WIRE WIZARD
WELDING PRODUCTS

WIRE TRACKER™
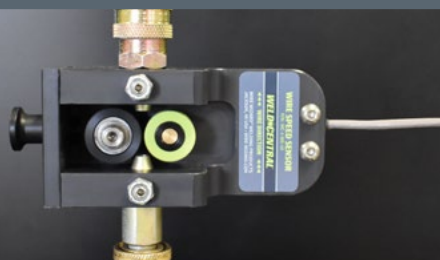### PORTABLE OR IN-LINE GAS FLOW MONITOR

INSTALLATION & OPERATION MANUAL

Installation, Maintenance and Warranty Information

WIRE TRACKER MONITOR

WIRE FEED SENSOR

OPTIONAL MOTOR CURRENT SENSOR

SHIP DATE

SERIAL #

ACCURATE WIRE TRACKING & MONITORING IN ONE DEVICE

The **Wire Tracker™ Digital Wire Monitor** provides an easy way to monitor and track wire in robotic or semi-automatic MIG welding applications. The device may be mounted in-line for 24/7 monitoring or used as a portable unit to check wire usage per weld or wire feed speed. It provides a simple and accurate method for monitoring and totalizing wire consumption, or measurement and verification of wire feed speed.

▶ Tracks and totalizes wire consumption — an easy way to determine wire usage per weld and amount of time a wire package will last

▶ Install in-line for constant monitoring or use as a portable device to check and verify wire feed speed and wire usage (rechargeable li-ion battery included)

▶ Includes Wire Speed Sensor to monitor wire feed speed (WFS) and wire consumption

▶ Optional Motor Current Sensor monitors workload on the wire feeder to detect wire feeding issues

▶ Monitors wire remaining and sends alert when wire package is low

▶ Detects and sends alerts on wire feeding issues

▶ Documents historical data for each weld, including: Timestamp, Duration, Average wire feed speed (WFS), and Wire Consumed. Data is downloadable via USB connection to a PC.

▶ PLC connectivity allows automated alert functions

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INTRODUCTION

Congratulations on your purchase of the Wire Tracker™ data collection system. Each Wire 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.

Wire Tracker™ offers the capability to monitor wire feed speed, motor current, and wire usage 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 Wire 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: _____

The Wire 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: 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 Wire 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
- ▶ Modbus RTU interface for PLC
- ▶ Normally-open relay contacts for stacklight or PLC

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

Wire Feed Sensor

- ▶ Range: 0 – 900 ipm
- ▶ Weight: 0.93 lbs (420 g)
- ▶ Dimensions: width: 5.25" (133 mm); height: 5.25" (133 mm); depth: 2.25" (57 mm)
- ▶ Input Power: 5 VDC
- ▶ Output Signal: 0 – 5 VDC
- ▶ Accuracy: +/- 3% (Full Scale)
- ▶ Wire Size Restrictions: Accepts up to .078 (2mm) wire

Wire Feed Sensor

Motor Current Sensor — Optional Add-on

- ▶ Range: 0 – 5 A
- ▶ Weight: 0.29 lbs (128 g)
- ▶ Dimensions:
  - ▷ Sensor: width: 1" (26 mm); height: 1.75" (44 mm); depth: 1.5" (38 mm)
  - ▷ Connector Junction: width: 2.75" (70 mm); height: 3.25" (82 mm); depth 1.25" (30 mm)
  - ▷ Cable Length: 11" (280 mm)
- ▶ Input Power: 5 VDC
- ▶ Output Signal: 0 – 5 VDC
- ▶ Accuracy: +/- 2% (Full Scale)

Motor Current Sensor

Installing Sensors
Wire Feed Speed Sensor

⚠ **Disconnect all power before servicing any equipment**

1. Cut and remove the welding wire back to the wire package.

2. Disconnect the wire delivery system from the wire package.

3. Install the wire feed speed sensor at the wire package. An example of this would be on the wire drum, on top of the hood. Refer to the wire feed direction arrows on the sensor to ensure that the sensor is installed in the proper orientation.

4. Reconnect the wire delivery system.

5. Feed wire back through the wire delivery system. The wire sensor has a spring-loaded tensioner that keeps pressure against the wire. Pull up on the handle to allow for easier feeding of the wire back through the sensor.

