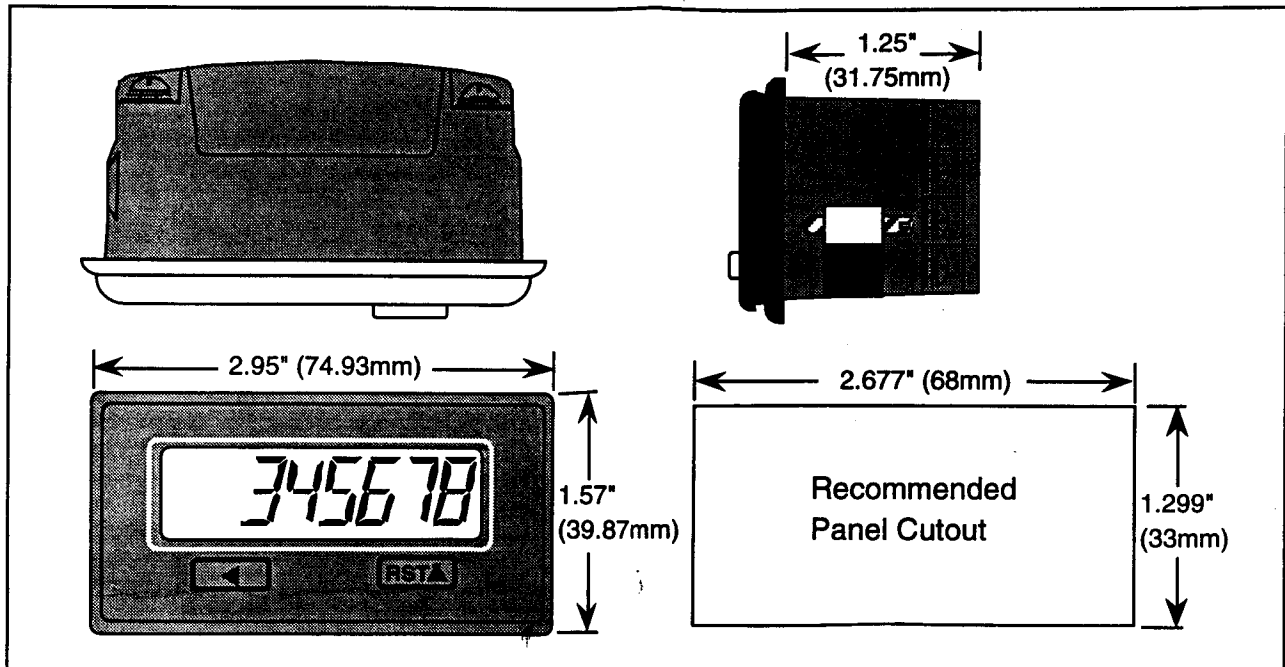




DPC10-QT Quadrature Indicator/Totalizer

M1664/0693



POWER

Internal battery: 3V, lithium
 Life expectancy: 5 years +
 Replacement Part: DPC10-BAT

PHYSICAL

Operation Temperature: 0° - 55°C
 Storage Temperature: -20 to 70°C
 Operating Humidity: 90% Non-condensing
 Weight: 2.2 oz. net
 Display Size: .43" high
 Front Panel Rating: NEMA-4X when mounted with gasket provided
 Case Material: Cyclopedia X-17

TOTALIZER

Type: Up/Down Counting
 Digits: 8 digits positive/minus sign and 7 digits negative
 Scaler: 0.0001 - 100.0000
 (0.0000 scales by 100)
 Decimal Point: 5 positions, programmable

DC COMMON (Terminal 1)

COUNT INPUTS A & B (Terminals 2 and 3)
 Inputs A & B require a quadrature signal with a voltage source such as a current sourcing sensor or a current sinking sensor used with the provided pull up resistors.

Speed: 0 to 10 kHz
 Minimum Low Time: 50 microseconds
 Minimum High Time: 20 microseconds
 (The above times are with a 0 to 5.0 V swing)
 Input Impedance: 2KΩ above 5 V dc
 Voltage Thresholds: Low 0 to 1.2 V dc
 High 2 to 28 V dc
 Maximum High 28 V dc

RESET INPUT (Terminal 4)

Resets totalizer when connected to dc common.

