Installation Instructions
Size 20 Absolute Encoder, Bulletin 845GM

IMPORTANT: SAVE THESE INSTRUCTIONS FOR FUTURE USE.

Specifications

Electrical		
Code Format	Parallel: Gray Code, Natural Binary, Binary Coded Decimal SSI: Gray Code	
Resolution Counts per Rev. (CPR)	256 CPR (8 bit) 360 CPR (9 or 10 bit) 512 CPR (9 bit) 1000 CPR (12 bit BCD) 1024 CPR (10 bit)	2048 CPR (11 bit) 4096 CPR (12 bit) 8192 CPR (13 bit) 16384 CPR (14 bit) 32768 CPR (15 bit)
Accuracy	±1 bit	
Requency Response	16K words/sec	
Power Requirements	Determined by Catalog Number: 5V DC ±5% @ 150mA maximum 8–24V DC @ 150mA maximum 10–30V DC @ 150mA maximum	
Output Drive Capability	16mA	
Output Logic	Parallel: Gray, Natural Binary or Binary Coded Decimal (BCD) Logic "0" = 0.0 to 0.6V DC Logic "1" = 3.5 to 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)	
Direction Control	Field selectable for increasing counts (CW or CCW)	
Reset	Reset position value to zero (see Note for reset pin). Only with shaft stationary.	
Mechanical		
Starting Torque	3.5in–oz. Typical [0.025 N•m]	
Running Torque	3.5in–oz. Typical [0.025 N•m]	
Shaft Loading	Axial 40lbs [178N] Radial 40lbs [178N]	
Shaft Size	6mm, 10mm, 3/8in (9.517mm), 3/8in (9.517mm) w/flat	
Moment of Inertia	0.30oz–in^2 (54gcm^2) maximum	
Slew Sped	5000RPM	
Environmental		
Housing	NEMA Type 4, 13; IP65	
Temperature	0°C to +85°C (+32°F to +185°F)—Operating –20°C to +85°C (–4°F to +185°F)—Max Working –40°C to +100°C (–40°F to +212°F)—Storage	
Humidity	90%, Noncondensing	
Shock	50g (11ms duration)	
Vibration	20g (58–150Hz), 1.5mm displacement (10–58Hz)	
Appoximate Shipping Weight	1lb (0.45kg)	

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.

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	6mm
2	10mm
3	3/8in w/flat
4	3/8in

c

Output Code Type ❶	
Code	**Description**
B	Natural Binary
D	Binary Coded Decimal
G	Gray 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/Range**
0256	8 bit/0–255
0360	9 or 10 bit/0–359 ❺
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 ❹

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 Gray Code output only.
❹ SSI only available with 12-pin connector.
❺ Excess 76 used for 9 bit 360 gray code. BCD is 10 bit.

Rockwell Automation

Allen-Bradley

Accessories

Description	Part Number
High Performance Flexible Coupling	845–FC–*–*
Measuring Wheels	845–MW–A–*
Servo Clamps	845–SC

Number of Pins	Mating Connector	Pre-Wired Cable
12	845–12P	845–CA–G–**
19	845–SCD	845–CA–D–**

*See *Sensors* catalog for selection.