6. Release the tensioner handle, forcing both wheels to be in contact with the wire.

7. Connect the wire feed sensor cable (WC-1-WS-C-20) to the Weld Central unit.

8. Route the cables so they are protected from any moving parts and so they are safely secured for personnel in the area.

9. Reenergize all necessary equipment.

Wire Feed Sensor

Optional Mounting with PAWFS-12 Probe

Alternatively, the Wire Feed Sensor may be mounted to the drum hood using part # PAWFS-12 (Fig. 1). The probe will thread directly into the direct pull attached to the drum hood (replaces quick disconnect). This is only recommended if the sensor is in a location likely to get knocked loose.
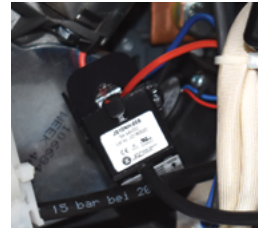

PAWFS-12
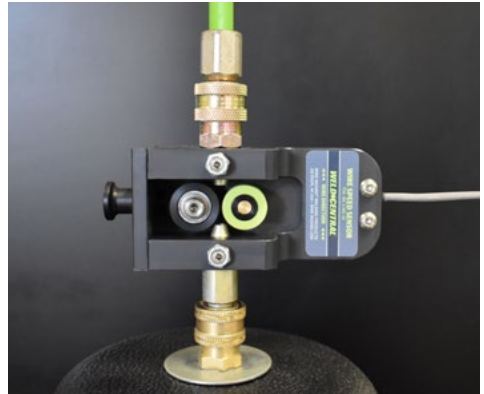
Figure 1

Optional Motor Current Sensor

⚠ **Disconnect all power before servicing any equipment**

1. Remove the wire feeder cover if there is one.

2. Locate the wires that supply the wire feeder with current. There are typically two larger wires that go into the feed motor. The larger wires are typically black and white or red and blue.

3. Open the split core Hall effect sensor (attached to motor current sensor).

4. Place it around one of the two larger wires. The direction of this sensor does not matter.

Motor Current Sensor

5. Close the sensor, ensure it clicks fully closed or you will get inaccurate data.

6. Feed the motor current cable (WC-1-MS-C-20) through the feeder and connect it to the motor current sensor. A hole may need to be drilled through the cable if there is not one provided by the wire feeder manufacturer.

7. Securely fasten the motor current sensor.

8. Reinstall the wire feeder cover, if applicable.

Split Core Sensor (attached to Motor Current Sensor)

9. Route the cables so they are protected from any moving parts and so they are safely secured from personnel in the area.

10. Connect the motor current cable (WC-1-MS-C-20) to the Weld Central unit.

11. Reenergize all necessary equipment.

Inline (Fixed) Installation

1. Permanently mount the Wire 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. Make sure the main unit can be placed within 20 feet of both sensors.

2. Using the 24 V power adapter, plug in the Wire Tracker™ to a 100 – 240 VAC outlet. Ensure the cord is not in a location subject to getting pulled or damaged.

3. Connect Cable for the Wire Feed Speed Sensor.

4. Connect Cable for the Motor Current Sensor (If monitoring Motor Current).

5. A power cycle is recommended before collecting data.

Figure 2

Figure 3

Setup for Portable Use

The Wire Tracker™ may be used as a portable device, most commonly with the wire sensor for checking wire feed speed or measuring the amount of wire consumed per weld or assembly. It may also be used with the motor current sensor, however inline installation is recommended for measuring the wire feeder workload.

1. The Wire 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 Wire Tracker™ before initial use (complete charge time is two (2) hours) (Fig. 2).

2. Connect cable for Wire Feed Speed Sensor (Wire Feed Speed Sensor required).

3. Connect cable for Motor Current Sensor (If monitoring Feed Motor Current).

4. A power cycle is recommended before collecting data.

OPERATING INSTRUCTIONS

▶ Power on the Wire Tracker™ using the power switch on the front cover (Fig. 4). The touch screen interface will now begin to load.

▶ When the Wire 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*.

Figure 4

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 one hour increments. Upon selecting the time

Figure 5

Figure 6

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.

