



ACURO™



### ACURO with Parallel Interface

#### DESCRIPTION

The Dynapar brand ACURO Absolute Encoder offers a modern full-feature design equipped with Parallel interface.

The Acuro AI25 optical absolute industrial encoder is available in a single-turn or multi-turn version. The multi-turn design is based on a reliable high-speed gear with optical scanning and the latest generation of OptoASIC technology.

The mechanical concept is based on a double ball bearing design, which is available as a solid-shaft or hollow-shaft version in common shaft diameters.

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Sensorsincorporated.com

## Series AI25™

### Absolute Encoder With Parallel Interface

#### APPLICATIONS:

Ideal for applications requiring digital feedback to be sent over an industrial bus network

- Elevators
- Machine Tool
- Assembly
- Positioning

#### INDUSTRIES

Manufacturing, Assembly, Material Handling and any other where precise, repeatable bidirectional position measurement is required.

#### FEATURES/BENEFITS

- Compact design to save valuable space
- Up to 14 Bit single-turn resolution
- 4096 revolution multi-turn resolution
- Short installation depth
- Safety through self-diagnostics
- Solid shaft and hollow shaft versions
- -40°C to +100°C Operating temperature
- Low power consumption
- Fast delivery of any model variant
- Additional field-bus and point-to-point interfaces available



**ACURO with Parallel Interface**

# Series AI25

## Absolute Encoder With Parallel Interface

### SPECIFICATIONS\*

#### STANDARD OPERATING CHARACTERISTICS

**Single-turn Resolution:** 10, 12, 13, 14 Bit, 360 PPR, 720 PPR  
**Multi-turn Resolution:** 12 bit (only available with 12 bit ST resolution)  
**Absolute Accuracy:** ± 0.01° mechanical (36 arc-sec.)  
**Repeatability:** ± 0.002° mechanical (7.2 arc-sec.)  
**Code format:** Binary, Gray, Gray Excess

#### ELECTRICAL

**Connection:** Cable, Conin Connector, MS Connector, Cable with Sub-D Connector (MT only)  
**Supply voltage:** 5 VDC -5%/+10%, or 10-30 VDC  
**Intrinsic current consumption:** 200 mA (ST), 300 mA (MT)  
**Output current:** 30 mA per bit, short circuit protected  
**Frequency response:** 500 kHz on single-turn, 1.5m cable\*  
**Alarm output:** NPN open collector max 5 mA  
**Maximum cable length:** 100 m

\*Data refresh rate: 70µsec is for multi-turn and single-turn with preset

Control Inputs		
Input	Logic Level	Function
Direction	1	Ascending code values when turning clockwise
	0	Descending code values when turning clockwise
Latch	1	Encoder data continuously changing at output
	0	Encoder data stored and constant at output
Tristate (ST)	1	Outputs active
	0	Outputs at high impedance (Tristate mode)
Tristate (MT)	1	Outputs at high impedance (Tristate mode)
	0	Outputs active

**Status LED:** Green = OK, Red = Alarm (IP64 only, not available on connector type J)  
**Preset Switch:** Sets encoder to zero output at present mechanical position (Multi-turn IP64 only, not available on connector type J)  
**Control Inputs:** Latch, Direction, Tri-state (see table below)

#### MECHANICAL

**All Types**  
**Maximum shaft speed:** 10,000 RPM (continuous), 12,000 RPM (peak)  
**Starting torque:** < 1.4 in-oz  
**Bearing life:**  
 1 x 10<sup>10</sup> revolutions at 35% full rated shaft load  
 1 x 10<sup>9</sup> revolutions at 75% full rated shaft load  
 1 x 10<sup>8</sup> revolutions at 100% full rated shaft load  
**Weight (approx.):** 350 g ST, 400 g MT

#### Shafted Types

**Flange configurations:** Square, Clamp, Servo  
**Shaft diameter:** 6 mm (Servo Mount), 10 mm (Clamping Mount), 3/8" (Square Flange Mount)  
**Maximum shaft load:**  
 6 mm shaft: 13 lb axial, 24 lb radial  
 10 mm shaft: 24 lb axial, 35 lb radial  
 3/8" Shaft: 24 lb axial, 35 lb radial

#### Hubshaft Types

**Flange configuration:** Hubshaft with flexible tether  
**Accepted Mating Shaft Diameter (min./max.):**  
 6mm (5.984/5.996); 10mm (9.980/9.995);  
 12 mm (11.976/11.994); 3/8" (.3742/.3748);  
 1/2" (.4991/.4997)  
**Allowable Mating Shaft Movement (hubshaft only):**  
 +/- 1.5 mm axial, +/- 0.2 mm radial

#### ENVIRONMENTAL

**Operating Temperature:** -40 to 100° C  
**Storage Temperature:** -40 to 100° C  
**Enclosure Rating:** IP64 or IP67  
**Shock:** 1,000 m/s<sup>2</sup> (6 ms)  
**Vibration:** 100 m/s<sup>2</sup> (10 to 2,000 Hz)

\* Specifications are for base models with standard features only unless otherwise noted. Specifications subject to change without notice in accordance with our DBS policy of continuous improvement. All product and brand names are trademarks of their respective owners. All rights reserved.

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 Dynapar Brand AI25 Parallel Data Sheet (8/05)

Code 1: Model	Code 2: Bits	Code 3 :Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector	
<b>AI25</b>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>AI25</b> Size25 Acuro Absolute Encoder	<b>Single-Turn</b> <b>0010</b> 10 Bit <b>0012</b> 12 Bit <b>0013</b> 13 Bit <b>0014</b> 14 Bit <b>0720</b> 720 PPR Gray Excess	Available when Code 4 is 0 or A <b>0</b> Servo* Available when Code 4 is 2 or C <b>1</b> Clamping* Available when Code 4 is 1 or B <b>2</b> Square flange**	<b>w/o shaft seal (IP64)</b> <b>0</b> 6 mm <b>1</b> 3/8" <b>2</b> 10 mm <b>3</b> 3/8" Hub Shaft <b>4</b> 12 mm Hubshaft <b>5</b> 1/2" Hubshaft <b>6</b> 10 mm Hub Shaft  <b>w/ shaft seal (IP67)</b> <b>A</b> 6 mm <b>B</b> 3/8" <b>C</b> 10 mm	<b>0</b> Parallel Binary <b>1</b> Parallel Gray	<b>0</b> 5 VDC <b>2</b> 10-30 VDC	<b>0</b> 1.5m axial cable <b>1</b> 1.5m radial cable Available when Code 2 is 00XX, 0360 or 0720 <b>6</b> M23 Conin 17 pin axial CW <b>7</b> M23 Conin 17 pin radial CW <b>J</b> 17 pin MS axial * <b>K</b> 19 pin Bayonet radial Available when Code 2 is 1212 <b>A</b> Cable 1.5m radial w/ 37 pin sub-D <b>B</b> Cable 1.5m axial w/37 pin sub-D <small>* Status LED and Preset Switch features not available with "J"</small>	
	Available when Code 7 is 0, 1, 6, 7 or J <b>0360</b> 360 PPR Gray Excess	Available when Code 4 is 1 or B <b>2</b> Square flange**					
	Available when Code 6 is 2 <b>Multi-Turn</b> <b>1212</b> 12 Bit Multi-Turn, 12 Bit Single-Turn	Available when Code 4 is 3, 4, 5 or 6 <b>3</b> Hubshaft w/tether† * 58mm Dia. ** 2.5" Square † 63mm BC					



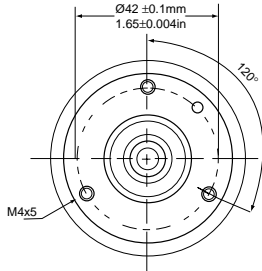
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ACURO with BiSS Interface

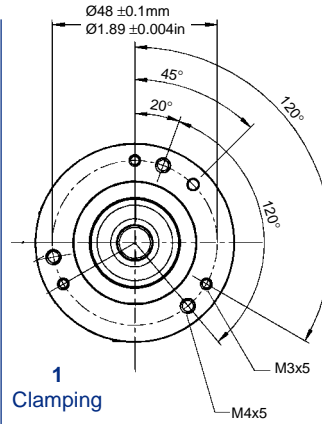
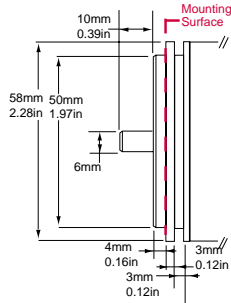
Series AI25

Absolute Encoder With BiSS Interface

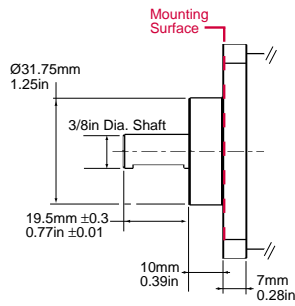
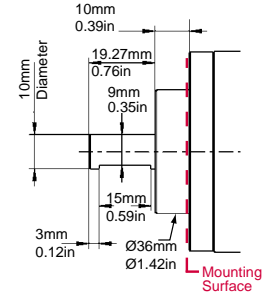
Code 3: Mounting



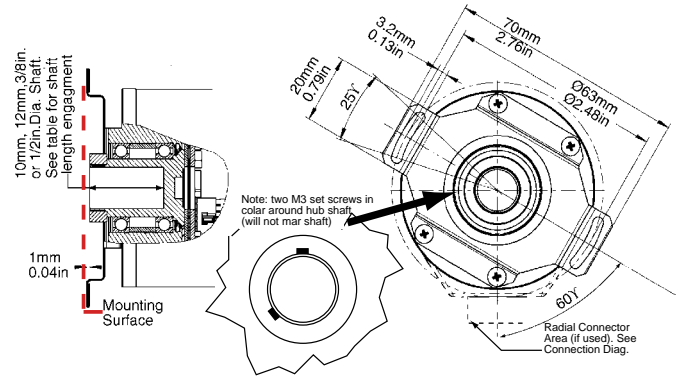
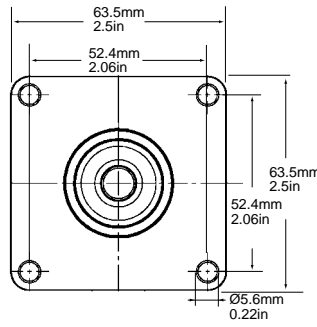
0 Servo



