Temperature Scanner/Pyrometer Model TDXM-DC

Installation and Operations Manual

WARNING

Please read the following information before installing.

BEFORE BEGINNING INSTALLATION OF THIS FW MURPHY PRODUCT:

- Read and follow all installation instructions.
- Please contact FW Murphy immediately if you have any questions.
- A visual inspection of this product for damage during shipping is recommended before installation.
- It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.
- Disconnect all electrical power to the machine.
- Make sure machine cannot operate during installation.
- Follow all safety warnings of the machine manufacturer.

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General Information

Description

The innovative TDXM-DC gives you a unique, configurable temperature scanner/pyrometer with a built-in power supply. The design features a 7-character, 7-segment Liquid Crystal Display window with 1/2 inch (13 mm) easy-to-read characters. Also located on the faceplate are membrane keys for easy configuring.

Highly reliable and versatile, the TDXM-DC accepts up to 24 type J or K grounded or ungrounded* thermocouples. Each channel has three (3) adjustable set points SP1, SP2 and SP3. The SP1, SP2 and SP3 set points correspond to the SP1, SP2 and SP3 outputs. Additionally, it has the selectable feature to monitor and alarm or shut down on deviation from an average from up to two groups of temperatures (GRP/DEV; deviation from average). One group could be exhaust temperatures, and another group could be bearing temperatures. The TDXM-DC is capable of communicating with controllers, PLCs, computers or SCADA systems by a built-in RS485 serial communications port. The TDXM-DC is available for 10 - 32 VDC systems.

User Interface

The User Interface includes a numeric LCD display and a 5-button membrane keypad for readout and channel configuration. Thermocouple types can be selected and set points entered through a series of set-up menus. See Setup Menu in Set Up section.

Thermocouple Types

Each of the 24 channels on the TDXM-DC can be configured as J or K type thermocouples, and temperature units can be selected as °F or °C for the readout of each channel. Unused channels can be set to **Ignore** and will not be seen in the display and will not affect the outputs. All the unused channels must have the jumper installed.

Control Options

Each TDXM-DC model features three outputs: Two outputs are the Field Effect Transistor (FET), and one output is the Form-C Relay. Each channel has three set points, one for each of the outputs. This allows for greater system flexibility by grouping sets of channels through one output.

Setpoint History

The TDXM-DC stores the last setpoint trip for each output in non-volatile memory. For instance, if SP1 of channel 1 was the last SP1 tripped, the LCD display will read SP1 1 when in the Setpoint History for SP1.

Pressing the channel SP1-3 key will show the channel and the setpoint for that channel. If the trip was from a group function, the offending channel is shown with the value of the deviation from average.

Sensor Inputs and Terminals

The TDXM-DC accepts up to 24 type J or K grounded or ungrounded* thermocouples using 24 pairs of screw type connections. Each pair has a jumper from the factory. Any tripped setpoint is detected within two seconds after the set point is exceeded.

RS485 Serial Port

The RS485 serial port (MODBUS RTU slave) on the back of the module is provided for communicating with microcontrollers, PCs, PLCs and SCADA systems (see Typical Wiring Diagrams). It is recommended that a termination resistor (customer supplied) be used when the TDXM-DC is the last device connected in a daisy-chain configuration. The baud rate, number of stop bits and slave node number can be set using the keypad. Communication is half-duplex. Modbus RTU function codes 3 and 6 are supported. Devices on the RS-485 network must have a common ground.

Modbus Integer Holding Registers

See TDXM-DC I/O Addresses.

