



**User Manual for the
*HE693RTD600-24***

Resistance Temperature Device Input Module

**First Edition
31 December 1998**

MAN0279-01

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

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 are written to the 90-30 %AI input table. All modules feature six channels, and support PT-90 (MIL-7990), PT-100 (alpha=.00385, .003902 and .03906), Ni-120, Cu-10, Cu-50, Cu-53, Cu-100, Pt-1000, TD5R and Linear Resistance.

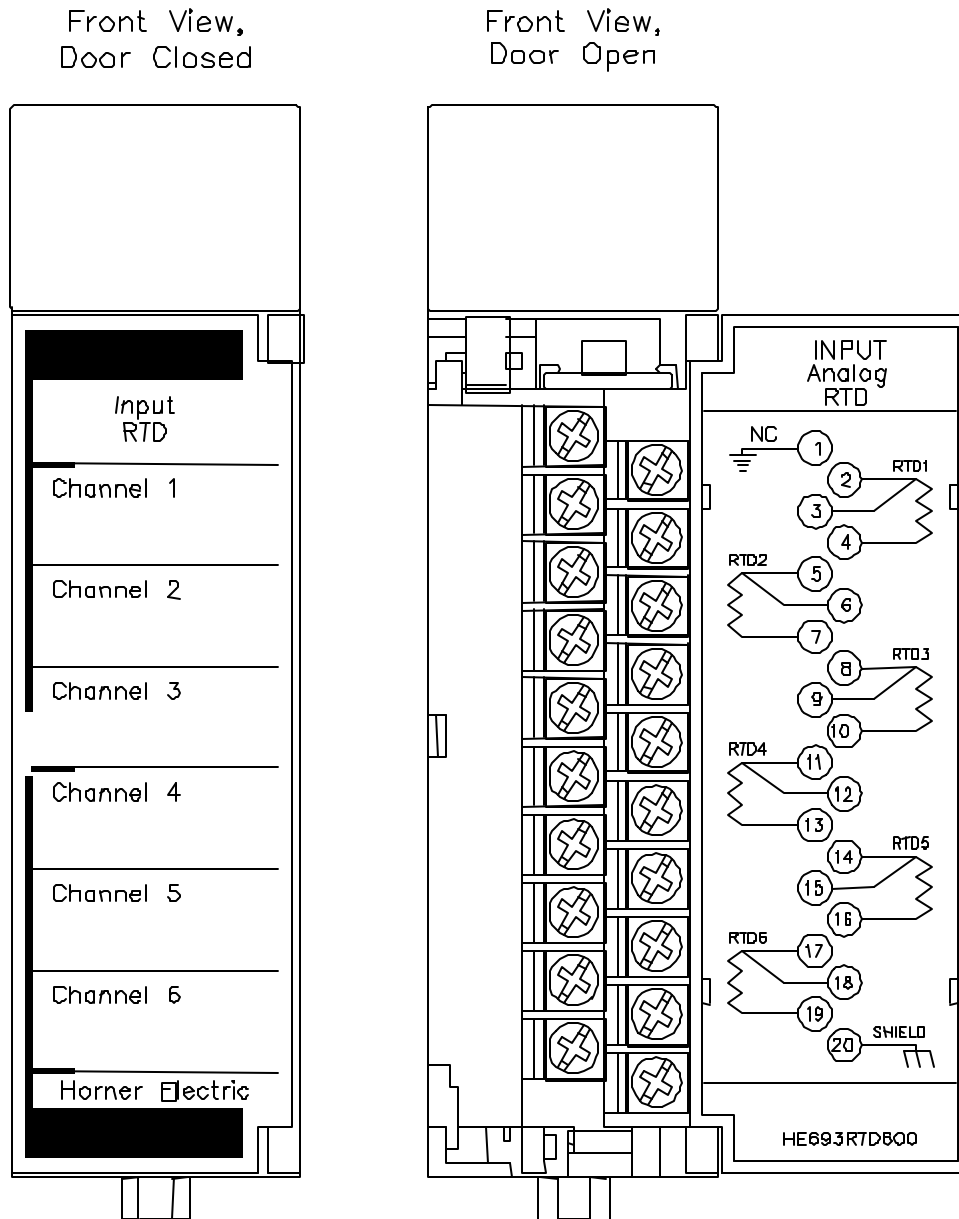


Figure 1.1 – Front

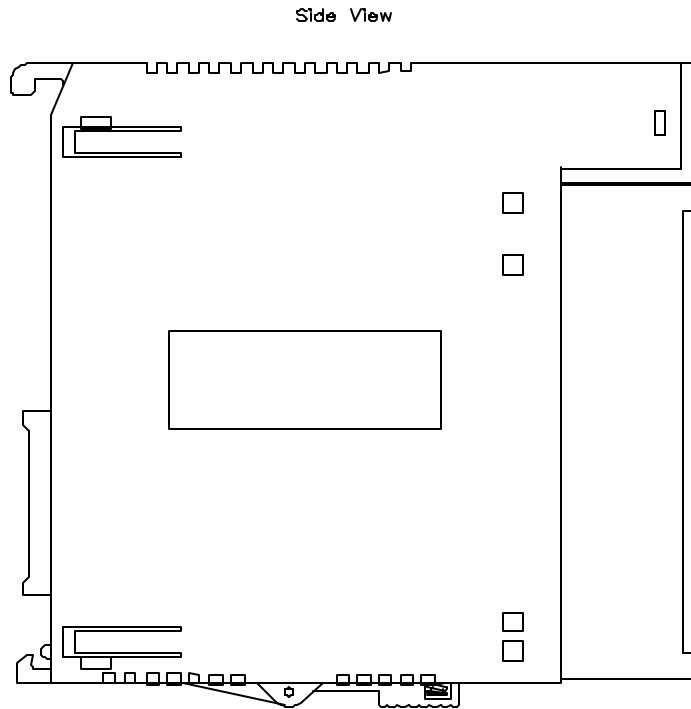


Figure 1.2 – Side View

RTD600.DWG

1.2 Specifications

Table 1.1 - HE693RTD600-24 Specifications				
Power Consumption (Typical)		75mA @ 5VDC	Number of Channels	6
Types Supported	Pt-100E	-200 to 850°C	I/O Points Required	6%AI
	Pt-100C	-100 to 650°C	Input Impedance	>1000 Meg Ω
	Pt-100Z	-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 per second
	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°C
	Cu-100	-200 to 200°C	Resolution	0.5°C or 0.5°F
	Ni-120	-100 to 270°C	Accuracy	$\pm 0.5^\circ\text{C}$ typical, $\pm 1.0^\circ\text{C}$ for Cu-10 and TD5R
	Linear	0 to 200 Ω	Operating Temperature	0 to 60°C (32° to 140°F)
	TD5R	-40 to 150°C	Relative Humidity	5% to 95% non-condensing
	Pt-90 (MIL-7990)	-50 to 200°C		

CHAPTER 2: CONFIGURATION

2.1 GENERAL

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.

