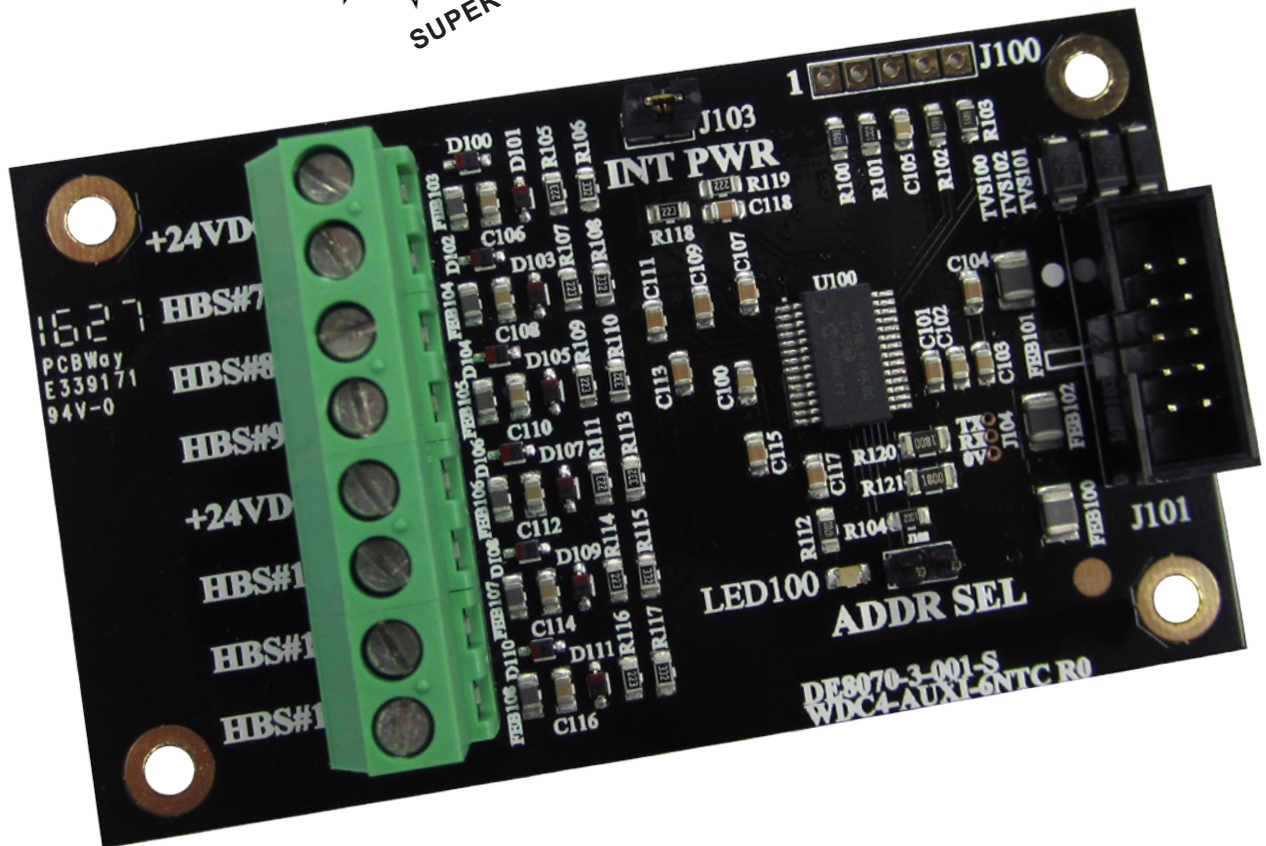




# NTC Expansion Board

## NTC TYPE TEMPERATURE SENSORS









INSTALLATION INSTRUCTIONS

# OPERATION MANUAL

Part No. WDC4-AUXI-6NTC

[www.go4b.com/usa](http://www.go4b.com/usa)

 	<p> <b>WARNING</b></p> <p>Rotating parts can crush, cut and entangle.</p> <p>Do NOT operate with guard removed.</p> <p>Lockout power before removing guard or servicing.</p>
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<p> <b>DANGER</b></p>	
	
<p>Exposed buckets and moving parts will cause severe injury or death.</p> <p>Lockout power before removing cover or inspection door.</p>	

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Dear 4B Customer:

Congratulations on your purchase. 4B appreciates your business and is pleased you have chosen our products to meet your needs.

