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JOHN C. ERNST LLC
PROCESS OBSERVATION SOLUTIONS
GAUGE VALVES

INSTALLATION, OPERATION & MAINTENANCE MANUAL
FOR SERIES: **V11B**

STYLES
450, 458,
459, & 460

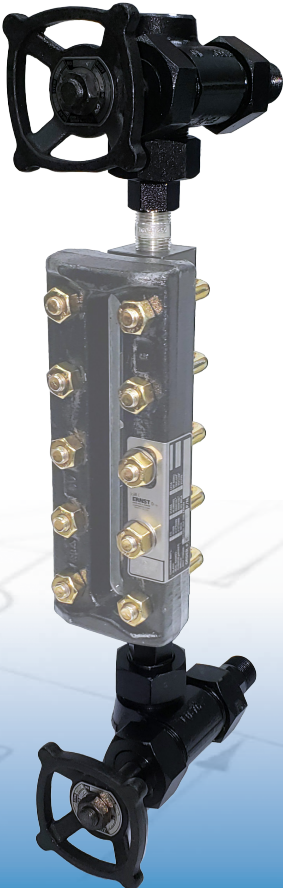


TABLE OF CONTENTS

I. INTRODUCTION	1
SYSTEM DESCRIPTION	
DESIGN RATINGS AT MAXIMUM AND MINIMUM OPERATING TEMPERATURES	
II. INSPECTION	2
RECEIVING INSPECTION	
USER RATING INSPECTION	
III. INSTALLATION	2
PIPING STRAIN	
DIFFERENTIAL THERMAL EXPANSION	
MOUNTING	
IV. OPERATION	3
HYDROSTATIC TEST	
V. MAINTENANCE	3
PREVENTATIVE MAINTENANCE	
DISASSEMBLY	
STEM PACKING REPLACEMENT	
VALVE SEAT REPLACEMENT	
REASSEMBLY	
TROUBLESHOOTING	
LIMITED WARRANTY	5
GENERAL PRESERVATION	5

PRODUCT QUICK SPECS.

Features	Style/Gauge Connection							
	458 Union	458 Rigid	459 Union	459 Rigid	450 Union	450 Rigid	460 Union	460 Rigid
Straight Pattern	•	•	•	•				
Offset Pattern					•	•	•	•
Integral Stem Sleeve	•	•			•	•		
Union Stem Sleeve			•	•			•	•
Union Gauge Connection	•		•		•		•	
Rigid Gauge Connection		•		•		•		•
Renewable Seat			•	•			•	•

Style	Material of Construction	Maximum Allowable Working Pressure
		Graphite packing
450 & 458	Carbon Steel or STS	2400 PSIG @ 100°F; 1323 PSIG @ 800°F Not Recommended for Steam
459 & 460	Carbon Steel or STS	4000 PSIG @ 100°F; 1308 PSIG @ 800°F Saturated Steam: 600 PSIG @ 489°F

For other materials or connections consult John C. Ernst LLC., Inc.

I. INTRODUCTION

This manual has been prepared as an aid and guide for personnel involved in installation or maintenance. All instructions must be read and understood thoroughly before attempting any installation, operation, or maintenance. Failure to follow any instruction could possibly result in a malfunction of the valve with resulting sudden release of pressure, property damage or physical injury to personnel.

NOTICE

John C. Ernst Company does not have control over the manner in which its gauge valve set is handled, installed, or used, and John C. Ernst Company cannot and does not warrant or guarantee that a gauge valve set is suitable or compatible with the user's specific application.

WARNING

Vessel Fluids may be pressurized and can unexpectedly exit vessel connections due to apparatus or material failure. Safety glasses should be worn when installing a gauge valve. Failure to do so could result in serious physical injury to personnel or property damage.

John C. Ernst gauge valves are used to isolate gauge glass, magnetic gauges or other apparatus from the holding or pressure vessel when it becomes necessary to drain and service the gauge. John C. Ernst Series 450 G valves are supplied in pairs (upper and lower) and are available with socketweld, flanged and NPT connections.