Replacement Parts

Plug, kit, TDXM-DC: Terminal Plug replacement kit-P/N 10-00-7848

* We recommend the use of ungrounded thermocouples. Errors in readings with grounded thermocouples can be the result of differences in grounding between different devices.
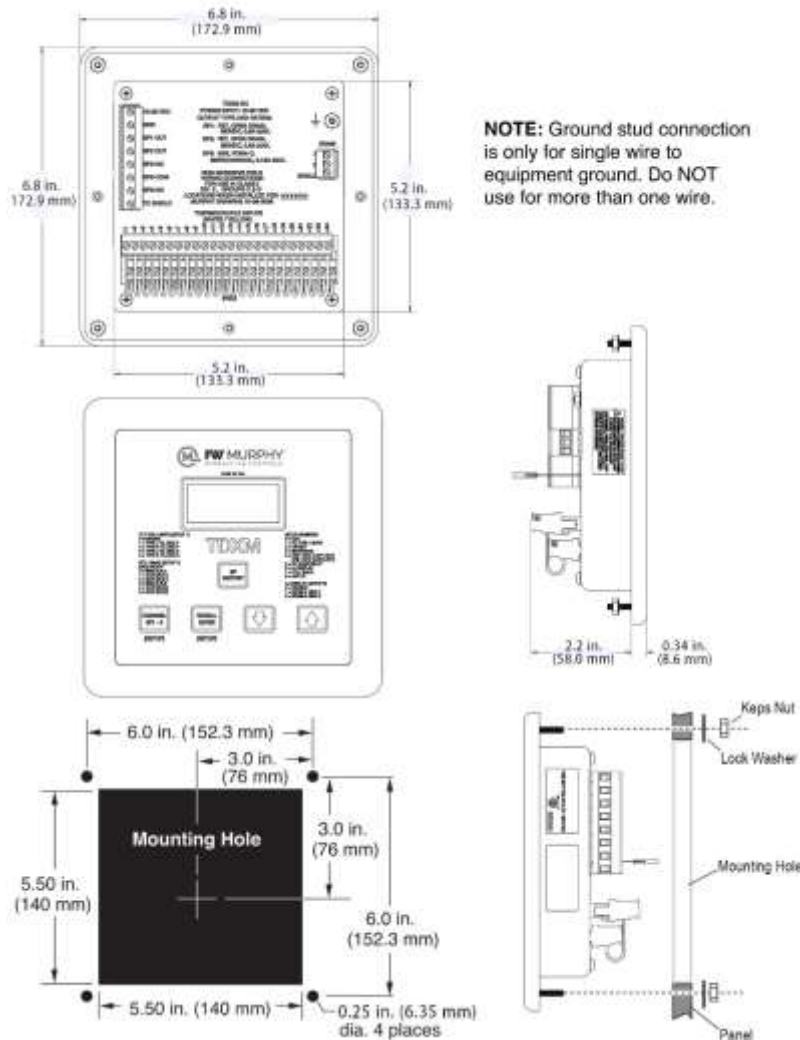
TDXM-DC Mounting

	Warning: Turn the power source off before mounting the TDXM-DC.

The TDXM-DC Series module was designed to be mounted within a weatherproof enclosure and is intended for mounting in a flat panel.

1. Precut a square mounting hole of 5.5 in. (140 mm) and four mounting holes 0.25 in. (6.35 mm) dia., see diagram.
2. Align the mounting studs to the drilled holes and insert the TDXM-DC from the front side of the panel.
3. Place a washer and a nut on each stud.
4. Equally tighten the nuts using an X-Pattern. The maximum torque is 9 in. lbs. Do not overtighten.

Dimensions

NOTE: The TDXM controller and TDXM-DC are the same product. The controller shows TDXM only.

IMPORTANT: For outdoor use, mount the TDXM-DC controller in a weatherproof enclosure.

TDXM-DC Typical Wiring Diagram

> **WARNING:** Route the sensor input wires away from other wires (2 in. [51 mm] minimum). For hazardous application requirements, the TDXM-DC complete system must be installed in accordance with the national electrical code (NEC) Class I, Division 2, Groups C & D (article 504) specifications and per FW Murphy drawing number 10-08-0006

TDXM-DC I/O Addresses

Channel	Eng. Units	SetP#1	SetP#2	SetP#3	Offsets	TC Type
Ch#1	40,001	40,031	40,055	40,079	40,103	40,127
Ch#2	40,002	40,032	40,056	40,080	40,104	40,128
Ch#3	40,003	40,033	40,057	40,081	40,105	40,129
Ch#4	40,004	40,034	40,058	40,082	40,106	40,130
Ch#5	40,005	40,035	40,059	40,083	40,107	40,131
Ch#6	40,006	40,036	40,060	40,084	40,108	40,132
Ch#7	40,007	40,037	40,061	40,085	40,109	40,133
Ch#8	40,008	40,038	40,062	40,086	40,110	40,134
Ch#9	40,009	40,039	40,063	40,088	40,111	40,135
Ch#10	40,010	40,040	40,064	40,068	40,112	40,136
Ch#11	40,011	40,041	40,065	40,089	40,113	40,137
Ch#12	40,012	40,042	40,066	40,090	40,114	40,138
Ch#13	40,013	40,043	40,067	40,091	40,115	40,139
Ch#14	40,014	40,044	40,068	40,092	40,116	40,140
Ch#15	40,015	40,045	40,069	40,093	40,117	40,141
Ch#16	40,016	40,046	40,070	40,094	40,118	40,142
Ch#17	40,017	40,047	40,071	40,095	40,119	40,143
Ch#18	40,018	40,048	40,072	40,096	40,120	40,144
Ch#19	40,019	40,049	40,073	40,097	40,121	40,145
Ch#20	40,020	40,050	40,074	40,098	40,122	40,146
Ch#21	40,021	40,051	40,075	40,099	40,123	40,147
Ch#22	40,022	40,052	40,076	40,100	40,124	40,148
Ch#23	40,023	40,053	40,077	40,101	40,125	40,149
Ch#24	40,024	40,054	40,078	40,102	40,126	40,150