1 Clamping



2 Square Flange

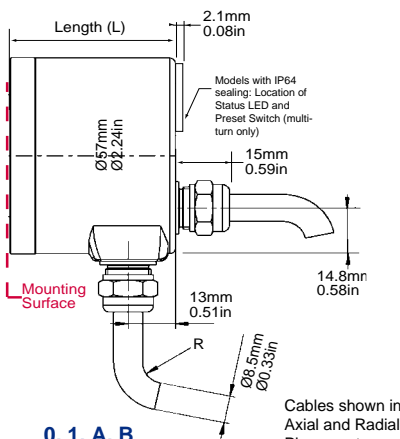


3 Hubshaft w/Tether

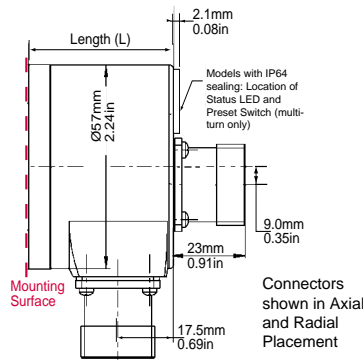
Hubshaft Shaft Engagement

HubShaft Diameter	Min. Shaft Length	Max. Shaft Length
10mm, 3/8"	15mm (0.59")	20mm (0.79")
12mm, 1/2"	18mm (0.71")	20mm (0.79")

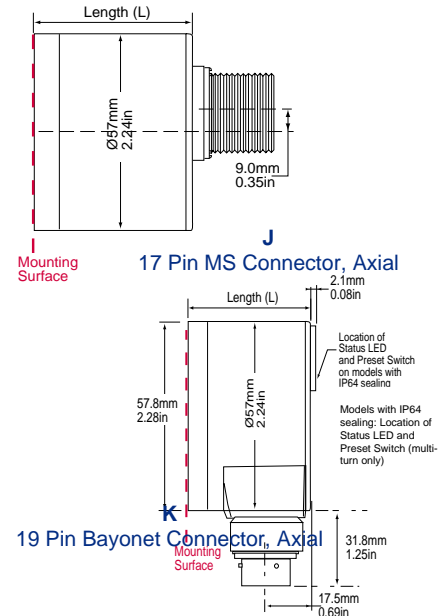
Code 7: Connector



0, 1, A, B 1.5M Cable



6, 7 Conin 12/17 Pin Connector



17 Pin MS Connector, Axial

19 Pin Bayonet Connector, Axial

Length (L) Mounting Surface to Rear

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	46.5/1.83	60.2/2.37
(1) Clamping	45.5/1.79	59.2/2.33
(2) Square Flng	45.5/1.79	59.2/2.33
(3) Hubshaft	49.9/1.96	67.1/2.64

## Absolute Encoder With Parallel Interface

### CONNECTOR WIRING

Explanation of Terms		
Tristate	+UB = Outputs at high impedance (Tristate mode) 0 V <sup>2)</sup> = Outputs active	
Tristate	+UB <sup>2)</sup> = Outputs active 0 V = Outputs at high impedance (Tristate-Mode)	
Latch	+UB <sup>2)</sup> = Encoder data continuously changing at output 0 V = Encoder data stored and constant at output	
Direction	+UB <sup>2)</sup> = Ascending code value when turning cw 0 V = Descending code value when turning cw	
N.C.	= Not Connected	
LSB	= Least Significant Bit	
MSB	= Most Significant Bit	
S0, S1, ...	= Data bits for resolution per turn	
M0, M1, ... (Multiturn)	= Data bits for number of turns	

2) Or unattached (floating)

PVC-cable (Singleturn) 9-12 Bit			
Color	9 Bit / 360 <sup>3)</sup>	10 Bit/720 <sup>3)</sup>	12 Bit
brn/gry	N.C.	N.C.	S0 (LSB)
red/blu	N.C.	N.C.	S1
vio	N.C.	S0 (LSB)	S2
wht/brn	S0 (LSB)	S1	S3
wht/grn	S1	S2	S4
wht/yel	S2	S3	S5
wht/gry	S3	S4	S6
wht/pnk	S4	S5	S7
wht/blu	S5	S6	S8
wht/red	S6	S7	S9
wht/blk	S7	S8	S10
brn/grn	S8 (MSB)	S9 (MSB)	S11 (MSB)
yel	Tristate D0...D8	Tristate D0...D9	Tristate D0.. D11
pnk	Latch <sup>4)</sup>	Latch <sup>4)</sup>	Latch <sup>4)</sup>
grn	Direction	Direction	Direction
blk	0 V	0 V	0 V
red	5/10...30VDC	5/10...30VDC	5/10...30VDC
brn	Alarm	Alarm	Alarm

3) Increments 4) Binary Only

Connector 17pol. (CONIN) 9-12 Bit			
Pin	9 Bit / 360 <sup>3)</sup>	10 Bit / 720 <sup>3)</sup>	12 Bit
1	S0 (LSB)	S0 (LSB)	S0 (LSB)
2	S1	S1	S1
3	S2	S2	S2
4	S3	S3	S3
5	S4	S4	S4
6	S5	S5	S5
7	S6	S6	S6
8	S7	S7	S7
9	S8 (MSB)	S8	S8
10	N.C.	S9 (MSB)	S9
11	N.C.	N.C.	S10
12	Tristate S0...S8	Tristate S0...S9	S11 (MSB)
13	Latch <sup>4)</sup>	Latch <sup>4)</sup>	Latch <sup>4)</sup>
14	Direction	Direction	Direction
15	0 V	0 V	0 V
16	5/10...30VDC	5/10...30VDC	5/10...30VDC
17	Alarm	Alarm	Alarm

3) Increments 4) Binary Only

Connector 17pol. (CONIN) 13-14 Bit		
Pin	13 Bit	14 Bit
1	S12 (MSB)	S13 (MSB)
2	S11	S12
3	S10	S11
4	S9	S10
5	S8	S9
6	S7	S8
7	S6	S7
8	S5	S6
9	S4	S5
10	S3	S4
11	S2	S3
12	S1	S2
13	S0 (LSB)	S1
14	Direction	S0 (LSB)
15	0 V	0 V
16	5/10...30VDC	5/10...30VDC
17	Latch (Binarycode) Alarm (Graycode)	Latch (Binarycode) Alarm (Graycode)

TPE-cable (Multiturn 13-14 Bit) 37 pol. Sub-D		
Color	Pin	
brn	2	S0
grn	21	S1
yel	3	S2
gry	22	S3
pnk	4	S4
vio	23	S5
gry/pnk	5	S6
red/blu	24	S7
wht/grn	6	S8
brn/grn	25	S9
wht/yel	7	S10
yel/brn	26	S11
wht/gry	8	M0
gry/brn	27	M1
wht/pnk	9	M2
pnk/brn	28	M3
wht/blu	14	M4
brn/blu	33	M5
wht/red	15	M6
brn/red	34	M7
wht/blk	16	M8
brn/blk	35	M9
gry/grn	17	M10
yel/gry	36	M11
pnk/grn	18	Alarm
yel/pnk	10	Direction
grn/blu	30	Latch
yel/blu	12	Tristate
red	13	10...30 VDC
wht	31	10...30 VDC
blu	1	0 V
blk	20	0 V

## Absolute Encoder With Parallel Interface

MS style 17 pin connectors					
Pin	Function		107865 Cable Accessory* Color Code	14 BIT	13 BIT
	12 Bit 4096 CPR	10 Bit 1024 CPR			
A	Vin		Red	D13 (MSB)	D12 (MSB)
B	N.C.		Violet	D12	D11
C	Latch (binary only)		Green	D11	D10
D	Direction		Orange	D10	D9
E	S1	N.C.	White	D9	D8
F	S3	S1	White/Brown	D8	D7
G	S5	S3	White/Orange	D7	D6
H	S7	S5	White/Green	D6	D5
J	S8	S6	White/Blue	D5	D4
K	S9	S7	White/Violet	D4	D3
L	S11 (MSB)	S9 (MSB)	White/Black/Brown	D3	D2
M	GND		Black	D2	D1
N	S4	S2	White/Red	D1	D0 (LSB)
P	S0 (LSB)	N.C.	Gray	D0 (LSB)	Direction
R	S2	S0 (LSB)	White/Black	GND	GND
S	S6	S4	White/Yellow	Latch	Latch
T	S10	S8	White/Grey	Vin	Vin
10ft Cable # 107865-0010				NA	
Mating Connector: MS 17 pin style MS3106A-20-29S part # MCN-N8					
*This is a mating connector/cable assembly. Color coding information is provides here for reference					

PVC-cable (Singleturn 13-14 Bit)		
Color	13 Bit	14 Bit
gry/pnk	N.C	S0 (LSB)
brn/yel	S0 (LSB)	S1
brn/gry	S1	S2
red/blu	S2	S3
vio	S3	S4
wht/brn	S4	S5
wht/grn	S5	S6
wht/yel	S6	S7
wht/gry	S7	S8
wht/pnk	S8	S9
wht/blu	S9	S10
wht/red	S10	S11
wht/blk	S11	S12
brn/grn	S12 (MSB)	S13 (MSB)
yel	Tristate S0...S12	Tristate S0...S13
pnk	Latch <sup>4)</sup>	Latch <sup>4)</sup>
grn	Direction	Direction
blk	0 V	0 V
red	5/10...30VDC	5/10...30VDC
brn	Alarm	Alarm

