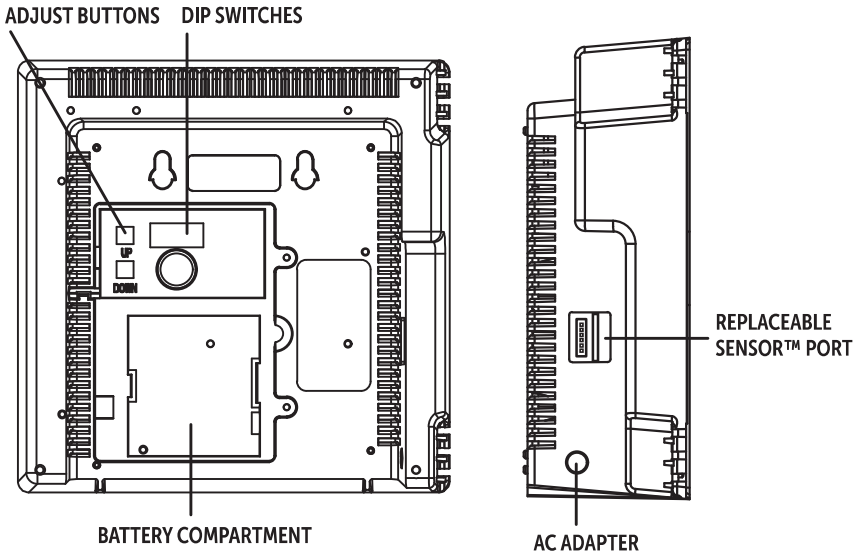
REFERENCE GUIDE



REPLACEABLE SENSOR™ CERTIFICATE OF VALIDATION

Dickson ensures that the Replaceable Sensors™ / Instruments listed below were developed, tested and validated together.

Replaceable Sensor™ Model: R400
Instrument Model: KT6P1, KT6P2, KT6P5

Operation: The Instruments and Replaceable Sensor™ models listed above were specifically designed to work together. No other sensors will work with the Instrument models listed. No other Instrument will work with the Replaceable Sensors™ listed. The Replaceable Sensor™ must be connected to the Instrument for the Instrument to operate properly.

Calibration: Only the Replaceable Sensor™ is calibrated. The sensor, and all calibration defaults and adjustments are stored on the Replaceable Sensor™. Accuracy is strictly controlled by the sensor – no adjustments are made by the Instrument. Readings are sent from the Replaceable Sensor™ to the Instrument for storage purposes only. Certificates of Calibration / NISTs are only supplied for the Replaceable Sensor™ for this reason.

Recalibration: When a Replaceable Sensor™ is due for recalibration the existing Replaceable Sensor™ can be replaced with a new Replaceable Sensor™ thus eliminating the need to return the entire instrument for recalibration. Replaceable Sensors™ can be returned for recalibration as well.

Need additional support?

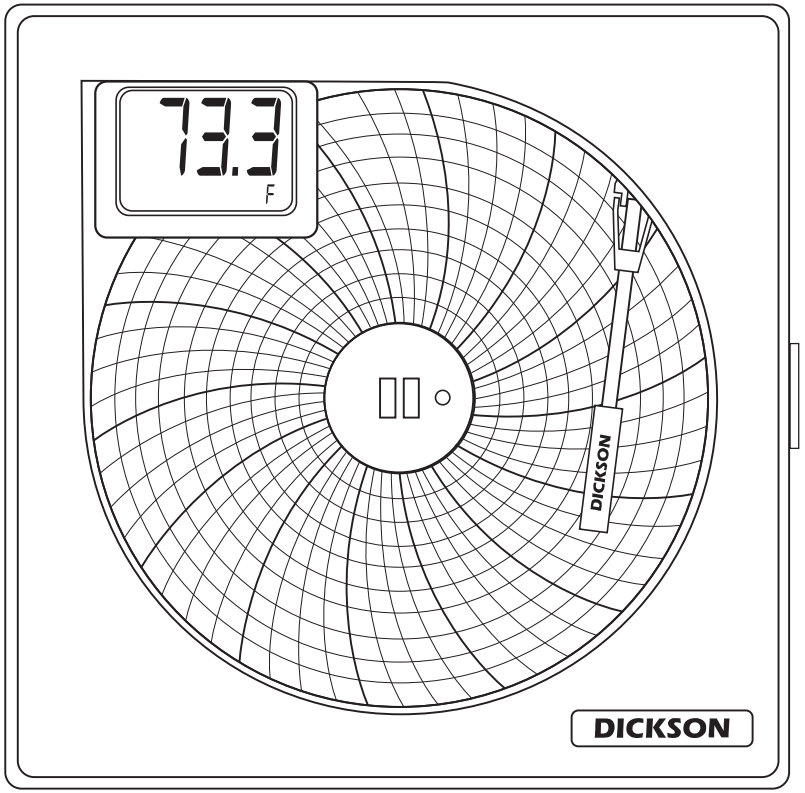
Web: DicksonData.com
Telephone: 630.543.3747
Email: support@dicksondata.com