Miscellaneous			
Cold Junction Average	40025	Deviation Error #2	40160
CJ1 Celsius Degrees (*100)	40026	Group Size #1	40161
CJ2 Celsius Degrees (*100)	40027	Deviation Setpoint #1	40162
Cold Junction Display (0,1, 2)	40028	Enable Value #1	40163
Delay Display	40029	Enabling Channel #1	40164
Force Outputs	40030	Group Size #2	40165
SP1 Channel Alarm	40151	Deviation Setpoint #2	40166
SP1 Set Point	40152	Enable Value #2	40167
SP2 Channel Alarm	40153	Enabling Channel #2	40168
SP2 Set Point	40154	Delay ADC (from 40 to 99 mS)	40169
SP3 Channel Alarm	40155	Watchdog cnt.	40170
SP3 Set Point	40156	RTU Node #	40171
Deviation Alarm #1	40157	Revision (*100)	40172
Deviation Error #1	40158	ID Prefix Number (0-99)	40173
Deviation Alarm #2	40159	ID Suffix Number (0-9999)	40174
NOTE: The term (*100) refers to value times 100			

Sequence of Operations
Scanning

Normal Scan

During Normal Scan mode, each channel is displayed for the period set in the CH SCAN DELAY (Setup 5). The default is 3 seconds. When the CH SCAN DELAY expires, the display changes to show the next channel. After all channels have been displayed, the sequence starts again from the first channel. The LCD looks like this:

The Normal Scan mode can be turned ON or OFF. To toggle the Normal Scan mode, press and hold the SCROLL button until the display shows (approx. 1 sec.).

Or

It is possible to disable channels from being displayed, by selecting the channel as Ø=Ignored in the TC TYPE / UNITS (Setup 1).

LOCKED SCAN

During a Locked Scan, the Normal Scan is temporarily interrupted and only the Locked Channel is displayed for 60 seconds. A channel is locked when the UP or DOWN buttons are used to select a channel during Normal Scan mode. To unlock and resume Normal Scan mode, press the SCROLL button.

After 60 seconds, the Normal Scan mode will resume, if no other keys have been pressed.

It should be noted that while only one channel is being displayed, all channels are being scanned and checked against their (3) set points every 2 seconds. All set points remain active at all times.

CHANNEL SP1-3

During Normal or Locked Scan mode, the set points for each channel can be viewed. To enter the CHANNEL SP view for the channel currently displayed, press and hold the CHANNEL SP1-3 button for approx. 1 second.

The display will first show:

From this display, use the UP button to view SP2 and SP3. Press

the CHANNEL SP1-3 button again to return to the Normal or Locked Scan mode. No changes can be made to the set points from this view. To change a set point, use the SETPOINTS (setup 3) menu.

SP HISTORY

During Normal or Locked Scan mode, a history of the last channel setpoint trip can be viewed. To enter the SP HISTORY channel display, press the SP HISTORY button.

The display will first show:
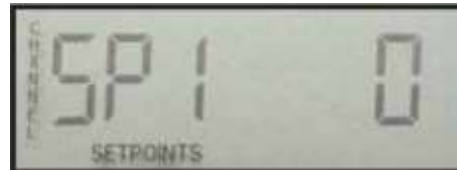
The value on the right represents the channel that tripped for the SP# shown. From this display, use the UP button to view SP2 and SP3. For each SP# it is possible to view the set point for that channel when the channel tripped. Press the CHANNEL SP1-3 button to view the setpoint for the channel stored in the history.

If the group/deviation caused the trip, the display will show:
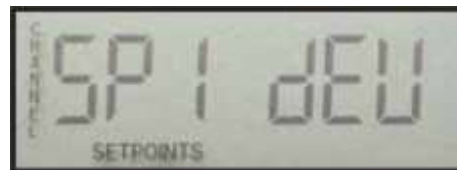
Pressing the CHANNEL SP1-3 button will show the channel that caused the trip and the temperature deviation that caused the trip. The temperature deviation shown is an absolute value. In other words if the deviation was a negative number, a positive number will be shown.

SP3 LATCH

The TDXM-DC W/SP3 LATCH is a special version available to latch one of the three digital outputs when a trip is detected. For this version only, setpoint values are first-out. If a sensor channel temperature rises above set point, SP3 will activate and remain active until RESET or power is recycled in the unit. The display will show 1 2 3 (#3 is ON). The icons for SETPOINT 1 and 2 may also be ON depending on the status of those set points.

If the tripped channel clears, the output for SP3 will not clear and the SP History for SP3 will not be overwritten by other SP3 trips. Example: If CH21 and CH22 have an SP3 setpoint of 180 and CH21 temperature rises to 190, SP3 OUT will be activated, and the SP History will show SP3 21 as the cause for trip. If temperature for SP3 21 falls below 180 or SP3 22 rises above 180 after the trip has occurred, the SP3 OUT will remain active, and the SP History will not be altered. All channels continue to be scanned and compared against SP1 and SP2 setpoint values.

To RESET the SP3 Output and allow continued scanning of SP3 set points, press and hold SCROLL ENTER and DOWN ARROW keys simultaneously for at least 3 seconds. The display will indicate the latch has been cleared when the number 3 is no longer visible on the SETPOINT icon display. The display will show SETPOINT 1 2 3 (#3 is OFF). The icons for SETPOINT 1 and 2 may also be ON depending on the status of those set points.

