

Alpha 614

STRAIN GAUGE MODULE



What is the Alpha 614 Strain Gauge Module?

The 614 and 614A provide 16 three-pole channels, which can be used for voltage or current measurement at up to 19 bit resolution and 1uV integrity. Pairs of these channels can be combined to make strain gauge measurements with six poles. Full, half and quarter bridge strain measurements are supported. The measurement resolution of a 350 bridge with two active gauges can be as high as 0.1uE. Strain energisation is by constant voltage with full remote sensing to eliminate lead and connector resistance errors. The bridge supply is directly derived from the A-D reference so that the effect of drift in these circuits does not affect measurement accuracy. Initial bridge unbalance can be compensated for. High quality cage clamp two part screw terminals are used for all connections.

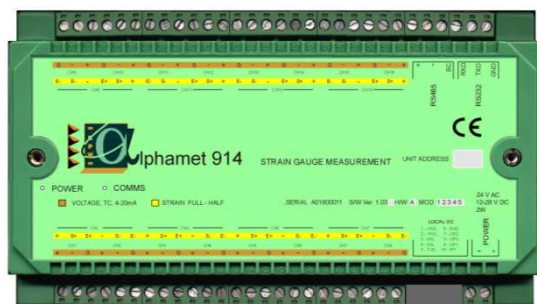
The 614/614A can be programmed to integrate signals to be measured over one or more complete mains cycles (50 - 60 Hz) allowing measurements to reject large levels of mains borne interference super imposed on micro-volt signals. During a measurement an auto-ranging facility ensures an input channel is measured on the best range to maintain maximum measurement resolution. A choice of measurement conversion resolution and speed is provided. These features together with a digital filter function and precision hardware design achieve excellent noise performance in strain gauge applications and general voltage measurements.

Measurements, measurement linearisation, measurement processing and communications are concurrent tasks for optimum performance. Calibration is performed by applying reference inputs and issuing commands to the module. No internal access is required.

As with most other modules in the Alpha series a local serial interface can be used to program and monitor operation locally independent of the communications on the RS485 network. This can be very convenient during installation or used later to diagnose application problems at the measurement site. Alternatively it could be used with a permanent local process display. Customised display output can be provided.

LOCAL OUTPUT FACILITIES (614A)

The 614A can be used with an auxiliary output termination panel. This connects to the 914 with a 10-way ribbon connector. A number of digital outputs and digital inputs can be provided on this panel. These can be controlled directly using commands sent on either serial interface. Alternatively the standard firmware can be configured to utilise this auxiliary I/O in a particular way for an application. Such a function can run independently of any communications from a host computer. For example they could be used to drive a local status panel, or provide synchronisation to external equipment or events.



Features

Strain, Voltage and Current inputs in compact DIN rail module.

Up to 16 Voltage or 8 Strain channels

13 to 19 bit resolution.

200 to 10 measurements per second

Programmable Measurement Types

Full, half and quarter strain bridge support

120R to 1000R Gauges

Auxiliary I/O expansion (614A option)

Scaling, alarm levels, filter functions

Second local diagnostic serial interface

High speed communications

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Specifications Details

Number of channels / module:	16
Number of 6 pole channel:	up to 8
Number of 3 pole channels:	Up to 16
Connector type input channel:	2 part screw terminal High quality cage clamp
Measurement modes:	
Voltage	uV DC mV DC 4-20mA ¼ bridge strain ½ bridge strain Full bridge strain

A-D Converter

5 Measurement resolutions are supported:	19 bits at 10 measurements/s 18 bits at 20 measurements/s 17 bits at 40 measurements/s 15 bits at 100 measurements/s 13 bits at 200 measurements/s
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In addition a channel filter function can be applied to any channel.

Voltage Measurement

Input voltage ranges	+10V to-10V +1.5V to-1.5V +180mV to-180mV +23mV to-23mV
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Automatic range selection is supported.

DC measurement accuracy	+/- 0.015% of reading + 0.01% of range + 6uV
Temperature coefficients DC voltage	25ppm rdg + 0.1uV/ ° C
Measurement sensitivity	<0.5uV on +23mV>-23mV range at 18bits

Note: Displayed sensitivity depends on reporting format.
Additional error at 200/sec mode of 0.05% of range.

Strain Measurements

Bridge Configurations	Full>=350R Half>=350R Full 120R (option) Half 120R (option) Quarter External Dummy
Bridge Supply Bridge Voltage	Voltage remote sensed 1.7V to 5.0V depending On mode of resistance
Accuracy	350R Full 0.05%rdg+3uE 350R Half 0.05%rdg+5uE 120R Full 0.05%rdg+6uE 120R Half 0.05%rdg+5uE
Measurement repeatability 24Hrs	2uE
Sensitivity 350R Half, Full, 120R Half	0-7000uE 0.1uE 7000-12000uE 0.8uE
120R full bridge	0-10000uE 0.2uE
Temperature coefficient	350R Full 0.003%rdg/°C 350R Half 0.003%rdg+2uE/°C 120R Full 0.003%rdg/°C 120R Half 0.003%rdg+2uE/°C

(Accuracies are stated for gauge factor 2, 2 active gauges, 18 bit ADC, at 23°C for 1 Yr)

All specifications subject to change without notice; correct at time of publication. Issue 5.01 DS914A04 refers to 1.05 firmware.

Interference Rejection

AC Common mode rejection ratio channel group:	<0.1uV/V
AC Single channel common mode rejection ratio:	<1uV/V
DC channel common mode rejection ratio:	<5uV/V
AC series mode rejection ratio 50 or 60 Hz +/- 0.05% (Applies to 17,18,19 bit measurements).	<1 mV/V
Maximum voltages operating:	
Max. voltage between any (+) and (-) inputs:	12V
Max. voltage between any two (-) input terminals:	11V
Max. voltage between any two terminals:	22V

Overload Protection

Channel Overload Protection	Passive 50V continuous 150V for short periods
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Isolation

Isolation test voltage between channel group and power supply or RS485:	Tested at 1500V
Input current of instrumentation amplifier	5nA
Input impedance of operating	>10m 0-12V

Auxiliary Channel Expansion (614A)

Connector type	10 Way IDC
Compatible termination panels	Contact supplier

Power Requirement

Connector	2-pole screw terminal
Voltage	24V AC I 12 to 28V DC
Current	200mA at 12V 120mA at 24V

General

RS485 INTERFACE	See Manual Baud rates to 153KB
Local series interface	RX TX 0 to 5V levels Compatible with most RS232 peripherals
STATUS LED's	2
Function	Power / Fault comms
Size	180*100*40mm
Weight	400g
Mounting	DIN rail Stackable
Operating Temperature Range	-20 to 70°C
Relative Humidity (noncondensing)	<90% 0 to 40°C
Vibration	3g 0hz to 400Hz in 3 planes
Programming storage	Secure flash memory

Stated Accuracy's are at 23° C