General information about encoders

What is an incremental encoder?

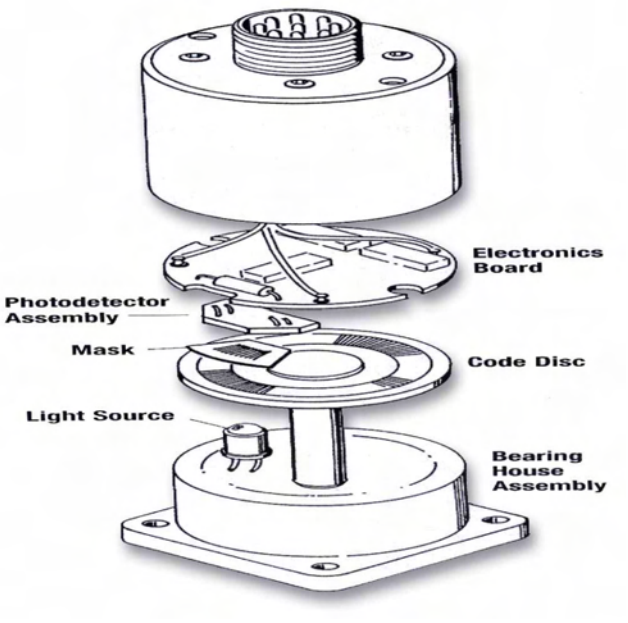
Incremental encoders are sensors capable of generating digital signals in response to rotary movement. They are employed to **convert the rotary movement into electrical signals** and to obtain position and speed measures. The encoder generates a signal for each incremental change in position. In conjunction with mechanical conversion devices, such as rack-and-pinions, measuring wheels or spindles, incremental encoders can also be used to **measure linear movement**.

Our incremental encoders are designed with an optical electronic circuit. With **optical encoders**, a grating disc made of metal or glass associated with a mask interrupts an infrared beam emitted by a transmitting gallium arsenide diode. The number of gratings (increments) determines the system's resolution, i.e. the number of increments per rotation. Every time the infrared beam is interrupted, this is registered by a receiver and then processed electronically. To make the detection less sensitive to the light level, the receiver uses a **differential measure** between two photodiodes: one lighted and the other masked. The result is a **square wave output signal.**

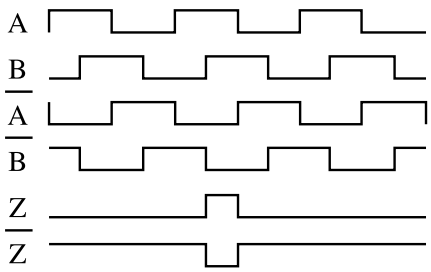
Two shifted photosensitive diode arrays deliver **squared signals (A and B) in quadrature**. The phase shift (90° electric) of signals A and B makes possible to determine the direction of rotation. In one direction, during the going up of the signal A, the signal B is equal to 1. In the other direction, during the going up of the signal A, the signal B is equal to 0.

The **Z or signal zero** comprises only one transparent window delivering one signal by turn. This signal is **gated** in synchronism **with signals A and B.** This zero signal **determines a position of reference** and allows reinitializing the system at each turn.

The electronic treatment delivers signals complementary to A, B and Z and makes possible to remove electric noises by using a differential transmission of the signals.



Output waveforms:
A leads B for clockwise rotation from front size



Rev B, 23/02/06 - We reserve the right to modify technical characteristics in the interest of technological advance.

Double Sens Communication

ZODIAC
PRECILEC

ERMEC
www.ermec.com
Distribución de componentes eléctricos y electrónicos

ERMEC, S.L. BARCELONA
C/ Francesc Teixidó, 22
E-08918 Badalona
(Spain)

Tel.: (+34) 902 450 160
Fax: (+34) 902 433 088
info@ermec.com
www.ermec.com

ERMEC, S.L. MADRID
C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
portugal@ermec.com
BILBAO
bilbao@ermec.com

www.precilec.com

Industrial Sensors

Incremental Optical Encoders, RCI range

PRECILEC optical incremental encoders are designed for accurately measuring speed and position of rotating shafts in industrial environment: machine tools, packing machines, motor drives…

They use a differential optical and ratio metric principle to minimize temperature and photodiode aging effects.

Their universal complementary push-pull output interface and their large supply voltage range make them very easy to connect to most of electronic control units with high noise immunity.

RCI 40A-BS
RCI 40A-HS

RCI 58A-BS
RCI 58A-HS

RCI 58A-FS

RCI 90A-HS

RCI 444R-FS

RCI 444ADF-FS

Type	Size mm	Shaft	Shaft size mm/inch	Max Speed Rpm	Max Résolution	Protection Shaft/housing	Termination
RCI 40A - HS	40	Hollow through	4, 6, 1/4"	6000	2500	IP 64/65	Cable
RCI 40A - BS	40	Blind hollow	4, 6, 1/4"	10000	2500	IP 64/65	Cable
RCI 40A - FS	40	Full	4, 6, 1/4"	10000	2500	IP 64/65	Cable
RCI 58A - HS	58	Hollow through	12, 1/2", 14, 15	6000	5400	IP 64/65	Cable/ connector
RCI 58A - BS	58	Blind hollow	12,1/2", 14, 15	10000	5400	IP 64/65	Cable/ connector
RCI 58A - FS	58	Full	6, 1/4", 3/8", 10	10000	5400	IP 64/65	Cable/ connector
RCI 90A - HS	90	Hollow through	20, 25, 1", 30, 42	3000	1024	IP 64/65	Cable/ connector
RCI 444R - FS	115	Full	7, 11	10000	5400	IP 64/65	Cable/connector/ junction box
RCI 444ADF - FS	115	Full	7, 11	10000	5400	IP 66	Junction box

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info@ermec.com
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C/ Sagasta, 8, 1ª planta
E-28004 Madrid
(Spain)

PORTUGAL
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BILBAO
bilbao@ermec.com