920i® Programmable HMI Indicator/Controller

Dual Channel Analog Input Card with Thermocouple Input Installation

The analog input option, when installed in the *920i* programmable HMI indicator (software version 2.05+), supports industry standard voltage and current input ranges, thermocouple inputs, and includes an onboard temperature sensor for monitoring the internal operating temperature of the *920i*.

Thermocouples are the most widely used temperature sensors in industrial applications. The *920i* analog input option supports types E, J, K, N, and T thermocouples.

Note *There is a seven card limit when using the Dual Channel Analog Input Card with Thermocouple Input*

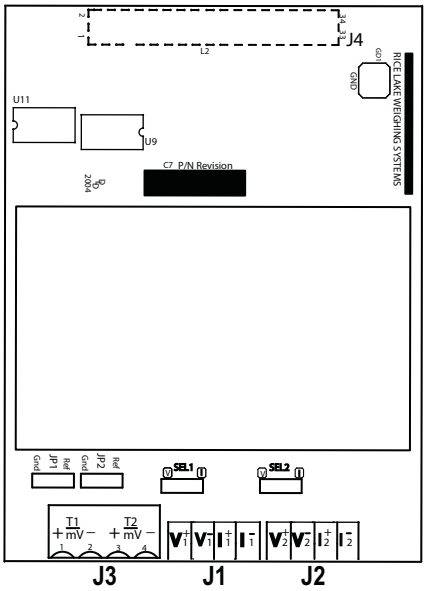

Figure 1. Dual Analog Input Card w/ Thermal Coupler

Part No.	Description	Qty
14626	Nut, Kep 8-32NC HEX	2
14822	Screw, Mach 4-40 NCx1/4	2
15133	Washer, Lock NO 8 Type A	2
15631	Cable Tie,3in Nylon	4
15885	Terminal Block,4 Position	1
53075	Clamp, Ground Cable Shield	2
73997	Bushing, Multiple Cable	1
76513	Conn,4 Pos Screw Terminal	2
85357	Card, Dual Analog Input	1
87702	Plug, Sealing 3 x 9 mm	1

Table 1. Dual Analog Input Card w/ Thermal Coupler Parts List

Analog Input Card Installation

Use the following procedure to install the analog input card in *920i* indicators:

WARNING *Disconnect power before removing indicator backplate.*

CAUTION *Use a wrist strap as a ground and to protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.*

1. Place indicator face-down on an anti-static work mat.
2. Loosen screws securing the back plate to the enclosure body and remove back plate.
3. Carefully align the large option card connector with connector J5 or J6 on the CPU board.
4. Press down to seat the option card in the CPU board connector.

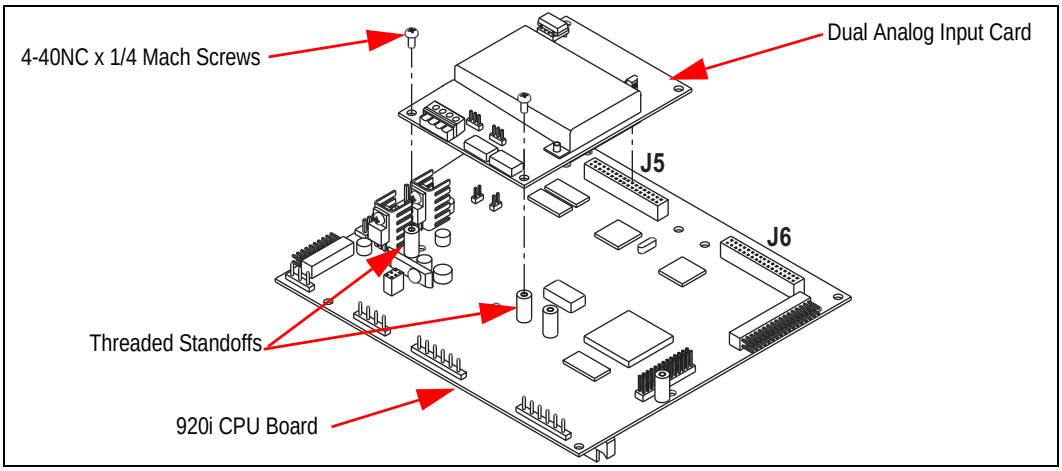

Figure 2. Dual Channel Analog Input Card with Thermocouple Input (PN 87697)

