ams

Magnetic Encoder Kit User Manual – AS5145B FIRST

AS5145B

12-bit Rotary Position Sensor with Digital Angle (Interface), PWM and ABI output

Table of Contents

1. General Description

Using the AS5145B position sensor, the exact drive shaft position can be read. The AS5145B Evaluation Kit User Manual descibes how to use the AS5145B Rotary Position Sensor in combination with the Andy Mark Toughbox Mini (Figure 1).

The position sensor provides the speed and direction of the shaft via ABI quadrature output and the absolute position of the shaft on the PWM[1] output and on the SSI digital interface. Find more about the outputs in section 4 (Design Considerations).

Figure 1:
Toughbox Mini with ams magnetic position sensor kit

Find more information on our webpage:

https://www.ams.com/eng/Products/Magnetic-Position-Sensors/Magnetic-Rotary-Position-Sensors/AS5145B

2. Package and Board Descriptions

Before starting the assembly makes sure that you have all items and tools to assemble the kit. Find the Evaluation Kit contents listed in Table 1. The additional items that are required are shown in Table 2 and the necessary tools in

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[1] pulse width modulation

Table 3.

Evaluation Kit Contents

Table 1:
AS5145B Eval Kit contents (included)

Pos	Item	Comment	Picture
1	AS5145B PCB	PCB with postion sensor.	
2	Magnet Holder for $\frac{1}{5}$ inch shaft diameter	To fix the magnet onto the drive shaft of the Toughbox Mini	
3	Allen key	To fasten the socket set screw of the Magnet Holder	

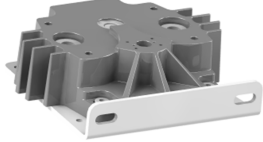Table 2:
Additional required items (not included)

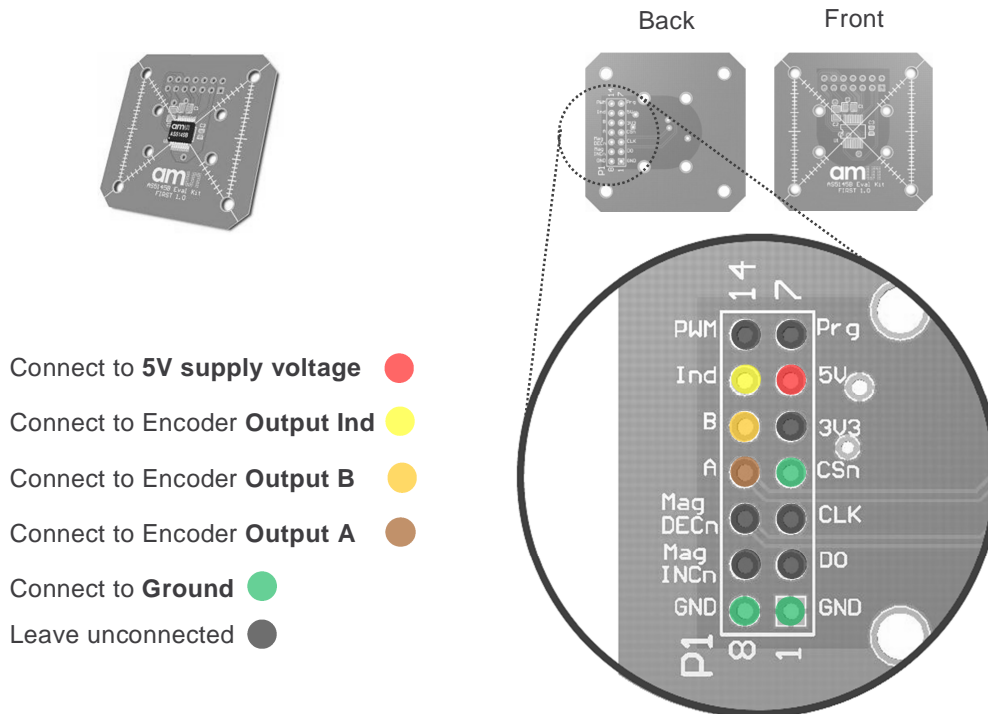| Quantity	Item	Comment	Picture
1	Andy Mark Toughbox Mini		
4	Socket Head Cap Screws	To fix the pcb	
	➜ 18-8 Stainless Steel Socket Head Cap Screw 2-56 Thread, 3/16" Length; http://www.mcmaster.com no. 92196A076		
4	Distance bolts	To place the pcb	
	➜ Zinc-Pltd Brass Male-Female Thrd Hex Standoff 3/16" Hex, 3/4" Length, 2-56 Screw Size; http://www.mcmaster.com no. 92700A215		
1	Connection cable	To connect sensor pcb and motor controller	

