OMEGA ENGINEERING, INC.

An OMEGA Technologies Company

DP-60 SERIES Indicators, Totalizers and Batch Controllers

Operator's Manual

WARRANTY

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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Direct all warranty and repair requests/inquiries to OMEGA Customer Service Department, telephone number (203) 359-1660. BEFORE RETURNING ANY INSTRUMENT, PLEASE CONTACT THE OMEGA CUSTOMER SERVICE DEPARTMENT TO OBTAIN AN AUTHORIZED RETURN (AR) NUMBER. The designated AR number should then be marked on the outside of the return package.

To avoid processing delays, also please be sure to include:

1. **Returnee's name, address, and phone number.**
2. **Model and Serial numbers.**
3. **Repair instructions.**

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. That way our customers get the latest in technology and engineering.

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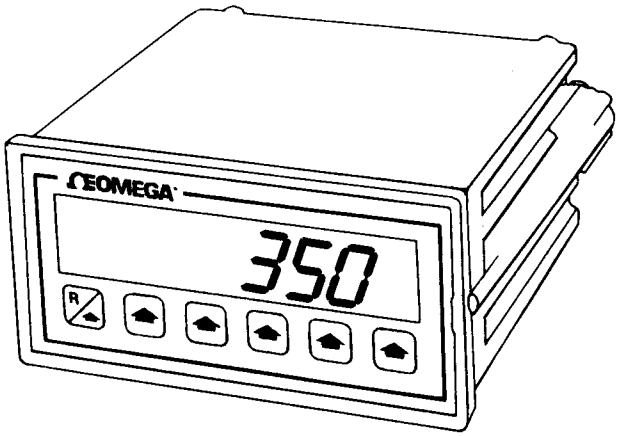

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DP-61 TOTALIZER AND BATCH CONTROLLER

SECTION 1 INTRODUCTION

The OMEGA® DP-61 is a Pulsed Input, Bi-directional (up/down) Six Digit Counter ideally suited for batching, totalizing and controlling a process. The unit accepts 3 to 30 volt peak to peak pulses at a maximum frequency of 1000 Hz. These input pulses can be accumulated or saved at a rate of up to 1000 counts per second. A total accumulation of 999,999 count is possible for totalization.

With the touch of a finger, the operator can load into the memory and display predetermined setpoint values, decimal point location, and a scaling factor for the process. Once entered into the memory, these preset values will remain until changed by the operator, even in the event of a power failure, without the use of a battery.

For batching, the operator presets the quantity or volume of product to be processed. The DP-61 monitors and displays the quantity delivered and when the preset amount is satisfied, the 10 amp control relay can activate a shut-off valve, thus completing the process.

For totalizing, the DP-61 will count input pulses up to 1000 pulses per second. The input pulses can be divided or scaled down by a factor of 1 to 100. For example, 1000 input pulses can increase the totalizer display anywhere from 10 up to 1000 counts. Setpoints are field programmable via the membrane keyboard to set the limits which will cause the relay to turn on or off.

SECTION 2 INSTALLATION

2.1 UNPACKING

Remove the Packing List and verify that all equipment has been received. If there are any questions about the shipment, please call OMEGA Customer Service Department at (203) 359-1660.

Upon receipt of shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

2.2 MOUNTING

The DP-61 has a high impact plastic case and standard DIN cut-out, 1.772" H x 3.622" W, 4.4" maximum panel depth. Refer to Figure 2-1.

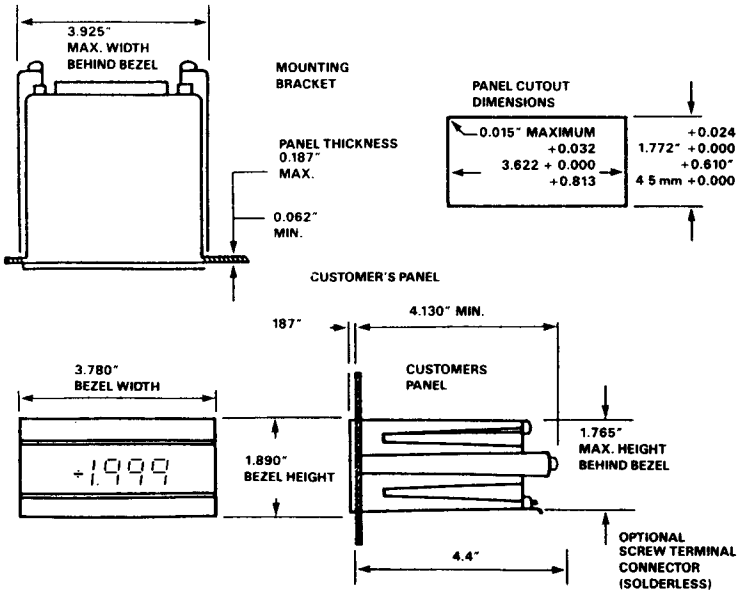


Figure 2-1. Cutout and Mounting Dimensions

2.3 WIRING CONNECTIONS (Refer to Figure 2-2)

CAUTION

Terminal #8 *must* be connected to earth ground at all times when in use. This provides a ground path for static electricity which otherwise would cause faulty operation, erroneous data or circuit damage.

