

- 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°C to +100°C
- Resolutions from 1 to 10000 PPR
- M12 or cable output (also available with terminal box connection)
- Also designed for use in hazardous areas (contact factory)



### Certifications:

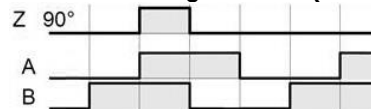
The LP Incremental Encoder is available with the following certifications



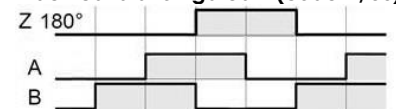
### Output Waveform:

Waveform AA/ BB/ 00/ Channel B before A Clockwise

#### Index calibration gated A & B (code 9)



#### Index calibration gated B (code V/US)



### Mechanical Characteristics:

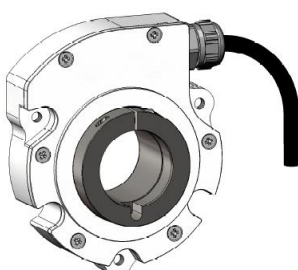
Material	Cover : anodised aluminum	Vibrations (EN60068-2-6)	$\leq 200\text{m.s}^{-2}$ (55 ... 2 000 Hz)
	Body : anodised aluminum	Shaft inertia	$< 84000 \text{ g.mm}^2$
	Shaft : AISI 303 stainless steel	Static/Dynamic torque	30 / 300 mN.m
Ball bearings	6807 - Sealed	Continuous max. speed *	6000 min <sup>-1</sup>
Maximum loads	Axial: 40 N	Theoretical mechanical lifetime L <sub>10h</sub> **	$> 18.10^9$ turns / 100000 hours
	Radial: 80 N	Encoder weight (approx.)	450g
Shocks (EN60068-2-27)	$\leq 3000\text{m.s}^{-2}$ (during 5 ms)		

\* please reference the user manual heat derating curves

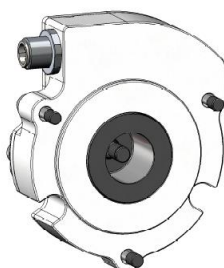
\*\* continuous max. speed – ½ max. load – ISO 281, L<sub>10</sub>