Valves for process use should include the ball check shut-off feature. Valves without the ball check shut-off feature will not automatically stop leakage of contained fluid in the event of accidental gauge glass breakage.

System Description

John C. Ernst armored valves are comprised of six basic components. Each component may vary slightly, depending on the desired physical and mechanical properties for the valve.

Body - a pressure retaining structure through which liquid passes to enter a gauge glass or other apparatus. Provides a rigid, union or spherical union connection to the vessel and seating surfaces for most valve components. Series 458 G and 459 G are straight pattern bodies; Series 450 G and 460 G are offset pattern bodies.

Ball Check - Spheres installed loosely within the body of the valve that seat to prevent significant leakage when a differential pressure surge occurs (e.g., mechanical failure). Ball checks for ASME steam service incorporate a vertically rising lower and leaky horizontal upper or omit ball checks completely.

Trim - wetted parts that mechanically control the liquid path from the vessel to the gauge glass or other apparatus. The ball and stem act to seal and release the liquid. In the event of mechanical failure, the ball will seat to prevent large quantities of the contained fluid from exiting the vessel. Liquid is allowed to exit the vessel into the gauge glass or other apparatus when the stem is screwed away from its seated position. The liquid is sealed when the stem is screwed into its seated position. The stem-packing retainer provides a compression surface between the process liquid and the stem packing. A stem-packing gland is used to compress the packing against the retainer and around the stem to prevent leakage.

Stem Packing - under compression the stem packing is forced to mold around the stem and prevent leakage of media during operation.

Gauge Connection - provides connection between the valve and the gauge glass or other apparatus. A union, spherical union or rigid connection may be used. A union connection can move in a plane parallel to the vessel connection.

Handwheel/Lever - rotated to engage threads and provide screw action of stem.

Design Ratings at Maximum and Minimum Operating Temperatures

To determine the maximum allowable working pressure for a specific temperature within the design limits, see page i for "Product Quick Specs", refer to a John C. Ernst product drawing, or the specific design limits of the John C. Ernst LLC. design product proposal.

WARNING

NEVER exceed these design ratings or application data. Exceeding design ratings or application data may result in mechanical failure of valve components resulting in serious personal injury and/or property damage.

II. INSPECTION

Receiving Inspection

Upon receipt of a gauge valve set, check all components carefully for damage incurred in shipping. If damage is evident or suspected, do not attempt installation. Notify carrier immediately and request damage inspection.

User Rating Inspection

The user should confirm that:

- The gauge valve set model number and pressure/temperature rating stamped on nameplate conforms to the description on the user's purchase order.
- The operating conditions described in the purchase order agree with the actual operating conditions at the installation site.

- The actual operating conditions at the installation site are within the applications data shown on the John C. Ernst Technical Data Bulletin or product proposal referred to previously;
- The materials of construction of the gauge valve set are compatible with both the contained fluid and the surrounding atmosphere in the specific application.

CAUTION

If the size, model, or performance data of the gauge valve set as received does not conform to any of the criteria above, do not proceed with installation. Contact John C. Ernst for assistance. The incorrect valve can result in unacceptable performance and potential damage to the gauge.

III. INSTALLATION

DANGER

John C. Ernst valves are not to be used for indicating the level of lethal substances as defined by ASME Section VIII.

Qualified personnel who are familiar with this equipment should only undertake installation. They should have read and understood all of the instructions in this manual. The user should refer to John C. Ernst dimension sheets or John C. Ernst product proposal to obtain dimensional information for the specific size and model gauge valve.

John C. Ernst recommendations on gauge valve installations are not necessarily related to the installation of flat glass liquid level gauges. The number of different types of gauge and valve installation is too great to adequately explain in an installation manual. Therefore, it is the user's responsibility to assure that knowledgeable installation personnel plan and carry out the installation in a safe manner. The following procedures are some of the guidelines that should be employed.

