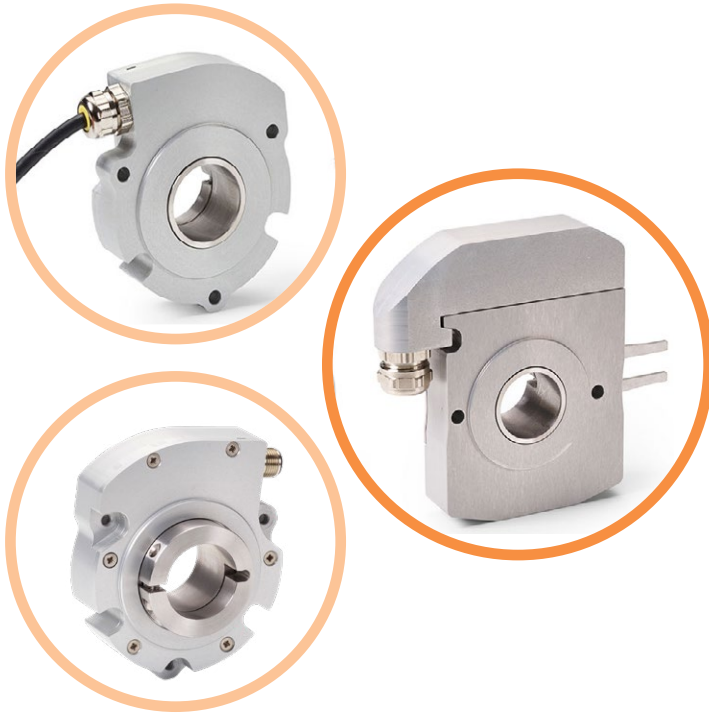




## MODEL LP35 | LP SERIES

### LOW PROFILE INTRINSIC SAFETY INCREMENTAL ENCODER



#### Features

- Certified for use in Class I & II, Div. 1 and Zone 0 and 1 hazardous areas
- Low profile package saves space
- Excellent resistance to shock and vibration
- 30mm standard through shaft, PEEK reduction hub available
- High protection level of IP66
- High performance in temperatures from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Resolutions up to 10,000 PPR, incremental
- Terminal box, M12 or cable output terminations
- Encapsulated electronics
- TTL Output Option



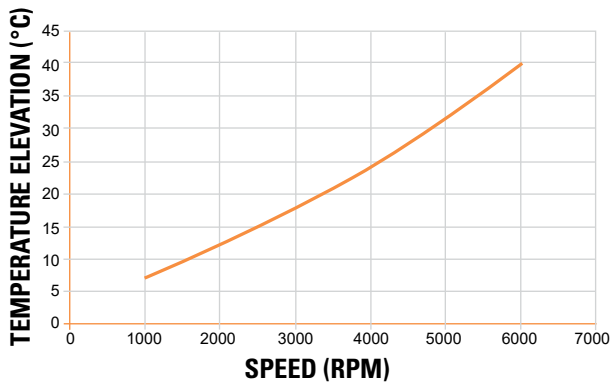
## SPECIFICATIONS

### Mechanical

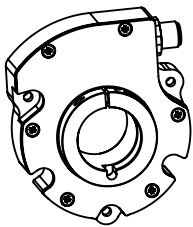
|                                                                                |                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Housing Size</b>                                                            | <b>Standard:</b> $\varnothing$ 90mm X 26mm deep<br><b>Terminal Box:</b> 128mm tall X 116mm wide X 25mm deep. (See dimensional drawings for detail)                                                                                                        |
| <b>Shaft Size</b>                                                              | <b>Hollow Shaft:</b> $\varnothing$ 1/2" to $\varnothing$ 30mm" blind or through<br><b>Solid Shaft:</b> $\varnothing$ 12 mm x 20 mm with keyway, $\varnothing$ 3/8" x 7/8" with flat<br><b>Hollow Shaft w/ Integrated Coupling:</b> 14mm, 20mm, 1/2", 3/4" |
| <b>Permissible Shaft Loads</b>                                                 | <b>Axial:</b> 40 N<br><b>Radial:</b> 80 N                                                                                                                                                                                                                 |
| <b>Shaft Runout</b>                                                            | <b>Hollow Shaft:</b> 0.1 mm [0.004"] TIR<br><b>Solid Shaft:</b> 0.02 mm [0.001"] TIR<br><b>Hollow Shaft w/ Integrated Coupling:</b> N/A <sup>(A)</sup>                                                                                                    |
| <b>Static/ Dynamic Torque</b>                                                  | 30 / 300 mN.m [4.2/ 42 oz-in] @ 25°C                                                                                                                                                                                                                      |
| <b>Bearings</b>                                                                | 6807 - Sealed                                                                                                                                                                                                                                             |
| <b>Material</b>                                                                | <b>Cover:</b> Clear anodized aluminum<br><b>Body:</b> Clear anodized aluminum<br><b>Shaft:</b> AISI 303 stainless steel                                                                                                                                   |
| <b>Bearing Life <math>L_{10h}</math><br/>(Theoretical Mechanical Lifetime)</b> | $> 18 \times 10^9$ turns / 100000 hours                                                                                                                                                                                                                   |
| <b>Continuous Max. Speed</b>                                                   | 6000 RPM, (Reference Chart 1. Speed vs Temperature)                                                                                                                                                                                                       |
| <b>Shaft Moment of Inertia</b>                                                 | $< 84000 \text{ g}\cdot\text{mm}^2$ [ $11.9 \times 10^{-3} \text{ oz}\cdot\text{in}\cdot\text{sec}^2$ ]                                                                                                                                                   |
| <b>Weight (approx.)</b>                                                        | <b>Terminal Box:</b> 790g<br><b>M12 or cable:</b> 450g                                                                                                                                                                                                    |

## Chart 1. Speed vs Temperature

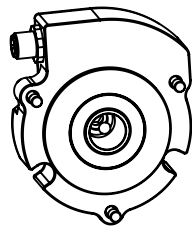
(Temperature on this chart to be added to ambient temperature. Do not exceed maximum temperature on datasheet.)



