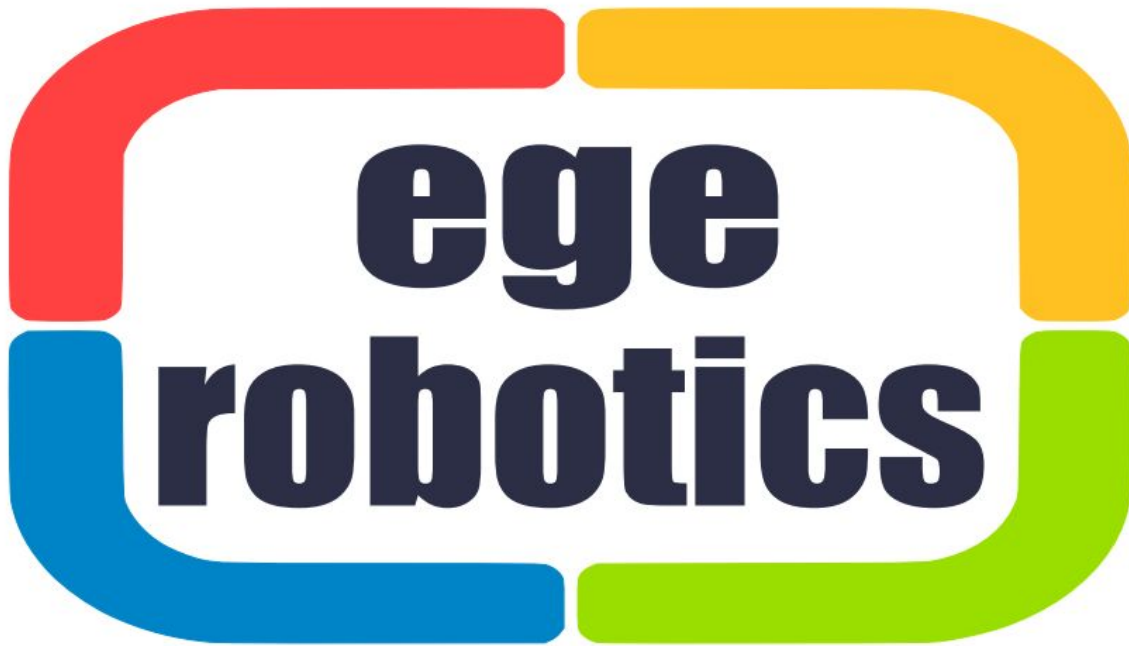




USER MANUAL

ETHERCAT ENCODER INTERFACE CARD

Document History

Version	Date	Author	Comment
V1.0	28.06.2025	Emre Şensoy	First Release.

