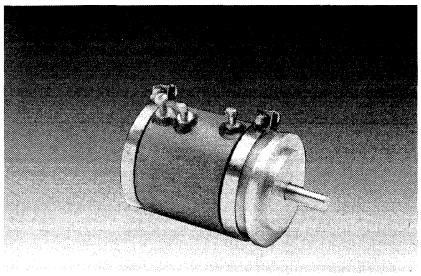
ADD 0.725" MAX. FOR EACH ADDITIONAL CUP





TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005



7/8'' DIAMETER/5-TURN/WIREWOUND AND HYBRITRON® ELEMENT

- Servo mount
- Shaft supported front and rear by precision ball bearings
- High temperature, moisture resistant, thermosetting plastic housing
- Special rotor and slider design assures excellent wiper stability
- Non-standard features and specifications available
- Gangable

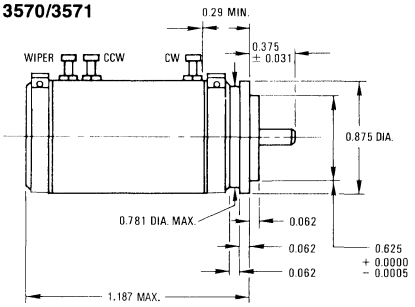
FOR ORDERING INFORMATION SEE PAGE 107

Models 3570/3571

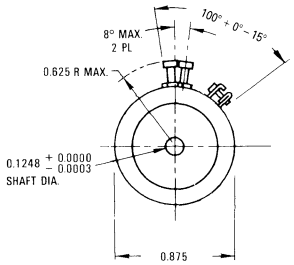
Bourns® Precision Potentiometers

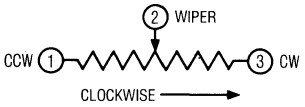
	3570 Wirewound	3571 Hybritron®
Electrical Characteristics[1]		
Standard Resistance Range	50 to 100KΩ	500 to 50KΩ
Resistance Tolerance	±3%	±10%
Independent Linearity	±0.25%	±0.25%
Resolution	See ordering information	Essentially infinite
Effective Electrical Angle	1800° +10°, −0°	1800° +10°, −0°
End Voltage	1Ω or 0.1% (whichever is greater)	0.1% maximum
Noise	100Ω ENR maximum	Output smoothness 0.05%
Power Rating		
+70°C	2.0 watts	2.0 watts
+125°C	0 watt	0 watt
Dielectric Strength MIL-R-39023		
Sea Level	1,000 VAC minimum	1,000 VAC minimum
80,000 Feet	300 VAC minimum	300 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature Range	−65°C to +125°C	−65°C to +125°C
Temperature Coefficient[2]	±20ppm/°C maximum	±100ppm°C maximum
Humidity	MIL-R-12934	MIL-R-39023
	Humidity cycling	Humidity cycling
Vibration	MIL-R-12934, 20G	MIL-R-39023, 20G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Wiper Shift	0.2% maximum	0.1% maximum
Shock	MIL-R-12934, 100G	MIL-R-39023, 100G
Wiper Bounce & Wiper Shift	Same as Vibration	Same as Vibration
Load Life MIL-R-39023	1,000 hours	1,000 hours
Total Resistance Shift	±2% maximum	±5% maximum
Sand, Dust, Fungus	MIL-E-5272	MIL-E-5272
Salt Spray	MIL-R-12934	MIL-R-39023
Mechanical Characteristics[1]		
Mechanical Angle	1800° +10°, −0°	1800° +10°, −0°
Shaft Runout	0.001 in. T.I.R.	0.001 in. T.I.R.
Lateral Runout	0.003 in. T.I.R.	0.003 in. T.I.R.
Pilot Diameter Runout	0.0015 in. T.I.R.	0.0015 in. T.I.R.
Shaft End Play	0.003 in. T.I.R.	0.003 in. T.I.R.
Shaft Radial Play	0.002 in. T.I.R.	0.002 in. T.I.R.
Rotational Life	1,000,000 shaft revolutions	4,000,000 shaft revolutions
Stop Strength	96 oz-in. minimum	96 oz-in. minimum
Torque		
Starting	0.4 oz-in. maximum	0.4 oz-in. maximum
Running	0.3 oz-in maximum	0.4 oz-in. maximum
Moment of Inertia	0.28g cm²	0.28g cm²
Ganging	3 cups maximum	3 cups maximum
Weight	Approximately 25g	Approximately 25g
Terminals	Gold-plated turret type	Gold-plated turret type
Markings	Manufacturer's name and part number, resistance value and tolerance, linearity tolerance, wiring diagram, date code	

3570/3571



ADD 0.860'' MAX. FOR EACH ADDITIONAL CUP



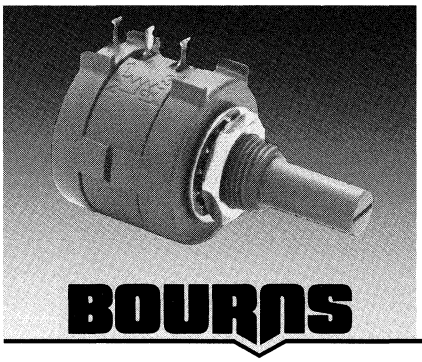


TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.

Specifications are subject to change without notice.



7/8'' DIAMETER / 10-TURN / WIREWOUND

- Bushing mount
- Optional AR pin feature
- Plastic or metal shaft and bushings
- Wirewound
- Solder lugs or PC pins
- Sealable
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGE 108

Model 3590

Bourns® Precision Potentiometer

Electrical Characteristics[1]

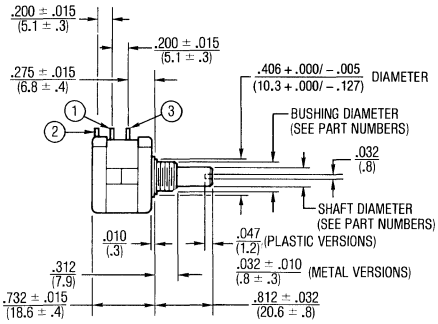
Standard Resistance Range	200 to 100KΩ
Resistance Tolerance	±5%
Independent Linearity	±0.25%
Resolution	See table page 108
Effective Electrical Angle	3600° +10°, −0°
Absolute Minimum Resistance	1Ω or 0.1% maximum (whichever is greater)
Noise	100Ω ENR maximum
Power Rating (Voltage Limited By Power Dissipation or 450 VAC, Whichever is Less)	
+40°C	2 watts
+125°C	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	2,000 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

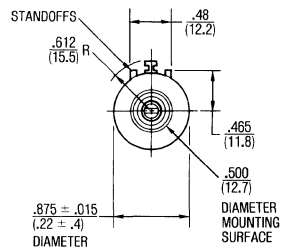
Environmental Characteristics[1]

Operating Temperature	
Static Operation Temperature Range	−55°C to +125°C
Dynamic Operation Temperature Range	+1°C to +125°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit
Vibration	15G
Wiper Bounce	0.1 millisecond maximum
Shock	50G
Wiper Bounce	0.1 millisecond maximum
Load Life	1,000 hours, 2 watts
Total Resistance Shift	±2% maximum
Rotational Life (No Load)	1,000,000 shaft revolutions
Total Resistance Shift	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum

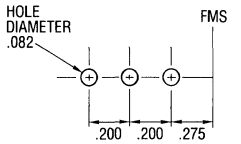
Mechanical Characteristics[1]

Mechanical Angle	3600° +10°, − 0°
Shaft Runout	0.005 in. T.I.R.
Lateral Runout	0.008 in. T.I.R.
Pilot Diameter Runout	0.003 in. T.I.R.
Shaft End Play	0.010 in. T.I.R.
Shaft Radial Play	0.005 in. T.I.R.
Stop Strength	64 oz-in. minimum
Torque (Starting & Running)	0.5 oz-in. maximum (unsealed)
	1.5 oz-in. maximum (sealed)
Mounting Torque	5-7 in-lbs. (plastic)
	15-18 in-lbs. (metal)
Backlash	1.0° maximum
Terminals	Solder lugs or PC pins

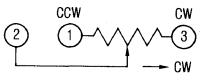




RECOMMENDED PC BOARD MOUNTING HOLE LOCATIONS



DIMENSIONS IN INCHES
PARENTHESES INDICATE MILLIMETERS

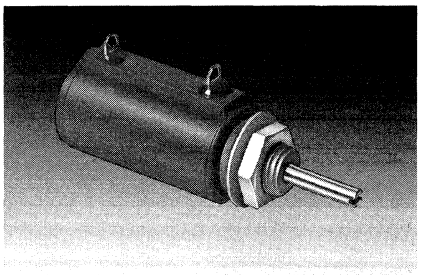


TOLERANCES
EXCEPT WHERE NOTED
.xx ± .02 (± .51)
.xxx ± .005 (± .127)

SHAFT & BUSHING CONFIGURATIONS
(Bushing - DxL, Shaft - D)
(-1) Plastic Bushing (3/8'' x 5/16'') and Shaft (.2480 +.001, −.002)
(-2) Metal Bushing (3/8'' x 5/16'') and Shaft (.2497 +.0000, −.0009)
(-3) Sealed, Plastic Bushing (3/8'' x 5/16'') and Shaft (.2480 +.001, −.002)
(-4) Sealed, Metal Bushing (3/8'' x 5/16'') and Shaft (.2497 +.0000, −.0009)
(-5) Metric, Plastic Bushing (9mm x 7.94mm) and Shaft (6mm +0, −.076mm)
(-6) Metric, Metal Bushing (9mm x 7.94mm) and Shaft (6mm +0, −.023mm)
(-7) Metric, Sealed, Plastic Bushing (9mm x 7.94mm) and Shaft (6mm +0, −.076mm)
(-8) Metric, Sealed, Metal Bushing (9mm x 7.94mm) and Shaft (6mm +0, −.023mm)

NOTE: For Anti-Rotation pin add 91 after configuration dash number. Example: -2 becomes -291 to add AR pin.
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult manufacturer for complete specification details for resistance below 1K ohms.

Specifications are subject to change without notice.



1/2'' DIAMETER/10-TURN/WIREWOUND AND HYBRITRON® ELEMENT

- Bushing mount
- Excellent resolution
- Non-standard features and specifications available
- Small diameter
- High rotational life

BOURNS

FOR ORDERING INFORMATION SEE PAGE 108

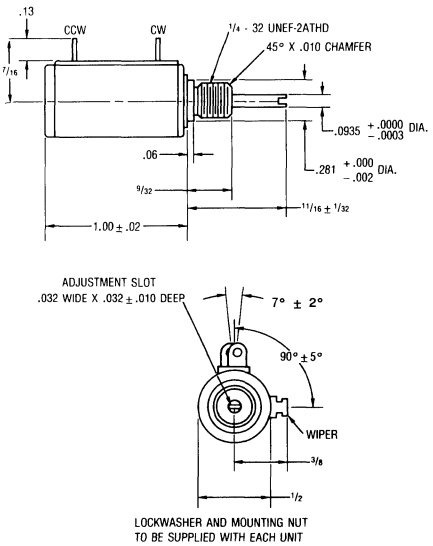
Models 3700/3701

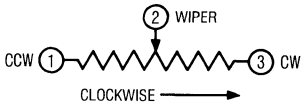
Bourns® Precision Potentiometers

	3700 Wirewound Element	3701 Hybritron® Element
Electrical Characteristics[1]		
Standard Resistance Range	100 to 100KΩ	1K to 100KΩ
Resistance Tolerance	±5%	±10%
Independent Linearity	±0.25%	±0.25%
Resolution	See table page 108	Essentially infinite
Effective Electrical Angle	3600° +10°, −0°	3600° +10°, −2°
Absolute Minimum Resistance/ Minimum Voltage	1Ω or 0.1% maximum (whichever is greater)	Minimum voltage 0.2% maximum
Noise	100Ω ENR maximum	Output smoothness 0.1% max.
Power Rating (Voltage Limited By Power Dissipation or 315 VAC, Whichever is Less)		
+70°C	1 watt	1 watt
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum	1,000 VAC minimum
80,000 Feet	400 VAC minimum	
70,000 Feet		300 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−65°C to +125°C	−55°C to +105°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +105°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit	±100ppm°C maximum/unit
Vibration	20G	20G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.5% maximum	0.5% maximum
Shock	100G	100G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.5% maximum	±0.5% maximum
Load Life	1,000 hours, 1 watt	1,000 hours, 1 watt
Total Resistance Shift	±2% maximum	±5% maximum
Rotational Life (No Load)	1,000,000 shaft revolutions	4,000,000 shaft revolutions
Total Resistance Shift	±5% maximum	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum	±5% maximum
Mechanical Characteristics[1]		
Mechanical Angle	3600° +50°, −0°	3600° minimum
Shaft Runout	0.002 in. T.I.R.	0.002 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.	0.005 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.	0.003 in. T.I.R.
Stop Strength	20 oz-in. minimum	20 oz-in. minimum
Torque (Starting & Running)	0.6 oz-in. maximum	0.6 oz-in. maximum
Backlash	1.0° maximum	1.0° maximum
Weight	Approximately 1 oz.	Approximately 1 oz.
Terminals	Gold-plated solder lugs	Gold-plated turret lugs

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.
Specifications are subject to change without notice.

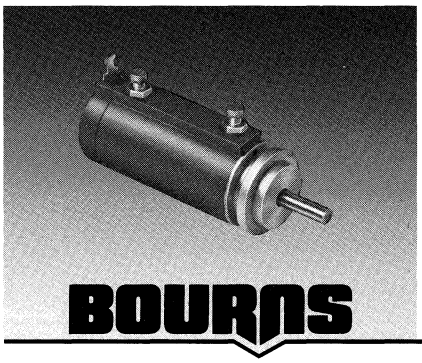
3700S-1/3701H-1





TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005



1/2" DIAMETER / 10-TURN / WIREWOUND AND HYBRITRON® ELEMENT

- Servo mount
- Excellent resolution
- Non-standard features and specifications available
- Small diameter
- High rotational life

FOR ORDERING INFORMATION SEE PAGE 108

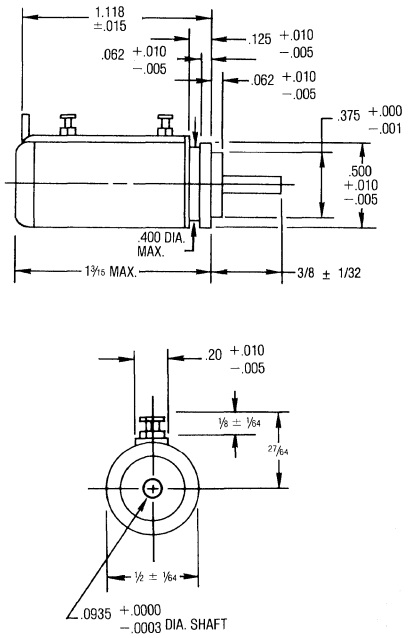
Models 3750/3751

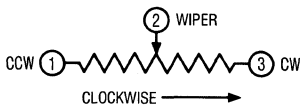
Bourns® Precision Potentiometers

	3750 Wirewound Element	3751 Hybritron® Element
Electrical Characteristics[1]		
Standard Resistance Range	100 to 100KΩ	1K to 100KΩ
Resistance Tolerance	±5%	±10%
Independent Linearity	±0.25%	±0.25%
Resolution	See table page 108	Essentially infinite
Effective Electrical Angle	3600° +10°, −0°	3600° +10°, −4°
Absolute Minimum Resistance/ Minimum Voltage	1Ω or 0.1% maximum (whichever is greater)	Minimum voltage 0.2% maximum
Noise	100Ω ENR maximum	Output smoothness 0.1% maximum
Power Rating (Voltage Limited By Power Dissipation or 315 VAC, Whichever is Less)		
+70°C	1 watt	1 watt
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum	1,000 VAC minimum
80,000 Feet	300 VAC minimum	
70,000 Feet		300 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−65°C to +125°C	−55°C to +105°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +105°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit	±100ppm/°C maximum/unit
Vibration	20G	20G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.2% maximum	0.2% maximum
Shock	100G	100G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±2% maximum	±2% maximum
Voltage Ratio Shift	±0.2% maximum	±0.2% maximum
Load Life	1,000 hours, 1 watt	1,000 hours, 1 watt
Total Resistance Shift	±2% maximum	±5% maximum
Rotational Life (No Load)	1,000,000 shaft revolutions	10,000,000 shaft revolutions
Total Resistance Shift	±5% maximum	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum	±5% maximum
Mechanical Characteristics[1]		
Mechanical Angle	3600° +20°, −0°	3600° +20°, −0°
Shaft Runout	0.003 in. T.I.R.	0.003 in. T.I.R.
Lateral Runout	0.003 in. T.I.R.	0.003 in T.I.R.
Pilot Diameter Runout	0.002 in. T.I.R.	0.002 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.	0.005 in. T.I.R.
Shaft Radial Play	0.002 in. T.I.R.	0.002 in. T.I.R.
Stop Strength	20 oz-in. minimum	20 oz-in. minimum
Torque, Starting	0.5 oz-in. maximum	0.5 oz-in. maximum
Torque, Running	0.3 oz-in. maximum	0.5 oz-in. maximum
Backlash	1.0° maximum	1.0° maximum
Weight	Approximately 0.3 oz.	Approximately 0.3 oz.
Terminals	Gold-plated turrets	Gold-plated turrets

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.

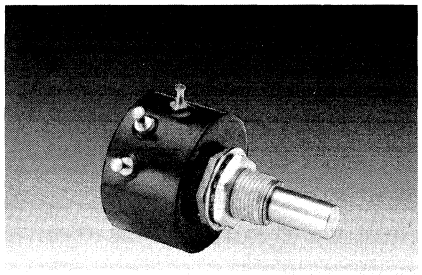
3750/3751





TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005



BOURNS

1-1/16" DIAMETER/SINGLE-TURN WIREWOUND AND HYBRITRON® ELEMENT

- Moisture resistant, thermosetting plastic housing; stainless steel shaft
- 1 watt power rating at 40°C
- Rotational life up to 4,000,000 shaft revolutions (Model 3438) outstanding vibration and shock performance
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGE 104

Models 3437/3438

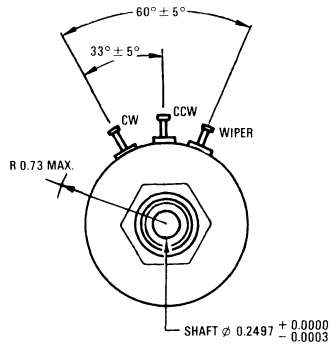
Bourns® Precision Potentiometers

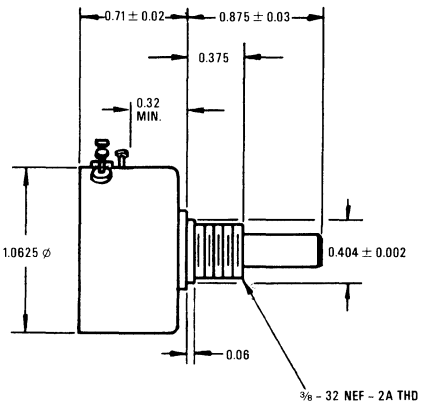
	Model 3437 Wirewound Element	Model 3438 Hybritron® Element
Electrical Characteristics[1]		
Standard Resistance Range	50 to 50KΩ	200 to 20KΩ
Resistance Tolerance	±5%	±10%
Independent Linearity	±0.5%	±0.5%
Effective Electrical Angle	320° ±5°	320° ±5°
Noise	100Ω ENR maximum	
Output Smoothness	0.05% maximum	
Power Rating		
+40°C	1 watt	1 watt
+80°C	0 watt	0 watt
Resolution	See ordering information	Essentially infinite
Dielectric Strength	MIL-R-12934	MIL-R-12934
Sea Level	500 VAC minimum	500 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature Range	−15°C to +80°C	−15°C to +80°C
Temperature Coefficient[2]	±20ppm/°C maximum	±100ppm°C maximum
Vibration		
Resistance Shift	10G, 10-500 CPS	10G, 10-500 CPS
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Wiper Shift	1% maximum	1% maximum
Shock	15¾G	15G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Resistance & Wiper Shift	Same as Vibration	Same as Vibration
Load Life	1,000 hours	1,000 hours
Total Resistance Shift	±5% maximum	±5% maximum
Mechanical Characteristics[1]		
Mechanical Angle	Continuous	Continuous
Rotational Life	200,000 shaft revolutions	4,000,000 shaft revolutions
Torque (Starting & Running)	2.0 oz-in. maximum	2.0 oz-in. maximum
Weight	Approximately 30g	Approximately 30g
Terminals	Gold-plated turrets	Gold-plated turrets
Markings	Manufacturer's name and part number, resistance value and tolerance, linearity tolerance, wiring diagram, date code	

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.

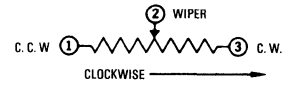
Specifications are subject to change without notice.

3437/3438

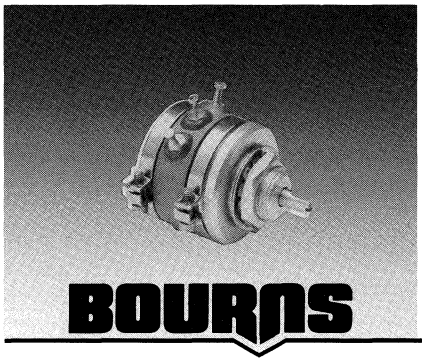




NOTE:
LOCKWASHER & HEX NUT TO BE SUPPLIED WITH UNIT.



TOLERANCES: .XX = ± 0.01
.XXX = ± 0.005 EXCEPT WHERE NOTED



7/8", 1-1/16", 2" DIAMETER/SINGLE-TURN WIREWOUND

- Bushing mount
- Gangable
- Outstanding vibration and shock performance
- Shaft supported front and rear by precision sleeve bearings
- High temperature, moisture resistant, thermosetting plastic housing
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGES 105 AND 106

Models 3535/3435/3415

Bourns® Precision Potentiometers

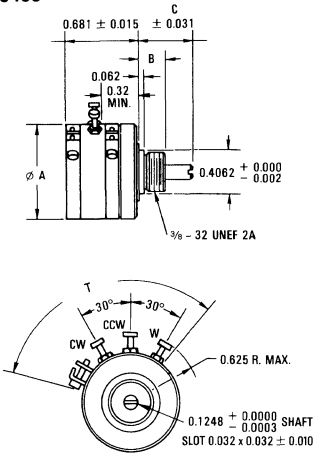
	Model 3535 7/8" Diameter	Model 3435 1-1/16" Diameter	Model 3415 2" Diameter
Electrical Characteristics[1]			
Standard Resistance Range	50 to 20KΩ	50 to 50KΩ	50 to 100KΩ
Resistance Tolerance	±3%	±3%	±3%
Independent Linearity	±0.5%	±0.5%	±0.3%
Resolution	See ordering information	See ordering information	See ordering information
Effective Electrical Angle	350° ±2°	350° ±2°	350° ±2°
Absolute Minimum Resistance	1Ω or 0.1% (whichever is greater)	1Ω or 0.1% (whichever is greater)	1Ω or 0.1% (whichever is greater)
Noise	100Ω ENR max.	100Ω ENR max.	100Ω ENR max.
Power Rating +70°C	1 watt	1.5 watts	4 watts
+125°C	0 watt	0 watt	0 watt
Dielectric Strength MIL-R-12934			
Sea Level	1,000 VAC min.	1,000 VAC min.	1,000 VAC min.
70,000 Feet	300 VAC min.	300 VAC min.	250 VAC min.
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]			
Operating Temperature Range	−65°C to +125°C	−65°C to +125°C	−65°C to +125°C
Temperature Coefficient[2]	±20ppm/°C max.	±20ppm°C max.	±20ppm°C max.
Humidity	MIL-R-12934 Humidity cycling	MIL-R-12934 Humidity cycling	MIL-R-12934 Humidity cycling
Vibration	MIL-R-12934, 15G	MIL-R-12934, 15G	MIL-R-12934, 15G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum	0.1 millisecond maximum
Wiper Shift	1.0% maximum	1.0% maximum	1.0% maximum
Shock	MIL-R-12934, 50G	MIL-R-12934, 50G	MIL-R-12934, 50G
Wiper Bounce	Same as Vibration	Same as Vibration	Same as Vibration
Load Life MIL-R-12934	1,000 hours	1,000 hours	1,000 hours
Resistance Shift	2.0% maximum	2.0% maximum	2.0% maximum
Sand, Dust, Fungus	MIL-E-5272	MIL-E-5272	MIL-E-5272
Salt Spray	MIL-R-12934	MIL-R-12934	MIL-R-12934
Mechanical Characteristics[1]			
Mechanical Angle	Continuous	Continuous	Continuous
Shaft Runout	0.001 in. T.I.R.	0.001 in. T.I.R.	0.001 in. T.I.R.
Shaft End Play	0.003 in. T.I.R.	0.003 in. T.I.R.	0.003 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.	0.003 in. T.I.R.	0.004 in. T.I.R.
Rotational Life	2,000,000 shaft revolutions	2,000,000 shaft revolutions	1,000,000 shaft revolutions
Torque (Starting)	0.15 oz-in. max.	0.2 oz-in. max.	1.5 oz-in. max.
Torque (Running)	0.15 oz-in. max.	0.2 oz-in. max.	1.0 oz-in. max.
Torque (Additional Cups)	Add 75% each	Add 75% each	Add 75% each
Ganging	8 cups maximum	8 cups maximum	8 cups maximum
Weight	Approx. 20g	Approx. 23g	Approx. 85g
Terminals	Gold-plated turrets	Gold-plated turrets	Gold-plated turrets
Markings	Manufacturer's name and part number, resistance value and tolerance, linearity tolerance, wiring diagram, date code		

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.

DIMENSIONS (INCH)

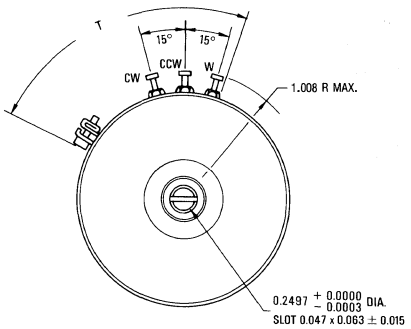
Model	ø A	B	C	T	Add for each additional cup
3535	0.875	0.250	0.500	145° + 0 − 20°	0.405
3435	1.060	0.375	0.875	130° + 0 − 15°	0.405
3415	2.000	0.375	0.875	90° + 0 − 20°	0.500

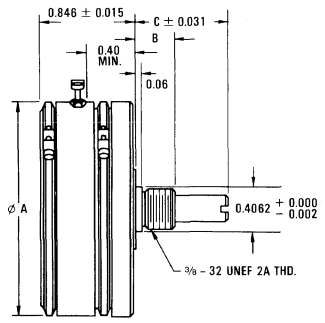
3535/3435

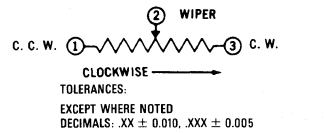


NOTE:
LOCKWASHER AND HEX NUT TO BE SUPPLIED WITH EACH UNIT.

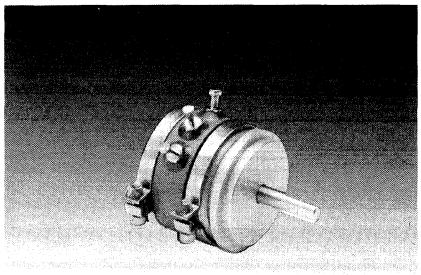
3415







Specifications are subject to change without notice.



BOURNS

7/8", 1-1/16", 2" DIAMETER/SINGLE-TURN WIREWOUND

- Servo mount
- Gangable
- Shaft support front and rear by precision ball bearings
- High temperature, moisture resistant, thermosetting plastic housing
- Outstanding vibration and shock performance
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGE 107

Models 3585/3485/3465

Bourns® Precision Potentiometers

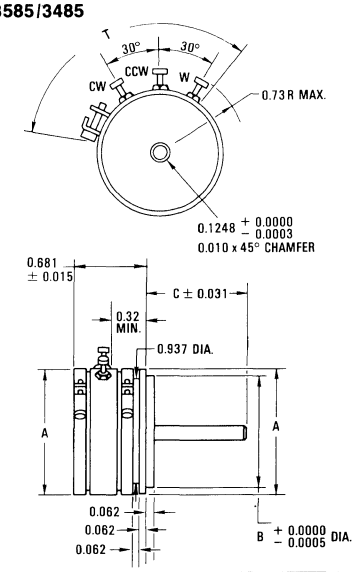
Electrical Characteristics[1]	Model 3585 7/8" Diameter	Model 3485 1-1/16" Diameter	Model 3465 2" Diameter
Standard Resistance Range	25 to 20KΩ	50 to 50KΩ	50 to 100KΩ
Resistance Tolerance	±3%	±3%	±3%
Independent Linearity	±0.5%	±0.5%	±0.3%
Resolution	See ordering information	See ordering information	See ordering information
Effective Electrical Angle	350° ±2°	350° ±2°	350° ±2°
Absolute Minimum Resistance	1Ω or 0.1% (whichever is greater)	1Ω or 0.1% (whichever is greater)	1Ω or 0.1% (whichever is greater)
Noise	100Ω ENR max.	100Ω ENR max.	100Ω ENR max.
Power Rating +70°C	1 watt	1.5 watts	4 watts
+125°C	0 watt	0 watt	0 watt
Dielectric Strength MIL-R-12934			
Sea Level	1,000 VAC min.	1,000 VAC min.	1,000 VAC min.
70,000 Feet	300 VAC min.	300 VAC min.	250 VAC min.
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]			
Operating Temperature Range	−65°C to +125°C	−65°C to +125°C	−65°C to +125°C
Temperature Coefficient[2]	±20ppm/°C max.	±20ppm°C max.	±20ppm°C max.
Humidity	MIL-R-12934 Humidity cycling	MIL-R-12934 Humidity cycling	MIL-R-12934 Humidity cycling
Vibration	MIL-R-12934, 15G	MIL-R-12934, 15G	MIL-R-12934, 15G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum	0.1 millisecond maximum
Wiper Shift	1.0% maximum	1.0% maximum	1.0% maximum
Shock	MIL-R-12934, 50G	MIL-R-12934, 50G	MIL-R-12934, 50G
Wiper Bounce	Same as Vibration	Same as Vibration	Same as Vibration
Load Life MIL-R-12934	1,000 hours	1,000 hours	1,000 hours
Resistance Shift	2.0% maximum	2.0% maximum	2.0% maximum
Sand, Dust, Fungus	MIL-E-5272	MIL-E-5272	MIL-E-5272
Salt Spray	MIL-R-12934	MIL-R-12934	MIL-R-12934
Mechanical Characteristics[1]			
Mechanical Angle	Continuous	Continuous	Continuous
Shaft Runout	0.001 in. T.I.R.	0.001 in. T.I.R.	0.001 in. T.I.R.
Shaft End Play	0.003 in. T.I.R.	0.003 in. T.I.R.	0.003 in. T.I.R.
Shaft Radial Play	0.002 in. T.I.R.	0.002 in. T.I.R.	0.0015 in. T.I.R.
Lateral Runout	0.002 in. T.I.R.	0.002 in. T.I.R.	0.003 in. T.I.R.
Pilot Diameter Runout	0.0015 in. T.I.R.	0.0015 in. T.I.R.	0.002 in. T.I.R.
Rotational Life	2,000,000 shaft revolutions	2,000,000 shaft revolutions	1,000,000 shaft revolutions
Torque (Starting)	0.1 oz-in. max.	0.1 oz-in. max.	1.0 oz-in. max.
Torque (Running)	0.1 oz-in. max.	0.1 oz-in. max.	0.6 oz-in. max.
Moment of Inertia	0.1g cm²	0.12g cm²	1.67g cm²
Ganging	8 cups maximum	8 cups maximum	8 cups maximum
Weight	Approx. 17g	Approx. 20g	Approx. 85g
Terminals	Gold-plated turrets	Gold-plated turrets	Gold-plated turrets
Markings	Manufacturer's name and part number, resistance value and tolerance, linearity tolerance, wiring diagram, date code		

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.

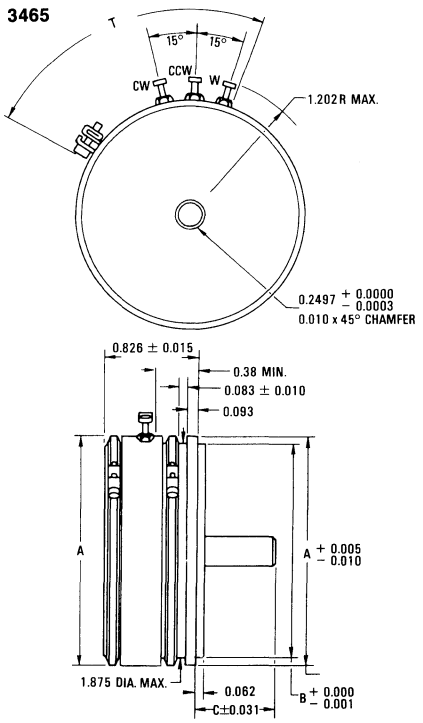
DIMENSIONS (INCH)

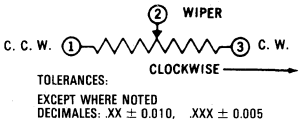
Model	ø A	ø B	C	T	Add for each additional cup
3585	0.875	0.7500	0.500	145° + 0 − 20°	0.405
3485	1.062	0.9688	0.875	130° + 0 − 15°	0.405
3465	2.000	1.8750	0.625	90° + 0 − 20°	0.500

3585/3485

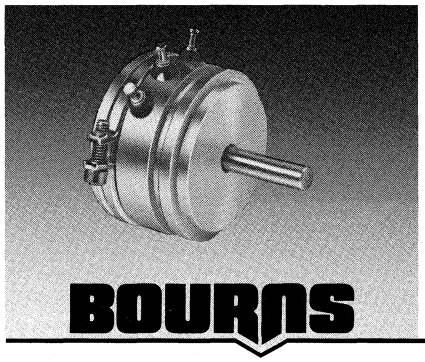


3465





Specifications are subject to change without notice.



7/8" DIAMETER/SINGLE-TURN CONDUCTIVE PLASTIC

- Servo mount
- Shaft supported by front and rear precision ball bearings
- Non-standard features and specifications available
- Gangable up to 10 cups

FOR ORDERING INFORMATION SEE PAGE 108

Model 6534

Bourns® Precision Potentiometer

Electrical Characteristics[1]

Standard Resistance Range	1K to 100KΩ
Resistance Tolerance	±10%
Independent Linearity	±0.5%
Effective Electrical Angle	320° ±3°
Minimum Voltage	0.1% maximum (0.2% at 2KΩ, 0.4% at 1KΩ)
Resolution	Essentially infinite
Power Rating (Voltage Limited By Power Dissipation or 350 VAC, Whichever is Less)	
+70°C	1 watt
+125°C	0 watt
Output Smoothness	0.1%
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	750 VAC minimum
70,000 Feet	250 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

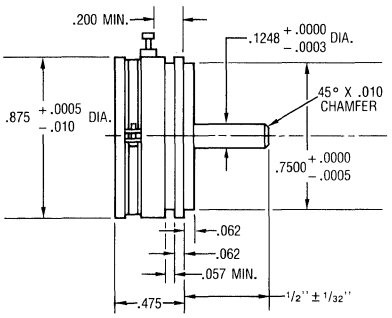
Environmental Characteristics[1]

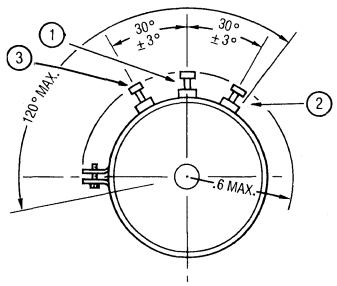
Operating Temperature	
Static Operation Temperature Range	−65°C to +125°C
Dynamic Operation Temperature Range	+1°C to +125°C
Temperature Coefficient	±500ppm/°C maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±10% maximum
Vibration	15G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Shock	50G
Wiper Bounce	0.1 millisecond maximum
Rotational Life (No Load)	25,000,000 shaft revolutions
Total Resistance Shift	±10% maximum

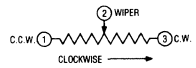
Mechanical Characteristics[1]

Shaft Runout	0.001 in. T.I.R.
Shaft End Play	0.003 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.
Pilot Diameter Runout	0.001 in. T.I.R.
Lateral Runout	0.002 in. T.I.R.
Backlash	0.1° maximum
Mechanical Angle	Continuous
Torque (Starting & Running)	0.25 oz-in. maximum

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.

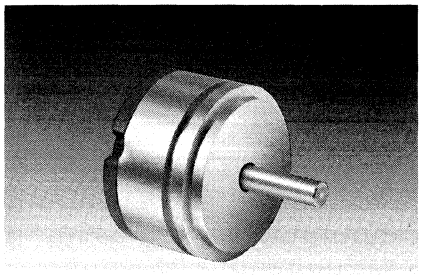






TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ±.015, .XXX ±.005
FRACTIONS: ±1/64

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.



7/8'' DIAMETER / SINGLE-TURN / CONDUCTIVE PLASTIC

- Infinite resolution element
- Standard linearity: 1.0%
- Extended temperature range: −65°C to +125°C
- Extended life version (6538)
- Output smoothness: 0.1% standard
- Molded-in rear terminals
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGE 108

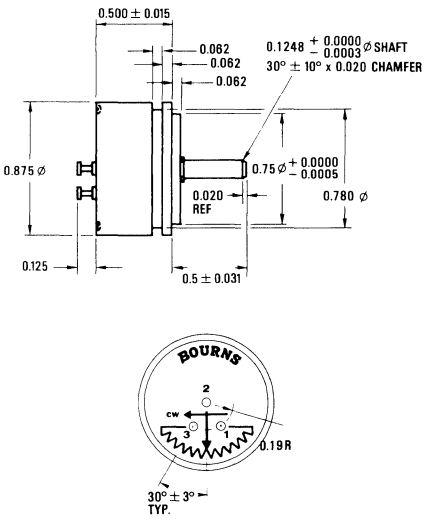
Models 6537/6538

Bourns® Precision Potentiometers

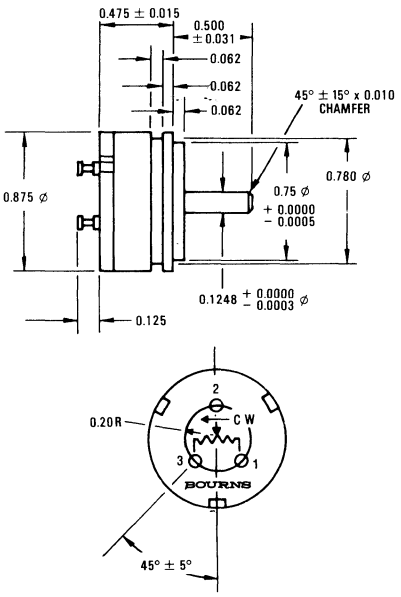
	6537 7/8'' Diameter	6538 7/8'' Diameter (Ball Bearing)
Electrical Characteristics[1]		
Standard Resistance Range	1KΩ to 100KΩ	1KΩ to 100KΩ
Resistance Tolerance	±10%	±10%
Independent Linearity	±1%	±1%
Resolution	Essentially infinite	Essentially infinite
Effective Electrical Angle	340° ±3°	340° ±3°
End Voltage	0.5% maximum	0.5% maximum
Output Smoothness	0.1%	0.1%
Power Rating (Voltage Limited By Power Dissipation, or 300 VAC, Whichever is Less)		
+70°C	1 watt	1 watt
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	750 VAC minimum	750 VAC minimum
Insulation Resistance (500 VDC)	500 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−65°C to +125°C	−65°C to +125°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +125°C
Temperature Coefficient	±500ppm/°C maximum	±500ppm°C maximum
Moisture Resistance	MIL-STD-202, Method 106	MIL-STD-202, Method 106
Total Resistance Shift	±10% maximum	±10% maximum
Vibration	15G	15G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±5% maximum	±5% maximum
Voltage Ratio Shift	±0.5% maximum	±0.5% maximum
Shock	50G	50G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±5% maximum	±5% maximum
Voltage Ratio Shift	±0.5% maximum	±0.5% maximum
Load Life	1,000 hours, 1 watt	1,000 hours, 1 watt
Total Resistance Shift	±10% maximum	±10% maximum
Rotational Life (No Load)	10,000,000 shaft revolutions	20,000,000 shaft revolutions
Total Resistance Shift	±10% maximum	±10% maximum
Mechanical Characteristics[1]		
Mechanical Angle	Continuous	Continuous
Backlash	0.1° maximum	0.1° maximum
Shaft Runout	0.005 in. T.I.R.	0.001 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.	0.005 in. T.I.R.
Shaft Radial Play	0.005 in. T.I.R.	0.003 in. T.I.R.
Pilot Diameter		
Runout	0.0025 in. T.I.R.	0.0025 in. T.I.R.
Lateral Runout	0.003 in. T.I.R.	0.003 in. T.I.R.
Torque (Starting & Running)	0.5 oz-in. maximum	0.25 oz-in. maximum
Terminals	Molded-in rear	Molded-in rear

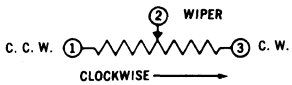
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.

6537



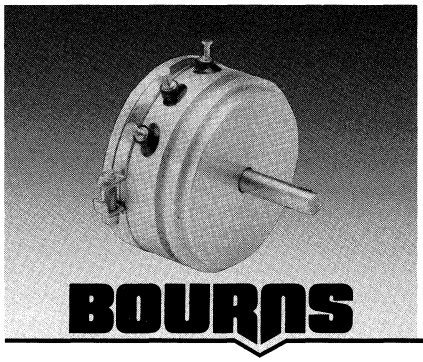
6538 7/8'' DIAMETER





TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005



1-1/16" DIAMETER/SINGLE-TURN CONDUCTIVE PLASTIC

- Extended rotational life
- Ball bearings front and rear
- Servo Mount
- Ganging up to 10 cups
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGE 108

Model 6544

Bourns® Precision Potentiometer

Electrical Characteristics[1]

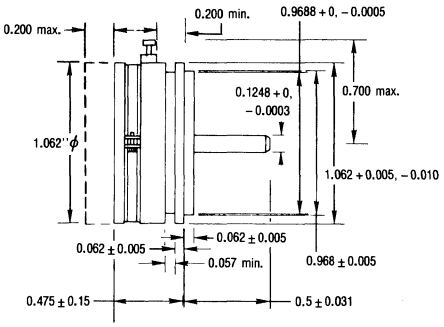
Standard Resistance Range	1KΩ to 100KΩ
Resistance Tolerance	±10%
Independent Linearity	±0.5%
Effective Electrical Angle	340° ±3°
End Voltage	MIL-R-39023
Power Rating	
+70°C	1.25 watts
+125°C	0 watt
Output Smoothness	0.1%
Dielectric Strength	
Sea Level	750 VAC minimum
70,000 Feet	250 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

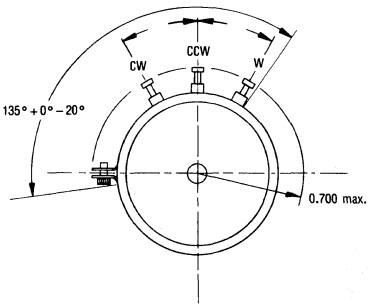
Environmental Characteristics[1]

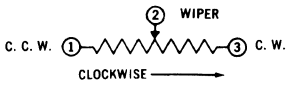
Test Procedures per:	MIL-R-39023
Operating Temperature Range	−65°C to +125°C
Temperature Coefficient	MIL-R-39023, Symbol A
Humidity	MIL-R-39023 moisture resistance
Vibration	MIL-R-39023, 15G
Wiper Bounce	0.1 millisecond maximum
Wiper Shift	1.0% maximum
Shock	MIL-R-39023, 50G
Wiper Bounce and Wiper Shift	Same as Vibration
Sand, Dust, Fungus	MIL-E-5272
Salt Spray	MIL-R-39023

Mechanical Characteristics[1]

Mechanical Angle	Continous Rotation
Shaft Runout	MIL-R-12934: 0.001" or 0.002" per inch shaft length
Lateral Runout	0.002 in. T.I.R.
Pilot Diameter Runout	0.001 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.
Backlash	0.1% maximum
Rotational Life, Shaft Revolutions	MIL-R-39023, Res. Change 10% maximum, Symbol 4 = 25 x 10^6 Rev.
Torque, Starting and Running	0.25 oz-in. maximum
Markings	Part number, resistance value and tolerance, linearity tolerance, wiring diagram, date code



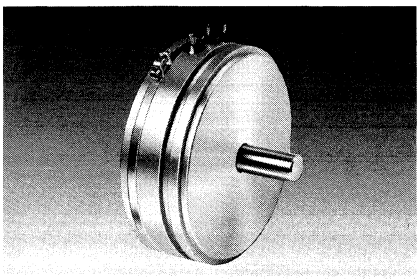




TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.



2" DIAMETER/SINGLE-TURN CONDUCTIVE PLASTIC

- Servo mount style
- Shaft supported by front and rear precision ball bearings
- Non-standard features and specifications available
- Gangable up to 10 cups

FOR ORDERING INFORMATION SEE PAGE 108

Model 6574

Bourns® Precision Potentiometer

Electrical Characteristics[1]

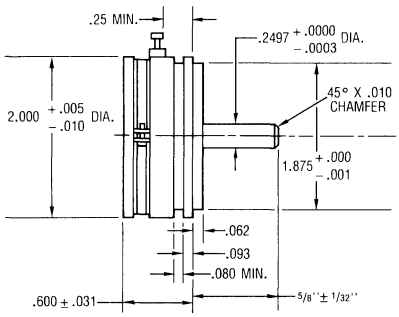
Standard Resistance Range	1K to 100KΩ
Resistance Tolerance	±10%
Independent Linearity	±0.25%
Effective Electrical Angle	350° ±2°
Minimum Voltage	0.1% maximum (0.2% at 2KΩ, 0.4% at 1KΩ)
Resolution	Essentially infinite
Power Rating (Voltage Limited By Power Dissipation or 350 VAC, Whichever is Less)	
+70°C	2 watts
+125°C	0 watt
Output Smoothness	0.1%
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum
70,000 Feet	350 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

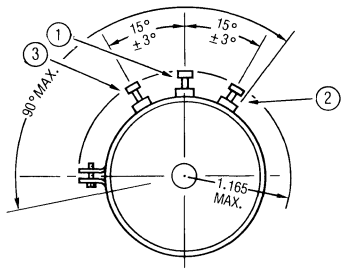
Environmental Characteristics[1]

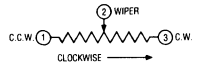
Operating Temperature	
Static Operation Temperature Range	−65°C to +125°C
Dynamic Operation Temperature Range	+1°C to +125°C
Temperature Coefficient	±500ppm/°C maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±10% maximum
Vibration	15G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Shock	60G
Wiper Bounce	0.1 millisecond maximum
Rotational Life (No Load)	25,000,000 shaft revolutions
Total Resistance Shift	±10% maximum
Load Life	1,000 hours, 1.5 watts
Total Resistance Shift	±10% maximum

Mechanical Characteristics[1]

Shaft Runout	0.001 in. T.I.R.
Shaft End Play	0.003 in. T.I.R.
Shaft Radial Play	0.003 in. T.I.R.
Pilot Diameter Runout	0.001 in. T.I.R.
Lateral Runout	0.003 in. T.I.R.
Backlash	0.1° maximum
Mechanical Angle	Continuous
Torque (Starting & Running)	0.75 oz-in. maximum

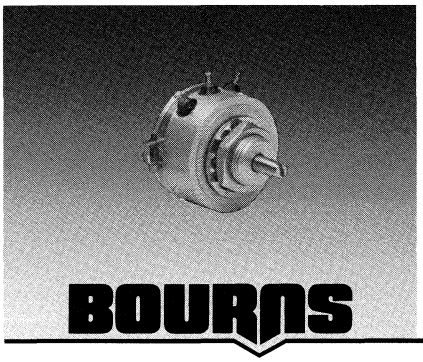






TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ±.015, .XXX ±.005
FRACTIONS: ±1/64

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.



7/8" DIAMETER/SINGLE-TURN CONDUCTIVE PLASTIC

- Excellent resolution
- High rotational life
- Bushing mount
- Non-standard features and specifications available
- Gangable up to 10 cups

FOR ORDERING INFORMATION SEE PAGE 109

Model 6634

Bourns® Precision Potentiometer

Electrical Characteristics[1]

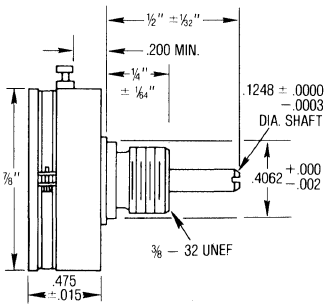
Standard Resistance Range	1K to 100KΩ
Resistance Tolerance	±10%
Independent Linearity	±0.5%
Effective Electrical Angle	320° ±3°
Absolute Minimum Resistance/Minimum Voltage	0.1% maximum (0.2% at 2KΩ, 0.4% at 1KΩ
Resolution	Essentially infinite
Power Rating (Voltage Limited By Power Dissipation or 350 VAC, Whichever is Less)	
+70°C	1 watt
+125°C	0 watt
Output Smoothness	0.1%
Dielectric Strength V.R.M.S.	
Sea Level	750
70,000 Feet	250
Insulation Resistance (500 VDC)	1,000 megohms minimum

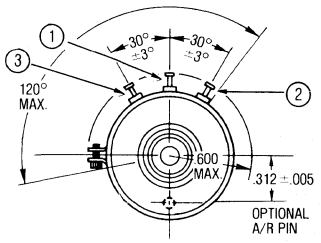
Environmental Characteristics[1]

Operating Temperature	−65°C to +125°C
Resistance Temperature Coefficient	±5% TRS
Moisture Resistance	Res. change ±10% maximum
Vibration	15G
Shock	50G
Rotational Life	25,000,000 revolutions
Total Resistance Shift	±10% maximum

Mechanical Characteristics[1]

Shaft Runout (MIL-R-39023)	0.001 in. T.I.R.
Shaft End Play (MIL-R-39023)	0.003 in. T.I.R.
Shaft Radial Play	0.004 in. T.I.R.
Backlash	0.1° maximum
Mechanical Angle	Continuous
Torque (Starting & Running, oz-in. Maximum)	0.25

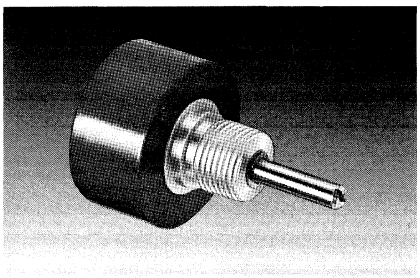




TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.



7/8" DIAMETER / SINGLE-TURN / CONDUCTIVE PLASTIC

- Bushing mount
- Excellent resolution
- High rotational life (ball bearing shaft support abailable - 6638)
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGE 109

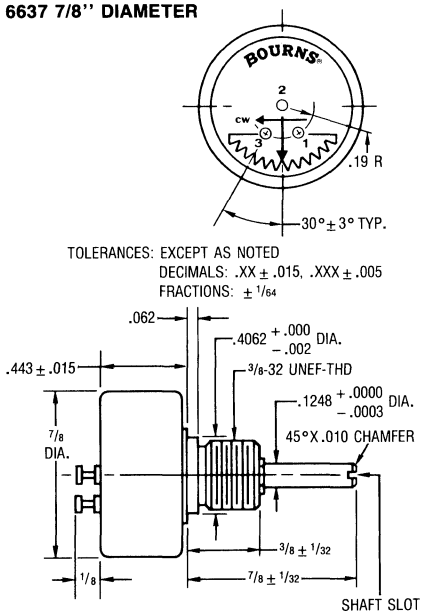
Models 6637/6638

Bourns® Precision Potentiometers

	6637 7/8" Diameter	6638 7/8" Diameter (Ball Bearing)
Electrical Characteristics[1]		
Standard Resistance Range	1KΩ to 100KΩ	1KΩ to 100KΩ
Resistance Tolerance	±10%	±10%
Independent Linearity	±1%	±1%
Effective Electrical Angle	340° ±3°	340° ±3°
End Voltage	0.5% maximum	0.5% maximum
Output Smoothness	0.1% maximum	0.1% maximum
Resolution	Essentially infinite	Essentially infinite
Power Rating (Voltage Limited By Power Dissipation, or 300 VAC, Whichever is Less)		
+70°C	1 watt	1 watt
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	750 VAC minimum	750 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Environmental Characteristics[1]		
Operating Temperature		
Static Operation Temp Range	−65°C to +125°C	−65°C to +125°C
Dynamic Temp Range	+1°C to +125°C	+1°C to +125°C
Temperature Coefficient	±500ppm/°C maximum	±500ppm°C maximum
Moisture Resistance	MIL-STD-202, Method 106	MIL-STD-202, Method 106
Total Resistance Shift	±15% maximum	±10% maximum
Vibration	15G	15G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±5% maximum	±5% maximum
Voltage Ratio Shift	±0.5% maximum	±0.5% maximum
Shock	50G	50G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Total Resistance Shift	±5% maximum	±5% maximum
Voltage Ratio Shift	±0.5% maximum	±0.5% maximum
Rotational Life (No Load)	10,000,000 shaft revolutions	20,000,000 shaft revolutions
Total Resistance Shift	±10% maximum	±10% maximum
Load Life	1,000 hours, 1 watt	1,000 hours, 1 watt
Total Resistance Shift	±10% maximum	±10% maximum
Mechanical Characteristics[1]		
Mechanical Angle	Continuous	Continuous
Backlash	0.1° maximum	0.1° maximum
Shaft Runout	0.001 in. T.I.R.	0.001 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.	0.005 in. T.I.R.
Shaft Radial Play	0.005 in. T.I.R.	0.003 in. T.I.R.
Torque (Starting & Running)	0.5 oz-in. maximum	0.25 oz-in. maximum

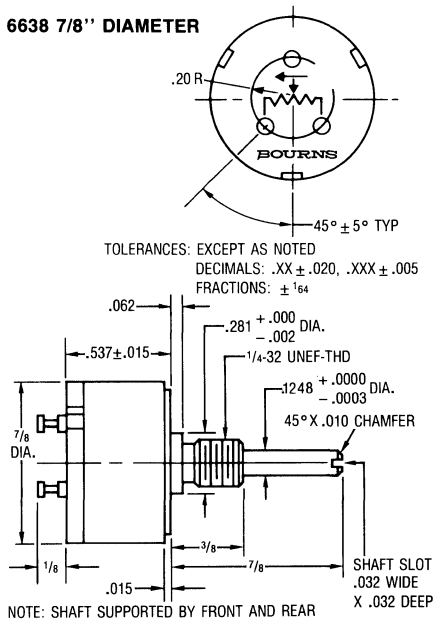
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.

6637 7/8" DIAMETER

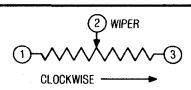


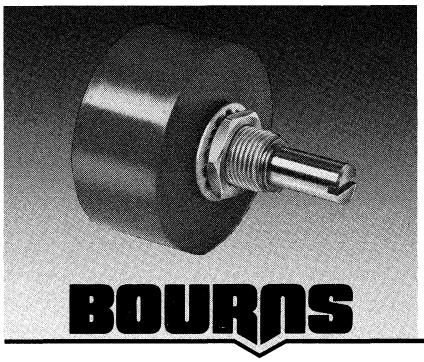
NOTE: SHAFT SUPPORTED BY FRONT SLEEVE BEARING.

6638 7/8" DIAMETER



NOTE: SHAFT SUPPORTED BY FRONT AND REAR PRECISION BALL BEARINGS.





1-5/16" DIAMETER/SINGLE-TURN CONDUCTIVE PLASTIC

- Bushing mount
- Shaft supported by front sleeve bearing
- Non-standard features and specifications available

FOR ORDERING INFORMATION SEE PAGE 109

Model 6657

Bourns® Precision Potentiometer

Electrical Characteristics[1]

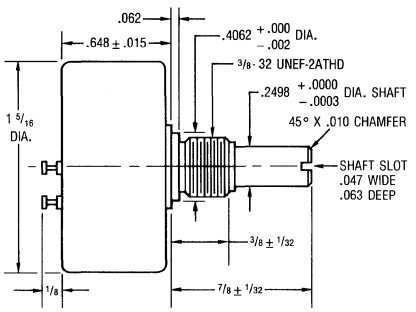
Standard Resistance Range	1K to 100KΩ
Resistance Tolerance	±10%
Independent Linearity	±1%
Resolution	Essentially infinite
Effective Electrical Angle	340° ±3°
End Voltage	0.5% maximum
Output Smoothness	0.1%
Power Rating (Voltage Limited By Power Dissipation or 300 VAC, Whichever is Less)	
+70°C	1.5 watts
+125°C	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	750 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

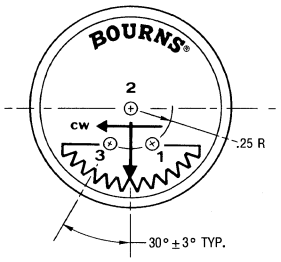
Environmental Characteristics[1]

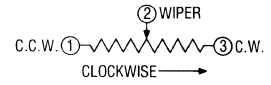
Operating Temperature	
Static Operation Temperature Range	−65°C to +125°C
Dynamic Operation Temperature Range	+1°C to +125°C
Temperature Coefficient	±500ppm/°C maximum
Vibration	15G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±5% maximum
Voltage Ratio Shift	±0.5% maximum
Shock	50G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±5% maximum
Voltage Ratio Shift	±0.5% maximum
Load Life	1,000 hours, 1.5 watts
Total Resistance Shift	±10% maximum
Rotational Life (No Load)	10,000,000 shaft revolutions
Total Resistance Shift	±10% maximum
Moisture Resistance	MIL-STD-202, Method 106
Total Resistance Shift	±15% maximum

Mechanical Characteristics[1]

Mechanical Angle	Continuous
Backlash	0.1° maximum
Shaft Runout	0.001 in. T.I.R.
Shaft End Play	0.005 in. T.I.R.
Shaft Radial Play	0.005 in. T.I.R.
Torque (Starting & Running)	0.5 oz-in. maximum

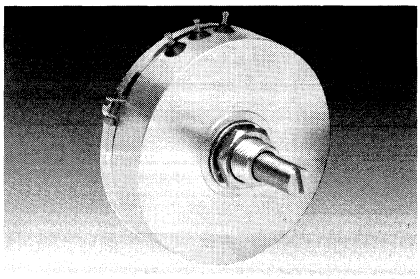






TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ± .010, .XXX ± .005
FRACTION ± 1/64

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.



2" DIAMETER/SINGLE-TURN CONDUCTIVE PLASTIC

- Excellent resolution
- High rotational life
- Bushing mount
- Non-standard features and specifications available
- Gangable up to 10 cups

FOR ORDERING INFORMATION SEE PAGE 109

Model 6674

Bourns® Precision Potentiometer

Electrical Characteristics[1]

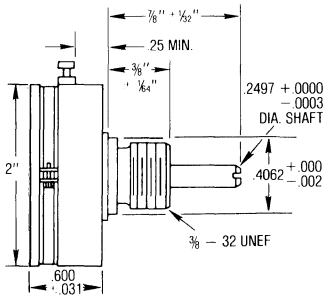
Standard Resistance Range	1K to 100KΩ
Resistance Tolerance	±10%
Independent Linearity	±0.25%
Effective Electrical Angle	350° ±2°
Resolution	Infinite
Power Rating (Voltage Limited By Power Dissipation or 350 VAC, Whichever is Less)	
+70°C	2 watts
+125°C	0 watt
Output Smoothness	0.1%
Dielectric Strength (VRMS)	
Sea Level	1,000
70,000 Feet	350
Insulation Resistance (300 VDC)	1,000 megohms minimum

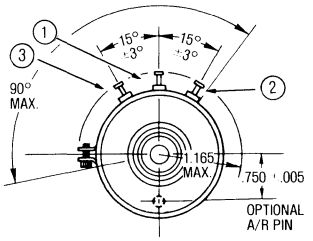
Environmental Characteristics[1]

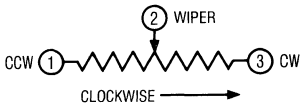
Test Procedures Per	Method 106
Operating Temperature	−65°C to +125°C
Resistance Temperature Coefficient	±5% TRS
Moisture Resistance Characteristics	Resistance change ±10% maximum
Vibration	15G
Shock	60G
Rotational Life	25,000,000 revolutions
Total Resistance Shift	±10% maximum

Mechanical Characteristics[1]

Shaft Runout	0.001 in. T.I.R.
Shaft End Play	0.003 in. T.I.R.
Shaft Radial Play	0.004 in. T.I.R.
Backlash	0.1% maximum
Mechanical Angle - Standard	Continuous
Torque (Starting & Running)	0.75 oz-in. maximum



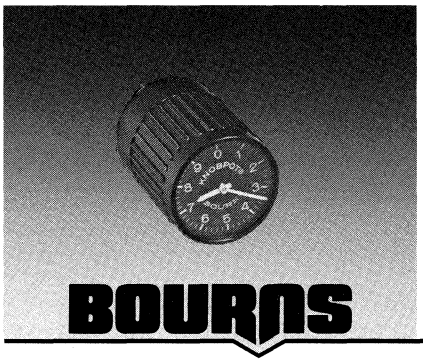




TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: .XX ± .010 , .XXX ± .005

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.



