
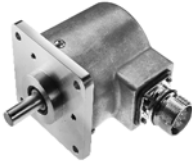










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Quick Selection Guide

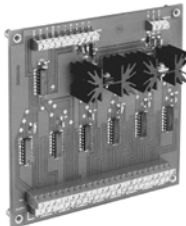
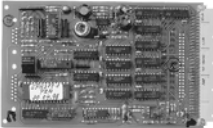

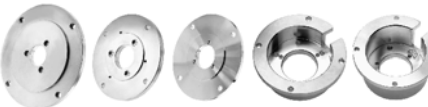
					
<b>Specifications</b>	<b>842A</b> Multi-Turn Magnetic Absolute	<b>842HR</b> Sine Cosine/Serial	<b>844A &amp; 844B</b> Hollow Shaft Incremental	<b>844D</b> Hollow Shaft Incremental	<b>845D</b> Single-Turn Absolute
<b>Resolution</b>	• 24 bits (2048...8192 CPR & 256...8192 revolutions)	• 1024 PPR	• 10...2500 PPR	• 360...16,384 PPR	• 8...12 bits (256...1000 CPR)
<b>Power Supply</b>	• 10...30V DC	• 5-12V DC, or 7...12C DC	• 5V DC, 12V DC, or 8...24V DC	• 5V DC, 10...30V DC, or 5...26V DC	• 5V DC or 8...24V DC
<b>Outputs</b>	• Synchronous Serial Interface (SSI)	• Analog differential • Digital RS-485 • Hiperface® compatible	• Differential line driver • NPN open collector	• Differential line driver • Push-Pull	• 5V TTL • Open collector
<b>Housing Size (Dia.)</b>	• 60 mm (2.36 in.)	• 64 mm (2.5 in.)	• 51 mm (2.0 in.)	• 90 mm (3.5 in.)	• 64 mm (2.5 in.)
<b>Frequency Response or Data Rate</b>	• Up to 500 kHz	• 200 kHz	• 100 kHz	• 200, 300, or 600 kHz	• 16 K words/sec
<b>Shaft Speed</b>	• 6000 RPM	• 6000 RPM	• 3000 RPM	• 3000 RPM	• 5000 RPM
<b>Mounting</b>	• Metric servo with 36 or 50 mm pilot	• Square flange • Hub Shaft	• Integral flex mount	• Three tether options & anti-rotation pin	• Square flange • English servo
<b>Connections</b>	• Radial connector	• Radial connector	• 18in (457mm) integral cable	• Radial connector • Radial cable • Terminal block	• Axial connector • Radial connector
<b>Protection</b>	• IP66 (IEC 529)	• IP66	• IP40 (IEC 529)	• NEMA 4, 13; IP66	• NEMA 4, 13; IP66
<b>Additional Info</b>	• See page 6-7	• See page 6-10	• See page 6-28	• See page 6-31	• See page 6-14

					
<b>Specifications</b>	<b>845F</b> Incremental with Integral Coupler	<b>845G</b> Single-Turn Absolute	<b>845GM</b> Single-Turn Absolute	<b>845H</b> Size 25 Incremental	<b>845K</b> Size 25 Incremental
<b>Resolution</b>	• 1...5000 PPR	• 8...15 bits (256-32,768 CPR)	• 8...15 bits (256-32,768 CPR)	• 1...5000 PPR	• Up to 5000 PPR
<b>Power Supply</b>	• 5V DC or 8...24V DC	• 5V DC, 10...30V DC, or 8...24V DC	• 5V DC, 10...30V DC, or 8...24V DC	• 5V DC or 8...24V DC	• 5V DC or 8...24V DC
<b>Outputs</b>	• Source • Sink w/pullup • Differential line driver • Open collector	• 5V TTL • Open collector • Push-Pull • SSI	• 5V TTL • Open collector • Push-Pull • SSI	• Source • Sink w/pullup • Differential line driver • Open collector	• Source • Sink • Differential line driver • Open collector
<b>Housing Size (Dia.)</b>	• 64 mm (2.5 in.)	• 64 mm (2.5 in.)	• 51 mm (2.0 in.)	• 64 mm (2.5 in.)	• 64 mm (2.5 in.)
<b>Frequency Response or Data Rate</b>	• 200 kHz	• 16 Kwords/sec	• 16 Kwords/sec	• 200 kHz	• 210 kHz
<b>Shaft Speed</b>	• 6000 RPM	• 5000 RPM	• 5000 RPM	• 6000 RPM	• 6000RPM
<b>Mounting</b>	• Standard coupler • High performance coupler	• Square flange • English servo	• Square flange • English servo	• Square flange • English servo	• Square flange • English servo
<b>Connections</b>	• Axial connector • Radial connector • Axial cable • Radial cable	• Axial connector • Radial connector	• Radial connector	• Axial connector • Radial connector • Axial cable • Radial cable	• 24in pigtail cable termination
<b>Protection</b>	• NEMA 4, 13; IP66	• NEMA 4, 13; IP66	• NEMA 4, 13; IP66	• NEMA 4, 13; IP66	• NEMA 1
<b>Additional Info</b>	• See page 6-34	• See page 6-18	• See page 6-23	• See page 6-37	• <a href="http://www.ab.com/catalogs">www.ab.com/catalogs</a>

## Quick Selection Guide

Specifications	 <b>845P</b> Size 15 Incremental	 <b>845PY</b> Digital Tachometer (5PY Mounting)	 <b>845S</b> IGBT Drive Incremental	 <b>845T</b> Size 20 Incremental
<b>Resolution</b>	• 500 or 1000 PPR	• 1...3000 PPR	• Up to 5000 PPR	• 1...3000 PPR
<b>Power Supply</b>	• 5V DC	• 5V DC, 11...20V DC or 24V DC	• 5V DC and 8...24V DC	• 5V DC, 11...20V DC or 24V DC
<b>Outputs</b>	• Differential line driver	• Differential line driver	• Differential line driver	• Push-Pull • Differential line driver
<b>Housing Size (Dia.)</b>	• 40 mm (1.59 in.)	• 51 mm (2.0 in.)	• 64 mm (2.5 in.)	• 51 mm (2.0 in.)
<b>Frequency Response or Data Rate</b>	• 100 kHz	• 100 kHz	• 100 kHz	• 100 kHz
<b>Shaft Speed</b>	• 5000 RPM	• 15000 RPM	• 6000RPM	• 15000 RPM
<b>Mounting</b>	• English servo	• 5PY	• Square flange • English Servo	• Square flange • English servo
<b>Connections</b>	• 18 in. (457 mm) integral cable	• Radial connector • Radial cable	• Axial connector & cable • Radial connector & cable	• Radial connector • Radial cable
<b>Protection</b>	• NEMA 1	• NEMA 4, 13; IP66	• NEMA 4, 13; IP66	• NEMA 4, 13; IP66
<b>Additional Info</b>	• <a href="http://www.ab.com/catalogs">www.ab.com/catalogs</a>	• See page 6-41	• <a href="http://www.ab.com/catalogs">www.ab.com/catalogs</a>	• See page 6-41

<b>Accessories</b>	 <b>Flexible Couplings</b>	 <b>Measuring Wheels</b>	 <b>Servo Clamps</b>	 <b>Cable Assemblies</b>	 <b>Mating Connectors</b>
<b>Additional Info</b>	• See page 6-47	• See page 6-48	• See page 6-48	• See page 6-49	• See page 6-52

<b>Accessories</b>	 <b>Buffer Board</b>	 <b>Serial Parallel Adaptor</b>	 <b>Servo Clamps</b>	 <b>Mounting Plates</b>
<b>Additional Info</b>	• See page 6-55	• See page 6-46	• See page 6-46	• See page 6-52

# I/O to Encoder Selection Guide

## Accessories

To use this selection guide, scan down the column of the input card or device being used, then look in the column to the right for typical encoders that could

be used in the application. The asterisk ( \* ) is used to represent one character in the catalog number. Complete the encoder catalog number by referring to

the appropriate pages in the catalog. Some absolute encoders typically require an output module to send a latching signal.

Incremental Encoders		Absolute Encoders		
If you have one of these Input Devices:	Select one of these Encoders:	If you have one of these Input Devices:	Select one of these Encoders:	And select one of these Output Modules if necessary:
1395 DC Drive 1746-HSCE 1746-HSTP1 1756-M02AE 1756-HSC 1771-IJ 1771-QC 1771-VHSC 8200 CNC 8400 CNC 8600 CNC 9 SERIES CNC IMC 110, 120 IMC 121, 123 IMC S-CLASS MAX CONTROL	845F-SJ*Z*4**Y** 845H-SJ***4**Y** 845K-SA*Z*4**Y3 845M-***5LD****	1746-IG16 1771-IG 1771-IGD	845D-SJ***4BD*** 845D-SJ***4BN*** 845G-*3**HT**** 845GM-*3**HT****	1771-OG / OGD 1746-OG16
	845P-SHC14-**3 845PY-**-**_* 845T-**13E**_* 845T-**43E**_* 845T-**53E**_* 844D-****1** 844D-****4** 844A-**05D**** 844B-**05D****	1746-IG16 1771-IG 1771-IGD	845D-SJ***4AG*** 845G-*3G*HT**** 845GM-*3G*HT**** 842A with 842-SPA	None Required
		1746-ITV16 1746-IV8,16,32 1771-IQ, IQ16 1771-IV, IVN 1756-IV16 1794-IV16	845D-SJ**25AG*** 845G-*3G8HC**** 845GM-*3G8HC**** 842A with 842-SPA	None Required
1771-IK	845F-SJ*Z26**Y** ❶ 845H-SJ**26**Y** ❶ 845K-SA*Z25**Y3 845T-**3***_*C 844A-**12C**** 844B-**12C**** 844D-****5**	1746-ITV16 1746-IV8,16,32 1771-IQ, IQ16 1771-IV, IVN 1756-IV16 1794-IV16	845D-SJ**25BD*** 845D-SJ**25BN*** 845G-*3B8HC**** 845G-*3D8HC**** 845GM-*3B8HC**** 845GM-*3D8HC****	1771-OV 1746-OV 1756-OV16E 1794-OV16
1336 PLUS 1336 FORCE 1336 IMPACT	845S-****	1771-DE	845D-SJ***4A**** 845G-*3**HT**** 845GM-*3**HT****	None Required
MICROLOGIX 1000, 1200, 1500	845T-**33A**_* 845TK-****_* 844D-****5** 844A-**12C**** 844B-**12C****	1771-DL	845D-SJ***5AGCW* 845G-*3G8HC0256* 845GM-*3G8HC0256*	None Required
1794-VHSC 1394	845H-SJ**24 845T-**53 844D-****4** 844A-**05D**** 844B-**05D****	4100-AEC AMCI 7561	842A-**** 845G-*3*AHS**** 845GM-*3*AHS****	None Required
		1756-IBI16	845G-*3G8LC**** 845GM-*3G8LC**** 845D-SJ**25AG	None Required
1794-ID2 1746-HSCE2 1756HSC 1397	845H-SJ**26 845T-**63 844D-****2** 844A-**24D**** 844B-**24D****	1756-PLS	846-SJDA1CG-R3C	None Required
1747-L**C 1747-L**D 1747L**E	845T-**31**	1746-ITB16 1746-IB8, IB16, IB32 1771-IQ, IQ16 1771-IB, IBN 1794-IB16 1756-IB16 MicroLogix 1000, 1200, 1500	845G-*3*8HP**** 845GM-*3*8HP****	1771-OV 1746-OV 1756-OV16E 1794-OV16
845-BB-	845F-SJ**14 845H-SJ**14 845K-SA**14 845P-SHC14-** 845T-**13 844D-****1** 844A-**05D**** (5V DC Supply)			
	844B-**05D**** 845F-**24 845H-SS**24 845K-SA**24 845T-**43 844D-****4** (12V DC Supply)			

❶ Wire Single Ended Only (no complements)

## Technical Definitions and Terminology

**5PY:** A type of analog DC tachometer with a specific bolt pattern.

**Angular Acceleration:** The rate of change of angular velocity usually expressed in radians per second squared.

**Angular Misalignment:** The maximum amount of angle between the coupled shafts.

**Axial:** The direction parallel to the encoder shaft.

**Axial Compliance:** The maximum amount of machine shaft end play.

**Axial Load:** The maximum amount of force that may be applied to an encoder shaft in a direction parallel to the shaft.

**Blind Shaft:** A hollow shaft encoder which is covered on one end so that the accepted shaft cannot exceed a maximum length. See also "Hollow Shaft" and "Through Shaft."

**Binary:** A number system using 2 as its base (1,2,4,8,16,32,...).

**Binary Coded Decimal (BCD):** A number system where decimal numbers 0 through 9 are represented by 4 binary bits (8,4,2,1).

**Bit:** An abbreviation for binary digit.

**Channel:** An incremental encoder output signal. A dual channel encoder has two outputs.

**Counts Per Turn:** Sometimes referred to as Pulses Per Revolution (PPR), the total number of positions in 360 degrees of shaft rotation.

**Current Sinking:** An output type where signal current flows from the load into the encoder.

**Current Sourcing:** An output type where signal current flows from the encoder into the load.

**Data:** Factual measurement information transmitted by an encoder either in parallel or serial form.

**Decades:** In BCD a decade is comprised of 4 bits (1, 2, 4, 8) representing one decimal place (units, tens, hundreds, etc.).

**Differential:** In digital logic terms a pair of outputs exactly opposite 0, 1, or 180 degrees out of phase.

**Differential Line Driver:** A type of output driver using two signal lines per encoder channel. When used with a differential line receiver, longer cable lengths and higher noise immunity can be provided.

**Duty Cycle:** The ratio of the logic "1" level to the total period of one cycle.

**End Play:** The amount of axial shaft movement with a specified amount of axial load applied.

**Flange:** A square mounting configuration for rotary encoders and resolvers.

**Frequency Response:** The maximum frequency at which all parameters are still in specification.

**Gray Code:** A binary code in which only one bit of the binary word changes for each sequential number or position.

**Heavy Duty:** Encoders with higher shaft loading characteristics are considered heavy duty.

**High Performance:** Encoders with high frequency response and resolution are considered high performance.

**Hollow Shaft:** A shaftless encoder design which mounts on the shaft of a connected device such as a motor. See also "Blind Shaft" and "Through Shaft."

**Impedances:** Impedances, expressed in ohms, are usually specified in rectangular form as  $R + jX$  where R is the sum of the DC and AC resistive components and X is the reactive component.

**Index:** An output signal, also known as a zero marker, which is produced once per revolution. It is used to identify a home position or a reset point.

**Input Current:** The current required to power the internal circuitry of the encoder.

**IP66 (IEC 529):** Provides a degree of protection against dust, and water projected in powerful jets from any direction.

**Load:** A term used to describe the device to which encoder signals are applied.

**Maximum Working Temperature:** A maximum temperature allowed for operation for most applications. Some specifications may not be met. Also see "Operating Temperature."

**Maximum Working Speed:** A maximum speed allowed for operation for most applications. Shaft loading must be minimized. Some specifications may not be met. See also "Operating Speed."

**Moment of Inertia:** The sum of the products formed by multiplying the mass of each element of a figure by the square of its distance from an axis.

**NEMA Type 1:** Type 1 enclosures are intended to provide protection against incidental contact with dirt, dust, lint, fibers, and other nonliquid contaminants.

**NEMA Type 4:** Type 4 enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water and hose directed water. They are not intended to provide protection against conditions such as internal condensation or internal icing.

**Nosepiece:** The housing that holds the shaft, bearings, and shaft seal.

**Null Voltage:** The residual voltage remaining when the in-phase component of the output voltage is zero.

**Operating Speed:** The maximum shaft RPM allowed at which all specifications are met. See also "Maximum Working Speed."

**Operating Temperature:** The maximum temperature allowed at which all specifications are met.

**Parallel Misalignment:** The maximum amount of distance between the center lines of the coupled shafts.

# Technical Definitions and Terminology

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**Pulses Per Revolution (PPR):** See counts per turn.

**Push-Pull:** A type of single-ended output driver capable of sinking and sourcing current. Also known as Totem-Pole.

**Quadrature:** Separation in phase by 90°. Used on incremental encoders to denote the direction of motion.

**Radial:** The direction perpendicular to the encoder shaft.

**Radial Load:** The maximum amount of force that may be applied to an encoder shaft in a perpendicular direction.

**Radial Play:** The amount of shaft radial movement with specified radial load.

**Radian:** An arc in any circle, equal in length to the radius of the same circle.

**Resolution:** The measure of the smallest change of input that the encoder can detect.

**Running Torque:** The torque required to keep a shaft rotating at constant velocity, typically measured in inch-ounces.

**Sensitivity:** The output voltage expressed as a function of the shaft angle in millivolts/degree.

**Servo:** A circular mounting configuration that allows for rotation of the encoder for purposes of alignment. Also a common term for a small electric motor.

**Shaft Loading:** The maximum amount of force that may be applied to an encoder shaft typically expressed in pounds (Newtons).

**Shaft Runout:** The amount of radial movement when spinning.

**Shock:** A transient motion which is capable of exciting mechanical resonances.

**Single-Ended:** An output referenced to common which uses only one signal line for data transmission.

**Size 15:** Encoders with a nominal diameter of 1.5 inches (1.625 inch encoders are also classified as size 15).

**Size 20:** Encoders with a nominal diameter of 2.0 inches.

**Size 25:** Encoders with a nominal diameter of 2.5 inches.

**Slew Speed:** The maximum velocity an encoder may be operated without physical damage to the unit.

**Starting Torque:** The torque required to start a shaft rotating, typically measured in inch-ounces.

**Symmetry:** The ratio of the logic "1" level to the total period of one cycle.

**Synchronous Serial Interface or SSI:** A serial communication protocol often used to translate parallel absolute encoder data. Advantages of SSI over parallel wiring include reduced wire count and better noise immunity.

**Through Shaft:** A hollow shaft encoder which is open on both ends so that the accepted shaft length is unlimited. For example, a through shaft encoder allows a motor shaft to protrude through it. See also "Blind Shaft" and "Hollow Shaft."

**Transformation Ratio:** The ratio of the output voltage to the input voltage when the output is at maximum coupling.

**Vibration:** The periodic change in displacement with respect to a fixed reference.

**Zero Reference:** An output signal which is produced once per revolution. It is used to identify a home position or a reset point.

# Bulletin 842A Absolute Multi-Turn Magnetic Encoders

## Synchronous Serial Interface



### Description

Bulletin 842A is a 25-bit absolute multi-turn shaft encoder. It can provide up to maximum of 8192 pulses per turn or a maximum of 8192 turns. It has SSI outputs to reduce cable costs.

The 842A can be interfaced in several ways:

- 1734-SSI Synchronous Serial Interface Absolute Encoder Module
- 842-SPA and 842-CH which converts SSI to parallel data
- 4100-AEC which converts SSI to A quad B data to interface with 1394 GMC/GMC Turbo and S Class Compact motion controllers (see publication 4100-AEC-1.1)
- SLC input module AMCI 7561 which inputs SSI data directly into the module (see Encompass partner AMCI).
- PLC—AMCI 7761H

Synchronous Serial Interface or SSI provides many advantages over traditional parallel wiring. SSI provides 25 bit resolution over 5 wires rather than the usual 24 wires. The use of SSI technology in the Bulletin 842A provides the following customer benefits:

- Greatly reduced wiring cost and complexity
- Greatly improved noise immunity achieved via differential communication format
- Simplified start up
- Choice of gray code or natural binary formats

### Specifications

Certifications	CE Marked for all applicable directives.
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#### Electrical

Code Format	Gray or Natural Binary
Code Direction	CW or CCW
Symmetry	40...60%
Operating Voltage	10...30V DC
Power Supply	30 mA @ 24V
No. of Steps, Max.	8192
No. of Revolutions, Max.	8192
SSI Position Forming Time	0.15 msec
Power-Up Delay	1050 msec
Clock +, Clock -, Data +, Data -	Synchronous Serial Interface (SSI)
CW/CCW	"L" active (L = 0-1.5V, H = 3.0 - V <sub>s</sub> )
Reset	Via covered rear button or reset pin

#### Mechanical

Angular Acceleration	5 x 10 <sup>5</sup> radians/sec <sup>2</sup>
Moment of Inertia	35 gcm <sup>2</sup> (5.0 x 10 <sup>-4</sup> oz-in-sec <sup>2</sup> )
Shaft Operating Speed, Max. (RPM)	6000 RPM at max shaft loading
Starting Torque	2.5 Ncm (3.5 oz-in)
Shaft Loading	Axial 11 lb (50 N) Radial 67 lb (300 N)

#### Environmental

Material	Aluminum housing
Operating Temperature [C (F)]	-20...85° (-4...+185°)
Storage Temperature [C (F)]	-40...100° (-40...+212°)
Relative Humidity	98% noncondensing
Enclosure Type Rating	NEMA Type 4, 13; IP67 (IEC 529): Static Shaft
Shock	100 g/6 msec
Vibration	20 g/10...2000 Hz
Weight [g (oz)]	0.5 (18)

### Typical Applications

- Steel mills
- Overhead cranes
- Punch press
- Transfer lines
- Oil rigs
- Wind mills
- Machine Tools
- Packaging

### Accessories

Description	Page Number
Serial Parallel Adaptor Board	6-46
Flexible Couplings	6-47
Measuring Wheels	6-48
Servo Clamps	6-48
Pre-Wired Cables	6-49
Mating Connectors	6-52
Mounting Plates	6-52

# Bulletin 842A Absolute Multi-Turn Magnetic Encoders

## Synchronous Serial Interface

### Product Selection

842A — **31** **G** **B**  
*a* *b* *c*

*a*

Mounting Configuration	
Code	Description
31	Servo Mount 10 mm Shaft 36 mm Pilot
56	Servo Mount 6 mm Shaft 50 mm Pilot

*b*

Code Type	
Code	Description
G	Gray Code
N	Natural Binary

*c*

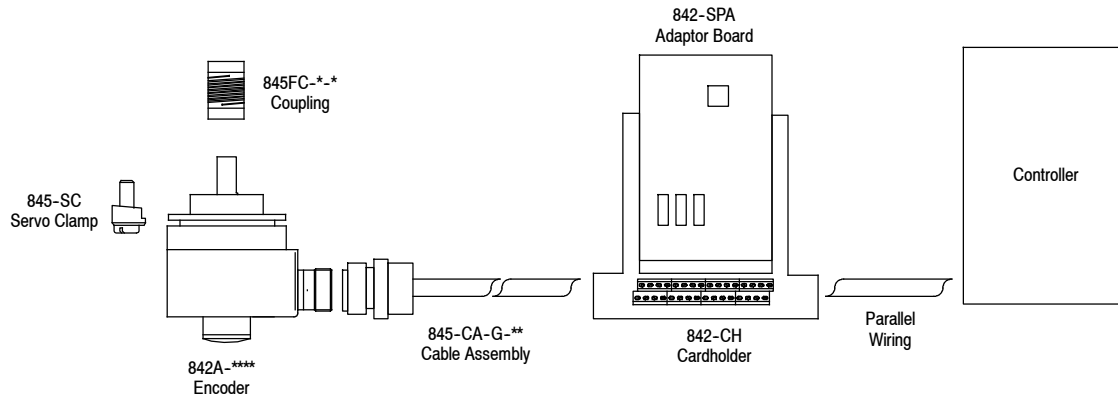
Resolution		
Code	Pulses per Revolution	Number of Revolutions
A	8192	2048
B	4096	4096
C	2048	8192
D	4096	512
E	4096	256

### Electrical Connections

The 842A comes with an M23 connector. Order the mating connector separately.

