

The versatile EA101 series Levelarms provide reliable, instant response to liquid level changes in boilers and tanks. A single EA101 can be used where maximum level variation is within 3 inches. Where greater variations are involved, two of these units can be installed in series. These compact units can be used almost anywhere.



Fig. 1

The electrode circuit is isolated from the power or alarm and signal circuits. This eliminates any possibility of electrolysis, as the probe circuit, the only electric contact with the boiler or tank, is 12 VAC. The power consumption is less than 4 watts for each probe circuit. A general circuit for a single alarm control is illustrated below.

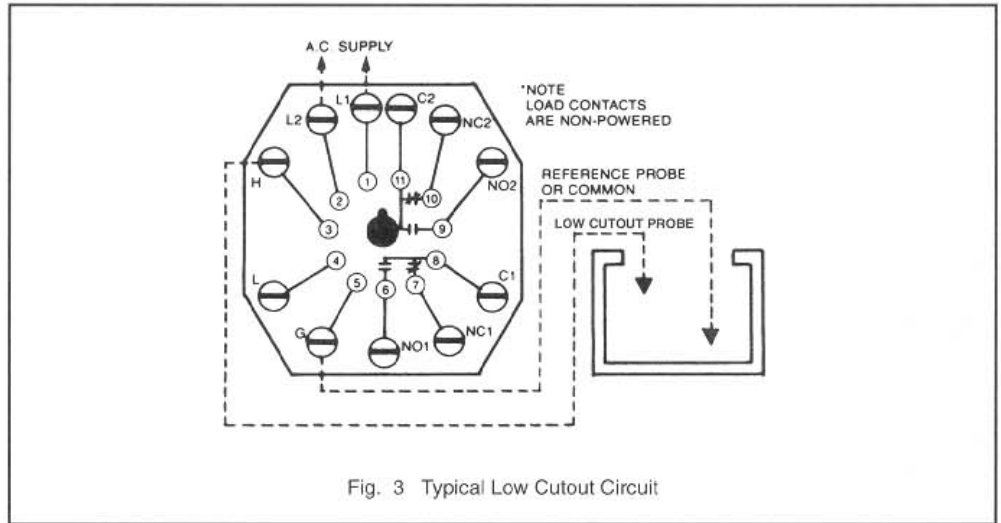


Fig. 3 Typical Low Cutout Circuit

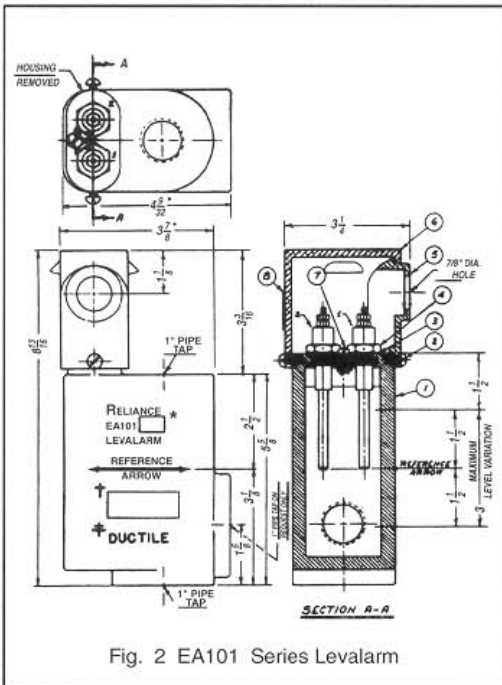


Fig. 2 EA101 Series Levelarm

When the water is below the control probe as shown, the relay is de-energized. When the water covers the ends of the common and the control probes, current flows and energizes the relay circuit, and reverses the switch contacts.

In Fig. 3 the contacts (9 & 11) are open; the Fuel Cut-out is not energized and fuel is shut off. If water is at or above the Cut-out level, contacts (9 & 11) are closed and the Fuel Cut-out circuit is energized, permitting fuel to pass to the burner or the stoker to operate. In the event of power failure, THIS UNIT WILL FAIL SAFE since the relay circuit is de-energized. A manual reset button is available, if desired.

These Levelarms are unaffected by pressure, temperature or water conditions. They are simple and rugged, avoiding the use of stuffing boxes or bellows, vacuum tubes, or magnets. Relays and controls may be located at any distance up to 1000 ft. from the water columns. They have been thoroughly tested in actual service.

