HENGSTLER
SERIES AI25 SSI

DYNAPAR™

Absolute Encoder

Key Features

- **Up to 34 Bit (22 Bit ST + 12 Bit MT)**
- **SSI Interface**
- **Additional Sin/Cos Outputs Available**
- **Onboard Diagnostics Option Available**
- **Available with Multiple Shaft Configurations**
- **Enclosure Ratings of IP64 or IP67**

IND Industrial Duty

c UL us LISTED E321846

CE RoHS

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS:

Code: Absolute, Optical

Resolution Single-turn: 10-22 Bit

Resolution Multi-turn: 12 Bit

Linearity: ± ½ LSB (± 1 LSB for resolution > 13 Bit

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

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

ELECTRICAL:

Interface: SSI

Output Code: Binary, Gray, Gray Excess, parameterization through AcuroSoft

Parameterization: Resolution code type, sense of rotation, warning, alarm

Input Power: ±10% 5 VDC or 10-30 VDC

Intrinsic Current Consumption: 5V: 100 mA (ST), 150 mA (MT); 10-30V: 100 mA (ST), 150 mA (MT)

Permissible Load: max 30mA

Output Current: 60 mA per bit, short circuit protected

Frequency Response (Baud Rate): 500 kHz

Maximum Cable Length: 400 m

Control Inputs: Direction

Alarms and Warning Outputs (SSI Extended Only):
Alarm Bit = LED Current
Warning Bit = Temperature
Additional Temperature String Readout

Status LED (IP64 only): Green = OK, Red = Alarm

Preset Switch (IP64 Only): Sets encoder to zero output at present mechanical position

Number of Sin/Cos Pulses: 2048

Noise Immunity: Tested to EN61326-1

Electrical Immunity: Tested to EN61326-1

MECHANICAL:

Shafted Diameters: 6mm, 10mm, 3/8"

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

Shaft Load (axial/radial): 40N (9lb.) / 60N (13lb.)

Shaft Tolerance (hubshaft only): ± 1.5 mm axial, ± 0.2 mm radial

Shaft Load (hub shaft): Spring Tether Tolerance: Axial ±0.5mm; Radial ±0.05mm

Maximum Shaft Speed: 10,000 RPM (continuous), 12,000 RPM (peak)

Starting Torque: < 1.4 in-oz

Housing Material: Aluminum

Shaft Material: Stainless Steel

Disc Material: Glass

Weight:
Single-Turn: approx. 9.2 oz (260 g)
Multi-Turn: approx. 11 oz. (310 g)

Termination:
Cable, axial or radial
M23 connector (Conin), 12 pole, axial or radial
M12 connector, 8 pole, axial or radial

ENVIRONMENTAL:

Operating Temperature: -40 °C ...+100 °C

Storage Temperature: -40 °C ...+100 °C

Shock: 300G, 3,000 m/s² for 6 msec

Vibration: 20G, 200 m/s² (10 to 2,000 Hz)

Humidity: Up to 75%, (no condensation allowed)

