



INSTALLATION, OPERATION and MAINTENANCE MANUAL

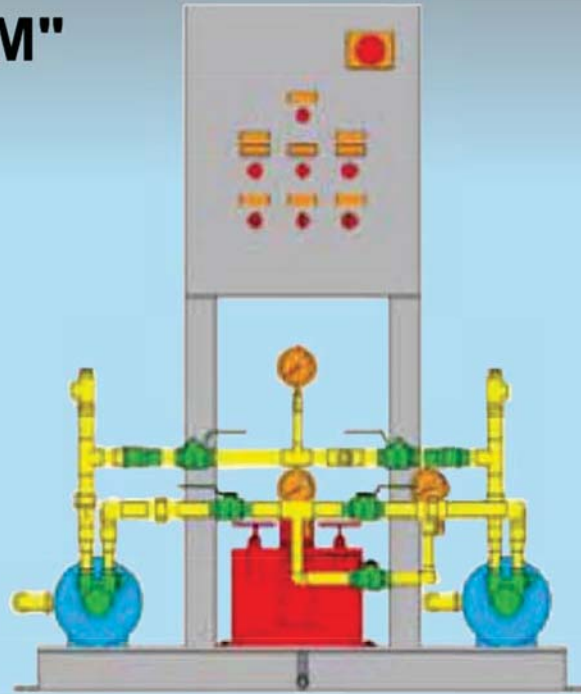
www.flofab.com

Go

With the

Fuel Oil Transfer System **FLO**

Series "FOM"



Manufacturer of Pumps, Tanks, Heat Exchangers & Accessories
for HVAC Market After-Sales Parts and Services

Fuel Oil Transfer System
Series "FOM"

FLO FAB INC
LAKE WORTH,
FLORIDA, USA

TABLE OF CONTENTS

1. PRIOR TO OPERATION	2
2. CARE UNDER OPERATION	2
3. CARE AFTER OPERATION	2
4. APPLICATION	3
5. TROUBLE SHOOTING CHART	3
6. SERVICE AND WARRANTY	4
7. TESTING	4
8. OPERATION	4
9. INSTALLATION	4
10. STARTING-UP	5
11. SYSTEM MAINTENANCE	5
12. OPERATING INSTRUCTIONS - ROTARY VANE PUMPS	6
13. FLO FAB STRAINERS - LCTY SERIES	12
14. FLO FAB STRAINERS - BS SERIES	12

C A U T I O N

PLEASE READ AND KEEP THESE INSTRUCTIONS. READ CAREFULLY BEFORE BEGINNING TO ASSEMBLE, INSTALL, RUN, OPERATE OR SERVICE THE DESCRIBE APPARATUS. PROTECT YOURSELF AND THE OTHERS BY FOLLOWING WELL ALL THE SAFETY INFORMATIONS. DISREGARDING THOSE INSTRUCTIONS CAN RESULT IN SOME SERIOUS BODY INJURIES AND/OR SOME MATERIAL DAMAGE, SO KEEP THOSE INSTRUCTIONS FOR FURTHER REFERENCES. ALSO, PEOPLE WHO ARE RESPONSABLE FOR INSTALLATION AND MAINTENANCE OF THE STRAINERS, ALWAYS HAVE TO BE CAREFUL FOR SOME LIQUID LEAKS AND ALWAYS HAVE TO PROTECT THEMSELVES PROPERLY. THE STRAINERS THAT ARE TAKEN OFF FOR THE SERVICE MUST BE MANIPULATED KNOWING THE PRESENCE OF LIQUID IN THE SYSTEM.

1. P R I O R T O O P E R A T I O N

- 1.1. Be sure to provide an adequate grounding and install with leakage breaker to prevent the users from serious electric shock injury.
- 1.2. Make sure the voltage of the power supply are identical to the indications of the nameplate (label) on the pump. Do not plug into other voltage and phase than indicated on the nameplate.
- 1.3. Do not have a dry-run in the air, it will damage the pump.

