Aera® FC-DR980®

**Electrical Connections**

<table>
<thead>
<tr>
<th>Port-to-Port</th>
<th>P</th>
<th>L</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>BF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DR980 STD</td>
<td>92.0</td>
<td>105.0</td>
<td>25.4</td>
</tr>
<tr>
<td>Compact</td>
<td>79.8</td>
<td>92.8</td>
<td></td>
</tr>
<tr>
<td>BM</td>
<td></td>
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<tr>
<td>DR980</td>
<td>92.0</td>
<td>105.0</td>
<td>127.0</td>
</tr>
<tr>
<td>DR981</td>
<td>135.0</td>
<td></td>
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<tr>
<td>BA</td>
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<tr>
<td>DR980</td>
<td>92.0</td>
<td>105.0</td>
<td>127.0</td>
</tr>
<tr>
<td>DR981</td>
<td>135.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Dimensions**

1. **5" Model**

- 1 VALVE OPEN /CLOSE
- 2 OUTPUT 0~5VDC
- 3 +15VDC
- 4 COMMON
- 5 -15VDC
- 6 CONTROL 0~5VDC
- 7 COMMON
- 8 COMMON
- 9 VALVE TEST PT. (0~4VDC)

2. **1.125" Model**

- 1 VALVE OPEN /CLOSE
- 2 OUTPUT 0~5VDC
- 3 +15VDC
- 4 COMMON
- 5 -15VDC
- 6 CONTROL 0~5VDC
- 7 COMMON
- 8 COMMON
- 9 VALVE TEST PT. (0~4VDC)

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**Safety Precaution**

Before using any of the products introduced in this catalog, please read the respective user manuals thoroughly.

- Control of the system is as of January 2012.
- Due to various specifications and particular conditions, the dimensional specifications shown may differ from the actual product. Please check the latest catalog, technical documents or specifications before your final design, procurement or use of the products.
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- VCR® is a trademark of Swagelok Company Corporation.
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### Aera FC-DR980 Series Features

- Analog, analog/digital, and digital control valves
- Piezoelectric control valves
- Metal seals, with a 1×10^-10 leak

### Multi-Mode Operation

- Multi-gas, multi-range FC-DR980 MFCs reduce overall costs by minimizing mechanical limits. For quick gas and full-scale reassignment, they store calibration curves for up to four gases and ten calibration points for each type.
- Algorithms unique to Aera MFCs provide very fast response between the sensor and control valve. The result is better flow accuracy, repeatability, and operational versatility, resulting in significant cost savings and ease of use.

### Specifications

#### Full Scale Ranges

<table>
<thead>
<tr>
<th>Model</th>
<th>Single-Point Setup</th>
<th>Multi-Point Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-DR980</td>
<td>10 sccm to 5 slm</td>
<td>6 to 50 slm</td>
</tr>
<tr>
<td>FC-DR981</td>
<td>10 sccm to 5 slm</td>
<td>6 to 50 slm</td>
</tr>
</tbody>
</table>

#### Control Valve Type

- Normally-open piezoelectric valve

#### Fittings

- Standard Fittings: 1/4"女 (50 slm), 1/8"女 (20 slm) N2 gas, 200 sccm full-scale range

#### Alarm/Diagnostic Functions

- Flow, valve voltage, EEPROM error, zero adjustment error, communications error, and microprocessor error

#### Max Operating Pressure

- 70 psiG

#### Differential Pressure

- 7 to 40 psiD

#### Control Range

- 2 to 100% of full scale

#### Leak Integrity

- 1×10^-10 Pa

#### Response Time

- 1.0 sec typical per SEMI E17-91 (all control range)

#### Satisfaction Index

- ± 0.15% of full scale

#### Set Point as % of Full-Scale Gas Flow

- ±1% of set point from 25 to 100% of full scale

#### Flow as % of Full-Scale Gas Flow

- ±1% of set point from 25 to 100% of full scale

#### Error as % of Full-Scale Gas Flow

- ±0.15% of full scale

#### Standard Fittings

- 1/4"女 (50 slm), 1/8"女 (20 slm) N2 gas, 200 sccm full-scale range

### Model and Suffix Codes

- FC-DR980, FC-DR981 Series MFC

#### Multi-Gas, Multi-Range Selection

- Multi-gas, multi-range Aera FC-DR980 series MFCs are easily field-programmable to run various gases, for any range within the MFC’s mechanical limits. For quick gas and full-scale reassignment, they store calibration curves for up to four gases and ten calibration points for each gas.

#### Multi-Mode Operation

- Choose from analog, analog/digital, and digital modes for operation with any control system.
**Superior Reliability**

High-quality electronic components and a robust design stand up to the effects of harsh operational demands, delivering superior long-term, zero-drift stability—less than 0.5% of full-scale flow over one year. Further, less than 0.5% of units are returned within a year of shipment.

