

EA100DRPT and EA100SRPV RetroPak Cap Installation and Maintenance Instructions



Reliance®

A PRODUCT OF CLARK-RELIANCE

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Caution: Before proceeding, follow any and all plant lock-out/tag-out procedures required. Any trips/alarms should be bypassed to prevent any false trips/alarms when servicing the equipment. Verify that all power is turned off to any applicable equipment. 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. 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 and plant procedures.

Only use a properly calibrated torque wrench to guarantee that the specified torque values are achieved. Make sure all bolting is clean and lubricated per the applicable Reliance IOM.

STORAGE and HANDLING

The Reliance® Probe type devices meet or exceed all applicable specifications when shipped from the factory. The equipment should be stored in an area protected from the elements and corrosive fumes, in a secure manner where they can neither fall, nor be struck by other objects. Avoid placing any objects probes or any part of the RetroPak Cap at any time. The temperature of the storage area should not exceed 150 degrees F. (65.5 degrees C) or drop below 32 degrees F (0 degrees C).

Unpacking and inspection

Upon receipt of the Boiler Drum Level instruments, examine the contents of the container(s) for damage. Care should be exercised as the items are uncrated. The shipment may contain fragile glass components. Report any faulty conditions as soon as possible to your carrier to avoid acceptance of damaged goods. Clark-Reliance will not be responsible for goods damaged in shipping or storage, or subsequent loss or damage due to improper storage or exposure as a result of damage to shipping containers. Submit a digital photo of any damaged equipment and container to Clark-Reliance, if possible.

Verify that all materials are present as recorded on the Packing List provided with each shipment. Report any discrepancies to Clark-Reliance immediately. Have the Clark-Reliance order number and shipping waybill available at the time of your call.

Handling

Your Clark-Reliance shipment has been carefully packed. However, the shipment may include spare parts, temporary water gages for “Boil-out” purposes, maintenance instructions, and engineering drawings. Upon receipt of the order, the equipment and above items should be identified and verified against the packing list. Any documentation that has been provided should be directed to the appropriate personnel.

Recommended Maintenance and Annual Inspections

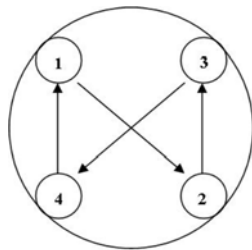
Regarding any recommended maintenance procedures or annual inspections, we suggest probes should be inspected annually (at a minimum) to guarantee that they are clean and not contaminated or coated with dirt or particulate. Always use a new probe gasket when replacing the probes. Refer to IOM R500-E189A for complete instructions.

Model EA100DRPT and EA100SRPV RetroPak Cap Assemblies are used to retrofit Clark-Reliance EA100D, EA100S, and EA100SW Levalarms. The RetroPak Cap will convert an existing float alarm type Levalarm to a probe type. The Cap along with a relay control unit will provide the necessary trip switch that is needed or required for the proper operation of the boiler. The probe furnished is sized to activate at the same point as the float type assembly.

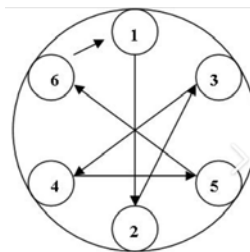
Note that CSD-1 does not permit the use of isolation valves between the boiler drum and the LWCO device on Automatically Fired Boilers with Fuel Input Ratings <12,500,000 Btu/hr

Installation

- 1) Perform the installation when the boiler is not in service. Open the drain valve to relieve any pressure in the Levalarm.
- 2) Remove the Switch Cover and disconnect the existing wiring from the microswitch.
- 3) Remove bolting from the Levalarm cap flange. Discard the flange cap, gasket, and components as they are no longer required.
- 4) Make sure there is no debris left from the old gasket. Inspect the gasket surface on the body for any steam cuts that may exist. If there is steam cut on the gasket surface, the EA100 body is no longer usable and must be replaced.
- 5) Carefully install the new RetroPak Cap Assembly into the water column with a new flange gasket. Never reuse the existing flange gasket!
- 6) Lubricate the flange bolting with a nickel based high temperature lubricant.
- 7) Torque the flange nuts to 70 ft-lbs (95 Newton-Meters) in 1/3rd increments, in the proper torque pattern.



Four-Bolt



Six-Bolt

- 8) Attach the high temperature wires that are furnished with the assembly to the function probe and the cap assembly (used as the common ground). Route the wires to the relay socket terminals inside of the Relay Control unit. See the Relay Control unit drawing for the wiring schematic diagram.
- 9) The relay will require a 120 VAC (P/N ECID-23R) or 230 VAC (P/N ECID-56R) power source.

Note: The relay can be installed in the user supplied enclosure with a surface mount relay socket (P/N ECID-49) or the relay can be ordered already in a NEMA 1, NEMA 4, or NEMA 4X enclosure from Clark-Reliance.