DO NOT USE THE PUMP IN EXPLOSIVE ENVIRONMENT, AND/OR ANY OTHER AREA WHERE THERE ARE PEOPLE; SERIOUS ACCIDENTS CAN OCCUR

2. C A R E U N D E R O P E R A T I O N

- 2.1. **When the pump stops suddenly (by the motor protection device) :**
The motor protection device is built-in and shuts off the circuit automatically to prevent the motor from burning-out when the motor is overloaded due to clogging by foreign particles or when plugged-in to wrong power source (Voltage, Frequency, etc.). Should the pump stop suddenly, please check piping, pump itself, connection of electrical cable to power source, etc. The motor protector always automatically trips-off in a few seconds if there is any abnormality. Please resume the operation after clearing the trouble and leave the pump as it is.
- 2.2. Please consult your local dealer or company from which the pump was purchased if you are unable to solve the problem. Unauthorized personel is prohibited from disassembling or assembling the pump as it will probably result in inferiority in performance or damage to motor.

3. C A R E A F T E R O P E R A T I O N

YOU DO NOT NEED TO TAKE ANY SPECIAL CARE ON THE PUMP AFTER OPERATION, HOWEVER, YOU MUST BE WARN OF THE FOLLOWINGS:

- 3.1. If a freezing temperature is predicted, lift up the pump and re-install it in dry condition.
- 3.2. If pump is left for a long period of time without running, rust and other possible particals will accumulate in the pump, which will inevitably shorten the life of the pump.

4. APPLICATION

THE MOST EFFICIENT, VERSATILE AND COST-EFFECTIVE PRODUCTS YOU'LL EVER USE!

- Reduce all material found in the factory oil, in institutions and in light industrial.
- Recommended for domestic and light commercial

5. TROUBLE SHOOTING CHART

TO PREVENT SERIOUS ACCIDENTS, DISCONNECT THE POWER SUPPLY BEFORE INSPECTING THE PUMP:

Malfunction	Reason(s)	Countermeasure(s)
Pump fails to start	No power is supplied (power outage)	Contact the electric power company or an electrical repair shop
	Open circuit or poor connection of the cabtyre cable	Check if there is an open circuit in the cabtyre cable or wiring
	Impeller is obstructed	Inspect the pump and remove the obstruction
Pump starts but stops immediately, causing the motor protector to actuate	Impeller is obstructed	Inspect the pump and remove the obstruction
	Voltage drop	Correct the voltage to the rated voltage, or use an extension cable that meets the standard
	A 50Hz model is operated at 60Hz	Check the nameplate and replace the pump or impeller
	The strainer is obstructed, and the pump was operated dry for long hours	Remove the obstruction
	Motor abnormal	Repair the motor or replace with a new motor
	The pump is picking up too much sediment	Place a concrete block under the pump to prevent the pump from picking-up sediment
The pump's head and pumping volume is lower	The impeller is worn	Replace
	The hose may be clogged	Minimize the number of bends in the hose, (in an area with a large amount of debris, use the pump in a meshed basket)
	The strainer is obstructed or buried	Remove the obstruction.
	The motor rotates in reverse	Interchange the power supply terminal connection
The pump generates noise or vibration	The bearing of the motor may be damaged	To replace the bearing, contact the dealer from whom you purchased the equipment

6. SERVICE AND WARRANTY

If you can not find the reasons of the problem, please consult the authorized local dealer or company from which the pump was purchased. The pump has a 1 year warranty from the invoice date. Invoice is required for any warranty work.

7. TESTING

This light oil transfer system had been through all the necessary tests in the factory to detect all hydraulic, electric and mechanical weakness.