**Superior Accuracy, Repeatability, and Stability**

Superior accuracy, repeatability, and stability, with an actual-flow settling time of 1 sec.

**Significant Cost Savings**

Significant cost savings are realized by dramatically reducing spare inventory requirements. For comprehensiveness, available in multi-gas, multi-range models.

**Multi-Gas, Multi-Range Selection**

Multi-gas, multi-range Aera FC-DR980 series MFCs are easily field-programmable to run various gases, for any range within the MFC's mechanical limits. For quick gas and full-scale reconfiguration, they store calibration curves for up to four gases and ten calibration points for each gas.

**Multi Mode Operation**

Choose from analog, analog/digital, and digital modes for operation with any control system.

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**Specifications**

<table>
<thead>
<tr>
<th>Feature</th>
<th>FC-DR980 Series</th>
<th>FC-DR981 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Scale Ranges</td>
<td>Single Gas Model</td>
<td>Multi-Gas Model</td>
</tr>
<tr>
<td>Response Time</td>
<td>1 to 2 sec (based on 20 to 80% full-scale)</td>
<td>2 to 10 sec (based on 20 to 80% full-scale)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.15% of full scale</td>
<td>±0.15% of full scale</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.1% of full scale</td>
<td>±0.1% of full scale</td>
</tr>
<tr>
<td>Leak Integrity</td>
<td>1×10⁻¹⁰ atm-cc/sec (He) maximum</td>
<td>1×10⁻¹¹ Pa</td>
</tr>
<tr>
<td>Response Time</td>
<td>≤2 sec (based on 20 to 80% full-scale)</td>
<td>≤2 sec (based on 20 to 80% full-scale)</td>
</tr>
<tr>
<td>Operating Pressure</td>
<td>10 to 145 psiG</td>
<td>10 to 145 psiG</td>
</tr>
<tr>
<td>Flow Rate</td>
<td>1 to 100 slm (based on gas)</td>
<td>1 to 100 slm (based on gas)</td>
</tr>
<tr>
<td>Temperature</td>
<td>-20°C to 50°C</td>
<td>-20°C to 50°C</td>
</tr>
</tbody>
</table>

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**Model and Suffix Codes**

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Description</th>
<th>Range (sccm or slm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-DR980/DR980C</td>
<td>Single Gas Model</td>
<td>10 sccm to 5 slm</td>
</tr>
</tbody>
</table>

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**Operational Pressures**

Flow meter ranges are based on adjustment, recalibration, and alarm pressures.

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**Weight**

1.2 kg (2.2 lb)
Aera FC-DR980 series digital MFCs (mass flow controllers) and MFMs (mass flow meters) deliver performance excellence and operational versatility, resulting in significant cost savings and ease of use.

**Features**
- Multi-gas, multi-range selection
- Analog, analog/digital, and digital modes
- Pneumatic control valves
- Multi-Alarm and diagnostic capabilities
- Metal seal, with a 1x10⁻¹¹ leak integrity
- Electroplated and ultra-cleaned gas-contact surfaces

**Benefits**
- Superior accuracy, repeatability, and stability
- Significant cost savings
- Superior operational versatility
- Superior reliability

**Superior Accurancy, Repeatability, and Stabiblity**
Algorithms unique to Aera MFCs provide the fastest response between the sensor and control valves. The result is better flow accuracy, repeatability, and stability, with an actual-flow settling time of 1 sec.

**Superior Operational Versatility**
Multi-gas, multi-range FC-DR980 series MFCs are easily field-programmable to run various gas, for any range within the MFC’s mechanical limits, regardless of gas type. Multi-gas, multi-range features lower costs for value and functionality, this product line features both single-gas and multi-gas, multi-range MFCs. Multi-gas, multi-range features lower costs for value and functionality, this product line features both single-gas and multi-gas, multi-range MFCs. Multi-gas, multi-range FC-DR980 series MFCs are used in the process within the device's mechanical limits, regardless of gas each process gas. Multi-gas, multi-range FC-DR980 MFC models dramatically reduce such requirements because they can replace any other MFC spares and part numbers. Single-gas MFCs require backup inventory for spare MFC inventory requirements. Just eight units can replace hundreds of