AC Powered Units — Apply 110 (standard) or 220 (optional) Volts AC, as required, to terminals 11 and 12. AC polarity is not important. Connect AC ground to Terminal 8.

DC Powered Units — Apply the correct DC voltage as required. Connect the negative voltage to Terminal 6 and the positive voltage to Terminal 10.

NOTE

The DP-61 can be wired for either 110 Vac or 12-10% to 24 +10% Vdc operation. Refer to Figure 2-2 for appropriate connections.

Reset Input — Contact Closure — Connect a normally open contact between Terminals 9 (reset) and 7 (5 volt out).

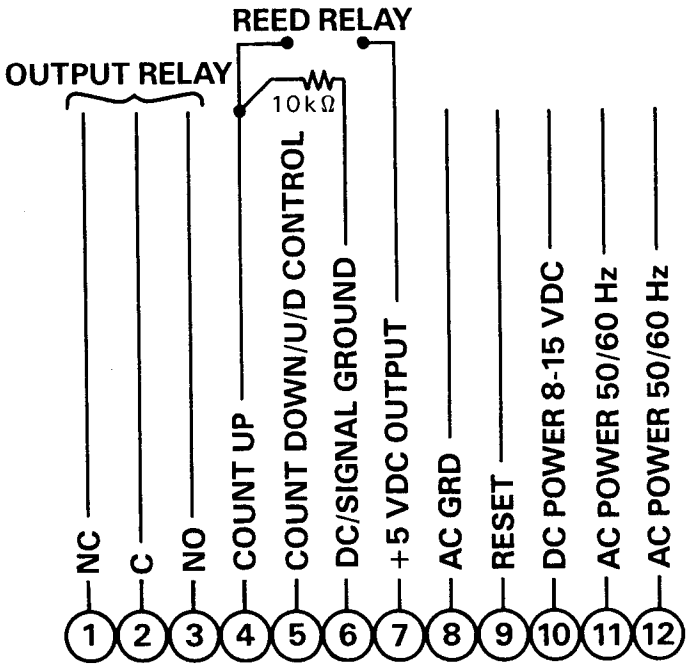
Voltage Pulse — Connect negative pulse lead to Terminal 6 (sig. Gnd) and positive pulse lead to Terminal 9 (reset).

Count Inputs — Separate Up and Down Inputs — Either contact closures or voltage pulses will activate these inputs. Terminal 4 is the UP input and Terminal 5 is the DOWN input. For contact closure inputs, connect a normally open contact between Terminal 7 (5 volt output) and the count input desired. Refer to paragraphs 3.5 and 3.6.

For Voltage Pulse Inputs — Connect the negative pulse lead to Terminal 6 (Sig. Gnd.) and the positive pulse lead to either Terminal 4 or 5 as desired.

NOTE

Connection can be made to both the UP and DOWN Inputs if bi-directional counting is required.



Note: For reed relay hook-up for count down operation, move both pin 4 connections to pin 5 and change the dipswitches (refer to paragraph 3.5)

Figure 2-2. Wiring Connections for DP-61

SECTION 3 OPERATION

3.1 SETTING SCALING FACTORS

Press the key, second from the right on the keyboard and, while keeping this key depressed, press the left-hand key (R). The letters SCL will appear on the left of the display and two digits will appear on the right. These numbers indicate the preset scaling factor. Any number from 1 to 100 may be entered at this time by pressing either of the keys directly under the digit to be changed. Press as long as or as many times as needed to bring the scaling number to the value desired. Holding either key down will cause the digit above to increment at about a 2 count per second rate.

NOTE

If 100 inputs per count are desired, enter 00. In order to enter the scaling factor into memory and leave the setting mode, press the left-hand key (R) until the scale factor display just disappears then release. After the preset number has been entered in this manner, the (R) key will function as a panel RESET.

When 1 count per input is required, set scaling factor to 1. Standard units are shipped from the factory set for 1 count per input unless otherwise specified with the order.

3.2 SETTING PRESET NUMBERS

For 6 digit or less preset numbers, press the right-hand key and while depressing this, activate the remote reset by applying a 3 to 30 Vdc signal momentarily to Terminal 9. All of the decimal points will light with the exception of any that may have been previously set and the previous preset will also appear. To change the number, press any of the 6 keys as above until the digit above it increments to the desired value. Each digit will count from 0 to 9 without carrying so this may be done in any order. After the correct number has been entered, again activate the remote reset momentarily as above. This will enter the new value of the preset into memory. Also the previously lighted decimal points will now turn off and the unlighted one, if any, will turn back on. If the preset value will be five digits or less, then you may follow a similar procedure except that now the left-hand (R) key may be used instead of the remote reset input.

