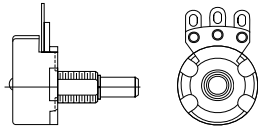


# Single Turn Rotary Wirewound Potentiometers

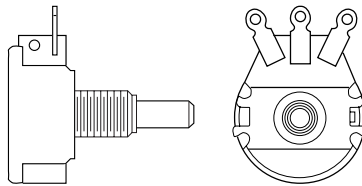
## Commercial & Suggested Mil-R19 Replacements



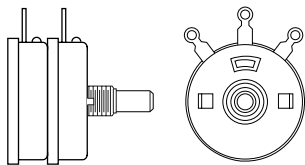
### COMMERCIAL STYLES



**QC & QCC Series** .766" Diameter, 5-Watts . . . . . **pg. 3**  
Suggested replacement for Honeywell 49-Series

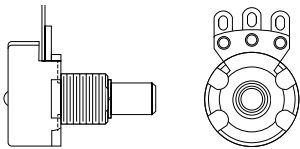


**QD & QDD Series**  
1.328" Diameter, 3 watts, Single or Dual Module . . . . . **pg. 6**  
Suggested replacement for Honeywell 43-Series

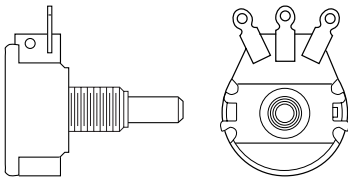


**QE & QEE Series**  
1 9/16" Diameter, 4 watts, Single or Dual Module . . . . . **pg. 9**  
Suggested replacement for Honeywell 58-Series

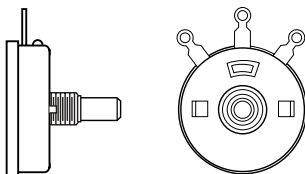
### MIL-R19 SUGGESTED REPLACEMENT STYLE



**QC10 Series**  
.766" Diameter, 5-Watts . . . . . **pg. 12**  
(Suggested replacement for Mil RA10 Style)



**QD20 Series**  
1.328" Diameter, 3 watts  
(Suggested replacement for Mil RA20 Style) . . . . . **pg. 15**



**QE30 Series**  
1 9/16" Diameter, 4 watts  
(Suggested replacement for Mil RA30 Style) . . . . . **pg. 18**

For more information about these products,  
visit our website at <http://www.potentiometers.com>

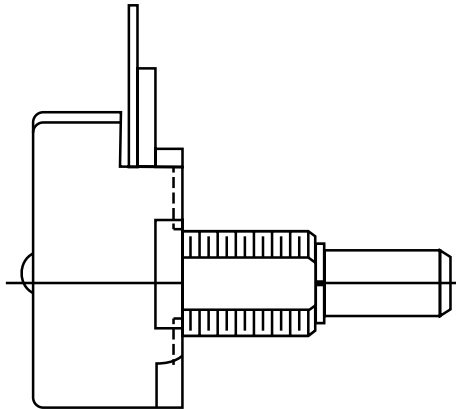


**GLOSSARY OF TERMS ..... pg. 21**

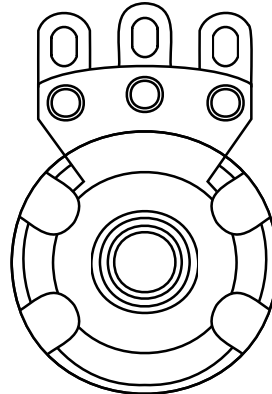
**GENERAL TERMS AND CONDITIONS ..... pg. 24**

**DISCLAIMERS..... pg. 25**

**QC Series**  
**Single Turn Rotary Wirewound Potentiometers**  
**.766" Diameter**



- 5 watts @ 35°C power rating
- 1/4" Diameter Bushing
- 1/8" Diameter Shaft



For more information about the  
**QC & QCC Series**  
**Wirewound Potentiometers,**  
visit our website at:  
<http://www.potentiometers.com>

### Electrical and Mechanical Specifications

**Power Rating:** 5 watts @ 35°C  
(Control mounted on steel panel 4"x4"x.060")

**Resistance Range:**  
Linear: 1 ohm thru 25 K ohms  
Audio: 5 ohms thru 10 K ohms

**Resistance Tolerance:**  
±10% Standard,  
±5% Special Order

**Resistance Taper:** Linear, Audio

**Voltage Ratings:**  
900 VAC terminals to mounting plate  
(High Pot Test for 1 minute) .

**Insulation Resistance:**  
1000 megohms minimum  
(50% relative humidity at 25°C)

**Operating Temperature:** -30°C to + 105°C

**Operating Life:** 10,000 cycles

**Mechanical Rotation:** 305° ± 5°

**Body materials**

Body metal parts are Steel / Zinc Dichromate.  
Body front is molded without openings.

**Shaft:** 1/8" Diameter

**Shaft Styles:**

Slotted, Flatted, Knurled - see Shaft Section

**Bushing:**

Thread: 1/4 - 32 MEF-2A  
Length: 3/8" or 1/4" FMS  
Round or Double Flat

**Terminals:** Solder Lug

**Locating Lug:** Single (optional)

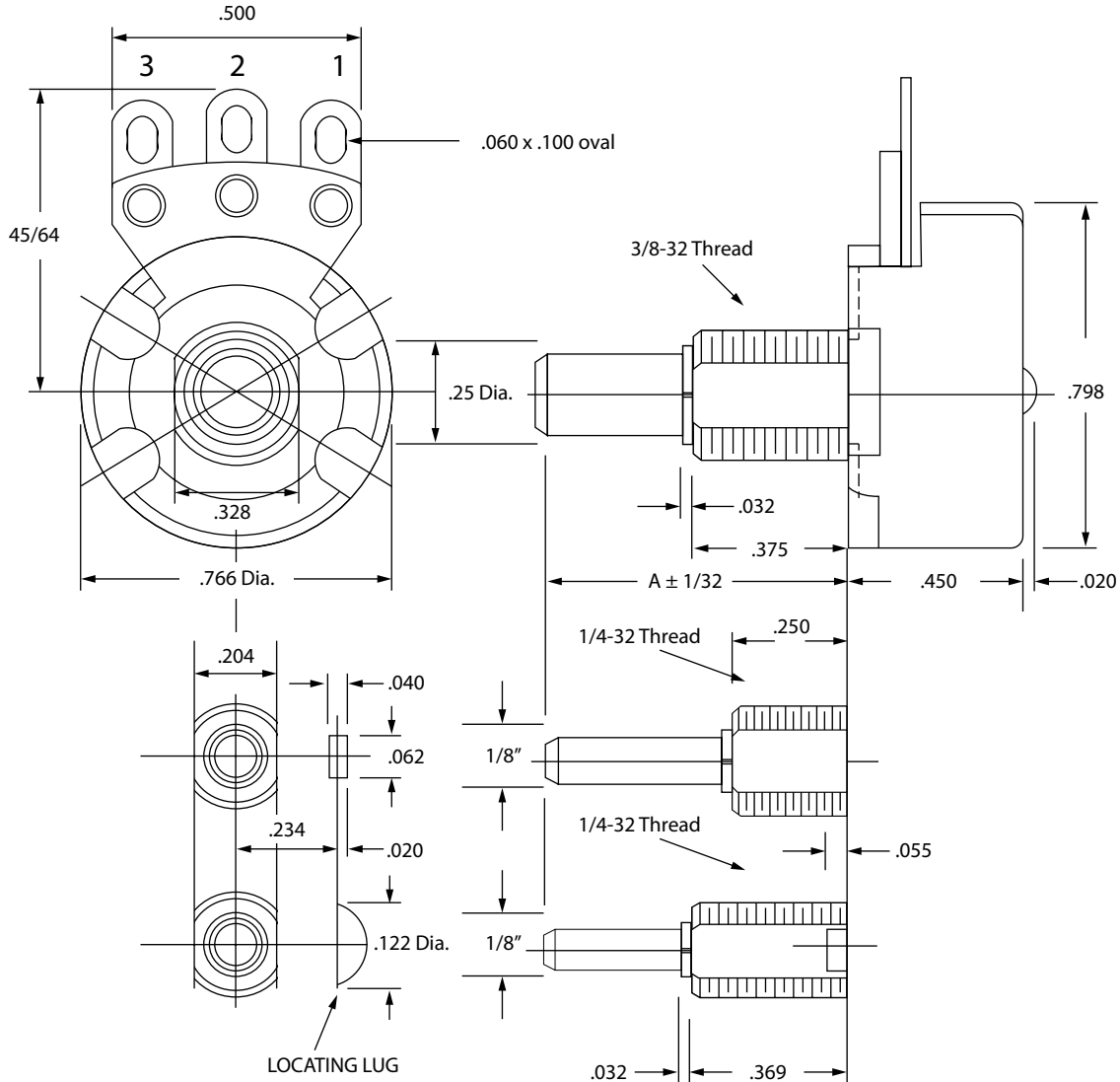
**Optional:** Shaft or Panel Seal

# QC Series Wirewound Potentiometers

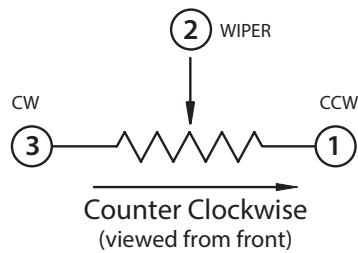


## Outline and Mounting Dimensions

1/8" Diameter Shaft, 1/4" Diameter Bushing



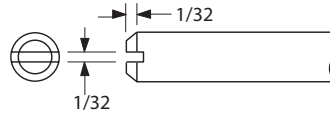
### Circuit Diagram



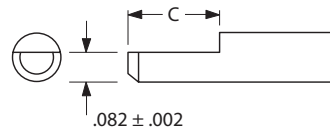
# QC & QCC Series Wirewound Potentiometers