Function	Pin Number
DC Return	1
Data +	2
Clock +	3
DC+ Input	8
Data -	10
Clock -	11
CW/CCW	12
Reset	9

### Typical Application

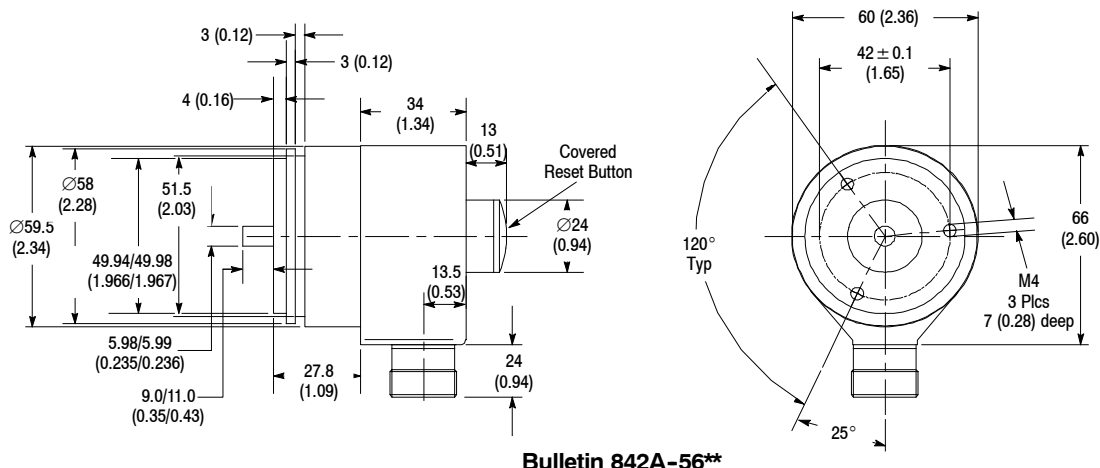




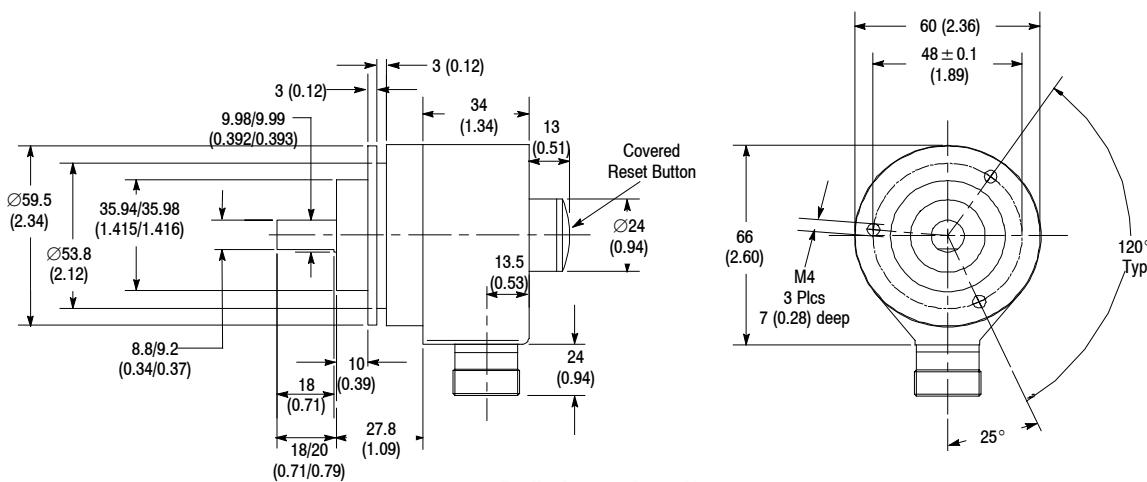
# Bulletin 842A Absolute Multi-Turn Magnetic Encoders

Synchronous Serial Interface

## Approximate Dimensions [mm (in.)]



Bulletin 842A-56\*\*



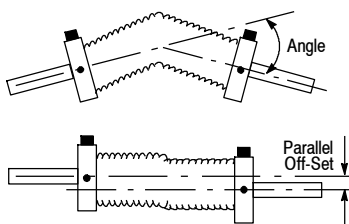
Bulletin 842A-31\*\*

**ATTENTION**



Activating the zero reset results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury.

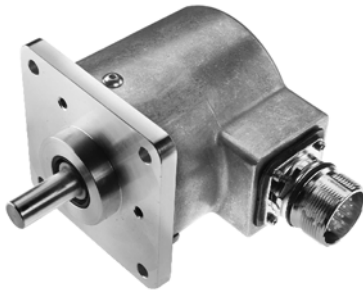
**Flexible Shaft Couplings**



**ATTENTION**



Rigidly coupling the encoder shaft to the machine shaft will cause a failure in either the bearings of the encoder or the bearings of the machine shaft.

**Bulletin 842HR Sine Cosine/Serial Encoders****Size 25, High Resolution Auxiliary Servo Feedback****Description**

Bulletin 842HR is a 15-bit serial/sine cosine encoder. Targeted for high performance digital servo drive systems that require absolute feedback for position control and high resolution incremental feedback for speed control.

Rockwell Automation sine cosine high performance encoders provide commutation, speed regulation and position control all in one device. Absolute position values of up to 15 bit combined with incremental resolution up to 2 million counts per turn.

**Features**

- Absolute feedback for position control
- High resolution Incremental feedback for speed control
- Commutation
- Sine cosine differential interface
- Digital bidirectional RS-485 interface
- Compatible with Hiperface<sup>®</sup> interface
- Internal diagnostic functions

**Typical Applications**

Compatible with a variety of motor control products including Kinetix<sup>®</sup> drives and the Allen-Bradley Guardmaster<sup>™</sup> MSR 57 safe speed monitoring relay, the 842HR is a flexible solution for a wide range of industrial applications.

- Packing machines
- Robotics
- Printing machines
- Rotary table positioning

**Specifications**

Certifications	CE Marked for all applicable directives
<b>Electrical</b>	
# of sine/cosine cycles per revolution	1,024
Code format for absolute position value	Binary
Code direction with clockwise rotation viewed from shaft end	Increasing
# of steps per revolution (Single 842HR-S)	32,768
# of revolutions (Multi 842HR-M)	4,096
Error limits for the digital absolute value via RS 485	±90 angular seconds
Error limits in evaluating the 1,024 signals, integral non-linearity	±45 singular seconds
Non-linearity within a sine/cosine period, differential non-linearity	±7 angular seconds
Output frequency for sine/cosine signals	0...200 kHz
Operating Voltage Range	7...12V, 5...12V
Max. Operating Current, no load	
5...12 V Supply ❶	180 mA
7...12 V Supply	80 mA
Available Memory on EEPROM ❷	128 bytes
Interface Signals	
Process data channel = SIN, REFSIN, COS, REFCOS	Analog, differential
Parameter channel = RS 485	Digital
<b>Mechanical</b>	
Angular Acceleration, Max.	5 x 10 <sup>5</sup> rad/sec <sup>2</sup>
Shaft Operating Speed, Max. (RPM)	6,000
Torque to Operate [N•m (lb•in)]	0.024 (0.212) max.
Starting Torque, Max.	0.035 N•m (0.309 lb•in)
Shaft Loading	Radial 35 lb, Axial 40 lb
Life of Ball Bearings	3.6 x 10 <sup>9</sup> rotations
<b>Environmental</b>	
Material	Aluminum housing
Operating Temperature [C (F)]	-20...85° (-4...+185°)
Storage Temperature [C (F)]	-30...+90° (-22...+194°)
Relative Humidity ❸	90%
Shock ❹	30 g/11 ms
Vibration ❺	20 g/10...2 kHz
Enclosure Type Rating ❻	IP66 (IEC60529)
Weight [g (oz)]	481 g (17 oz)
EMC	DIN EN61000-6-2 DIN 61000-6-3

❶ Inrush current with 5...12V supply can be as high as 1 Amp

❷ If applying the electronic type label, in connection with numeric controllers, attention should be paid to Patent EP 425 912 B 2. Application of the electronic type label in connection with speed regulation is exempt.

❸ Condensation not permissible

❹ To DIN EN 60068-2-27

❺ To DIN EN 60068-2-6

❻ With mating connector inserted

## Bulletin 842HR Sine Cosine/Serial Encoders

Size 25, High Resolution Auxiliary Servo Feedback

## Product Selection

842HR — **S** **J** **DZ** **1** **15FWY** **2**

*a*                      *b*                      *c*                      *d*

*a*

No. of Turns	
Code	Description
S	Single-turn (1 turn)
M	Multi-turn (4096 turns)

*b*

Mounting Configuration (Note)	
Code	Description
DZ	Square Flange, 3/8 in. solid shaft
DN	Square Flange, 3/8 in. solid shaft with flat
A1	Hub shaft, 15 mm blind hollow shaft
A2	Hub shaft, 1/2 in. blind hollow shaft
A3	Hub shaft, 12 mm blind hollow shaft
A4	Hub shaft, 10 mm blind hollow shaft
A5	Hub shaft, 3/8 in. blind hollow shaft
A6	Hub shaft, 8 mm blind hollow shaft
A7	Hub shaft, 1/4 in. blind hollow shaft
A8	Hub shaft, 6 mm blind hollow shaft

*C*

Power Supply	
Code	Description
1	5...12V DC
2	7...12V DC

*d*

Connection Options	
Code	Description
2	MS 10-pin
D	M23 17-pin

Note: Hub shaft units are supplied with 15 mm blind hollowshaft. For shaft bores smaller than 15 mm, a shaft insert is supplied having the correct ID.

## Output Termination: M23 17-Pin

Pin No.	Function	Explanation	Wire Color
1	SINE	Process Data Channel	Black
2	REFSINE	Process Data Channel	White/Black
3	COSINE	Process Data Channel	Red
4	REFCOSINE	Process Data Channel	White/Red
5	Data +	RS-485 parameter channel	Green
6	Data -	RS-485 parameter channel	White/Green
9	DC + Input	5V Supply Voltage	Grey
10	DC Return	Ground Connection	White/Grey ①
11	DC + Input	9V Supply Voltage	Orange
13	N.C.		
14	N.C.		
15	N.C.		
16	N.C.		
17	N.C.		
7	CASE	Case Ground	Brown
8	N.C.		
12	DC Return	Ground Connection	①

① Pin 12 internally tied to pin 10

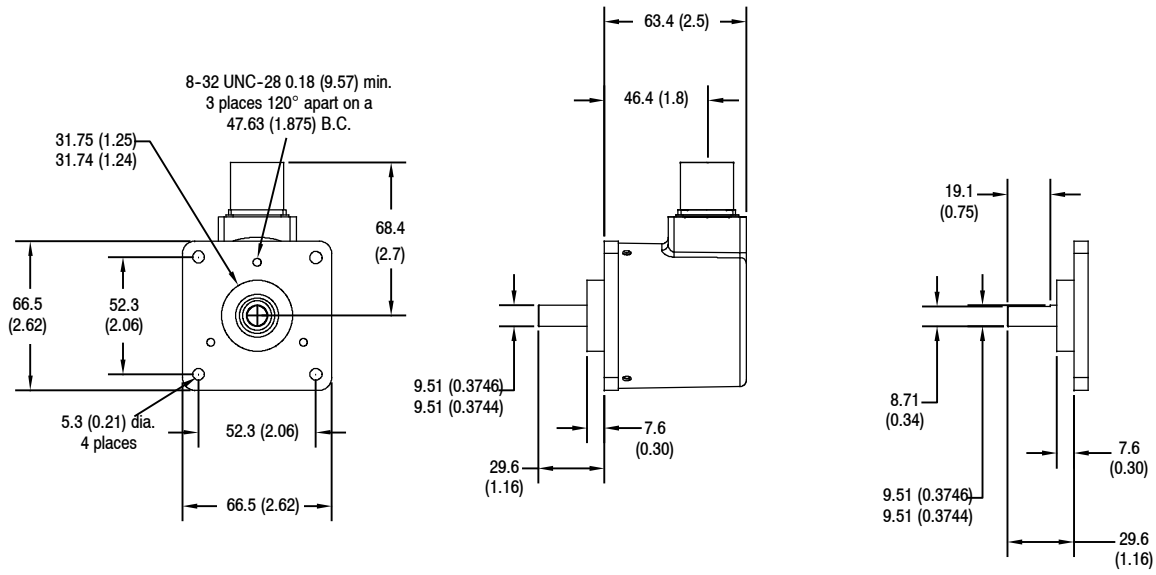
## Output Termination: MS 10-Pin

Pin No.	Function	Wire Color
A	+VS	Red
B	Common	Blue
C	Ref SIN	Brown
D	Ref COS	Black
E	Data +	Grey
F	Data -	Green
G	SIN	White
H	COS	Pink
I	Not Used	
J	Case	Case

# Bulletin 842HR Sine Cosine/Serial Encoders

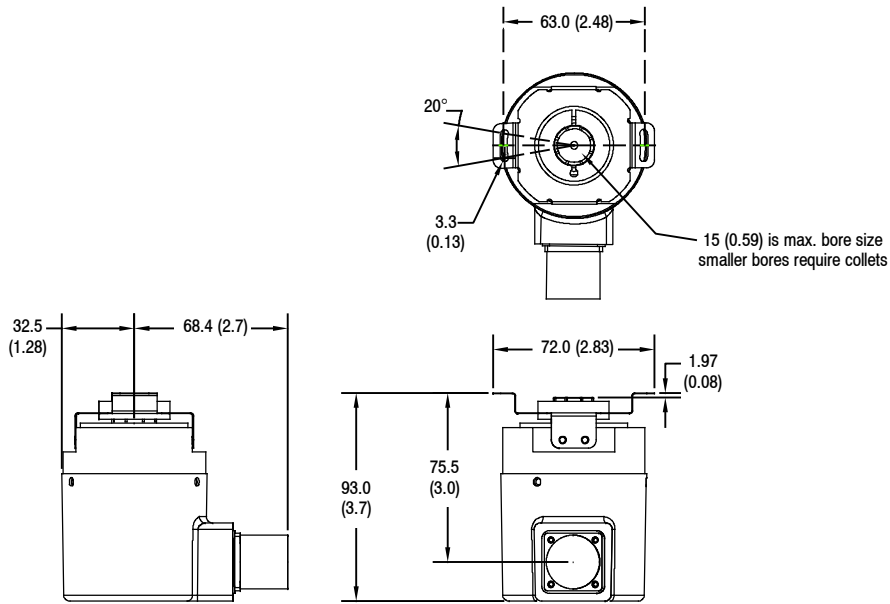
## Size 25, High Resolution Auxiliary Servo Feedback

### Approximate Dimensions [mm (in.)]



Square Flange, Solid Shaft

Solid Shaft with Flat



Hub Shaft

# Bulletin 842HR Sine Cosine/Serial Encoders

## Size 25, High Resolution Auxiliary Servo Feedback

### Accessories

Description	Cat. No.
M23 17-Pin Cables	2090-XXNFMF-Sxx
MS 10-Pin Cables	842HR-CA-2-yy
Flexible Coupling	845-FC-x-x

#### 2090-XXNFMF-Sxx

Pre-wired cable to a M23 DIN 17-pin connector for the encoder. The other end of the cable is flying leads.

xx = Cable Length	
01	1 m
02	2 m
03	3 m
04	4 m
05	5 m
07	7 m
09	9 m
12	12 m
15	15 m
20	20 m
25	25 m
30	30 m

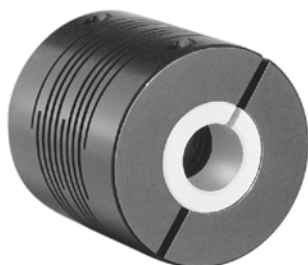
**Note:** Consult manufacturer's drive manual for maximum recommended cable length.

#### 842HR-CA-2-yy

Pre-wired cable to a MS 10-pin connector for the encoder. The other end of the cable is flying leads.

yy = Cable Length	
01	1 m
03	3 m
05	5 m
10	10 m
20	20 m
30	30 m

### Flexible Couplings



### Description

High performance flexible couplings are used to connect two shafts, and help to reduce the effects of misalignment between the shafts. Flexible couplings are offered in the high performance version, with nonconductive inserts. They are of the flexible curved beam helical type with clamping screw at both ends.

### Specifications

Parallel Offset	0.51 mm (0.02 in.) max.
Angular Offset	10° max.
Axial Compliance	1.58 mm (0.06 in.) max.
Construction	Aluminum with a fiberglass insert

Available cat. nos. for this encoder:

- 845-FC-B-B
- 845-FC-B-C
- 845-FC-B-R
- 845-FC-B-T
- 845-FC-A-B
- 845-FC-R-B

### Product Selection

845 — FC —  $\frac{B}{a}$  —  $\frac{B}{b}$

*a*

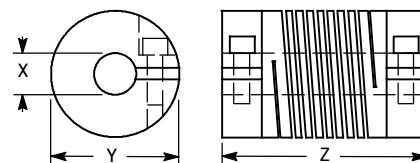
Smallest Bore Diameter	
Code	Description
A	1/4 inch
B	3/8 inch
R	6 mm
T	10 mm

*b*

Largest Bore Diameter	
Code	Description
A	1/4 inch
B	3/8 inch
C	1/2 inch
R	6 mm
T	10 mm

### Approximate Dimensions [mm (in.)]

#### High Performance Flexible Coupling



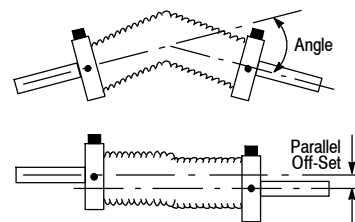
Dimension Code	Bore Size Code Letter				
	A	B	C	R	T
X	6.4 (0.25)	9.5 (0.375)	12.7 (0.50)	6	10
Y	30.56 (1.20) Dia.				
Z	32 (1.25) Long				

### ATTENTION



The shielded cables, output devices, and power supplies must be properly grounded. All National Electric Code and applicable local codes and ordinances must be observed when wiring the system.

### Flexible Shaft Couplings



### ATTENTION



Rigidly coupling the encoder shaft to the machine shaft **will cause a failure** in either the bearings of the encoder or the bearings of the machine shaft.

**Bulletin 845D Absolute Encoders**

Single-Turn, Size 25



English Servo Mount  
845D-SJHZ14BDCK2

**Description**

The Bulletin 845D is a heavy duty, NEMA Type 4 single-turn absolute position encoder that digitizes shaft angle position into one of a number of absolute code formats. The absolute encoder has a unique digital output for each shaft position. The use of absolute encoders assures that true position is always available, regardless of power interruptions to the system.

The Bulletin 845D provides improved accuracy, increased operating speed and high noise immunity over competitive units. The 845D is housed in a size 25 NEMA Type 4 enclosure to meet the demands of today's industrial environment.

**Features**

- Absolute Gray Code, Natural Binary or BCD output
- Optional latch command input for discrete I/O
- Optional 5V or 8...24V DC power requirements
- 85°C (185°F) operating temperature
- Electronic zero set pin
- Field-selectable direction control
- CE Marked for all applicable directives

**Specifications**

<b>Electrical</b>	
Code Format	Binary Coded Decimal (BCD) Gray Code Natural Binary
Resolution	(Gray and Natural Binary): 256 CPR (8 bit); 512 CPR (9 bit) 1024 CPR (10 bit) (BCD): 360 CPR (10 bit); 1000 CPR (12 bit)
Accuracy	±1 bit
Response Frequency	16 K words/sec
Power Supply	Determined by Cat. No.: 5V DC ±5% @ 400 mA max. 8...24V DC @ 400 mA max.
Output Drives	NPN current sink = 16 mA
Output Logic	Parallel BCD, GRAY, or NAT BIN: Logic "0" = 0.0...0.6V DC Logic "1" = 3.5...5.0V DC (TTL) Logic "1" = 24V DC maximum (Open collector)
Latch Command	Optional with BCD and NAT BIN only: Logic "0" = outputs active (DC common) Logic "1" = outputs latched (+DC or open)
Code Direction	Field selectable for increasing counts (CW or CCW)
Reset	Reset position value to zero (Natural Binary and BCD) or max. (Gray Code). Only with shaft stationary.
<b>Mechanical</b>	
Starting Torque	2.5 Ncm typical [3.5 in.-oz]
Running Torque	2.5 Ncm typical [3.5 in.-oz]
Shaft Loading	Axial 89 N [20 lbs]; Radial 178 N [40 lbs]
Shaft Size	6 mm, 10 mm, 1/4 in., 3/8 in. diameter
Moment of Inertia	54 g-cm <sup>2</sup> (0.3 oz-in. <sup>2</sup> )
Slew Speed	5000 RPM
<b>Environmental</b>	
Housing	NEMA Type 4, IP66 (IEC 529); NEMA Type 4X on selected models
Operating Temperature [C (F)]	0...+85° (+32...+185°)
Storage Temperature [C (F)]	-25...+90° (-13...+194°)
Humidity	98%, noncondensing
Shock	50 g (11 ms duration)
Vibration	20 g (58...150 Hz), 1.5 mm displacement (10...58 Hz)
Weight [kg (lbs)]	0.91 (2)

**Accessories**

Description	Page Number
Flexible Couplings	6-47
Measuring Wheels	6-48
Servo Clamps	6-48
Pre-Wired Cables	6-49
Mating Connectors	6-52
Mounting Plates	6-52

## Product Selection

845D — **S** **J** **D** **Z** **1** **4** **B** **D** **CK** **4**

*a b c d e f g h i*

*a*

NEMA Rating	
Code	Description
J	NEMA 4
X	NEMA 4X ❶

*d*

Power Supply Options	
Code	Description
1	5V DC ±5%
2	8...24V DC Unregulated

*h*

Resolution		
Code	Description	
CW	256 ❸	Gray Code or Natural Binary
DW	512 ❸	
FW	1024 ❸	
CK	360 ❹	Binary Coded Decimal
CN	1000 ❹	

*b*

Mounting Configuration	
Code	Description
D	Square Flange
E	70 mm Diameter Flange
F	90 mm Diameter Flange
G	Metric Servo 48 mm B.C.
H	English Servo
J	Metric Servo 42 mm B.C.

