

# Bourns® Industrial Panel Controls

*Short Form Brochure*



**BOURNS®**

# Introduction

Bourns® industrial panel controls have been integrated into many applications for generations and continue to be a part of applications that require reliable Human to Machine Interface (HMI). Implementation of lean manufacturing processes along with product innovation and technology enable production of reliable industrial grade panel control solutions.

Bourns offers a wide variety of industrial panel controls to meet market demands. Common package sizes include ½", ⅝", and ¾" in cermet, conductive polymer, wirewound, and Bourns® Hybritron® elements. Features and options include long rotational life, a variety of tapers and terminal styles, rotary switch options, detents, a seal for common industrial board processing, a variety of shaft and bushing sizes, and other features commonly requested.

## Important Performance Parameters

Performance parameters that are important for panel controls are rotational life, linearity and taper.

### I. Rotational Life

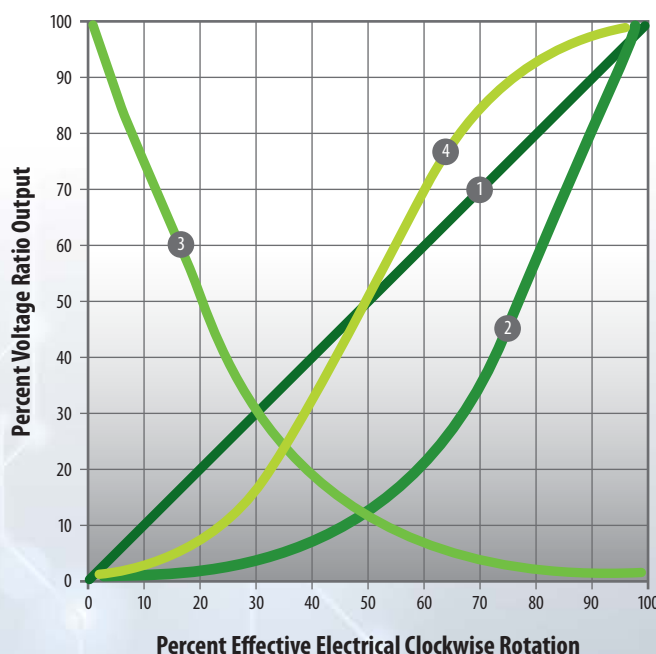
Rotational life is the ability to withstand a specified number of cycles under specific operating conditions while remaining within allowable specifications. Industrial panel controls use both conductive polymer (CP) and cermet elements. Conductive polymer typically offers up to 4x the rotational life of cermet elements. CP also has a smoother surface finish which aids in reducing wiper wear and extending the life of the element.

### II. Linearity

Linearity is the relationship between output voltage and the mechanical rotation of the shaft. All standard industrial panel controls are characterized by independent linearity.

### III. Taper

An important consideration in selecting a panel control is the type of taper needed for the application. Taper is defined as the output curve of the voltage ratio measured between one end of the element and the wiper. It is expressed in percent of total resistance versus percent of effective electrical rotation.