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1 - Product Overview

1-1 Dimensions

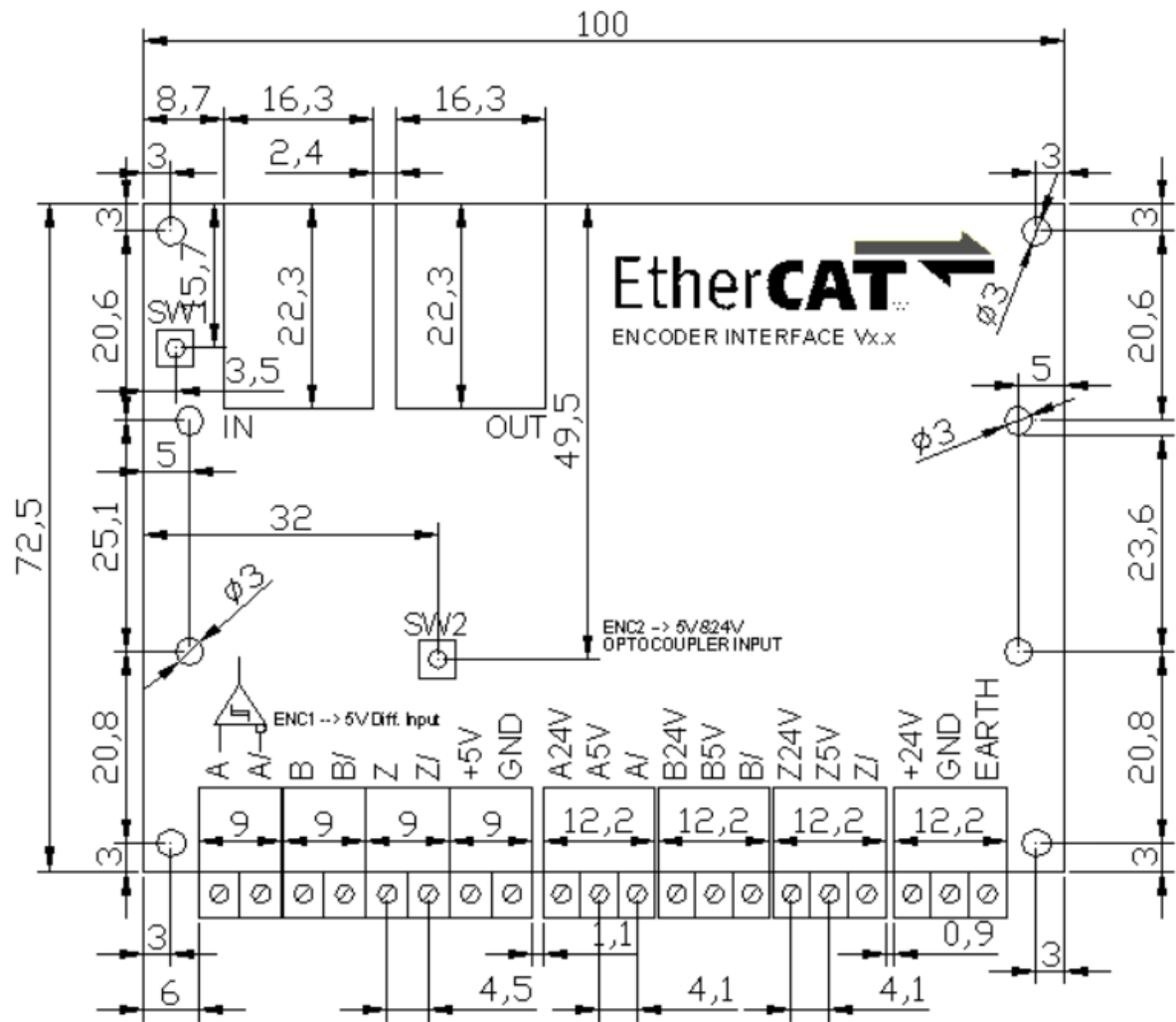


Figure 1 Outline dimensions in mm (all tolerances : $\pm 0.5\text{mm}$)

