



MODEL DP5 – 1/8 DIN ANALOG INPUT PANEL METERS



- PROCESS, VOLTAGE, CURRENT, AND TEMPERATURE INPUTS
- 5-DIGIT 0.56" HIGH LED DISPLAY
- PROGRAMMABLE FUNCTION KEYS/USER INPUT
- 9 DIGIT TOTALIZER (INTEGRATOR) WITH BATCHING
- OPTIONAL CUSTOM UNITS OVERLAY W/BACKLIGHT
- NEMA 4X/IP65 SEALED FRONT BEZEL



GENERAL DESCRIPTION

The DP5 Panel Meters offer many features and performance capabilities to suit a wide range of industrial applications. These meters are available in three different models to handle various analog inputs, including DC Voltage/Current, Process, and Temperature Inputs. Refer to pages 4 and 5 for the details on the specific models.

The meters provide a MAX and MIN reading memory with programmable capture time. The capture time is used to prevent detection of false max or min readings which may occur during start-up or unusual process events.

The signal totalizer (integrator) can be used to compute a time-input product. This can be used to provide a readout of totalized flow, calculate service intervals of motors or pumps, etc. The totalizer can also accumulate batch weighing operations.

Once the meters have been initially configured, the parameter list may be locked out from further modification.

The meters have been specifically designed for harsh industrial environments. With NEMA 4X/IP65 sealed bezel and extensive testing of noise effects to CE requirements, the meter provides a tough yet reliable application solution.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in this literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



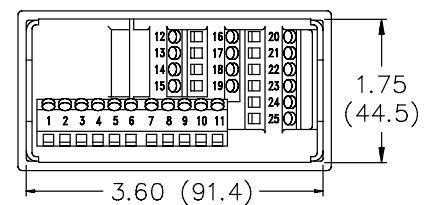
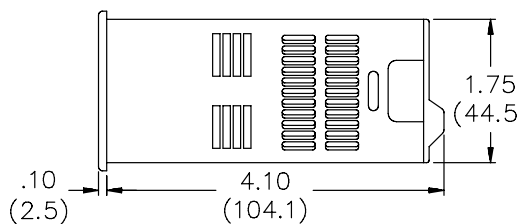
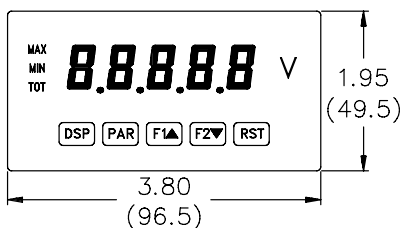
CAUTION: Risk of Danger.
Read complete instructions prior to installation and operation of the unit.



CAUTION: Risk of electric shock.

DIMENSIONS In inches (mm)

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.1" (53.4) H x 5.0" (127) W.



ORDERING INFORMATION

Meter Part Numbers



D - DC Volt/Current Input
P - Process Input
T - Thermocouple and RTD Input

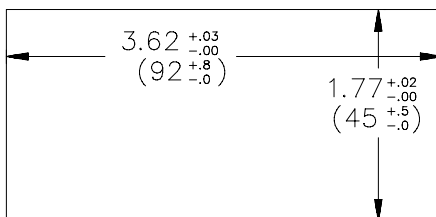
0 - Red LED Display

0 - 85 to 250 VAC
1 - 11 to 36 VDC, 24 VAC

Accessories Part Number

| TYPE | MODEL NO. | DESCRIPTION | PART NUMBERS |
|-------------|-----------|---|--------------|
| Accessories | PAXLBK | Units Label Kit Accessory (Not required for DP5T) | PAXLBK10 |

