

User Manual for the HE693RTD600, HE693RTD601

Resistance Temperature Device Input Module

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MAN0073-12

PREFACE

This manual explains how to use the Horner APG's Resistance Temperature Device Input Module.

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To obtain warranty service, return the product to your distributor with a description of the problem, proof of purchase, post paid, insured and in a suitable package.

ABOUT PROGRAMMING EXAMPLES

Any example programs and program segments in this manual or provided on accompanying diskettes are included solely for illustrative purposes. Due to the many variables and requirements associated with any particular installation, Horner APG cannot assume responsibility or liability for actual use based on the examples and diagrams. It is the sole responsibility of the system designer utilizing the Resistance Temperature Device Input module to appropriately design the end system, to appropriately integrate the Resistance Temperature Device Input module and to make safety provisions for the end equipment as is usual and customary in industrial applications as defined in any codes or standards which apply.

Note: The programming examples shown in this manual are for illustrative purposes only. Proper machine operation is the sole responsibility of the system integrator.

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CHAPTER 1: DESCRIPTION

1.1 **Product Description**

1.1.1 The RTD Input Modules allow RTD temperature sensors to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.). All analog and digital processing of the RTD signal is performed on the module, and temperature values in 0.5°C or 0.5°F increments (RTD600) or 0.125°C, 0.1°C or 0.1°F (RTD601) increments are written to the 90-30 %Al input table. All modules feature six channels, and support PT-90 (MIL-7990); PT-100E, PT-100C, and PT-100Z; Ni-120, Cu-10, Cu-50, Cu-53, Cu-100, Pt-1000, TD5R and Linear Resistance.

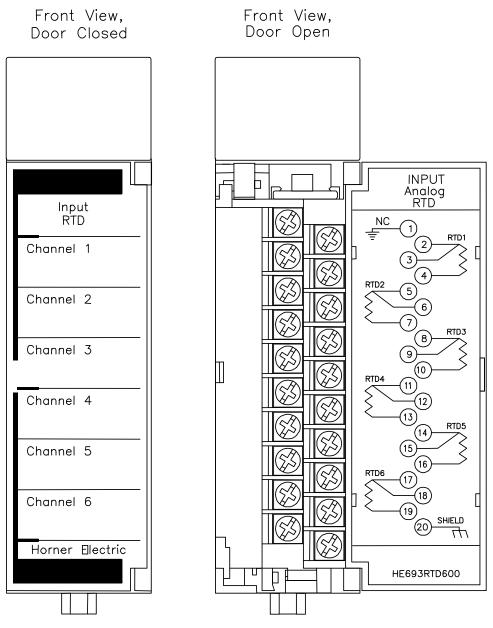


Figure 1.1 – Front View

Side View

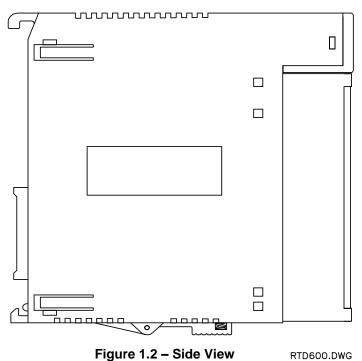


Figure 1.2 – Side View

1.2 Specifications

		Table 1.1 - HE693RTE	600/601 Specifications		
Power Consumption (Typical)		75mA @ 5VDC	Number of Channels	6	
	Pt-100E alpha=.00385	-100 to 850°C	I/O Points Required	6%	AI
	Pt-100C alpha=.003902	-100 to 650°C	Input Impedance >1000 Meg Ω		
	Pt-100Z alpha=.03906	-200 to 300°C	Fault Protection	Zener Dio	de Clamp
	Pt-1000	-100 to 850°C	A/D Conversion Type	16 bit, Int	egrating
	Cu-10	-200 to 260°C	Update Time	50 Channels	per second
Types Supported	Cu-50	0 to 100°C	Average RTD current, PT-100	330 microamps	
	Cu-53	-200 to 260°C	Channel to Channel Tracking	0.1	S
	Cu-100	-200 to 200°C	Resolution	0.5°C or 0.5°F	0.125°C, 0.1°C,or0. 1°F
	Ni-120	-100 to 270°C	Accuracy	± 0.5°C ± 1.0°C for TD5	Cu-10 and
	Linear	0 to 200Ω	Operating Temperature	0 to 60°C (32	2° to 140°F)
	TD5R	-40 to 150°C	Relative Humidity	5% to 95% no	n-condensing
	Pt-90 (MIL-7990)	-50 to 200°C	Platform Support (Hardware Revision)	Rev R and Prior 90-30 Only	Later Revisions 90-30 and RX3i Platforms

