Analog Input Modules

This section describes the Analog Input Modules available with Tricon v9–v10 systems. For installation information, see Replacing I/O Modules on page 223.

Table 11 Analog Input Modules

Model	Voltage Range	Type	Module Description
3700 3700A	0–5 VDC	TMR	Analog Input
3701	0–10 VDC	TMR	Analog Input
3703E	0–5 or 0–10 VDC	TMR	Isolated Analog Input
3704E	0–5 or 0–10 VDC	TMR	High-Density
3720[1]	0–5 VDC	TMR	High-Density Single-Ended
3721[1]	0 to 5 or –5 to +5 VDC	TMR	Differential

1. The 3720 and 3721 modules can be installed only in Tricon v10.2 and later systems.

All Analog Input Modules have three independent input channels. Each input channel receives variable voltage signals from each point, converts them to digital values, and transmits the values to the three Main Processors on demand. To ensure correct data for every scan, one value is selected using a mid-value selection algorithm. Sensing of each input point is performed in a manner that prevents a single failure on one channel from affecting another channel.

The 3700A, 3703E, and 3704E, 3720, and 3721 Analog Input Modules provide a six percent over-range measurement capability. The 3703E provides open-input detection, which can be configured as upscale or downscale in TriStation 1131. If an open input (< 0 VDC) goes out of range downscale, the Main Processors receive the integer value –32,767. If an open input (> 5 VDC or 10 VDC) goes out of range upscale, the Main Processors receive the integer value +32,767.

The 3720 and 3721 can be configured in TriStation 1131 for either Standard (12 bit) resolution or High (14 bit) resolution. In High resolution, the 3721 can be configured in TriStation 1131 for Unipolar (0 to 5 VDC) or Bipolar (-5 to +5 VDC) inputs.

Each Analog Input Module sustains complete, ongoing diagnostics for each channel. Failure of any diagnostic on any channel activates the Fault indicator for the module, which in turn activates the chassis alarm signal. The Fault indicator points to a channel fault, *not* a module failure. The module is guaranteed to operate properly in the presence of a single fault and may continue to operate properly with some multiple faults.

Analog Input Modules include the hot-spare feature which allows online replacement of a faulty module. Like all I/O modules, Analog Input Modules require a separate field termination assembly with a cable interface to the Tricon controller backplane. Each module is mechanically keyed to prevent improper installation in a configured chassis.

Mis-Compare Readings

All Analog Input Modules are susceptible to mis-compare readings which can increase the probability of a fault. Generally, the greater the difference between readings and the longer the period of mis-compares, the more probable that a fault will be declared. The amount of difference and period varies among Analog Input Modules.

- For models 3700, 3700A and 3701, if the readings differ by a minimum of 2% of full scale and continue for a minimum period of 40 input samples, the probability of a fault increases.
- For models 3703E and 3704E, if the readings differ by a minimum of 0.5% of full scale and continue for a minimum period of 256 input samples, the probability of a fault increases.
- For models 3720 and 3721, if the readings differ by a minimum of 0.5% of full scale and continue for a minimum period of 25 input samples, the probability of a fault increases.

32-Point Differential Analog Input Modules

This figure is a simplified schematic for models 3700, 3700A, and 3701, which are 32-point TMR Analog Input Modules.