4) Binary Only

Bayonet style 19 pin connectors							
Pin	Function 14 Bit 16384 CPR	112077 Cable Accessory* Color Code	Function 13 it 8192 CPR	112076 Cable Accessory* Color Code	Function		110158 Cable Accessory* Color Code
					12 Bit 4096 CPR	10 Bit 1024 CPR	
A	S13 (MSB)	White/Black/Brown	S12	White/Black/Brown	S11 (MSB)	S9 (MSB)	White/Black/Brown
B	S12	White/Grey	S11	White/Grey	S10	S8	White/Grey
C	S11	White/Violet	S10	White/Violet	S9	S7	White/Violet
D	S10	White/Blue	S9	White/Blue	S8	S6	White/Blue
E	S9	White/Green	S8	White/Green	S7	S5	White/Green
F	S8	White/Orange	S7	White/Orange	S6	S4	White/Orange
G	S7	White/Yellow	S6	White/Yellow	S5	S3	White/Yellow
H	S6	White/Red	S5	White/Red	S4	S2	White/Red
J	S5	White/Brown	S4	White/Brown	S3	S1	White/Brown
K	S4	White/Black	S3	White/Black	S2	S0 (LSB)	White/Black
L	S3	Brown	S2	Blue	S1	N.C.	White
M	S2	Blue	S1	White	S0 (LSB)	N.C.	Grey
N	S1	White	S0 (LSB)	Grey	N.C	N.C.	
P	S0 (LSB)	Grey	GND	Black	GND		Black
R	Direction	Orange	Direction	Orange	Direction		Orange
S	Case	Violet	Case	Violet	Case		Violet
T	GND	Black	GND	Yellow	GND		Yellow
U	Latch	Green	Latch	Green	Latch (binary only)		Green
V	Vin	Red	Vin	Red	Vin		Red
10ft Cable # 112077-0010			10ft Cable # 112076-0010		10ft Cable # 110158-0010		
Mating Connector: 19 pin Bayonet style PT06E-14-19S part # 606219-0001							

\*This is a mating connector/cable assembly. Color coding information is provided here for reference

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Dynapar Brand AI25 Parallel Data Sheet (8/05)

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# Series AI25 DeviceNet Interface

- Up to 14 Bit single-turn resolution
- 4096 revolutions of multi-turn resolution
- Short installation depth
- Safety through self-diagnostics
- Solid shaft and hollow shaft versions
- -40° C to +85° C Operating temperature

CE  
ACURO



## APPLICATION/INDUSTRY

The Dynapar brand ACURO Absolute Encoder offers a modern full-feature design equipped with DeviceNet interface.

## DESCRIPTION

The *Acuro AI25* optical absolute industrial encoder is available in a single-turn or multi-turn version. The multi-turn design is based on a reliable high-speed gear with optical scanning and the latest generation of OptoASIC technology.

The mechanical concept is based on a double ball bearing design, which is available as a solid-shaft or hollow-shaft version in common shaft diameters.

## FEATURES AND BENEFITS

- Compact design to save valuable space
- Low power consumption
- Fast delivery of any model variant
- Additional field-bus and point-to-point interfaces available

## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Single-turn Resolution:** 10, 12, 13, 14 Bit  
**Multi-turn Resolution:** 12 bit  
**Linearity:** +/- 1/2 LSB  
**Absolute Accuracy:** ± 0.01° mechanical (36 arc-sec.)  
**Repeatability:** ± 0.002° mechanical (7.2 arc-sec.)  
**Code format:** Binary

### ELECTRICAL

**Connection:** Bus Cover with spring terminal clamps  
**Supply voltage:** 10-30 VDC  
**Intrinsic current consumption:** 200 mA (ST), 220 mA (MT)  
**Baud Rate:** 125, 250, 500 kBaud  
**Interface:** CAN Highspeed according to ISO/DIS 11898, CAN Specification 2.0 B (11 and 29 bit identifier)  
**Protocol:** According to DeviceNet V2.0  
**Transfer mode:**  
 Poll mode  
 Bit strobe (time-synchronous for all devices)  
 Change of State (automatic after change of values)  
 Cyclic, with adjustable cycle timer

### MECHANICAL

**Shaft diameter:**  
 Shaft: 6 mm (Servo Mount), 10 mm (Clamping Mount), 3/8" (Square Flange Mount)  
 Hubshaft: 10mm, 12 mm, 3/8", 1/2"  
**Maximum shaft load:**  
 6 mm shaft: 13 lb axial, 24 lb radial  
 10 mm shaft: 24 lb axial, 35 lb radial  
**Maximum shaft speed:** 10,000 RPM (continuous), 12,000 RPM (peak)  
**Starting torque:** < 1.4 in-oz  
**Body Diameter:** 58 mm, nominal  
**Weight (approx.):** 350 g ST, 400 g MT  
**Shaft tolerance (hubshaft only):** +/- 1.5 mm axial, +/- 0.2 mm radial  
**Flange configurations:** Square, Clamp, Servo, Hubshaft with flexible tether  
**Bearing life:**  
 1 x 10<sup>10</sup> revolutions at 35% full rated shaft load  
 1 x 10<sup>9</sup> revolutions at 75% full rated shaft load  
 1 x 10<sup>8</sup> revolutions at 100% full rated shaft load

### ENVIRONMENTAL

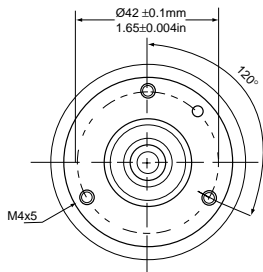
**Operating Temperature:** -40 to 85° C  
**Storage Temperature:** -40 to 100° C  
**Enclosure Rating:** IP64 or IP67  
**Shock:** 1,000 m/s<sup>2</sup> (6 ms)  
**Vibration:** 100 m/s<sup>2</sup> (10 to 2,000 Hz)

Code 1: Model	Code 2: Bits	Code 3 :Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
<b>AI25</b>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AI25</b> Size25 Acuro Absolute Encoder	<b>Single-Turn</b>	Available when Code 4 is 0 or A <b>0</b> Servo*	<b>w/o shaft seal (IP64)</b>	<b>9</b> Devicenet	<b>2</b> 10-30 VDC	<b>F</b> Bus Cover 1 M12, 5-Pole Connector  <b>G</b> Bus Cover 2 Strain Relief Exits and 1 M12, 5-Pole Connector (for Tico display). Internal T-coupler included  <b>L</b> Bus Cover 2 Strain Relief Exits. Internal T-coupler included
	<b>0010</b> 10 Bit		<b>0</b> 6 mm			
	<b>0012</b> 12 Bit	<b>1</b> 3/8"				
	<b>0013</b> 13 Bit	<b>2</b> 10 mm				
<b>0014</b> 14 Bit	Available when Code 4 is 2 or C <b>1</b> Clamping*	<b>3</b> 3/8" Hub Shaft	<b>4</b> 12 mm Hubshaft			
<b>Multi-Turn</b>	Available when Code 4 is 1 or B <b>2</b> Square flange**	<b>5</b> 1/2" Hubshaft	<b>6</b> 10 mm Hub Shaft			
<b>1212</b> 12 Bit Multi-Turn, 12 Bit Single-Turn		<b>w/ shaft seal (IP67)</b>	<b>A</b> 6 mm			
<b>1213</b> 12 Bit Multi-Turn, 13 Bit Single-Turn		Available when Code 4 is 3, 4, 5 or 6 <b>3</b> Hubshaft w/tether†	<b>B</b> 3/8"	<b>C</b> 10 mm		
<b>1214</b> 12 Bit Multi-Turn, 14 Bit Single-Turn						
		* 58mm Dia. ** 2.5" Square † 63mm BC				

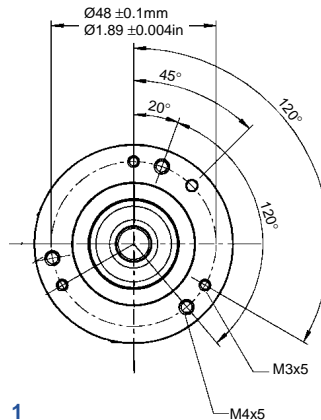
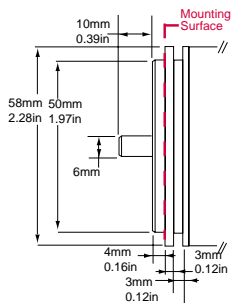
ABSOLUTE  
ACURO

# Series AI25 DeviceNet Interface

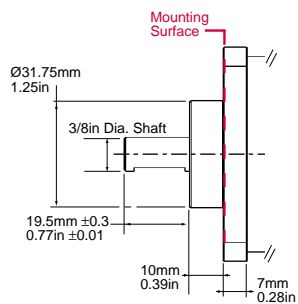
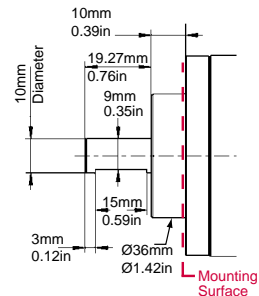
## Code 3: Mounting