### Available mechanics – shaft options:

**HHU9: Through Hollow Shaft**



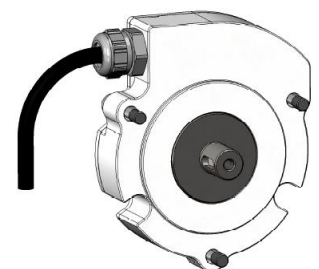
**HHK9: Blind Hollow Shaft**



**HHA9: Shaft with Integrated coupling**

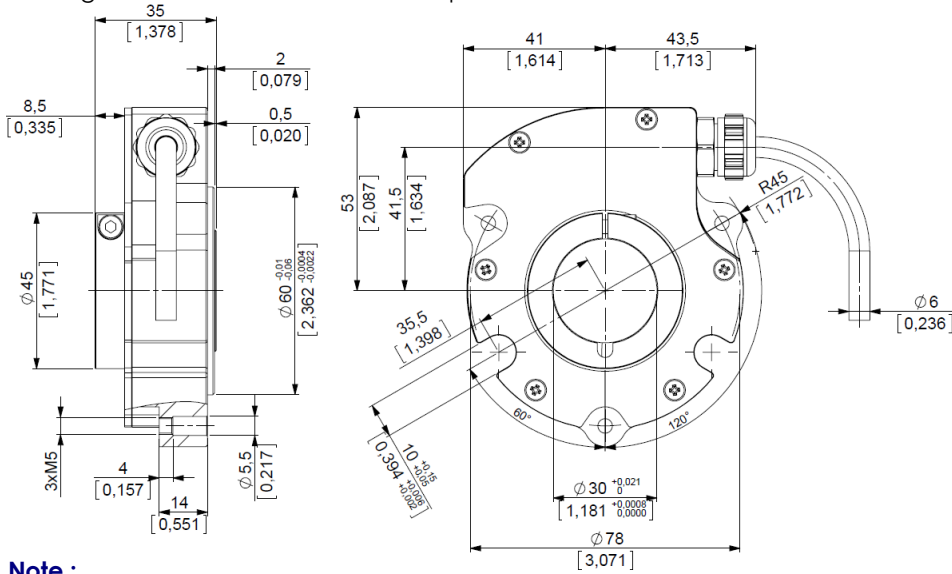


**HHM9: Solid Shaft**

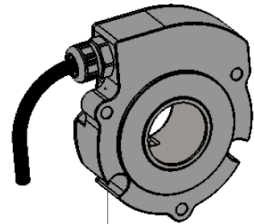
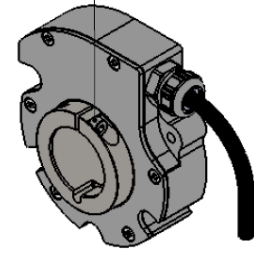


### Dimensions

HHU9 – Through hollow shaft – with cable output



Chc M4 Screw (SW3)



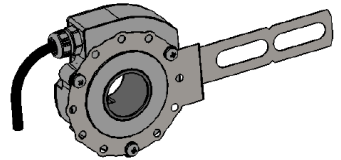
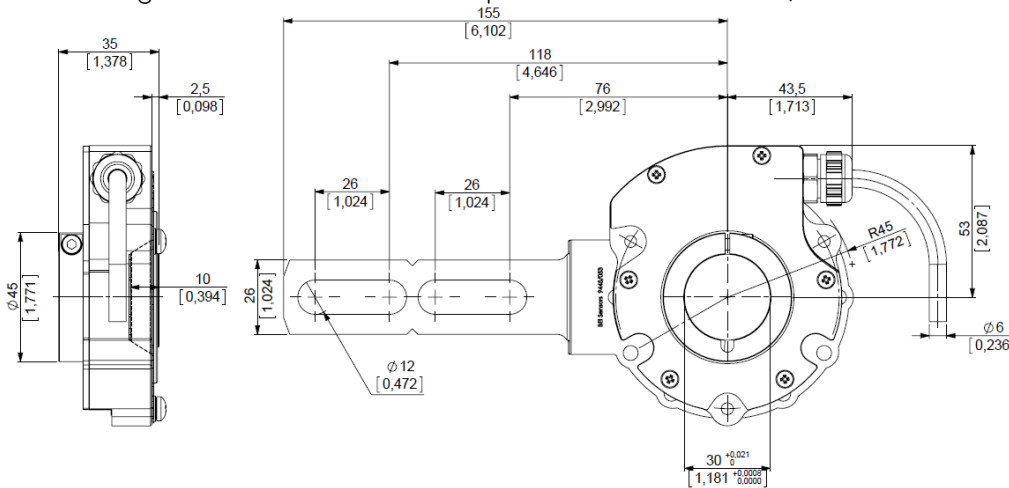
Anti-rotation slots

### Note :

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

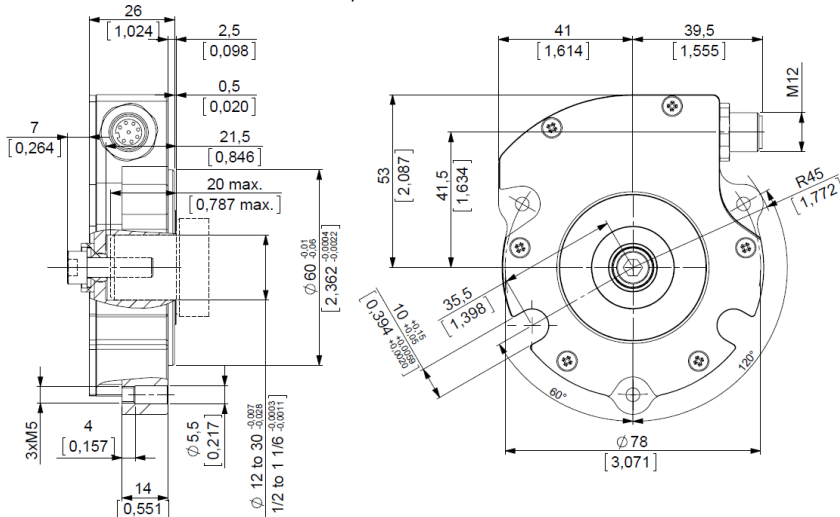
### Dimensions

HHU9 – Through hollow shaft – with M12 output and anti-rotation 9445/053

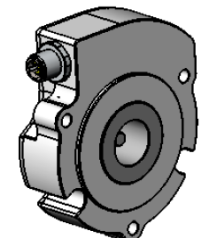
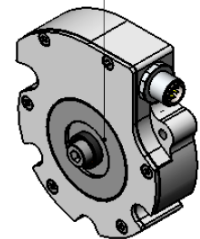


