Tek-Batch 7900A
NEMA 4X Analog Input Batch Controller

Quick Start Guide

1. Before You Begin

This guide provides basic guidelines to assist you in quickly getting started.

The Tek-Batch NEMA 4X 7900A is an analog input (4-20 mA, 0-5 V, 1-5 V, etc.) digital batch controller specifically designed for single and multi-stage batching applications. It provides excellent, yet simple batch control capabilities with features such as preclose relays and automatic overrun correction for more accurate batches. The convenient SafeTouch® through-glass buttons for simple operation and menu navigation without having to remove the cover. The preclose deactivates a specific relay before the batch is finished in order to allow slower fill rates and increased accuracy. Automatic overrun correction keeps the batch size accurate over time and with system wear.

2. Unpack

Tek-Batch NEMA 4X 7900A Analog Batch Controller

3. Dimensional View

Note: For additional dimensions refer to the detailed manual.
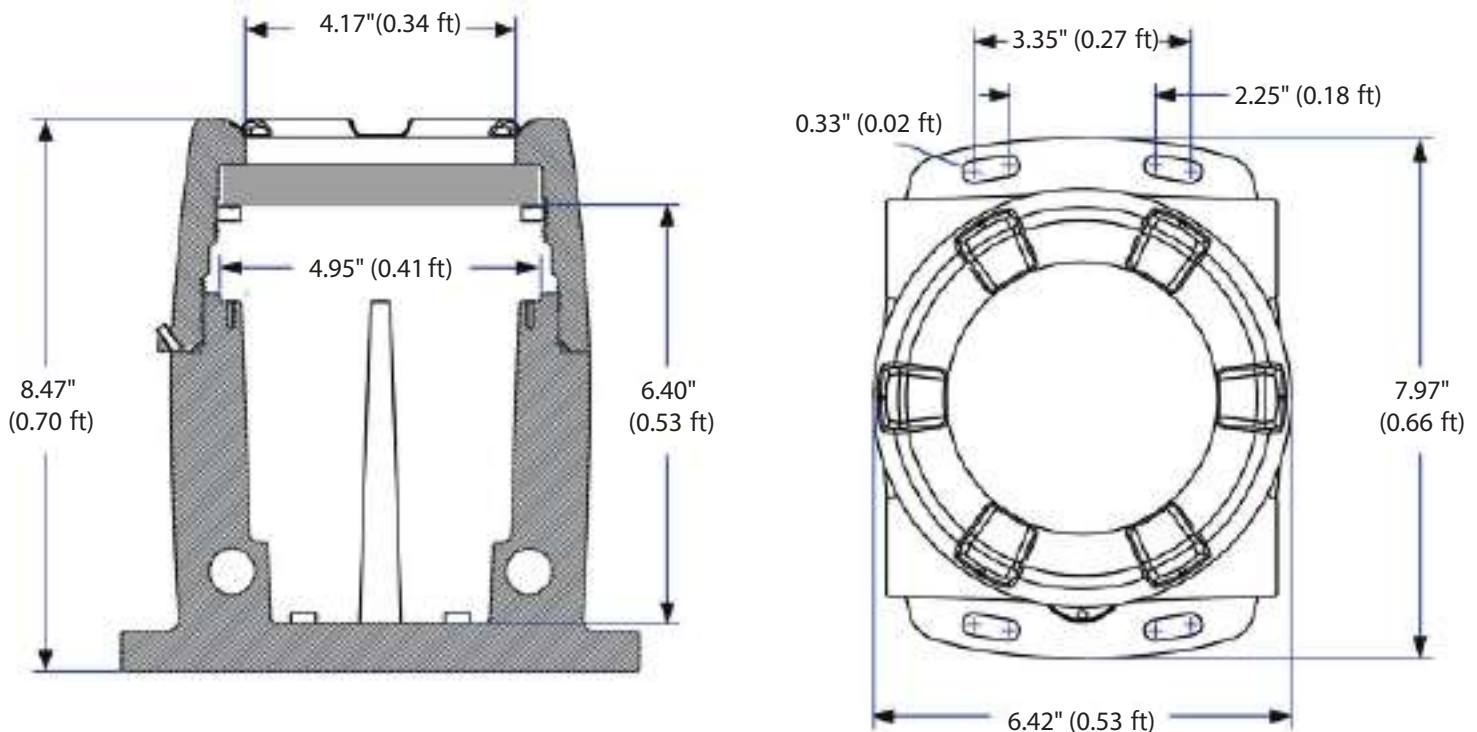
4. Compliance Information

Safety	
UL & c-UL Listed	USA & Canada, UL 508 Industrial Control Equipment
UL File Number	E160849
Front Panel	UL Type 4X, NEMA 4X, IP65; panel gasket provided
Low Voltage Directive	EN 61010-1:2010 Safety requirements for measurement, control, and laboratory use

