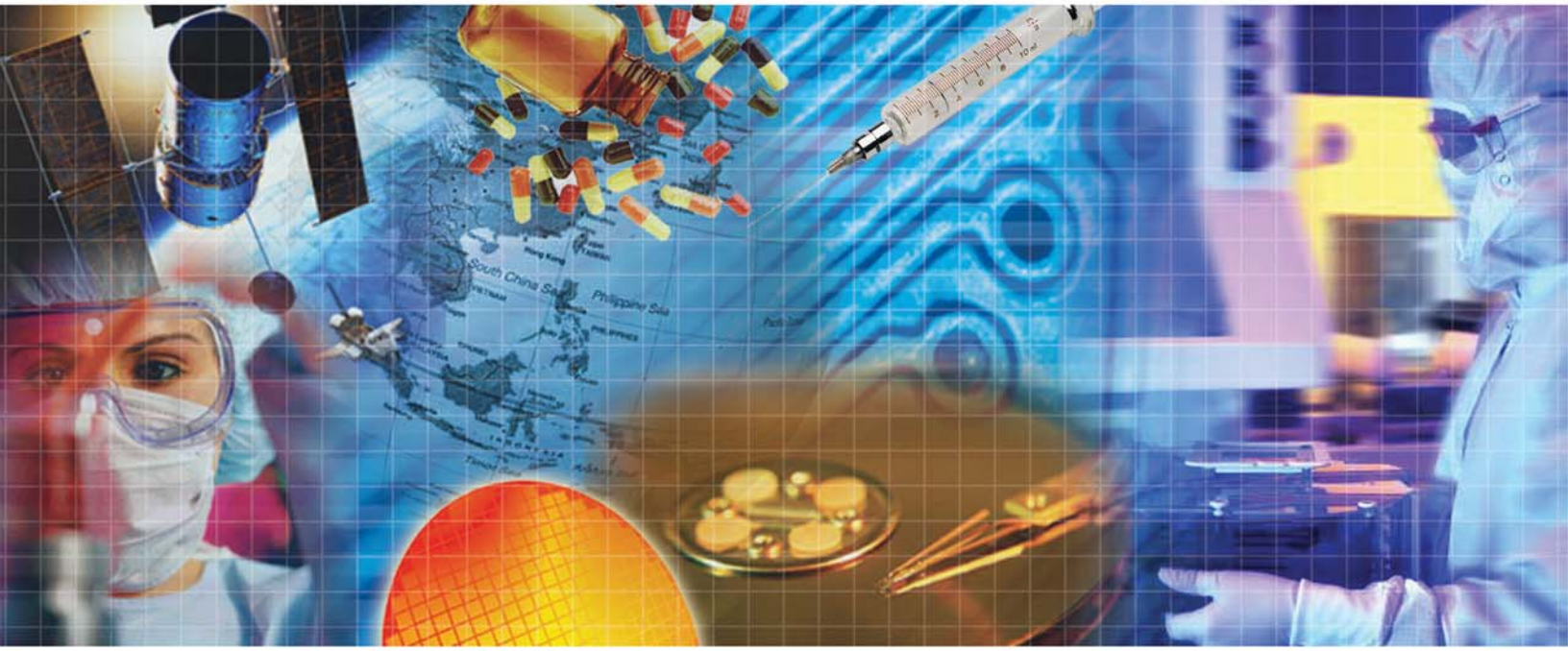


LIGHTHOUSE
WORLDWIDE SOLUTIONS
Technology That Counts!

# Differential Pressure Sensor

Installation Guide

# *Lighthouse Worldwide Solutions*

***Differential Pressure Sensor***

***Installation Guide***

Copyright © 2011 by Lighthouse Worldwide Solutions.  All rights reserved. No part of this document may be reproduced by any means except as permitted in writing by Lighthouse Worldwide Solutions.

The information contained herein constitutes valuable trade secrets of Lighthouse Worldwide Solutions. You are not permitted to disclose or allow to be disclosed such information except as permitted in writing by Lighthouse Worldwide Solutions.