3/4" DIAMETER / 10-TURN / WIREWOUND

- Bushing mount
- Cost saving; pre-phased
- Highly readable clockface readout
- Easy mounting

FOR ORDERING INFORMATION SEE PAGE 109

Model 3600

Knobpot® Precision Potentiometer

Electrical Characteristics[1]

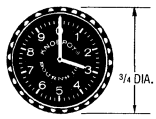
Standard Resistance Range	100 to 100KΩ
Resistance Tolerance	±5%
Accuracy (Correleation of Dial Readout to Voltage Ratio Output)	±0.5% voltage ratio
Repeatability of Dial Readout	±0.1% voltage ratio
Resolution	See table page 109
Effective Electrical Angle	3600° nominal
Absolute Minimum Resistance	1Ω or 0.1% maximum (whichever is greater)
Noise	100Ω ENR maximum
Power Rating (Voltage Limited By Power Dissipation or 385 VAC, Whichever is Less)	
+25°C	1.5 watts
+85°C	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum
70,000 Feet	400 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

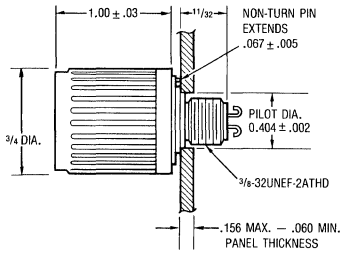
Environmental Characteristics[1]

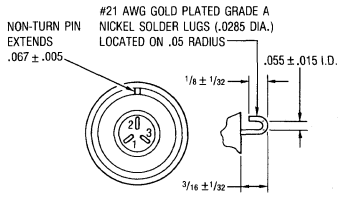
Operating Temperature	
Static Operation Temperature Range	−65°C to +85°C
Dynamic Operation Temperature Range	+1°C to +85°C
Temperature Coefficient[2]	±50ppm/°C maximum/unit
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum
Vibration	10G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.2% maximum
Shock	50G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.2% maximum
Load Life	1,000 hours, 1.5 watts
Total Resistance Shift	±2% maximum
Rotational Life (No Load)[2]	200,000 revolutions
Total Resistance Shift	±2% maximum

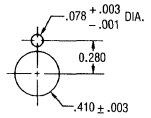
Mechanical Characteristics[1]

Mechanical Angle	3600° +20°, − 0°
Stop Strength	20 oz-in. minimum
Torque (Starting & Running)	4.0 oz-in. maximum
Variation	1.0 oz-in. maximum
Backlash	1.0° maximum
Weight	Approximately 0.6 oz.
Terminals	Gold-plated J-Hooks
Markings	Manufacturer's name and part number, resistance value and date code



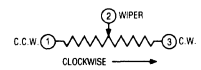






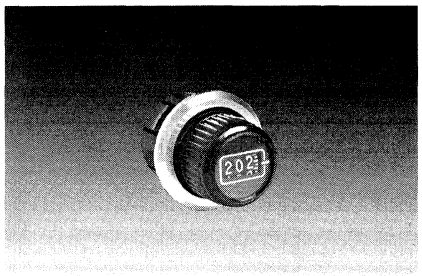
PANEL HOLE PATTERN

LOCKWASHER AND MOUNTING NUT TO BE SUPPLIED WITH EACH UNIT



TOLERANCES: EXCEPT AS NOTED
DECIMALS: .XX ± .010, .XXX ± .005
FRACTIONS: ± 1/64

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult manufacturer for complete specification details for resistances below 1000 ohms.



BOURNS

7/8'' DIAMETER / 10-TURN / DIGITAL / WIREWOUND

- Snap-in mounting
- Space saving - extends only 5/8'' behind most panels
- Easy one-hole, snap-in mounting
- Digital dial provides excellent readability

FOR ORDERING INFORMATION SEE PAGE 109

Model 3610

Knobpot® Precision Potentiometer

Electrical Characteristics[1]

Standard Resistance Range	100 to 100KΩ
Resistance Tolerance	±5%
Accuracy (Correleation of Dial Readout to Voltage Ratio Output)	±0.5% voltage ratio
Repeatability of Dial Readout	±0.1% voltage ratio
Resolution	See table page 109
Effective Electrical Angle	3600° nominal
Absolute Minimum Resistance	1Ω or 0.1% maximum (whichever is greater)
Noise	100Ω ENR maximum
Power Rating (Voltage Limited By Power Dissipation or 385 VAC, Whichever is Less)	
+25°C	1.5 watts
+85°C	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum
70,000 Feet	400 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

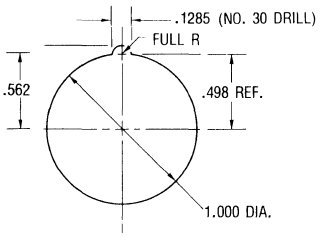
Environmental Characteristics[1]

Operating Temperature	
Static Operation Temperature Range	−25°C to +85°C
Dynamic Operation Temperature Range	+1°C to +85°C
Temperature Coefficient[2]	±50ppm/°C maximum/wire
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum
Vibration	10G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.2% maximum
Shock	50G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.2% maximum
Load Life	1,000 hours, 1.5 watts
Total Resistance Shift	±2% maximum
Rotational Life (No Load)	50,000 revolutions
Total Resistance Shift	±2% maximum

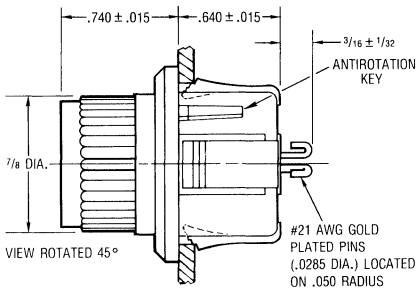
Mechanical Characteristics[1]

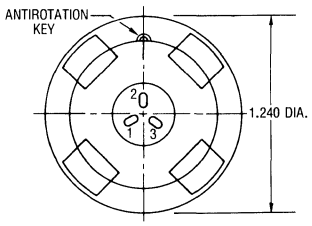
Mechanical Angle	3600° +20°, − 0°
Stop Strength	20 oz-in. minimum
Torque (Starting & Running)	4.0 oz-in. maximum
Variation	1.0 oz-in. maximum
Backlash	1.0° maximum
Weight	Approximately 0.7 oz.
Terminals	Gold-plated J-Hooks
Markings	Manufacturer's name and part number, resistance value and date code

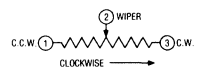
PANEL HOLE PATTERN



NOTES:
1. SNAP-IN MOUNTING CUP ACCOMMODATES PANEL THICKNESS .025 THRU .078 (NO. 22GA THRU NO. 14GA) AND .125



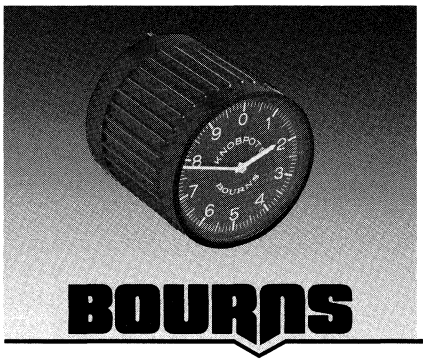




TOLERANCES: EXCEPT AS NOTED
DECIMALS: .XX ± .010, .XXX ± .005
FRACTIONS: ± 1/64

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult manufacturer for complete specification details for resistances below 500 ohms and above 100K ohms.

Specifications are subject to change without notice.



1-1/4" DIAMETER / 10-TURN / WIREWOUND

- Bushing mount
- Integral clockface readout
- Cost saving; pre-phased
- Highly readable clockface readout

FOR ORDERING INFORMATION SEE PAGE 109

Model 3640

Knobpot® Precision Potentiometer

Electrical Characteristics[1]

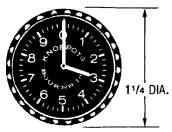
Standard Resistance Range	100 to 250KΩ
Resistance Tolerance	±3%
Accuracy (Correleation of Dial Readout to Voltage Ratio Output)	
100 to 200Ω	±0.20% voltage ratio
500 to 5KΩ	±0.15% voltage ratio
10KΩ	±0.12% voltage ratio
15K to 250KΩ	±0.10% voltage ratio
Repeatability of Dial Readout	±0.05% voltage ratio
Resolution	See table page 109
Effective Electrical Angle	3600° nominal
Absolute Minimum Resistance	1Ω or 0.1% maximum (whichever is greater)
Noise	100Ω ENR maximum
Power Rating (Voltage Limited By Power Dissipation or 500 VAC, Whichever is Less)	
+25°C	2.5 watts
+85°C	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum
70,000 Feet	250 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

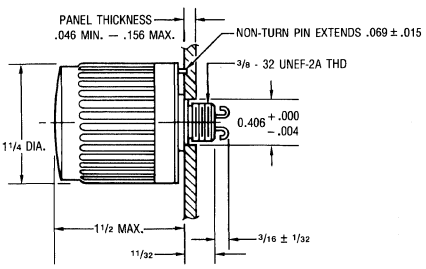
Environmental Characteristics[1]

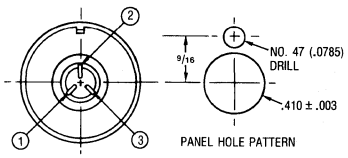
Operating Temperature	
Static Operation Temperature Range	−65°C to +85°C
Dynamic Operation Temperature Range	+1°C to +85°C
Temperature Coefficient[2]	±50ppm/°C maximum/wire
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum
Vibration	10G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.2% maximum
Shock	50G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.2% maximum
Load Life	1,000 hours, 2.5 watts
Total Resistance Shift	±2% maximum
Rotational Life (No Load)	100,000 revolutions
Total Resistance Shift	±4% maximum

Mechanical Characteristics[1]

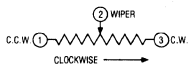
Mechanical Angle	3600° +10°, − 0°
Stop Strength	48 oz-in. minimum
Torque	
Starting	1.0 to 10.0 oz-in. maximum
Running	10.0 oz-in. maximum
Variation	3.0 oz-in. maximum
Weight	Approximately 1.75 oz.
Terminals	Gold-plated J-Hooks
Markings	Manufacturer's name and part number, resistance value and date code





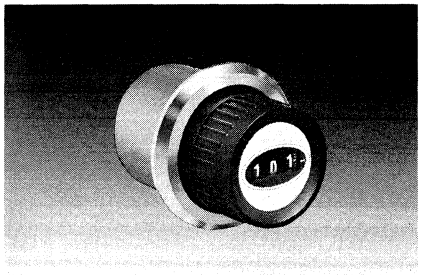


NOTE: LOCKWASHER AND HEX NUT SUPPLIED WITH EACH UNIT.



TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ±.010, .XXX ±.005
FRACTION: ± 1/64

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.



1-1/4'' DIAMETER / 10-TURN / DIGITAL WIREWOUND

- Easy single-hole mounting with recessed cup provided
- Digital dial provides excellent readability
- Cost saving; pre-phased

BOURNS

FOR ORDERING INFORMATION SEE PAGE 110

Model 3650

Knobpot® Precision Potentiometer

Electrical Characteristics[1]

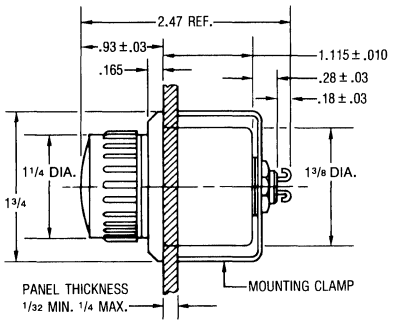
Standard Resistance Range	100 to 100KΩ
Resistance Tolerance	±3%
Accuracy (Correleation of Dial Readout to Voltage Ratio Output)	
100 to 200Ω	±0.20% voltage ratio
500 to 5KΩ	±0.15% voltage ratio
10K to 20KΩ	±0.12% voltage ratio
50K to 100KΩ	±0.10% voltage ratio
Repeatability of Dial Readout	±0.05% voltage ratio
Resolution	See table page 110
Effective Electrical Angle	3600° nominal
Absolute Minimum Resistance	1Ω or 0.1% maximum (whichever is greater)
Noise	100Ω ENR maximum
Power Rating (Voltage Limited By Power Dissipation or 500 VAC, Whichever is Less)	
+25°C	2.5 watts
+85°C	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum
70,000 Feet	250 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum

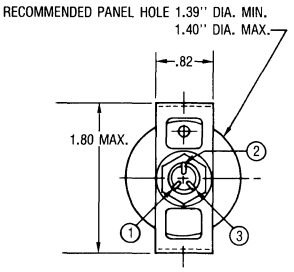
Environmental Characteristics[1]

Operating Temperature	
Static Operation Temperature Range	−25°C to +85°C
Dynamic Operation Temperature Range	+1°C to +85°C
Temperature Coefficient[2]	±50ppm/°C maximum/wire
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum
Vibration	10G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.2% maximum
Shock	50G
Wiper Bounce	0.1 millisecond maximum
Total Resistance Shift	±2% maximum
Voltage Ratio Shift	±0.2% maximum
Load Life	1,000 hours, 2.5 watts
Total Resistance Shift	±2% maximum
Rotational Life (No Load)	100,000 revolutions
Total Resistance Shift	±4% maximum

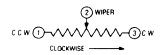
Mechanical Characteristics[1]

Mechanical Angle	3600° +10°, − 0°
Stop Strength	48 oz-in. minimum
Torque	
Starting	1.0 to 15.0 oz-in. maximum
Running	15.0 oz-in. maximum
Variation	3.0 oz-in. maximum
Backlash	1.0° maximum
Weight	Approximately 4 oz.
Terminals	Gold-plated J-Hooks
Markings	Manufacturer's name and part number, resistance value and date code



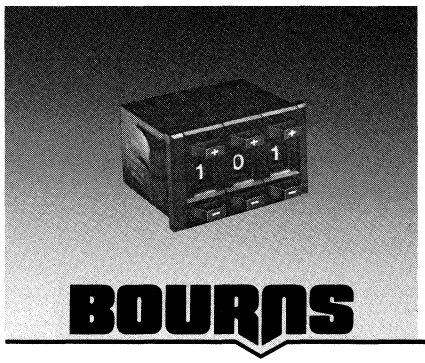


NOTE: LOCKWASHER HEX NUT AND 2 MOUNTING CLAMPS SUPPLIED WITH EACH UNIT.



TOLERANCES: EXCEPT WHERE NOTED
DECIMAL: .XX ± .010, .XXX ± .005
FRACTION: ± 1/64

[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
[2]Consult factory for complete specification details.
Specifications are subject to change without notice.



DIGITAL PUSHBUTTON POTENTIOMETER/ CERMET

- Repeatable settings
- Resolution to 0.001%
- Digital display provides excellent readability
- Snap-in panel mount

FOR ORDERING INFORMATION SEE PAGE 110

Model 3680

Knobpot® Precision Potentiometer

Electrical Characteristics[1]

Standard Resistance Range ..... 50 ohms to 1 megohm
Resistance Tolerance ..... ±3%
Absolute Minimum Resistance ..... 3Ω or 0.2% maximum (whichever is greater)
Resolution
3681 ..... 10%
3682 ..... 1%
3683 ..... 0.1%
3684 ..... 0.01%
3685 ..... 0.001%
Insulation Resistance (500 VDC) ..... 1,000 megohms minimum
Power Rating (Voltage Limited By Power Dissipation or 500 VAC, Whichever is Less)
+25°C ..... 2 watts
+85°C ..... 0 watt
Dielectric Withstanding Voltage ..... MIL-STD-202, Method 301
Sea Level ..... 1,000 VAC minimum
Accuracy (Dial Reading to Output Ratio) ..... ±0.5% full scale

Environmental Characteristics[1]

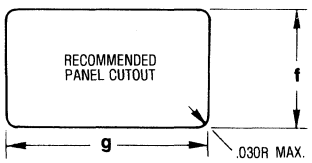
Operating Temperature Range ..... -25°C to +85°C
Temperature Coefficient ..... ±100ppm/°C maximum
Vibration 10G
Wiper Bounce ..... 0.1 millisecond maximum
Total Resistance Shift ..... ±1% maximum
Voltage Ratio Shift ..... ±0.2% maximum
Shock 50G
Wiper Bounce ..... 0.1 millisecond maximum
Total Resistance Shift ..... ±1% maximum
Voltage Ratio Shift ..... ±0.2% maximum
Load Life ..... 1,000 hours, 2 watts
Total Resistance Shift ..... ±2% maximum

Mechanical Characteristics[1]

Expected Life ..... 75,000 button operations each decade
Total Resistance Shift ..... ±2% maximum
Terminals ..... 0.11" wide x .016" thick, tinned solder lugs for 3 #20 AWG wires
Readout Marking ..... 10 positions, 0-9
Markings ..... Manufacturer's name and part number, resistance value and date code

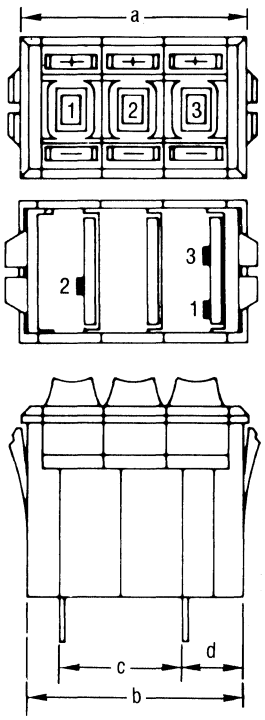
Model	Dimensions					Weight (Approx)	
	a	b	c	d	e ±.015	oz.	gms.
3681	.650	.590	—	.39	.165	.336	9.53
3682	1.050	.990	.420	.47	.330	.576	16.33
3683	1.460	1.390	.730	.47	.165	.824	23.36
3684	1.870	1.790	1.210	.47	.330	1.072	30.39
3685	2.270	2.190	1.540	.47	.165	1.320	37.42

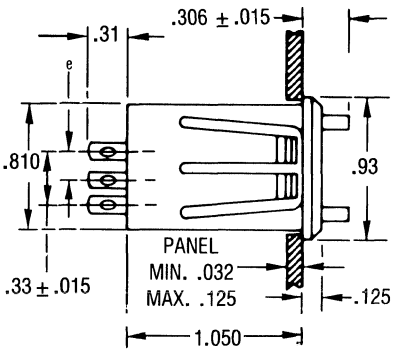
Model	f ±.010	g ±.010
3681	.830	.620
3682	.830	1.020
3683	.830	1.420
3684	.830	1.820
3685	.830	2.220

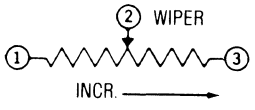


[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
NOTE: Terminals 1 & 3 are reversed from illustration for models 3682 and 3684.

3680

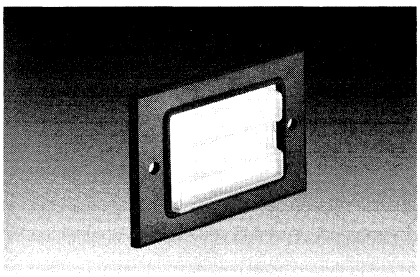






NOTE: TOLERANCES EXCEPT AS SHOWN:
.XX ± .015
.XXX ± .005

Specifications are subject to change without notice.



PROTECTOR FOR PUSHBUTTON POTENTIOMETER

■ For use with Model 3680 digital pushbutton precision potentiometer

BOURNS

Model H-385

Panel Seal Assembly

Physical Characteristics

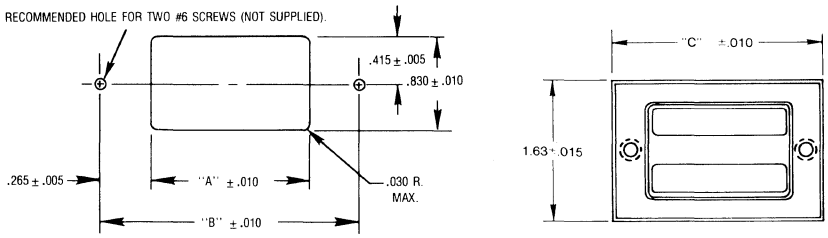
Material (Boot) ..... Clear silicone rubber
Material (Frame) ..... Rigid black plastic
Expected Life ..... 100,000 actuations minimum
Weight
H-385-1 ..... Approximately 0.25 oz.
H-385-2 ..... Approximately 0.30 oz.
H-385-3 ..... Approximately 0.35 oz.
H-385-4 ..... Approximately 0.40 oz.
H-385-5 ..... Approximately 0.45 oz.

APPLICATION DATA

- Protects front of the pot from unwanted entry of rain, dust, grease or oils
- Transparent for easy viewing of numerals
- Tear resistant for long life
- Matte finish black plastic frame to complement most front panels

Bourns® Model H-385 Panel Seal Assembly minimizes accidental entry of liquids or foreign matter through the front of the Model 3680 Family Potentiometer.

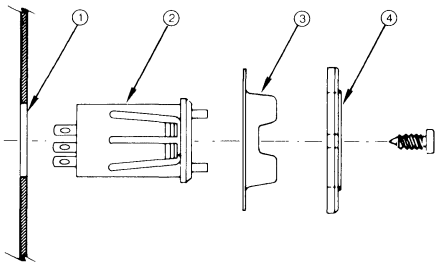
PANEL CUT-OUT/HOLE DIMENSIONS



For Use With	Part Number	Frame Dimensions "C"	Panel Cutout/ Hole Dimensions "A"	"B"
3681	H-385-1	1.592	.620	1.150
3682	H-385-2	1.992	1.020	1.550
3683	H-385-3	2.392	1.420	1.950
3684	H-385-4	2.792	1.820	2.350
3685	H-385-5	3.192	2.220	2.750

H-385 MOUNTING INSTRUCTIONS

1. Cut out and drill panel [1] per chart.
2. Install snap-in potentiometer [2].
3. Locate silicone boot [3] and frame [4] over potentiometer and holes.
4. Attach panel seal assembly to panel with two #6 screws (not supplied).



Precision Potentiometers

3070

(For product specifications, see page 72.)

Resistance (Ohms)	PART NUMBERS*						Nominal Resolution (Percent)
	Printed Circuit Pins						
	Panel Mount (Solder Lugs)	Panel Mount (Flexible Leads)	Printed Circuit Pins		Eyelet Mounting (Flexible Leads)	Eyelet Mounting (Solder Lugs)	
100	3070S-1-101M	3070L-1-101M	3070H-1-101	3070P-1-101	3070L-1-101	3070S-1-101	.117
200	3070S-1-201M	3070L-1-201M	3070H-1-201	3070P-1-201	3070L-1-201	3070S-1-201	.095
500	3070S-1-501M	3070L-1-501M	3070H-1-501	3070P-1-501	3070L-1-501	3070S-1-501	.072
1,000	3070S-1-102M	3070L-1-102M	3070H-1-102	3070P-1-102	3070L-1-102	3070S-1-102	.064
2,000	3070S-1-202M	3070L-1-202M	3070H-1-202	3070P-1-202	3070L-1-202	3070S-1-202	.043
5,000	3070S-1-502M	3070L-1-502M	3070H-1-502	3070P-1-502	3070L-1-502	3070S-1-502	.046
10,000	3070S-1-103M	3070L-1-103M	3070H-1-103	3070P-1-103	3070L-1-103	3070S-1-103	.037
20,000	3070S-1-203M	3070L-1-203M	3070H-1-203	3070P-1-203	3070L-1-203	3070S-1-203	.030
50,000	3070S-1-503M	3070L-1-503M	3070H-1-503	3070P-1-503	3070L-1-503	3070S-1-503	.022

3400

(For product specifications, see page 74.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3400S-1-101	100	.045
3400S-1-201	200	.034
3400S-1-501	500	.023
3400S-1-102	1,000	.020
3400S-1-202	2,000	.016
3400S-1-502	5,000	.013
3400S-1-103	10,000	.010
3400S-1-203	20,000	.011
3400S-1-503	50,000	.008
3400S-1-104	100,000	.006
3400S-1-204	200,000	.005
3400S-1-254	250,000	.005
3400S-1-504	500,000	.004

Optional Feature	Part Number
±0.05% Ind. Linearity	3400S-41-RC (1KΩ min.)

3450

(For product specifications, see page 75.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3450S-1-102	1,000	0.015
3450S-1-202	2,000	0.012
3450S-1-502	5,000	0.009
3450S-1-103	10,000	0.007
3450S-1-203	20,000	0.008
3450S-1-503	50,000	0.006
3450S-1-104	100,000	0.005
3450S-1-204	200,000	0.004
3450S-1-504	500,000	0.003

3437

(For product specifications, see page 87.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3437S-1-500	50	0.371
3437S-1-101	100	0.285
3437S-1-201	200	0.233
3437S-1-501	500	0.174
3437S-1-102	1,000	0.143
3437S-1-202	2,000	0.111
3437S-1-502	5,000	0.103
3437S-1-103	10,000	0.095
3437S-1-203	20,000	0.071
3437S-1-503	50,000	0.054

3438

(For product specifications, see page 87.)

Part Number*	Resistance (Ohms)
3438H-1-201	200
3438H-1-501	500
3438H-1-102	1,000
3438H-1-202	2,000
3438H-1-502	5,000
3438H-1-103	10,000
3438H-1-203	20,000

*The last three digits of the part number represent the resistance value in standard code.

Precision Potentiometers

3500 & 3501

(For product specifications, see page 76.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3500S-2-500	50	.058
3500S-2-101	100	.053
3500S-2-201	200	.044
3500S-2-501	500	.033
3500S-2-102	1,000	.030
3500S-2-202	2,000	.024
3500S-2-502	5,000	.018
3500S-2-103	10,000	.019
3500S-2-203	20,000	.015
3500S-2-503	50,000	.011
3500S-2-104	100,000	.008
3500S-2-204	200,000	.007

Part Number*	Resistance (Ohms)
3501H-1-102	1,000
3501H-1-202	2,000
3501H-1-502	5,000
3501H-1-103	10,000
3501H-1-203	20,000
3501H-1-503	50,000
3501H-1-104	100,000

Optional Feature	Part Number
High Torque (2 to 8 oz-in.)	3500S-16-RC 3501H-16-RC
Sealed for Dip Test	3500S-21-RC 3501H-20-RC
±0.1% Ind. Linearity	3500S-42-RC (200 Ω min.)
CenterTap	3500S-52-RC 3501H-50-RC
AR Pin	3500S-90-RC 3501H-91-RC

3510

(For product specifications, see page 77.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3510S-1-500	50	.162
3510S-1-101	100	.123
3510S-1-201	200	.104
3510S-1-501	500	.085
3510S-1-102	1,000	.090
3510S-1-202	2,000	.070
3510S-1-502	5,000	.055
3510S-1-103	10,000	.041
3510S-1-203	20,000	.032
3510S-1-253	25,000	.037
3510S-1-503	50,000	.028
3510S-1-104	100,000	.021

*The last three digits of the part number represent the resistance value in standard code.

Specifications are subject to change without notice.

3511

(For product specifications, see page 77.)

Part Number*	Resistance Ω
3511H-1-501	500
3511H-1-101	1,000
3511H-1-202	2,000
3511H-1-502	5,000
3511H-1-103	10,000
3511H-1-203	20,000

3520

(For product specifications, see page 78.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3520S-1-200	20	.120
3520S-1-500	50	.097
3520S-1-101	100	.089
3520S-1-201	200	.077
3520S-1-501	500	.054
3520S-1-102	1,000	.047
3520S-1-202	2,000	.050
3520S-1-502	5,000	.037
3520S-1-103	10,000	.030
3520S-1-203	20,000	.025
3520S-1-503	50,000	.020
3520S-1-753	75,000	.015

3521

(For product specifications, see page 78.)

Part Number*	Resistance Ω
3521H-1-501	500
3521H-1-102	1,000
3521H-1-202	2,000
3521H-1-502	5,000
3521H-1-103	10,000
3521H-1-203	20,000
3521H-1-503	50,000

3535

(For product specifications, see page 88.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3535S-1-500	50	.308
3535S-1-101	100	.292
3535S-1-201	200	.234
3535S-1-501	500	.194
3535S-1-102	1,000	.189
3535S-1-202	2,000	.146
3535S-1-502	5,000	.118
3535S-1-103	10,000	.095
3535S-1-203	20,000	.090

Precision Potentiometers

3435

(For product specifications, see page 88.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3435S-1-500	50	0.323
3435S-1-101	100	0.246
3435S-1-201	200	0.200
3435S-1-501	500	0.154
3435S-1-102	1,000	0.120
3435S-1-202	2,000	0.106
3435S-1-502	5,000	0.115
3435S-1-103	10,000	0.085
3435S-1-203	20,000	0.072
3435S-1-503	50,000	0.058

3415

(For product specifications, see page 88.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3415S-1-500	50	0.233
3415S-1-101	100	0.186
3415S-1-201	200	0.154
3415S-1-501	500	0.128
3415S-1-102	1,000	0.095
3415S-1-202	2,000	0.076
3415S-1-502	5,000	0.076
3415S-1-103	10,000	0.062
3415S-1-203	20,000	0.047
3415S-1-503	50,000	0.039
3415S-1-104	100,000	0.030

3540 & 3541

(For product specifications, see page 79.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3540S-1-101	100	.061
3540S-1-201	200	.038
3540S-1-501	500	.031
3540S-1-102	1,000	.025
3540S-1-202	2,000	.022
3540S-1-502	5,000	.017
3540S-1-103	10,000	.018
3540S-1-203	20,000	.016
3540S-1-503	50,000	.010
3540S-1-104	100,000	.009

Part Number*	Resistance (Ohms)
3541H-1-102	1,000
3541H-1-202	2,000
3541H-1-502	5,000
3541H-1-103	10,000
3541H-1-203	20,000
3541H-1-503	50,000
3541H-1-104	100,000

Optional Feature	Part Number
High Torque (2 to 8 oz-in.)	3540S-16-RC 3541H-16-RC
±0.1% Ind. Linearity	3540S-40-RC (250 Ω min.) 3541H-40-RC (1KΩ min.)

3540 & 3541 Continued

Optional Feature	Part Number
Center Tap	3540S-52-RC 3541H-52-RC
Rear Shaft Extension	3540S-79-RC 3541H-79-RC
Flatted Shaft	3540S-80-RC 3541H-80-RC
AR Lug	3540S-91-RC 3541H-91-RC

3543 & 3545

(For product specifications, see page 80.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3543S-1-200	20	.169
3543S-1-500	50	.148
3543S-1-101	100	.127
3543S-1-201	200	.110
3543S-1-501	500	.077
3543S-1-102	1,000	.077
3543S-1-202	2,000	.062
3543S-1-502	5,000	.047
3543S-1-103	10,000	.040
3543S-1-203	20,000	.031
3543S-1-503	50,000	.024

Part Number*	Resistance (Ohms)	Resolution (Percent)
3545S-1-500	50	.110
3545S-1-101	100	.084
3545S-1-201	200	.069
3545S-1-501	500	.054
3545S-1-102	1,000	.043
3545S-1-202	2,000	.044
3545S-1-502	5,000	.038
3545S-1-103	10,000	.029
3545S-1-203	20,000	.023
3545S-1-503	50,000	.017

Optional Feature	Part Number
AR Pin	3543S-91-RC 3545S-91-RC

3550 & 3551

(For product specifications, see page 81.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3550S-1-101	100	.058
3550S-1-201	200	.044
3550S-1-501	500	.038
3550S-1-102	1,000	.030
3550S-1-202	2,000	.024
3550S-1-502	5,000	.023
3550S-1-103	10,000	.019
3550S-1-203	20,000	.017
3550S-1-503	50,000	.011
3550S-1-104	100,000	.009
3550S-1-204	200,000	.008

*The last three digits of the part number represent the resistance value in standard code.

Precision Potentiometers

3550 & 3551 Continued

Part Number*	Resistance (Ohms)
3551H-1-102	1,000
3551H-1-202	2,000
3551H-1-502	5,000
3551H-1-103	10,000
3551H-1-203	20,000
3551H-1-503	50,000
3551H-1-104	100,000

3560

(For product specifications, see page 82.)

Part Number*	Resistance Ω	Resolution (Percent)
3560S-1-500	50	0.149
3560S-1-101	100	0.121
3560S-1-201	200	0.102
3560S-1-501	500	0.076
3560S-1-102	1,000	0.065
3560S-1-202	2,000	0.063
3560S-1-502	5,000	0.047
3560S-1-103	10,000	0.041
3560S-1-203	20,000	0.031
3560S-1-503	50,000	0.024

3561

(For product specifications, see page 82.)

Part Number*	Resistance Ω
3561H-1-501	500
3561H-1-102	1,000
3561H-1-202	2,000
3561H-1-502	5,000
3561H-1-103	10,000
3561H-1-203	20,000

3570

(For product specifications, see page 83.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3570S-1-500	50	0.105
3570S-1-101	100	0.086
3570S-1-201	200	0.068
3570S-1-501	500	0.053
3570S-1-102	1,000	0.043
3570S-1-202	2,000	0.042
3570S-1-502	5,000	0.032
3570S-1-103	10,000	0.029
3570S-1-203	20,000	0.021
3570S-1-503	50,000	0.016
3570S-1-104	100,000	0.013

*The last three digits of the part number represent the resistance value in standard code.

Specifications are subject to change without notice.

3571

(For product specifications, see page 83.)

Part Number*	Resistance (Ohms)
3571H-1-501	500
3571H-1-102	1,000
3571H-1-202	1,000
3571H-1-502	5,000
3571H-1-103	10,000
3571H-1-203	20,000
3571H-1-503	50,000

3585

(For product specifications, see page 89.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3585S-1-500	50	0.370
3585S-1-101	100	0.307
3585S-1-201	200	0.260
3585S-1-501	500	0.233
3585S-1-102	1,000	0.189
3585S-1-202	2,000	0.162
3585S-1-502	5,000	0.119
3585S-1-103	10,000	0.097
3585S-1-203	20,000	0.080

3485

(For product specifications, see page 89.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3485S-1-500	50	0.304
3485S-1-101	100	0.253
3485S-1-201	200	0.215
3485S-1-501	500	0.163
3485S-1-102	1,000	0.162
3485S-1-202	2,000	0.132
3485S-1-502	5,000	0.101
3485S-1-103	10,000	0.081
3485S-1-203	20,000	0.066
3485S-1-503	50,000	0.052

3465

(For product specifications, see page 89.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3465S-1-500	50	0.233
3465S-1-101	100	0.186
3465S-1-201	200	0.159
3465S-1-501	500	0.116
3465S-1-102	1,000	0.095
3465S-1-202	2,000	0.084
3465S-1-502	5,000	0.076
3465S-1-103	10,000	0.062
3465S-1-203	20,000	0.047
3465S-1-503	50,000	0.036
3465S-1-104	100,000	0.030

Precision Potentiometers

3590

(For product specifications, see page 84.)

Part Number (Printed Circuit)	Part Number (Solder Lug)	Resistance (Ohms)	Resolution (Percent)
3590P-X*-201	3590S-X*-201	200	.039
3590P-X*-501	3590S-X*-501	500	.033
3590P-X*-102	3590S-X*-102	1,000	.029
3590P-X*-202	3590S-X*-202	2,000	.023
3590P-X*-502	3590S-X*-502	5,000	.025
3590P-X*-103	3590S-X*-103	10,000	.020
3590P-X*-203	3590S-X*-203	20,000	.019
3590P-X*-503	3590S-X*-503	50,000	.013
3590P-X*-104	3590S-X*-104	100,000	.009

*X = refer to Shaft/Bushing Table for appropriate configuration dash number.

3700 & 3701

(For product specifications, see page 85.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3700S-1-101	100	.090
3700S-1-201	200	.075
3700S-1-251	250	.070
3700S-1-501	500	.060
3700S-1-102	1,000	.050
3700S-1-202	2,000	.040
3700S-1-502	5,000	.040
3700S-1-103	10,000	.035
3700S-1-203	20,000	.025
3700S-1-503	50,000	.020
3700S-1-753	75,000	.020
3700S-1-104	100,000	.020

Part Number*	Resistance (Ohms)
3701H-1-102	1,000
3701H-1-202	2,000
3701H-1-502	5,000
3701H-1-103	10,000
3701H-1-203	20,000
3701H-1-503	50,000
3701H-1-104	100,000

3750 & 3751

(For product specifications, see page 86.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3750S-1-101	100	.090
3750S-1-201	200	.075
3750S-1-251	250	.070
3750S-1-501	500	.060
3750S-1-102	1,000	.050
3750S-1-202	2,000	.040
3750S-1-502	5,000	.040
3750S-1-103	10,000	.035
3750S-1-203	20,000	.025
3750S-1-503	50,000	.020
3750S-1-104	100,000	.020

Part Number*	Resistance (Ohms)
3751H-1-102	1,000
3751H-1-202	2,000
3751H-1-502	5,000
3751H-1-103	10,000
3751H-1-203	20,000
3751H-1-503	50,000
3751H-1-104	100,000

6534

(For product specifications, see page 90.)

Part Number*	Resistance (Ohms)
6534S-1-102	1,000
6534S-1-202	2,000
6534S-1-502	5,000
6534S-1-103	10,000
6534S-1-203	20,000
6534S-1-503	50,000
6534S-1-104	100,000

6537

(For product specifications, see page 91.)

Part Number*	Resistance Ω
6537S-1-102	1,000
6537S-1-202	2,000
6537S-1-502	5,000
6537S-1-103	10,000
6537S-1-203	20,000
6537S-1-503	50,000
6537S-1-104	100,000

6538

(For product specifications, see page 91.)

Part Number*	Resistance (Ohms)
6538S-1-102	1,000
6538S-1-202	2,000
6538S-1-502	5,000
6538S-1-103	10,000
6538S-1-203	20,000
6538S-1-503	50,000
6538S-1-104	100,000

6544

(For product specifications, see page 92.)

Part Number*	Resistance Ω
6544S-1-102	1,000
6544S-1-202	2,000
6544S-1-502	5,000
6544S-1-103	10,000
6544S-1-203	20,000
6544S-1-503	50,000
6544S-1-104	100,000

6574

(For product specifications, see page 93.)

Part Number*	Resistance (Ohms)
6574S-1-102	1,000
6574S-1-202	2,000
6574S-1-502	5,000
6574S-1-103	10,000
6574S-1-203	20,000
6574S-1-503	50,000
6574S-1-104	100,000

*The last three digits of the part number represent the resistance value in standard code.

Precision Potentiometers

6634

(For product specifications, see page 94.)

Part Number*	Resistance (Ohms)
6634S-1-102	1,000
6634S-1-202	2,000
6634S-1-502	5,000
6634S-1-103	10,000
6634S-1-203	20,000
6634S-1-503	50,000
6634S-1-104	100,000

6637 & 6638

(For product specifications, see page 95.)

Part Number*		Resistance (Ohms)
6637S-1-102	6638S-1-102	1,000
6637S-1-202	6638S-1-202	2,000
6637S-1-502	6638S-1-502	5,000
6637S-1-103	6638S-1-103	10,000
6637S-1-203	6638S-1-203	20,000
6637S-1-503	6638S-1-503	50,000
6637S-1-104	6638S-1-104	100,000

6657

(For product specifications, see page 96.)

Part Number*	Resistance (Ohms)
6657S-1-102	1,000
6657S-1-202	2,000
6657S-1-502	5,000
6657S-1-103	10,000
6657S-1-203	20,000
6657S-1-503	50,000
6657S-1-104	100,000

6674

(For product specifications, see page 97.)

Part Number*	Resistance (Ohms)
6674S-1-102	1,000
6674S-1-202	2,000
6674S-1-502	5,000
6674S-1-103	10,000
6674S-1-203	20,000
6674S-1-503	50,000
6674S-1-104	100,000

3600

(For product specifications, see page 98.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3600S-1-101	100	.057
3600S-1-201	200	.047
3600S-1-501	500	.045
3600S-1-102	1,000	.035
3600S-1-202	2,000	.030
3600S-1-502	5,000	.027
3600S-1-103	10,000	.022
3600S-1-203	20,000	.017
3600S-1-503	50,000	.013
3600S-1-104	100,000	.012

3610

(For product specifications, see page 99.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3610S-1-101	100	.057
3610S-1-201	200	.047
3610S-1-501	500	.045
3610S-1-102	1,000	.035
3610S-1-202	2,000	.030
3610S-1-502	5,000	.027
3610S-1-103	10,000	.022
3610S-1-203	20,000	.017
3610S-1-503	50,000	.013
3610S-1-104	100,000	.012

3640

(For product specifications, see page 100.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3640S-1-101	100	.060
3640S-1-201	200	.045
3640S-1-501	500	.031
3640S-1-102	1,000	.030
3640S-1-202	2,000	.021
3640S-1-502	5,000	.016
3640S-1-103	10,000	.019
3640S-1-153	15,000	.016
3640S-1-203	20,000	.013
3640S-1-503	50,000	.011
3640S-1-753	75,000	.010
3640S-1-104	100,000	.010
3640S-1-254	250,000	.006

*The last three digits of the part number represent the resistance value in standard code.

Specifications are subject to change without notice.

Precision Potentiometers

3650

(For product specifications, see page 101.)

Part Number*	Resistance (Ohms)	Resolution (Percent)
3650S-1-101	100	.060
3650S-1-201	200	.045
3650S-1-501	500	.031
3650S-1-102	1,000	.030
3650S-1-202	2,000	.021
3650S-1-502	5,000	.016
3650S-1-103	10,000	.019
3650S-1-153	15,000	.016
3650S-1-203	20,000	.013
3650S-1-503	50,000	.011
3650S-1-753	75,000	.010
3650S-1-104	100,000	.010

3680

(For product specifications, see page 102.)

Resistance (Ohms)	3681S-1 1 Decade	3682S-1 2 Decade	3683S-1 3 Decade	3684S-1 4 Decade	3685S-1 5 Decade
50	-500				
100	-101				
200	-201				
500	-501	-501			
1,000	-102	-102	-102		
2,000	-202	-202	-202		
5,000	-502	-502	-502		
10K	-103	-103	-103	-103	
20K		-203	-203	-203	
50K		-503	-503	-503	
100K	-104	-104	-104	-104	-104
500K			-504	-504	-504
1 Meg		-105	-105	-105	-105

*The last three digits of the part number represent the resistance value in standard code.

DEFINITIONS AND TEST PROCEDURES

Cermet Elements

Cermet elements are available in a wide range of resistance values and tapers. They offer essentially infinite resolution and excellent stability in the most severe environmental conditions. Static and dynamic noise (CRV) performance is good but not as good as that of conductive plastic.

The temperature coefficient of cermet elements, though not as good as wirewound elements, is better than conductive plastic or carbon type elements. Linearity is quite good for a film type element and can be improved considerably for greater dial setting accuracy by laser tailoring.

Frequency response of cermet materials is very good and the practical application range extends well beyond 100 MHZ.

Conductive Plastic Elements

Conductive plastic is a thick film ink, similar to cermet, but has a smoother surface. This characteristic offers several operational advantages over cermet. Dynamic noise characteristics (CRV or output smoothness) and rotational life are measurably improved as a result of the surface smoothness. Resolution is essentially infinite.

Conductive plastic elements are generally available in a wide range of resistance values and tapers.

Moisture resistance, temperature coefficient, power dissipation and wiper current capacity for conductive plastic elements are not as good as cermet elements.

Wirewound Elements

Wirewound elements offer good stability, excellent linearity, low noise, high power capabilities and good operational life.

Wirewound elements offer a wide selection of resistance values up to 500k ohms.

One primary limitation of wirewound elements is the finite resolution steps, which result from the wiper moving from turn to turn. (These steps are distinct, sudden, repeatable changes in output.) Resolution improves as resistance values increase due to the manufacturing processes whereby smaller wire and a higher number of turns are utilized.

In systems that might be sensitive to such discrete steps, care should be taken to select an element with resolution fine enough to avoid difficulty.

The many turns of resistance wire exhibit an inductive reactance that increases directly with frequency. This effect is most noticeable in low total resistance elements because the inductive reactance can be larger than the resistance, even at frequencies as low as 20KHZ.

The performance of wirewound elements is also affected by inherent capacitance. Capacitance exists from turn to turn and also between the winding and the mandrel. Capacitance effects are most significant in high total resistance elements.

Hybritron® Elements

This element is a combination of a wirewound element with a conductive plastic coating. It exhibits the temperature coefficient and resistance stability approaching a pure wirewound element. It displays the long operational life, essentially infinite resolution and low noise characteristics of the pure conductive plastic elements. The combination of the two provides the major benefits of both types of elements. Not recommended in applications requiring high wiper currents.

Absolute Minimum Resistance

DEFINITION
The resistance measured between the wiper terminal and either end terminal when the wiper is positioned to give a minimum value on the measuring device.

TEST PROCEDURE
The wiper shall be positioned at one end of the resistance element so that a minimum value of resistance shall be measured as specified between the wiper and the corresponding end terminal. The same procedure shall be followed for the opposite end of the resistance element.

Contact Resistance Variation (CRV)

DEFINITION
The apparent resistance seen between the wiper and the resistance element when the wiper is energized with a specified current and moved over the adjustment travel in either direction at a constant speed. The output variations are measured over a specified frequency bandwidth, exclusive of the effects due to roll-on or roll-off of the terminations and expressed in ohms or percent of total resistance.

TEST PROCEDURE
CRV shall be tested using the circuit as shown in Fig. 1 on page 253 of Potentiometer Handbook (or its equivalent). The operating shaft shall be rotated in both directions through 90% of the adjustment travel for a total of 6 cycles. Only the last 3 cycles shall count in determining whether or not a contact resistance variation is observed at least twice in the same area (within 5%), exclusive of the roll-on or roll-off points where the wiper moves from the termination, on or off, the resistance element. The rate of rotation of the operating shaft shall be such that the wiper completes 1 cycle in 5 seconds, minimum, to 2 minutes, maximum. The test current used shall be in accordance with the table below, unless otherwise specified.

Test Current (±20%)	Total Resistance Range
30 ma	50 Ohms
10 ma	= or > 50 Ohms to < 500 Ohms
1 ma	= or > 500 Ohms to < 100K
100 ua	= or > 100K to < 2 Meg
50 ua	= or > 2 Meg

DEFINITIONS AND TEST PROCEDURES

Dielectric Withstanding Voltage

DEFINITION
The ability to withstand under prescribed conditions, a specified potential of a given characteristic between the terminals of each cup and exposed conducting surface of the potentiometer, or between the terminals of each cup and the terminals of every other cup in the assembly without exceeding a specified leakage current value.

TEST PROCEDURE
The magnitude of the test voltage shall be specified. Connect the equipment by applying the high voltage source between the potentiometer terminals (interconnected) and the shaft or case. Raise the test voltage from zero to the proper maximum value at a rate of 500 volts per second maximum. Maintain the test voltage at this level while operating the shaft through one full sweep of its mechanical travel in a time interval of not less than 5 seconds nor more than 60 seconds. Monitor the leakage current indicating device throughout this test for evidence of damage, arcing, breakdown, or leakage current in excess of 1 milliampere. Upon completion of the test, prior to disconnecting the leads, gradually reduce the test voltage to zero.

For ganged potentiometers, repeat the foregoing applying the high voltage between the terminals of each cup and the terminals of every other cup on the potentiometer under test.

Equivalent Noise Resistance (ENR)

DEFINITION
Any spurious variation in the electrical output not present in the input, defined quantitatively in terms of an equivalent parasitic transient resistance in ohms, appearing between the contact and the resistance element when the shaft is rotated or translated. The equivalent noise resistance is defined independently of the resolution, the functional characteristics, and the total travel. The magnitude of the equivalent noise resistance is the maximum departure from a specified reference line. The wiper of the potentiometer is required to be excited by a specified current and moved at a specified speed.

TEST PROCEDURE
The potentiometer shaft is cycled not less than ten times over a minimum of 95% of the electrical continuity travel within the rated travel speed of the potentiometer just prior to making noise measurements. The potentiometer shaft is then connected mechanically to the constant speed drive and electrically connected to the test circuit. With the constant speed drive engaged, the potentiometer noise characteristic may then be noted on the oscilloscope as the wiper traverses one complete cycle over the full electrical continuity travel and the maximum values are compared to the specified limit.

If only random spikes of noise are noted, the potentiometer should be cycled again. If the random spikes are repetitive, the maximum values should be noted. Otherwise do not consider the initial measurements as noise.

Independent Linearity

DEFINITION
The maximum deviation expressed as a percent of the total applied voltage, of the actual function characteristic from a straight line whose slope and position minimize the maximum deviations over the actual electrical travel, or any specified portion thereof.

TEST PROCEDURE
Consult factory.

Insulation Resistance

DEFINITION
The resistance to a specified impressed DC voltage between the terminals of each cup and the exposed conducting surfaces of the potentiometer, or between the terminals of each cup and the terminals of every other cup in the gang, under prescribed conditions.

TEST PROCEDURE
Interconnect all electrically insulated terminals of each cup of the potentiometer. Connect the insulation resistance test set to the terminal of the first cup and to some exposed conducting surface (shaft, housing, etc.) and apply the specified test voltage. Unless otherwise specified the test voltage shall be 500 VDC. Maintain the test voltage at this level for 5 to 10 seconds before initiating movement of the shaft through one full sweep of the total mechanical travel in a time interval of not less than 5 seconds nor more than 60 seconds. Monitor the indicated insulation resistance during this voltage application, the insulation resistance is the minimum value observed during the movement of the shaft.

For ganged potentiometers, repeat the procedure for each cup applying the high voltage between the terminals of each cup and the exposed conducting surface of the potentiometer.

DEFINITIONS AND TEST PROCEDURES

Output Smoothness

DEFINITION
The spurious variations in the electrical output not present in the input. They are measured for specified travel increments over the theoretical electrical travel and expressed as a percentage of the total applied voltage.

TEST PROCEDURE
Mount the potentiometer in the constant-speed drive (4 RPM) and excite it with the power supply. Connect the wiper and the power common lead to the input of the filter and the output of the filter to the oscilloscope. When a load is specified for a conformity test, use that load for the output smoothness test. When no load is specified for the conformity test, apply a load equal to 100 times the nominal resistance value of the potentiometer under test between the wiper and the CCW end (unless otherwise specified).

The output smoothness is the largest excursion voltage occuring over one specified travel increment, divided by the total applied voltage. Unless otherwise specified, the travel increment is 1% of the theoretical electrical travel.

Excursions occuring at the point of abrput changes in input slope (start, end, and reversal) are not considered output smoothness faults.

Power Rating

DEFINITION
The maximum power, in watts, that a potentiometer can dissipate across the entire resistive element under specified conditions while meeting specified operating performance requirements.

Resolution

DEFINITION
A measure of the sensitivity to which the output of a potentiometer may be set. (Applicable to wirewound potentiometers only.)

Theoretical resolution; the reciprocal of the number of turns of wire in the resistance winding in the actual electrical travel, expressed as a percentage.

Travel resolution; the maximum value of shaft travel (in degress for rotary devices) in one direction per incremental voltage step in any specified portion of the resistance element.

Voltage resolution; the maximum incremental change in output ratio with shaft travel in one direction in any specified portion of the resistance element.

TEST PROCEDURE
Consult factory.

Temperature Coefficient of Resistance

DEFINITION
The unit change in resistance per degree Celsius change from a reference temperature, expressed in parts per million per degree Celsius using the following formula:

$TC = R1\text{-}R2/R1(T2\text{-}T1)x\ 10^6$

WHERE: R1 = Resistance at reference temperature in ohms
R2 = Resistance at test temperature in ohms
T1 = Reference temperature in degrees Celsius
T2 = Test temperature in degrees Celsius

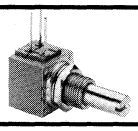
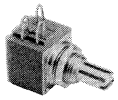
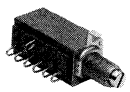
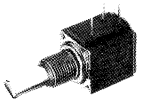
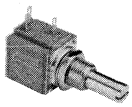
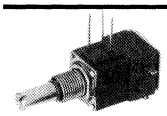
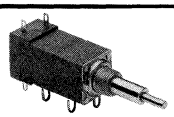
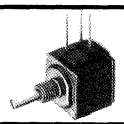
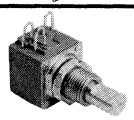
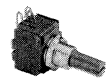
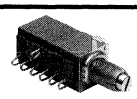
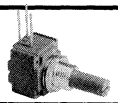
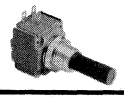
TEST PROCEDURE
Position the wiper of the potentiometer to be tested off of the actual electrical travel or at a point to minimize the total resistance if no over travel exists. Subject the potentiometer to the specified test temperature(s). The total resistance is measured after temperature chamber has been stabilized for the test temperature for a minimum of 30 minutes (avoid over aging). The reference temperature of 25 degree Celsius shall be used for all elevated and reduced temperatures. Calculate the (TC) by inserting the appropriate data into the above formula and comparing the result to the specification.

Total Resistance

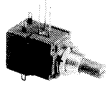
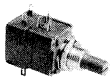
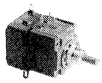
DEFINITION
The DC resistance between the end terminals of a potentiometer with the shaft positioned so as to give a maximum resistance value.

TEST PROCEDURE
With the VOM or DVM device (10ma maximum current) connected between the wiper and one end terminal, position the wiper onto the electrical overtravel. Reconnect the test leads of the measuring device to the end terminals of the potentiometer under test, the reading observed is the total resistance of the potentiometer.

Panel Controls

Product	Model No.	Turns	Element Type	Tolerance	Tapers	Terminal Style	Package Dimension	Multi. Sec. Avail.	Switch Avail.	Page No.
	**81**	Single	Cermet / Conductive Plastic	±5%, ±10% / ±10%, ±20%	Linear, Audio	PC Pins L-Pattern	5/8" Square	Yes	No	117
	**82**	Single	Cermet / Conductive Plastic	±5%, ±10% / ±10%, ±20%	Linear, Audio	J-Hooks L-Pattern	5/8" Square	Yes	No	117
	**81/82**	Single	Cermet	±10%, ±20%	Straight T-Pad Atten-uator	PC Pins/ J-Hook L-Pattern	5/8" Square	3 Only	No	134
	**83**	10	Wirewound / Hybritron®	±5% / ±10%	Linear	PC Pins	5/8" Square	Yes	No	118
	**84**	10	Wirewound / Hybritron®	±5% / ±10%	Linear	Solder Lugs	5/8" Square	Yes	No	118
	**85**	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	PC Pins L-Pattern	5/8" Square	Yes	Yes	120
	**86**	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	J-Hooks L-Pattern	5/8" Square	Yes	Yes	120
	**87**	Single	Conductive Plastic / Cermet	±5% / ±3%	Semi-Precision Linear	PC Pins L-Pattern	5/8" Square	Yes	No	121
	**88**	Single	Conductive Plastic / Cermet	±5% / ±3%	Semi-Precision Linear	J-Hooks L-Pattern	5/8" Square	Yes	No	121
	**91**	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	In-Line PC Pins	5/8" Square	Yes	No	126
	**92**	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	In-Line J-Hooks	5/8" Square	Yes	No	126
	**91/92**	Single	Cermet	±10%, ±20%	Straight T-Pad Atten-uator	PC Pins/ J-Hook	5/8" Square	3 Only	No	134
	**93**	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	L-Pattern PC Pins	5/8" Square	Yes	No	126
	**94**	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	L-Pattern J-Hooks	5/8" Square	Yes	No	126
	**95**	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	Triangle Pattern Solder Lugs	5/8" Square	Yes	No	126

Panel Controls

Product	Model No.	Turns	Element Type	Tolerance	Tapers	Terminal Style	Package Dimension	Multi. Sec. Avail.	Switch Avail.	Page No.
	96	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	In-Line PC Pins (Sealed)	5/8" Square	Yes	No	126
	97	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	L-Pattern PC Pins	5/8" Square	Yes	Yes	127
	98	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	L-Pattern J-Hooks	5/8" Square	Yes	Yes	127
	99	Single	Conductive Plastic / Cermet	±10%, ±20% / ±5%, ±10%	Linear, Audio	Triangle Pattern Solder Lugs	5/8" Square	Yes	Yes	127
	3851	Single	Conductive Plastic	±10%, ±20%	Linear, Audio	PC Pins, Solder Lugs	3/4" Diameter	No	No	130
	3852	Single	Cermet	±5%, ±10%	Linear, Audio	PC Pins, Solder Lugs	3/4" Diameter	No	No	130
	3856	3-3/4	Cermet	±5%, ±10%	Linear, Audio	PC Pins, Solder Lugs	3/4" Diameter	No	No	130
	3862	Single	Cermet	±5%, ±10%	Linear, Audio	PC Pins, J-Hooks	1/2" Diameter	No	No	132

Stepped Attenuators

Product	Model Series	Taper	Tolerance	Resistance Value	Step Error	Detents	Page No.
	PA	db Linear	±5% of Nominal	10KΩ to 100K Ω	0.5 db At Each Step	22 11	135

Slimline Potentiometers

Product	Model Series	Tapers	Tolerance	Standard Resistance Range	Terminal Styles	Sections	Page No.
	PC	Linear CP CW Audio CP CCW Audio CP	±20%	500Ω to 2.5MΩ	PC Pin, Solder Lug	Single	141

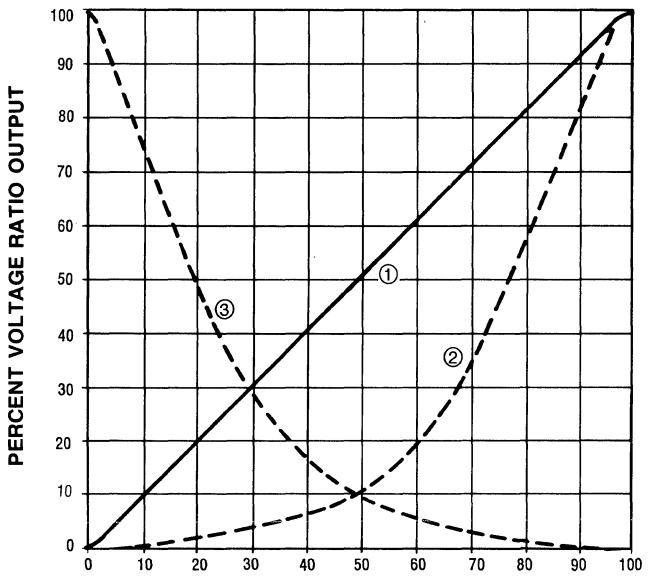
Open Frame Slide Potentiometers

Product	Model Series	Sections	Stroke Lengths	Terminal Styles	Element Types/Tapers	Page No.
	S	Single, Dual	10mm 15mm 20mm 30mm	PC Pins, Horizontal and Vertical	Linear, LH Audio, RH Audio, "S" Curve	138

Specifications are subject to change without notice.