Enclosure Rating: IP64 or IP67

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ORDERING INFORMATION

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: Resolution	Code 3: Mounting	Code 4: Shaft Size	Code 5: Interface	Code 6: Input Voltage	Code 7: Termination	Code 8: Cable Length Option
AI25	☐☐☐☐	☐	☐	☐	☐	☐	☐
AI25 Size25 Absolute Encoder	**0010** 10 Bit ST **0012** 12 Bit ST **0013** 13 Bit ST **0014** 14 Bit ST **0017** 17 Bit ST **0019** 19 Bit ST **0022** 22 Bit ST **1212** 12 Bit MT 12 Bit ST **1213** 12 Bit MT 13 Bit ST **1214** 12 Bit MT 14 Bit ST **1217** 12 Bit MT 17 Bit ST **1219** 12 Bit MT 19 Bit ST **1222** 12 Bit MT 22 Bit ST	Available when Code 4 is 0 or A **0** Servo* Available when Code 4 is 1, 2 or B, C **1** Clamping* **2** Square Flange** Available when Code 4 is 3, 4, 5 or 6 **3** Hubshaft w/Tether† * 58mm Diameter ** 2.5" Square † 63mm BC	w/o shaft seal (IP64) **0** 6 mm **1** 3/8" **2** 10 mm **3** 3/8" Hubshaft **4** 12 mm Hubshaft **5** 1/2" Hubshaft **6** 10mm Hubshaft w/shaft seal (IP67) **A** 6 mm **B** 3/8" **C** 10mm Available only when Code 2 is MT (Multi-Turn, 12XX) **K** 1/4" Hubshaft	**2** SSI Gray **3** SSI Binary **E** SSI Binary + Sin/Cos 1Vp-p **F** SSI Gray + Sin/Cos 1Vp-p **Q** SSI Binary + High Active Preset **P** SSI Gray + High Active Preset **R** SSI Binary Extended	**0** 5 VDC **2** 10-30 VDC	Available for all Code 5 options **0** Cable, axial **1** Cable, radial **2** M23 Conin 12 pin axial, CW **3** M23 Conin 12 pin radial, CW **4** M23 Conin 12 pin axial, CCW **5** M23 Conin 12 pin radial, CCW Available only when code 5 is 2, 3, or R **C** M12 , 8-pole connector axial **D** M12 , 8-pole connector radial	Available only when code 7 is 0 or 1 **BLANK** 1.5m **D** 3m **F** 5m **K** 10m **P** 15m **U** 20m **V** 25m

NOTES:

[1] Sin/Cos Models supplied with 12 leads, Non-Sin/Cos supplied with 8 leads. See Electrical Connections for appropriate lead connection references.

[2] CW and CCW references wiring direction of M23 Connector. If CW wiring is selected for encoder, correct interface cable assembly for this would be CW (ref code 7 and accessory cables below).

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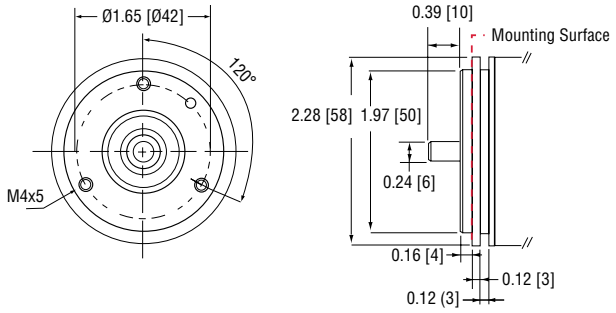
ELECTRICAL CONNECTIONS

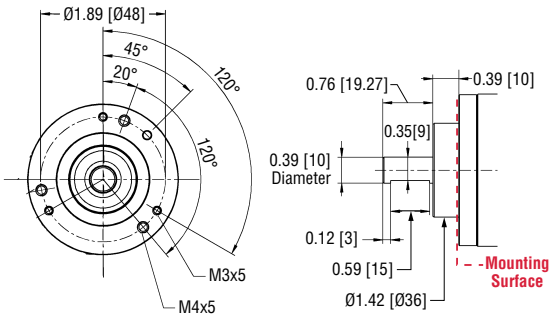
Dimensions: inch [mm]

