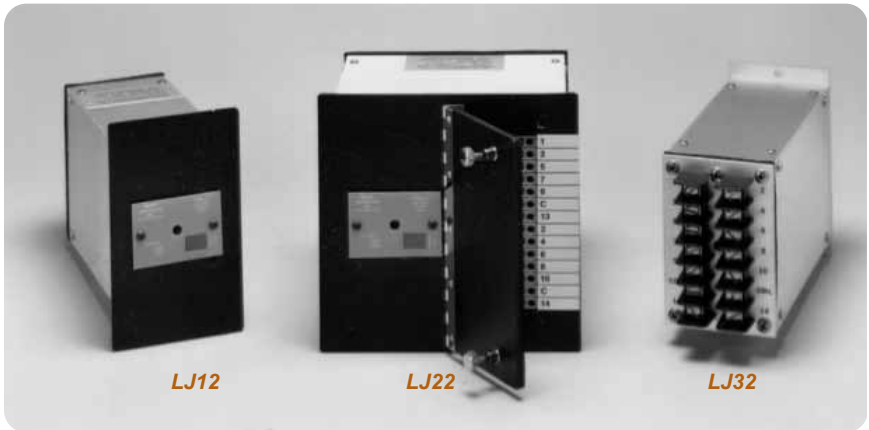




# INSTRUCTION MANUAL

Relay Associates Type LJ - High Speed Auxiliary Relays

CI110805EHW



*Relay Associates brand is owned by Relay & Power Systems*

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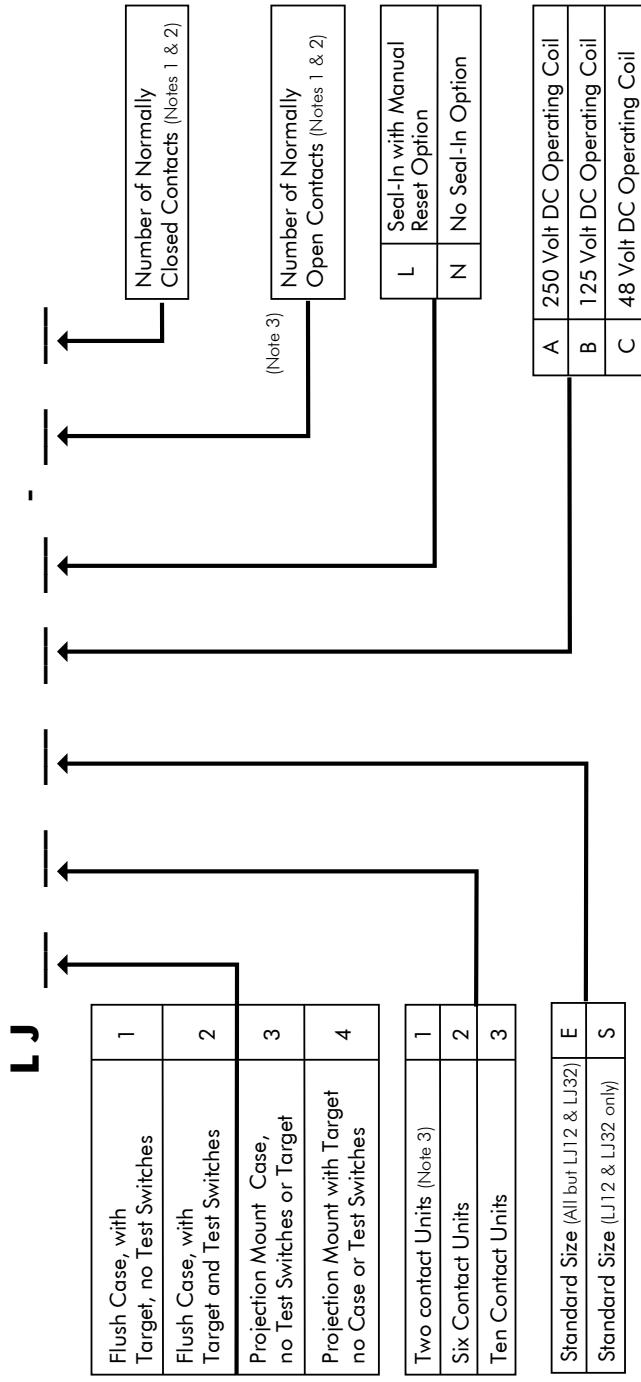
## General Description

