Installation, Operation, & Maintenance Instructions
R500.E262A
5/20/2020

Specifications for Control Units with Model ECID Relays

Reliance®
A PRODUCT OF CLARK-RELIANCE
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Caution: Before proceeding, follow any and all plant lock out - tag out procedures required. Verify that all power is turned off to the probes. If under pressure, the equipment should be isolated, or the boiler should be shut down *before* proceeding with the installation. Open drain valve to eliminate any trapped pressure. Any trips or alarms connected to the controller should be bypassed. All inspection and installation steps should be performed by a qualified technician and should be executed in accordance with all applicable national and local codes.

This bulletin should be used by experienced personnel as a guide to the installation of model RECID controls. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact the Clark-Reliance Corporation or its representative if further information is required.

SPECIFICATIONS

Control Design: Solid State components enclosed in a clear Lexan plug-in style housing. Housing carries no NEMA rating.

Contact Design: DPDT (2 form C): two normally open (N.O.) and two normally closed (N.C.) non-powered contact.

Contact Ratings: 5A @ 120, 240 VAC resistive, 1/3 H.P. @ 120, 240 VAC, 5A @ 30 VDC.

Contact Life: Mechanical – 5 million operations. Electrical – 100,000 operations minimum at rated load.

Supply Voltage: 24, 120, and 240 VAC models 10%, minus 15%, 50/60 Hz.

Supply Current: 24, 120, and 240 VAC, Relay energized 4.4 VA

Secondary Circuit: 12 VAC RMS voltage on probes, 1.5 milli-amp current.

Sensitivity: Models operate from 0 – 100,000 OHM maximum specific resistance.

Temperature: -40 to 150° F. ambient.

Terminals: All connections #6-32 screw type terminals with pressure clamps

Listings: U.L. listed, Industrial Motor Control (508), CSA approved Industrial Control.

LED Terminal Output: Probe in water, +12VDC, Probe out of water, -12 VDC.

MODEL NUMBER INFORMATION

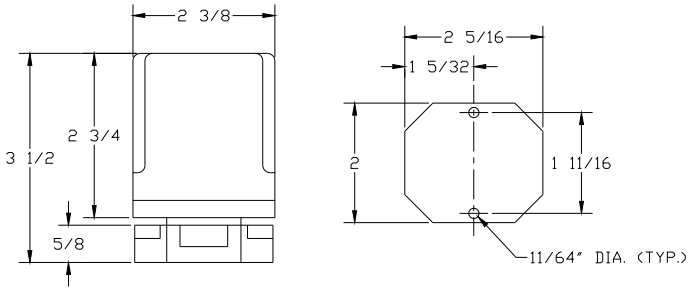
SUFFIX	SENS. (ohms)	MODE	SUPPLY
-22R	28K	DIRECT	120VAC
-23R	50K	DIRECT	120VAC
-24R	100K	DIRECT	120VAC
-26R	28K	INVERSE	120VAC
-28R	50K	INVERSE	120VAC
-27R	100K	INVERSE	120VAC
-28R	28K	DIRECT	24VAC
-29R	50K	DIRECT	24VAC
-30R	100K	DIRECT	24VAC
-31R	28K	INVERSE	24VAC
-32R	50K	INVERSE	24VAC
-33R	100K	INVERSE	24VAC
-116	28K	DIRECT	240VAC
-58R	50K	DIRECT	240VAC
-121R	100K	DIRECT	240VAC
-72	50K	INVERSE	240VAC

