

## Vessel Doors

- Maintain paint as per the vessel body.
- Visually inspect the Viton O-ring with each use of vessel. The O-ring should be **lightly** coated with **halogenated grease**. **Immediately replace** the O-ring if it shows **any** excessive wear or deterioration.
- Visually inspect both sealing faces of the closure with each use of the vessel. Both faces must be kept clean and free of any dirt or foreign material. Wipe the faces clean with a soft cloth, then apply a **very thin** coating of **halogenated grease** to prevent corrosion.
- At least annually clean and lubricate with Never Seez Regular Grade Anti-Seize & Lubricating Compound .
- As needed, remove surface rust on the inside of the yoke by spraying a small amount of Next Safety Solvent and wiping clean. A light sanding with steel wool will smooth out the surface. **Do not apply any lubricant to the inside of the yoke.**

# HINGED CLOSURES

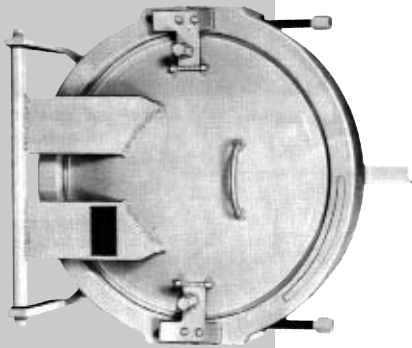


For Blanking Off  
Pipeline Ends,  
Tank and  
Vessel Openings

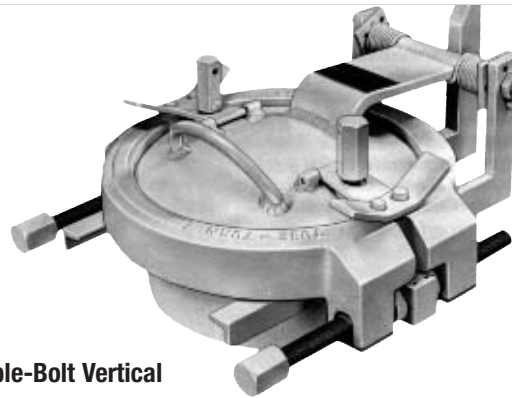
# GENERAL SIZES CLASSES

Hinged Closure Styles and Sizes			
Nomenclature	Type or Class	Nominal Sizes	Service/Rating
Double Bolt Horizontal	150H	8" - 42"	150lb (285 PSI)
	300H	8" - 42"	300lb (740 PSI)
	600H	8" - 42"	600lb (1480 PSI)
	900H	8" - 42"	900lb (2220 PSI)
	1500H	8" - 36"	1500lb (3705 PSI)
	2500H	8" - 24"	2500lb (6170 PSI)
Double Bolt Vertical *	150V	8" - 42"	150lb (285 PSI)
	300V	8" - 30"	300lb (740 PSI)
	600V	8" - 30"	600lb (1480 PSI)
	900V	8" - 24"	900lb (2220 PSI)
	1500V	10" - 20"	1500lb (3705 PSI)
	2500V	10" - 16"	2500lb (6170 PSI)
Single Bolt Closure	150S	2" - 8"	150lb (285 PSI)
	300S	2" - 8"	300lb (740 PSI)
	600S	2" - 8"	600lb (1480 PSI)
T-Bolt Hinged Closure	75 TB Horizontal	10" - 48"	see page 22
	150 TB Horizontal	6" - 48"	see page 22
	300 TB Horizontal	6" - 42"	see page 22
	75 TB Vertical	10" - 42"	see page 22
	150 TB Vertical	10" - 36"	see page 22
	300 TB Vertical	10" - 36"	see page 22

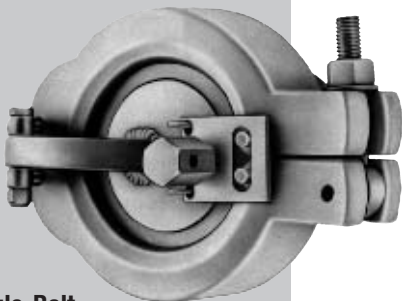
\* Larger Sizes Available with Counter Balanced Head with Weights.



Double-Bolt Horizontal



Double-Bolt Vertical

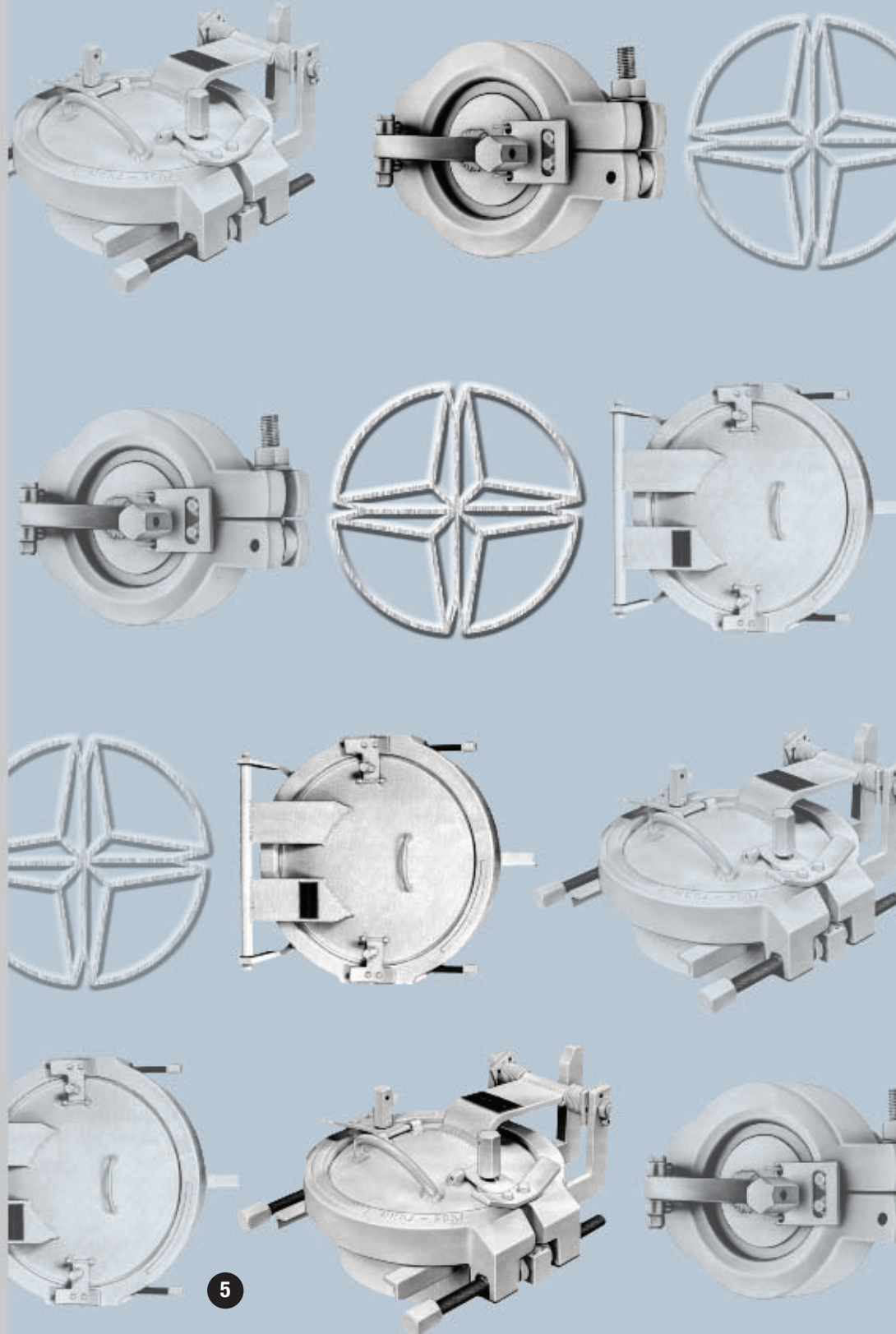


Single-Bolt



T-Bolt Hinged Closures

# YOKE STYLE CLOSURES



# DOUBLE BOLT YOKE CLOSURES

The Tube Turns Double Bolt Yoke Style Closure is compact in size and functional in design. A typical unit consists of a forged hub, a hinged blanking head, split-yoke clamps, operating bolts, and a self-energizing O-ring gasket. Materials of construction are in accord with ASME specifications and manufacture complies with applicable rules of the ASME Code for Pressure Piping and with the ASME Boiler and Pressure Vessel Code.

