WIRE WIZARD
WELDING PRODUCTS

GAS TRACKER

PORTABLE OR IN-LINE GAS FLOW MONITOR

INSTALLATION & OPERATION MANUAL

Installation, Maintenance and Warranty Information

SHIP DATE _____ **SERIAL #** _____

ELCo ENTERPRISES, INC.
5750 Marathon Drive • Jackson, Michigan 49201
517.782.8040 • *sales@wire-wizard.com*
wire-wizard.com

INTRODUCTION

Congratulations on your purchase of the *Gas Tracker* data collection system. Each *Gas Tracker* unit is proudly made in the USA and quality tested and inspected prior to shipping. Please check the box upon receiving the products for any damage that may have occurred during transit and to ensure all components are accounted for.

Gas Tracker offers the capability to monitor the gas flow rate as a portable unit or as an inline system. The unit has a built-in battery for easy transport without the need of nearby electrical outlets.

This guide is designed to assist the user whose primary responsibility is to operate and maintain the *Gas Tracker* system. This manual provides specific information on the installation, safety, basic operation, and maintenance. **Please read, understand and follow all safety precautions noted in this manual.**

For customer service and support, contact ELCo Enterprises at 517.782.8040 or toll free 1.866.584.7281. This manual and additional product information is available on our website at **wire-wizard.com**.

WARRANTY

LIMITED ONE (1) YEAR WARRANTY
REGISTRATION REQUIRED: VISIT WIRE-WIZARD.COM/REGISTER

ELCo Enterprises, Inc. (hereinafter "ELCo") shall warrant this product to be free of defects in material and/or workmanship for a period of one (1) year from the date of shipment to the buyer. The warranty shall cover 100% of all parts and labor with the exception of misuse, abuse, neglect and typical consumables as determined by ELCo. Failure to follow proper installation and/or maintenance procedures specified in the operating instructions will void this warranty. ELCo will, at its option, repair, replace or issue a credit for the value of the defective product within the warranty period.

Buyer accepts all responsibility for compliance with any/all Local, State and Federal Laws or Regulations including Regulations of Foreign Governments.

No equipment shall be returned without a Return Authorization Number. Upon evaluation and validation of warranty, replacements or repairs will be sent to the Buyer. If a replacement is needed immediately, a purchase order is required to cover the cost of the product until the warranty is determined.

ELCo's warranty is limited to replacing any goods that are proved to be defective and ELCo in no event shall have any liability for paying incidental or consequential damages including and without limitation, damages resulting in personal or bodily injury or death, or damages to, or loss of use of any property. Notwithstanding any of these terms and conditions, the warranties set forth shall apply in connection with any sales of goods, services or design by ELCo and are in lieu of all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

PRODUCT REGISTRATION

Please register this product online or by phone within 14 days after receipt to validate warranty.

Register this product online by going to **wire-wizard.com/register** or scanning the QR code on the right, or you may call 517.782.8040 to register by phone. Registering this product will allow us to provide firmware and software updates via email, as well as expedited service should there be any problems potentially covered by this warranty in the future.

Please record the following information for this product and retain for your records:

Model #: _____ Lot #: _____ Shipment Date: _____

SAFETY NOTES/DISCLAIMER

The *Gas Tracker* system is designed to be safe to operate, provided the user reads, understands, and adheres to the safety precautions listed below. Failure to adhere to these precautions may result in personal injury and/or damage to the equipment.

WARNING: DO NOT USE WITH FLAMMABLE GASES

WARNING: AVOID EXTREME HEAT

WARNING: USE WITH DRY GAS ONLY

WARNING: EXCEEDING 50 PSI WILL DAMAGE UNIT

WARNING: USE CLEAN GAS ONLY

WARNING: NO PIPE DOPE SHOULD BE USED ON THREADS

WARNING: ELECTRIC SHOCK HAZARD

Operators should always wear dry welding gloves and protective clothing when welding. Do not contact electrically live parts. Keep welding guns and other welding equipment away from moisture and water. Ensure ground connections are secure and compatible with the required electric current. When welding under wet conditions or where perspiration is a factor, the use of automatic controls for reducing the no load voltage is recommended to reduce the risk of electric shock. Accidental contact must be prevented with open circuit voltage exceeding 80 volts AC, or 100 volts DC by using insulation or other means. When welding gun is not in use, turn off power supply to prevent any accidental contact.

Welding equipment should be installed and maintained in accordance with National Electrical Code (NFPA 70) and in compliance with local codes. Equipment should only be serviced by qualified or trained personnel only. Do not disassemble torch or change welding consumables with the power supply on. See welding safety and operating references in section 2.1 for safety guidelines and additional information.

