



TITAN FLOW CONTROL, INC.

INSTALLATION, OPERATION, AND MAINTENANCE

PREFACE:

This manual contains information concerning the installation, operation, and maintenance of Titan Flow Control (Titan FCI) Duplex Strainers. To ensure efficient and safe operation of Titan FCI Duplex Strainers, the instructions in this manual should be thoroughly read and understood. This manual is general in nature and is not meant to take the place of an on-site, process engineer or pipe fitter. As such, Titan FCI recommends that only experienced, skilled personnel be allowed to install and maintain Titan FCI Duplex Strainers. Please retain this manual in a location where it is readily available for reference.

GENERAL INFORMATION:

A Duplex Strainer is installed in a pipeline to remove sediment and Debris from fluids. Fluid flow is not interrupted while the basket is removed for cleaning. These Strainers are designed for pressure or suction applications.

Straining is accomplished by directing fluid flow to one strainer housing of the duplex basket strainer. Once sediments and debris are collected in the basket, fluid flow is switched and directed to the second strainer housing. The isolated basket may then be serviced without interruption of flow.

Prior to selection of a Titan FCI Duplex Strainer, the following factors must be determined:

- Material construction requirements of the Duplex Strainer.
- Design and working pressure/temperature requirements.
- Operating conditions (throttling, pressure drop, condensation, flow reversal, operation frequency, etc.).
- Service media type (liquid, gas, abrasive, corrosive, dirty, etc).
- Pipeline Media Flow-rate and Viscosity.
- Debris Size to be removed and debris loading of the pipeline.
- Ability to interrupt flow for servicing and cleaning
- Clean Start-up Pressure of the Pipeline.
- Space availability for installation. and operation.

Titan Design Engineers are available to assist in the determination of these requirements prior to selection and purchase.



Figure: 1-1



Figure: 2-1

DUPLIX TYPE STRAINER

1

DSIOM0819

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UNPACKING AND INSPECTION:

- Unpack and inspect strainer for damage that may have occurred during shipping. Any damage should be reported to the carrier immediately. Store the container in a dry, clean area until the strainer is installed.
- Prior to installation, remove strainer covers and inspect for any foreign matter that could be washed downstream when the strainer is put into service. The strainer has been packed with a preservative coating on the inside surfaces. This coating should be removed if there is a possibility of contamination of the piping system.
- See Disassembly Instructions for Service and Maintenance in this manual.
- Carefully check the pressure and temperature ratings on the strainer body or nameplate to be sure that they are correct for the intended application.
- Inspect the Duplex Strainer's flange ends and the pipeline's mating flanges to ensure gasket surfaces are free of defects. The pipeline should also be checked for proper alignment. Titan FCI Duplex Strainers should never be utilized to realign an existing piping system.

STORAGE:

1. Store your strainer indoors in a clean, dry environment whenever possible.
2. Be sure that all protective wrappings, flange protectors, plugs, etc. are in place.
3. Outdoor Storage, if unavoidable, should be treated as follows:
 - A) Cover all openings and seal flange protectors with water-proof tape.
 - B) Protect the entire strainer with heavy polyethylene wrap and seal with waterproof tape.

CAUTION:

In both indoor and outdoor storage, do not stack any object on your strainer.

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INSTALLATION:

Installation Procedure

Step 1:

Place the strainer in the line so that the liquid enters the side marked INLET. DO NOT LIFT the strainer by the knobs or handle. Use slings around body or flanges for lifting. Provide proper pipe supports to minimize loading on duplex strainer flanges.

Step 2:

Allow enough room above the strainer for easy basket removal. See DIMENSIONS AND PERFORMANCE DATA. In product literature.

Step 3:

When connecting flanged strainers to the line, be sure that the flanges are the same type: flat face to flat face or raised face to raised face. Flat face flanges require full-face gaskets. Note: Specified face-to-face dimension of the strainer an approximation one due to machining tolerances. Allow adjustment in prefabricated piping or request certified dimensions prior to shipment.

Step 4:

Check to see that flange gaskets are properly positioned before tightening bolts. Tighten bolts in a star sequence in accordance with good mechanical practice.

CAUTION:

Excessive bolt torque may damage flanges. Please refer to established flange bolt torques for guidelines.

Step 5:

We recommend the installation of flexible hoses on the pet cocks on the basket covers if service temperatures greater than 120°F are expected.

OPERATION:

Once proper installation has been successfully completed, start the system gradually, at start up as well as after shut down. This eliminates sudden shock to the strainer and other equipment in the line.

Start-up Procedure:

Step 1:

Turn handle to the center, directly over the INLET. Open pet cocks on both basket covers. SLOWLY fill the chambers with line fluid. Close pet cocks when fluid starts to flow from them.

