

# CONTENTS

Chapter 1.....	Description
Chapter 2.....	Installation
Chapter 3.....	Operation
Chapter 4.....	Omega Viewer
Chapter 5.....	Specifications

# Chapter 1

## Description

The DP470V is designed as a fully programmable digital process indicator and miniature datalogger. The unit will accept either 0-10 Vdc or 4-20 mA input and is fully scalable from -999 to +9999 display counts. Scaling and decimal point placement is selectable through the front panel keys. PROGRAM (P) and PROCESS (L) status are indicated by a green, .4" seven segment LED located to the right of the main display.

The displays are 0.56" in-line red LED type. The menu driven display prompts and 14-segment alphanumeric characters make programming simple. A single dash (-) displayed at the left of the readout indicates a negative reading. Positive readings are inferred (no dash displayed). Overload is indicated by an 'OL' on the display. Plus OL (+OL) indicates a positive over range condition. Negative (-OL) indicates a negative over range condition. The DP470V Series is powered by a 100-240Volt, 50-400Hz AC source and uses a switching power supply for maximum input power flexibility.

Serial communications is standard, either RS232 or RS485. This bi-directional serial port allows the user complete program set-up, programming and operational capability. All controls and features are selectable through the front panel. The front panel lens may be removed to install or remove the program lockout jumper or fine tune the analog output if necessary. Power and serial connections to the meter are made to the rear of the instrument via a removable Euro-

style terminal block. Sensor connections are made by screw terminals also on the rear of the instrument.

Minimum and Maximum values are always available for viewing. On the Basic model (no options), the information is accessible through the front panel menu system. Configuration settings are stored in on-board memory and are not affected by power loss.

<u>RS-232 Models</u>	<u>RS-485 Models</u>	<u>Description</u>
DP470-V-C2	DP470-V-C4	Base Meter
DP471-V-C2	DP471-V-C4	Meter with Dual Alarms
DP472-V-C2	DP472-V-C4	Multi-channel Input Meter
DP473-V-C2	DP473-V-C4	Meter with Analog Out Voltage
DP474-V-C2	DP474-V-C4	Meter with Analog Out Current

<u>Power Options</u>	<u>Description</u>
-12VDC	8 to 15 Vdc
-24VDC	20 to 28 Vdc
-24VAC	20 to 28 Vac

#### Multiple Input and Output Boards for Base Units

DP470-206	Six channel voltage or current inputs
DP470-AOV	Analog voltage output board
DP470-AOC	Analog current output board
DP470-AL2	Dual alarm output board
DP470-C2-SOFT	RS-232 configuration and datalogging software
DP470-C2-CABLE	Configuration cables includes: RS-232 cable and power cable pre-wired to a DP470 connector
DP470-PROTOCOL	Protocol manual for RS-485