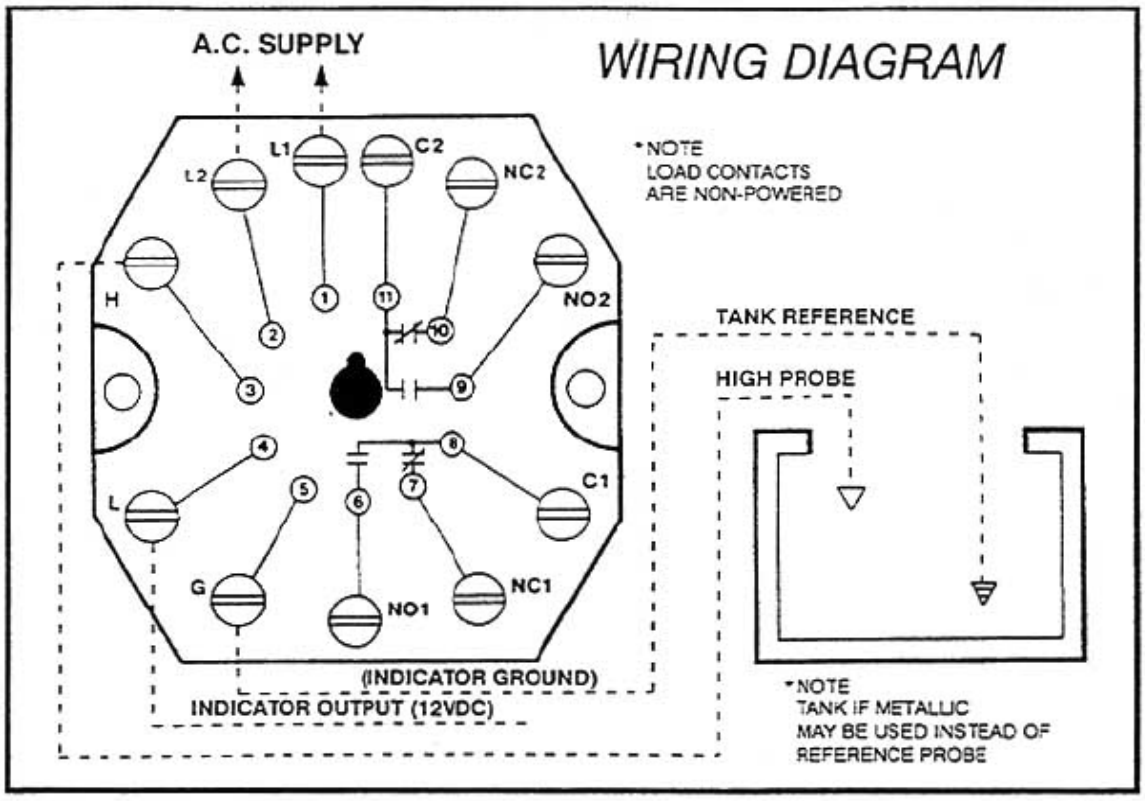
INSTALLATION

1) Install octal socket in appropriate enclosure using two (2) #6 or #8 metal screws.
2) Wire control per wiring diagram, following N.E.C. and local codes.
3) Install control module in socket.

SENSITIVITIES VS MAXIMUM PROBE WIRE DISTANCE

SEN. (K ohms)	DISTANCE (ft.)
28	2,200
50	1,075
100	570





Direct Mode: Single Level Service:

With power applied to the control and the probe on terminal 3 out of the liquid, the load contacts are in their shelf position and a negative 12 VDC signal is present on terminal 4. (LED will not be lit) When the liquid rises to the electrode on terminal 3, the control energizes, changing the state of the load contacts and providing a plus 12 VDC signal on terminal 4. (LED will be lit)

Inverse Mode: Single Level Service:

With power applied, with the probe on terminal 3 out of the liquid, the control energizes, changing the state of the load contacts and providing a negative 12VDC signal on terminal 4. (LED will be lit) When liquid rises to the electrode on terminal 3, the control de-energizes, returning the load contacts to their shelf position and a plus 12VDC signal on terminal 4.

