

## SMD Trimmers

### Product Overview

Tyco Electronics Components offers a comprehensive range of variable resistors and potentiometers to satisfy the demands of circuit designers throughout the full spectrum of industrial and professional markets.

A vast range of trimming potentiometers is readily available to suit all needs with devices manufactured in a variety of technologies in conventional or SMD packages from as small as 2mm square up to the traditional 10mm professional trimmer. The packages include single-turn , multi-turn , semi sealed , fully sealed and skeleton versions which represents a fully comprehensive range of solutions to all circuit requirements.

- Well Established Brand Name
- Unequalled Comprehensive Range
- Stable Cermet Elements
- Economic Carbon Elements
- Multi-turns For Precise Set-ability
- Various Sealing Solutions

Size	Element	Style	Features	Family	Page
2mm sq	Cermet	Open-Frame	Auto Adjust Head	<b>3121</b>	172
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## Type 3121 Series



Is this the ultimate in small size electro-mechanical components? Probably not, but certainly so for some long time to come. Just 2.2mm x 2.7mm in size, this tiny surface mount trimmer is offered in a range of values and available from Tyco Electronics Components NOW. The 3121 trimmer covers a board area of approx. 6mm square - about the same size as a 12:06 flat chip. Its adjustment rotor has an unbroken perimeter with internal driver slot allowing standard vacuum nozzles and trim tools to be used.

### Key Features

- Consumes Minimal Board Space
- Taped and Reeled (8mm)
- 50V Operating Maximum
- Wide Value Range
- Attractively Priced
- Suited to Pick and Place
- 0.15 Watts Power Rating
- Stable Alumina Substrate

## Type 3121 Series

### Characteristics - Electrical

<b>Resistance Range:</b>	100R to 1M (Linear)
<b>Resistance Values:</b>	1, 2, 5 in each decade
<b>Resistance Tolerance:</b>	± 25%
<b>Temperature Coefficient of Resistance:</b>	±250ppm/°C ( -20°C ~ +85°C)
<b>Continuous Operating Voltage:</b>	50 Volts DC maximum
<b>Power Rating @ 70°C:</b>	0.15 Watt
<b>Effective Electrical Angle:</b>	260° ±20°

### Mechanical

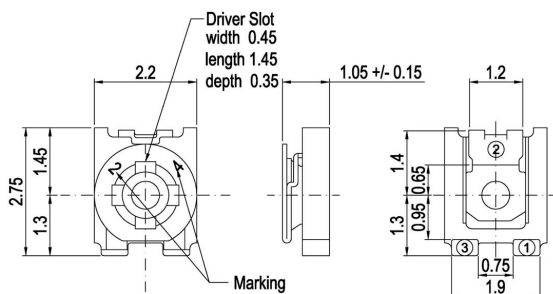
<b>Mechanical Adjustment:</b>	Continuous
<b>Rotational Torque:</b>	1 to 15 mNm
<b>Rotational Life:</b>	±15% maximum change (20 cycles)
<b>Packaging:</b>	3000 pieces per 7" reel

### Environmental

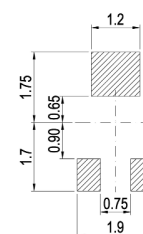
<b>Operating Temperature:</b>	-40°C to +100°C
<b>Storage Temperature:</b>	-10°C to +40°C
<b>Storage Time:</b>	6 Months

For maximum shelf life do not disturb polythene sleeve until you are ready to use potentiometers.

### Dimensions



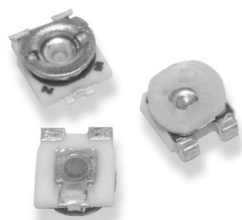
### Recommended Land Pattern



### How to Order

3121	X	102	P
Common Part	Orientation	Resistance Value	Tolerance
Auto Adjust Trimmer	X - Terminals 1 and 3 away from the sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 1K: 102 5K: 103 100K: 104	P - 25 %

## Type 3130 Series



The ultimate in miniaturised potentiometers the 3130 trimmer from Tyco Electronics Components is one of the smallest and lightest trimmers available. With a weight of just 40mg and a height profile of only 1.55mm, it has been developed specifically for new generation hand held equipment where design specification demands precise setting and exceptional reliability. These tiny trimmers are supplied packaged for auto assembly in 8mm blister tape on 7" reels of 2000 pieces.

### Key Features

- Tiny 3mm Potentiometer
- Stable Cermet Element
- Light Weight - Only 0.04 Grams
- Only 1.55mm Height above Board
- Components Marked with Value
- Packaged in 2000 Pieces on 8mm Tape
- Delta Terminals Prevent Solder Bridging
- Top and Underside Adjust Available

## Type 3130 Series

### Characteristics - Electrical

<b>Resistance Range:</b>	100R to 1M
<b>Resistance Values:</b>	1, 2 & 5 in each decade
<b>Resistance Tolerance:</b>	± 25%
<b>Resistance Law:</b>	Linear
<b>Temperature Coefficient of Resistance:</b>	± 250ppm/°C (-40°C to +100°C)
<b>Maximum Operating Voltage:</b>	50 V DC
<b>Resolution:</b>	Infinite
<b>Contact Resistance Variation:</b>	5% of Nominal Value
<b>Power Rating:</b>	0.15W @ 70°C (Derating to zero @ 100°C)
<b>Electrical Rotation:</b>	260° ±20°

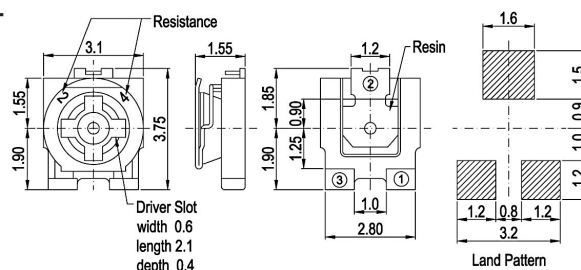
### Mechanical

<b>Rotation Torque:</b>	20 - 200 gfcM
<b>Mechanical Rotation:</b>	Continuous
<b>Marking:</b>	2 Digit Resistance Code on Potentionmeter. Date Code on Reels

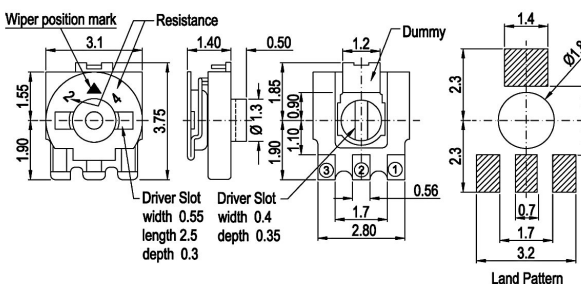
### Environmental

<b>Temperature Range:</b>	-40°C to +100°C
<b>Rotational Life:</b>	20 Cycles ΔR ±15%
<b>Load Life:</b>	ΔR < 5% after 500 Hours @ 70°C
<b>Humidity Load Life:</b>	ΔR ± 5% 500 Hours at 95% RH under load
<b>High Temperature:</b>	ΔR ± 5% 500 Hours at 70°C

### Dimensions - 3130



### 3132



### How to Order

3130	X	102	P
Common Part	Orientation	Resistance Value	Tolerance
3130 - Top Adjust 3132 - Underside Adjust	X - Terminals away from the sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K: 102 10K: 103 100K: 104	P - 25 %

## Type 3133 Series



The ultimate in miniaturised potentiometers the 3133 trimmer from Tyco Electronics Components is one of the smallest and lightest trimmers available. With a weight of just 40mg and a height profile of only 1.2mm, it has been developed specifically for new generation hand held equipment where design specification demands precise setting and exceptional reliability. These tiny trimmers are supplied packaged for auto assembly in 8mm blister tape on 7" reels of 2500 pieces.

### Key Features

- Tiny 3mm Potentiometer
- Stable Cermet Element
- Light Weight - Only 0.04 Grams
- Only 1.2mm Height above Board
- Components Marked with Value
- Packaged in 2500 Pieces on 8mm Tape
- Delta Terminals Prevent Solder Bridging

## Type 3133 Series

### Characteristics - Electrical

Resistance Range:	100R to 1M
Resistance Values:	1, 2 & 5 in each decade
Resistance Tolerance:	± 25%
Resistance Law:	Linear
Temperature Coefficient of Resistance:	± 250ppm/°C (-40°C to +100°C)
Maximum Operating Voltage:	50 V DC
Resolution:	Infinite
Contact Resistance Variation:	5% of Nominal Value
Power Rating:	0.1W @ 70°C (Derating to zero @ 100°C)
Electrical Rotation:	260° ±20°

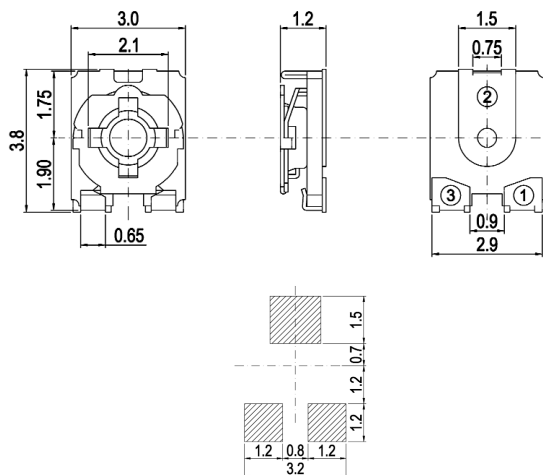
### Mechanical

Rotation Torque:	1mNm - 12 mNm
Mechanical Rotation:	Continuous
Marking:	2 Digit Resistance Code on Potentiometer. Date Code on Reels

### Environmental

Temperature Range:	-40°C to +100°C
Rotational Life:	20 Cycles ΔR ±10%
Load Life:	ΔR < 5% after 1000 Hours @ 70°C
Soldering Heat:	240°C 10 seconds recommended
Humidity Load Life:	ΔR ± 5% 1000 Hours at 95% RH under load

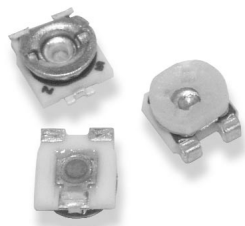
### Dimensions



### How to Order

3133	X	104	P
Common Part	Orientation	Resistance Value	Tolerance
3133 - 3mm Top Adjust Cermet Trimmer	X - Terminals 1 and 3 away from the sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K: 102 10K: 103 100K: 104	P - 25 %

## Type 3135 Series



The 3135 miniature chip trimmer incorporates the latest technology developments and has been rigorously tested to the highest standards. It has been developed specifically for new generation handheld equipment, where the design specification demands precise setting and exceptional reliability. This tiny trimmer is supplied packaged for auto assembly in 8mm plastic blister tape on 180mm reels of 2000 units.

### Key Features

- Tiny 3mm Potentiometer
- Stable Cermet Element
- Weight 0.04 Grams
- Components Marked with Value
- Delta Terminals Prevent Solder Bridging
- Attractively Priced
- Packaged in Standard 8mm Tape

## Type 3135 Series

### Characteristics - Electrical

<b>Resistance Range:</b>	100R to 1M
<b>Resistance Values:</b>	1, 2, 5 in each decade
<b>Resistance Tolerance:</b>	± 25%
<b>Resistance Law:</b>	Linear
<b>Temperature Coefficient of Resistance:</b>	± 250ppm / °C ( -40°C to 100°C)
<b>Maximum Operating Voltage:</b>	50V DC or AC RMS maximum
<b>Resolution:</b>	Essentially Infinite
<b>Contact Resistance:</b>	<5% nominal resistance
<b>Power Rating:</b>	0.1W at 70°C (derating to zero at 100°C)
<b>Effective Electrical Angle:</b>	270° ± 20°

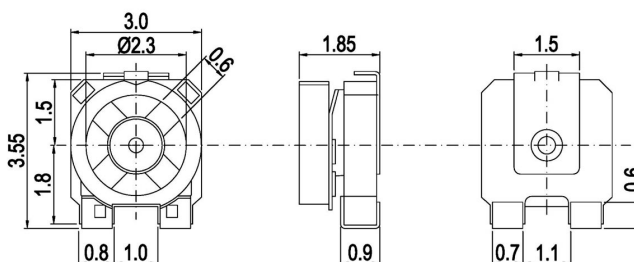
### Mechanical

<b>Rotational Torque:</b>	2 to 20 mNm
<b>Mechanical Adjustment:</b>	Continuous
<b>Weight:</b>	0.04 grams
<b>Marking:</b>	2 digit resistance code on potentiometer

### Environmental

<b>Temperature Range:</b>	-40°C to +100°C
<b>Rotational Life:</b>	After 20 cycles ΔR < 10%
<b>Load Life:</b>	ΔR < 5% after 1000 hours at 70°C
<b>Soldering Heat:</b>	220°C for 40 Seconds maximum.
<b>Humidity Load Life:</b>	ΔR < 5% after 1000 hours 95% RH under load
<b>High Temperature:</b>	ΔR < 5% after 1000 hours at 70°C

### Dimensions



### How to Order

3135	X	502	P
Common Part	Orientation	Resistance Value	Tolerance
3mm Trimmer	X - Terminals 1 and 3 away from the sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 1K: 102 10K: 103 100K: 104	P - 25 %

## Type 3142 Series



A range of small single turn trimmers suited to reflow soldering and attractively priced for volume application. The 3142 trimmer is supplied on 12mm tape on 180mm diameter reels. This product is long established, having an excellent reputation for long term stability. It is readily available from our network of distributors.

### Key Features

- Stable Cermet Element
- 0.15W Power Rating
- Packed in Standard 12mm Tape
- Suited to Auto Placement
- Temperature Range -25°C to +85°C
- Excellent Vacuum Pickup on Rotor
- Height Profile of Just 2.4mm from Board

## Type 3142 Series

### Characteristics - Electrical

Resistance Range:	100R to 1M
Resistance Values:	1, 2 & 5 in each decade
Resistance Tolerance:	± 25%
Resistance Law:	Linear
Temperature Coefficient of Resistance:	± 250ppm/°C
Operating Voltage:	50 V DC maximum
Wiper Current:	50mA maximum
Resolution:	Infinite
Contact Resistance Variation:	<5% of Nominal Value
Power Rating:	0.15 Watts @ 70°C (Derating to zero @ 85°C)
Electrical Rotation:	270° ±10°
End Resistance:	5% maximum
Insulation Resistance:	100M (250V DC) minimum

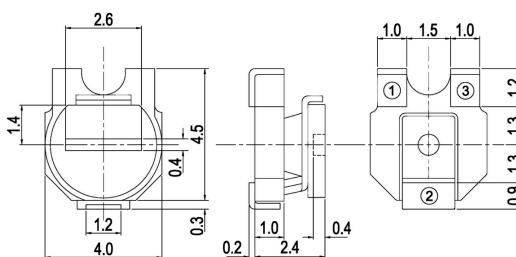
### Mechanical

Rotation Torque:	2.0 - 20 mNm
Solder Strength:	300mNm (3 directions) minimum
Mechanical Rotation:	360° Continuous

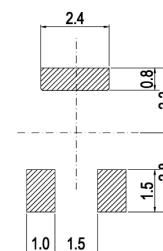
### Environmental

Operating Temperature Range:	-25°C to +85°C
Humidity Load Life:	350 hrs 40°C RH 90-95% ΔR ±5%
Load Life:	1000 hrs @ 70°C ΔR ±5%
Temperature Cycle:	ΔR ±3% -25°C ~ +85°C
Rotational Life:	10 ±10% cycles

### Dimensions



### Substrate Layout



### How to Order

3142	W	102	P
Common Part	Orientation	Resistance Value	Tolerance
3130 - 3 Terminals	W - Terminals 1&3 towards sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K: 102 10K: 103 100K: 104 1MΩ: 105	P - 25 %

## Type 3150 Series



This is the ultimate in lightweight, low profile skeleton 4mm surface mount potentiometers. Offered in easy, top or underside adjustment, with a plus slot that is ideal for automatic top adjustment. At a weight of 0.2 grams and a profile height that is only 1.5mm above the board, it is a natural choice for new generation hand held equipments. The trimmer is a mere 4mm and is a well proven and popular package supplied on standard 12mm tape for automatic placement, and reflow soldering systems. The central hole is filled with resin to improve ease of pick and placement.

### Key Features

- Tiny 4mm Potentiometer
- Stable Cermet Element
- Light Weight - Only 0.2 Grams
- Only 1.5mm Height above Board
- Components Marked with Value
- 0.2W Power Dissipation
- Packaged in 1000 Pieces on 12mm Tape
- Delta Terminals / In Line Terminals
- Top and Underside Adjust Available

## Type 3150 Series

### Characteristics - Electrical

Resistance Range:	100R to 1M
Resistance Values:	1, 2 & 5 in each decade
Resistance Tolerance:	± 25%
Resistance Law:	Linear
Temperature Coefficient of Resistance:	± 250ppm/°C (-25°C to +85°C)
Maximum Operating Voltage:	50 V DC
Resolution:	Infinite
Contact Resistance Variation:	5% of Nominal Value
Power Rating:	0.2W @ 70°C (Derating to zero @ 100°C)
Electrical Rotation:	260° ±20°

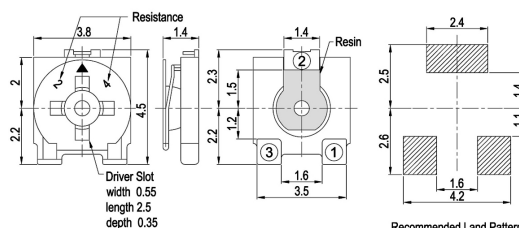
### Mechanical

Rotation Torque:	2 - 20 mNm
Weight:	0.2 grams
Terminal Strength:	Horizontal 1Kg - Vertical 500gf
Mechanical Rotation:	Continuous
Marking:	Resistance Code on Potentiometer. Date Code on Reels

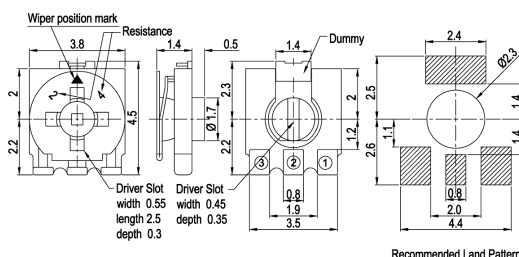
### Environmental

Temperature Range:	-40°C to +100°C
Temperature Storage:	-55°C to +100°C
Rotational Life:	20 Cycles ΔR ±15%
Load Life:	ΔR < 5% after 500 Hours @ 70°C
Humidity Load Life:	ΔR ± 5% 500 Hours at 95% RH under load (60°C)
High Temperature:	ΔR ± 5% 500 Hours at 70°C

### Dimensions - 3150



### 3155



### How to Order

3150	W	102	P
Common Part	Orientation	Resistance Value	Tolerance
3150 - 3 Terminals Offset Top Adjust  3155 - 3 Terminals Inline Top / Underside Adjust	W - Terminals a and c towards the sprockets holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K: 102 10K: 103	P - 25 %



## Type 3165 Series



These cermet element surface mount trimmers feature a cross-slot adjustment head with unbroken perimeter for ease of vacuum pick up and auto adjustment.

Available in two and three terminal styles these 4mm trimmers are supplied on standard 12mm blister tape and are suitable for all reflow soldering processes.

### Key Features

- Stable Cermet Element
- Choice of Orientation Options
- Available on Standard 12mm Tape
- Lightweight - Only 0.2 Grams
- New Style Cross Slot Adjust
- Low Price Reduces Production Costs
- Small Compact Size (4mm Square)
- 2 and 3 Terminal Options

## Type 3165 Series

### Characteristics - Electrical

<b>Resistance Range:</b>	100R to 1M
<b>Resistance Values:</b>	1, 2 & 5 in each decade
<b>Resistance Tolerance:</b>	± 25%
<b>Resistance Law:</b>	Linear
<b>Temperature Coefficient of Resistance:</b>	± 250ppm/°C at -25°C to +85°C
<b>Operating Voltage:</b>	50 V maximum
<b>Resolution:</b>	Infinite
<b>Contact Resistance Variation:</b>	<5% of Nominal Value
<b>Power Rating:</b>	0.15 Watts @ 70°C (Derating to zero @ 100°C)
<b>Electrical Rotation:</b>	270° ±10°

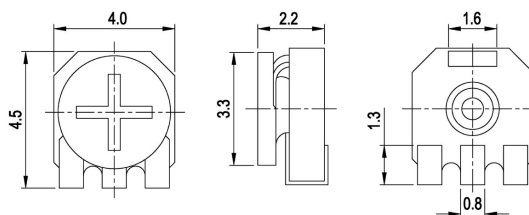
### Mechanical

<b>Rotation Torque:</b>	2.0 - 20 mNm
<b>Weight:</b>	0.2 grams

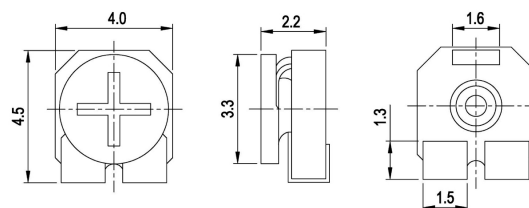
### Environmental

<b>Operating Temperature Range:</b>	-25°C to +85°C
<b>Storage Temperature:</b>	500 hours at 70°C
<b>Humidity Load Life:</b>	350 hours ΔR ± 5% 40°C RH 90-95%
<b>Load Life:</b>	1000 hours ΔR ± 5% @ 70°C
<b>Effect of Soldering:</b>	250°C ±10°C 3 seconds ΔR ± 3%
<b>Rotational Life:</b>	10 cycles ΔR ± 15%

### Dimensions 3165



### 3166



### How to Order

3165	W	102	P
Common Part	Orientation	Resistance Value	Tolerance
3165 - 3 Terminals Inline 3166 - 2 Terminals Delta Configuration	W - Terminals 1 and 3 towards the sprockets holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K0: 102 10K: 103	P - 25 %

## Type 3103 Series



The latest miniaturised Citec sealed trimmer is the smallest, lightest sealed potentiometer available and the most cost effective. Consuming just 10.5mm<sup>2</sup> of board real estate, it has been developed specifically for new generation hand held equipment, where double sided component placement is often unavoidable. These 3mm devices are only 1.8mm high. Due to the innovative carbon on polymer technology, the device sets new standards in low cost high reliability electro mechanical components.

### Key Features

- Tiny 3mm Square Size
- Latest Carbon Polymer Technology
- Suitable For Washing
- Delta Terminals Prevent Solder Bridging
- Super Thin - Less Than 2mm High
- Packed in 8mm Standard Plastic Tape
- Integrated End Stop

## Type 3103 Series

### Characteristics - Electrical

<b>Resistance Range:</b>	200R to 1M
<b>Resistance Values:</b>	1, 2, 5 in each decade
<b>Resistance Tolerance:</b>	± 30%
<b>Temperature Coefficient of Resistance:</b>	± 500ppm / °C (25 to 85°C) ± 750ppm / °C (-25 to 25°C)
<b>Resistance Law:</b>	Linear
<b>Max. Operating Voltage:</b>	50V dc
<b>Contact Resistance Variation:</b>	5% of Nominal Max.
<b>Power Rating:</b>	0.05W at 50°C (Derating to zero @ 85°C)
<b>Effective Electrical Angle:</b>	260° ± 20°

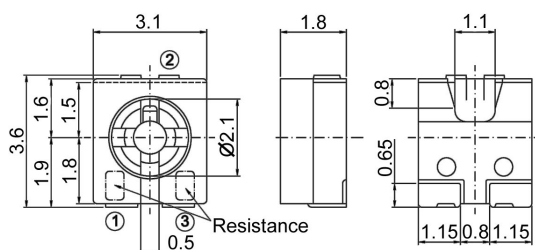
### Mechanical

<b>Rotational Torque:</b>	1 to 15 mNm
<b>Adjustment (End Stop Torque):</b>	20 mNm
<b>Weight:</b>	0.09 grams
<b>Terminal Robustness:</b>	Horizontal 10 N Vertical 5 N

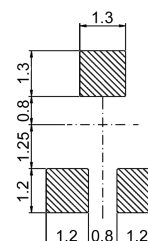
### Environmental

<b>Temperature Range:</b>	- 25°C to 70°C
<b>Rotational Life:</b>	After 20 cycles ΔR ± 15%
<b>Load Life:</b>	ΔR Within + 2%, -15% after 500 hrs at 50°C Under Load
<b>Sealing:</b>	Dustproof - Suitable for Washing
<b>Humidity Load Life:</b>	ΔR -10%, +15% after 500 hrs at 40°C, RH 90 to 95%, Under Load

### Dimensions



### Substrate Layout



### How to Order

3103	X	502	N
Common Part	Orientation	Resistance Value	Tolerance
3mm Sealed Trimmer	X - Terminals 1 and 3 away from the sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 1K: 102 5K: 502 100K: 104	N - 30 %

## Type 3203 Series



Consuming just 10.5 sq.mm of board, the 3203 trimmer has been developed specifically for a new generation of hand held equipment, where mixed technology and double sided component placement are unavoidable. These 3mm devices are just 2mm high and sealed for IR, vapour phase and full immersion wave soldering together with solvent board washing process. Also available within this range is the 3213 trimmer, the auto adjust sister to the 3203 trimmer.

### Key Features

- Tiny 3mm Square Size
- Suited to Dip and Wave Solder
- Latest Cermet Technology
- Suitable for Solvent Washing
- Delta Terminals Prevent Solder Bridging
- Super Thin - Only 2mm High
- Designed for Auto Adjust
- Packed in Standard 12mm Tape

## SMD Trimmers

### Type 3203 Series

#### Characteristics - Electrical

<b>Resistance Range:</b>	100R to 1M (1, 2, 5 in each decade)
<b>Resistance Tolerance:</b>	± 20%
<b>Temperature Coefficient:</b>	± 100ppm/°C at -65°C to +150°C
<b>Operating Voltage:</b>	15V DC or AC RMS maximum
<b>Contact Resistance Variation:</b>	5% of nominal maximum
<b>Power Rating:</b>	0.05 watts at 70°C
<b>Effective Electrical Angle:</b>	210° nom

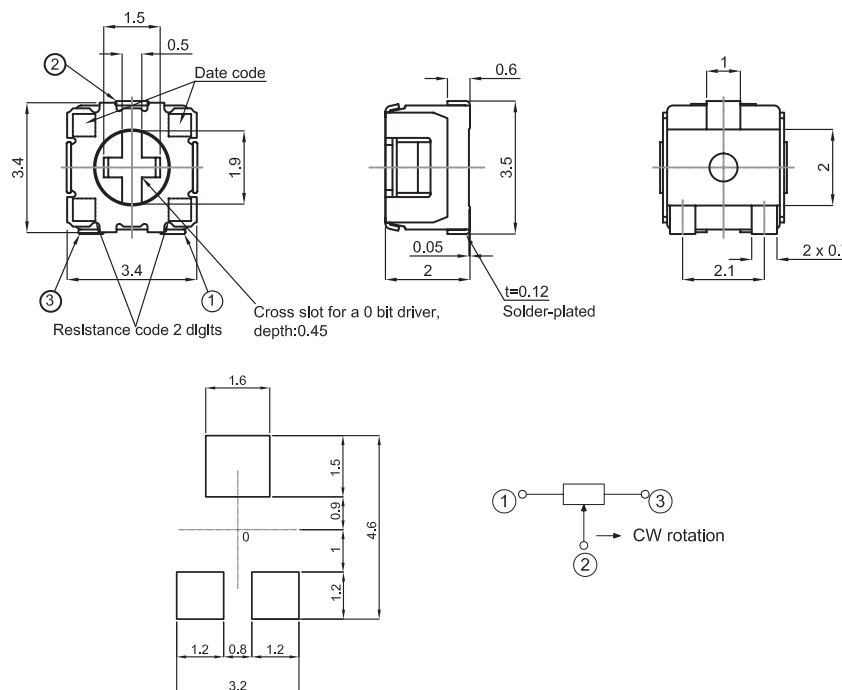
#### Mechanical

<b>Rotational Torque:</b>	5mNm
<b>Mechanical Adjustment:</b>	250° Nom

#### Environmental

<b>Temperature Range:</b>	-55°C to + 150°C
<b>Rotational Life:</b>	After 100 cycles $\Delta R < \pm 15\%$
<b>Load Life:</b>	$\Delta R < 5\%$ after 1000 hours
<b>Sealing:</b>	For dip and wave solder, prior to adjustment

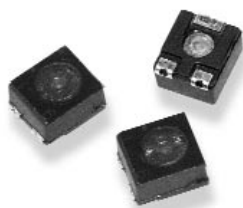
#### Dimensions



#### How to Order

3203	X	102	P
Common Part	Orientation	Resistance Value	Tolerance
3203 – Screwdriver Slot	X – Terminals 1 & 3 away from sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K0: 102 10K: 103	P - 25 %

## Type 3204 Series



The 3204 miniature chip trimmer incorporates the latest technology developments and has been rigorously tested to the highest standards. Special attention during the design of the product, ensures that this component meets specific requirements of hybrids and modern surface mounting boards. It is fully sealed until you are ready to trim, so it is highly suitable for both dip and wave soldering. It can then be resealed by the use of rubber based lock paint.