NOTE

Whichever method is used to enter into the preset mode, the same must also be used to exit. Example: If the panel (R) key is used to enter the preset, then the panel (R) key must be used to exit.

In the five digit or less mode using the panel reset (R) key to enter, only the five right-hand keys may be used to enter the preset. Pressing the (R) key will automatically exit the preset mode.

When exiting, use the shortest time possible to load the number into memory since holding the reset active for longer than two seconds will also reset any counts that may have been accumulated. If it is desired to reset, then either hold the reset longer than two seconds or press reset again.

The value 0 cannot be preset on the DP-61. If 0 is entered, a default to a preset of 1 will occur.

3.3 SETTING THE DECIMAL POINT POSITION

Press the key which is third from the right and then, while keeping the key depressed, press the left-hand key (R). The letters DP will appear on the left of the display and any previously entered decimal point will also appear. To enter a new location for the decimal point, press any key except the (R) key and it will change location. To eliminate the decimal point, press the right-hand key. Once the desired location has been achieved, exit the setting mode by pressing the left-hand (R) key just until the DP display disappears; then release. The new decimal point location is now entered. It now should appear on the display in its correct position along with any counts or preset number depending on the condition prior to entering into this mode.

3.4 RELAY OUTPUT OPERATION

On any preset unit, the relay will turn on whenever the preset number of counts has been reached. If a scaling factor other than one has been entered, then the display will not increment or decrement until that number of input pulses has been reached. A count is considered a change of one on the display. The relay will either latch on or momentarily turn on depending on the setting of the internal program switches (Refer to Paragraph 3.5).

3.5 PROGRAMMING SWITCH SETTING

Behind the front panel are eight switches (see Figure 3-1) located in the lower right-hand corner. To access these switches, the lens must be carefully removed. To remove this lens, locate the small notch at the bottom of the lens. With a pointed object, carefully pry outward at this point until the lens is released from the case. Then gently lift the lens upward, without pulling, until clear access is gained to the switch area. If the lens is pulled, it will strain the cable connection and can cause a keyboard failure. Care should be taken to prevent damage due to scratching or excessive bending during removal and replacement.

To replace the lens, insert the right end under the retainer first. Then gently bow it while holding by its center and slide the left end under its retainer. Release the center and allow the lens to fall flat into the recess in the case. Look at the position of the lens to determine if it is in its correct position before placing the unit into service.

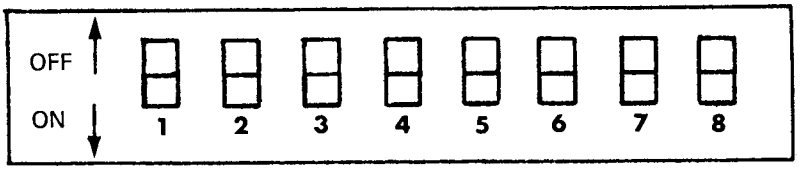


Figure 3-1. Switch Diagram

The switches are numbered from one to eight starting at the left. Switches in the UP position are OFF, and those in the DOWN position are ON.

Set the switches to the desired function according to the programming instructions following.

Switch 1	OFF	Reset to Zero (up counter)
	ON	Reset to Preset (down counter)

Refer to Paragraph 3.6 Bidirectional (Up/Down) Counting

Switch 2	OFF	Separate up/down (input Pin 4 = up; input Pin 5 = down)
	ON	Count input and up/down control line (input Pin 4 = count; input Pin 5 = up/down line)
Switch 3	OFF	This switch must be in this position to be a counter.
Switch 4 & 5		Sets count speed

SW4	SW5	Max. Count Speed
OFF	OFF	1000 CPS
ON	OFF	120 CPS
OFF	ON	50 CPS
ON	ON	20 CPS

Lowering the maximum count speed improves debouncing of input signal, which is particularly useful for contact closure pulse input.

Switch 6	OFF	Outputs latched until reset
	ON	Momentary output (250 ms)
Switch 7	OFF	Display continues counting through preset
	ON	Display auto recycles at preset
Switch 8		Has no function in count mode

NOTE

After selecting the proper switch configuration, the reset (R) key or the remote reset must be activated to input the new parameters into the microprocessor function memory. If this is not done, the unit will function as before until a reset command is given.

3.6 BIDIRECTIONAL (UP/DOWN) COUNTING

Two types of up/down control are selectable through use of the switch assembly located behind the lens.

1. Separate up and down count pulses may be applied to the unit.
2. Direction control and separate count input, where all counts are applied to the count input and a direction control signal is applied to the U/D control input. A Logic 1 (greater than 3 VDC) applied to the U/D terminal will cause the counter to count up while a Logic 0 (less than .7VDC) will cause it to count down.

Two types of bidirectional counter functions are also selectable by the switch assembly.

1. Up Counter: This mode causes the counter to reset to "0" and count from there, usually up. It can, however, count both ways. Output occurs at preset.
2. Down Counter: Performs similarly to the up counter except that reset causes the counter to return to the preset number instead of "0". Several applications require "down" counting. Output occurs at zero.

