PD6300
ProVu® Dual-Line 6-Digit Flow Rate/Totalizer

- Pulse, Open Collector, NPN, PNP, TTL, Switch Contact, sine Wave (Coil), Square Wave Inputs
- 5, 10 or 24 VDC Flowmeter Power Supply
- Gate Function for Rate Display of Slow Pulse Rates
- K-Factor, Internal Scaling, or External Calibration
- 4-20 mA Output Option Converts the Pulse Input to an Isolated 4-20 mA Output
- NEMA 4X, IP65 Front
- Universal 85-265 VAC or 12/24 VDC Input Power
- Dual-Line 6-Digit Display, 0.60" & 0.46"
- Programmable Displays & Function Keys
- On-Board Digital Input
- Modbus® RTU Communication Protocol Standard
- Display Rate & Total at the Same Time
- Rate in Units per Second, Minute, Hour, or Day
- Total, Grand Total or Non-Resettable Grand Total
- Password Protection for Total Reset
- 9-Digit Totalizer with Total Overflow Feature
- Any Relay for Rate or Total
- 4-20 mA Output for Rate or Total

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PERFECT FOR FLOW APPLICATIONS

The PD6300 ProVu® meters are 1/8 DIN flow rate/totalizers specifically designed for displaying flow rate and total from flowmeters with analog or pulse outputs. These flow rate/totalizers are particularly well-suited for flow applications because they can display flow rate and flow total at the same time, provide power to drive the flowmeter, and display flow total, flow grand total, or non-resettable flow total on up to nine digits.

KEY FEATURES

Display Flow Rate, Total or Grand Total

The upper display can be programmed to display flow rate, total, or grand total, and the lower display can be programmed to display flow rate, total, grand total, engineering units, custom legends, or can be turned off. Both displays could also display relay set points, or max and min values.

In the graphic at the top of the page, the upper display is displaying flow rate (as indicated by the “R” to the right of the number) and the lower display is displaying flow grand total (as indicated by the “G” & “T” under the number.) The following photographs show typical ways these flow rate/totalizers can be programmed.

Optional SunBright Display Models

ProVu’s SunBright 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. Option is available on all ProVu models.

Totalizer Overflow Displays Total to 9 Digits

These flow rate/totalizers can display up to nine digits of total flow with the total overflow feature. In the diagrams below, the flow totalizer is displaying 532,831,470 by toggling between a display of “OF 532” and “831470”. Notice the (T with arrow ▲ symbol) is lit up indicating the display is in overflow mode.

Rugged

A unique front panel design makes the ProVu nearly impenetrable in typical applications. Here, the ProVu easily survives a direct hit on the display from a heavy 2” solid stainless steel ball dropped from eight feet.

Three Tier Password Protection

The ProVu offers 3 levels of password protection:

- Level 1 protection allows the operator use of only the 3 pre-configured function keys on the front panel without a password.
- Level 2 protection allows the operator use of only the function keys and the ability to change set points without a password.
- Level 3 protection restricts the operator from using the function keys and all meter configuration menus without a password.
**Easy to Use**
The user friendly dual-line display makes the ProVu easy to set up & program. No jumpers to set for input selection. All setup & programming are done via the front panel.

**On-Board Digital Input**
The PD6300 include a digital input as standard. This digital input can operate with the tare, reset tare, or interlock relays feature, force relays on from a signal from a PLC or relay on other equipment, and much more. This is ideal for installations where the meter is inaccessible behind a cover, or where an additional function key is needed for customized operation.

**Rounding**
The rounding feature is used to give the user a steadier display with fluctuating signals. It causes the display to round to the nearest value according to the rounding value selected (1, 2, 5, 10, 20, 50, or 100). For example, with a rounding value of 10, and a input of 12346, the display would indicate 12350.

**TOTALIZER CAPABILITIES**
ProVu flow rate/totalizers can be programmed for a wide variety of totalizer applications. They can display total, grand total, or non-resettable grand total with a time base of seconds, minutes, hours or days. The user can program a totalizer conversion factor, a non-resettable grand total, password protection, and several total reset methods.

**Totalizer Conversion Factor**
The user can enter a totalizer conversion factor that allows the meter to display total in different units than the rate. For instance, a customer could measure flow rate in gallons per minute and total in hundreds of acre-feet.

**Totalizer Password Protection**
The total and grand total can be password protected so they can be reset only by authorized personnel.

**Non-Resettable Grand Total**
The user can set up the grand total to be non-resettable by entering a specific password. Once this is done, the grand total can never be reset.

**Remote Total Reset**
An I/O expansion module can be used to remotely reset the total or grand total. The reset switch is wired into the module and the module is connected to the M-Link RJ45 connector at the back of the flow rate/totalizer.

