This pocket guide is not intended to replace the instruction manual. Read the instruction manual thoroughly before operating the equipment.

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Part #69-4303-093
Released: January 2013
Before installing, operating, or maintaining this equipment, you should read the full user manual. While specific hazards may vary by location and application, it is still helpful to read this safety section, as well as the general safety information contained in the full instruction manual.

If you have any questions regarding the equipment or its installation, contact Teledyne Isco or one of its representatives for assistance. This manual applies Hazard Severity Levels to the safety alerts. Two levels used in this manual are described in the sample alerts below.

⚠️ CAUTION

Cautions identify a potential hazard, which if not avoided, may result in minor or moderate injury. This category can also warn you of unsafe practices, or conditions that may cause property damage.

⚠️ WARNING

Warnings identify a potentially hazardous condition, which if not avoided, could result in death or serious injury.
# Signature® Flow Meter Pocket Guide

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1.1 Overview

The Signature Flow Meter is designed for open channel flow monitoring applications using any combination of flow and parameter measurement technologies and sampling, depending on what is required at the monitoring site.

Measurement devices for flow and water quality can be connected to the same Signature and run simultaneously with TIENet™ connectivity (up to 9 TIENet devices). The flow meter can also communicate with an optional Teledyne Isco wastewater sampler.

For complete information about Signature and TIENet installation, operation, and options, refer to the full-length user manuals for the Signature meter and TIENet devices.
1.2 Visual Guides

This section provides a quick visual guide for TIENet wiring, keypad functions, and the top programming menus.

1.2.1 TIENet Wiring
1.2.2 Keypad Functions

Numerical:

0, 1, 2...

- Enter values
- Type characters

Arrows:

, , , ...

- Navigate up, down, left, right

Soft Keys:

A B C

- Current displayed function

- Back = Return to last menu

- Next = Confirm & advance to next step
Enter:

- Open list
- Confirm selection
- Activate field

- \( \downarrow \) = Pull down list available

- \( \begin{array}{c}
\text{•} \\
\text{•} \\
\text{•} \\
\text{•} \\
\end{array} \) = Character grid available

Delete/Exit:

- Clear last entry
- Exit list
- Close window

Home:

- Return to Home Screen from anywhere
1.2.3 Hardware Setup
   1. TIENet Devices
   2. SDI-12 Setup
   3. Modbus In
   4. Modbus Out
   5. Modem

1.2.4 Configuration Options
   1. **Site**: Clock, Name, Display, Units
   2. **Measurement Setup**: Level, Velocity, Flow, Volume
   3. **Adjust**: Level, pH, Velocity
   4. Equation / Trigger
   5. Data Storage Rate / Data Push
   6. Sampler Interface Setup
   7. **Outputs**: Alarm, Analog
   8. Reset Totalizers
   9. Reports / History

1.2.5 Administration
   1. Language
   2. Set New Passcode
   3. Update Firmware
   4. Sensor Diagnostics
   5. System Information
   6. License Information
   7. Gather Fault Data
   8. Restore Defaults
2.1 User Interface

The Signature Flow Meter can be set up, programmed, and interrogated directly through the keypad and display screen, or remotely using a computer equipped with Teledyne Isco’s Flowlink® software version 5.1.510 or later, with either a USB cable or optional modem. The Signature Flow Meter has its own browser, accessed via Flowlink, that mirrors the physical keypad and display.

Complete flow meter connection, setup, and programming instructions are provided in the Signature User Manual.

Complete Flowlink software instructions are provided in the context-sensitive Flowlink Help menus and software user manual.
2.2 Home Screen

The home screen, or run screen, is displayed when the flow meter is in normal operating mode. This screen shows the current parameter readings and system status or alarm conditions.

A scroll bar on the right of the screen indicates there are more parameters off-screen that can be viewed by scrolling up or down.

![Home screen (normal operating mode)](image)

---

**Figure 2-1 Home screen (normal operating mode)**
2.3 Shortcuts
The Shortcuts menu provides quicker access to most commonly used commands, such as level adjustment or viewing data recorded over a period of time. Not all menu items described in this section will necessarily appear in your Shortcuts menu. The selections available in the Shortcuts menu are determined by what connected devices have been detected by the Signature flow meter. To access your shortcuts, press SHORTCUTS (A).

2.3.1 Adjust Level
To set a new level, enter the value in the field next to Level, and select Adjust. To update the current reading, select Update.

