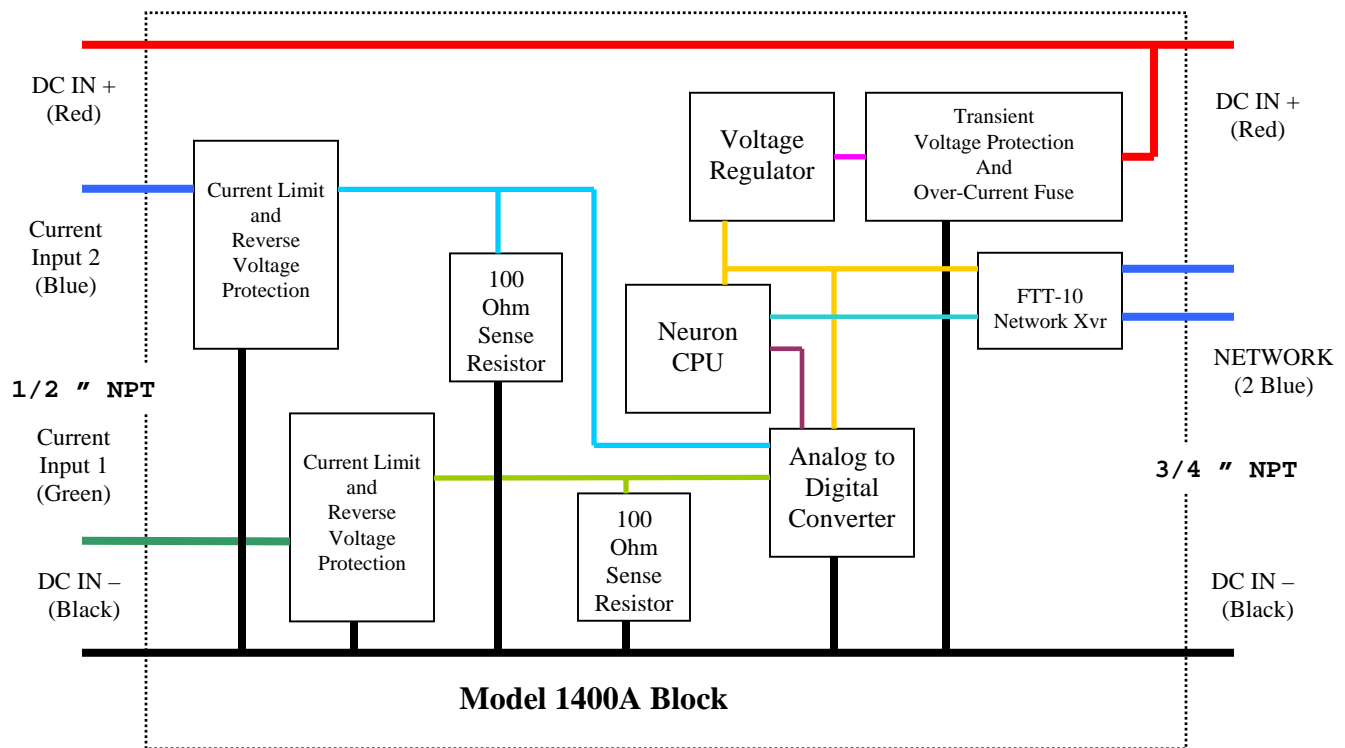


**DUAL 4-20 MA NETWORK BRIDGE**

- Instantly integrate any standard 4-20 mA sensor into the LONWORKS digital network.
- Supports loop and self powered sensors.
- Electronics are sealed for environmental durability.
- Digitally calibrated for high accuracy and custom inputs
- 1/2" NPT connection attaches directly to most sensors' conduit entry.
- 3/4" NPT wiring conduit connection attaches to any standard wiring junction box.
- Multiple sensors multiplexed on same wires
- All outputs available using Standard Network Variables (SNVT)



- Compact and rugged body for durability
- Very compact package becomes part of the wiring conduit.
- Very high resolution of 0.05 uA.



# MODEL 1400A

## DESCRIPTION

The Model 1400A is a dual 4-20 mA input network bridge. It bridges industry standard analog 4-20 mA transmitters with LONWORKS network devices. While the functionality of the Model 1400A is not new, its packaging allows it to essentially become part of the wiring conduit. One side simply fastens directly into most standard 4-20 mA transmitters via their 1/2" NPT wiring entry. The other side of the Model 1400A is a 3/4" NPT that allows attachment of any standard electrical conduit box. This approach greatly reduces the amount of wiring and space required for interfacing 4-20 mA sensors to a LonWorks network.