▶ To set the **Wire Type** and **Wire Package Capacity**, press the **Wire Setup** button. Under the **Wire Type** text, click **Change** to change the wire type. Select the proper wire type from the menu. The options are as follows: *Steel, Aluminum, Silicon Bronze, Metal Core, Flux Core.* Upon selecting a wire type, the page will return to the **Wire Setup** page.
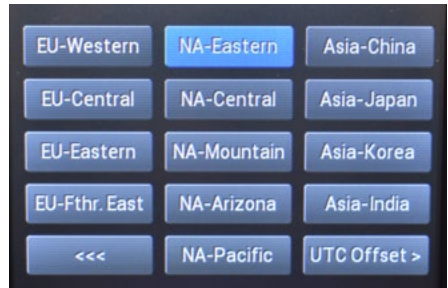
- **Wire Density Calculator (Unit)**
  If you do not know your wire density you can use the Wire Tracker's built in **Wire Density Calculator**. To access this function, select the **Setup** tab. Once in the **Setup** page, select the **Wire Setup** button to go to the **Wire Setup** page. From here, select the **Change** button underneath **Wire Type**. Once in the **Wire Type Setup** page, navigate to the **Wire Density** section and select the **Calculate** button. From here, input the **Wire Length (Feet or Meters)**, **Wire Weight (Ounces or Grams)**, and the unit will calculate the wire density (Pounds per inch³, or Grams per centimeter³). Once the Wire Tracker™ calculates your density, select the **Apply** button and this will apply the calculated density to the **Wire Setup** page.

- Change the Wire Package Capacity by pressing the **Change** button under Package Capacity. The wire package capacity options are configured on the keypad. A capacity from 1 – 2000 lbs (1 – 1000 kg) can be established. The number entered will be in the selected units (lbs if imperial and kg if metric). Upon selecting an option, the screen will return to the **Wire Setup** page. Click the backwards arrows once the wire type and Package Capacity have been configured.

Alerts Setup

- To set up alerts, click the **Alerts** button on the **Setup** page. Six alerts can be configured (Fig. 7). The alerts are as follows: *Motor Current, Package Low, Low WFS, High WFS, Low Consumption Threshold, and High Consumption Threshold*. 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 desired alert settings are established.
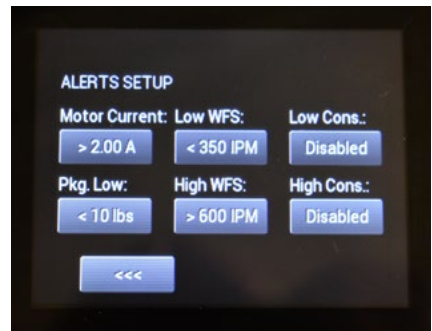

Figure 7

- 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** screen as they appear. Alerts that are in a green box means there was no alert and the previous weld was within parameters. Alerts represented in a yellow box signal the value fell out of the predetermined range.

- Click the backwards arrow to return to the **Setup** page.

Outputs Setup

- The Wire 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 WFS, Low WFS, Low/High WFS, High Motor Current, Low Consumed, High Consumed, Low/High Consumed, or Package 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.*

PIN Code Protection

The Wire Tracker™ includes a PIN code feature to protect the unit from someone modifying any settings. There are two methods for configuring a PIN code: first, you can press the **Lock** button located in the top right corner of the screen. Second, you can select the **Setup** tab. This will take you to the **Setup** screen where you will select the PIN code button. From here, you can set a four-digit PIN code for the unit. When you lock the unit, the **Lock** button in the top right corner will turn grey and show a locked symbol, this will only lock the **Setup** tab. If you ever forget your password, you can still enter the system using the master unlock code 5750. This must be entered three times to enter the system. Once you enter the master code, the previous code will still work but you will also have the ability to set a new PIN code.

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 WFS is shown under the Wire Feed header along with the appropriate units. Motor Current is displayed under the WFS in amps. This can be tested by running a section of wire out of the feeder. The **Wire Feed** will show the real time WFS value. The Wire Tracker™ is designed to only record wire consumed when the length of time, of the event, is above 0.2 seconds.

Figure 8

▶ Under the **Last Weld** header is the information or the most recent weld. This includes *Duration, Average WFS, Average Motor Current,* and *Wire Consumed*. This information will show data from the most recent wire feed 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 wire consumed is added to the totalized wire amount.

▸ The totalized wire amount can be viewed by clicking the **Totalizer** tab on the left-hand side of the screen (Fig. 9).

