DPC10-RM Ratemeter
M1665/0693

1.25"
(31.75mm)

2.95" (74.93mm)
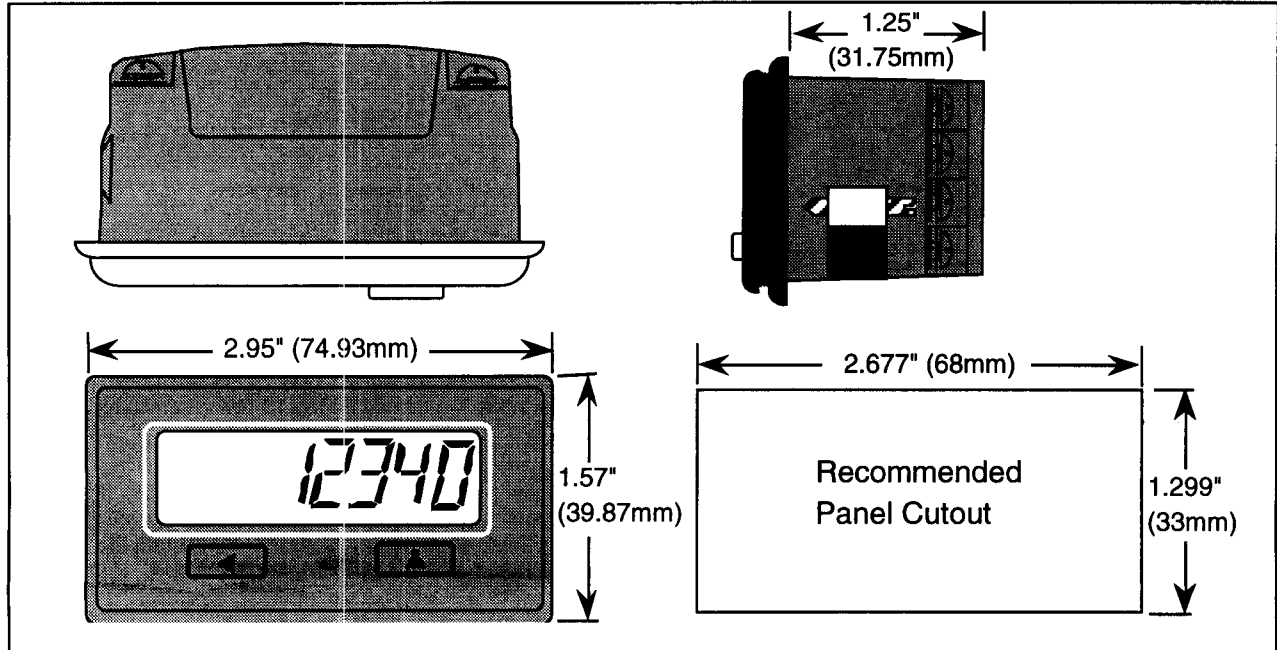
1.57"
(39.87mm)

2.677" (68mm)

Recommended
Panel Cutout

1.299"
(33mm)

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

PHYSICAL
Operation Temperature: 0° - 55°C
Storage Temperature: -20° - 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: Cycolac X-17

RATE INDICATOR
Type: 1/Tau
Digits: 4/5 (4 calculated, 5 displayed with fixed 0 in LSD)
Scaler Range: .001 to 9999
Decimal Point: 5 positions, programmable
Accuracy: ±0.2%
Update Time: .7 sec
Zero Time: 10 seconds

DC COMMON (Terminal 1)

RATE INPUTS
Input B (Terminal 2) Low speed input designed for contact closures to DC common
Speed: 0-20 Hz
Minimum Low Time: 10 milliseconds
Minimum High Time: 40 milliseconds
Impedance: 101 kΩ
Voltage Thresholds: Low 0 to 0.4 V dc
High 2.0 to 28 V dc
Maximum High 28 V dc

