



**FORCE SENSOR ADAPTER T9540**

**Measure More**  
**Sense Better**

# Technical Note Series

## FORCE SENSOR ADAPTER (T9540)

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## IMPORTANT OPERATION INFORMATION

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- Type BF Equipment
- Internally powered equipment
- Continuous operation



### WARNING

- Explosion Hazard; Do not use in the presence of a flammable anesthetic mixture with air, or with Oxygen or Nitrous Oxide.
- Not to be immersed in water.



### CAUTION

- Connection of customer supplied circuits to Thought Technology sensor products has the potential to damage the sensor. Such damage is not covered by warranty.



### ATTENTION

- For research only. Not for use in diagnostic procedures.
- To prevent voiding warranty by breaking connector pins, carefully align white guiding dot on sensor plug with slot on sensor input.

### MAINTENANCE AND CALIBRATION

- Wipe with a clean cloth
- Factory testing and calibration ensure equipment accuracy and frequency response.
- No preventative inspections required.

### STORAGE

- Temperature -23C – +60C
- Humidity (non-condensing) 10% – 90%
- Atmospheric pressure 700 – 1060 KPa

### TRANSPORTATION

- Temperature -23C – +60C
- Humidity (non-condensing) 10% – 90%
- Atmospheric pressure 700 – 1060 KPa

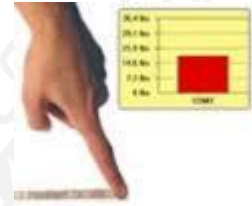
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## PRODUCT OVERVIEW

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This adapter connects to third party Force sensors of varying sensitivity to measure pressure or force, such as Tekscan Flexiforce and Imaging Technologies Uniforce. It can be used to monitor tactile activity, or as a foot switch for Gait Analysis.



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## OPERATING PRINCIPLE

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A force sensor is sensitive to load applied to a small area of its surface. Force sensors are available in a number of maximum load ratings, for example 10lbs and 50lbs. When connected to a person or object they sense changes in the applied pressure. The sensor plugs into the adapter which in turn plugs into the encoder.

### Recommended Force Sensors :

Manufacturer	Tekscan Inc
Sensor model	Flexiforce Sensor
Part number	A201-1 (1lb) A201-25 (25lb) A201-100 (100lb)

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## TECHNICAL SPECIFICATIONS

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Length	~152cm (60")
Weight (approx.)	~10g
Recommended Force Sensors	Manufacturer – Tekscan Inc Sensor model – Flexiforce Sensor Part # A201-1 (1lb) A201-25 (25lb) A201-100 (100lb)
Force Sensor Type	Variable Resistive
Force Sensor Resistive Range ( $R_{fs}$ )	1K $\Omega$ - 1.4M $\Omega$ (native Infiniti modes)
Output Voltage Transfer Function	$V_{out} = [301K\Omega / (R_{fs} + 575K\Omega)] * V_s$ where $R_{fs}$ is the resistance of force sensor in K $\Omega$ and $V_s$ is sensor supply voltage.
Supply Voltage	7.26VDC nominal
Current Consumption	<1mA @ 7.26 VDC nominal
Accuracy	$\pm 1\%$

This sensor provides a relative measurement of applied pressure. The output voltage signal may be converted to pressure units (PU) for qualitative purposes only. The measured signal does not accurately reflect applied pressure at the sensing component.

### Recommended Connectivity for Electrical Safety

To ensure electrical safety in the user setup, Thought Technology recommends the use of TT Sensor Isolator SE9405AM when interfacing client connected sensor(s) to line powered equipment(s) or devices.

