Resistive / Potentiometer Sensor Card - SDI12 Network

Intelligent single channel potentiometer sensor interface card with SDI-12 digital communications.

Part No: NP-POTR-1-SDI12

OEM Customised Product

Introduction

The NP-POTR-1-SDI12 card is one of the range of Keynes Controls intelligence sensor interface cards designed for use with resistive crack meter sensors, potentio-metric and draw wire resistance based sensors.

The NP-POTR-1-SDI12 card operates with all other Keynes Control sensor interface cards and intelligent interface units on the same network. A wide range of applications can be created using the range of interface cards available from Keynes Controls. All cards are supported by the **free Q-LOG Data Acquisition & Display Software**.

The card is fully compatible with any SDI-12 based data logger unit and the Keynes Controls range of media converters.

The NP-POTR-1-SDI12 uses the same command set as all of the other Keynes Controls devices and will operate with 3rd party SDI-12 network data loggers.

FEATURES

In-built Signal Conditioning

16 Bit ADC

Temperature sensor option

1 x SDI-12 Port

Free Windows applications software.

Easy Calibration

Daisy Chained Network Support

In-built statistical processing

Raw & Engineering Units Output

Customised Identifier String

Download Q-LOG

Download a free copy of Q-LOG at

http://www.aquabat.net/QLOGFree/qlogv2.html

Potentiometer Sensor Input

The circuit above shows how to connect the sensor to the NP-POTR-1 card.

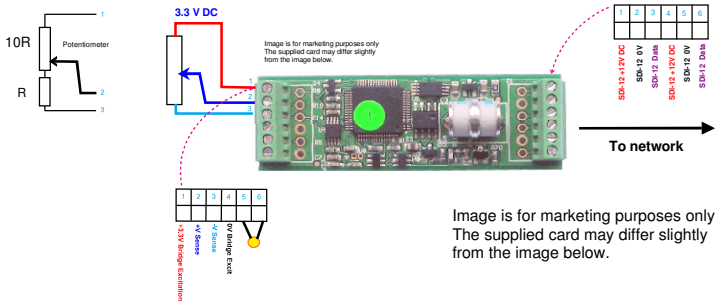
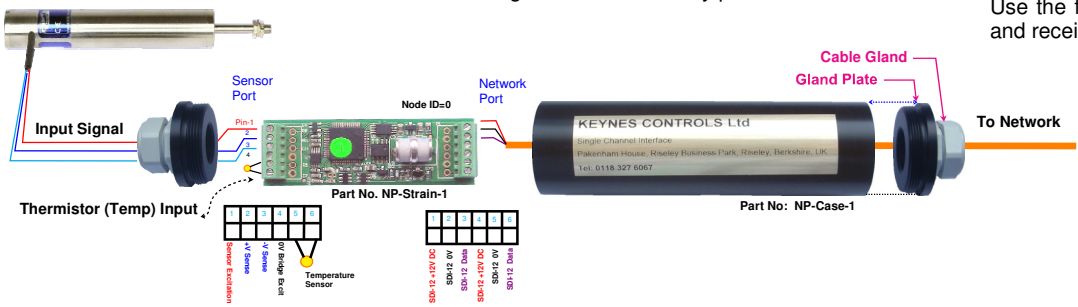


Image is for marketing purposes only
The supplied card may differ slightly
from the image below.

Crack Meter Interface fitted into environmental enclosure

The image below demonstrates how the NP-POTR-1 card fits into its custom designed environmentally protected enclosure



SDI-12 Commands

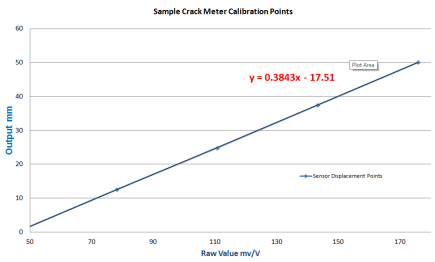
Use the following commands to start a measurement and receive data from the devices.

Simple Measurement Commands:

0M! returns 012 - 1 sec response 2 values
0D0! returns 0+'Meaurement' +temp

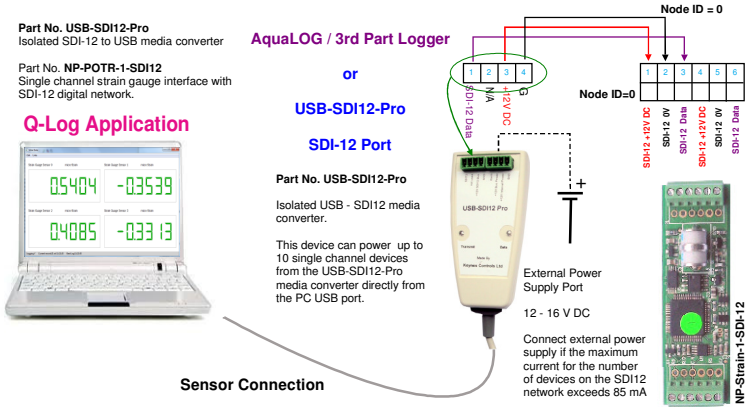
Sample Test Data & Engineering Unit Configuration

