

ENC-KCD-BCB Absolute Magnetic Kit Encoder



FEATURES

- No Battery and No Maintenance
- High Shock and Vibration Resistance
- Digital Serial Interface: BiSS C
- 37mm Maximum Diameter
- 4.75 - 12.5 VDC
- Electrical Resolution: Up to 17-Bit Singleturn and 16-Bit Multiturn
- Energy Harvesting System

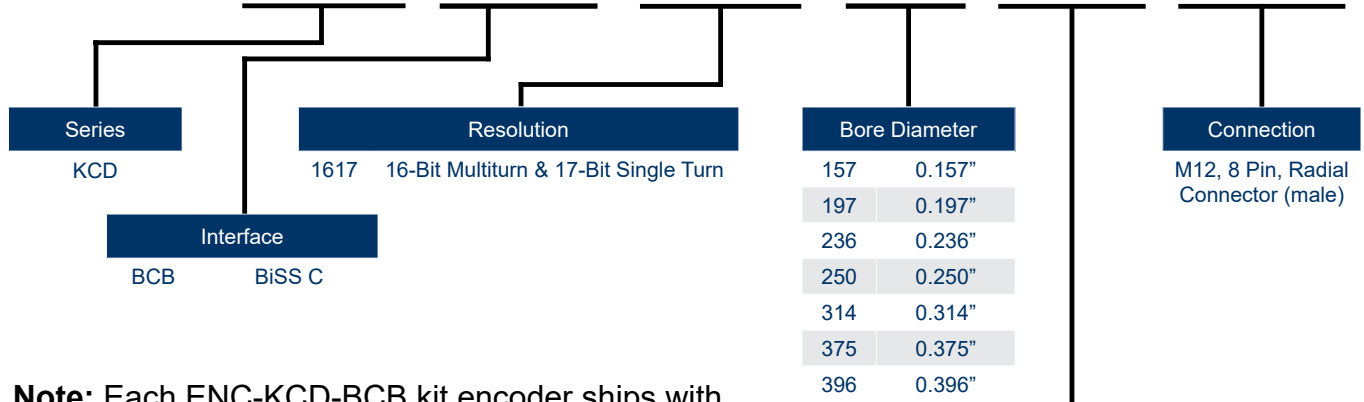


DESCRIPTION

The ENC-KCD-BCB Multiturn Absolute Magnetic Kit Encoders are the perfect combination of accuracy, reliability, and cost efficiency. This Multiturn Absolute Magnetic Kit Encoder with BiSS C Interface is for integration to motors, for robots and machinery that use a Kit Encoder for integration to motors, and for robots and machinery. ENC-KCD-BCB Multiturn Absolute Magnetic Kit Encoder is made to easily mount and dismount from an already existing shaft to provide digital feedback information. These Multiturn Kit Encoders have an Electrical Resolution up to 17-Bit Singleturn. Also, these Multiturn Kit Encoders have Multiturn range of up to 16-Bit Resolution. There are four main components that make the ENC-KCD-BCB: Base (Adapter Plate), Magnet, Printed Circuit Board (PCB), and Housing. The base fits 0.750", 0.823", or 1.812" mounting bolt circles. Furthermore, there is no battery and no maintenance.