2.3.2 Adjust Velocity
This selection will open the velocity grid with current readings and laser controls for the TIENet LaserFlow velocity sensor. For complete information about this device, refer to the TIENet 360 LaserFlow user manual.

2.3.3 Purge (Bubbler Only)
The Signature Bubbler flow meter allows you to manually purge the bubble line if an obstruction is suspected.
2.3.4  Histograph
The histograph displays the measurements taken of up to three selected parameters in graphical format, beginning at your selected date/time, and spanning one to 48 hours. Enter a value in the Threshold field for a reference line. The measurements available for graphing are determined by what measurements are set up for data storage.

2.3.5  Report View
Reporting is set up from the Configure Options menu. **Summary** displays summaries of data measurements (i.e., Min/Max/Avg). **History** tracks user and meter events. **Program** tracks changes made to the flow meter’s program configuration.

2.4  Programming
To access the setup/program menus, press `MENU`.

When you press `MENU`, the four top menu options appear:

- **Hardware Setup** detects all devices connected to the flow meter, establishes proper communication with them, and allows configuration of each device.
- **Configuration Options** sets up the measurement site and program parameters.
Administration dictates operating preferences and perform general housekeeping tasks.

Home returns to the home screen.

Additionally,

USB Options appears when a flash drive is connected to the USB port in the lower left corner of the control panel.

The program menus consist of steps and substeps. During programming, available subordinate menu content and steps will be determined by what you have previously entered, and what optional equipment is connected to the Signature flow meter.

2.4.1 Off-Screen Content

An arrow in the lower right corner of the flow meter’s screen indicates that there is additional content on this screen in the direction the arrow is pointing. Use the arrow keys to access this content.

2.4.2 Character Grid

A small grid icon in the lower right corner of the flow meter’s screen indicates that the character grid is available.
Whenever you need to enter characters, such as letters, numbers, or punctuation, press Enter to display the character grid (Figure 2-2).

Use the arrow keys to navigate to the desired character and press Enter to select. When you are finished editing, select DONE and press Enter.

![Character grid](image)

**Figure 2-2  Character grid**

### 2.4.3 Pull Down Menus

Fields with a pull down arrow next to them (see example at left) indicate a pull down list. Use the arrow keys to navigate between fields on the screen; when you highlight a pull down field, press Enter to display the items on the list. Then use the arrow keys and Enter to select from the list.
2.5 Main Menu

Menu
1. Hardware Setup
2. Configure Options
3. Administration
4. Home

Hardware Setup
1. Smart Sensor Setup (TIENet)
2. SDI-12 Setup
3. MODBUS Input Setup
4. MODBUS Output Setup
5. Modem Setup

Configure Options
1. Site Setup
2. Measurement Setup
3. Adjust
4. Equation/Trigger Setup
5. Data Storage/Push Setup
6. SAMPLER SETUP
7. Outputs/Alarms Setup
8. Reset Totalizers
9. Report/History Setup

Administration Options
1. Language Options
2. Set New Password
3. Update Firmware
4. Sensor Diagnostics
5. Display Signature Information
6. Display License Information
7. Gather Fault Data
8. Restore Factory Defaults

HOME
(Returns to home screen)

Figure 2-3 Menu Tree: Main menu
2.6 Hardware Setup

From the Hardware Setup menus, the flow meter detects and configures all connected devices.

**Figure 2-4 Menu Tree: Hardware Setup**

- **Smart Sensor Setup (TlENet)**
  - View system devices
  - Configure measurements
  - Perform scan

- **MODBUS Output Setup**
  - Enter MODBUS address from 2 to 247.
  - Configure communication protocol

- **SDI-12 Setup**
  - Scan for connected sondes
  - Add/Remove
  - Configure/Manual config

- **Modem Setup**

**All TIENet devices detected by the most recent scan will be listed under Smart Sensor Setup, by Serial Number and Device Type.**

**For Modbus output register information, refer to Appendix C in the Signature User Manual.**

**Screen content determined by type of modem installed. Refer to Cellular Modem Configuration in the Signature User Manual.**
2.7 Configuration Options

The Configure Options menu is used for setting up the measurement site and setting the program parameters.

![Menu Tree: Configure](image)

**Figure 2-5** Menu Tree: Configure
2.7.1 Site Setup

The Site Setup menu sets some basic operating characteristics specific to the site.

**Set Clock**

Enter Year, Month, Day, Hour, Minute.

**Site Name**

Press Enter to display the character grid. Select one character at a time to create the desired site name.

**Home Display**

The Home Display determines how current measurement data is displayed on the Home screen.

