PSH32-TC6 SHIELDED CABLE WITH THERMOCOUPLE MINICONNECTORS

This installation guide describes how to install and connect thermocouples and digital I/O signals to the PSH32-TC6 shielded cable with thermocouple miniconnectors for use with your DAQMeter DAQCard-4350.

Introduction

The PSH32-TC6 shielded cable with thermocouple miniconnectors consists of a pod with six miniconnectors that connect your thermocouples to the DAQCard-4350. This pod connects to the DAQCard-4350 input/output (I/O) connector with a shielded cable. You can also access the four digital I/O (DIO) lines and digital ground of the DAQCard-4350 using the detachable screw terminal connector located on the pod.

This cable is designed specifically for ease of use with thermocouples. The cable features isothermal construction to minimize the temperature gradients across the thermocouple junctions and a high-accuracy thermistor cold-junction temperature sensor.

The pod provides connections to all DAQCard-4350 DIO lines and to all but two analog input channels (CH). CH0 is dedicated to the cold-junction sensor and CH1 is dedicated to auto-zeroing circuitry. Refer to the *DAQMeter 4350 User Manual* for further details about these two channels.

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What You Need to Get Started

You need the following to set up and use your accessories:

- ❑ PSH32-TC6 shielded cable with thermocouple miniconnectors
- ❑ *PSH32-TC6 Shielded Cable with Thermocouple Miniconnectors Installation Guide*
- ❑ DAQMeter DAQCard-4350 and documentation
- ❑ Thermocouple with a miniconnector
- ❑ $^{1}/_{8}$ in. flathead screwdriver
- ❑ Wire cutter
- ❑ Wire insulation stripper
- ❑ Adhesive hook-and-loop fastener strip

Signal Connections

Refer to your *DAQMeter 4350 User Manual* for signal connection examples.

Connecting Thermocouples

Insert your thermocouple miniconnector to the mating miniconnector on the thermocouple pod, as shown in Figure 1. Each miniconnector is polarized; that is, it has two spades of different widths so that you can insert the thermocouple in only one way.

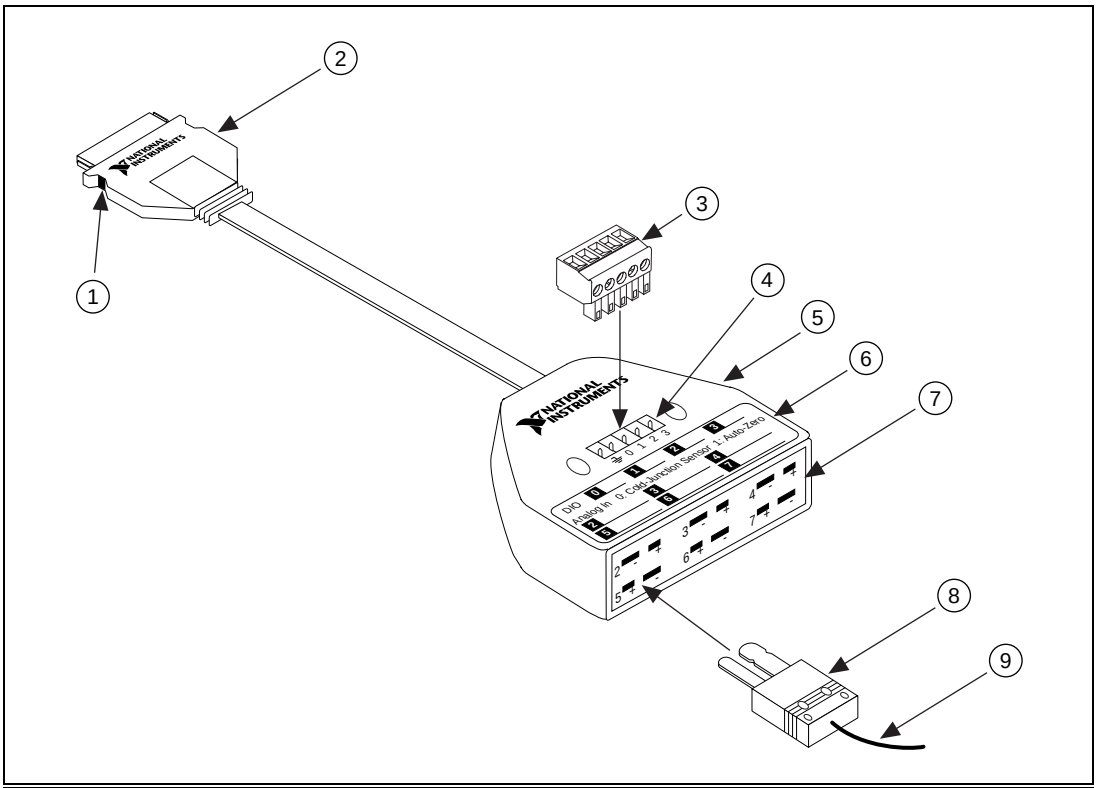
Do not force the miniconnector; if you encounter difficulty while inserting the miniconnector, check whether the polarity is correct.