1-2 Top view

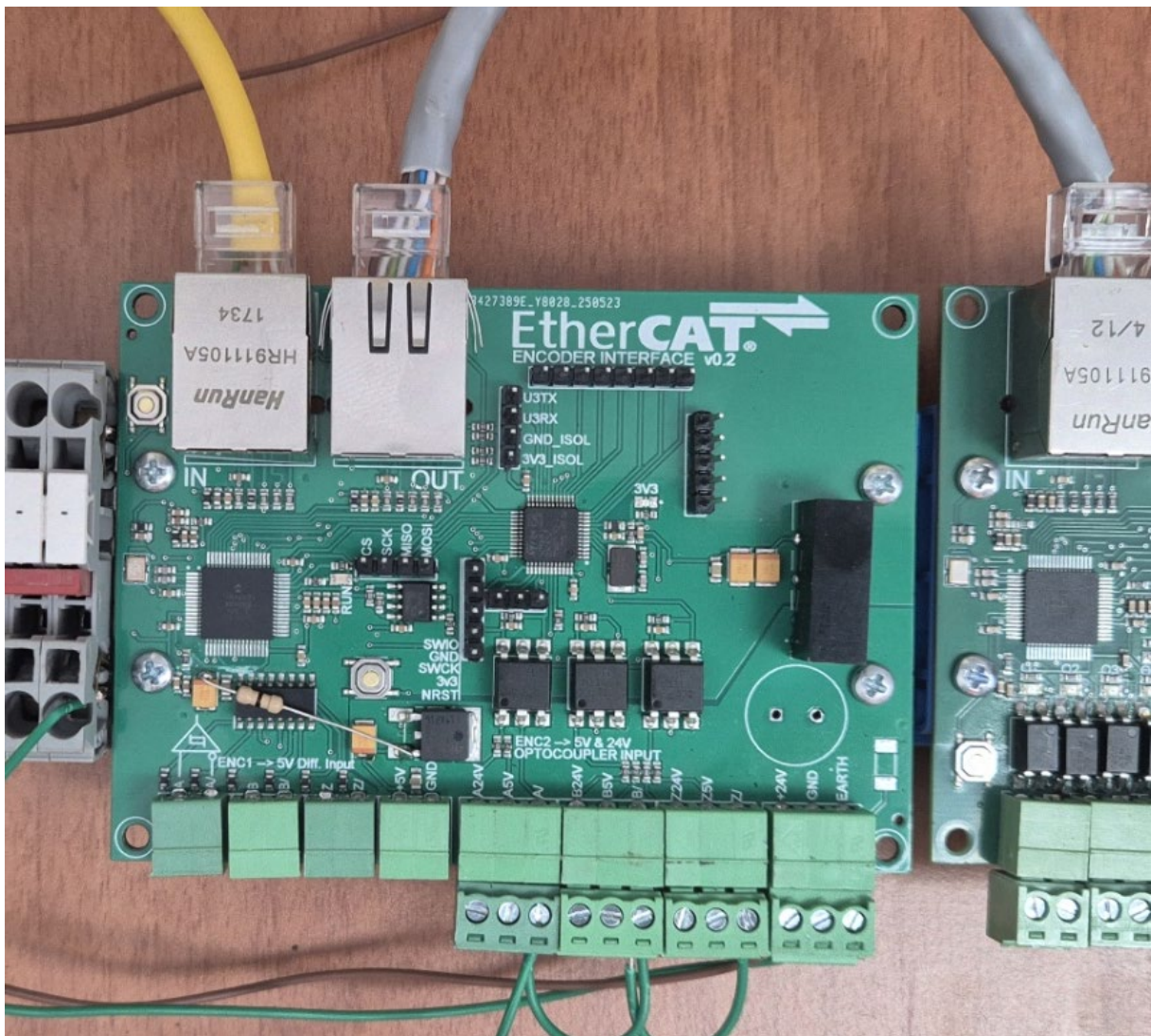


Figure 2 Top view of EtherCAT Encoder Interface

2 - Connections

2-1 IN & OUT ports

IN : A connection must be made to the IN port from the previous ethercat device. A standard Ethernet cable should be used.

OUT : If there is another EtherCAT device after this device, a connection must be made from the OUT port to the IN port of the other device. A standard Ethernet cable should be used.

