



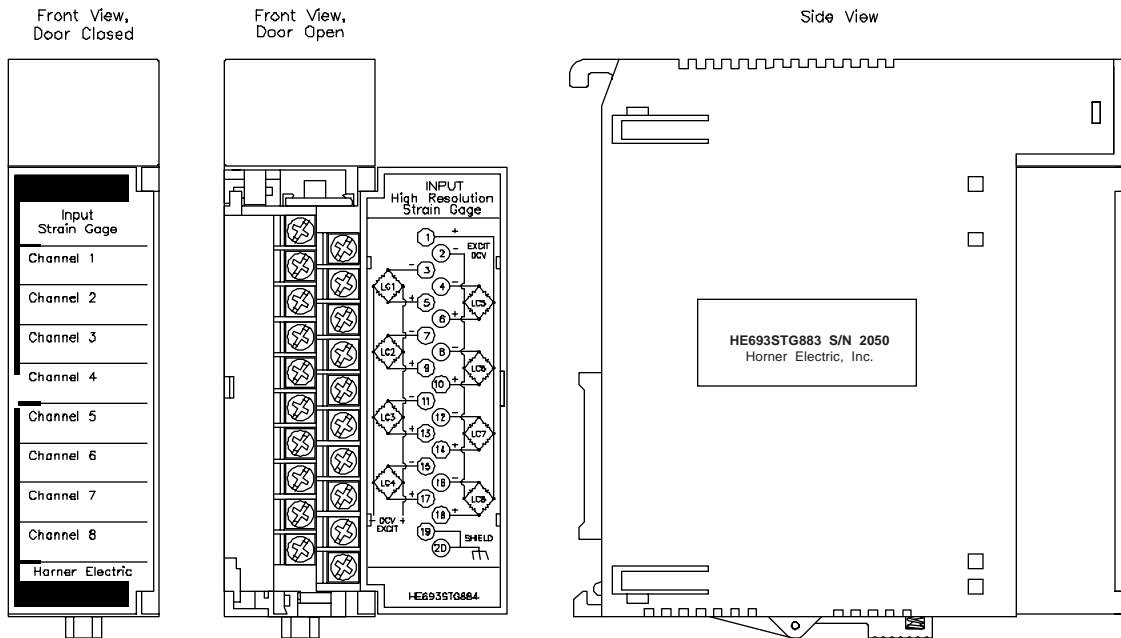
# High Resolution Strain Gage Module

## Product Specifications

DESCRIPTION

The Horner Electric High Resolution Strain Gage Input Module allows bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.). All analog and digital processing of the signal is performed on the module, and precision millivolt values are written to the Series 90-30 %AI input table with 16 bit resolution. The input range of this module is +/-20mV, +/-25mV, or +/-30mV configurable through Logicmaster on a channel-by-channel basis. This provides a resolution of approximately 0.6uV, 0.8uV, or 0.9uV, respectively. Also, individual channels can be turned off, so that unused channels do not increase module response time. Another ability of this module is to monitor the load cell excitation voltage, and compensate for variations in this signal. **Excitation voltage output is not supplied by the module.** The HE693STG883 also features a setpoint for each channel, set with %AQ values and enunciated with %I inputs. Outputs (%Q) allow the ladder logic to trigger the module to perform a ZERO, TARE, or CLEAR function, critical for weighing applications.

ILLUSTRATION



STG884.DWG

SPECIFICATIONS

Specification	HE693STG883	Specification	HE693STG883
Power Consumption	Inrush: 150mA @ 5VDC 80mA @ 24V Relay	Input Impedance	>1000 Mohms
	Steady State: 60mA @ 5VDC 30mA @ 24V Relay	Accuracy	.03%
Number of Channels	8	Max Normal Voltage Input	100mV
I/O Points Required	8-%AI, 16-%I, 8-%AQ, 16%Q	Maximum Safe Voltage	+/- 35VDC or AC
Strain Gages Supported	Bridged (Load Cells)	A/D Conversion Type	Integrating
Input Range	+/-20mV, +/-25mV, +/-30mV	A/D Conversion Time	35 channels per second
Resolution	.6uV, .8uV, .9uV, respectively	Operating Temperature	0 to 60°C (32 to 140°F)
Excitation Monitoring	10 VDC	Relative Humidity	5% to 95% non-condensing

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 :	16 Byte 4 : 00 Byte 12 : 00
%AI Ref Adr :	%AI001 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

