To install the flex module:

1. Note the part number to determine the number and type of inputs or outputs available to be connected in step 7.
2. Turn off power to the controller.
3. Select a compatible base slot for the module. See the Flex Module-Slot Dependencies table below. If replacing a module, remove the old module.
4. Affix corresponding slot number labels (provided) to the module and to the removable screw terminal block.
5. With the component side of the module facing right (viewing the controller from the rear) insert the module into the slot until it latches.
6. Remove the screw terminal block from the module.
7. Wire field devices to the appropriate terminals. Wiring details for each input and output are provided in the following sections.
8. Reconnect the wired screw terminal block to the module. Be sure to reconnect the terminal block to the correct module.
9. Restore power to the controller.

**Note:**
If the flex module is a replacement with the same part number and slot position, the controller uses it immediately when powered up. Otherwise, use Composer software to configure the F4T to expect and use the module.

**Module Characteristics**

**Description and Identification**
Many of the modules appear to look alike at first glance, therefore, it is always recommended that the module part number be verified prior to plugging it into any of the available slots in a base. Each module is identified with a part number located on the back side of the assembly next to the screw terminal block, as displayed in the graphic to the right.

**Wiring**
Prior to wiring any of the I/O modules described in this document it is recommended that the warnings and notes listed below be reviewed.

**CAUTION:**
To prevent damage to the controller, do not connect wires to unused terminals.

**AVERTISSEMENT:** Pour prévenir tout endommagement du régulateur, ne pas faire de raccordements à des bornes inutilisées.
Note:
Maintain electrical isolation between the analog input, digital input outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Note:
Modules IP10 when properly installed in base enclosure with slot caps in empty slots.

CAUTION: Quencharc Note:
Switching pilot duty inductive loads (relay coils, solenoids, etc.) with the mechanical relay, solid-state relay or open collector output options requires use of an R.C. suppressor for AC load or a diode for a DC load.

AVERTISSEMENT: les charges inductives de commutation de lampes témoins (bobines de relais, solénoïdes, etc.) avec des options de sortie à relais mécanique, de relais statique ou collecteur ouvert requièrent un dispositif anti parasite R.C.

Note:
Wire size and torque for screw terminations:
- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 lb.-in.) torque

**Input Connections**

**Thermocouple**
- FMHA - [R] A A A - A __ __ 
  - Grounded or ungrounded sensors, greater than 20MΩ input impedance, 2kΩ source resistance max
  - 3mA open-sensor detection
  - Thermocouples are polarity sensitive. The negative lead (usually red) must be connected to S terminal
  - To reduce errors, the extension wire for thermocouples must be of the same alloy as the thermocouple

**Thermistor**
- FMHA - [P] A A A - A __ __ 
  - >20MΩ input impedance
  - 0 to 40kΩ, 0 to 20kΩ, 0 to 10kΩ, 0 to 5kΩ
  - 2.252kΩ and 10kΩ base at 77°F (25°C)
  - User-selectable curves for Alpha Technics, Beta THERM and YSI
  - User-scaling support for Steinhart-Hart coefficients

<table>
<thead>
<tr>
<th>Thermistor Curve Setting</th>
<th>Base R @ 25 °C</th>
<th>Alpha Techniques</th>
<th>Beta Therm</th>
<th>YSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curve A</td>
<td>2.252k</td>
<td>Curve A</td>
<td>2.2k3A</td>
<td>004</td>
</tr>
<tr>
<td>Curve B</td>
<td>10k</td>
<td>Curve A</td>
<td>10k3A</td>
<td>016</td>
</tr>
<tr>
<td>Curve C</td>
<td>10k</td>
<td>Curve C</td>
<td>10k4A</td>
<td>006</td>
</tr>
<tr>
<td>Custom</td>
<td>Use Steinhart-Hart equation coefficients (A, B and C) from thermistor manufacturer corresponding to the terms of the Steinhart-Hart equation: ( 1/T = A + B/R(T) + C/(ln(R))^2 )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Process**

<table>
<thead>
<tr>
<th>Volts</th>
<th>Milliamps</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 20mA</td>
<td>@ 100Ω input impedance</td>
</tr>
<tr>
<td>0 to 10V</td>
<td>@ 20kΩ input impedance</td>
</tr>
<tr>
<td>0 to 50mV</td>
<td>@ 20MΩ input impedance</td>
</tr>
<tr>
<td>Scalable</td>
<td></td>
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</tbody>
</table>

**Potentiometer**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Potentiometer: 0 to 1.2kΩ</td>
</tr>
</tbody>
</table>

**Output Connections**

**Six Digital Outputs**

<table>
<thead>
<tr>
<th>Voltage Input</th>
<th>Dry Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td></td>
</tr>
<tr>
<td>Max. input 36V at 3mA</td>
<td></td>
</tr>
<tr>
<td>Input inactive when ≤ 2V</td>
<td></td>
</tr>
<tr>
<td>Input active when ≥ 3V at 0.25mA</td>
<td></td>
</tr>
<tr>
<td>Dry Contact</td>
<td></td>
</tr>
<tr>
<td>Input inactive when ≥ 500Ω</td>
<td></td>
</tr>
<tr>
<td>Input active when ≤ 100Ω</td>
<td></td>
</tr>
<tr>
<td>Max. short circuit 13mA</td>
<td></td>
</tr>
</tbody>
</table>