## Available Shaft Styles



Style 2  
Screwdriver Slot - .125 Diameter



Style 5  
Flatted - .125 Diameter

## Ordering Information (Commercial)

Example Part Number: **QC-1-1-056-101-J-A**

QC	1	1	056	101	J	A
<b>Model</b> QC=Single Module QCL = Locking Bushing (Type 3) QCS = Shaft & Panel Seal QCT = Locking Shaft/ Panel Seal (Type 3)	<b>Bushing Length:</b> 1 = .375" 2 = .250" 3 = .500"	<b>Shaft Type:</b> 1 = Slotted 2 = Knurled 3 = Flatted	<b>Shaft Length:</b> 032 = 1/2" 040 = 5/8" 056 = 7/8" 100 = 1" 200 = 2"	<b>Resistance:</b> 1A0 = 1 ohm 5A0 = 5 ohms 200 = 20 ohms 250 = 25 ohms 101 = 100 ohms 102 = 1K ohms 252 = 2.5K ohms 502 = 5K ohms 253 = 25K ohms <small>Partial list - Use Std Mill-Code for other Values</small>	<b>Resistance Tolerance:</b> K = ±10% (standard) J = ±5% X = Special	<b>Resistance Taper:</b> A = Linear (Formerly -1) C = Log Taper E = Reverse Log X = Special

All models:  
1/4" Bushing Dia.  
1/8" Shaft Dia.

Resistance codes for multiple sections are formatted as follows:  
If resistance and taper is the same for all sections: Resistance Code followed by the letter "X" then the number of sections.

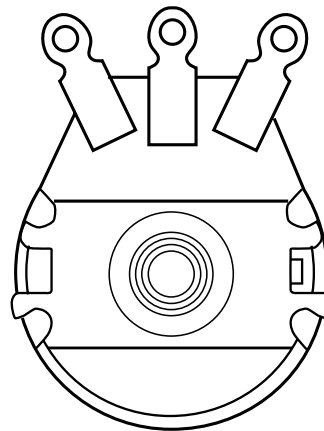
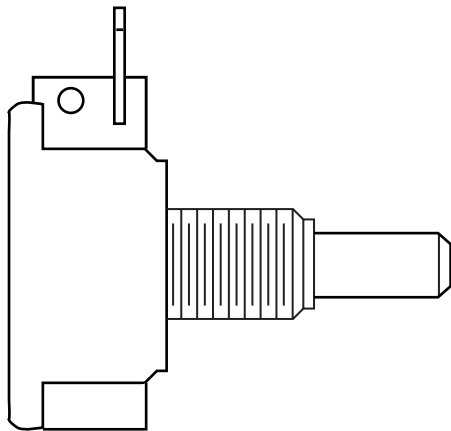
Example:  
QC-1-1-100-103-J-A  
10K linear

Contact Sales for correct format for other combinations

Part number shown above is for specifying purposes only. A unique part number will be assigned once the design has been finalized and approved by customer.

For more information about this product, visit our website at:  
<http://www.potentiometers.com>

**QD & QDD Series**  
**Single Turn Rotary Wirewound Potentiometers**  
**1.328" Diameter**



- 3 watts @ 40°C power rating
  - Single or Dual Potentiometer
  - 3/8" Diameter Bushing
  - 1/4" or 1/8" Diameter Shaft
- Options:**
- Concentric Shaft for Dual Potentiometer
  - Rotary Power Switch

For more information about the  
**QD & QDD Series**  
**Wirewound Potentiometers**,  
visit our website at:  
<http://www.potentiometers.com>

### Electrical and Mechanical Specifications

**Power Rating:** 3 watts @ 40°C  
(Control mounted on steel panel 4"x4"x.060")

**Resistance Range:**  
Linear: .5 ohm thru 100 K ohms  
Audio: 5 ohms thru 20 K ohms

**Resistance Tolerance:**  
±10% Standard,  
±5% Special Order

**Resistance Taper:** Linear, Audio, Special

**Voltage Ratings:**  
900 VAC terminals to mounting plate  
(High Pot Test for 1 minute) .

**Insulation Resistance:**  
1000 megohms minimum  
(50% relative humidity at 25°C)

**Operating Temperature:** -55°C to + 105°C

**Operating Life:** 10,000 cycles

**Mechanical Rotation:** 297° ± 5°

**Body materials**  
Body metal parts are Steel / Zinc Dichromate.  
Body front is molded without openings.

**Shaft:** 1/4" or 1/8" Diameter

**Shaft Styles:**  
Slotted, Flatted, Knurled - see Shaft Section

**Bushing:**  
Thread: 3/8 - 32 MEF-2A  
Length: 3/8" or 1/4" FMS

**Concentric Shaft Option:**  
Outer Shaft: .265" Diameter  
Inner Shaft: .187" Diameter

**Terminals:** Solder Lug

**Locating Lug:** Single

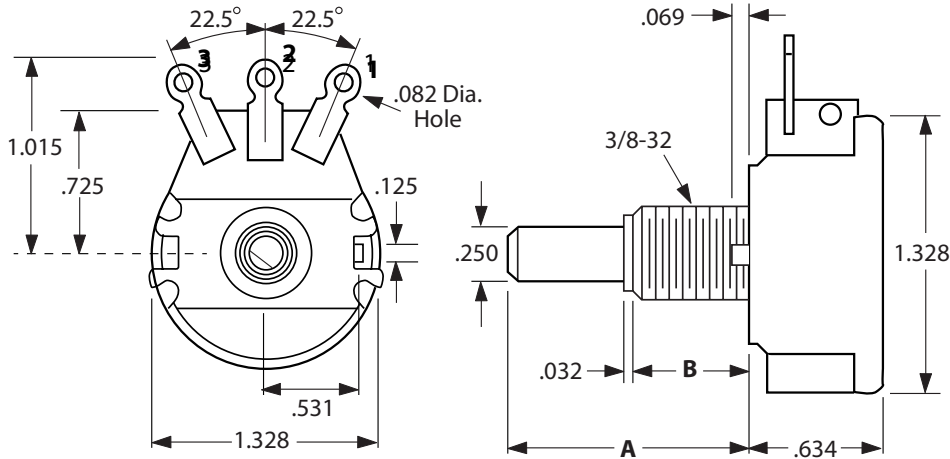
**Optional Switch:** Rotary SPST, SPDT, or DPST

**Optional:** Shaft or Panel Seal

# QD & QDD Series Wirewound Potentiometers

## Outline and Mounting Dimensions

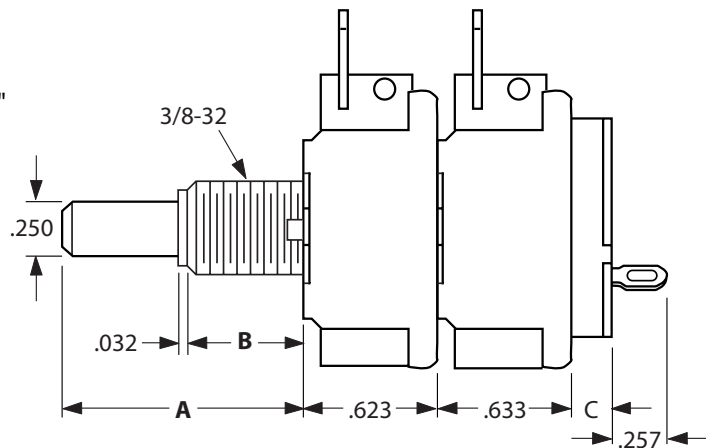
1/4" Diameter Shaft, 3/8" Diameter Bushing



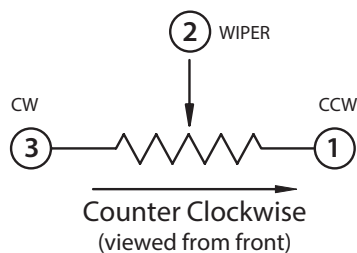
**Note:** The flat on a flatted shaft is always opposite terminal 1 when the shaft is fully rotated CCW

### Dimensions:

- A** = Shaft Length  $\pm .031$
- B** = Bushing Length: .375" or .250"
- C** = .280 (Rotary Switch)