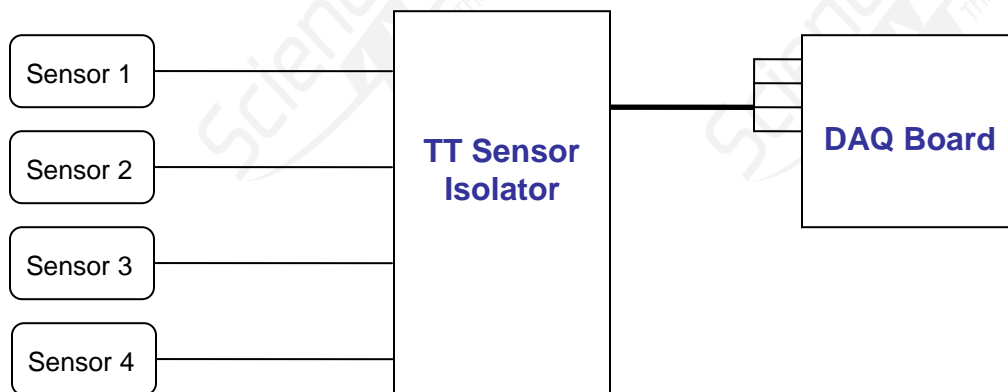


The TT Sensor Isolator SE9405AM is an interface device providing medical grade electrical isolation between the client connected sensors and the acquisition system. It provides the equivalent of Two Means of Client Protection under IEC 60601-1, and supplies battery power to the sensors. Using this device ensures Thought Technology sensors are safely interfaced to the analog inputs of line-powered systems such as computers with DAQ cards.

**Note that this device isolates only between sensors and the DAQ interface, not between different sensor channels.**

The TT Sensor Isolator can interface up to 4 sensors to a DAQ card. TT Sensor Isolator can be connected to the DAQ card in two ways:

- via two stereo jacks, or
- via a DB-15 connector; a BNC interface cable (SA9409BNC) or a pigtail cable (SA9409PGT) can be provided with the unit.



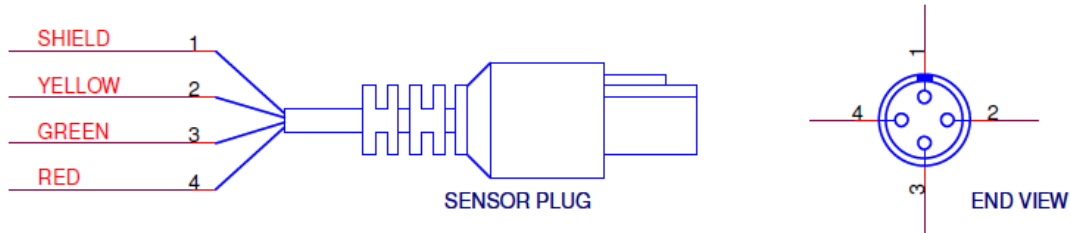
For more detailed information on the Sensor Isolator 4<sup>∞</sup>, consult the Thought Technology Science Division website or contact the sales department or an authorized distributor.

### Direct Connectivity for Electrically Isolated Systems

The following notes are provided for qualified users to directly interface Thought Technology sensors with external systems.

To interface with a sensor, a single sensor cable may be cut in half. Both sides can then be used to make custom interfacing cables by stripping the outer insulation of each required conductor. The sensor cable contains 4 color coded conductors. The table below shows the color coding and pin connector assignment.

Pin	Color code	Function	Note
1	metal (shield)	ground	Signal and power ground, connection required.
2	yellow	auxiliary (sensor ID)	No connection required.
3	green	signal	Sensor output signal
4	red	sensor power	Supply voltage, +7.26V referenced to ground. Note: sensor performance may be sensitive to supply voltage.



#### Notes:

1. The nominal supply voltage for this sensor is 7.26V. The sensor can safely be used with a supply voltage of up to 9V.

#### Recommended Specifications for DAQ Hardware

- Recommended resolution of 0.15mV (16-bit ADC over 10V span) or better
- Minimum input range:
  - If connected via SE9405AM Sensor Isolator, choose 0-5V (unipolar) or ±5V (bipolar)
  - If directly connected to DAQ, choose ±5V (bipolar).

#### Simplified Transfer Function

$$PU = 799.47V_{out} - 1639$$

Conversion of voltage to pressure units (PU)  
(for quantitative purposes only)

The simplified transfer function assumes the sensor is used with the Sensor Isolator, or the supply voltage provided in the user setup is 7.26V nominal.