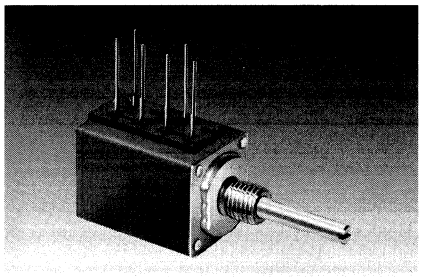
Panel Controls

Bourns® Panel Controls



TAPER DESCRIPTIONS

Graph Ref.	Models	Taper Code	Description	Linearity	T.R. Tol.
1	81,82,85,86,91-99,3852,3856,3862	A	Linear — Cermet	±5% Ind.	±10%
1	81,82,85,86,91-99,3851	B	Linear — C.P.	±5% Ind.	±20%
2	81,82,85,86,91-99,3852,3856	C	CW Audio — Cermet	N/A	±10%
2	81,82,85,86,91-99,3851	D	CW Audio — C.P.	N/A	±20%
1	81,82,85,86,91-99,3851	E	Linear — C.P.	±5% Ind.	±10%
3	81,82,85,86,91-99,3852,3856	F	CCW Audio — Cermet	N/A	±10%
3	81,82,85,86,91-99,3851	G	CCW Audio — C.P.	N/A	±20%
1	81,82,85,86,91-99,3852,3856,3862	H	Linear — Cermet	±5% Ind.	±5%
1	83,84	J	Linear — Wirewound	±.25% Ind.	±5%
1	83,84	K	Linear — Hybritron® el.	±.25% Ind.	±10%
1	85,86,87,88	L	Linear — C.P.	±2% Z.B.	±5%
1	85,86,87,88	M	Linear — Cermet	±2.5% Z.B.	±3%
1	85,86,87,88	N	Linear — C.P.	±1% Z.B.	±5%
1	85,86,87,88	P	Linear — Cermet	±1.5% Z.B.	±3%
2	81,82,85,86,91-99	S	CW Audio — C.P.	N/A	±10%
3	81,82,85,86,91-99	T	CCW Audio — C.P.	N/A	±10%



5/8 INCH SQUARE/SINGLE-TURN MODULAR/CERMET/CONDUCTIVE PLASTIC

- Unique shaft torque control
- Consistent, smooth quality feel
- Up to 4 sections available

BOURNS

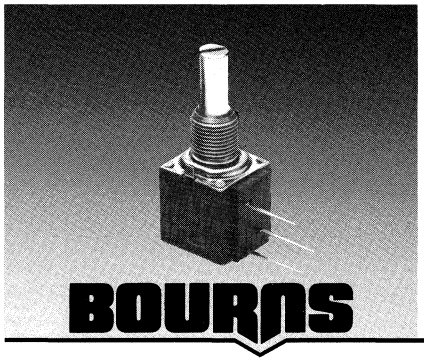
FOR DIMENSIONAL DRAWINGS SEE PAGE 122
FOR ORDERING INFORMATION SEE PAGE 124

Models 81/82

Bourns® Panel Controls

	Conductive Plastic Element	Cermet Element
Initial Electrical Characteristics[1]		
Standard Resistance Range		
Linear Tapers (A, B, E, & H)	(B & E) 250 ohms to 5 megohms	(A & H) 50 ohms to 5 megohms
Audio Tapers (C, D, F, G, S, & T)	(D, G, S, & T) 1K ohms to 5.0 megohms	(C & F) 1K ohms to 5.0 megohms
Resistance Tolerance	(B, D, & G tapers) ±20% (E, S, & T tapers) ±10%	(A, C, & F tapers) ±10% (H taper) ±5%
Independent Linearity	(B & E tapers) ±5%	(A & H tapers) ±5%
Absolute Minimum Resistance	2 ohms maximum	2 ohms maximum
Continuity	Maintained for full mechanical angle.	Maintained for full mechanical angle.
Effective Electrical Angle	240° ±5°	240° ±6°
Contact Resistance Variation	±1%	±1% or 3 ohms (whichever is greater)
Theoretical Resolution	Essentially infinite	Essentially infinite
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum	1,000 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	(B & E tapers) 1 watt (D, G, S, & T tapers) 0.5 watt	(A & H tapers) 2 watts (C & F tapers) 1 watt
+70°C Multiple Section Assembly	(B & E tapers) 0.5 watt/section (D, G, S & T tapers) 0.25 watt/section	(A & H tapers) 1 watt/section (C & F tapers) 0.5 watt/section
+125°C	0 watt	0 watt
Roll-on/Roll-off	(B & E tapers) 0.25% maximum (D & S tapers) 0.1% maximum CCW end (G & T tapers) 0.1% maximum CW end (D & S tapers) 0.5% maximum CW end (G & T tapers) 0.5% maximum CCW end	(A & H tapers) 0.5% maximum (C taper) 0.1% maximum CCW end (F taper) 0.1% maximum CW end (C taper) 1.0% maximum CW end (F taper) 1.0% maximum CCW end
Environmental Characteristics[1]		
Storage Temperature Range	−55°C to +125°C	−55°C to +125°C
Temperature Coefficient Over Storage Temperature Range	±1,000PPM/°C	±150PPM/°C
Vibration (Single Section)	15G	15G
Voltage Ratio Shift	±5% maximum	±5% maximum
Total Resistance Shift	±2% maximum	±2% maximum
Shock (Single Section)	30G	30G
Voltage Ratio Shift	±5% maximum	±5% maximum
Total Resistance Shift	±2% maximum	±2% 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	(B & E tapers) 10 ohms or ±12% maximum (whichever is greater) (D, G, S & T tapers) ±20% maximum	10 ohms or ±10% maximum (whichever is greater)
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	(B & E tapers) ±10% maximum (D, G, S & T tapers) ±20% maximum	±5% maximum (all tapers)
Insulation Resistance (500 VDC)	100 megohms minimum	100 megohms minimum
Mechanical Characteristics[1]		
Running Torque (Non-Locking Bushings)		
Single Section (B & E Bushings)	0.2 to 4.0 oz-in.	0.2 to 4.0 oz-in.
Single Section (A & C Bushings)	0.3 to 1.5 oz-in.	0.3 to 1.5 oz-in.
Dual Section (All Bushings)	0.3 to 1.5 oz-in.	0.3 to 1.5 oz-in.
Triple Section (All Bushings)	0.5 to 2.0 oz-in.	0.5 to 2.0 oz-in.
Quadruple Section (All Bushings)	0.5 to 2.0 oz-in.	0.5 to 2.0 oz-in.
Shaft Locking Torque with Locknut @ 10 in-lb. (B & E Bushings)	20 in-oz.	20 in-oz.
Stop Strength	1/4" and 1/8" shafts — 4 in-lb. minimum .078" shaft — 2 in-lb. minimum	1/4" and 1/8" shafts — 4 in-lb. minimum .078" shaft — 2 in-lb. minimum
Mechanical Angle	300° ±5°	300° ±5°
Weight (Single Section)	21 grams maximum	21 grams maximum
Each Additional Section	6 grams maximum	6 grams maximum
Terminals	Printed circuit terminals or J-Hooks	Printed circuit terminals or J-Hooks
Markings	Manufacturer's trademark, wiring diagram, date code, resistance, manufacturer's part number	Manufacturer's symbol, wiring diagram, date code, resistance, manufacturer's part number.

NOTE: Model 81/82 performance specifications do not apply to units subjected to printed circuit board cleaning procedures.
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.



5/8'' SQUARE/10-TURN/MODULAR WIREWOUND OR HYBRITRON® ELEMENT

- Compatible with other members of the Model 80 Series
- The only 10-turn precision potentiometer in a modular panel control package
- Up to 3 sections available

FOR ORDERING INFORMATION SEE PAGE 124

Models 83/84

Bourns® Precision Potentiometers

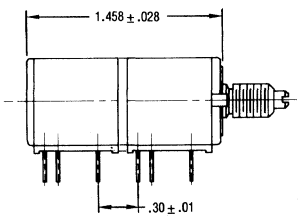
	Wirewound Element (J Taper)	Hybritron® Element (K Taper)
Initial Electrical Characteristics[1]		
Standard Resistance Range	200 to 100K ohms	1K to 100K ohms
Resistance Tolerance	±5%	±10%
Independent Linearity	±0.25%	±0.25%
Effective Electrical Angle	3600° +10°, −0°	3600° +10°, −0°
Minimum Resistance (J Taper)	1.0 ohm or 0.1% (whichever is greater)	—
End Voltage (K Taper)	—	0.2% of applied voltage
Noise (J Taper)	100 ohms ENR maximum	—
Output Smoothness (K Taper)	—	0.15% maximum
Power Rating (Voltage Limited by Power Dissipation or 316 VAC, Whichever is Less)		
+70°C	1 watt	1 watt
+125°C	0 watt	0 watt
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum	1,000 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum	1,000 megohms minimum
Theoretical Resolution	See table	Essentially infinite
Environmental Characteristics[1]		
Storage Temperature Range	−55°C to +125°C	−55°C to +125°C
Temperature Coefficient Over Storage Temperature Range	±50PPM/°C	±100PPM/°C
Vibration	15G	15G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Shock	50G	50G
Wiper Bounce	0.1 millisecond maximum	0.1 millisecond maximum
Load Life	1,000 hours	1,000 hours
Total Resistance Shift	±2% maximum	±5% maximum
Rotational Life (No Load)	1,000,000 shaft revolutions	4,000,000 shaft revolutions
Total Resistance Shift	±5% maximum	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum	±5% maximum
Insulation Resistance (500 VDC)	100 megohms minimum	100 megohms minimum
Mechanical Characteristics[1]		
Mechanical Angle	3600° +15°, −0°	3600° +15°, −0°
Shaft Runout	0.006 in. T.I.R.	0.006 in. T.I.R.
Shaft End Play	0.014 in. T.I.R.	0.014 in. T.I.R.
Shaft Radial Play	0.005 in. T.I.R.	0.005 in. T.I.R.
Stop Strength	48.0 oz-in. minimum	48 oz-in. minimum
Running Torque (1 or 2 Section)	0.25 to 2.0 oz-in.	0.25 to 2.0 oz-in.
Weight	Approximately 0.75 oz.	Approximately 0.75 oz.
Terminals	Printed circuit terminals or solder lugs	Printed circuit terminals or solder lugs
Markings	Manufacturer's trademark, wiring diagram, date code, resistance, manufacturer's part number	Manufacturer's symbol, wiring diagram, date code, resistance, manufacturer's part number.

Wirewound Resolution Table

Resistance (ohms)	Resolution (nom.) (%)
200	.048
500	.037
1K	.032
2K	.031
5K	.023
10K	.020
20K	.015
50K	.012
100K	.010

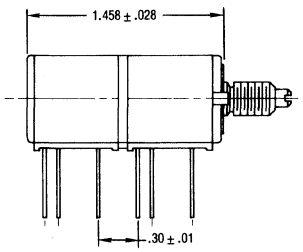
Dimensional Drawings

Dual Section Model 84 Solder Lugs



Note: The Models 83/84 dimensions for dual section assembly are for either single or dual concentric shaft styles.

Dual Section Model 83 PC Pins



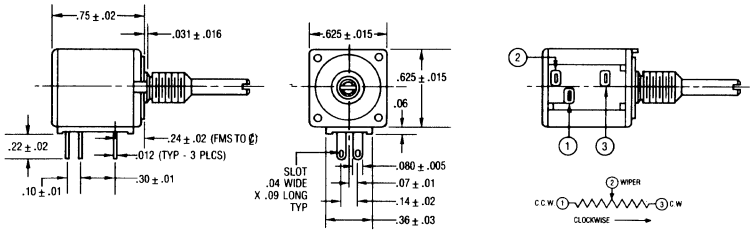
NOTE: Model 83/84 performance specifications do not apply to units subjected to printed circuit board cleaning procedures.
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.

TOLERANCES EXCEPT AS SHOWN: DECIMAL .XXX ± .005
.XX ± .015
FRACTION ± 1/64
ANGLE ± 5°

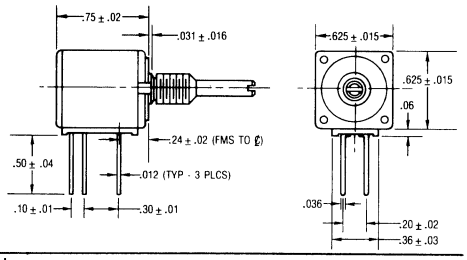
Models 83/84

Bourns® Precision Potentiometers

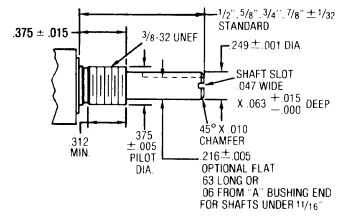
Solder Lug Model 84



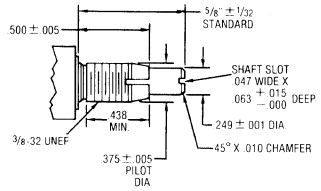
PC Pin Model 83



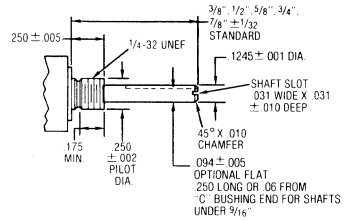
"A" Bushing
3/8" Dia. Plain - Single Shaft



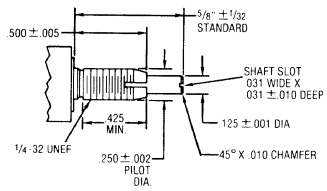
"B" Bushing
3/8" Dia. Locking - Single Shaft



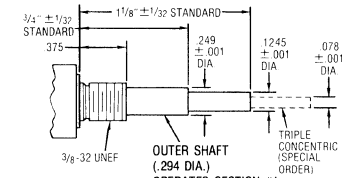
"C" Bushing
1/4" Dia. Plain - Single Shaft



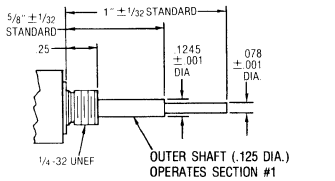
"E" Bushing
1/4" Dia. Locking - Single Shaft



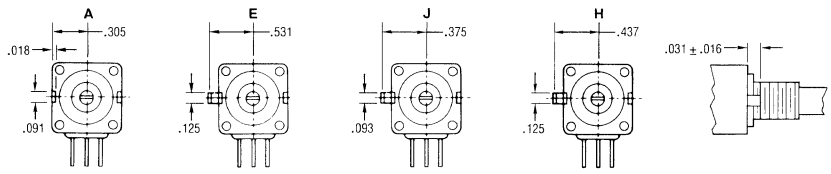
"A" Bushing
3/8" Dia. Plain - Concentric Shaft



"C" Bushing
1/4" Dia. Plain - Concentric Shaft

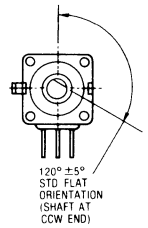


Locating Lug Options - All Model 80 Series

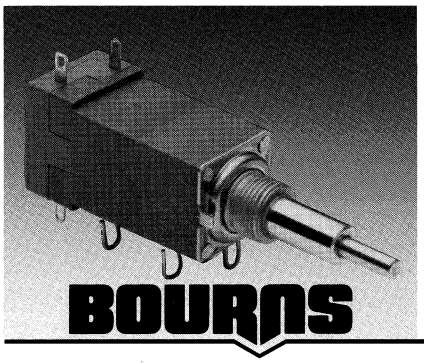


NOTE: "D" OPTION - NO A/R LUG. OTHER LOCATING LUG OPTIONS AVAILABLE. FOR DETAILS CONSULT FACTORY.

Shaft Flat Orientation



NOTE: SLOTTED END SHAFT ORIENTATION IS RANDOM



5/8 INCH SQUARE/SINGLE-TURN/ROTARY SWITCH MODULE/CERMET OR CONDUCTIVE PLASTIC

- Designed for "on-off" function control
- Positive action, "non-tease" detent
- Low actuation torque

FOR DIMENSIONAL DRAWINGS SEE PAGE 123
FOR ORDERING INFORMATION SEE PAGE 124

Models 85/86

Bourns® Panel Controls

Switch specifications listed below. For potentiometer specifications, see page 117.

Initial Electrical Characteristics[1]

Contacts:	
DPST	N.O./N.O., N.C./N.C. or N.O./N.C.
DPDT	2 N.O./N.C. (break before make)
Power Rating (Resistive Load):	
DPST	2A @ 125 volts RMS-60Hz or 2A @ 28 VDC, 1A @ 250 volts RMS-60 Hz
DPDT	1A @ 125 volts RMS-60 Hz or 1A @ 28 VDC
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1000 VAC minimum
Insulation Resistance	1000 megohms minimum
Contact Resistance (.1VDC-10ma.)	10 milliohms nominal
Contact Bounce	5 milliseconds maximum

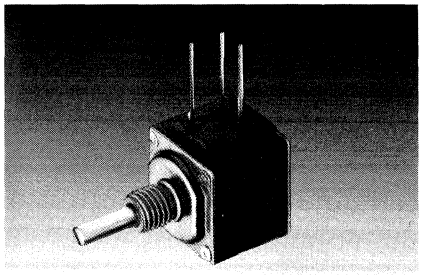
Environmental Characteristics[1]

Operating Temperature Range	0° to +70°C
Exposure Temperature Range	−65° to +125°C
Vibration (Dual Section)	8G
Contact Resistance	10 milliohms maximum
Contact Bounce	0.1 millisecond maximum
Shock (Dual Section)	20G
Contact Resistance	10 milliohms maximum
Contact Bounce	0.1 millisecond maximum
Rotational Life	25,000 cycles
Switch Actuating Torque (50% Duty Cycle @ Rated Power Load)	2-7 oz-in.
Contact Resistance	100 milliohms maximum
Moisture Resistance	MIL-STD-202, Method 106, Condition B
Contact Resistance (0.1VDC-10ma)	10 milliohms maximum
Insulation Resistance (After 24 Hours @ Room Temperature) (500 VDC)	100 megohms minimum
Housing Material	High temperature, flame retardant, thermosetting plastic

Mechanical Characteristics[1]

Actuating Torque (Each Section, Switch Module Only)	5-15 oz-in.
Running Torque (Out of Detent, 2-4 Module Assembly)	0.3-2 oz-in.
Detent	CW or CCW standard
Actuation Angle	25°
Contact Materials	Fine silver with gold overlay
Terminal Styles	Solder lug only
Standard Orientation	In-line with control terminals
Optional	Rotated 90° CCW from standard
Terminal Strength (Before and After Soldering Heat Exposure)	2 lbs. minimum

NOTE: Model 85/86 performance specifications do not apply to units subjected to printed circuit board cleaning procedures.
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.



5/8 INCH SQUARE/SINGLE-TURN MODULAR/SEMI-PRECISION/CERMET OR CONDUCTIVE PLASTIC

- Zero base linearity, as low as 1% available
- Exclusive shaft torque control feature
- Up to 4 sections available

FOR DIMENSIONAL DRAWINGS SEE PAGE 122
FOR ORDERING INFORMATION SEE PAGE 124

BOURNS

Models 87/88

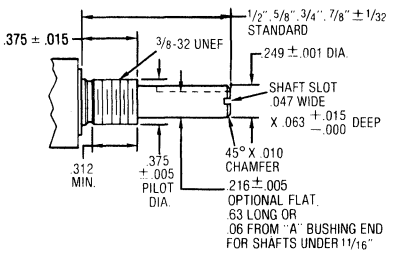
Bourns® Panel Controls

	Conductive Plastic Element	Cermet Element
Initial Electrical Characteristics[1]		
Standard Resistance Range	(L & N) 250 ohms to 2.5 megohms	(M & P) 250 ohms to 2.5 megohms
Resistance Tolerance	±5%	±3%
Zero Base Linearity	(L) Standard ±2%, (N) Optional ±1%	(M) Standard ±2.5%, (P) Optional ±1.5%
Absolute Minimum Resistance	2 ohms	2 ohms
Continuity	Maintained for full mechanical angle	Maintained for full mechanical angle
Effective Electrical Angle	240° ±4°	240° ±6°
Contact Resistance Variation	±1%	±1.5% or 3 ohms (whichever is greater)
Theoretical Resolution	Essentially infinite	Essentially infinite
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum	1,000 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	1 watt	2 watts
+70°C Multiple Section Assembly	0.5 watt/section	1 watt/section
+125°C	0 watt	0 watt
Roll-on/Roll-off	0.5% maximum	0.5% maximum
Environmental Characteristics[1]		
Storage Temperature Range	−55°C to +125°C	−65°C to +150°C
Temperature Coefficient Over Storage Temperature Range	±1,000PPM/°C	±150PPM/°C
Vibration (Single Section)	15G	15G
Voltage Ratio Shift	±5% maximum	±5% maximum
Total Resistance Shift	±2% maximum	±2% maximum
Shock (Single Section)	30G	30G
Voltage Ratio Shift	±5% maximum	±5% maximum
Total Resistance Shift	±2% maximum	±2% 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	10 ohms or ±12% maximum (whichever is greater)	10 ohms or ±10% maximum (whichever is greater)
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±10% maximum	±10% maximum
Insulation Resistance (500 VDC)	100 megohms minimum	100 megohms minimum
Mechanical Characteristics[1]		
Running Torque (Non-Locking Bushings)		
Single or Dual Section (A & B Bushings)	0.3 to 1.5 oz-in.	0.3 to 1.5 oz-in.
Single or Dual Section (C & E Bushings)	0.3 to 1.5 oz-in.	0.3 to 1.5 oz-in.
Triple Section (All Bushings)	0.5 to 2.0 oz-in.	0.5 to 2.0 oz-in.
Quadruple Section (All Bushings)	0.5 to 2.0 oz-in.	0.5 to 2.0 oz-in.
Shaft Locking Torque with Locknut @ 10 in-lb. (B & E Bushings)	20 in-oz.	20 in-oz.
Stop Strength	1/4" and 1/8" shafts — 4 in-lb. minimum .078" shaft — 2 in-lb. minimum	1/4" and 1/8" shafts — 4 in-lb. minimum .078" shaft — 2 in-lb. minimum
Mechanical Angle	300° ±5°	300° ±5°
Weight (Single Section)	21 grams maximum	21 grams maximum
Each Additional Section	6 grams maximum	6 grams maximum
Terminals	Printed circuit terminals or J-Hooks	Printed circuit terminals or J-Hooks
Markings	Manufacturer's trademark, wiring diagram, date code, resistance, manufacturer's part number	Manufacturer's symbol, wiring diagram, date code, resistance, manufacturer's part number.

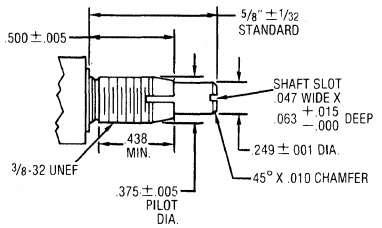
NOTE: Model 87/88 performance specifications do not apply to units subjected to printed circuit board cleaning procedures.
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.

Models 81, 82, 87, 88

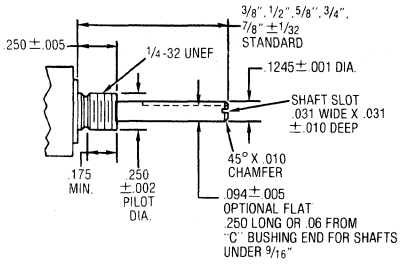
"A" Bushing
3/8" Dia. Plain - Single Shaft



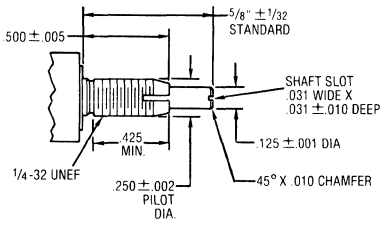
"B" Bushing
3/8" Dia. Locking - Single Shaft



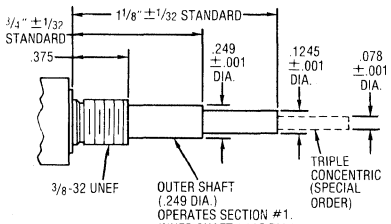
"C" Bushing
1/4" Dia. Plain - Single Shaft



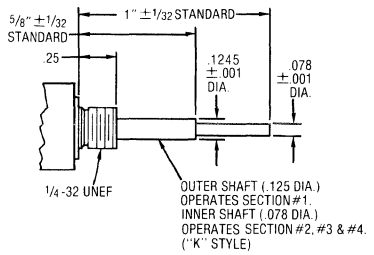
"E" Bushing
1/4" Dia. Locking - Single Shaft



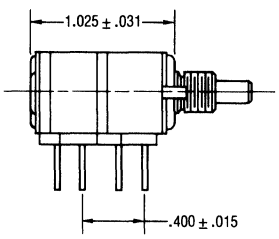
"A" Bushing
3/8" Dia. Plain - Concentric Shaft



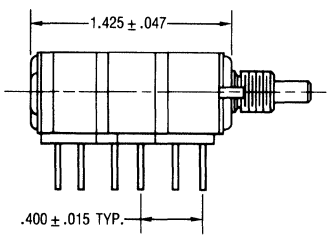
"C" Bushing
1/4" Dia. Plain - Concentric Shaft



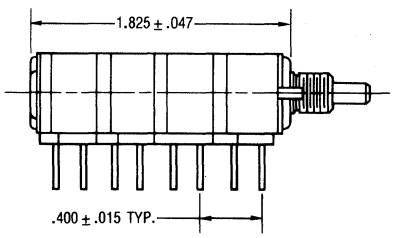
Dual Unit - PC Pins & J-Hook



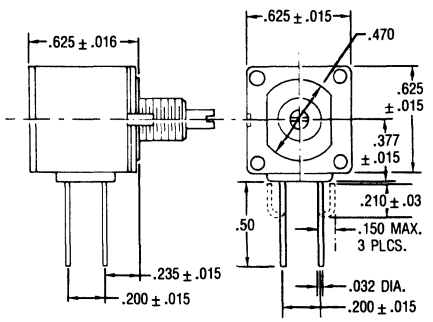
Triple Unit - PC Pins & J-Hook



Quad Unit - PC Pins & J-Hook

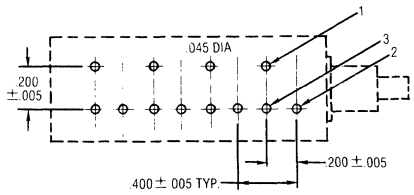


Model 81/82, 87/88
Single Unit - PC Pins & J-Hook



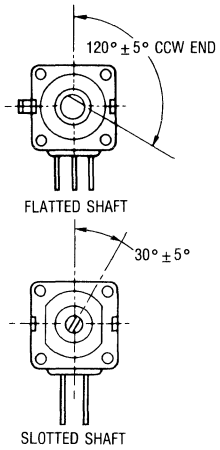
Terminal outlines shown as solid lines represent PC Pins, available on Model 81/87. Dashed line terminal outline represents "J" Hook, available on Model 82/88.

Model 81, 87
Suggested PC Board Layout - PC Pins
(Single-Shaft Style Bottom View)



Note: For units with dual concentric shaft styles, a .100 spacer is added between the module(s) driven by the outer shaft and those driven by the inner shaft. For G, K, or V shafts, add the spacer between modules 1 and 2. For L or M shafts, add the spacer between modules 2 and 3. For N or P shafts, add the spacer between modules 3 and 4.

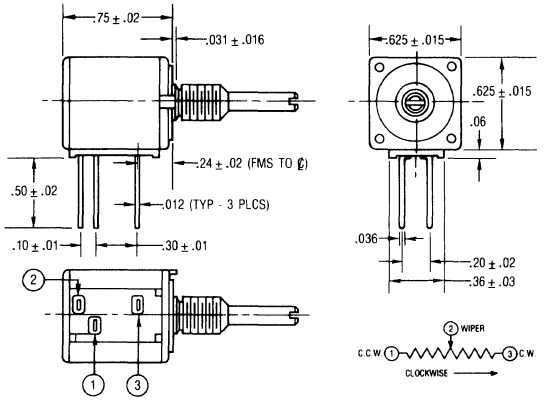
Shaft Flat Orientation*



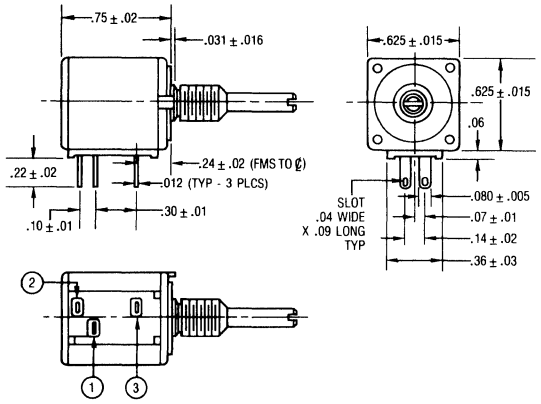
*EXCLUDES MODELS 83 AND 84

Models 83, 84, 85, 86,

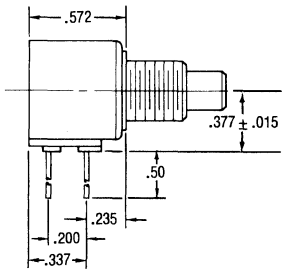
PC Pin Model 83



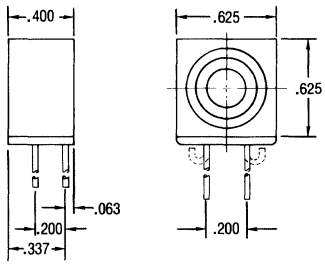
Solder Lug Model 84



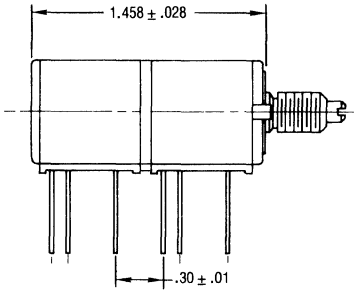
Primary Potentiometer Module Model 85/86



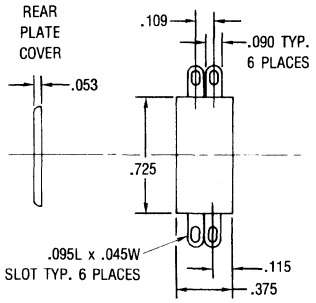
Secondary Potentiometer Module Model 85/86



Dual Section Model 83 PC Pins



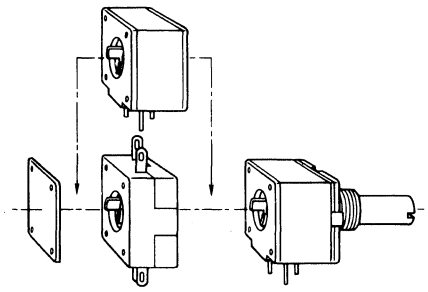
Switch Module Model 85/86



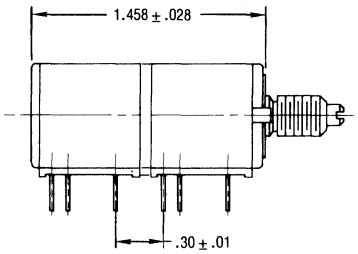
Note: For switch contact configurations and terminal identification, see "Switch Model Variations" on page 128.

Assembly Sequence Model 85/86

Secondary Potentiometer Module



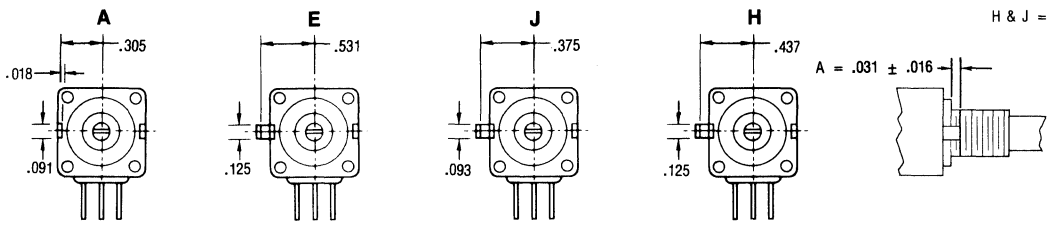
Dual Section Model 84 Solder Lugs



Note: The Models 83/84 dimensions for dual section assembly are for either single or dual concentric shaft styles.

TOLERANCES EXCEPT AS SHOWN: DECIMAL .XXX ± .005
.XX ± .015
FRACTION ± 1/64
ANGLE ± 5°

Locating Lug Options - All Model 80 Series



NOTE: "D" OPTION - NO A/R LUG. OTHER LOCATING LUG OPTIONS AVAILABLE. FOR DETAILS CONSULT FACTORY.

BOURNS HOW TO ORDER

80 Series Panel Controls

85	A	2	A - B	28 - A	03	R51

ANTI-ROTATION LUG	
A	Single .305R, 90°CW
B	Double .305R, 90° & 270°CW
C	Single .305R, 270°CW
D	No Lug
E	Single .531R, 90°CW
F	Single .305R, 180°CW
G	Single .305R, 0°
H	Single .437R, 90°CW
J	Single .375R, 90°CW
K	Double, .375R, 90° & 270°CW

SWITCH TYPE (MODELS 85 & 86 ONLY)	
(R50)	DPST N.O./N.C. CW Detent In-Line Term
(R51)	DPST N.O./N.C. CCW Detent In-Line Term
(R52)	DPST N.O./N.O. CW Detent In-Line Term
(R53)	DPST N.O./N.O. CCW Detent In-Line Term
(R54)	DPST N.C./N.C. CW Detent In-Line Term
(R55)	DPST N.C./N.C. CCW Detent In-Line Term
(R56)	DPST N.O./N.C. CW Detent Horz Term
(R57)	DPST N.O./N.C. CCW Detent Horz Term
(R58)	DPST N.O./N.O. CW Detent Horz Term
(R59)	DPST N.O./N.O. CCW Detent Horz Term
(R60)	DPST N.C./N.C. CW Detent Horz Term
(R61)	DPST N.C./N.C. CCW Detent Horz Term
(R70)	DPDT CW Detent In-Line Term
(R71)	DPDT CCW Detent In-Line Term
(R72)	DPDT CW Detent Horz Term
(R73)	DPDT CCW Detent Horz Term

NOTE: All switch model terminals are solder lugs.

# SECTIONS		APPLICABLE MODELS
1	Single	81,82,83,84,87,88
2	Double	81,82,83,84,85,86,87,88
3	Triple	81,82,83*,84*,85*,86*,87,88
4	Quad	81,82,85*,86*,87,88

*Consult Factory

BUSHING	
A	Plain 3/8"D x 3/8"L
B	Locking 3/8"D x 1/2"L
C	Plain 1/4"D x 1/4"L
E	Locking 1/4"D x 1/2"L
J	Plain 3/8"D x 1/4"L
N	Plain 1/4"D x 3/8"L
R	Plain 10mmD x 9mmL
U	Plain 7mmD x 6mmL

MODEL	
81	Single-Turn, PC Pins
82	Single-Turn, J-Hooks
83	10-Turn, PC Pins
84	10-Turn, Solder Lugs
85	Single-Turn, Pot/Rotary Switch, PC Pins
86	Single-Turn, Pot/Rotary Switch, J-Hooks
87	Single-Turn, PC Pins, Semi-Precision
88	Single-Turn, J-Hooks, Semi-Precision

SHAFT LENGTH (From Mounting Surface)		Available Only In BUSHINGS (CODE)
12	3/8"L	C, N*, J
16	1/2"L	A, C, J, N
20	5/8"L	A, B, C, E, J, N
24	3/4"L	A, B, C, E, J, N
28	7/8"L	A, B, C, E, J, N
32	1"L	A, B, C, E, J, N
36	1-1/8"L	A, B, C, E, J, N
40	1-1/4"L	A, B, C, E, J, N
	METRIC	
10	10mmL	U
13	13mmL	U
16	16mmL	R
19	19mmL	R
22	22mmL	R, U
30	30mmL	R
42	42mmL	R
50	50mmL	R

*Consult Factory

SHAFT TYPE		Available Only In LENGTHS (CODE)	Available Only In BUSHINGS (CODE)
A	Single Plain 1/4"D	16,20,24,28	A, B, J
B	Single Slotted 1/4"D	16,20,24,28	A, B, J
C	Single Flatted 1/4"D	24,28	A, B, J
D	Single Plain 1/8"D	Consult Factory	C, N
E	Single Slotted 1/8"D	12,16,20,24,28	C, E, N
F	Single Flatted 1/8"D	Consult Factory	C, N
G	Dual Concentric Plain 1/4"D - 1/8"D Outer Operates Section 1	36,40	A, J
K	Dual Concentric Plain 1/8"D - 5/64"D Outer Operates Section 1	32,36	C, N
L	Dual Concentric Plain 1/4"D - 1/8"D, Outer Operates Sections 1 & 2	36,40	A, J
M	Dual Concentric Plain 1/8"D - 5/64"D, Outer Operates Sections 1 & 2	32,36	C, N
N	Dual Concentric Plain 1/4"D - 1/8"D, Outer Operates Sections 1, 2 & 3	36,40	A, J
P	Dual Concentric Plain 1/8"D - 5/64"D, Outer Operates Sections 1, 2 & 3	32,36	C, N
R	Single Slotted 6mmD	16,19,22,50	R
T	Single Slotted 4mmD	10,13,22	U
V	Dual Concentric Plain 6mmD - 3mmD Outer Operates Section 1	30,42	R

ELEMENT TAPER TYPE/TOLERANCE		RESISTANCE (CODE)/ VALUE IN OHMS	
MODELS 81, 82, 85 AND 86 ONLY			
(A)	Linear Cermet ±10%	(03) — 50	(30) — 15K
(H)	Linear Cermet ±5%	(04) — 75	(16) — 20K
		(05) — 100	(17) — 25K
		(28) — 150	(18) — 50K
		(06) — 200	(19) — 75K
		(07) — 250	(20) — 100K
		(08) — 500	(31) — 150K
		(09) — 750	(21) — 200K
		(10) — 1K	(22) — 250K
		(29) — 1.5K	(23) — 500K
		(11) — 2K	(24) — 750K
		(12) — 2.5K	(25) — 1M
		(13) — 5K	(36) — 2M
		(14) — 7.5K	(26) — 2.5M
		(15) — 10K	(27) — 5M
(B)	Linear C-P ±20%	(07) — 250	(18) — 50K
(E)	Linear C-P ±10%	(08) — 500	(20) — 100K
		(10) — 1K	(22) — 250K
		(12) — 2.5K	(23) — 500K
		(13) — 5K	(25) — 1M
		(15) — 10K	(26) — 2.5M
		(16) — 20K	(27) — 5M
		(17) — 25K	
(C)	CW Audio Cermet ±10%	(10) — 1K	(20) — 100K
(D)	CW Audio C-P ±20%	(12) — 2.5K	(22) — 250K
(F)	CCW Audio Cermet ±10%	(13) — 5K	(23) — 500K
(G)	CCW Audio C-P ± 20%	(15) — 10K	(25) — 1M
(S)	CW Audio C-P ±10%	(17) — 25K	(26) — 2.5M
(T)	CCW Audio C-P ±10%	(18) — 50K	
MODELS 83 AND 84 ONLY			
		J	K
(J)	Linear Wirewound 10-Turn ±5%	(06) — 200	(10) — 1K
		(08) — 500	(11) — 2K
(K)	Linear Hybritron® 10-Turn ±10%	(10) — 1K	(13) — 5K
		(11) — 2K	(15) — 10K
		(13) — 5K	(16) — 20K
		(15) — 10K	(18) — 50K
		(16) — 20K	(20) — 100K
		(18) — 50K	
		(20) — 100K	
MODELS 87 AND 88 ONLY			
(L)	Linear C-P ±5% Tol ±2% Z.B. Linearity	(07) — 250	(18) — 50K
		(08) — 500	(20) — 100K
(M)	Linear Cermet ±3% Tol ±2.5% Z.B. Linearity	(10) — 1K	(22) — 250K
		(12) — 2.5K	(23) — 500K
(N)	Linear C-P ±5% Tol. ±1% Z.B. Linearity	(13) — 5K	(25) — 1M
		(15) — 10K	(26) — 2.5M
(P)	Linear Cermet ±3% Tol. ±1.5% Z.B. Linearity	(17) — 25K	
ELEMENT TYPE - ATTENUATOR MODELS 81 & 82 THREE SECTION ONLY			
ST3510	Straight T, 600 ohm impedence, ±10% tolerance		
ST3520	Straight T, 600 ohm impedence, ±20% tolerance		

Panel Controls

Bourns® Panel Controls

MOUNTING HARDWARE

Panel control mounting hardware is determined by bushing style. The "X" in the bushing style column indicates what hardware is used with that bushing. Hardware indicated by shaded area is normally supplied with unit. Other hardware may be ordered separately. Hardware is bulk packaged with units.

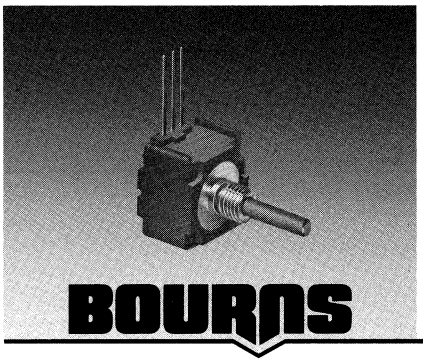
Part Number and Description	Bushing Style										
	A	B	C	E	J	N	R	T	U	L	W
H-36-1 Flat Washer			X	X		X		X			
H-36-2 Flat Washer	X	X			X						
H-37-1 Lockwasher			X	X		X		X			
H-37-2 Lockwasher	X	X			X					X	X
H-38-1 Mounting Nut			X	X		X		X			
H-38-2 Mounting Nut	X	X			X						
H-38-3 Lock Nut				X				X			
H-38-4 Lock Nut		X									
H-37-3 Lockwasher									X		
H-37-4 Lockwasher							X				
H-38-8 M-7 Mounting Nut									X		
H-38-9 M-10 Mounting Nut							X				
H-38-11 M-9 Mounting Nut										X	X

PANEL CONTROLS OPTIONS MATRIX

	3851	3852	3856	3862	81/82	83/84	85/86	87/88	91-95	97-99	96	PC
Single Section	X	X	X	X	X	X	*	X	X	*	X	X
Dual Section					X	X	X*	X	X	X*	Δ	
Triple Section					X	Δ	Δ	X	Δ	Δ		
Quad Section					X	Δ	Δ	X	Δ	Δ		
1/8" Shafts	X	X	X	X	X	X	X	X	X	X	X	
3/16" Shafts												X
1/4" Shafts	X	X	X		X	X	X	X	X	X	X	X
4mm Shaft					X	X	X	X	X	X	X	
6mm Shaft					X	X	X	X	X	X	X	X
Dual Concentric Shafts					X	X	Δ	X				
Switches							X*			X*		
Locking Bushing	X	X		X	X	X		X				

ΔConsult factory.

*Standard Construction - 1 pot section and 1 switch module.



5/8 INCH SQUARE/SINGLE-TURN MODULAR/CERMET OR CONDUCTIVE PLASTIC

- Features one-piece molded plastic shaft and rotor
- Virtually infinite electrical circuit isolation
- Available in a variety of pin-out configurations

FOR DIMENSIONAL DRAWINGS SEE PAGE 128
FOR ORDERING INFORMATION SEE PAGE 129

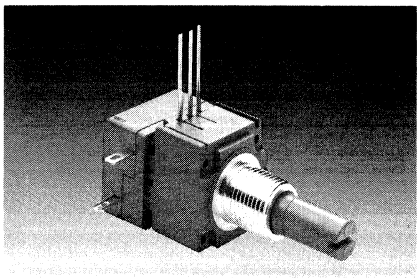
Models 91, 92, 93, 94, 95, 96

Bourns® Panel Controls

	Conductive Plastic Element	Cermet Element
Initial Electrical Characteristics[1]		
Standard Resistance Range		
Linear Tapers (A, B, E, & H)	(B & E) 150 ohms to 5 megohms	(A & H) 50 ohms to 5 megohms
Audio Tapers (C, D, F, G, S, & T)	(D, G, S, & T) 1K ohms to 5.0 megohms	(C & F) 1K ohms to 5.0 megohms
Resistance Tolerance	(B, D, & G tapers) ±20%	(A, C, & F tapers) ±10%
	(E, S, & T tapers) ±10%	(H taper) ±5%
Independent Linearity	(B & E tapers) ±5%	(A & H tapers) ±5%
Absolute Minimum Resistance	2 ohms maximum	2 ohms maximum
Continuity	Maintained for full mechanical angle.	Maintained for full mechanical angle.
Effective Electrical Angle	240° ±5°	240° ±6°
Contact Resistance Variation	±1%	±1% or 3 ohms (whichever is greater)
Theoretical Resolution	Essentially infinite	Essentially infinite
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum	1,000 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	(B & E tapers) 1 watt	(A & H tapers) 2 watts
	(D, G, S, & T tapers) 0.5 watt	(C & F tapers) 1 watt
+70°C Multiple Section Assembly	(B & E tapers) 0.5 watt/section	(A & H tapers) 1 watt/section
	(D, G, S & T tapers) 0.25 watt/section	(C & F tapers) 0.5 watt/section
+125°C	0 watt	0 watt
Roll-on/Roll-off	(B & E tapers) 0.25% maximum	(A & H tapers) 0.5% maximum
	(D & S tapers) 0.1% maximum CCW end	(C taper) 0.1% maximum CCW end
	(G & T tapers) 0.1% maximum CW end	(F taper) 0.1% maximum CW end
	(D & S tapers) 0.5% maximum CW end	(C taper) 1.0% maximum CW end
	(G & T tapers) 0.5% maximum CCW end	(F taper) 1.0% maximum CCW end
Environmental Characteristics[1]		
Storage Temperature Range	−55°C to +125°C	−55°C to +125°C
Temperature Coefficient		
Over Storage Temperature Range	±1,000PPM/°C	±150PPM/°C
Vibration (Single Section)	15G	15G
Voltage Ratio Shift	±5% maximum	±5% maximum
Total Resistance Shift	±2% maximum	±2% maximum
Shock (Single Section)	30G	30G
Voltage Ratio Shift	±5% maximum	±5% maximum
Total Resistance Shift	±2% maximum	±2% 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	(B & E tapers) 10 ohms or ±12% (±15% 250Ω - 75KΩ) maximum (whichever is greater)	10 ohms or ±10% maximum (whichever is greater)
	(D, G, S & T tapers) ±20% maximum	
Contact Resistance Variation @ 50,000 cycles	(B & E tapers) ±2%	
	(D, G, S & T tapers) ±3%	
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	(B & E tapers) ±10% maximum	±5% maximum (all tapers)
	(D, G, S & T tapers) ±20% maximum	
Insulation Resistance (500 VDC)	100 megohms minimum	100 megohms minimum

Mechanical Characteristics[1]	
Running Torque	
Single or Dual Section (A, D & R Bushings)	0.3 to 1.5 oz-in.
Single or Dual Section (C & U Bushings)	0.2 to 1.5 oz-in.
Starting Torque	0.3 oz-in. maximum above average running torque
Torque Variation	0.5 oz-in. maximum in 45° shaft travel
Stop Strength (1/4" D Shaft)	4 in-lb.
(1/8" D Shaft)	3 in-lb.
Mechanical Angle	300° ±5°
Weight (Single Section)	7 grams maximum
Each Additional Section	4 grams maximum
Terminals	Printed circuit terminals, J-Hooks or solder lugs
Markings	Manufacturer's trademark, date code, resistance, manufacturer's part number

NOTE: All Model 90 performance specifications do not apply to units subjected to printed circuit board cleaning procedures, except for the sealed version (Model 96).
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.



5/8 INCH SQUARE/SINGLE-TURN/ROTARY SWITCH MODULE/CERMET OR CONDUCTIVE PLASTIC

- Designed for "on-off" function control
- Positive action "non-tease" detent
- Low actuation torque

FOR DIMENSIONAL DRAWINGS SEE PAGE 128
FOR ORDERING INFORMATION SEE PAGE 129

Models 97, 98, 99

Bourns® Panel Controls

Switch specifications are listed below. For potentiometer specifications see Models 93/94/95, page 126.

Initial Electrical Characteristics[1]

Contacts:	
DPST	N.O./N.O., N.C./N.C. or N.O./N.C.
DPDT	2 N.O./N.C. (break before make)
Power Rating (Resistive Load):	
DPST	2A @ 125 volts RMS-60 Hz or 2A @ 28 VDC, 1A @ 250 volts RMS-60 Hz
DPDT	1A @ 125 volts RMS-60 Hz or 1A @ 28 VDC
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1000 VAC minimum
Insulation Resistance	1000 megohms minimum
Contact Resistance (0.1 VDC-10ma.)	10 milliohms maximum
Contact Bounce	5 milliseconds maximum

Environmental Characteristics[1]

Operating Temperature Range	0° to +70°C
Exposure Temperature Range	−65° to +125°C
Vibration (Dual Section)	8G
Contact Resistance	10 milliohms maximum
Contact Bounce	0.1 millisecond maximum
Shock (Dual Section)	20G
Contact Resistance	10 milliohms maximum
Contact Bounce	0.1 millisecond maximum
Rotational Life	25,000 cycles
Switch Actuating Torque (50% Duty Cycle @ Rated Power Load)	2-7 oz-in.
Contact Resistance	100 milliohms maximum
Moisture Resistance	MIL-STD-202, Method 106, Condition B
Contact Resistance (0.1VDC-10ma.)	10 milliohms maximum
Insulation Resistance (After 24 Hours @ Room Temperature) (500 VDC)	100 megohms minimum
Housing Material	High temperature, flame retardant, thermosetting plastic

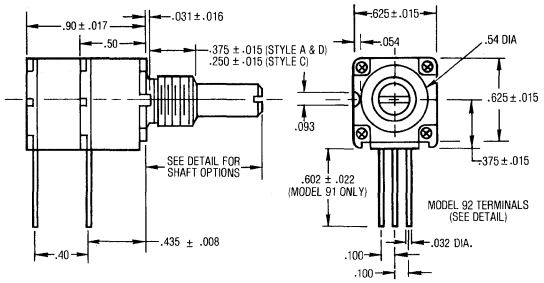
Mechanical Characteristics[1]

Actuating Torque (Each Section, Switch Module Only)	5-15 oz-in.
Running Torque (Out of Detent, 2-4 Module Assembly)	0.3-2 oz-in.
Detent	CW or CCW standard
Actuation Angle	20° ± 5°
Contact Materials	Fine silver with gold overlay
Terminal Styles	Solder lug only
Standard Orientation	In-line with control terminals
Optional	Rotated 90° CCW from standard
Terminal Strength (Before and After Soldering Heat Exposure)	2 lbs. minimum

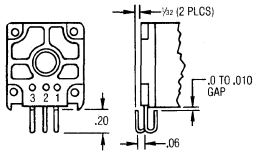
NOTE: Model 97/98/99 performance specifications do not apply to units subjected to printed circuit board cleaning procedures.
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.

Models 91, 92, 93, 94, 95, 96, 97, 98, 99

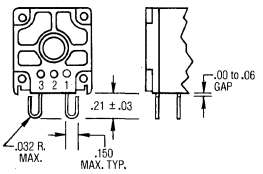
Model 91 PC Pin Terminals, In-Line



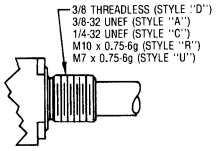
Model 92 J-Hooked Terminals, In-Line



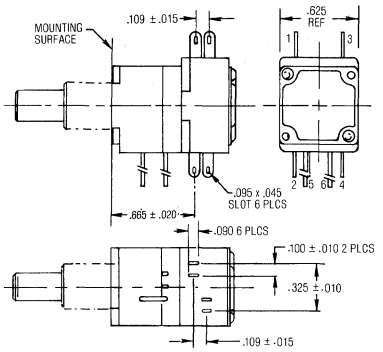
Model 94 J-Hooked Terminals, "L" Pattern



Bushing Styles

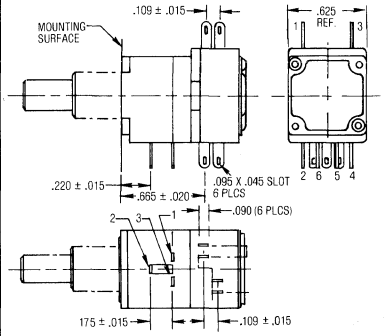


Model 97 1st Cup Same As Model 93 (2nd Cup - Switch)

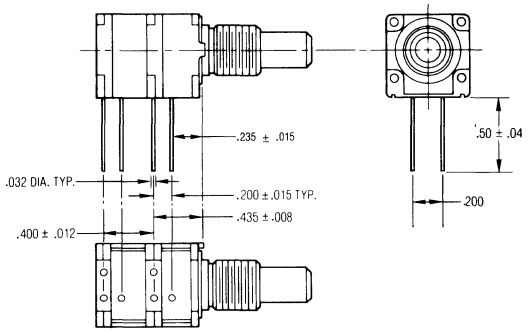


Model 98 1st Cup Same As Model 94 (2nd Cup - Switch)

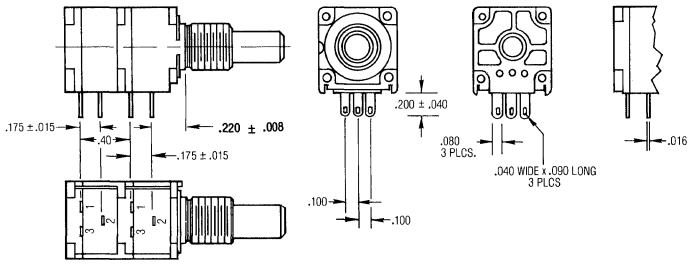
Model 99 1st Cup Same As Model 95 (2nd Cup - Switch)



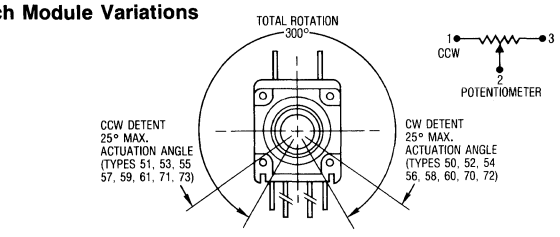
Model 93 PC Pin Terminals, "L" Pattern



Model 95 Solder Lug Terminals, "Triangular" Pattern

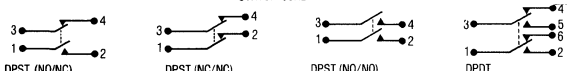


Switch Module Variations



NOTE: Switch terminals shown in vertical position.

SWITCH SCHEMATICS



DPST (NO/NC) (TYPES 50, 51, 56, 57)

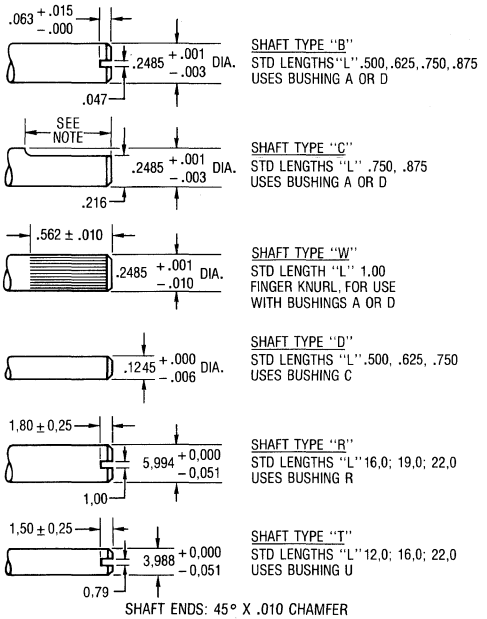
DPST (NC/NC) (TYPES 54, 55, 60, 61)

DPST (NO/NO) (TYPES 52, 53, 58, 59)

DPDT (TYPES 70, 71, 72, 73)

Switch contacts shown in detent position.

Shaft Styles



SHAFT ENDS: 45° X .010 CHAMFER

* DIMENSIONS ARE IN MM

NOTE: FOR .750 SHAFT - FLAT LENGTH IS .313 - .875 SHAFT - FLAT LENGTH IS .440

TOLERANCES EXCEPT AS SHOWN: DECIMAL .XXX ± .005 FRACTION ± 1/64
.XX ± .015 ANGLE ± 5°

90 Series Panel Controls

PART NUMBERING SYSTEM

97	A	2	A - B	28 - B	15	R51

ANTI-ROTATION LUG	
A	Single .305R, 90°CW
C	Single .305R, 270°CW
D	No Lug

NO. SECTIONS	
1	Single, Models 91 Thru 96 Only
2	Dual, All Models, 2nd Section is a Switch in Models 97 Thru 99
3	Triple, Model 91/92 Attenuators Only

BUSHING	
A	Metal Plain 3/8"D x 3/8"L
C	Metal Plain 1/4"D x 1/4"L
D	Plastic Unthreaded 3/8"D x 3/8"L
R	Metal Plain 10mmD x 9mmL
U	Metal Plain 7mmD x 6mmL

SWITCH TYPE (MODELS 97, 98 & 99 ONLY)	
(R50)	DPST N.O./N.C. CW Detent In-Line Term
(R51)	DPST N.O./N.C. CCW Detent In-Line Term
(R52)	DPST N.O./N.O. CW Detent In-Line Term
(R53)	DPST N.O./N.O. CCW Detent In-Line Term
(R54)	DPST N.C./N.C. CW Detent In-Line Term
(R55)	DPST N.C./N.C. CCW Detent In-Line Term
(R56)	DPST N.O./N.C. CW Detent Horz Term
(R57)	DPST N.O./N.C. CCW Detent Horz Term
(R58)	DPST N.O./N.O. CW Detent Horz Term
(R59)	DPST N.O./N.O. CCW Detent Horz Term
(R60)	DPST N.C./N.C. CW Detent Horz Term
(R61)	DPST N.C./N.C. CCW Detent Horz Term
(R70)	DPDT CW Detent In-Line Term
(R71)	DPDT CCW Detent In-Line Term
(R72)	DPDT CW Detent Horz Term
(R73)	DPDT CCW Detent Horz Term

NOTE: All switch module terminals are solder lugs.

MODEL	
91	Single-Turn, In-Line PC Pins
92	Single-Turn, In-Line J-Hooks
93	Single-Turn, L-Pattern PC Pins
94	Single-Turn, L-Pattern J-Hooks
95	Single-Turn, Triangle-Pattern Solder Lugs
96	Single-Turn, In-Line PC Pins, Sealed
97	Single-Turn, L-Pattern PC Pins w/Switch
98	Single-Turn, L-Pattern J-Hooks w/Switch
99	Single-Turn, Triangle-Pattern Solder Lugs w/Switch

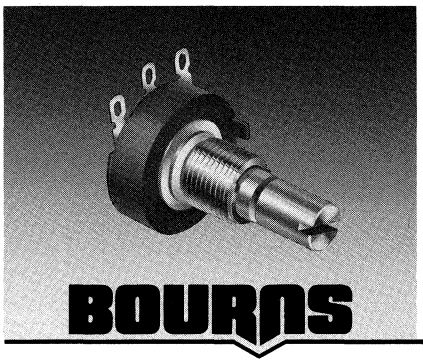
SHAFT TYPE (ALL PLASTIC)		Available Only In LENGTHS (CODE)	Available Only In BUSHINGS (CODE)
B	Single Slotted 1/4"D	16,20,24,28	A, D
C	Single Flatted 1/4"D	24,28	A, D
D	Single Plain 1/8"D	16,20,24	C
R	Single Slotted 6mmD	Metric 16,19,22	R
T	Single Slotted 4mmD	Metric 12,16,22	U
W	Single Knurled 1/4"D	32	A, D

SHAFT LENGTH (From Mounting Surface)		Available Only In BUSHINGS (CODE)
16	1/2"L	A, C, D
20	5/8"L	A, C, D
24	3/4"L	A, C, D
28	7/8"L	A, D
32	1"L	A, D
	METRIC	
12	12mmL	U
16	16mmL	R, U
19	19mmL	R
22	22mmL	R, U

ELEMENT TAPER TYPE/TOLERANCE		RESISTANCE CODE VALUE IN OHMS	
(A) (H)	Linear Cermet ±10% Linear Cermet ±5%	(03) — 50 (04) — 75 (05) — 100 (28) — 150 (06) — 200 (07) — 250 (08) — 500 (09) — 750 (10) — 1K (29) — 1.5K (11) — 2K (12) — 2.5K (13) — 5K (14) — 7.5K (15) — 10K	(30) — 15K (16) — 20K (17) — 25K (18) — 50K (19) — 75K (20) — 100K (31) — 150K (21) — 200K (22) — 250K (23) — 500K (24) — 750K (25) — 1M (36) — 2M (26) — 2.5M (27) — 5M
(B) (E)	Linear C-P ±20% Linear C-P ±10%	(07) — 250 (08) — 500 (10) — 1K (12) — 2.5K (13) — 5K (15) — 10K (16) — 20K (17) — 25K	(18) — 50K (20) — 100K (22) — 250K (23) — 500K (25) — 1M (26) — 2.5M (27) — 5M
(C) (D) (F) (G) (S) (T)	CW Audio Cermet ±10% CW Audio C-P ±20% CCW Audio Cermet ±10% CCW Audio C-P ± 20% CW Audio C-P ±10% CCW Audio C-P ±10%	(10) — 1K (12) — 2.5K (13) — 5K (15) — 10K (17) — 25K (18) — 50K	(20) — 100K (22) — 250K (23) — 500K (25) — 1M (26) — 2.5M

ELEMENT TYPE - ATTENUATOR MODELS 91 & 92 THREE SECTION ONLY	
ST3510	Straight T, 600 ohm impedence, ±10% tolerance
ST3520	Straight T, 600 ohm impedence, ±20% tolerance

Specifications are subject to change without notice.



3/4 INCH DIAMETER/CERMET OR CONDUCTIVE PLASTIC

- Single-turn (3851 and 3852)
- 3-3/4-turn (3856)
- Minimal depth package
- Good resolution

FOR ORDERING INFORMATION SEE PAGE 133

Models 3851/3852/3856

Bourns® Panel Controls

	3851 Conductive Plastic Element	3852/3856 Cermet Element
Initial Electrical Characteristics[1]		
Standard Resistance Range		
Linear Tapers (A, B, E, and H)	1K to 2.5 megohms	50 ohms to 5 megohms
Audio Tapers (C, D, F, and G)	750 ohms to 2.5 megohms	1K ohms to 2.5 megohms
Resistance Tolerance	(B, D, & G tapers) ±20%	(A, C, & F tapers) ±10%
	(E taper) ±10%	(H taper) ±5%
Independent Linearity	±10%	(A & H tapers) ±5%
Absolute Minimum Resistance	2 ohms maximum	2 ohms maximum
Continuity	Maintained for full mechanical angle	Maintained for full mechanical angle
Effective Electrical Angle	250° ±5°	250° ±5°
Contact Resistance Variation	±1%	±3% of total resistance or 3 ohms (whichever is greater)
Theoretical Resolution	Essentially infinite	Essentially infinite
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	MIL-STD-202, Method 301
Sea Level	900 VAC minimum	900 VAC minimum
70,000 Feet	350 VAC minimum	350 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	(B & E tapers) 1 watt	(A & H tapers) 2 watts
	(D & G tapers) 0.5 watt	(C & F tapers) 1 watt
+125°C	0 watt	
+150°C		0 watt
Environmental Characteristics[1]		
Storage Temperature Range	−65°C to +125°C	−65°C to +150°C
Temperature Coefficient		
Over Temperature Range	±1,000PPM/°C	±150PPM/°C
Vibration	20G	20G
Voltage Ratio Shift	±5% maximum	±6% maximum
Total Resistance Shift	±2% maximum	±2% maximum
Shock	100G	100G
Voltage Ratio Shift	±5% maximum	±6% maximum
Total Resistance Shift	±2% maximum	±2% maximum
Load Life	1,000 hours	1,000 hours
Total Resistance Shift	±10% maximum	±3% maximum
Rotational Life (No Load)	100,000 cycles	50,000 cycles
Total Resistance Shift	±10% maximum	±5% or 5 ohms (whichever is greater)
Moisture Resistance	MIL-STD-202, Method 103, Condition B	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±10% maximum	±2% maximum
Insulation Resistance (500 VDC)	100 megohms minimum	100 megohms minimum
Mechanical Characteristics[1]		
Shaft Torque	(A & B bushings) 0.5 to 6.0 oz-in.	3852 (A & B bushings) 0.5 to 6.0 oz-in.
	(C & E bushings) 0.3 to 6.0 oz-in.	(C & E bushings) 0.3 to 6.0 oz-in.
		3856 — 0.15 to 3.0 oz-in.
Stop Strength	5 in-lb.	5 in-lb.
Mechanical Angle	280° ±5°	3852 — 280° ±5°
		3856 — 1350° ±50°
Weight	30 grams maximum	30 grams maximum
Terminals	Printed circuit terminals or solder lugs.	Printed circuit terminals or solder lugs.
Markings	Manufacturer's trademark, wiring diagram, date code, resistance, manufacturer's part number	Manufacturer's symbol, wiring diagram, date code, resistance, manufacturer's part number.

