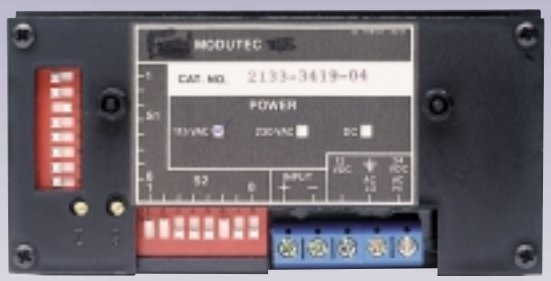
Jewell Instruments

# 2000 Series
# Digital Panel Meters
## MODUTEC

BEST OF CLASS






*2100 Series with DIP switch selections and multiple power options.*

**Backlighting Options**

- Positive Green Black on Green Background
- Negative Green Green on Black Background
- Positive Red Black on Red Background
- Negative Red Red on Black Background
- Non-Backlit LCD Black on Grey Background

## *Customize for features that are important to you and rely on industry standards for routine digital PM elements.*

*You need flexibility. We provide it. We customize our meters to meet your specifications.*

- **Scalable** in engineering units
- **Custom labels** for special readouts
- **User Selectable functions**, decimal point, offset, span, process voltage or current, DC voltage
- Red or green **backlit display**

*You need reliability. The MODUTEC 2000 Series operates in the harshest environments.*

- **Splash and hose proof** meeting NEMA 4, NEMA 12, and IPC 55 standards
- Resistant to damage with a **high impact polycarbonate case**
- Wide operating temperature ranging from **-4°F to +140°F (-20°C to +60°C)**

*You need standards. The MODUTEC 2000 Series gives you industry standards designed in.*

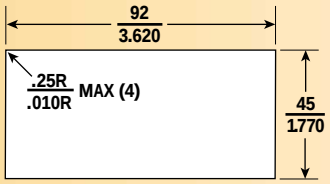
- **1/8 DIN** industry standard cut-out and **1 inch depth**
- Screw terminals
- **Over range indication**
- Low cost
- The MODUTEC 2100 includes **user-friendly dipswitch selection features**

**Applications**

- ► *Telecommunications*
- ► *Water Purification*
- ► *Sewage Treatment*
- ► *Flow*
- ► *Process*
- ► *Desalinization*
- ► *Temperature*
- ► *AC & DC Amps*
- ► *AC & DC Volts*

## 2000 & 2100 Series Dimensional Drawings (mm/in)

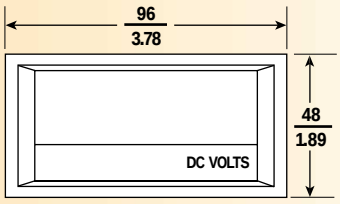
### Panel Cutout



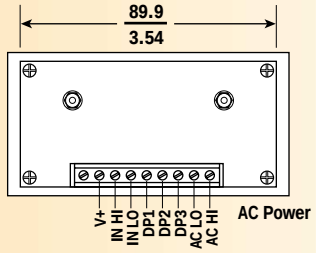

Panel Cutout Notes:

1. For optimum water resistance use cutout height of 43 MM (1.693 Inches).
2. Panel thickness .81 to 6.35 MM (.032 to .250 Inches).

### Front View




### Rear View




### Side View Non-backlit

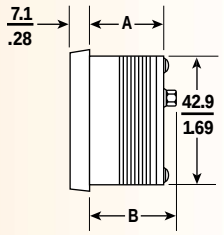



Figure A

### Side View Backlit

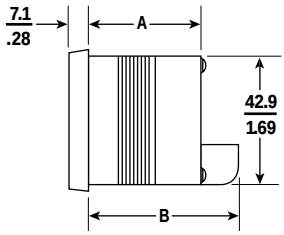
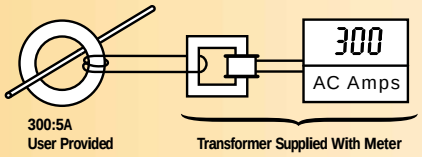



Figure B

| Input Type | Figure | A (mm/in) | B (mm/in) |
|---|---|---|---|
| AC | A | 25.1/.99 | 29.2/1.15 |
| DC | A | 25.1/.99 | 29.2/1.15 |
| Temperature | A | 25.1/.99 | 29.2/1.15 |
| 4-20mA Process | B | 37.8/1.49 | 50.8/2.00 |
| Frequency | A | 25.1/.99 | 29.2/1.15 |