Piping Strain

The gauge valve should be mounted and connected so that it can support the gauge without binding. Torsional stresses can make it difficult or impossible to seal tailpipes. Although union connection will allow marginal errors in piping alignment, misalignment can still create unusual strain on connectors.

Support brackets should be considered if the gauge is over 4 feet in length or over 100 Lbs of weight especially when exposed to vibration. Gauges not properly supported by brackets may subject the gauge valve to stresses that can cause leaks or mechanical failure.

Differential Thermal Expansion

High mechanical loading may be imposed on a gauge valve by expanding and contracting gauges due to hot or

cold service. Controlling process conditions in the system must minimize such mechanical loads on the valve.

NOTICE

When installing liquid level gauges, always provide shut-off valves between gauge and vessel. Valves equipped with automatic ball checks are recommended to provide protection against physical injury and loss of product if glass failure should occur.

Mounting

1. Prior to installation, turn the handwheel of each valve clockwise until the stem closes against the seat.
2. Remove union vessel connections from valves, where applicable, and apply heavy grease (where allowable) to tailpipe seat.
3. Wrench tighten tailpipes of upper and lower valves to the vessel using Teflon® tape, or equivalent, on all male tapered pipe thread connections as shown in Figure 1. If valve is flange or weld mounted, use proper industry standard procedures.
4. If installing with a flat glass gauge, follow all installation instructions for the specific liquid level gauge as there are many points to consider on gauge installation among them, piping strain differential thermal expansion, weight, and bolt torque.
5. Install gauge tailpipes to union gauge connections, where applicable, making sure that the coupling nuts are in place.

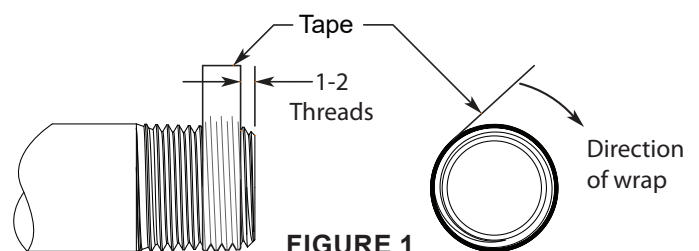


FIGURE 1

IV. OPERATION

Before initializing gauge valve operation, check that all installation procedures have been completed. Use only qualified, experienced personnel who are familiar with valve equipment and thoroughly understand the implications of the tables and all the instructions. Check to determine that all connections are pressure tight.

For protection during shipments, packing gland is loosened and the stem is in the open position. Adjust stem and packing after installation. Do not tighten more than enough to stop leakage.

Hydrostatic Test

Take all precautions necessary to handle the possibility of leakage during the test. Hydrostatic pressure test all installations to 100 PSIG and correct any leakage proceeding.

⚠ CAUTION

Rapid opening of valves can cause glass breakage and/or possible injury to personnel.

⚠ WARNING

Valve installations should be brought into service slowly. Valves should be opened slightly, and the valve assembly temperature and pressure allowed to slowly equalize. If the valves are equipped 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 failure. Failure to follow the recommended operating procedures can result in severe personal injury and property damage.

⚠ CAUTION

While the valves are in operation, they must be in their fully open position. A partially open valve will prevent automatic ball checks from seating which could result in physical injury and loss of product.

V. MAINTENANCE

⚠ WARNING

Use only qualified experienced personnel who are familiar with liquid level gauge equipment and thoroughly understand the implications of all of the instructions. DO NOT proceed with any maintenance unless the liquid level gauge has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature and has been drained or purged of all fluids. Failure to do so can cause serious personal injury and property damage.

The user must create maintenance schedules, safety manuals, and inspection details for each gauge valve. These will be based upon the users own operating experience with their specific application. Realistic maintenance schedules can only be determined with full knowledge of the services and application situations involved.

