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JOHN C. ERNST LLC
PROCESS OBSERVATION SOLUTIONS

LIQUID LEVEL GAUGES

INSTALLATION, OPERATION & MAINTENANCE MANUAL

FOR SERIES: **T13**

STYLES
416 & 442



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PRODUCT QUICK SPECS.				
Style	NPT Size	Primary Material	Pressure/Temp.	
			@ 100°F	@ Max Temp
442	1/2" - 3/4"	Carbon Steel	500	500PSI @ 400°F
416	1/2" - 3/4"	Stainless Steel	500	500PSI @ 400°F

Limited to Glass & Gasket Ratings

I. INTRODUCTION

This manual is a guide for the responsible personnel installing, operating and maintaining these items. It is imperative that instructions are read and understood thoroughly before attempting any installation, operation and maintenance. Failure to follow any of these instructions could result in a malfunction or failure of the gauge valves, resulting in leakage and physical injury to personnel.

Features and Specifications

John C. Ernst valve sets are supplied in pairs, which consist of an upper and lower valve, that secure each end of a vertically placed tubular gauge glass. The complete assembly of valves and gauge glass creates a gauge that visually indicates accurate liquid level and characteristics. Unless requested otherwise, all valve sets include the following features:

- Straight pattern design
- 1/4" Vent and Drain ports with plugs

- Ball checks in Non-steam applications to prevent media loss

These valves are suitable for steam-water applications in the following configuration:

- **Non-Automatic** – Non-Standard Configuration (will not retain media if glass breaks) Ball checks are removed from both valves.

Design Ratings at Maximum and Minimum Operating Temperatures

To determine maximum allowable working pressures at specific temperatures, the user should refer to 'Quick Product Specs', the valve set drawing, and the specific design limits on the John C. Ernst LLC. product proposal. All ratings are limited to the Glass & Gasket pressure & temperature limitations.

II. INSPECTION

Receiving Inspection

Upon receipt of gauge valve set, check all components carefully to ensure that damage did not occur. If damage is evident or suspected, do not attempt installation.

End User's Rating Inspection

The user(s) must confirm that:

1. The operating conditions described in the purchase order agree with the actual operating conditions at the installation site.

2. The materials of construction at the installation site are within the application data shown on the John C. Ernst Company Drawing or product proposal.
3. The materials of construction of the gauge valves are compatible with both the contained fluid and surrounding atmosphere in the specific application.

III. INSTALLATION

Installation should only be performed by qualified and experienced personnel who are 1) familiar with this equipment and 2) have read and understood all instructions in this manual.

⚠ WARNING

Only qualified personnel who are familiar with gauge glass valves and their operation should undertake installation of this product. Failure to properly install could result in serious injury and property damage.

⚠ CAUTION

Under no circumstances should these valves be used for Steam-Water applications unless the ball checks have been removed from both lower and upper valves.

The user should refer to the John C. Ernst LLC. product proposal or drawing to obtain dimensional information for the specific size and model of the valve set.

Mounting

1. Prior to installation, turn hand wheel (028) of each valve clockwise to closed position.
2. Install upper valve (the one with a deep glass insertion hole) and the lower valve to vessel using Teflon® tape or equivalent thread sealing compound as shown in **Figure 1**.
3. Tighten valves making certain that the gauge glass connections aligned vertically.

Sight Glass Installation

1. Turn upper valve approximately 1/8 of a turn counter-clockwise and loosen the glass packing nut (037) to insure there is no compression on the on the glass packing seal (034).
2. Insert the tubular level gauge into the upper valve sight glass connection.
3. Tighten the upper valve to its original position while holding the tubular level gauge in position to ensure it clears the lower valve sight glass connection.
4. Loosen the glass packing nut (037) on the lower valve and lower the tubular level gauge down into the lower valve sight glass connection to a positive stop.
5. Tighten both glass packing nuts (037).

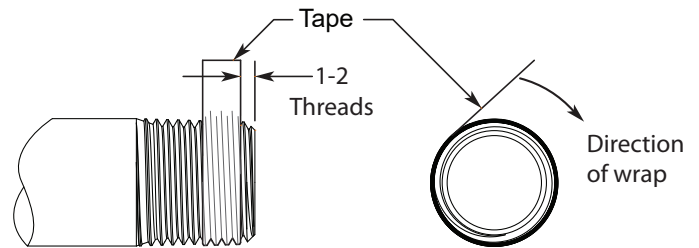


FIGURE 1

IV. OPERATION

Pre-Operational Check

- Assure that all installation procedures have been completed.
- Check to determine that all connections are pressure tight.
- Valves should be opened slightly to avoid thermal shock or mechanical stress on the tubular level gauge.

