



# GFC-T | Thermal Gas Flow Controller

## ECONOMICAL SOLUTION

An economical thermal solution, servicing broader applications and markets. Pivotal Systems' GFC-T offers a thermal MFC solution for a wide flow range from 2 SCCM to 200 SLM. At Pivotal Systems, we aim to significantly enhance fab productivity and capital efficiency by utilizing our innovative solutions.

### Benefits of GFC-T

- Wide flow range 2 SCCM – 200 SLM
- Economical solution
- Communications available in Analog, RS-485, DeviceNET, EtherCAT, Profibus, and Profinet

### Key Features

- Pressure insensitive
- No fixed orifice
- Multi-gas configurable with 350+ gases supported



# GFC-T Specifications

|                      |                             |                                                                                                                                                                                                                                                    |
|----------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Performance          | Flow Range (N2 Equivalent)  | 2 sccm – 200,000 sccm (200 slm) F.S.                                                                                                                                                                                                               |
|                      | Flow Accuracy               | For bin sizes ≤50 slm:<br>Standard Option ±1% of Setpoint at 25–100% F.S. & ±0.25% of F.S. at 2–25% F.S.<br>For bin sizes >50 slm: ±2% F.S.                                                                                                        |
|                      | Repeatability               | ±0.15% F.S.                                                                                                                                                                                                                                        |
|                      | Response Time               | N2 Eqv flow rates 50 sccm–50 slm: 0.8s to ±1% F.S. of target SP for 10–100% F.S.<br>N2 Eqv flow rates 2–50 sccm: <1.0s for 10%–100% F.S.<br>N2 Eqv flow rates 50 slm–200 slm: 3s to ±2% F.S. of target SP for 10–100% F.S.                         |
|                      | Leak Integrity              | ≤ 1E-9 atm • cc/sec (He)                                                                                                                                                                                                                           |
|                      | Leak by Rate                | <0.5% F.S.                                                                                                                                                                                                                                         |
| Operating Conditions | Standard Operating Pressure | For 2 sccm–5 slm: 0.05–0.35 MPa (7.25–50.76 psig)<br>For 5–23 slm: 0.07–0.25 MPa (10.15–36.26 psig)<br>For 23–50 slm: 0.14–0.35 MPa (20.30–50.76 psig)<br>For 50–200 slm: 0.15–0.30 MPa (21.75–43.51 psig)<br>Low pressure drops can be customized |
|                      | Maximum Operating Pressure  | 0.48 MPa (~70psig), high operating pressure version can be customized                                                                                                                                                                              |
|                      | Proof Pressure              | 1.03 MPa (~150psig), high pressure resistance version can be customized                                                                                                                                                                            |
|                      | Operating Temperature       | Standard: 15–45°C                                                                                                                                                                                                                                  |
|                      | Temperature Coefficient     | <0.05% F.S. / °deg C                                                                                                                                                                                                                               |
|                      | Valve Type                  | For 2 sccm–50 slm: Normally Open (N/O), Normally Closed (N/C)<br>For 50 slm–200 slm: Normally Closed (N/C)                                                                                                                                         |
| Materials            | Wetted Surface Finish       | 5 µin Ra, Semi F19 compliant                                                                                                                                                                                                                       |
|                      | Wetted Surface Material     | SUS 316L UHP, Semi F20 compliant<br>PCTFE valve seats                                                                                                                                                                                              |
|                      | Fittings                    | 1/4" VCR for 0–50 slm, 1/2" VCR for 50–200slm, C-Seal, W-Seal<br>PCTFE valve seats                                                                                                                                                                 |
|                      | Seals                       | Metal                                                                                                                                                                                                                                              |
| Electrical           | ECAT                        | +24 VDC with M8 5-pin connector                                                                                                                                                                                                                    |
|                      | DeviceNet                   | +24 VDC with M12 5-pin connector                                                                                                                                                                                                                   |
|                      | Analog and RS-485           | 0–5V or 4–20mA I/O, Supports ±15 VDC 9-pin OR 24 VDC 9-pin                                                                                                                                                                                         |
|                      | Profibus-DP                 | Supports 24 VDC 9-pin and Profibus I/O 9-pin                                                                                                                                                                                                       |
|                      | ProfiNet                    | +24 VDC with M8 5-pin connector                                                                                                                                                                                                                    |

Note: Pressure insensitivity (PI) is currently only released for N2 equivalent flow rates >100 sccm. Please contact your Pivotal Systems sales representative for any questions or requests.