### Key Features

- Cermet Element
- Suitable for Dip and Wave Soldering
- Available in Standard 12mm Tape
- Available from Stock
- Small, Compact Size (4mm Square)
- Terminal Layout Stops Solder Bridging
- Smooth Top Assists Placement

## Type 3204 Series

### Characteristics - Electrical

<b>Resistance Range:</b>	100R to 1M
<b>Standard Resistance Values:</b>	1, 2, 5 in each decade
<b>Resistance Tolerance:</b>	± 25%
<b>Temperature Coefficient of Resistance:</b>	± 250ppm / °C ( -30°C to 100°C)
<b>Resistance Law:</b>	Linear
<b>Maximum Operating Voltage:</b>	50V DC or AC RMS maximum
<b>Resolution:</b>	Essentially Infinite
<b>Contact Resistance:</b>	<10R below 1K - <1% above 1K
<b>Power Rating:</b>	0.1W at 70°C (Derating to zero @ 100°C)
<b>Effective Electrical Angle:</b>	250° ± 20°

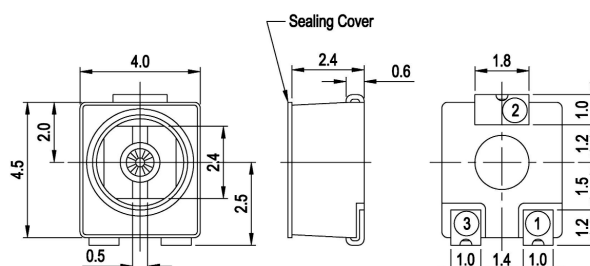
### Mechanical

<b>Rotational Torque:</b>	2 to 20 mNm
<b>Mechanical Adjustment:</b>	Continuous
<b>Weight:</b>	0.11 grams
<b>Soldering Strength:</b>	Horizontal 500gf minimum Vertical 500gf minimum

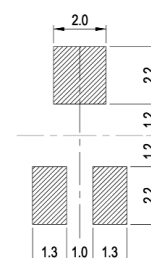
### Environmental

<b>Temperature Range:</b>	- 20°C to 85°C
<b>Temperature Storage:</b>	500 hours at 70°C
<b>Rotational Life:</b>	20 cycles
<b>Load Life:</b>	ΔR < 5% after 1000 hours
<b>Sealing:</b>	Sealed for dip and wave solder until silicone is removed
<b>Soldering Heat:</b>	250°C ± 5°C for 5 ± 1 seconds
<b>Humidity Load Life:</b>	ΔR ± 5% after 500 hours at 95 RH under load
<b>High Temperature Rise:</b>	ΔR ± 5% after 500 hours at 100°C

### Dimensions



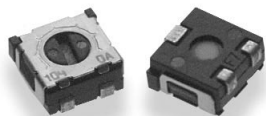
### Substrate Layout



### How to Order

3204 Common Part	X Orientation	502 Resistance Value	P Tolerance
3204 - 4mm Sealed Trimmer	X - Terminals 1 and 3 away from the sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 1K: 102 5K: 502 100K: 104	P - 25 %

## Type 3212 Series



Consuming just 6.72 sq.mm of board, the 3212 trimmer has been developed specifically for a new generation of hand held equipment, where mixed technology and double sided component placement are unavoidable. These 2mm devices are less than 2mm high and sealed for IR, vapour phase and full immersion wave soldering together with solvent board washing process.

### Key Features

- Tiny 2mm Square Size
- Suited to Dip and Wave Solder
- Latest Cermet Technology
- Suitable for Solvent Washing
- Delta Terminals Prevent Solder Bridging
- Super Thin - Only 1.7mm High
- Packed in Standard 12mm Tape

### Characteristics - Electrical

Resistance Range:	100R to 1M (1, 2, 5 in each decade)
Resistance Tolerance:	± 20%
Temperature Coefficient:	± 150ppm/°C
Operating Voltage:	50V DC or Power Rating, whichever is smaller
Contact Resistance Variation:	2% or 3Ω, whichever is greater
Power Rating:	0.1 watts at 70°C (Derating to zero @ 125°C)
Effective Electrical Angle:	240°
End Resistance:	1% or 2Ω, whichever is greater

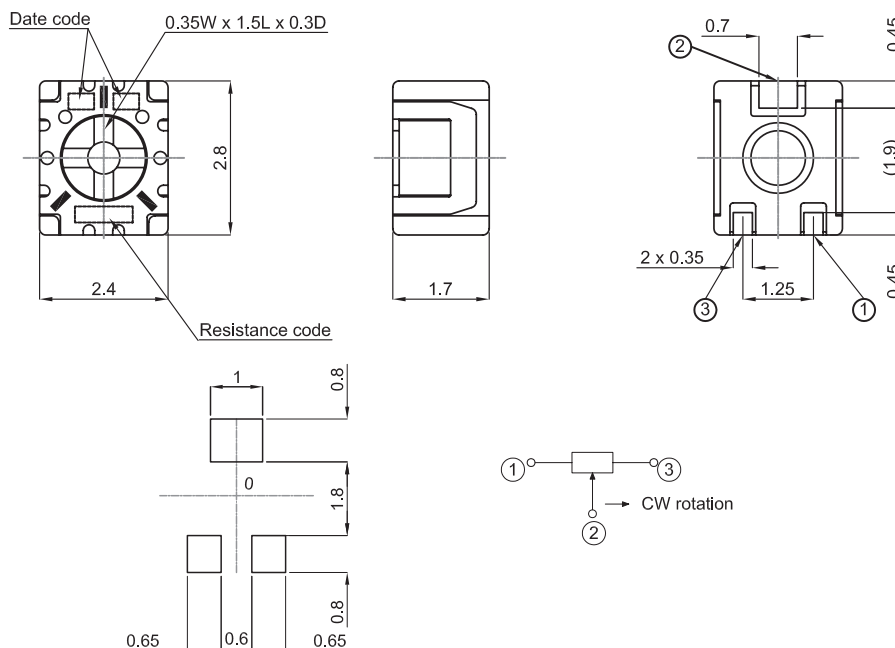
### Mechanical

Rotational Torque:	5mNm
Mechanical Adjustment:	250° Nom

### Environmental

Temperature Range:	-55°C to + 150°C
Rotational Life:	After 100 cycles $\Delta R < \pm 15\%$
Load Life:	$\Delta R < 5\%$ after 1000 hours
Sealing:	For dip and wave solder, prior to adjustment

### Dimensions



### How to Order

3212	X	102	M
Common Part	Orientation	Resistance Value	Tolerance
3212 – 2mm Sealed Trimmer	X – Terminals 1 & 3 away from sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K0: 102 10K: 103	M - 20 %

## Type 3213 Series



Consuming just 11.5 sq.mm of board, the 3213 trimmer has been developed specifically for a new generation of hand held equipment, where mixed technology and double sided component placement are unavoidable. These 3mm devices are just 2mm high and sealed for IR, vapour phase and full immersion wave soldering together with solvent board washing process. Also available within this range is the 3203 trimmer.

### Key Features

- Tiny 3mm Square Size
- Suited to Dip and Wave Solder
- Latest Cermet Technology
- Suitable for Solvent Washing
- Delta Terminals Prevent Solder Bridging
- Super Thin - Only 2mm High
- Designed for Auto Adjust
- Packed in Standard 12mm Tape

## SMD Trimmers

### Type 3213 Series

#### Characteristics - Electrical

<b>Resistance Range:</b>	100R to 1M (1, 2, 5 in each decade)
<b>Resistance Tolerance:</b>	± 20%
<b>Temperature Coefficient:</b>	± 100ppm/°C at -65°C to +150°C
<b>Operating Voltage:</b>	15V DC or AC RMS maximum
<b>Contact Resistance Variation:</b>	1% of nominal maximum
<b>Power Rating:</b>	0.125 watts at 70°C (Derating to zero @ 125°C)
<b>Effective Electrical Angle:</b>	210°

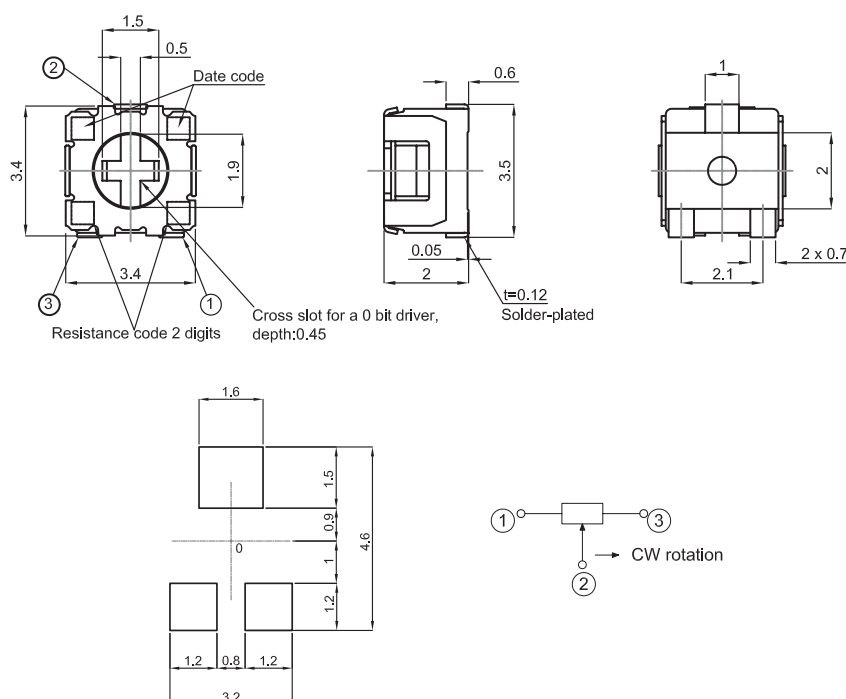
#### Mechanical

<b>Rotational Torque:</b>	5mNm
<b>Mechanical Adjustment:</b>	250°

#### Environmental

<b>Temperature Range:</b>	-55°C to + 125°C
<b>Rotational Life:</b>	After 100 cycles $\Delta R < \pm 5\%$
<b>Load Life:</b>	$\Delta R < 3\%$ after 1000 hours
<b>Sealing:</b>	For dip and wave solder, prior to adjustment

#### Dimensions



#### How to Order

3213	X	102	M
Common Part	Orientation	Resistance Value	Tolerance
3213 – Auto Adjust	X – Terminals 1 & 3 away from sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K0: 102 10K: 103	M - 20 %

## Type 3315 Series



This component is an ideal choice for applications when miniaturisation is essential. With a very small outline package (5.0 x 4.5 x 2.3mm), it is designed specifically for pick and place equipment. This is probably the ultimate in a sealed miniature potentiometer eminently suited to surface mounting and hybrid systems. Special radial O ring seals and state of the art materials permit circuit adjustments and re-adjustments even after wave soldering. The 3315 trimmer is designed to withstand temperatures up to 300°C hence providing unparalleled safety margins, regardless of the SMD process.

### Key Features

- Supplied on STD EIA Embossed Tape
- Small Versatile Size
- Sealed with an O-Ring
- Suitable for Dip and Reflow Soldering
- Ideal for Automatic Placement
- Side Adjust Version Available
- 0.25W at 70°C
- Available in J Hook and Gull Wing Styles

## Type 3315 Series

### Characteristics - Electrical

Resistance Range:	10R to 2M 1, 2, 5 in each decade
Resistance Tolerance:	±20%
Power Rating:	0.25W at 70°C, (Derating to 0 at 125°C)
Resolution:	Essentially infinite
Input Voltage:	200V dc or Power Rating, whichever is smaller
Wiper Current:	100mA
Electrical Angle:	210°
End Resistance:	1% or 2 ohms, whichever is greater
Contact Resistance Variation:	1% or 3 ohms, whichever is greater
Insulation Resistance:	500 V DC 1000M minimum
Dielectric Strength:	500V AC 1 minute

### Mechanical

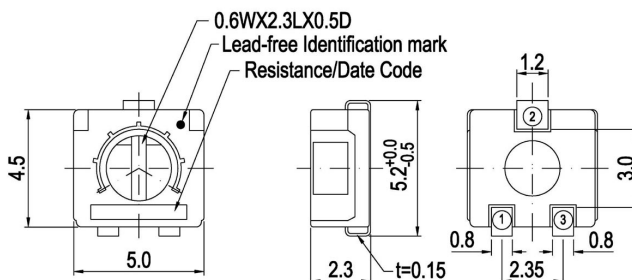
Mechanical Angle:	240°
Operating Torque:	10mNm
Stop Strength:	30mNm
Weight:	3315/3316 - 0.12 grams ~ 3317 - 0.22 grams
Terminals:	Solder Plated Copper Alloy

### Environmental

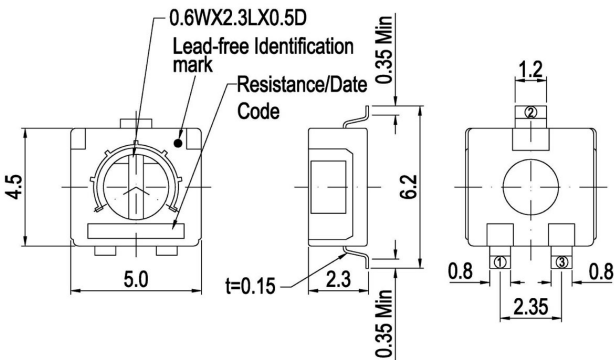
ITEM	TEST CONDITIONS	ΔR/R
Operating Temperature:	-55°C - +125°C	-
Temperature Coefficient:	100ppm/°C maximum 100R to 2M 250ppm/°C maximum 10R to 50R	-
Thermal Shock:	-65°C - 125°C, 5 cycles (0.5 hrs)	≤ ± 2%
Humidity:	-10°C to +65°C 80 - 90% RH, 10 cycles, 240 hours.	≤ ± 2%
Shock:	100G, 6 directions, 3 times	≤ ± 1%
Vibration:	20G, 10 - 2000 Hz, 12 times.	≤ ± 1%
Soldering Heat:	260°C 10 secs / 215°C - 35 secs.	≤ ± 1%
Load Life:	70°C, rated power, 1000 hours.	≤ ± 3%
Low Temperature Operation:	-55°C, 2 hours.	≤ ± 2%
High temperature Operation:	125°C, 250 hours.	≤ ± 3%
Rotational Life:	100 cycles	≤ ± (2 ohm+ 3%)
Seal Test:	85°C 1 minute	No Leaks

ΔR/R: Change in total resistance

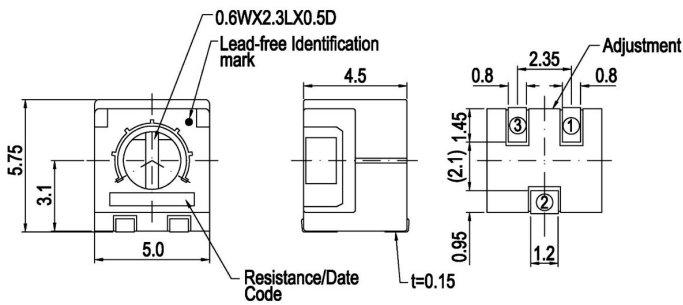
### Dimensions - 3315



**3316**



**3317**



**How to Order**

3315	X	104	M
Common Part	Orientation	Resistance Value	Tolerance
3315 - J Lead Termination 3316 - Gull Wing Termination 3317 - Side Adjust	X - Terminals 1 and 3 away from the sprocket holes	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K: 102 10K: 103 100K: 104	M - 20 %



## Type 3240 Series



Tyco Electronics Components is pleased to introduce this tiny (4mm square) multiturn trimmer potentiometer. The 3240 Series is designed with a footprint meeting EIA and other international board layout standards. It is also compatible with all surface mount manufacturing processes. It is ideally suited to small sensors where its 10 turn setability and small size enables it to stand out from most other competitors.

### Key Features

- Full Ten Turns
- Fully Sealed
- Wave and Reflow Solder
- Only 4mm Square
- Flush Adjustment Screws
- Top or Low Profile Styles
- Tape and Reeled (EIJ Std Reels)
- Smooth Top - Good Pickup

### Characteristics - Electrical

<b>Resistance Range:</b>	10R to 2M 1, 2, 5 in each decade
<b>Resistance Tolerance:</b>	±10%
<b>Power Rating (300 volts maximum):</b>	0.25Watts at 85°C, derating to 0 at 150°C
<b>Absolute Minimum Resistance:</b>	1% or 2 ohms, (whichever is greater)
<b>Contact Resistance Variation:</b>	1% or 3 ohms, (whichever is greater)
<b>Resolution:</b>	Essentially infinite
<b>Insulation Resistance:</b>	1000 Meg ohms minimum at 500V DC
<b>Dielectric Strength (Sea Level):</b>	600 V AC (1 minute)
<b>Electrical Angle:</b>	10 turns nominal

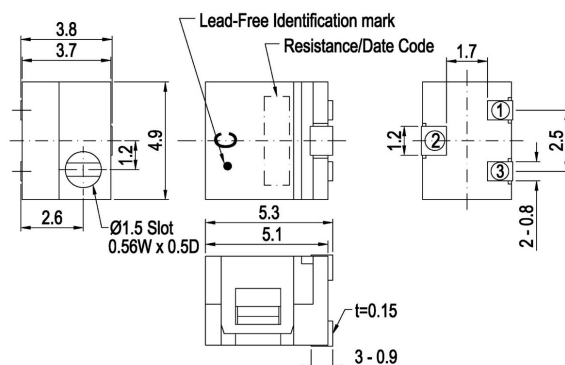
### Mechanical

<b>Mechanical Angle:</b>	12 turns nominal
<b>Operating Torque:</b>	20 mNm maximum
<b>Mechanical Stop:</b>	Wiper Idles
<b>Weight:</b>	0.2 gram approximately
<b>Packaging:</b>	500 pieces on 7" Reel (P Style) 250 pieces on 7" Reel (W Style)

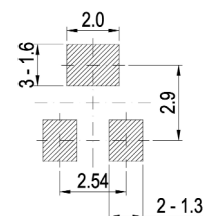
### Environmental

<b>Soldering Heat:</b>	260°C for 5 - 6 seconds, $\Delta R \leq \pm 1\%$
<b>Temperature Range:</b>	-65°C to +150°C
<b>Temperature Coefficient:</b>	±100ppm/°C
<b>Humidity:</b>	-10°C – +65°C, 80 - 98% RH 10 cycles, 240 hours $\Delta R \leq \pm 2\%$
<b>Vibration:</b>	20G $\Delta R < 1\%$
<b>Shock:</b>	100G $\Delta R \leq \pm 1\%$
<b>Load Life:</b>	@ 85°C rated power 1000 hours TRS 2 ohms or 2% (whichever is greater)
<b>Rotational Life:</b>	200 cycles $\Delta R \leq \pm 3\%$ or 3 ohms (whichever is greater)
<b>Thermal Shock:</b>	5 cycles, -65°C to +150°C, $\Delta R \leq \pm 2\%$

**Dimensions -  
3240W**

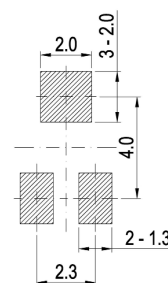
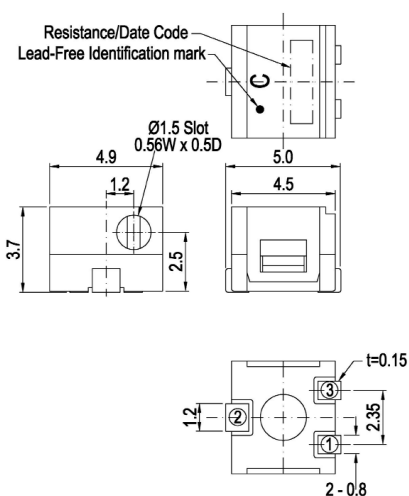


**Substrate Layout**



**3240P**

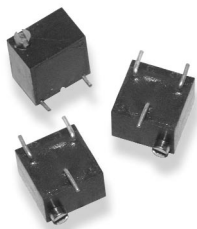
**Substrate Layout**



**How to Order**

3240	W	102	K
Common Part	Orientation	Resistance Value	Tolerance
3240 – 4mm Multiturn Trimmer	W – Top Adjustment P – Side Adjustment	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K: 102 10K: 103 100K: 104	K - 10 %

Type 3270 Series



This is the surface mount version of the popular Tyco Electronics Components 4270. Top adjust and low profile side adjust versions are available in special high temperature resistant packages. This multi-turn device offers good setability, infinite resolution and the other specification features typical of conventional trimmers yet now suitable for s.m. applications.

Key Features

- Stable, Infinite Resolution Element
- High Temperature Construction
- 0.25 Watt Power Rating at 85°C
- Low Temperature Coefficient:  $\pm 100\text{ppm}/^\circ\text{C}$
- Vertical and Low Profile Adjust Style
- Sealed to Withstand Dip and Wave Solder
- Packaged in Plastic Tubes

Characteristics - Electrical

Resistance Range:	10R to 1M
Resistance Tolerance:	$\pm 10\%$ standard (closer tolerance available)
Absolute Minimum Resistance:	1% or 2 ohms maximum
Contact Resistance Variation:	3.0% or 3 ohms (whichever is greater)
Adjustability:	Voltage $\pm 0.02\%$ : Resistance $\pm 0.05\%$
Resolution:	Infinite
Insulation Resistance:	500 VDC, 1000M minimum
Dielectric Strength:	Sea level 600 VAC 80,000 feet 250 VAC
Electrical Travel:	12 turns nominal

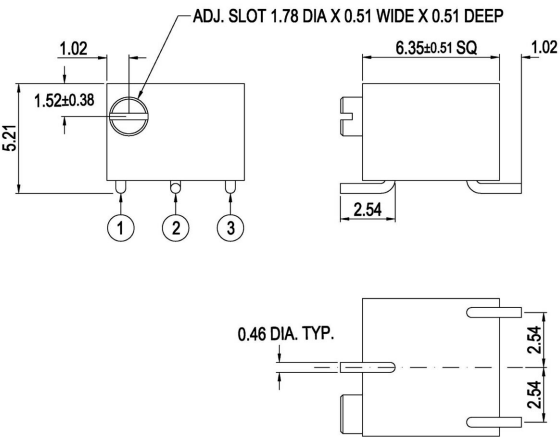
Mechanical

Torque:	21 mNm maximum
Mechanical Stops:	Wiper idles
Terminals:	Solderable pins
Weight:	0.4 gram maximum
Mechanical Travel:	16 turns nominal

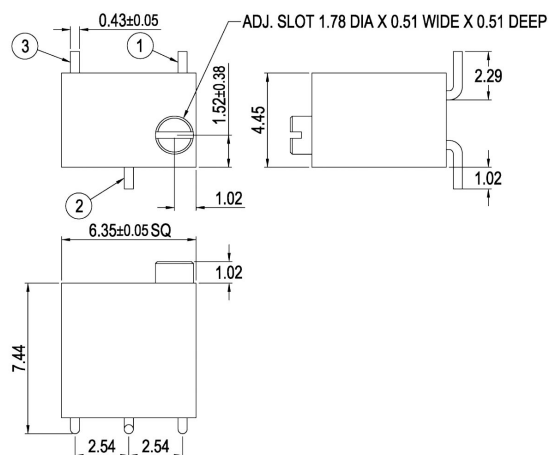
Environmental

Maximum Exposure Temperature/Time:	+245°C 10 seconds
Power Rating (300 Volts maximum):	0.25 Watt at 85°C derating to zero at 150°C
Temperature Range:	-65°C to 150°C
Temperature Coefficient of Resistance:	$\pm 100\text{ppm}/^\circ\text{C}$ maximum
Seal Test:	85°C fluorinert
Humidity:	MIL STD 202 method 106 (2% $\Delta\text{TR}$ , IR 100 MW minimum)
Vibration:	30G (1% $\Delta\text{TR}$ % $\Delta\text{VR}$ )
Shock:	100G (1% $\Delta\text{TR}$ % $\Delta\text{VR}$ )
Load Life:	$\Delta\text{R}$ 3% (1000 hours, 0.25 Watts at 85°C)
Mechanical Life:	200 cycles

Dimensions - 3270P



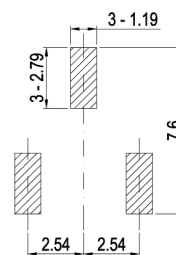
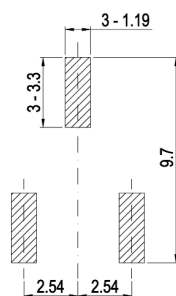
**Dimensions -  
3270W**



The 3270W is supplied in tubes of 50 pieces

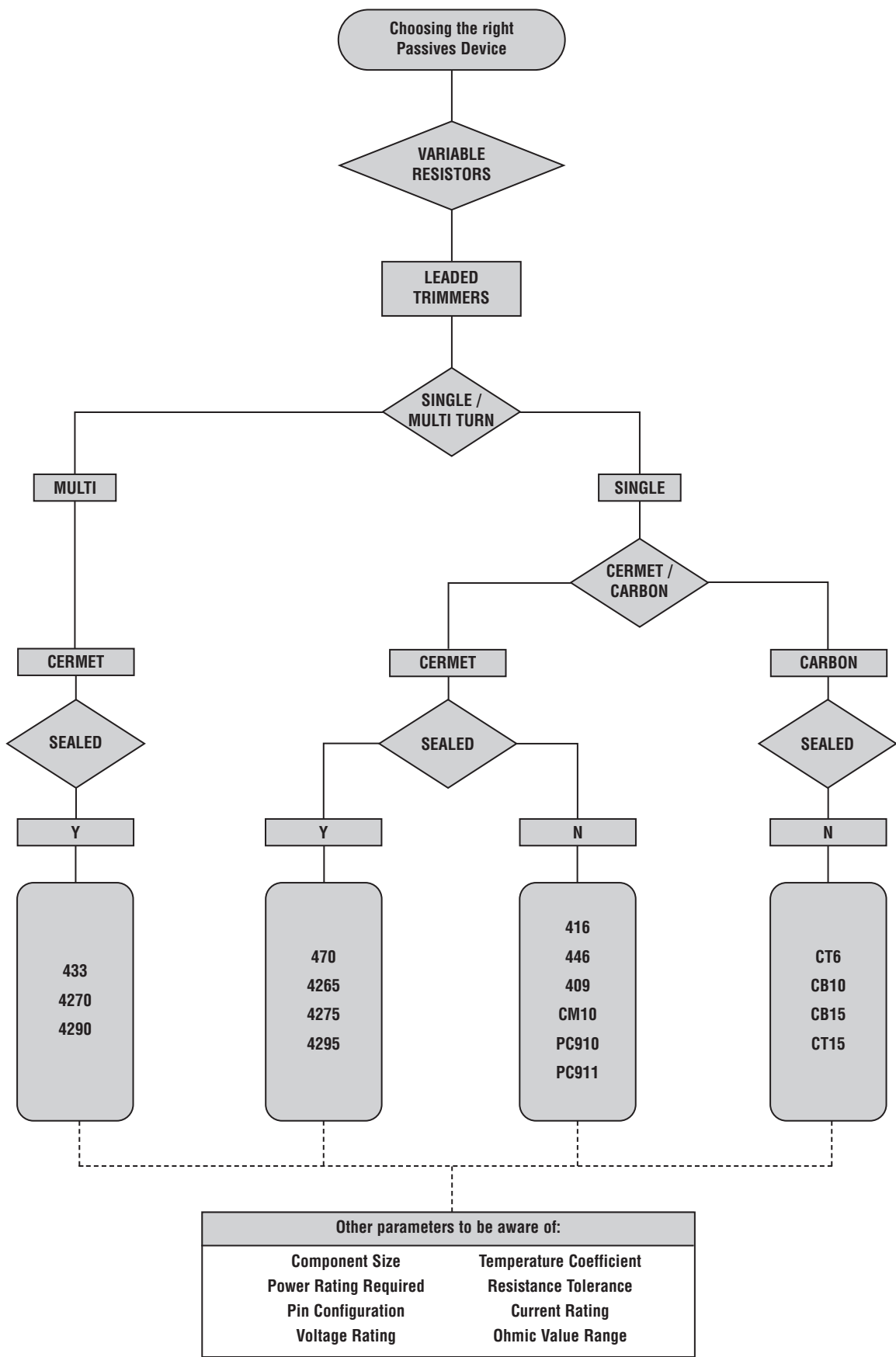
**Substrate Layout -  
3270P**

**3270W**



**How to Order**

3270	P	104	K
Common Part	Orientation	Resistance Value	Tolerance
3270 - 6mm Multiturn Trimmer	P - Low Profile Side Adjust W - Top Adjust	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 1K: 102 10K: 103 100K: 104	K - 10 %



## Leaded Trimmers

### Product Overview

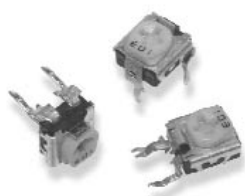
Tyco Electronics Components offers a comprehensive range of variable resistors and potentiometers to satisfy the demands of circuit designers throughout the full spectrum of industrial and professional markets.