THE

# Clark·Reliance®

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# INSTALLATION

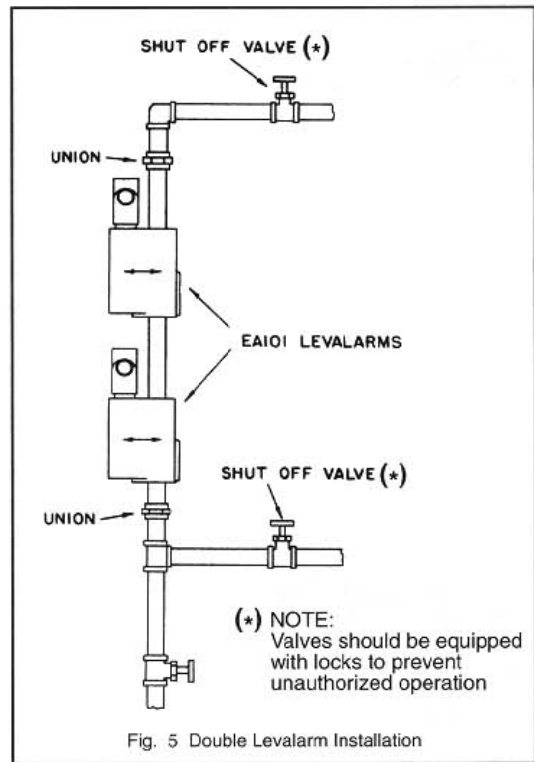
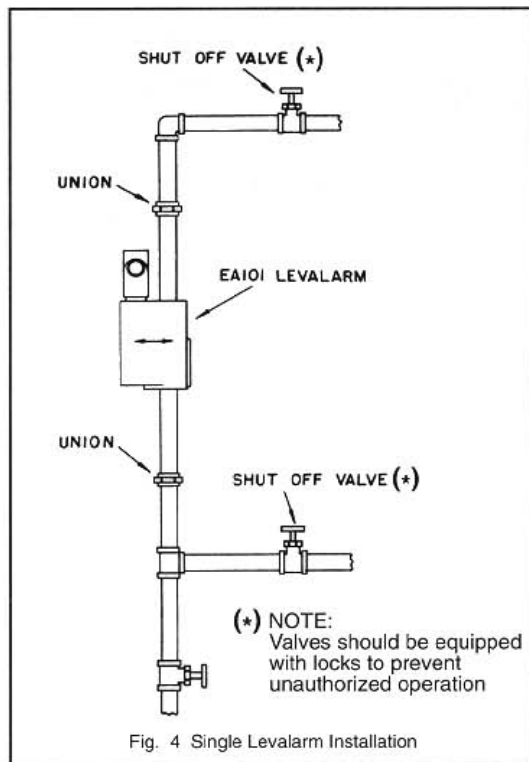


Figure 4 is a typical arrangement of an EA101 for low alarm or fuel cut off or both. Piping should be one inch (1") minimum size for satisfactory operation. Piping should have shut off valves so that the EA101 series, LEVALARM can be removed for inspection and repair. Unions immediately above and below the LEVALARM will facilitate such work. Locks should be installed on the valves to prevent unauthorized operation or maintenance.

NOTE: If socket weld connection, remove probe(s) fittings before welding, and replace probe sealing gasket. See maintenance section for gasket part numbers.

Figure 5 illustrates a typical arrangement for installing two EA101 LEVALARMS, one above the other as illustrated.

Follow this procedure after piping has been connected to body of LEVALARM:

1. Install relay control unit at any convenient location, as the connecting wires may be of any reasonable length up to 1000 ft. Be sure control unit is rated for the correct supply line voltage and frequency (cycles).
2. Install optional light indicator, or horn, or both at a convenient location for the operator.

3. Now remove probe fitting housing. This will give you access to the terminals on the probe assemblies for wiring. Check to make sure that the probe fittings are screwed down to 40 Ft-Lb. The conduit bracket has an opening for BX or 1/2" conduit.
4. Wire per wiring diagram. See next page.
5. Replace probe fitting housing.

The probe assemblies have a 5/8" - 24 thread and are furnished with a copper or monel gasket. Stainless steel rods are connected to the probes with a coupling nut to make a complete assembly. The complete unit can be removed in one piece for inspection and cleaning by merely unscrewing the probe(s) from the LEVALARM body with a socket wrench. When replacing, be sure to use a new gasket. Probes should be removed for cleaning within 30-60 days after installation. Future cleaning frequency will depend upon conditions of boiler water. Probes can usually be cleaned by wiping with a damp cloth. WEEKLY BLOW DOWN helps keep probes clean.

