

| HS25

2,5" BLIND - HOLLOW SHAFT INCREMENTAL ENCODERS - ORDINARY & HAZARDOUS LOCATIONS

The HS25 combines the rugged, heavy duty features usually associated with shafted encoders into a hollow-shaft style. Its design includes dual bearings and seals for up to IP65 environmental ratings, a rugged metal housing and a sealed cable gland. This low profile design, just 2" deep, is easily mounted on a through shaft. Securing the encoder to the shaft is simple with a collet-style single screw clamp. A tether arm and tether block are available options to maintain housing stability during operation.

GEN²

For **Generation 1**
datasheet [click here](#).



Features

- Accommodates shafts up to 3/4" in diameter.
- Two available tethering styles provides installation flexibility
- Reducer bushings provide both electrical and thermal isolation
- Shaft seal and sealed bearing are standard features to provide IP rating
- Selected configurations available in 1 to 3 days shipment ("Express Encoder" option)
- Certifications in Hazardous Locations: Intrinsically safe or Non-incendive UL/Atex/IECEx

Applications

- Motor feedback – variable frequency drives
- Paper converting and printing equipment – registration, cut-to-length, cartonizing
- Robotics – compact size saves space
- Elevators – traction control

SPECIFICATIONS

Mechanical

Material		Cover: Die cast Aluminum with Iridite finish Body: Aluminum Shaft: AISI 303 Stainless Steel
Bearings		High precision ball bearings, Material: Chrome steel
Maximum Loads	Axial	5 pounds
	Radial	12 pounds
Shaft inertia		17×10^{-4} oz-in-sec ²
Torque		7 in-oz (max) for Through shaft (SS) 4 in-oz (max) for Blind shaft (BS)
Permissible Max. Speed		6 000 RPM
Continuous Max. Speed		4 000 RPM
Encoder Weight (Approx.)		9 oz typical
Theoretical Mechanical Lifetime (F_{axial} / F_{radial})		$7,5 \times 10^9$ revs

Electrical

Certification	CENELEC Classification	Electronic	Output Signals ^{(4) (5)}	Operating Voltage +V	Supply Current (no loads)	Current per Channel	Short Circuit Proof	Overvoltage protection	Reverse Polarity Tolerant	Frequency Capability	Resolutions category ⁽¹⁾	Operating Temperature Range ^{(2) (3)}
Ordinary Location + Non-Incendive	Ex ec IIC T4 Gc Ex ec IIC T3 Gc	28/V	HTL	4,75-30V	<75mA	<40mA	Yes	Up to 33V	Yes	Up to 1MHz	Standard	-40°C.. +100°C
											Low	-40°C.. +100°C
											High	-40°C.. +80°C
		15/V	HTL	9-16V	<75mA	<40mA	Yes	Up to 18V	Yes	Up to 300kHz	Standard	-40°C.. +100°C
											Low	-40°C.. +100°C
											High	-40°C.. +80°C
		28/O	Open Collector	4,75-30V	<75mA	<40mA	Yes	Up to 33V	Yes	Up to 300kHz	Standard	-40°C.. +100°C
											Low	-40°C.. +100°C
											High	-40°C.. +80°C
		28/5	TTL	4,75-30V	<75mA	<40mA	Yes (Except to +V)	Up to 33V	Yes	Up to 1MHz	Standard	-40°C.. +100°C
											Low	-40°C.. +100°C
											High	-40°C.. +80°C
Intrinsically safe	Ex ia IIC	5/V	TTL	4,5-6V	<75mA	<40mA	Yes	Up to 6,8V	Yes	Up to 1MHz	Standard	-40°C.. +80°C
											Low	-40°C.. +80°C
											High	-40°C.. +80°C
		5/O ⁽⁶⁾	Open Collector	4,5-6V	<75mA	<40mA	Yes	Up to 6,8V	Yes	Up to 300kHz	Standard	-40°C.. +80°C
											Low	-40°C.. +80°C
											High	-40°C.. +80°C
	Ex ia IIB	9/V	HTL	8-12V	<75mA	<40mA	Yes	Up to 16V	Yes	Up to 1MHz	Standard	-40°C.. +80°C
											Low	-40°C.. +80°C
											High	-40°C.. +80°C
		9/O ⁽⁶⁾	Open Collector	8-12V	<75mA	<40mA	Yes	Up to 16V	Yes	Up to 300kHz	Standard	-40°C.. +80°C
											Low	-40°C.. +80°C
											High	-40°C.. +80°C

⁽¹⁾ See resolutions section for details.

