CTXL

High Performance Universal Portable Circular Chart Superecorder™

Operator's Manual



NEWPORT ELECTRONICS, INC.

For immediate technical or application assistance please call:

1-800-639-7678®

1-800-NEWPORT

NEWPORT Electronics, Inc.
2229 South Yale Street • Santa Ana, CA • 92704-4426 • U.S.A.
TEL: (714) 540-4914 • FAX: (714) 546-3022 • Toll Free: 1-800-639-7678
newportUS.com • e-mail: info@newportus.com

NEWPORT Technologies, Inc.
976 Bergar • Laval (Quebec) • H7L 5A1 • Canada
TEL: (514) 335-3183 • FAX: (514) 856-6886 • Toll Free: 1-800-639-7678
newport.ca • e-mail: info@newport.ca

NEWPORT Electronics, Ltd.
One Omega Drive • River Bend Technology Centre
Northbank • Irlam • Manchester •M44 5BD • United Kingdom
TEL: 44 (161) 777-6611 • FAX: 44 (161) 777-6622 • Toll Free: 0800 488 488
newportuk.co.uk • e-mail: info@newportuk.co.uk

NEWPORT Electronics B.V.
Postbus 8034 • 1180 LA Amstelveen • The Netherlands
TEL: (31) 20 6418405 • FAX: (31) 20 6434643 • Toll Free: 0 800 0993344
newport.nl • e-mail: info@newport.nl

NEWPORT Electronics spol s.r.o.
Frystatska 184 • 73301 Karviná • Czech Republic
TEL: 42 (59) 6311899 • FAX: 42 (59) 6311114 • Toll Free: 0 800-1-66342
newport.cz • e-mail: info@newport.cz

NEWPORT Electronics GmbH
Daimlerstrasse 26 • D-75392 Deckenpfronn • Germany
TEL: 49 (07056) 3017 • FAX: 49 (07056) 8540 • Toll Free: 0130 11 21 66
newport.de • e-mail: info@newport.de

NEWPORT Electronique S.A.R.L.
11 rue Jacques Cartier • 78280 Guyancourt • France
TEL: 33 (0)1 61 37 2900 • FAX: 33 (0)1 30 57 5427 • Toll Free: 0800-4-6978
www.newport.fr • e-mail: info@newport.fr

Mexico and Latin America
TEL: 001 (203) 359-7803 • FAX: 001 (203) 359-7807

NEWPORTnet℠ On-Line Service newportus.com	**Internet e-mail** info@newportus.com

Newport Electronics, Inc.

Page

Chapter 1 Introduction 1-1

1.1 Parts of the Recorder 1-2
1.2 Membrane Keypad & Display Functions 1-5

Chapter 2 Setting Up the Recorder 2-1

2.1 Placing the Recorder on the Bench Top 2-1
2.2 Mounting the Recorder on the Wall 2-3
2.3 Using Batteries 2-4
2.3.1 Installing Batteries 2-4
2.3.2 Connecting ac power 2-5
2.4 Installing the Chart Paper 2-6
2.4.1 Changing Chart Speed & Scale 2-6
2.5 Installing and Removing Pens 2-7
2.5.1 Installing the Pens 2-7
2.5.2 Removing the Pens 2-9
2.6 Setting Alarms and Time Clock 2-10
2.7 Reviewing Parameter Values 2-12
2.8 Using the Remote Sensor Cable - Temperature/HumidityModel 2-13
2.9 Using the Sensor Clip 2-14
2.10 Open/Out Range Input 2-15
2.11 Pen Jamming 2-15
2.12 Pen Re-Scaling 2-15
2.13 Chart Lights & Display Back Light 2-16
2.14 Lock/Unlock Keypad Functions (White Box) 2-16

Chapter 3 PC Interface Software 3-1

3.1 Get Display Data In Real Time 3-1
3.2 Re-scaling One or Both Pens on Chart Paper 3-2
3.3 Download Stored Chart Data from Recorder to PC 3-3
3.4 Humidity Probe Calibration Procedure (CTXL-TRH) 3-4
3.5 Changing Thermocouple Input Type 3-5

Chapter 4 Specifications 4-1

4.1 General 4-1
4.2 Temperature/Humidity Model 4-3
4.3 Dual Thermocouple Input Model 4-4
4.4 Dual Process Input Model 4-5

Chapter 5 Maintaining the Recorder 5-1

5.1 General Considerations 5-1

Chapter 6 List of Accessories and Chart Papers 6-1

Chapter 7 Troubleshooting the Recorder 7-1

Index I

Figure	Description	Page
1-1	Front and Side Views of the Recorder - Temperature/Humidity Model	1-2
1-2	Wiring Diagram, Dual Process Input Model, CTXL-DPR	1-3
1-3	Rear and Side Views	1-4
1-4	Front and Side Views of the Recorder - Dual Thermometer Model	1-4
1-5	Front View of the Recorder - Dual Process Input Model	1-4
1-6	Membrane Keypad and Display Functions	1-5
2-1	Foot Cover Removal	2-1
2-2	Swiveling Stabilizing Arm	2-2
2-3a	Stabilizing Arm Use for Bench Top Use (Normal Position)	2-2
2-3b	Stabilizing Arm in Extended Position (Position When You Open Door)	2-2
2-4a	Installing the Foot Cover (Top View)	2-3
2-4b	Installing the Foot Cover (Side View)	2-3
2-5	Battery Compartment and Battery Orientation	2-4
2-6	Battery Warnings	2-5
2-7	Changing Chart Speed and Scale Flow Diagram	2-6
2-8	Changing Chart Paper and Setting the Time	2-7
2-9	Offset Alignment of Pens (For Ease of Pen Installation)	2-7
2-10	Vertical Alignment of Pens (Pens Can't Be Inserted)	2-8
2-11	Post Location for Pen Caps	2-8
2-12	Pen Installation	2-9
2-13	Pen Removal	2-9
2-14	Setting Alarms and Time Clock	2-10
2-15	Relay Terminal Block Wiring Diagram	2-11
2-16	Reviewing Parameter Values	2-12
2-17	Using the Remote Sensor Cable	2-13
2-18	Using the Sensor Clip for Mounting Sensor in a Remote Location	2-14
4-1	Using Internal Excitation to Power External Transmitters (CTXL-DPR)	4-5

CAUTION & SAFETY INFORMATION

If the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.

The Installation category is one (1).

There is no user replaceable fuse in this product.

The output terminals of this product are for use with equipment (digital meters, chart recorders, etc.) which have no accessible live parts. Such equipment should comply with all the applicable safety requirements.

Do not operate the equipment in flammable or explosive environments.

Power must be disconnected before making any electrical connections.

A recommended DC adaptor is included with this product, 9 Vdc @ 1.7 A.

SAFETY WARNINGS AND IEC SYMBOLS

This device is marked with international safety and hazardous symbols in accordance with IEC1010. It is important to read and follow all the precautions and instructions in this manual before operating or commissioning this device as it contains important information relating to safety and EMC. Failure to follow all the safety precautions may result in injury and/or damage to your equipment.

IEC Symbol	Description
	Caution - Refer to the accompanying document(s).
	Direct Current

Notes

1 Introduction

This advanced Universal Circular Chart SUPERECORDER™ monitors and records data on a 1, 7, or 32 Days chart. The microprocessor based portable recorder provides many powerful and practical features as follows:

- Three models are offered:
  Temperature/Relative Humidity –TRH [-17 to 49ºC (2 to 120ºF) & 2 to 98% RH]
  Dual Thermocouple Input –DTC [J , K , or T type TC]
  Dual Process Input –DPR [(0-1, 0-5, 0-10) VDC, (0-20, 4-20) mA]
- 203 mm (8") Chart paper for 1, 7, or 32 Day recording
- Custom backlit LCD display shows two channels simultaneously
- Membrane keypad provides full access to all functions of the recorder
- Minimum, Maximum, and Average values are monitored and can be displayed
- Chart data is stored in non-volatile memory
- Chart paper can be re-scaled from the PC via RS232 interface
- Temp/RH sensor probe can be up to 12.2 m (40 feet) away from the recorder without any sacrifice in performance
- Battery as well as ac power operation.
- Battery icon displays the status of the battery voltage
- High & Low alarm points set via keypad
- Audible & visual alarms with built-in Relay contacts
- Additional two drive lines to power external Relays
- Wall Mount or Bench top Mount
- Built-in Real time Clock to monitor two channels vs. time
- Electronic Lock/Unlock key for unauthorized access
- RS232 Computer interface allows downloading of recorded chart data to PC
- Recorder comes with two built-in chart lights, and time reference arrow
- Decorative Foot cover for wall mounting
- Double sided Linear Radial Chart Paper

1.1 Parts of the Recorder

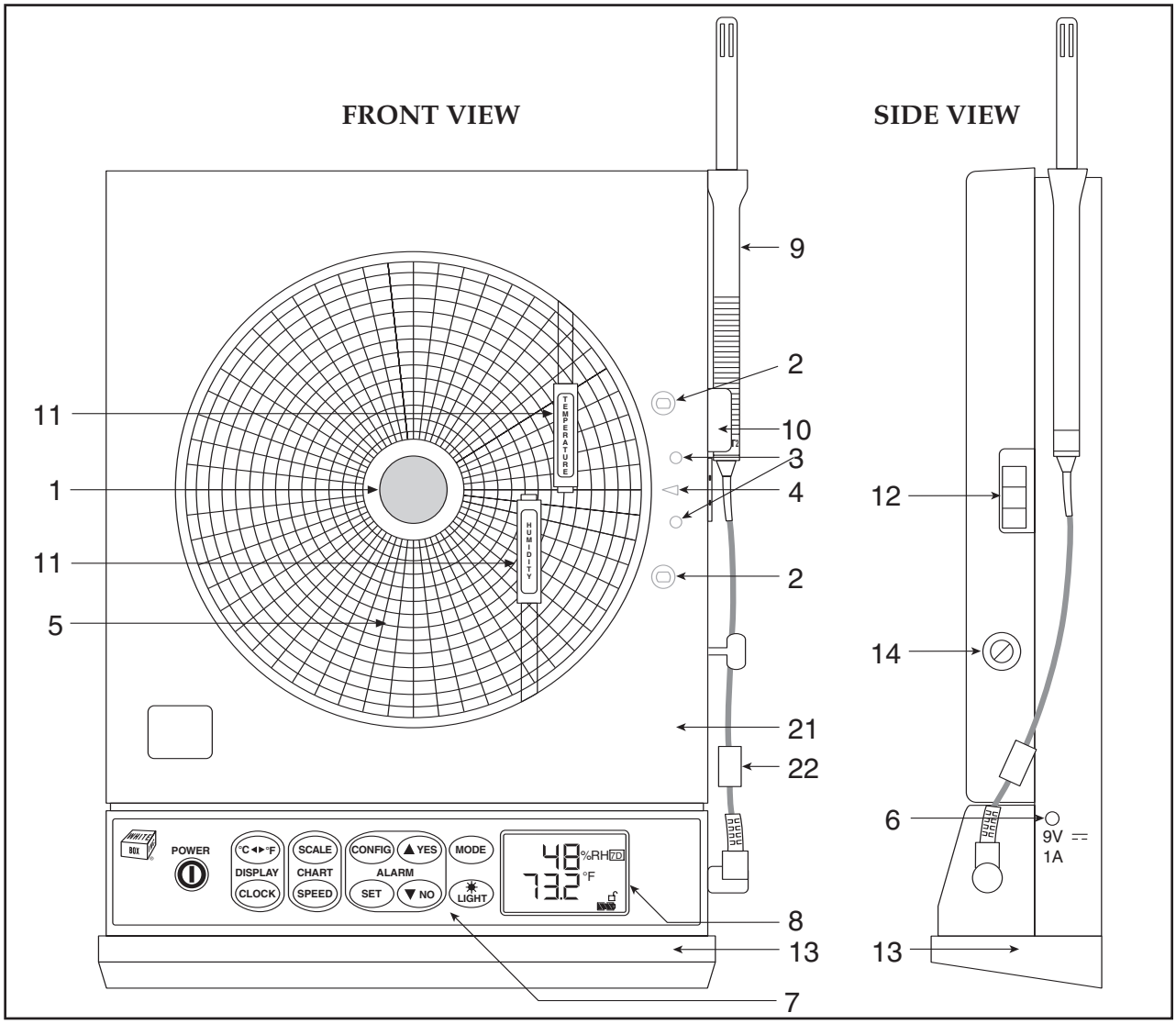


Figure 1-1. Front and Side Views of the Recorder - Temperature/Humidity Model

Item	Description	Function
1	Chart Paper Knob (magnetic)	Holds chart paper in place.
2	Chart Lights	Lights up the chart paper. The light comes on for 3 seconds in battery mode and permanently in ac adapter mode.
3	Pen Cap Posts	Holds the loose pen caps.
4	Time Reference Arrow	Helps align the time on the new chart paper with the actual time.
5	Chart Paper	Linear Radial Double sided charts are available for 1, 7, and 32 day recording. See the inside back cover for a detailed list of paper available.

