The E-Chart P2DAAA is a field mounted flow computer with a built in Rosemount® 205 Multivariable Transmitter (DP, P and TEMP) for custody or non-custody transfer measurements. It is a single bi-directional meter run computer that can be used in gas or liquid applications. Multiple primary elements and density equations are supported. A unique graphical interface allows users to have up to three trend screens with two user selectable parameters per screen. This mimics a chart recorder display and allows users the ability to get at-a-glance information concerning their flow conditions.

The E-Chart P2DAAA is designed to meet the needs of our clients throughout all sectors of the oil and gas industry. After listening to and understanding the needs of our clients, Dynamic Flow Computers designed the E-Chart P2DAAA with a focus on reducing spare parts requirements, reducing the "learning curve" for new users, and an overall reduction in the time and cost of its implementation. Because of this foresight in design we are confident that the E-Chart P2DAAA flow computer will exceed all of your expectations.

The E-Chart P2DAAA calculates all the necessary standard equations (AGA, API, ISO, NIST, etc.) for liquids & gases. Monthly, daily, or hourly reports are stored in flash memory. If you include the E-Chart P2DAAA's impressively low power consumption, battery back-up capabilities, solar power options, and built-in wireless communications the E-Chart P2DAAA proves itself to be the number one flow computer for all applications.

## Features
- Low operating power (0.3 watts)
- 0.075% accuracy
- 32 bit processor
- 64x128 Programmable display
- Min-max charting
- Wireless radio/Modem ready
- Multiple I/O options
- Custody transfer accuracy
- Built-in multivariable 3-in-1 transmitter
- Smart field I/O

## Communications
- RS232 Modbus
- RS485 Modbus
- Analog and digital I/O
- Zigbee wireless Radio
- FreeWave wireless Radio
- Bluetooth

## Applications
- Liquid and gas measurement
- Well head measurement and automation
- Custody measurement and control
- Compressor stations
- Well optimization
- PID control
- Field mounted trending
- Multiple primary elements
- Injection index testing

## Reports
- Hourly
- Daily
- Monthly
- Monthly day by day
- Calibration and audit
- Data storage in years

## Alternative Power
- Battery backup
- Solar power

The E-Chart P2DAAA flow computer has the capacity to measure a single bi-directional gas or liquid measurement train (+1 Auxiliary Meter). Multiple equations are included among which are AGA3/API14.3, API14.9, API 5, 6, API5.7, API2540, AGA7, AGA9, API21, with more being added continuously. The E-Chart P2DAAA accepts any type of primary element: Venturi, Annubar, Turbine, PD, Ultrasonic, V-Cone, Wedge, Vortex, etc. Additionally, it can carry out density calculations according to the following standards: API12, AGA8; 24A, B, C; NBS for steam, saturated and supersaturated steam, NBS1045 for ethylene, etc. Contact our offices or visit our website for available equation updates.

The E-Chart P2DAAA includes a factory integrated multivariable 3-in-1 digital transmitter manufactured by Rosemount® for the simultaneous measurement of temperature, pressure, and differential pressure. The E-Chart P2DAAA can also control pneumatic or electrical valves (on-off or variable by means of analog outputs or process PID control).

The E-Chart P2DAAA can have up to three textual display screens with four user-selectable parameters being displayed per screen. In addition, three graphical trend screens can be displayed showing two user selectable parameters per trend. All screens are scrolled at user-defined intervals.

The input/output assignment, flow equations, historical data storage, and other functions are carried out using Dynamic Flow Computers' DYNACOM® software. This software is Windows based, free of charge, and available for download/update at any time on our website.

**DYNACOM® Software Capabilities:**
- Flow computer diagnostics
- Configure inputs and outputs
- Configure PID control
- Personalize report time and content
- Configure and select the local LCD screen displayed parameters
- Reassign and customize MODBUS® registers and values
- Create and implement custom math and formulas
- Input and output calibration
- Automatic and periodic downloading of flow computer reports
- Obtain historic data for display, saving, exportation, or printing

Historic data is available in the memory of the flow computer for download or display.

**Maximum Report Storage:**
- Hourly reports:                    1536 hours*
- Daily reports:                     64 *
- Daily reports, hour by hour:       64*
- Monthly reports:                   6*
- Monthly, day by day:               2 months*
- Calibration reports:               20*
- Audit reports:                     100*
- Alarm reports:                     100*
- Special reports:                   HTML, and others

*The number of reports stored can vary according to application.

# Multivariable Transmitter

The Multivariable Sensor is a 3-in-1 model 205 transmitter manufactured by Rosemount® Inc. for Dynamic Flow Computers. This sensor measures static/ absolute pressure, differential pressure, and using an optional RTD, process temperature. These three process variables are available all the time and updates are sent to the flow computer up to NINE times per second.

