



Mixed Analog Input Module

Product Specifications and Installation Data

1 DESCRIPTION

The Mixed Analog Input Module (HE693MIX800) allows sensors to be directly connected to the PLC without external signal processing (e.g., transducers and transmitters). All analog and digital processing of the signals is performed in the module. The module features eight channels and provides an interface for $\pm 100\text{mV}$, $\pm 10\text{V}$, $\pm 20\text{mA}$, $\pm 20\mu\text{A}$, 100-ohm RTDs, and Thermocouples (Types J,K,N, and E).

2 INSTALLATION

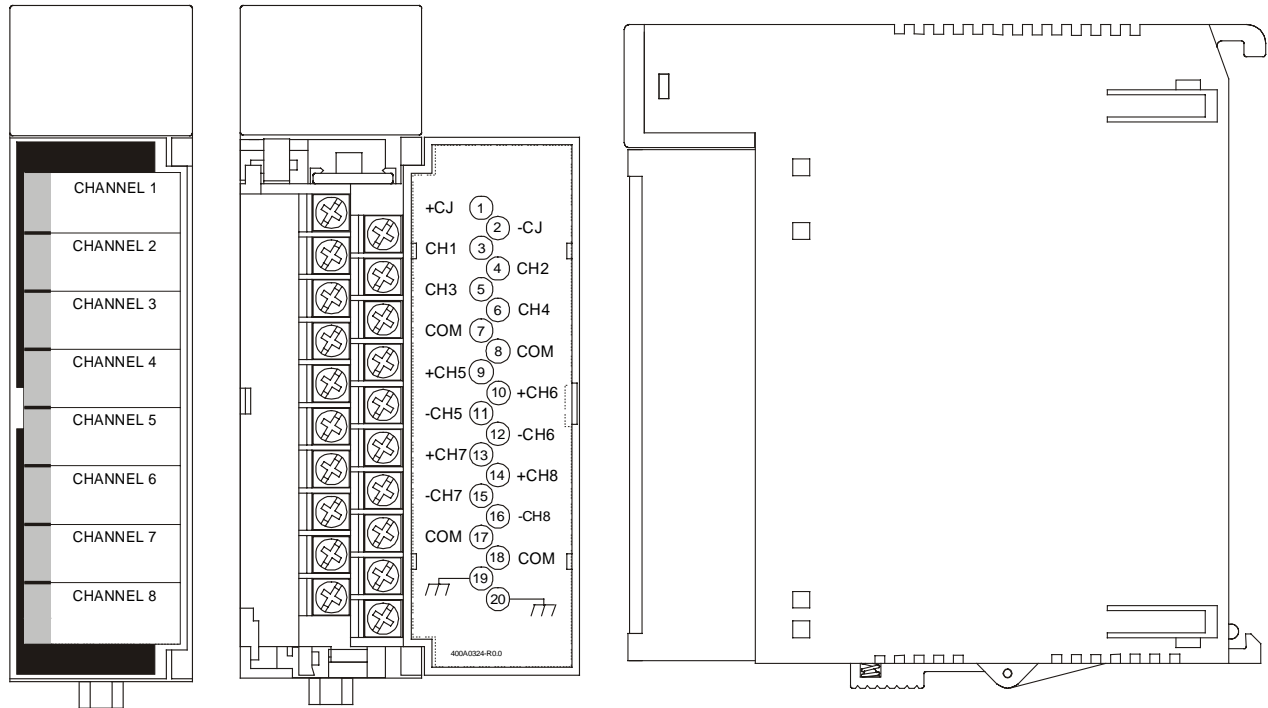


Figure 1 – MIX800

3 SPECIFICATIONS

Table 1 – MIX800 Specifications			
GENERAL			
Number of Channels	8	Type of Measurement	Integrating, true ratiometric resistance circuit for RTD
Speed	40 measurements per second	Analog Noise Filter	Single Pole, 1.5KHz low pass
Digital Averaging	1,2,4,8,16,32,64,128 samples	Input Transient Protection	Ferrite/Capacitor/Transzorb clamped at $\pm 13V$, Maximum continuous overcurrent: 75mA
Isolation Voltage	500VDC to PLC/Earth ground	Relative Humidity	5% to 95% non-condensing
Required Power (Steady State)	400mA @ 5VDC	Operating Temperature	0 to 60°C (32 to 140°F)
Required Power (Inrush)	600mA @ 5VDC for 5mS		
RTD (AVAILABLE ON CHANNELS 5-8)			
RTD Type	Pt100 Alpha = 0.00385 -200 to 850°C	Accuracy	$\pm 1^\circ C$
Excitation Current	205 μA peak, 50 μA average	3-Wire Lead Resistance Compensation Error	0.25% of lead resistance max.
Resolution	0.1°C	RTD Short to Ground	Indefinite
Channel to Channel Tracking	$\pm 0.1^\circ C$	Input Impedance	>1 Megohm
THERMOCOUPLE (AVAILABLE ON CHANNELS 5-8)			
Thermocouple Types	J -210 to 1200°C K -270 to 1372°C N -270 to 1300°C E -270 to 1000°C	Cold Junction Compensation	Internal External AD592 sensor supported. Module must be calibrated with actual sensor for rated accuracy.
Open Thermocouple Sense Current	100nA	Common Mode Range	$\pm 10V$ to isolated common
Resolution	$\pm 0.1^\circ C$	Accuracy	$\pm 2^\circ C$
PHOTOCURRENT (20 μA (AVAILABLE ON CHANNELS 7,8))		DIFFERENTIAL $\pm 100MV$ (AVAILABLE ON CHANNELS 5-8)	
Sensitivity	20 μA full scale	Accuracy	0.2%
Accuracy	$\pm 2\%$	Input Impedance	2 Megohms
Common Mode Range	$\pm 10V$ to isolated common	Common Mode Range	$\pm 10V$ to isolated common
Resolution	15 Bits	Resolution	16 Bits