Electromagnetic Compatibility	
Emissions	EN 55022:2010 Class A ITE emissions requirements
Radiated Emissions	Class A
AC Mains Conducted Emissions	Class A
Immunity	EN 61326-1:2013 Measurement, control, and laboratory equipment EN 61000-6-2:2005 EMC heavy industrial generic immunity standard
RFI - Amplitude Modulated	80 -1000 MHz 10 V/m 80% AM (1 kHz) 1.4 - 2.0 GHz 3 V/m 80% AM (1 kHz) 2.0 - 2.7 GHz 1 V/m 80% AM (1 kHz)
Electrical Fast Transients	±2kV AC mains, ±1kV other
Electrostatic Discharge	±4kV contact, ±8kV air
RFI - Conducted	10V, 0.15-80 MHz, 1kHz 80% AM
AC Surge	±2kV Common, ±1kV Differential
Surge	1KV (CM)
Power-Frequency Magnetic Field	30 A/m 70%V for 0.5 period
Voltage Dips	40%V for 5 & 50 periods 70%V for 25 periods
Voltage Interruptions	<5%V for 250 periods

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5. Mounting

The Tek-Batch 7900A has four slotted mounting flanges that should be used for pipe mounting or wall mounting. Refer to Mounting Dimensions.

Cover Jam Screw

The cover jam screw should be properly installed once the instrument has been wired and tested in a safe environment. The cover jam screw is intended to prevent the removal of the instrument cover in a flameproof environment without the use of tools. Using a M2 hex wrench, turn the screw clockwise until the screw contacts the aluminum enclosure. Turn the screw an additional 1/4 to 1/2 turn to secure the cover. Caution: Excess torque may damage the threads and/or wrench.

Connections

The Tek-Batch 7900A comes with a pre-wired connection. This connection is detailed below, and must be maintained in order for the instrument to function properly.

MAIN BOARD

J4 CONFIGURATION

5 V   10 V   24 V

Factory Default

INPUT SIGNAL

MA+
V+
COM
F4
P-
P+

J4

Not all connectors shown. Power connector shown for orientation and location reference. Drawing not to scale.

M-LINK on PROVU Integrated Electronics

POWER

1   2

M-Link connection from Integrated PROVU electronics to ProtEX-MAX connector board.

M-LINK on ProtEX-MAX Connector Board

Power Connections

Install the sensor and the transmitter on the pipeline. The transmitter can be mounted with 90 ° revolutions depending on the requirement of sensor installation.

POWER

+   -

AC or DC POWER

Required External Fuse: 5 A max, 250 V Slow Blow
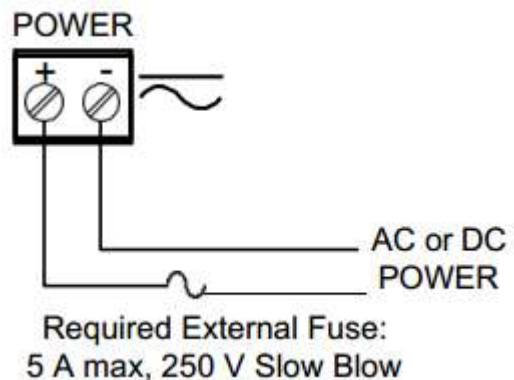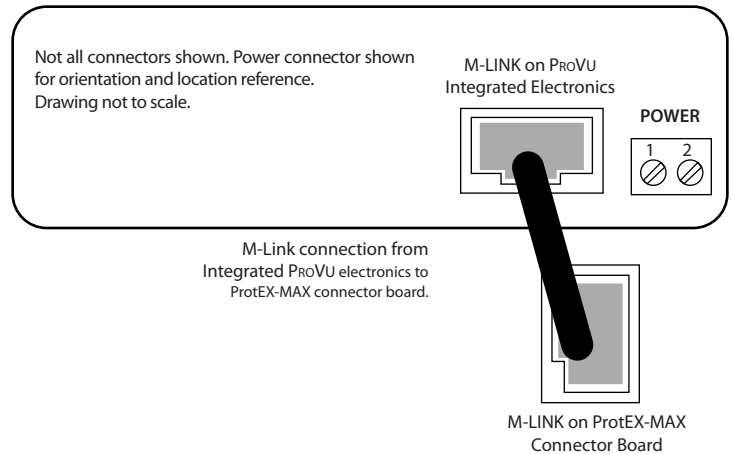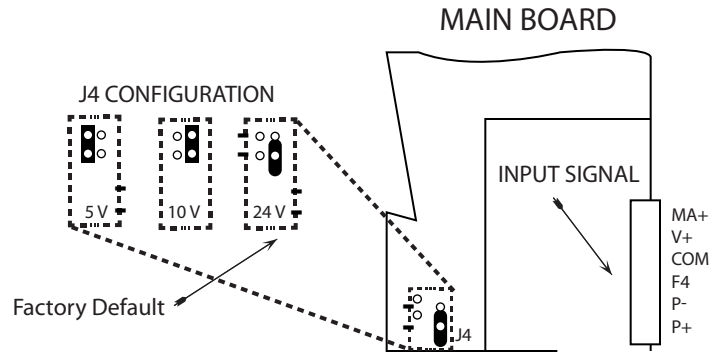
Current and Voltage Connections

The following figures show examples of current and voltage connections.