The NP-POTR-1 card can be configured to give data values directly in engineering values. This is a simple operation to setup and use. The NP-POTR-1 cards are factory calibrated regarding the analogue measurement operation. Calibration factors are set using standard SDI-12 command operations.



Sample Test Data

Raw Data mV/V	Calibration Points micro-Strain
45.567	0.0
78.121	12.6
110.676	24.9
143.231	37.5
175.786	50.1



Example Calibration Commands

aXC0,offset! aXC1,scale!

Example - Using the sample test data above and Set calibration factors for device with ID = 3 to Scale = 0.3843 and offset = -17.53

SDI-12 Commands are 3XC1,0.3843! 3XC0,-17.53!

Results are now in engineering units.

Output (Eng Units) = 0.3843 . (Raw value in mV/ V_{in} + 520.06

The following data points were measured under test conditions using a gauge calibrator. The sensor used has a 50 mm range. The calibration factors used in in this example are calculated using the above test data.

Use a simple linear regression to determine calibration curve used to convert measured values directly into engineering units. The greater the number of reliable points used, the more accurate the calibration curve will become.

The linear equation 'Y = 0.3843. X - 17.51' is taken from the Excel Plot using the test data values shown in the table above.

Calibration Factor Calculations

Display the sample test data in a Microsoft Excel Scatter Chart.

Use the Trend Line format operations and select '**Linear**' and '**Display Equation on Chart** .

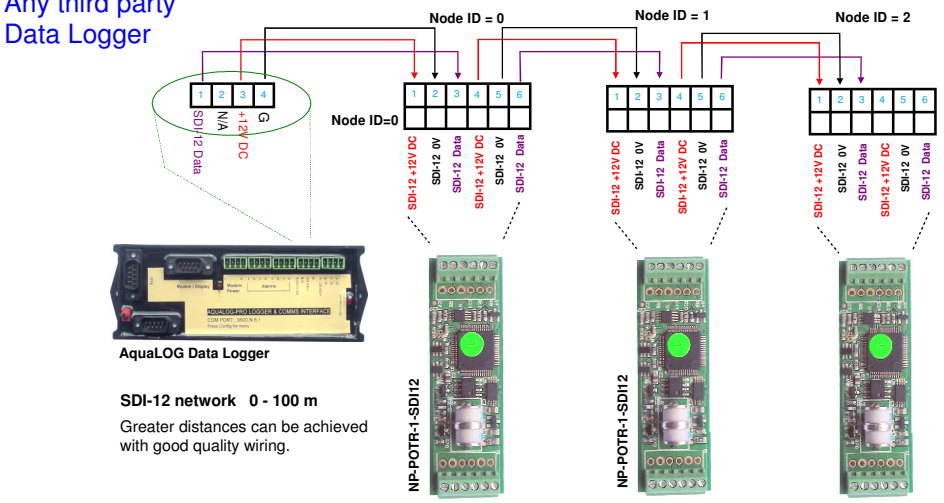
The equation shown is used to convert raw data into engineering units.

Technical Specifications

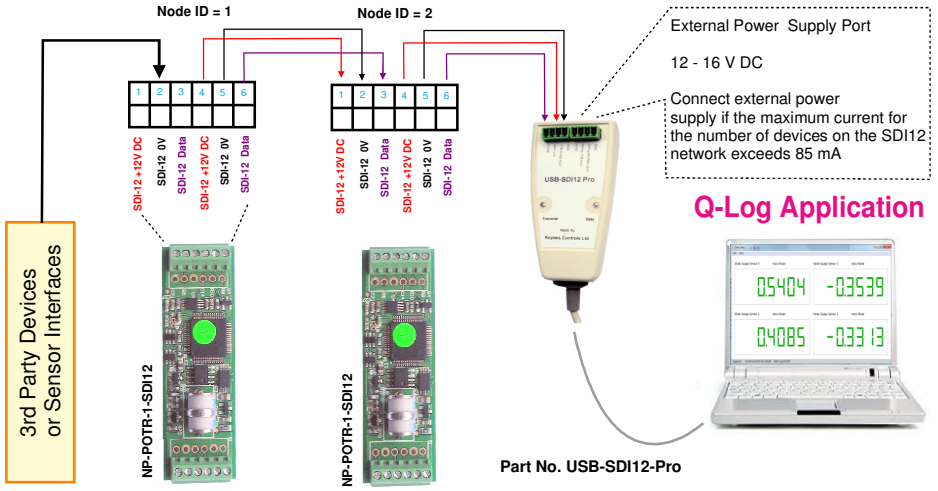
Specifications are accurate at the time of publishing but can be changed without notice.

