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JACOBY-TARBOX®

A PRODUCT OF CLARK-RELIANCE

HYGIENIC SIGHT FLOW INDICATORS

Installation, Operation, and Maintenance Manual

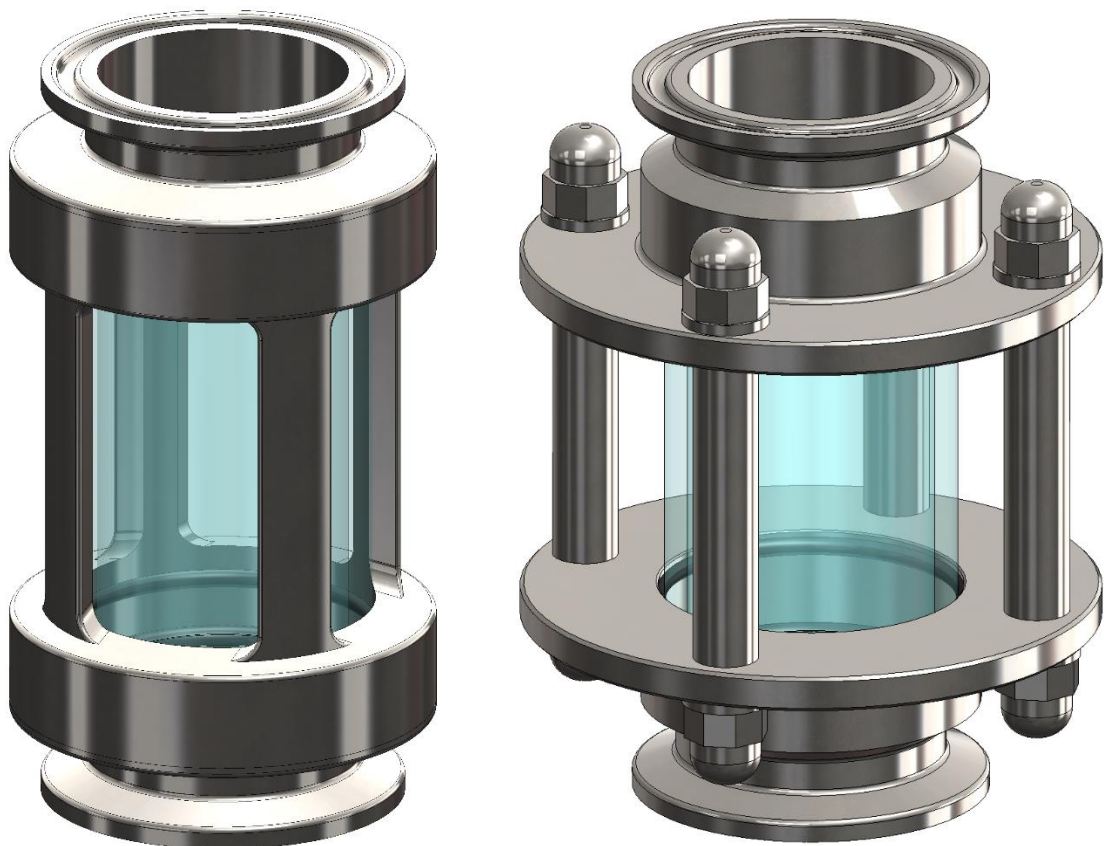


Table of Contents

1. Introduction.....	2
1.1. Specification	2
2. Installation.....	3
2.1. Unpacking	3
2.2. Visual Inspection	3
2.3. Positioning.....	3
2.4. Commissioning / Start Up	3
3. Maintenance.....	4
3.1. Hy-Sight Components	5
3.2. Hy-Sight Disassembly	6
3.3. Hy-Sight Assembly	6
3.4. Hy-Sight FV Components.....	7
3.5. Hy-Sight FV Disassembly.....	8
3.6. Hy-Sight FV Assembly.....	8

1. Introduction

Clark-Reliance® Hy-Sight™ and Hy-Sight™ Full View (FV) hygienic inline flow indicators are designed and manufactured to provide an uninterrupted window for observation of the process flow in high purity applications.