CHAPTER 2: CONFIGURATION

2.1 General

2.1.1 Chapter Two describes the procedures and set-up for I/O configuration using LogicMaster™ software.

2.2 Configuration

1. Upon entering the LogicMaster[™] 90 Software, select 'LogicMaster Configuration Package' (F2) from the menu.

MICRO 90-20 90-30 90-70	
LOGICMASTER 90 SOFTWARE For Series 90 (c) programmable controllers	
Shift-F1 Series 90 Micro Programmable Controller Shift-F2 Series 90-20 Programmable Controller Shift-F3 Series 90-30 Programmable Controller Shift-F5 Series 90-70 Programmable Controller	
F1 Logicmaster 90 Programmer Package F2 Logicmaster 90 Configuration Package F3 PCM Development Package (PCOP) F4 Axis Positioning Module Package F5 Operator Interface Utilities F6 C Development Utilities F7 Logicmaster 90 Utilities F8 User Command Menu F9 Logicmaster 90 Setup Package F10 Exit to DOS	
Use the Shift-function keys to select PLC type. Use the function keys to start software package.	

Figure 2.1 – Default Screen

2. To reach the configuration screen, select 'I/O Configuration' (F1), from the menu

ERTES	90-30 / 90-20 / MICRO C O N F I G U R A T I O N S O F T W A R
	Version 6.01 Direct Serial - COM
	E4 I/O Configuration
	F1 I/O Configuration F2 CPU Configuration
	F3 PLC Control and Status
	F7 Programmer Mode and Setup
	F8 Program Folder Functions
	F9 Utility: Load/Store/etc.
	F10 Print Functions

Figure 2.2 – Configuration Screen

3. Move cursor to the designated slot containing the module and select 'Other' (F8).

RACK 1m30 io >	COPY 2genius	REF 5 3	VU DELE 4 <mark>ps</mark>	TE UN 5 <mark>PC</mark>	DEL Ksel 6 <mark>co</mark>	omm 7	8 <mark>other</mark>	,	 10 <mark>zoom</mark>
PS/CPU	1 Progri	2	CK [] 3 Configue	4 Ration :	5				
PWR321 CPU 30									

Figure 2.3 – Rack Configuration

4. From the following screen, select 'Foreign' (F3) .

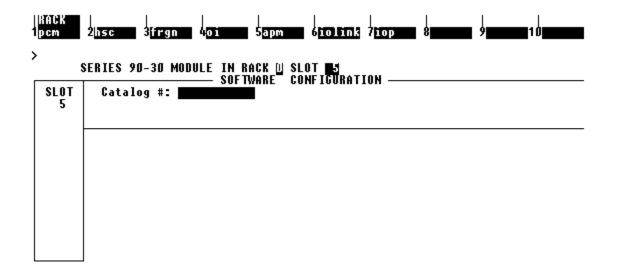


Figure 2.4 – Slot Configuration

5. The screen (shown in Figure 2.5) should appear:

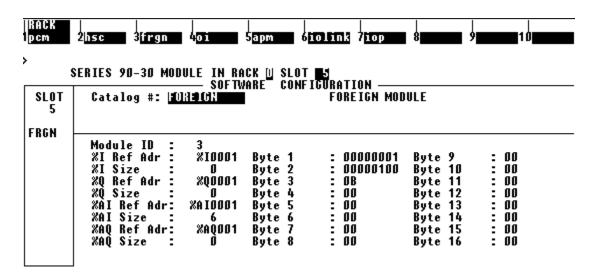


Figure 2.5 – Module Configuration

2.2.1 Configuration Parameters

2.2.1.1 Tables 2.1 and 2.2 indicate the five necessary parameters for configuring the HE693RTD600 and the HE693RTD601 respectively. The parameters include % AI Size, Byte 1, Byte 2, Byte 3, and Byte 4.

2.2.1.2 Change the various bytes (1-4) and set %AI to '6' to reach the desired set-up.

Table 2.1 – Configuration Parameters for RTD 600					
%AI Size	Byte 1	Byte 2	Byte 3	Byte 4	
		0000 thru 0111 (see chart)	00=Pt-100E		
			01=Ni-120		
	0001		02=Pt-100C		
			03=Cu-10		
			04=LIN100	00=0.5°C	
6			05=Pt-1000	01=0.5°F	
			06=TD5R		
			07=Pt-100Z		
			08=Cu-50		
			09=Cu-53		
			0A=Cu-100		
			0B=Pt-90		

Table 2.2 – Configuration Parameters for RTD601					
%AI Size	Byte 1	Byte 2	Byte 3	Byte 4	
			00=Pt-100E		
			01=Ni-120		
	0001	0000 thru 0111 (see chart)	02=Pt-100C		
6			03=Cu-10	00=0.125°C	
			04=LIN100	01=0.1°C	
			05=Pt-1000	02=0.1°F	
			06=TD5R		
			07=Pt-100Z		
			08=Cu-50		
			09=Cu-53		
			0A=Cu-100		
L			0B=Pt-90		

2.2.2 Digital Filtering

2.2.2.1 The effect of digital filtering (on the HE693RTD600/601module) in response to a temperature change is graphically represented in Figure 2.6. (*%temp change completed vs. time*). Byte 2 sets the amount of digital filtering.

