

# Aera

## **Aera<sup>®</sup> FC-R7700 Series**

Mass Flow Controller

Economical, analog control, elastomer-sealed model



# Aera

## Benefits

- ▶ Fast response— $\leq 2$  s flow-settling time
- ▶ Easy integration—standard connectors and dimensions

## Features

- ▶ Elastomer seals
- ▶ VCR® and Swagelok® compatible connections
- ▶ Full-scale flow ranges from 10 SCCM to 50 SLM
- ▶ Normally-closed or normally-open solenoid control valve
- ▶ Leak integrity of  $1 \times 10^{-6}$  atm-cc/s of He



As the field-proven standard for a range of applications, Proterial's Aera® FC-R7700 Series delivers Economical, analog controlled, elastomer-sealed mass flow control performance.

For process and equipment engineers working in the semiconductor, flat panel display, data storage, industrial vacuum, and industrial coating markets, this series provides high reliability and superior performance for non-corrosive gas applications, including CVD, PVD, etch, ion implantation, sputtering, thermal oxidation, optical glass coating, optical fiber, surface treatment, and other coating processes.

This unit is compliant with the EU-RoHS Directive.

## Low Cost

Custom-made for applications that require top performance but not the corrosion resistance or high leak integrity of metal seals, the FC-R7700 Series is cost-effective, with low noise and low power consumption.

## Easy Integration

This model features standard electrical connectors and critical dimensions to easily fit in existing systems with lower noise and lower power consumption than digital models.

## Fast Response

Advances in the FC-R7700 Series' technical design deliver enhanced performance compared to competing mass flow controllers (MFC). These advances include a highly sensitive, rapid-response, small-diameter sensor. With normally-open and normally closed solenoid designs, the FC-R7700 Series provides flexibility for many needs, with a settling time of  $\leq 2$  sec.

## Unsurpassed Reliability

With fewer electronic components than digital MFCs, and no DC-DC converter, the FC-R7700 provides outstanding long-term reliability.

# Aera® FC-R7700 Series

## Specifications

| Operational                                   | FC-R7700CD/FC-R7700D Series  | FC-R7710CD/FC-R7710D Series             |
|---|--|---|
| Full-Scale Range                              | 10 SCCM to 5 SLM   | N/O: 5 to 20 SLM*<br>N/C: 5 to 50 SLM** |
| Response Time                                 | ≤ 2 s to within ±2% of full scale 0→100%, SEMI E17-91  |   |
| Flow Accuracy with calibration gas @22°C ±3°C | ≤ ±1% of full scale  | ≤ ±2% of full scale                     |
| Linearity                                     | ≤ ± 0.5% of full scale   | ≤ ± 0.5% of full scale**1               |
| Repeatability                                 | ≤ ± 0.2% of full scale   |   |
| Leak Integrity                                | 1x10 <sup>-6</sup> atm-cc/s (He) max; 1x10 <sup>-7</sup> Pa·m <sup>3</sup> /s (He) max       |   |
| Flow Control Range                            | 2 to 100% of full scale  |   |
| Normal operating Pressure                     | 49 to 275kPaD  | 69 to 275kPaD**2<br>69 to 275kPaD**3    |
| Maximum Operating Pressure                    | 490kPaG  |   |
| Proof Pressure                                | 1MPaG  |   |
| Operating Temperature Range                   | 5 to 45°C (41 to 113°F) Gas temperature needs to be the same as the atmospheric temperature. |   |

※1: Less than ±1% for Full Scale Flow greater than 30SLM

※2: N/O: Normally Open Valve Model

※3: N/C: Normally Closed Valve Model [20 SLM < N<sub>2</sub> density flow ≤ 50 SLM: 147 to 275 kPaD]

These specifications are valid only in lab conditions used in factory testing, with standard configuration. Performance in the field may not be compliant with this document.