Please read in its entirety and understand the literature accompanying the product before you place the product into service. Please read the safety precautions carefully before operating the product. With each product you purchase from 4B, there are some basic but important safety considerations you must follow to be sure your purchase is permitted to perform its design function and operate properly and safely, giving you many years of reliable service. Please read and understand the Customer Safety Responsibilities listed below. Failure to follow this safety directive and the Operation Manuals and other material furnished or referenced, may result in serious injury or death.

### ***SAFETY NOTICE TO OUR CUSTOMERS***

- A. In order to maximize efficiency and safety, selecting the right equipment for each operation is vital. The proper installation of the equipment, and regular maintenance and inspection is equally important in continuing the proper operation and safety of the product. The proper installation and maintenance of all our products is the responsibility of the user unless you have asked 4B to perform these tasks.
- B. All installation and wiring must be in accordance with Local and National Electrical Codes and other standards applicable to your industry. (Please see the article “Hazard Monitoring Equipment Selection, Installation and Maintenance” at [www.go4b.com](http://www.go4b.com).) The installation of the wiring should be undertaken by an experienced and qualified professional electrician. Failure to correctly wire any product and/or machinery can result in the product or machine failing to operate as intended, and can defeat its design function.
- C. Periodic inspection by a qualified person will help assure your 4B product is performing properly. 4B recommends a documented inspection at least annually and more frequently under high use conditions.
- D. Please see the last page of this manual for all warranty information regarding this product.

### ***CUSTOMER SAFETY RESPONSIBILITIES***

#### **1. READ ALL LITERATURE PROVIDED WITH YOUR PRODUCT**

Please read all user, instruction and safety manuals to ensure that you understand your product operation and are able to safely and effectively use this product.

#### **2. YOU BEST UNDERSTAND YOUR NEEDS**

Every customer and operation is unique, and only you best know the specific needs and capabilities of your operation. Please call the 24-hour hotline at 309-698-5611 for assistance with any questions about the performance of products purchased from 4B. 4B is happy to discuss product performance with you at any time.

### **3. SELECT A QUALIFIED AND COMPETENT INSTALLER**

Correct installation of the product is important for safety and performance. If you have not asked 4B to perform the installation of the unit on your behalf, it is critical for the safety of your operation and those who may perform work on your operation that you select a qualified and competent electrical installer to undertake the installation. The product must be installed properly to perform its designed functions. The installer should be qualified, trained, and competent to perform the installation in accordance with Local and National Electrical Codes, all relevant OSHA Regulations, as well as any of your own standards and preventive maintenance requirements, and other product installation information supplied with the product. You should be prepared to provide the installer with all necessary installation information to assist in the installation.

### **4. ESTABLISH AND FOLLOW A REGULAR MAINTENANCE AND INSPECTION SCHEDULE FOR YOUR 4B PRODUCTS**

You should develop a proper maintenance and inspection program to confirm that your system is in good working order at all times. You will be in the best position to determine the appropriate frequency for inspection. Many different factors known to the user will assist you in deciding the frequency of inspection. These factors may include but are not limited to weather conditions; construction work at the facility; hours of operation; animal or insect infestation; and the real-world experience of knowing how your employees perform their jobs. The personnel or person you select to install, operate, maintain, inspect or perform any work whatsoever, should be trained and qualified to perform these important functions. Complete and accurate records of the maintenance and inspection process should be created and retained by you at all times.

### **5. RETAIN AND REFER TO THE OPERATION MANUAL FOR 4B'S SUGGESTED MAINTENANCE AND INSPECTION RECOMMENDATIONS**

As all operations are different, please understand that your specific operation may require additional adjustments in the maintenance and inspection process essential to permit the monitoring device to perform its intended function. Retain the Operation Manual and other important maintenance and service documents provided by 4B and have them readily available for people servicing your 4B equipment. Should you have any questions, please call the free 24-hour hotline number (309-698-5611).