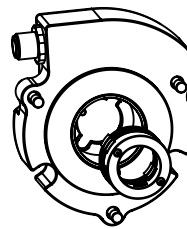
## Cable or M12 Connection Shaft Options



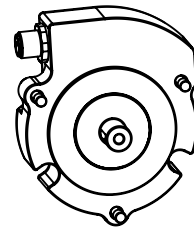
Through Hollow Shaft



Blind Hollow Shaft



Shaft with Integrated coupling



Solid Shaft

## Electrical <sup>(B)</sup>

|                                                      |                                                                                                                  |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Output Format</b>                                 | Two channels in quadrature + index and complements                                                               |
| <b>Resolution</b>                                    | Up to 10,000 CPT                                                                                                 |
| <b>Encoder Accuracy</b>                              | ±0.1°                                                                                                            |
| <b>Supply Voltage Vcl</b>                            | 5 Vdc                                                                                                            |
| <b>Supply Current (No Loads)</b>                     | 75 mA                                                                                                            |
| <b>Current Per Channel Pair</b>                      | 40mA                                                                                                             |
| <b>Voltage / Output</b>                              | <b>5/V:</b> Line Driver 5 V in/out; push pull                                                                    |
| <b>Short Circuit Proof</b>                           | No                                                                                                               |
| <b>Reverse Polarity Tolerant</b>                     | No                                                                                                               |
| <b>Wiring Fault Tolerant &amp; Overvoltage Prot.</b> | No                                                                                                               |
| <b>Frequency Response</b>                            | Up to 1MHz                                                                                                       |
| <b>Output Terminations</b>                           | Cable, M12 or Terminal Box                                                                                       |
| <b>EMC</b>                                           | EN 61000-6-2 : 2005, see user manual for details<br>EN 61000-6-4 : 2017 + A1 : 2011, see user manual for details |
| <b>Isolation</b>                                     | 1000V                                                                                                            |

## Environmental

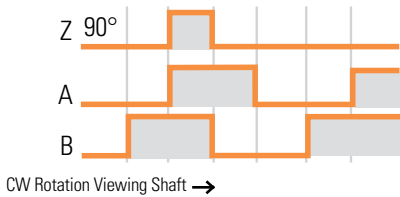
|                                   |                             |                                                                        |
|-----------------------------------|-----------------------------|------------------------------------------------------------------------|
| <b>Protection Class (sealing)</b> | IP66                        |                                                                        |
| <b>Temperature Range</b>          | -40°C to +85°C              |                                                                        |
| <b>Mechanical Resistance</b>      | <b>Shock</b>                | (EN60068-2-27): $\leq 3000\text{m.s}^{-2}$ (5 ms, half sine) (300 G's) |
|                                   | <b>Vibration</b>            | (EN60068-2-6): $\leq 200\text{m.s}^{-2}$ (55 ... 2 000 Hz) (20 G's)    |
| <b>Humidity</b>                   | 98% RH without condensation |                                                                        |

## OUTPUT WAVEFORMS

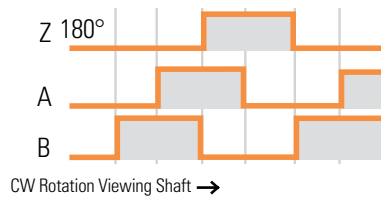
Waveform AA/ BB/ 00/ Channel B before A Clockwise (US convention is A leads B CCW)

### Incremental Waveform

#### INDEX GATED WITH A & B HIGH (CODE Q28)



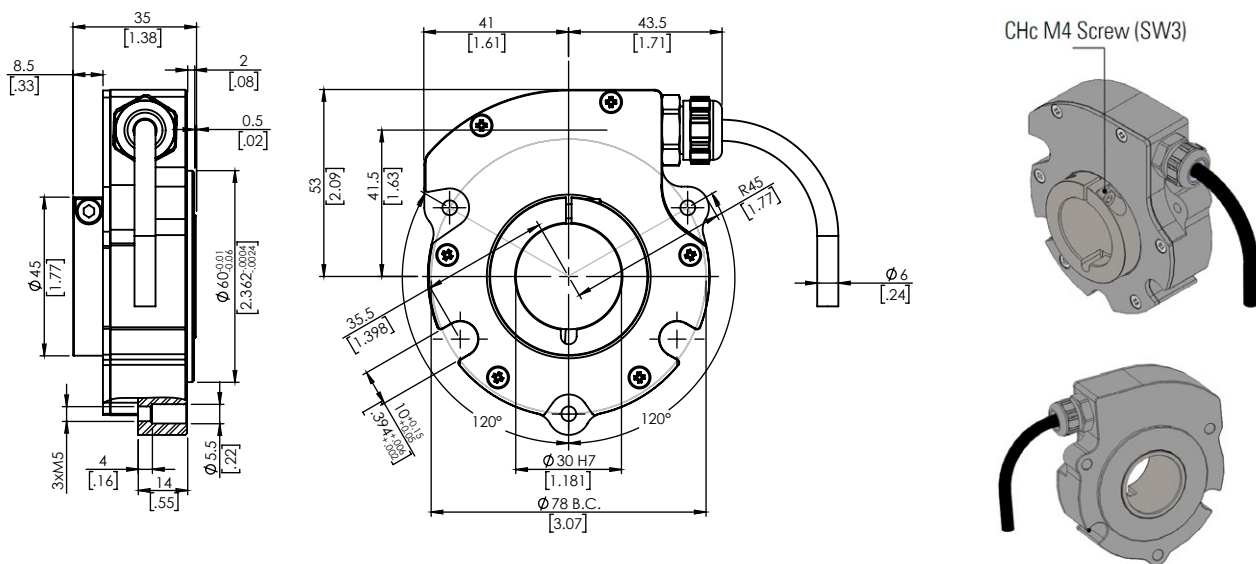
#### INDEX GATED WITH B LOW (CODE Q29)



## DIMENSIONS (C)

All dimensions are in millimeters [inches]