The LJ relay is a high speed, high inertia auxiliary relay designed to operate in 4 milliseconds\*. The relay can be configured with any combination of two (2), six (6) or ten (10) contacts normally open or normally closed contacts. The dustproof, all aluminum case is available in both flush and projection mount configurations. The shielded coil minimizes internally generated transients and provides immunity to misoperations from system transients.

The different models can be identified by referring to the Table 1

*\* Refer to Table 2 and 3 for LJ relay specifications and ratings*

# LJ Relay Configuration & Ordering Information



Note 1. Selecting the seal-in unit reduces usable contacts by one. Not available on projection mount units

Note 2. Summation of N/O and N/C contacts cannot exceed 2 for **LJ X 1** models, 6 for **LJ X 2** models, and 10 for **LJ X 3** models.

Note 3. 2 Contact units only available on **LJ4X** models

**TABLE 1. MODEL IDENTIFICATION / ORDERING INFORMATION**

## Application

LJ auxiliary relays are mainly applied in protective relay high speed tripping schemes in electric utility and industrial substations. LJ relays are also suitable for control, switching and general purpose applications.

## Specifications and Ratings

In tests conducted by an independent lab, the LJ relay was found to meet or exceed the Fast Transients and Surge Withstand requirements as defined by ANSI C37.90. The capacitive energy required to induce a momentary contact closure is greater than 0.60 Joules.

Tables 2 and 3 below are in compliance with ANSI C37.90 rating specifications.

### Contact Rating for LJ Relays Per ANSI C37.90

Contact Circuit	Current Interrupting Rating		Make & Carry Current Ratings	
	Resistive	Inductive (L/R=0.1)	Short Time (1 sec)	Continuous
125 VDC	1.1 amps	0.55 amps	30 amps	5 amps
250 VDC	0.55 amps	0.28 amps	30 amps	5 amps
125 VAC	5.76 amps	2.88 amps	60 amps	10 amps
250 VAC	2.88 amps	1.44 amps	60 amps	10 amps

TABLE 2. CONTACT RATINGS

## Operating Data for Continuously Rated LJ Relay Per ANSI C37.90

Coil Circuit Voltage (DC)	Operating Coil Resistance (Ohm)	Holding Coil Resistance (Ohm)	Typical Operate Time (ms) N.O. Contact		Operating Voltage (DC)	
			Pickup	Dropout (Typical)	Must Pickup	Must Dropout
125 (2&6 contacts)	13	1490	4.5 (+/- 0.5)	17	100	17
125 (10 contacts)	13	1490	5.0 (+/- 0.5)	17	100	17
250 (2&6 contacts)	52	8600	4.5 (+/- 0.5)	17	200	17
250 (10 contacts)	52	8600	5.0 (+/- 0.5)	17	200	17
48 (2&6 contacts)	1.9	1724	4.5 (+/- 0.5)	17	38	17
48 (10 contacts)	1.9	1724	5.0 (+/- 0.5)	17	38	17

**TABLE 3. RELAY COIL AND OPERATING SPECIFICATIONS**

## Target

### **Operation**

A direct driven, manually resettable target is standard on flush mount units. When the relay operates, a bright orange target and a small black reset tab are exposed.

### **Reset**

After de-energizing the relay, pushing up the black tab will reset the target. Target reset can only be accomplished manually.