SECTION 4 SPECIFICATIONS

ACCURACY: Digital accuracy of 100% up to 1000 Hz input
INPUT SIGNAL: High level: between 3 to 30 Vdc pulse, 0.5 ms minimum duration; low level: below 1 Vdc for 0.5 ms minimum duration.
TEMPERATURE RANGE: Operating, 32° to 130°F (0° to 54°C); Storage, −40° to 200°F (−40° to 93°C)
RELAY OUTPUT: Dual level hi/lo SPDT relay, 10A @ 250 Vac
5 VOLT DC OUTPUT: Up to 100 mA of +5V regulated power is available to wet contact closures, etc.
POWER: 110 Vac, 50/60 Hz, 12 Vdc −10% to 24 Vdc +10%, jumper selectable
DISPLAY: LED, six digits, 0.6" x 0.32"; indicates, shows scale factor and presets with decimal points.
STANDBY SYSTEM: Non-volatile RAM retains scale factor, presets, output status and total flow for up to 1 year without power.
ENCLOSURE: High Impact plastic case (aluminum optional); cutout 1.772" (45 mm) H x 3.622" (92 mm) W (per DIN); 4.4" (111.8 mm) max. panel depth

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DP-62 TOTALIZER AND BATCH CONTROLLER

SECTION 1 INTRODUCTION

The OMEGA® Model DP-62 is an Analog Input Six Digit Scalable Totalizer and Batch Controller. The DP-62 accepts a 4-20 mA analog signal input. Two models are available: The DP-62M, which provides 0 to 9999 counts per minute; and the DP-62H, which provides 0 to 9999 counts per hour.

Because of the analog input, it is possible to scale the input signal from 0 to 9999 counts. For example, a 4 mA signal could be scaled to read zero and 20 mA scaled to read 9999 on the meter or any value in-between.

With the touch of a finger, the operator can load into the memory and display predetermined setpoint values, decimal point location, and a scaling factor for the process. Once entered into the memory, these preset values will remain until changed by the operator, even in the event of a power failure, without the use of a battery.

For batching, the operator presets the quantity or volume of product to be processed. The DP-62 monitors and displays the quantity delivered and when the preset amount is satisfied, the 10 amp control relay can activate a shut-off valve, thus completing the process.

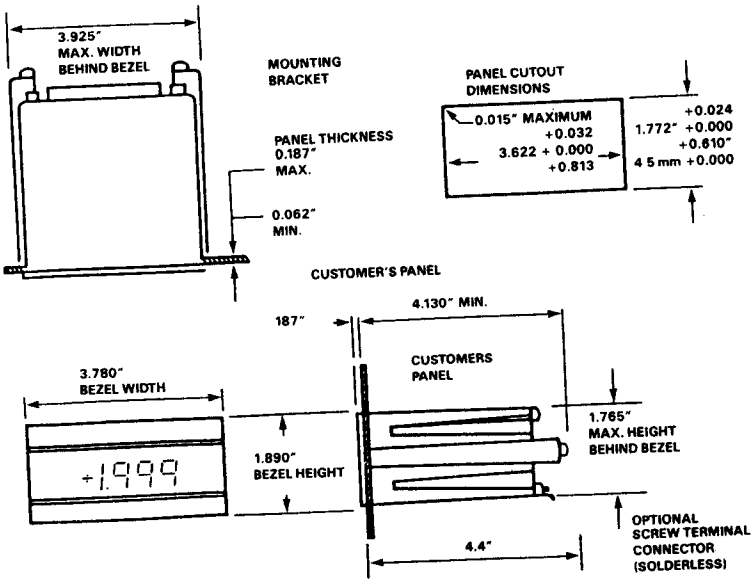

Figure 2-1. Cutout and Mounting Dimensions

SECTION 2 INSTALLATION

2.1 UNPACKING

Remove the Packing List and verify that all equipment has been received. If there are any questions about the shipment, please call OMEGA Customer Service Department at (203) 359-1660.

Upon receipt of shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

2.2 MOUNTING

The DP-62 has a high impact plastic case and standard DIN cut-out, 1.772" H x 3.622" W, 4.4" maximum panel depth. Refer to Figure 2-1.

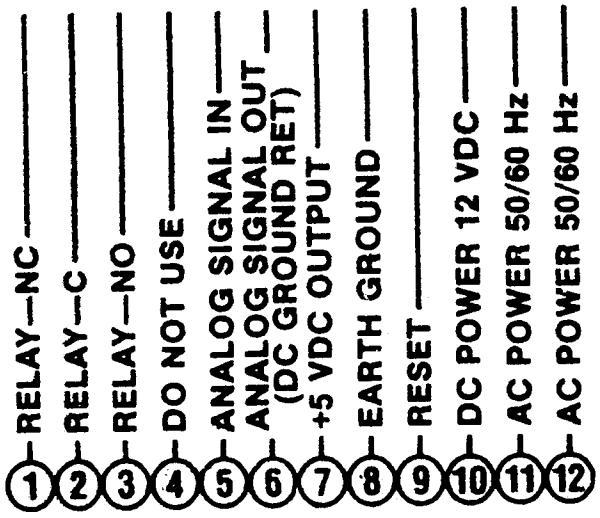

Figure 2-2. Wiring Connections for DP-62

2.3 WIRING CONNECTIONS (Refer to Figure 2-2)

CAUTION

Terminal #8 *must* be connected to earth ground at all times when in use. This provides a ground path for static electricity which otherwise would cause faulty operation, erroneous data or circuit damage.

