

# Flange Temperature Controller

Many semiconductor processing systems employ water-cooled flanges to protect the o-rings from burning. The cooling water is typically plumbed directly to the flange with just an in-line metering valve to provide a fixed flow rate. However, the heat load to the flange can vary significantly with process conditions, between door open and door closed, and while pulling a completed run. This results in widely fluctuating flange temperatures which can cause burned o-rings and thermal stress to the flange. Moreover, setting the cooling water flow rate to handle the maximum heat load can result in a flange that is too cold during processing, causing unwanted deposits on the flange and resultant particle problems.

The solution is a **Flange Temperature Controller** from *innovative Silicon Systems*! The **FTC** monitors the temperature of the flange and adjusts the cooling water flow accordingly to maintain a constant flange temperature. What could be simpler?

The **FTC-D** flange temperature controller from *ISIS* offers a simple, low-cost solution to flange temperature control. Flange temperature is monitored by a thermocouple interfaced to an auto-tune PID controller. The controller regulates the flange temperature to a user-adjustable setpoint by switching a two-state solenoid valve on the cooling water line between normal and trickle flow positions. The **FTC-D** outputs provide the Host system with either an analog signal corresponding to flange temperature or Lower and Upper Limit alarms.

The *ISIS* **FTC-A** provides even greater precision control of flange temperature by utilizing a proportional flow control valve on the cooling water line. Flange temperature is monitored by a thermocouple interfaced to an auto-tune PID controller. The controller regulates the position of the proportional flow control valve to provide a cooling water flow rate commensurate with the heat load on the flange. The **FTC-A** also offers greater flexibility, featuring two flange temperature setpoints which can be set remotely, upper and lower temperature alarms and an analog output of the flange temperature. The **FTC-A** is available as a single (**FTC-1A**) or dual (**FTC-2A**) flange controller.

	<b>FTC-D</b>	<b>FTC-A</b>
Temperature Sensor	Thermocouple	Thermocouple
Cooling Water Flow Control	Binary	Proportional
Cooling Water Flow Rate	High/Low	Infinitely Variable over Flow Range
Temperature Setpoint(s)	One	Two
Setpoint Input	Manual	Manual or Remote
Outputs	High and Low Limit Alarms OR Analog Output of Temp	High and Low Limit Alarms AND Analog Output of Temperature



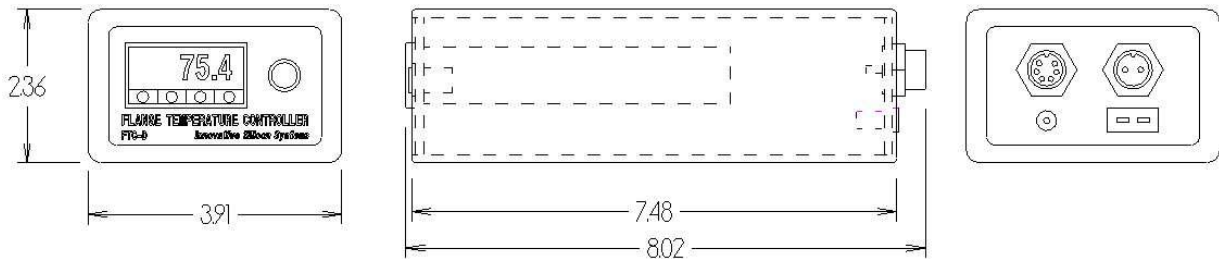
*innovative Silicon Systems*

1203 Foxworthy Avenue  
San Jose, CA 95118-1212  
Tel: 408-265-4842 Fax: 408-265-7108  
www.isilicon.net

# Flange Temperature Controller

## FTC-D System Specifications

Controller Size:	3.91" W x 2.36" H x 8.02" D
Power Requirement:	24VDC, 1.0A
Water Flow Control:	Binary - High/Low Flow
Temperature Control:	Auto-tune PID
Accuracy:	± 1 C
Control Temp. Setpoint:	One; Manually set on Unit, -200 to +250 C
Display:	4 Digit LED
Output Signal (to Host):	Upper and Lower Limit Alarms (contact closures) OR Analog (0-10V) proportional to temperature
Thermocouple:	Type T
Thermocouple Shape:	Probe (mounts in 1/8 NPT blind port in flange) or Washer (#8 or 1/4" size – bolts onto flange)
Valve Size	3.2" W (fitting to fitting) x 3.1" H x 1.7" D
Valve Type	ON/OFF Solenoid, Normally-Open, 0.15 Cv
Wetted Materials:	Type 430 Stainless Steel; Buna-N O-ring
Water Connections:	1/4" Tube Compression (Standard); 3/8" Tube Compression (Optional)
Maximum Water Pressure:	250 psig
Max. Differential Pressure:	100 psid
Max. Water Temperature:	75 C



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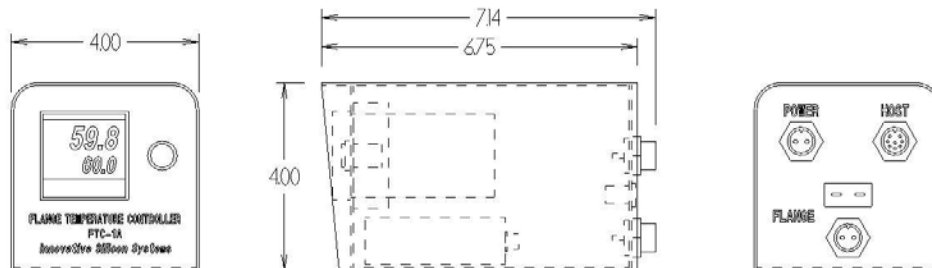
FTC061003