## Size and Rating

Double-bolt yoke style hinged closures are available in pressures ranging from 285 PSI to 6170 PSI and can be used in a horizontal or vertical application. They are furnished in Carbon Steel, Stainless Steel, Low Temperature materials and other alloys depending upon availability of raw material. Adding further to the completeness of Tube Turns Hinged Closures is the availability of standard designs in sizes, 2" to 42" in carbon steel, stainless steel, and other alloys. Sizes up to 72" O.D. have been produced on special orders.

## Materials of Construction

Standard construction material is Carbon Steel made to ASME specifications i.e. SA105 or SA106 grade B/C for the hub, SA516 grade 70 or SA105 for the head, SA105, SA106 Grade B/C or SA352 LCB for

the yoke, SA193 Grade B7 for yoke bolts and SA36 for structural components. Buna-N O-ring material is furnished unless another material is specified. Yoke bolts are fluorocarbon coated to lubricate the threads and prevent rust and corrosion of these working parts.

Tube Turns Hinged Closures can be equipped with sight glasses, drains, gauges, sampling ports, etc. The size and number of such openings is dependent upon the thickness of the closure head and whether threaded or socket-weld openings are utilized. Since the welding of sight glass frames, nipples, couplings and other appurtenances to the closure head or hub may result in distortion unless precautionary measures are taken; these attachments should be added at time of manufacture.

## Faster, Easier Operation

Operation is smooth and direct, and even the largest unit can be opened or closed in a matter of minutes. Turning of the actuating bolts - accomplished by one man using only standard hand tools - spreads the yoke halves until they are fully separated, allowing the head to be swung open on its hinge. There is no need to tug or hammer at bulky flanges or heavy metal doors...or to struggle with bulky lugs and threads. Contact surfaces of the clamping yokes,

head and hub are tapered and when the head is closed and the yoke bolts are tightened, the head and hub are wedged together, compressing the O-ring and effecting a leakproof seal.

## Maintenance Minimized

The standard gasket for Tube Turns Hinged Closures is an oil-resistant O-ring that is stationary when the head is being opened or closed. There is no rubbing or chafing that could cause undue wear and shorten seal life. The yokes separate evenly via the use of two yoke bolts preventing wear on the yoke contact surfaces. The yoke bolts are coated with fluorocarbon to lubricate the threads and to prevent rust and corrosion of these working parts.

Many of our closures manufactured as far back as the 1960's are still in operation only requiring periodic replacement of spare parts. Tube Turns keeps a serialized record of each closure to allow easy identification of replacement parts.

The Tube Turns Hinged Closure is remarkably easy to install, too...a single circumferential butt weld joining the closure hub to the pipe end or vessel nozzle does the job. Complete installation, operating and maintenance instructions are furnished with each Tube Turns Hinged Closure and additional copies are available upon request.



Typical of Tube Turns Yoke Type Hinged Closures being used with scraper traps.

# DOUBLE BOLT YOKE CLOSURES

## Yoke Style Closures Allowable Working Pressures (Ratings)

In general, the pressure classes established for Tube Turns Hinged Closures refer to ASME/ANSI B16.5 ratings used in normal piping terminology. This is done as a matter of convenience to give the engineer a clear understanding of service limitations and the exact Hinged Closure design required for a particular application.

Maximum allowable working pressures for carbon steel Tube Turns Yoke Type Hinged Closures are:

Closure Pressure Class	ASME/ANSI Service to 450 °F
150	285
300	740
600	1480
900	2220
1500	3705
2500	6170

## O-Ring Materials

The maximum temperatures are based on 100% compression set in 1000 hours. The O-rings may be used at higher temperatures but with an undetermined decreased life.

**“Buna-N”** - General service. Resistant to petroleum-base hydraulic and lubricating oils; animal and vegetable oils; gases such as butane, propane, acetylene and natural gas; aromatic and nonaromatic fuels such as gasoline, kerosene, diesel fuel and fuel oils; anhydrous ammonia, and water. Temperature limits: -30F to 250F; special compounds suitable for -65F.

**“Viton”** - Generally used for high-temperature services. Resistant to synthetic lubricants, petroleum-base products, some chlorinated solvents, benzene, toluene, and many acids and alkalis. Temperature limits: -20F to 400F.

### “Ethylene Propylene”

Superior resistance to phosphate-ester type fluids, Skydrol, Pydrol, Cellulubes and glycol type coolants. Excellent resistance to mild acids and alkalis. Can be used in steam service. Replacing butyl rubber in most applications. Temperature limits: -70F to 300F.

**“Silicone Rubber”** - Good resistance to high and low temperature dry gases, air, oxygen and ozone. May be satisfactory in high-aniline oils, but not recommended for use with most petroleum base products. Temperature limits: -65F to 450F.

**Note: Determination of compatibility of O-ring material with medium is the responsibility of the purchaser.**

## ASME Code-Stamped Closures

Code stamping of Tube Turns Hinged Closures is available on request at a nominal extra cost. This includes (1) the furnishing of a Partial Data Sheet verifying shop inspection of the unit by a commissioned inspector of the National Board of Boiler and Pressure Vessel Inspectors, and (2) the affixing of the ASME stamp.

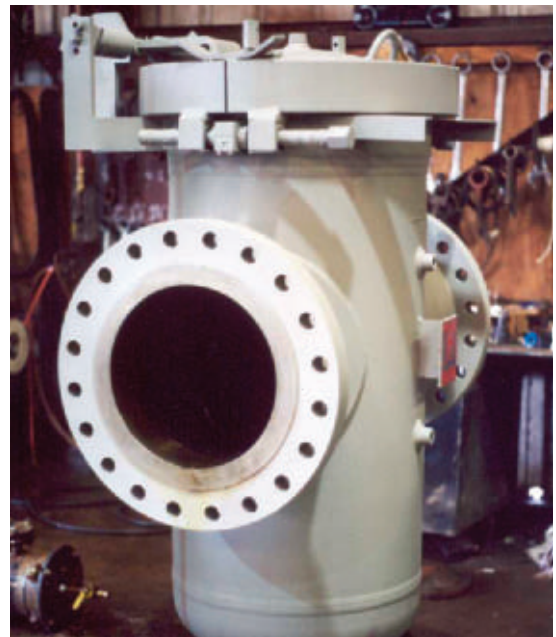
## Manufacturer’s Statement of Code Compliance

In the event that shop inspection and stamping in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code is not required, Tube Turns can furnish a Manufacturer’s Statement of Code Compliance. This document affirms that the Hinged Closure is manufactured in accordance with the applicable requirements of the Code.

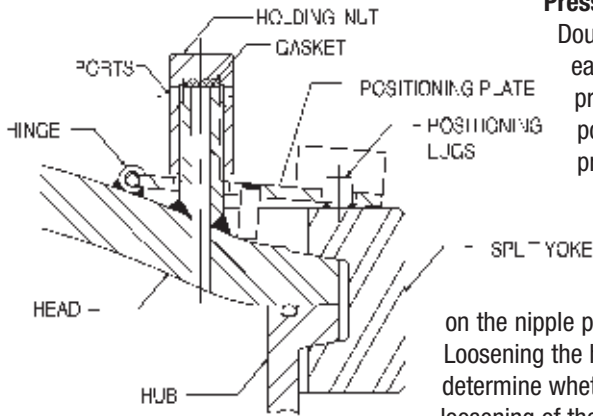
## Ordering Data

When inquiring and/or purchasing Tube Turns Hinged Closures, please specify the following:

1. Quantity required
2. Size required
3. Material required
4. Design conditions - both pressure and temperature
5. Minimum design metal temperature - the lowest temperature to which closure will be subjected.
6. Application - horizontal (opens like a car door) or vertical (opens like a car hood)
7. Bore (wall thickness) required
8. ASME code stamp and partial data reports required
9. O-ring materials required
10. Corrosion allowance if applicable.



