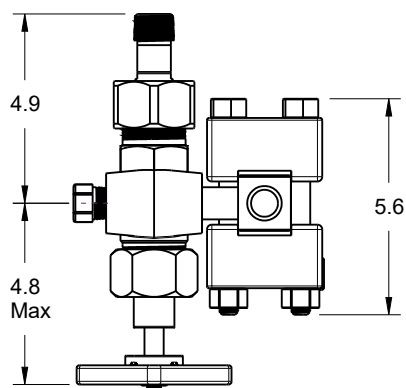


FT "Free Turn"  
Patent 6,991,216



### Close Hook-Up "CH" Style LG

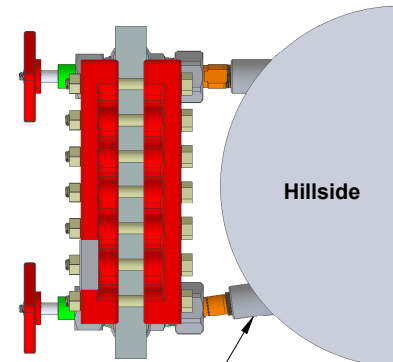
- Close Hook-up design insures the longest possible glass length for a given vessel C-C
- LG chamber elongated to accomodate lateral ports
- Gage valves can be set closer together than a standard end connected gage, within 3/8" of the visible glass dimension, see Table
- Permits use of spherical unions

**Irregularities** in parallelism of upper & lower vessel nozzles can cause the vessel unions to be out of square. The two point attachment of a typical sight glass requires simultaneous squareness when making up the unions - otherwise leak at the union or excessive strain of the connector and the "connecting nipples" will result

### Spherical Union Advantages:

- Minimize piping strain
- Minimize leak at union
- 1.7x stronger in bending than regular Flat Floating Union vessel connector.... more suitable for long and heavy gages

Reference Documents: EN.RT-S5, Eng. Notes  
M991980, MOC



Angular misalignment often  
seen on horizontal vessels  
and field constructed piping

Corrected with use of  
spherical unions - as shown

General Arrangement Drawing  
Level Gage & Gage Valve Combo

Transparent Style: T100 / T200  
Level Gage, Side Connected  
Gage Valves, Single Union: FT15 / 15A  
Assembly Orientation: Fig. 5-3-L  
Offsets Inside