**Multi-Mode Operation**
Choose from analog, analog/digital, and digital modes for operation with any control system.

**Specifications**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Analog Mode</th>
<th>Digital Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Type</td>
<td>0 to 5 VDC</td>
<td>–15 VDC ±2% at 40 mA</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.25% of full scale from 2 to 25% of full scale</td>
<td>±1% of set point from 25 to 100% of full scale</td>
</tr>
<tr>
<td>Response Time</td>
<td>1.0 sec typical per SEMI E17-91 (all control range)</td>
<td>1.0 sec typical per SEMI E17-91 (all control range)</td>
</tr>
<tr>
<td>Temperature</td>
<td>–10°C to 50°C (59°F to 122°F)</td>
<td>–10°C to 50°C (59°F to 122°F)</td>
</tr>
<tr>
<td>Fitting</td>
<td>1/4” VCR® compatible</td>
<td>1/4” VCR® compatible</td>
</tr>
<tr>
<td>Fitting</td>
<td>1.125” c-seal</td>
<td>1.125” c-seal</td>
</tr>
<tr>
<td>Fitting</td>
<td>1.5” w-seal</td>
<td>1.5” w-seal</td>
</tr>
<tr>
<td>Fitting</td>
<td>Side mounted pigtail connector</td>
<td>Side mounted pigtail connector</td>
</tr>
<tr>
<td>Flow Range</td>
<td>10 sccm to 5 slm</td>
<td>10 sccm to 5 slm</td>
</tr>
<tr>
<td>Flow Range</td>
<td>6 to 50 slm</td>
<td>6 to 50 slm</td>
</tr>
<tr>
<td>Flow Range</td>
<td>981</td>
<td>981</td>
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<tr>
<td>Flow Range</td>
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<tr>
<td>Flow Range</td>
<td>985</td>
<td>985</td>
</tr>
<tr>
<td>Flow Range</td>
<td>991</td>
<td>991</td>
</tr>
</tbody>
</table>

**Error vs. % of Full-Scale Gas Flow**

- Error as % of Full-Scale Gas Flow
- Range: 0 to 100%
- Scale: 0 to 25%

**Algorithms**
- Unique to Aera MFCs: fastest response between sensor and control valves. Result is better flow accuracy, repeatability, and stability, with an actual-flow settling time of 1 sec.

**Superior Reliability**
High-quality electronic components and a robust design stand up to the effects of harsh operational demands, delivering superb long-term, zero-drift stability—less than 0.5% of full-scale flow over one year. Further, less than 0.5% of units are returned within a year of shipment.

**Model and Suffix Codes**

**Aera® FC-DR980, FC-DR981 Series MFC**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-DR980</td>
<td>Multi-Range Multi-Mode</td>
<td>3, 2, 1, 0</td>
</tr>
<tr>
<td>FC-DR981</td>
<td>Multi-Gas MFC</td>
<td>9, 8, 7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>FC-DR986</td>
<td>Multi-Gas MFC</td>
<td>8, 7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>FC-DR985</td>
<td>Multi-Gas MFC</td>
<td>9, 8, 7, 6, 5, 4, 3, 2, 1</td>
</tr>
</tbody>
</table>

**Operational FC-DR980/DR980C Series**

- Full-Scale Flow Range (sccm or slm)
  - 50slm
  - 30 slm

**FC-DR981 Series MFC**

- Full-Scale Flow Range (sccm or slm)
  - 5,000 sccm

**Operational FC-DR981/DR981C Series**

- Full-Scale Flow Range (sccm or slm)
  - 5,000 sccm

**Multi-Gas/Multi-Range**

- PLEASE REVIEW FULL SCALE RANGES

**In & Output Signal**

- Analog Mode: 0 to 5 VDC
- Digital Mode: –15 VDC ±2% at 40 mA

**Alarm/Diagnostic Functions**

- Flow, valve voltage, EEPROM error, zero adjustment error, communications error, and microprocessor error

**Proof Pressure**

- 145 psiG

**Max Operating Pressure**

- 70 psiG

**Control Range**

- 2 to 100% of full scale

**Accuracy**

- ±0.25% of full scale from 2 to 25% of full scale
- ±1% of set point from 25 to 100% of full scale

**Response Time**

- 1.0 sec typical per SEMI E17-91 (all control range)

**Temperature**

- –10°C to 50°C (59°F to 122°F)

**Surface Finish**

- Electropolished and ultra-cleaned to 5 Ra

**Weight**

- 1.2 kg (2.2 lb)

**Attitude Sensitivity**

- May be mounted in any position

**Surface Treatment**

- 300 sccm full-scale range)
- 30 to 40 psiD (30slm to 50slm nitrogen equivalent
- 10 to 40 psiD (5slm to 20slm nitrogen equivalent
- 4 to 10 psi (5slm to 20slm)
- 0.5 to 2.5 slm nitrogen equivalent
- 0.5 to 2.5 slm nitrogen equivalent
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**Aera® FC-DR980®**

**Digital Mass Flow Products**

Leading digital MFCs and MFMIs, providing superior versatility in various system

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</tr>
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<td></td>
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</tr>
</tbody>
</table>

### Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-DR980 (C)</td>
<td>127.0 mm</td>
</tr>
<tr>
<td>FC-DR981 (C)</td>
<td>135.0 mm</td>
</tr>
</tbody>
</table>

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### Equivalent Fitting Model

- **1/4” VCR®**
- **1” IGS Model**
- **1.125” IGS Model**
- **"T" Model**
- **"Y" Model**

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(Corporate Communications Office)

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E-mail : hmcc@hitachi-metals.co.jp

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**Materials Magic**

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