⁽²⁾ Surface encoder temperature

⁽³⁾ UL Listed: -20°C +80°C. Device must be supplied by a Class 2, LPS or SELV limited energy source 250mA.

⁽⁴⁾ Complementary outputs are recommended for use with line driver type (source/sink) outputs. When used with differential receivers, this combination provides a high degree of noise immunity.

⁽⁵⁾ - Output IC's are available as either Line Driver or NPN Open Collector types. Open Collectors require external pull-up resistors, resulting in higher output source impedance (sink impedance is similar to that of line drivers). In general, use of a Line Driver style output is recommended.

Line Drivers source or sink current and their lower impedance mean better noise immunity and faster switching times.

Warning: do not connect any line driver outputs permanently to 0V,+V or to any other signal. This may overtime damage the driver. Unused outputs should be isolated and left floating.

Our applications specialists would be pleased to discuss your system requirements and the compatibility of your receiving electronics. These IS encoders must be installed per Control Drawing 08292-001.

⁽⁶⁾ - Output IC's NPN Open Collector are also available with internal 2,7K ohm pull-up resistors : 5/OR or 9/OR

Environmental

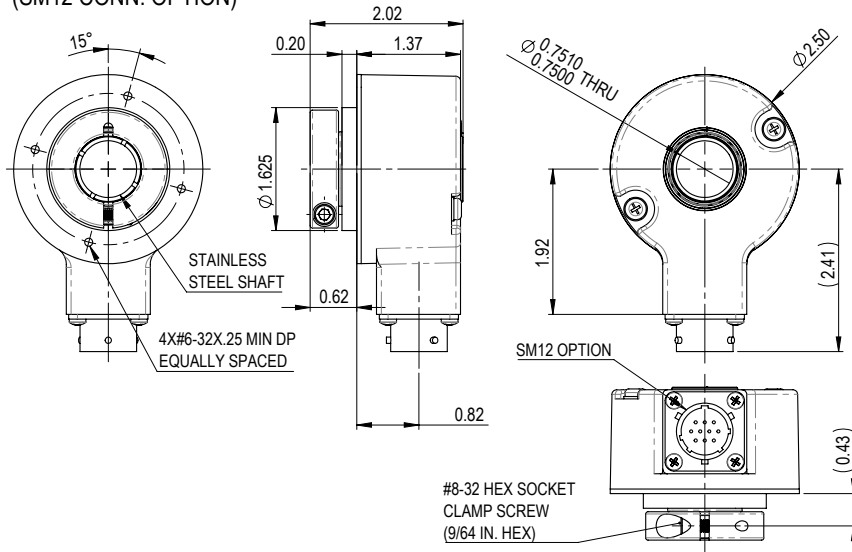
Shocks (EN 60068-2-27)	≤ 1000 m.s-2 (during 5 ms)
Vibrations (EN 60068-2-6)	≤ 300 m.s-2 (50...2 000Hz)
EMC	EN 61000-6-2, EN 61000-6-4
Isolation	1 000V eff
Operating Temperature ⁽¹⁾	See Electrical table above
Storage Temperature	-40°C ... +100°C
Protection (EN 60529)	IP 65
Humidity	93% RH non-condensing at 20 °C

⁽¹⁾ Extended temperature ratings : some models can operate down to -55°C. Extended temperature ranges can affect other performance factors. Consult with factory