Typical Relay Wiring Examples

FUEL CUTOUT WIRE TO N.O. CONTACT	LOW ALARM WIRE TO N.C. CONTACT	HIGH ALARM WIRE TO N.O. CONTACT
SHELF STATE (NO WATER) SWITCH IS OPEN	SHELF STATE (NO WATER) SWITCH IS CLOSED	SHELF STATE (NO WATER) SWITCH IS OPEN
WITH WATER ON THE PROBE THE SWITCH WILL CHANGE AND CLOSE (NO TRIP)	WITH WATER ON THE PROBE THE SWITCH WILL CHANGE AND OPEN (NO ALARM)	WITH NO WATER ON THE PROBE THE SWITCH WILL STAY THE SAME AND REMAIN OPEN (NO ALARM)
WHEN WATER LEAVES THE PROBE THE SWITCH WILL CHANGE STATE AND OPEN CAUSING THE BOILER TO TRIP (TURN OFF)	WHEN WATER LEAVES THE PROBE THE SWITCH WILL CHANGE STATE AND CLOSE CAUSING THE ALARM TO TURN ON	WHEN WATER TOUCHES THE PROBE THE SWITCH WILL CHANGE STATE AND CLOSE CAUSING THE ALARM TO TURN ON

Enclosure Options

NEMA 1 (IP10) Standard Indoor Enclosure
NEMA 4 (IP66) Weatherproof Enclosure
NEMA 4X (IP66) Weatherproof Enclosure with Corrosion Resistance
NEMA 7/4X Explosionproof Enclosure with Corrosion Resistance
No Enclosure

Troubleshooting

Note: Before proceeding with any tests or checks, follow all plant lock out - tag out procedures required. Notify proper personnel that work is being done and make sure to by-pass any alarms and cutout trips. All inspection and installation steps should be performed by a qualified technician and should be executed in accordance with all applicable national and local codes.

Troubleshooting is only necessary if a control relay fails to energize or de-energize. In the event that the relay fails to *de-energize* during a blow-down, the cause is a failed (short circuited) probe. The probe should be replaced.

If a relay fails to *energize*, the following steps should be taken:

1) Verify supply voltage to the system. When checking a relay and socket, use a VOM meter and check the voltage on terminals #1 and #2. When checking on a relay mounted to a PC board, check the voltage on terminals L1 and L2.
2) Check the wiring from the probe to the relay. Verify that the wiring is tight, and the wire is in good shape – not frayed or damaged. If using a spade type connector, make sure the connection is tight.
3) Verify that all terminal connections in the relay control unit are tight and secure.
4) Verify probe wiring to the appropriate probes from each relay.
5) Verify water level in the column.
6) Exchange relays to verify function. If the problem moves with the relay, then replace the relay.

Performing a Relay Test with Unit Isolated

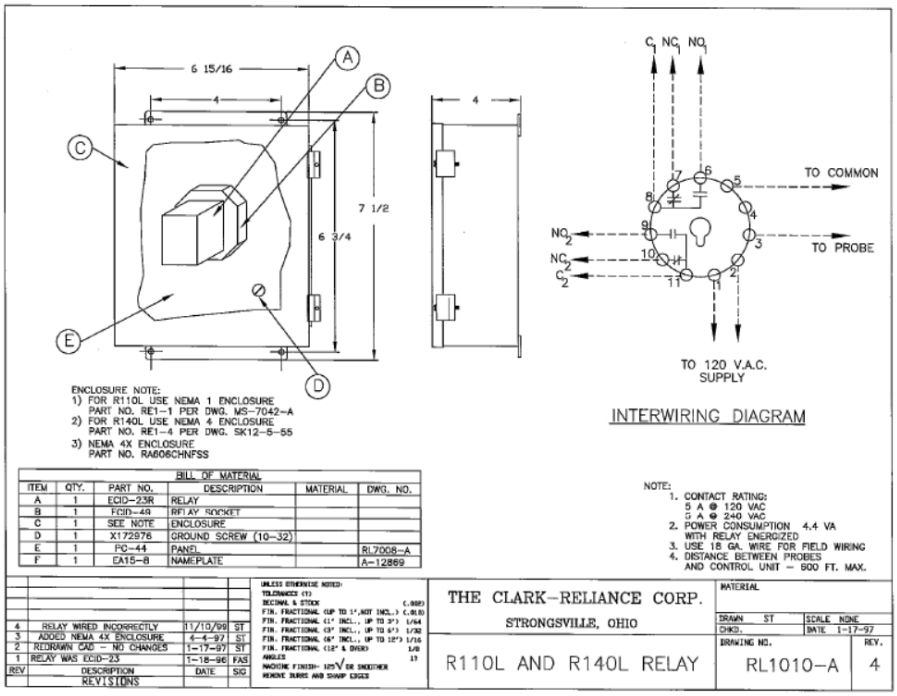
1) To test the relays with a relay and socket, disconnect the power to the unit. Remove wiring on terminals #3 and #5. Reconnect the power, and using a jumper wire, jumper terminals #3 and #5. The relay should energize, and the red LED should illuminate. If not, the relay has failed and should be replaced.
2) To test the relays with mounted to a PC board, disconnect the power to the unit. Remove wiring on terminals L1 and L2. To test relay #1, remove the wires on terminals #1 and C. Reconnect the power, and using a jumper wire, jumper terminals #1 and C. The relay should energize, and the red LED should illuminate. If not, the relay has failed and should be replaced.

