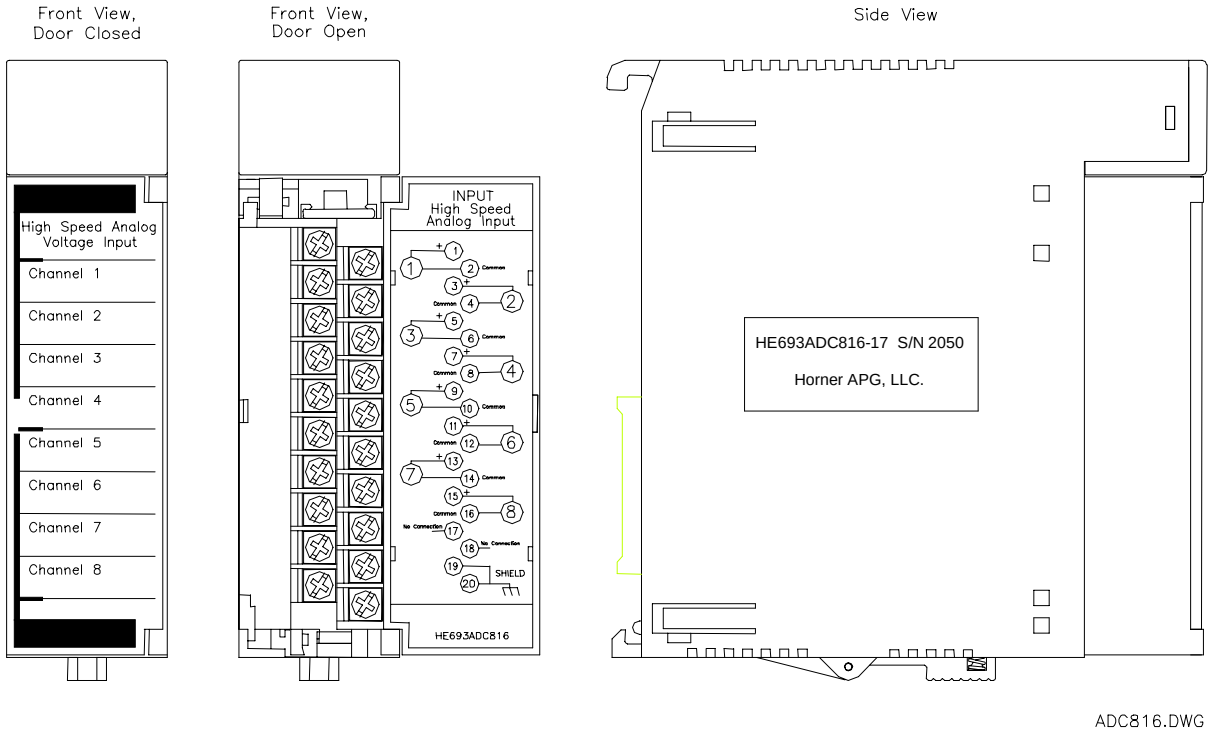
High Speed +/- 1mA Analog Input Module

Product Specifications and Installation Data

1 DESCRIPTION

The Horner APG High Speed +/-1mA Analog Input Module provides eight single ended analog input channels, with 16-bits of resolution. The HE693ADC816-17 has 500VDC backplane isolation. This module converts the current input signals into digital values (0 to +32,000), which are placed directly into the %AI table of the PLC CPU. Each of the eight channels has a programmable setpoint, the level of which is set in the PLC program via %AQ output registers. If the analog input value reaches or exceeds the setpoint, a corresponding digital input %I is energized.



2 SPECIFICATIONS

Table 2.1 – Module Specifications			
Specification		**Specification**	
Power Consumption, Typical	230mA @ 5VDC (440mA inrush)	Analog Filtering	1.6KHz low pass
Number of Channels	8 single ended	Digital Filtering	1-128 samples/update
I/O Required	8 %AI, 8 %AQ, 16 %I	Maximum Error	0.1% full scale of +/-1 mA full scale
Input Range	+/- 1mA	Maximum Input Voltage	75VDC
A/D Type, Resolution	Successive Approx. 16 bits	Backplane Isolation	500VDC
Useable Resolution	16 bits	Common Mode Rejection	>100dB
Sample Rate	3000 channels/S, No Filtering *(See Installation Hints)	Operating Temperature	0 to 60• C
Input Impedance	10 kohms	Relative Humidity	5% to 95%, non-condensing

3 CONFIGURATION

```
|RACK
1pcm  2hsc  3frgn  4pi  5apm  6iolink  7iop  8  9  10
>
        SERIES 90-30 MODULE IN RACK 3 SLOT 2
                    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:  %AI0001   Byte 5     : 00         Byte 13    : 00
        %AI Size   :     8      Byte 6     : 00         Byte 14    : 00
        %AQ Ref Adr:   %AQ001   Byte 7     : 00         Byte 15    : 00
        %AQ Size   :     8      Byte 8     : 00         Byte 16    : 00
```