Electrical Connections—19 Pin Connector (Gray 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 2^0	G(0) or 2^0	G(0) or 2^0	N/C	N/C	G(0) or 2^0	G(0) or 2^0	G(0) or 2^0
B	Orange	G(1) or 2^1	G(1) or 2^1	G(1) or 2^1	G(0) or 2^0	N/C	G(1) or 2^1	G(1) or 2^1	G(1) or 2^1
C	Yellow	G(2) or 2^2	G(2) or 2^2	G(2) or 2^2	G(1) or 2^1	G(0) or 2^0	G(2) or 2^2	G(2) or 2^2	G(2) or 2^2
D	Green	G(3) or 2^3	G(3) or 2^3	G(3) or 2^3	G(2) or 2^2	G(1) or 2^1	G(3) or 2^3	G(3) or 2^3	G(3) or 2^3
E	Blue	G(4) or 2^4	G(4) or 2^4	G(4) or 2^4	G(3) or 2^3	G(2) or 2^2	G(4) or 2^4	G(4) or 2^4	G(4) or 2^4
F	Violet	G(5) or 2^5	G(5) or 2^5	G(5) or 2^5	G(4) or 2^4	G(3) or 2^3	G(5) or 2^5	G(5) or 2^5	G(5) or 2^5
G	Gray	G(6) or 2^6	G(6) or 2^6	G(6) or 2^6	G(5) or 2^5	G(4) or 2^4	G(6) or 2^6	G(6) or 2^6	G(6) or 2^6
H	White	G(7) or 2^7	G(7) or 2^7	G(7) or 2^7	G(6) or 2^6	G(5) or 2^5	G(7) or 2^7	G(7) or 2^7	G(7) or 2^7
J	White/Orange	G(8) or 2^8	G(8) or 2^8	G(8) or 2^8	G(7) or 2^7	G(6) or 2^6	G(8) or 2^8	G(8) or 2^8	N/C
K	White/Brown	G(9) or 2^9	G(9) or 2^9	G(9) or 2^9	G(8) or 2^8	G(7) or 2^7	G(9) or 2^9	N/C	N/C
L	White/Red	G(10) or 2^{10}	G(10) or 2^{10}	G(10) or 2^{10}	G(9) or 2^9	G(8) or 2^8	Direction ❷	Direction ❷	Direction ❷
M	White/Yellow	G(11) or 2^{11}	G(11) or 2^{11}	G(11) or 2^{11}	G(10) or 2^{10}	G(9) or 2^9	N/C	N/C	N/C
N	White/Green	G(12) or 2^{12}	G(12) or 2^{12}	G(12) or 2^{12}	G(11) or 2^{11}	G(10) or 2^{10}	N/C	N/C	N/C
P	White/Blue	G(13) or 2^{13}	G(13) or 2^{13}	N/C	Direction ❷	Direction ❷	N/C	N/C	N/C
R	White/Black	G(14) or 2^{14}	Reset	Reset	Reset	Reset	Reset	Reset	Reset
S	White/Violet	Direction ❷	Direction ❷	Direction ❷	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/Gray	Latch Control ❶	Latch Control ❶	Latch Control ❶	Latch Control ❶	Latch Control ❶	Latch Control ❶	Latch Control ❶	Latch Control ❶
V	Red	+DC	+DC	+DC	+DC	+DC	+DC	+DC	+DC

❶ Latch control not available with Gray Code or SSI output. On Gray Code encoders this pin is not connected (N/C).
❷ **Important**—The Direction pin function provides Direction Control for Binary Coded Decimal and Natural Binary or MSBC for parallel Gray Code. 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	Gray	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/Gray	Latch Control	Latch Control

Electrical Connections for SSI Output—12 Pin Connector

Catalog Number	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 Gray Code encoders, its function is Most significant Bit Complement or MSBC for short. In Natural Binary, Binary Coded Decimal and Gray Code SSI encoders, its function is Direction Control.

Direction Control ❶

Natural Binary and BCD

A logic “1” (+DC or open) on the direction control pin will produce increasing counts with a counter- clockwise 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 (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.