6	ac Power Jack	Allows the unit to be powered from ac power using the universal 100/240 Vac adapter supplied.
7	Membrane Keypad	Provides full access to all functions of the recorder.
8	Backlit LCD Display	Displays temperature and relative humidity values simultaneously.
9	Temperature/Humidity Sensor	Houses the electronic sensor which measures ambient temperature and relative humidity.
10	Sensor Holder (clip)	Holds the temperature/humidity probe to the side of the recorder.
11	Pen Arm and Holder (2 each)	Holds and moves the temperature and humidity pens. Upper pen, red, CHAN 1 (temperature) Lower pen, blue, CHAN 2 (humidity)
12	Latch Button	Releases and secures the recorder's door.
13	Decorative Foot Cover	Stays in place for wall-mounting the recorder. The cover must be removed for upright bench-top use (otherwise the recorder topples over)!
14	Door Key	It locks/unlocks the chart door.
15	"Keyhole" Slot Mounting Holes	Allows the recorder to be mounted on the wall.
16	Carrying Slot	Allows the user to carry the recorder conveniently.
17	Product Label	Product information label.
18	Alarm/Relay Terminal Block	Allows the user to connect to built-in relay contacts or power external mechanical relays.
19	Battery Compartment	Holds 4 "D" size batteries which provide power if the ac adapter is not used, or provide power backup in case of ac power failure.
20	RS232 Connection	Serial PC interface
21	Recorder Door	It contains pen drive mechanisms. Open the door to change chart paper.
22	Ferrite Core	Attach the snap-on Ferrite Core (included) on the Sensor Probe cable to minimize RF radiation emission.

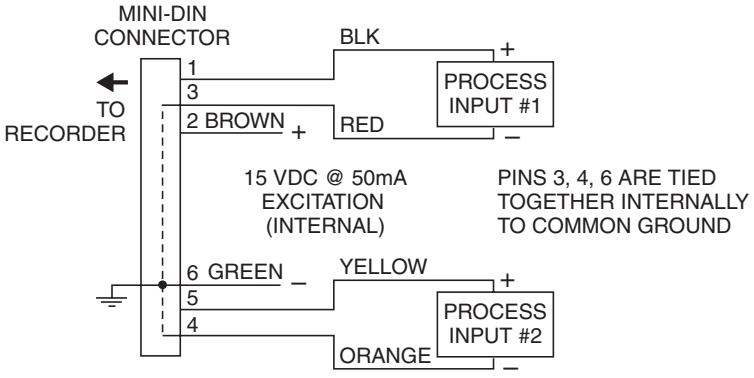


Figure 1-2. Wiring Diagram, Dual Process Input Model, CTXL-DPR

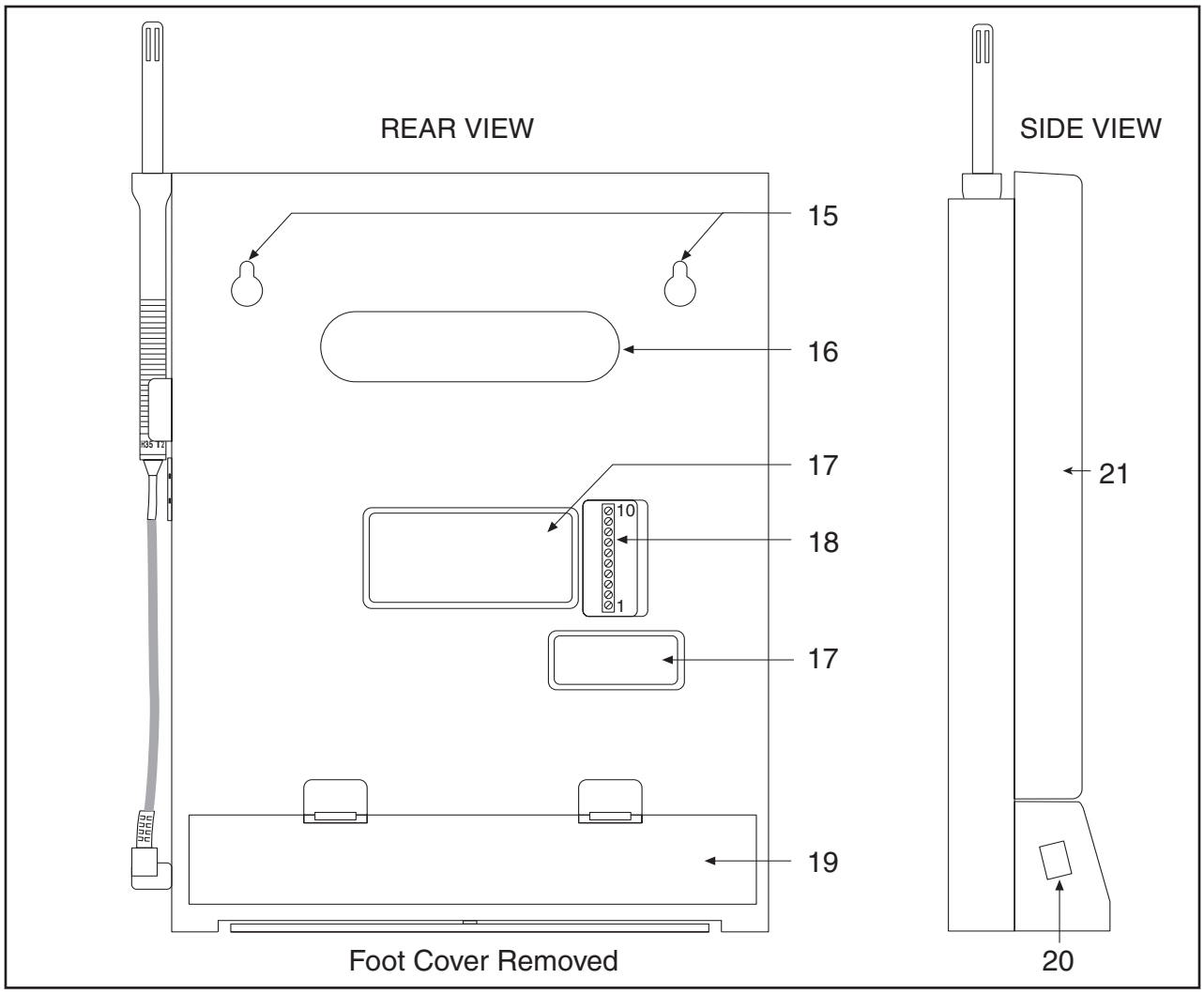


Figure 1-3. Rear and Side Views

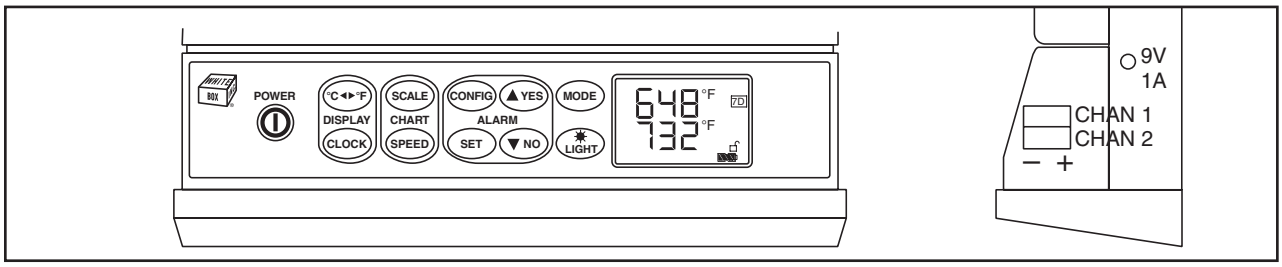


Figure 1-4. Front and Side Views of the Recorder - Dual Thermocouple Model

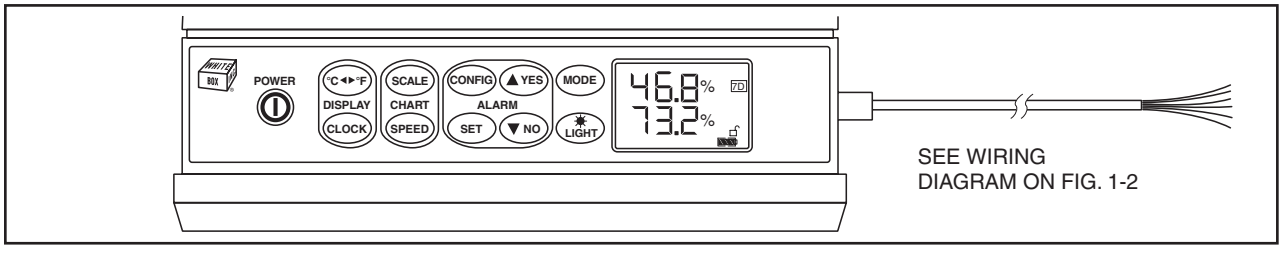
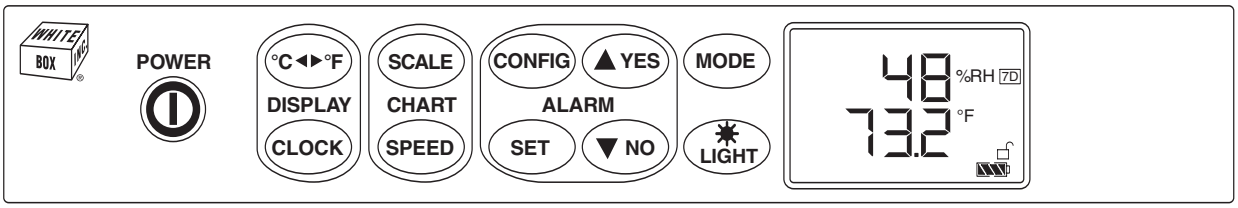


Figure 1-5. Front View of the Recorder - Dual Process Input Model

1.2 Membrane Keypad and Display Functions



MEMBRANE KEYPAD

POWER

Turns ON/OFF the recorder

°C◁▷°F — Changes temperature display from °F to °C or vise versa

CLOCK — Displays Real Time Clock for 3 seconds

SCALE — Sets the Chart Scale to °F & RH or °C & RH

SPEED — Sets the Chart Speed to 1,7, or 32 Day chart

CONFIG — Configuration Menu - Sets Low , High Alarms & Time Clock (Sec. 2-6)

SET — Enables/disables low & high alarms (Sec. 2-6)

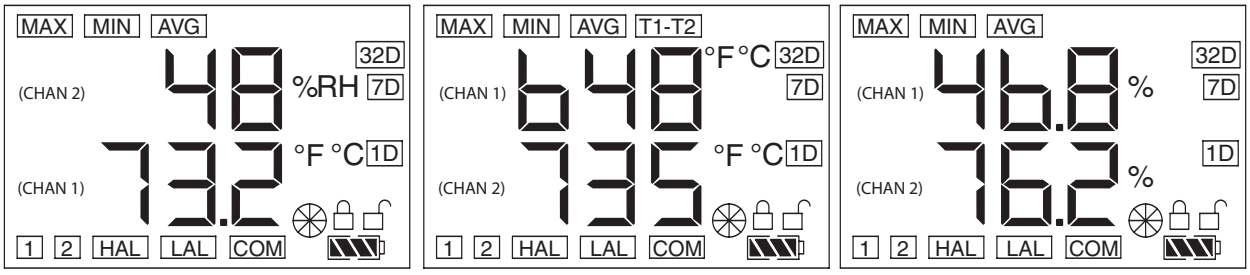
△YES — Increments set values

▽NO — Decrements set values

MODE — Mode Menu- Displays Max, Min, Average values (Sec. 2-7)