Although it is very compact, the Model 1400A electronics include a central processing unit, precision sense resistors, a high-resolution analog to digital converter, and a network communication interface. The communication interface is the FTT-10 transceiver. This architecture allows multiple sensors to be used over a simple four-wire bus installation. Two wires are used for power, the other are used for digital communication.

## WIRING AND INSTALLATION

There are four flying leads that extend out of the 3/4-inch NPT end of the Model 1400A. Also note the Service Switch and LED on this end. The Service Switch and LED are used for network installation. When pressed the unit transmits its internal Neuron ID onto the network. The four wires connect power and the LonWorks network to the Model 1400A as follows:



WIRE COLOR	DESCRIPTION
Red	Positive DC Input Voltage of 10 to 32 volts
Black	Negative DC Input Voltage
Blue – 2 Wires	LonWorks FTT-10 network. Polarity insensitive.

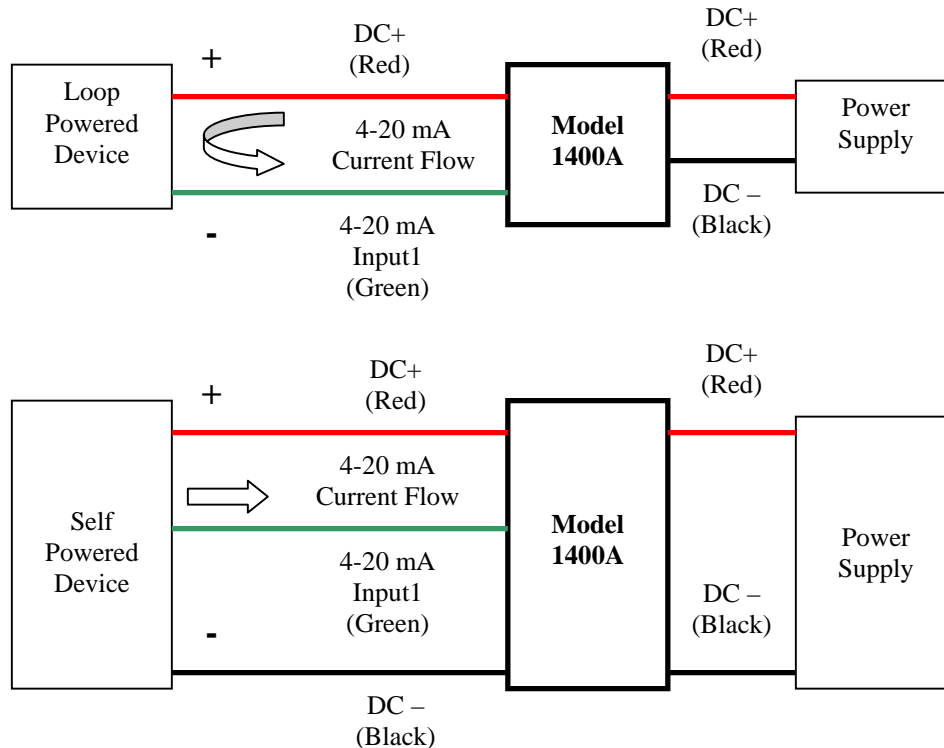
There are four additional flying leads that extend out of the 1/2-inch NPT end. These leads connect the Model 1400A's current inputs to external devices. Please note that the Red and Black wires on the 1/2-inch NPT end can be used to supply power to the unit if it is more convenient to do so on that side. Please see later sections and the block diagram above for clarity. The wire connections are as follows:



WIRE COLOR	DESCRIPTION
Red	Positive DC Input Voltage of 10 to 32 volts
Black	Negative DC Input Voltage
Green	Current Input 1 (4-20 mA Input by default)
Blue	Current Input 2 (4-20 mA Output by default)

## Current Inputs

The current input supports loop and self powered devices. Loop powered devices require a two wire connection and are normally simple devices that can operate on a current between 4 and 20 mA. Self-powered devices require a three-wire connection and normally require much higher currents to operate. The following diagrams demonstrate proper connection of loop and self powered devices to the Model 1400A's Input #1. Substitute the blue wire for the green in the following diagrams to connect to the second input. Note, that power can be connected to the Model 1400A from either side.