# DOUBLE BOLT YOKE CLOSURES

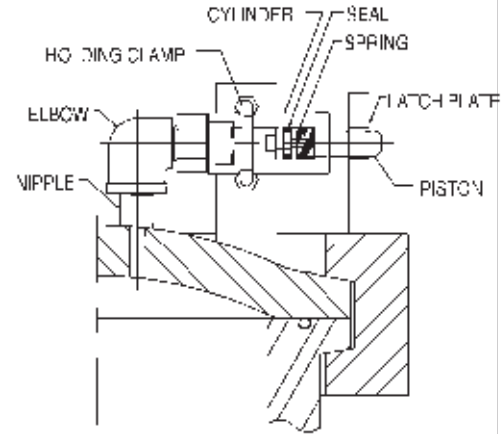


## Pressure Warning Device With Yoke Positioning Plate

Double Bolt Yoke Closures are equipped with 2 pressure warning devices on each closure. The Pressure Warning Device with yoke positioning plate provides visual and mechanical assurance that the yokes are in the correct position over the head for commencement of operations. Additionally, the pressure warning device serves the purpose of alerting the operator to any residual pressure in the vessel should the operator inadvertently attempt to open the closure before all pressure has been relieved. A pressure warning device is located at each of the yoke splits with one of the positioning lugs attached to each yoke half. Tightening the holding nut on the nipple provides a seal and locks the hinged positioning plate on the positioning lugs. Loosening the holding nut breaks the seal and provides a means by which the operator can determine whether the vessel has been completely relieved of internal pressure. Continued loosening of the holding nut will allow the disengagement of the positioning plate from the positioning lugs, permitting the yoke halves to be spread and the closure to be opened.

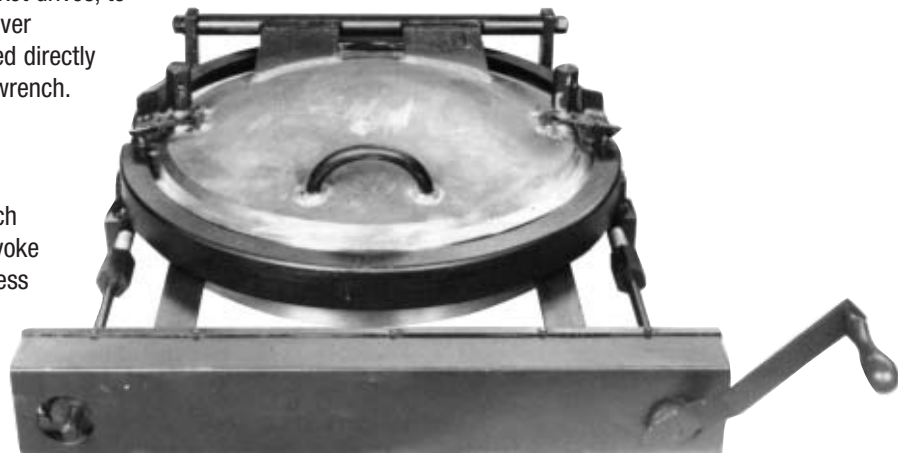
## Safety Locking Device

An additional feature that can be added to the Yoke Style Closure is the Safety Locking Device. This device is intended to prevent opening of the closure under pressure. It consists of a cylinder/piston connected to the interior of the closure and a latch plate. Whenever there is pressure inside the closure the piston is extended and engages the latch plate. This prevents opening of the closure under pressure. When the pressure has been reduced, the piston retracts, allowing the closure to be opened. This is a closed system and does not release its contents to the atmosphere.



## Operating Aids

Tube Turns furnishes a variety of operating aids to speed and simplify the opening and closing of Yoke Type Closures. These range from simple, break-over wrenches, to chain-and-sprocket drives, to fully automated models. Attached break-over wrenches are available. These are attached directly to the bolts and eliminate the need for a wrench. Examples are on Page 21. The Chain and Sprocket Drive option is by far the most economical opening assist device we offer. This is a manually operated aid which assists in the opening and closing of the yoke bolts. These units not only make the process faster, they also prevent the uneven movement of the yokes which may cause binding. On larger closures, ratio reduction is available to further ease the force required to turn the unit. Hand wheels can also be furnished which provides faster operation and eliminates the need for additional tools. The basic pattern of the Tube Turns' Chain and Sprocket Drives follows the basic principal of the familiar bicycle chain and sprocket arrangement. Same size sprockets are attached to longer than standard yoke bolts. Positioned around the sprockets is a linked belt or chain. For safety precautions, a chain and sprocket guard is furnished. A lever or crank is fitted to one of the sprockets which, when turned, rotates both yoke bolts simultaneously. This device can be modified by changing the ratio of the sprockets to increase the speed and ease of opening the yoke bolts. Tube Turns can further automate their yoke style closures by designing opening and closing devices which are either electrically, pneumatically or hydraulically operated. These devices cannot only be designed to open and close the yoke bolts, but they can also raise and lower the head for vertical applications.



**Double Bolt Yoke Closure with Chain & Sprocket Drive.**

# DOUBLE BOLT YOKE CLOSURES

Tube Turns Automated Closures have flexibility of design and can be developed and manufactured to meet your needs. Our Automated Closures are located in industries throughout the world. Applications for Tube Turns Automated Closures include Pipeline Launchers and Receivers and operations with batch processes such as pulp and paper mills, food process, chemical plants and petrochemical plants.

In addition to this flexibility, our Automated Yoke Style Closures have other advantages.

**1. SAFETY**- Automation provides a tight seal which prevents leakage and exposure of the operators to fumes and the medium which is potentially hazardous to their health. To prevent inadvertent opening of these closures, they are normally furnished with the following safety systems:

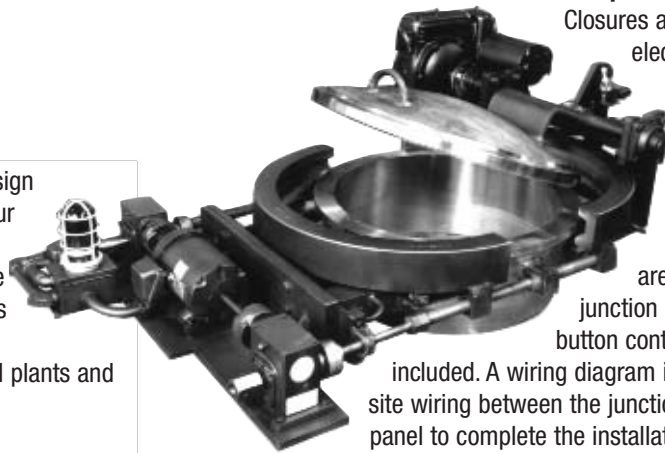
- a. Electrically Operated Closures are equipped with a pressure switch and an electrical relay.
- b. Pneumatically Operated Closures are equipped with a pressure switch and a solenoid valve.
- c. Hydraulically Operated Closures are equipped with a pressure switch and an electrical relay.

**2. IMPROVED EMPLOYEE MORALE** - With the environmental concerns in industry today, Tube Turns' Automated Closure enables the operators to be stationed away from the reactor thus eliminating their exposure to the fumes and medium involved in the opening and closing operation. As a result, the operator's health concerns are reduced significantly. The very fact that in most instances the closure head is hinged means elimination of pinched fingers and toes or badly skinned knuckles that too often occur with the use of flanges.

### 3. ECONOMIC CONSIDERATIONS

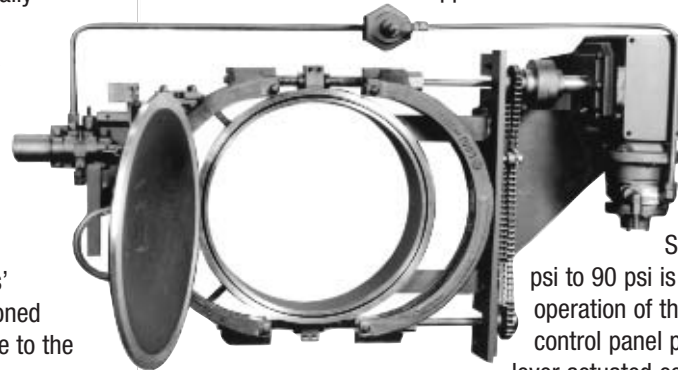
- A. It is fast! Depending upon size, the opening and closing cycle can take less than one minute.
- B. One man can open it. He does so by merely pushing a button. As a result of these savings in operating cost, an early payback in your initial investment can be realized.

