

BOURNS®

Rotary Encoders



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Bourns, Inc. has been providing reliable and innovative solutions to the electronics industry for over 50 years. With manufacturing facilities and customer support teams located throughout the world, Bourns is uniquely positioned to serve the industrial, automotive, telecommunications, audio/visual, aerospace and other electronic industries.

Most importantly, Bourns is firmly committed to quality, service and innovation.

Bourns Sensors and Controls Division has continued to expand its encoder offering with a wide variety of models to support customer's specific applications. Recognised worldwide for supplying standard and custom products as well as providing excellent technical support, Sensors and Controls is committed to providing customers with reliable rotary encoder solutions.

General Design Consideration

Encoders are the digital version of potentiometers and panel controls. Rather than providing a resistive variable output with rotation of the shaft, encoders simulate an on/off switching digital output. Applied as human-to-machine interface (HMI) devices, encoders are typically used to sense human adjustment of the device in a clockwise or counterclockwise direction triggering some action by the digital circuit. Applied as machine-to-machine interface (MMI) devices, encoders are typically coupled to a motor or other mechanical device to sense speed and direction of rotation.

Important Characteristics

In selecting an encoder for your application, the most important characteristics to consider are the type of technology, type of output signal, speed of rotation, expected cycle life and switching capability of the product. There are two basic technology classifications of encoders: contacting (mechanical) and non-contacting (optical and magnetic). Your application will dictate the type of technology that will be best suited for your design.

Features & Benefits

- Contacting Encoders: Manual rotation, detent and push switch options, low cost
- Optical Encoders: Manual or machine rotation, detent/push switch or higher speed options, long life
- Magnetic Encoders: Machine rotation, very high speed, extremely long life

Custom Solutions

A wide range of "value-added" enhancements are available to provide customers with cost-effective solutions. Bourns' capabilities to develop custom encoder solutions and modifications include the following:

- Custom Output
- Seal
- Mounting Brackets
- Customised Shaft Options
- Detents
- Torque
- Terminal Configurations
- Special Packaging
- Marking
- Mechanical Stops
- Cable Harness/Lead Wires
- Special Test Requirements

Incremental Optical Encoders (Non-Contacting)

2-bit quadrature

EM14



Features

- 14mm body
- Sealed to IP54
- Metal threaded bush
- Metal flatted or slotted shaft
- Vert or R/A PCB mount or ribbon cable
- Long operating life

Resolution PPR	8, 16, 32, 64
Detents	32
Push Switch	Yes
Contact Rating	TTL, CMOS, HCMOS
Rotational Life	2 million revolutions

EN



Features

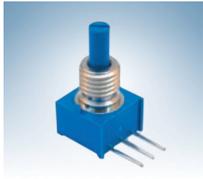
- 16mm body
- Sealed to IP40
- Bushing or servo mount
- Metal shaft
- Vert or R/A PCB mount or ribbon cable
- Long operating life

Resolution PPR	25, 50, 64, 100, 125, 128, 200, 256
Detents	No
Push Switch	No
Contact Rating	TTL, CMOS,
Rotational Speed/Life	3,000 RPM max./10 million revolutions

Incremental Contacting Encoders

2-bit quadrature

3315



Features

- 9mm body, panel mounting
- Sealed to IP67
- Plastic or metal threaded bush
- Plastic shaft
- Vert or R/A PCB mount
- Conductive plastic element

Resolution PPR	6, 16
Detents	No
Push Switch	No
Contact Rating	TTL
Rotational Life	25k/100k Revolutions

PEC09



Features

- 9mm body, panel mounting
- Sealed to IP40
- Metal threaded bush
- Metal flatted shaft
- R/A PCB mount

Resolution PPR	12
Detents	12, 24, 30
Push Switch	Yes
Contact Rating	10mA 5VDC
Rotational Life	60k Revolutions

PEC11



Features

- 12mm body, panel mounting
- Sealed to IP40
- Metal threaded bush
- Metal flatted or knurled shaft
- Vert PCB mount