Setup

To enter the SETUP routines, press the SCROLL ENTER and CHANNEL SP1-3 buttons simultaneously for 5 seconds. The display will first show:

While continuing to depress the two buttons, the display will show progress in the form of dashes until the 5 seconds expires, as shown here:

After the 5-second delay expires, the user will be required to enter a passcode. This shows that display (code is on a single sheet of paper provided with the instructions to the original buyer of the product):

Use the UP and DOWN buttons to set the correct code and press the SCROLL ENTER button to enter the SETUP menu. If the correct code is not entered, the display will show:

After three attempts, the display will return to Normal Scan mode. Upon entering the correct code, the SETUP menus can be accessed. The LCD will display:

Use the UP and DOWN buttons to select the desired SETUP number and press the SCROLL ENTER button. To exit the SETUP menu, select Setup 0 and press the SCROLL ENTER button. In the SETUP menu, a zero shortcut can be used to return to a zero value such as CH 0 or SETUP 0. Press the CHANNEL SP1-3 button to zero any menu value.

SETUP MENU

The Setup menu is as follows:

Setup 0 =   EXIT

Setup 1 =   TC TYPE / UNITS

Setup 2 =   OFFSET

Setup 3 =   SETPOINTS

Setup 4 =   GRP / DEV SETUP

Setup 5 =   CH SCAN DELAY

Setup 6 =   CJ DISPLAY SELECTION

Setup 7 =   RTU / BAUD SETUP

Setup 1 TC TYPE / UNITS

Each channel can be individually set to display in units °C or °F for Type J or K thermocouples or ignored completely. When a channel is ignored, it is no longer scanned or displayed. Ignored channels do not appear in other SETUP menus. When the display shows SETUP 1, pressing the SCROLL ENTER button will change the display to the entrance and exit display for this setup.

The LCD will first display the Channel Select display:

Use the UP and DOWN buttons to select the desired channel to set up. (Select CH 0 to exit.) Press the SCROLL ENTER button, and the display will read:


0 =   Ignore

1 =   J type for °F

2 =   K type for °F

3 =   J type for °C

4 =   K type for °C

NOTE: All unused channels must have the jumper installed.

Use the UP and DOWN buttons to set the desired channel type. Press the SCROLL ENTER button to return to the Channel Select display. Repeat until all channels are configured. Return to CH 0 to exit this setup. Press the UP button to go to SETUP 2.

Setup 2 OFFSET

It is possible to adjust the temperature value for each channel to match analog gauges or other instrumentation. This OFFSET is added to the actual scanned temperature. The offset for each channel is adjustable from -20 to +20 in the units set (for °F or °C) for that channel. For example, a reading of 100° C with an OFFSET of 5 would be adjusted to 105° C. This adjusted value is used for comparison to set points as well as display. At SETUP 2, press SCROLL ENTER. The LCD will first display the Channel Select entrance/exit display:
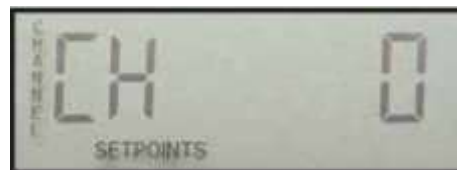
Setup (continued)

Use the UP and DOWN buttons to select the desired channel to set up. (Select CH 0 to exit.) Press SCROLL ENTER, and the LCD will read:

```
OFF          0
SETPOINTS
```

Use the UP and DOWN buttons to adjust the offset for the channel being set. Press the SCROLL ENTER button to go back to the channel display. Go to CH 0 to exit by pressing SCROLL ENTER. Press the UP button to go to SETUP 3.

Setup 3 SETPOINTS

Press the SCROLL ENTER button to get into the setpoint setup. The LCD will first display the Channel Select entrance/exit display:

```
CH           0
SETPOINTS
```

Use the UP and DOWN buttons to select the desired channel to setup. Press the SCROLL ENTER button and the LCD will read:

```
SP1          0
SETPOINTS
```
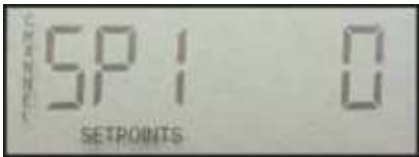
SP# indicates the output that the setpoint is tied to. For example, SP 1 is tied to Output 1 (SP1 OUT). Use the UP and DOWN buttons to set the desired set point. Press the SCROLL ENTER button to accept the entry. Repeat for SP2 and SP3, and you will return to the Channel Select display. Repeat until all set points are entered.

Note that entering Ø (zero) for a setpoint will disable the output for that particular channel. With zero as the set point, open thermocouple will not cause that output to activate. In this way, channels can be grouped, if desired. Further, an alarm before shutdown feature can be implemented by setting the set points progressively higher. For example, if SP1 = 900 and SP2 = 1000, Output 1 (SP1 OUT) could be wired to an Alarm Input and Output 2 to a Shutdown Input on an annunciator. The range of adjustment is 0-1999 in the Units (°F or °C) chosen for those channels. Once all set points have been entered or checked, go to the CH 0 entrance/exit display. Press the SCROLL ENTER button to exit. Then press UP to go to Setup 4.