AC Powered Units — Apply 110 (standard) or 220 (optional) Volts AC, as required, to terminals 11 and 12. AC polarity is not important. Connect AC ground to Terminal 8.

DC Powered Units — Apply the correct DC voltage as required. Connect the negative voltage to Terminal 6 and the positive voltage to Terminal 10.

NOTE

The DP-62 can be wired for either 110 Vac or 12-Vdc operation. Refer to Figure 2-2 for appropriate connections.

Reset Input — Contact Closure — Connect a normally open contact between Terminals 9 (reset) and 7 (5 volt out).

Voltage Pulse — Connect negative pulse lead to Terminal 6 (Ana. Ret.) and positive pulse lead to Terminal 9 (reset).

Analog Input — Connect the DC positive loop signal to Terminal No. 5 (Analog Input) and the negative loop signal to Terminal No. 6 (Analog Return).

NOTE

If the unit is powered by a DC supply, then the power supply negative lead will also go to Terminal No. 6. DC powered units cannot have isolation between the loop and the supply.

SECTION 3 OPERATION

3.1 SETTING FULL SCALE

Determine the number of counts required by unit of time (minutes for DP-62M; hours for DP-62H). Make a mathematical conversion if the known time base is different from the time base of the DP-62 being adjusted. Example: The DP-62 has been manufactured for minutes readings (DP-62M) but it is known that 20 mA should equal 10.0 gallons per second. This is equal to 600 gallons per minute (60 seconds x 10.0). The operator may enter in either 600 or 600.0 as the scaling factor. Remember to enter the decimal point if required. (Refer to paragraph 3.3 for setting the decimal point).

To enter the scaling factor, press the first key from the right on the keyboard, and while still holding that key depressed, press the left-hand (R) key. The letters ''FL'' will appear at the left of the display, along with the previous full scale setting with its decimal point. Press any of the four right-hand keys to bring the scaling factor to the desired number from 1 to 9999. Once the correct full-scale value has been entered, press the left-hand (R) key once again and the value will be entered.

3.2 SETTING PRESET NUMBERS

Press the second key from the right, and while holding this key depressed, press the left-hand key (R). The letters "PS" will appear in the center of the display. Press the left-hand (R) key again, and the preset value will appear. To change the preset, press any of the six keys on the keyboard to bring the preset to the desired number from 1 to 999999. Once the correct value has been entered, wait about 10 seconds, and the preset will automatically enter itself.

3.3 SETTING THE DECIMAL POINT

If a decimal point is desired, press the key which is third from the right and, while keeping the key depressed, press the left-hand key (R). The letters DP will appear on the left of the display. Press any of the five right-hand keys to move the decimal point to the desired location. The right-hand key will eliminate the decimal point completely. Once the correct position has been entered, press the left-hand key (R) once again and the DP-62 will return to normal operation.

3.4 RELAY OUTPUT OPERATION

On any preset unit, the relay will turn on whenever the preset number of counts has been reached. A count is considered a change of one on the display. The relay will latch on until reset manually.

SECTION 4 CALIBRATION

Equipment needed:

Source for 4.000 to 20.000 mA. Frequency meter with ranges to measure from 10,000 Hz down to 1 Hz and 5 decimal places. (A period meter that measures seconds to 6 decimal places could be used in place of a frequency meter below 1 Hz) General purpose VOM.

Procedure:

Allow the units to warm up for at least 15 minutes before calibrating. Set "FL" (1) scaling to 9999.

Hook up Frequency Meter to Pin #4.

Apply 4.001 mA to input terminals (positive, Pin #5; negative, Pin #6). Adjust R10 (on rear of unit, see Figure 4-1) so frequency at scaled output, Pin #4, (approximately 2.5V pulses through 10K resistor) is 0 to 1 Hz. At 4.000 mA, there should be no output pulses.

Apply 20.000 mA. For DP-62M, adjust R3 (R3 is on back to right of R10) so frequency is 166.650 Hz. ±17 (for period of 0.0060006 sec. ±6). For DP-62H, adjust R3 so frequency is 2.7775 Hz. ±2 (for period of 0.360036 sec. ±36). (Tolerance .01%)

NOTE

Frequency of 9999 will slow down approximately 0.4 counts per degree C rise above 25°C.

Return to 4.001 mA to insure frequency still reads 0-1 Hz. Adjust until it does and 4.000 mA is 0.