There are no switches or jumpers to set up for current and voltage inputs. Setup and programming is performed through the front panel buttons.

The current input is protected against current overload by a resettable fuse. The display may or may not show a fault condition depending on the nature of the overload.

The fuse limits the current to a safe level when it detects a fault condition, and automatically resets itself when the fault condition is removed.
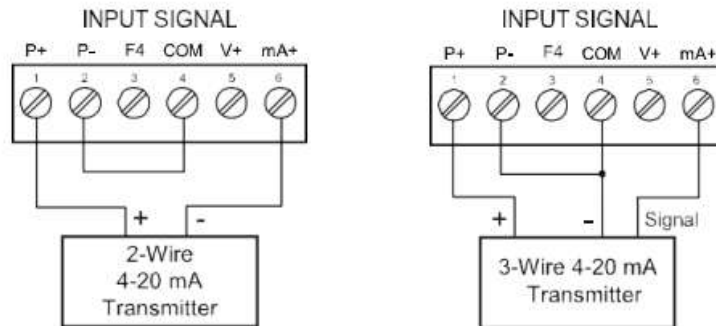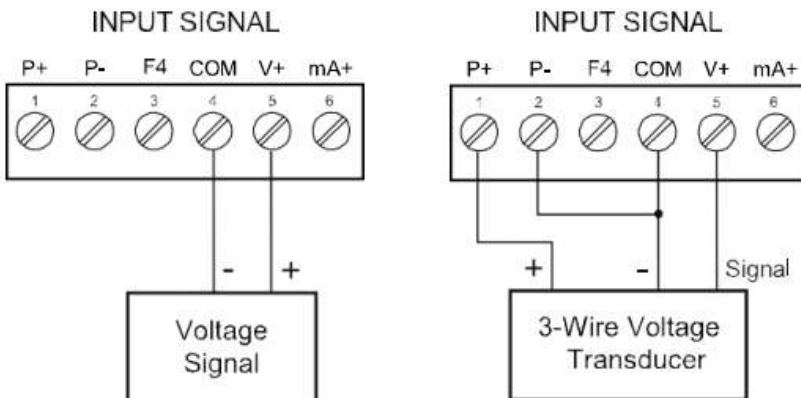

Figure 5: Transmitters Powered by Internal Supply
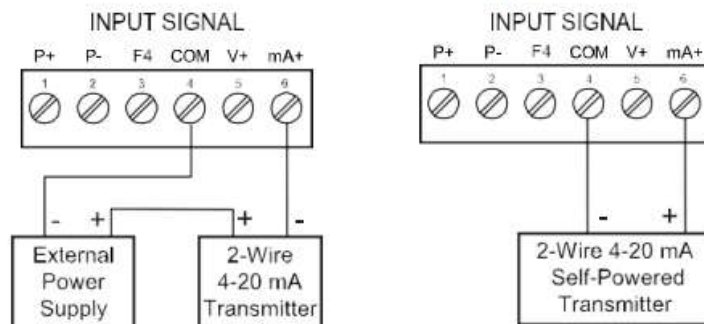
Figure 6: Transmitter Powered by Ext. Supply or Self-Powered

The controller is capable of accepting any voltage from -10 VDC to +10 VDC.

Figure 7: Voltage Input Connections

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Serial Communications Connections

| Tek-Batch 7900A to RS-485 Serial Converter Connections	
RS-485 Serial Converter	7900A RS-485 Connections
$\perp$	$\perp$
$\overline{DO}$	$\overline{DI}$
DO	DI
$\overline{DI}$	$\overline{DO}$
DI	DO

