Tek-LCD 7801C
NEMA 4X Panel Mount Multi-Channel Controller

Quick Start Guide

1. Before you begin

The Quick Start guide provides essential information to assist you in quickly getting started. Go to our website to download the full User Guide for detailed installation and other information.

⚠️ Read complete instructions before the installation and operation of the meter.

⚠️ Failure to follow installation guidelines could result in death or serious injury. Make sure only qualified personnel perform the installation. Risk of electric shock or personal injury.

2. Unpack

Tek-LCD 7801C NEMA 4X Panel Mount Multi-Channel Controller
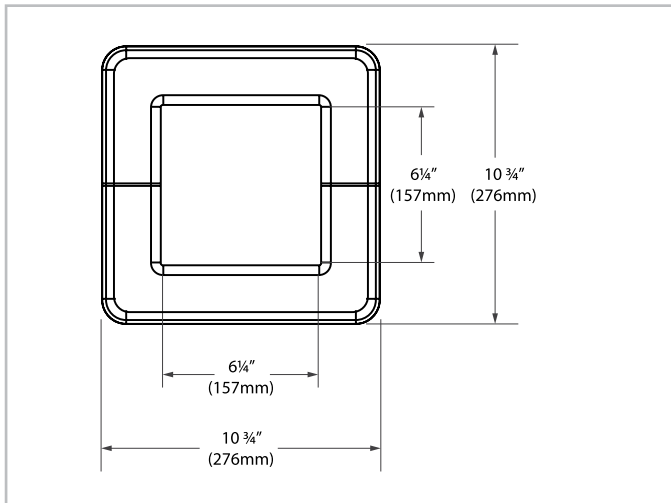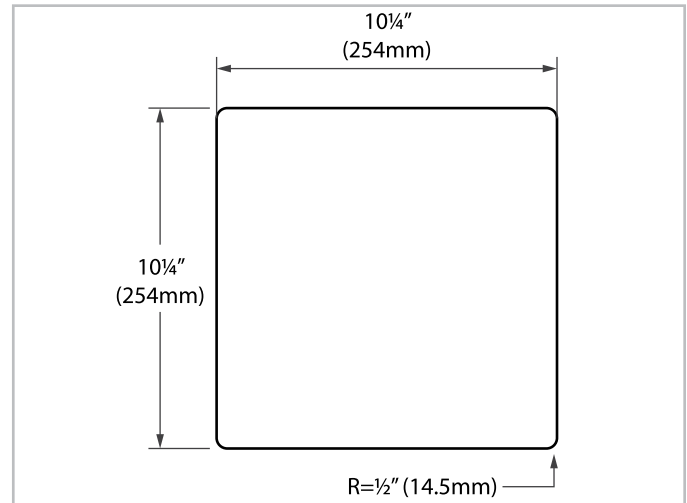
3. Dimensional Drawings

6¼"
(157mm)   10 ¾"
(276mm)

6¼"
(157mm)

10 ¾"
(276mm)

Fig 1: Front Panel Mount

10¼"
(254mm)

10¼"
(254mm)

R=½" (14.5mm)

Fig 2: Panel Cut-out

10¾"
(276mm)
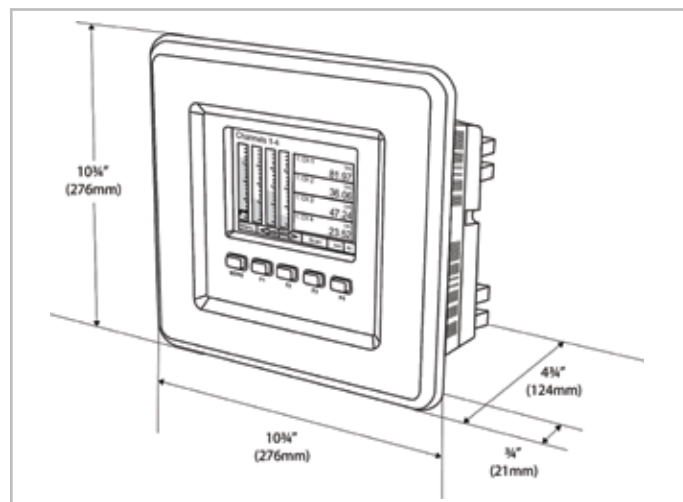
10¾"
(276mm)

4¾"
(124mm)

¾"
(21mm)

Fig 3: Mounting Panel
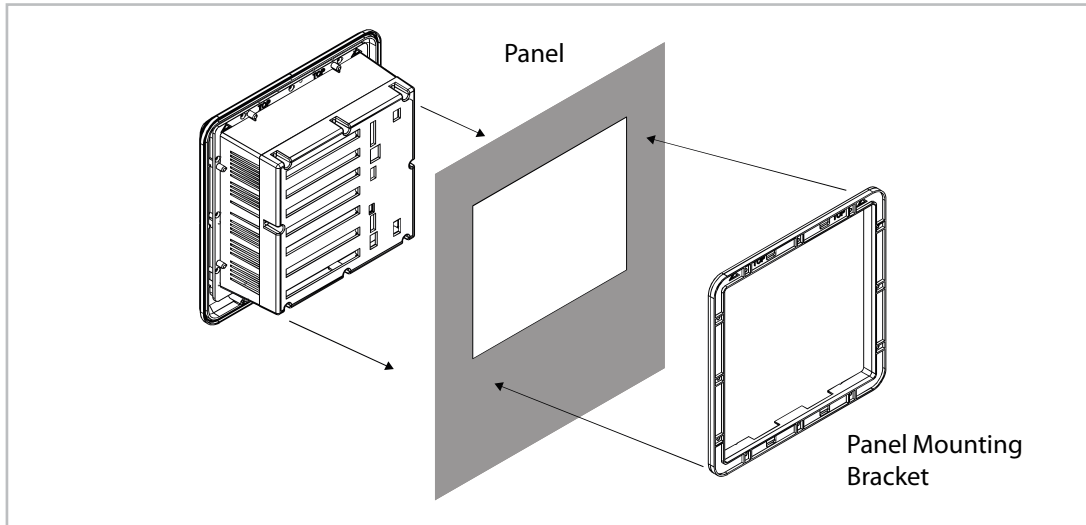
4. Mounting

• **Panel Mounting**

Fig 4: Panel Mount Installation

- Prepare panel cutout as per the dimensions provided.
- Locate the panel mounting bracket and screws.
- Inspect the controller to assure the gasket is securely in place.
- Insert controller in the panel cutout, the latches on the top and bottom should hold it in place.
- Insert the panel mounting bracket from the back of the panel, observe the orientation of the piece marked TOP.
- Install the 12 screws provided.

*Note:
1. Panel cutout: 10 ¼" x 10 ¼" ±1/16" (254mm x 254mm ±1.3mm)
2. Panel thickness: 1/16" to ¼" (1.8mm to 8.9mm)
3. Clearance: Allow 6" (150mm) behind panel

5. Display

• **Keys and Buttons**

Fig 5: Screen Navigation

Fig 6: Menu Navigation

Table 1: Key and its Description

Key	Action
Menu	Enter menu
Right-key →	Step into menu/setting
Left-key ←	Exit/go back
Down-key ↓	Next screen/channel/setting
Up-key ↑	Previous screen/channel/setting
Stop	Stop automatic scan
Scan	Scan screens automatically
Ack	Acknowledge alarms/relays
Reset	Reset total/max/min
Setup	Enter the Setup menu
Edit	Modify selection
Enter	Execute keypad entry
Ok	Accept setting change
Save	Save all settings in view
Cancel	Discard changes
Delete	Delete channel/item
New	Create new channel/alarm
←|	Move cursor left
|→	Move cursor right
X→	Delete to the right
←X	Delete to the left
≡	Access additional settings or actions
Alert!	Flashing red: View new alarm alerts Steady red: Alarm alerts, already viewed
Alert!	Amber: View manually controlled outputs, and simulated parameters

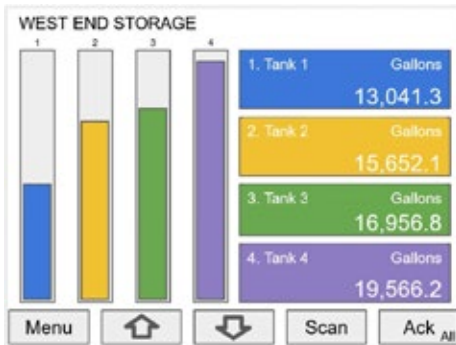***Note:** This is not a touch-screen display; the pushbuttons must be used to activate the key.