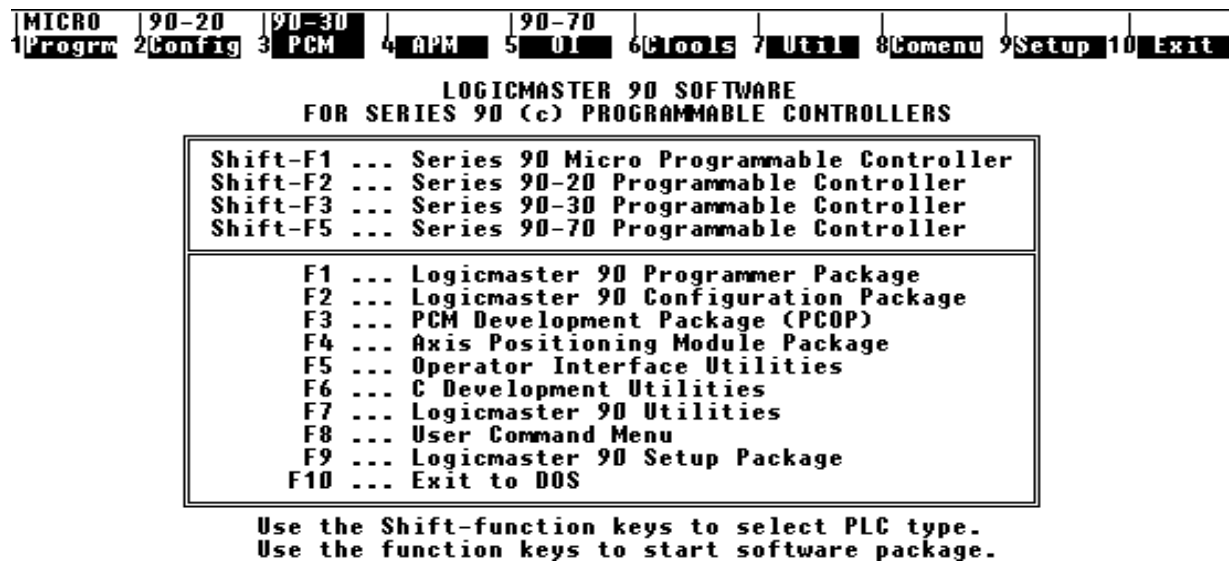


Figure 2.1 – Default Screen

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

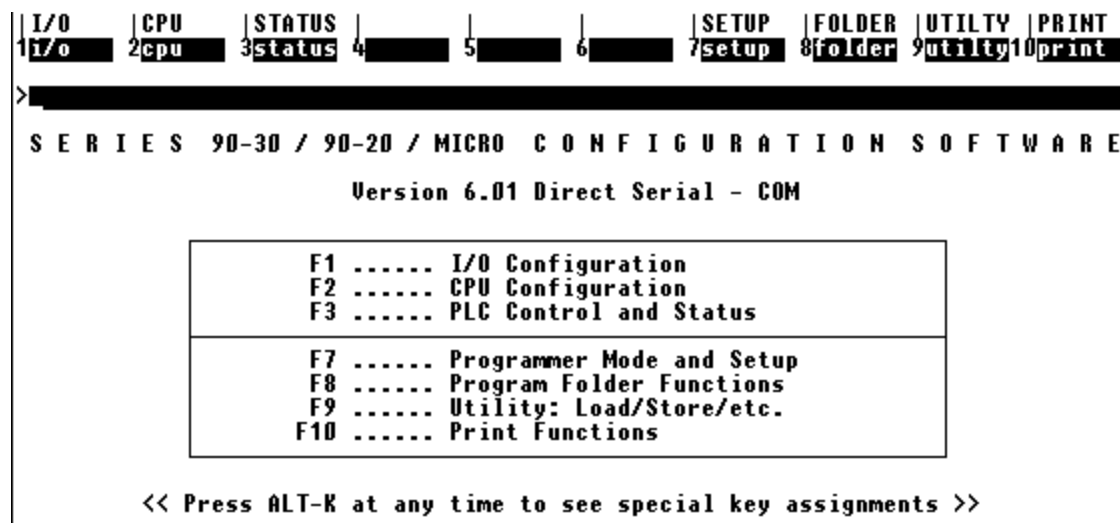


Figure 2.2 – Configuration Screen

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

```
|RACK| COPY | REF UU | DELETE | UNDEL | | | | | | | | | |
| 30 io | 2genius | 3 | 4ps | 5rcksel | 6comm | 7 | 8other | 9 | 10zoom
```

>

PS/CPU	1	2	3	4	5
-----	PROGRAMMED		CONFIGURATION		-----
PWR321					
CPU 30					

Figure 2.3 – Rack Configuration

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

```
|RACK| | | | | | | | | | | |
| pcm | 2hsc | 3frgn | 4oi | 5apm | 6iolink | 7iop | 8 | 9 | 10
```

>

```
SERIES 90-30 MODULE IN RACK [ ] SLOT [ 5 ]
SOFTWARE CONFIGURATION _____
```

SLOT 5	Catalog #: []
-----------	----------------

Figure 2.4 – Slot Configuration

5. The screen appears as shown in Figure 2.5:

```

RACK
1 pcm 2 hsc 3 frgn 4 oi 5 apm 6 iolink 7 iop 8 9 10
>
SERIES 90-30 MODULE IN RACK [ ] SLOT 5
SOFTWARE CONFIGURATION
-----
SLOT 5 Catalog #: FOREIGN 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 : 0B Byte 11 : 00
%Q Size : 0 Byte 4 : 00 Byte 12 : 00
%AI Ref Adr : %AI0001 Byte 5 : 00 Byte 13 : 00
%AI Size : 6 Byte 6 : 00 Byte 14 : 00
%AQ Ref Adr : %AQ0001 Byte 7 : 00 Byte 15 : 00
%AQ Size : 0 Byte 8 : 00 Byte 16 : 00
    
```

Figure 2.5 – Module Configuration

2.2.1 Configuration Parameters

Tables 2.1 and 2.2 indicate the five necessary parameters for configuring the HE693RTD600-24. The parameters include % AI Size, Byte 1, Byte 2, Byte 3, and Byte 4.

