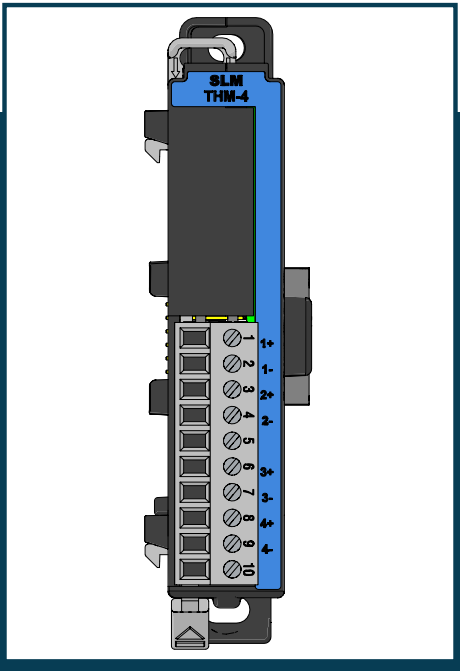
SLM-THM-4 Analog Input

The SLM-THM-4 Thermocouple Input Module provides four differential channels for receiving thermocouple and voltage input signals. For use with Synergy Logic Micro systems.



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Revision XA	9/5/2024

Technical Specifications

Input Specifications	
Input Channels	4 differential
Data Format	Floating Point
Common Mode Range	±0.5 V
Common Mode Rejection	100dB @ DC
Input Impedance	>5MΩ
Maximum Ratings	Fault Protected Inputs to ±50V
Resolution	16-bit, ±0.1 °C or °F
Thermocouple Input Ranges	Type J -190° to 760°C (-310° to 1400°F) Type E - 210° to 1000°C (-346° to 1832°F) Type K -150° to 1372°C (-238° to 2505°F) Type R 65° to 1768°C (149° to 3214°F) Type S 65° to 1768°C (149° to 3214°F) Type T -230° to 400°C (-382° to 752°F) Type B 529° to 1820°C (984° to 3308°F) Type N -70° to 1300°C (-94° to 2372°F) Type C 65° to 2320°C (149° to 4208°F)
Thermocouple Linearization	Automatic
Cold Junction Compensation	Automatic
Sample Duration Time	270ms
All Channel Update Rate	1.08 s
Open Circuit Detection Time	Within 5s
Conversion Method	Sigma-Delta
Accuracy vs. Temperature	±50ppm per °C (maximum)
Maximum Inaccuracy	±3°C maximum (excluding thermocouple error)
Linearity Error	±1°C maximum (±0.5 °C typical) Monotonic with no missing codes
Warm-up Time	30 minutes for ±1% repeatability 2 minutes to reach voltage specifications
External Power Supply Required	None

Technical Specifications

Voltage Input Specifications	
Linear mV Device Input Ranges	0–39.0625 mVDC, ±39.0625 mVDC, ±78.125 mVDC, 0–156.25 mVDC, ±156.25 mVDC, 0–1250 mVDC
Max Voltage Input Offset Error	0.05% @ 0°–60 °C, typical 0.04% @ 25°C
Max Voltage Input Gain Error	0.06% @ 25°C
Max Voltage Input Linearity Error	0.05% @ 0°–60 °C, typical 0.03% @ 25°C
Max Voltage Input Impedance	0.2% @ 0°–60 °C, typical 0.06% @ 25°C

Configuration/Diagnostics	
Linear mV Device Input Ranges	0–39.0625 mVDC, ±39.0625 mVDC, ±78.125 mVDC, 0–156.25 mVDC, ±156.25 mVDC, 0–1250 mVDC
Max Voltage Input Offset Error	0.05% @ 0°–60 °C, typical 0.04% @ 25°C
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Max Voltage Input Linearity Error	0.05% @ 0°–60 °C, typical 0.03% @ 25°C
Max Voltage Input Impedance	0.2% @ 0°–60 °C, typical 0.06% @ 25°C

