### **RTD** Termination Panel

M/N 6°C615

Instruction Manual J-3645-2



The information in this user's manual is subject to change without notice.

Reliance Electric Industrial Company assumes no responsibility for errors that may appear in this user's manual.

#### WARNING

THIS UNIT AND ITS ASSOCIATED EQUIPMENT MUST BE INSTALLED, ADJUSTED AND MAINTAINED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL EQUIPMENT IN THE SYSTEM AND THE POTENTIAL HAZARDS INVOLVED, FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN BODILY INJURY.

#### WARNING

INSERTING OR REMOVING THIS MODULE OR ITS CONNECTING CABLES MAY RESULT IN UNEXPECTED MACHINE MOVEMENT. TURN OFF POWER TO THE MACHINE BEFORE INSERTING OR REMOVING THE UNIT OR ITS CONNECTING CABLES. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN BODILY INJURY.

Reliance® is a registered trademark of Reliance Electric Industrial Company. AutoMate: is a registered trademark of Reliance Electric Industrial Company.

## **Table of Contents**

1.0	Introduction	1-1			
2.0	Mechanical/Electrical Description				
	2.1 Mechanical Description	2-1			
	2.2 Dectrical Description	2.1			
3.0	Installation				
	11 Wring	3-1			
	3.2 Initial Installation	3-1			
	0.3 Field Calibration	3-2			
	3.4 Fond Replacement	33			
4.0	Diagnosilics and Troubleshooting	4-1			

# Appendices

Appendix A Technical Specifics.ons	A-1
Appendix B	
Platinum RTD Temperature-Resistance Values European Curve	B-1
Appendix C	
Field Connections	Ç-1
Appendix D	
Related Components	D-1

# List of Figures

Figure 2.1	610615 Termination Fend	36	04	21
Figure 2.2	- Typical hput Crcuit	÷.	554	2.2
Egun: 3.1	- Typical Field Signal Connections	32	16	3-2

# 1.0 INTRODUCTION

The 61C615 is an active termination panel that conditions and powers 100 obro platinum Basistance Temperature Detectors used with the 61C613 analog input module.

Four input screw terminals are provided for each 3 wire FTD. A 4th terminal is used to connect the RTD shield to a common ground.

This manual describes the functions and specifications of the panel. It also describes how to install, set  $\mu\rho$  and service the panel.

Related publications that may be of interest:

- J-2605 AUTOMATEV 30/40 PRODUCT SUMMARY.
- J-2611 DCS 5000 PROBUCT SUMMARY.
- JR35/3-1, 16 CHANNEL ANALOG INPUT MODULE INSTRUCTION MANUAL
- IEE- 518 GUIDE FOR THE INSTALLATION OF ELECTRICAL EQUIPMENT TO MINIMIZE
   FOTH GAL NOISE INPUTS TO GUNTROLLERS FROM EXTERNAL SOURCES

# 2.0 MECHANICAL/ELECTRICAL DESCRIPTION

The following is a description of the termination connectors and electrical characteristics of the field connections.

### 2.1 Mechanical Description

The 61 C615 is a 19° rack-mountable termination panel that includes two 6-loot, 50-wire twisted pair flat cables and a 6-loot power cable. A separately mounted  $\pm$ 1 divolutions are listed in Appendix A.

When the panel is viewed from the nort, the fiel cable on the right side of the formination panel (TB2) is for energy inputs \$-15. If connects to the cottom connector on the 610613. The fist osbie on the left side of the fermination panel (TB1) is for one og inputs 0-7. If connects to the middle connector on the 610613. The too connector on the 610613 in the too connector on the 610613 module is not used.

The termination panel includes 64 clamp type screw terminals for terminating field signals. Alc car plastic shield is provided as a cover for the terminal strips



Figure 2.1 61C615 Termination Fanal

### 2.2 Electrical Description

The RTD lemmation panel is used to meanize and power 100 ohm platinum Realatance Temperature Detectors used with the 61061S anslop input module. The realatance change of the RTD with temperature is sensed by using the RTD as the external 4th arm of a bridge. The termination panel contains the internal portions of the bridge as well as the bridge excitation supply. See figure 2.2,



Figure 2.2- Typical Input Circuit

A three wire connection to each RTD allows the effects of least resistance (up to 5 ohms per leas) to be compensated out. A separate shield connection is also prividee. The shield is grounded at the termination pane.