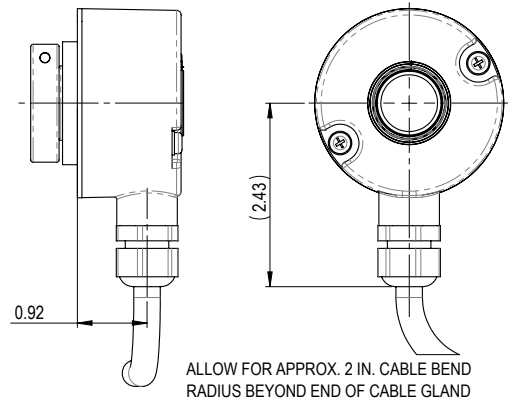
DIMENSIONS

Dimensions in inches

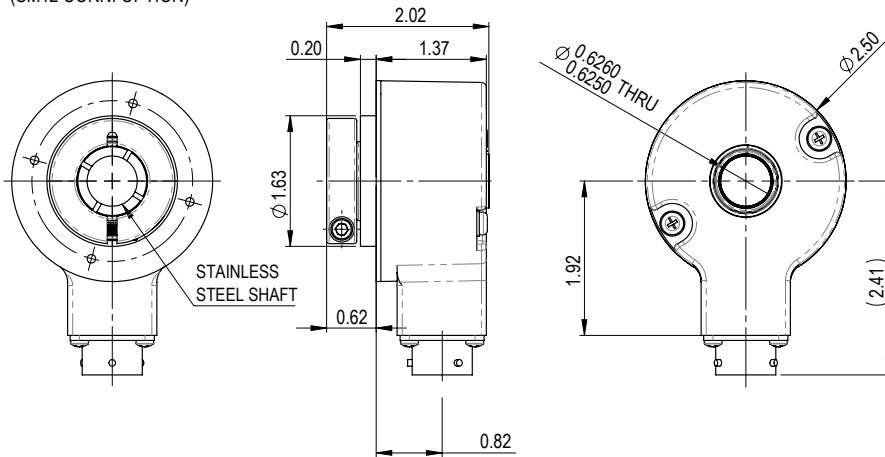
HS25F-75-SS: .75 IN. THRU BORE
(SM12 CONN. OPTION)



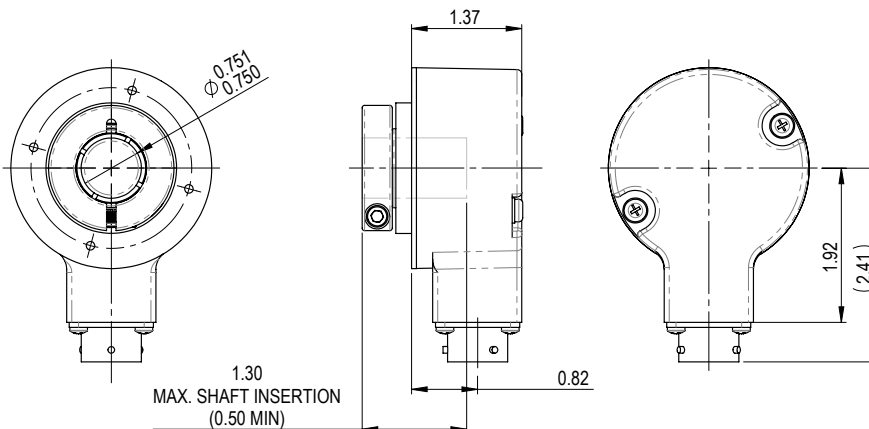
HS25F-75-SS: .75 IN. THRU BORE
(SCS CABLE OPTION)



HS25F-62-SS: .625 IN. THRU BORE
(SM12 CONN. OPTION)

