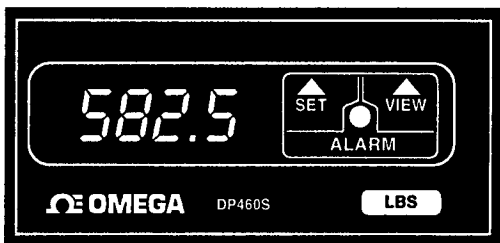




DP460-S, DP461-S, and DP462-S

Digital Panel Indicators for Strain Gages and Load Cells



Operator's Manual



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Strain-Gage Indicator

INTRODUCTION

Congratulations! You have purchased the best, value-packed strain-gage indicator available. Your new indicator is a compact panel instrument; designed for accurate, reliable, trouble-free measurement of strain-gage transducers outputting up to 500 millivolts full-scale.

This is a display scaleable, 4-digit instrument with built-in 10VDC excitation power supply for the transducer.

As an option, the indicator can include fully settable alarm limits, single or dual, with LED and relay outputs.

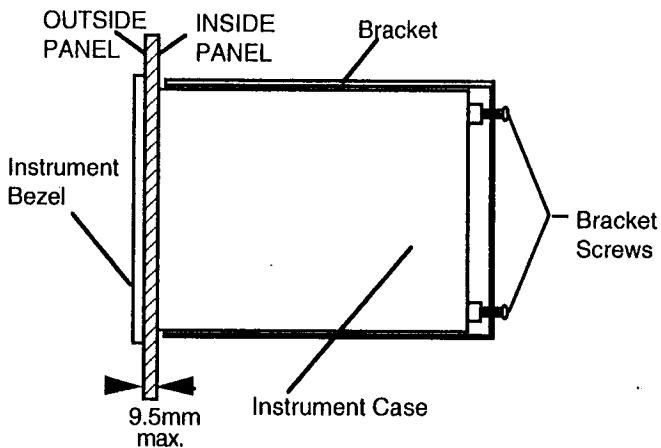
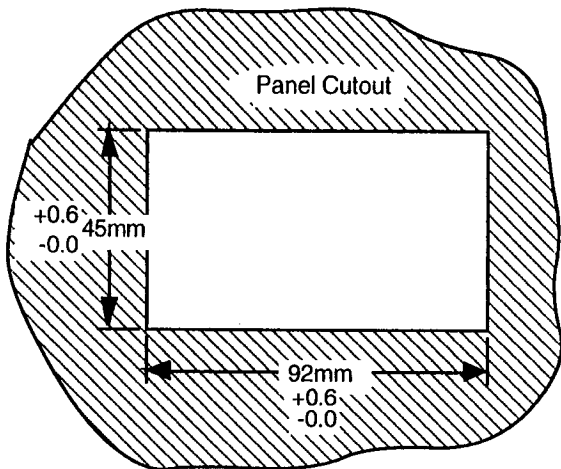
Unpacking

When unpacking your indicator, compare its configuration to your order by checking the label at the top of the instrument case. Also be sure the power requirement indicated on the label matches your power source. Report any discrepancies

immediately.

PANEL INSTALLATION

1. Prepare a mounting panel cutout by cutting a rectangular hole (92mm +0.6mm/-0.0mm x 45mm +0.6mm/-0.0mm) in the desired location. The maximum panel thickness is 9.5mm (3/8 inches).
2. Remove the mounting bracket from the instrument housing by removing the two bracket screws on the rear of the indicator.
3. Install the indicator in the panel cutout from the front side of the panel. Be sure the instrument is right-side-up.
4. 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

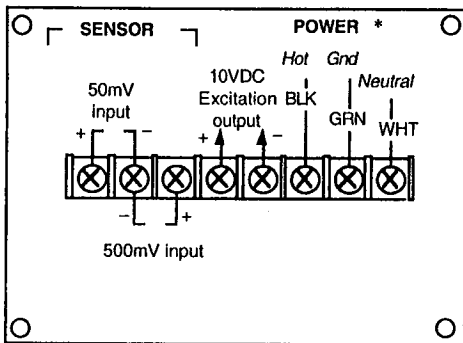


over-tightening the bracket screws.