From the Measurements Setup screen, select all measurement parameters to be displayed. The parameters available in the pull down menus will be determined by what devices are connected to the Signature meter.

**Default Units**

To set units of measure for each parameter, first select the parameter from the menu list. The available units of measure that appear will be determined by the parameter you have selected. Under Units, highlight the units of measure and press NEXT. When finished, press NEXT again to save and exit.

2.7.2 Measurement Setup

This menu is for setting up the level measurement (Level Input Setup), flow conversion (Flow Input Setup), and flow volume
totalizer(s) (Volume Input Setup). Menu items that appear are dependent on what equipment is connected to the Signature flow meter.

**Level Input Setup**
Under Level Setup, select the level input. Usually there will only be one listed, unless your system is using more than one level measurement device.

For the TIENet 310 ultrasonic sensor, the minimum blanking distance refers to the maximum water level, and the maximum blanking distance refers to zero water level in the channel. For detailed instructions about 310 setup, refer to the TIENet 310 Installation and Operation Guide.

**Flow Rate Input Setup**
Measurement settings and flow conversion are programmed for the flow rate(s) from this menu (refer to Figure 2-6 on the following page). If more than one flow rate data set is being calculated, these settings are programmed separately for each one.

1. Select the flow rate to set up.

2. For level-to-flow conversions, from Measurement Settings, select the Level Input to be used in the flow calculation and the Measurement Rate (interval). Enter the name for this flow rate.

3. Select the flow conversion type to be used (Weir, Flume, Metering Inserts, Manning Formula, Area Velocity, Equation, or Data Points); then set up the conversion.
Additional information about flow conversions can be found in the *Isco Flow Measurement Handbook* included with the Signature Flow Meter.

**Figure 2-6 Menu Tree: Flow rate input (1)**

2-12
Figure 2-7 Menu Tree: Flow rate input (2)

Volume Input Setup

You can set up one to four Total Flow measurements. Select the flow rate(s) used for total volume, the totalizing method (Net, Positive, or Negative), and the interval at which the total flow will be updated (between 30 seconds and 24 hours).
From the Resolution pull down menu, select the degree of resolution required for your total flow (lower = fewer digits to right of decimal; higher = more digits to right of decimal).

**Figure 2-8  Menu Tree: Volume Input Setup**

*total flow*
2.7.3 Adjust
Adjust levels and/or velocity measurement, and/or calibrate measurement values for other connected TIENet devices.

☑ Note
For detailed instructions on calibration of a connected TIENet 301 pH device through this menu selection, refer to the 301 user manual.

☑ Note
For detailed instructions on laser velocity measurement setup through this menu selection, refer to the LaserFlow (360) user manual.
2.8 Administration

Administrative settings dictate operating preferences and perform general housekeeping tasks.

**Figure 2-9 Menu Tree: Administration**
2.9 USB Options

The USB Options menu will only appear when you connect a flash drive to the USB port on the front panel of the Signature.

Figure 2-10 Menu Tree: USB Options
This section contains physical preparation procedures and mounting methods for the Signature Flow Meter and associated Teledyne Isco equipment.

⚠️ **WARNING**

The installation and use of this product may expose you to hazardous working conditions that can cause serious or fatal injury. Take all necessary precautions before entering a worksite. Install and operate this product in accordance with all applicable safety and health regulations and local ordinances.

### 3.1 Accessing the Interior

External device cables and mains line cord are passed, usually via conduit or cord-grip fittings, through the port holes in the bottom of the case and wired directly to the connector case.

Tinning unterminated wires prior to installation is recommended.
Tools Required:
- Small flat screwdriver (3.5mm)
- #2 Phillips screwdriver
- Channel locks
- Soldering iron (for tinning wires)

⚠️ DANGER
Before opening the case, first ensure that mains power is disconnected from the unit.

⚠️ CAUTION
Before opening the case, disconnect the optional battery backup power, if used.

✅ Note
Before restoring mains power, ensure that the flow meter’s USB connector does not have a cable attached.
Open the door to access the two large screws holding the front panel on the connector case. Remove the two screws.

Figure 3-1 Open door and front panel to access interior
Open the front panel to access the connector case. Connectors on the board are identified in Figure 3-2.

