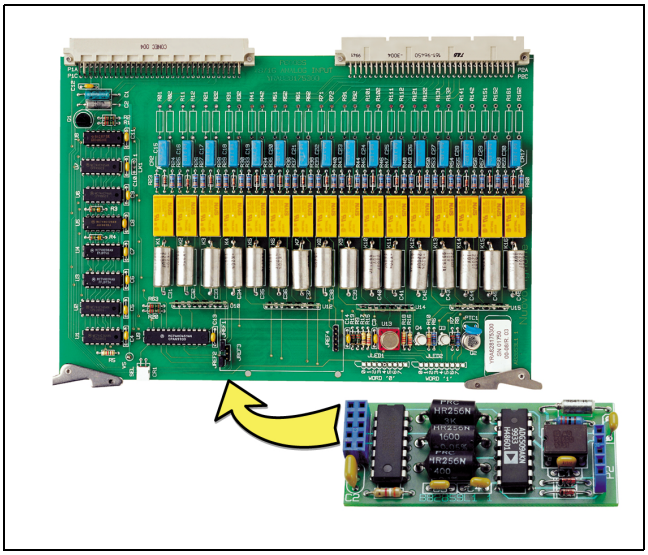
I/A Series® Remote Terminal Unit (RTU)
RTU 20 – 14 Analog Input/Reference Voltage Module



The 14 Analog Input/Reference Voltage module is a full-size electronic board in the I/A Series RTU 20 designed to read and convert 14 analog inputs from the field.

Analog inputs can be:

- current signals
- voltage signals.

Piggy-back adapters can be installed on four input connectors inside the additinal terminal board to accept other signals like RTD, T/C Type K, T/C Type J.

Analog inputs are sampled by multiplexing the relevant relay (one for each measure) every x seconds (programmable time). The relay's expected lifecycle is 10^8 operations.

The use of a relay-based multiplexer provides a high common mode noise rejection, typically greater than 100 dB.

The input signal buffering is executed with flying capacitor technique (one capacitor per analog input).

Each capacitor is charged by the relevant analog signal coming from the field.

It is switched, for about 16 ms, to the input of the "successive-approximations type" analog-to-digital converter (ADC) housed in the RTU's central processing unit (CPU).

This data acquisition method is very effective in terms of accuracy and acquisition rate (about 50 conversions per second), providing a circuit isolation from the external signals equal to the relay contact isolation voltage (1500 Vrms).

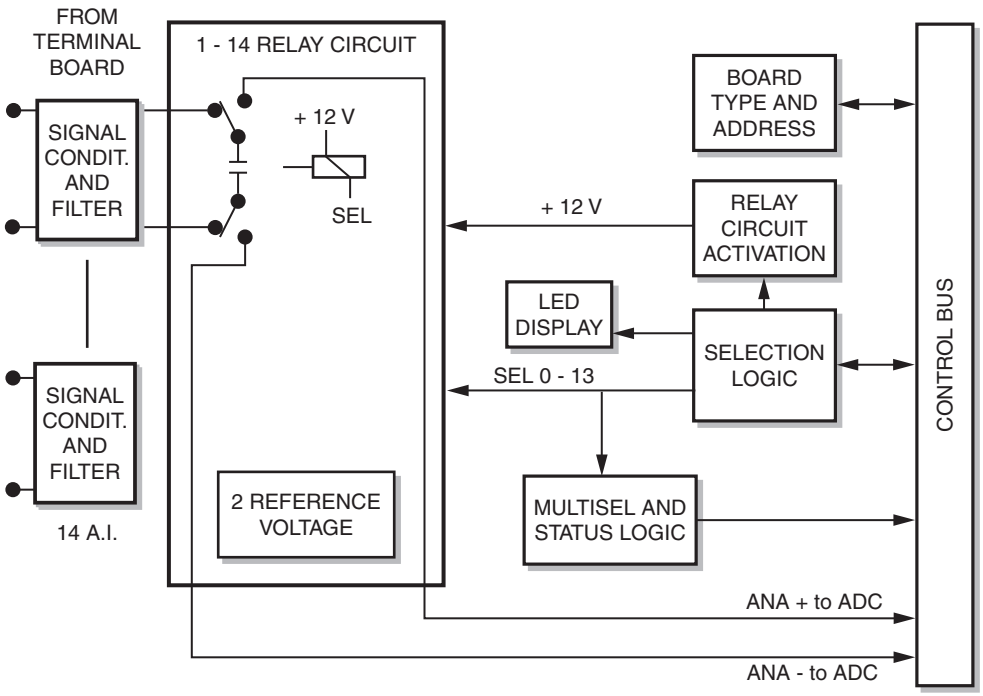
Each acquisition channel (analog input) is provided with a 6 dB per octave (30 dB at 50 Hz) single-cell filter to reject noise in differential mode.

The two reference voltages (life-zero and full scale values) are used to continuously check the analog-to-digital converter (ADC) precision.

Signal conditioning is performed inside the additional terminal board (external to the module), using precision resistive dividers that, properly configured, can interface with wide voltage and current input ranges.

Several LEDs, located on the module's front edge, provide local fault indication and analog input status, while an optional alphanumeric LCD display (mounted on the RTU cabinet) can monitor the analog input values and status, on request.

14 ANALOG INPUT/REFERENCE VOLTAGE MODULE – BLOCK DIAGRAM



SPECIFICATIONS

Inputs
14 multiplexed relay/flying capacitor floating inputs and 2 reference voltage inputs

Maximum Power Requirements
+5 V dc/3 mA, +12 V dc/16 mA (on relay activation)

Signal Conditioning
Built-in resistive dividers ±0.02% precision

Input Filtering
Single-cell filters 6 dB per octave (30 dB at 50 Hz)

Application Data Format
Binary

Input Mode
Differential

Isolation
1500 Vrms (relay coil contacts)

Noise Rejection
100 dB (common mode)
30 dB at 50 Hz (differential mode)

Relay Specifications
Expected lifecycle: 10^8 operations, gold-plated contacts

Accuracy at 25°C(a)
0.1%

Output Offset Drift with Temperature(a)
0.002%/°C

Digital Resolution(a)
12 bits

Digital Output Reading(a)
4095 and overflow bit

Acquisition Rate(a)
50 conversions per second

Operating Temperature
–25°C to +70°C

Field Cable Connection
Removable screw-terminal blocks on dedicated terminal board connected to module's backplane

Diagnostics and Status
LED indicators on module's front edge

(a)Refer to the analog-to-digital converter (ADC) on CPU module.

Table 1.

Input Signals	Input Impedance	Less Significant Bit (LSB)	Maximum Continuous Overload
0 to 2 V	≥ 100 KOhm	0.5 mV	10 V
0 to 5 V	≥ 5 KOhm	1.25 mV	25 V
0 to 10 V	≥ 10 KOhm	2.5 mV	50 V
0 to 20 mA	100 Ohm	5 µA	100 mA
4 to 20 mA	100 Ohm	5 µA	100 mA

The Foxboro Company
33 Commercial Street
Foxboro, Massachusetts 02035-2099
United States of America
http://www.foxboro.com
Inside U.S.: 1-508-543-8750 or 1-888-FOXBORO (1-888-369-2676)
Outside U.S.: Contact your local Foxboro representative.

MB 021 Printed in U.S.A. 0201