SoliTrac®

4 ... 20 mA/HART four-wire, Radiation-Based Detector for Level Measurement

QUICK REFERENCE GUIDE
Safety

Before attempting any wiring, make sure you read and understand all the instructions and safety guidelines in the Operating Instructions before operating the gauge. You must adhere to the country-specific installation standards and all prevailing safety regulations and accident prevention rules.

Regulatory agencies throughout the world have different requirements, regulations, and restrictions with respect to the use of nuclear instrumentation. Refer to the Radiation Safety Manual for more detailed safety information and instructions.
Mounting

Measurement accuracy is highly influenced by the proper installation of the gauge. This section contains the guidelines for optimizing performance through proper installation. You may also reference the application sizing sheet and any installation drawings provided at the time of order.

Preferred Orientation

Install the scintillator material near the vessel parallel to the axis of level change. Locate the electronics housing just above the top of the measurement span. Alternatively, invert the detector with 2" (50 mm) of the scintillator material above the top of the measurement span.

![Diagram of preferred orientation]

The detector active area is between the bottom of the detector housing to 2" (50 mm) from the end of the scintillator bundle. Mount the detector so that this area spans the desired measurement length.

![Figure 1: Preferred Orientation]

1  2 Inches Minimum
2  0 %
3  100 %
4  Normal Mount (Orientation)
5  Inverted Mount (Orientation)
Mounting Instructions
Use an L-bracket to secure the electronics housing. Mount the L-bracket to the vessel or possibly another nearby structure using U-bolts.

Figure 2: Bracket and Conduit Mount

1. L-Bracket
2. U-bolts (customer supplied)
3. Gauge
4. 2" Conduit (customer supplied)
Wiring

Primary Chamber Connections

Figure 3: Primary Terminal Connections

1. Power Supply
2. Relay Output (4 = Normally Closed, 5 = Common, 6 = Normally Open)
3. 4 ... 20 mA Active Output (Ex Proof Gauges Only, 9 = DC+, 11 = DC-)
4. 4 ... 20 mA Passive Output (Ex Proof Gauges Only, 10 = DC+, 11 = DC-)
5. 4 ... 20 mA Passive Input
6. Digital Input, 10 mA max.
7. Relay Input, 100 mA max. (14 = DC+, 16 = DC-)
8. Digital Output
9. Multi-gauge Communication (21 & 22 = Out, 19 & 20 = in)
10. Address Switches for Multi-gauge Systems

Secondary Chamber Connections

Figure 4: Secondary Terminal Connections

1. 4 ... 20 mA Passive Output option (Intrinsically Safe Current Loop Output Option, Passive)
2. PLICSCOM Connection
3. Terminals 5, 6, 7, 8 (Intrinsically Safe Connections for Remote Display VEGADIS 61)
4. Ground Connection
Setup and Adjustment

Setup Procedures
Complete the following procedures in the order listed for the proper setup and operation of your gauge.

Install PACTware
Install PACTware and the DTM by inserting the CD or double-clicking the autorun.exe and following the installation assistant.

Connect to a Detector

![Diagram of Detector Connection]

1. Detector
2. Press Module on Electronics and Turn Right (USB mini connector must face away from cover)
3. VEGACONNECT
4. USB Cable
5. PC with PACTware Software

⚠️ **NOTE**
See the Operating Instructions for additional options for connecting the gauge.

Start PACTware
To open PACTware, click Windows Start, All Programs, PACTware, PACTware or double-click the PACTware shortcut on your desktop.

Set up Project Tree
1. Open PACTware, if you have not already done so.
2. From the Device menu, click Add device or click the Add device icon from the PACTware toolbar.
3. From the Device for dialog box, click VEGACONNECT 4.
4. Click OK.
5. From the Device menu, click Add device or click the Add device icon from the PACTware toolbar.
6. From the Device for dialog box, click the DTM for your particular ProTrac device.
7. Click OK.
8. From the Channel select dialog box, click one of the following:
   - Click I²C if you are connecting directly to a detector
   - Click HART if you are using clips (alligator clips) to connect through the current output loop.
9. Click OK.
10. From the PACTware toolbar, click the Connect icon or right-click the detector from the left pane of the PACTware dialog box and click Connect.

Setup Assistant

Use the Setup Assistant to complete the gauge setup.
1. Double-click the sensor in the Project window to open the device’s DTM.
2. Type the measurement loop name in the Measurement loop name box.
3. In the Isotope list, click Cs 137 or Co 60 for your source isotope.
4. Click Start the setup assistant.

Selection of the Application

Follow the steps below to select the application:
1. From the Application list, click the application you wish to use.
2. Click Next.

Select Inputs

From the Select inputs dialog box, click Next.

Background Radiation (Optional)

Follow the steps below to configure the gauge to subtract background pulses:
1. Close all radiation source shutters.
2. From the Background radiation dialog box, click Measure background radiation to determine the count rate and the amount of background radiation present.
3. Click Next.