8. OPERATION

- The pump runs continuously in order to transfer a certain oil quantity at a constant pressure for it to be sufficient to the minimum requirements wanted. If an anormal pressure drop or if one of the float happend to show "low level", at the aspiration, the pump will stop. This will be made possible by a level-switch inside the tank.
- Some control of high and low level floats will make the start of one pump, after being requested to.
- The pump has an internal relief valve which allows the flow to deviate when the pressure in the system is too high, in which we inject, has reached the oil level wanted.
- When the level has reached it's required spot, the electric supply is stopped.
- In manual position, the pump can serve up for filling the tank.

9. INSTALLATION

The system is assemble and pre-wired entirely in factory, the contractor will have to join the suction manifolds and backflow to the existing piping with the help of flexible joints. The electrician-contractor will then have to complete the control panel electrical connection to the electrical source. Copies of the control panel electrical drawings have been included with the shipment. So, the job of the contractor are resumed to :

- To connect the electrical power to the command station
- To connect the pump's discharge to the system
- To connect the relief valve's outlet to the main system

10. S T A R T I N G - U P

The mechanical contractor will have to be sure of the systems good functioning by following carefully these instructions:

10.1. Be assured that the stop gates are in the opened position.

10.2. Minimum running timer

- Only if the system is provided with an adjustable minimum running timer. Put the timer to 0 before checking pressure switches operation (if required), and then, set it to 2 minutes. This timer prevents repetitive pump starting and stopping, when desired pressure is reached.

10.3. Level switch

- Place the pump selector button at "automatic" position. The pump should start immediately.

*** If the pump doesn't start?

Adjust the level switch until the pump starts. After the pump have started, the adjustment level goal is to start the pump, in case of a low level.

When we have a low level, a red indicator lamp will light up, and the pump will stop.

10.4. Start-up level switch

- The switch allows the start-up of the pump.

*** If the pump doesn't start?

Thw switch adjustment is too high or too low, adjust the float until the start-up of the pump and keep it running until the automatic level shut-down.

Check out the backflow gauge in order to establish which level the pump will stop.

11. S Y S T E M M A I N T E N A N C E

Control panel:

- Every weakness of one or some components should be reported to the manufacturer or a qualified electrician contractor. The manufacturer won't be held responsible of controls malfunctioning, after being repaired or maintained by un-qualified staff.

OPERATING INSTRUCTIONS

12. ROTARY VANE PUMPS

DESCRIPTION

The FLO FAB's rotary vane positive displacement pumps are used for handling of clean liquids at low flow and high pressure. Bronze pump models are designed for water pumping and moderately aggressive liquids. 304/303 Stainless Steel pump are for water pumping and aggressive liquids. For non-abrasive and non-flammable liquids that are compatible with pump components materials.

Pump body is built with two brass or two 303 Stainless Steel parts, with internal bypass relief valve, and graphite carbone pump chamber and vane. **CYB** and **CYS** models are delivered with a cleanable built-in strainer. 304 Strainless Steel shaft is machined to interface with notch carbonator motor shaft. The mechanical join seal has a ceramic stationary seat, coal rotative face, Buna-N elastomer and stainless steel pieces. All pump bodies are machined bar clamp assembly. Bar clamp included.

APPLICATIONS

- Carbonated water for beverage dispensers
 - Ultra-filtration
 - Deionized water
 - Reverse-osmosis systems
 - Espresso coffee machines
 - Lubrication spraying
 - Light fuel oil
 - Insecticide spraying
 - Dispensing soap
 - Glycol Feed
 - Distilled water
 - Fire resistant fluids
 - Hydraulic oil
 - Steam cleaning machines with clean water
 - Cooling circulation
 - Pressure booster
 - Atomizing misting humidification systems
 - Laboratory pumps
 - Pilot plants
 - Boiler feeds
 - Water purification
 - Jockey fire pumps
- and many more applications...*

UNPACKING

Carefully inspect everything to possibly detect any damage that may have occurred while shipping. Check out for damage by turning the pump shaft. The shaft should turn easily.