All dimensions in Inches

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Drawing No: GA.TS5-3-L

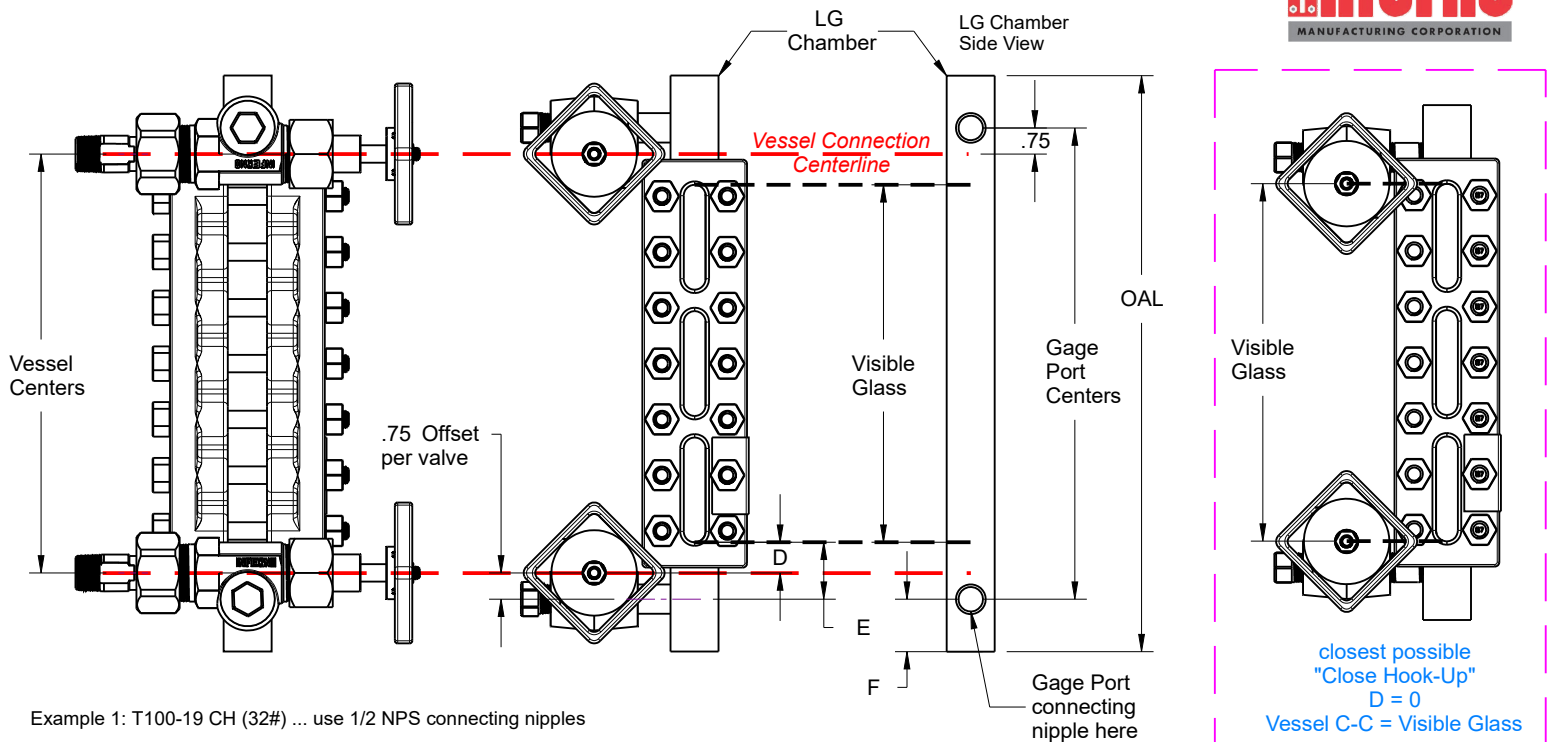
Drawing Date: 9/12/2019

Revision: 0

Rev Date: N/A

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Example 1: T100-19 CH (32#) ... use 1/2 NPS connecting nipples

Case A, Typical arrangement: mounted on 14" vessel centers ...  
 $D = (14 - 12.625 \text{ vis. glass}) / 2 = .687"$

Case B, Factory minimum - Catalog standard: design vessel nozzles at 12.625" C-C, to match the visible glass length ...  
 $D = 0$

Example 2: T100-89 CH (256#) ... use 3/4 NPS connecting nipples

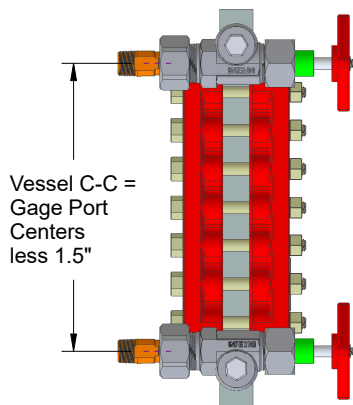
Case A, Typical arrangement: mounted on 114" vessel centers ...  
 $D = (114 - 111.5 \text{ vis. glass}) / 2 = 1.25"$

Case B, Factory minimum - Catalog standard: design vessel nozzles at 111.875" C-C (111.5 + .375), to "match" the visible glass length ...  
 $D = .187"$

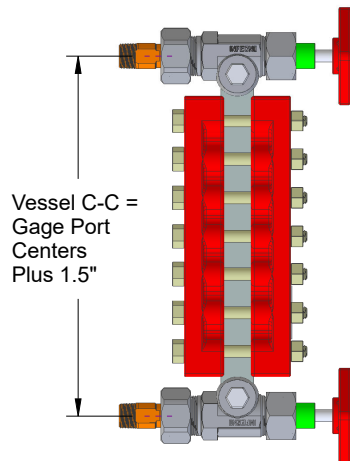
Table I

Gage Port NPS	Minimum Vessel C-C Equals	D = distance from lower glass view to lower vessel C/L	Min. D	Min. Gage Port C-C	E = distance from lower glass view to lower gage port	F
1/2	Visible Glass	(Vessel C-C minus Visible Glass / 2)...or specify asymmetry if required	0	Visible Glass + 1.5"	Min. .75"	1.5"
3/4	Visible Glass + .375"		.187"	Visible Glass + 1.875"	Min. 1.062"	2"