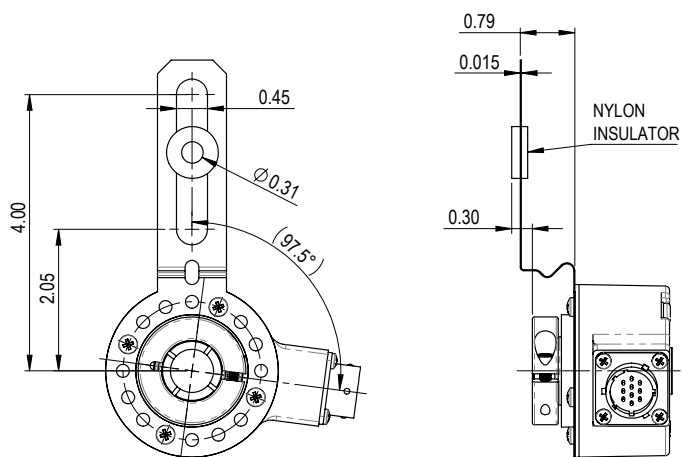


HS25F-75-BS: .75 IN. BLIND BORE



HS25F - R2 TETHER ARM (STAINLESS STEEL)

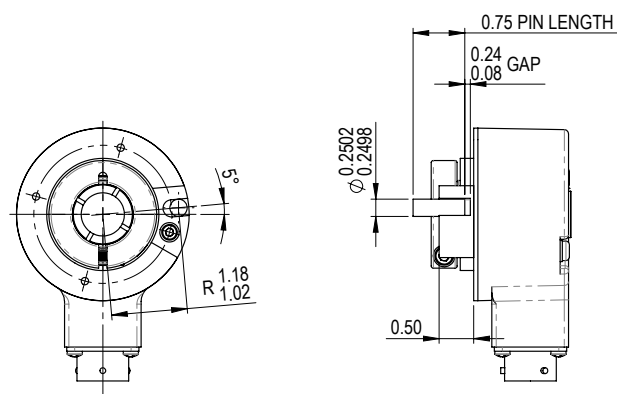
(INCLUDES 5/16"-18 MOUNTING BOLTS NOT SHOWN)



TETHER ARM POSITION SHOWN FOR REFERENCE ONLY, CAN BE MOUNTED AT ANY OTHER ANGLE IN 22.5° INCREMENTS.

HS25F - R1 TETHER BLOCK (NYLON)

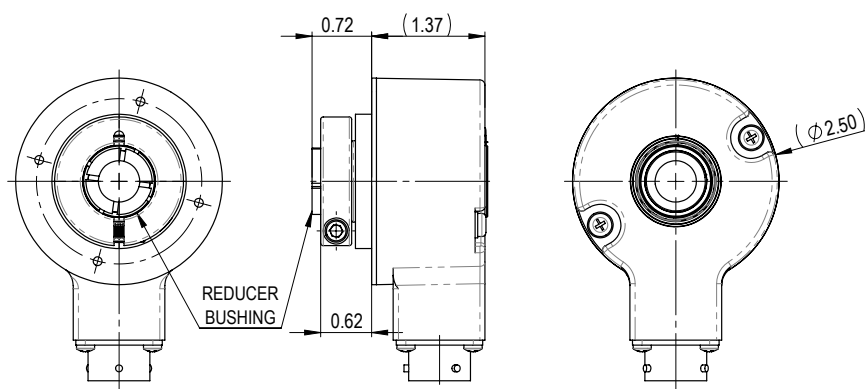
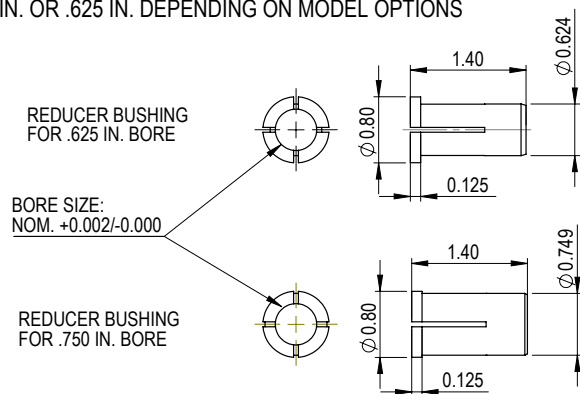
(STEEL TETHER PIN MUST BE INSTALLED IN A BORED HOLE)



TETHER BLOCK POSITION SHOWN FOR REFERENCE ONLY, CAN BE MOUNTED AT ANY OF FOUR POSITIONS.