The inline tubular design has evolved to incorporate a number of features that ensure the internal area or flow path is smooth & crevice free, exceeding the requirements as governed by both the ASME BPE and 3A standards.

As standard units are supplied with tri-clamp ended covering imperial OD tube sizes from 1/4" through to 6".

1.1. Specification

The specified operating conditions for your Hy-Sight unit is tube size, pressure and temperature dependant, ensure your chosen Hy-Sight product conforms to the quick reference table shown below:

Tube Size OD	Operating Pressure		Maximum Allowable Operating Temperature (°F / °C)							
	PSIG	Bar g	EPDM		Silicone		FKM (Viton®)		FEP/Silicone	
1/4"	300	21	302	150	392	200	392	200	450	232
3/8"	300	21	302	150	392	200	392	200	450	232
1/2"	300	21	302	150	392	200	392	200	450	232
3/4"	250	17	302	150	392	200	392	200	450	232
1" ALT	200	14	302	150	392	200	392	200	450	232
1"	200	14	302	150	392	200	392	200	450	232
1 ½"	150	10	302	150	392	200	392	200	450	232
2"	125	9	302	150	392	200	392	200	450	232
2 ½"	125	9	302	150	392	200	392	200	450	232
3"	110	8	302	150	392	200	392	200	450	232
4"	90	6	302	150	392	200	392	200	450	232
6" (FV)	70	4.8	302	150	392	200	392	200	450	232

If in any doubt regarding specification and suitability, please contact a member of the Clark-Reliance technical sales team, prior to installation.



DANGER

Exceeding designed operating pressures or temperatures could result in loss of containment, sudden escape of pressure could result in severe personal injury or property damage.

2. Installation

2.1. Unpacking

Your Hy-Sight unit is pre-assembled by Clark-Reliance and should arrive carefully packed and as one fully assembled unit.



WARNING

Care should be taken during the un-packing of the unit as all units contain glass components that have the potential to have been broken through mishandling.

2.2. Visual Inspection

Upon receipt of your Hy-Sight unit visual inspect the unit for any sign of damage that may have occurred during shipping or mishandling.

During visual inspection, particular attention should be made to the glass cylinders internal and external surfaces. Any sign of chips, cracks or imperfections on these surfaces may potentially reduce the safe operating pressure as published.

In the unlikely event of damage being discovered or suspected to do not attempt installation under any circumstances.

2.3. Positioning

The Hy-Sight unit can be mounted in any orientation, vertically or horizontally with the flow passing through in either direction.

Locating & positioning the unit should be given careful consideration, to optimise the life time of the unit, it is essential that the unit is not exposed to any of the following:

- a) Piping loads or torsional forces. (the unit is not designed to be load bearing)
- b) Sudden increases of pressure.
- c) Excessive vibrations.
- d) Rapidly fluctuating temperatures.
- e) Other moving parts.

To maximise clarity of the media passing through the unit, we would recommend installation in a length of pipe that has 24" of straight line pipe either side of the unit, promoting a laminar flow through the viewable area.

2.4. Commissioning / Start Up

Following correct installation, the Hy-Sight unit should be brought into service slowly, gradually building the pressure & temperature until the desired process values are reached. We would advise this is carried out during a CIP process where the unit can be checked for leaks prior to the process media being introduced.

3. Maintenance

Periodic maintenance and inspection should be carried out on the Hy-Sight unit, the frequency of which will vary with application. The end user should determine the appropriate maintenance schedule based on their experience with the given application.

Maintenance & inspection procedures should focus on the following areas:

- a) Hy-Sight: The screwed head connections remain tight and butted up against the body.
Hight-Sight FV: The acorn nuts remain tight to keep the heads butted up against the spacers.
- b) The glass cylinder for signs of wear or damage.
- c) The sealing O-rings for signs of degradation, protrusion or intrusion.
- d) The centralizing O-rings for signs of degradation, resulting in a loose fittings glass cylinder.
- e) Corrosion to the stainless steel body or head connections.

Elastomer based O-rings degrade over a period of time, this reduction in volume greatly affects the compressibility of an O-ring and in turn the sealing capability, resulting in a unit that may leak.