## Electrical Seal-In Option

An LJ relay with this option will pick up and seal-in continuously using a rated voltage source until reset by one of the methods below. The recommended wiring for this option is shown in Figure 6. Due to internal space requirements, an LJ12 which is ordered with this option will be supplied in a LJ13 case. (note: reduces number of usable contacts by one)

### **Local Reset**

When reset is desired, depress the small push-button located on the front panel of the relay. This will interrupt the seal-in circuit allowing the relay to reset.

### **Remote Reset**

Remote reset of the coil can also be accomplished by connecting a SCADA controlled normally closed contact, in series with the electrical seal-in circuit (see Figure 6).



## Receiving

Upon receipt of the relay, inspect the relay to verify that its model number agrees with the requisition. Also check for damage which may have been sustained in transit. If damage is evident, file a claim with the transportation company and notify your supplier or Relay & Power Systems directly at 610-941-2900. If the unit is to be stored, Relay & Power Systems recommend keeping the relay in its original packaging to protect the unit. When handling the relay, exercise reasonable care as to avoid severe impacts.

## Installation

The relay is shipped from the factory pre-configured to the customer's specifications and should not require any modifications on site. Mount the relays vertically on switchboard instrument and control panels for proper target operation. Refer to Figures 7 & 8 for LJ panel cutout and drilling dimensions, respectively. Panel fasteners are included in the shipping carton. Recommended terminal block and wiring connections for different LJ models are shown in figures 4, 5, 6 and 9).

## Adjustments

LJ relays have been designed with no maintenance or adjustments required to maintain reliable operability within specified ratings.

## Converting Normally Open and Normally Closed Contacts

These instructions assist the user in converting contacts located in the upper "B" deck of the relay shown in Figure 1. Note: LJ Relays with six (6) available contacts have two decks (A & B) and LJ's with ten (10) contacts have three decks (A, B & C). Read each instruction fully before beginning the work outlined in that step.

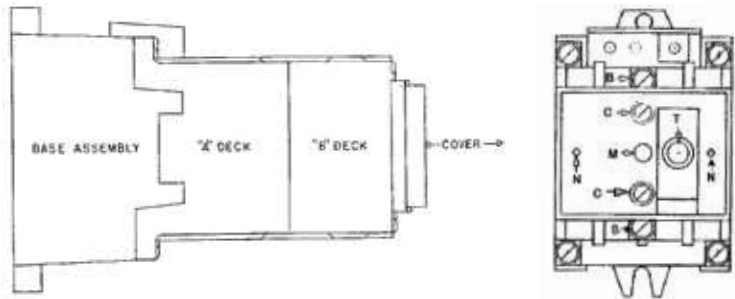


FIGURE 1. SIDE AND FRONT VIEW OF A SIX CONTACT RELAY ASSEMBLY

### **Upper Deck: Removal and Conversion of Contacts**

#### **Projection Mount Units:**

1. For an LJ32 or LJ33, proceed to step 4 under **Flush Mount Units** below. For an LJ41, LJ42 or LJ43, follow the **Flush Mount Units** instructions, skipping step 4.

## Flush Mount Units:

1. Using a 1/16" Allen wrench, remove and retain the two button head (4-40 X 1/4") nameplate retaining screws.(labeled N in Figure 1)
2. Remove and retain the nameplate.
3. Observing the assembly order, remove and set aside the target reset and target.
4. Remove the four (4) screws located at the corners of the case. These are on the terminal strip end of the case. Remove the relay from the case (*note: On units with the seal-in option, you must first unscrew the collar from around the reset button*)
5. Noting the orientation of the cover, use a 1/4" standard screwdriver to remove the two (2) screws (labeled C in Figure 1) which hold the cover in place. Remove cover.
6. Noting the location of the target magnet (T in Figure 1), use a 1/4" screwdriver to back out the red cross bar screw one (1) inch shown in Figure 2. Now rotate the red cross bar 90 degrees to provide access to the selected contact.