HS25F REDUCER BUSHING

GLASS FILLED NYLON. FOR BORE SIZES LESS THAN .750 IN. OR .625 IN. DEPENDING ON MODEL OPTIONS



STANDARD CONNECTIONS

		0V	+V	A	B	Z	A/	B/	Z/	Case Ground	Shield Drain
M12	M12 Connector 10 Pins	F	D	A	B	C	H	J	K	G	—
M18 end of cable	M18 Connector 10 Pins	F	D	A	B	C	H	I	J	G	—
CABLE - ABZ	PVC Cable 9 Wires	BK (Black)	RD (Red)	YE (Yellow)	BU (Blue)	OG (Orange)	—	—	—	GR (Green)	WH (White)
CABLE - ABC		BK (Black)	RD (Red)	YE (Yellow)	BU (Blue)	—	WH/YE (White/Yellow)	WH/BU (White/Blue)	—	GR (Green)	WH (White)
CABLE - ABZC		BK (Black)	RD (Red)	YE (Yellow)	BU (Blue)	OG (Orange)	WH/YE (White/Yellow)	WH/BU (White/Blue)	WH/OR (White/Orange)	GR (Green)	WH (White)

RESOLUTIONS

Standard resolutions:

Resolutions available with any shaft version:

1000, 1024, 1800, 2000, 2048, 2500, 3600, 4000, 4096, 5000, 7200, 10000
 Resolutions available with 3/4 in., 17mm, 18mm or 5/8 in. isolated thru options [HS25F-75-()-SS-... or HS25F-()-62-SS-...]:

360, 500, 600, 720, 1200, 1270, 1440, 2400, 2540, 5080

Low resolutions ⁽¹⁾: (not found in the Standard resolutions range)

Any resolution within the 1-2500ppr range (not available with 3/4 in., 17mm, 18mm or 5/8 in. isolated thru options).

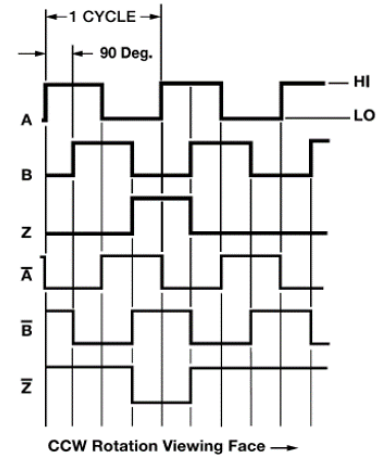
High resolutions: (not found in the Standard resolutions range)

All multipliers of 1000, 1024, 1800, 2500 from 1 to 200.

⁽¹⁾ Signal tolerances available in Instructions Manual

⁽²⁾ Non-standard index widths are available. Consult factory.

Channel Synchronization ⁽²⁾



ORDERING OPTIONS

Example : HS25F-75-R1-SS-1024-ABZC-28/V-SM12

	HS25	F	75	R1	SS	1024	ABZ	C	28/V	SM12		
Type												
X = Express Encoder Blank = Standard Leadtime												
Family												
HS25 = Hollow Shaft; 2.5" diameter												
Housing Configuration												
F = Standard												
Shaft Bore												
75 = 0.750" non-isolated bore 62 = 0.625" isolated bore 62S = 0.625" non-isolated bore (only with "SS" Shaft Seal) 50 = 0.500" isolated bore 37 = 0.375 isolated bore												
Tether												
Blank = None R1 = Tether Block and Pin R2 = Tether Arm												
Shaft Seal Configuration												
SS = Through Shaft Rubber Seals BS = Blind Shaft Rubber Seal												
Cycles Per Turn												
(Enter Cycles) See Resolutions section												
Number of Channels												
A = Single Channel AB = Dual Quad. Channel ABZ = Dual with Index AZ = Single with Index												
Complements												
C = Complementary Outputs Blank = None												
Voltage Output												
Ord. loc + Non-incendive 15/V = 5-15 Vin/out 28/V = 5-28Vin/out 28/5 = 5-28Vin/5Vout 28/0 = 5-28Vin/OCout	Intrinsically safe 5/V = 5 Vin/out 5/0 = 5 Vin/OCout 9/V = 8-12 Vin/out 9/0 = 8-12 Vin/OCout											
Output Termination												
SM12 = MS3112E12-10P SCSXXX = Shielded, Jacketed Cable with Cable gland seal and cable length in inches, (i.e. SCS18 = 18 inches) SCSXX-M18 = M18 connector (MS3101F18-1P equiv.) on end of XX in. cable. SCS18-M18 is standard option												
Hazardous Area Ratings												
Blank = None EX = Intrinsically Safe NI = Non-Incendive Contact factory for voltage options												
Special Features												
S = Special Features specified on Purchase Order. -S at the end of the model number is used to define a variety of non-standard features such as special shaft lengths, voltage options, or special testing. Please consult the factory to discuss your special requirements.												