Connecting DIO Signals

Refer to Figure 1 as you perform the following steps to connect DIO signals to your PSH32-TC6:

1. Use a wire cutter and wire insulation stripper to strip the wire ends as necessary to connect them to the screw terminals.
2. Loosen the screws in the screw terminals with the $^1/_8$ in. flathead screwdriver.
3. Insert the stripped wires into the screw terminals. Tighten the screws with the $^1/_8$ in. flathead screwdriver.

☞ **Note:** ***You can detach the screw terminal connector from the thermocouple pod to make connecting digital signals easier.***



1	Ejector Ears	4	Screw Terminal Receptacle	7	Miniconnector Receptacles
2	DAQCard Connector	5	Thermocouple Pod	8	Miniconnector
3	Screw Terminals for DIO	6	Label	9	Thermocouple

Figure 1. PSH32-TC6 Parts Locator Diagram

Connecting to the PSH32-TC6 to Your DAQCard-4350

Attach the connector end of the PSH32-TC6 cable to the DAQCard-4350 I/O connector, as shown in Figure 2. The two connectors should snap together. To disconnect the cable from the DAQCard-4350, press inward on the ejector ears and gently pull out the connector housing; the cable should pop out. Do *not* pull the cable.

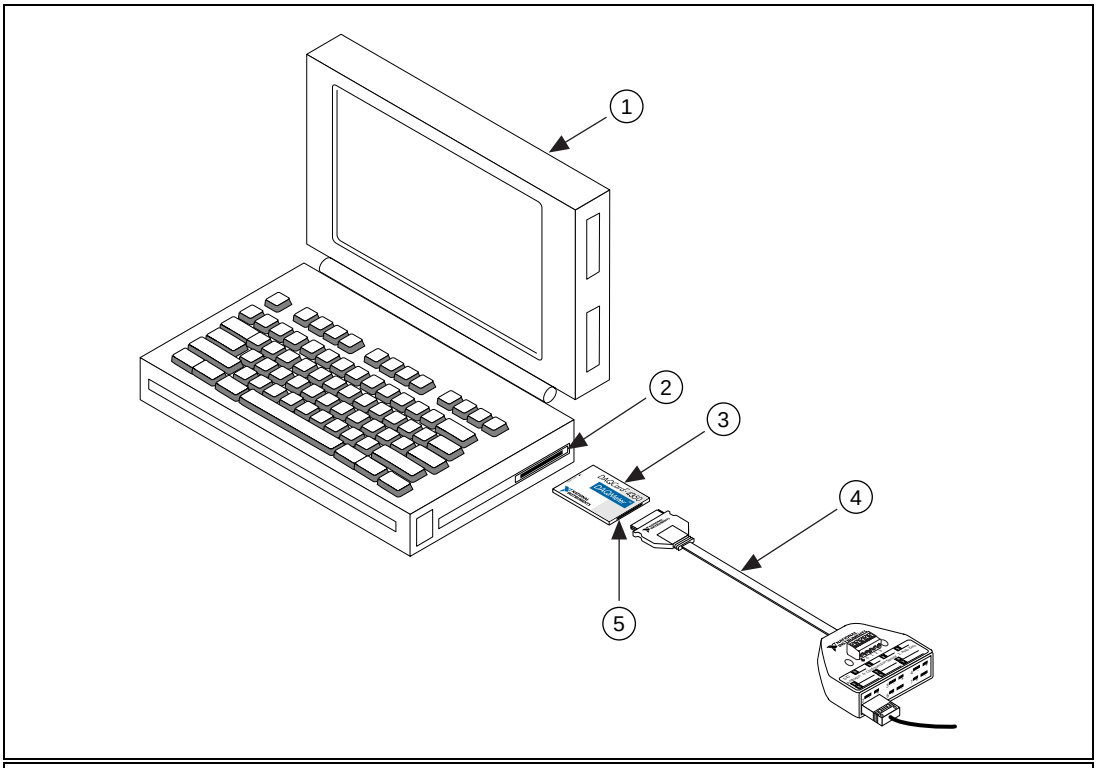
You can use the adhesive hook-and-loop fastener to attach the thermocouple receptacle end of the cable to any flat surface.