Input A (Terminal 3) High Speed Input requiring a voltage source such as a current sourcing sensor or a current sinking sensor used with the provided pull up resistors.
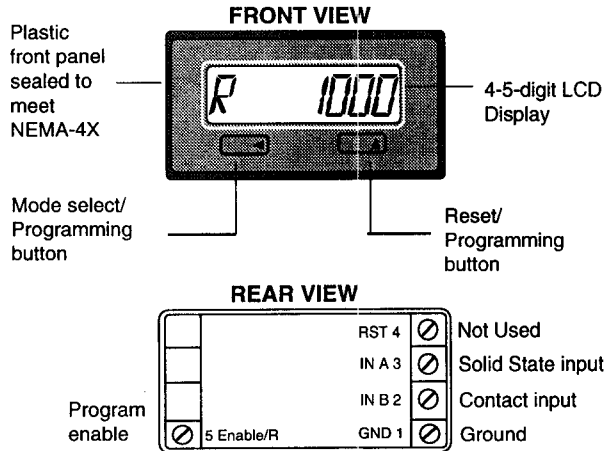Speed: 0 to 10 kHz
Minimum Low Time: 80 microseconds
Minimum High Time: 20 microseconds
(The above times are with a 0 to 5.0 V swing)
Input Imedance: 2KΩ above 5 V dc
Voltage Thresholds: Low 0 to 1.2 V dc
High 2.0 to 28 V dc
Maximum High 28 V dc

PROGRAM ENABLE INPUT (Terminal 5)
Operation: Level sensitive (maintained)

INTRODUCTION

Your OMEGA DPC10-RM is a ratemeter with a 4-5 digit LCD display. The four most significant digits are calculated; five digits will be displayed with fixed 0 in the least significant digit. A programmable rate scaler and decimal point allow for display of rate in any engineering term.

FRONT VIEW

Plastic front panel sealed to meet NEMA-4X

4-5-digit LCD Display

Mode select/ Programming button

Reset/ Programming button

REAR VIEW

RST 4	⊘	Not Used
IN A 3	⊘	Solid State input
IN B 2	⊘	Contact input
5 Enable/R	GND 1 ⊘	Ground

Program enable

APPLICATIONS

The DPC10-RM is designed to show you process rate. 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 ratemeter be scaled to?
   • How many pulses per item is the sensor providing?
   • Is a decimal point needed on the rate display?

2. Calculate the rate scale factor.

MOUNTING

2.677" (67mm)

Recommended Panel Cutout

1.299" (33mm)

Gasket Installed?

Install mounting clip
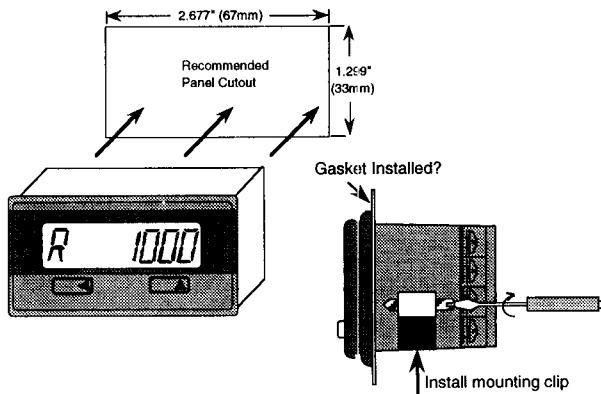
OPERATION

Rate Inputs

Separate contact and solid state inputs are provided. The solid state input (terminal 3) requires a current-sourcing sensor and can accept inputs up to 10 kHz. Inputs into this terminal are realized on the positive-going edge.

Input realized on this edge of the pulse (Voltage applied to terminal)
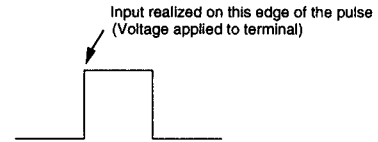
Terminal 3 is pulled down to common. When a sensor output supplies voltage to this terminal, one count is registered on the display. The sourcing signal must supply at least +2.0 V dc but no more than +28 V dc.

Note: When a sourcing signal is applied to terminal 3, a power assist feature of the DPC10-RM extends the life of the battery.

Terminal 2 is the low-speed, current-sinking rate input designed to be used with a contact closure to ground. It has a maximum count speed of 20 Hz. Inputs into this terminal are counted on the negative-going edge.