LIGHT — Turns on/off Chart Lights & Display backlight (Sec. 2-13)

WHITE BOX INC — Locks/unlocks the Keypad Functions (Sec. 2-14)



DISPLAY - TEMPERATURE/ HUMIDITY MODEL

DISPLAY - DUAL THERMOCOUPLE MODEL

DISPLAY - DUAL PROCESS MODEL

MAX — Displays Maximum values of two channels

MIN — Displays Minimum values of two channels

AVG — Displays Average values of two channels

32D — Turns on when Chart Speed is set to 32 Days

7D — Turns on when Chart Speed is set to 7 Days

1D — Turns on when Chart Speed is set to 1 Day

RH — Displays % Relative Humidity

°F — Displays Temperature in °F

°C — Displays Temperature in °C

% — Displays percentage (0-100%) Dual Process Input Model

Turns on when Chart is not set to standard scale
Flashes when pens are jammed

Turns on when Keypad functions are locked

Turns on when Keypad functions are unlocked

Displays Battery life status (Sec. 2-3)

1 — Refers to Channel (1)

2 — Refers to Channel (2)

HAL — Turns on or flashes when in High alarm condition

LAL — Turns on or flashes when in Low alarm condition

COM — Turns on when communicating thru RS232

T1-T2 — Displays Differential temperature
Dual Thermocouple Model only

Figure 1-6. Membrane Keypad and Display Functions

Notes

2 Setting Up the Recorder

2.1 Placing the Recorder on the Bench Top

Figure 2-1 shows the removal of the decorative foot cover.

1. Place the recorder on its back (so it is face up).
2. Remove the clip-on foot cover by lifting up on the cover and releasing it from the stabilizing arm at the bottom of the recorder. This exposes the rubber feet and stabilizing arm. The rubber feet protect the bench top surface.

CAUTION

DO NOT ATTEMPT TO SET THE RECORDER UPRIGHT ON THE BENCH WHEN THE CLIP-ON FOOT COVER IS IN PLACE. THE RECORDER WILL TOPPLE OVER.

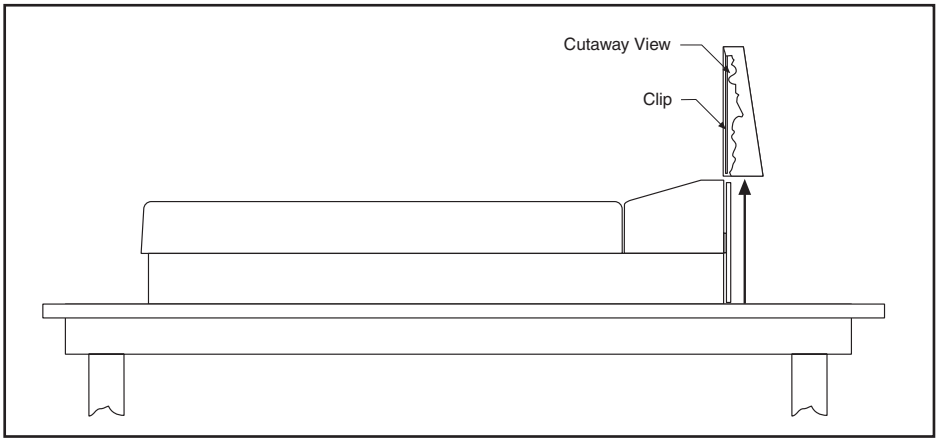


Figure 2-1. Foot Cover Removal

3. Swing out the stabilizing arm and extend it towards you. Figure 2-2 shows how to swing out the stabilizing arm. Make sure the slot in the stabilizing arm extends out the rear of the recorder.

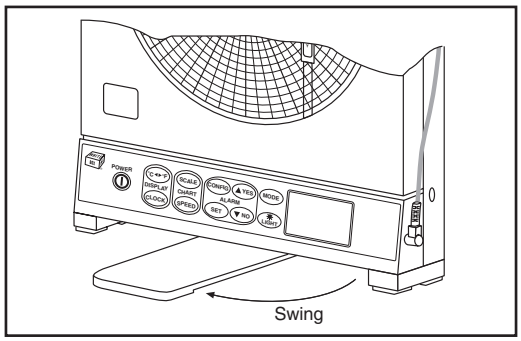


Figure 2-2. Swiveling Stabilizing Arm

NOTE

When the recorder is in normal operating position (chart door is closed), the stabilizing arm should be pushed to middle position (the bumps on the arm will click in place under the recorder). Refer to Figure 2-3a.

Before opening the chart door, pull the stabilizing arm out to its full extension position to provide full stability. Refer to Figure 2-3b. After closing the door, return the arm to its middle position. Refer to Figure 2-3a.

Note that the arm extends towards the front or rear of the case. If the unit is placed on a bench top snug against the wall, extend the stabilizing arm fully to the front of the unit. Refer to Figure 2-3b.

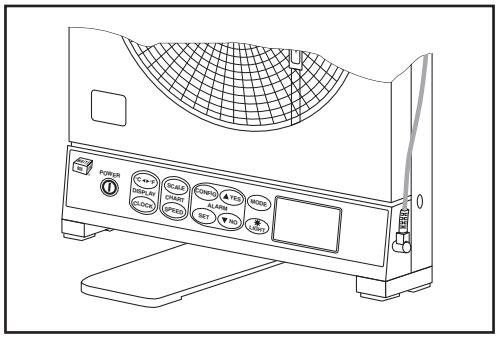


Figure 2-3a. Stabilizing Arm Use for Bench Top Use (Normal Position)

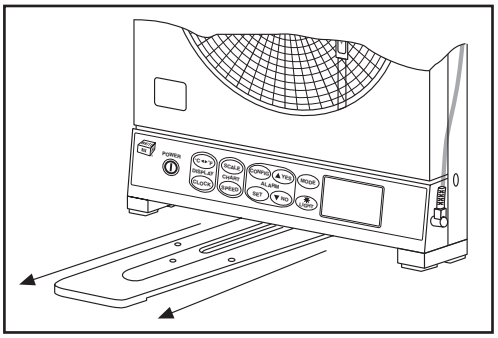


Figure 2-3b. Stabilizing Arm in Extended Position (Position When You Open Door)

2.2 Mounting the Recorder on the Wall

To mount the recorder on the wall, first locate the wall mounting holes using the template provided in the wall mounting kit. Leave the decorative foot cover (Figure 1-1, item #18) in place*. After drilling the holes, insert the wall anchors and put in the screws, leaving ⅛ inch (3 mm) between the screw heads and the wall. Hang the recorder by positioning the two (2) "keyholes" in the rear cover over the screw heads.

* If the decorative foot cover is not in place, go through the following steps to reinstall the cover (if desired):

1. Place the recorder on the table (so it is front face up).
2. Roughly position the foot cover so the clips are in line with the stabilizing arm. Gently "stretch" the clips out and position over the arm as shown in Figure 2-4a.
3. Once the clips are in place, gently slide down until the foot cover is even with the front of the recorder as shown in Figure 2-4b.

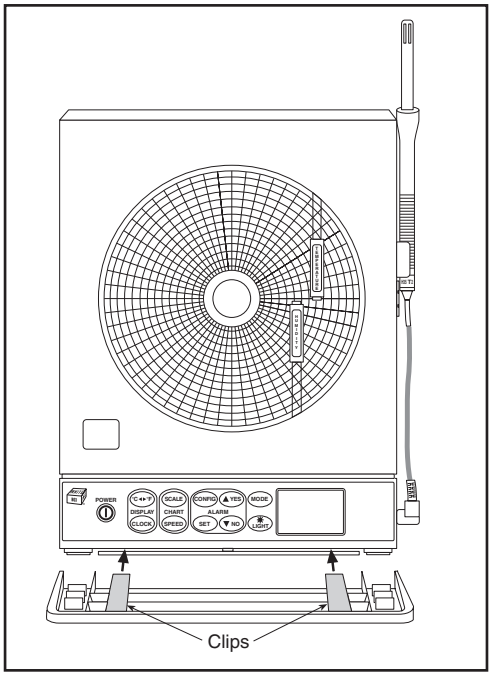


Figure 2-4a. Installing the Foot Cover (Top View)

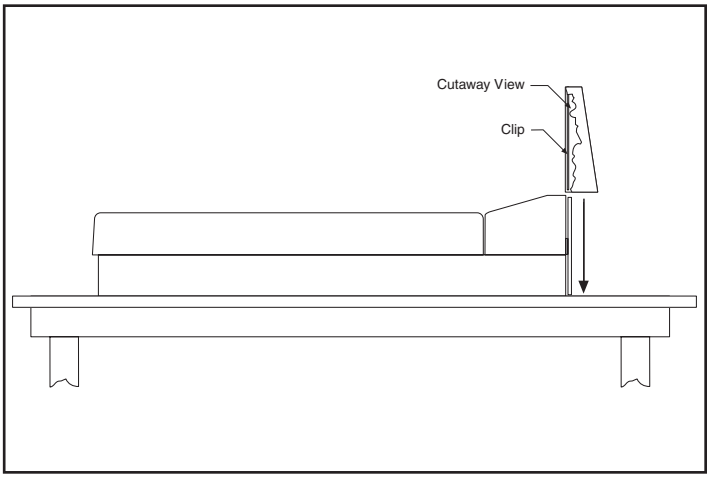


Figure 2-4b. Installing the Foot Cover (Side View)

2.3 Using Batteries

The recorder operates on either four "D" size non-rechargeable alkaline batteries or a universal (100-240 Vac, 50-60 Hz) ac adapter.

NOTE

In the event of ac power failure, the unit will switch over to battery power automatically. Keep a fresh set of batteries in the unit in case of power outage.

2.3.1 Installing Batteries

You may power the recorder with four "D" size alkaline batteries. Under normal conditions, the recorder operates full time on battery power for up to three months when using fresh alkaline batteries. When replacing batteries, we recommend that you use Alkaline "D" size batteries for long life and for best performance at low temperatures.

To install the batteries (refer to Figure 2-5):

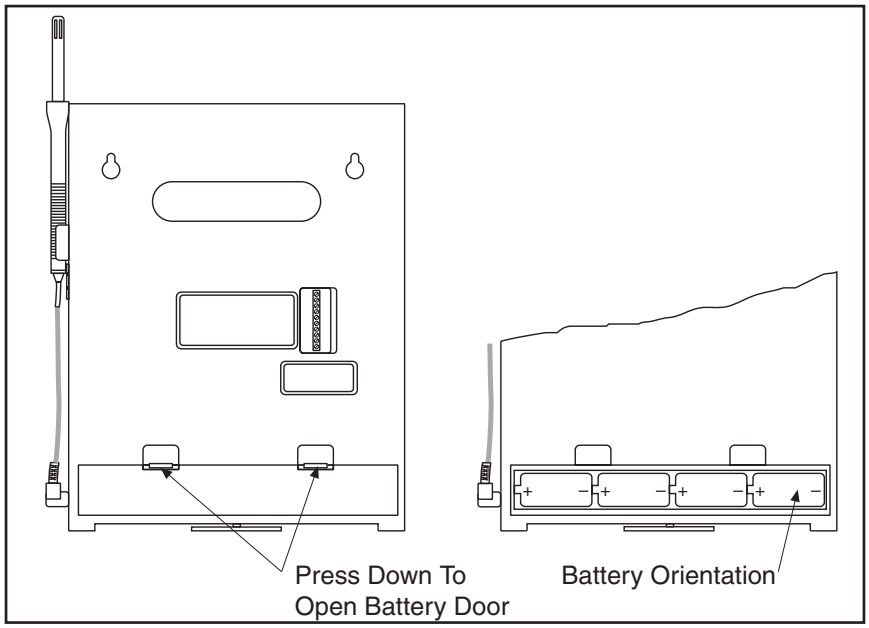


Figure 2-5. Battery Compartment and Battery Orientation

The battery icon on the LCD shows the status of the batteries as shown below.