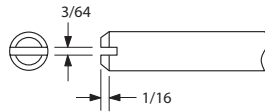


### Circuit Diagram

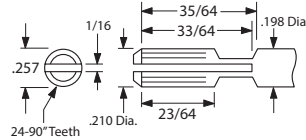


# QD & QDD Series Wirewound Potentiometers

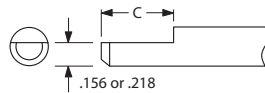
## Available Shaft Styles



Style 1  
Screwdriver Slot - .250 Diameter



Style 3  
E.I.A. Knurl - .250 Diameter



Style 4  
Flatted - .250 Diameter

## Ordering Information (Commercial)

Example Part Number: **QD-1-1-056-101-J-A-OAC-1**

<b>QD</b>	<b>1</b>	<b>1</b>	<b>056</b>	<b>101</b>	<b>J</b>	<b>A</b>	<b>OAC-1</b>
<b>Model</b> QD=Single Module QDD=Dual Module QDL = Locking Bushing (Type 3) QDS = Shaft & Panel Seal QDT = Locking Shaft/ Panel Seal (Type 3) All models: 3/8" Bushing Dia. 1/4" Shaft Dia.	<b>Bushing Length:</b> 1 = .375" 2 = .250" 3 = .500"	<b>Shaft Type:</b> 1 = Slotted 2 = Knurled 3 = Flatted	<b>Shaft Length:</b> 032 = 1/2" 040 = 5/8" 056 = 7/8" 100 = 1" 200 = 2"	<b>Resistance:</b> 1A0 = 1 ohm 5A0 = 5 ohms 200 = 20 ohms 250 = 25 ohms 101 = 100 ohms 102 = 1K ohms 252 = 2.5K ohms 502 = 5K ohms 253 = 25K ohms Partial list - Use Std Mil-Code for other Values	<b>Resistance Tolerance:</b> K = ±10% (standard) J = ±5% X = Special	<b>Resistance Taper:</b> A = Linear (Formerly -1) C = Log Taper E = Reverse Log X = Special	

Resistance codes for multiple sections are formatted as follows:  
If resistance and taper is the same for all sections: Resistance Code followed by the letter "X" then the number of sections.

Example:  
QD-1-1-100-103X3-J-A-OAC-1  
3 sections, all 10K linear

Contact Sales for correct format for other combinations

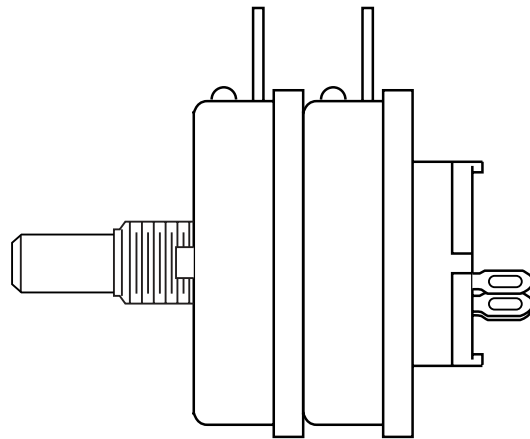
Switch Option	Switch Action	Switch Type	Switch Rating
Blank	No Switch		
OAC-1	Rotary	SPST	6A 125VAC 3A 125VDC
OAC-2	Rotary	DPST	6A 125VAC 2A 125VDC
OAC-3	Rotary	SPDT	3A 125VAC

Part number shown above is for specifying purposes only. A unique part number will be assigned once the design has been finalized and approved by customer.

For more information about this product, visit our website at:  
<http://www.potentiometers.com>



# QE & QEE Series Single Turn Rotary Wirewound Potentiometers 1 9/16" Diameter



- 4 watts @ 40°C power rating
- 3/8" Diameter Bushing;
- 1/4" or 1/8" Diameter Shaft
- Single or Dual Potentiometer

**Optional:**

- Concentric Shaft for Dual Potentiometer
- Rotary Power Switch

For more information about  
**QE & QEE Series Wirewound Potentiometers,**  
visit our website at:  
<http://www.potentiometers.com>

## Electrical and Mechanical Specifications

**Power Rating:** 4 watts@ 40°C  
(Control mounted on steel panel 4"x4"x.060")

**Resistance Range:**  
.5 ohm thru 100 K ohms, linear  
5 ohms thru 20 K ohms, audio

**Resistance Tolerance:**  
±10% Standard, ±5% special

**Resistance Taper:** Linear, Audio, Special

**Voltage Ratings:**  
900 VAC terminals to mounting plate  
(High Pot Test for 1 minute) .

**Insulation Resistance:**  
1000 megohms minimum  
(50% relative humidity at 25°C)

**Operating Temperature:** -55°C to + 105°C

**Operating Life:** 10,000 cycles

**Mechanical Rotation:** 300° ± 5°

**Body materials:**  
Body metal parts are Steel / Zinc Dichromate.  
Body front is molded without openings.

**Shaft Styles:**  
Slotted, Flatted, Knurled - see Shaft Section

**Concentric Shaft Option for QEE Series:**  
Outer Shaft: .265" Diameter  
Inner Shaft: .187" Diameter

**Bushing:**  
Thread: 3/8 - 32 MEF-2A  
Length: 3/8" or 1/4" FMS

**Terminals:** Solder Lug

**Locating Lug:** Single

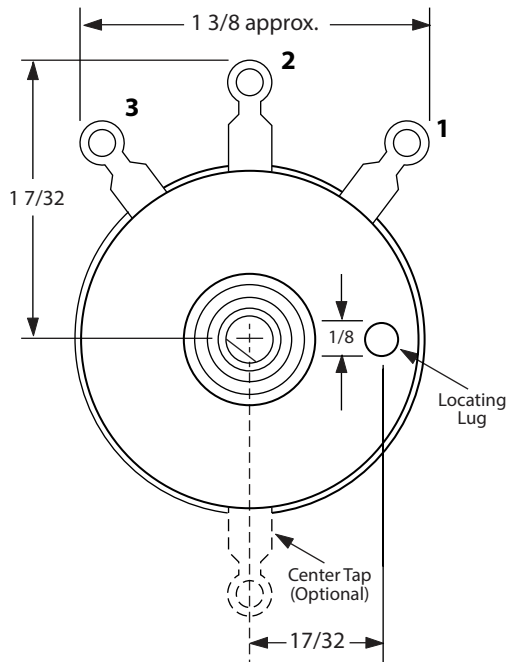
**Optional Switch:** Rotary SPST, SPDT, or DPST

**Optional Features:**  
Shaft or panel seal  
High torque construction  
Multi-gang tandem construction

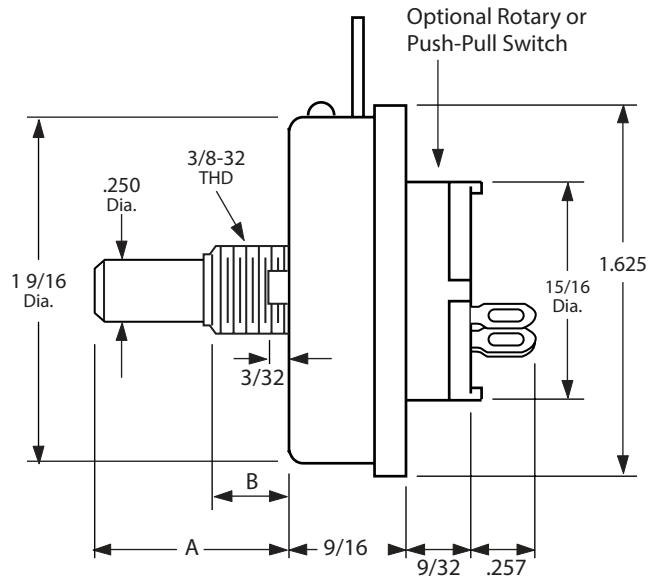
# QE & QEE Series Wirewound Potentiometers

## Outline and Mounting Dimensions

1/4" Diameter Shaft, 3/8" Diameter Bushing

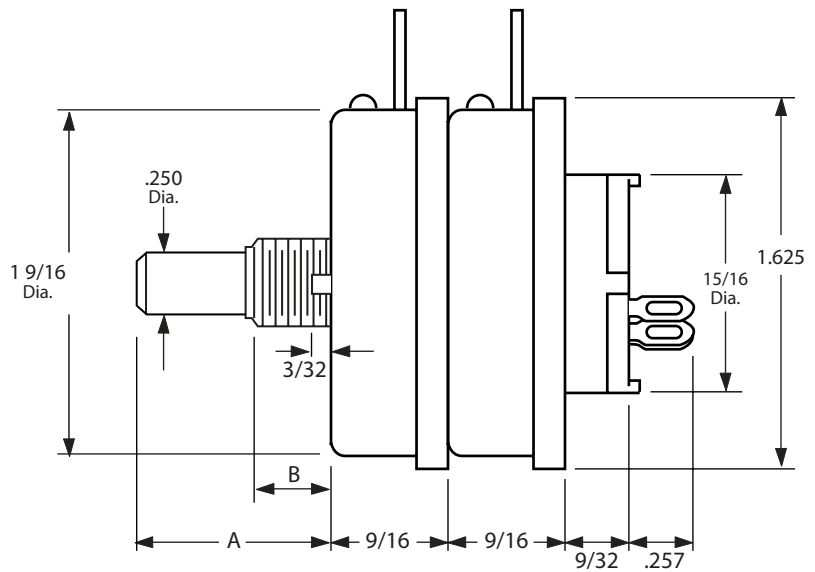
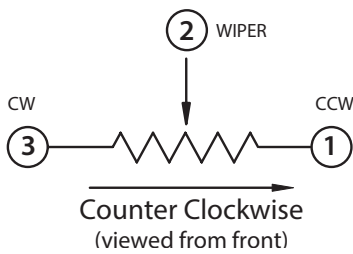