### Connection for High Current Measurement




## 2000 and 2100 Series Specifications

### Display

**Digits:** 3 ½ digits, 7 segments Backlit LCD (1999)
**Digit Height:** 0.5" (12.7 mm)
**Polarity:** Automatic (-) displayed
**Decimal Point:** Three positions, external selection
**Overload:** Three lower digits blank for readings greater than 1999

### Performance

**Conversion Rate:** 2.5 per second
**Normal Mode Rejection:** ≥ 40 db 50Hz-60Hz
**Common Mode Rejection:** ≥ 100db 50 Hz-60 Hz[1]
**Zero Adjust:** Automatic
**Tempco:** ±200 PPM/°C typical[2]
**Warmup:** 10 minutes

### Environment

**Operating Range:** -4°F to 140°F (-20°C to + 60°C)
**Storage Range:** -22°F to 158°F (-30°C to + 70°C)

### Power Options

| | |
|---|---|
| **115V +10%, -15%** | 50Hz to 400Hz at 2VA |
| **230V +10%, -15%** | 50Hz to 400Hz at 2VA |
| **10 to 28VDC** | 150 mA (including backlighting) |
| **10 to 15VDC or 20 to 32VDC** | 150mA (including backlighting) |

### Weight

2 oz.

### FCC Compliance

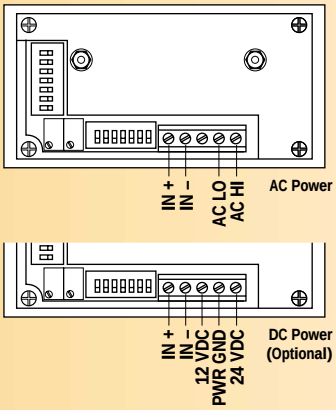
Complies with the class B Limits of FCC rules and regulations, part 15, sub part J for conducted and radiated emissions.

[1] except isolated DC powered which is ≥ 80 db 50 Hz-60Hz
[2] except thermocouple inputs which are .1°/ degree zero tempco for selectable process ranges is only ±.2 count/°C

Specifications continued on back page.

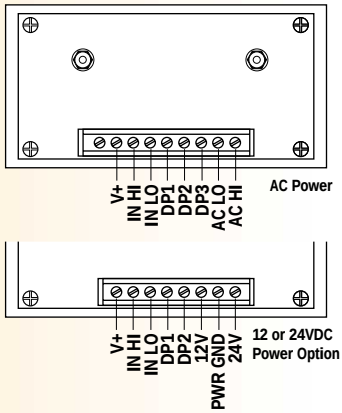
## 2000 & 2100 Series Connection Drawings

### Universal Switchable — Model 2100



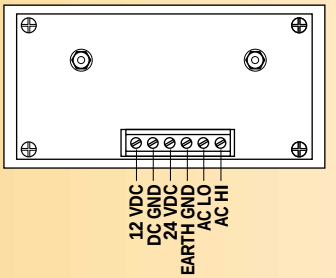

| Terminal | Description |
|---|---|
| IN+ / IN– | Signal Input |
| AC Power Low / AC Power HI | AC Power Input, 115VAC or 230VAC depending on model selected |
| 12VDC Power GND | 12VDC power input (optional) |
| 24VDC Power GND | 24VDC power input (optional) |

### AC and DC Inputs (AC and Isolated DC power)



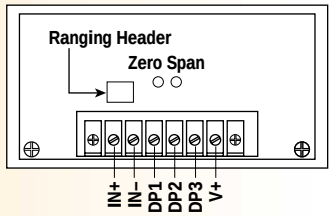

| Terminal | Description |
|---|---|
| V+ | 10-28VDC power input |
| IN HI / IN LO | Signal Input |
| DP1, DP2, DP3 — Decimal point selection, connect to V+ as follows: DP1=XXX.X, DP2=XX.XX, DP3=X.XXX | |
| AC Power LO / AC Power HI | AC Power Input, 115VAC or 230VAC depending on model selected |
| 12V Power GND | 12VDC power input (optional) |
| 24V Power GND | 24VDC power input (optional) |

### Frequency Input



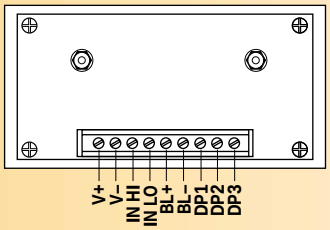

| Terminal | Description |
|---|---|
| AC LO / AC HI / Earth GND | Signal input and power, 115VAC or 230VAC depending on model selected. |
| 12VDC Power GND | 12VDC power input (optional) |
| 24VDC Power GND | 24VDC power input (optional) |