## Chapter 2

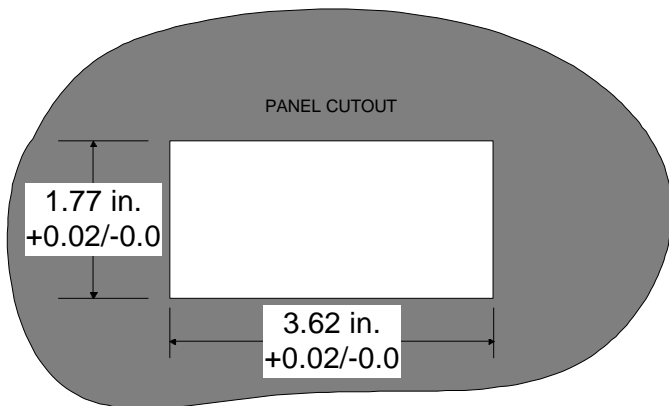
### Installation

#### Panel Installation

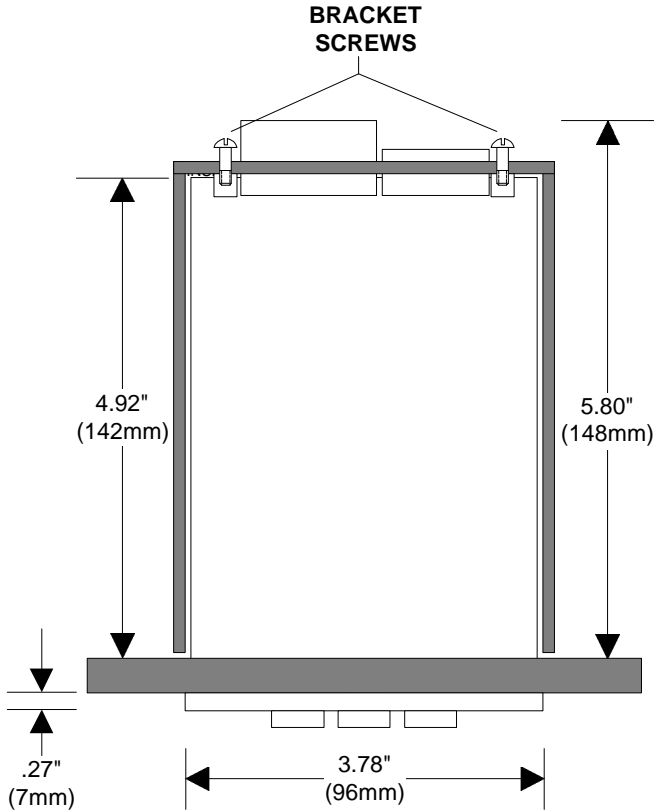
1. Prepare a mounting panel cutout by cutting a rectangular hole (3.62" +0.02/-0.0" X 1.77" + 0.02/-0.0") in the desired location (see Figure following page). The maximum panel thickness is 3/8 inches.
2. Remove the mounting bracket from the instrument housing by removing the two screws on the rear of the indicator.
3. Remove the pluggable terminal block located at the rear of the unit and wire the input power and RS232 or RS485 wires. If an option board is installed in the indicator, remove the connector and make the appropriate connections (refer to diagram on page 6).

#### **WARNING!**

*Dangerous voltages are exposed at the screw terminals. Always remove power before working in this area for rewiring, disassembly, and all other activities that involve proximity to electrical circuitry. Allow at least 10 minutes prior to working on the unit.*

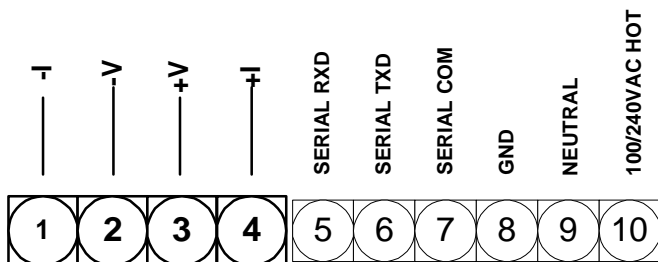


4. Install the indicator in the panel cutout from the front side of the panel. Be sure the instrument is right-side-up. See figure on following page.
5. Reinstall the mounting bracket on the indicator. Tighten the bracket screws to achieve a snug fit against the panel. Avoid distorting or cracking the housing by not over-tightening the bracket screws.



## Single Channel Wiring (DP470)

For easy installation, remove the pluggable terminal block located at the rear of the unit. Connect the input power and RS232 or RS485 wires to the wire entry locations beneath and perpendicular to the plug-in direction according to figure below.



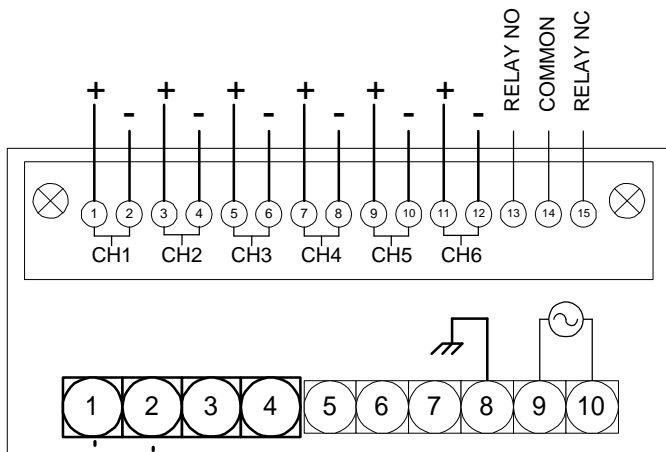
**NOTE: FOR 4 TO 20 mA CURRENT INPUT ADD JUMPER (NOT INCLUDED) BETWEEN TERMINALS 1 AND 2**

