



*Mass Flow Controllers*  
*Mass Flow Meters      Pressure Controllers*

*One Instrument... Over 100 Gases*

Contact information

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# Calculate Communicate Integrate



## With Flow, We Measure Up

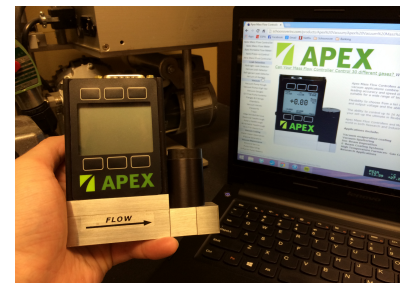
### Calculate



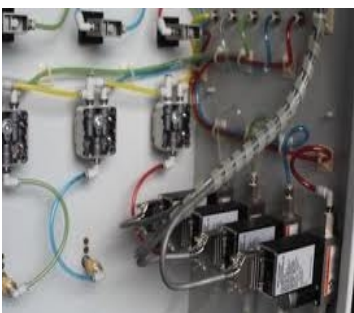
- ➔ High accuracy at 2% Full Scale and 4% Reading
- ➔ Low flow option from 0.5 to 0.0025 sccm
- ➔ High flow option from 15 to 3000 slpm
- ➔ Control pressure from 1000 to  $1 \times 10^{-6}$  Torr
- ➔ Repeatability at 0.2% Full Scale
- ➔ 200 to 1 Turndown ratio for all devices
- ➔ Gas mixture capabilities with up to four gases
- ➔ Record your data with FlowVision software

- ✓ Control 9 Devices with one communication hub (BB9 Box)
- ✓ Read all devices on one PC with FlowVision Software
- ✓ Range of two sided and single sided communication cords
- ✓ Downloads available for Lab View Drivers
- ✓ MKS and Brooks pin-out options available
- ✓ RS-232 and RS-485 capability
- ✓ Read immediate data from the Digital Display
- ✓ Alarms and Buzzer signal options for quick notification

### Communicate



### Integrate



- ∴ 10 milliseconds meter response time
- ∴ 100 milliseconds controller reaction time
- ∴ Less than 1 second Warm-Up time
- ∴ Tuneable PID parameters
- ∴ Power multiple devices with one power supply cord
- ∴ No need for display or power supply boxes
- ∴ Use one device to manage a variety of gas

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## Apex MFC in a Glance

The Apex Mass Flow Controllers are laminar flow controllers that use differential pressure measurements within the known volume coupled with a proportional valve to control flow rates. Unlike Thermal Mass Flow Controllers, Apex MFCs have ten millisecond reaction time, no significant warmup time, and can measure multiple gases with one controller, among other advantages. One MFC works across 110+ gases.

## Common Applications

Research and Development  
Sputtering  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Vacuum Venting and Gassing  
Fuel Cell Systems  
Nitrogen Blanketing  
Shaping Air in Paint Booths



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## Why we Stand Out

- ◆ Flexibility of 117+ selectable on-board gases
- ◆ Fast 100 millisecond valve control
- ◆ Pinpoint accuracy at 0.2% Full Scale and 0.8% Reading
- ◆ 200-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flows from 0.5 SCCM to 2000 SLPM Full Scale
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

## Technical Information

Accuracy	0.8% of reading / 0.2% of Full Scale
Repeatability	0.2% at Full Scale
Operating Range	1-200 % Measure and Control
Response Time	100 Milliseconds
Standard Conditions	25°C and 14.696 PSIA (STP)
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Flow Rate	102.4% Controllable Full Scale
Maximum Pressure	145 PSIG
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Input / Output 2 <sup>nd</sup>	0-5 Vdc; 0-10 Vdc; 4-20 mA
Electrical Connections	8 Pin Mini Din (6 Pin Industrial Option)

Dimensions	Connections
≤50 SCCM	10-32 UNF (Euro M-5)
50 SCCM ≤ 20 SLPM	1/8" NPT Female
20 SLPM ≤ 100 SLPM	1/4" NPT Female
100 SLPM ≤ 250 SLPM	1/2" NPT Female
> 250 SLPM ≤ 2000 SLPM	3/4" NPT Female

## Accessories

## &

## Additions

- |  |   |
|--|---|
| - Local Set Point Module                 | - Totalizer                             |
| - Remote Digital Display                 | - Additional Fittings                   |
| - Assortment of Connecting Cables        | - Orifice Sizing                        |
| - Simple Power Cords                     | - Gas Blend Calibrations                |
| - FlowVision                             | - Bi-Directional Flow Calibration       |
| - Upstream valve for Vacuum Applications | - 0.4% of Reading, High Accuracy Option |

# APEX

## Aggressive Gas Mass Flow Controllers

One Instrument... Over 100 Gases



### Apex MFC in a Glance

The Apex Mass Flow Controllers are laminar flow controllers that use differential pressure measurements within the known volume coupled with a proportional valve to control flow rates. The Aggressive Gas Flow Controllers are compatible with Ammonia, Hydrogen Sulfide, Nitric Oxide, Nitrogen Trifluoride, Propylene, along with the 110 on board gases offered with the standard Apex MFC. Contact for additional aggressive gases

