

## User Manual



# TMDL400

4 Channel Type K Thermocouple SD Datalogger



CE

# ***Introduction***

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Thank you for purchasing the Triplet TMDL4004 Channel Type K Thermocouple Datalogger with SD. This meter is user-friendly and with proper care will provide many reliable years of service. Please read this manual thoroughly before operation.

## **Features:**

- Portable size with super big LCD
- Wall mountable SD card type datalogger
- Measures temperature via K type thermocouple
- 4 channel K type thermocouple to use at once
- Unlimited manual memories with SD card
- Unlimited autologger memories with SD card
- Hold function freezes current readings
- Checking MAX/MIN value
- Beeper and LED alarm are both available
- One press to display T1-T2
- Display temperature change from baseline
- Programmable temperature high/low alarm threshold
- Temperature offset function for adjustment purpose
- Over-range indication with error messages
- Blue backlight for dark area operation
- 12hour/24hour time format selectable
- Real time display (YEAR-MON-DATE-,HOUR-MIN)
- Auto power off feature
- Temperature units(°C/°F)selection
- Low battery indicator

## ***Included Materials***

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- Meter x1
- Manual x1
- AA alkaline batteries x4pcs
- 2pcs bead type K thermocouple
- SD card x1
- Plain box x1

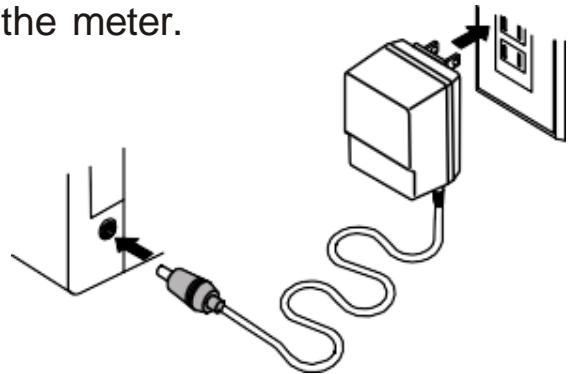
# ***Power Options***

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## **Adaptor (Optional Not Included)**

The TMDL400 can be powered by any 9VDC adaptor (See specifications section for requirements) and 4pcs AA batteries.

The power jack is on the right side on the meter.



## **Battery**

The TMDL400 is to be powered by 4 pcs AA batteries.

While in logging status, the battery can last a period of time. Suggest to use adaptor for long term operation.

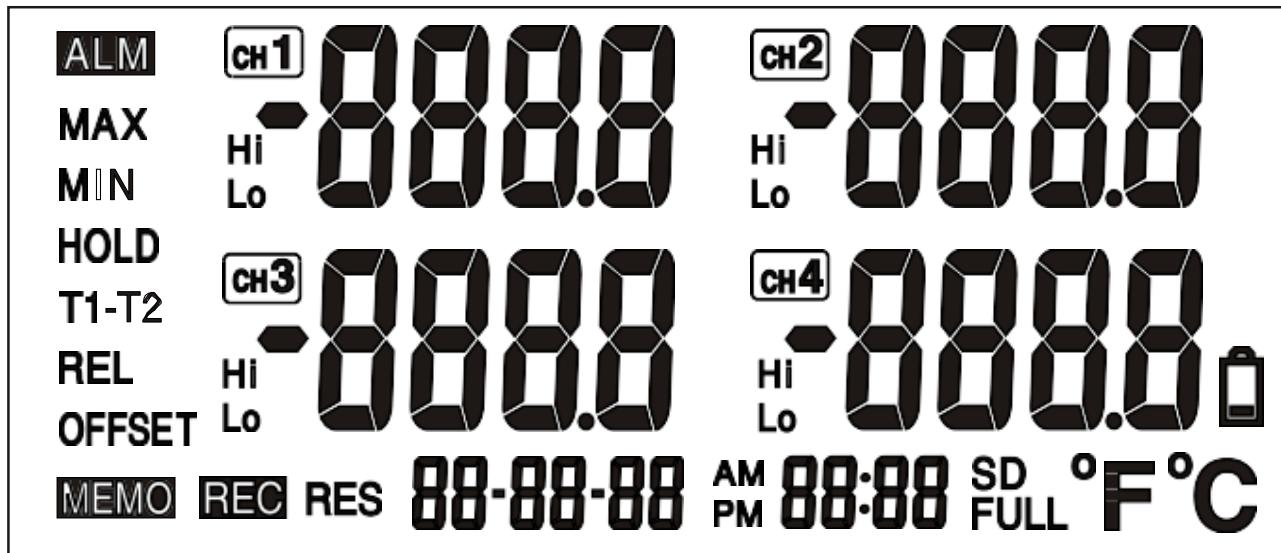
Low battery might cause improper operation and reading. When battery level is lower than certain range, the logging function will be terminated.

