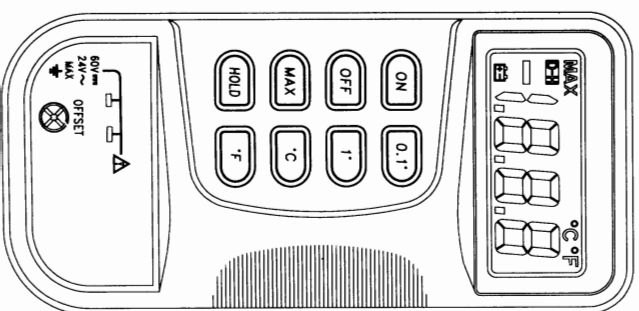


# OPERATING INSTRUCTIONS

## MODEL 305 DIGITAL THERMOMETER



### INTRODUCTION

This instrument is a portable 3½ digit, compact-sized digital thermometer designed to use external K-type thermocouple as temperature sensor. Temperature indication follows National Bureau of Standards and IEC 584 temperature/voltage tables for K-type thermocouples. One K-type thermocouple is supplied with the thermometer.

### SAFETY INFORMATION

It is recommended that you read the safety and operation instructions before using the thermometer.

#### WARNING

TO AVOID ELECTRICAL SHOCK, DO NOT USE THIS INSTRUMENT WHEN VOLTAGES AT THE MEASUREMENT SURFACE EXCEED 24V AC OR 60V DC.

#### WARNING

TO AVOID DAMAGE OR BURNS, DO NOT MAKE TEMPERATURE MEASUREMENTS IN MICRO-WAVE OVENS.

#### CAUTION

Repeated sharp flexing can break the thermocouple leads. To prolong lead life, avoid sharp bends in the leads, especially near the connector.

The  $\Delta$  symbol on the instrument indicates that the operator must refer to an explanation in this manual.

### SPECIFICATIONS

#### ELECTRICAL

**Temperature Scale:**

Celsius or Fahrenheit user-selectable

**Measurement Range:**

-50°C to 1300°C, (-58°F to 2000°F)

**Resolution:** 1°C or 1°F, 0.1°C or 0.1°F

**Accuracy:**

Accuracy is specified for operating temperatures over the range of 18°C to 28°C (64°F to 82°F), for 1 year, not including thermocouple error.

±(0.3% rdg+1°C) -50°C to 1000°C

±(0.5% rdg+1°C) 1000°C to 1300°C

±(0.3% rdg+2°F) -58°F to 2000°F

**Temperature Coefficient:**

0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F).

**Input Protection:**

60V dc or 24V rms ac maximum input voltage on any combination of input pins.

**Reading Rate:** 2.5 times per second.

**Input Connector:**

Accepts standard miniature thermocouple connectors (flat blades spaced 7.9mm, center to center).

### ENVIRONMENTAL

**Ambient Operating Range:**

0°C to 50°C (32°F to 122°F)

**Storage Temperature:**

-20°C to 60°C (-4°F to 140°F)

**Relative Humidity:**

0% to 80% (0°C to 35°C) (32°F to 95°F)

0% to 70% (35°C to 50°C) (95°F to 122°F)

### GENERAL

**Display:**

3½ digit liquid crystal display (LCD) with maximum reading of 1999

**Battery:**

Standard 9V battery (NEDA 1604, IEC 6F22)

**Battery Life:**

200 hours typical with carbon zinc battery

**Dimensions:**

147 mm (H) x 70 mm (W) x 39 mm (D)

**Weight:** 7.4 oz (210g)

**Supplied Probe:**

4-foot type "K" thermocouple bead probe (teflon tape insulated). Maximum insulation temperature 260°C (500°F). Probe accuracy ±2.2°C or ±0.75% of reading (whichever is greater) from 0° to 800°C.

## OPERATING INSTRUCTIONS

## NOTE

### Selecting the Temperature Scale

Readings are displayed in either degrees Celsius ( $^{\circ}\text{C}$ ) or degrees Fahrenheit ( $^{\circ}\text{F}$ ), when the thermometer is turned on, it is set to the temperature scale that was in use when the thermometer was last turned off. To change the temperature scale, press the  $^{\circ}\text{C}$  or  $^{\circ}\text{F}$  key.