### Common Applications

Research and Development  
Sputtering  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Vacuum Venting and Gassing  
Fuel Cell Systems  
Nitrogen Blanketing  
Shaping Air in Paint Booths

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### Why we Stand Out

- ◆ Flexibility of 130+ selectable on-board gases
- ◆ Fast 100 millisecond valve control
- ◆ Pinpoint accuracy at 0.2% Full Scale and 0.8% Reading
- ◆ 200-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flows from 0.5 SCCM to 2000 SLPM Full Scale
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

### Technical Information

Accuracy	0.8% of reading / 0.2% of Full Scale
Repeatability	0.2% at Full Scale
Operating Range	1-200 % Measure and Control
Response Time	100 Milliseconds
Standard Conditions	25°C and 14.696 PSIA (STP)
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Flow Rate	102.4% Controllable Full Scale
Maximum Pressure	145 PSIG
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Input / Output 2 <sup>nd</sup>	0-5 Vdc; 0-10 Vdc; 4-20 mA
Electrical Connections	8 Pin Mini Din (6 Pin Industrial Option)

Dimensions	Connections
≤50 SCCM	10-32 UNF (Euro M-5)
50 SCCM ≤ 20 SLPM	1/8" NPT Female
20 SLPM ≤ 100 SLPM	1/4" NPT Female
100 SLPM ≤ 250 SLPM	1/2" NPT Female
> 250 SLPM ≤ 2000 SLPM	3/4" NPT Female

### Accessories

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### Additions

- |  |   |
|--|---|
| - Local Set Point Module                 | - Totalizer                             |
| - Remote Digital Display                 | - Additional Fittings                   |
| - Assortment of Connecting Cables        | - Orifice Sizing                        |
| - Simple Power Cords                     | - Gas Blend Calibrations                |
| - FlowVision                             | - Bi-Directional Flow Calibration       |
| - Upstream valve for Vacuum Applications | - 0.4% of Reading, High Accuracy Option |





## Low Pressure Drop Mass Flow Controllers

One Instrument... Over 100 Gases



### Apex MFC in a Glance

The Apex Low Pressure Drop Mass Flow Controllers are laminar flow controllers that use differential pressure measurements within the known volume coupled with a proportional valve to control flow rates. With Pressure Drops as low as 0.06 PSID, the Low Pressure Drop MFCs have all the advantages of the standard Apex MFC, but with the additional advantage of accurate flow control without the pressure gradient.

### Common Applications

Research and Development  
Atmospheric Testing  
Environmental Air Sampling  
Expensive Gas Applications  
Leak Detection  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Fuel Cell Systems

### Why we Stand Out

- ◆ Pressure drops as low as 0.06 PSID for the toughest applications
- ◆ Flexibility of Over 117+ selectable on-board gases
- ◆ Fast 100 millisecond valve control
- ◆ Pinpoint accuracy at 0.2% Full Scale and 0.8% Reading
- ◆ 200-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flows from 0.5 SCCM to 2000 SLPM Full Scale
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

### Technical Information

Pressure Drop	As low as 0.06 PSID
Accuracy	0.8% of reading / 0.2% of Full Scale
Repeatability	0.2% at Full Scale
Operating Range	1-200 % Measure and Control
Response Time	100 Milliseconds
Standard Conditions	25°C and 14.696 PSIA (STP)
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Flow Rate	102.4% Controllable Full Scale
Maximum Pressure	50 PSIG
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Electrical Connections	8 Pin Mini Din (6 Pin Industrial Option)

Dimensions	Connections
≤50 SCCM	10-32 UNF (Euro M-5)
50 SCCM ≤ 20 SLPM	1/8" NPT Female
20 SLPM ≤ 100 SLPM	1/4" NPT Female
100 SLPM ≤ 250 SLPM	1/2" NPT Female
> 250 SLPM ≤ 2000 SLPM	3/4" NPT Female

### Accessories

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### Additions

- |  |   |
|--|---|
| - Local Set Point Module                 | - Totalizer                             |
| - Remote Digital Display                 | - Additional Fittings                   |
| - Assortment of Connecting Cables        | - Orifice Sizing                        |
| - Simple Power Cords                     | - Gas Blend Calibrations                |
| - FlowVision                             | - Bi-Directional Flow Calibration       |
| - Upstream valve for Vacuum Applications | - 0.4% of Reading, High Accuracy Option |



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## Mass Flow Meter

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### Apex MFM in a Glance

The Apex Mass Flow Meters are laminar flow meters that use differential pressure measurements within the known volume to determine flow rates. Unlike Thermal Mass Flow Controllers, Apex MFMs have ten millisecond reaction time, no significant warmup time, and can measure multiple gases with one controller, among other advantages. Gone are the times when one device measured one gas species.

