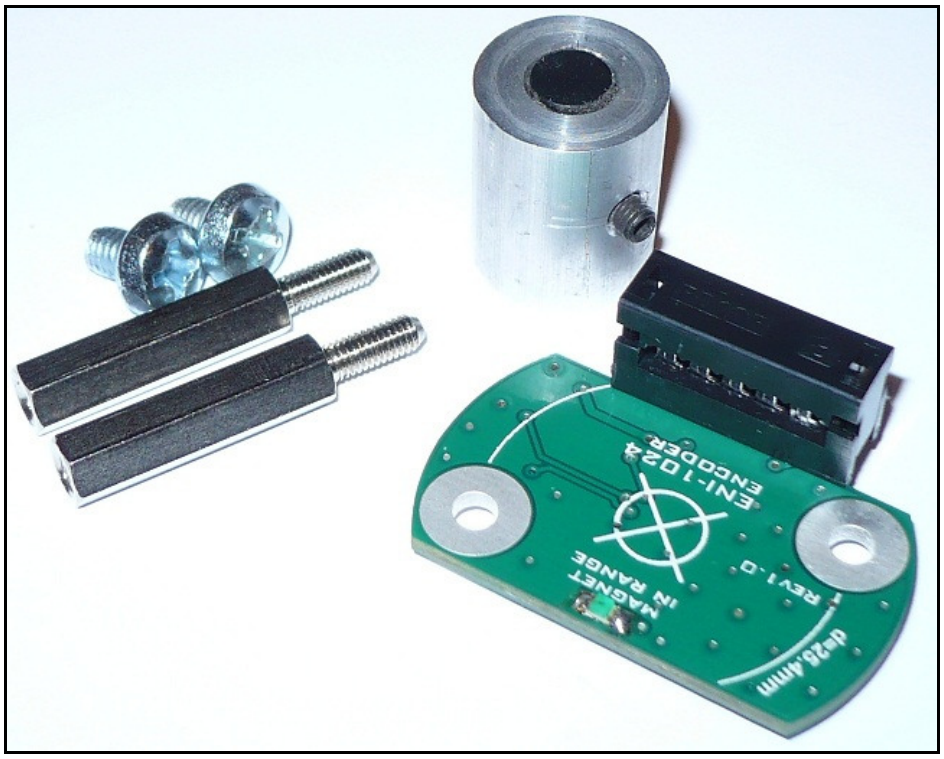
ENI-1024

Incremental magnetic rotary encoder KIT

User's Manual and Installation Guide



Contents

CNCdrive
motion controls

1. Safety, policy and warranty.

1.1. Safety Notes

The device should not be used where it can cause personal injury, death or high financial loss.

1.2. Policy

CNCdrive cannot take responsibility for any personal injury and/or financial loss caused by their devices failure or caused by following an error in this documentation.

1.3. Warranty

We give 12 months of standard warranty period with our ENI-1024 KIT encoders. Customers may send back the device within 15 days from reception date if they are not satisfied with the performance.
Using the devices outside of the specified electrical ranges may cause permanent damage to the device and voids warranty.
ESD notice: Use ESD protection gloves when installing the device.
ESD damage caused by human body discharge to the device excludes from warranty.

2. Electric specifications.

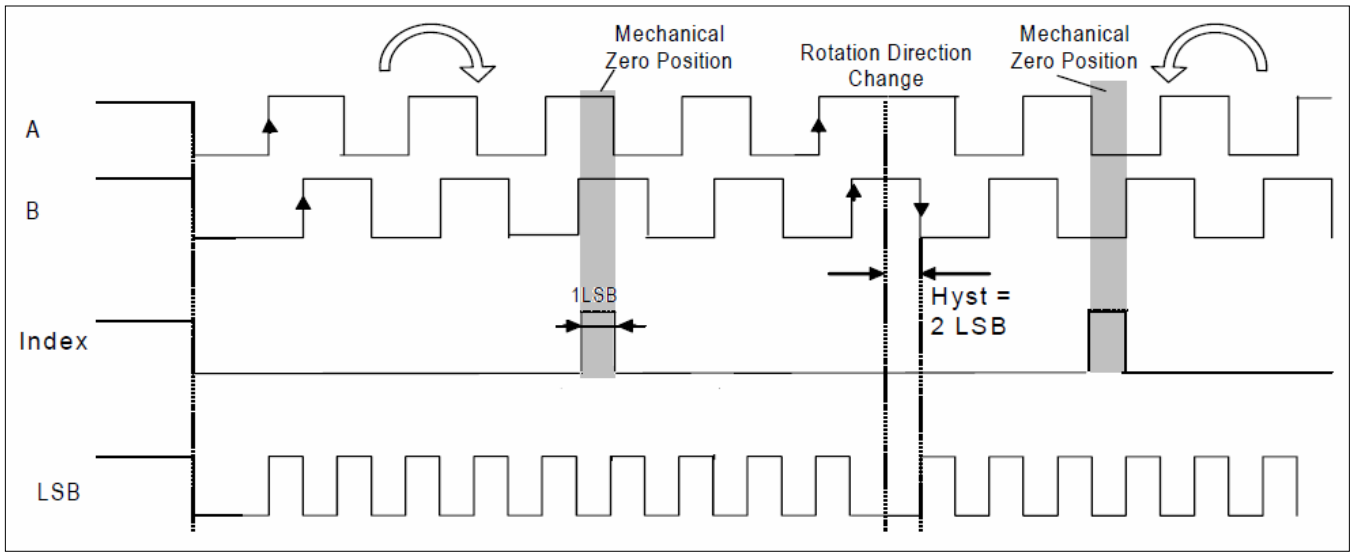
2.1.Operation ranges.