Performing a Relay Test with Power Supplied to the Unit

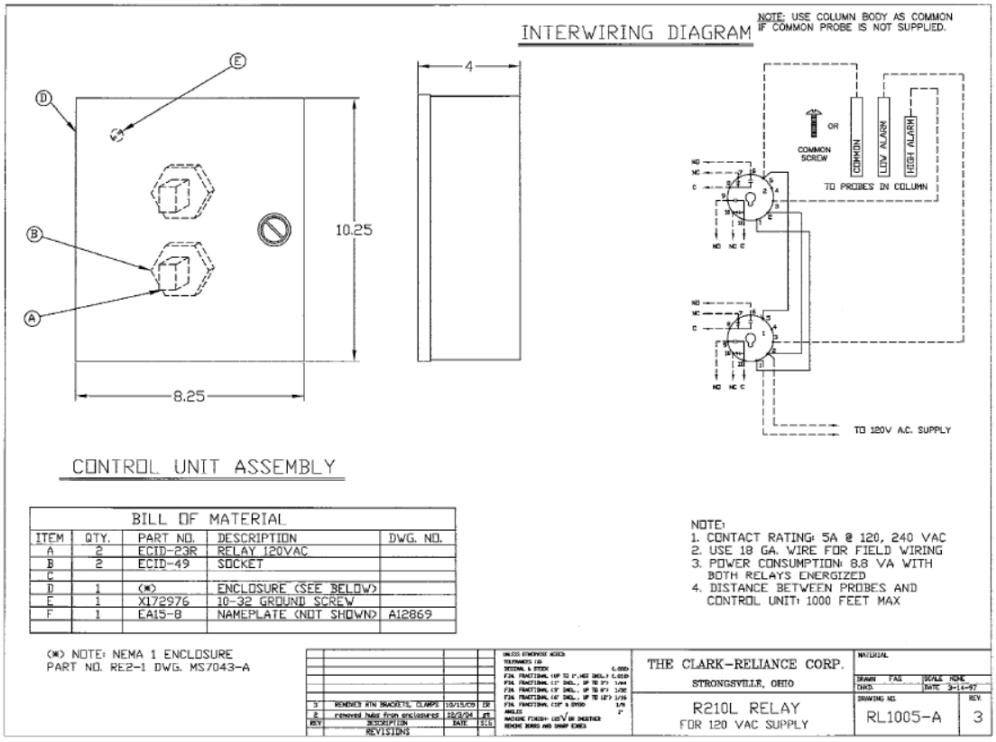
1) To test the relays with a relay and socket, without disconnecting the power to the unit. Using a VOM meter, and with water at the corresponding probe level, check for continuity on terminals #6 (NO) and #8 (C). The ohm meter should show continuity, and if so, the relay is operating properly. If not, the relay has failed and should be replaced.