Fig 7: Typical screen view displaying 4 channels and 4 bar graphs representing the values of each channel
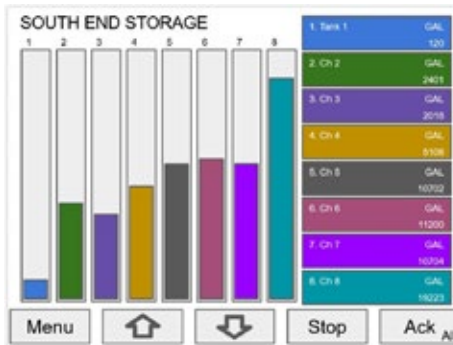
Fig 8: Typical screen view displaying 8 channels and 8 bar graphs representing the values of each channel
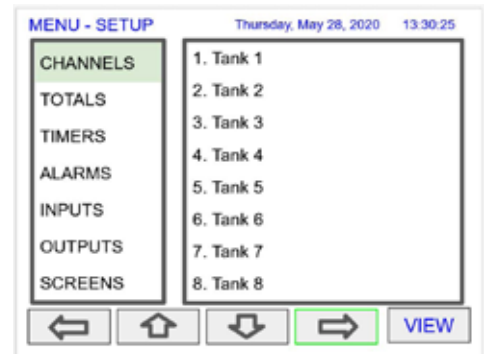
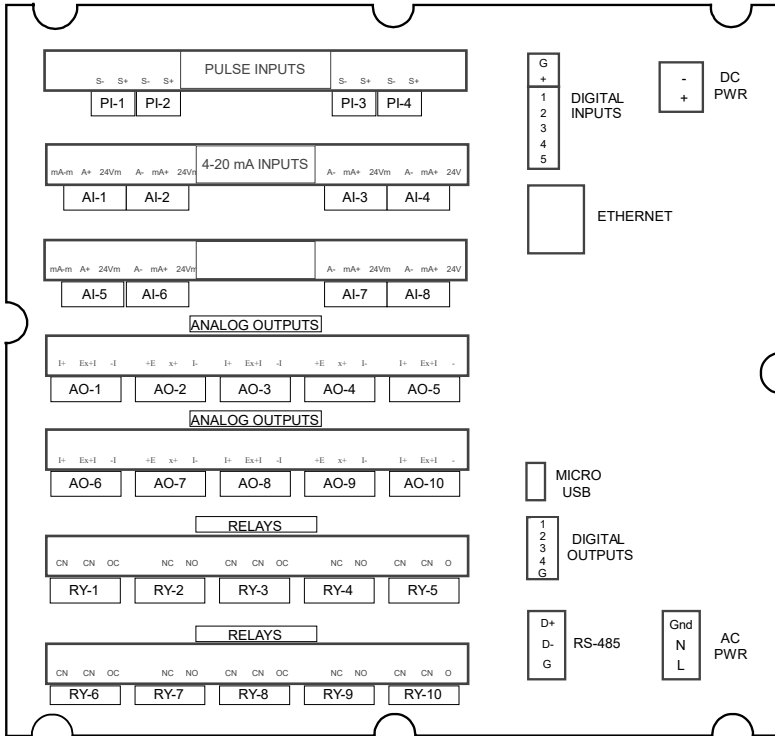Fig 9: Menu Setup

6. Power Supply

• **Terminal Connection**

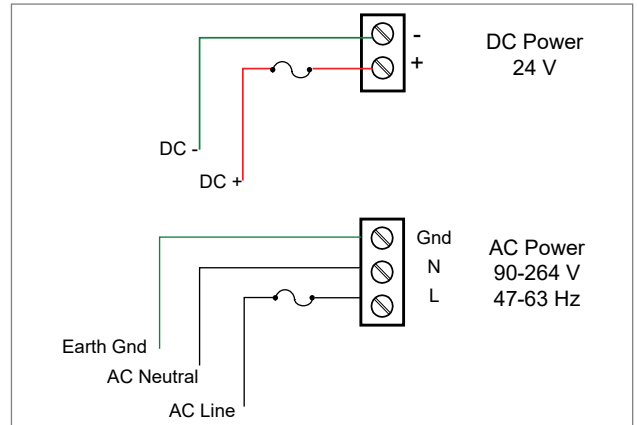Fig 10: Terminal connection for Tek-LCD 7801C

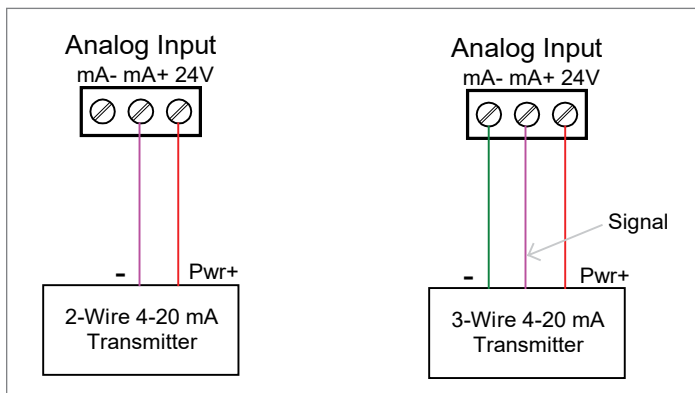Fig 11: Power Connection for Tek-LCD 7801C

• **4-20 mA Analog Input Connections**

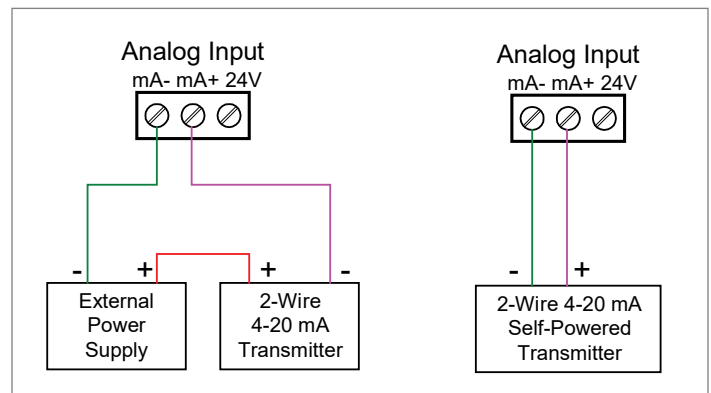Fig 12: Transmitters Powered by Tek-LCD 7801C Isolated 24 VDC Power Supply

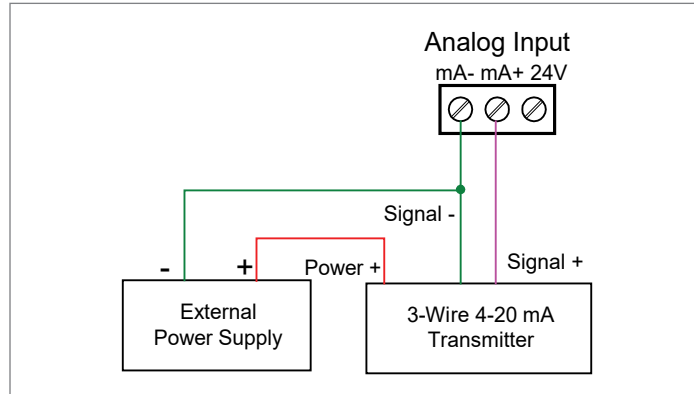Fig 13: Transmitter Powered by Ext. Supply or Self-Powered

