

## MODEL 2020

### DIFFERENTIAL THERMOCOUPLE THERMOMETER

#### FEATURES

This instrument is designed for applications requiring either direct or differential measurement. It incorporates many features such as

- \*\*\* °C / °F / °A Switchable
- \*\*\* I/P 1 , I/P 2 , DIFFERENTIAL, HOLD
- \*\*\* True arithmetic differential reading or differential result and input 1
- \*\*\* Simultaneous display of both inputs
- \*\*\* Resolution of 0.1° to 1000° autoranging
- \*\*\* Switchable thermocouple types K / T / J / R / N / E / S
- \*\*\* Infra-Red compatability
- \*\*\* Full retention of thermocouple type and temperature scale
- \*\*\* User configurable Auto Switch Off capability
- \*\*\* Overrange / Open circuit sensor indication
- \*\*\* Low battery indication
- \*\*\* Supplied complete with shock resistant holster
- \*\*\* IP67 casing

The custom display allows input 1 to be shown on a secondary display whilst displaying differential measurement. Input 1 and input 2 may also be displayed simultaneously

#### SPECIFICATIONS

##### ENVIRONMENTAL

AMBIENT OPERATING RANGE	:	-30 to 50 °C
STORAGE TEMPERATURE RANGE	:	-40 to 50 °C
HUMIDITY	:	0 to 70% R.H.

##### ELECTRICAL

MEASUREMENT RANGES	:	K	-200 to 1372 °C
		T	-200 to 400 °C
		J	-200 to 1200 °C
		R	0 to 1767 °C
		N	-200 to 1200 °C
		E	-200 to 1000 °C
		S	0 to 1767 °C
THERMOCOUPLE TYPES	:	K T J R N E S	
INFRA-RED SENSOR (Exergen K80)	:	K80 -50 to 250 °C	
ACCURACY @23°C	:	+/- 0.1% OF READING +/- 0.2 °C	
CHARACTERISING ACCURACY	:	LESS THAN 0.05 °C	
TEMPERATURE COEFFICIENT	:	0.01% OF READING/°C	
COLD JUNCTION COMPENSATION	:	0.0075 °C/°C	
RESOLUTION	:	0.1° to 1000, 1° ABOVE 1000	
TEMPERATURE SCALES	:	°C / °F / °A	
FUNCTIONS	:	I/P1 / I/P2 / DIFFERENTIAL / HOLD	

##### GENERAL

BATTERY	:	PP3 9V I.E.C. 6F22
BATTERY LIFE (INTERMITTENT USE)	:	GREATER THAN 200 HOURS (ALKALINE)
WEIGHT	:	155 gms
DIMENSIONS	:	130 X 70 X 33 mm

**CALIBRATION PROCEDURE**

**EQUIPMENT REQUIRED**

1. 30mV GENERATOR ACCURATE TO WITHIN  $\pm 4\mu V$
2. THERMOCOUPLE SIMULATOR ACCURATE TO WITHIN  $\pm 0.1^\circ C$
3. TYPE 'K' MINIATURE THERMOCOUPLE PLUG TO MINIATURE THERMOCOUPLE PLUG LEAD
4. COPPER MINIATURE THERMOCOUPLE PLUG TO COPPER MINIATURE THERMOCOUPLE PLUG LEAD

**CALIBRATION PROCEDURE**

The 2020 instrument has its own built in calibration sequence that is activated via the 'HOLD' and '1/2/DIFF' buttons on the front panel

1. Switch the unit OFF.
2. Whilst holding down both the '1/2/DIFF' and the 'HOLD' buttons switch the unit ON.
3. The word 'CAL' will appear in the top right hand corner of the display.
4. Connect the 30mV source and allow to settle.
5. Press the 'HOLD' button.
6. A solid bar will appear on the left hand of the display. This indicates that the unit is calibrating. When the calibration is complete, the bar will be deactivated.
7. Connect the thermocouple simulator and set for  $0^\circ C$  type 'K', Allow to settle (approx 10 minutes)
8. Press the '1/2/DIFF' button.
9. A solid bar will appear on the left hand of the display. This indicates that the unit is calibrating. When the calibration is complete, the bar will be deactivated.
10. The unit should now be displaying  $0.0^\circ C$ .
11. Check that the calibration is in accordance with the figures shown in Table 1. If not then repeat procedure.
12. Remove the battery to switch the unit OFF.
13. The unit is now fully calibrated.

**NOTES**

**1. AUTO SWITCH OFF**

Whilst the unit is in 'CAL' mode, if the pads within the battery compartment to the left of the battery are shorted the Auto-Switch off feature will be toggled. The state of the Auto-Switch off feature is shown in the top right hand side of the display next to the 'CAL' message. If the Auto-Switch off is active the letter 'A' will be displayed if not then no character will be shown.