SINGLE-ENDED $\pm 100MV$ (AVAILABLE ON CHANNELS 1-4)		SINGLE-ENDED $\pm 10V$ (AVAILABLE ON CHANNELS 1-4)	
Accuracy	0.2%	Accuracy	0.1%
Input Impedance	1 Megohms	Input Impedance	1 Megohms
Resolution	16 Bits	Resolution	16 Bits
SINGLE-ENDED $\pm 20MA$ (AVAILABLE ON CHANNELS 1-4)			
Accuracy	0.2%		
Input Impedance	<55 ohms		
Resolution	16 Bits		

4 CONFIGURATION

4.1 Configuration Procedure

SERIES 90-30 MODULE IN RACK 2 SLOT 2

SLOT 2	Catalog #: FOREIGN	SOFTWARE CONFIGURATION FOREIGN MODULE
FRGN	Module ID : 3 %I Ref Adr : %I0001 Byte 1 : 00000001 Byte 9 : 00 %I Size : 0 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 : 6 Byte 6 : 00 Byte 14 : 00 %AQ Ref Adr : %AQ001 Byte 7 : 00 Byte 15 : 00 %AQ Size : 0 Byte 8 : 00 Byte 16 : 00	

Figure 2 – Foreign Module Configuration Screen

To reach the Foreign Module Configuration screen in Figure 2:

- a. Select I/O Configuration (F1).
- b. Cursor over to the slot containing the module and select Other (F8), and Foreign (F3).
- c. Set parameters (refer to Table 2).

4.1.1 Configuration Parameters

Table 2 indicates the necessary parameters for configuring the MIX800. Change the various bytes (1-11) and set %AI to "8" to reach the desired set-up.

Table 2 – Configuration Parameters for MIX800					
%AI Size	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
		Filter	Channel 1	Channel 2	Channel 3
8	0001	0000 thru 0111 (see chart)	00= ±10V 01= ±100mV 02= ±20mA	00= ±10V 01= ±100mV 02= ±20mA	00= ±10V 01= ±100mV 02= ±20mA
	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10
	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8
00= ±10V 01= ±100mV 02= ±20mA	00= Type J 01= Type K 02= Type N 03= Type E 04= PT100 05= ±100mV	00= Type J 01= Type K 02= Type N 03= Type E 04= PT100 05= ±100mV	00= Type J 01= Type K 02= Type N 03= Type E 04= PT100 05= ±100mV 06= 20µA	00= Type J 01= Type K 02= Type N 03= Type E 04= PT100 05= ±100mV 06= 20µA	00= Internal 01= External

4.1.2 Digital Filtering (Byte 2)

Figure 3 indicates the effect of digital filtering (set with Byte 2 from Table 2) on module response to a temperature change. (% temp change completed vs. time).

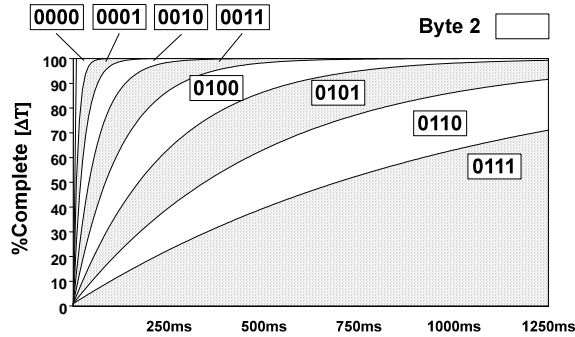


Figure 3 – Digital Filtering

4.1.3 Temperature Scaling

The MIX800 reports temperature values to the %AI table in 0.1°C increments. Conversion to actual degrees is as indicated: °C = %AI / 10.