▸ The totalized page shows the following information: *Last Reset* (Time and Date), *Count* (event count since last reset), *Consumed* (amount of wire consumed since last reset).

Figure 9

Viewing Historical Data

▸ Historical data can be viewed under the **History** tab (Fig. 10). The **History** page shows the time and date of each weld. It also shows the *Timestamp, Duration, Average WFS, Average Motor Current,* and *Wire Consumed* for each specific weld.

▸ The data can be toggled back and forth using the arrows at the bottom of the page.

Figure 10

Viewing Device Information

▸ The **About** page shows the *Software Version, Build Date,* and *Serial Number*.

▸ Access this data by clicking the **About** tab on the left-hand side of the touch screen (Fig. 11).

Editing/Refilling Wire Setup

▸ There are two options to edit the wire settings:

  ▷ Option 1 is by clicking the wire remaining bar graph on the right-hand side of the touch screen.

  ▷ Option 2 is by clicking the **Setup** tab and then clicking the **Wire Setup** button.

▸ Once in the **Wire Setup** page (Fig. 12), the *Wire Type and Package Capacity* can be changed if required. To keep the same *Wire Type and Package 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.

Figure 11

Figure 12

Clearing the Totalizer

▶ The wire **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 and Wire Consumed* will all say 0 until the next time wire feeds through the sensor.

▶ All wire 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 WFS**).

▶ 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 Wire Tracker™ has a list of time zones that can be set based on the unit's location.

▶ If the Timezone needs to be changed, click the **Setup** tab.

▶ Press the **Timezone** button in the upper right-hand corner.

▶ Select the appropriate timezone.

▶ If the time is out of sync for any reason the Wire 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 to be 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 (i.e., *Imperial*) are the units that are selected.

Software Installation

The Wire Tracker™ unit 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.
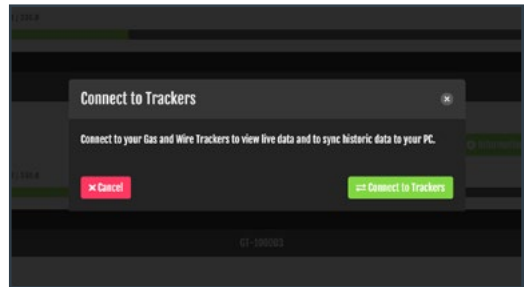
Using the Software

A Wire 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 Wire 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 Wire Tracker™ must be powered on for it to be recognized. Open the Gas and Wire Tracker application.

Figure 13

After the USB cable is connected to both the computer and Wire Tracker™, click **Connect to Trackers**. A new window appears with the options of **Cancel** or **Connect to Trackers** (Fig. 13). Click **Connect to Trackers**. If the USB cable becomes disconnected or the Wire 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**.

Any tracker that is connected will now appear on the screen (Fig. 14). Each tracker can be denoted by the serial number in the center of the header (example: WT-XXXXXX). The number on the left-hand side shows the instantaneous WFS, and Motor Current. The bar across the bottom shows how much Wire is remaining on the wire package. The green portion of the icon is the visual amount of wire remaining. At the bottom right hand side of the screen are the options for Metric and Imperial measurement units. The Wire 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 WFS, and Motor Current.
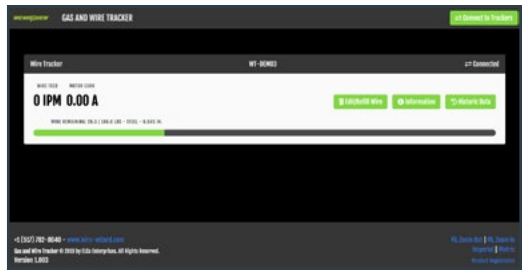

Figure 14

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 Wire**
Clicking this icon will take you to the Wire Details screen. On this page, the wire type is selected in the **Wire Type** dropdown box. The package capacity can be adjusted by typing in the correct number or using the up and down arrows to toggle. The Wire Density can either be adjusted by typing in the correct number or using the up and down arrows to toggle. If you do not know the Wire Density you can use the Wire Density Calculator in the software. After a change in wire type, the **Update Wire Type and Capacity** button must be clicked. This will update both the Gas and Wire Tracker software and the Wire Tracker™ unit. To refill the wire in the internal memory, click the blue **Refill Wire** icon. Upon completion of the changes, click **OK**.