### Common Applications

Research and Development  
Sputtering  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Vacuum Venting and Gassing  
Fuel Cell Systems  
Nitrogen Blanketing  
Shaping Air in Paint Booths

### Why we Stand Out

- ◆ Flexibility of 117+ selectable on-board gases
- ◆ Fast 10 millisecond response
- ◆ Pinpoint accuracy at 0.2% Full Scale and 0.8% Reading
- ◆ 200-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flows from 0.5 SCCM to 3000 SLPM Full Scale
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

### Technical Information

Accuracy	0.8% of reading / 0.2% of Full Scale
Repeatability	0.2% at Full Scale
Operating Range	1-200 % Measure and Control
Response Time	10 Milliseconds
Standard Conditions	25°C and 14.696 PSIA (STP)
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Flow Rate	128% Measurable Full Scale
Maximum Pressure	145 PSIG
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Input / Output 2 <sup>nd</sup>	0-5 Vdc; 0-10 Vdc; 4-20 mA
Electrical Connections	8 Pin Mini Din (6 Pin Industrial Option)

Dimensions	Connections
≤50 SCCM	10-32 UNF (Euro M-5)
50 SCCM ≤ 20 SLPM	1/8" NPT Female
20 SLPM ≤ 100 SLPM	1/4" NPT Female
100 SLPM ≤ 250 SLPM	1/2" NPT Female
> 250 SLPM ≤ 2000 SLPM	3/4" NPT Female

### Accessories

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### Additions

- |                                      |   |
|--------------------------------------|---|
| - Local Set Point Module             | - Totalizer                             |
| - Remote Digital Display             | - Additional Fittings                   |
| - Assortment of Connecting Cables    | - Orifice Sizing                        |
| - Portable Batteries and Power Cords | - Gas Blend Calibrations                |
| - FlowVision                         | - Bi-Directional Flow Calibration       |
|                                      | - 0.4% of Reading, High Accuracy Option |



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## Aggressive Gas Mass Flow Meter

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### Apex MFM in a Glance

The Apex Aggressive Gas Mass Flow Meters are laminar flow meters that use differential pressure measurements within the known volume to determine flow rates. The Aggressive Gas Meters are compatible with Ammonia, Hydrogen Sulfide, Nitric Oxide, Nitrogen Trifluoride, Propylene, Sulfur Dioxide, and Chlorine Gas along with the 110 on board gases offered with the standard Apex MFM. Contact for additional aggressive gases available.

### Common Applications

Research and Development  
Sputtering  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Vacuum Venting and Gassing  
Fuel Cell Systems  
Nitrogen Blanketing  
Shaping Air in Paint Booths



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### Why we Stand Out

- ◆ Flexibility of 130+ selectable on-board gases
- ◆ Fast 10 millisecond response
- ◆ Pinpoint accuracy at 0.2% Full Scale and 0.8% Reading
- ◆ 100-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flows from 0.5 SCCM to 3000 SLPM Full Scale
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

### Technical Information

Accuracy	0.8% of reading / 0.2% of Full Scale
Repeatability	0.2% at Full Scale
Operating Range	1-100 % Measure and Control
Response Time	10 Milliseconds
Standard Conditions	25°C and 14.696 PSIA (STP)
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Flow Rate	128% Measurable Full Scale
Maximum Pressure	145 PSIG
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Input / Output 2 <sup>nd</sup>	0-5 Vdc; 0-10 Vdc; 4-20 mA
Electrical Connections	8 Pin Mini Din (6 Pin Industrial Option)

Dimensions	Connections
≤50 SCCM	10-32 UNF (Euro M-5)
50 SCCM ≤ 20 SLPM	1/8" NPT Female
20 SLPM ≤ 100 SLPM	1/4" NPT Female
100 SLPM ≤ 250 SLPM	1/2" NPT Female
> 250 SLPM ≤ 2000 SLPM	3/4" NPT Female

### Accessories

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### Additions

- |   |   |
|---|---|
| - Local Set Point Module  | - Totalizer                             |
| - Remote Digital Display  | - Additional Fittings                   |
| - Assortment of Connecting Cables   | - Orifice Sizing                        |
| - Portable Batteries and Power Cords                                      | - Gas Blend Calibrations                |
| - FlowVision  | - Bi-Directional Flow Calibration       |
| - Add Gases: Nitrogen Dioxide, Silane, Trans-Butene, and Nitrogen Dioxide | - 0.4% of Reading, High Accuracy Option |



## Low Pressure Drop Mass Flow Meters

One Instrument... Over 100 Gases



### Apex MFM in a Glance

The Apex Low Pressure Drop Mass Flow Meters are laminar flow gas meters that use differential pressure measurements within the known volume to determine flow rates. With Pressure Drops as low as 0.06 PSID, the Low Pressure Drop Gas Flow Meters have all the advantages of the standard Apex Meters, but with the additional advantage of accurate flow measurement without the pressure gradient across the controller.

