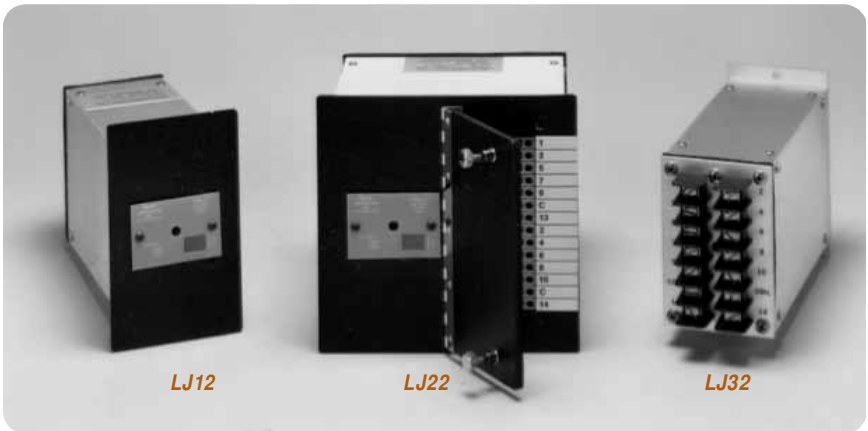


# INSTRUCTION MANUAL

## Relay Associates Type LJ - High Speed Auxiliary Relays



*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 6 and 7 for LJ relay specifications and ratings*

# LJ Relay Configuration & Ordering Information

LJ Relay Model Number	LJ								
<b>Case Type</b>									
Flush Case, with Target, no Test Switches	1								
Flush Case, with Target and Test Switches	2								
Projection Mount Case, no Test Switches or Target	3								
Projection Mount with no Case or Test Switches	4								
<b>Number of Contacts</b>									
Two Contact Units (see note 3)	1								
Six Contact Units	2								
Ten Contact Units	3								
<b>Standard Size</b>									
All excluding LJ12 & LJ32		E							
LJ12 & 32 only		S							
<b>Operating DC Voltage</b>									
250 Volt DC Operating Coil			A						
125 Volt DC Operating Coil			B						
48 Volt DC Operating Coil			C						
<b>Seal Option</b>									
Seal-In with Manual Reset Option (see note 4)				L					
No Seal-In Option				N					
<b>Number of Normally Open/Close Contacts (see note 1&amp;2)</b>									
Open Contacts								X	
Closed Contacts									X
<b>*NOT ALL CONFIGURATIONS ARE AVAILABLE CHECK TABLE 2. FOR AVAILABLE MODELS</b>									
<p>Note 1. Selecting the seal-in unit reduces usable contacts by one not available on projection mount units</p> <p>Note 2. Summation of N/O and N/C contacts cannot exceed 2 for LJ <u>X</u>1 models, 6 for LJ <u>X</u>2 models, and 10 for LJ <u>X</u>3 models.</p> <p>Note 3. 2 Contacts units only available on LJ4X models.</p> <p>Note 4. Reset Option only available on Flush Case models (LJ1 and LJ2)</p>									
<b>TABLE 1. MODEL IDENTIFICATION / ORDERING INFORMATION</b>									

LJ	X	X	X	X	X	- [XX]
1	1	2	S	A	N	- [42], [60], [33]
	1	2	S	B	N	- [33], [42], [51], [60]
	1	2	S	C	N	- [33], [51]
	1	3	E	A	N	- [100], [82]
	1	3	E	B	L	- [100], [64]
	1	3	E	B	N	- [100], [46], [55], [64], [73], [82], [91]
	1	3	E	C	N	- [100], [55], [64]
	2	2	2	E	A	N
2		2	E	B	N	- [33], [42], [51], [60]
2		3	E	A	N	- [100], [64], [73], [82]
2		3	E	B	L	- [100], [46], [64]
2	2	3	E	B	N	- [010], [100], [55], [64], [73], [82], [91]
	2	3	E	C	N	- [55], [73]
	3	2	S	B	N	- [33], [51], [42], [60]
	3	2	S	C	N	- [60], [33], [42]
3	3	3	E	B	N	- [100], [55], [64], [73], [82], [91]
	4	2	E	B	N	- [33], [42], [24], [06], [60]
4	4	3	E	B	N	- [100], [73], [55], [64]
	4	3	E	C	N	- [100], [73], [82]

TABLE 2. AVAILABLE LJ RELAY MODEL NUMBERS

LJ	1	3	E	C	N	-	5	5
1 - Flush Case, with Target, No Test Switches								
3 - Ten Contacts								
E - Standard Size								
C - 48 Volt DC Operating Coil								
N - No Seal-In Option								
5 - Five Normally Open Contacts								
5 - Five Normally Closed Contacts								