WARNING: ARC RAYS AND SPARKS CAN CAUSE EYE INJURY AND BURNS

Always wear a federally compliant welding helmet with the proper lens when welding, along with protective welding gloves and protective clothing. Protective clothing should cover all exposed skin to prevent burns and exposure to ultraviolet rays. An approved welding curtain or solid wall must be used in areas where other personnel may be exposed to arc rays. Other personnel in the work area exposed to arc rays and sparks must also wear a welding helmet and protective clothing to prevent eye injury and burns. Ear plugs should be worn to protect ears from sparks. Avoid using flammable hair preparations when welding. Never attempt to weld without a welding helmet, protective gloves and clothing. See welding safety and operating references in section 2.1 for safety guidelines and additional information.

WARNING: COMPRESSED GAS CAN EXPLODE

Compressed gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding, cutting or other electrical circuits.
- Never drape a welding electrode or cutting torch over a gas cylinder.
- Never allow a welding electrode or cutting torch to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only the correct compressed gas cylinders, regulators, hoses and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve. Do not stand in front of or behind the regulator when opening the valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

WARNING: WELDING WIRE CAN CAUSE INJURY

Keep hands and other body parts away from end of welding gun in case of accidental activation of the trigger. Weld wire can puncture skin and cause injury. Never point the gun toward the body or others when feeding wire.

1. Do not remove or deface any labels that are attached to the unit.
2. Ensure that all equipment in the area is disabled and a lockout/tagout procedure is adhered to when required.
3. Never open or any remove any panels without first disconnecting and locking out power to the system.
4. Never exceed the maximum rated gas pressures on the gas flow sensor.
5. Additional safety information can be found at the following websites:
   - *osha-slc.gov/SLTC/robotics/index.html*
   - *ansi.org*
   - *nfpa.org*

LEGAL DISCLAIMER

The *Gas Tracker* is designed to be a non-obtrusive unit upon installation. It is always the decision of the end user if the equipment should have the capabilities of interrupting production. If the end user chooses to integrate this unit with a PLC or any other means of communication that could stop or interrupt production, they do so voluntarily. ELCo shall not be held responsible for the loss of any production due to equipment interference, or any shutdown due to equipment damage during installation or improper installation.

TECHNICAL SPECIFICATIONS

Hardware

- Dimensions: 7" (178 mm) x 5.25" (134 mm) x 3.25" (83 mm)
- Weight: 2.2 lbs (1 kg)
- Input Power: 24 VDC (Type A-style plug; 100 – 240 VAC required for power supply)
- Power Consumption: 2 A maximum
- 3.5" (89 mm) LED Touch Screen
- Internal memory for up to 8,000 events
- USB connection for exporting data via PC connection
- Four (4) programmable outputs
- Accepts 1/4" NPT thread types
- Modbus RTU interface for PLC
- Normally-open relay contacts for stacklight or PLC

Gas Flow Sensor Specifications

- Range: 0 – 100 CFH (0 – 50 LPM)
- Accuracy: +/- 3% (Full Scale)
- Maximum operating pressure of 50 psi (350 kPa)
- Gas Types:
  - Argon (Ar)
  - Nitrogen (N)
  - Carbon Dioxide (CO_2)
  - Helium (He)
  - C-2 (98% Ar/2% CO_2)
  - C-10 (90% Ar/10% CO_2)
  - C-15 (85% Ar/15% CO_2)
  - C-20 (80% Ar/20% CO_2)
  - C-25 (75% Ar/25% CO_2)
  - 97-3 (97% Ar/3% O_2)
  - He-25 (25% He/75% Ar)

Software Requirements

- Microsoft Windows 7 or newer with latest updates
- At least one (1) USB 2.0 port
- 2 GB RAM
- 1 GB free disk space

Setup for Portable Use

1. The *Gas Tracker* comes with a rechargeable lithium ion battery. Included is a 24 VDC power supply (100 – 240 VAC required). Use the power supply to completely charge the *Gas Tracker* before initial use (complete charge time is two (2) hours) (Fig. 1).
2. Note the gas flow direction on the front of the unit (left to right) (Fig. 2).
3. Install the nozzle cone hose assembly into the inlet (left hand side) of the *Gas Tracker* (Fig. 3). This includes the funnel/hose assembly and a filter which screw into the brass fitting on the unit.
4. Install the exhaust screen fitting on the outlet (right hand side) of the *Gas Tracker* (Fig. 4).

