MODEL PAXDR - 1/8 DIN DUAL RATE METER / TOTALIZER

- SIX DISPLAYS - ONE EACH FOR: RATE A & B; TOTALIZER A & B; DISPLAY C RATE CALCULATION & TOTALIZER CALCULATION
- DISPLAY C CALCULATIONS: SUM (A+B), DIFFERENCE (A-B), RATIO (A/B), % OF TOTAL (A/A+B) OR DRAW (A-B/B)
- 0.56" RED SUNLIGHT READABLE DISPLAY
- VARIABLE INTENSITY DISPLAY
- 10 POINT NON-LINEAR SCALING FOR BOTH RATE DISPLAYS
- SEPARATE INPUT SCALING FOR A AND B TOTALIZERS
- PROGRAMMABLE FUNCTION KEYS/USER INPUTS
- FOUR SETPOINT ALARM OUTPUTS (W/Option Card)
- RETRANSMITTED ANALOG OUTPUT (W/Option Card)
- COMMUNICATION AND BUS CAPABILITIES (W/Option Card)
- NEMA 4X/IP65 SEALED FRONT BEZEL

GENERAL DESCRIPTION

The PAXDR is a 5-digit Dual Rate Indicator and 6-digit Dual Totalizer in a single meter. Two Rate and two Total displays are provided (A and B), along with two additional calculation displays (C) to show the Sum, Difference, Ratio, % of Total or Draw between A and B displays. Any of the six displays are viewable: A, B or C Rate and A, B or C Total. The meter’s LED display has 0.56" digits, available in red sunlight readable or standard green. The display intensity is adjustable for low level lighting conditions up to sunlight readable applications.

The meter has two signal inputs from which the Rate and Totalizer values are derived. For the Rate displays, up to 10 point scaling is provided for each input, to scale non-linear rate processes. Separate scaling is provided for both the A and B Totalizers. The independent scaling allows for Rate only, Totalizer only or combination Rate/Totalizer applications, with or without the calculation displays.

While suitable for many applications, this meter is ideal for flow measurement where both flow rate and flow volume are measured. Two separate flow lines can be monitored simultaneously, each scaled to convert flow to a common unit of measure. Flow rate is easily scaled to read flow per time period (sec/min/hr). The flow rate and volume for each line can be shown, as well as the Sum, Difference, Ratio, etc. between the two lines for flow rate and/or volume. A different calculation function may be used for Rate and Total if desired.

Optional plug-in cards provide up to four setpoint outputs, a linear DC output and communications capability. The plug-in setpoint cards provide dual FORM-C relays (5 A), quad FORM-A relays (3 A), or either quad sinking or quad sourcing open collector logic outputs. The outputs can be assigned to any of the Rate or Totalizer display values, and configured to suit a variety of control and alarm requirements.

The linear DC output plug-in card provides either 20 mA or 10 V signals. The output can be scaled independent of the input range and can track any of the Rate or Totalizer displays.

Communication and Bus Capabilities are also available as option cards. These include RS232, RS485, Modbus, DeviceNet and Profibus-DP. Readout values and setpoint alarm values can be controlled through the bus. Additionally, the meter has a feature that allows a remote serial device to directly control the meter outputs.

The PAXDR is available in AC or DC powered versions. The meter has been specifically designed for harsh industrial environments. With NEMA 4X/IP65 sealed bezel and extensive testing to meet 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.

Do not use this meter to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the meter.

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" (127) W.
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## Ordering Information

### Meter Part Numbers

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<thead>
<tr>
<th>PAX</th>
<th>0</th>
</tr>
</thead>
</table>

- **DR** - Dual Rate/Totalizer
- **0** - Red, Sunlight Readable Display
- **1** - Green Display
- **0** - 85 to 250 VAC
- **1** - 11 to 36 VDC, 24 VAC

