

# *Relay Interface Board User's Guide*

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## Warranty

Watlow Anafaze, Incorporated warrants that the products furnished under this Agreement will be free from defects in material and workmanship for a period of three years from the date of shipment. The customer shall provide notice of any defect to Watlow Anafaze, Incorporated within one week after the Customer's discovery of such defect. The sole obligation and liability of Watlow Anafaze, Incorporated under this warranty shall be to repair or replace, at its option and without cost to the Customer, the defective product or part.

Upon request by Watlow Anafaze, Incorporated, the product or part claimed to be defective shall immediately be returned at the Customer's expense to Watlow Anafaze, Incorporated. Replaced or repaired products or parts will be shipped to the Customer at the expense of Watlow Anafaze, Incorporated.

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If replacement parts are supplied or repairs made during the original warranty period, the warranty period for the replacement or repaired part shall terminate with the termination of the warranty period of the original product or part.

The foregoing warranty constitutes the sole liability of Watlow Anafaze, Incorporated and the customer's sole remedy with respect to the products. It is in lieu of all other warranties, liabilities, and remedies. Except as thus provided, Watlow Anafaze, Inc. disclaims all warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.



# *Relay Interface Board Installation Guide*

## Introduction

The Relay Interface Board (RIB) replaces the standard I/O terminal board. It connects a Watlow Anafaze controller to a third-party I/O board with 8, 16, 24, or 32 relays.

This document lists system requirements, specifications and explains how to install and wire the RIB.

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### System Requirements

Choose which of the controller's digital inputs and outputs are needed. Refer to *Table 3 and 4* for connections for 24-module I/O boards or *Table 5* for connections for a 32-module I/O board. An 8-module I/O board contains the first eight modules of the 24-module board, a 16-module board contains the first 16 modules of the 24-module board, etc.

- 8, 16 and 24-module I/O boards are connected to J2 and J3 on the RIB.
- 32-module boards connect to J4 only.

The system safe and global alarm outputs are available via J2 and TB1 only. To connect to all of the digital inputs and outputs, use two 24-module boards.

A 32-module board connected to J4 provides outputs for 32 heat-only loops or for 16 heat/cool loops.

MLS300 and CLS200 controllers have a 50-pin, SCSI-II, female connector for digital I/O. You will have to make or obtain from Watlow Anafaze a cable that connects from SCSI to ribbon cable in order to use the RIB with these controllers.

## Hardware Requirements

Choose I/O modules designed to operate with +5 Vdc power. Watlow Anafaze systems are designed to operate at this voltage.

Choose I/O boards which have 50-pin headers with long latch levers. Short latch levers will not Watlow Anafaze cables.

Calculate the maximum current requirement of the desired I/O boards. If they require more current than the controller can supply, use an external power supply.

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### **Installation**

These instructions assume the controller has previously been installed.