DIMENSIONS

GALLONS PER HOUR AT PRESSURE IN POUNDS PER SQUARE INCH GAUGE (PSI)*												
FLO FAB Model		In / Out	20	40	60	80	100	120	140	160	180	200
Stainless Steel	Brass		PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI
CYS16-170	CYB16-170	3/8"	49 - 1/4hp	48 - 1/4hp	47 - 1/4hp	46 - 1/4hp	45 - 1/4hp	43 - 1/4hp	42 - 1/4hp	41 - 1/4hp	40 - 1/4hp	39 - 1/4hp
CYS16-295	CYB16-295	3/8"	111 - 1/4hp	110 - 1/4hp	109 - 1/4hp	108 - 1/4hp	107 - 1/3hp	105 - 1/3hp	104 - 1/3hp	103 - 1/3hp	102 - 1/2hp	101 - 1/2hp
CYS16-377	CYB16-377	3/8"	144 - 1/4hp	143 - 1/4hp	142 - 1/4hp	141 - 1/3hp	140 - 1/3hp	138 - 1/3hp	137 - 1/2hp	136 - 1/2hp	135 - 1/2hp	134 - 1/2hp
CYS16B-560	CYB16B-560	1/2"	201 - 1/4hp	200 - 1/3hp	198 - 1/3hp	197 - 1/3hp	196 - 1/3hp	195 - 1/2hp	194 - 1/2hp	193 - 1/2hp	192 - 1/2hp	190 - 1/2hp
CYS16-1026	CYB16-1026	1/2"	327 - 1/3hp	326 - 1/3hp	324 - 1/2hp	323 - 1/2hp	322 - 1/2hp	321 - 3/4hp	320 - 3/4hp	318 - 3/4hp	317 - 3/4hp	316 - 3/4hp

* Performance based on water at 68°F, no inlet pressure, motor speed of 1725 RPM. Flows will change in direct proportion to new speed vs. old speed

* FLO FAB pump performance in liters per hour (L/hr) and pressure in kilopascal (kPa).

GENERAL SAFETY INFORMATIONS

1. Know the pump application, limitations, and potential hazards.

C A U T I O N

DO NOT USE TO PUMP FLAMMABLE OR EXPLOSIVE FLUIDS SUCH AS GASOLINE, FUEL OIL, KEROSENE, ETC. DO NOT USE IN FLAMMABLE AND/OR EXPLOSIVE ATMOSPHERES. PUMP SHOULD ONLY BE USED WITH LIQUIDS COMPATIBLE WITH PUMP COMPONENT MATERIALS. FAILURE TO FOLLOW THIS WARNING CAN RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE.

2. Make certain that the power source (electric motor) conforms to the requirements of your equipment.
3. When wiring an electrically driven pump, follow all electrical and safety codes, as well as the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA) in the United States.

C A U T I O N

RISK OF ELECTRIC SHOCK!!!

TO REDUCE THE RISK OF ELECTRIC SHOCK, ELECTRIC MOTOR MUST BE ADEQUATELY GROUNDED TO A GROUNDED METAL RACEWAY SYSTEM, OR BY USING A SEPARATE GROUNDING WIRE CONNECTED TO BARE METAL ON THE MOTOR FRAME, OR TO THE GROUNDING SCREW LOCATED INSIDE MOTOR TERMINAL BOX, OR BY SOME OTHER SUITABLE MEANS. REFER TO THE MOST RECENT NATIONAL ELECTRICAL CODE (NEC) ARTICLE 250 (GROUNDING) FOR ADDITIONAL INFORMATION. ALL WIRING SHOULD BE DONE BY A QUALIFIED ELECTRICIAN.

