

AMIAD WATER SYSTEMS

ICS-TCP Series

Installation, Operation and Maintenance Instructions



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Introduction:

Amiad filtration equipment has been designed to give long, trouble-free service when properly installed, operated and maintained. This manual contains important installation procedures and should be read prior to installing. This manual is also a guide for proper filter operation maintenance and winterizing. It is important that maintenance personnel review this manual carefully, including the Safety Precautions and Warnings before performing any maintenance on this sand media water filter.

Note that the recommendations on the frequency service are minimums, and where operating conditions are severe, the service should be performed more often. For each required service, follow the procedures outlined under the Maintenance Procedures section in this manual. If additional information beyond the scope of this manual is required, contact your local Amiad Representative or the factory.

General Description:

The ICS-TCP basin cleaning system and side stream system are compact filter packages for the removal of **grit, airborne particles and scale from the cooling tower water in order to avoid system failing.**

The system use the ICS Separator with centrifugal-action performance, Amiad quality, reliability, to control buildup of solid with in a heat transfer system. The system reduces maintenance of the system, while increasing cost effectiveness as reduced blowdown and reduced chemicals provide additional savings.

Basin sweeping ICS-TCP Systems provide circulation and agitation of the cooling tower basin. Directing the flow to the filter the system can reduce buildup of solids in the tower. The condenser water ICS-TCP is a side stream after the main circulation pumps and returns back into the condenser water line, providing removal troublesome particulates that cause maintenance issues.

Pre Assembly & Start-up Checks:

- Only licensed or trained electricians and pipe fitters should install ICS-TCP systems.
- Pad should be level and structurally sound for the application and equipment.
- Proper anchor bolts should be sized correctly for the application to secure unit.
- All piping to the and from the filter is to be supported.
- Suction line is to be sized for 5ft/sec with pipe length not to exceed 30'. Long runs with elbows and fittings should be calculated for head loss to make sure pump receives proper NPSH.
- Proper gaskets and treaded sealants are required for proper sealing of the system. If you need recommendations please contact Amiad.
- Only tighten fittings, nuts & bolts, threads as required to prevent leaks.
- Power should be supplied to the unit with proper conductor size and voltage. The wiring will need to be arranged for proper pump rotation for three phase systems. It is recommended that this is performed by a trained electrician. Motor name plate provides necessary information required for electrical.



- Once fitted and wired allow water to flow into the pump, only bump the motor for rotation at this time. Caution....bumping a dry motor will damage the seals and is not a warranty event. Reverse terminal leads as required.

Start-up and Operation:

1. The pump suction strainer needs to be filled with water before starting the Pump (Tower Clean Systems only). Partially close (approximately 25%) the discharge valve and make sure that the suction valve is fully open. Start the pump and observe the pressure gauge which reads the discharge pressure of the pump at the inlet of the separator. The needle of the gauges might flicker for a few seconds and will then settle, indicating that any air in the system is being bled off naturally. If it continuously flickers and if the pump cavitates for more than a minute, bleed-off air from the system.

Once pressure has reached 20 psi or more (Tower Clean System) or 15 psi (Side Stream System), slowly open the discharge valve to ensure proper pump operation. If the valve cannot be fully opened without the pump cavitating, be sure there are the correct number of sweeper jets installed downstream of the Tower Clean System. In a Side Stream System application the valve may need to be adjusted to ensure proper backpressure on the pump. This is normal.

NOTE:

Make sure that all suction valves (from the source of water to the pump intake) are fully opened when the pump is running. Operating the system with a partially closed suction valve can damage the pump and/or affect the system's performance. Each model requires a minimum liquid submergence level (above the pump intake) to meet the pump's Net Positive Suction Head Required (NPSHR) to avoid air intrusion or cavitation (vortexing at point of source). See appropriate pump curve included with your submittal. This is also very important when Amiad sweeper jets are in use.

Entrapped air will always seek the highest elevation in the system. A valve in the system outlet will be at the highest elevation. When partially opened during start-up, it will relieve air from the system.

The Solids Recovery System, if installed with your system, must also be primed and vented at the solids collection vessel (BGFS). Please see BGFS operating procedure in this manual.

DO NOT DRY-RUN THE PUMP. All pumps require a flooded suction before starting, using water as a lubricant for their seals. John Crane-type seals (e.g., Silicon Carbide Seals) can wear out in 20 seconds of dry operation. It only takes a small amount of water to lubricate the seal, and it vaporizes during pump operation. Also, when replacing the seals, avoid touching the Silicon Carbide faces; oils, moisture and dirt from your fingers escalate seal wear.



2. Negative Lift Applications

If the water level of the sump is lower than the centerline of the pump inlet, the use of a self-priming pump might be necessary. Follow priming procedures every time the pump is started.

Consult the factory for systems requiring suction lift.

3. Winterizing

In areas subject to freezing winter temperatures, protect the pump when not in use by removing both drain plugs (from the pump volute and from the suction strainer). Use a compressed air hose to remove any water trapped in the pump casing or flush the system with antifreeze. Do not replace the plugs. Store them in the strainer basket for the winter.

Alternatively, remove the pump and motor from the plumbing entirely. Store them indoors in a warm and dry place.

The ICS Separator and the purge line should also be drained of liquid to prevent damage from freezing. To remove trapped water from the separator, use a compressed air. Alternatively, flush system with antifreeze is recommended.

Heat tracing or pipe insulation may be used. Please contact your local supplier of these products to ensure proper usage.

Maintenance:

1. ICS-TCP System start information is important, a record of all readings (inlet and outlet pressures, motor amperage draw and liquid flow rate) during start-up as reference. Please record the required information and keep a copy for your records.
 2. Record and compare these readings whenever periodic check-up and maintenance is required. These records would be helpful in troubleshooting the system when a problem occurs during the operational life of the system.
- A. Suction Strainer Basket

The suction strainer basket is sized to allow a maximum pressure drop of 2 psi at the specified flow rate. It will protect the pump, separator, flow control valves and other equipment from becoming plugged by dirt and debris 1/4" in size and greater. The strainer basket is easy to clean. Isolate the strainer by closing the isolation valves



installed before the pump and after the separator outlet. These are not provided as a standard option by Amiad, but are available if a valve kit is ordered. Loosen the nuts or threaded stud and remove the lid. Remove the basket and clean. Inspect the 'O' ring or gasket and, if damaged, replace. Replace the lid and tighten the nuts.

B. Pump and Motor

Make sure that there are no leaks in the pump housing. If leaks occur at the back of the volute casing, you may have a damaged the seal (pump seals are not covered under warranty) and/or loose bolts. Replace and/or tighten as necessary.

Whenever maintenance or repair is needed for the pump, SHUT-OFF and LOCK-OUT power into the panel feeding the pump; close the suction and discharge valves, open drain plug/valve, making sure no air or hydraulic pressure is in the system before unhooking the pump. Refer to Pump Manual.