### **6. SERVICE REQUEST**

If you have questions or comments about the operation of your unit or require the unit to be serviced please contact the 4B location who supplied the product or send your request via fax (309-698-5615) or call us via our 24-hour hotline number in the USA (309-698-5611). Please have available product part numbers, serial numbers, and approximate date of installation. In order to assist you, after the product has been placed into service, complete the online product registration section which is accessed via our website [www.go4b.com/usa](http://www.go4b.com/usa).

## ! WARNING

- Rotating machinery can cause serious injury or death
- Always lockout and tagout the machine prior to installation

## PRODUCT OVERVIEW

The NTC expansion board provides the ability to connect 6 additional NTC temperature sensors to the WDC4 Super Elite Controller. A maximum of two boards can be installed, providing a total of 12 additional NTC inputs.

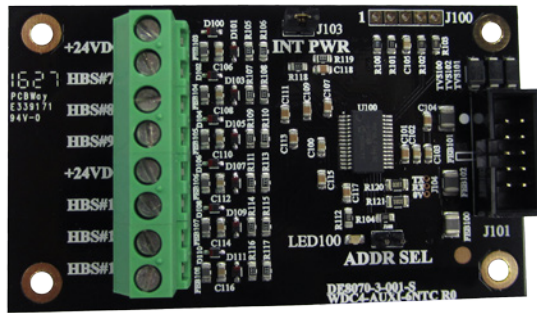
## SPECIFICATIONS

Inputs -	<ul style="list-style-type: none"><li>• 6 NTC (Individually Selectable)</li><li>• 2 Sensor Power Supply (24 VDC)</li></ul>
Sensor Power Consumption -	1 mA @ 24 VDC
Dimensions -	85 mm x 50 mm x 21 mm ( L x W x H)

## NTC EXPANSION BOARD KIT CONTENTS

1. NTC Board (1)
2. Ribbon Cable (1)
3. EXP2 Label (1)\*
4. Insulation Card (1)
5. M3 x 48 mm Hex Pillar, M3 Screw and Washer (4)

1.



2.



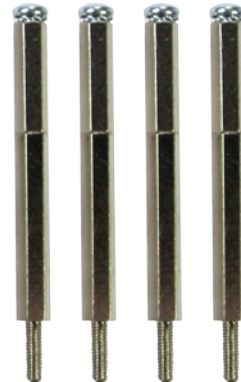
3.



4.



5.



\* Only needed if installing two expansion boards. Properly labels sensors 13-18 for EXP2 location.

## WARNING

Expansion boards are NOT suitable for HOT INSTALL. Never install expansion boards while the WDC4 is powered or damage will occur. Always remove power from the WDC4 prior to board installation.

## INSTALLATION

For factory pre-installed boards, skip to *Electrical Connection* on page 10.

Up to two NTC expansion boards can be installed on the Watchdog Super Elite WDC4. For the rest of this manual, the top board position will be referred to as EXP1 (blue), and the bottom board will be referred to as EXP2 (red) as show in image 3. The NTC expansion board can be installed in either location.

Step 1 - Remove power from the WDC4 before proceeding with the expansion board installation.

Step 2 - Ensure that the hex pillars are assembled and are securely connected as shown in the board kit contents (#5). Remove the four M3 screws and washers and proceed to step 3.

Step 3 - Line up the insulation card with the back of the expansion board. Gently push the M3 screws through the mounting holes on the front of the expansion board so that they extend through the insulation card (image 1). Set the completed assembly aside for the moment and proceed to step 4.

Step 4 - Attach the four hex pillars to the threaded brass inserts for EXP1 or EXP2 on the WDC4 board. The inserts are located near the power supply as shown in image 2. Carefully hand tighten the hex pillars so that they are flush to the top of the brass insert on the board. Over tightening can strip the threads of the inserts. Image 4 shows the hex pillars installed for position EXP1.