<table>
<thead>
<tr>
<th></th>
<th>Connector Case</th>
<th></th>
<th>Connector Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>External TIENet Devices/ Modbus In D1 = Yellow (+) D0 = Brown (–)</td>
<td>B</td>
<td>SDI-12 Input</td>
</tr>
<tr>
<td>C</td>
<td>Modbus RS485 Out</td>
<td>D</td>
<td>TTL Serial</td>
</tr>
<tr>
<td>E</td>
<td>Battery Backup</td>
<td>F</td>
<td>12.8 VDC</td>
</tr>
<tr>
<td>G</td>
<td>Ethernet Modem</td>
<td>H</td>
<td>Ethernet Port</td>
</tr>
<tr>
<td>I</td>
<td>Cellular Modem (power &amp; serial)</td>
<td>J</td>
<td>4-20mA Output</td>
</tr>
<tr>
<td>K</td>
<td>Fuse &quot;T&quot; 3.15A</td>
<td>L</td>
<td>Fuse &quot;T&quot; 4.00A</td>
</tr>
</tbody>
</table>

Figure 3-2 Connector case, connectors, and fuses
Note
The three TIENet terminal strips (A) are interchangeable; any of the devices can be connected at any of the three locations.

3.2 Case Bottom Cable Entries
The connections made through the cable entries depend on the application, but their most common uses, in accordance with the connector case layout, are depicted below.

All optional cable entries must use appropriate ID conduit connections or cord-grip fittings to retain the IP68 rating. If you are using non-TIENet or non-Signature cables, you must supply the appropriate ID conduit connections or cord-grip fittings.

CAUTION
If you are using conduit instead of the cord-grip fitting, the conduit and wires must be sealed to prevent harmful gases and moisture from entering the Signature enclosure. Failure to seal conduit could reduce equipment life.
3.3 Connecting TIENet Devices

The optional external TIENet devices compatible with the Signature flow meter all connect in the same manner. Multiple TIENet devices can be connected simultaneously to the same Signature Flow Meter.

**Note**

The steps that follow include instructions for installing cord-grip fittings. Some applications will use user-supplied 3/4" ID conduit for cable routing.

1. Remove one of the 6-position plug-in terminal strip connectors from the connector case.

![TIENet Device terminal strips](image)

*Figure 3-3 TIENet Device terminal strips*

2. If using a cord-grip fitting, install the cable nut in the appropriate opening on the bottom of the Signature enclosure, securing
it to the wall with the lock nut (concave side facing wall).

3. Feed the TIENet device cable end through the sealing nut and seal, and through the cable nut. Lightly tighten the sealing nut, just enough to hold the cable in place while installing the connector.

![Figure 3-4 Installing TIENet cable with a cord-grip fitting](image)

4. Attach the wire ends to the terminal strip as shown in Figure 3-5, then press the terminal strip back down into its socket on the case board, as shown in Figure 3-6, taking care not to strain any wire connections. Gently tug each wire when finished, to verify secure connection to the screw terminals.

**Note**

The SHIELD wire is the bare drain emerging from the foil shield around the YELLOW and BROWN wires. The BRAID-DRAIN wire is the bare drain emerging from the surrounding braided shield inside the cable jacket. It is not necessary to prevent the two braids from coming into contact with each other.
All optional cable entries must use appropriate ID conduit connections or cord-grip fittings to retain the IP68 rating. If you are using non-TIENet or non-Signature cables, you must supply the appropriate ID conduit connections or cord-grip fittings.
Figure 3-6 Attach wire terminal strip to connector case socket

a. **Systems using the TIENet 350 Area Velocity Sensor Only:**
Insert the reference tubing into the REF AIR port on the case board, pushing it down inside the silicon tubing. Be careful not to kink the reference tubing.

Figure 3-7 Insert the cable reference tubing into the case board reference port (System w/ TIENet 350)
5. Tighten the cord grip sealing nut.

Figure 3-8  Position and secure the cable

6. Close the front panel and fasten it shut with the two Phillips screws.

⚠️ CAUTION
If you are using conduit instead of the cord-grip fitting, the conduit must be sealed to prevent harmful gases and moisture from entering the Signature enclosure. Failure to seal conduit could reduce equipment life.

3.4 Power
The Signature is in compliance with North American and International safety standards while the input voltage remains within 100-240VAC (50/60Hz).
AC line wiring to the Signature power supply should use twisted pair cabling for optimal electromagnetic compatibility (EMC) with the surrounding environment.
External current protection between mains power and the flow meter must allow for up to 40A inrush current at power up.

If the instrument has been fitted with a line cord, ensure that its installation is near a mains outlet for easy access to remove power in the event of an emergency.

If the instrument has been hard-wired for power using conduit, ensure that a switch or mains circuit breaker is installed near the instrument for easy access to remove power in the event of an emergency.