If the low battery icon appeared on the LCD, please remove the battery cover from the rear side and replaced 4 new AA batteries into the battery compartment. Please check the polarity and make good contact.

## **Caution:**

1. The battery life will be shorten when using a high capacity SD card or in high operating temperature.
2. Please remove the batteries before long term storage.
3. To avoid battery leakage, please do not mixes use the new and old batteries.
4. Please follow your local law for battery disposition.

## LCD Display



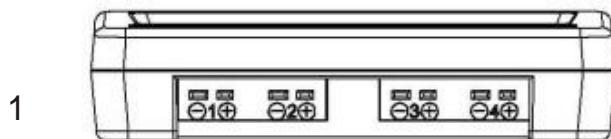
1. The “ALM” icon indicates the alarm function is activated.
2. The “MAX: & “MIN” icon indicates the minimum & maximum value since power on.
3. The “Hold” icon indicates freezes current reading
4. The “T1-T2” icon indicates the difference value between CH1 and CH2
5. The “REL” icon indicates the relative temperature from baseline
6. The “OFFSET” icon indicates the reading was adjusted manually
7. The “MEMO” icon indicates Manual logging is in processing
8. The “REC” icon indicates Auto logging is in processing
9. The “RES” icon indicates the logger is in reservation status
10. The “CH1、CH2、CH3、CH4” display probe temperature
11. The “Hi, Lo” icon indicate the high or low threshold is over
12. The “AM, PM” icon indicate the time format
13. The “SD” icon indicates the SD card is inserted.
14. The “FULL” icon indicates the SD card capacity is full.
15. is battery low indicator
16. The “°F, °C” icon indicate the temperature unit.