### Dimensions

HHK9 – Blind hollow shaft – with M12 output



Chc M6x20 Screw





### Electrical Characteristics:

Version	Output signals	Resolution	Operating Voltage Vcl	Supply current (no loads)	Current per channel pair	Output Levels (Is=20mA)	Frequency capability	Short circuits proof	Reverse polarity tolerant	Temperature range
PG5	HTL	1 to 10000	5-30V --- 250mA	75mA	40mA	Low max: 0.5V High min: Vcl - 2.5V	Up to 1MHz	Yes	Yes	-40°C +100°C (1)
2G2	TTL RS422		5V+/-5% --- 250mA			Low max: 0.5V				
RG2			4.75-30V --- 250mA			High min: 4V		Yes (except to Vcl)		

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

### Connection:

		-	+	A	B	Z	A/	B/	Z/	Ground
<b>GM</b>	M12 - 8 pins	1	2	3	4	5	6	7	8	Connector Body
<b>G3</b>	PVC cable 8 wires	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding
<b>GC</b>	PUR cable 8 wires	BK black	RD red	GN green	BN brown	VT violet	YE yellow	OG orange	BU blue	General shielding
<b>GP</b>	PUR cable 12 wires (not UL)	WH white + WH/GN white /green	BU blue + BN/GN brown / green	GY grey	BN brown	RD red	PK pink	GN green	BK black	General shielding
<b>TE</b>	Silicone cable (2) 8 wires (not UL)	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding

(2) Advised cable for mobile application, in extreme temperature from -40°C to +100°C

### Available resolutions:

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

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

### LP Incremental Ordering Options

Use this diagram, working from left to right to construct your model number (Example : **HHA9\_E6//PG5V/US/01024//GMR//U6**)

HH_9	--	//	---	-	//	-----	//	---	---	//	--
TYPE:	SHAFT BORE:		VOLTAGE/ OUTPUT:	CHANNELS:		CYCLES/ TURN:		OUTPUT TERMINATION:	CABLE LENGTH:		HUB:
HHU9 = hollow shaft	E5 = 5/8" E6 = 3/4" E8 = 1" 30 = 30mm		2G2 = 5V voltage and RS422 output	9 = AA/ BB/ ZZ/ B before A Z gated A&B		(Enter Cycles)		G3R = PVC cable GCR = PUR cable GPR = PUR cable (not UL) TER = Silicone cable (not UL)	xxx = cable length ex. 020 = 2meters		U3 = With insulated sleeve
HHK9 = blind shaft			PG5 = 5-30V voltage and push-pull output	V/US = AA/BB/ZZ/ B before A Z gated on B		See available resolutions above		GMR = M12	Blank (no cable)		U5 = Blind sleeve U6 = Through sleeve
HHA9 = hollow shaft with integrated coupling	E6 = 3/4" 14 = 14mm 20 = 20mm		RG2 = 4.75-30V voltage and RS422 output								** = no sleeve
HHM9 = solid shaft	E3 = 3/8" 12 = 12mm										

Stainless steel option available. Anti-rotation accessory: M9445/053 to be ordered separately.

#### BEI SENSORS Europe

9, rue de Copenhague  
Espace Européen de l'Entreprise-Schiltigheim  
BP 70044 - 67013 STRASBOURG Cedex France  
Tel: +33 (0)3-88-20-80-80 | Fax: +33 (0)3-88-20-87-87  
email: info@beisensors.com

#### BEI SENSORS North America

1461 Lawrence Dr | Thousand Oaks, CA 91320 USA  
Tel: 800-350-2727 or 805-968-0782  
Fax: 800-960-2726 or 805-968-3154  
email: beisales@beisensors.com  
www.beisensors.com