A vast range of trimming potentiometers is readily available to suit all needs with devices manufactured in a variety of technologies in conventional or SMD packages from as small as 2mm square up to the traditional 10mm professional trimmer. The packages include single-turn , multi-turn , semi sealed , fully sealed and skeleton versions which represents a fully comprehensive range of solutions to all circuit requirements.

- Well Established Brand Name
- Unequalled Comprehensive Range
- Stable Cermet Elements
- Economic Carbon Elements
- Multi-turns For Precise Set-ability
- Various Sealing Solutions
- Custom Designs Welcome

Size	Element	Adjustment Style	Features	Family	Page
6mm sq	Carbon	Top,Side,Underside	Low Cost	<b>CT6</b>	192-193
6mm sq	Cermet	Top,Side,Underside	Various Adjusters	<b>416</b>	194-195
6mm sq	Cermet	Top,Side,Underside	Auto Insertion	<b>446</b>	196-197
6mm dia	Cermet	Top	Fully Sealed	<b>470</b>	198
6mm sq	Cermet	Top,Side	Fully Sealed	<b>4265</b>	199
6mm sq	Cermet	Top,Side	Fully Sealed	<b>4275</b>	200-201
10mm rect	Carbon	Top,Side,Underside	Plug In Actuators	<b>CB10</b>	202-203
10mm rect	Cermet	Top,Side,Underside	Plug In Actuators	<b>CM10</b>	204-205
10mm rect	Cermet	Top,Side,Underside	Various Adjusters	<b>409</b>	206-207
10mm sq	Cermet	Top,Side	Fully Sealed	<b>4295</b>	208-209
15mm rect	Carbon	Top,Side,Underside	Plug In Actuators	<b>CB15</b>	210
15mm rect	Carbon	Top,Side,Underside	Plug In Actuators	<b>CT15</b>	211
6mm sq	Cermet	Top,Side	Fully Sealed	<b>4270</b>	212-213
10mm sq	Cermet	Top,Side	Fully Sealed	<b>4290</b>	214
19mm rect	Cermet	Side	Fully Sealed	<b>433</b>	215
15mm dia	Cermet	Top,Finger	High Power	<b>PC910</b>	216

## Type CT6 Series



This miniature trimmer incorporates the latest technology developments and has been rigorously tested to the highest standards. Special Attention at the design stage has created a new resin moulded technology which is ideally suited to high volume, low cost applications in a range of consumer and industrial markets. The CT6 trimmer is also available taped and ammo packed for extra high-speed insertion. The cross-slot head is designed for automatic adjustment and the CT6 trimmer can also be adjusted from both sides.

### Key Features

- Robust Enclosed Construction
- Dust and Flux Proof
- New Resin Moulded Element
- Space-Saving Device
- Arrow Position Indicator
- Top, Bottom and Side Adjustment Styles
- Stable in High Humidity

## Type CT6 Series

### Characteristics - Electrical

Resistance Range:	100R to 1M		
Resistance Values:	1, 2, and 5 in each decade		
Resistance Tolerance:	± 30%		
End Resistance:	<3%		
Maximum Wiper Current:	50 mA		
Power Rating:	0.1 Watts at 50°C		
Limiting Element Voltage:	≤ 500K 50V > 500K 25V		
Residual Resistance:	<1K 30R maximum	1K – 2K 60R maximum	>2K 3% maximum

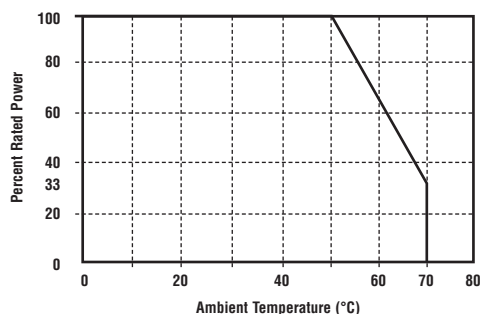
### Mechanical

End Stop:	75mNm minimum
Starting Torque:	2 – 25mNm maximum
Mechanical Adjustment:	210° nominal
Terminal Strength:	5mNm (At PCB mounting surface)

### Environmental

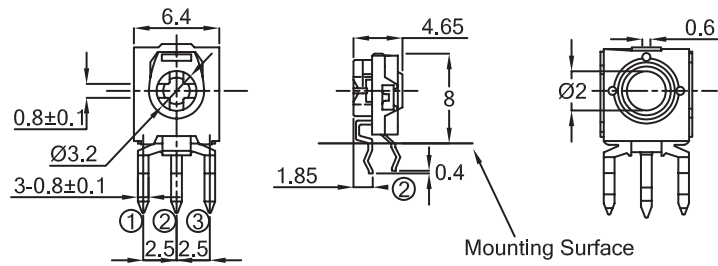
Temperature Range:	-20°C to +70°C
Temperature Storage:	-40°C to +75°C
Bump Severity:	4000 bumps; 40G
Vibration Severity:	10 - 55 Hz; 10G
Rotational Life:	100 cycles minimum
Load Life at 40°C:	ΔR <10% after 1000 hours at 0.15W
Climatic Category:	25/70/21
Sealing:	Dust and Flux proof
Resistance to Soldering Heat:	240°C to 280°C for 5 seconds maximum 280°C to 300°C for 3 seconds maximum
Resistance to Damp Heat (40°C ±2°C 90% - 95% RH):	R <100K After 350 hours +15 %/-0 % R >100K / < 1M After 350 hours +20 %/-0 %
Endurance under Damp Heat (40°C ±2°C 90% - 95% RH):	R <100K After 350 hours 1.5 hours on 0.5 hours off +15 % R >100K / < 1M After 350 hours 1.5 hours on 0.5 hours off +20 %
Endurance under High Temperature:	70°C ±3°C, After 250 hours +5%/-15%
Sealing:	Dust and Flux proof

### Derating Curve

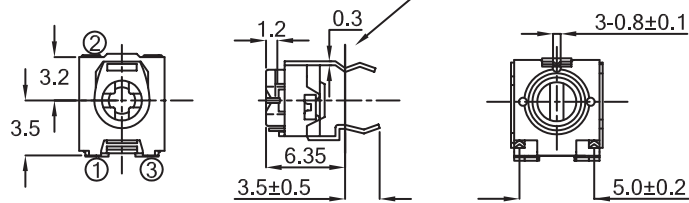


Type CT6 Series (continued)

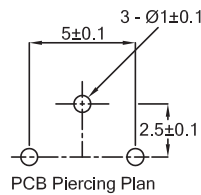
Dimensions  
CT6V



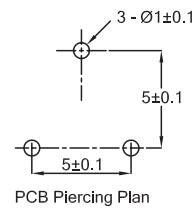
CT6H



PCB Layout  
CT6V



CT6H



How to Order

CT6	H	102	N
Common Part	Orientation	Resistance Value	Tolerance
CT6 - 6mm Moulded Trimmer	H - Top / Bottom Adjust V - Both Side Adjust	The first two digits are significant figures of resistance value. The third denotes the number of zeros following. e.g. 100R: 101 1K: 102 10K - 103 100K - 104	N - 30 %



## Type 416 Series



This tiny 6mm square cermet trimmer is offered with alternative adjustment covers for screwdriver and automatic setting and can be supplied in bulk or taped in ammo pack. The 416 trimmer can be adjusted from the top or side and is an inexpensive solution to high reliability potentiometer requirements. This series is used to replace some of the larger, expensive, sealed types in high volume circuits.

### Key Features

- Stable High Resolution Cermet Element
- Space-Saving Device
- 0.2 Watt Rating at 70°C
- Wide Value Range
- Available Taped for Auto Insertion
- Dust and Splash Proof
- Top or Side Adjustment
- Auto Adjust Head Available
- Widely Available via Distribution

## Type 416 Series

### Characteristics - Electrical

Resistance Range:	100R to 1M
Resistance Values:	1, 2, 5 in each decade
Resistance Tolerance:	± 25%, (±20% by selection)
End Resistance:	1% Nominal or 10 ohms maximum, whichever is greater.
Wiper Current:	50mA
Power Rating:	0.2W at 70°C Derating to zero at 100°C
Limiting Element Voltage:	100V DC or AC RMS maximum
Rotational Noise (CRV):	3% maximum
Temperature Coefficient:	±250ppm/°C

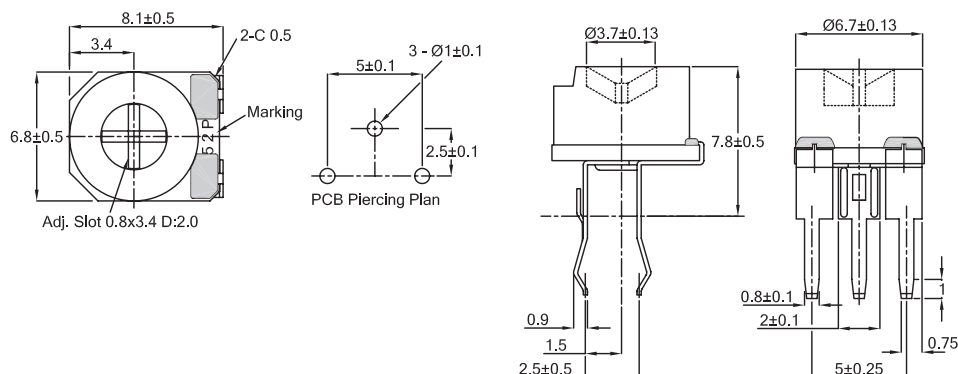
### Mechanical

End Stop:	50 mNm minimum
Starting Torque:	30 mNm maximum
Mechanical Adjustment:	240° nominal
Operational Life:	100 turns

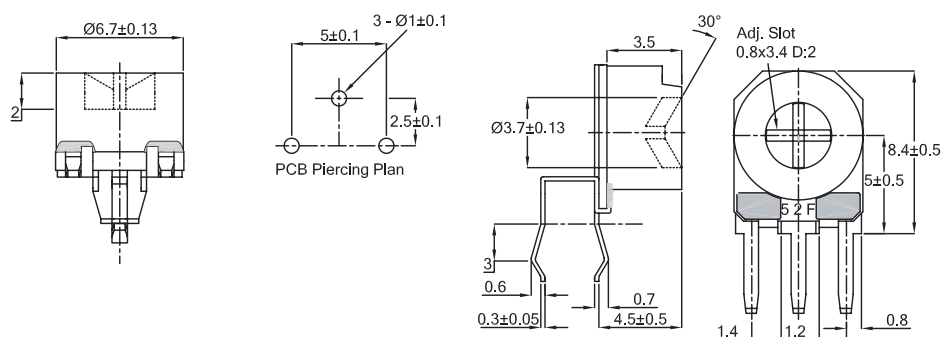
### Environmental

Temperature Range:	- 25°C to + 100°C
Load Life at 70°C:	ΔR < 5% after 1000 hours
Sealing:	Dust Proof
Climatic Category:	25/100/21

### Dimensions 416P

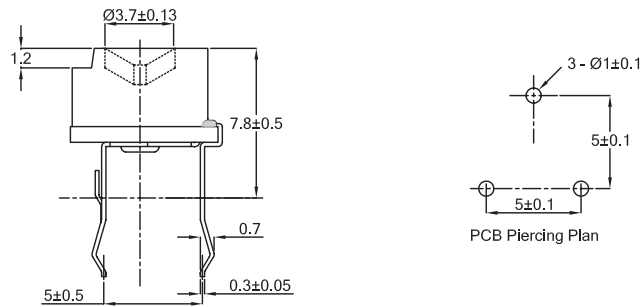


### 416X



Type 416 Series (continued)

Dimensions  
416M



How to Order

416	X	A	104	P
Common Part	Adjustment Style / Configuration	Adjustment Head	Resistance Value	Tolerance
416-6mm Low Cost Trimmer	P - Top Adjust 2.5mm x 5.0mm  M - Top Adjust 5.0mm x 5.0mm  X - Side Adjust 2.5mm x 5.0mm	A - Cross Slot  R - Auto Adjust  X - Skeleton	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K0: 102 10K: 103 100K: 104	P - 25%  (M - 20% by selection only)

Please state top or side adjustments on all orders

Leaded Trimmers

## Type 446 Series



This tiny 6mm square cermet trimmer is available on tape in ammo packs for auto insertion. The 446 trimmer can be adjusted from the top or the side and is an inexpensive solution to high reliability potentiometer requirements. This series is used to replace some of the larger, expensive, sealed types in high volume circuits.

### Key Features

- Stable High Resolution Cermet Element
- Space-Saving Device
- 0.3 Watt Rating at 70°C
- Wide Value Range
- Taped for Auto Insertion
- Low Cost Solution
- Dust and Splash Proof
- Top or Side Adjustment

### Characteristics - Electrical

Resistance Range:	100R to 1M
Resistance Values:	1, 2, 5 in each decade
Resistance Tolerance:	± 30%
End Resistance:	2% or 10 ohms maximum, whichever is greater.
Wiper Current:	50mA
Power Rating:	0.3W at 70°C Derating to zero at 100°C
Limiting Element Voltage:	100V DC or AC RMS maximum
Rotational Noise (CRV):	3% maximum
Temperature Coefficient:	±250ppm/°C

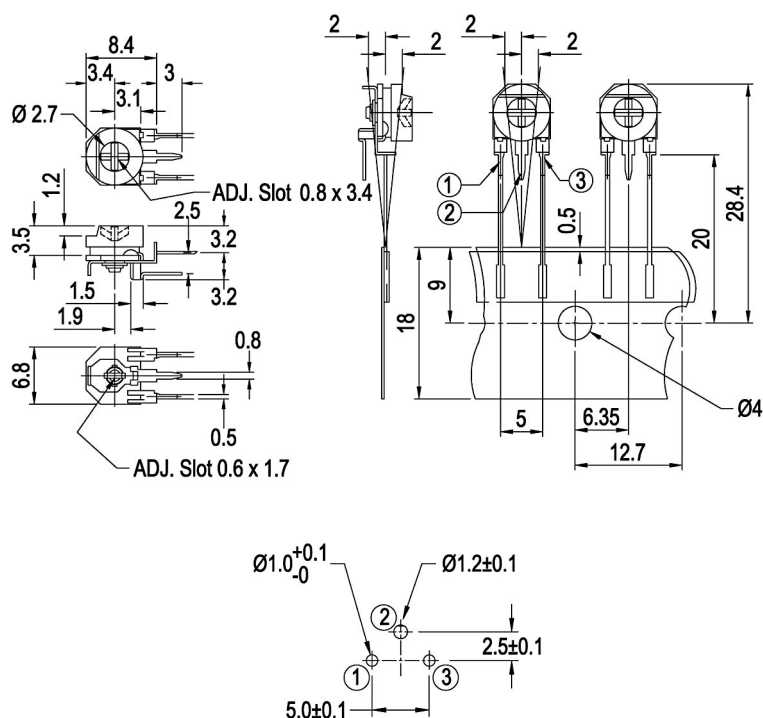
### Mechanical

End Stop:	50 mNm minimum
Starting Torque:	30 mNm maximum
Mechanical Adjustment:	240° ±10°
Operational Life:	50 turns

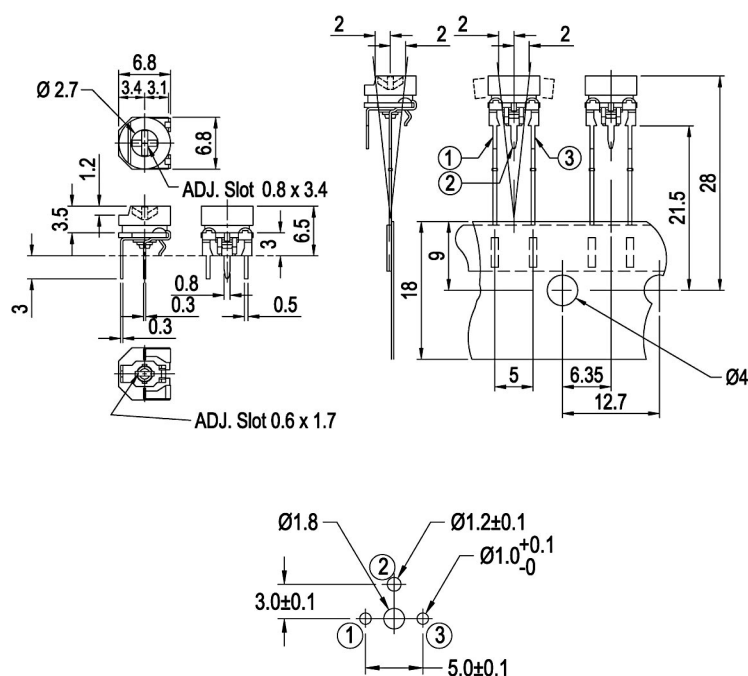
### Environmental

Temperature Range:	- 25°C to + 100°C
Load Life at 70°C:	ΔR < 5% after 1000 hours
Sealing:	Dust Proof
Climatic Category:	25/100/21

### Dimensions 446XT



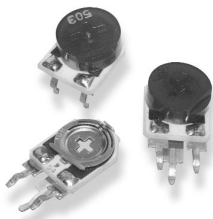
**Dimensions**  
**446MT**



**How to Order**

446	XT	104	N
Common Part	Adjustment Style	Resistance Value	Tolerance
446 – 6mm Cermet Trimmer	MT – Top Adjust XT – Side Adjust	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K: 102 10K: 103 100K: 104	N - 30 %

## Type 409 Series



The 409 series offers typical Tyco Electronics Components features, the stability of a cermet resistive element, and an attractive price. The range satisfies many applications in industrial and professional equipment. Components are available with top, underside, side, finger, auto and skeleton adjustments. The 409 trimmer is widely used in power supplies, telecommunications, medical instrumentation and the automotive industry.

### Key Features

- Stable High Resolution Cermet Element
- Rugged Construction
- PCB Standoffs
- Wide Value Range
- 0.5 Watt Power Rating
- High Reliability
- Dust and Splash Proof
- Auto Adjust Head Available

## Economy Trimmers

### Type 409 Series

#### Characteristics - Electrical

Resistance Range:	100R to 1M (Linear)
Resistance Values:	1, 2, 5 in each decade
Resistance Tolerance:	± 20%
End Resistance:	2% Nominal
Wiper Current:	50mA maximum
Power Rating:	0.5W at 70°C derating to zero at 100°C
Limiting Element Voltage:	200V DC or AC RMS maximum
Rotational Noise (CRV):	3% maximum
Temperature Coefficient:	±250ppm/°C

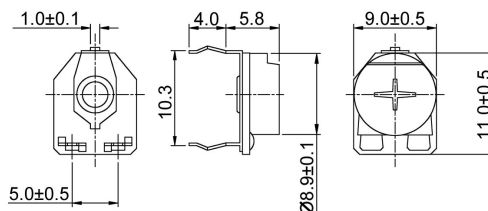
#### Mechanical

End Stop:	50 mNm minimum
Starting Torque:	30 mNm maximum
Mechanical Adjustment:	260° nominal
Operational Life:	100 turns

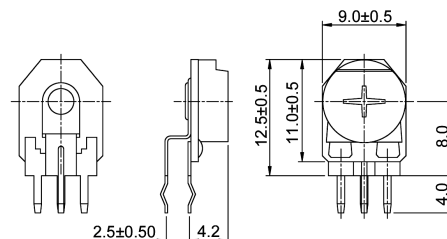
#### Environmental

Temperature Range:	- 25°C to + 100°C
Load Life at 70°C:	ΔR < 5% after 1000 hours
Sealing:	Dust Proof
Climatic Category:	25/100/21

#### Dimensions 409H



#### 409V



#### How to Order

409	H	A	104	M
Common Part	Adjustment Style	Head Style	Resistance Value	Tolerance
409	H - Top / Bottom Adjust V - Side Adjust	A - Phillips Slot R - Auto Adjust S - Finger Adjust T - Minus Slot X - Skeleton	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K0: 102 10K: 103	M - 20%

## Type 470 Series



For applications that demand a durable, miniature trimming potentiometer, this military style offers quality at the right price. Cermet element technology ensures stability and performance in these 6mm diameter components. All units are fully sealed to withstand immersion in normal board washing solvents.

### Key Features

- Stable High Resolution Cermet Element
- 0.5 Watt Rating at 85°C
- Space-Saving Device
- Proven Reliability
- -55°C to +125°C Temperature Range
- Sealed to Withstand Wave Soldering
- Sealed to Withstand Immersion Cleaning

### Characteristics - Electrical

Resistance Range:	100R to 1M
Resistance Values:	1, 2 and 5 in each decade
Resistance Tolerance:	± 10%
End Resistance:	2 Ohms or 1%, whichever is greater
Slider Current:	50 mA or within power rating, Max.
Power Rating:	0.5W at 85°C derating to zero at 125°C
Isolation Voltage:	300 V dc or ac peak
Limiting Element Voltage:	200 V dc or ac RMS, Max.
Breakdown Voltage:	600 V ac for one minute
Insulation Resistance:	1000 M Ohms at 500 V dc, Min.
Resolution:	Essentially Infinite
Rotational Noise (CRV):	3 Ohms or 3 %, whichever is greater
Temperature Coefficient:	± 250 ppm/°C
Electrical Adjustment:	240° Nominal

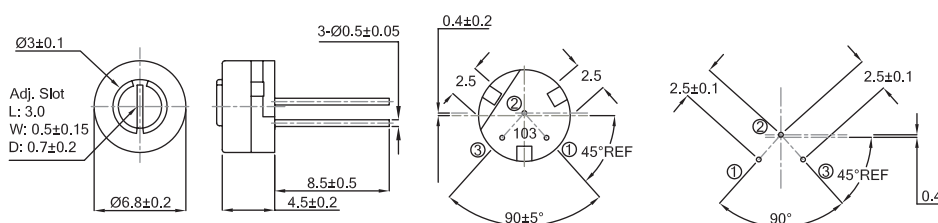
### Mechanical

End Stop:	40 mNm Min.
Starting Torque:	30 mNm Max.
Mechanical Adjustment:	260° Nominal
Weight:	0.57 gm Max.

### Environmental

Temperature Range:	-55°C to +125°C
Thermal Shock:	5 Cycles -55°C to +150°C
Bump Severity:	4000 Bumps; 40G
Vibration Severity:	10 - 500Hz; 30 G $\Delta R < 1\%$
Rotational Life:	200 Cycles
Load Life at 70°C:	1000 Hours at 0.5 W
Sealing:	Sealed for immersion & board washing processes
Climatic Category:	55/125/21

### Dimensions



### How to Order

470	104	K
Common Part	Resistance Value	Tolerance
470	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K: 102 10K: 103 100K: 104	K - 10 %

## Type CB10 Series



Low price, versatility and stable environmental characteristics are important benefits of this product. Featuring an innovative carbon resistive element printed on film in a fully enclosed package, this potentiometer style is normally chosen for a wide range of applications in industrial, professional and consumer equipment.

### Key Features

- Low Cost
- Robust Enclosed Construction
- Spindle Adjust Versions
- Flame Retardant
- Arrow Position Indicator
- Top, Bottom and Side Adjust Styles
- Stable in High Humidity
- Edgewise Operation Style

## Characteristics - Electrical

Resistance Range:	100R to 10M Linear , 1K to 1M Non-Linear
Resistance Values:	1, 2.2 & 4.7 in each decade
Resistance Tolerance:	± 20% (± 30% above 1 Megohms)
End Resistance:	< 3%
Power Rating @ 40°C:	0.15 Watts (derating to zero at 70°C)
Maximum Voltage:	Lin. 200V DC / Log. 150V DC
Rotational Noise (CRV):	<5% of Rn nominal
Temperature Coefficient:	±500 ppm/°C ( < 100K ohms)
Slider Current:	50mA
Resolution:	Essentially Infinite
Electrical Adjustment:	240° Nominal 1 Turn

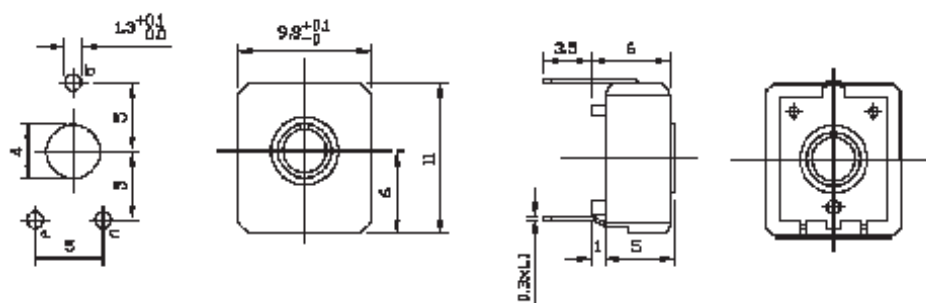
## Mechanical

End Torque:	50 mNm maximum
Starting Torque:	4 to 20 mNm
Mechanical Adjustment:	295° nominal
Weight:	0.8 grams

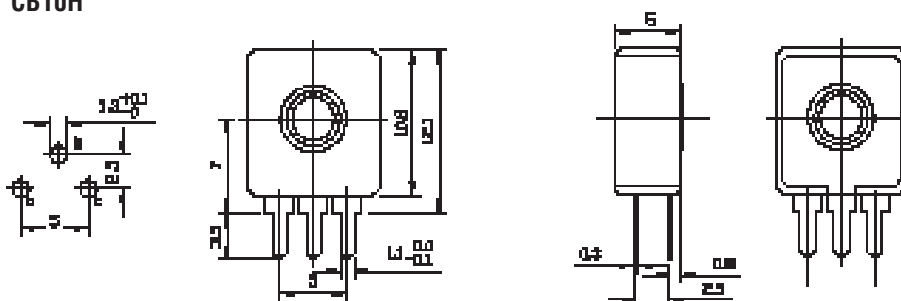
## Environmental

Temperature Range:	-25°C to +70°C
Temperature Storage:	1000 hours at 100°C
Rotational Life:	500 cycles, minimum (10000 cycles-extended life versions)
Load Life at 40°C:	ΔR <10% after 1000 hours
Sealing:	Dust and Splash Proof
Climate Category:	25/70/21

## Dimensions CB10V

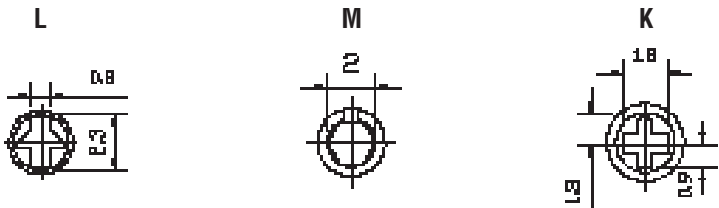


## CB10H

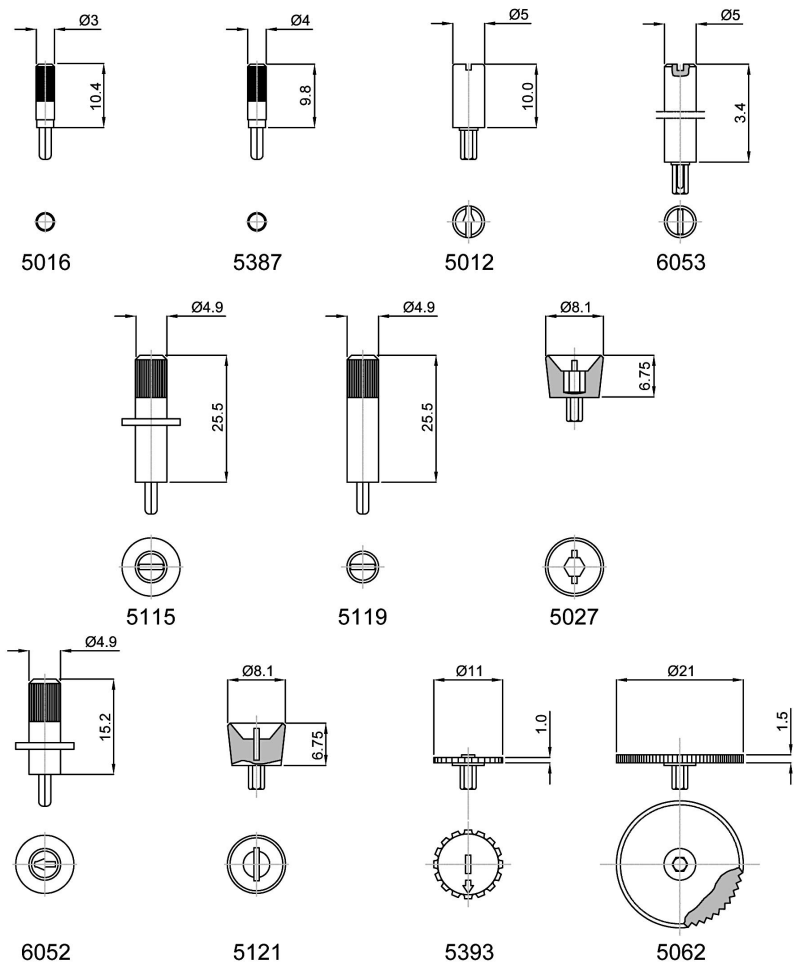


Type CB10 Series (continued)

Adjustment Styles



Plug-in Accessories



How to Order Accessories

Prefix the above numbers with CB10. i.e. CB105393

How to Order

CB10	L	H	102	M	-	-
Common Part	Adjustment Style	Orientation	Resistance Value	Tolerance	Law	Features
CB10 - 10mm Cermet Trimmer	L - Arrow Head M - Hex Centre K - Cross Slot	H - Vertical to PCB V - Horizontal to PCB	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K0: 102 10K: 103 100K: 104	K - 10% (Special)  M - 20%  N - 30% (<1 Meg)	- Linear  B - Log  C - Inv. Log	- Standard  E - Extended Life



## Type CM10 Series



The Cermet sister to the CB10 trimmer, this low price, enclosed cermet potentiometer offers excellent long-term stability at a sensible price.