**Note:** The flat on a flattened shaft is always opposite terminal 1 when the shaft is fully rotated CCW



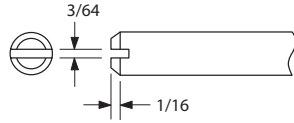
**Dimensions:**  
 A = Shaft Length ±.031  
 B = Bushing Length

### Circuit Diagram

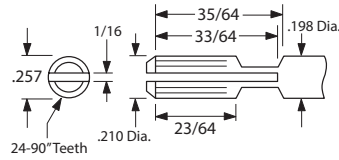


# QE Series Wirewound Potentiometers

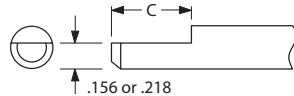
## Available Shaft Styles



Style 1  
Screwdriver Slot - .250 Diameter



Style 3  
E.I.A. Knurl - .250 Diameter



## Ordering Information

Example Part Number: **QE-1-1-056-101-J-1-OAC-1**

<b>QE</b>	<b>1</b>	<b>1</b>	<b>056</b>	<b>101</b>	<b>J</b>	<b>1</b>	<b>OAC-1</b>
<b>Model</b>	<b>Bushing Length:</b>	<b>Shaft Type:</b>	<b>Shaft Length:</b>	<b>Resistance :</b>	<b>Resistance Tolerance:</b>	<b>Resistance Taper:</b>	
QE=Single Module	1 = .375"	1 = Slotted	032 = 1/2"	1A0 = 1 ohm	K = ±10%	A = Linear (Formerly 1)	
QEE=Dual Module	2 = .250"	2 = Knurled	040 = 5/8"	5A0 = 5 ohms	J = 5%	C = Log	
QEL = Locking Bushing (Type 3)	3 = .500"	3 = Flatted	056 = 7/8"	200 = 20 ohms	X = Special	E = Reverse Log	
QES = Shaft & Panel Seal			100 = 1"	250 = 25 ohms		X = Special	
QET = Locking Shaft/ Panel Seal (Type 3)			200 = 2"	101 = 100 ohms			
				102 = 1K ohms			
				252 = 2.5K ohms			
				502 = 5K ohms			
				253 = 25K ohms			
				104 = 100K ohms			
				Partial list - Use Std Mil Code for other Values			

Switch Option	Switch Action	Switch Type	Switch Rating
Blank	No Switch		
OAC-1	Rotary	SPST	6A 125VAC 3A 125VDC
OAC-2	Rotary	DPST	6A 125VAC 2A 125VDC
OAC-3	Rotary	SPDT	3A 125VAC

Resistance codes for multiple sections are formatted as follows:

If resistance and taper is the same for all sections: Resistance Code followed by the letter "X" then the number of sections.

Example:

QE-1-1-100-103X3-J-A-OAC-1  
3 sections, all 10K linear

Part number shown above is for specifying purposes only.

A unique part number will be assigned once the design has been finalized and approved by customer.

Contact Sales for correct format for other combinations

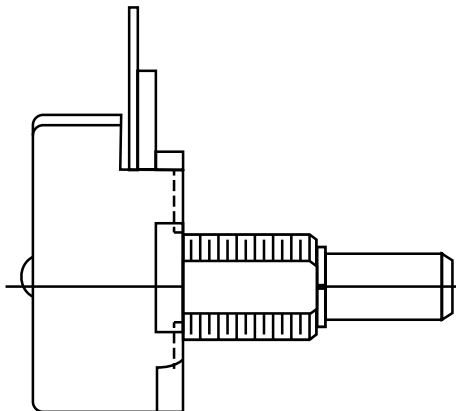
For more information about Wirewound Controls, visit our website at:

<http://www.potentiometers.com>

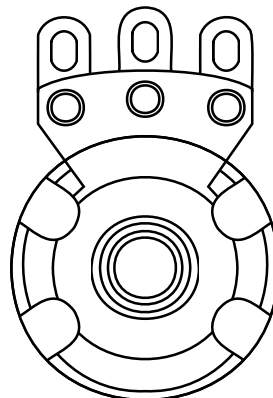
## QC10 Series

### Single Turn Rotary Wirewound Potentiometers .766" Diameter

#### Suggested Replacement for Mil-R-19 RA10 Style



- 5 watts @ 35°C power rating
- 1/4" Diameter Bushing
- 1/8" Diameter Shaft



For more information about the  
**QC10Series**  
**Wirewound Potentiometers**,  
visit our website at:

<http://www.potentiometers.com>

## Electrical and Mechanical Specifications

**Power Rating:** 5 watts @ 35°C  
(Control mounted on steel panel 4"x4"x.060")

**Resistance Range:**  
Linear: 1 ohm thru 25 K ohms  
Audio: 5 ohms thru 10 K ohms

**Resistance Tolerance:**  
±10% Standard,  
±5% Special Order

**Resistance Taper:** Linear, Audio

**Voltage Ratings:**  
900 VAC terminals to mounting plate  
(High Pot Test for 1 minute).

**Insulation Resistance:**  
1000 megohms minimum  
(50% relative humidity at 25°C)

**Operating Temperature:** -30°C to + 105°C

**Operating Life:** 10,000 cycles

**Mechanical Rotation:** 305° ± 5°

**Body materials**  
Body metal parts are Steel / Zinc Dichromate.  
Body front is molded without openings.

**Shaft:** 1/8" Diameter

**Shaft Styles:**  
Slotted, Flatted, Knurled - see Shaft Section

**Bushing:**  
Thread: 1/4 - 32 MEF-2A  
Length: 3/8" or 1/4" FMS  
Round or Double Flat

**Terminals:** Solder Lug

**Locating Lug:** Single (optional)

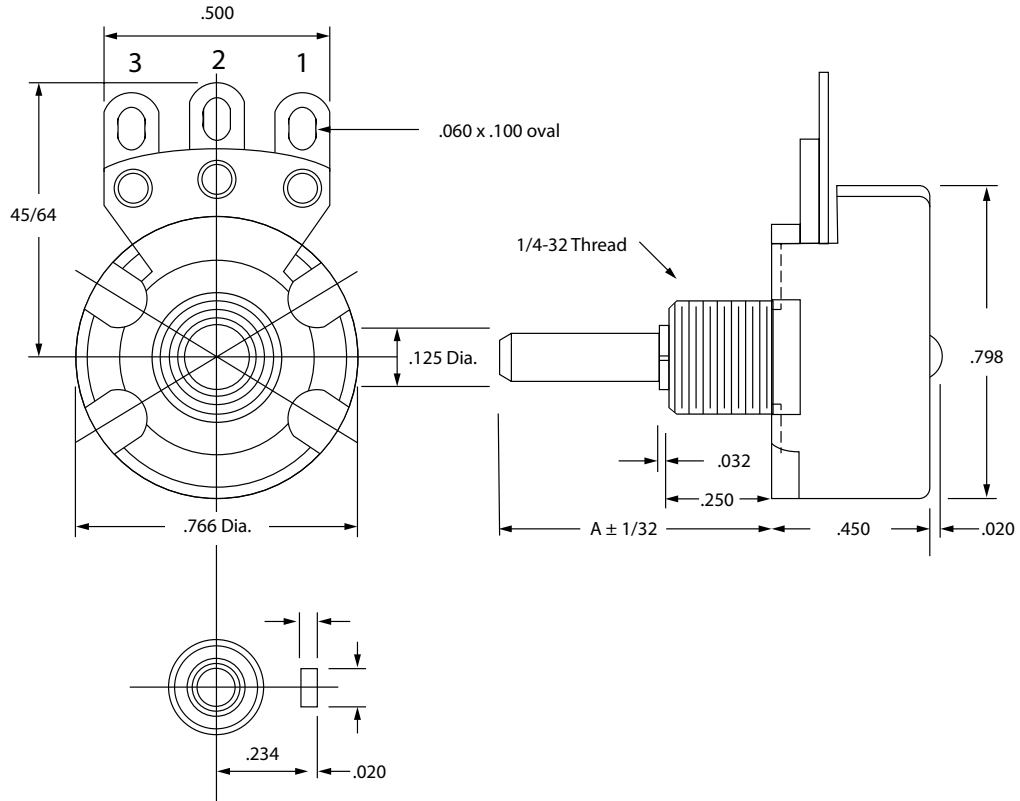
**Optional:** Shaft or Panel Seal

# QC10 Series Wirewound Potentiometers

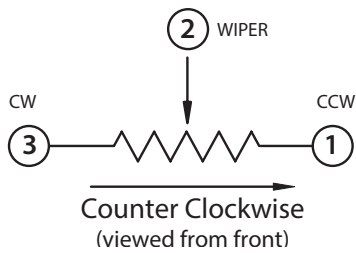


## Outline and Mounting Dimensions

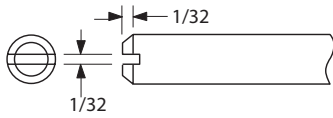
1/8" Diameter Shaft, 1/4" Diameter Bushing