### **WARNING!**

*Dangerous voltages are exposed at the screw terminals. Always remove power before working in this area for rewiring, disassembly, and all other activities that involve proximity to electrical circuitry.*

## Multiple Channel Wiring (DP472)

### 6-CHANNEL MULTIPLE INPUT WIRING DIAGRAM



**NOTE: FOR 4 TO 20 mA CURRENT INPUT ADD JUMPER (NOT INCLUDED) BETWEEN TERMINALS 1 AND 2**

### **Multiple input current configuration:**

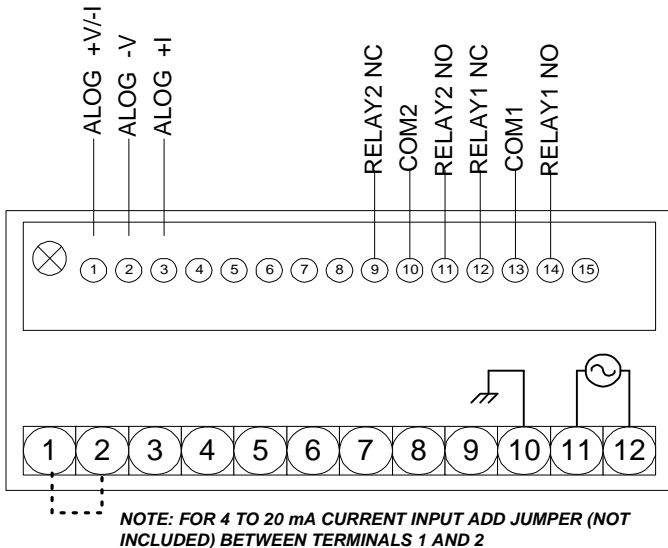
Remove power and snap off the front panel lens. Leave the keypad attached to the display board, as it will be required to enter the calibration menu. Remove the rear pluggable connectors from the rear of the indicator and slide the main board electronics out of the case from the front. (Gently lift the display board above the catch located on the bottom of the inside of the plastic housing while pushing on the rear male



connector on the rear of the main board assembly.) Locate the three-pin header near the rear of the unit. Move the jumper from position A to position B. Carefully re-install the electronics back into the housing and wire the inputs according to the diagram on page 7.

*Note: If the multiple input option is used to switch 4 to 20 mA inputs, note that loop continuity will not be maintained when changing channels.*

## Analog Output/Dual Alarm Wiring



## Chapter 3

### Operation

Your indicator is programmed by a series of menu driven displays that are operated by three front panel pushbuttons; Program-PGM, Arrow- $\Delta$ , and Enter-ENT.



PROGRAM



ARROW



ENTER

Addressing the main menu items configures the indicator. The indicator has a program lockout jumper located behind the front panel lens. Removing the jumper will prevent any front panel changes of the indicator programming. The indicator may still be programmed via the computer interface.

*Note: When using the DP470 Viewer Software, the front panel keyboard is automatically disabled.*

The basic unit has three main menu items-

1. **SCAL:** Sets up desired display counts including decimal points.
2. **MATH:** Selection enables viewing of either minimum or maximum value.
3. **CAL:** Used for calibrating the voltage or current limits.

The following menu items are displayed only when the appropriate option is installed-

4. **ALM1/ALM2:** Sets relay trip points to programmed values, hysteresis and delay.
5. **AOUT:** Programs the indicator to translate the display to a proportional analog voltage or current output.
6. **MULT:** Configures indicator for multiple voltage or current inputs

Pressing the PGM key allows you to access any of the menus listed above by placing the indicator in program mode, indicated by a 'P' lit to the right of the display. Placing the indicator in PGM mode will prevent the indicator from performing measurements. Any alarm monitoring will be disabled.

If the PGM key is pressed anywhere within a menu, the menu reverts to the previous menu level. Repeatedly pressing the PGM key will return the indicator to the display mode. Choices within a menu are viewed by pressing the ARROW key. A menu item is selected by pressing the ENT key for selection, or edited by pressing the ARROW key. Generally, the ARROW key allows you to scroll horizontally through a selection of choices while the ENT key enables you to make selections and move down vertically to the next menu item.

## Unlatching the Relays

The keypad may be used to unlatch the relays in MAN (manual) mode. If the DP470 Viewer Software is being used the front panel keypad becomes disabled and the relays can be unlatched only through the software control panel.