Adjustment

1. From the Unit of process values list, click the measurement unit you want to use.
2. In the Max. process value box, type the maximum process value you want to use.
3. In the Min. process value box, type the minimum process value you want to use.
4. Click Next.

Linearizer Data Points (Adjustment Steps)

Follow the steps below to add data points to your linearizer table when working online:

1. Set the process material to a known level and record the value.
2. Click Determine pulse rate, if you want PACTware to automatically determine the Pulse rate [ct/s].
When adding adjustment points to the linearizer table, make certain the process is stable before clicking **Determine pulse rate**.

3. Click **OK**.
4. Type the known value in the **Level** column next to the displayed pulse rate.
5. Repeat steps 1 through 4 for each point in the linearizer table.
6. Click **Next**, if you wish to save the linearization.

Follow the steps below to manually add pre-determined data points to your linearizer table:
1. Type a known value in the **Pulse rate [ct/s]** column.
2. Type a known value in the **Level** column next to the displayed pulse rate.
3. Repeat steps 1 and 2 for each point in the linearizer table.
4. Click **Next**, if you wish to save the linearization.

If you wish to delete data points in your linearization table, complete the following steps:
1. Right-click a line in the **Pulse rate [ct/s]** and **Level** window.
2. Click **Delete line** to delete existing data points.
3. Click **Next**.

To re-order the data points in order of increasing pulse rate, complete the steps below:
1. Click the **Pulse rate[ct/s]** heading cell.
2. If the counts are displayed in decreasing order, click the heading cell again.
3. Click **Next**.

**Damping**

To set the damping features, complete the following steps:
1. In the **Damping** dialog box, click the type of filter you wish to use from **Filter selection** list.
2. If you clicked **Automatically**, click **Next**.
3. If you clicked **Manually** from the **Filter selection** list, type the integration time in the **Integration time** box.
4. Click **Next**.

**Current Output**

Set the **Current Output** with the following steps:
1. From the **Output characteristics** list, choose how you want the current output to track increasing level.
2. From the **Failure mode** list, choose the current you want to indicate alarm status.
3. From the Min. current list, click the value you wish to use.
4. From the Max. current list, click the value you wish to use.
5. Click **Next**.
Configure the relay to indicate high electronics temperature or a high or low process using the relay setup.

The Upper and Lower Switch Settings are used to establish a "dead band" or hysteresis. The dead band is the point between the alarm activation and the point at which the alarm releases or deactivates.

To set the relay, complete the following steps:
1. From the **Basic value** list, click one of the following:
   - **None** - Click this value if you want the relay to indicate diagnostic faults only.
   - **Electronics temperature** - Click this value if you want the relay to indicate high electronics temperature and diagnostic faults.
   - **Process value** - Click this value if you want the relay to indicate a high or low process value and diagnostic faults.

   If you clicked **None**, the **Failure mode** is off.
   1. Click **Next**.
   2. Click **Finish** to complete the **Setup assistant** and save the data to the gauge.

   If you clicked **Electronics temperature** from the **Basic value** list, complete the following:
   1. From the **Temperature unit** list, click °C or °F.
   2. In the **Upper switching point (S2)** box, type an upper switching point value.
   3. In the **Lower switching point (S1)** box, type a lower switching point value.
   4. Click **Next**.
   5. Click **Finish** to complete the **Setup assistant** and save the data to the gauge.

   If you clicked **Process value** from the **Basic value** list, complete the following:
   1. From the **Mode of operation** list, click **Overfill protection** or **Dry run protection**.
   2. In the **Upper switching point (S2)** box, type an upper switching point value.
   3. In the **Lower switching point (S1)** box, type a lower switching point value.
   4. Click **Next**.
   5. Click **Finish** to complete the **Setup assistant** and save the data to the gauge.
Maintenance and Diagnostics

Periodic Maintenance Schedule

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardize</td>
<td>As required by process conditions, usually at least once every six months</td>
<td>Follow the steps listed in <strong>Real Value Correction</strong> to standardize the gauge.</td>
</tr>
<tr>
<td>Source holder shutter check</td>
<td>Every six months unless otherwise required by applicable nuclear regulatory agency</td>
<td>Check the radiation safety instructions shipped separately with your source holder.</td>
</tr>
<tr>
<td>Source wipe</td>
<td>Every three years unless otherwise required by applicable nuclear regulatory agency</td>
<td>Check the radiation safety instructions shipped separately with your source holder.</td>
</tr>
</tbody>
</table>

Troubleshooting

If your gauge displays an error, refer to the following table for assistance.

