H20 SERIES

2" SOLID SHAFT INCREMENTAL ENCODERS - ORDINARY & HAZARDOUS LOCATIONS

The Model H20 is a compact encoder designed to economically fill the resolution range up to 10,000 cycles per turn. This compact unit features a precision disc, precision ball bearings and EMI shielding. The encoder meets IP66 sealing requirements when ordered with the shaft seal and one of the available connectors.

GEN 2

For **Generation 1** datasheet click here.

Features

- Compact size to fit in tight installations
- Well-sealed for dusty and wet environments
- Shielded against EMI
- Reverse voltage protection
- Over voltage protection
- Output protection diode
- Any resolution from 1 to 10000 is available
- Certifications in Hazardous Locations: Intrinsically Safe UL/Atex/IECEx

Applications

- Machine control
- Process control and automation
- Agricultural machinery
- Robotics
- Food processing
- Metering operations

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; shielded bearings standard, sealed bearings optional
Maximum Loads	**Axial**	40 pounds
	Radial	35 pounds
Shaft inertia		$4{,}1 \times 10^{-4}$ oz-in-sec^2
Torque		1,0 in-oz (max) without shaft seal 2,5 in-oz (max) with shaft seal
Permissible Max. Speed		10 000 RPM
Continuous Max. Speed		6 000 RPM
Encoder Weight (Approx.)		9 oz typical
Theoretical Mechanical Lifetime (F_{axial} / F_{radial})		2×10^8 revs (1300 hrs at 2 500 RPM) at rated load, 1×10^{10} revs (67 000 hrs at 2 500 RPM) at 10% of rated load

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	
											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	
											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	
											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	
											High	
		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	
											High	
	Ex ia IIB	9/V	HTL	8-12V	<75mA	<40mA	Yes	Up to 16V	Yes	Up to 1MHz	Standard	-40°C.. +80°C
											Low	
											High	
		9/O [6]	Open Collector	8-12V	<75mA	<40mA	Yes	Up to 16V	Yes	Up to 300kHz	Standard	-40°C.. +80°C
											Low	
											High	

[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 IP66 when ordered with shaft seal (on units with an MS connector) or a cable gland (on units with cable termination).
Humidity	93% RH non-condensing at 20 °C

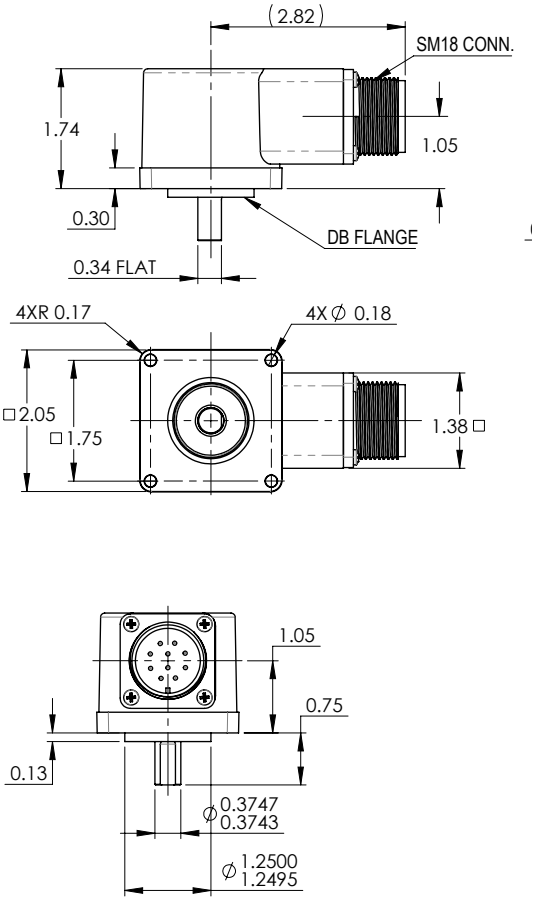
[1] Extended temperature ratings : some models can operate down to -55°C. Extended temperature ranges can affect other performance factors. Consult with factory

