KING-GAGE TDM/ TDR Indicator Service Manual

Normal Service Procedures

The KING-GAGE indicator does not require periodic recalibration. Excluding accidental damage, maintenance may be required if indicating fluid becomes discolored, or seals require replacement due to wear or deterioration. Prior to performing any maintenance or replacement, the following 3 steps should be followed:

- Disconnect compressed air supply to indicator (not applicable to models with hand pump).
- Disconnect tank airline from pressure connection at top (or bottom) of indicator.
- Disconnect overflow check valve from center connection at top of indicator.

1. Draining the Indicating Fluid

To replace glass tube or recharge with new fluid, first drain all existing fluid from the indicator. Avoid direct physical contact with fluid.

a. Remove front cover and remove scale strips from indicator.

b. Unthread drain plug slowly to open until fluid begins to stream out. Use large mouth container to collect fluid.

c. If replacing glass tube, proceed to tube replacement instruction.

d. Tighten drain plug to close. Through top center connection of indicator, add 2-4 ounces of specified cleaning fluid into the glass tube. For MERCURY filled indicator, use Acetone. For COLORED liquids, use Alcohol.

e. Connect a short length of flexible airline or hose to the pressure connection of indicator. Place finger lightly over top center connection and carefully blow into hose to force cleaning fluid up into glass tube. Repeat several times to remove residue from inside glass tube.

f. Unthread drain plug to open and drain cleaning fluid from indicator.

g. Remove drain plug completely and use clean, dry compressed air to blow dry indicator. Direct compressed air flow into drain port, top center connection and pressure (tank) connection of indicator until completely dry.

h. Reinstall scale strips and position so that mounting screws are centered in the elongated slots.

i. Insert drain plug and washer and tighten securely. Use eyedropper or small funnel to fill indicator with fluid type (Mercury, #294 Red, etc.) specified on scale strip through top center into glass tube until level rests at lowest mark on scale strip.

j. Use flexible hose (or airline) at pressure connection again to blow into indicator to force fluid up glass tube. Repeat to remove any trapped air inside lower block and reservoir.

k. If necessary, adjust scale strips up or down to precisely align fluid level and lowest mark on scale. Reconnect indicator — see Section 6.

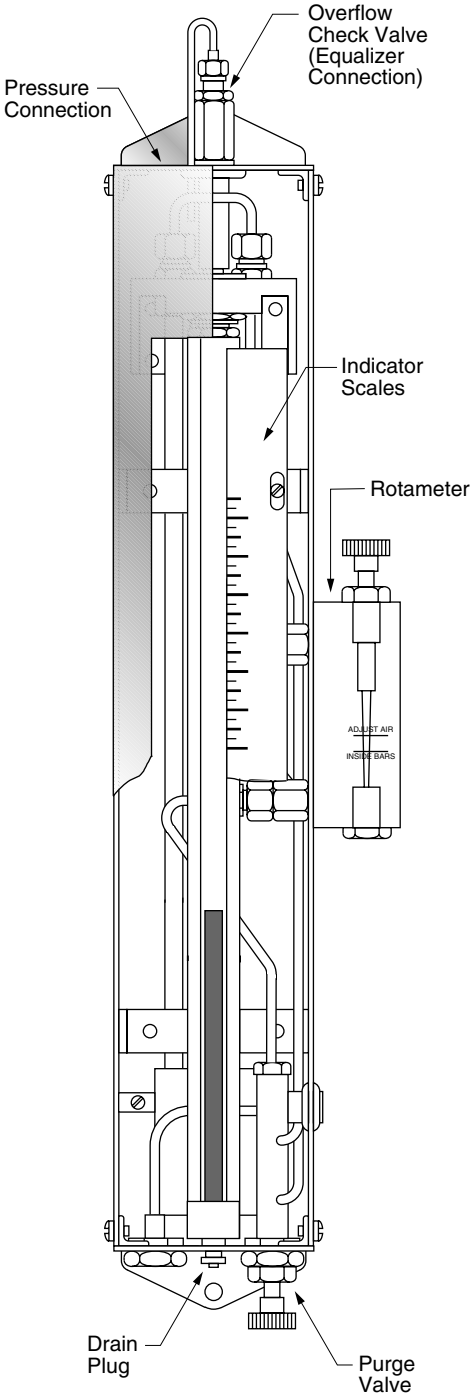

Figure 1 - Internal View

2. Glass Tube Replacement

Glass tube packing gasket (8179) has been replaced by a pair of O-rings. Use tube packing seal kit 5181-1 or order O-rings separately (6554-21).