Tyco Electronics Components can offer hexagon centres for a wide variety of plug-in spindles, accessories and other custom made parts.

The Tyco Electronics Components CM10 trimmer is normally selected when professional equipment requires high reliability and stable potentiometers for setting precise voltages.

### Key Features

- Robust Enclosed Construction
- Spindle Adjust Versions
- Flame Retardant
- Arrow Position Indicator
- Top, Bottom and Side Adjust Styles
- Stable in High Humidity
- Edgewheel Operation Style

### Characteristics - Electrical

<b>Resistance Range:</b>	100R to 10M
<b>Resistance Values:</b>	1, 2.2 & 4.7 in each decade
<b>Resistance Tolerance:</b>	± 20% (± 10% available to order)
<b>End Resistance:</b>	2 ohms or 2% whichever is greater
<b>Power Rating @ 40°C:</b>	0.5 Watts (derating to zero at 100°C)
<b>Maximum Voltage:</b>	250V DC
<b>Rotational Noise (CRV):</b>	<3% of R <sub>n</sub> nominal or 3 ohms (whichever is the greater)
<b>Temperature Coefficient:</b>	±200 ppm/°C < 100K ohms
<b>Slider Current:</b>	50mA
<b>Resolution:</b>	Essentially Infinite
<b>Electrical Adjustment:</b>	240° Nominal 1 Turn

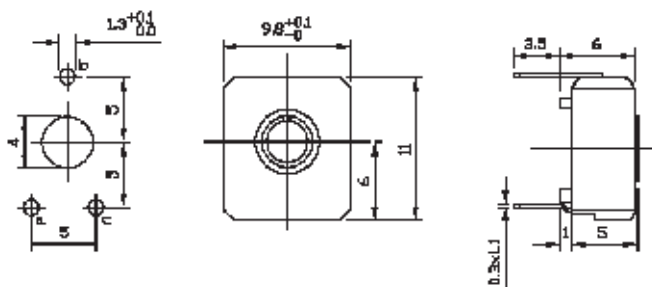
### Mechanical

<b>End Torque:</b>	50 mNm maximum
<b>Starting Torque:</b>	4 to 20 mNm
<b>Mechanical Adjustment:</b>	295° nominal 1 Turn
<b>Weight:</b>	1.0 grams maximum

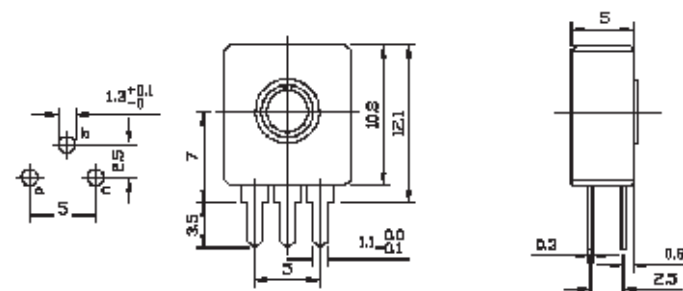
### Environmental

<b>Temperature Range:</b>	-40°C to +90°C
<b>Temperature Storage:</b>	1000 hours at 100°C
<b>Rotational Life:</b>	200 cycles, minimum
<b>Load Life at 40°C:</b>	ΔR <10% after 1000 hours
<b>Sealing:</b>	Dust and Splash Proof
<b>Climate Category:</b>	40/90/21

### Dimensions CM10V

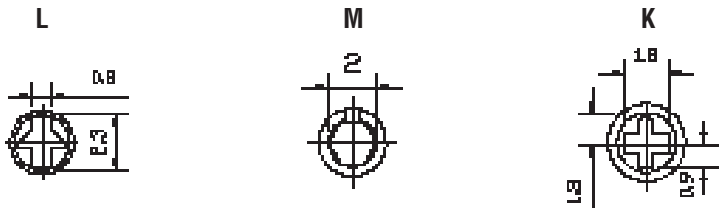


### CM10H

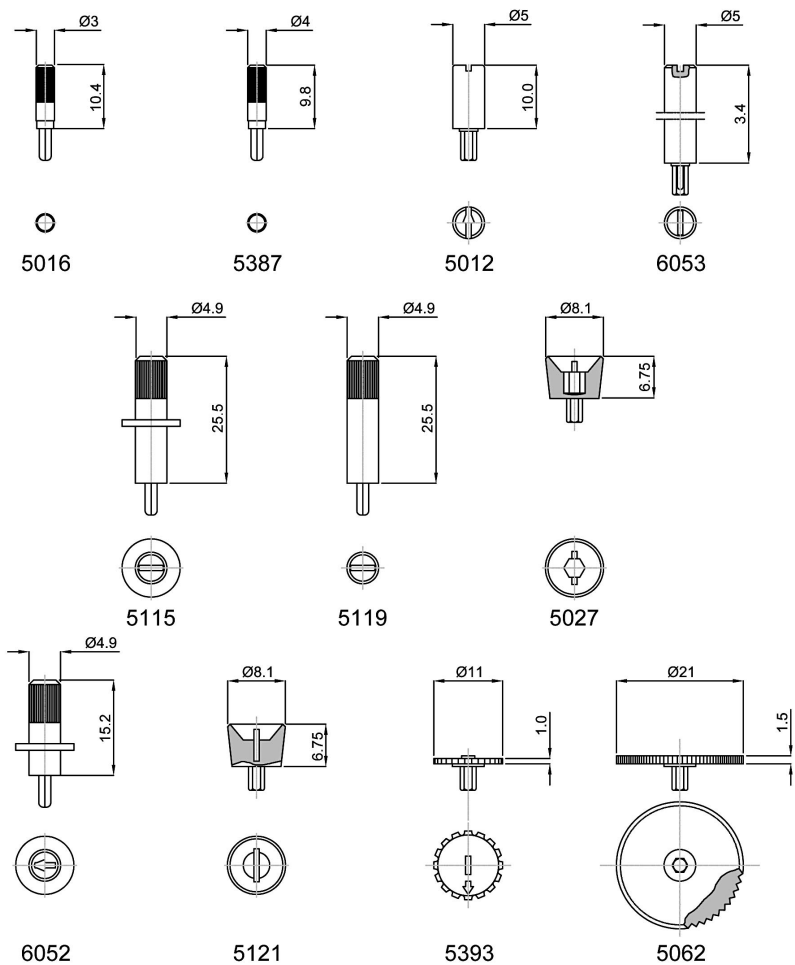


Type CM10 Series (continued)

Adjustment Styles



Plug-in Accessories



How to Order Accessories

Prefix the above numbers with CB10. i.e. CB105393

How to Order

CM10	L	H	102	M	-
Common Part	Adjustment Style	Orientation	Resistance Value	Tolerance	Features
CM10 - 10mm Cermet Trimmer	L - Arrow Head M - Hex Centre K - Cross Slot	H - Vertical to PCB V - Horizontal to PCB	The first two digits are significant figures of resistance value. The third digit denotes the number of zeros following. e.g. 100R: 101 1K0: 102 10K: 103 100K: 104	K - 10% (Special) M - 20% N - 30% (>1 Meg)	- Standard E - Extended Life

## Type CB15 Series



Low price, versatility and stable environmental characteristics are important benefits of this product. Featuring an innovative carbon resistive element printed on film in a fully enclosed package, this potentiometer style is normally chosen for a wide range of applications in industrial, professional and consumer equipment.

### Key Features

- Low Cost
- Robust Enclosed Construction
- Spindle Adjust Versions
- Flame Retardant
- Arrow Position Indicator
- Top, Bottom and Side Adjust Styles
- Stable in High Humidity
- Edgewise Operation Style

## Characteristics - Electrical

<b>Resistance Range:</b>	100R to 4M7 Linear, 1K to 2M2 Non-Linear
<b>Resistance Values:</b>	1, 2.2 & 4.7 in each decade
<b>Resistance Tolerance:</b>	± 20% (± 30% above 1 Megohms)
<b>Power Rating @ 40°C:</b>	0.25 Watt Linear, 0.15 Watt Non Linear
<b>Maximum Voltage:</b>	300V DC Linear, 200V DC Non Linear
<b>Rotational Noise (CRV):</b>	<5% of Rn nominal
<b>Temperature Coefficient:</b>	<100 KΩ±500ppm; ≥100 KΩ±1000ppm
<b>Resolution:</b>	Essentially Infinite
<b>Electrical Adjustment:</b>	240° ±20°

## Mechanical

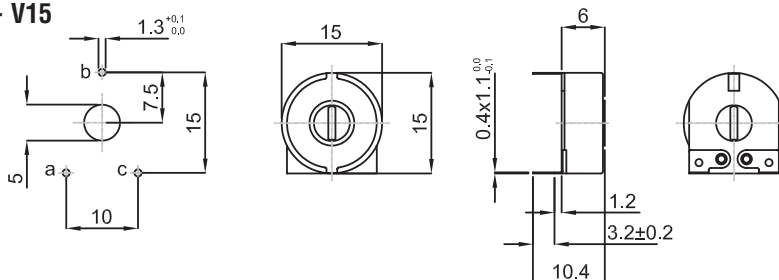
<b>End Torque:</b>	100 mNm minimum
<b>Starting Torque:</b>	4 to 25 mNm
<b>Mechanical Adjustment:</b>	280° ±5°
<b>Weight:</b>	1.5 grams

## Environmental

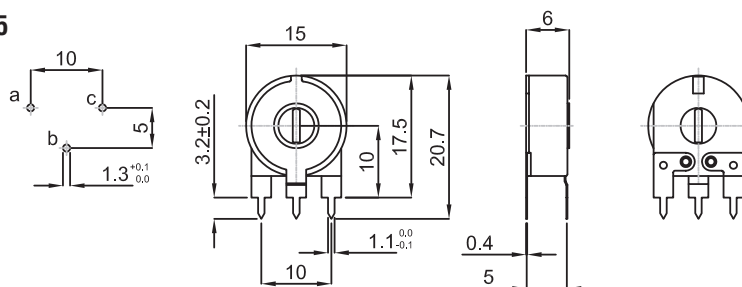
<b>Temperature Range:</b>	-25°C to +70°C
<b>Rotational Life:</b>	10,000 cycles
<b>Load Life at 40°C:</b>	ΔR <10% after 1000 hours
<b>Sealing:</b>	Dust and Splash Proof
<b>Climate Category:</b>	IEC 293-1 Category 25/70/21

## Dimensions

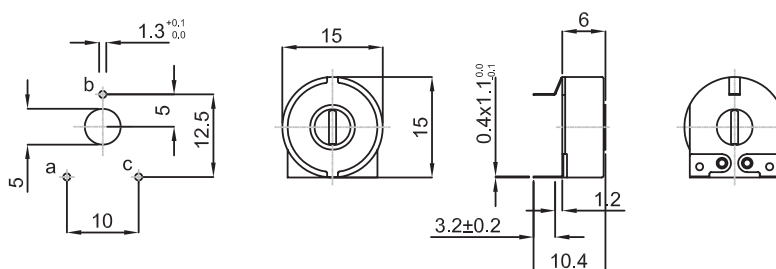
### CB15 - V15



### CB15 - H5

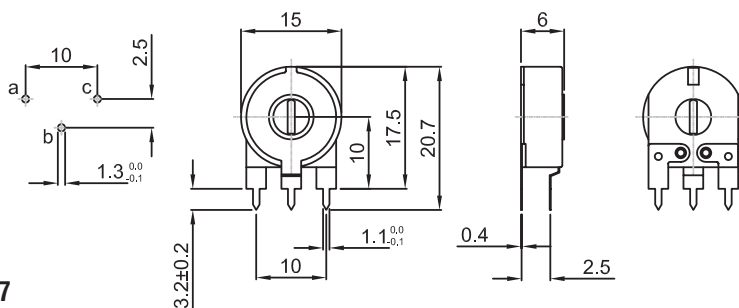


### CB15 - V12

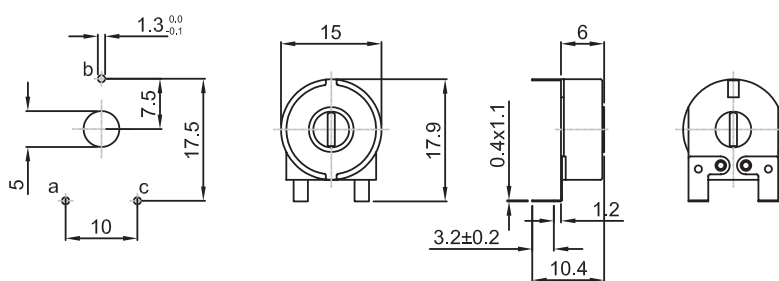


**Dimensions**

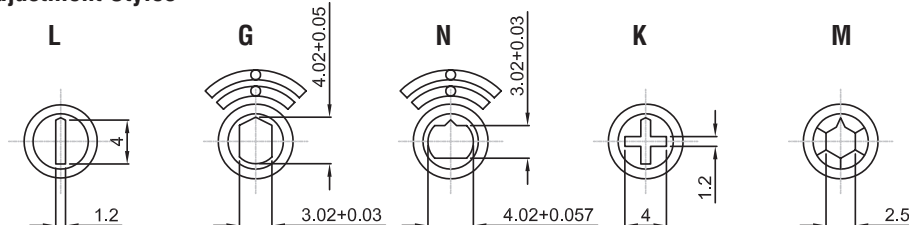
**CB15 - H2**



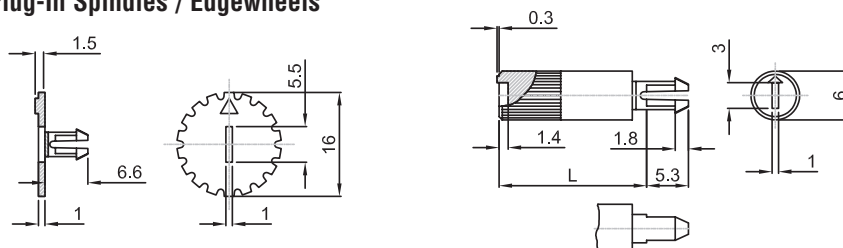
**CB15 - V17**



**Adjustment Styles**



**Plug-In Spindles / Edgewheels**

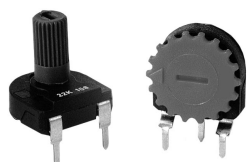


Colour	Part Number	Colour	13.1mm	17.5mm	19.5mm	24.3mm	26.3mm	28.5mm	34.0mm
White	CB155147	White	CB155137	CB155577	CB155242	CB155600	CB155499	CB155578	CB155450
Black	CB155388	Black	CB155378	CB155241	CB155382	CB155243	CB155244	CB155245	CB155246
Red	CB155391	Red	CB155379	CB155452	CB155385	CB155492	CB155475	CB155770	CB155491
Blue	CB155390								
Green	CB155392								
Yellow	CB155389								

**How to Order**

Common Part	Adjustment Style	Orientation / Pin Pitch	Resistance Value	Tolerance	Law
CB15 - 15mm Carbon Trimmer	K - Cross Slot L - Arrow Head M - Hex Centre N - Plug In G - Plug In 90°	H2 - 2.5mm H5 - 5.0mm V12 - 12.5mm V15 - 15.0mm V17 - 17.5mm	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K: 102 10K: 103 100K: 104	K - 10% (Special) M - 20% N - 30% (<1 Meg)	- Linear B - Log C - Inv. Log

## Type CT15 Series



Low price, versatility and stable environmental characteristics are important benefits of this product. Featuring an innovative carbon resistive element printed on film in a fully enclosed package, this potentiometer style is normally chosen for a wide range of applications in industrial, professional and consumer equipment.

### Key Features

- Robust Enclosed Construction
- Spindle Adjust Versions
- Flame Retardant
- Arrow Position Indicator
- Top, Bottom and Side Adjust Styles
- Stable in High Humidity
- Edgewheel Operation Style

## Characteristics - Electrical

<b>Resistance Range:</b>	100R to 4M7 Linear, 1K to 2M2 Non-Linear
<b>Resistance Values:</b>	1, 2.2 & 4.7 in each decade
<b>Resistance Tolerance:</b>	± 20% (± 30% above 1 Megohms)
<b>Power Rating @ 40°C:</b>	0.25 Watt Linear, 0.12 Watt Non Linear
<b>Maximum Voltage:</b>	300V DC Linear, 200V DC Non Linear
<b>Rotational Noise (CRV):</b>	<5% of Rn nominal
<b>Temperature Coefficient:</b>	<100 K ±500ppm; ≥100 K ±1000ppm
<b>Resolution:</b>	Essentially Infinite
<b>Electrical Adjustment:</b>	250° ±20°

## Mechanical

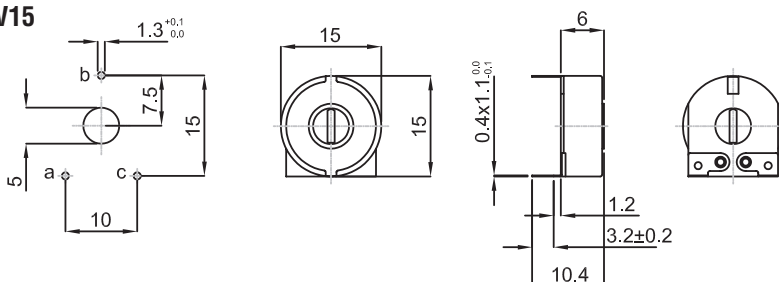
<b>End Torque:</b>	100 mNm minimum
<b>Starting Torque:</b>	4 to 25 mNm
<b>Mechanical Adjustment:</b>	265° ±5°
<b>Weight:</b>	1.3 grams

## Environmental

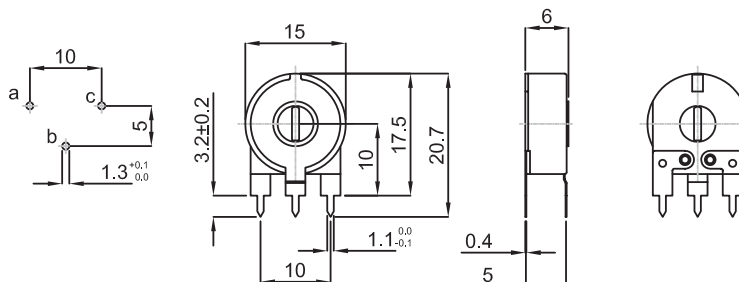
<b>Temperature Range:</b>	-25°C to +70°C
<b>Rotational Life:</b>	10,000 cycles
<b>Load Life at 40°C:</b>	ΔR <10% after 1000 hours
<b>Sealing:</b>	Dust and Splash Proof
<b>Climate Category:</b>	IEC 293-1 Category 25/70/21

## Dimensions

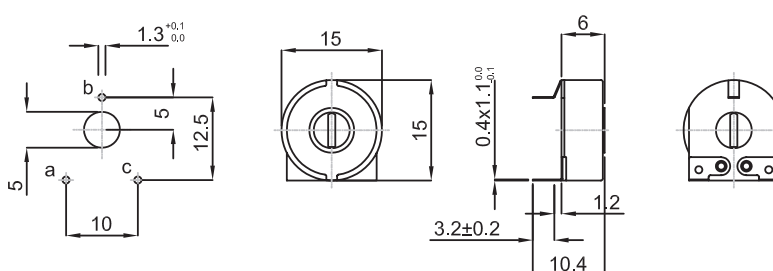
### CT15-V15



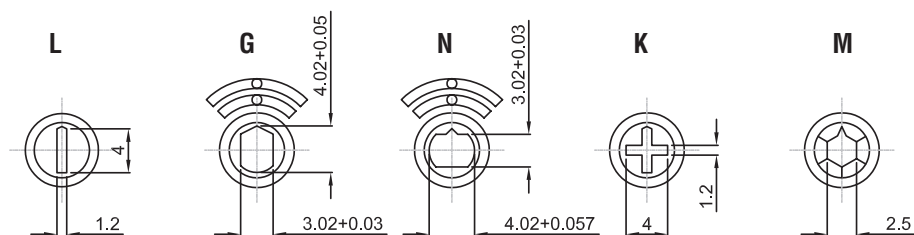
### CT15-H5



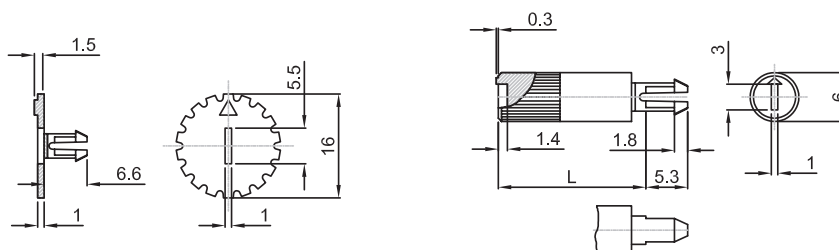
### CT15-V12



### Adjustment Styles



### Plug-In Spindles / Edgewheels



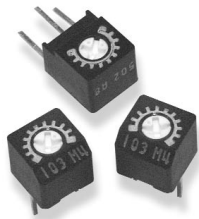
Colour	Part Number
White	CB155147
Black	CB155388
Red	CB155391
Blue	CB155390
Green	CB155392
Yellow	CB155389

Colour	13.1mm	17.5mm	19.5mm	24.3mm	26.3mm	28.5mm	34.0mm
White	CB155137	CB155577	CB155242	CB155600	CB155499	CB155578	CB155450
Black	CB155378	CB155241	CB155382	CB155243	CB155244	CB155245	CB155246
Red	CB155379	CB155452	CB155385	CB155492	CB155475	CB155770	CB155491

### How to Order

CT15	L	H5	102	M	B
Common Part	Adjustment Style	Orientation / Pin Pitch	Resistance Value	Tolerance	Law
CT15 - 15mm Carbon Trimmer	K - Cross Slot L - Arrow Head M - Hex Centre N - Plug In G - Plug In 90°	H5 - 5.0mm V12 - 12.5mm V15 - 15.0mm	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K: 102 10K: 103 100K: 104	K - 10% (Special) M - 20% N - 30% (<1 Meg)	- Linear B - Log C - Inv. Log

## Type 4265 Series



A tiny, fully sealed, professional single turn trimmer with a range of pin configurations. The 4265 trimmer is available with top or side adjustment and pin configurations that meet the majority of requirements.

The cermet element is very stable and has good setability. A high quality modern trimmer at a very attractive price. Of particular interest will be the 4265 LT and UT versions supplied on radial tape for automatic insertion.

### Key Features

- High Resolution Stable Cermet Element
- Compact 6mm Size
- Fully Sealed Construction
- 0.5 Watt Rating at 70°C
- Flame Retardant
- P.C.B. Standoffs
- Robust Construction
- Vertical or Horizontal Adjustments
- Available on Tape

## Type 4265 Series

### Characteristics - Electrical

Resistance Range:	10 ohms to 2M ohms
Resistance Values:	1, 2, and 5 in each decade
Resistance Tolerance:	± 20%
End Resistance:	3 ohms or 1% of total resistance
Slider Current:	50 mA or within power rating, Max.
Power Rating, Watts:	0.5 at 70°C derating to zero at 125°C
Dielectric Withstand:	500 V RMS for 1 minute
Max. Input Voltage:	200 V dc or ac RMS, Max.
Insulation Resistance:	1000 M Ohms (Min.) at 500 V dc
Resolution:	Essentially infinite
Rotational Noise (CRV):	3 ohm or 3%, whichever is greater
Electrical Adjustment:	220° Nominal

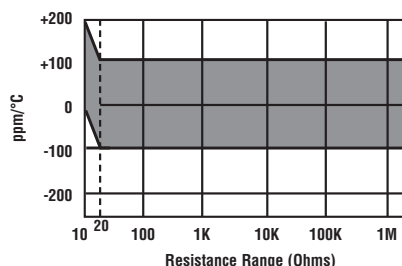
### Mechanical

End Stop:	50 mNm minimum
Rotational Torque:	20 mNm maximum
Mechanical Adjustment:	250° nominal
Weight:	0.55 gram nominal
Solderability:	MIL Std 202 Method 208A

### Environmental

Temperature Range:	-55°C to +125°C
Temperature Storage:	250 Hours. at 125°C
Thermal Shock:	5 Cycles - 55°C to 125°C
Shock:	Medium Impact
Vibration Severity:	10-2000 -10Hz 20 minutes
Rotational Life:	100 Cycles minimum
Sealing:	Sealed for Board Washing (85°C Florinert)
Climatic Category:	55/125/21
Humidity:	MIL - Std - 202G Method 103 (96 hours)
Temperature Coefficient:	See graph below

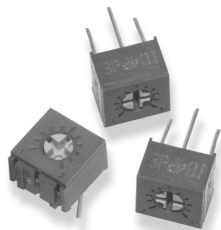
### Temperature Coefficient







## Type 4275 Series



A tiny, fully sealed, professional trimmer offered with a range of pin configurations. The 4275 trimmer is available with top or side adjustment. Standard packaging is in tough plastic tubes. The cermet element is very stable and has good setability.