Return to 20.000 mA. Recheck making adjustments until no further improvement is achieved.

Apply 12.000 mA, set "FL" (1) to 6666. For Model DP-62M frequency should be 55.550 Hz. ±5 (period 0.0180018 sec. ±18). For Model DP-62H frequency should be 0.925833 ±83 Hz (period 1.080108 sec. ±97).

If reading is off over tolerance indicated, check VR1 (2.5 V reference) or scaler circuitry (74LS173, 4527 area). Call Omega Engineering Customer Service Department at (203) 359-1660.

Recheck keypad operation
Set "FL" (1) to 9999
Set "PS" (2) to 10
Set "dP" (3) to off (no decimal)

Check that output activates at setpoint.

WARNING

Tampering or unauthorized modification will void warranty.

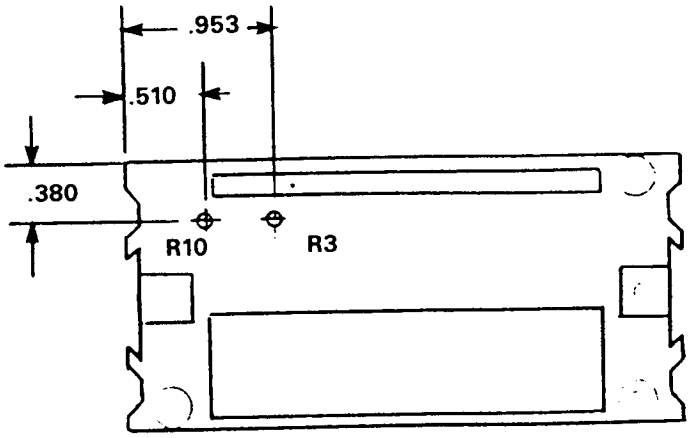

Figure 4-1. Calibration Adjustments

SECTION 5 SPECIFICATIONS

ACCURACY: ±0.175% FS zero error; ±0.5% FS overall error (includes zero offset error)
INPUT SIGNAL: 4 to 20 mA current loop, 250Ω
TEMPERATURE RANGE: Operating, 32° to 130°F (0° to 54°C); Storage, −40° to 200°F (−40° to 93°C)
RELAY OUTPUT: Dual level hi/lo SPDT relay, 10A @ 250 Vac
5 VOLT DC OUTPUT: Up to 75 mA of +5V regulated power is available to power peripheral devices.
POWER: 110 Vac, 50/60 Hz, 12 Vdc ±10%, jumper selectable; 220 Vac optional
DISPLAY: LED, six digits, 0.6" x 0.32"; indicates, shows scale factor and presets with decimal points.
STANDBY SYSTEM: Non-volatile RAM retains scale factor, presets, output status and total flow for up to 1 year without power.
ENCLOSURE: High Impact plastic case (aluminum optional); cutout 1.772" (45 mm) H x 3.622" (92 mm) W (per DIN); 4.4" (111.8 mm) max. panel depth

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DP-64 RATE INDICATOR WITH ALARM RELAY

SECTION 1 INTRODUCTION

The OMEGA® Model DP-64 Rate Indicator accepts 4 to 20 mA current loop input signal. The DP-64 is fully scalable and programmable from 0 to 9999 counts. A 4 mA input signal would always be set to display zero. The 20 mA input signal can be adjusted to display any value from 1 to 9999 counts which indicates the flow rate represented by the 20 mA current input signal.

For greater resolution of reading, the operator may locate the decimal point to give up to four significant digits for any flowrate, i.e., .1000 to 1000. For example, a nine GPM flowrate could be read to the nearest 1/1000 of a GPM (9.000 GPM).

The DP-64 also comes with an alarm relay which can be set for both high and low setpoints. The scaling and setpoints are programmed into the indicator via the membrane keyboard on the face of the indicator without external instrumentation.

SECTION 2 INSTALLATION

2.1 UNPACKING

Remove the Packing List and verify that all equipment has been received. If there are any questions about the shipment, please call OMEGA Customer Service Department at (203) 359-1660.

Upon receipt of shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

2.2 MOUNTING

The DP-64 has a high impact plastic case and standard DIN cut-out, 1.772" H x 3.622" W, 4.4" maximum panel depth. Refer to Figure 2-1.

