

**ISOLATED 6-CHANNEL THERMOCOUPLE INPUT INTERFACE**

- 6 Thermocouple Input Channels that are isolated from main power source and network communications.
- Separate shield connection for each input.
- Very compact design, available in DIN Rail and NEMA 4X enclosures.
- FTT-10A network interface with temperature information available using multiple Standard Network Variable Type, SNVT, formats.
- Wide operating voltage range of 10 to 36 VDC at 0.75 VA.
- Removable terminal blocks on power and network connections.
- Cold junction compensation via Class A platinum RTD with accuracy of better than 0.25 C degrees.
- Electronics have extremely high temperature stability and low drift.
- Analog to Digital converter has 24-bit resolution.
- Six status LEDs provide quick visual indication of each input.
- -40 to 85 C operating temperature range.
- Initial support for K-type, -200 to 1372 C, and planned support of a wide variety of standard thermocouple types.
- High precision thermocouple polynomial calculations to ITS-90.

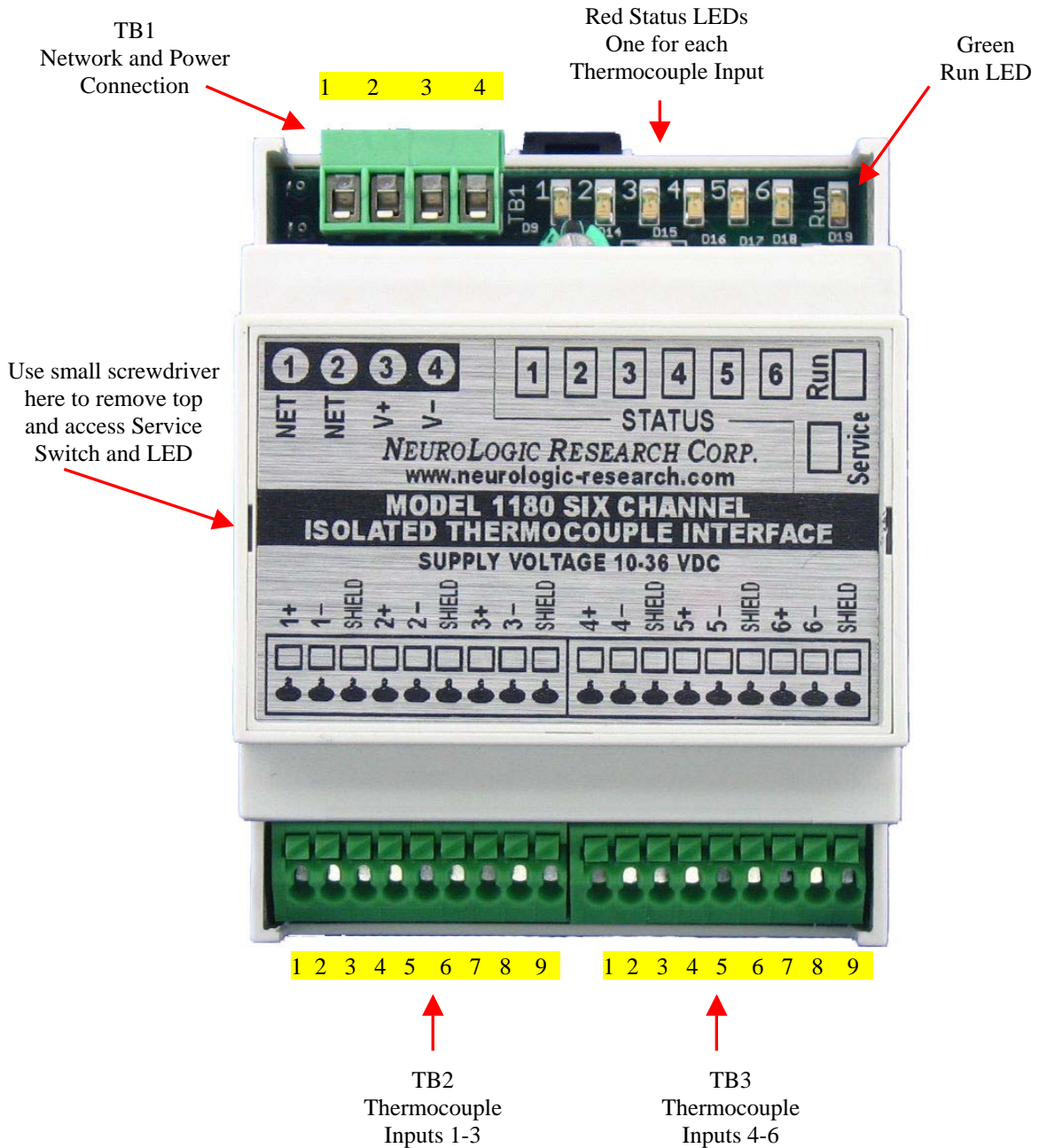
**DESCRIPTION**

The Model 1180 is a 6-channel Isolated Thermocouple Input Interface. The thermocouple inputs are electrically isolated from the input power and network communication. It is available in a DIN Rail mount or NEMA 4X enclosure. The electronics use a precision A Class platinum RTD for cold junction compensation. A very high-resolution 24-bit converter that continuously compensates itself for offset and gain errors as well as provide 50/60 Hz noise rejection. A powerful dedicated I/O processor implements full ITS-90 polynomial thermocouple compensation.

Finally, the Model 1180's Thermocouple input is isolated from the DC input power supply. This allows it to be used with grounded thermocouple as well as non-grounded types.

**DIN Rail Enclosure**

The DIN Rail Enclosure allows mounting on a standard 35 mm DIN Rail. Please see the diagram below. Note, you must remove the top cover with a small screwdriver to access the Service Switch.



***Input Power and Network Wiring***

Power and network are connected via terminal block TB1. The Model 1180 requires about 0.75 VA typical and operates from 10 to 36 Volts DC.

The network interface is Echelon’s FTT-10 Free Topology Transceiver. The interface includes DC blocking capacitors for compatibility with Link Power Transceivers. The network connection is not sensitive to polarity. Please note, the Model 1180 does not include any network termination and it must be added externally.

TERMINAL BLOCK	FUNCTION
TB1	Power and Network Connection. 1: NetA 2: NetB 3: Vin+ = Positive Input of DC Power Supply: 10-36 VDC 4: Vin- = Negative input of DC Power Supply