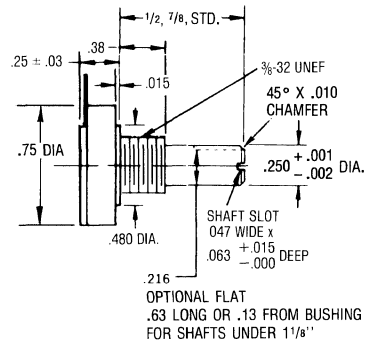
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.

- Linear and audio tapers
- Wide resistance range

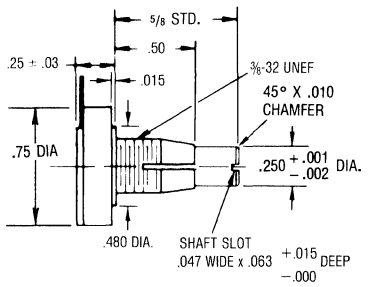
Models 3851/3852/3856

Bourns® Panel Controls

3851A/3852A

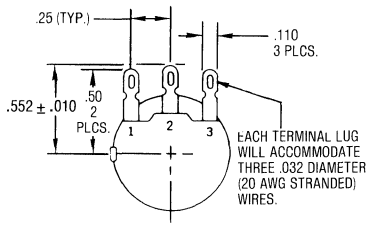


3851B/3852B

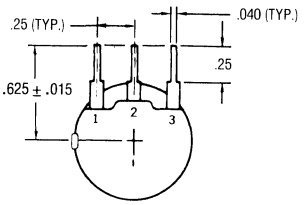


Terminal Configuration

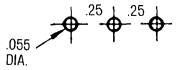
SOLDER LUG TERMINAL



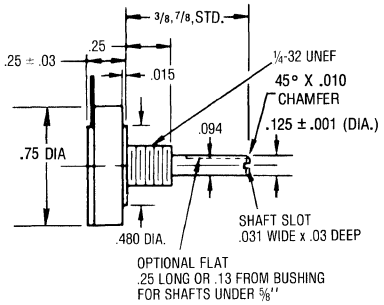
STANDARD PRINTED CIRCUIT TERMINAL



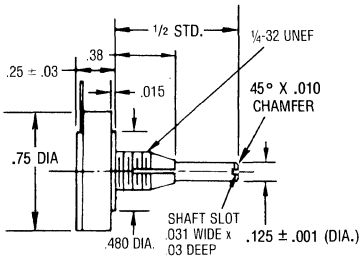
SUGGESTED BOARD LAYOUT



3851C/3852C

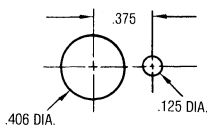


3851E/3852E

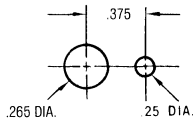


3851/3852/3856

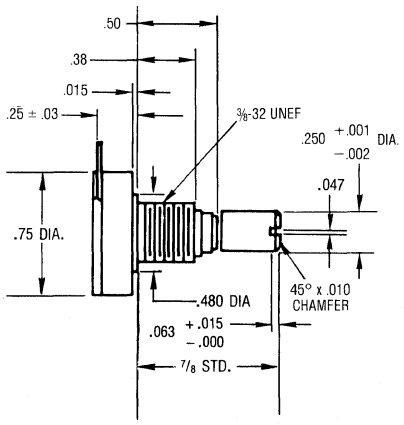
A, B & H BUSHINGS



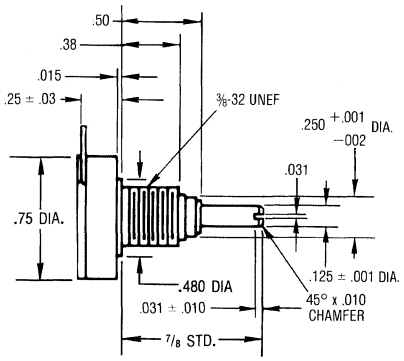
C & E BUSHINGS



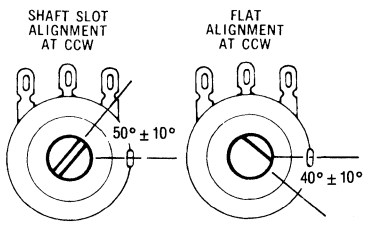
3856A



3856H

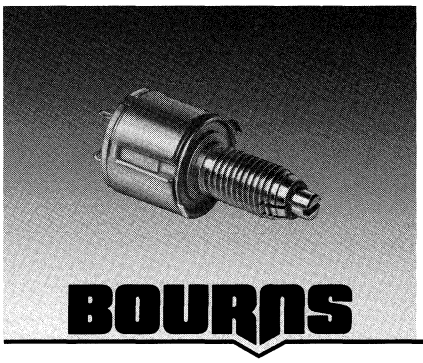


Shaft End Detail 3850 Family



TOLERANCES EXCEPT AS NOTED:
DECIMALS: .XXX ± .005, .XX ± .015
FRACTIONS: ± 1/64
ANGLE: ± 3°

Specifications are subject to change without notice.



1/2 INCH DIAMETER/SINGLE-TURN CERMET

- Small diameter
- Wide resistance range
- Good resolution
- Linear and audio tapers

FOR ORDERING INFORMATION SEE PAGE 133

Model 3862

Bourns® Panel Controls

Initial Electrical Characteristics[1]

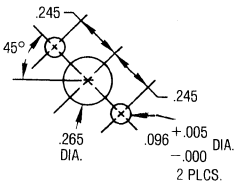
Standard Resistance Range (A and H Tapers)	100 ohms to 5 megohms
Resistance Tolerance	(A Taper) ±10%
	(H Taper) ±5%
Independent Linearity	±5%
Absolute Minimum Resistance	2 ohms maximum
Continuity	Maintained for full mechanical angle
Effective Electrical Angle	260° ±10°
Contact Resistance Variation	±3% of total resistance
Theoretical Resolution	Essentially infinite
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	750 VAC minimum
70,000 Feet	350 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms minimum
Power Rating (Voltage Limited by Power Dissipation or 350 VAC, Whichever is Less)	
+70°C	1 watt
+125°C	0 watt

Environmental Characteristics[1]

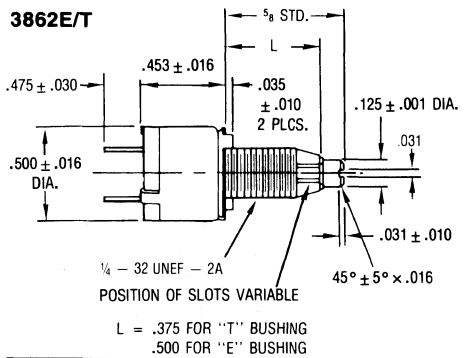
Storage Temperature Range	−65°C to +125°C
Temperature Coefficient Over Temperature Range	±150 ppm/°C
Vibration	20G
Voltage Ratio Shift	±6% maximum
Total Resistance Shift	±2% maximum
Shock	50G
Voltage Ratio Shift	±6% maximum
Total Resistance Shift	±2% maximum
Load Life	1,000 hours
Total Resistance Shift	±3% maximum
Rotational Life (C & N Bushing) (No Load)	50,000 cycles
Total Resistance Shift	±5% maximum
Moisture Resistance	MIL-STD-202, Method 103, Condition B
Total Resistance Shift	±2% maximum
Insulation Resistance (500 VDC)	100 megohms minimum
Salt Spray	MIL-STD-202, Method 101, Condition A

Mechanical Characteristics[1]

Shaft Torque	5 oz-in maximum
Shaft Locking Torque with Locking Bushings	20 oz-in
Mechanical Angle	295° ±3°
Weight	25 grams maximum
Terminals	Printed circuit pins or J-Hooks
Markings ... Manufacturer's trademark, wiring diagram, date code, resistance, manufacturer's part number	
Stop Strength	3 in-lb. maximum

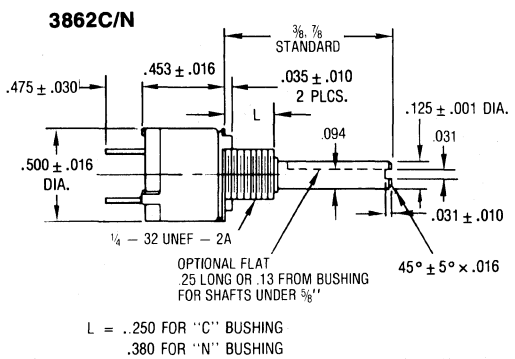


3862E/T



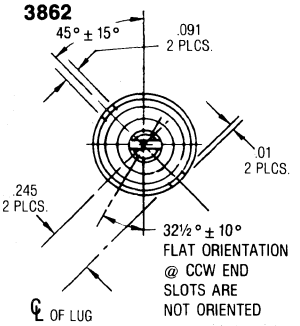
L = .375 FOR "T" BUSHING
.500 FOR "E" BUSHING

3862C/N



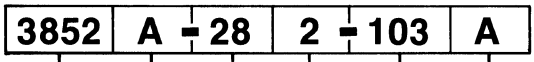
L = .250 FOR "C" BUSHING
.380 FOR "N" BUSHING

Shaft End Detail
3862



3800 Series Panel Controls

PART NUMBERING SYSTEM



SHAFT LENGTH (FMS) & DIAMETER		AVAILABLE ONLY IN MODELS	BUSHINGS
12	3/8"L x 1/8"D	3851, 3852, 3862	C
16	1/2"L x 1/4"D	3851, 3852	A
16	1/2"L x 1/8"D	3851, 3852	C, E
		3862	C
20	5/8"L x 1/4"D	3851, 3852	A, B
20	5/8"L x 1/8"D	3851, 3852	C, E
		3862	C, E, N, T
28	7/8"L x 1/4"D	3851, 3852	A, B
		3856	A
28	7/8"L x 1/8"D	3851, 3852	C, E
		3856	H
		3862	C, E, N, T

Consult factory for lengths not shown.

	BUSHING	APPLICABLE MODELS
A	Plain 3/8"D x 3/8"L	3851, 3852, 3856
B	Locking 3/8"D x 1/2"L	3851, 3852
C	Plain 1/4"D x 1/4"L	3851, 3852, 3862
E	Locking 1/4"D x 3/8"L	3851, 3852
E	Locking 1/4"D x 1/2"L	3862
H	Plain 3/8"D x 3/8"L	3856 (1/8" Dia. Shaft)
N	Plain 1/4"D x 3/8"L	3862 (Consult Factory)
T	Locking 1/4"D x 3/8"L	3862 (Consult Factory)

MODEL	
3851	3/4"D Single-Turn C.P.
3852	3/4"D Single-Turn Cermet
3856	3/4"D 3 3/4-Turn Cermet
3862	1/2"D Single-Turn Cermet

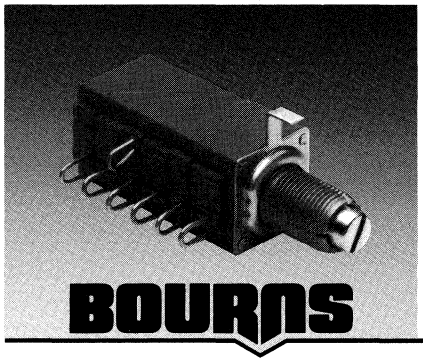
RESISTANCE CODE/VALUE (IN OHMS)	
Model 3851	
(102)	1K
(252)	2.5K
(502)	5K
(103)	10K
(253)	25K
(503)	50K
(104)	100K
(254)	250K
(504)	500K
(105)	1M
(255)	25M
Models 3852/3856	
(500)	50
(101)	100
(251)	250
(501)	500
(102)	1K
(252)	2.5K
(502)	5K
(103)	10K
(253)	25K
(503)	50K
(104)	100K
(254)	250K
(504)	500K
(105)	1M
(255)	2.5M
(505)	5M
Model 3862	
(101)	100
(251)	250
(501)	500
(102)	1K
(252)	2.5K
(502)	5K
(103)	10K
(253)	25K
(503)	50K
(104)	100K
(254)	250K
(504)	500K
(105)	1M
(255)	2.5M
(505)	5M

	TERMINAL STYLE AND SHAFT TYPE	NOT RECOMMENDED FOR BUSHING/SHAFT COMBINATIONS SHOWN
1	Solder Lugs*, Plain End	A16, C12, E16 (Consult Factory)
2	Solder Lugs*, Slotted End	
3	Solder Lugs*, Flatted Shaft	A16, C12, E16 (Consult Factory)
5	PC Pins, Plain End	A16, C12, E16 (Consult Factory)
6	PC Pins, Slotted End	
7	PC Pins, Flatted Shaft	A16, C12, E16 (Consult Factory)

*Model 3862 comes with J-hook solder lugs.

	ELEMENT TAPER/TOLERANCE	APPLICABLE MODELS
A	Linear ±10%	3852, 3856, 3862
B	Linear ±20%	3851
C	Audio CW ±10%*	3852, 3856, 3862
D	Audio CW ±20%*	3851
E	Linear ±10%	3851
F	Audio CCW ±10%*	3852, 3856, 3862
G	Audio CCW ±20%*	3851
H	Linear ±5%	3852, 3856, 3862

*The maximum resistance range for audio tapers is 1000 ohms to 2.5 megohms.



VARIABLE ATTENUATORS/STRAIGHT T-PAD

Models 81/82 & 91/92

Bourns® Variable Attenuators

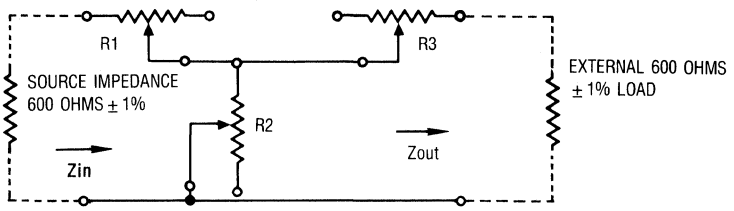
ATTENUATOR SPECIFICATIONS

- The impedance of the attenuator is 600 ohms ±10% or ±20% from DC through 15KHz and throughout the attenuation range when connected in the straight T-Pad configuration as shown in the schematic to a 600 ohm ±1% source and a 600 ohm ±1% load.
- Attenuation range is 30 dB minimum.
- Insertion loss, or minimum attenuation at output, 0.2 dB with shaft in full CW position.
- Adjustability ±0.1 dB from 0.5 to 20 dB attenuation and ±0.2 dB from 20 dB to maximum attenuation.
- In T-Pad configuration this model will withstand 10 DC voltage surges (5 each polarity) of 550 volts peak within a 10 minute period. Voltage surge characteristics to have a rise time of 100 v/sec. minimum and a decay time of 1/2 peak voltage in ≥1 millisecond.
- Customer part number and identification labelling is available on these attenuators.

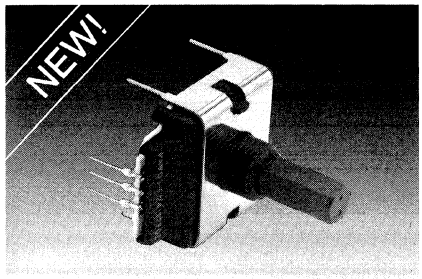
The attenuator is most widely used in line balancing and voltage monitoring applications. The unique characteristic of this component is that it will maintain input and output impedance at an equal and constant level as the amount of attenuation is varied.

We offer a straight T, 600 ohm attenuator, that is extremely reliable, will withstand repeated high voltage surges without excessive change in impedance, has been customer qualified to REA specification PE-61, and offers a truly competitive price and delivery time.

STRAIGHT T ATTENUATOR SCHEMATIC



[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.



STEPPED ATTENUATOR SERIES

- Precision step adjustment
- High quality
- Long life
- Space saving

BOURNS

Stepped Attenuator

Bourns® Stepped Attenuator

Electrical Characteristics[1]

Voltage	32 vac maximum
Minimum Resistance	5 ohms maximum
Insulation Resistance (500 vdc)	1,000 megohms minimum
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1,000 vac minimum
Temperature Coefficient	±150ppm/°C
Volume Controls	
Taper	db
Standard db/TR Range	
50db	10K - 100K ohms
60db	20K - 100K ohms
70db	50K - 100K ohms
Resistance Tolerance	±5% nominal
Detent Step Angle	15° per step
Detent Positions	22
Total Rotational Angle	315°

db Taper Value	Increments 1	2	3	4	5	6	7	8	20	21	22
-50db	Inf.	-50	-42	-37	-34	-32	-30	-28	-4	-2	0
-60db	Inf.	-60	-50	-42	-37	-33	-30	-28	-4	-2	0
-70db	Inf.	-70	-60	-50	-40	-34	-30	-28	-4	-2	0

db Step Error	Within 0.5db at each step with respect to the first step
Tone Controls	
Taper	Linear
Total Resistance Range	10K ohms - 100K ohms (±5% nominal)
Step Resistance Values	±5% nominal (except center detent position to be ±3%)
Total Resistance Tolerance	±5% nominal
Detent Step Angle	30° per step
Detent Positions	11
Total Rotational Angle	300°

Environmental Characteristics[1]

Storage Temperature Range	-40°C to +125°C
Temperature Coefficient Over Storage Temperature Range	±150ppm
Vibration	15G
Wiper Bounce	0.1MS maximum
Shock	50G
Wiper Bounce	0.1MS maximum
Rotational Life	100,000 cycles
Moisture Resistance	MIL-STD-202, Method 103, Condition B

Mechanical Characteristics[1]

Stop Strength	7 in-lbs. maximum
Terminals	Printed circuit pins or solder lugs
Mechanical Angle	
315°	22 detent positions
300°	11 detent positions
Mounting Torque	7 in-lbs. maximum

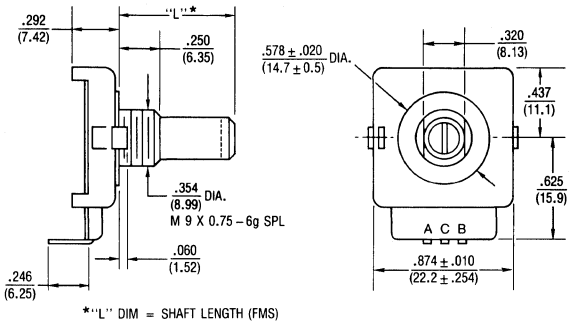
[1]At room ambient: +25°C nominal and 50% relative humidity nominal, except as noted.
Specifications are subject to change without notice.

BOURNS

Stepped Attenuator

Bourns® Stepped Attenuator

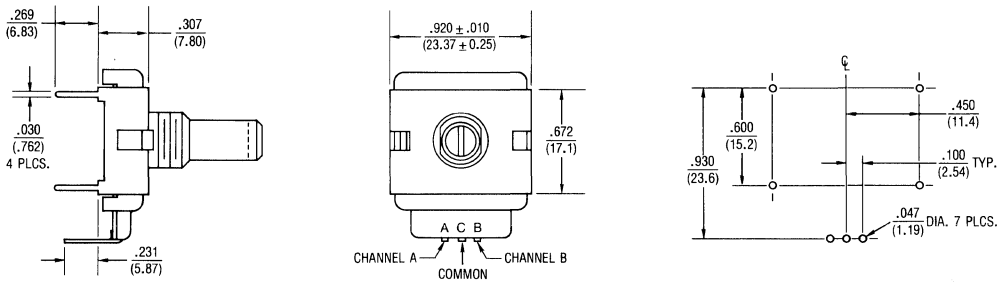
BUSHING MOUNTED



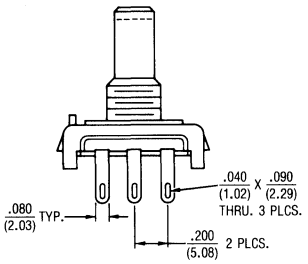
*"L" DIM = SHAFT LENGTH (FMS)

PCB BRACKET MOUNTED

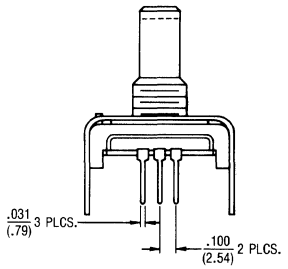
Dimensions not given are the same as bushing mounted.



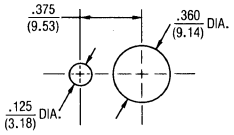
SOLDER LUG



TERMINAL

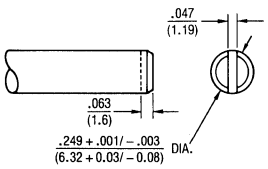


PANEL HOLE DIMENSIONS

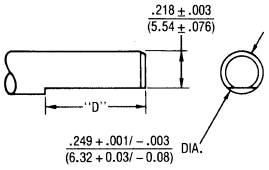


SHAFT STYLES (Full CCW Rotation)

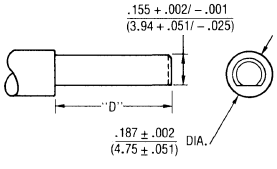
Shaft Style **B**



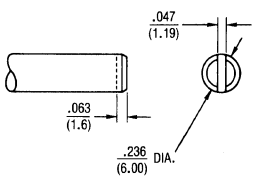
Shaft Style **C**



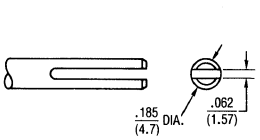
Shaft Style **J**



Shaft Style **R**



Shaft Style **Y**

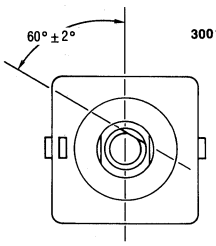


SLOT DEPTH ("Y" SHAFT)
.380" (9.65) FOR SHAFTS < 1" LENGTH
.580" (14.73) FOR SHAFTS ≥ 1" LENGTH

"D" DIMENSION EXTENDS FROM SHAFT END TO BUSHING FACE
"D" = (SHAFT LENGTH, FMS) – (BUSHING LENGTH)

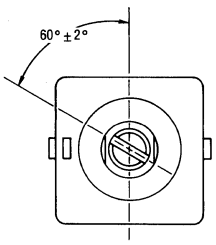
SHAFT ORIENTATIONS

Shaft Styles **C, J**

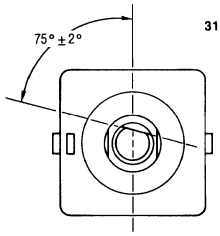


300° MECH ROTATION

Shaft Styles **B, R, Y**

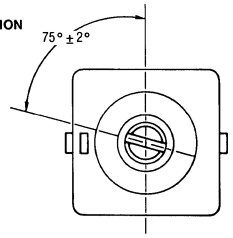


Shaft Styles **C, J**



315° MECH ROTATION

Shaft Styles **B, R, Y**



FOR TOLERANCES NOT SHOWN .XX = ± .010
.XXX = ± .005

BOURNS

Stepped Attenuator

Bourns® Stepped Attenuator

PART NUMBERING SYSTEM

P	A	W	0	J	-	B	2	4	-	B	A	0	1	0	3

SHAFT LENGTH (FMS)	
Code	**Descriptiion**
24	3/4" (19mm) Length
28	7/8" (22.2mm) Length
32	1" (25.4mm) Length
36	1-1/8" (28.6mm) Length
	Metric
19	19mm Length (Shaft Style "R" Only)
24	24mm Length (Shaft Style "R" Only)

RESISTANCE VALUES	
Code	**Value**
103	10K Ohms
203	20K Ohms
253	25K Ohms
503	50K Ohms
104	100K Ohms

SHAFT STYLES (See Outline Drawing)	
Code	**Description**
B	1/4" Dia. Slotted
C	1/4" Dia. Flatted
J	3/16" Dia. Flatted
R	6mm Dia. Slotted
Y	3/16" Dia. Split Shaft

CENTER TAP OPTION	
Code	**Description**
0	No Center Tap
1	Center Tap

ELEMENT TAPER		AVAILABLE RESISTANCE VALUES					
Code	**Description**	**(Codes Shown)**					**Detents**
A	50db	103	203	253	503	104	22
B	60db	—	203	253	503	104	22
C	70db	—	—	—	503	104	22
D	Linear	103	203	253	503	104	11

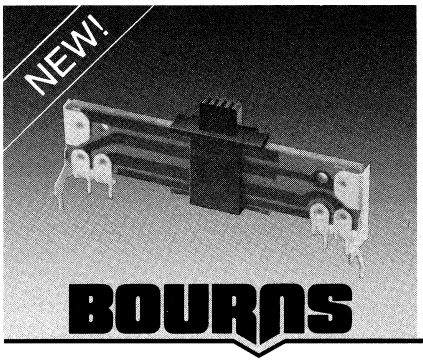
ANTI-ROTATION LUG	
Code	**Description**
0J	9:00 Position
0D	None

BUSHING CONFIGURATION	
Code	**Descriptiion**
W	9mm x .250 Length Threaded M9 x 0.75 6g 5 Pl

TERMINAL CONFIGURATION (X Indicates "Equipped With")				
	Code			
Features	**A**	**B**	**C**	**D**
PC Pins	X	X		X
Solder Lugs			X	
PCB Bracket		X		X
Hardware Incl.	X		X	X

The sample part number demonstrates the identification code for Bourns

The part number shown is a commonly used model, typically available from stock.



10, 15, 20, AND 30MM LOW PROFILE

- Minimal installation space for maximum design flexibility
- Linear or audio taper versions
- Wide assortment of options

(FOR SALE IN UNITED STATES AND CANADA ONLY.)

Open-Frame Slide Potentiometers

Bourns® Slide Potentiometers

SPECIFICATIONS / MODEL		OPEN FRAME SLIDE POTENTIOMETERS			
		10MM	15MM	20MM	30MM
ELECTRICAL					
Standard Resistance Range (ohms)	Linear	1K 2K 5K 10K 20K 50K 100K 200K		2K 5K 10K 20K 50K 100K 200K 500K	
	Audio	2K 5K 10K 20K 50K 100K 200K		5K 10K 20K 50K 100K 200K 500K	
Resistance Tolerance		±20%, All Resistances/Tapers			
Resistance Taper	Linear	B and Y Tapers (see taper curves)			
	Audio	D and G Tapers (see taper curves)			
Independent Linearity		±5% for B Tapers (see curves for Y, D and G tapers)			
Absolute Minimum Resistance		1% or 100 ohms, whichever is less, for B taper			
Continuity		Maintained for full stroke			
Effective Electrical Travel		80% of Mechanical Travel	85% of Mechanical Travel	90% of Mechanical Travel	90% of Mechanical Travel
Peak Noise (CRV) Linear/Audio		3% / 6%	2% / 5%	2% / 5%	2% / 5%
Theoretical Resolution		Essentially Infinite			
Dielectric Strength (Sea Level)		500 VAC, 1 Minute, between Lever and Terminals			
Insulation Resistance (500 VDC)		1,000 Megohms Minimum between Lever and Terminals			
Power Rating at 70°C (0 Watt at 90°C)	Linear	0.05 Watt	0.05 Watt	0.1 Watt	0.1 Watt
	Audio	0.025 Watt	0.025 Watt	0.05 Watt	0.05 Watt
Maximum Working Voltage		Power Dissipation or 350 VAC, Whichever is Less			
Tracking Error (Dual Only)		4 dB Maximum; 0 to −40 dB			
MECHANICAL					
Operating Force		15 to 150 Gr			
Stop Strength		1.5 Kg Minimum			
Stroke		10mm	15mm	20mm	30mm
Terminals		PC Pins (Vertical or Horizontal)			
Marking		Trademark, Date Code, Taper and Resistance (ex. B10K) and Japan			
ENVIRONMENTAL					
Storage Temperature		−20°C to +90°C			
Temperature Coefficient of Resistance		±1,000ppm/°C			
Vibration (10 to 55Hz, 1.5mm)		Voltage Ratio Change: ±5% Maximum. Total Resistance Shift: ±2% Maximum			
Load Life (Rated Power at 25°C for 1,000 Hours)		(Pre-conditioning: 55°C, 20% RH, 24±4 Hours) Total Resistance Shift: ±10%			
Sliding Life (No Load - 15,000 Cycles)		Total Resistance Shift: ±5% = Linear; 2K, 5K, 10K, 20K, 50K ±10% = Linear; 100K, 200K, 500K & Audio; 2K to 500K			
Moisture Resistance (96 Hours @ 40°C 90-95% RH, Rated Power)		Total Resistance Shift: Linear ±12% Maximum, Audio ±20% Maximum Insulation Resistance: 100 Megohms Minimum			
Soldering Heat (3 Seconds @ 350°C)		Total Resistance Shift: ±5% Maximum			

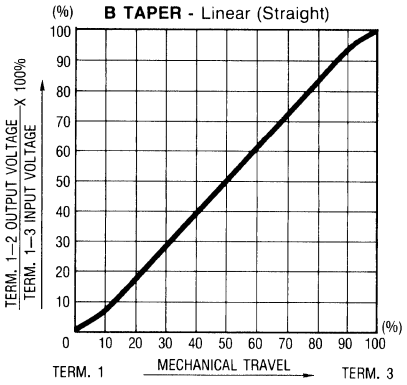
Specifications are subject to change without notice.

Open-Frame Slide Potentiometers

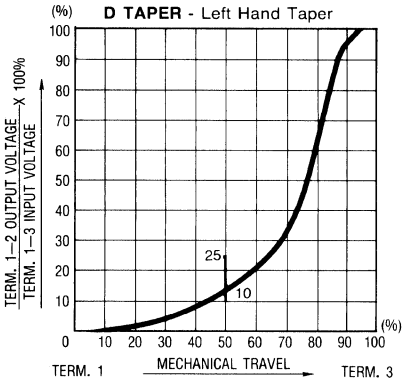
Bourns® Slide Potentiometers

TAPER CURVES

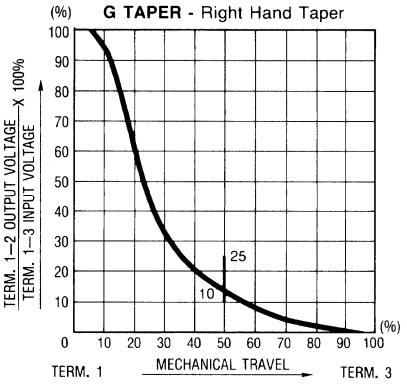
B TAPER - Linear (Straight)



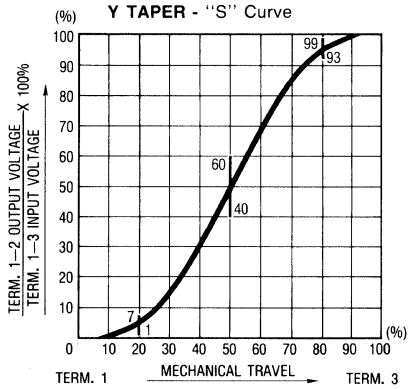
D TAPER - Left Hand Taper



G TAPER - Right Hand Taper



Y TAPER - "S" Curve

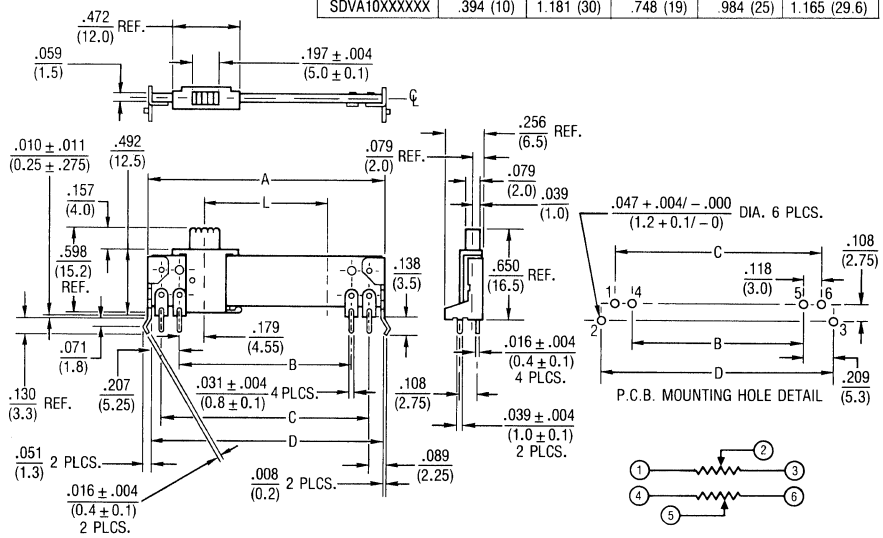


OUTLINE AND DIMENSIONAL DRAWINGS

(Dimensions Shown In Brackets Are In Millimeters)

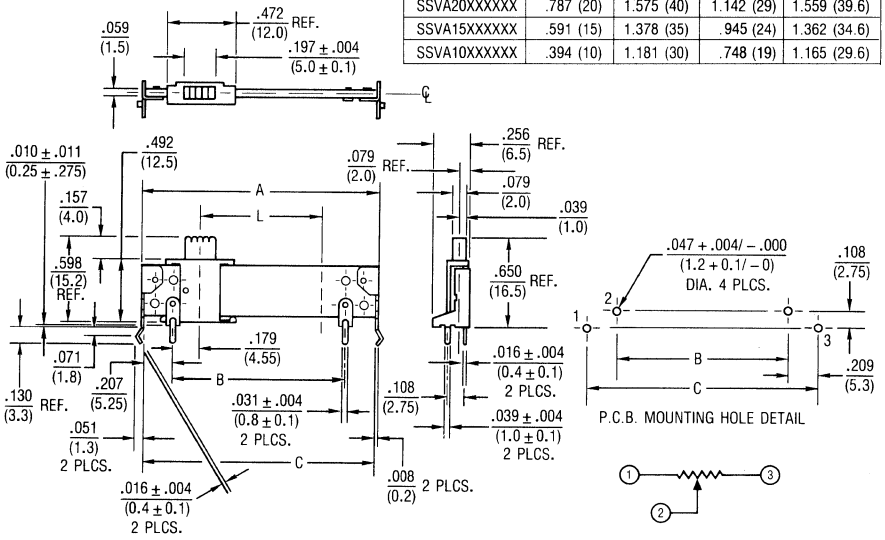
Dual Element
Vertical Mount

MODEL	DIMENSIONS ±0.20 (±0.5)				
	L (STROKE)	A	B	C	D
SDVA30XXXXXX	1.181 (30)	1.969 (50)	1.535 (39)	1.772 (45)	1.953 (49.6)
SDVA20XXXXXX	.787 (20)	1.575 (40)	1.142 (29)	1.378 (35)	1.559 (39.6)
SDVA15XXXXXX	.591 (15)	1.378 (35)	.945 (24)	1.181 (30)	1.362 (34.6)
SDVA10XXXXXX	.394 (10)	1.181 (30)	.748 (19)	.984 (25)	1.165 (29.6)



Single Element
Vertical Mount

MODEL	DIMENSIONS ±0.20 (±0.5)			
	L (STROKE)	A	B	C
SSVA30XXXXXX	1.81 (30)	1.969 (50)	1.535 (39)	1.953 (49.6)
SSVA20XXXXXX	.787 (20)	1.575 (40)	1.142 (29)	1.559 (39.6)
SSVA15XXXXXX	.591 (15)	1.378 (35)	.945 (24)	1.362 (34.6)
SSVA10XXXXXX	.394 (10)	1.181 (30)	.748 (19)	1.165 (29.6)



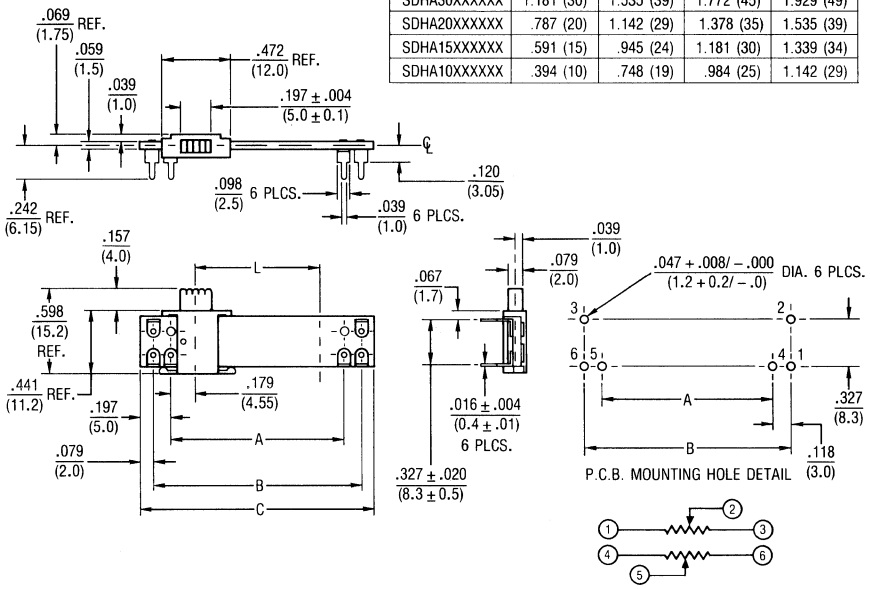
Specifications are subject to change without notice.

Open-Frame Slide Potentiometers

Bourns® Slide Potentiometers

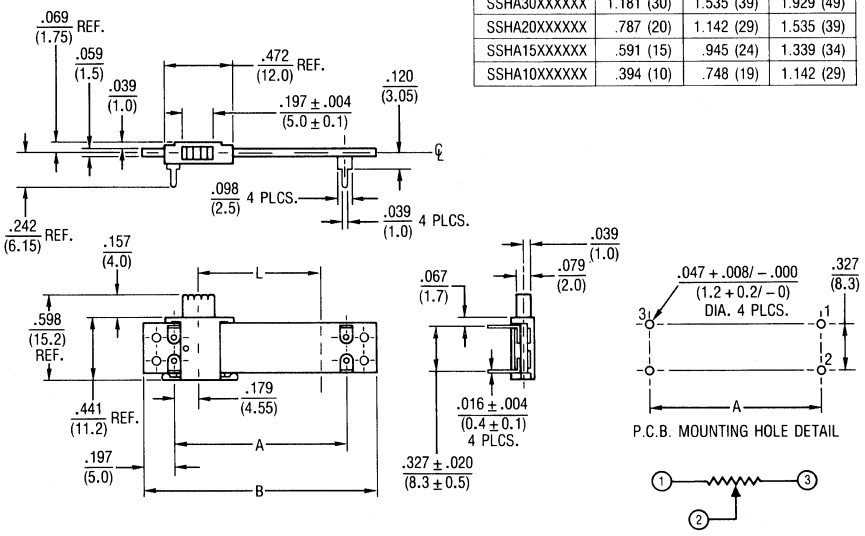
Dual Element
Horizontal Mount

MODEL	DIMENSIONS ±0.20 (±0.5)			
	L (STROKE)	A	B	C
SDHA30XXXXXX	1.181 (30)	1.535 (39)	1.772 (45)	1.929 (49)
SDHA20XXXXXX	.787 (20)	1.142 (29)	1.378 (35)	1.535 (39)
SDHA15XXXXXX	.591 (15)	.945 (24)	1.181 (30)	1.339 (34)
SDHA10XXXXXX	.394 (10)	.748 (19)	.984 (25)	1.142 (29)



Single Element
Horizontal Mount

MODEL	DIMENSIONS ±0.20 (±0.5)		
	L (STROKE)	A	B
SSHA30XXXXXX	1.181 (30)	1.535 (39)	1.929 (49)
SSHA20XXXXXX	.787 (20)	1.142 (29)	1.535 (39)
SSHA15XXXXXX	.591 (15)	.945 (24)	1.339 (34)
SSHA10XXXXXX	.394 (10)	.748 (19)	1.142 (29)



PART NUMBERING SYSTEM

S	S	V	A	2	0	B	1	0	3	0	0

STROKE LENGTH

Code	Description
10	10mm Slide Stroke
15	15mm Slide Stroke
20	20mm Slide Stroke
30	30mm Slide Stroke

LEVER AND COLOR

A	Black 4mm H x 5mm W

TERMINAL STYLE

H	PC Pin, Horizontal
V	PC Pin, Vertical

SECTIONS

S	Single Element
D	Dual Element

PRODUCT CLASS

S	Slide Potentiometer

ELEMENT TYPE/TAPER

Code	Description
B	Linear ±20%
D	LH Audio ±20%
G	RH Audio ±20%
Y	"S" Curve ±20%

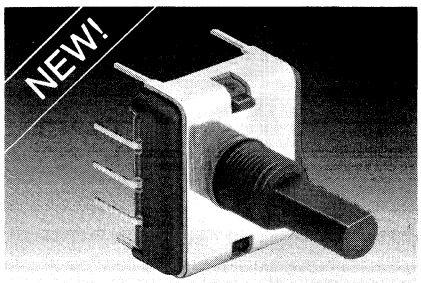
RESISTANCE CODE

Code	Resistance
102	1,000*
202	2,000
502	5,000
103	10,000
203	20,000
503	50,000
104	100,000
204	200,000
504	500,000**

*Available only on linear taper 10mm and 15mm stroke versions.
**Available only on 20mm and 30mm stroke versions.

COMBINATIONS

Code	Description
00	No Detent
01	Center Detent
02	Center Tap (B & Y Taper Only)
03	Center Tap With Detent (B & Y Taper Only)



NEW / LOW COST POTENTIOMETER CONDUCTIVE PLASTIC

- Space saving design
- PC pin or solder lug terminals
- Mounting brackets available
- Linear or audio taper versions
- Wide range of resistance values
- Metric shaft and bushing options

Slimline Potentiometers

Bourns® Slimline Potentiometers

Electrical Characteristics

Standard Resistance Range	
Linear Tapers	500 ohms to 2.5 megohms
Audio Tapers	1K ohms to 2.5 megohms
Resistance Tolerance (All Tapers)	±20%
Independent Linearity	±5% (linear taper)
Absolute Minimum Resistance	5 ohms maximum
Effective Electrical Angle	270° ± 5°
Dielectric Withstanding Voltage	MIL-STD-202, Method 301
Sea Level	1,000 VAC minimum
70,000 Feet	500 VAC minimum
Insulation Resistance (500 VDC)	1,000 megohms
Power Rating @ 70°C (Voltage Limited by Power Dissipation or 350 VAC, Whichever is Less)	
Linear	.75 watt
Audio	.50 watt

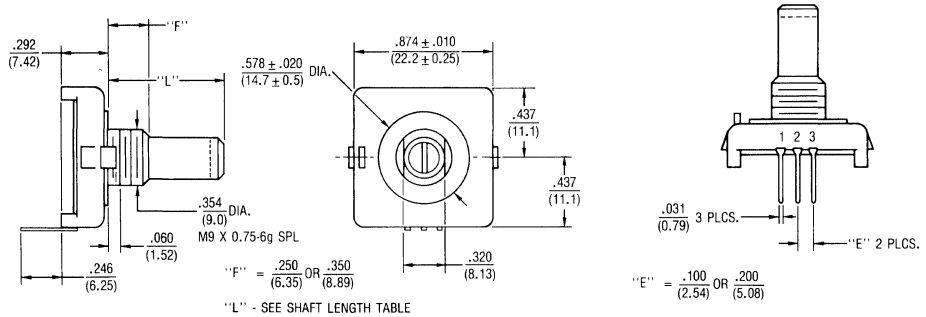
Environmental Characteristics

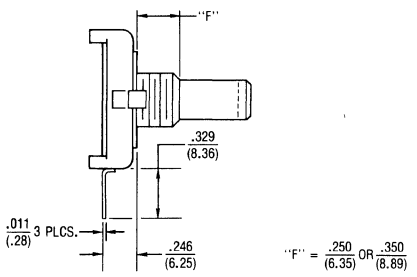
Storage Temperature	−55°C to +125°C
Load Life (1,000 Hours @ Rated Power, 20% RH, 70°C)	±10% maximum resistance shift
Rotational Life	50,000 cycles
Total Resistance Shift	
Linear	±10 ohms or 12%, whichever is greater
Audio	±20% maximum

Mechanical Characteristics

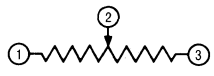
Stop Strength (1/4" and 6mm Shaft Diameters)	8 in-lb.
Mechanical Angle	300° ± 5°
Terminals	PC pin or solder lug
Running Torque	.3 to .75 in-oz. (undetented)
Mounting Torque	7 in-lbs. maximum
Detents	Center, 10, 20, 30, none
Shaft Variations	See diagram

PC PINS (Rear Facing)





SCHEMATIC DIAGRAM



TOLERANCES WHERE NOT SHOWN
.XX = ± .010
.XXX = ± .005

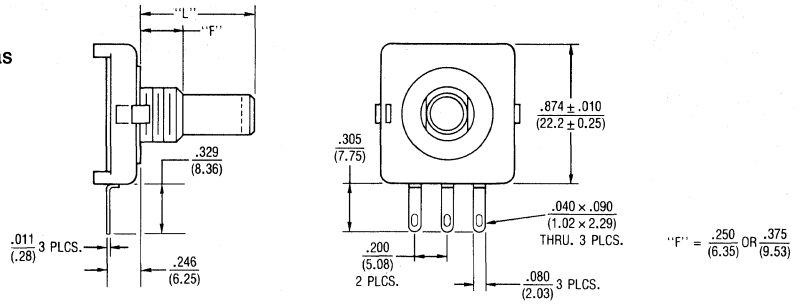
For additional features or specifications not shown, consult factory.
Specifications are subject to change without notice.

Slimline Potentiometers

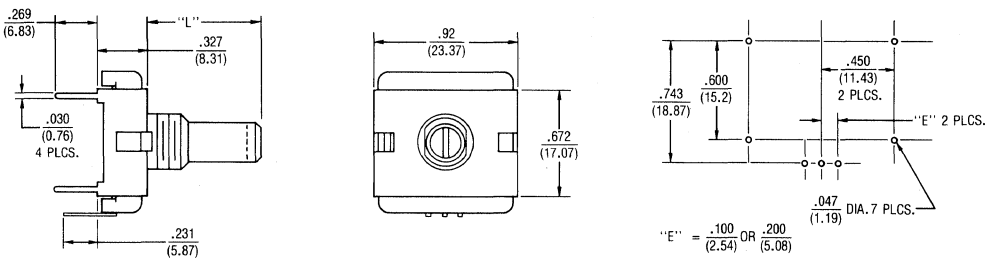
Bourns® Slimline Potentiometers

SOLDER LUGS

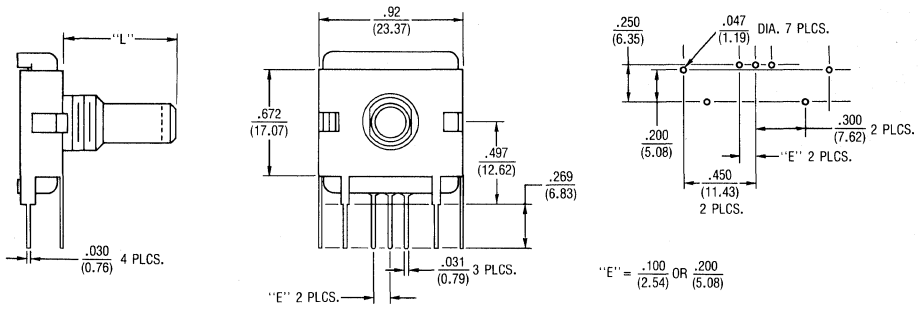
Dimensions not given are the same as PC pins (rear facing).



PC PINS (Rear Facing) With Rear Mounting Bracket

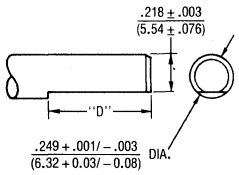


PC PINS (Side Exit) With Side Mounting Bracket

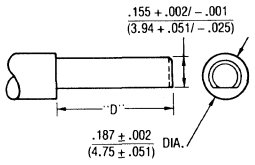


SHAFT STYLES AND ORIENTATION (Full CCW Rotation)

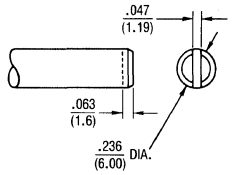
Shaft Style **C**



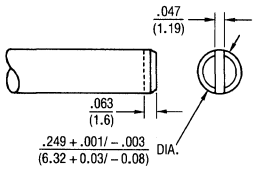
Shaft Style **J**



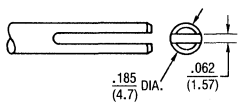
Shaft Style **R**



Shaft Style **B**



Shaft Style **Y**

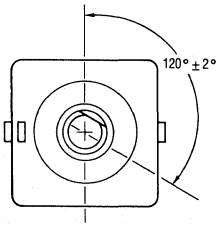


Slot Depth (Y Shaft)
.380 (9.65) for shafts <1" (2.54) length
.580 (14.73) for shafts ≥1" (2.54) length

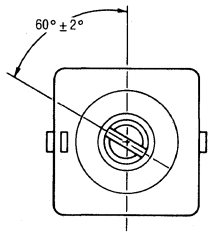
"D" dimensions extend from shaft end to bushing face "D" = (shaft length, FMS) − (bushing length)

Shaft Orientations

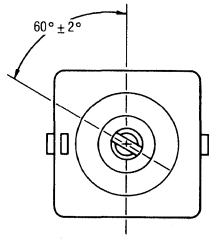
Shaft Styles **C, J**



Shaft Styles **B, R**



Shaft Style **Y**



TOLERANCES WHERE NOT SHOWN .XX = ± .010
.XXX = ± .005

Specifications are subject to change without notice.

BOURNS

Slimline Potentiometers

Bourns® Slimline Potentiometers

PART NUMBERING SYSTEM

P	C	W	1	J	-	B	2	4	-	B	C	D	1	0	3

SHAFT LENGTH (FMS)	
Code	**Descriptiion**
24	3/4" (19mm) Length
28	7/8" (22.2mm) Length
32	1" (25.4mm) Length
36	1-1/8" (28.6mm) Length
	Metric
19	19mm Length (Shaft Style "R" Only)
24	24mm Length (Shaft Style "R" Only)

RESISTANCE VALUES					
Code	**TR**	**Code**	**TR**	**Code**	**TR**
		103	10KΩ	254	250KΩ
501	500Ω	203	20KΩ	504	500KΩ
102	1KΩ	253	25KΩ	105	1MΩ
252	2.5KΩ	503	50KΩ	255	2.5MΩ
502	5KΩ	104	100KΩ		

SHAFT STYLES (See Outline Drawing)	
Code	**Description**
B	1/4" Dia. Slotted
C	1/4" Dia. Flatted
J	3/16" Dia. Flatted
R	6mm Dia. Slotted
Y	3/16" Dia. Split Shaft

ELEMENT TAPER VERSIONS			
Code	**Taper Description**	**Code**	**Taper Description**
B	Lin. CP ± 20%	G	CCW Audio CP ± 20%
D	CW Audio CP ± 20%		

ANTI-ROTATION LUG	
Code	**Description**
J	9:00 Position
D	None

DETENT CONFIGURATIONS	
Code	**Description**
A	No Detents
B	10 Detents
C	Center Detent Only
D	20 Detents
E	30 Detents

NO. SECTIONS	
1	Single

BUSHING CONFIGURATION		Available Shaft Styles
Code	**Description**	
W	9MM x .250 Length Threaded M9 x 0.75 6g 5 Pl	All
L	9MM x .375 Length Threaded M9 x 0.75 6g 5 Pl	B,C,R,

HOUSING TERMINAL CONFIGURATION												
	Code											
Features	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**
Rear Mounting Bracket		X							X	X			X
Side Mounting Bracket					X		X				X	X	
Rear Facing Terminals .100" Centers	X	X								X			
Side Exiting Terminals .100" Centers				X	X						X		
Side Exiting Terminals .200" Centers						X	X					X	
Solder Lugs .200" Centers			X										
Rear Facing Terminals .200" Centers								X	X				X
Hardware Included	X		X	X		X		X		X	X	X	X

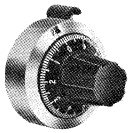
Panel mount hardware not included as standard on bracketed versions.

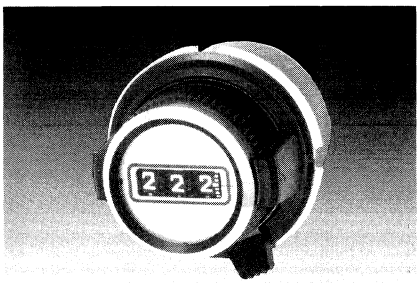
The sample part number demonstrates the identification code for Bourns Slimline Potentiometers.

The part number shown is a commonly used model, typically available from stock.

Specifications are subject to change without notice.

Turns-Counting Dials

Product	Model Number	Turns	Approximate Package Diameter	Approximate Package Depth	Page No.
	**CT23**	0-10	1-1/16"	1-1/4"	145
	**CT26**	0-10	1-1/4"	1-1/4"	145
	**H490**	0-30	1"	29/32"	148
	**H506**	0-15	7/8"	1"	146
	**H507-6**	0-15	7/8"	1"	147



1-1/16" AND 1-1/4" DIAMETER/0-10 TURNS

- No backlash - mounted directly to potentiometer shaft
- For use with precision potentiometers or other rotating devices up to 10 turns
- High force, positive brake

BOURNS

Models CT23/CT26

Bourns® Turns-Counting Dials

Mechanical and Physical Characteristics

Number of Turns	0 to 10
Readability	Within 1/500 of a turn
Weight	Approximately 1 1/8 oz.
Markings	White on black background
Accepts Shaft Diameter	1/4"
Locking Brake	Positive, friction

Shaft and Bushing Requirements

Shaft Extension Beyond Face of Locator Plate	0.435 in. minimum 0.640 in. maximum
Bushing Extension Beyond Face of Locator Plate	0.158 in. maximum

FEATURES

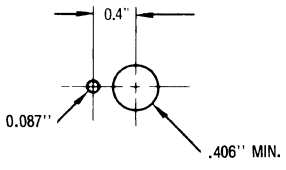
- For use with precision potentiometers or other rotating devices up to 10 turns
- Simplified mounting
- High quality, rugged construction throughout
- No backlash - mounted directly to potentiometer shaft
- White digits on black counter wheels for maximum readability
- High force, positive brake

Bourns® Model CT-23, front of panel mounting, digital turns-counting dial saves valuable internal space. Highly accurate, it will enhance the man/machine interface of any control panel. Easy to read white on black numerals provide excellent legibility and accurate readings within 1/500 of a turn.

Bourns® Model CT-26 recessed mounting digital turns-counting dial, counterpart to the Bourns Model CT-23, provides a lower panel profile. The design simplifies installation requiring only one panel hole. The CT-26 maintains the same high level of symmetry, legibility and accuracy of its counterpart.

CT-23 MOUNTING INSTRUCTIONS

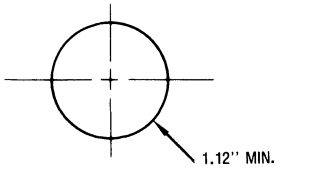
1. Drill or punch panel. See suggested hole pattern below.
2. Insert potentiometer in panel.
3. Position locator plate against panel and secure with hex nut making sure that anti-rotation tang is in the small hole.
4. Turn the potentiometer shaft counterclockwise to obtain minimum resistance or voltage ratio (not necessarily at the end of travel).
5. Loosen setscrew in knob with allen wrench. Set the dial readout to "000."
6. Slip the dial carefully over the potentiometer shaft. Tighten the setscrew without causing movement of the dial readout or potentiometer shaft.



PANEL HOLE PATTERN

CT-26 MOUNTING INSTRUCTIONS

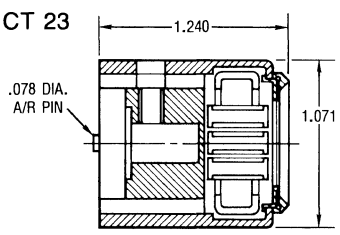
1. Drill or punch panel. See suggested hole pattern below.
2. Insert turns-counting dial in panel cutout and secure with mounting nut.
3. Secure locator plate to potentiometer bushing using two hex nuts.
4. Turn the potentiometer shaft counterclockwise to obtain minimum resistance or voltage ratio (not necessarily at the end of travel).
5. Loosen setscrew in turns-counting dial with allen wrench. Set the dial readout to "000."
6. Slip the potentiometer shaft into the turns-counting dial, insuring that the notch in the locator plate is over the pin at the rear of the dial. Tighten the setscrew without causing movement of the dial readout or potentiometer shaft.



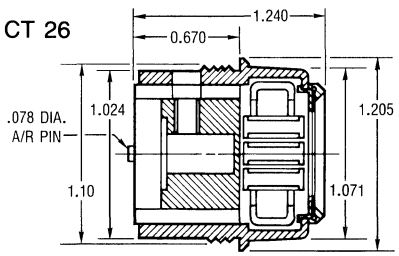
PANEL HOLE PATTERN

Dimensional Drawings

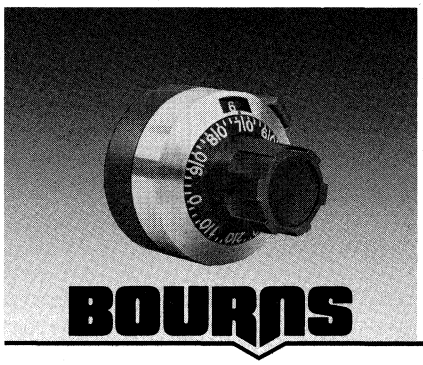
CT 23



CT 26



Specifications are subject to change without notice.



7/8" DIAMETER/0-15 TURNS

- Compact, requires only 0.9" diameter panel space
- No backlash
- For use with precision potentiometers or other rotating devices up to 15 turns

Model H-506

Bourns® Turns-Counting Dials

Mechanical and Physical Characteristics

Number of Turns	0 to 15
Dial Divisions	50 per turn
Readability - Over 10 Turns	2 parts in 1000
Torque - With Brake Engaged	7.0 oz-in. (5.0 Ncm) minimum
Weight	Approximately 10 grams
Markings	White on black background
Set Screws	2 screws 120° apart

Shaft and Bushing Requirements

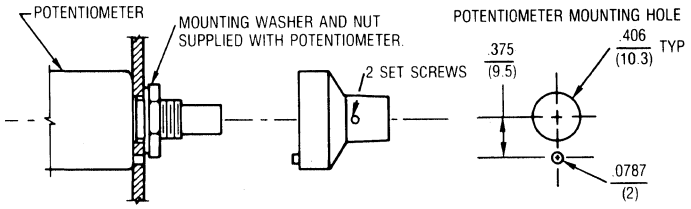
Shaft Extension Beyond Panel	0.6890 in. minimum (17.5 mm) 0.8858 in. maximum (22.5 mm)
Bushing Extension Beyond Panel	0.3937 in. maximum (10 mm)

FEATURES

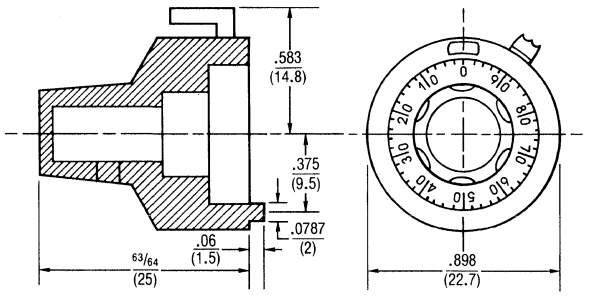
- For use with precision potentiometers or other rotating devices up to 15 turns
- Excellent legibility - white marking on black background
- High quality, rugged construction
- Two set screws
- No backlash
- High force, positive brake
- Compact - requires only .9" diameter panel space
- Standard models to fit 1/4" and 6mm diameter shafts

H-506 MOUNTING INSTRUCTIONS

1. Drill .0787 (2) diameter anti-rotation pin hole on vertical centerline, .375 (9.5mm) below center of potentiometer mounting hole.
2. Mount potentiometer in panel with nut and lockwasher supplied with the potentiometer.
3. Turn potentiometer shaft counterclockwise to obtain minimum resistance or voltage ratio. This is not necessarily identical with mechanical stop.
4. Loosen set screws in knob of dial. Set dial to "0.0" reading.
5. While holding outer ring of dial, position unit lightly against panel. Tighten knob set screws to potentiometer shaft.