A high quality modern trimmer at an attractive price. The product is designed for use in small size professional equipments and boasts performance well beyond its price.

### Key Features

- High Resolution Stable Cermet Element
- Only 6mm Square
- Vertical or Horizontal Adjustment
- 0.5 Watt Rating at 70°C
- Choice of Pin Configuration
- Rugged Construction
- Flame Retardant
- Supplied in Firm Plastic Tubes

## Professional Trimmers

### Type 4275 Series

#### Characteristics - Electrical

Resistance Range:	100R to 2M
Resistance Values:	1, 2 and 5 in each decade
Resistance Tolerance:	10%
End Resistance:	10 ohms or 1% whichever is greater
Power Rating:	0.5W at 70°C derating to zero at 125°C
Isolation Voltage:	300 V dc or ac peak
Limiting Element Voltage:	220 V dc or ac RMS, maximum
Insulation Resistance:	1000 M at 500 V dc, minimum
Rotational Noise (CRV):	3 Ohms or 2%, whichever is greater
Electrical Adjustment:	1 turn - 240° Nominal
Temperature Coefficient:	± 250ppm/°C

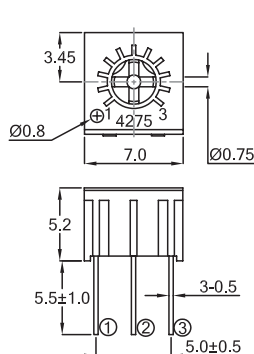
#### Mechanical

End Stop:	40 mNm, minimum
Starting Torque:	30 mNm, maximum
Mechanical Adjustment:	1 turn - 260° Nominal
Weight:	0.6 gm Nominal

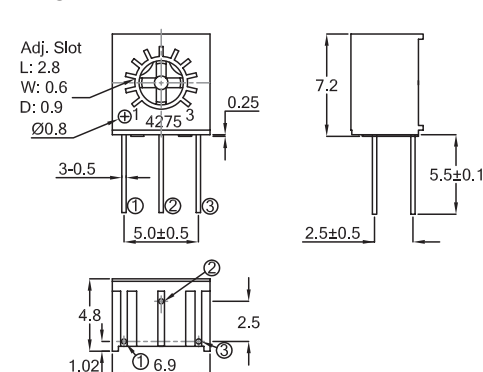
#### Environmental

Temperature Range:	-55°C to +125°C
Temperature Storage:	250 hrs. at 125°C
Thermal Shock:	5 cycles -55°C to 125°C
Bump Severity:	4000 bumps 40G
Vibration Severity:	10 - 500 Hz, 30G
Rotational Life:	200 cycles, minimum
Load Life at 70°C:	ΔR <3% after 1000 hours.
Sealing:	Sealed for board washing
Soldering Heat:	5 seconds at 350°C
Climatic Category:	55/125/21

#### Dimensions 4275P



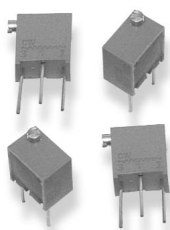
#### 4275X



#### How to Order

4275	P	104	K
Common Part	Pin/Adjustment Style	Resistance Value	Tolerance
4275	P - Top Adjust X - Side Adjust	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K0: 102 10K: 103 100K: 104	K - 10 %

## Type 4270 Series



Small modern and reliable, this is a range of 6mm square multiturn trimming potentiometers well suited to industrial and professional applications. For stability, the range has a cermet resistance element. The trimmer is actuated by a lead screw with slipping clutch at each end of travel. Components from this range are available with various adjustment configurations. They are all fully sealed to withstand immersion in normal board washing solvents.

### Key Features

- High Resolution Cermet Element
- Reliable, Quality Performance
- Choice of Adjustment Styles
- 0.25 Watt Rating at 70°C
- Low Temperature Coefficient
- Space-Saving Size
- Fully Sealed for Board Washing

## Characteristics - Electrical

Resistance Range:	50R to 2M
Resistance Values:	1, 2 and 5 in each decade
Resistance Tolerance:	± 10%
End Resistance:	2 Ohms or 1% whichever is the greater.
Slider Current:	50 mA maximum.
Power Rating:	0.25W at 70°C derating to zero at 125°C
Isolation Voltage:	300 V dc or ac peak maximum
Limiting Element Voltage:	250 V dc or ac RMS maximum
Breakdown Voltage:	420 VAC
Insulation Resistance:	1000 M at 500 V dc
Resolution:	Essentially Infinite
Rotational Noise (CRV):	3 Ohms or 3 %, whichever is greater maximum.
Electrical Adjustment:	12 ± 1 turns

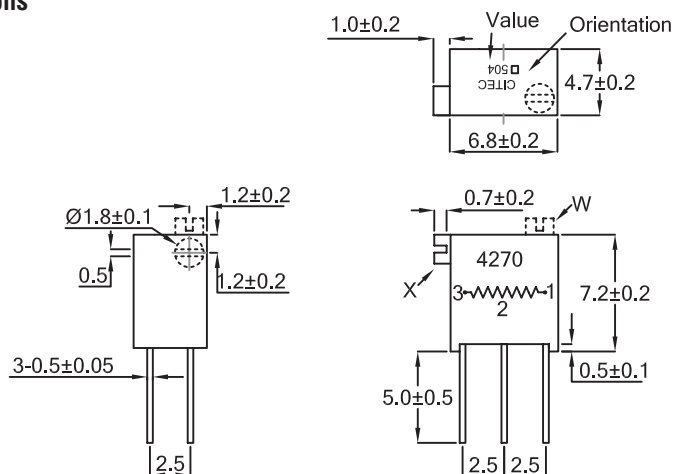
## Mechanical

End Stop:	Slipping clutch action, wiper idles
Starting Torque:	< 21mNm
Mechanical Adjustment:	14 turns, nominal
Weight:	0.4gm maximum

## Environmental

Temperature Range:	-55°C to +125°C
Thermal Shock:	5 Cycles -55°C to +125°C
Temperature Coefficient:	± 250ppm/°C
Shock:	100g
Vibration Severity:	10 - 500Hz; 10g (0.75mm or 98m/s²)
Rotational Life:	200 Cycles
Load Life at 85°C:	ΔR <2% after 1000 hours
Sealing:	Sealed for board washing

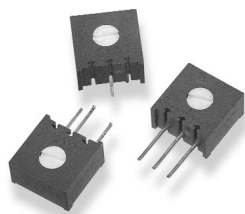
## Dimensions



## How to Order

4270	W	502	K
Common Part	Pin Layout	Resistance Value	Tolerance
4270	W - Top Adjust X - Side Adjust	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 1K: 102 5K: 502 100K: 104	K - ±10 %

## Type 4295 Series



These long established 10mm square, single turn potentiometers will meet a wide range of industrial and professional applications. Cermet element technology ensures stability and reliability. This P.C.B. mounted package has easy top or side adjustment, or finger adjust styles. All components are sealed to withstand printed circuit board washing solvents.

### Key Features

- High Resolution Cermet Element For Stability
- Enclosure Sealed
- 0.5 Watt Rating at 85°C
- Flame Retardant
- P.C.B. Standoffs
- Robust Construction
- Vertical or Horizontal Adjustments Available
- Finger Adjustment Available

### Characteristics - Electrical

Resistance Range:	100R to 2M
STD Resistance Values:	1, 2 and 5 in each decade
STD Resistance Tolerance:	± 10%
End Resistance:	20hms or 1% whichever is greater
Slider Current:	100 mA or within power rating, Max.
Power Rating, Watts:	0.5 at 85°C derating to zero at 125°C
Isolation Voltage:	300 V dc or ac peak
Limiting Element Voltage:	220 V dc or ac RMS, Max.
Breakdown Voltage. (Sea Level):	900 V ac for one minute
Insulation Resistance:	1000 M Ohms at 500 V dc, Min.
Resolution:	Essentially Infinite
Rotational Noise (CRV):	3 Ohms or 2 % min.
Temperature Coefficient:	± 250 ppm/°C, Max.
Electrical Adjustment:	280° Nominal

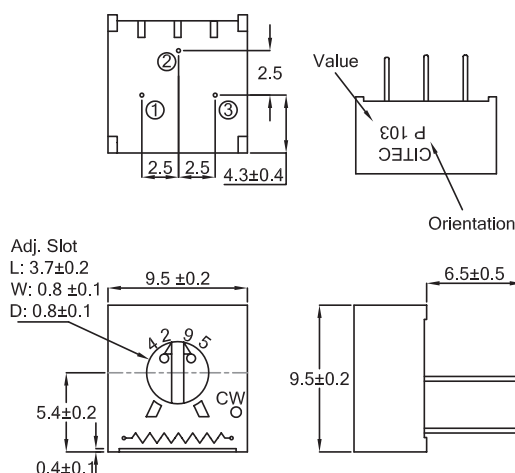
### Mechanical

End Stop:	40 mNm Min.
Starting Torque:	35 mNm Max.
Mechanical Adjustment:	300° Nominal
Weight:	0.85 gm Nominal
Solderability:	MIL Std 202 Method 208A

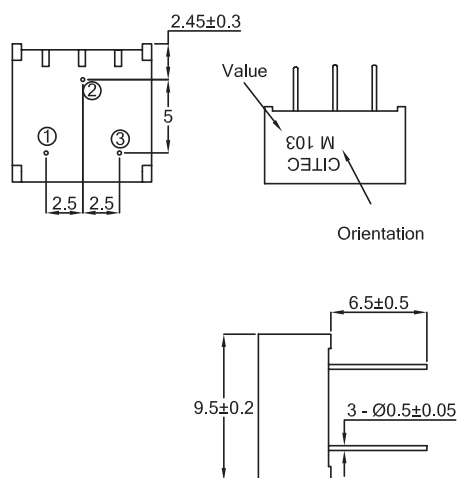
### Environmental

Temperature Range:	-55°C to +125°C
Temperature Storage:	250 Hrs at 125°C
Thermal Shock:	5 Cycles -55°C to +125°C
Bump Severity:	4000 Bumps; 40G
Vibration Severity:	10 - 500Hz; 30 G
Rotational Life:	200 Cycles, Min.
Load Life at 70°C:	ΔR < 3% after 1000 Hrs. at 0.5 watts
Sealing:	Sealed for board washing (85°C Florinert)
Climatic Category:	55/125/56
Humidity:	MIL - Std - 202G Method 103 (96hrs)

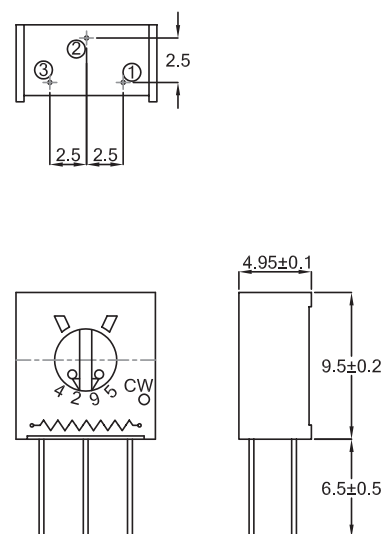
### Dimensions 4295P



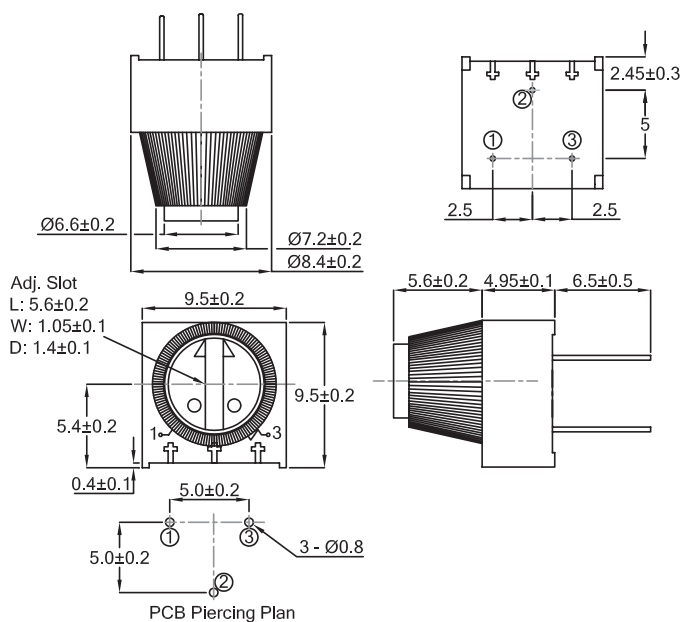
**Dimensions**  
**4295M**



**4295X**



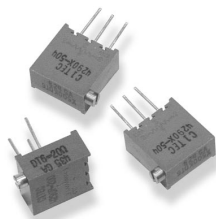
**4295MF**



**How to Order**

4295	P	104	K
Common Part	Pin Configuration	Resistance Value	Tolerance
4295	<p>M – Top Adjust 5mm x 5mm</p> <p>MF – Finger Top Adjust 5mm x 5mm</p> <p>P – Top Adjust 5mm x 2.5mm</p> <p>X – Side Adjust 5mm x 2.5mm</p>	<p>The first two digits are significant figures of resistance value and the third denotes the number of zeros following.</p> <p>e.g. 100R: 101 1K: 102 10K: 103 100K: 104</p>	K - 10 %

## Type 4290 Series



Where size and reliability are critical, this range of 10mm square multiturn trimming potentiometers satisfies the requirements in industrial and professional applications.

The cermet resistance element offers stability and high resolution. The trimmer is actuated by a lead screw with a slipping clutch at each end of travel. Top or side adjustment components are available and pin configurations meet the majority of requirements. All units are fully sealed to withstand immersion in board washing solvents.

### Key Features

- High Stability Cermet Element
- 0.5 Watt Rating at 70°C
- Slim Profile Assists Stacking
- Top & Side Adjustment Styles Available
- Flame Retardant Case

## Characteristics - Electrical

Resistance Range:	10R to 2M
Resistance Values:	1, 2 and 5 in each decade
Resistance Tolerance:	± 10%
End Resistance:	2 ohms or 1% whichever is greater
Slider Current:	100 mA DC or AC, maximum
Power Rating:	0.5 Watts at 70°C derating to zero at 125°C
Isolation Voltage:	430 V DC or AC peak
Limiting Element Voltage:	300 V DC or AC RMS, maximum
Breakdown Voltage:	900 V AC for one minute
Insulation Resistance:	1000 M at 500 V DC, minimum
Resolution:	Essentially Infinite
Rotational Noise (CRV):	3 Ohms or 1 %, whichever is greater
Temperature Coefficient:	± 250 ppm/°C, maximum
Electrical Adjustment:	25 turns

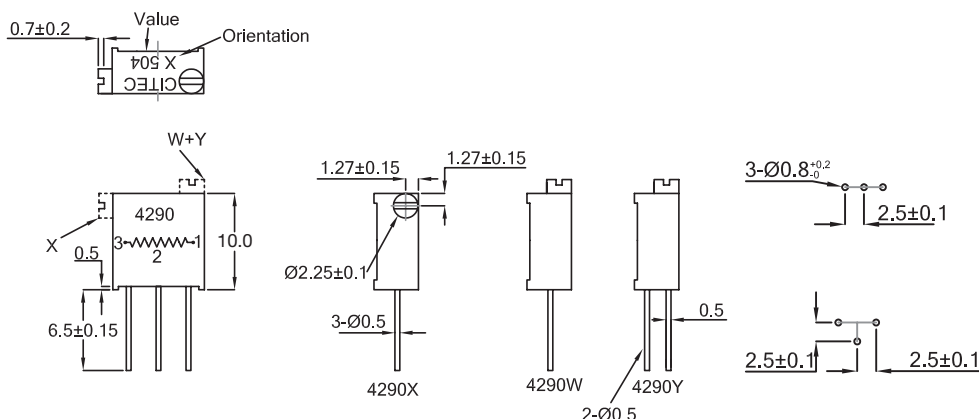
## Mechanical

End Stop:	Slipping clutch both ends
Starting Torque:	35 mNm
Weight:	0.8 gram, approx.

## Environmental

Temperature Range:	-55°C to +125°C
Temperature Storage:	1000 Hrs at 125°C
Thermal Shock:	5 Cycles -55°C to +125°C
Bump Severity:	4000 Bumps; 40 G (3mm or 390m/s²)
Vibration Severity:	10 - 500Hz; 20 G
Rotational Life:	200 Cycles
Load Life at 85°C:	ΔR <3% after 1000 hours
Sealing:	Sealed for board washing
Climatic Category:	55/125/21

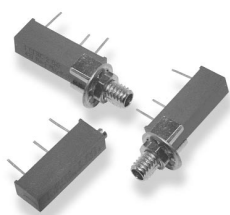
## Dimensions



## How to Order

4290	W	502	K
Common Part	Pin Configuration	Resistance Value	Tolerance
4290	W - Top Adjust X - Side Adjust Y - Top Adjust	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 1K: 102 10K: 103 100K: 104	K - ±10 %

## Type 433PW Series



When you need a durable trimming potentiometer, these 19mm rectilinear styles offer quality performance at a competitive price. They feature a cermet element for stability and resolution and are available in two formats. Type 433 PW will withstand all recognised board-washing solvents and can be offered with panel mount for external adjustment.

### Key Features

- Stable Infinite Resolution
- High Performance
- Wiper Idles at End Stop
- Rugged Construction
- Fully Sealed
- Panel Mount Available

## Characteristics - Electrical

Resistance Range:	10 Ohms to 2M Ohms
STD Resistance Values:	1, 2 and 5 in each decade
STD Resistance Tolerance:	± 10%
End Resistance:	2 Ohms or 1% of total resistance, whichever is greater
Slider Current:	100 mA or within power rating maximum
Power Rating, Watts:	0.75 at 70°C derating to zero at 125°C
Isolation Voltage:	500 V dc or ac peak
Input Voltage:	400 V dc or ac RMS maximum
Breakdown Voltage:	1000 V ac for one minute
Insulation Resistance:	1000 M ohms at 100 V ac minimum
Resolution:	Essentially Infinite
Rotational Noise (CRV):	1 Ohm or 1 % of total resistance, whichever is greater
Temperature Coefficient:	± 250 ppm/°C maximum
Electrical Adjustment:	15 Turns Nominal

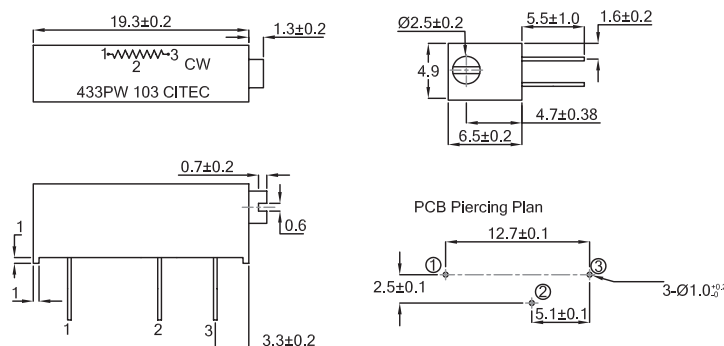
## Mechanical

End Stop:	Slipping Clutch Both Ends
Starting Torque:	35mNm maximum
Weight:	1.4 grams maximum

## Environmental

Temperature Range:	-55°C to +125°C
Temperature Storage:	1000 Hrs at 125°C
Thermal Shock:	5 Cycles -55°C to +125°C
Vibration Severity:	10 - 500Hz; 20G (0.75mm or 98m/s <sup>2</sup> )
Rotational Life:	200 Cycles
Load Life at 70°C:	ΔR < 4% after 1000 Hours
Sealing:	Sealed for Board Washing
Climatic Category:	55/125/21
Shock:	50G

## Dimensions



## How to Order

433	PW	104	K
Common Part	Pin/Adjustment Style	Resistance Value	Tolerance
433	PW – PCB Mount PM – PCB Mount with Panel Mount	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K: 102 10K: 103 100K: 104	K - 10 %

## Type PC910 Series



Specify the PC910 series, offering a number of quality features. This series is ideal for use in many types of professional and industrial equipment, the components have a higher power rating and offer the stability and reliability that come with cermet element technology. The finger adjust styles are widely used in v.d.u. brightness controls and as stable adjustment potentiometers in temperature control and timing applications.

### Key Features

- Stable High Resolution Cermet Element
- Proven Reliability
- 1 Watt Power Rating at 40°C
- Resistant to Most PCB Washing Solvents
- Tag Solderability to BS2011 Part 2.1 TA
- Wiper Position Indicator
- Special Log Laws Available
- Replaces the MP Series

## Type PC910 Series

### Characteristics - Electrical

<b>Std. Resistance Range &amp; Laws:</b>	47 Ohms to 2M2 (Linear) 1 K Ohm to 1 M Ohm (Non-Linear)
<b>Resistance Values:</b>	1, 2.2 and 4.7 in each decade (2 & 5 also available to order)
<b>Selection Tolerance:</b>	± 20% (tighter by request)
<b>Rated Dissipation at 40°C:</b>	1 Watts (Linear); 0.5 Watts (Log)
<b>Limiting Element Voltage:</b>	315 V DC or AC
<b>Electrical Rotation:</b>	240° nominal
<b>Rotational Noise: (C.R.V.)</b>	5 ohms or 5% of total resistance maximum whichever is greater

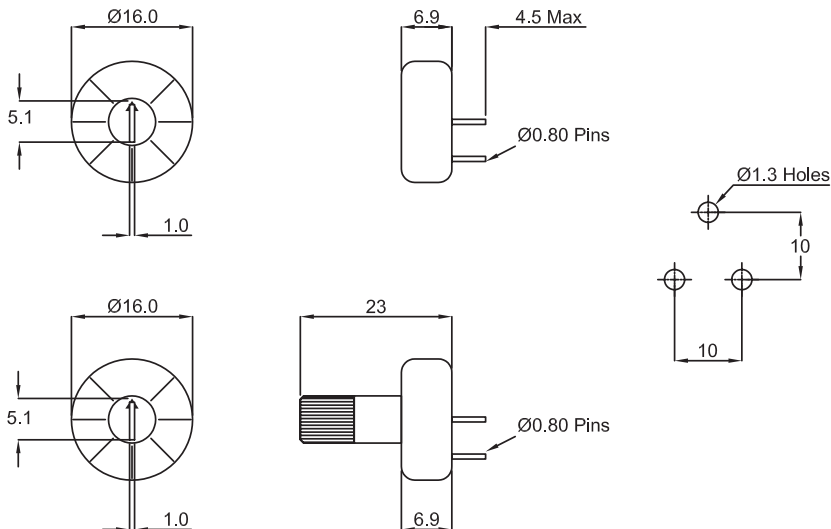
### Mechanical

<b>Starting Torque:</b>	30 mNm maximum
<b>Mechanical Rotation:</b>	270°
<b>End Stop Torque:</b>	90 mNm minimum

### Environmental

<b>Limits of Resistance Change:</b>	3% (after 1000 hours endurance)
<b>Temperature Characteristics of Resistance (20°C to 70°C):</b>	0.75%
<b>Climatic Category:</b>	40/100/21
<b>Mechanical Endurance:</b>	200 operations minimum

### Dimensions PC910



### PC911

### How to Order

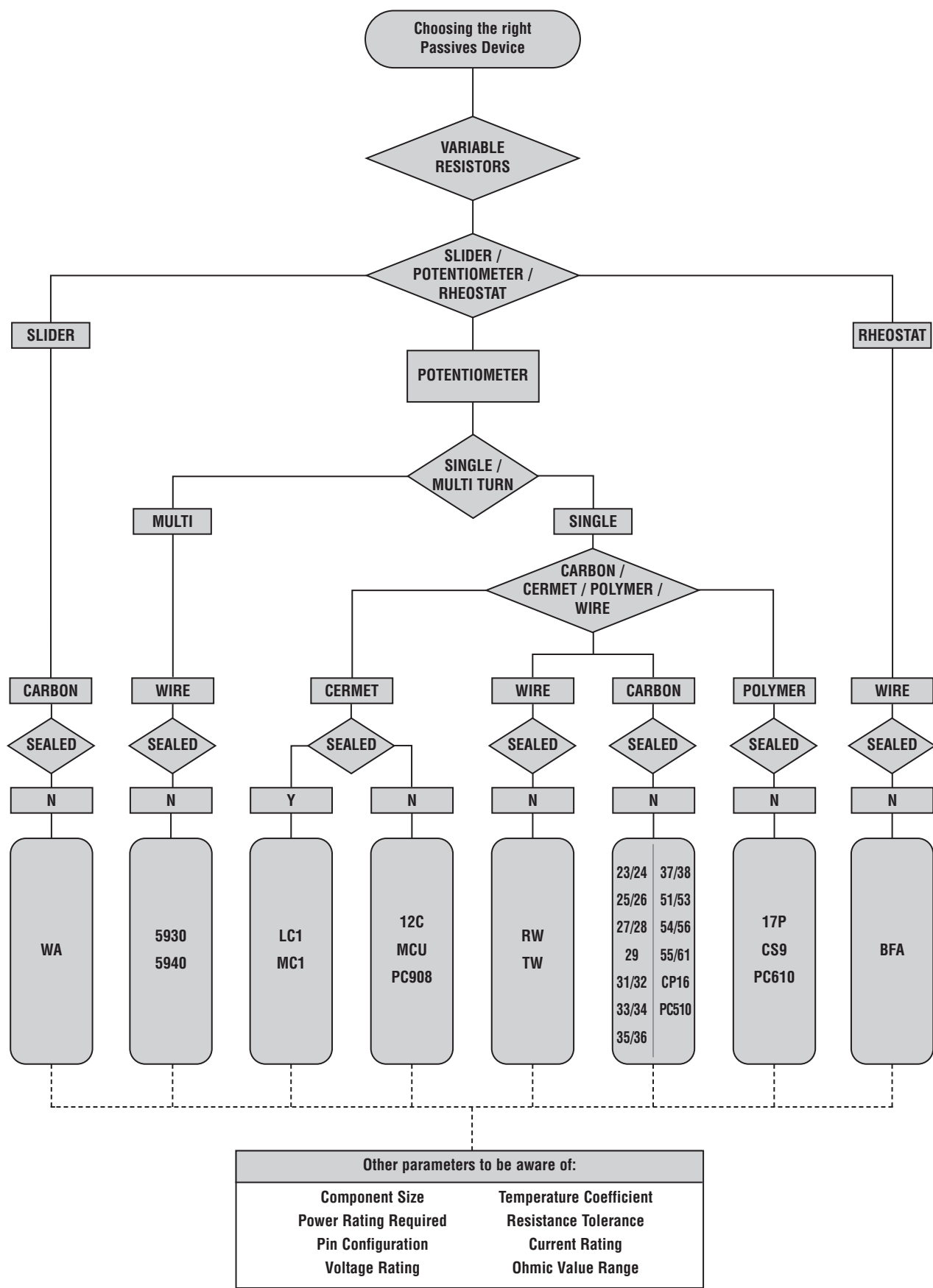
PC910	102	M	A
Common Part	Inductance Value	Tolerance	Law
PC910 - Screwdriver Adjust PC911 - Finger Adjust	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 1K: 102 10K: 103 100K: 104	K - ±10% M - ±20%	A - Linear B - Stepped Log

We will advise a multidigit Tyco Electronics Part Number against this description

A large grid of graph paper for engineering notes, consisting of 20 columns and 40 rows of small squares.

Leaded Trimmers





## Potentiometers & Rheostats

### Product Overview

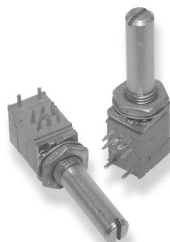
Tyco Electronics Components offers a comprehensive range of variable resistors and potentiometers to satisfy the demands of circuit designers throughout the full spectrum of industrial and professional markets.

Control potentiometers ranging in size from 9mm conductive plastic devices up to 3 watt wire wound controls have evolved over the last 25 years as the Citec brand has grown to become first choice for electronic design engineers. These controls are represented here in their more standard styles and configurations but they can be customised to satisfy individual customer specifications.