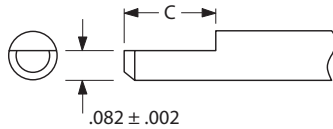
### Circuit Diagram



# QC10 Series Wirewound Potentiometers



Style 2  
Screwdriver Slot - .125 Diameter



Style 5  
Flatted - .125 Diameter

## Ordering Information (Suggested Mil R-19 Replacement for RA10 Style)

Example Part Number: **QC10NASD103A**

<b>QC10</b>	<b>N</b>	<b>A</b>	<b>S</b>	<b>D</b>	<b>101</b>	<b>A</b>														
<p><b>Model</b>  <b>QC10=Single Module</b>                  All models:                  1/4" Bushing Dia.                  1/8" Shaft Dia.</p> <p><b>Bushing Length:</b>                  Standard N = .250"                  Locking L = .375"</p>		<p><b>SwitchType:</b>                  A = None                  Not Offered</p>	<p><b>Shaft Style:</b>                  S = Slotted</p>		<p><b>Resistance:</b>                  150 = 15 ohm                  250 = 25 ohms                  500 = 50 ohms                  750 = 75 ohms                  101 = 100 ohms                  201 = 200 ohms                  251 = 250 ohms                  351 = 350 ohms                  501 = 500 ohms                  751 = 750 ohms                  102 = 1,000 ohms                  152 = 1,500 ohms                  202 = 2,000 ohms                  252 = 2,500 ohms</p>	<p><b>Resistance Taper:</b>                  A = Linear</p>														
		<table border="1" style="margin: auto;"> <thead> <tr> <th rowspan="2">Symbol</th> <th colspan="2">Length of shaft from mounting surface (FMS)</th> </tr> <tr> <th>Bushings N</th> <th>Bushings L</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>5/16" - 0.3125"</td> <td>-</td> </tr> <tr> <td>M</td> <td>-</td> <td>7/16" - 0.4375</td> </tr> <tr> <td>D</td> <td>7/8" - 0.875</td> <td>7/8" - 0.875</td> </tr> </tbody> </table>		Symbol	Length of shaft from mounting surface (FMS)		Bushings N	Bushings L	L	5/16" - 0.3125"	-	M	-	7/16" - 0.4375	D	7/8" - 0.875	7/8" - 0.875			
Symbol	Length of shaft from mounting surface (FMS)																			
	Bushings N	Bushings L																		
L	5/16" - 0.3125"	-																		
M	-	7/16" - 0.4375																		
D	7/8" - 0.875	7/8" - 0.875																		

Partial list - Use Std Mil-Code for other Values

Example:

SC10NASD103A

10K LINEAR TAPER, SLOTTED 7/8" SHAFT.

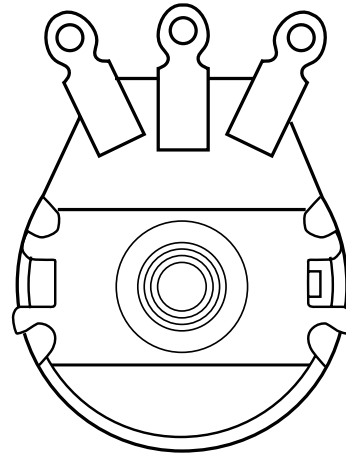
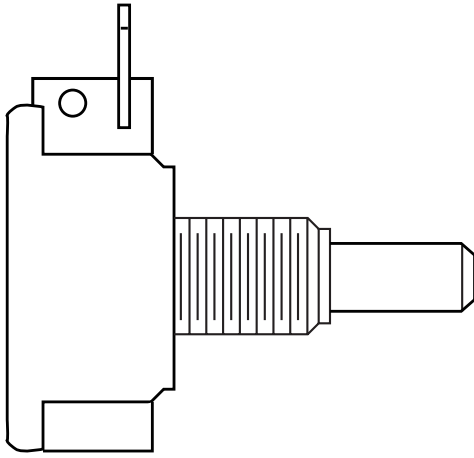
Contact Sales for correct format for other combinations

Hint: If the RA10 part number is known, simply substitute "QC10" for "RA10"

## QD20 Series

### Single Turn Rotary Wirewound Potentiometers 1.328" Dia.

#### Suggested Replacement for Mil-R-19 RA20 Style



- 3 watts @ 40°C power rating
- Single or Dual Potentiometer
- 3/8" Diameter Bushing
- 1/4" or 1/8" Diameter Shaft

#### Options:

- Concentric Shaft for Dual Potentiometer
- Rotary Power Switch

For more information about the  
**QD & QDD Series**  
**Wirewound Potentiometers,**  
visit our website at:

<http://www.potentiometers.com>

## Electrical and Mechanical Specifications

**Power Rating:** 3 watts @ 40°C  
(Control mounted on steel panel 4"x4"x.060")

**Resistance Range:**  
Linear: .5 ohm thru 100 K ohms  
Audio: 5 ohms thru 20 K ohms

**Resistance Tolerance:**  
±10% Standard,  
±5% Special Order

**Resistance Taper:** Linear, Audio, Special

**Voltage Ratings:**  
900 VAC terminals to mounting plate  
(High Pot Test for 1 minute) .

**Insulation Resistance:**  
1000 megohms minimum  
(50% relative humidity at 25°C)

**Operating Temperature:** -55°C to + 105°C

**Operating Life:** 10,000 cycles

**Mechanical Rotation:** 297° ± 5°

**Body materials**  
Body metal parts are Steel / Zinc Dichromate.  
Body front is molded without openings.

**Shaft:** 1/4" or 1/8" Diameter

**Shaft Styles:**  
Slotted, Flatted, Knurled - see Shaft Section

**Bushing:**  
Thread: 3/8 - 32 MEF-2A  
Length: 3/8" or 1/4" FMS

**Concentric Shaft Option:**  
Outer Shaft: .265" Diameter  
Inner Shaft: .187" Diameter

**Terminals:** Solder Lug

**Locating Lug:** Single

**Optional Switch:** Rotary SPST, SPDT, or DPST

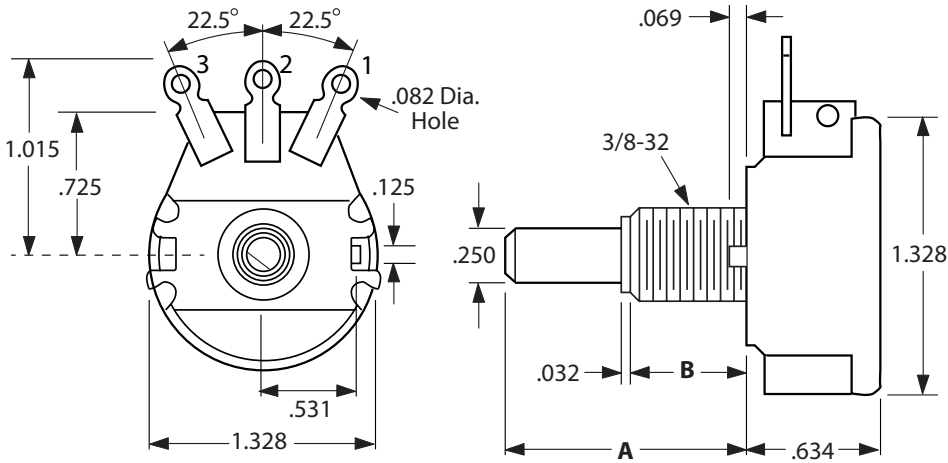
**Optional:** Shaft or Panel Seal

# QD20 Series Wirewound Potentiometers



## Outline and Mounting Dimensions

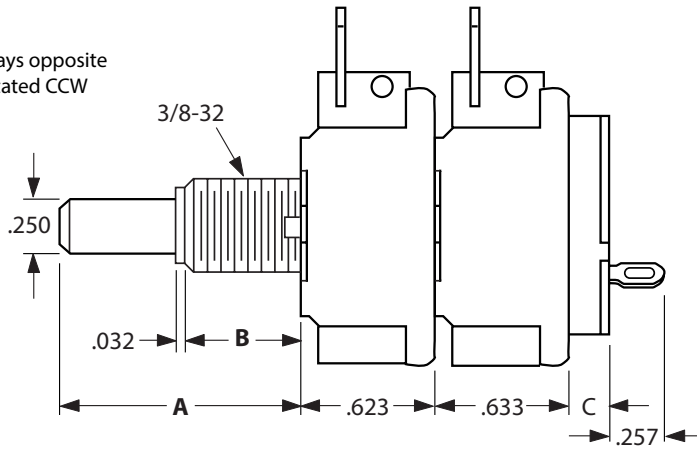
1/4" Diameter Shaft, 3/8" Diameter Bushing



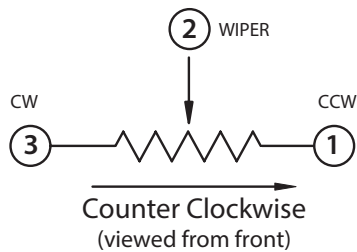
**Note:** The flat on a flatted shaft is always opposite terminal 1 when the shaft is fully rotated CCW

### Dimensions:

- A** = Shaft Length  $\pm .031$
- B** = Bushing Length: .375" or .250"
- C** = .280 (Rotary Switch)