2-1-1 Standart Ethernet Cable

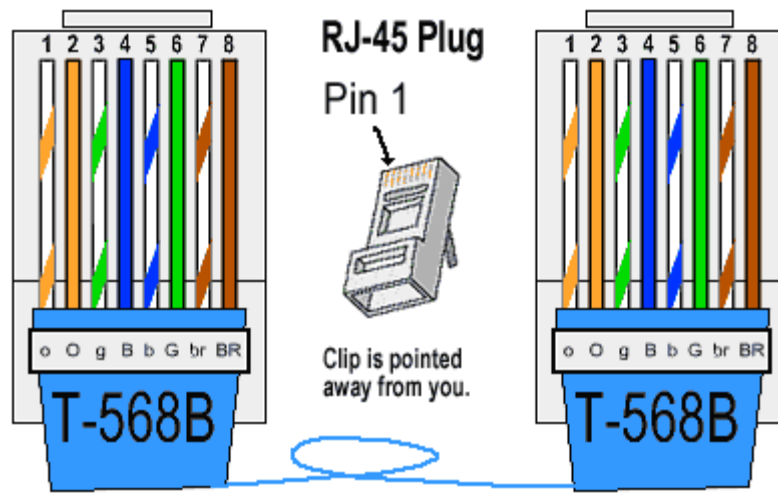


Figure 3 Standart ethernet cable pinout

2-2 ENC1 INPUTS & OUTPUTS

All ENC1 related ports (A A/, B B/, Z Z/ and +5V GND) are 5V tolerant. You must connect only 5V differential line driver output encoders to these ports.

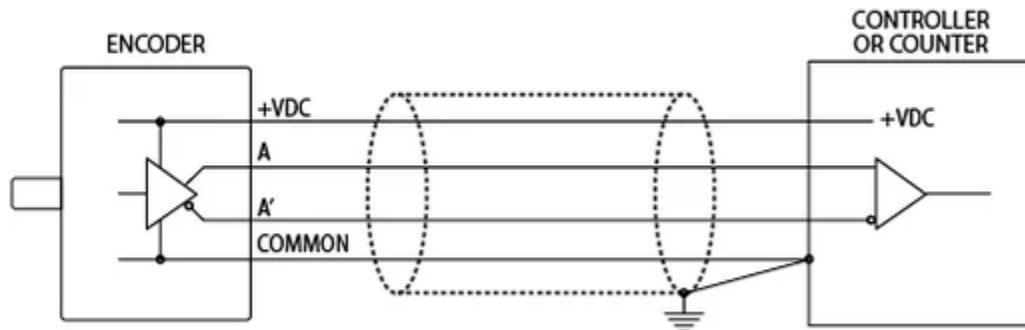


Figure 4 Differential line driver output encoder's output schematic

All inputs (A, A/, B, B/, Z, Z/) has a ferrite bead as input filter (BLM18EG221SN1D).

2-2-1ENC1 A A/ PORT

This port is an input port that connected to a differential input IC (26LS32) in the pcb. You must connect Encoder's A output to boards A input, and A/ output to A/ input.

2-2-2ENC1 B B/ PORT

This port is an input port that connected to a differential input IC (26LS32) in the pcb. You must connect Encoder's B output to boards B input, and B/ output to B/ input.

2-2-3ENC1 Z Z/ PORT

This port is an input port that connected to a differential input IC (26LS32) in the pcb. You must connect Encoder's Z output to boards Z input, and Z/ output to Z/ input. If encoder has no Z nor Z/ output you can leave this port blank.

2-2-4ENC1 +5V GND PORT

This port is an DC +5V 500mA output port. It must only use for encoder voltage supply. If encoder connected to another 5V voltage supply, both GND's must be connected together.

2-3 ENC2 INPUTS & OUTPUTS

There are 3 triple ports in the ENC2 port and these ports are used only for input. There is no output in these ports.

2-3-1ENC2 A24V A5V A/ INPUTS

In Figure 5 there is input schematic of all 3 ENC2 ports.

If you use 24V encoder, you must connect encoders A output to port's A24V input, encoder's A/ output to port's A/ input. Leave A5V input blank.

If you use 5V encoder, you must connect encoders A output to port's A5V input, encoder's A/ output to port's A/ input. Leave A24V input blank.

Apply the same connection pattern for B and Z.

If your encoder has no Z output you can leave Z input port blank.