Outside air is very important to cool the motor. The TEFC motor has a fan in the back. Ensure that the fan is rotating when motor is energized. Zerk fittings were installed in the front and back of the pump shaft/bearing housing. A small amount of grease might be needed periodically to replenish the old grease in the housing. Whenever new grease is injected, the old grease will ooze out on the opposite side and wipe clean. Please see pump and motor manufactures IOM for additional details.

C. Control Panel

See control panel IOM in this manual for details.

D. Periodically check pressure gauges for proper readings. Verify operation by opening and closing servicing valve installed prior to gauge. Stuck needles or damaged gauges will need to be replaced.

E. BGFS (Solids Recovery)

These bag filters are in place to recover separated solids from the system from the purge outlet of the ICS Separator.

Collected solids will need to be periodically removed from the BGFS. The bags can be used over if clean up to 4-5 times before discarded. The change out of the bags can be performed without disruption to the filtering process of the system.

The BGFS uses a differential pressure gauge/switch or gauges. The DP gauge will have a red zone when need to change, gauges will indicate that the filter meets a 12 PSI differential and bag needs to be changed. The electrical contact with the DP switch gives the ability for remote indication.

Steps for changing/maintenance/operation:

1. Close the manual valve on the purge line from the ICS Separator.
2. Close the valve on the line from the BGFS to pump suction. It is important to only close this valve after pressure is released.
3. Open the lid on the vessel.
4. Remove the bag retainer from the vessel with the bag filter.



5. Clean and or replace the bag in the retainer basket.
6. Inspect all seals or O-rings (replace as necessary).
7. Replace the basket and bag into the unit and secure the lid.
8. Open the from the purge line to the BGFS.
9. When the auto vent or manual vet indicated vessel is full open the valve from BGFS to pump suction.

F. Purge valves

Purge valves typically do not require periodic maintenance. With ball valve or failsafe valve it should be checked once a week for proper operation through a test purge. Also look for leakage from the seals. Replace or repair as necessary. For flush setting please review the electrical portion of this manual.

Trouble shooting:

- Pump will not prime:
 - Make sure the strainer basket is not clogged (if applicable).
 - Make sure the strainer basket is positioned correctly (if applicable).
 - Tighten the strainer lid down completely (if applicable).
 - Make sure the strainer is full of water (if applicable).
 - Tighten all the fittings and seal all the joints on the suction side.
 - Open all the valves on the return and suction lines.
 - Remove and replace the pump seal if needed.
 - Check the compatibility of the pump and motor.
 - Check pump rotation. Reverse motor wire terminals if necessary.
- Motor Runs Hot:
 - Motors will run warm to the touch. The motor starter thermal and overload module will function to tum off the motor if there is an overload current problem.
 - Factors which will increase the operating temperature:
 - The pump is installed in the direct sun.
 - Poor ventilation in the area the pump is located.
 - Low voltage is available to the pump.
 - The wiring is the incorrect size for the load.
 - The solids loading requires more than the pump's motor horsepower rating.
 - The pump is operated above the full load Amp rating of the motor.
 - Motor is experiencing imbalance load (in case of 3 phase; it is doing a single phase.)
 - Fan is broken/missing.
- Motor does not start:
 - There is a safety/shock hazard. Have a qualified electrician perform the testing. Opening the motor starter box does not shut off power into the box; it only disconnects the starter module and control transformer. Follow electro-mechanical safety lock-out procedure.
 - If the system does not start, open the motor control box and check for power and/or blown control transformer fuses. If the motor overload trips, check the overload amp setting. Adjust the overload module to



the motor's full load amp rating. Replace the overload with the correct overload module going from 460 to 230 system and re-wire the control transformer and motor terminals inside the motor junction box. Do not set or adjust to above full load amp rating.

- Deadhead pressure cannot be met:
 - First determine if the pump motor is rotating in the correct direction. Jog-start the motor control box hand switch off and on while observing the motor shaft rotation.
 - If the pump is not rotating correctly, shut off the power and switch two of the motor lead wires.
 - If the pump is rotating correctly, check for shut valves on the suction line, a clogged suction line at inlet, a clogged strainer basket, or a clogged pump.

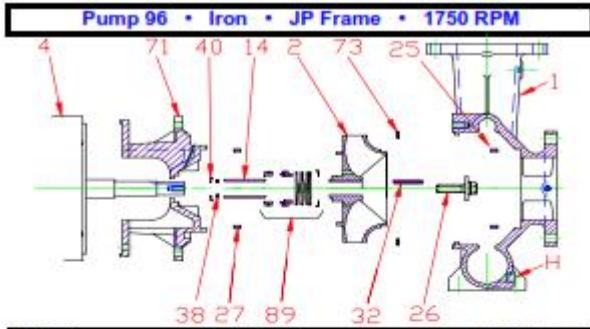
Adjust the separator outlet valve to the required pressure drop across the separator for the desired flow. If the flow rate cannot be obtained, check for closed valves downstream of the separator, or restricted outlet piping. Systems with Amiad Sweeper Jets, you can use the Sweeper Jets to act as a control valve.

- No solids in BGFS:
 - Purge valve to the inlet of the SRV is closed.
 - Air-locked in the system, bleed BGFS of trapped air. Follow BGFS maintenance procedure.
 - Purge line is blocked. Isolate the system from pressure by closing the purge line and liquid recovery line valves. Remove piping and clean out the blockage or replace the appropriate components.



Pump Data and Spare parts:

Amiad Pump Part No. 720401-000215
Amiad Pump Seal Kit Part No. 720401-000303



KEY NO.	PART NAME	PUMP NO. 96
1*	CASE, IRON, 6 x 8 P.I.G.	130.000.322X
2	IMPELLER, 1/2" KEYED, ENCLOSED, SPECIFY DIAMETER	
	IRON	137.000.149
	BRONZE	137.000.111
4	MOTOR, JP210/250	See Chart
	MOTOR, JP280/320	See Chart
14*	SHAFT SLEEVE, BRONZE	110.000.398
	SHAFT SLEEVE, STAINLESS	110.000.960
25	WEAR RING, CASE, BRONZE	103.000.190
	WEAR RING, CASE, STEEL	103.000.184
26*	IMPELLER RETAINER, STAINLESS	118.000.641
27	WEAR RING, ADAPTER, BRONZE	103.000.190
	WEAR RING, ADAPTER, STEEL	103.000.184
32*	KEY, STAINLESS	107.000.284
33*	O-RING, SHAFT, Buna	118.000.218
	O-RING, SHAFT, Viton	118.000.218A
40*	FLINGER, STAINLESS	104.000.300
71*	ADAPTER, IRON, JP210/250	132.000.357X
	ADAPTER, IRON, JP280/320	132.000.362X
73*	GASKET, GASK, FIPFH	118.000.267
	O-RING SEALS	
89*	BN-CARB/CM	101.000.196
	VN-CARB/CM	101.000.216
	VN-CARB/SIL	101.000.221
	VN-SL/SIL	101.000.231
	EPDM-CARB/SIL	101.000.196B
	EPDM-SIL/SE	137.001.555
-	REPAIR KITS	
	BN-CARB/CM SEAL	118.000.405
	VN-CARB/CM SEAL (S)	118.000.405A
	VN-CARB/SIL SEAL (S)	118.000.405B
	VN-SL/SIL SEAL (S)	118.000.405C
	EPDM-CARB/SIL SEAL	118.000.405C
	EPDM-SIL/SE SEAL	118.000.405B

* DENOTES COMPONENTS INCLUDED IN REPAIR KIT.
 * INCLUDES BRONZE WEAR RING.
 FOR STEEL WEAR RING, REPLACE SUFFIX "X" WITH "X1".
 * THE REPAIR KIT INCLUDES THE BRONZE SHAFT SLEEVE EXCEPT THE (S) INDICATED, WHICH IS STAINLESS WITH VITON SHAFT O-RING.