### Circuit Diagram



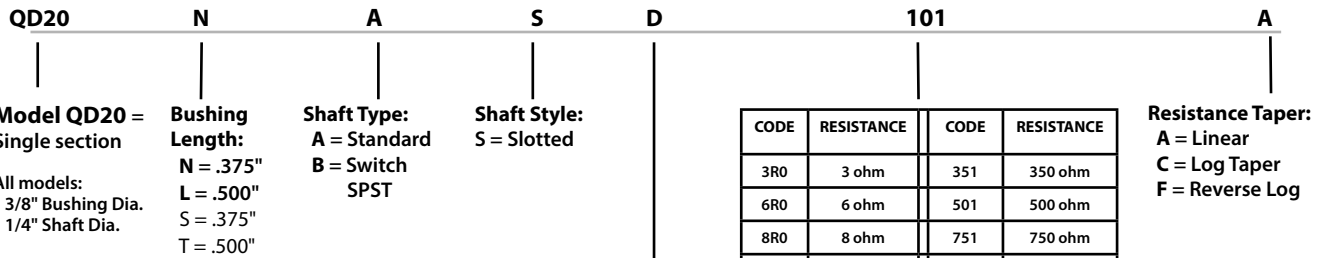


# QD20 Series Wirewound Potentiometers



## Ordering Information (Suggested Mil R-19 Replacement for RA20 Style)

Example Part Number: **QD20NASD103A**



N = Standard threaded Bushing  
 L = Locking Bushing  
 S = Standard Bushing + Shaft and Panel Seal  
 T = Locking Bushing + Shaft and Panel Seal

Code	Length of shaft from mounting surface (FMS)	
	Bushings N & S	Bushings L & T
A	1/2" - 0.500"	-
B	-	5/8" - 0.625"
D	7/8" - 0.875	7/8" - 0.875
G	1-1/4" - 1.250"	1-1/4" - 1.250"
K	2-1/2" - 2.50"	-

Example:  
 QD20NAD103A

10K LINEAR TAPER, NO SWITCH, SLOTTED 7/8" SHAFT.

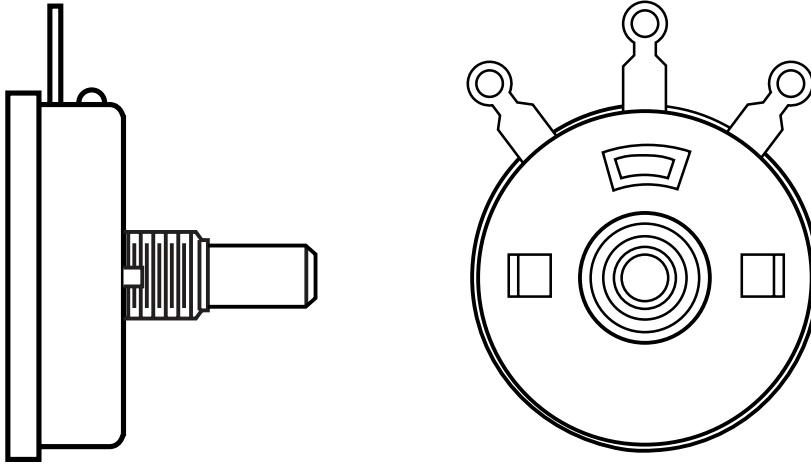
Contact Sales for correct format  
 for other combinations

Hint: If the RA20 part number is known, simply substitute "SD20" for "RA20"

## QE30 Series

### Single Turn Rotary Wirewound Potentiometers 1-9/16" Dia.

*Suggested Replacement for Mil-R-19 RA30 Style*



- 4 watts @ 40°C power rating
- 3/8" Diameter Bushing;
- 1/4" or 1/8" Diameter Shaft
- Single or Dual Potentiometer

**Optional:**

- Rotary Power Switch

For more information about  
**QE30 Series Wirewound Potentiometers,**  
visit our website at:

<http://www.potentiometers.com>

## Electrical and Mechanical Specifications

**Power Rating:** 4 watts@ 40°C  
(Control mounted on steel panel 4"x4"x.060")

**Resistance Range:**  
.5 ohm thru 100 K ohms, linear  
5 ohms thru 20 K ohms, audio

**Resistance Tolerance:**  
±10% Standard, ±5% special

**Resistance Taper:** Linear, Audio, Special

**Voltage Ratings:**  
900 VAC terminals to mounting plate  
(High Pot Test for 1 minute).

**Insulation Resistance:**  
1000 megohms minimum  
(50% relative humidity at 25°C)

**Operating Temperature:** -55°C to + 105°C

**Operating Life:** 10,000 cycles

**Mechanical Rotation:** 300° ± 5°

**Body materials:**  
Body metal parts are Steel / Zinc Dichromate.  
Body front is molded without openings.

**Shaft Styles:**  
Slotted, Flatted, Knurled - see Shaft Section

**Concentric Shaft Option for QEE Series:**  
Outer Shaft: .265" Diameter  
Inner Shaft: .187" Diameter

**Bushing:**  
Thread: 3/8 - 32 MEF-2A  
Length: 3/8" or 1/4" FMS

**Terminals:** Solder Lug

**Locating Lug:** Single

**Optional Switch:** Rotary SPST, SPDT, or DPST

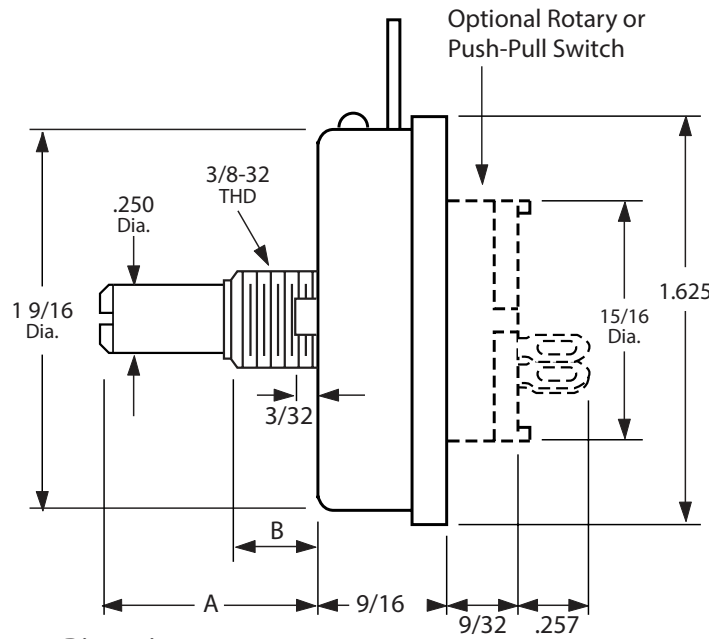
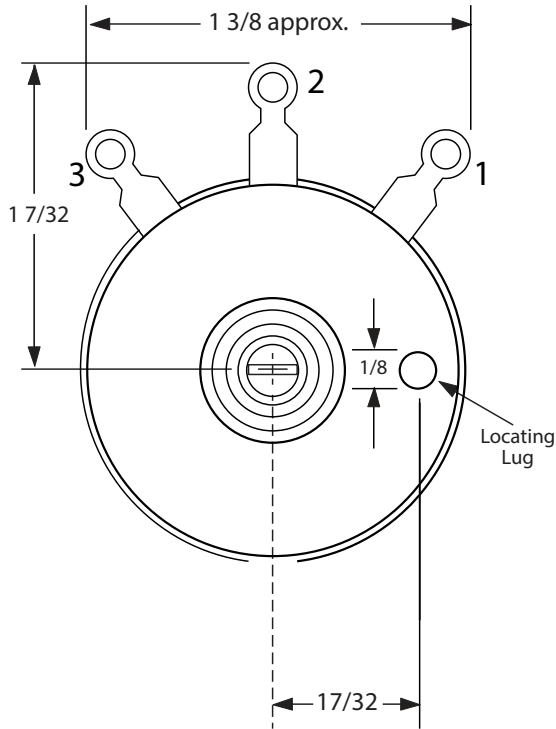
**Optional Features:**  
Shaft or panel seal  
High torque construction  
Multi-gang tandem construction

# QE30 Series Wirewound Potentiometers



## Outline and Mounting Dimensions

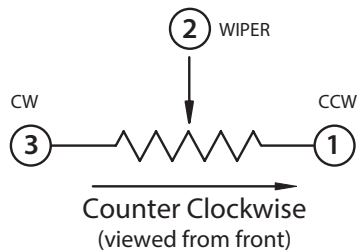
### 1/4" Diameter Shaft, 3/8" Diameter Bushing