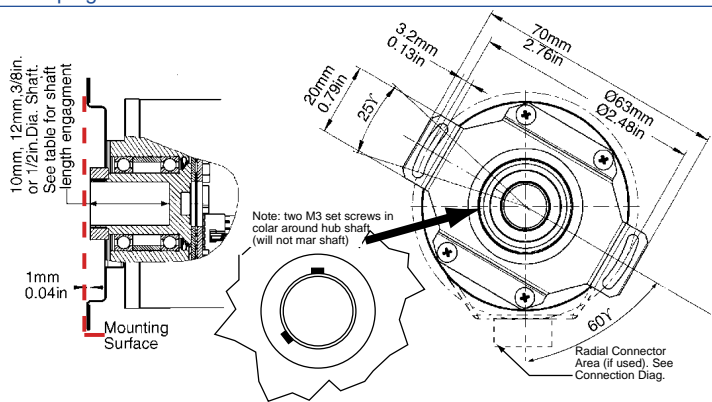
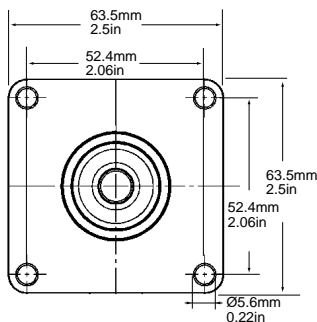
**0**  
Servo



**1**  
Clamping



**2**  
Square Flange

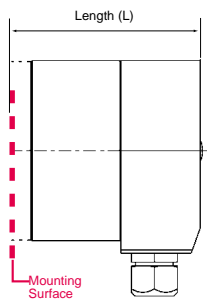


**3**  
Hubshaft w/Tether

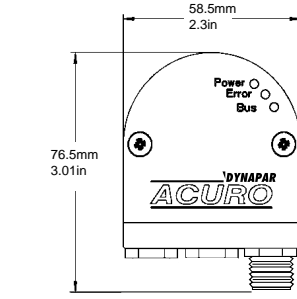
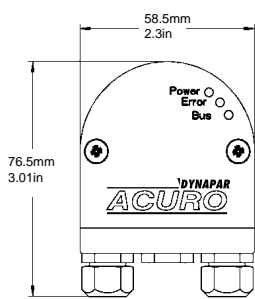
### Hubshaft Shaft Engagement

HubShaft Diameter	Min. Shaft Length	Max. Shaft Length
10mm, 3/8"	15mm (0.59")	20mm (0.79")
12mm, 1/2"	18mm (0.71")	20mm (0.79")

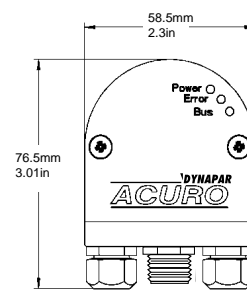
## Code 7: Connector



**L**  
2 Strain Relief Exits



**F**  
1 M12, 5-Pole Connector



**G**  
2 Strain Relief Exits  
1 M12, 5-Pole Connector\*

Length (L) Mounting Surface to Rear  
For connector types L, F and G

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	63.3/2.49	72.3/2.85
(1) Clamping	62.3/2.45	71.3/2.81
(2) Square Flng	64.8/2.55	73.8/2.91
(3) Hubshaft	72.2/2.84	81.2/3.2

\*M12, 5-Pole Connector used to interface Hengstler Tico 731 LCD display

# Series AI25 Acuro Absolute - Profibus Interface



- **Up to 14 Bit single-turn resolution**
- **4096 revolutions of multi-turn resolution**
- **Short installation depth**
- **Safety through self-diagnostics**
- **Solid shaft and hollow shaft versions**
- **-40°C to +85°C Operating temperature**

The **Acuro AI25** optical absolute industrial encoder is available in a single-turn or multi-turn version. The multi-turn design is based on a reliable high-speed gear with optical scanning and the latest generation of OptoASIC technology.

The mechanical concept is based on a double ball bearing design, which is available as a solid-shaft or hollow-shaft version in common shaft diameters.

## SPECIFICATIONS

### Electrical

**Connection:** Bus Cover with spring terminal clamps

**Single-turn Resolution:** 10, 12, 13, 14 Bit

**Multi-turn Resolution:** 12 bit

**Linearity:** +/- 1/2 LSB

**Absolute Accuracy:** ± 0.01° mechanical (36 arc-sec.)

**Repeatability:** ± 0.002° mechanical (7.2 arc-sec.)

**Code format:** Binary

**Supply voltage:** 10-30 VDC

**Intrinsic current consumption:** 200 mA (ST), 220 mA (MT)

**Baud Rate:** 12 Mbaud

**Interface:** Profibus-DP, Encoder Profile

**Programmable:** According to Class 2

**Special Functions:** Speed, Acceleration

### Mechanical

#### Shaft diameter:

Shaft: 6 mm (Servo Mount), 10 mm (Clamping Mount), 3/8" (Square Flange Mount)

Hubshaft: 10mm, 12 mm, 3/8", 1/2"

#### Maximum shaft load:

6 mm shaft: 13 lb axial, 24 lb radial

10 mm shaft: 24 lb axial, 35 lb radial

#### Maximum shaft speed:

10,000 RPM (continuous), 12,000 RPM (peak)

#### Starting torque:

< 1.4 in-oz

#### Weight (approx.):

350 g ST, 400 g MT

#### Shaft tolerance (hubshaft only):

+/- 1.5 mm axial, +/- 0.2 mm radial

#### Flange configurations:

Square, Clamp, Servo, Hubshaft with flexible tether

#### Bearing life:

1 x 10<sup>10</sup> revolutions at 35% full rated shaft load

1 x 10<sup>9</sup> revolutions at 75% full rated shaft load

1 x 10<sup>8</sup> revolutions at 100% full rated shaft load

### Environmental

**Operating Temperature:** -40 to 85° C

**Storage Temperature:** -40 to 100° C

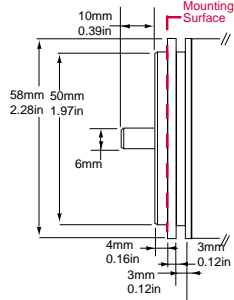
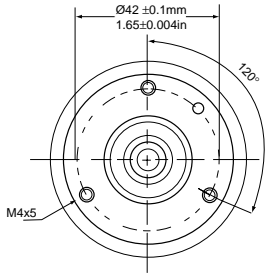
**Enclosure Rating:** IP64 or IP67

**Shock:** 1,000 m/s<sup>2</sup> (6 ms)

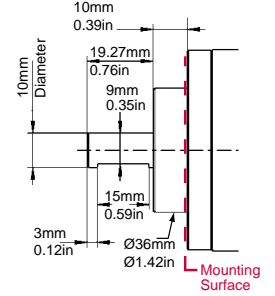
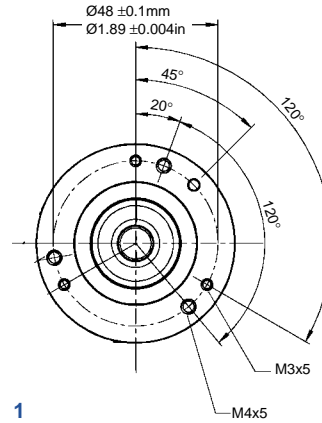
**Vibration:** 100 m/s<sup>2</sup> (10 to 2,000 Hz)

Code 1: Model	Code 2: Bits	Code 3: Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
<b>AI25</b>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AI25</b> Size25 Acuro Absolute Encoder	<b>Single-Turn</b> <b>0010</b> 10 Bit <b>0012</b> 12 Bit <b>0013</b> 13 Bit <b>0014</b> 14 Bit  <b>Multi-Turn</b> <b>1212</b> 12 Bit Multi-Turn, 12 Bit Single-Turn <b>1213</b> 12 Bit Multi-Turn, 13 Bit Single-Turn <b>1214</b> 12 Bit Multi-Turn, 14 Bit Single-Turn	Available when Code 4 is 0 or A <b>0</b> Servo*  Available when Code 4 is 2 or C <b>1</b> Clamping*  Available when Code 4 is 1 or B <b>2</b> Square flange**  Available when Code 4 is 3, 4, 5 or 6 <b>3</b> Hubshaft w/tether†  * 58mm Dia. ** 2.5" Square † 63mm BC	<b>w/o shaft seal (IP64)</b> <b>0</b> 6 mm <b>1</b> 3/8" <b>2</b> 10 mm <b>3</b> 3/8" Hub Shaft <b>4</b> 12 mm Hubshaft <b>5</b> 1/2" Hubshaft <b>6</b> 10 mm Hub Shaft  <b>w/ shaft seal (IP67)</b> <b>A</b> 6 mm <b>B</b> 3/8" <b>C</b> 10 mm	<b>6</b> Profibus	<b>2</b> 10-30 VDC	<b>E</b> Bus Cover 3 Strain Relief Exits. Internal T-coupler included  <b>G</b> Bus Cover 2 Strain Relief Exits and 1 M12, 5-Pole Connector (for Tico display). Internal T-coupler included  <b>H</b> Bus Cover Double Conin. Internal T-coupler included

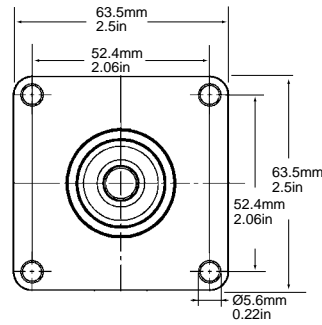
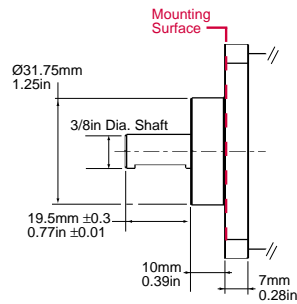
### Code 3: Mounting