3.4.1 Connecting Mains Power

The flow meter comes with the power supply wired to the connector case, and held in place by a screw (Figure 3-9 below).

Mains power is wired into the Signature’s internal power supply, normally via a standard three-wire line cord (sold separately or user-supplied).

For complete power supply installation instructions, refer to Section 4 of your user manual.
Figure 3-9  Location of power supply

- Power Supply
- Mounting Screw
- Connector Case
- Mains Power Cord
3.5 Setting the Level

Prior to installing the bubble line or sensor in the flow stream, enter a value of zero (0) for level, under Configure > Adjust Options. Highlight “Adjust” and press Enter to confirm. From this screen, you can also update the display to show the current level of the stream.

![Diagram of level adjustment process]

**Figure 3-10 Level adjustment**
4.1 Cleaning
Proper care and regular maintenance of the Signature Flow Meter and associated equipment help to maximize performance and ensure continued operation of the system. The Signature flow meter may be cleaned with water and a mild detergent. For hard to remove stains, isopropyl alcohol may be used. If the instrument is in an isolated area and the case is sealed closed, it may be cleaned using a water hose.

4.2 Desiccant
The inside of the flow meter housing must be kept dry at all times to prevent moisture damage to the internal components. All Signature flow meters have an internal desiccant bag to absorb moisture. Signature flow meters using a 330 bubbler or 350 AV sensor also require an external desiccator.
If increased humidity is indicated by either the humidity reading of the flow meter or the color of the external desiccant, the desiccant must be renewed or replaced before damage occurs. If this occurs more frequently than expected, inspect the seals of cord-grip fittings and conduit, if used.

4.2.1 Internal Desiccator

Saturated internal desiccant bags must be replaced; unlike the external desiccant, they are not renewable.

⚠️ DANGER

Before opening the case, first ensure that mains power is disconnected from the unit.

⚠️ CAUTION

Before opening the case, disconnect the optional battery backup power, if used.

Open the case, as described in Section 3.
The desiccant bag is held in place by a metal bracket. Remove the two screws holding the bracket.
4.2.2 External Desiccator

The desiccator vents the reference port for a pressure transducer, and the air intake port for the bubbler system air pump, keeping the interior of the flow meter case dry.

Figure 4-2 External desiccator, installed
When dry, the loose silica gel desiccant inside the chambers is orange or yellow. When the desiccant is saturated with moisture, it turns green or blue, indicating the intake air and reference line are prone to humidity.

**Note**
Teledyne Isco recommends checking the desiccant at least every 6 months, and changing/renewing the desiccant before the entire compartment has changed color.

![Desiccant indicating saturation](image)

**Figure 4-3 Desiccant indicating saturation**
The desiccant cartridge is held in place by a spring tab on the side of the flow meter. Press against the front of the cartridge to disengage it from the unit.
Figure 4-4  Removing the external desiccant cartridge

Unscrew the two black caps and carefully pour the desiccant out.

If removal is difficult, screw the caps back in and unscrew again.

Gently knock the caps and the cartridge against a hard surface to free any small particles in the threads, as these can hinder proper sealing and cause wear.

Using a funnel, fill both chambers with dry desiccant, replace the caps, ensuring that they are fully engaged. Press the cartridge back into place on the side of the flow meter.
Note
If this is a new desiccant cartridge, remove the two red protective end caps from the ports before installing a new cartridge.

Figure 4-5 Opening the desiccant cartridge chambers

4.2.3 Renewing loose desiccant
To renew the desiccant, spread it in a single layer on a flat metal tray. Place in a vented, circulating forced air, conventional oven in a well ventilated room, and heat at 100 - 175°C (212 - 350°F) for about three hours, or until the color has returned to orange or yellow.
4.3 Troubleshooting

The tables in the following section provide troubleshooting information to help in determining the causes of problems that may occur with the Signature flow meter or TIENet devices.

The troubleshooting tables cover the flow meter and each TIENet device separately. Note that the 300 TIENet device (Table 4-2 is the internal connector case.

