Technical Data for Alicat MCD and MCRD Dual Valve Mass Flow Controllers

0 – 0.5 sccm Full Scale through 0 – 3000 slpm Full Scale

**Tel:** 888-290-6060

www.alicat.com/mcd

**Standard Specifications (Contact Alicat for available options.)**

<table>
<thead>
<tr>
<th>Performance</th>
<th>MCD Mass Flow Controller</th>
<th>MCRD Mass Flow Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy at calibration conditions after tare</td>
<td>± (0.8% of reading + 0.2% of total span from positive full scale to negative full scale)</td>
<td>± (0.4% of total span from positive full scale to negative full scale)</td>
</tr>
<tr>
<td>High Accuracy at calibration conditions after tare</td>
<td>High Accuracy option not available for units ranged under 5 sccm or over 500 slpm.</td>
<td>± 0.2% Full Scale</td>
</tr>
<tr>
<td>Repeatability</td>
<td></td>
<td>0.02% Full Scale / °Celsius / Atm</td>
</tr>
<tr>
<td>Zero Shift and Span Shift</td>
<td></td>
<td>100% to 100% Full Scale / 200:1 Turndown</td>
</tr>
<tr>
<td>Operating Range / Turndown Ratio</td>
<td>102.4% Full Scale</td>
<td>up to 128% Full Scale (Gas Dependent)</td>
</tr>
<tr>
<td>Maximum Controllable Flow Rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Measurable Flow Rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Response Time</td>
<td>100 ms (Adjustable)</td>
<td>Warm-up Time &lt; 1 Second</td>
</tr>
</tbody>
</table>

**Operating Conditions**

<table>
<thead>
<tr>
<th>MCD Mass Flow Controller</th>
<th>MCRD Mass Flow Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass Reference Conditions (STP)</td>
<td>25ºC &amp; 14.696 psia (standard — others available on request)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>−10 to +60 ºCelsius</td>
</tr>
<tr>
<td>Humidity Range (Non–Condensing)</td>
<td>0 to 100%</td>
</tr>
<tr>
<td>Maximum Internal Pressure (Static)</td>
<td>145 psig</td>
</tr>
<tr>
<td>Proof Pressure</td>
<td>175 psig</td>
</tr>
<tr>
<td>Mounting Altitude Sensitivity</td>
<td>None</td>
</tr>
<tr>
<td>Valve Type</td>
<td>Normally Closed</td>
</tr>
<tr>
<td>Ingress Protection</td>
<td>IP64</td>
</tr>
</tbody>
</table>

**Wetted Materials**


**Communications / Power**

| Monochrome LCD or Color TFT Display with integrated touchpad | Simultaneously displays Mass Flow, Volumetric Flow, Pressure and Temperature |
| Analog Input / Output Signal Options | 0-5 Vdc / 1-5 Vdc / 0-10 Vdc / 4-20 mA |
| Optional Secondary Output Signal | 0-5 Vdc / 1-5 Vdc / 0-10 Vdc / 4-20 mA |
| Electrical Connection Options | 8-Pin Mini-DIN / 9-pin D-sub (DB9) / 15-pin D-sub (DB15) / 6-pin locking / 8-pin M12 |
| Supply Voltage | 12 to 30 Vdc (15-30 Vdc for 4-20 mA outputs) |
| Supply Current | 0.250 Amp |

1. The Digital Output Signal communicates Mass Flow, Volumetric Flow, Pressure and Temperature
2. The Analog Output Signal and Optional Secondary Analog Output Signal communicate your choice of Mass Flow, Volumetric Flow, Pressure or Temperature

**Features**

Gas Select™ 5.0

Gas Select™ 5.0 provides the MCD with 98 and MCDS with 128 Preloaded Gas Calibrations: See the following page for a complete list. If your application calls for a gas not on this list, please let us know. We can also calibrate to a wide variety of complex gas mixtures involving up to eight gas constituents.

COMPOSER™

COMPOSER™ is a feature of Gas Select™ 5.0 that allows users to defines up to 20 user gas compositions with up to 5 constituent gases per mix (www.alicat.com/composer).