Company: Amiad Filtration Systems
 Name: ICS-TCP-900gpm-HH
 Date: 12/3/2015

Pump:

Size: 096-10-6.0x5.0
 Type: Endsuct-Encl
 Synch speed: 1800 rpm
 Curve: 40.000.322
 Specific Speeds:
 Dimensions:
 Speed: 1750 rpm
 Dia: 9.25 in
 Impeller:
 Ns: ---
 Nss: ---
 Suction: 6 in
 Discharge: 5 in

Search Criteria:

Flow: 900 US gpm
 Head: 70 ft
 Near miss: 5 % of Head

Fluid:

Water
 SG: 1
 Viscosity: 1.105 cP
 NPSHa: 10 ft
 Temperature: 60 °F
 Vapor pressure: 0.2563 psi a
 Atm pressure: 14.7 psi a

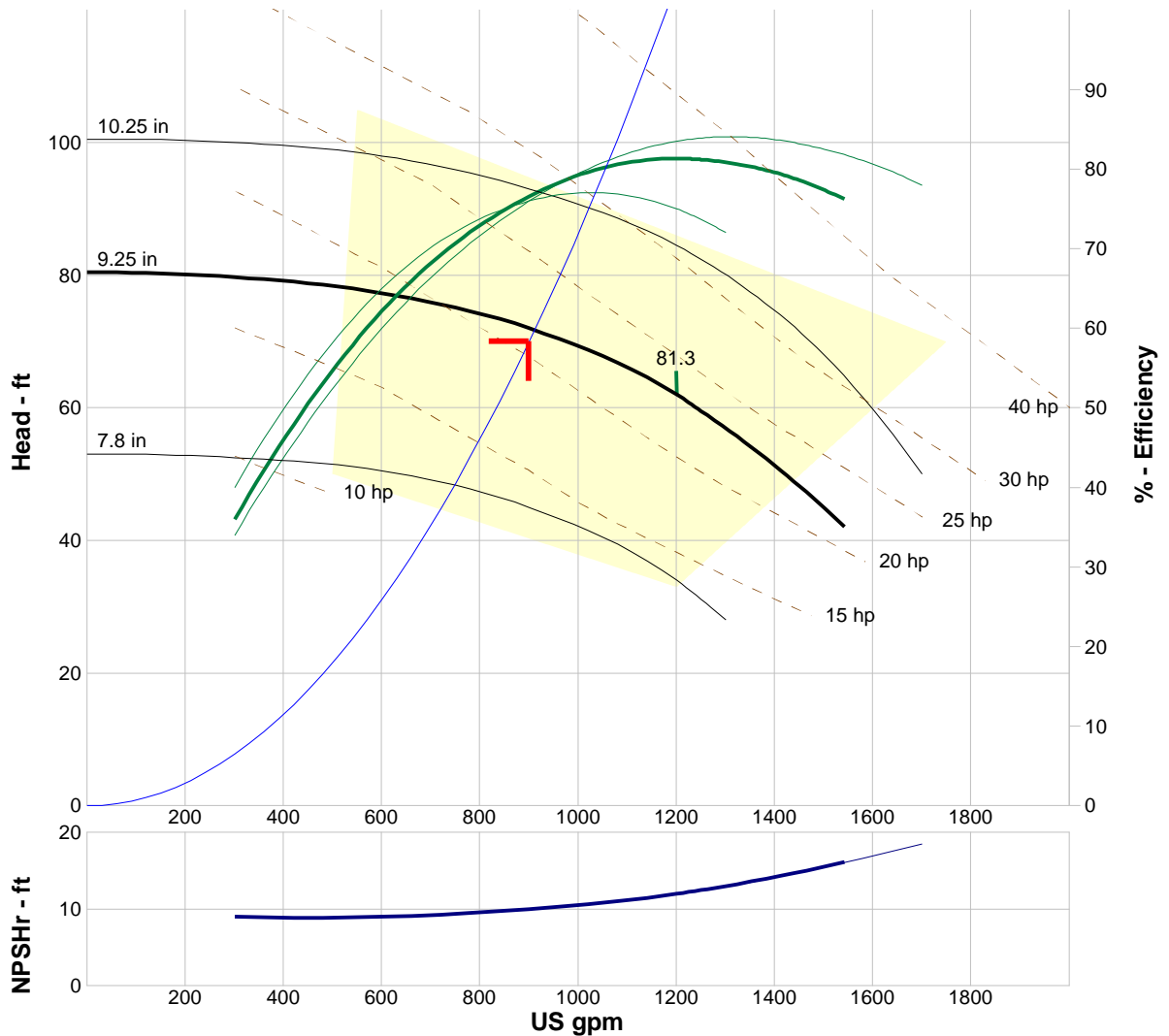
Pump Limits:

Temperature: 300 °F
 Pressure: 175 psi g
 Sphere size: 1.25 in
 Power: ---
 Eye area: ---

Motor:

Standard: NEMA
 Enclosure: TEFC
 Sizing criteria: Max Power on Design Curve
 Size: 25 hp
 Speed: 1800
 Frame: 284T

---- Data Point ----	
Flow:	900 US gpm
Head:	72 ft
Eff:	77%
Power:	21.4 hp
NPSHr:	10 ft
---- Design Curve ----	
Shutoff head:	80.4 ft
Shutoff dP:	34.8 psi
Min flow:	---
BEP:	81% @ 1200 US gpm
NOL power:	23.1 hp @ 1263 US gpm
-- Max Curve --	
Max power:	31.5 hp @ 1350 US gpm