Current Input1, green wire, updates the nvoAI[0] output network variable. Current Input 2, blue wire, updates nvoAI[1] output network variable. By default, 4 mA on the input represents 0% while 20 mA represents 100%. Many 4-20 mA sensors provide a local mean to adjust the 4 mA and 20 mA to some actual process values to re-range the transmitter's current output. If this approach is used, there are no further calibration or adjustment to be made.

Additionally, the input can be digitally calibrated via commands sent across the network. Digital calibration is much more precise and does not suffer from long-term component drift. The Model 1400A's input calibration is very flexible allowing any current value in the range of 0 to 25 mA to be specified. Calibration of the Model 1400A includes zero and span to re-define the 0% and 100% points as well as an offset. For convenience, the Model 1400A allows the customer to also calibrate any two custom points. For example precision input sources may only be available at 23% and 68%. The net result is to simply define the lower and upper points on a straight line. This is then used to internally correlate the input signal to the output percentage value. The offset is used to move the straight line up and down without changing its slope.

For maximum flexibility, there are no limits imposed on the upper or lower calibration points. This is useful since you can actually re-define the upper point to be less than the lower point and thus define a

# MODEL 1400A

characteristic line with a negative slope. In this case, the percentage output, nvoAI, will actually go down as the input current goes up.

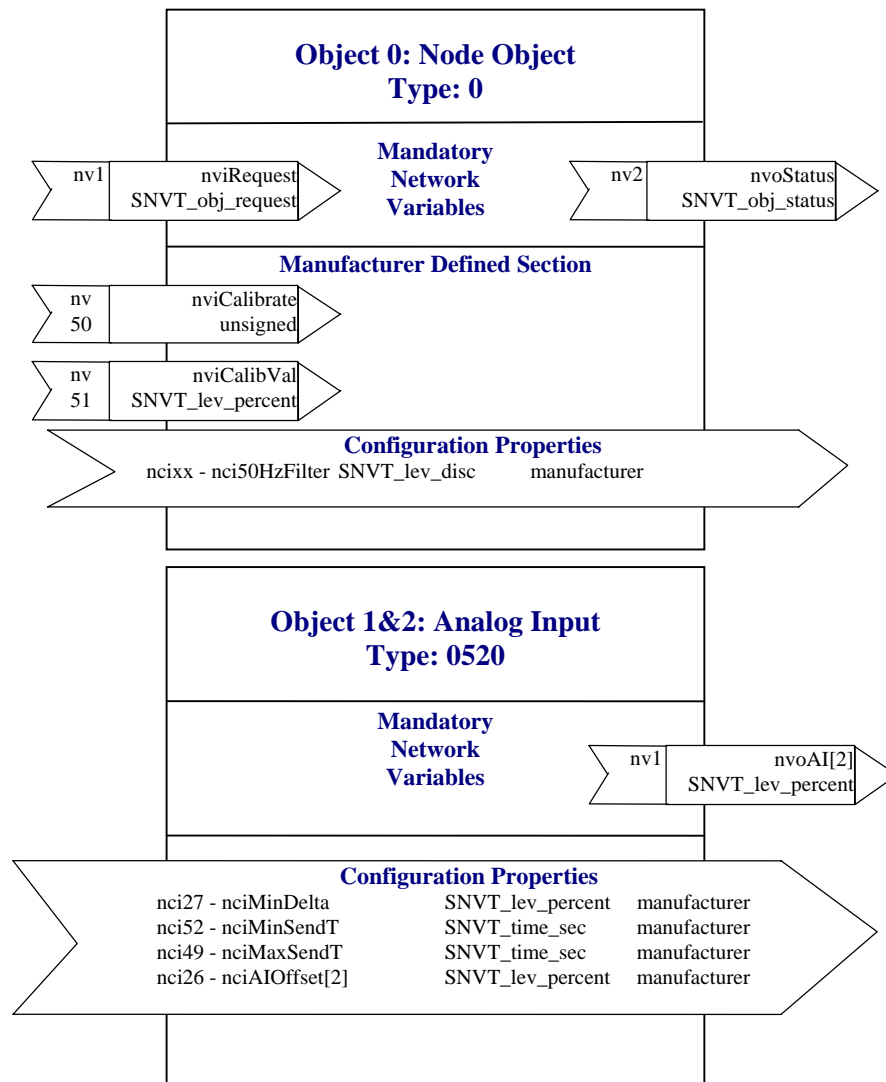
## ***Enabling 50 Hz Filter***

By default, the Model 1400A hardware has high rejection of 60 Hz that may be induced on to the analog signals. If the units are installed in an environment where 50 Hz power lines are used the 50 Hz filter can be enabled by setting the nci50HzFilter Configuration Network Variable to "ON".