The apply for each bridge is modified by the output of a linearizing amplifier to compensate for both bridge and ITTD nonlinearities. Three potent orderes are included for each channel to acjust offset, range, and linearity. Nominal full scale is 200 mVolts for s.200 deg. C span, or 100mVolts, depending upon how the panel is callorated.

# 3.0 INSTALLATION

T tis section describes how to install and remove the termination panel and its cable assembly.

### 3.1 Wiring

The Installation of wiring anould conform to all applicable codes.

To reduce the possibility of electrical noise interfering with the proper operation of the control system, exercise care when installing the wining from the system to the external devices. For detailed recommendations refer to IEEE 518.

### 3.2 Initial Installation

#### WARNING

THERE IS NO ISOLATION BETWEEN THE INDIVIDUAL CHANNELS ON THE TERMINATION PANEL. DO NOT CONNECT DIFFERENT CHANNELS ON THE SAME TERMINATION PANEL TO COMMON POINTS OF DIFFERENT POTENTIALS. (FOR EXAMPLE, THIS PANEL SHOULD NOT BE CONNECTED TO RTD DEVICES USED TO MONITOR MOTOR TEMPERATURES BECAUSE THE RTD DEVICES WILL FLUCTUATE IN COMMON MODE VOLTAGE LEVEL BETWEEN THE DIFFERENT MOTORS.) FAILURE TO OBSERVE THIS PRECAUTION MAY DESTROY THE TERMINATION PANEL DUE TO EXCESSIVE CURRENTS FLOWING IN THE COMMON WIRING.

Use the following procedure to install the module:

- Step 1. Turn off power to the system. All power to the tack as well ea all power to the wiring leading to the termination panel should be off.
- Step 2 Mount the termination panel. It should be mounted to permit easy access to the screw terminals on the terminal house. Make certain that the terminal board is close enough to the rack so that the cable will reach hoween the terminal occard are the module. The panel should be located so that the fat cables can be routed to the front of the module without coming in centeet with high voltage wires.
- Step 3. Mount the external power supply it must be located within a 6-ft cable run of the termination canel. It should be located so that the power cable can be routed to the termination panel without conting in contact with high pollage wires.
- Step 4 Gorners the power sable on the termination panel to the power aupply.
- Step 5. Fasten field wires to the terminal strip. Make contain that all field wires are securely fastened. The shield should be terminates at the panel. Do not connect the shield at both ends of the cable. Typical field signal connections are shown in figure 3-1.



Figure 3.1- Typical Field Signal Connections

- Step 6. Connect the 50 pin fat cables to their corresponding connector on the analog input module (610618). Attach the cables by algoing the triangle marks on the cable and the brane sockst. Input channels 0-7 (TB1) use the missile connector on the input module. Input channels 8-10 (TB2) use the britism connector. If the rack contains more than one analog input module, make contains that optimations are the procedures for the module.
- Step /. Turn on power to the system.
- Step 8. Verily the installation Refer to the instruction manual for the 16 Channel Analog Input Module (J-3813-1).

### 3.3 Field Calibration

The lemnihilition panel is acjusted for European curve RTDs (stphatemperature coefficient of 0.00385 ph/ns/ohn/cegree C) and includes an atowards for 0.1 ph/n lead resistance. For lead resistance greater than 0.1 ph/n, the following procedure can be used to calibrate the input for maximum accuracy:

- The offset adjustment should not normally need further lie of adjustment. If it becomes necessary, substitute a procision 100 ohm resistor in place of the RTD and adjust the placet potentiometer for an output of zero volta. The placet potentiometers are located at the back of the panel. Each ohannel hos a separate offset adjustment labeled "OS".
- 2 Acjust the gain potentiometer so that total bridge voltage is 253.3mV across the 100 onm resistor. The gain potentiometers are located at the back of the panel. Each channel has a separate gain adjustment laceled "GN"

5. Force the TTD to a known temperature or simulate a known temperature by connecting a precision resistor at the RTD and of the field wring. For example, if R = 162.0 chms, then lock up in the table in Appendix B the resistor values above and below 162.0 ohms. With those values and their equivalent temperatures, interpolate to find the expected temperature.