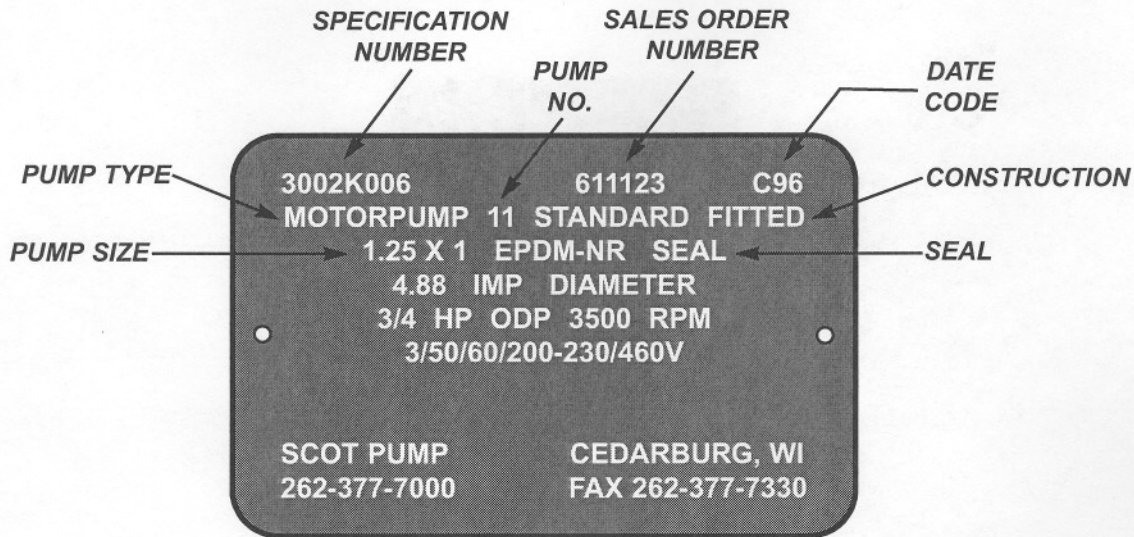


Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
1080	1750	66	79	22.4	11.2
900	1750	72	77	21.4	10
720	1750	75.2	68	19.8	9.4
540	1750	77.8	57	18.4	9
360	1750	79.2	41	17.2	9

PUMP IDENTIFICATION GUIDE

Below is a representative nameplate from one of our standard pumps:



PUMP TYPE — Designates pump driver. Example: Motorpump, Framepump, Enginepump.

PUMP NUMBER — Number designating a specific pump.

SPECIFICATION NUMBER — Refers to a specific bill of material for a pump and driver combination that identifies all of the components of the pump.

SALES ORDER NUMBER — Refers to a specific order that the pump was ordered on.

CONSTRUCTION — Identifies metallurgy of major pump components.

PUMP SIZE — Size of suction x discharge connections.

Cases include wear rings and cad steel pipe plugs. The "X" suffix indicates a bronze wear ring (where applicable) for standard fitted, bronze fitted and all bronze construction. The "X1" suffix indicates a steel wear ring (where applicable) for all iron construction.

Example: 130.000.257X — Iron Case, Includes Bronze Wear Ring
 130.000.257X1 — Iron Case, Includes Steel Wear Ring

SEAL — Identifies major components of mechanical seal.

DATE CODE — Month and year the pump was manufactured.

Scot recommends stocking a spare mechanical seal or repair kit to eliminate down time.

PM1106

SCOT

MOTORPUMP™

C56 & JM FRAME
STRAIGHT CENTRIFUGAL

1.50" & 1.75" TYPE 21 MECHANICAL SEALS

● INSTALLATION ● OPERATION ● MAINTENANCE

INCLUDES MECHANICAL SEAL REPLACEMENT

INSPECTION

Check pump for shortage and damage immediately upon arrival. Note damage or shortage on freight bill (bill of lading); immediately file claim with carrier.

EXTERIOR — Pay particular attention to conduit box, external hardware and accessories. Touch up abrasions or scratches with approved paint.

INTERNAL — If extensive or serious external damage is noted, if impeller is damaged (look in ports), or if shaft binds or sticks, disassemble as required to permit internal inspection.

HANDLING

Handle with care. Dropping or jarring can seriously damage motor bearings or break pump parts. Lift with device having capacity for pump weight, and use lifting hooks or eye bolts (if provided) or rig double sling around motor frame and pump casing. Do not use sling through pump motor adapter nor around suction and discharge flanges.

INSTALLATION

Location — Pump location should provide the following:

1. Install as close to suction supply as possible.
2. Shortest and most direct suction pipe practical. Suction lift must not exceed limit for pump. NPSH available must equal or exceed pump requirement.
3. Suction port below pumping level to provide priming.
4. Room for inspection and maintenance.
5. Correct power supply to motor; all wiring should meet National Electrical and Local Codes and Regulations.
6. If outdoors, protection from the elements, freezing and water damage due to flooding.

Piping — Suction and discharge gauges are useful to check pump operation and are excellent trouble indicators. Install gauges in the lines if pump ports do not have gauge taps. Observe these precautions when installing piping:

1. Support close to, but independently of pump.
2. Use the next larger pump size for suction and discharge.
3. Keep as straight as possible. Avoid bends and fittings.
4. Remove burrs, sharp edges, ream pipe cuts, and make joints air-tight.
5. Don't spring pipe to make connections. Strain must not be transmitted to pump.
6. Allow for pipe expansion with hot fluids; expansion joints are not recommended.

Suction — Size and install suction piping to keep pressure loss at minimum and to provide correct NPSH by observing the following:

1. The suction pipe should be equal in size or preferably one size larger than the suction connection of the pump. If pipe is larger than the pump suction, an eccentric pipe reducer should be used at the pump.
2. Pipe should slope upward to pump, even for horizontal run.
3. Use 45-degree or long-sweep 90-degree elbows.
4. A valve in the suction is necessary only on positive suction head installation and must not be used to throttle the pump. The suction valve should be installed for maintenance purposes only.

Discharge — Pumps permit discharge port location at any of four positions, 90 degrees apart. Change by removing cover bolts, rotate casing, and replace bolts. Do not slice O-ring or tear fibre gasket. Scot does not recommend bottom vertical discharge due to erratic pump performance. Ensure there is adequate clearance with selected position between wall or tank, motor conduit box, and grease fittings. Casing may extend beyond base or feet.

1. Short discharge lines may be the same size as the discharge port. Long runs require a pipe larger than the discharge port.
2. Long horizontal runs require a grade as even as possible. Avoid high spots and loops. Trapped air will throttle flow and may result in erratic pumping.

• Cedarburg, WI 53012

SCOT DIVISION OF ARDOX CORP. — HOME OFFICE
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• FAX 262-377-7330

INSTALLATION, CONT.

3. Install check and gate valves in discharge line; check valve (if used) between pump and gate valve.

OPERATION

Pre-Start — Before initial start of the pump, check as follows:

1. The rotation must be checked upon installation. Close, then break the contacts quickly and observe the rotation of the exposed portion of the rotating parts. Rotation must agree with the rotation arrow on the motor. For all pumps, the standard rotation is counterclockwise when viewed from the suction end. Motor wiring is easily changed in the field. Observe the wiring diagram on the inside of the terminal box cover, or on the motor nameplate.
2. Check voltage, phase and frequency of line circuit with motor nameplate.
3. Check suction and discharge piping and pressure gauges for proper operation.
4. Assure that pump is full of liquid (primed).

Priming — If pump is installed with a positive head on the suction, prime by opening suction valve and allowing liquid to enter the casing, at the same time venting all air out of the top of the casing.

If pump is installed with a suction lift, priming must be done by other methods, such as foot valves, ejectors, or by manually filling casing and suction line.

CAUTION - DO NOT RUN PUMP DRY HOPING IT WILL SELF-PRIME. Serious damage may result if started dry.