# Flange Temperature Controller

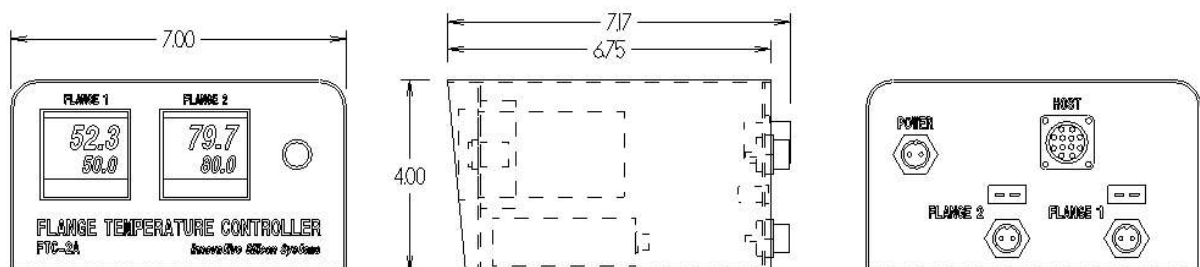
## FTC-A System Specifications

Controller Size:	<b>FTC-1A</b> 4.0" W x 4.0" H x 7.14" D	<b>FTC-2A</b> 7.0" W x 4.0" H x 7.17" D
Power Requirement:	<b>FTC-1A</b> 24VDC ( $\pm 10\%$ ), 1.0A	<b>FTC-2A</b> 24VDC ( $\pm 10\%$ ), 2.0A
Water Flow Control:	Proportional with trickle flow bypass	
Temperature Control:	Auto-tune PID	
Accuracy:	$\pm 1$ C	
Control Temp. Setpoints:	Two, manually or remotely set, -200 to +250 C	
Display:	4 Digit LED	
Input Signal (from Host)	0-5 VDC Remote Setpoint; 1 Mohm impedance	
Output Signal (to Host):	Analog, 0-10 VDC $\pm 0.2\%$ FS Accuracy and Linearity Two Contact Closures (for Upper Limit and Lower Limit)	
Thermocouple:	Type T	
Thermocouple Shape:	Probe (mounts in 1/8 NPT blind port in flange) or Washer (#8 or 1/4" size – bolts onto flange)	
Valve Size	3.25" W (fitting to fitting) x 3.45" H x 1.00" D	
Valve Type	Variable-stroke Solenoid; Normally-Closed	
Wetted Materials:	Type 316 and 416 Stainless Steel; Viton O-ring	
Water Connections:	1/4" Tube Compression (Standard); 3/8" Tube Compression (Optional)	
Maximum Water Pressure:	500 psig	
Max Differential Pressure:	50 psid	
Max Water Flow Rate:	125 mL/min (2 gph) / 400 mL/min (6.3 gph) / 850 mL/min (13.5 gph) or 2.85 L/min (45 gph)	
Max. Water Temperature:	90 C	

### FTC-1A



### FTC-2A



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## Ordering Information:

### Part Number

8-67-11AB-C0     **FTC-D Economy Flange Temperature Controller**

**A = Valve Fittings**

- 1 = 1/4" Tube Compression
- 2 = 3/8" Tube Compression

**B = Thermocouple Style**

- 1 = Probe Type, 1/8" Male NPT
- 2 = Washer Type, #8 Size
- 3 = Washer Type, 1/4" Size

**C = Output to Host**

- 1 = Analog (0-10V) signal of Flange Temperature
- 2 = Two Contact Closures (Upper & Lower Limit Alarms of Flange Temperature)

8-67-21AB-C0     **FTC-1A Single Flange Precision Temperature Controller**

8-67-22AB-CD     **FTC-2A Dual Flange Precision Temperature Controller**

**A = Valve Fittings**

- 1 = 1/4" Tube Compression
- 2 = 3/8" Tube Compression

**B = Thermocouple Style**

- 1 = Probe Type, 1/8" Male NPT
- 2 = Washer Type, #8 Size
- 3 = Washer Type, 1/4" Size

**C = Maximum Water Flow Rate, Flange 1**

- 1 = 125 mL/min (2 gph)
- 2 = 400 mL/min (6.3 gph)
- 3 = 850 mL/min (13.5 gph)
- 4 = 2.85 L/min (45 gph)

**D = Maximum Water Flow Rate, Flange 2**

- 1 = 125 mL/min (2 gph)
- 2 = 400 mL/min (6.3 gph)
- 3 = 850 mL/min (13.5 gph)
- 4 = 2.85 L/min (45 gph)



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## Pricing:

<b>FTC-D</b> 8-67-11AB-00	<b>Economy Flange Temperature Controller</b>	<b>\$1130.00</b>
<b>FTC-1A</b> 8-67-21AB-C0	<b>Single Flange Precision Temperature Controller</b>	<b>\$3450.00</b>
<b>FTC-2A</b> 8-67-22AB-CD	<b>Dual Flange Precision Temperature Controller</b>	<b>\$5950.00</b>



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