5. Use the 4-40NC x 1/4 screws, provided in the option kit, to secure option card to the threaded standoffs on the CPU board.
6. Route the cable through the cord grip closest to the installed option card and attach to the analog input card.
7. If available, connect the shield wire to the ground stud on the enclosure using the ground clamp and screws included in the kit

See the *920i* Technical Manual (PN 67887) for more information on grounding cables.

Thermocouple Wire Installation

There are five different types of thermocouple probes that are supported by the *920i*. Table 2 lists the various thermocouple probe types, their corresponding wire colors, and their temperature ranges.

Thermocouple Cable	Typical Corresponding Wire Colors	Temperature Range
Type E	+ Purple – Red	-328 – 1832°F (-200 – 1000°C)
Type J	+ White – Red	-148 – 1400°F (-100 – 760°C)
Type K	+ Yellow – Red	-148 – 2300°F (-100 – 1260°C)
Type N	+ Orange – Red	-148 – 2300°F (-100 – 1260°C)
Type T	+ Blue – Red	-328 – 752°F (-200 – 400°C)

Table 2. Thermocouple Wire Identification

To connect thermocouple cables in the *920i* indicator:

1. Insert the multi-cable bushing (PN 73997), into one of the available cord grips on the *920i* located closest to the analog input option (See Figure 5).

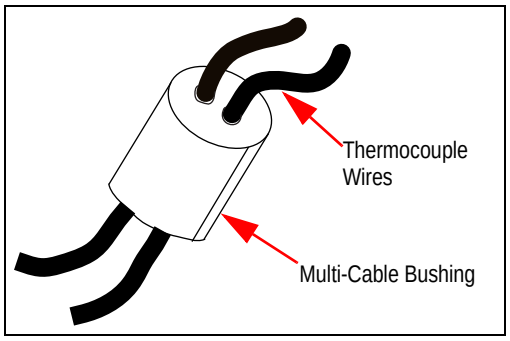

Figure 3. Multi-Cable Bushing

2. Route the thermocouple wire through one of the holes in the multi-cable bushing.
3. Strip 1/4" of insulation from the end of the thermocouple cable.
4. Install wires into the J3 connector on the analog input option card. Depending upon the type of cable used, the wire colors will differ, however, the – signal is always the red wire (see Figure 5).

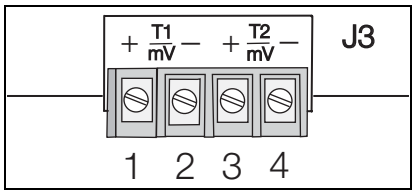

Figure 4. J3 – Thermocouple Wiring

J3 Connector Pin	Function
1	T1/mV +
2	T1/mV –
3	T2/mV +
4	T2/mV –

Table 3. Thermocouple and +/– 100 mV Pin Assignments

5. If you need to extend the length of the thermocouple cable, the same type of cable must be used.

   Example: Type E cable for a Type E probe.

6. When connections are complete, use cable ties to secure loose cables inside the enclosure if needed.

Low Level Input Wiring (+/– 100 mV)

When using the 100 mV range, wires must be connected to J3. Two input channels, T1 and T2, are available. Verify the reference jumper is selected along with 100 mV scale.