Table 3:
Required tools for the assembly (not included)

Pos	Tool	Comment
1	Saw or a cutter	To adapt the sensor pcb
2	Drill, $\frac{1}{4}$ inch	To adapt the Magnet holder
3	Drill, 0.086 inch; size 44	To adapt the Toughbox mini
4	White permanent marker and ruler	To mark the dill positions and PCB cutting guide lines
5	Drilling machine	To drill the holes for the fixture
6	Allen Key	To fasten the socket head cap screws

Position sensor board connections

The position sensor board is described below in Figure 2.

Figure 2:
Position sensor connections

Connect to **5V supply voltage** ●
Connect to Encoder **Output Ind** ●
Connect to Encoder **Output B** ●
Connect to Encoder **Output A** ●
Connect to **Ground** ●
Leave unconnected ●

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3. How to get the kit running

Following step-by-step guide shows how to attach the sensor kit to the Toughbox Mini.

Step 1: Prepareing the Magnet Holder

Widen the holde of the drive shaft to the correct size to be mounted on the drive shaft.

Use: Drill, $\frac{1}{4}$ inch ; Drilling machine

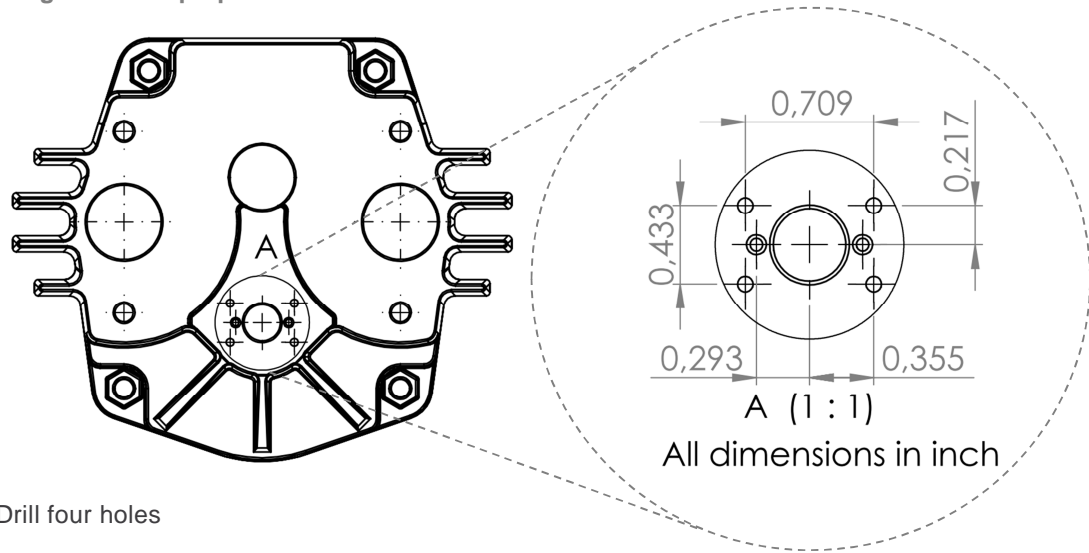Figure 3:
Magnet holder preparation

BEFORE DRILLING: AFTER DRILLING:

0,20   0,25

Scale 1:1   All dimensions in inch
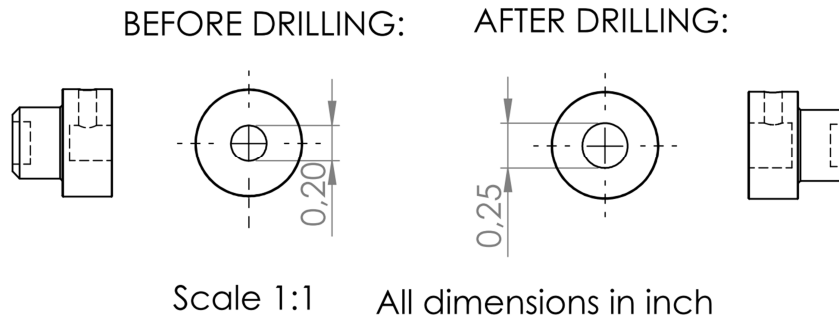
Step 2: Prepareing the Toughbox Mini Housing

a) Mark the hole positions on the Toughbox Mini housing as shown below.

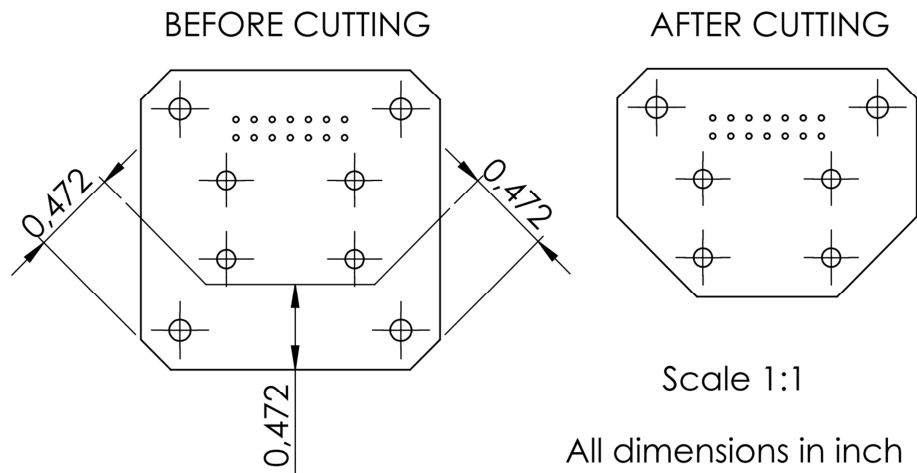Use: White permanent marker and ruler

Figure 4:
Toughbox Mini preparation

b)   Drill four holes

Use: Drill, 0.086 inch; size 44 ; Drilling machine

Step 3: Preparing the Sensor PCB

a)   Mark the cutting line on the Sensor PCB as shown below.

Use: White permanent marker and ruler White permanent marker and ruler
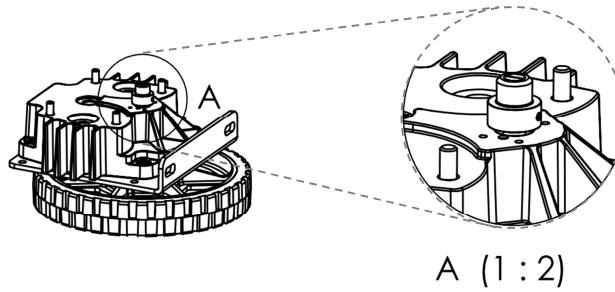
Figure 5:
Marking the cutting line

b)   Cut along the marked line to remove the overlaying part of the PCB.