DIMENSIONS

Dimensions in inches

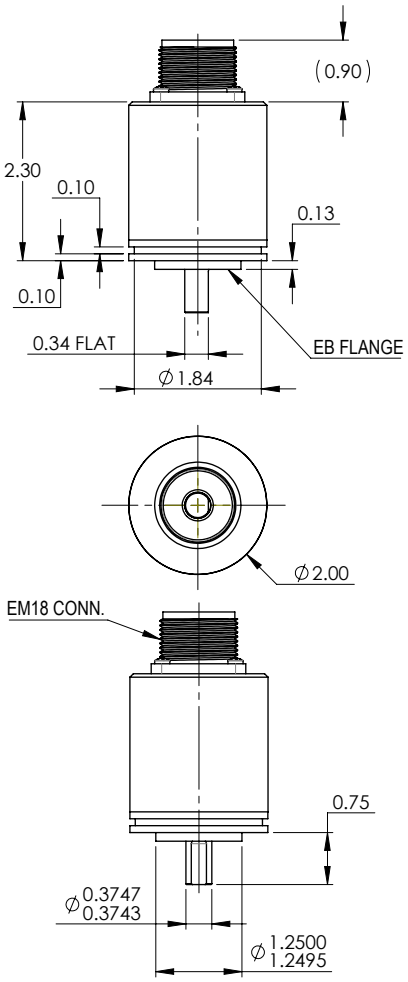
H20DB SQUARE FLANGE

(WITH STANDARD 3/8" SHAFT AND SM18 CONN.)

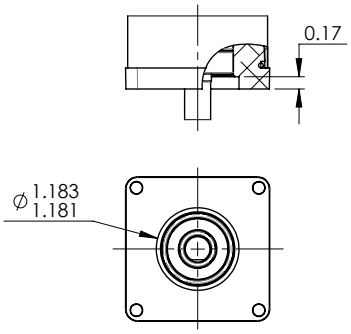


H20EB SERVO FLANGE

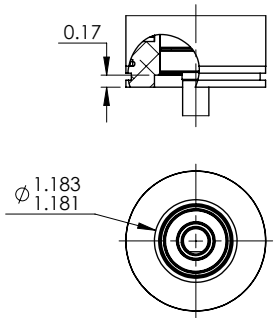
(WITH OPTIONAL F28 FACEMOUNT AND EM18 CONN.)



