Quick Start Guide

Cyl-Tel® & Tank-Tel®

Liquid Level Gauges

Designed and Built by:

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# Revision Log

<table>
<thead>
<tr>
<th>Revision Level</th>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>B</td>
<td>07/15/2014</td>
<td>Reformat with new layout and update to include Gen 4.</td>
</tr>
<tr>
<td>C</td>
<td>10/06/2014</td>
<td>Add Sensor Names section</td>
</tr>
<tr>
<td>D</td>
<td>04/10/2015</td>
<td>Update information in #5 of DP Sensor (Selecting correct sensor type) section</td>
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Preface

General

The Cyl-Tel & Tank-Tel Liquid Level Gauges are digital electronic level gauges. The gauge has been updated to Gen 4 to include the latest in electronic and differential pressure measurement technologies. The new design includes accurate liquid level reading using differential pressure, a graphical display, and a simplified logic with nine selectable units of measure that eliminate the need for lookup charts. The Cyl-Tel & Tank-Tel gauges are telemetry-ready with built-in outputs which eliminate the need for additional boards and is completely compatible to most current telemetry system requirements.

Highlights

• Improves customer readability by eliminating calibration charts
• Programmable to tank model or by tank geometry
• Telemetry-ready outputs compatible with many systems
• Standard pulse and voltage outputs (and optional 4-20mA with interface board); as well as 3 alarm (digital) outputs
• Power: Battery (2 x 1.5V Long Life Lithium) powered or optional 12Vdc adapter (for continuous power)
• Improved readability with a graphical display
• Built-in additional analog input port (0-5V) for optional pressure sensor connection

Quick Start Guide

This Cyl-Tel & Tank-Tel Quick Start Guide is designed to be used in conjunction with PN 20544482 Cyl-Tel & Tank-Tel Product Manual. If there are any questions regarding the operation of the Cyl-Tel/Tank-Tel gauge, contact Chart’s Technical Service at 1-800-400-4683.

To obtain a complete installation and user manual, please scan QR code or go to: www.chartparts.com and click on Manuals, then MicroBulk, then PN 20544482 Cyl-Tel & Tank-Tel Product Manual.
Terms

Throughout this quick start guide safety precautions will be designated as follows:

Caution! Description of a condition that can result in equipment or component damage.

Note: A statement that contains information that is important enough to emphasize or repeat.

Acronyms / Abbreviations

The following acronyms / abbreviations are used throughout this manual:

- Ar  Argon
- CO₂ Carbon Dioxide
- N₂  Nitrogen
- O₂  Oxygen
- PB  Pressure Builder
- PSID Pounds per Square Inch Differential
Instructions

Installation

The Cyl-Tel/Tank-Tel Liquid Level Gauge has a maximum operating differential pressure of 29 psid. In order to protect the sensor from damage, ensure that the equalization valve is in the ‘EQUALIZATION SERVICE’ position before removing or installing a Cyl-Tel/Tank-Tel Gauge onto a Chart tank. If the valve is not in equalization then the diaphragm in the sensor can be permanently damaged. Refer to the user manual for more information.

Initial Setup

Upon receiving, the Cyl-Tel/Tank-Tel Gauge will look one of two ways. If it has been setup at the factory it will show 0% (left). If it has not been setup it will show a sad face (right). If “NO TANK SET” is displayed, refer to First Time Setup in this guide.

Keypad Use

There are four buttons on the Cyl-Tel/Tank-Tel Gauge face. Each one has a different purpose. Each button performs the operation of the text box above the button on the screen.

FILL - This button will lock the display on for 15 minutes.

UNITS - This button will toggle the different units available.

ALARMS - This button will toggle the display of any setup alarms on and off. It will not clear any alarms.

MENU - When on, holding this button for 15 seconds will allow the user to enter the “MAIN MENU” for the gauge.