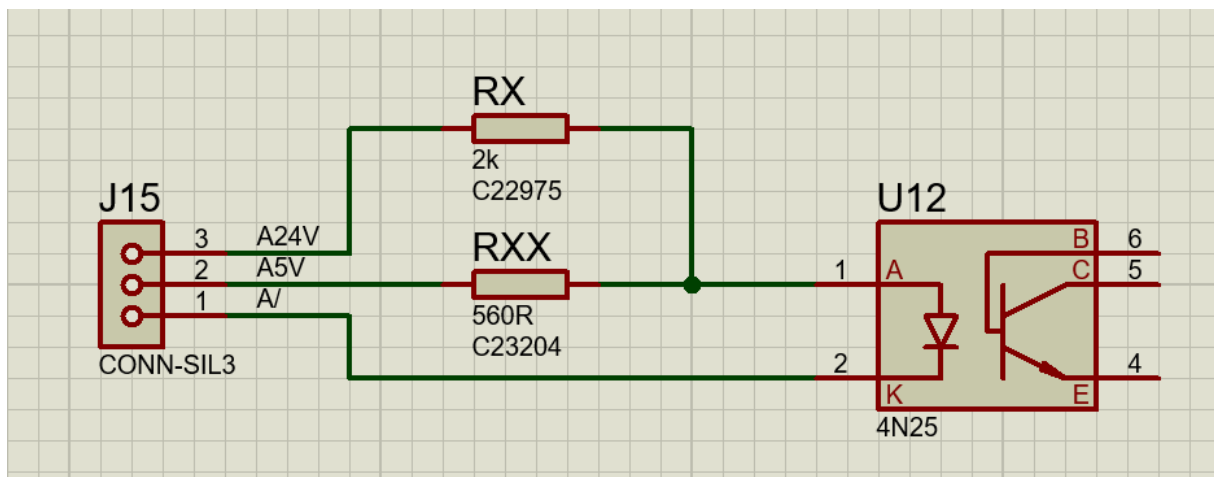


Figure 5 ENC2 Port input schematic.

2-3-2ENC2 B24V B5V B/ INPUTS

Same as 2-3-1.

2-3-3ENC2 Z24V Z5V Z/ INPUTS

Same as 2-3-1.

2-3-4ENC2 CONNECTIONS WITH NO NOT OUTPUT ENCODERS

If your encoder has no NOT outputs (A/, B/, Z/) you must connect as this schematic.