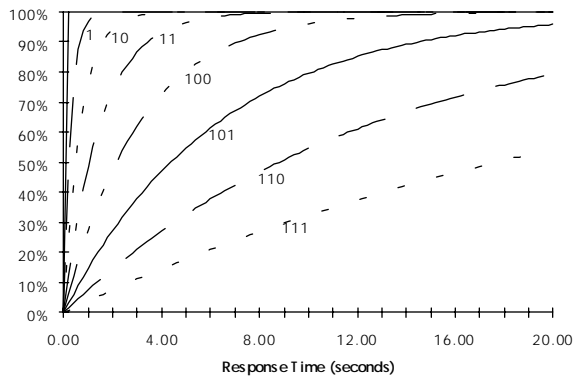
**Foreign Module Configuration.** To reach this screen, select I/O Configuration (F1), cursor over to the slot containing the module and select Other (F8), and Foreign (F3).

%AI	%I	%AQ	%Q	Byte 1	Byte 2
8	16	8	16	1	0 to 111 binary (see chart)

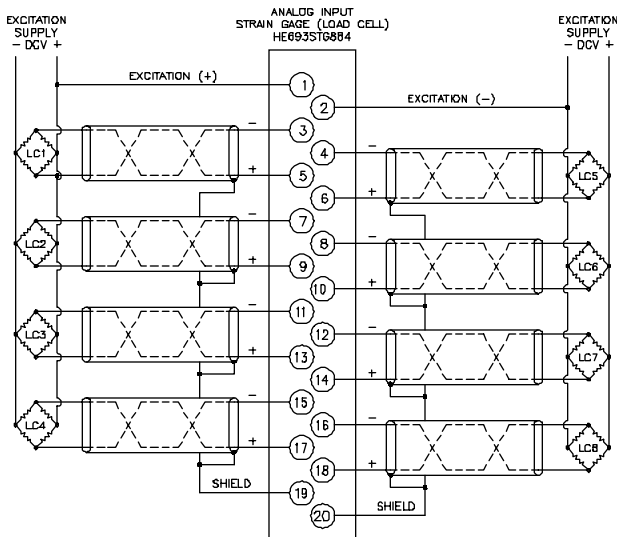
**Configuration Parameters.** The necessary parameters are %AI Size, %I Size, %AQ Size, %Q Size, Byte 1, Byte 2 (digital filtering), and Bytes 3-10(input range).

Input Range (+/-)	20mV	25mV	30mV	20mV	25mV	30mV	Off
Excitation comp?	N	N	N	Y	Y	Y	N
Byte 3-10 Value	0	1	2	3	4	5	6

**Input Range.** The input range for each channel is configurable through Bytes 3-10. Byte 3 sets channel 1, Byte 4 sets channel 2, etc. Excitation compensation is also set through these configuration parameters.

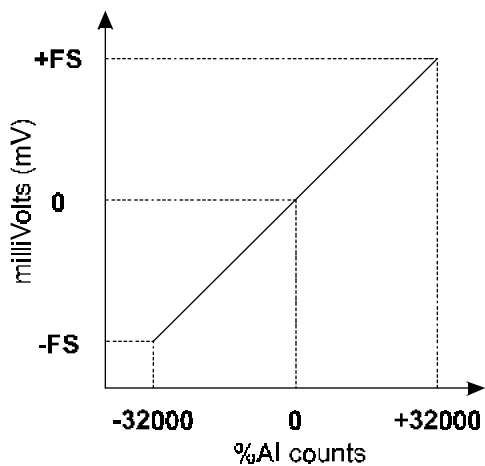


**Digital Filtering.** The effect of digital filtering (set with Byte 2) on module response to a millivolt input change (% temp change completed vs. time). The response time is improved by 12.5% for each unused channel turned off with bytes 3-10 in the configuration.