- Well Established Brand Name
- Unequalled Comprehensive Range
- Stable Cermet Elements
- Economic Carbon Elements
- Multi-turns For Precise Set-ability
- Various Sealing Solutions
- Custom Designs Welcome

Size	Element	Adjustment Style	Features	Family	Page
9mm sq	Carbon	Metal Shaft	Compact	<b>CS9</b>	220
9mm sq	Carbon	Plastic Shaft	Economy Compact	<b>PC610</b>	221
16mm sq	Carbon	Plastic Shaft	Push Switch	<b>17P</b>	222-223
16mm sq	Carbon	Plastic Shaft	Fully Insulated	<b>CP16</b>	224-225
16mm rect	Carbon	Metal Shaft	Switch Version	<b>51</b>	226-228
16mm dia	Carbon	Plastic Shaft	Multi-Gang Options	<b>31</b>	230-232
20mm dia	Carbon	Plastic Shaft	Multiple Options	<b>23</b>	234-236
13mm dia	Cermet	Metal Shaft	Sealed	<b>LC1</b>	238
19mm dia	Cermet	Metal Shaft	Sealed	<b>MC</b>	239
23-40mm dia	Wirewound	Metal Shaft	High Power	<b>RW</b>	240
23mm dia	Wirewound	Metal Shaft	1 Watt Dissipation	<b>TW</b>	241
19mm dia	Wirewound	Metal Shaft	Long-Life Multiturn	<b>5930</b>	242
19mm dia	Wirewound	Metal Shaft	Multiturn	<b>5940</b>	243
Various	n/a	n/a	Suits 5930 and 5940	<b>DIALS Accessories</b>	244-245
14mm dia	Carbon	Edgewheel	Lin and Non-Lin	<b>PC510</b>	246
18mm dia	Cermet	Edgewheel	Lin and Non-Lin	<b>PC908</b>	247
30-60mm	Carbon	Plastic Lever	Dual Gang	<b>WA</b>	248-249
450mm rect	Wirewound	Plastic Lever	Box Enclosed	<b>BFA</b>	250

## Type CS9 Series



A compact, fully enclosed, modern PCB potentiometer being only 9mm square and suitable for use in small instruments, the audio industry and a range of applications where board space is at a premium. The metal shaft and diecast bush, provide long mechanical life and mechanical strength. Offered in both linear and audio law, with centre detent option, alternative shafts, multi-sections and switches to order.

### Key Features

- Small Convenient Size
- Range of Resistance Laws
- Detents Available
- Wide Range Available
- Dual Gang & Switches to Order
- Rugged Metal Spindle/Bush

## Type CS9 Series

### Characteristics - Electrical

Nominal Resistance Range:	5K to 250K
Resistance Tolerance:	± 20%
Power Rating (Watts):	Linear law - 0.05W
Voltage Rating:	Non-linear law - 0.025W √ Power x Resistance
Insulating Resistance:	≥ 50 Meg ohms between terminal and case.
Withstand Voltage:	300V AC, applied between terminal and case for 1 minute.
Noise:	100mV maximum (Ref. JIS C5261)
Switch Type:	SPST - off at CCW end
Switch Rating:	3A 12V DC

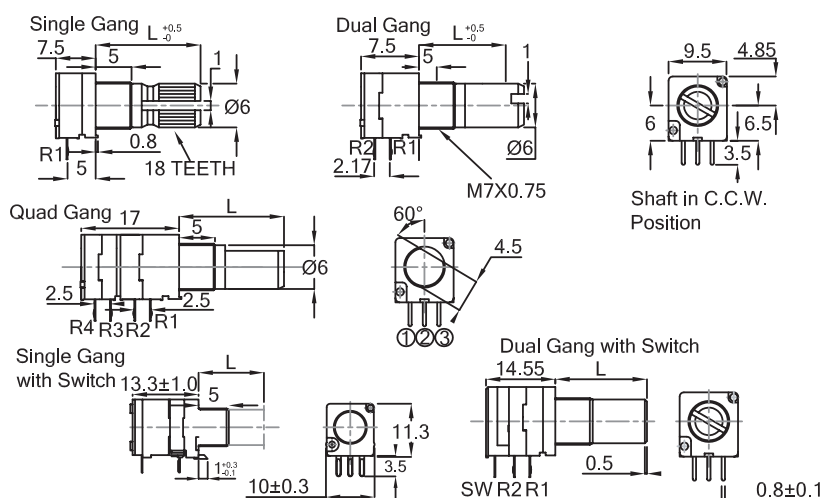
### Mechanical

Angle of Rotation:	300° ± 5°
Switch Operating Angle:	50° maximum
Rotational Torque:	2-15 mNm at room temperature of 20°C
Switch Torque:	40 mNm
Stop Strength:	500 mNm
Shaft Push-Pull Strength:	10 kgf for 10 ± 1 seconds
Shaft Wobble:	Within 0.3L/30mm when 1 kgf - cm moment is applied, perpendicular to the axis of the shaft.
Mounting Nut Tightening Strength:	12 kgf
Terminal Strength:	500gf

### Endurance

Rotational Life:	10,000 turns ΔR <15%
------------------	----------------------

### Dimensions



### How to Order

CS9	A	S	15	B	502	C
Common Part	Number of Sections	Shaft Style	Shaft Length	Resistor Law	Resistor Value	Detent Style
CS9 - 9mm Control Pot	A - Single Gang B - Dual Gang C - Triple Gang D - Quad Gang AS - Single plus Switch BS - Dual plus Switch	S - Slotted F - Flatted P - Serrated	15 - 15mm FMF 20 - 20mm FMF 25 - 25mm FMF	A - Linear B - Log	The first two digits are significant figures of the resistance value. The third digit denotes the number of zeros following: e.g. 5K - 502 20K - 203 100K - 104	N - No Detent C - Centre Detent F - 41 Detents

## Type PC610 Series



Tyco Electronics Components specification in polymer technology gives this small single turn potentiometer stability, reliability and long life. For use in industrial and consumer applications, this component offers durability and quality performance and is available with top or side mounting versions with alternative shafts.

The PC610 potentiometer is an ideal component in toys, games, computer brightness and contrast and most suited to similar large volume applications where the completely automated manufacture allows attractive prices to be achieved. The PC610 potentiometer is often used without a control knob with the splined tip protruding from the fascia. The PC610 potentiometer is available with or without centre detent.

### Key Features

- Stable High Resolution Element
- Space Saving Size (Only 9.5mm Wide)
- Offered in Linear and Non-Linear Laws
- Vertical or Horizontal Mounting
- Choice of Shaft Style
- PCB Standoffs
- Simple One Piece Style

## Type PC610 Series

### Characteristics - Electrical

Resistance Range:	500 Ohms to 500K Ohms
Resistance Values:	1,2 and 5 in each decade
Resistance Laws available:	Linear and Non Linear
Resistance Tolerance:	± 20%
End Resistance:	2% Nominal
Slider Current:	50mA
Power Rating, Watts:	0.08W at 50°C Linear. 0.05W at 50°C Non-Linear
Maximum Working Voltage:	20Vdc or ac RMS, Max.
Insulation Resistance:	50 M Ohms Min at 250 Vdc
Rotational Noise (CRV):	20 Ohms or 3% whichever is greater
Temperature Coefficient:	5%

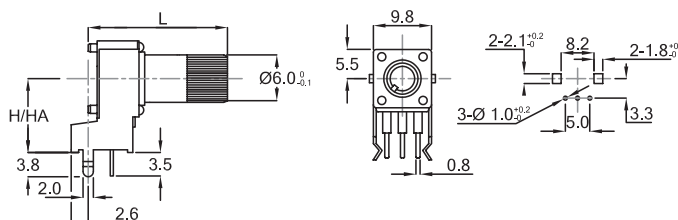
### Mechanical

End Stop:	20mNm
Rotational Torque:	1 - 15mNm
Mechanical Adjustment:	1 Turn - 280°C ±10%
Soldering:	300°C (maximum 3 seconds)
Weight:	3 grams approximate.

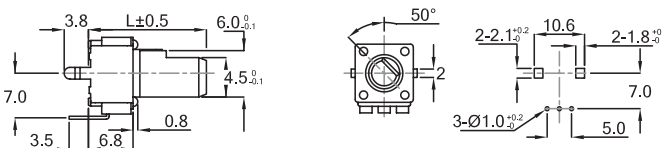
### Environmental

Temperature Range:	-20°C to 70°C
Temperature Storage:	1000 Hrs at 70°C
Bump Severity:	4000 Bumps; 20G
Vibration Severity:	10 - 500Hz; 10G
Rotational Life:	5,000 Operations minimum
Load Life at 50°C:	ΔR < +10% -15% after 500 hours

### Dimensions PC610H



### PC610V



### How to Order

PC610	H	104	B	M	20
Common Part	Orientation	Resistance Value	Resistance Law	Shaft Style	Shaft Length
PC610 - No Detent PC611 - With Detent PC612 - Special Mounting Height (6.5mm)	H - 10mm Mounting Height Shaft parallel to PCB HA - 12.5mm Mounting Height Shaft parallel to PCB V - Shaft at 90° to PCB	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 1K: 102 5K: 502 100K: 104	A - Linear B - Log C - Inverse Log	F - Flatted K - Knurled M - Pointer N - Plain P - Phillips Slot S - Serrated	(S)20 - 20mm Serrated (S)30 - 30mm Serrated (S)35 - 35mm Serrated (F)15 - 15mm Flatted (P)15 - 15mm Slotted (K)30 - 30mm Knurled

## Type 17P Series



Specify the type 17P for applications where high insulation resistance and voltage proof are key requirements.

The materials used in the all plastic body and spindle construction are UL approved making it an ideal component for domestic appliances and control systems where safety is of prime importance.

This popular low cost potentiometer is suitable for industrial and professional applications.

A range of approved switches can be added to the rear of the potentiometer, to produce rotary or push-push action mains switches.

### Key Features

- Polymer Thick Film Element
- Switch Versions Available
- Dual Gang Version Available
- High Reliability
- Small Versatile Size
- All Plastic Body
- Plastic Spindle
- Flame Retardant

## Type 17P Series

### Characteristics - Electrical

<b>Resistance Range:</b>	1K to 1M (Linear), 4K7 to 470K (Non-Linear)
<b>Resistance Value:</b>	1, 2.2 and 4.7 in each decade
<b>Resistance Tolerance:</b>	± 20% (10% by selection)
<b>Rated Dissipation at 20°C:</b>	0.25W (Linear), 0.125W (Non Linear)
<b>Limiting Element Voltage:</b>	350 V dc or ac RMS
<b>Electrical Rotation:</b>	267° without switch, 232° with switch
<b>Terminal Resistance:</b>	5 ohms, maximum
<b>Noise (ENR):</b>	2% maximum (Linear), 3% maximum (Non Linear)
<b>Insulation Resistance:</b>	4G Ohms, minimum
<b>Voltage Proof:</b>	1KV ac Peak

### Mechanical

<b>Operating Torque:</b>	15 mNm maximum
<b>Mechanical Rotation:</b>	300° nominal
<b>End Stop Torque:</b>	350 mNm maximum

### Environmental

<b>Limits of Resistance Change:</b>	15% (after 1000Hrs. Endurance)
<b>Temperature Characteristics of Resistance:</b>	5% (20°C to 70°C)
<b>Bump Severity:</b>	390m/s <sup>2</sup> , 4000 Bumps
<b>Vibration Severity:</b>	10 - 500Hz, 0.75 mm or 98M/s <sup>2</sup>
<b>Climatic Category:</b>	25/70/04
<b>Mechanical Endurance:</b>	10000 Operations (minimum)

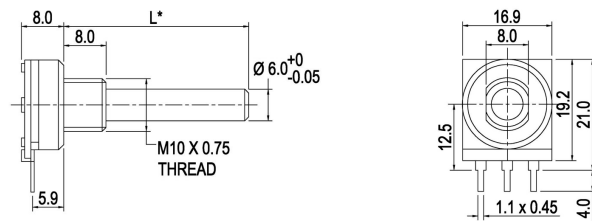
### Switch

	B & D	A & E	P
<b>Switch Type:</b>	1 Amp	4 Amps	10 Amps
<b>Current/Voltage Rating:</b>	1.0A - 24 Volts DC 0.3A - 250 Volts AC	10A - 12 Volts DC 4A - 250 Volts AC	10A - 250 Volts AC
<b>On/Off Torque:</b>	40 mNm maximum	40mNm maximum	Life - 25,000 cycles minimum
<b>Initial Contact Resistance:</b>	20 milliohms	20 milliohms	Proof Voltage - 3KV minimum
<b>Contact Gap:</b>	3mm	3mm	

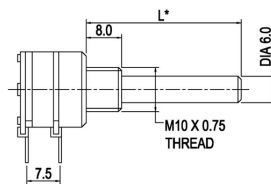
Type 17P Series

Dimensions

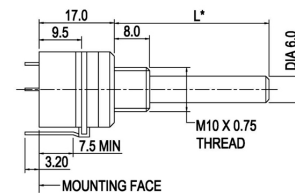
Single Potentiometer



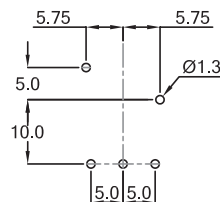
Dual Potentiometer



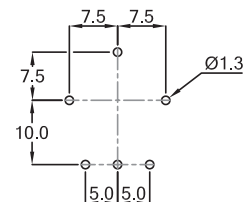
Single Switched Potentiometer



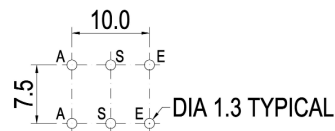
Rotary Switch PCB Layout



Push-Push Switch PCB Layout



Potentiometer PCB Layout



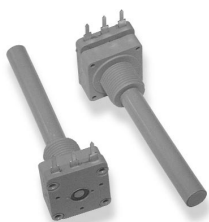
$L^*$  - Standard Shaft Length 35mm

All Dimensions given from Component Side

How to Order

17PE	S	A	102	M	B	25	N
<b>Common Part</b>		<b>Resistor Law</b>		<b>Tolerance</b>		<b>Shaft Length</b>	
17PC - P.C. 17PE - Eyelet		A - Linear B - Log C - Inv. Log		M - 20% K - 10%		FMF in mm 25mm Standard Minimum Shaft Length with P Style Switch is 19mm	
	<b>Product Identification</b>		<b>Resistance Value</b>		<b>Shaft Style</b>		<b>Switch Details</b>
	S - Standard Single X - Customer Special D - Standard Dual		The first two digits are significant figures of the resistance value and the third one denotes the number of zeros following. e.g. 4K7: 472 47K: 473 470K: 474		A - Plain 6mm B - Slotted 6mm C - Flatted (5mm A/F) D - Flatted (4mm A/F) E - Plain 4mm F - Flatted 6mm (4.6mm A/F)		A - DPST 4A/250V AC B - SPST 1A D - DPST 1A E - SPST 4A N - No Switch P - Push Push SPDT 10A P Switch only available on Single Gang Styles

## Type CP16 Series



Specify the type CP16 for applications where high insulation resistance and voltage proof are key requirements. The materials used in the all-plastic body and spindle construction make it an ideal component for domestic appliances and control systems where safety is of prime importance. This popular low cost potentiometer is suitable for industrial and professional applications.

### Key Features

- High Reliability
- Small Versatile Size
- All Plastic Body
- Plastic or Metal shaft styles
- Switch Types Available
- Multiple Sections Available
- Flatted, Serrated Shaft Available

## Type CP16 Series

### Characteristics - Electrical

<b>Resistance Range:</b>	100R to 4M7 Linear, 2K2 to 2M2 Non-Linear
<b>Resistance Values:</b>	1, 2.2 & 4.7 in each decade
<b>Resistance Tolerance:</b>	±20% (>1M ± 30%) - ±10% by selection
<b>Power Rating @ 40°C:</b>	0.2 Watts Linear - 0.1 Watts Non-Linear
<b>Limiting Element Voltage:</b>	250 Volts dc (Linear), 125 Volts dc (Non Linear)
<b>Electrical Rotation:</b>	260° ± 20°
<b>Terminal Resistance:</b>	5 ohms, maximum ≤0.1% (2 ohms, minimum)
<b>Noise (ENR):</b>	≤3% (3 ohms minimum)
<b>Insulation Resistance:</b>	4G ohms, minimum
<b>Resolution:</b>	Essentially Infinite
<b>Voltage Proof:</b>	1KV ac peak

### Mechanical

<b>End Torque:</b>	400 mNm maximum
<b>Operating Torque:</b>	5 to 25 mNm maximum
<b>Mechanical Adjustment:</b>	300° ± 5°
<b>Maximum Torque to Nut:</b>	800 mNm

### Environmental

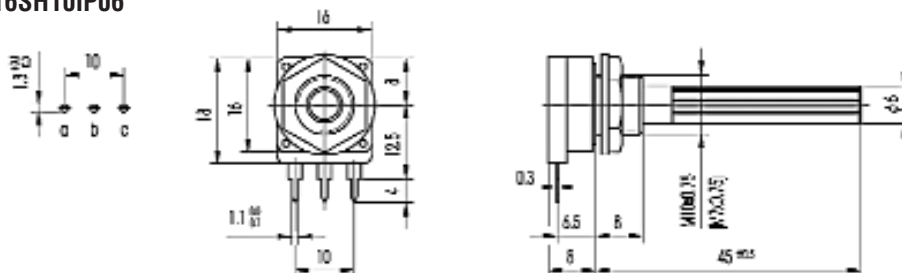
<b>Electrical Life:</b>	ΔR± 5% (1000 hours 0.2 Watts @ 40°C)
<b>Mechanical Life:</b>	25,000 operations
<b>Operating Temperature:</b>	-25°C to +70°C
<b>Temperature Coefficient:</b>	± 300ppm/°C (Rn <100K ohms)
<b>Thermal Cycling:</b>	ΔR± 2.5% (16 hours 85°C, 2 hours @ -25°C)
<b>Damp Heat:</b>	ΔR± 5% (500 hours @ 40°C +95% RH)
<b>Vibration:</b>	ΔR± 2% (2 hours @ 20g - 10Hz ~50 Hz)

### Switch Specifications

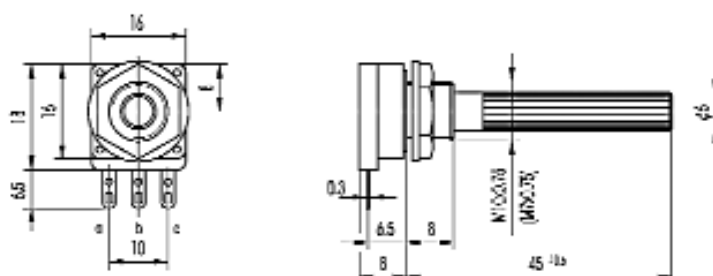
<b>Nominal Current:</b>	1A, 250 VAC
<b>Contact Resistance:</b>	10 milli ohms
<b>Operating Torque:</b>	10 to 30mNm
<b>Operating Angle:</b>	30° ± 5°
<b>Test Voltage:</b>	500 V

### Dimensions

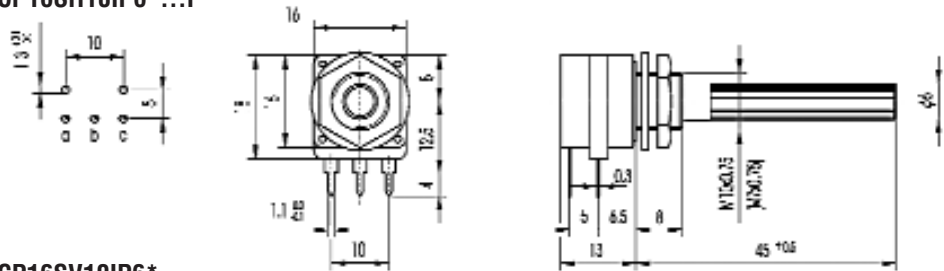
#### CP16SH10IP06\*



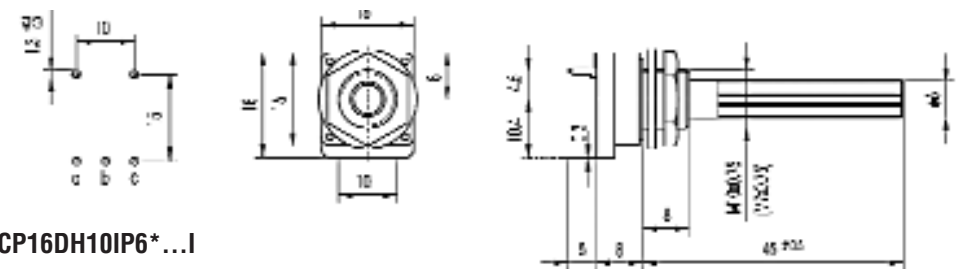
#### CP16SH10CP06\*



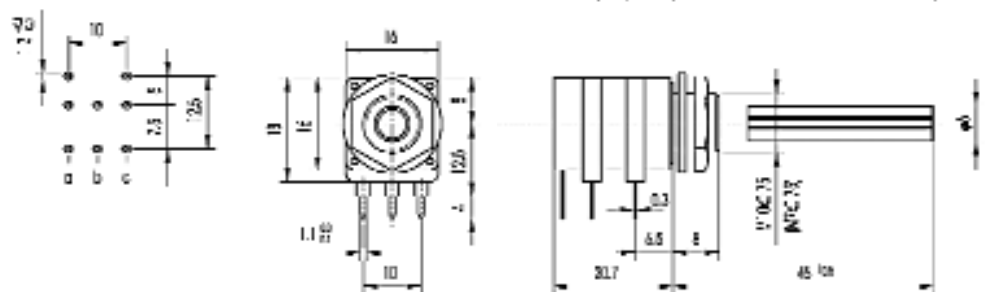
**Dimensions**  
**CP16SH10IP6\*...I**



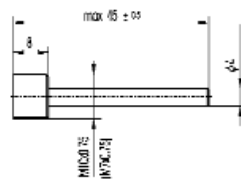
**CP16SV10IP6\*...**



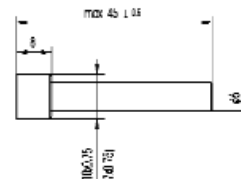
**CP16DH10IP6\*...I**



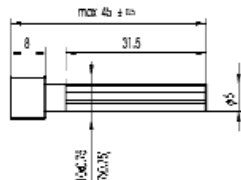
**Shaft Styles**  
**M04/M4**



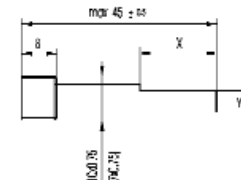
**R06/R6**



**P06/P6**



**F06/F6**

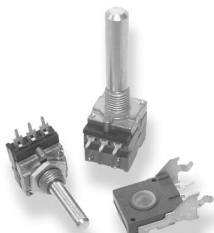


**How to Order**

CP16S	H10	I	P06	102	-	-	-
Common Part	Style / Bush	Terminals	Shaft Type	Resistance Value	Law	Tolerance	Switch
CP16S – Single CP16D – Dual	H10 – Horz. M10 Bush V10 – Vert. M10 Bush	I – PCB C – Eyelet	P06/P6 Standard M04/M4 Metal 4mm F06/F6 Flatted 6mm R06/R6 Round 6mm	The first two digits are significant figures of resistance value. The third denotes the number of zeros following. e.g. 100R: 101 1K: 102 10K: 103 100K: 104	- – Linear B – Log C – Inverse Log	- – Standard K – 10%	- – No Switch I – Switched



## Type 51 Series



The Type 51 Series from Tyco Electronics Components offers a small, high quality potentiometer system. You can choose a standalone module or a conventional bush potentiometer with shaft. Advanced carbon polymer element technology potentiometers with or without switches are available to meet your every requirements.

### Key Features

- Choice of Shafts and Edgewheels
- SPST Switch Style
- Available in Distribution
- Automatic Machine Insertable Modules
- Eyelet or PC Terminations
- Linear and Non-Linear Laws
- Multi Gang Versions Available

## Type 51 Series

### Characteristics - Electrical

<b>Resistance Range</b>	
<b>Linear Law:</b>	470 Ohm to 4.7 Megohm
<b>Log Law:</b>	2.2K Ohm to 470K Ohm
<b>Tolerance:</b>	± 20% (tighter by selection)
<b>Power Rating</b>	
<b>Linear Law:</b>	0.2 Watt @ 40°C (Derating to zero @ 100°C)
<b>Log Law:</b>	0.1 Watt @ 40°C (Derating to zero @ 100°C)
<b>Operating Voltage</b>	
<b>Linear Law:</b>	350 VAC or 500 VDC maximum
<b>Log Law:</b>	$\sqrt{P \text{ maximum} \times R \text{ nominal}}$
<b>Load Life:</b>	$\Delta R < 10\%$ after 1000 hours @ 70°C
<b>Rotational Life:</b>	$\Delta R < 10\%$ @ 15,000 cycles
<b>CRV (Linear Law):</b>	$\Delta R < 1\%$
<b>Isolation Voltage:</b>	500 V dc
<b>Insulation Resistance:</b>	> 100 Megohm

### Mechanical

<b>Angle of Rotation:</b>	300° ± 2°
<b>Rotational Torque:</b>	10 mNm maximum
<b>Stop Strength:</b>	400 mNm maximum
<b>Rotational Life:</b>	25,000 cycles

### Environmental

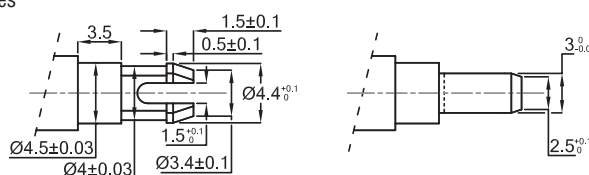
<b>Storage Temperature:</b>	- 40°C to 85°C
<b>Operating Temperature:</b>	- 25°C to 70°C
<b>Humidity:</b>	< 15% $\Delta R$ RH 75% @ 35°C
<b>Temperature Coefficient:</b>	± 500 PPM/°C @ -25 to 70°C
<b>Climatic Category:</b>	25/070/10

### Switch - 1000 Hrs at 0.5 W

<b>Contact Resistance:</b>	< 20 milliohm initial
<b>Rating:</b>	3.5 Amp @ 14.4 VDC
<b>Contact Configuration:</b>	SPST Off @ CCW E
<b>On/Off Torque:</b>	30 mNm maximum
<b>Operational Angle:</b>	30° maximum
<b>Electrical Rotation:</b>	50° to 295°

### Snap-In Shafts and Edgewheels -

For Standalone Modules



The diagram illustrates the snap-in part of a plastic actuator which can be used to rotate the Series 51 Standalone module. Consult MEC Citec Sales Action Desk for details on our full custom knob and shaft capabilities. We will for example be pleased to quote for moulding your shaft and knob as a single snap-in component, subject to suitable volumes being available.

Type 51 Series

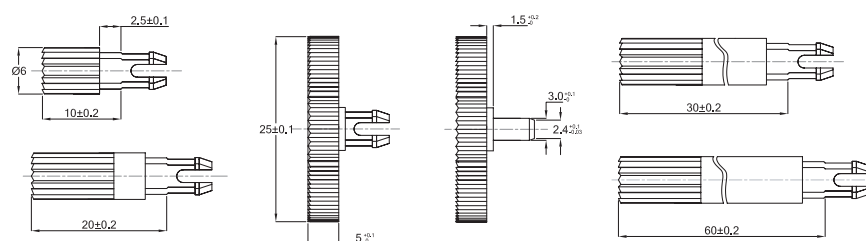
Accessory Options -

For Standalone Modules

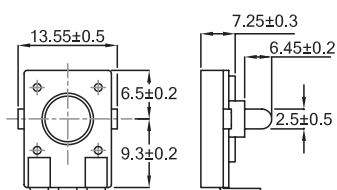
At the date of publication the following mould tools exist for plug in accessories:

5904620111 - Shafts 60 mm long x 6 mm diameter	with knurl end and screwdriver slot colour black
5904620101 - Shafts 30 mm long x 6 mm diameter	with knurl end and screwdriver slot colour black
5904620091 - Shafts 20 mm long x 6 mm diameter	with knurl end and screwdriver slot colour black
5904620081 - Shafts 10 mm long x 6 mm diameter	with knurl end and screwdriver slot colour black
5904620121 - Edgewheel for horizontal modules 25mm diameter	colour black.