**4. MAINTENANCE** - Since operation is simple, direct and positive, Tube Turns' Automated Closures require little or no maintenance other than replacement of the O-ring and periodic inspection of yoke bolts and nuts for wear. The human element is virtually eliminated in that the automation mechanism of the closure performs all the work.



### Electric Operated Automated

Closures are supplied with electric motors and appropriate gear boxes to drive the yoke bolts and to open and close the head. Electric circuits are wired to a central junction box and a push button control panel is included. A wiring diagram is provided for on-site wiring between the junction box and control panel to complete the installation.

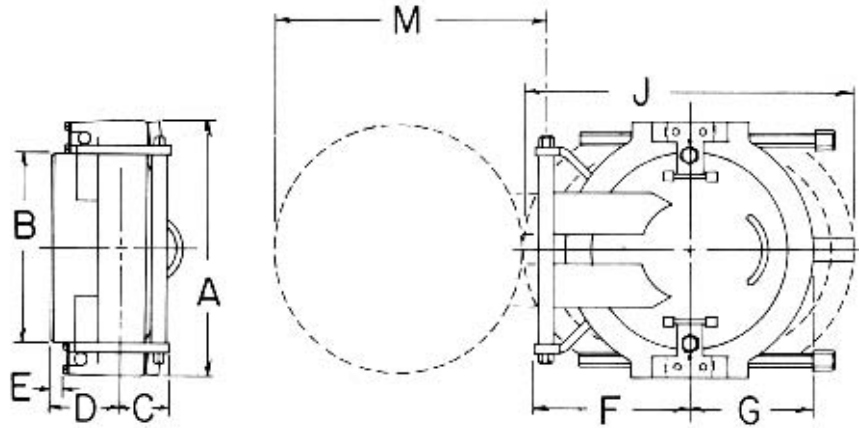


### Pneumatic Operated Automated

Closures are supplied with air driven motors, a gear box to drive the yoke bolts through a joint chain drive and a gear box to open and close the head. Shop air from 60 psi to 90 psi is used for operation of the unit through a control panel provided with lever actuated control valves.

**Hydraulic Operated Automated** Closures are similar to those described above except that hydraulic motors are used for the driving force. A hydraulic pump system with electric controls can be provided with the units or by the end user.

# DOUBLE BOLT HORIZONTAL DIMENSIONS



U.S. PAT. NO. 3,077,360

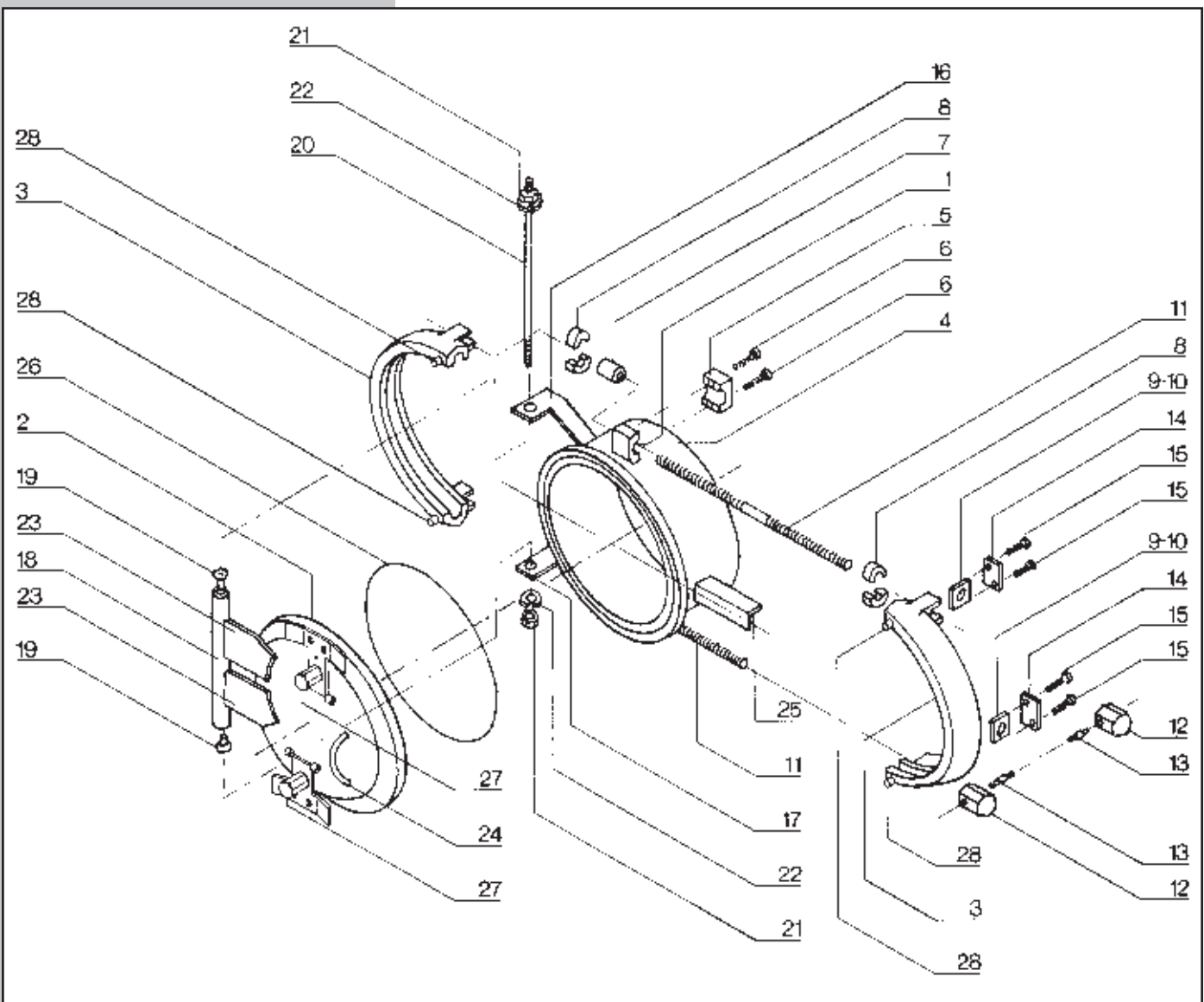
	Nominal Size	Over-all A	OD at Welding Bevel B	Back to Face Max. C	Hub Length D	Clear Hub Length E	Center to Hinge End F	Center to Free End G	Yoke Clearance J	Opening Clearance M	Approx. Weight Lbs
<b>Class 150-H Double Bolt Horizontal</b>	8	12 11/16	8 5/8	2 9/16	4	5/8	7 1/8	5 1/2	15 1/8	11 3/16	60
	10	14 7/8	10 3/4	2 11/16	4 1/4	7/8	8 1/2	6 3/4	18 1/8	13 1/8	80
	12	16 7/8	12 3/4	2 5/8	4 1/4	13/16	8 9/16	7 3/4	20 3/8	14 3/4	110
	14	18 1/8	14	2 11/16	4 1/4	3/4	9 5/16	8 7/16	22	16 1/8	130
	16	20 7/8	16	2 11/16	4 5/8	11/16	10 3/8	9 1/2	26 7/16	18 1/4	160
	18	22 7/8	18	2 11/16	4 5/8	11/16	11 1/2	10 1/2	28 7/16	20 1/4	190
	20	24 7/8	20	3 1/8	4 5/8	5/8	12 13/16	11 1/2	30 1/2	22 9/16	220
	22	26 7/8	22	3 1/4	4 5/8	5/8	14	12 9/16	32 1/8	24 11/16	260
	24	28 7/8	24	3 1/4	4 5/8	5/8	15	13 5/8	34 5/8	26 11/16	310
	26	30 7/8	26	3 5/16	5	1/2	16 1/16	14 11/16	37 3/8	28 13/16	370
	28	32 7/8	28	3 1/2	5	7/16	17 9/16	15 3/4	39 7/8	31 5/16	440
	30	34 7/8	30	3 5/8	5 1/2	13/16	19	16 15/16	43	33 3/8	530
	32	37 5/8	32	4	5 1/2	1/2	20 3/8	18	45 3/8	35 3/4	600
	34	39 5/8	34	4	5 1/2	1/2	21 3/8	19	47 5/8	37 3/4	680
	36	41 5/8	36	4 1/8	6	13/16	22 3/8	20 1/16	50	39 3/4	780
	38	44 1/8	38	4 1/8	6	3/4	23 3/8	21 1/8	52 3/8	41 3/4	880
40	46 1/8	40	4 1/4	6	5/8	24 7/16	22 5/16	55 5/8	43 7/8	990	
42	48 1/8	42	4 5/8	6 1/8	5/8	25 7/16	23 5/16	57 7/8	45 7/8	1150	
<b>Class 300-H Double Bolt Horizontal</b>	8	12 11/16	8 5/8	2 9/16	4	5/8	7 1/8	5 1/2	15 1/8	11 3/16	60
	10	14 13/16	10 3/4	2 11/16	4 1/4	7/8	8 1/2	6 3/4	18 1/8	13 1/8	80
	12	16 13/16	12 3/4	2 3/4	4 1/4	15/16	8 1/2	7 3/4	21	14 11/16	110
	14	18 3/16	14	2 7/8	4 1/4	15/16	9 5/16	8 7/16	22 13/16	16 1/8	140
	16	20 15/16	16	3 5/16	5	1	12 3/8	9 1/2	26 1/2	19 15/16	170
	18	23 1/8	18	3 11/16	5 1/4	7/8	12 5/8	11 3/16	29 13/16	21 3/4	220
	20	25 1/4	20	4 1/8	5 5/8	11/16	13 7/8	12 5/16	33 1/8	24	300
	22	27 3/4	22	4 1/4	6 1/4	15/16	16 3/16	13 1/8	36 3/16	27 1/16	360
	24	30 9/16	24	4 5/8	6 1/2	1 1/8	16	14 11/16	38 7/16	28 1/8	460
	26	32 1/2	26	4 13/16	6 3/4	1 1/4	19 1/2	15 7/16	42	32 1/8	570
	28	34 3/4	28	5	7 1/2	1 5/16	20 1/2	16 1/2	44 9/16	34 1/8	700
	30	36 7/8	30	5 1/8	7 3/4	1 7/16	21 11/16	17 11/16	47 11/16	36 7/16	840
	32	38 7/8	32	5 3/16	7 3/4	1 3/8	22 11/16	18 3/4	50 3/16	38 7/16	980
	34	42 1/4	34	5 7/16	8 1/4	1 3/8	21 7/8	20	53 7/16	38 3/4	1150
	36	44 1/4	36	5 7/16	8 1/2	1 9/16	23 3/8	21 1/16	56	40 3/4	1350
	38	46 3/8	38	5 5/8	8 3/4	1 11/16	24 5/8	22 1/4	59 1/16	43 1/8	1600
40	48 7/8	40	5 13/16	9 1/4	1 11/16	25 5/8	23 3/8	62 1/16	45 3/16	1850	
42	51	42	5 15/16	9 1/2	1 7/8	26 3/4	24 1/2	64 7/16	47 3/8	2100	