**Open Collector**
- Maximum switched open collector voltage is 32V (dc)
- 400mA, maximum open circuit voltage of 25V (dc), typical 8V (dc) at 80mA
- Maximum output sink current per output is 1.5A (external class 2 or SELV supply required)
- Total sink current for all outputs not to exceed 8A
- Do not connect outputs in parallel
- Safety Extra Low Voltage

**Switched DC**
- User selectable voltage, 5V (dc) at 130mA or 19 to 22V (dc) at 80mA
Output Connections (cont.)

**Tri-Process/Retransmit Outputs**

- 0 to 20mA into 400Ω maximum load
- 0 to 10V= (dc) into 4 kΩ minimum load
- Outputs are scalable
- Output supplies power
- Each output can be independently set for voltage or current
- Output may be used as retransmit or control

**Four Mechanical Relays, Form A**

- 5A at 240V~ (ac) or 30V= (dc) maximum resistive load
- 20mA at 24V minimum load
- 125 VA pilot duty @ 120/240V~ (ac), 25 VA at 24V~ (ac)
- 100,000 cycles at rated load
- Output does not supply power.
- For use with ac or dc
- See Quencharc note (page 4)

**Note:**
This module requires 2 slots, therefore it cannot be placed in slot 3 or 6.

**Note:**
Not 60730 compliant.

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Output Connections (cont.)

**Dual 10A Solid-State Relays, Form A**

- 10A at 20 to 264V~ (ac) maximum resistive load
- 10A per output at 240V~ (ac), max. 20A per card at 122°F (50°C), max. 12A per card at 149°F (65°C)
- Opto-isolated, without contact suppression
- Maximum off state leakage of 105µA
- Output does not supply power
- Do not use on dc loads.
- Requires two slots

**Note:**
This module requires 2 slots, therefore it cannot be placed in slot 3 or 6.

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Output Connections (cont.)

**3 Mechanical Relays, 2 Form C, 1 Form A**

- 5A at 24 to 240V~ (ac) or 30V = (dc) maximum resistive load
- 125 VA pilot duty 120/240V~ (ac) 25 VA at 24V~ (ac)
- Output does not supply power
- Form A relay shares common with one Form C relay.
- See Quencharc note (page 4)

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**Warranty**

F4T Flex modules are manufactured by ISO 9001 registered processes and are backed by a three-year warranty to the first purchaser for use, providing that the modules have not been misapplied.

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**Technical Assistance**

To get assistance from Watlow:
- Contact a local representative: see last page
- Email: wintechsupport@watlow.com
- Call: +1 (507) 494-5656 from 7 a.m. to 5 p.m. Central Standard Time (CST)

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### Specifications

<table>
<thead>
<tr>
<th>Input Type</th>
<th>Max Error @ 25 Deg C</th>
<th>Accuracy Range</th>
<th>Operating Range</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>J</em></td>
<td>±1.75</td>
<td>0</td>
<td>750</td>
<td>1200</td>
</tr>
<tr>
<td><em>K</em></td>
<td>±2.45</td>
<td>-200</td>
<td>1250</td>
<td>1371</td>
</tr>
<tr>
<td><em>T</em> (-200 to 350)</td>
<td>±1.55</td>
<td>-200</td>
<td>350</td>
<td>400</td>
</tr>
<tr>
<td>N</td>
<td>±2.25</td>
<td>0</td>
<td>1250</td>
<td>1300</td>
</tr>
<tr>
<td><em>E</em></td>
<td>±2.10</td>
<td>-200</td>
<td>900</td>
<td>1000</td>
</tr>
<tr>
<td>R</td>
<td>±3.9</td>
<td>0</td>
<td>1450</td>
<td>1767</td>
</tr>
<tr>
<td>S</td>
<td>±3.9</td>
<td>0</td>
<td>1450</td>
<td>1767</td>
</tr>
<tr>
<td>B</td>
<td>±2.66</td>
<td>870</td>
<td>1700</td>
<td>1816</td>
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<tr>
<td>C</td>
<td>±3.32</td>
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<td>2315</td>
<td>2315</td>
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<tr>
<td>D</td>
<td>±3.32</td>
<td>0</td>
<td>2315</td>
<td>2315</td>
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<tr>
<td>F (PTII)</td>
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<td>1343</td>
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</tr>
</tbody>
</table>

### Declarations of Conformity

**Series EZ-ZONE® Flex Modules**

**WATLOW Electric Manufacturing Company**

*ISO 9001 since 1996*

**EN 61326-1** 2006

**ISO 61010-1:2010**

**EN 60730-1:2011**

**EN 60730-2-8:2010**

Automatic electrical controls for household and similar use – Part 1: General requirements

Compliant with 2011/65/EU RoHS2 Directive


See the Declarations of Conformity for Watlow EZ-ZONE® CC and Flex models for further details on standards used for compliance.