



EKG RECEIVER FOR POLAR SA9330

Measure More
Sense Better

Technical Note Series

EKG RECEIVER FOR POLAR (SA9330)



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



The EKG Receiver detects the heart rate of a user from the Polar transmitter belt T31, T31c and WearLink®+ (**not provided**) that the user wears around the chest. The Wireless reception range of the EKG receiver is deliberately kept short, typically 80cm (2.5 feet) to prevent it from connecting with other belts in the neighborhood of the user.

Benefits:

- **Wireless transmissions** from the transmitter to the EKG receiver, thus no electrodes are needed.
- Heart beat signal is less prone to movement or EMG artifacts, and is very stable, so you have **freedom of movement**.
- Polar™ transmitter belts are slim and light, easy to position on the chest, and fully water resistant and designed for all weather conditions.

IMPORTANT NOTES:

Polar™ transmitter belt T31, T31c or WearLink®+ is not provided by Thought Technology and must be purchased separately. It can be easily purchased at your local major department stores, sports specialty stores, or other stores.

Coded or non-coded?

Polar™ has 2 variations of transmitter belts: coded and non-coded. *Polar™ CODED Wireless Technology* is to greatly reduce CROSSTALK issues when equipment is placed in close proximity to other equipment (typically in health clubs where equipment is placed <1 ½ feet apart.), so that one person's Polar™ watch won't pick up the heart rate from the person next to you.

Our EKG Receiver can detect heart beats from both coded and non-coded Polar™ transmitter belts. However, EKG Receivers with serial numbers **from E1024 to E1098** do not differentiate between them. These will still receive and process the signal, but will treat the coded belt as a NON-CODED one.

Compatible Polar™ Belts

<http://www.polar.fi/en/products/accessories>)

T31 coded™ transmitter

Source: Polar™ website



At the heart of your training is the coded T31. Its purpose is simple: to transmit your heart rate to your wrist unit. Slim and light, the ECG (electrocardiogram) accurate transmitter is fully water resistant and designed for all weather conditions

- Built to last with up to 2500 hours of training usage
- Prevents cross-talk from other electrical devices for accurate measurement of your training

Compatibility: fully compatible, except the EKG receivers with the serial numbers listed E1024 to E1098. Those receivers will treat T31c transmitter as a NON-CODED belt (like a T31 transmitter).

T31 transmitter

Source: Polar™ website



Slightly different to the T31c Transmitter, the slim, light and waterproof T31 doesn't have the benefit of coding for interference free transmission. However, its purpose remains the same: to transmit your heart rate to your wrist unit ECG (electrocardiogram) accurately.

Compatibility: fully compatible.

WearLink®+ transmitter

Source: Polar™ website



Comfort is key when training. That's why Polar created the Polar WearLink®+ transmitter belt. It not only measures your heart rate but also seamlessly adapts to your body shapes so you feel as if it's not even there. The transmitter consists of an electrode strap and a connector, and with its new side-clip mechanism, it's just as quick to put on as it is to take off.

Compatibility: fully compatible

TECHNICAL SPECIFICATIONS

Dimensions	25mm x 23mm x 11mm
Weight	15g
Wireless Reception Range	80cm (2.5 feet) typical, 105cm (3.5 feet) maximum
Output Waveform	Digital pulses 15mS
Operating temperature	10°C-40°C
Current Consumption, maximum	1.5mA

INTERFACING WITH 3RD PARTY DATA ACQUISITION SYSTEM

Recommended Connectivity for Electrical Safety

Thought Technology recommends the use of TT Sensor Isolator SE9405AM when interfacing client connected sensor(s) to line powered equipment(s) or devices.

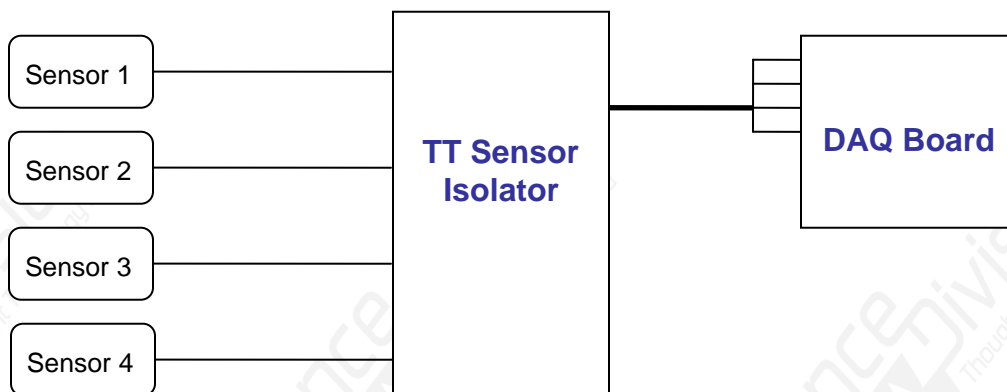


The TT Sensor Isolator SE9405AM is an interface device providing medical grade electrical isolation between the client connected sensors and the acquisition system. It provides the equivalent of Two Means of Client Protection under IEC 60601-1, and supplies battery power to the sensors. Using this device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



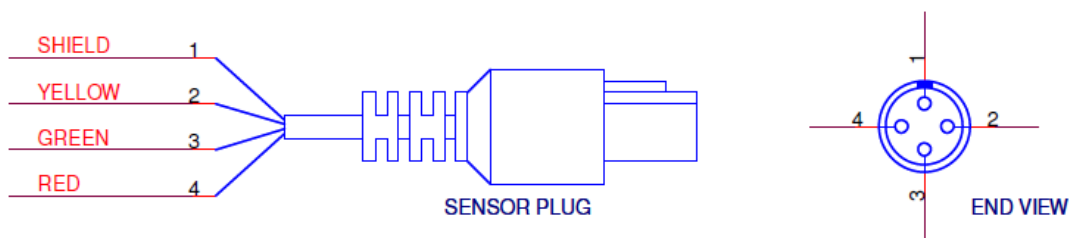
For more detailed information on the Sensor Isolator 4[∞], consult the Thought Technology Science Division website or contact the sales department or an authorized distributor.

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. This sensor can safely be used with a supply voltage of up to 9V.
2. The output of the sensor is AC (capacitive) coupled. Therefore, in order to set the DC level of the signal when connected to a DAQ system, it is usually necessary to connect a DC bias resistor between the signal (pin 3, green wire) and ground (pin 1, shield wire). A typical value for this resistor is 2.2 Mega ohms.

If no resistor is connected, the DC signal level may be unstable. The signal may drift upward or downward and saturate the DAQ input. This condition will result in an unusable signal but will not typically cause any equipment damage.

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).