**Total Alarms**
The ProVu’s four internal and four external relays can be set up to alarm when the total reaches a user-defined set point. A variety of reset modes are available and the user can also program time delays and fail-safe operation.

**Front Panel Total Reset**
The three front panel function keys can be programmed to reset the total and grand total. This makes it possible for the user to reset either the total or the grand total by pressing the appropriate function key. Of course, if the total or grand total is password protected, they will not reset when the function key is pressed.

**DIGITAL COMMUNICATIONS**

**Modbus® RTU Serial Communications**
With the purchase of a serial communication adapter, ProVu meters can communicate with any Modbus Master device using the ever-popular Modbus communications protocol that is included in every ProVu. This greatly increases the flexibility of the meter. Modbus provides much more capability than read PV and write set points.

**Meter Copy**
The Copy feature is used to copy (or clone) all the settings from one ProVu to other ProVu meters in about 20 seconds! The Copy function is a standard feature on all meters. It does not require a communications adapter, only an optional cable assembly, P/N PDA1200. See the ordering information for complete details.
FIELD EXPANSION MODULES

Add functionality to the ProVu in the field with easy-to-install external expansion modules. Add USB, RS-232, or RS-485 communications, I/O modules (up to 2), and 4-relay expansion module. The menu items for these modules do not appear until the module is connected, simplifying the basic menu. Relay and digital I/O modules are shown below with optional DIN rail mounting kit, P/N PDA1002.

OUTPUTS

Relay Outputs

The ProVu has up to four 3 A Form C relays (SPDT) with multiple power loss fail-safe options. Relays can be configured for proper protective action upon input loop break. Relay ON and OFF delay times are user adjustable. Up to eight front panel indicators show alarm and/or relay state. All relays can be configured for 0-100% deadband.

Relay Operation/Configuration

There are powerful relay functions that can be configured in the ProVu meter, including:

• Automatic reset only (non-latching)
• Automatic + manual reset at any time (non-latching)
• Latching (manual reset only)
• Latching with clear (manual reset after alarm condition has cleared)
• Pump alternation control (automatic reset only)
• Sampling (activated for a user-specified time)
• User selectable fail-safe operation
• Relay action for loss (break) of 4-20 mA input signal
• Time delay (on and off), independent for each relay
• Manual control mode
• Interlock relay mode

Analog Output

The isolated analog retransmission signal can be configured to represent the rate/process variable (PV), total, grand total, maximum (peak) value, minimum (valley) value, the value for any of the eight relay set points, manual setting control, or Modbus input. While the output is nominally 4-20 mA, the signal will accurately accommodate under- and over-ranges from 1 to 23 mA.

Sampling Function (PV Triggered Timed Relay)

The sampling function allows the operator to set a set point for a “sampling” relay. When the process (rate or total) reaches that set point, it will close that relay’s contacts for a preset period of time (0.1 to 5999.9 seconds). An example of its use may be for wastewater sampling. When the wastewater total reaches a preset total interval (i.e., every 10,000 gallons), the relay contacts would close for a preset time, and by some means (light, horn, etc.) alert someone to take a sample, or provide the trigger to automatically take a sample of the wastewater (see chart on page 5). The utility of this function can, of course, be expanded beyond sampling and be used whenever a timed relay output closure is required when the rate or a total interval reaches a certain set point.

Manual Output Control

Take control of any output with this feature. All relays can be forced ON or OFF, and the 4-20 mA output signal can be set to any value within its range. When the relays and 4-20 mA output are controlled manually, an LED labeled “M” is turned on and the associated Alarm LEDs (1-8) flash every 10 seconds indicating that the meter is in manual control mode.

Isolated Transmitter Power Supplies

A powerful 24 V @ 200 mA power supply is a standard feature on the ProVu meter. It can be configured for 5, 10, or 24 V (default) by means of a simple internal jumper (see manual). An additional power supply (24 V @ 40 mA) is standard with the 4-20 mA output option.

Interlock Relay(s)

This function allows a process to use one or more very low voltage input signals or simple switch contacts to control the state of one or more internal “interlock” relays. A violation (i.e. loss of input, open switch, or open circuit) forces one or more N/O interlock relay contacts to open. One input can be used in series with a number of interlock switches, or up to eight inputs can be required to force-on one (or more) internal interlock relays. Please see Application Note AN-1008 on our website for more information. Requires PDA1044 Digital I/O module or use of on-board digital input F4.

APPLICATIONS

Convert Pulse to 4-20 mA with PD6300

The PD6300 accepts the pulse output from a flowmeter and with the appropriate option installed can convert the pulse to a 4-20 mA signal. The 4-20 mA signal can be programmed to correspond to either the flow rate or the total flow.

