+/- 10v Isolated Analog Input Module
Product Specifications and Installation Data

1   DESCRIPTION

The Horner APG +/-10V Isolated Analog Input Modules provide four analog input channels, with 14-bits of resolution. Two models are available, the HE693ADC410 with 1500VAC (RMS) isolation, and the HE693ADC405 with 500VAC (RMS) isolation. These isolation levels are channel-to-channel and channel-to-ground. The modules convert the voltage input signals to digital values (-32,000 to +32,000), which are placed directly into the %AI table of the PLC CPU. Each of the four channels has a programmable setpoint, the level of which is set in the PLC program via four %AQ output registers. If the analog input value reaches or exceeds the setpoint, a corresponding digital input %I is energized. The first four %Is represent the four input channel setpoint alarms, respectively.
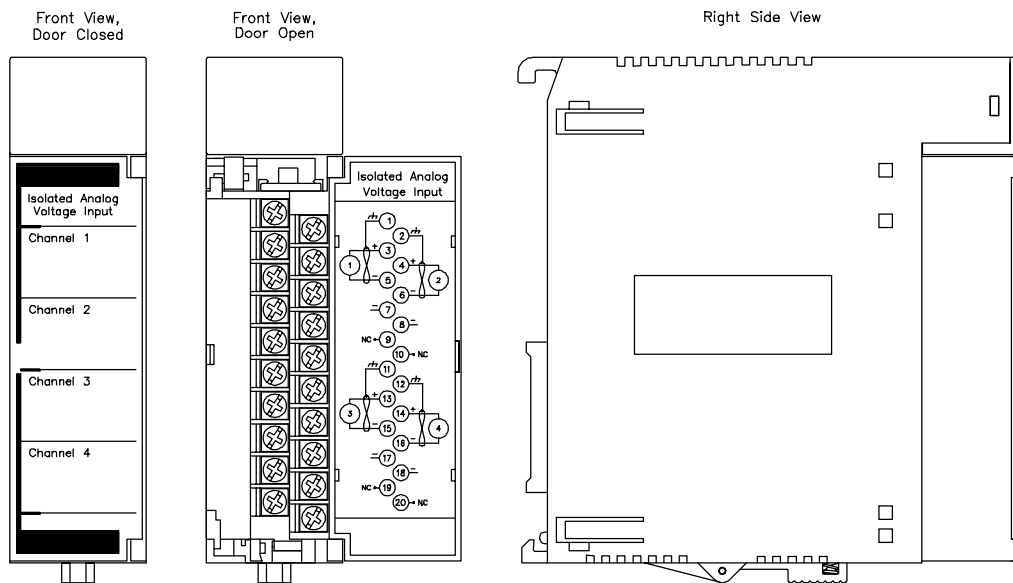

Figure 1 – HE693ADC410 Module

2   SPECIFICATIONS

Table 1 – HE693ADC405+ Specifications			
Specification		**Specification**	
Steady-State Power Consumption	ADC405: .4W / 80mA @ 5V, 2.16W / 90mA @ 24V	Analog Filtering	1KHz, 3 pole Bessel
	ADC410: .7W / 140mA @ 5V, 1.2W / 50mA @ 24V	Maximum Error	.05% full scale
Surge Current at Power-Up	ADC405: 120mA @ 5V 150mA @ 24V	Input Impedance	1 Megohm
	ADC410: 200mA @ 5V 100mA @ 24V	Maximum Over-Voltage	+/- 15VDC
Number of Channels	4	Channel to Channel (ADC410)	1500VAC (RMS), +/- 2000VDC
I/O Required	4 %AI, 4 %AQ, 16 %I	Common Mode Range (ADC410)	1500VAC (RMS), +/- 2000VDC
Input Range	+/- 10V	Channel to Channel (ADC405)	500VAC (RMS), +/-700VDC
A/D Type, Resolution	Integrating, 18 bits	Common Mode Range (ADC405)	500VAC (RMS), +/-700VDC
Useable Resolution	13 bits plus sign	Common Mode Rejection	>100dB
Module Update Rate	45 channels/S	Relative Humidity	5% to 95%, non-condensing
Digital Filtering	1-128 samples / update	Operating Temperature	0 to 60● C

3   CONFIGURATION


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┌────────┬──────────── SOFTWARE  CONFIGURATION ──────────────────
│ SLOT   │  Catalog #: FOREIGN                 FOREIGN MODULE
│  2     │
│        │
│ FRGN   ├──────────────────────────────────────────────────────
│        │  Module ID  :   3
│        │  %I Ref Adr :   %I0001   Byte 1   : 00000001   Byte 9  : 00
│        │  %I Size    :   16       Byte 2   : 00000100   Byte 10 : 00
│        │  %Q Ref Adr :   %Q0001   Byte 3   : 00         Byte 11 : 00
│        │  %Q Size    :   0        Byte 4   : 00         Byte 12 : 00
│        │  %AI Ref Adr:   %AI001   Byte 5   : 00         Byte 13 : 00
│        │  %AI Size   :   4        Byte 6   : 00         Byte 14 : 00
│        │  %AQ Ref Adr:   %AQ001   Byte 7   : 00         Byte 15 : 00
│        │  %AQ Size   :   4        Byte 8   : 00         Byte 16 : 00
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Figure 2 – LM90 Foreign Module Configuration

To reach this screen in the LM90 Configuration Package, select I/O Configuration (F1), cursor over to the slot containing the module and select Other (F8), and Foreign (F3).