Starting — Proceed as follows to start pump:

1. Close drain valves and valve in discharge line.
2. Open fully all valves in the suction line.
3. Prime the pump. If pump does not prime properly, or loses prime during start-up, shut down and correct condition before repeating procedure.
4. For pumps moving high temperature liquids, open warm-up valve to circulate liquid for preheating. Close valve after pump has warmed up.
5. Start the motor (pump).
6. When pump is operating at full speed, open discharge valve slowly.

Running — Periodically inspect pump while running, but especially after first start and following repair.

1. Check pump and piping for leaks. Repair immediately.
2. Record pressure gauge readings for future reference.
3. Record voltage, amperage per phase, and kW (if an indicating wattmeter is available).
4. Adjust pump output capacity with discharge valve. DO NOT throttle suction line.

Freezing Protection — Protect pumps shut down during freezing conditions by one of the following methods:

1. Drain pump; remove all liquid from the casing.
2. Keep fluid moving in pump and insulate or heat the pump to prevent freezing. If heated, do not let temperature go above 100 to 150 degrees F.
3. Fill pump completely with antifreeze solution.

MAINTENANCE

Cleaning — Remove oil, dust, dirt, water, chemicals from exterior or motor and pump. Keep motor air inlet and outlet open. Blow out interior of open motors with clean compressed air at low pressure. Regularly drain moisture from TEFC motors.

Temperature — Total temperature, not the rise, is the measure of safe operation for a motor. If temperature by thermometer exceeds limits for insulation class, investigate and change operating conditions.

Labeled Motors — It is imperative for repair of a motor with Underwriters' Laboratories label that original clearances be held; that all plugs, screws, other hardware be fastened securely, and that parts replacements be exact duplicates or approved equals. Violation of any of the above invalidates Underwriters' label.

Lubrication — Pumps should require no maintenance, other than the motor bearings, according to the following instructions:

DOUBLE SHIELDED. When double shielded prelubricated bearings are furnished, no lubrication is required for the life of the bearings. Inspect bearings periodically to determine the condition of the grease and replace the bearings if necessary.

SINGLE SHIELDED W/GREASE FITTING PROVISIONS. When single shielded bearings are furnished, periodic inspection, cleaning and relubrication is required. See motor manufacturer's specific instructions for lubrication.

MECHANICAL SEAL REPLACEMENT

JM FRAME MOTOR

A.) Disassembly:

1. Turn off power.
2. Close suction and discharge valves.
3. Drain pump.
4. Remove bolts holding base to foundation
5. Remove casing bolts.
6. Remove motor and rotating element from casing, leaving casing and piping undisturbed.
7. Insert a screwdriver in one of the impeller waterway passages and back off the impeller retaining assembly with a socket wrench, as shown in Figure 1.

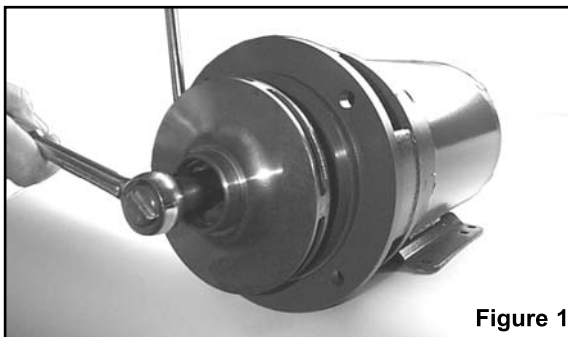
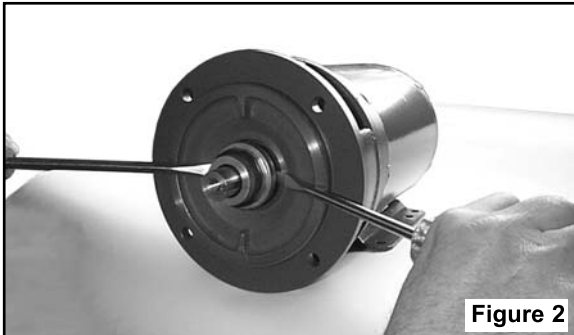


Figure 1

8. Remove impeller from shaft, being careful not to lose the impeller key, spring and seal retainer. If impeller is difficult to remove, it may be necessary to use a bearing puller to pull off impeller.
9. Pry off rotating member of mechanical seal from sleeve by using two (2) screwdrivers. (Figure 2)



10. Remove bolts holding adapter to motor and take off adapter.
11. Place adapter on a flat surface with case rabbet facing down, and push out stationary part of mechanical seal.
12. Inspect the shaft sleeve, shaft O-ring and flinger. If damaged or worn, remove and replace with a new one.

B.) Reassembly:

CAUTION: The mechanical seal is a precision product and should be handled accordingly. Use care when handling the lapped running surfaces of the mechanical seal to ensure they remain clean and free of chips or scratches.

1. Clean gasket and flange faces, seal seat cavity, shaft sleeve, and motor shaft.
2. Lubricate the seal seat cavity of the adapter and the rubber cup or O-ring of seal seat with the lubricating fluid that comes with the mechanical seal or repair kit. Press the stationary seat in seal seat cavity of the adapter squarely and evenly using an arbor press (if possible) and the cardboard disc supplied with the seal. Be certain that the lapped face (shiny side) is facing you.
3. Install the flinger on the motor shaft until it bottoms on the motor shaft.
4. Slide the shaft O-ring on the motor shaft until it is tight against the flinger. Make sure that the shaft O-ring does not get damaged during this procedure.
5. Position shaft sleeve chamfer towards motor and slide on motor shaft.
6. With motor preferably in vertical position, remount the adapter on motor, making sure the motor shaft does not dislocate or chip the stationary seat of the seal.
7. Apply the lubricating fluid that comes with the mechanical seal or repair kit to the shaft sleeve and the rubber bellows of the rotary seal. Slide the seal head on the sleeve; press the rubber drive band on the rotary head until the lapped face on the head seats firmly against the lapped face of the stationary seat. Do not chip or scratch faces during installation. Take extra care to make sure the lapped faces are clean. Install seal

spring on seal head and retainer on spring.

8. Place key in key seat. Line up keyway in impeller with key on motor shaft, and slide impeller on motor shaft. Be certain that the key is positioned in the keyway of the motor and impeller. Slightly compress seal spring with impeller and hold impeller while installing impeller retaining assembly in motor shaft.
9. Insert a screwdriver in a waterway passage of the impeller holding it against rotation and tighten the retaining assembly as discussed in paragraph 7 of disassembly instructions. The impeller will compress the seal spring to the proper length assuring the correct pressure on the lapped surfaces.
10. Remove any burrs caused by screwdriver on the vane of impeller in waterway passage.
11. Slide motor and rotating element in casing. Be sure that any damaged O-ring or gasket is replaced.
12. Tighten casing bolts alternately and evenly.
13. Replace hold-down bolts.
14. Check for free rotation after assembly is completed.
15. Seal all drain openings using pipe sealant on threads.
16. Reprime before starting. Do not start until pump is completely filled with water.