• Use K-Factor or Multi-Point Scaling
• ProVu Powers the Flowmeter
• Display Flow Rate & Total
SPECIFICATIONS
Except where noted all specifications apply to operation at +25°C.

General
Display: Upper display: 0.60” (15 mm) high. Lower display: 0.46” (12 mm) high. Both are 6 digits (-99999 to 999999), red LEDs.
Display Intensity: Eight user selectable intensity levels
Display Update Rate: 5/second (200 ms)
Overrange: Display flashes 999999
Underrange: Display flashes -999999
Display Assignment: The upper and lower displays may be assigned to rate, total, grand total, alternate (rate/total, rate/total, rate/grand total, rate/grand units, total/units, and grand total/units), max/min, units (lower display only), set points, or Modbus input. Additional displays are available if parameter total is off, and parameter d-SCAL is on: gross, alternating gross/net, PV1, PV2, and PCT (refer to PD6000 instruction manual).
Front Panel: NEMA 4X, IP65
Programming Methods: Four front panel buttons, digital inputs, PC and MeterView Pro software, Modbus registers, or cloning using Copy function.
F4 Digital Input Contacts: 3.3 VDC on contact. Connect normally open contacts across F4 to COM.
F4 Digital Input Logic Levels: Logic High: 3 to 5 VDC
Logic Low: 0 to 1.25 VDC
Noise Filter: Programmable from 2 to 199 (0 will disable filter)
Filter Bypass: Programmable from 0.1 to 99.9% of calibrated span
Recalibration: All ranges are 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: Three programmable passwords restrict modification of programmed settings and two prevent resetting the totals.
Non-Volatile Memory: All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
Power Options: 85-265 VAC 50/60 Hz, 90-265 VDC 20 W max, or jumper selectable 12/24 VDC ±10%, 15 W max.
Fuse: Required external fuse: UL Recognized, 5 A max, slow blow; up to 6 meters may share one 5 A fuse.
Isolated Transmitter Power Supply: Terminals P+ & P-: 24 VDC ± 10%.
12/24 VDC powered models selectable for 24, 10, or 5 VDC supply (internal jumper J4).
ProVu Series:
85-265 VAC models rated @ 200 mA max, 12/24 VDC powered models rated @ 100 mA max, @ 50 mA max for 5 or 10 VDC supply.
Normal Rejection Mode:
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.
Overshoot Category:
Installation Overvoltage Category II: Local level with smaller transient overvoltages than Installation Overvoltage Category III.

Environmental:
Operating temperature range: -40 to 65°C
Storage temperature range: -40 to 85°C
Relative humidity: 0 to 90% non-condensing
Max Power Dissipation:
PDB Series: Maximum power dissipation limited to 15.1 W. See PDB instruction manual for additional details.
Connections: Removable screw terminal blocks accept 12 to 22 AWG wire, RJ45 for external relays, digital I/O, and serial communication adapters.
Enclosure: 1/8 DIN, high impact plastic, UL 94V-0, color: black
Mounting: 1/8 DIN panel cutout required: 1.622” x 1.772” (32 mm x 45 mm). Two panel mounting bracket assemblies are provided.
Tightening Torque: Screw terminal connectors: 5 lb-in (0.56 Nm)
Dimensions: 4.68” x 2.45” x 5.64” (119 mm x 62 mm x 143 mm) (W x H x D)
Weight: 9.5 oz (269 g)
UL File Number: UL & c-UL Listed: E160949; 508 Industrial Control Equipment.
Warranty: 3 years parts & labor

PD6300 Rate Inputs
Inputs: Field selectable: Pulse or square wave 0-5 V, 0-12 V, or 0-24 V @ 30 kHz; TTL; open collector 4.7 kΩ pull-up to 5 V @ 30 kHz; NPN or PNP transistor, switch contact 4.7 kΩ pull-up to 5 V @ 40 Hz; coil ( sine wave) 40 mV-p-p min @ 10 kHz; Modbus PV (Slave)
Low Voltage Mag Pick up (Isolated): Sensitivity: 40 mV-p-p to 8 Vp-p
Minimum Input Frequency: 0.001 Hz – Minimum frequency is dependent on high gate setting.
Maximum Input Frequency: 30,000 Hz (10,000 for Low Voltage Mag Pickup)
Input Impedance: Pulse input: Greater than 300 kΩ @ 1 kHz. Open collectorswitch input: 4.7 kΩ pull-up to 5 V
Accuracy: ±0.03% of calibrated span ±1 count
Display Update Rate: Total: 10/sec, Rate: 10/sec to 1/1000 sec
Temperature Drift: Rate display is not affected by changes in temperature.
Multi-Point Linearization: 2 to 32 points
Low-Flow Cutoff: 0-999999 (0 disables cutoff function)
Decimal Point: Up to five decimal places or none: ddddd, ddddd, ddddd, ddddd, or ddddd
Calibration: May be calibrated using K-factor, scale using internal calibration, or calibrate by applying an external calibration signal.
K-Factor: Field programmable K-factor converts input pulses to rate in engineering units. May be programmed from 0.00001 to 999,999 pulses/unit.
Calibration Range: Input 1 signal may be set anywhere in the range of the meter; input 2 signal may be set anywhere above setting.
Filter: Programmable contact de-bounce filter, 40 to 999 Hz maximum input frequency allowed with low speed filter.
Time Base: Second, minute, hour, or day
Low Gate: 0.1-99.9 seconds
High Gate: 2.0-999.9 seconds

