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Wireless Sensing Systems & Design
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CorTemp™ Core Body Temperature Monitoring System

User Manual



**CorTemp™ Core Body
Temperature Sensor
HT15002**

**CorTemp™ Data Recorder
HT15001 / HT15016 (w/HR)
r4.3**

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I. System Overview



The CorTemp™ Core Body Temperature Monitoring System provides a complete electronic thermometer system that is easy to use and provides accurate core body temperature measurements ($\pm 0.1^{\circ}\text{C}$). The system uses an ingestible, wireless sensor, which transmits a signal via magnetic flux to the CorTemp™ Data Recorder. This system has obvious advantages over a "wired probe", for monitoring individuals performing strenuous activities or working in hazardous environments.

The monitoring system captures the core body temperature of single or multiple subjects while participating in sports, working in hazardous conditions, or participating in research activities in two different modes of monitoring / data collection:

- **AUTO RUN MODE** – CorTemp™ Data Recorder is worn by the monitored subject while data is collected at user programmable intervals.
- **SPORTS MODE** – CorTemp™ Data Recorder is held by an athletic trainer taking individual readings of single or multiple players.

The CorTemp™ Core Body Temperature Monitoring System is registered and cleared by the FDA as a Class II Non-Invasive Medical Device under 510(k) number (880639) as a Clinical Electronic Thermometer – Substantially Equivalent (SE) designation.

II. System Components

The CorTemp™ Core Body Temperature Monitoring System consists of the following components:

| Component | Product # | Description |
|--|--------------------------------------|---|
| CorTemp™ Core Body Temperature Sensor  | HT150002 | <ul style="list-style-type: none"> Ingestible sensor which transmits core body temperature. |
| CorTemp™ Data Recorder  | HT150001 OR HT150016 (w/HR) | <ul style="list-style-type: none"> Receives signal from CorTemp™ Core Body Temperature Sensor. Displays and saves data. |
| Data Recorder Pouch  | HT300001 | <ul style="list-style-type: none"> Soft pouch with belt loop for wearing Data Recorder. (AUTO RUN MODE) |
| Data Recorder Storage Case  | HT300002 | <ul style="list-style-type: none"> Molded plastic carrying case for Data Recorder. |
| Data Transfer Cable  | HT340004 | <ul style="list-style-type: none"> Allows communication between the Data Recorder and a PC / Laptop. |
| CorTrack™ II Software  | HT610000 | <ul style="list-style-type: none"> Software interface between CorTemp™ Data Recorder and PC / Laptop. |

| Options | Product # | Description |
|---|--|---|
| Polar® Transmitter and Chest Belt (HR Option)  | HT300005 | <ul style="list-style-type: none"> Transmits heart rate. |
| Belt Clip  | HT300017 | <ul style="list-style-type: none"> Allows Data Recorder to be attached to a belt or pocket for portability and quick release. (SPORTS MODE) |
| Data Recorder Alarm  | HT150008 | <ul style="list-style-type: none"> Audio / visual alarm that can be positioned on the monitored subject up to 3ft. from the Data Recorder. (AUTO RUN MODE) |
| 9-Volt Battery Eliminator  | HT300010 | <ul style="list-style-type: none"> 120V / 60Hz AC Adapter with 9-Volt Snap Connector designed for the Data Recorder. |
| Barcode Scanner System  | HT150025 | <ul style="list-style-type: none"> Provides faster input of Serial & Calibration #s. Eliminates data entry errors. Scans Barcode via LED Beam. |
| RF Remote Unit  | HT150009 (914Mhz) OR HT150014 (433Mhz) | <ul style="list-style-type: none"> Transmits data via RF to a RF Central Base Station or a PDA – RF Base Unit. Belt clip attached for portability. |
| Sports RF Remote Cable  | HT340008 | <ul style="list-style-type: none"> Allows Data Recorder to be handheld by Athletic Trainer. (SPORTS MODE) |

III. CorTemp™ Core Body Temperature Sensor



The CorTemp™ Core Body Temperature Sensor, or "Pill", is a small electronic device (0.88" Length x 0.42" Diameter) which senses core body temperature and transmits that temperature to a receiver positioned within a radial proximity (approximately 40cm) to the sensor. The sensor is intended to be swallowed and passes harmlessly through the gastrointestinal tract at the normal rate of motility. The CorTemp™ Core Body Temperature Sensor is powered by a silver-oxide battery that will last for several days. The sensor components are encapsulated in an epoxy resin, which is then coated in silicone. Prior to use, the sensor is activated by removing the small magnet attached to the orange Warranty Seal.

FCC Notice

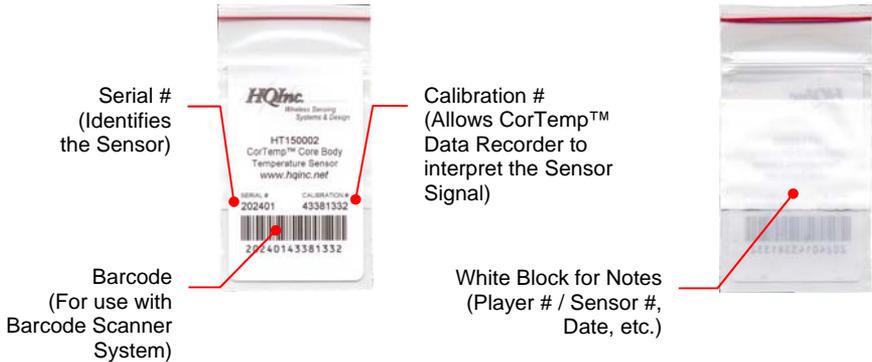
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: Changes or modifications not expressly approved by HQ, Inc. could void the user's authority to operate the equipment.

A. Sensor Storage

The CorTemp™ Core Body Temperature Sensors are shipped with magnets attached. These magnets keep the sensors turned off. If the sensors are stored too closely together, in close proximity to metal objects such as metal drawers / shelving, or within electromagnetic fields generated by large equipment such as a MRI, the sensors may turn on and drain the batteries. It is extremely important that individual sensors are stored with at least one inch separating each sensor. **NEVER** store the sensors in or near metal objects. The sensors are shipped within custom-made foam inserts to maintain constant separation between sensors. It is strongly recommended that the sensors be kept in these foam inserts during storage. Use the *SENSOR TEST* feature of your CorTemp™ Data Recorder to verify if stored sensors are turned off. A Sensor Storage Alarm System (HT150011), which features an audio / visual alarm, may be purchased from HQI to monitor the sensors continuously while in storage.

B. Sensor Packaging



The CorTemp™ Core Body Temperature Sensor is intended for one-time use only. The sensor is factory calibrated and packaged in a sealed plastic bag. This bag should not be opened until the sensor is ready for use. Once the bag is opened, the sensor should be used immediately. A small magnet is attached to the sensor, which keeps the sensor turned off during storage. To activate the sensor, simply remove the magnet.

To turn the sensor off once the magnet has been removed, using *SENSOR TEST*, hold the sensor near the CorTemp™ Data Recorder, making sure that you see *SENSOR ON* displayed on the recorder screen. Move the magnet on the sensor until *SENSOR OFF* is displayed on the recorder screen.

C. Warranty Seal



Each CorTemp™ Core Body Temperature Sensor is covered by a limited warranty. This warranty is evidenced by the bright ORANGE Warranty Seal placed around each sensor. HQI tests each sensor for accurate calibration and operation. If, for any reason, the CorTemp™ Core Body Temperature Sensor fails to operate, it may be returned to HQI for replacement at no cost to the user, as long as the Warranty Seal is unbroken and remains in place. (Refer to **Section VI: Warranty and Service Information** for more details).

D. Intended Use and Contraindications

INTENDED USE: The CorTemp™ Core Body Temperature Sensor is designed for the measurement of core body temperature in individuals for whom accurate, continuous core body temperatures are required and may be used only on the order of a physician who has clinically evaluated the contraindications and warnings associated with the use of an ingestible thermometer sensor.

CONTRAINDICATIONS: The CorTemp™ Core Body Temperature Sensor is contraindicated for HQI under the following conditions:

- In any subject whose body weight is less than eighty (80) pounds.
- In the presence of any known or suspected obstructive disease of the gastrointestinal tract, including but not limited to diverticulitis and inflammatory bowel disease.
- In any subject exhibiting or having a history of disorders or impairment of the gag reflex.
- In any subject with previous gastrointestinal surgery.
- In any subject having felinization of the esophagus.
- In any subject who might undergo Nuclear Magnetic Resonance (NMR) / Magnetic Resonance Imaging (MRI) scanning during the period that the CorTemp™ Core Body Temperature Sensor is within the body.
- In any subject with hypomotility disorders of the gastrointestinal tract, including but not limited to ileus.
- In any subject having a cardiac pacemaker or other implanted electromedical device.