2) With no water at the corresponding probe level, using the voltmeter, check for continuity on terminals #7 (NC) and #8 (C). The ohm meter should show continuity, and if so, the relay is operating properly. If not, the relay has failed and should be replaced.
3) To test the relays with mounted to a PC board, without disconnecting the power to the unit. Using a VOM meter, and with water at the corresponding probe level, check for continuity on the Alarm Contacts terminals (NO) and (C). The ohm meter should show continuity, and if so, the relay is operating properly. If not, the relay has failed and should be replaced.
4) Using a ohm meter, and with water no at the corresponding probe level, check for continuity on the Alarm Contacts terminals (NC) and (C). The voltmeter should show continuity, and if so, the relay is operating properly. If not, the relay has failed and should be replaced.

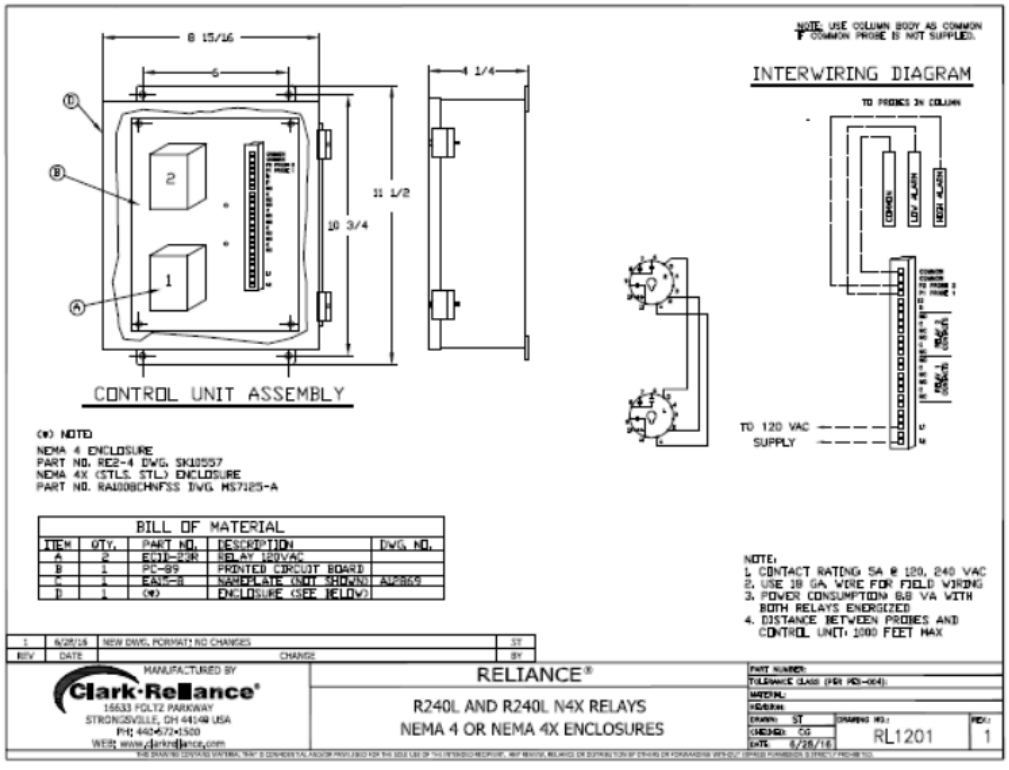
When necessary, refer to Reliance IOM R500.E189-A when removing and replacing a probe. When all tests are complete and relay unit is functioning properly, replace and verify all wiring and return the system back into service. Test any alarms or trips that may have been by-passed for proper function.