### Selecting the Display Resolution

The thermometer allows two choices of resolution:

High resolution:  $0.1^{\circ}\text{C}$  or  $0.1^{\circ}\text{F}$

Low resolution:  $1.0^{\circ}\text{C}$  or  $1.0^{\circ}\text{F}$

To select the alternate display resolution, press the corresponding "1 $^{\circ}$ " or "0.1 $^{\circ}$ " key.

### HOLD Mode

Pressing the HOLD key to enter the Data Hold mode, the "D-H" annunciator is displayed. When HOLD mode is selected, the thermometer held the present readings and stops all further measurements.

Pressing the HOLD key again cancels HOLD mode, causing the thermometer to resume taking measurements.

### MAX Mode

Pressing the MAX key to enter the MAX mode. The thermometer then records and updates the maximum values and the MAX annunciator appears on the

display. Pressing the MAX key again to exit the MAX recording mode.

In the MAX mode, press HOLD key to stop the recording, press HOLD again to resume recording.

### OFFSET ADJUSTMENT

The OFFSET controls are set at the factory to allow for the variations found in standard thermocouples. By adjusting the OFFSET controls, you can optimize measurement accuracy for a particular thermocouple at a particular temperature.

### Adjusting for Accurate Measurements

1. Connect the thermocouple to the input connector and turn the thermometer ON, then press the 0.1 $^{\circ}$  key to select the high display resolution.
2. Place the thermocouple in a known, stable temperature environment at or near the temperature you wish to measure, and allow the readings to stabilize.
3. Slowly adjust the OFFSET control so that the thermometer reading matches the temperature of the known environment. Leave sufficient time between adjustments to allow for measurement lag.
4. The calibration of the thermometer-thermocouple combination is now optimized for measurements near the temperature measured in step 2.

### Resetting the OFFSET Control

To return the OFFSET control to their factory setting without having to recalibrate the thermometer, perform the following procedure:

1. Connect a thermocouple that is in good working order to the input that is to be adjusted.
2. Place the thermocouple in an ice-water bath and allow the readings to stabilize.
3. Slowly adjust the OFFSET control until the thermometer reads  $0^{\circ}\text{C}$  ( $32^{\circ}\text{F}$ ).

## OPERATOR MAINTENANCE

### WARNING

TO AVOID POSSIBLE ELECTRICAL SHOCK, DISCONNECT THE THERMOCOUPLE CONNECTORS FROM THE THERMOMETER BEFORE REMOVING THE COVER.

### Battery Replacement

Power is supplied by a 9 volt "transistor" battery. (NEDA 1604, IEC 6F22). The "E" appears on the LCD display when replacement is needed. To replace the battery, remove the three screws from the back of the meter and lift off the front case. Remove the battery from case bottom.

## 305 CALIBRATION PROCEDURE

### A. EQUIPMENT REQUIRED

1. FLÜKE 5101B CALIBRATOR
2. OMEGA TRC III ICE POINT CELL
3. OMEGA TRP (K) REFERENCE PROBE

### B. CALIBRATION

1. SET UP THE EQUIPMENT AS SHOWN IN FIGURE 1.
2. INSERT THE T/C PROBE INTO THE THERMOCOUPLE JACK.
3. PRESS "°C" AND "0.1°" BUTTON TO TOGGLE IN OF THE 0.1°C MODE.
4. SET THE OUTPUT OF THE DC CALIBRATOR TO 0.000mV AND ADJUST  $\overline{VR1}$  UNTIL THE METER INDICATES 00.0°C.
5. PRESS "°F" BUTTON TO TOGGLE IN OF THE 0.1°F MODE.
6. SET THE OUTPUT OF THE DC CALIBRATOR TO -0.692mV AND ADJUST  $\overline{VR5}$  UNTIL THE METER INDICATES 00.0°F.
7. SET THE OUTPUT OF THE DC CALIBRATOR TO 3.012mV AND ADJUST  $\overline{VR3}$  UNTIL THE METER INDICATES 165.0°F.
8. PRESS "1.0°" BUTTON TO TOGGLE IN OF THE 1°F MODE.
9. SET THE OUTPUT OF THE DC CALIBRATOR TO  $\overline{41.269mV}$  AND ADJUST  $\overline{VR6}$  UNTIL THE METER INDICATES  $\overline{1832°F}$ .
10. PRESS "°C" BUTTON TO TOGGLE IN OF THE 1°C MODE.
11. SET THE OUTPUT OF THE DC CALIBRATOR TO  $\overline{41.269mV}$  AND ADJUST  $\overline{VR4}$  UNTIL THE METER INDICATES  $\overline{1000°C}$ .
12. REMOVE THERMOCOUPLE AND REASSEMBLE THE METER.