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

Table 2.1 – Configuration Parameters for RTD600-24				
%AI Size	Byte 1	Byte 2	Byte 3	Byte 4
6	0001	0000 thru 0111 (see chart)	00=Pt-100E	00=0.5°C 01=0.5°F
			01=Ni-120	
			02=Pt-100C	
			03=Cu-10	
			04=LIN100	
			05=Pt-1000	
			06=TD5R	
			07=Pt-100Z	
			08=Cu-50	
			09=Cu-53	
0A=Cu-100				
0B=Pt-90				

2.2.2 Digital Filtering

The effect of digital filtering (on the HE693RTD600-24 module) 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.

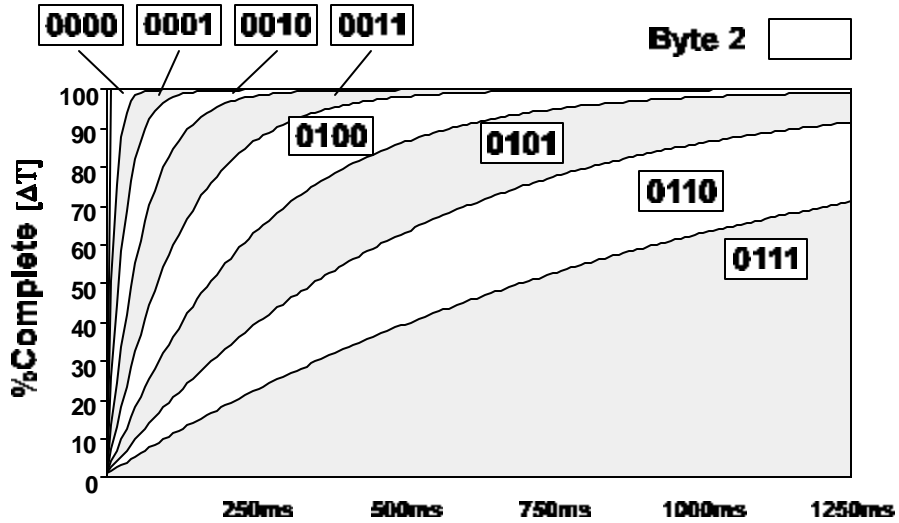


Figure 2.6 - The Effects of Digital Filtering

2.2.3 Temperature Scaling

The Resistance Temperature Device reports values to the %AI table in 0.5 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=%AI/2
0.5°F	°F=%AI/2
LIN100 reports 128 counts per 1Ω.	

Examples:

If %AI2 equals Channel 2 on the RTD module, and %AI2 equals 1,000 and Byte 4 equals 00, the temperature reading is T=500°C (format .5°C).

If %AI2 equals 142 and Byte 4 equals 01 (.5°F), the temperature is T=71°F.