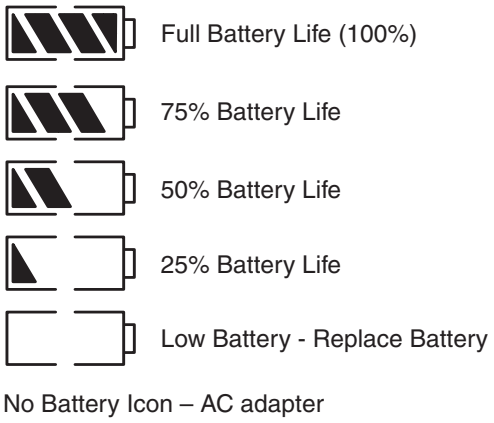


Figure 2-6. Battery Warnings

2.3.2 Connecting ac Power

The recorder can be ac powered using the universal 100-240 Vac adapter supplied. The dc power jack is located on the right side of the unit (refer to Figure 1-1, item #6.). The ac adapter provides 9 Vdc @ 1.7A power output and comes with a 1.8 meters (6 ft.) long cable.

NOTE

The following parameters are stored in the non-volatile memory and will not be lost when batteries or main power are removed

- Chart speed & scale
- High & low alarm set points for the two channel
- Chart Data points

When the recorder runs only on AC adaptor, and the main power restores after a power failure, the recorder turns on automatically without pressing the Power Key. All LCD segments turn on momentarily, then there is a 20 second delay before the revision screen. This only happens when the power is removed without pressing the Power Key. The pens go to the home position and back to the correct chart scale everytime the recorder powers up.

2.4 Installing and Changing Chart Paper

Make sure the Sensor probe is plugged into the Recorder when power is on. The Factory set up is for 7 Day Chart Speed & °F Chart Scale for CTXL-TRH.

To install or change the same Chart paper:

- Open the Recorder door & remove the magnetic hub that holds the paper.
- Place the new Chart paper.
- Rotate the paper, until the present time lines up with the Time reference arrow as shown in Fig 2.8.
- Place the magnetic hub over the paper & close the recorder door. This can be done with or without power turned on.

2.4.1 Changing Chart Speed & Scale

You can change the Chart speed & scale as follows:

- Make sure the unit is turned on by pressing the Power Key.
- Open the Recorder door. The pens will go to the Home position (Bottom of scale) and the display will show "door oPEn" as well as the existing Chart Speed (7 Days) and Chart scale (°F).
- Press the Chart Speed key (SPEED) to change to 1 or 32 day chart.
- Press the Chart Scale key (SCALE) to change to °C if needed (CTXL-TRH only).
- Install the new Chart paper as explained in the previous paragraph
- Close the Recorder door. The display will show "dAtA rSt?"
- Press (▲YES) key to reset (erase) previous stored data in memory. The unit beeps for verification.
- Press (▼NO) key to continue recording without resetting (erasing) previous stored data in memory.
- If no keys are pressed, the unit will resume recording after 5 seconds without erasing previous stored data in memory

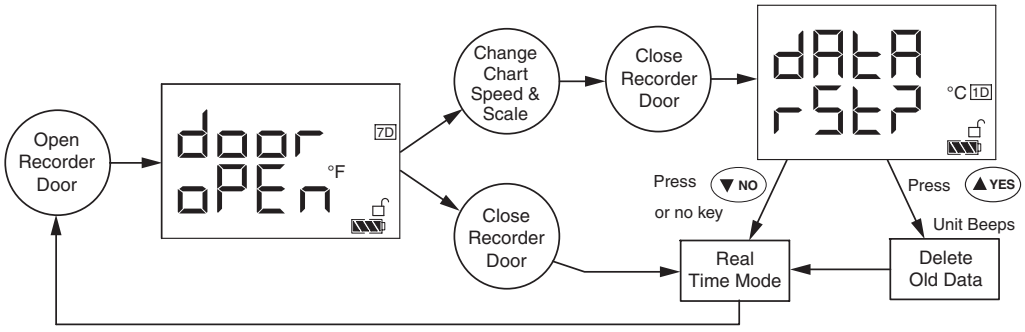


Figure 2-7. Changing Chart Speed and Scale Flow Diagram

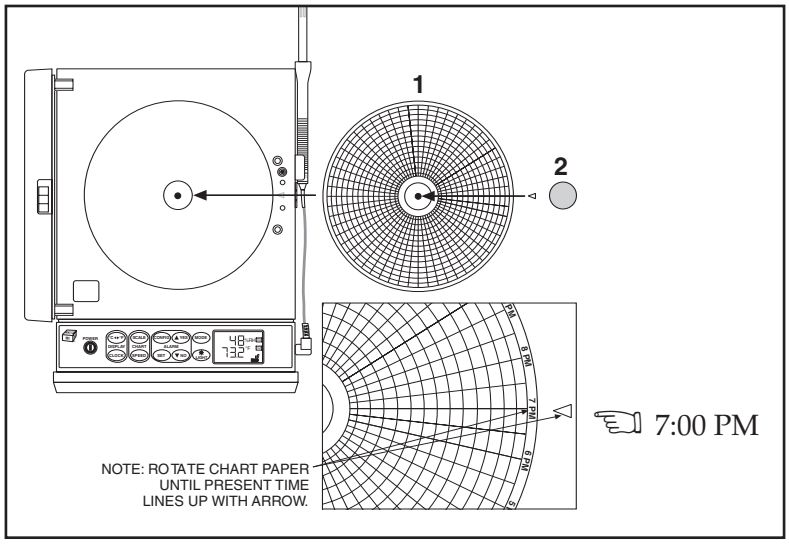


Figure 2-8. Changing Chart Paper and Setting the Time

2.5 Installing and Removing Pens

The recorder already comes with the two pens installed. While the unit is turned off, open the recorder door and remove the pen caps from the two pens. Place the pen caps on the two posts as shown in Fig. 2-11.

2.5.1 Installing the Pens

The recorder uses two different colored pens to record information. The red (upper) pen records temperature. The blue (lower) pen records relative humidity. Pen life varies with use and climate. Under normal operating conditions, pens last at least one month. We recommend that you install a fresh set of pens after every month of use.

To install pens:

1. Make sure the recorder is turned off. The recorder door should be closed.
2. Examine the location of the pen arms through the window in the recorder door.
   a. If the pen arms are offset as shown in Figure 2-9, continue to Step 3:

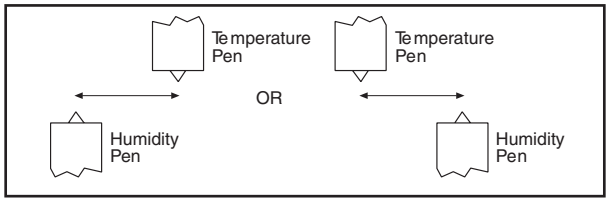


Figure 2-9. Offset Alignment of Pens (For Ease of Pen Installation)

b. If the pen arms are vertically aligned as shown in Figure 2-10, do the following and then proceed to Step 3.

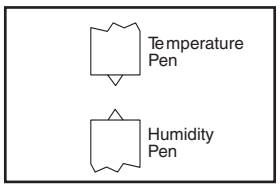


Figure 2-10. Vertical Alignment of Pens (Pens Can't Be Inserted)

(The pen arms must be offset sufficiently to allow for clearance before insertion or removal of pens are attempted. The pens must be moved electrically.)

- Make sure the recorder door is closed and a piece of chart paper is installed on the spindle on the chart base.
- Turn on the unit by pressing the power key and wait for the pens to be far enough apart to remove a used pen one at a time or to insert a new pen one at a time.

CAUTION

DO NOT ATTEMPT TO OFFSET THE PENS MANUALLY (BY HAND). THE DRIVE MECHANISM COULD BE DAMAGED. DO NOT ATTEMPT TO CHANGE THE PENS WHILE THEY ARE IN MOTION.

- Turn off the unit by pressing the power key again to stop the pen movement.

3. Open the recorder door by applying downward pressure on the latch button.
4. Remove the pens from the package and the cap from each pen.

We recommend that you put the pen caps on special posts located on the chart base of the recorder near the light bulbs. Figure 2-11 shows the location of the posts.

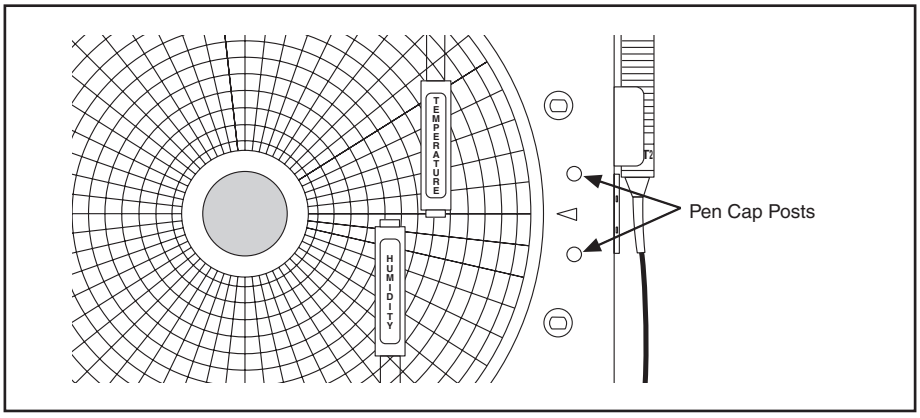


Figure 2-11. Post Location for Pen Caps

5. Insert the blue pen fully into the lower (humidity) holder and the red pen fully into the upper (temperature) holder.

If you installed the pens correctly, you will hear a click as they position themselves in the holders. Figure 2-12 shows how to insert the pens.

6. Close the recorder door.

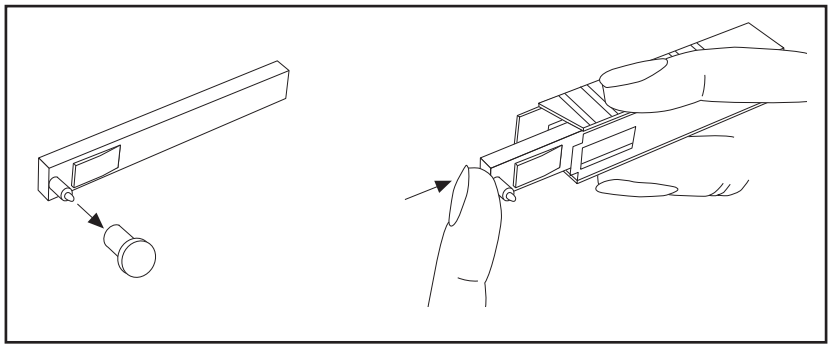


Figure 2-12. Pen Installation

2.5.2 Removing the Pens

1. Check to see that the pens are offset as shown in Figure 2-9. Otherwise, you can damage the arm and drive mechanism if you try to remove them.

CAUTION

DO NOT ATTEMPT TO OFFSET THE PENS MANUALLY (BY HAND). THE DRIVE MECHANISM COULD BE DAMAGED. DO NOT ATTEMPT TO CHANGE THE PENS WHILE THEY ARE IN MOTION.

2. Perform Step 2b in Section 2.5.1 to offset the pens.
3. With a screwdriver in one hand, push on the rectangular area of the pen shown in Figure 2-13. Using the other hand, release the pen from the spring clip attached to the pen holder.