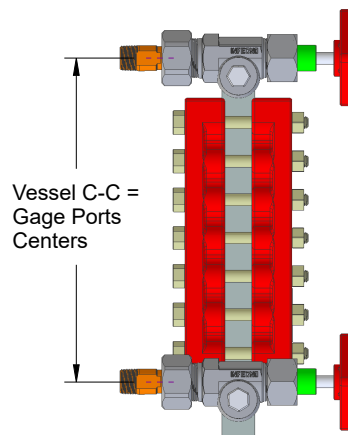
#### Offsets Inside



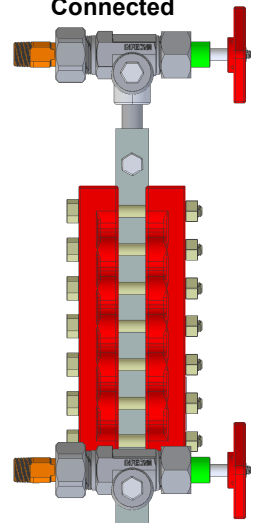
#### Offsets Outside



#### Offsets Parallel



#### Special Side / End Connected



General Arrangement Drawing  
 Level Gage & Gage Valve Combo

Transparent Style: T100 / T200  
 Level Gage, Side Connected  
 Gage Valves, Single Union: FT15 / 15A  
 Assembly Orientation: Fig. 5-3-L  
 Offsets Inside

All dimensions in Inches

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Drawing No: **GA.TS5-3-L**

Drawing Date: 9/12/2019

Revision: 0

Rev Date: N/A

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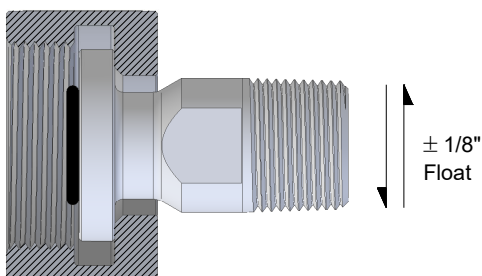
Sheet: 2/4

# Choice of Vessel Union Connector

3/8" inside diameter flow path

## FLAT / FLOATING UNION

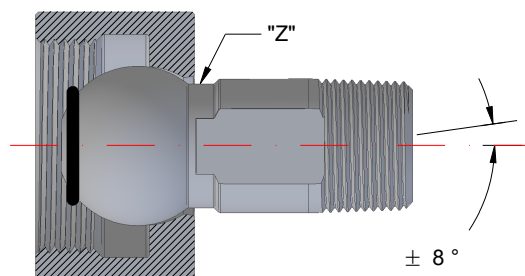
Linear Adjustment



Permits up to 1/4" on vessel centers (pair)

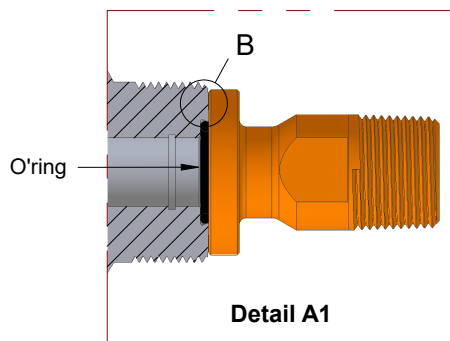
## SPHERICAL UNION

Angular Adjustment

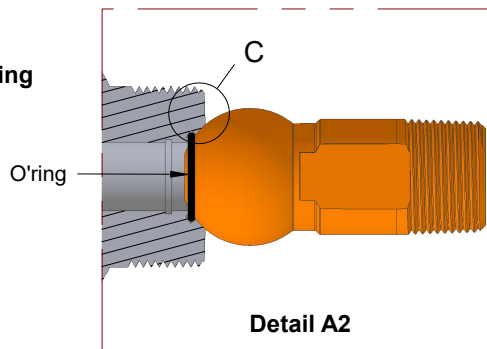


Larger section modulus "Z" than FLAT floating union connector, 1.7x stronger in bending