Any time a circuit board is replaced or a sensor disconnected, you MUST perform a hardware scan and SDI-12 scan (if connected) before resuming operation.
## Table 4-1 Troubleshooting Signature Flow Meter

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank Display but audible &quot;beep&quot; when a key is pressed</td>
<td>Contrast is out of adjustment</td>
<td>Adjust the display contrast by repeatedly pressing the up or down arrow while holding down the +/- key.</td>
</tr>
<tr>
<td></td>
<td>Faulty Display</td>
<td>Replace with known good display.</td>
</tr>
</tbody>
</table>
Table 4-1 Troubleshooting Signature Flow Meter (Continued)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank Display and no beep when a key is pressed</td>
<td>DC power supply not supplying 12.8 VDC output.</td>
<td>Check for proper AC voltage. If proper AC voltage is present, replace DC power supply.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Service check: Disconnect the internal power supply wires (Red +/pos, Black – /neg) from the power terminals Connect an Isco adaptor cable to the power terminals (Black +/pos, White –/neg). Then connect an Isco power supply (Model 913, 914, 923, or 924) to the adaptor cable. If the Signature then functions properly, replace the internal power supply.</td>
</tr>
<tr>
<td>Symptom</td>
<td>Cause</td>
<td>Action</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Blank Display and no beep when a key is</td>
<td>Broken or loose wire from power supply module to the connector case.</td>
<td>Repair connections (Red +/pos, Black –/neg).</td>
</tr>
<tr>
<td>pressed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Open Fuse F3</td>
<td>Replace 4A/250V/5X20mm Slo Blo fuse. If the fuse opens again, check</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for devices that may be shorting the supply, such as a modem or option</td>
</tr>
<tr>
<td></td>
<td></td>
<td>card.</td>
</tr>
<tr>
<td>Nonresettable totalizer does not advance</td>
<td>Programming error - Zero flow rate or asterisk (*)</td>
<td>Check measurement configuration of level, flow rate, and volume input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for the Total Flow parameter.</td>
</tr>
</tbody>
</table>
Table 4-1 Troubleshooting Signature Flow Meter (Continued)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonresettable totalizer does not advance (continued)</td>
<td>Broken wire connection</td>
<td>Check wire connections for the totalizer on the CPU board.</td>
</tr>
<tr>
<td>USB device not recognized - No USB Options screen</td>
<td>Meter was booted up with USB adapter cable connected.</td>
<td>Remove USB cable and reboot the meter</td>
</tr>
<tr>
<td></td>
<td>Meter was booted up with USB to computer cable connected.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4-1 Troubleshooting Signature Flow Meter (Continued)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB device not recognized - No USB Options screen (continued)</td>
<td>Flash drive encrypted or defective</td>
<td>Try a different USB Flash drive</td>
</tr>
<tr>
<td></td>
<td>Adaptor cable defective</td>
<td>Replace USB Adaptor Cable 480-2946-02</td>
</tr>
<tr>
<td>Cannot update software / Read flash drive</td>
<td>The necessary files are not on the flash drive.</td>
<td>Load the firmware from our website onto the flash drive, into a folder named BIN-FILE.</td>
</tr>
</tbody>
</table>
### 4.3.2 TIENet 300 Connector Case

#### Table 4-2 Troubleshooting TIENet 300 Connector Case

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIENet or SDI12 devices not appearing on display for configuration</td>
<td>Device has not been scanned.</td>
<td>Perform a hardware scan from Smart Sensor Setup or SDI-12 Setup.</td>
</tr>
<tr>
<td></td>
<td>Device is not wired correctly.</td>
<td>Rewire connector following label on the case circuit board.</td>
</tr>
<tr>
<td></td>
<td>Open Fuse</td>
<td>Check fuse F1, F4, F5. Replace if open. 3.15A Fuse 411-0212-70</td>
</tr>
<tr>
<td></td>
<td>Defective TIENet or SDI12 device.</td>
<td>Substitute a known working device and rescan. If it now works, replace the faulty device.</td>
</tr>
</tbody>
</table>
Table 4-2  Troubleshooting TIENet 300 Connector Case (Continued)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIENet or SDI12 devices not appearing on display for configuration (continued)</td>
<td>Device not configured for display on the Home Display.</td>
<td>Add the parameters to the Home Display.</td>
</tr>
<tr>
<td></td>
<td>Wired incorrectly.</td>
<td>Repair/rewire per the label on the connector case.</td>
</tr>
</tbody>
</table>
### 4.3.3 TIENet 301 pH/Temp