ORDERING INFORMATION

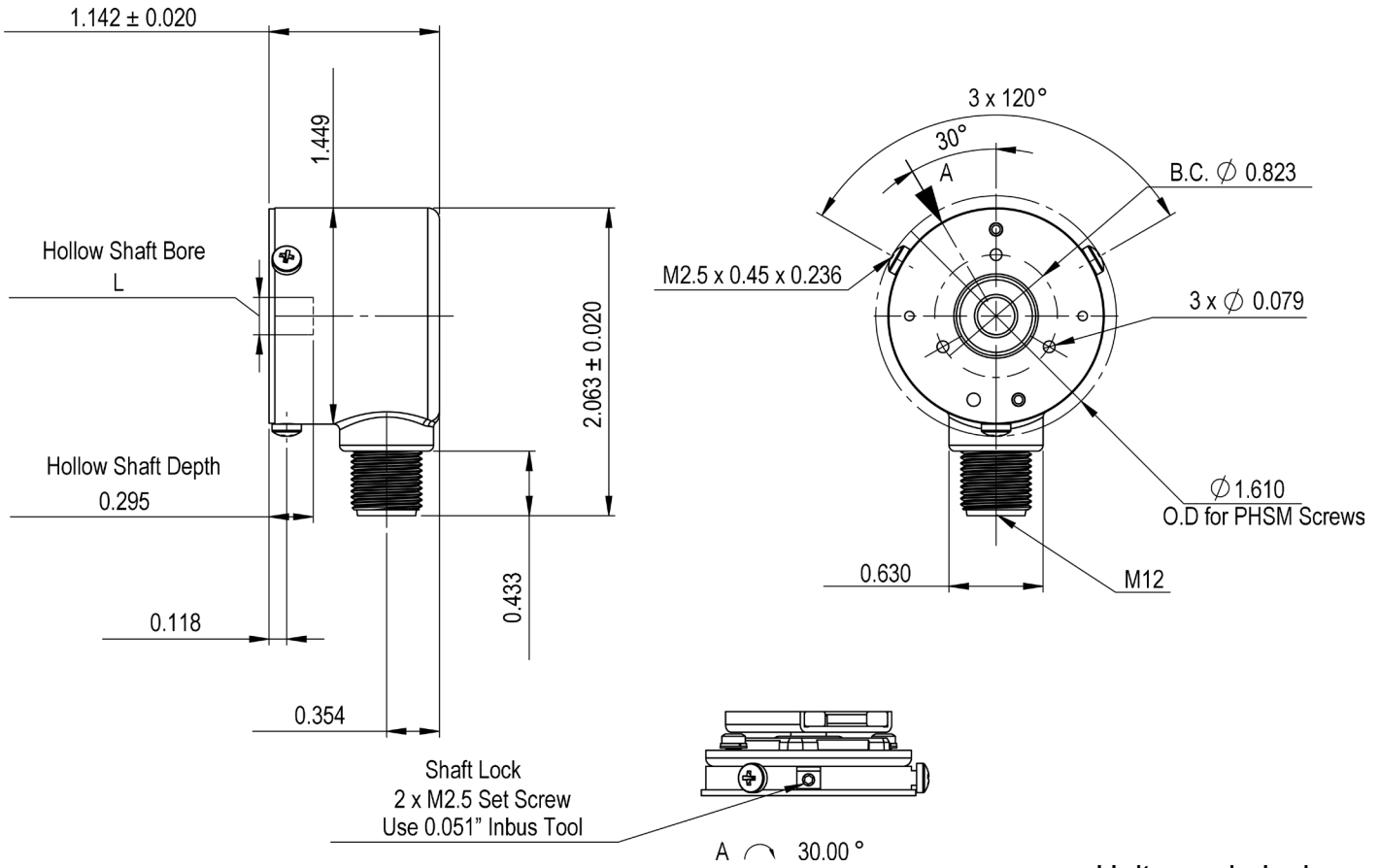
ENC-KCD-BCB-1617-157-E5U-PRQ



Note: Each ENC-KCD-BCB kit encoder ships with assembly tools, free of charge.

Mounting / Adapter Flange		
E5U	2 Mounting Holes on a 0.750" Bolt Circle	Available Bore Diameters: 157, 197, 236, and 250
E6U	3 Mounting Holes on a 0.823" Bolt Circle	
E7U	2 Mounting Holes on a 1.812" Bolt Circle	
F5U	2 Mounting Holes on a 0.750" Bolt Circle	Available Bore Diameters: 314, 375, and 393
F7U	2 Mounting Holes on a 1.812" Bolt Circle	