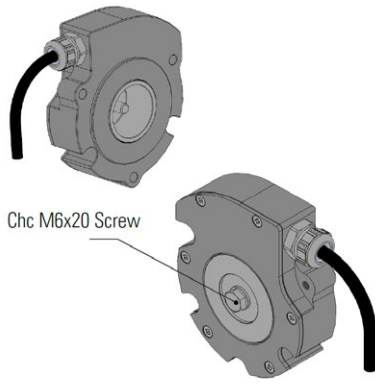
### Through hollow shaft



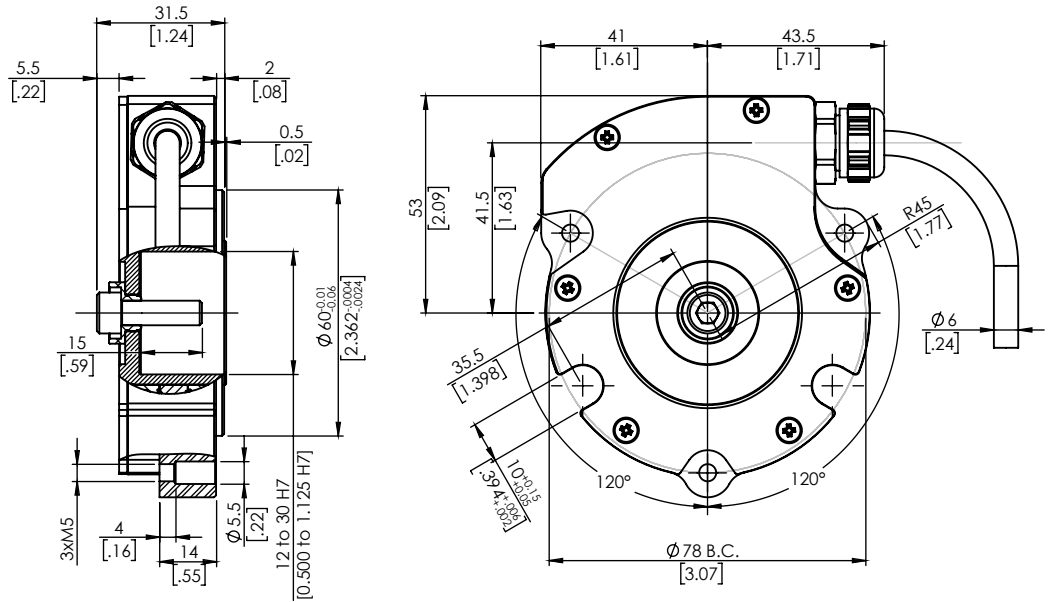
**NOTE:**

CHc : Hexagonal Socket head cap screws HC : Hexagonal socket set screws

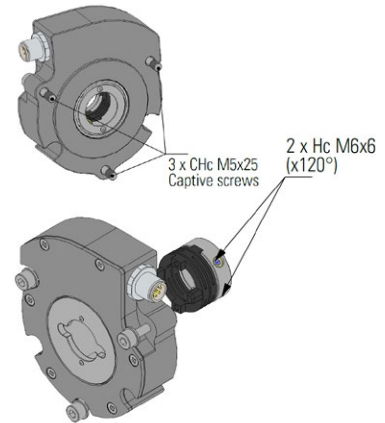
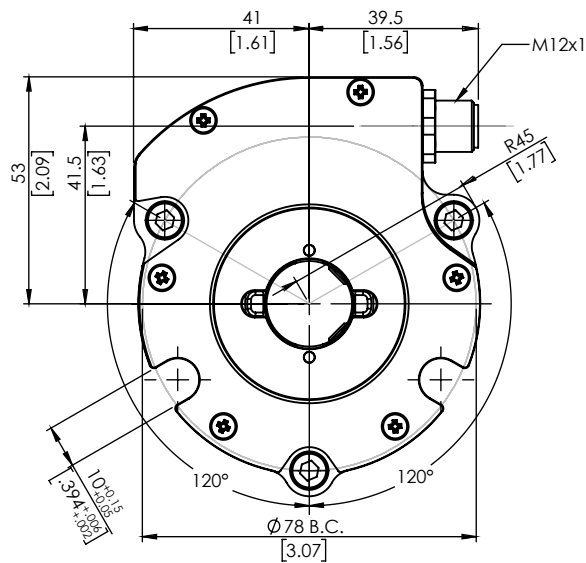
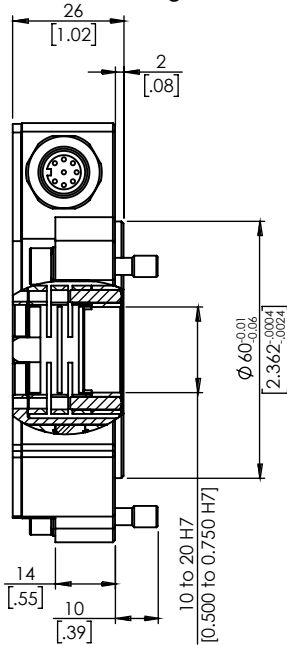
## Blind hollow shaft



Chc M6x20 Screw

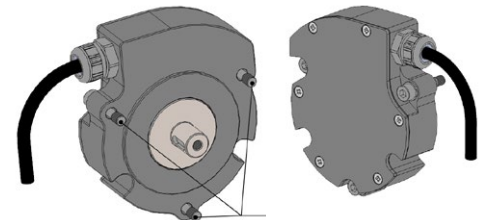
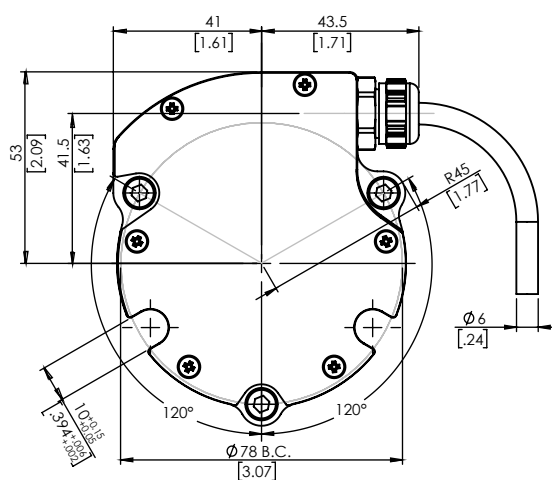
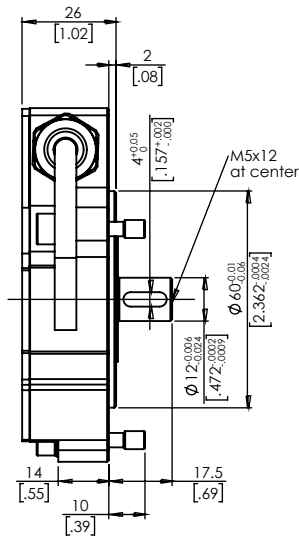