The information contained herein is subject to change without notice. Lighthouse Worldwide Solutions is not responsible for any damages arising out of your use of the LMS program.

LMS™ and ECS™ are trademarks of Lighthouse Worldwide Solutions.

Microsoft®, Microsoft Windows™, and Excel™, Internet Explorer™ are trademarks of Microsoft Corporation.

LWS Part Number 248083377-1 Rev 2

# *Table of Contents*

## About this Manual



## Chapter 1 General Safety



## Chapter 2 Installation



## Index

# *About this Manual*

This manual describes the installation of the Lighthouse Differential Pressure Sensor.

## Text Conventions

The following typefaces have the following meanings:

**Note:** *A note appears in the side bar like this to give more information about a topic. Usually, the topic is to the right of the note in the main text area.*

**WARNING:** ***A warning appears in a paragraph like this and warns that doing something incorrectly could result in personal injury, damage to the instrument or loss of data.***

| | |
|---|---|
| *italics* | Represents information not to be typed or interpreted literally. For example, *file* represents a file name. Manual titles are also displayed in italics. |
| **boldface** | Introduces or emphasizes a term. |
| `Courier font` | Indicates command syntax or text displayed by the diagnostic terminal. |
| **`Bold Courier`** | Indicates commands and information that you type. |
| *Helvetica Italics* | Indicates a comment on a command or text output. |

Hexadecimal numbers are shown with the word “hex” or with a small “h” following the digits. For example:

```
hex 0D
0Dh
```

## Additional Help

For more information about Lighthouse Differential Pressure Sensor, contact Lighthouse Worldwide Solutions.

| | |
|---|---|
| (800) 945-5905 | Sales and Service |
| (541) 770-5905 | Outside of USA |

www.golighthouse.com
techsupport@golighthouse.com

# 1 General Safety

## General Safety

Warnings and cautions are used throughout this manual. Familiarize yourself with the meaning of a warning before operating the instrument. All warnings will appear in the left margin of the page next to the subject or step to which it applies. Pay close attention to each warning message. Take extreme care when performing any procedure preceded by or containing a warning.

The international Caution symbol may be found on the rear of the instrument next to the RS-232/485 IN port. If so, the symbol will be accompanied in this manual with a warning about +24VDC being present on the connector pin-7 when instrument power is applied.

**WARNING:** ***+24VDC is present on some LWS instruments RS-232/485 IN port when power is applied to the counter.***

# 2 Installation

**Installation of any devices or equipment that require wiring or cabling within a facility should have that wiring installed, as well as any required support equipment, before this document is used. It may be necessary to involve facility IT personnel to complete any connections involving facility wiring.**

## Overview

The Lighthouse Worldwide Solutions (LWS) *Differential Pressure Sensor* (***DPS*** or ***DP***) may come configured for use with the LWS *Sensor Interface Unit* (***SIU DPS***) (uses a DB-15 connector), as the *Instrument DP* or as the *System Control Cabinet DP.* These three configurations are noticeably different in how they look, as shown in Figure 2-1, but perform the same function and may be calibrated to the same operating parameters.


**SIU DPS**


**Instrument DPS**

**System Control Cabinet DPS**

**Figure 2-1 The Different DPS Configurations**

**Note:** *4-20mA devices use 3-wire or 2-wire configurations. It is unwise to configure a device improperly - the device may be damaged as a result. Contact Lighthouse Technical Support for additional information.*

Operating parameters include the range and the accuracy, such as 0-0.5” WC ± 0.1 and signal output, such as 0-5VDC or 4-20mA.

Signal output is very specific and 4-20mA devices cannot be used in a 0-5VDC environment and 0-5VDC devices cannot be used in a 4-20mA environment.

## Definitions of Terms Used

This list is provided for the convenience of the user or technician.

- WC - Water Column; a measurement of pressure equivalent to ’X’ inches of water.
- DP - Differential Pressure; a measurement or detection of the difference between two atmospheric pressure zones in inches of water, inches of mercury or Pascals.
- 4-20mA - a network communication scheme that uses low current to indicate conditions based on the amount of current (from four milliamps to twenty milliamps) generated.
- Overpressure - the pressure difference relative to "normal" or "ambient" pressure in various circumstances.

