

Chapter 2

Installing the Module

Chapter Objectives

This chapter gives you information on:

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Determining Power Requirements	2-1
Determining Module Location in the Chassis	2-2
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Before You Install Your Analog Module

Before installing your module in the I/O chassis you must:

Action required:	Refer to:
Calculate power requirements for the I/O chassis.	page 2-1
Determine module location in the I/O Chassis	page 2-2
Connect the cable and make wiring connections to the remote termination panel	page 2-3

Electrostatic Damage

ATTENTION



Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- When not in use, keep modules in appropriate static-safe packaging.

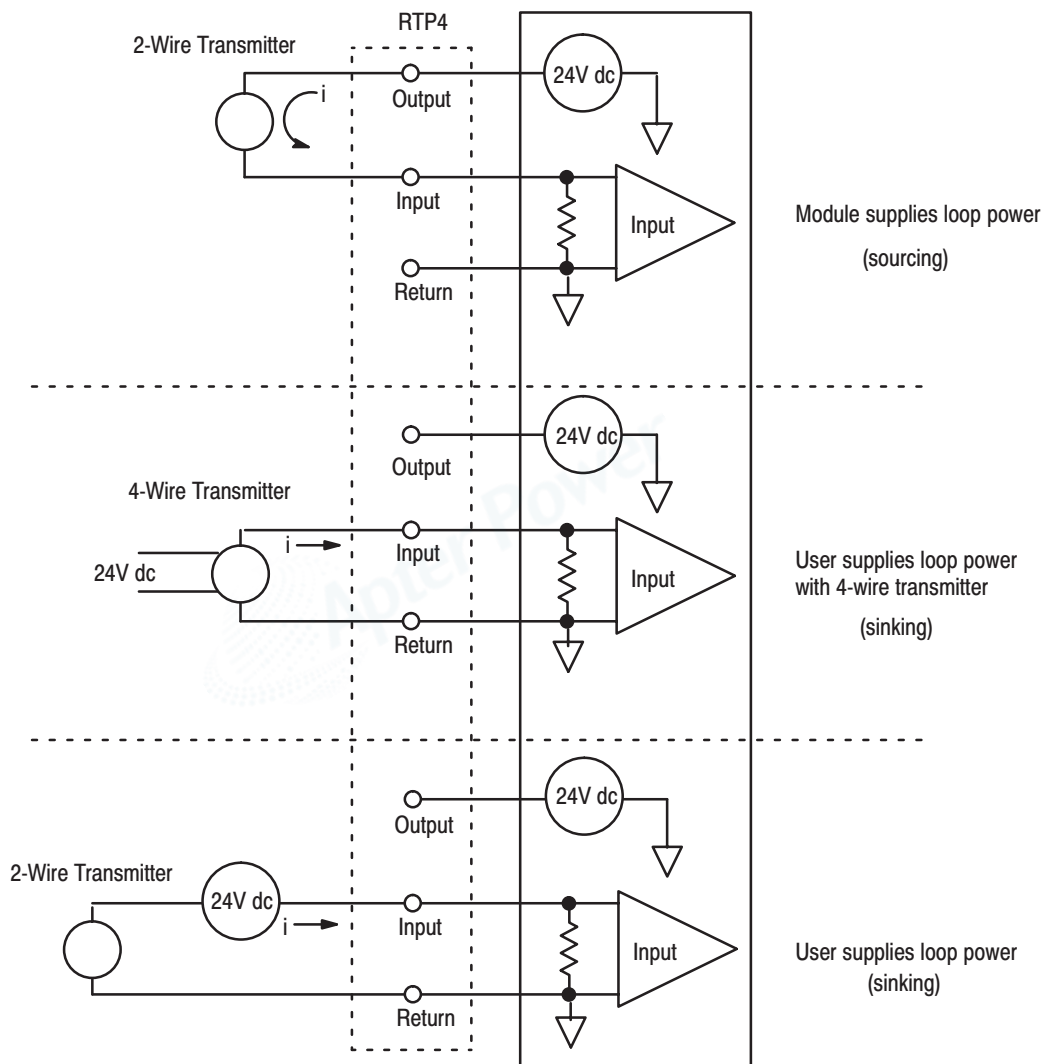
Calculate Power Requirements for the I/O Chassis

Your module receives its power through the 1771 I/O chassis backplane from the chassis power supply. The maximum current drawn by the module from this supply ranges from 1.5 to 3.3A, dependent upon the particular type of module. Refer to the specifications in appendix A for standard modules.