Image 1 -  
Insulation Card Installed

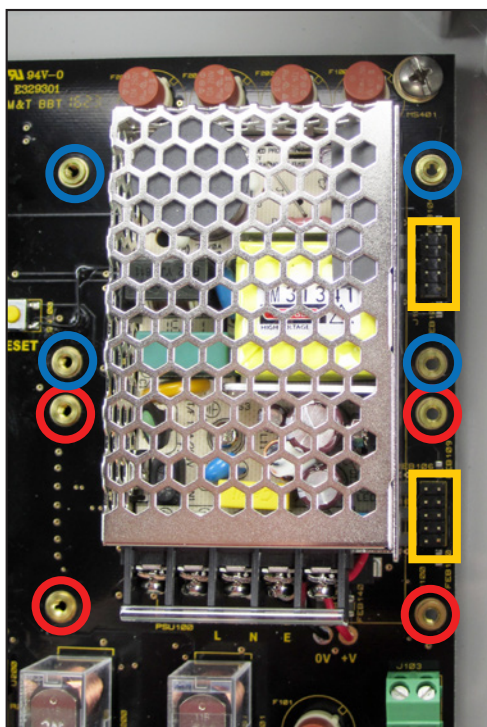


Image 2 -  
EXP1 Hex Pillar Inserts (Blue)  
EXP2 Hex Pillar Inserts (Red)  
Ribbon Cable Connection (Yellow)

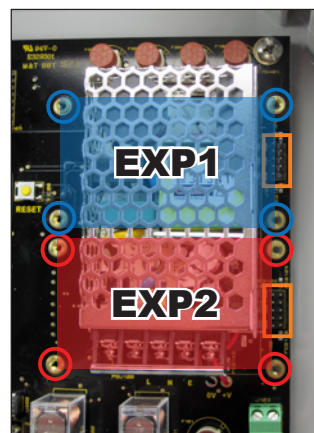
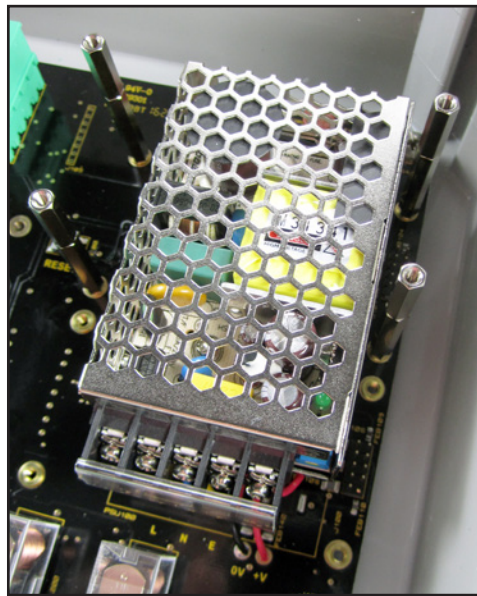