- 10) Use the existing wires that were attached to the original EA100 Levalarm microswitch to wire from the Relay Control unit to the trip circuit in the burner management system.
- 11) Verify that all wiring terminations are tight and secure.

Interwiring

Note: Refer to Probe Maintenance **IOM R500-E189** for further information

The wires attached to the probes must be of high temperature type in order to withstand the heat. We suggest the following types of wire:

<u>Maximum Application Pressure (PSI)</u>	<u>Wire Specification</u>
1000	18 Ga. Stranded conductors, Teflon insulation rated at 300 VAC and 200°C (Belden #83029, Alpha #5857, or equal)
1001 to 3000	18 Ga. Stranded conductors, Teflon treated glass braided insulation rated at 300 VAC and 400°C, Nickel coated copper conductor U.L. #5182 (Radix #MGT-4502 or equal)

Note: When installing the high temperature wire to the probe, use an open end wrench to prevent the Probe assembly from turning while tightening the wire terminal nut. Use a ¼” wrench for both the compression nut and the terminal nuts on T and V type probes. ZG, ZB, FG, and FB type probes require a ½” wrench for the compression nut and a 3/8” wrench for the terminal nut.



The high temperature wires attached to the probes can be routed to a local junction box or directly to the control unit. If a junction box is used, a low cost 18 Ga. Multi-conductor cable may be used to carry the signal to the control unit. We suggest Belden #8467 or equal.

Reliance® probes require very little maintenance. To clean a probe, use a stainless steel wire brush or fine emery cloth to clean the stainless steel rod portion of the probe. To clean the insulator, use a soft cloth and a mild detergent.

If probes are removed at any time for replacement or inspection, the sealing gasket must be replaced. Probe replacement kits are furnished with two spare gaskets. The gasket part numbers are as follows:

T type probe use P/N WCM-13

V type probe use P/N X175500 (formerly P/N E10-10)

Replacing the probes:

1. Before removing and replacing any probes, make sure that the column is isolated from any pressure and the drain valve is open.
2. After the column has cooled, remove probe to be inspected or replaced.
3. When replacing the probes, coat the threads lightly and uniformly with a high temperature anti-seize type lubricant such as 'Never-Seize', 'MolyCote G' or 'Fel-Pro C'
4. Torque the probes as follows:
Type T and V to 40 Ft-Lb. (54 Newton-Meters)

Clark-Reliance ECID-23R Relay Specifications

Note: Refer to Relay IOM R500-E137A for further information

Design: Solid State components enclosed in a clear Lexan plug-in style housing

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

Contact Ratings: 5A @ 120, 240 VAC, 5A @ 30 VDC, and 1A @ 120 VDC

Contact Life: Mechanical – 5 million operations, Electrical – 100,000 operations min. at full load

Supply Voltage: Standard units are designed for 120 VAC supply. Some custom units are fabricated for 220 VAC (Refer to appropriate wiring diagram for details)

Supply Current: 4.4 VA

Probe Circuit: 1.5mA @ 12 VAC per probe

Sensitivity: ECID-22R 26,000 Ohms (50 and greater mho water conductivity)

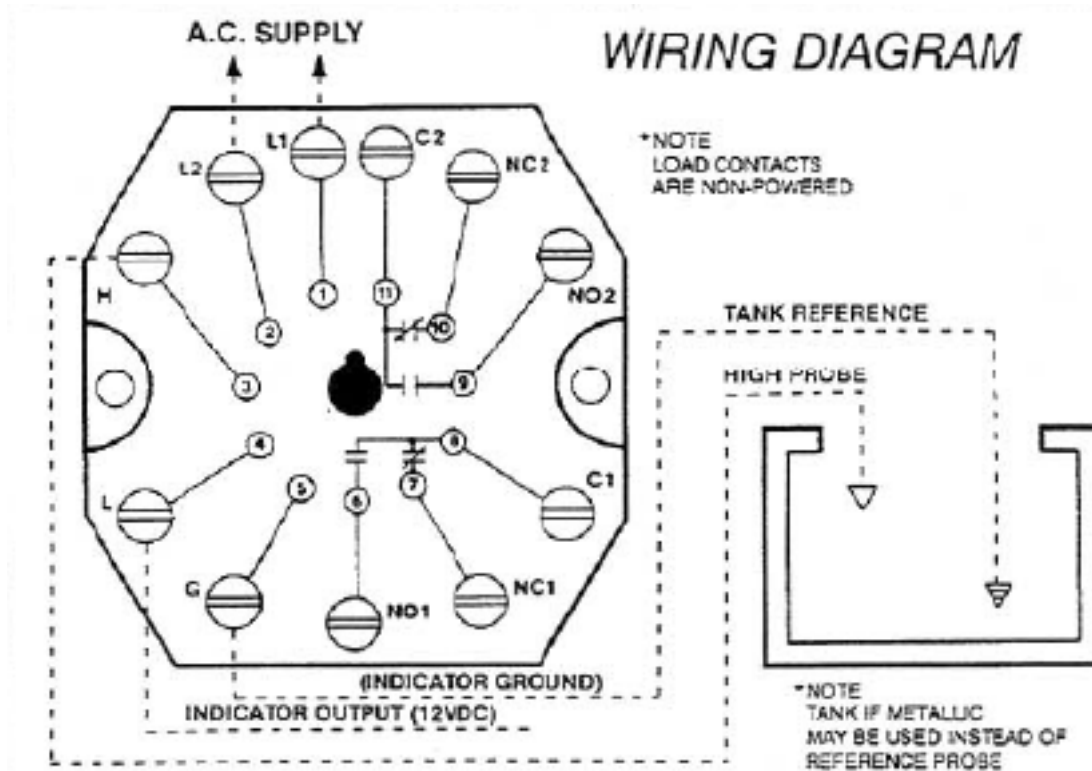
ECID-23R 50,000 Ohms (10 – 50 mho water conductivity)