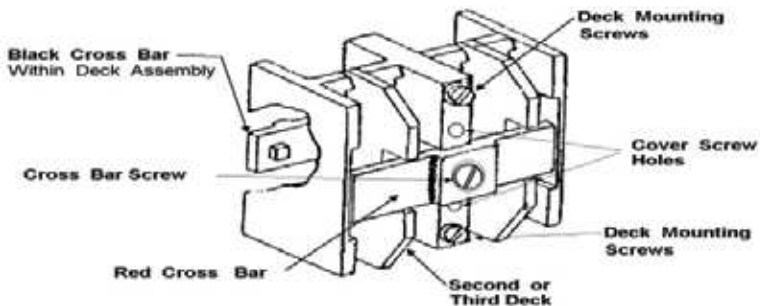
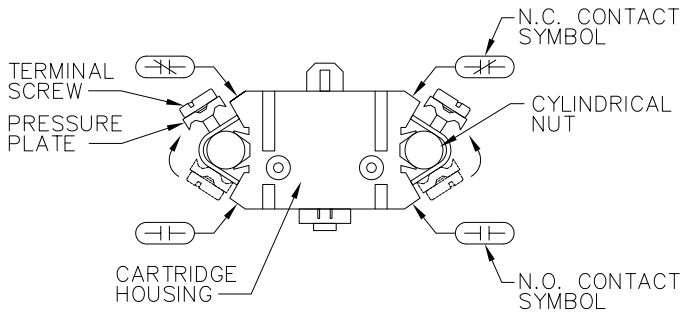


FIGURE 2. TOP RELAY DECK



**FIGURE 3. CONTACT CARTRIDGE**

7. Remove the wires connected to the terminals of the contact being converted.
8. Lift the contact cartridge out of its location. Turn the cartridge over and rotate the two cylindrical nuts in Figure 3 to the required position (inserting the terminal screws a turn or two helps to facilitate this) in order to reassemble. Insert the cartridge back into its position. Verify the desired contact form by noting the N.C. or N.O. symbol on the contact. The symbol that is visible (facing upward) is the selected configuration.
9. Reassemble the relay in the exact reverse order stated above. Using a screwdriver, hand tighten all screws securely. When assembly is complete no further adjustments are necessary, however testing the relay is recommended to assure its proper operation.

## Lower Deck: Removal and Conversion of Contacts

Should the user wish to convert any of the contacts in the Lower Deck (A Deck in Figure 1 on Page 10), follow the direction below:

1. Follow steps one through six (6) above for the type of mounting configuration you have.
2. Back out the screw in the center of the red operator completely (Figure 2 on page 11) and set both screw and red operator aside.
3. Carefully remove the eight (8) terminated leads from the four (4) contacts in the uppermost deck **Note:** *Write down which sets of leads go to each contact terminal.*
4. Remove the two (2) deck mounting screws in Figure 2. These screws are long and hold the different decks together.
5. The deck is now ready to be removed. As you remove the deck note its orientation, the bottom of each deck is keyed to assist in assembly. As you lift the deck, the black cross bar (Figure 3) for that deck will fall out of its center. Set the deck with its corresponding black crossbar aside.
6. You may now convert the contacts as listed in steps 7-9 of converting contacts.
7. Reassemble in the reverse order listed above. Take particular care when rewiring the relay to ensure that all pairs of leads match up and go to the properly configured contact. If there is any question as to the proper wiring pattern, refer to Figure 5.

**Note:** *All decks are labeled near the contact wells as Axx, Bxx, or Cxx. When assembling make sure you assemble A first, then B, then, if it is a 10 contact relay, C deck. (refer to Figure 1).*

## Testing Procedures

### **Electrical Operation**

The relay can be tested by applying a rated DC voltage source to the coil circuit. When the voltage source is applied, a low resistance “operate” coil is energized to enable the high speed operation. When the relay picks up, a high resistance “holding” coil is switched into the circuit and allows the LJ to be continuously energized with minimal current until the power source has been removed.