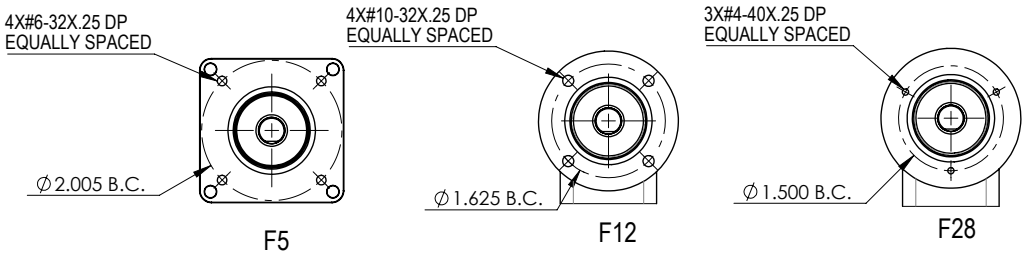
H20DA SQUARE FLANGE



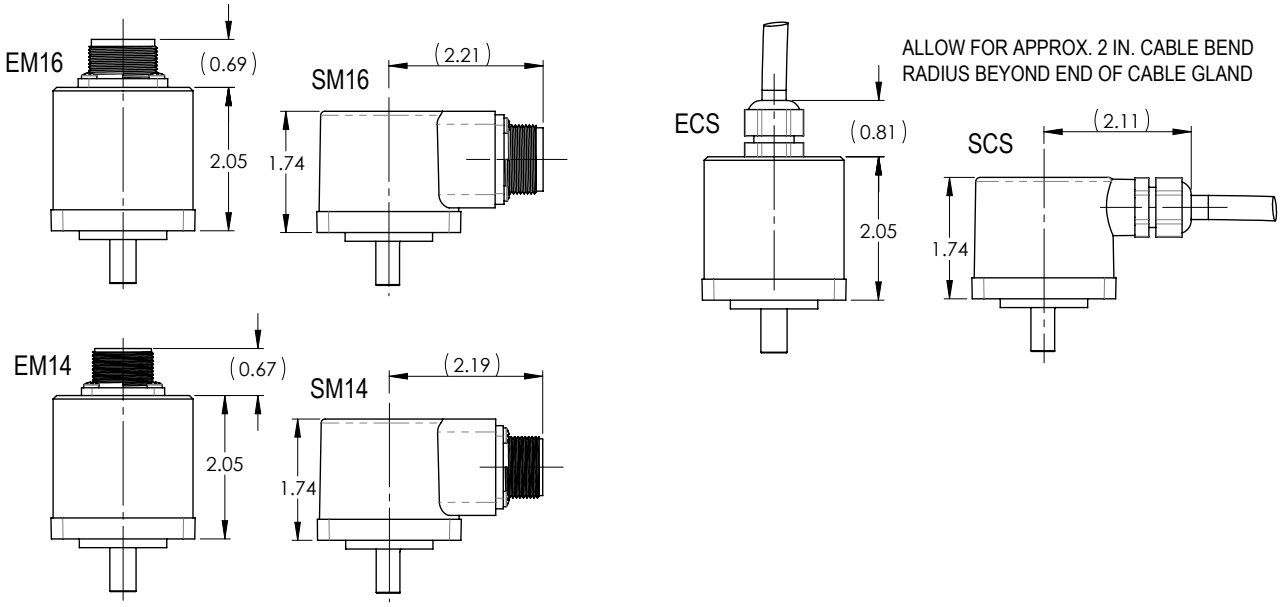
H20EA SERVO FLANGE



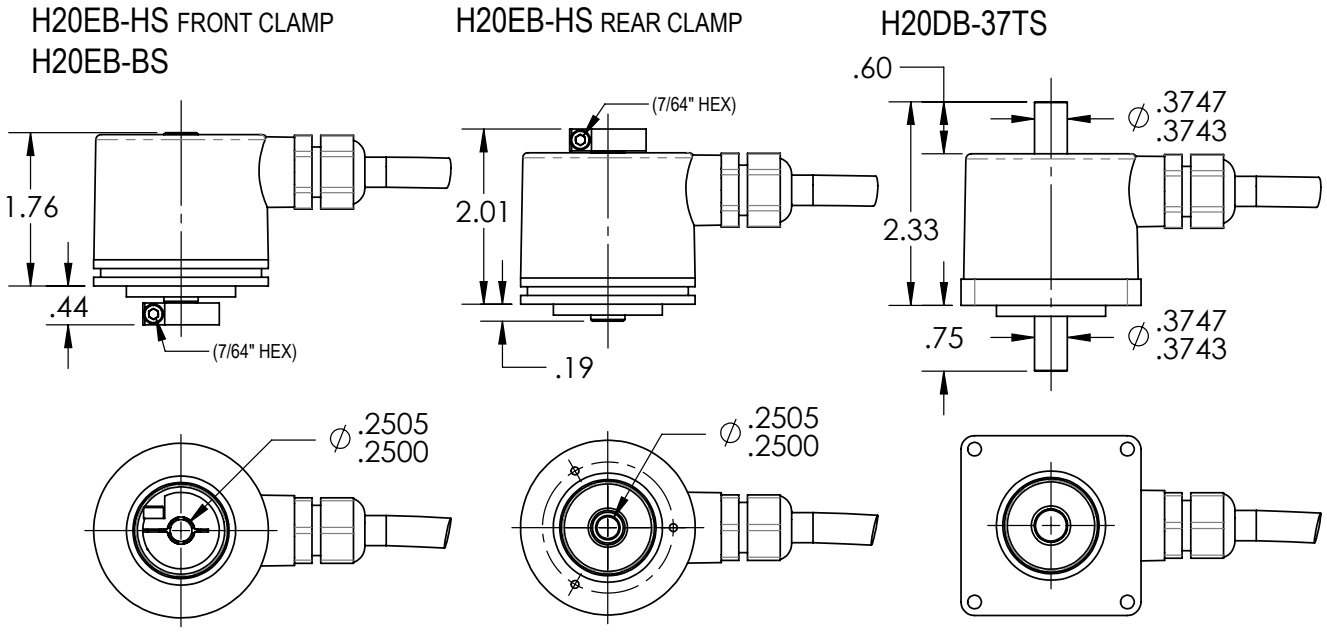
OPTIONAL FACEMOUNTS



CONNECTOR OPTIONS



SHAFT VARIATIONS AVAILABLE:



H20EB-HS BORE IS THRU
H20EB-BS BORE IS .85 DP
FROM END OF SHAFT

H20EB-HS REAR
SHOWN WITH OPTIONAL
F28 FACEMOUNT

STANDARD CONNECTIONS

		0V	+V	A	B	Z	A/	B/	Z/	Case Ground	Shield Drain
M18	M18 Connector 10 Pins	F	D	A	B	C	H	I	J	G	—
M14 - ABZ	M14 Connector 6 pins	A	B	E	D	C	—	—	—	—	—
M14 - ABC		A	B	E	D	—	C	F	—	—	—
M16 - ABZ	M16 Connector 7 Pins	F	D	A	B	C	—	—	—	G	—
M16 - ABC		F	D	A	B	—	C	E	—	G	—
K8	M12x1 Metric Connector 8 Pins	7	2	1	4	6	3	5	8	—	—
