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# **IFC AUTOMATIC STRAINERS MODEL A150FSBW 2" Thru 24"**

## **Introduction**

The IFC Automatic Strainer is used to remove dirt and other unwanted debris from pipeline fluid. Straining is accomplished by the passing of the pipeline fluid through a wedge wire, perforated or mesh screen. During the cleaning cycle the backwash system isolates a small portion of the screen allowing both straining and cleaning to take place at the same time. Cleaning is accomplished by using a small portion of the fluid to carry the unwanted debris out the backwash line away from the strainer.

The IFC Automatic Strainer is installed where continuous removal of pipeline debris is required or where manual cleaning is not possible or unfeasible. Factors such as variable loading rates and remote installation locations make the A150FSBW the logical choice.

## **Receiving and Inspection**

(I) Prior to shipment the A150FSBW are coated externally to protect against rust. All openings are covered and the motor reducer unit wrapped with plastic. The motor is supplied mounted to the gear reducer and the backwash valve is mounted to the strainer backwash connection.

(II) Inspect strainer after unpacking for damage incurred during transit. Report any damages to IFC

immediately so that they may be attended to.

(III) Check to be sure the available electrical power matches the voltage, phase and cycle requirements of the strainer motor and automatic control panel.

(IV) Remove flange and thread protectors. Check for and remove any foreign or loose materials that could be carried down stream when the strainer is utilized.

## **Storage**

(I) Store strainers indoors in a clean, dry environment whenever possible.

(II) Replace any protection that may have been removed during receiving and/or inspection.

(III) If outdoor storage is unavoidable special treatment is required.

a) Place a bag of desiccant in each strainer to absorb moisture.

b) Apply rust preventative to any machined surface which became exposed due to handling and/or receiving inspection.

c) Wrap motor-reducer unit with plastic and secure with tape.

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## Installation

(I) Position the strainer so that the fluid enters the connection marked inlet.

(II) When lifting strainer use slings under the inlet and outlet connection

(III) Be sure that sufficient head room is provided for the removal of internal parts if required. This height can be found on the drawings that follow.

(IV) The strainer may be supported by either the mounting legs and/or pipe supports near the inlet and outlet. Do not support strainer, or piping coming to and from the strainer, by the strainer flanges and flange bolting.

(V) When connecting the strainer to the line ensure that both sets of mating flanges are the same. For example do not bolt a flat faced flange to a raised face flange.

(VI) Be sure to install gaskets between the mating flanges.

(VII) Attach the drain line to the N.P.T. threaded opening located at the bottom of the strainer. Install a manually operated valve in this line. Keep the drain valve closed except when it is necessary to remove the settled debris from the strainer bottom.

(VIII) Attach the backwash line to the backwash valve protruding

horizontally from the strainer body. It is important that a vigorous backwash flow result. Therefore it is important to prevent back pressure by having a short free flowing backwash line with a minimum number of bends, elbows or vertical risers.

(IX) Follow "**Removal of Cover and Cleaning Mechanism**" procedures.

(X) Inspect all components of the cleaning mechanism for misalignment due to handling and shipping.

(XI) Follow "**Re-assembly of Cover and Cleaning Mechanism**" procedures.

(XII) Remove the drive key and rotate the backwash arm manually. Follow "**Manual Operation of the Backwash Arm**" procedures. At Least one complete revolution should be performed to ensure that nothing will prevent the backwash from rotating when installed.

(XIII) Mount the supplied control panel and differential switch in the required location

(XIV) Connect power source to the control panel, strainer motor, backwash valve actuator and the supplied differential switch.

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## Start-Up

(I) Check the reducer for lubricant. Fill unit to pipe plug level with proper oil if level is low. See **“Reducer Maintenance”** section

(II) Open reducer vent which has been plugged to prevent lubricant loss during shipment.

(III) Loosen packing gland bolts

(IV) Energize strainer motor and/or controls

(V) Open vent on strainer cover

(VI) Slowly pressurize pipeline the strainer is installed in.

(VII) Close strainer vent when air is expelled and fluid begins to flow.

(VIII) Hand tighten packing gland bolts until only a slight weepage is observed

## Operation

During the initial operation of the strainer the operator should observe the strainer to determine the best operating mode (i.e. continuous or intermittent).

Normally the drain valve is left in the closed position. Approximately once a week adjust the valve to the full open position to remove any debris that has settled on the strainer bottom. The frequency of this

operation is directly dependent on the type and quantity of the solids being removed by the strainer.