*e*

Output Configuration	
Code	Description
4	5V DC TTL Compatible
5	NPN Open Collector 24V DC Max.

*i*

Connector Options	
Code	Description
1	Axial Connector (End) without Mate
2	Radial Connector (Side) without Mate
4	Axial Connector (End) with Mate
5	Radial Connector (Side) with Mate

*c*

Shaft Options	
Code	Description
A	6 mm Diameter
B	10 mm Diameter
C	1/4 in. Diameter
Z	3/8 in. Diameter
K	6 mm w/Flat
L	10 mm w/Flat
M	1/4 in. w/Flat
N	3/8 in. w/Flat

*f*

Latch Options	
Code	Description
A	No Latch
B	Latch (Sink Output Module Compatible)

*g*

Output Code Type	
Code	Description
D	Binary Coded Decimal
G	Gray Code ❷
N	Natural Binary

- ❶ Available with square flange mounting configuration only.
- ❷ This option not available with Latch Options code: "B."
- ❸ These options not available with Output Code Type code: "D."
- ❹ These options not available with Output Code Type code: "G" & "N."

## Electrical Connections

Pin	Function		
	Gray Code	Natural Binary	BCD (8421)
A	G(0)	2 <sup>0</sup>	1
B	G(1)	2 <sup>1</sup>	2
C	G(2)	2 <sup>2</sup>	4
D	G(3)	2 <sup>3</sup>	8
E	G(4)	2 <sup>4</sup>	10
F	G(5)	2 <sup>5</sup>	20
G	G(6)	2 <sup>6</sup>	40
H	G(7)	2 <sup>7</sup>	80
J	G(8)	2 <sup>8</sup>	100
K	G(9)	2 <sup>9</sup>	200
L	MSB Complement	Not Used	400
M	Not Used	Not Used	800
N	Not Used	Not Used	Not Used
P	Not Used	Not Used	Not Used
R	Not Used	Direction Control	Direction Control
S	Reset	Reset	Reset
T	DC Return	DC Return	DC Return
U	Not Used	Latch Control	Latch Control
V	DC+ Input	DC+ Input	DC+ Input

## Direction Pin

The Direction Pin can change function with code type. In parallel type Gray Code encoders, its function is Most Significant Bit Complement or MSBC for short. In Natural Binary and Binary Coded Decimal encoders, its function is Direction Control.

Direction Control 

## Natural Binary and BCD

A logic "1" (+DC or open) on the direction control pin will produce increasing counts with a counterclockwise rotation of the shaft. A logic "0" (DC common) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft.

## Gray Code (parallel only)

Counterclockwise rotation of the shaft will produce increasing counts. For increasing counts with a clockwise rotation, use the Most Significant Bit Complement Pin instead of the Most Significant Bit Pin. See Electrical Connection table for pin designation.

## ATTENTION



For parallel gray code: connecting the MSB or MSBC to +DC will result in permanent damage to the encoder.

## Reset Pin

The shaft must be stationary before using the reset function. Connecting the Reset Pin to +DC will reset Natural

Binary and BCD position value to zero. Connecting the Reset Pin to +DC will reset Gray Code position value to maximum (e.g., 255, 511, 1023, etc.) if MSBC is used, to zero if MSB is used. The reset function requires a connection to +DC for 0.1 seconds or longer.

## ATTENTION

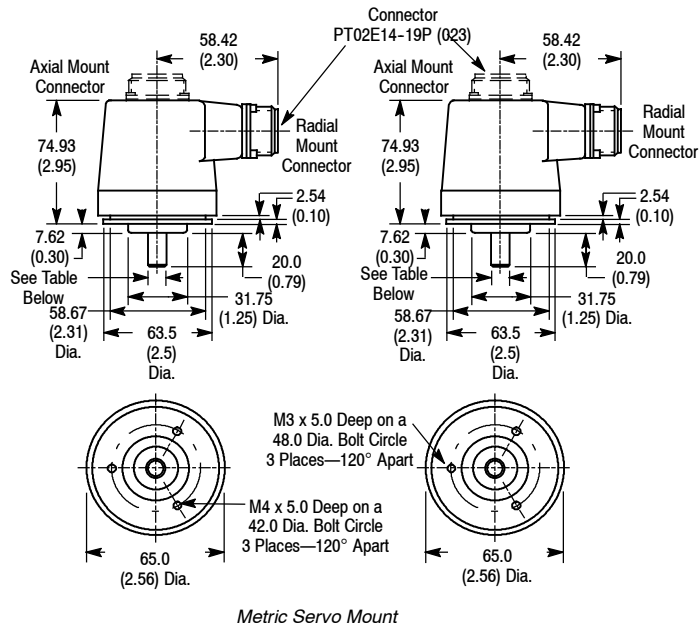
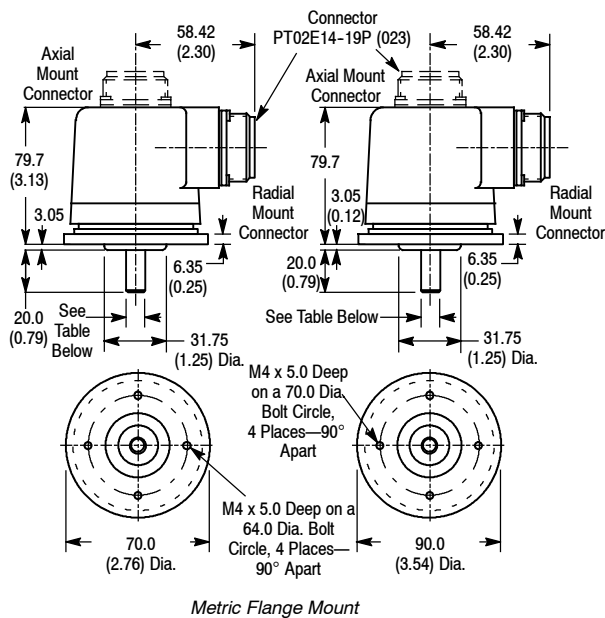
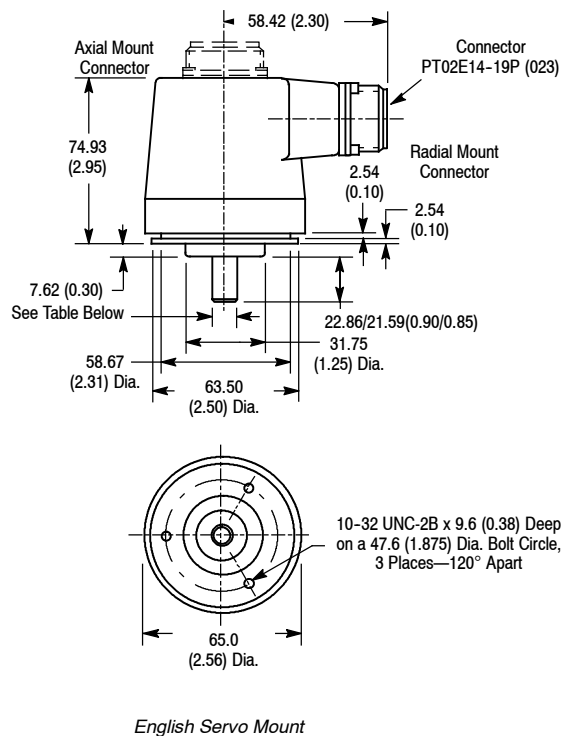
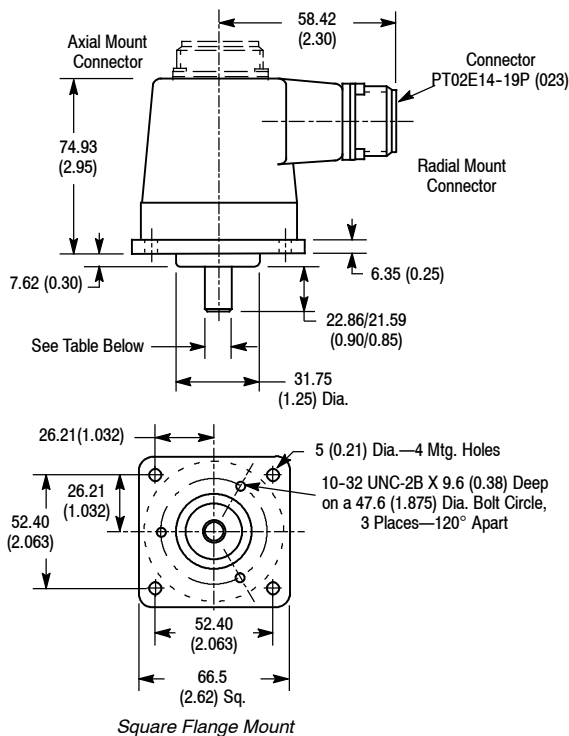


Activating the Reset Pin results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury.

 Rotation is viewed from the end of the encoder shaft.

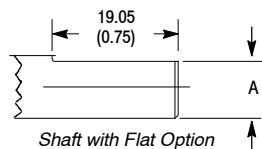


Approximate Dimensions [mm (in.)]



Shaft Diameter Options

Code	Shaft Diameter
A or K	6 mm +0.00 mm, -0.013 mm
B or L	10 mm +0.00 mm, -0.013 mm
C or M	6.35(0.2499) +0.0000, -0.0005
Z or N	9.52 (0.3749) +0.0000, -0.0005



Flat Dimensions

Code	Dimension "A"
K	5.3 mm (0.21 in.)
L	9.1 mm (0.36 in.)
M	5.5 mm (0.22 in.)
N	8.6 mm (0.34 in.)

## Bulletin 845G Absolute Encoders

Single-Turn, Size 25



English Servo Mount  
845G-S3G5HC1024R

## Description

Bulletin 845G is a heavy duty NEMA Type 4 and 13 single-turn absolute encoder that digitizes shaft position. The absolute encoder has a unique digital output for each shaft position. The use of absolute encoders assures that true position is available, regardless of power interruptions.

## Features

- Absolute grey code, natural binary or binary coded decimal (BCD)
- 8-...15-bit resolution (256...32,768)
- Open collector, TTL, push-pull or SSI outputs
- Low or high true output optional
- NEMA Type 4 and 13
- Reverse polarity protection
- 85°C operating temperature
- CE Marked for all applicable directives

## Specifications

Electrical	
Code Format	Binary Coded Decimal (parallel only) Grey code or natural binary (parallel or SSI)
Resolution	Counts per Rev. (CPR) 256 CPR (8 bit)                      2048 CPR (11 bit) 360 CPR (9 or 10 bit)              4096 CPR (12 bit) 512 CPR (9 bit)                      8192 CPR (13 bit) 1000 CPR (12 bit BCD)              16384 CPR (14 bit) 1024 CPR (10 bit)                    32768 CPR (15 bit)
Accuracy	±1 bit
Response Frequency	16 K words/sec
Power Supply	Determined by Cat. No:              5V DC ±5% @ 150 mA max. 8...24V DC @ 150 mA max. 10...30V DC @ 150 mA max.
Output Drives	16 mA
Output Logic	Parallel Grey, natural binary or binary coded decimal (BCD) Logic "0" = 0.0...0.6V DC Logic "1" = 3.5...5V DC (TTL) Logic "1" = 24V DC maximum (Open Collector) SSI RS-422 compatible
Latch Command	Standard with natural binary and BCD Logic "0" = outputs active (DC common) Logic "1" = outputs latched (+DC or open)
Code Direction	Field selectable for increasing counts (CW or CCW)
Reset	Reset position value to zero (natural binary and BCD) or max. (grey code). Only with shaft stationary.
Mechanical	
Starting Torque	0.025 N·m [3.5 in.-oz.]Typical
Running Torque	0.025 N·m [3.5 in.-oz.]Typical
Shaft Loading	Axial 89 N [20 lbs]; Radial 178 N [40 lbs]
Shaft Dimensions	9.517 mm [3/8 inch] diameter w/flat
Moment of Inertia	0.08 oz.-in. <sup>2</sup> max.
Slew Speed	5000 RPM
Environmental	
Enclosure Type Rating	NEMA Type 4, 13, IP66 (IEC 529)
Operating Temperature [C (F)]	0...+85° (+32°...+185°)
Storage Temperature [C (F)]	-40...+100° (-40...+212°)
Working Temperature [C (F)]	-20...+85° (-4...+185°), max.
Relative Humidity	98%, noncondensing
Shock	50 g (11 ms duration)
Vibration	20 g (58...150 Hz), 1.5 mm displacement (10...58 Hz)
Weight [kg (lbs)]	0.91 (2)

## Accessories

Description	Cat. No.	No. of Pins	Mating Connector	Pre-Wired Cable
High Performance Flexible Coupling	845-FC- <b>1-1</b>	12	845-12P	845-CA-G- <b>1</b>
Measuring Wheels	845-MW-A- <b>1</b>	17	845-17P	845-CA-H- <b>1</b>
Servo Clamps	845-SC	19	845-SCD	845-CA-D- <b>1</b>

**1** For additional information, see the Accessories section on pages 6-46...6-55.

## Product Selection

845G — **F** **3** **G** **8** **H** **C** **1024** **R**  
*a* *b* *c* *d* *e* *f* *g*

*a*

Mounting Configuration	
Code	Description
F	Square Flange
S	English Servo

*b*

Output Code Type ❶	
Code	Description
B	Natural Binary
D	Binary Coded Decimal ❷
G	Grey Code

*c*

Power Supply	
Code	Description
5	5V DC ±5%
8	8...24V DC
A	10...30V DC ❸

*d*

Output Logic	
Code	Description
H	High True
L	Low True ❹

*e*

Output Configuration	
Code	Description
C	NPN Open Collector 24V DC Max
P	Push-Pull (7272) ❺
S	SSI Output ❻❻❻
T	5V DC TTL NPN

*f*

Resolution	
Code	Description
0256	8 bit/0...255
0360	9 or 10 bit/0...359 ❽❽
0512	9 bit/0...511
1000	12 bit/0...999 BCD only
1024	10 bit/0...1023
2048	11 bit/0...2047
4096	12 bit/0...4095
8192	13 bit/0...8191
016K	14 bit/0...16,383
032K	15 bit/0...32,767

*g*

Connector Options	
Code	Description
A	Axial 19-Pin
R	Radial 19-Pin
S	Axial 17-pin
T	Axial 12-Pin ❿
U	Radial 12-Pin ❿

- ❶ Latch control available with natural binary and binary coded decimal (BCD) only.
- ❷ BCD output available in 0360 and 1000 resolutions only. Not available with SSI output.
- ❸ 10...30V DC power supply may only be ordered together with either push-pull or SSI output.
- ❹ Not available with push-pull output. Output logic inverted.
- ❺ Not available with BCD. Latch not available.
- ❻ Excess 76 used for 9 bit grey code. BCD is 10 bit.
- ❼ Only available with SSI output.
- ❽ SSI available with grey code output only.
- ❾ Not available with SSI.

# Bulletin 845G Absolute Encoders

Single-Turn, Size 25

## Electrical Connections—17 Pin Connector (All code types)

Pin	845-CA-H- Wire Color	8192 (13 Bit)	1000 BCD or 4096 (12 Bit)	2048 (11 Bit)	360 BCD or 1024 (10 Bit)	512 (9 Bit)	360 (9 Bit)	0256 (8 Bit)
A	White/Orange	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>
B	White	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>
C	Grey	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>
D	Violet	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>
E	Blue	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>
F	Yellow	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>
G	Orange	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>
H	Brown	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>
J	White/Violet	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	N/C
K	White/Brown	G(9) or 2 <sup>9</sup>	G(9) or 2 <sup>9</sup>	G(9) or 2 <sup>9</sup>	G(9) or 2 <sup>9</sup>	N/C	N/C	N/C
L	White/Green	G(10) or 2 <sup>10</sup>	G(10) or 2 <sup>10</sup>	G(10) or 2 <sup>10</sup>	N/C	N/C	N/C	Reset
M	White/Yellow	G(11) or 2 <sup>11</sup>	G(11) or 2 <sup>11</sup>	N/C	N/C	N/C	N/C	Direction ②
N	White/Red	G(12) or 2 <sup>12</sup>	Reset	Reset	Reset	Reset	Reset	Latch Control ①
P	White/Blue	Latch Control ①	Latch Control ①	Latch Control ①	Latch Control ①	Latch Control ①	Latch Control ①	N/C
R	Black	DC Common	DC Common	DC Common	DC Common	DC Common	DC Common	DC Common
S	Red	+DC	+DC	+DC	+DC	+DC	+DC	+DC
T	Green	Direction ②	Direction ②	Direction ②	Direction ②	Direction ②	Direction ②	Case Ground

## Electrical Connections—19 Pin Connector (Grey code or natural binary)

Pin	845-CA-D- Wire Color	32768 (15 Bit)	16384 (14 Bit)	8192 (13 Bit)	4096 (12 Bit)	2048 (11 Bit)	1024 (10 Bit)	360 and 512 (9 Bit)	0256 (8 Bit)
A	Brown	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	N/C	N/C	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>
B	Orange	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(0) or 2 <sup>0</sup>	N/C	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>
C	Yellow	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(1) or 2 <sup>1</sup>	G(0) or 2 <sup>0</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>
D	Green	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(2) or 2 <sup>2</sup>	G(1) or 2 <sup>1</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>
E	Blue	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(3) or 2 <sup>3</sup>	G(2) or 2 <sup>2</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>
F	Violet	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(4) or 2 <sup>4</sup>	G(3) or 2 <sup>3</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>
G	Grey	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(5) or 2 <sup>5</sup>	G(4) or 2 <sup>4</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>
H	White	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(6) or 2 <sup>6</sup>	G(5) or 2 <sup>5</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>
J	White/Orange	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	G(7) or 2 <sup>7</sup>	G(6) or 2 <sup>6</sup>	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	N/C
K	White/Brown	G(9) or 2 <sup>9</sup>	G(9) or 2 <sup>9</sup>	G(9) or 2 <sup>9</sup>	G(8) or 2 <sup>8</sup>	G(7) or 2 <sup>7</sup>	G(9) or 2 <sup>9</sup>	N/C	N/C
L	White/Red	G(10) or 2 <sup>10</sup>	G(10) or 2 <sup>10</sup>	G(10) or 2 <sup>10</sup>	G(9) or 2 <sup>9</sup>	G(8) or 2 <sup>8</sup>	Direction ②	Direction ②	Direction ②
M	White/Yellow	G(11) or 2 <sup>11</sup>	G(11) or 2 <sup>11</sup>	G(11) or 2 <sup>11</sup>	G(10) or 2 <sup>10</sup>	G(9) or 2 <sup>9</sup>	N/C	N/C	N/C
N	White/Green	G(12) or 2 <sup>12</sup>	G(12) or 2 <sup>12</sup>	G(12) or 2 <sup>12</sup>	G(11) or 2 <sup>11</sup>	G(10) or 2 <sup>10</sup>	N/C	N/C	N/C
P	White/Blue	G(13) or 2 <sup>13</sup>	G(13) or 2 <sup>13</sup>	N/C	Direction ②	Direction ②	N/C	N/C	N/C
R	White/Black	G(14) or 2 <sup>14</sup>	Reset	Reset	Reset	Reset	Reset	Reset	Reset
S	White/Violet	Direction ②	Direction ②	Direction ②	N/C	N/C	N/C	N/C	N/C
T	Black	DC Common	DC Common	DC Common	DC Common	DC Common	DC Common	DC Common	DC Common
U	White/Grey	Latch Control ①	Latch Control ①	Latch Control ①	Latch Control ①	Latch Control ①	Latch Control ①	Latch Control ①	Latch Control ①
V	Red	+DC	+DC	+DC	+DC	+DC	+DC	+DC	+DC

① Latch control not available with grey code or SSI output. On grey code encoders this pin is not connected (N/C).

② The Direction pin function is either Direction Control or MSBC. See next page for further detail.

## Electrical Connections—19 Pin Connector (Binary Coded Decimal)

Pin	845-CA-D-__ Wire Color	1000 BCD (12 Bit)	360 BCD (10 Bit)
V	Red	+DC	+DC
A	Brown	1	1
B	Orange	2	2
C	Yellow	4	4
D	Green	8	8
E	Blue	10	10
F	Violet	20	20
G	Grey	40	40
H	White	80	80
J	White/Orange	100	100
K	White/Brown	200	200
L	White/Red	400	N/C
M	White/Yellow	800	N/C
N	White/Green	N/C	N/C
P	White/Blue	N/C	N/C
R	White/Black	Direction Control	Direction Control
S	White/Violet	Reset	Reset
T	Black	DC Common	DC Common
U	White/Grey	Latch Control	Latch Control

## Electrical Connections for SSI Output—12 Pin Connector

Cat. No.	Wire Pair	Wire Color	Function	Pin
845-CA-G-__ (With 12 pin connector)	Red/Black/Shield	Red	+DC Input	8
		Black	DC Common	1
	White/Black/Shield	White	Clock +	3
		Black	Clock -	11
	Blue/Black/Shield	Blue	Data +	2
		Black	Data -	10
	Green/Black/Shield	Green	CW/CCW	12
		Black	Reset	9

## Direction Pin

The Direction Pin can change function with code type. In parallel type grey code encoders, its function is Most Significant Bit Complement or MSBC for short. In Natural Binary, Binary Coded Decimal and grey code SSI encoders, its function is Direction Control.