-**Relay #1** may be unlatched by pressing and holding the ARROW key while pressing the PGM key.

-**Relay #2** may be unlatched by pressing and holding the ARROW key while pressing the ENT key.

## Scaling and Calibration

For the indicator to display in your desired engineering units, the indicator must be scaled and then calibrated. Scaling and calibration are performed in the **SCAL** and **CAL** menus respectively. The **SCAL** menu allows you to set the desired engineering units within a range of -999 to +9999 counts. The **CAL** menu requires the actual simulation of two different inputs (typically 0 to 10 Vdc or 4 to 20 mA). Calibration can be performed through the front panel keypad or PC interface.

*Note: It is not necessary to recalibrate when the indicator is rescaled.*

## Scaling Procedure

**Example:** *Program the indicator to display 0-5000 lbs. With a 4 to 20mA input signal.*

**STEP 1.** Press the **PGM** button. PGM will appear on the display. The indicator status LED will change from **L** (linear) to **P** (for 'Program Mode') and the **SCAL** menu will appear. Press **ENT**.

**STEP 2.** A **LOW** or **HIGH** will appear. Pressing the **ARROW** key repeatedly will cause **LOW** and **HIGH** to alternate on the display. With **LOW** on the display, select **LOW** by pressing the **ENT** key. The digits **0000** will appear with the left most digit flashing. With the **ARROW** key select the number 0. Press **ENT**. The second digit will flash. Enter **0** again with the **ARROW** key. Continue on until **0000** is on the display. Press **ENT**.

**STEP 3.** A **HIGH** will appear on the display. Press the **ARROW** key. A number with the left most digit flashing will appear on the display. Using the **ARROW** key, set the left most digit until the number 5 appears. Press **ENT**. The next digit will flash. Use the **ARROW** key to set the remaining digits to **000**. With the right most 0 flashing, press **ENT**. **dCPT** will appear.

**STEP 4.** With **dCPT** on the display, press the **ARROW** until the decimal point disappears. Press **ENT**. The **CAL** menu appears on the display. The scaling portion is now complete.

## Calibration Procedure

### 4 to 20mA Input

**STEP 1.** Hook up the current input to terminals 1 (-I) and 4 (+I) according the wiring diagram on page 6. In addition, for 4-20mA current inputs install jumper wire between terminals 1 and 2.

**STEP 2.** With the **CAL** menu on the display, press **ENT**. **INLO** will appear on the display. Input 4.00 mA and press **ENT**. **INHI** will appear on the display.

**STEP 3.** With **INHI** on the display, input 20.0mA into the meter. Press **ENT**. Calibration is complete.

### 0 to 10 Vdc Input

**STEP 1.** Hook up the current input to terminals 2 (-V) and 3 (+V) according the wiring diagram on page 6.

**STEP 2.** With the **CAL** menu on the display, press **ENT**. **INLO** will appear on the display. Input 0.0 Vdc and press **ENT**. **INHI** will appear on the display.

**STEP 3.** With **INHI** on the display, input 10.0 Vdc into the meter. Press **ENT**. Calibration is complete.

## **Math Function Setup**

*\*For DP472 multi-channel models, MATH functions can only be viewed through the Omega DP470 Software.*

*Example:* View the maximum display value recorded.

*Note: A running record is kept of the minimum and maximum display values. Nothing is required to initiate this recording. These values are there whenever you need them. You can display the Minimum or Maximum value by following the steps below.*

**STEP 1.** With the MATH menu on the display, open this menu item by pressing the ENT key. MIN will appear on the display.

**STEP 2.** Press the Arrow key to toggle between MIN and MAX. When the display shows MAX, press the ENT key and the display will now indicate the maximum value. The MIN/MAX memory may be reset at this point by pressing the ARROW key. With CLR (CLEAR) on the display, press ENT. This will restart the recording process. To go back to the current temperature display, press the PGM button and the display will indicate the current temperature reading.

## **Multiple Input (DP472)**

*Note: For multiple-channel 4 to 20 mA current inputs, see the instructions in Chapter 2 page 7.*

The multiple input option will enable the user to monitor up to 6 same type inputs, either voltage or current. Any number of channels can be selected manually or scanned automatically. Alarm limits may be assigned to individual channels. One NO/NC 5 amp 115VAC relay contact is available for high or low alarm limit programming.