### 4-20mA Process & Flow Inputs



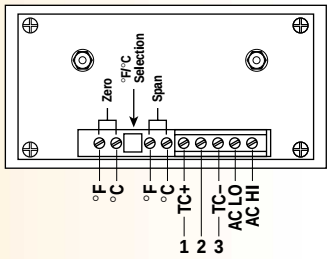

| Terminal | Description |
|---|---|
| IN+ / IN– | Signal Input |
| DP1, DP2, DP3 — Decimal point selection, connect to V+ as follows: DP1= XXX.X, DP2= XX.XX, DP3= X.XXX | |
| V+ | DC voltage output to select decimal points |

### DC Inputs (Non-Isolated DC Power)




| Terminal | Description |
|---|---|
| V+ / V– | 10-28VDC power input |
| IN HI / IN LO | Signal Input |
| BL + / BL – | Backlight power input |
| DP1, DP2, DP3 — Decimal point selection, connect to V+ as follows: DP1=XXX.X, DP2=XX.XX, DP3=X.XXX | |

### Temperature Inputs




| Terminal | Description |
|---|---|
| TC+ / TC– | Thermocouple Inputs |
| AC Power Low / AC Power HI | AC Power Input, 115VAC or 230VAC depending on model selected |
| 1 / 2 / 3 | RTD inputs |

## 2000 Series Scaling Chart

Model 2100, of the 2000 Series, provide the unique ability to switch-select a range and then scale and offset that range. Input will be displayed in engineering units. For example, by changing switch positions and recalibrating, a 2133-3419-04 may be set-up for any of the following displays:

- 4 to 20mA input display -148°F to 932°F (-100°C to +500°C) temperature
- 1 to 5V input displaying – 60kPa to 300kPa differential pressure
- 0 to 10V input displaying +700°F to +950°F (+682°C to +932°C) temperature
- 0 to 50mV input displaying 0 to 300 amperes

## Scaling Capability

*Zero Range Adjustment*

**4mA to 20mA, 1V to 5V** — -1000 counts to +1500 counts. Switch selectable in four ranges: a 25-turn potentiometer enables continuous adjustment.

**0 to 200mV, 0 to 2V, 0 to 10V** — -1500 counts to +1500 counts. Switch selectable in six ranges: a 25-turn potentiometer enables continuous adjustment.

*Full Scale Span Adjustment*

All ranges — 0 to 2000 counts. Switch selectable in four ranges: a 25-turn potentiometer enables continuous adjustment.

*Other ranges and scaling available.*

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## How to Order

| 2 | a | b | 3[1] | - | 3 | c | d | - | e | f |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 3 | | | | 4 | 6 1 | | 0 4 | 2 |

**a — Configuration**

| | |
|---|---|
| 0 = 1/8 DIN | 1 = UPM |
| 2 = TRMS (Inst) | 3 = TRMS (Power) |

**b — Display**

| | |
|---|---|
| 1 = Non Bklit | 3 = Pos Grn Bklit |
| 4 = Neg Grn Bklit | 5 = Neg Red Bklit |
| 6 = Pos Red Bklit | |

**c — DPM Power[2]**

| | |
|---|---|
| 0 = loop power | 1 = 9 VDC |
| 2 = ±5VDC | 3 = +5 volts |
| 4 = 115VAC | 5 = 230VAC |
| 6 = 10 to 28VDC | 7 = 12 or 24VDC (Iso) |
| 8 = 12 VDC | 9 = 24VDC |

**d — Input**

00 = 100mVDC (1999 counts)
01 = 200mVDC scaled 0 to 199.9
02 = 2VDC scaled 0 to 1.999
03 = 20VDC
04 = 200VDC
05 = 1V to 5 VDC scaled 0 to 100.0
06 = 10VDC scaled 0 to 10.00
07 = 500VDC
10 = 200uADC
11 = 2mADC
12 = 20mADC
13 = 200mADC
18 = 4 to 20mADC Sq Rt[3]
19 = 4 to 20mADC scaled 0 to 100.0[3]
21 = 200.0mVAC RMS
22 = 2.000VAC RMS
23 = 20.00VAC RMS
24 = 200.0VAC RMS
25 = 500VAC RMS
27 = 500VAC Avg
28 = 80.0 - 130.0VAC Avg
29 = 80 - 260VAC Avg
30 = 250VAC RMS
31 = 2.000mAAC RMS
32 = 20.00mAAC RMS
33 = 200.0mAAC RMS
34 = 2.000AAC RMS
36 = 5.00AAC[4] RMS
37 = 50.0AAC[4] RMS
38 = 0 - 5AAC[4] AVG
39 = 0 - 50AAC[4] AVG
60 = 40 to 440Hz
61 = 40.0 to 199.9Hz
70 = 100 Ohms Pt 1° Resolution
71 = 100 Ohms Pt .1° Resolution
80 = Type J Thermocouple
81 = Type K Thermocouple
82 = Type T Thermocouple