Resolution PPR	12, 18, 24
Detents	12, 18, 24
Push Switch	Yes
Contact Rating	10mA 5VDC
Rotational Life	30k Revolutions

PEC11L



Features

- Low profile body
- 11mm body, panel mounting
- Sealed to IP40
- Metal threaded bush
- Metal flatted or knurled shaft
- Vert PCB mount

Resolution PPR	15, 20
Detents	15, 20
Push Switch	Yes
Contact Rating	10mA 5VDC
Rotational Life	100k Revolutions

PEC12



Features

- 12mm body
- Sealed to IP40
- No bush
- Plastic flatted shaft
- Vert PCB mount

Resolution PPR	12, 24
Detents	12, 24
Push Switch	Yes
Contact Rating	10mA 5VDC
Rotational Life	30k Revolutions

PEC16



Features

- 16mm body, panel mounting
- Sealed to IP40
- Metal threaded bush
- Plastic flatted shaft
- R/A PCB mount

Resolution PPR	12, 24
Detents	12, 24
Push Switch	Yes
Contact Rating	10mA 5VDC
Rotational Life	100k Revolutions

ECW



Features

- 22mm body, panel mounting
- Sealed to IP40
- Plastic threaded bush
- Plastic flatted shaft
- Vert PCB mount

Resolution PPR	6, 9, 12, 24, 36
Detents	12, 24, 36
Push Switch	No
Contact Rating	10mA 10VDC
Rotational Life	200k Revolutions

Incremental Contacting Encoders continued

2-bit quadrature

EPS



Features

- 22mm x 27mm body, panel mounting
- Sealed to IP40
- Plastic threaded bush
- Plastic flatted shaft
- Vert PCB mount
- Snap-in mount option

Resolution PPR	6, 9, 12, 24, 36
Detents	24
Push Switch	Yes
Contact Rating	10mA 10VDC
Rotational Life	200k Revolutions

PES12



Features

- 12mm body
- Sealed to IP40
- No bush
- Shaftless
- Vert PCB mount

Resolution PPR	24
Detents	24
Push Switch	No
Contact Rating	1mA 5VDC
Rotational Life	30k Revolutions

ES



Features

- 20mm body
- Sealed to IP40
- No bush
- Shaftless
- Vert PCB mount

Resolution PPR	6, 9, 12, 24
Detents	12, 24
Push Switch	No
Contact Rating	10mA 10VDC
Rotational Life	200k Revolutions

PEC11S



Features

- 12mm body
- Sealed to IP40
- No bush
- Metal flatted or knurled shaft
- SMD PCB mount

Resolution PPR	15
Detents	30
Push Switch	Yes
Contact Rating	10mA 5VDC
Rotational Life	15k Revolutions

Illuminated

PEL12S



Features

- 12mm body
- Sealed to IP40
- No bush
- Clear plastic shaft
- Single colour LED illumination
- Vert PCB mount

Resolution PPR	24
Detents	24
Push Switch	No
Contact Rating	0.5mA 5VDC
Rotational Life	30k Revolutions

PEL12D



Features

- 12mm body
- Sealed to IP40
- No bush
- Clear plastic shaft
- Dual colour LED illumination
- Vert PCB mount

Resolution PPR	24
Detents	24
Push Switch	Yes
Contact Rating	0.5mA 5VDC
Rotational Life	30k Revolutions

PEL12T



Features

- 12mm body
- Sealed to IP40
- No bush
- Clear plastic shaft
- Tri-colour LED illumination
- Vert PCB mount

Resolution PPR	24
Detents	24
Push Switch	Yes
Contact Rating	0.5mA 5VDC
Rotational Life	30k Revolutions

Magnetic Encoders (Non-Contacting)

Incremental Encoder 2-bit Quadrature

EMS22Q



Features

- 16mm body
- Sealed to IP65
- Bushing or servo mount
- Metal shaft
- High speed
- Vert or R/A PCB mount or ribbon cable
- Extremely long operating life