Two scanning modes are selectable for the multiple input option- manual (MAN), and automatic (AUTO). MAN mode allows the user to view a selected channel. Pressing the arrow key advances the display to the next active channel. The channel number is indicated by a .4" green LED located in the upper left-hand corner of the display. To begin automatic scanning, enter the MULT menu, and select AUTO. The scan rate is selectable in one-second increments between 5 and 20 seconds. The display readout will then sequentially show the display values of the active channels. Any number of channels may be selected for scanning.

If an alarm limit is exceeded on any displayed channel, the display will flash, and the relay contact will latch. The relay will remain latched until the alarm condition clears. In scanning mode the display will flash on the alarm channel as it scans.

By using the Omega DP470 Viewer, the DP470 can log and send multiple channel data through the serial port making it a miniature datalogger (see Chapter 5).



## **Dual Alarm (DP471,DP473,DP474)**

The alarm card has two 5 amp/115VAC relays for high, low or deviation set points. The alarm card is available by itself or with analog output (either voltage or current). Relay set points are programmed through the front panel menu or via the serial port. An alarm limit may be disabled within the alarm menu by selecting OFF at the first menu prompt. If OFF is selected the display will return to the next main menu item for further programming. If ON is selected the menu proceeds down through the alarm menu for further set point programming.

The relays can be operated in MAN or AUTO mode. In AUTO mode, the relay unlatches by itself once the alarm limit is no longer exceeded.

In MAN mode the relay is reset manually. However, the display continues to flash until the alarm limit is no longer exceeded.

- Pressing and holding the ARROW key and pressing the PGM key resets Relay 1 (ALM1).
- Pressing and holding the ARROW key and pressing the ENT key resets Relay 2 (ALM2)

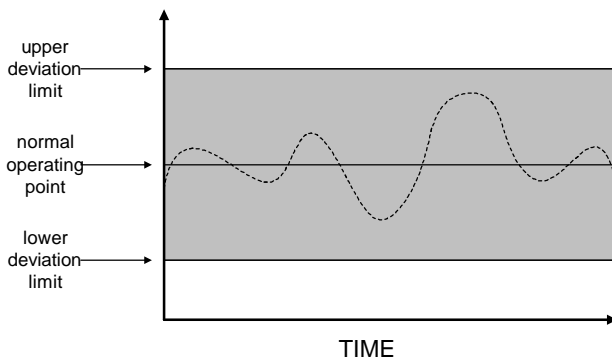
*Note: When using Viewer Software, the front panel keys are disabled. Relays must therefore be reset using the Unlatch buttons on the Viewer control panel.*

When HIGH is selected, a displayed value greater than the limit value will cause an alarm. When LOW is selected, a displayed value less than the limit value will cause an alarm.

*Note: When setting alarm limits enter only the raw counts. Ignore any decimal points. For example, an alarm limit of 100.0 would be entered as 1000.*

## *Using Deviation*

Deviation allows the user to assign alarm limits above and below the normal operating points of a process. If the displayed value remains within the high and low deviation set points no alarm occurs. If the displayed value equals or exceeds either the high or low deviation limits an alarm occurs. Hysteresis and delay are also programmable for deviation set points (see following explanations). Deviation allows the user to assign two set points per alarm relay for a total of four alarm set points per alarm option (See drawing below). This could be useful for indicating a warning condition with one relay and an emergency condition for the other relay.



## *Hysteresis*

Hysteresis or deadband is used to prevent the latching and unlatching of an alarm relay around the set point. Hysteresis is selectable from 0-500 counts in 1-count increments. Hysteresis assumes negative values for HIGH limits and positive values for LOW limits.

For example:

- Alarm limit set to High
- The alarm set point is 5000
- Hysteresis is set at 50 counts

If the display value exceeds 5000, the alarm relay closes and the display flashes. The relay will not open until the display value drops below 4950.

## *Delay*

Programming the meter for alarm delay prevents an alarm trip for a specified period of time (0-99 seconds). An alarm delay would be used whenever an unstable or noisy input signal is present. By filtering out short duration alarm conditions, alarm delay prevents unnecessary alarms from occurring.

## **Analog Output (DP473, DP474)**

The analog output option translates the indicators' display reading to a proportional analog output signal. There are two versions of the analog output option, either 0-10VDC (DP473) or 4 to 20ma (DP474). Both voltage and current outputs are scalable within their ranges and are similarly programmed. Note that the analog output is active only in the display mode. When in Program mode, the output goes to its

zero output value. The display reading can be scaled from -999 to +9999, which enables the user to use only a portion of the full scale if necessary.

