copenhagen atomics

Salt leak detection V2.0

6 channel, detect small salt leaks using CA custom salt leak detection probes

Photo showing version 2.0

Introduction

Usage

The salt leak detection box helps you find small salt leaks. The sensors are put in the hot area (400 - 800 °C) and using leakage current, the sensor detects if there are salt leaks.

The box uses 48V for the detection, therefore it is important that the board is turned off when humans have access. Ideally it should only be turned on when above 400 °C and low oxygen atmosphere.

You can find commands, which this box accepts explained on Page 5.

The box has galvanic insulation between the USB-C port and the thermocouple ports.

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 board 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 board. Just type in a command, then the board 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 board and insert each channel in IO.conf as a generic prefix. You then use the Math function to set a threshold value which indicates if there is a salt leak or not. The value returned from the box with 10 Hz is the resistance in kOhm, but different sensors require different thresholds.

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 board uses Phoenix Contact 1790292 connectors for output.

You can buy the connectors here: https://www.digikey.dk/en/products/detail/phoenix-contact/1790292/2743755

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

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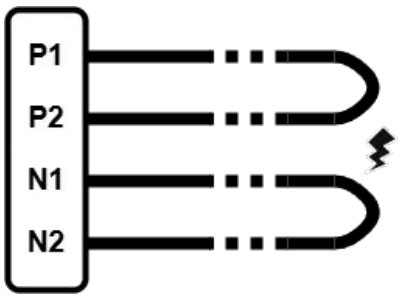
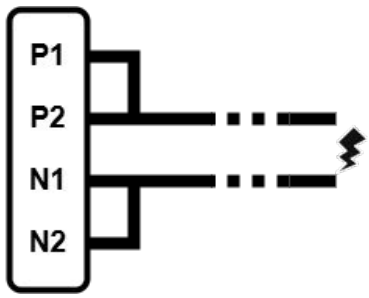
For more information, please contact sales@copenhagenatomics.com

Specs

4-wire probe connection



2-wire probe connection



Serial terminal output (baud: 115200)

Output	Measured resistance						Sensor state						Boost voltage	Status code
	p1	p2	p3	p4	p5	p6	p1	p2	p3	p4	p5	p6		
Unit	[kOhm]						-						[V]	[hex]

Commands

Command	<Arguments>	Description
boost <1-100000> <1-100000>	T_{ON} (s), T_{OFF} (s)	Alternating measurement for ever. Measures during T_{ON}, then stops during OFF time.
switch off	-	Stops alternating measurement. Measures all the time.
Status	-	Verbose output of the current board status.
StatusDef	-	Definition of board status bits.
Serial	-	Verbose output of serial number and calibration.

Specifications

Parameter	Condition	Value	Unit(s)
Applied voltage across probe	typ.	48	V
Leak resistance threshold	typ.	10	kOhm
USB power	max.	2.2	W
USB current	max.	440	mA

Specs

Status code

The last output of the salt Leak is a 32-bit status code. The 16 most significant bits are general status bits available across all boards as listed below.

Bit 31 (MSB)	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25
Error bit	Over temperature	Under Voltage	Over Voltage	Over Current	Version error	USB error

The 16 least significant bits of the status code are AC board specific and described below.

Bit 2	Bit 1	Bit 0 (LSB)
Boost error	Boost switch active	Boost pin ON

All bit fields not described above are unused.

Sensor State

Output value	Name	Description
0	NOMINAL	No leak detected, resistance in nominal range
1	LEAK	Leak detected, resistance below leak threshold
2	BROKEN	Broken sensor
3	NC OR BROKEN	Not connected or broken sensor
4	BOOST ERROR	Boost voltage out of range
5	INACTIVE	No boost voltage applied

Product photos

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