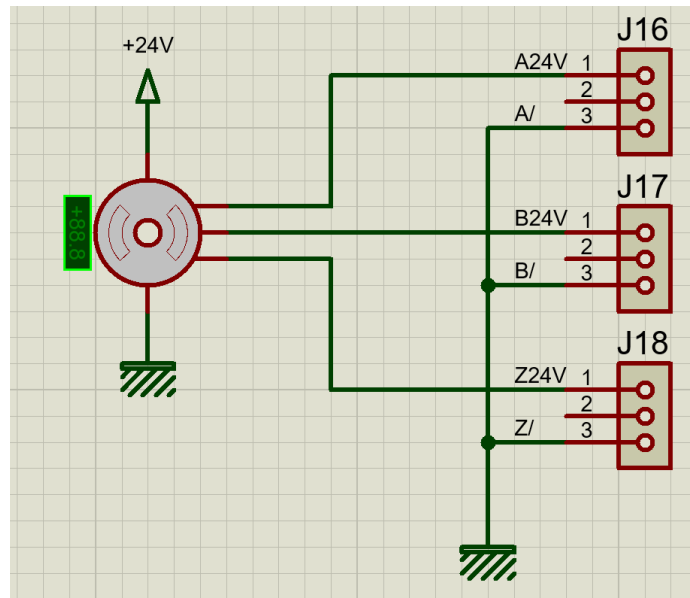


Figure 6 24V, has no NOT output encoders connection schematic

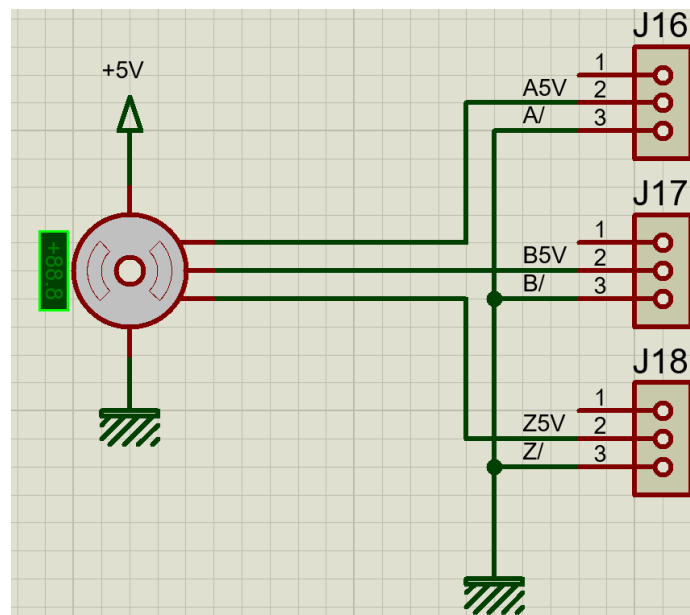


Figure 7 5V, has no NOT output encoders connection schematic

2-4 +24V GND EARTH INPUTS

This device must supply with DC 24V. You must connect +24V to port's +24V input. GND to port's GND input. Also you must connect system's EARTH GROUND to EARTH input.

2-5 SW1 AND SW2 BUTTONS

This buttons are for debugging purpose. You don't need to use them anytime.

3 TWINCAT INSTALLATION

Copy ER-ENCODER.xml file, provided by us, to TwinCAT\3.1\Config\Io\EtherCAT directory.

Make all connections. Run TwinCAT. Open or create a new Project and do a right click to Ethercat device and click to SCAN as in the screen shot.

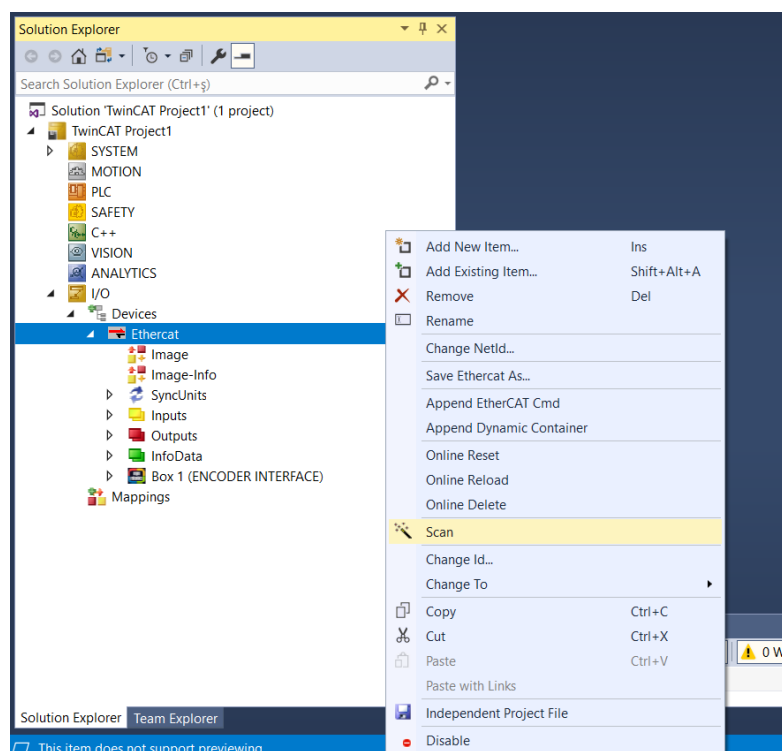


Figure 8 Twincat project tree screen shot

It will scan the network and add connected devices to tree. As you can see there is a BOX 1(ENCODER INTERFACE).