The Differential Pressure Sensors have two ports. One for detection of high pressure and one for detection of low pressure. Inside the sensor is a tensioned stainless steel diaphragm and electrode that can handle up to 10 PSI Overpressure (Δp).

---

**WARNING:** ***Do not tap fingers or objects over the ports, as this could cause damage to the diaphragm and electrode and void the warranty.***

***Make sure that air lines are off/depressurized before attaching them to the sensor ports.***

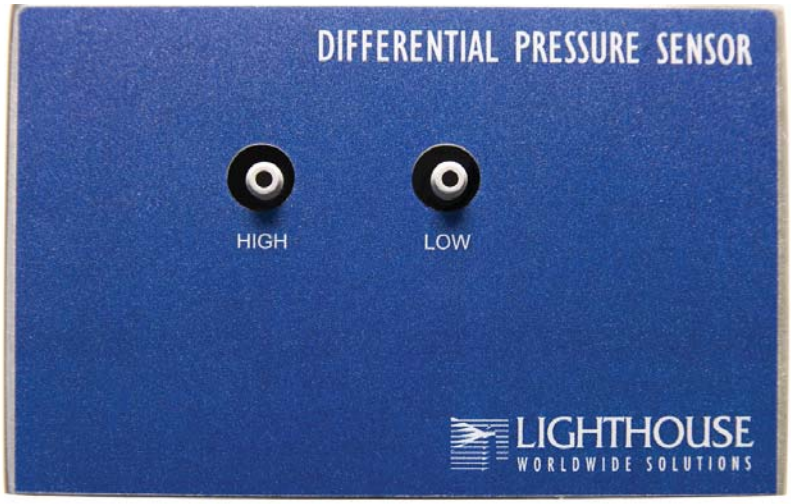



**Figure 2-2 High/Low Pressure Ports**

## SIU DPS

The SIU DP Sensor operates at 4-20mA and is configured to connect to a Sensor Interface Unit (SIU) through a DB-15 connector. See Figure 2-3.

**Figure 2-3 SIU DPS DB-15 Connector**

Table 2-1 shows the DB-15 pinout for the analog connector on the SIU.

**WARNING:** ***Miswiring the cable may damage the SIU board or the sensor. Be careful not to reverse polarity on any of the lines.***

**Table 2-1 SIU Connector Pinout**

| Pin | Assignment |
|---|---|
| 1 | Chassis GND |
| 2 | CH1- |
| 3 | CH1+ |
| 4 | CH2- |
| 5 | CH2+ |
| 6 | ST1- |
| 7 | ST1+ |
| 8 | Reserved |
| 9 | GND |
| 10 | 24VDC or DI+ |
| 11 | DI- |
| 12 | DO+ |

**Table 2-1 SIU Connector Pinout**

| Pin | Assignment |
|---|---|
| 13 | DO- |
| 14 | 24VDC |
| 15 | GND Return |

The sensor is not self-powered and is wired negative/- and positive/+ to pins 2 and 3 respectively. The sensor is powered by 24VDC at pin 14 on the SIU and returns 4-20mA to Pin 3. Figure 2-4 shows the wiring between the DP Sensor and the SIU.