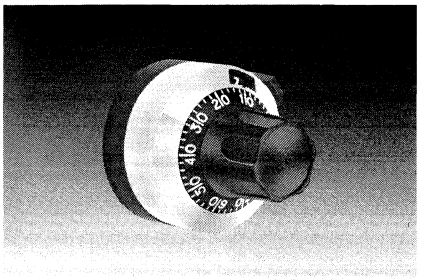
Dimensional Drawings



MEASUREMENTS IN INCHES (MM)

STANDARD PART NUMBERS

Shaft Diameter	Model
1/4" 6mm	H-506-1/4 H-506-6



7/8'' DIAMETER/0-15 TURNS

- No backlash
- Compact - requires minimal panel space
- For use with precision potentiometers or other rotating devices, up to 15 turns

BOURNS

Model H-507-6

Bourns® Turns-Counting Dials

Mechanical and Physical Characteristics

Number of Turns	0 to 15
Dial Divisions	50 per turn
Readability - Over 10 Turns	2 parts in 1000
Torque - With Brake Engaged	5 oz-in. (350 cm. gr.) minimum
Weight	Approximately .2469 oz. (7 gr.)
Markings	White on black background
Mechanical Life	10,000 cycles
Set Screws	1 included

Shaft and Bushing Requirements

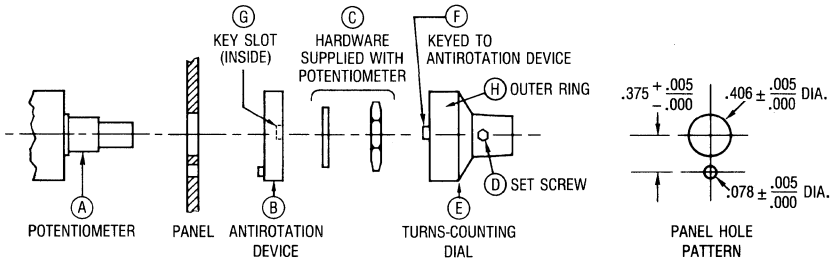
Shaft Extension Beyond Panel	0.7126 in. minimum (18.1 mm) 0.8504 in. maximum (21.6 mm)
Bushing Extension Beyond Panel	0.3976 in. maximum (10.1 mm)
Shaft Diameter	1/4'' (6.35 mm)

FEATURES

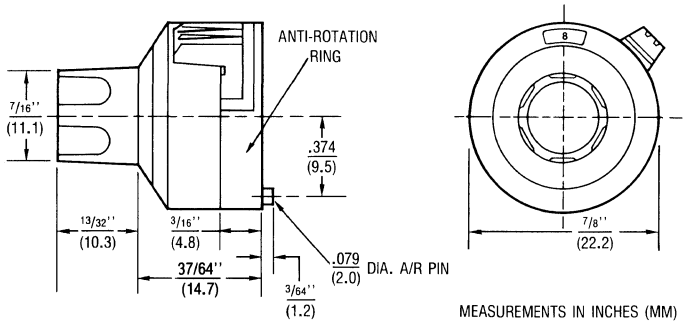
- For use with precision potentiometers or other rotating devices up to 15 turns
- Excellent legibility - white marking on black background
- High quality, rugged construction, aluminum housing, metal-to-metal setscrew threads
- No backlash - mounted directly to potentiometer shaft
- Compact - requires only 7/8'' diameter panel space
- High force, positive brake

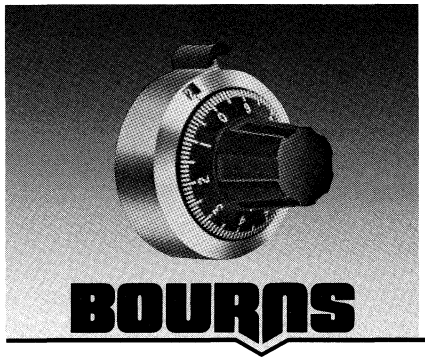
H-507-6 MOUNTING INSTRUCTIONS

1. Insert potentiometer [A] in panel.
2. Install anti-rotation device [B] using hardware [C] supplied with potentiometer.
3. Turn potentiometer shaft counterclockwise to minimum resistance or voltage ratio.
4. Loosen set screw [D] in knob of turns-counting dial [E] using allen wrench. Set dial to "0.0."
5. Mount dial on potentiometer shaft and position against anti-rotation device. Care must be exercised to insure dial key [F] is inserted in anti-rotation device slot [G].
6. While holding outer ring [H] of turns-counting dial, tighten set screw [D] to potentiometer shaft.



Dimensional Drawings





1" DIAMETER/0-30 TURNS

- No backlash - mounted directly to potentiometer shaft
- For use with precision potentiometers or other rating devices up to 30 turns
- Compact size - requires only 1" diameter panel space
- Available with or without brake

BOURNS

Model H-490

Bourns® Turns-Counting Dials

Mechanical and Physical Characteristics

Number of Turns	0 to 30
Dial Divisions	100 per turn
Readability - Over 10 Turns	1 part in 1000
Torque With Brake Engaged	5 oz-in. minimum
Weight	Approximately 1/4 oz.
Markings	White on black background
Set Screws	2 screws 120° apart

Environmental Characteristics

Operating Temperature Range	−15°C to +85°C
Mechanical Life	10,000 cycles
Set Screw Tightening Torque	2 in-lbs. minimum

Shaft and Bushing Requirements

Shaft Extension Beyond Panel	0.620 in. minimum 0.835 in. maximum
Bushing Extension Beyond Panel	0.355 in. maximum

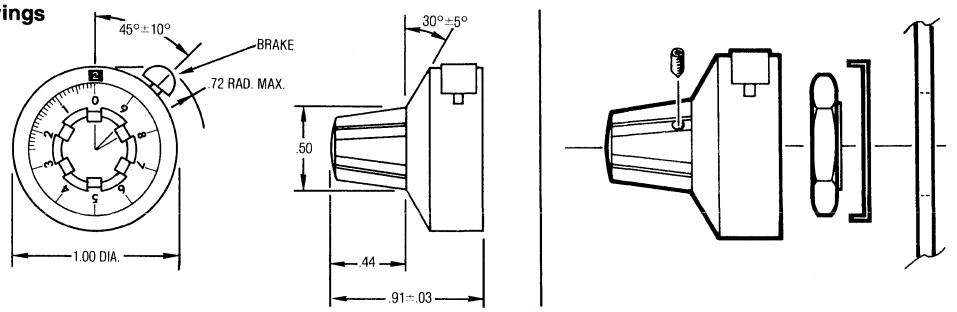
FEATURES

- For use with precision potentiometers or other rotating devices up to 30 turns
- Readability - 1 part in 1000 for ten turns
- Simplified mounting - no special panel holes required
- Compact - requires only 1" diameter panel space
- No backlash - mounted directly to potentiometer shaft
- Standard models available for 3/32", 1/8" and 1/4" diameter shafts
- Excellent legibility - white marking on black background
- Two set screws - standard on all models
- Available with or without brake

H-490 MOUNTING INSTRUCTIONS

1. Discard standard mounting nut and lockwasher supplied with the potentiometer; they will not be used.
2. Insert potentiometer in panel.
3. Using parts supplied with dial, position anti-rotation washer against panel. Tangs of washer should stick out from panel.
4. Install mounting nut supplied with dial. Be sure:
   a. Shoulder on nut engages hold of anti-rotation washer.
   b. Tangs of anti-rotation washer are aligned vertically. This positions the turns-counting window properly.
5. Turn potentiometer shaft counterclockwise to minimum resistance or voltage ratio. This is not necessarily at the end of travel.
6. Loosen set screw in knob of dial assembly. Set dial to "0.00" reading. Slip dial assembly over end of potentiometer shaft.
7. Holding outer ring of dial assembly, engage locating tangs on anti-rotation washer in notches on dial assembly.
8. While holding outer ring, position unit lightly against panel. Uniformly tighten knob set screws to potentiometer shaft with furnished hex wrench.

Dimensional Drawings



Part Number	Fits Shaft Diameter	Fits Bushing Size	Brake	Body Finish
H-491-1	3/32	1/4"-32UNEF-2A	No	Clear
H-492-1	3/32	1/4"-32UNEF-2A	Yes	Clear
H-493-1	3/32	1/4"-32UNEF-2A	No	Black
H-494-1	3/32	1/4"-32UNEF-2A	Yes	Black
H-491-2	1/8	1/4"-32UNEF-2A	No	Clear
H-492-2	1/8	1/4"-32UNEF-2A	Yes	Clear

Part Number	Fits Shaft Diameter	Fits Bushing Size	Brake	Body Finish
H-493-2	1/8	1/4"-32UNEF-2A	No	Black
H-494-2	1/8	1/4"-32UNEF-2A	Yes	Black
H-491-3	1/4	3/8"-32UNEF-2A	No	Clear
H-492-3	1/4	3/8"-32UNEF-2A	Yes	Clear
H-493-3	1/4	3/8"-32UNEF-2A	No	Black
H-494-3	1/4	3/8"-32UNEF-2A	Yes	Black

ENCODERS

DIGITAL CONTACTING

The Digital Contacting Encoder is commonly referred to by such names as Digital Panel Control, Bit Switch, Gray Switch and Digital Switch. All such names are synonymous with a device whose output is a digital gray code signal, rather than a conventional potentiometric voltage ratio output.

The advantage of the Digital Contacting Encoder is that it permits the direct entry of digitized analog data into a digital circuit without A/D conversion. The two (2) channel gray coded signal of this incremental encoder allows the user's decoder circuit to sense analog direction of rotation, as well as up-down counter capabilities . . . all without the time and cost required for A/D conversion. This approach can reduce memory overhead, wiring and wiring interconnects, and can provide greater MPU program speed.

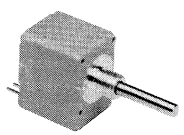
Product	Model Series	Circuit Resistance	Output	Terminal Styles	Mount	Page No.
	EC...	5Ω max. - Closed 100KΩ min. - Open	Quadrature	PC Pin Solder Holes	PC Board or Bushing	150

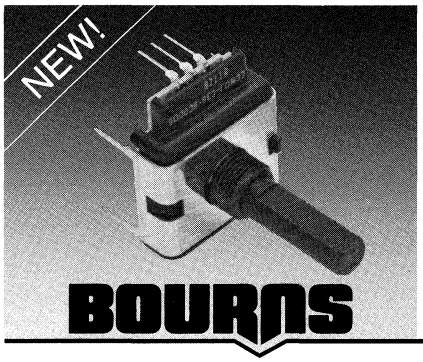
ROTARY OPTICAL

The Bourns® EN model is a self-contained rotary optical encoder. It produces a 2-bit quadrature signal which is suitable for digital systems where both magnitude and direction of adjustment must be provided. The EN encoder is ideal for use as a digital panel control or as a position sensing device in applications where long life, reliability, high resolution and precise linearity are critical.

The EN series encoder converts rotary input into electrical signals which can be used by microprocessors without A/D conversion. Bourns encoder output signals are square wave digital pulses which do not require debounce circuitry. Both features make it possible to significantly reduce the memory overhead, wiring and wiring interconnects required by other types of control devices.

EN optical encoders offer a useful rotational life of from 10 million to 200 million shaft revolutions, making them ideal for extended service applications. The Bourns encoder is also compact and well suited for situations where the available space is limited. For easy mounting, the EN series comes standard with a front bushing and shaft.

Product	Model Series	Supply Voltage	Output	Output Voltage	Mount	Page No.
	EN...	5.0 VDC ±0.25	Quadrature	Low: 0.8V max. High: 4V min.	Bushing or Servo	153



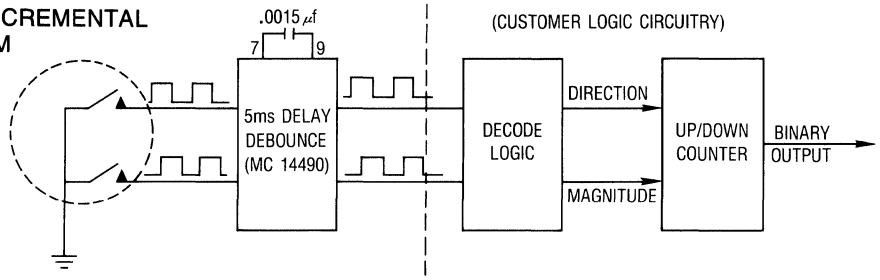
INCREMENTAL ENCODER/QUADRATURE OUTPUT

- Exceptionally long operating life
- High operating temperature capabilities
- Sturdy construction
- Bushing mount
- Available with PC board mounting bracket (optional)

Digital Contacting Encoders

Bourns® Contacting Encoders

RECOMMENDED INCREMENTAL CONTROL DIAGRAM



Electrical Characteristics

Output	2 bit Gray Code, Channel A leads Channel B by 90° electrically turning clockwise (CW)
Closed Circuit Resistance	5 ohms maximum
Open Circuit Resistance	100K ohms minimum
Contact Rating	10 milliamp @ 10 VDC or 0.1 watt maximum
Insulation Resistance (500 VDC)	1,000 megohms minimum
Dielectric Withstanding Voltage	MIL-STD-202 Method 301
Sea Level	1,000 VAC minimum
Electrical Travel	Continuous
Contact Bounce (15 RPM)	5 milliseconds maximum
RPM (Operating)	120 maximum

Environmental Characteristics

Storage Temperature Range	−40°C to +140°C
Operating Temperature Range	+1°C to +125°C
Humidity	MIL-STD-202, Method 103B, Condition B
Vibration	15 G
Contact Bounce	0.1 millisecond maximum
Shock	50 G
Contact Bounce	0.1 millisecond maximum
Rotational Life	200,000 shaft revolutions

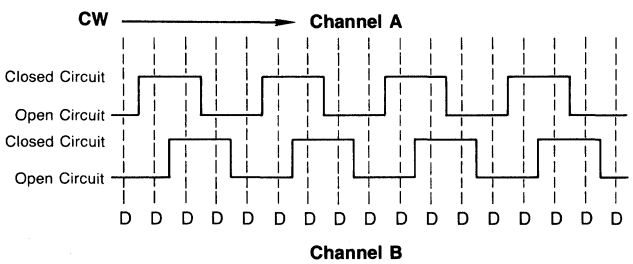
Mechanical Characteristics

Mechanical Angle	Continuous
Weight	Approximately 0.75 oz.
Torque (Detented)	0.75 to 2.25 oz-in.
Mounting Torque	7 in-lbs. maximum
Shaft Side Load (Static)	10 lbs. minimum

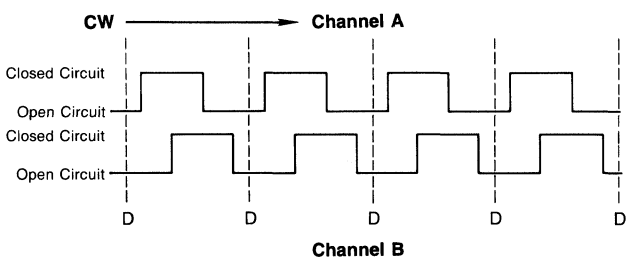
QUADRATURE OUTPUT TABLE

This table is intended to show available outputs as currently defined.

1/4 CYCLE PER DETENT



FULL CYCLE PER DETENT (Normally Open in Detent Shown)



Specifications are subject to change without notice.

BOURNS

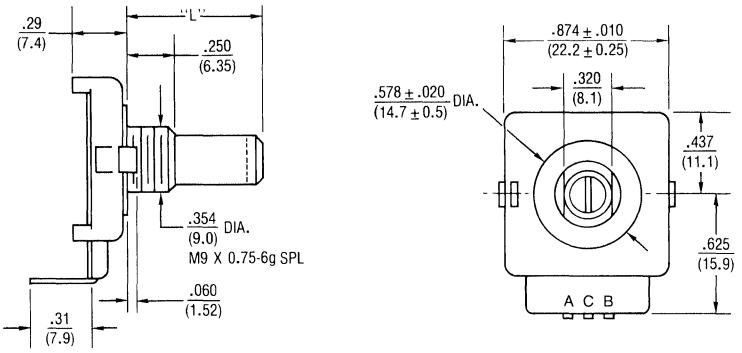
Digital Contacting Encoders

Bourns® Contacting Encoders

BUSHING MOUNTED - HOUSING **A**

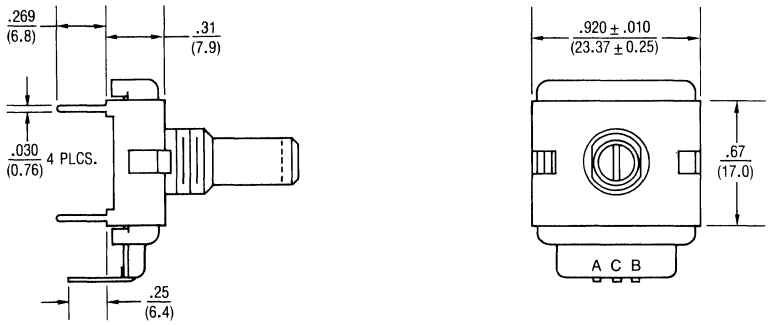
W style bushing shown.

Shaft lengths "L" for B, C, R and Y styles
24 = .750" (19mm)
36 = 1.125" (28.5mm)



PCB BRACKED MOUNTED - HOUSING **B**

Dimensions not given are the same as Bushing Mounted.

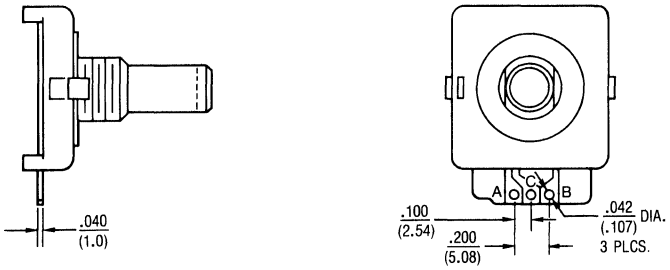


SOLDER HOLES - HOUSING **C**

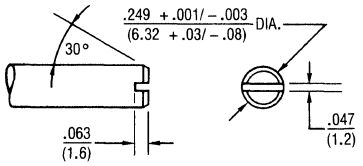
Dimensions not given are the same as Bushing Mounted.

SOLDER HOLES, PCB BRACKET - HOUSING **D**

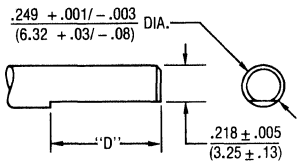
Dimensions not given are the same as PCB Bracket Mounted.



SHAFT STYLE **B**

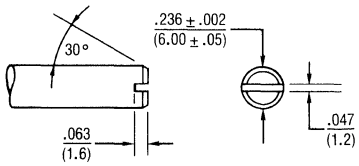


SHAFT STYLE **C**

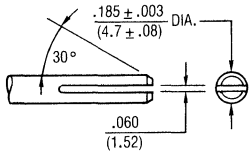


"D" dimension extends from shaft end to bushing face.
"D" = (shaft length, FMS) − (bushing length)

SHAFT STYLE **R**



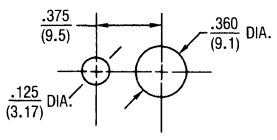
SHAFT STYLE **Y**



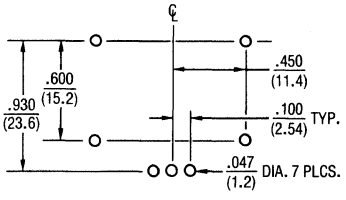
Slot depth (Y shaft) .380 (9.65) for shafts < 1" (2.54) length
.580 (14.7) for shafts ≥ 1" (2.54) length

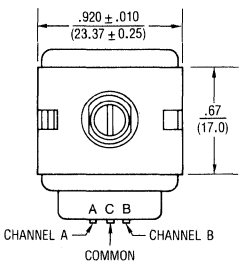
PANEL HOLE DIMENSIONS

Bushing Mounted



PCB MOUNTING DIMENSIONS





FOR TOLERANCES NOT SHOWN
.XX = ± .010
.XXX = ± .005
SHAFT DIMENSIONS ± 1/32"

Specifications are subject to change without notice.

Digital Contacting Encoders

Bourns® Contacting Encoders

HOW TO ORDER

E	C	W	1	J	-	B	2	4	-	B	C	0	0	2	4

SHAFT STYLE (See Outline Drawing for Details)

Code	Description
B	Plain with Inserted Slot (1/4" Dia.)
C	Single Flatted
R	Plain with Inserted Slot (6mm Dia.)
Y	Split Shaft Version

PERFORMANCE CODE

Code	Detents	Cycles/Rev.
E0006	0	6
E0009		9
E0012		12
E0024		24
B0012	12	12
C0006	24	6
C0024		24
D0009	36	9

ANTI-ROTATION LUG POSITION

Code	Description
J	9:00 Position
D	None

SWITCHING CONFIGURATION (In Detent Position)
Applies to performance codes B0012 and C0024 only, use code "0" for all other performance codes.

Code	Description
0	Not Applicable
1	Normally Open
2	Normally Closed

HOUSING/TERMINAL CONFIGURATION
(X indicates "Equipped With")

	Code					
Features	A	B	C	D	E	F
Terminal Cover	X	X			X	
Terminals	X	X			X	
Solder Holes			X	X		X
PCB Bracket		X		X	X	X
Hardware Included	X		X		X	X

BUSHING CONFIGURATION

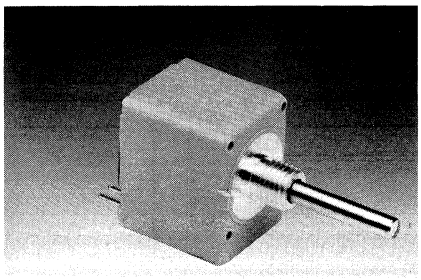
Code	Description
W	9mm x 1/4" Length. Threaded M9x0.75

SHAFT LENGTH (FMS)

Code	Descriptiion
24	3/4" Length (19mm)
36	1-1/8" Length (28.6mm)
Metric	
19	19mm Length (Shaft Style "R" Only)
24	24mm Length (Shaft Style "R" Only)

The sample part number demonstrates the identification code for Bourns Contacting Encoders.

The part number shown is a commonly used model, typically available from stock.



OPTICAL INCREMENTAL ENCODERS

- Two channel quadrature output
- Square wave signal
- Small size

BOURNS

Rotary Optical Encoders

Bourns® Optical Encoders

Electrical Characteristics

Output	2-bit gray code, Channel A leads Channel B by 90° (electrical) with clockwise rotation
Supply Voltage	5.0 VDC ±0.25 VDC
Supply Current	26 mA maximum
Output Voltage	
Low Output	0.8V maximum
High Output	4V minimum
Output Current	
Low Output	25 mA minimum
Insulation Resistance (500 VDC)	1,000 megohms
Rise/Fall Time	200ns (typical)
Shaft RPM (Ball Bearing)	5,000 rpm maximum
Power Consumption	136 mW maximum
Pulse Width (Electrical Degrees, Each Channel)	180° ±45°
Phase (Electrical Degrees, Channel A to Channel B)	90° ±45°

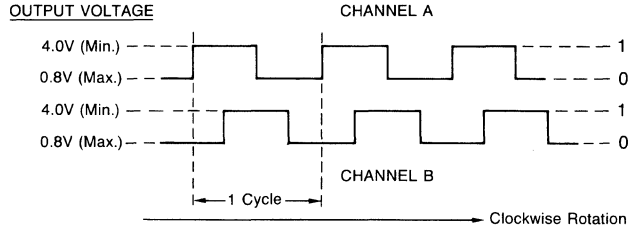
Environmental Characteristics

Operating Temperature Range	−40°C to +85°C
Vibration	5G
Shock	50G
Humidity	MIL-STD-202, Method 103B, Condition B

Mechanical Characteristics

Torque (Starting and Running)	
A & C Bushings	1.5 oz-in. maximum
W, S & T Bushings	0.1 oz-in. maximum
Mechanical Rotation	Continuous
Shaft End Play	0.012" T.I.R. maximum
Shaft Radial Play	0.005" T.I.R. maximum
Rotational Life	
A & C Bushings (100 rpm maximum)	10,000,000 revolutions
W, S & T Bushings (5,000 rpm maximum)	Ball bearing life
Weight	0.4 oz.

QUADRATURE OUTPUT TABLE



STANDARD RESOLUTIONS AVAILABLE

(Full quadrature output cycles per shaft revolution.)

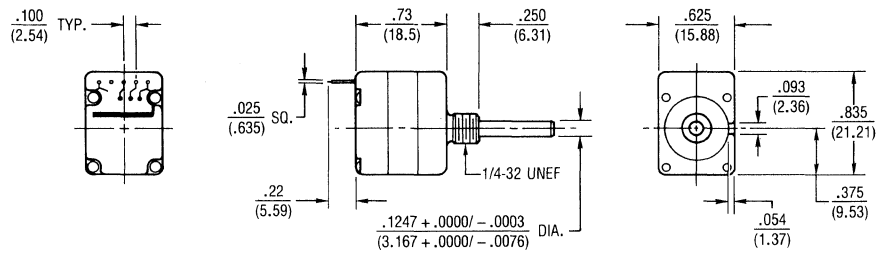
64
100
128
256

For Non-Standard Resolutions--Consult Factory

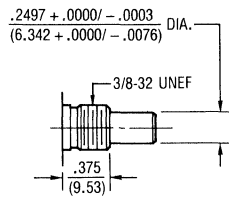
- CMOS and TTL compatible
- Long life
- Bushing mount configuration

Rotary Optical Encoders

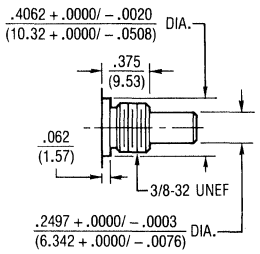
Bourns® Optical Encoders



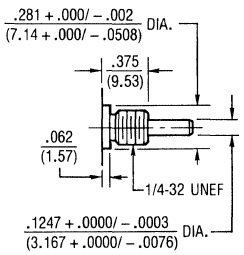
Bushing Style **C**



Bushing Style **A**

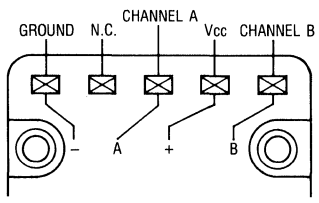


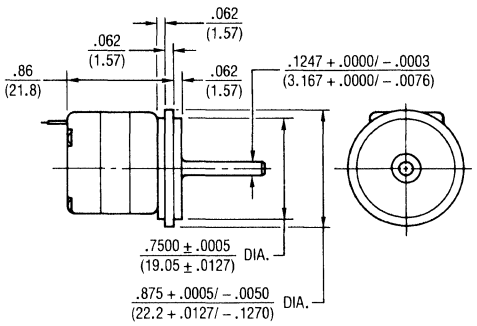
Bushing Style **S** (Ball Bearing)



Bushing Style **T** (Ball Bearing)

TERMINATION DIAGRAM





Servo Mount Style **W** (Ball Bearing)

HOW TO ORDER

BOURNS EN SERIES OPTICAL ENCODER

E	N	C	1	J	—	D	2	8	-	L	0	0	1	2	8

ANTI-ROTATION LUG POSITION

Code	Description
D	None
J	9:00 Position

SHAFT LENGTH*

Code	Description
16	1/2" Long
20	5/8" Long
28	7/8" Long

SWITCHING CONFIGURATION

Code	Description
1	Channel A Leads Channel B By 90° (Clockwise Rotation)

TERMINAL CONFIGURATION

Code	Description
L	Axial, Multi-Purpose Pin

RESOLUTION

Code	Cycles Per Revolution
00064	64
00100	100
00128	128
00256	256

SHAFT STYLE

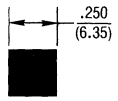
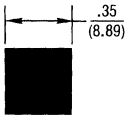
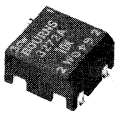
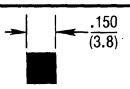
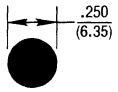
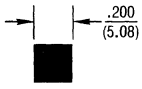
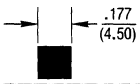
Code	Description	Use With Bushings (Code)
B	1/4" Dia., Plain End	A, S
D	1/8" Dia., Plain End	C, T, W

BUSHING CONFIGURATION

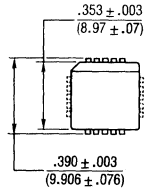
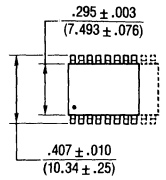
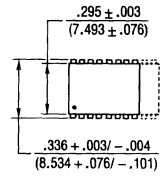
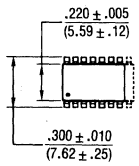
Code	Description
A	3/8"D x 3/8"L Threaded
C	1/4"D x 1/4"L Threaded
S	3/8"D x 3/8"L Threaded (Ball Bearing)
T	1/4"D x 1/4"L Threaded (Ball Bearing)
W	Servo Mount 7/8"D (Ball Bearing)

*Shaft length measured from mounting surface.

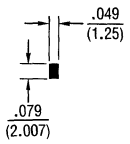
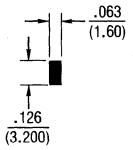
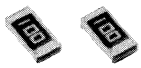
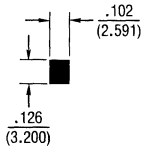
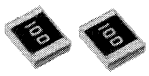
SURFACE MOUNTED TRIMMING POTENTIOMETERS

Board Space	Product	Model Number	Type	Configuration	Adjustment	Pin Styles	Page No.
 .250 (6.35)		**3269**	Sealed	Gull Wing	Top & Side Multiturn	P, W, X	157
 .35 (8.89)		**3272**	Sealed	Gull Wing	Side - Multiturn	A, C	158
 .150 (3.8)		**3304**	Open	Leadless Chip	Top - Single-Turn	W, X	159
 .250 (6.35)		**3325**	Sealed	J Lead/Gull Wing	Top & Side Single-Turn	P, W, X	162
 .200 (5.08)		**3335**	Sealed	J Lead/Gull Wing Leaded	Top - Single-Turn	A, B, C W, X	163
 .177 (4.50)	NEW 	**3314**	Sealed	J Lead/Gull Wing Leaded	Top - Single-Turn	J, G A, B C, H	160

SURFACE MOUNTED RESISTOR NETWORKS

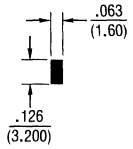
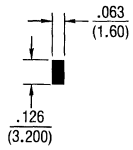
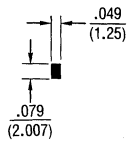
Package Outline	Product	Series Number	Pin Ct.	Isolated Resistors	Bussed Resistors	Dual Terminators	Page No.
 .353 ± .003 (8.97 ± .07) .390 ± .003 (9.906 ± .076)	Leaded Chip Carrier (PCC) 	**4200P**	10	4210P-102-RC	4210P-105-RC	4210P-104-RC/RC	164
			20	4220P-102-RC	4220P-105-RC		
 .295 ± .003 (7.493 ± .076) .407 ± .010 (10.34 ± .25)	Wide Body (SOL) 	**4400P**	16	4416P-001-RC 4416P-004-RC	4416P-002-RC	4416P-003-RC/RC	166
			20	4420P-001-RC 4420P-004-RC	4420P-002-RC	4420P-003-RC/RC	
 .295 ± .003 (7.493 ± .076) .336 + .003/ − .004 (8.534 + .076/ − .101)	Wide Body J-Lead (SOL-J) 	**4400J**	16	4416J-001-RC 4416J-004-RC	4416J-002-RC	4416J-003-RC/RC	168
			20	4420J-001-RC 4420J-004-RC	4420J-002-RC	4420J-003-RC/RC	
 .220 ± .005 (5.59 ± .12) .300 ± .010 (7.62 ± .25)	Medium Body (SOM) 	**4800P**	14	4814P-001-RC	4814P-002-RC	4814P-003-RC/RC	170
			16	4816P-001-RC 4816P-004-RC	4816P-002-RC	4816P-003-RC/RC	

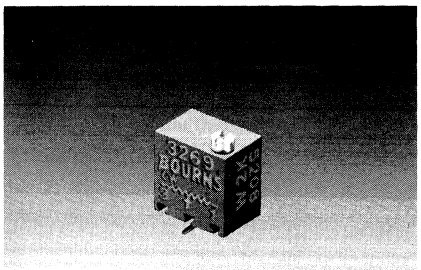
THICK FILM CHIP RESISTORS

Package Outline	Product	Series Number	Tolerance	Resistance Range and Temperature Coefficient	Power Rating and Maximum Operating Voltage	Page Number
		**CR0805**	5%	47Ω-1MΩ, 200ppm/°C 10Ω-47Ω, 300ppm/°C	0.100W, 100V	174
				0Ω Jumper (.05Ω Max), 200ppm/°C		
		**CR1206**	5%	47Ω-1MΩ, 200ppm/°C 10Ω-43Ω, 300ppm/°C	0.125W, 220V	174
			1%	100Ω-1MΩ, 100ppm/°C		
				0Ω Jumper (.05Ω Max), 200ppm/°C		
		***CR1210**	10%	4.7Ω-100Ω, 500ppm/° 120Ω-470KΩ, 300ppm/° 560KΩ-1 MegΩ, 500ppm/°	0.250W, 200V	Contact Factory
			5%	10Ω-100Ω, 500ppm/° 110Ω-470KΩ, 300ppm/° 510KΩ-1MegΩ, 500ppm/°		

*NOTE: 1210 available on special order.

THICK FILM CHIP RESISTORS LAB DESIGN KITS

Board Space	Product	Part Number	Watt	Tolerance	Contents	Page Number
		**H-810**	1/8	1%	CR1206 Series - 25 pieces on standard paper tape of 50 popular ohmic values	173
		**H-811**	1/8	5%	CR1206 Series - 25 pieces on standard paper tape of 50 popular ohmic values	173
		**H-812**	1/10	5%	CR0805 Series - 25 pieces on standard paper tape of 50 popular ohmic values	173



SMD 1/4 INCH SQUARE / MULTITURN CERMET / INDUSTRIAL / SEALED

- High temperature construction, recommended for reflow solder processing
- Stable, infinite resolution cermet element
- Vertical and horizontal adjust styles
- Packaged in plastic tubes ("W" and "X" styles) or plastic trays ("P" style)

BOURNS

Model 3269

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 ohms to 1 megohm
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1 ohm or 1%
(whichever is greater)
Contact Resistance Variation
.....3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.02%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000.....250 vac
Effective Travel.....12 turns nom.

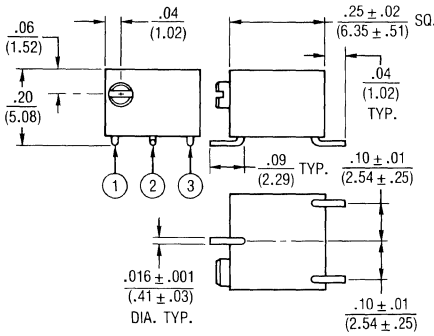
Environmental Characteristics

Maximum Exposure (Temp/Time)
..... +215°C/3 min.
Power Rating (300 volts max.)
85°C.....0.25 watt
150°C.....0 watt
Temperature Range
.....−65°C to +150°C
Temperature Coefficient
..... ±100ppm/°C max.
Seal Test .....85°C Fluorinert*
Humidity..MIL-STD-202 Method 106
(2% ΔTR, IR 100 megohms min.)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
...1,000 hours 0.25 watts @ 85°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(2% ΔTR, 3% CRV)

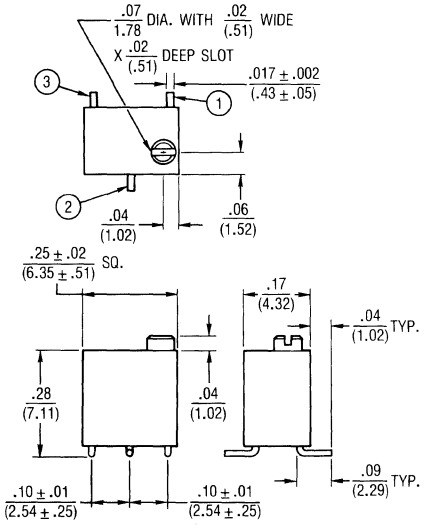
Physical Characteristics

Mechanical Angle....16 turns nom.
Torque.....3.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.015 oz.
Marking.....Manufacturer's
trademark, resistance code,
wiring diagram, date code,
manufacturer's model number
and style

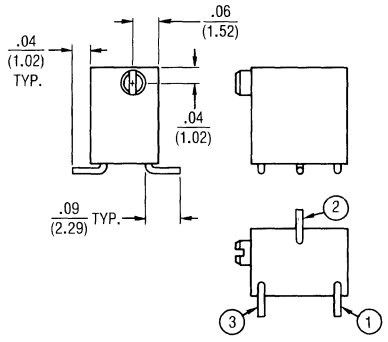
3269P



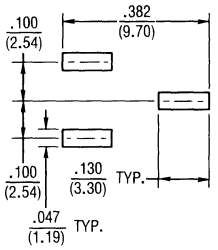
3269W



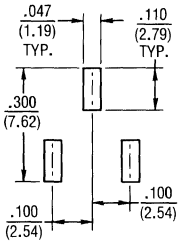
3269X



LAND RECOMMENDED PCB LAYOUT — "P"



SOLDER RECOMMENDED PCB LAYOUT — "W" & "X"



STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105

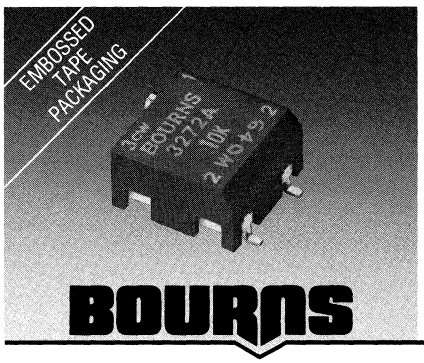
Special resistances available from 10 ohms to 1 megohm.

HOW TO ORDER

3269 X - 1 - 103

Model
Style
Standard Product
Resistance Code
1st 2 Significant Digits of Value
3rd Digit Number of Zeroes

Specifications are subject to change without notice.
*"Fluorinert is a registered trademark of 3M Company.



SMD .350 INCH SQUARE/MULTITURN CERMET/INDUSTRIAL/SEALED

- JEDEC package compatible with automatic placement equipment
- Recommended for reflow solder processing
- Exceptional setting stability after high temperature exposure
- Packaged in tubes or optional 24mm embossed tape

Model 3272

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....100 ohms to 1 megohm
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1 ohm or 1%
(whichever is greater)
Contact Resistance Variation
.....1.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.02%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000.....250 vac
Effective Travel.....12 turns nom.

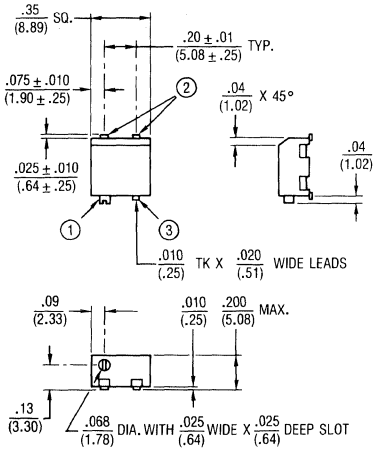
Environmental Characteristics

Maximum Exposure (Temp/Time)
..... +215°C/3 min.
Setting Stability
(After High Temperature Exposure)
Total Resistance Shift....1% max.
Voltage Ratio Shift....0.75% max.
Power Rating (300 volts max.)
85°C.....0.25 watt
150°C.....0 watt
Temperature Range
..... –65°C to +150°C
Temperature Coefficient
..... ±100ppm/°C max.
Seal Test .....85°C Fluorinert*
Humidity..MIL-STD-202 Method 106
(2% ΔTR, IR 100 megohms min.)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
...1,000 hours 0.25 watts @ 85°C
(3% ΔTR, 3% CRV)
Mechanical Life.....200 cycles
(2% ΔTR, 3% CRV)

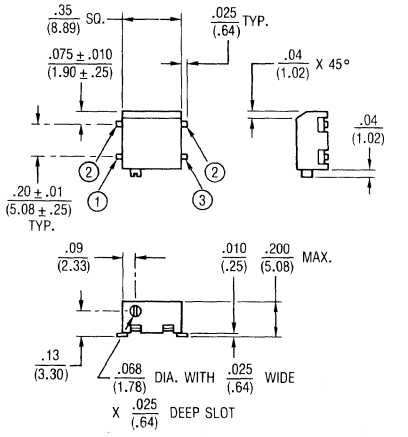
Physical Characteristics

Mechanical Angle....16 turns nom.
Torque.....3.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.02 oz.
Marking.....Manufacturer's trademark, resistance code, terminal numbers, date code, manufacturer's model number and style

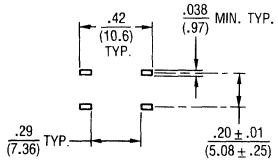
3272A

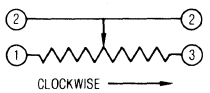


3272C



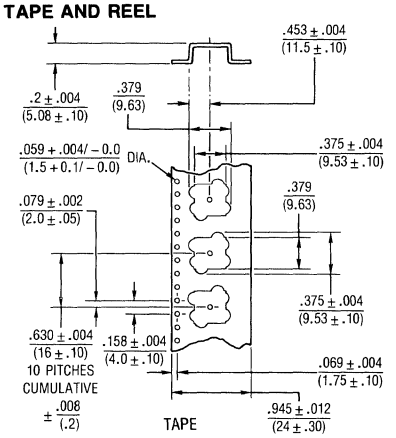
RECOMMENDED PCB LAYOUT — "A" & "C"

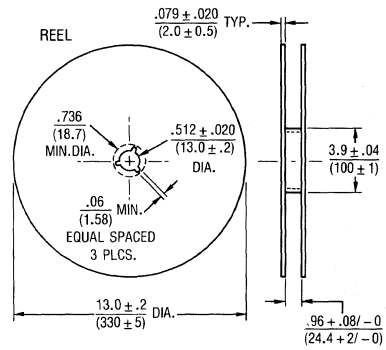




TOLERANCES EXCEPT WHERE NOTED:
DECIMALS: .XX ± .015 (.25) .XXX ± .005 (.13)
DIMENSIONS: IN. (MM)

TAPE AND REEL





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Code	Resistance (Ohms)	Code
100	101	25,000	253
200	201	50,000	503
500	501	100,000	104
1,000	102	200,000	204
2,000	202	250,000	254
5,000	502	500,000	504
10,000	103	1,000,000	105
20,000	203		

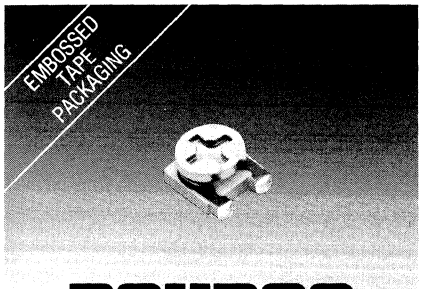
Special resistances available from 100 ohms to 1 megohm.

HOW TO ORDER

3272 C - 1 - 103 E

Model
Style
Standard Product
Resistance Code
•First 2 significant digits of value
•Third digit represents number of zeros
Optional Embossed Tape Designator
Tube Packaging Standard - No Suffix Letter
PACKAGING NOTE: Embossed tape is on 16mm pitch, 750 pcs. per reel. Units in tubes are 50 pcs. per tube.

Specifications are subject to change without notice.
*"Fluorinert is a registered trademark of 3M Company.



BOURNS

SMD 4MM SQUARE / SINGLE-TURN CERMET / INDUSTRIAL / OPEN FRAME

- Recommended for reflow solder processing
- Unique cross-slot rotor design suitable for pick and place and automatic adjustment equipment
- Supplied in 12mm embossed tape, compatible with automatic assembly equipment
- Two packaging orientations - "W" and "X"

Model 3304

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....500 to 1,000,000 ohms
(see standard resistance table)
Resistance Tolerance....±25% std.
Absolute Minimum Resistance
.....5% max.
Contact Resistance Variation
.....5% max.
Resolution.....Infinite
Adjustment Angle.....230° nom.

Environmental Characteristics

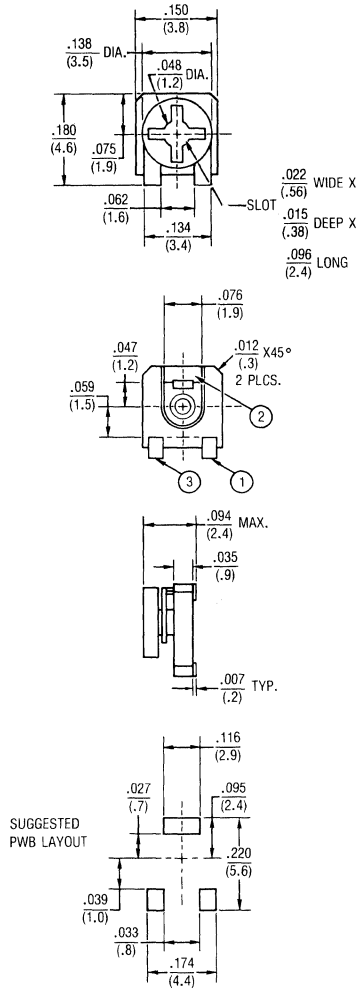
Power Rating (50 volts max.)
70°C.....0.2 watt
Temperature Range
.....−55°C to +125°C
Temperature Coefficient
.....±200ppm/°C nom.
Humidity..MIL-STD-202, Method 103
500 hours (5% ΔTR)
Vibration...30G (2% ΔTR, 2% ΔVR)
Shock....100G (2% ΔTR, 2% ΔVR)
Load Life
.....1,000 hours 0.2 watt @ 70°C
(5% ΔTR)
Mechanical Life.....20 cycles
(15% ΔTR)

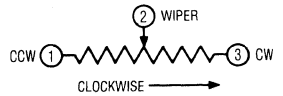
Physical Characteristics

Torque (Operating)
.....3.0 oz-in. max.
Mechanical Angle.....Continuous
Marking.....Manufacturer's trademark, resistance code, manufacturer's full part number and date code on packaging
Packaging.....750 pieces/7" reel

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
50,000	503
100,000	104
500,000	504
1,000,000	105

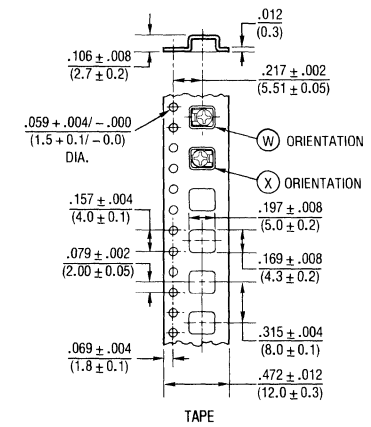


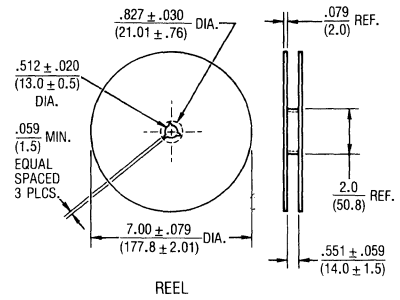


TOLERANCES: ± .012 (.3) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

TAPE AND REEL



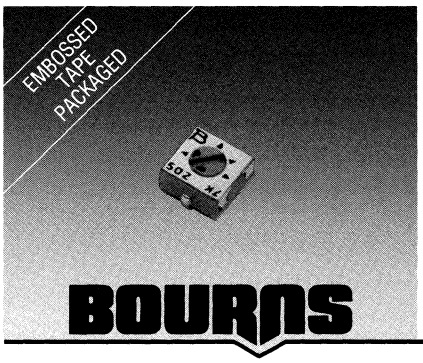


HOW TO ORDER

3304 X - 1 - 103 E

Model
Style
Standard or Modified Product Indicator
-1 = Standard Product
Resistance Code
Embossed Tape Designator

Consult factory for other available options.



BOURNS

SMT/4MM SQUARE/SINGLE-TURN CERMET/INDUSTRIAL/SEALED

- Withstands 300°C dual wave immersion
- Very low CRV - 1%
- Standoffs facilitate boardwashing and mechanical stability
- Compatible with popular vacuum pick-and-place equipment

Model 3314

Bourns® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10Ω to 2 megohms
Resistance Tolerance....±20% std.
(closer tolerance available)
Absolute Minimum Resistance
.....1% or 2 ohms maximum
(whichever is greater)
Contact Resistance Variation
.....1% or 3 ohms
(whichever is greater)
Contact Resistance...1% maximum
Resolution.....Essentially infinite
Insulation Resistance.....500 vdc.
100 megohms minimum
Dielectric Strength
Sea Level.....500 vac (1 minute)
Adjustment Angle.....210° nominal

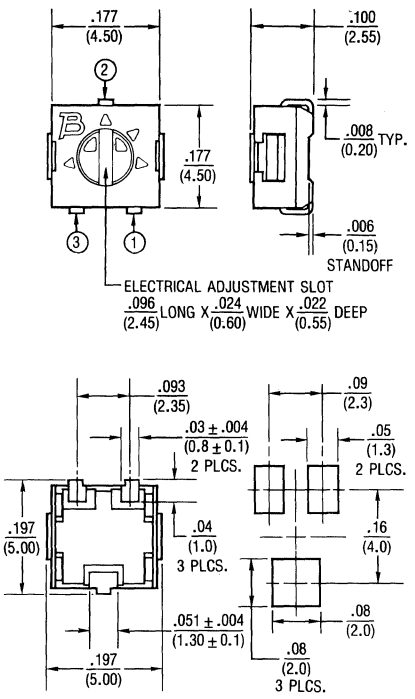
Environmental Characteristics

Solder Immersion Exposure
Recommended Maximum Soldering
Time/Temp Limits.215°C/3 minutes
.....265°C/30 seconds
.....300°C/10 seconds
Resistance to Soldering Iron Heat
.....350°C/10 seconds
ΔTR 1% maximum
Power Rating (300 volts maximum)
70°C.....0.25 watt
125°C.....0 watt
Operating Temperature Range
.....-55°C to +125°C
Temperature Coefficient
..... ±100ppm/°C
Humidity.....80-90% RH,
10 cycles, 240 hours
ΔTR 2%, IR 10 megohms
Seal Test.....85°C Fluorinert*
Vibration....20G ΔTR 1%, ΔVR 1%
Shock.....100G ΔTR 1%, ΔVR 1%
Load Life
(@ 70°C Rated Power 1000 Hours)
.....ΔTR 3%, ΔVR 1%
Mechanical Life.....100 cycles
ΔTR ±3%
Thermal Shock.....5 cycles
ΔTR 2%, ΔVR 1%

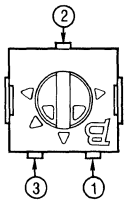
Physical Specifications

Mechanical Angle.....240° nominal
Torque.....150g-cm maximum
Stop Strength....300g-cm maximum
Terminals..Hot solder dipped copper
Weight.....Approximately 0.01 oz.
Marking.....Manufacturer's code,
resistance value or code, date code

3314J (Standard)

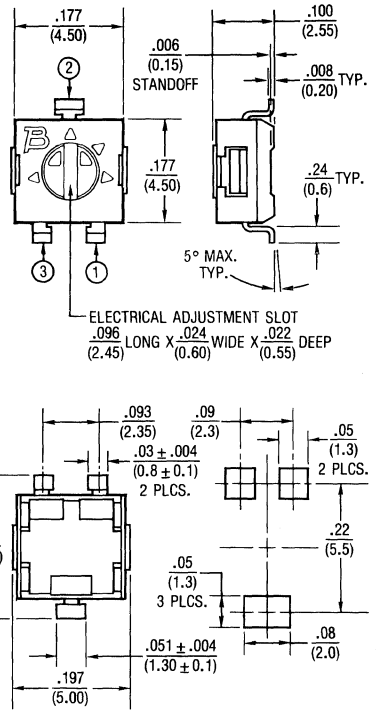


3314A (Optional)

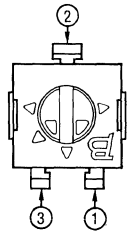


Reversed printing of standard 3314J style (shown above). All dimensions and mounting references are the same.

3314G (Standard)



3314B (Optional)



Reversed printing of standard 3314G style (shown above). All dimensions and mounting references are the same.

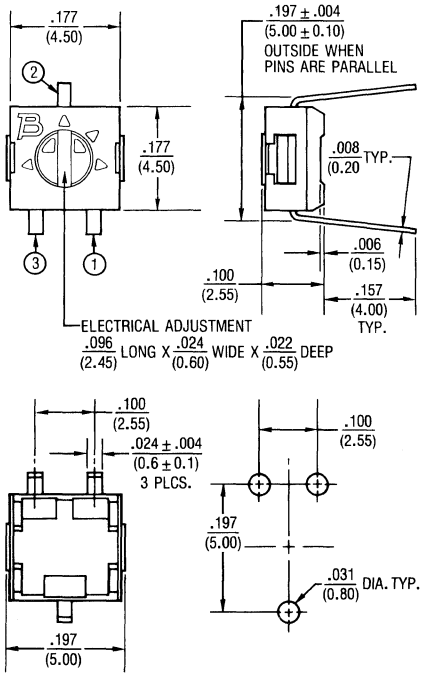
Specifications are subject to change without notice.
*Fluorinert is a registered trademark of 3M Co.

- J-hook, gull-wing and pinned configurations
- Optional reversed printing available
- Meets proposed EIA/EIAJ/IPC/VRCI SDM standard trimmer designs - J, G and H styles

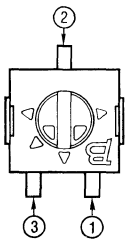
Model 3314

B® Trimming Potentiometer

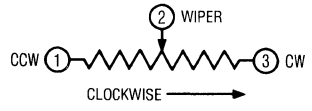
3314H (Standard)



3314C (Optional)



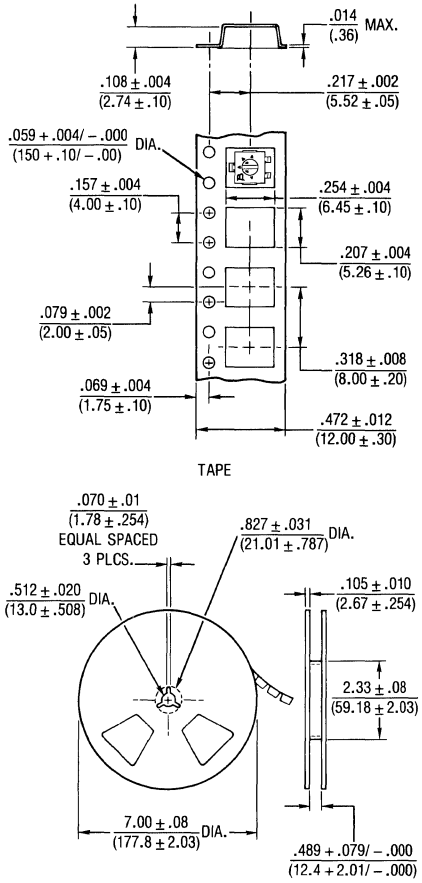
Reversed printing of standard 3314H style (shown above). All dimensions and mounting references are the same.



TOLERANCES: ± .012 (0.30) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

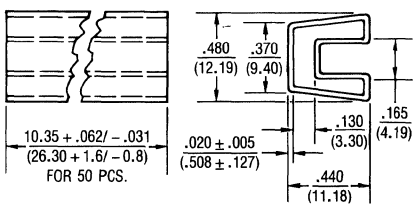
PACKAGING SPECIFICATIONS (J, G, A, B Styles)



Cover tape panel strength:
40 to 70 grams measured 175° to 180° on longitudinal axis at a speed of 120±5mm/min.

Units packaged 500 pieces per reel.

PACKAGING SPECIFICATIONS (H, C Styles)



Units packaged 50 pieces per tube.

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
50,000	503
100,000	104
200,000	204
500,000	504
1,000,000	105
2,000,000	205

Special resistances available from 10 to 5,000,000 ohms.

HOW TO ORDER

3314 G - 1 - 502 E

Model

Style

Standard or Modified Product Indicator
-1 = Standard Product
-11 = 10% Tolerance

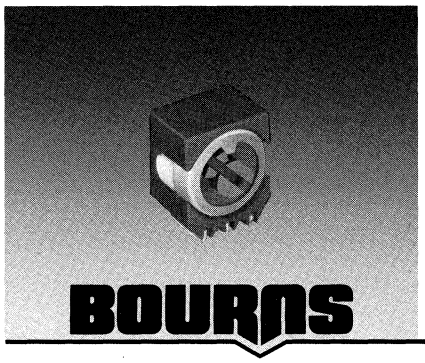
Resistance Code

Embossed Tape

(Applicable to SMT styles only. Not available for "C" and "H" pin styles.)

Consult factory for other available options.

Specifications subject to change without notice.



SMD 1/4 INCH DIAMETER/SINGLE-TURN CERMET/INDUSTRIAL/SEALED

- Stable, infinite resolution cermet element
- High temperature construction
- Recommended for reflow solder processing
- Vertical and horizontal adjust styles
- Packaged in plastic tubes ("W" and "X" styles) or plastic trays ("P" style)

Model 3325

BOURNS® Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
.....10 ohms to 1 megohm
(see standard resistance table)
Resistance Tolerance....±10% std.
(closer tolerance available)
Absolute Minimum Resistance
.....2 ohms or 1%
(whichever is greater)
Contact Resistance Variation
.....1.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.05%
Resistance..... ±0.15%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000.....250 vac
Adjustment Travel.....240° nom.

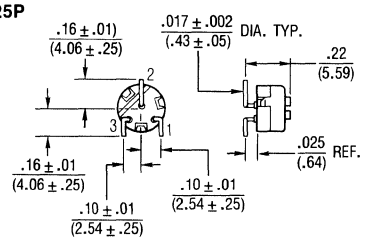
Environmental Characteristics

Maximum Exposure (Time/Temp)
.....+215°C/3 min.
Power Rating (300 Volts Max.)
85°C.....0.5 watt
150°C.....0 watt
Temperature Range
.....−55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85°C Fluorinert*
Humidity.....MIL-STD-202
Method 103 (96 hours)
(3% ΔTR, IR 10 megohms min.)
Vibration...30G (1% ΔTR, 1% ΔVR)
Shock....100G (1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 85°C
(3% ΔTR, 3% CRV
Mechanical Life.....200 cycles
(4% ΔTR, 4% CRV)

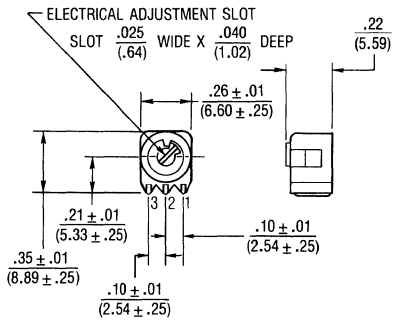
Physical Characteristics

Mechanical Angle.....260° nom.
Torque.....3.0 oz-in. max.
Stop Strength.....5.0 oz-in.
Terminals.....Solderable pins
Weight.....0.02 oz.
Marking.....Manufacturer's trademark, resistance code, date code, manufacturer's model number and style

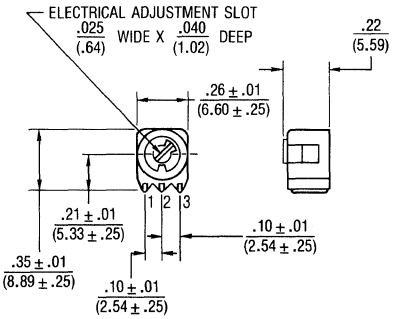
3325P



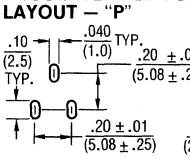
3325W



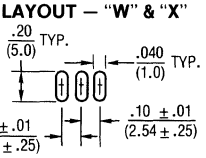
3325X

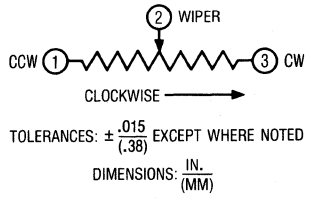


RECOMMENDED PCB LAYOUT — "P"



RECOMMENDED PCB LAYOUT — "W" & "X"





STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code
10	100
20	200
50	500
100	101
200	201
500	501
1,000	102
2,000	202
5,000	502
10,000	103
20,000	203
25,000	253
50,000	503
100,000	104
200,000	204
250,000	254
500,000	504
1,000,000	105

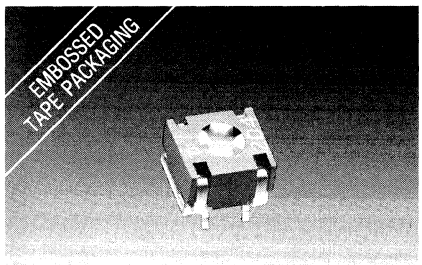
Special resistances available from 10 ohms to 1 megohm.

HOW TO ORDER

3325 P - 1 - 103

Model
Style
Standard Product
Resistance Code
1st 2 Significant Digits of Value
3rd Digit Number of Zeroes

Specifications are subject to change without notice.
*"Fluorinert is a registered trademark of 3M Company.



SMD 5MM SQUARE / SINGLE-TURN CERMET / INDUSTRIAL / SEALED

- Available in 3 and 4 pad SMD design or thru-hole
- Auto adjust rotor design, packaged in 12mm embossed tape, compatible with automatic placement equipment
- Superior lead frame construction
- Recommended for reflow solder processing

BOURNS

Model 3335

Trimming Potentiometer

Electrical Characteristics

Standard Resistance Range
..... 10 to 500,000 ohms
(see standard resistance table)
Resistance Tolerance.... ±20% std.
(closer tolerance available)
Absolute Minimum Resistance
..... 1% or 2 ohms max.
(whichever is greater)
Contact Resistance Variation
..... 3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.05%
Resistance..... ±0.15%
Resolution..... Infinite
Insulation Resistance..... 500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level..... 600 vac
80,000 feet..... 250 vac
Adjustment Travel..... 240° nom.