## Shaft with integrated coupling

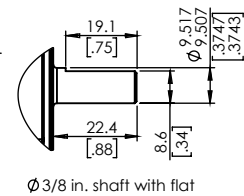


3 x Chc M5x25 Captive screws  
2 x Hc M6x6 (x120°)

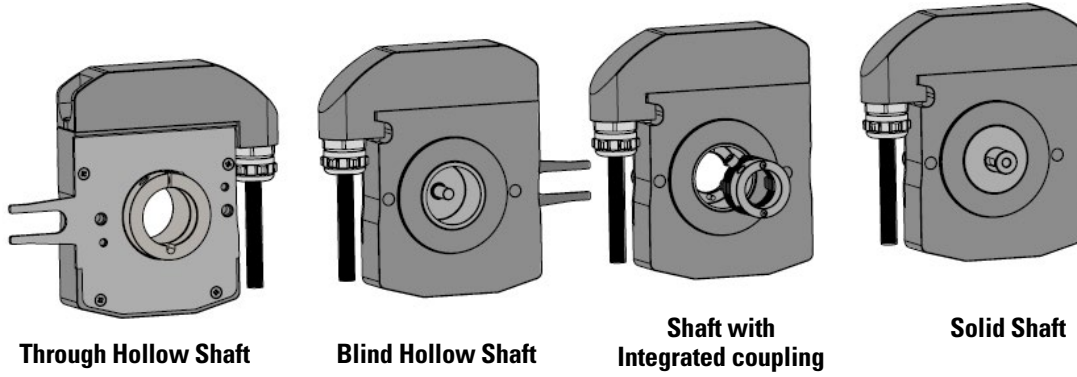
## Solid shaft



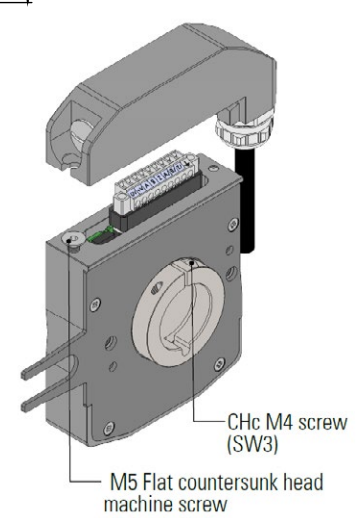
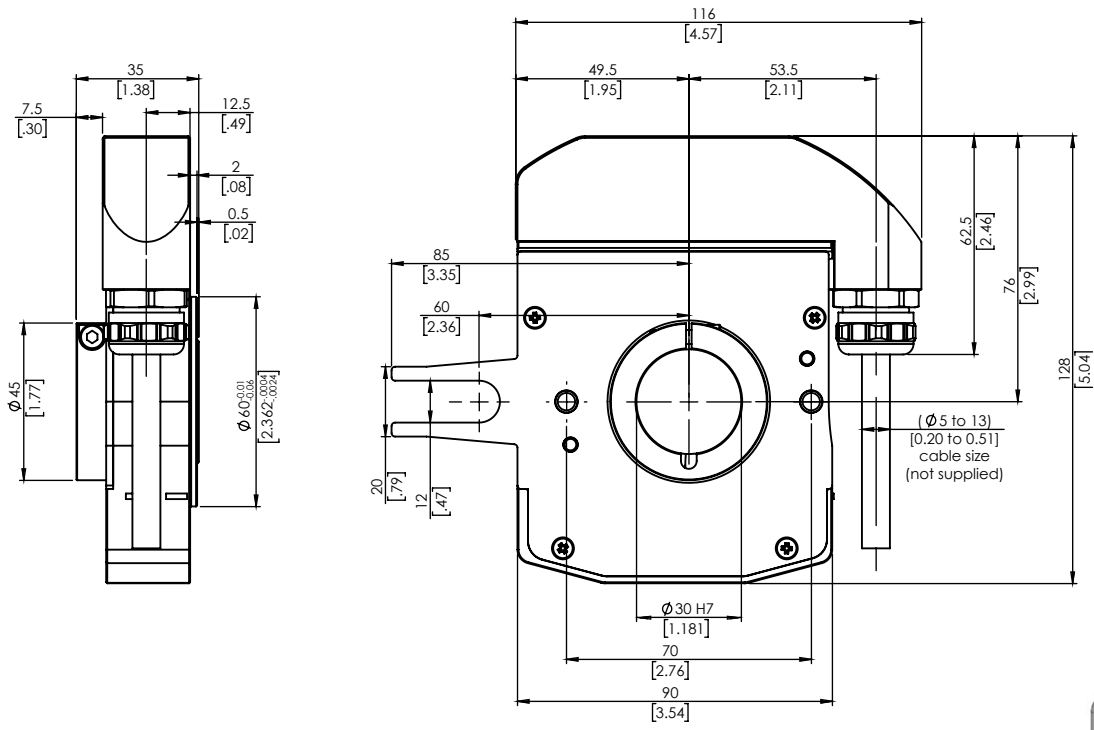
3x Chc M5x25 Captive screws