**e — Backlit Power[2]**

| | |
|---|---|
| 00 = No Backlight | 01 = 5VDC |
| 02 = 12VDC | 03 = 24VDC |
| 04 = 115VAC | 05 = 230VAC |
| 06 = 10 to 28VDC | 07 = 12 or 24VDC |

**f — Display[5]**

| | | |
|---|---|---|
| 1 = 2000 | 2 = 1500 | 3 = 1000 |
| 4 = 600 | 5 = 500 | 6 = 300 |
| 7 = 200 | 8 = 100 | |

## 2000 and 2100 Series Specifications (continued)

| DC Inputs | Accuracy | Input Resistance | Overload Protection |
|---|---|---|---|
| 200mVDC & 2VDC | ±(.1% +1 count) typical<br>±(.2% +1 count) max. | ≥ 100 Meg Ohms | 200V continuous<br>300V intermittent |
| 20VDC & 200VDC | ±(.1% +1 count) typical<br>±(.2% +1 count) max. | 1 Meg Ohm | 350V continuous<br>500V intermittent |
| DC Current | ±(.1% +1 count) typical<br>±(.2% +1 count) max. | 200mV drop full scale | 3 times f.s. current |
| Universal Selectable Process | ±(.1% +2 counts) | 4 to 20mA, 10 Ohms<br>≥ 200mV, ≥ 200K Ohms<br>2V and up, ≥ 1Meg Ohm | 4 to 20 mA, ±100mA<br>Voltage Inputs,<br>200V continuous<br>300V intermittent |

| AC Inputs | Accuracy | Input Resistance | Overload Protection |
|---|---|---|---|
| AC Voltage | ±(.5% + 1 count) | 1 Meg Ohm | 350V continuous<br>500V intermittent |
| 5A AC Current | ±(.5% +1 count) | Current transformer | 3 times f.s. current |
| 50A AC Current | ±(.5% +5 counts) | Current transformer | 3 times f.s. current |

| Frequency Inputs | Accuracy | Distortion |
|---|---|---|
| 40.0 to 199.9Hz | ±.2Hz (40 to 70Hz)<br>±.5Hz (above 70Hz) | ≤ .1 Hz for up to 20% third harmonic distortion |
| 40 to 440Hz | ±1Hz | ≤ .1 Hz for up to 20% third harmonic distortion |

| Temperature Inputs | Accuracy | Input Characteristic | Overload Protection |
|---|---|---|---|
| **Type J thermocouple**<br>-10°F to +1200°F<br>(-23°C to +649°C) | ±(.1% +1 count) accuracy<br>±1.3°C (2.8°F)<br>conformity error | 45 uV max per 100 Ohms<br>thermocouple lead resistance | 200V continuous |
| **Type K thermocouple**<br>-40°F to +1500°F<br>(-40°C to +815°C) | ±(.1% +1 count) accuracy<br>±1.2°C (2.5°F)<br>conformity error | 45 uV max per 100 Ohms<br>thermocouple lead resistance | 200V continuous |
| **Type T thermocouple**<br>-100°F to +600°F<br>(-73°C to +315°C) | ±(.1% +1 count) accuracy<br>±1.5°C (3.5°F)<br>conformity error | 45 uV max per 100 Ohms<br>thermocouple lead resistance | 200V continuous |
| 100 Ω Pt. α =.00385<br>-200°F to +600° F<br>(-129°C to +315°C) | ±(.2% + 1 count) max | 1mA RTD current | ±5V |
| 100 Ω Pt. α =.00385<br>-100.0°F to +199.9°F<br>(-73°C to +98°C) | ±(.2% + 1 count) max | 1mA RTD current | ±5V |

[1] Change Order Number to "4" for 200 VDC Input

[2] Backlit power must be the same as the selected DPM power.

[3] Available on Non-Backlit meters only.

[4] Rated for use with 5A or 50A external current transformer supplied with DPM. See high current connection on inside page.

[5] For 5A current transformer inputs only.