Minimum Low Time: 0.25 to 1.0 seconds (maintained)
 The required pulse width varies with count speed, scale factor and number of digits displayed.
 Voltage Thresholds: Low 0 to 0.4 V dc
 High 2 to 28 V dc
 Maximum High 28 V dc

PROGRAM ENABLE INPUT (Terminal 5)

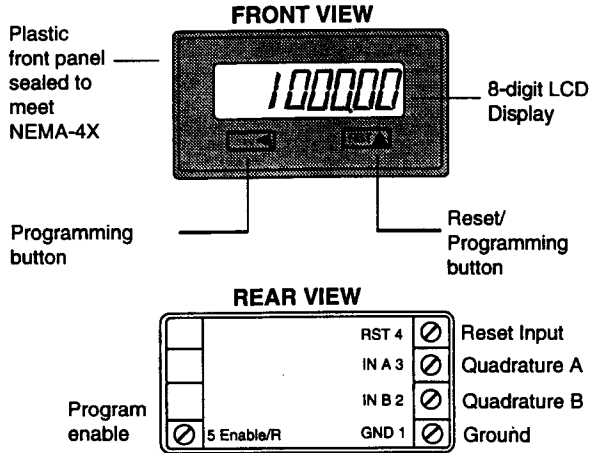
Operation: Level sensitive (maintained)

COUNT ACCURACY

100% when operated within specifications.

INTRODUCTION

Your OMEGA DPC10-QT is a counter with a 8 digit LCD display. A programmable scaler and decimal point allow for display in any engineering unit.

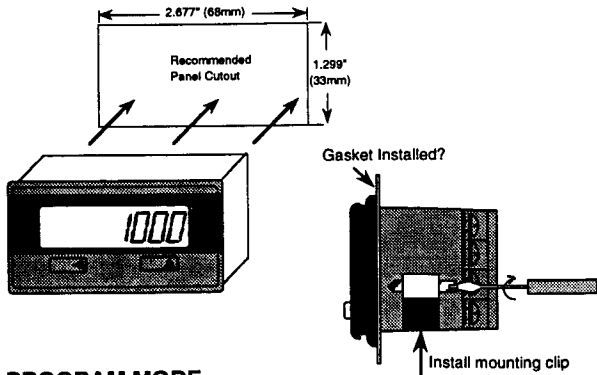


APPLICATION

You must make certain programming and wiring choices to accomplish your application. We recommend the following sequence:

1. Answer the following questions:
 - What type of sensor will be used?
 - What engineering units should the counter be scaled to?
 - How many pulses per item is the sensor providing?
 - Is a decimal point needed on the display?
2. Calculate the scale factor.

MOUNTING



PROGRAM MODE

NOTE: To enter the program mode, you must connect a jumper between terminals 1 and 5 (see page 4). To leave the program mode, disconnect the jumper.

Screens

There are four program-mode screens in the DPC10-QT. Upon entering the setup mode, the counter will display screen 1. Press and hold the key while repeatedly pressing the key to advance to successive screens.

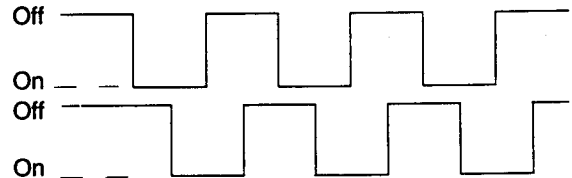
Programming Screens	
Screen	Function
1	Count Scale Factor
2	Count Decimal Point
3	Reset to Offset Value
4	Reset Key Enable / Disable

OPERATION

Quadrature Counting

Quadrature is a bi-directional count mode requiring an input signal at each of the totalizer's two count inputs. Quadrature counting is typically accomplished by using a quadrature encoder as the count source although any two sensors with single channel outputs may be used if the sensors are positioned correctly. In either case, both sensor outputs must produce pulses at the same frequency and there must be a phase shift between the signals. The totalizer recognizes the phase shift and uses it to determine if it should be counting up, or counting down. Finally, the signal channels must alternate changes of state. This produces the four distinct input conditions from which the term quadrature is derived. These conditions are off-off, on-off, on-on, and off-on.