IMPORTANT *Do not exceed maximum input voltage ratings. This can cause permanent damage to the analog input card.*

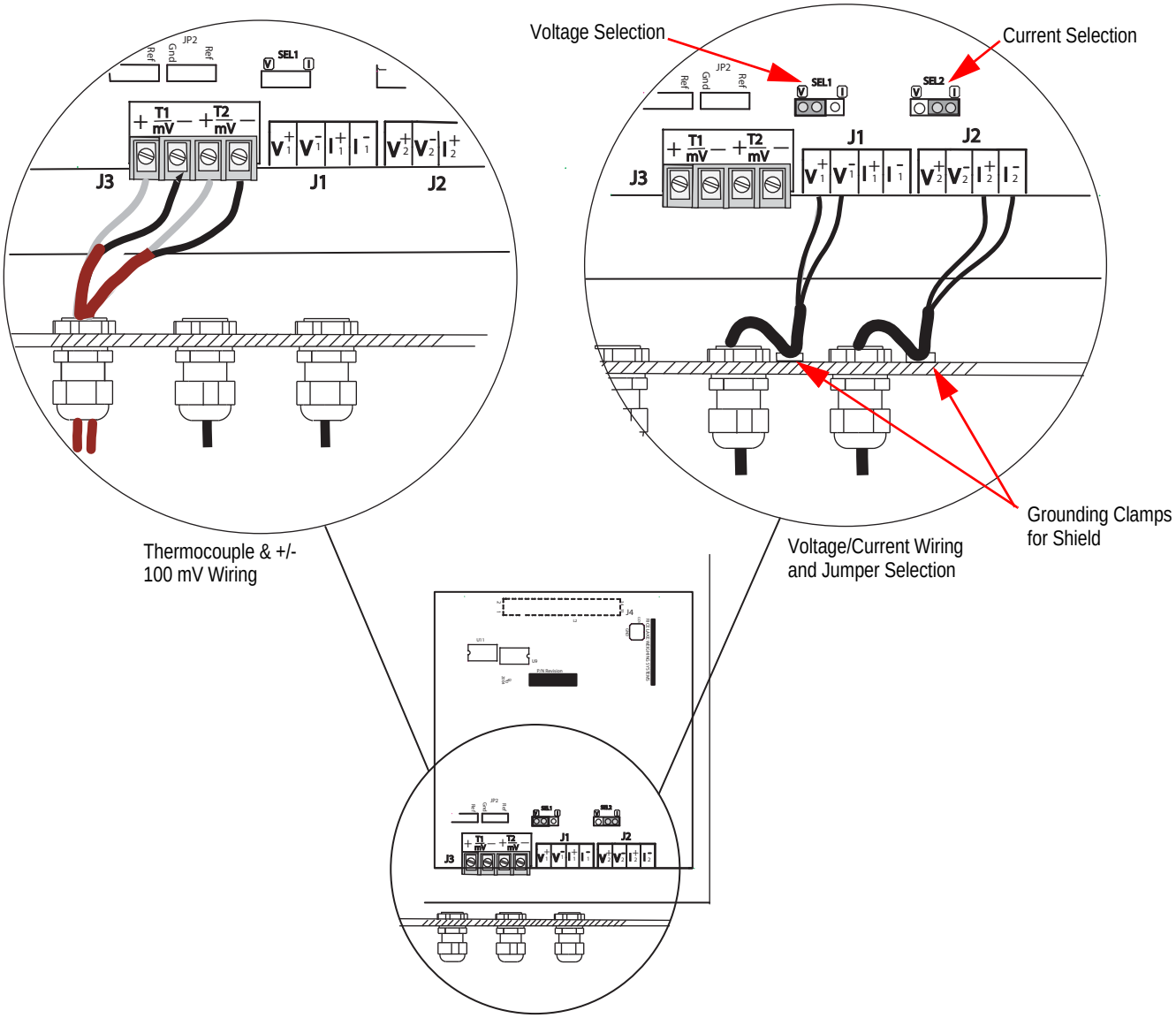

Figure 5. Thermocouple and +/– 100 mV Voltage/Current Selection Wiring Diagram

Voltage/Current Selection and Wiring

Set jumpers to I for a 4-20mA and to V for 0-10 V.