#### **Tools Needed**

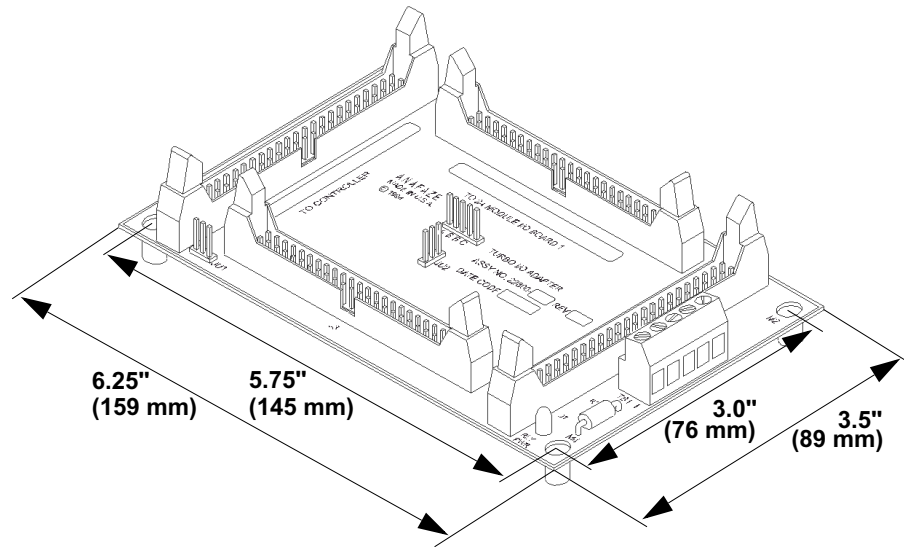
Four, #6 screws  
Screwdriver

#### **Mounting**

1. Choose a mounting location large enough to accommodate the RIB, the I/O board or boards, the ribbon cable or cables and wires that connect them.
2. Place the RIB in a suitable location to be mounted and use a pencil to trace around the plastic standoffs or use the dimension diagram in Figure 1 to position the mounting holes.
3. Drill and tap #6-32 holes in the marked locations.
4. Place the Relay Interface Board in the mounting location and insert the #6 screws in the plastic standoffs.
5. Tighten the screws.



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**Figure 1** Relay Interface Board

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### Wiring

These instructions explain how to connect the RIB to the Watlow Anafaze Controller and to the I/O board.

#### Ribbon Cable

Connect the ribbon cable to the controller. Plug the other end of the ribbon cable into the header labeled J1 on the Relay Interface Board. The red stripe on the ribbon cable should line up with Pin 1 on the board.

Plug one end of the I/O board ribbon cable into the I/O board and the other end into the RIB. See *Tables 3, 4 and 5* for connection information. Repeat for each I/O board installation.

Use a felt-tip pen to write the cable's name and number in the white box next to the header.

#### I/O Board Terminals

Refer to *Tables 3, 4 and 5* for the controller signals that correspond to each I/O module.

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### Power Connections

Choose one of the following options for installing and configuring the jumper on JU1 appropriately for your I/O board.

- **Option 1: 8, 16, and 24-module I/O boards only:** Jumper JU1 in position A to get power from the controller to the I/O boards via the ribbon cable.
- **Option 2: 8, 16 and 24-module I/O boards only:** Jumper JU1 in position B to disconnect the controller power supply. Jumper the I/O boards to get power from the ribbon cable. Use an external power supply to provide power to TB1. This arrangement powers the I/O boards through their ribbon cables.
- **Option 3: For any I/O board:** Jumper JU1 in position A. Set the I/O board for an external power supply. Then connect power from TB1 to the terminals on the I/O board.
- **Option 4: For any I/O board:** Jumper the I/O board for an external power supply. Wire an external power supply directly to the terminals on the I/O board.

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**Additional Terminals**      The Relay Interface Board contains a 5-pin terminal block (TB1) with these functions:

**TABLE 1. TB1 Functions**

<b>TB1</b>	<b>Function</b>
1	+5 Vdc power
2	Power common
3	Global alarm output
4	CPU Watchdog output
5	Pulse input

These terminals are directly connected to the controller. They allow connection to separate sensors, SSRs, PLCs and safety controls.

**Jumpers**      The RIB has three sets of jumpers: JU1, JU2 and JU3. JU2 and JU3 only affect the I/O board connect to J2.

The jumpers let you choose between options listed in *Table 2*.

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**TABLE 2. Jumper Positions**

<b>Jumper</b>	<b>Jumper Position A</b>	<b>Jumper Position B</b>	<b>Jumper Position C (JU3 only)</b>
JU1	Controller supplies +5 Vdc to power both 24-module I/O boards. TB1 terminal 1 can supply power to a 32-module I/O board.	Controller power supply is disconnected. TB1 terminal 1 can connect +5 Vdc power from an external supply to both 24-module I/O boards.	
JU2	Module 3 (on the I/O board connected to connector J2) is connected to the controller's digital input 1. The module should be an input module.	Module 3 (on the I/O board connected to connector J2) is connected to controller digital output 34. The module should be an output module.	
JU3	Module 2 (on the I/O board connected to connector J2) is connected to the controller's pulse input. The module should be an input module.	Module 2 (on the I/O board connected to connector J2) is connected to the controller's digital input 2. The module should be an input module.	Module 2 (on the I/O board connected to connector J2) is connected to the controller's digital output 33. The module should be an output module.