Quadrature Signal



Count Inputs

Count inputs A and B (terminals 3 and 2) are pulled down to ground (terminal 1). The sensor must supply between 2.0 and 28 V dc at the count inputs for the totalizer to count.

The totalizer has high speed inputs only and is capable of receiving pulses at 10kHz per channel if each signal is a square wave and there is a 90° phase shift between the two signals. For this reason, it is recommended that solid state sensors (PNP output with a pull-down resistor or NPN output with a pull-up resistor) be used.

If the totalizer counts in the "wrong" direction at startup, stop the process and switch the wires at terminals 2 and 3. This will cause the totalizer to count in the "right" direction when the process is re-started.

COUNT SCALER

Calculating the Count Scale Factor

The count scale factor is used to convert the incoming count pulses to the desired unit of measure to be displayed (feet, gallons, etc.) or to correct for a known amount of error (wheel wear, viscosity, etc.). This scaler has six digits available with a fixed decimal point.

Count Scaler Range: 0.0001 to 99.9999

Count Scaler (CS) Formula:

$$CS = \frac{DPF}{PPI}$$

where:

DPF is the decimal point factor corresponding to the desired decimal point location.

DISPLAY	DPF	DISPLAY	DPF
XXXXXX	= 1	XXX.XXX	= 1,000
XXXXX.X	= 10	XX.XXXX	= 10,000
XXXX.XX	= 100		

PPI is the number of pulses per item from the sensor.

Example 1: A sensor produces 20 pulses per inch of material travel. Calculate the count scaler required to indicate material used in whole inches (XXXXXX).

$$CS = \frac{1}{20} = 0.05000$$

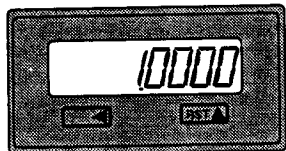
Example 2: An encoder produces 120 pulses per foot. Calculate the count scaler required to indicate material usage in 1/100's of feet (XXXX.XX).

$$CS = \frac{100}{120} = 0.8333$$

(Select the XXXX.XX position on the totalizer decimal point menu).

Programming Count Scale Factor

The first screen in the program mode is used to enter the count scale factor.



The far right digit will be flashing. Press the **RST** key until reaching the desired digit value.

Note: Pressing and holding the **RST** key will cause the numbers to autoscroll.

Next press the **←** key to move the flashing digit one place to the left. Change this digit to the desired value with the **RST** key.

Repeat this process until all digits are set correctly.

(Setting the count scale factor to 0.0000 will allow scaling by 100)

Programming Decimal Point

The second screen is used to enter the decimal point display on the totalizer screen. Press and hold the **←** key and then press the **RST** key to move from screen one to screen two.

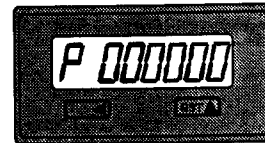


Press the **RST** key to move the decimal point to the desired position.

Programming Offset Value

Programming an offset value allows the counter to reset to a value other than zero. The offset may be up to six digits. The offset cannot be a negative number.

The third screen in the program mode is used to enter the offset value.



The far right digit will be flashing. Press the **RST** key until reaching the desired digit value.

Note: Pressing and holding the **RST** key will cause the numbers to autoscroll.

Next press the **←** key to move the flashing digit one place to the left. Change this digit to the desired value with the **RST** key. Repeat this process until all digits are set correctly.

Enabling the Front Panel Reset Key

The fourth screen in the program mode allows the user to enable or disable the front panel reset key.



Press the **RST** key to choose the option you want.

Note: The reset terminal on the rear panel is still active when the front reset button is disabled.

Note: To exit the program mode, disconnect the jumper between terminals 1 and 5.

WIRING RECOMMENDATIONS

Following these suggestions will increase noise immunity and lengthen unit life.