# Meter Description

## FRONT

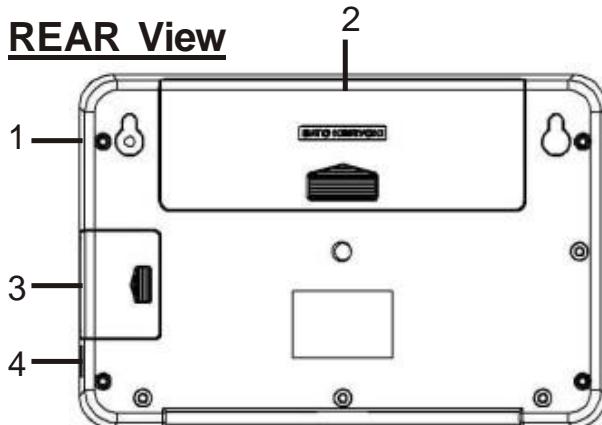


## Bottom view



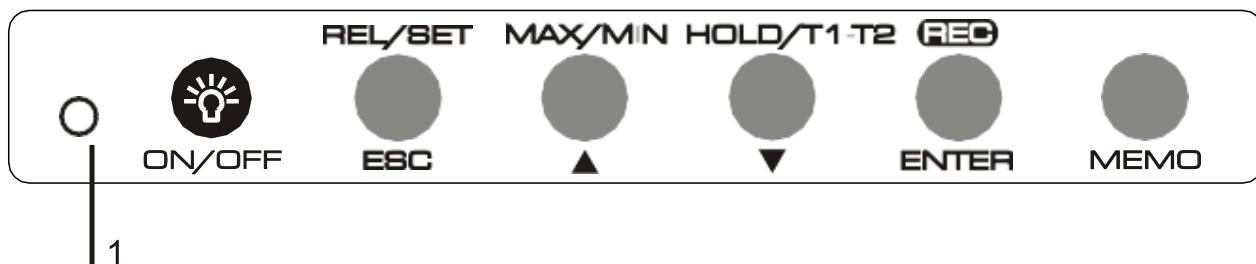
1. 4 channel probe socket

## REAR View



1. Wall-mounted hole
2. Battery compartment
3. SD card slot
  - Push to open the cover.
  - Insert the SD card by following the icon reminder on housing
  - To take out the SD card, press the SD card for ejection.
4. Adaptor socket

## Keypad



1. Red LED alarm indicator

# Function Buttons

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## ON/OFF

Power “  ” key longer to turn on /off the meter.

## LCD BACKLIGHT

While the meter is in measurement mode, press “  ” key to turn backlight on for 10 seconds.

## REL

Pressing “  ” key to switch to REL mode. The existing temperature will be set as a baseline, (0.0) will appear on the LCD. The meter will then show the difference of the measured value from baseline. Press “  ” key again to return to normal measurement mode .

## MAX/MIN

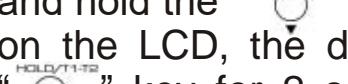
This function can display the maximum and minimum value since power on.

1. Press “  ” key to see maximum and minimum value of each channel in turns.
2. The MAX/MIN value will be reset after power off.
3. The MAX/MIN will not be recorded if the ERROR message displayed
4. This mode is also working in above “REL” status.

## HOLD

Press “  ” key to freeze the readings. Press again to release and return to normal measurement mode.

## T1-T2

To view the temperature difference between CH1 and CH2, press and hold the “  ” key for 2 seconds. When the “T1-T2” icon appears on the LCD, the difference (T1-T2) will show on the ch3 area. Press “  ” key for 2 seconds again to return to the measurement mode. The temperature of CH3/CH4 won't appear on the display under this function.

## **AUTO LOGGING( press REC key to start )**

Before starting the datalogging, be sure to program the meter with correct date and time. To change the date and time while logging will stop the logger right away.

1. Press “  ” key for 2 seconds, the ” REC” symbol will appear on the LCD. It starts to record. The measurement mode will be off when the meter starts recording.
2. Press “  ” key for 2 seconds again, the meter will stop to record and return to the measurement mode.
3. The LCD is off during logging mode for power saving. Press “  ” key may turn the LCD on.
4. While the LCD is on, the displayed value will be updated every second.
5. The recording of data is unlimited. (after 30,000 data, it will create a new file in SD card)
6. When the meter is REC status, auto power off function is disable.
7. When the meter is in MAX/MIN, HOLD, T1-T2, REL status, the function will be relieved after pressing “  ” key.
8. When the meter is in recording status, press power key can not turn the meter off. The recording mode must be stopped first to turn the meter off.

## **AUTO LOGGING(reservation to start )**

1. While the logger is pre-programmed as “reservation start”, a “ RES” icon will appear on LCD.
2. Do not power off the logger so the logger will start logging from the reserved start time.
3. When the meter is in RES status, pressing “  ” key to turn of LCD ON or OFF.
4. Data recording is unlimited. A new file will be created if the data was over 30,000 points
5. When the meter is in RES status, the auto power off function will not able to work.
6. Pressing “  ” key for 2 sec, it still can start recording immediately even the meter is preset as RES status ( reservation start)

## **MANUAL LOGGING(record for one data)**

1. Pressing “” key, the “MEMO” symbol will be appeared on the LCD to indicate the manual recording is in process.
2. It will record 1 data and return to the measurement mode.
3. The shortest interval for taking manual memory is 5 seconds.
4. Data recording is unlimited.
5. If the meter is in either MAX/MIN, HOLD, T1-T2 or REL status, these function will be relieved and return to the measurement mode if you press “” key.