930 S. Westwood Avenue
Addison, IL 60101

REV 09/2019

DICKSON
Environmental Monitoring + Compliance Experts

USER MANUAL & PRODUCT GUIDE



KT8

8" TEMPERATURE CHART RECORDER

GETTING STARTED

7-DAY CHART ROTATION
0 TO 100°F

IMPORTANT

Dickson Chart Recorder accuracy specifications are only valid with the use of authentic Dickson brand charts and pens. The specifications for chart printing, die cutting and paper absorption rates, and the complementary bleed rate specifications of pens are critical factors in determining system accuracy.

QUICK START

TO BEGIN OPERATION

1. Remove the protective pen cap(s).
2. Connect probe(s).
   a. KT8P0/2/3: Make sure the KTC probe is connected firmly to the Replaceable Sensor™ and that the Replaceable Sensor™ is plugged in firmly to the chart recorder.
   b. KT856: Make sure the KTC probe is connected firmly to the Replaceable Sensor™ and that the Replaceable Sensor™ is plugged in firmly to the chart recorder.
3. Insert batteries and plug in AC adapter (See Figure 3).
   a. KT8P0:4 AA batteries required
   b. KT8P2/3 & KT856: 4 AA batteries backup power only. Unit will power on.
4. The instrument will move pen(s) to the appropriate readings.
5. Install the chart that matches the DIP SWITCH settings.
6. Press the PEN HOME key to move the pen(s) to the outside of the chart. The pen(s) is automatically raised off the chart.
7. Remove the old chart, place the new chart on the CHART HUB being certain that the edge of the chart slides under the Chart Guide Clip located at the outside of the chart.
8. Set the appropriate time. There are two ways to adjust the chart and set the appropriate time:
   a. Set the chart time manually by inserting a coin into the groove in the chart hub and turning clockwise until the correct hour (and day if applicable) on the chart is referenced to the timing arrow (just to the right of the pen tip on the dial). Press PEN HOME to move the pen(s) back onto the chart.
   b. To adjust the chart time, press and hold ADJUST-UP and ADJUST-DOWN buttons located on the back of the unit next to the dip switch.

      The green LED will blink rapidly for about five seconds, then the LED will remain solid green. While in this state the ADJUST-UP button will move the chart backward (counter clockwise) and the ADJUST-DOWN button will move the chart forward (clockwise).

      Rotate the chart until the correct hour (and day if applicable) on the chart is referenced to the timing arrow. Once you have set your chart, press the PEN HOME button to exit Chart Adjust Mode. The unit will take one minute to exit the Chart Adjust Mode once PEN HOME is pressed. Press PEN HOME to move the pen(s) back onto the chart.
   c. Place the KT8 recorder on a flat vibration-free surface. Be sure it is in a vertical position and level. For best performance and longevity, the location should be a clean environment, free from dust and corrosive fumes. Do not exceed temperature specifications. Wall Mount: Keyhole slots are provided on the KT8 recorder for wall mounting.