### Option Card Part Numbers

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAXCDL</td>
<td>Analog Output Card</td>
<td>PAXCDL10</td>
</tr>
<tr>
<td>PAXCDC</td>
<td>DeviceNet Communications Card</td>
<td>PAXCDC20</td>
</tr>
<tr>
<td>PAXCDT</td>
<td>Modbus Communications Card</td>
<td>PAXCDT40</td>
</tr>
<tr>
<td>PAXCDS</td>
<td>Quad Setpoint Relay Output Card</td>
<td>PAXCDS30</td>
</tr>
<tr>
<td>PAXCDS</td>
<td>Quad Setpoint Sinking Open Collector Output Card</td>
<td>PAXCDS30</td>
</tr>
<tr>
<td>PAXCDS</td>
<td>Quad Setpoint Sourcing Open Collector Output Card</td>
<td>PAXCDS40</td>
</tr>
<tr>
<td>PAXCDT</td>
<td>Extended RS232 Serial Communications Card with Dual RJ11 Connector</td>
<td>PAXCDT44</td>
</tr>
<tr>
<td>PAXCDT</td>
<td>Modbus Communications Card with Dual RJ11 Connector</td>
<td>PAXCDT44</td>
</tr>
</tbody>
</table>

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6. METER SPECIFICATIONS

5. RATE DISPLAYS:

Maximum Display: 5-digits
- Display Range: 0 to 99999 (Rate A or B); -999999 to 999999 (Rate C)
- Over/Under Range Display: “OL”
- Annunciators (in Digit 0): A, B and C along left side of display for selected Totalizer.
- Display Update Time: Adjustable 0.1 to 99.9 seconds
- Over/Under Range Display: “-”

4. KEYPAD:

- 3 programmable function keys, 5 keys total
- 12 VDC, ±10%, 100 mA max.
- Short circuit protected

3. SENSOR POWER:

- AC Power: 85 to 250 VAC, 50/60 Hz, 18 VA
- DC Power: 11 to 36 VDC, 14 W

2. POWER:

- AC Power Runs for 1 min. to all inputs and outputs (300 V working)
- DC Power: 11 to 36 VDC, 14 W

1. DISPLAY:

- 6-digit, 0.56” (14.2 mm) red sunlight readable or standard green LED, intensity adjustable.

User Inputs:

<table>
<thead>
<tr>
<th>Rate A (or B)</th>
<th>Dual Rate (A &amp; B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>44 KHz² (with or without setpoints)</td>
<td>19 KHz² (with or without setpoints)</td>
</tr>
</tbody>
</table>

DUAL RATE WITH TOTALIZER(S)

- Single Totalizer Enabled (A or B)
- Both Totalizers Enabled (A & B)

<table>
<thead>
<tr>
<th>Setpoint(s) assigned to an enabled Totalizer</th>
<th>Maximum Frequency in KHz²</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

TOTALIZER A or B OPERATING MODE:

| Count 1 | 14 | 8.5 | 13 | 8.5 |
| Count 2 | 14 | 8.5 | 10 | 7  |
| Quadrature 1 | 9.5 | 9  | 8  | 4  |
| Quadrature 2 | 9.5 | 8.5 | 7  | 4  |
| Quadrature 4 | 9.5 | 5  | N/A | N/A |

Notes:

1 These values apply with or without Rate C Calculation enabled.
2 If both Totalizers are used with different operating modes, then the lower frequency listed applies to both Totalizers.
3 See Programming Module 4 for Totalizer Operating Mode descriptions.
4 Derate listed values by 15% if Totalizer C Calculation is enabled.

7. INPUTS A and B:

- DIP switch selectable to accept pulses from a variety of sources including switch contacts, TTL outputs, magnetic pickups and all standard Red Lion sensors.
- Logic: Input trigger levels VTH = 1.5 V max.; VIL = 3.75 V min.
- Current sinking: Internal 7.8 KΩ pull-up to +12 VDC, IMAAX = 1.9 mA.
- Current sourcing: Internal 5.9 KΩ pull-down, 7.3 mA max. @ 28 VDC,

- Input impedance: 5.1 KΩ.

- Input voltage: ±40 V peak, 30 Vrms
- Dual Count Modes: When any dual count mode is used, then User Inputs 1 and/or 2 will accept the second signal of each signal pair. The user inputs do not have the Logic/Mag, HI/LO Freq, and Sink/Source input setup switches. The user inputs are inherently a logic input with no low frequency filtering. Any mechanical contacts used for these inputs in a dual count mode must be debounced externally. The user input may only be selected for sink/source by the User Jumper placement.