#### Table 4-3 Troubleshooting TIENet 301 pH/Temp

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH Will not calibrate</td>
<td>Probe defective</td>
<td>Replace pH Probe 60-9004-126</td>
</tr>
<tr>
<td></td>
<td>301 module not recognized</td>
<td>Rescan device in Hardware Setup</td>
</tr>
<tr>
<td></td>
<td>No sensor connected to the 301</td>
<td>Check TIENet wire connections. Follow wiring code silkscreened on circuit board.</td>
</tr>
<tr>
<td>pH Will not calibrate</td>
<td>TIENet connection fuse open</td>
<td>Replace if open. 3.15A Fuse 411-0212-70</td>
</tr>
<tr>
<td>Symptom</td>
<td>Cause</td>
<td>Action</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Incorrect pH readings / slow response</td>
<td>Buffers contaminated or wrong buffer used.</td>
<td>Use new/correct pH buffer solution.</td>
</tr>
<tr>
<td></td>
<td>Temperature is not being read.</td>
<td>Replace pH Probe 60-9004-126</td>
</tr>
<tr>
<td></td>
<td>Probe bulb is contaminated</td>
<td>Clean probe and recalibrate. If readings are still incorrect, replace probe.</td>
</tr>
<tr>
<td></td>
<td>Calibrated before reading stabilized.</td>
<td>Recalibrate and allow the readings to stabilize before continuing with calibration.</td>
</tr>
</tbody>
</table>
### 4.3.4 TIENet 306 Sampler Interface

#### Table 4-4 Troubleshooting TIENet 306 Sampler Interface

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect pacing interval</td>
<td>Incorrect flow total selected for pacing</td>
<td>Assign the correct sensor to the correct flow rate to the correct total flow. Example: Needed to pace from the 330 bubbler, but programmed to pace from the 310 USLS.</td>
</tr>
<tr>
<td>No sampler pacing</td>
<td>Sampler’s flow pulse input not working</td>
<td>Connect a different sampler, or test the existing sampler by shorting pins A and C on the sampler’s Flow Meter port, while the program is running. The displayed pulse count should count down.</td>
</tr>
</tbody>
</table>
### 4.3.5 TIENet 308 Analog Output

#### Table 4-5  Troubleshooting TIENet 308 4-20mA Analog Output

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-20 output is missing, or zero current output</td>
<td>Incorrect wiring</td>
<td>Rewire per connector diagram</td>
</tr>
<tr>
<td></td>
<td>Excessive load</td>
<td>Disconnect external equipment and test the output with VOM. If OK then reduce load resistance (maximum 500 Ω) or add isolated power to the current loop.</td>
</tr>
<tr>
<td></td>
<td>Analog circuit board failure</td>
<td>Use the other output on the 308 card If current is still 0 mA, replace card. If the VOM reads 4mA or greater, reprogram to use that output or replace the card. Part #60-4304-006</td>
</tr>
</tbody>
</table>
Table 4-5  Troubleshooting TIENet 308 4-20mA Analog Output

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-20 only reads 4mA</td>
<td>Wires on incorrect output (wired to output 2 instead of output 1)</td>
<td>Move connector to proper output</td>
</tr>
<tr>
<td></td>
<td>Analog percent is not selected in the TIENet sensor configure options in Hardware setup</td>
<td>Reconfigure the 308 card.</td>
</tr>
<tr>
<td></td>
<td>Improper parameter set for the output.</td>
<td>Verify/change the settings/range to the proper parameter.</td>
</tr>
</tbody>
</table>
### Table 4-5 Troubleshooting TINet 308 4-20mA Analog Output

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-20 reading incorrectly</td>
<td>Excessive load</td>
<td>Disconnect external equipment and test the output with VOM. If OK then reduce load resistance (maximum 500 $\Omega$) or add isolated power to the current loop.</td>
</tr>
<tr>
<td></td>
<td>Improper module/parameter set for the output</td>
<td>Verify/change the settings/range to the correct module/parameter.</td>
</tr>
<tr>
<td></td>
<td>Connected to incorrect output; e.g., wired to output 2 instead of output 1</td>
<td>Move connector to proper output</td>
</tr>
</tbody>
</table>
### Table 4-5  Troubleshooting TIENet 308 4-20mA Analog Output

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog is not available under Outputs menu</td>
<td>TIENet 308 is not properly configured</td>
<td>Verify the TIENet configuration contains analog percent readings</td>
</tr>
<tr>
<td>Measurement error for analog current</td>
<td>No load applied to the output circuit, or open circuit wiring.</td>
<td>The output must have a load resistance (maximum 500 Ω). For verification, this can be accomplished by connecting the current meter leads to the terminals of the 308 card.</td>
</tr>
</tbody>
</table>
## Table 4-6 Troubleshooting TIENet 310 Ultrasonic Level Sensor

