

# Installation Instructions

## Size 25 Absolute Encoder, Bulletin 845G

**IMPORTANT: SAVE THESE INSTRUCTIONS FOR FUTURE USE.**

### Specifications

Electrical											
<b>Code Format</b>	Gray Code, Natural Binary, Binary Coded Decimal (parallel); Gray Code (SSI)										
<b>Resolution Counts per Rev. (CPR)</b>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">256 CPR (8 bit)</td> <td style="width: 50%;">2048 CPR (11 bit)</td> </tr> <tr> <td>360 CPR (9 or 10 bit)</td> <td>4096 CPR (12 bit)</td> </tr> <tr> <td>512 CPR (9 bit)</td> <td>8192 CPR (13 bit)</td> </tr> <tr> <td>1000 CPR (12 bit BCD)</td> <td>16384 CPR (14 bit)</td> </tr> <tr> <td>1024 CPR (10 bit)</td> <td>32768 CPR (15 bit)</td> </tr> </table>	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)
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)										
<b>Accuracy</b>	±1 bit										
<b>Frequency Response</b>	16K words/sec										
<b>Power Requirements</b>	Determined by Catalog Number: 5V DC ±5% @ 150mA maximum 8–24V DC @ 150mA maximum 10–30V DC @ 150mA maximum										
<b>Output Drive Capability</b>	16mA										
<b>Output Logic</b>	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) SSI RS–422 compatible										
<b>Latch Command</b>	Standard with Natural Binary and BCD Logic “0” = outputs active (DC common) Logic “1” = outputs latched (+DC or open)										
<b>Direction Control</b>	Field selectable for increasing counts (CW or CCW)										
<b>Reset</b>	Reset position value to zero (see note on page 3). Only with shaft stationary.										
Mechanical											
<b>Starting Torque</b>	3.5 in.–oz. Typical [0.025 N•m]										
<b>Running Torque</b>	3.5 in.–oz. Typical [0.025 N•m]										
<b>Shaft Loading</b>	Axial 20 lbs. [89 N] Radial 40 lbs. [178 N]										
<b>Shaft Size</b>	3/8 inch diameter [9.517mm] w/flat										
<b>Moment of Inertia</b>	0.08 oz.–in. <sup>2</sup> maximum										
<b>Slew Speed</b>	5000RPM										
Environmental											
<b>Housing</b>	NEMA Type 4, 13, IP66 (IEC 529)										
<b>Temperature</b>	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										
<b>Humidity</b>	98%, Noncondensing										
<b>Shock</b>	50g (11ms duration)										
<b>Vibration</b>	20g (58–150Hz), 1.5mm displacement (10–58Hz)										
<b>Approximate Shipping Weight</b>	2lbs. (0.91kg)										



**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

**845G — F 3 G 5 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	
Code	Description
B	Natural Binary
D	Binary Coded Decimal (0360 & 1000 resolution only)
G	Gray Code

**c**

Power Supply	
Code	Description
5	5V DC ±5%
8	8–24V DC
A	10–30V DC ①

**d**

Output Logic	
Code	Description
H	High True
L	Low True ②

**e**

Output Configuration	
Code	Description
C	NPN Open Collector 24V DC Max.
P	10–30V DC Push-Pull (7272) ③
S	SSI Output ④⑤⑥
T	5V DC TTL NPN

**f**

Resolution	
Code	Description/Range
0256	8 bit/0–255
0360	9 or 10 bit/0–359 ⑤
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 ④
U	Radial 12-Pin ④

- ① Push-Pull or SSI output can only be ordered with 10–30V DC power supply.
- ② Not available with push-pull and SSI output. Output logic inverted.
- ③ SSI available with Gray Code output only.
- ④ SSI only available with 12-pin connector.
- ⑤ Excess 76 used for 9 bit gray code. BCD is 10 bit.

## 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-**
17	845-17P	845-CA-H-**
19	845-SCD	845-CA-D-**

\*See *Sensors* catalog for selection.

## 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	Gray	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 (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 <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	Gray	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/Gray	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 Gray Code or SSI output. On Gray 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	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 ⓘ

#### 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 (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.

ⓘ Rotation is viewed from the end of the encoder 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.

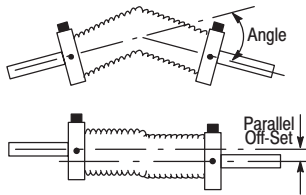
### Reset Pin

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 zero if MSB is used or to maximum, (e.g., 255, 511, 1023, etc.) if MSBC 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.

## 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.

## Dimensions—Inches (mm)