### **Manual Operation**

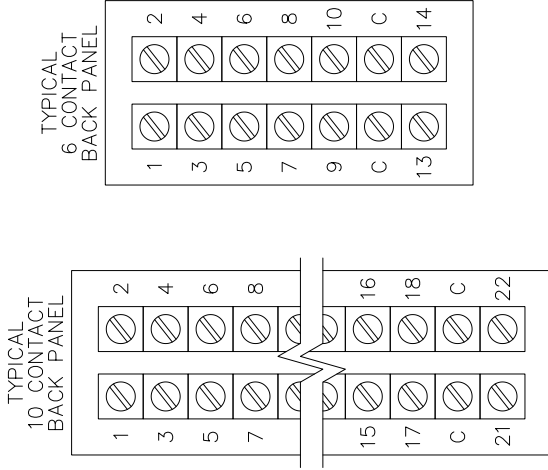
For testing purposes, the relay can also be operated manually by inserting a small probe (e.g. #2 Phillip head screwdriver) through the center hole of the nameplate (M on Figure 1). Pushing in on this probe will move the armature, and thereby operate the contacts and target assembly (note: Not applicable on LJ32 or LJ33).

### **Test Switches**

As an option, test switches are provided on both sides of each contact and the operating coil (refer to Figure 5). The test switches are used to isolate each individual contact or the operate coil for testing purposes. Small banana plug electrical connectors (3/64” dia.) can be used to electrically connect to the relay circuit at the test switches. In order to assure connection to the proper circuit, please refer to Figure 5. Opening the appropriate test switches will allow the user to operate the relay while isolating it from the external circuits.

**Important:** *When completed, be sure to close all test switches and secure the test switch cover plate.*

## Typical Terminal Blocks



- Contacts are between 1 and 2, 3 and 4, etc.
- Normally closed contacts (if any) would be wired to the lowest numbered terminals.
- Contacts 21-22 / 13-14 are not available for use on an electrical seal-in unit.
- Coil is wired between terminals labeled "C" and is not polarity