WIRING

Input Sensor and Power Wiring

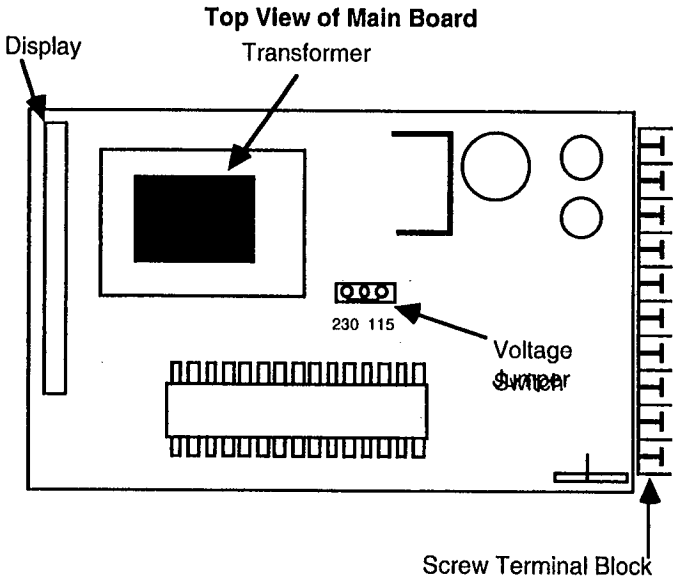
Connect the input sensor and power wires to the screw



* 115VAC or 230VAC is selectable using a switch on the indicator's main circuit board. Check the instrument's tag for the voltage range set at the factory. You may move the switch to match your power source if needed.

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.



terminals at the back of the instrument as shown below:

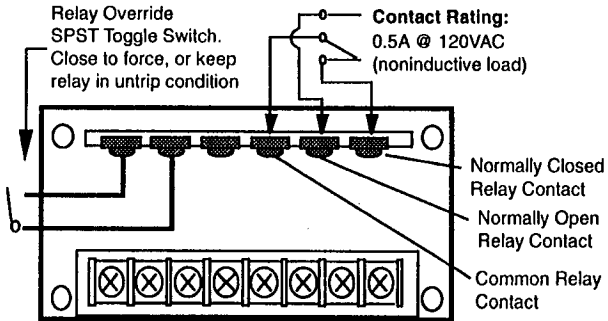
Alarm Option Wiring

Connections to the alarm option are provided by blade terminals accessible at the back of the instrument. Female connectors are supplied to wire the alarm option into your system. (See drawing on next page.)

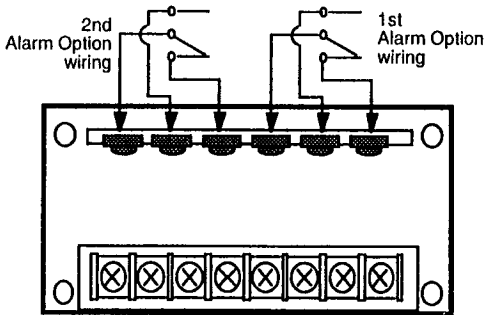
The relay override connection (single alarm version only) is provided to prevent relay closure. A switch closure can be used to acknowledge and silence alarms that otherwise would be maintained by the alarm option relay contacts.

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.



Single Alarm Unit Wiring



Dual Alarm Unit Wiring

OPERATION

Power

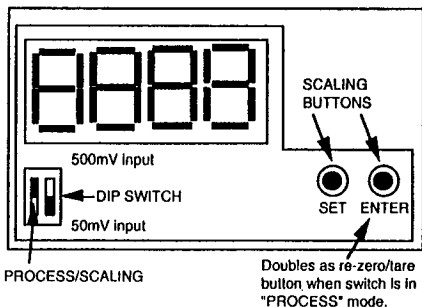
Power is applied to the indicator as long as it is plugged into an active power source. To remove power, turn off the main switch or unplug the instrument. Do NOT unscrew power leads while the instrument is plugged into the main.

Selecting 50mV or 500mV Range Input Mode

Whether to select the 50mV or 500mV range is dependent upon the full-scale output of your transducer. For strain-gages outputting 5mV/V or less, select the 50mV position. For sensors outputting greater than 10mV/V and up to 50mV/V, select the 500mV position.

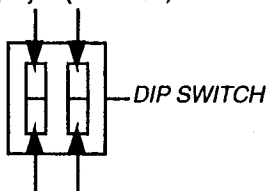
To select between 50mV and 500mV input mode, snap off the front panel lens to gain access to the display board. On the display board, lower left, is a DIP switch used to set the indicator's input measuring mode.