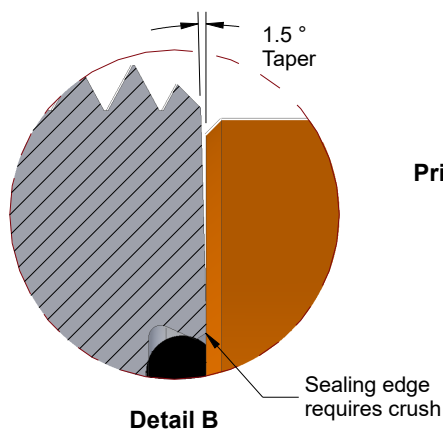
Recommended for angular misalignment due to non-jig set construction, vibration service, & long / heavy gages



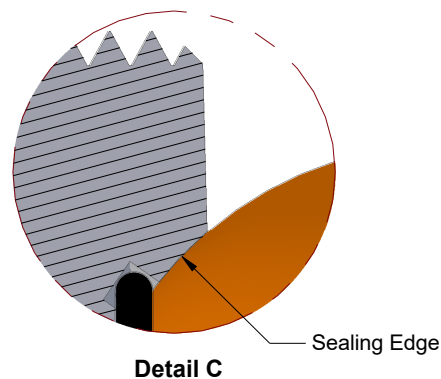
**Soft Seal: Static O'ring**  
Standard feature



Union Nut omitted for clarity



**Primary Seal: Metal to Metal**  
O'ring not required



General Arrangement Drawing  
Level Gage & Gage Valve Combo

Transparent Style: T100 / T200  
Level Gage, Side Connected  
Gage Valves, Single Union: FT15 / 15A  
Assembly Orientation: Fig. 5-3-L  
Offsets Inside

All dimensions in Inches

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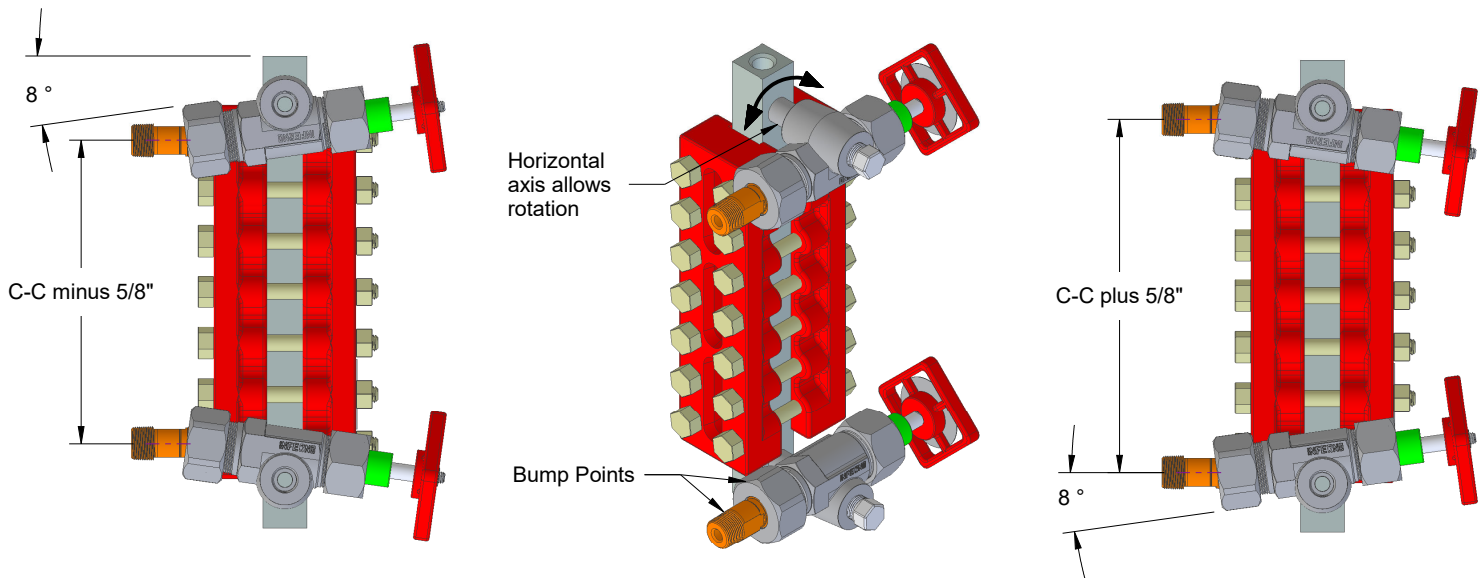
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# Center to Center Adjustment using Spherical Unions