ON Button

Pressing the ‘ON’ button will turn the Cyl-Tel/Tank-Tel Gauge display on and run through the startup diagnostics and tests. When the test is complete the screen will display the tank’s liquid level and pressure (pressure display is optional). Once the unit is on and the level is displayed, holding the ‘ON’ button for 15 seconds will access the Cyl-Tel/Tank-Tel Gauge setup menus.
Cyl-Tel/Tank-Tel Quick Start Guide

First Time Setup (‘NO TANK SET’ displayed)

1. With the ‘NO TANK SET’ screen displayed, press and hold the ‘ON’ button for 15 seconds (‘PLEASE WAIT’ will display) or until the ‘SETUP STD TANK’ screen is displayed.

2. On the ‘SETUP STD TANK’ menu use the up and down buttons to toggle through the different tank types. Select the desired tank type by pressing the ‘NEXT’ button.

3. The next screen is the ‘SET CONTENTS’ menu. Use the up and down buttons to cycle through the different contents (N₂, O₂, Ar, and CO₂). Select the desired contents by pressing the ‘NEXT’ button.

4. On the ‘SETUP DISPLAY’ screen, select the desired default units-of-measure by pressing the ‘NEXT’ button. Then use the up and down buttons to scroll through the various units. This selection will be the default units which are displayed every time the ‘ON’ button is pressed. Once the desired units are selected, press the ‘NEXT’ button.

Note: Level reading can always be displayed in other units-of-measure on the main screen by pressing the ‘UNITS’ button.

5. To save the settings scroll down to the ‘SAVE’ option and press the ‘NEXT’ button.

6. Confirm that the correct DP Sensor is selected by following the steps in the DP Sensor section in this guide. Remember to DP Zero the gauge after it is installed by following the steps in the DP Zero section in this manual.

7. Press the ‘EXIT’ button to return to the main screen.

DP Sensor (selecting correct sensor type)

Note: The gauge can come with a variety of different sensors depending on the range needed for the tank. To ensure an accurate reading the correct sensor must be chosen.

Note: Changing the sensor type also resets the DP Zero setting. Upon changing the DP Sensor type remember to follow the DP Zero procedure.

DP Zero (Tare the DP Sensor)

Caution! Proper calibration (DP Zero) is critical for accurate liquid level measurement. The DP Zero function is similar to the “Tare” function on a digital scale. Both functions set the measurement range ‘zero’ point which compensates for any intrinsic offset within the sensor.

1. If tank contains product (liquid), then turn the equalization valve located near the Cyl-Tel/Tank-Tel gauge to the EQUALIZATION/SERVICE position. If the tank is empty, skip to step 2.

2. Press the ‘ON’ button to turn on the gauge display.

3. Hold the ‘ON’ button for 15 seconds to access the MAIN MENU.

4. In the MAIN MENU select ‘MORE’, at the bottom of the screen and press the ‘NEXT’ button.

5. On the MORE FEATURES menu select ‘DP Zero’ and press ‘NEXT.’
6. The screen will display "PLEASE WAIT" for a few seconds at the bottom of the screen and then the new DP Zero value will appear below the old.

7. Apply the new DP Zero by pressing the 'NEXT' button.

8. To save the settings scroll down to ‘SAVE’ and press the ‘NEXT’ button.

9. Press the ‘EXIT’ button to return to the main screen.

**Setting Correct Saturation Pressure**

*Note: Setting the correct liquid saturation pressure is also critical for accurate liquid level measurement. The set pressure is used to determine the liquid density, which in turn is used in the liquid level and volume calculations. An incorrect pressure setting can cause the level reading to be significantly higher or lower than the actual level within the tank.*

1. Press the ‘ON’ button to turn on the gauge display.

2. Hold the ‘ON’ button to access the MAIN MENU.

3. Select ‘SET CUSTOM’ and press the ‘NEXT’ button.

4. Scroll down and select the ‘PRESSURE’ option and press the ‘NEXT’ button.

5. Using the up and down buttons, set the pressure to an average between Orca/delivery truck pressure and PB set point of the tank. Press the ‘NEXT’ button to apply the setting.

6. Scroll down and select ‘SAVE.’ Press the ‘NEXT’ button to save the setting.

7. Confirm the contents of the tank by pressing the ‘NEXT’ button. If the contents are incorrect use the up and down buttons to cycle through before pressing the ‘NEXT’ button.