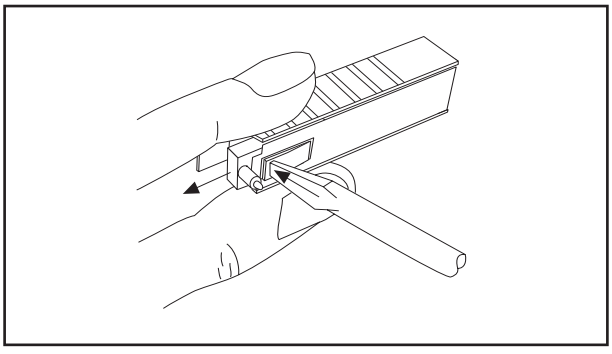


Figure 2-13. Pen Removal

4. At the same time, slide the pen out from the pen holder.
5. Install new pens following section 2.5.1, steps 3 thru 6.

2.6 Setting Alarms and Time Clock

The following flow chart shows how to set the alarms and the time clock in a Temperature/Humidity model recorder.

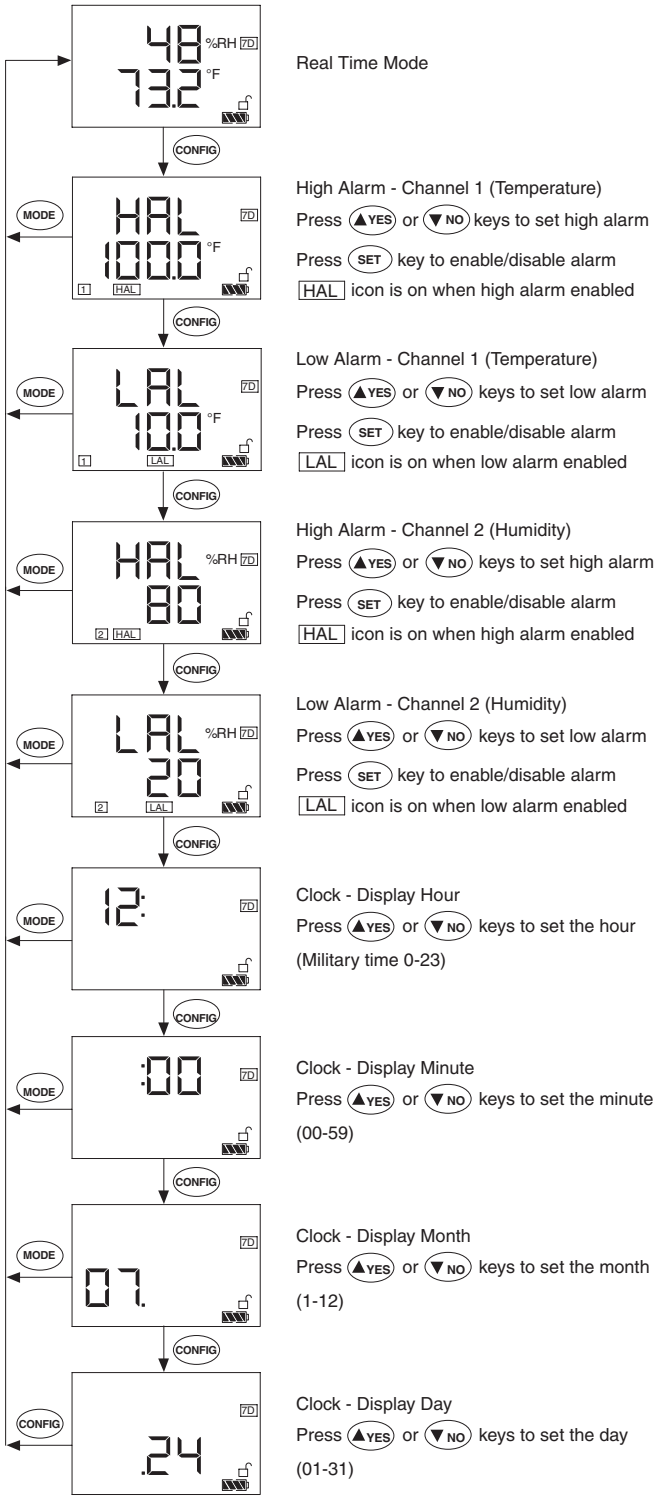


Figure 2-14. Setting Alarms and Time Clock

Press CONFIG key to get into the Configuration mode. In this mode, you can set High & Low alarm points as well as the Time Clock as shown in the flow chart on the previous page.

You can exit the configuration menu at any time by pressing the MODE key. The high & low alarm set points are stored in the non-volatile memory. Removing power (ac adapter or batteries) will not affect the alarm settings. The real time clock has its own rechargeable battery back up. The clock continues to operate when the main power is removed for about 14 days. There is no need to change the real time clock battery since it gets charged every time the main power is present.

The recorder has two built-in Relays and provides an additional two voltage outputs to drive external mechanical relays. There is a 10 position terminal block in the back of the recorder. It provides the two relay contact closures & two signal outputs to drive external mechanical relays as shown in Fig 2.14. In order to do your wiring, remove the terminal block from the back of the recorder. Connect your wiring, then plug the terminal block back in its place.

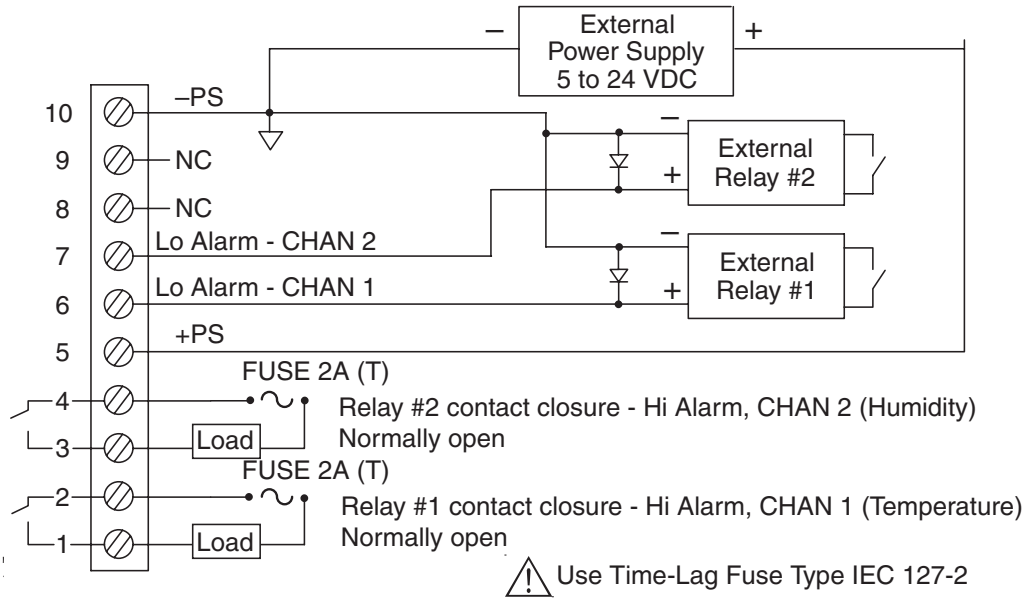


Figure 2-15. Relay Terminal Block Wiring Diagram

NOTE

When the recorder is in alarm condition, the high or low alarm icon and the channel no. flashes on the display. The unit beeps and the corresponding relay output turns on (Built-in Relay energizes-contact closure- and/or relay voltage output goes high). You can disable the high or low alarms by going thru the configuration menu and pressing the SET key to disable.
If you are switching inductive loads across Relay contacts, it is recommended to connect a Varistor across the relay contacts to protect the contacts from the rush current during the switching period.

2.7 Reviewing Parameter Values

You can review the Maximum, Minimum, and Average values of the two channels by pressing the MODE key. You can review the differential temperature between the two channels (T1-T2) on the Dual Thermocouple models. You can reset the values and start fresh at any time by pressing the SET key.

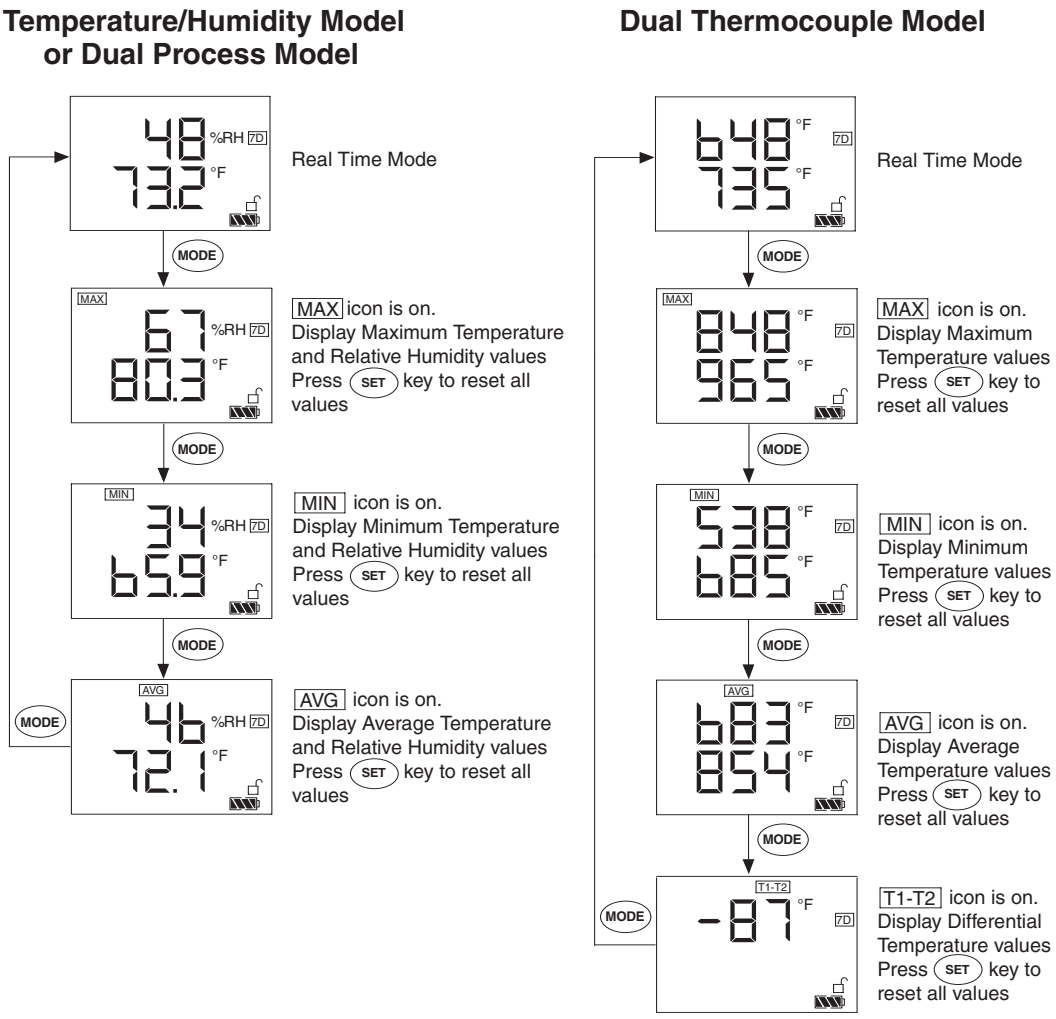


Figure 2-16. Reviewing Parameter Values

NOTE

The Minimum, Maximum, and Average values will reset when power is removed.

2.8 Using the Remote Sensor Cable - Temperature/Humidity Model

1. Connect the end of the cable with the arrow to the short cable on the sensor. Line up the two arrows as shown in Figure 2-16 before mating the two cables.
2. Connect the other end of the remote sensor cable to the recorder.