$\phi 3/8$  in. shaft with flat



Through hollow shaft



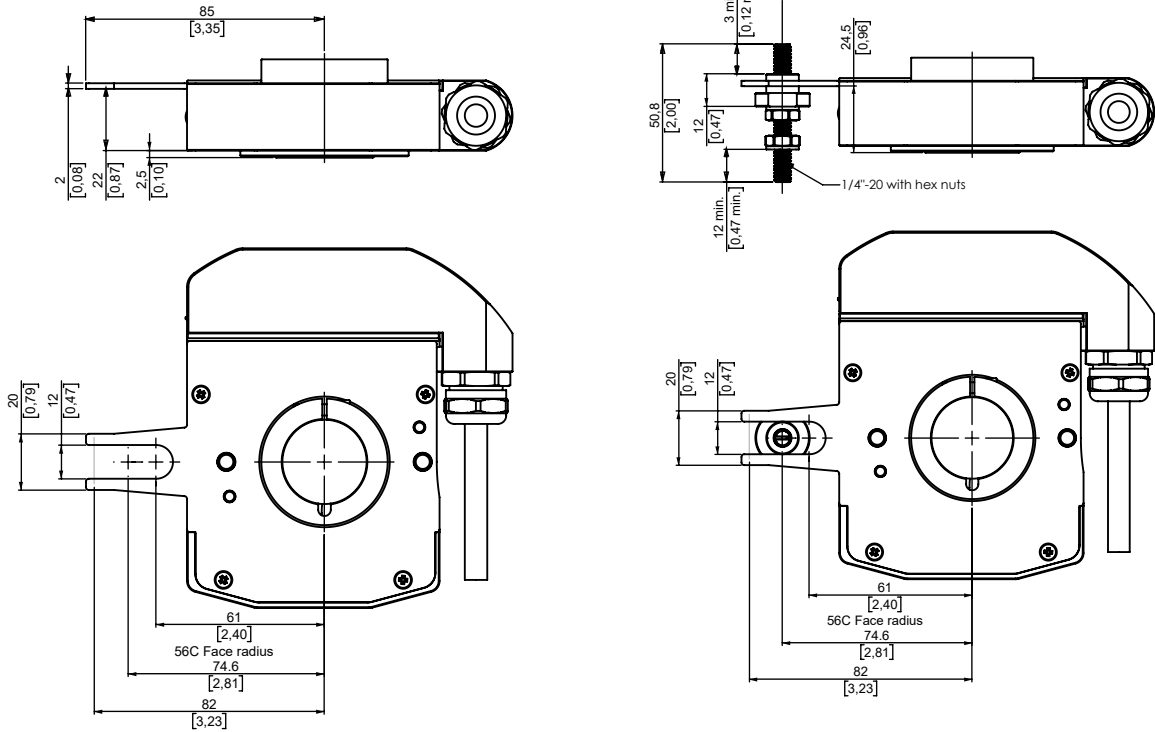
**NOTE:**  
CHc : Hexagonal Socket head cap screws    HC : Hexagonal socket set screws







## TETHER OPTIONS FOR TERMINAL BOX OUTPUT



T4- Standard Fork is provided for all blind or through hollow shaft versions

T5- M9445/059-02 Standard Fork + 56C Face Pin



## TERMINATIONS

### Connection Incremental

| Termination    | Connection Ordering Code | Description           | -   | +   | A   | B   | Z   | A/          | B/          | Z/          | Case Ground    |
|----------------|--------------------------|-----------------------|-----|-----|-----|-----|-----|-------------|-------------|-------------|----------------|
| M12            | M12                      | EUR M12 - 8 pins      | 1   | 2   | 3   | 4   | 5   | 6           | 7           | 8           | Connector Body |
| Standard Cable | SG                       | PVC Jacket            | BLK | RED | YEL | BLU | ORN | WHT/<br>YEL | WHT/<br>BLU | WHT/<br>ORN | GRN            |
| Terminal Box   | T                        | Terminal box - 9 pins | 1   | 2   | 3   | 4   | 5   | 6           | 7           | 8           | 9              |

Other cable types available- Consult factory



## STANDARD RESOLUTIONS

### Incremental

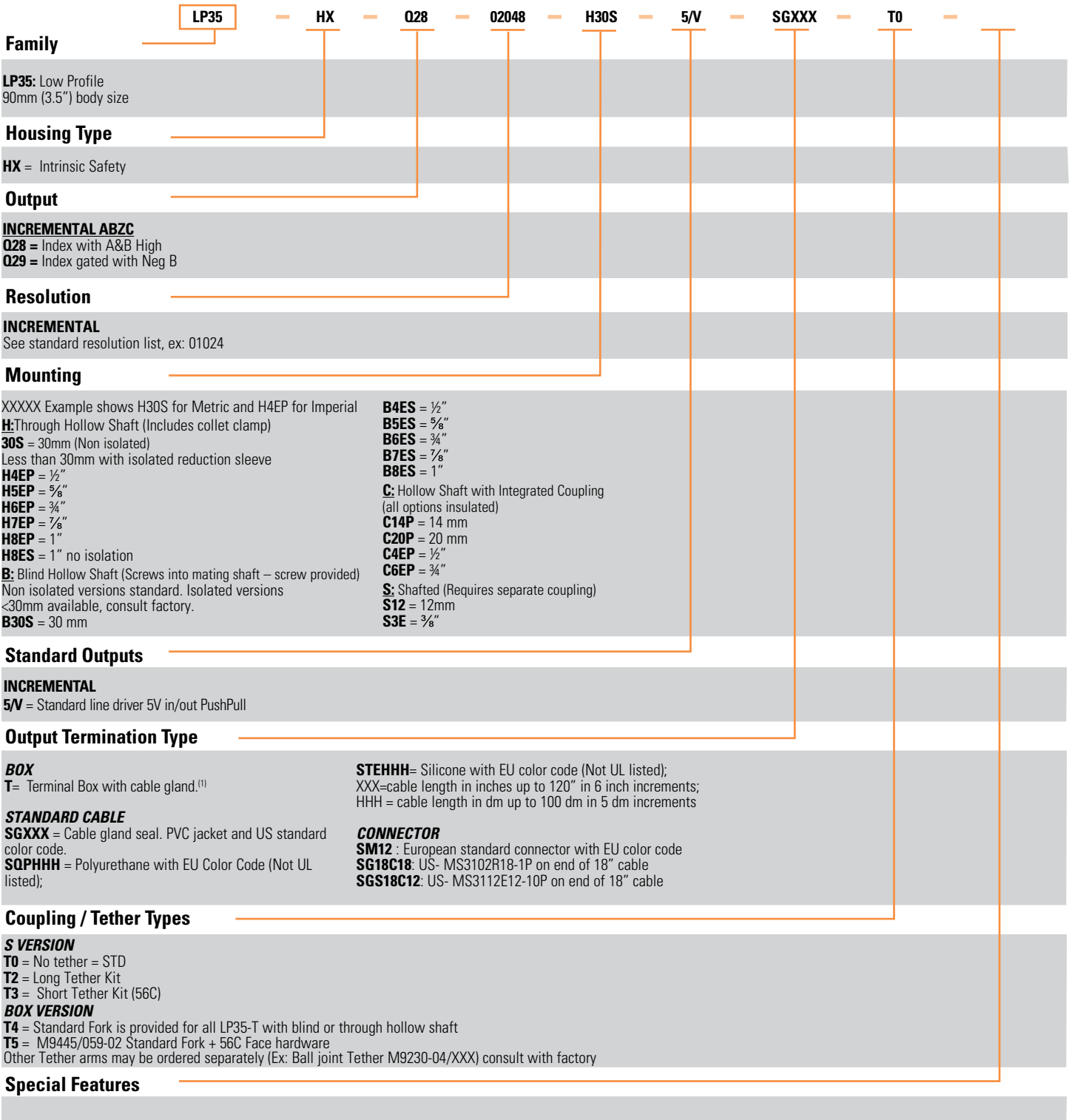
|      |      |      |      |      |      |      |      |       |
|------|------|------|------|------|------|------|------|-------|
| 32   | 64   | 100  | 128  | 250  | 256  | 360  | 500  | 512   |
| 600  | 720  | 1000 | 1024 | 1200 | 1250 | 1440 | 1500 | 2000  |
| 2048 | 2500 | 2880 | 3600 | 4096 | 5000 | 7200 | 8192 | 10000 |