## Direction Control ①

## Natural Binary and BCD

A logic "1" (+DC or open) on the direction control pin will produce increasing counts with a counterclockwise rotation of the shaft. A logic "0" (DC common) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft.

① Rotation is viewed from the end of the encoder shaft.

## Grey Code (SSI)

A logic "1" (+DC or open) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft. A logic "0" (DC common) on the direction control pin will produce increasing counts with a counterclockwise rotation of the shaft.

## Grey Code (parallel)

Counterclockwise rotation of the shaft will produce increasing counts. For increasing counts with a clockwise rotation, use the Most Significant Bit Complement Pin instead of the Most Significant Bit Pin. See Electrical Connection table for pin designation.

## ATTENTION



For parallel grey code: connecting the MSB or MSBC to +DC will result in permanent damage to the encoder.

## Reset Pin

The shaft must be stationary before using the reset function. Connecting the Reset Pin to +DC will reset Natural Binary and BCD position value to zero. Connecting the Reset Pin to +DC will reset grey code position value to maximum (e.g., 255, 511, 1023, etc.) if MSBC is used, to zero if MSB is used. The reset function requires a connection to +DC for 0.1 seconds or longer.

## ATTENTION

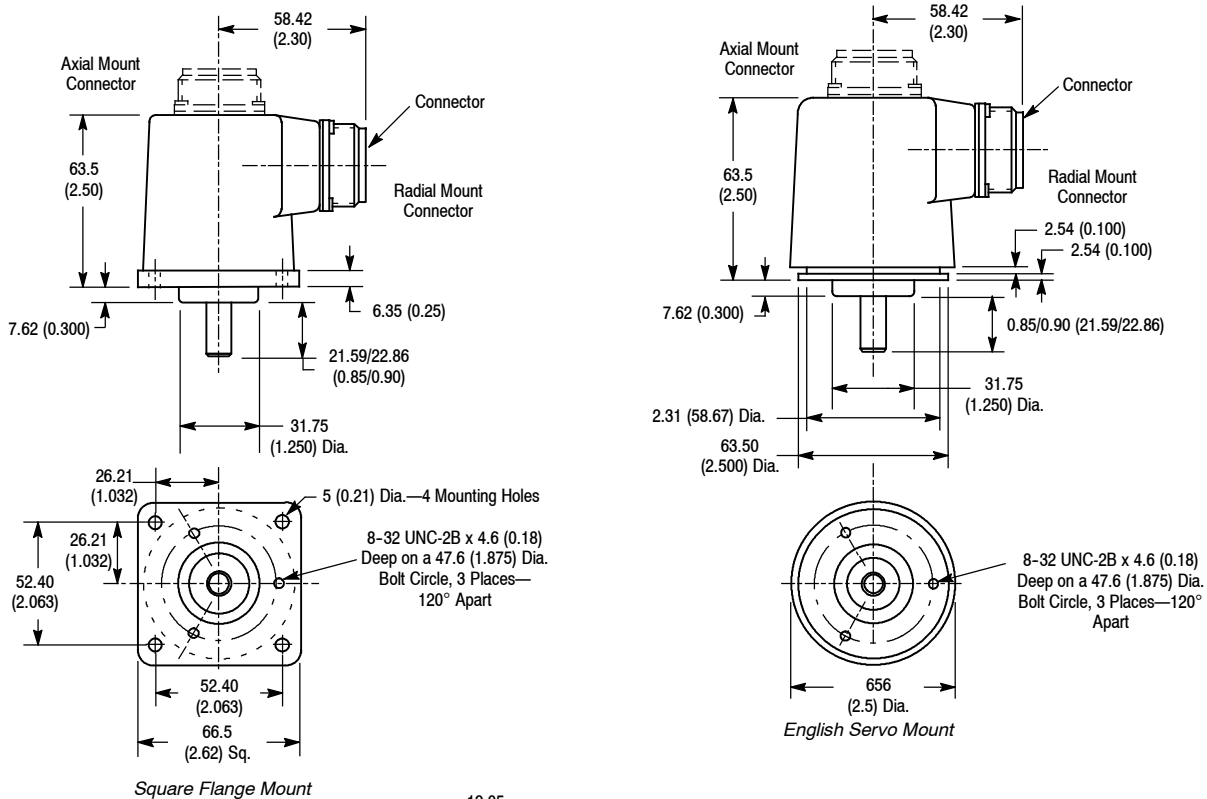


Activating the reset pin results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury.

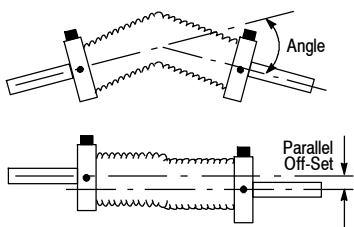
# Bulletin 845G Absolute Encoders

Single-Turn, Size 25

## Approximate Dimensions [mm (in.)]



## Flexible Shaft Couplings



Shaft Dimensions

### ATTENTION



Rigidly coupling the encoder shaft to the machine shaft **will cause a failure** in either the bearings of the encoder or the bearings of the machine shaft.



845GM-S3G8HC0360R

## Description

Bulletin 845GM is a single-turn absolute encoder that provides a unique digital output for each shaft position. These size 20 encoders are available with resolution ranging from 256...32,768 CPR (counts per revolution). The electronic zero-set feature facilitates synchronization of electrical and mechanical zero positions.

## Features

- Absolute grey code, natural binary or binary coded decimal (BCD)
- 8-...15-bit resolution (256...32,768)
- Open collector, TTL, push-pull or SSI outputs
- Electronic zero-set pin
- Low or high true output optional
- NEMA Type 4 and 13
- Reverse polarity protection
- 85°C operating temperature
- CE Marked for all applicable directives

## Specifications

Electrical	
Code Format	Parallel: grey code, natural binary, binary coded decimal (BCD) SSI: grey code
Resolution	Counts per Rev. (CPR) 256 CPR (8 bit)                      2048 CPR (11 bit) 360 CPR (9 or 10 bit)              4096 CPR (12 bit) 512 CPR (9 bit)                      8192 CPR (13 bit) 1000 CPR (12 bit BCD)              16384 CPR (14 bit) 1024 CPR (10 bit)                    32768 CPR (15 bit)
Accuracy	±1 bit
Response Frequency	16 K words/sec
Power Supply.	Determined by Cat. No.:      5V DC ±5% @ 150 mA max. 8...24V DC @ 150 mA max. 10...30V DC @ 150 mA max.
Output Drives	16 mA
Output Logic	Parallel: grey, natural binary or (BCD) Logic "0" = 0.0...0.6V DC Logic "1" = 3.5...5V DC (TTL) Logic "1" = 24V DC maximum (Open Collector) Logic "1" = 0.7 x Vs (Push-Pull) SSI RS-422 compatible
Latch Command	Standard with natural binary and BCD Logic "0" = outputs active (DC common) Logic "1" = outputs latched (+DC or open)
Code Direction	Field selectable for increasing counts (CW or CCW)
Reset	Reset position value to zero (see the Reset Pin section on page 6-26). Only with shaft stationary.
Mechanical	
Starting Torque	0.025 N·m (3.5 in-oz) typical
Running Torque	0.025 N·m (3.5 in-oz) typical
Shaft Loading	Axial 178 N (40 lbs); radial 178 N (40 lbs)
Shaft Dimensions	6 mm, 10 mm, 9.517 mm (3/8 in.), 9.517 mm (3/8 in.) w/flat
Moment of Inertia	54 gcm <sup>2</sup> (0.30 oz-in <sup>2</sup> ) max.
Slew Speed	5000 RPM
Environmental	
Enclosure Type Rating	NEMA Type 4, 13; IP65
Operating Temperature [C (F)]	0...+85° (+32...+185°)
Storage Temperature [C (F)]	-40...+100° (-40...+212°)
Working Temperature [C (F)]	-20...+85° (-4...+185°), max.
Relative Humidity	90%, noncondensing
Shock	50 g (11 ms duration)
Vibration	20 g (58...150 Hz), 1.5 mm displacement (10...58Hz)
Weight [kg (lbs)]	0.45 (1)

## Accessories

Description	Cat. No.	No. of Pins	Mating Connector	Pre-Wired Cable
High Performance Flexible Coupling	845-FC-①-①	12	845-12P	845-CA-G-①
Measuring Wheels	845-MW-A-①	19	845-SCD	845-CA-D-①
Servo Clamps	845-SC			

① For additional information, see the Accessories section on pages 6-46...6-55.

# Bulletin 845GM Absolute Encoders

Single-Turn, Size 20

## Product Selection

**845GM** — **F** **3** **G** **8** **H** **C** **1024** **R**  
*a b c d e f g h*

*a*

Mounting Configuration	
Code	Description
F	Square Flange
S	English Servo

*b*

Shaft Options	
Code	Description
1	6 mm
2	10 mm
3	3/8 in. w/flat
4	3/8 in.

*c*

Output Code Type ❶	
Code	Description
B	Natural Binary
D	Binary Coded Decimal
G	Grey Code

*d*

Power Supply	
Code	Description
5	5V DC ±5%
8	8...24V DC
A	10...30V DC ❶

*e*

Output Logic	
Code	Description
H	High True
L	Low True ❷

*f*

Output Configuration	
Code	Description
C	NPN Open Collector 24V DC Max
P	Push-Pull (7272) ❶
S	SSI Output ❶❸❹
T	5V DC TTL NPN

*g*

Resolution	
Code	Description
0256	8 bit/0...255
0360	9 or 10 bit/0...359 ❸❹
0512	9 bit/0...511
1000	12 bit/0...999 BCD only
1024	10 bit/0...1023
2048	11 bit/0...2047
4096	12 bit/0...4095
8192	13 bit/0...8191
016K	14 bit/0...16,383
032K	15 bit/0...32,767

*h*

Connector Options	
Code	Description
R	Radial 19-Pin
U	Radial 12-Pin ❺

- ❶ Push-Pull or SSI output can only be ordered with 10...30V DC power supply.
- ❷ Not available with push-pull and SSI output. Output logic inverted.
- ❸ SSI available with grey code output only.
- ❹ SSI only available with 12-pin connector.
- ❺ Excess 76 used for 9 bit 360 grey code. BCD is 10 bit.
- ❻ Not available with SSI.



## Electrical Connections—19 Pin Connector (Grey code or natural binary)

Pin	845-CA-D- Wire Color	32768 (15 Bit)	16384 (14 Bit)	8192 (13 Bit)	4096 (12 Bit)	2048 (11 Bit)	1024 (10 Bit)	360 and 512 (9 Bit)	0256 (8 Bit)
A	Brown	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	N/C	N/C	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>	G(0) or 2 <sup>0</sup>
B	Orange	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(0) or 2 <sup>0</sup>	N/C	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>	G(1) or 2 <sup>1</sup>
C	Yellow	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(1) or 2 <sup>1</sup>	G(0) or 2 <sup>0</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>	G(2) or 2 <sup>2</sup>
D	Green	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(2) or 2 <sup>2</sup>	G(1) or 2 <sup>1</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>	G(3) or 2 <sup>3</sup>
E	Blue	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(3) or 2 <sup>3</sup>	G(2) or 2 <sup>2</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>	G(4) or 2 <sup>4</sup>
F	Violet	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(4) or 2 <sup>4</sup>	G(3) or 2 <sup>3</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>	G(5) or 2 <sup>5</sup>
G	Grey	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(5) or 2 <sup>5</sup>	G(4) or 2 <sup>4</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>	G(6) or 2 <sup>6</sup>
H	White	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(6) or 2 <sup>6</sup>	G(5) or 2 <sup>5</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>	G(7) or 2 <sup>7</sup>
J	White/Orange	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	G(7) or 2 <sup>7</sup>	G(6) or 2 <sup>6</sup>	G(8) or 2 <sup>8</sup>	G(8) or 2 <sup>8</sup>	N/C
K	White/Brown	G(9) or 2 <sup>9</sup>	G(9) or 2 <sup>9</sup>	G(9) or 2 <sup>9</sup>	G(8) or 2 <sup>8</sup>	G(7) or 2 <sup>7</sup>	G(9) or 2 <sup>9</sup>	N/C	N/C
L	White/Red	G(10) or 2 <sup>10</sup>	G(10) or 2 <sup>10</sup>	G(10) or 2 <sup>10</sup>	G(9) or 2 <sup>9</sup>	G(8) or 2 <sup>8</sup>	Direction Ⓢ	Direction Ⓢ	Direction Ⓢ
M	White/Yellow	G(11) or 2 <sup>11</sup>	G(11) or 2 <sup>11</sup>	G(11) or 2 <sup>11</sup>	G(10) or 2 <sup>10</sup>	G(9) or 2 <sup>9</sup>	N/C	N/C	N/C
N	White/Green	G(12) or 2 <sup>12</sup>	G(12) or 2 <sup>12</sup>	G(12) or 2 <sup>12</sup>	G(11) or 2 <sup>11</sup>	G(10) or 2 <sup>10</sup>	N/C	N/C	N/C
P	White/Blue	G(13) or 2 <sup>13</sup>	G(13) or 2 <sup>13</sup>	N/C	Direction Ⓢ	Direction Ⓢ	N/C	N/C	N/C
R	White/Black	G(14) or 2 <sup>14</sup>	Reset	Reset	Reset	Reset	Reset	Reset	Reset
S	White/Violet	Direction Ⓢ	Direction Ⓢ	Direction Ⓢ	N/C	N/C	N/C	N/C	N/C
T	Black	DC Common	DC Common	DC Common	DC Common	DC Common	DC Common	DC Common	DC Common
U	White/Grey	Latch Control Ⓢ	Latch Control Ⓢ	Latch Control Ⓢ	Latch Control Ⓢ	Latch Control Ⓢ	Latch Control Ⓢ	Latch Control Ⓢ	Latch Control Ⓢ
V	Red	+DC	+DC	+DC	+DC	+DC	+DC	+DC	+DC

Ⓢ Latch control not available with grey code or SSI output. On grey code encoders this pin is not connected (N/C).

Ⓢ **Important**—The Direction pin function provides Direction Control for Binary Coded Decimal and Natural Binary or MSBC for parallel grey code. See next page for further detail.

## Bulletin 845GM Absolute Encoders

Single-Turn, Size 20

## Electrical Connections—19 Pin Connector (Binary Coded Decimal)

Pin	845-CA-D-___ Wire Color	1000 BCD (12 Bit)	360 BCD (10 Bit)
V	Red	+DC	+DC
A	Brown	1	1
B	Orange	2	2
C	Yellow	4	4
D	Green	8	8
E	Blue	10	10
F	Violet	20	20
G	Grey	40	40
H	White	80	80
J	White/Orange	100	100
K	White/Brown	200	200
L	White/Red	400	N/C
M	White/Yellow	800	N/C
N	White/Green	N/C	N/C
P	White/Blue	N/C	N/C
R	White/Black	Direction Control	Direction Control
S	White/Violet	Reset	Reset
T	Black	DC Common	DC Common
U	White/Grey	Latch Control	Latch Control

## Electrical Connections for SSI Output—12 Pin Connector

Cat. No.	Wire Pair	Wire Color	Function	Pin
845-CA-G-___ (With 12 pin connector)	Red/Black/Shield	Red	+DC Input	8
		Black	DC Common	1
	White/Black/Shield	White	Clock +	3
		Black	Clock -	11
	Blue/Black/Shield	Blue	Data +	2
		Black	Data -	10
	Green/Black/Shield	Green	Direction Control	12
		Black	Reset	9

## Direction Pin

The Direction Pin can change function with code type. In parallel type grey code encoders, its function is Most Significant Bit Complement or MSBC for short. In Natural Binary, Binary Coded Decimal and grey code SSI encoders, its function is Direction Control.

## Direction Control ⓘ

## Natural Binary and BCD

A logic "1" (+DC or open) on the direction control pin will produce increasing counts with a counterclockwise rotation of the shaft. A logic "0" (DC common) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft.

ⓘ Rotation is viewed from the end of the encoder shaft.

## Grey Code (SSI)

A logic "1" (+DC or open) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft. A logic "0" (DC common) on the direction control pin will produce increasing counts with a counterclockwise rotation of the shaft.

## Grey Code (parallel)

Counterclockwise rotation of the shaft will produce increasing counts. For increasing counts with a clockwise rotation, use the Most Significant Bit Complement Pin instead of the Most Significant Bit Pin. See Electrical Connection table for pin designation.

## ATTENTION



For parallel grey code: connecting the MSB or MSBC to +DC will result in permanent damage to the encoder.

## Reset Pin

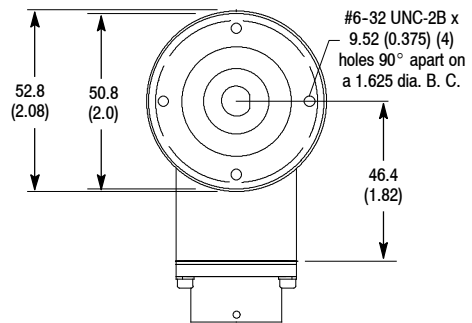
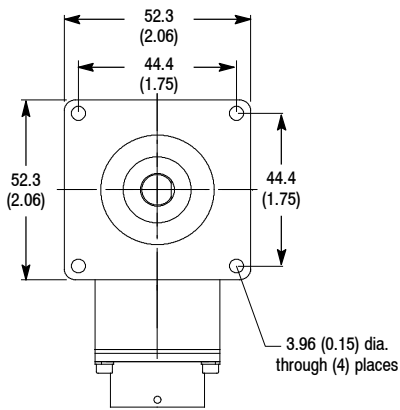
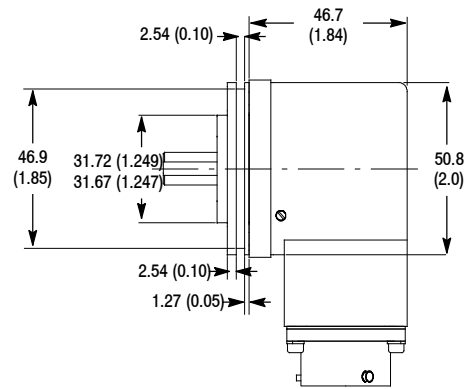
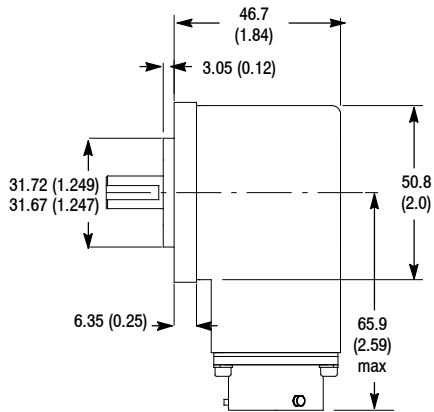
The shaft must be stationary before using the reset function. Connecting the Reset Pin to +DC will reset Natural Binary and BCD position value to zero. Connecting the Reset Pin to +DC will reset grey code position value to maximum (e.g., 255, 511, 1023, etc.) if MSBC is used, to zero if MSB is used. The reset function requires a connection to +DC for 0.1 seconds or longer.

## ATTENTION



Activating the Reset Pin results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury.

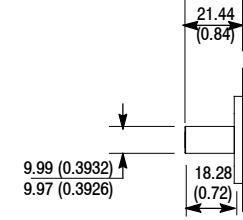
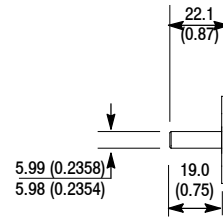
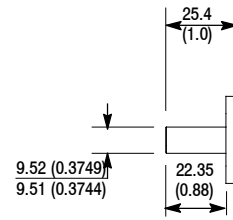
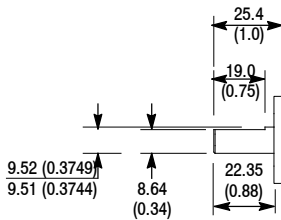
Approximate Dimensions [mm (in.)]



Square Flange Mount

English Servo Mount

Shaft Options—Square Flange Mount



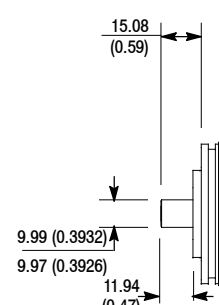
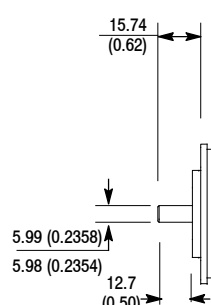
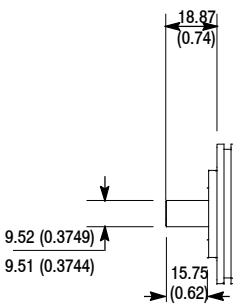
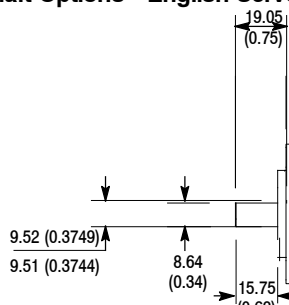
3/8 in. w/flat

3/8 in.

6 mm

10 mm

Shaft Options—English Servo Mount



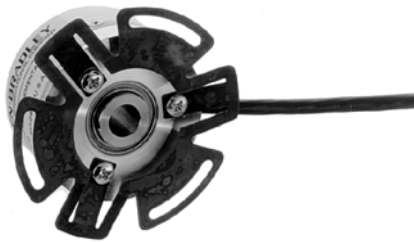
3/8 in. w/flat

3/8 in.

6 mm

10 mm

## Bulletin 844A &amp; 844B Hollow Shaft Incremental Encoders



## Description

Bulletin 844A blind-shaft and 844B through-shaft incremental encoders are used to electronically monitor the position or speed of a rotating shaft. Shaft position is converted to digital pulses in an A quad B format.