Image 3 -  
Expansion Board Positions

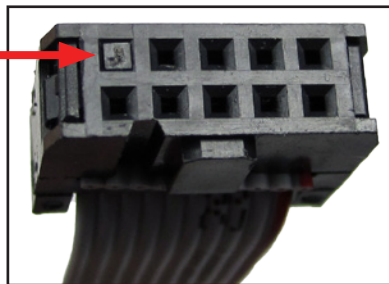


**Image 4 -  
Hex Pillars Installed (EXP1)**

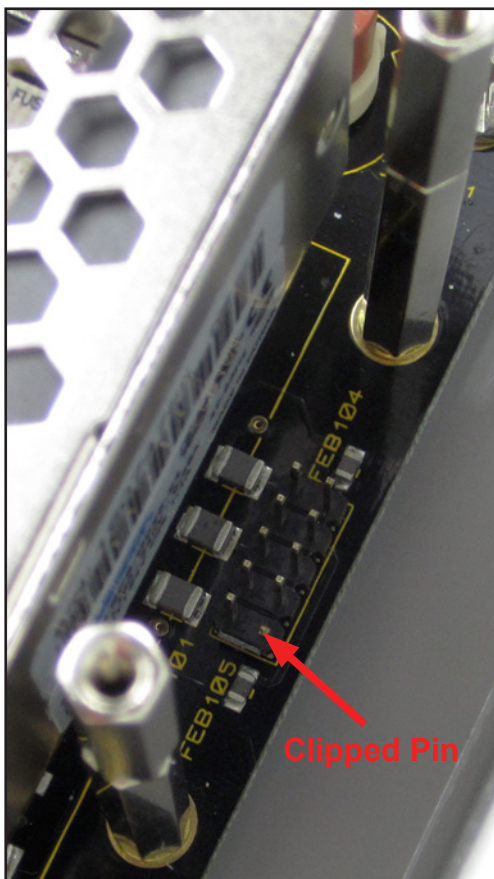
Step 5 - Look at both ends of the ribbon cable, one end will have a blocked connection (image 5). On the WDC4 board, one connection pin is clipped (image 6). Connect the ribbon cable to the WDC4 board, using the end with the blocked connection (image 7).

Step 6 - Place the assembled expansion board and insulation card from step 3 onto the four pillars, make sure that the green wire terminal block is on the left. Attach the board to the hex pillars using the M3 screws (image 8). Be careful not to over tighten the screws.