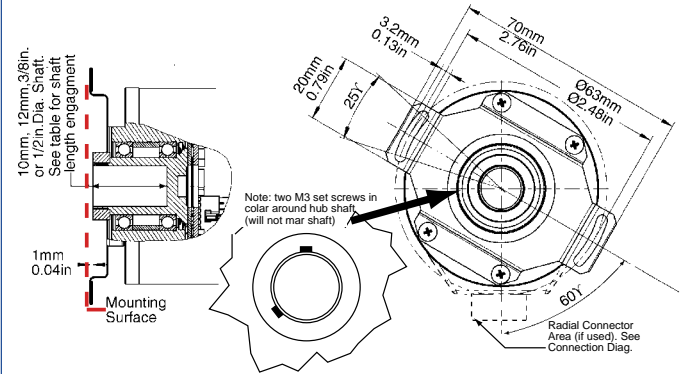
**0**  
Servo



**1**  
Clamping



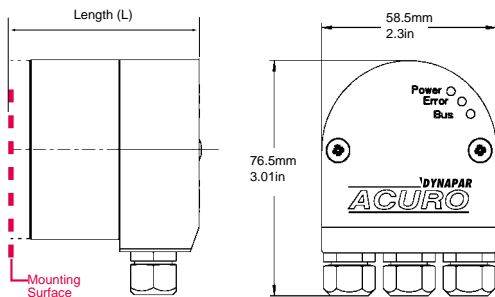
**2**  
Square Flange



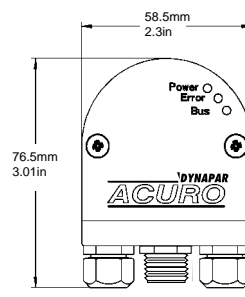
**3**  
Hubshaft w/Tether

HubShaft Diameter	Min. Shaft Length	Max. Shaft Length
10mm, 3/8"	15mm (0.59")	20mm (0.79")
12mm, 1/2"	18mm (0.71")	20mm (0.79")

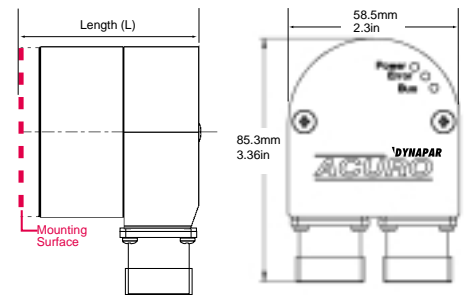
### Code 7: Connector



**E**  
3 Strain Relief Exits



**G**  
2 Strain Relief Exits  
1 M12, 5-pole Connector\*



**H**  
Double Conin

Length (L) Mounting Surface to Rear  
 For connector types E, G, H & L

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	63.3/2.49	72.3/2.85
(1) Clamping	62.3/2.45	71.3/2.81
(2) Square Flng	64.8/2.55	73.8/2.91
(3) Hubshaft	72.2/2.84	81.2/3.2

\*M12, 5-pole Connector used to interface Hengstler Tico 731 LCD display



ACURO™



### ACURO with SSI Interface

#### DESCRIPTION

The Dynapar brand ACURO Absolute Encoder offers a modern full-feature design equipped with SSI interface.

The **Acuro AI25** optical absolute industrial encoder is available in a single-turn or multi-turn version. The multi-turn design is based on a reliable high-speed gear with optical scanning and the latest generation of OptoASIC technology.

The mechanical concept is based on a double ball bearing design, which is available as a solid-shaft or hollow-shaft version in common shaft diameters.

## Series AI25™

### Absolute Encoder With SSI Interface

#### APPLICATIONS:

Ideal for applications requiring digital feedback to be sent over an industrial bus network

- Elevators
- Machine Tool
- Assembly
- Positioning

#### INDUSTRIES

Manufacturing, Assembly, Material Handling and any other where precise, repeatable bidirectional position measurement is required.

#### FEATURES/BENEFITS

- Compact design to save valuable space
- Up to 17 Bit single-turn resolution
- 4096 revolutions of multi-turn resolution
- Short installation depth
- Safety through self-diagnostics
- Solid shaft and hollow shaft versions
- -40°C to +100°C Operating temperature
- Low power consumption
- Fast delivery of any model variant
- Additional field-bus and point-to-point interfaces available



**ACURO with SSI Interface**

**Series AI25**

**Absolute Encoder With SSI Interface**

**SPECIFICATIONS\***

STANDARD OPERATING CHARACTERISTICS	ELECTRICAL	MECHANICAL
<p><b>Single-turn Resolution:</b> 10, 12, 13, 14, 17 Bit</p> <p><b>Multi-turn Resolution:</b> 12 bit (only available with 12 or 13 bit ST resolution)</p> <p><b>Linearity:</b> +/- 1/2 LSB</p> <p><b>Absolute Accuracy:</b> ±0.01° mechanical (36 arc-sec.)</p> <p><b>Repeatability:</b> ±0.002° mechanical (7.2 arc-sec.)</p> <p><b>Code format:</b> Binary, Gray, Gray Excess, parameterization through <i>AcuroSoft</i></p> <p><b>Parameterization:</b> Resolution code type, sense of rotation, warning, alarm</p>	<p><b>Connection:</b> Cable, M23 - 12 pole Conin connector, M12- 8-pole connector</p> <p><b>Supply voltage:</b> 5 VDC -5%/+10% or 10-30 VDC</p> <p><b>Intrinsic current consumption:</b> 50 mA (ST), 100 mA (MT) not including output current</p> <p><b>Output current:</b> 60 mA per bit, short circuit protected</p> <p><b>Frequency response:</b> 500 kHz</p> <p><b>Maximum cable length:</b> 400 m</p> <p><b>Control Inputs:</b> Direction</p> <p><b>Alarm output:</b> Alarm bit</p> <p><b>Status LED:</b> Green = OK, Red = Alarm (IP64 only)</p> <p><b>Preset Switch:</b> Sets encoder to zero output at present mechanical position (IP64 only)</p>	<p><b>All Types</b></p> <p><b>Maximum shaft speed:</b> 10,000 RPM (continuous), 12,000 RPM (peak)</p> <p><b>Starting torque:</b> &lt; 1.4 in-oz</p> <p><b>Bearing life:</b>            1 x 10<sup>10</sup> revolutions at 35% full rated shaft load            1 x 10<sup>9</sup> revolutions at 75% full rated shaft load            1 x 10<sup>8</sup> revolutions at 100% full rated shaft load</p> <p><b>Weight (approx.):</b> 350 g ST, 400 g MT</p> <p><b>Shafted Types</b></p> <p><b>Flange configurations:</b> Square, Clamp, Servo</p> <p><b>Shaft diameter:</b> 6 mm (Servo Mount), 10 mm (Clamping Mount), 3/8" (Square Flange Mount)</p> <p><b>Maximum shaft load:</b>            6 mm shaft: 13 lb axial, 24 lb radial            10 mm shaft: 24 lb axial, 35 lb radial            3/8" Shaft: 24 lb axial, 35 lb radial</p> <p><b>Hubshaft Types</b></p> <p><b>Flange configuration:</b> Hubshaft with flexible tether</p> <p><b>Accepted Mating Shaft Diameter (min./max.):</b>            6mm (5.984/5.996); 10mm (9.980/9.995);            12 mm (11.976/11.994); 3/8" (.3742/.3748);            1/2" (.4991/.4997)</p> <p><b>Allowable Mating Shaft Movement (hubshaft only):</b> +/- 1.5 mm axial, +/- 0.2 mm radial</p>
ENVIRONMENTAL		
<p><b>Operating Temperature:</b> -40 to 100° C</p> <p><b>Storage Temperature:</b> -40 to 100° C</p> <p><b>Enclosure Rating:</b> IP64 or IP67</p> <p><b>Shock:</b> 1,000 m/s<sup>2</sup> (6 ms)</p> <p><b>Vibration:</b> 100 m/s<sup>2</sup> (10 to 2,000 Hz)</p>		

\* Specifications are for base models with standard features only unless otherwise noted. Specifications subject to change without notice in accordance with our DBS policy of continuous improvement. All product and brand names are trademarks of their respective owners. All rights reserved.

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Dynapar Brand AI25 SSI Data Sheet (8/05)

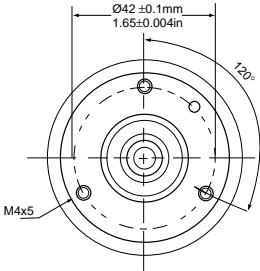
Code 1: Model	Code 2: Bits	Code 3: Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector
<b>AI25</b>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AI25</b> Size25 Acuro Absolute Encoder	<b>Single-Turn</b>	Available when Code 4 is 0 or A	<b>w/o shaft seal (IP64)</b>	<b>2</b> SSI Gray <b>3</b> SSI Binary	<b>0</b> 5 VDC <b>2</b> 10-30 VDC	<b>0</b> 1.5m axial cable <b>1</b> 1.5m radial cable <b>2</b> M23 Conin 12 pin axial CW <b>3</b> M23 Conin 12 pin radial CW <b>C</b> M12, 8-pole connector axial <b>D</b> M12, 8-pole connector radial
	<b>0010</b> 10 Bit	<b>0</b> Servo*				
	<b>0012</b> 12 Bit	Available when Code 4 is 2 or C	<b>1</b> 3/8"			
	<b>0013</b> 13 Bit	<b>1</b> Clamping*	<b>2</b> 10 mm			
<b>0014</b> 14 Bit	Available when Code 4 is 1 or B	<b>3</b> 3/8" Hub Shaft	<b>3</b> 3/8" Hub Shaft			
<b>0017</b> 17 Bit	<b>2</b> Square flange**	<b>4</b> 12 mm Hubshaft	<b>5</b> 1/2" Hubshaft			
<b>Multi-Turn</b>	<b>1212</b> 12 Bit Multi-Turn, 12 Bit Single-Turn	Available when Code 4 is 3, 4, 5 or 6	<b>w/ shaft seal (IP67)</b>	<b>6</b> 10 mm Hub Shaft		
<b>1213</b> 12 Bit Multi-Turn, 13 Bit Single-Turn	<b>3</b> Hubshaft w/tether†	<b>A</b> 6 mm	<b>A</b> 6 mm			
	* 58mm Dia.	<b>B</b> 3/8"	<b>B</b> 3/8"			
	** 2.5" Square	<b>C</b> 10 mm	<b>C</b> 10 mm			
	† 63mm BC					