WARNING: The following should be carefully considered before determining if the CorTemp™ Core Body Temperature Sensor is appropriate for an individual:

The CorTemp™ Core Body Temperature Sensor may not be appropriate in individuals who have experienced swallowing disorders. If an individual experiences difficulty swallowing the sensor, they may not be a candidate for CorTemp™ Core Body Temperature Monitoring System. Careful consideration should be given before using the CorTemp™ Core Body Temperature Sensor for temperature monitoring during abdominal or other surgery that might expose the sensor to ambient air and cause inaccurate temperature readings. Special consideration should be given to the placement of the CorTemp™ Data Recorder when monitoring obese individuals, the recorder may have to be repositioned as the sensor travels through the digestive tract. Also, the CorTemp™ Core Body Temperature Sensor should be used with caution in any individual exhibiting nausea and / or vomiting.

Only one CorTemp™ Core Body Temperature Sensor should be ingested. The signals transmitted from multiple sensors could cause inaccurate temperature readings. If multiple sensors are to be used, be certain each previously administered sensor has passed before the individual is administered a new sensor.

IV. CorTemp™ Data Recorder – Standard Menu



The CorTemp™ Data Recorder receives the signal from the CorTemp™ Core Body Temperature Sensor and converts the signal frequency into digital temperature data. This temperature data is displayed on the recorder LCD screen with a resolution of 0.01 degree. The recorder operates within environments between 10 and 50 degrees Celsius. The temperature / heart rate is sampled at user programmable intervals and displayed for real time monitoring, while simultaneously saving to memory for future download and analysis.

The CorTemp™ Data Recorder can be programmed as a standalone unit with the recorder keypad, or it can be programmed by the CorTrack™ II software from your PC / Laptop. The recorder can be programmed with up to 99 sensor calibration numbers and record / store up to 25,000 readings. The recorder can be used as an ambulatory unit (*AUTO RUN MODE*) to collect temperature / heart rate data for extended periods from one subject, or as a handheld unit (*SPORTS MODE*) to collect individual temperature / heart rate

readings from multiple players, easily switching back and forth between active players (sensors). The data, when downloaded, displays the active sensor (player) number, the date of the collection period, and time correlated temperature / heart rate readings.

A. Programming the CorTemp™ Data Recorder – Standard Menu

A.1. Battery Installation

The CorTemp™ Data Recorder operates on one standard 9-Volt alkaline battery, which will provide approximately 110 hours of continuous recording at 10 second intervals. Battery power can last up to 336 hours (14 days), depending on the sampling interval. Energizer®, Duracell®, or Ultralife® brands of battery are recommended.

To install the battery in the CorTemp™ Data Recorder, do the following:

1. Remove the battery cover from the recorder.
2. Connect a new 9-Volt battery (Energizer®, Duracell®, or Ultralife®) by attaching the battery connector to the battery.
3. Insert the battery in the battery compartment and replace battery cover.

A.2. Using the Keypad – Standard Menu



Throughout **Section IV** of this manual, we will refer to the CorTemp™ Data Recorder keypad. Before continuing with **Section IV**, take a few moments to observe the keypad and its functions in relation to the **STANDARD MENU**.

| Key | Description |
|-------------------|--|
| MENU | From the <i>EXIT / STBY</i> mode, pressing <i>MENU</i> will gain access to the Standard Programming Menus. |
| ENTER | From the Standard Programming Menus, pressing <i>ENTER</i> returns the recorder to the <i>EXIT / STBY</i> mode. |
| READ | From the Standard Programming Menus, pressing <i>READ</i> will move to the next Standard Programming Menu screen. From the <i>AUTO RUN MODE</i> , pressing <i>READ</i> will take a manual reading. |
| RUN / STOP | From the <i>EXIT / STBY</i> mode, pressing <i>RUN / STOP</i> begins or ends <i>AUTO RUN MODE</i> . From <i>PC LINK</i> , pressing <i>RUN / STOP</i> ends <i>PC LINK</i> . |
| F1 | While in the Standard Programming Menus, pressing <i>F1</i> selects the option at the top of the screen. |
| F2 | While in the Standard Programming Menus, pressing <i>F2</i> selects the option at the bottom of the screen. |
| 0 – 9 | Numeric input for the Standard Programming Menus. From the <i>AUTO RUN MODE</i> , pressing 0 – 9 will initiate an Event Marker. |

A.3. Turning ON the CorTemp™ Data Recorder

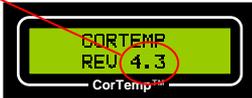
To turn *ON* the CorTemp™ Data Recorder, do the following:

1. Once the battery has been installed turn the ON / OFF switch to the *ON* position.
2. The recorder will run a self-test. During the self-test, screens similar to the following will display. The Firmware Revision # and whether or not the recorder has the heart rate upgrade are noted as below.



Firmware Revision #

Heart Rate Designation



Non-Heart Rate Recorder



Heart Rate Recorder

3. On completion of the self-test, the date and time will appear briefly. The date represents the last programmed date and the time represents the current time. **Verify that the date is not 00-00-00 and that the time is correct.**



NOTE: If the CorTemp™ Data Recorder has been off for an extended period of time, turn the recorder ON for approximately 10 minutes. This allows the internal components to recharge. After 10 minutes, turn the recorder OFF. Then, after 1 minute, turn the recorder back ON and initialize. You are now ready to proceed.

A.4. Exit / Standby Mode



EXIT / STBY mode allows the user to access the Standard Programming Menus, initiate *AUTO RUN MODE*, and *TURN OFF* the CorTemp™ Data Recorder.

Accessing the Standard Programming Menus

To access the Standard Programming Menus, do the following:

1. From *EXIT / STBY* mode, press **MENU** on the recorder keypad.
2. Press **READ** to progress through the Standard Programming Menus.
3. Press **ENTER** on any of the Standard Programming Menus to return to *EXIT / STBY* mode.

AUTO RUN MODE

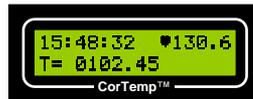
AUTO RUN MODE allows the user to take Temperature / Heart Rate readings at a set temperature collection interval.

To initiate *AUTO RUN MODE*, do the following:

1. From *EXIT / STBY* mode, press **RUN / STOP**.
2. Temperature / Heart Rate readings will display at the end of the set interval.



Temperature Reading



Temperature Reading with Heart Rate

To terminate *AUTO RUN MODE*, press **RUN / STOP** on the recorder keypad.

Turning OFF the CorTemp™ Data Recorder

To turn *OFF* the CorTemp™ Data Recorder, do the following:

1. From *EXIT / STBY* mode, press **F1**.
2. A *TURN OFF UNIT* message will display.



3. Turn the recorder ON / OFF switch to the *OFF* position.

A.5. Date and Time

To program the date and time, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. The *DATE / TIME* screen will display.



3. Press **F1** on the recorder keypad to program the **DATE**.
4. Enter the Date (mm-dd-yy). **NOTE: Default is 00-00-00.**
5. Press **F2** on the recorder keypad to program the **TIME**.
6. Enter the Time (hh:mm:ss). **NOTE: Default is 00:00:00.**

NOTE: The CorTemp™ Data Recorder does not display a changing date, but counts hours and days from when the date was last entered to keep an accurate elapsed-day record. The date initially entered will display in the downloaded data as well as all changed dates with corresponding "H" markers. To display the actual date, simply re-enter the date. (Refer to Appendix 3: Data Interpretation Key).

A.6. Temperature Collection Interval and High / Low Temperature Alarms

The temperature collection interval can be programmed anywhere between every 10 seconds to once every 24 hours (23:59:59). Data is collected at the **END** of the set interval. The default interval is 10 seconds. **If the heart rate feature is to be used, the required minimum temperature collection interval is 20 seconds.**

High and Low Temperature Alarms display on the recorder screen when collected data is outside the programmed parameters. A Data Recorder Alarm (HT150008) may be purchased from HQI to provide an audio / visual alarm that can be positioned on the monitored subject up to 3ft. from the CorTemp™ Data Recorder. (**AUTO RUN MODE**)

Temperature Collection Interval

To program the temperature collection interval, do the following:

1. From **EXIT / STBY** mode, press **MENU**.
2. Press **READ** until the **INTERVAL** screen displays:



3. Press **F1** on the recorder keypad to program the **INTERVAL**.
4. Enter the Interval (hh:mm:ss). **NOTE: Default is 00:00:10.**

High / Low Temperature Alarms

To program the high / low temperature alarms, do the following:

1. Press **F2** on the recorder keypad to program the **ALARMS**.
2. Enter the High and Low Limits. **NOTE: Default is 000.0.**

When the alarm is triggered, **HALRM** or **LALRM** will display on the recorder screen.

A.7. Data Transfer and PC LINK

DATA TRANSFER allows the user to transfer collected data to terminal programs, such as *HyperTerminal*. **PC LINK** allows 2-way communication between the CorTemp™ Data Recorder and a PC / Laptop. **PC LINK** is used for programming the recorder from the CorTrack II software and downloading data to the CorTrack II software.