## **Analog Output Setup**

*Example 1:* Program the indicator to output 4.0 ma at 0 lbs. and 20.0 ma at 8000lbs.

**STEP 1.** Press the PGM button. PGM will appear on the display. The P/L LED will change from L to P (for 'Program Mode').

**STEP 2.** Press the Arrow key until ALOG appears on the display. Open the ALOG Menu for programming by pressing the ENT key.

**STEP 3.** A LOW or HIGH will appear. Pressing the Arrow key repeatedly will cause LOW and HIGH to alternate on the display. With LOW on the display, select LOW by pressing the ENT key. The digits 0000 will appear with the left most digit flashing. With the ARROW key select the number 0. Press ENT. The second digit will flash. Enter 0 again with the ARROW key. Continue on until 0000 is on the display with the right most digit flashing. Press ENT.

**STEP 4.** HIGH will appear on the display. Press ENT. Set the first digit to 8 by using the ARROW button. Set the second digit to 0 and so on until 8000 is on the display. With the farthest digit to the right flashing, press ENT. The next menu item appears.

*Example 2:* Program the indicator to output 0.0 Vdc at 0 gallons and 5.0 Vdc at 4000 gallons.

*Note: The analog output may be scaled to output various voltages such as 0 to 2VDC, 1 to 5VDC etc.*

**STEP 1.** Press the PGM button. PGM will appear on the display. The P/L LED will change to P (for ‘Program Mode’).

**STEP 2.** Press the Arrow key until ALOG appears on the display. Open the ALOG Menu for programming by pressing the ENT key.

**STEP 3.** A LOW or HIGH will appear. Pressing the Arrow key repeatedly will cause LOW and HIGH to alternate on the display. With LOW on the display, select LOW by pressing the ENT key. The digits 0000 will appear with the left most digit flashing. With the ARROW key select the number 0. Press ENT. The second digit will flash. Enter 0 again with the ARROW key. Continue on until 0000 is on the display with the 0 flashing. Press ENT.

**STEP 4.** HIGH will appear on the display. Press ENT. Set the first digit to 8 by using the ARROW button. Set the second digit to 0 and so on until 8000 is on the display. With the farthest digit to the right flashing, press ENT. The next menu item appears.

## Analog Output Calibration

### **Current: 4 to 20mA (DP474)**

*NOTE: The Analog Output Current option is calibrated from the factory to output 20.00 ma with 100.0 on the display and 4.00 ma with 0.0 on the display. The output may be trimmed to meet your specific application.*

Equipment Required:

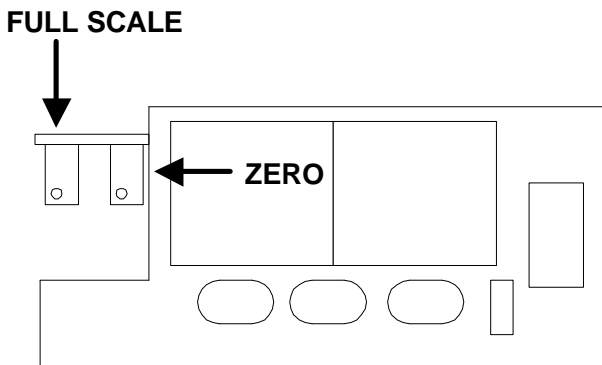
1. Precision current meter with 0.1% accuracy and 10uA resolution.
2. Interconnecting copper wire from the DC current meter to the indicator, +I to terminal 3 and -I to terminal 1 of the 15 position terminal block located at the rear of the unit.
3. Trimmer adjusting tool.
4. Precision voltage (accuracy  $\pm .01\% \pm 2\mu\text{V}$ ) or current source (accuracy  $\pm 0.1\% \pm 2\mu\text{A}$ ).

**STEP 1.** Remove power and snap off the front panel lens. Leave the keypad attached to the display board, as it will be required to enter the programming menu.

**STEP 2.** Apply power to the unit and allow at least a 10-minute warm-up. Program the unit for the appropriate sensor type.