BUTTON OPERATION

ON/OFF

The ON/OFF key turns the unit on and off.

PEN HOME

If the pen is located on the outside edge of the chart, press PEN HOME to move pen to recording position. If the pen is located on the chart, press PEN HOME to move the pen to the outside edge of the chart.

ALARM (OPTIONAL)

» Pen 1 =Red Pen
» Pen 2= Blue Pen

1. To set the ALARM, make sure unit is on and press and hold the ALARM button. The LED will blink red rapidly for about five seconds, then the LED will turn solid green. Release the ALARM button and the LED will turn solid red. At this point the display will show "On" or "Off".

   Pressing either the ADJUST-UP or ADJUST-DOWN buttons, located on the back of the unit next to the dip switch, will toggle the ALARM on or off.
2. Pressing PEN HOME will scroll to the next ALARM options.
   » Pen 1 ALARM minimum
   » Pen 1 ALARM maximum

   If KT856 two pen model, the additional options are:
   » Pen 2 ALARM minimum
   » Pen 2 ALARM maximum
3. In order to set pen(s) ALARM minimums and maximums, pressing ADJUST-UP will increase the ALARM value, and pressing ADJUST-DOWN will decrease the ALARM value. There is acceleration if the ADJUST-UP button is held down.

   Repetitively pressing the PEN HOME button will scroll through the five options until the ALARM button is pressed to exit from ALARM adjust. Each press of the PEN HOME or ALARM button will store the new settings. The unit will take one minute to exit ALARM Set Mode once the ALARM button is pressed.
4. If the ALARM is triggered, the LED will show as solid red and the ALARM will sound. Press the ALARM button to silence the audible ALARM.

ALARM RELAYS

The SPST 24V 500mA relay contacts are normally open and will close on ALARM conditions when the ALARMs are enabled. Relay contacts are always functional when the ALARM is enabled. The relay will close only during minimum and maximum ALARM conditions. The KT856 has 2 sets of relay contacts which operate independently. Relays will not operate under battery only power conditions.

CH1 = PINS 1,2,3
- Pins 1 and 2 make contact when CH1 is in alarm
- Pins 1 and 3 make contact when CH1 is not in alarm

CH2 = PINS 4,5,6
- Pins 4 and 5 make contact when CH2 is in alarm
- Pins 4 and 6 make contact when CH2 is not in alarm

POWER

The KT8 operates on AC power with an optional 4 AA battery backup. Depending on chart rotation selected and model, battery backup will last:

KT8P2/3 AND KT865

» 24 Hour Chart Rotation = 1 day backup
» 7 Day Chart Rotation = 2 day backup
» 31 Day Chart Rotation = 1 week backup

Note: ALARM and relays will not operate under battery only power.

KT8P0 at 70°F

» 24 Hour Chart Rotation = 1 month backup
» 7 Day Chart Rotation = 6 month backup

KT8P0 at 32°F

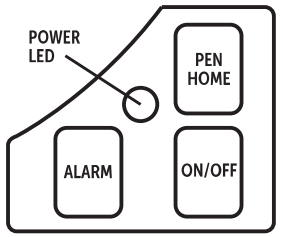
» 24 Hour Chart Rotation = 3 week backup
» 7 Day Chart Rotation = 4 month backup

Note: Unit should not be placed in an environment below 32°F

LED Indicators

- Solid Green — AC Power with Battery Backup
- Flash Red — AC Power with Low Battery or No Battery
- Blinks Green — Battery Only
- Solid Red — Battery Only (Low Battery)

Note: KT8P0 operates on battery only and will blink one time every minute to conserve battery life.



(Alarm button on KT8P3/KT856 only)

PENS

The blue pen has a longer pen arm and records channel 2 temperature (depending on your dip switch selection). The red pen has a shorter arm and records channel 1 temperature. The pens are offset to allow the red pen to glide under the blue pen. The blue pen indicates the correct time and the red pen precedes it by 3/16 of an inch.