For non-standard and resolutions above 10000 PPR, please contact factory



# ORDERING OPTIONS - NORTH AMERICAN LP35 MODELS

Use this diagram, working from left to right to construct your model number  
(Example : LP35-HX-Q28-02048-H30S-5/V-SGXXX-T0)



**NOTE:** <sup>(1)</sup>"T" Code changes the form from approximately 90mm (3.5") round to a rectangle that is approximately 128mm (5") high by 116mm wide (4.5")

# AGENCY APPROVALS & CERTIFICATIONS



Class I, Div. 1, Gps A,B,C & D  
Class II, Div. 1, Gps F & G



Ex ia IIC T4 Ga



2004 / 108 / CE



Cenelec  
II 1 G Ex ia IIC T4 Ga

**DEMKO 17 ATEX 1854X**  
**IECEX UL 17.0028X**

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# GENERAL NOTES



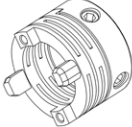
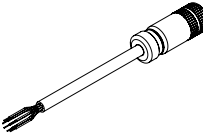
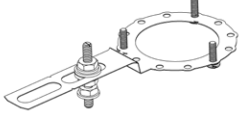
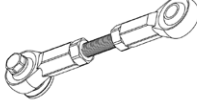
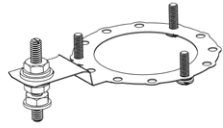
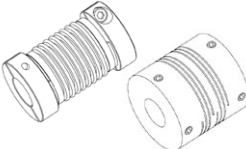
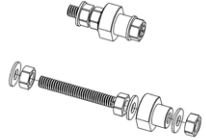
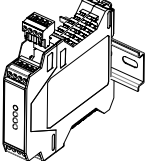
<sup>(A)</sup> For more information refer to the User Manual

<sup>(B)</sup> CAUTION: This product must be installed with an appropriate, agency approved Associated Apparatus (i.e. Intrinsic Safety Barrier) between the safe zone and this product. See other important Application Notes in the Control Drawing at the end of this specification

<sup>(C)</sup> For detailed installation instructions and recommend screw torques refer to the User Manual

# ACCESSORIES

The following accessories are included with your LP series encoder as defined by your part number selection.

| <p>Bore Reduction Sleeve</p>                                             | <p>9418/HXX series: range is from 1/2" through 1" in 1/8 inch increments</p>                                                                                   | <p>Key for 12mm slot</p>            | <p>9435/006 = 4X4X12 mm key</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|-------------|------|--------------------------|-------------|----|--------------------------|-------------|----|--------------------------|-------------|----|--------------------------|-------------|-----|--------------------------|-------------|
| <p>Integrated Coupling Kit<br/>(includes flex, hub and set screws)</p>  | <p>M9410/009-14 = 14 mm<br/>M9410/009-20 = 20 mm<br/>M9410/009-E3 = 1/4 in.<br/>M9410/009-E4 = 1/2 in.<br/>M9410/009-E5 = 5/8 in.<br/>M9410/009-E6 = 1 in.</p> | <p>Cable Assemblies</p>          | <table border="1"> <thead> <tr> <th>Length</th> <th>Model Number</th> <th>Part Number</th> </tr> </thead> <tbody> <tr> <td>0.5m</td> <td>9416/111-8230/200-GM-005</td> <td>RAL-005-002</td> </tr> <tr> <td>1m</td> <td>9416/111-8230/200-GM-010</td> <td>RAL-010-012</td> </tr> <tr> <td>2m</td> <td>9416/111-8230/200-GM-020</td> <td>RAL-020-035</td> </tr> <tr> <td>5m</td> <td>9416/111-8230/200-GM-050</td> <td>RAL-050-045</td> </tr> <tr> <td>10m</td> <td>9416/111-8230/200-GM-100</td> <td>RAL-100-047</td> </tr> </tbody> </table> | Length | Model Number | Part Number | 0.5m | 9416/111-8230/200-GM-005 | RAL-005-002 | 1m | 9416/111-8230/200-GM-010 | RAL-010-012 | 2m | 9416/111-8230/200-GM-020 | RAL-020-035 | 5m | 9416/111-8230/200-GM-050 | RAL-050-045 | 10m | 9416/111-8230/200-GM-100 | RAL-100-047 |
| Length                                                                                                                                                     | Model Number                                                                                                                                                   | Part Number                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |
| 0.5m                                                                                                                                                       | 9416/111-8230/200-GM-005                                                                                                                                       | RAL-005-002                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |
| 1m                                                                                                                                                         | 9416/111-8230/200-GM-010                                                                                                                                       | RAL-010-012                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |
| 2m                                                                                                                                                         | 9416/111-8230/200-GM-020                                                                                                                                       | RAL-020-035                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |
| 5m                                                                                                                                                         | 9416/111-8230/200-GM-050                                                                                                                                       | RAL-050-045                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |
| 10m                                                                                                                                                        | 9416/111-8230/200-GM-100                                                                                                                                       | RAL-100-047                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |
| <p>Long Tether Arm Kit</p>                                              | <p>M9445/053 = long tether, M8x1 rod<br/>M9445/053-01 = long tether, 3/8"-16 rod<br/>M9445/053-02 = long tether, 1/4"-20 rod</p>                               | <p>Ball End Tether</p>           | <p>M9230-04/XXX</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |
| <p>Short Tether Arm Kit</p>                                             | <p>M9455/058 = short tether, M8x1 rod<br/>M9455/058-01 = short tether, 3/8"-16 rod<br/>M9445/058-02 = short tether, 1/4"-20 rod</p>                            | <p>Flexible Couplings</p>        | <p>Bellows Type<br/>9404/S/12-12 = for use with a 12mm shaft</p> <p>Triple Beam<br/>Type 39074-12-12 = for use with a 3/8" shaft</p>                                                                                                                                                                                                                                                                                                                                                                                                         |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |
| <p>Tether Pin Kit</p>                                                   | <p>M9445/059 = M10x1.5 rod and hardware<br/>M9445/059-01 = 3/8"-16 rod and hardware<br/>M9445/059-02 = 1/4"-20 rod and hardware</p>                            | <p>Intrinsic Safety Barrier</p>  | <p>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.</p>                                                                                                                                                                                                                                          |        |              |             |      |                          |             |    |                          |             |    |                          |             |    |                          |             |     |                          |             |