See notes on page 11.

# DOUBLE-BOLT HORIZONTAL PARTS

## Class H Double-Bolt Horizontal Parts List

1. Hub	9. Nut (RH)	17. Hub Hinge Arm (Lower)	25. Support Arm
2. Head	10. Nut (LH)	18. Hinge Tube	26. O-Ring
3. Yoke	11. Yoke Bolt	19. Hinge Bearing	27. Pressure Warning Device and Positioning Plate
4. Bolt Holder (W)	12. Wrench Lug	20. Hinge Rod	28. Positioning Lugs
5. Bolt Holder (L)	13. Wrench Lug Pin	21. Hinge Rod Nut	
6. Cap Screws	14. Cover Plate	22. Lockwasher	
7. Yoke Bolt Bushing	15. Cap Screws	23. Head Hinge Arm	
8. Collar	16. Hub Hinge Arm (Upper)	24. Head Handle	



Spare Parts—It is suggested that the following spare parts be stocked for each closure:

Four O-Rings ..... Part No. 26

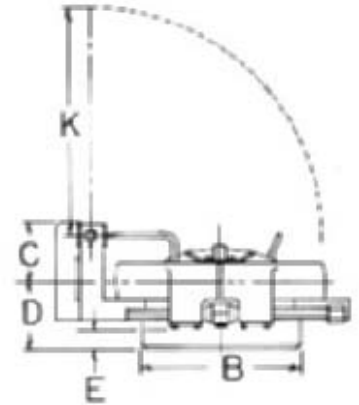
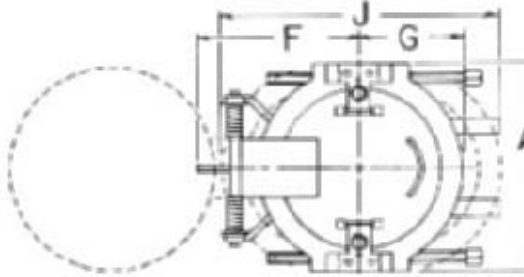
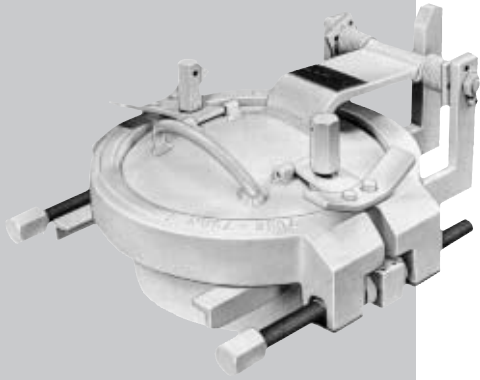
Two Yoke Bolt Units consisting of:

Part Nos ..... 7,8,9,10,11,12&13

When ordering spare parts, give amount, description, part number and size, pressure class and serial number of closure (located on front of yoke or ASME nameplate).