PEN HOME ADJUST

If over time the pen location does not match the display, you may need to adjust the pen location on the chart. A PEN HOME Adjustment will not affect calibration of the sensor, but rather corrects for the natural drift that occurs with mechanical moving parts over time.

1. While the unit is on, press and hold both PEN HOME and ON/OFF buttons until the LED is solid green.

   Release the PEN HOME and ON/OFF BUTTONS. The LED will flash amber and green for one second then the LED will turn off.

   Note: Press PEN HOME first so the unit will not turn off
2. The pen(s) will move to the outer edge of the chart and the shorter red pen will move to the outer chart ring (max temperature/RH line). If the red pen tip does not

PEN HOME ADJUST (CONT.)

line up with the outer chart ring, use the ADJUST-UP and ADJUST-DOWN buttons (on the back of the unit) to move the red pen so that the pen tip is on top of the outer chart ring.

3. Once set, press ON/OFF to save and exit PEN HOME adjust. If using KT856 continue to step 4 below.
4. Once the shorter red pen is set, press PEN HOME to move the shorter red pen to the outer edge of the chart. The longer blue pen will move to the outer chart ring.

   If the blue pen tip does not line up with the out chart ring, use the ADJUST-UP and ADJUST-DOWN buttons to move the blue pen so that the pen tip is on top of the outer ring.
5. Once the blue pen is set, pressing the PEN HOME button will move the longer blue pen to the outer edge of the chart and the shorter red pen will move to the outer chart ring.
6. Each time PEN HOME is pressed, the two pens will switch positions (moving the most recently adjusted position) until ON/OFF is pressed to exit pen adjust mode.

   Note: Pressing the ON/OFF button will exit the adjustment and return the unit to normal operation. Each time the PEN HOME or ON/OFF button is pressed, the adjustment currently in progress will be stored. The unit will take one minute to exit Pen Adjust Mode once the ON/OFF button is pressed.

CALIBRATION

KT8P0/2/3:

The R400 Replaceable Sensor was carefully tested and calibrated before being shipped from the factory.

To order a Calibrated Replaceable Sensor™, call customer service at (630) 543-3747 or go to DicksonData.com. When your new Replaceable Sensor arrives, simply turn off the recorder, remove and discard the old sensor, plug in the new one and power the recorder back on. Your recorder will continue to record temperature and humidity without interruption.

KT856:

The KT856 was carefully tested and calibrated before being shipped from the factory.

USER CALIBRATION

If you have an accurate standard to compare against, the Replaceable Sensor or unit (KT856) calibration can be adjusted at one point. This will not adjust the span and is not as accurate as replacing the Replaceable Sensor with a newly calibrated one, or returning the KT856 for recalibration.

1. To activate Calibration mode, turn the unit on and press and hold both the On/Off and the ADJUST-DOWN button until the LED is solid green. The LED will then blink amber at which point only the pen being adjusted will show on the display.

   Note: Make sure to press the ADJUST-DOWN button first so the unit will not turn off
2. To raise the unit of measurement, press the ADJUST-DOWN button. To lower the unit of measurement, press the ADJUST-UP button. Pressing PEN HOME switches between the red and blue pens on a two pen unit and stores the current adjustment value.
3. When Calibration is complete, press the ON/OFF button. The adjustment is stored in memory even after you turn the unit off or if AC power fails.

   Note: After two hours, if no buttons are pressed, the unit will time out of Calibration mode and resume normal operation. If you wish to cancel the Calibration, simply enter Calibration mode and toggle through the steps without adjusting displayed readings. Exit by pressing the On/Off button. You have now restored factory calibration settings.