**Note:** *Ensure that CH1- at pin 2 is tied to GND Return at pin 15 on the SIU connector.*

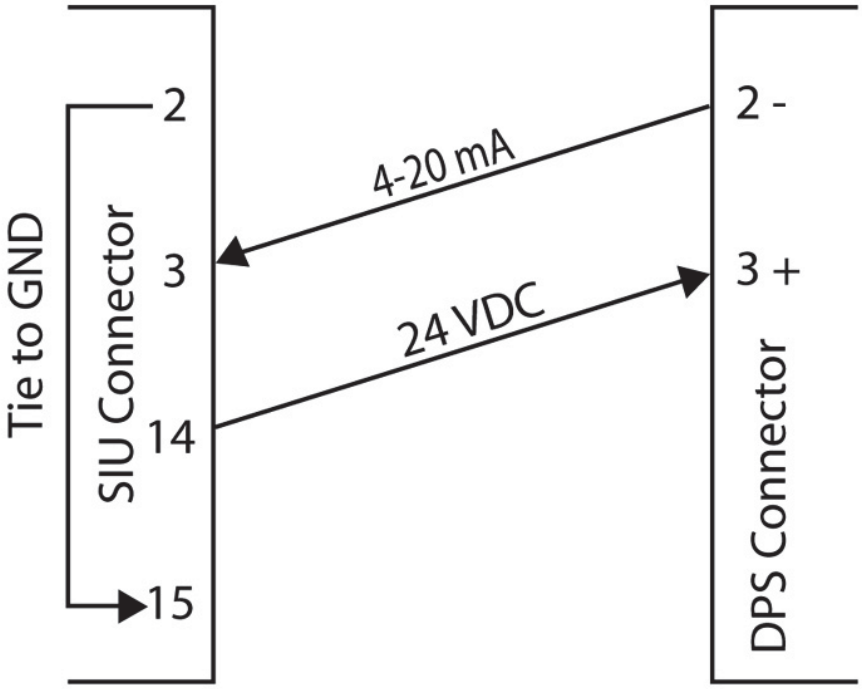



**Figure 2-4 SIU DPS: Loop Power Wiring**

## Instrument DPS

The Instrument DP Sensor is configured to connect to the 4-20mA analog port of an instrument such as a Solair particle counter or Mini-Multiplexer using an RJ-12 cable. See Figure 2-5.

**Figure 2-5 Instrument DPS RJ-12 Connector**

### Connecting to a Solair

The sensor can be directly connected to a Solair analog port without any additional wiring modifications. The connector pinout for the Solair Particle Counter is shown in Table 2-2.

**Table 2-2 Analog Connector Pinout**

| Pin Number | Function |
|---|---|
| 1 | 5VDC |
| 2 | Analog #1 In |
| 3 | 24VDC (VCC) |
| 4 | GND (Tied to Pin 6) |
| 5 | Analog #2 In |
| 6 | GND |

**WARNING:** ***Wiring the pins in reverse order may harm the instrument and/or the sensor and void their respective warranties.***

If the user is wiring a cable to use with an instrument from another manufacturer, please note that the connectors on telephone cables are mirror images of each other. For that reason the color coding has not been included in the table.

The Instrument DP Sensor in not self-powered. The sensor's RJ-12 connector is wired with COM/- at pin 5 and the EXC/+ at pin 3. See Figure 2-6. The sensor is powered with 24VDC from the Solairs pin 3 and returns 4-20mA to pin 5.

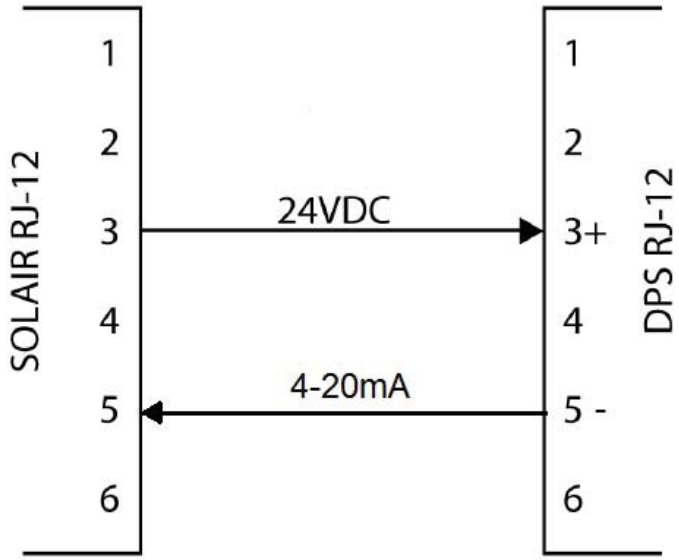



**Figure 2-6 SOLAIR to DP Sensor Wiring**

### Connecting to a Mini Multiplexer

The Instrument DP Sensor can also be connected to a Mini Multiplexer, which uses a 10-pin terminal block. Table 2-3 shows the pinouts for the Mini Multiplexer.