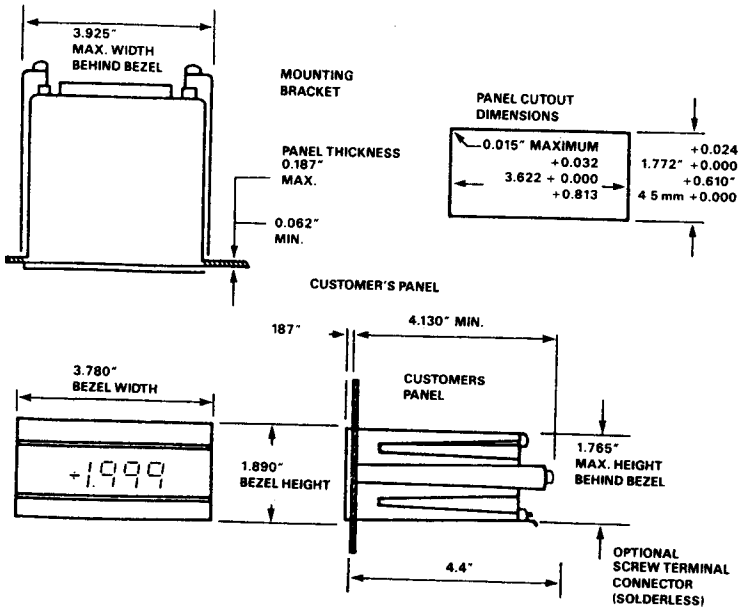

Figure 2-1. Cutout and Mounting Dimensions

2.3 WIRING CONNECTIONS (Refer to Figure 2-2)

CAUTION

Terminal #8 *must* be connected to earth ground at all times when in use. This provides a ground path for static electricity which otherwise would cause faulty operation, erroneous data or circuit damage.

AC Powered Units — Apply 110 (standard) or 220 (optional) Volts AC to terminals 11 and 12. AC polarity is not important. Connect AC ground to Terminal 8.

DC Powered Units — Apply the correct DC voltage as required. Connect the negative voltage to Terminal 6 and the positive voltage to Terminal 10.

NOTE

The DP-64 can be wired for either 110 Vac or 12 Vdc operation. Refer to Figure 2-2 for appropriate connections.

Analog Input — Connect the DC positive loop signal to Terminal No. 5 (Analog Input) and the negative loop signal to Terminal No. 6 (Analog Return).

NOTE

If the DPM is powered by a DC supply, then the power supply negative lead will also go to Terminal No. 6. DC powered units cannot have isolation between the loop and the supply.

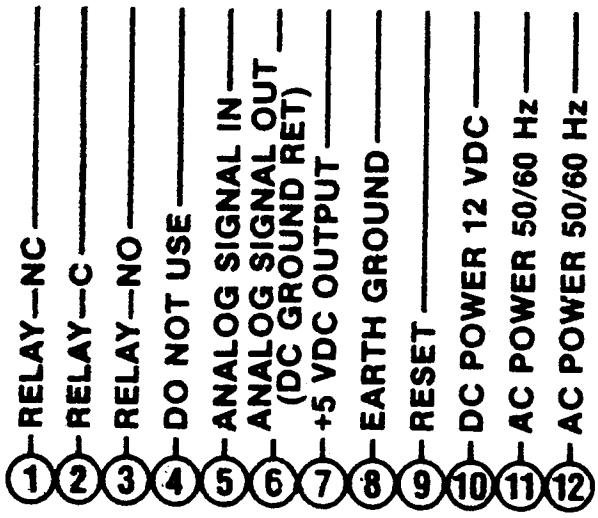

Figure 2-2. Wiring Connections for DP-64

SECTION 3 OPERATION

3.1 SETTING FULL SCALE

Determine the full scale reading required: Press the right-hand key and while still holding this key depressed, press the left-hand (R) key. The letters ''FL'' will appear at the left of the display, along with the previous full scale setting with its decimal point. Press any of the four right-hand keys to bring the scaling factor to the desired number from 1 to 9999. Once the correct full-scale value has been entered, press the left-hand (R) key once again and the value will be entered.

3.2 SETTING THE PRESET NUMBERS

The preset value must be four digits or less. To set the low limit preset value, press the second key from the right and while holding this key, press the left-hand (R) key. Now the letter ''L'' will appear at the left of the display and previous low preset with the decimal point location will be displayed.

To change the preset number, press any of the five keys below the displayed preset. Each key will cause the digit directly above it to count up from the preset number to 9 and then from 0 up again. Since this will not carry over to the next digit, setting can be done in any order. When the correct values have been set, press the left-hand (R) key again to leave the setting mode.

To set the high limit preset value, press the third key from the right, and while holding this key depressed, press the left-hand (R) key. Now the letter "H" will appear at the left of the display along with the previously high preset. Follow the procedure above to complete the preset entry, and then exit by pressing the left-hand (R) key.

3.3 SETTING THE DECIMAL POINT

If a decimal point is desired, press the second key from the left and, while still holding this key, press the left-hand (R) key. The letters "dP" will appear at the left of the display. Then press any of the five right-hand keys to move the decimal point to the desired location. The right-hand key will eliminate the decimal completely. Once the correct position has been entered, press the left-hand (R) key once again, and the DP-64 will return to normal operation.

NOTES

If the low limit is set to zero, the output will come on at zero.

Setting the high limit lower than the low limit will inhibit the output.

3.4 RELAY OUTPUT OPERATION

On any preset unit, the relay will turn on whenever the low limit preset value has been reached and turn off again when either the high limit has been exceeded or the value falls below the low limit. The relay will stay on whenever the reading falls between the low limit and the high limit settings.