Figure 8: Tek-Batch 7900A Connections to a Serial Converter

The Tek-Batch 7900A has three diagnostic LEDs: a Power (P) LED to show when the module is powered properly, a Transmit Data (TX) LED to show when the module is being transmitted ok by the PC side, and a Receive Data (RX) LED to show when the module is sending data to a receiving device.
The following diagrams detail how to connect the RS-485 serial communications from the Tek-Batch 7900A to a RS-485/RS-232 serial converter in four wire and two wire configurations.
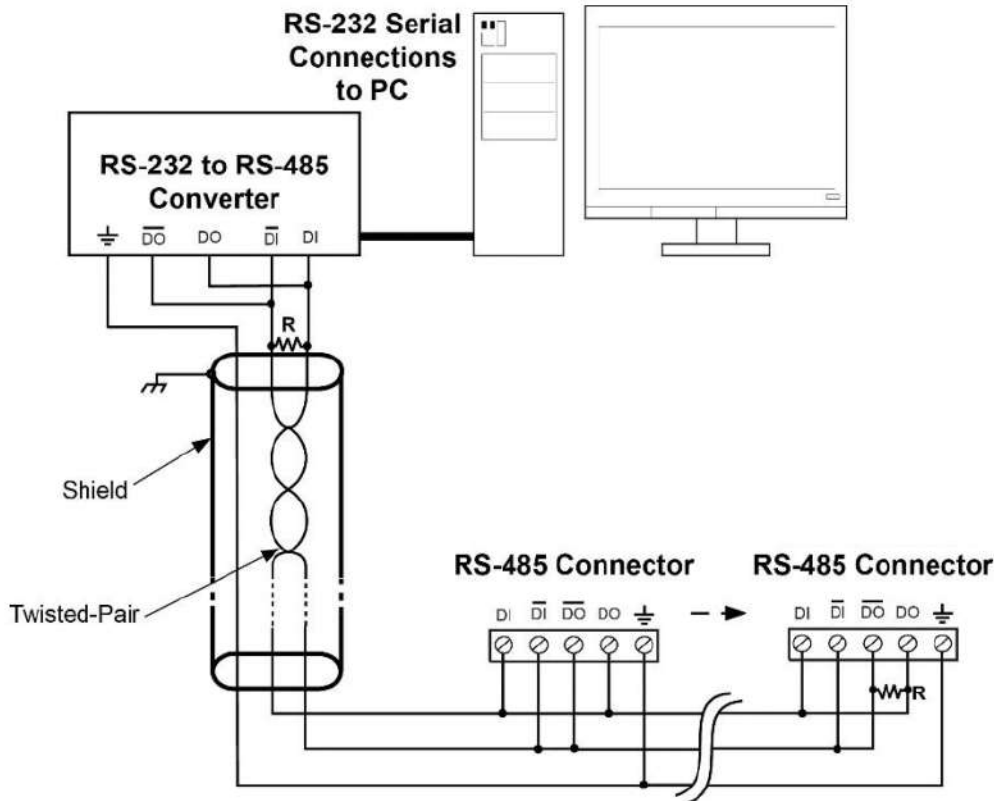
Three Wire Connections
In order to wire the 5 pins for use as a 3-wire half-duplex RS-485 connection, it is necessary to create a jumper connection between DI – DO and DI- – DO- as shown below.
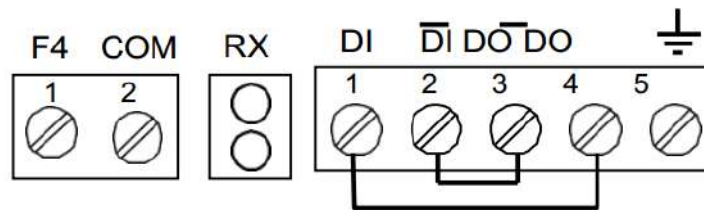
Figure 9. Three-Wire RS485 Connection
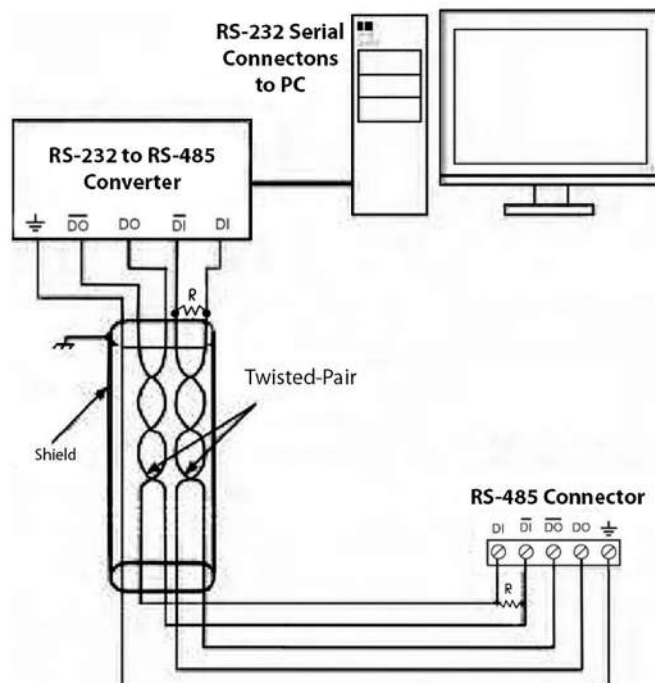

Figure 10: RS-485 Wiring

Figure 11: RS-485 Two-Wire Multi-Drop Wiring

Notes:
1. Termination resistors are optional and values depend on the cable length and characteristic impedance. Consult the cable manufacturer for recommendations.
2. Refer to RS-232 to RS-485 Converter documentation for further details.
3. Use shielded cable, twisted-pair plus ground. Connect ground shield only at one location.