FIGURE 4. TERMINAL BLOCKS

# Standard Wiring Diagram

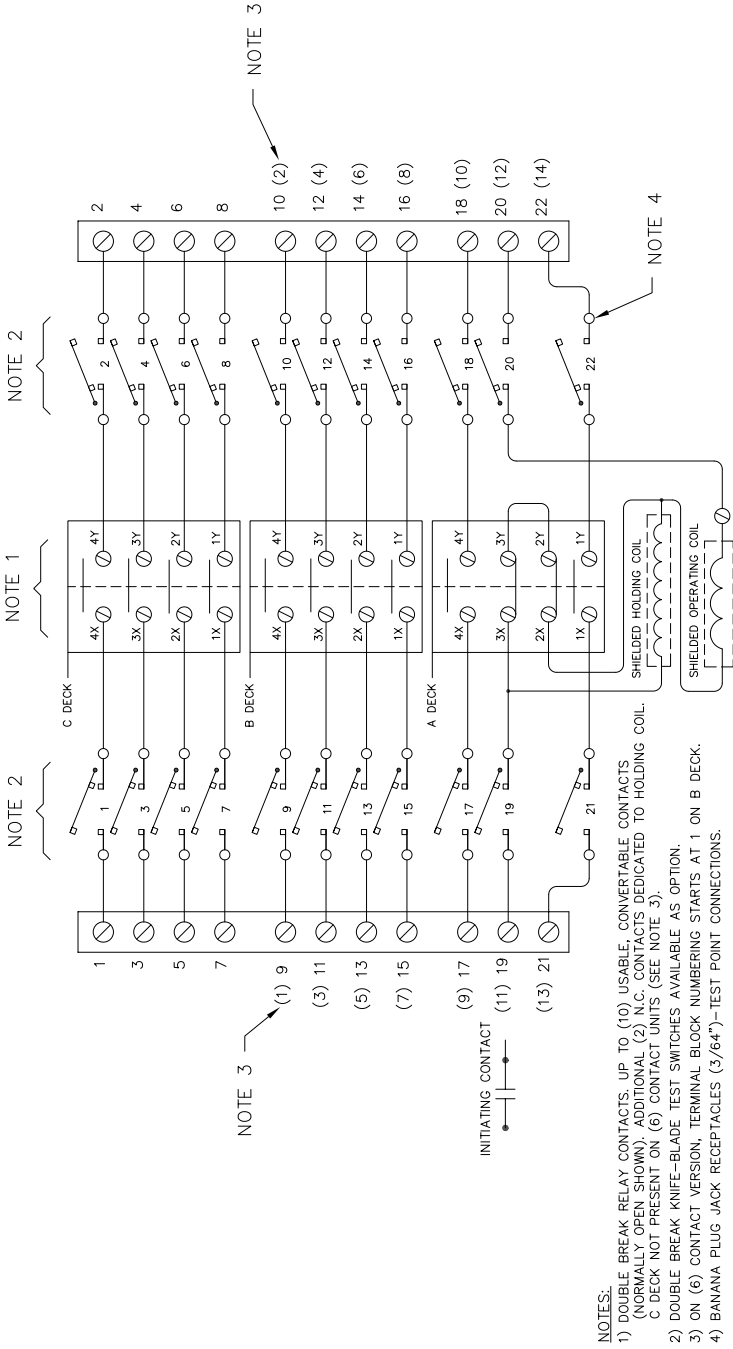
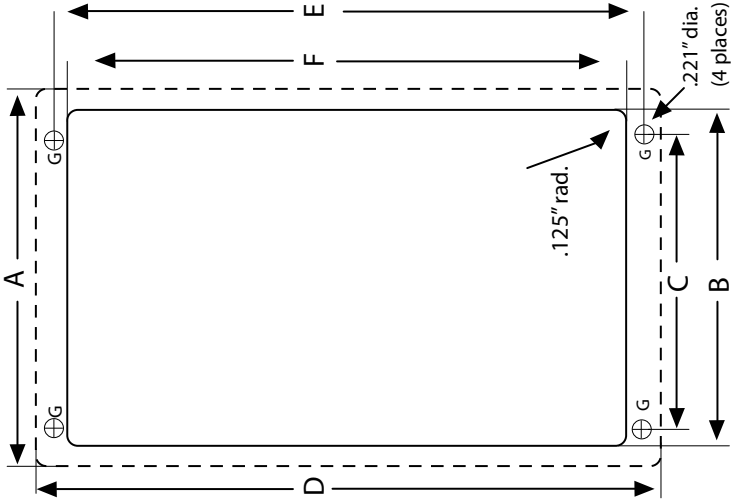


FIGURE 5. STANDARD WIRING DIAGRAM (EXCLUDING LJ4X SERIES)





## Panel Cutout And Drilling For Semi-Flush Cases



	LJ12	LJ22	LJ13	LJ23
A	3.000	5.750	3.000	6.074
B	2.625	5.500	2.625	5.572
C	2.000	5.250	2.000	5.126
D	5.750	5.675	7.000	8.000
E	5.187	5.175	6.500	7.500
F	4.625	4.812	5.875	7.056
Depth	7.250	5.976	8.250	7.400