Contact Closes   Contact Opens

Input realized on this edge of the pulse
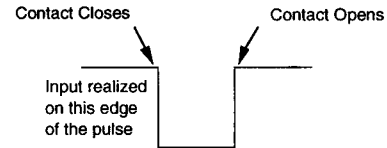
Terminal 2 is pulled up to +3 V dc. When a contact closes, pulling the voltage down to .4 V dc or less, one count is registered.

PROGRAM MODE

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

Screens
There are three program-mode screens in theDPC10-RM.
Press and hold the [◄] key while repeatedly pressing the
[▲] key to advance to successive screens.

Programming Screens	
Screen	**Function**
1	Rate Scale Factor
2	Ratemeter Decimal Point
3	Rate x1/x10

RATE SCALER

Calculating the Rate Scale Factor

This 1/Tau ratemeter calculates rate by measuring the time interval between input pulses, converting to a frequency (F = 1/Tau), and multiplying the product by the rate scaler. The rate scaler is user programmed to convert the count input frequency into the desired rate units for display (feet/minute, inches/second, gallons/hour, etc.)

Rate Scaler Range: 0.001 to 9999

Rate Scaler (RS) formula:

$$RS = \frac{SEC \times DPF}{PPI}$$

where:

SEC is the number of seconds in the rate time unit (items/second = 1, items/minute = 60, items/hour = 3600, etc.)

DPF is the decimal point factor corresponding to the desired decimal point location on the run mode screen:

Display	DPF
XXXX	1
XXX.X	10
XX.XX	100
X.XXX	1000

Use the rate display decimal point screen to program the desired decimal point position.

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

Example 1: A sensor produces 10 pulses per foot of material travel. Display rate in whole feet per minute (XXXX).

$$RS = \frac{60 \times 1}{10} = \frac{60}{10} = 6$$

Example 2: A flow sensor produces 400 pulses per gallon. Display flow rate in tenths of gallons per hour (XXX.X).

$$RS = \frac{3600 \times 10}{400} = \frac{36,000}{400} = 90$$

Programming Rate Scale Factor

The first program mode screen allows you to enter the rate scale factor.
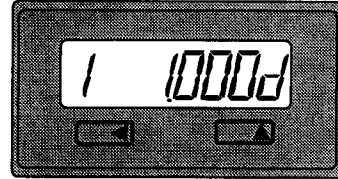
The lower case "d" appears on the right of the display when it is time to enter the decimal point position for the rate scaler.

Note: This decimal point is used for the rate scaler only and will not appear on the ratemeter screen.

Press the [▲] key to change the first digit to the correct value. Press the [◀] key to select the next digit to be changed. Repeat this process until all the digits are correct. When the "d" appears, press the [▲] key until the decimal point is in the desired location.

Ratemeter Decimal Point

The second program mode screen is used to enter the decimal point position for the ratemeter run-mode display.
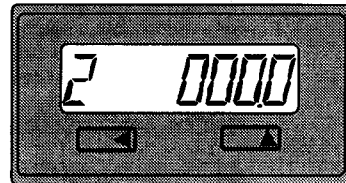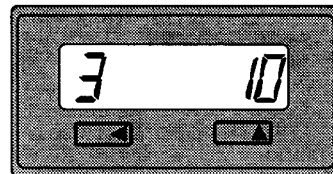

Press the [▲] key until the decimal point is in the correct position.

Rate x1 or x10

The third screen is used to select the rate display multiplier of one or ten. Selecting rate x10 will add a zero to the far right of the display. This zero will not change value and does not affect the decimal point position.

Press the [▲] key to select 1 or 10.

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

OMEGA® ... Your Source for Process Measurement and Control

TEMPERATURE

☑ Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
☑ Wire: Thermocouple, RTD & Thermistor
☑ Calibrators & Ice Point References
☑ Recorders, Controllers & Process Monitors
☑ Infrared Pyrometers

PRESSURE/STRAIN FORCE

☑ Transducers & Strain Gauges
☑ Load Cells & Pressure Gauges
☑ Displacement Transducers
☑ Instrumentation & Accessories

FLOW/LEVEL

☑ Rotameters, Gas Mass Flowmeters & Flow Computers
☑ Air Velocity Indicators
☑ Turbine/Paddlewheel Systems
☑ Totalizers & Batch Controllers

pH/CONDUCTIVITY

☑ pH Electrodes, Testers & Accessories
☑ Benchtop/Laboratory Meters
☑ Controllers, Calibrators, Simulators & Pumps
☑ Industrial pH & Conductivity Equipment

