

## **Replacing only the Hall sensor with Incremental encoder for AZ by ON4AOI**

### **Why only AZ ?**

**Well the HH-12INC from George DF1SR is accurate enough for my needs and easy chained to my RAZTRAK or WINTRAK (N8CQ) tracking controllers.**

**Old Hall sensor connection to gearbox removed**

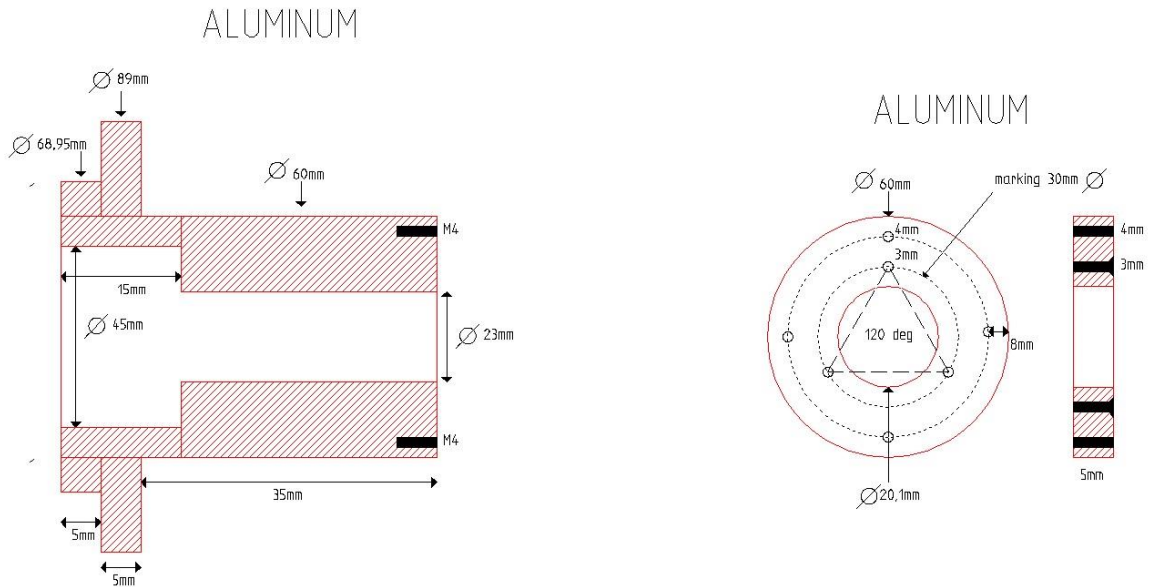


**View of the gearbox part where the above is connected**



**Like can be seen on picture 1 some parts are cutoff to fit on gearbox, in my drawing this is not done yet because they can be different so it's better to make a copy of the hall sensor housing when it is removed.**

**Below are the needed parts for a GHS38-06G100BLM5 encoder (drawing is not scaled !)**  
**The marking line serves for drilling the 3 holes @ 120deg to connect the encoder at the inside**  
**The other 4 holes are at 8mm from the side**