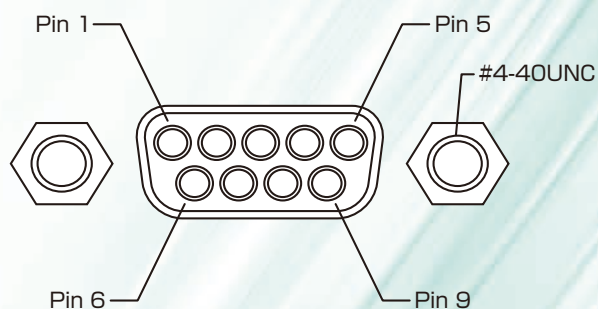
| Physical           | FC-R7700CD/FC-R7700D Series  | FC-R7710CD/FC-R7710D Series |
|--------------------|--|-----------------------------|
| Control Valve Type | Normally-open or normally-closed solenoid  |                             |
| External seals     | Fluoroelastomer or Chloroprene Rubber  |                             |
| Materials          | Stainless-steel type 316L, 316, PTFE, Magnetic Stainless, Fluoro Rubber, Chloroprene Rubber* |                             |
| Standard Fittings  | 1/4" VCR®, 1/4" Swagelok® compatible   |                             |
| Orientation        | May be mounted in any position   |                             |
| Mass               | 1.0 kg (2.2 lb)  |                             |

\* Fluoro Rubber or Chloroprene Rubber is used when N<sub>2</sub> density flow is 11.096 SLM or greater with normally open valve models. Material used also depends on the applied gas. Contact factory for information on what material is used.  
Fluoro Rubber or Chloroprene Rubber is used when N<sub>2</sub> density flow is 551 SCCM or greater with normally closed valve models. Materials used also depends on the gas. Contact factory for information on what material is used.

| Electrical           | FC-R7700CD/FC-R7700D Series               | FC-R7710CD/FC-R7710D Series |
|----------------------|---|-----------------------------|
| Input Power          | +15 VDC ±2%, 25 mA<br>-15 VDC ±2%, 180 mA |                             |
| Power Consumption    | 3.1 W max                                 |                             |
| Input Command Signal | 0 to 5 VDC Input impedance > 1MΩ          |                             |
| Output signal        | 0 to 5 VDC Load impedance > 2kΩ           |                             |

## Electrical Connections

| 9-Pin D-sub, pin contact connector |                           |
|------------------------------------|---------------------------|
| 1                                  | VALVE OPEN/CLOSE*         |
| 2                                  | OUTPUT(DC 0~5V/0-100%)    |
| 3                                  | POWER DC +15V             |
| 4                                  | COMMON                    |
| 5                                  | POWER DC -15V             |
| 6                                  | CONTROL (DC 0~5V/0-100%)  |
| 7                                  | COMMON                    |
| 8                                  | COMMON                    |
| 9                                  | VALVE TEST PT.(DC 0~-13V) |



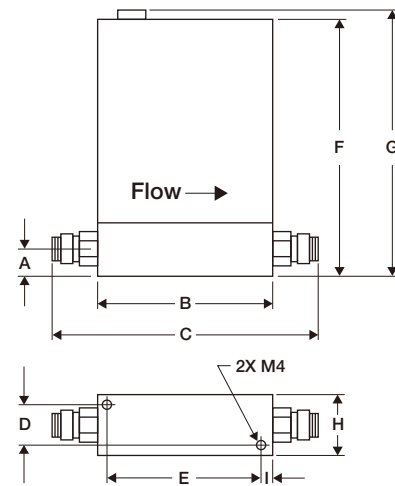
\* Connection to +15V OPEN, Connection to -15V : CLOSE (Normally closed valve model)  
Connection to +15V CLOSE, Connection to -15V : OPEN (Normally open valve model)