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### Applying Power

After wiring the I/O board modules and selecting the appropriate jumper positions, power may be connected to the system.

If power is present at the RIB, the green LED labeled RLY PWR will light.

### Testing Your System

Test the system after connecting power. For specific information on testing controllers, refer to your controller manual.

- To test a PID control output, set the appropriate loop to Manual mode and set the output to 100%. The LED located on or next to the output module will light.
- To test digital alarms, outputs and inputs, use the controller's Manual I/O Test menus.

## Controller Connections

Tables 3, 4 and 5 describe connections for Watlow Anafaze controllers with the RIB.

**TABLE 3. 24 I/O Rack #1 (J2)**

Module#	Controller Function	CLS204-4CLS	CLS208-8CLS	CLS216-16CLS	MLS316-16MLS	MLS332-32MLS
0	CPU Watchdog	CPU Watchdog	CPU Watchdog	CPU Watchdog	CPU Watchdog	CPU Watchdog
1	Global Out	Global Out	Global Out	Global Out	Global Out	Global Out
2 (JU3-C) <sup>1</sup>	Dig Out 33	Dig Out 33	Dig Out 33	Loop 16 Cool	Dig Out 33	Pulse Loop Heat
2 (JU3-B) <sup>1</sup>	Dig Input 2	Dig Input 2	Dig Input 2	Dig Input 2	Dig Input 2	Dig Input 2
2 (JU3-A) <sup>1</sup>	Pulse Input	Pulse Input	Pulse Input	Pulse Input	Pulse Input	Pulse Input
3 (JU2-B) <sup>2</sup>	Dig Out 34	Dig Out 34	Dig Out 34	Pulse Loop Cool	Dig Out 34	Dig Out 34
3 (JU2-A) <sup>2</sup>	Dig Input 1	Dig Input 1	Dig Input 1	Dig Input 1	Dig Input 1	Dig Input 1
4	Dig Out 1	Loop 1 Heat	Loop 1 Heat	Loop 1 Heat	Loop 1 Heat	Loop 1 Heat

<sup>1</sup> The function of module 2 depends on the setting of jumper JU3.

<sup>2</sup> The function of module 3 depends on the setting of jumper JU2.

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**TABLE 3. 24 I/O Rack #1 (J2)**