FIGURE 7. PANEL CUTOUT

## Projection Unit Mounting Footprints

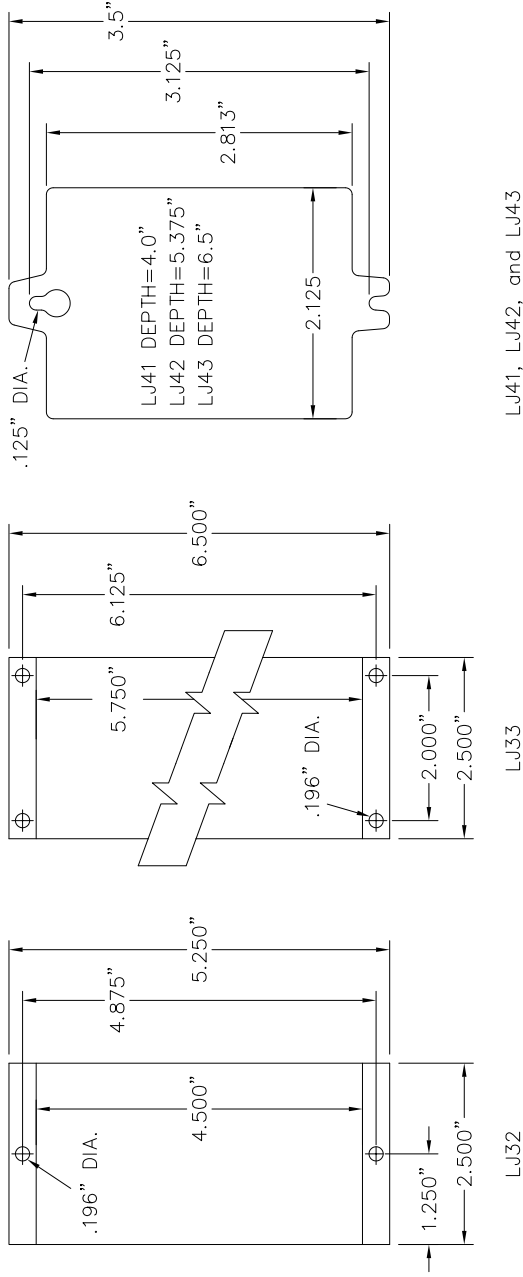
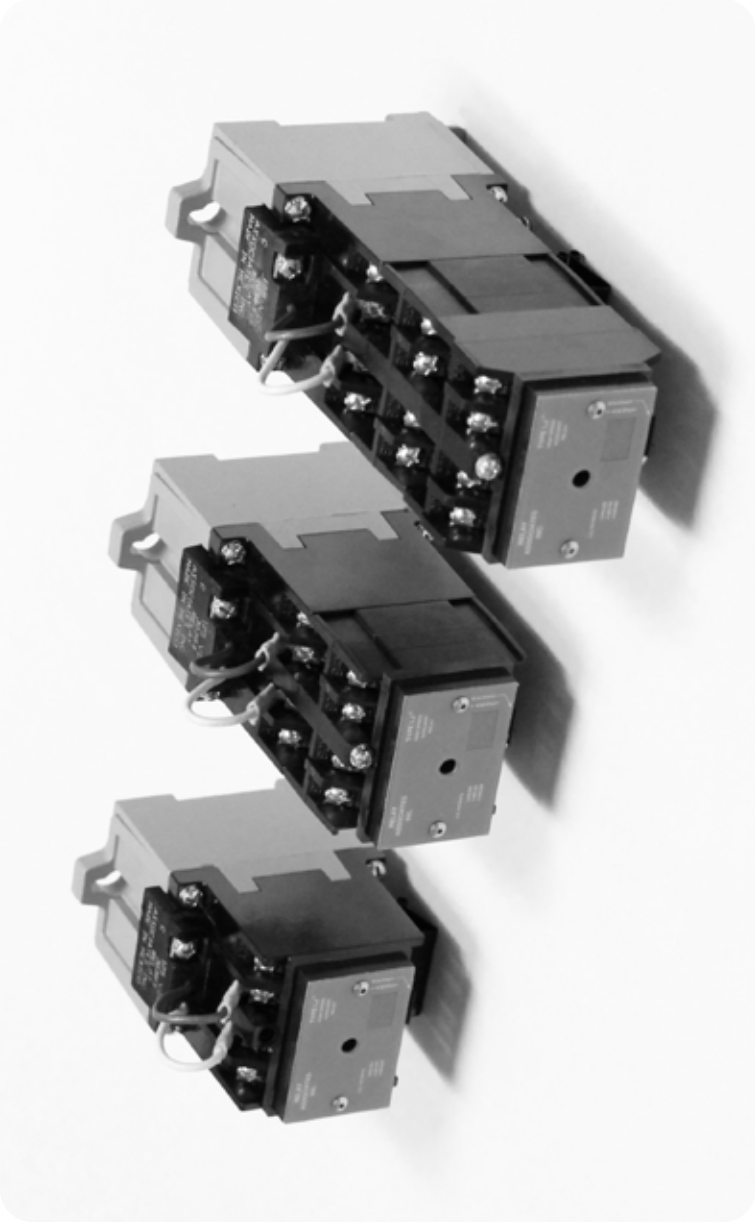
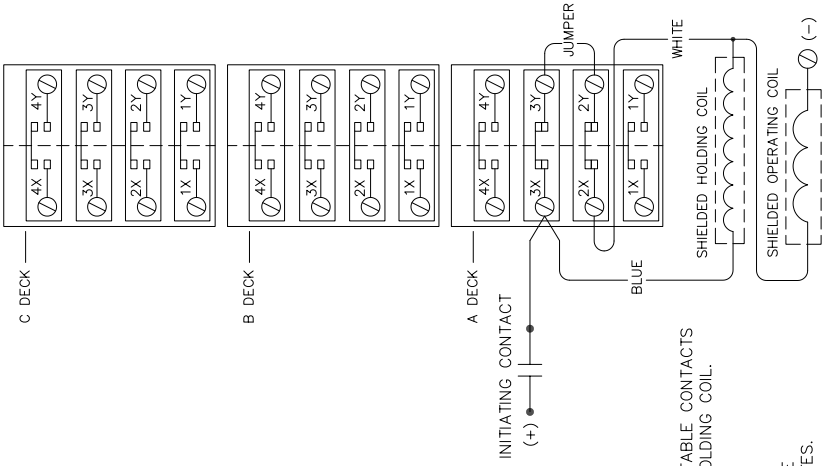