## **MANUAL LOGGING(record continuously)**

1. Press and hold “” key for more 2 seconds, the meter will record the data continuously by the 2 seconds interval.
2. If you released the key., it will stop recording and return to the measurement mode

## **Temperature alarm**

1. This meter provides alarm warning by beeper and red flashing LED. High/Low alarm threshold of each channel are selectable and adjustable.
2. Once temperature alarm function is activated, a “ALM” icon always appear on LCD to indicate the alarm function is ON.
3. When the measured temperature is out of threshold, beeper sounds and red LED lit to remind user. It stops 30 seconds later or while the measured values is returned to normal. You may also press any key to mute the beeper but red LED remain flashing.
4. A “Lo” or “Hi” icon appears while reading is out of threshold. Once the reading return to normal, the icon remain on LCD to remind user the alarm issue happened already. To eliminate the “Lo” or “Hi” icon from LCD, press “” >2 seconds.

## **Enabling /Disabling the Auto Power OFF**

1. When the meter is on, the meter will automatically power off after 20 minutes of inactivity.
2. When the power is off, press “” key and “” key simultaneously , “n” mark will appear on the LCD. It means that the auto power off function is now disabled.
3. The auto power off will not work when the meter is on manual logging and auto logging mode.
4. The default setting of the auto power off function is activated.

## **LOW BATTERY ICON**

1. When the battery is low, the low battery icon will be appeared on the display. Suggest to change the batteries.
2. The Manual logging or Auto logging is invalid when the low battery icon appears on the display.
3. When the low battery icon appears on the LCD, the reservation function will not function.
4. If the low battery icon appears during the recording mode, the data will be recorded until the power is too low to work normally. In above condition, the logging will be terminated automatically and return to normal measurement mode.

## **BURN OUT NOTIFICATION**

If the sensor is not connected or is broken, the 「---」 will be displayed on LCD and the data in the SD card is blank.

## ***Operation***

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1. For long term logging, suggest to connect the meter to the adaptor

### **STARTING UP**

and install 4 pcs AA batteries as spare power source. Or, you may just use battery as power source.

2. Insert the Type K probes into probe socket.
3. Power on the meter by pressing the “” key for 2 seconds
4. When the meter is on, pressing the “” key for 2 seconds can turn the meter off.
5. Program the real time and alarm setting for the first time usage. You may refer to page 10 in SETUP MODE.  
Without the batteries as spare power source, all the parameters will be reset after the adaptor power is removed.
6. The temperature default unit is °C, to change it from °C to °F, you may refer to page 10 in SETUP MODE.
7. A “----” will be displayed on LCD if the probe is not plugged.

## SET UP

The advanced SETUP function lets you customize your meter's preferences and defaults. The programmable parameters are :

### 1.RECORDING SETTING

Auto logging related setup, such as reservation start and sampling rate(1sec.,2 sec.,5sec. ,10sec.,15sec.,30sec.,1min.,2min.,5min., 10min.,15min.,30min. ,60min.,90min.)

### 2.ALARM SETTING

Temperature High/Low threshold setting of each channel

### 3.OFFSET SETTING

Manually adjust (increasing/decreasing) measured temperature

### 4.REAL TIME SETTING

Time format and Date/Time setting

### 5.TEMP UNIT SETTING

Degree C or Degree F setting

## SETTING KEY OPERATION

1. Press the “  ” key for 2 sec into the set up mode when the meter is in measurement mode.
2. Pressing “  ” or “  ” key to chose the setting mode:  
【RECORDING SETTING, P1.0】、【ALARM SETTING, P2.0】、  
【OFFSET SETTING, P3.0】、【REAL TIME SETTING, P4.0】、  
【TEMP. UNIT SETTING, P5.0】
3. Pressing “  ” key to confirm the setting and enter next layer.
4. Pressing “  ” key to increase the value in the setting mode
5. Pressing “  ” key for decrease the value in the setting mode
6. Pressing “  ” key to return to the previous setting item
7. Pressing “  ” for more than2 sec. will return to normal measurement mode.