### Common Applications

Research and Development  
Atmospheric Testing  
Environmental Air Sampling  
Expensive Gas Applications  
Leak Detection  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Fuel Cell Systems

### Why we Stand Out

- ◆ Flexibility of 117+ selectable on-board gases
- ◆ Fast 10 millisecond response
- ◆ Pinpoint accuracy at 0.2% Full Scale and 0.8% Reading
- ◆ 100-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flows from 0.5 SCCM to 3000 SLPM Full Scale
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

### Technical Information

Pressure Drop	As low as 0.06 PSID
Accuracy	0.8% of reading / 0.2% of Full Scale
Repeatability	0.2% at Full Scale
Operating Range	1-100 % Measure and Control
Response Time	10 Milliseconds
Standard Conditions	25°C and 14.696 PSIA (STP)
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Flow Rate	128% Measurable Full Scale
Maximum Pressure	50 PSIG
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Electrical Connections	8 Pin Mini Din (6 Pin Industrial Option)

Dimensions	Connections
≤50 SCCM	10-32 UNF (Euro M-5)
50 SCCM ≤ 20 SLPM	1/8" NPT Female
20 SLPM ≤ 100 SLPM	1/4" NPT Female
100 SLPM ≤ 250 SLPM	1/2" NPT Female
> 250 SLPM ≤ 2000 SLPM	3/4" NPT Female

### Accessories

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### Additions

- |   |   |
|---|---|
| - Local Set Point Module  | - Totalizer                             |
| - Remote Digital Display  | - Additional Fittings                   |
| - Assortment of Connecting Cables   | - Orifice Sizing                        |
| - Portable Batteries and Power Cords                                      | - Gas Blend Calibrations                |
| - FlowVision  | - Bi-Directional Flow Calibration       |
| - Add Gases: Nitrogen Dioxide, Silane, Trans-Butene, and Nitrogen Dioxide | - 0.4% of Reading, High Accuracy Option |



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## Portable Mass Flow Meter

One Instrument... Over 100 Gases



### Why we Stand Out

- ◆ Rechargeable Battery Powered and Portable
- ◆ Measure multiple systems with one unit
- ◆ Flexibility of 117+ selectable on-board gases
- ◆ Fast 10 millisecond response
- ◆ Pinpoint accuracy at 0.2% Full Scale and 0.8% Reading
- ◆ 200-1 Turndown Ratio allows lower accurate flow readings
- ◆ All functions of the standard Apex Flow Meter but portable
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and compatible with FlowVisionSC

### Technical Information

Accuracy	0.8% of reading / 0.2% of Full Scale
Repeatability	0.2% at Full Scale
Operating Range	1-200 % Measure and Control
Response Time	10 Milliseconds
Standard Conditions	25°C and 14.696 PSIA (STP)
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Flow Rate	128% Measurable Full Scale
Maximum Pressure	145 PSIG
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Input / Output 2 <sup>nd</sup>	0-5 Vdc; 0-10 Vdc; 4-20 mA
Electrical Connections	8 Pin Mini Din (6 Pin Industrial Option)

### Apex MFM in a Glance

The Apex Mass Flow Meters are laminar flow meters that use differential pressure measurements within the known volume to determine flow rates. With the Apex Portable Mass Flow Meter, get all the features of the standard Mass Flow Meter with the flexibility to move from system to system and circumvent the need to hard wire in your controller. No need to replace batteries, all units come with a 9vdc rechargeable battery.

### Common Applications

Research and Development  
Sputtering  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Vacuum Venting and Gassing  
Fuel Cell Systems  
Nitrogen Blanketing  
Furnace Flow Testing

Dimensions	Connections
≤50 SCCM	10-32 UNF (Euro M-5)
50 SCCM ≤ 20 SLPM	1/8" NPT Female
20 SLPM ≤ 100 SLPM	1/4" NPT Female
100 SLPM ≤ 250 SLPM	1/2" NPT Female
> 250 SLPM ≤ 2000 SLPM	3/4" NPT Female

### Accessories

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### Additions

- Local Set Point Module
- Remote Digital Display
- Assortment of Connecting Cables
- Portable Batteries and Power Cords
- FlowVision

- Totalizer
- Additional Fittings
- Orifice Sizing
- Gas Blend Calibrations
- Bi-Directional Flow Calibration
- 0.4% of Reading, High Accuracy Option



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## Pressure Controllers

One Instrument... Over 100 Gases



### Apex DVPC in a Glance

The Apex Pressure Controllers are laminar flow controllers that use differential pressure measurements within the known volume to control process pressure. Apex PCs use a valve system upstream for vacuum applications and downstream for pressure applications, insuring pinpoint accuracy for both situations. The Dual Valve System replaces a bleed valve, potentially saving large amounts of expensive gas, and money.

