

Installation Instructions

847H-F 2.5-inch Diameter Solid Shaft Incremental Encoders with Bell Housing and Coupler

IMPORTANT: SAVE THESE INSTRUCTIONS FOR FUTURE USE.

Selection Guide

847 $\frac{H}{a} - \frac{F}{b} \frac{B}{c} \frac{2}{d} \frac{4}{e} - \frac{A}{f} \frac{B}{g} \frac{01204}{h}$

a

Code	Encoder Diameter/Type
H	2.5 in. diameter solid shaft

b

Code	Mounting Configuration
F	Bell housing and coupler

c

Code	Shaft Size
B	1/4 in. diameter bore helical coupler (standard)
E	3/8 in. diameter bore helical coupler (standard)
F	1/4 in. diameter bore bellows coupler (high performance)
G	3/8 in. diameter bore bellows coupler (high performance)

d

Code	Power Supply
1	4.5...5.5V DC
2	8...30V DC

e

Code	Output Configuration
Signal Phasing A-leads-B clockwise rotation viewed from shaft end, Z gated A	
4	4.5...5.5V line driver outputs (TTL)
5	4.5...5.5V open collector outputs ❶
6	8...30V line driver outputs (HTL) ❷
7	8...30V open collector outputs ❷
Signal Phasing B-leads-A clockwise rotation viewed from shaft end, Z gated BN	
A	4.5...5.5V line driver outputs (TTL)
B	4.5...5.5V open collector outputs ❶
C	8...30V line driver outputs (HTL) ❷
D	8...30V open collector outputs ❷

❶ Options 5 and B cannot be ordered with option 2 from table d.

❷ Options 6, 7, C, and D cannot be ordered with option 1 from table d.

f

Code	Connector/Cable Exit
A	Axial exit
R	Radial exit

g

Code	Connector/Cable Type
A	M12 connector, 8-pin with mating connector
B	M12 connector, 8-pin
C	MS connector, 6-pin with mating connector
D	MS connector, 6-pin
E	MS connector, 7-pin with mating connector
F	MS connector, 7-pin
G	MS connector, 10-pin with mating connector
H	MS connector, 10-pin
P	1.5 m (4.9 ft) cable
Q	5 m (16.4 ft) cable
R	10 m (32.8 ft) cable

h

Code	Resolution
1...65536	00001...65536 pulses/revolution

Accessories

Description	Part Number
Pre-wired cables	845-CA-*. *
Mating connectors	845-6P 845-7P 845-7P-RT 845-10P 845-10P-RT
Differential encoder buffer board	845-BB*
M12 cable	889D-F8FB-*

* See <http://ab.rockwellautomation.com/Motion-Control/High-Resolution-Incremental-Optical-Encoder> for selection.

Specifications

Electrical	
Code format	Incremental, 2 channels with zero index
Signal options, clockwise rotation viewed from shaft end	A-leads-B, 180° marker gated with A or B-leads-A, 180° marker gated with BN
Signal phase relation	90° ± 22°, channels
Symmetry	50% ± 10%
Zero index channel	Gated 1/2 cycle
Supply current	50 mA
Frequency response	4.5...5.5V line driver output: 820 kHz 8...30V line driver output: 820 kHz Open collector: 150 kHz
Resolution	1...65536 pulses/revolution
Load current	30 mA for all output types
Output drivers	4.5...5.5V line driver - IC HD2 8...30V line driver - IC HD2 Open collector - 7406
Electrical protection	Reverse polarity and short circuit for all output types
Cable outer diameter	0.25 in (6.2 mm)
Cable type	300V, 105° C, 26 AWG, 9-conductor with overall braided shield, UL AWM type 20327 for use in fixed (non-flexing) installations; RoHS compliant
Cable bend radius	Minimum 5x outer diameter

Mechanical [mm (in.)]

