copenhagen atomics

Current box V1.9

Measure current and frequency on 3 channels and leakage current on channel 4.

Photo showing version 1.9

Introduction

Usage

The Current box is meant to be used to measure the AC current drawn in wires using a current coil. See Page 6 for examples of current coils. You can buy current coils to measure currents from 1 amp to thousands of amps. The box assumes that the AC frequency is 50 Hz or 60 Hz.

The fault current channel is used to measure if there is a fault current in the system, between either of the 3 phases and ground. This is measured as the ohm resistance between wires and ground. See page 5 for more information.

Data communication

Data communication happens over USB with the serial communication protocol (COM-port, /dev/ttyXX).

Baud rate 115200, with 8 data bits, no parity, and 1 stop bit. (8N1)

After you connect to the box it will output one line of text to the terminal every 0.1 second (10 Hz).

The content of this line is specified on the next page.

You can also send commands to the box. Just type in a command, then the box will turn channels on and off accordingly.

This video gives an introduction to serial data and commands: https://youtu.be/-64MM8h5SdI

Introduction

Integration with TurboCtrl

TurboCtrl AutoConfig will detect the box and insert each channel in IO.conf as a Current config line. See page 5 on how to configure this line, it will set the current amplification in the current coil and the max frequency.

This video gives an introduction to autoconfig: https://youtu.be/MhT1DqOuWLE

This video gives an introduction to TurboCtrl programming: https://youtu.be/MhT1DqOuWLE

TurboCtrl.ai supports many sensor and actuator types:
Temperatures, pressure, humidity, oxygen and other gasses, gas and liquid flow sensors, DC ports, AC ports, VFDs, current, voltage, oven controllers, light controllers, motors, audio, video, scales, position, liquid level, density, viscosity, integration with Festo and other pneumatics systems. And much more

Buy connectors

This box uses the same connector both for measurement and for DC input called

KANGNEX WJ15EDGK-3.81-2P

You can buy the connectors here:

https://lcsc.com/product-detail/Pluggable-System-Terminal-Block_Ningbo-Kangnex-Elec-WJ15EDGK-3-81-2P_C8466.html

The box comes with a USB-C to USB-C cable included and standard DIN rail mounting.

i For more information, please contact sales@copenhagenatomics.com

Specs

Serial terminal output (baud: 115200)

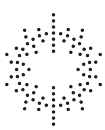
Output	p1 current rms	p2 current rms	p3 current rms	fault	p1 max freq.	p2 max freq.	p3 max freq.	p1 amplitude of max freq	p2 amplitude of max freq	p3 amplitude of max freq
Unit	[A]	[A]	[A]	[Ω]	[Hz]	[Hz]	[Hz]	[A]	[A]	[A]

IO config setup

Format	Example	Description
Current;Name;boxName;Port;LoadSideRating;MeterSideRating	Current;PhaseA;ct01;01;300;5	A current sensing on port 1 with a current transformer with a 300A to 5A rating
CurrentFault;Name;boxName	CurrentFault;FaultChannel;ct01	IO.conf input of the fault channel

Commands

Command	<Arguments>	Description
LOG	[p1 - p3]	Debugging mode. Changes the terminal output to show the raw ADC values of channel 1 - 3 i.e. 'LOG p1' shows the raw ADC measurements of channel 1 (4kHz).
LOG	[p9 - p11]	Debugging mode. Changes the terminal output to show the real fft values of channel 1 - 3 i.e. 'LOG p9' shows the raw fft of channel 1 (4kHz).
LOG	p0	Return to default output state.
Status	-	Verbose output of the current board status.
Serial	-	Verbose output of serial number and calibration.



Specs

Specification

Parameter	Condition	Value	Unit(s)
Current amplitude measurable range (peak-peak).[1]	Min. est.	0.008	A
	max.	3.3	A
Maximum frequency of current sine measureable.	typ.	60	Hz
Fault resistance measurable range.	Min. typ.	200	Ω
	max. typ.	150	kΩ
Current draw on 24V supply.	typ.	0.15	A
USB power	max.	0.52	W
USB current	max.	101	mA

1. See Coil Selection Note

Coil Selection

A current transformer (“coil”) is necessary to avoid the box being in the main current path of the actuation device. The box can measure a current from ~0 - 3.3 A, so a coil must be selected that takes the maximum expected current for the system down to a value below 3.3 A.

For a 150 A system, a 300:5 ratio coil would be suitable:

`150 x 5 / 300 = 2.5 A`

Example Coil:

https://www.digikey.dk/en/products/detail/selec-controls-usa-inc/SPCT-62-40-300-5-A-VA-3-CL-0-5-CU-ROHS/15954456

Product photos

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