ECID-24R 100,000 Ohms (.1 – 10 mho water conductivity)

Temperature Rating: -40 to +150 degrees F.

Listing: FM Global #0T8A3.AF, CSA #LR14001, and U.L. listed

Direct Mode Operation: When the water level rises in the column to the probe, the control energizes (LED will be lit). The control remains energized until the water level in the column falls below the probe. The relay will then de-energize (LED will not be lit)



Typical single relay module circuit for Direct Mode operation

Recommended Maintenance and Annual Inspections

Regarding any recommended maintenance procedures or annual inspections, we suggest any device containing probes should be inspected on an annual basis for contaminated probes and wire secure terminations.

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.

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.

With no pressure or elevated temperature, beyond ambient conditions, remove the probe for inspection. If the probe displays signs of contamination, it can be cleaned with a mild detergent and re-installed using a new sealing gasket, if applicable. Refer to IOM # E189-A for additional details. If the probe exhibits and contamination across the length of the insulator, which cannot be easily cleaned, the probe should be replaced.

The importance of proper cleaning and maintenance of the Levalarm cannot be stressed enough. The Levalarm and probe must be kept clean to ensure the proper function of the device.

Troubleshooting

Troubleshooting is only necessary in the event that a control relay fails to energize or de-energize.

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

1. Verify that probe wiring to the appropriate probes from each relay is tight and secure.
2. Verify that the common connection is tight and secure.
3. With no pressure in the Levalarm, remove the probe and verify that it is clean and not contaminated.
4. Verify water level in the drum
5. Exchange relays to verify function. If the problem moves with the relay, then replace the relay.

Probe Evaluation

Probes can be evaluated by performing the following 3 steps:

- 1.) **Resistance** – For practical purposes, a resistance measurement taken by a typical DVM (Digital Voltmeter) between the probes tip connection and its securing body should measure an infinite impedance. It should measure less than 10 ohms from its tip to its wiring connection.
- 2.) **Appearance** – The probe tip and its associated insulator(s) should be clean and free of any scaling, rust, corrosion, or any other foreign contamination. All surfaces should also have no visible degradation, cracks, galling, or any other signs of excessive wear. The entire assembly should be secure and moderately tight with no loose or missing parts. Inspection should also include the wiring connection and its associated lock washer and hex nut.
- 3.) **Age/Usage** – Probes should generally be replaced after 3 to 5 years of severe service, such as extreme heat, daily heat cycling, usage in extreme outdoor environments, excessive vibration, use in applications with low water quality, etc. Assessing the operational attributes of your boiler system and keeping a record of performance and maintenance can yield useful future information to keep any system in optimum performance. In some applications, probes may provide up to 15 years of service in low pressure applications up to 450 PSI (30 Bar).

Notes:

Recommended Spare Parts

Part Number	Description
C1-3	Cap Gasket
T060RK	Probe for EA100DRPT
V060RK	Probe for EA100SRPV
X172372	Flange Cap Bolt
X171501	Flange Cap Nut
RK-29	Probe Fitting Housing Kit



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REPLACEMENT PARTS WARNING

THE USE OF NON-ORIGINAL EQUIPMENT MANUFACTURER PARTS (SUCH AS GLASS, GASKETS, PROBES, MODULES, ETC.) WILL VOID THE AGENCY APPROVAL (FM, UL, CAS, CRN, ABS, ETC.) PRESSURE/TEMPERATURE RATING, AND WARRANTY OF THE EQUIPMENT. CLARK-RELIANCE REQUIRES THE USE OF OEM PARTS FOR ALL REPAIRS IN ON THIS PRODUCT IN ORDER TO MAINTAIN PLANT AND PERSONNEL SAFETY, AND RELIABLE OPERATION.

Consult the factory or your local Clark-Reliance Representative with any questions. Please have the model numbers and/or reference drawing numbers available when calling. You can also contact us at our website www.relianceboilertrim.com or RelianceAppEng@clark-reliance.com.