

User Manual for the HE693RTD600, HE693RTD601

Resistance Temperature Device Input Module

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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.

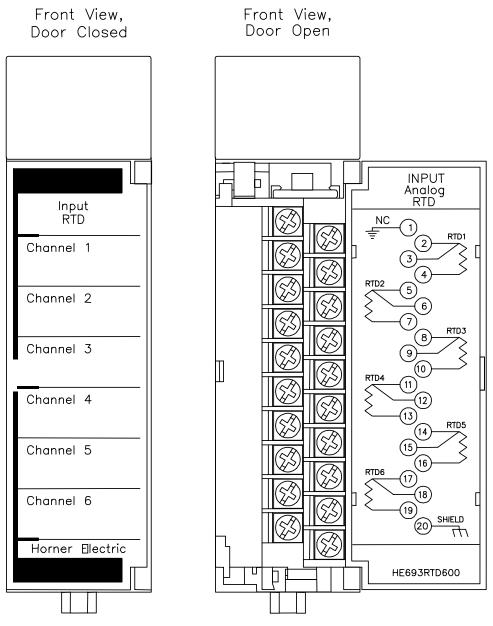


Figure 1.1 – Front View

Side View

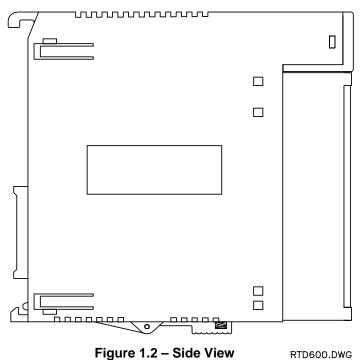


Figure 1.2 – Side View

1.2 Specifications

		Table 1.1 - HE693RTE	0600/601 Specifications				
Power Consu (Typical)	umption	75mA @ 5VDC	Number of Channels	6			
	Pt-100E alpha=.00385	-100 to 850°C	I/O Points Required	6%A	J		
	Pt-100C alpha=.003902	-100 to 650°C	Input Impedance	>1000 Meg Ω			
	Pt-100Z alpha=.03906	-200 to 300°C	Fault Protection	Zener Diode Clamp			
	Pt-1000	-100 to 850°C	A/D Conversion Type	16 bit, Integrating			
	Cu-10	-200 to 260°C	Update Time	50 Channels p	per second		
	Cu-50	0 to 100°C	Average RTD current, PT-100	330 microamps			
Types Supported	Cu-53	-200 to 260°C	Channel to Channel Tracking	0.1°C			
	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 typical, ± 1.0°C for Cu-10 and TD5R			
	Linear	0 to 200Ω	Operating Temperature	0 to 60°C (32° to 140°F)			
	TD5R	-40 to 150°C	Relative Humidity	5% to 95% non-	,		
	Pt-90 (MIL-7990)	-50 to 200°C			Ť		

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

6 E R	I	E S	90-30	7 91	J-20	Z M	ICRO	C	0 N	FΙ	G	U R	A 1	I	O N	S 0	F	т₩	A F
					Vers	ion	6.01	l Di	rect	t Se	ria	1 -	COM	1					
F1 I/O Configuration F2 CPU Configuration F3 PLC Control and Status																			
				F8		I	Progr Progr Jtili	am	Fold	ler	Fun	cti	ons)					
				F1Ó		.: i	Print	Fu	ncti	ions		., .							

Figure 2.2 – Configuration Screen

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

KACK COPY 1m30 io 2genius 3 >	REF VU DELETE UNDEL 4ps 5rckse	l 6 <mark>comm 7</mark>	8 <mark>other</mark> 9 10 <mark>zoom</mark>
PS/CPU 1 ===== PROGRAMM PWR321 CPU 30	- RACK U	5 ====	