Example: (1) O-ring - Part Number 26 - 8" CL 600 - S/N 13845

# DOUBLE BOLT VERTICAL DIMENSIONS



U.S. PAT. NO. 3,077,360

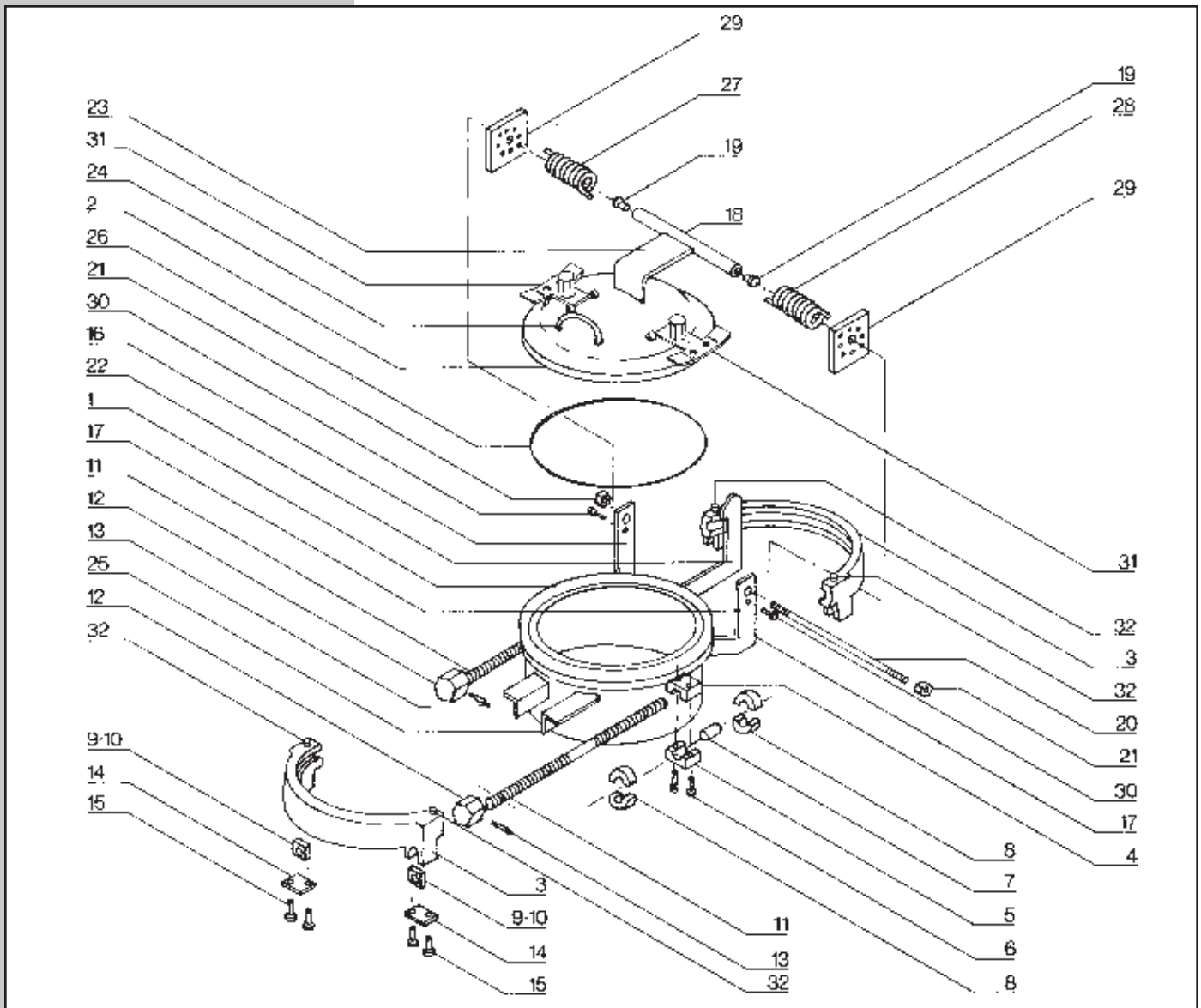
	Nominal Size	Over-all A	OD at Welding Bevel B	Back to Face Max. C	Hub Length D	Clear Hub Length E	Center to Hinge End F	Center to Free End G	Yoke Clearance J	Opening Clearance K	Approx. Weight Lbs
<b>Class 150-V Double Bolt Vertical</b>	8	12 11/16	8 5/8	4 3/16	4	5/8	9 9/16	5 1/2	15 1/8	12 1/16	60
	10	14 7/8	10 3/4	4 9/16	4 1/4	7/8	11 1/4	6 3/4	18 1/8	14 15/16	80
	12	16 7/8	12 3/4	4 3/8	4 1/4	13/16	12 9/16	7 3/4	20 7/16	17 1/4	110
	14	18 1/8	14	4 5/16	4 1/4	3/4	13 1/2	8 7/16	22	18 13/16	130
	16	20 7/8	16	4 13/16	4 5/8	11/16	14 1/4	9 1/2	24 15/16	19 5/8	170
	18	22 7/8	18	5 1/16	4 5/8	11/16	15 5/8	10 1/2	27 3/16	22 1/4	200
	20	24 7/8	20	6	4 5/8	5/8	16 3/4	11 1/2	29 7/16	24 1/16	230
	22	26 7/8	22	6 1/4	4 5/8	5/8	18 7/16	12 9/16	32 1/4	26 15/16	270
	24	28 7/8	24	6	4 5/8	5/8	19 5/8	13 5/8	34 5/8	28 1/16	320
	26	30 7/8	26	5 9/16	5	1/2	21 1/4	14 11/16	37 1/2	31	380
	28	32 7/8	28	6 5/8	5	7/16	23 7/16	15 3/4	40	32 3/4	450
	30	34 7/8	30	7 1/2	5 1/2	13/16	25 1/8	16 15/16	43 1/8	35 3/8	540
	32	37 5/8	32	9 1/2	5 1/2	1/2	29 1/8	18	45 9/16	37 1/8	620
	34	39 5/8	34	9 1/2	5 1/2	1/2	29 13/16	19	47 13/16	39 3/8	700
36	41 5/8	36	9 3/8	6	13/16	28 1/2	20 1/16	50 1/4	39 5/8	810	
38	44 1/8	38	9 3/8	6	3/4	29 3/4	21 1/8	52 9/16	42 1/8	910	
40	46 1/8	40	9 1/4	6	5/8	31 1/4	22 5/16	55 13/16	44 9/16	1030	
42	48 1/8	42	9 5/8	6 1/8	5/8	32 1/2	23 5/16	58 3/16	46 3/16	1200	
<b>Class 300-V Double Bolt Vertical</b>	8	12 11/16	8 5/8	4 3/16	4	5/8	9 9/16	5 1/2	15 1/8	12 1/16	60
	10	14 13/16	10 3/4	4 9/16	4 1/4	7/8	11 1/4	6 3/4	18 1/8	14 15/16	80
	12	16 13/16	12 3/4	4 1/2	4 1/4	15/16	12 9/16	7 3/4	20 13/16	17 1/4	120
	14	18 3/16	14	4 1/2	4 1/4	15/16	13 9/16	8 7/16	22 13/16	18 15/16	150
	16	20 15/16	16	7 13/16	5	1	15 1/16	9 1/2	25 7/8	19 13/16	180
	18	23 1/8	18	8 13/16	5 1/4	7/8	17 7/8	11 3/16	30 7/16	23 1/2	240
	20	25 1/4	20	8 1/4	5 5/8	11/16	18 11/16	12 5/16	33 1/8	25	320
	22	27 3/4	22	8 1/16	6 1/4	15/16	20	13 1/8	35 7/8	27 3/8	390
	24	30 9/16	24	8 1/2	6 1/2	7/8	22 9/16	14 11/16	38 9/16	29 7/8	490
	26	32 1/2	26	9 3/16	6 3/4	1 1/4	24 3/16	15 7/16	42 3/16	32 1/8	610
28	34 3/4	28	10 1/8	7 1/2	1 5/16	25 9/16	16 1/2	44 3/8	34 3/8	740	
30	36 7/8	30	10 1/2	7 3/4	1 7/16	27	17 11/16	47 11/16	36 1/4	890	

All dimensions are in inches. When ordering, please specify type, nominal size, bore, material and service conditions. Tube Turns Hinged Closures are regularly furnished in carbon steel; however, closures are also available in high yield strength steels. Closures are also available in other metals and alloys and in other sizes and pressure classes on special order. Lifting Eyes are provided on Vertical types when specified. Vertical Hinged Closures are furnished with spring-loaded heads. Heads counter-balanced by weights can be provided for larger sizes. They can be provided by Tube Turns on special orders. Chain-and Sprocket Drives are available at extra cost (see page 8). Attached Break-Over Wrenches are available at extra cost (see page 21). For Pressure-Temperature Ratings, see page 7

# DOUBLE-BOLT VERTICAL PARTS

## Class V Double-Bolt Vertical Parts List

1. Hub	8. Collar	15. Cap Screws	22. Stop Arm	29. Adjusting Plate
2. Head	9. Nut (RH)	16. Hub Hinge Arm (RH)	23. Head Hinge Arm	30. Lock Screw
3. Yoke	10. Nut (LH)	17. Hub Hinge Arm (LH)	24. Head Handle	31. Pressure Warning Device And Positioning Plate
4. Bolt Holder (W)	11. Yoke Bolt	18. Hinge Tube	25. Support Arm	32. Positioning Lugs
5. Bolt Holder (L)	12. Wrench Lug	19. Hinge Bearing	26. O-Ring	
6. Cap Screws	13. Wrench Lug Pin	20. Hinge Rod	27. Spring (RH)	
7. Yoke Bolt Bushing	14. Cover Plate	21. Hinge Rod Nut	28. Spring (LH)	



Spare Parts—it is suggested that the following spare parts be stocked for each closure:  
Four O-Rings

..... Part No. 26

Two Yoke Bolt Units consisting of:

Part Nos ..... 7,8,9,10,11,12&13

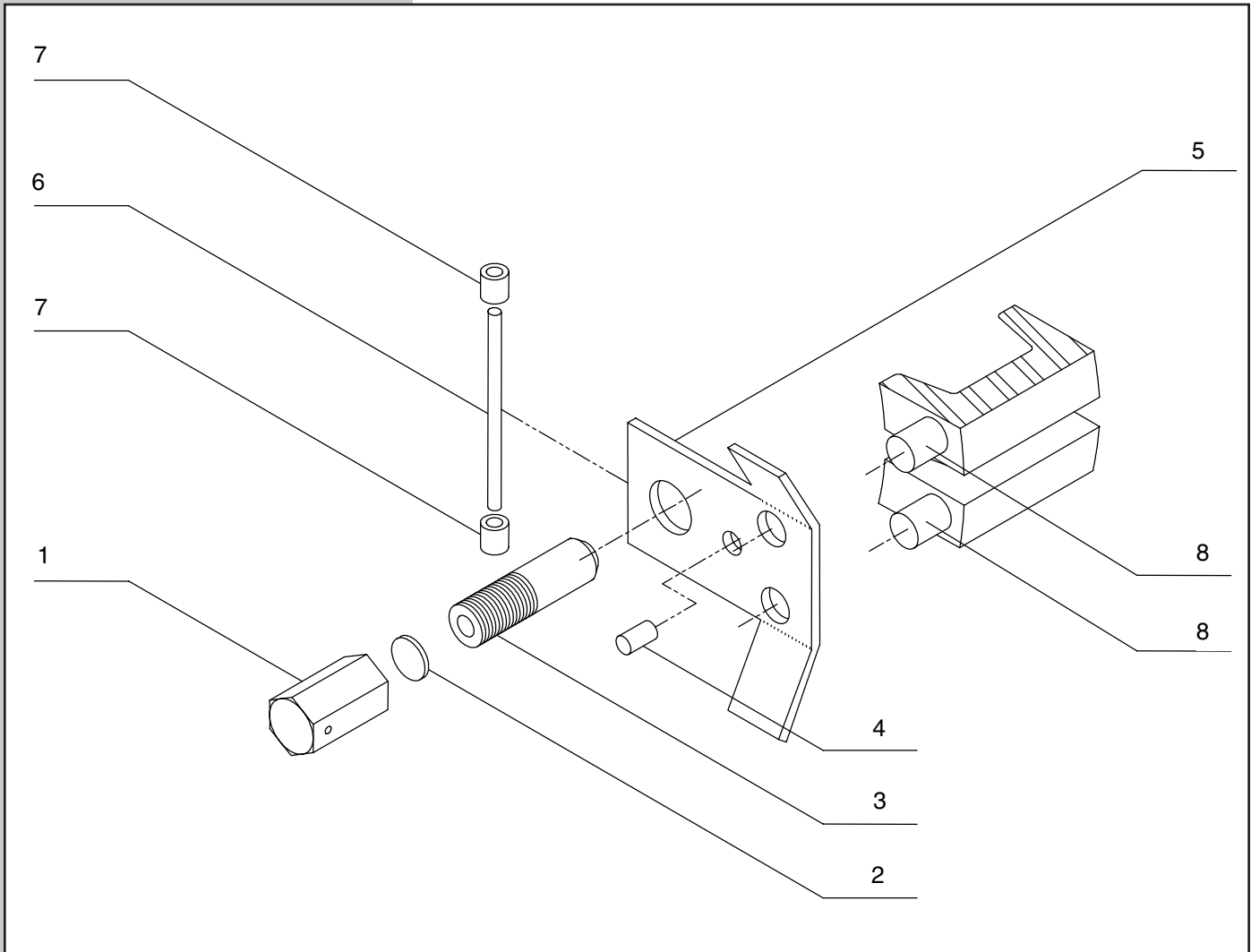
When ordering spare parts, give amount, description, part number and size, pressure class and serial number of closure (located on front of yoke or ASME name plate). Example: (1) O-ring - Part Number 26 - 8" CL 600 - S/N 13845



# PRESSURE WARNING DEVICE

## Pressure Warning Device Parts List

- |                |                      |
|----------------|----------------------|
| 1. Holding Nut | 5. Positioning Plate |
| 2. Gasket      | 6. Hinge Pin         |
| 3. Nipple      | 7. Hinge             |
| 4. Plate Stop  | 8. Positioning Lugs  |



## Yoke Type Hinged Closures Installation, Operation & Maintenance

**Caution: Operating a closure can be a hazardous activity and certain precautions should be exercised. Proper installation and maintenance of Tube Turns Hinged Closures have a direct bearing on the safety of the operator. All instructions should be read carefully by personnel engaged in installation, operation and maintenance.**

Tube Turns Hinged Closures are designed so that the head, hub and yoke are the only pressure containing parts. Proper containment of pressure depends on the O-ring being in place and the head and yokes being completely closed. The nuts and bolts serve the purpose of drawing the yokes into position.

Since a metal-to metal contact between the laps of the head, hub and yoke is a primary requirement for successful and safe operation of these closures, it is imperative that during the installation, maintenance and operations described below that these surfaces be kept clean and dry.

### Installation

**The H type closure** is designed for installation and operation in the horizontal plane (opens like a car door). The standard hinge orientation is left hand such that the head opens from right to left. Right hand hinging is also available it must be specified at time of order.

**The V type closure** is designed for installation and operation in the vertical plane (opens like a car hood).

**The S type closure** may be installed in either the horizontal or vertical plane.

To guard against possibilities of distortion and to protect the contact surfaces from weld spatter, the closure head and yokes should be closed during all welding operations. Closures are shipped with a standard Buna-N O-ring gasket installed which should be removed before any welding on the closure. Special compound O-rings gaskets are packed separately. The O-ring gasket should be installed after all attachment welding and stress relieving.

The closure should be joined to the pipe end or vessel nozzle by a circumferential butt-weld, employing the standard technique most appropriate to the particular installation. The closure hub is equivalent to a short, thin, close tolerance, pipe nipple and all precautions that are normally required in fabrications of this type must be taken.

The welding of nozzles, sight glass frames, structural attachments, etc. to the closure should be done at the factory prior to final machining. If it is necessary to make field welds on the vessel in the vicinity of the closure, they should be made before the closure is attached to the pipe or vessel.

**Stress Relieving:** When the closure attachment weld must be stress relieved, local stress relief treatment is recommended. Careful control is required during this operation to assure that the fabricator does not warp the closure. The use of proven procedures is required. If care is exercised, local stress relief can eliminate the need for disassembly and reassembly of the unit.

When it is necessary to stress relieve the entire vessel, the following steps should be taken to prevent distortion of the closure during heat treating: (1) Remove O-ring gasket, (2) Close the head and draw the yoke halves tightly together, (3) Remove the yoke holding bolts and provide substitute bolting, (4) Remove all sealed bearings, (5) Support all structural attachments and, (6) After stress relieving, remove

substitute bolting and replace with the original yoke holding bolts. (See **Disassembly and Reassembly** procedures on following pages.)

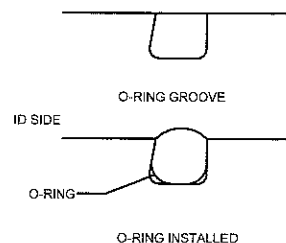
Section VIII, ASME Boiler and Pressure Vessel Code, recommends the following stress relieving temperatures and holding times for mild carbon and low alloy steels:

Metal Temperature (Deg. F)	Holding Time (Hr./in. of Thickness)
1100	1
1050	2
1000	3
950	5
900	10

(Use of a lower temperature and a corresponding increase in holding time tends to minimize possibilities of distorting the closure components.)

**Gasket:** Closures are shipped with a standard Buna-N gasket installed. Special compound O-ring gaskets are packed separately. The O-ring gasket should be installed after all welding or stress relieving of the closure is completed. The O-ring should be installed per the following procedure which is intended to be a general guide for installation of O-Ring gaskets in Tube Turns Yoke Style Double Bolt Closures. Please contact the factory for specific questions or situations not covered by this procedure.