▶ **Wire Density Calculator (Software)**
Note: If the Wire Density has already been set on the unit, this should not require adjustment in the software.

To navigate to the **Wire Density Calculator**, select the **Edit/Refill Wire** button. This takes you to the **Refill Wire** screen, from here select the **Wire Density Calculator** button to open the **Wire Density Calculator**. Insert your **Wire Length (Feet or Meters)**, **Wire Weight (Ounces or Grams)**. The software will then calculate your density and once you click the green **OK** button it will save your wire density in the software. To finalize the density, you must select the blue **Update Wire Type and Capacity** button to save your changes to the **Refill Wire** page.

▶ **Information**
The Wire Tracker™ information can be found on this page. The page shows the type of product, **Serial Number, Firmware Version, Package Capacity, Wire Remaining, Manufacture Date,** and **Current Date**. If the time on the Wire 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 wire feed speed and Motor Current (Fig. 15). 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 wire feed

Figure 15

speed up the left side (y-axis) and the time scale along the bottom (x-axis). The average Motor Current is represented in blue and the average WFS in green. When the page is scrolled down all the appropriate data is displayed in columnized form. The **Date/Time, Duration (seconds), Average WFS (IPM or MM/S), Average Motor Current (A), Consumed (lbs or kg),** and **Wire 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.).
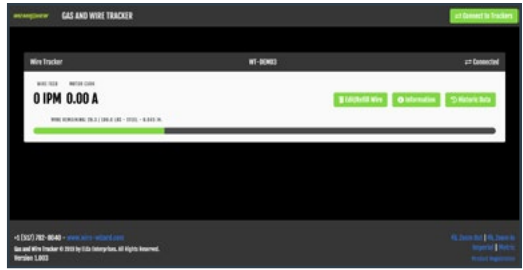
► **Tracking Wire Feed Time**

In order to track **Total Wire Feed Time**, you will first need to select the given time frame for the data you wish to track before exporting. If data is already exported, select the times you would like to totalize. Once you have the time frame for the welds you would like to track, sum up the durations to find your Total Wire Feed Time. Since the Wire Tracker tracks any Wire Feeding Event that is over 0.2 seconds in duration, this will not be an accurate method of tracking "Total Arc-On Time." In order to effectively track Arc-On Time, a Weld Central® Optimization System is recommended.

UPDATING THE SOFTWARE

There are two methods for updating the software on your Wire Tracker™. Option 1 is automatic updates. These will be completed each time the Wire 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 sensor that comes with the Wire Tracker™ is certified for one (1) year. The Wire Feed Speed Sensor (WC-1-WS-18) and the Motor Current Sensor (WC-1-MS) 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 sensor recalibration and is available through ELCo by ordering part number WC-1-WS-18-RECAL to have the WFS Sensor (WC-1-WS-18) recalibrated or WC-1-MS-RECAL to have the Motor Current Sensor (WC-1-MS) recalibrated.

DIMENSIONS
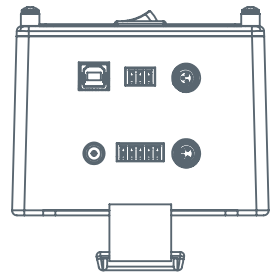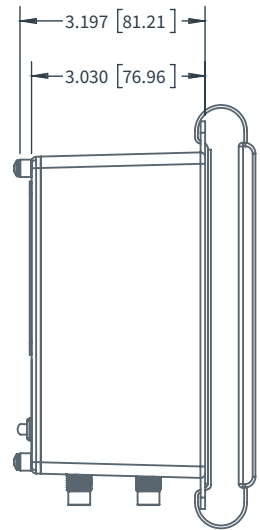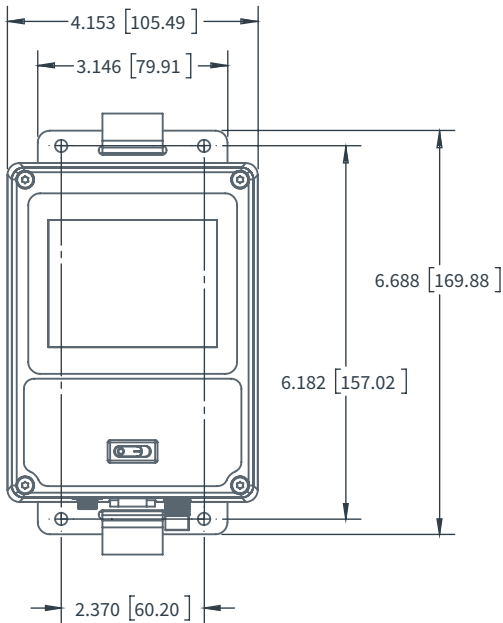
PARTS LIST