**Dimensions:**  
 A = Shaft Length  $\pm .031$   
 B = Bushing Length

**Note:** The flat on a flattened shaft is always opposite terminal 1 when the shaft is fully rotated CCW

### Circuit Diagram



# QE30 Series Wirewound Potentiometers

## Outline and Mounting Dimensions

1/4" Diameter Shaft, 3/8" Diameter Bushing



### Ordering Information (Suggested Mil R-19 Replacement for RA30 Style)

Example Part Number: **QE-1-1-056-101-J-A-OAC-1**

<b>QE30</b>	<b>N</b>	<b>A</b>	<b>S</b>	<b>D</b>	<b>101</b>	<b>A</b>																																																												
<p><b>Model</b> QE30=Single Module</p> <p>All models: 3/8" Bushing Dia. 1/4" Shaft Dia.</p>	<p><b>Bushing Length:</b> N = .375" L = .500" S = .375" T = .500"</p>	<p><b>Shaft Type:</b> A = Standard B = Switch SPST</p>	<p><b>Shaft Style:</b> S = Slotted</p>		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>CODE</th> <th>RESISTANCE</th> <th>CODE</th> <th>RESISTANCE</th> </tr> </thead> <tbody> <tr><td>3R0</td><td>3 ohm</td><td>351</td><td>350 ohm</td></tr> <tr><td>6R0</td><td>6 ohm</td><td>501</td><td>500 ohm</td></tr> <tr><td>8R0</td><td>8 ohm</td><td>751</td><td>750 ohm</td></tr> <tr><td>100</td><td>10 ohm</td><td>102</td><td>1,000 ohm</td></tr> <tr><td>150</td><td>15 ohm</td><td>152</td><td>1,500 ohm</td></tr> <tr><td>200</td><td>20 ohm</td><td>202</td><td>2,000 ohm</td></tr> <tr><td>250</td><td>25 ohm</td><td>252</td><td>2,500 ohm</td></tr> <tr><td>350</td><td>35 ohm</td><td>352</td><td>3,500 ohm</td></tr> <tr><td>500</td><td>50 ohm</td><td>502</td><td>5,000 ohm</td></tr> <tr><td>750</td><td>75 ohm</td><td>752</td><td>7,500 ohm</td></tr> <tr><td>101</td><td>100 ohm</td><td>103</td><td>10,000 ohm</td></tr> <tr><td>151</td><td>150 ohm</td><td>153</td><td>15,000 ohm</td></tr> <tr><td>201</td><td>200 ohm</td><td>203</td><td>20,000 ohm</td></tr> <tr><td>251</td><td>250 ohm</td><td>253</td><td>25,000 ohm</td></tr> </tbody> </table>	CODE	RESISTANCE	CODE	RESISTANCE	3R0	3 ohm	351	350 ohm	6R0	6 ohm	501	500 ohm	8R0	8 ohm	751	750 ohm	100	10 ohm	102	1,000 ohm	150	15 ohm	152	1,500 ohm	200	20 ohm	202	2,000 ohm	250	25 ohm	252	2,500 ohm	350	35 ohm	352	3,500 ohm	500	50 ohm	502	5,000 ohm	750	75 ohm	752	7,500 ohm	101	100 ohm	103	10,000 ohm	151	150 ohm	153	15,000 ohm	201	200 ohm	203	20,000 ohm	251	250 ohm	253	25,000 ohm	<p><b>Resistance Taper:</b> A = Linear C = Log Taper F = Reverse Log</p>
CODE	RESISTANCE	CODE	RESISTANCE																																																															
3R0	3 ohm	351	350 ohm																																																															
6R0	6 ohm	501	500 ohm																																																															
8R0	8 ohm	751	750 ohm																																																															
100	10 ohm	102	1,000 ohm																																																															
150	15 ohm	152	1,500 ohm																																																															
200	20 ohm	202	2,000 ohm																																																															
250	25 ohm	252	2,500 ohm																																																															
350	35 ohm	352	3,500 ohm																																																															
500	50 ohm	502	5,000 ohm																																																															
750	75 ohm	752	7,500 ohm																																																															
101	100 ohm	103	10,000 ohm																																																															
151	150 ohm	153	15,000 ohm																																																															
201	200 ohm	203	20,000 ohm																																																															
251	250 ohm	253	25,000 ohm																																																															
		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Code</th> <th colspan="2">Length of shaft from mounting surface (FMS)</th> </tr> <tr> <th></th> <th>Bushings N &amp; S</th> <th>Bushings L &amp; T</th> </tr> </thead> <tbody> <tr><td>A</td><td>1/2" - 0.500"</td><td>-</td></tr> <tr><td>B</td><td>-</td><td>5/8" - 0.625"</td></tr> <tr><td>D</td><td>7/8" - 0.875</td><td>7/8" - 0.875</td></tr> <tr><td>G</td><td>1-1/4" - 1.250"</td><td>1-1/4" - 1.250"</td></tr> <tr><td>K</td><td>2-1/2" - 2.50"</td><td>-</td></tr> </tbody> </table>		Code	Length of shaft from mounting surface (FMS)			Bushings N & S	Bushings L & T	A	1/2" - 0.500"	-	B	-	5/8" - 0.625"	D	7/8" - 0.875	7/8" - 0.875	G	1-1/4" - 1.250"	1-1/4" - 1.250"	K	2-1/2" - 2.50"	-																																										
Code	Length of shaft from mounting surface (FMS)																																																																	
	Bushings N & S	Bushings L & T																																																																
A	1/2" - 0.500"	-																																																																
B	-	5/8" - 0.625"																																																																
D	7/8" - 0.875	7/8" - 0.875																																																																
G	1-1/4" - 1.250"	1-1/4" - 1.250"																																																																
K	2-1/2" - 2.50"	-																																																																
		<p>N = Standard threaded Bushing L = Locking Bushing S = Standard Bushing + Shaft and Panel Seal T = Locking Bushing + Shaft and Panel Seal</p>																																																																

Example:  
QE30NASD103A

10K LINEAR TAPER, NO SWITCH, SLOTTED 7/8" SHAFT.

Contact Sales for correct format  
for other combinations

Hint: If the RA30 part number is known, simply substitute "QE30" for "RA30"

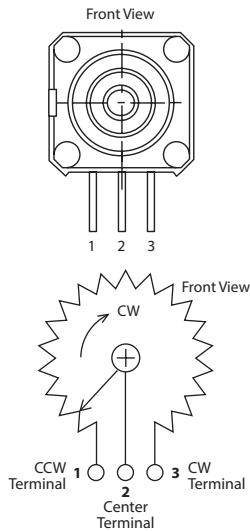
# GLOSSARY OF TERMS

## Input and Output Terms

### Output Voltage

(e) The voltage between the wiper terminal and the designated reference point. Unless otherwise specified, the designated reference point is the CCW terminal (See 3.1).

Figure 1  
Circuit and Travel  
Diagram



### Output Ratio

(e/E) The ratio of the output voltage to the designated input reference voltage. Unless otherwise specified, the reference voltage is the total applied voltage.

## Rotation and Translation

### Total Mechanical Travel

The total travel of the shaft between integral stops, under the specified stop load. In potentiometers without stops, the mechanical travel is continuous.

### Mechanical Overtravel - Wirewound

The shaft travel between each End Point (or Theoretical End Point for Absolute Conformity or Linearity units) and its adjacent corresponding limit of Total Mechanical Travel.

### Mechanical Overtravel

The shaft travel between each Theoretical End Point and its adjacent corresponding limit of Total Mechanical Travel.

### Backlash

The maximum difference in shaft position that occurs when the shaft is moved to the same actual Output Ratio point from opposite directions.

### Theoretical Electrical Travel

The specified shaft travel over which the theoretical function characteristic extends between defined Output Ratio limits, as determined from the Index Point.

### Electrical Overtravel - Nonwirewound

The shaft travel over which there is continuity between the wiper terminal and the resistance element beyond each end of the Theoretical Electrical Travel.

### Electrical Continuity Travel

The total travel of the shaft over which electrical continuity is maintained between the wiper and the resistance element.

### Tap Location

The position of a tap relative to some reference. This is commonly expressed in terms of an Output Ratio and/or a shaft position. When a shaft position is specified, the Tap Location is the center of the Effective Tap Width.

## Resistance

### End Resistance

The resistance measured between the wiper terminal and an end terminal with the shaft positioned at the corresponding End Point.

### Temperature Coefficient Of Resistance

The unit change in resistance per degree celsius change from a reference temperature, expressed in parts per million per degree celsius as follows:

$$T.C. = \frac{R_2 - R_1}{R_1(T_2 - T_1)} \times 10^6$$

Where:

R1 = Resistance at reference temperature in ohms.

R2 = Resistance at test temperature in ohms

T1 = Reference temperature in degrees celsius.

T2 = Test temperature in degrees celsius.

## Conformity and Linearity

### Linearity

A specific type of conformity where the theoretical function characteristic is a straight line.

Mathematically:

$$\frac{e}{E} = f(W) \pm C = A(W) + B \pm C$$

Where:

A is the given slope; B is given intercept at W=0.

W = Angle or slope

### Absolute Linearity

The maximum deviation of the actual function characteristic from a fully defined straight reference line. It is expressed as a percentage of the Total Applied Voltage and measured over the Theoretical Electrical Travel. An Index Point on the actual output is required.

The straight reference line may be fully defined by specifying the low and high theoretical end Output Ratios separated by the Theoretical Electrical Travel. Unless otherwise specified, these end Output Ratios are 0.0 and 1.0 respectively.