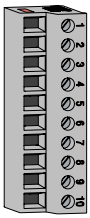
General Specifications

General Specifications	
Operating Temperature	0° to 50°C (32° to 122°F)
Storage Temperature	-20° to 70°C (-4° to 158°F)
Humidity	5 to 95% (non-condensing)
Altitude	2,000 meters max
Pollution Degree	2
Environmental Air	Pollution Degree 2 environment, no corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Overvoltage Category	II
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resisitance	>10MΩ @ 500VDC
Heat Dissipation	100mW
Enclosure Type	Open Equipment
Module Location	Any I/O position in a Synergy Logic Micro System
Field Wiring	Removable Terminal Block (included)
Terminal Type	18-Position Removable Terminal Block
Weight	58g (2.0 oz)
Agency Approvals	UL 61010 and UL 61010-2-201 File E139594, Canada and USA CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)*

*See CE Declaration of Conformance for details.

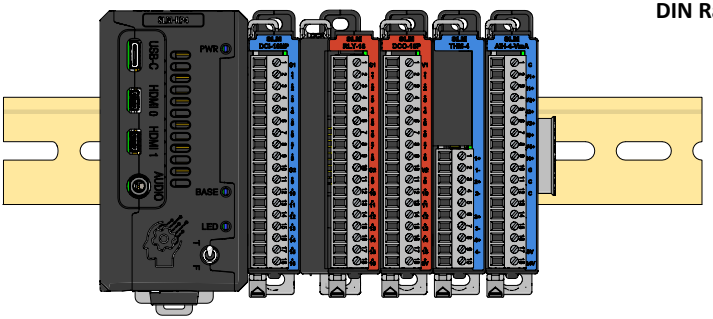
Terminal Block Specifications

Removable Terminal Block Specifications	
Part Number	Dinkle EC381F-S1672210P
Number of Positions	10 screw terminals
Pitch	3.5 mm
Wire Range	30–16 AWG (0.051–1.31 mm²) Solid / Stranded Conductor 3/64 in (1.2 mm) Insulation Max. 1/4 in (6–7 mm) Strip Length
Conductors	“USE COPPER CONDUCTORS, 75ºC” or equivalent.
Screw Driver Width	0.1 in (2.5 mm) Maximum*
Screw Size	M2
Screw Torque	2.5 lb·in (0.28 N·m)

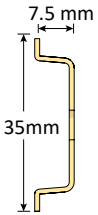


Mounting Clearances

The Synergy Logic Micro System can be secured within an enclosure or cabinet using mounting rails. Use rails that conform to DIN EN standard 50022. The rails are approximately 35mm high, with a depth of 7.5 mm.



DIN Rail Dimensions

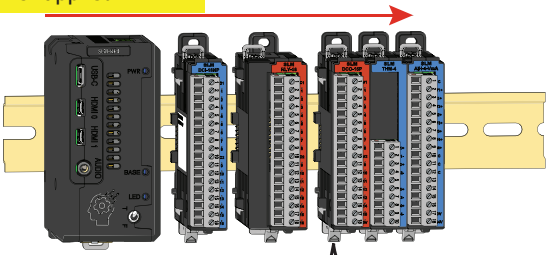


- Provide a minimum clearance of 2 inches (50mm) on all sides of the assembled system to allow proper airflow.
- Allow extra clearance for door-mounted operator panels, push buttons, lights, and other items.
- Maintain a minimum of 3 inches (76mm) of vertical clearance between the module(s) and any wire duct.
- Ensure a minimum of 7.2 inches (183mm) of vertical distance from chassis to chassis in a multiple unit installation.

Installation

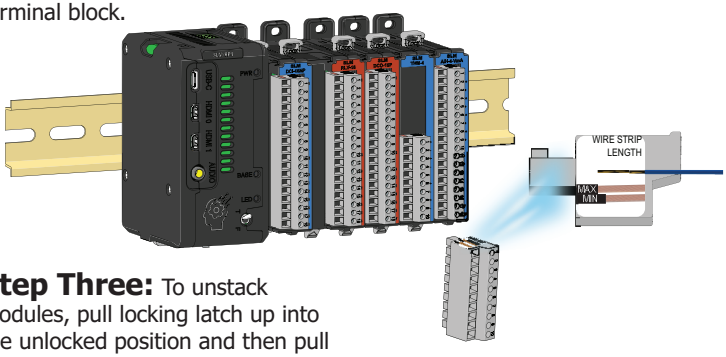
WARNING: Do not add or remove modules with field power applied.