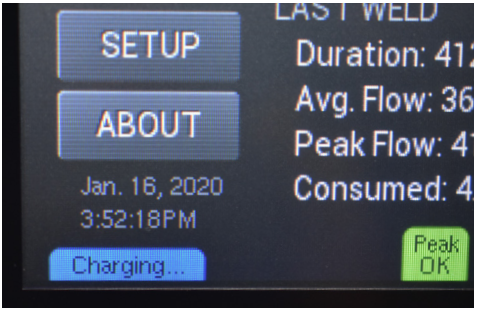


Figure 1

Figure 2

Figure 3

Figure 4

Inline (Fixed) Installation

1. Permanently mount the *Gas Tracker* using the mounting tabs and four holes on the top and bottom of the unit. The unit should be mounted in a location far enough away from the work area to avoid damage from weld spatter, and a 100 – 240 VAC outlet is also required (within 59 in (1.5 m)) for powering the unit. Having the *Gas Tracker* installed near the inlet of the solenoid or past the outlet of the solenoid will increase accuracy of the peak gas flow readings.
2. Connect the *Gas Tracker* inline to the gas supply. The *Gas Tracker* shall **only** be used on the outlet side of the gas regulator. Ensure the inline filter provided with the unit is installed on the inlet side of the sensor.
3. The *Gas Tracker* is designed to accept ¼ inch NPT thread types. Any gas rated fitting with the correct thread type is acceptable. The *Gas Tracker* is not sent with any hose barbs. These must be supplied by the customer. ELCo recommends the use of teflon tape on all threaded fittings. Upon installation, ensure the teflon tape does not cover the orifice of the fittings.
4. Ensure the *Gas Tracker* is installed with the gas flowing from left to right, as indicated with the arrows on the front of the unit (Fig. 2).
5. Using the 24 V power adapter, plug in the *Gas Tracker* to a 100 – 240 VAC outlet. Ensure the cord is not in a location subject to getting pulled or damaged.

- Power on the *Gas Tracker* using the power switch on the front cover. The touch screen interface will now begin to load.
- When the *Gas Tracker* is plugged into the 24 V power supply and charging, the text *Charging* appears along the bottom of the display. When the battery is fully charged, the text *Charging* disappears and is replaced by the text *Fully Charged*.

Initial Setup

- Once the unit is powered on and the touch screen has loaded it must be configured. Configuration requirements are completed in the **Setup** tab (Fig. 5).
- Click **Setup** on the left hand side of the touch screen interface.
- Set the units by clicking the **Units** button. The options are **Metric** and **Imperial**. The current unit variation selected is what the data will be displayed in.
- Select the timezone by clicking the **Timezone** button. Options with NA are for North American time zones and options with EU are for European time zones. Select from the following options (Fig. 6): *NA-Eastern, NA-Central, NA-Mountain, NA-Arizona, NA-Pacific, EU-Western, EU-Central, EU-Eastern, EU-Fthr. East, Asia-China, Asia-Japan, Asia-Korea,* and *Asia-India*. If the necessary timezone is not represented here, the UTC offset can be used. Do this by clicking the UTC Offset button. Select the proper hour offset from UTC. The range goes from -12 hours to +12 hours in 1 hour increments. Upon selecting the time zone, the page will automatically save and return back to the **Setup** page. If the time is incorrect it must be synced to a PC. Use the provided USB cable and the instructions in the **Software** section of the manual under **Information** to complete this task.

Figure 5

Figure 6

- To set the **Gas Type** and **Cylinder Capacity** press the **Gas Setup** button. Under the **Gas Type** text click **Change** to change the gas type. Select the proper gas type from the menu. The options are as follows: *Argon, CO_2, Helium, Nitrogen, 2% CO_2/Ar, 10% CO_2/Ar, 15% CO_2/Ar, 20% CO_2/Ar, 25% CO_2/Ar, 25% He/Ar,* and *3% 0_2/Ar*. Upon selecting a gas mixture, the page will return back to the Gas Setup page.
- Change the Cylinder Capacity by pressing the **Change** button under Cylinder Capacity. The cylinder capacity options are configured on the keypad. A capacity from 1 – 500 CF (1 – 15,000 liters) can be established. The number entered will be in the selected units (cubic feet if imperial and liters if metric) If using bulk gas select the **Bulk** option. Upon selecting an option, the screen will return to the **Gas Setup** page. Click the backwards arrows once the gas type and cylinder capacity have been configured.

Alerts Setup

- To set up alerts, click the **Alerts** button on the **Setup** page. Six alerts can be configured. The alerts are as follows: *Peak Flow, Low Flow, Low Consumption, Cylinder Low, High Flow, and High Consumption*. Set the threshold by clicking on the appropriate alert. Use the keypad to type the desired setting and click **OK**. Each of the alerts must be configured separately from one another. Repeat the steps until the alerts are established to the user's preference.
- Alerts can be disabled by clicking the disable button under each alert threshold configuration.
- Alerts are updated at the completion of a weld.
- Alerts will be seen on the **Home** page as they appear. Alerts that are in a green box means there was no alert. Alerts that are represented in a yellow box show the value fell out of the predetermined range.
- Click the backwards arrow to return to the **Setup** page.

Outputs Setup

- The *Gas Tracker* is capable of 4 outputs mimicking a normally-open relay.
- Each output can be mapped to 1 of the 4 pins.
- The output options are as follows: *Always Off, Always On, Heartbeat, High Flow, Low Flow, Low/High Flow, High Peak Flow, Low Consumed, High Consumed, Low/High Consumed, Cylinder Low.*
- Outputs are further discussed in *Appendix B*.

Modbus Setup

- Modbus is the ability to query information from the unit. It Is best suited for interfacing with a PLC.
- The Modbus explanation and setup instructions are found in *Appendix A*.