Program	Note
P1.0 (rEc) Recording,	
P1.1 (int) Interval	Sampling rate starts from 1 second to 90 minutes
P1.2 (rES) Reservation start	First, decide to turn ON or OFF the reservation function.
1, rES ON or OFF select	While turn it on, setup the start Date & Time.
1A~1E, start date to minute	<b>WARNING: Reservation start time CANNOT be earlier than now.</b>
P2.0 (AL) temperature alarm	First, choose the channel and decide high or low alarm threshold.
P2.1, CH1 to CH4 select	Then, each high or low alarm can be enabled or disable by choosing ON or OFF, even a previous alarm threshold value is stored in meter.
P2.2, High or Low select	
P2.3, ON or OFF select	The last step is to setup the threshold. The adjustable range is -200°C to 1370°C
P2.4, alarm threshold	
P3.0(oFSt) offset	First, choose the channel. Then, each offset value can be enabled or disable by choosing ON or OFF, even a previous offset value is stored in meter.
P3.1, CH1 to CH4 select	
P3.2, ON or OFF select	
P2.3, offset value	The last step is to setup the value. The adjustable range is -12°C to +12°C
P4.0 (dAt) Date, real time clock	First choose the time format as 12H or 24H
P4.1, time format	Then, setup the time from year, month, day, hour to minute.
P4.2 ~4.6, High or Low select	
P5.0(UNit) Unit	Select the temperature unit as °C/°F. Default as °C.
P5.1, °C/°F select	

## ***Datalogging to SD Card***

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The advanced SD card logging function lets you record all data into SD card per your preset sampling rate. The sampling rate can be 1sec to 90min.

Once a new logging is started, a file name will be auto created. The file name is given per the start date and time. For example : if the logging starts at 2012/08/31 09:30, the file name will be given as 08310930.txt The maximum file size is 30000 records. Once the file size is bigger than 30000 records, a new file will be created and the file name will be generated.

The “REC” will appear on LCD when the meter is starting logging. The “SD” icon will appear on LCD if you insert the SD card to the meter. It will not appear “SD” icon if you take off the SD card from meter.

While the SD card capacity is under 10M byte, “SD” icon flashes. You can't reserve setting or start recording if “SD” icon is flashing.

“ FULL ” icon appears when the SD card capacity is full.

### **SD CARD PREPARATION**

This product is compatible with format SD/SDHC SD card.

Before loading or unloading the SD card into meter, please follow the suggestion below:

1. The data loss caused by the damaged SD card is not in product warranty. Please make sure your SD card can function well before start a logging.
2. This product is compatible with FAT16 & FAT32. No NTFS format.
3. Check the available SD card capacity before logging.
4. This meter is designed to use SD or SDHC cards only.
5. Not all brands SD card compatible with this meter are within our warranty. We suggest you run a short logging trial to ensure your SD card is working with this logger before official recording.
6. Please don't add extra label on SD card in case the label is stuck on the SD card slot.

8. Following the correct direction to load the SD card. **Always power off the meter before loading and unloading the SD card.**
9. Avoid using the SD card in strong statics, high temperature or high humidity environment in order to minimize the SD card damage.
10. For the first time usage of the SD card, it is recommended to format the SD card first.
11. If possible, please using both battery and adaptor, so even in a black-out, the logging can be last by using battery.

### File Name & Content

#### 1. AUTO LOGGING

File timing: the file will be made when the meter starts recording

File name: mmdatetimestamp.txt (such as: recording time is from Jan 25th 13:24pm, the file name is 「01251324.txt」)

The records will be covered if the recording time is same as one year ago.

#### 2. MANUAL LOGGING

File time : Power on, made the file. The data will record on the same file.