Hydrostatic Test

Take all precautions necessary to handle the possibility of leakage during the test.

Pressure test assembly to 1/2 the required pressure, and repair any leakage before proceeding.

Operating

If the valves are furnished with ball checks, the valves must be opened all the way after the pressure and temperature have equalized, to permit operation of the automatic ball check in the event of gauge failure.

V. MAINTENANCE

Maintenance should only be performed by qualified and experienced personnel who are familiar with this equipment and have read and understood all instructions in this manual.

During system shut down, the gauge valves should be left open to permit the gauge to lose pressure and cool with the rest of the system. Failure to do so will trap high-pressure fluid in the gauge.

Preventative Maintenance

On all installations, the user should regularly evaluate for signs of:

- Leakage around stem area
- Internal stem leak
- Leakage around stuffing box connection
- Internal or external corrosion

The user must have maintenance schedules, safety manuals and inspection details created for each application and valve set. These must be determined based on evaluation of the maintenance team's operating experience, for what's necessary for the specific application. Realistic maintenance schedules can only be determined with full

knowledge of the services and application unique to each installation.

Servicing

Use the exploded view (Page 4), in the spare parts index, to assist in following the steps ahead.

Disassembly

For stem packing servicing:

1. Ensure vessel is drained of all liquid.
2. Close upper and lower valves, remove upper and lower pipe plugs, and allow valves to drain.
3. Remove hand wheel screw, washer, nameplate and hand wheel from stems.
4. Loosen and remove stem packing nut.
5. Then remove stem by turning counterclockwise.
6. Once the stem has been removed, slip stem packing retainer from stem.

For glass packing seal servicing:

1. Loosen both upper and lower glass packing nuts.
2. Slide tubular gauge upward into the upper valve until the bottom of the tubular level gauge clears the sight glass connection of the lower valve.

3. While holding the tubular level gauge in this upward position, rotate the upper valve approximately 1/8 turn to allow clearance to remove tubular level gauge from the upper valve.
4. Once tubular level gauge has been removed, remove glass packing nuts, glass packing seal and glass packing retainer.

Reassembly

1. Clean all packing areas and glands.
2. Install new stem packing into stem packing nut.
3. Ensure that slits in stem packing are offset 180° from each other to ensure a proper seal.
4. Slip stem packing retainer and stem packing nut onto stem.
5. Assemble hand wheel onto stem and secure with screw and washer.
6. Thread stem assembly into valve by turning clockwise until the stem seats and back off one turn.
7. Now tighten stem packing nut.
8. Install new glass packing seal, glass packing retainer, and glass packing nut onto the valves.
9. Once these steps have been followed, reinstall the tubular level gauge into the gauge valve set previously detailed.

Troubleshooting

Problem: *Leaking around stem*

Solution:

- Often corrected by tightening the stem packing nut in 1/4 turn increments until leak stops. If leakage persists replace stem packing by following steps discussed in disassembly.

Problem: *Leakage around gauge glass*

Solution:

- If tightening in 1/4 turn increments does not stop leak replace glass packing seal (034) by following steps discussed in disassembly.

Problem: *Signs of internal or external corrosion*

Solution:

- An immediate investigation should be carried out to determine the cause. This could be an indication of misapplication.