Property	Min	Typ	Max	Unit	Notes
Supply voltage	4.5	5	5.5	VDC	
Supply current		38		mA	Outputs not connected
High level output current			-20	mA	
Low level output current			20	mA	
Encoder resolution	-	1024	-	Counts per revolution	In 4X decoding mode. Counting A and B channels' both the rising and the falling edges.
Maximum count frequency		512		kHz	
Hysteresis		2		Counts	Hysteresis introduced to avoid flickering of the encoder outputs
Differential non-linearity			+-0.176	degrees	
Integral non-linearity			+-1.4	degrees	With magnet displacement of 0.485mm out of the center of the sensor.
Maximum allowed displacement of magnet from center of the sensor.			0.485	mm	Measured on the radius from center of the sensor IC.
Ambient temperature range	-55		+85	℃	

2.2. Incremental channel signals.

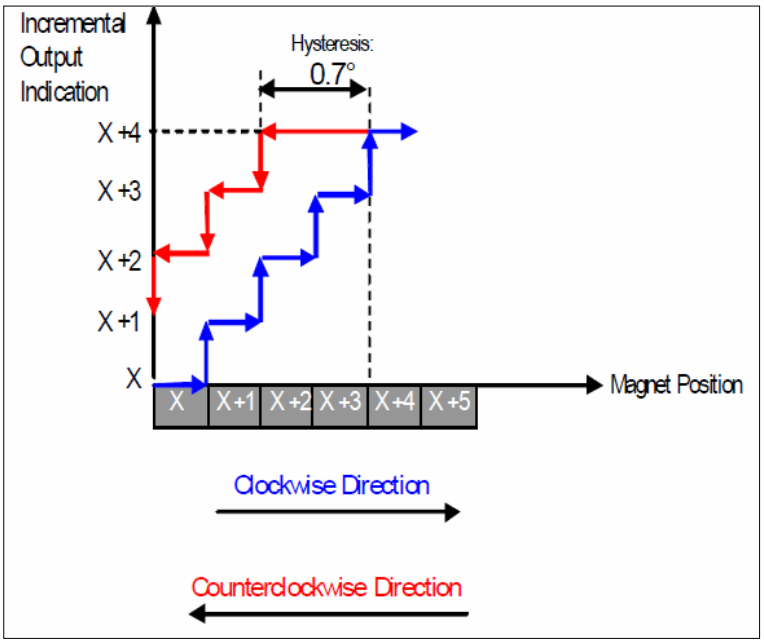
The device outputs 90°shifted incremental A and B channel signals. The signal A leads signal B in one rotational direction and signal B leads A in the opposite rotational direction of the magnet. In addition an index signal output is provided which signal is produced on the zero mechanical position, one LSB pulse width and one pulse per full revolution duration.

The following figure shows the encoder signals:



To avoid the flickering of the encoder signals a 2 counts (LSB) length of hysteresis is introduced.

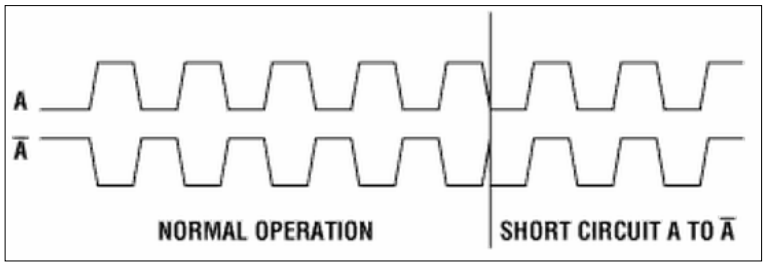
The following figure shows the 2 counts hysteresis:



2.3. Differential outputs.

All output signals A and B and Index are output as differential signals. This means that each signal has it's negated output too. The differential signals can be transferred in twisted wire pairs to long distance. The differential outputs are produced with the onboard 26LS31 differential line driver chip.