CHAPTER 3: WIRING & INSTALLATION

3.1 Wiring Diagram for the RTD Terminal Block Connection

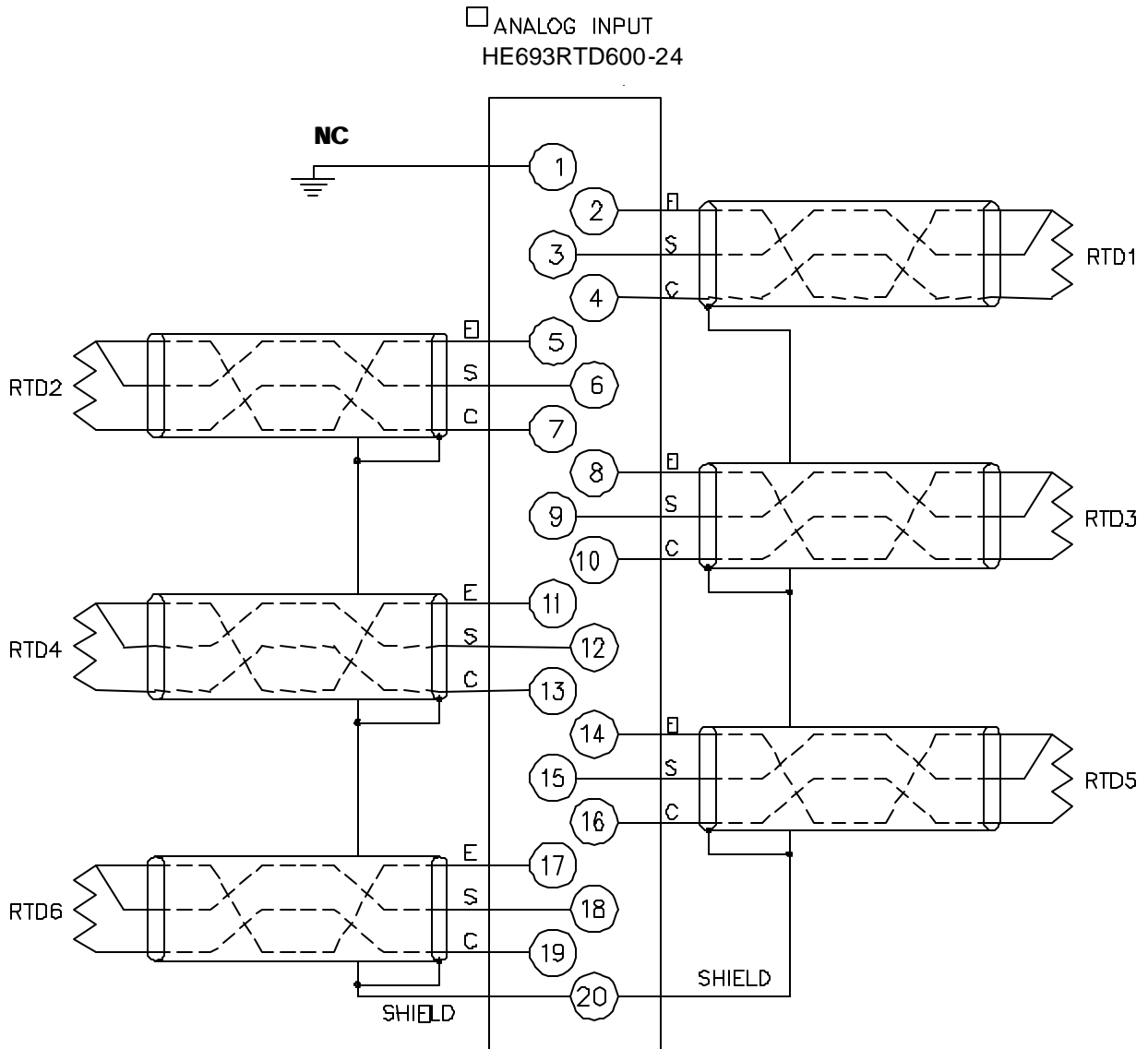


Figure 3.1 – Wiring Diagram

3.1.1 Three-Wire Connection

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

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

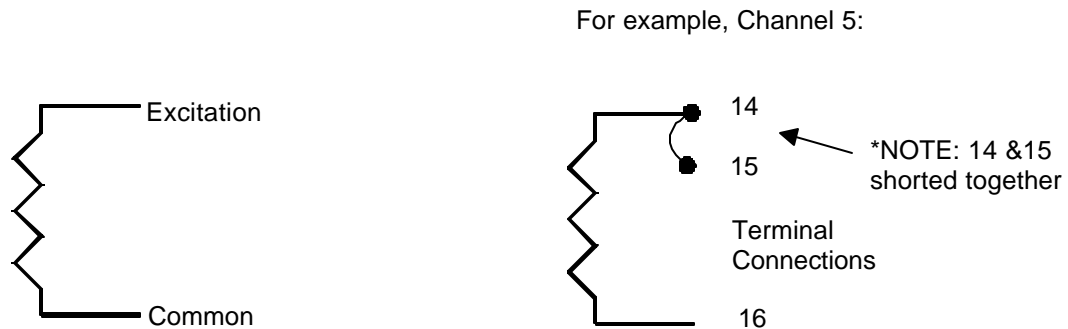


Figure 3.3 – Two-Wire Connection

NOTE: Two-wire RTDs are supported, but accuracy may vary.
Four-Wire RTD's are NOT 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.