To initiate **DATA TRANSFER** or **PC LINK**, do the following:

1. From **EXIT / STBY** mode, press **MENU**.
2. Press **READ** until the **DATA TRANSFER / PC LINK** screen displays.



3. Press **F1** on the recorder keypad to initiate **DATA TRANSFER** or press **F2** on the recorder keypad to initiate **PC LINK**.

To terminate **DATA TRANSFER** or **PC LINK**, press **RUN / STOP** on the recorder keypad.

A.8. Temperature Scale

The CorTemp™ Data Recorder can be programmed to take temperature readings in either Fahrenheit or Celsius. The default temperature scale is Fahrenheit.

To set the temperature scale, do the following:

1. From **EXIT / STBY** mode, press **MENU**.
2. Press **READ** until the **DEGREE / RF/RT** screen displays.



3. Press **F1** on the recorder keypad to program the **DEGREE**.
4. **DEGREE** will toggle between **F** (Fahrenheit) and **C** (Celsius). **NOTE: Default is F.**

NOTE: Always Download Data, then Clear Data before switching between F (Fahrenheit) and C (Celsius).

A.9. RF / Real Time Option

The CorTemp™ Data Recorder can transmit via a serial connection to a RF Remote Unit or a PC / Laptop for Real Time data output. The RF / RT option can be activated for these purposes.

To turn the RF / RT ON, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *DEGREE / RF / RT* screen displays.



3. Press **F2** on the recorder keypad to program the RF / RT status.
4. RF / RT will toggle between OFF and ON. **NOTE: Default is OFF.**

A.10. Initializing the CorTemp™ Data Recorder

Initializing will clear the CorTemp™ Data Recorder memory of all collected temperature / heart rate data, clear all sensor Serial / Calibration #s, and restore all default parameters. (Refer to **Appendix 4: Default Parameters**).

NOTE: Always remember to download any collected data prior to initializing. Any data not downloaded will be permanently lost.

To initialize the CorTemp™ Data Recorder, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *INITIALIZE / CLEAR DATA* screen displays.



3. Press **F1** on the recorder keypad to *INITIALIZE*. The following screen will display:



4. Press **F1** to Initialize. To cancel, press **F2**.

A.11. Clearing Data

Clearing data will clear the CorTemp™ Data Recorder memory of all collected temperature / heart rate data. Clearing data will **not** clear sensor Serial / Calibration #s or programmed parameters.

NOTE: Always remember to download any collected data prior to clearing data. Any data not downloaded will be permanently lost.

To clear data from the CorTemp™ Data Recorder, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *INITIALIZE / CLEAR DATA* screen displays.



3. Press **F2** on the recorder keypad to *CLEAR DATA*. The following screen will display:



4. Press **F1** to Clear Data. To cancel, press **F2**.

A.12. Adding Sensors

To program the CorTemp™ Data Recorder with the CorTemp™ Core Body Temperature Sensors, do the following:

1. From the *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *ADD SENSOR / SENSOR ACT* screen displays.



3. Press **F1** on the recorder keypad to *ADD SENSOR*. The following screen will display:



4. Enter the 2-digit Sensor # (Player #, 01 – 99).

- When the Sensor # is entered, the following screen will display:



- Press **F1** on the recorder keypad to program the Serial #.
- Enter the 6-digit Serial # from the sensor package label.
- Press **F2** on the recorder keypad to program the Calibration #.
- Enter the 8-digit Calibration # from the sensor package label.
- When the sensor Serial / Calibration #s have been entered, press **READ** to enter the Serial / Calibration #s for the next sequential sensor. If no other sensors require programming, press **ENTER** to return to the **ADD SENSOR / SENSOR ACT** screen.

Sensor Serial / Calibration #s may be programmed into the recorder via the CorTrack™ II software or directly into the recorder via serial barcode entry. (Refer to **Section IV, Part A.21.: Barcode**).

NOTE: If any of the calibration numbers have been entered incorrectly, temperature readings for that sensor will be inaccurate. Generally, bad temperature readings will be so far off as to be immediately obvious. However, there are times when they are not. Attention to detail during data entry is critical to ensure accurate temperature data collection.

A.13. Changing Active Sensor

The active sensor tells the CorTemp™ Data Recorder to assign a specific Calibration # to the sensor signal it is receiving.

To change the active sensor, do the following:

- From the EXIT / STBY mode, press **MENU**.
- Press **READ** until the **ADD SENSOR / SENSOR ACT** screen displays.



- Press **F2** on the recorder keypad to program the **ACTIVE SENSOR**.
- Enter the 2-digit Sensor # (Player #). **NOTE: Default is 01.**

A.14. ID Number

A 9-digit ID # can be assigned to the collected data. This ID # will appear in the downloaded data. The CorTemp™ Data Recorder # can be used as the ID # to identify which recorder the collected data was downloaded from.

To assign an ID #, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *ID# / SENSOR TEST* screen displays.



3. Press **F1** on the recorder keypad to program the *ID #*.
4. Enter the 9-digit ID #. For example, if entering recorder #0521, enter 000000521.
NOTE: Default is 000000000.

A.15. Sensor Test

The *SENSOR TEST* function is used to check for an active sensor signal. The CorTemp™ Data Recorder does not require programming of a sensor calibration # in order to check for an active signal. *SENSOR TEST* can be used to check sensors just received or alarming in storage (using an HQI Sensor Storage Alarm System) by identifying any sensors which may have switched on due to magnet shifting. It can also be used to verify that a sensor is active before administering it to a subject (player), or to test whether or not a subject (player) may have passed the sensor from the body. The *SENSOR TEST* feature can also detect EMF interference if no sensor is present.

To test a sensor, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *ID# / SENSOR TEST* screen displays.



3. Press **F2** on the recorder keypad to initiate *SENSOR TEST*.
4. The recorder will continuously check for an active signal and will display *SENSOR ON* or *SENSOR OFF*, depending on the actual status of the signal.



5. Press **ENTER** to return to the *ID# / SENSOR TEST* screen.

A.16. Low Battery Detector

The CorTemp™ Data Recorder can be set to detect and display low battery power. The recorder will end data collection when it detects low battery power and will go into sleep mode, which disrupts extended monitoring periods. This feature may not be useful in all situations. If the battery completely drains, the recorder will shutdown, without losing data or programmed parameters. It is important not to let the recorder stay in this condition for an extended period of time. If the internal components discharge completely, data and parameters will be lost.

To program the CorTemp™ Data Recorder to detect low battery power, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *SET BAT / DETECT SIG ON* screen displays.



3. Press **F1** on the recorder keypad to select *BAT OK* and program the *DETECT LBAT*. The following screen will display:



4. Press **F2** on the recorder keypad to program the *DETECT LBAT* status.
5. *DETECT LBAT* will toggle between *ON* and *OFF*. **NOTE: Default is ON.**

When the recorder detects low battery power during the *EXIT / STBY* or *AUTO RUN MODEs*, the recorder screen will display *LBAT*. The unit will end data collection and go into sleep mode.



A.17. Resetting LBAT

The *LBAT* error message will display when any of the following situations occur:

- The CorTemp™ Data Recorder has a low battery.
- The CorTemp™ Data Recorder loses power.
- The CorTemp™ Data Recorder was turned off incorrectly.

Once detected, the recorder screen will continue to display *LBAT* until the *LBAT* is reset.

To reset the *LBAT* error message, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *SET BAT / DETECT SIG* screen displays.



3. Press **F1** on the recorder keypad to select *SET BAT*. The screen will display *LBAT RESET*.



4. Press **F1** on the recorder keypad to reset *LBAT*. The screen will display *BAT OK*.



5. Press **ENTER** to return to the *SET BAT / DETECT SIG* screen.

A.18. Signal Detector

The CorTemp™ Data Recorder can be programmed to display either an obviously incorrect temperature reading or no temperature reading when the receiver loses the sensor signal while in *AUTO RUN MODE*. The Signal Detect feature can be used to eliminate confusion and facilitate ease of data analysis. (Refer to **Appendix 3: Data Interpretation Key**)

To program the detect signal feature, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *SET BAT / DETECT SIG* screen displays.



3. Press **F2** on the recorder keypad to program the *DETECT SIG* status.
4. *DETECT SIG* will toggle between *ON* and *OFF*. **NOTE: Default is ON.**

When the *DETECT SIG* feature is turned *ON*, the recorder will display *T = ---.---*, which records a no-read to memory. The no-read will appear as *8888.88* in the downloaded data.



AUTO RUN MODE



SPORTS MODE

A.19. Heart Rate Interval and High / Low Heart Rate Alarms

If your CorTemp™ Data Recorder is equipped with the heart rate upgrade, the recorder will show *CORTEMP HR REV 4.3H*, for example, during start up.