Relay Connections

Relay connections are made to two six-terminal connectors labeled RELAY1 – RELAY4 on Figure 7.Each relay's C terminal is common only to the normally open (NO) and normally closed (NC) contacts of the corresponding relay. The relays' C terminals should not be confused with the COM (common) terminal of the INPUT SIGNAL connector.
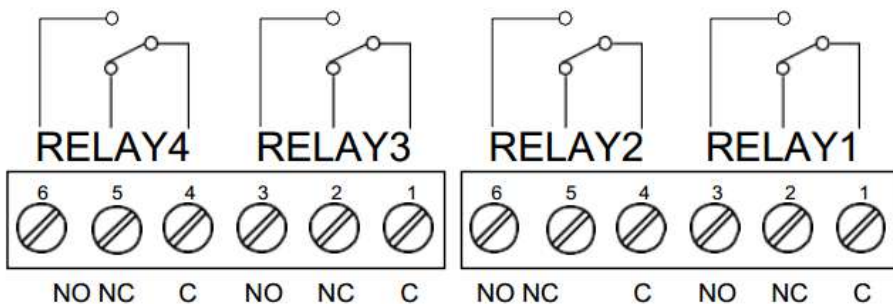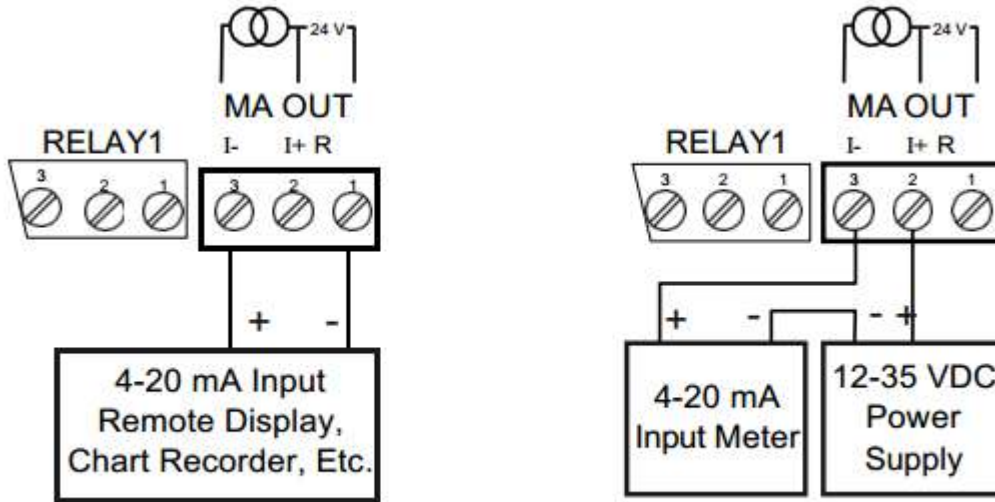

Figure 12: Relay Connections

Tek-Batch 7900A
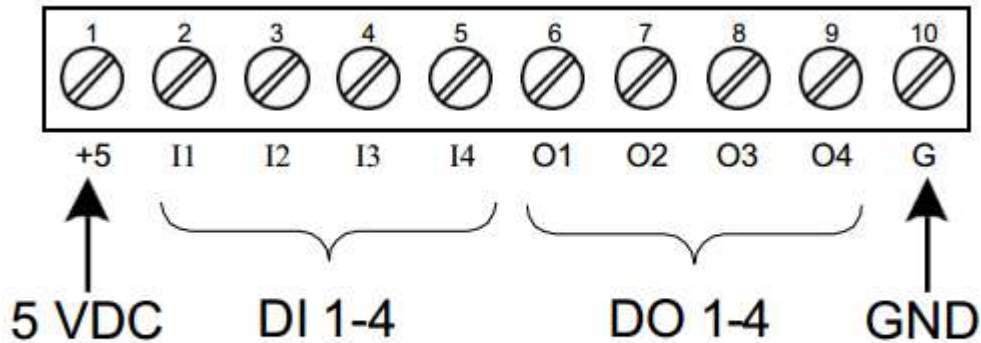
4-20 mA Output Connections

Connections for the 4-20 mA transmitter output are made to the connector terminals labeled MA OUT. The 4-20 mA output may be powered internally or from an external power supply.

Figure 16: 4-20 mA Output Connections

Digital I/O Connections

The Tek-Batch 7900A has a 10 position terminal block for connecting digital inputs and outputs.

Figure 18: Digital I/O Connections

SafeTouch Button Tips:

• When possible, install the display facing away from sunlight, windows, reflective objects and any sources of infrared interference.
• Keep the glass window clean.
• Tighten the cover securely.
• Use a password to prevent tampering.