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invalid level, display has asterisk (*) by level reading</td>
<td>Not scanned</td>
<td>Perform a smart sensor scan</td>
</tr>
<tr>
<td></td>
<td>Not able to achieve signal lock (misalignment, loose mounting, turbulence, foam, or debris in the water)</td>
<td>Adjust mounting or place over a solid surface.</td>
</tr>
<tr>
<td></td>
<td>Level outside of the Blanking distances</td>
<td>Adjust min/max blanking distances</td>
</tr>
</tbody>
</table>
### Table 4-6 Troubleshooting TIENet 310 Ultrasonic Level Sensor (Continued)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invalid level, display has asterisk (*) by level reading (continued)</td>
<td>Not wired correctly</td>
<td>Check/repair wiring</td>
</tr>
<tr>
<td></td>
<td>Open fuse</td>
<td>Replace fuse and rescan. Part #411-0212-70</td>
</tr>
<tr>
<td></td>
<td>Failed sensor</td>
<td>Replace with known good sensor</td>
</tr>
<tr>
<td>No level reading on the display</td>
<td>Parameter not selected to be displayed on Home Display</td>
<td>Add the parameter to the Home Display.</td>
</tr>
<tr>
<td>Incorrect level reading</td>
<td>Level not adjusted properly</td>
<td>Readjust level</td>
</tr>
</tbody>
</table>
### Table 4-6 Troubleshooting TIENet 310 Ultrasonic Level Sensor (Continued)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect level reading</td>
<td>Sensor misaligned</td>
<td>Realign sensor</td>
</tr>
<tr>
<td>(continued)</td>
<td>Objects in the path of the signal</td>
<td>Adjust min/max blanking distances and/or reposition sensor.</td>
</tr>
<tr>
<td></td>
<td>Sensor exposed to direct sunlight</td>
<td>Install sunshade. (Refer to user manual.)</td>
</tr>
</tbody>
</table>
# Section 4  Maintenance and Troubleshooting

## 4.3.7 TIENet 330 Bubbler

### Table 4-7 TIENet 330 Bubbler

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>No bubble out</td>
<td>Bubble line from Signature to primary device (weir/flume) damaged or blocked.</td>
<td>Clear blockage or replace bubble line. Perform a manual purge before resuming operation.</td>
</tr>
<tr>
<td></td>
<td>Plugged orifice</td>
<td>Replace orifice/bubbler device</td>
</tr>
<tr>
<td></td>
<td>Pump motor failure</td>
<td>Replace motor/bubbler device</td>
</tr>
<tr>
<td></td>
<td>Damaged/pinched bubble line</td>
<td>Replace bubble line</td>
</tr>
<tr>
<td></td>
<td>Blocked inlet air line</td>
<td>Remove the exterior desiccator and perform a manual purge. If the pump runs and has an output, repair/replace desiccator.</td>
</tr>
<tr>
<td></td>
<td>Interior air line leaking/failure</td>
<td>Repair/replace damaged air lines</td>
</tr>
</tbody>
</table>
### Table 4-7 TIENet 330 Bubbler (Continued)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invalid level reading display; Asterisk (*) dis-played next to reading.</td>
<td>Blocked bubble line</td>
<td>Remove bubble line to see if the bubbler will start reading. If yes, replace bubble line.</td>
</tr>
<tr>
<td></td>
<td>Interior air line leaking/failure</td>
<td>Inspect all air lines and repair/replace where needed. Perform a manual purge.</td>
</tr>
<tr>
<td>Incorrect level reading</td>
<td>Bubble line starting to clog</td>
<td>Inspect all air lines and repair/replace where needed. Perform a manual purge.</td>
</tr>
<tr>
<td></td>
<td>Incorrect level adjustment.</td>
<td>Measure and adjust to proper level</td>
</tr>
<tr>
<td></td>
<td>Bubbler module failure</td>
<td>Replace the module</td>
</tr>
</tbody>
</table>
4.4 Service and Repair

Service tasks described in this manual may be performed on site by properly trained personnel. Other service and repairs must be performed at the factory. If your Teledyne Isco equipment requires repair, contact Teledyne Isco’s Technical Service department. Speaking with a Teledyne Isco Technical Service representative can often resolve the problem without the need to return the item. If the issue cannot be resolved by phone or email, you will receive a Return Authorization Number (RAN) and information on returning the equipment to the factory.

4.4.1 Contact Teledyne Isco

Teledyne Isco
Technical Service Dept.
P.O. Box 82531
Lincoln, NE 68501 USA

Phone: 866 298-6174
402 464-0231
FAX: 402 465-3085

E-mail:
IscoService@teledyne.com