Click on the right-pointing triangle to the left of BOX1. And you will see this screen.

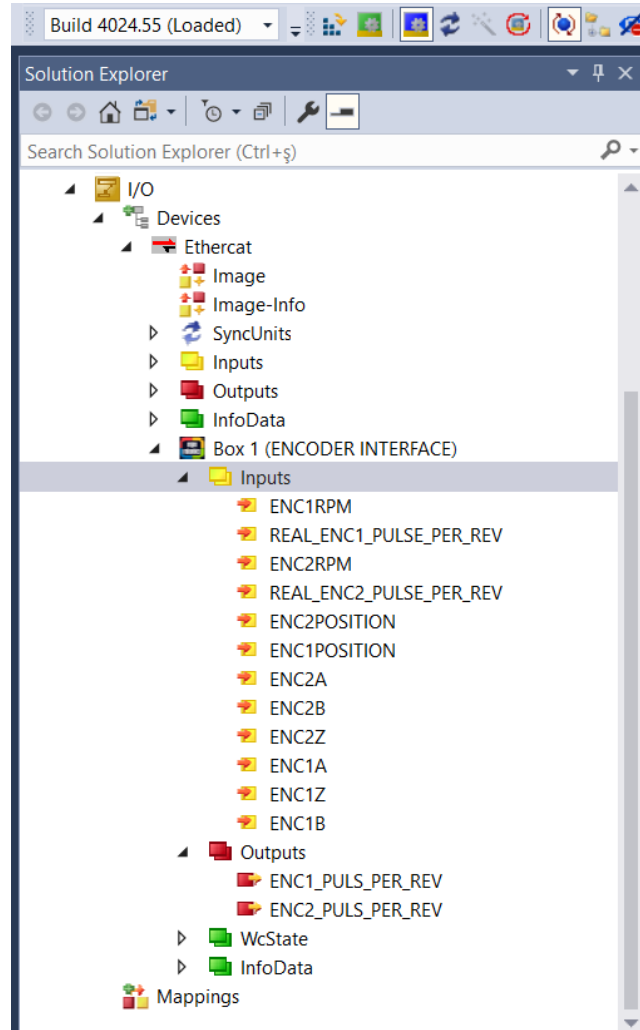


Figure 9 Twincat screenshot of Encoder Interface's Inputs & Outputs

3-1 INPUTS

3-1-1ENC1RPM

This register shows the encoder's rotate per minute (RPM) value. To get a correct RPM value from this register, REAL_ENC1_PULSE_PER_REV must accurately indicate the number of pulses in 1 revolution of the encoder.

3-1-2REAL_ENC1_PULSE_PER_REV

It shows the pulse value in 1 revolution that the card uses when calculating the RPM value of the encoder. Default value is 1000.

To change this value, you must write ENC1's 1 revolution pulse value to ENC1_PULSE_PER_REV output register.

3-1-3ENC1POSITION

It shows encoders position value. It will increase for CW direction movement and decrease for CCW direction movements.

3-1-4ENC1A

You can see A pins value on the fly.

3-1-5ENC1B

You can see B pins value on the fly.

3-1-6ENC1Z

You can see Z pins value on the fly.

3-1-6ENC2 INPUTS

Same as ENC1 inputs.

3-2 OUTPUTS

3-2-1ENC1_PULS_PER_REV

With this register, you can set the Encoder1's pulse per 1 revolution value. If you use 100PPR encoder you must set this register to 100. Or if you use 5000PPR encoder you must set this encoder to 5000.

If you use 1000PPR encoder, you don't need to set any value to this register.

3-2-2ENC1_PULS_PER_REV

Same as 3-2-1.

4 MORE DETAILED VIDEO

<https://youtu.be/cxXCMV-sUPo>