**STEP 3.** With the input set to correspond with the LOW input, adjust the zero pot to read 4.00ma on the DC Ammeter.

**STEP 4.** With the input set to correspond with the HIGH or full scale input, adjust the full-scale potentiometer to read 20.00ma on the DC Ammeter.



**Voltage: 0 to 10 Vdc (DP473)**

*NOTE: The Analog Output Voltage option is calibrated from the factory to output 10.00 VDC with 100.0 on the display and 0.00 VDC with 0.0 on the display. The output may be trimmed to meet your specific application.*

## Equipment Required:

1. Precision voltage meter with 0.1% accuracy and 10mVdc resolution.
2. Interconnecting copper wire from the DC voltmeter to the indicator, -V to terminal 3 and +V to terminal 1 of the 15 position terminal block located at the rear of the unit.
3. Trimmer adjusting tool.
4. Precision voltage (accuracy  $\pm .01\% \pm 2\mu\text{V}$ ) or current source (accuracy  $\pm 0.1\% \pm 2\mu\text{A}$ ).

**STEP 1.** Remove power and snap off the front panel lens. Leave the keypad attached to the display board, as it will be required to enter the programming menu.

**STEP 2.** Apply power to the unit and allow at least a 10-minute warm-up. Program the unit for the appropriate sensor type.

**STEP 3.** With the input set to correspond with the LOW input, adjust the zero pot to read 0.00Vdc on the DC voltmeter.

**STEP 4.** With the input set to correspond with the HIGH or full scale input, adjust the full-scale potentiometer to read 10.00Vdc on the DC Voltmeter.



# Chapter 4

## Omega DP470 Viewer Overview

DP470 Series indicators interface to PC compatible computers through the RS232 port. Remote monitoring as well as scaling and calibration can be accomplished without the use of the front panel keys. Configuration of RS232 is accomplished simply by selection of an active COM port. Baud rate and communications parameters are automatically configured. All DP470 series features (Alarm Status, Input Identification, Min/Max Indication, Time Tagged Readings) are presented with a simulated LED display in an on-screen control panel format. A bar graph located below the simulated display indicates the percentage of full scale.

The internal clock is automatically set to your computer's time and date each time you launch the DP470 Viewer Software. The Omega DP470 Viewer enhances the DP470 series indicators by adding large volume data logging capability. Data is logged to formatted ASCII text files that are compatible with most modern spreadsheet applications. Data can be logged in increments from 1 minute to 24 hours.

### Minimum PC requirements

486 Processor minimum (Pentium recommended)

Windows 95/NT

16 Mb ram (32 recommended)

Mouse

3.5 inch disk drive

9 or 25 pin serial port-max length 50 feet

## **File Formats**

Space delimited ASCII text

DATE TIME AM/PM CHAN READING ALM STATUS (optional)

Alarm relay status not present on the model DP470.

Units with alarm relays installed also indicate alarm status within the file text. Alarm SET (S) or Alarm CLEAR (C) are located in the far right column.

## **Installation**

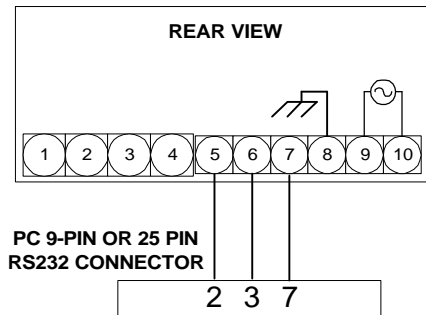
1. Connect a communications cable between your PC and the meter according to the diagram next page.
2. Start Windows 95.
3. Insert disk into drive A or (B).
4. In Windows 95 choose RUN from the Start menu.
5. Type A:\setup (or B:\setup) and click OK.

The Installation Wizard will guide you through the remainder of the installation procedure.

COM port 1 is the default port. After installation the indicator will attempt to establish communications with COM port 1. If the unit is not communicating ensure the serial communications cable is wired correctly and the proper COM port is selected. Another COM port may be selected through

the Preferences menu. After selecting another COM port, the application must be closed and then reopened again.

***Note: Once communications is established, the PC has control of the instrument and the front panel keys become non-functional. In order to regain control of the front panel the software program must be closed. Configuration data is automatically saved each time you exit the program.***



## General Operation

The simulated display on the control panel represents the current reading. The following parameters may be selected through the preferences menu.

- Display scaling
- Datalogging
- Software alarms
- Engineering units

The control panel can be minimized at any time while maintaining communications and control of the indicator.