Heart Rate Designation

The heart rate programming screen allows you to select the Heart Rate Interval. The interval can be set at 1, 2 or 3 beats. The recorder will sample the selected number of beats and extrapolate heart rate per minute based on the time it took to sample the programmed number of beats. It is recommended that the Heart Rate Interval is set to 3 to ensure the greatest accuracy.

NOTE: *In order to monitor heart rate, the Temperature Collection Interval must be set at a minimum of 20 seconds.*

High and Low Heart Rate Alarms display on the recorder screen when collected data is outside the programmed parameters. A Data Recorder Alarm (HT150008) may be purchased from HQI to provide an audio / visual alarm that can be positioned on the monitored subject up to 3ft. from the CorTemp™ Data Recorder. (*AUTO RUN MODE*)

Heart Rate Interval

To program the heart rate interval, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *H_RATE* screen displays.



3. Press **F1** on the recorder keypad to program the *H_RATE INTERVAL*.
4. Enter 0, 1, 2, or 3. **NOTE: Default is 0 (OFF).**

High / Low Heart Rate Alarms

To program high / low heart rate alarms, do the following:

1. Press **F2** on the recorder keypad to program the **ALARMS**.
2. Enter the High and Low Limits. **NOTE: Default is 000.0**

When the heart rate alarm is triggered, **♥ALRM** will display on the recorder screen.

NOTE: If a temperature HALRM or LALRM is present, the ♥ALRM will NOT display.

A.20. Sports Mode

The **SPORTS MODE** feature of the CorTemp™ Data Recorder allows the athletic trainer to take individual readings of multiple players by entering the Player # (Player # is the same as the Sensor #).

To take readings in **SPORTS MODE**, do the following:

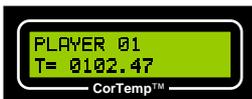
1. From **EXIT / STBY** mode, press **MENU**.
2. Press **READ** until the **SPORTS MODE / BARCODE** screen displays.



3. Press **F1** on the recorder keypad to initiate **SPORTS MODE**. The following screen will display the **LAST** active player #:



4. Press **READ** to take a reading for the Player # displayed.



SPORTS MODE
Temperature Reading



SPORTS MODE
Temperature Reading with Heart Rate

5. To take a reading of a different player, enter the 2-digit Player #.

To terminate **SPORTS MODE**, press **RUN / STOP** on the recorder keypad.

A.21. Barcode

The Barcode Scanner System (HT150025) provides accurate input by eliminating the possibility of human errors during sensor data entry into the recorder. **This feature is only used with a SERIAL Barcode Scanner.** Sensor Serial / Calibration #s may be programmed into the recorder via the CorTrack™ II software.

To enter Serial / Calibrations #s using the Barcode Scanner System, do the following:

1. Connect the Barcode Scanner to the CorTemp™ Data Recorder. (Follow the instructions in the **Barcode Scanner System User Manual revision 1.2, Section III, Part A: Connection to CorTemp™ Data Recorder**).
2. After connecting the Barcode Scanner, turn **ON** the recorder.
3. From **EXIT / STBY** mode, press **MENU**.
4. Press **READ** until the **SPORTS MODE / BARCODE** screen displays.



5. Press **F2** on the recorder keypad to select **BARCODE**. The following screen will display:



6. Enter the 2-digit Player # (Sensor #). The following screen will display:



7. Scan the barcode on the CorTemp™ Core Body Temperature Sensor package label.
8. When the barcode is scanned, the following screen will display:



9. Verify that the Serial / Calibration #s match those on the sensor package label. If the Serial / Calibration #s are correct, press **F1** to select **Y** (Yes).
10. If the Serial / Calibration #s are incorrect, press **F2** to select **N** (No). Re-enter the Player # (Sensor #) and rescan the barcode.
11. When all barcodes have been scanned, press **ENTER** to return to the **SPORTS MODE / BARCODE** screen.

A.22. Time R3.X Option

The *TIME R3.X* option allows the CorTemp™ Data Recorder, revisions 3.9 and higher, to emulate the time format used for RF and Real Time transmission of CorTemp™ Data Recorders, revisions 3.8 and lower.

To turn *TIME R3.X ON*, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *TIME R3.X / SPORTS MENU* screen displays.



3. Press **F1** on the recorder keypad to program *TIME R3.X* status.
4. *TIME R3.X* will toggle between *OFF* and *ON*. **NOTE: Default is OFF.**

TIME R3.X OFF supports the CorTrack™ II RF / RT module, CorTrack™ PDA (version 2.6 and higher) and CorTrack™ PC RF software programs.

TIME R3.X ON supports CorTrack™ II RF (version 2.2) and CorTrack™ PDA (version 2.2 and lower) software programs.

A.23. Sports Menu Option

The *Sports Menu* option allows the CorTemp™ Data Recorder, revisions 4.3 and higher, to startup in the *SPORTS MENU*. The *SPORTS MENU* allows the athletic trainer to be "one keystroke" from the two most used options, *PC LINK* and *SPORTS MODE*. The *SPORTS MENU* also contains a quick link to the following programming menus *LBAT RESET*, *SPORTS MENU*, *ADD SENSOR*, and *SENSOR TEST*. Once the *Sports Menu* option is set to *ON*, the recorder will startup in the *SPORTS MENU* until reset to *OFF*.

To turn *SPORTS MENU ON*, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *TIME R3.X / SPORTS MENU* screen displays.



3. Press **F2** on the recorder keypad to program *SPORTS MENU* status.
4. *SPORTS MENU* will toggle between *OFF* and *ON*. **NOTE: Default is OFF on initial startup.** The *Sports Menu* option selected will remain until changed by user or equipment reset. For detailed use of this option (Refer to **Section V: CorTemp™ Data Recorder – Sports Menu**).

B. Monitoring Core Body Temperature – Standard Menu

Once all parameters (**DATE, TIME, CALIBRATION #, ETC**) have been programmed, you are now ready to begin monitoring / data collection.

B.1. Administering the Sensor and Checking the Signal

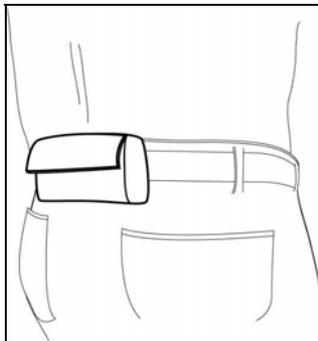
Before administering the sensor, be sure to review the *Intended Use / Contraindications* for the CorTemp™ Core Body Temperature Sensor on Page 41 of this manual. **NOTE: The sensor should be administered at least 2 hours before monitoring begins.**

To administer the CorTemp™ Core Body Temperature Sensor, do the following:

1. Remove the magnet from the CorTemp™ Core Body Temperature Sensor.
2. Verify the sensor signal using the *SENSOR TEST* function.
3. Remove the sensor Warranty Seal.
4. Give the sensor to the subject (player) to swallow with a glass of tepid water.

B.2. Placement of the CorTemp™ Data Recorder

AUTO RUN MODE – Standard Menu



1. Attach the Data Recorder Pouch to the monitored subject via the belt loop.
2. Place the CorTemp™ Data Recorder into the pouch with the recorder keypad **facing outward** from the monitored subject and aligning the Data Port down towards the cable relief in the bottom of the pouch.

NOTE: The CorTemp™ Data Recorder will receive the best signal when placed at the small of the back. When placement at the small of the back is not feasible, the recorder can be worn near the hip on either side, or on the front at hip level.

SPORTS MODE – Standard Menu



Hold the recorder near the small of the back.

NOTE: *The CorTemp™ Data Recorder will receive the best signal when held at the small of the back. When placement at the small of the back is not feasible, the recorder can be held near the hip on either side, or on the front at hip level.*

B.3. Data Collection

NOTE: *Always Download Data, then Clear Data before:*

- *Switching between F (Fahrenheit) and C (Celsius)*
- *Changing ID Number (AUTO RUN MODE)*

AUTO RUN MODE – Standard Menu

To start monitoring / data collection in *AUTO RUN MODE*, do the following:

1. From *EXIT / STBY* mode, press **RUN / STOP** to begin *AUTO RUN MODE*.
2. Place recorder in the Data Recorder Pouch, with the keypad facing outward.
3. To end monitoring / data collection, remove recorder from the pouch and press **RUN / STOP** to end *AUTO RUN MODE*.

Manual Readings in AUTO RUN MODE

When in *AUTO RUN MODE*, press **READ**. A Temperature / Heart Rate reading will display. After the recorder screen clears, the recorder will resume the set interval.

NOTE: *This reading does record to memory and is noted with an "M".*

SPORTS MODE – Standard Menu

To start monitoring / data collection in *SPORTS MODE*, do the following:

1. From *EXIT / STBY* mode, press **MENU**.
2. Press **READ** until the *SPORTS MODE / BARCODE* screen displays.
3. Press **F1** to initiate *SPORTS MODE*.
4. Approach the player (subject) and hold the recorder near the small of the back.
5. Press **READ** to take a reading for the Player # (Sensor #) displayed or enter the 2-digit Player # (Sensor #).