⚠ WARNING

During system shutdown, the valves should be left open to permit the gauge to lose pressure and cool with the rest of the system. Failure to leave the valve open during system shut down may trap high-pressure fluid in the gauge.

Preventative Maintenance

On all instructions the user for purposes of maintenance should regularly evaluate the following items:

- Leakage around stem area
- Internal stem leak
- Leakage around union connections
- Internal or external corrosion

The user must determine upon evaluation of his or her own operating experience an appropriate maintenance schedule necessary for his or her specific application. Realistic maintenance schedules can only be determined with full knowledge of the services and application situation involved.

Ball Check Shut-off

An operational check can be performed on the valve ball checks by closing both the upper and lower valve stems completely. Drain contents from and relieve pressure on liquid gauge to an appropriate safe container/area. NOTE: Some loss of process fluid to the drain line is expected with this test procedure.

⚠ CAUTION

Ball checks, when installed, may fail to seat due to corrosion of the ball or seat, foreign material in ball chamber or viscous material in the ball chamber. A routine operational test of the ball check can prevent significant seepage of liquid in the event of glass breakage.

With drain line still in place, open BOTTOM valve as rapidly as possible. Listen for "click" sound that will indicate that the ball has seated. If possible, observe the quantity of flow from the drain line. Flow should either stop completely or be no greater than single drips (no solid stream). Close lower valve. Repeat above procedure for UPPER valve. There must be a pressure differential of at least 5 psi for the above procedure to work properly.

If the above procedure is not successful, the only alternative is to isolate the gauge and valve assembly from the vessel or to shut the process down completely. Visibly inspect ball check and ball seats in the valve body. Remove

any foreign matter and/or replace with new ball checks if inspection indicates this is required. If the ball seat is damaged, consider replacing the valve or the seat (if it is removable).

⚠ WARNING

Prior to any disassembly of valve, first be sure that the valves are relieved of all internal pressure, temperature is ambient, and has been drained and/or purged of any fluids. Failure to do this may result in a sudden release of pressure and/or physical injury to personnel.

⚠ WARNING

When gauge fails causing the ball check to seat, closing the valve will allow fluid to flow from the vessel. During that time, when the stem pushes the ball check off the seat and before the stem seats, the operator may be hurt if not careful or fires could result if hazardous liquids are involved.

Disassembly

1. Close valves and drain fluids.
2. Remove handwheel nut, nameplate and handwheel or lever from stem.
3. Disengage packing gland/bonnet nut.
4. Remove Stem assembly by turning counter-clockwise, leaving gland, packing, and retainer on the stem.

Stem Packing Replacement

1. Slid off packing gland, and set aside.
2. Remove and discard old packing.
3. Insert new packing.
4. Slid the packing gland, then packing gland nut onto stem.

Valve Seat Replacement

(459 G & 460 G Only)

1. Using a standard 5/8" socket wrench remove seat.
2. Before replacing seat apply lubricant to the threads to prevent seizure of metals.
3. The seat is then replaced and tightened well to prevent leakage.

Reassembly

1. Reinstall the stem assembly by turning clockwise until it stops then backing off about one turn counterclockwise.
2. Tighten packing nut onto the valve.
3. The packing gland nut should be tightened enough to stop leakage around the stem without causing excessive binding of stem during operation.
4. Replace the handwheel or lever onto the stem, followed by the nameplate, then thread and tighten the handwheel nut.
5. Close both valves clockwise until stem seats.
6. Refer to Section IV. Operation for returning gauge valve to service.

Troubleshooting

Problem: *Stem Packing Leak*

Solution:

- Can often be stopped by tightening the stem-packing nut.
- If leak persists, the stem packing should be replaced

Problem: *Leak Around Union*

Solution:

- Tighten union coupling nut
- Remake connection using Teflon® tape, or equivalent, on all male pipe threads as shown in **Figure 1**.

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, LLC'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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