***Sensor Input***

The six-thermocouple sensors are attached to the Model 1180 via TB2 and TB3 terminal blocks. Each thermocouple input has 3 terminal block positions. The first is for the positive input, the second for the negative input and the third for the cable shield. It is recommended that shielded thermocouples be used and the shield connected only at the Model 1180. Sensor inputs are isolated from the power supply and network communications but not from each other. All shield connections are tied together at the Model 1180. A description of each position is shown below.

**Please note, for best results insert thermocouple wires at about 30 degrees into the spring cage terminal block while depressing the plunger.**

TERMINAL BLOCK	Usage
TB2	Thermocouple Sensor Inputs 1-3 1: Thermocouple Input 1 + 2: Thermocouple Input 1 - 3: Thermocouple Input 1 Shield 4: Thermocouple Input 2 + 5: Thermocouple Input 2 - 6: Thermocouple Input 2 Shield 7: Thermocouple Input 3 + 8: Thermocouple Input 3 - 9: Thermocouple Input 3 Shield
TB3	Thermocouple Sensor Inputs 4-6 1: Thermocouple Input 4 + 2: Thermocouple Input 4 - 3: Thermocouple Input 4 Shield 4: Thermocouple Input 5 + 5: Thermocouple Input 5 - 6: Thermocouple Input 5 Shield 7: Thermocouple Input 6 + 8: Thermocouple Input 6 - 9: Thermocouple Input 6 Shield

***Red Status LEDs***

Each channel has an associated red status LED. As shown in the diagrams above, there are two status LEDs. The status of each input is displayed as follows. The on-board I/O processor and not the Neuron CPU control these LEDs.

<b>Red LED</b>	<b>Condition</b>
Off	Normal condition. Sensors appear to be working properly
Flash	The junction temperature is within 3 degrees of the cold junction temperature. This is not necessarily an error condition. However, it will occur if the thermocouple is at the same ambient condition as the electronics, disconnected or broken.
On	Fault condition. Either there is a problem reading the junction temperature or the thermocouple is out of range.

***Green Run Status LED***

The Green LED flashes to indicate that the on-board I/O processor is running. The LED will pause once every 30 seconds while the unit does zero and full scale calibration and reads the junction temperature.

## NETWORK INTERFACE FOR 1080\_010 FIRMWARE

The Model 1180 has a simple network interface. There are 7 temperatures that can be read. The first is the junction temperature measured by the on-board RTD. Junction temperature data uses an index of 0 into the network variable arrays below. Index 1 through 6 are used to return the temperature associated with thermocouple input 1 to 6.