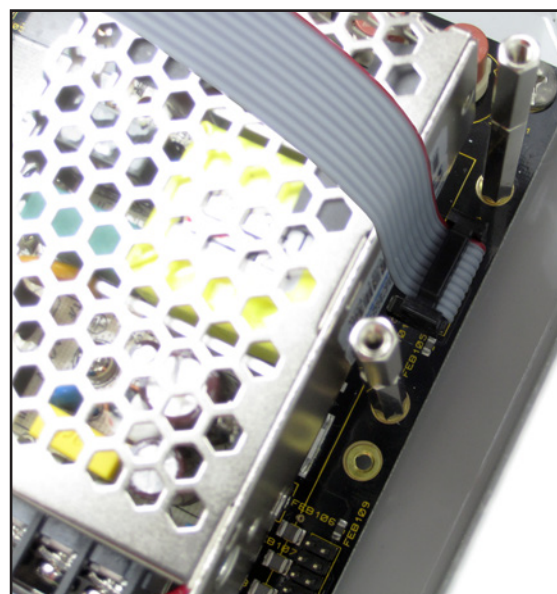
**Blocked Pin  
Connection**



**Image 5 -  
Ribbon Cable End  
for WDC4 Board  
Connection**

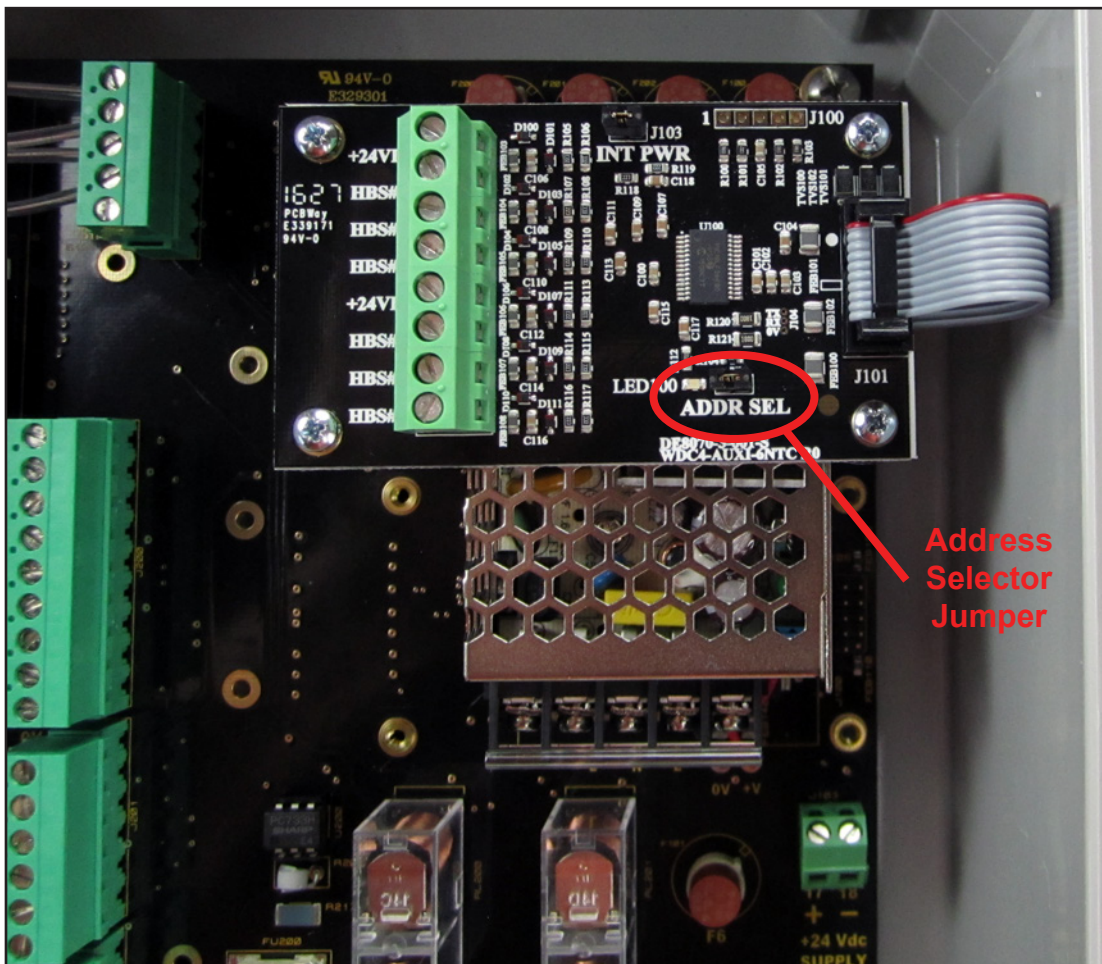


**Image 6 -  
WDC4 Board Pin Connection**



**Image 7 -  
Ribbon Cable Installed on WDC4 Board**



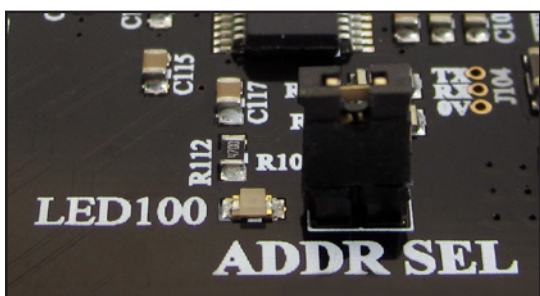


**Image 8 -  
EXP1 NTC Board Installed**

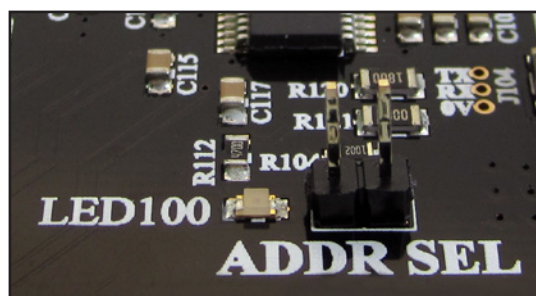
Step 7 - Connect the ribbon cable to the NTC expansion board (image 8).

Step 8 - Near the bottom of the expansion board, there is an address selector jumper (ADDR SEL). This jumper tells the Watchdog control unit that an expansion board has been installed in either location EXP1 or EXP2. The top expansion board should be jumpered to EXP1, and the bottom board EXP2.

Leaving the pre-installed jumper on the board sets the NTC board address to EXP1, removing the jumper will change the address to EXP2 (Image 9A & 9B).



**Image 9A -  
Address Selector Jumper On (EXP1)**



**Image 9B -  
Address Selector Jumper Off (EXP2)**

Step 9 - If installing a second NTC expansion board in location EXP2, repeat steps 1-8. Use the EXP2 label (#3 board kit contents) to properly identify sensors 13-18.