Step 2:

Allow system to gradually reach normal operating pressure and temperature. Check carefully for leaks at this time. Be sure that all basket cover knobs and bolts are securely tightened. If there are any leaks, follow the procedures in this manual under Disassembly Instructions For Service and Maintenance.

Step 3:

Rotate handle until it is directly over one of the chambers. The handle is always over the chamber in service. DO NOT leave the handle in the center position or both baskets will become clogged, requiring the system to be shut down for cleaning. See Changeover and Cleaning Instructions in this manual for switching the flow from one chamber to the other.

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MAINTENANCE:

Titan Flow Control Duplex Basket Strainers require little monitoring once they are properly installed. The pressure differential across the basket should be checked periodically to determine if the basket needs to be cleaned or replaced. If the pressure differential goes unchecked and the screen becomes completely clogged, the screen will break and require replacing, and possibly damage downstream equipment.

Titan Flow Control Duplex Strainers are designed to require very little maintenance. Regular maintenance involves:

- Inspect baskets at each cleaning for Holes /Damages. Repair/replace as required.
- Inspect body cover seats and Gaskets. Clean seats and Gaskets as required.

CAUTION:

Before performing any kind of service, be sure to check pressure and temperature of the system and whether the fluid is corrosive or otherwise dangerous.

Bodily injury and property damage could result if appropriate protection and safety procedures are not used. Read the following instructions completely and carefully **BEFORE SERVICING**.

Keep these instructions for future reference. In the instructions below, it is important to keep in mind that the “dirty” chamber is the one in use **NOW**. The handle is always directly over the one in use. The “clean” chamber is the one that is not in use. **See Figure I-4**

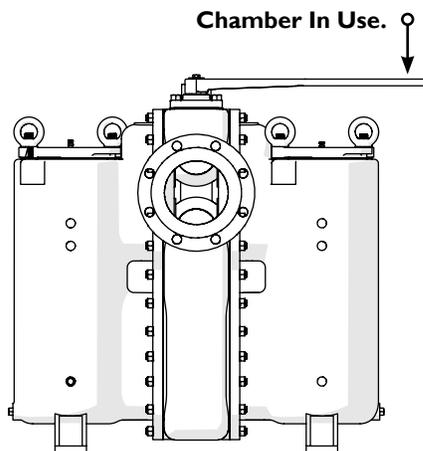


Figure: I-4

Change Over And Cleaning Instructions - STANDARD

- Step 1:
Open pet cock on clean (unused) chamber.
- Step 2:
Admit liquid slowly into the clean chamber by turning the diverter handle to the halfway position over the inlet.
- Step 3:
When liquid flows from the pet cock, close the pet cock.
- Step 4:
Examine clean chamber for leaks. If none, proceed with step 6.
- Step 5:
If leakage occurs, turn diverter handle back to its position over the dirty chamber. Vent and drain the clean chamber; remove the cover, correct the cause of leakage, replace cover and repeat steps 1 through 4.
- Step 6:
Slowly shift flow to the clean chamber by slowly rotating the diverter handle to position it over the clean chamber. If there is no leakage, proceed to step 7. If there is leakage, repeat step 5.
- Step 7:
Open pet cock slowly on the dirty chamber.
- Step 8:
Open drain plug on dirty chamber and allow liquid to drain while removing the cover.
- Step 9:
When liquid level is below the top of the strainer basket, close the drain plug.
- Step 10:
Open Cover, remove the strainer basket and allow the liquid to drip into the strainer body.

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Change Over And Cleaning Instructions continued...

Step 11:
Clean the basket and examine for damage. Repair or replace as necessary.

Step 12:
Reinstall basket.

Step 13:
Examine cover O-ring. Replace if damaged.

Step 14:
Reinstall and secure cover.

Step 15: Shift diverter handle back toward the center position.

Step 16:
When liquid flows from newly cleaned side pet cock, close pet cock.

Step 17:
Examine for leaks. If leakage is evident, go to step 5. If there is no evidence of leakage, shift diverter handle back to its position over the clean basket. The newly cleaned basket is now ready for the next changeover when needed

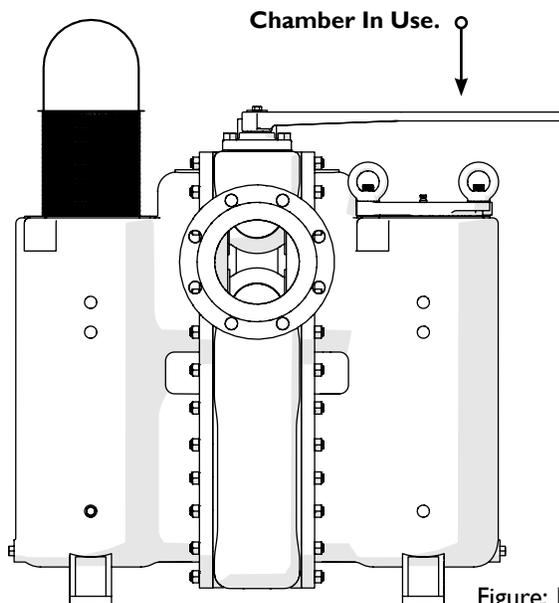


Figure: I-5

Change Over And Cleaning Instructions With Optional Equalizing Line Installed Continued...