MECHANICAL SEAL REPLACEMENT

C56 FRAME MOTOR

A.) Disassembly:

1. Refer to "JM FRAME" Disassembly, Notes 1-11.
12. Inspect the stub shaft. If damaged or worn, replace with a new one; removal:
 - A.) Drive pin from stub shaft and remove pin.
 - B.) Loosen set screws
 - C.) Remove stub shaft from motor shaft.

Assembly:

For motors with drilled hole:

- A.) Slide stub shaft on motor shaft. Line up set screws in stub shaft with motor keyway, and drilled hole in stub shaft with drilled hole in motor shaft.
- B.) Tighten set screws
- C.) Insert #12 drill in pilot hole of stub and motor shaft. Drill out opposite side of stub shaft.
- D.) Install pin

For motors without a drilled hole in the motor shaft:

- A.) Slide stub shaft on motor shaft. Line up set screws in stub shaft with keyway in motor shaft.
- B.) Position stub 3 3/32" from Motor C face. See Figure 1.
- C.) Tighten set screws
- D.) Insert #12 drill in stub shaft pilot hole and drill completely through motor shaft and opposite side of stub shaft. See Figure 2.
- E.) Install pin

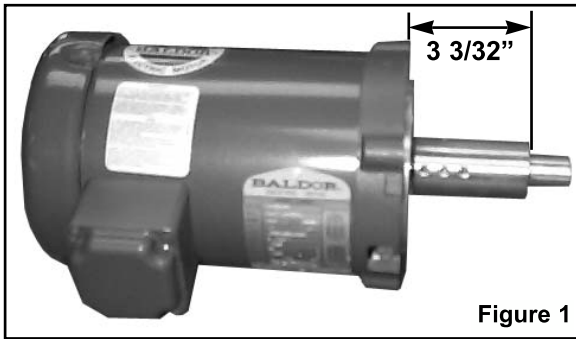


Figure 1

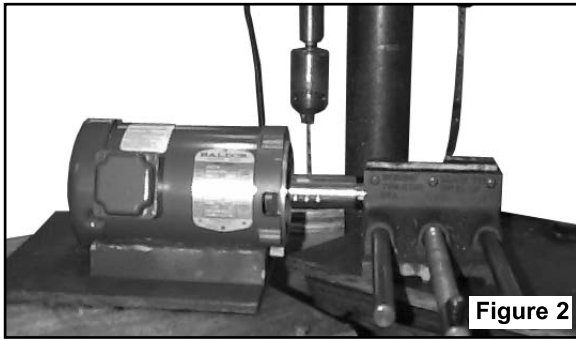


Figure 2

B.) Reassembly:

CAUTION: The mechanical seal is a precision product and should be handled accordingly. Use care when handling the lapped running surfaces of the mechanical seal to ensure they remain clean and free of chips or scratches.

1. Clean gasket and flange faces, seal seat cavity, and stub shaft.
2. Lubricate the seal seat cavity of the adapter and the rubber cup or O-ring of seal seat with the lubricating fluid that comes with the mechanical seal or repair kit. Press the stationary seat in seal seat cavity of the adapter squarely and evenly using an arbor press (if possible) and the cardboard disc supplied with the seal. Be certain that the lapped face (shiny side) is facing you.
3. With motor preferably in vertical position, remount the adapter on motor, making sure the stub shaft does not dislocate or chip the stationary seat of the seal.
4. Apply the lubricating fluid that comes with the mechanical seal or repair kit to the stub shaft and the rubber bellows of the rotary seal. Slide the seal head on the stub; press the rubber drive band on the rotary head until the lapped face on the head seats

- firmly against the lapped face of the stationary seat. Do not chip or scratch faces during installation. Take extra care to make sure the lapped faces are clean. Install seal spring on seal head and retainer on spring.
5. Place key in key seat. Line up keyway in impeller with key on stub shaft, and slide impeller on stub shaft. Be certain that the key is positioned in the keyway of the stub and impeller. Slightly compress seal spring with impeller and hold impeller while installing impeller retaining assembly in stub shaft.
6. Insert a screwdriver in a waterway passage of the impeller holding it against rotation and tighten the retaining assembly as discussed in paragraph 7 of disassembly instructions for JM shaft. The impeller will compress the seal spring to the proper length assuring the correct pressure on the lapped surfaces.
7. Remove any burrs caused by screwdriver on the vane of impeller in waterway passage.
8. Slide motor and rotating element in casing. Be sure that any damaged O-ring or gasket is replaced.
9. Tighten casing bolts alternately and evenly.
10. Replace hold-down bolts.
11. Check for free rotation after assembly is completed.
12. Seal all drain openings using pipe sealant on threads.
13. Reprime before starting. Do not start until pump is completely filled with water.

The approved lubricating fluid for seal installation is included with the mechanical seal or repair kit. **DO NOT USE OTHER LUBRICATING LIQUIDS!**

WE RECOMMEND STOCKING A SPARE MECHANICAL SEAL OR REPAIR KIT TO ELIMINATE DOWN TIME.

**PRESSURE AND TEMPERATURE LIMITATION
STANDARD FITTED PUMPS**

PUMP NO.	PRESSURE		TEMPERATURE	
	STANDARD	OPTIONAL	STANDARD	OPTIONAL
68, 69	75 PSI	N/A	220°F	275°F
51, 61, 74	75 PSI	150 PSI	220°F	275°F
71, 72, 77, 78, 79, 82	75 PSI	N/A	220°F	275°F
11, 13, 60	75 PSI	150 PSI	220°F	275°F
62	165 PSI	165 PSI	220°F	275°F
ALL OTHERS	175 PSI	175 PSI	220°F	275°F
N/A-NOT AVAILABLE				

CAUTION

DO NOT ALLOW EITHER THE DISCHARGE PRESSURE OR THE TEMPERATURE OF THE LIQUID TO EXCEED THE LIMITATIONS LISTED ABOVE.

SCOT

MOTORPUMP™

TCZ & JP FRAME
STRAIGHT CENTRIFUGAL
1.50" & 1.75" TYPE 21 MECHANICAL SEAL

● INSTALLATION ● OPERATION ● MAINTENANCE INCLUDES MECHANICAL SEAL REPLACEMENT

INSPECTION

Check pump for shortage and damage immediately upon arrival. Note damage or shortage on freight bill (bill of lading); immediately file claim with carrier.

EXTERIOR — Pay particular attention to conduit box, external hardware and accessories. Touch up abrasions or scratches with approved paint.

INTERNAL — If serious external damage is noted, or if shaft binds or sticks, disassemble pump and inspect.

HANDLING

Handle with care. Dropping or jarring can seriously damage motor bearings or break pump parts. Lift with device having capacity for pump weight, and use lifting hooks or eye bolts (if provided) or rig double sling around motor frame and pump casing. Do not use sling through pump motor adapter nor around suction and discharge flanges.

