Relay Multiplexer

Model AM416

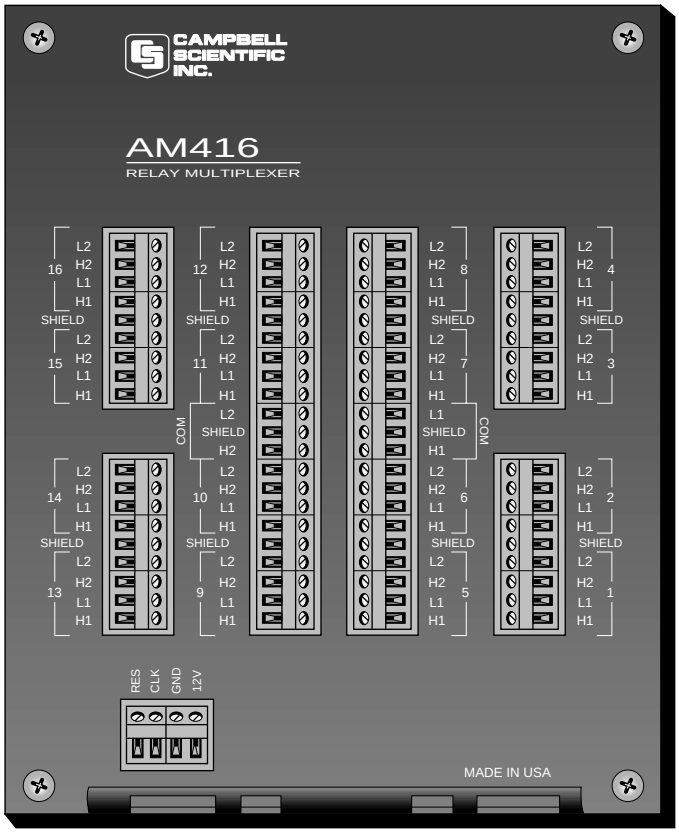
The AM416 Multiplexer increases the number of sensors that can be scanned by a CR10(X), 21X, CR23X, or CR7 datalogger. The AM416 sequentially multiplexes sixteen groups of four lines at a time (a total of sixty-four lines) through four common (COM) terminals. Compatible sensors include thermistors, thermocouples, potentiometers, load cells, strain gages, vibrating wires, and gypsum soil moisture blocks.

Number of Sensors Scanned

The maximum number of sensors multiplexed through one AM416 depends on the type(s) of sensors scanned. Examples, assuming identical sensors, are:

- Up to 32 single-ended or differential sensors that require two wires (e.g., thermistors, thermocouples, half bridges)
- Up to 16 single-ended or differential sensors that require four wires (e.g., full bridges, four-wire half bridges)
- Up to 32 vibrating wire sensors, in conjunction with the CR10(X) or CR23X and the AVW1 or AVW4 Vibrating Wire Sensor Interface
- Up to 32 gypsum soil moisture blocks. The AM416 eliminates the requirement for DC blocking capacitors on gypsum soil moisture blocks, significantly reducing sensor cost (Models 223 or 253).

Mixing sensor types may require special considerations. Contact Campbell Scientific for application assistance.



Datalogger Connections

A four- or five-conductor cable connects the measurement/excitation channels of the datalogger with the COM terminals of the multiplexer. This reduces the cost of cabling individual sensors on long wire runs. The maximum distance between the datalogger and the AM416 depends on the sensors, the scan rate, and the cable type used in the application.

Datalogger control and power to the AM416 are supplied via a four-conductor cable. The AM416 requires one datalogger control port to enable a scan (reset terminal), and a second control port or an excitation channel to "clock" through the channels (clock terminal). Either the datalogger's power supply or a separate 12 VDC supply is used to power the multiplexer.

Scanning Multiple AM416's

Several AM416's may be connected to the same datalogger; usually up to three AM416's with a CR10(X), four with a 21X, and six with a CR23X. Sequential scanning requires a common clock line and separate reset lines. Simultaneous scanning is possible when the reset and clock lines are common.