## Model and Suffix Codes

| Category   | Description                     | Suffix Codes |     |      |         |     |     |                |          |
|--|---------------------------------|--------------|-----|------|---------|-----|-----|----------------|----------|
| Product Type   | Mass flow controller            | FC-          | ... | ...  | ...     | ... | ... | ...            | ...      |
| RoHS Compliance  | Compliant with RoHS directives  | ...          | R   | ...  | ...     | ... | ... | ...            | ...      |
| Full-Scale Range   | 10 SCCM to 5 SLM                | ...          | ... | 7700 | ...     | ... | ... | ...            | ...      |
|  | 5 to 50 SLM                     | ...          | ... | 7710 | ...     | ... | ... | ...            | ...      |
| Control Valve  | Normally-closed                 | ...          | ... | ...  | C       | ... | ... | ...            | ...      |
|  | Normally-open                   | ...          | ... | ...  | (Blank) | ... | ... | ...            | ...      |
| Connector  | Aera® 9-Pin D                   | ...          | ... | ...  | ...     | D   | ... | ...            | ...      |
| Fittings   | 1/4" VCR® compatible            | ...          | ... | ...  | ...     | ... | 4V  | ...            | ...      |
|  | 1/4" Swagelok® compatible       | ...          | ... | ...  | ...     | ... | 4S  | ...            | ...      |
| Gas  | Type of gas                     | ...          | ... | ...  | ...     | ... | ... | N <sub>2</sub> | ...      |
| Flow   | Flow range of gas (SCCM or SLM) | ...          | ... | ...  | ...     | ... | ... | ...            | 200      |
| Single-Gas Example   |                                 | FC-          | R   | 7700 | C       | D   | 4V  | N <sub>2</sub> | 200 SCCM |
| (MFC, RoHS compliant, 9-pin D connector, normally-closed valve, 1/4" VCR® fittings, N <sub>2</sub> gas, 200 SCCM full-scale range) |                                 |              |     |      |         |     |     |                |          |

## Dimensions

|   | FC-R7700CD/<br>FC-R7700D Series | FC-R7710CD/<br>FC-R7710D Series |
|---|---------------------------------|---------------------------------|
| A | 12.7 mm (0.5")                  | 12.7 mm (0.5")                  |
| B | 76.0 mm (3.0")                  | 78.5 mm (3.09")                 |
| C | 124.0 mm (4.9")                 | 124.0 mm (4.9")                 |
| D | 18.3 mm (0.72")                 | 18.3 mm (0.72")                 |
| E | 69.0 mm (2.7")                  | 69.0 mm (2.7")                  |
| F | 119.0 mm (4.7")                 | 119.0 mm (4.7")                 |
| G | 125.0 mm (4.92")                | 125.0 mm (4.92")                |
| H | 32.0 mm (1.3")                  | 32.0 mm (1.3")                  |
| I | 3.5 mm (0.2")                   | 3.5 mm (0.14")                  |



## Proterial, Ltd.

<https://www.proterial.com/e>

### Headquarters

Piping Components Business Unit  
Fine Flow Dept.  
Toyosu Prime Square, 5-6-36 Toyosu, Koto-ku, Tokyo 135-0061, Japan  
Tel +81-(0)50-3664-9511 Fax +81-294-87-7147

### Proterial America, Ltd.

#### San Jose Office

2570 N. First Street, Suite 200, San Jose, California 95131, U.S.A.  
Tel +1-408-467-8900 Fax +1-408-467-8901  
E-mail : aerasales@us.proterial.com

### Proterial (China), Ltd.

<https://www.china.proterial.com>  
Room 1501, T1 of Raffles City, No.1133, Changning Road, Shanghai, 200051, P.R.China  
TEL: +86-(0)21-3366-3000  
Call Center  
TEL: + 86-(0)755-8600-6828 ext: 885  
+ 86-(0)138-0989-5542  
Email: service@proterial.com

### Proterial Europe GmbH

Immermannstrasse 14-16, 40210 Duesseldorf, Germany  
Tel +49-211-16009-0 Fax +49-211-16009-29  
E-mail : aerasales-europe@eu.proterial.com



## Safety Precaution

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

- Contents of this catalog is as of May 2023.
- The products and their specifications are subject to change without notice. Please check the latest catalog, technical documents or specifications before your final design, procurement or use of the products.
- Aera® is a registered trademark of Proterial, Ltd..
- Swagelok® and VCR® are registered trademarks of Swagelok Company Corporation.

We are not liable for and do not accept responsibility for any loss, direct or indirect, caused by incorrect use, careless handling, force majeure, war, terrorism, fire, pollution, use in unapproved environments, salt damage, or any natural disasters (such as wind or flood damage, earthquakes or lightning), or for any consequential damage.