DATA ACQUISITION

☑ Data Acquisition and Engineering Software
☑ Communications-Based Acquisition Systems
☑ Plug-in Cards for Apple, IBM & Compatibles
☑ Datalogging Systems
☑ Recorders, Printers & Plotters

HEATERS

☑ Heating Cable
☑ Cartridge & Strip Heaters
☑ Immersion & Band Heaters
☑ Flexible Heaters
☑ Laboratory Heaters

® **OMEGA ENGINEERING INC.**

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 ratemeter 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 stack or jumble up batteries
- Do not heat batteries above 95°C
- Do not disassemble batteries
- Do not recharge lithium batteries
- Do not apply pressure to, or deform batteries
- Do not solder to batteries
- Do not dispose of batteries in fire
- Insert battery with correct polarity

Terminal	Function	Operation
1	Ground	
2	Input B Rate Input	Use with Contact Closure to Ground Maximum 20 Hz Count Speed
3	Input A Rate Input	Use with Current Sourcing Sensor Maximum 10 kHz Count Speed
4	Not Used	
5	Program Enable	Connect to Ground to Enter Program Mode

WIRING DIAGRAMS

CONTACT CLOSURE RATE INPUT
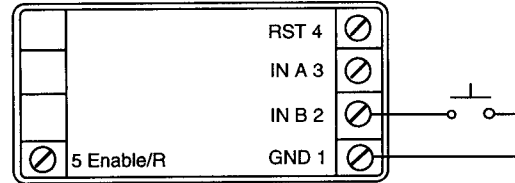
SOLID STATE RATE INPUT
CURRENT SOURCING SENSOR
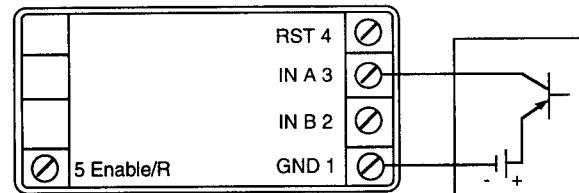
SOLID STATE RATE INPUT
CURRENT SINKING SENSOR

+6 to +28 VDC
1.5kΩ

Current Sinking Sensor
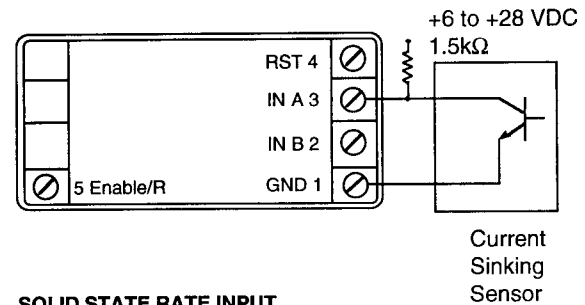
SOLID STATE RATE INPUT
MAGNETIC PICKUP

3V p-p min
20V p-p max
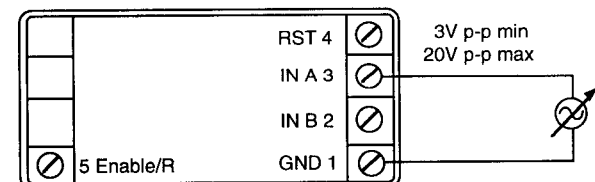
* Not suitable for direct turbine meter or direct self-generating paddlewheel input.

PROGRAM MODE ENABLE
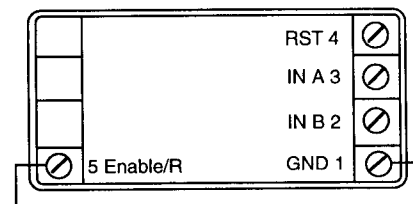
REPLACEMENT PARTS

DPC10-BAT	Battery
46066-210	Gasket
53300-241	Mounting Clip
28772-200	Mounting Screw

OTHER OMEGA MINI COUNTER PRODUCTS

DPC10-TL	Totalizer
DPC10-CS	Add/Subtact Totalizer (Solid State Input)
DPC10-CC	Add/Subtract Totalizer (Contact Input)
DPC10-QT	Quadrature Indicator
DPC10-RT	Ratemeter/Totalizer