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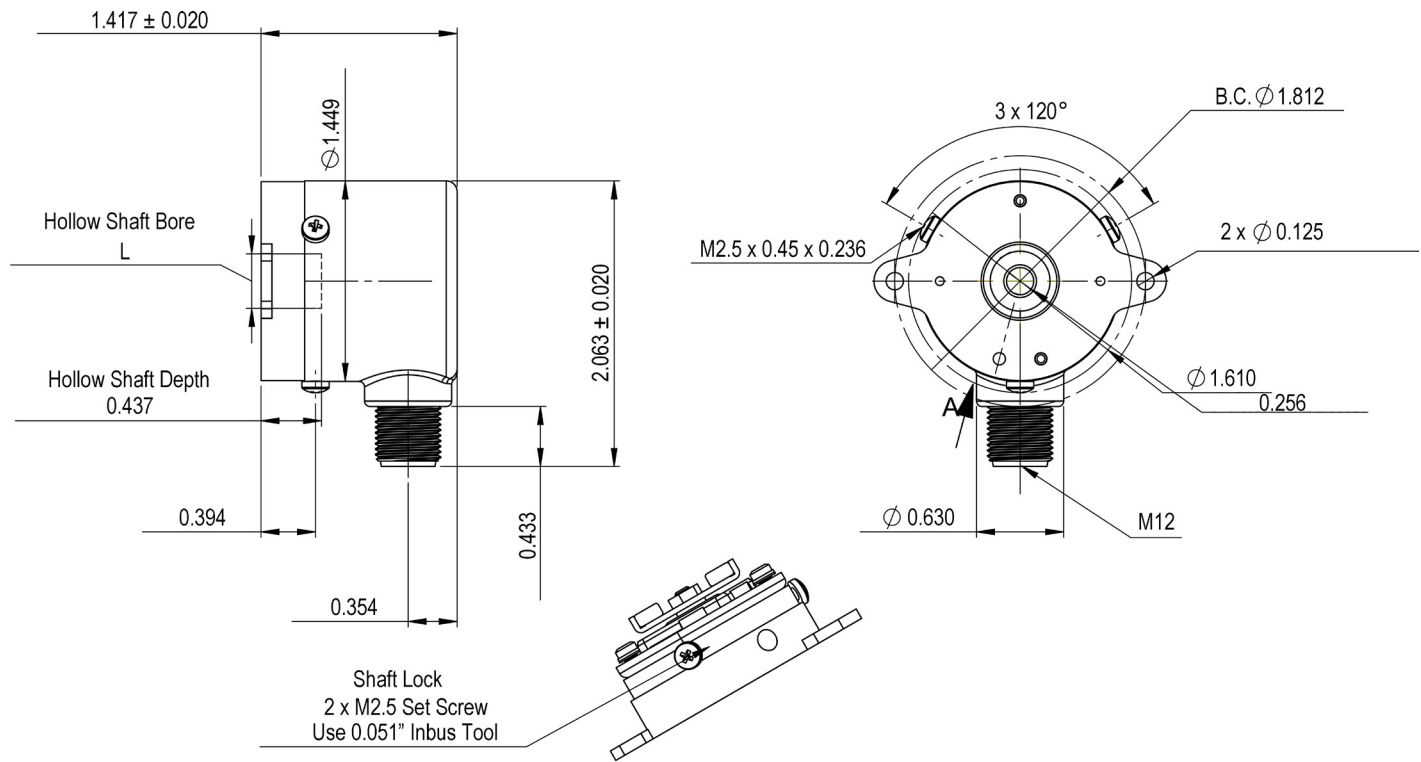


Units are in Inches

Part #	Diameter "L"
ENC-KCD-BCB-1617-157-E5U-PRQ	0.157"
ENC-KCD-BCB-1617-197-E5U-PRQ	0.197"
ENC-KCD-BCB-1617-236-E5U-PRQ	0.236"
ENC-KCD-BCB-1617-250-E5U-PRQ	0.250"

Part #	Diameter "L"
ENC-KCD-BCB-1617-157-E6U-PRQ	0.157"
ENC-KCD-BCB-1617-197-E6U-PRQ	0.197"
ENC-KCD-BCB-1617-236-E6U-PRQ	0.236"
ENC-KCD-BCB-1617-250-E6U-PRQ	0.250"

Part #	Diameter "L"
ENC-KCD-BCB-1617-157-E7U-PRQ	0.157"
ENC-KCD-BCB-1617-197-E7U-PRQ	0.197"
ENC-KCD-BCB-1617-236-E7U-PRQ	0.236"
ENC-KCD-BCB-1617-250-E7U-PRQ	0.250"



Units are in Inches

Part #	Diameter "L"
ENC-KCD-BCB-1617-314-F5U-PRQ	0.314"
ENC-KCD-BCB-1617-375-F5U-PRQ	0.375"
ENC-KCD-BCB-1617-393-F5U-PRQ	0.393"