We advise that both the sealing & centralizing O-rings are replaced to fall in line with the end users current gasket change out schedule.

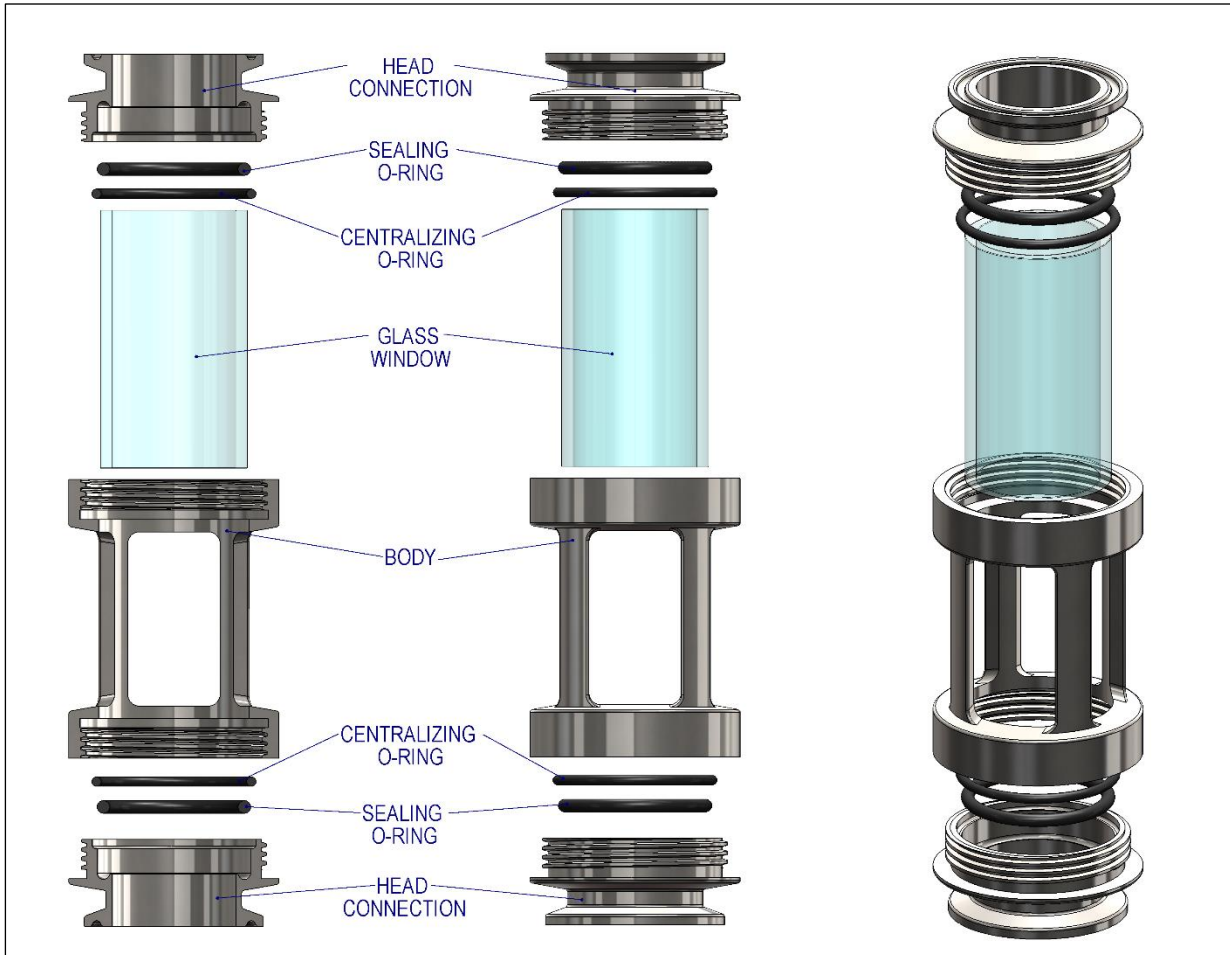


WARNING

Do not attempt to carry out maintenance on the Hy-Sight unit whilst installed in pipework, ensure the pressure has been removed from the process line prior to unit removal