Power Supply	10 -18 V
Current	2 mA at acquisition 10 uA standby
Input Range	+/- 0 - 2.5 V Other ranges on request
SDI-12 Port	1 x Port Version 1.03
Max update rate	1 sec
Cable Clamp Size	2 mm diameter
Sensor Excitation	3.3 V DC
Raw Value	Raw data mV/V
Engineering Value	mm, m, ft, Inch, cm User defined
Range	User defined, depends on sensor installed
Temp Sensor	Thermistor
Thermistor Type	3 K EC95 F type material 10K 3A1 Betatherm
Calibration	Steinhart-Hart Built Pre-defined Set at manufacture
Accuracy	0.05 Deg -8 to 25 Deg C
Range	-30 to + 60 Deg
Units	Deg C / Deg F user select
RMS Noise (Typical values)	less than 1 uV/V less than 0.01 Deg C
PCB Dimension	
Length	60 mm
Width	19.7 mm
Max depth	11.2 mm
Cable Entry	1 m Screw terminal
Number Channels	1
Gauge Resistance	120 - 1K Ohm
Gauge Factor	User Defined
ADC	16 Bit
Statistics	
Input	Max, Min
Temp	Max, Min

Connection multiple devices to a SDI-12 data logger

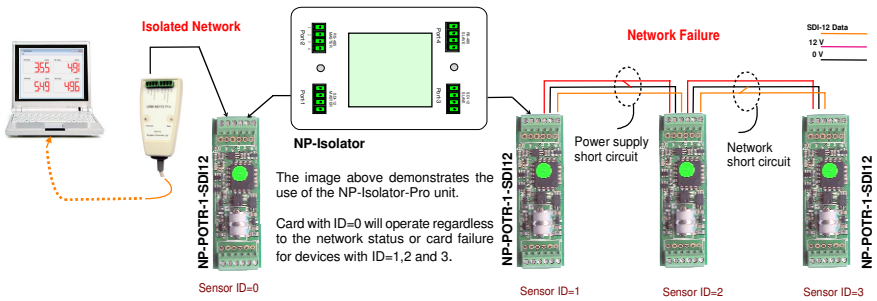


Connection multiple devices to a USB-SDI12-Pro media converter



Isolated Network Operations

In applications where the SDI-12 intelligent sensors and interfaces are being are to be used in harsh environments, or hard to access locations, and where long term stand-alone operations are desired, then the NP-Isolator module should be used to protect the NP-POTR-1-SDI12 cards and/or additional devices connected to the network.



Isolated Network Operations

This device protects intelligent

Part No. NP-Isolator

Isolated network and media converter
Isolated SDI12 - SDI-12 Network Conversion.
Isolated SDI12 - 485 Network Conversion.
Isolated RS485 - SDI12 Network Conversion.

This device is powered by directly from the network on to which is connected.

Download datasheet at:

http://www.aquabat.net/downloads/NP-isolatorv1.pdf

The **USB-SDI12-Pro** media converter connects to a Microsoft Windows laptop or PC, and powers SDI-12 based sensors and interfaces directly from the USB port.

Part No. USB-SDI12-Pro

Isolated USB-SDI12 media converter

Download datasheet at:

http://www.aquabat.net/downloads/Installation-USBSDI12-Pro-V1.pdf

Supported SDI-12 Commands

Command	Response	Description
aM!	a0tt2	2 values in time tt given by stats
aD0!	a+0.123+25.5	Raw data/ Engineering value & temperature values
aD1!	a+0.1299+0.1201+25.9+25.0	Statistical values max S, min S, max T, Min T
aI!	a13KEYNESCOPRESR001	Identification string
aXUTu!	au	Temperature units u=0 → Celsius, u=1 → Fahrenheit with read back
aXCn,xxxx	an,xxxx	Calibration data (No temp compensation - default) E = [0] + [1]*s with read back. s is in mV E is in engineering units
aXFt,nn,xxxx!	at,nn,xxxx	Ensemble Averaging Command t → filter type (should be 0 - mean only) nn → number of filtered values 1 to 12 xxxx → interval between beasurment * 200ms
aXTHMT(0..1)	a+0/1	Thermistor type selection 0 → default = 3.3 K Material type F - Model EC95 1 → 10 K Ohm Model 10K3A1 Betatherm