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)

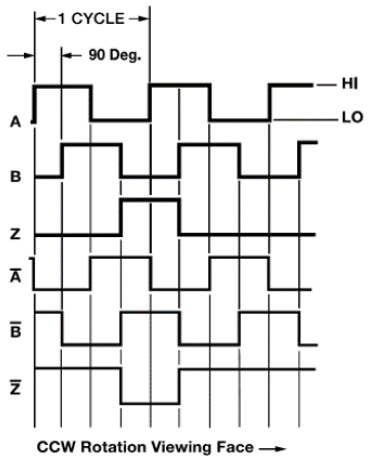
RESOLUTIONS

Standard resolutions:
Any resolution within the 1-2500ppr range.

Higher resolutions[(1)]:
Any resolution within 2500-10000ppr range. Consult factory.

[(1)] Signal tolerances available in Instructions Manual
[(2)] Non-standard index widths are available. Consult factory.

Channel Synchronization[(2)]



Items highlighted with this are standard Express Encoders and ship in few days.

ORDERING OPTIONS

Example : H20DB-37-SS-1024-ABZC-28/V-SM18

H20 D B - 37 - - SS - 1024 - ABZ C - 28/V - S M18

Type
X = Express Encoder
Blank = Standard Leadtime

Family
H20 = Heavy duty, 2.0" dia.