▶ Power Adapter 24 V (P/N: WC-1-GS-S-PA)
▶ USB Cable – 6 ft. (P/N: WC-1-GS-S-USB)
▶ Hand Strap (P/N: WC-1-GS-S-STRAP)
▶ Wire Feed Speed Sensor (P/N: WC-1-WS-18)
  ▷ Wire Feed Speed Sensor Recalibration (P/N: WC-1-WS-18-RECAL)
▶ Motor Current Sensor (P/N: WC-1-MS)
  ▷ Motor Current Sensor Recalibration (P/N: WC-1-MS-RECAL)

TROUBLESHOOTING

Motor Current Sensor

Name	Description
Sensor reading is 0	Ensure there is a secure cable connection on both the sensor and the Weld Central unit Ensure the cable is in good working condition Ensure the sensor is installed on the proper wire in the wire feeder Ensure the sensor is only around one wire in the feeder
Sensor reading is inaccurate	Ensure the sensor is within calibration Ensure the sensor is installed on the proper wire in the wire feeder and fully closed

Wire Feed Speed Sensor

Name	Description
Sensor is reading a negative number	Ensure the sensor is installed in the proper orientation to the direction of wire feed
Sensor reading is 0	Ensure there is a secure cable connection on both the sensor and the Wire Tracker™ unit Ensure the cable is in good working condition Ensure the encoder wheel is spinning while wire is feeding
Sensor reading is inaccurate	Ensure the wheel (Green Wheel) on the encoder is not damaged or worn down and sensor is within calibration

Wire Tracker™

Name	Description
Trouble connecting to Wire Tracker to PC	Ensure Gas and Wire Tracker software is installed Ensure the Wire Tracker™ 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.
Wire 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	Perform a power cycle on the unit to reset the display.
Negative number on display	Ensure the wire is feeding through the sensor in the proper direction.
Incorrect date or time	Ensure the correct timezone is selected in the setup page of the Wire 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 Wire 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 Wire Tracker™.
Sensor is giving false readings	Ensure the sensor still falls within its calibration dates.
	Check the Wire Tracker™ against a different sensor or gauge to check the data validity.
	Ensure the correct Wire Type and Diameter is selected in the **Setup** page.
	Ensure the Wire Tracker™ is in the proper units

APPENDIX A

Modbus Integration

Overview

The Wire 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 such as wire feed speed, remaining wire in package and to retrieve alert statuses.

When connected to a personal computer through USB, the 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 any values. The USB interface always identifies as Modbus device ID 0x01.

The RS-485 can interface supporting ID's 1-16, this is configurable on the touchscreen in the Modbus Setup Page. 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.

On the **Modbus Setup** screen, the "Status of the Modbus Settings" is shown. "COMMS OK" means the Wire Tracker is receiving Modbus traffic that is addressed to it. "COMMS INACTIVE" means the Wire Tracker is not receiving any Modbus Traffic that is addressed to it. "COMMS ERROR" means the Wire Tracker is receiving traffic that is not recognized as Modbus. This is likely because the settings are incorrect. Check the Baud Rate and Stop Bit Settings.

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) 3.5 mm 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
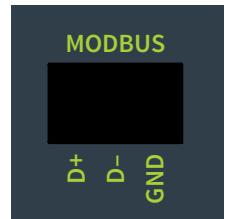
MODBUS
D+ D− GND