Problem: *Broken gauge glass*

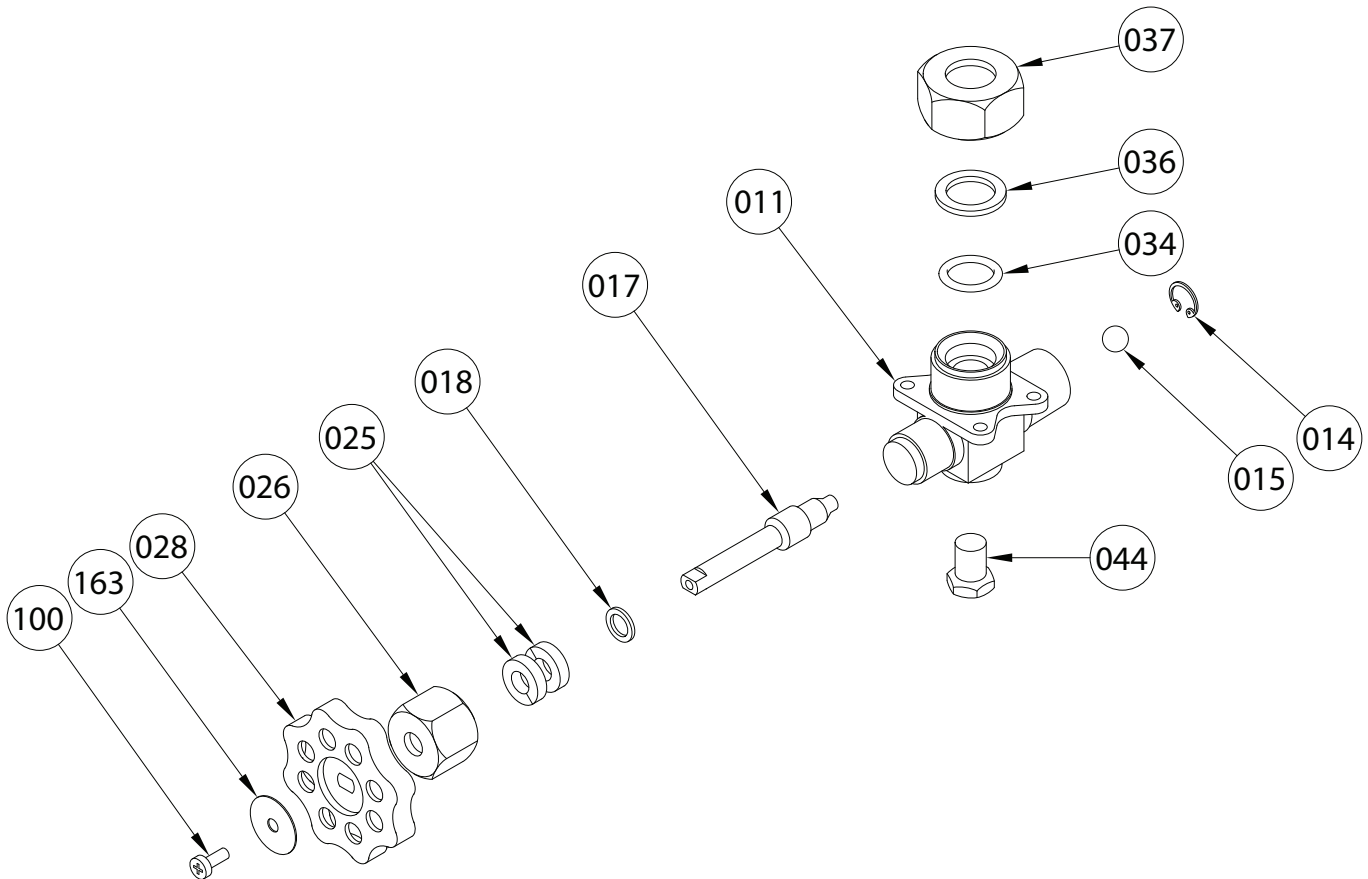
Solution:

- Follow valve disassembly for glass packing seal, steps 1 to 3. Once glass has been removed, follow installation instructions.

VII. SPARE PARTS INDEX

Part Number Reference			
NO.	Name	NO.	Name
010	Upper Valve Body (Not Shown)	044	Drain Plug
011	Lower Valve Body	026	Stem Packing Nut
014	Retainer, Ball Check	028	Handwheel
015	Ball Check	036	Glass Packing Gland
017	Stem	037	Glass Packing Nut
018	Retainer, Stem Packing	100	Handwheel Screw
025	Packing, Stem	163	Name Plate
034	Gasket, O-Ring		

* - Standard Material



LIMITED WARRANTY

Period of Coverage

The John C. Ernst LLC. expressly warrants products to the original purchaser to be free from defects in the material and workmanship for 12 months from date of shipment. John C. Ernst LLC. will, at its option, replace or repair any products which fail during the warranty period due to defective material or workmanship. Evaluations, repairs, and replacements will most often occur in Sparta NJ 07871 USA, or another facility determined by the John C. Ernst LLC.. The warranty does not cover costs required to transport warranted units to or from the John C. Ernst facility.

Limitations

The responsibility of the John C. Ernst LLC. is hereunder limited to repairing or replacing the product at its expense. This warranty shall not apply if the product has been disassembled, tampered with, repaired, subjected to misuse, neglect, accident, or otherwise altered in any way. The warranty does not guarantee products against normal wear, glass breakage, clouding, or corrosion. The John C. Ernst LLC. shall not be liable for loss, shipping costs, damage, or expenses related directly or indirectly to the installation or use of its products. It is expressly understood that the John C. Ernst LLC. is not responsible for damage or injury caused to other products, buildings, personnel, citizens, or property by reason of the installation or use of its products.

Advertised ratings apply only to units serviced with parts supplied by the John C. Ernst LLC. Use of parts during maintenance from other companies will void the warranty. Service must be done in accordance with the instructions of the product that is being serviced.

THIS IS JOHN C. ERNST, CO'S. SOLE WARRANTY AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED WHICH ARE HEREBY EXCLUDED, INCLUDING IN PARTICULAR ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WE WILL NOT BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY NATURE.