PANEL CUT-OUT



GENERAL METER SPECIFICATIONS

1. **DISPLAY:** 5 digit, 0.56" (14.2 mm) red LED, (-19999 to 99999)
2. **POWER:**
 - AC Versions:
 - AC Power: 85 to 250 VAC, 50/60 Hz, 10 VA
 - Isolation: 2300 Vrms for 1 min. to all inputs.
 - DC Versions:
 - DC Power: 11 to 36 VDC, 11 W
 - AC Power: 24 VAC, $\pm 10\%$, 50/60 Hz, 10 VA
 - Isolation: 500 Vrms for 1 min. to all inputs (50 V working).
3. **ANNUNCIATORS:**
 - MAX - maximum readout selected
 - MIN - minimum readout selected
 - TOT - totalizer readout selected, flashes when total overflows
 - Units Label - optional units label backlight
4. **KEYPAD:** 3 programmable function keys, 5 keys total
5. **A/D CONVERTER:** 16 bit resolution
6. **UPDATE RATES:**
 - A/D conversion rate: 10 readings/sec.
 - Step response: 200 msec. max. to within 99% of final readout value (digital filter and internal zero correction disabled)
 - 700 msec. max. (digital filter disabled, internal zero correction enabled)
 - Display update rate: 1 to 10 updates/sec.
 - Max./Min. capture delay time: 0 to 3275 sec.
7. **DISPLAY MESSAGES:**
 - "OLOL" - Appears when measurement exceeds + signal range.
 - "ULUL" - Appears when measurement exceeds - signal range
 - DP5T: "OPEN" - Appears when open sensor is detected.
 - DP5T: "SHrt" - Appears when shorted sensor is detected (*RTD only*)
 - "..." - Appears when display values exceed + display range.
 - "-..." - Appears when display values exceed - display range.
8. **INPUT CAPABILITIES:** See specific product specifications, pages 4-5
9. **EXCITATION POWER:** See specific product specifications, pages 4-5
10. **LOW FREQUENCY NOISE REJECTION:**
 - Normal Mode: > 60 dB @ 50 or 60 Hz $\pm 1\%$, digital filter off
 - Common Mode: >100 dB, DC to 120 Hz
11. **USER INPUT:** One software defined user input
 - Max. Continuous Input: 30 VDC
 - Isolation To Sensor Input Common: Not isolated. Do not tie commons together.
 - Response Time : 50 msec. max.
 - Logic State: Jumper selectable for sink/source logic

| INPUT STATE | SINKING INPUTS 22 K Ω pull-up to +5 V | SOURCING INPUTS 22 K Ω pull-down |
|-------------|---|--|
| Active | $V_{IN} < 0.9$ VDC | $V_{IN} > 3.6$ VDC |
| Inactive | $V_{IN} > 3.6$ VDC | $V_{IN} < 0.9$ VDC |
12. **TOTALIZER:**
 - Time Base: second, minute, hour, or day
 - Time Accuracy: 0.01% typical
 - Decimal Point: 0 to 0.0000
 - Scale Factor: 0.001 to 65.000
 - Low Signal Cut-out: -19,999 to 99,999
 - Total: 9 digits, display alternates between high order and low order readouts
13. **MEMORY:** Nonvolatile E²PROM retains all programmable parameters and display values.

14. **ENVIRONMENTAL CONDITIONS:**
 - Operating Temperature Range: 0 to 50°C
 - Storage Temperature Range: -40 to 60°C
 - Operating and Storage Humidity: 0 to 85% max. RH non-condensing
 - Altitude: Up to 2000 meters
15. **CERTIFICATIONS AND COMPLIANCES:**
 - SAFETY**
 - UL Recognized Component, File #E179259, UL61010-1, CSA C22.2 No. 61010-1
 - DP5T Only: File # E156876, UL873, CSA C22.2 No. 24
 - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
 - UL Listed, File # E137808, UL508, CSA C22.2 No. 14-M95
 - LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards
 - Type 4X Enclosure rating (Face only), UL50
 - IECEE CB Scheme Test Certificate #US/8843A/UL
 - CB Scheme Test Report #04ME11209-20041018
 - Issued by Underwriters Laboratories, Inc.
 - IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part I
 - IP65 Enclosure rating (Face only), IEC 529
 - IP20 Enclosure rating (Rear of unit), IEC 529
 - ELECTROMAGNETIC COMPATIBILITY**
 - Immunity to EN 50082-2**

| | | |
|-----------------------------------|--------------|--|
| Electrostatic discharge | EN 61000-4-2 | Level 2; 4 Kv contact Level 3; 8 Kv air |
| Electromagnetic RF fields | EN 61000-4-3 | Level 3; 10 V/m ¹ 80 MHz - 1 GHz |
| Fast transients (burst) | EN 61000-4-4 | Level 4; 2 Kv I/O Level 3; 2 Kv power |
| RF conducted interference | EN 61000-4-6 | Level 3; 10 V/rms 150 KHz - 80 MHz |
| Simulation of cordless telephones | ENV 50204 | Level 3; 10 V/m 900 MHz ± 5 MHz 200 Hz, 50% duty cycle |
 - Emissions to EN 50081-2**

| | | |
|-----------------|----------|--|
| RF interference | EN 55011 | Enclosure class A Power mains class A |
|-----------------|----------|--|
 - Notes:*
 - 1. *Self-recoverable loss of performance during EMI disturbance at 10 V/m: Measurement input signal may deviate during EMI disturbance.*
 - For operation without loss of performance:*
 - Unit is mounted in a metal enclosure (Buckeye SM7013-0 or equivalent)*
 - I/O and power cables are routed in metal conduit connected to earth ground.*
 - Refer to EMC Installation Guidelines section of the bulletin for additional information.*
 - 16. **CONNECTIONS:** High compression cage-clamp terminal block
 - Wire Strip Length: 0.3" (7.5 mm)
 - Wire Gauge: 30-14 AWG copper wire
 - Torque: 4.5 inch-lbs (0.51 N-m) max.
 - 17. **CONSTRUCTION:** This unit is rated for NEMA 4X/IP65 outdoor use. IP20 Touch safe. Installation Category II, Pollution Degree 2. One piece bezel/case. Flame resistant. Synthetic rubber keypad. Panel gasket and mounting clip included.
 - 18. **WEIGHT:** 7 oz. (200 g)