Sourcing Input Analog Modules

The 1771-NIS, 1771-NBSC and 1771-NB4S modules are sourcing/sinking input modules. These modules can supply the necessary loop power for 2-wire transmitters connected to the input. All loop power functionality is contained within the analog module. Examples of typical configurations are shown in Figure 2.6. No external resistors are required.

Figure 2.6
Examples of Sourcing/Sinking Input Modules



Inputs can be configured as sourcing or sinking inputs. For sourcing inputs, the N-series module supplies the loop power. For sinking inputs, you supply the loop power.

When the loop power is supplied externally, the 16-bit resolution provides 65535 counts over the 0–20mA current range. This provides about twice the resolution of voltage inputs with external resistors.

A-2 Specifications

Vibration	IEC 60068-2-6 (Test Fc, Operating) 2g @ 10-500Hz
ESD Immunity	IEC 61000-4-2 4kV contact discharges
Radiated RF Immunity	IEC 61000-4-3 10V/m with 1kHz sine-wave 80% AM from 30MHz to 1000MHz 10V/m with 200Hz 50% Pulse 100% AM at 900MHz
EFT/B Immunity	IEC 61000-4-4 ±1kV @ 5kHz on signal ports
Surge Transient Immunity	IEC 61000-4-5 ±2kV line-earth (CM) on shielded ports
Conducted RF Immunity	IEC 61000-4-6 10V rms with 1kHz sine wave 80% AM from 150kHz to 30MHz
Emissions	CISPR 11 Group 1, Class A (with appropriate enclosure)
Enclosure Type	None (open style)
Connecting Cable(s)	1771-NC6 = 1.8m (6ft) 1771-NC15 = 4.6m (15ft)
Field Wiring Arm Wiring Size	14-22AWG (2.5-0.25mm ²) solid or stranded copper wire rated at 60°C or greater
Insulation Category	3/64 inch (1.2mm) maximum 2 ¹
Keying	Between 26 and 28 Between 32 and 34
Certifications (when product is marked)	UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment CE ² European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4, Industrial Emissions EN 50082-2, Industrial Immunity EN 61000-6-2, Industrial Immunity EN 61326, Meas./Control/Lab., Industrial Requirements C-Tick ² Australian Radiocommunications Act, compliant with AS/NZS 2064, Industrial Emissions

¹ Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines."

² See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Temperature Specifications