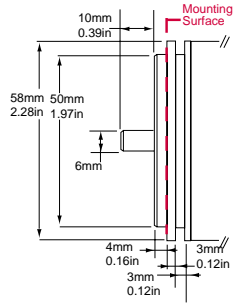
Customer Service +1 800.873.8731 • Technical Support +1 800.234.8731  
 www.feedbackdevices.com • www.danaherindustrialcontrols.com

**Absolute Encoder With SSI Interface**

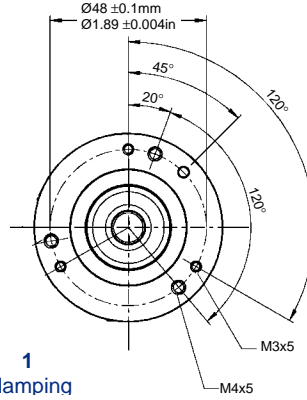
**Code 3: Mounting**



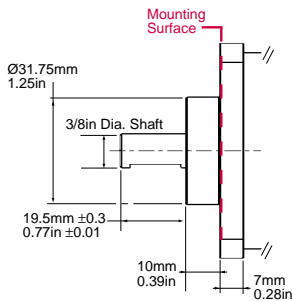
**0**  
Servo



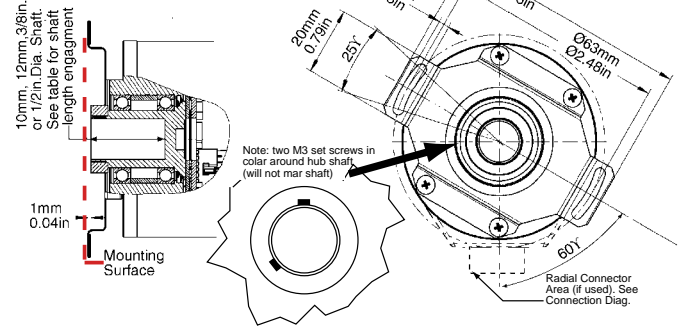
**1**  
Clamping



**2**  
Square Flange



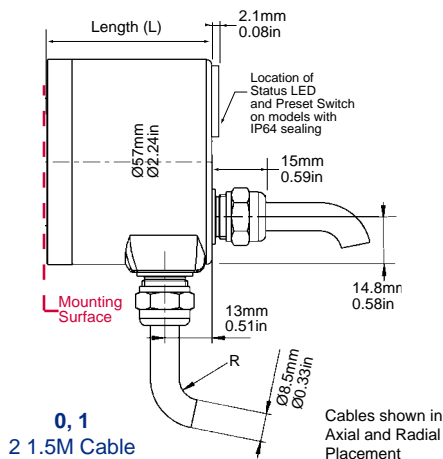
**3**  
Hubshaft w/Tether



**HUBSHAFT SHAFT ENGAGEMENT**

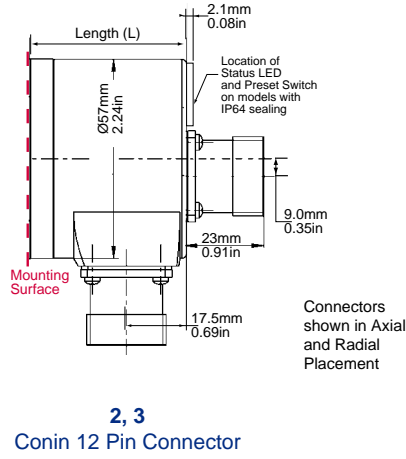
HubShaft Diameter	Min. Shaft Length	Max. Shaft Length
10mm, 3/8"	15mm (0.59")	20mm (0.79")
12mm, 1/2"	18mm (0.71")	20mm (0.79")

**Code 7: Connector**



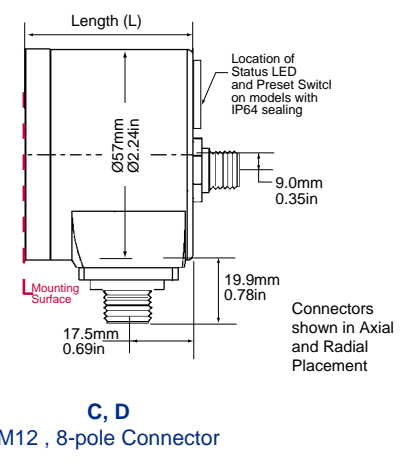
**Length (L) Mounting Surface to Rear**

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	46.5/1.83	46.5/1.83
(1) Clamping	45.5/1.79	45.5/1.79
(2) Square Flng	45.5/1.79	45.5/1.79
(3) Hubshaft	53.4/2.1	53.4/2.1



**Length (L) Mounting Surface to Rear**

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	46.5/1.83	46.5/1.83
(1) Clamping	45.5/1.79	45.5/1.79
(2) Square Flng	45.5/1.79	45.5/1.79
(3) Hubshaft	53.4/2.1	53.4/2.1



**Length (L) Mounting Surface to Rear**

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	46.5/1.83	46.5/1.83
(1) Clamping	45.5/1.79	45.5/1.79
(2) Square Flng	45.5/1.79	45.5/1.79
(3) Hubshaft	53.4/2.1	53.4/2.1

## Absolute Encoder With SSI Interface

### SSI Data Format

Bits	T1 - T10	T11	T12	T13	T14	T15	T16	T17	T18	T19
10	S9 - S0	0	0	0	0	S9	S8	S7	S6	S5
12	S11 - S2	S1	S0	0	0	S11	S10	S9	S8	S7
13	S12 - S3	S2	S1	S0	0	S12	S11	S10	S9	S8
14	S13 - S4	S3	S2	S1	S0	0	S13	S12	S11	S10
17	S16 - S7	S6	S5	S4	S3	S2	S1	S0	0	S16

Bits	T1 - T12	T13 - T21	T22	T23	T24	T25	T26	T27	T28	T29
1212	M11 - M0	S11 - S3	S2	S1	S0	0	0	M11	M10	M9
1213	M11 - M0	S12 - S4	S3	S2	S1	S0	0	M11	M10	M9

S9, S8 Data Bits for resolution per turn.

M11, M10 Data Bits for number of turns.

**Electrical Connections 12 pin CONIN**

Wire Color	Pin	Function
Brown	1	0V
Pink	2	Data
Yellow	3	Clock
—	4	N.C.
Blue	5	Direction
Red	6	N.C.
Violet	7	N.C.
White	8	5V/10-30V
—	9	N.C.
Gray	10	Data
Green	11	Clock
Black	12	0 V Data

12 pin CONIN Connector **Part Number: G3 539 202**

Bulk Cable (sold by the meter) **Part Number: G3 280 220**

Cable Assembly (with Connector)

- 3 meters **Part Number: G1 542 003**
- 5 meters **Part Number: G1 542 004**
- 10 meters **Part Number: G1 542 005**

S9 - S0 Data Bits S9, S8, S7, S6, S5, S4, S3 Etc.

M11- M0 Turn Data Bits M11, M10, M9, M8, Etc.

**Electrical Connections 8 pin M12**

Wire Color	Pin	Function
White	1	5/10-30 Volt
Brown	2	0 Volt
—	3	N.C.
Green	4	Clock
Pink	5	Data
Yellow	6	Clock
Blue	7	Direction
Gray	8	Data

8 pin M12 Connector **Part Number: G3 539 597**

Bulk Cable (sold by the meter) **Part Number: G3 280 251**

Cable Assembly (with Connector)

- 3 meters **Part Number: G1 565 329**
- 5 meters **Part Number: G1 565 330**
- 10 meters **Part Number: G1 565 331**

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Dynapar Brand AI25 SSI Data Sheet (8/05)

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ACURO™



### ACURO with Parallel Interface

#### DESCRIPTION

The Dynapar brand ACURO Absolute Encoder offers a modern full-feature design equipped with Parallel interface.

The Acuro AI25 optical absolute industrial encoder is available in a single-turn or multi-turn version. The multi-turn design is based on a reliable high-speed gear with optical scanning and the latest generation of OptoASIC technology.

The mechanical concept is based on a double ball bearing design, which is available as a solid-shaft or hollow-shaft version in common shaft diameters.

## Series AI25™

### Absolute Encoder With Parallel Interface

#### APPLICATIONS:

Ideal for applications requiring digital feedback to be sent over an industrial bus network

- Elevators
- Machine Tool
- Assembly
- Positioning

#### INDUSTRIES

Manufacturing, Assembly, Material Handling and any other where precise, repeatable bidirectional position measurement is required.