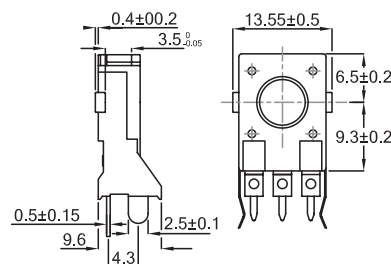
Thumbwheel Actuating Devices



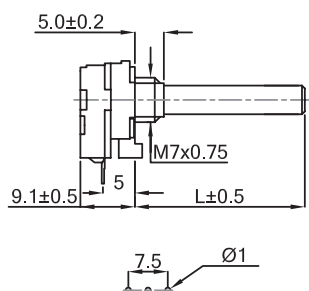
Dimensions - Single Module  
Type 51 Horizontal



Type 53 Vertical

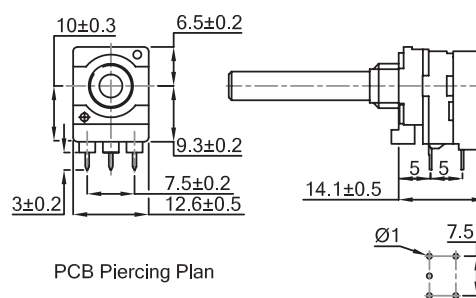


Type 54 No Switch



H - 10mm or 12.5mm to choice

Type 56 with Switch

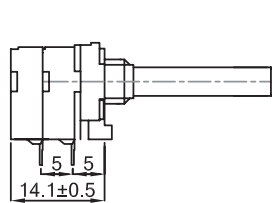


PCB Piercing Plan

L - 5mm or 8mm to choice

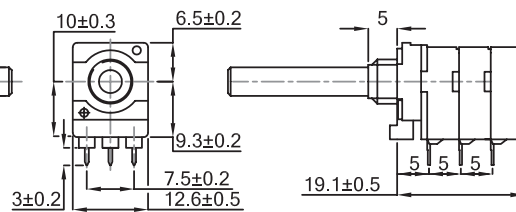
**Type 51 Series**

**Type 55 Dual Section**



H - 10mm or 12.5mm to choice

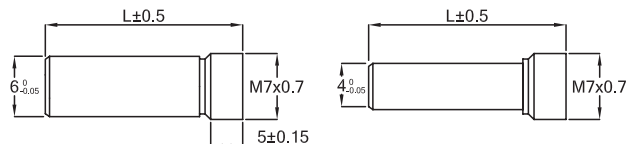
**Type 61 Triple Section**



L - 5mm or 8mm to choice

Type 61 has the same general dimensions as Type 55

**Spindle Options  
Potentiometers with Bush**

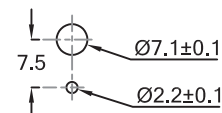


L - We can offer any length up to 30mm, (20mm x 4mm Shafts) with or without flats or slots in metal.  
Plastic plug-in shafts shown on previous page

**Panel Hole Data - Potentiometers with Bushes  
Required Mounting Holes in Chassis**

For Single and Dual Gang Potentiometers with  
Mounting Bush M7 x 0.75mm.

Fix Potentiometer with Mounting Nut Supplied.  
Max. Torque for tightening - 1 Nm  
Thickness of Mounting Plate - 1mm

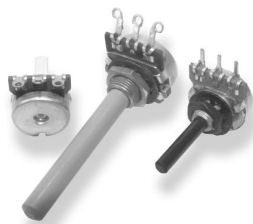


**How to Order**

51	102	A	4	20	PL
Common Part	Value	Resistance Law	Shaft Diameter	Shaft Length	Spindle Style
51 53 54 55 56 61	The first two digits are significant figures of the resistance value and the third one denotes the number of zeros following.  e.g. 4K7: 472 47K: 473 470K: 474	A - Linear  B - Log  C - Inverse Log	4 - 4mm 6 - 6 mm	20 - 20mm 30 -30mm	PL - Plain FL - Flatted

A large grid of graph paper for engineering notes, consisting of 20 columns and 40 rows of small squares.

## Type 31 Series



Tyco Electronics Components will customise these neat 16mm diameter control potentiometers to suit your requirements. They comprise a printed carbon resistance element with 0.25 W current handling and are available with various bush, termination and spindle styles.

As an additional feature, the range includes a twist tab design with mounting bracket applications for use where low price is an important consideration.

### Key Features

- Versatile Design can be Customised to Suit Your Requirements
- SPST Switch Style
- Low Cost Twist Tab Model
- PC Mounting Bracket
- Insulated Shafts Up To 50mm
- Non Linear Laws
- Available with Choice of Bush Styles
- Eyelet or PC Terminations

## Type 31 Series

### Characteristics - Electrical

<b>Resistance Range (Law):</b>	1K Ohm to 1M Ohm Linear 4K7 to 470K (Non Linear)
<b>Resistance Values:</b>	1, 2.2 and 4.7 per decade
<b>Resistance Tolerance:</b>	± 20% (± 10% by selection)
<b>Rated Dissipation at 40°C:</b>	0.25W (Linear), 0.125W (Non Linear)
<b>Limiting Element Voltage:</b>	350Vdc or ac RMS
<b>Electrical Rotation:</b>	267° NOM without switch, 240° NOM with switch
<b>Terminal Resistance:</b>	5 Ohms, Max.
<b>Noise (ENR):</b>	2% Max. (Linear), 3% Max. (Non Linear)
<b>Insulation Resistance:</b>	4 G Ohms Min.
<b>Voltage Proof:</b>	500 Vac peak

### Mechanical

<b>Operating Torque:</b>	15 mNm, Max.
<b>Mechanical Rotation:</b>	270° Nominal
<b>End Stop Torque:</b>	350 mNm, Max.

### Environmental

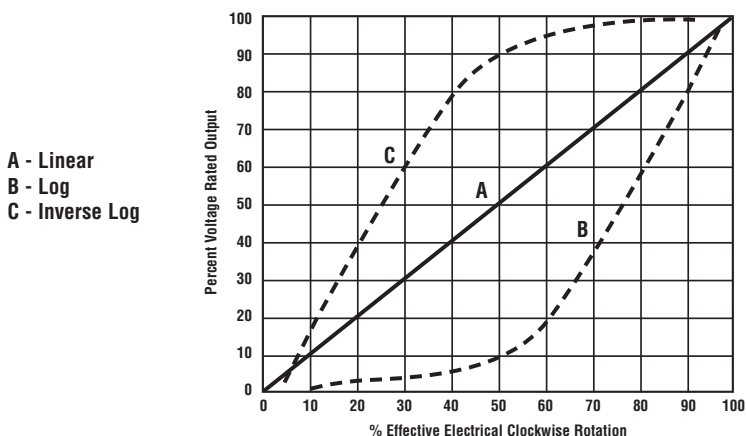
<b>Limits of Resistance Change:</b>	15% (After 1000 hours endurance)
<b>Temperature characteristics of resistance ( 20°C to 70°C ):</b>	5%
<b>Bump Severity:</b>	390m/s <sup>2</sup> , 4000 Bumps
<b>Vibration Severity:</b>	10 - 500 Hz, 0.75mm or 98m/s <sup>2</sup>
<b>Climatic Category:</b>	8 days @ 36°C 82% RH DR < 15%
<b>Mechanical Endurance:</b>	15000 Operations ( Min )

### DIY Design

The 31 Series can be customised to suit your individual requirements with features such as detent action, track centre tap etc.

Please call our technical sales team to discuss variations on these 16mm diameter devices.

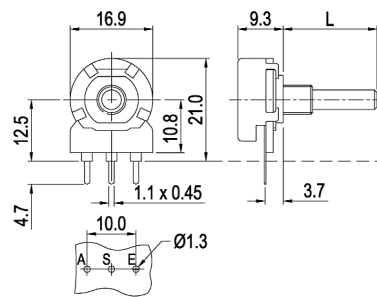
### Resistance Laws



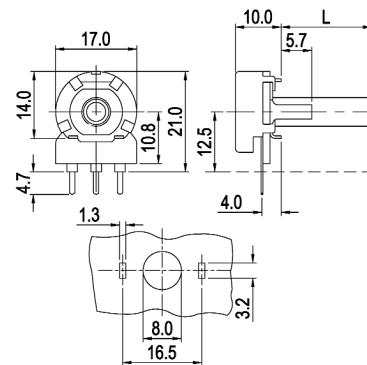
Type 31 Series

Dimensions

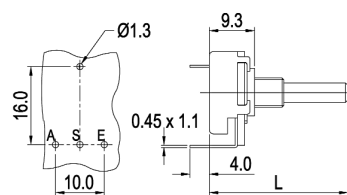
Type 31



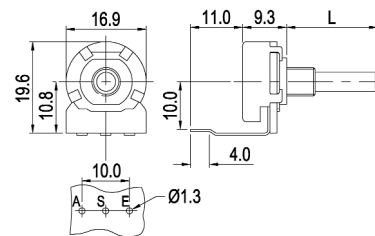
Type 32



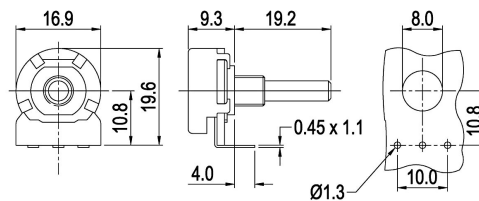
Type 34



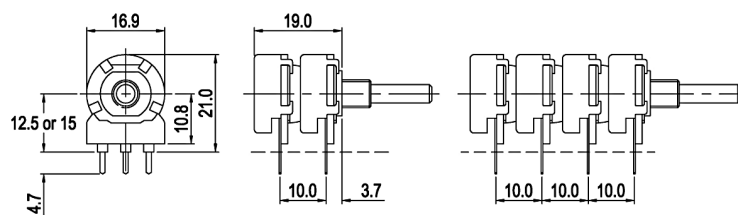
Type 35



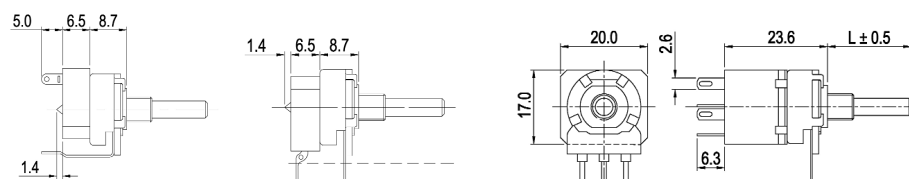
Type 36



Multi Ganged Types



Switched Types



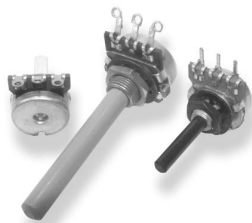
How to Order

<b>31</b>	<b>E</b>	<b>X</b>	<b>A</b>	<b>104</b>	<b>M</b>	<b>W</b>	<b>B</b>	<b>25</b>	<b>B</b>
<b>Potentiometer Type</b> 31 - Std Spindle Style 32 - No Bush Mtg Bracket 33 - Spindle with Integ Knurled Knob 4mm State Colour 34 - Rev Mount with mounting pin and PC terminals swept down to board 35 - Rev Mount with PC Terminals swept down to board. No terminal on case 36 - Forward mount with PC pins swept forward to parallel to shaft 37 - Dual gang style single shaft same value / tol on each section 38 - Single Spindle Pot with centre detent	<b>Customer Identity</b> S - Standard X - Customer Special See Drawing (provide copy with order)	<b>Resistance Value</b> The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 4.7K Ohms: 472 22K Ohms: 223 100K Ohms: 104				<b>Bush Details</b> N - Black plastic 8mm A/F - M10 with 4mm hole P - Diecast M7 x 6mm 4mm hole S - Diecast M10 x 8mm 6.35mm hole T - Diecast M7 x 9mm 4mm hole U - No Bush V - Diecast M10 x 8mm 6mm hole W - Black plastic M10 8mm M10 6mm hole		<b>Shaft Length</b> FMF in mm Standard Lengths are 15, 20, 25 and 50mm	
<b>Termination Style</b> E - Std Eyelet P - Std PC 12.5mm MH R - Long PC 15mm MH X - Extra long for rear PC Mtg S - PC bend forward at 90°	<b>Resistor Law</b> A - Linear B - Log C - Inv. Log	<b>Resistance Tolerance</b> K - 10% M - 20%		<b>Shaft Style</b> A - Plain 6mm B - Slotted 6mm C - Flatted 6mm (5mm A/F) D - Flatted 6mm deep flat 4mm A/F E - Plain 4mm F - Full 6.35mm flat - special angle G - Flatted 4mm H - Plain 6.35mm J - Flatted 6.35mm (4.6mm A/F)	<b>Switch Details</b> A - DPST - Demko approved 4A/250V AC B - SPST - Eyelet Termination C - DPDT - Changeover Switch D - DPST - Eyelet Terminations on rear T - SPST - PC Push Switch				

A large grid of graph paper for engineering notes, consisting of 20 columns and 40 rows of small squares.



## Type 23 Series



A popular range of 20mm control potentiometers, the type 23 series can be tailored to suit more specific requirements. The potentiometers are available with printed carbon resistance element, choice of bush lengths in metal or plastic and insulated shafts up to 50mm in length. In addition, approved mains and low current switches are available as standard options.

### Key Features

- Versatile design can be customised to suit your requirements
- 0.4 Watt at 40°C
- Die Cast Metal Bush Available
- Insulated Bush Available
- Insulated Shafts up to 50mm
- Eyelet or PC Terminations
- Rugged Construction
- Mounting Bracket
- Audio Laws Available
- Dual Gang and Dual Concentric Styles

## Type 23 Series

### Characteristics - Electrical

<b>Resistance Range (Law):</b>	1K to 1M (Linear) 4K7 to 470K (Non Linear)
<b>Resistance Values:</b>	1, 2.2 and 4.7 per decade
<b>Resistance Tolerance:</b>	± 20% (± 10% by selection)
<b>Rated Dissipation at 40°C:</b>	0.4W (Linear), 0.2W (Non Linear)
<b>Limiting Element Voltage:</b>	500V DC or AC RMS
<b>Electrical Rotation:</b>	267° without switch, 232° with switch
<b>Terminal Resistance:</b>	5 Ohms maximum
<b>Noise (ENR):</b>	2% maximum (Linear), 3% maximum (Non Linear)
<b>Insulation Resistance:</b>	4G minimum
<b>Voltage Proof:</b>	1000 V AC peak

### Mechanical

<b>Operating Torque:</b>	15 mNm maximum
<b>Mechanical Rotation:</b>	300°
<b>End Stop Torque:</b>	800 mNm maximum

### Environmental

<b>Limits of Resistance Change:</b>	15% (After 1000 hours endurance)
<b>Temperature Characteristics of Resistance:</b>	5% ( -55°C to 125°C )
<b>Bump Severity:</b>	390m/s <sup>2</sup> , 4000 Bumps
<b>Vibration Severity:</b>	10 - 500 Hz, 0.75mm or 98m/s <sup>2</sup>
<b>Climatic Category:</b>	8 days @ 36°C 82% RH R < 15%
<b>Mechanical Endurance:</b>	15000 Operations (minimum)

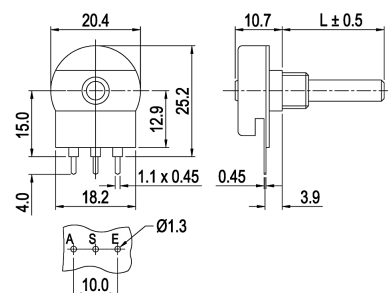
### DIY Design

The 23 Series can be customised to suit your individual requirements with features such as detent action, track centre tap etc.

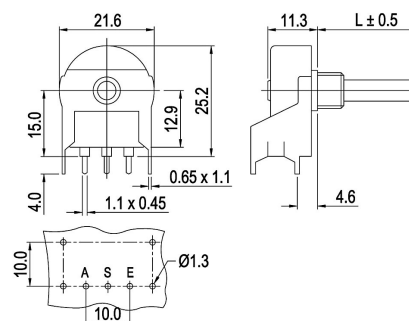
Please call our technical sales team to discuss variations on these 20mm diameter devices.

### Dimensions

#### Type 23



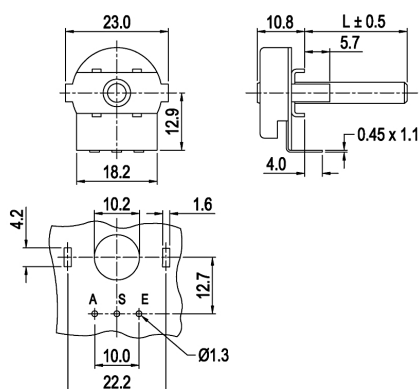
#### Type 24



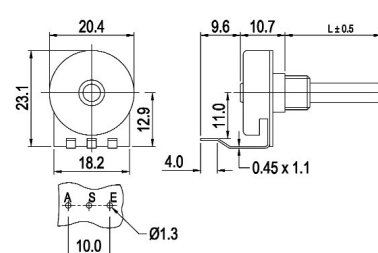
Type 23 Series

Dimensions (continued)

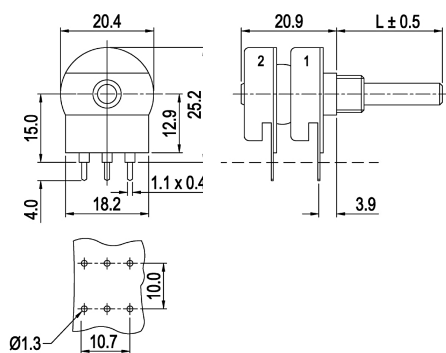
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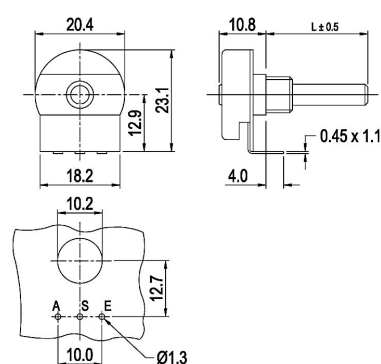
Type 26



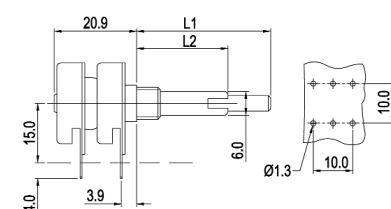
Type 27



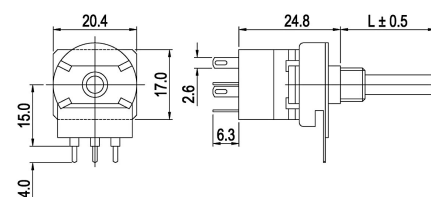
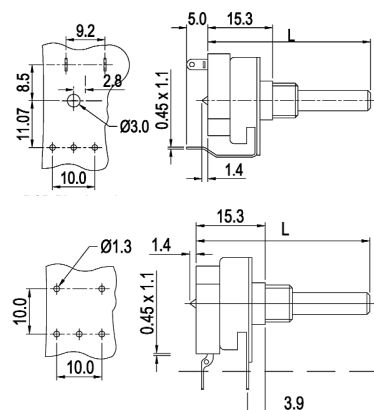
Type 28



Type 29



Switched Types



How to Order

23	E	X	A	104	M	L	B	22	A
<b>Potentiometer Type</b> 23 - Std Spindle Style 24 - Standard 20mm with Mounting Bracket 25 - No Bush - Mounting Bracket Terminations swept forward parallel to shaft 26 - PC Terminations swept down to board for rear mounting 27 - Dual gang style single shaft same value / tol on each section 28 - PC Terminations swept forward parallel to shaft 29 - Dual Concentric style	<b>Customer Identity</b> S - Standard X - Customer Special See Drawing (provide copy with order) D - Special Cut and Mtd track	<b>Resistance Value</b> The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R Ohms: 101 4.7K Ohms: 472 22K Ohms: 223 100K Ohms: 104			<b>Bush Details</b> L - Diecast M10 x 9mm no location lug, 6mm hole W - Diecast M10 x 9mm with locator, 6mm hole Y - Diecast M10 x 9mm no locator, 4mm hole M - Diecast 3/8" x 8mm with location lug, 6.35mm hole K - Diecast 3/8" x 8mm no locator, 6.35mm hole P - Diecast M7 x 6mm no locator, 4mm hole S - Insulated M10 x 7mm 6mm hole T - Insulated M10 x 10mm 6mm hole U - No Bush F - Diecast 3/8" x 12mm 6.35mm hole G - Diecast 3/8" x 8mm no locator, 4mm hole		<b>Shaft Length</b> FMF in mm i.e. 22mm		
<b>Termination Style</b> E - Std Eyelet P - Std PC 15mm MH R - Long PC X - Extra long PC S - PC bend forward at 90°	<b>Resistance Law</b> A - Linear B - Log C - Inv. Log	<b>Resistance Tolerance</b> M - 20% K - 10%	<b>Shaft Style</b> A - Plain 6mm B - Slotted 6mm C - Flatted 6mm (5mm A/F) D - Flatted 6mm deep flat 4mm A/F E - Plain 4mm F - Full 6.35mm flat - special angle G - Flatted 4mm H - Plain 6.35mm J - Flatted 5.5mm L - Flatted 6mm (4.6mm A/F)	<b>Switch Details</b> A - DPST 4A/250V AC B - SPST - Eyelet Termination C - DPDT - Changeover Switch D - DPST - Eyelet Terminations N - No Switch T - SPST - PC Terminals					

N.B. Where a potentiometer is rear mounting then the SHAFT LENGTH is measured from the PCB to the tip of the shaft whether or not it is fitted with a mounting bush.

A large grid of graph paper for engineering notes, consisting of 30 columns and 40 rows of small squares.

## Type LC1 Series



A very popular range is this 13mm diameter spindle operated potentiometer family. The LC1 Series has a cermet resistance element. This technology provides excellent electrical and thermal stability, reliability, low noise and long life, to meet most professional or military applications for small size potentiometers. Recent changes have meant that the LC type is no longer released to BS CECC specification.

### Key Features

- Rugged Terminations
- Panel Sealed
- Designed To Mil Standard
- Proven Reliability
- 1W Rating at 70°C
- Low Noise
- Cermet Element
- Rugged Terminations

## Type LC1 Series

### Characteristics - Electrical

Resistance Values and Law:	100R to 1M Linear
Selection Tolerance:	± 10%
Rated Dissipation at 70°C:	1W
Limiting Element Voltage:	315V DC
Isolation Voltage:	450V DC
Electrical Rotation:	260°
Terminal Resistance:	<50 Ohms
Noise (ENR):	3% maximum
Insulation Resistance:	>5 G Ohms
Voltage Proof:	630V AC peak

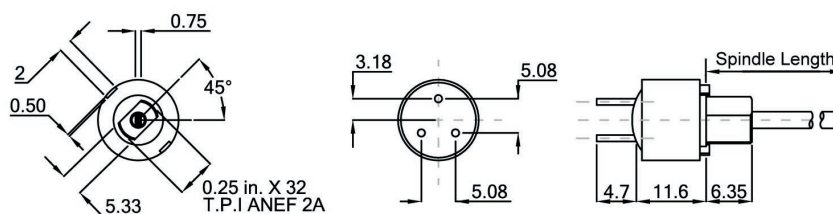
### Mechanical

Starting Torque:	5 -20 mNm
Mechanical Torque:	295° ± 5°
End Stop Torque:	>225 mNm

### Environmental

Limits of Resistance Change:	± 3% (after 1000 hours)
TCR (20°C to 70°C):	<0.75%
Bump Severity:	390m/s <sup>2</sup> , 4000 Bumps
Vibration Severity:	10 – 500Hz, 0.75mm or 98m/s <sup>2</sup>
Climatic Category:	55/125/56
Mechanical Endurance:	25000 Operations minimum

### Dimensions



### Approvals

The LC1 meets military specifications similar to MIL-R-94C style RV6 and MII-R-23285 style REC6.

### How to Order

LC1	10K	10%	16mm	PL
Common Part	Resistance Value	Tolerance	Spindle Length	Spindle Style
LC1 - Spindle Operated Potentiometer	100R 2K2 47K 220R 4K7 100K 470R 10K 220K 1K 22K 470K 1M	10% 20%	i.e 16mm 1 1/2"	PL - Plain SL - Slotted FL - Flatted

## Type MC Series



This is one of Tyco Electronics Component's most popular ranges and is available with cermet resistance elements. This choice means that components offer excellent electrical and thermal stability, reliability, low noise and long life which makes them most suitable for the majority of professional applications.

The MC Series is used in the Tornado Project and is the standard single turn general purpose panel control used for most military applications in the UK and in Europe.

### Key Features

- Cermet Element
- Proven Reliability
- 2W Power Rating
- Strong Construction
- Sealed to Military Standard
- Panel Sealed (MC1)
- Rugged Terminations

## Type MC Series

### Characteristics - Electrical

	MC1	MCU
Element Technology:	Cermet	Cermet
Std. Resistance Range:	100 Ohms to 2M2	10 Ohms to 1M Ohm
Law:	Linear	Linear
Resistance Values:	1,2,2 and 4.7 in each decade	1,2,2 and 4.7 in each decade
Selection Tolerance:	± 10%	± 10%
Rated Dissipation at 70°C:	2W	2W
Limiting Element Voltage:	315 Vdc	315 Vdc
Isolation Voltage:	450 Vdc	450 Vdc
Electrical Rotation:	210°	210°
Terminal Resistance:	< 3 Ohms	< 3 Ohms
Noise (E.N.R.):	3% Max.	3 Ohms or 3%
Insulation Resistance:	> 5 G Ohms	> 1 G Ohms
Voltage Proof:	630 V ac peak	630 V ac peak

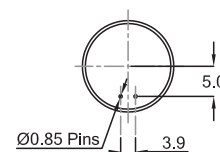
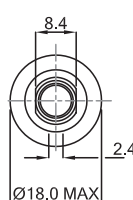
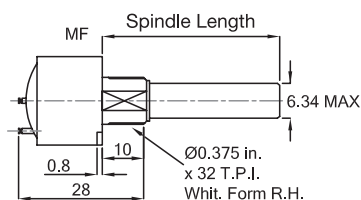
### Mechanical

Starting Torque:	< 85 mNm	< 40 mNm
Mechanical Rotation:	270°	270°
End Stop Torque:	800 mNm	800 mNm

### Environmental

Limits of Resistance Change:	3% (after 1000 hrs)	3% (after 1000 hrs)
Temperature Coefficient:	0.5%	0.75%
Bump Severity:	390 m/s², 4000 bumps	245 m/s², 4000 bumps
Vibration Severity:	10-500 Hz 98 m/s²	10-150 Hz 98 m/s²
Climatic Category:	55/125/56	55/125/21
Mechanical Endurance:	25000 operations Min.	25000 operations Min.
Sealing:	Panel sealed	Fully enclosed

### Dimensions



Type	Standard Spindles		
	Plain	Slotted	Drilled
MC1	25	16, 20, 25	25
MCU	25	16, 20, 25	25

### MC1/MCU Wire Terminations

Standard Spindles	
Slotted	Drilled
1.53 Deep x 1.53 Wide	Hole 3.18, Dia. 5.08 From End of Spindle

### How to Order

MCU	10K	10%	1"	PL
Common Part	Resistance Value	Tolerance	Spindle Length	Spindle Style
MCU - Enclosed MC1 - Sealed Spindle Operated Potentiometer	100R 4K7 220K 220R 10K 470K 470R 22K 1M 1K 47K 2M2 2K2 100K	10% 20%	i.e 16mm 1 1/2"	PL - Plain SL - Slotted FL - Flatted DR - Drilled

Type RW Series

Type RW Series



This high power wire wound potentiometer is a recent addition to the Tyco Electronics Components range. The RW series offers a range of shaft styles, 1 and 3 Watt power ratings, low terminal resistance and excellent linearity. For a rugged high power control potentiometer at a very attractive price - the RW Series will satisfy your requirements.