INSTALLATION

Location — Pump location should provide the following:

1. Install as close to suction supply as possible. Use shortest and most direct suction pipe practical. Suction lift must not exceed limit for pump. NPSH available must equal or exceed pump requirement.
2. A flooded suction is desirable. The suction port must be below liquid level to provide priming.
3. Room for inspection and maintenance.
4. Correct power supply to motor; all wiring should meet National Electrical and Local Codes and Regulations.
5. If outdoors, protection from the elements, freezing and water damage due to flooding.

Piping — Suction and discharge gauges are useful to check pump operation and are excellent trouble indicators. Install gauges in the lines if pump ports do not have gauge taps. Observe these precautions when installing piping:

1. Support close to, but independently of pump.
2. Use the next larger pump size for suction and discharge.
3. Keep as straight as possible. Avoid bends and fittings.
4. Remove burrs, sharp edges, ream pipe cuts, and make joints air-tight.
5. Don't spring pipe to make connections. Strain must not be transmitted to pump.
6. Allow for pipe expansion with hot fluids; expansion joints are not recommended.

Suction — Size and install suction piping to keep pressure loss at minimum and to provide correct NPSH by observing the following:

1. The suction pipe should be equal in size or preferably one size larger than the suction connection of the pump. If pipe is larger than the pump suction, an eccentric pipe reducer should be used at the pump.
2. Use 45-degree or long-sweep 90-degree elbows.
3. A valve in the suction is necessary only on positive suction head installation and must not be used to throttle the pump. The suction valve should be installed for maintenance purposes only.

Discharge — Pumps permit discharge port location at any of four positions, 90 degrees apart. Change by removing cover bolts, rotate casing, and replace bolts. Do not slice O-ring or tear fibre gasket. Scot does not recommend bottom vertical discharge due to erratic pump performance. Ensure there is adequate clearance with selected position between wall or tank, motor conduit box, and grease fittings. Casing may extend beyond base or feet.

• Cedarburg, WI 53012

SCOT DIVISION OF ARDOX CORP. — HOME OFFICE
• P.O. Box 286

• 262-377-7000

• FAX 262-377-7330

INSTALLATION, CONT.

1. Short discharge lines may be the same size as the discharge port. Long runs require a pipe larger than the discharge port.
2. Long horizontal runs require a grade as even as possible. Avoid high spots and loops. Trapped air will throttle flow and may result in erratic pumping.
3. Install check and gate valves in discharge line; check valve (if used) between pump and gate valve.

OPERATION

Pre-Start — Before initial start of the pump, check as follows:

1. The rotation must be checked upon installation. Close, then break the contacts quickly and observe the rotation of the exposed portion of the rotating parts. Rotation must agree with the rotation arrow on the motor. For all pumps, the standard rotation is counterclockwise when viewed from the suction end. Motor wiring is easily changed in the field. Observe the wiring diagram on the inside of the terminal box cover, or on the motor nameplate.
2. Check voltage, phase and frequency of line circuit with motor nameplate.

Priming — Pumps installed with a flooded suction can be primed by opening suction valve and allowing liquid to enter the casing. At the same time vent air out the top of the casing.

If pump is installed with a suction lift, priming must be done by other methods, such as foot valves, ejectors, or by manually filling casing and suction line.

CAUTION - DO NOT RUN PUMP DRY. Serious damage may result if started dry.

Starting — Proceed as follows to start pump:

1. Close drain valves and valve in discharge line.
2. Open fully all valves in the suction line.
3. Prime the pump. If pump does not prime properly, or loses prime during start-up, shut down and correct condition before repeating procedure.
4. For pumps moving high temperature liquids, open warm-up valve to circulate liquid for preheating. Close valve after pump has warmed up.
5. Start the motor (pump).
6. When pump is operating at full speed, open discharge valve slowly.

Running — Periodically inspect pump while running, but especially after first start and following repair.

1. Check pump and piping for leaks. Repair immediately.
2. Record pressure gauge readings for future reference.
3. Record voltage, amperage per phase, and kW (if an indicating wattmeter is available).
4. Adjust pump output capacity with discharge valve. DO NOT throttle suction line.

Freezing Protection — Protect pumps shut down during freezing conditions by one of the following methods:

1. Drain pump; remove all liquid from the casing.
2. Keep fluid moving in pump and insulate or heat the pump to prevent freezing. If heated, do not let temperature go above 100 to 150 degrees F.

3. Fill pump completely with antifreeze solution.

MAINTENANCE

Cleaning — Remove oil, dust, dirt, water, chemicals from exterior of motor and pump. Keep motor air inlet and outlet open. Blow out interior of open motors with clean compressed air at low pressure. Regularly drain moisture from TEFC motors.

Temperature — Total temperature, not the rise, is the measure of safe operation for a motor. If temperature by thermometer exceeds limits for insulation class, investigate and change operating conditions.

Labeled Motors — It is imperative for repair of a motor with Underwriters' Laboratories label that original clearances be held; that all plugs, screws, other hardware be fastened securely, and that parts replacements be exact duplicates or approved equals. Violation of any of the above invalidates Underwriters' label.

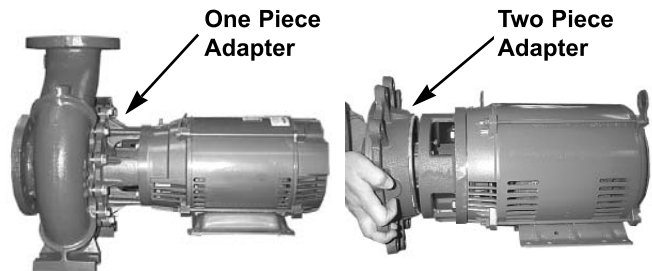
Lubrication — Pumps should require no maintenance, other than the motor bearings, according to the following instructions:

DOUBLE SHIELDED AND DOUBLE SEALED. When prelubricated bearings are furnished, no lubrication is required for the life of the bearings. Inspect bearings periodically to determine the condition of the grease and replace the bearings if necessary.

SINGLE SHIELDED W/GREASE FITTING PROVISIONS. When single shield bearings are furnished, periodic inspection, cleaning and relubrication is required. See motor manufacturer's specific instructions for lubrication.

PUMP IDENTIFICATION

The pumps are manufactured with a one piece adapter or a two piece adapter. Identify design from photos shown below.



MECHANICAL SEAL REPLACEMENT ONE PIECE ADAPTER

A.) Disassembly:

1. Turn off power.
2. Close suction and discharge valves.
3. Drain pump.
4. Remove bolts holding base to foundation
5. Remove casing bolts.
6. Remove motor and rotating element from casing, leaving casing and piping undisturbed.
7. Insert a screwdriver in one of the impeller waterway passages and back off the impeller retaining nut with a socket wrench as shown in Figure 1.