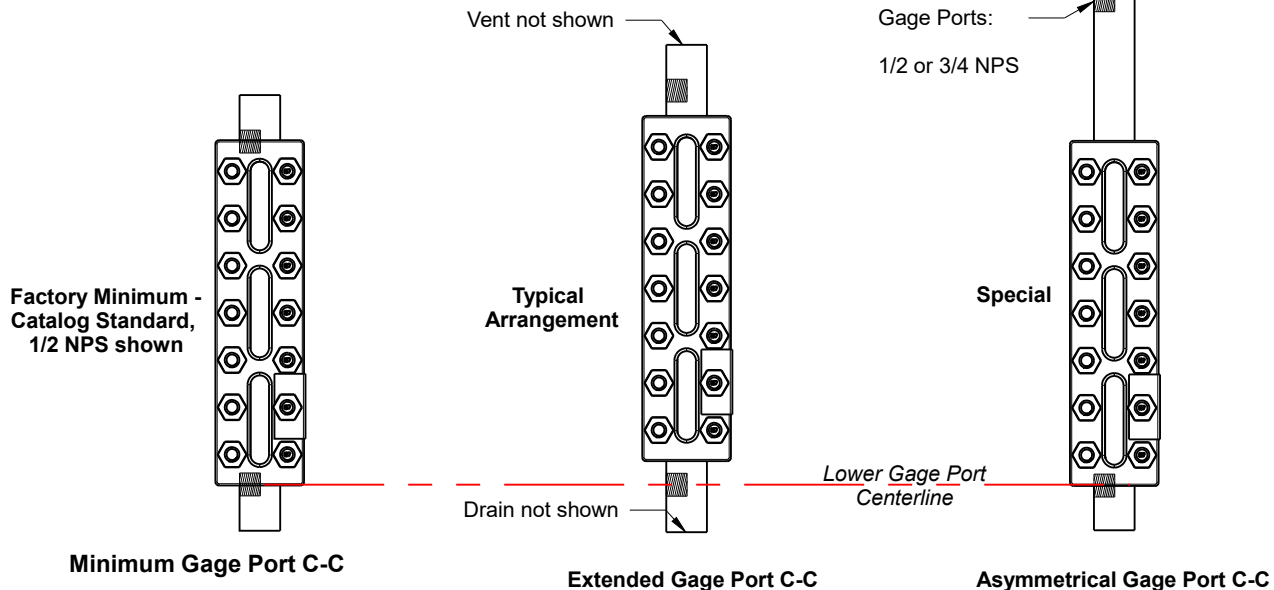
Vessel connectors remain parallel after rotation



If required, use a soft hammer to "bump" the spherical union vessel connector into "rotated" position.

Note: the horizontal connecting axis between LG and GV permits use of spherical union, which will overcome both angular AND vessel C-C misalignment at the same time.

## Gage Port Options



Design vessel C-C distance using Table 1... where  
Vessel C-C = Visible Glass (1/2 NPS), or  
Vessel C-C = Visible Glass + .375" (3/4 NPS)

Factory customized to match  
vessel centers

General Arrangement Drawing  
Level Gage & Gage Valve Combo

Transparent Style: T100 / T200  
Level Gage, Side Connected  
Gage Valves, Single Union: FT15 / 15A  
Assembly Orientation: Fig. 5-3-L  
Offsets Inside

All dimensions in Inches

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