Step 1:
Locate Equalizing Line Valve. Operate valve to both open and closed positions. Leave valve OPEN.

Step 2:
Examine clean (unused) chamber for leaks. If none, CLOSE the Equalizing Line Valve and proceed to Step 4.

Step 3:
If leakage occurs, CLOSE Equalizing Line Valve. Vent and drain the clean chamber, remove the cover, correct the cause of leakage, replace cover and repeat step 1.

Step 4:
Open pet cock on clean (unused) chamber.

Step 5:
Admit liquid slowly into the clean chamber using the Equalizing Line Valve.

Step 6:
When liquid flows from the pet cock, CLOSE the Equalizing Line Valve and pet cock.

Step 7:
Examine clean chamber for leaks. If none, proceed.

Step 8:
To reduce line pressure load on valve seats, OPEN Equalizing Line Valve.

Step 9:
Shift flow to the clean chamber by slowly rotating the diverter handle to position it over the clean chamber.

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Change Over And Cleaning Instructions With Equalizing Line Installed *Continued...*

Step 10:
CLOSE Equalizing Line Valve.

Step 11:
Open pet cock slowly on the dirty chamber.

Step 12:
Open drain plug on dirty chamber and allow liquid to drain while removing the cover.

Step 13:
When liquid level is below the top of the strainer basket, close the drain plug.

Step 14:
Remove the strainer basket and allow the liquid to drip into the strainer body.

Step 15:
Clean the basket and examine for damage. Repair or replace as necessary.

Step 16:
Reinstall basket.

Step 17:
Examine cover O-ring. Replace if damaged.

Step 18:
Reinstall and secure cover.

Step 19:
Open pet cock on newly cleaned chamber.

Step 20:
Admit liquid slowly into the newly cleaned chamber using the Equalizing Line Valve.

Step 21:
When liquid flows from the pet cock, CLOSE the Equalizing Line Valve.

Step 22:
Close pet cock.

Change Over And Cleaning Instructions With Equalizing Line Installed *Continued...*

Step 23:
To reduce line pressure load on valve seats, OPEN Equalizing Line Valve.

Step 24:
Shift flow to the newly cleaned chamber by slowly rotating the diverter handle to position it over the newly cleaned chamber.

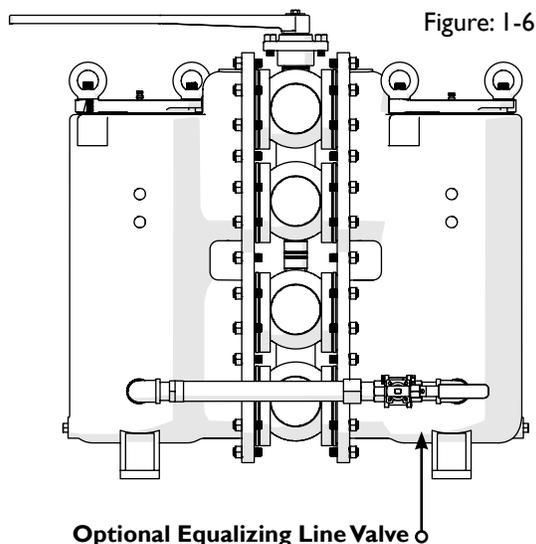
Step 25:
Examine chamber for leaks if none proceed.

Step 26:
To reduce line pressure load on valve seats, OPEN Equalizing Line Valve.

Step 27:
Shift flow back to previous side

Step 28:
CLOSE Equalizing Line Valve.

Step 29:
The newly cleaned basket is now ready for the next changeover when needed.



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DISASSEMBLY INSTRUCTIONS FOR SERVICE AND MAINTENANCE:

CAUTION:

Before performing any kind of service, be sure to check pressure and temperature of the system and whether the fluid is corrosive or otherwise dangerous.

Bodily injury and property damage could result if appropriate protection and safety procedures are not used. Read the following instructions completely and carefully BEFORE SERVICING.

Keep these instructions for future reference. This strainer can remain in the line while being serviced. If desired, it may also be removed from the line for servicing. Care should be taken when removing the basket housing. Slings should be used to remove the basket housings on these larger units. DO NOT LIFT the strainer or the basket housing by the knobs or handle.

