



ROTARY ENCODER SELECTION

A Step by Step Guide

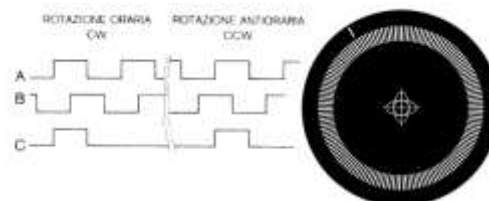


ENCODER SELECTION (THE BASICS)

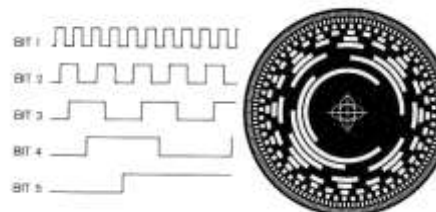
Choosing the right encoder may seem overwhelming. There are so many options and configurations that you may or may not require for your application. It is important to select an encoder that will provide you with all the flexibility and features you need. Here are a few things you need to know when choosing an encoder.

INCREMENTAL VS ABSOLUTE

- **Incremental encoders** are very simple and basic devices which provide pulses or signals to a controller. They DO NOT maintain positional data. Pulses are typically provided in an A Quad B format. Details can be found in the Output Formats 101 (Incremental) training manual.



- **Absolute encoders** provide a digital value to the controller, maintaining positional data even when power is turned off. There are many different formats in which the data can be transmitted; Point to Point, Fieldbus and Ethernet. Details can be found in the Industrial Communications 101 training manual.



SINGLE TURN VS MULTI-TURN

- **Single Turn encoders** resolve a single revolution or turn into measuring increments. They provide positional data, which rolls over after one complete revolution. The number of measuring increments per revolution is measured using a single code disk.
- **Multi-Turn encoders** provide positional data over multiple or continuous turns, up to the maximum revolutions. The positional data rolls over after the total number of revolutions has been made. The number of measuring increments is measured using a main disk and satellite disks which are driven through internal reduction gears.

PROGRAMMABLE VS NON-PROGRAMMABLE

- **Programmable encoders** offer the end user the flexibility to change specific parameters of the encoder in the field. Total Resolution, Steps per Revolution, Preset Values and Direction are amongst the many parameters that are customizable.
- **Non-Programmable encoders** have all of the specifications defined at the time of ordering. They provide a single configuration / setup which cannot be changed once the encoder is manufactured.

MECHANICAL INTERFACE STYLE

- **Solid Shaft encoders** are available in a variety of lengths and diameters, with options such as flats, with or without keys and in metric or US dimensions. They require a mechanical coupler to join the encoder to the device being monitored.
- **Hollow Shaft encoders** mount directly on a shaft, allowing the shaft to penetrate through the entire body of the encoder. They are available with or without keys, in metric or US and diameters up to 25 mm.
- **Blind Shaft encoders** mount similarly to a **Hollow Shaft**, however they only allow the shaft to penetrate partially into the housing of the encoder. They are also available with or without keys, in metric or US and diameters up to 25 mm.
- **Integrated Coupling encoders** are designed for flush mounting against a specific coupler, such as those used in String Pots (Cable Retractors).
- **String Pot (Cable Retractor)** refers to an encoder mounted onto a spring loaded drum with a cable. This allows a rotary encoder to measure linear position when the environment or application would not allow for a standard linear encoder.

STEPS PER REVOLUTION VS REVOLUTIONS

Steps per Revolution refers to the number of steps or pulses the encoder will produce per single Revolution or turn.

Revolutions refers to the total number of turns that a Multi-Turn encoder will provide positional data before rolling over.

Overall measuring length of an encoder can be calculated using the following formula:

Measuring Length = Steps per Revolution X Revolutions

SUPPLY VOLTAGE

- 5 Vdc
- 11-27 Vdc

OUTPUT INTERFACE

- **Point to Point interfaces** are basic and include the following:
 - SSI (Synchronous Serial Interface)
 - ISI (Incremental Serial Interface)
 - ASI (Asynchronous Serial Interface)
 - Parallel
 - Analog
 - Sin/Cos
 - OTHER _____.

- **Fieldbus interfaces** provide a higher level of communication and include:
 - DeviceNet
 - ProfiBus
 - CANopen
 - LWL (Optical Waveguide)
 - Interbus
 - OTHER _____.

- **EtherNet interfaces** provide the highest level of communication using the EtherNet Protocol and include:
 - EtherNet IP
 - ProfiNet
 - EtherCAT
 - PowerLink

SPECIAL REQUIREMENTS

- **Special Requirements** include Heavy Duty Housings, Custom Wire Connectors, High Vibration, Heavy Shaft Loading, Unique Mounting, or any other variables unique to your application.

TR Electronic Center of Technical Excellence will work with you to develop the best solution for your Application.

USA 1.800.709.3309 | CAN 1.800.265.9493

customer care@trelectronic.com