8. USER INPUTS:

- Three programmable user inputs
- Max. Continuous Input: 30 VDC
- Isolation To Sensor Input Commons: Not isolated
- Logic State: Jumper selectable for sink/source logic

<table>
<thead>
<tr>
<th>Input State</th>
<th>Sinking Inputs</th>
<th>Sourcing Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>VIL &gt; 0.9 VDC</td>
<td>VIL &lt; 0.9 VDC</td>
</tr>
<tr>
<td>Inactive</td>
<td>VIL &gt; 3.6 VDC</td>
<td>VIL &lt; 0.9 VDC</td>
</tr>
</tbody>
</table>

Response Time: 6 msec. typical; function dependent. Certain resets, stores and inhibits respond within 25 μsec if an edge occurs with the associated totalizer or within 6 msec if no count edge occurs with the associated totalizer. These functions include R ≤ SL, R ≤ SLF, INH ≤ SLF, and F≤ SLE. Once activated, all functions are latched for 50 msec min. to 100 msec max. After that period, another edge/level may be recognized.

9. MEMORY:

- Nonvolatile E2PROM retains all programmable parameters and display values when power is removed.

10. CERTIFICATIONS AND COMPLIANCES:

7. ENVIRONMENTAL CONDITIONS:

- Operating Temperature Range: 0 to 50 °C (0 to 45 °C with all three plug-in cards installed)
- Storage Temperature Range: -40 to 70 °C
- Altitude: Up to 2000 meters

8. CONNECTIONS:

- High compression cage-clamp terminal block
- Wire Strip Length: 0.3” (7.5 mm)

9. WEIGHT:

- 10.1 oz. (286 g)
**Optional Plug-in Output Cards**

**WARNING:** Disconnect all power to the unit before installing Plug-in cards.

**Adding Option Cards**
The PAX and MPAX series meters can be fitted with up to three optional plug-in cards. The details for each plug-in card can be reviewed in the specification section below. Only one card from each function type can be installed at one time.

The function types include Setpoint Alarms (PAXCDS), Communications (PAXCDC), and Analog Output (PAXCDL). The plug-in cards can be installed initially or at a later date.

**COMMUNICATIONS CARDS (PAXCDC)**
A variety of communication protocols are available for the PAX and MPAX series. Only one of these cards can be installed at a time.

- **PAXCDC2C** - RS232 Serial (Connector)
- **PAXCDC20** - RS232 Serial (Terminal)
- **PAXCDC1C** - RS485 Serial (Connector)
- **PAXCDC10** - RS485 Serial (Terminal)

**SERIAL COMMUNICATIONS CARD**

*Type:* RS485 or RS232  
**Isolation To Sensor & User Input Commons:** 500 Vrms for 1 min.  
**Working Voltage:** 50 V.  
**Parity:** No, odd or even  
**Data:** 7/8 bits  
**Baud:** 300 to 19,200  
**Bus Address:** Selectable 0 to 99, Max. 32 meters per line (RS485)  
**Transmit Delay:** Selectable for 2 to 50 msec or 50 to 100 msec (RS485)

**DEVICENET™ CARD**

**Compatibility:** Group 2 Server Only, not UCMM capable  
**Baud Rates:** 125 Kbaud, 250 Kbaud, and 500 Kbaud  
**Bus Interface:** Phillips 82C250 or equivalent with MIS wiring protection per DeviceNet™ Volume I Section 10.2.2.  
**Node Isolation:** Bus powered, isolated node  
**Host Isolation:** 500 Vrms for 1 minute (50 V working) between DeviceNet™ and meter input common.

**MODBUS CARD**

**Type:** RS485, RTU and ASCII MODBUS modes  
**Isolation To Sensor & User Input Commons:** 500 Vrms for 1 minute.  
**Working Voltage:** 50 V.  
**Baud Rates:** 300 to 38400.  
**Data:** 7/8 bits  
**Parity:** No, Odd, or Even  
**Addresses:** 1 to 247.  
**Transmit Delay:** Programmable; See Transmit Delay explanation.

**PROFIBUS-DP CARD**

**-fieldbus Type:** Profibus-DP as per EN 50170, implemented with Siemens SPC3 ASIC  
**Conformance:** PNO Certified Profibus-DP Slave Device  
**Baud Rates:** Automatic baud rate detection in the range 9.6 Kbaud to 12 Mbaud  
**Station Address:** 0 to 125, set by rotary switches.  
**Connection:** 9-pin Female D-Sub connector  
**Network Isolation:** 500 Vrms for 1 minute (50 V working) between Profibus network and sensor and user input commons. Not isolated from all other commons.