Note: This switch may be either a rocker type (press down on appropriate end) or a slider type (slide toward appropriate end). The drawings detail the adjustment activities:



Push down here or slide towards this end for regular **process measuring** mode display

Push down here or slide toward this end to configure instrument for **500mV** ($>10\text{mV/V}$, $\leq 50\text{mV/V}$)



Push down here or slide towards this end for **Scaling** calibration mode

Push down here or slide towards this end to configure instrument for **50mV** ($\leq 5\text{mV/V}$)

CALIBRATING & SCALING THE DISPLAY

Scaling the indicator to display in your desired engineering units requires simulation of two different input VALUES (typically the lowest input and the highest input) and using the two, "SET" and "ENTER" Buttons to scroll the Digital Display.

With the front lens removed and the 50mV/500mV switch in the position compatible with your input...

Step 1: Hookup a bridge simulator or actual transducer, capable of supplying a low scale and full scale input, to the appropriate rear panel screw terminals on the indicator.

Step 2: Set the "PROCESS/SCALING" switch to the SCALING position. The word "LO" will appear on the display.

Step 3: a) Simulate the low scale input (e.g. 0mV)

b) Push the "ENTER" Button

c) Use the "SET" Button to change the value of the flashing digit. When the flashing digit is correct, push the "ENTER" Button. The flashing digit will now move to the next right hand digit. Continue until all digits are correct with the rightmost digit still flashing.

(e.g. □□□□—Still flashing)

d) Push both "SET" and "ENTER" buttons at the same time to program in this scale factor. In other words, when the indicator receives a process input signal identical to the simulated (calibration) one, it will display the same value shown now..

(e.g. 0mV = 0000)

Note: While the indicator is calibrating itself "oo" will appear in the display. After a few seconds it will return to display "HI" (go to step 4) or "Err" (see error message table).

Step 4: With "HI" displayed...

Change the input to simulate + full-scale (High)
(e.g. 30mV).

Step 5: Repeat Steps as shown in Steps 3b, 3c, 3d changing the digits to represent the Full Scale desired display (e.g. 5000). When complete, the indicator will then go to decimal point position.

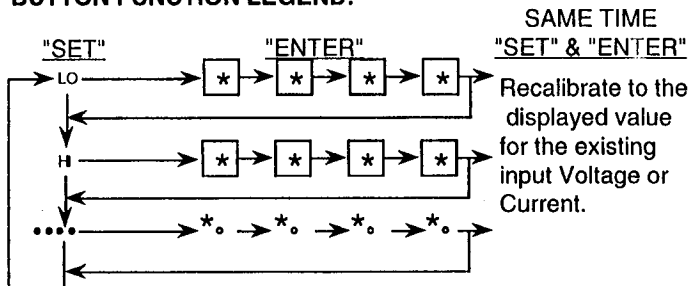
Step 6: With decimal points displayed...

- a) Push "ENTER" button and the present position will blink. If no change is needed, go to step 7.
- b) Push "SET" button to change the position.
- c) Push "SET" and "ENTER" buttons at the same time to program the new position into memory.

Step 7: Return the "PROCESS/SCALING" switch to the PROCESS position. Replace the front lens. Remove the calibrator from the input terminals.

- Notes:**
- 1) Pushing both the "SET" and "ENTER" button at the same time always causes the indicator to recalibrate itself to the given input and what is on the display at that moment. As a protective measure, if scaling changes are made and not terminated this way no recalibration will occur, previous values will remain.
 - 2) Changing the switch position from "PROCESS" to "SCALING" mode, automatically removes any fine tare which was done with the zero/tare button while in the "PROCESS" mode.

BUTTON FUNCTION LEGEND:



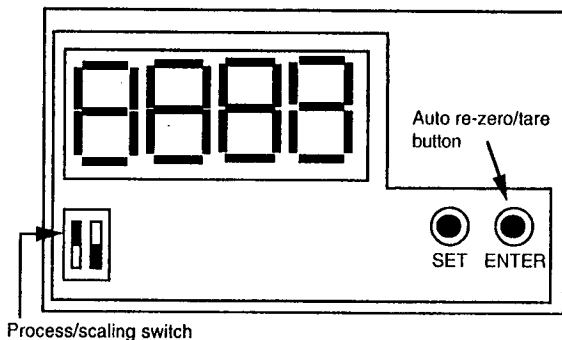
* Use "SET" key to change value of flashing digit or decimal point