Step 10 - After all boards have been installed and addressed correctly, proceed to the ELECTRICAL CONNECTION section.

# ELECTRICAL CONNECTION

All wiring must be in accordance with local and national electrical codes and should be undertaken by an experienced and qualified electrician.

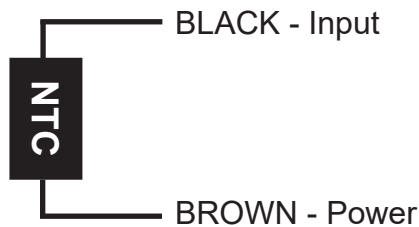
Always use dust/liquid tight flexible metal conduit with approved fittings to protect the sensor cables. Use rigid metal conduit to protect the cables from the sensors to the control unit. Conduit systems can channel water due to ingress and condensation directly to sensors and sensor connections which over time will adversely affect the performance of the system. As such, the installation of low point conduit drains is recommended for all sensors.

For more information regarding WDC4 wiring, refer to Watchdog Super Elite manual, or contact 4B.

## ⚠ WARNING

Expansion boards are NOT suitable for HOT INSTALL. Never install expansion boards while the WDC4 is powered or damage will occur. Always remove power from the WDC4 prior to board installation.

NTC temperature sensors are non-polarity sensitive, however 4B recommends wiring the sensors as outlined below. This wiring method is consistent with all WDC4 wiring diagrams found in the Watchdog Super Elite product manual.



## NOTE

Recommended cable type is Belden 5508FE with 10 conductors each 22 AWG, shielded. Overall outer diameter is 0.23 inches.

The two tables below show the wire terminal connections for EXP1 and EXP2. Sensor wiring may vary depending on your individual setup, refer to the Watchdog Super Elite manual for sample wiring diagrams (section 9) or contact 4B for more information.