3.1. Hy-Sight Components

Each standard Hy-Sight assembly unit is comprised of five different components:



Body Component

Quantity: 1
Material: 316L Stainless Steel (standard, options available)

Head Connection

Quantity: 2
Material: 316L Stainless Steel (standard, options available)

Glass Cylinder

Quantity: 1
Material: 3.1 Borosilicate Glass (standard, Acrylic available)

Sealing O-Ring

Quantity: 2
Material: USP Class VI Elastomer, EPDM (Standard, options available)

Centralizing O-Ring

Quantity: 2
Material: USP Class VI Elastomer, EPDM (Standard)

3.2. Hy-Sight Disassembly

Disassembly should only be carried out by trained personnel who are familiar with this IOM manual.

The following steps should be taken:

- a) Release the tri-clamps from both ends of the Hy-Sight unit, remove the unit as a complete assembly.
- b) Hy-Sight: Unscrew both head connections from the body, one at a time.
Carefully remove the glass from the body (second head on the FV).
- c) Remove the O-rings from both the glass cylinder and/or the head connections.

Used glass and O-rings should be disposed of immediately, never try to re-assemble the Hy-Sight unit with glass or O-rings that have already been used in service.



DANGER

Adequate PPE should be worn when assembling or disassembling the Hy-Sight unit, this includes but not limited to eye protection and cut proof gloves.

3.3. Hy-Sight Assembly

Assembly should only be carried out by trained personnel who are familiar with this IOM manual.

The following steps should be taken:

- a) Install one of the new centralizing O-rings over the glass cylinder, so that it sits approximately 1" away from the one end of the cylinder.
- b) Place the new sealing O-rings into the head connections (one in each), ensuring they sit snugly into the precision machined groove.
- c) Now add lubricant** to the visible surfaces of both sealing O-rings & the external threads of the head connections.
- d) Place the glass cylinder into one of the head connections, centralizing O-Ring end first.
- e) Roll the centralising O-Ring down to sit between the precision groove on the head connection and the glass cylinder.
- f) Carefully place the body over the top of the glass cylinder, slipping it down and over until it engages with the threaded head connection.
- g) Loosely thread the body onto the head connection. Do not tighten the two components together, a small gap between body & head connection should be visible.
- h) Fit the final centralizing O-ring into the groove in outstanding head connection.
- i) Now add lubricant** to the visible surfaces of the centralizing O-ring.
- j) Slip the head connection complete with installed O-Rings over the glass cylinder and tighten loosely.
- k) Tighten both head connections until they are butted up against the body.