**Table 2-3 Mini-Multiplexer Pinout**

| Pin Number | Analog Channel |
|---|---|
| 1 | 24VDC |
| 2 | GND |
| 3, 5, 7, 9 | Analog Channel + |
| 4, 6, 8, 10 | Analog GND |

Figure 2-7 shows the wiring diagram for connecting the DP Sensor to the terminal block on a Mini Multiplexer. Power is supplied from terminal 1 of the Mini Multiplexer to pin 3 of the DP Sensor. Pin 5 of the DP sensor returns the 4-20mA to terminal 3 on the Mini Multiplexer.

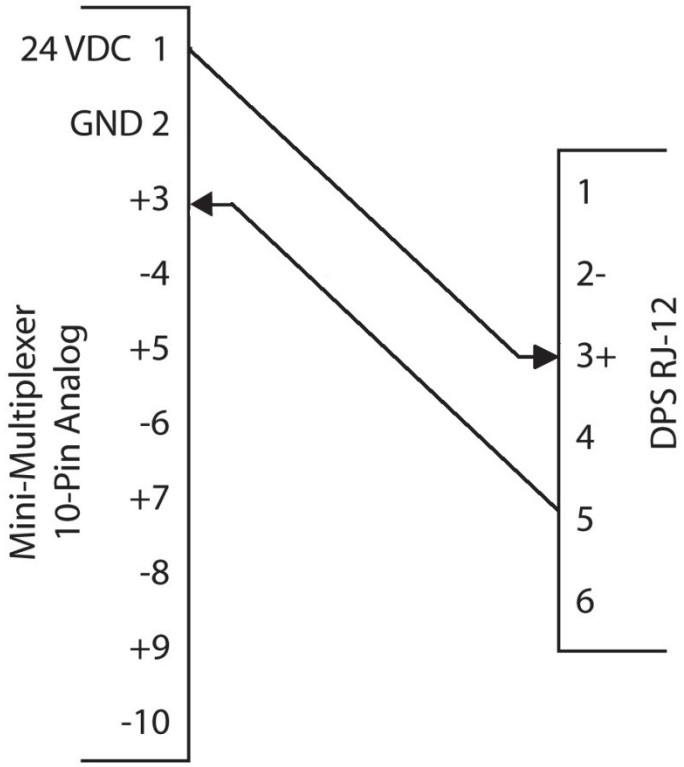



**Figure 2-7 Mini-Multiplexer to DP Sensor Wiring**

## System Control Cabinet DPS

The System Control Cabinet DP Sensor is designed to monitor duct and static pressure in large areas and can be configured to operate at 4-20mA or 0-5V/0-10V.

The sensor allows for selectable WC ranges, unidirectional/ bidirectional mode, LCD display and automatic zero adjustment. See Figure 2-8.