Fig 14: 3-Wire Transmitters Powered Externally

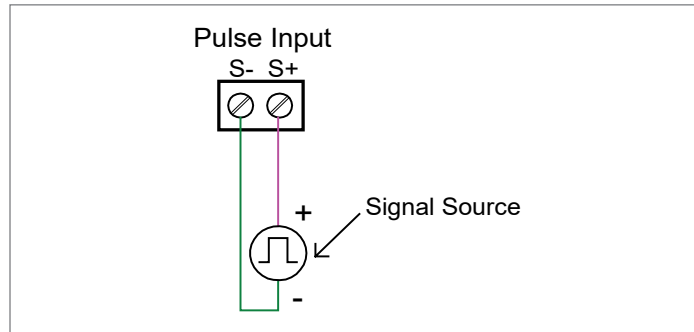- **Flow Meter Pulse Input Connections**

Fig 15: Pulse Input Connections
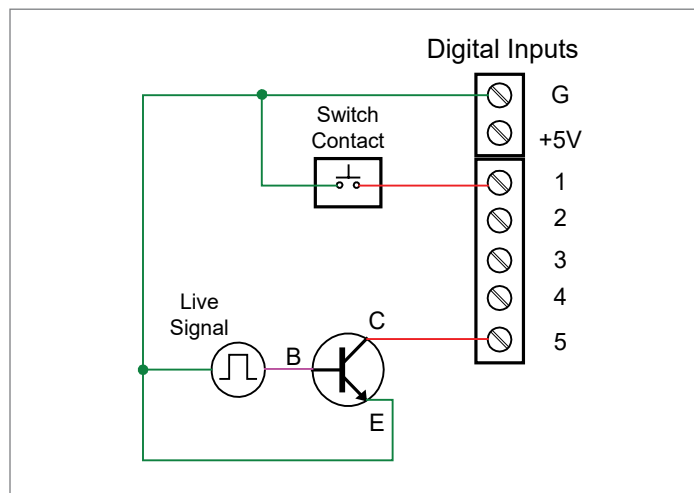
- **Digital Input Connections**

Fig 16: Digital Input from Switch Closure and Live Signal

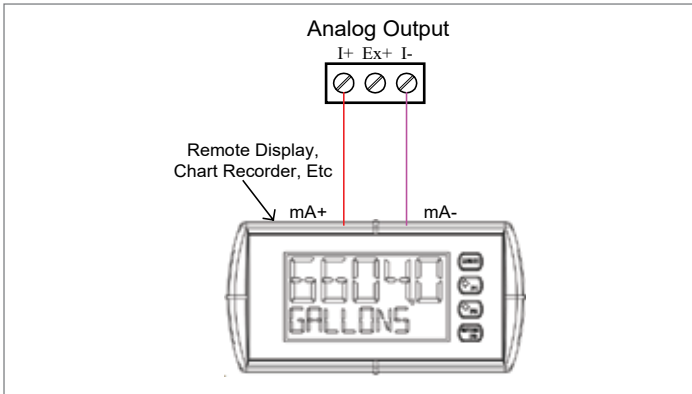## • Analog Output Connections
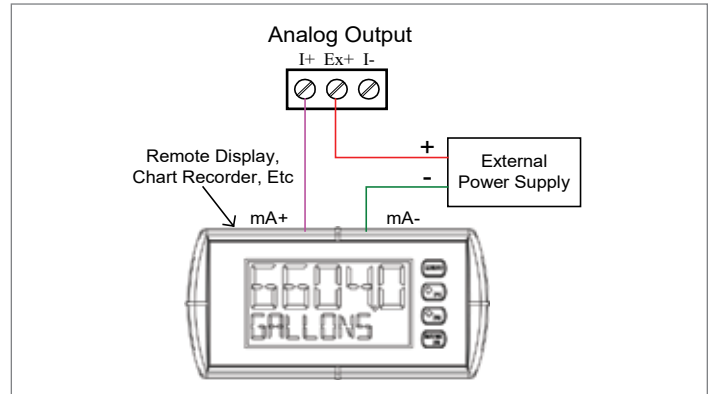

Fig 17: Active 4-20 mA Output Powered by Controller

Fig 18: Passive 4-20 mA Output Powered by External Supply

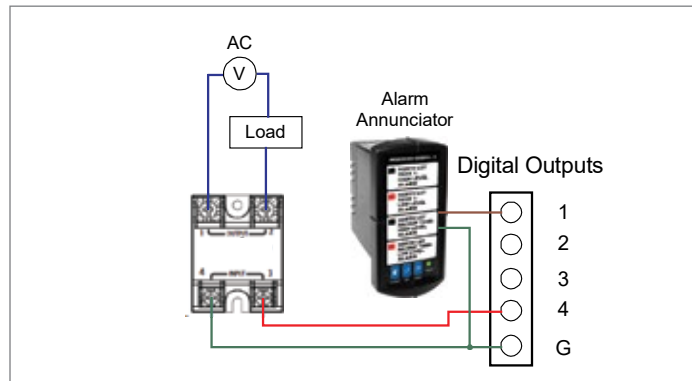## • Digital Output Connections

Fig 19: Digital Outputs Driving 5 V Solid State Relay

• Power Gas Detector Connections
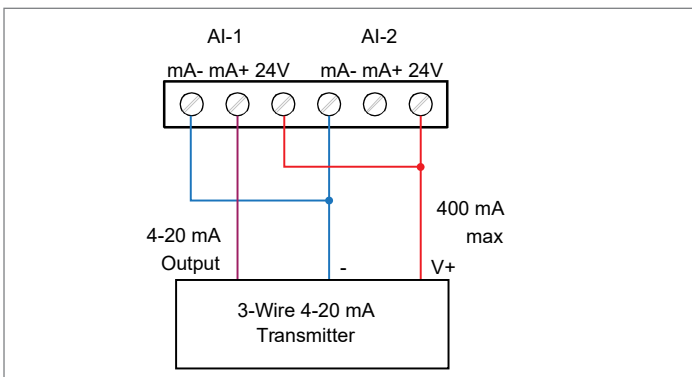
Fig 20: Two Supplies in Parallel Powering 3-Wire Transmitter
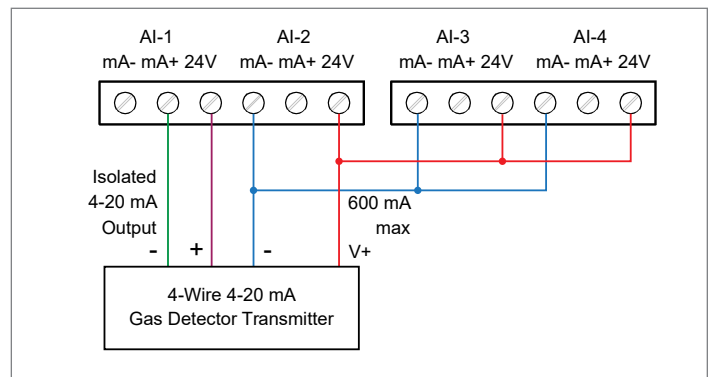
Fig 21: Powering 4-Wire Gas Detector & Isolated 4-20 mA Output

- **Relay Connections**

Relay Output
C   NC   NO
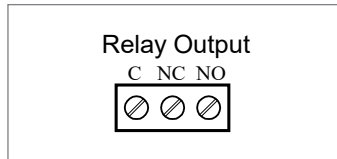
Fig 22: Relay Connections