ERROR MESSAGE TABLE

MESSAGE DISPLAYED	DURING CALIBRATION/SCALING MODE		DURING NORMAL PROCESS MEASURING MODE	
	CAUSE	CURE	CAUSE	CURE
Err1	Slope error. Same values entered for both "LO" and "HI"	"LO" and "HI" values Must be different. Push "set" button and re-enter for "LO" and "HI" values.	N/A	
Err2	Slope error. Too many display counts for too little input voltage or current	Push "SET" button. Reduce the number of display counts for the given input. example: Reduce 700.0 to 700	N/A	
OL, OL	Overloaded Input or display. Input exceeds specification	Check input voltage. Must be within 0 - 50mV or 0 - 500mV	Input exceeds maximum specification or display is beyond -999 or 9999	Check input voltage for over range or break/open circuit.
-----	Internal A/D overload.	Turn power off, wait 25 seconds, and turn power on again. If problem persists, call repair department.	Internal A/D overload.	Turn power off, wait 25 seconds, and turn power on again. If problem persists, call repair department.
Flashing at 3-4 sec. intervals	N/A	N/A	Excitation power supply out of tolerance.	Check AC line power first. Check excitation supply for 10VDC $\pm 10\%$.

Auto Re-Zero/Tare Button

This function is designed to provide a quick method of returning the display to a zero point without going into a system recalibration. As an example, consider a weighing system, that through mechanical scale movements or residue on the scale, does not return to "0000" when there is no load on the scale. A simple button push will null this out, returning the display to "0000". The functions described below operate while the meter is in the normal "Process" measuring mode.



A) Auto Re-Zero/Tare Button:

The "**ENTER**" button functions as the tare button. Pushing it will immediately remove any displayed value, returning it to the tare point, typically zero. (See "C" below for tare point setting.) Access to the button requires removing the front red lens, unless the front panel button option is installed.

B) Reset/Corrections:

To reset or correct an inadvertent re-zero/tare, push the **"SET"** button. All stored (accumulated) tare display counts will be removed from memory. (**Note:** Changing the "Process/Scaling" DIP switch to the "Scaling" position will also cause this reset.)

C) Setting A Tare Point:

The normal factory setting is for the tare function to return the display (Tare Point) to "0000". However, the meter can be user programmed, as often as needed, for an alternate value or returned to "0000" by the following method.

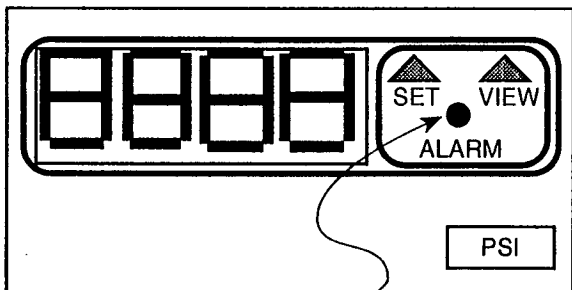
1. While in the normal process measuring mode, press **"SET"** and **"ENTER"** buttons at the same time. The current tare value is displayed, ready to be programmed.
2. Select the digit to be changed by pressing the **"ENTER"** button as required. The current selection is indicated by a blinking digit.
3. Change the blinking number by pressing the **"SET"** button.
4. Repeat steps 2 and 3 as necessary to set a new limit value.
5. After you finish changing the tare value, press the **"SET"** and **"ENTER"** buttons at the same time to return to the measurement display mode. The newly programmed tare value is now in effect and stored in the nonvolatile memory. Pushing the **"ENTER"** button will reset the display to this value.

Using the Alarm Options

The Alarm LED indicators will turn on and the corresponding relay output will change state when an alarm condition exists. The LED will turn off automatically when the alarm limit is no longer exceeded.

The alarm option uses two front panel buttons, "**SET**" and "**VIEW**", to setup and view the alarm trip point.

To examine the current limit value, press the "**VIEW**" button. For dual alarm versions, hold the "**VIEW**" button for 3 seconds to see the second limit value. Releasing the button returns you to the measurement mode.