MODEL DP5D - UNIVERSAL DC INPUT

- FOUR VOLTAGE RANGES (300 VDC Max)
- FIVE CURRENT RANGES (2A DC Max)
- 24 VDC TRANSMITTER POWER

DP5D SPECIFICATIONS

INPUT RANGES:

| INPUT RANGE | ACCURACY* (18 to 28°C) | ACCURACY* (0 to 50°C) | IMPEDANCE/ COMPLIANCE | MAX CONTINUOUS OVERLOAD | RESOLUTION |
|-------------|------------------------------|-----------------------------|-----------------------|-------------------------|------------|
| ±200 µADC | 0.03% of reading +0.03 µA | 0.12% of reading +0.04µA | 1.11 Kohm | 15 mA | 10 nA |
| ±2 mADC | 0.03% of reading +0.3 µA | 0.12% of reading +0.4 µA | 111 ohm | 50 mA | 0.1 µA |
| ±20 mADC | 0.03% of reading +3µA | 0.12% of reading +4 µA | 11.1 ohm | 150 mA | 1 µA |
| ±200 mADC | 0.05% of reading +30 µA | 0.15% of reading +40 µA | 1.1 ohm | 500 mA | 10 µA |
| ±2 ADC | 0.5% of reading +0.3 mA | 0.7% of reading +0.4 mA | 0.1 ohm | 3 A | 0.1 mA |
| ±200 mVDC | 0.03% of reading +30 µV | 0.12% of reading +40 µV | 1.066 Mohm | 100 V | 10 µV |
| ±2 VDC | 0.03% of reading +0.3 mV | 0.12% of reading +0.4 mV | 1.066 Mohm | 300 V | 0.1 mV |
| ±20 VDC | 0.03% of reading +3 mV | 0.12% of reading +4 mV | 1.066 Mohm | 300 V | 1 mV |
| ±300 VDC | 0.05% of reading +30 mV | 0.15% of reading +40 mV | 1.066 Mohm | 300 V | 10 mV |

* After 20 minute warm-up. Accuracy is specified in two ways: Accuracy over an 18 to 28°C and 10 to 75% RH environment; and accuracy over a 0 to 50°C and 0 to 85%RH (non-condensing environment). Accuracy over the 0 to 50°C range includes the temperature coefficient effect of the meter.

EXCITATION POWER:

Transmitter Power: 24 VDC, ±5%, regulated, 50 mA max.

MODEL DP5P - PROCESS INPUT

- DUAL RANGE INPUT (20 mA or 10 VDC)
- 24 VDC TRANSMITTER POWER

DP5P SPECIFICATIONS

SENSOR INPUTS:

| INPUT (RANGE) | ACCURACY* (18 to 28°C) | ACCURACY* (0 to 50°C) | IMPEDANCE/ COMPLIANCE | MAX CONTINUOUS OVERLOAD | DISPLAY RESOLUTION |
|-----------------------|---------------------------|---------------------------|-----------------------|-------------------------|--------------------|
| 20 mA (-2 to 26 mA) | 0.03% of reading +2 µA | 0.12% of reading +3 µA | 20 ohm | 150 mA | 1 µA |
| 10 VDC (-1 to 13 VDC) | 0.03% of reading +2 mV | 0.12% of reading +3 mV | 500 Kohm | 300 V | 1 mV |

* After 20 minute warm-up. Accuracy is specified in two ways: Accuracy over an 18 to 28°C and 10 to 75% RH environment; and accuracy over a 0 to 50°C and 0 to 85%RH (non-condensing environment). Accuracy over the 0 to 50°C range includes the temperature coefficient effect of the meter.

EXCITATION POWER:

Transmitter Power: 24 VDC, ±5%, regulated, 50 mA max.