Accompanying the spec is a control drawing. This is specific for the Intrinsic Safety products from the LP35 family and consist of Installation Requirements, Special Conditions of Operation and a Certificate of Conformity. In these documents, the LP series models are referred to as HH\_9 and HH\_B. Despite the difference in nomenclature, these are the same product specified under the LP35 nomenclature. Both the LP35 and the HH\_9 or HH\_B model numbers will appear on the label of the finished product.

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## CONTACT US

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### Warning - Special conditions for safe use

- The enclosures of Model HH\_9 and HH\_B encoders may contain aluminum. For such models, care must be taken to avoid ignition hazards due to impact or friction.
- To prevent excessive heating caused by friction of shaft seals and bearings of the product beyond the Temperature Code ratings, each model shall be operated within the following constraints: Estimated Bearing Life = 18 Billion Revs (Cont. Max. Speed @ 1/2 Max. Load)

### Important Intrinsic Safety Application notes:

1. Control equipment must not use or generate more than 250 V rms or DC with respect to earth.
2. Associated apparatus (e.g., intrinsic safety barrier) must be installed in accordance with its manufacturer's Control Drawing and Article 504 of the National Electrical Code (ANSI/NFPA 70) for installation in the United States, Section 18 of the Canadian Electrical Code for installations in Canada, or other local installation codes, as applicable.
3. All intrinsic safety wiring shall be kept separate from non-intrinsically safe wiring.
4. Selected associated apparatus must be third party listed as providing intrinsically safe circuits for the application, and have  $V_{oc}$  or  $V_t$  not exceeding  $V_{max}$  (or  $U_o$  not exceeding  $U_i$ ),  $I_{sc}$  or  $I_t$  not exceeding  $I_{max}$  (or  $I_o$  not exceeding  $I_i$ ), and the  $P_o$  of the associated apparatus must be less than or equal to the  $P_{max}$  or  $P_i$  of the intrinsic safety equipment, as shown in **Table 2**.
5. Associated apparatus may be in a Division 2 or Zone 2 location if so approved.
6. Associated apparatus must not be used in combination unless permitted by the associated apparatus certification.
7. In cases where cable is not already supplied with equipment, and cable capacitance and inductance per foot are not known, hazardous area cable capacitance (C cable) and inductance (L cable) are calculated by multiplying the cable length by the number of conductors by 60pF/foot (200pF/Meter) and 0.2uH/foot (1.0 uH/meter) respectively. Cable capacitance (C cable) and inductance (L cable) values plus  $C_i$  and  $L_i$  (respectively) must not exceed values of  $C_a$  (or  $C_o$ ) and  $L_a$  (or  $L_o$ ) determined by barrier manufacturer. If  $P_o$  of the associated apparatus is not known, it may be calculated using the formula  $P_o = (V_{oc} * I_{sc})/4 = (U_o * I_o)/4$ .
8. Intrinsic safety connections evaluated with all barrier channels of an output set connected in the worst-case configuration.  $V_t$  (or  $V_o$ ) and  $I_t$  (or  $I_o$ ) are total barrier parameters, taking the highest barrier voltage output as  $V_t$  and the worst case combined barrier output current as  $I_t$ .
9. When required by the manufacturer's control drawing, the associated apparatus must be connected to a suitable ground electrode per the National Electrical Code (ANSI/NFPA 70), the Canadian Electrical Code, or other local installation codes, as applicable. The resistance of the ground path must be less than 1 ohm.
10. Unused inputs of barrier should not be connected to 5VH or 0VH unless otherwise indicated for each output type.
11. For best signal quality, cable shield or drain wire of intrinsic safety cable shall be connected to a suitable chassis ground at or near the location of the associated apparatus i.e. intrinsic safety barrier enclosure or DIN rail.

**WARNING:** substitution of components may impair intrinsic safety.

**WARNING:** to prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

**Table 1.** Entity Parameters of Models HH\_9 & HH\_B IS Encoder

|                                                             |          |
|-------------------------------------------------------------|----------|
| Encoder Power MAX, $P_i$                                    | 0.87 W   |
| V MAX, $U_i$                                                | 9.5V DC  |
| I MAX, $I_i$                                                | 367 mA   |
| Encoder capacitance, $C_i$ (no cable)                       | 1.1 uF   |
| Encoder with 15 meters cable capacitance, $C_i + C_{cable}$ | 1.124 uF |
| Encoder inductance, $L_i$ (no cable)                        | 0 mH     |
| Encoder with 15 meters cable inductance, $L_i + L_{cable}$  | 120 uH   |