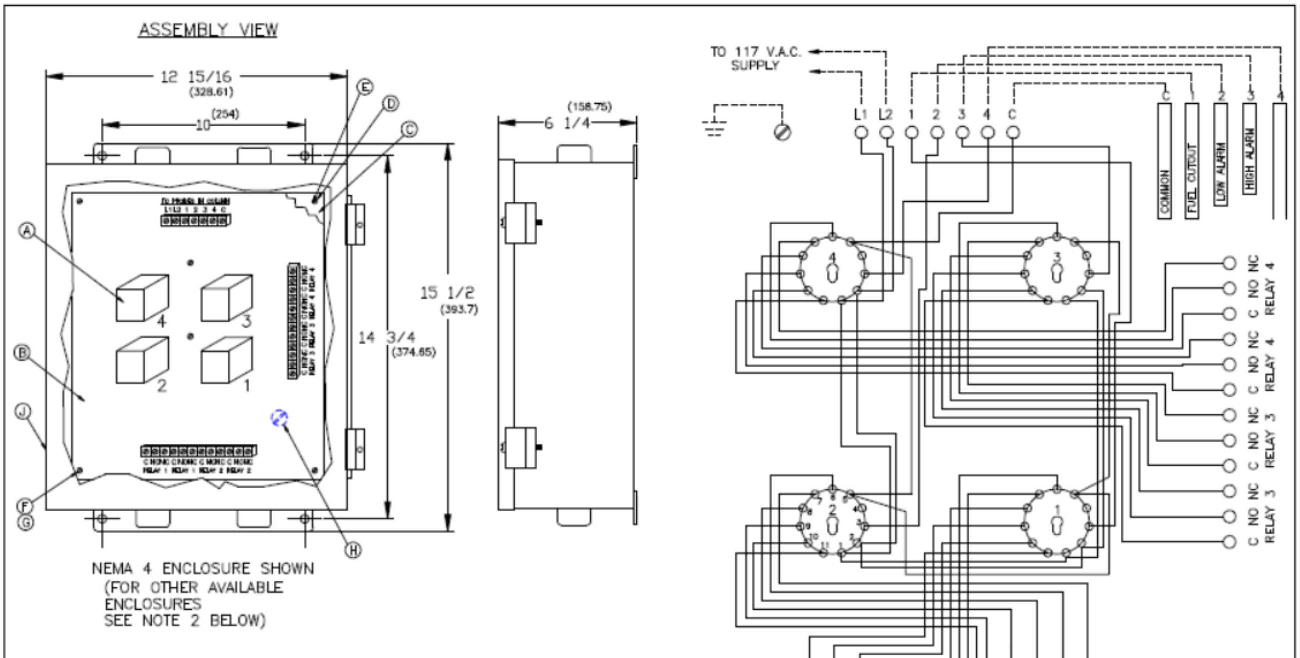
R110L and R140L Relay Unit



R210L Relay Unit



R240L Relay Unit



BILL OF MATERIAL					
ITEM	QTY.	PART NO.	DESCRIPTION	MATERIAL	DWG. NO.
A	NOTE 1	ECID-23R	RELAY		
B	1	PC-41	PRINTED CIRCUIT BOARD		RL7000-AB
C	1	PC-40	PANEL	18 GA. S.S.	RL7001-A
D	6	PI-13	SPACER	STEATITE L5	PS7014-A
E	6	X173595	STUD (10-32 X 1 1/2) CONT. THRD.	STN. STL.	
F	6	X171260	HEX NUT 10-32	STN. STL.	
G	6	X174116	#10 INT. TOOTH LOCK WASHER	STN. STL.	
H	1	X172976	GROUND SCREW		
J	1	NOTE 2	ENCLOSURE		

DIMENSIONS IN ( ) MILLIMETERS
DIMENSIONS IN INCHES

NOTE:
1 – FOR R310L & R340L USE 3 RELAYS
FOR R410L & R440L USE 4 RELAYS
2 – FOR NEMA 1 USE P/N RE4-1 REF. DWG. MS1021-A
FOR NEMA 4 USE P/N RE4-4 REF. DWG. MS1001-A
FOR NEMA 4X STNLS. STL. USE P/N RA1412CHNFSS

REV	DESCRIPTION	DATE	SIG
3	RECID 23R RELAY WAS RECID 23	11-11-05	PAS
2	REDRAWN ON CAD – NO CHANGES	3-8-94	ST

REVISIONS

THE CLARK–RELIANCE CORP.
STRONGSVILLE, OHIO

R310L, R340L, R410L, OR R440L RELAY WIRING

DRAWN ST SCALE NONE
CHKD. DATE 3-8-94
DRAWING NO. RL1000-AB REV. 3

R310L/R410L and R340L/R440L Relay Unit

Questions? Contact a Reliance Applications Engineer at
RelianceAppEng@clark-reliance.com

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