Button Symbol	Description
⟳ MENU or MENU	Menu
▶ F1 or F1	START (Right arrow/F1)
▲ F2 or F2	BATCH (Up arrow/F2)
↵ F3 or F3	STOP (Enter/F3)
Note: *F4 is a digital input.*	

| LED	Status
1-8	Relay 1 – 8 indicators
R	Rate indicator
T	Batch Total indicator
G T	Grand Total indicator
▲	Total overflow indicator
M	Manual control relays &/or analog output

Programming

• Press the Menu button to enter or exit the Programming Mode at any time.
• Press the Right arrow button to move to the next digit during digit
  or decimal point programming.
• Press or hold the Up arrow button to scroll through the menus,
  decimal point or press or hold to increment the value of a digit.
• Press the Enter button to access a menu or to accept a setting.
• Press and hold the Menu button for three seconds to access the advanced features of the controller

7. MeterView Pro Installation

1. Connect one end of the provided USB cable to the internal electronics module and the other end to the computer. The computer will automatically install the driver software it needs to talk to the meter.
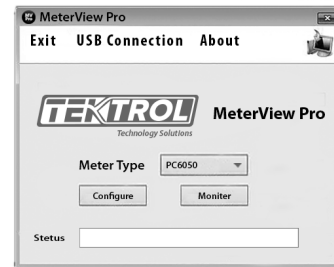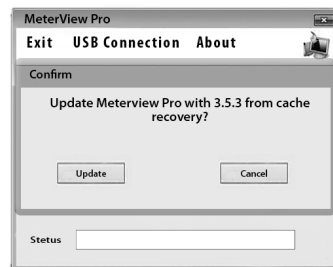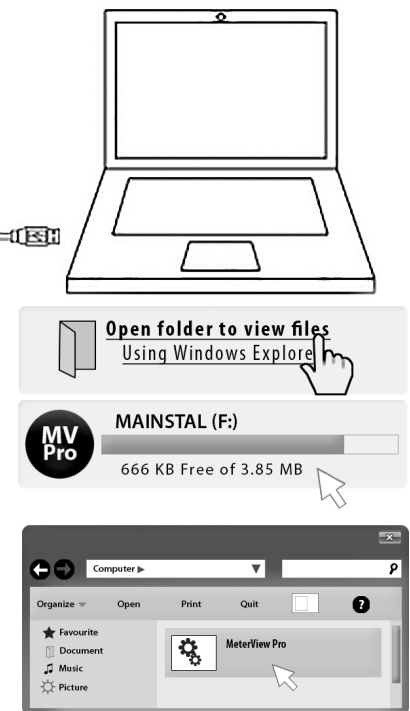**Only one meter may be connected at a time. Attaching multiple meters will cause a conflict with the meter software.**
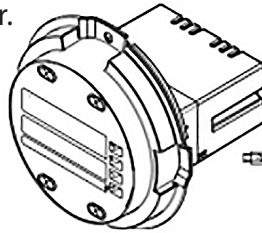
2. Once the driver is installed, an AutoPlay dialog should appear for the drive "MAINSTAL." Click "Open folder to view files." If the computer does not display an AutoPlay dialog for the drive "MAINSTAL," you should open My Computer and double- click on the drive labeled "MAINSTAL."

3. Double-click on the file named "MAStart." The program will open a few windows and install two programs on your com- puter. Simply follow the onscreen instructions until you seeone of the dialogs below. If you receive a "User Account Con- trol" warning, click "Yes."

4. If there is an update available, click the "Update" button to in- stall the new version. Otherwise, click "Configure" to begin pro- gramming your meter.

Open folder to view files
Using Windows Explorer

MV Pro **MAINSTAL (F:)**
666 KB Free of 3.85 MB

Computer ▶
Organize   Open   Print   Quit   ?
★ Favourite
📄 Document   **MeterView Pro**
🎵 Music
☼ Picture

MeterView Pro
Exit   USB Connection   About
Confirm
Update Meterview Pro with 3.5.3 from cache recovery?
Update   Cancel
Status