## RELAY CONTROL UNIT

Please refer to actual relay control unit drawing provided with your system for details.

## OPTIONAL VIBRATORY HORN AND LIGHT INDICATORS

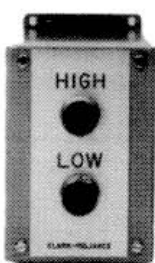


Fig. 6  
2 light indicator LI-2  
Dimensions:  
4" wide x 7" high x 6" deep



Fig. 7  
Vibratory Horn  
Over-all Dimensions 4" x 4"

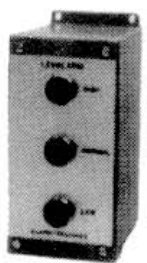


Fig. 8  
3 light indicator LI-3  
Dimensions:  
4" wide x 9" high x 6" deep

# OPTIONAL FIELD WIRING INSTALLATIONS

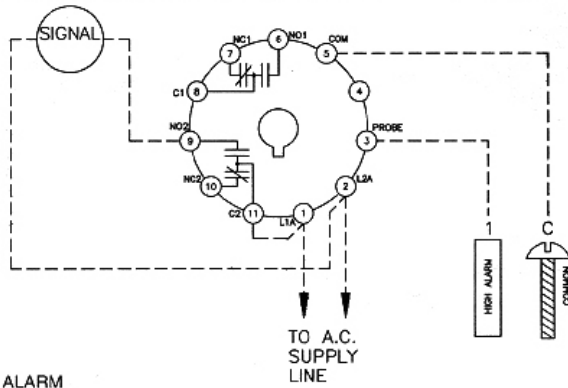


Fig. 9 — HIGH ALARM

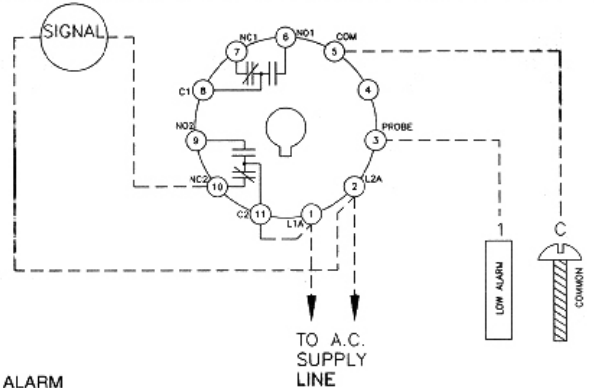


Fig. 10 — LOW ALARM

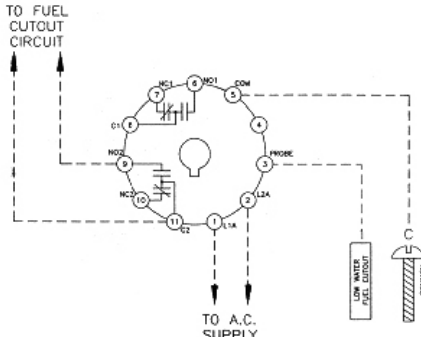


Fig. 11 — LOW WATER FUEL CUTOUT

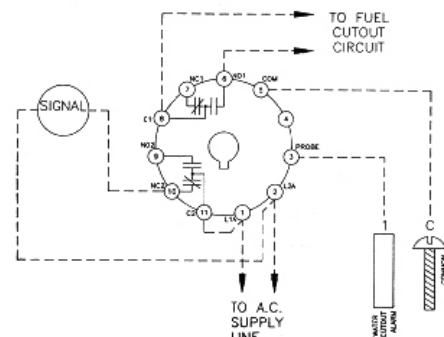


Fig. 12 — LOW WATER FUEL CUTOUT & LOW ALARM (SAME LEVEL)