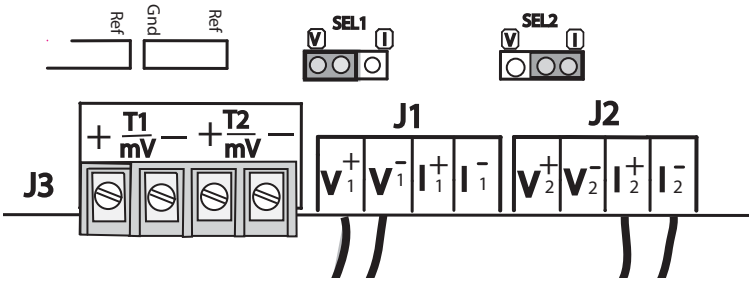

Figure 6. SEL1 and SEL2 Jumpers

When using the +/- 10 volt or the 0-20 mA ranges, the option card selection jumpers should be set to the appropriate setting. Table 4 lists the voltage and current selections

Connection	Function	Range
J1-1	V1, +	+/–10 V
J1-2	V1, –	+/– 10 V
J1-3	I1, +	0-20 mA
J1-4	I1, –	0-20 mA
J2-1	V2, +	+/– 10 V
J2-2	V2, –	+/– 10 V
J2-3	I2, +	0-20 mA
J2-4	I2, –	0-20 mA

Table 4. Voltage and Current Selections

Note *Only one input is available per connector, two channels per option card, with the exception of the low level input channel, J3.*

Enclosure Reassembly

Once cabling is complete:

1. Ensure no excess cable is left inside the enclosure and tighten cord grips.
2. Position the backplate over the enclosure and reinstall the backplate screws. Use the torque pattern shown in Figure 7 to prevent distorting the backplate gasket. Torque screws to 15 in-lb (1.7 N-m).
3. Reconnect power to the indicator.

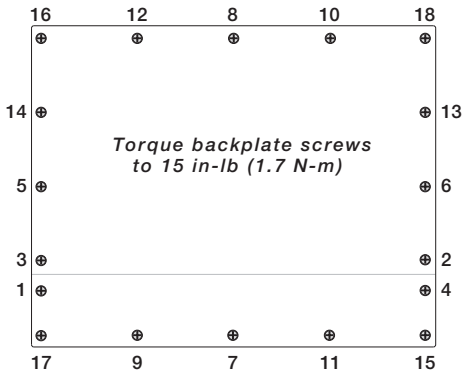

Figure 7. 920i Enclosure Backplate

The *920i* automatically recognizes all installed option cards when the unit is powered on.

Configuration

The analog input option must be installed for the ALGIN menu to be displayed.

Front Panel Configuration

Use the CONFIG menu under the SCALES to configure A/D scales.

Example: In an indicator with an analog input card installed in Slot 1, the scale configuration displays the A/D listed (Slot 1 Channel 1 and Slot 1 Channel 2) under the AVAILABLE A/D's column.

Note *Select only one A/D per scale.*

Use the left arrow key to select the A/D, then press the ADD softkey. The A/D is moved to the *ASSOCIATED A/D*'s. If no other A/D's are listed in the *AVAILABLE A/D's* column, the Done softkey displays. Press Done to exit the Scale Configuration display