Code 3: Mounting

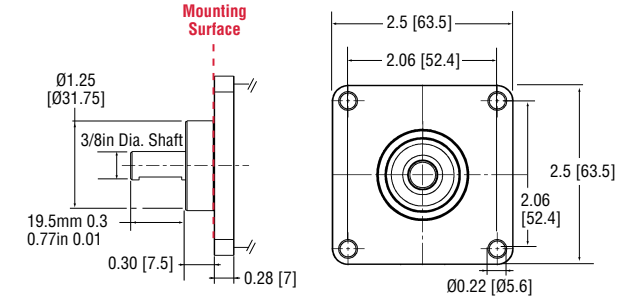
0 Servo



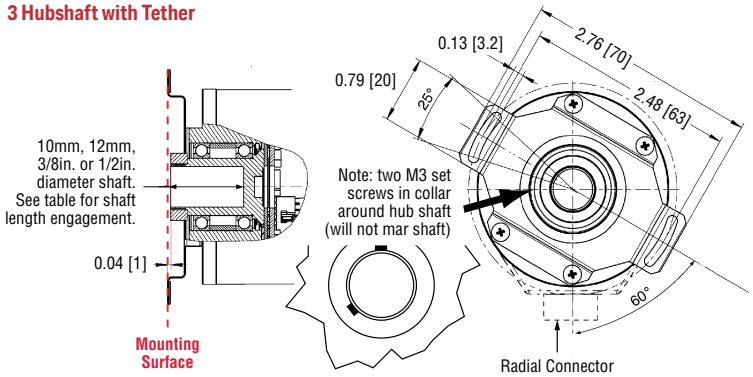
1 Clamping



2 Square Flange



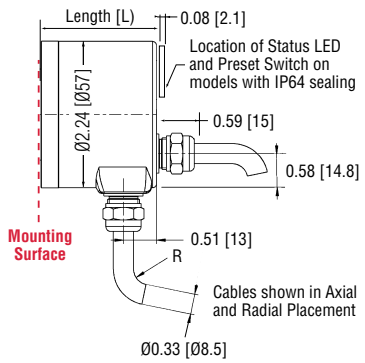
3 Hubshaft with Tether



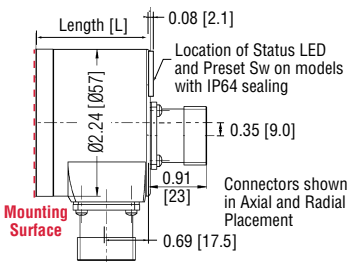
Hubshaft Shaft Engagement		
HubShaft Diameter	Min. Shaft Length	Max. Shaft Length
10mm, 3/8"	15mm (0.59")	20mm (0.79")
12mm, 1/2"	18mm (0.71")	20mm (0.79")

Code 7: Connector

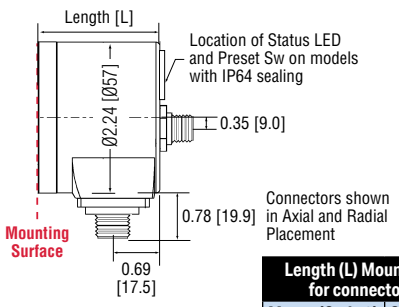
Cables



M23 Conin 12 Pin Connector



M12, 8-pole Connector



Length (L) Mounting Surface to Rear for connector and cable types		
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

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ELECTRICAL CONNECTIONS

M23 Connector (Conin), 12 Pole Interfaces: SSI Binary, SSI Gray and SSI Extended

Cable	M23 Pin	Signal
brown[3]	1	0 V (supply voltage)
pink	2	Data
yellow	3	Clock
	4	N.C.
blue	5	$\overline{\text{Direction}}$[1]
	6	N.C.
brown/green	7	N.C.
white[3]	8	DC 5/10 - 30 V
	9	N.C.
grey	10	$\overline{\text{Data}}$
green	11	$\overline{\text{Clock}}$
black	12	0 V-signal output[2]

[1] $\overline{\text{Direction}}$: UB or unconnected = ascending code values with rotation cw

[2] Connected with 0 V in the encoder. Use this to change counting Direction (see note 1)

[3] Use only thin wires Ø = 0.14 mm)

0 V = descending code values with rotation cw

M23 Connector (Conin), 12 Pole / Cable Interfaces: SSI Binary and SSI Gray with Active High Preset

Cable	M23 Pin	Signal
brown	1	0 V (supply voltage)
pink	2	Data
yellow	3	Clock
white/green	4	N.C.
blue	5	Direction1
red/blue	6	N.C.
brown/green	7	N.C.
white	8	DC 5/10-30V
grey/pink	9	N.C.
grey	10	$\overline{\text{Data}}$
green	11	$\overline{\text{Clock}}$
red	12	Preset[1]
Screen	Screen	Screen

[1] Preset and Direction Active High
High ≥ 70% V-Input; Low ≤ 20% V-Input or Unconnected
Preset Bounce Time ≥ 2s
Direction Bounce Time ≤ 1ms
Preset Value: Zero. Other Preset Values on request

M23 Connector (Conin), 12 Pole / Cable Interfaces: SSI Binary and SSI Gray with Sin/Cos 1V p-p