Setup 4 GRP / DEV SETUP

At the Setup 4, press the SCROLL ENTER button. The LCD will first display the Number of Channels in the first group to Average. All first group settings have the letter A. The second group settings have the letter B:

```
grPA         24
SETPOINTS
```

If the group is set to Ø (zero), the function is disabled. The first group must start with Channel 1. For an example on a 16

cylinder engine, group will be set to 16. The first 16 channels will be in the group. The group can be all 24 channels. If a second group is used, it starts with the first channel after the first group. Use the UP and DOWN buttons to select the number of channels that will be grouped in the averaging group. Enter Ø (zero) to disable this feature. Press the SCROLL ENTER button. Next enter the allowable deviation. This is a temperature adjustable from 0–255 in the Units (°F or °C) chosen for the channels:

```
dEuA         0
SETPOINTS
```

If any of the grouped channels (beginning with channel 1) deviates from the average of the other channels by the amount entered, Output 1 will be energized. Use the UP and DOWN buttons to enter an amount. Press the SCROLL ENTER button. Next enter the enable value. This is a temperature setpoint for enabling the group/deviation function. If the temperature of the channel selected in the next setting exceeds this enabled set point, the group/deviation function becomes active:

```
EnA          0
SETPOINTS
```

Use UP and DOWN to enter a value. Press the SCROLL ENTER button and enter the enable channel:

```
ECHA         0
SETPOINTS
```

If this channel value is set to Ø (zero), any of the grouped channels will enable the group/deviation function when any of the channels reaches the EN value. If this channel value is set to any other value (1-24), then ONLY that channel will enable the deviation function when it reaches the EN value. The enabling channel does not have to be in the group. Use the UP and DOWN buttons to enter a value.

Press SCROLL ENTER, and the display will go to grpb for the second group. If a second group is not desired, the grpb setting should be set to zero. With a setting of zero. pressing scroll enter will bring back the setup 4 display. If a second group is used, it is done like the first group.

Setup 5 CH SCAN DELAY

At Setup 5, press SCROLL ENTER. The LCD will display the current display delay between channels during Normal Scan. This delay is also the update delay for the temperature readings. The channels are still scanned within 2 seconds and trip point comparisons are made, but the actual display of the temperature is delayed by this time.

```
dLY          3
SETPOINTS
```

Setup (continued)

Use the UP and DOWN buttons to enter the desired Channel Scan Delay value (settable from 0 to 10 sec.). This is only for the display. Press the SCROLL ENTER button to return to Setup 5. Press the UP button to go to Setup 6.

Setup 6 CJ DISPLAY Selection

At Setpoint 6, press the SCROLL ENTER button. The LCD will display the Cold Junction Sensor Display setting:
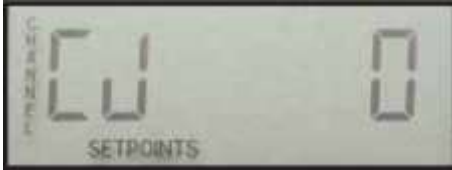
0 = Disable display

1 = °F

2 = °C

Use the UP and DOWN buttons to set the display or display units, then press SCROLL ENTER. Press the UP button to go to Setup 7.

Setup 7 RTU / BAUD

At Setpoint 7, press the SCROLL ENTER button. The LCD will display the current RTU Node address assigned to the TDXM-DC:

Use the UP and DOWN buttons to enter the desired RTU Node Number. This is adjustable from 0-255. Press the SCROLL ENTER button and enter the baud rate and number of stop bits selection:

0 = 9600 Baud, N,8,1

1 = 19.2 KBaud, N,8,1

2 = 38.4 KBaud, N,8,1

3 = 9600 Baud, N,8,2

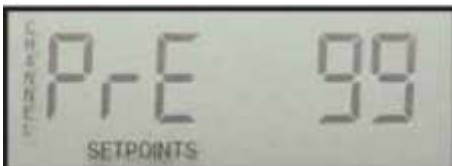**4 = 19.2 KBaud, N,8,2**

5 = 38.4 KBaud, N,8,2

Use the UP and DOWN buttons to set the desired baud rate and number of stop bits. Press SCROLL ENTER to go back to Setpoint 7 display. Press the UP button to go to Setup 8.