- Step 1:
Shut down flow on both sides of the strainer.
- Step 2:
Turn diverter handle toward the center position. Open pet cocks on both chambers to bleed pressure.
- Step 3:
Open drain plugs and drain both chambers.
- Step 4:
Remove the knobs/nuts from the basket covers and remove the covers. Pull the strainer baskets from the basket housings.
- Step 5:
Unit may be serviced from either side. Turn diverter handle toward the basket housing which will be removed.
- Step 6: Remove handle from the main housing.
- Step 7:
Loosen nuts holding the basket housing and carefully pull it from the center housing. (Use a sling to ensure that the basket housing does not drop.)

Disassembly instructions for service and maintenance Continued...

- Step 8:
Slide balls and, if applicable “connection boxes” from the center housing.
- Step 9:
Remove the PTFE seats and elastomer seals.
- Step 10:
If only the seats and seals are to be replaced, skip to step 16.
- Step 11:
Remove the lower stem from the main housing by pressing it down from the top into the lower ball area.
- Step 12:
Remove the upper stem from the main housing by pressing it down from the top into the upper ball area.
- Step 13:
Inspect all O-rings on the upper and lower stems and, if worn, replace them.
- Step 14:
Slide thrust washer onto the upper stem. Lightly grease the O-rings on the upper stem. Insert the upper stem into the main housing from the upper ball area by pushing up through the top hole. Ensure that the rounded portion of the stem faces toward the basket in the main housing.
- Step 15:
Lightly grease the O-ring on the lower stem. Insert the lower stem into the main housing from the lower ball area by pushing up through the center hole. Ensure that the flats on both the upper and lower stems are in line and parallel with each other.
- Step 16:
Inspect the counter bores for the PTFE seats in the main housing to ensure that they are clean. Push the PTFE seats and seals into the counter bore, making sure that they are flat and parallel to the counter bore.

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Disassembly instructions for service and maintenance *Continued...*

Step 17:

Slide diverter ball(s) into the UPPER chamber keeping the solid side of the ball facing the fixed basket housing. Install the connection box between the balls.

Step 18:

If applicable, slide diverter ball(s) into the LOWER chamber keeping the solid side of the ball facing the fixed basket housing. Install the connection box between the balls.

Step 19:

Inspect the center housing O-ring seals and replace if worn.

Step 20:

Inspect the counter bores for the PTFE seats in the removed basket housing to ensure that they are clean. Push the PTFE seats and seals into the counter-bore making sure that they are flat and parallel to the counter bore.

Step 21:

Verify that the balls are installed correctly and slide the basket housing on to studs in the center housing. Install lock washers and nuts and tighten the nuts in the proper sequence.

Step 22:

Reinstall handle on the main housing.

Step 23:

Operate handle to verify operation. Inspect to verify solid side of ball on opposite side of handle.

Step 24:

Inspect the O-rings on the baskets and replace if worn. (Basket O-rings may not be required for unlined baskets.) Insert the baskets into the basket chambers.

Step 25:

Inspect the O-ring in the covers and replace if worn. Assemble the covers on the basket housings and tighten down with the knobs/nuts.

Step 26:

Reinstall the drain plugs in both basket housings.

SPARE PARTS:

For the bill of materials and spare parts listing of each Duplex Strainer model, please refer to the corresponding Engineering Specification Sheet. For special or fabricated units, please refer to the certified engineering for that unit.

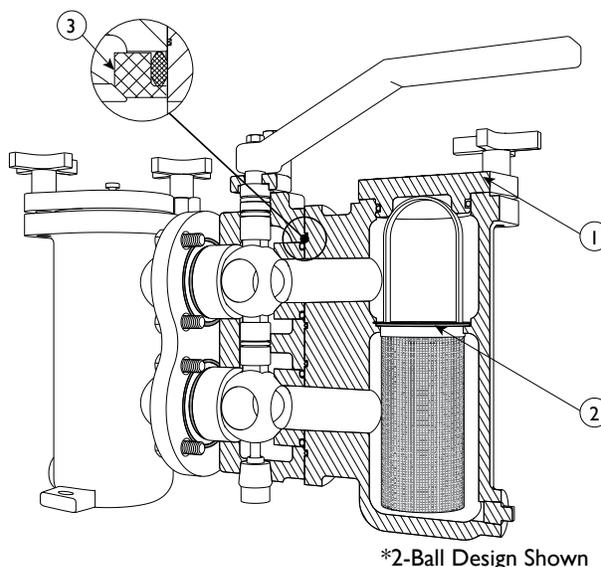


Figure I-8: CAD Illustration

SAMPLE PARTS LIST

No.	Duplex Strainer
1	BASKET
2	O-RING
3*	SEAT

*Denotes recommended spare parts

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