Resolution PPR	32, 64, 128, 256
Detents	No
Push Switch	No
Contact Rating	TTL, CMOS
Rotational Speed	10,000 RPM max.
Rotational Life	100 million revolutions

Direction/Step Encoder

EMS22D



Features

- 16mm body
- Sealed to IP65
- Bushing or servo mount
- Metal shaft
- High speed
- Vert or R/A PCB mount or ribbon cable
- Extremely long operating life

Resolution PPR	64, 128, 256, 512
Detents	No
Push Switch	No
Contact Rating	TTL, CMOS
Rotational Speed	10,000 RPM max.
Rotational Life	100 million revolutions

Absolute Encoder

EMS22A



Features

- 16mm body
- Sealed to IP65
- Bushing or servo mount
- Metal shaft
- High speed
- Vert or R/A PCB mount or ribbon cable
- Extremely long operating life

Resolution	1024 states
Detents	No
Push Switch	No
Contact Rating	TTL, CMOS
Rotational Speed	10,000 RPM max.
Rotational Life	100 million revolutions

PWM Encoder

EMS22P



Features

- 16mm body
- Sealed to IP65
- Bushing or servo mount
- Metal shaft
- High speed
- Vert or R/A PCB mount or ribbon cable
- Extremely long operating life

Resolution	1024 states
Detents	No
Push Switch	No
Contact Rating	TTL, CMOS
Rotational Speed	10,000 RPM max.
Rotational Life	100 million revolutions

Incremental (Quadrature)

This output waveform is the most common among all contacting and non-contacting encoders. Quadrature, also known as 2-bit quadrature, is often used to determine magnitude (count) and direction (up/down) by an external interface circuit. EMS22Q comes equipped with such capability; an external interface circuit is not required. It also offers an indexed output with an adjustable width of one or three times the absolute position value that can be used for counting the shaft rotation.

Direction/Step

This output is very similar to the incremental (quadrature) waveform but offers up to 512 PPR, as opposed to 256 PPR in quadrature. This output can be used in incremental counting applications where a better resolution is desired. Indexing output is also available with a Direction/Step output waveform.

Absolute

Absolute output refers to the absolute angular position. This type of output is especially useful for applications where the absolute position of a device, such as a camera, is necessary to locate an object. Also with 1024 distinct angular positions, the EMS22A offers very high resolution indexing at every 0.35°. This type of output code is not affected by a power outage to the encoder since each angular position of the encoder has a unique code.

PWM

Pulse-Width Modulation is another form of absolute waveform that utilises the square wave output generated by the sensor to control the duty cycle of the output at different desired shaft positions. The EMS22P encoder can generate pulse widths as low as 1µs, and as high as 1024µs in a complete signal period of 1025µs. Some advantages of using this output waveform over other output types include immunity to noise and faster data acquisition.

Absolute Contacting Encoder

EAW



Features

- 22mm body
- Sealed to IP40
- Plastic threaded bush
- Plastic shaft
- Vert PCB mount

Resolution	128 states
Detents	No
Push Switch	No
Contact Rating	10mA 10VDC
Rotational Life	50k Revolutions

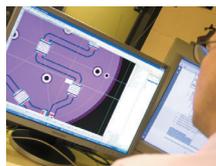
About Anglia

Anglia is the UK's leading independent authorised distributor of semiconductors, optoelectronics, interconnect, and passive and electromechanical components. A signatory of the ADS SC21 programme, the company holds AS9120, ISO9001 & ISO14001 accreditations and IECQ-CECC qualification.

Technically adept, with an experienced team of staff, Anglia supports OEM and EMS companies in every sector of electronics manufacturing. Suppliers include some of the world's leading electronic component brands, complemented by many smaller companies with leadership in their chosen technologies.

Anglia stocks over 700 million components from 500,000 product lines in the UK ready for same-day dispatch. It aims to streamline logistics and reduce customers' transaction costs through services that include KAN-BAN, EDI and customer-dedicated inventory culminating in accurate on-time delivery.

Anglia is driven by an ethic of ever-improving customer understanding and, as a privately owned business, aims to provide a fast, consistent and highly responsive service.



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