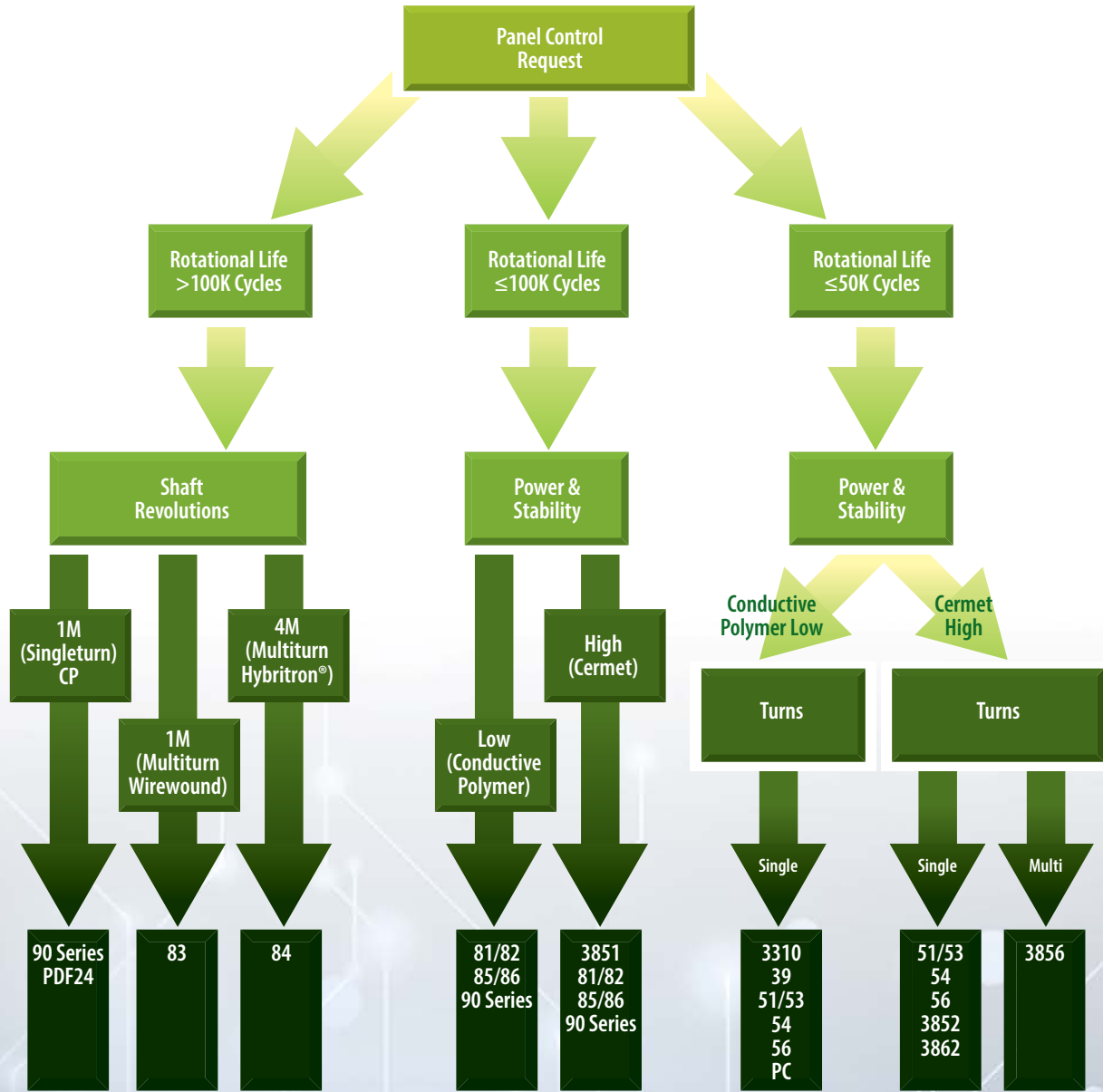


Four standard tapers have been established as shown above:

1. *Linear*
2. *Clockwise audio*
3. *Counterclockwise audio*
4. *Modified linear*

# Industrial Panel Controls Selection Guide

The adjoining flowchart will assist you in selecting the appropriate industrial panel control model for your application.



# Array of Applications



## Popular Medical Product Applications

- Alarms
- Amplifiers
- Blood / chemical analyzers
- Blood monitors
- Communication equipment
- Dialysis
- EKG and EEG monitors
- Electrosurgical equipment
- Incubators
- Infusion pumps for insulin
- Isokinetic equipment
- Lasers
- Line isolation monitors
- Magnetic resonance equipment (MR)
- Medical test equipment
- Paper chart recorders
- Radiographic equipment
- Respirators
- Respiratory monitors
- Scanners
- Stimulators
- Temperature monitors
- Transducers
- Ventilators
- X-ray equipment

## Popular Avionics Product Applications

- Radio controls
- Cockpit and passenger light dimmers
- Various cockpit controls

## Popular Portable Electronics Product Applications

- 2-way radios
- Appliances
- Bar code scanners
- Battery chargers
- Copiers
- Cordless phones
- Detectors: CO<sub>2</sub>, gas, heat, humidity
- Electrostatic testers
- Intercom systems
- Irrigation controllers
- Multimeters
- Portable monitoring equipment
- Power generators
- Radio systems
- Scanners


## Telecommunications Product Applications


- 2-way radios
- 2-wire communication interfaces
- Access equipment
- CB and shortwave base stations
- Computerized telephone equipment
- Data communications equipment
- Digital television cable boxes
- Hardwired communication interfaces
- Hardwired remote controls
- Headset amplifiers
- Internet telephony equipment
- Mobile phone equipment
- Mobile phone headsets
- Satellite systems
- Video conferencing equipment
- Wireless remote controls