	±100mV Thermocouple Input	-5 to +55mV Thermocouple Input	1-650Ω RTD Input
Input Range (selectable)	±105mV Type B: 300 to 1800°C (572 to 3272°F) Type E: -270 to 1000°C (-454 to 1832°F) Type J: -210 to 1200°C (-346 to 2192°F) Type K: -270 to 1372°C (-454 to 2502°F) Type R: -50 to 1768°C (-58 to 3214°F) Type S: -50 to 1768°C (-58 to 3214°F) Type T: -270 to 400°C (-454 to 752°F)	-5.5 to 56.0mV Type B: 300 to 1800°C (572 to 3272°F) Type C: 0 to 2315°C (32 to 4199°F) Type E: -20 to 735°C (-4 to 1355°F) Type J: -37 to 966°C (-34 to 1770°F) Type K: -71 to 1372°C (-95 to 2502°F) Type N: -270 to 1300°C (-450 to 2372°F) Type R: -50 to 1768°C (-58 to 3214°F) Type S: -50 to 1768°C (-58 to 3214°F) Type T: -73 to 400°C (-99 to 752°F)	4 to 650Ω 100Ω Pt a=0.00385 European standard: -200 to +870°C (-328 to +1598°F) 100Ω Pt a=0.003916 U.S. standard: -200 to +630°C (-328 to +1166°F) 10Ω copper: -200 to +260°C (-328 to +500°F) 120Ω nickel: -80 to +320°C (-112.1 to +608°F)
Maximum Input Resolution ¹	3.3μV/bit @ 15 bits with sign bit Type E, J, K, T: 0.1°C (0.2°F) ² Type B, R, S: 0.3°C (0.6°F) ²	0.95μV/bit @ 16 bits unipolar Type E, J, K, T, N: 0.03°C (0.06°F) ² Type B, R, S: 0.1°C (0.2°F) ² Type C: 0.07°C (0.1°F) ²	10mΩ/bit @ 16 bits unipolar 100Ω Pt & 120Ω Ni 0.03 °C (0.06 °F) 10Ω Cu 0.3°C (0.5°F)
Default Display Resolution	0.01mV / 0.1°C (0.1°F)	0.1mV / 1.0°C (0.1°F)	0.01 ohm / 0.1°C (0.1°F)
Temperature Scale (per module)	°C (°F)	°C (°F)	°C (°F)
Input Impedance	> 10 MΩ	> 10 MΩ	
Thermocouple Linearization	IPTS-68 standard, NBS MN-125	IPTS-68 standard, NBS MN-125	
Cold Junction Compensation	0 to 70°C ±0.25°C	0 to 70°C ±0.25°C	
Open Input Detection	upscale	upscale	upscale
Open TC Leakage Current	< 10 nA (maximum)	< 10 nA (maximum)	
Time to Detect Open Input	10s (maximum)	5s (maximum)	5s (maximum)
RTD Excitation Current			1mA (typical)
Input Overvoltage Protection	140V ac rms continuous	140V ac rms continuous	140V ac rms continuous
Normal Mode Rejection (50/60Hz)	50dB / 60dB (minimum)	50dB / 60dB (minimum)	50dB / 60dB (minimum)
Common Mode Rejection (60Hz)	150dB (typical)	150dB (typical)	150dB (typical)
Offset Drift (maximum)	±0.50μV/°C	±0.50μV/°C	±25 mΩ/°C
Gain Drift (maximum)	±35ppm/°C	±35ppm/°C	±50ppm/°C
Input Bandwidth	9Hz	9Hz	9Hz
Update Time (per module)	25ms (maximum)	25ms (maximum)	25ms (maximum)
Settling Time to within 0.1% of Full Scale	125ms (maximum)	125ms (maximum)	125ms (maximum)
Non-linearity	0.02% of full range (maximum)	0.02% of full range (maximum)	0.02% of full range (maximum)
Accuracy with Calibration (includes non-linearity, gain, offset)	0.01% of full range @ 25°C (typical) 0.05% of full range @ 25°C (maximum)	0.01% of full range @ 25°C (typical) 0.05% of full range @ 25°C (maximum)	0.025% of full range @ 25°C (typical) 0.05% of full range @ 25°C (max.)
Calibration Values	0.000 / 100.000mV	0.000 / 55.000mV	1.00 / 649.0Ω
Underrange Threshold	-103.0mV	-5.5mV	0.9Ω
Overrange Threshold	+103.0mV	+56.0mV	650Ω
Rate Alarm Value Minimum (0.04% FSR) Maximum (50% FSR)	0.08mV / 0.9°C (1.6°F) per second 100mV / 1050°C (1890°F) per second	24μV / 0.9°C (1.6°F) per second 30mV / 1050°C (1890°F) per second	0.26Ω / 0.44°C (0.8°F) per second 325Ω / 550°C (990°F) per second
Scaling Points → Default Scaling Values ³	-100/+100mV → -10000/+10000 -300/1800°C → -3000/18000 -508/3272°F → -5080/32720	-5/+55mV → -500/+5500 -300/1800°C → -3000/18000 -508/3272°F → -5080/32720 Type C only: -300/2500°C → -3000/25000 -508/4532°F → -5080/4532	+1/650Ω → +10/6500 -200/900°C → -2000/9000 -328/1652°F → -3280/16520

¹ Maximum resolution is obtained by rescaling input data to counts.

² These resolutions apply to the commonly used ranges for these thermocouples. See graphs.

³ Values shown are applicable when using 2's complement data format.