# GFC-T Product Description Codes

| Code | Description                          | Option    | Option Description                                                                                                       |
|------|--------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------|
| I    | Base Model                           | GTS       | GFC-T, Thermal GFC compliant to SEMI F20 and SEMI F19                                                                    |
| II   | Application                          | ST        | Standard Application (15°C- 45°C)                                                                                        |
|      |                                      | HA        | 5-100% Accuracy Option (15°C- 45°C)                                                                                      |
|      |                                      | HT        | High Temperature Application (up to 120°C)                                                                               |
|      |                                      | LT        | Low Temperature Application (-40°C-Room Temperature)                                                                     |
| III  | Configurability                      | C         | Multi-Gas Standard Bins                                                                                                  |
|      |                                      | X         | Gas Configured                                                                                                           |
| IV   | Bin Size                             | PS60-010C | Bin-0: N2 Eqv 10 sccm F.S.                                                                                               |
|      |                                      | PS61-030C | Bin-1: N2 Eqv 30 sccm F.S.                                                                                               |
|      |                                      | PS62-100C | Bin-2: N2 Eqv 100 sccm F.S.                                                                                              |
|      |                                      | PS63-300C | Bin-3: N2 Eqv 300 sccm F.S.                                                                                              |
|      |                                      | PS64-001L | Bin-4: N2 Eqv 1,000 sccm F.S.                                                                                            |
|      |                                      | PS65-003L | Bin-5: N2 Eqv 3,000 sccm F.S.                                                                                            |
|      |                                      | PS66-005L | Bin-6: N2 Eqv 5,000 sccm F.S.                                                                                            |
|      |                                      | PS67-010L | Bin-7: N2 Eqv 10,000 sccm F.S.                                                                                           |
|      |                                      | PS68-030L | Bin-8: N2 Eqv 30,000 sccm F.S.                                                                                           |
|      |                                      | PS69-050L | Bin-9 N2 Eqv 50,000 sccm F.S.                                                                                            |
|      |                                      | XXXX XXXX | Special Semi Gas Code and Range.<br>For N2 Equivalent 51,000-200,000 sccm (51-200slm), gas configured is the only option |
| V    | Fittings                             | 01        | 1/4" VCR male                                                                                                            |
|      |                                      | 02        | 1.125" C-seal                                                                                                            |
|      |                                      | 03        | 1.125" W-seal                                                                                                            |
|      |                                      | 12        | 1/4" Swagelok tube fitting male                                                                                          |
|      |                                      | 13        | 3/8" SwageLok tube fitting male                                                                                          |
|      |                                      | 14        | 1.5" C-seal                                                                                                              |
|      |                                      | 15        | 1.5" W-seal                                                                                                              |
|      |                                      | 16        | 1/2" SwageLok tube fitting male                                                                                          |
|      |                                      | 17        | 1/2" VCR male                                                                                                            |
| VI   | Valve Configuration                  | C         | Normally Closed (N/C)                                                                                                    |
|      |                                      | O         | Normally Open (N/O) *                                                                                                    |
| VII  | Seals                                | M         | Metal                                                                                                                    |
| VIII | Communication & Power Supply Options | AW        | Analog, 4-20mA, 24V Power Supply                                                                                         |
|      |                                      | AX        | Analog, 0-5 VDC, 24V Power Supply                                                                                        |
|      |                                      | AY        | Analog, 4-20mA, ±15V Power Supply                                                                                        |
|      |                                      | AZ        | Analog, 0-5 VDC, ±15V Power Supply                                                                                       |
|      |                                      | DU        | RS485, 24V Power Supply                                                                                                  |
|      |                                      | DZ        | RS485, ±15V Power Supply                                                                                                 |
|      |                                      | EZ        | ECAT                                                                                                                     |
|      |                                      | NZ        | DeviceNet                                                                                                                |
|      |                                      | PZ        | Profibus                                                                                                                 |
|      |                                      | RZ        | Profinet                                                                                                                 |
| IX   | Special Requests                     | XXXX      | Customer Special Request Number                                                                                          |

\* Normally Open (N/O) configuration is only available on bin sizes up to 50 slm

| Sample Standard Application Model Code |    |     |           |    |    |     |      |      |
|----------------------------------------|----|-----|-----------|----|----|-----|------|------|
| I                                      | II | III | IV        | V  | VI | VII | VIII | IX   |
| GTS                                    | ST | C   | PS61-030C | 02 | C  | M   | EZ   | XXXX |

# The Future of Flow Control is Now.

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