Table 3.1 – Foreign Module Configuration

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

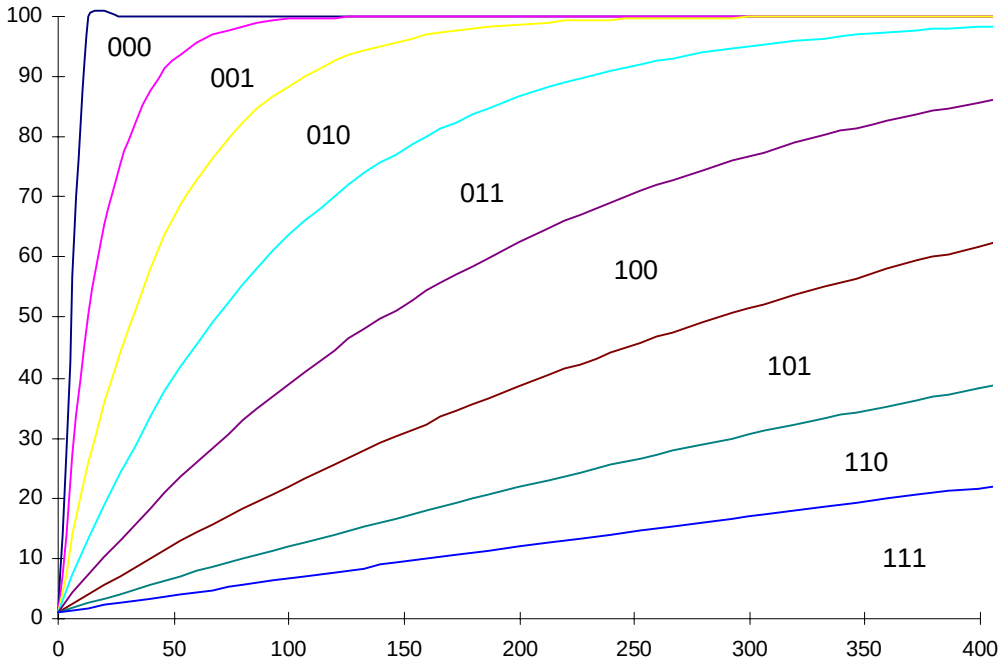


Figure 3.2 – Digital Filtering

The effect of digital filtering (set with Byte 2) on module response to a voltage change. *(% voltage change completed vs. time in milliseconds).*

Table 3.1 – I/O Description

	Channel	Setpoint Bit	Setpoint
SINGLE ENDED	1	%I1	%AQ1
	2	%I2	%AQ2
	3	%I3	%AQ3
	4	%I4	%AQ4
	5	%I5	%AQ5
	6	%I6	%AQ6
	7	%I7	%AQ7
	8	%I8	%AQ8

Table 3.2 – Configuration Parameters					
%I Size	**%AI Size**	**%AQ Size**	**Byte 1**	**Byte 2**	**Bytes 3-6**
16	8	8	0001	0000 thru 0111 (see chart)	0=Single Ended

The nine necessary parameters are %I Size, %AI Size, %AQ Size, and Bytes 1 through 6.

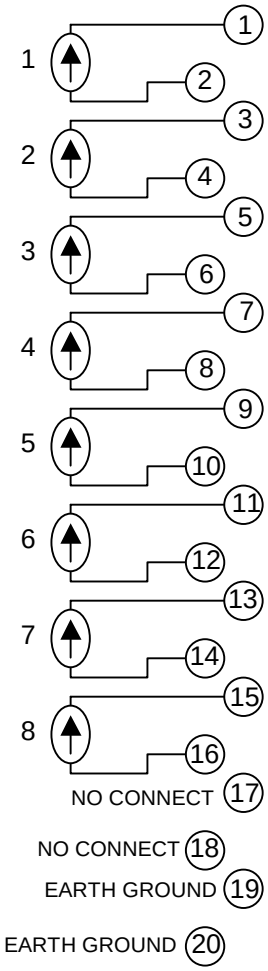
Table 3.3 - Scaling	
Scaling	**Smallest Step Change**
Volts = %AI / 32,000	1 (dec) = 0.00003125mV

The module converts each analog current into a decimal value between +/-32,000. Each bit is significant, therefore the smallest decimal step change is 1.

4 WIRING / INSTALLATION

Table 4.1 – Input Description	
Single Ended	
Reference	Description
%AI1	Input Value of Channel 1
%AI2	Input Value of Channel 2
%AI3	Input Value of Channel 3
%AI4	Input Value of Channel 4
%AI5	Input Value of Channel 5
%AI6	Input Value of Channel 6
%AI7	Input Value of Channel 7
%AI8	Input Value of Channel 8

When configured as a single ended input, each channel reports the analog value in the appropriate %AI register



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 is critical. If shields are connected at the module end, terminals 19 and 20 should be used as the shield ground point.

d. 3000 channels/S is achieved if there are 2 or more modules present in the rack. With the HE693ADC816 in the rack alone or using the DO/IO command, the Sample Rate is 2700 channels/S.