8. On the ‘SETUP DISPLAY’ screen select the ‘SAVE’ option and press ‘NEXT.’

9. Press the ‘EXIT’ button to return to the main screen.

10. Verify liquid level/volume reading with actual tank liquid level.

**Standard Tank Configuration (If Gauge Previously Setup)**

1. Press the ‘ON’ button to turn on the gauge display.

2. Hold the ‘ON’ button for 15 seconds to access the MAIN MENU.

3. Select ‘SET TANK’ and press the ‘NEXT’ button. This allows access to the standard tank list built into the gauge.

4. Use the up and down buttons to cycle through the different tanks. Select the desired tank and press the ‘NEXT’ button to apply the setting.

5. On the ‘SET CONTENTS’ screen use the up and down buttons to set the correct liquid contents of the tank. With the desired contents selected press the ‘NEXT’ button to apply the setting.

6. On the ‘SETUP DISPLAY’ screen select the default units you wish to have displayed when the ‘ON’ button is pressed.

7. To save the settings select the ‘SAVE’ option and press the ‘NEXT’ button to save the settings.

8. Check the DP Zero and Pressure settings to make sure they are correct.

**Setting Alarms**

*Note: Alarms are only active with external power. They are inactive on battery power.*

1. Press the ‘ON’ button to turn on the gauge display.

2. Hold the ‘ON’ button for 15 seconds to access the MAIN MENU.

3. In the MAIN MENU use the up and down buttons to select the ‘ALARMS’ option and press the ‘NEXT’ button.

4. The gauge is capable of setting up three separate alarms. Choose one with the up and down buttons and press the ‘NEXT’ button to start configuring it.

5. Under the alarm text a ‘*’ will be highlighted with the alarm number next to it. Press the right button to select the number next to the ‘*’.

6. Use the up and down buttons to set the alarm to go off when the tank is greater than (>) or lesser than (<=) a desired value.
7. Press the right button to select the number next to the ‘0/0’. Use the up and down buttons to set the value at which the alarm will go off.

8. After the alarm parameters have been set select the ‘SAVE’ option and press the ‘NEXT’ button to save and apply the settings.

**Troubleshooting**

Refer to the table below for troubleshooting procedures. The table is arranged in a Symptom/Possible Cause/Solution format. Note that possible causes for specific symptoms are listed in descending order of significance. That is, check out the first cause listed before proceeding to the next. If you need further assistance please call the Customer Support Hotline at 1-800-400-4683.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyl-Tel/Tank-Tel gauge does not turn on.</td>
<td>Battery dead, low, installed incorrectly or missing. Transformer not plugged in or faulty wiring. Electrical supply circuit breaker tripped. Faulty Cyl-Tel/Tank-Tel. Physical keypad not connected to Cyl-Tel/Tank-Tel circuit board.</td>
<td>Replace battery. Inspect wiring and insure transformer is plugged in. Reset circuit breaker. Reset breaker. Replace Cyl-Tel/Tank-Tel front. Verify that the ribbon cable for the keypad is connected to the Cyl-Tel/Tank-Tel circuit board.</td>
</tr>
<tr>
<td>Cyl-Tel/Tank-Tel display always reads 0%.</td>
<td>No product in tank. Equalization valve in the equalization position. Equalization valve installed incorrectly. Phase lines installed incorrectly. Tank parameters are improperly set. Faulty Cyl-Tel/Tank-Tel gauge.</td>
<td>Ensure there is liquid in tank. Turn valve to the &quot;Normal Operation&quot; position. See user manual to confirm proper installation. See user manual to confirm proper installation. Verify each parameter in the Cyl-Tel/Tank-Tel focusing on the tank selection and DP zero setting. Replace Cyl-Tel/Tank-Tel front.</td>
</tr>
<tr>
<td>Display always reads 100%.</td>
<td>Tank parameters are improperly set.</td>
<td>Verify each parameter focusing on the tank selection and DP zero setting.</td>
</tr>
<tr>
<td>Display reads “OUT OF RANGE”.</td>
<td>The gauge thinks the tank is over 100% full.</td>
<td>Verify each parameter focusing on the tank selection and DP zero setting.</td>
</tr>
<tr>
<td>Liquid level display does not drop to 0% when in equalization mode.</td>
<td>Cyl-Tel/Tank-Tel DP zero setting is incorrect.</td>
<td>Follow the DP zero section to reset the DP zero setting.</td>
</tr>
<tr>
<td><strong>Symptom</strong></td>
<td><strong>Possible Cause</strong></td>
<td><strong>Solution</strong></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Liquid level display is not accurate. | DP zero setting is incorrect.  
Incorrect differential pressure sensor selected.  
Incorrect pressure setting.  
Incorrect tank dimensions.  
Incorrect tank orientation. | Follow the DP zero section to reset the DP zero setting.  
Refer to user manual to ensure correct sensor selected.  
Follow pressure section to reset the pressure setting.  
Follow tank selection section to select tank.  
Follow tank selection section to select tank. |
| Display reads “OPEN LOOP”. | DP sensor not connected to Cyl-Tel/Tank-Tel circuit board.  
Incorrect differential pressure sensor selected. | Verify that the sensor is connected to the back of the board (J21).  
Refer to user manual to ensure correct differential pressure sensor is selected. |
| (Optional) pressure display always reads 0. | Pressure sensor not connected to the Cyl-Tel/Tank-Tel circuit board. | Verify that the pressure sensor is connected to terminal J18 on the back of the Cyl-Tel/Tank-Tel circuit board. |
### Standard MicroBulk Tank List