Key Features

- Wirewound Elements
- Proven Reliability
- Excellent Linearity
- 3W Rating at 40°C in Wirewound
- Robust Construction
- Range of Shaft Styles
- Custom Designs Possible

Characteristics - Electrical

	RW1	RW3
Element Technology:	Wirewound	
Resistance Range:	10R to 100K (Linear)	10R to 25K (Linear)
Resistance Values:	1, 2 & 5 in each decade	
Selection Tolerance:	10% Standard, ± 5% By Request	
Linearity:	2% maximum	
Rated Dissipation at 40°C:	1W	3W
Maximum Working Voltage:	250V DC	500 V DC
Electrical Rotation:	285° nominal	275° nominal
Terminal Resistance:	0.2R or 0.02% whichever is greater	
Noise (E.N.R.):	100R maximum	
Insulation Resistance:	> 5 Gig Ohms	
Voltage Proof:	630V AC peak	

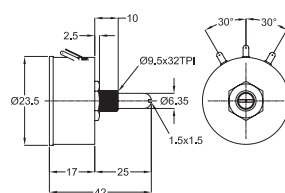
Mechanical

Starting Torque:	<70 mNm	< 85 mNm
Mechanical Rotation:	295° nominal	285° nominal
End Stop Torque:	500 mNm minimum	800 mNm minimum
Standard Shaft Lengths:	25mm - Others By Special Request	

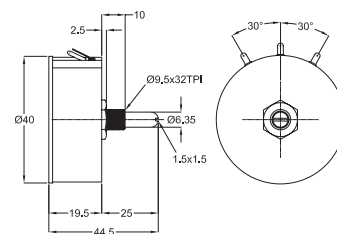
Environmental

Operating Temperature:	-40°C to +70°C
Limits of Resistance Change:	3% (after 1000 hrs)
Temperature Coefficient:	100ppm/°C
Bump Severity:	390 m/s <sup>2</sup> , 4000 bumps
Vibration Severity:	10 - 500 Hz, 98m/s <sup>2</sup>
Climatic Category:	40/070/21
Mechanical Endurance:	2000 operations
Sealing:	Fully enclosed

Dimensions  
RW1



RW3



How to Order

RW	3	102	K	A
Common Part	Power Dissipation	Resistance Value	Tolerance	Shaft Style
RW - Wirewound Potentiometer	1 - 1 Watt at 70°C 3 - 3 Watts at 70°C	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 100R: 101 1K0: 102 10K: 103 100K: 104	J - ±5% (special) K - ±10% (standard)	A - 6.35 x 25mm Plain B - 6.35 x 68mm Full Flat C - 6.35 x 19mm Slotted D - 6.35 x 38mm Slotted E - 6.35 x 16mm Slotted

## Type TW Series



This high power wire wound potentiometer is a recent addition to the Tyco Electronics Components range. The TW series offers 1 Watt power rating, low terminal resistance and excellent linearity. For a rugged high power control potentiometer at a very attractive price the TW Series will satisfy your requirements.

### Key Features

- Wirewound Element
- Proven Reliability
- Excellent Linearity
- 1 W Rating at 40°C
- Robust Construction
- Custom Designs Possible

## Type TW Series

### Characteristics - Electrical

Resistance Range:	5R0 to 20K (Linear)
Resistance Values:	1, 2 and 5 in each decade
Resistance Tolerance:	10%
Linearity:	2% maximum
Rated Dissipation at 40°C:	1 W
Maximum Working Voltage:	200V DC
Electrical Rotation:	265° ±5°
Terminal Resistance:	2 ohms
Maximum Wiper Current:	100mA
Insulation Resistance:	1000M Ohms at 500V DC
Voltage Proof:	1000V AC

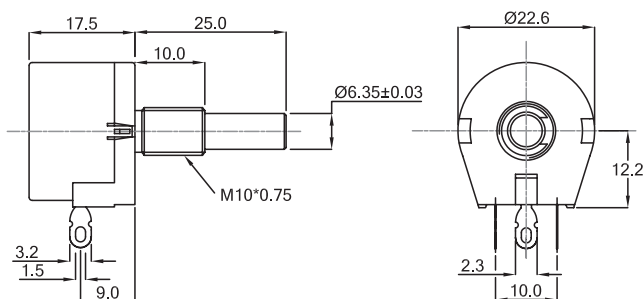
### Mechanical

Shaft Torque:	3.5 - 100 mNm
Mechanical Rotation:	285° ±5°

### Environmental

Operating Temperature:	-55°C to +125°C
Temperature Coefficient:	100ppm/°C
Mechanical Endurance:	10,000 operations
Sealing:	Enclosed

### Dimensions



### How to Order

TW	1	102	K	A
Common Part	Power Dissipation	Resistance Value	Tolerance	Shaft Style
TW - Wirewound Potentiometer	1 - 1 Watt at 40°C	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K0: 102 10K: 103 100K: 104	K - ±10%	A - 6.35 x 25mm Plain



## Type 5930 Series



This precision 10 turn potentiometer has been developed to satisfy a wide range of applications where high resolution and low temperature coefficient and fine linearity are of particular importance. Tyco Electronics Components invite opportunities for custom design of this product where the quantities are suitable. With a power rating of 2W at 70°C and <0.25% linearity this multiturn potentiometer is an important addition to the wide range of professional approved spindle operated potentiometer products on offer from Tyco Electronics Components.

### Key Features

- Less Than 3/4" Required Behind Panel
- High Performance at Low Cost
- Rugged Mechanical Construction
- Sealed Option for Board Washing
- Metal or Plastic Shaft/Bushing
- 3 & 5 Turn Options Available
- 6mm Metric Shaft Version Available

## Panel Potentiometers

### Type 5930 Series

#### Characteristics - Electrical

Resistance Range:	100R - 100K
Resistance Tolerance:	± 5%
Linearity (Independent):	± 0.25%
Effective Electrical Angle:	3600° + 10° - 0°
Absolute Minimum Resistance:	± 1%
Noise:	100 ohms ENR maximum
Power Rating @ 40°C:	2.0 Watts derating to 0 at +125°C
Dielectric Strength:	2000V AC
Insulation Resistance 500V:	1000M minimum

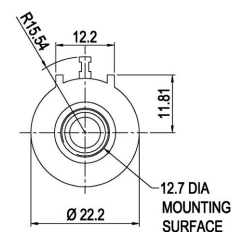
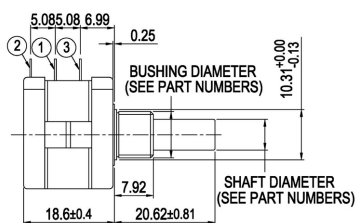
#### Mechanical

Operating Temperature Range:	-55°C to +125°C
Temperature Coefficient:	50ppm/°C maximum
Vibration:	15G
Wiper Bounce:	0.1 milliseconds maximum
Shock:	50G 0.1ms maximum
Load Life MIL - R - 12534:	1000 hours ΔR 2% maximum

#### Environmental

Mechanical Angle:	3600° +15° -0°
Shaft Runout:	0.003" TIR
Lateral Runout:	0.008" TIR
Pilot Diameter Runout:	0.003" TIR
Shaft End Play:	0.010" TIR
Shaft Radial Play:	0.005" TIR
Rotational Life:	1,000,000 revolutions
Stop Strength:	42.0 Ncm minimum
Torque (Starting and Running):	0.56 Ncm maximum unsealed/1.0 Ncm sealed
Weight:	21 grams approximately
Terminals:	Solder Lugs
Mounting Torque:	17 - 20 mNm

#### Dimensions



#### How to Order

5930	S	A	104	J	S
Common Part	No. of Sections	Identifier Ref.	Resistance Value	Tolerance	Shaft Options
5930 - 10 Turn	S - Single Section D - Dual Section	A - Standard F - Sealed X - See Customer Drawing	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 500R: 501 1K: 102 10K: 103 100K: 104	J - 5%	(Dim B x A) R - 1/8" shaft x 17.5mm FMF M - 6mm shaft x 20.6mm FMF S - 1/4" shaft x 20.6mm FMF

## Type 5940 Series



This precision 10 turn potentiometer has been developed to satisfy a wide range of applications where high resolution and low temperature coefficient and fine linearity are of particular importance. Tyco Electronics Components invite opportunities for custom design of this product where the quantities are suitable. With a power rating of 2W at 70°C and <0.25% linearity this multiturn potentiometer is an important addition to the wide range of professional approved spindle operated potentiometer products on offer from Tyco Electronics Components.

### Key Features

- Less Than 19mm Required Behind Panel
- High Performance at Low Cost
- Rugged Mechanical Construction

## Type 5940 Series

### Characteristics - Electrical

Resistance Range:	100R - 100K
Resistance Tolerance:	±5%
Linearity (Independent):	±0.25%
Effective Electrical Angle:	3600°
Absolute Minimum Resistance:	≤2 Ohms or 0.3%
Noise:	200Ω ENR maximum
Power rating @ 70°C:	2.0 Watts derating to 0 at +125°C
Dielectric Strength:	1000V
Insulation resistance 500V:	1000M minimum

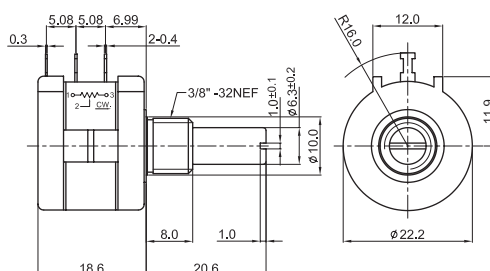
### Mechanical

Mechanical Angle:	3600° +15° -0°
Rotational Life:	10,000 cycles
Stop Strength:	420 mNm minimum
Torque (Starting and Running):	≤25mNm
Weight:	21 grams approximately
Terminals:	Wire Wrap
Mounting Torque:	17 - 20 mNm

### Environmental

Operating Temperature Range:	-55°C to +125°C
Temperature Coefficient of Wire:	100ppm/°C maximum
Shock:	100G 0.1ms max.
Load Life:	1000 hours ΔR 5% maximum

### Dimensions



### How to Order

5940	S	A	102	J	S
Common Part	Sections	Identifier	Resistance Value	Tolerance	Shaft Style
5940 - 10 Turn Wirewound Potentiometer	S - Single Section	A - Standard	The first two digits are significant figures of resistance value and the third denotes the number of zeros following. e.g. 100R: 101 1K0: 102 10K: 103 100K: 104	J - ±5%	S - 6.35mm Shaft x 20.6mm FMF

## Digital and Analogue Counting Dials



Tyco Electronics Components can offer you an excellent range of analogue and digital turns counting dials to complement the popular 5930 and 5940 potentiometer series. The 7/8" series CT56 and CT57 offer up to 15 turns and are excellent low cost models, the CT46 is a well proven 2" diameter 20 turn dial and the new CT27 offers digital readout in a premium package at a surprising attractive price. All dials are supplied with mounting instructions and are of course locking devices to prevent accidental movement. Tyco Electronics Components offers the perfect solution to your pot / dial combination requirements.

### Key Features

- 10, 15 or 20 Turns Available
- Alternative Colours to Suit Stylist
- Very Wide Range
- Analogue and Digital Models
- Reasonable M.O.Q's

## Digital and Analogue Counting Dials

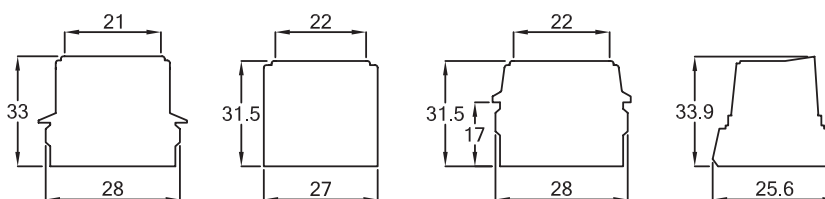
### Characteristics - Digital - Mechanical & Physical

	CT27	CT23	CT26	CT50
Number of turns:	10	10	10	10
Readability over ten turns:	1/5000	1/5000	1/5000	1/5000
Torque with brake engaged:	5 Ncm minimum	5 Ncm minimum	5 Ncm minimum	5 Ncm minimum
Markings:	White on Black	White on Black	White on Black	White on Black
Weight:	21.5 grams	32 grams	32 grams	11 grams

### Digital - Shaft & Bushing Requirements

	CT27	CT23	CT26	CT50
Shaft Extension (mm min./max.)	11.0 / 16.5	11.0 / 16.2	11.0 / 16.2	14.5 / 18.5
Bushing Extension (mm max)	4.1	4.0	4.0	6.7

### Dimensions



Part Number	Mounting	Shaft Ø	Brake
CT-23-6A	Front	6.35mm	Yes
CT-26-6A	Recessed	6.35mm	Yes
CT-50-6AH	Front	6.35mm	Yes
CT-27-1/4"	Recessed	6.35mm	Yes

Digital and Analogue Counting Dials

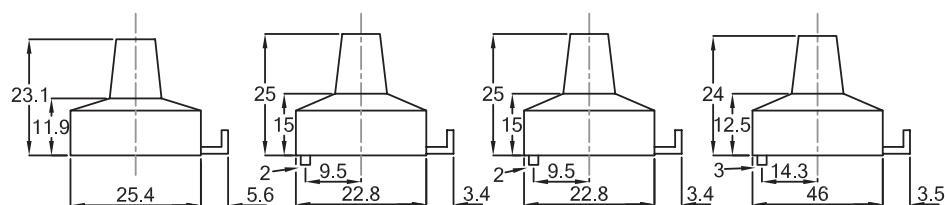
Characteristics -  
Analogue - Mechanical & Physical

	CT49	CT56	CT57	CT46
Number of turns:	30	10	10	10
Dial Diversions (per turn):	100	50	50	100
Readability over ten turns:	1/1000	2/1000	2/1000	1/1000
Torque with brake engaged:	3.5 Ncm minimum	5 Ncm minimum	5 Ncm minimum	5 Ncm minimum
Markings:	White on Black	White on Black	White on Black	Black on Alum.
Weight:	7.0 grams	10 grams	7.0 grams	55 grams

Analogue - Shaft & Bushing Requirements

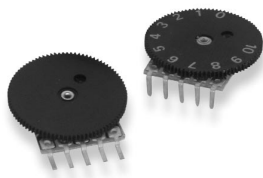
	CT49	CT56	CT57	CT46
Shaft Extension (mm min./max.)	15.8 / 21.2	18.0 / 22.5	17.0 / 22.0	17.5 / 23.5
Bushing Extension (mm max)	9.0	10.0	10.0	10.0

Dimensions



Part Number	Shaft Ø	Brake	Body Finish
CT-49-22	3.12mm	Yes	Clear
CT-49-42	3.12mm	Yes	Black
CT-49-23	6.35mm	Yes	Clear
CT-49-43	6.35mm	Yes	Black
CT-56-6	6.00mm	Yes	Clear
CT-56-1/4"	6.35mm	Yes	Clear
CT-57-60	6.00mm	Yes	Clear
CT-57-6A	6.35mm	Yes	Clear
CT-57-6AN	6.35mm	Yes	Black
CT-57-6AB	6.35mm	Yes	Blue
CT-57-6AR	6.35mm	Yes	Red
CT-57-6AO	6.35mm	Yes	Gold
CT-46-6M	6.00mm	Yes	Clear
CT-46-6A	6.35mm	Yes	Clear

## Type PC510 Series



The PC510 is a new concept in edge operated potentiometers. It is offered in styles compatible with boards which address panels either in right angle or parallel mode. The choice of edgewise is fixed at 14mm diameter, colour black or grey, yet the total profile is less than 2mm! It is offered in non-linear and linear laws with resistance values up to 500K (linear). It is ideally suited to a range of modern hand held portable communications equipments as well as toys, games, small radios and other applications where small size, low profile, low noise and light weight are key requirements.

### Key Features

- Only 2mm Profile
- Non Inductive
- High Reliability
- Small Versatile Size
- Insulation Resistance 100 M Ohms
- Choice of Laws
- Low Noise (3% Max Lin)

## Type PC510 Series

### Characteristics - Electrical

Resistance Range:	1K to 500K (Linear), 5K to 100K (Non Linear) 1, 2, and 5 in each decade
Resistance Tolerance:	± 20%
Rated Dissipation at 20°C:	0.1W
Electrical Rotation:	240°
Noise (ENR):	3% Max.(Linear), 8% Max. (Non Linear)
Insulation Resistance:	100M Ohms Min. 500V dc
Max. Working Voltage:	50Vdc

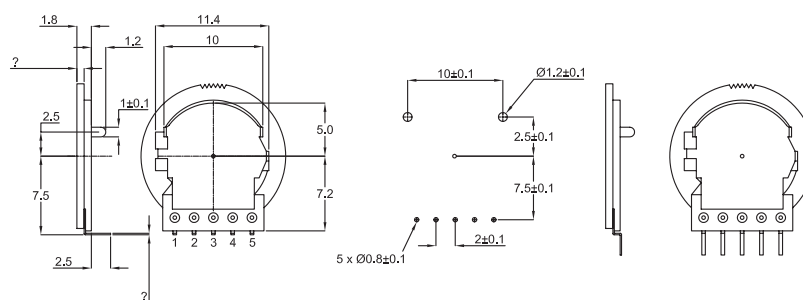
### Mechanical

Mechanical Rotation:	270° ± 5°
Rotational Torque:	1 - 8mNm
End Stop Torque:	70mNm
Wheel Push Strength:	0.3 Kg

### Environmental

Limits of Resistance Change:	15% (after 1000 Hrs. Endurance)
Temperature Coefficient of Resistance (20° to 70°C):	5%
Humidity:	ΔR ± 15% 500 Hrs. 90 - 95% RL, 40°C ± 2°C no load
Humidity Load Life:	ΔR ± 15% 500 Hrs. 90 - 95% RL, 40°C ± 2°C Rated AC Voltage
Load Life:	ΔR ± 15% 50°C Intermittent load of rated AC voltage 500 Hrs.
UL Class:	Wheel 94HB Substrate 94 V - 0
Rotational Life:	10,000 Operations
Climatic Category:	20/40/21
Storage Temperature:	70°C ± 3°C no load 5 Hrs, ΔR ± 13% max.

### Dimensions PC510H



### PC510V

### How to Order

PC510	H	104	M
Common Part	Orientation	Resistance Value	Tolerance
PC510	H - Wheel Parallel to PCB V - Wheel at 90° to PCB	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 1K: 102 5K: 502 100K: 104	M ±20%

## Type PC908 Series



Where edgewheel operation, high current handling and longlife are required specify the Tyco Electronics Components PC908 Series. Its cermet element ensures stability and high performance. This potentiometer is ideal for use in many industrial and professional equipment applications. It is widely used in business machines, visual display units, medical and telecommunication equipment.

### Key Features

- Stable High Resolution Cermet Element
- Easy to Adjust
- Convenient Size
- Proven Reliability
- Up to 1 Watt Power Rating at 40°C
- Log and Linear Laws Available
- Resistant to Most PCB Washing Solvents
- Custom Design Edgewheels Available

## Type PC908 Series

### Characteristics - Electrical

Std. Resistant range and Laws:	47 Ohms to 2M2 (Linear) 1 K Ohm to 1M Ohm (Non Linear)
Resistance Values:	1, 2, .2 and 4.7 in each decade
Selection Tolerance:	± 20% (± 10% to order)
Rated Dissipation at 40°C:	1 W (Linear); 0.5 W (Log)
Limiting Element Voltage:	315 V DC or AC
Electrical Rotation:	240°
Rotational Noise (CVR):	< 5%

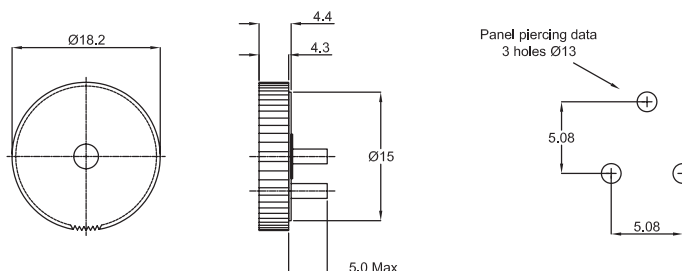
### Mechanical

Starting Torque:	30 mNm, maximum
End Stop Torque:	90 mNm, minimum
Mechanical Rotation:	270°
Weight:	2.02 gms, maximum

### Environmental

Limits of Resistance Change:	5% (after 1000 hour.endurance)
Temperature Characteristics of Resistance (20°C to 70°C):	0.75%
Climatic Category:	40/100/04
Mechanical Endurance:	10,000 Operations, minimum

### Dimensions



### How to Order

Type	Resistance Value & Tolerance	Law
PC908	1K ±10% We will advise a Tyco Electronics Part Number against this description	Linear Log

Type WA Series

Type WA Series



A family of high reliability Slide Potentiometers having a range of metal or insulated levers offered in dual output style. The WA Series utilises the very latest inset moulding technology to produce a slider with excellent "feel" and range of throw and body lengths with linear or non-linear outputs.

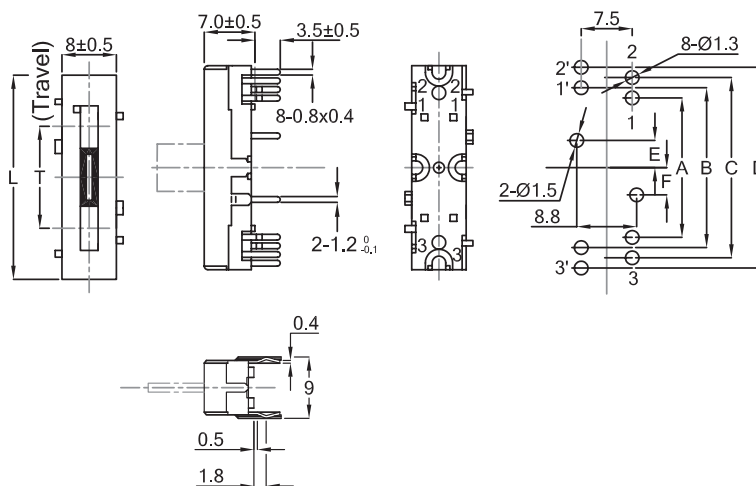
Key Features

- Latest Inset Moulded Technology
- Linear or Non-Linear Outputs
- 15mm to 60mm Throws
- Consistent Smooth Feel
- Plastic or Metal Lever
- Suitable for Wave Solder
- Earth Screen Plate
- Available via Distribution

Characteristics - Electrical

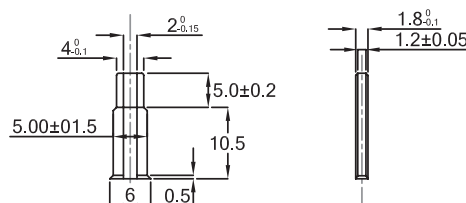
Resistance Range:	10K to 100K
Resistance Tolerance:	± 20%
Output Law:	Linear & Logarithmic
Voltage Rating:	$E = \sqrt{P \times R}$
Electrical Life:	15,000 cycles
Insulation Resistance:	10 M minimum @ 250V DC
Dielectric Withstand Voltage:	300V AC

Dimensions

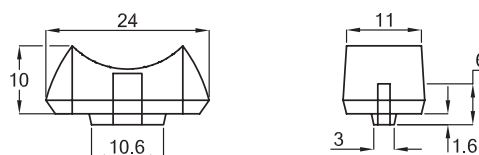


Travel (T)	A	B	C	D	E	F	L
15mm	19.0	22.0	25.0	28.0	4.0	4.0	30.0
20mm	24.0	27.0	30.0	33.0	0.0	2.0	35.0
30mm	34.0	37.0	40.0	43.0	0.0	5.0	45.0
45mm	49.0	52.0	55.0	58.0	0.0	5.0	60.0
60mm	64.0	67.0	70.0	73.0	6.0	11.00	75.0

Lever Style

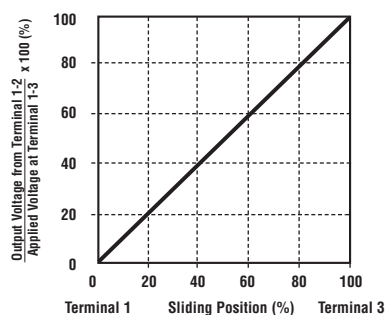


Slider Knob Dimensions

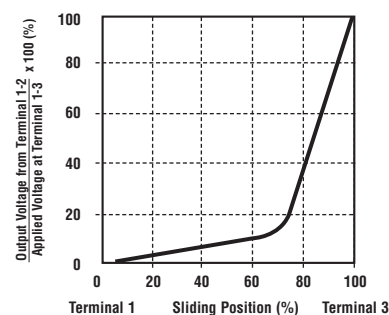


Type WA Series

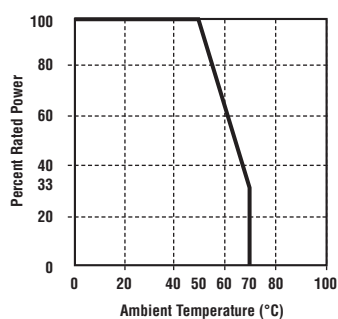
Output Law -  
Linear (B)



Logarithmic (D)



Power Derating



Travel (T)	Power @ 50°C		Max. Operating Voltage	
	Lin	Log	Lin	Log
15mm	0.03W	0.02W	75V	75V
20mm	0.04W	0.02W	150V	150V
30mm	0.06W	0.03W	150V	150V
45mm	0.10W	0.05W	200V	150V
60mm	0.12W	0.06W	200V	200V

Preferred Styles / Values

Travel	Values	Available Law
15mm	10K, 100K	Linear
45mm	10K, 50K, 100K	Linear / Log
60mm	10K, 50K, 100K	Linear / Log

How to Order

WAKA2			B	104	C15
Common Part			Output Law	Resistance Value	Lever
Dual	No Detent	Detent	B - Linear  D - log.	The first two digits are significant figures of resistance value and the third denotes the number of zeros following.  e.g. 10K: 103 20K: 203 100K: 104	C15
15mm	WAKA2	WAKA0			
20mm	WAMA2	WAMA0			
30mm	WANA5	WANA0			
45mm	WAPA5	WAPA0			
60mm	WAQA2	WAQA0			



## High Power Resistors

### Type BFA Series

#### Type BFA Series



These variable rheostats are produced using constantan (CuNi44) wire, wound onto ceramic formers, with insulated wire to give mechanical stability and good heat dissipation.

A leaf spring type wiper, with a ceramic handle is used to vary the resistance.

The resistors are protected with a perforated, pressed steel cover and three laboratory terminals are provided so that the unit can be used as a series resistor or potential divider.

These are ideal to provide variable current outputs in all laboratory environments.

#### Key Features

- Power Dissipation up to 10 Amps
- Tough Steel Box Construction
- 3 Terminals For Divider Use
- 10 Times Power - Short Time
- Operate up to 400°C
- Custom Designs Welcome

#### Characteristics - Electrical

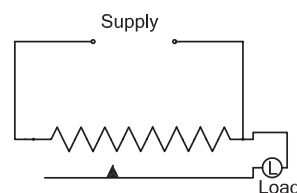
<b>Maximum Current (Amps):</b>	10	5	4	2	1
<b>Resistance (Ohms):</b>	5.6	22	33	120	560
<b>Maximum Continuous Power (Watts):</b>	811	760	675	580	521
<b>Element Size (mm):</b>	400 x 60	400 x 60	400 x 60	400 x 60	400 x 40
<b>Weight (Kg):</b>	2.6	2.6	2.6	2.6	1.7

Resistor Tolerance: -10%  
Resistor Values: Conforms to IEC Series E12

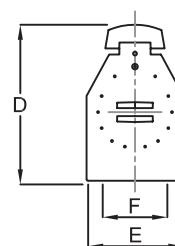
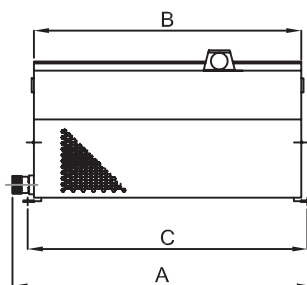
#### Connection Details Single Tube, Series Connected



#### Single Tube, Potentiometer Connected



#### Dimensions



Current Rating	A	B	C	D	E	F
10	450	405	420	153	94	63
5	450	405	420	153	94	63
4	450	405	420	153	94	63
2	450	405	420	153	94	63
1	450	405	420	132	68	47

#### How to Order

Type	Current Rating	Resistance Value
BFA - High Power Resistors	See Table	See Table