Figure 2.3 – Rack Configuration

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

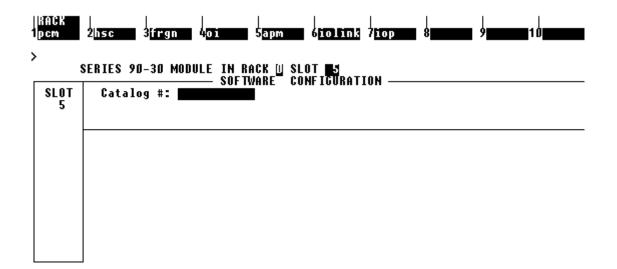


Figure 2.4 – Slot Configuration

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

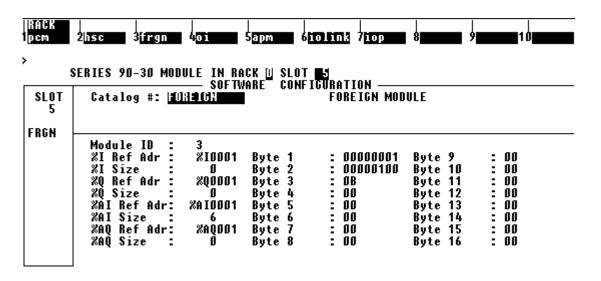


Figure 2.5 – Module Configuration

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				
			00=Pt-100E					
	0000 0001 thru 0111 (see char		01=Ni-120					
6			02=Pt-100C					
		0000	03=Cu-10					
			04=LIN100	00=0.5°C				
		0001	0001			05=Pt-1000	01=0.5°F	
		0111 (see chart)	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					
6			01=Ni-120					
	0001		02=Pt-100C					
		0000 thru 0111 (see chart)	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					
			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.

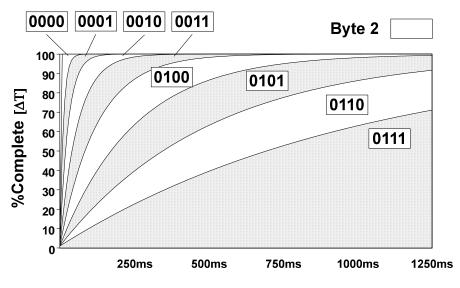


Figure 2.6 - The Effects of Digital Filtering

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 Configuration	Temperature Conversion					
0.5°C	°C=%Al/2					
0.5°F	°F=%Al/2					
0.125°C	°C=%Al/8					
0.1°C	°C=%AI/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 %Al2equals 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

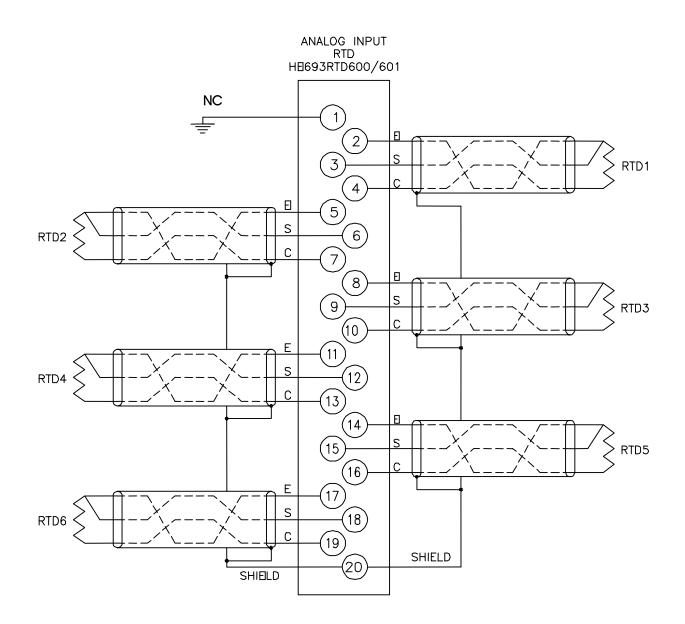


Figure 3.1 – Wiring Diagram

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:

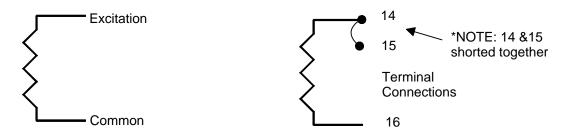


Figure 3.3 – Two-Wire Connection

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.