a. Drain indicating fluid as outlined in Section 1.

b. See **Figure 2** Loosen upper and lower packing nuts. Unthread locknut on equalizer connector and remove through top of bracket.

c. Remove glass tube from lower block. Rotate tube if necessary to loosen seal and pull upward to free.

d. Remove existing packing washers and gaskets from ends of glass tube or from inside connector block.

e. Place new washers, O-ring seals, packing nuts and connector locknut onto replacement glass tube. Insert glass tube up through top bracket and then down into lower connector block.

f. Install equalizer connector through top bracket and tighten locknut securely.

g. Glass tube should be fully seated into lower connector. Alternately tighten the upper and lower packing nuts about 1/2 turn each, repeating until packing seals are fully inserted.

h. Refer to Section 1, Steps D thru G to rinse well assembly and glass tube with cleaning solution. Refill indicating fluid as further outlined in Section 1.

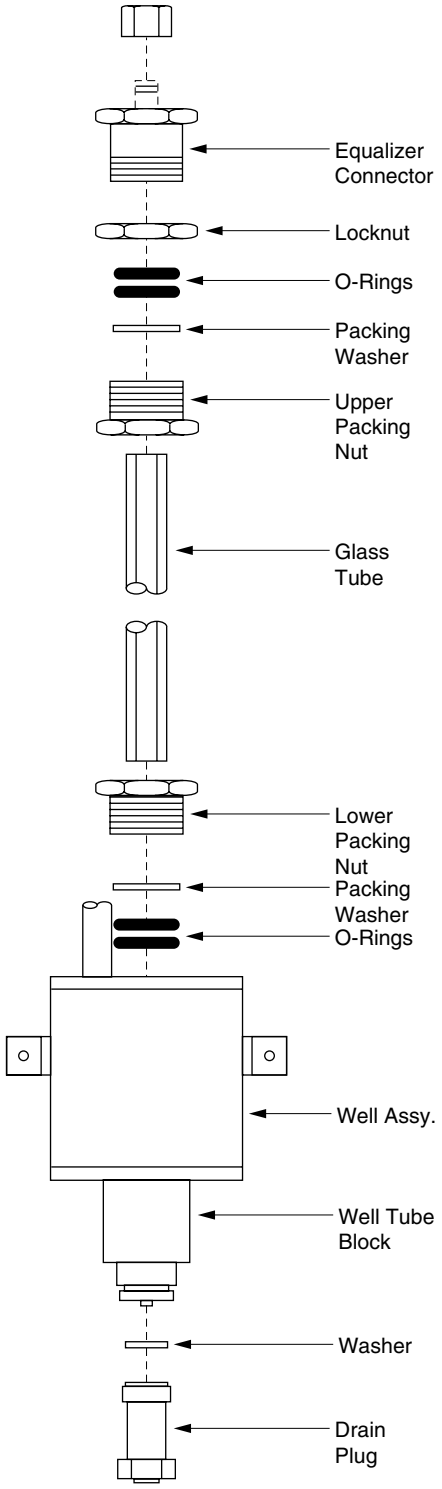

Figure 2 - Glass Tube Replacement

3. Servicing Purge Valve

For models with 3-position purge valve. Prior to servicing, disconnect compressed air supply at indicator connection.

a. Refer to **Figure 3** Disconnect inlet tube from Rotameter connection inside of indicator housing. Remove inlet tube assembly from top of purge valve body.

b. Inspect and replace O-rings if worn or deteriorated. Check poppet assembly and spring, replace if necessary.

c. Remove stem assembly from bottom of indicator housing by loosening locknut. Inspect O-ring seals and replace as necessary. Lubricate O-rings with petroleum jelly or silicone lubricant before reassembling.