4. Disconnect power before servicing. If the power disconnect is out-of-sight, lock in the open position and tag it to prevent unexpected application of power. Failure to do so could result in fatal electrical shock!
5. Release all pressure within the system before servicing any component.
6. Drain all liquids from the system before servicing.
7. Secure the discharge line before starting the pump. An unsecured discharged line will whip, possibly causing personal injury and/or property damage or puncture.
8. Check piping before each use, making certain that all connections are secure.
9. Periodically inspect pump and system components. Perform routine maintenance as required.
10. Provide a pressure relief system on pumps whose discharge line can be shut off or obstructed.
11. Personal Safety:
 - 11.1. Wear safety glasses at all times when working with pumps.
 - 11.2. Wear a face shield and proper apparel when pumping hazardous chemicals.
 - 11.3. Keep work area clean, uncluttered and properly lighted. Replace all unused tools and equipment.

- 11.4. Keep visitors at a safe distance from the work area.
- 11.5. Make workshop child proof with padlocks, master switches, and by removing starter keys.
12. All wiring should be performed by a qualified electrician.
13. Protect electrical cord from sharp objects, hot surfaces, oil and chemicals. Avoid kinking the cord. Replace or repair damaged or worn cords immediately.
14. Keep fingers and foreign objects away from ventilation and other openings. Do not insert any objects into the motor.
15. Use wire of adequate size to minimize voltage drop at the motor.
16. Do not touch an operating pump or motor. Modern pumps and motors are designed to operate at high temperatures.

C A U T I O N

DO NOT HANDLE A PUMP MOTOR WITH WET HANDS OR WHEN STANDING ON A WET OR DAMP SURFACE OR IN WATER.

INSTALLATION - FOR EXISTING INSTALLATION

1. Shut off electrical power supply to pump. Drain system (or close isolation valves on both sides of pump and relieve pressure).
2. Remove inlet and outlet connections at pump.
3. Loosen clamp that mounts pump to motor.
4. Remove pump and clamp.
5. Check that slot in motor shafts is not worn excessively or broken.

I M P O R T A N T

CHECK THAT ROTATION OF NEW PUMP MATCHES ROTATION OF OLD PUMP. IF NOT, CHANGE LOCATION OF INLET AND OUTLET PIPING AND CHANGE MOTOR ROTATION TO MATCH PUMP REQUIREMENTS. PUMP ROTATION CANNOT BE CHANGED. FAILURE TO DO SO COULD RESULT IN DAMAGE TO PUMP AND SYSTEM.

C A U T I O N

CHECK THAT HORSE-POWER METTES OR EXCEEDS WHAT IS REQUIRED BY PUMP. ROTATIONAL SPEED (RPM) OF MOTOR LISTED ON NAMEPLATE SHOULD MATCH SPEED REQUIRED BY PUMP; MAXIMUM RPM IS 1725. FAILURE TO DO SO COULD RESULT IN PROPERTY DAMAGE AND SEVERE PERSONAL INJURY OR DEATH.

6. Install pump and clamp on motor. Check that pump is aligned and not cocked in registered fit hub of motor.
7. Tighten clamp, checking that pump is secure.
8. Remove inlet and outlet port protection plugs.

I M P O R T A N T

BEFORE PROCEEDING, CHECK THAT FLUID AND SYSTEM ARE CONTAMINANT FREE. FAILURE TO DO SO COULD RESULT IN PREMATURE OR UNSATISFACTORY LIFE OF PUMP.

9. Install fittings with pipe sealant tape or soft paste on pump, taking care not to over-tighten fittings. Tighten just enough to prevent leakage. While tightening, make sure you do not put pressure on pump body or motor mounting, which would cause either to distort.
10. Double check fit of all parts, rotation of pump and motor, motor HP and RPM.
11. Fill system, including pump, with clean fluid.

I M P O R T A N T

PUMP MUST NOT RUN DRY. FAILURE TO DO SO COULD RESULT IN DAMAGE TO PUMP.