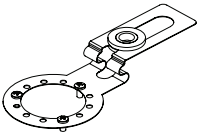
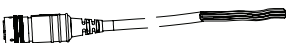
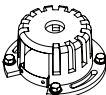
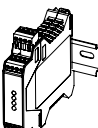
● AGENCY APPROVALS & CERTIFICATIONS

Special Models of the HS25 Incremental Encoder are available with one or more of the following certifications. Consult with factory in order to ensure how to correctly specify the agency approval(s) that you require.

Model H25 Hazardous Area Ratings	Agency		Ratings and Markings (for all standard product configurations)	File Number
Blank		CE	EN 55011: Electromagnetic Disturbance (EMI) EN 61000-6-2: Electromagnetic Compatibility (EMC)	-
EX Intrinsic Safety		UL	Class I, Groups A, B, C, D Class II, Groups E, F, G	E78446
		DEMKO	Ex II 1 G Ex ia IIC T4 Ga (9V/O is II 1 G Ex ia IIB T4 Ga)	DEMKO 06 ATEX 041424X
		IEC/IECEx	Ex ia IIC T4 Ga (9V/O is Ex ia IIB T4 Ga) -40°C ≤ Ta ≤ +85°C	IECEx UL 12.0035X
NI Non-Incendive		UL	Class I, Div. 2, Groups A, B, C, D Class II, Div. 2, Groups F, G	E78446
		DEMKO	Ex II 3 G Ex ec IIC T3 Gc	DEMKO 25 ATEX 3400X
		IEC/IECEx	Ex ec IIC T3 Gc -40°C ≤ Ta ≤ +85°C	IECEx UL 25.0048X



this is the RoHS logo commonly used in Sensata.

Description	Part Number
HS25 R2 tether arm 	31215-002 = HS25 R2 tether arm
HS25 R1 tether block 	31215-001 = HS25 R1 tether block
Connector mates 	MS3106F18-1S = Mates to standard M18 style, 10pin conn. MS3116F12-10S = Mates to standard M12 style, 10pin conn.
Connector cable assemblies 	31186-1810 = M18, 10pin, 10 ft length 31186-1820 = M18, 10pin, 20 ft length 31186-1850 = M18, 10pin, 50 ft length 31186-1210 = M12, 10pin, 10 ft length 31186-1220 = M12, 10pin, 20 ft length 31186-1250 = M12, 10pin, 50 ft length
Bulk encoder cable 	37048-003-100 = 100 ft spool 37048-003-500 = 500 ft spool 37048-003-1000 = 1K ft spool
Electronic Modules 	60001-010 = Opto isolator 60011-001 = Broadcaster 60002-000 = Encoder tester
Protective cover Kit 	26068-001 = 3/8 bolts on 56C 26068-002 = #10 tapping screws on 56C
Intrinsic Safety Barrier 	This galvanically isolated barrier provides both power and signal isolation for an incremental encoder. With differential line driver outputs, it can carry signals up to 500 feet with a bandwidth of up to 250 kHz. For detailed ordering options, refer to accessory specification sheet.
Reducer bushings 	32059-375 = 3/8" bore 32059-250 = 1/4" bore 32059-313 = 5/16" bore 32059-625 = 5/8" bore 32059-500 = 1/2" bore 32059-472 = 12mm bore

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