Cable: Make the connection between the count source and the ratemeter with a two-conductor shielded cable. Connect the shield to earth ground at one end only.

Relay Coil Suppression: If a relay contact is used as a count source, suppress the relay coil. This can be accomplished with an RC network for AC coils or a diode for DC coils.

Mounting: Do not mount the totalizer near a solenoid or other inductive devices. Supply enough ventilation to keep the ratemeter operating within the temperature specifications. Do not mount this unit in a heavy vibration area.

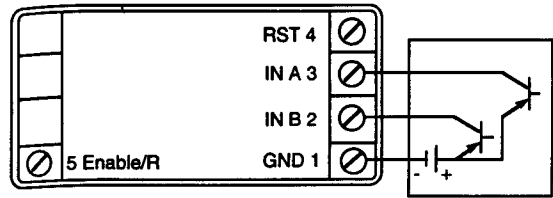
BATTERY SAFETY

The lithium battery that powers your device contains inflammable materials such as lithium organic solvent, and other chemical ingredients. Explosion or fire may result if the battery is not handled correctly. To avoid an accident follow these guidelines:

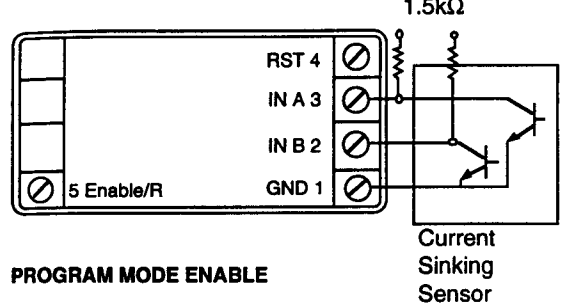
- Do not heat batteries above 95°C
- Do not recharge lithium batteries
- Do not dispose of batteries in fire
- Insert battery with correct polarity

WIRING DIAGRAMS

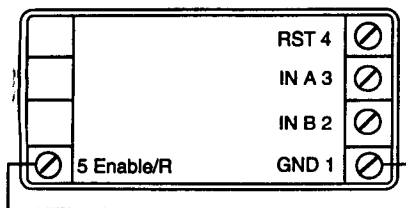
SOLID STATE QUADRATURE INPUT CURRENT SOURCING SENSOR



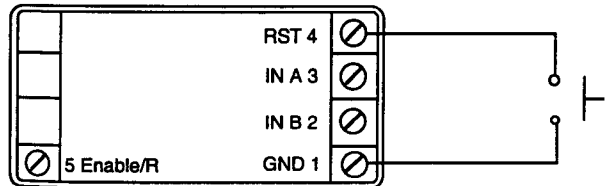
SOLID STATE QUADRATURE INPUT CURRENT SINKING SENSOR



PROGRAM MODE ENABLE



REMOTE RESET



Terminal	Function	Operation
1	Ground	
2	Input B Count Input	Use with Current Sourcing Quadrature Count Source
3	Input A Count Input	Use with Current Sourcing Quadrature Count Source
4	Reset	Connect through Contact Close to Ground
5	Program Enable	Connect to Ground to Enter Program Mode

REPLACEMENT PARTS

DPC10-BAT Battery
53300-210 Gasket
53300-241 Mounting Clip
28772-200 Mounting Screw

OTHER OMEGA MINI COUNTER PRODUCTS

DPC10-TL Totalizer
DPC10-CS Add/Subtract Totalizer
 (Solid State Input)
DPC10-CC Add/Subtract Totalizer
 (Contact Input)
DPC10-RM Ratemeter
DPC10-RT Ratemeter/Totalizer



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.

We are glad to offer suggestions on the use of our various products. Nevertheless OMEGA only warrants that the parts manufactured by it will be as specified and free of defects.

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RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING Customer Service Department. Call toll free in the USA and Canada: 1-800-622-2378, FAX: 203-359-7811; International: 203-359-1660, FAX: 203-359-7807.

BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, YOU MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OUR CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence. 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, and
3. Repair instructions and/or specific problems you are having with the product.

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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