### Common Applications

Research and Development  
Sputtering  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Vacuum Venting and Gassing  
Fuel Cell Systems  
Nitrogen Blanketing  
Shaping Air in Paint Booths



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### Why we Stand Out

- ◆ Controls ranges from 26,000 Torr to 8 Torr
- ◆ Faster than 100 millisecond valve control
- ◆ Pinpoint accuracy at 0.25% Full Scale
- ◆ 200-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flexibility of 117+ selectable on-board gases
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

### Technical Information

Accuracy	0.25% Full Scale
Repeatability	0.8% at Full Scale
Operating Range	1-200 % Measure and Control
Response Time	100 Milliseconds
Pressure Range	26,000 Torr to 8 Torr
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Excess Pressure	128% Controllable Full Scale
Burst Pressure	3 Times Full Scale
Supply Voltage	12 to 30 Volts DC
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Electrical Connections	8 Pin Mini Din, DB9, or DB15

#### Dimensions

Pressure Controller

#### Connections

1/8" NPT Female

Compatible with Swagelok® tube, Parker®, face seal, push connect and compression adapter fittings. Other Alternative available

#### Wetted Materials

302 and 303 Stainless Steel, Brass, Viton®, Silicone RTV, Silicon, Glass

### Accessories

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### Additions

- |                                   |                                   |
|-----------------------------------|-----------------------------------|
| - Local Set Point Module          | - Totalizer                       |
| - Remote Digital Display          | - Additional Fittings             |
| - Assortment of Connecting Cables | - Orifice Sizing                  |
| - Simple Power Cords              | - Gas Blend Calibrations          |
| - FlowVision                      | - Bi-Directional Flow Calibration |
| - BB9 for Multi-Drop Ability      | - Larger Valves for Larger Loads  |
| - FlowVisionSC for Windows Users  |                                   |

# APEX

## Millitorr Pressure Controllers

One Instrument... Over 100 Gases

IX



### Why we Stand Out

- ◆ Controls ranges from 1000 Torr to 1 Millitorr
- ◆ Faster than 100 millisecond valve control
- ◆ Pinpoint accuracy at 0.25% Full Scale
- ◆ 200-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flexibility of 117+ selectable on-board gases
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

### Technical Information

Accuracy	0.5% Full Scale
Repeatability	0.8% at Full Scale
Operating Range	1-200 % Measure and Control
Response Time	100 Milliseconds
Pressure Range	1000Torr to 1E-6 Torr
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Excess Pressure	128% Controllable Full Scale
Burst Pressure	3 Times Full Scale
Supply Voltage	12 to 30 Volts DC
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Electrical Connections	8 Pin Mini Din, DB9, or DB15

#### Dimensions

Pressure Controller

#### Connections

1/8" NPT Female

Compatible with Swagelok® tube, Parker®, face seal, push connect and compression adapter fittings. Other Alternative available

#### Wetted Materials

302 and 303 Stainless Steel, Brass, Viton®, Silicone RTV, Silicon, Glass

### Apex DVPC in a Glance

The Apex Millitorr Pressure Controllers are laminar flow controllers that use differential pressure measurements within the known volume to determine flow rates and keep pressure constant. Apex DVPC use a valve system upstream of the vacuum system along with a CDG, insuring pinpoint accuracy. The Apex PID loop allows for fast Controller to CDG communication. Pressure ranges for CDG vary depending on need.

### Common Applications

Research and Development  
Sputtering  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Vacuum Venting and Gassing  
Fuel Cell Systems  
Nitrogen Blanketing  
Shaping Air in Paint Booths

### Accessories

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### Additions

- Local Set Point Module
- Remote Digital Display
- Assortment of Connecting Cables
- Simple Power Cords
- FlowVision
- BB9 for Multi-Drop Ability
- FlowVisionSC for Windows Users
- CDG ranges for each application
- Additional Fittings
- Orifice Sizing
- Gas Blend Calibrations
- Bi-Directional Flow Calibration
- Larger Valves for Larger Loads
- Totalizer



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## Dual Valve Pressure Controllers

One Instrument... Over 100 Gases



### Apex DVPC in a Glance

The Apex Dual Valve Pressure Controllers are laminar flow controllers that use differential pressure measurements within the known volume to determine flow rates and keep pressure constant. Apex DVPC use a valve system up and downstream of the vacuum system, insuring pinpoint accuracy. The Dual Valve System replaces a bleed valve, potentially saving large amounts of expensive gas, and money.