The model 205 is a culmination of the vast technological experience that Rosemount® Inc. has in the multivariable field. It includes the well recognized and tested 3051C technology using capacitive cells for differential pressure as well as a patented piezoresistive/silicon sensors for measurement of absolute/ static pressures.

The digital technology utilized in the production of the 205 module is the most advanced measurement technology on the market, assuring maximum accuracy and rangeability. The extensive use of patented technology concerning the sensors internal circuitry significantly reduces the size and the weight of the 205 sensor.

The Multivariable Sensor measures three process variables at one time.  It incorporates a capacitive differential pressure sensor, a piezoresistive absolute/static pressure sensor, and an optional connection for a two, three, or four wire RTD.  The sensors convert the process variables to a digital format for direct communication with the flow computer.

## PHYSICAL SPECIFICATIONS

| | |
|---|---|
| **Electrical/Conduit Connections:** | Two 3/4" NPT. |
| **Process Connection:** | Two ¼' -18 NPT (multivariable) |
| **Housing (Flow Computer):** | Material:  copper free aluminum<br>Painting:  epoxy or polyurethane.<br>Classification:  NEMA 4X class 1 div. 1 – IP66 |
| **RTD Connection:** | Directly to multivariable |
| **Multivariable:** | 3 measurements in 1 (pressure, differential pressure, and temperature), manufactured by Rosemount® Inc. |
| **Display:** | Text - 8 lines x 16 characters<br>Graphics – 64 x 128 pixels |
| **Terminal Blocks:** | Easily accessible; removable for easy connection |
| **Certifications:** | CSA for class 1, div. 1, groups B, C and D<br>UL for class l, zone 1, AEx d IIB+H2 |
| **Temperature Limits:** | Operation:  -40 to 185 °F (-40 to 85 °C)<br>Storage:  -50 to 190 °F (-46 to 87 °C) |
| **Humidity:** | 100% |

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Voltage** | 7 to 24 VDC |
| **Power Consumption** | 0.3 watt |
| **Temperature** | -40 to 185 °F (-40 to 85 °C) |
| **Humidity** | 100% |
| **Solar Board (Optional)** | 10/20 watts, 12 volts |
| **UPS (Optional)** | 7 day operation |
| **Polarity** | Reverse polarity protected |
| **Processor** | 32 bits @ 16.7Mhz |
| **Flash ROM** | 4 MB @ 70 Nano seconds |
| **RAM** | 2 MB @ 70 Nano seconds |
| **Real Time Clock** | Years/Months/Days/Hours/Minutes |
| **Internal Battery** | Lithium ion |

## INPUT SPECIFICATIONS

| | |
|---|---|
| **Optic Isolation** | Each input is optically isolated with ±250 VDC chassis isolation |
| **Digital/Switch/Frequency Input** | One input<br>5-28 VDC<br>0.25Amp rating<br>For frequency input - square wave only<br>Frequency range  0 - 6000 HZ<br>Signal must be > 3 volts |

## OUTPUT SPECIFICATIONS

| | |
|---|---|
| **Optic Isolation** | Each output is optically isolated with ±250 VDC chassis/ground isolation |
| **Digital/Switch/Pulse Output** | Two outputs<br>5-28 VDC<br>0.25Amp rating<br>On/Off or pulses (to 125 pulses/sec.) |
| **Analog Output** | One output (16 bit)<br>4-20mA (external power required)<br>For PID control or for data transmission |

## COMMUNICATION SPECIFICATIONS

| | |
|---|---|
| **RS232/485** | Quantity 1 @ 1200 – 19200 bps |
| **RS232 (w/ Elbow Option)** | Quantity 1 @ 1200 – 19200 bps |
| **Protocol** | MODBUS® RTU/ASCII |
| **Optional** | Modem, Radio, Bluetooth |

## DIAGNOSTIC SPECIFICATIONS

| | |
|---|---|
| **Monitor/Alarm** | Multivariable: P, DP, T<br>Analog inputs/outputs<br>Digital/switch inputs<br>Digital/switch outputs<br>Pulse/frequency inputs<br>Internal temperature<br>Battery voltage<br>Internal power supply |

## FLOW COMPUTATION SPECIFICATIONS

| Number of Trains: | One (+1 Aux meter) |
|---|---|
| Flow Calculation: | Gas or liquid |
| Primary Elements: | Differential:<br>    Orifice, V-Cone, Wedge, Annubar,<br>    Venturi, etc.<br>Pulse/Frequency:<br>    Turbine, PD, Vortex, Ultrasonic, etc. |
| Units of Engineering: | US and Metric |
| Base Conditions: | 60°F, 14.7 Psia (15 °C and 1 Kg. /Cm²)<br>68°F, 14.7 Psia (20 °C and 1 Kg/Cm²) |
| Equations: | AGA8 methods 1, 2, and detailed; 24A,B,C; Steam NBS<br>Others added continuously<br>Consult factory for complete list |