- Blind or through-shaft designs
- Integral flex mount
- 10...2500 PPR
- 2 inch diameter housing

Bulletin 844A and 844B encoders offer a built-in flexible coupling which reduces installation cost and mounting space requirements. Additionally, the Bulletin 844B Encoder is a through-shaft design allowing additional accessories to be mounted to the same shaft. Both families come standard with channels A, B and Z and differential line driver (DLD) outputs. Single-ended outputs are also supported at no additional charge. All support shaft sizes up to 1/2 inch in diameter. Bulletin 844A and 844B Encoders offer 42 resolution options.

## Specifications

Electrical	
Code Format	2 channels with zero index
Quadrature	90° ±22° channel A leads B CW
Symmetry	40...60%
Power Supply	120 mA (no load)
Output Frequency, Max.	100 kHz
Resolution	Up to 2500 pulses per revolution
Cable Diameter [mm (in.)]	457 (18)
Output Drivers	RS422 Line driver—3487 Open collector—7406 8-24V Line driver—7272

Mechanical	
Angular Acceleration	50,000 radians/sec <sup>2</sup>
Moment of Inertia	19.4 gcm <sup>2</sup> (2.75 x 10 <sup>-4</sup> oz-in-sec <sup>2</sup> )
Operating Speed, Max. (RPM)	3000 at max shaft loading
Permissible Shaft Movement	Radial 0.13 mm (0.005 in.); Axial ±0.76 mm (±0.030 in.)
Shaft Loading	Axial 0.45 kg (1 lb); Radial 1.36 kg (3 lb)
Shaft Dimensions	3/8 inch or 1/2 inch

Environmental	
Material	Aluminum Housing
Operating Temperature [C (F)]	0...70° (+32...+158°)
Storage Temperature [C (F)]	-20...85° (-4...+185°)
Relative Humidity	95% noncondensing
Enclosure Type Rating	IP40 (IEC529)
Shock	20 g/11 ms
Vibration	5 g/10...150 Hz
Weight [kg (oz)]	0.12 (4)

## Bulletin 844A & 844B Hollow Shaft Incremental Encoders

### Product Selection

844 **A** — **Z3** **05C** **2500**  
*a*      *b*      *c*      *d*

*a*

Coupling Options	
Code	Description
A	Front (Blind-Shaft)
B	Rear (Through-Shaft)

*b*

Shaft Options	
Code	Description
Z3	3/8 inch
Z4	1/2 inch

*c*

Power Supply & Output <sup>①</sup>	
Code	Description
05D	5V DC In, 5V DC DLD RS-422 Out
05C	5V DC In, NPN Open Collector Out
12C	12V DC In, NPN Open Collector Out
24D	8...24V DC In, 8...24V DC DLD Out

① DLD = Differential Line Driver

*d*

Resolution (PPR)	
Code	Description
0010	10
0020	20
0030	30
0050	50
0060	60
0100	100
0128	128
0150	150
0180	180
0200	200
0240	240
0250	250
0256	256
0300	300
0336	336
0360	360
0400	400
0500	500
0512	512
0600	600
0720	720
0800	800
0900	900
0960	960
1000	1000
1024	1024
1140	1140
1152	1152
1200	1200
1230	1230
1250	1250
1260	1260
1270	1270
1386	1386
1500	1500
1512	1512
1800	1800
1888	1888
2000	2000
2048	2048
2400	2400
2500	2500

### Accessories

Description	Page Number
Differential Encoder Buffer Board	6-55

# Bulletin 844A & 844B Hollow Shaft Incremental Encoders

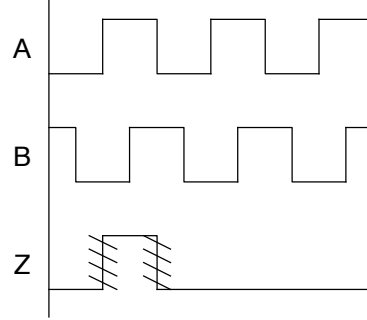
## Electrical Connections

Function	Line Driver Wire Color	Open Collector Wire Color
V DC	Red	Red
Common	Black	Black
A Output	White	White
B Output	Green	Green
Z Output	White/Black	White/Black
$\bar{A}$ Output	Blue	NC
$\bar{B}$ Output	Orange	NC
$\bar{Z}$ Output	Red/Black	NC
Shield	Drain Wire	Drain Wire

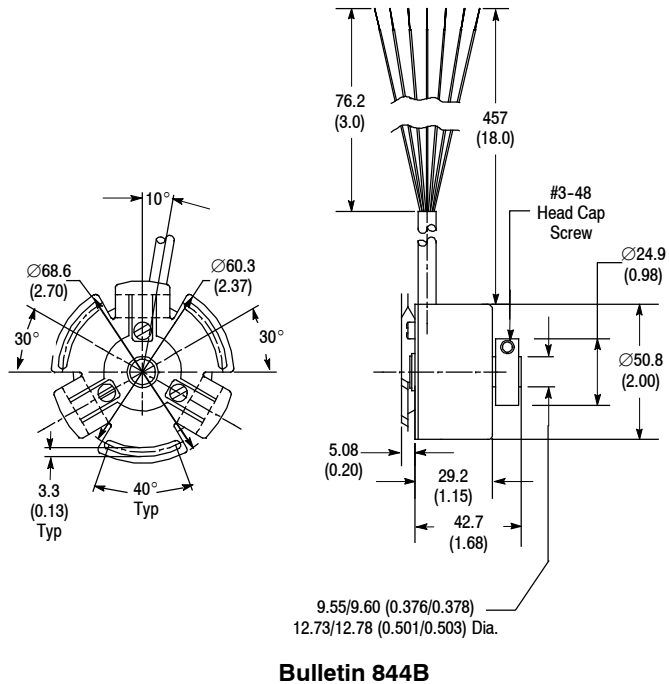
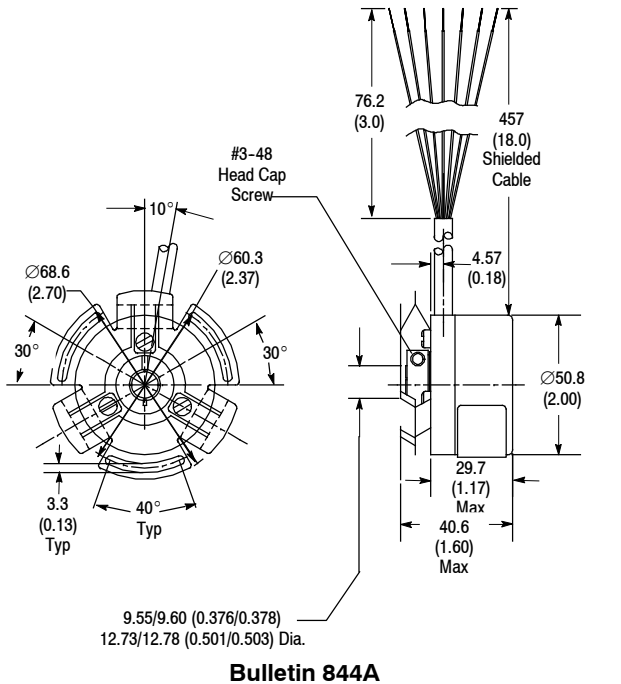
## Output Waveforms

1. Channel A leads Channel B for clockwise rotation when viewed from face of the encoder.
2. Complementary signals (A, B, and Z) are supplied only on units with line drivers.
3. Marker Pulse is nongated and is approximately centered on the positive-going edge of Channel B for clockwise rotation and is  $180^\circ \pm 90^\circ$  wide.

## Channel



## Approximate Dimensions [mm (in.)]



## 844A Mating Shaft Tolerance [mm (in.)]

Bore	Diameter	Length
3/8 in.	9.50/9.55 (0.374/0.376)	10.7/31 (0.42/1.22)
1/2 in.	12.67/12.73 (0.499/0.501)	10.7/31 (0.42/1.22)

## 844B Mating Shaft Tolerance [mm (in.)]

Bore	Diameter	Length (minimum)
3/8 in.	9.50/9.55 (0.374/0.376)	41 (1.6)
1/2 in.	12.67/12.73 (0.499/0.501)	

## Bulletin 844D Hollow Shaft Incremental Encoders

HS35 Style



### Description

Bulletin 844D blind-shaft and through-shaft incremental encoders are used to electronically monitor the position or speed of a rotating shaft. Shaft position is converted to digital pulses in an A quad B format. A Zero Index Channel is also included with all models.

### Features

- Blind-shaft and through-shaft front coupled models
- Flexible coupler not required
- Adaptor plate not required
- 120...16,384 PPR
- 3.5 in. diameter housing
- Supports 1/2...1 1/8 inch shafts
- Cable, connector or terminal block connection options
- CE Marked for all applicable directives

### Specifications

<b>Electrical</b>	
Code Format	2 channels with zero index
Power Supply	120 mA (no load)
Output Frequency, Max.	200 kHz Push-Pull (120...8192 PPR) 300 kHz all other drivers (120...8192 PPR) 600 kHz (above 8192 PPR)
Resolution	Up to 16,384 pulses per revolution
Output Drives	3487 Line driver = ± 40 mA 4469 Line driver = ± 200 mA 7272 Line driver = ± 40 mA Push-Pull Single Ended Driver = ± 70 mA
<b>Mechanical</b>	
Angular Acceleration	100,000 radians/sec <sup>2</sup>
Starting Torque	9.3 Ncm (13 in-oz) @ 25°C (77°F)
Running Torque	5 Ncm (7 in-oz) @ 25°C (77°F)
Moment of Inertia	490 gcm <sup>2</sup> (6.9 x 10 <sup>-3</sup> oz-in-sec <sup>2</sup> )
Slew Speed	3000 rpm maximum
Shaft Loading	120...2500 PPR: Axial 67 N (15 lbs); Radial 133 N (30 lbs) 4096...16,384 PPR: Axial 44 N (10 lbs); Radial 67 N (15 lbs)
Permissible Shaft	Radial Movement: Static ±0.5 mm (0.02 in.); Dynamic ±0.1 mm (0.004 in.) Axial Movement: Static ±0.5 mm (0.02 in.); Dynamic ±0.5 mm (0.02 in.)
Bore Size	Supports 1/2...1 1/8 in. and 30 mm shafts
<b>Environmental</b>	
Enclosure Type Rating	NEMA Type 4, 13; IP66 (IEC 529) except terminal block connection type rated IP40 (IEC 529) only
Material	Aluminum Housing
Operating Temperature [C (F)]	-20...85° (-4...+185°)
Storage Temperature [C (F)]	-30...85° (-22...+185°)
Relative Humidity	90% noncondensing
Shock	50 g for 11 ms
Vibration	20 g from 5...2000 Hz
Weight [kg (lbs)]	0.91 (2)

### Accessories

Description	Page Number
Pre-Wired Cables	6-49
Mating Connectors	6-52
Differential Encoder Buffer Board	6-55

## Bulletin 844D Hollow Shaft Incremental Encoders

HS35 Style

## Product Selection

844D — **A** **5** **A** **C** **1** **CR**  
*a b c d e f*

*a*

Shaft Design	
Code	Description
A	Blind-Shaft
B	Through-Shaft

*b*

Shaft Size ①	
Code	Description
4	1/2 inch
5	5/8 inch
6	3/4 inch
7	7/8 inch
8	1.0 inch
9	1 1/8 inch
M	30 mm

- ① Shaft sizes below 1 inch include an insulating insert.
- ② Terminal block unit is not rated for fluid ingress protection (IP40 (IEC 529) only).
- ③ DLD = Differential Line Driver
- ④ 7272 line driver has a voltage drop of 1.9V.
- ⑤ Available with power supply and output options 1, 2, 3, and 4.

*c*

Mounting Configuration	
Code	Description
A	Tether, 1/2 inch bolt on a 7.25 inch dia. B.C. (to fit 8 1/2 inch NEMA C face)
B	Tether, 3/8 inch bolt on a 5.88 inch dia. B.C. (to fit 4 1/2 inch NEMA C face)
C	Tether, 3/8 inch bolt on a 2.5...4.0 inch dia. radius
D	Anti-rotation pin

*d*

Connection Type	
Code	Description
C	10 pin connector
T	Terminal block ②
1	1 m (3.28 ft) cable

*e*

Power Supply & Output⑤	
Code	Description
1	5V DC in, 5V DC DLD out (3487)
2	5...26V DC in, 5...26V DC DLD out (7272) ④
3	5...15V DC in, 5...15V DC DLD out (4469)
4	8...26V DC in, 5V DC DLD out (3487)
5	10...30V DC in, 10...30V DC Push-Pull out

*f*

Resolution	
Code	Description (PPR)
DB	120
CK	360
FW	1024
CS	2048
CR	2500
DS	4096
DR	5000
FS	8192
CV	10000 ⑥
LS	16384 ⑥

## Electrical Connections

Table A: Differential Line Driver Outputs

Function	10-Pin Connector	Shielded Cable	Terminal
Channel A Output	A	White	1
Channel B Output	B	Pink	2
Channel Z Output	C	Violet	7
DC+ Input	D	Red	3
DC Return	F	Blue	4
Case Ground	G	Green	—
Channel A' Output	H	Brown	5
Channel B' Output	I	Black	6
Channel Z' Output	J	Yellow	8

Table B: Push-Pull Outputs

Function	10-Pin Connector	Shielded Cable	Terminal
Channel A Output	A	White	1
Channel B Output	B	Pink	2
Channel Z Output	C	Violet	7
DC+ Input	D	Red	3
DC Return	F	Blue	4
Case Ground	G	Green	—
Not connected	—	Brown	—
Not connected	—	Black	—
Not connected	—	Yellow	—

Note: 10-pin connector type MS3102R18-1P



# Bulletin 844D Hollow Shaft Incremental Encoders

HS35 Style

## 844D Blind-Shaft Tolerance

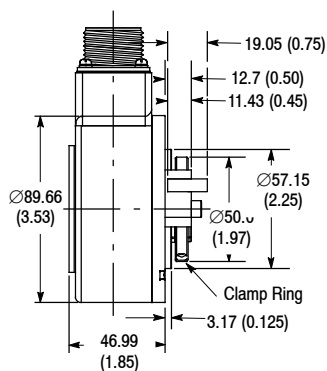
Shaft Size	Bore	Mating Shaft	Length
1/2 inch	0.500/0.501 inch	0.500/0.499 inch	0.70/2.00 inch
5/8 inch	0.625/0.626 inch	0.625/0.624 inch	0.70/2.00 inch
3/4 inch	0.750/0.751 inch	0.750/0.749 inch	0.70/2.00 inch
7/8 inch	0.875/0.876 inch	0.875/0.874 inch	0.70/2.00 inch
1.0 inch	1.000/1.001 inch	1.000/0.999 inch	0.70/2.00 inch
1 1/8 inch	1.125/1.126 inch	1.125/1.124 inch	0.70/2.00 inch
30 mm	30.000/30.025 mm	30.000/29.975 mm	18/50 mm

## 844D Through-Shaft Tolerance

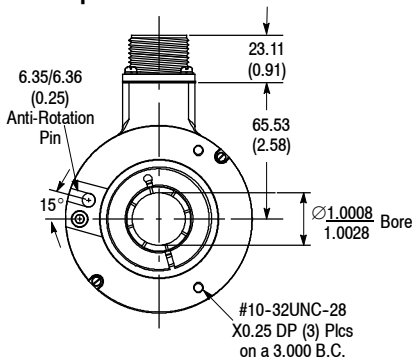
Shaft Size	Bore	Mating Shaft	Length—min.
1/2 inch	0.500/0.501 inch	0.500/0.499 inch	0.70 inch
5/8 inch	0.625/0.626 inch	0.625/0.624 inch	0.70 inch
3/4 inch	0.750/0.751 inch	0.750/0.749 inch	0.70 inch
7/8 inch	0.875/0.876 inch	0.875/0.874 inch	0.70 inch
1.0 inch	1.000/1.001 inch	1.000/0.999 inch	0.70 inch
1 1/8 inch	1.125/1.126 inch	1.125/1.124 inch	0.70 inch
30 mm	29.980/29.959 mm	30.000/29.975 mm	18 mm

## Approximate Dimensions [mm (in.)]

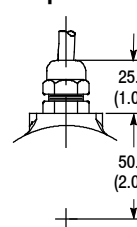
### Blind-Shaft ❶



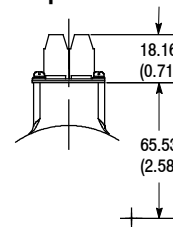
### Connector Option



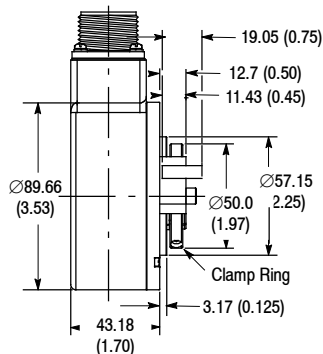
### Cable Option



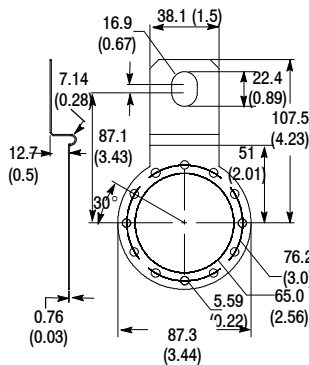
### Terminal Option



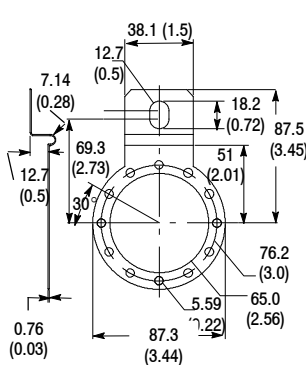
### Through-Shaft ❷



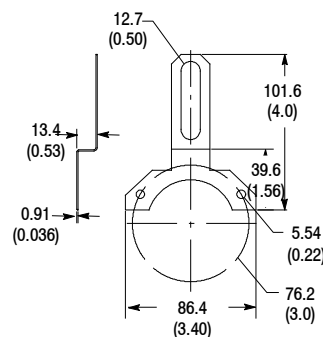
### Tether Option "A"



### Tether Option "B"



### Tether Option "C"



❶ Shown with optional anti-rotation pin.

**Bulletin 845F Incremental Encoders**

Size 25, High Performance with Integral Shaft Coupling



High Performance Coupling  
845F-SJGZ14FWY2

**Description**

The Bulletin 845F is an optical incremental encoder that provides digital feedback corresponding to the position of a rotating shaft. This feedback is compatible with Programmable Controllers, Numerical Controllers, Motion Controllers, and other positioning systems.

The 845F provides code disk resolution up to 5000 pulses per revolution, frequency response of 210 kHz, and high immunity to electromagnetic interference. Housed in a rugged, size 25, NEMA Type 4 and 13, IP66 (IEC 529), aluminum enclosure, the 845F has a flange mount with integral coupling for ease of installation in harsh industrial environments.

**Features**

- Code disk resolution up to 5000 PPR
- Optional sink, source, open collector or differential line driver output configurations
- 210 kHz operating frequency
- Input reverse polarity protection
- CE Marked for all applicable directives

**Specifications**

<b>Electrical</b>	
Code Format	Incremental, 2 channels with zero index
Quadrature	90° ±22°; Channel A leads B CCW
Symmetry	50% ±10%
Zero Index Channel	1/2 cycle, gated to channel B̄
Power Supply	Determined by cat. no.: 5V DC ±5% @ 150 mA max. 8...24V DC @ 150 mA max.
Response Frequency	Data: 210 kHz      Zero index: 125 kHz
Operating Speed (Data)	(210 kHz x 60)/pulses per rev. = RPM or 6000 RPM, whichever is lower
Resolution	Up to 5000 PPR on code disk
Output Drives	PNP current source = 20 mA; NPN current sink = 20 mA; Differential line driver = ±20 mA; NPN open collector = 20 mA
<b>Mechanical</b>	
Starting Torque	2.5 Ncm typical [3.5 in-oz]
Running Torque	2.5 Ncm typical [3.5 in-oz]
Moment of Inertia	27 gcm <sup>2</sup> (3.9 x 10 <sup>-4</sup> oz-in-sec <sup>2</sup> )
Slew Speed	6000 RPM
Shaft Misalignment	Angular: 5° standard, 10° high performance; Parallel: 0.010 in. standard, 0.020 in. high performance
Coupling Axial Compliance	±0.030 in. standard, ±0.060 in. high performance
Bore Size	9.517 mm (3/8 in.) or 6.4 mm (1/4 in.) dia.
<b>Environmental</b>	
Enclosure Type Rating	NEMA Type 4,13; IP66 (IEC 529)
Operating Temperature [C (F)]	0...+60° (+32...+140°)
Storage Temperature [C (F)]	-25...+90° (-13...+194°)
Relative Humidity	98%, noncondensing
Shock	50 g (11 ms duration)
Vibration	20 g (5...2000 Hz)
Weight [kg (lbs)]	0.91 (2)

**Accessories**

Description	Page Number
Pre-Wired Cables	6-49
Mating Connectors	6-52
Differential Encoder Buffer Board	6-55

# Bulletin 845F Incremental Encoders

Size 25, High Performance with Integral Shaft Coupling

## Product Selection

845F — S J **G** Z 1 4 FW Y 2 C  
*a b c d e f*

*a*

Coupling Version	
Code	Description
B	Standard 1/4 in. Bore
E	Standard 3/8 in. Bore
F	High Performance 1/4 in. Bore
G	High Performance 3/8 in. Bore

*b*

Power Supply	
Code	Description
1	5V DC ±5%
2	8...24V DC Unregulated

*c*

Output Configuration ①	
Code	Description
2	PNP Current Source
3	NPN Current Sink
4	DLD 5V DC RS-422
5	NPN Open Collector 24V DC Max ②
6	DLD 8...24V DC ③

- ① DLD = Differential Line Driver
- ② External pull-up resistor required
- ③ Can not be ordered with 5V DC power supply (code 1 above)

*d*

Resolution	
Code	Description (PPR)
AG	1
AM	5
BG	10
CA	50
CB	60
CE	64
CF	80
CG	100
DB	120
DF	150
EB	180
CH	200
CJ	250
CC	254
CW	256
EG	300
CK	360
CL	400
CM	500
DW	512
EH	600
DG	720
DL	800
LG	900
CN	1000
FW	1024
EL	1200
CD	1250
RF	1280
CU	1472
EM	1500
FL	1600
CP	1800
DN	2000
CS	2048
HL	2400
CR	2500
CY	2540
LJ	2750
EN	3000
CT	3600
DR	5000

*e*

Connection Options	
Code	Description
1	Axial Connector (End)
2	Radial Connector (Side)
A	Axial Cable (End)
R	Radial Cable (Side)

*f*

Connection Options	
Code	Description
Blank	Without Mating Connector ④
C	With Mating Connector ④
1	1 m (3.28 ft) Cable Length ⑤
5	5 m (16.4 ft) Cable Length ⑤
9	9 m (29.52 ft) Cable Length ⑤

- ④ These options not available with Connection Options code: "A" and "R."
- ⑤ These options not available with Connection Options code: "1" and "2."