### Common Applications

Research and Development  
Sputtering  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Vacuum Venting and Gassing  
Fuel Cell Systems  
Nitrogen Blanketing  
Shaping Air in Paint Booths



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### Why we Stand Out

- ◆ Controls ranges from 1000 torr to 8 torr
- ◆ Faster than 100 millisecond valve control
- ◆ Pinpoint accuracy at 0.5% Full Scale
- ◆ 200-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flexibility of 117+ selectable on-board gases
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

### Technical Information

Accuracy	0.5% Full Scale
Repeatability	0.8% at Full Scale
Operating Range	1-200 % Measure and Control
Response Time	100 Milliseconds
Pressure Range	1000Torr to 1E-6 Torr
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Excess Pressure	128% Controllable Full Scale
Burst Pressure	3 Times Full Scale
Supply Voltage	12 to 30 Volts DC
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Electrical Connections	8 Pin Mini Din, DB9, or DB15

#### Dimensions

Pressure Controller

#### Connections

1/8" NPT Female

Compatible with Swagelok® tube, Parker®, face seal, push connect and compression adapter fittings. Other Alternative available

#### Wetted Materials

302 and 303 Stainless Steel, Brass, Viton®, Silicone RTV, Silicon, Glass

### Accessories

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### Additions

- |                                   |                                   |
|-----------------------------------|-----------------------------------|
| - Local Set Point Module          | - Totalizer                       |
| - Remote Digital Display          | - Additional Fittings             |
| - Assortment of Connecting Cables | - Orifice Sizing                  |
| - Simple Power Cords              | - Gas Blend Calibrations          |
| - FlowVision                      | - Bi-Directional Flow Calibration |
| - BB9 for Multi-Drop Ability      | - Larger Valves for Larger Loads  |
| - FlowVisionSC for Windows Users  |                                   |





## Water Flow Controllers & Meters

One Instrument... Over 100 Gases



### Apex MFC in a Glance

The Apex Water Mass Flow Controllers and Meters are laminar flow devices that use differential pressure measurements within the known volume to measure and control water flow. The controllers use valve communications to control the water flow through the system. Use only DI and Distilled water with the Apex Water Flow Units to avoid particulate buildup or chemical degradation of the materials inside the device.

### Common Applications

Research and Development  
Water Cooling Systems  
Gas and Vapor Mixing  
Chemical Plants  
Serial Temperature Measurement  
Liquid Mixing  
Water Flow Totalization



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### Why we Stand Out

- ◆ Temperature Measurement, Optional Pressure Measurement
- ◆ Fast 20 millisecond valve control
- ◆ Pinpoint accuracy at 2% Full Scale
- ◆ 50-1 Turndown Ratio allows lower accurate flow readings
- ◆ Flows from 0.5 CCM to 10 LPM Full Scale
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ Multiple unit control made easy with the BB9 Breakout Box

### Technical Information

Accuracy	2% of Full Scale
Repeatability	2% at Full Scale
Operating Range	2-100 % Measure and Control
Response Time	20 Milliseconds (Adjustable)
Standard Conditions	25°C and 14.696 PSIA (STP)
Operating Temp	+10°C to +50°
Warm-up Time	Less Than 1 Second
Flow Rate	102.4% Controllable Full Scale
Maximum Pressure	200 PSIG
Input / Output Signal	RS-232 Serial and 0-5 Vdc
Input / Output 2 <sup>nd</sup>	0-5 Vdc; 0-10 Vdc; 4-20 mA
Electrical Connections	8 Pin Mini Din (6 Pin Industrial Option)

Dimensions	Connections / Pressure Drop
0.5 CCM ≤ 1 CCM	10-32 UNF (Euro M-5) / 2.0 PSID
2 SCCM ≤ 500 CCM	1/8" NPT Female / 2.0 PSID
1 LPM	1/8" NPT Female / 4.0 PSID
2 LPM	1/4" NPT Female / 4.0 PSID
5 LPM	1/4" NPT Female / 10.0 PSID
10 LPM	1/4" NPT Female / 20.0 PSID

### Accessories

&

### Additions

- |                                   |                            |
|-----------------------------------|----------------------------|
| - Local Set Point Module          | - Totalizer                |
| - Remote Digital Display          | - Additional Fittings      |
| - Assortment of Connecting Cables | - Orifice Sizing           |
| - Simple Power Cords              | - Pressure Sensor          |
| - FlowVision                      | - External Pressure Sensor |

## Flow Leak Detection

One Instrument... Over 100 Gases



### Apex MFC in a Glance

The Apex Flow Leak Detection System uses Pressure Control along with Mass Flow Measurement to determine leak rates at known and controlled pressures. Using state of the art low pressure drop laminar technology, this unit can accurately find and quantify small leaks. With this technology, a user can find leak rates at multiple desired pressures as well as test with any of the 110 on-board gases choices with one device.

### Common Applications

Research and Development  
Water Cooling Systems  
Pipe Testing  
Chemical Plants  
Weld Testing  
Pressurized Leak Testing  
Refrigerant Lines

### Why we Stand Out

- ◆ Leak test with one of 110 selectable on-board gases
- ◆ Fast 100 millisecond valve control
- ◆ Pinpoint accuracy at 0.2% Full Scale and 0.8% Reading
- ◆ 200-1 Turndown Ratio allows lower accurate flow readings
- ◆ Digital Screen allows stand alone control
- ◆ Compatible with FlowVisionSC download on Windows
- ◆ No additional rack mount power or display supplies needed
- ◆ All units come with RS-232 and all Analog Communication
- ◆ 0.5 SCCM Leak Detector for small leak detection