NOTE: Take a minimum of 2 readings per Player # (Sensor #) to ensure correct proximity of the recorder to the Player (Subject) while taking a reading.

6. To end monitoring / data collection, press **RUN / STOP**. Then the recorder will return to the *SPORTS MODE / BARCODE* screen.

NOTE: If erratic readings are observed, verify the following: Placement of the CorTemp™ Data Recorder (AUTO RUN MODE), proximity and movement of the CorTemp™ Data Recorder while taking a reading (SPORTS MODE), and EMF Interference.

B.4. Use of More than One Sensor

In some applications it may be necessary to monitor core body temperature even after one temperature sensor has passed from the body. When using more than one sensor, be absolutely certain that the previous active sensor has passed from the body.

To verify that a sensor has passed from the body, do the following:

1. Use the *SENSOR TEST* function to verify that the sensor has passed from the body.
2. Move the recorder to several positions near the abdomen of the subject (player).
3. If the sensor has passed from the body, the screen will display *SENSOR OFF*.

NOTE: If two active sensors are ingested at the same time, there is no danger to the subject (player). However, the resulting temperature recordings will be inaccurate.

B.5. Event Markers in AUTO RUN MODE

Each numeric key of the keypad may be assigned to an event. Whenever the subject (player) experiences a specific event (such as drinking cold or hot liquid) an event can be tagged to the next collected temperature recording by pressing the appropriate numerical key. For example, key 1 could be "Hot Drink," key 2 could be "Cold Drink," key 3 could be "Running," etc. Each time a key is pressed, the recorder screen will display the event number entered, and event markers are recorded to memory and appear in the downloaded data. (Refer to **Appendix 3: Data Interpretation Key**).

B.6. Signal Interference

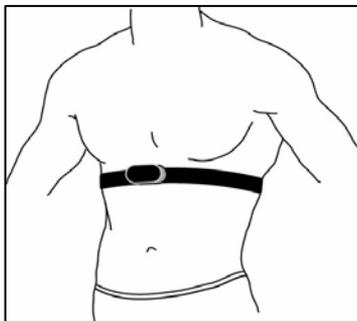
Erratic readings may be observed when within close proximity to PC / Laptops, CRTs, Digital Phone Systems, and other equipment (such as NMR / MRI machines) generating large electromagnetic fields (EMF).

B.7. MEM Message

When the CorTemp™ Data Recorder has recorded and stored approximately 25,000 readings, it will stop recording data and the *EXIT / STBY* screen will display a *MEM* message. The collected data must be downloaded to a PC / Laptop.

C. Monitoring Heart Rate – Standard Menu

If your CorTemp™ Data Recorder includes the heart rate upgrade and heart rate will be monitored, use of the POLAR® Heart Rate Transmitter and Chest Belt is required. Refer to the diagram below for instructions on how to wear the POLAR® Heart Rate Transmitter and Chest Belt:



1. Attach the transmitter to the chest belt (strap).
2. Adjust the strap length to fit snugly and comfortably. Secure the strap around your chest, just below the chest muscles, and buckle it.
3. Lift the transmitter off your chest and **moisten the two grooved electrode areas** on the back.
4. Check that the wet electrode areas are firmly against your skin and the Polar logo is in a central, upright position.

NOTE: The Temperature Collection Interval must be set at a minimum of 20 seconds in order to monitor heart rate.

D. Downloading Data – Standard Menu

D.1. Connecting the CorTemp™ Data Recorder to a PC / Laptop

To connect the CorTemp™ Data Recorder to a PC / Laptop do the following:

1. Connect the DB9 serial connector of the Data Transfer Cable to the appropriate COM port on the PC / Laptop.
2. Connect the MF6 connector of the Data Transfer Cable to the 6-pin Data Port on the CorTemp™ Data Recorder.

D.2. Downloading Data to CorTrack™ II Software

Collected data can be downloaded to the CorTrack™ II software. (Refer to the **CorTrack™ II Software User Manual** for downloading instructions).

V. CorTemp™ Data Recorder – Sports Menu



The CorTemp™ Data Recorder receives the signal from the CorTemp™ Core Body Temperature Sensor and converts the signal frequency into digital temperature data. This temperature data is displayed on the recorder LCD screen with a resolution of 0.01 degree. The recorder operates within environments between 10 and 50 degrees Celsius. User initiated sampling of temperature / heart rate is displayed for real time monitoring, while simultaneously saving to memory for future download and analysis.

The CorTemp™ Data Recorder can be programmed as a standalone unit with the recorder keypad, or it can be programmed by the CorTrack™ II software from your PC / Laptop. The recorder can be programmed with up to 99 sensor calibration numbers and record / store up to 25,000 readings. While in *SPORTS MENU*, the recorder is used as a handheld unit (*SPORTS MODE*) to collect individual temperature / heart rate readings from multiple players, easily switching back and forth between players.

The *SPORTS MENU* allows the athletic trainer to be "one keystroke" from the two most used options, *PC LINK* and *SPORTS MODE*. The *SPORTS MENU* also contains a quick link to the following programming menus *LBAT RESET*, *SPORTS MENU*, *ADD SENSOR*, and *SENSOR TEST*. Once the *Sports Menu* option is set to *ON*, the CorTemp™ Data Recorder will startup in the *SPORTS MENU* until reset to *OFF*.

A. Programming the CorTemp™ Data Recorder – Sports Menu

A.1. Battery Installation

The CorTemp™ Data Recorder operates on one standard 9-Volt alkaline battery, which will provide approximately 110 hours of continuous recording at 10 second intervals. Battery power can last up to 336 hours (14 days), depending on the sampling interval. Energizer®, Duracell®, or Ultralife® brands of battery are recommended.

To install the battery in the CorTemp™ Data Recorder, do the following:

1. Remove the battery cover from the recorder.
2. Connect a new 9-Volt battery (Energizer®, Duracell®, or Ultralife®) by attaching the battery connector to the battery.
3. Insert the battery in the battery compartment and replace battery cover.

A.2. Using the Keypad – Sports Menu



Throughout **Section V** of this manual, we will refer to the CorTemp™ Data Recorder keypad. Before continuing with **Section V**, take a few moments to observe the keypad and its functions in relation to the **SPORTS MENU**.

| Key | Description |
|-------------------|---|
| MENU | From the SPORTS MENU , pressing MENU will gain access to the Sports Programming Menus. |
| ENTER | From the Sports Programming Menus, pressing ENTER returns the recorder to the SPORTS MENU . From the SPORTS MENU , pressing ENTER will initiate the Exit Routine. |
| READ | From the Sports Programming Menus, pressing READ will move to the next Sports Programming Menu screen. |
| RUN / STOP | From PC LINK , pressing RUN / STOP ends PC LINK . From SPORTS MODE , pressing RUN / STOP ends SPORTS MODE . |
| F1 | While in the Sports Programming Menus, pressing F1 selects the option at the top of the screen. |
| F2 | While in the Sports Programming Menus, pressing F2 selects the option at the bottom of the screen. |
| 0 – 9 | Numeric input for Sports Programming Menus. |

A.3. Turning ON the CorTemp™ Data Recorder

To turn *ON* the CorTemp™ Data Recorder, do the following:

1. Once the battery has been installed turn the ON / OFF switch to the *ON* position.
2. The recorder will run a self-test. During the self-test, screens similar to the following will display. The Firmware Revision # and whether or not the recorder has the heart rate upgrade are noted as below.



Firmware Revision #

Heart Rate Designation



Non-Heart Rate Recorder



Heart Rate Recorder

3. On completion of the self-test, the date and time will appear briefly. The date represents the last programmed date and the time represents the current time. **Verify that the date is not 00-00-00 and that the time is correct.**



NOTE: If the CorTemp™ Data Recorder has been off for an extended period of time, turn the recorder ON for approximately 10 minutes. This allows the internal components to recharge. After 10 minutes, turn the recorder OFF. Then, after 1 minute, turn the recorder back ON and initialize. You are now ready to proceed.

A.4. Sports Menu Screen



SPORTS MENU allows the user to access *PC LINK* and *SPORTS MODE*, Sports Programming Menus and the Standard Programming Menus, *TURN OFF* the CorTemp™ Data Recorder, and view the current time (hh:mm).

Accessing PC LINK

PC LINK allows 2-way communication between the CorTemp™ Data Recorder and a PC / Laptop. *PC LINK* is used for programming the recorder from the CorTrack II software and downloading data to the CorTrack II software.

To initiate *PC LINK*, do the following:

1. Press **F1** on the recorder keypad to initiate *PC LINK*. The following will display:



To terminate *PC LINK*, press **RUN / STOP** on the recorder keypad.

Accessing SPORTS MODE

The *SPORTS MODE* feature allows the user to take individual readings of multiple players by entering the Player #.