Use: Saw or a cutter

Step 4: Attaching the Magnet Holder to the drive shaft

Mount the Magnet holder onto the drive shaft using the socket set screw.
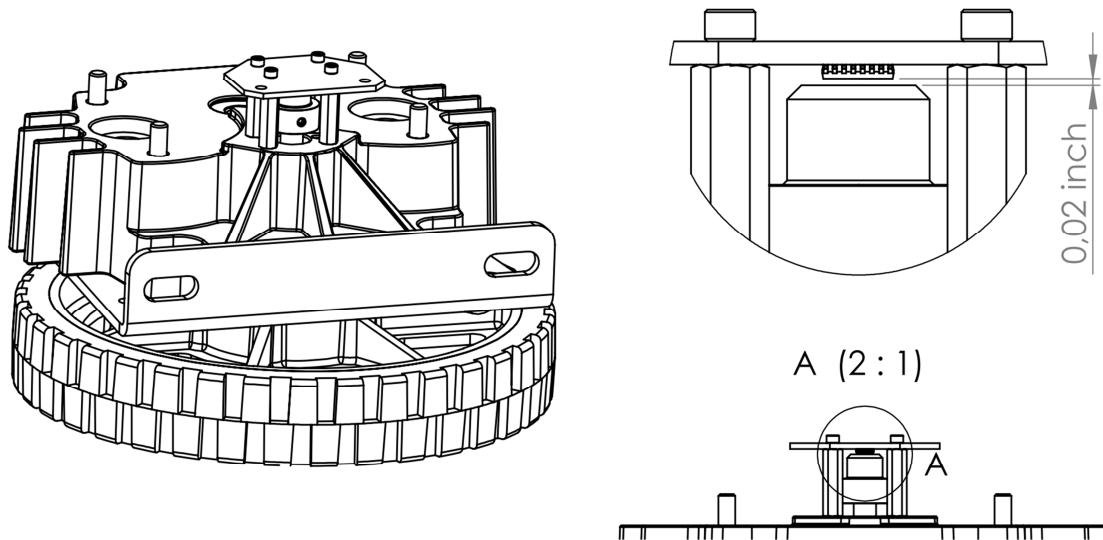
Figure 6:
Magnet holder assembly

A (1 : 2)

Step 5: Mounting the Sensor PCB

a) Shorten the distance bolts to the right length

b) Screw the distance bolts into the Toughbox Mini housing

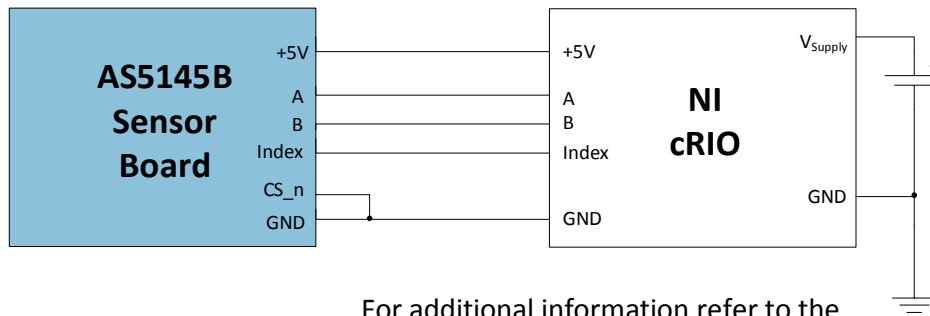c) Fit the Sensor PCB on the Toughbox Mini and fix it with the screws.

Use: Allen Key

Figure 7:
Sensor PCB assembly

0,02 inch

A (2 : 1)

A

Step 6: Connecting sensor and controller

Connect the AS5145B PCB and the cRIO main controller as shown below.

Figure 8:
Position sensor connections

For additional information refer to the
Digital Input Module Specification

4. Design Considerations

In this section, the correct magnet field strength and the quadrature output are explained in detail.

Magnet Field Strength

Make sure to keep an air gap between the AS5145B and the magent in a range of 0.5mm – 2mm (0.0197 inch – 0.0787 inch).

ABI - Quadrature Interface

The ABI signals are shown in Figure 9. These signals have to be connected directly to the cRIO input module.

Figure 9:
ABI - Quadrature Interface

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