<b>Module#</b>	<b>Controller Function</b>	<b>CLS204-4CLS</b>	<b>CLS208-8CLS</b>	<b>CLS216-16CLS</b>	<b>MLS316-16MLS</b>	<b>MLS332-32MLS</b>
5	Dig Out 2	Loop 2 Heat	Loop 2 Heat	Loop 2 Heat	Loop 2 Heat	Loop 2 Heat
6	Dig Out 3	Loop 3 Heat	Loop 3 Heat	Loop 3 Heat	Loop 3 Heat	Loop 3 Heat
7	Dig Out 4	Loop 4 Heat	Loop 4 Heat	Loop 4 Heat	Loop 4 Heat	Loop 4 Heat
8	Dig Out 5	Pulse Loop Heat	Loop 5 Heat	Loop 5 Heat	Loop 5 Heat	Loop 5 Heat
9	Dig Out 6	Loop 1 Cool	Loop 6 Heat	Loop 6 Heat	Loop 6 Heat	Loop 6 Heat
10	Dig Out 7	Loop 2 Cool	Loop 7 Heat	Loop 7 Heat	Loop 7 Heat	Loop 7 Heat
11	Dig Out 8	Loop 3 Cool	Loop 8 Heat	Loop 8 Heat	Loop 8 Heat	Loop 8 Heat
12	Dig Out 9	Loop 4 Cool	Pulse Loop Heat	Loop 9 Heat	Loop 9 Heat	Loop 9 Heat
13	Dig Out 10	Pulse Loop Cool	Loop 1 Cool	Loop 10 Heat	Loop 10 Heat	Loop 10 Heat
14	Dig Out 11	Dig Out 11	Loop 2 Cool	Loop 11 Heat	Loop 11 Heat	Loop 11 Heat
15	Dig Out 12	Dig Out 12	Loop 3 Cool	Loop 12 Heat	Loop 12 Heat	Loop 12 Heat
16	Dig Out 13	Dig Out 13	Loop 4 Cool	Loop 13 Heat	Loop 13 Heat	Loop 13 Heat
17	Dig Out 14	Dig Out 14	Loop 5 Cool	Loop 14 Heat	Loop 14 Heat	Loop 14 Heat
18	Dig Out 15	Dig Out 15	Loop 6 Cool	Loop 15 Heat	Loop 15 Heat	Loop 15 Heat
19	Dig Out 16	Dig Out 16	Loop 7 Cool	Loop 16 Heat	Loop 16 Heat	Loop 16 Heat
20	Dig Out 17	Dig Out 17	Loop 8 Cool	Pulse Loop Heat	Loop 1 Cool	Loop 17 Heat/ Loop 1 Cool



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**TABLE 3. 24 I/O Rack #1 (J2)**

<b>Module#</b>	<b>Controller Function</b>	<b>CLS204-4CLS</b>	<b>CLS208-8CLS</b>	<b>CLS216-16CLS</b>	<b>MLS316-16MLS</b>	<b>MLS332-32MLS</b>
21	Dig Out 18	Dig Out 18	Pulse Loop Cool	Loop 1 Cool	Loop 2 Cool	Loop 18 Heat/ Loop 2 Cool
22	Dig Out 19	Dig Out 19	Dig Out 19	Loop 2 Cool	Loop 3 Cool	Loop 19 Heat/ Loop 3 Cool
23	Dig Out 20	Dig Out 20	Dig Out 20	Loop 3 Cool	Loop 4 Cool	Loop 20 Heat/ Loop 4 Cool

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**TABLE 4. 24 I/O Rack #2 (J3)**

Module #	Controller Function	CLS204-4CLS	CLS208-8CLS	CLS216-16CLS	MLS316-16MLS	MLS332-32MLS
0	Dig Out 21	Dig Out 21	Dig Out 21	Loop 4 Cool	Loop 5 Cool	Loop 21 Heat/ Loop 5 Cool
1	Dig Out 22	Dig Out 22	Dig Out 22	Loop 5 Cool	Loop 6 Cool	Loop 22 Heat/ Loop 6 Cool
2	Dig Out 23	Dig Out 23	Dig Out 23	Loop 6 Cool	Loop 7 Cool	Loop 23 Heat/ Loop 7 Cool
3	Dig Out 24	Dig Out 24	Dig Out 24	Loop 7 Cool	Loop 8 Cool	Loop 24 Heat/ Loop 8 Cool
4	Dig Out 25	Dig Out 25	Dig Out 25	Loop 8 Cool	Loop 9 Cool	Loop 25 Heat/ Loop 9 Cool
5	Dig Out 26	Dig Out 26	Dig Out 26	Loop 9 Cool	Loop 10 Cool	Loop 26 Heat/ Loop 10 Cool
6	Dig Out 27	Dig Out 27	Dig Out 27	Loop 10 Cool	Loop 11 Cool	Loop 27 Heat/ Loop 11 Cool
7	Dig Out 28	Dig Out 28	Dig Out 28	Loop 11 Cool	Loop 12 Cool	Loop 28 Heat/ Loop 12 Cool
8	Dig Out 29	Dig Out 29	Dig Out 29	Loop 12 Cool	Loop 13 Cool	Loop 29 Heat/ Loop 13 Cool
9	Dig Out 30	Dig Out 30	Dig Out 30	Loop 13 Cool	Loop 14 Cool	Loop 30 Heat/ Loop 14 Cool