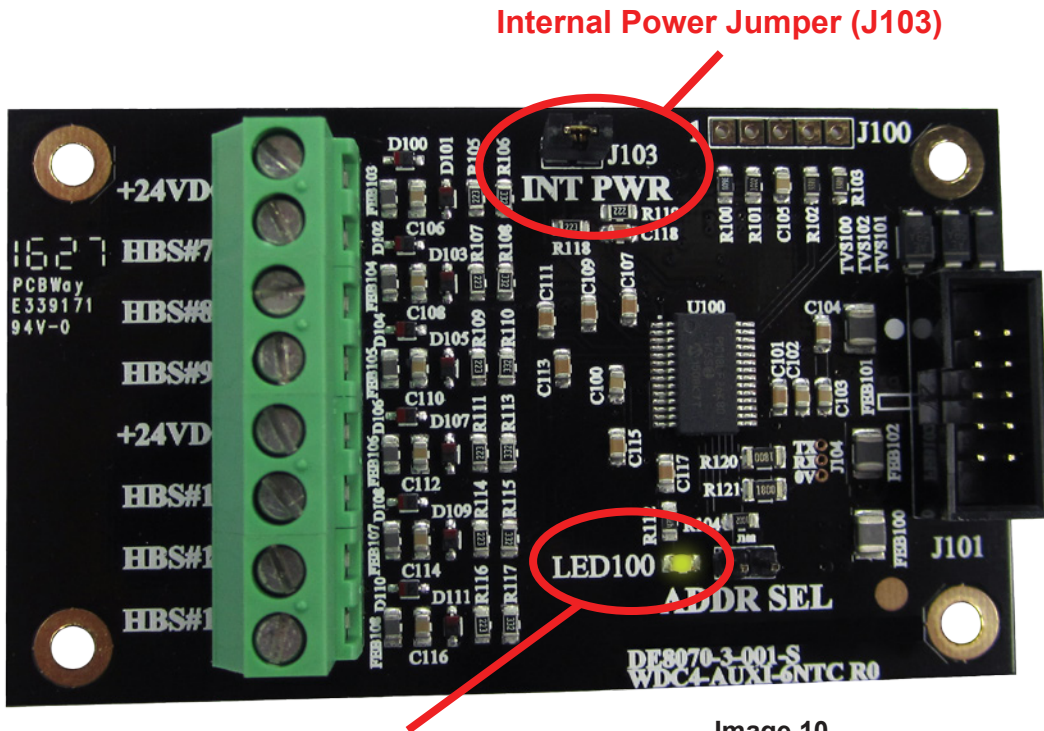
### EXP1 NTC Board Inputs -

+24 VDC	Supply for NTC Sensors
HBS#7	Input for Sensor #7
HBS#8	Input for Sensor #8
HBS#9	Input for Sensor #9
+24 VDC	Supply for NTC Sensors
HBS#10	Input for Sensor #10
HBS#11	Input for Sensor #11
HBS#12	Input for Sensor #12

### EXP2 NTC Board Inputs -

+24 VDC	Supply for NTC Sensors
HBS#13	Input for Sensor #13
HBS#14	Input for Sensor #14
HBS#15	Input for Sensor #15
+24 VDC	Supply for NTC Sensors
HBS#16	Input for Sensor #16
HBS#17	Input for Sensor #17
HBS#18	Input for Sensor #18

The power to each NTC sensor is usually derived from the expansion board directly. If necessary, a separate +24 VDC supply can be connected from the WDC4 internal +24 VDC supply. To use the internal supply, the INT PWR jumper on J103 (image 10) must be removed, and power should be connected to the +24 VDC terminals on the expansion board.



**Diagnostics LED (LED100)**

**Image 10 -  
Internal Power Jumper  
& Diagnostics LED 100**

After all expansion boards have been installed and all sensor inputs are wired, re-connect power to the WDC4 control unit.

Before the new expansion boards and sensors can be used, they will need to be activated and programmed into the WDC4 control unit. Refer to the Watchdog Super Elite manual for setup information (section 12).

## NOTE

A diagnostics green LED (LED 100) is located next to the ADDR SEL jumper on the NTC expansion board (image 10). This LED will flash to indicate that the expansion board is communicating with the Watchdog Super Elite. If the LED is not flashing, refer to the TROUBLESHOOTING GUIDE.

# TROUBLESHOOTING GUIDE

FAULT	REMEDY
EXP1 is enabled but not functioning (LED 100 is flashing).	<ol style="list-style-type: none"> <li>1. Check that the ADDR SEL jumper is on (image 9A).</li> <li>2. Check that the NTC sensors have been set up in the WDC4 control unit menu.</li> <li>3. Check that the INT PWR (J103) jumper is on if using the board to supply power to the sensors (image 10). If using an external power supply, make sure that this jumper is off and that +24 VDC input on the expansion board is wired correctly.</li> </ol>
EXP1 LED 100 is not flashing.	<ol style="list-style-type: none"> <li>1. Check that the ADDR SEL jumper is on (image 9A).</li> <li>2. Check that the ribbon cable is properly connected to the NTC expansion board and the WDC4 board.</li> <li>3. Check that the NTC sensors have been set up in the WDC4 control unit menu.</li> </ol>
EXP2 is enabled but not functioning (LED 100 is flashing).	<ol style="list-style-type: none"> <li>1. Check that the ADDR SEL jumper is off (image 9B).</li> <li>2. Check that the NTC sensors have been set up in the WDC4 control unit menu.</li> <li>3. Check that the INT PWR (J103) jumper is on if using the board to supply power to the sensors (image 10). If using an external power supply, make sure that this jumper is off and that +24 VDC input on the expansion board is wired correctly.</li> </ol>
EXP2 LED 100 is not flashing.	<ol style="list-style-type: none"> <li>1. Check that the ADDR SEL jumper is off (image 9B).</li> <li>2. Check that the ribbon cable is properly connected to the NTC expansion board and the WDC4 board.</li> <li>3. Check that the NTC sensors have been set up in the WDC4 control unit menu.</li> </ol>

For installation questions or trouble shooting help, contact 4B.





# PRODUCT WARRANTY

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