Table 2 – Configuration Parameters				
%I Size	**%AI Size**	**%AQ Size**	**Byte 1**	**Byte 2**
16	4	4	0001	0000 thru 0111 (see chart)

The five necessary parameters are %I Size, %AI Size, %AQ Size, Byte 1 and Byte 2.

Table 3 – Scaling	
Scaling	**Smallest Step Change**
Volts = %AI / 32,000 x 10	4 (dec) = 1.25mV

The module converts each analog voltage into a decimal value between +/- 32,000. The two least significant bits of each %AI are always 0, therefore the smallest decimal step change is 4.
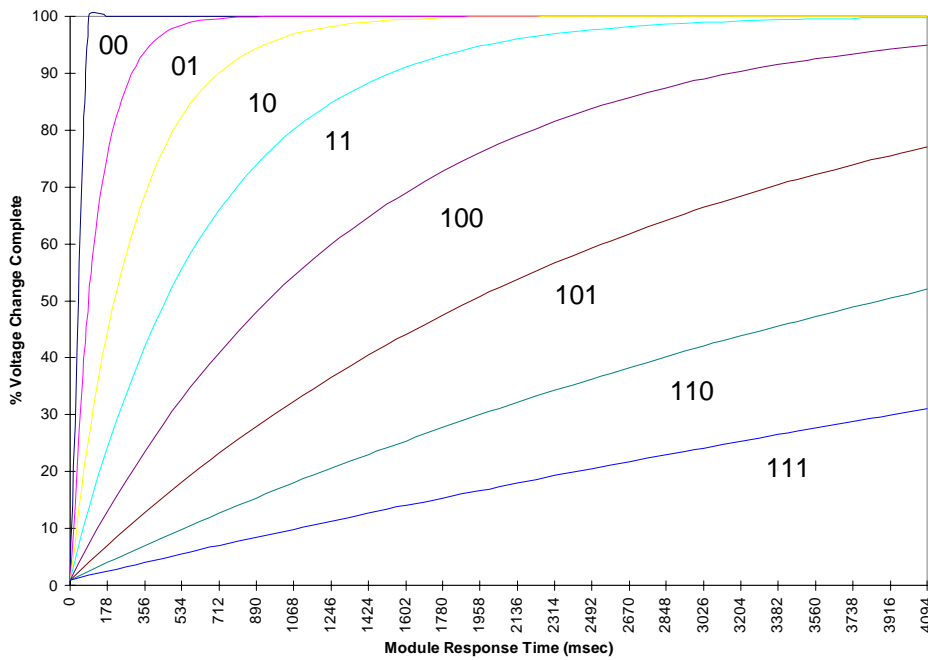

Figure 3 – Digital Filtering

The effect of digital filtering (set with Byte 2) on module response to a voltage change. (% voltage change completed vs. time).
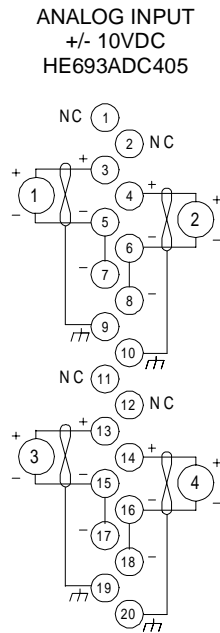
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4   WIRING / INSTALLATION

ANALOG INPUT
+/- 10VDC
HE693ADC405

ANALOG INPUT
+/- 10VDC
HE693ADC410

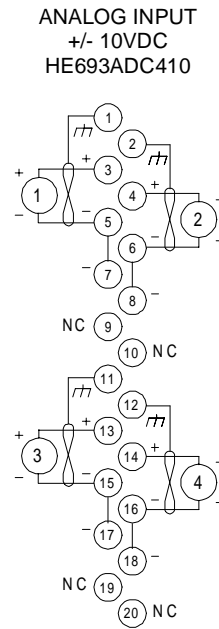**Figure 4 – HE693ADC405 Wiring**   **Figure 4 – HE693ADC410 Wiring**

4.1   Installation Hints

The following installation hints need to be followed.

a.   Wiring needs to be routed in its own conduit.

b.   Shielded, twisted pair extension wiring offers best noise immunity.

c.   If shielded wiring is used, a good earth ground connection, at one end only, is critical. If shields are grounded at the module end, terminals 9, 10, 19 and 20 on the ADC405, or pins 1, 2, 11 and 12 on the ADC410 need to be used as the shield connection points.