TEMPERATURE ( $^\circ C$ )	LOW( $^\circ C$ )	HIGH( $^\circ C$ )
-150	-150.4	-149.6
-50	-50.2	-49.8
0	-.1	.1
30	29.8	30.2
100	99.7	100.3
500	499.6	500.4
1300	1301	1299

Table 1. Calibration limit

### Cross-reference for compatible probes

Suitable probes for use with this instrument

TME PART No	DESCRIPTION	APPLICATION	T/C TYPE
KP05	NEEDLE PROBE	CORE TEMPERATURE OF SEMI-SOLID MATERIAL	K
TP05	NEEDLE PROBE	CORE TEMPERATURE OF SEMI-SOLID MATERIAL	T
KP07	NEEDLE PROBE HEAVY DUTY	CORE TEMPERATURE OF SEMI-SOLID MATERIAL	K
T07	NEEDLE PROBE HEAVY DUTY	CORE TEMPERATURE OF SEMI-SOLID MATERIAL	T
KM01	LIGHT DUTY M.I. PROBE	GENERAL PURPOSE LIQUID/GAS MEASUREMENT	K
TM01	LIGHT DUTY M.I. PROBE	GENERAL PURPOSE LIQUID/GAS MEASUREMENT	T
KM03	M.I. PROBE	GENERAL PURPOSE LIQUID/GAS MEASUREMENT	K
TM03	M.I. PROBE	GENERAL PURPOSE LIQUID/GAS MEASUREMENT	T
KM04	M.I. PROBE EXTENDED LENGTH	GENERAL PURPOSE LIQUID/GAS MEASUREMENT	K
TM04	M.I. PROBE EXTENDED LENGTH	GENERAL PURPOSE LIQUID/GAS MEASUREMENT	T
KS01	SURFACE BAND PROBE	FAST RESPONSE SURFACE MEASUREMENT	K
KS07	SURFACE PROBE	GENERAL PURPOSE SURFACE MEASUREMENT	K
TS04	SURFACE PROBE	GENERAL PURPOSE SURFACE MEASUREMENT	T
KS08	HIGH TEMP SURFACE PROBE	HIGH TEMPERATURE SURFACE MEASUREMENT	K
KA04	AIR TEMPERATURE PROBE	FAST RESPONSE AIR TEMPERATURE PROBE	K
TA04	AIR TEMPERATURE PROBE	FAST RESPONSE AIR TEMPERATURE PROBE	T
TA12	SPATULA PROBE	BETWEEN PACK PROBE	T
KH01	SOCKET IN HANDLE	HANDLE FOR USE WITH PLUG MOUNTED PROBES	K
TH01	SOCKET IN HANDLE	HANDLE FOR USE WITH PLUG MOUNTED PROBES	T
KHA02	PLUG MOUNTED AIR PROBE	FAST RESPONSE AIR TEMPERATURE PROBE	K
THA2	PLUG MOUNTED AIR PROBE	FAST RESPONSE AIR TEMPERATURE PROBE	T
KHM01	PLUG MOUNTED M.I. PROBE	GENERAL PURPOSE LIQUID/GAS MEASUREMENT	K
THM01	PLUG MOUNTED M.I. PROBE	GENERAL PURPOSE LIQUID/GAS MEASUREMENT	T
KHN01	PLUG MOUNTED NEEDLE PROBE	CORE TEMPERATURE OF SEMI-SOLID MATERIAL	K
THN01	PLUG MOUNTED NEEDLE PROBE	CORE TEMPERATURE OF SEMI-SOLID MATERIAL	T
THA12	PLUG MOUNTED SPATULA PROBE	BETWEEN PACK PROBE	T
KHS01	PLUG MOUNTED SURFACE BAND PROBE	FAST RESPONSE SURFACE MEASUREMENT	K
KHS02	PLUG MOUNTED SURFACE PROBE	GENERAL PURPOSE SURFACE MEASUREMENT	K
THS02	PLUG MOUNTED SURFACE PROBE	GENERAL PURPOSE SURFACE MEASUREMENT	T
PKHV1	HVAC KIT	PROBE KIT DESIGNED FOR THE HVAC INDUTRY	K
PKF1	FOOD KIT	PROBE KIT DESIGNED FOR THE FOOD INDUTRY	T
PKG1	GENERAL PURPOSE KIT	PROBE KIT CONTAINING MOST POPULAR PROBES	K
TP01	CORKSCREW PROBE	PROBE DESIGNED FOR CORE TEMPERATURE OF MEAT	T
KPS10	PIPE CLAMP PROBE	PROBE DESIGNED TO BE CLAMPED ONTO PIPES	K