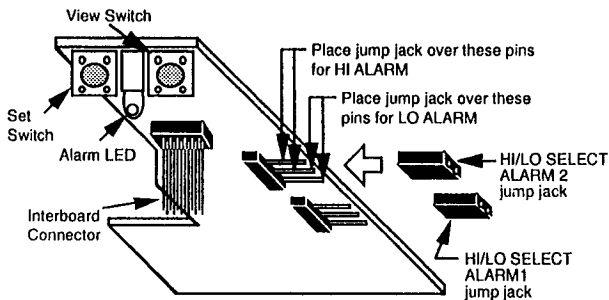
Single alarm unit has one red LED. Dual alarm unit has one yellow and one red.

Programming the Limit Value(s):

1. Press "**VIEW**" and "**SET**" buttons at the same time. The current limit value is displayed, ready to be programmed. For dual alarm versions, program the second limit value by holding the "**VIEW**" button for 3 seconds (until the display changes to show second value) then, with the **VIEW** button still held, press the "**SET**" button. Follow steps 2-5 below. (**Note:** During the process of changing the limit value, the instrument is still taking readings and performing alarm checking against the current limit value.)(**Note:** During the process of changing the limit value, the instrument is still taking readings and performing alarm checking against the current limit value.)
2. Select the digit to be changed by pressing the "**VIEW**" button as required. The current selection is indicated by a blinking digit.
3. Change the blinking number by pressing the "**SET**" button.
4. Repeat steps 2 and 3 as necessary to set a new limit value.
5. After you finish changing the limit value, press the "**VIEW**" and "**SET**" buttons at the same time to return to the measurement display mode. The newly programmed limit value is now in effect and stored in the nonvolatile memory.

To Configure for a HI or LO Alarm:

1. Snap off the front panel lens.
2. Locate the jump jack on the board behind the "VIEW " button.
3. Place the jump jack over the appropriate pair of pins for a desired alarm action. See the drawing below for details.



SPECIFICATIONS

Functional

Input Range:

0-5mV/V (50mV maximum full-scale)

10-50mV/V (500mV maximum full-scale)

Sensitivity:

0-5mV/V range: maximum $1\mu\text{V}/\text{count}$, minimum 1 display count

0-50mV/V range: maximum $10\mu\text{V}/\text{count}$, minimum 1 display count

Input Impedance:

$1\text{M}\Omega$

A/D Read Rate:

2 per second nominal

Power:

115VAC $\pm 10\%$, 50-60Hz; 230VAC $\pm 10\%$, 50-60Hz
Switch selectable

PERFORMANCE SPECIFICATIONS

Reference Operating Conditions (ROC):

±10% line voltage
23 ±2 °C ambient temperature
<80% RH noncondensing

Accuracy (at ROC):

0-5mV/V range: 0.02% rdg. ±1 count for sensitivities
≥ 2μV/count
0.02% rdg. ±4 counts for sensitivities
< 2μV/count

0-50mV/V range: 0.02% rdg. ±1 count for sensitivities
≥ 20μV/count
0.02% rdg. ±4 counts for sensitivities
< 20μV/count

Noise Rejection:

NMRR: ≥ 60dB @ 50/60Hz, ±0.1Hz
CMRR: ≥ 120dB @ 50/60Hz, ±0.1Hz with 250Ω
unbalance

Overload Protection:

Power lead to ground: 1500VDC or AC RMS
Across inputs: Up to 250VDC or VAC for 1 minute, +V to -V

Stability With Temperature:

Zero: 1μV/°C
Span: 0.01% rdg/°C

Stability With Time: 10 counts/year max.

ENVIRONMENTAL/PHYSICAL SPECIFICATIONS

Operating Range:

Temperature: 5 to 45 °C

Relative Humidity: 10-80% RH noncondensing

Storage Range:

-40 to 65 °C

Power:

115VAC \pm 10%, 50-60Hz

230VAC \pm 10%, 50-60Hz

Size:

Bezel: 96mm W x 48mm H

Case: 92mm W x 40mm H x 136mm D

Nominal Weight:

\approx 454 kg/1 lb

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of **13 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that our customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. Our Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

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FOR **WARRANTY** RETURNS, please have the following information available **BEFORE** contacting OMEGA:

1. P.O. number under which the product was **PURCHASED**,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems you are having with the product.

FOR **NON-WARRANTY** REPAIRS OR **CALLIBRATION**, consult OMEGA for current repair/calibration charges. Have the following information available **BEFORE** contacting OMEGA:

1. P.O. number to cover the **COST** of the repair/calibration,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems you are having with the product.

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