- **Switching Inductive Loads**
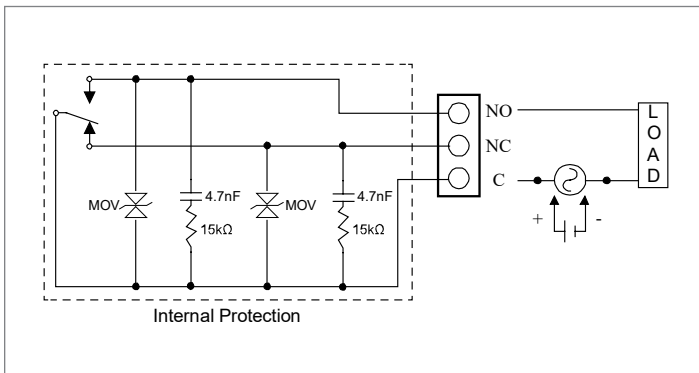
Fig 23: AC and DC Internal Inductive Loads Protection

Use diode with a reverse breakdown voltage two to three times the circuit voltage and forward current at least as large as the load current.
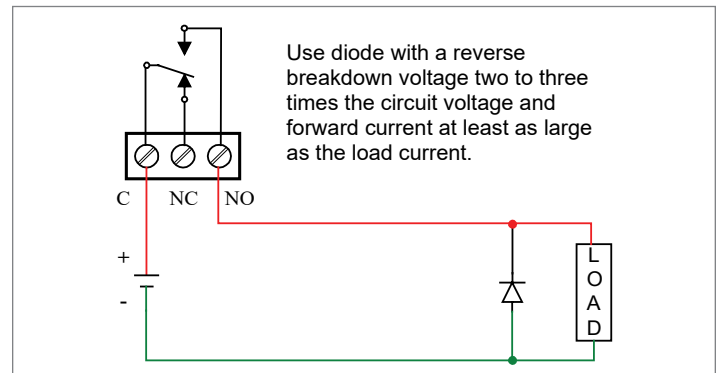
Fig 24: Low Voltage DC Loads Protection

- **Serial Communication Connections**
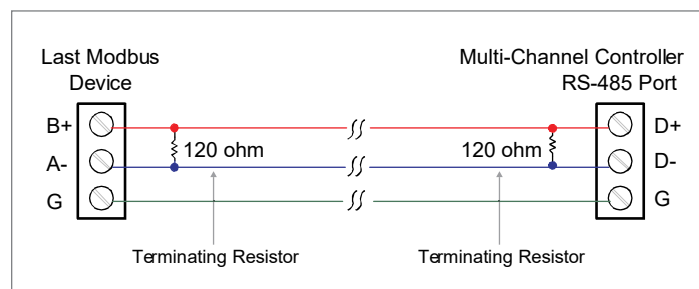
Fig 25: Serial Connections

- **External Keypad Connections**
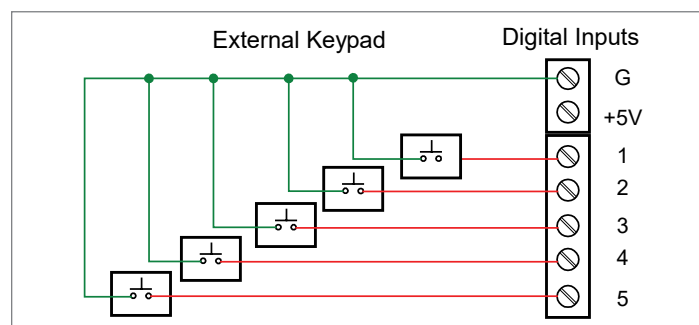
Fig 26: External Keypad Connections

7. Configuration

- **Software Installation**

We recommend the following sequence for getting the controller into service:

1. Download the latest version of the Tek-LCD 7801C configuration software from our website predig.com/software or from the included CD.
2. Extract the contents of the Multi-channelcontroller_Installer.zip file into a folder in your computer.
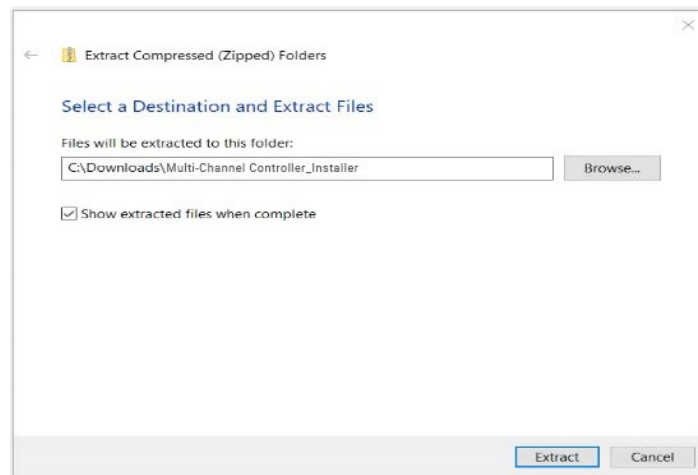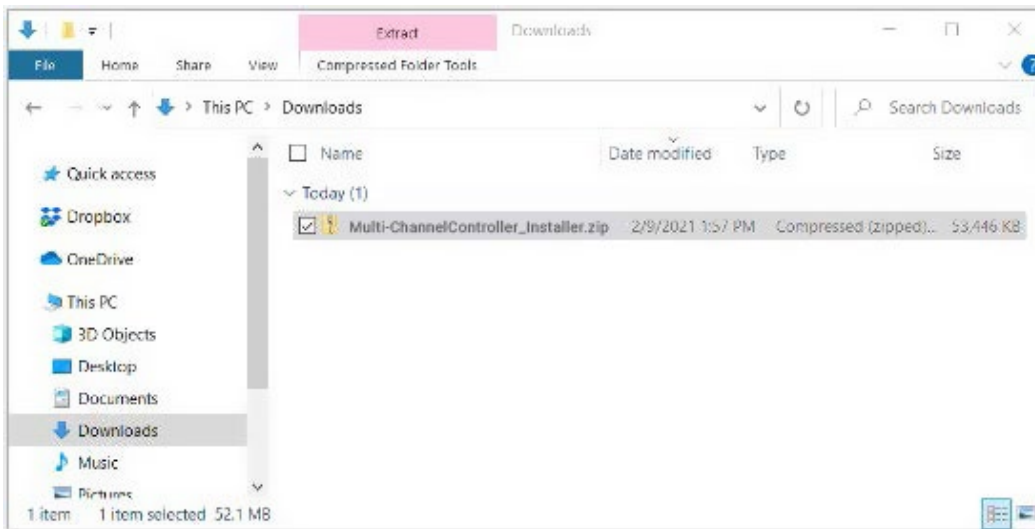
3. Double-click on the executable file Multi-channelcontroller_Installer.exe and follow the on-screen instructions.
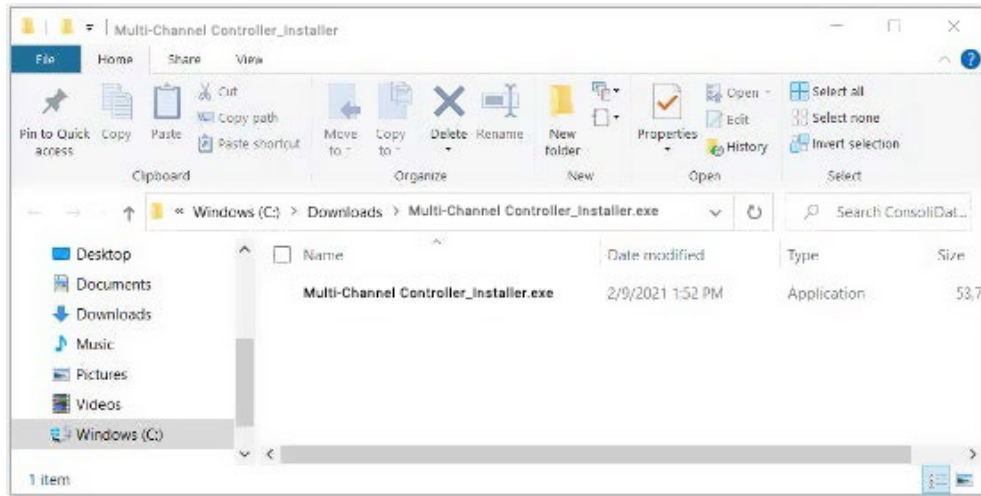
4. This message is displayed. Click on Install to start the software installation process.
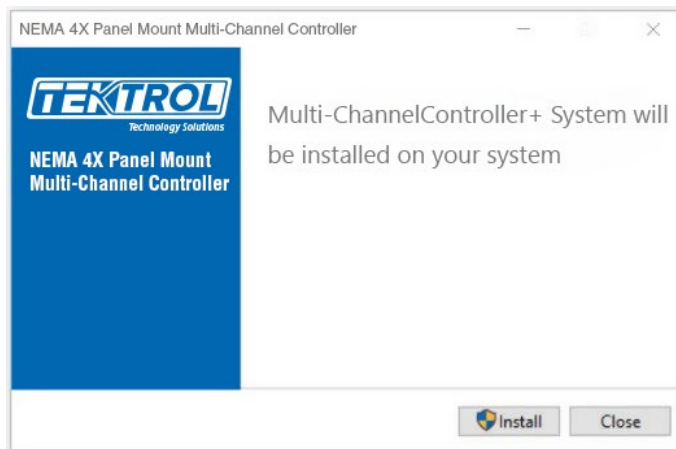
5. The User Account Control message is displayed. Click Yes to proceed with the installation.
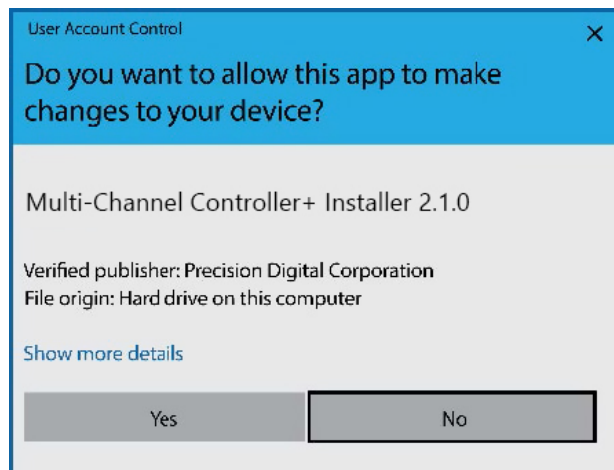
6. The installation progress is displayed.
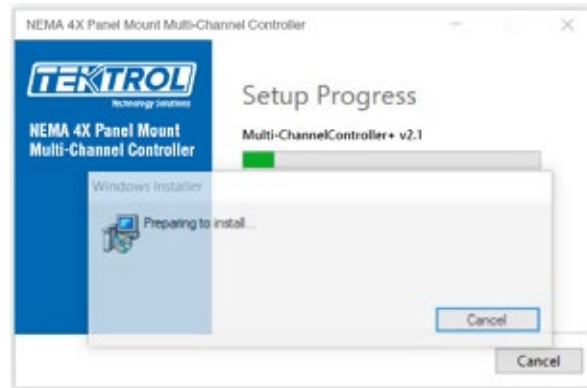
7. Read and accept the End-User License Agreement and click Install to proceed.
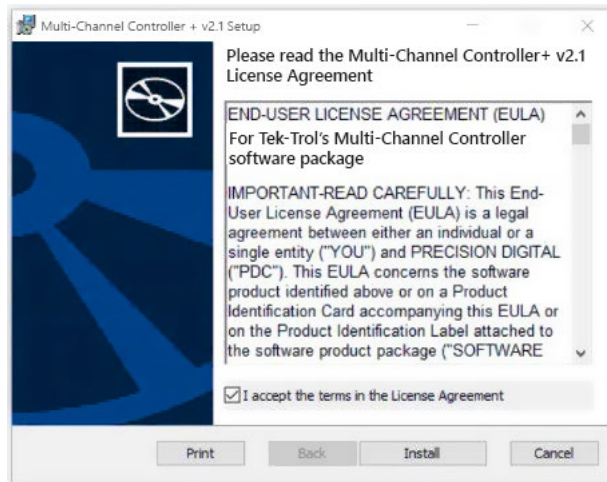
8. After the software installation is complete, click the Finish button.
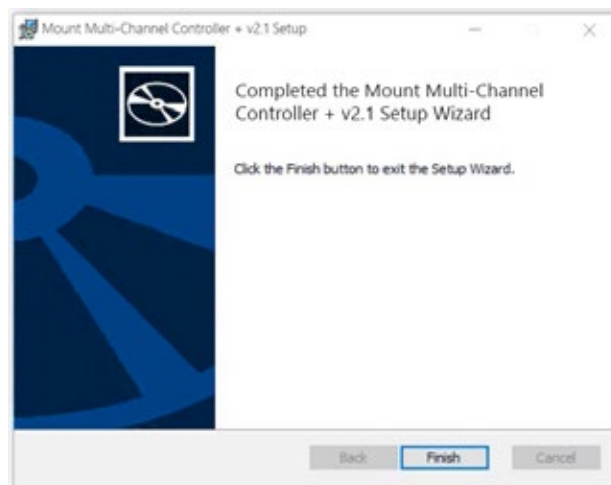
9. After the installation is complete, the following message is displayed. Click Close to finish. A Tek-LCD 7801C icon will be placed on your desktop.
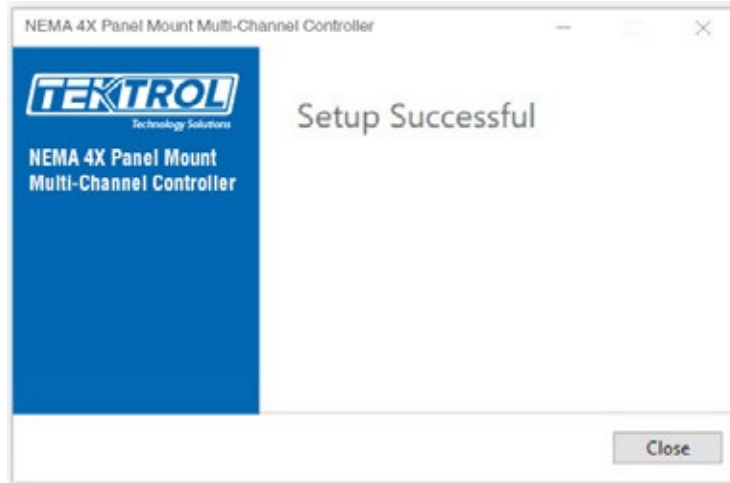
10. You are now ready to start using the software to configure your Multi-Channel Controller.