Dec. C	OTIMS
ato	179.51
X	182.0
220	183.17

X = 215 80 dec. D

4. Acjust the incerity potention of a flic corresponding simulates temperature. The temperature should be at the upper end of the operating range and must be well away from 0 deg C. The linearity potention etcrs are located at the back of the panel. Each channel has a separate linearity acjustment labeled "U".

### 3.4 Panel Replacement

Use the following processure to replace a termination pane :

- Step 1. Turn off power to the rack and all connections
- Step 2 Use a screwdriver to inoten the access holding the field wirea to the fermination panel. Make certain that the wirea are tagged an that they can be replaced in the correct order.
- Step 3. Berrove the S0-bin flat cables from the back of the termination panel.
- Step 4 Remove the termination panel.
- Step 5 Follow steps 2-6 in the installation princeture, section 3.2.

# 4.0 DIAGNOSTICS AND TROUBLESHOOTING

For details on how to troubleshoot the termination panel, refer to the Instruction manual for the 16 Channel Analog Input Module (J-3613-1).

# Appendix A

### **Technical Specifications**

#### **Ambient Conditions**

- Storage temperature: -10° C 65° C
- Operating temperature: 0°C 55°C
- Ilumidity: 5.90% non-condensing.

#### Dimensions

- Height: 1.7 Inches
- Width: 19.0 inches
- Depth: 1 6 inches behind rack rails 2 5 inches in front of rack rails

#### Input Circuit

- Number of inputs: 16.
- Type: 100 chm (@ 0 degrees C) platinum RTD
- Besistance curve: European, Alpha = 0.00385 chmarohm/ceg. C
- acistion: All channels on panel have a common ground. Entire canel may operate at inon-zero common mode voltage depending on input board common mode range and power aucply tap atton.
- Connections, Screw-adivated, damp lype barrier strips, Accompdates 24 to 14 AWC wire. Four connections/RTD.

### **Output Circuit**

- Linearized range: 20 to -1 250 eeg, C
- · Senaltivity: .5mVolt/deg. G
- Zom point Clorg, C
- Linearization error for 0.1 obmilleari resistance: <0.1 deg. G (-20.10 250 deg.G).</li>

```
for 0.1 to 0.2 chm resistance: <0.1% reading + 0.1 deg. C
( 20 to 250 deg. C)
Cr
< 25 deg. C ( 20 to 200 deg. C)
```

- Temperature variation (0-55 deg. C): 0.5% of reading, 0.2mVolts max.
- Connections: 50 wire twisted pair flat cable per 8 channels; 6 fl long. One end harowired into panel; other end terminated in a connector (3M part no. 3425-5050).

## Appendix A

### (Continued)

#### **Power Requirements**

- +15 Volle, 100 mA
- –1 a Volts: 160 mA
- Voltage tolerande: ±1%
- Voltage temp Coel: 0.02%/deg.C
- Line regulation: 0.15%
- Losso regulation: 0.115
- Bioplet <2 mVolts BMG</li>
- Protection: Each line fusion at 1A and reverse voltage protected.
- Fuse type: Littelfuse 276001.
- Connector: Siwre cable, 6 ft long with specillugs 15 Volts - yollow 15 Volts - y olet ground - gray

#### WARNING

UNUSED INPUTS SHOULD BE CLOSED. OPEN INPUTS CAN CAUSE -15V CURRENT TO INCREASE BY 15MA PER CHANNEL AND +15V CURRENT TO INCREASE BY 10MA PER CHANNEL. JUMPER "SENSE" TO "HIGH R" (GROUND) AT ALL UNUSED INPUTS. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY INJURY OR DAMAGE TO EQUIPMENT.