Housing Configuration
D = Square Flange
E = 2.00 Diameter Servo Mount

Pilot Configuration
A = 1.181 (30mm) Female
B = 1.25 x .125 Pilot

Shaft Type and Diameter
25 = Single Ended Solid Shaft, 1/4"
37 = Single Ended Solid Shaft, 3/8"
BS = Blind Hollow Shaft, 1/4" bore
HS = Through Hollow Shaft, 1/4" bore
TS = Through Solid Shaft, 3/8"

Face Mount
F5, F12, F28 See Dimensions
Blank = None

Shaft Seal
SS = Shaft Seal - Available only with Pilot Configuration Option B
Blank = No Shaft Seal

Cycles Per Turn
1 to 10000
See Resolutions section

No. 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	Intrinsically safe
28/V = 5–28Vin/out	**5/V =** 5 Vin/out
28/5 = 5–28Vin/5Vout	**5/O =** 5 Vin/OCout
28/O = 5–28Vin/OCout	**9/V =** 8-12 Vin/out
	9/O = 8-12 Vin/OCout

Output Termination Location
E = End
S = Side

Output Termination
M18 = MS3102R18S-1P
M16 = MS3102R16S-1P
M14 = MS3102R14S-6P
K8 = M12 x 1 (metric connector)
CSXX = Cable with Seal. XX is cable length in 6 inch increments starting at 24"

Hazardous Area Ratings
Blank= None
EX = Intrinsically safe
NI = Non Incendive

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.

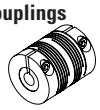
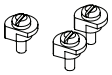
AGENCY APPROVALS & AVAILABLE CERTIFICATIONS

Special Models of the H20 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.

Hazardous Area Ratings	Agency		Ratings and Markings (for all standard product configurations)	File Number
Blank	CE	CE	EN 55011: Electromagnetic Disturbance (EMI) EN 61000-6-2: Electromagnetic Compatibility (EMC)	-
EX Intrinsic Safety	c UL us LISTED	UL	Class I, Groups A, B, C, D Class II, Groups E, F, G	E78446
	Ex	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	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	c UL us	UL	Class I, Div. 2, Groups A, B, C, D Class II, Div. 2, Groups F, G	E78446
	Ex	DEMKO	Ex II 3 G Ex ec IIC T3 Gc	DEMKO 25 ATEX 3400X
	IEC IECEx	IEC/IECEx	Ex ec IIC T3 Gc -40°C ≤ Ta ≤ +85°C	IECEx UL 25.0048X

RoHS

ACCESSORIES

Description	Part Number	Description	Part Number
Flexible shaft couplings 	39074-12-12 = 3/8 to 3/8 39074-12-8 = 3/8 to 1/4 39074-8-8 = 1/4 to 1/4	**Connector cable assemblies** 	31186-1810 = M18, 10pin, 10 ft length 31186-1820 = M18, 10pin, 20 ft length 31186-1850 = M18, 10pin, 50 ft length 31186-1610 = M16, 7pin, 10 ft length 31186-1620 = M16, 7pin, 20 ft length 31186-1650 = M16, 7pin, 50 ft length 31186-1410 = M14, 6pin, 10 ft length 31186-1420 = M14, 6pin, 20 ft length 31186-1450 = M14, 6pin, 50 ft length
Adapter plates 	38228-001 = Aluminum 38228-002 = Delrin		
Servo clamps 	31165-001 = 0.093 grip 31165-002 = 0.125 grip	**Connector mates** 	MS3106F18-1S = Mates to standard M18 style, 10pin conn. MS3106F16S-1S = Mates to standard M16 style, 7pin conn. MS3106F14S-6S = Mates to standard M14 style, 6pin conn.
High load bearing assemblies 	11008-000 = H20 and H25 flange mount 11009-001 = H25 foot mount 11009-002 = H20 foot mount	**Bulk encoder cable** 	37048-003-100 = 100 ft spool 37048-003-500 = 500 ft spool 37048-003-1000 = 1K ft spool
12 in. OD Measuring wheels 	31196-001 = 3/8in. Bore 31196-002 = 1/2in. Bore 31196-003 = 5/8in. Bore	**Electronic Modules** 	60001-010 = Opto isolator 60011-001 = Broadcaster 60002-000 = Encoder tester *There are many options for Electronic modules, consult factory for help selecting the best one for your application
		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 accesory specification sheet.

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