Step One: With latch in "locked" position, align connectors on the side of each module and stack by pressing together.

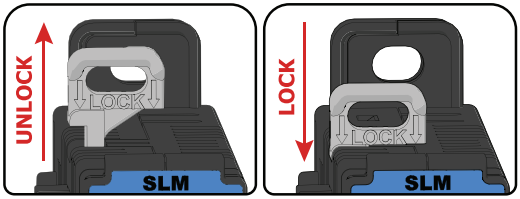


Ensure all latches are secure after modules are connected.

Step Two: Attach field wiring using the removable terminal block.



Step Three: To unstack modules, pull locking latch up into the unlocked position and then pull modules apart.



Installation

Mounting within an Enclosure:

Your selection of a proper enclosure is important to ensure the safe and proper operation of your Synergy Logic Micro System. Applications for the system vary and may require additional hardware considerations. The minimum considerations for enclosures include:

- Conformance to electrical standards
- Protection from the elements in an industrial environment
- Common ground reference
- Not exceeding the specified maximum ambient temperature
- Access to the equipment
- Security or restricted access
- Sufficient space for proper installation and maintenance of the equipment.

Mounting Position:

Mount the Synergy Logic Micro system horizontally, as shown in the cabinet illustration on the following page, to provide proper ventilation. Do NOT mount vertically, upside down, or on a flat horizontal surface.

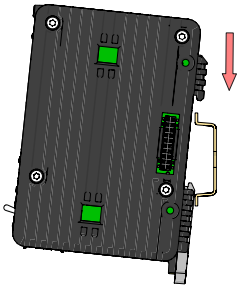
Temperature Considerations:

The Synergy Logic Micro System enclosure should be installed in an environment that falls within the specified equipment operating temperature range. If the environment temperature deviates above or below the specified operating temperature range, measures such as cooling or heating the enclosure should be taken to remain within the range specification.

Installation

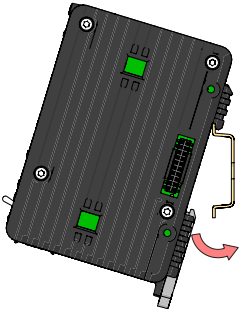
Follow the steps below to mount Synergy Logic Micro System modules onto DIN rail.

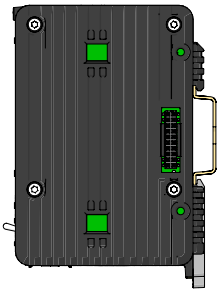
STEP 1



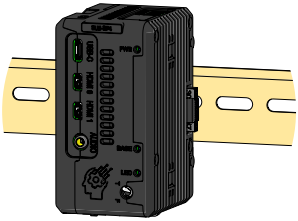
Insert DIN rail in mounting slots.