If the strainer is supplied with a differential pressure gage take daily readings of the strainer pressure drop to ensure that the strainer is operating properly. In most cases a total pressure drop in excess of 15 psig is a warning signal which requires investigation and corrective action. If this should occur:

a) Check strainer to be sure that the backwash arm is rotating. If it is not the strainer must be turned off, cover removed and the obstructing item removed.

b) Check backwash line for obstructions. If any are found they must be removed.

c) Open the drain valve for 2 - 3 minutes to remove excess debris.

d) Should the pressure drop still remain high, close the outlet valve and open the backwash valve for several minutes. If upon resuming flow thru the strainer, the pressure drop is not normal, the strainer should be shut down.

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## Normal Shut-Down

When it becomes necessary to shut-down the strainer and it's controls:

- (I) Clean the strainer element by backwashing for at least 10 minutes.
- (II) Isolate the strainer from the fluid flow, close the backwash valve and open both the strainer drain and strainer vent.
- (III) De-energize the strainer motor and controls.
- (IV) Follow the maintenance procedures found in this manual. Do not allow the straining element to dry when dirty.

## Emergency Shut-Down

If it becomes necessary to quickly shut-down the strainer:

- (I) Isolate the strainer from the fluid flow.
- (II) Open both the drain and vent.
- (III) De-energize the strainer motor and controls.
- (IV) Follow the maintenance procedures when possible.

## Internal Maintenance

During normal intervals the strainer should be shut-down and disassembled for internal inspection.

(I) For larger sized strainers internal inspection may be performed by opening the inspection opening cover.

(II) Follow "**Removal of Cover and Cleaning mechanism**" procedures.

(III) Inspect the interior of the strainer for any signs of damage.

(IV) Examine the straining element, port shoes and guide bearing.

(V) Clean the straining element by using a bristle, water jet or, if required, steam.

## Reducer Maintenance

The reducer supplied with the strainer is factory filled with Shell "Tivela SA" synthetic oil. The reducer is lubricated for life. In the event of a major overhaul involving strip-down and re-assembly of the gear unit , the reducer requires 0.2 US/gallons of lubricating oil to function properly.

## Manual Operation of the Backwash Arm

The strainer is furnished with a removable drive key to facilitate manual operation.

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(I) De-energize the power supply to the motor and controls.

(II) Remove the spacer and both nuts located at the top of the drive shaft.

(III) Remove the gib key (If Supplied)

(IV) Replace the spacer and both lock nuts, making sure the thrust collar and the thrust spacer has been pulled up against the reducer.

(V) The backwash arm is disconnected and may be rotated manually.

(VI) Manually open the backwash valve (manually cleaning only)

(VII) Place a wrench on the flats at the top of the shaft and rotate the backwash arm as often as required to maintain a acceptable pressure drop. Do not use excessive force when rotating the arm. If resistance is suddenly met rotate the arm in the opposite direction to dislodge the obstructing debris.

When manual cleaning is complete:

(VIII) Close the backwash control valve.

(IX) Remove the nuts and spacer.

(X) Align the keyways and insert the gib key.

(XI) Re-install the spacer and both nuts

(XII) Re-energize the power supply to the strainer and its controls.

## Parts Replacement

The A150FSBW may be disassembled entirely without removal from the pipeline to permit examination or replacement of any individual part. Before beginning any maintenance ensure the strainer has been subjected to “**Normal Shut-down**” procedures.

## Removal of Cover and Cleaning Mechanism

(I) Disconnect power source and remove fuses.

(II) Disconnect electrical connections to motor.

(III) Remove cover studs and nuts.

(IV) Match mark body flange and cover flange.

(V) Using the eyebolts supplied lift the assembly.

All internal parts may be inspected and/or replaced. Minor cleaning of the straining element may now be performed.

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## Re-assembly of Cover and Cleaning Mechanism

- (I) Examine both the cover and upper and lower basket gaskets. Replace gaskets if necessary.
- (II) Lower the assembly into place lining up the body flange and cover flange match marks.
- (III) Replace cover studs and nuts and tighten.
- (IV) Follow the "Manual Operation of the Backwash Arm" procedures to ensure the strainer has been properly assembled.
- (V) Reconnect the wiring to the motor. The backwash arm must rotate clockwise to perform properly.
- (VI) Replace fuses and connect power.

## Motor Replacement

- (I) Follow "**Normal Shut-Down**" Procedures.
- (II) Disconnect power source and remove fuses.
- (III) Disconnect motor leads.
- (IV) Remove bolts holding motor to reducer.
- (V) Remove key from motor output shaft.

(VI) Install the key on the new motor, install the new motor on the reducer and secure with mounting bolts.

(VII) Reconnect the motor leads .The shaft must rotate clockwise.

