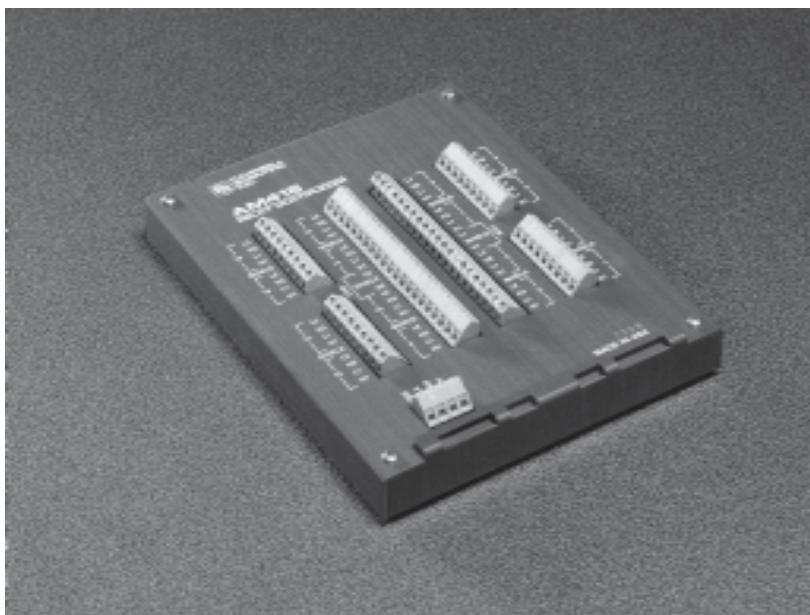


AM416 Relay Multiplexer



**Add up to 32 differential input channels to your
Campbell Scientific datalogger**

Description

The AM416 is used with any Campbell Scientific datalogger (except the CR500 series) to increase the number of sensors which can be scanned. It is positioned between the sensors and the datalogger and, using relays, it sequentially connects each of the sixteen groups of four lines to the common output terminals.

Many different sensor types can be multiplexed, including thermocouples, thermistors, potentiometers, strain gauges, soil moisture blocks and vibrating wire sensors. Different sensor types can also be connected to a single AM416 – please contact Campbell Scientific for further details.

Scanning Multiple AM416s

Several AM416s can be connected to a single datalogger for totally independent analogue readings.

The nominal limit is three AM416s for a CR10/10X and four AM416s for a CR23X, CR7 or 21X. These nominal limits may be increased, depending on the system configuration. Please contact us for further details.

Maximum Number of Sensors

The AM416 can multiplex a total of 64 lines, four of which are connected through to the datalogger at any one time. The actual number of sensors which can be multiplexed will depend on the system configuration and the sensor type. Maximum numbers for various sensor types are given overleaf.

Key Features

Cost-effective route to extra analogue channels

Compatible with most common sensors

Can be used with mixed sensor types

Suitable for use in bridge circuits

Can be located remotely from datalogger to minimise cabling costs

Typical Applications

Automotive testing

Structural monitoring

Scientific and environmental research

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Specifications

Electrical

Power: 9.6 to 16V DC

Current Drain: <100µA quiescent, 17mA active (average)

Reset Levels: <0.9V inactive, 3.5V to 16V active

Clock Levels: Scan advance occurs on the leading edge of the clock pulse (from below 1.5V to above 3.5V).

Minimum Clock Pulse Width: 5ms

Initial Relay Resistance (closed): 0.1Ω

Maximum Switching Current: 500mA – switching currents greater than 30mA (occasional 50mA is acceptable) degrades the suitability of that channel for switching low signal voltages

Minimum Contact Life: 10⁷ closures (optimum)

Physical

Construction: Anodised aluminium case, designed to reduce temperature gradients across terminal strips. Built in strain relief flange on top edge of case. Sensor inputs do not have spark gaps.

Operating Temperature: -40°C to +65°C

Operating Humidity: 0 to 95% non-condensing

Dimensions: 210 x 165 x 38mm (without enclosure) 288 x 343 x 143mm (with AM-ENCT enclosure)

Weight: 0.7kg

Connections to a Datalogger

A maximum of nine conductors is required for all sensor, control and power functions. Cable costs can therefore be significantly reduced by siting the AM416 away from the datalogger. The maximum cable length between the AM416 and

the datalogger depends on the sensors, the scan rate and the cable type. Each AM416 needs one datalogger control port for the enable function plus another control port or 5V excitation channel for clocking. Several AM416s can share one control port for the clock line. Power can be supplied from the datalogger or from a separate battery.

Grounding

Each differential channel has a ground terminal for connection of sensor shields. These ground terminals are connected to the AM416's main grounding terminal, which should be connected to the datalogger's power ground.

Maximum Cable Length

Maximum cable length is sensor and scan rate dependent (longer leads necessitate longer measurement delays). See the datalogger manual for more specific information.

Maximum Number of Sensors

The AM416 multiplexes a total of 64 lines, four of which are connected through to the datalogger at any one time. This means that the AM416 can provide:

- 32 differential input channels (four common lines connected to two datalogger differential channels)
- 32 single-ended input channels (two common lines connected to datalogger ground, two to datalogger single-ended channels)
- 64 single-ended channels (all four common lines connected to datalogger single-ended channels, sensor grounds routed separately via customer-supplied commoning blocks to datalogger ground)

Examples of Maximum Number of Sensors per AM416:

- 32 thermocouples
- 48 thermistors with completion resistors at the datalogger
- 16 four-wire full bridges (AM416 switches the bridge output and the excitation lines)
- 16 six-wire full bridges (in conjunction with a second multiplexer or common – i.e. unswitched – excitation)
- 16 vibrating wire sensors (in conjunction with a CR10/10X or CR23X and an AVW1 Vibrating Wire Interface)

Environmental Enclosures

The AM416 operates in most field conditions but requires a non-condensing environment. Outdoor applications require a weather-resistant enclosure with desiccant.

A remote AM416 can be housed in the AM-ENC enclosure, which is constructed from white fibreglass and has two cable glands. It can be mounted to pipework or bolted to a flat surface. Special 'stacking brackets' are available to allow more than one AM416 to be easily and neatly fitted.

For thermocouple applications the AM-ENCT Thermally Insulated Enclosure is recommended. This is similar to the AM-ENC, but has foam insulation and internal aluminium plates to reduce internal temperature gradients.

The AM416 can also be fitted with the datalogger in a standard ENC 12/14 or ENC 16/18 enclosure.

For more information on enclosure options, please call Campbell Scientific or your local representative.

**Please call for assistance in
configuring the AM416 in
your application**

*Campbell Scientific products are
available from:*