## MULTIVARIABLE SPECIFICATIONS

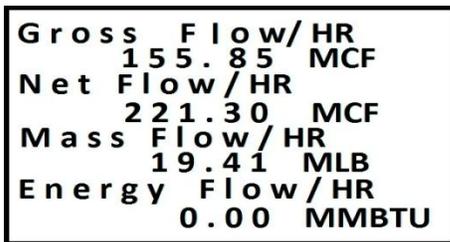| Function | Gas, oil, water, steam, and others |
|---|---|
| Differential Sensor Limits | Range 2: -250 to 250 in H2O (-0.622 to 0.622 bar)<br>Range 3: -1000 to 1000 in H2O (-2.49 to 2.49 bar) |
| Absolute Sensor Limits | Range 3: 0.5 to 800 psia (3447 to 5516 kPa)<br>Range 4: 0.5 to 3626 psia (3447 to 25000 kPa) |
| Gage Sensor Limits | Range C: 0 to 800 psig (0 to 5516 kPa)<br>Range D: 0 to 3626 psig (0 to 25000 kPa) |
| Temperature Sensor (does not consider error from external RTD) | Compatible with any 100 Ohm Platinum RTD<br>Range 3: -300 to 1200 °F (-184 to 649 °C)<br>accuracy ±1.0 °F (±0.56 °C)<br>Range 4: 1200 to 1500 °F (649 to 816 °C)<br>accuracy ±0.5 °F by each 50 °F |
| Temperature Limits (Multivariable Flange temperature, Does not apply to process temperature) | -40 to 250 °F (-40 to 121 °C) (Silicon fill)<br>0 to 185 °F (-17.8 to 85 °C) (Inert fill) |
| Environmental Temperature Limits | -40 to 185 °F (-40 to 85 °C) (Silicon fill)<br>0 to 185 °F (-17.8 to 85 °C) (Inert fill) |
| Storage Temperature Limits | -40 to 230 °F (-40 to 100 °C) |
| Humidity | 0 –100% relative humidity |

### Multivariable Accuracy
(Includes the combined effects of linearity, hysteresis and repeatability)
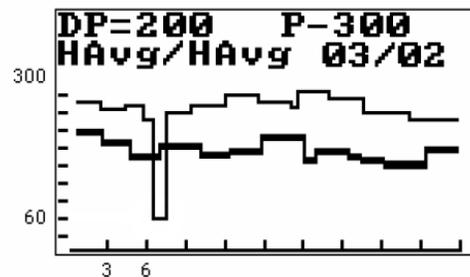
| Differential Pressure: | ± 0.075% of the span for spans from 1:1 to 10:1 of the URL. For spans smaller than 10:1 calculate according to:<br>Accuracy = ±[0.025 + 0,005 (URL/Span)]% of span |
|---|---|
| Pressure absolute/static: | ± 0.075% of the span for spans from 1:1 to 10:1 of the URL. For spans smaller than 10:1, calculate according to:<br>Accuracy = ±[0.03 + 0,0075 (URL/Span)]% of span |
| Temperature: | Accuracy ±1.0 °F (±0.56 °C) from<br>-300 to 1200 °F (-184 to 649 °C) |

### Multivariable Construction Material

| | |
|---|---|
| **Process Connections** | <u>Transmitter</u><br>2 Coplanar ¼–18 NPT on 2⅛" centers ½–14 NPT on 2", 2⅛", or 2¼" centers with optional flange adapters<br><u>RTD</u><br>RTD dependent |
| **Wetted Parts** | <u>Isolating Diaphragms</u><br>316L SST or Hastelloy C-276®<br><u>Drain Vents/Valves</u><br>316 SST or Hastelloy C-276®<br><u>Flanges</u><br>Plated carbon steel, 316 SST, or Hastelloy C-276<br><u>Wetted O-Rings</u><br>Glass-Filled PTFE |
| **Non-Wetted Parts** | <u>Screws</u><br>Plated carbon steel per ASTM A449, grade 5 or austenitic 316 SST<br><u>Fill Fluid</u><br>Silicone or halocarbon inert oil<br><u>O-Rings</u><br>Buna N |

```
Gross  Flow/HR
       155.85  MCF
Net Flow/HR
       221.30   MCF
Mass Flow/HR
       19.41  MLB
Energy Flow/HR
       0.00  MMBTU
```

Text Display

```
DP=200   P-300
HAvg/HAvg 03/02
```

Graphic / Trend Display

## Optional Accessories

RS-232 Elbow

SmartCone®

Armored RTD Cable

Shielded RTD Cable

Solar Panel

FreeWave Radio

Zigbee Radio

Bluetooth

L-Shaped Mounting Bracket

Back-Up Battery

5-Valve Manifold