4. Servicing Rotameter Assembly

Dirt, oil or moisture may affect operation of Rotameter. Small internal float may stick to side of internal passageway. Check operation by turning top needle valve closed — if float does not drop, clean assembly. Disconnect compressed air supply at indicator.

a. Refer to **Figure 4** Remove needle valve stem from top of Rotameter and check O-ring seal. Replace if needed.

b. If moisture and/or dirt is present, remove Rotameter assembly from indicator housing. When disconnecting tube adapter from inlet check valve (if applicable), use a wrench to hold check valve body while unthreading adapter.

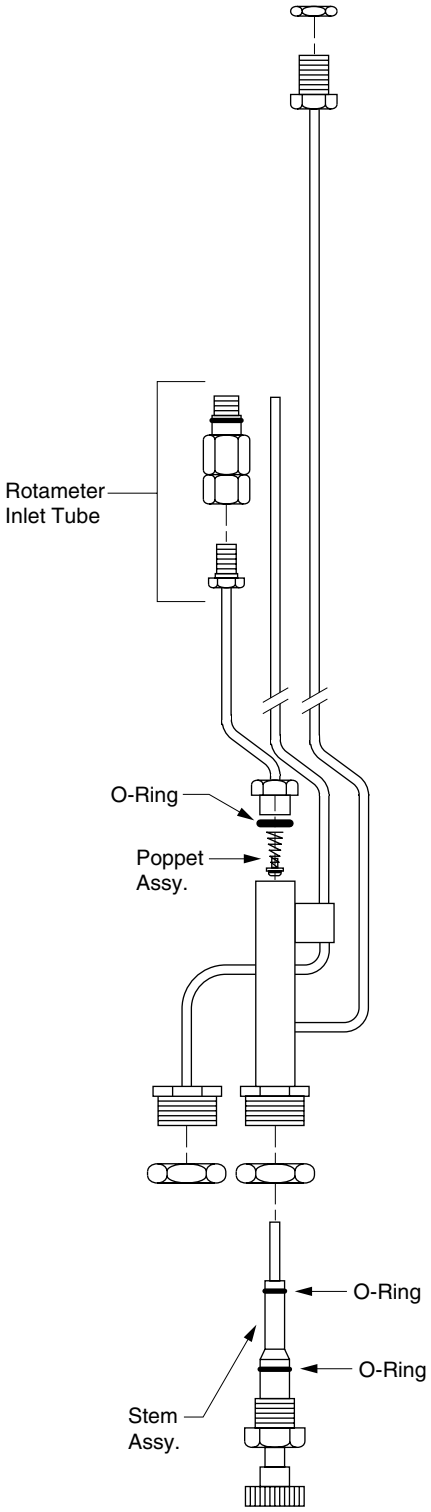

Figure 3 - Purge Valve Assembly

c. Remove connectors (and inlet check valve, if applicable) at Rotameter from inside of indicator housing. Separate Rotameter from indicator housing by removing screw fasteners.

d. Carefully remove lower plug assembly and upper adapter from Rotameter body. Use care not to lose small ball float.

e. Wash Rotameter body in mild detergent and water. Caution — Rotameter body is machined from acrylic block, DO NOT USE solvents or abrasive materials when cleaning Rotameter. Rinse using clean water and blow internal passages dry using clean compressed air.

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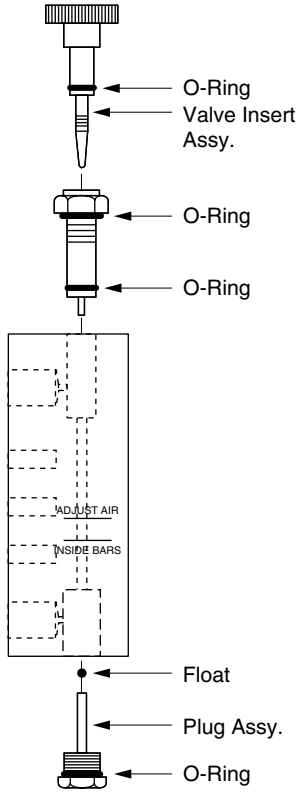