**Range Specific Specifications**

<table>
<thead>
<tr>
<th>Full Scale Flow Mass Controller</th>
<th>Pressure Drop at FS Flow (psid) venting to atmosphere</th>
<th>Mechanical Dimensions</th>
<th>Process Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCD 0.5 sccm to 50 sccm</td>
<td>1.0</td>
<td>Dimensions will vary with valve choice.</td>
<td>M-5 (10-32) Female Thread</td>
</tr>
<tr>
<td>MCD 100 sccm to 500 sccm</td>
<td>1.0</td>
<td></td>
<td>1/8” NPT Female</td>
</tr>
<tr>
<td>MCD 1 slpm</td>
<td>1.5</td>
<td></td>
<td>1/4” NPT Female</td>
</tr>
<tr>
<td>MCD 2 slpm</td>
<td>3.0</td>
<td></td>
<td>1/8” NPT Female</td>
</tr>
<tr>
<td>MCD 5 slpm</td>
<td>2.0</td>
<td></td>
<td>3/4” NPT Female</td>
</tr>
<tr>
<td>MCD 10 slpm</td>
<td>5.5</td>
<td></td>
<td>A 1-1/4” NPT Female process connection is available for 2000 slpm controllers.</td>
</tr>
<tr>
<td>MCD 20 slpm</td>
<td>20.0</td>
<td></td>
<td>1-1/4” NPT Female</td>
</tr>
<tr>
<td>MCRD 50 slpm</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCRD 100 slpm</td>
<td>3.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCRD 250 slpm</td>
<td>2.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCRD 500 slpm</td>
<td>6.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCRD 1000 slpm</td>
<td>14.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCRD 1500 slpm</td>
<td>17.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCRD 2000 slpm</td>
<td>28.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCRD 10000 slpm</td>
<td>16.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Lower Pressure Drops Available, please see our WHISPER-Series mass flow controllers at www.alicat.com/whisper.
2. Compatible with Beswick®, Swagelok® tube, Parker®, face seal, push connect and compression adapter fittings. VCR and SAE connections upon request.
## Pure Non-Corrosive Gases

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>C2H2</td>
<td>Acetylene</td>
</tr>
<tr>
<td>0</td>
<td>Ar</td>
<td>Argon</td>
</tr>
<tr>
<td>1</td>
<td>H2</td>
<td>Hydrogen</td>
</tr>
<tr>
<td>16</td>
<td>He</td>
<td>Helium</td>
</tr>
<tr>
<td>12</td>
<td>CH4</td>
<td>Methane</td>
</tr>
<tr>
<td>11</td>
<td>N2</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>12</td>
<td>C2H2</td>
<td>Ethylene</td>
</tr>
<tr>
<td>12</td>
<td>C2H3</td>
<td>Ethane</td>
</tr>
<tr>
<td>12</td>
<td>C2H4</td>
<td>Propylene</td>
</tr>
<tr>
<td>12</td>
<td>C2H6</td>
<td>Ethylene</td>
</tr>
<tr>
<td>12</td>
<td>C2H2</td>
<td>Ethylene</td>
</tr>
<tr>
<td>12</td>
<td>C2H2</td>
<td>Ethylene</td>
</tr>
<tr>
<td>12</td>
<td>C2H2</td>
<td>Ethylene</td>
</tr>
</tbody>
</table>

## Corrosive Gases

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>C2H2</td>
<td>Ethylene</td>
</tr>
<tr>
<td>81</td>
<td>C2H2</td>
<td>Ethylene</td>
</tr>
<tr>
<td>82</td>
<td>C2H2</td>
<td>Ethylene</td>
</tr>
<tr>
<td>83</td>
<td>C2H2</td>
<td>Ethylene</td>
</tr>
</tbody>
</table>

## Bio-Reactors Gases

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>145</td>
<td>Bi2O3</td>
<td>Bismuth Oxide</td>
</tr>
<tr>
<td>146</td>
<td>Bi2O3</td>
<td>Bismuth Oxide</td>
</tr>
<tr>
<td>147</td>
<td>Bi2O3</td>
<td>Bismuth Oxide</td>
</tr>
<tr>
<td>148</td>
<td>Bi2O3</td>
<td>Bismuth Oxide</td>
</tr>
</tbody>
</table>

## Chromatography Gases

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>P-5</td>
<td>5% CH4/95% Ar</td>
</tr>
<tr>
<td>206</td>
<td>P-10</td>
<td>10% CH4/90% Ar</td>
</tr>
</tbody>
</table>