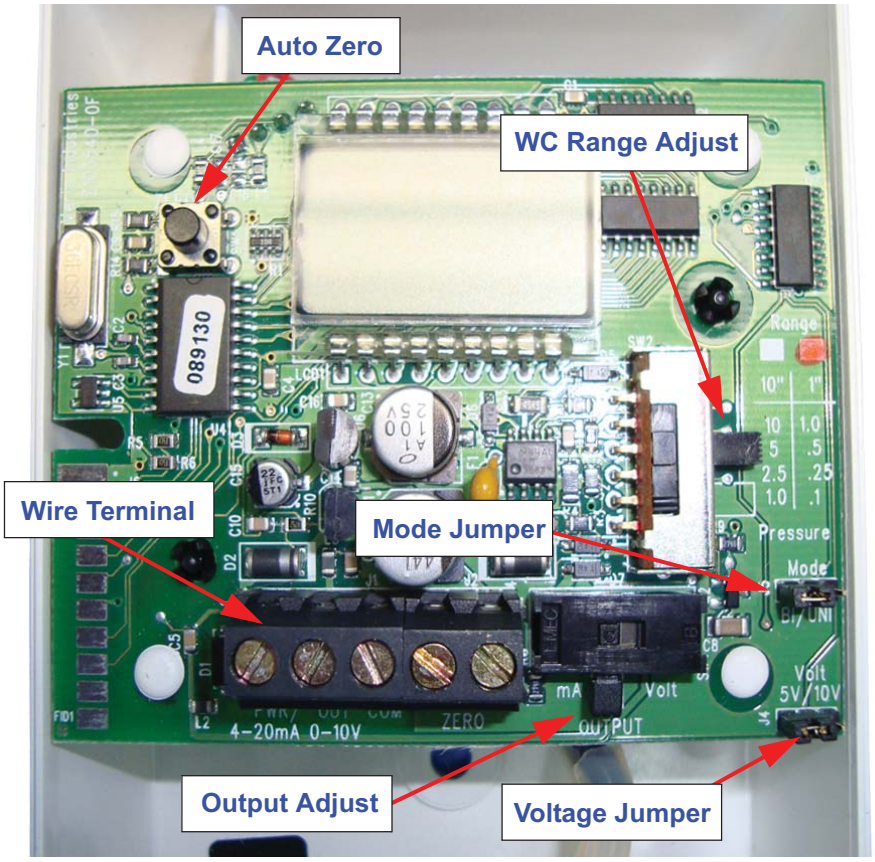



**Figure 2-8 System DPS Adjustments**

**Note:** *If voltage is selected for the output, ensure that the voltage jumper is set to the correct voltage (5V or 10V).*

4-20mA or 0-5V/0-10V Output is selected by the Output Adjustment switch and wiring is connected from the terminal block to a digital control box and power source.

For professional installation of the System Control Cabinet DP Sensor: Contact Lighthouse Sales and Service at (800) 945-5905.

Figure 2-9 shows the wiring diagram for a 2-wire, 4-20mA setup.