How to get Warranty Service

Prior to submitting any claim for warranty service, the owner must submit proof of purchase, and obtain written authorization to return the product. All returns must be sent back with an MSDS for the application that the product was used in, and with a maintenance log of all service including inspections. Thereafter, the product shall be returned to the John C. Ernst LLC. with freight paid and packaged to prevent damage in transit. Should damage in transit occur the John C. Ernst LLC. will not be held liable.

GENERAL PRESERVATION

Recommended Practice for Long Term Storage of John C. Ernst Products

1. All units should be inspected upon receipt to ensure that no damage has been incurred during transit. If there has been damage, a claim should be filed with the carrier immediately. Units 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. Care should be taken to protect the glass and the end connections from damage. Avoid placing any objects directly on the glass(es) at any time.
2. Units should be checked to ensure that they contain no foreign matter and that the end connections are clean, undamaged, and in line with adjoining piping. Examine each glass carefully using a flashlight for any indications of chips, scratches, blemishes or cloudiness. Inspect for scratches, shining a bright concentrated light (powerful flashlight will suffice) at about a 45° angle. Any scratch that glistens and catches a fingernail, or star or crescent-shaped mark that glistens, is cause for replacement. Process surface that appears cloudy or roughened, after cleaning, is evidence of chemical attack and is cause for replacement. If any type of flaw is apparent, the unit should not be installed until the glass and gaskets have been replaced. Follow the torquing recommendations given by the gasket and piping manufacturers to achieve proper sealing pressures.
3. Some products are shipped unassembled, as they are to be welded into position and then assembled. Individual pieces should be carefully stored in a manner to avoid damage until installation. The glass requires special attention. It should not be stored or mixed with objects that may cause damage and should remain wrapped or boxed until assembly.
4. Gaskets frequently assume a compression-set over a period of time. Some materials, however, may compress/relieve or creep. Visually inspect the gaskets for gaps or looseness before start-up. If the gaskets are not compressed, adjust the unit gasket compression. Do not tighten any fasteners or clamps while the unit is in operation.
5. Periodic visual inspection should be made to ensure that no leaks are evident and that there is no clouding, scratching, or blemishing of the glass. Keep glasses clean using commercial glass cleaners. Cleaning should be done without removing glass. This may require recirculation of cleaning material if process side of glass is not accessible. Never use harsh abrasives, wire brushes, metal scrapers, or anything that may scratch the glass. Do not attempt to clean glasses while equipment is in operation.
6. Should leaking around the glass occur, first check the glass for damage. If the glass appears to be in good condition, the gasket seal should be checked, but only after the system pressure has been brought down to zero. If the gasket appears to be loose, or hardly compressed, the spacers must be adjusted. If the leak persists after repressurizing, disassemble and replace the gaskets.
7. Glass, shields and gaskets that have been removed, **MUST BE REPLACED**. Used parts may contain hidden damage. Induced stress in glass and de-tempering are **NOT** visible to the naked eye. Be sure that the replacement glass is proper for the service.
8. Inspect protective coating (if applied) for chipping.
9. Store within the temperature extremes of the nameplate or specification documents – do not expose to direct sunlight or other UV sources.
10. Products should be stored off of the floor on suitable skids, pallets, or racks and protected from dirt, debris, and exposure to direct sunlight, particularly to soft sealing surfaces.
11. Store in a cool dry place, room temperatures between 40°F - 80°F with a relative humidity level between 40 – 75%.
12. Store in dry areas, avoiding any contamination with any liquids. Products should be kept in a clean, heated, weather-tight (dry), well ventilated facility.
13. If a flanged product is to be stored for any extended period of time, the flange or end protector should be examined to ensure they are fastened securely, and any other open areas should be sealed to prevent any moisture damage.
14. Product assemblies with electrical components, pneumatic tubing, positioners, actuators, and other accessories should be protected from impact.
15. Useful Life When Stored:
 - a. Unit: Indefinite, based on ideal storage conditions.
 - b. Spare Gaskets: Indefinite, based on ideal storage conditions.
 - c. After 9 months, the torque of the bolting should be checked as the gasket relaxes. This should be done for units not in service as well as those installed in process.
 - d. The useful life of the material, when the storage conditions differ from the recommended factors is not known. It has been established, however, that room temperature has a significant influence on the shelf life of material.
 - e. Spare Gaskets should be stored flat.
16. Periodical checks at least every 6 months have to be carried out in the storage area to verify that the above mentioned conditions are maintained.

If there are any questions or concerns, please contact the John C. Ernst LLC. Sales Office at 888-943-5000.

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