12. Reconnect power.
13. Turn system on and check for leaks and operation.

INSTALLATION - FOR NEW INSTALLATION

C A U T I O N

CHECK THAT HORSE-POWER MEETS OR EXCEEDS WHAT IS REQUIRED BY PUMP. ROTATIONAL SPEED (RPM) OF MOTOR LISTED ON NAMEPLATE SHOULD MATCH SPEED REQUIRED BY PUMP. FAILURE TO DO SO COULD RESULT IN PROPERTY DAMAGE AND SEVERE PERSONAL INJURY OR DEATH.

1. Align pump and clamp on to motor.
2. Tighten clamp, checking that pump is secure and aligned.
3. Remove inlet and outlet port protection plugs.
4. Install fittings with pipe sealant tape or soft paste on pump, taking care not to over-tighten fittings. Tighten just enough to prevent leakage. While tightening, make sure you do not put pressure on pump body or motor mounting, which would cause either to distort.

5. Double check fit of all parts, rotation of pump (check on pump) and motor, motor HP and RPM.
6. Install pump and motor following motor installation instructions.

C A U T I O N

FAILURE TO FOLLOW MOTOR INSTALLATION INSTRUCTIONS COULD RESULT IN FATAL ELECTRICAL SHOCK.

7. Fill system, including pump, with clean fluid.

I M P O R T A N T

PUMP MUST NOT RUN DRY. FAILURE TO DO SO COULD RESULT IN DAMAGE TO PUMP.

8. Turn system on and check for leaks and operation.

*** NOTE

No replacement parts available.

MAINTENANCE

C A U T I O N

MAKE CERTAIN THAT THE POWER SOURCE IS DISCONNECTED BEFORE ATTEMPTING TO SERVICE OR DISASSEMBLE ANY COMPONENTS! IF THE POWER DISCONNECT IS OUT-OF-SIGHT, LOCK IT IN THE OPEN POSITION AND TAG TO PREVENT APPLICATION OF POWER.

1. CLEANING

Inspect suction strainer periodically, clean as necessary.

2. ROUTINE

Pump should be checked for proper operation daily, weekly, monthly, etc. If anything has changed (pump noise, motor noise, leaks, etc.) since the pump was new, the pump should be removed, examined and repaired if necessary. This is a difficult motor/pump to repair, therefore only qualified electricians or servicemen should attempt to repair this unit. Improper repair and/or assembly can cause problems with the electric motor used with this unit. See General Safety Information. Retighten V-band clamp screw as necessary. Use Loctite or similar thread sealant if screw keeps loosening.

3. FREEZING TEMPERATURE AND STORAGE

Pumps should not be used or stored in areas subject to freezing temperatures.

4. REPAIR

No replacement parts are available for these pumps.

5. LUBRICATION

None.

TROUBLE SHOOTING CHART

Malfunction	Reason(s)	Countermeasure(s)
Low capacity	Inadequate inlet	Increase piping size and/or increase fluid supply
	Rotation wrong	Change rotation
	Low motor RPM	Check voltage
	Bypass valve improperly set	Set valve at proper point
Leakage through weep holes; noise	Seal damage	Replace pump, also clean system
	Inadequate inlet	Increase piping, increase fluid, lower temperature of fluid to prevent cavitation, and/or clean strainer
	Bypass valve improperly set	Lower setting below 200 PSIG and/or tighten lock nut
	Air (cavitation)	Tighten inlet pipe connections
	Misalignment	Loosen clamp and make sure pump and motor are seated properly, and/or retighten clamp
Binding	Misalignment	Loosen clamp and make sure pump and motor are seated properly, and/or retighten clamp
	Mineral deposits	Remove deposits by cleaning pump
	Grit, foreign matter	Remove by cleaning and eliminate from fluid supply by installing strainer

FLO FAB STRAINERS LCTY SERIES

FLO FAB "Y" Type Strainers and Basket Strainers

For maximum efficiency, determine the length of time it takes for screens or baskets to become approximately 1/3 clogged. If strainer is equipped with a blow-down valve and open bottom screen or basket, open valve until sediment is removed. Where strainer is not fitted for blow-down, remove cover and clean screen or basket. Replace gasket if necessary. A spare screen

or basket will facilitate shorter "Shut-down-time" during cleaning. A pressure gauge installed before and after the strainer in-line will indicate pressure loss due to clogging and may be used as a guide to determine if cleaning is required.