The following figure shows the A and _A channel signals in normal operation (when counting) and also in an external short circuit of the wires. The figure is similar for B to _B and for Index to _Index channels:



2.3. LED indicator.

The device has one LED on the top (connector) side of the panel. The LED indicates if the magnet used for the position sensing is in the correct range for the device to read the mechanical position. If the magnet is in the correct range (1-2mm distance from the surface of the sensor IC) then the LED lights. If the magnet is out of the good range (too close or too far) then the LED light goes off. The sign of the LED makes the correct alignment of the magnet easy to check.

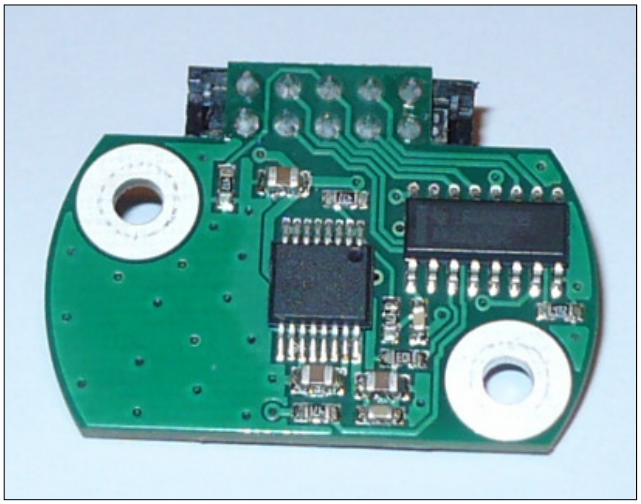
3. Installation guide.

3.1. Description of working.

The device is a rotary encoder module for position sensing in rotary motion. The aluminium hub which includes a magnet at it's end can be attached to a motor shaft. To make the device working place the printed circuit board of the module above the magnet keeping 1-2mm distance with the magnet centered to the center mark on the PCB. The device producing differential incremental A and B channel signals, 1024 edges per full revolution of the magnet. In addition there is an index and _Index output with one counts output per every full rotation.

The output signals can be used to measure the relative position of the rotation.

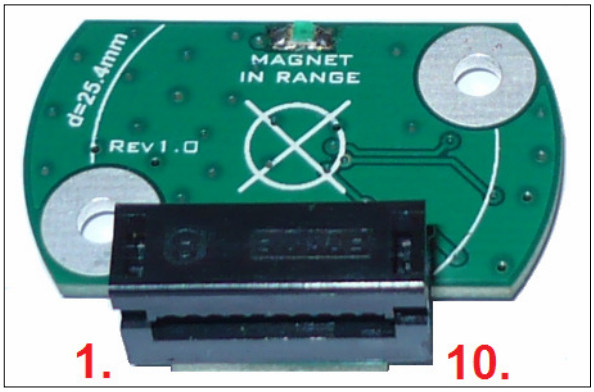
The following picture shows the bottom of the printed circuit board with the sensor IC located in the center of the PCB:



3.2. Pinout of the connector.

The device has a 10 pin IDC crimpable connector. This connector is used to connect the 5Volts to power the device and to route out the incremental output signals.
The connector is crimpable to a 10 pin ribbon cable or for example to wires of a CAT5/6 patch cable.

The following picture and diagram shows the pinout of the connector:



Pin number	Description
1	Ground power input
2	+5Volts power input
3	Index signal output
4	_Index signal output
5	A signal output
6	_A signal output
7	B signal output
8	_B signal output
9	NC. No internal connection
10	NC. No internal connection

3.3. Installation of the device.

To following steps should done to install the device:

a.) Make 2pcs of tapped M3 drills around the motor backshaft (or to the shaft of the installation). The tapped drills should be made on a 25.4 (1 Inch) circle around the midpoint of the shaft on a line alignment (180°) to eachother.
b.) Place the magnet holder hub to the motor's backshaft. The hub is pre-drilled with 3mm diameter and should be drilled up if nessessary. Drilling it up can be made on a drillpress with a standard HSS drilling tool. Take care to not drill into the magnet located at the other end of the hub.
c.) bolt in the hexagonal spacers to the tapped holes done in point a.
d.) crimp your cable to the connector on the encoder PCB.
e.) Place the encoder PCB to the top of the hexagonal spacers with the ICs facing down and the connector and LED facing upward. Bolt the PCB to the top of the hexagonal spacers with the supplied M3 screws through the 3mm drills on the PCB.
f.) Adjust the hub on the shaft with keeping a 1-2mm distance of the magnet on the hub end to the IC surface on the PCB. Lock the hub to the shaft with bolting the screw located in the side of the hub.
g.) Power up the device with providing 5Volts Voltage to it's power pins and check the LED on the top of the PCB. The LED continious on state means a correct alignment of the magnet. If the LED is off after powered means the magnet is out of the correct range and needs to be aligned.

For more information visit:

http://www.cncdrive.com
e-mail: info@cncdrive

CNCdrive
motion controls

Please consider the enviroment before printing this document.