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*For over 60 years, Jewell Instruments and our predecessor companies have provided high quality panel meter solutions for a wide range of aerospace, industrial and commercial applications. JEWELL and MODUTEC are some of the most trusted brands in the industry. They are known for:*

- *reliable, high quality, products*
- *superb applications knowledge*
- *custom designs for unique requirements*
- *"extended staff" relationships with customers*
- *creative engineering expertise*

## Jewell Instruments

*The only panel meter manufacturer that offers a full spectrum of panel meters. Analog, digital. Any size, and shape. Surface mount, window mount, bezel mount. We have decades of broad-based experience resulting in our superior breadth of product — and our ability to meet your custom needs. Jewell Instruments can provide a proven, quick and cost-effective solution to your panel meter needs.*

*Analog panel meters can be either electrical or electronic. Application areas include:*

### Electrical

- ***Field Strength Meters***
- ***Power Generation***
- ***Power Distribution Panel***
- ***Control Panels***
- ***Switchgear Panels***
- ***Power Supplies***
- ***Power Conditioners***
- ***Voltage Regulators***
- ***UPS Systems***
- ***Automatic Transfer Switches***
- ***Generator Paralleling Switchgear***

### Electronic

- ***Liquid Level***
- ***Flow***
- ***Pressure Monitors***
- ***Volume Units***
- ***Laboratory Equipment***
- ***Test Equipment***
- ***Broadcast Equipment***
- ***Stereo Equipment***
- ***Medical***
- ***Temperature***
- ***Battery Level***
- ***Speed***
- ***Tension Control***
- ***Kilns***
- ***Marine***
- ***Chart Recorders***
- ***Field Strength***

*Digital panel meter applications include:*

### Digital

- ***Telecommunications***
- ***Welders***
- ***Agricultural***
- ***Water Purification***
- ***Desalinization***

| | Categories | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | BL Series | 1000 Series | BGE Series | PMC Series | 2000 Series | 2100 Series | DW Series | 1800 Series |
| **Display** | | | | | | | | |
| LCD | ● | ● | ● | ● | ● | ● | ● | ● |
| Backlit LCD | ● | ● | ● | ● | ● | ● | | |
| LED | | | | | | ● | | ● |
| **Mounting** | | | | | | | | |
| Surface | ● | ● | | | | | ● | |
| Window | ● | | ● | ● | | | ● | |
| Bezel | ● | ● | ● | | ● | ● | ● | ● |
| **Connections** | | | | | | | | |
| Pins | ● | ● | ● | | | | | |
| Solder Pads | ● | | | | | | | |
| Screw Terminal Connector | ● | | | ● | ● | ● | | ● |
| Banana Plugs | | | | ● | | | | |
| **Inputs** | | | | | | | | |
| DC Volt | ● | ● | ● | | ● | ● | ● | ● |
| DC AMP | ● | ● | | ● | ● | ● | ● | ● |
| AC Volt | ● | | | | ● | ● | ● | |
| AC AMP | ● | | | | ● | ● | ● | |
| Frequency | ● | | | | ● | ● | | |
| RTD | ● | | | | ● | ● | | ● |
| Thermocouple | ● | | | | ● | ● | | |
| **DPM Power** | | | | | | | | |
| 5 Volt DC | ● | ● | ● | | | | ● | ● |
| +/- 5 Volt DC | ● | ● | | | | | | |
| 9 Volt DC | ● | ● | ● | | | | ● | |
| Loop Powered | ● | ● | | ● | ● | ● | ● | |
| 115 VAC | ● | | | | ● | ● | ● | |
| 230 VAC | ● | | | | ● | ● | ● | |
| 12 or 24 VDC (Isolated) | ● | | | | ● | ● | | |
| 10 to 28 VDC (Isolated) | ● | ● | | | | | ● | |
| 10 to 30 VDC (Isolated) | ● | | | | | | | |
| **Page Number** | 15 | 15 | 15 | 16 | 16 | 16 | 17 | 17 |


## *PMC Series* — MODUTEC

The *PMC Series* is designed to meet the unique needs of process instrumentation applications. It is self-powered from a 4-20mA control loop. It includes our standard features, such as selectable decimal points and large digits.


## *2000 Series* — MODUTEC

The *Series 2000* is the ideal industrial application panel meter. This 1/8" DIN meter is splash and hose proof, with a wide temperature range. The polycarbonate case makes it resistant to knocks. With all of these rugged features, the *Series 2000* remains a slim meter, easy to fit in the design of your industrial application.


## *2100 Series* — MODUTEC

The *Series 2100* is the next generation *2000* with all the features of the *2000*, but now with DIP switch selections for decimal points and inputs. We've also added multiple power options.

***meters not shown to scale***