To take readings in *SPORTS MODE*, do the following:

1. Press **F2** on the recorder keypad to initiate *SPORTS MODE*. The following screen will display the **LAST** active Player #:



2. Press **READ** to take a reading for the Player # displayed:



SPORTS MODE
Temperature Reading



SPORTS MODE
Temperature Reading with Heart Rate

3. To take a reading of a different Player, enter the 2-digit Player #.

To terminate *SPORTS MODE*, press **RUN / STOP** on the recorder keypad.

Accessing the Sports Programming Menus

To access the Sports Programming Menus, do the following:

1. From *SPORTS MENU*, press **MENU** on the recorder keypad.
2. Press **READ** to progress through the Sports Programming Menus.
3. Press **ENTER** on any of the Sports Programming Menus to return to *SPORTS MENU*.

Accessing the Standard Programming Menus

To access the Standard Programming Menus, do the following:

1. From *SPORTS MENU*, press **MENU** on the recorder keypad.
2. The *BAT OK / SPORTS MENU ON* screen will display.



3. Press **F2** on the recorder keypad to toggle *OFF* the *SPORTS MENU*, then press **ENTER**. The recorder will return to the *STANDARD MENU* in the *EXIT / STBY* mode. (Refer to **Section IV, Part A: CorTemp™ Data Recorder – Standard Menu**)

Turning OFF the CorTemp™ Data Recorder

To turn *OFF* the CorTemp™ Data Recorder, do the following:

1. From *SPORTS MENU*, press **ENTER**. The following screen will display:



2. Press **F1** to *EXIT*, or press **F2** to *CANCEL* and return to the *SPORTS MENU*.
3. A *TURN OFF UNIT* message will display.



4. Turn the recorder ON / OFF switch to the *OFF* position.

A.5. Resetting LBAT



The *LBAT* error message will display when any of the following situations occur:

- The CorTemp™ Data Recorder has a low battery.
- The CorTemp™ Data Recorder loses power.
- The CorTemp™ Data Recorder was turned off incorrectly.

Once detected, the recorder screen will continue to display *LBAT* until the *LBAT* is reset.

To reset the *LBAT* error message, do the following:

1. From *SPORTS MENU*, press **MENU**. The *LBAT RESET / SPORTS MENU* screen will display.



2. Press **F1** on the recorder keypad to reset *LBAT*. The screen will display *BAT OK*.



3. Press **ENTER** to return to the *SPORTS MENU*.

A.6. Sports Menu Option

1. From *SPORTS MENU*, press **MENU**. The *BAT OK / SPORTS MENU* screen will display.



2. Press **F2** on the recorder keypad to program *SPORTS MENU* status.
3. *SPORTS MENU* will toggle between *ON* and *OFF*. Press **ENTER** after desired selection. (*ON* returns to *SPORTS MENU* and *OFF* returns to *STANDARD MENU*)

A.7. Adding Sensors

To program the CorTemp™ Data Recorder with the CorTemp™ Core Body Temperature Sensors, do the following:

1. From the *SPORTS MENU*, press **MENU**.
2. Press **READ** until the *ADD SENSOR / SENSOR TEST* screen displays.



3. Press **F1** on the recorder keypad to *ADD SENSOR*. The following screen will display:



4. Enter the 2-digit Player # (Sensor #, 01 – 99).
5. When the Player # (Sensor #) is entered, the following screen will display:



6. Press **F1** on the recorder keypad to program the Serial #.
7. Enter the 6-digit Serial # from the sensor package label.
8. Press **F2** on the recorder keypad to program the Calibration #.
9. Enter the 8-digit Calibration # from the sensor package label.
10. When the sensor Serial / Calibration #s have been entered, press **ENTER** to return to the *ADD SENSOR / SENSOR TEST* screen.
11. Press **ENTER** to return to the *SPORTS MENU*.

A.8. Sensor Test

The *SENSOR TEST* function is used to check for an active sensor signal. The CorTemp™ Data Recorder does not require programming of a sensor calibration # in order to check for an active signal. It can also be used to verify that a sensor is active before administering it to a player, or to test whether or not a player may have passed the sensor from the body.

To test a sensor, do the following:

1. From *SPORTS MENU*, press **MENU**.
2. Press **READ** until the *ADD SENSOR / SENSOR TEST* screen displays.



3. Press **F2** on the recorder keypad to initiate **SENSOR TEST**. The recorder will continuously check for an active signal and will display **SENSOR ON** or **SENSOR OFF**, depending on the actual status of the signal.



4. Press **ENTER** to return to the **ADD SENSOR / SENSOR TEST** screen.
5. Press **ENTER** to return to the **SPORTS MENU**.

B. Monitoring Core Body Temperature – Sports Menu

Once all parameters (**DATE, TIME, CALIBRATION #, ETC**) have been programmed, you are now ready to begin monitoring / data collection.

B.1. Administering the Sensor and Checking the Signal

Before administering the sensor, be sure to review the *Intended Use / Contraindications* for the CorTemp™ Core Body Temperature Sensor on Page 41. **NOTE: The sensor should be administered at least 2 hours before monitoring / data collection begins.**

To administer the CorTemp™ Core Body Temperature Sensor, do the following:

1. Remove the magnet from the CorTemp™ Core Body Temperature Sensor.
2. Verify the sensor signal using the **SENSOR TEST** function.
3. Remove the sensor Warranty Seal.
4. Give the sensor to the player to swallow with a glass of tepid water.

B.2. Placement of the CorTemp™ Data Recorder

SPORTS MODE – Sports Menu



Hold the recorder near the small of the back.

NOTE: The CorTemp™ Data Recorder will receive the best signal when held at the small of the back. When placement at the small of the back is not feasible, the recorder can be held near the hip on either side, or on the front at hip level.

B.3. Data Collection

NOTE: Always Download Data, then Clear Data before switching between F (Fahrenheit) and C (Celsius)

SPORTS MODE – Sports Menu

To start monitoring / data collection in *SPORTS MODE*, do the following:

1. From *SPORTS MENU*, press **F2** to initiate *SPORTS MODE*.
2. Approach the player and hold the recorder near the small of the back.
3. Press **READ** to take a reading for the Player # displayed or enter the 2-digit Player #.
NOTE: Take a minimum of 2 readings per Player # to ensure correct proximity of the recorder to the Player while taking a reading.
4. To end monitoring / data collection, press **RUN / STOP**.

NOTE: If erratic readings are observed, verify the following: Proximity and movement of the recorder while taking a reading, and EMF Interference.

B.4. Use of More than One Sensor

In some applications it may be necessary to monitor core body temperature even after one temperature sensor has passed from the body. When using more than one sensor, be absolutely certain that the previous active sensor has passed from the body.

To verify that a sensor has passed from the body, do the following:

1. Use the *SENSOR TEST* function to verify that the sensor has passed from the body.
2. Move the recorder to several positions near the abdomen of the player.
3. If the sensor has passed from the body, the screen will display *SENSOR OFF*.

NOTE: If two active sensors are ingested at the same time, there is no danger to the player. However, the resulting temperature recordings will be inaccurate.

B.5. Signal Interference

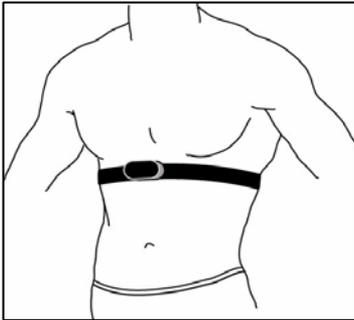
Erratic readings may be observed when within close proximity to PC / Laptops, CRTs, Digital Phone Systems, and other equipment (such as NMR / MRI machines) generating large electromagnetic fields (EMF).

B.6. MEM Message

When the CorTemp™ Data Recorder has recorded and stored approximately 25,000 readings, it will stop recording data and the *SPORTS MENU* screen will display a *MEM* message. The collected data must be downloaded to a PC / Laptop.

C. Monitoring Heart Rate – Sports Menu

If your CorTemp™ Data Recorder includes the heart rate upgrade and heart rate will be monitored, use of the POLAR® Heart Rate Transmitter and Chest Belt is required. Refer to the diagram below for instructions on how to wear the POLAR® Heart Rate Transmitter and Chest Belt:



1. Attach the transmitter to the chest belt (strap).
2. Adjust the strap length to fit snugly and comfortably. Secure the strap around your chest, just below the chest muscles, and buckle it.
3. Lift the transmitter off your chest and **moisten the two grooved electrode areas** on the back.
4. Check that the wet electrode areas are firmly against your skin and the Polar logo is in a central, upright position.

NOTE: *The Temperature Collection Interval must be set at a minimum of 20 seconds in order to monitor heart rate.*

D. Downloading Data – Sports Menu

D.1. Connecting the CorTemp™ Data Recorder to a PC / Laptop

To connect the CorTemp™ Data Recorder to a PC / Laptop do the following:

1. Connect the DB9 serial connector of the Data Transfer Cable to the appropriate COM port on the PC / Laptop.
2. Connect the MF6 connector of the Data Transfer Cable to the 6-pin Data Port on the CorTemp™ Data Recorder.