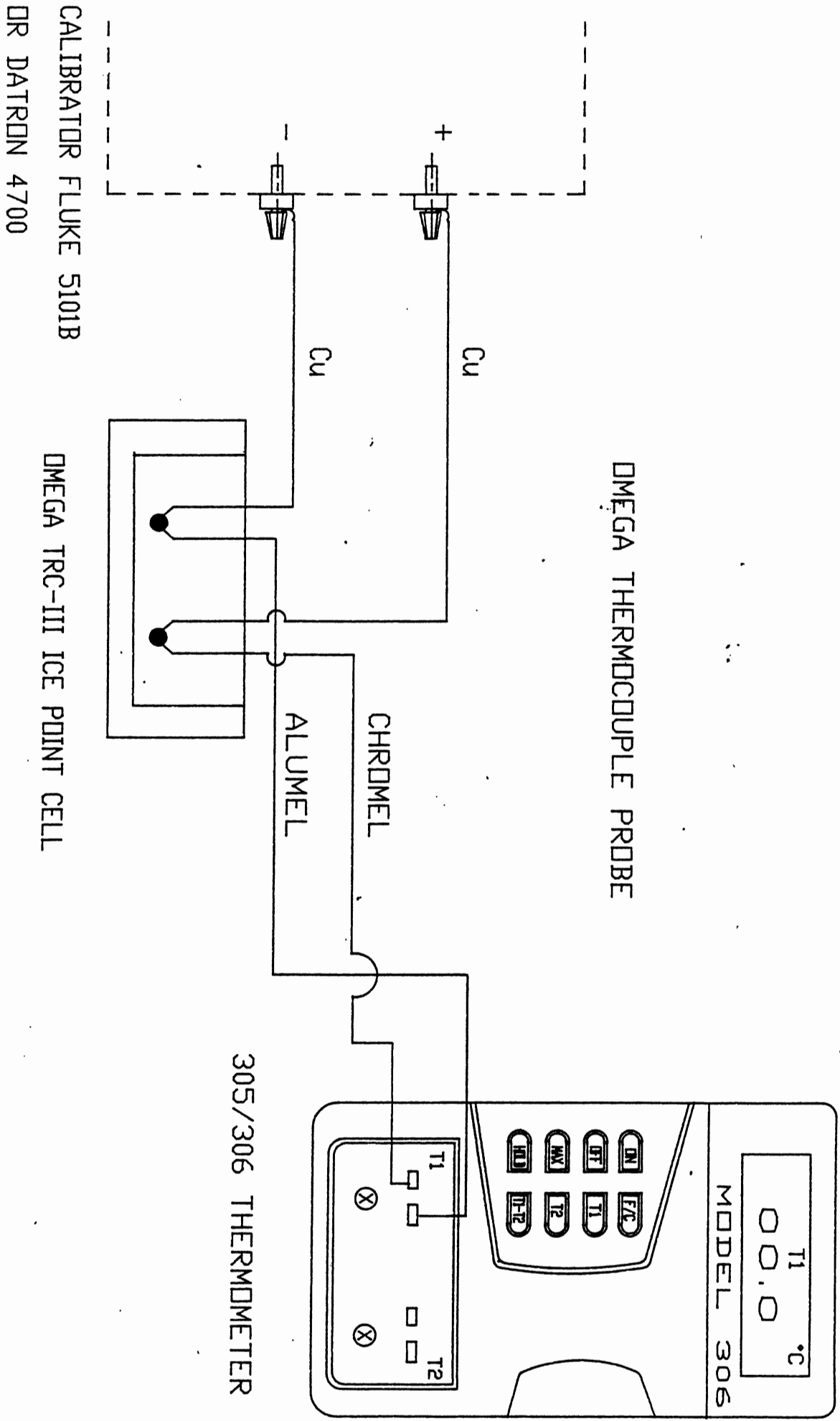
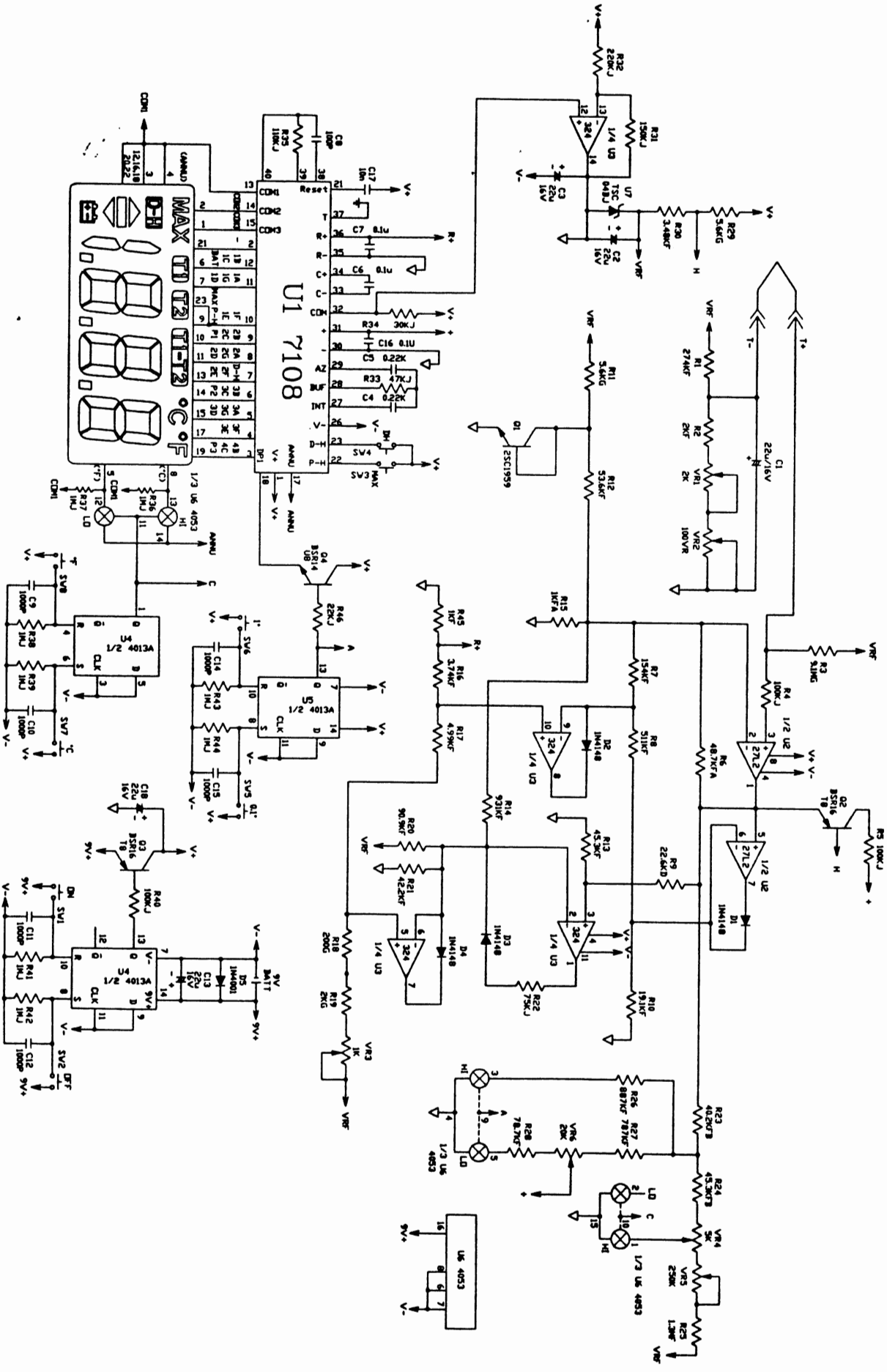


FIGURE 1



C. I. E.

MODEL	NAME	DWG	SHEET	OF	REV	DSCN	DWN	CKD	APPVD	APPVD
305		305	DATE	83, 8, 10						
			CHK							