

# 1/8 DIN Process Panel Meter With Optional USB Communications



## DP6000 Series



- ✓ Modular USB, RS232, RS485 Serial Communication Options and Relays
- ✓ 0 to 20 mA, 4 to 20 mA, 0 to 5V, 1 to 5V, and ±10V Inputs
- ✓ NEMA 4X (IP65) Front
- ✓ Universal 85 to 265 Vac or 12/24 Vdc Input Power
- ✓ Large Dual-Line 6-Character Display, 15 and 12 mm (0.60 and 0.46")
- ✓ Sunlight Readable Display Models
- ✓ Isolated 24 Vdc @ 200 mA Transmitter Power Supply Standard
- ✓ Programmable Displays and Function Keys
- ✓ 32-Point, Square Root, or Exponential Linearization
- ✓ MODBUS® RTU Communication Protocol Standard
- ✓ Free Software for Operation, Monitoring and Programming

The DP6000 Series meter boasts specifications and functionality that clearly make it one of the most advanced process meters available. Its dual-line 6-digit display (999,999), advanced signal input conditioning functions, function keys, MODBUS RTU serial communications, and optional expansion modules are only a few of the features found on the DP6000. Sunlight readable display models have an extraordinarily bright LED display. They are perfect for applications where the meter is in direct sunlight or in applications where visibility may be impaired by smoke, fog, dust, or distance. The upper display can be programmed to indicate PV,



DP6000 shown smaller than actual size.

maximum (peak), minimum (valley), alternating maximum/minimum, one of eight alarm set points, or MODBUS input. The lower display can also be configured to display engineering units, set points, user defined legends, or simply turned off. The user friendly dual-line display makes the DP6000 easy to set up and program. No jumpers to set for input selection. All setup and programming are done via the front panel. Three levels of password protection help maintain the reliability of the programming. The Copy feature is used to copy (or clone) all the settings from one DP6000 to other meters in about 20 seconds! The Copy function is a standard feature on all meters. It does not require a communications adaptor, only an optional cable assembly.

### General Specifications

**Display:** Both displays are 6 digits (-99999 to 999999), red LEDs with leading zero blanking

**Upper Display:** 15 mm (0.60") high

**Lower Display:** 12 mm (0.46") high

**Display Intensity:** 8 intensity levels

**Display Update Rate:** 5/second (200 ms)

**Overrange:** Display flashes 999999

**Underrange:** Display flashes -99999

**Display Assignment:** The upper and lower displays may be assigned to PV1, PV2, PCT (percent), max/min, alternate max and min, set points, units (lower display only), or MODBUS input

**Front Panel:** NEMA 4X (IP65)

**Programming Methods:** 4 front panel buttons, digital inputs, PC and software, MODBUS registers, or cloning using copy function

**Noise Filter:** Programmable from 2 to 199 (0 will disable filter)

**Filter Bypass:** Programmable from 0.1 to 99.9% of calibrated span

**Recalibration:** Calibrated at the factory. Recalibration is recommended at least every 12 months

**Max/Min Display:** Max (peak)/min (valley) readings reached by the process are stored until reset by the user or until power to the meter is cycled

**Password:** 3 programmable passwords restrict modification of programmed settings; Pass 1: Allows use of function keys and digital inputs; Pass 2: Allows use of function keys, digital inputs and editing set/reset points; Pass 3: Restricts all programming, function keys, and digital inputs

**Non-Volatile Memory:** All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost

**Power Options:** 85 to 265 Vac 50/60 Hz, 90 to 265 Vdc, 20 W max, or jumper selectable 12/24 Vdc  $\pm 10\%$ , 15 W max

**Fuse (External, Required):** 5 A max, slow blow; up to 6 meters may share one 5 A fuse

#### Isolated Transmitter Power

**Supply:** 24 Vdc  $\pm 5\%$  @ 200 mA max (standard), (12/24 Vdc powered models rated @ 100 mA max); 5 or 10 Vdc @ 50 mA max, selectable with internal jumper J4

**Normal Mode Rejection:** Greater than 60 dB at 50/60 Hz

**Isolation:** 4 kV input/output-to-power line; 500 V input-to-output or output-to-P+ supply

**Overvoltage Category:** Installation overvoltage category II; local level with smaller transient overvoltages than installation overvoltage category III

**Operating Temperature Range:** -40 to 65°C (-40 to 149°F)

**Storage Temperature Range:** -40 to 85°C (-40 to 185°F)

**Relative Humidity:** 0 to 90% non-condensing

**Connections:** Removable screw terminal blocks accept 12 to 22 AWG wire, RJ45 for external relays, digital I/O, and serial communication adaptors

**Enclosure:** ½ DIN, high impact plastic, color: black

**Mounting:** ½ DIN panel cutout required: 92 x 45 mm (3.622 x 1.772"); two panel mounting bracket assemblies are provided

**Tightening Torque:** Screw terminal connectors: 5 lb-in (0.56 Nm)

**Overall Dimensions:** 119 W x 62 H x 143 mm D (4.68 x 2.45 x 5.64")

**Weight:** 269 g (9.5 oz)

#### Process Input

**Input:** Field selectable: 0 to 20 mA, 4 to 20 mA,  $\pm 10$  Vdc (0 to 5, 1 to 5, 0 to 10V), MODBUS PV (slave)

**Accuracy:**  $\pm 0.03\%$  of calibrated span  $\pm 1$  count, square root and programmable exponent accuracy range: 10 to 100% of calibrated span