#### FEATURES/BENEFITS

- Compact design to save valuable space
- Up to 14 Bit single-turn resolution
- 4096 revolution multi-turn resolution
- Short installation depth
- Safety through self-diagnostics
- Solid shaft and hollow shaft versions
- -40°C to +100°C Operating temperature
- Low power consumption
- Fast delivery of any model variant
- Additional field-bus and point-to-point interfaces available



**ACURO with Parallel Interface**

# Series AI25

## Absolute Encoder With Parallel Interface

### SPECIFICATIONS\*

**STANDARD OPERATING CHARACTERISTICS**

**Single-turn Resolution:** 10, 12, 13, 14 Bit, 360 PPR, 720 PPR  
**Multi-turn Resolution:** 12 bit (only available with 12 bit ST resolution)  
**Absolute Accuracy:** ± 0.01° mechanical (36 arc-sec.)  
**Repeatability:** ± 0.002° mechanical (7.2 arc-sec.)  
**Code format:** Binary, Gray, Gray Excess

**ELECTRICAL**

**Connection:** Cable, Conin Connector, MS Connector, Cable with Sub-D Connector (MT only)  
**Supply voltage:** 5 VDC -5%/+10%, or 10-30 VDC  
**Intrinsic current consumption:** 200 mA (ST), 300 mA (MT)  
**Output current:** 30 mA per bit, short circuit protected  
**Frequency response:** 500 kHz on single-turn, 1.5m cable\*  
**Alarm output:** NPN open collector max 5 mA  
**Maximum cable length:** 100 m

\*Data refresh rate: 70µsec is for multi-turn and single-turn with preset

Control Inputs		
Input	Logic Level	Function
Direction	1	Ascending code values when turning clockwise
	0	Descending code values when turning clockwise
Latch	1	Encoder data continuously changing at output
	0	Encoder data stored and constant at output
Tristate (ST)	1	Outputs active
	0	Outputs at high impedance (Tristate mode)
Tristate (MT)	1	Outputs at high impedance (Tristate mode)
	0	Outputs active

**Status LED:** Green = OK, Red = Alarm (IP64 only, not available on connector type J)  
**Preset Switch:** Sets encoder to zero output at present mechanical position (Multi-turn IP64 only, not available on connector type J)  
**Control Inputs:** Latch, Direction, Tri-state (see table below)

**MECHANICAL**

**All Types**  
**Maximum shaft speed:** 10,000 RPM (continuous), 12,000 RPM (peak)  
**Starting torque:** < 1.4 in-oz  
**Bearing life:**  
 1 x 10<sup>10</sup> revolutions at 35% full rated shaft load  
 1 x 10<sup>9</sup> revolutions at 75% full rated shaft load  
 1 x 10<sup>8</sup> revolutions at 100% full rated shaft load  
**Weight (approx.):** 350 g ST, 400 g MT

**Shafted Types**  
**Flange configurations:** Square, Clamp, Servo  
**Shaft diameter:** 6 mm (Servo Mount), 10 mm (Clamping Mount), 3/8" (Square Flange Mount)  
**Maximum shaft load:**  
 6 mm shaft: 13 lb axial, 24 lb radial  
 10 mm shaft: 24 lb axial, 35 lb radial  
 3/8" Shaft: 24 lb axial, 35 lb radial

**Hubshaft Types**  
**Flange configuration:** Hubshaft with flexible tether  
**Accepted Mating Shaft Diameter (min./max.):**  
 6mm (5.984/5.996); 10mm (9.980/9.995);  
 12 mm (11.976/11.994); 3/8" (.3742/.3748);  
 1/2" (.4991/.4997)  
**Allowable Mating Shaft Movement (hubshaft only):**  
 +/- 1.5 mm axial, +/- 0.2 mm radial

**ENVIRONMENTAL**

**Operating Temperature:** -40 to 100° C  
**Storage Temperature:** -40 to 100° C  
**Enclosure Rating:** IP64 or IP67  
**Shock:** 1,000 m/s<sup>2</sup> (6 ms)  
**Vibration:** 100 m/s<sup>2</sup> (10 to 2,000 Hz)

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 Dynapar Brand AI25 Parallel Data Sheet (8/05)

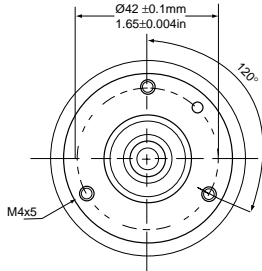
Code 1: Model	Code 2: Bits	Code 3 :Mounting	Code 4: Shaft Size	Code 5: Protocol	Code 6: Electrical	Code 7: Connector	
<b>AI25</b>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>AI25</b> Size25 Acuro Absolute Encoder	<b>Single-Turn</b> <b>0010</b> 10 Bit <b>0012</b> 12 Bit <b>0013</b> 13 Bit <b>0014</b> 14 Bit <b>0720</b> 720 PPR Gray Excess	Available when Code 4 is 0 or A <b>0</b> Servo* Available when Code 4 is 2 or C <b>1</b> Clamping* Available when Code 4 is 1 or B <b>2</b> Square flange**	<b>w/o shaft seal (IP64)</b> <b>0</b> 6 mm <b>1</b> 3/8" <b>2</b> 10 mm <b>3</b> 3/8" Hub Shaft <b>4</b> 12 mm Hubshaft <b>5</b> 1/2" Hubshaft <b>6</b> 10 mm Hub Shaft  <b>w/ shaft seal (IP67)</b> <b>A</b> 6 mm <b>B</b> 3/8" <b>C</b> 10 mm	<b>0</b> Parallel Binary <b>1</b> Parallel Gray	<b>0</b> 5 VDC <b>2</b> 10-30 VDC	<b>0</b> 1.5m axial cable <b>1</b> 1.5m radial cable Available when Code 2 is 00XX, 0360 or 0720 <b>6</b> M23 Conin 17 pin axial CW <b>7</b> M23 Conin 17 pin radial CW <b>J</b> 17 pin MS axial * <b>K</b> 19 pin Bayonet radial Available when Code 2 is 1212 <b>A</b> Cable 1.5m radial w/ 37 pin sub-D <b>B</b> Cable 1.5m axial w/37 pin sub-D <small>* Status LED and Preset Switch features not available with "J"</small>	
	Available when Code 7 is 0, 1, 6, 7 or J <b>0360</b> 360 PPR Gray Excess	Available when Code 4 is 1 or B <b>2</b> Square flange**					
	Available when Code 6 is 2 <b>Multi-Turn</b> <b>1212</b> 12 Bit Multi-Turn, 12 Bit Single-Turn	Available when Code 4 is 3, 4, 5 or 6 <b>3</b> Hubshaft w/tether† * 58mm Dia. ** 2.5" Square † 63mm BC					



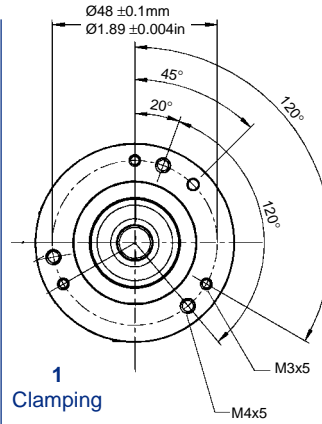
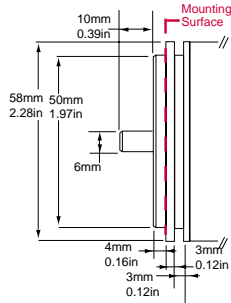
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Absolute Encoder With BiSS Interface

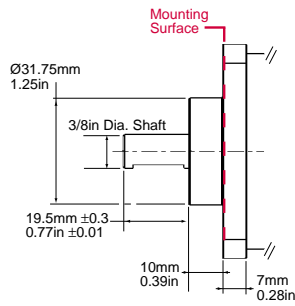
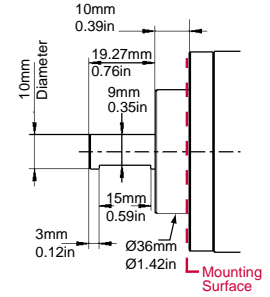
Code 3: Mounting



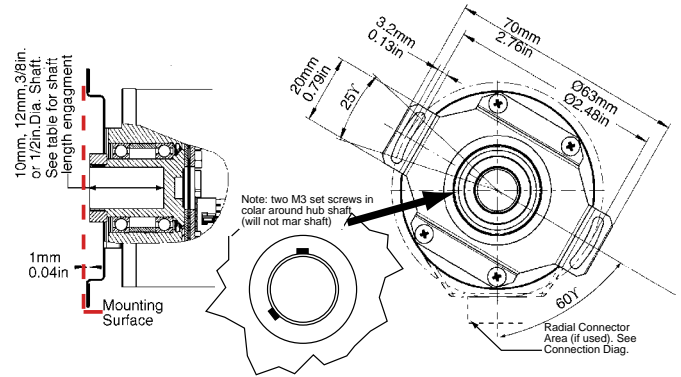
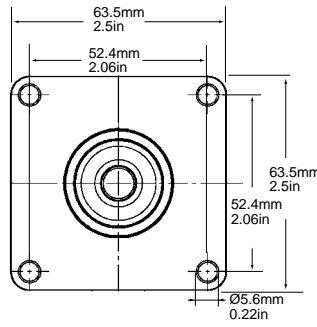
0 Servo



1 Clamping



2 Square Flange

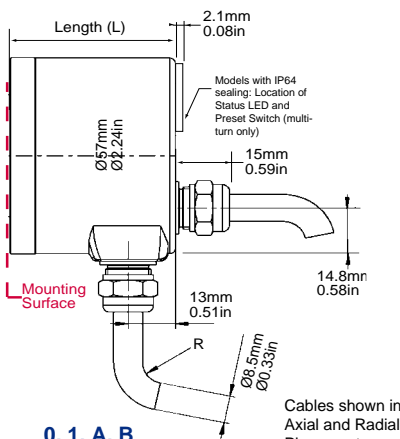


3 Hubshaft w/Tether

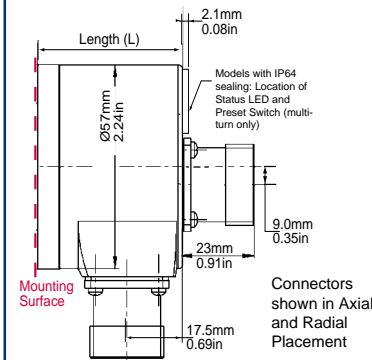
Hubshaft Shaft Engagement

HubShaft Diameter	Min. Shaft Length	Max. Shaft Length
10mm, 3/8"	15mm (0.59")	20mm (0.79")
12mm, 1/2"	18mm (0.71")	20mm (0.79")