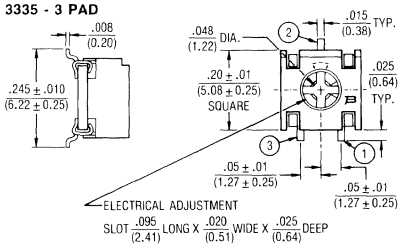
Environmental Characteristics

Maximum Exposure (Temp/Time)
..... +215°C/3 min.
Power Rating (100 Volts Max.)
85°C..... 0.2 watt
150°C..... 0 watt
Temperature Range
..... −55°C to +150°C
Temperature Coefficient
..... ±100ppm/°C max.
Seal Test..... 85°C Fluorinert*
Humidity..... MIL-STD-202
Method 103 (96 hours)
(3% ΔTR, 10 megohms min.)
Vibration... 30G (1% ΔTR, 1% ΔVR)
Shock.... 100G (1% ΔTR, 1% ΔVR)
Load Life
..... 1,000 hours 0.2 watt @ 85°C
(3% ΔTR, 3% CRV)
Mechanical Life..... 200 cycles
(4% ΔTR, 3% CRV)

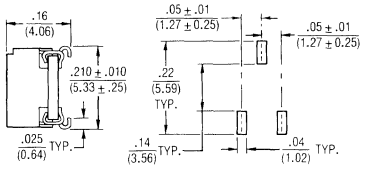
Physical Characteristics

Mechanical Angle..... 270° nom.
Torque..... 3.0 oz-in. max.
Stop Strength..... 4.0 oz-in. min.
Terminals..... Solderable pins
Weight..... 0.02 oz.
Marking..... Manufacturer's trademark, resistance code, (model number, style, resistance code and date code on packaging)
Packaging..... 500 pieces/7" reel

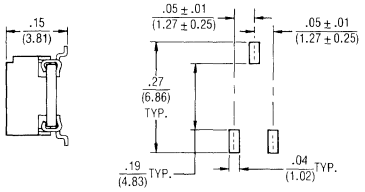
3335 - 3 PAD



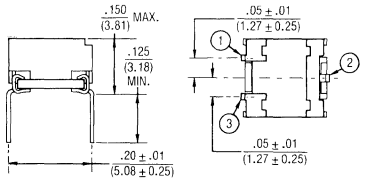
3335A — RECOMMENDED PCB LAYOUT - "A"



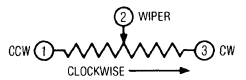
3335B — RECOMMENDED PCB LAYOUT - "B"



3335C - 3 PIN STYLE



STANDARD PACKAGING: PLASTIC TRAYS



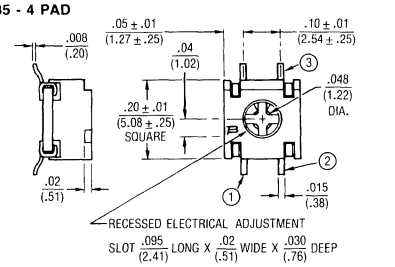
HOW TO ORDER

3335 W - 1 - 103 E

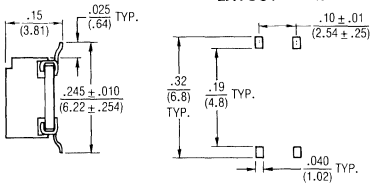
Model
Style
Standard Product
Resistance Code
- First 2 significant digits of value
- Third digit represents number of zeros

Embossed Tape Designator
("C" model available only in plastic trays)

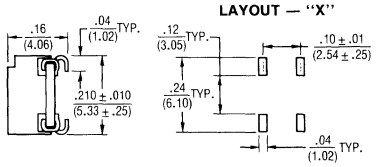
3335 - 4 PAD

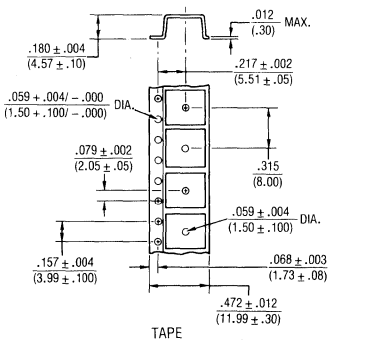


3335W — RECOMMENDED PCB LAYOUT — "W"



3335X — RECOMMENDED PCB LAYOUT — "X"





TAPE

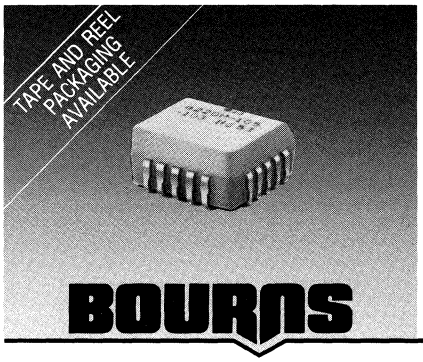
Reel dimensions same as 3304, see page 159.

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Code	Resistance (Ohms)	Code
10	100	10,000	103
20	200	20,000	203
50	500	25,000	253
100	101	50,000	503
200	201	100,000	104
500	501	200,000	204
1,000	102	250,000	254
2,000	202	500,000	504
5,000	502		

Special resistances available from 10 to 500,000 ohms.

Specifications are subject to change without notice.
*"Fluorinert is a registered trademark of 3M Company.



BOURNS

SURFACE MOUNTED RESISTOR NETWORK MOLDED PCC STYLE/10 AND 20 PIN

- JEDEC package compatible with automatic placement equipment
- Compliant leads to reduce solder joint fatiguing
- High temperature design suitable for all popular soldering techniques
- Copper leads for excellent heat dissipation
- Available on tape and reel packaging (see page 172 for dimensions)

Model 4200P

BI® Resistor Networks

Electrical Characteristics

Standard Resistance Range
.....10 ohms to 1.0 megohm
Maximum Operating Voltage....50V
Temperature Coefficient of Resistance
(TCR).....±100ppm/°C
±250ppm/°C for values less than 50 ohms
Voltage Coefficient
.....±100ppm/V typical
TCR Tracking
.....50ppm/°C max.; equal values
Operating Temperature
.....–55°C to +125°C
Power Rating.....Derate to zero power from +70°C to +125°C
Power Dissipation
4210P.....0.160 watt/resistor
1.50 watts/package
4220P...0.115 to .160 watt/resistor
2.00 watts/package

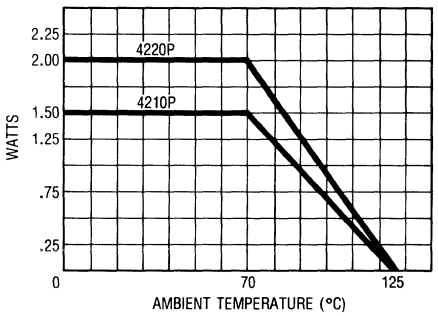
Environmental Characteristics

Tests per MIL-STD-202.....ΔR max.
Short Time Overload.....±0.25%
Load Life.....±1.00%
Mechanical Shock.....±0.25%
Moisture Resistance.....±0.50%
Resistance to Soldering Heat
.....±0.25%
Thermal Shock.....±0.25%
Insulation Resistance
.....10,000 megohms min.
Dielectric Withstanding Voltage
.....200 VRMS
Lead Solderability/Solvent Resistance
.Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material.....Copper (OLIN 194) 60/40 reflowed plating
Body Material.....Novolac epoxy

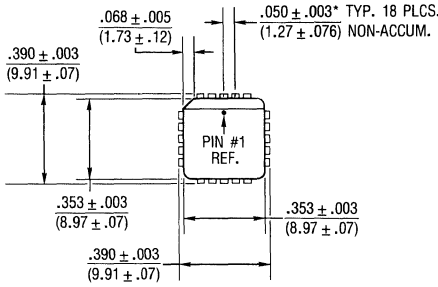
PACKAGE POWER TEMPERATURE DERATING CURVE

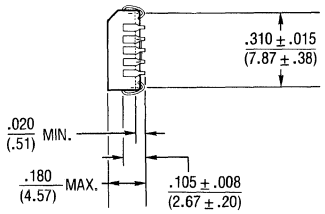


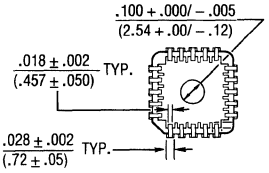
PACKAGE POWER RATING AT 70°C

4220P.....2.00 watts
4210P.....1.50 watts

4220P

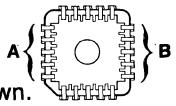






Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

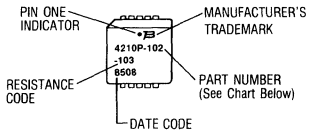


Model 4220P shown.

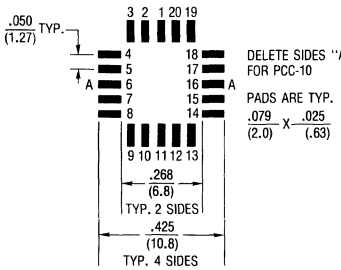
Model 4210 is identical to the Model 4220P package without pin patterns A and B (as indicated above).

TYPICAL PART MARKING

Represents total content. Layout may vary.



RECOMMENDED LAND PATTERN



NOTE: Land pattern dimensions are based on design rules established by the Institute for Interconnecting and Packaging Electronic Circuits in IPC-SM-782.

HOW TO ORDER SMD PCC PACKAGE NETWORKS

42 20 P - 102 - 103

Model
(42 = PCC Pkg)

Number of Pins

Physical Configuration
Surface Mount Device
(SMD)

Resistance Code
•First 2 digits are significant
•Third digit represents the number of zeroes to follow.

Electrical Configuration
•102 = Isolated
•104 = Dual Terminator
•105 = Bussed

Specifications are subject to change without notice.

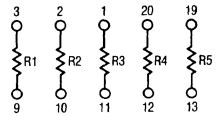
- Superior package integrity to withstand moisture and contamination
- Laser marking on contrasting background for permanent identification
- Standard electrical schematics: isolated, bussed, dual terminator
- Custom circuits are available

Model 4200P

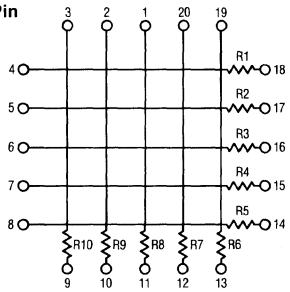
BI® Resistor Networks

ISOLATED RESISTORS (102 CIRCUIT)

10 Pin



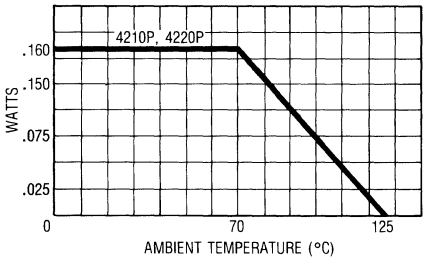
20 Pin



Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 1.0 megohm. . . . . ±2%

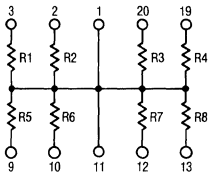
Power Rating per Resistor
10 Pin at 70°C. . . . . 0.160 watt
20 Pin at 70°C. . . . . 0.160 watt

POWER TEMPERATURE DERATING CURVE

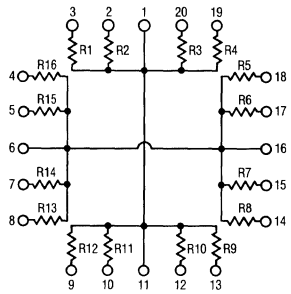


BUSSED RESISTORS (105 CIRCUIT)

10 Pin



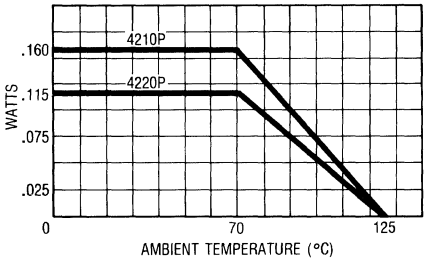
20 Pin



Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 1.0 megohm. . . . . ±2%

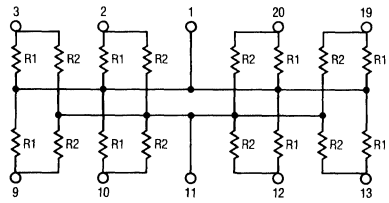
Power Rating per Resistor
10 Pin at 70°C. . . . . 0.160 watt
20 Pin at 70°C. . . . . 0.115 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATOR (104 CIRCUIT)

10 Pin



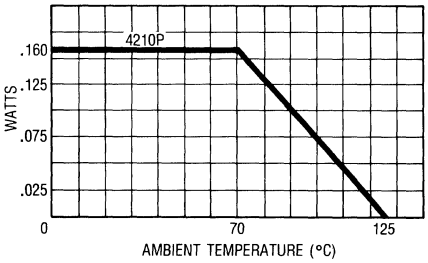
This network terminates 8 lines, convenient for an 8-bit computer bus.

20 Pin
(Consult Factory)

Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 1.0 megohm. . . . . ±2%

Power Rating per Resistor
10 Pin at 70°C. . . . . 0.160 watt

POWER TEMPERATURE DERATING CURVE



STANDARD RESISTANCE VALUES (102, 105 CIRCUITS)

Resistance (Ohms)	Resistance Code
10	100
22	220
27	270
33	330
39	390
47	470
56	560
68	680
82	820
100	101
120	121
150	151
180	181
220	221
270	271

Resistance (Ohms)	Resistance Code
330	331
390	391
470	471
560	561
680	681
820	821
1,000	102
1,200	122
1,500	152
1,800	182
2,000	202
2,200	222
2,700	272
3,300	332
3,900	392

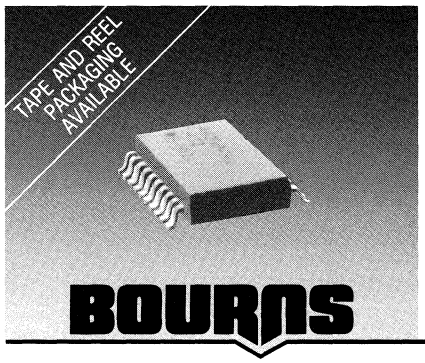
Resistance (Ohms)	Resistance Code
4,700	472
5,600	562
6,800	682
8,200	822
10,000	103
12,000	123
15,000	153
18,000	183
20,000	203
22,000	223
27,000	273
33,000	333
39,000	393
47,000	473
56,000	563

Resistance (Ohms)	Resistance Code
68,000	683
82,000	823
100,000	104
120,000	124
150,000	154
180,000	184
220,000	224
270,000	274
330,000	334
390,000	394
470,000	474
560,000	564
680,000	684
820,000	824
1,000,000	105

STANDARD RESISTANCE VALUES (104 CIRCUITS)

Resistance (Ohms)		Resistance Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.



SURFACE MOUNTED RESISTOR NETWORK WIDE BODY (.300 INCH WIDE) MOLDED SOL STYLE/16 AND 20 PINS

- JEDEC package compatible with automatic placement equipment
- Compliant leads to reduce solder joint fatiguing
- High temperature design suitable for all popular soldering techniques
- Copper leads for excellent heat dissipation

Model 4400P

Bourns® Resistor Networks

Electrical Characteristics

Standard Resistance Range
.....10 ohms to 1.0 megohm
Maximum Operating Voltage....50V
Temperature Coefficient of Resistance
(TCR).....±100ppm/°C
±250ppm/°C for values less than 50 ohms
Voltage Coefficient
.....±100ppm/V typical
TCR Tracking
.....50ppm/°C max.; equal values
Operating Temperature
.....–55°C to +125°C
Power Rating.....Derate to zero power from +70°C to +125°C
Power Dissipation
4420P...0.115 to .200 watt/resistor
2.0 watts/package
4416P...0.115 to .200 watt/resistor
1.6 watts/package

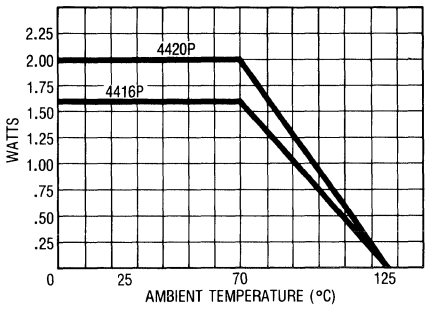
Environmental Characteristics

Tests per MIL-STD-202.....ΔR max.
Short Time Overload.....±0.25%
Load Life.....±1.00%
Mechanical Shock.....±0.25%
Moisture Resistance.....±0.50%
Resistance to Soldering Heat
.....±0.25%
Thermal Shock.....±0.25%
Insulation Resistance
.....10,000 megohms min.
Dielectric Withstanding Voltage
.....200 VRMS
Lead Solderability/Solvent Resistance
.Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material.....Copper (OLIN 194) 60/40 reflowed plating
Body Material.....Novolac epoxy

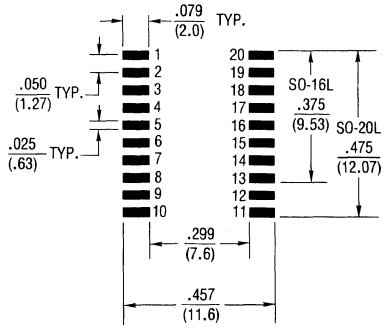
PACKAGE POWER TEMPERATURE DERATING CURVE



PACKAGE POWER RATING AT 70°C

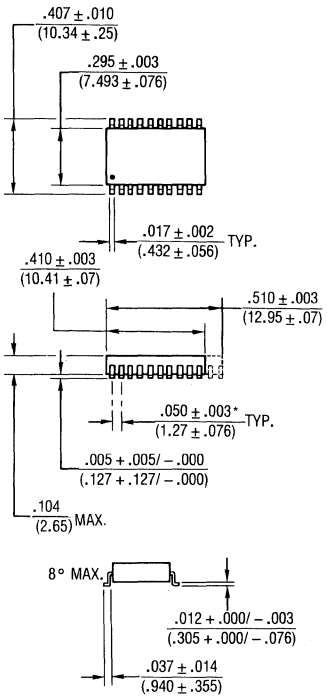
4420P.....2.00 watts
4416P.....1.60 watts

RECOMMENDED LAND PATTERN



NOTE: Land pattern dimensions are based on design rules established by the Institute for Interconnecting and Packaging Electronic Circuits in IPC-SM-782.

4420P

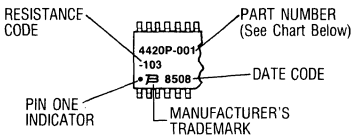


Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

TYPICAL PART MARKING

Represents total content. Layout may vary.



HOW TO ORDER SMD SOL PACKAGE NETWORKS

44 20 P - 001 - 103

Model
(44 = SMD SOIC Pkg)
Number of Pins
Physical Configuration
Surface Mount Device (SMD)
Resistance Code
•First 2 digits are significant
•Third digit represents the number of zeroes to follow.
Electrical Configuration
•001/004 = Isolated
•002 = Bussed
•003 = Dual Terminator

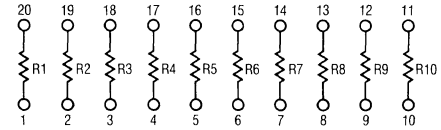
- Superior package integrity to withstand moisture and contamination
- Laser marking on contrasting background for permanent identification
- Standard electrical schematics: isolated, bussed, dual terminator
- Custom circuits are available

Model 4400P

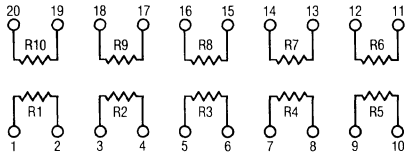
BI® Resistor Networks

ISOLATED RESISTORS (001 and 004 CIRCUITS)

Model 4416P-001
Model 4420P-001 (Shown)



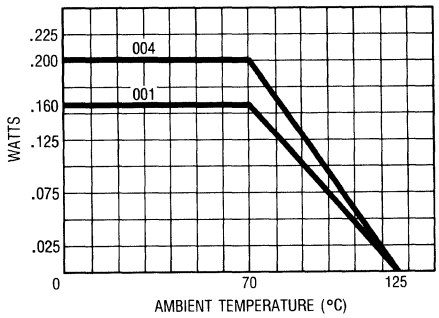
Model 4416P-004
Model 4420P-004 (Shown)



Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 1.0 megohm. . . . . ±2%

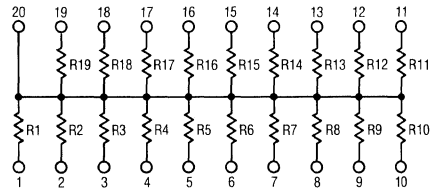
Power Rating per Resistor
001 Circuit at 70°C. . . . . 0.160 watt
004 Circuit at 70°C. . . . . 0.200 watt

POWER TEMPERATURE DERATING CURVE



BUSSED RESISTORS (002 CIRCUIT)

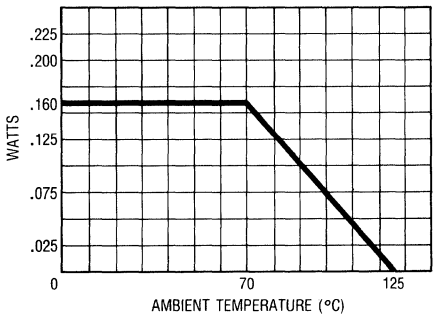
Model 4416P-002
Model 4420P-002 (Shown)



Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 1.0 megohm. . . . . ±2%

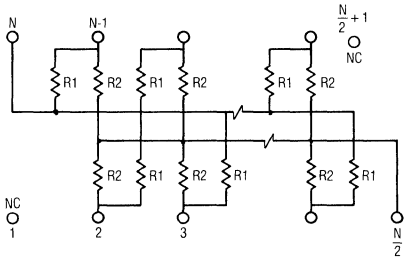
Power Rating per Resistor
002 Circuit at 70°C. . . . . 0.160 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATOR (003 CIRCUIT)

Model 4416P-003
Model 4420P-003

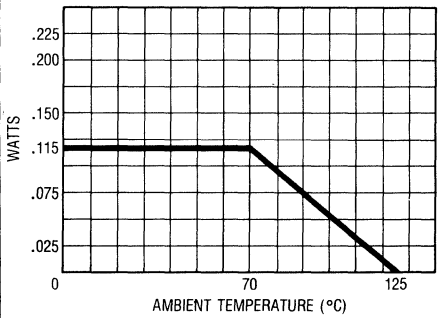


4420P-003 terminates 16 lines, convenient for a 16-bit computer bus.

Resistance Tolerance
Below 100 ohms. . . . . ±2 ohms
100 ohms to 1.0 megohm. . . . . ±2%

Power Rating per Resistor
003 Circuit at 70°C. . . . . 0.115 watt

POWER TEMPERATURE DERATING CURVE



STANDARD RESISTANCE VALUES (001, 004, and 002 CIRCUITS)

Resistance (Ohms)	Resistance Code
10	100
22	220
27	270
33	330
39	390
47	470
56	560
68	680
82	820
100	101
120	121
150	151
180	181
220	221
270	271

Resistance (Ohms)	Resistance Code
330	331
390	391
470	471
560	561
680	681
820	821
1,000	102
1,200	122
1,500	152
1,800	182
2,000	202
2,200	222
2,700	272
3,300	332
3,900	392

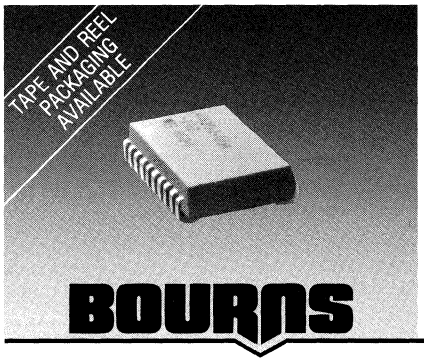
Resistance (Ohms)	Resistance Code
4,700	472
5,600	562
6,800	682
8,200	822
10,000	103
12,000	123
15,000	153
18,000	183
20,000	203
22,000	223
27,000	273
33,000	333
39,000	393
47,000	473
56,000	563

Resistance (Ohms)	Resistance Code
68,000	683
82,000	823
100,000	104
120,000	124
150,000	154
180,000	184
220,000	224
270,000	274
330,000	334
390,000	394
470,000	474
560,000	564
680,000	684
820,000	824
1,000,000	105

STANDARD RESISTANCE VALUES (003 CIRCUITS)

Resistance (Ohms)		Resistance Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.



SURFACE MOUNTED RESISTOR NETWORK WIDE BODY (.300 INCH WIDE) MOLDED SOL-J STYLE/16 AND 20 PINS

- Board footprint identical to medium body (.220 wide) SOM gull wing
- Compliant leads to reduce solder joint fatiguing
- High temperature design suitable for all popular soldering techniques
- Copper leads for excellent heat dissipation

Model 4400J

Bourns® Resistor Networks

Electrical Characteristics

Standard Resistance Range
.....10 ohms to 1.0 megohm
Maximum Operating Voltage....50V
Temperature Coefficient of Resistance (TCR).....±100ppm/°C
±250ppm/°C for values less than 50 ohms
Voltage Coefficient
.....±100ppm/V typical
TCR Tracking
.....50ppm/°C max.; equal values
Operating Temperature
.....−55°C to +125°C
Power Rating.....Derate to zero power from +70°C to +125°C
Power Dissipation
4420J...0.115 to .200 watt/resistor
2.0 watts/package
4416J...0.115 to .200 watt/resistor
1.6 watts/package

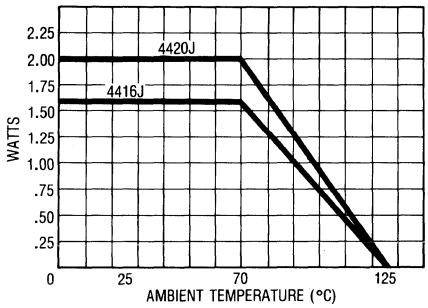
Environmental Characteristics

Tests per MIL-STD-202.....ΔR max.
Short Time Overload.....±0.25%
Load Life.....±1.00%
Mechanical Shock.....±0.25%
Moisture Resistance.....±0.50%
Resistance to Soldering Heat
.....±0.25%
Thermal Shock.....±0.25%
Insulation Resistance
.....10,000 megohms min.
Dielectric Withstanding Voltage
.....200 VRMS
Lead Solderability/Solvent Resistance
.Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material.....Copper (OLIN 194) 60/40 reflowed plating
Body Material.....Novolac epoxy

PACKAGE POWER TEMPERATURE DERATING CURVE

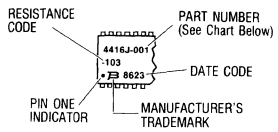


PACKAGE POWER RATING AT 70°C

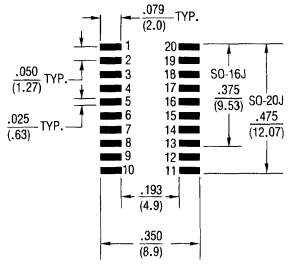
4420J.....2.00 watts
4416J.....1.60 watts

TYPICAL PART MARKING

Represents total content. Layout may vary.

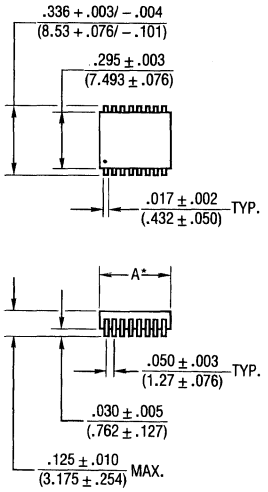


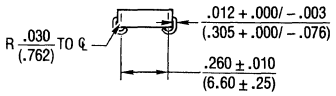
RECOMMENDED LAND PATTERN



NOTE: Land pattern dimensions are based on design rules established by the Institute for Interconnecting and Packaging Electronic Circuits in IPC-SM-782.

4416J





*DIM. A

4416J = .410 ± .003 (10.41 ± .07)

4420J = .510 ± .003 (12.95 ± .07)

Lead coplanarity .004 maximum.

Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

HOW TO ORDER SMD SOL-J PACKAGE NETWORKS

44 20 J - 001 - 103

Model
(44 = SMD SOIC Pkg)
Number of Pins
Physical Configuration
Surface Mount Device
(J-Leads)
Electrical Configuration
•001/004 = Isolated
•002 = Bussed
•003 = Dual Terminator
Resistance Code
•First 2 digits are significant
•Third digit represents the number of zeroes to follow.

Specifications are subject to change without notice.

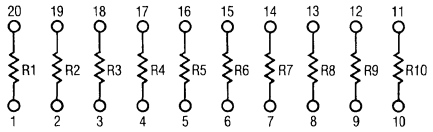
- Superior package integrity to withstand moisture and contamination
- Laser marking on contrasting background for permanent identification
- Standard electrical schematics: isolated, bussed, dual terminator
- Custom circuits are available

Model 4400J

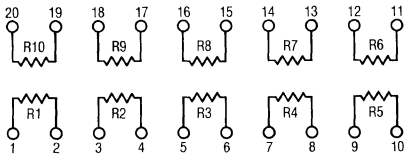
BI® Resistor Networks

ISOLATED RESISTORS (001 and 004 CIRCUITS)

Model 4416J-001
Model 4420J-001 (Shown)



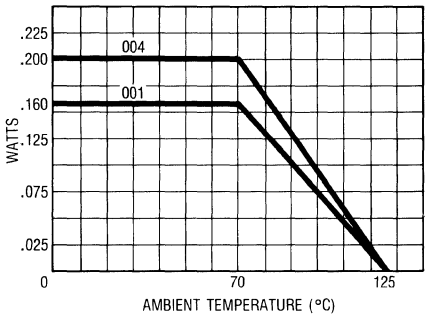
Model 4416J-004
Model 4420J-004 (Shown)



Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 1.0 megohm. . . . . ±2%

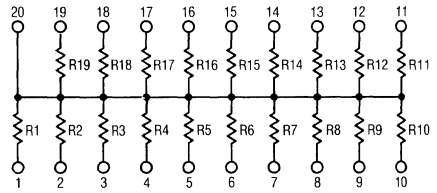
Power Rating per Resistor
001 Circuit at 70°C. . . . . 0.160 watt
004 Circuit at 70°C. . . . . 0.200 watt

POWER TEMPERATURE DERATING CURVE



BUSSED RESISTORS (002 CIRCUIT)

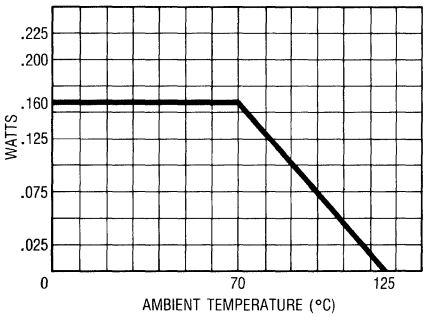
Model 4416J-002
Model 4420J-002 (Shown)



Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 1.0 megohm. . . . . ±2%

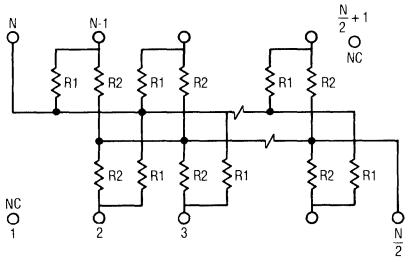
Power Rating per Resistor
002 Circuit at 70°C. . . . . 0.160 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATOR (003 CIRCUIT)

Model 4416J-003
Model 4420J-003

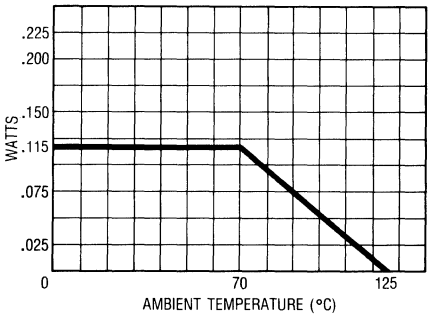


4420J-003 terminates 16 lines, convenient for a 16-bit computer bus.

Resistance Tolerance
Below 100 ohms. . . . . ±2 ohms
100 ohms to 1.0 megohm. . . . . ±2%

Power Rating per Resistor
003 Circuit at 70°C. . . . . 0.115 watt

POWER TEMPERATURE DERATING CURVE



STANDARD RESISTANCE VALUES (001, 004, and 002 CIRCUITS)

Resistance (Ohms)	Resistance Code
10	100
22	220
27	270
33	330
39	390
47	470
56	560
68	680
82	820
100	101
120	121
150	151
180	181
220	221
270	271

Resistance (Ohms)	Resistance Code
330	331
390	391
470	471
560	561
680	681
820	821
1,000	102
1,200	122
1,500	152
1,800	182
2,000	202
2,200	222
2,700	272
3,300	332
3,900	392

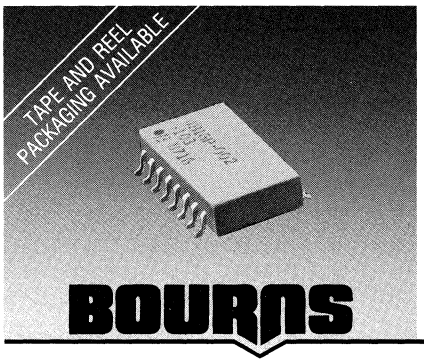
Resistance (Ohms)	Resistance Code
4,700	472
5,600	562
6,800	682
8,200	822
10,000	103
12,000	123
15,000	153
18,000	183
20,000	203
22,000	223
27,000	273
33,000	333
39,000	393
47,000	473
56,000	563

Resistance (Ohms)	Resistance Code
68,000	683
82,000	823
100,000	104
120,000	124
150,000	154
180,000	184
220,000	224
270,000	274
330,000	334
390,000	394
470,000	474
560,000	564
680,000	684
820,000	824
1,000,000	105

STANDARD RESISTANCE VALUES (003 CIRCUITS)

Resistance			
(Ohms)		Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

Specifications are subject to change without notice.



SURFACE MOUNTED RESISTOR NETWORK MEDIUM BODY (.220 INCH WIDE) SOM PACKAGE/14 AND 16 PINS

- Standard E.I.A. (SOGN-0002) package compatible with automatic placement equipment
- High temperature solder suitable for all popular soldering techniques
- Available on tape and reel packaging (see page 172 for dimensions)

Model 4800P

BI® Resistor Networks

Electrical Characteristics

Standard Resistance Range
.....10 ohms to 1.0 megohm
Maximum Operating Voltage....50V
Temperature Coefficient of Resistance (TCR).....±100ppm/°C
±250ppm/°C for values less than 50 ohms
Voltage Coefficient
.....±100ppm/V typical
TCR Tracking
.....50ppm/°C max.; equal values
Operating Temperature
.....–55°C to +125°C
Power Rating.....Derate to zero power from +70°C to +125°C
Power Dissipation
4814P... .080 to .200 watt/resistor
1.12 watts/package
4816P... .080 to .200 watt/resistor
1.28 watts/package

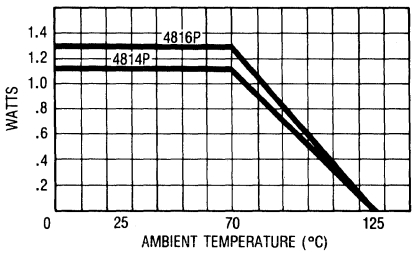
Environmental Characteristics

Tests per MIL-STD-202.....ΔR max.
Short Time Overload.....±0.25%
Load Life.....±1.00%
Mechanical Shock.....±0.25%
Moisture Resistance.....±0.50%
Resistance to Soldering Heat
.....±0.25%
Thermal Shock.....±0.25%
Insulation Resistance
.....10,000 megohms min.
Dielectric Withstanding Voltage
.....200 VRMS
Lead Solderability/Solvent Resistance
.Meet requirements of MIL-R-83401

Physical Characteristics

Flammability..Conforms to UL94V-0
Lead Frame Material.....Copper (OLIN 194) 60/40 reflowed plating
Body Material.....Novolac epoxy

PACKAGE POWER TEMPERATURE DERATING CURVE

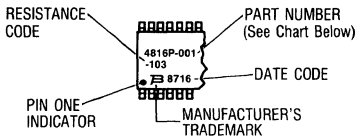


PACKAGE POWER RATING AT 70°C

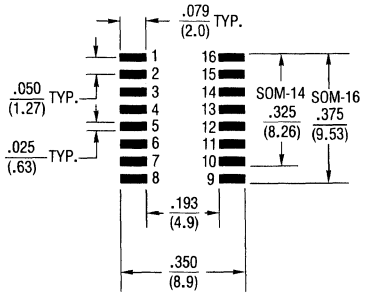
4814P.....1.12 watts
4816P.....1.28 watts

TYPICAL PART MARKING

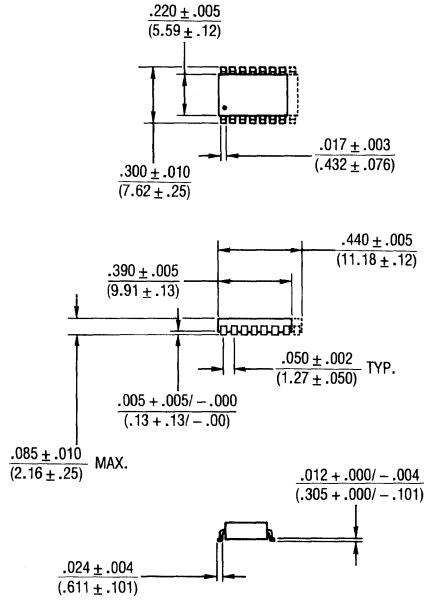
Represents total content. Layout may vary.



RECOMMENDED LAND PATTERN



NOTE: Land pattern dimensions are based on design rules established by the Institute for Interconnecting and Packaging Electronic Circuits in IPC-SM-782.



Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

HOW TO ORDER SMD SOM PACKAGE NETWORKS

48 16 P - 001 - 103

Model
(48 = SOM Pkg)

Number of Pins

Physical Configuration
Surface Mount Device
Gull Wing Leads

Electrical Configuration
•001/004 = Isolated
•002 = Bussed
•003 = Dual Terminator

Resistance Code
•First 2 digits are significant
•Third digit represents the number of zeros to follow

Production date for 4814P to be announced.

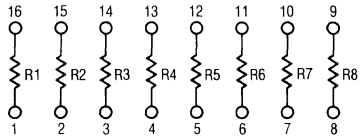
- Superior package integrity to withstand moisture and contamination
- Laser marking on contrasting background for permanent identification
- Compliant leads to reduce solder joint fatiguing
- Copper leads for superior heat dissipation
- Standard electrical schematics: isolated, bussed, dual terminator
- Custom circuits are available

Model 4800P

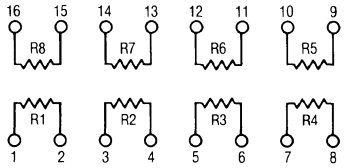
BI® Resistor Networks

ISOLATED RESISTORS (001 and 004 CIRCUITS)

Model 4814P-001
Model 4816P-001 (Shown)



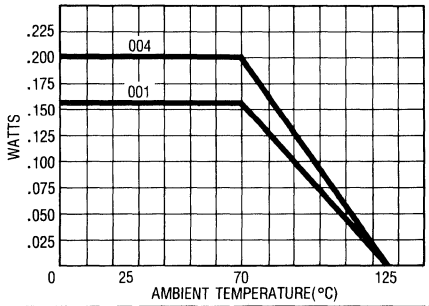
Model 4814P-004
Model 4816P-004 (Shown)



Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 1.0 megohm. . . . . ±2%

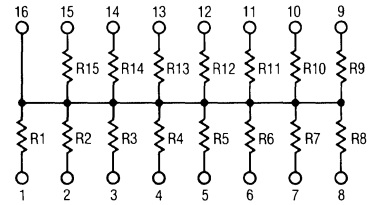
Power Rating per Resistor
001 Circuit at 70°C. . . . . 0.160 watt
004 Circuit at 70°C. . . . . 0.200 watt

POWER TEMPERATURE DERATING CURVE



BUSSED RESISTORS (002 CIRCUIT)

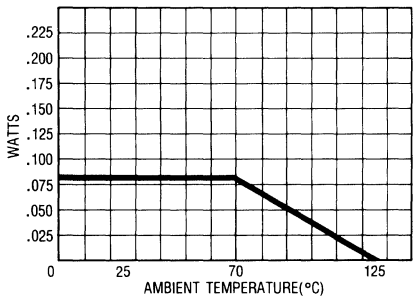
Model 4814P-002
Model 4816P-002 (Shown)



Resistance Tolerance
10 ohms to 49 ohms. . . . . ±1 ohm
50 ohms to 1.0 megohm. . . . . ±2%

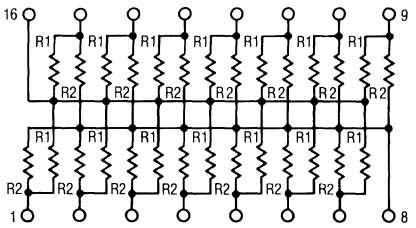
Power Rating per Resistor
002 Circuit at 70°C. . . . . .080 watt

POWER TEMPERATURE DERATING CURVE



DUAL TERMINATOR (003 CIRCUIT)

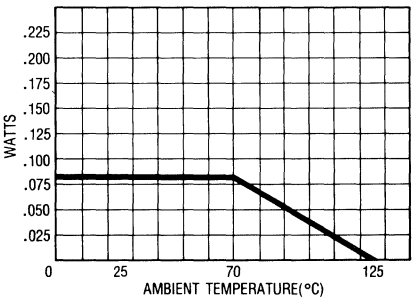
Model 4814P-003
Model 4816P-003 (Shown)



Resistance Tolerance
Below 100 ohms. . . . . ±2 ohms
100 ohms to 1.0 megohm. . . . . ±2%

Power Rating per Resistor
003 Circuit at 70°C. . . . . .080 watt

POWER TEMPERATURE DERATING CURVE



STANDARD RESISTANCE VALUES (001, 004, and 002 CIRCUITS)

Resistance (Ohms)	Resistance Code
10	100
22	220
27	270
33	330
39	390
47	470
56	560
68	680
82	820
100	101
120	121
150	151
180	181
220	221
270	271

Resistance (Ohms)	Resistance Code
330	331
390	391
470	471
560	561
680	681
820	821
1,000	102
1,200	122
1,500	152
1,800	182
2,000	202
2,200	222
2,700	272
3,300	332
3,900	392

Resistance (Ohms)	Resistance Code
4,700	472
5,600	562
6,800	682
8,200	822
10,000	103
12,000	123
15,000	153
18,000	183
20,000	203
22,000	223
27,000	273
33,000	333
39,000	393
47,000	473
56,000	563

Resistance (Ohms)	Resistance Code
68,000	683
82,000	823
100,000	104
120,000	124
150,000	154
180,000	184
220,000	224
270,000	274
330,000	334
390,000	394
470,000	474
560,000	564
680,000	684
820,000	824
1,000,000	105

STANDARD RESISTANCE VALUES (003 CIRCUITS)

Resistance			
(Ohms)		Code	
R_1	R_2	R_1	R_2
160	240	161	241
180	390	181	391
220	270	221	271
220	330	221	331
330	390	331	391
330	470	331	471
3,000	6,200	302	622

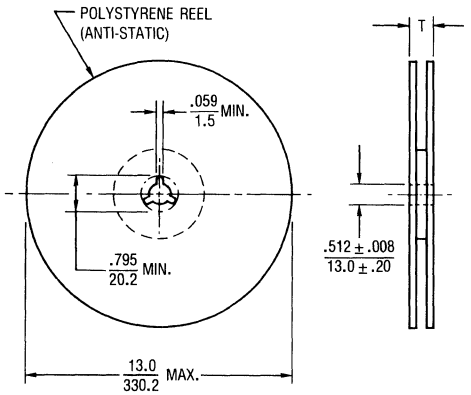
Specifications are subject to change without notice.

BOURNS

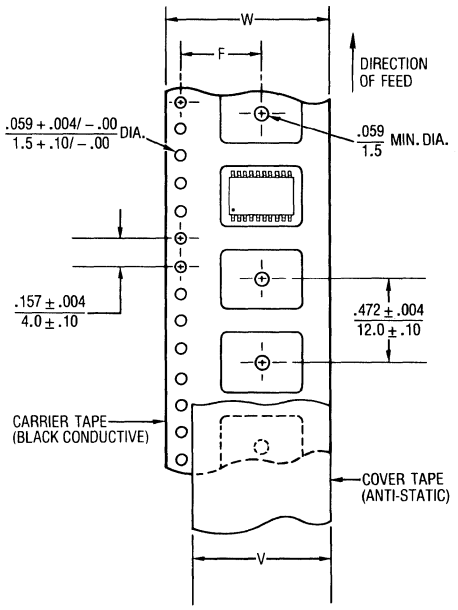
RESISTOR NETWORKS
SURFACE MOUNT
TAPE AND REEL SPECIFICATIONS

Model	Standard Quantity Per Reel	Carrier Tape Width (W)	Cover Tape Width (V)	Reel Width (T)	Pocket Center (F)
4210P **4220P**	1,000	$\frac{.630 \pm .012}{16.0 \pm .30}$	$\frac{.524}{13.3}$ NOM.	$\frac{.882}{22.4}$ MAX.	$\frac{.295 \pm .004}{7.5 \pm .10}$
4416P **4416J**	1,500				
4814P	2,000				
4420P **4420J**	1,500	$\frac{.945 \pm .012}{24.0 \pm .30}$	$\frac{.827}{21.0}$ NOM.	$\frac{1.43}{36.4}$ MAX.	$\frac{.453 \pm .004}{11.5 \pm .10}$
4816P	2,000				

Leader Length = 530 ± 30mm
Trailer Length = 500mm Min.
} Empty Component Pockets Sealed With Cover Tape



INCHES / MM



NOTE: Dimensions not specified are per EIA RS-481.
Governing dimensions are in millimeters.

BOURNS

LAB DESIGN KITS

- Models feature "anti-tombstoning" design
- Convenient, easy-to-use binder format
- All parts individually packaged, marked, and protected
- Most popular ohmic values included
- Standard paper tape provided - 25 pieces each in 50 values

Models H-810/H-811/H-812

Bourns® Chip Resistors

A wide assortment of the most popular thick film chip resistors is available in these convenient kits. Three different versions are available: the H-810 Series (1/8 watt, 1% tolerance), the H-811 (1/8 watt, 5% tolerance), and the H-812 (1/10 watt, 5% tolerance).

Each kit contains 50 different ohmic values, with a strip of 25 parts for each. Product literature is included with each kit, which contains specifications, dimensional drawings and an application note on "tombstoning" chip resistors.

Select the size, tolerance and range to suit your application.

H-810
(CR1206 Series)
1/8 Watt
1% Tolerance

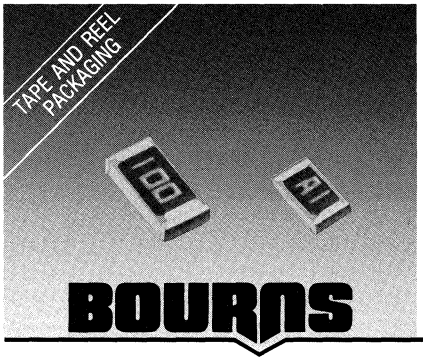
Ohmic Values Included	
100 ohms	6.19K ohms
121 ohms	6.81K ohms
150 ohms	7.5K ohms
200 ohms	8.25K ohms
301 ohms	10K ohms
332 ohms	13K ohms
475 ohms	15K ohms
511 ohms	17.8K ohms
681 ohms	20K ohms
750 ohms	22.1K ohms
825 ohms	24.9K ohms
1K ohms	27.4K ohms
1.21K ohms	28K ohms
1.5K ohms	30.1K ohms
2K ohms	36.5K ohms
2.21K ohms	47.5K ohms
2.49K ohms	68.1K ohms
2.61K ohms	75K ohms
3.01K ohms	82.5K ohms
3.32K ohms	90.9K ohms
3.83K ohms	100K ohms
4.02K ohms	150K ohms
4.75K ohms	200K ohms
5.11K ohms	511K ohms
5.62K ohms	1M ohms

H-811
(CR1206 Series)
1/8 Watt
5% Tolerance

Ohmic Values Included	
10 ohms	2.7K ohms
18 ohms	3.3K ohms
22 ohms	3.9K ohms
33 ohms	4.7K ohms
39 ohms	5.6K ohms
47 ohms	6.8K ohms
56 ohms	8.2K ohms
68 ohms	10K ohms
100 ohms	12K ohms
120 ohms	15K ohms
150 ohms	20K ohms
180 ohms	22K ohms
220 ohms	27K ohms
270 ohms	33K ohms
330 ohms	39K ohms
390 ohms	47K ohms
470 ohms	56K ohms
560 ohms	82K ohms
680 ohms	100K ohms
820 ohms	120K ohms
1K ohms	150K ohms
1.2K ohms	220K ohms
1.5K ohms	270K ohms
2K ohms	470K ohms
2.2K ohms	1M ohms

H-812
(CR0805 Series)
1/10 Watt
5% Tolerance

Ohmic Values Included	
10 ohms	2.7K ohms
18 ohms	3.3K ohms
22 ohms	3.9K ohms
33 ohms	4.7K ohms
39 ohms	5.6K ohms
47 ohms	6.8K ohms
56 ohms	8.2K ohms
68 ohms	10K ohms
100 ohms	12K ohms
120 ohms	15K ohms
150 ohms	20K ohms
180 ohms	22K ohms
220 ohms	27K ohms
270 ohms	33K ohms
330 ohms	39K ohms
390 ohms	47K ohms
470 ohms	56K ohms
560 ohms	82K ohms
680 ohms	100K ohms
820 ohms	120K ohms
1K ohms	150K ohms
1.2K ohms	220K ohms
1.5K ohms	270K ohms
2K ohms	470K ohms
2.2K ohms	1M ohms



1/8 AND 1/10 WATT, THICK FILM, COMMERCIAL

- Tightest tolerances on electrode dimensions in the industry
- Superior flat surface rectangular design
- Glass and epoxy coating for superior protection

(FOR EUROPEAN EQUIVALENTS, CONSULT LOCAL EUROPEAN OFFICE.)

Model CR Series

Bourns® Chip Resistors

Electrical Characteristics

Resistance Range, Tolerance and Temperature Coefficient

CR0805 ..... 47 ohms to 1 megohm, ±5%, ±200ppm/°C
10 ohms to 47 ohms, ±5%, ±300ppm/°C
Zero ohm jumper (.05 ohm max.)

CR1206 ..... 100 ohms to 1 megohm, ±1%, 100ppm/°C
47 ohms to 1 megohm, ±5%, 200ppm/°C
10 ohms to 47 ohms, ±5%, 300ppm/°C
Zero ohm jumper (.05 ohm max.)

Power Rating and Maximum Operating Voltage at 70°C

CR0805 ..... 0.100W, 100V
CR1206 ..... 0.125W, 200V

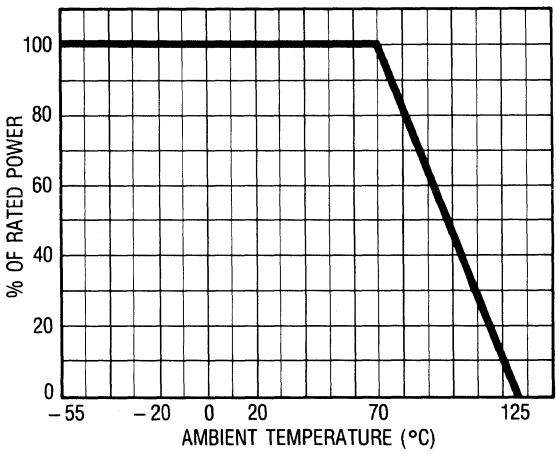
Maximum Ambient Temperature ..... 125°C (See derating curve)

Temperature Range ..... −55°C to +125°C

Performance Specifications

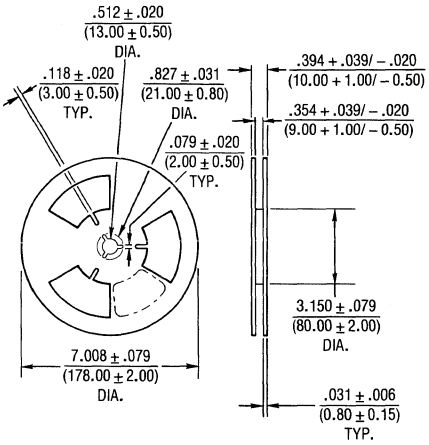
TEST	REQUIREMENT	METHOD
Thermal Shock −55°C/125°C	±0.5% ΔR Max.	MIL-R-55342 Par. 4.7.3
Low Temperature Operation −55°C	±0.5% ΔR Max.	MIL-R-55342 Par. 4.7.4
Short-Time Overload	±0.5% ΔR Max.	MIL-R-55342 Par. 4.7.5
High Temp Exposure 125°C	±0.5% ΔR Max.	MIL-R-55342 Par. 4.7.6
Resistance to Bonding Exposure	±0.25% ΔR Max.	MIL-R-55342 Par. 4.7.7
Moisture Resistance	±0.5% ΔR Max.	MIL-R-55342 Par. 4.7.8
Life 70°C/2,000 Hours	±2.0% ΔR Max.	MIL-R-55342 Par. 4.7.10
Solderability	95% Minimum Coverage	MIL-R-55342 Par. 4.7.11

PACKAGE POWER TEMPERATURE DERATING CURVE



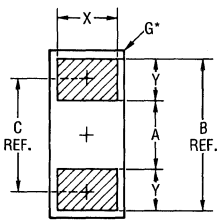
Bourns CR0805 and CR1206 chip resistors have an operating temperature range of −55°C to +125°C. They should be derated according to the curve.

TAPE AND REEL SPECIFICATIONS



Tape and reel dimensions conform to EIA RS-481A.

RECOMMENDED LAND PATTERNS



Symbol	0805	1206
A	.039 (1.00)	.072 (1.82)
B	.118 (3.00)	.160 (4.06)
C	.079 (2.00)	.116 (2.94)
X	.050 (1.27)	.064 (1.62)
Y	.039 (1.00)	.044 (1.12)
G	.059 X .138 (1.5 X 3.5)	.079 X .177 (2.0 X 4.5)

*Grid part outline is the perimeter that encompasses the part and its land pattern measured to the next .5mm increment.

Dimensions are in inches. Dimensions in parentheses are millimeters.

Specifications are subject to change without notice.

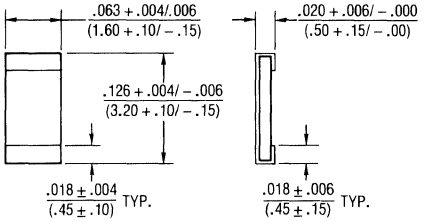
- Consistent manufacturing processes and product performance
- Broad range of resistance values
- High temperature materials and construction

Model CR Series

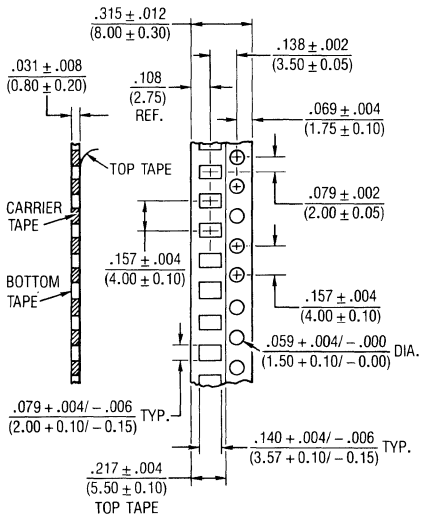
Bourns® Chip Resistors

1/8 WATT (CR1206)

PACKAGE DIMENSIONS



TAPE DIMENSIONS



Dimensions are in inches. Dimensions in parentheses are millimeters.

TYPICAL PART MARKING

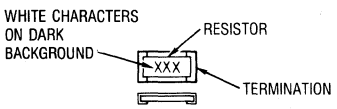
Units will be marked with resistance code only, in the following manner:

CR1206 (±5% tolerance): 3 digits will be used. The first 2 digits are significant, with the third digit denoting the number of zeros following. "R" will be used to denote a decimal point.

Example: 4.7Ω = 4R7 1MΩ = 105
10Ω = 100 20MΩ = 206
100Ω = 101 0Ω JUMPER = 000

CR1206 (±1% tolerance): 4 digits will be used. The first 3 digits are significant, with the fourth digit denoting the number of zeros following. "R" will be used to denote a decimal point.

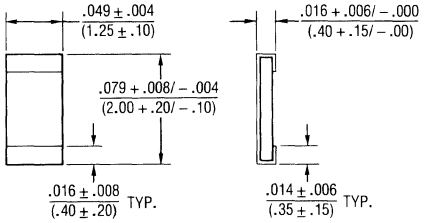
Example: 4.7Ω = 4R70 1MΩ = 1004
100Ω = 1000 20MΩ = 2005



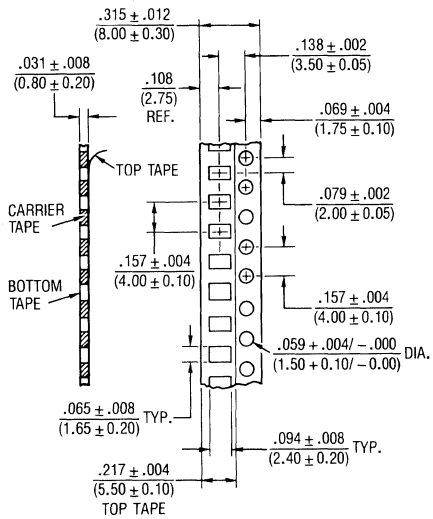
Specifications are subject to change without notice.

1/10 WATT (CR0805)

PACKAGE DIMENSIONS



TAPE DIMENSIONS



Dimensions are in inches. Dimensions in parentheses are millimeters.

TYPICAL PART MARKING

CR0805 (±5% tolerance): 2 digits will be used, an alpha character followed by a number, per Tables 1 and 2.

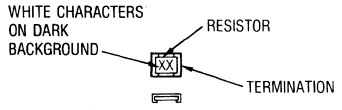
Example: 10Ω = A1 4.7Ω = S0
68KΩ = W4 0Ω = 00

TABLE 1

STANDARD NUMBER	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0
SYMBOL	A	B	C	D	E	F	G	H	J	K	L	M
STANDARD NUMBER	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1
SYMBOL	N	P	Q	R	S	T	U	V	W	X	Y	Z

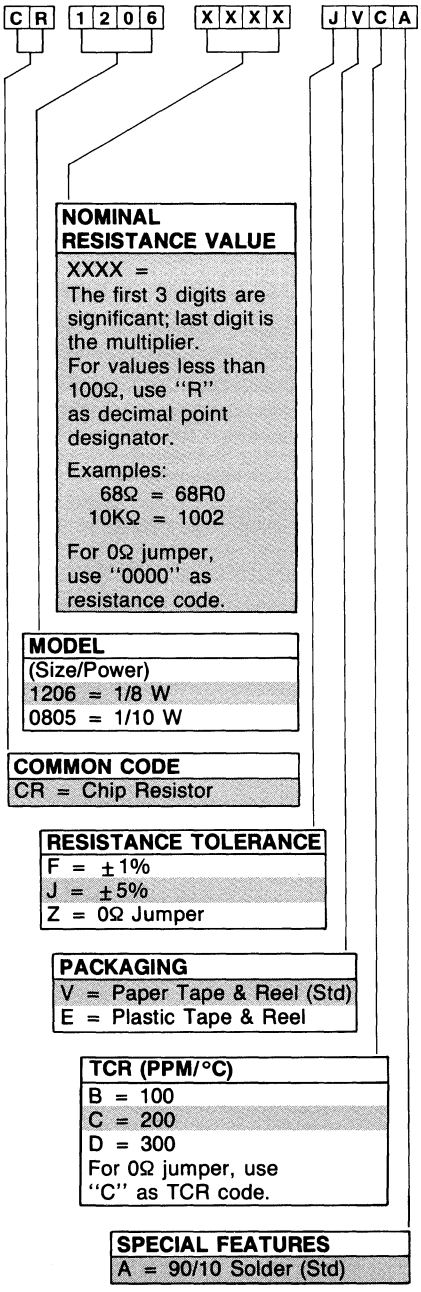
TABLE 2

MULTIPLIER	10^0	10^1	10^2	10^3	10^4	10^5	10^6	10^7	10^8	10^9
SYMBOL	0	1	2	3	4	5	6	7	8	9



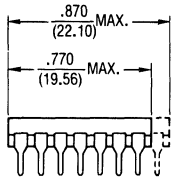
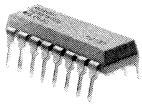
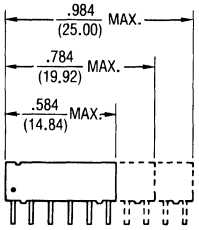
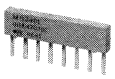
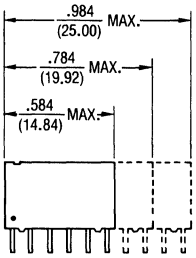
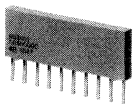
NOTE: As of fourth quarter 1988, CR0805 will become the same as CR1206 ±5.

HOW TO ORDER

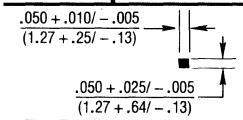
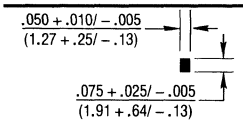
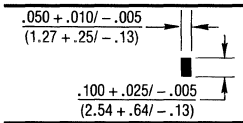
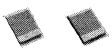
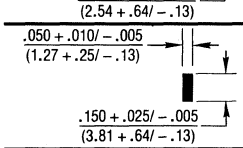
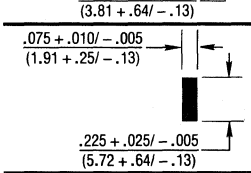


Part Number Example:
CR12061002JVCA = Chip Resistor, 1/8 Watt, 10KΩ ±5%, Paper Tape, 200 PPM/°C, 90/10 Solder Coating.

