Conductivity Probe Maintenance

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

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

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

MODEL FG PROBE FOR PRESSURES TO 3000 PSI (ZIRCONIUM OXIDE INSULATED)

Replacement Probe Part Numbers

T***RK	ZG***RK
V***RK	FBRZ***RK
ZBRZ***RK	FG***RK

*** = Probe length measured from gasket surface of probe fitting body. 1st two digits (**) indicate length in whole inches, 3rd digit (*) indicates additional eighths of an inch.

Note: Each replacement probe is furnished with 2 spare sealing gaskets.

Patented Probes:
U.S. 4,507,521
S.A. 83/664
U.K. 2,127,976
Canada 1,200,283
Plus Others World-Wide

Brazed Probes

MODEL ZBRZ has been designed for specification or retrofit into any Clark-Reliance instrument designed for pressures up to 1800 PSI.

MODEL FBRZ has been designed for specification or retrofit into any Clark-Reliance instrument designed for 3000 PSI.

Note: For model FSB Probes, refer to IOM #R500.E229A

Reliance®
A PRODUCT OF CLARK-RELIANCE
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Caution: Before proceeding, 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. Verify that all power is turned off to the 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.

A. Maintenance

Reliance® probes require very little maintenance. We suggest weekly blow downs of the water columns 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 the blow-down procedure. The proper blow-down procedure can be found at www.relianceboilertrim.com (Refer to Reliance Form E156-B, "Recommended Blow-Down Practices for Water Columns, Electrolevs, and Water Gages" and also the on-line video)

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 two spare gaskets. The gasket part numbers are as follows:

Probe Type	Gasket part Number
T	WCM-13
V	X175500 (Formerly E10-10)
ZG or ZB	E10-10S
FG or FB	E10-10S

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, V, ZG, or ZB to 40 Ft-Lb. (54 Newton-Meters)
   Type FG or FB Probes to 90 Ft-Lb. (122 Newton-Meters)

Hot torqueing is suggested for all probes (except the FSB model – refer to IOM #R500.E229A). However, the column *must* be isolated from service with the drain valve open *before* re-torqueing the probes. The hot torque procedure will extend probe sealing gasket life and should be performed as follows:

1. Partially open *steam* valve to warm up the column with the drain valve slightly open.
2. Close steam (and water) valves to isolate the column.
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.

(Refer to Reliance IOM # R500.E239A for the Hot Torque Procedure)

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:

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.

Maximum Application Pressure (PSI)	Wire Specification
1000	18 Ga. Stranded conductors, Teflon insulation rated at 300 VAC and 200ºC (Belden #83029, Alpha #5857, or equal)
1001 to 3000	18 Ga. Stranded conductors, Teflon treated glass braided insulation rated at 300 VAC and 400ºC, 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.

C. Troubleshooting

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

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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).

Other Inspections
Other inspections are recommended to be periodically performed. These inspections can affect overall level measurement system performance and are as follows.

1.) Inspect water columns for leaking probes. Probes leaking on others not only are subject to fail but can also affect others. Address them ASAP.

2.) Inspect the condition and securement off all probes wires and wiring connections from the probe connections themselves, through any junction box connections, back to the input on the level measuring system. This also includes the condition of the wire insulation, as they tend to degrade over time and can short to adjacent probe wiring or ground out in the conduits and along the column.

3.) Inspect and maintain a good ground connection from the column back to the measuring system. File clean ground surfaces on the column and replace the wiring or wiring hardware if necessary. A bad ground compromises the entire measurement system.

4.) If possible, compare the operations results with channels above and below any suspect probe and other level measuring instrumentation.

Any additional questions should be directed to your local Clark-Reliance Representative, or to the Factory. Phone: (440) 572-1500 Fax: (440) 238-8828 or www.relianceappeng@clark-reliance.com.

Warranty Note: **Reliance warrants that probes manufactured by Reliance will be free from defects in material and workmanship for 18 months following the date code that is stamped on the probe. This excludes any misuse or mishandling of the probe or the equipment.**

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