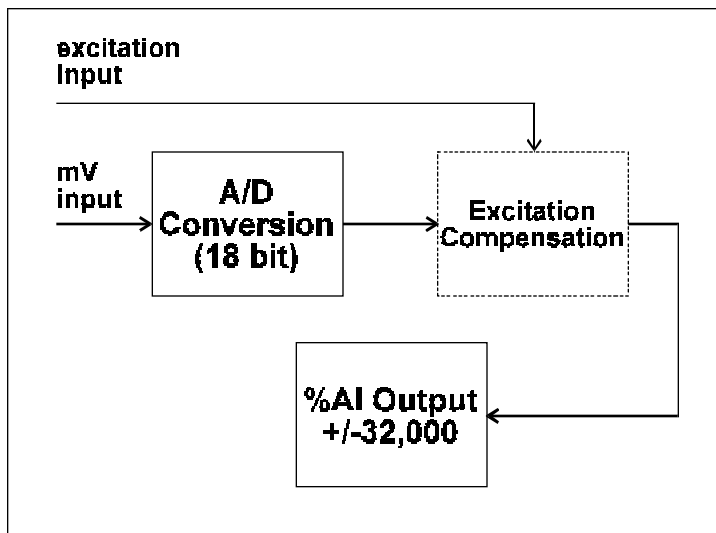


### Installation Hints

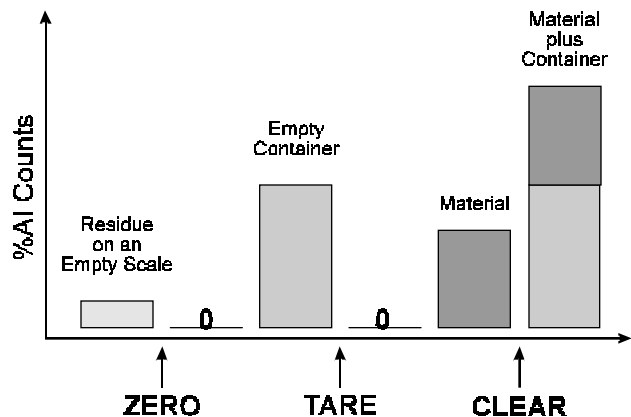
- Keep total wire resistance less than 100 ohms to maintain rated accuracy.
- Wiring should be routed in its own conduit. Shielded, twisted pair wiring offers best noise immunity.
- If shielded wiring is used, a good earth ground connection is critical. If shields are connected at the module end, terminals 19 & 20 may be used as the shield ground.
- All unused inputs should be shorted and connected to pin 19 or 20



**Normal Input Scaling.** The value of each %AI input varies from -32,000 to +32,000, as the millivolt input ranges from minus full scale (-FS) to positive full scale (+FS). Full scale is either 20mV, 25mV, or 30mV, as configured by the system designer on a channel-by-channel basis.



**Excitation Compensation.** If the excitation voltage drifts, the module automatically adjusts the %AI value in the PLC to compensate for the voltage variation. This function may be selected on a channel-by-channel basis in the configuration software through bytes 3-10 of the configuration parameters.



**Weighing Functions.** The graphic at left demonstrates the weighing functions which can be performed by the Strain Gage input module. A small amount of residue causes an empty scale to read a non-zero value. Performing the **ZERO** function causes the module to set the input value (%AI) to 0.

An empty container is now placed on the scale. The value in the %AI register now reflects the weight of the empty container. Performing a **TARE** function causes the module to store the weight of the container in its internal memory, and set the %AI register to 0.

Material is poured into the container. The %AI value now reflects the weight of this material only. Performing a **CLEAR** function causes the module to add the weight of the container stored in its internal memory back into the %AI register. The %AI reading now reflects the total weight of the material plus the container.

Channel # (%AI)	1	2	3	4	5	6	7	8
Output Bit # (%Q)	1	2	3	4	5	6	7	8
<b>ZERO</b>	1	1	1	1	1	1	1	1
<b>TARE</b>	1	0	1	0	1	0	1	0
<b>CLEAR</b>	0	1	0	1	0	1	0	1

**Weighing Functions.** The chart above lists the 3 weighing functions, and the bit pattern required to trigger their execution

I/O Function	Channel Number							
	1	2	3	4	5	6	7	8
Input Value (%AI)	%AI1	%AI2	%AI3	%AI4	%AI5	%AI6	%AI7	%AI8
Setpoint (%AQ)	%AQ1	%AQ2	%AQ3	%AQ4	%AQ5	%AQ6	%AQ7	%AQ8
Overrange Bit # (%I)	%I1	%I2	%I3	%I4	%I5	%I6	%I7	%I8
Setpoint Exceeded Bit (%I)	%I9	%I10	%I11	%I12	%I13	%I14	%I15	%I16

**PLC Interface.** In addition to the weighing functions triggered by the %Q output bits, the Strain Gage input module's I/O interface performs other functions as well. The input value read by each channel is written to %AI input registers, which are scaled as shown by the chart at the top of this page. Each channel may have a setpoint, which is set by writing a decimal value to the appropriate %AQ register. If the input value for a channel exceeds its setpoint, the "Setpoint Alarm" bit (%I) for that channel is energized. If the input value reaches the normal 32,767 count maximum, an "Overrange Alarm" bit (%I) is energized for that channel.