D.2. Downloading Data to CorTrack™ II Software

Collected data can be downloaded to the CorTrack™ II software. (Refer to the **CorTrack™ II Software User Manual** for downloading instructions).

VI. Warranty and Service Information

A. CorTemp™ Core Body Temperature Sensor – Limited Warranty

HQ, Inc. warrants for a single use and to the original purchaser that the CorTemp™ Core Body Temperature Sensor will be free from defects in workmanship and material and may be stored for a period of three (3) months from the date of purchase. This assumes that all storage instructions described on Page 4 of this manual have been observed. All functional testing may be accomplished with the Warranty Seal in place and it should not be removed until the user has determined that the sensor is functioning properly. Once this seal has been removed, the sensor will be deemed to have been used and all warranties are void.

HQ, Inc. will, without charge, replace the defective CorTemp™ Core Body Temperature Sensor within 90 days of receipt of product. An RMA number must be obtained prior to return of the equipment.

HQ, Inc. shall not be liable for any consequential damages, including with limitation, damages resulting from loss of use. This warranty gives you specific rights and you may also have other rights which vary from state to state.

B. CorTemp™ Data Recorder – Limited Warranty

HQ, Inc. will, at no charge, repair or replace, at its option, defective product or component parts of the CorTemp™ Data Recorder and ancillary equipment within 90 days of receipt of product. An RMA number must be obtained prior to return of the equipment.

C. Recalibration of the CorTemp™ Data Recorder

The CorTemp™ Data Recorder contains a very accurate quartz crystal oscillator. This oscillator is accurate to 3 parts in 1,000,000. As it ages, it will drift somewhat and could cause your CorTemp™ Data Recorder to give inaccurate temperature readings. For this reason we suggest you return your CorTemp™ Data Recorder to the factory every 12 months for recalibration. There will be a modest charge made for this recalibration.

To schedule a recalibration, please call Customer Service, at (941) 721-7588. Customer Service can also provide you with the current cost of recalibration and a Return Material Authorization (RMA) number.

D. Service / Repairs

To schedule service / repairs, please call Customer Service, at (941) 721-7588. Customer Service can also provide you with the current cost of service / repairs and a Return Material Authorization (RMA) number.

Invoices will be submitted to your company for the repair of any item out of warranty.

VII. Customer Service

HQ, Inc. Customer Service hours are 8:00am through 5:00pm EST. Please feel free to contact Customer Service at (941) 721-7588 for technical assistance, return authorizations, and additional equipment purchases.

An RMA number must be obtained from HQ, Inc. Customer Service (941) 721-7588 before returning any equipment for repair. The RMA number should appear on both the outside of the package and on all correspondence sent with the shipment. **THE SHIPMENT MUST BE SENT, WITH PREPAID FREIGHT ONLY, TO:**

HQ, Inc.
Attn: Repair Dept.
210 – 9th Street Drive West
Palmetto, FL 34221
Email: sales@hqinc.net
Website: www.hqinc.net

CorTemp™ Core Body Temperature Sensor – Intended Use and Contraindications

INTENDED USE: The CorTemp™ Core Body Temperature Sensor is designed for the measurement of core body temperature in individuals for whom accurate, continuous core body temperatures are required and may be used only on the order of a physician who has clinically evaluated the contraindications and warnings associated with the use of an ingestible thermometer sensor.

CONTRAINDICATIONS: The CorTemp™ Core Body Temperature Sensor (HT150002) is contraindicated for HQI under the following conditions:

- In any subject whose body weight is less than eighty (80) pounds.
- In the presence of any known or suspected obstructive disease of the gastrointestinal tract, including but not limited to diverticulitis and inflammatory bowel disease.
- In any subject exhibiting or having a history of disorders or impairment of the gag reflex.
- In any subject with previous gastrointestinal surgery.
- In any subject having felinization of the esophagus.
- In any subject who might undergo Nuclear Magnetic Resonance (NMR) / Magnetic Resonance Imaging (MRI) scanning during the period that the CorTemp™ Core Body Temperature Sensor is within the body.
- In any subject with hypomotility disorders of the gastrointestinal tract, including but not limited to ileus.
- In any subject having a cardiac pacemaker or other implanted electromedical device.

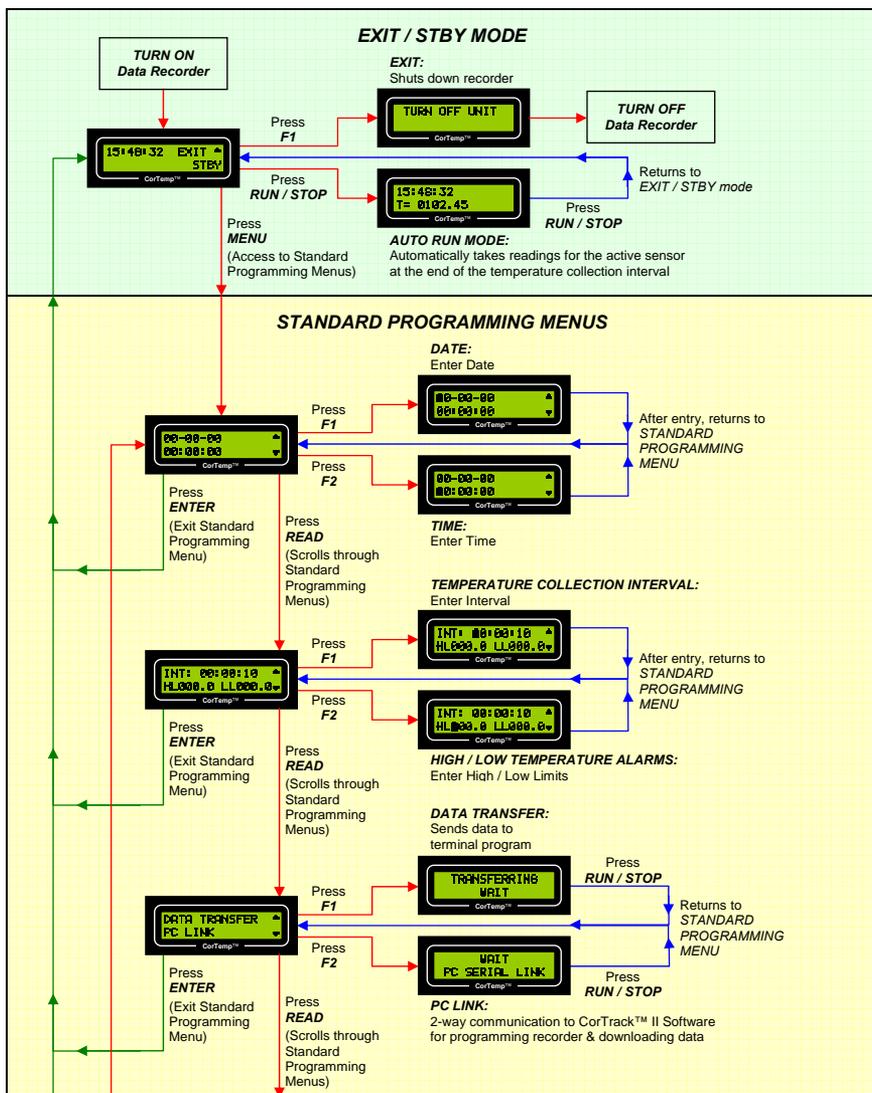
WARNING: The following should be carefully considered before determining if the CorTemp™ Core Body Temperature Sensor is appropriate for an individual:

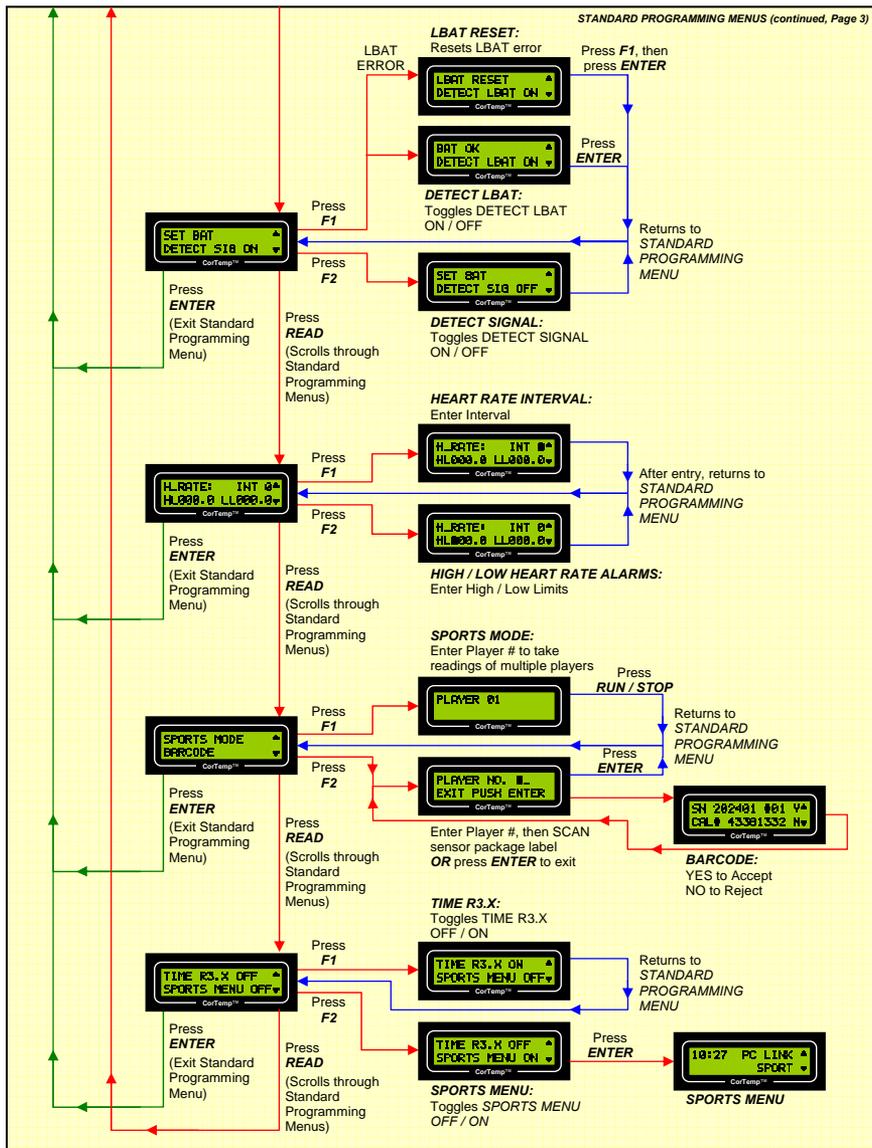
The CorTemp™ Core Body Temperature Sensor may not be appropriate in individuals who have experienced swallowing disorders. If an individual experiences difficulty swallowing the sensor, they may not be a candidate for CorTemp™ Core Body Temperature Monitoring System. Careful consideration should be given before using the CorTemp™ Core Body Temperature Sensor for temperature monitoring during abdominal or other surgery that might expose the sensor to ambient air and cause inaccurate temperature readings. Special consideration should be given to the placement of the CorTemp™ Data Recorder when monitoring obese individuals, the recorder may have to be repositioned as the sensor travels through the digestive tract. Also, the CorTemp™ Core Body Temperature Sensor should be used with caution in any individual exhibiting nausea and / or vomiting.

Only one CorTemp™ Core Body Temperature Sensor should be ingested. The signals transmitted from multiple sensors could cause inaccurate temperature readings. If multiple sensors are to be used, be certain each previously administered sensor has passed before the individual is administered a new sensor.

Appendix 1: Standard Menu Progression

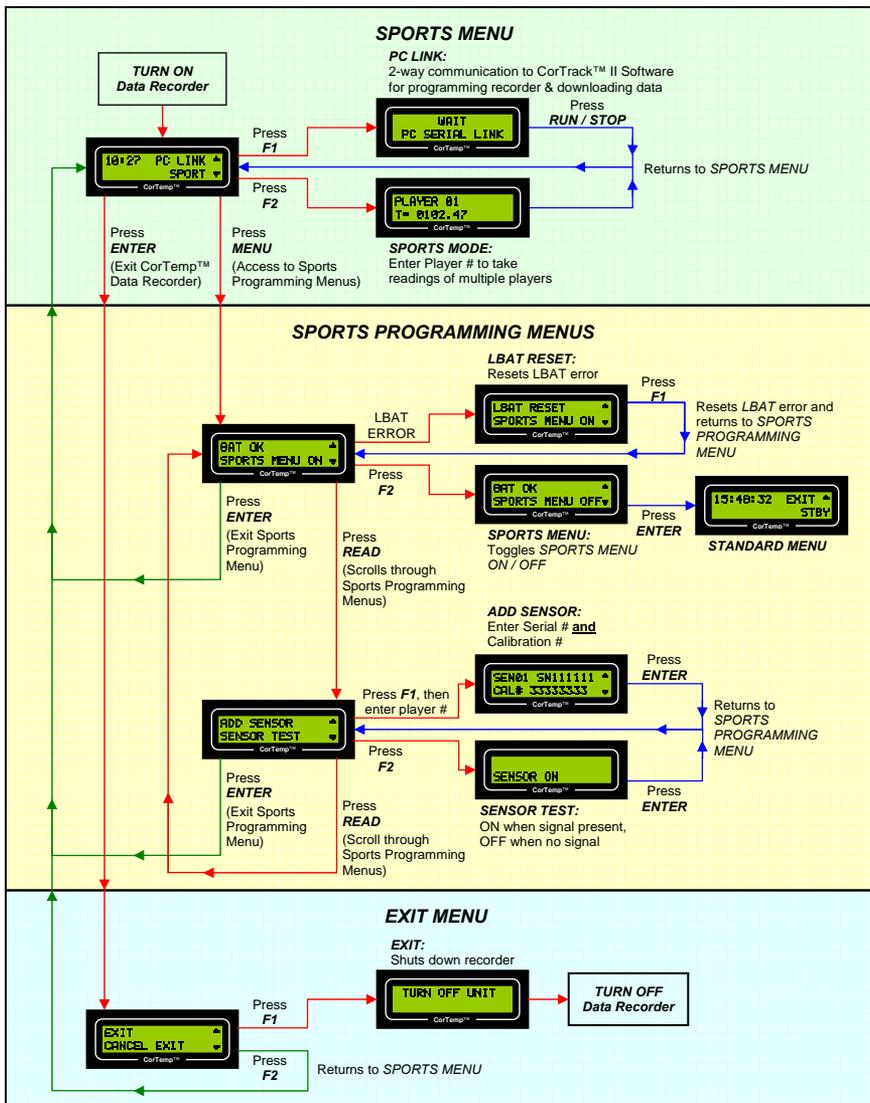
After turning ON the CorTemp™ Data Recorder, the recorder runs a self test and briefly displays the date and time.





Appendix 2: Sports Menu Progression

After turning ON the CorTemp™ Data Recorder, the recorder runs a self test and briefly displays the date and time.



Appendix 3: Data Interpretation Key

Downloaded Data File (.dat)

```

A
REV 4.0

B      C      D
S01, 111111, 11111111
S02, 222222, 22222222
S03, 333333, 33333333
S04, 444444, 44444444
S05, 555555, 55555555
▼
S95, 111111, 33333333
S96, 111111, 33333333
S97, 111111, 33333333
S98, 111111, 33333333
S99, 111111, 33333333
E I000000411
F AT115.0,040.0
G AR100.0,060.0
H B00-00:00:00
I  J  K
DF,01,10/03/05
L  M
H00,08
N T48:08,0137.28
O R48:08,070.7
P M48:17,0137.31
R48:17,064.3
▼
T49:28,0137.33
R49:28,081.5
Q E49:28,1
▼
R T50:08,8888.88
R50:08,049.9
S DF,01,10/03/05
H00,10
T58:15,0045.73
R58:15,080.2
T DF,05,10/03/05
H00,10
T59:54,0039.12
R59:54,050.3
U H02,11
T00:14,0039.54
R00:14,051.4

```

Data Interpretation Key

A = Data Recorder Revision #
(4.0 and higher)

B = Sensor # (Player #)

C = Sensor Serial #

D = Sensor Calibration #

E = ID # (Recorder #)

F = High / Low Temperature Alarm Limits

G = High / Low Heart Rate Alarm Limits

H = LBAT – Day and Time LBAT occurred

I = Temperature Scale (DF or DC)

J = Active Sensor # (Player #)

K = Date Marker (mm/dd/yy)

L = Days from Date Marker

M = Hour of Day (24hr format)

N = Temperature Reading
(Minutes:Seconds, Temperature)

O = Heart Rate Reading
(Minutes:Seconds, Heart Rate)

P = Manual Reading
(Minutes:Seconds, Temperature)

Q = Event Marker
(Minutes:Seconds, Key Pressed)

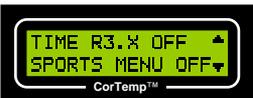
R = No-Read

S = Break in data stream indicates data collection was interrupted and then restarted

T = Active Sensor # (Player #) was changed

U = Time has incremented to the 11th hour of day 2

Appendix 4: Default Parameters

| | |
|---|-----------------------|
|  | 00-00-00 |
| | 00:00:00 |
|  | 00:00:10 |
| | 000.0, 000.0 |
|  | F |
| | OFF |
|  | 01 |
|  | 00000000 |
|  | ON |
|  | ON |
|  | 0 (OFF) |
| | 000.0, 000.0 |
|  | OFF |
| | OFF (Initial Startup) |