Maximum operating speed	9000 RPM
Angular acceleration	500,000 radians/s ²
Moment of inertia	41 g·cm ²
Startup torque at 20° C (68° F)	0.8 N·cm
Operating torque at 20° C (68° F)	0.6 N·cm
Approximate weight [kg (lb)]	0.40 (0.86 lb) with M12 connector
MTTFd (EN ISO 13849-1)	330 years
Angular shaft misalignment [mm (in.)]	5° standard coupler, 10° high performance coupler
Parallel shaft misalignment [mm (in.)]	0.25 (0.010) standard coupler, 0.51 (0.020) high performance coupler
Coupling axial compliance [mm (in.)]	± 0.76 (0.030) standard coupler, ± 1.52 (0.060) high performance coupler
Coupler bore size	9.52 (3/8) or 6.4 (1/4) diameter

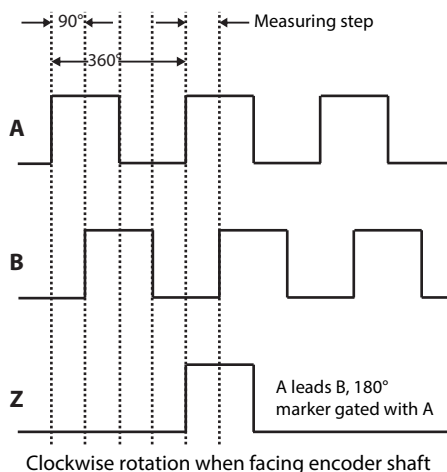
Environmental

Enclosure rating per IEC 60529	Shaft: IP65 Housing, connector version with mating connector installed: IP67 Housing, cable version: IP67
Temperature	-30...+80° C (-22...+176° F) operating -40...+100° C (-40...+212° F) storage
Relative humidity	90% noncondensing
Shock	100 G/11 ms duration
Vibration	30 G/10...2000 Hz
EMC	EN 61000-6-2 and EN 61000-6-3 (M12 connector)
Housing material	EN AC-47100 die-cast aluminum
Housing finish	Powder coat paint, color RAL 9005, Pantone black C (jet black)
Flange material	6061-T6 aluminum
Shaft material	SAE 303 stainless steel
Certifications	RoHS compliant CE marked for all applicable directives UL listing valid only for encoders with cable and M12 connections For use in NFPA 79 applications only

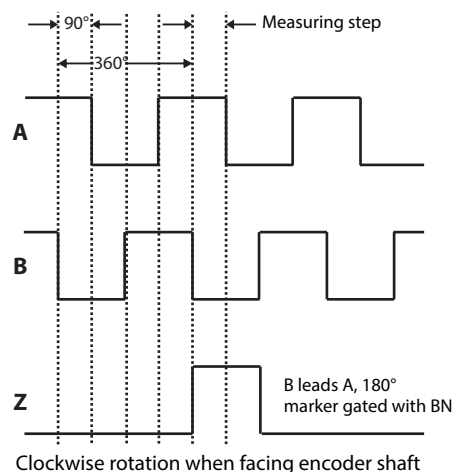
Output Waveforms

Complementary signals AN, BN, and ZN are supplied only on units with line driver outputs.

Signals and marker option - A leads B (CW rotation)



Signals and marker option - B leads A (CW rotation)



Connector Pins and Signal Availability

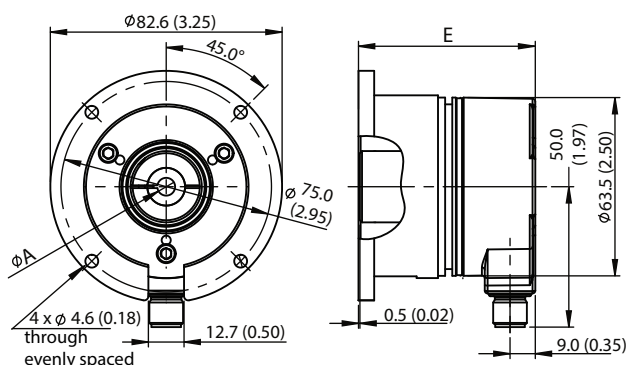
Signal Name	MS 6-pin	MS 7-pin	MS 10-pin	M12 8-pin	Wire colors, attached cable
V DC	B	D	D	8	Red
Common	A	F	F	7	Black with red band
A output	E	A	A	2	White
AN output	-	-	H	1	Black with white band
B output	D	B	B	4	Blue
BN output	-	-	I	3	Black with blue band
Z output	C	C	C	6	Green
ZN output	-	-	J	5	Black with green band
Zero set input	-	E	E	-	Yellow
Case	F	G	G	-	Black
Encoder connectors					-
Recommended mating cable	845-CA-A-*	845-CA-B-*	845-CA-C-*	889D-F8FB-*	(Attached to encoder)

Approximate Dimensions [mm (in.)]