Operation and Use

Viewing the Home page

- Click the **Home** button on the screen to go to the main page. The main page shows the most recent weld that has been completed.
- The current flow rate is shown under the **Gas Flow** header along with the appropriate units. This can be tested by purging the gas. The **Gas Flow** will show the real time gas value. The *Gas Tracker* is designed to only record gas consumed when the flow rate is above 5 CFH (2.3 LPM). The duration of the last event is only recorded when the gas is above the 5 CFH (2.3 LPM) threshold.
- Under the **Last Weld** header is the information for the most recent weld. This includes *Duration, Average Flow Rate, Peak Flow,* and *Gas Consumed*. This information will show data from the most recent gas flow event.

Viewing Alerts

- The alerts are shown at the bottom of the **Home** page. If the box with the alert name is green, there was no alert. If the box is yellow, it signifies there was an alert with that weld. Any alerts that are triggered for the most recently completed weld will be shown on the **Home** page.

Viewing the Totalizer

- Each time an event is recorded the gas consumed is added to the totalized gas amount.
- The totalized gas amount can be viewed by clicking the **Totalizer** tab on the left hand side of the screen.
- The totalized page shows the following information: *Last Reset* (Time and Date), *Count* (event count since last reset), *Consumed* (amount of gas consumed since last reset), and *Average Flow* (Average flow rate since last reset).

Viewing Historical Data

- Historical data can be viewed under the **History** page. The **History** page shows the time and date of each weld. It also shows the *Duration, Average Flow Rate, Peak Flow,* and *Gas Consumed* for each specific weld.
- The data can be toggled back and forth using the arrows at the bottom of the page.

Viewing Device Information

- The **About** page shows the *Software Version, Build Date, Calibration Date,* and *Serial Number*.
- Access this data by clicking the **About** tab on the left hand side of the touch screen.

Editing/Refilling Gas Setup

- There are two options to edit the gas settings.
- Option 1 is by clicking the gas remaining bar graph on the right hand side of the touch screen. Option 2 is by clicking the **Setup** tab and then clicking the **Gas Setup** button.
- Once in the **Gas Setup** page, the *Gas Type* and *Cylinder Capacity* can be changed if required. To keep the same *Gas Type* and *Cylinder Capacity* but just do a refill click the **Refill** button. Click *Yes* or *No* accordingly on the pop up and use the back arrow to reverse out to the **Home** page.

Clearing the Totalizer

- The gas **Totalizer** has a clearing function to reset it to zero.
- Complete this task by clicking on the **Totalizer** tab and then clicking the **Reset Total** button at the bottom of the page.
- The most recent reset time will update to the time the button was pressed. The *Count, Consumed,* and *Average Flow* will all say 0 until the next time gas flows through the sensor.
- All gas used after a clear will be tallied and totaled until another clear is done.
- The **Reset Total** button only clears the totalizer and no other data.

Clearing System Data

- If all the weld data is to be cleared from the unit it can be done via the **Clear Data** button found on the **About** tab.
- The **Clear Data** button clears all previously saved events. The only thing not cleared by this is the *Alert* and *Output* settings which have been previously configured.

Changing Alert Settings

- Alert settings are changed by going to the **Setup** tab and then clicking **Alerts**.
- Each alert must be clicked individually and changed to the desired value.
- Begin by clicking the desired alert (example: **Low Flow**).
- In the keypad area press the double arrow to delete the preexisting value.
- Type in the desired value on the keypad.
- Press **OK**.
- If an alert is to be disabled do so with the **Disable** button to the left of the keypad.

Changing Outputs

- Output settings are changed by clicking the **Setup** tab and then clicking the **Output** button.
- Each output can be modified by clicking the button under the output number.
- When selected, the new output replaces the one that was previously configured.
- Use the back button to go back to the **Setup** page.
- Configuring signals via the **Output** information can be found in *Appendix B* of the manual.

Updating the Unit's Time

- Each *Gas Tracker* has multiple time zones that can be selected.
- If the Timezone needs changed, click the **Setup** tab.
- Press the **Timezone** button in the upper right hand corner.
- Select the appropriate time zone.
- If the time is out of sync for any reason the *Gas Tracker* must be connected to a PC. Do this by following the instructions in the *Software Use* section of the manual under Information.

Changing Units

- If the units need changed from *Metric* to *Imperial* or vice versa do so on the **Setup** page.
- After clicking the **Setup** tab, click the button under the text *Units*. The text that shows in the box (ie. *Imperial*) are the units that are selected.

Software Installation

The *Gas Tracker* unit works as delivered as a portable measuring unit, but software is required for use with a computer if monitoring and data exporting features are desired. The *Wire Wizard® Gas and Wire Tracker* software is included on a USB drive and can also be downloaded on the Wire Wizard® website (*wire-wizard.com*). The software requires Windows version 7 or greater. Install the software by double clicking the installer folder. Follow the steps on the screen to complete the installation. Upon completion, press **Finish** and the installation will be complete. Open the newly installed application.

Product Registration

Product registration is required for warranty on this product. The registration page comes up automatically when the software is installed. If the page does not come up automatically it can be found at **wire-wizard.com/register**.