MeterView Pro
Exit   USB Connection   About
TEK TROL **MeterView Pro**
Technology Solutions
Meter Type   PC6050 ▼
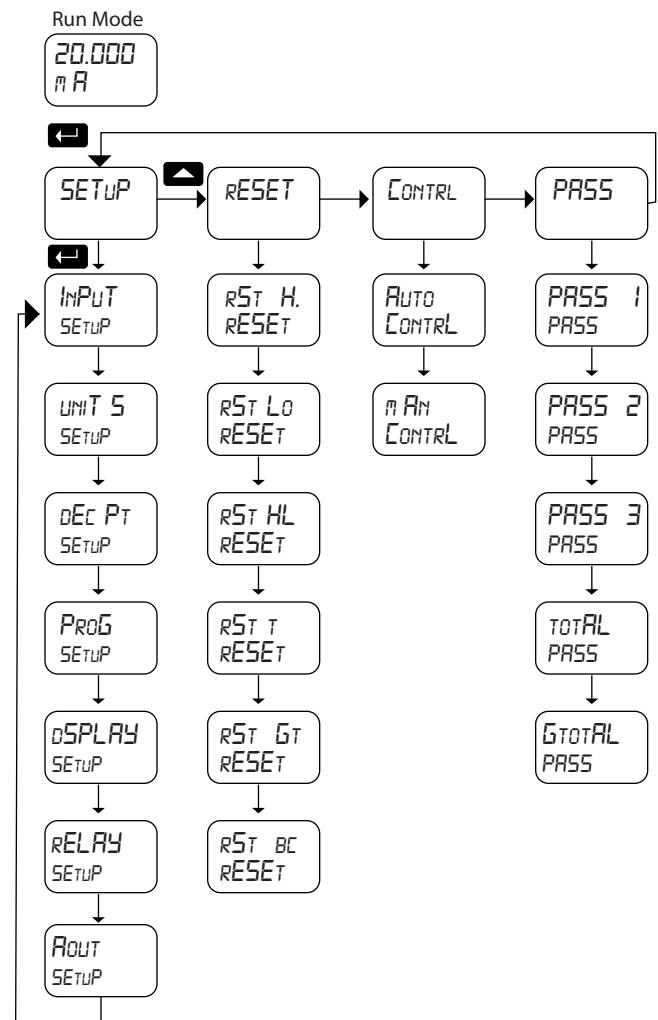Configure   Moniter
Status

Note: If you decide to update your MeterView Pro software, once the installation has completed, you will be asked if you want to update the setup files located on the meter itself. This way, you will always have the most current version on the meter for future installs.

8. Main Menu Map

The main menu consists of the most commonly used functions: Setup, Reset, Control, and Password.

- Press Menu button when a batch is not running to enter Programming Mode then press the Up arrow button to scroll main menu.

- Press Menu, at any time, to exit and return to Run Mode. Changes made to settings prior to pressing Enter are not saved.

- Changes to the settings are saved to memory only after pressing Enter.
  The display moves to the next menu every time a setting is accepted by pressing Enter.

Run Mode

```
20.000
m A
```

SETuP	RESET	ConTRL	PASS
InPuT SEtuP	rSt H. rESEt	Auto ConTRL	PASS 1 PASS
uniT S SETuP	rSt Lo rESEt	m An ConTRL	PASS 2 PASS
dEc Pt SEtuP	rSt HL rESEt		PASS 3 PASS
ProG SEtuP	rSt t rESEt		totAL PASS
dSPLAY SEtuP	rSt Gt rESEt		GtotAL PASS
rELAY SEtuP	rSt BC rESEt		
Aout SEtuP			

9. Setting the Relay Operation (relay)

This menu is used to set up the operation of the relays.

1. Relay assignment

2. Relay action

3. Set and reset points; batch preset

4. Fail-safe operation

5. Time delay

6. Relay action for loss (break) of 4-20 mA input (ignore, on, off)

Note: Fail-safe should not be used for relays assigned to batch control.

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10. Function Keys Operation

During operation, the programmable function keys operate according to the way they have been programmed in the Advanced Features – User menu. The following table shows the default setting for each of the function keys.

Function Key/Button	Default Setting	Action
F1/START	Start	Start batch
F2/BATCH	preset	Change preset
F3/STOP	stop	Pause/stop batch
F4/Digital Input	Srtstp	Start/stop batch

11. Troubleshooting

Due to the many features and functions of the controller, it's possible that the setup of the controller does not agree with what an operator expects to see.
If the controller is not working as expected, refer to the Diagnostics menu and recommendations below.

Diagnostics Menu (diag)

The Diagnostics menu is located in the Advanced Features menu. To access Diagnostics menu Refer to Advanced Operation and Programming.
This menu allows the user to test the functionality of all the meter LEDs, check the meter's software and version information, and erase the MeterView Pro software installation files from the meter. Press the Enter button to view the settings and the Menu button to exit at any time. For a description of the diagnostic messages, see Advanced Features Menu & Display Messages.

Determining Software Version

To determine the software version of a controller:
    1. Go to the Diagnostics menu (diAG) and press Enter button.
    2. Press Up arrow button and scroll to Information menu (Info).
    3. Press Enter to access the software number (SFT) and version (UER) information. Write down
       the information as it is displayed. Continue pressing Enter until all the information is displayed.
    4. The controller returns to Run Mode after displaying all the settings.

Reset Controller to Factory Defaults

When the parameters have been changed in a way that is difficult to determine what's happening, it might be better to start the setup process from the factory defaults.