## Popular Test and Measurement Product Applications


- Appliance testers
- Backplane testers
- Battery testers
- Board in-circuit testers
- Cable testers
- Calibration equipment
- Component testers
- Continuity testers
- Counters
- Cycle testers
- Disk drive testers
- Distortion testers
- Electric motor testers
- Electrostatic testers
- Environmental chambers and testers
- Hi-pot testers
- High voltage testers
- Integrated circuit testers
- Laser and fiber optic testers
- Light testers
- Logic and spectrum analyzers
- Oscilloscopes
- Power supply testers
- Radiation & x-ray testers
- Signal level testers
- Telecom line testers
- Timers
- Transmission testers
- Tube testers
- TV/Video generation testers
- Ultrasonic testers


# Bourns® Industrial Panel Controls


3310	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	50 K Cycles	Conductive Plastic	Standard Rotary	2	No	-40 to +125 °C	0.25 watts	±5 %	<ul style="list-style-type: none"> <li>• Conductive plastic</li> <li>• PC board and bushing mount</li> <li>• Plastic bushing and shaft</li> <li>• Withstands typical industrial washing processes</li> <li>• Compact package</li> <li>• Audio taper versions available</li> <li>• RoHS compliant*</li> </ul>


3851	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	100 K Cycles	Conductive Plastic	No	1	No	-1 to +125 °C	0.5 to 1.0 watts	±10 %	<ul style="list-style-type: none"> <li>• Linear and audio tapers</li> <li>• Wide resistance range</li> <li>• Minimal depth packaging</li> <li>• Good resolution</li> <li>• RoHS compliant*</li> </ul>

3852	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	50 K Cycles	Cermet	No	1	No	-1 to +125 °C	1.0 to 2.0 watts	±5 %	<ul style="list-style-type: none"> <li>• Linear and audio tapers</li> <li>• Wide resistance range</li> <li>• Minimal depth packaging</li> <li>• Good resolution</li> <li>• RoHS compliant*</li> </ul>


3856	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	50 K Cycles	Cermet	No	1	No	-1 to +125 °C	1.0 to 2.0 watts	±5 %	<ul style="list-style-type: none"> <li>• Linear and audio tapers</li> <li>• Wide resistance range</li> <li>• Minimal depth packaging</li> <li>• Good resolution</li> <li>• 3/4 turn</li> <li>• RoHS compliant*</li> </ul>


3862	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	50 K Cycles	Cermet	No	1	No	-40 to +125 °C	1.0 watt	±5 %	<ul style="list-style-type: none"> <li>• Small diameter</li> <li>• Wide resistance range</li> <li>• Good resolution</li> <li>• Linear tapers</li> <li>• Cermet element</li> <li>• RoHS compliant *</li> </ul>


39	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	500 K Cycles	Carbon	No	1	No	-10 to +85 °C	0.5 watts	±3 %	<ul style="list-style-type: none"> <li>• Long life carbon element</li> <li>• Plain or slotted shaft option</li> <li>• Anti-rotation pin</li> <li>• metal shaft</li> <li>• Audio or linear taper options</li> <li>• Variety of resistance values</li> <li>• RoHS compliant*</li> </ul>


39	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	50 K Cycles	Conductive Plastic	Rotary or Push Momentary	1	No	-40 to +85 °C	0.125 to 0.25 watts	±5 %	<ul style="list-style-type: none"> <li>• Low profile package</li> <li>• PCB mount terminal configuration</li> <li>• Rugged metal housing for industrial applications</li> <li>• Long rotational life</li> <li>• RoHS compliant*</li> </ul>


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51/53	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	25 K to 50 K Cycles	Conductive Plastic or Cermet	No	2	Yes	+1 to +125 °C	0.25 to 1.0 watts	±5 %	<ul style="list-style-type: none"> <li>• Linear or audio tapers</li> <li>• PC board and bushing mount</li> <li>• Gangable</li> <li>• Metal bushing and shaft</li> <li>• Sealed for board washing</li> <li>• RoHS compliant*</li> </ul>


54	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	50 K Cycles	Conductive Plastic	Push-Pull	Single plus Switch	No	+1 to +125 °C	0.25 to 0.5 watts	±5 %	<ul style="list-style-type: none"> <li>• Linear or audio tapers</li> <li>• PC board and bushing mount</li> <li>• Splash seal</li> <li>• Metal bushing and shaft</li> <li>• RoHS compliant*</li> </ul>


56	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	50 K Cycles	Conductive Plastic	Rotary	Single plus Switch	No	+1 to +125 °C	0.25 to 0.5 watts	±5 %	<ul style="list-style-type: none"> <li>• CW or CCW rotary switch options</li> <li>• Linear or audio tapers</li> <li>• PC board and bushing mount</li> <li>• Splash Seal</li> <li>• Metal bushing and shaft</li> <li>• RoHS compliant*</li> </ul>