**WARNING:** ***If wiring the sensor for 4-20mA: Do not apply power to output terminal. Permanent damage will result.***

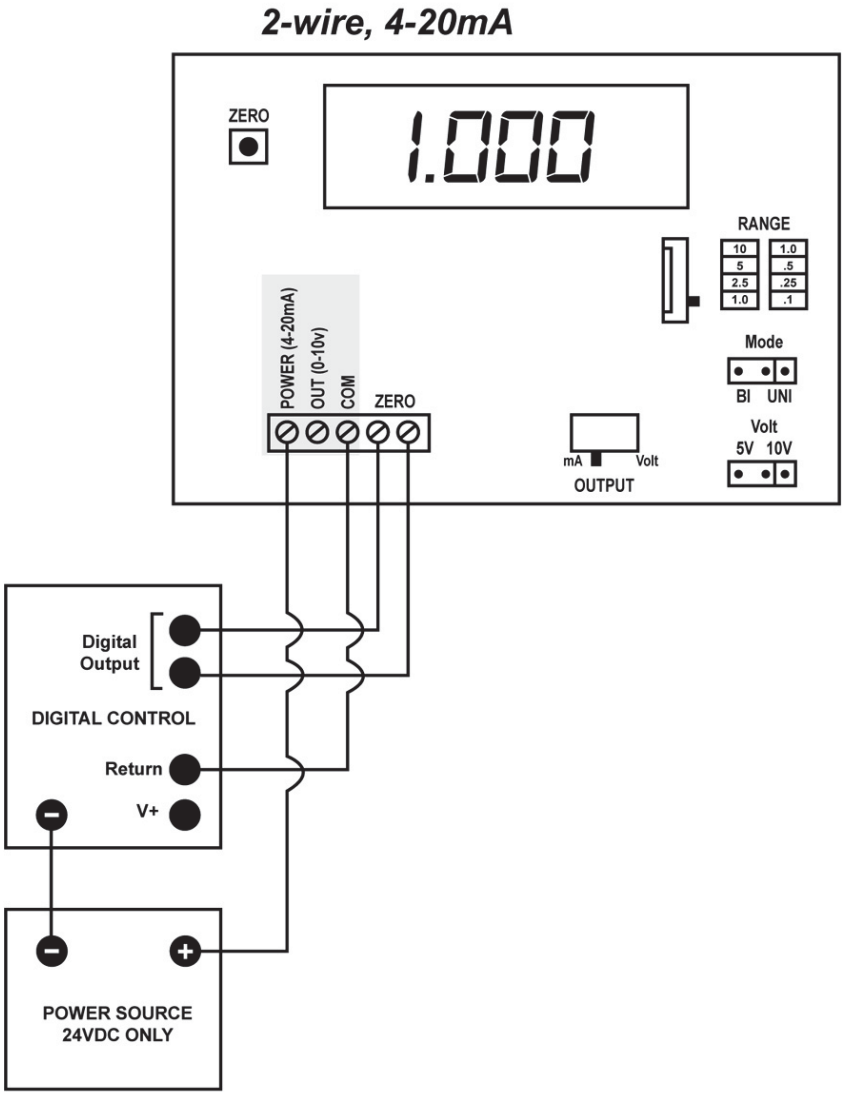



**Figure 2-9 2-wire, 4-20mA System DP Wiring**

Figure 2-10 shows the wiring diagram for a 3-wire, 0-5V/0-10V setup.