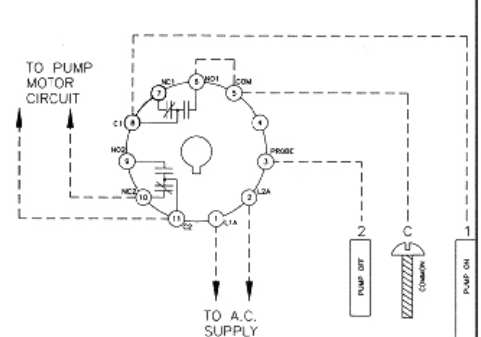


Fig. 13 — PUMP CONTROL

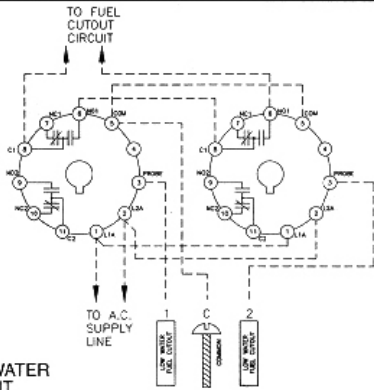


Fig. 14 — DUAL LOW WATER FUEL CUTOUT

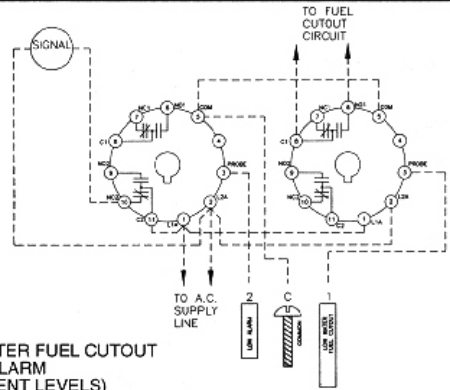


Fig. 15 — LOW WATER FUEL CUTOUT & LOW ALARM (DIFFERENT LEVELS)

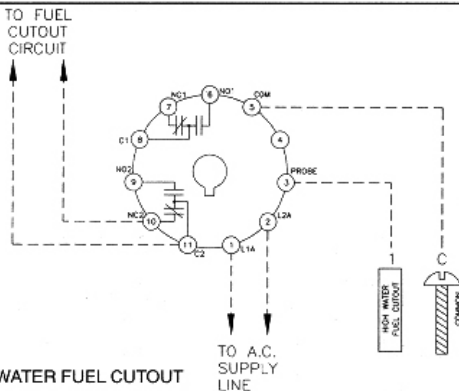


Fig. 16 — HIGH WATER FUEL CUTOUT

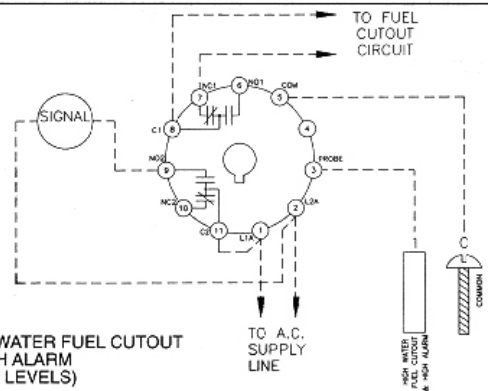


Fig. 17 — HIGH WATER FUEL CUTOUT & HIGH ALARM (SAME LEVELS)

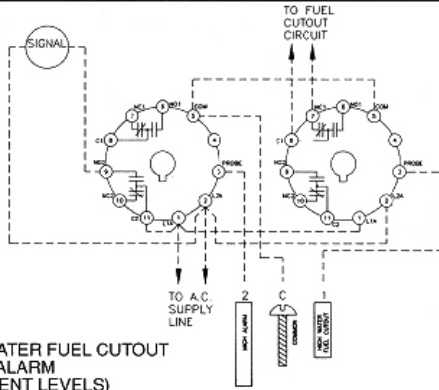


Fig. 18 — HIGH WATER FUEL CUTOUT & HIGH ALARM (DIFFERENT LEVELS)

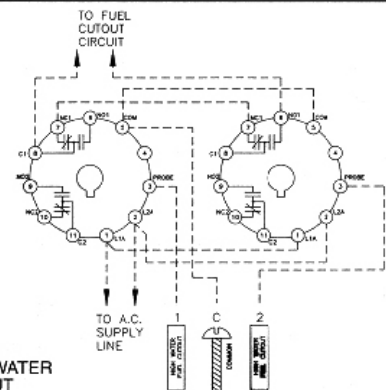


Fig. 19 — DUAL HIGH WATER FUEL CUTOUT

NOTES: 1. RELAYS FURNISHED FOR LINE VOLTAGE AND FREQUENCY SPECIFIED ON ORDER  
 2. SWITCH CONTACTS U/I RATED AT 5AMP@240 VAC OR 30 VDC  
 3. SOLID LINES INDICATE INTERWIRING BY CLARK-RELIANCE (ONLY WHEN RELAYS ARE FURNISHED IN ENCLOSURE)

4. BROKEN LINES INDICATE FIELD WIRING  
 5. USE NO. 18 AWG TEFLON INSULATED WIRE FOR PROBE CIRCUITS

BELDEN NO. \_\_\_\_\_, OR EQUAL.