The product must be registered 14 days from purchase for the warranty to be valid.

Using the Software

A *Gas Tracker* must be connected to the computer via a USB cable to be detected by the software. Plug in the provided USB cable to both the *Gas Tracker* and the computer with the *Gas and Wire Tracker* software installed on it. If the *Gas and Wire Tracker* software is not installed, please do so before proceeding.

The *Gas Tracker* must be powered on in order for it to be recognized. Open the *Gas and Wire Tracker* application. After the USB cable is connected to both the computer and *Gas Tracker,* click **Connect to Trackers**. A new window appears with the options of **Cancel** or **Connect to Trackers** (Fig. 7). Click **Connect to Trackers**. If the USB cable becomes disconnected or the *Gas Tracker* is powered off, the connection will be lost. The connection must be re-established by reconnecting the USB cable, powering on the unit, and clicking **Connect to Trackers**.

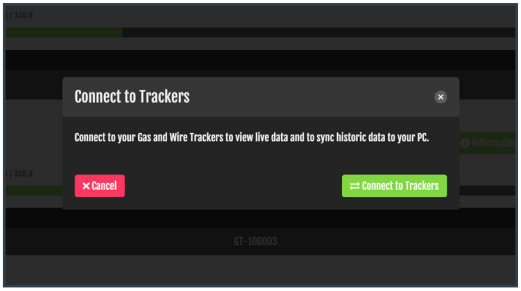


Figure 7

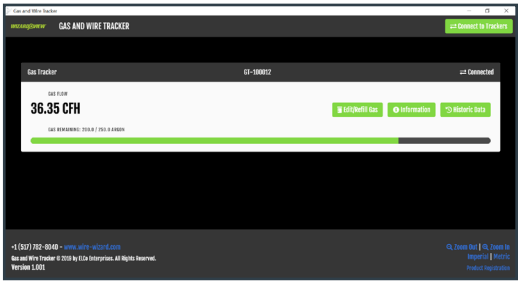


Figure 8

Any tracker that is connected will now appear on the screen (Fig. 8). Each tracker can be denoted by the serial number in the center of the header (example: GT-XXXXXX). The number on the left hand side shows the instantaneous gas flow rate. The bar across the bottom shows how much gas is remaining in the gas cylinder. The green portion of the icon is the visual amount of gas remaining. At the bottom right side of the screen are the options for Metric and Imperial measurement units. The *Gas Tracker* and the *Gas and Wire Tracker* software can be simultaneously running in matching units or in mismatched units if desired. Click the appropriate unit to see the instantaneous flow rate in Cubic Feet per Hour (CFH) (imperial) or Liters per Minute (LPM) (metric).

There is a zoom in and zoom out function for the software. This is located on the bottom right side. There is also a product registration link in the corner. Clicking this link will open a browser to the Wire Wizard® product registration page. Upon registering, new products and updates will be readily available.

There are three buttons on the right side of the screen for each sensor which is connected:

- **Edit/Refill Gas**

  By clicking this icon the gas details can be viewed. On this page the gas type is selected in the **Gas Type** dropdown box. The cylinder capacity can be adjusted by typing in the correct number or using the up and down arrows to toggle. After a change in gas type, the **Update Gas Type and Capacity** button must be clicked. This will update both the *Gas and Wire Tracker* software and the *Gas Tracker* unit. To refill the internal memory of gas, click the blue **Refill Gas** icon. Upon completion of the changes, click **OK**.

- **Information**

  The *Gas Tracker* information can be found on this page. The page shows the type of product, **Serial Number**, **Firmware Version**, **Gas Capacity**, **Gas Remaining**, **Manufacture Date**, and **Current Date**. If the time on the *Gas Tracker* is incorrect, the time may be synced with the computer time by clicking the **Sync Time** icon in the bottom left corner. Upon completion, press **OK** to exit the page.

- **Historic Data**

  The **Historic Data** page shows a graphical representation of the average gas flow rates. The **Start** and **End** dialog boxes represent the time frame displayed on the graph. These can be adjusted by clicking the drop down arrow. Ensure that the start date is always a prior date to the end date. The graph displays the data with the flow rate up the left side (y-axis) and the time scale along the bottom (x-axis). The peak flow is represented in blue and the average flow in green. When the page is scrolled down all of the appropriate data is displayed in columnized form. The **Date/Time**, **Duration (seconds)**, **Average Flow (CFH or LPM)**, **Consumed (cf or l)**, and **Gas Type** are all displayed. A CSV export can be performed on this page as well. Simply click the **Export CSV** button to save a file. Select the appropriate file location and click **Save**. This file can now be viewed using any application which can open CSV files (e.g., *Microsoft Excel*, etc.).