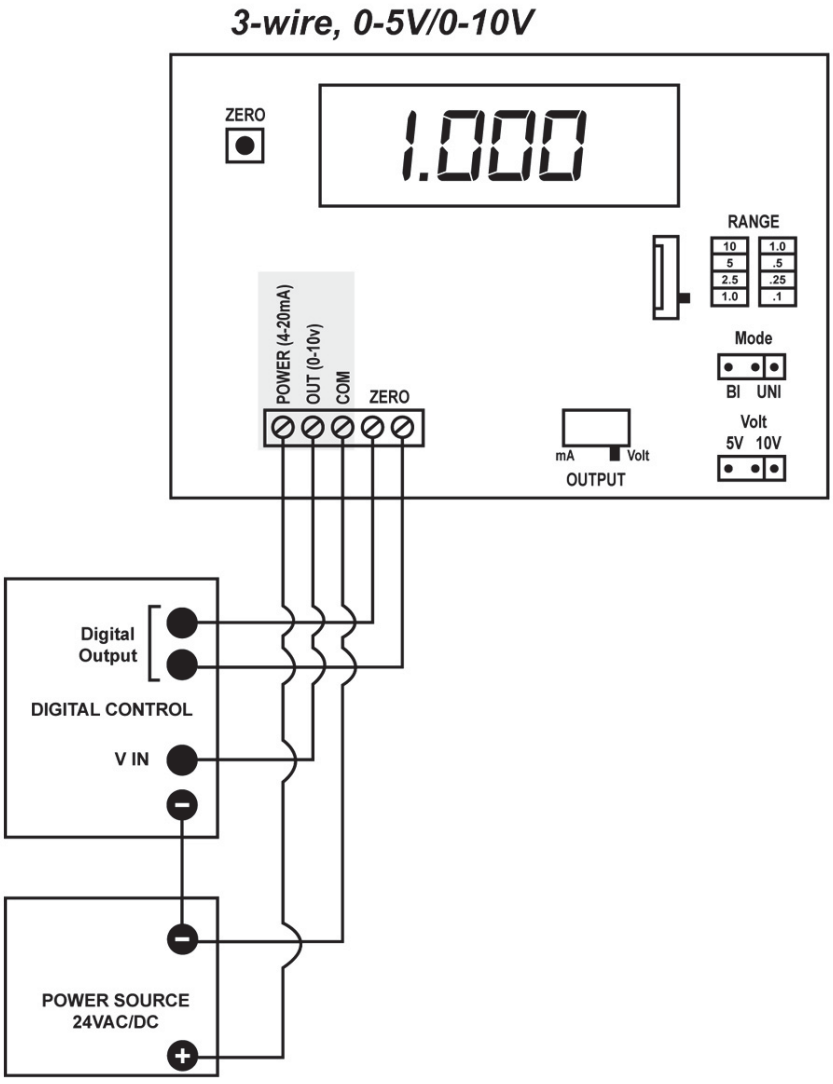
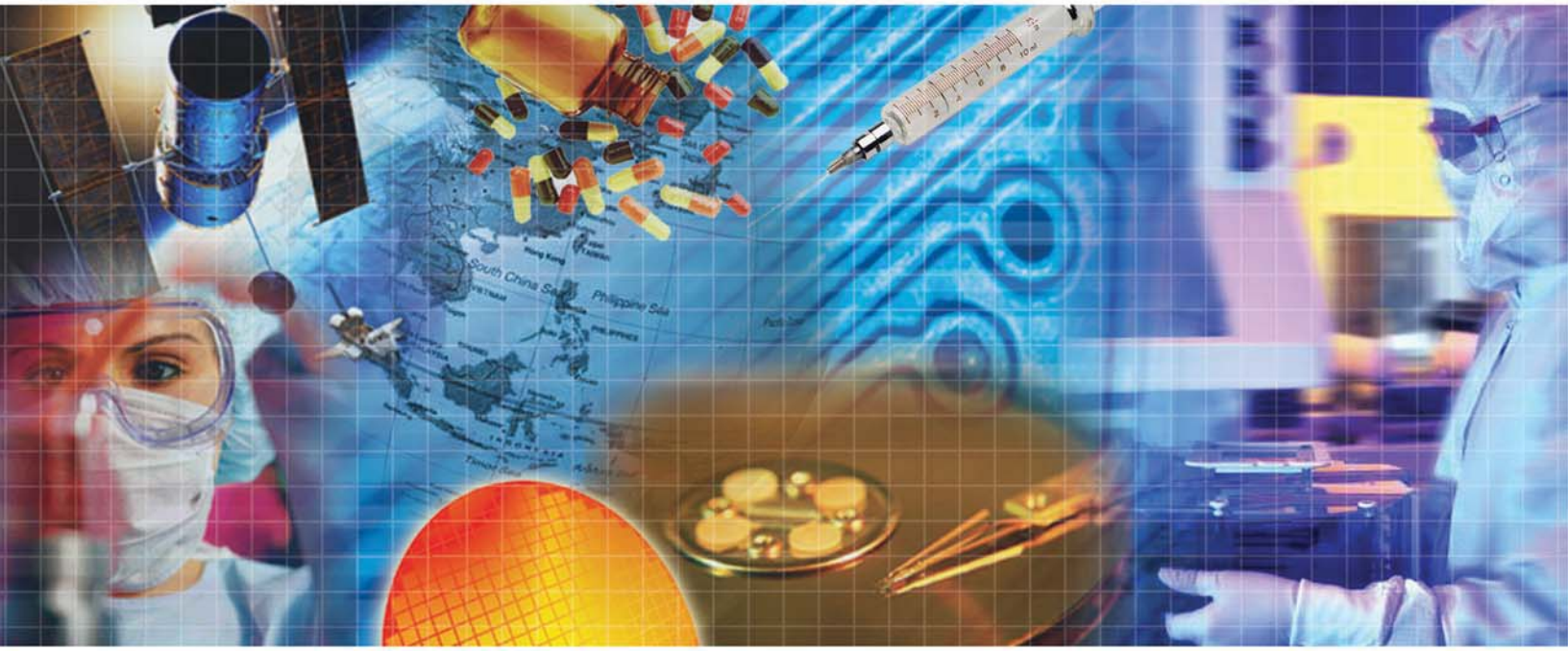



**Figure 2-10 3-Wire, 0-5V/0-10V System DP Wiring**

# *Index*




LIGHTHOUSE
WORLDWIDE SOLUTIONS

**Sales and Service 800-945-5905**

**www.golighthouse.com**
**techsupport@golighthouse.com**