Relay Multiplexer

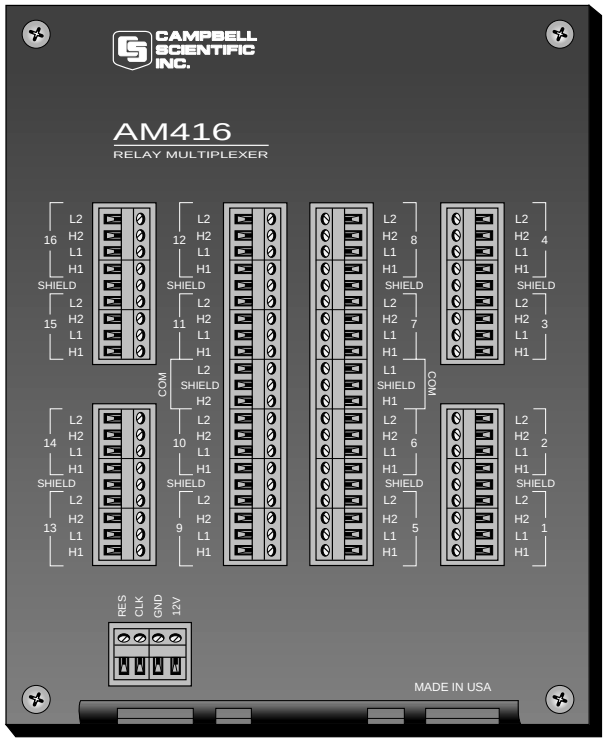
Model AM416

The AM416 Multiplexer increases the number of sensors that can be scanned by a CR10(X), 21X, CR23X, CR5000, 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, potentiometers, load cells, strain gages, vibrating wires, water content reflectometers and gypsum soil moisture blocks. The AM416 not only increases system channel capacity, it also reduces the cost of cabling individual sensors on long wire runs. The maximum distance between the datalogger and the AM416 is determined by the sensors used, the datalogger's scan rate, and the cable used in the applications.

Number of Sensors Scanned

The maximum number of sensors multiplexed through one AM416 depends on the type(s) of sensors scanned. For example, assuming identical sensors, the AM416 can multiplex:

- Up to 32 single-ended or differential sensors that require two wires (e.g., thermistors, half bridges)
- Up to 16 single-ended or differential sensors that require four wires (e.g., full bridges, four-wire half bridges)
- Up to 48 half-bridge measurements (assumes common excitation and completion resistors at the dataloggers)
- Up to 32 vibrating wire sensors, in conjunction with the CR10(X) or CR23X and the AVW1, AVW4, or AVW100 Vibrating Wire Sensor Interface
- Up to 48 CS615 Water Content Reflectometers (assumes common excitation)
- Up to 32 gypsum soil moisture blocks (models 223 or 253). The AM416 eliminates the requirement for dc blocking capacitors on gypsum soil moisture blocks, significantly reducing sensor cost



The new version of SCWin software (available free of charge from our Web site) supports simple programs and generates wiring diagrams for AM416 applications.

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

Datalogger Connections

Campbell Scientific offers the MUXSIGNAL_L, a four-conductor cable (with shield) to connect the measurement/excitation channels of the datalogger with the COM terminals of the multiplexer. Another cable, the MUXPOWER_L, is used to power and control signals to the datalogger. This cable is also a four-conductor cable with shield. 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, depending on the number of control ports and analog inputs available. For example, some customers have connected six multiplexers to one datalogger. This assumes that adequate analog inputs, plus eight control ports, two for clock lines and six for enable lines, are available.

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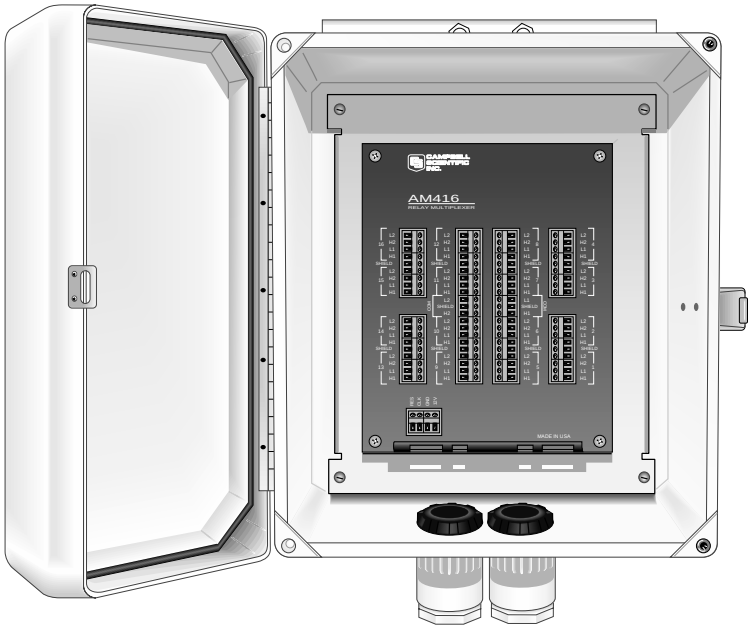
Environmental Enclosures

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. The AM-ENC houses one AM416 and has conduit bushings for cable entry. This white fiber-glass enclosures can be attached to a 1.25" IPS pipe (1.660" OD) or lag-bolted to a flat surface. If the AM416 is housed in the datalogger's enclosure, a larger enclosure (e.g. ENC 16/18) is required.



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 (16.5 x 20.8 x 3.8 cm)
  Weight/shipping: 1.5 lbs/6.0 lbs (0.68 kg/2.72 kg)
- AM416 in AM-ENC
  Size: 11.3"W x 13.5"L x 5.6"D (28.7 x 34.3 x 14.2 cm)
  Weight/shipping: 12.0 lbs/16.0 lbs (5.44 kg/7.26 kg)

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

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