# Appendix B

### Platinum RTD Temperature-Resistance Values European Curve

Alpha = 0.00385 chmaiohm/cep.C

Dare D	-	2004	-
Degus	onma	ieg.G	QUIT1A
-150	39.85	180	168.47
110	13.50	197	172.16
-130	17.90	200	175.6/
-120	52.04	210	179.51
-110	56.13	220	163.17
-100	60.20	230	163.62
- 90	64.25	240	190.46
50	58.28	250	194.08
70	72.29	260	197.70
80	76.28	273	201.50
50	80.25	280	204.88
- 10	8/.21	290	208.46
30	88.17	300	212.03
-20	92.13	310	215.58
-10	96.07	320	219.13
0	100.00	390	222.66
10	HDG.90	340	226.18
20	107.79	360	224.54
30	111.57	360	233.19
40	115.54	370	236.57
50	119.40	387	240.15
50	123.24	590	243.51
70	127.07	400	247.56
60	130.69	410	250.50
90	13/.70	120	253.93
100	133.50	430	257.34
110	142.20	440	260.75
120	146.06	46/0	264.14
130	149.92	400	267.52
140	153.57	470	270.59
150	157.32	480	274.25
150	161.05	490	277.80
170	16/.76	500	260.53

# Appendix C

### **Field Connections**

	TB1			TB2		
14		► \$2	14		<b>→</b> \$?	
Pir	Chennel	hput	Pin	Charnel	Input	
1 3 4	0 0 0 0	Shield High B Low R Garea	1 2 3 4	5 5 6 6	Shicid High R Low R Bense	
5 é 7 8	1	Shield High B Low R Sense	5 6 7 5	4 4 6 8	Shield High Fi Low Ri Sense	
8 10 11 12	2 2 2 7 2 2 7 2	Shield High R Low R Sansa	9 10 11 12	10 10 10 10	Shield High R Low R Sense	
13 14 10 16	3 3 3 3	Shiaid High R Low R Bansa	13 14 15 16	11 11 11 11	Shield High II Low R Sense	
17 18 19 20	य र य य	Shield High D Low R Sonso	17 18 19 20	12 12 12 12	Shield High H Low R Sense	
21 22 23 24	5 10 10 6	Shield High R Low R Sense	21 22 23 24	13 13 13 15	Shicid High R Low R Sense	
25 26 27 28	8 8 8	Shield High D Low R Sansa	2a 26 27 28	14 11 14 14	Shield High R Low H Sense	
29 30 31 32	7 7 7 7	Shield High R Low R Soneo	28 30 31 32	15 15 15 15	Sheid High R Low R Sense	
33 34 35 36		1.6 1.6 1.0 1.0	33 35 35	014	n.e. 1.e. 1.e.	

R = resistance in c. = no connection

# Appendix D

## **Related Components**

M/N 61 C613 16 Channel Analog Input Module

#### For additional information

1 Allen-Bradley Drive Mayfield Heights, Ohio 44124 USA Tel: (800) 241-2886 or (440) 646-3599 http://www.reliance.com/automax

seven actives before the company

European Hankaparan Indonesi Kalamata, 20 Milani, Mataran Anna, Lak 140, Minanina, M. 1920-500, 1991, 1993, 1493, 1492, 1202, 1493

Hankgueren for Allen-Bredley Protoco, Rockwall Software Produce, and Othel Manaface day Solution. Ann war behavel faithere, an Eur Soull dava die an Helwaten. W 2004-2008 Eds hier (144-2002) (Eds 1000) (Eds 20 Roch Hell, SadVille, Allen Helman, and Protocol and Allendon, and Eur Charles and Allendon (Eds 2004) (Eds 20 Allendon (Eds 2004) (Eds 2004)

Hestigenten fin Belgened Belgen Rieden Rechten Kannon Briterie Janwar zu DAB festar Gazy Gewelle, 2008/94817 J. St., het (1404/32/4000, het (1704/32/200 Bezen Mide, Belf-Miter Robert Auforation, 54 (1809) (2007) Belgen Briterie J. Belgen St. (1809) St. J. Hestik 2011/201 Miterie Belgen Robert Auforation, 16 (1907) (2007) St. (1907) Belgen Belgen Belgen Belgen St. (1907) St. J. Hestik 2011/2011

Collection Market - Engels (38)

Copy join 4, 2008 Rodwell Automator, 112, A high measure. Final in U.S.A.