Setup 8 Unit Number

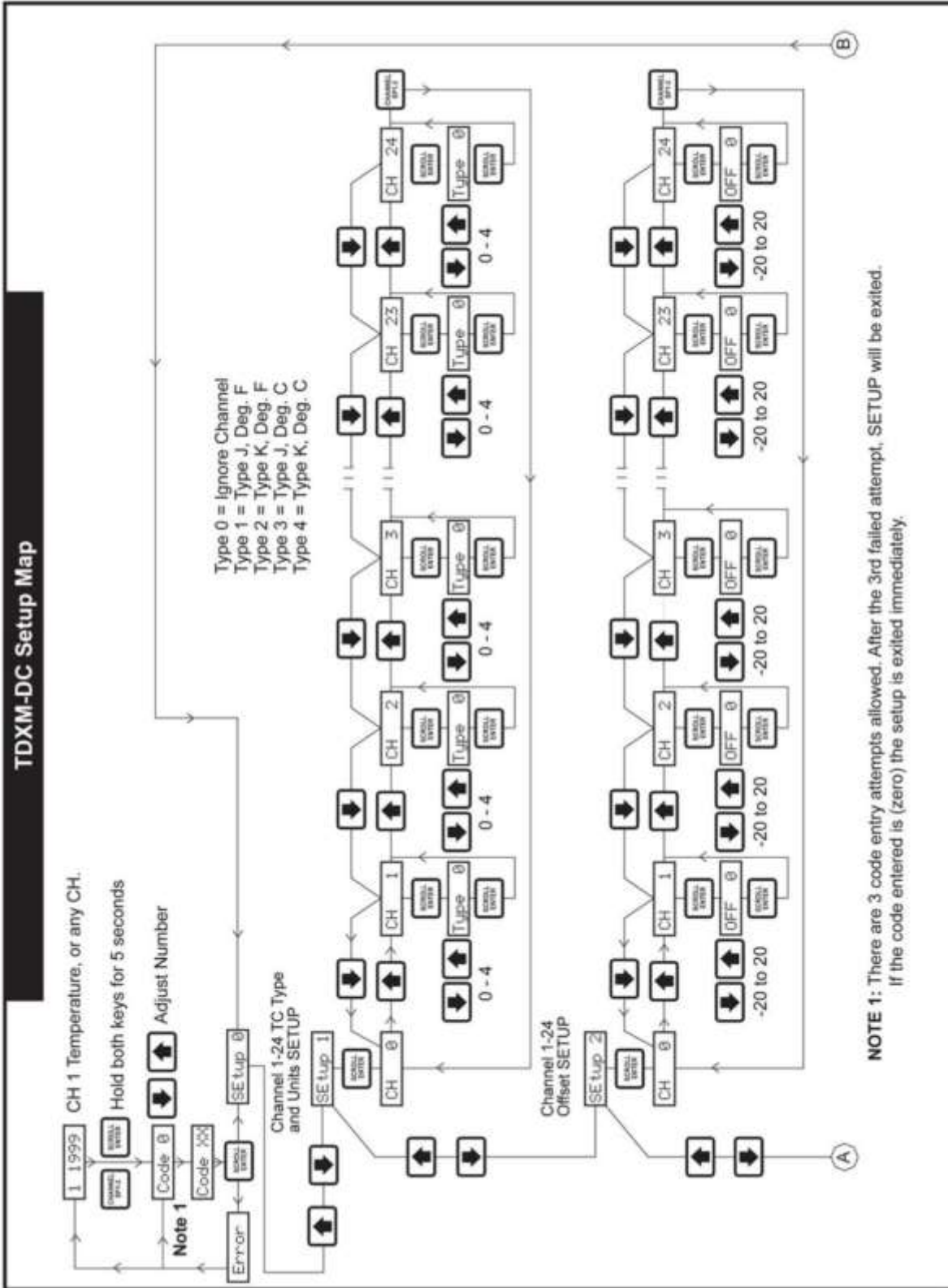At Setpoint 8, press SCROLL ENTER the display will show:

This is the prefix for the unit number. It can be set from Ø (zero) to 99 using the UP and DOWN buttons. Once this is set, pressing SCROLL ENTER will give the following display:
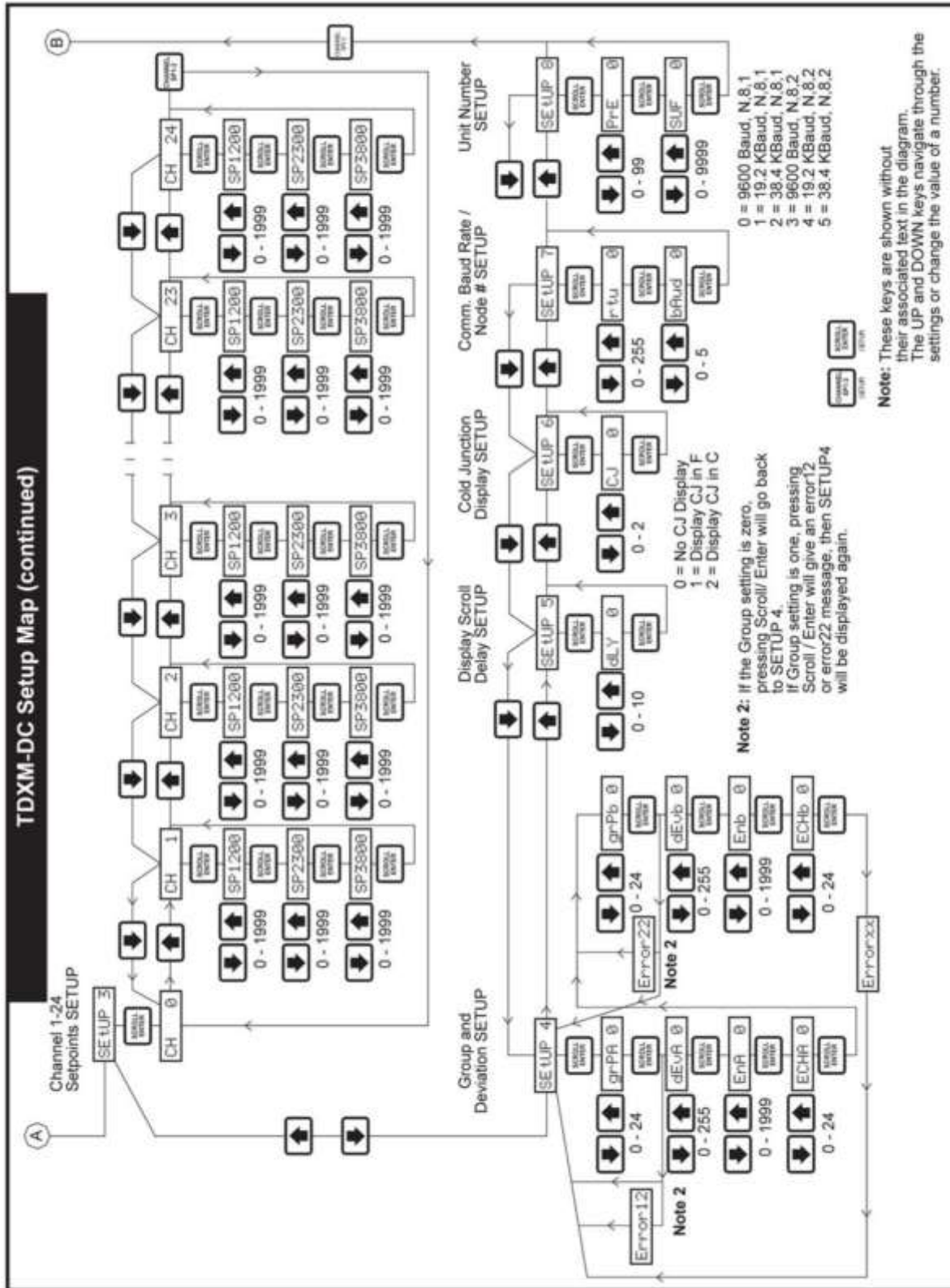

This is the suffix for the unit number. It can be set from 0–9999 using the UP and DOWN buttons.

Within this, the unit number can be set up to 999999. The unit number is only displayed here but is available as MODBUS registers for remote communications.

Map of Setup

TDXM-DC Setup Map

CH 1 Temperature, or any CH.

Hold both keys for 5 seconds

Adjust Number

Type 0 = Ignore Channel
Type 1 = Type J, Deg. F
Type 2 = Type K, Deg. F
Type 3 = Type J, Deg. C
Type 4 = Type K, Deg. C

Channel 1-24 TC Type and Units SETUP

Channel 1-24 Offset SETUP

NOTE 1: There are 3 code entry attempts allowed. After the 3rd failed attempt, SETUP will be exited. If the code entered is (zero) the setup is exited immediately.

Note 1

Map of Setup (continued)

TDXM-DC Setup Map (continued)

Note: These keys are shown without their associated text in the diagram. The UP and DOWN keys navigate through the settings or change the value of a number.

0 = 9600 Baud, N,8,1
1 = 19.2 KBaud, N,8,1
2 = 38.4 KBaud, N,8,1
3 = 9600 Baud, N,8,2
4 = 19.2 KBaud, N,8,2
5 = 38.4 KBaud, N,8,2

0 = No CJ Display
1 = Display CJ in F
2 = Display CJ in C

Note 2: If the Group setting is zero, pressing Scroll/ Enter will go back to SETUP 4.
If Group setting is one, pressing Scroll / Enter will give an error12 or error22 message, then SETUP4 will be displayed again.
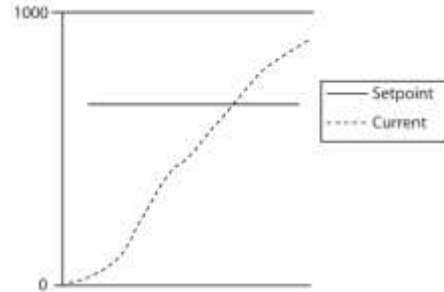
Deviation from Average

TDXM-DC – Deviation from Average Calculations

This example is for a 6-cylinder engine.

Figure 1

Deviation from Average Calculations[1]	TDXM-DC Channels	Enabling Channel grPA= 6
Absolute (1 – ((2+3+4+5+6)/5))	1	
Absolute (2 – ((1+3+4+5+6)/5))	2	
Absolute (3 – ((1+2+4+5+6)/5))	3	Included
Absolute (4 – ((1+2+3+5+6)/5))	4	
Absolute (5 – ((1+2+3+4+6)/5))	5	
Absolute (6 – ((1+2+3+4+5)/5))	6	

Figure 2

Troubleshooting Tips

If a temperature reading is incorrect, check the following:

1. Setup 1 – TC Type and Units correct?
2. Cold junction reading reasonable?
3. Install a jumper in place of the TC, should read the same as cold junction temperature.
4. Check for proper and recommended wiring practices.
    A. Shielded thermocouple grade extension wire.
    B. No splices involving metals other than TC type metals?
    C. TC wire separation from other wiring.
5. Check for possible grounded thermocouple problems.
6. Check DC power voltage to see proper range of voltage and possible noise.

