

GONIOMETER ADAPTER T9545

Measure More
Sense Better

Technical Note Series

GONIOMETER ADAPTER (T9545)



IMPORTANT OPERATION INFORMATION



- 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

PRODUCT OVERVIEW

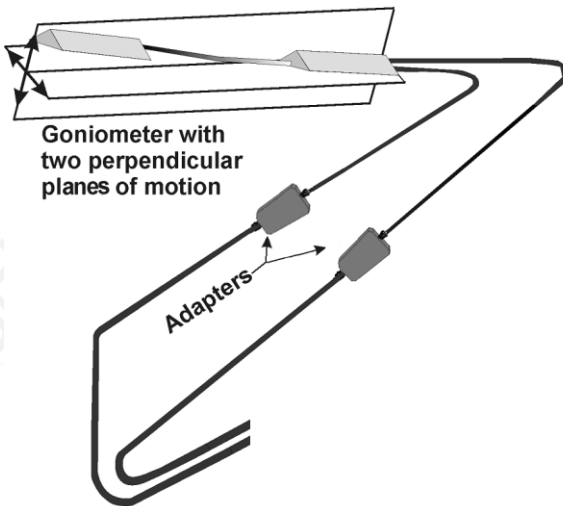


This adapter connects to Biometrics' torsiometers or single and dual axis goniometers, used for monitoring joint movement in multiple planes. Ideal choice for Ergonomics and Gait Analysis.

(Goniometer & Torsiometer to be purchased from Biometrics Ltd. separately).

A Goniometer or Torsiometer set up comprises two parts, the sensor and the adapter. Two types of Goniometer Adaptor are available; one is labeled Goniometer/Torsiometer Adapter and is for interfacing to the Penny & Giles style sensor; the other is for interfacing with the Flexpoint bend sensor. Both are treated the same with respect to operation. Contact TTL or our authorized dealers for information on purchasing the sensors.

OPERATING PRINCIPLE



A Goniometer/Torsiometer sensor can be sensitive to movement in a number of directions X axis, Y axis and Rotation for a Torsiometer. Goniometers are available in a number of sizes with measurement in up to two axes. Each axis requires a separate adapter. When connected to a person or articulated object they sense changes in angle of one end of the sensor in relation to the other end. The sensor plugs into the adapter.

Note: Single Axis Goniometers require one (1) adapter. Twin Axis Goniometers require two (2) adapters.

TECHNICAL SPECIFICATIONS

Size (approx.)	370mm x 370mm x 100mm (1.45" x 1.45" x 0.44")
Weight (approx.)	15g (0.5 oz)
Input Impedance	>1M Ω
Signal Input Range	-180° – +180° ($\pm 5^\circ$ degrees of movement)
Signal Output Range	2.200 – 3.400V
Supply Voltage	7.26VDC
Current Consumption	<4mA @ 7.26 VDC
Accuracy	$\pm 5\%$

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.

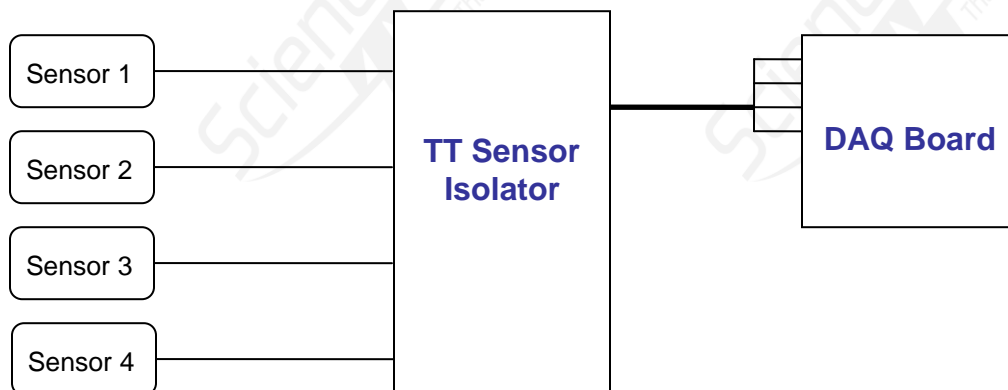


The TT Sensor Isolator SE9405AM is an interface device providing medical grade electrical isolation between the client connected sensors and the acquisition system. It provides the equivalent of Two Means of Client Protection under IEC 60601-1, and supplies battery power to the sensors. Using this device 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.



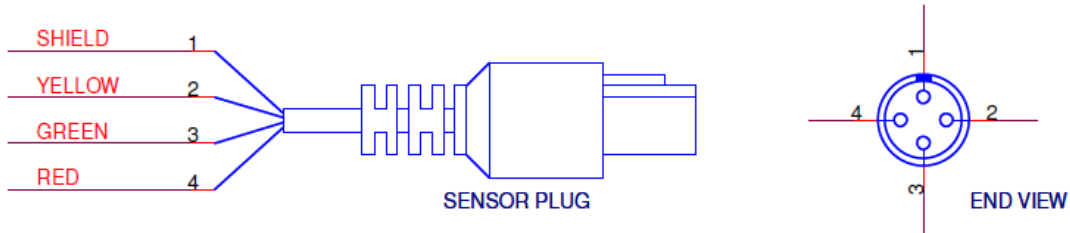
For more detailed information on the Sensor Isolator 4[∞], consult the Thought Technology Science Division website or contact the sales department or an authorized distributor.

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 $\pm 5V$ (bipolar)
 - If directly connected to DAQ, choose $\pm 5V$ (bipolar).

Simplified Transfer Function

$$\theta = 300V_{out} - 840$$

Conversion of voltage [V] to output angle in degrees

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.