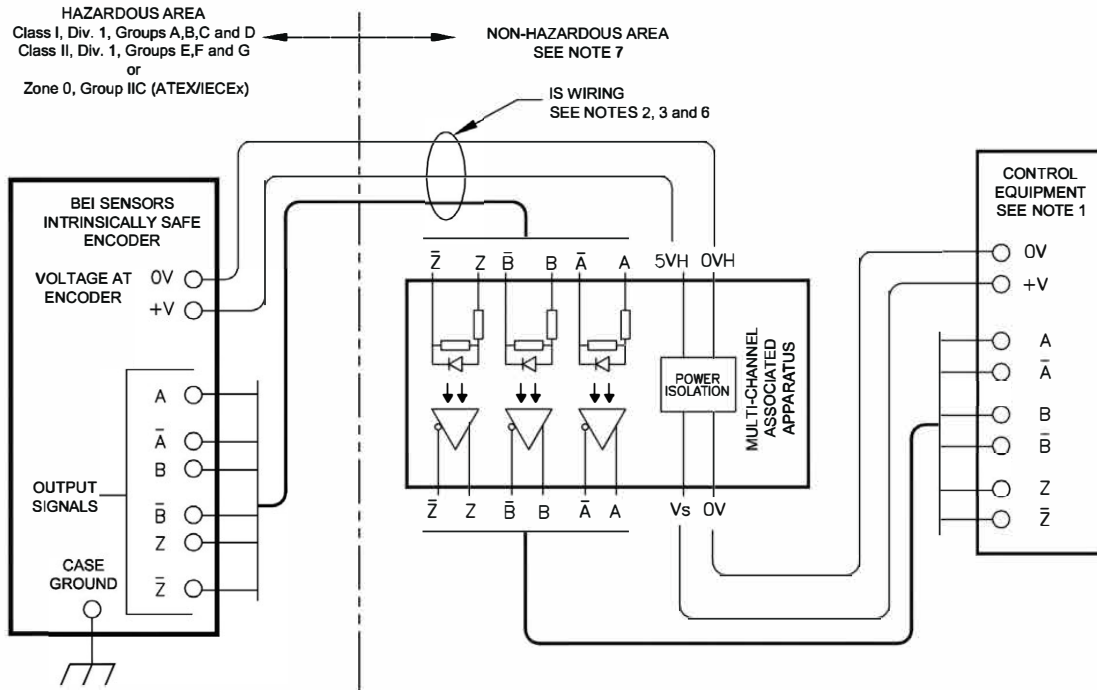
**TABLE 2**

| I.S. Equipment    | Associated Apparatus               |
|-------------------|------------------------------------|
| V max (or $U_i$ ) | $\geq V_{oc}$ or $V_t$ (or $U_o$ ) |
| I max (or $I_i$ ) | $\geq I_{sc}$ or $I_t$ (or $I_o$ ) |
| P max (or $P_i$ ) | $\geq P_o$                         |
| $C_i + C_{cable}$ | $\leq C_a$ (or $C_o$ )             |
| $L_i + L_{cable}$ | $\leq L_a$ (or $L_o$ )             |

# BEI SENSORS UL – ATEX – IECEx certified LP Series

## Intrinsic Safety Incremental Encoder– Models HH\_9 & HH\_B CE

**Basic wiring diagram:** See application notes for important intrinsic safety details.



### Product description and markings:

The product is an intrinsically safe variation of the Model HH\_9 or Model HH\_B rotary shaft encoder. It is an electrical device which operates at 5Vdc and utilizes protection method "ia" (EPL Ga) for use in Zone 0 and/or Zone 1 hazardous locations. When installed using a suitable associated apparatus (i.e. Intrinsic safety barrier) the specific ratings and markings of the product are:



Class I, Division 1, Groups A,B,C,D  
Class II, Division 1, Groups E,F,G  
TEMP CODE T4



IECEx UL 17.0028X  
DEMKO 17 ATEX 1854X  
II 1 G Ex ia IIC T4 Ga

$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +85^{\circ}\text{C}$

Manufacturer's Name and address: BEI Sensors, 9 rue de Copenhague, Espace Européen de l'Entreprise-Schiltigheim BP 70044 - 67013 STRASBOURG Cedex France

There are no user serviceable parts in these products and they shall be returned to manufacturer in Europe or USA for repair or service. The unit is factory sealed and there are no adjustments or maintenance required. Contact information is noted below.

The product shall be operated in an ambient temperature range of  $-40^{\circ}$  to  $+85^{\circ}\text{C}$  and is rated for T4 (135°C) temperature classification.

### Construction Notes:

See Assembly Detail Drawing 01303-000 for Model HH\_9 and 01311-000 for Model HH\_B construction notes.

## EU Declaration of Conformity

Manufacturer's Name: BEI Sensors SAS

Manufacturer's Address: 9 rue de Copenhague, Espace Européen de l'Entreprise-Schiltigheim BP 70044 - 67013 STRASBOURG Cedex France

Product Name: Intrinsic Safety Incremental Encoders Model HH\_9 with E4/2G2 all resolutions, channel and options as noted on the IECEx and DEMKO certificates cited below

With the following inscriptions: II 1G Ex ia IIC T4 Ga

Designed and manufactured to comply with these directives: ATEX : 2014/34/UE and CEM : 2014/30/UE

Complies with the protection requirement of European Council Directive 2004/108/EC on the approximation of the laws of the member states relating to electromagnetic compatibility, relevant to these test specifications:

EN 60-529, NFC 23-520, NFC 23-539, EN 50081-1, EN 55022 classe B, EN 55014, EN 61000-6-2, CEI 61000-4-2, CEI 61000-4-3, CEI61000-4-4, CEI 61000-4-5, CEI 61000-4-6, CEI 61000-4-8, CEI 61000-4-11

Also complies with the relevant parts of these standards: ATEX: EN IEC 60079-0:2018 ; EN60079-11:2012  
IECEx: IEC60079-0 :2017 ; IEC60079-11 :2011

A comparative study of the standards EN 60079-0 (.2012+A11 2013 and 2018), shows that the product is not concerned by the substantial modifications.

As detailed in EC type examination certificates: DEMKO 17 ATEX 1854X and IECEx UL 17.0028X

Product Quality Assurance Notification: LCIE 03 ATEX Q8060

Product Quality Assurance Report: FR/LCI/QAR08.0002/04

The notified organization responsible for the follow-up of the ATEX directive is (Assessed by):

LCIE, B.P.8, F92260 Fontenay-aux-Roses

Identification number: 0081

The company in charge of certification CEM is: LCIE BUREAU VERITAS, Aire de la Thur 68840 Pulversheim

## UL Declaration of Conformity

Model HH\_9 Intrinsically Safe Incremental Encoder variations with E4/2G2 model option is listed as compliant with the following standards as defined in UL File E78446, Vol. 4: Class I, Groups A,B,C,D and Class II, Groups E,F,G and T4 and -40°C to +85°C

- UL 913, 8th Ed. Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations
- CAN/CSA C22.2 No. 157-92 Intrinsically Safe and Non-incendive Equipment for Use in Hazardous Locations

The notified organization responsible for the follow-up inspections for this UL listing is (Assessed by):

UL International (France) SA

Espace Technologique de Saint-Aubin, Immeuble Explorer

Route de l'Orme des Merisiers – F-91190 SAINT AUBIN:

Identification No. 675

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