STEP 2



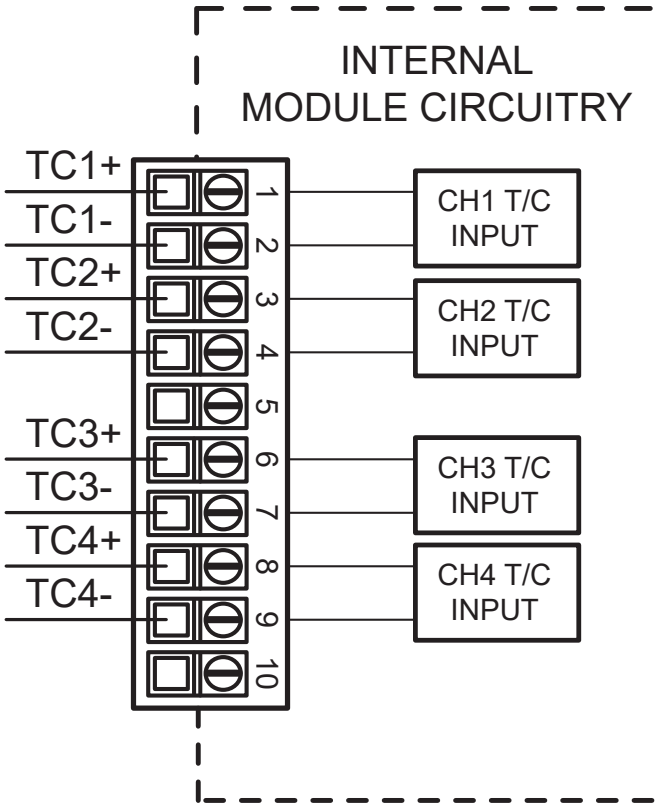


Rotate module ensuring clip snaps onto rail.



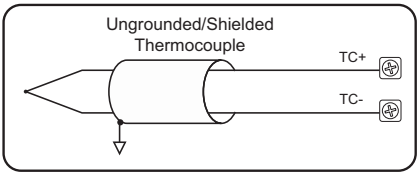
Module securely mounted on DIN rail.

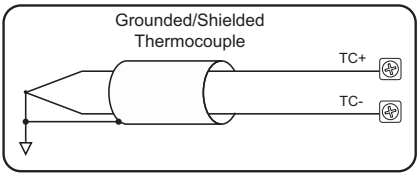
Schematic


INTERNAL
MODULE CIRCUITRY
TC1+
TC1-
TC2+
TC2-
TC3+
TC3-
TC4+
TC4-
1
2
3
4
5
6
7
8
9
10
CH1 T/C
INPUT
CH2 T/C
INPUT
CH3 T/C
INPUT
CH4 T/C
INPUT

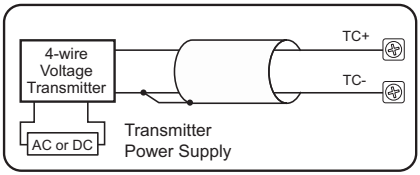
Wiring Diagram

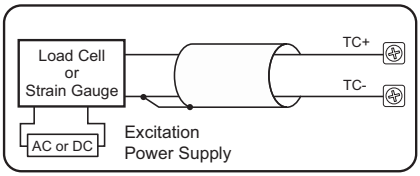
Thermocouple Input Circuits





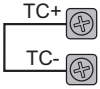
Voltage Input Circuits





NOTES:

1. Connect shield to thermocouple signal/ground only. Do not connect to both ends.
2. Install jumper wire on each unused input, TC+ to TC-.



3. With grounded thermocouples, take precautions to prevent having a voltage potential between thermocouple tips. A voltage of 0.5 V or greater between tips will skew measurements.
4. Use shielded, twisted thermocouple extension wire that matches the thermocouple type. Use thermocouple-compatible junction blocks.

Safety Precautions

Follow the manufacturer's guidelines for thermal management to prevent overheating.

WARNING: Thank you for choosing Synergy Logic equipment. Prior to installation or operation, carefully read this publication and any relevant materials. To mitigate potential safety risks, comply with local and national codes governing equipment installation and operation. Ensure adherence to the National Fire Code, National Electrical Code, and codes from the National Electrical Manufacturer's Association (NEMA) at a minimum. Local regulatory offices can provide additional guidance on codes and standards. Failure to comply may result in equipment damage or serious injury. Our products are not intended for High Risk Activities and do not come with a warranty for such applications. For warranty and safety details, refer to our Limited Warranty and Limitation of Liability statement which can be found at www.synergy-logic.com. For inquiries or additional information, contact us at support@synergy-logic.com. Synergy Logic reserves the right to modify products and publications without notice.

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Contact Information

To obtain warranty service, technical support, product inquires and additional information, please email us at **support@synergy-logic.com**

NOTE: Do not return parts directly to Synergy Logic without first obtaining return authorization.

Unauthorized returns can result in unavoidable delays.