MIL-SPEC RESISTOR NETWORKS

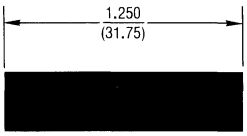
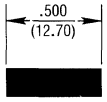
Package Outline	Product	Series Number	Pin Ct.	Isolated Resistors	Bussed Resistors	Page Number
	Molded DIP Low Profile 	**M83401-01**	14	M8340101KXXXXGA M8340101MXXXXGA M8340101MXXXXJA	M8340101KXXXXGB M8340101MXXXXGB M8340101MXXXXJB	178
		M83401-02	16	M8340102KXXXXGA M8340102MXXXXGA M8340102MXXXXJA	M8340102KXXXXGB M8340102MXXXXGB M8340102MXXXXJB	
	Molded SIP Low Profile  .195" (4.96mm) Seated Height	**M83401-07**	6	M8340107KXXXXGG M8340107MXXXXGG M8340107MXXXXJG	M8340107KXXXXGC M8340107MXXXXGC M8340107MXXXXJC	180
		M83401-08	8	M8340108KXXXXGG M8340108MXXXXGG M8340108MXXXXJG	M8340108KXXXXGC M8340108MXXXXGC M8340108MXXXXJC	
		M83401-09	10	M8340109KXXXXGG M8340109MXXXXGG M8340109MXXXXJG	M8340109KXXXXGC M8340109MXXXXGC M8340109MXXXXJC	
	Molded SIP High Profile  .350" (8.89mm) Seated Height	**M83401-04**	6	M8340104KXXXXGG M8340104MXXXXGG M8340104MXXXXJG	M8340104KXXXXGC M8340104MXXXXGC M8340104MXXXXJC	182
		M83401-05	8	M8340105KXXXXGG M8340105MXXXXGG M8340105MXXXXJG	M8340105KXXXXGC M8340105MXXXXGC M8340105MXXXXJC	
		M83401-06	10	M8340106KXXXXGG M8340106MXXXXGG M8340106MXXXXJG	M8340106KXXXXGC M8340106MXXXXGC M8340106MXXXXJC	

THICK FILM CHIP RESISTORS

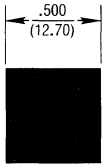
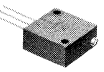
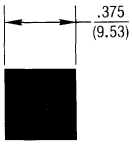
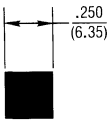
Board Space	Product	Mil Standard	Series No.	Tolerance	Resistance Range	Power Rating	Page Number
		M55342, 02	RM 0505	1%	10 ohms to 294K ohms	50 Milliwatt	196
				5%	10 ohms to 470K ohms		
		M55342, 06	RM 0705	1%	10 ohms to 500K ohms	100 Milliwatt	197
				5%	10 ohms to 1 megohm		
		M55342, 03	RM 1005	1%	10 ohms to 500K ohms	100 Milliwatt	198
				5%	10 ohms to 1 megohm		
		M55342, 04	RM 1505	1%	10 ohms to 1 megohm	150 Milliwatt	199
				5%	10 ohms to 4.7 megohms		
		M55342, 05	RM 2208	1%	10 ohms to 2 megohms	225 Milliwatt	200
				5%	10 ohms to 15 megohms		

Mil-Spec Trimming Potentiometers

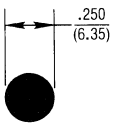
RECTANGULAR, MULTITURN, SEALED

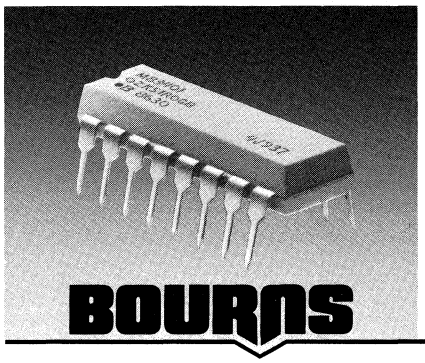
Board Space	Product	Model Number	Element Type	Turns	Grade	Pin Styles	Page Number
		**RTR12**	Wirewound	22	Hi-Rel Military	L,P,Y	184
		**RT12**	Wirewound	22	Military	L,P,Y	184
		**RJR12**	Cermet	22	Hi-Rel Military	L,Y	188
		**RJ12**	Cermet	22	Military	L,P,Y	188
		**RJR28**	Cermet	10	Hi-Rel Military	P	192

SQUARE, MULTITURN, SEALED

		**RTR22**	Wirewound	25	Hi-Rel Military	L,P,W,X	185
		**RT22**	Wirewound	25	Military	L,P,W,X	185
		**RJ22**	Cermet	25	Military	L,P,W,X	189
		**RTR24**	Wirewound	25	Hi-Rel Military	P,W,X	186
		**RT24**	Wirewound	25	Military	P,W,X	186
		**RJR24**	Cermet	22	Hi-Rel Military	P,W,X	190
		**RJ24**	Cermet	22	Military	L,P,W,X	190
		**RT26**	Wirewound	11	Military	W,X	187
		**RJR26**	Cermet	12	Hi-Rel Military	P,W,X	191
		**RJ26**	Cermet	12	Military	P,W,X	191

ROUND, SINGLE-TURN, SEALED

		**RJR50**	Cermet	1	Hi-Rel Military	P	193
		**RJ50**	Cermet	1	Military	P	193



MILITARY QUALIFIED MOLDED DIPS

- Molded package is compatible with automatic insertion equipment
- High temperature solder ensures compatibility with all popular board soldering techniques

Models M83401-01/M83401-02

Bourns® Resistor Network

Electrical Specifications

Environmental Specifications

Mechanical Specifications

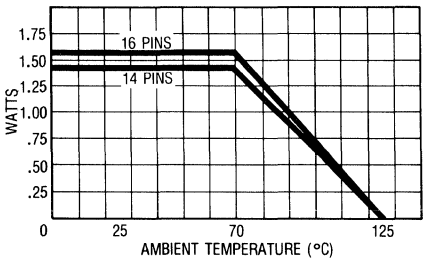
	CHARACTERISTICS K	CHARACTERISTICS M
Temperature Coefficient of Resistance (TCR)	±100ppm/°C	±300ppm/°C
Maximum Ambient Temperature @ Rated Power	70°C	70°C
Maximum Ambient Temperature @ Zero Power	125°C	125°C
Resistance Tolerance	G = ±2%	G = ±2% J = ±5%
Thermal Shock ΔR Plus Power Conditioning ΔR	±0.7%	±0.7%
Low Temperature Operation ΔR	±0.25%	±0.5%
Short Time Overload ΔR	±0.25%	±0.5%
Terminal Strength ΔR	±0.25%	±0.25%
Resistance to Soldering Heat - ΔR	±0.25%	±0.25%
Moisture Resistance ΔR	±0.5%	±0.5%
Shock ΔR	±0.25%	±0.25%
Vibration - High Frequency ΔR	±0.25%	±0.25%
Life ΔR	±0.5%	±2.0%
High Temperature Exposure ΔR	±0.5%	±1.0%
Low Temperature Storage ΔR	±0.25%	±0.5%
Insulation Resistance	10,000MegΩ	10,000MegΩ

Flammability ..... Conforms to UL94V-0
Lead Frame Material ..... Copper (OLIN 194) tin/lead alloy finish
Body Material ..... Novolac epoxy

Schematic A (Isolated)

PACKAGE POWER RATING AT 70°C
14-Pin ..... 1.4 watts
16-Pin ..... 1.6 watts

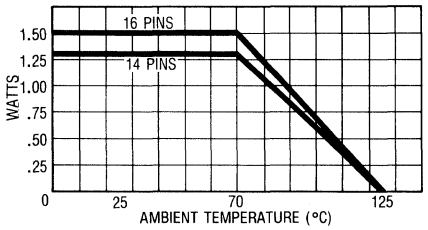
DERATING CURVE

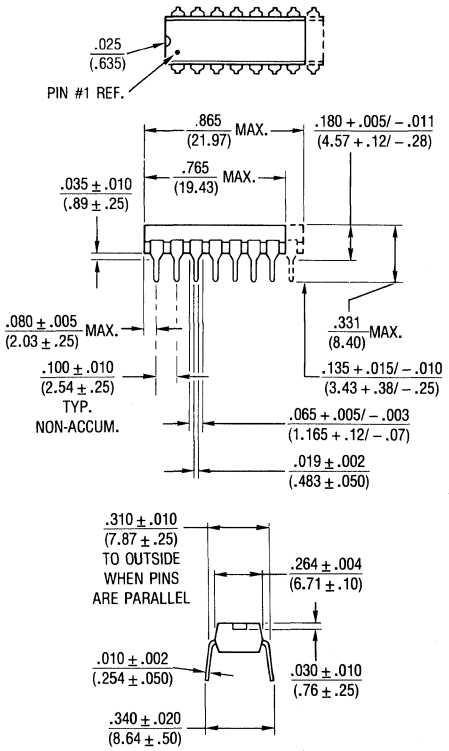


Schematic B (Bussed)

PACKAGE POWER RATING AT 70°C
14-Pin ..... 1.3 watts
16-Pin ..... 1.5 watts

DERATING CURVE



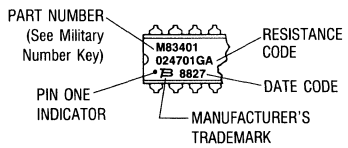


Governing dimensions are in inches. Dimensions in parentheses are metric (mm) and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

TYPICAL PART MARKING

Represents total content. Layout may vary.



MILITARY NUMBER KEY

M83401 01 K XXXX G B

- Military Resistor Network Identifier
- Number of Pins: •01 = 14-pin; •02 = 16-pin
- Characteristic (See specifications above)
- Resistance Code: •First 3 digits are significant (R indicates decimal point); •Fourth digit represents number of zeros to follow
- Tolerance: •G = ±2.0%; •J = ±5.0%
- Schematic: •B = Bussed; •A = Isolated

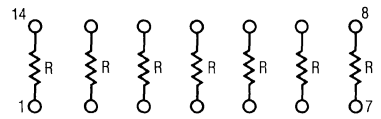
- Copper leads for superior heat dissipation
- Gold epoxy provides excellent marking contrast
- Laser marking for permanent identification

Models M83401-01/M83401-02

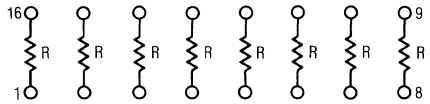
BI® Resistor Network

ISOLATED RESISTORS

Mil-Style 01 (14-Pin)



Mil-Style 02 (16-Pin)

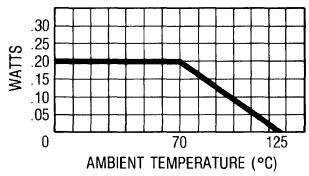


SCHEMATIC A

Resistance Tolerance
- G . . . . . ±2%
- J . . . . . ±5%

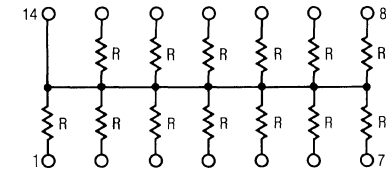
Power Rating each Resistor
- At 70°C . . . . . 0.20 watt

POWER TEMPERATURE DERATING CURVE

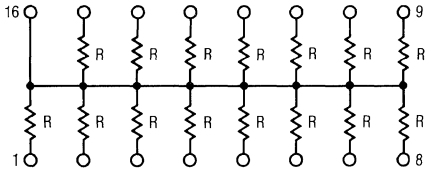


BUSSED RESISTORS

Mil-Style 01 (14-Pin)



Mil-Style 02 (16-Pin)

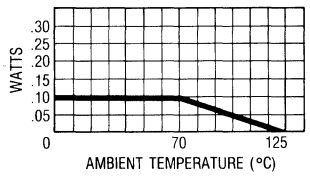


SCHEMATIC B

Resistance Tolerance
- G . . . . . ±2%
- J . . . . . ±5%

Power Rating each Resistor
- At 70°C . . . . . 0.10 watt

POWER TEMPERATURE DERATING CURVE

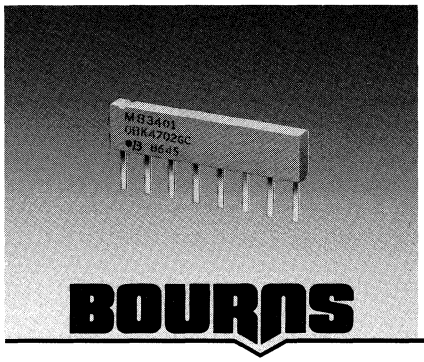


STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
51	51R0	4.7K	4701
56	56R0	5.1K	5101
68	68R0	5.6K	5601
82	82R0	6.8K	6801
100	1000	8.2K	8201
150	1500	10K	1002
220	2200	22K	2202
330	3300	33K	3302
470	4700	47K	4702
510	5100	56K	5602
560	5600	68K	6802
680	6800	82K	8202
820	8200	100K	1003
1K	1001	220K	2203
1.5K	1501	470K	4703
2.0K	2001	1Meg	1004
2.2K	2201		
3.3K	3301		

Other values available between 51 ohms and 1.0 megohms.

Military P/N	Commercial Equivalent (Ref. Only)
M8340102KXXXXGB M8340102MXXXXGB M8340102MXXXXJB	4116R-002-RC
M8340102KXXXXGA M8340102MXXXXGA M8340102MXXXXJA	4116R-001-RC
M8340101KXXXXGB M8340101MXXXXGB M8340101MXXXXJB	4114R-002-RC
M8340101KXXXXGA M8340101MXXXXGA M8340101MXXXXJA	4114R-001-RC



BOURNS

MILITARY QUALIFIED MOLDED SIPS / LOW PROFILE

- Molded package is compatible with automatic insertion equipment
- Low profile is compatible with DIPs

Models M83401-07/M83401-08/M83401-09

B® Resistor Network

Electrical Specifications

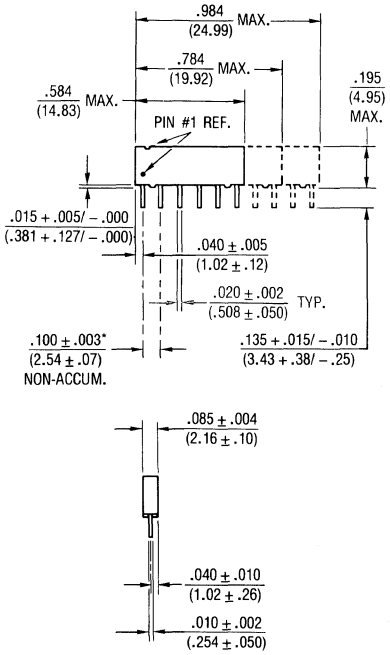
	CHARACTERISTICS K	CHARACTERISTICS M
Temperature Coefficient of Resistance (TCR)	±100ppm/°C	±300ppm/°C
Maximum Ambient Temperature @ Rated Power	70°C	70°C
Maximum Ambient Temperature @ Zero Power	125°C	125°C
Resistance Tolerance	G = ±2%	G = ±2% J = ±5%

Environmental Specifications

	K	M
Thermal Shock ΔR Plus Power Conditioning ΔR	±0.7%	±0.7%
Low Temperature Operation ΔR	±0.25%	±0.5%
Short Time Overload ΔR	±0.25%	±0.5%
Terminal Strength ΔR	±0.25%	±0.25%
Resistance to Soldering Heat - ΔR	±0.25%	±0.25%
Moisture Resistance ΔR	±0.5%	±0.5%
Shock ΔR	±0.25%	±0.25%
Vibration - High Frequency ΔR	±0.25%	±0.25%
Life ΔR	±0.5%	±2.0%
High Temperature Exposure ΔR	±0.5%	±1.0%
Low Temperature Storage ΔR	±0.25%	±0.5%
Insulation Resistance	10,000MegΩ	10,000MegΩ

Mechanical Specifications

Flammability ..... Conforms to UL94V-0
Lead Frame Material ..... Copper (OLIN 194) tin/lead alloy finish
Body Material ..... Novolac epoxy



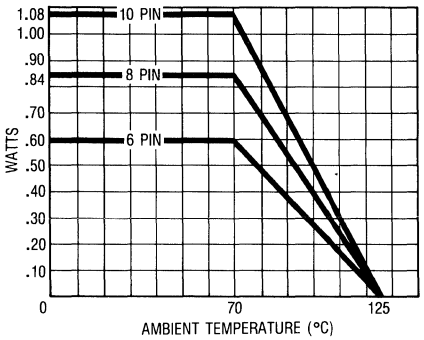
Governing dimensions are in inches. Dimensions in parentheses are metric (mm), and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

Schematic C (Bussed)

PACKAGE POWER RATING AT 70°C
10-Pin ..... 1.08 watts
8-Pin ..... .84 watt
6-Pin ..... .60 watt

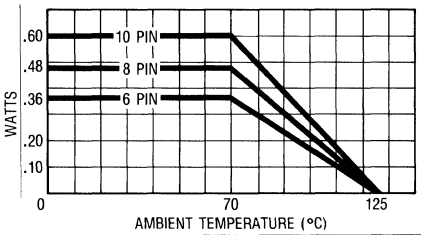
DERATING CURVE



Schematic G (Isolated)

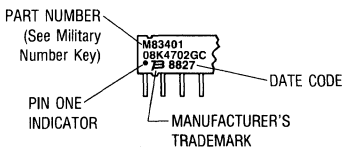
PACKAGE POWER RATING AT 70°C
10-Pin ..... .60 watt
8-Pin ..... .48 watt
6-Pin ..... .36 watt

DERATING CURVE



TYPICAL PART MARKING

Represents total content. Layout may vary.



MILITARY NUMBER KEY

M83401 08 K XXXX G C

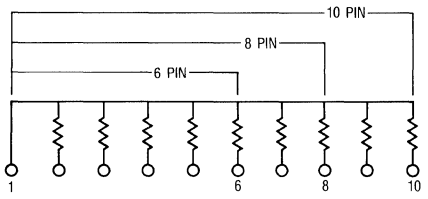
- Military Resistor Network Identifier
- Number of Pins
  - •07 = 6-pin
  - •08 = 8-pin
  - •09 = 10-pin
- Characteristic (See specifications above)
- Resistance Code
  - •First 3 digits are significant (R indicates decimal point)
  - •Fourth digit represents number of zeros to follow
- Tolerance
  - •G = ±2.0%
  - •J = ±5.0%
- Schematic
  - •C = Bussed
  - •G = Isolated

- High temperature solder ensures compatibility with all popular board soldering techniques
- Copper leads for superior heat dissipation

Models M83401-07/M83401-08/M83402-09

B® Resistor Network

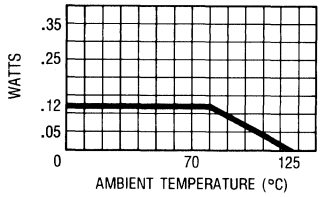
BUSSED RESISTORS
Mil-Style 07 (6-Pin)
08 (8-Pin)
09 (10-Pin)



SCHEMATIC C

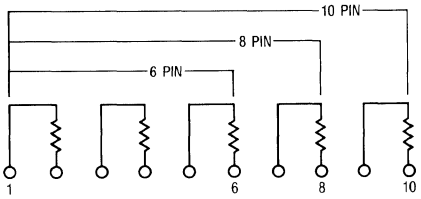
Resistance Tolerance
G . . . . . ±2%
J . . . . . ±5%
Power Rating each Resistor
At 70°C . . . . . 0.12 watt

POWER TEMPERATURE DERATING CURVE



These models incorporate 5, 7 or 9 thick-film resistors of equal value, each connected between a common bus (pin 1) and a separate pin.

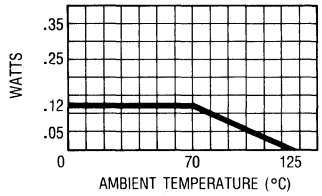
ISOLATED RESISTORS
Mil-Style 07 (6-Pin)
08 (8-Pin)
09 (10-Pin)



SCHEMATIC G

Resistance Tolerance
G . . . . . ±2%
J . . . . . ±5%
Power Rating each Resistor
At 70°C . . . . . 0.12 watt

POWER TEMPERATURE DERATING CURVE



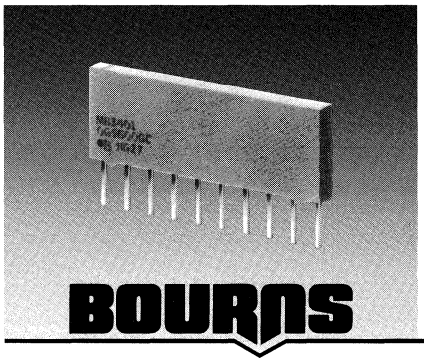
These models incorporate 3, 4 or 5 isolated thick-film resistors of equal value, each connected between two pins.

STANDARD RESISTANCE TABLE

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
51	51R0	4.7K	4701
56	56R0	5.1K	5101
68	68R0	5.6K	5601
82	82R0	6.8K	6801
100	1000	8.2K	8201
150	1500	10K	1002
220	2200	22K	2202
330	3300	33K	3302
470	4700	47K	4702
510	5100	56K	5602
560	5600	68K	6802
680	6800	82K	8202
820	8200	100K	1003
1K	1001	220K	2203
1.5K	1501	470K	4703
2.0K	2001	1Meg	1004
2.2K	2201		
3.3K	3301		

Other values available between 51 ohms and 1.0 megohms.

Military Part Number	Commercial Equivalent (Ref. Only)
M8340107KXXXXGG M8340107MXXXXGG M8340107MXXXXJG	4306R-102-RC
M8340107KXXXXGC M8340107MXXXXGC M8340107MXXXXJC	4306R-101-RC
M8340108KXXXXGG M8340108MXXXXGG M8340108MXXXXJG	4308R-102-RC
M8340108KXXXXGC M8340108MXXXXGC M8340108MXXXXJC	4308R-101-RC
M8340109KXXXXGG M8340109MXXXXGG M8340109MXXXXJG	4310R-102-RC
M8340109KXXXXGC M8340109MXXXXGC M8340109MXXXXJC	4310R-101-RC



MILITARY QUALIFIED MOLDED SIPS / HIGH PROFILE

- Molded package is compatible with automatic insertion equipment
- High temperature solder ensures compatibility with all popular board soldering techniques
- Copper leads for superior heat dissipation

Models M83401-04/M83401-05/M83401-06

BI® Resistor Network

Electrical Specifications

	CHARACTERISTIC K	CHARACTERISTIC M
Temperature Coefficient of Resistance (TCR)	±100ppm/°C	±300ppm/°C
Maximum Ambient Temperature @ Rated Power	70°C	70°C
Maximum Ambient Temperature @ Zero Power	125°C	125°C
Resistance Tolerance	G = ±2%	G = ±2% J = ±5%

Environmental Specifications

	K	M
Thermal Shock ΔR Plus Power Conditioning ΔR	±0.7%	±0.7%
Low Temperature Operation ΔR	±0.25%	±0.5%
Short Time Overload ΔR	±0.25%	±0.5%
Terminal Strength ΔR	±0.25%	±0.25%
Resistance to Soldering Heat - ΔR	±0.25%	±0.25%
Moisture Resistance ΔR	±0.5%	±0.5%
Shock ΔR	±0.25%	±0.25%
Vibration - High Frequency ΔR	±0.25%	±0.25%
Life ΔR	±0.5%	±2.0%
High Temperature Exposure ΔR	±0.5%	±1.0%
Low Temperature Storage ΔR	±0.25%	±0.5%
Insulation Resistance	10,000MegΩ	10,000MegΩ

Mechanical Specifications

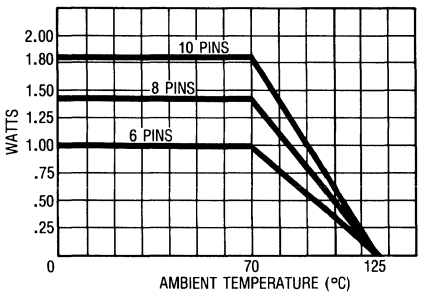
Flammability ..... Conforms to UL94V-0
Lead Frame Material ..... Copper (OLIN 194) tin/lead alloy finish
Body Material ..... Novolac epoxy

Schematic C (Bussed)

PACKAGE POWER RATING AT 70°C

10-Pin ..... 1.8 watts
8-Pin ..... 1.4 watts
6-Pin ..... 1.0 watts

DERATING CURVE

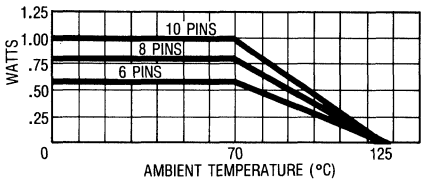


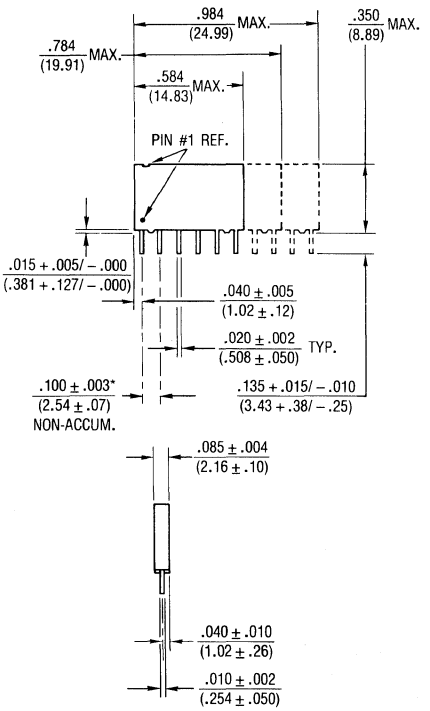
Schematic G (Isolated)

PACKAGE POWER RATING AT 70°C

10-Pin ..... 1.0 watt
8-Pin ..... 0.8 watt
6-Pin ..... 0.6 watt

DERATING CURVE



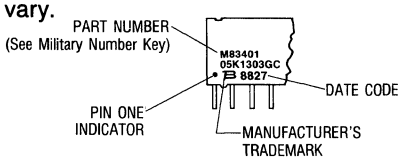


Governing dimensions are in inches. Dimensions in parentheses are metric (mm), and are approximate.

*Terminal centerline to centerline measurements made at point of emergence of the lead from the body.

TYPICAL PART MARKING

Represents total content. Layout may vary.



MILITARY NUMBER KEY

M83401 05 K XXXX G C

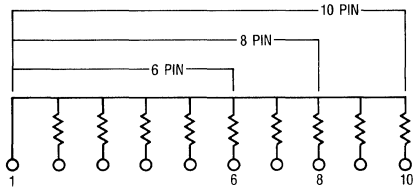
- Military Resistor Network Identifier
- Number of Pins
  - •04 = 6-pin
  - •05 = 8-pin
  - •06 = 10-pin
- Characteristic (See specifications above)
- Resistance Code
  - •First 3 digits are significant (R indicates decimal point)
  - •Fourth digit represents number of zeros to follow
- Tolerance
  - •G = ±2.0%
  - •J = ±5.0%
- Schematic
  - •C = Bussed
  - •G = Isolated

- Gold epoxy provides excellent marking contrast
- Laser marking for permanent identification

Models M83401-04/M83401-05/M83401-06

B® Resistor Network

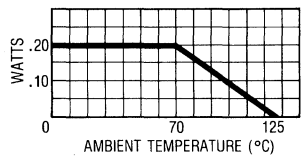
BUSSED RESISTORS
Mil-Style 04 (6-Pin)
05 (8-Pin)
06 (10-Pin)



SCHEMATIC C

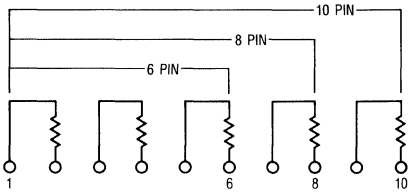
Resistance Tolerance
G ..... ±2%
J ..... ±5%
Power Rating each Resistor
At 70°C ..... 0.20 watt

POWER TEMPERATURE DERATING CURVE



These models incorporate 5, 7 or 9 thick-film resistors of equal value, each connected between a common bus (pin 1) and a separate pin.

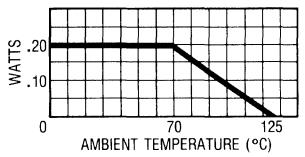
ISOLATED RESISTORS
Mil-Style 04 (6-Pin)
05 (8-Pin)
06 (10-Pin)



SCHEMATIC G

Resistance Tolerance
G ..... ±2%
J ..... ±5%
Power Rating each Resistor
At 70°C ..... 0.20 watt

POWER TEMPERATURE DERATING CURVE



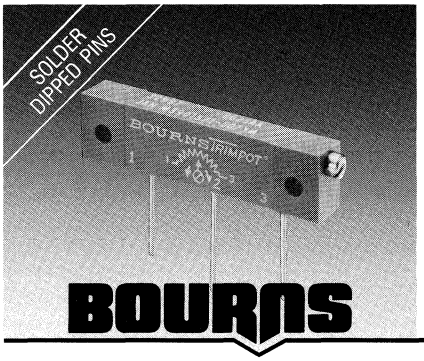
These models incorporate 3, 4 or 5 isolated thick-film resistors of equal value, each connected between two pins.

STANDARD RESISTANCE VALUES

Resistance (Ohms)	Resistance Code	Resistance (Ohms)	Resistance Code
51	51R0	4.7K	4701
56	56R0	5.1K	5101
68	68R0	5.6K	5601
82	82R0	6.8K	6801
100	1000	8.2K	8201
150	1500	10K	1002
220	2200	22K	2202
330	3300	33K	3302
470	4700	47K	4702
510	5100	56K	5602
560	5600	68K	6802
680	6800	82K	8202
820	8200	100K	1003
1K	1001	220K	2203
1.5K	1501	470K	4703
2.0K	2001	1Meg	1004
2.2K	2201		
3.3K	3301		

Other values available between 51 ohms and 1.0 megohms.

Military Part Number	Commercial Equivalent (Ref. Only)
M8340104KXXXXGG M8340104MXXXXGG M8340104MXXXXJG	4306H-102-RC
M8340104KXXXXGC M8340104MXXXXGC M8340104MXXXXJC	4306H-101-RC
M8340105KXXXXGG M8340105MXXXXGG M8340105MXXXXJG	4308H-102-RC
M8340105KXXXXGC M8340105MXXXXGC M8340105MXXXXJC	4308H-101-RC
M8340106KXXXXGG M8340106MXXXXGG M8340106MXXXXJG	4310H-102-RC
M8340106KXXXXGC M8340106MXXXXGC M8340106MXXXXJC	4310H-101-RC



1-1/4 INCH LONG / MULTITURN / WIREWOUND / SEALED

- DESC QPL for Model RT12 per MIL-R-27208
- DESC QPL for Model RTR12 per High-Rel MIL-R-39015
- High power dissipation 0.75 watt @ 85°C
- High operating temperature 150°C

Models RT/RTR 12

Trimpot® Potentiometer

Electrical Specifications

Standard Resistance Range
.....10 to 20,000 ohms
(see qualified part number table)
Resistance Tolerance.....±5% std.
Absolute Minimum Resistance
.....0.1% or 1.0 ohm
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution.....(see standard
qualified part number table)
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000 feet.....350 vac
Adjustment Travel....22 turns nom.

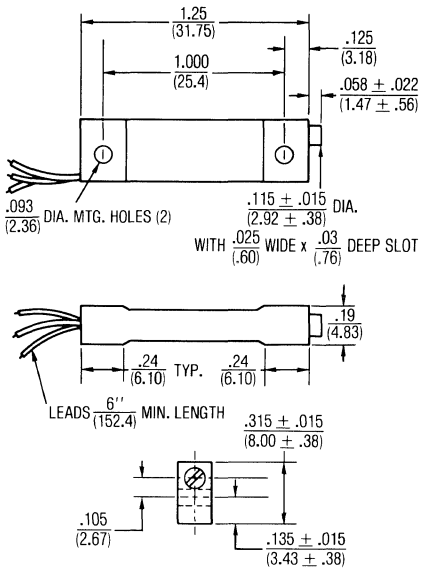
Environmental Specifications

Power Rating
85°C.....0.75 watt
150°C.....0 watt
Temperature Range
.....–65°C to +150°C
Temperature Coefficient
.....±50ppm/°C max.
Seal Test ..... 85°C Fluorinert*
(pin styles only)
Humidity..MIL-STD-202 Method 106
.....RT12 (1% ΔTR, 10 meg. IR)
....RTR12 (1% ΔTR, 100 meg. IR)
Vibration 20G
RT/RTR12 (1% ΔTR,
0.5% + Resolution ΔVR)
Shock 100G
RT/RTR12 (1% ΔTR,
0.5% + Resolution ΔVR)
Load Life
RT12 1,000 hours 0.75 watt @ 85°C
(2% ΔTR, 2% + Resolution ΔVR)
RTR12 10,000 hours 0.75 watt at 85°C
(3% + Resolution ΔTR)
Mechanical Life.....200 cycles
RT/RTR12 (2% ΔTR)

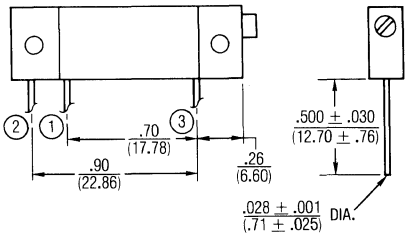
Physical Specifications

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable pins and lugs
Flexible leads/7 strands of 38 AWG
Weight.....0.10 oz.
Marking..Manufacturer's trademark,
wiring diagram, date code,
Mil-Spec part number

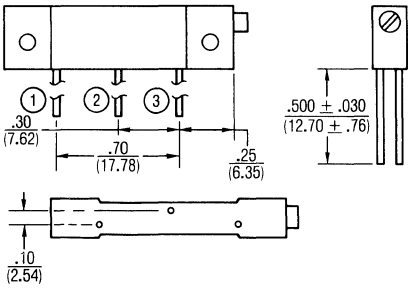
"L" FLEX LEAD TYPE

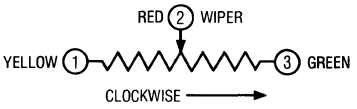


"P" PRINTED CIRCUIT PIN TYPE



"Y" PRINTED CIRCUIT PIN TYPE





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

Refer to pages 194 and 195 for RTR part numbering/ordering information.

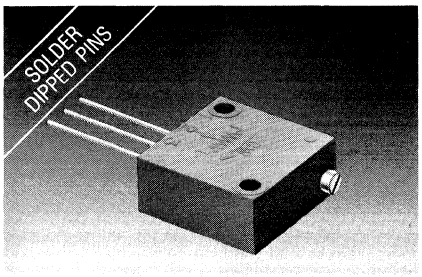
BOURNS QUALIFIED PART NUMBERS

STD. VALUES OHMS	RT12C2_____			RTR12D_____			NOMINAL RESOLUTION (PERCENT)
	L	P	Y	L	P	Y	
10	RT12C2L100	RT12C2P100	RT12C2Y100	—	—	—	2.40
20	RT12C2L200	RT12C2P200	RT12C2Y200	—	—	—	1.90
50	RT12C2L500	RT12C2P500	RT12C2Y500	—	—	—	1.40
100	RT12C2L101	RT12C2P101	RT12C2Y101	—	—	—	1.00
200	RT12C2L201	RT12C2P201	RT12C2Y201	—	—	—	0.86
500	RT12C2L501	RT12C2P501	RT12C2Y501	RTR12DL501*	RTR12DP501*	RTR12DY501*	0.89
1K	RT12C2L102	RT12C2P102	RT12C2Y102	RTR12DL102*	RTR12DP102*	RTR12DY102*	0.72
2K	RT12C2L202	RT12C2P202	RT12C2Y202	RTR12DL202*	RTR12DP202*	RTR12DY202*	0.58
5K	RT12C2L502	RT12C2P502	RT12C2Y502	RTR12DL502*	RTR12DP502*	RTR12DY502*	0.43
10K	RT12C2L103	RT12C2P103	RT12C2Y103	RTR12DL103*	RTR12DP103*	RTR12DY103*	0.39
20K	RT12C2L203	RT12C2P203	RT12C2Y203	RTR12DL203*	RTR12DP203*	RTR12DY203*	0.31

*Last letter in number is failure rate level. M = 1.0% P = 0.1%

Bourns reserves the right to substitute a higher grade failure rate (QPL) than requested as per MIL-R-39015.

*"Fluorinert" is a registered trademark of 3M Co.



BOURNS

1/2 INCH SQUARE / MULTITURN / WIREWOUND / SEALED

- DESC QPL for Model RT22 per MIL-R-27208
- DESC QPL for Model RTR22 per High-Rel MIL-R-39015
- High power dissipation 0.75 watt @ 85°C
- Superior humidity-proof performance
- SILVERWELD® termination

Models RT/RTR 22

Bourns® Trimming Potentiometer

Electrical Specifications

Standard Resistance Range
.....50 to 20,000 ohms
(see qualified part number table)
Resistance Tolerance.....±5% std.
Absolute Minimum Resistance
.....0.1% or 1.0 ohm
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution.....(see standard
qualified part number table)
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000 feet.....350 vac
Effective Travel.....25 turns nom.

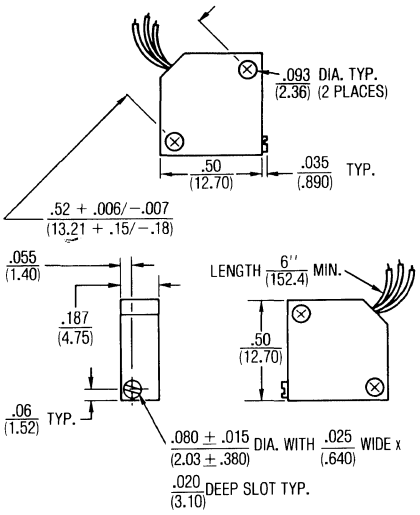
Environmental Specifications

Power Rating
85°C.....0.75 watt
150°C.....0 watt
Temperature Range
.....−65°C to +150°C
Temperature Coefficient
.....±50ppm/°C max.
Seal Test.....85°C Fluorinert*
(pin styles only)
Humidity..MIL-STD-202 Method 106
.....RT22 (1% ΔTR, 10 meg. IR)
....RTR22 (1% ΔTR, 100 meg. IR)
Vibration.....20G
RT/RTR22 (1% ΔTR,
0.5% + Resolution ΔVR)
Shock.....100G
RT/RTR22 (1% ΔTR,
0.5% + Resolution ΔVR)
Load Life
RT22 1,000 hours 0.75 watt @ 85°C
(2% ΔTR, 2% + Resolution ΔVR)
RTR22 10,000 hours 0.75 watt at 85°C
(3% + Resolution ΔTR)
Mechanical Life.....200 cycles
RT/RTR22 (2% ΔTR)

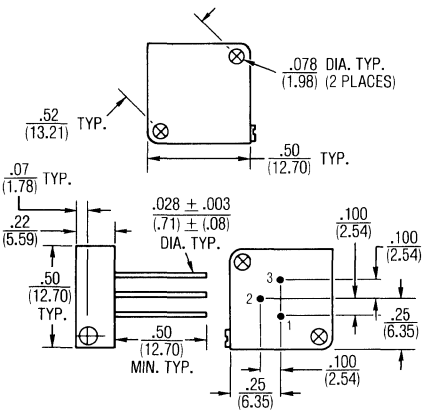
Physical Specifications

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Flexible leads/7 strands of 38 AWG
Weight.....0.06 oz.
Machine Screw Mounting
Torque.....12 oz-in. max.
Marking..Manufacturer's trademark,
wiring diagram, date code,
Mil-Spec part number

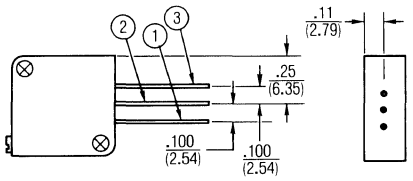
"L" FLEX LEAD TYPE



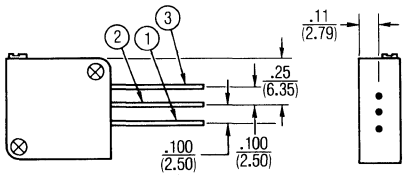
"P" PRINTED CIRCUIT PIN TYPE

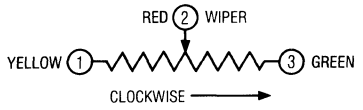


"W" PRINTED CIRCUIT PIN TYPE



"X" PRINTED CIRCUIT PIN TYPE





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

Refer to pages 194 and 195 for RTR part numbering/ordering information.

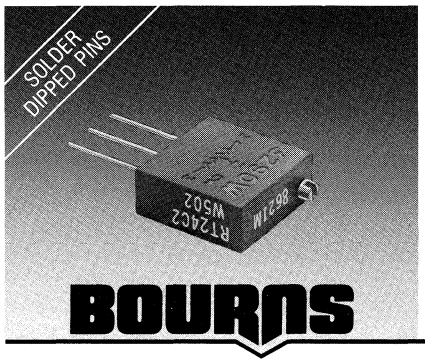
BOURNS QUALIFIED PART NUMBERS

STD. VALUES OHMS	RT22C2____				RTR22D____				NOMINAL RESOLUTION (PERCENT)
	L	P	W	X	L	P	W	X	
10	—	—	—	—	—	—	—	—	—
20	—	—	—	—	—	—	—	—	—
50	RT22C2L500	RT22C2P500	RT22C2W500	RT22C2X500	—	—	—	—	0.80
100	RT22C2L101	RT22C2P101	RT22C2W101	RT22C2X101	—	—	—	—	0.90
200	RT22C2L201	RT22C2P201	RT22C2W201	RT22C2X201	—	—	—	—	0.70
500	RT22C2L501	RT22C2P501	RT22C2W501	RT22C2X501	RTR22DL501*	RTR22DP501*	RTR22DW501*	RTR22DX501*	0.60
1K	RT22C2L102	RT22C2P102	RT22C2W102	RT22C2X102	RTR22DL102*	RTR22DP102*	RTR22DW102*	RTR22DX102*	0.40
2K	RT22C2L202	RT22C2P202	RT22C2W202	RT22C2X202	RTR22DL202*	RTR22DP202*	RTR22DW202*	RTR22DX202*	0.30
5K	RT22C2L502	RT22C2P502	RT22C2W502	RT22C2X502	RTR22DL502*	RTR22DP502*	RTR22DW502*	RTR22DX502*	0.25
10K	RT22C2L103	RT22C2P103	RT22C2W103	RT22C2X103	RTR22DL103*	RTR22DP103*	RTR22DW103*	RTR22DX103*	0.19
20K	RT22C2L203	RT22C2P203	RT22C2W203	RT22C2X203	RTR22DL203*	RTR22DP203*	RTR22DW203*	RTR22DX203*	0.16

*Last letter in number is failure rate level. M = 1.0% P = 0.1%

Bourns reserves the right to substitute a higher grade failure rate (QPL) than requested as per MIL-R-39015.

*"Fluorinert" is a registered trademark of 3M Co.



3/8 INCH SQUARE / MULTITURN / WIREWOUND / SEALED

- DESC QPL for Model RT24 per MIL-R-27208
- DESC QPL for Model RTR24 per High-Rel MIL-R-39015
- High performance: 0.75 watt @ 85°C
- 150°C maximum operating temperature
- Space saving design: 0.150'' body width

Models RT/RTR 24

Trimpot® Potentiometer

Electrical Specifications

Standard Resistance Range
.....10 to 10,000 ohms
(see qualified part number table)
Resistance Tolerance.....±5% std.
Absolute Minimum Resistance
.....0.1% or 1.0 ohm
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution.....(see standard
qualified part number table)
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000 feet.....350 vac
Effective Travel.....25 turns nom.

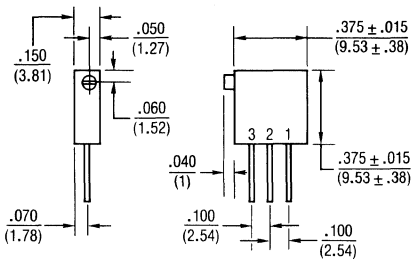
Environmental Specifications

Power Rating
85°C.....0.75 watt
150°C.....0 watt
Temperature Range
.....–65°C to +150°C
Temperature Coefficient
.....±50ppm/°C max.
Seal Test .....85°C Fluorinert*
Humidity..MIL-STD-202 Method 106
.....RT24 (1% ΔTR, 10 meg. IR)
....RTR24 (1% ΔTR, 100 meg. IR)
Vibration.....20G
RT/RTR24 (1% ΔTR,
0.5% + Resolution ΔVR)
Shock.....100G
RT/RTR24 (1% ΔTR,
0.5% + Resolution ΔVR)
Load Life
RT24 1,000 hours 0.75 watt @ 85°C
(2% ΔTR, 2% + Resolution ΔVR)
RTR24 10,000 hours 0.75 watt at 85°C
(3% + Resolution ΔTR)
Mechanical Life.....200 cycles
RT/RTR24 (2% ΔTR)

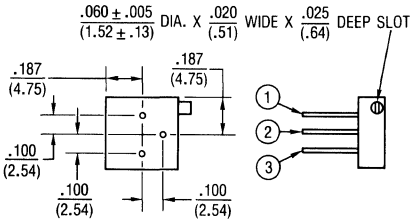
Physical Specifications

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Weight.....0.025 oz.
Marking..Manufacturer's trademark,
wiring diagram, date code,
Mil-Spec part number

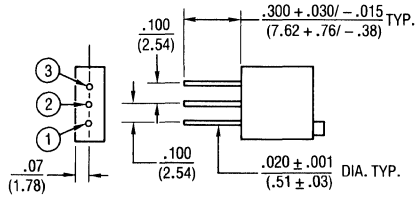
"X" PRINTED CIRCUIT PIN TYPE

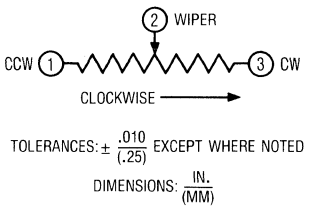


"P" PRINTED CIRCUIT PIN TYPE



"W" PRINTED CIRCUIT PIN TYPE





BOURNS QUALIFIED PART NUMBERS

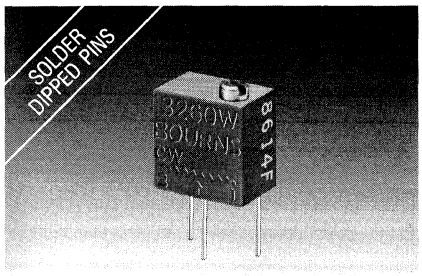
STD. VALUES OHMS	RT24C2_____			RTR24D_____			NOMINAL RESOLUTION (PERCENT)
	P	W	X	P	W	X	
10	RT24C2P100	RT24C2W100	RT24C2X100	—	—	—	1.11
20	RT24C2P200	RT24C2W200	RT24C2X200	—	—	—	0.93
50	RT24C2P500	RT24C2W500	RT24C2X500	—	—	—	0.60
100	RT24C2P101	RT24C2W101	RT24C2X101	—	—	—	0.62
200	RT24C2P201	RT24C2W201	RT24C2X201	—	—	—	0.54
500	RT24C2P501	RT24C2W501	RT24C2X501	RTR24DP501*	RTR24DW501*	RTR24DX501*	0.42
1K	RT24C2P102	RT24C2W102	RT24C2X102	RTR24DP102*	RTR24DW102*	RTR24DX102*	0.33
2K	RT24C2P202	RT24C2W202	RT24C2X202	RTR24DP202*	RTR24DW202*	RTR24DX202*	0.26
5K	RT24C2P502	RT24C2W502	RT24C2X502	RTR24DP502*	RTR24DW502*	RTR24DX502*	0.20
10K	RT24C2P103	RT24CW103	RT24C2X103	RTR24DP103*	RTR24DW103*	RTR24DX103*	0.17

*Last letter in number is failure rate level. M = 1.0% P = 0.1%

Bourns reserves the right to substitute a higher grade failure rate (QPL) than requested as per MIL-R-39015.

Refer to pages 194 and 195 for RTR part numbering/ordering information.

*"Fluorinert" is a registered trademark of 3M Co.



1/4 INCH SQUARE/MULTITURN/ WIREWOUND/SEALED

- DESC QPL for Model RT26 per MIL-R-27208
- Power rating of .25 watt @ 85°C
- SILVERWELD® multiwire termination

BOURNS

Model RT 26

Bourns® Trimming Potentiometer

Electrical Specifications

Standard Resistance Range
.....10 to 5,000 ohms
(see qualified part number table)
Resistance Tolerance.....±5% std.
Absolute Minimum Resistance
.....0.25% or 1 ohm max.
(whichever is greater)
Noise.....100 ohms ENR max.
Resolution
...(see qualified part number table)
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000 feet.....250 vac
Effective Travel.....11 turns nom.

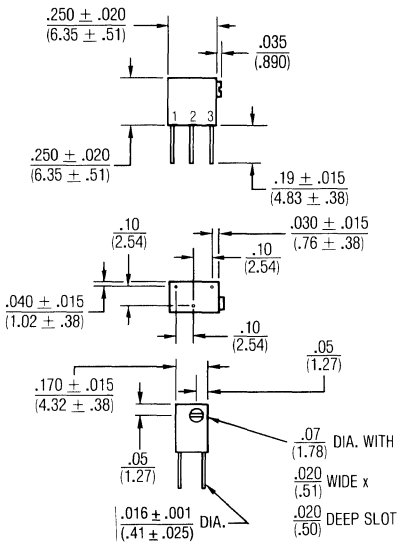
Environmental Specifications

Power Rating
85°C.....0.25 watt
150°C.....0 watt
Temperature Range
.....−55°C to +150°C
Temperature Coefficient
.....±50ppm/°C max.
Seal Test.....85°C Fluorinert*
Humidity..MIL-STD-202 Method 106
(1% ΔTR, 10 meg. IR)
Vibration.....20G
(1% ΔTR, 1% + resolution ΔVR)
Shock.....100G
(1% ΔTR, 1% + resolution ΔVR)
Load Life
....1,000 hours 0.25 watt @ 85°C
(2% ΔTR, 2% + resolution ΔVR)
Mechanical Life.....200 cycles
(2% ΔTR)

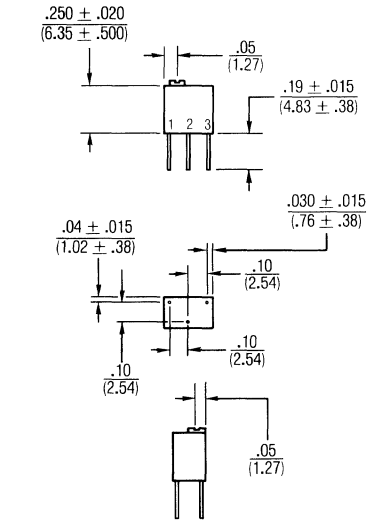
Physical Specifications

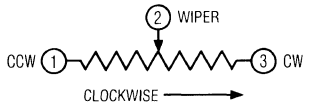
Torque.....3.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Weight.....0.015 oz.
Marking..Manufacturer's trademark,
wiring diagram, date code,
Mil-Spec part number

"X" PRINTED CIRCUIT PIN TYPE



"W" PRINTED CIRCUIT PIN TYPE



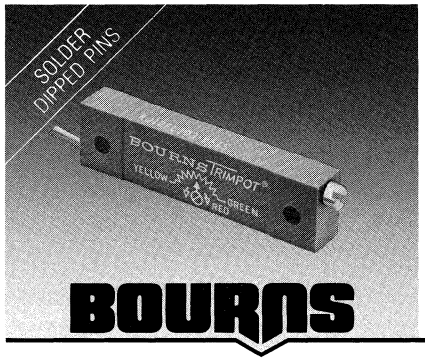


BOURNS QUALIFIED PART NUMBERS

STD. VALUES OHMS	RT26C2___ W	RT26C2___ X	NOMINAL RESOLUTION (PERCENT)
10	RT26C2W100	RT26C2X100	1.90
20	RT26C2W200	RT26C2X200	1.50
50	RT26C2W500	RT26C2X500	1.25
100	RT26C2W101	RT26C2X101	1.00
200	RT26C2W201	RT26C2X201	0.94
500	RT26C2W501	RT26C2X501	0.50
1K	RT26C2W102	RT26C2X102	0.50
2K	RT26C2W202	RT26C2X202	0.45
5K	RT26C2W502	RT26C2X502	0.34

Refer to pages 194 and 195 for RTR part numbering/ordering information.

*"Fluorinert" is a registered trademark of 3M Co.



1-1/4 INCH RECTANGULAR/MULTITURN/ CERMET/SEALED

- DESC QPL for Model RJ12 per MIL-R-22097
- DESC QPL for Model RJR12 per High-Rel MIL-R-39035
- Infinite resolution cermet element
- High operating temperature +150°C

Models RJ/RJR 12

Trimpot® Potentiometer

Electrical Specifications

Standard Resistance Range
.....10 to 1,000,000 ohms
(see qualified part number table)
Resistance Tolerance....±10% std.
Absolute Minimum Resistance
.....1% or 2 ohms max.
(whichever is greater)
Contact Resistance Variation
.....1.0% or 1 ohm
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000 feet.....350 vac
Effective Travel.....22 turns nom.

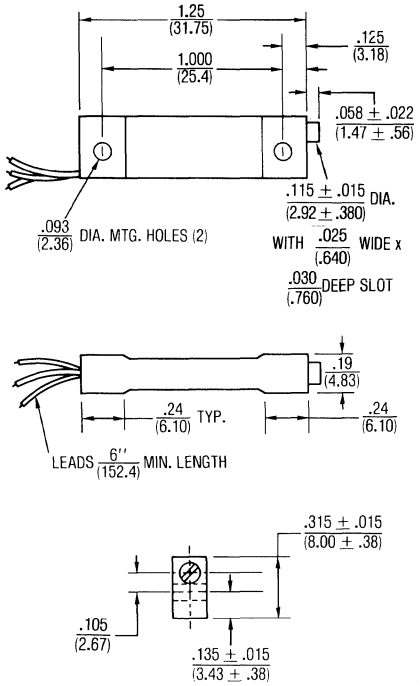
Environmental Specifications

Power Rating (300 volts max.)
85°C.....0.75 watt
150°C.....0 watt
Temperature Range
.....−55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85°C Fluorinert*
(pin styles only)
Humidity..MIL-STD-202 Method 106
.....RJ12 (1% ΔTR, 10 meg. IR)
....RJR12 (1% ΔTR, 100 meg. IR)
Vibration 20G
RJ/RJR12 (1% ΔTR, 1% ΔVR)
Shock 100G
RJ/RJR12 (1% ΔTR, 1% ΔVR)
Load Life
RJ12 1,000 hours 0.75 watt @ 85°C
(2% ΔTR, 1% ΔVR)
RJR12 10,000 hours 0.75 watt at 85°C
(3% ΔTR)
Mechanical Life.....200 cycles
RJ/RJR12 (2% ΔTR)

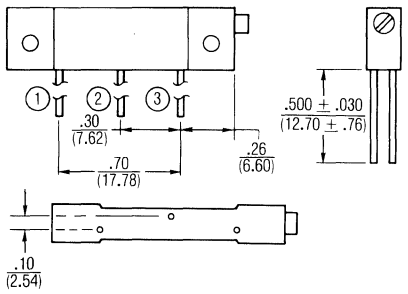
Physical Specifications

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Flexible leads - 7 strands of 38 AWG
Weight.....0.1 oz.
Marking..Manufacturer's trademark,
wiring diagram, date code,
Mil-Spec part number

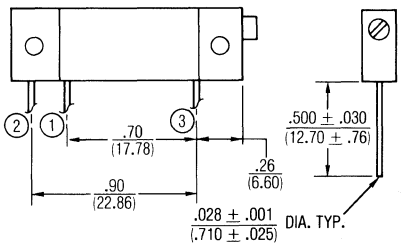
"L" FLEX LEAD TYPE

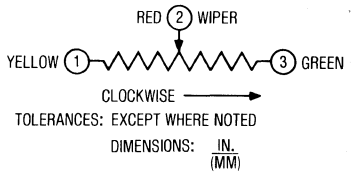


"Y" PRINTED CIRCUIT PIN TYPE



"P" PRINTED CIRCUIT PIN TYPE





BOURNS QUALIFIED PART NUMBERS

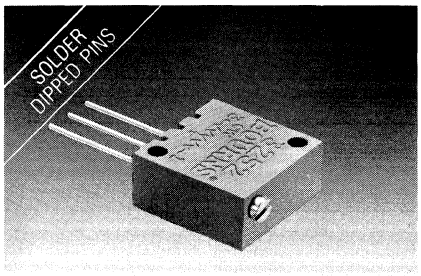
STD. VALUES OHMS	RJ12C_____			RJ12F_____			RJR12C_____		RJR12F_____	
	L	P	Y	L	P	Y	L	Y	L	Y
10	RJ12CL100	RJ12CP100	RJ12CY100	RJ12FL100	RJ12FP100	RJ12FY100	—	—	—	—
20	RJ12CL200	RJ12CP200	RJ12CY200	RJ12FL200	RJ12FP200	RJ12FY200	—	—	—	—
50	RJ12CL500	RJ12CP500	RJ12CY500	RJ12FL500	RJ12FP500	RJ12FY500	—	—	—	—
100	RJ12CL101	RJ12FP101	FJ12CY101	RJ12FL101	RJ12FP101	RJ12FY101	RJR12CL101*	RJR12CY101*	RJR12FL101*	RJR12FY101*
200	RJ12CL201	RJ12CP201	RJ12CY201	RJ12FL201	RJ12FP201	RJ12FY201	RJR12CL201*	RJR12CY201*	RJR12FL201*	RJR12FY201*
500	RJ12CL501	RJ12CP501	RJ12CY501	RJ12FL501	RJ12FP501	RJ12FY501	RJR12CL501*	RJR12CY501*	RJR12FL501*	RJR12FY501*
1K	RJ12CL102	RJ12CP102	RJ12CY102	RJ12FL102	RJ12FP102	RJ12FY102	RJR12CL102*	RJR12CY102*	RJR12FL102*	RJR12FY102*
2K	RJ12CL202	RJ12CP202	RJ12CY202	RJ12FL202	RJ12FP202	RJ12FY202	RJR12CL202*	RJR12CY202*	RJR12FL202*	RJR12FY202*
5K	RJ12CL502	RJ12CP502	RJ12CY502	RJ12FL502	RJ12FP502	RJ12FY502	RJR12CL502*	RJR12CY502*	RJR12FL502*	RJR12FY502*
10K	RJ12CL103	RJ12CP103	RJ12CY103	RJ12FL103	RJ12FP103	RJ12FY103	RJR12CL103*	RJR12CY103*	RJR12FL103*	RJR12FY103*
20K	RJ12CL203	RJ12CP203	RJ12CY203	RJ12FL203	RJ12FP203	RJ12FY203	RJR12CL203*	RJR12CY203*	RJR12FL203*	RJR12FY203*
25K	RJ12CL253	RJ12CP253	RJ12CY253	RJ12FL253	RJ12FP253	RJ12FY253	RJR12CL253*	RJR12CY253*	RJR12FL253*	RJR12FY253*
50K	RJ12CL503	RJ12CP503	RJ12CY503	RJ12FL503	RJ12FP503	RJ12FY503	RJR12CL503*	RJR12CY503*	RJR12FL503*	RJR12FY503*
100K	RJ12CL104	RJ12CP104	RJ12CY104	RJ12FL104	RJ12FP104	RJ12FY104	RJR12CL104*	RJR12CY104*	RJR12FL104*	RJR12FY104*
†200K	RJ12CL204	RJ12CP204	RJ12CY204	RJ12FL204	RJ12FP204	RJ12FY204	—	—	—	—
250K	RJ12CL254	RJ12CP254	RJ12CY254	RJ12FL254	RJ12FP254	RJ12FY254	RJR12CL254*	RJR12CY254*	RJR12FL254*	RJR12FY254*
500K	RJ12CL504	RJ12CP504	RJ12CY504	RJ12FL504	RJ12FP504	RJ12FY504	RJR12CL504*	RJR12CY504*	RJR12FL504*	RJR12FY504*
1 MEG	RJ12CL105	RJ12CP105	RJ12CY105	RJ12FL105	RJ12FP105	RJ12FY105	RJR12CL105*	RJR12CY105*	RJR12FL105*	RJR12FY105*

*Last letter in number is failure rate level. M = 1.0% P = 0.1%
†For replacement purpose only. Not for new design.

Bourns reserves the right to substitute a higher grade temperature characteristic or failure rate (QPL) than requested as per MIL-R-39035.

Refer to pages 194 and 195 for RTR part numbering/ordering information.

*"Fluorinert" is a registered trademark of 3M Co.



1/2 INCH SQUARE/MULTITURN/CERMET SEALED

- DESC QPL for Model RJ22 per MIL-R-22097
- Infinite resolution cermet element
- High temperature all plastic case
- High power dissipation: 0.5 watt @ 85°C

BOURNS

Model RJ 22

Bourns® Trimming Potentiometer

Electrical Specifications

Standard Resistance Range
.....10 to 1,000,000 ohms
(see qualified part number table)
Resistance Tolerance....±10% std.
Absolute Minimum Resistance
.....1 ohm max.
Contact Resistance Variation
.....2.0% or 2 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000 feet.....350 vac
Effective Travel.....25 turns nom.

Environmental Specifications

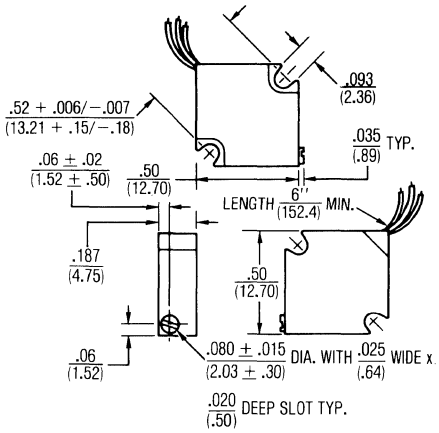
Power Rating (300 volts max.)
85°C.....0.50 watt
150°C.....0 watt
Temperature Range
.....-55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test ..... 85°C Fluorinert*
(pin styles only)
Humidity..MIL-STD-202 Method 106
(1% ΔTR, 10 meg. IR)
Vibration 20G
(1% ΔTR, 1% ΔVR)
Shock 100G
(1% ΔTR, 1% ΔVR)
Load Life
.....1,000 hours 0.5 watt @ 85°C
(2% ΔTR, 1% ΔVR)
Mechanical Life.....200 cycles
(2% ΔTR)

Physical Specifications

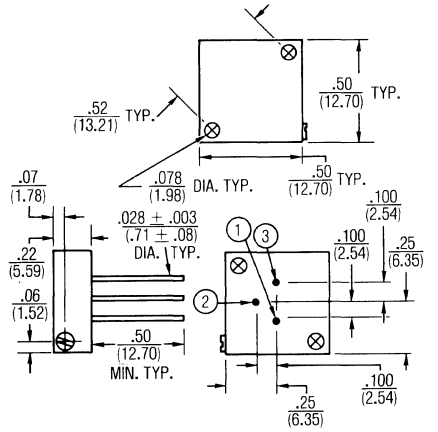
Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Flexible leads/7 strands of 38 AWG
Weight.....0.065 oz.
Machine Screw Mounting
Torque.....12 oz-in. max.
Marking..Manufacturer's trademark,
wiring diagram, date code,
Mil-Spec part number

*"Fluorinert" is a registered trademark of 3M Co.