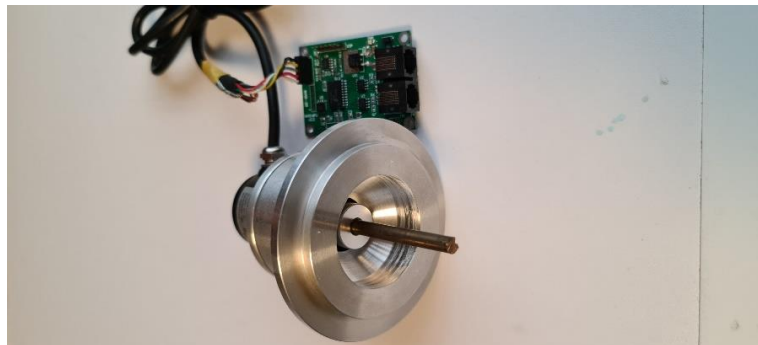


**My choice to use a 100ppr incremental encoder explained**

**Depending on Bob KA1GT and Spid info the overall gearing of the BigRas/HR = 6120:1**

**Motor gear must be 51:1 depending on the 120 tooth Bob counted each 1 is 3 deg > 360:3 or 120:1**

**120x51=6120 ~ so 120x100 = 12000 pulses for 360deg = 33.33/deg so even 0.1deg is still 3.333 pulses**



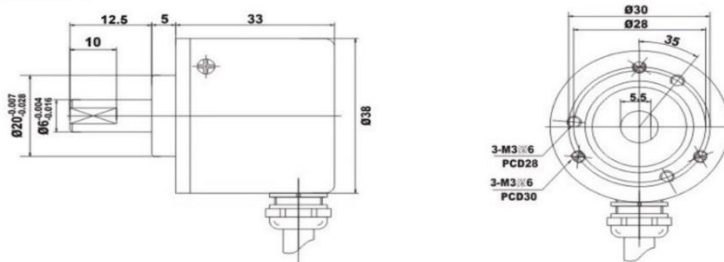


**Connections to the MABMPU V2.0 is done with VCC-GND-A-B-Z(=X)**

**Mechanical spec:**

Max speed r/min	Starting torque	Axis maximum load	Impact	Anti-vibration
3000	<0.05Nm	Radial 25 N Axial 15N	50G/11ms	10G 10-2000Hz
Moment inertia	Work Temperature	Storage Temperature	Protection Degree	Weight
4 x 10. <sup>-5</sup> kgm <sup>2</sup>	-30~85°C	-35~85°C	IP54/IP65	100g

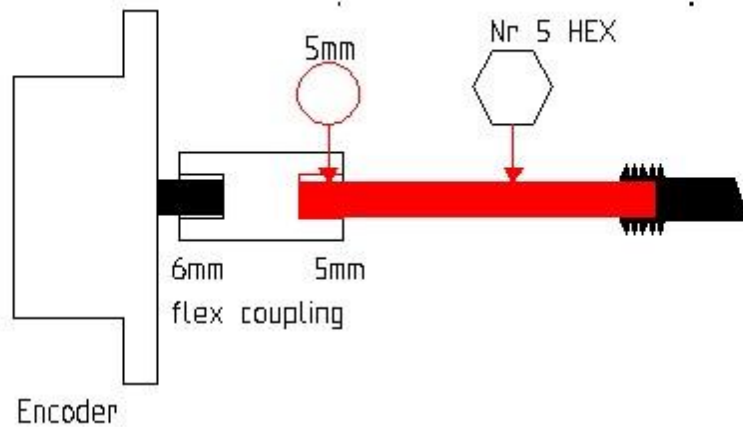
**Dimensions :**



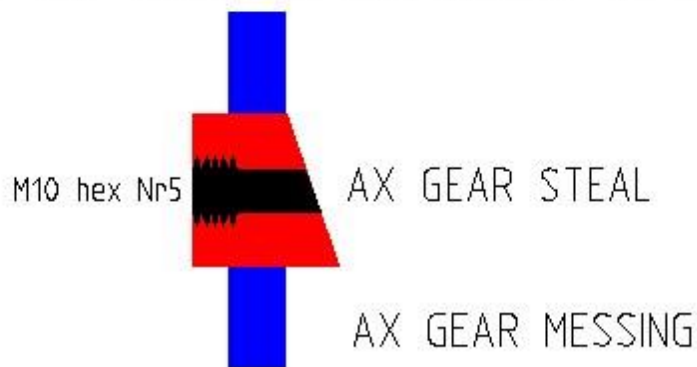
**Connections:**

Signal	A	B	Z	A-	B-	Z-	Vcc	GND
<b>Color</b>	Green	White	Yellow	Brown	Grey	Orange	Red	Black
<b>Without inverted signal</b>	Green	White	Yellow	-	-	-	Red	Black

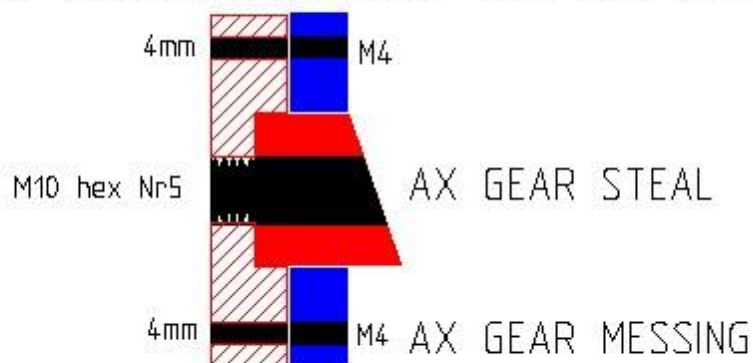
**Last part to construct is the connection from the flexible coupler to the gearbox, this will be done with a modified hex wrench that will glide into the center ax where I will fit an adjusting screw (Hex). Since I lost my notes (2 years ago) from the AX opening diameter It can only be made when I start to rebuild the BigRas/HR in spring. I presume it will be a number 5 or 6 Max (metric). If no go I have a plan B 😊**



OPTION 1 IF NOT HARDENED FOR THREAD TAPPING



OPTION 2 IF HARDENED ANOTHER ALU RING NEEDED



ALUMINUM

**Pictures of how it is intended to be for option1, hex wrench pass through into the gear ax.**



**Guy ON4AOI – OT7K**