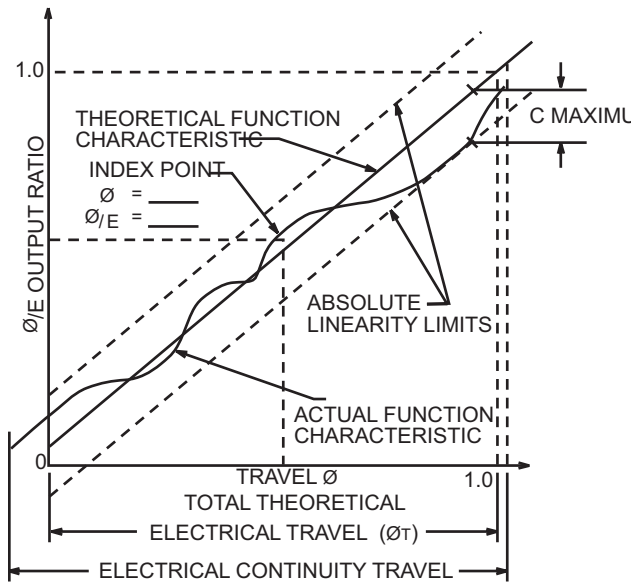
Mathematically:

$$\frac{e}{E} = A(W/W_T) + B \pm C$$

Where:

A is the given slope; B is given intercept at  $W=0$ .  
Unless otherwise specified:  $A=1$ ;  $B=0$

Figure 2



### Independent Linearity

The maximum deviation, expressed as a percent of the Total Applied Voltage, of the actual function characteristic from a straight reference line with its slope and position chosen to minimize deviations over the Actual Electrical Travel, or any specified portion thereof.

Note: End Voltage requirements, when specified, will limit the slope and position of the reference line.

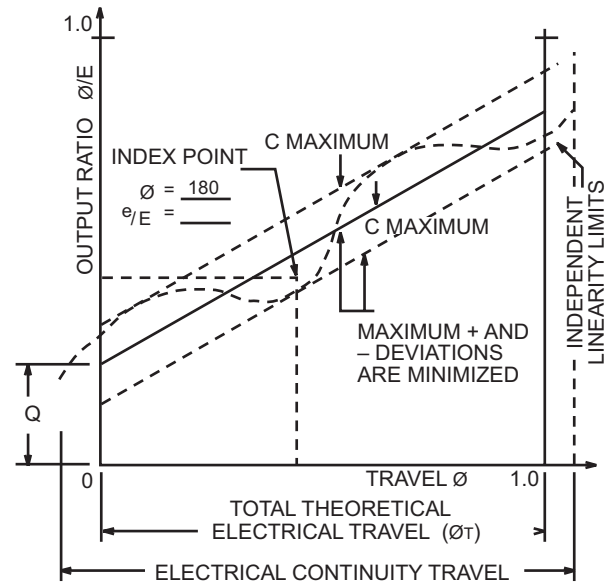
Mathematically:

$$\frac{e}{E} = P(W/W_A) + Q \pm C$$

Where:

P is unspecified slope; Q is unspecified intercept at  $W=0$ . And both are chosen to minimize C but are limited by the End Voltage requirements.

Figure 3  
Independent Linearity



---

## Electrical Characteristics

### Noise

Any spurious variation in the electrical output not present in the input, defined quantitatively in terms of an equivalent parasitic, transient resistance in ohms, appearing between the contact and the resistance element when the shaft is rotated or translated. The Equivalent Noise Resistance is defined independently of the resolution, the functional characteristics, and the total travel. The magnitude of the Equivalent Noise Resistance is the maximum departure from a specified reference line. The wiper of the potentiometer is required to be excited by a specified current and moved at a specified speed.

### Output Smoothness (Non-wirewound Potentiometers Only)

Output Smoothness is a measurement of any spurious variation in the electrical output not present in the input. It is expressed as a percentage of the Total Applied Voltage and measured for specified travel increments over the Theoretical Electrical Travel. Output Smoothness includes effects of contact resistance variations, resolution, and other micron-nonlinearities in the output.

### Resolution

A measure of the sensitivity to which the Output Ratio of the potentiometer may be set.

### Dielectric Strength

Ability to withstand under prescribed conditions, a specified potential of a given characteristic between the terminals of each cup and the exposed conducting surfaces of the potentiometer, or between the terminals of each cup and the terminals of every other cup in the gang without exceeding a specified leakage current value.

### Insulation Resistance

The resistance to a specified impressed DC voltage between the terminals of each cup and the exposed conducting surfaces of the potentiometer, or between the terminals of each cup and the terminals of every other cup in the gang, under prescribed conditions.

### Power Rating

The maximum power that a potentiometer can dissipate under specified conditions while meeting specified performance requirements.

### Power Derating

The modification of the nominal power rating for various considerations such as Load Resistance, Output Slopes, Ganging, nonstandard environmental conditions and other factors.

### Life

The number of shaft revolutions or translations obtainable under specific operating conditions and within specified allowable degradations of specific characteristics.

---

## Mechanical Characteristics

### Shaft Runout

The eccentricity of the shaft diameter with respect to the rotational axis of the shaft, measured at a specified distance from the end of the shaft. The body of the potentiometer is held fixed and the shaft is rotated with a specified load applied radially to the shaft. The eccentricity is expressed in inches, TIR.

### Lateral Runout

The perpendicularity of the mounting surface with respect to the rotational axis of the shaft, measured on the mounting surface at a specified distance from the outside edge of the mounting surface. The shaft is held fixed and the body of the potentiometer is rotated with specified loads applied radially and axially to the body of the pot. The Lateral Runout is expressed in inches.

### Shaft Radial Play (single shaft potentiometer)

The total radial excursion of the shaft, measured at a specified distance from the front surface of the unit. A specified radial load is applied alternately in opposite directions at a specified point. Shaft Radial Play is expressed in inches.

### Shaft End Play

The total axial excursion of the shaft, measured at the end of the shaft with a specified axial load supplied alternately in opposite directions. Shaft End Play is expressed in inches.

### Starting Torque

The maximum moment in the clockwise and counterclockwise directions required to initiate shaft rotation anywhere in the Total Mechanical Travel.

### Running Torque

The maximum moment in the clockwise and counterclockwise directions required to sustain uniform shaft rotation at a specified speed throughout the Total Mechanical Travel.

### Moment of Inertia

The mass moment of inertia of the rotating elements of the potentiometer about their rotational axis.

---

## Stop Strength

### Static Stop Strength

The maximum static load that can be applied to the shaft at each mechanical stop for a specified period of time without permanent change of the stop positions greater than specified.

### Dynamic Stop Strength

The inertia load, at a specified shaft velocity and a specified number of impacts, that can be applied to the shaft at each stop without a permanent change of the stop position greater than specified.

# General Terms and Conditions of Sale

## Orders

All orders are suPPect to acceptance by State Electronics, E. Hanover, NJ. No order or contract shall be deemed accepted unless and until such acceptance is made in writing by State Electronics.

All agreements are more contingent upon strikes, accidents or causes of delay beyond our control

## Prices and Specifications

Prices, quotations, specifications and other terms and all statements appearing in the Company's catalogs and advertisements, and otherwise made by the Company, are suPPect to change without notice. State Electronics reserves the right to make changes in design at any time without incurring any obligation to provide same units previously purchased or to continue to supply discontinued items. The specifications shown in the sales literature are not always the latest version. Certified current specification prints are available upon request.

Unless specifically provided in writing, prices quoted are based upon manufacture of quantities and types originally specified and are suPPect to revision when interpretation or engineering changes are initiated by the customer. Quoted prices are based upon present cost of materials and labor and are suPPect to change without notice.

We are not responsible for typographical errors made in any of our publications or for stenographic or clerical errors made in preparations of quotations, all such errors are suPPect to correction.

## Delivery

Delivery promise is based on our best estimate of the date material will be shipped from our factory and we assume no responsibility for losses, damage or consequential damages due to delays.

## Authorization

State Electronics does not have any authorized distributors, independent representatives or agents.

State Electronics is an Authorized Distributor for the Sensing and Control Division of Honeywell International.

## Terms of Payment

On approved orders, terms are net thirty (30) days from the date of invoice. The Company may at any time, when in its opinion the financial condition of the customer warrants it, either hold or suspend credit. In cases where credit is not established or satisfactory financial information is not available, the terms are cash with order or C.O.D. at the option of the Company. Each shipment will be considered a separate and independent transaction and payment should be made accordingly.

## Shipments

All shipments are made F.O.B. shipping point (unless otherwise specified) and packaging for domestic shipment is included in the quoted price. When special domestic or export packaging is specified involving greater expense than is customary, a charge will be made to cover such extra expense. Unless otherwise specified, we will normally use the best, least expensive surface transportation. Reasonable care is exercised in packaging our products for shipment and no responsibility is assumed by the Company for delay, breakage or damage after having made delivery in good order to the carrier. All claims for breakage or damage should be made to the carrier, but will be glad to render all possible assistance in securing satisfactory adjustment of such claims.

## Claims and Rejected Material

Claims for defective material must be made within 30-days of the customer's receipt of shipment. No products may be returned without a return authorization (RMA).

## Country of Origin

The 388 / 389, S88 / S89, 70 and S159 series Mod-Pot products are assembled in the United States at our facility located in East Hanover, New Jersey, USA.

## Export Information

HARMONIZED TARIFF SCHEDULE (HTS #) - 8533.31.0000

EXPORT CONTROL CLASSIFICATION # (ECCN #) - EAR99



# DISCLAIMER

**ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.**

State Electronics Parts Corp., Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "State Electronics"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product. State Electronics makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product.

To the maximum extent permitted by applicable law, State Electronics disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on State Electronics' knowledge of typical requirements that are often placed on State Electronics products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify State Electronics' terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, State Electronics products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the State Electronics product could result in personal injury or death. Customers using or selling State Electronics products not expressly indicated for use in such applications do so at their own risk. Please contact authorized State Electronics personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of State Electronics. Product names and markings noted herein may be trademarks of their respective owners.