## Alarms

A small box located to the left of the alarm box indicates alarm status. An **L** inside the box indicates a low alarm limit and an **H** indicates a high alarm limit. A gray box with no letter indicates an inactive alarm.

- A green box indicates an active alarm not in an alarm condition
- A flashing red box indicates that the channel is in an alarm condition

If an alarm condition occurs while the Viewer window is minimized, the window will reopen automatically to alert the user that an alarm limit has been exceeded. The window cannot be minimized when alarming.

## Multiple Input

Active channels, Minimum and Maximum values and alarm status of each channel can be viewed simultaneously. The following parameters may be selected through the preferences menu:

- Channel ID
- Auto/Manual scan
- Scan rate (5 to 20 seconds)
- Alarm limits

When in MANUAL mode, the instrument can only monitor the selected channel. The selected channel and its ID is displayed under the simulated display

- The next **active** channel may be viewed by pressing the NEXT button located beneath and to the left of the simulated display
- If a selected channel alarms and the next channel is selected, the flashing red indicator turns yellow. This indicates that this channel was in an alarm condition when last viewed.

The time a Minimum or Maximum occurred can be viewed by clicking the TIME button located near the MIN/MAX section of the control panel.

## **Logging data**

To create a file of logged data, open the preference menu by clicking the Preferences button located in the upper right hand corner of the Viewer window. Open the LOG menu by clicking the LOG button. You may name your file any acceptable Windows 95 name. The default file extension is .dat. The path for your log file will be shown on the main control panel window. Select the interval (between 0-24 hours at 1-minute increment.) at which logs will be taken. Close the log preference window. To begin logging, click the button on the main control panel labeled OFF. The button will change to ON and the unit will now begin logging. The log data can be reviewed by clicking the ON/OFF button and opening the log file.

# Chapter 5

## General Electrical Specifications

### Input Range:

mA: 0 to 20 mADC

Voltage: 0 to 10VDC

### Sensitivity:

Maximum: 200uV/count; 0.4 uA/count

Minimum: 1 count

### Accuracy Specification (at ROC):

0.02% ± 1 digit

### Reference Operating Conditions: (ROC)

23±2°C ambient temperature

<80% RH non-condensing

### Repeatability +/- 1 Count (single channel only)

### Stability with temperature

Zero: 1uV/°C

Span: .01%/rdg/°C

### Noise Rejection

NMRR: 60dB @ 50/60 Hz

CMRR: 120dB @ 50/60 Hz (+/-0.1Hz with 250Ω unbalance)

### Overload Protection

Power leads to ground: (1500Vdc or Vac RMS)

Across inputs, for one minute:

Voltage: up to 250Vdc or Vac, V+ to V-

Current: up to 75mA dc or mA Ac

### Input Impedance

Voltage: 1 M $\Omega$

Current: 10 $\Omega$

### Point Update Rate

2 per second nominal

### Display

4 Digit, 14-segment red or green .56 in. height

LED plus 1.4 inch green L/P LED

### Environmental Ranges

Operating: 0°C to 50°C

Storage: -40°C to +65°C

Humidity:  $\leq$ 80%RH non-condensing

### Alarm Relay Contact Rating

5A@ 120Vac(non-inductive load) Form C

Power 100-240Vac ( $\pm$ 10%), 50-400Hz, switching power supply



### RS-232 Serial Communications (-C2)

Type: Full-duplex voltage, isolated from ground to 500Vac. Complete configuration set-up and message display capability, programmable to transmit current display. 9600 bps 8 bits no parity 1 stop bit. Isolation: Isolated between input and internal circuit to 500VAC

### RS-485 Serial Communications (-C4)

Type: Two-wire connection. Half-duplex, bi-directional voltage isolated from ground to 500Vac. Communications uses MODBUS-RTU protocol with selectable baud rate from 1200-19.2K baud. Addressable up to 99. Transmit of RS-485 interface is connected to terminal 6 of the DP470. Receive is connected to terminal 5 of DP470.

### Analog Output (Option)

0-10Vdc (load current 2ma maximum)

4-20mA dc (load resistance 300Ω maximum)

Accuracy:  $\pm 0.25\%$  full scale of display value

Resolution: Approximately .0125 full scale

Isolation: Isolated between input and internal circuit to 500Vac.

**Notes:**