## NETWORK OBJECTS

The Model 1400A contains a Node Object and two identical LONMARK Analog Input Profiles, 0520, with input and output data shown below. The nviCalibrate and nviCalibVal network variables allow the Model 1400A to be calibrated and re-ranged by the customer. Specific calibration functions for channel #1 are accomplished by writing the following values into nviCalibrate. The calibrate by value functions assume that nviCalibVal contains a valid value before the command is written into nviCalibrate. Note, for the second channel add 16 to the command.

- 00 - Zero. The current input signal corresponds to 0%.
- 01 - Span. The current input signal corresponds to 100%.
- 02 - Calibrate Value #1. The current input signal corresponds to lower value which is contained in nviCalibVal.
- 03 - Calibrate Value #2. The current input signal corresponds to upper value which is contained in nviCalibVal.
- 15 - Reset calibration to factory



# MODEL 1400A

## GENERAL SPECIFICATION

### General

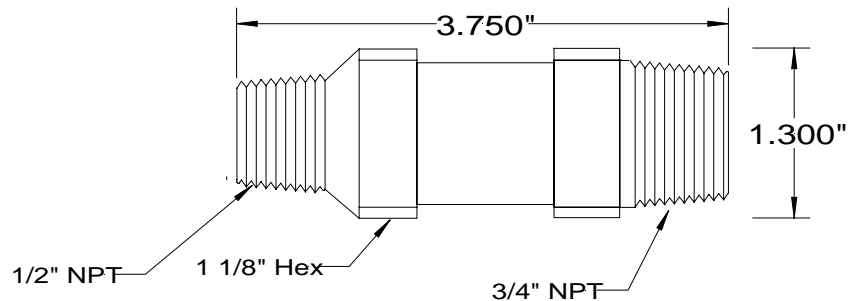
CPU	3120 Neuron
Network Transceiver	FTT-10A
Operating Temperature	-40 – 85 C
Operating Humidity	0-95% Relative Humidity non-condensing
Environmental Protection	Electronics are sealed.
Input Power	10 to 32 VDC
Input Power Protection	Input power is fused and transient voltage protected. (Fuses do not need to be replaced)
Current Consumption	20-30 mA Typical with service LED plus power used by 4-20 mA devices. Plan for an additional 25 mA for each loop powered 4-20mA sensor.
Network Transceiver Type	Echelon FTT-10A transceiver at 78 kbps. DC blocking capacitors for LPT10 network.
4-20 mA Sensor Wiring	Non-terminated 24-awg wire leads 8" length. See Wiring and Installation Section for connection diagram and wire color.
Input Power and Network Wiring	Non-terminated 24-awg-wire leads 8" length. See Wiring and Installation Section for connection diagram and wire color.

### Analog Inputs

Inputs	2
Input Types	0-25 mA current. Factory default is scaled for 4-20 mA
Input impedance	100 Ohm
A/D resolution	0.05 uA. Note, limited by resolution of SNVT_lev_percent which is 0.005%
Accuracy	5 uA at 25 C
Software Update Frequency	All inputs updated once every 300 milliseconds.
Software Resolution	0.005% = SNVT_lev_percent network variable resolution
Temp Coefficient	15 ppm per degree C
Protection	Reverse voltage and over-current limited to 32 mA typical

### Dimension and Materials

Wiring Connection	3/4" Male NPT
4-20 mA Transmitter	1/2" Male NPT
Probe Body	304 Stainless Steel 1.125" Hex, Installed length = 3.25"



# MODEL 1400A

## ORDERING INFORMATION

<b>1400A</b>	<b>Model 1400A Dual 4-20 mA Network Bridge</b>	
	<b>Code</b>	<b>Network Transceiver Option</b>
	-0	TP/FTT-10A
<b>1400A</b>	<b>-0</b>	<b>Model 1400A with FTT-10A transceiver</b>

Echelon, LON, LONWORKS, Neuron, 3120, 3150, LONMARK are trademarks of Echelon Corporation.