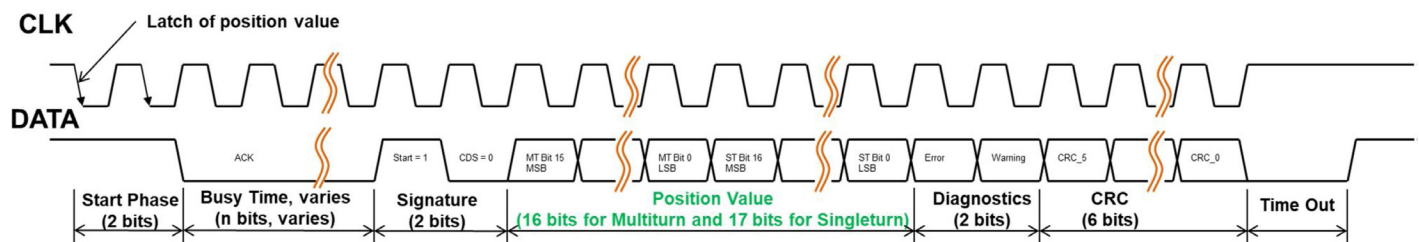
Part #	Diameter "L"
ENC-KCD-BCB-1617-314-F7U-PRQ	0.314"
ENC-KCD-BCB-1617-375-F7U-PRQ	0.375"
ENC-KCD-BCB-1617-393-F7U-PRQ	0.393"

Introduction to BiSS C Interface

In the signal timing diagram figure 2 you can see in the beginning of the transmission a start phase containing 2 bits with always high level or logical 1. The position value capture is triggered implicitly with the falling edge of the clock signal. After this start phase we have a time frame called busy time within the kit encoder is preparing the transmission of the position value in its serial interface. When this process is done a signature phase containing 2 bits with logical “1” and “0” is transmitted. This signature is important for the SPI master, because it indicates that the following bits are relevant now like position value, diagnostic bits and CRC. CRC ensures a detection of wrong transmission caused by EMC or other effects.

For simple applications it might be sufficient to just read in the position value and abort immediately afterwards the transmission. As you can see the overhead of the BiSS protocol is quite small and very efficient regarding bandwidth.

Be aware that the busy time is NOT constant and varies slightly with 6 μ s up to 7 μ s. Because of this issue it is strongly recommended to search in the received data stream for the “signature” to detect the start position of position value. Don’t assume a constant number of bits for the transmission. Otherwise you might get sporadic wrong interpretation of data values!



Latch: First rising edge of clock signal latches encoder position

Busy Time: Indicated as ACK, with second rising edge of clock signal the encoder sends “0” until data processed internal and ready to send. This takes approximately 5.5 μ s. This time is not constant and might vary. It is recommended to add one 1 μ s for safety reasons. Depending on the used clock frequency (CLK) the number of cycles must be adapted. Example: CLK frequency of 2.6 MHz. Busy time $\sim 5.5\mu\text{s} + 1 \mu\text{s} \sim 6.5 \mu\text{s}$. Number of needed CLK pulses: 14 to 16 CLK pulses.

Signature: Consists of 2 bits:

Start: Encoder is ready to transmit data indicated by “1”

CDS: Is always “0” in unidirectional mode, that means for SSI operation

Position Value: Consists of
 Multiturn (MT) 16 bit
 Singleturn (ST) 17 bit

Diagnostics: Error: e.g. HW-failure detected like memory. 0=failure, 1=data valid
 Warning: currently not supported. Constant = “1” 0=failure 1=good

CRC: Check sum. Inverted. See app note. http://www.biss-interface.com/files/BiSS_AN3_apnote_E1en.pdf

Time Out: Corresponds to t_m at SSI, $t_m=12\mu\text{s}$. It is shorter than standard SSI $t_m = 20 \mu\text{s}$, but allows to have interface cycle of 50 μs starting with 1MHz CLK

SPECIFICATIONS

Specifications	
Electrical Resolution	Up to 17 Bit
Multiturn Range	Up to 16 Bit
Accuracy	0.1°
Electrical Interface	BiSS C
Temperature Range	-40 to +105°C
Rotational Speed	Up to 12,000 RPM
Auto Calibration	No Complex Equipment
	Extensive Diagnostic Coverage
	Various Programmable Parameters

PINOUTS

This encoder uses an industry standard M12, 8 pin connector

Pin #	Description
1	GND
2	Power (Vs)
3	Clock+
4	Clock-
5	Data+
6	Data-
7	Reserved
8	Reserved
Connector Housing	Shield