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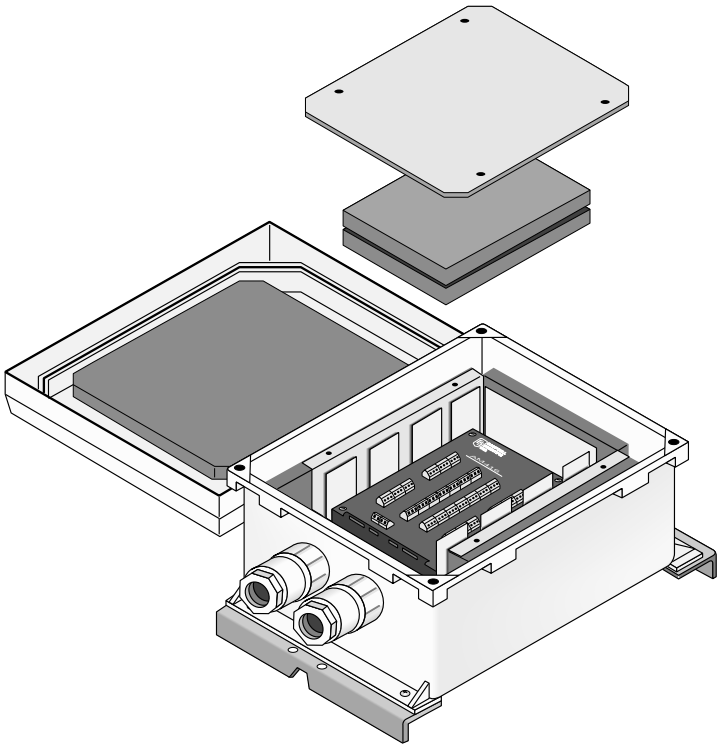
Environmental Enclosures

The AM416 operates in most field conditions but requires a non-condensing environment. A weather-resistant enclosure equipped with desiccant is required for field use.

The AM-ENC Multiplexer Enclosure is recommended for non-thermocouple applications. The AM-ENCT (shown at right) has foam insulation (dark gray) and internal aluminum plates. These components aid in reducing temperature gradients. Thermocouple wires should be routed around the aluminum plates to dissipate conducted heat. The AM-ENCT has a thermal time constant (τ) of 1 hour 25 minutes (10%) at 2 m/s wind speeds.

Each enclosure houses one AM416 and has conduit bushings for cable entry. The white fiberglass enclosures can be attached to a 1.25" IPS pipe (1.660" OD) or lag-bolted to a flat surface.



Specifications

Electrical

- Power: 9.6 to 16 VDC (under load), unregulated
- Current drain: < 100 µA-quiescent; 17 mA-active (average)
- Reset levels: < 0.9 V-inactive; 3.5 to 16 V-active
- Clock levels: Scan advance occurs on the leading edge of the clock pulse (from below 1.5 V to above 3.5 V)
- Minimum clock pulse width: 5 ms
- Initial relay resistance, closed: 0.1 ohm
- Maximum switching current: 500 mA switching currents greater than 30 mA (occasional 50 mA, acceptable) degrades the suitability of that channel for switching low-voltage signals.
- Minimum contact life: 10^7 closures

Physical

- Operating temperature: -25° to +50°C (typical)
- Operating humidity: 0 to 95%, non-condensing
- AM416
  Size: 6.5"W x 8.2"L x 1.5"D
  Weight/shipping: 1.5 lbs/6.0 lbs
- AM416 (with AM-ENC)
  Size: 11.3"W x 13.5"L x 5.6"D
  Weight/shipping: 12.0 lbs/16.0 lbs
- AM416 (with AM-ENCT)
  Size: 11.3"W x 13.5"L x 5.6"D
  Weight/shipping: 12.6 lbs/18.0 lbs

If you have questions concerning the use of the AM416 in your application, please call Campbell Scientific.

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