# Bulletin 845F Incremental Encoders

Size 25, High Performance with Integral Shaft Coupling

## Electrical Connections

### 7-Pin Connector (ACS02E16S-1P (023))

Current Source, Current Sink,  
Open Collector Outputs

Pin	Function	Pin	Function
A	Channel A Output	E	—
B	Channel B Output	F	DC Return
C	Channel Z Output	G	Case Ground
D	DC+ Input	—	—

### 10-Pin Connector (ACS02E18-1P (023))

Differential Line-Driver Outputs

Pin	Function	Pin	Function
A	Channel A Output	F	DC Return
B	Channel B Output	G	Case Ground
C	Channel Z Output	H	Channel $\bar{A}$ Output
D	DC+ Input	I	Channel $\bar{B}$ Output
E	—	J	Channel $\bar{Z}$ Output

⦿ Pins D and E internally connected

## Cable

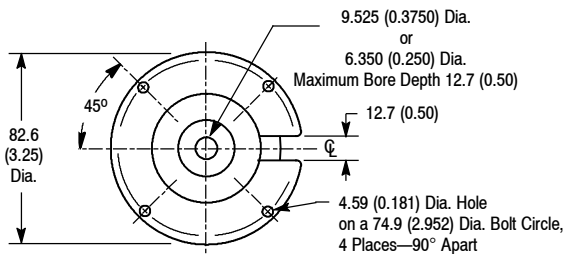
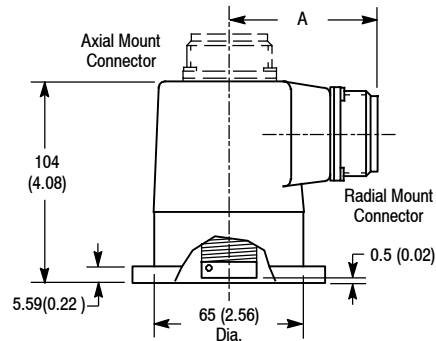
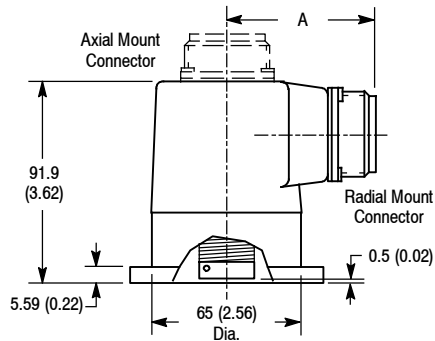
Current Source, Current Sink,  
Open Collector Outputs

Wire Pair	Wire Color	Function
Red/Black	Red	DC+ Input
	Black	DC Return
White/Black	White	Channel A Output
	Black	Not Connected
Blue/Black	Blue	Channel B Output
	Black	Not Connected
Green/Black	Green	Channel Z Output
	Black	Not Connected

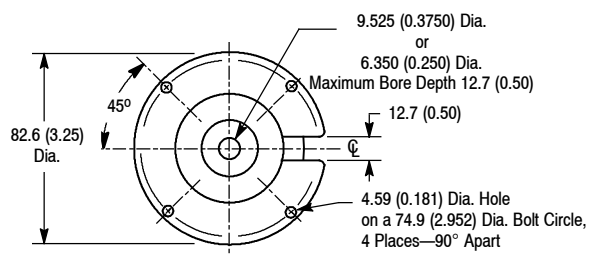
Differential Line Driver Outputs

Wire Pair	Wire Color	Function
Red/Black	Red	DC+ Input
	Black	DC Return
White/Black	White	Channel A Output
	Black	Channel $\bar{A}$ Output
Blue/Black	Blue	Channel B Output
	Black	Channel $\bar{B}$ Output
Green/Black	Green	Channel Z Output
	Black	Channel $\bar{Z}$ Output

## Approximate Dimensions [mm (in.)]



Standard Coupling



High Performance Coupling

### Connector Type [mm (in.)]

Output Code	Output Type	Connector Type	Number of Pins	Dimension "A"
2	Current Source	ACS02E16S-1P (023)	7	63 (2.48)
3	Current Sink	ACS02E16S-1P (023)	7	63 (2.48)
4	Diff. Line Driver	ACS02E18-1P (023)	10	73.9 (2.91)
5	Open Collector	ACS02E16S-1P (023)	7	63 (2.48)



Square Flange Mount  
845H-SJDZ14CRY2

## Description

The Bulletin 845H optical incremental encoders electronically digitize shaft motion of a rotating element by converting mechanical motion to an electronic digital format. Incremental square waves are accumulated in a counter as position feedback. The encoder provides code disk resolutions up to 5000 pulses per revolution at a signal frequency response of 210 kHz.

The Bulletin 845H encoder is housed in a size 25, NEMA Type 4 and 13, IP66 (IEC 529), enclosure making it suitable for many of today's industrial environments.

## Features

- Code disk resolution up to 5000 PPR
- Optional sink, source, open collector or differential line driver output configurations
- English and metric options
- Input reverse polarity protection
- CE Marked for all applicable directives

## Specifications

Electrical	
Code Format	Incremental, 2 channels with zero index
Quadrature	90° ±22°; Channel A leads B CCW
Symmetry	50% ±10%
Zero Index Channel	1/2 cycle, gated to channel B
Power Supply	Determined by cat. no.: 5V DC ±5% @ 150 mA max. 8...24V DC @ 150mA max.
Response Frequency	Data: 210 kHz      Zero index: 125 kHz
Shaft Operating Speed, Max. (RPM)	(210 kHz x 60)/pulses per rev. = RPM or 6000 RPM, whichever is lower
Resolution	Up to 5000 PPR on code disk
Output Drives	PNP current source = 20 mA; NPN current sink = 20 mA; Differential line driver = ±20 mA; NPN open collector = 20 mA
Mechanical	
Starting Torque	2.5 Ncm typical [3.5 in-oz]
Running Torque	2.5 Ncm typical [3.5 in-oz]
Moment of Inertia	15 gcm (2.1 x 10 <sup>-4</sup> oz-in-sec <sup>2</sup> )
Slew Speed	6000 RPM
Shaft Loading	3/8 in. and 10 mm Dia.: Axial 89 N (20 lbs) (10 lbs 5000 PPR); Radial 178 N (40 lbs) (20 lbs 5000 PPR)
Shaft Diameter	6 mm, 10 mm, 6.4 mm (1/4 in.) 9.517 mm (3/8 in.) diameter
Environmental	
Enclosure Type Rating	NEMA Type 4, 13; IP66 (IEC 529)
Operating Temperature [C (F)]	0...+60° (+32...+140°)
Storage Temperature [C (F)]	-25...+90° (-13...+194°)
Relative Humidity	98%, noncondensing
Shock	50 g (11 ms duration)
Vibration	20 g (4...2000 Hz)
Weight [kg (lbs)]	0.91 (2)

## Accessories

Description	Page Number
Flexible Couplings	6-47
Measuring Wheels	6-48
Servo Clamps	6-48
Pre-Wired Cables	6-49
Mating Connectors	6-52
Mounting Plates	6-52
Differential Encoder Buffer Board	6-55

# Bulletin 845H Incremental Encoders

Size 25, High Performance

## Selection Guide

**845H** — **S** **J** **H** **Z** **1** **4** **CR** **Y** **2** **C**

*a*
*b*
*c*
*d*
*e*
*f*
*g*

*a*

Mounting Configuration ❶	
Code	Description
D	Square Flange
E	70 mm Diameter Flange
F	90 mm Diameter Flange
G	Metric Servo 48 mm B.C.
H	English Servo
J	Metric Servo 42 mm B.C.

*b*

Shaft Options ❶	
Code	Description
A	6 mm Diameter
B	10 mm Diameter
C	1/4 in. Diameter
Z	3/8 in. Diameter
K	6 mm w/Flat
L	10 mm w/Flat
M	1/4 in. w/Flat
N	3/8 in. w/Flat
P	3/8 in. w/Double Flat

❶ Standard cat. nos. consist of either English Mounting Configurations with English Shaft Options or Metric Mounting Configurations with Metric Shaft Options.

*c*

Power Supply	
Code	Description
1	5V DC ±5%
2	8...24V DC Unregulated

*d*

Output Configuration ❷	
Code	Description
2	PNP Current Source
3	NPN Current Sink
4	DLD 5V DC RS-422
5	NPN Open Collector 24V DC Max ❸
6	DLD 8...24V DC ❹

❷ DLD = Differential Line Driver

❸ External pull-up resistor required

❹ Can not be ordered with 5V DC power supply (code 1 above)

*e*

Resolution	Resolution
Code	Description (PPR)
AG	1
AM	5
BG	10
CA	50
CB	60
CE	64
CF	80
CG	100
DB	120
DF	150
EB	180
CH	200
CJ	250
CC	254
CW	256
EG	300
CK	360
CL	400
CM	500
DW	512
EH	600
DG	720
DL	800
LG	900
CN	1000
FW	1024
EL	1200
CD	1250
RF	1280
CU	1472
EM	1500
FL	1600
CP	1800
DN	2000
CS	2048
HL	2400
CR	2500
CY	2540
LJ	2750
EN	3000
CT	3600
DR	5000

*f*

Connection Type	
Code	Description
1	Axial Connector (End)
2	Radial Connector (Side)
A	Axial Cable (End)
R	Radial Cable (Side)

*g*

Connection Options	
Code	Description
Blank	Without Mating Connector ❺
C	With Mating Connector ❺
1	1 m (3.28 ft) Cable Length ❻
5	5 m (16.4 ft) Cable Length ❻
9	9 m (29.52 ft) Cable Length ❻

❺ These options not available with Connection Options code: "A" & "R."

❻ These options not available with Connection Options code: "1" & "2."

Electrical Connections

7-Pin Connector  
(ACS02E16S-1P (023))

Current Source, Current Sink,  
Open Collector Outputs

Pin	Function	Pin	Function
A	Channel A Output	E	—
B	Channel B Output	F	DC Return
C	Channel Z Output	G	Case Ground
D	DC+ Input	—	—

10-Pin Connector  
(ACS02E18-1P (023))

Differential Line-Driver Outputs

Pin	Function	Pin	Function
A	Channel A Output	F	DC Return
B	Channel B Output	G	Case Ground
C	Channel Z Output	H	Channel $\bar{A}$ Output
D	DC+ Input	I	Channel $\bar{B}$ Output
E	—	J	Channel $\bar{Z}$ Output

ⓘ Pins D and E internally connected

Cable  
Current Source, Current Sink,  
Open Collector Outputs

Wire Pair	Wire Color	Function
Red/Black	Red	DC+ Input
	Black	DC Return
White/Black	White	Channel A Output
	Black	Not Connected
Blue/Black	Blue	Channel B Output
	Black	Not Connected
Green/Black	Green	Channel Z Output
	Black	Not Connected

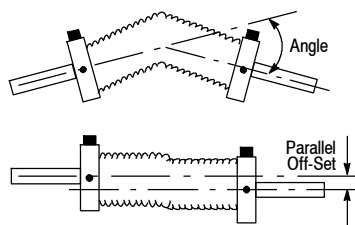
Cable  
Differential Line Driver Outputs

Wire Pair	Wire Color	Function
Red/Black	Red	DC+ Input
	Black	DC Return
White/Black	White	Channel A Output
	Black	Channel $\bar{A}$ Output
Blue/Black	Blue	Channel B Output
	Black	Channel $\bar{B}$ Output
Green/Black	Green	Channel Z Output
	Black	Channel $\bar{Z}$ Output

Connector Type

Output Code	Output Type	Connector Type	Number of Pins	Dimension "B"
2	Current Source	ACS02E16S-1P (023)	7	63 (2.48)
3	Current Sink	ACS02E16S-1P (023)	7	63 (2.48)
4.6	Diff. Line Driver	ACS02E18-1P (023)	10	73.9 (2.91)
5	Open Collector	ACS02E16S-1P (023)	7	63 (2.48)

Flexible Shaft Couplings

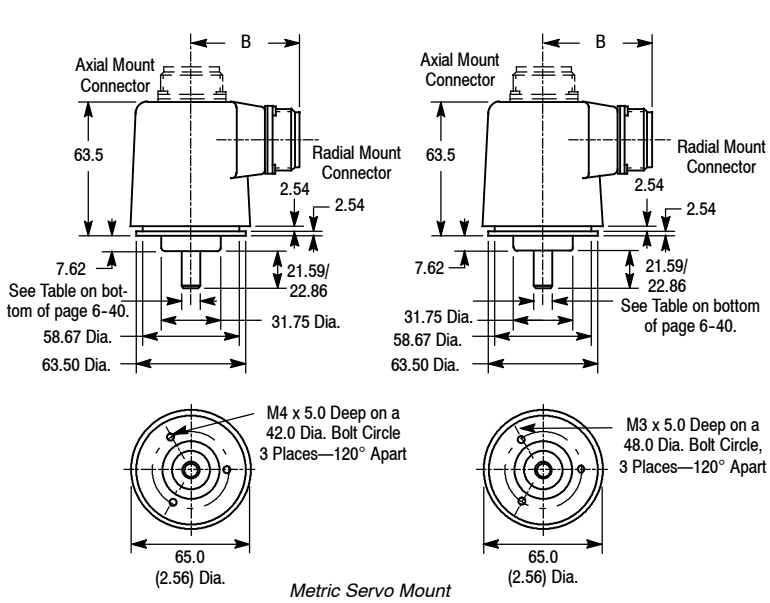
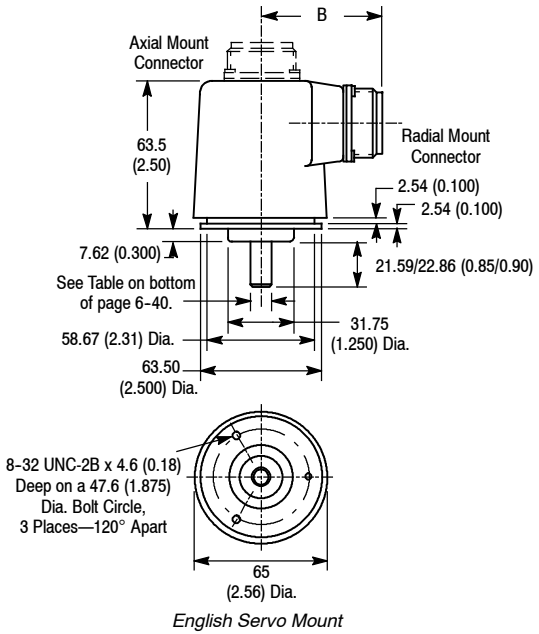
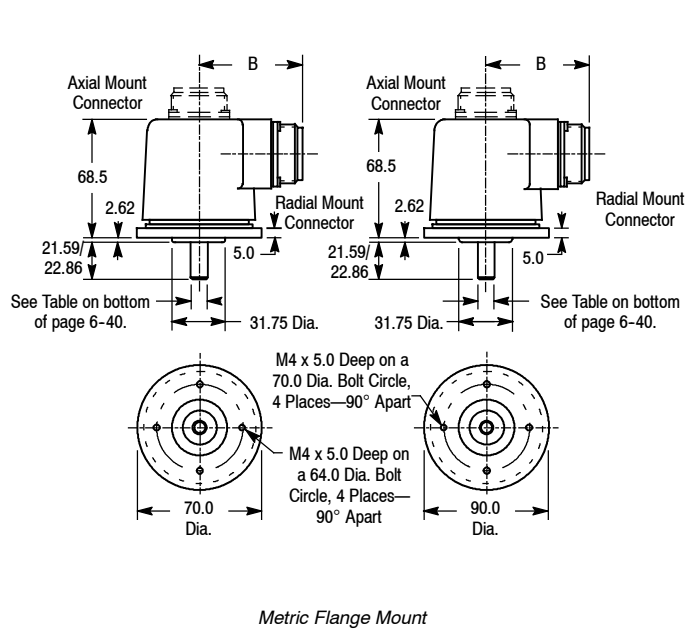
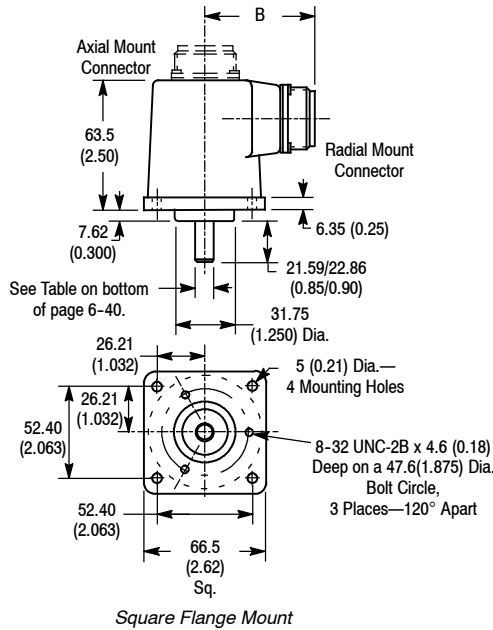


ATTENTION



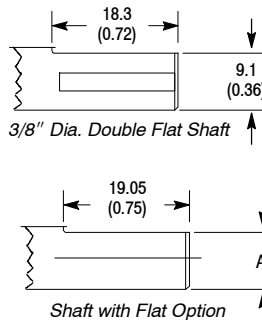
Rigidly coupling the encoder shaft to the machine shaft **will cause a failure** in either the bearings of the encoder or the bearings of the machine shaft.

Approximate Dimensions [mm (in.)]



**Shaft Diameter Options**

Code	Shaft Diameter [mm (in.)]
A or K	6 +0.00, -0.013
B or L	10 +0.00, -0.013
C or M	6.35 (0.2499) +0.0000, -0.0005
Z or N	9.52 (0.3749) +0.0000, -0.0005



**Flat Dimensions**

Code	Dimension "A" [mm (in.)]
K	5.3 (0.21)
L	9.1 (0.36)
M	5.5 (0.22)
N	8.6 (0.34)



## Bulletin 845T Incremental Encoders

Size 20, Heavy Duty



Square Flange Mount  
845T-DZ13ECR

## Description

Bulletin 845T optical incremental encoders are used to electronically monitor the position of a rotating shaft. Shaft motion is converted to digital pulses which are accumulated and evaluated by various electronic controllers. The 845T provides code disk resolutions of up to 3000 pulses per revolution, and a frequency response of up to 100 kHz.

The Bulletin 845T encoder is a heavy duty, NEMA Type 4, and IP66 (IEC 529) rated optical incremental shaft encoder that is housed in a two inch diameter enclosure. Typical applications for the 845T include machine tools, packaging machinery, motion controls, and robotics. The heavy duty bearing assembly, rugged construction and high shaft loading capabilities make the 845T suitable for many of today's harsh industrial environments.

## Features

- Code disk resolution up to 3000 PPR
- Input reverse polarity protection
- CE Marked for all applicable directives

## Specifications

Electrical	
Code Format	Incremental (A, AB or ABZ channels)
Quadrature	90° ±22°; Channel A leads B CCW
Symmetry	50% ±10%
Zero Index Channel	1/2 cycle, gated to channel B̄
Power Supply	Determined by cat. no.: 5V DC ±5% @ 150 mA max. 11...20V DC @ 150 mA max. 24V DC @ 150 mA max.
Response Frequency	Data: 100 kHz      Zero index: 100 kHz
Operating Speed	100 kHz x 60/pulses per revolution = RPM or 15,000 RPM, whichever is lower
Resolution	Up to 3000 PPR on code disk
Output Drives	Push-Pull Single Ended Driver = ±20 mA Differential line driver = ±20 mA
Mechanical	
Starting Torque	2.5 Ncm (3.5 in-oz) typical
Running Torque	2.5 Ncm (3.5 in-oz) typical
Slew Speed	15,000 RPM
Shaft Loading	Axial: 359 N (80lbs); Radial: 359 N (80 lbs) (10 mm, 3/8 in. shafts) 180 N (40 lbs) (6 mm, 1/4 in. shafts)
Shaft Dimensions	6 mm, 10 mm, 6.4 mm (1/4 in.), 9.517 mm (3/8 in.) diameter
Environmental	
Enclosure Type Rating	NEMA Type 4; IP66 (IEC 529)
Operating Temperature [C (F)]	0...+60° (+32...+140°)
Storage Temperature [C (F)]	-25...+90° (-13...+194°)
Relative Humidity	98%, noncondensing
Shock	50 g (11 ms duration)
Vibration	20 g (5...2000 Hz)
Weight [kg (oz)]	0.44 (14)

## Accessories

Description	Page Number
Flexible Couplings	6-47
Measuring Wheels	6-48
Servo Clamps	6-48
Pre-Wired Cables	6-49
Mating Connectors	6-52
Mounting Plates	6-52
Differential Encoder Buffer Board	6-55

# Bulletin 845T Incremental Encoders

Size 20, Heavy Duty

## Product Selection

845T — **D** **Z** **1** **3** **E** **CR** — **C**  
*a b c d e f g*

*a*

Mounting Configuration	
Code	Description
D	Square Flange
H	Servo with Face Mount Holes
L	Servo without Face Mount Holes

*b*

Shaft Options	
Code	Description
A	6 mm Diameter
B	10 mm Diameter
C	1/4 in. Diameter
Z	3/8 in. Diameter
K	6 mm w/Flat
L	10 mm w/Flat
M	1/4 in. w/Flat
N	3/8 in. w/Flat

*c*

Electrical Options ①	
Code	Description
1	5V DC in, 5V DC DLD Out
2	5V DC in, 5V DC P-P Out
3	11...24V DC in, 11...24V DC P-P Out
4	11...20V DC in, 5V DC DLD Out
5	24V DC in, 5V DC DLD Out
6	11...24V DC in, 11...24V DC DLD out

① DLD = Differential Line Driver  
 P-P = Push-Pull Single Ended Driver

*d*

Signal Options	
Code	Description
1	Channel A Only
2	Channel A and B
3	Channel A, B, and Z

*e*

Connection Options	
Code	Description
A	6 Pin Connector ②
B	7 Pin Connector ②
E	10 Pin Connector
P	Pigtail Cable

② This option not available with Electrical Option codes: "1," "4," "5" or "6."