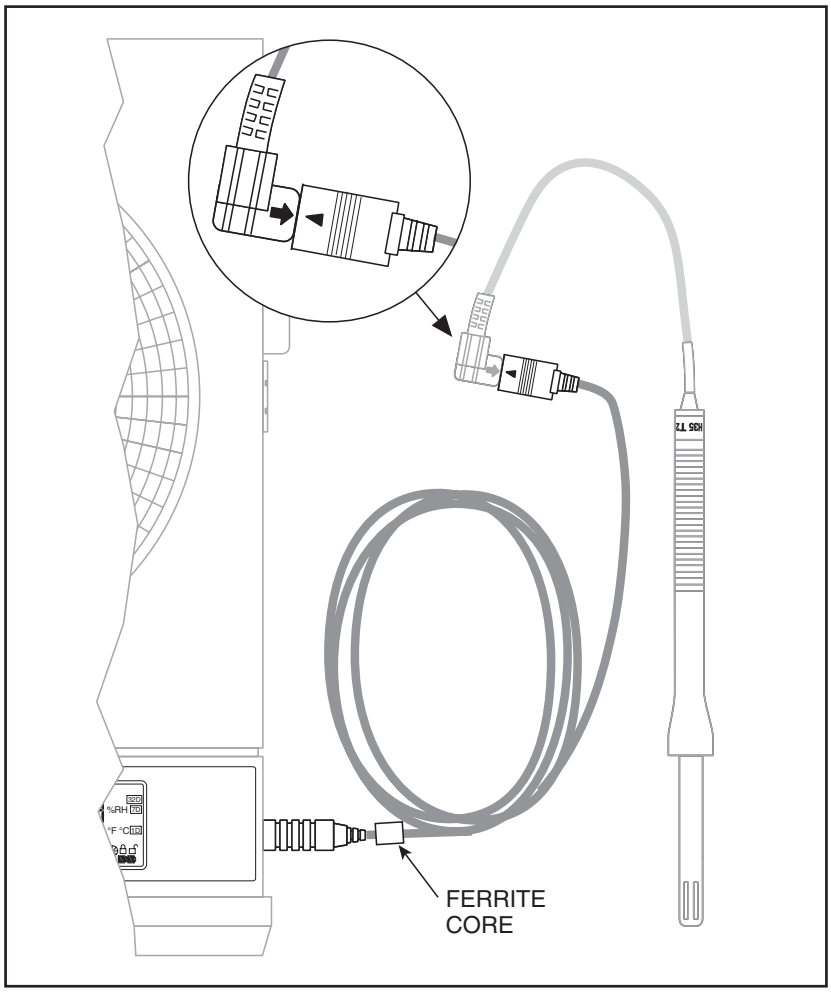


Figure 2-17. Using the Remote Sensor Cable

NOTE

For accurate temperature and humidity readings, the sensor probe can be up to 12.2 m (40 ft.) away from the recorder.

2.9 Using the Sensor Clip

An extra sensor clip is provided in the shipping box, so you can hang the sensor in a remote location. Two self-tapping screws are provided for mounting to wood, sheet rock or plastic surfaces. When mounting to wood or sheet rock surfaces, drill two 1/16" (1.5 mm) diameter holes. When mounting to plastic, drill two 5/64" (1.9 mm) diameter holes. Appropriate hardware must be selected when mounting to metal surfaces. Refer to Figure 2-17.

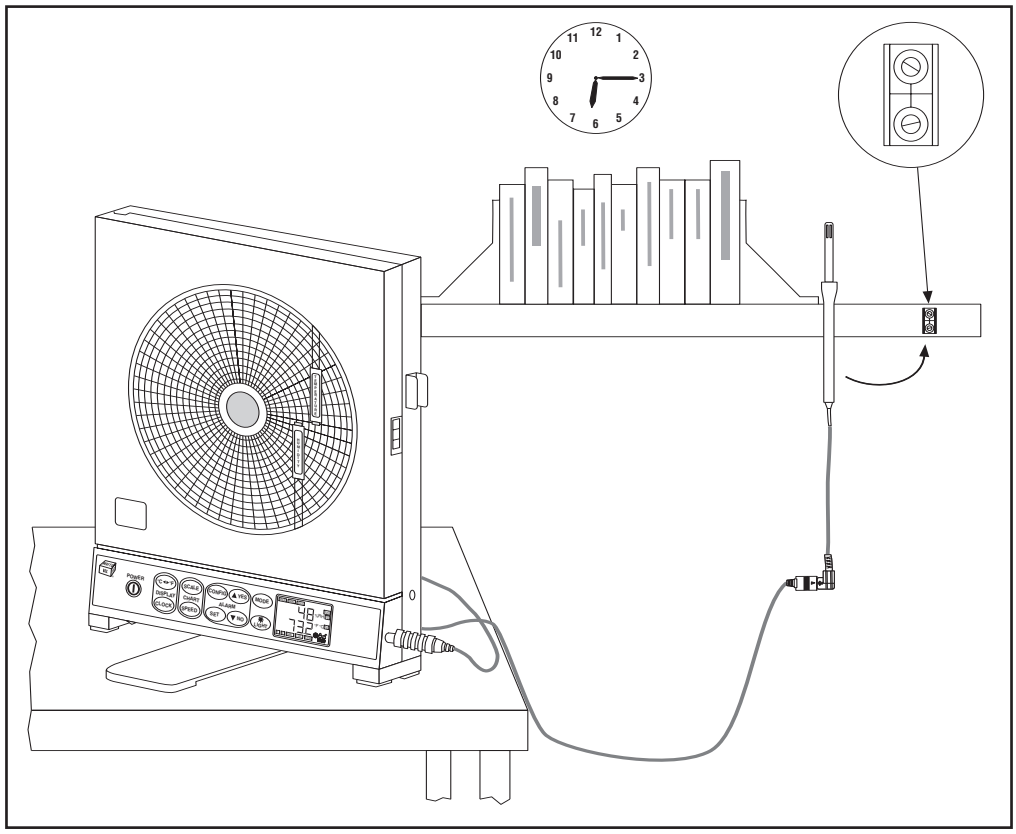


Figure 2-18. Using the Sensor Clip for Mounting Sensor in a Remote Location

2.10 Open/Out of Range Input

If the input to the recorder is open or out of range, the chart motor continues to run but the recorder handles the situation as follows:

1. Temperature/Humidity Model: When the sensor probe is disconnected, the pens go to the home position and the display shows “Prb Err”. When the probe is out of range, the display flashes.
2. Dual Thermocouple Model: When any of the two thermocouple inputs open up, the pens go to the home position, and the display shows “Prb Err”. When the input is out of range, the display flashes.
3. Dual Process input Model: When the two inputs are out of range, the display flashes.

2.11 Pen Jamming

Each pen drive mechanism has two optical sensors. One is to detect the home position, the other is to detect pen movement. If the pen drive mechanism skips steps due to wear & tear or dirt & dust over a period of time, the recorder can compensate for it so that the pens are at the right location on the chart. If the pens have too much friction or get jammed for any reason, the recorder detects the situation. It turns off both the pen and the chart motors. It continues to display the parameters on the LCD and stores data in the memory. The Chart icon starts to flash to indicate Pen Jamming.

Once the pen drive mechanisms are serviced, and the recorder is powered back on, the unit continues to operate normally and the chart icon flashing will disappear.

2.12 Pen Re-scaling

Each or both pens can be re-scaled within the range of the input sensor. Here are the standard chart ranges for the three models:

Temperature/ Humidity Model	-17.7 to 49ºC (0 to 120ºF)
	0 to 100% RH
Dual Thermocouple Input	
Type K	-40 to 560ºC (-40 to 1040ºF)
Type J	-40 to 260ºC (-40 to 500ºF)
Type T	-40 to 160ºC (-40 to 320ºF)
Dual Process Input	0 to 100%

The pens can be re-scaled thru RS232 from the PC using certain commands. See Chapter 3 for more details. Once the pens are re-scaled, the Chart icon turns on. The unit remembers the new pen scales even if the main power is removed. The chart icon will disappear if the pens are scaled back to factory settings.

2.13 Chart Lights & Display Backlight

You can turn ON/OFF the chart lights and the display backlight by pressing the LIGHT key on the front panel keypad.

In Battery mode (Battery Powered), the lights stay on for 3 seconds. In DC adaptor mode, the lights say on until pressing the LIGHT key again to turn them off.

2.14 Lock/Unlock Keypad Functions (White Box)

You can Lock/Unlock the front panel keypad functions by pressing & holding the WHITE BOX key for 3 seconds. When in lock mode, the lock icon comes on and the configuration menu will be inactive (Config, Set, Yes, No). When in unlock mode, the Unlock icon comes on and all the keys are active.

3 PC Communication

You can communicate with the CTXL recorder thru RS232 port from a PC. There are a number of PC commands that allows the user to do the following functions:

- Get the data (Like Temperature & Relative Humidity) in real time. This is the same data displayed on the LCD.
- Download the stored chart data from the recorder to the PC. It will save the data into a data file. It can then be imported into the Excel spread sheet program for further review and analysis.
- Re-scale the Chart paper for one or both Pens to any range within the input operating range.
- Reset the Chart scale back to the Factory standard scales.

You can initiate the PC commands from the Hyper terminal or can develop your own program and incorporate these commands. Here are the steps to work from the Hyper terminal:

- From Start → Programs → Accessories → Hyper Terminal
- Create a name for your communication
- Set the communication settings as follows (In the Properties Menu):
  - COM port (1, 2, 3)
  - Baud Rate (9600)
  - Data Bits (8)
  - Parity (None)
  - Stop Bit (1)
  - Flow Control (None)

3.1 Get Display Data in Real Time

You can get the data for channels 1 & 2 in real time. It will be the same data displayed on the LCD. The following two commands perform such functions.

In the Temperature/Humidity Model, the temperature data is multiplied by 10 using the AT command.

Please note that all the PC commands terminate with a Carriage Return. In the Example section of the following tables, the PC commands are in Bold, and the response is in regular text.

Command	Description	Example
AT	Get display data from Chan 1 (Temperature)	**AT**;00748
AH	Get display data from Chan 2 (Humidity)	**AH**;0048

3.2 Re-scaling One or Both Pens on Chart Paper

You can re-scale one or both pens to any range within the operating input range. Here are the commands:

NOTE

The rescaling of the Temperature Pen is based on Degree F scale on both CTXL-TRH and CTXL-DTC Models.

Command	Description	Example
PUT	Change Chan 1 Pen (Temp) top chart value	**PUT90**; Pen Scale set
PUB	Change Chan 1 Pen (Temp) bottom chart value	**PUB50**; Pen Scale set
PLT	Change Chan 2 Pen (Humidity) top chart value	**PLT80**; Pen Scale set
PLB	Change Chan 2 Pen (Humidity) bottom chart value	**PLB40**; Pen Scale set
PR0	Issue the new Pen scales values to the recorder	**PR0**; Rescaled
PS	Get the Pen scales for Chan 1 & 2	**PS**;0090,0050,0080,0040
PR1	Re-scale the Pens to the standard Factory scales	**PR1**; Rescaled

In the above example, we are re-scaling both Pens as follows:

Temperature Pen: 50 to 90ºF (Standard: 0 to 120ºF)

Humidity Pen: 40 to 80% RH (Standard: 0 to 100%RH)

After issuing the PR0 command, the new Pen scale values will take affect, otherwise the previous scale values will remain. The Chart icon comes on to indicate new chart scale. The new scale is stored in the non-volatile memory. To restore the Pen scales back to the Factory settings, you need to issue the PR1 command.

The rescaling value can be a negative number on models CTXL-DTC and CTXL-DPR. For example, you can issue a PC command: PUB-100 meaning the bottom of chart for channel 1 starts at -100.

3.3 Download Stored Chart Data from Recorder to PC

You need to create a Text file for saving the data from the recorder before issuing the MD command. While in Hyperterminal, go to: Transfer → Capture Text (Create a Text file) → Start

Command	Description	Example
MD	Download stored Chart data & save it in a data file	**MD**;
MI	Erase stored Chart data from recorder's memory	**MI**;Done

When you issue the MD command, it will download the Chart data (Chan 1 & 2) stored in the non-volatile memory of the recorder. It will save the data into a text file which can be imported into the Excel spread sheet program. Depending on the amount of data stored in the non-volatile memory of the recorder, the data transfer could take up to 3 minutes.

Here is a sample of data downloaded from the recorder.

CTXL Circular Chart Recorder
Ver: 10.12
OnLine
Chart Speed: 1d
Hum% Temp Deg F

0012 0075
0011 0076
0012 0077
0013 0078
0014 0079
0014 0079
0015 0080
0017 0079
0020 0078
,,Month, Day, Hour, Minute,
,,0012, 0019, 009, 0012 ← Ending Time

Please note that the data file begins with the Chart Speed (1, 7, 32 Days). Then it follows the headings of the data (Humidity % RH, Temp Deg F). Then it follows the chart data. Then the Ending Time of the Chart data in Month, Day, Hour, Minute.