### CONFIGURATION NETWORK VARIABLES

Configuration network variables are input network variables that are non-volatile and retained when power is lost. Data at index [0] is for the junction temperatures. Data at index [1..6] is for thermocouple inputs 1 to 6.

Network Variable	Format	Default	Description
nciTempOffset[7]	SNVT_temp_p	0.0 C	Offset for user temperature calibration. This value is added to the measured temperature returned. Please note that while you can enter an offset for the junction temperature at index 0, this only affects the junction temperature on the network and is not used by calculation routines to junction compensate the thermocouple temperature readings.
nciMinDelta[7]	SNVT_temp_p	1.0 C	Minimum change required for temperature network output update.
nciMinSendT[7]	SNVT_time_sec	3.0 seconds	Minimum time between temperature network output updates even if nciMinDelta is met.
nciMaxSendT[7]	SNVT_time_sec	30.0 seconds	Maximum time between network variable updates whether or not changes occur. This is sometimes called heartbeat.

### OUTPUT NETWORK VARIABLES

The Model 1180 firmware is designed to control output network variable traffic for integration into large LonWorks networks. On power up the unit randomizes the start of network updates. The nciMaxSendT[x] configuration network variable is the send heartbeat for each of the temperature output network variables. Output network variables will be transmitted at least once every nciMaxSendT[x]. To disable this, set nciMaxSendT[x] to 0.

The output network variables nvoTemp[x], nvoFixPtTemp[x], and nvoFloatTemp[x] are only transmitted if there is a minimum of nciMinDelta[x] change from the last transmitted value. However, they are only transmitted if nciMinSendT[x] has elapsed since last update. nciMinSendT [x] acts as a throttle to minimize traffic even if the data is changing rapidly.

Data at index [0] is for the junction temperatures. Data at index [1..6] is for thermocouple inputs 1 to 6.

Network Variable	Format	Description
nvoTemp[7]	SNVT_temp_p	Temperature output 0.01 C resolution. Set to 327.67 on any hardware errors.
nvoFixPtTemp[7]	SNVT_temp	Temperature output. 0.1 C resolution. Set to 6279.5 on any hardware errors.
nvoFloatTemp[7]	SNVT_temp_f	Temperature in floating point format. Set to 1E38 on any hardware error.

## GENERAL SPECIFICATION

### General

CPU	3120 Neuron @ 5 MHz
Operating Temperature	-40 – 85° C operation
Operating Humidity	0-95% Relative Humidity non-condensing
Input Power	10 to 36 VDC at 0.75 VA
Input Power Protection	Input power is fused and transient voltage protected. (Fuses do not need to be replaced)
Network Transceiver Type	Echelon FTT-10A transceiver at 78 kbps. DC blocking capacitors for LPT10 network.
Input Power and Network Wiring	Removable terminal blocks. Accepts up to 20 GA wire. Input power is reverse voltage protected. Network wiring is polarity insensitive.

### Thermocouple Inputs

Types Supported	K type currently with support for many standard types planned
K Type Temperature Range	-200 C to 1372 C with full ITS-90 polynomial correction
Electronics Accuracy (Preliminary)	0.5 C typical –50 to 500 C 0.75 C typical –100 to 1000 C 1.0 C typical otherwise.
Input Impedance	20 M Ohm
Resolution	0.1 uV
Temperature Drift	better than 5 ppm/C

### Cold Junction Compensation

Type	On-board Class A Platinum RTD.
Accuracy	0.25 C typical

### Dimension and Materials

DIN Rail Enclosure's external Dimension	71 mm (2.8") W x 90 mm (3.54") L x 58 mm (2.28") H
DIN Rail Enclosure's Material	Grey frame retardant Noryl UL94
NEMA 4 Enclosure's external Dimension	130 mm (5.12") W x 130 mm (5.12") L x 60 mm (2.36") H
NEMA 4 Enclosure's Material	Grey polycarbonate with translucent polycarbonate cover. Flame retardant UL94

## ORDERING INFORMATION

<b>1180</b>	<b>Model 1180 Isolated Thermocouple Input Network Interface</b>		
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<b>Code</b>	<b>Enclosure / Housing Options</b>
-0	NEMA 4X
-1	DIN-Rail Mount

<b>Code</b>	<b>Network Communications Option</b>
-0	TP/FTT-10A - LonWorks

<b>1180</b>	<b>-1</b>	<b>-0</b>	<b>Model 1180 Isolated Thermocouple Input Network Interface with FTT-10 in a DIN-Rail Enclosure.</b>
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