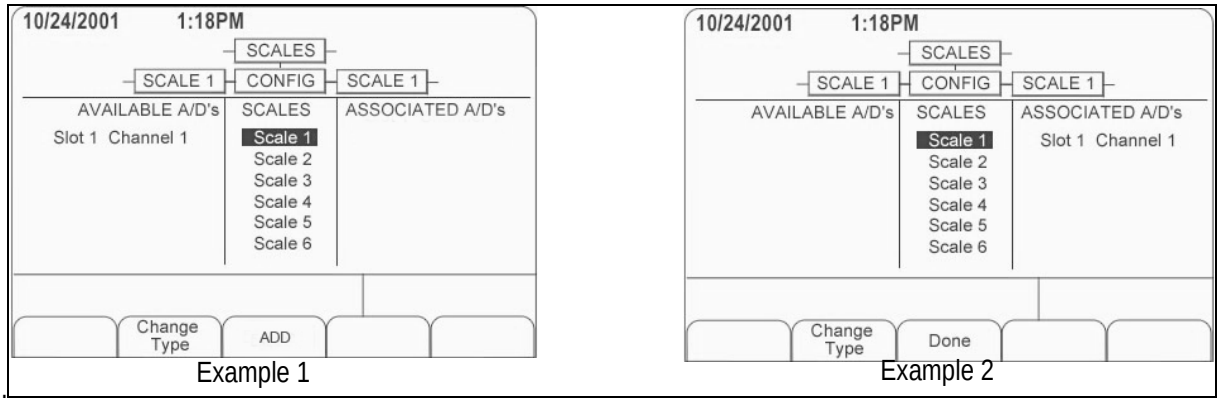

Figure 8. Scale Configuration Displays

Analog Input Configuration

Use the following steps to work down to the ALGIN menu and fully configure the analog input option for the *920i*.

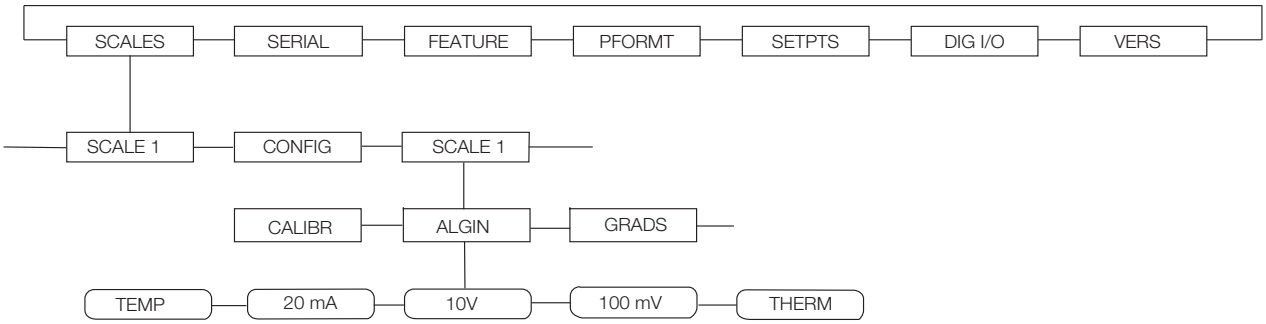

Figure 9. Analog Input Menu

1. Select SCALES from the *920i*main menu.
2. Scroll down and select the desired scale input.
3. Select SCALE 1 to set scale 1 configuration.
4. Select ALGIN to select the desired input ranges:
   - Temp
   - 20 mA
   - 10 V
   - 100 mV
   - Therm
5. Press the Enter key to temporarily store a highlighted setting.

Note *Settings are saved upon pressing the Save and Exit softkeys when the configuration and calibration complete. The Restore softkey restores the highlighted input parameter to its previously saved setting. The* Default *softkey restores the highlighted input parameter to its default setting.*

Thermocouple Type Setup

There are five types of thermocouple probes that are supported by the *920i*. The probe types include Types E, J, K, N, and T. They are all handled internally by *920i* core software, Version 2.05 and later.

Upon selecting *THERM* as the analog input signal and pressing Enter, a previously hidden parameter *PROBE* will be displayed. Scroll down to view and select the desired probe type. The thermocouple calibration values are stored in the *920i* so no calibration is required.

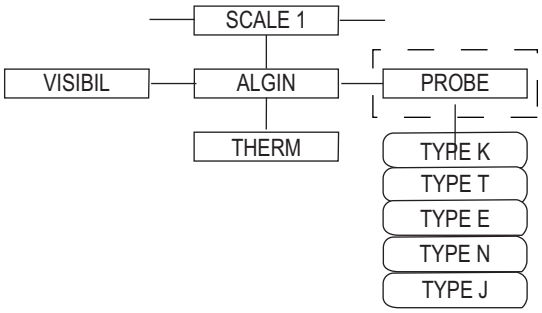

Figure 10. Thermocouple Temperature Menu

Temperature Setup

To set up and measure the ambient temperature inside of the indicator, select *TEMP* as the analog input signal.

There is no calibration required for this function.

0-20 mA Analog Input Setup

Select 0-20 mA and proceed with configuration and calibration.