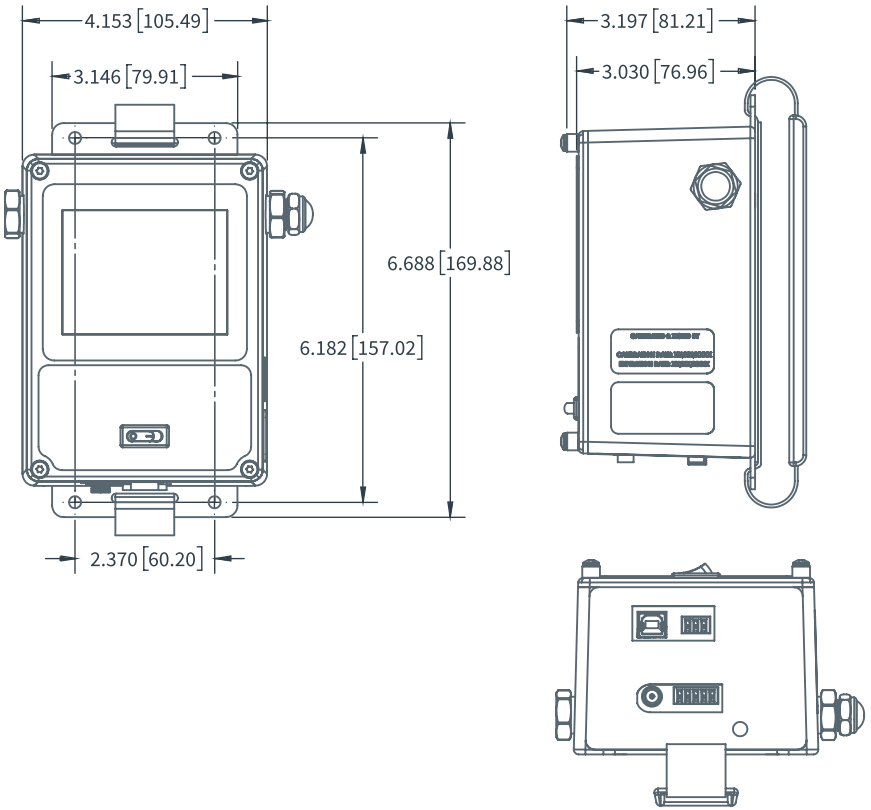
UPDATING THE SOFTWARE

There are two methods for updating the software on your *Gas Tracker*. Option 1 is automatic updates. These will be completed each time the *Gas Tracker* is connected to a PC with the *Gas and Wire Tracker* software installed. Upon connection to the PC, the steps for updating the software will automatically appear. The user has the choice to follow the steps and complete the update or close the window and use the current software. Option 2 is found on the Wire Wizard website (*wire-wizard.com*). Download the newest software of the *Gas and Wire Tracker* software. Follow the install steps as they appear. In both options, the new software will locate and delete the old software files. Upon finishing either option, open the software for continued use.

SENSOR CALIBRATION

The calibration on each *Gas Tracker* is certified for one (1) year. The *Gas Tracker* may be sent back to ELCo Enterprises, Inc. to have the calibration renewed. Each sensor has a calibration sticker with a date and the initials of the certification specialist. A Certificate of Calibration is included with each *Gas Tracker* unit. Sensor recalibration is available through ELCo by ordering part number WC-1-GS-5.

DIMENSIONS



PARTS LIST

- Gas Line Adapter Fitting and Filter (part number WC-1-GS-S-001)
- Power Adapter 24 V (part number WC-1-GS-S-PA)
- Sensor Recalibration (part number WC-1-GS-RECAL)
- USB Cable – 6 ft. (part number WC-1-GS-S-USB)
- Hand Strap (part number WC-1-GS-S-STRAP)
- Hose Assembly (part number WC-1-GS-RH)
- Portable Use Outlet Filter (part number W0970530053U)

TROUBLESHOOTING

Name	Description
Trouble connecting to a sensor	Ensure *Gas and Wire Tracker* software is installed Ensure the sensor is plugged in via the USB cable. Ensure the unit is powered on. If it is not saying “Connected to PC” it is likely a cable or driver issue. The sensor uses generic Windows USB Serial drivers, which are included with the Windows operating system. Verify a USB Serial device exists in Device Manager.
Gas Tracker will not turn on	Ensure the power switch on the front cover is turned to "On." Ensure the battery is charged or the unit is plugged in. Ensure the power supply is plugged into a working outlet rated for the proper voltage.
Screen is frozen	Ensure the gas flow does not exceed the rated operating flow rate (50 LPM, 100 CFH). Perform a power cycle on the unit to reset the display.
Negative number on display	Ensure the gas is flowing the proper direction through the *Gas Tracker*.
Incorrect date or time	Ensure the correct timezone is selected in the setup page of the *Gas Tracker*. Sync Time to the *Gas and Wire Tracker* software in the Information page.
Displaying the wrong units	Change the units in the **Setup** page of the *Gas Tracker*. Change the units at the bottom of the page on *Gas and Wire Tracker* software.
Charging icon not showing	Ensure the power adapter is plugged into a functional receptacle. Ensure the barrel connector is fully inserted in the *Gas Tracker*.
Sensor is giving false readings	Ensure the sensor still falls within its calibration dates. Check the *Gas Tracker* against a different sensor or gauge to check the data validity. Ensure the correct gas composition is selected in the **Setup** page. Ensure the *Gas Tracker* is in the proper units
Low gas flow	Check if there is adquate gas flow. Ensure the inline filters are not plugged.