- **Tek-LCD 7801C Software**
  - Connect one end of the provided USB cable to the controller and the other end to the computer.
  - Double-click on the Multi-Channel Controller icon.
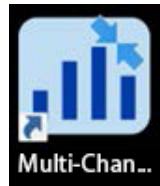
  - The application will start displaying the System menu and the connection status.
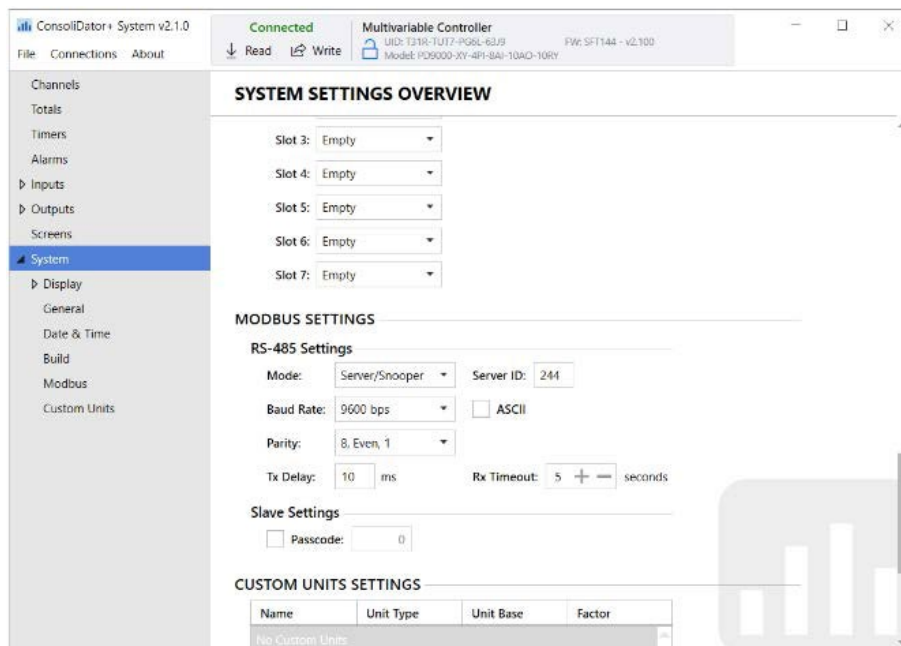
- Click on Read, at the bottom or top of the screen, to read the configuration of the connected controller. After a read the channels, settings overview is displayed.
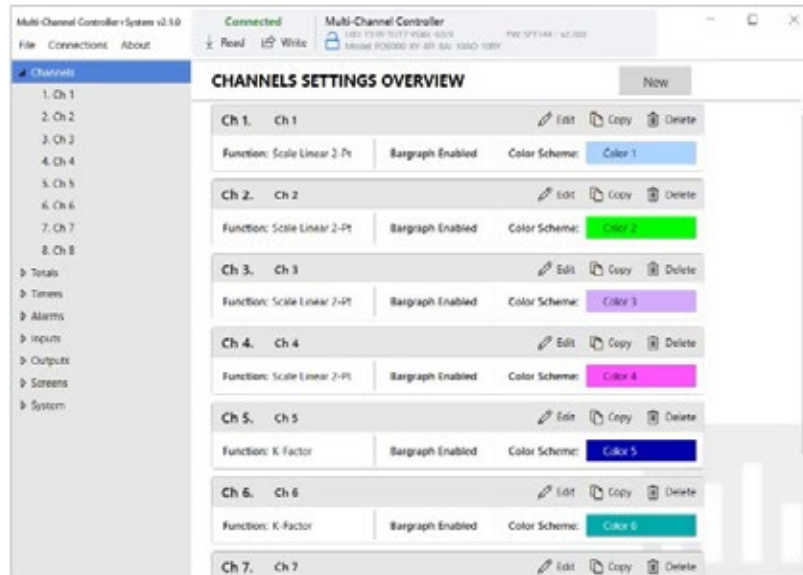
- You can now begin to configure the Tek-LCD 7801C for your application, either by editing the existing settings or by starting fresh creating a new configuration.
- Click on File to save files, open existing files, or to create a new configuration even without a controller connected.

8. Ethernet Full Port Setup

⚠️ Consult with your IT department to configure the Ethernet port and maintain network security.

The Ethernet port option is fully configured using the Tek-Trol DeviceInstaller software, available for download from the Tek-Trol's Website. https://www.Tek-Trol.com/products/xport

Follow these steps, after installation of the DeviceInstaller software.

1. Connect an Ethernet cable to the Local Area Network
2. Launch the Tek-Trol DeviceInstaller; it will search for XPort devices on the Local Area Network (LAN) and display their status.
3. If no controller is found, click on Options, and select the type of connection being used (e.g. Wi-Fi).
4. If more than one controller is connected to the network, determine which is the new controller by the assigned IP address. If necessary, disconnect the new controller and click Device – Search, take note of the IP addresses listed. Next, connect the new controller to the LAN and repeat the search; check the list to see which the new IP address is.

5. Double-click on the new device IP Address to be configured.
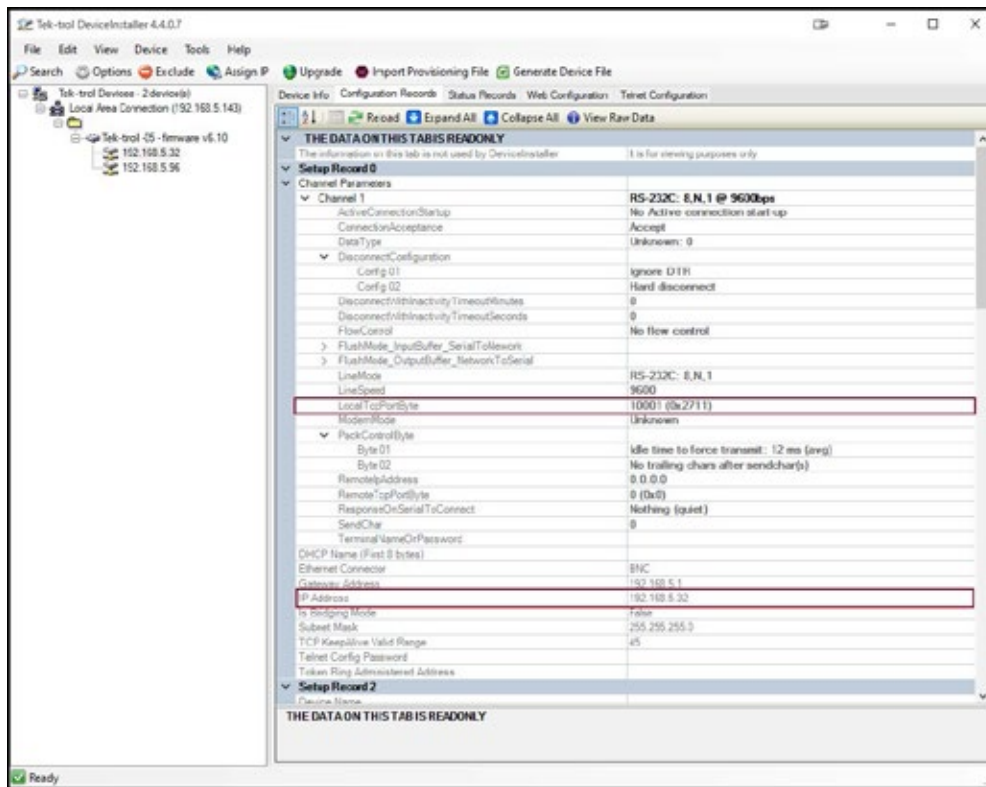
To communicate with a device connected over a LAN, you need the IP Address and the Local TCP Port.