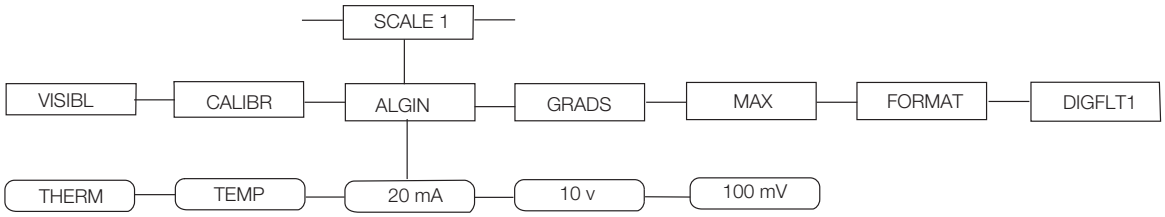

Figure 11. 0-20 mA Analog Input Menu

Note

WVAL = actual current used

MAX = maximum value for display

0-10 V and 0-100 mV Analog Input Setup

Select 0-10 V or 0-100 mV and proceed with configuration and calibration.

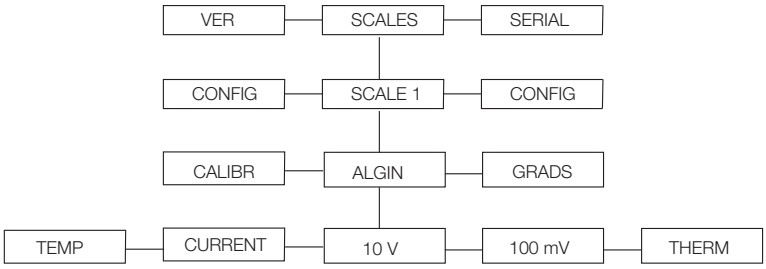

Figure 12. 0-10 V and 0-100 mV Analog Input Menus.

Calibration

To calibrate the indicator using the front panel, use the following steps.

1. Place the indicator in setup mode (display reads *Scale Configuration*).
2. With the Scales menu highlighted, press the down arrow key, then select the scale to be calibrated. Press down again, then press left to highlight the *CALIBR* menu.
3. Use down arrow to go to zero calibration (*WZERO*).
4. Set input current or voltage to the desired value.
5. Use the down arrow key to view the previous calibration value.
6. With the input value set to the lowest desired level, press the Calibrate softkey.
7. Use the up and right arrow keys to go to *WVAL*.
8. Use the down arrow key to view the previous *WVAL* value.
9. Enter the display value proportional to the calibration input signal (*WSPAN*).
10. Press enter.
11. Use the up and right arrow keys to go to *WSPAN*.
12. Adjust the input to the desired input value.
13. Use the down arrow key to view the previous value.
14. Press the Calibrate softkey.
15. Use the up arrow key to return to *SCALES*.
16. Press Save and Exit to return to normal operating mode.

Specifications

A/D Resolution 14 Bit Effective Resolution

Available Channels 2

Analog Input Ranges

Range	Sensitivity @ 60 Hz
+/– 10V	+/– 1 mV
+/– 100 mV	+/– .05 mV
4-20 mA / 0020 mA	+/– .05 mA

Absolute Max. Input Signal J1 & J2 Volts –11 to +15V, Input +/– 20.4 mA
J3 –0.3V to 5V w/respect to (-T/mV) input

Absolute maximum input ratings are those values beyond which the life of the input card may be impaired.

Input Impedance Typical
J1 & J2+/–10 >27kΩ 0-20mA 249Ω (measurement shunt)
J3 +/–100mV >100KΩ

Input Protection J1 & J2 15V, 600Watts (suppression diodes)

Sample Rates Selectable 10, 50, 60, or 250Hz

Power Consumption 200mW, 30mA

Thermocouple InputTypes E, J, K, N, T

Thermocouple Temperature Ranges
- E -328 to 1832°F
- J -148 to 1400°F
- K -148 to 2300°F
- N -148 to 2300°F
- T -328 to 752°F

Accuracy +/– 1° C

Temperature Input Internal Temperature Sensor

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