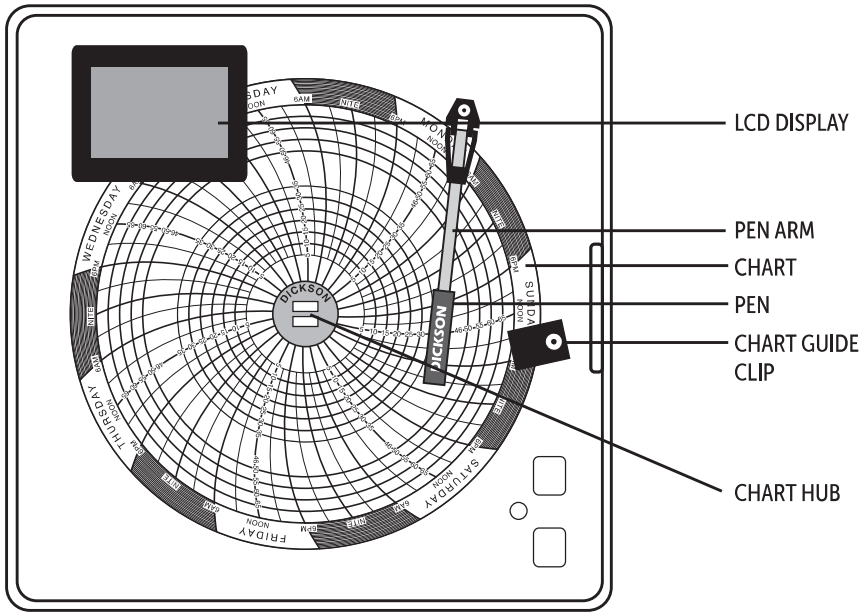
   Note: It is recommended that you use a controlled chamber when determining if Calibration is necessary. Adjusting the pen locations in an open room is not recommended as humidity can vary greatly within a very small area.

   Note: User calibration invalidates Dickson's Certificate of Calibration.

NEED TO KNOW

The pen movement for the KT8P0 is slower than on the AC powered models in order to conserve battery power. In 24-hour mode the pen(s) will move every 1 minute and 30 seconds. In 7-day mode the pen(s) will move every 8 minutes and 30 seconds. The recorder takes temperature readings every 50 seconds. An average of the reading taken between pen(s) movements is what is drawn on the chart.

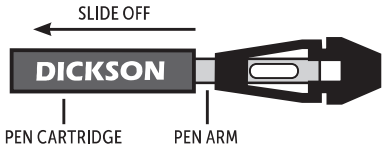
CHART REPLACEMENT



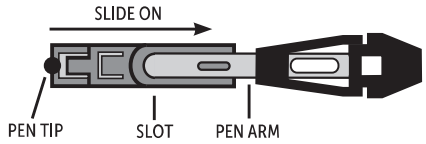
1. Flip pen arm up and away from chart. Slip your finger under the chart and lift the chart off the CHART HUB
2. Put one new chart on the recorder
3. Make sure the center of the chart, between CHART HUB, is not torn
4. Set the time by inserting a coin in CHART HUB and turning clockwise until the current hour is referenced by the time indicator
5. Flip pen arm down

PEN REPLACEMENT

TOP SIDE OF PEN



BOTTOM SIDE OF PEN



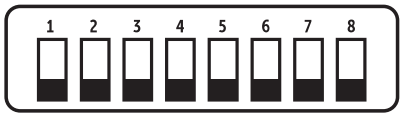
1. Flip pen arm up
2. Slide used pen cartridge off pen arm
3. Slide new pen cartridge on pen arm
4. Make sure end of pen arm comes into contact with pen tip
5. Remove pen cap
6. Flip pen arm down

DIP SWITCH SETUP

To setup the KT8 recorder for your specific application, you might need to change some of the DIP SWITCHES. The DIP SWITCHES are located on the back of the unit. Use a pen or small screw driver to flip the switches.

Remember to install the correct chart to match the corresponding DIP SWITCH setting.