### Technical Information

Accuracy	0.8% of reading / 0.2% of Full Scale
Repeatability	0.2% at Full Scale
Operating Range	1-200 % Measure and Control
Response Time	100 Milliseconds
Standard Conditions	25°C and 14.696 PSIA (STP)
Operating Temp	-10°C to +50°
Humidity Range	Non-Condensing (0-100%)
Flow Rate	102.4% Controllable Full Scale
Maximum Pressure	50 PSIG (Higher Line Pressure Available)
Input / Output Signal	RS-232 Serial, PROFIBUS and 0-5 Vdc
Input / Output 2 <sup>nd</sup>	0-5 Vdc; 0-10 Vdc; 4-20 mA
Electrical Connections	8 Pin Mini Din (6 Pin Industrial Option)

Dimensions	Connections
≤20 SCCM	10-32 UNF (Euro M-5)
20 SCCM ≤ 2 SLPM	1/8" NPT Female
5 SLPM ≤ 20 SLPM	1/4" NPT Female
40 SLPM	1/2" NPT Female
50 SLPM ≤ 500 SLPM	3/4" NPT Female

### Accessories

### &

### Additions

- |                                   |   |
|-----------------------------------|---|
| - Local Set Point Module          | - Totalizer   |
| - Remote Digital Display          | - Additional Fittings   |
| - Assortment of Connecting Cables | - Orifice Sizing  |
| - Simple Power Cords              | - Gas Blend Calibrations                                      |
| - FlowVision                      | - Bi-Directional Flow Calibration                             |
| - TFT Color Display               | - 0.4% of Reading, High Accuracy Option for Larger Leak Tests |



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## BB9 Multi-drop Breakout Box

One Instrument... Over 100 Gases



APEX

### Why we Stand Out

- ◆ Can easily connect 9 MFC, MFM, and Pressure Controllers
- ◆ Can connect up to 27 meters and controllers with multiple BB9s
- ◆ Allows all your controllers to be controlled by one power source
- ◆ One connection for multiple units into your computer
- ◆ All units are RS-232 compatible
- ◆ Can be used with FlowVisionSC on Windows Operating Systems
- ◆ No additional rack mount power or display supplies needed
- ◆ USB connection available
- ◆ There is an option for 6 Pin industrial or custom connections

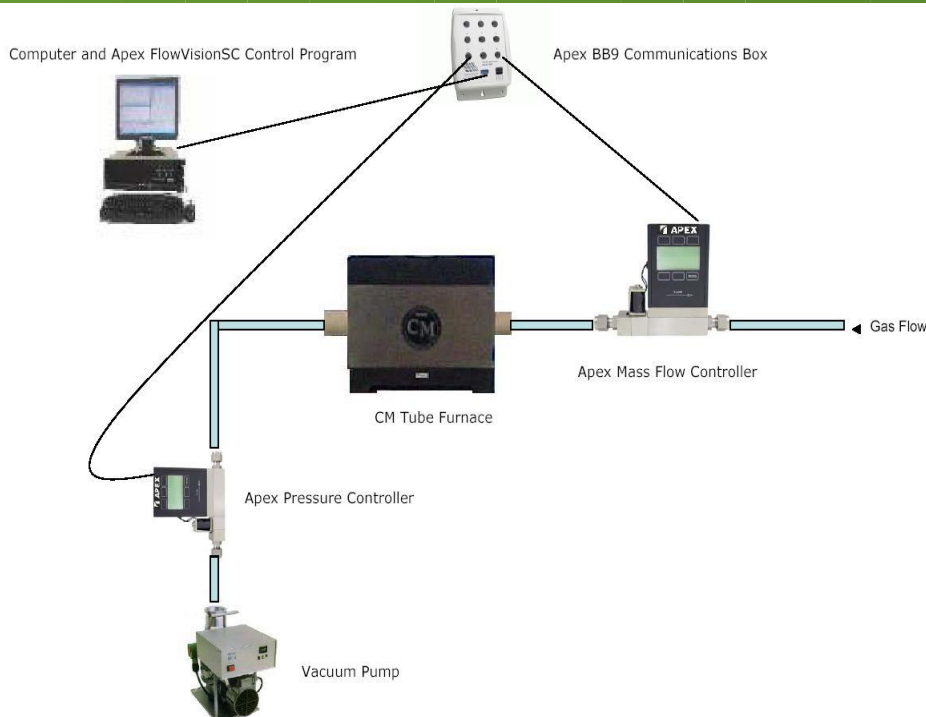
### Technical Information

#### Apex MFM in a Glance

The Apex BB9 Multi-drop Breakout Box allows for the connection of multiple Apex Flow Meters, Flow Controllers, Pressure Gauges, and Pressure Controllers to one control computer with either RS-232 or FlowVisionSC Software. This allows for easy control of simple systems of 2 or 3 Apex products or even complex systems containing multiple Apex BB9 boxes daisy chained together full of controllers and meters.