INSTALLATION

Prior to installation, the strainers mating flanges should be inspected to assure gasket surfaces are free of defects. Strainers should not be mounted between flanges having defective gasket surfaces. Piping should be checked to assure sufficient clearance for strainer's installation. The strainer must be visually centered with respect to the flange faces, or may be centered with flange bolting. Flange boltings should be tightened gradually in a crisscross manner. Bolting should be tightened sufficiently to prevent loosening of the joint or gaskets.

MAINTENANCE

Strainers require periodic maintenance and cleaning is required throughout the life of the product. It is, however, recommended that the following practices be followed on at least a monthly bases:

1. Operate the blowdown valve to remove debris in the basket
2. Check fasteners for evidence of loosening and correct as required
3. Inspect valve and surrounding area for previous or existing leakage at flange faces or at the blowdown valve.

FLO FAB STRAINERS BS SERIES

FLO FAB Duplex Basket Strainer

For maximum efficiency, determine the length of time it takes for screens or baskets to become approximately 1/3 clogged. Once cleaning is required, isolate the strainer chamber in which cleaning is to take place by the use of the manual actuator supplied. The manual actuator allows flow to be diverted to the other parallel strainer chamber without any interruption in fluid flow. When flow diversion is completed, remove cover and clean basket. When cleaning is completed, replace basket in strainer in original position and replace

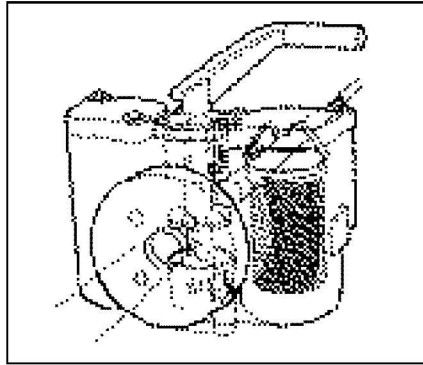
gasket if necessary. Repeat the above for the other strainer chamber when necessary. An installed pressure gauge before and after strainer inline will indicate pressure loss due to clogging and may determine if cleaning is required. Use in systems where the continuous flow of filtered liquid needs to be maintained and not interrupted to change or replace strainer baskets.

DUPLEX BASKET STRAINER OPERATION

Each strainer has one straining chamber located on each side of the main valve. Liquid flow can be diverted from one to the other by changing the position 180 degrees of the lever handle mounted on top of the main valve. The position of this handle indicates which straining chamber is in use.

EXAMPLE:

When the handle is directly over the chamber, and right angles to the pipeline flow, only the chamber below is in use. The other chamber basket can then be removed for cleaning or replacement without interrupting liquid flow.



PROBLEMS AND TECHNIQUES

1. After pressurizing, inspect cover to check for leakage between flanges. Gasket replacement or cover tightening is necessary if leakage occurs.
2. If the required filtration is not taking place, ensure basket is installed in correct position, that being flush to the body support ring.

SPARE PARTS

To order replacement screens, baskets or gaskets which are the only items normally required, specify:

- Size, figure number and filtration requirements of strainer
- Specify service. EXAMPLE: Water, oil or steam

NON-STANDARD UNIT

FLO FAB can design and fabricate your strainer to suit your operational and maintenance needs.



**Manufacturer of Pumps, Tanks, Heat Exchangers & Accessories
for HVAC Market After-Sales Parts and Services**

www.flofab.com

**FLO-FAB INC
LAKE WORTH,
FLORIDA, USA**

SEPTEMBER 2009