**Note:** This table includes recommended pressure settings for the Cyl-Tel Liquid Level Gauge

<table>
<thead>
<tr>
<th>Display Order</th>
<th>PN</th>
<th>Tank Model</th>
<th>Length (in)</th>
<th>Diameter (in)</th>
<th>Orientation</th>
<th>RV</th>
<th>PB</th>
<th>Pressure Setting PSI</th>
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<tbody>
<tr>
<td>1</td>
<td>10982263</td>
<td>PERMA-CYL 230 MP</td>
<td>37.1</td>
<td>24.0</td>
<td>VERTICAL</td>
<td>250</td>
<td>125</td>
<td>100</td>
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<tr>
<td>2</td>
<td>11529508</td>
<td>PERMA-CYL 300 MP</td>
<td>49.1</td>
<td>24.0</td>
<td>VERTICAL</td>
<td>250</td>
<td>120</td>
<td>100</td>
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<tr>
<td>3</td>
<td>10914877</td>
<td>PERMA-CYL 450 MP</td>
<td>50.9</td>
<td>27.6</td>
<td>VERTICAL</td>
<td>250</td>
<td>120</td>
<td>100</td>
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<tr>
<td>4</td>
<td>10899005</td>
<td>PERMA-CYL 450 HP</td>
<td>50.4</td>
<td>27.6</td>
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<td>350</td>
<td>300</td>
<td>200</td>
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<tr>
<td>5</td>
<td>10907634</td>
<td>PERMA-CYL 450 VHP</td>
<td>51.8</td>
<td>27.2</td>
<td>VERTICAL</td>
<td>500</td>
<td>450</td>
<td>250</td>
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<tr>
<td>6</td>
<td>11684305</td>
<td>PERMA-CYL 700 HP</td>
<td>47.5</td>
<td>37.3</td>
<td>VERTICAL</td>
<td>350</td>
<td>300</td>
<td>200</td>
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<td>7</td>
<td>10879864</td>
<td>PERMA-CYL 700 VHP</td>
<td>47.5</td>
<td>37.3</td>
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<td>8</td>
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<td>PERMA-CYL 1000 MP</td>
<td>65.2</td>
<td>37.4</td>
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<td>120</td>
<td>100</td>
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<tr>
<td>9</td>
<td>11075024</td>
<td>PERMA-CYL 1000 VHP</td>
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<td>37.1</td>
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<td>500</td>
<td>450</td>
<td>250</td>
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<td>10</td>
<td>11501804</td>
<td>PERMA-CYL 1500 HP</td>
<td>69.0</td>
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<td>300</td>
<td>200</td>
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<td>11202441</td>
<td>PERMA-CYL 1500 VHP</td>
<td>69.0</td>
<td>44.0</td>
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<td>250</td>
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<td>12</td>
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<td>PERMA-CYL 2000 HP</td>
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<td>14401278</td>
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<td>14507523</td>
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<td>250</td>
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<td>10672951</td>
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<td>100</td>
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<tr>
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<td>MEGA-CYL 450 HP</td>
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<td>VERTICAL</td>
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<td>300</td>
<td>200</td>
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<td>17</td>
<td>10473573</td>
<td>MEGA-CYL 600 MP</td>
<td>51.5</td>
<td>33.5</td>
<td>VERTICAL</td>
<td>250</td>
<td>120</td>
<td>100</td>
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<td>18</td>
<td>10513758</td>
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<td>51.3</td>
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<td>120</td>
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<td>10858975</td>
<td>MEGA-CYL 1000 MP</td>
<td>65.2</td>
<td>37.4</td>
<td>VERTICAL</td>
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<td>100</td>
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<td>10752281</td>
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<tr>
<td>23</td>
<td>10619659</td>
<td>LASER-CYL 450 VHP</td>
<td>50.4</td>
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<td>500</td>
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<td>250</td>
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<td>24</td>
<td>11122585</td>
<td>CARBO-MAX 750</td>
<td>49.3</td>
<td>24.0</td>
<td>VERTICAL</td>
<td>300</td>
<td></td>
<td></td>
</tr>
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</table>
Cyl-Tel/Tank-Tel Sensor Names