*f*

Resolution	
Code	Description (PPR)
AG	1
AM	5
BG	10
CA	50
CB	60
CE	64
CF	80
CG	100
DB	120
DF	150
EB	180
CH	200
CJ	250
CC	254
CW	256
EG	300
CK	360
CL	400
CM	500
DW	512
EH	600
DG	720
DL	800
LG	900
CN	1000
FW	1024
EL	1200
CD	1250
RF	1280
CU	1472
EM	1500
FL	1600
CP	1800
DN	2000
CS	2048
HL	2400
CR	2500
CY	2540
LJ	2750
EN	3000

*g*

Mating Connector/Cable Length	
Code	Description
Blank	Without Mating Connector ③
C	With Mating Connector ③
1	1 m (3.28 ft) Cable Length ④
5	5 m (16.4 ft) Cable Length ④
9	9 m (29.52 ft) Cable Length ④

③ These options not available with Connection Options code: "P."

④ These options not available with Connection Options code: "A," "B," & "E."

## Cable

### Push-Pull Outputs

Wire Pair	Wire Color	Function
Red/Black	Red	DC+ Input
	Black	DC Return
White/Black	White	Channel A Output
	Black	Not Connected
Blue/Black	Blue	Channel B Output
	Black	Not Connected
Green/Black	Green	Channel Z Output
	Black	Not Connected

### Differential Line Driver Outputs

Wire Pair	Wire Color	Function
Red/Black	Red	DC+ Input
	Black	DC Return
White/Black	White	Channel A Output
	Black	Channel $\bar{A}$ Output
Blue/Black	Blue	Channel B Output
	Black	Channel $\bar{B}$ Output
Green/Black	Green	Channel Z Output
	Black	Channel $\bar{Z}$ Output

Electrical Connections

6-Pin Connector  
(ACS02E14S-6P (023))

Push-Pull Outputs

Pin	Function	Pin	Function
A	DC Return	D	Channel B Output
B	DC+ Input	E	Channel A Output
C	Channel Z Output	F	No Connection

7-Pin Connector  
(ACS02E16S-1P (023))

Push-Pull Outputs

Pin	Function	Pin	Function
A	Channel A Output	E	No Connection
B	Channel B Output	F	DC Return
C	Channel Z Output	G	No Connection
D	DC+ Input	—	No Connection

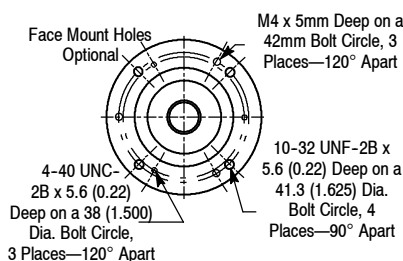
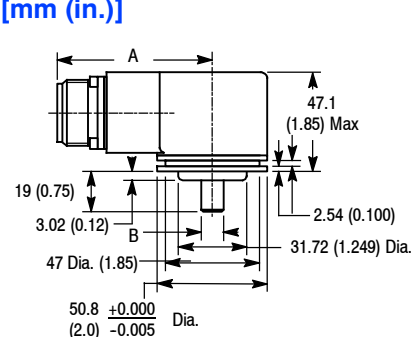
10-Pin Connector  
(ACS02E18-1P (023))

Push-Pull, Differential Line Driver Outputs

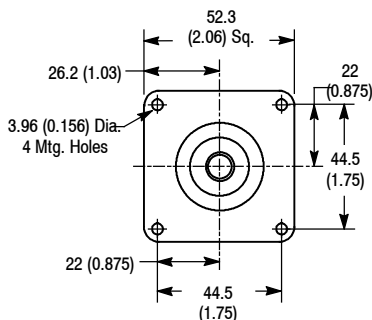
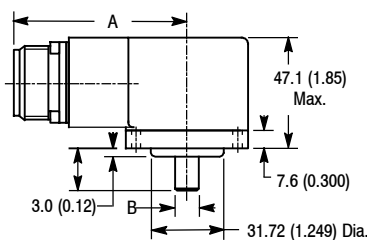
Pin	Function	Pin	Function
A	Channel A Output	F	DC Return
B	Channel B Output	G	No Connection
C	Channel Z Output	H	Channel A Output <sup>Ⓢ</sup>
D	DC+ Input	I	Channel B Output <sup>Ⓢ</sup>
E	No Connection	J	Channel Z Output <sup>Ⓢ</sup>

<sup>Ⓢ</sup> Not included with push-pull outputs

Approximate Dimensions  
[mm (in.)]



Servo Mount



Square Flange Mount

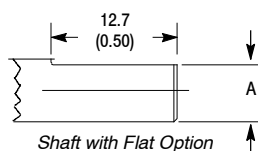
Connector Dimensions

Dimension Code	Radial Connector Options	Length mm (inches)
A	ACS02E14S-6P (023)	57.7 (2.272)
	ACS02E16S-1P (023)	62.5 (2.460)
	ACS02E18-1P (023)	68.9 (2.691)

Shaft Diameter Options  
Dimension "B"

Code	Shaft Diameter [mm (in.)]
A or K	6 +0.00, -0.013
B or L	10 +0.00, -0.013
C or M	6.35 (0.2499) +0.0000, -0.0005
Z or N	9.52 (0.3749) +0.0000, -0.0005

Option H Mounting Configuration includes all 3 sets of mounting holes.



Shaft with Flat Option

Flat Dimensions

Code	Dimension "A" [mm (in.)]
K	5.3 (0.21)
L	9.1 (0.36)
M	5.5 (0.22)
N	8.6 (0.34)

**Bulletin 845PY Digital Tachometer**

Size 20, 5PY Mounting



5PY Mount  
845PY-FW-2

**Description**

Bulletin 845PY digital tachometer is an optical encoder that determines the angular velocity of a rotating shaft and is a direct digital replacement for the standard 5PY analog tachometer. The Bulletin 845PY will mount on the same bolt hole pattern and use the same flexible coupling.

The Bulletin 845PY digital tachometer is a heavy duty, NEMA Type 4, and IP66 (IEC 529) rated optical incremental shaft encoder that is housed in a two-inch diameter enclosure. Typical applications for the 845PY include velocity feedback to a variety of DC drives, and machine tools.

**Features**

- Digital replacement for the 5PY Analog Tachometer
- Direct 1395 digital DC drive interface
- Code disk resolution up to 3000 PPR
- Input reverse polarity protection
- CE Marked for all applicable directives

**Specifications**

<b>Electrical</b>	
Code Format	Incremental, 2 channels
Quadrature	90° ±22°; Channel A leads B CCW
Symmetry	50% ±10%
Power Supply	Determined by cat. no.: 5V DC ±5% @ 150 mA max. 11...20V DC @ 150 mA max. 24V DC @ 150 mA max.
Response Frequency	100 kHz
Operating Speed	(100 kHz x 60)/pulses per revolution = RPM or 15,000 RPM, whichever is lower
Resolution	Up to 3000 PPR on code disk
Output Drives	Differential line driver = ±20 mA @ 5V DC
<b>Mechanical</b>	
Starting Torque	2.5 Ncm (3.5 in-oz) typical
Running Torque	2.5 Ncm (3.5 in-oz) typical
Slew Speed	15,000 RPM
Shaft Loading	Axial: 359 N (80 lbs); Radial: 222 N (50 lbs)
Shaft Dimensions	7.94 mm (5/16 in.) diameter
<b>Environmental</b>	
Enclosure Type Rating	NEMA Type 4; IP66 (IEC 529)
Operating Temperature [C (F)]	0...+60° (+32...+140°)
Storage Temperature [C (F)]	-25...+90° (-13...+194°)
Relative Humidity	98%, noncondensing
Shock	50 g (11 ms duration)
Vibration	20 g (5...2000 Hz)
Weight [kg (oz)]	0.56 (20)

**Accessories**

Description	Page Number
Pre-Wired Cables	6-49
Mating Connectors	6-52
Differential Encoder Buffer Board	6-55

Product Selection

845PY — **FW** — **2** — **C**  
           a          b          c

a

Resolution	
Code	Description (PPR)
AG	1
AM	5
BG	10
CA	50
CB	60
CE	64
CF	80
CG	100
DB	120
DF	150
EB	180
CH	200
CJ	250
CC	254
CW	256
EG	300
CK	360
CL	400
CM	500
DW	512
EH	600
DG	720
DL	800
LG	900
CN	1000
FW	1024
EL	1200
CD	1250
RF	1280
CU	1472
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FL	1600
CP	1800
DN	2000
CS	2048
HL	2400
CR	2500
CY	2540
LJ	2750
EN	3000

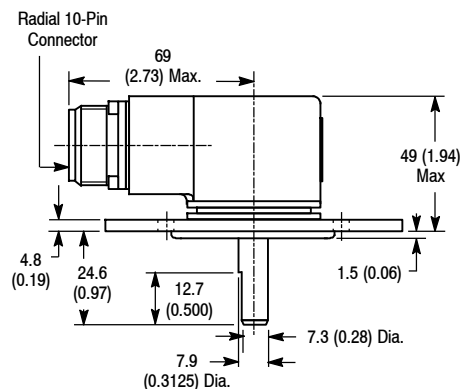
b

Power Supply Option	
Code	Description
1	5V DC ±5%
2	11...20V DC
3	24V DC ±10%

c

Mating Connector	
Code	Description
Blank	Without Mating Connector
C	With Mating Connector

Approximate Dimensions [mm (in.)]

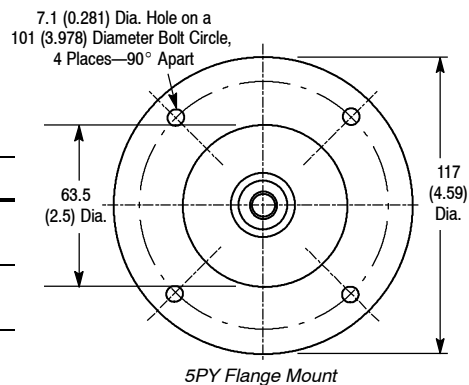


Electrical Connections

10-Pin Connector (ACS02E18-1P (023))

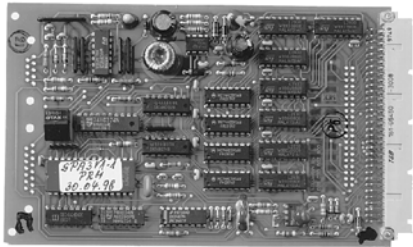
Differential Line Driver Outputs

Pin	Function	Pin	Function
A	Channel A Output	F	DC Return
B	Channel B Output	G	No Connection
C	No Connection	H	Channel A Output
D	DC+ Input	I	Channel B Output
E	No Connection	J	No Connection



# Bulletin 842 Encoder Accessories

## Serial Parallel Adaptor/SPA Card Holder



Serial Parallel Adaptor  
842-SPA

### Product Selection

## 842 — SPA

<b>Size</b>	10.3 x 165 mm (4 x 6.5 in.)
<b>Voltage Supply</b>	11...32V DC
<b>Power Requirements</b>	250 mA
<b>Operating Temperature [C (F)]</b>	0...50° (32...122°)
<b>Output Driver (parallel)</b>	Push-pull, 5...32V, 20 mA (max)
<b>Input</b>	RS422 (SSI)

### Description

The 842-SPA, Serial Parallel Adaptor, converts Synchronous Serial Interface (SSI) signals to parallel data format. The 842-SPA is used with 842A, 845G, and 845GM absolute encoders.

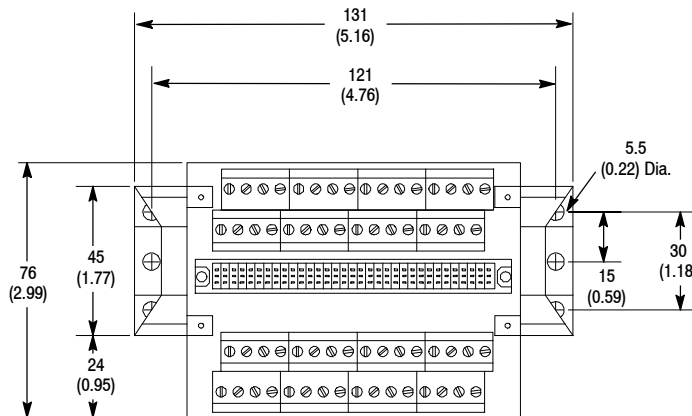
Typically, one each of the 842-SPA and 842-CH are ordered for each application.



SPA Card Holder  
842-CH

### Product Selection

## 842 — CH

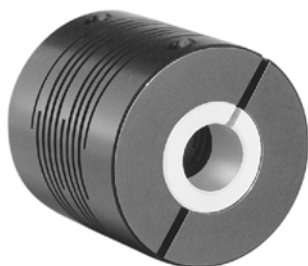


### Description

The 842-CH is the card holder for the 842-SPA. It is designed to be mounted in an enclosure provided by the user. The card holder should be mounted as close as possible to the controller or input card.

Typically, one each of the 842-SPA and 842-CH are ordered for each application.

The 842-CH can accommodate wire sizes from #26...16 AWG.



High Performance Flexible Coupling  
845-FC-B-B

Product Selection—  
High Performance

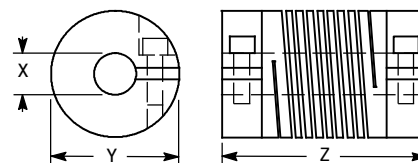
845 — FC —  $\frac{B}{a}$  —  $\frac{B}{b}$

Smallest Bore Diameter	
Code	Description
A	1/4 in.
B	3/8 in.
R	6 mm
T	10 mm

Largest Bore Diameter	
Code	Description
A	1/4 in.
B	3/8 in.
C	1/2 in.
R	6 mm
T	10 mm

Approximate Dimensions  
[mm (in.)]

High Performance Flexible Coupling



Dimension Code	Bore Size Code Letter				
	A	B	C	R	T
X	6.4 (0.25)	9.5 (0.375)	12.7 (0.50)	6	10
Y	30.56 (1.20) Dia.				
Z	32 (1.25) Long				

Description

High performance flexible couplings are used to connect two shafts, and help to reduce the effects of misalignment between the shafts. Flexible couplings are offered in the high performance version, with nonconductive inserts. They are of the flexible curved beam helical type with clamping screw at both ends.

Specifications

Parallel Offset	0.51 mm (0.020 in.) max.
Angular Offset	10.0° max.
Axial Compliance	1.58 mm (0.060 in.) max.
Construction	Aluminum with a fiberglass insert



Miniature Style  
Flexible Coupling  
845-FC-1

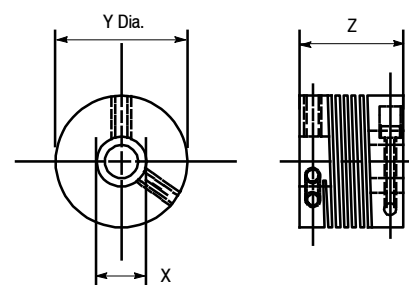
Product Selection—  
Miniature Style

845 — FC —  $\frac{1}{a}$

Bore Diameter	
Code	Description
1	3/8...3/8 in.
2	1/4...3/8 in.

Approximate Dimensions  
[mm (in.)]

Miniature Style Flexible Coupling



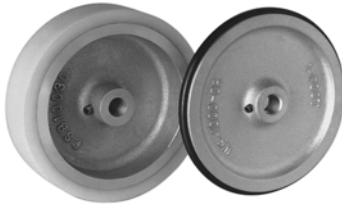
Dimension Code	Bore Size Code Letter	
	1	2
X	9.5 (0.375)	6.4 (0.25)
Y	25.40 (1.0) Dia.	
Z	19 (0.750) Long	

Specifications

Parallel Offset	0.25 mm (0.010 in.) max
Angular Offset	5.0° max
Axial Compliance	0.76 mm (0.030 in.) max
Construction	Aluminum with a fiberglass insert

**Product Selection**

**845** — M W — A — 1  
a



Polyurethane 845-MW-A-2  
Rubber O-Ring 845-MW-A-1

**a**

Contact Material	
Code	Description
1	Rubber O-Ring
2	Polyurethane

**Specifications**

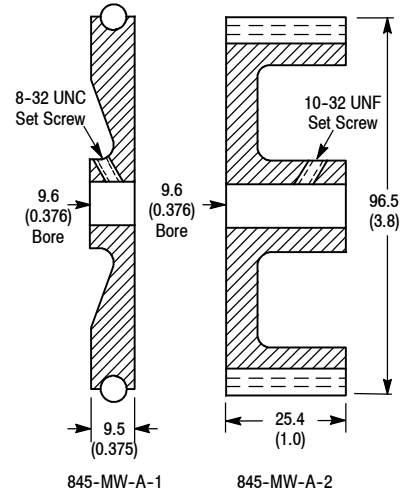
<b>Circumference</b>	304.8 mm (12.00 in.)
<b>Bore Hole Diameter</b>	9.6 mm (0.376 in.)
<b>Durometer</b>	70 Shore D
<b>Material</b>	Cast Aluminum

**Description**

Measuring wheels are used to convert a fixed amount of linear motion to a corresponding amount of rotary motion. Rubber O-Ring type contact material is used on metal, paper, foil, film and hard plastics. Polyurethane type contact material is used on soft smooth materials, such as soft paper, cardboard and fine weave textiles.

**Approximate Dimensions [mm (in.)]**

**Measuring Wheels**



**Product Selection**

**845** — SC



Servo Clamps 845-SC

Dimension Code	Approximate Dimension
A	2.38 ± 0.003 (0.093)
B	1.02 ± 0.003 (0.040)
C	3.38 (0.133)
D	9.5 + 0.000, - 0.032 (0.375)
E	3.43 (0.135)
F	9.90 (0.390)
G	3.18 (0.125)
H	1.73 (0.068) max.
J	#4...40
K	0.25 (0.010)

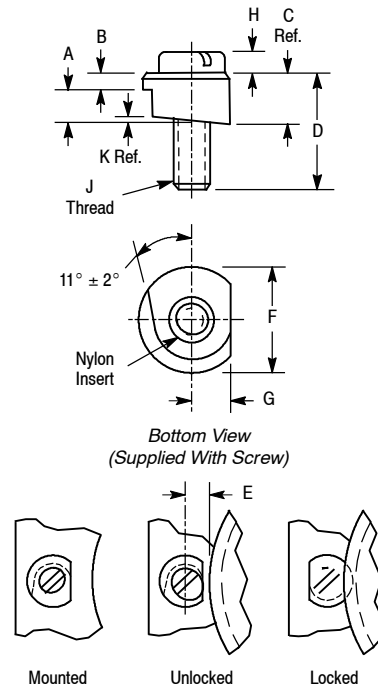
Material: Stainless Steel 316

**Description**

Servo clamps are used for the mounting of all encoders with the servo type mounting option. For the size 15 device, 3 clamps are arrayed on a 48.1 mm (1.895 in.) diameter bolt circle. For the size 20 device, 3 or 4 clamps are arrayed on a 57.7 mm (2.27 in.) diameter bolt circle. For 60 mm encoders (i.e., the 842A), 3 or 4 clamps are arrayed on a 66.3 mm (2.61 in.) diameter bolt circle. For the size 25 device, 3 or 4 clamps are arrayed on a 70.4 mm (2.77 in.) diameter bolt circle. Servo clamps are sold as a kit (set of 4 clamps).

**Approximate Dimensions [mm (in.)]**

**Servo Clamps**





## Product Selection



6 Pin Connector  
845-CA-A-50

845 — CA —  $\frac{C}{a}$  —  $\frac{25}{b}$

a

b

Connector		
Code	Description	Cable Type
A	6 Pin (845T)	Alpha 6054C or equivalent
B	7 Pin (845F, H, T)	
C	10 Pin (845F, H, T, 844D)	
D	19 Pin (845D, G, GM)	Alpha 5199/20C or equivalent
G	12 Pin (842A, 845G, GM)	Alpha 6054C or equivalent
H	17 Pin (845G)	Alpha 5199/20C or equivalent
K	10 Pin (845F, H, T)	Alpha 6318 or equivalent ②
PY	10 Pin (845PY)	Alpha 6054C or equivalent

Cable Length ①	
Code	Description
10	10 ft
25	25 ft
50	50 ft ②
100	100 ft ②

① See table on page 6-51 for other available lengths.

② Not recommended for 5V DC powered encoders.

③ Low capacitance cable for long cable runs.

## Description

The following pre-wired cable assemblies are available for use with Allen-Bradley encoder products. The cables are wired to the appropriate mating connector for the encoder with which they will be used. The other end of the cable will be a stripped and tinned pigtail. Connector catalog numbers shown below from Amphenol Corporation.