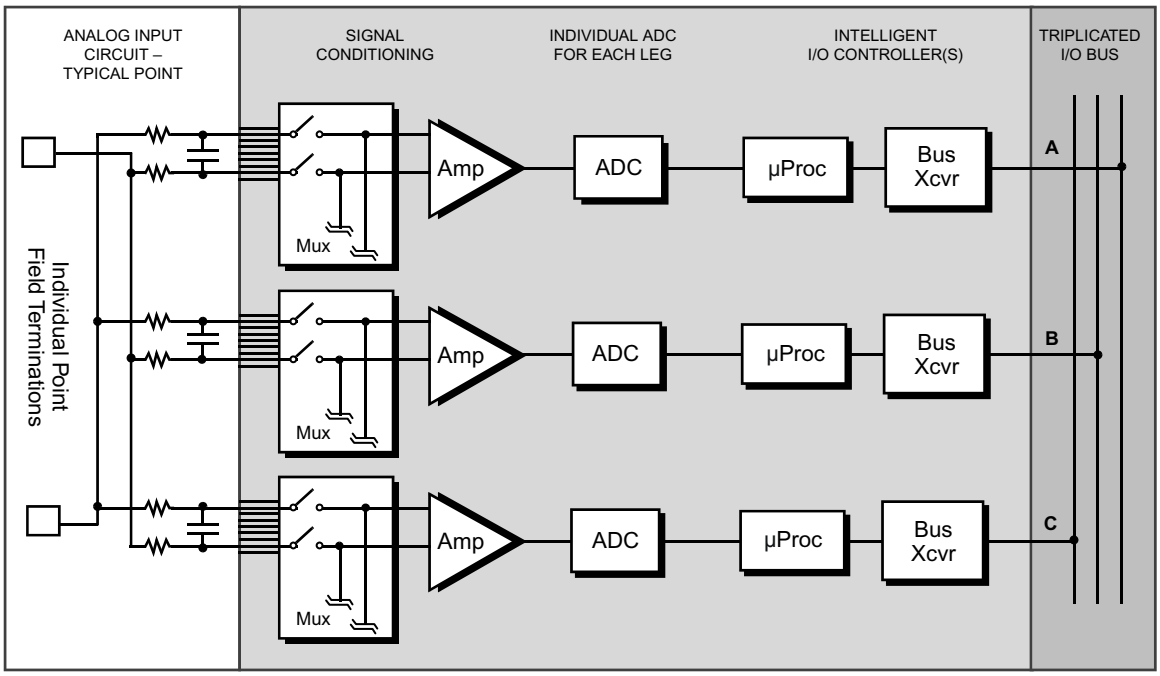

Figure 17 3700, 3700A, and 3701 Simplified Schematic

This figure is a simplified schematic for model 3721, which is a 32-point TMR Analog Input Module with field-to-system isolation.

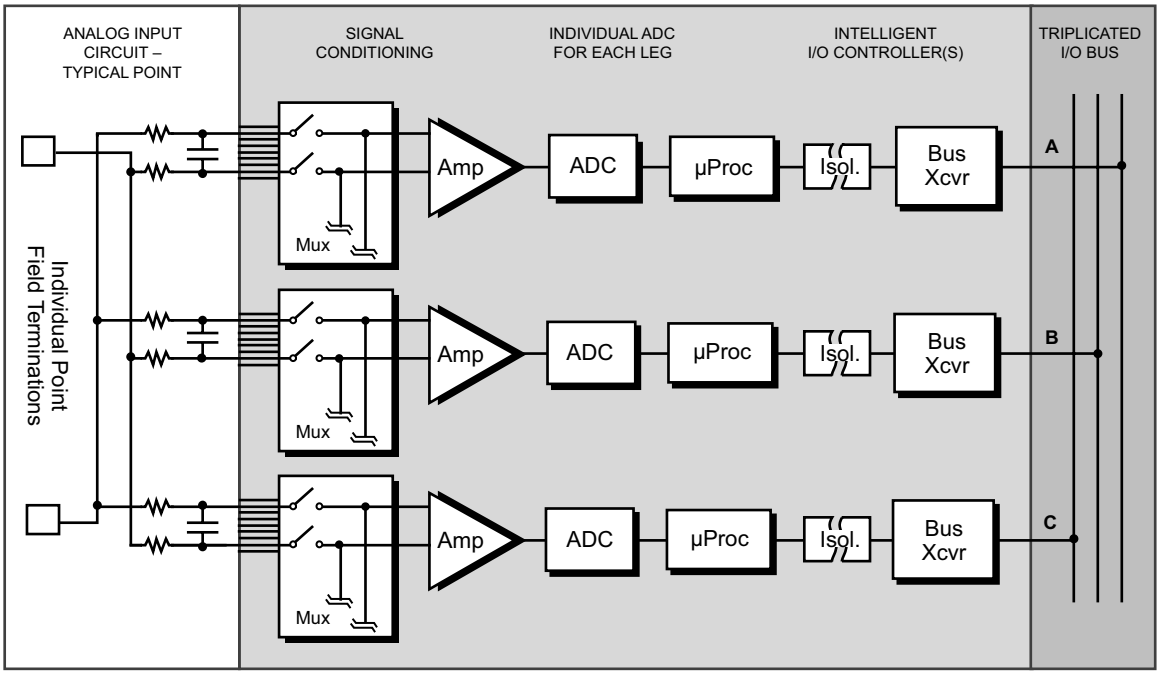

Figure 18 3721 Simplified Schematic

This figure shows the front panels of models 3700, 3700A, 3701, and 3721.