**Temperature Drift:** 0.005% of calibrated span/°C max from 0 to 65°C ambient, 0.01% of calibrated span/°C max from -40 to 0°C ambient

**Signal Input Conditioning Function:** Linear, square root, programmable exponent, or round horizontal tank volume calculation

**Multi-Point Linearization:** 2 to 32 points for PV or PV1; 2 to 8 points for PV2 (dual-scale level feature)

**Programmable Exponent:** 1.0001 to 2.9999

**Low-Flow Cutoff:** 0 to 999999 (0 disables cutoff function)

**Decimal Point:** Up to 5 decimal places or none: d.ddddd, dd.dddd, ddd.ddd, dddd.dd, ddddd.d, or dddddd

#### Calibration Range:

**4 to 20 mA:** Minimum span; input 1 and Input 2: 0.15 mA

**$\pm 10$  V:** Minimum span; input 1 and 2: 0.10 V

An Error message will appear if input 1 and input 2 signals are too close together

#### Input Impedance:

**Voltage Ranges:** Greater than 1 M $\Omega$

**Current Ranges:** 50 to 100  $\Omega$  (depending on resettable fuse impedance)

**Input Overload:** Current input protected by resettable fuse, 30 Vdc max; fuse resets automatically after fault is removed

#### Relays

**Rating:** 2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A @ 30 Vdc and 125/250 Vac resistive load; 1/14 HP ( $\approx 50$  W) @ 125/250 Vac for inductive loads such as contactors, solenoids, etc.

**Noise Suppression:** Recommended for each relay contact switching inductive loads

**Deadband:** 0 to 100% of span, user programmable

**High or Low Alarm:** User may program any alarm for high or low trip point; unused alarm LEDs and relays may be disabled (turned off)

**Relay Operation:** Automatic (non-latching), latching (requires manual acknowledge), sampling (based on time), pump alternation control (2 to 8 relays), off (disable unused relays and enable interlock feature, manual on/off control mode)

**Time Delay:** 0 to 999.9 seconds, on and off relay time delays; programmable and independent for each relay

**Fail-Safe Operation:** Programmable and independent for each relay

**Note:** Relay coil is energized in non-alarm condition. In case of power failure, relay will go to alarm state.

**Auto Initialization:** When power is applied to the meter, relays will reflect the state of the input to the meter

#### Serial Communications

**Protocol:** MODBUS RTU

**Meter Address/Slave ID:** 1 - 247

**Baud Rate:** 300 to 19,200 bps

**Transmit Time Delay:** Programmable between 0 and 199 ms

**Data:** 8 bit (1 start bit, 1 or 2 stop bits)

**Parity:** Even, odd, or none with 1 or 2 stop bits

**Byte-to-Byte Timeout:** 0.01 to 2.54 seconds

**Turn Around Delay:** Less than 2 ms (fixed)

#### Isolated 4 to 20 mA Transmitter Output

**Output Source:** Process variable (PV), max, min, set points 1 through 8, manual control setting, or MODBUS input

**Scaling Range:** 1.000 to 23.000 mA for any display range

**Factory Calibration:** 4.000 to 20.000 = 4 to 20 mA output

**Analog Output Programming:** 23.000 mA maximum for all parameters: overrange, underrange, max, min, and break

**Accuracy:**  $\pm 0.1\%$  of span  $\pm 0.004$  mA

**Temperature Drift:** 0.4  $\mu\text{A}/^\circ\text{C}$  maximum from 0 to 65°C ambient, 0.8  $\mu\text{A}/^\circ\text{C}$  maximum from -40 to 0°C ambient

**Note:** Analog output drift is separate from input drift.

**Isolated Transmitter Power Supply:** Terminals I+ & R: 24 Vdc  $\pm 5\%$  @ 40 mA maximum, may be used to power the 4 to 20 mA output or other devices

**External Loop Power Supply:** 35 Vdc maximum

#### Output Loop Resistance:

**24 Vdc Power Supply:** 10  $\Omega$  minimum, 700  $\Omega$  maximum

**35 Vdc (External) Power Supply:** 100  $\Omega$  minimum, 1200  $\Omega$  maximum

#### Digital I/O Expansion Module

**Channels:** 4 digital inputs and 4 digital outputs per module

**System:** Up to 2 modules for a total of 8 inputs and 8 outputs

#### Digital Input Logic:

**High:** 3 to 5 Vdc

**Low:** 0 to 1.25 Vdc

#### Digital Output Logic:

**High:** 3.1 to 3.3 Vdc

**Low:** 0 to 0.4 Vdc

**Source Current:** 10 mA maximum

**Sink Current:** 1.5 mA minimum

**+5 V Terminal:** To be used as pull-up for digital inputs only

#### 4-Relay Expansion Module

**Relays:** 4 Form A (SPST) rated 3 A @ 30 Vdc and 125/250 Vac resistive load; 1/14 HP ( $\approx 50$  W) @ 125/250 Vac for inductive loads