Cat. No.	Wire Pair	Wire Color	Function	Pin
845-CA-A- (With 6 pin ACS06E14S-6S (023) connector)	Red/Black/Shield	Red	+DC Input	B
		Black	DC Common	A
	White/Black/Shield	White	CH A	E
		Black	N/C	—
	Blue/Black/Shield	Blue	CH B	D
		Black	N/C	—
Green/Black/Shield	Green	CH Z	C	
	Black	N/C	—	

Cat. No.	Wire Pair	Wire Color	Function	Pin
845-CA-B- (With 7 pin ACS06E16S-1S (023) connector)	Red/Black/Shield	Red	+DC Input	D
		Black	DC Common	F
	White/Black/Shield	White	CH A	A
		Black	N/C	—
	Blue/Black/Shield	Blue	CH B	B
		Black	N/C	—
Green/Black/Shield	Green	CH Z	C	
	Black	N/C	—	

Cat. No.	Wire Pair	Wire Color	Function	Pin
845-CA-C- (With 10 pin ACS06E18-1S (023) connector)	Red/Black/Shield	Red	+DC Input	D
		Black	DC Common	F
	White/Black/Shield	White	CH A	A
		Black	CH $\bar{A}$	H
	Blue/Black/Shield	Blue	CH B	B
		Black	CH $\bar{B}$	I
	Green/Black/Shield	Green	CH Z	C
		Black	CH $\bar{Z}$	J

**Bulletin 845 Encoder Accessories****Pre-Wired Cable Assemblies**

Cat. No.	Wire Color	Pin	Wire Color	Pin
845-CA-D- (With 19 pin PT06E14-19S connector)	Brown	A	White/Red	L
	Orange	B	White/Yellow	M
	Yellow	C	White/Green	N
	Green	D	White/Blue	P
	Blue	E	White/Black	R
	Violet	F	White/Violet	S
	Grey	G	Black	T
	White	H	White/Grey	U
	White/Orange	J	Red	V
	White/Brown	K	White/Black/Brown	—
			Shield	Shield

Cat. No.	Wire Pair	Wire Color	Function	Pin
845-CA-G- (With 12 pin connector)	Red/Black/Shield	Red	+DC Input	8
		Black	DC Common	1
	White/Black/Shield	White	Clock +	3
		Black	Clock -	11
	Blue/Black/Shield	Blue	Data +	2
		Black	Data -	10
	Green/Black/Shield	Green	CW/CCW	12
		Black	Reset	9

Cat. No.	Wire Color	Pin	Wire Pair	Pin
845-CA-H- (With 17 pin MS3106E20-29S connector)	White/Orange	A	White/Green	L
	White	B	White/Yellow	M
	Grey	C	White/Red	N
	Violet	D	White/Blue	P
	Blue	E	Black	R
	Yellow	F	Red	S
	Orange	G	Green	T
	Brown	H		
	White/Violet	J		
	White/Brown	K		
				Shield

## Bulletin 845 Encoder Accessories

## Pre-Wired Cable Assemblies

Cat. No.	Wire Pair	Wire Color	Function	Pin
845-CA-K- (With 10 pin ACS06E18-1S (023) connector)	Red/Black/Shield	Red	+DC Input	D
		Black	DC Common	F
	White/Black/Shield	White	CH A	A
		Black	CH $\bar{A}$	H
	Blue/Black/Shield	Blue	CH B	B
		Black	CH $\bar{B}$	I
	Green/Black/Shield	Green	CH Z	C
		Black	CH $\bar{Z}$	J
All Shields	—	Shield	G	

Cat. No.	Wire Pair	Wire Color	Function	Pin
845-CA-PY- (With 10 pin ACS06E18-1S (023) connector)	Red/Black/Shield	Red	+DC Input	D
		Black	DC Common	F
	White/Black/Shield	White	CH A	A
		Black	CH $\bar{A}$	H
	Green/Black/Shield	Green	CH B	B
		Black	CH $\bar{B}$	I

Cat. No.	Description	Cat. No.	Description
845-CA-A-10	6 Pin Connector for 845T—3 m (10 ft)		
845-CA-A-25	6 Pin Connector for 845T—7.6 m (25 ft)		
845-CA-A-50	6 Pin Connector for 845T—15.2 m (50 ft)		
845-CA-A-100	6 Pin Connector for 845T—30.4 m (100 ft)		
845-CA-B-10	7 Pin Connector for 845F, H, T—3 m (10 ft)	845-CA-G-10	12 Pin Connector for 842A, 845G <sup>①</sup> , GM <sup>②</sup> —3 m (10 ft)
845-CA-B-25	7 Pin Connector for 845F, H, T—7.6 m (25 ft)	845-CA-G-25	12 Pin Connector for 842A, 845G <sup>①</sup> , GM <sup>②</sup> —7.6 m (25 ft)
845-CA-B-50	7 Pin Connector for 845F, H, T—15.2 m (50 ft)	845-CA-G-50	12 Pin Connector for 842A, 845G <sup>①</sup> , GM <sup>②</sup> —15.2 m (50 ft)
845-CA-B-100	7 Pin Connector for 845F, H, T—30.4 m (100 ft)	845-CA-G-100	12 Pin Connector for 842A, 845G <sup>①</sup> , GM <sup>②</sup> —30.4 m (100 ft)
845-CA-C-10	10 Pin Connector for 845F, H, T, 844D—3 m (10 ft)	845-CA-H-10	17 Pin Connector for 845G—3 m (10 ft)
845-CA-C-25	10 Pin Connector for 845F, H, T, 844D—7.6 m (25 ft)	845-CA-H-25	17 Pin Connector for 845G—7.6 m (25 ft)
845-CA-C-50	10 Pin Connector for 845F, H, T, 844D—15.2 m (50 ft)	845-CA-H-50	17 Pin Connector for 845G—15.2 m (50 ft)
845-CA-C-100	10 Pin Connector for 845F, H, T, 844D—30.4 m (100 ft)	845-CA-H-100	17 Pin Connector for 845G—30.4 m (100 ft)
845-CA-C-200	10 Pin Connector for 845F, H, T, 844D—60.9 m (200 ft)	845-CA-K-10	10 Pin Connector <sup>②</sup> —3 m (10 ft)
845-CA-C-330	10 Pin Connector for 845F, H, T, 844D—100.5 m (330 ft)	845-CA-K-25	10 Pin Connector <sup>②</sup> —7.6 m (25 ft)
845-CA-D-10	19 Pin Connector for 845D, G, GM—3 m (10 ft)	845-CA-K-50	10 Pin Connector <sup>②</sup> —15.2 m (50 ft)
845-CA-D-25	19 Pin Connector for 845D, G, GM—7.6 m (25 ft)	845-CA-K-100	10 Pin Connector <sup>②</sup> —30.4 m (100 ft)
845-CA-D-50	19 Pin Connector for 845D, G, GM—15.2 m (50 ft)	845-CA-K-200	10 Pin Connector <sup>②</sup> —60.9 m (200 ft)
845-CA-D-100	19 Pin Connector for 845D, G, GM—30.4 m (100 ft)	845-CA-K-300	10 Pin Connector <sup>②</sup> —91.4 m (300 ft)
845-CA-D-150	19 Pin Connector for 845D, G, GM—45.7 m (150 ft)	845-CA-K-400	10 Pin Connector <sup>②</sup> —121.9 m (400 ft)
845-CA-D-200	19 Pin Connector for 845D, G, GM—60.9 m (200 ft)	845-CA-PY-10	10 Pin Connector for 845PY—3 m (10 ft)
		845-CA-PY-25	10 Pin Connector for 845PY—7.6 m (25 ft)
		845-CA-PY-50	10 Pin Connector for 845PY—15.2 m (50 ft)
		845-CA-PY-100	10 Pin Connector for 845PY—30.4 m (100 ft)

Cables 50 ft and longer not recommended for 5V DC powered encoders.

① 845-CA-G-\*\* for 845G and 845GM SSI models.

② Low capacitance cable.

# Bulletin 845 Encoder Accessories

## Mating Connectors/Mounting Plates

### Product Selection

**845 — 10P**  
*a*



Mating Connectors

### Description

Mating connectors listed are either included with, or available as standard options for all encoder products.

<i>a</i>	
Connector	
Code	Description
6P	6 Pin (845T)
7P	7 Pin (845F, H, T)
7P-RT	7 Pin, Right Angle (845F, H, T)
10P	10 Pin (845F, H, T, PY, 844D)
10P-RT	10 Pin, Right Angle (845F, H, T, PY, 844D)
12P	12 Pin (842A, G, GM)
SCD	19 Pin, KPT06F-14-19S (845D, G, GM)
17P	17 Pin, MS3106E20-29S (845G)

### Description

Mounting plates are used to physically mount the encoder or resolver to the rotating member that is to be monitored.

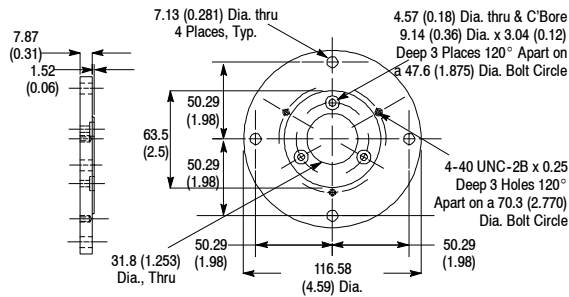
### Product Selection

**845 — MB — 1**  
*a*

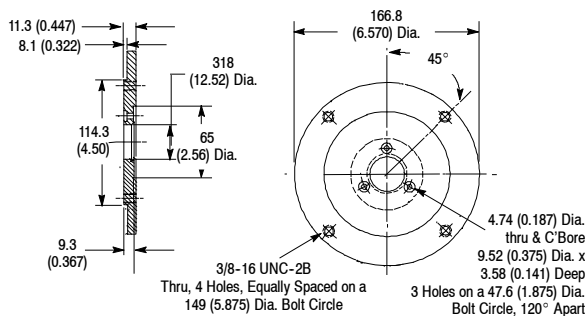
### Approximate Dimensions [mm (in.)]



845-MB-1



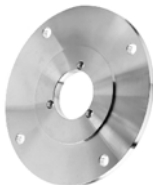
845-MB-2



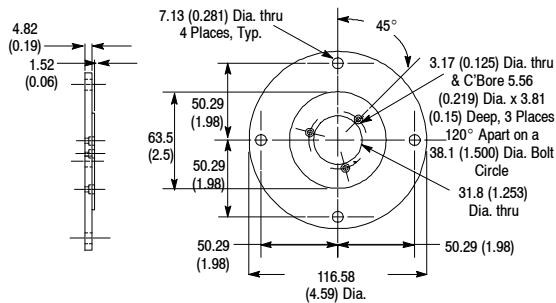
<i>a</i>	
Plate	
Code	Description
1	5PY Mounting Plate for Size 25 Face or Servo Mount (845H, K, G, D)
2	BC42 Mounting Plate for Size 25 Face Mount (845H, K, G, D)
3	5PY Mounting Plate for Size 20 Face Mount (845T)
4	Integral Coupling Flange, Miniature Style (845D, G, H, K, T) ❶
5	Integral Coupling Flange, High Performance (845D, G, H, K, T) ❶
6	BC48 Servo to Square (842A) ❷
7	0.1875 Servo to Square (845H, K) ❷
8	NEMA 180 C-Face Mount (845H, K) ❸
9	Low Profile Coupling Flange Miniature Style (845D, G, H, K, T)

- ❶ For size 20/25 face mount
- ❷ Square flange adaptor
- ❸ Face or servo mount

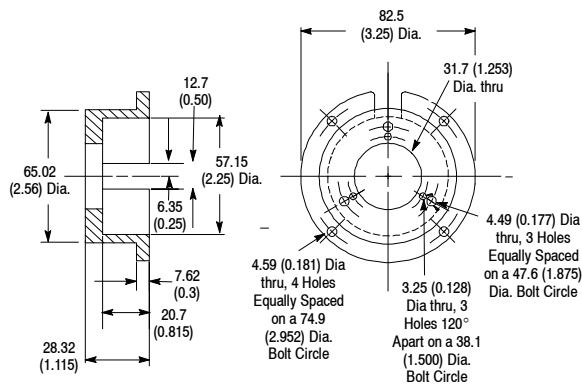
Approximate Dimensions [mm (in.)] (continued)



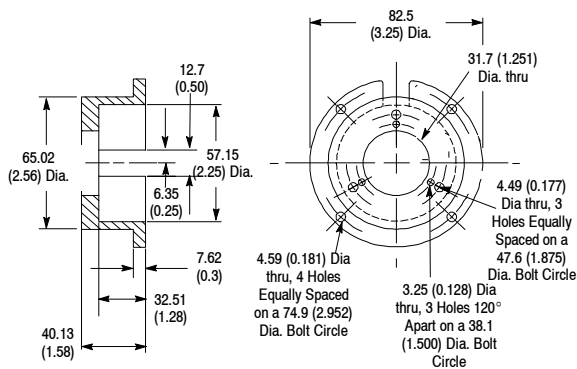
845-MB-3



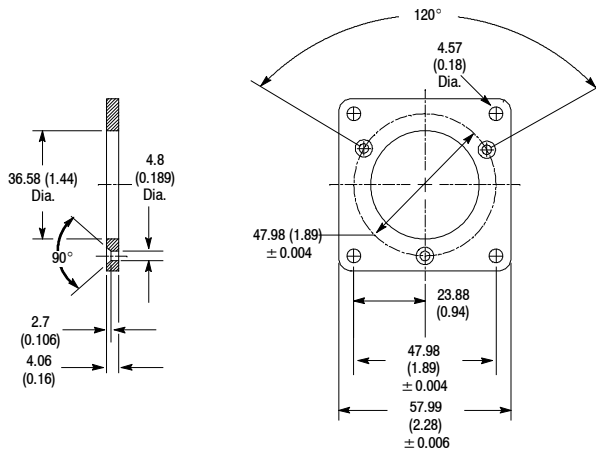
845-MB-4



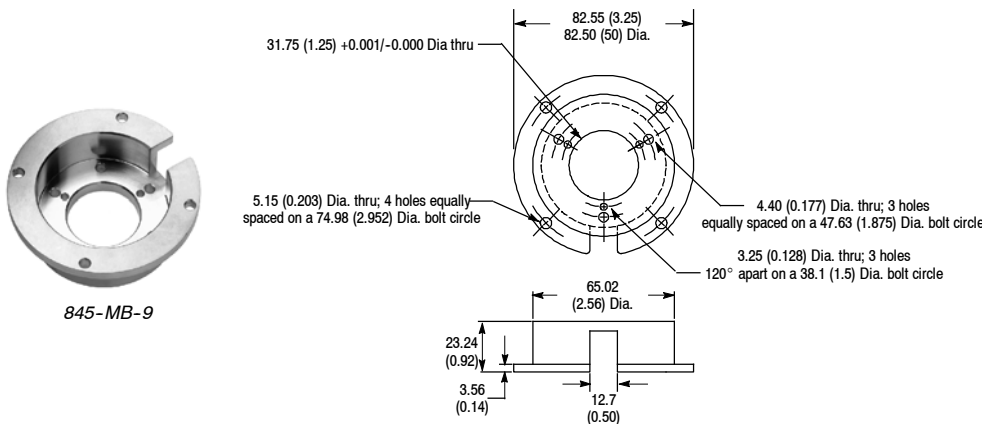
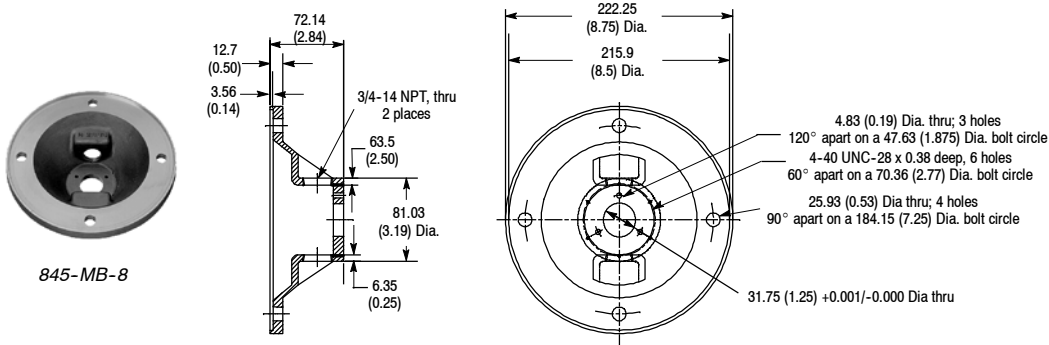
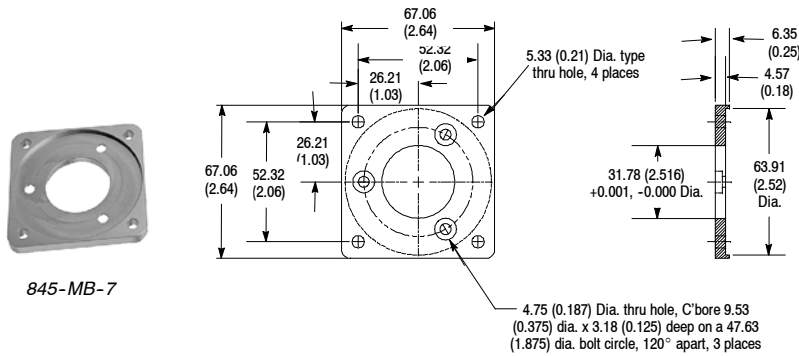
845-MB-5



845-MB-6



Approximate Dimensions [mm (in.)] (continued)

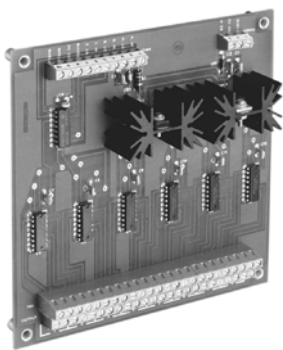


Encoder Mounting Plate Options

Mounting Plate	Option 1	Option 2	845D #1	845D #2	845G	845K	845T
845-MB-1	845H-SJD*	845H-SJH*	845D-S*D*	845-S*H*	845G-*	845K-*	
845-MB-2							
845-MB-3							
845-MB-4	845H-SJD*	845H-SJH*	845D-S*D*	845D-S*H*	845G-*	845K-*	845T-H*
845-MB-5							
845-MB-6	842A-31*						
845-MB-7	845H-SJH*			845D-S*H*	845G-S*	845K-SAH*	
845-MB-8	845H-SJD*	845H-SJH*	845D-S*D*	845D-S*H*	845G-*	845K-*	
845-MB-9							

# Bulletin 845 Encoder Accessories

## Differential Encoder Buffer Board



Buffer Board  
845-BB

### Selection Guide

## 845 — BB

### Specifications

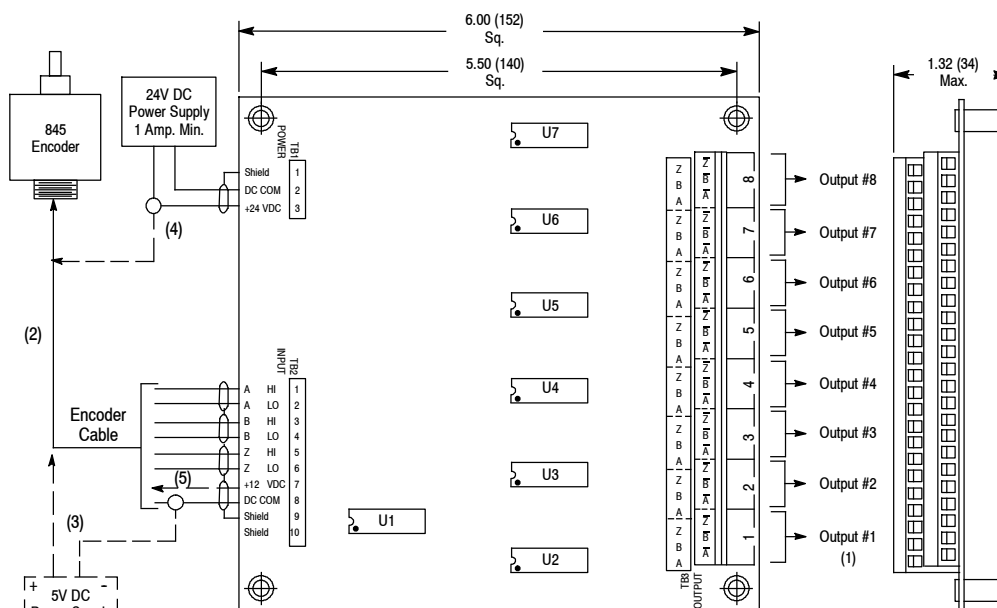
Electrical	
<b>Power Requirements</b>	24V DC ±10% filtered @ 1 A maximum
<b>Input Code Format</b>	Incremental differential line driver dual channel with zero index
<b>Input Signal</b>	5V DC RS-422 differential line driver
<b>Available Encoder Power</b>	12V DC ±10% @ 220 mA maximum
<b>Frequency Response</b>	250 kHz maximum
<b>Outputs</b>	Eight (8) sets of ABZ channel 5V DC RS-422 differential line driver signals
<b>Output Drive Capability</b>	±20 mA per channel
Mechanical	
<b>Dimensions</b>	152 mm (6 in.) x 152 mm (6 in.) x 34 mm (1.32 in.) maximum
<b>Mounting</b>	Thru-hole standoffs on circuit board four (4) holes on a 140 mm (5.5 in.) square
<b>Enclosure</b>	None (non-enclosed circuit board)
Environmental	
<b>Operating Temperature</b>	0...+50°C (+32...+122°F)
<b>Storage Temperature</b>	-25...+90°C (-13...+194°F)
<b>Humidity</b>	98%, Noncondensing
<b>Approximate Ship Weight</b>	0.23kg (0.5lbs)

### Description

The 845-BB buffer board is an encoder interface designed to allow a single differential line driver type encoder to be wired to eight sets of differential inputs. The inputs may be programmable controllers, numerical controllers, motion controllers, and other positioning systems that require differential encoder input signals.

The 845-BB buffer board should be mounted in the I/O cabinet and will provide a degree of immunity to electrical noise. The buffer board is powered with 24V DC, 1 A maximum. Internal voltage regulator circuits make available 12V DC as encoder power. All connections are made via terminal strips mounted on the buffer board.

### Approximate Dimensions [mm (in.)]



Notes:

- (1) Output cable is (Alpha 6053C) or (Belden 9329) or equivalent.
- (2) Encoder cable is (Alpha 6054C) or (Belden 9330) or equivalent.
- (3) For 5V DC Encoders, connect 5V common to DC common (max cable length = 30 feet).
- (4) Connect for 24V DC Encoders.
- (5) Connect for 12V DC Encoders.