MODEL DP5T - THERMOCOUPLE AND RTD INPUT

- THERMOCOUPLE AND RTD INPUTS
- CONFORMS TO ITS-90 STANDARDS
- TIME-TEMPERATURE INTEGRATOR

DP5T SPECIFICATIONS

READOUT:

Resolution: Variable: 0.1, 0.2, 0.5, or 1, 2, or 5 degree

Scale: F or C

Offset Range: -19,999 to 99,999 display units

THERMOCOUPLE INPUTS:

Input Impedance: 20 MΩ

Lead Resistance Effect: 0.03μV/ohm

Max. Continuous Overvoltage: 30 V

| INPUT TYPE | RANGE | ACCURACY* (18 to 28°C) | ACCURACY* (0 to 50°C) | STANDARD | WIRE COLOR | |
|---------------|----------------------------------|---------------------------|--------------------------|--------------------|-----------------------|------------------------|
| | | | | | ANSI | BS 1843 |
| T | -200 to 400°C -270 to -200°C | 1.2°C ** | 2.1°C | ITS-90 | (+) blue (-) red | (+) white (-) blue |
| E | -200 to 871°C -270 to -200°C | 1.0°C ** | 2.4°C | ITS-90 | (+) purple (-) red | (+) brown (-) blue |
| J | -200 to 760°C | 1.1°C | 2.3°C | ITS-90 | (+) white (-) red | (+) yellow (-) blue |
| K | -200 to 1372°C -270 to -200°C | 1.3°C ** | 3.4°C | ITS-90 | (+) yellow (-) red | (+) brown (-) blue |
| R | -50 to 1768°C | 1.9°C | 4.0°C | ITS-90 | no standard | (+) white (-) blue |
| S | -50 to 1768°C | 1.9°C | 4.0°C | ITS-90 | no standard | (+) white (-) blue |
| B | 100 to 300°C 300 to 1820°C | 3.9°C 2.8°C | 5.7°C 4.4°C | ITS-90 | no standard | no standard |
| N | -200 to 1300°C -270 to -200°C | 1.3°C ** | 3.1°C | ITS-90 | (+) orange (-) red | (+) orange (-) blue |
| C (W5/W26) | 0 to 2315°C | 1.9°C | 6.1°C | ASTM E988-90*** | no standard | no standard |

*After 20 min. warm-up. Accuracy is specified in two ways: Accuracy over an 18 to 28°C and 15 to 75% RH environment; and Accuracy over a 0 to 50°C and 0 to 85% RH (non condensing) environment. Accuracy specified over the 0 to 50°C operating range includes meter tempco and ice point tracking effects. The specification includes the A/D conversion errors, linearization conformity, and thermocouple ice point compensation. Total system accuracy is the sum of meter and probe errors. Accuracy may be improved by field calibrating the meter readout at the temperature of interest.

** The accuracy over the interval -270 to -200°C is a function of temperature, ranging from 1°C at -200°C and degrading to 7°C at -270°C. Accuracy may be improved by field calibrating the meter readout at the temperature of interest.

*** These curves have been corrected to ITS-90.

RTD INPUTS:

Type: 3 or 4 wire, 2 wire can be compensated for lead wire resistance

Excitation current: 100 ohm range: 165 μA

10 ohm range: 2.6 mA

Lead resistance: 100 ohm range: 10 ohm/lead max.

10 ohm range: 3 ohms/lead max.

Max. continuous overload: 30 V

| INPUT TYPE | RANGE | ACCURACY* (18 to 28°C) | ACCURACY* (0 to 50°C) | STANDARD *** |
|----------------------------------|---------------|---------------------------|--------------------------|----------------------|
| 100 ohm Pt alpha = .00385 | -200 to 850°C | 0.4°C | 1.6°C | IEC 751 |
| 100 ohm Pt alpha = .003919 | -200 to 850°C | 0.4°C | 1.6°C | no official standard |
| 120 ohm Nickel alpha = .00672 | -80 to 260°C | 0.2°C | 0.5°C | no official standard |
| 10 ohm Copper alpha = .00427 | -100 to 260°C | 0.4°C | 0.9°C | no official standard |

DIRECT READOUT:

Input range: -10 to 65 mV

0 to 400 ohms, high range

0 to 25 ohms, low range

Display range: -19999 to 99999

| INPUT TYPE | RANGE | ACCURACY* (18 to 28°C) | ACCURACY* (0 to 50°C) |
|-------------------------|----------------------------|-------------------------------|-------------------------------|
| Direct mV range | -10 to 65mV (1 μV res.) | 0.02% of reading + 4μV | 0.12% of reading + 5μV |
| Direct 100 ohm range | 0 to 400 Ω (10 MΩ res.) | 0.02% of reading + 0.04 Ω | 0.12% of reading + 0.05 Ω |
| Direct 10 ohm range | 0 to 25 Ω (1 MΩ res.) | 0.04% of reading + 0.005 Ω | 0.20% of reading + 0.007 Ω |