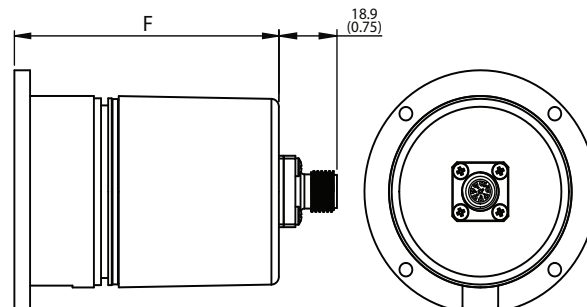
Shaft dimensions		
Nominal, in.	Shaft ϕ A	Bore depth
1/4	6.35/6.43(0.250/0.253)	12.7 (0.50)
3/8	9.53/9.61 (0.375/0.378)	12.7 (0.50)

Part no.	E	F	G
847H-FB**-*****	63.0 (2.48)	94.2 (3.71)	73.2 (2.88)
847H-FE**-*****	63.0 (2.48)	94.2 (3.71)	73.2 (2.88)
847H-FF**-*****	74.8 (2.94)	106.0 (4.17)	85.0 (3.35)
847H-FG**-*****	74.8 (2.94)	106.0 (4.17)	85.0 (3.35)

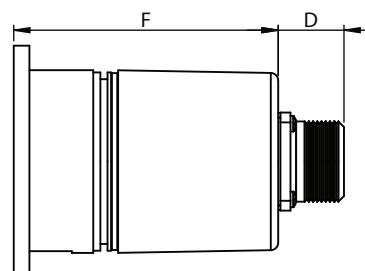
Standard/high performance with radial M12 connector



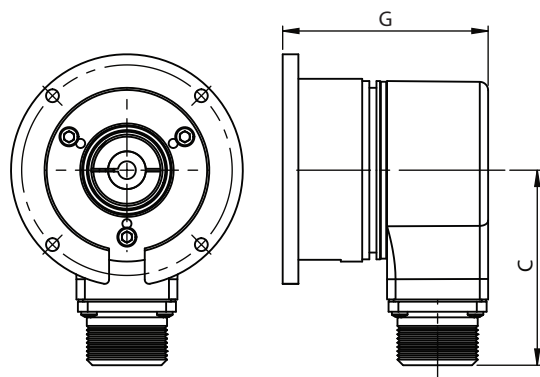
Standard/high performance with axial M12 connector



Standard/high performance with axial MS connector

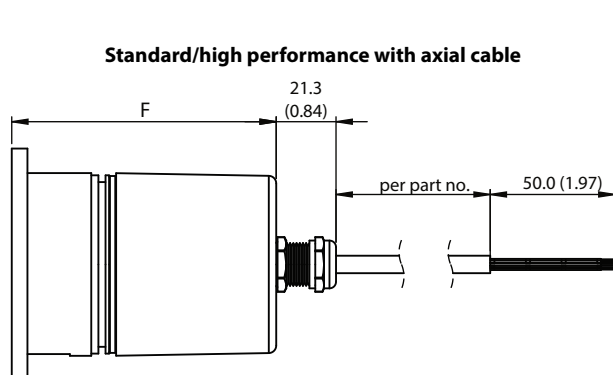


Standard/high performance with radial MS connector

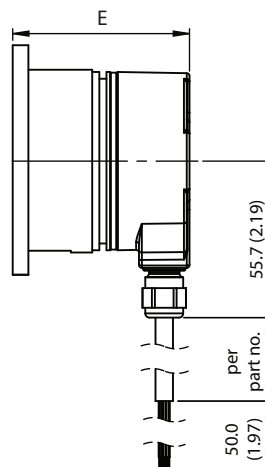


MS connector dimensions		
Type	C	D
6-pin	63.9 (2.52)	17.8 (0.70)
7-pin	63.9 (2.52)	17.8 (0.70)
10-pin	69.4 (2.73)	23.4 (0.92)

Standard/high performance with radial cable



Cable options
1.5 m (4.9 ft)
5 m (16.4 ft)
10 m (32.8 ft)



Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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