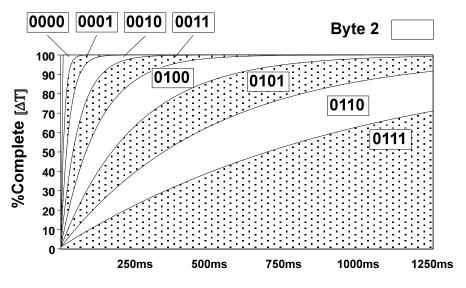


Figure 2.6 - The Effects of Digital Filtering

2.2.3 Temperature Scaling

2.2.3.1 The Resistance Temperature Device reports values to the %AI table in 0.5, 0.125, or 0.1 increments in either °C or °F. Conversion to actual degrees can be calculated using Table 2.3. Note: the module configuration depends on the parameter assigned to Byte 4.

Table 2.3 - Temperature Scaling			
Module	Temperature		
Configuration	Conversion		
0.5°C	°C=%Al/2		
0.5°F	°F=%Al/2		
0.125°C	°C=%Al/8		
0.1°C	°C=%Al/10		
0.1°F	°F=%Al/10		
LIN100 reports 128 counts per 1 Ω .			

Examples:

If %Al2 equals Channel 2 on the RTD module, and %Al2 equals 1,000, the temperature reading is $T=100^{\circ}C$ (format .1°C).

If %AI2equals 1,000 and Byte 4 equals 00 (.125°C or 1/8), the temperature is T=125°C.

NOTES

CHAPTER 3: WIRING & INSTALLATION

3.1 Wiring Diagram for the RTD Terminal Block Connection

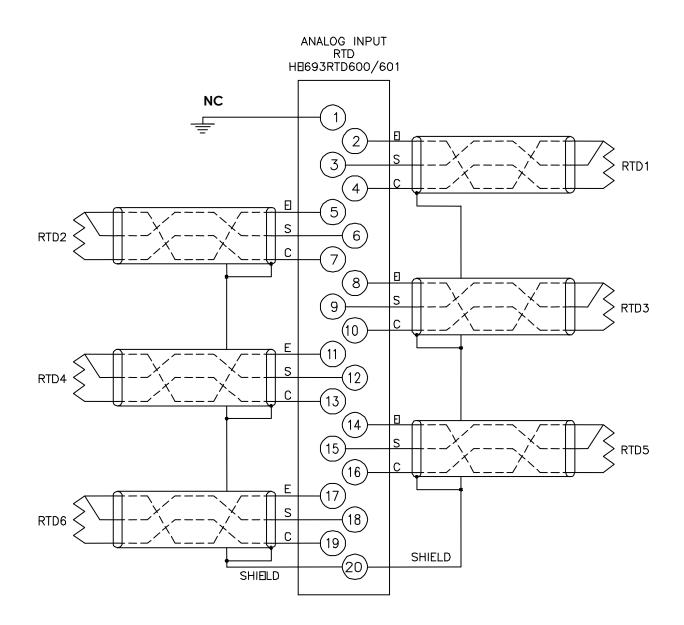


Figure 3.1 – Wiring Diagram

3.1.1 Three-Wire Connection

3.1.1.1 Figure 3.2 shows how to make a three-wire connection with an RTD module. (Refer to Figure 3.1.)



Figure 3.2 – Three-Wire Connection

3.1.2 Two-Wire Connection

3.1.2.1 Figure 3.3 shows how to make a two-wire connection with an RTD module. (Refer to the Figure 3.1.)

For example, Channel 5:

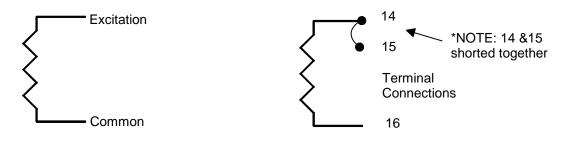


Figure 3.3 – Two-Wire Connection

NOTE: Two-wire RTDs are supported, but accuracy may vary. Four-Wire RTDs are <u>NOT</u> supported

3.2 Installation Requirements

- a. Wiring should be routed in its own conduit.
- b Shielded, twisted wiring offers the best noise immunity.
- c. If shielded wiring is used, a good earth ground connection (on one end only) is critical.
- c. If shields are connected at the module end, terminals 1 or 20 may be used as the shield ground point.
- d. The lead resistance of each wire should be no more than 50Ω .
- e. All unused channels should be shorted together and connected to pins 1 or 20.