**BACKGROUND:** The O-ring groove used in these closures is a single dovetail, with the dovetail on the ID side of the groove, as shown below. The O-ring diameter is deliberately made smaller than that of the groove into which it will be installed. This puts the O-ring in tension, holding it against the dovetail, which keeps the O-ring in the groove and prevents accidental removal.



**PROCEDURE:** There are three important aspects to the installation procedure: cleaning, lubrication and uniform installation.

**Cleaning -** The O-ring groove and the seating surfaces must be free of all foreign material and corrosion before the O-ring is installed. Foreign material such as grease, oil, dirt, etc. can be removed with a rag and, if required, a solvent. Corrosion can be removed, MANUALLY, with a fine emery paper or wire brush. **DO NOT USE POWER TOOLS.**

**Lubrication -** The O-ring should be lightly coated with a lubricant such as vaseline or silicone grease. **WARNING:** too much lubricant on the O-ring or in the groove will prevent proper seating of the O-ring in the groove and possibly lead to premature o-ring failure.

**Installation -** It is important that the O-ring be installed in the following manner to provide equal distribution of the O-ring in the groove.

a. Push the O-ring into the groove in (4) sequential steps as shown in Figure 1.

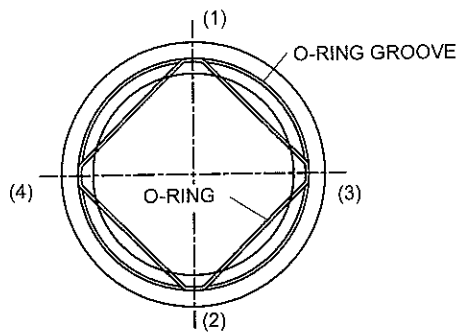


FIGURE 1

b. "Split the difference" between these (4) points and push the O-ring into the groove as shown in Figure 2

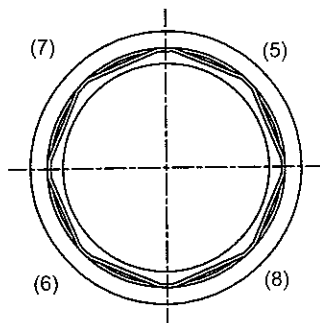


FIGURE 2

c. Complete the installation by pushing the O-ring into the groove in between the initial installation points above. If the O-rings are of a high hardness (90 durometer) or are being installed in cold weather it may be necessary to use a block of soft wood and a small hammer to tap the o-ring into its fully seated position in the groove.

### Operation

#### Opening

**Caution: Do not attempt to open the closure until all incoming pressure lines have been closed off and the pipe or vessel has been relieved of all internal pressure. Opening under pressure may result in injury to persons and damage to property.**

The closures are equipped with pressure warning devices which serve a dual purpose. Their primary purpose is as a safety device to prevent the closure from being opened under pressure or pressurized while not being fully closed. If the internal pressure has not been completely relieved in a vessel containing gas, they will produce a whistling sound. Conversely, if the vessel contains a liquid, the Pressure Warning Device will leak when the holding screw is loosened. Their secondary purpose is to assure that the yokes are approximately in the proper location in the closed position. **THESE DEVICES ARE NOT BLEEDER PLUGS AND ARE NOT DESIGNED TO RELIEVE INTERNAL PRESSURE.**

Prior to opening the closure, relieve internal pressure or vacuum in the pipe or vessel.

**For H and V type closures** open pressure warning devices. Lift positioning plates. Spread the yoke halves by turning both yoke bolts with a hand wrench, either simultaneously or by turning one bolt until it reaches its limit of movement (as indicated by an increase of turning effort) and then turning the other bolt, alternating this procedure. If an impact wrench is used, it must be operated very carefully to avoid uneven tightening that will result in imposing binding action on either of the bolts. This can actually break the smaller yoke bolts and bend the larger yoke bolts.

**Caution: If excessive torque is required to turn the bolts after two full turns, internal pressure may still exist in the closure. Stop and check to determine if all internal pressure has been completely relieved from the pipe or vessel.**

When both yoke halves clear the flange of the closure head, it may be swung open on its hinge affording full access to the interior.

The springs on the V type closures are intended only to assist the operator in lifting the closure head. Table 2 gives the approximate force required to lift the heads of V type closures of various sizes.

Size In Inches	Type		
	150	300	600
8	3	5	8
10	6	9	14
12	9	14	21
14	11	17	26
16	15	24	36
18	20	31	48
20	26	41	62
22	33	51	78
24	40	64	95
26	49	77	118
28	59	92	141
30	70	110	168
32	82	*	*
36	109	*	*
38	124	*	*
40	141	*	*
42	159	*	*

\* Springs are not available. Contact manufacturer for alternate methods of lifting heads.

**For S closures** loosen the swing bolt nut with a hand wrench until it will clear the lug. **DO NOT USE AN IMPACT WRENCH.**

### Closing

**For H and V type closures:** To close the unit, first inspect the O-ring, O-ring groove and seating surfaces to see that the O-ring is properly in place and remove all foreign material. Swing the head to the closed position, and draw the yoke halves over the head flange by tightening the yoke bolts, turning the bolts either simultaneously or one at a time alternately with a hand wrench. If an impact wrench is used, it must be operated very carefully to avoid uneven tightening that will result in imposing binding action on either of the bolts. This can actually break the smaller yoke bolts and bend the larger yoke bolts. Tighten the yoke bolts to the torque shown in Table 3, the "splits" between the yokes (top and bottom) should be equal within 1/16" (1.5 mm). Tighten the pressure warning device holding nuts to approximately 10-15 ft-lbs of torque for the 5/8" diameter nipple and 20-25 ft-lbs for the 7/8" diameter nipple.

TABLE 3 - RECOMMENDED MINIMUM BOLT TORQUE FOR OPERATING CONDITIONS - INCREASE BY 50% FOR HYDROSTATIC PRESSURE TEST

Closure Nominal Diameter	Class 150		Class 300		Class 600		Class 900		Class 1500	
	Bolt Dia	Torque (ft-lbs)	Bolt Dia	Torque (ft-lbs)	Bolt Dia	Torque (ft-lbs)	Bolt Dia	Torque (ft-lbs)	Bolt Dia	Torque (ft-lbs)
8"	5/8"	30	5/8"	30	5/8"	30	3/4"	40	1"	50
10"	3/4"	40	3/4"	40	3/4"	40	1"	50	1 1/8"	90
12"	3/4"	40	3/4"	40	1"	50	1 1/8"	55	1 1/4"	110
14"	3/4"	40	3/4"	40	1"	50	1 1/4"	60	1 1/2"	120
16"	7/8"	45	7/8"	45	1 1/8"	55	1 1/2"	70	1 1/2"	160
18"	7/8"	45	7/8"	45	1 1/4"	60	1 1/2"	80	1 3/4"	250
20"	7/8"	45	1"	50	1 1/2"	80	1 3/4"	100	2"	340
22"	7/8"	45	1 1/8"	55	1 1/2"	80	1 3/4"	120	2"	410
24"	7/8"	45	1 1/4"	60	1 3/4"	100	2"	150	2 1/4"	550
26"	1"	50	1 1/4"	60	1 3/4"	100	2"	170	2 1/2"	700
28"	1"	50	1 1/2"	80	1 3/4"	100	2 1/4"	220	2 1/2"	810
30"	1"	50	1 1/2"	80	2"	140	2 1/4"	260		
32"	1 1/8"	55	1 1/2"	80	2"	140	2 1/2"	320		
34"	1 1/8"	55	1 3/4"	125	2 1/4"	160	2 3/4"	400		
36"	1 1/8"	55	1 3/4"	125	2 1/4"	160	3"	510		
38"	1 1/4"	60	1 3/4"	125	2 1/2"	200	3"	530		
40"	1 1/4"	60	2"	150	2 1/2"	200	3 1/4"	630		
42"	1 1/4"	60	2"	150	2 3/4"	270	3 1/4"	670		

**Caution: Do not pressurize closure until positioning plates are properly engaged and holding nut has been tightened. If, for any reason, the positioning plates will not close, the yokes are out of adjustment or the closure has been improperly operated or installed and should not be used until the condition is corrected. (See Disassembly and Reassembly procedures on following pages.)**