You can stop data transfer at any time by pressing the Q key. You can restart data transfer by issuing the MD command again.

NOTE

The download data is always in Degree F scale on models CTXL-TRH and CTXL-DTC.

3.4 - Humidity Probe Calibration Procedure (CTXL-TRH)

This is a two point humidity calibration, 33% RH and 75% RH. The temperature does not require calibration although it can be certified at room or any other temperature within its operating range. Before the humidity calibration, you must record the humidity reading of the probe at 33% RH & 75% RH environments. If the reading accuracy at these two points are within +/-3% RH, no calibration is required. Otherwise the probe needs calibration as described below:

Example: The probe humidity reading at 33% RH is 37% RH and at 75% RH is 72% RH.

(PC commands are in Bold)

1. Connect the CTXL recorder to a PC with the RS232 cable provided.
2. Run HyperTerminal program from the PC. The COM port setting are:
   Baud rate: 9600
   Data Bits: 8
   Parity: None
   Stop Bit: 1
3. Turn on the power to the CTXL. The probe does not have to be at any specific humidity environment (Regular room environment).
4. Type HH then press Enter key from the Hyper Terminal. The following message shows the previous two calibration data (Factory Default setting are 33% RH and 75% RH) saved in the CTXL memory.
   HH; Humidity calibration saved data are:
   00033
   00075
5. Type HC then press Enter key to start the humidity calibration, and the following message will appear.
   HC; Humidity calibration begins,
   Please type HUL followed by the measurement value at 33% RH.
6. Type HUL37 then press Enter key. (37 is the value that the probe was reading at 33% RH humidity), and the following message will appear:
   HUL37; 00037
   Please type HUH followed by the measurement value at 75% RH.
7. Type HUH72 then press Enter key. (72 is the value that the probe was reading at 75% RH humidity), and the following message will appear:
   HUH72; 00072
   Humidity calibration is done.
   00037
   00072
8. Now the humidity calibration is complete and the probe reading should be in specs.

3.5 Changing Thermocouple Input Type (Model CTXL-DTC)

The dual thermocouple input model CTXL-DTC can accommodate J, K, or T thermocouple types. The factory default setting is Dual K type thermocouple input. You can configure the recorder for other thermocouple types (J or T) from the PC without re-calibration as follows:

Once the PC is connected to the recorder thru RS232 cable, use the following PC commands (in Bold):

Command	Description	Example
IT0	Change to K type TC	**IT0**; Toggle Power to use new input type
IT1	Change to J type TC	**IT1**; Toggle Power to use new input type
IT2	Change to T type TC	**IT2**; Toggle Power to use new input type

After issuing the command, the response is "Toggle Power to use new input type" which means to remove and then apply power to the recorder for the command to take affect. At the power up, the LCD screen always shows the thermocouple type for two seconds. This is the way to confirm thermocouple input type.

Notes

4 Specifications

4.1 General

Display: Custom made 4 Digit Dual LCD, Backlit

Display Data sampling rate: Once per 2 seconds

Chart Speed: 1 Day, 7 Days, 32 Days

Chart Response time: 0.5 min, 3.5 min, 16 min for 1, 7, 32 days respectively

Keypad response: 250 msec

Chart Paper: 203 mm (8") circular, Linear radial divisions,

Double sided:

Chart Drive
- **Type:** Stepper Motor
- **Accuracy:** 1% Rotation

Chart Hold Down: Magnetic Hub

Pen Drive
- **Type:** Stepper Motor, Linear screw drive
- **Deadband:** 1ºF (0.5ºC) or 1% RH

Pen Lift: Automatic on Door opening- Pens are door mounted and swing clear of the chart when door opens

Lights: LCD Backlight & Chart lights
Turns on/off using Light key
In Battery mode, it turns on for 3 seconds
In DC adapter mode, it toggles on/off

Display Modes – Press Mode key
- **MAX:** Displays Maximum value
- **MIN:** Displays Minimum value
- **AVG:** Displays Average value
- **T1-T2:** Displays differential temperature between Channel 1 & 2 (Dual Thermocouple Model only)

ºC ◄► ºF key: Displays temperature in Degree C or F

Clock key: Displays the clock time & date for 3 seconds

Configuration Modes – Press Config key
- **High Alarm – Channel 1**
- **Low Alarm – Channel 1**
- **High Alarm – Channel 2**
- **Low Alarm – Channel 2**
- **Clock – Hour (Military time 0-23)**
- **Clock- Minute (0-59)**
- **Date - Month (1-12)**
- **Date – Day (1-31)**

Clock Battery Backup:	0.33 F Super Capacitor, Holds Clock information for about 14 days when main power is removed.
White Box key:	Press & hold for 3 seconds to Lock/Unlock When in Lock mode, all keys are inactive except for the Power, Light, Mode, Clock, and the White Box keys
Pens Going to Home Position:	At the Power Up Chart Door is opened Input Probe is open Chart is re-scaled
Audible alarm:	Piezo-electric beeper
Alarm outputs	Two separate relay contacts & two voltage outputs
Relay Contacts:	2A @ 30 Vdc
Voltage output:	100 mA to drive an external relay
Operating ambient temperature:	0 to 49ºC (32 to 120ºF)
Operating Relative Humidity:	0 to 98% RH
Power:	Four "D" size alkaline Batteries or DC adaptor
Battery Life:	3 Months under normal conditions
Battery status indication:	Icon on the LCD
AC adapter	100 to 240 VAC, 50-60 Hz input
Output:	9Vdc @ 1.7A, UL, CE, FCC Marked
Output Plug (Female):	Center Positive, Coax 2.0/5.5/10 mm
Output Cable:	1.8 m (6 Ft.) Long
Serial PC communication:	RS232, 2 way, 9600 Buad, 8 Bits Data, 1 Step Bit, No Parity

RS232 Adaptor - RJ12 to 9 pin D - Sub connector, Female	RJ12 Pin #	9 pin D connector Pin #
	3 Tx	2 Rx
	4 Rx	3 Tx
	5 GND	5 GND

Memory:	256K EEPROM, Circular Buffer - Holds 2.8 Chart revolutions worth of data

PC Communication – See Chapter 3 for more details

Chart Rescale:	Rescale one or both pens Restore Default Factory settings
Data Transfer:	Download stored data and save into a data file Erase stored data from recorder's memory
Get Data in Real Time:	Read current data from channel 1 and 2
Mounting:	Key hole slots for wall mounting Foot cover for Bench top use

Dimensions:	33.5 H x 27.1 W x 6.7 cm D (13 3/16 x 10 11/16 x 2 5/8") You can double
Weight:	Approx. 3.2 Kg (7 lbs) including batteries

4.2 Temperature/Humidity Model

Temperature:

Range:	-17.7 to 49ºC (0 to 120ºF)
Accuracy:	1ºC (2ºF)
Display Resolution:	0.1 Degree F or C

Relative Humidity:

Range:	0 to 98% RH
Accuracy:	3% RH, From 15-90% RH @ room temperature 5% RH, Below 15 & above 90% RH @ room temperature
Display Resolution:	1% RH

Distance for Remote Probe: 40 Feet

Temperature/Humidity sensor: Digital chip

Probe Disconnect: Pens will go to the Home position, Display will show "Prb Err". Chart motor will continue to run

Alarm set point Resolution

Temperature:	0.5 ºC or ºF
Humidity:	1%RH

Alarm Deadband: 0.5ºC or ºF – Temperature
3% RH – Humidity

Factory Default settings:

Chart Scale:

Temperature:	0-120ºF
Humidity:	0-100% RH

High Alarm set point:

Temperature:	120ºF
Humidity:	100% RH

Low Alarm set point:

Temperature:	0ºF
Humidity:	0% RH

Chart Speed: 7 Days

4.3 Dual Thermocouple Input Model

Display Range
- **Type K:** -100 to 1000ºC (-148 to 1832ºF)
- **Type J:** -100 to 700ºC (-148 to 1292ºF)
- **Type T:** -100 to 300ºC (-148 to 572ºF)

Display Accuracy
- **Type K:** 2ºC (4ºF)
- **Type J & T:** 1.5ºC (3ºF)

Standard Chart Scales
- **Type K:** -40 to 560ºC (-40 to 1040ºF)
- **Type J:** -40 to 260ºC (-40 to 500ºF)
- **Type T:** -40 to 160ºC (-40 to 320ºF)

Input connection: Universal connector

Probe input: Dual K, J, or T programmable from PC

Open Thermocouple input: Pens will go to the Home position, Display will show "Prb Err". Chart motor will continue to run

Out of Range Input: Display flashes

Alarm set point Resolution: 1ºC or ºF

Alarm Deadband: 3ºC or ºF

Factory Default settings

- **Thermocouple Input:** Dual Type K
- **Chart Scale, both inputs:** -40 to 560ºC (-40 to 1040ºF)
- **High Alarm set point**
  - **Chan 1:** 1040ºF
  - **Chan 2:** 1040ºF
- **Low Alarm set point**
  - **Chan 1:** -40ºF
  - **Chan 2:** -40ºF
- **Chart Speed:** 7 Days

4.4 Dual Process Input Model

Inputs:	0-1 V, 0-5 V, 0-10 V, 4-20 mA, 0-20 mA
Display Accuracy:	0.2% Full scale
Input Connection:	Wire connection
Out of range input:	Display will flash. Chart motor will continue to run.
Standard Chart Scale:	0-100%
Alarm set point Resolution:	1%
Alarm Deadband:	3%
Excitation Voltage:	15Vdc @ 50 mA
Factory Default settings	
Process Input:	Dual 4-20 mA (CTXL-DPR-I) Dual 0/5 Vdc (CTXL-DRP-V)
Chart Scale, both inputs:	0 to 100 %
High Alarm set point	
Chan 1:	100%
Chan 2:	100%
Low Alarm set point	
Chan 1:	0%
Chan 2:	0%
Chart Speed:	7 Days

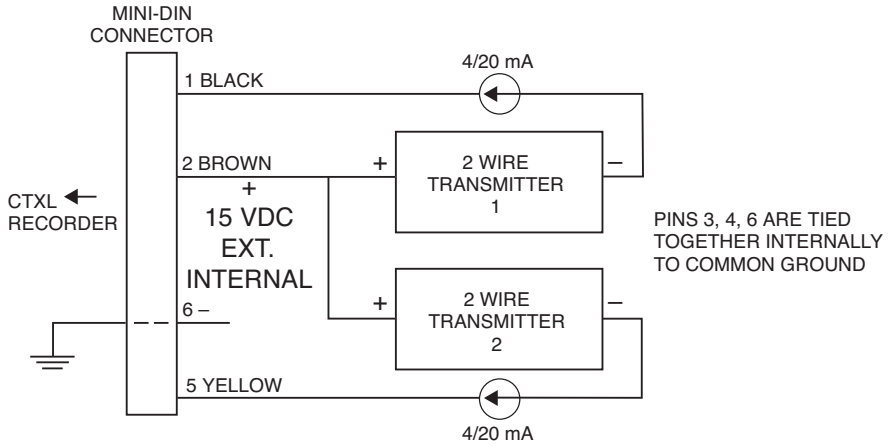
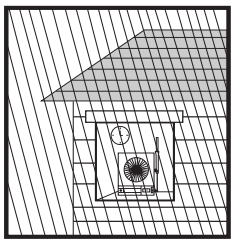


Figure 4-1. Using Internal 15 Vdc Excitation to Power External Transmitters

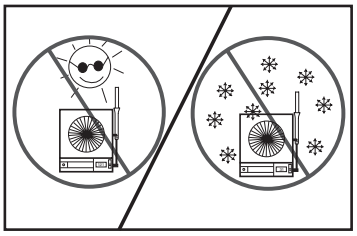
Notes

5 Maintaining the Recorder

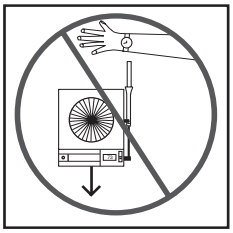
5.1 General Considerations



Keep the recorder in a dry place. If it gets wet, wipe the case as soon as possible to get rid of any moisture.