LJ	3	2	S	C	N	-	3	3
3 - Projection Mount Case, No Test Switches or Target								
2 - Six Contacts								
S - Standard Size (LJ12 & LJ32 only)								
C - 48 Volt DC Operating Coil								
N - No Seal-In								
3 - Three Normally Open Contacts								
3 - Three Normally Closed Contacts								

TABLE 3. EXAMPLES 48V DC STANDARD MODELS

LJ	4	3	E	B	N	-	6	4
4 - Projection Mount with No Case or Test Switches								
3 - Ten Contacts								
E - Standard Size								
B - 125 Volt DC Operating Coil								
N - No Seal-In								
6 - Six Normally Open Contacts								
4 - Four Normally Closed Contacts								

LJ	2	3	E	B	L	-	10	0
2 - Flush Case, with Target and Test Switches								
3 - Ten Contacts								
E - Standard Size								
B - 125 Volt DC Operating Coil								
L - Seal-In with Manual Reset								
10 - Ten Normally Open Contacts								
0 - Zero Normally Closed Contacts								

TABLE 4. EXAMPLES 125V DC STANDARD MODELS

LJ	1	2	S	A	N	-	4	2
1 - Flush Case, with Target, no Test Switches								
2 - Six Contacts								
S - Standard Size (LJ12 & LJ32 only)								
A - 250 Volt DC Operating Coil								
N - No Seal-In								
4 - Four Normally Open Contacts								
2 - Two Normally Closed Contacts								

LJ	2	3	E	A	N	-	8	2
2 - Flush Case, with Target and Test Switches								
3 - Ten Contacts								
E - Standard Size								
A - 250 Volt DC Operating Coil								
N - No Seal-In								
8 - Eight Normally Open Contacts								
2 - Two Normally Closed Contacts								

TABLE 5. EXAMPLES 250V DC STANDARD MODELS

## 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 6 and 7 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 6. 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 7. 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 3. 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 3).

## 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 4 & 5 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 1, 2, 3 and 6).

## Adjustments

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

# 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***

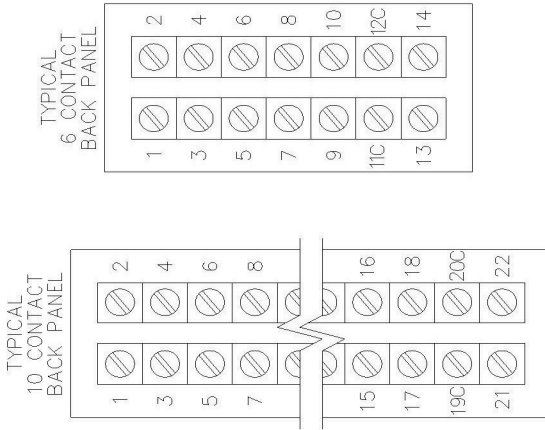
For testing purposes, the relay can also be operated manually by inserting a small probe (e.g. #2 Phillip head screwdriver) through the center hole of the nameplate. Pushing in on this probe will move the armature, and thereby operate the contacts and target assembly (note: Not applicable on LJ32 or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

## ***Test Switches***

As an option, test switches are provided on both sides of each contact and the operating coil (refer to Figure 2). 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 2. 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 polarized