The following tables explain the sensor names used in the Cyl-Tel/Tank-Tel liquid level gauge firmware on rev. 2.6M and later. If the Cyl-Tel/Tank-Tel gauge has rev. 2.6M or later then the sensor name will be printed on the back label of the gauge for the customer’s reference. The names are used when selecting the sensor type in the Cyl-Tel/Tank-Tel gauge menu. For example, if a Cyl-Tel gauge has a brass block sensor on the back, the sensor needs to be DP4 in the sensor type in the setup menu.

The tables below give a complete list of sensors currently compatible with the Cyl-Tel/Tank-Tel liquid level gauges.

### Differential Pressure Sensors

<table>
<thead>
<tr>
<th>Cyl-Tel/Tank-Tel Sensor Name</th>
<th>Sensor Type</th>
<th>Sensor Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP1</td>
<td>AST15</td>
<td>415 ( \text{m}_\text{H}_2\text{O} )</td>
</tr>
<tr>
<td>DP2</td>
<td>AST7.25</td>
<td>200 ( \text{m}_\text{H}_2\text{O} )</td>
</tr>
<tr>
<td>DP3</td>
<td>AST30</td>
<td>830 ( \text{m}_\text{H}_2\text{O} )</td>
</tr>
<tr>
<td>DP4</td>
<td>Brass Block 200</td>
<td>200 ( \text{m}_\text{H}_2\text{O} )</td>
</tr>
<tr>
<td>DP5</td>
<td>Brass Block 1000</td>
<td>1000 ( \text{m}_\text{H}_2\text{O} )</td>
</tr>
<tr>
<td>DP6</td>
<td>Brass Block 2000</td>
<td>2000 ( \text{m}_\text{H}_2\text{O} )</td>
</tr>
<tr>
<td>DP7</td>
<td>Data Online 200(^{(1)})</td>
<td>200 ( \text{m}_\text{H}_2\text{O} )</td>
</tr>
<tr>
<td>DP8</td>
<td>Data Online 600(^{(1)})</td>
<td>600 ( \text{m}_\text{H}_2\text{O} )</td>
</tr>
</tbody>
</table>

\(^{(1)}\) Data Online Sensors require a special adaptor cable

### Gauge Pressure Sensors

<table>
<thead>
<tr>
<th>Cyl-Tel/Tank-Tel Sensor Name</th>
<th>Sensor Type</th>
<th>Sensor Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>None Attached</td>
<td>--</td>
</tr>
<tr>
<td>GP1</td>
<td>AST 50 Bar</td>
<td>725 psig</td>
</tr>
<tr>
<td>GP2</td>
<td>MLH Honeywell</td>
<td>1000 psig</td>
</tr>
<tr>
<td>GP3</td>
<td>WIKA</td>
<td>600 psig</td>
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</tbody>
</table>