6. Click on Configuration Records to find these settings, see the example above. IP Address: 192.168.5.32; Local TCP Port: 10001 (0x2711).
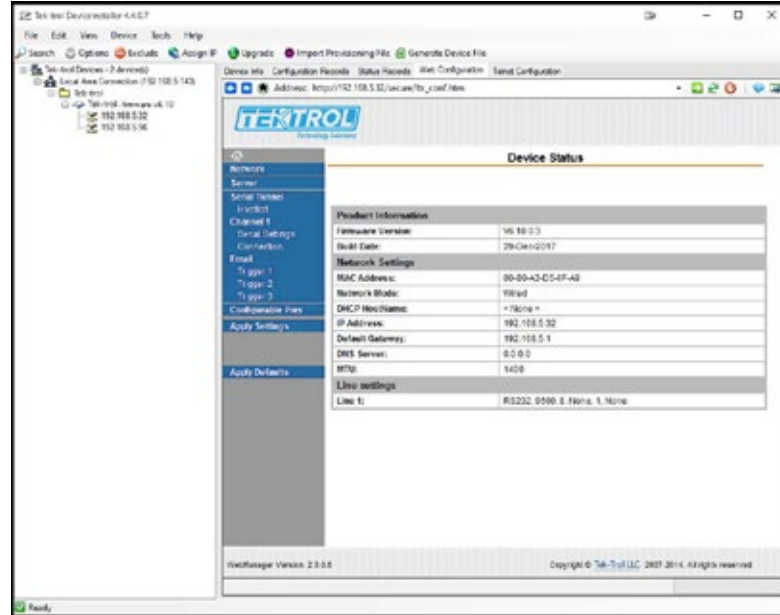
7.   Click on Web Configuration.
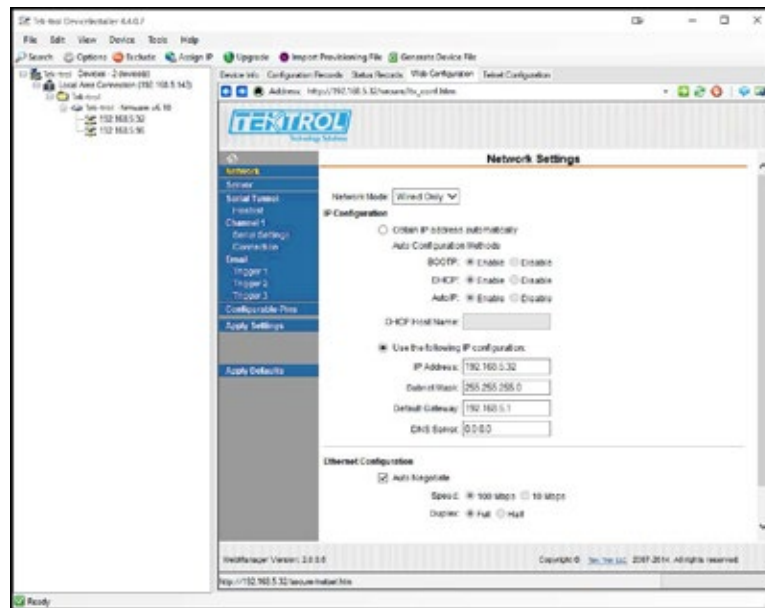
8.   Click on Network to assign a new IP Address.
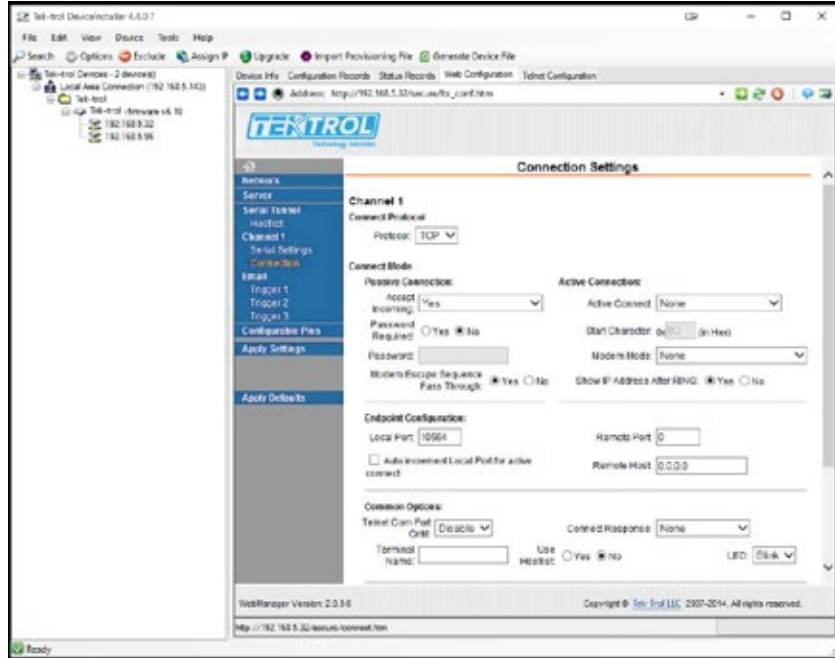
9.   Click on Channel 1 – Connection to select the protocol: TCP or UDP. Note: For UDP protocol, select Datagram Type: 01

10.   Under Endpoint Configuration, enter the Local Port to be used to access the controller locally or from a remote location. This should be provided by your company's IT department.

11.   Click OK and then click Apply Settings for settings to be sent to the Ethernet device.

9. Modbus RTU & ASCII Serial Communication

The controller is equipped with serial communication capability as a standard feature. Baud Rate, Parity, Server ID (Address) and Transmit Delay are entered in the System menu, which appears in the main Setup menu. The baud rate and parity selected must match the settings for all other devices on the network. The Server ID must be unique, so it will not interfere with other devices. Modbus Enron is supported by the Client/Snooper add-on feature. The controller supports the following Modbus functions:

Table 2: Modbus Functions

Command	Name	Description
01	Read Coils (0x)	Read coil value
03	Read Holding Register (4x)	Read multiple bytes from holding registers.
04	Read Input Register (3x)	Read multiple bytes from input registers.
05	Write Single Coil (Bit)	Set single coil value control
15	Write Multiple Coils (Bits)	Set multiple coil value control
06	Write Single Register	Set single value into specified holding register.
16	Write Multiple Registers	Set multiple values into specified holding registers.

The multi-channel controller can also work as a "Modbus Display/Controller" by writing the desired value to the selected Modbus input (MB-1 to MB-199). The Modbus input can be used the same way a 4-20 mA input is used; it can be brought into a channel to be displayed and generate alarms to control relays, generate 4-20 mA outputs, and Modbus outputs (MO-1 to MO-64).

- *Modbus Register Table*

Table 3: Default Register Numbers / Addresses

Reg. Number	Reg. Address	Description	Data Type	Function Codes	R/W
40001	0	Channel (1) Value	Float	03, 04	R
40003	2	Channel (2) Value	Float	03, 04	R
40005	4	Channel (3) Value	Float	03, 04	R
40007	6	Channel (4) Value	Float	03, 04	R
40009	8	Channel (5) Value	Float	03, 04	R
40011	10	Channel (6) Value	Float	03, 04	R
40013	12	Channel (7) Value	Float	03, 04	R
40015	14	Channel (8) Value	Float	03, 04	R
40017	16	Total (1) Value	Float	03, 04	R
40019	18	Total (2) Value	Float	03, 04	R
40021	20	Total (3) Value	Float	03, 04	R
40023	22	Total (4) Value	Float	03, 04	R
40025	24	Timer (1) Value	Float	03, 04	R
40027	26	Timer (2) Value	Float	03, 04	R
40029	28	Timer (3) Value	Float	03, 04	R
40031	30	Timer (4) Value	Float	03, 04	R
40033	32	Alarm (1) Status*	Short	03, 04	R
40034	33	Alarm (2) Status*	Short	03, 04	R
40035	34	Alarm (3) Status*	Short	03, 04	R
40036	35	Alarm (4) Status*	Short	03, 04	R
40037	36	Alarm (5) Status*	Short	03, 04	R
40038	37	Alarm (6) Status*	Short	03, 04	R
40039	38	Alarm (7) Status*	Short	03, 04	R
40040	39	Alarm (8) Status*	Short	03, 04	R

*Note: Alarm Status: 0: Off, 1: On, 2: On & Acknowledged
The table above contains some predefined registers and data types used.
The following table contains the definitions of all accessible registers with their corresponding data type.