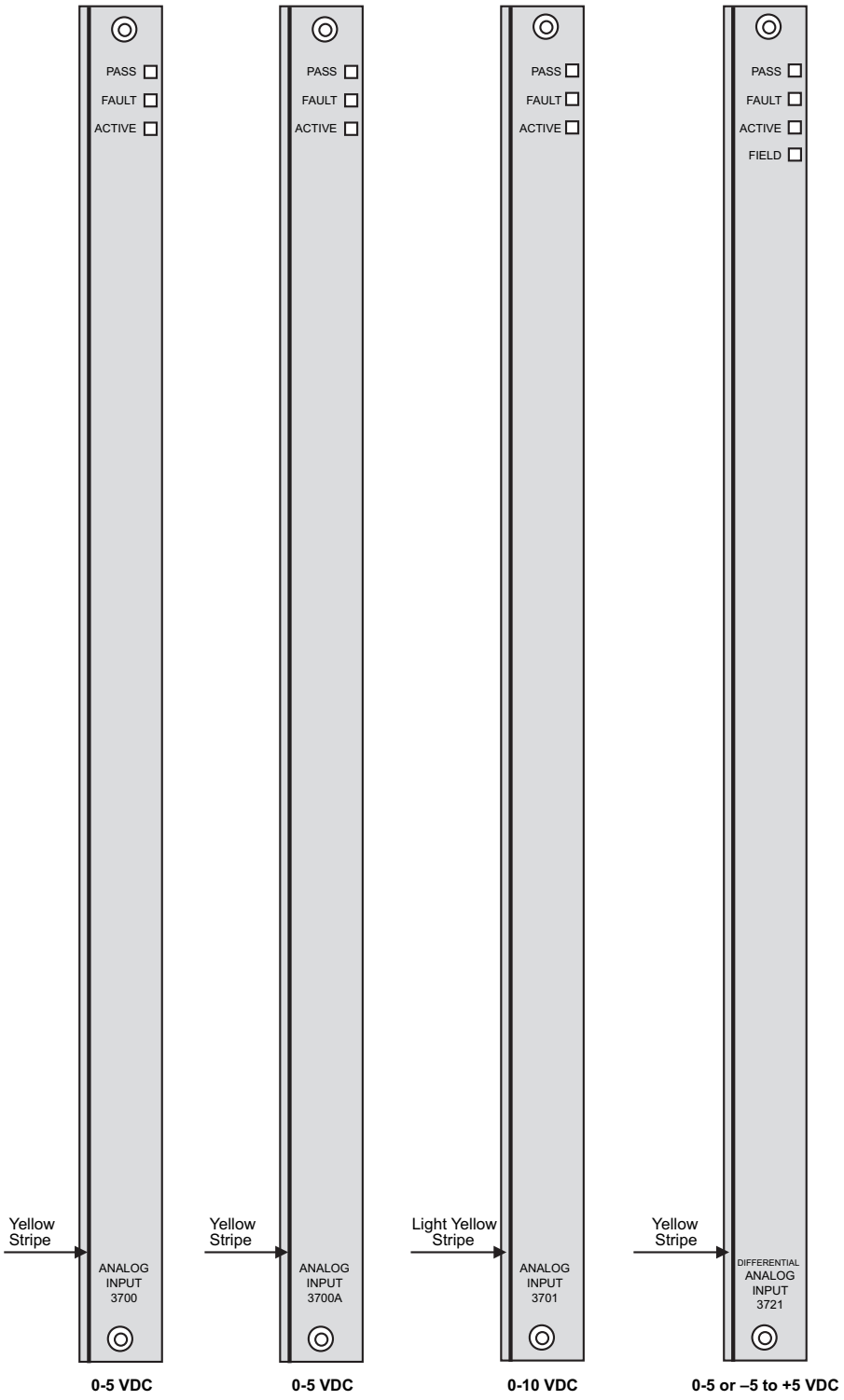

Figure 19 3700, 3700A, 3701, and 3721 Front Panels

3700A Specifications

This section includes specifications for model 3700A, which is a TMR Analog Input Module with a voltage range of 0 to 5 VDC.

WARNING If the common-mode voltage range of a channel is exceeded, Triconex does not guarantee proper operation of the module and accuracy of other channels.

Table 12 3700/3700A Analog Input Specifications

Feature	Specification
Color code	Yellow
Number of input signals	32 differential, DC-coupled
Input update rate	55 ms
Resolution	12 bits
Accuracy	< 0.15% of FSR, from 0° to 60° C
Input resistance (load)	30 MΩ (DC), minimum
Input resistance @ power off	30 kΩ (DC), typical
Common mode rejection (typical)	-80 dB (DC - 100 Hz)
Common mode range (See Warning)	-12V to +12V peak
Channel-to-channel isolation	200 kΩ, typical
Normal mode rejection	-3 dB @ 8 Hz -17 dB @ 60 Hz -23 dB @ 120 Hz
Input voltage range	0 to 5V
Input over-range measurement (only for 3700A)	+6%, 0 to 5.3 VDC
Logic power	< 10 watts
Input over-range protection	150 VDC continuous, 115 VAC continuous
Input current range	0 to 20 mA with 250 Ω shunt resistor
Module status indicators	Pass, Fault, Active
Input diagnostic fault coverage[1]	
Minimum input change	2% of full scale
Input change sample period	1 scan or 200 ms, whichever is greater
Minimum period of mis-compares	40 samples

1. Rapidly or continuously changing inputs may cause mis-compare readings because the measured values of the three channels may different by more than 0.5 percent of full scale, which can cause a fault to be declared in error. If the input readings differ by a minimum of 2 percent of full scale and continue for a minimum period of 40 input samples, the probability of a fault increases.