FIGURE 1. TERMINAL BLOCKS

# Standard Wiring Diagram

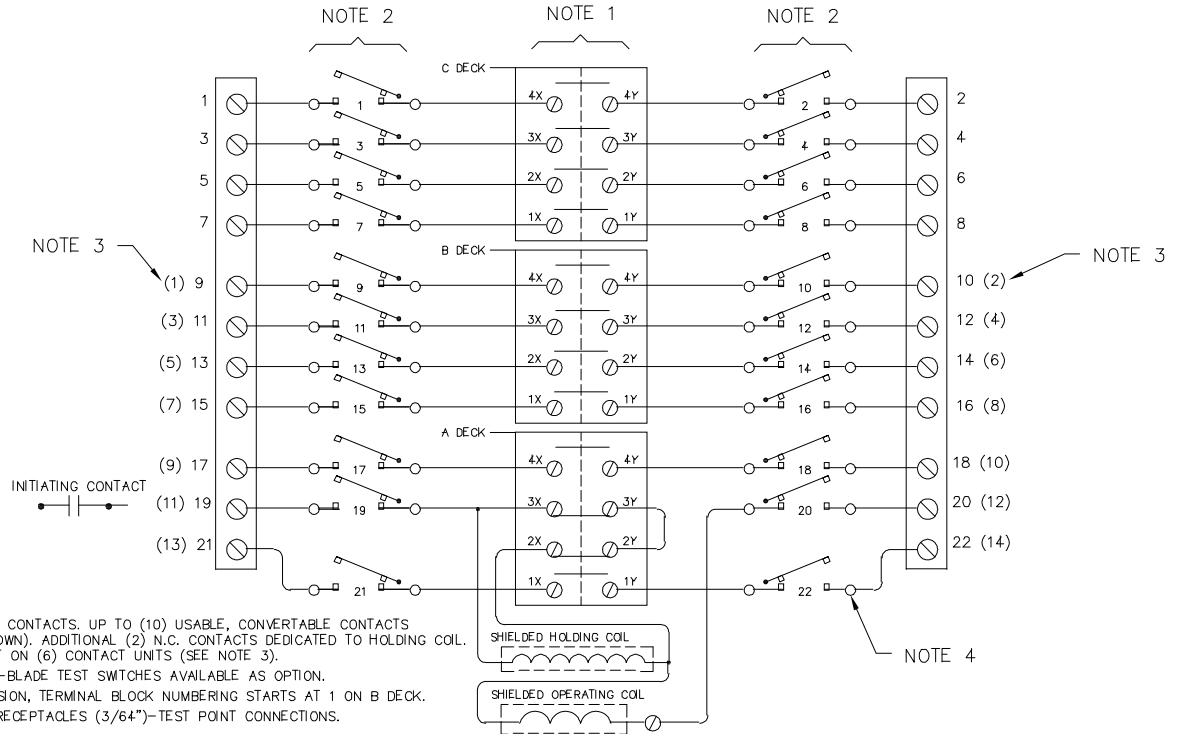
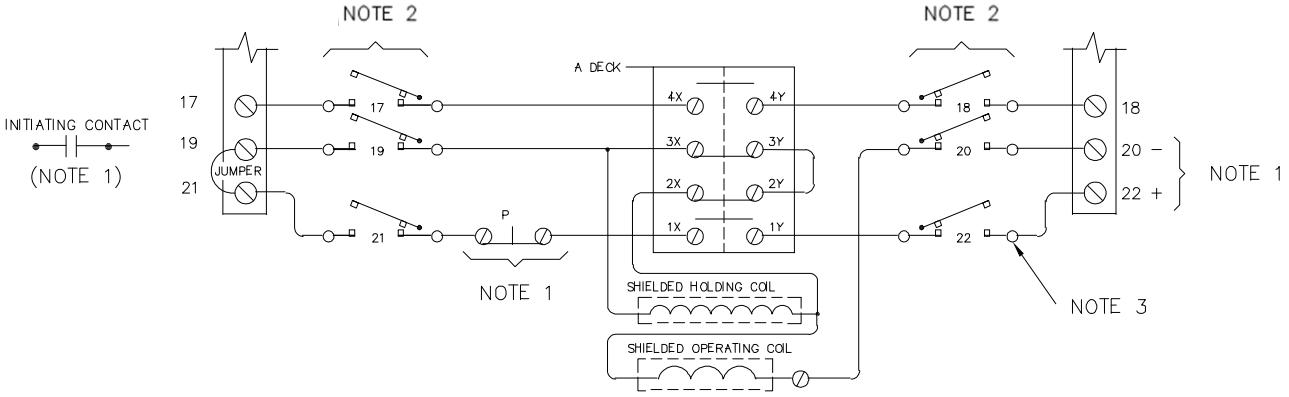


FIGURE 2. STANDARD WIRING DIAGRAM (EXCLUDING LJ4X SERIES)