Figure 4 - Rotameter Assembly

f. Reassemble Rotameter components using new O-ring seals applied with petroleum jelly or silicone lubricant. Install lower plug assembly first. Insert clean float element through top opening and install upper adapter. Do not use excessive torque — this may crack acrylic body.

g. Install needle valve stem into top of Rotameter. Mount Rotameter assembly to side of indicator housing and reconnect tubing adapters. (Also note Inlet Check valve procedure Step B).

h. Reconnect compressed air supply to indicator and check rotameter connection for leaks. Close needle valve tightly and make certain float drops to bottom. If not, check for leaking O-ring seals or damaged needle valve stem.

5. Servicing Bubbler

Accumulation of dirt from air supply may foul bubbler oil and make it difficult to see air flow bubbles. Replace oil fill with Bubbler Fluid No. 9294-8. Disconnect compressed air supply at indicator.

a. Refer to **Figure 5** Remove fill plug from top of bubbler. Loosen drain plug at bottom of bubbler and drain oil fill.
b. Loosen nut from bottom of bubbler to remove sight tube and gaskets. Clean sight tube with mild detergent and water.
c. Clean center air tube and make certain that air hole near bottom is not obstructed.
d. Remove needle valve assembly and check O-ring seal. Replace if needed. Lubricate O-ring with petroleum jelly or silicone lubricant.

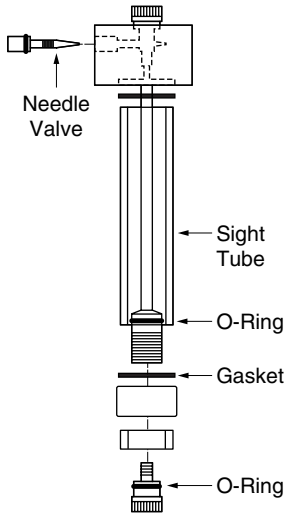

Figure 5 - Bubbler Assembly

e. Reassemble sight tube. Replace gaskets if necessary.
f. Inspect O-ring seal on drain plug, replace as necessary. Install drain plug and tighten to seal.
g. Through top opening, fill bubbler with oil fill up to red line. Inspect O-ring on fill plug (replace if needed) and replace.
h. Reconnect compressed air supply. Check bubbler connections (fill plug, drain plug) for leaks.

6. Overflow Check Valve and Vent Line

Overflow check valve operation should be checked. Shake check valve and listen for internal float to rattle. If no rattle is heard, replace Overflow Check Valve. Vent line connected to top of Overflow Check Valve must not be broken, crimped or bent shut. If replacement is needed, order Part No. 6030-2. Refer to **Figure 6**.

7. Reconnecting Indicator

Following maintenance or repair, restore indicator to normal service in the following sequence.

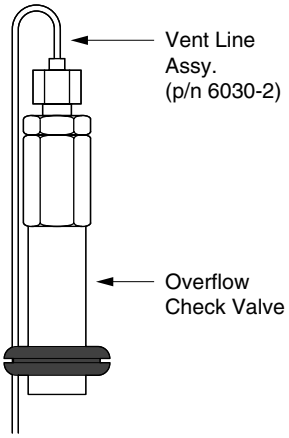

Figure 6 - Overflow Check Valve and Vent Line

- Make certain scale strips are mounted inside indicator and indicating fluid rests at level equal to lowest mark on scale.
- Connect airline from tank to pressure connection at top or bottom of indicator.
- Make certain Overflow Check Valve and Vent line (see above) are properly installed at top of indicator. Vent line should be inserted through slit in rubber grommet on top of housing and hang downward behind scales.
- Install front cover and secure to housing.
- Reconnect compressed air supply (55-60 psig or as specified on indicator instruction plate). Follow normal operating procedures for tank gauging system.

Note: Compressed air supply must be clean, dry and oil free for proper, trouble free operation. A compressed air filter should be installed upstream in the compressed air supply line. Replace filter cartridges as necessary based on air quality and contaminants present.