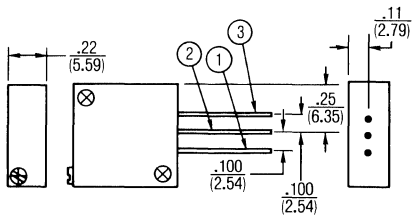
"L" FLEX LEAD TYPE



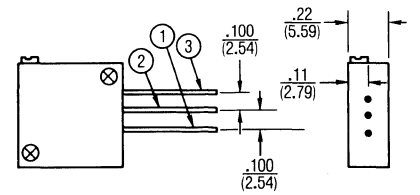
"P" PRINTED CIRCUIT PIN TYPE

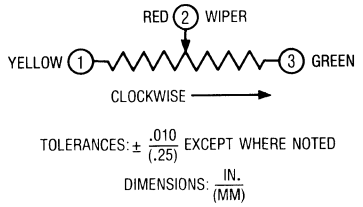


"W" PRINTED CIRCUIT PIN TYPE



"X" PRINTED CIRCUIT PIN TYPE



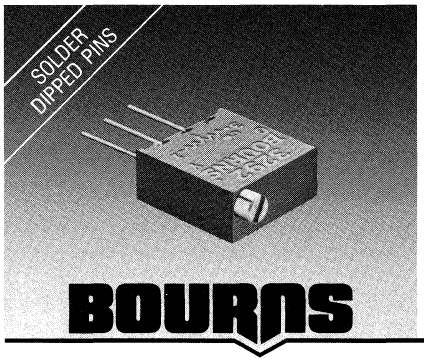


BOURNS QUALIFIED PART NUMBERS

STD. VALUES OHMS	RJ22C_____				RJ22F_____			
	L	P	W	X	L	P	W	X
10	RJ22CL100	RJ22CP100	RJ22CW100	RJ22CX100	RJ22FL100	RJ22FP100	RJ22FW100	RJ22FX100
20	RJ22CL200	RJ22CP200	RJ22CW200	RJ22CX200	RJ22FL200	RJ22FP200	RJ22FW200	RJ22FX200
50	RJ22CL500	RJ22CP500	RJ22CW500	RJ22CX500	RJ22FL500	RJ22FP500	RJ22FW500	RJ22FX500
100	RJ22CL101	RJ22CP101	RJ22CW101	RJ22CX101	RJ22FL101	RJ22FP101	RJ22FW101	RJ22FX101
200	RJ22CL201	RJ22CP201	RJ22CW201	RJ22CX201	RJ22FL201	RJ22FP201	RJ22FW201	RJ22FX201
500	RJ22CL501	RJ22CP501	RJ22CW501	RJ22CX501	RJ22FL501	RJ22FP501	RJ22FW501	RJ22FX501
1K	RJ22CL102	RJ22CP102	RJ22CW102	RJ22CX102	RJ22FL102	RJ22FP102	RJ22FW102	RJ22FX102
2K	RJ22CL202	RJ22CP202	RJ22CW202	RJ22CX202	RJ22FL202	RJ22FP202	RJ22FW202	RJ22FX202
5K	RJ22CL502	RJ22CP502	RJ22CW502	RJ22CX502	RJ22FL502	RJ22FP502	RJ22FW502	RJ22FX502
10K	RJ22CL103	RJ22CP103	RJ22CW103	RJ22CX103	RJ22FL103	RJ22FP103	RJ22FW103	RJ22FX103
20K	RJ22CL203	RJ22CP203	RJ22CW203	RJ22CX203	RJ22FL203	RJ22FP203	RJ22FW203	RJ22FX203
25K	RJ22CL253	RJ22CP253	RJ22CW253	RJ22CX253	RJ22FL253	RJ22FP253	RJ22FW253	RJ22FX253
50K	RJ22CL503	RJ22CP503	RJ22CW503	RJ22CX503	RJ22FL503	RJ22FP503	RJ22FW503	RJ22FX503
100K	RJ22CL104	RJ22CP104	RJ22CW104	RJ22CX104	RJ22FL104	RJ22FP104	RJ22FW104	RJ22FX104
250K	RJ22CL254	RJ22CP254	RJ22CW254	RJ22CX254	RJ22FL254	RJ22FP254	RJ22FW254	RJ22FX254
500K	RJ22CL504	RJ22CP504	RJ22CW504	RJ22CX504	RJ22FL504	RJ22FP254	RJ22FW254	RJ22FX254
1 MEG	RJ22CL105	RJ22CP105	RJ22CW105	RJ22CX105	RJ22FL105	RJ22FP105	RJ22FW105	RJ22FX105

Bourns reserves the right to substitute a higher grade temperature characteristic than requested.

Refer to pages 194 and 195 for RTR part numbering/ordering information.



3/4 INCH SQUARE / MULTITURN / CERMET / SEALED

- DESC QPL for Model RJ24 per MIL-R-22097
- DESC QPL for Model RJR24 per High-Rel MIL-R-39035
- Double chevron shaft seal
- Reliable wiper idling mechanism
- Space saving design: 0.150" body width

Models RJ/RJR 24

Bourns® Trimming Potentiometer

Electrical Specifications

Standard Resistance Range
.....10 to 1,000,000 ohms
(see qualified part number table)
Resistance Tolerance....±10% std.
Absolute Minimum Resistance
.....1 ohm max.
Contact Resistance Variation
.....3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.01%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000 feet.....350 vac
Effective Travel.....22 turns nom.

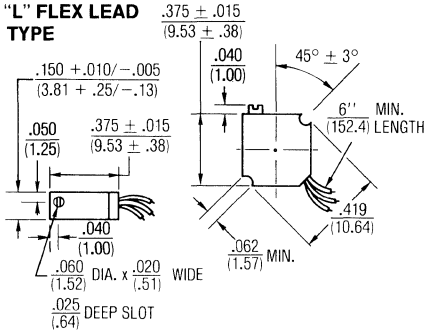
Environmental Specifications

Power Rating (300 volts max.)
85°C.....0.50 watt
150°C.....0 watt
Temperature Range
.....−55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test ..... 85°C Fluorinert*
(pin styles only)
Humidity..MIL-STD-202 Method 106
.....RJ24 (1% ΔTR, 10 meg. IR)
....RJR24 (1% ΔTR, 100 meg. IR)
Vibration 20G
RJ/RJR24 (1% ΔTR, 1% ΔVR)
Shock 100G
RJ/RJR24 (1% ΔTR, 1% ΔVR)
Load Life
RJ24 1,000 hours 0.5 watt @ 85°C
(2% ΔTR, 1% ΔVR)
RJR24 10,000 hours 0.5 watt at 85°C
(3% ΔTR)
Mechanical Life.....200 cycles
RJ/RJR24 (2% ΔTR)

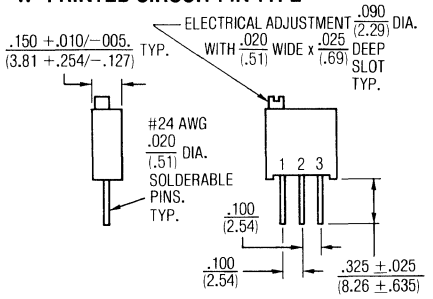
Physical Specifications

Torque.....5.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals
.....Solderable printed circuit pins
Flexible leads/7 strands of 38 AWG
Weight.....0.025 oz.
Machine Screw Mounting Torque
.....12 oz-in. max.
Marking..Manufacturer's trademark,
wiring diagram, date code,
Mil-Spec part number

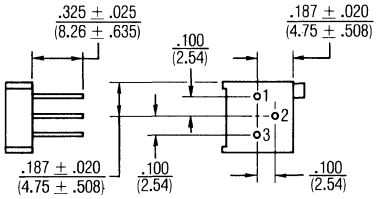
"L" FLEX LEAD TYPE



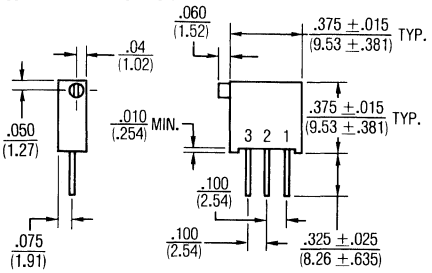
"W" PRINTED CIRCUIT PIN TYPE

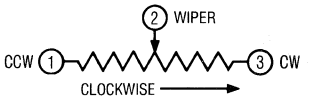


"P" PRINTED CIRCUIT PIN TYPE



"X" PRINTED CIRCUIT PIN TYPE





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

BOURNS QUALIFIED PART NUMBERS

STD. VALUES OHMS	RJ24C_____				RJ24F_____			
	L	P	W	X	L	P	W	X
10	RJ24CL100	RJ24CP100	RJ24CW100	RJ24CX100	RJ24FL100	RJ24FP100	RJ24FW100	RJ24FX100
20	RJ24CL200	RJ24CP200	RJ24CW200	RJ24CX200	RJ24FL200	RJ24FP200	RJ24FW200	RJ24FX200
50	RJ24CL500	RJ24CP500	RJ24CW500	RJ24CX500	RJ24FL500	RJ24FP500	RJ24FW500	RJ24FX500
100	RJ24CL101	RJ24CP101	RJ24CW101	RJ24CX101	RJ24FL101	RJ24FP101	RJ24FW101	RJ24FX101
200	RJ24CL201	RJ24CP201	RJ24CW201	RJ24CX201	RJ24FL201	RJ24FP201	RJ24FW201	RJ24FX201
500	RJ24CL501	RJ24CP501	RJ24CW501	RJ24CX501	RJ24FL501	RJ24FP501	RJ24FW501	RJ24FX501
1K	RJ24CL102	RJ24CP102	RJ24CW102	RJ24CX102	RJ24FL102	RJ24FP102	RJ24FW102	RJ24FX102
2K	RJ24CL202	RJ24CP202	RJ24CW202	RJ24CX202	RJ24FL202	RJ24FP202	RJ24FW202	RJ24FX202
5K	RJ24CL502	RJ24CP502	RJ24CW502	RJ24CX502	RJ24FL502	RJ24FP502	RJ24FW502	RJ24FX502
10K	RJ24CL103	RJ24CP103	RJ24CW103	RJ24CX103	RJ24FL103	RJ24FP103	RJ24FW103	RJ24FX103
20K	RJ24CL203	RJ24CP203	RJ24CW203	RJ24CX203	RJ24FL203	RJ24FP203	RJ24FW203	RJ24FX203
25K	RJ24CL253	RJ24CP253	RJ24CW253	RJ24CX253	RJ24FL253	RJ24FP253	RJ24FW253	RJ24FX253
50K	RJ24CL503	RJ24CP503	RJ24CW503	RJ24CX503	RJ24FL503	RJ24FP503	RJ24FW503	RJ24FX503
100K	RJ24CL104	RJ24CP104	RJ24CW104	RJ24CX104	RJ24FL104	RJ24FP104	RJ24FW104	RJ24FX104
250K	RJ24CL254	RJ24CP254	RJ24CW254	RJ24CX254	RJ24FL254	RJ24FP254	RJ24FW254	RJ24FX254
500K	RJ24CL504	RJ24CP504	RJ24CW504	RJ24CX504	RJ24FL504	RJ24FP254	RJ24FW254	RJ24FX254
1 MEG	RJ24CL105	RJ24CP105	RJ24CW105	RJ24CX105	RJ24FL105	RJ24FP105	RJ24FW105	RJ24FX105

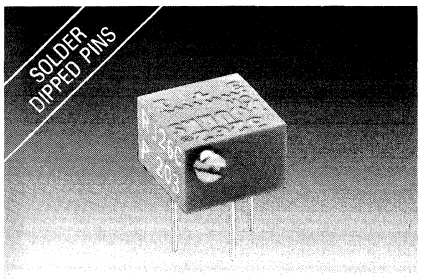
STD. VALUES OHMS	RJR24C_____			RJR24F_____		
	P	W	X	P	W	X
10	RJR24CP100*	RJR24CW100*	RJR24CX100*	RJR24FP100*	RJR24FW100*	RJR24FX100*
20	RJR24CP200*	RJR24CW200*	RJR24CX200*	RJR24FP200*	RJR24FW200*	RJR24FX200*
50	RJR24CP500*	RJR24CW500*	RJR24CX500*	RJR24FP500*	RJR24FW500*	RJR24FX500*
100	RJR24CP101*	RJR24CW101*	RJR24CX101*	RJR24FP101*	RJR24FW101*	RJR24FX101*
200	RJR24CP201*	RJR24CW201*	RJR24CX201*	RJR24FP201*	RJR24FW201*	RJR24FX201*
500	RJR24CP501*	RJR24CW501*	RJR24CX501*	RJR24FP501*	RJR24FW501*	RJR24FX501*
1K	RJR24CP102*	RJR24CW102*	RJR24CX102*	RJR24FP102*	RJR24FW102*	RJR24FX102*
2K	RJR24CP202*	RJR24CW202*	RJR24CX202*	RJR24FP202*	RJR24FW202*	RJR24FX202*
5K	RJR24CP502*	RJR24CW502*	RJR24CX502*	RJR24FP502*	RJR24FW502*	RJR24FX502*
10K	RJR24CP103*	RJR24CW103*	RJR24CX103*	RJR24FP103*	RJR24FW103*	RJR24FX103*
20K	RJR24CP203*	RJR24CW203*	RJR24CX203*	RJR24FP203*	RJR24FW203*	RJR24FX203*
25K	RJR24CP253*	RJR24CW253*	RJR24CX253*	RJR24FP253*	RJR24FW253*	RJR24FX253*
50K	RJR24CP503*	RJR24CW503*	RJR24CX503*	RJR24FP503*	RJR24FW503*	RJR24FX503*
100K	RJR24CP104*	RJR24CW104*	RJR24CX104*	RJR24FP104*	RJR24FW104*	RJR24FX104*
250K	RJR24CP254*	RJR24CW254*	RJR24CX254*	RJR24FP254*	RJR24FW254*	RJR24FX254*
500K	RJR24CP504*	RJR24CW504*	RJR24CX504*	RJR24FP254*	RJR24FW254*	RJR24FX254*
1 MEG	RJR24CP105*	RJR24CW105*	RJR24CX105*	RJR24FP105*	RJR24FW105*	RJR24FX105*

*Last letter in number is failure rate level. M = 1.0% P = 0.1% R = 0.01%

Bourns reserves the right to substitute a higher grade temperature characteristic or failure rate (QPL) than requested as per MIL-R-39035.

Refer to pages 194 and 195 for RTR part numbering/ordering information.

*"Fluorinert" is a registered trademark of 3M Co.



1/4 INCH SQUARE/MULTITURN/CERMET/ SEALED

- DESC QPL for Model RJ26 per MIL-R-22097
- DESC QPL for Model RJR26 per High-Rel MIL-R-39035
- Stable, infinite resolution cermet element

BOURNS

Models RJ/RJR 26

Bourns® Trimming Potentiometer

Electrical Specifications

Standard Resistance Range
.....10 to 1,000,000 ohms
(see qualified part number table)
Resistance Tolerance.... ±10% std.
Absolute Minimum Resistance
.....1 ohm max.
Contact Resistance Variation
.....3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.02%
Resistance..... ±0.05%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000 feet.....250 vac
Effective Travel.....12 turns nom.

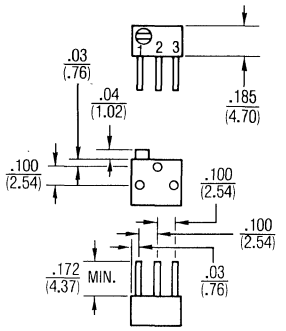
Environmental Specifications

Power Rating (200 volts max.)
85°C.....0.25 watt
150°C.....0 watt
Temperature Range
.....–55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test ..... 85°C Fluorinert*
Humidity..MIL-STD-202 Method 106
.....RJ26 (1% ΔTR, 10 meg. IR)
....RJR26 (1% ΔTR, 100 meg. IR)
Vibration 20G
RJ/RJR26 (1% ΔTR, 1% ΔVR)
Shock 100G
RJ/RJR26 (1% ΔTR, 1% ΔVR)
Load Life
RJ26 1,000 hours 0.25 watt @ 85°C
(2% ΔTR, 1% ΔVR)
RJR26 10,000 hours 0.25 watt at 85°C
(3% ΔTR)
Mechanical Life.....200 cycles
RJ/RJR26 (2% ΔTR)

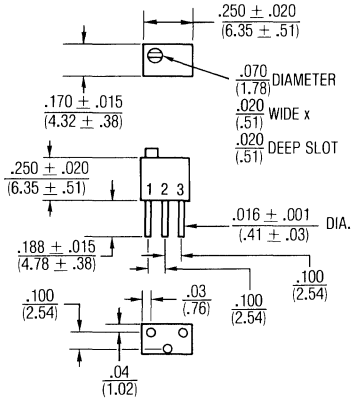
Physical Specifications

Torque.....3.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....0.015 oz.
Marking..Manufacturer's trademark,
wiring diagram, date code,
Mil-Spec part number

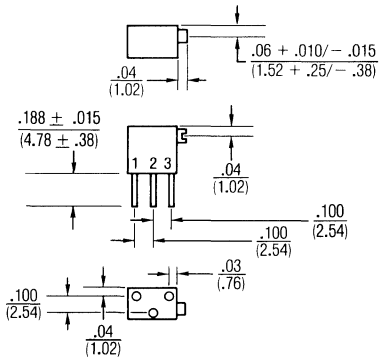
"P" PRINTED CIRCUIT PIN TYPE

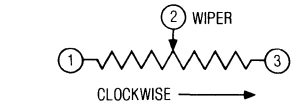


"W" PRINTED CIRCUIT PIN TYPE



"X" PRINTED CIRCUIT PIN TYPE





TOLERANCES: EXCEPT WHERE NOTED
DECIMALS: .XX ± .010 (.25), .XXX ± .005 (.13)

DIMENSIONS: IN. (MM)

BOURNS QUALIFIED PART NUMBERS

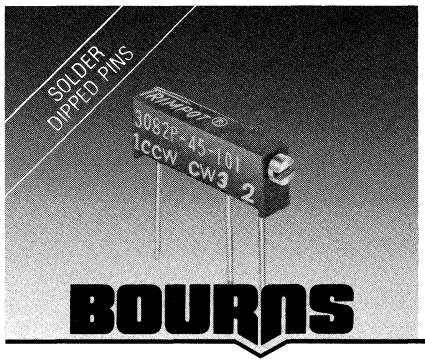
STD. VALUES OHMS	RJ26C_____			RJ26F_____			RJR26F_____		
	P	W	X	P	W	X	P	W	X
10	RJ26CP100	RJ26CW100	RJ26CX100	RJ26FP100	RJ26FW100	RJ26FX100	RJR26FP100*	RJR26FW100*	RJR26FX100*
20	RJ26CP200	RJ26CW200	RJ26CX200	RJ26FP200	RJ26FW200	RJ26FX200	RJR26FP200*	RJR26FW200*	RJR26FX200*
50	RJ26CP500	RJ26CW500	RJ26CX500	RJ26FP500	RJ26FW500	RJ26FX500	RJR26FP500*	RJR26FW500*	RJR26FX500*
100	RJ26CP101	RJ26CP101	RJ26CW101	RJ26FP101	RJ26FW101	RJ26FX101	RJR26FP101*	RJR26FW101*	RJR26FX101*
200	RJ26CP201	RJ26CW201	RJ26CX201	RJ26FP201	RJ26FW201	RJ26FX201	RJR26FP201*	RJR26FW201*	RJR26FX201*
500	RJ26CP501	RJ26CW501	RJ26CX501	RJ26FP501	RJ26FW501	RJ26FX501	RJR26FP501*	RJR26FW501*	RJR26FX501*
1K	RJ26CP102	RJ26CW102	RJ26CX102	RJ26FP102	RJ26FW102	RJ26FX102	RJR26FP102*	RJR26FW102*	RJR26FX102*
2K	RJ26CP202	RJ26CW202	RJ26CX202	RJ26FP202	RJ26FW202	RJ26FX202	RJR26FP202*	RJR26FW202*	RJR26FX202*
5K	RJ26CP502	RJ26CW502	RJ26CX502	RJ26FP502	RJ26FW502	RJ26FX502	RJR26FP502*	RJ26FW502*	RJR26FX502*
10K	RJ26CP103	RJ26CW103	RJ26CX103	RJ26FP103	RJ26FW103	RJ26FX103	RJR26FP103*	RJR26FW103*	RJR26FX103*
20K	RJ26CP203	RJ26CW203	RJ26CX203	RJ26FP203	RJ26FW203	RJ26FX203	RJR26FP203*	RJR26FW203*	RJR26FX203*
25K	RJ26CP253	RJ26CW253	RJ26CX253	RJ26FP253	RJ26FW253	RJ26FX253	RJR26FP253*	RJR26FW253*	RJR26FX253*
50K	RJ26CP503	RJ26CW503	RJ26CX503	RJ26FP503	RJ26FW503	RJ26FX503	RJR26FP503*	RJR26FW503*	RJR26FX503*
100K	RJ26CP104	RJ26CW104	RJ26CX104	RJ26FP104	RJ26FW104	RJ26FX104	RJR26FP104*	RJR26FW104*	RJR26FX104*
250K	RJ26CP254	RJ26CW254	RJ26CX254	RJ26FP254	RJ26FW254	RJ26FX254	RJR26FP254*	RJR26FW254*	RJR26FX254*
500K	RJ26CP504	RJ26CW504	RJ26CX504	RJ26FP504	RJ26FW504	RJ26FX504	RJR26FP504*	RJR26FW504*	RJR26FX504*
1 MEG	RJ26CP105	RJ26CW105	RJ26CX105	RJ26FP105	RJ26FW105	RJ26FX105	RJR26FP105*	RJR26FW105*	RJR26FX105*

*Last letter in number is failure rate level. M = 1.0% P = 0.1% R = 0.01%

Bourns reserves the right to substitute a higher grade temperature characteristic or failure rate (QPL) than requested as per MIL-R-39035.

Refer to pages 194 and 195 for RTR part numbering/ordering information.

*"Fluorinert" is a registered trademark of 3M Co.



1/2 INCH LONG / MULTITURN / CERMET / SEALED

- DESC QPL for Model RJR28 per MIL-R-39035
- Stable, infinite resolution cermet element
- Space saving size: 0.100" X 0.150" X 0.500"
- ±100ppm/°C temperature coefficient over entire temperature and resistance ranges

Model RJR 28

Trimpot® Potentiometer

Electrical Specifications

Standard Resistance Range
.....10 to 50,000 ohms
(see qualified part number table)
Resistance Tolerance....±10% std.
Absolute Minimum Resistance
.....1% or 2 ohms max.
(whichever is greater)
Contact Resistance Variation
.....3% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.03%
Resistance..... ±.1%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....900 vac
80,000 feet.....350 vac
Effective Travel.....10 turns nom.

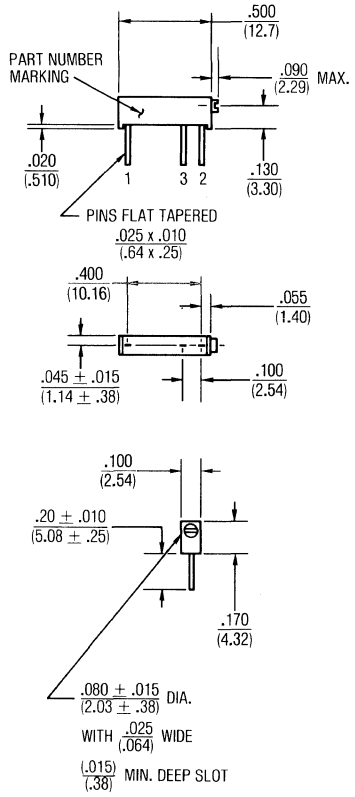
Environmental Specifications

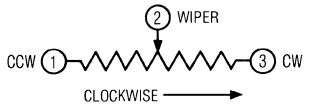
Power Rating (300 volts max.)
85°C.....0.3 watt
150°C.....0 watt
Temperature Range
.....-55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85°C Fluorinert*
Humidity..MIL-STD-202 Method 106
(1% ΔTR, 100 meg. IR)
Vibration.....20G
(1% ΔTR, 1% ΔVR)
Shock.....100G
(1% ΔTR, 1% ΔVR)
Load Life
....10,000 hours 0.3 watt @ 85°C
(3% ΔTR)
Mechanical Life.....200 cycles
(2% ΔTR)

Physical Specifications

Torque.....2.0 oz-in. max.
Mechanical Stops.....Wiper idles
Terminals.....Solderable pins
Weight.....Approximately 0.1 oz.
Marking..Manufacturer's trademark,
terminal numbers, date code,
Mil-Spec part number

"P" PRINTED CIRCUIT PIN TYPE





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

BOURNS QUALIFIED PART NUMBERS

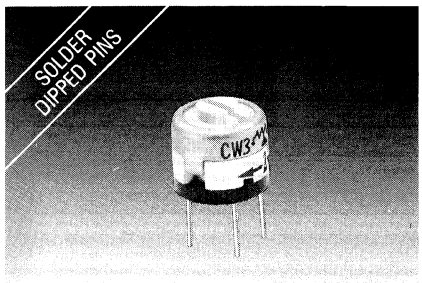
STD. VALUES OHMS	RJR28C_____ P	RJR28F_____ P
10	RJR28CP100*	RJR28FP100*
20	RJR28CP200*	RJR28FP200*
50	RJR28CP500*	RJR28FP500*
100	RJR28CP101*	RJR28FP101*
200	RJR28CP201*	RJR28FP201*
500	RJR28CP501*	RJR28FP501*
1K	RJR28CP102*	RJR28FP102*
2K	RJR28CP202*	RJR28FP202*
5K	RJR28CP502*	RJR28FP502*
10K	RJR28CP103*	RJR28FP103*
20K	RJR28CP203*	RJR28FP203*
25K	RJR28CP253*	RJR28FP253*
50K	RJR28CP503*	RJR28FP503*

*Last letter in number is failure rate level.
M = 1.0% P = 0.1%

Bourns reserves the right to substitute a higher grade temperature characteristic or failure rate (QPL) than requested as per MIL-R-39035.

Refer to pages 194 and 195 for RTR part numbering/ordering information.

*"Fluorinert" is a registered trademark of 3M Co.



1/4 INCH SINGLE-TURN / CERMET / SEALED

- DESC QPL for Model RJ50 per MIL-R-22097
- DESC QPL for Model RJR50 per High-Rel MIL-R-39035
- Stable, infinite resolution cermet element
- Space saving size: 0.25" diameter

BOURNS

Models RJ/RJR 50

Ⓑ® Trimming Potentiometer

Electrical Specifications

Standard Resistance Range
.....10 ohms to 1 megohm
(see qualified part number table)
Resistance Tolerance....±10% std.
Absolute Minimum Resistance
.....1% or 2 ohms max.
(whichever is greater)
Contact Resistance Variation
.....3.0% or 3 ohms
(whichever is greater)
Adjustability
Voltage ..... ±0.05%
Resistance..... ±0.15%
Resolution.....Infinite
Insulation Resistance.....500 vdc.
1,000 megohms min.
Dielectric Strength
Sea Level.....600 vac
80,000 feet.....250 vac
Adjustment Angle.....240° nom.

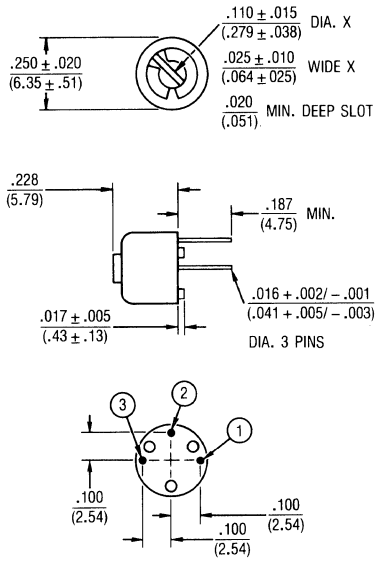
Environmental Specifications

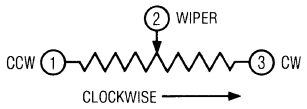
Power Rating (200 volts max.)
85°C.....0.25 watt
150°C.....0 watt
Temperature Range
.....−55°C to +150°C
Temperature Coefficient
.....±100ppm/°C max.
Seal Test.....85°C Fluorinert*
Humidity..MIL-STD-202 Method 106
.....RJ50 (1% ΔTR, 10 meg. IR)
....RJR50 (1% ΔTR, 100 meg. IR)
Vibration.....20G
RJ/RJR50 (1% ΔTR, 1% ΔVR)
Shock.....100G
RJ/RJR50 (1% ΔTR, 1% ΔVR)
Load Life
RJ50 1,000 hours 0.25 watt @ 85°C
(2% ΔTR, 1% ΔVR)
RJR50 10,000 hours 0.25 watt at 85°C
(3% ΔTR)
Mechanical Life.....200 cycles
RJ/RJR50 (2% ΔTR)

Physical Specifications

Mechanical Angle.....260° nom.
Torque.....3.0 oz-in. max.
Stop Strength.....5.0 oz-in. min.
Terminals.....Solderable pins
Weight.....0.02 oz.
Marking..Manufacturer's trademark,
wiring diagram, date code,
Mil-Spec part number

"P" PRINTED CIRCUIT PIN TYPE





TOLERANCES: ± .010 (.25) EXCEPT WHERE NOTED

DIMENSIONS: IN. (MM)

BOURNS QUALIFIED PART NUMBERS

STD. VALUES OHMS	RJ50C____	RJ50F____	RJR50F____
	P	P	P
10	RJ50CP100	RJ50FP100	RJR50FP100
20	RJ50CP200	RJ50FP200	RJR50FP200
50	RJ50CP500	RJ50FP500	RJR50FP500
100	RJ50CP101	RJ50FP101	RJR50FP101
200	RJ50CP201	RJ50FP201	RJR50FP201
500	RJ50CP501	RJ50FP501	RJR50FP501
1K	RJ50CP102	RJ50FP102	RJR50FP102
2K	RJ50CP202	RJ50FP202	RJR50FP202
5K	RJ50CP502	RJ50FP502	RJR50FP502
10K	RJ50CP103	RJ50FP103	RJR50FP103
20K	RJ50CP203	RJ50FP203	RJR50FP203
25K	RJ50CP253	RJ50FP253	RJR50FP253
50K	RJ50CP503	RJ50FP503	RJR50FP503
100K	RJ50CP104	RJ50FP104	RJR50FP104
250K	RJ50CP254	RJ50FP254	RJR50FP254
500K	RJ50CP504	RJ50FP504	RJR50FP504
1 MEG	RJ50CP105	RJ50FP105	RJR50FP105

*Last letter in number is failure rate level.
M = 1.0% P = 0.1%

Bourns reserves the right to substitute a higher grade temperature characteristic or failure rate (QPL) than requested as per MIL-R-39035.

*"Fluorinert" is a registered trademark of 3M Co.

Explanation of System

NON-WIREWOUND RJR STYLES - HIGH RELIABILITY

MIL-R-39035 **RJR24** **(C Or F)** **W** **102** **P**

- RJR24 — Style No.
- (C Or F) — Characteristic Ltr.
- W — Terminal Type: L, P, W Or X
- 102 — Resistance In Code: First Two Digits Significant; Last Digit No. Of Zeros; 102 = 1,000 Ohms
- P — Failure Rate (% Failures/1,000 Hrs. — 60% Confidence): M = 1.0%; P = 0.1%; R = .01%

	C	F
T.C. Max.	±250 PPM°C	±100 PPM°C
C.R.V. Max.	3% or 3 Ohms	
Thermal Shock *	2%	1%
Humidity	2%	1%
Shock	1%	1%
Vibration	1%	1%
Load Life		
2,000 Hrs.	3%	3%
10,000 Hrs.	3%	3%
Low Temp.	2%	1%
High Temp.	3%	3%
Rotational Life	2%	2%
Conditioning	2%	1½%

*Max. Change In Resistance

NON-WIREWOUND RJ STYLES

MIL-R-22097 **RJ12** **(C Or F)** **L** **103**

- RJ12 — Style No.
- (C Or F) — Characteristic Ltr.
- L — Terminal Type: L, P Or Y
- 103 — Resistance In Code: First Two Digits Significant; Last Digit No. Of Zeros; 103 = 10,000 Ohms

	C	F
T.C. Max.	±250 PPM°C	±100 PPM°C
C.R.V. Max.	3% or 3 Ohms	
Thermal Shock *	2%	1%
Humidity	2%	1%
Shock	1%	1%
Vibration	1%	1%
Load Life	3%	2%
Low Temp.	2%	1%
High Temp.	3%	2%
Rotational Life	2%	2%

*Max. Change In Resistance

WIREWOUND RT STYLES

MIL-R-27208 **RT24** **C2** **P** **101**

- RT24 — Style No.
- C2 — Characteristic
- P — Terminal Type: P, W, Or X
- 101 — Resistance In Code: First Two Digits Significant; Last Digit No. Of Zeros; 101 = 100 Ohms

C = Temp. Coeff. ±50 PPM/°C

2 = 85°C Rating Temp. 150°C Max. Oper. Temp.

Note: C & 2 Are The Only Characteristics In MIL-R-27208 - Years Ago There Were Others, But Not Any More

Mil-Spec Part Numbers

HIGH-REL WIREWOUND SPECIFICATION MIL-R-39015 RTR STYLES

This specification has a procedure for ordering, processing, and marking parts entirely different than the other three specifications. IT DOES NOT USE THE TYPE DESIGNATION NUMBER AS THE PART NUMBER.

THE NUMBER TO ORDER BY CONSISTS OF:

1. The individual specification sheet number
   M39015/1 (FOR STYLE RTR12)
   M39015/2 (FOR STYLE RTR22)
   M39015/3 (FOR STYLE RTR24)
2. A dash number from the specification sheet table for the resistance value

M39015/1	M39015/2	M39015/3
—009[1] 10Ω	—009[1] 10Ω	—001 10Ω
—010[1] 20	—010[1] 20	—002 20
—011[1] 50	—011[2] 50	—003 50
—001 100	—001 100	—004 100
—002 200	—002 200	—005 200
—003 500	—003 500	—006 500
—004 1K	—004 1K	—007 1K
—005 2K	—005 2K	—008 2K
—006 5K	—006 5K	—009 5K
—007 10K	—007 10K	—010 10K
—008 20K	—008 20K	

3. Terminal Type L, P, W, X or Y
4. Failure rate level M, P or R
   M = 1%
   P = 0.1%
   R = 0.01%
   % FAILURE/1,000 Hrs. — 60% Confidence

EXAMPLES OF PART NUMBERS

M39015/1 — **001PM**
100Ω Term. Type P — Failure Rate M

M39015/2 — **006LP**
5K Term. Type L — Failure Rate P

M39015/3 — **010XR**
10K Term. Type X — Failure Rate R

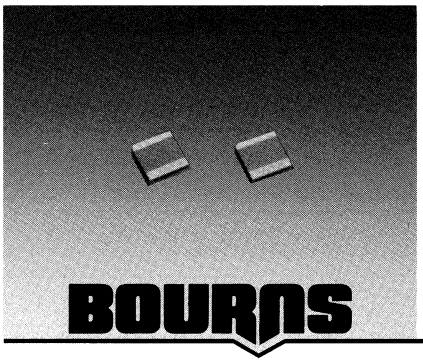
The following table shows all part numbers covered by this specification, the conversion to the RTR type designation number required by the supplier to manufacture the part, and the number that will be marked on the units you receive (same as part number ordered but with the letter "J" in front of it). The letter "J" is a government mark and it is certification that the parts comply with the specification.

INFORMATION NOTES
1. 10Ω, 20Ω and 50Ω values were added to M39015/1 and 39015/2 after original release.
2. M39015/3 was added to the Mil-Spec after its original release.

BOURNS HIGH RELIABILITY MIL-SPEC PART NUMBERS

Order By	Process By*	Marked With	Terminal Types	Failure Rates
M39015/1-003(TS)(FR)	RTR12D(TS)501(FR)	JM39015/1-003(TS)(FR)	L, P, Y	M, P
M39015/1-004(TS)(FR) M39015/1-005(TS)(FR) M39015/1-006(TS)(FR)	RTR12D(TS)102(FR) RTR12D(TS)202(FR) RTR12D(TS)502(FR)	JM39015/1-004(TS)(FR) JM39015/1-005(TS)(FR) JM39015/1-006(TS)(FR)		
M39015/1-007(TS)(FR) M39015/1-008(TS)(FR)	RTR12D(TS)103(FR) RTR12D(TS)203(FR)	JM39015/1-007(TS)(FR) JM39015/1-008(TS)(FR)		
M39015/2-003(TS)(FR) M39015/2-004(TS)(FR) M39015/2-005(TS)(FR)	RTR22D(TS)501(FR) RTR22D(TS)102(FR) RTR22D(TS)202(FR)	JM39015/2-003(TS)(FR) JM39015/2-004(TS)(FR) JM39015/2-005(TS)(FR)	L, P, W, X	
M39015/2-006(TS)(FR) M39015/2-007(TS)(FR) M39015/2-008(TS)(FR)	RTR22D(TS)502(FR) RTR22D(TS)103(FR) RTR22D(TS)203(FR)	JM39015/2-006(TS)(FR) JM39015/2-007(TS)(FR) JM39015/2-008(TS)(FR)		
M39015/3-006(TS)(FR) M39015/3-007(TS)(FR) M39015/3-008(TS)(FR)	RTR24D(TS)501(FR) RTR24D(TS)102(FR) RTR24D(TS)202(FR)	JM39015/3-006(TS)(FR) JM39015/3-007(TS)(FR) JM39015/3-008(TS)(FR)	P, W, X	M, P
M39015/3-009(TS)(FR) M39015/3-010(TS)(FR)	RTR24D(TS)502(FR) RTR24D(TS)103(FR)	JM39015/3-009(TS)(FR) JM39015/3-010(TS)(FR)		

NOTE: See individual model pages for Bourns qualified resistance values.
*May also order using this part number.



50 MILLIWATT, THICK FILM ESTABLISHED RELIABILITY, MILITARY GRADE

- 1% and 5% tolerances
- "M" and "K" characteristics
- "S," "R," "P" and "M" life failure rates
- Wide variety enhances design flexibility
- Waffle pack and tape & reel packaging
- Wrap-around terminations
- Meets Mil-R-55342D requirements

Model M55342, 02 (STYLE RM0505)

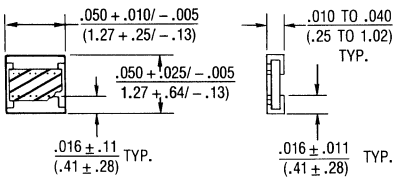
Bourns® Chip Resistor

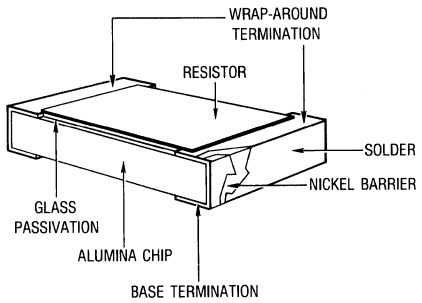
Electrical Characteristics

Resistance Range and Tolerance*
1% ..... 10 ohms to 249K ohms
5% ..... 10 ohms to 470K ohms
Power Rating "K" and "M" Characteristics ..... 50 milliwatts
Maximum Operating Voltage ..... 40 VDC
Temperature Range ..... −65°C to +150°C

	Characteristics	
	K	M
Resistance Temperature Coefficient	±100ppm/°C	±300ppm/°C
Maximum Ambient Temperature Full Power	70°C	70°C
Maximum Temperature Zero Wattage	150°C	150°C
Thermal Shock (Max. % Change)	±0.50	±0.50
Low Temperature Operation (Max. % Change)	±0.25	±0.50
Short Time Overload (Max. % Change)	±0.25	±0.50
High Temperature Exposure (Max % Change)	±0.50	±1.00
Resistance to Bonding Exp. (Max. % Change)	±0.25	±0.25
Moisture Resistance (Max. % Change)	±0.50	±0.50
Life, 2000 Hours (Max. % Change)	±0.50	±2.00

Packaging
Waffle Packs ..... In accordance with MIL-B-81705
Embossed Plastic Tape ..... Per EIA 481A
Tape and Reel ..... 8mm wide tape
Marking and Labeling ..... Per MIL-R-55342D (Para. 3.14)





*2% and 10% available on special requests; consult factory.

HOW TO ORDER

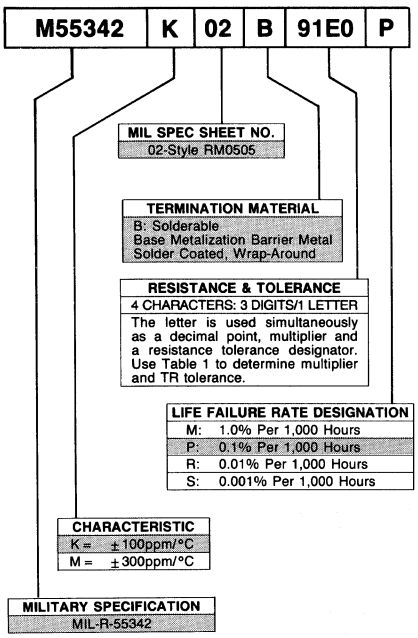
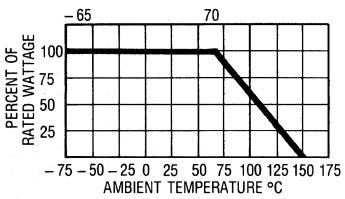


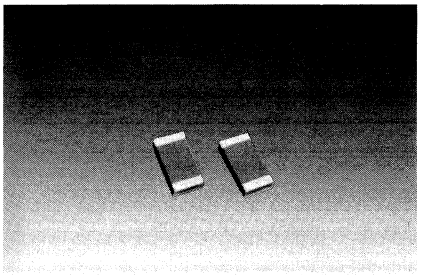
TABLE 1

Symbol	Multiplier	Tolerance ± %
A	X1	.1
B	X1,000	.1
C	X1,000,000	.1
D	X1	1
E	X1,000	1
F	X1,000,000	1
G	X1	2
H	X1,000	2
T	X1,000,000	2
J	X1	3
K	X1,000	3
L	X1,000,000	3
M	X1	10
N	X1,000	10
P	X1,000,000	10

DERATING CURVE



NOTE: This curve indicates the percentage of nominal wattage to be applied at temperatures higher than 70°C. This curve applies only to units mounted on a substrate; however, at no time shall the applied voltage exceed the maximum for each style (see 3.1).



100 MILLIWATT, THICK FILM ESTABLISHED RELIABILITY, MILITARY GRADE

- 1% and 5% tolerances
- "M" and "K" characteristics
- "S," "R," "P" and "M" life failure rates
- Wide variety enhances design flexibility
- Waffle pack and tape & reel packaging
- Wrap-around terminations
- Meets Mil-R-55342D requirements

Model M55342, 06 (STYLE RM0705)

Bourns® Chip Resistor

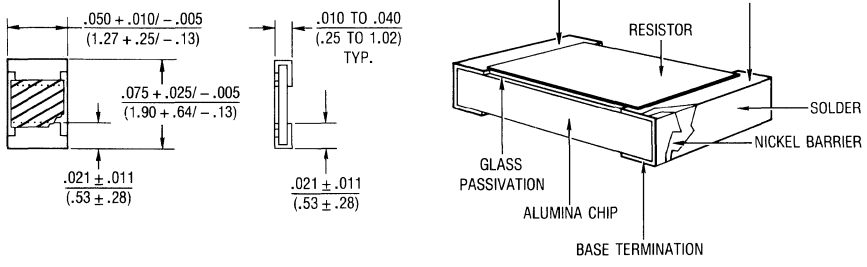
Electrical Characteristics

Resistance Range and Tolerance*
- 1% ..... 10 ohms to 500K ohms
- 5% ..... 10 ohms to 1 megohm

Power Rating "K" and "M" Characteristics ..... 100 milliwatts
Maximum Operating Voltage ..... 50 VDC
Temperature Range ..... −65°C to +150°C

	Characteristics K	Characteristics M
Resistance Temperature Coefficient	±100ppm/°C	±300ppm/°C
Maximum Ambient Temperature Full Power	70°C	70°C
Maximum Temperature Zero Wattage	150°C	150°C
Thermal Shock (Max. % Change)	±0.50	±0.50
Low Temperature Operation (Max. % Change)	±0.25	±0.50
Short Time Overload (Max. % Change)	±0.25	±0.50
High Temperature Exposure (Max % Change)	±0.50	±1.00
Resistance to Bonding Exp. (Max. % Change)	±0.25	±0.25
Moisture Resistance (Max. % Change)	±0.50	±0.50
Life, 2000 Hours (Max. % Change)	±0.50	±2.00

Packaging
- Waffle Packs ..... In accordance with MIL-B-81705
- Embossed Plastic Tape ..... Per EIA 481A
- Tape and Reel ..... 8mm wide tape
- Marking and Labeling ..... Per MIL-R-55342D (Para. 3.14)



*2% and 10% available on special requests; consult factory.

HOW TO ORDER

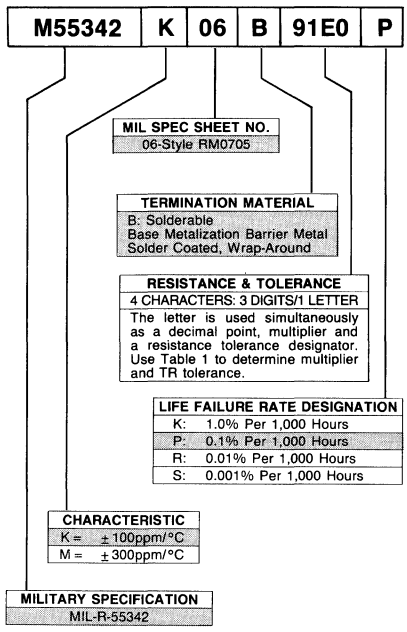
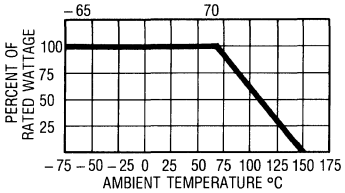


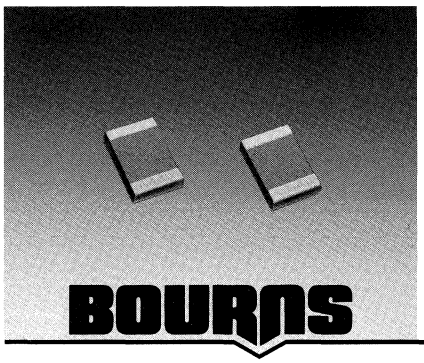
TABLE 1

Symbol	Multiplier	Tolerance ± %
A	X1	.1
B	X1,000	.1
C	X1,000,000	.1
D	X1	1
E	X1,000	1
F	X1,000,000	1
G	X1	2
H	X1,000	2
T	X1,000,000	2
J	X1	3
K	X1,000	3
L	X1,000,000	3
M	X1	10
N	X1,000	10
P	X1,000,000	10

DERATING CURVE



NOTE: This curve indicates the percentage of nominal wattage to be applied at temperatures higher than 70°C. This curve applies only to units mounted on a substrate; however, at no time shall the applied voltage exceed the maximum for each style (see 3.1).



100 MILLIWATT, THICK FILM ESTABLISHED RELIABILITY, MILITARY GRADE

- 1% and 5% tolerances
- "M" and "K" characteristics
- "S," "R," "P" and "M" life failure rates
- Wide variety enhances design flexibility
- Waffle pack and tape & reel packaging
- Wrap-around terminations
- Meets Mil-R-55342D requirements

Model M55342, 03 (STYLE RM1005)

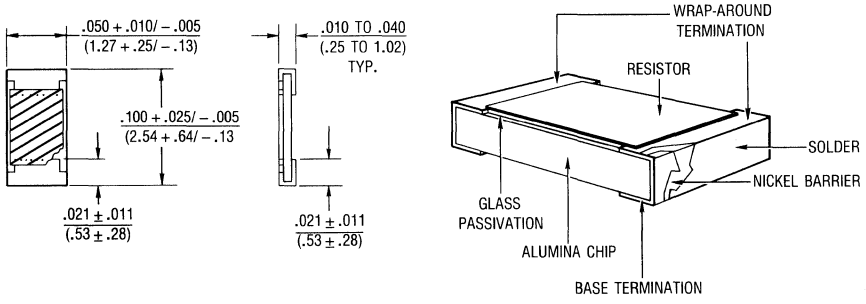
Bourns® Chip Resistor

Electrical Characteristics

Resistance Range and Tolerance*
1% ..... 10 ohms to 500K ohms
5% ..... 10 ohms to 1 megohm
Power Rating "K" and "M" Characteristics ..... 100 milliwatts
Maximum Operating Voltage ..... 40 VDC
Temperature Range ..... −65°C to +150°C

	Characteristics	
	K	M
Resistance Temperature Coefficient	±100ppm/°C	±300ppm/°C
Maximum Ambient Temperature Full Power	70°C	70°C
Maximum Temperature Zero Wattage	150°C	150°C
Thermal Shock (Max. % Change)	±0.50	±0.50
Low Temperature Operation (Max. % Change)	±0.25	±0.50
Short Time Overload (Max. % Change)	±0.25	±0.50
High Temperature Exposure (Max % Change)	±0.50	±1.00
Resistance to Bonding Exp. (Max. % Change)	±0.25	±0.25
Moisture Resistance (Max. % Change)	±0.50	±0.50
Life, 2000 Hours (Max. % Change)	±0.50	±2.00

Packaging
Waffle Packs ..... In accordance with MIL-B-81705
Embossed Plastic Tape ..... Per EIA 481A
Tape and Reel ..... 8mm wide tape
Marking and Labeling ..... Per MIL-R-55342D (Para. 3.14)



*2% and 10% available on special requests; consult factory.

HOW TO ORDER

M55342	K	03	B	91E0	P

MIL SPEC SHEET NO.
03-Style RM1005

TERMINATION MATERIAL
B: Solderable
Base Metalization Barrier Metal
Solder Coated, Wrap-Around

RESISTANCE & TOLERANCE
4 CHARACTERS: 3 DIGITS/1 LETTER
The letter is used simultaneously as a decimal point, multiplier and a resistance tolerance designator. Use Table 1 to determine multiplier and TR tolerance.

LIFE FAILURE RATE DESIGNATION
K: 1.0% Per 1,000 Hours
P: 0.1% Per 1,000 Hours
R: 0.01% Per 1,000 Hours
S: 0.001% Per 1,000 Hours

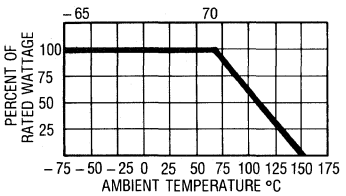
CHARACTERISTIC
K = ±100ppm/°C
M = ±300ppm/°C

MILITARY SPECIFICATION
MIL-R-55342

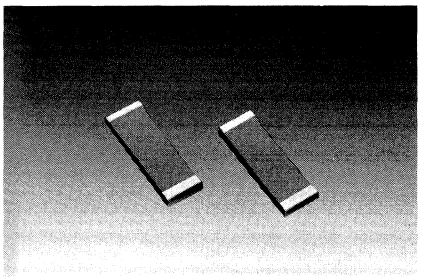
TABLE 1

Symbol	Multiplier	Tolerance ± %
A	X1	.1
B	X1,000	.1
C	X1,000,000	.1
D	X1	1
E	X1,000	1
F	X1,000,000	1
G	X1	2
H	X1,000	2
T	X1,000,000	2
J	X1	3
K	X1,000	3
L	X1,000,000	3
M	X1	10
N	X1,000	10
P	X1,000,000	10

DERATING CURVE



NOTE: This curve indicates the percentage of nominal wattage to be applied at temperatures higher than 70°C. This curve applies only to units mounted on a substrate; however, at no time shall the applied voltage exceed the maximum for each style (see 3.1).



150 MILLIWATT, THICK FILM ESTABLISHED RELIABILITY, MILITARY GRADE

- 1% and 5% tolerances
- "M" and "K" characteristics
- "S," "R," "P" and "M" life failure rates
- Wide variety enhances design flexibility
- Waffle pack and tape & reel packaging
- Wrap-around terminations
- Meets Mil-R-55342D requirements

Model M55342, 04 (STYLE RM1505)

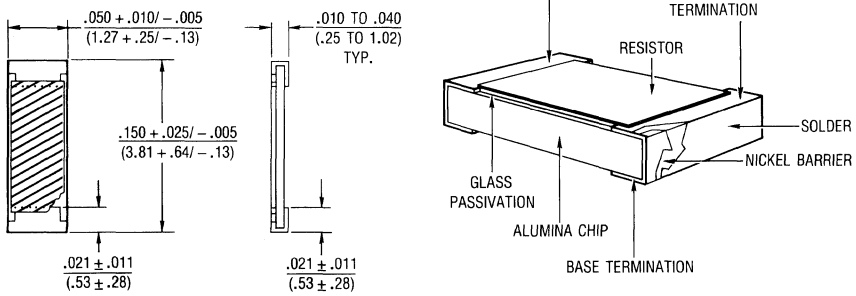
Bourns® Chip Resistor

Electrical Characteristics

Resistance Range and Tolerance*
1% ..... 10 ohms to 1 megohm
5% ..... 10 ohms to 4.7 megohms
Power Rating "K" and "M" Characteristics ..... 150 milliwatts
Maximum Operating Voltage ..... 40 VDC
Temperature Range ..... −65°C to +150°C

	Characteristics	
	K	M
Resistance Temperature Coefficient	±100ppm/°C	±300ppm/°C
Maximum Ambient Temperature Full Power	70°C	70°C
Maximum Temperature Zero Wattage	150°C	150°C
Thermal Shock (Max. % Change)	±0.50	±0.50
Low Temperature Operation (Max. % Change)	±0.25	±0.50
Short Time Overload (Max. % Change)	±0.25	±0.50
High Temperature Exposure (Max % Change)	±0.50	±1.00
Resistance to Bonding Exp. (Max. % Change)	±0.25	±0.25
Moisture Resistance (Max. % Change)	±0.50	±0.50
Life, 2000 Hours (Max. % Change)	±0.50	±2.00

Packaging
Waffle Packs ..... In accordance with MIL-B-81705
Embossed Plastic Tape ..... Per EIA 481A
Tape and Reel ..... 12mm wide tape
Marking and Labeling ..... Per MIL-R-55342D (Para. 3.14)



*2% and 10% available on special requests; consult factory.

HOW TO ORDER

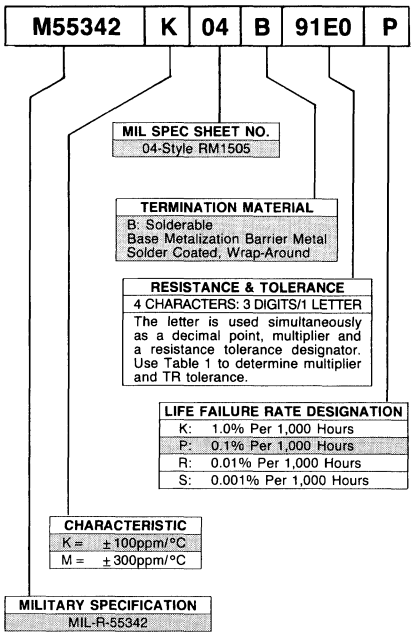
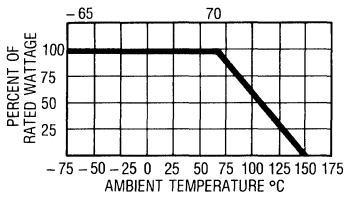


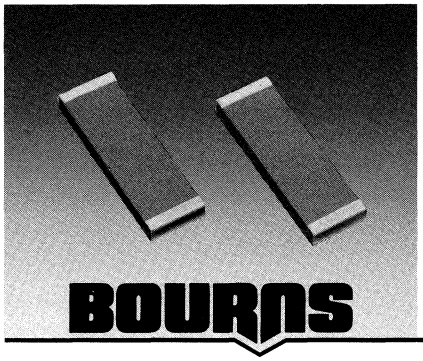
TABLE 1

Symbol	Multiplier	Tolerance ± %
A	X1	.1
B	X1,000	.1
C	X1,000,000	.1
D	X1	1
E	X1,000	1
F	X1,000,000	1
G	X1	2
H	X1,000	2
T	X1,000,000	2
J	X1	3
K	X1,000	3
L	X1,000,000	3
M	X1	10
N	X1,000	10
P	X1,000,000	10

DERATING CURVE



NOTE: This curve indicates the percentage of nominal wattage to be applied at temperatures higher than 70°C. This curve applies only to units mounted on a substrate; however, at no time shall the applied voltage exceed the maximum for each style (see 3.1).



225 MILLIWATT, THICK FILM ESTABLISHED RELIABILITY, MILITARY GRADE

- 1% and 5% tolerances
- "M" and "K" characteristics
- "S," "R," "P" and "M" life failure rates
- Wide variety enhances design flexibility
- Waffle pack and tape & reel packaging
- Wrap-around terminations
- Meets Mil-R-55342D requirements

Model M55342, 05 (STYLE RM2208)

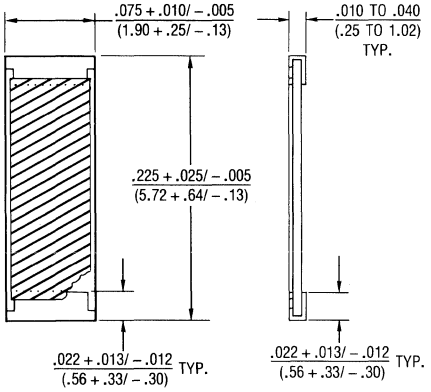
Bourns® Chip Resistor

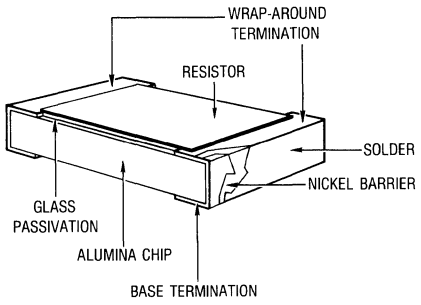
Electrical Characteristics

Resistance Range and Tolerance*
1% ..... 10 ohms to 2 megohms
5% ..... 10 ohms to 15 megohms
Power Rating "K" and "M" Characteristics ..... 225 milliwatts
Maximum Operating Voltage ..... 40 VDC
Temperature Range ..... −55°C to +125°C

	Characteristics K	Characteristics M
Resistance Temperature Coefficient	±100ppm/°C	±300ppm/°C
Maximum Ambient Temperature @ Full Rated Power	70°C	70°C
Maximum Temperature Zero Wattage	150°C	150°C
Thermal Shock (Max. % Change) ΔR	±0.50	±0.50
Low Temperature Operation (Max. % Change)	±0.25	±0.50
Short Time Overload (Max. % Change)	±0.25	±0.50
High Temperature Exposure (Max % Change)	±0.50	±1.00
Resistance to Bonding Exp. (Max. % Change)	±0.25	±0.25
Moisture Resistance (Max. % Change)	±0.50	±0.50
Life, 2000 Hours (Max. % Change)	±0.50	±2.00

Packaging (All packaging complies with MIL-R-55342D)
Waffle Packs ..... In accordance with MIL-B-81705
Tape and Reel ..... 12mm wide tape
Embossed Plastic Tape ..... Per EIA 481A
Marking and Labeling ..... Per MIL-R-55342D (Para. 3.14)





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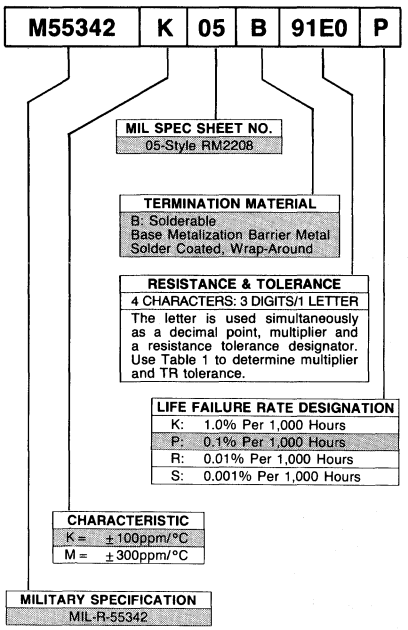
HOW TO ORDER



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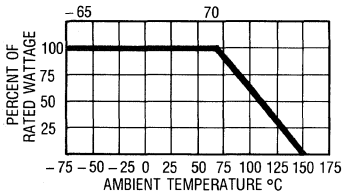
J	X1	3
K	X1,000	3
L	X1,000,000	3
M	X1	10
N	X1,000	10
P	X1,000,000	10

DERATING CURVE



NOTE: This curve indicates the percentage of nominal wattage to be applied at temperatures higher than 70°C. This curve applies only to units mounted on a substrate; however, at no time shall the applied voltage exceed the maximum for each style (see 3.1).

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TEL: 305-944-5031 (Dade)
TEL: 305-276-0070 (Palm Beach)
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FAX: 613-592-0373

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FAX: 514-745-5858

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BOURNS, INC. LIFE SUPPORT AND NUCLEAR FACILITY APPLICATIONS POLICY

As a general policy Bourns, Inc. does not recommend the use of any of its products in (a) life support applications where failure or malfunction of the Bourns product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness or (b) any nuclear facility applications. Bourns, Inc. will not knowingly sell its products for use in such applications unless it receives in writing assurances satisfactory to Bourns that (a) the risks of injury or damage have been minimized, (b) the customer assumes all such risks, and (c) the liability of Bourns is adequately protected under the circumstances.

Examples of devices considered to be life support are neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), autotransfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, and infusion pumps, as well as other devices designated as "critical" by the FDA.

Examples of nuclear facility applications are applications in (a) a nuclear reactor or (b) any device designated or used in connection with the handling, processing, packaging, preparation, utilization, fabricating, alloying, storing, or disposal of fissionable material or waste products thereof.

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