# MAINTENANCE INSTRUCTIONS



Fig. 20  
MODEL T PROBE FOR PRESSURES TO 450 PSI  
(TEFLON® INSULATED)



Fig. 21  
MODEL V PROBE FOR PRESSURES TO 1000 PSI  
(TEFLON® INSULATED)



Fig. 22  
MODEL ZG PROBE FOR PRESSURES TO 1800 PSI  
(ZIRCONIUM OXIDE INSULATED)

## A. MAINTENANCE

Clark-Reliance probes require very little maintenance. We suggest weekly blow downs of the Levalarm to prevent the build-up of contamination on the probes. A bypass switch can be installed on fuel cutout circuits. This switch will prevent a false trip during blow-down. The blow-down procedure is conducted thoroughly by closing the water valve and opening the drain valve slightly for about 20 seconds. (Refer to Clark-Reliance Form E156-B, "Recommended Blow-Down Practices for Water Columns, Electrolevs, and Water Gages"). If valves are installed, they should be equipped with locks, to prevent unauthorized use.

If blowing-down of the column does not clean the probes sufficiently, 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 four spare gaskets. The gasket part numbers are as follows:

Probe Type	Gasket Part Number	Material
T	WCM-13	Copper
V	X175500 (Formerly E10-10)	Monel
ZG	E10-10S	Silver-Plated Monel

Replacing the probes:

1. Close both steam and water valves (if available) or shut down boiler before starting probe maintenance.
2. Remove probe to be inspected or replaced.
3. When replacing the probes, coat 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 probe(s) to 40 Ft-Lb. (54 Newton-Meters)

Hot torquing is suggested for all probes. However, the Levalarm *must* be isolated from service with the drain valve open *before* retorquing the probes. The hot torquing procedure will extend probe sealing gasket life and should be performed as follows. (Note: This procedure can be performed *only* if isolation valves are installed.)

1. Partially open the *steam* valve to warm up the Levalarm with the drain valve slightly opened.
2. Close steam (and water) valves to isolate the Levalarm.
3. Open the drain valve completely.
4. Re-torque as instructed above.
5. Return to service by closing the drain valve, and opening the steam and water valves.

## B. INTERWIRING

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:

Maximum Application Pressure (PSI)	Wire Specification
1000	18 Ga. Stranded conductors, Teflon insulation rated at 300 VAC and 200°C (Belden #83029, Alpha #5857, or equal)
1001 to 1800	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)

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 temperature 18 Ga. Multi-conductor cable may be used to carry the signal to the control unit. We suggest Belden cable rated at 300V 60°C, with tinned copper conductors, PVC insulated.

## C. TROUBLESHOOTING

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

In the event that a relay fails to *energize*, the following steps should be taken:

1. Verify probe wiring to the appropriate probes from each relay.
2. Verify water level in the Levalarm.
3. Exchange relays to verify function. If the problem moves with the relay, then replace the relay.

Any additional questions should be directed to your local Clark-Reliance Representative, or to the Factory. Phone (440) 572-1500 Fax (440) 238-8828



## Notice to Plant Operators

The use of non-Original Equipment Manufacturer parts (such as glass, gaskets, probes, modules, etc.) will void the Agency Approval (FM, UL, CSA, CRN, ABS, etc.), pressure/temperature rating, and warranty of this equipment. Clark-Reliance requires the use of OEM parts for all repairs on this product in order to maintain plant and personnel safety, and reliable operation.

**"PARTS-PLUS"**  
Critical spare parts for overnight  
delivery, direct from the manufacturer.

[clark-reliance.com/parts](http://clark-reliance.com/parts)



Steel Valve Repair Kit



Replacement Probes



Gage Glass Repair Kit



Simpliport Module



Simpliport Packing Nut



Replacement Relays



Probe Repair Kit



Replacement EA100 Ass'y



Replacement Micro-switch



Bronze Valve Repair Kit



Valve Packing



Replacement Floats

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