If the display shows all dashes (----------), it means all channels are set to ignore and the cold junction display is disabled.

7. If the SP3 Latch model does not unlatch, check the following:
    A. Be sure the display is in the scan mode. The unlatch operation cannot be performed while viewing the history displays.
    B. Verify that the channel in the SP3 history has cleared. To do this exit the SP history and use the arrow keys to navigate to the channel in the scan display mode. Take note of the current temperature and press and hold Channel SP1-3 to verify the temperature setpoint SP3 for the channel. (See mode details on CHANNEL SP1-3 key function.)

Notes:

- Figure 1, these numbers represent the data from the channels. The values that are derived are not visible. The deviation from average calculation compares each channel to the rest of the group's averaged value.

- Figure 1, the setting group (grPA) selects how many channels are included, from channel 1 for the first group. The second group/starts with the first channel after the first group. These channels will be involved in the deviation from average calculation.

- Figure 2, the setpoint represents the enabling threshold (EnA or Enb). The current represents the enabling channel(s) (EChA or EChb) (0=any channel in the group). When the enabling channel(s) exceed the enabling threshold, the deviation from average calculations will take place.

- When a channel's deviation exceeds the deviation (dEvA or dEvb) set point, the deviated channel will be recorded in the history.

Grouping Errors

Because of the flexible nature of the TDXM-DC, the setup can cause conflicts when settings are made. If there is a conflict which will cause problems in the Group/deviation function, there will be error codes displayed. The display will show one of the values below:

Group #1

    Error 11 - Channel 1 disabled

    Error 12 - Too few channels

    Error 13 - Inconsistent engineering units

    Error 14 - Channels skipped/disabled

    Error 15 - Deviation value set to 0

Group #2

    Error 21 - Channel 1 disabled

    Error 22 - Too few channels

    Error 23 - Inconsistent engineering units

    Error 24 - Channels skipped/disabled

    Error 25 - Deviation value set to 0

    Error 26 - Group size goes past the 24th channel

CJ Error

If a cold junction sensor fails, the display will show: CJError. Output 3 (SP3. out) will be de-energized to the tripped state, and SP1 out and SP2 out will turn on. The SP1, SP2 and SP3 histories will show the number 61. The TDXM-DC will no longer scan channels or allow use of the keypad. If this happens, the unit should be replaced.

Specifications

Power Input (Operating Voltages): 10–32 VDC, 4.2 W max

Sensor Inputs: Up to 24 type J or K grounded or ungrounded thermocouples*

Outputs: Two (2) Outputs 0.5 A, 350 VDC, FET-sink to ground to trip

One (1) Form C Solid State Relay Output 0.125 A, 350 VDC/240 VAC

> **NOTE:** The form C relay output is de-energized for a trip condition. The NC terminal is closed and the NO terminal is open for trip.

Communications: RS485 Serial Port, Modbus RTU slave

Operating, Storage, and Display Temperature: -40° F to 185° F (-40° C to 85° C)

Sensor Scan Rate: Scans all channels in 2 seconds

Range:

Type J: 0° F - 1538° F (0° C - 837° C)

Type K: 0° F - 1999° F (0° C - 1093° C)

Display Type: Custom 7-segment, 7-character type with temperature units' indication and setpoint trip indication

Accuracy:

Cold junction: Better than ±1.0° F (±0.5° C)

Type J or K: ±2° F (±1° C); 100° F - 1999° F (38° C - 1093° C).

Cold Junction Compensation: -40°F to 185° F (-40° C to 85° C).

Open Thermocouple Detection: Drives channel reading high

> **NOTE:** ANSI MCQ6.1 states limits of error for thermocouples.
> Type J - 32° F -1382° F (0° C - 750° C) ±4.4° F (±2.2° C) or ±0.75%.
> Type K - 35° F - 2282° F (0° C - 1250° C) ±4.4° F (±2.2° C) or ±0.75% whichever is greater.

Third-Party Approvals: CSA Class I, Division 2, Groups C and D

* We recommend the use of ungrounded thermocouples. Errors in readings with grounded thermocouples can be the result of differences in grounding between different devices.

Notes

Notes

FW MURPHY PRODUCTION CONTROLS

SALES, SERVICES & ACCOUNTING
5417 S. 122ND E. AVE.
TULSA, OK 74146

CONTROL SYSTEMS & SERVICES
105 RANDON DYER ROAD
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5757 FARINON DRIVE
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FW MURPHY PRODUCTS
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FM 668578 (San Antonio, TX - USA)
FM 668933 (Rosenberg, TX - USA)

bsi. ISO 9001 Quality Management TS 16949 Automotive Quality Management
FM 523951 (China) TS 589322 (China)