4.1.4 Scale Factor

Table 3 – Scale Factor		
Type	Count	Value
RTD	8000	800.0°C
	0	0°C
THM	10000	1000.0°C
	0	0°C
20 μA	32000	20 μA
	0	0
± 100 mV	32000	100.0 mV
	-32000	-100.0 mV
± 20 mA	32000	20.0 mA
	-32000	-20.0 mA
± 10 V	32000	10 V
	-32000	-10 V

5 WIRING

5.1.1 Wiring Diagram

Pin	Description
1	External cold junction sensor +
2	External cold junction sensor -
3	Single-ended input 1
4	Single-ended input 2
5	Single-ended input 3
6	Single-ended input 4
7	Single-ended common
8	Single-ended common
9	Differential input 5 +
10	Differential input 6 +
11	Differential input 5 -
12	Differential input 6 -
13	Differential input 7 +
14	Differential input 8 +
15	Differential input 7 -
16	Differential input 8 -
17	Differential common
18	Differential common
19	Earth ground
20	Earth ground

All commons are at the same potential and are isolated from earth and PLC ground.

Three-wire RTDs are wired with the single-wire end connected to differential + and the two wires on the other end connected to differential - and differential common.

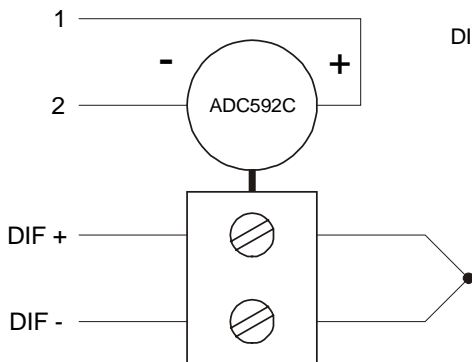


Figure 6 - Optional External Cold Junction

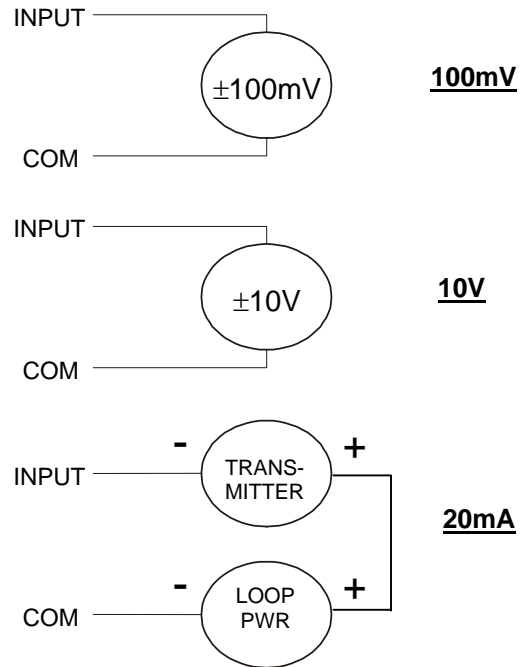


Figure 4 - Single-Ended Channels
(Channels 1,2,3, and 4)

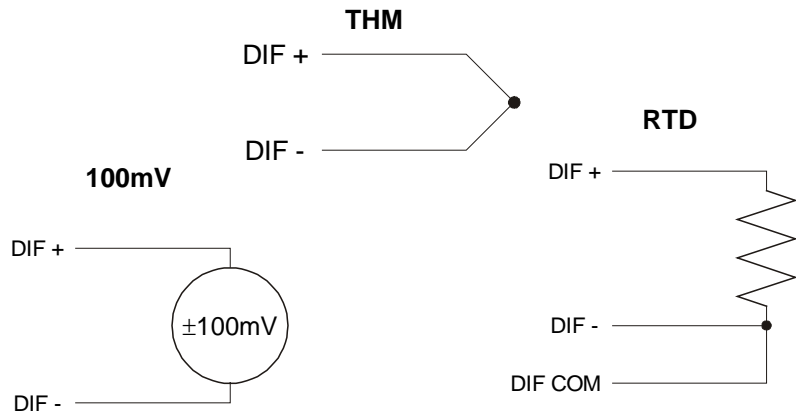


Figure 5 - Differential Channels
(Channels 4,5,6, and 7)



Figure 7 - PhotoCurrent
(Channel 7 and 8 only)

5.1.2 Wiring Installation Hints

Short all unused channels to frame ground. (See Figure 1, Pins 17 and 18.)

Wiring must be routed in its own conduit.

Shielded, twisted wiring offers the best noise immunity.

If shielded wiring is used, a good ground connection (on one end only) is critical.

For proper RTD lead resistance compensation, the lead resistances must be matched and must be no more than 50 ohms each.

5.1.3 Wiring Fault Conditions

Table 4 – Wiring Faults		
	OPEN	SHORT
Voltage or Current Inputs	0	0
Thermocouple	Maximum Full Scale	Temperature at Short
RTD	+ Maximum Full Scale - Minimum Full Scale COM Minimum Full Scale	Minimum Full Scale Minimum Full Scale Minimum Full Scale

6 TECHNICAL ASSISTANCE

For user manual updates, contact Horner APG, Technical Support Division, at (317) 916-4274 or visit our web site at www.heapg.com.