81/82	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	100 K Cycles	Conductive Plastic or Cermet	No	4	No	-40 to +125 °C	0.5 to 2.0 watts	±5 %	<ul style="list-style-type: none"> <li>• Metal shaft and bushing</li> <li>• Consistent, smooth, quality feel</li> <li>• Gangable</li> <li>• RoHS compliant*</li> </ul>


82 Vintage	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	100 K Cycles	Conductive Plastic	No	1	No	-40 to +125 °C	0.5 watts	±5 %	<ul style="list-style-type: none"> <li>• Premium guitar potentiometer</li> <li>• Plain or knurled shaft option</li> <li>• 10 % TR tolerance</li> <li>• Very low noise</li> <li>• Single-turn</li> <li>• 250 K and 500 K resistance</li> <li>• RoHS compliant*</li> </ul>


83/84	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	1 M to 4 M Cycles	Wirewound or Hybritron®	No	2	No	+1 to +125 °C	1.0 watt	±0.25 %	<ul style="list-style-type: none"> <li>• Compatible with other members of the Model 80 Series</li> <li>• 1M to 4M shaft revolutions</li> <li>• Gangable</li> <li>• RoHS compliant*</li> </ul>


85/86	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	100 K Cycles	Conductive Plastic or Cermet	Rotary	4	No	-40 to +125 °C	0.5 to 2.0 watts	±5 %	<ul style="list-style-type: none"> <li>• Metal shaft and bushing</li> <li>• Consistent, smooth, quality feel</li> <li>• Gangable</li> <li>• Variety of rotary switch configurations</li> <li>• RoHS compliant*</li> </ul>

91/92/93 94/95	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	100 K to 1 M Cycles	Conductive Plastic or Cermet	No	2	No	-40 to +125 °C	0.25 to 2.0 watts	±5 %	<ul style="list-style-type: none"> <li>• Variety of standard resistances and tapers</li> <li>• Available in a variety of in-out configurations</li> <li>• PC pin and solder lug options</li> <li>• Metal or plastic shaft options</li> <li>• Virtually infinite electrical circuit isolation</li> <li>• RoHS compliant*</li> </ul>

95	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	100 K Cycles	Conductive Plastic	No	1	No	-40 to +125 °C	0.25 watts	±5 %	<ul style="list-style-type: none"> <li>• Premium guitar potentiometer</li> <li>• 25K and 50K ohm resistance options for active electronics</li> <li>• Knurled or plain shaft</li> <li>• Plain and knurled metal shaft options</li> <li>• Very low noise</li> <li>• RoHS compliant*</li> </ul>

96	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	100 K Cycles	Conductive Plastic or Cermet	No	2	No	-40 to +125 °C	0.25 to 2.0 watts	±5 %	<ul style="list-style-type: none"> <li>• Virtually infinite electrical circuit isolation</li> <li>• Variety of standard resistances and tapers</li> <li>• Sealed for board wash</li> <li>• Metal or plastic shaft options</li> <li>• RoHS compliant*</li> </ul>

97/99	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	100 K Cycles	Conductive Plastic or Cermet	Rotary	2	No	-40 to +125 °C	0.25 to 2.0 watts	±5 %	<ul style="list-style-type: none"> <li>• Virtually infinite electrical circuit isolation</li> <li>• Variety of resistance values and tapers</li> <li>• PC pin or solder lug option</li> <li>• Variety of rotary switch configurations</li> <li>• Metal or plastic shaft options</li> <li>• RoHS compliant*</li> </ul>

PC	Rotational Life	Element	Switch Option	Multi-section (Max.)	Detent Option	Operating Temp. Range	Power Rating	Independent Linearity	Features
	50 K Cycles	Conductive Plastic	No	1	Yes	+1 to +125 °C	0.25 to 0.75 watts	±5 %	<ul style="list-style-type: none"> <li>• Space-saving design</li> <li>• Wide range of resistance values</li> <li>• PC pin or solder lug terminals</li> <li>• Metric shaft and bushing option</li> <li>• Mounting bracket available</li> <li>• Linear and audio taper versions</li> <li>• RoHS compliant*</li> </ul>

\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

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[www.bourns.com](http://www.bourns.com)

Bourns® products are available through an extensive network of manufacturer's representatives, agents and distributors. To obtain technical applications assistance, a quotation, or to place an order, contact a Bourns representative in your area.

Specifications subject to change without notice. Actual performance in specific customer applications may differ due to the influence of other variables. Customers should verify actual device performance in their specific applications.

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