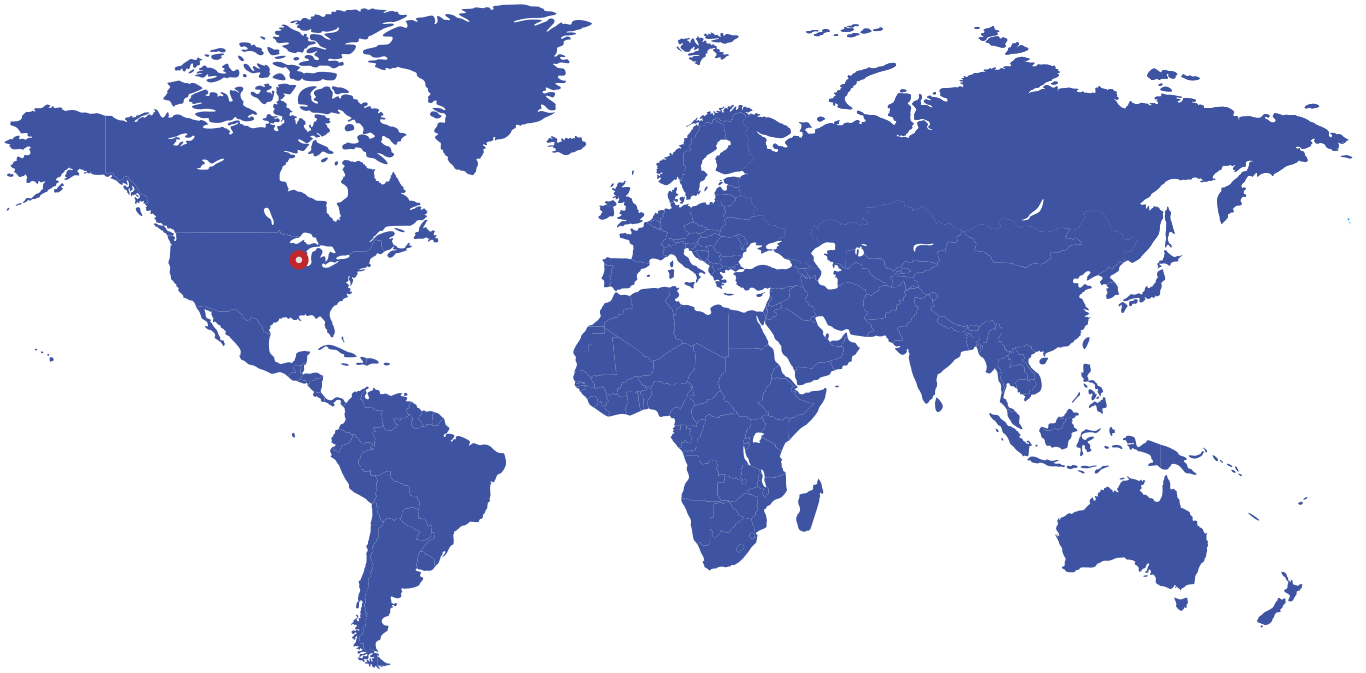### Instructions to load factory defaults:

1. Enter the Advanced Features menu. See Advanced Operation and Programming, page 47.
2. Press Up arrow to go to Diagnostics menu
3. Press and hold Right arrow for three seconds, press Enter when display flashes reset.
   Note: If Enter is not pressed within three seconds, the display returns to the Diagnostics menu.
4. The controller goes through an initialization sequence (similar as on power-up), and loads the factory
   default settings.

12. Troubleshooting Tips

Symptom	Symptom
During operation, the programmable function keys operate according to the way they have been programmed in the Advanced Features – User menu. The following table shows the default setting for each of the function keys.	If mechanical button was pushed. The SafeTouch buttons will be re-enabled automatically 60 seconds after the last button push. If slide switch on connector board is in DISABLE position, switch to ENABLE. Strong direct sunlight may interfere with SafeTouch button operation. It is recommended to operate the buttons by standing so as to block direct sunlight.
Serial Communications Power LED Indicator is off	1. Check modular cable connection 2. Check power to the device
If only the TX (or DATA IN) data status LED is flashing when serial communications attempted	1. Check serial cable 2. Check protocol selected on device 3. Check instrument address & baud rate 4. Check program address & baud rate
If both data status LEDs (TX and RX) are off when trying to communicate	Remove all unnecessary cables and instruments from the bus. Try getting the system to work with only one device (to ease troubleshooting) and then expand the system one device at a time.
Communications slow	Increase the baud rate
Random communication errors	1. Increase the TX delay time 2. Decrease the baud rate
Power LED is off	1. Check modular cable connection 2. Check power to instrument
No display at all	Check power at power connector
Not able to change setup or programming, Locd is displayed	Controller is password-protected, enter correct six-digit password to unlock
Controller displays error message during calibration (Error)	Check: 1. Signal connections 2. Input selected in Setup menu 3. Minimum input spanrequirements
Controller displays 999999 -99999	Check: 1. Input selected in Setup menu 2. Corresponding signal at Signal connector
Display is unstable	Check: 1. Input signal stability and value 2. Display scaling vs. input signal 3. Filter and bypass values (increase)
Display response is too slow	Check filter and bypass values
Display reading is not accurate	1. Signal input conditioning selected: Linear, square root, etc. 2. Scaling or calibration

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