#### Common Applications

Research and Development  
Sputtering  
Thin Film Deposition  
Chemical Vapor Deposition  
Plasma Production  
Replacement for Valve Control  
Vacuum Venting and Gassing  
Fuel Cell Systems  
Nitrogen Blanketing  
Shaping Air in Paint Booths



A picture showing a simple system using the Apex BB9 to connect two types of controllers. First the pump is connected to an Apex Pressure Controller. This is connected to a tube furnace with gas flow controlled by an Apex Mass flow Controller. These are connected to the Apex BB9 box which connects to a computer with RS-232 or FlowVisionSC software to communicate with the controllers.

#### Accessories

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#### Additions

- Apex MFC, MFM
- Apex Pressure Controller and Gauges
- Assortment of Connecting Cables
- USB Compatible
- FlowVision
- 6 pin industrial connectors
- Additional Fittings



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### FlowVision



- ◆ Connect and control multiple Controllers and Meters from one PC
- ◆ Graphical user interface for setup and in use control
- ◆ Repeatable experiments with session saving and data capturing
- ◆ Software Alarms
- ◆ Requires Windows Xp, Vista, or 7

### DC Series 8-Pin Mini-DIN Cables



- ◆ Single and double ended cables
- ◆ Single sided right arm cables
- ◆ All males ends
- ◆ Custom Lengths
- ◆ Double ended perfect for connection to the BB9 Box

### IC Series 6-Pin Locking Industrial DIN Cables



- ◆ Great for industrial application
- ◆ Single and double ended cables
- ◆ All male ends
- ◆ Twisting locking collars
- ◆ Double ended perfect for connection to the BB9 Box

### 9 and 15-Pin D-Sub Cables



- ◆ For connection to PLC's and other devices
- ◆ Include locking screws
- ◆ 9-Pin cable offered in both single and double ended cables
- ◆ 15-Pin cable offered in single ended cables

### Conversion Cables



- ◆ Connect your Device to straight to your PC using the 8-Pin mini-DIN to serial adapter Cable
- ◆ Connect to you PC using USB with the USB-RS232 converter to the MD8DB9 cord

### Power Supplies



- ◆ PVPS24U; 100-240Vac; 50/60 Hz; Delivers 24Vdc at 1amp
- ◆ 1 Power Supply can power multiple units daisy-chained
- ◆ High Current Power Supply with the PS24VHC Power Supply



## APEX

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***What flow range does Apex cover?***

Apex units have an assortment of calibrations from 0.5 sccm to 3000 slpm. Depending on your application and target flow, we will help you find the range that is best for you.

***Are Apex units custom built?***

Apex units are produced daily throughout the calibration range but are easily customizable for each customer due to our large amount of options including: alarms, high accuracy calibration, totalizer, RS-485 communications, bi-directional flow and a range of Swagelok Fittings.

***What if I need fittings other than NPT***

If your application requires fittings other than NPT, we can weld a variety of fittings to our devices. Please contact us and we will find a solution for your application.

***How many units can I use at once?***

Using the BB9 box, you can connect and control up to 9 MFCs, MFM's, and Pressure Controllers with one computer. You can connect up to 27 units by daisy chaining 3 BB9 boxes. You can power all the units with one power source through your BB9 box.

***How does the 110 gas capability work?***

Apex units can be equipped with an on-board digital display which allows the user to change the gas setting with only a few clicks. Click mode, gas list, and then select your gas.

***Why can you offer this over the competition?***

We use pressure drop to measure flow by measuring temperature and pressure inside of our units. The only element that changes in our equation is the viscosity of the gas. These viscosities are stored in the units memory.



***What is the downside to measuring pressure drop?***

The construction of the sensors limit us when it comes to corrosive gases, although this option is available if needed. Also, our units max pressure is 140psi.

***Are there other options other than the 110 on-board gases?***

Every unit comes with the ability to add your own gas mixtures down to the hundredths place using the 110 on board gases. You can also order an aggressive gas series for metering and controlling of aggressive gases.

***How does Apex compare in cost?***

The cost of our units are very competitively priced. When you consider the cost of expensive power supplies, display units, wiring, communication software and devices that the competition need for their device to function, there are great savings in going with Apex and its features.

***How are Apex units powered?***

We offer a wall outlet plug at a very low cost. There is no need for costly readout boxes and power supply units that the competition uses. You also only need one power supply for multiple units when daisy chained together.

***What are my options to control my Apex units?***

1. On-board display
2. Through Analog 0-5V, 0-10V, or 4-20mA signals
3. Through Hyper-Terminal software (found on most PCs)
4. FlowVision software and RS 232 compatibility with all Apex devices
5. Compatible with Labview or competitor Control Software

***What Apex units can be powered by the battery pack?***

Apex Mass Flow Meters and Gauges can be powered with the BPACK that uses a 9V rechargeable battery for 6-7 hours of run-time. The Apex Mass Flow Controllers and Pressure Controllers cannot use the BPACK and need one of the other battery power sources we offer.