<table>
<thead>
<tr>
<th>Value</th>
<th>DTM Text</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F008</td>
<td>Error multisensor communication</td>
<td>Communication error</td>
</tr>
<tr>
<td>F013</td>
<td>Sensor signals failure</td>
<td>Sensor input out of range</td>
</tr>
<tr>
<td>F016</td>
<td>Adjustment data exchanged</td>
<td>Adjustment data is exchanged</td>
</tr>
<tr>
<td>F017</td>
<td>Adjusted span too small</td>
<td>Adjustment span too small</td>
</tr>
<tr>
<td>F025</td>
<td>Invalid linearizer table</td>
<td>Invalid linearizer table</td>
</tr>
<tr>
<td>F030</td>
<td>Process value not within the limits</td>
<td>Measurement value invalid</td>
</tr>
<tr>
<td>F034</td>
<td>EEPROM hardware error</td>
<td>EEPROM failure</td>
</tr>
<tr>
<td>F035</td>
<td>EEPROM data error</td>
<td>Corrupt EEPROM</td>
</tr>
<tr>
<td>F036</td>
<td>Error in the program memory</td>
<td>Corrupt program memory</td>
</tr>
<tr>
<td>F037</td>
<td>RAM hardware error</td>
<td>RAM failure</td>
</tr>
<tr>
<td>F038</td>
<td>Slave signals failure</td>
<td>Network gauge response error</td>
</tr>
<tr>
<td>F040</td>
<td>Hardware error</td>
<td>Hardware error</td>
</tr>
<tr>
<td>F041</td>
<td>Photomultiplier error</td>
<td>No sensor connected</td>
</tr>
<tr>
<td>F045</td>
<td>Error in the current output</td>
<td>Current loop error</td>
</tr>
<tr>
<td>F052</td>
<td>Faulty configuration of the multisensor communication bus</td>
<td>Gauge configuration error, consult factory</td>
</tr>
<tr>
<td>F053</td>
<td>Adjustment span of the input too small</td>
<td>Span in EB too small</td>
</tr>
<tr>
<td>F057</td>
<td>Error in the linearization table for the input instrument</td>
<td>Input device linearizer table error</td>
</tr>
</tbody>
</table>

37447-US-101012
<table>
<thead>
<tr>
<th>Value</th>
<th>DTM Text</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F059</td>
<td>Faulty adjustment of the steam density compensation</td>
<td>Configuration Error</td>
</tr>
<tr>
<td>F066</td>
<td>Faulty adjustment</td>
<td>Adjustment out of bounds</td>
</tr>
<tr>
<td>F068</td>
<td>Counting rate too high</td>
<td>Error in measurement</td>
</tr>
<tr>
<td>F072</td>
<td>Limit value exceeded</td>
<td>Limit Exceeded</td>
</tr>
<tr>
<td>F073</td>
<td>Error real value correction</td>
<td>Standardization error</td>
</tr>
<tr>
<td>F080</td>
<td>System failure</td>
<td>System error, contact factory.</td>
</tr>
<tr>
<td>F086</td>
<td>Communication error</td>
<td>Network error</td>
</tr>
<tr>
<td>F120</td>
<td>Filter time failure</td>
<td>Filter time error, consult factory</td>
</tr>
<tr>
<td>F121</td>
<td>Faulty participant list on the multisensor communication bus</td>
<td>MGC configuration error</td>
</tr>
<tr>
<td>F122</td>
<td>Double addresses on the multisensor communication bus</td>
<td>Duplicate MGC addresses</td>
</tr>
<tr>
<td>F123</td>
<td>X-ray alarm</td>
<td>X-ray interference</td>
</tr>
<tr>
<td>F124</td>
<td>Excessive field alarm</td>
<td>Excessive radiation alarm</td>
</tr>
<tr>
<td>F125</td>
<td>Ambient temperature too high</td>
<td>Gauge temperature error</td>
</tr>
<tr>
<td>F126</td>
<td>Trend data failure</td>
<td>Trend data error</td>
</tr>
<tr>
<td>F127</td>
<td>Trend execution error</td>
<td>Error while trend processing</td>
</tr>
</tbody>
</table>
# Customer Service

## U.S., Canada, and Worldwide

<table>
<thead>
<tr>
<th>Contact Information</th>
<th>Telephone Number/E-mail Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday through Friday 8:00 A.M. - 5:00 P.M. EST (Eastern Standard Time)</td>
<td>1-513-272-0131</td>
</tr>
<tr>
<td>Emergencies: Follow the voice mail instructions</td>
<td>1-513-272-0131</td>
</tr>
<tr>
<td>Fax</td>
<td>1-513-272-0133</td>
</tr>
<tr>
<td>VEGA 24 hour Service, 7 Days a Week</td>
<td>+49 1805 858550</td>
</tr>
<tr>
<td>Field Service e-mail</td>
<td><a href="mailto:fieldservice@ohmartvega.com">fieldservice@ohmartvega.com</a></td>
</tr>
<tr>
<td>Nuclear Services e-mail</td>
<td><a href="mailto:nuclearservices@ohmartvega.com">nuclearservices@ohmartvega.com</a></td>
</tr>
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