Cable	M23 Pin	Signal
brown[2]	1	0 V (supply voltage)
pink	2	Data
yellow	3	Clock
white/green	4	A+
blue	5	$\overline{\text{Direction}}$[1]
red/blue	6	B+
brown/green	7	A-
white[2]	8	DC 5/10 - 30 V
grey/pink	9	B-
grey	10	$\overline{\text{Data}}$
green	11	$\overline{\text{Clock}}$
black	12	Sense

[1] $\overline{\text{Direction}}$: +UB or unconnected = ascending code values with rotation cw

[2] use only thin wires (Ø = 0.14 mm)

0 V = descending code values with rotation cw

8 Pole M12 / 8 Pole Standard Cable Interfaces: SSI Binary, SSI Gray and SSI Extended

Cable	M12 Pin	Signal
white	1	DC 5/ 10 - 30 V
brown	2	0 V
	3	N.C.
green	4	Clock
pink	5	$\overline{\text{Data}}$
yellow	6	$\overline{\text{Clock}}$
blue	7	$\overline{\text{Direction}}$[1]
grey	8	Data

[1] Direction: + UB or unconnected = ascending code values with rotation cw

0 V = descending code values with rotation cw

View on connector

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.
T1, T2 SSI Clock number

S9 - S0 Data Bits S9, S8, S7, S6, S5, S4, S3 Etc.
M11- M0 Turn Data Bits M11, M10, M9, M8, Etc.

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Encoder M23 Mating Cable Assemblies

	Part Number	Description	Length
M23 12 Pole CW Female w/ ScrewLock	**G1542003**	M23, 12 Pole, TPE Cable, CW, Female Mating connector to Flying leads, 3m	3m
	G1542004	M23, 12 Pole, TPE Cable, CW, Female Mating connector to Flying leads, 5m	5m
	G1542005	M23, 12 Pole, TPE Cable, CW, Female Mating connector to Flying leads, 10m	10m
	G1542006	M23, 12 Pole, TPE Cable, CW, Female Mating connector to Flying leads, 15m	15m
	G1542007	M23, 12 Pole, TPE Cable, CW, Female Mating connector to Flying leads, 20m	20m
	G1542008	M23, 12 Pole, TPE Cable, CW, Female Mating connector to Flying leads, 25m	25m
	G1542009	M23, 12 Pole, TPE Cable, CW, Female Mating connector to Flying leads, 30m	30m
M23 12 Pole CCW Female w/ ScrewLock	**G1542010**	M23, 12 Pole, TPE Cable, CCW, Female Mating connector to Flying leads, 3m	3m
	G1542011	M23, 12 Pole, TPE Cable, CCW, Female Mating connector to Flying leads, 5m	5m
	G1542012	M23, 12 Pole, TPE Cable, CCW, Female Mating connector to Flying leads, 10m	10m
	G1542013	M23, 12 Pole, TPE Cable, CCW, Female Mating connector to Flying leads, 15m	15m
	G1542014	M23, 12 Pole, TPE Cable, CCW, Female Mating connector to Flying leads, 20m	20m
	G1542015	M23, 12 Pole, TPE Cable, CCW, Female Mating connector to Flying leads, 25m	25m
	G1542016	M23, 12 Pole, TPE Cable, CCW, Female Mating connector to Flying leads, 30m	30m

Encoder M12 Mating Cable Assemblies

	Part Number	Description	Length
M12 8 Pole Cable Assembly	**G1567098**	M12, 8 Pole, PUR Cable, Female Mating connector to Flying leads, 3m	3m
	G1567097	M12, 8 Pole, PUR Cable, Female Mating connector to Flying leads, 5m	5m
	G1535331	M12, 8 Pole, PUR Cable, Female Mating connector to Flying leads, 10m	10m

Encoder M12 and M23 Female Mating Connectors

	Part Number	Description	Length
M12 and M23 Connectors	**G3539597**	M12 Connector, Female, 8 Pin, A-Coded	Connector Only
	G3539229	M23 Connector, CCW, Female, 12 Pin	Connector Only
	G3539202	M23 Connector, CW, Female, 12 Pin	Connector Only

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