Rate/Totalizer
Rate Display Indication: 0 to 999999, lead zero blanking. “R” LED illuminates while displaying rate.
Total Display & Total Overflow: 0 to 999,999; automatic lead zero blanking. “T” LED is illuminated while displaying total and “G” for grand total. Up to 999,999,999 with total-overflow feature. “OF” is displayed to the left of total overflow and ▲ LED is illuminated.
Total Decimal Point: Up to five decimal places or none: ddddd, ddddd, ddddd, ddddd, or ddddd
Totalizer: Calculates total based on rate and field programmable multiplier to display total in engineering units. Time base must be selected according to the time units in which the rate is displayed. Selectable up/down count.
Total Conversion Factor: 0.00001 to 59,999
Totalizer Rollover: Totalizer rolls over when display exceeds 999,999,999. Relay status reflects the display value.
Total Overflow Override: Program total reset for automatic with 0.1 second delay and set point 1 for 999,999
Totalizer Presets: Up to eight, user selectable under Setup menu. Any set point can be assigned to total and may be programmed anywhere in the range of the meter for total alarm indication.
Programmable Total Reset Delay: 0.1 to 999.9 seconds; applied to the first relay assigned to total or grand total. If the meter is programmed to reset total to zero automatically when the preset is reached, then a delay will occur before the total is reset.
Total Reset: Via front panel button, external contact closure on digital inputs, automatically via user selectable preset value and time delay, or through serial communications.
Total Reset Password: Total and grand total passwords may be entered to prevent resetting the total or grand total from the front panel.
Non-Resettable Total: The grand total can be programmed as a non-resettable total by entering the password “050873”.
Caution: Once the Grand Total has been programmed as “non-resettable” the feature cannot be disabled.
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 (= 50 W) @ 125/250 VAC for inductive loads.
Noise Suppression: Noise suppression is recommended for each relay contact switching inductive loads.
Relay Assignment: Relays may be assigned to rate, total, or grand total.
Deadband: 0-100% 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 manual on/off control mode.
Relay Reset: User selectable via front panel buttons, digital inputs, or PC
1. Automatic reset only (non-latching), when input passes the reset point or total is reset to zero.
4. Manual reset only after alarm condition has cleared (latching).
Note: Front panel button or digital input may be assigned to acknowledge relays programmed for manual reset.
Deadband: 0-100% of span, user programmable
Time Delay: 0 to 999.9 seconds, on & 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.

Isolated 4-20 mA Transmitter Output
Output Source: Rate/process, total, grand total, max, min, set points 1-8, manual control setting, or Modbus input
Scaling Range: 1.000 to 23,000 mA for any display range
Calibration: Factory calibrated: 4.000 to 20.000 mA = 4-20 mA output
Analog Output Programming: 23,000 mA maximum for all parameters: Overrange, underrange, max, and min break
Accuracy: ± 0.1% FS ± 0.004 mA
Temperature Drift: 0.4 µA/C max from 0 to 65°C ambient, 0.8 µA/C max from -40 to 0°C ambient
Note: Analog output drift is separate from input drift.
Isolated Transmitter Power Supply: Terminals I+ & R: 24 VDC ± 10% . May be used to power the 4-20 mA output or other devices. All models rated @ 40 mA max.
External Loop Power Supply: 35 VDC maximum
Output Loop Resistance:
<table>
<thead>
<tr>
<th>Power supply</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VDC</td>
<td>10 Ω</td>
<td>700 Ω</td>
</tr>
<tr>
<td>35 VDC (external)</td>
<td>100 Ω</td>
<td>1200 Ω</td>
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</tbody>
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Serial Communications
Protocol: Modbus® RTU
Meter Address/Slave ID: 1 - 247
Baud Rate: 300 - 19,200 bps
Transmit Time Delay: Programmable between 0 and 199 ms or transmitter always on for RS-422 communication
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 - 2.54 seconds
Turn Around Delay: Less than 2 ms (fixed)
Note: Refer to the ProVu® Modbus Register Tables located at www.predig.com for details.

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