File name:azxxx.tet (such as : power on :Jan 26 13:24pm, the file name is 「01261324.txt」)

The recorded data is stored in SD card in the following format:

The temperature unit is determined by setting.

\*AUTO Logging: AT

\*MANUAL logging: MN

MN/AT	date	time	int	1ch	2ch	3ch	4ch	unit
AT	2011/1/1	12:55:21	10s	155.5	300.5	658.4	1357	C
AT	2011/1/1	13:55:31	10s	155.1	300.1	653.2	1341	C
AT	2011/1/1	14:55:41	10s	154.9	299.5	640.2	1256	C

MN/AT	date	time	int	1ch	2ch	3ch	4ch	unit
MN	2011/1/2	12:55:21		155.5	300.5	658.4	1357	C
MN	2011/1/2	13:55:54		155.1	300.1	653.2	1341	C
MN	2011/1/4	14:54:48		154.9	299.5	640.2	1256	C

# Troubleshooting

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## METER DOES NOT BE POWER ON

-Please check the meter by press “  “key >2 sec first.

-Then check the connection status of adaptor or batteries.

## ERROR CODES STAND FOR

Error	Problem & Solution
----	K type cable can't connect <b>Solution:</b> check whether the cable is connected correctly with the meter, If r -----still appeared on the LCD, send back for repair.
E02	Temp. measurement is under lower limit. <b>Solution:</b> Put the meter in room temp. for 30 minutes. If the error message still appears, Send back for repair.
E03	Temp. measurement is over the upper limit. <b>Solution:</b> Put the meter in room temp. for 30 minutes. If the error message still appears, Send back for repair.
E04	The data sourcing is wrong. <b>Solution:</b> Put the meter in regular room for 30 minutes. If the error message still appears, Send back for repair.
E07	The room Temp. is lower than 10°C <b>Solution:</b> Put the meter in regular room for 30 minutes. If the error message still appears, Send back for repair.
E08	The room Temp. is higher than 60°C <b>Solution:</b> Put the meter in regular room for 30 minutes. If the error message still appears, Send back for repair.
E09	This error message indicates he reservation start time or stop time setting is wrong <b>Solution:</b> review setting
E10	SD card does't insert or SD card's capacity is low when you start setting, start manual logging /Auto logging. <b>Solution:</b> Insert SD card correct or using low capacity of SD card
E11	The SD card is not presented when the reservation or recording is running. <b>Solution:</b> power off and insert SD card to meter
E12	Error in SD card
E13	Low battery icon appears on the LCD, starting record or setting reservation. <b>Solution:</b> change the new battery or using Adaptor for starting record or setting reservation
E14	SD card can't be read. <b>Solution:</b> We suggest you use Adaptor for supplying power for long time recording
E31	Error in circuit <b>Solution:</b> Send back for repair

# Specifications

Type K Temp Range	-328~2498°F (-200~1370°C),-
Type K Resolution	0.1°C,0.1°F
Type K Accuracy (under 18-28°C ambient temp.)	±(0.3%rdg+1°C)
Sampling rate	Programmable from 1 second up to 90 minutes
LCD size (HxW)	1.9" x 4.0" (47x104mm)
Operating temp.	32 to 122°F (0~50°C)
Operating RH%	Humidity<80%
Storage temp.	-4 to 122°F (-20~50°C)
Storage RH%	Humidity<90%
Dimension(LxWxD)	6.0" x 4.0" x 1.5" (152x100x39mm)
Weight	~0.66lb (10.6oz) (300g)
Battery	4pcs AA alkaline batteries or 9V adaptor
Standard Package	Meter,2pcs bead Type K Thermocouple, battery,manual,SD, Box

# ***Warranty***

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Triplett / Jewell Instruments extends the following warranty to the original purchaser of these goods for use. Triplett warrants to the original purchaser for use that the products sold by it will be free from defects in workmanship and material for a period of (1) one year from the date of purchase. This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way or purchased from unauthorized distributors so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence, accident or which have had the serial numbers altered, defaced, or removed. Accessories, including batteries are not covered by this warranty

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