APPENDIX A

Modbus Integration

Overview

The *Gas Tracker* supports integration with a PLC or personal computer through Modbus RTU over RS-485 or USB. RS-485 is preferred for integrating with PLCs or other embedded devices. Using the USB interface may be more convenient when integrating with a personal computer. This interface allows the user to query unit status like gas flow rates, remaining gas in cylinder and to retrieve alert statuses.

When connected to a personal computer through USB, thew device will appear as a COM port. Modbus requests can be sent over this virtual serial port. Serial port settings such as baud rate and parity have no influence on the virtual serial port and can be set to anything. The USB interface always identifies as Modbus device ID 0x01.

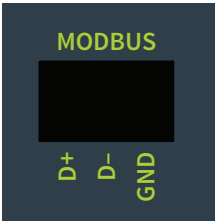
The RS-485 interface provides more configuration options. The user can specify the baud rate and parity options by clicking **Setup** in the left menu and then pressing **Modbus** on the **Setup** page. The baud rate can be set to either 4800 or 9600. The parity can be *None, Even* or *Odd*. As per the Modbus specification, two stop bits are used with None parity, and one stop bit is used with Even and Odd parities. If the bus is shared, match the baud rate and parity to that of other devices on the bus, otherwise a baud of 9600 and a parity of None are the best defaults.

Modbus has been an industry standard since 1979, and with minor changes in the early years, has remained largely unchanged. Because of its longevity, it has a large presence in factory automation and control.

Connector

The Modbus connector is Euro-style (also referred to as a Euro Block) 3.5mm pitch screw terminal connector. Replacements can be purchased from a handful of suppliers.

- Phoenix Contact, BCP Series #5441210
- Adam Tech, EB Series #EBKA-03-A



Overview

Modbus is a request/response protocol, where memory items are accessed by an identifier number. Memory items come in four different types and are named for the legacy purpose of controlling relay hardware.

- Coils are used to trigger actions on the Tracker, in this way they function as commands.
- Discrete inputs are used to read status and warning information.

Type	Access	Data Type	Address Range
Coil	Read/Write	Boolean	00001-09999
Discrete Input	Read-Only	Boolean	10001-19999
Holding Register	Read/Write	16-bit	40001-49999
Input Register	Read-Only	16-bit	30001-39999

- Input registers contain measure values.
- Holding registers contain configuration values which can be changed by the user

It should be noted that 16-bit registers can be signed or unsigned integers. Always refer to the supporting documentation to verify if the data in a register should be treated as a signed or unsigned quantity.

Larger values many need to be represented as long integers (32-bit). A special extension to the Modbus specification is utilized to store these as two contiguous registers. As with 16-bit integers, always check the supported documentation to understand if these quantities are signed or unsigned. Values are stored with the least significant word in the lower addressed register.

The Tracker supports all Class 0 and Class 1 function codes except for Read Exception Status. This code does not apply to the Tracker.

For more information about command formats, please review the following publicly-available documents:

Modbus Application Protocol V1.1b3
Published by Modbus Organization, Inc.
http://www.modbus.org/docs/Modbus_Application_Protocol_V1_1b3.pdf

Modbus Protocol Reference Guide
Published by Modicon, Inc. (now Schneider Electric), Made Available by Modbus Organization, Inc.
http://modbus.org/docs/PI_MBUS_300.pdf

Modbus Register Definitions

Coils

Coil	Name	Description
00001	Metric Units	Setting to 1 causes the display to show in Metric units. Setting to 0 causes the display to show in Imperial units. This does not affect data available in Modbus registers, which are always in Imperial units.
00003	Restart Application	Resets the *Gas Tracker* software by triggering the unit to reboot itself.
00021	Store Gas Settings	Persists the updated gas type and cylinder volume.
00022	Refill Gas	Refills the gas remaining to 100% of the cylinder capacity.
00031	Persist Time	Persists the current timestamp to a hardware RTC.
00041	Reset Totalizer	Resets the totalizer to zero consumption.
00101	Clear Data	Commands the unit to erase all weld events in its memory. This also resets the totalizer and restarts the application.

Discrete Inputs

Discrete Input	Name	Description
10001	Charging	Indicates that the AC power adapter is connected, and the unit is charging.
10002	Fully Charged	Indicates that the AC power adapter is connected, and the unit has completed charging.
10003	Heartbeat	Toggles roughly every second to indicate the unit is running.
10011	Gas Flowing	High whenever gas is flowing through the *Gas Tracker*.
10012	High Peak Flow Warning	Triggered after a weld completes, if the flow exceeded the peak threshold. Resets with the next weld.
10013	Low Flow Warning	Triggered after a weld completes, if the average flow was less than the threshold. Resets with the next weld.
10014	High Flow Warning	Triggered after a weld completes, if the average flow was more the threshold. Resets with the next weld.
10015	Low Consumption Warning	Triggered after a weld completes, if the volume of gas consumed was less than the threshold. Resets with the next weld.
10016	High Consumption Warning	Triggered after a weld completes, if the volume of gas consumed was more than the threshold. Resets with the next weld.
10017	Low Cylinder Warning	Triggers any time the amount of gas remaining in the cylinder is less than the threshold. Resets when the cylinder is refilled.