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™ or Wire Tracker™ software by triggering the unit to reboot itself.
00026	Store Wire Settings	Persists the updated wire type, diameter, density and package weight.
00027	Refill Wire	Refills the wire remaining to 100% of the package 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.
10004	Locked	Indicates if the display is locked with a PIN Code.
10021	Wire Moving	High whenever wire is moving through the WFS sensor.
10022	High Motor Amps Warning	Triggered after a weld completes if the motor current exceeded the threshold. Resets with the next weld.
10023	Low WFS Warning	Triggered after a weld completes if the average WFS was less than the threshold. Resets with the next weld.
10024	High WFS Warning	Triggered after a weld completes if the average WFS was more the threshold. Resets with the next weld.
10025	Low Consumption Warning	Triggered after a weld completes if the mass of wire consumed was less than the threshold. Resets with the next weld.
10026	High Consumption Warning	Triggered after a weld completes if the mass of wire consumed was more than the threshold. Resets with the next weld
10027	Low Package Warning	Triggers any time the amount of wire remaining in the package 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 Gas or Wire Tracker.
30002	Firmware Version	Firmware version running on the Tracker. 1014 equals 1.014.
30026	Instantaneous WFS	WFS reading in whole number inches per minute, as a signed value.
30027	Instantaneous Motor Current	Motor current reading in hundredths of an amp, as a signed value.
30028	Remaining Wire	Remaining wire in the package, in ounces.
30031	Last Weld Duration	Duration of last weld event in tenths of seconds as an unsigned value.
30036	Last Weld Average WFS	Average WFS from the last weld event in whole number inches per minute as an unsigned value.
30037	Last Weld Average Motor Current	Average motor current from last weld event in hundredths of amps as a signed value.
30071	Totalizer Count	Number of welds in the totalizer as an unsigned value.
30074, 30075	Totalized Consumption	Wire consumption of all welds in the totalizer in hundredths of ounces. 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
40026	Wire Type	An enumerated value representing the current wire type: 113: Steel 114: Aluminum 115: Silicon Bronze 116: Metal Core 117: Flux Core Others: Reserved for future use Be sure to write to Store Wire Setting coil to persist after power cycle.
40027	Wire Capacity	Total capacity of the wire package (spool or drum) in ounces.
40028	Wire Diameter	Diameter of the wire, in thousandths of inches.
40027	Wire Density	Density of the wire, in thousandths of pounds per cubic inch.

Outputs

Overview

The Wire 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.
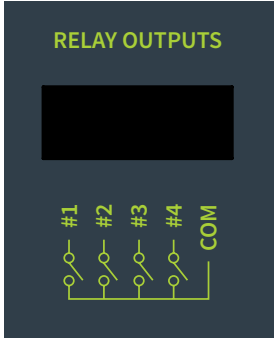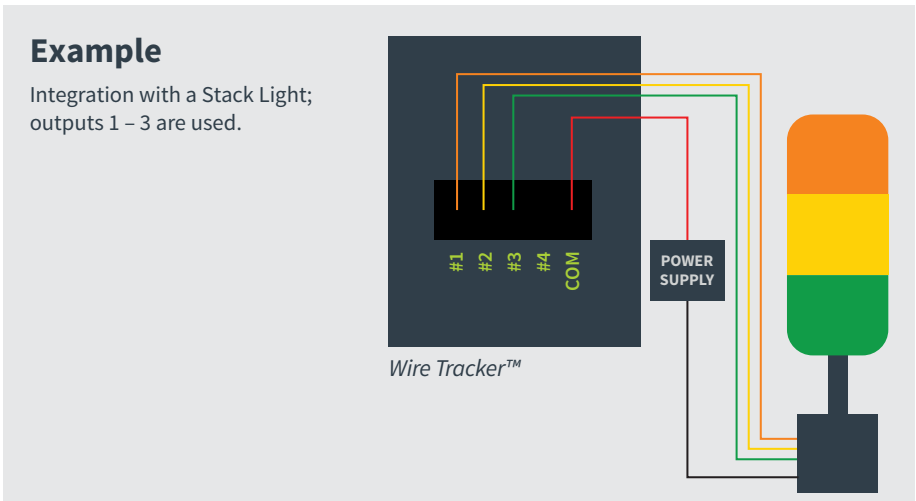
These relay contacts are solid state relays. Solid state relays are more durable than traditional relays but are more susceptible to damage from overcurrent. Be careful to limit the amount of current through each contact to less than 100mA. The contacts are fused with a self-resetting link, but care should be taken to not exceed 100mA of instantaneous current. The solid state relays can switch up to 60 V 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) 3.5 mm 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.

Wire Tracker™

NOTES

WIRE WIZARD
WELDING PRODUCTS

ELCo Enterprises, Inc. • Jackson, Michigan USA
Service & Support: 517.782.8040

wire-wizard.com