Slide toggle UP for ON position



Slide toggle DOWN for OFF position

Dip Switches 7 and 8 are not active on this recorder

RECORDING TIME	
7 Day (all models)	#1 DOWN — #2 DOWN
24 Hour (all models)	#1 DOWN — #2 UP
31 Day (KT8P2/3, KT856)	#1 UP — #2 UP
RECORD IN °F OR °C	
°F	#3 DOWN
°C	#3 UP
TEMPERATURE RANGE	
Select the temperature range that matches the chart paper	
0° to 100° F/C	#4 DOWN — #5 DOWN — #6 DOWN
-50° TO 50° F/C	#4 DOWN — #5 DOWN — #6 UP
0° TO 250° F/C	#4 DOWN — #5 UP — #6 UP
0° TO 500° F/C	#4 UP — #5 DOWN — #6 DOWN
0° to 150° F/C	#4 DOWN — #5 UP — #6 DOWN
-20° to 20° F/C	#4 UP — #5 UP — #6 UP
0° to 1000° F/C*	#4 UP — #5 DOWN — #6 UP
0° to 2000 F/C*	#4 UP — #5 UP — #6 DOWN
* A203 High Temp Probe required. Range not available on Model KT8P0.	

TROUBLESHOOTING

Why isn't the chart keeping time or running slow?

- The chart may be hung up or restricted, possibly caused by a rip on the outer edge of the chart or the CHART HUB, or the chart may be caught between the arm and pen(s) arm platform.
- Incorrect chart installed for the selected chart speed.

Why did the chart stop turning?

- Chart hung up or restricted, (ripped chart)
- Unit may be "locked up", this can be confirmed by pressing any of the buttons on the keypad, if the unit is locked up there will be no response to button presses and the Chart Recorder may appear to be working, but the readings won't change, also the chart will not rotate. Remove power and battery, and then re-power.

Why don't the display and chart match?

- DIP SWITCHES set for a specific range, but using chart for another range, or vice versa.
- Pen(s) not inserted on pen arm(s) all the way
- To adjust pen(s) to match chart see "PEN HOME Adjust" section of this manual.

Why does the display read PROB?

- Check the sensor pod and KTC probe(s). Make sure it is properly plugged into the unit.
- Is the unit locked up? This can be confirmed by pressing any of the buttons on the keypad, if the unit is locked up there will be no response to button presses and the unit may appear to be working, but the readings won't change, also the chart will not rotate. Remove power and battery, and then re-power.

Why does calibration seem to be off?

- What is the tolerance of the unit it's being compared to? It's ok if the unit is within the sum of the two tolerances.
- Has an outside calibration house attempted calibration? It may not have been adjusted properly.
- Walk through calibration adjustment, found in the manual

Why won't the battery back-up work?

- Are there good batteries in the chart recorder?
- Keep in mind that battery backup varies significantly depending on temperature, pen movement and chart rotation speed.
- If there was a momentary power outage (Brown out), the unit may not have had enough time to recognize this and switch to battery mode. (The Chart Recorder may lock up or shut off in this situation) This situation may also occur if the unit is plugged into an outlet that shares the circuit with other machinery that has phase motors or compressors that cycle periodically. As these other machines cycle, they momentarily have a high current draw, therefore drawing from the unit.

Why won't the chart recorder respond to changes?

- Is the unit locked up? This can be confirmed by pressing any of the buttons on the keypad, if the unit is locked up there will be no response to button presses and the unit may appear to be working, but the readings won't change, also the chart will not rotate. Remove power and batteries, and then re-power.

Why won't the unit power up?

- Remove the batteries and power adapter for a minute or two, this will reset the unit. The unit should respond when the adapter is plugged in.

WARRANTY

Dickson warrants that this line of instruments will be free from defects in material and workmanship under normal use and service for a period of twelve months after delivery.

This warranty does not cover routine calibration and battery replacement. For Specifications and Technical Support go to DicksonData.com

FACTORY SERVICE AND RETURNS

Contact Customer Service at 630.543.3747 for a Return Authorization Number (RA) before returning any instrument. Please have the model and serial numbers and PO ready before calling.

Note: Dickson shall not be liable for consequential or incidental damages resulting from failure or malfunction of its products.