# Electric Seal in Wiring Schematic

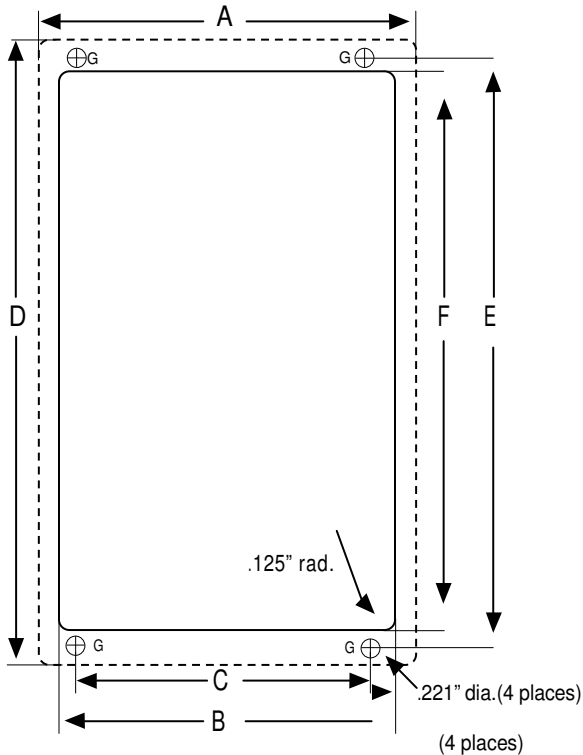


**NOTES:**

- 1) ELECTRICAL SEAL-IN OPTION INCLUDES MANUAL RESET PUSHBUTTON (P) AND EXTERNAL TERMINAL BLOCK JUMPER AS SHOWN. RECOMMENDED INITIATING CONTACT & POWER CONNECTIONS ALSO SHOWN.
- 2) DOUBLE BREAK KNIFE-BLADE TEST SWITCHES AVAILABLE AS OPTION.
- 3) BANANA PLUG JACK RECEPTACLES (3/64")-TEST POINT CONNECTIONS.

**FIGURE 3. ELECTRICAL SEAL IN WIRING DIAGRAM**

## Panel Cutout And Drilling For Semi-Flush Cases



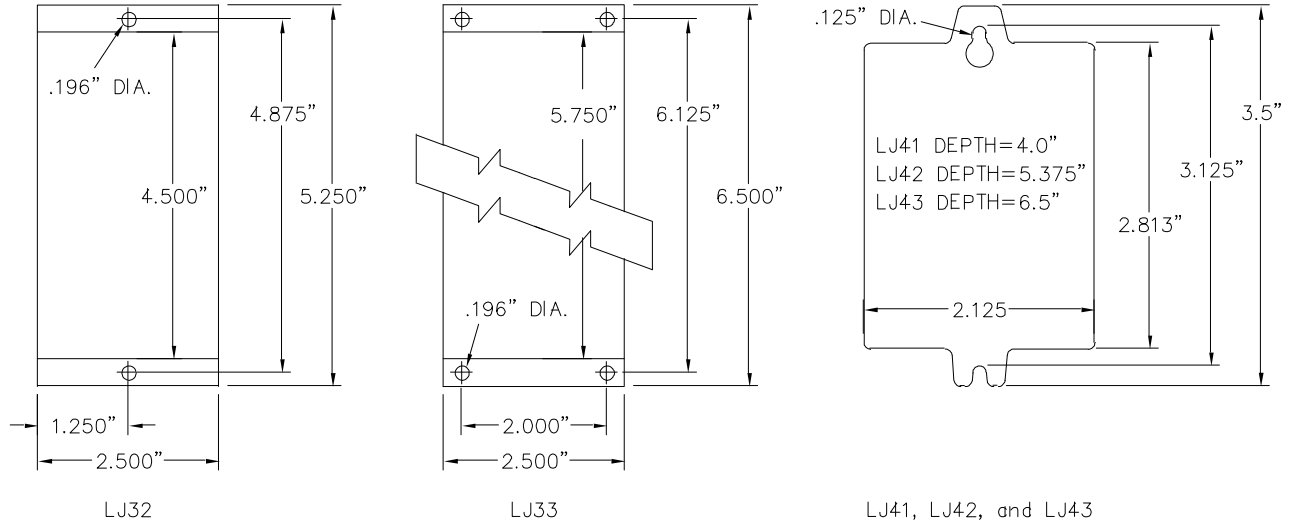
**FIGURE 4. PANEL CUTOUT**

	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

**TABLE 8. CUTOUT DIMENSIONS (INCHES) FOR FLUSH CASES:**



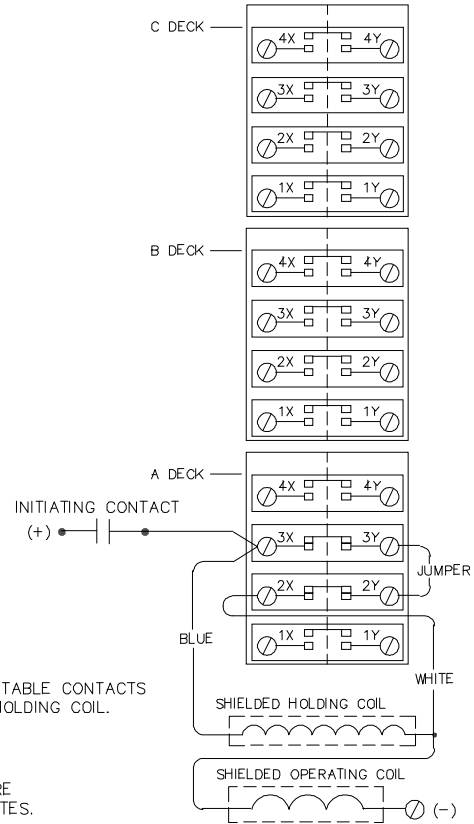
## Projection Unit Mounting Footprints



**FIGURE 5. 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 6. 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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