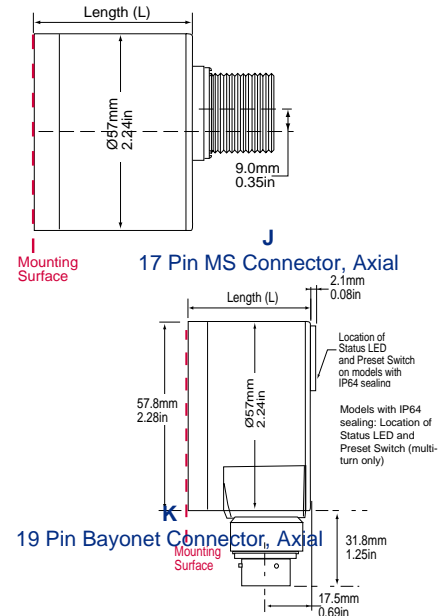
Code 7: Connector



0, 1, A, B 1.5M Cable



6, 7 Conin 12/17 Pin Connector



19 Pin Bayonet Connector, Axial

Length (L) Mounting Surface to Rear

Mount (Code 3)	Single-Turn	Multi-Turn
(0) Servo	46.5/1.83	60.2/2.37
(1) Clamping	45.5/1.79	59.2/2.33
(2) Square Flng	45.5/1.79	59.2/2.33
(3) Hubshaft	49.9/1.96	67.1/2.64

Absolute Encoder With Parallel Interface

CONNECTOR WIRING

Explanation of Terms		
Tristate	+UB = Outputs at high impedance (Tristate mode) 0 V <sup>2)</sup> = Outputs active	
Tristate	+UB <sup>2)</sup> = Outputs active 0 V = Outputs at high impedance (Tristate-Mode)	
Latch	+UB <sup>2)</sup> = Encoder data continuously changing at output 0 V = Encoder data stored and constant at output	
Direction	+UB <sup>2)</sup> = Ascending code value when turning cw 0 V = Descending code value when turning cw	
N.C.	= Not Connected	
LSB	= Least Significant Bit	
MSB	= Most Significant Bit	
S0, S1, ...	= Data bits for resolution per turn	
M0, M1, ... (Multiturn)	= Data bits for number of turns	

2) Or unattached (floating)

PVC-cable (Singleturn) 9-12 Bit			
Color	9 Bit / 360 <sup>3)</sup>	10 Bit/720 <sup>3)</sup>	12 Bit
brn/gry	N.C.	N.C.	S0 (LSB)
red/blu	N.C.	N.C.	S1
vio	N.C.	S0 (LSB)	S2
wht/brn	S0 (LSB)	S1	S3
wht/grn	S1	S2	S4
wht/yel	S2	S3	S5
wht/gry	S3	S4	S6
wht/pnk	S4	S5	S7
wht/blu	S5	S6	S8
wht/red	S6	S7	S9
wht/blk	S7	S8	S10
brn/grn	S8 (MSB)	S9 (MSB)	S11 (MSB)
yel	Tristate D0...D8	Tristate D0...D9	Tristate D0.. D11
pnk	Latch <sup>4)</sup>	Latch <sup>4)</sup>	Latch <sup>4)</sup>
grn	Direction	Direction	Direction
blk	0 V	0 V	0 V
red	5/10...30VDC	5/10...30VDC	5/10...30VDC
brn	Alarm	Alarm	Alarm

3) Increments 4) Binary Only

Connector 17pol. (CONIN) 9-12 Bit			
Pin	9 Bit / 360 <sup>3)</sup>	10 Bit / 720 <sup>3)</sup>	12 Bit
1	S0 (LSB)	S0 (LSB)	S0 (LSB)
2	S1	S1	S1
3	S2	S2	S2
4	S3	S3	S3
5	S4	S4	S4
6	S5	S5	S5
7	S6	S6	S6
8	S7	S7	S7
9	S8 (MSB)	S8	S8
10	N.C.	S9 (MSB)	S9
11	N.C.	N.C.	S10
12	Tristate S0...S8	Tristate S0...S9	S11 (MSB)
13	Latch <sup>4)</sup>	Latch <sup>4)</sup>	Latch <sup>4)</sup>
14	Direction	Direction	Direction
15	0 V	0 V	0 V
16	5/10...30VDC	5/10...30VDC	5/10...30VDC
17	Alarm	Alarm	Alarm

3) Increments 4) Binary Only

Connector 17pol. (CONIN) 13-14 Bit		
Pin	13 Bit	14 Bit
1	S12 (MSB)	S13 (MSB)
2	S11	S12
3	S10	S11
4	S9	S10
5	S8	S9
6	S7	S8
7	S6	S7
8	S5	S6
9	S4	S5
10	S3	S4
11	S2	S3
12	S1	S2
13	S0 (LSB)	S1
14	Direction	S0 (LSB)
15	0 V	0 V
16	5/10...30VDC	5/10...30VDC
17	Latch (Binarycode) Alarm (Graycode)	Latch (Binarycode) Alarm (Graycode)

TPE-cable (Multiturn 13-14 Bit) 37 pol. Sub-D		
Color	Pin	
brn	2	S0
grn	21	S1
yel	3	S2
gry	22	S3
pnk	4	S4
vio	23	S5
gry/pnk	5	S6
red/blu	24	S7
wht/grn	6	S8
brn/grn	25	S9
wht/yel	7	S10
yel/brn	26	S11
wht/gry	8	M0
gry/brn	27	M1
wht/pnk	9	M2
pnk/brn	28	M3
wht/blu	14	M4
brn/blu	33	M5
wht/red	15	M6
brn/red	34	M7
wht/blk	16	M8
brn/blk	35	M9
gry/grn	17	M10
yel/gry	36	M11
pnk/grn	18	Alarm
yel/pnk	10	Direction
grn/blu	30	Latch
yel/blu	12	Tristate
red	13	10...30 VDC
wht	31	10...30 VDC
blu	1	0 V
blk	20	0 V

## Absolute Encoder With Parallel Interface

MS style 17 pin connectors					
Pin	Function		107865 Cable Accessory* Color Code	14 BIT	13 BIT
	12 Bit 4096 CPR	10 Bit 1024 CPR			
A	Vin		Red	D13 (MSB)	D12 (MSB)
B	N.C.		Violet	D12	D11
C	Latch (binary only)		Green	D11	D10
D	Direction		Orange	D10	D9
E	S1	N.C.	White	D9	D8
F	S3	S1	White/Brown	D8	D7
G	S5	S3	White/Orange	D7	D6
H	S7	S5	White/Green	D6	D5
J	S8	S6	White/Blue	D5	D4
K	S9	S7	White/Violet	D4	D3
L	S11 (MSB)	S9 (MSB)	White/Black/Brown	D3	D2
M	GND		Black	D2	D1
N	S4	S2	White/Red	D1	D0 (LSB)
P	S0 (LSB)	N.C.	Gray	D0 (LSB)	Direction
R	S2	S0 (LSB)	White/Black	GND	GND
S	S6	S4	White/Yellow	Latch	Latch
T	S10	S8	White/Grey	Vin	Vin
10ft Cable # 107865-0010				NA	
Mating Connector: MS 17 pin style MS3106A-20-29S part # MCN-N8					
*This is a mating connector/cable assembly. Color coding information is provides here for reference					

PVC-cable (Singleturn 13-14 Bit)		
Color	13 Bit	14 Bit
gry/pnk	N.C	S0 (LSB)
brn/yel	S0 (LSB)	S1
brn/gry	S1	S2
red/blu	S2	S3
vio	S3	S4
wht/brn	S4	S5
wht/grn	S5	S6
wht/yel	S6	S7
wht/gry	S7	S8
wht/pnk	S8	S9
wht/blu	S9	S10
wht/red	S10	S11
wht/blk	S11	S12
brn/grn	S12 (MSB)	S13 (MSB)
yel	Tristate S0...S12	Tristate S0...S13
pnk	Latch <sup>4)</sup>	Latch <sup>4)</sup>
grn	Direction	Direction
blk	0 V	0 V
red	5/10...30VDC	5/10...30VDC
brn	Alarm	Alarm

4) Binary Only

Bayonet style 19 pin connectors							
Pin	Function 14 Bit 16384 CPR	112077 Cable Accessory* Color Code	Function 13 it 8192 CPR	112076 Cable Accessory* Color Code	Function		110158 Cable Accessory* Color Code
					12 Bit 4096 CPR	10 Bit 1024 CPR	
A	S13 (MSB)	White/Black/Brown	S12	White/Black/Brown	S11 (MSB)	S9 (MSB)	White/Black/Brown
B	S12	White/Grey	S11	White/Grey	S10	S8	White/Grey
C	S11	White/Violet	S10	White/Violet	S9	S7	White/Violet
D	S10	White/Blue	S9	White/Blue	S8	S6	White/Blue
E	S9	White/Green	S8	White/Green	S7	S5	White/Green
F	S8	White/Orange	S7	White/Orange	S6	S4	White/Orange
G	S7	White/Yellow	S6	White/Yellow	S5	S3	White/Yellow
H	S6	White/Red	S5	White/Red	S4	S2	White/Red
J	S5	White/Brown	S4	White/Brown	S3	S1	White/Brown
K	S4	White/Black	S3	White/Black	S2	S0 (LSB)	White/Black
L	S3	Brown	S2	Blue	S1	N.C.	White
M	S2	Blue	S1	White	S0 (LSB)	N.C.	Grey
N	S1	White	S0 (LSB)	Grey	N.C	N.C.	
P	S0 (LSB)	Grey	GND	Black	GND		Black
R	Direction	Orange	Direction	Orange	Direction		Orange
S	Case	Violet	Case	Violet	Case		Violet
T	GND	Black	GND	Yellow	GND		Yellow
U	Latch	Green	Latch	Green	Latch (binary only)		Green
V	Vin	Red	Vin	Red	Vin		Red
10ft Cable # 112077-0010			10ft Cable # 112076-0010		10ft Cable # 110158-0010		
Mating Connector: 19 pin Bayonet style PT06E-14-19S part # 606219-0001							

\*This is a mating connector/cable assembly. Color coding information is provided here for reference

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