(VIII) Replace fuses and connect power.

## Shaft Packing Replacement

(I) Follow "**Normal Shut-Down**" procedures

(II) Disconnect power to the strainer.

(III) Remove the drive assembly by removing the bolts holding the reducer to the strainer cover. (Not required if split packing is being used)

(IV) Remove packing gland by removing bolts.

(V) Remove packing set.

(VI) Install new packing set and replace packing gland. Care should be given not to over tighten bolts.

(VII) Reconnect the power to the motor.

(VIII) Follow "**Start-Up**" procedures. After the strainer is in operation some adjustment of the packing gland may be required.

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## Replacement of Straining Element

(I) Follow **“Normal Shut-Down”** Procedures

(II) Follow **“Removal of Cover and Cleaning Mechanism”** procedures.

(III) Invert the cover assembly and place on equally spaced supports so that the element assembly and backwash arm are accessible to be worked on.

(IV) Remove the element retaining bolts from the underside of the cover.

(V) The straining element can now be removed.

(VI) Replace the upper straining element gasket if necessary.

(VII) Place the new straining element into location and hand-tighten the element retaining bolts.

(VIII) Follow **“Manual Operation of the Backwash Arm”** procedure to allow for manual rotation of the backwash arm.

(IX) Place a wrench on the flats at the top of the shaft and rotate the backwash arm. Clearance between the backwash arm and the straining element should be adjusted to attain a minimal free running clearance. Shim where required.

(X) Check the clearance between the port shoes and the lower element support plate and cover flange. This clearance should be evenly spaced on both sides.

(XI) Follow **“Re-assembly of Cover and Cleaning Mechanism”** procedures.

(XII) Follow **“Start-Up”** procedures.

## Replacement of Port Shoes

(I) Follow steps (I) thru (V) of **“Replacement of Straining Element”** procedures. Take care to match mark the element and the cover flange.

(II) Remove the fasteners which retain the port shoes to the backwash arm flange.

(III) Assemble the new port shoe/s on the backwash arm flange

(IV) Replace the straining element into original position.

(V) Follow steps (VIII) thru (XII) of **“Replacement of Straining Element”** procedures.

## Reducer Replacement

(I) Disconnect power and remove motor leads.

(II) Remove motor flange bolts and remove motor.

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(III) Measure the distance between the top of the shaft flats and the top of the lock-nut. Retain this measurement for future reference.

(IV) Remove lock nuts, spacer and gib key.

(V) Remove bolts securing the reducer to the reducer mount and remove reducer.

(VI) Position the new reducer in same position as the original reducer.

(VII) Replace the spacer and both nuts. Make sure the top of the locknut is located the same distance from the top of the shaft flats.

(VIII) Manually rotate the drive shaft to check for binding.

(IX) Remove nuts and spacer.

(X) Align the key ways and insert gib key.

(XI) Install spacer and both nuts.

(XII) Replace motor and tighten all fasteners.

(XIII) Reconnect power supply to motor and follow **“Start-Up”** procedures.

### **Lower Bearing Replacement**

(I) Open inspection opening (If supplied) or follow **“Removal of Cover and Cleaning Mechanism”** procedures.

(II) Remove the bearing retaining nuts and slide the bearing housing up and out of it's seat.

(III) Insert new bearing housing and tighten the bearing retaining nuts.

(IV) Follow **“Manual Operation of the Backwash Arm”** procedures.

(V) Replace inspection opening cover or follow **“Re-assembly of Cover and Cleaning Mechanism”** procedure.

(VI) Follow **“Start-up”** procedures.

## **Trouble Shooting**

Possible causes of High Differential Pressure:

- (I) High solids loading rate
  - a) Increase length of backwash cycle
  - b) Backwash continuously
- (II) Piping
  - a) Shorten backwash line, eliminate elbows and other restrictions.
- (III) Backwash arm not rotating
  - a) Motor overloads tripped
    - 1. Obstruction between straining element and backwash arm.
    - 2. Misalignment of backwash arm
    - 3. Insufficient clearance between port shoes and straining element.
    - 4. Packing too tight.
    - 5. Bearing Failure
  - b) Motor / Reducer Failure
    - 1. Incorrect power applied to strainer motor.
    - 2. Lubrication level in reducer too low.
    - 3. Reducer vent plugged.
- (IV) Control Problems
  - a) Blown Fuses
  - b) Incorrect power applied to control panel and/or valves, switches, etc.
  - c) Incorrect wiring between control panel and valves, switches, alarms, etc.
  - d) Differential pressure switch improperly adjusted.
  - e) Insufficient air pressure applied to pneumatically operated backwash valves