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

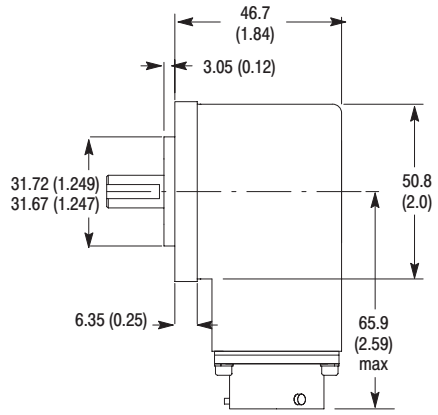
Reset Pin

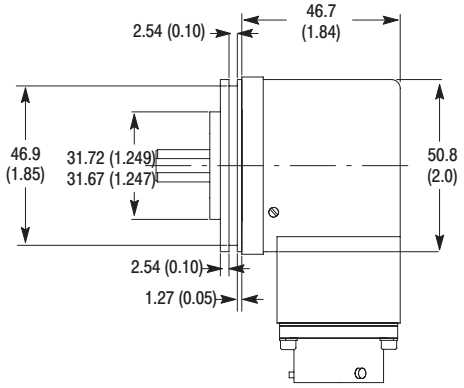
The shaft must be stationary before using the reset function. Connecting the Reset Pin to +DC will reset Natural Binary and BCD position value to zero. Connecting the Reset Pin to +DC will reset Gray Code position value to maximum (e.g., 255, 511, 1023, etc.) if MSBC is used, to zero if MSB is used.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

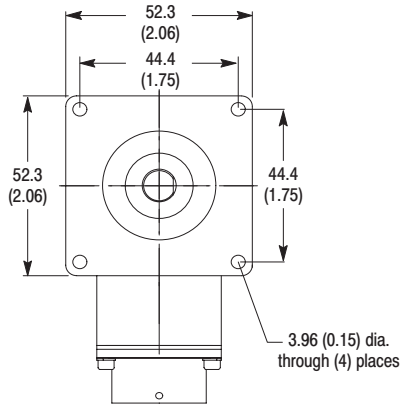
ATTENTION: Activating the Reset Pin results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury.

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

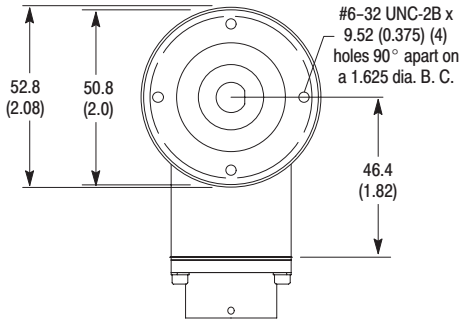
Dimensions—mm (inches)





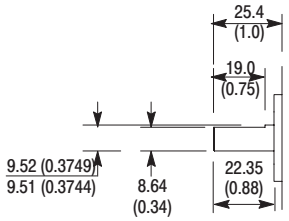


Square Flange Mount

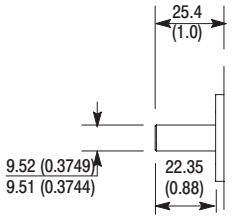


English Servo Mount

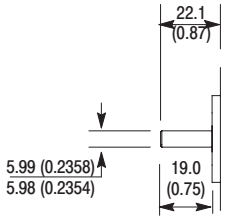
Shaft Options—Square Flange Mount



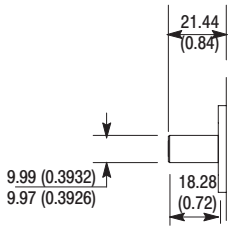
3/8in w/flat



3/8in

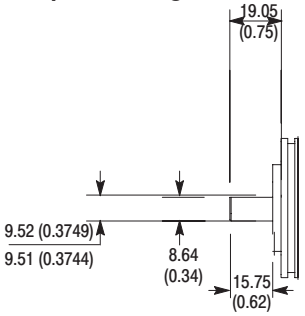


6mm

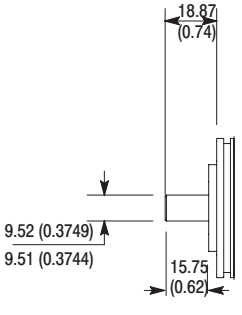


10mm

Shaft Options—English Servo Mount



3/8in w/flat



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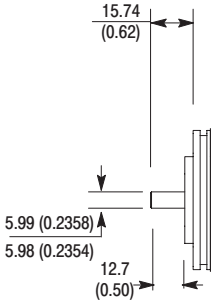
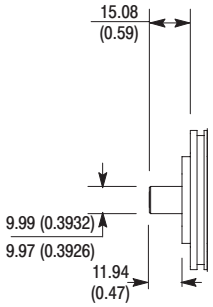


6mm



10mm