**SETPOINT CARDS (PAXCDS)**
The PAX and MPAX series has 4 available setpoint alarm output plug-in cards. Only one of these cards can be installed at a time. (Logic state of the outputs can be reversed in the programming.) These plug-in cards include:

- **PAXCDS10** - Dual Relay, FORM-C, Normally open & closed  
- **PAXCDS20** - Quad Relay, FORM-A, Normally open only  
- **PAXCDS30** - Isolated quad sinking NPN open collector  
- **PAXCDS40** - Isolated quad sourcing PNP open collector

**DUAL RELAY CARD**

**Type:** Two FORM-C relays  
**Isolation To Sensor & User Input Commons:** 2000 Vrms for 1 min.  
**Working Voltage:** 240 Vrms  
**Contact Rating:**  
- One Relay Energized: 5 amps @ 120/240 VAC or 28 VDC (resistive load), 1/8 HP @120 VAC, inductive load  
- Total current with both relays energized not to exceed 5 amps

**Life Expectancy:** 100 K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads  
**Response Time:** 5 msec. nominal pull-in with 3 msec. nominal release  
**Timed Output Accuracy:**  
- Totalizer = ± 0.01% + 10 msec.  
- Rate = ± 0.01% + 20 msec.

**QUAD RELAY CARD**

**Type:** Four FORM-A relays  
**Isolation To Sensor & User Input Commons:** 2300 Vrms for 1 min.  
**Working Voltage:** 250 Vrms  
**Contact Rating:**  
- One Relay Energized: 3 amps @ 250 VAC or 30 VDC (resistive load), 1/10 HP @120 VAC, inductive load  
- Total current with all four relays energized not to exceed 4 amps

**Life Expectancy:** 100K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads  
**Response Time:** 5 msec. nominal pull-in with 3 msec. nominal release  
**Timed Output Accuracy:**  
- Totalizer = ± 0.01% + 10 msec.  
- Rate = ± 0.01% + 20 msec.

**QUAD SINKING OPEN COLLECTOR CARD**

**Type:** Four isolated sinking NPN transistors.  
**Isolation To Sensor & User Input Commons:** 500 Vrms for 1 min.  
**Working Voltage:** 50 V.  
**Rating:** 100 mA max @ VSAT = 0.7 V max. VMAX = 30 V  
**Response Time:** Counter = 25 usec; Rate = Low Update time  
**Timed Output Accuracy:**  
- Totalizer = ± 0.01% + 10 msec.  
- Rate = ± 0.01% + 20 msec.

**QUAD SOURCING OPEN COLLECTOR CARD**

**Type:** Four isolated sourcing PNP transistors.  
**Isolation To Sensor & User Input Commons:** 500 Vrms for 1 min.  
**Working Voltage:** 50 V.  
**Rating:** Internal supply: 24 VDC ± 10%, 30 mA max. total  
**External supply: 30 VDC max., 100 mA max. each output  
**Response Time:** Counter = 25 usec; Rate = Low Update time  
**Timed Output Accuracy:**  
- Totalizer = ± 0.01% + 10 msec.  
- Rate = ± 0.01% + 20 msec.

**ANALOG OUTPUT CARD (PAXCDL)**

Either a 0(4)-20 mA or 0-10 V retransmitted linear DC output is available from the analog output plug-in card. The programmable output low and high scale can be based on various display values. Reverse slope output is possible by reversing the scaling point positions.

**PAXCDL10** - Retransmitted Analog Output Card

**ANALOG OUTPUT CARD**

**Types:** 0 to 20 mA, 4 to 20 mA or 0 to 10 VDC  
**Isolation To Sensor & User Input Commons:** 500 Vrms for 1 min.  
**Working Voltage:** 50 V.  
**Accuracy:** ±0.17% of FS (18 to 28°C); ±0.4% of FS (0 to 50°C)  
**Resolution:** 1/3500  
**Compliance:** 10 VDC: 10 KΩ load min., 20 mA: 500 Ω load max.  
**Power:** Self-powered  
**Response Time:** 50 msec. max., 15 msec. typ.