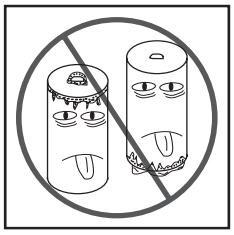
Do not expose the recorder to temperatures other than those stated in the specifications. The recorder can operate in temperatures as high as 120°F (49°C) or as low as 32°F (0°C).



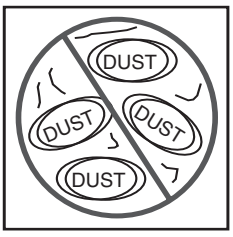
Handle the recorder carefully (DO NOT DROP IT).



Do not use strong cleaning solvents or alcohol when cleaning the outer case. Refer to Section 8.3 for more details.



Do not use old or weak batteries in the recorder. It is important to change the batteries monthly or when you see the LO BAT indicator (see Fig. 2-6).



Keep the recorder away from excessive dirt and dust. Do not use the recorder or the sensor in a corrosive air environment.

NOTE

All humidity sensors are susceptible to contamination from outside sources that can affect accuracy and response time. Take care to prevent excessive contamination by dirt, oil, grease, solvents, or a corrosive air environment.

Notes

6 List of Accessories and Chart Papers

Accessories

Model Number	Description
CTXL-CABLE-6	1.8 m (6') extension cable
CTXL-CABLE-10	3.05 m (10') extension cable
CTXL-CABLE-25	7.6 m (25') extension cable
CTXL-CABLE-6-S	1.8 m (6') analog cable, stripped leads
CAL-3-CTXL	NIST Traceable Calibration
CT485B-CAL-KIT	Calibration kit (33 and 75% RH salt solutions)
CT485-PS	Pen set, red & blue, package of 1 each
CT485-PS-6	Pen set, red & blue, package of 6 each
CT485B-CLIP-KIT	Sensor clip kit

Charts

Model Number	Description
CTXL-DTC-R1-CD	100 Charts, 1 Day -40/1040ºF (-40/560ºC)
CTXL-DTC-R1-CW	100 Charts, 7 Day -40/1040ºF (-40/560ºC)
CTXL-DTC-R1-CM	100 Charts, 32 Day -40/1040ºF (-40/560ºC)
* **CTXL-DTC-R2-CD**	100 Charts, 1 Day -40/500ºF (-40/260ºC) *
CTXL-DTC-R2-CW	100 Charts, 7 Day -40/500ºF (-40/260ºC)
CTXL-DTC-R2-CM	100 Charts, 32 Day -40/500ºF (-40/260ºC)
CTXL-DTC-R3-CD	100 Charts, 1 Day -40/320ºF (-40/160ºC)
CTXL-DTC-R3-CW	100 Charts, 7 Day -40/320ºF (-40/160ºC)
CTXL-DTC-R3-CM	100 Charts, 32 Day -40/320ºF (-40/160ºC)
CTXL-DPR-CD	100 Charts, 1 Day, 0 to 100%
CTXL-DPR-CW	100 Charts, 7 Day, 0 to 100%
CTXL-DPR-CM	100 Charts, 32 Day, 0 to 100%
CTXL-BLANK-CD	100 Charts, 1 Day, Blank Scale
CTXL-BLANK-CW	100 Charts, 7 Day, Blank Scale
CTXL-BLANK-CM	100 Charts, 32 Day, Blank Scale
CTXL-CSP-T	150 Charts, Sample Pack Temperature
CTXL-CSP-P	120 Charts, Sample Pack Process
CT485-CDF	100 Charts, 1 day am/pm, °F
CT485-CDC	100 Charts, 1 day am/pm, °C
CT485-C24F	20 Charts, 24 hour clock, °F
CT485-C24C	20 Charts, 24 hour clock, °C
CT485-CWF	100 Charts, 7 day, °F
CT485-CWC	100 Charts, 7 day, °C
CT485-CMF	100 Charts, 32 day, °F
CT485-CMC	100 Charts, 32 day, °C
CT485-CSP	120 Charts, 20 of each style
CT485-CDF-6	600 Charts, 1 day, °F
CT485-CDC-6	600 Charts, 1 day, °C
CT485-CWF-6	600 Charts, 7 day, °F
CT485-CWC-6	600 Charts, 7 day, °C
CT485-CMF-6	600 Charts, 32 day, °F
CT485-CMC-6	600 Charts, 32 day, °C

* Please note that on the °F graduation, on the chart paper, the 45°F is misprinted. It should be 77°F instead.

Notes

7 Troubleshooting the Recorder

Table 7-1 contains a brief troubleshooting guide.

Table 7-1. Troubleshooting Guide

If this occurs	Perform these steps
? Recorder appears not to function at all.	Make sure POWER switch is pressed.
	Make sure the ac adapter is securely plugged into the wall and into the power jack on the recorder.
	If using fresh batteries, make sure they are inserted correctly.
	If using old batteries, replace with a fresh set of alkaline batteries.
? Chart paper appears not to turn, or to turn at the wrong speed.	Make sure the magnetic chart knob is in place.
	Make sure the chart speed 1/7/32 days is set properly.
? The humidity pen (blue) appears to be in the wrong position.	Make sure the "CHART SCALE" °C/°F is set properly.

? The pens do not appear to be leaving traces on the paper.	Make sure the door is completely closed and the latch button is in the uppermost position. It may be necessary to squeeze the case slightly to close the latch completely.
? The pens do not appear to be leaving traces on the paper.	Make sure the pens are fresh. Remove a pen and test it on a piece of chart paper. Insert new pens if necessary.
	Check that the pens are locked firmly in position in their holders.
	Make sure pen caps are removed (and secured on the cap posts as recommended).
? Bulbs don't light.	Bulbs are blown. Replace them with new bulbs.

I Index

A

ac Adapter 2-5
ac Power Failure 2-5
Alarms
- Deadband 4-3, 4
- Enable/Disable 2-10, 11
- High 2-10, 11
- Low 2-10, 11
- Relay Outputs 2-11
- Setting the Alarm 2-10

B

Batteries
- Compartment 1-3, 4
- Installation/replacement 2-4
- Life 2-4, 4-2
- Indication/status 2-5

Bulb replacement 1-2

C

Carrying Slot 1-3, 4
Chart
- Door 1-2, 3
- Icon 1-5, 2-15
- Lights 1-2, 3

Chart Data
- Download 3-2, 3
- Storage 4-2

Chart Paper
- Installing 2-6
- Changing 2-6

Chart Scale 1-5, 2-6
Chart Speed 1-5, 2-6
CLOCK Key 1-5, 2-10
- Battery back-up 4-2

CONFIG Key 1-5, 2-10
Control Panel
- Display 1-5
- Keypad 1-5

Cover for Feet & Stabilizing Arm 2-2

D

"D" Size Batteries 2-4
Decorative Foot Cover 1-2, 3, 2-3
Display
- Backlite 1-3, 5
- Configuration 1-5, 2-10
- Functions 1-5, 2-10, 12
- Mode 1-5, 2-12

Door
- Latch Button 1-2, 3
- Lock (Key) 1-2, 3
- Recorder 1-2, 3

Dual Process Input 1-3, 4, 4-5
Dual Thermocouple Input 1-4, 2-12, 4-4

E

Electronic
- Data Storage 1-1
- Lock/Unlock 1-5
- Sensor 4-3

Extension Cable 2-13

F

Foot Cover 1-2, 3, 2-3

H

High Alarm 2-10

I

Input
- Range 1-1, 4-3, 4, 5
- Open 2-15
- Out of Range 2-15

Installing
- Batteries 2-4
- Chart Paper 2-6
- Pens 2-7

J

Jack, DC Power Input 1-2, 3
Jamming Pen 2-15

K

Keypad 1-5

L

Latch Button for Door 1-2, 3
LCD Display 1-5
LIGHT Key 1-5, 4-1
Lock Key for Door 1-2, 3
Lock/Unlock Keypad 1-5
Low Alarm 1-5, 2-10
Low Battery 2-5

M

Maintenance 5-1
Memory 3-2, 4-2
MODE Key 1-5, 2-12
Mounting Holes (Key Holes) 1-3, 4, 2-3

O

On/Off Power Switch 1-5, 2-5

P

PC Commands 3-1, 2
PC Communication 3-1
Pen Cap Posts 1-2, 2-8
Pen Holders 2-9
Pen Jamming 2-15
Pen Replacing 2-9
Pen Rescaling 2-15, 3-2
Power
- Battery 1-5, 2-4
- DC Adapter 2-5
- Failure 2-5
- Switch 1-5

Process Input 4-5

R

Relative Humidity 1-2, 3, 4-3
RelayAlarm
- Contact Closure 2-11, 4-2
- Wiring Diagram 2-11
- Outputs 2-11, 4-2

Remote Sensor 2-13
Rescaling 2-15, 3-2

S

SCALE Key 1-5, 2-6
Sensor Clip 2-14
SET Key 1-5, 2-10
Specifications 4-1
SPEED Key 1-5, 2-6
Stabilizing Arm 2-2

T

Temperature/Humidity Sensor 4-3
Thermocouple Input 2-12, 4-4
Time Set Arrow 1-2, 2-7
Trouble Shooting 6-1

W

Wall Mounting 1-4, 2-3
WHITE BOX Key 1-5, 2-16, 4-2

Warranty/Disclaimer

NEWPORT ELECTRONICS, INC. warrants this unit to be free of defects in materials and workmanship for a period of one (1) year from date of purchase. In addition to NEWPORT's standard warranty period, NEWPORT ELECTRONICS will extend the warranty period for one (1) additional year if the warranty card enclosed with each instrument is returned to NEWPORT.

If the unit malfunctions, it must be returned to the factory for evaluation. NEWPORT's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by NEWPORT, if the unit is found to be defective, it will be repaired or replaced at no charge. NEWPORT's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of NEWPORT's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

NEWPORT is pleased to offer suggestions on the use of its various products. However, NEWPORT neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by NEWPORT, either verbal or written. NEWPORT warrants only that the parts manufactured by it will be as specified and free of defects. NEWPORT MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of NEWPORT with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall NEWPORT be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by NEWPORT is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, NEWPORT assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify NEWPORT and hold NEWPORT harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

Return Requests/Inquiries

Direct all warranty and repair requests/inquiries to the NEWPORT Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO NEWPORT, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM NEWPORT'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting NEWPORT:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult NEWPORT for current repair charges. Have the following information available BEFORE contacting NEWPORT:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

NEWPORT's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

NEWPORT is a registered trademark of NEWPORT ELECTRONICS, INC.

© Copyright 2006 NEWPORT ELECTRONICS, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of NEWPORT ELECTRONICS, INC.

PATENT NOTICE: This product is covered by one or more of the following patents: U.S. PAT. 5,019,838; D311,695/ CANADA 1,306,452; 1,319,925; Ⓓ OMEGA ENGINEERING, INC./GERMANY M 88 03 842.4 Used under license. Other U. S. and International Patents Pending.

Additional products from

Newport Electronics, Inc.

Counters	Rate Meters
Frequency Meters	Timers
PID Controllers	Totalizers
Clock/Timers	Strain Gauge Meters
Printers	Voltmeters
Process Meters	Multimeters
On/Off Controllers	Soldering Iron Testers
Recorders	pH pens
Relative Humidity	pH Controllers
Transmitters	pH Electrodes
Thermocouples	RTDs
Thermistors	Thermowells
Wire	Flow Sensors

For Immediate Assistance
In the U.S.A. and Canada: 1-800-NEWPORT®
In Mexico: (001) 800-826-6342
Or call your local NEWPORT Office.

NEWPORTnet℠ On-Line Service	**Internet e-mail**
newportus.com	info@newportus.com

It is the policy of NEWPORT to comply with all worldwide safety and EMC/EMI regulations that apply. NEWPORT is constantly pursuing certification of its products to the European New Approach Directives. NEWPORT will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but NEWPORT Electronics, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.
WARNING: These products are not designed for use in, and should not be used for, patient-connected applications.

M4098/N/0906