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Table 4: Device Tag, Date & Time, Firmware Information

Reg. Number	Reg. Address	Description	Data Type	Function Codes	R/W	Comments
40041 - 40056	40-55	Device Tag	String (32 char)	03, 04	R	Null terminating string Write 00 for the last char
		RTC Date & Time				
40061	60	Year	Short	03, 04	R	20 = 2020
40062	61	Month	Short	03, 04	R	
40063	62	Day	Short	03, 04	R	
40064	63	Hour	Short	03, 04	R	
40065	64	Minute	Short	03, 04	R	
40066	65	Second	Short	03, 04	R	
40073	72	SFT No.	Short	03, 04	R	
40074	73	SFT Version	Short	03, 04	R	
40081	80	Program Id	Short	06, 16	W	Program is executed when Program Id is written. Program parameters can be written either before or with the Program Id.
40082 - 40099	81 - 98	Program Parameters (x18)	Various	06, 16	W	

- **Modbus application**
  - o **Snooper Mode**

    The Snooper mode can listen and read the process variables being transmitted on the RS-485 bus without causing any disruptions to the network. The controller can read up to 199 Modbus values, as inputs from other Modbus devices being polled by a Modbus Client. The inputs can be used as the source for channels, math functions, alarms, relay control, etc.
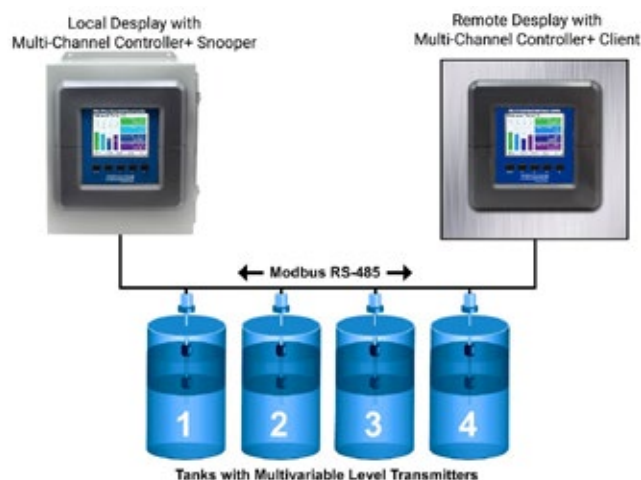
10. Troubleshooting

This controller is a highly sophisticated instrument with an extensive list of features and capabilities. If the front panel buttons are used to program the controller, it may be a difficult task to keep everything straight. That is why we strongly recommend the use of the free Tek-LCD 7801C configuration software for all programming activities. A cable is provided with the controller for programming with the software. If you have programmed the controller with the front panel buttons and it is not working as intended, try re-programming it with the Tek-LCD 7801C configuration software.

Table 5: Troubleshooting Tips

Symptom	Check/Action
No display or only backlight is visible, but outputs still function normally.	1. Ambient temperature is below -40°C and affects LCD visibility. 2. Grounding is inadequate or not connected.
	Check earth ground continuity.
"BREAK" is displayed	1. Check the 4-20 mA input; if less than the break value (e.g. 0.01 mA), it displays BREAK. This can be changed in the Input menu. 2. Modbus: Make sure all devices in the network have a unique server ID. 3. Modbus Inputs: Check the Timeout setting, increase the timeout if necessary.
Display response seems slower than normal	Ambient temperature is too cold: Consider installing a heater with the instrument.
Display reading is unstable, it fluctuates too much	1. Check signal source stability 2. Increase filter value 3. Decrease the display refresh rate (increase time)
mA input not responding to signal changes (value frozen)	1. Cycle the power or 2. Go to setup mA input and disable input channel, then enable the input channel 3. Check that back cover is fully seated, and all I/O cards are tightly fixed in place.
Display locks up or the instrument does not respond at all	Cycle the power to reboot the microprocessor.
Settings reprogrammed, but instrument behavior remains as previously programmed	Cycle the power to reboot the microprocessor.
Relay and status do not respond to signal	Check if relays are in manual control mode. Check Setup menu alarm set and reset points.

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Writing to Modbus Input register failed	Check register number or register address being used 1. If using PLC address (Base 1) use register number (e.g. 46701) 2. If using Base 0 address, use register address (e.g. 6700)
The Modbus value being read is not correct	1. Check the data type. 2. Check the byte order. 3. Confirm the units being sent by the server
Controller does not communicate with another device.	Check baud rates and parity settings. Make sure all serial devices have matching parameters.
Other symptoms not described above	Call Technical Support for assistance.
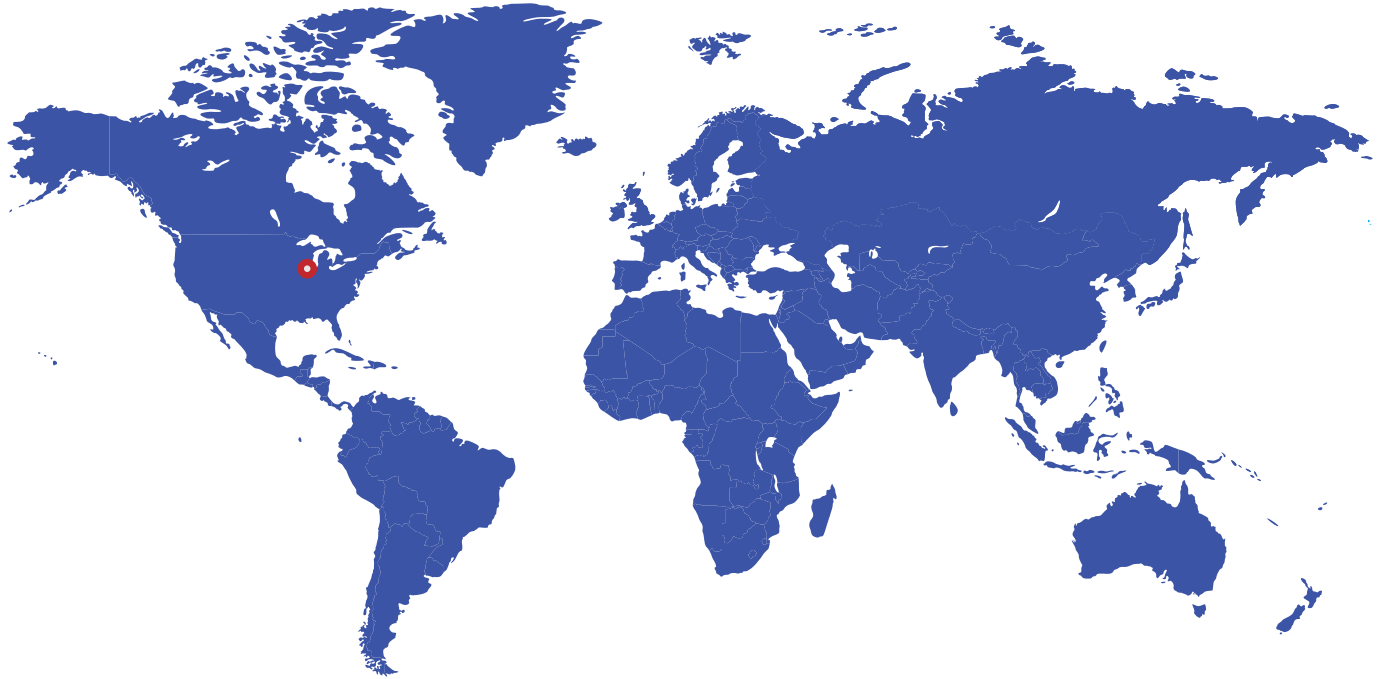
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