** Ensure the lubricant used is not harmful to either the O-rings material or the end users process.

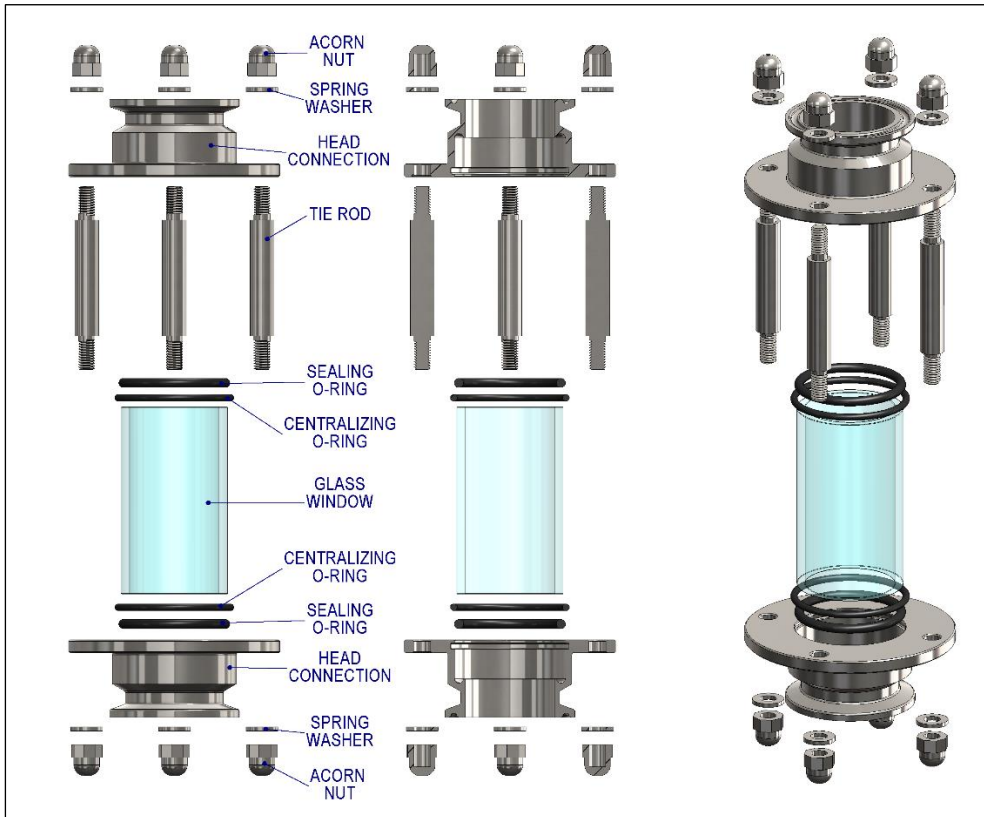


DANGER

Adequate PPE should be worn when assembling or disassembling the Hy-Sight unit, this includes but not limited to eye protection and cut proof gloves.

3.4. Hy-Sight FV Components

Each standard Hy-Sight FV (Full View) assembly unit is comprised of seven different components:



Head Connection

Quantity: 2
Material: 316L Stainless Steel (standard, options available)

Glass Cylinder

Quantity: 1
Material: 3.1 Borosilicate Glass (standard, Acrylic available)

Sealing O-Ring

Quantity: 2
Material: USP Class VI Elastomer, EPDM (Standard, options available)

Centralizing O-Ring

Quantity: 2
Material: USP Class VI Elastomer, EPDM (Standard)

Tie Rod

Quantity: 4
Material: 316L Stainless Steel (Standard)

Spring Washer

Quantity: 4
Material: 316 Stainless Steel (Standard)

Acorn Nut

Quantity: 4
Material: 316 Stainless Steel (Standard)

3.5. Hy-Sight FV Disassembly

Disassembly should only be carried out by trained personnel who are familiar with this IOM manual.

The following steps should be taken:

- d) Release the tri-clamps from both ends of the Hy-Sight FV unit, remove the unit as a complete assembly.
- e) Unscrew the four acorn nuts from one end remove the head while holding the glass.
- f) Carefully remove the glass from the second head.
- g) Remove the O-rings from both the glass cylinder and/or the head connections.

Used glass and O-rings should be disposed of immediately, never try to re-assemble the Hy-Sight unit with glass or O-rings that have already been used in service.



DANGER

Adequate PPE should be worn when assembling or disassembling the Hy-Sight unit, this includes but not limited to eye protection and cut proof gloves.

3.6. Hy-Sight FV Assembly

Assembly should only be carried out by trained personnel who are familiar with this IOM manual.

The following steps should be taken:

- a) Install one of the new centralizing O-rings into the head connections (one in each), ensuring they sit snugly into the precision machined groove in the side of the counterbore.
- b) Place the new sealing O-rings into the head connections (one in each), ensuring they sit snugly into the precision machined groove at the bottom of the counterbore.
- c) Now add lubricant** to the visible surfaces of both centralizing O-rings.
- d) Place the glass cylinder into one of the head connections.
- e) Watch to ensure you do not displace the centralising O-Ring.
- f) Carefully place the second head over the top of the glass cylinder, slipping it down and over until the spacer threads extend through the head. Again, watch to ensure you do not displace the centralising O-Ring.
- g) Loosely thread the acorn nuts onto all four spacers. A small gap between head & the spacers should be visible.
- h) Tighten the acorn nuts until the spacers are butted up against the body. A cross pattern will make tightening easier. There is no torque requirement because tightening stops when metal to metal contact is made.

** Ensure the lubricant used is not harmful to either the O-rings material or the end users process.



DANGER

Adequate PPE should be worn when assembling or disassembling the Hy-Sight unit, this includes but not limited to eye protection and cut proof gloves.