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**TABLE 4. 24 I/O Rack #2 (J3)**

<b>Module#</b>	<b>Controller Function</b>	<b>CLS204-4CLS</b>	<b>CLS208-8CLS</b>	<b>CLS216-16CLS</b>	<b>MLS316-16MLS</b>	<b>MLS332-32MLS</b>
10	Dig Out 31	Dig Out 31	Dig Out 31	Loop 14 Cool	Loop 15 Cool	Loop 31 Heat/ Loop 15 Cool
11	Dig Out 32	Dig Out 32	Dig Out 32	Loop 15 Cool	Loop 16 Cool	Loop 32 Heat/ Loop 16 Cool
12	Dig Out 33	Dig Out 33	Dig Out 33	Loop 16 Cool	Dig Out 33	Pulse Loop Heat
13	Dig Out 34/ SDAC Clock	Dig Out 34/ SDAC Clock	Dig Out 34/ SDAC Clock	Pulse Loop Cool/ SDAC Clock	Dig Out 34/ SDAC Clock	Dig Out 34/ SDAC Clock
14	Dig Input 2	Dig Input 2	Dig Input 2	Dig Input 2	Dig Input 2	Dig Input 2
15	Dig Input 3	Dig Input 3	Dig Input 3	Dig Input 3	Dig Input 3	Dig Input 3
16	Dig Input 4	Dig Input 4	Dig Input 4	Dig Input 4	Dig Input 4	Dig Input 4
17	Dig Input 5	Dig Input 5	Dig Input 5	Dig Input 5	Dig Input 5	Dig Input 5
18	Dig Input 6	Dig Input 6	Dig Input 6	Dig Input 6	Dig Input 6	Dig Input 6
19	Dig Input 7	Dig Input 7	Dig Input 7	Dig Input 7	Dig Input 7	Dig Input 7
20	Dig Input 8	Dig Input 8	Dig Input 8	Dig Input 8	Dig Input 8	Dig Input 8

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TABLE 5. 32 I/O Rack (J4)

Module#	Controller Function	CLS204-4CLS	CLS208-8CLS	CLS216-16CLS	MLS316-16MLS	MLS332-32MLS
0	Dig Out 1	Loop 1 Heat	Loop 1 Heat	Loop 1 Heat	Loop 1 Heat	Loop 1 Heat
1	Dig Out 2	Loop 2 Heat	Loop 2 Heat	Loop 2 Heat	Loop 2 Heat	Loop 2 Heat
2	Dig Out 3	Loop 3 Heat	Loop 3 Heat	Loop 3 Heat	Loop 3 Heat	Loop 3 Heat
3	Dig Out 4	Loop 4 Heat	Loop 4 Heat	Loop 4 Heat	Loop 4 Heat	Loop 4 Heat
4	Dig Out 5	Pulse Loop Heat	Loop 5 Heat	Loop 5 Heat	Loop 5 Heat	Loop 5 Heat
5	Dig Out 6	Loop 1 Cool	Loop 6 Heat	Loop 6 Heat	Loop 6 Heat	Loop 6 Heat
6	Dig Out 7	Loop 2 Cool	Loop 7 Heat	Loop 7 Heat	Loop 7 Heat	Loop 7 Heat
7	Dig Out 8	Loop 3 Cool	Loop 8 Heat	Loop 8 Heat	Loop 8 Heat	Loop 8 Heat
8	Dig Out 9	Loop 4 Cool	Pulse Loop Heat	Loop 9 Heat	Loop 9 Heat	Loop 9 Heat
9	Dig Out 10	Pulse Loop Cool	Loop 1 Cool	Loop 10 Heat	Loop 10 Heat	Loop 10 Heat
10	Dig Out 11	Dig Out 11	Loop 2 Cool	Loop 11 Heat	Loop 11 Heat	Loop 11 Heat
11	Dig Out 12	Dig Out 12	Loop 3 Cool	Loop 12 Heat	Loop 12 Heat	Loop 12 Heat
12	Dig Out 13	Dig Out 13	Loop 4 Cool	Loop 13 Heat	Loop 13 Heat	Loop 13 Heat
13	Dig Out 14	Dig Out 14	Loop 5 Cool	Loop 14 Heat	Loop 14 Heat	Loop 14 Heat
14	Dig Out 15	Dig Out 15	Loop 6 Cool	Loop 15 Heat	Loop 15 Heat	Loop 15 Heat
15	Dig Out 16	Dig Out 16	Loop 7 Cool	Loop 16 Heat	Loop 16 Heat	Loop 16 Heat
16	Dig Out 17	Dig Out 17	Loop 8 Cool	Pulse Loop Heat	Loop 1 Cool	Loop 17 Heat/ Loop 1 Cool