## Welding Gases

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>C-2</td>
<td>2% CO2/98% Ar</td>
</tr>
<tr>
<td>21</td>
<td>C-10</td>
<td>10% CO2/90% Ar</td>
</tr>
<tr>
<td>22</td>
<td>C-15</td>
<td>15% CO2/85% Ar</td>
</tr>
</tbody>
</table>

## Breathing Gases

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>164</td>
<td>EAN-32</td>
<td>32% O2/68% N2</td>
</tr>
<tr>
<td>165</td>
<td>EAN-40</td>
<td>40% O2/60% N2</td>
</tr>
<tr>
<td>166</td>
<td>EAN-60</td>
<td>60% O2/40% N2</td>
</tr>
</tbody>
</table>

## Fuel Gases

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>160</td>
<td>C-2C</td>
<td>2% CO2/98% Ar</td>
</tr>
<tr>
<td>161</td>
<td>C-15C</td>
<td>15% CO2/85% Ar</td>
</tr>
</tbody>
</table>

## Lasers Gases

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>FG-1</td>
<td>2.5% CO2/98% CO2/85.5% N2</td>
</tr>
<tr>
<td>201</td>
<td>FG-2</td>
<td>2.5% O2/14% CO1/82.1% N2</td>
</tr>
<tr>
<td>202</td>
<td>FG-3</td>
<td>3.7% CO2/15% CO2/80.3% N2</td>
</tr>
<tr>
<td>203</td>
<td>FG-4</td>
<td>4% CO2/12% CO2/80% N2</td>
</tr>
<tr>
<td>204</td>
<td>FG-5</td>
<td>10% CO2/95% CO2/79.5% N2</td>
</tr>
<tr>
<td>205</td>
<td>FG-6</td>
<td>13% CO2/7% CO2/97% N2</td>
</tr>
</tbody>
</table>

## Refrigerants

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>R-11</td>
<td>Chlorofluorocarboxane</td>
</tr>
<tr>
<td>101</td>
<td>R-115</td>
<td>Chloropentafluoroethane</td>
</tr>
<tr>
<td>102</td>
<td>R-116</td>
<td>Hexafluoroethane</td>
</tr>
<tr>
<td>103</td>
<td>R-124</td>
<td>Chlorotrifluoroethane</td>
</tr>
<tr>
<td>104</td>
<td>R-125</td>
<td>Pentafuoroethane</td>
</tr>
<tr>
<td>105</td>
<td>R-134A</td>
<td>Tetrafluoroethane</td>
</tr>
<tr>
<td>106</td>
<td>R-14</td>
<td>Tetrafluoroethane</td>
</tr>
<tr>
<td>107</td>
<td>R-142b</td>
<td>Chlorodifluoroethane</td>
</tr>
<tr>
<td>108</td>
<td>R-143A</td>
<td>Trifluoroethane</td>
</tr>
<tr>
<td>109</td>
<td>R-152a</td>
<td>Difluoroethane</td>
</tr>
<tr>
<td>110</td>
<td>R-22</td>
<td>Trifluoroethane</td>
</tr>
<tr>
<td>111</td>
<td>R-23</td>
<td>Difluoroethane</td>
</tr>
<tr>
<td>112</td>
<td>R-318</td>
<td>Octafluorocyclobutane</td>
</tr>
</tbody>
</table>

## Stack Gases

<table>
<thead>
<tr>
<th>Gas Number</th>
<th>Short Name</th>
<th>Long Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>FG-1</td>
<td>2.5% O2/10.8% CO2/85.5% N2</td>
</tr>
<tr>
<td>201</td>
<td>FG-2</td>
<td>2.5% O2/14% CO1/82.1% N2</td>
</tr>
<tr>
<td>202</td>
<td>FG-3</td>
<td>3.7% O2/15% CO2/80.3% N2</td>
</tr>
<tr>
<td>203</td>
<td>FG-4</td>
<td>4% O2/12% CO2/80% N2</td>
</tr>
<tr>
<td>204</td>
<td>FG-5</td>
<td>10% O2/95% CO2/79.5% N2</td>
</tr>
<tr>
<td>205</td>
<td>FG-6</td>
<td>13% O2/7% CO2/97% N2</td>
</tr>
</tbody>
</table>
MCD-Series
0 - 20 slpm shown

MCRD-Series
0 - 2000 slpm shown