Note: ***To minimize the temperature gradient inside the thermocouple pod and thus maintain its isothermal nature for accurate cold-junction compensation, place the PSH32-TC6 away from extreme temperature differentials.***



Caution: ***The connectors of both the DAQCard-4350 and the PSH32-TC6 are polarized. You can attach them in only one way. Do not force the cable when inserting it into or removing it from the DAQCard-4350 connector.***



1	Portable Computer	3	DAQCard-4350	5	DAQCard 4350 I/O Connector
2	PCMCIA Slot	4	PSH32-TC6 Shielded Cable		

Figure 2. Connecting the Cable Assembly to the DAQCard-4350

Cold-Junction Temperature Sensor

The PSH32-TC6 cold-junction temperature sensor consists of a precision thermistor excited by the 25 μA current source on the DAQCard-4350. At 25° C, the resistance of the thermistor is 5,000 Ω. The thermistor resistance varies from 16,305 to 1,492 Ω over the 0° to 55° C temperature range. The corresponding sensor output voltage varies from 408 to 37 mV over this temperature range.

To select and measure the temperature sensor, refer to your data acquisition software documentation for programming information.

Alternatively, you can use the following formulas to convert the cold-junction sensor voltage to cold-junction temperature:

$$T(^\circ C) = T_K - 273.15$$

where T_K is the temperature in kelvin.

$$T_K = \frac{1}{a + b \cdot (\ln R_T) + c \cdot (\ln R_T)^3}$$

a = 1.295361×10^{-3}

b = 2.343159×10^{-4}

c = 1.018703×10^{-7}

R_T = resistance of the thermistor in Ω

$$T(^\circ F) = \frac{T(^\circ C) \cdot 9}{5} + 32$$

where T(° F) and T(° C) are the temperature readings in degrees Fahrenheit and degrees Celsius, respectively.

Specifications

Cold-junction sensor accuracy[1]	0.06° C from 15° to 35° C 0.2° C from 0° to 15° C and 35° to 55° C
Maximum working voltage[2] (signal + common mode)	Each input should remain within ±42 V of ground

[1] Includes only the thermistor accuracy. The combined effects of the temperature sensor accuracy, as well as the current source tolerances due to tolerances in all component values in the DAQCard-4350, the effects caused by temperature and loading, and self-heating and current leakage are discussed in the *DAQMeter 4350 User Manual*.

[2] Refer to the DAQCard-4350 maximum working voltage specification in Appendix A, *Specifications*, of the *DAQMeter 4350 User Manual*; use the lower number of the two.



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