FIGURE 8. PROJECTION MOUNT DRILLING DIMENSIONS



*Left to Right : the 2 contact LJ41, the 6 contact LJ42 and the 10 contact LJ43*



**NOTES:**

- 1) DOUBLE BREAK RELAY CONTACTS: UP TO (10) USABLE, CONVERTABLE CONTACTS (NORMALLY OPEN SHOWN). (2) N.C. CONTACTS DEDICATED TO HOLDING COIL.
- 2) (2) CONTACT RELAY Lj41 UTILIZES THE 'A' DECK ONLY.  
 (6) CONTACT RELAY Lj42 UTILIZES BOTH THE 'A' & 'B' DECKS.  
 (10) CONTACT RELAY Lj43 UTILIZES THE 'A', 'B' & 'C' DECKS.  
 ON ALL UNITS, THE CENTER (2) CONTACTS ON THE 'A' DECK ARE USED TO SWITCH IN THE HOLDING COIL ONCE THE RELAY OPERATES.
- 3) COIL IS NOT POLARITY SENSITIVE. RECOMMENDED WIRING AS SHOWN.

**FIGURE 9. Lj41, Lj42, AND Lj43 DRAWING**

**Notes:**

## About Us

### ***Relay & Power Systems***

(RPS) is a full-service engineering and registered ISO manufacturing resource, serving clients who produce, deliver and consume medium & high voltage electrical power throughout the Northeast and Mid-Atlantic US.

We offer a full range of services for delivering relay systems, integrated power systems and control houses including: engineering, system design, fabrication, testing, and commissioning.

Relay & Power Systems – formally Relay Associates Inc - is a wholly-owned subsidiary of Rumsey Electric. Since its founding in 1895, Rumsey Electric has been a leading provider of products and services to users and consumers of power in the Northeastern United States.



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