Input Registers

Input Register	Name	Description
30001	Identifier	Always equal to 0x31C0. Used a signature to identify this as a Tracker.
30002	Firmware Version	Firmware version running on the Tracker. 1014 equals 1.014.
30021	Instantaneous Gas Flow	Gas flow reading in hundredths of cubic feet per hour as a signed value.
30022	Remaining Gas Capacity	Gas capacity remaining in hundreds of cubic feet as an unsigned value.
30031	Last Weld Duration	Duration of last weld event in tenths of seconds as an unsigned value.
30032	Last Weld Average Flow	Average flow from last weld event in hundredths of cubic feet per hour as an unsigned value.
30033	Last Weld Peak Flow	Peak flow from last weld event in hundredths of cubic feet per hour as an unsigned value.
30071	Totalizer Count	Number of welds in the totalizer as an unsigned value.
30072, 30073	Totalizer Duration	Duration of all welds in the totalizer in tenths of a second. Occupies two registers, is a 32-bit unsigned value.
30074, 30075	Totalized Consumption	Gas consumption of all welds in the totalizer in hundredths of cubic feet. Occupies two registers, is a 32-bit unsigned value.

Holding Registers

Holding Register	Name	Description
40001	Unit Type	This read-only register will identify this unit as: 1: *Gas Tracker* 2: *Wire Tracker* Others: Reserved for future use
40021	Gas Type	An enumerated value representing the current gas type: 81: Argon 82: CO_2 83: Helium 84: Nitrogen 91: 2% CO_2, Argon 93: 10% CO_2, Argon 94: 15% CO_2, Argon 95: 20% CO_2, Argon 96: 25% CO_2, Argon 100: 25% Helium, Argon 105: 3% Oxygen, Argon Others: Reserved for future use Be sure to write to Store Gas Setting coil to persist after power cycle.
40022	Cylinder Capacity	Represents the cylinder capacity in hundredths of a cubic foot. (i.e., 33000 equals 330 CF) This is an unsigned value. Be sure to write to Store Gas Setting coil to persist after power cycle.

APPENDIX B

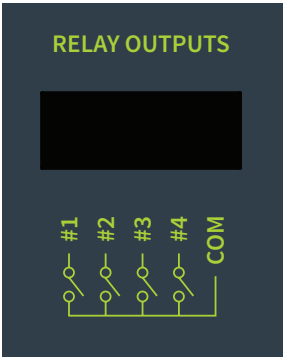
Outputs

Overview

The *Gas Tracker* supports integration with a PLC or a stack light through the IO connector. This provides warning and operational statuses.

To provide the greatest flexibility, the outputs operate as a dry relay contact. They behave as normally-open contacts which close when a warning is raised. Statuses are mapped to each output by clicking **Outputs** on the **Setup** page.

These relay contacts are solid state relays. Solid state relays are more durable than traditional relays but are more susceptible to damage from overcurrent. Be careful to limit the amount of current through each contact to less than 100mA. The contacts are fused with a self-resetting link, but care should be taken to not exceed 100mA of instantaneous current. The solid state relays can switch up to 60V of AC or DC current.



If you suspect damage to an output, set it to *Always On* mode to test that it is functional. A multimeter in resistance or diode mode can be used to confirm that the relay is closed. Typical on-state resistance is around 2 ohms.

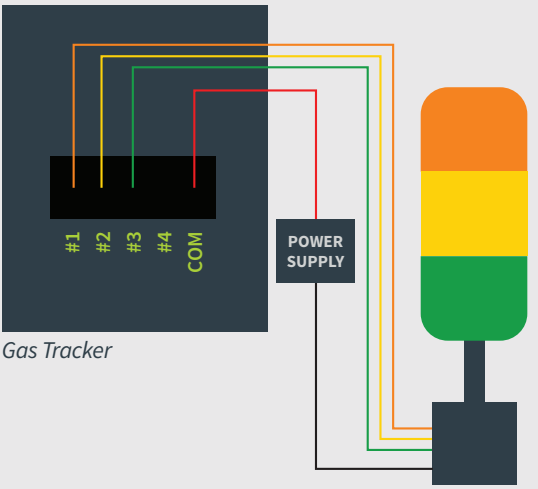
Connector

The relay connector is Euro-style (also referred to as a Euro Block) 3.5mm pitch screw terminal connector. Replacements can be purchased from a handful of suppliers.

- Phoenix Contact, BCP Series #5441236
- Adam Tech, EB Series #EBKA-05-A

Example

Integration with a Stack Light; outputs 1 – 3 are used.



Gas Tracker

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