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<b>Module#</b>	<b>Controller Function</b>	<b>CLS204-4CLS</b>	<b>CLS208-8CLS</b>	<b>CLS216-16CLS</b>	<b>MLS316-16MLS</b>	<b>MLS332-32MLS</b>
17	Dig Out 18	Dig Out 18	Loop 2 Cool	Pulse Loop Cool	Loop 2 Cool	Loop 18 Heat/ Loop 2 Cool
18	Dig Out 19	Dig Out 19	Dig Out 19	Loop 2 Cool	Loop 3 Cool	Loop 19 Heat/ Loop 3 Cool
19	Dig Out 20	Dig Out 20	Dig Out 20	Loop 3 Cool	Loop 4 Cool	Loop 20 Heat/ Loop 4 Cool
20	Dig Out 21	Dig Out 21	Dig Out 21	Loop 4 Cool	Loop 5 Cool	Loop 21 Heat/ Loop 5 Cool
21	Dig Out 22	Dig Out 22	Dig Out 22	Loop 5 Cool	Loop 6 Cool	Loop 22 Heat/ Loop 6 Cool
22	Dig Out 23	Dig Out 23	Dig Out 23	Loop 6 Cool	Loop 7 Cool	Loop 23 Heat/ Loop 7 Cool
23	Dig Out 24	Dig Out 24	Dig Out 24	Loop 7 Cool	Loop 8 Cool	Loop 24 Heat/ Loop 8 Cool
24	Dig Out 25	Dig Out 25	Dig Out 25	Loop 8 Cool	Loop 9 Cool	Loop 25 Heat/ Loop 9 Cool
25	Dig Out 26	Dig Out 26	Dig Out 26	Loop 9 Cool	Loop 10 Cool	Loop 26 Heat/ Loop 10 Cool
26	Dig Out 27	Dig Out 27	Dig Out 27	Loop 10 Cool	Loop 11 Cool	Loop 27 Heat/ Loop 11 Cool
27	Dig Out 28	Dig Out 28	Dig Out 28	Loop 11 Cool	Loop 12 Cool	Loop 28 Heat/ Loop 12 Cool

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<b>Module#</b>	<b>Controller Function</b>	<b>CLS204-4CLS</b>	<b>CLS208-8CLS</b>	<b>CLS216-16CLS</b>	<b>MLS316-16MLS</b>	<b>MLS332-32MLS</b>
28	Dig Out 29	Dig Out 29	Dig Out 29	Loop 12 Cool	Loop 13 Cool	Loop 29 Heat/ Loop 13 Cool
29	Dig Out 30	Dig Out 30	Dig Out 30	Loop 13 Cool	Loop 14 Cool	Loop 30 Heat/ Loop 14 Cool
30	Dig Out 31	Dig Out 31	Dig Out 31	Loop 14 Cool	Loop 15 Cool	Loop 31 Heat/ Loop 15 Cool
31	Dig Out 32	Dig Out 32	Dig Out 32	Loop 15 Cool	Loop 16 Cool	Loop 32 Heat/ Loop 16 Cool