Interfacing non-Thought Technology Sensors to Infiniti Encoders

Overview

This technical note provides technical information necessary to interface a sensor to Thought Technology Infiniti encoders (ProComp2, ProComp5 Infiniti, ProComp Infiniti and FlexComp Infiniti).

NOTE: Thought Technology allows interface of their encoders with non-Thought Technology sensors only for non-commercial research or educational purposes.

CAUTION: ProComp2, ProComp5 Infiniti, ProComp Infiniti and FlexComp Infiniti are medical devices. US Federal Laws restricts these devices and accessories to sale by or on the order of a physician or any other practitioner licensed by the law of the state in which he or she practices, to use or order the use of this device.

CAUTION: Connection of non-Thought Technology sensors to the encoder without using the SA9405MA Voltage Isolator 4∞ can damage the encoder. Such damage is not covered by warranty.

Connectivity Options

This section outlines two options for connecting non-Thought Technology sensors to ProComp or FlexComp encoders.

Isolated Interface using Voltage Isolator 4∞ (SA9405MA)

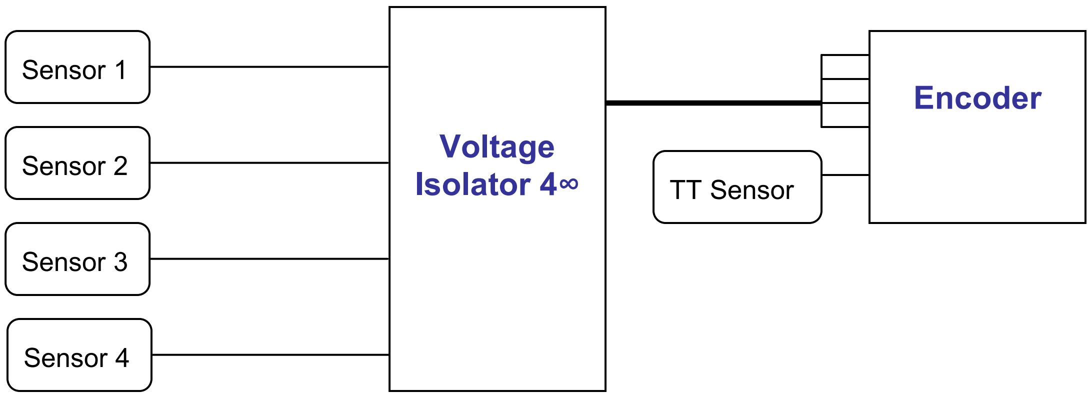
Electrical safety of the subject may require use of the Voltage Isolator if a sensor is mains-powered, and if the subject is electrically connected to an encoder receiving signals from the sensor. This is because any voltages developed by the sensor may affect the subject, and the sensor or its power supply may not provide adequate safety isolation to ensure subject safety in normal or fault conditions.

TT Voltage Isolator 4∞ (SA9405MA) is an interface device providing electrical isolation at a level of 4kV, equivalent to two Means of Patient Protection under IEC 60601-1. It allows the encoder to be safely interfaced with line-powered sensors.

Note that this device does not provide isolation between its input channels or between its output channels.

TT Voltage Isolator 4∞ can interface up to 4 signals. Inputs to Voltage Isolator 4∞ inputs can be provided in two ways:

- via the two stereo jacks (2 channels per jack), or
- via the DB-15 connector (a BNC interface cable or a pigtail cable can be provided with the unit).



For more detailed information on Voltage Isolator 4∞, consult the Thought Technology website or contact the sales department.

Direct Encoder Interface

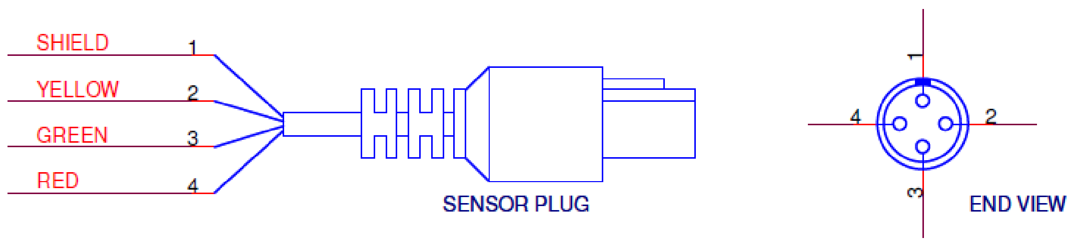
WARNING: Thought Technology does not guarantee that user setups including non-Thought Technology signal sources are electrically safe for patient connection. In particular, if an encoder input is connected to any line powered device, an elevated risk of electrical shock may be present on any other patient-connected sensor plugged into that encoder, unless all interfaces to which the encoder is connected implement medical grade patient isolation. TT Voltage Isolator 4∞ must be used if there is any question of electrical safety for which the user is not qualified and prepared to take full responsibility.

CAUTION: direct connection of customer-supplied circuits to Thought Technology encoder products has the potential to damage the encoder. Such damage is not covered by warranty.

Connection

The sensor cable has 4 color coded conductors. The following table shows the color coding and connector pin assignment. To make interfacing cables for custom set-ups, a single sensor cable may be cut in half. Both sides may then be used, by stripping the outer insulation from each required conductor.

Pin	Color code	Function	Note
1	metal (shield)	Sensor Ground	
2	yellow	auxiliary (sensor ID)	No connection required.
3	green	signal	Provide the signal on this line with respect to Sensor Ground.
4	red	sensor power	Nominally 7.26V above Sensor GND. Must draw approx. 200µA or more to GND to enable sensor detection when connected to the encoder (e.g. use a 33k resistor to GND). The maximum current that can be drawn on this line is in the range of 10mA (5mA on some ProComp2 inputs)



Input Characteristics and Transfer function

The encoder will digitize a direction connected signal as follows, around a nominal reference (zero) level of 2.8 volts above Sensor Ground. If the sensor output range is not appropriate for the encoder input range, signal conditioning (beyond the scope of this document) will be required.

Equipment / Protocol	Input Signal range	Digitized Range (Encoder Volts)
Infiniti FlexComp or Infiniti ProComp outputting an Infiniti Protocol	2.8V ± 1.696V	± 1.696V
Any other applicable Protocol or Encoder	2.8V ± 0.848V	± 0.848V

Note that if the sensor output signal is AC (no DC component is significant), it is possible to capacitively couple the output to the encoder input. This will result in a signal that is centered around a nominal level of zero volts DC. For purposes of calculating the RC time constant, the input resistance of the encoder (to 2.8 volts above Sensor Ground) is 2.2 megohms.