SECTION 4 CALIBRATION

Equipment needed:

Source for 4.000 to 20.000 mA. General purpose VOM.

Procedure:

Allow unit to warm up 15 minutes.

Set "FL" (1) scaling to 9999.

Apply 4.001 mA to input terminals (positive, Pin #5; negative, Pin #6).

Adjust R10 (on rear of unit, see Figure 4-1) so display blinks between 0-1 on right hand digit. At 4.000 mA display should read "0".

Apply 20.000 mA. Adjust R3 for display to read 9999. (R3 is on back to right of R10). (Note: 9999 reading will drift down approximately 0.4 counts per degree rise above 25°C).

Return to 4.001 mA to insure unit still blinks 0-1. Adjust until it does and 4.000 mA is 0.

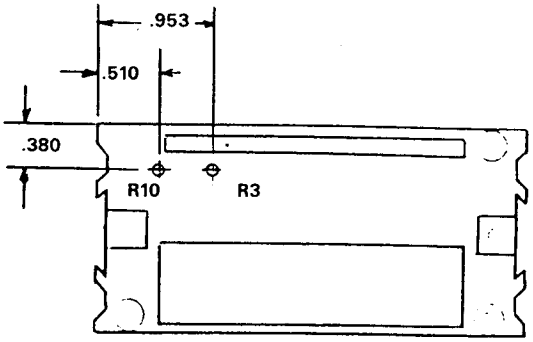

Figure 4-1. Calibration Adjustments

Return to 20.000 mA. Recheck, making adjustments as necessary until no further improvement is achieved.

Apply 12.000 mA, set "FL" (1) to 6666. Meter should read 3333. If off over ±1, check VR1 (2.5 V reference) or scaler circuitry (74LS173, 4526 area). Call Omega Engineering Customer Service Department at (203) 359-1660.

Recheck keypad operation
- Set "FL" (1) to 9999
- Set "L" (2) to 10
- Set "H" (3) to 100
- Set "dP" (5) — no decimal

Check that output activates at "L" and drops out at "H" settings.

WARNING

Tampering or unauthorized modification will void warranty.

SECTION 5 SPECIFICATIONS

ACCURACY: ±0.175% FS zero error; ±0.5% FS overall error (includes zero offset error)
INPUT SIGNAL: 4 to 20 mA current loop, 250Ω
TEMPERATURE RANGE: Operating, 32° to 130°F (0° to 54°C); Storage, −40° to 200°F (−40° to 93°C)
RELAY OUTPUT: Dual level hi/lo SPDT relay, 10A @ 250 Vac
5 VOLT DC OUTPUT: Up to 75 mA of +5V regulated power is available to power peripheral devices.
POWER: 110 Vac, 50/60 Hz, 12 Vdc ±10%, jumper selectable; 220 Vac optional
DISPLAY: LED, six digits, 0.6" x 0.32"; indicates, shows scale factor and presets with decimal points.
STANDBY SYSTEM: Non-volatile RAM retains scale factor, presets, output status and total flow for up to 1 year without power.
ENCLOSURE: High Impact plastic case (aluminum optional); cutout 1.772" (45 mm) H x 3.622" (92 mm) W (per DIN); 4.4" (111.8 mm) max. panel depth

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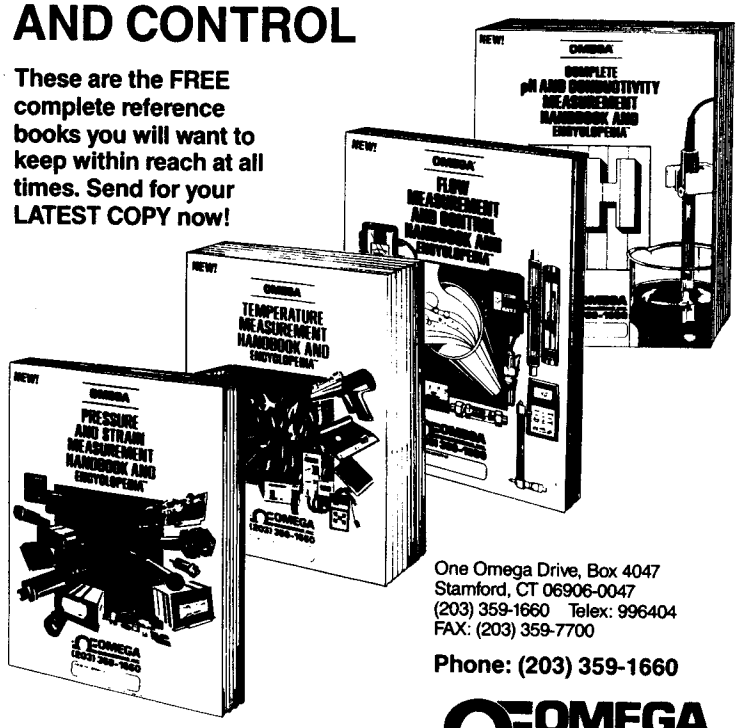

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