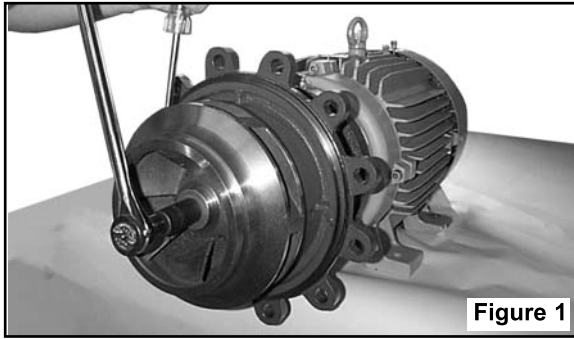


Figure 1

8. Remove impeller from shaft, being careful not to lose the impeller key, spring and seal retainer. If impeller is difficult to remove, it may be necessary to use a bearing puller to pull off impeller.
9. Pry off rotating member of mechanical seal from sleeve by using two (2) screwdrivers. (Figure 2)

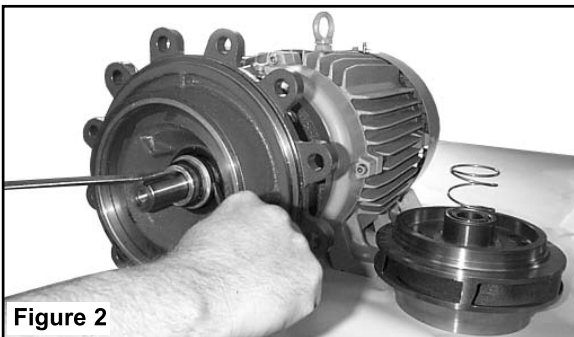


Figure 2

10. Remove bolts holding adapter to motor and take off adapter.
11. Place adapter on a flat surface with case rabbet facing down, and push out stationary part of mechanical seal.
12. Inspect shaft sleeve, shaft O-ring and flinger. If damaged or worn, replace with a new one.

B.) Reassembly:

CAUTION: The mechanical seal is a precision product and should be handled accordingly. Use care when handling lapped running surfaces of the mechanical seal to ensure they remain clean and are free of chips or scratches.

1. Clean gasket and flange faces, seal seat cavity, shaft sleeve and motor shaft.
2. Lubricate the seal seat cavity of the adapter and the rubber cup or O-ring of seal seat with the lubricating fluid that comes with the mechanical seal or repair kit. Press the stationary seat in seal seat cavity or the adapter squarely and evenly using an arbor press (if possible) and the cardboard disc supplied with the seal. Be certain that the lapped face (shiny side) is facing you.
3. Install the flinger on the motor shaft until it bottoms on the motor shaft.
4. Slide the shaft O-ring on the motor shaft until it is tight against the flinger. Make sure that the shaft O-ring does not get damaged during this procedure.
5. Position shaft sleeve chamfer towards motor and slide on motor shaft.

6. Remount the adapter on motor, making sure the motor shaft does not dislocate or chip the stationary seat of the seal.
7. Apply the lubricating fluid that comes with the mechanical seal or repair kit to the shaft sleeve and the rubber bellows of the rotary seal. Slide the seal head on the sleeve; press the rubber drive band on the rotary head until the lapped face on the head seats firmly against the lapped face of the stationary seat. Install seal spring on head and seal spring retainer on spring. Do not chip or scratch faces during installation. Take extra care to make sure the lapped faces are clean.
8. Place key in key seat. Line up keyway in impeller with key on motor shaft, and slide impeller with key on motor shaft. Be certain that the key is positioned in the keyway of the motor and impeller. Slightly compress seal spring with impeller and hold impeller while installing impeller retaining assembly in motor shaft.
9. Insert a screwdriver in a waterway passage of the impeller holding it against rotation as described in paragraph 7 of disassembly instructions, and tighten impeller retaining assembly. The impeller will compress the seal spring to the proper length assuring the correct pressure on the lapped surfaces.
10. Remove any burrs caused by screwdriver on the vane of impeller in waterway passage.
11. Slide motor and impeller into the pump case. Replace any damaged gasket.
12. Tighten casing bolts alternately and evenly.
13. Replace hold-down bolts.
14. Check for free rotation after assembly is completed.
15. Seal all drain openings, using pipe sealant on threads.
16. Reprime before starting. Do not start unit until pump is completely filled with water.

The approved lubricating fluid for seal installation is included with the mechanical seal or repair kit. **DO NOT USE OTHER LUBRICATING LIQUIDS!**

MECHANICAL SEAL REPLACEMENT TWO PIECE ADAPTER

A.) Disassembly:

1. Refer to "One Piece Adapter" Disassembly, Notes 1-8.
9. Remove bolts holding cover to pump adapter. Pry cover from pump adapter. This process will remove mechanical seal head and shaft sleeve from motor shaft. Use caution when removing cover to eliminate the possibility of marring shaft sleeve. See Figure 2.
10. Remove (4) bolts that hold seal plate to cover. Place seal plate on flat surface and push out stationary part of mechanical seal.
11. It is not necessary to remove adapter from motor.

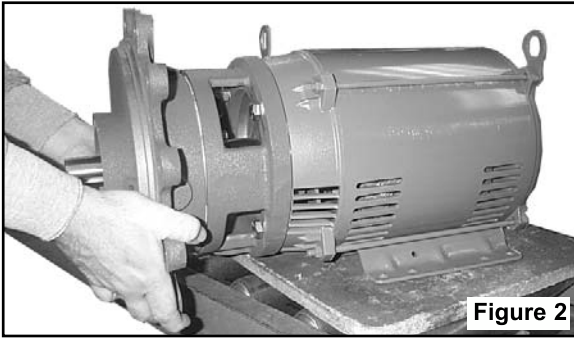


Figure 2

A.) Reassembly:

1. Clean gasket and flange faces, seal seat cavity, shaft sleeve, and motor shaft.
2. Lubricate the seal seat cavity of the seal plate and the rubber cup or O-ring of seal seat with the lubricating fluid that comes with the mechanical seal or repair kit. Press the stationary seat in seal seat cavity of the seal plate squarely and evenly using an arbor press (if possible) and the cardboard disc supplied with the seal. Be certain that the lapped face (shiny side) is facing you.
3. Install seal plate in pump cover and tighten bolts alternately and evenly. See Figure 3.



Figure 3

4. Install the flinger on the motor shaft until it bottoms on the motor shaft.
5. Slide the shaft O-ring on the motor shaft until it is tight against the flinger. Make sure that the shaft O-ring does not get damaged during this procedure.
6. Position shaft sleeve chamfer towards motor and slide on motor shaft.
7. Remount cover to the adapter on motor, making sure the motor shaft does not dislocate or chip the stationary seat of the seal.

8. Apply the lubricating fluid that comes with the mechanical seal or repair kit to the shaft sleeve and the rubber bellows of the rotary seal. Slide the seal head on the sleeve; press the rubber drive band on the rotary head until the lapped face on the head seats firmly against the lapped face of the stationary seat. Install seal spring on head and seal spring retainer. Do not chip or scratch faces during installation. Take extra care to make sure the lapped faces are clean.
9. Place key in key seat. Line up keyway in impeller with key on motor shaft, and slide impeller on motor shaft. Be certain that the key is positioned in the keyway of the motor and impeller. Slightly compress seal spring with impeller and hold impeller while installing impeller retaining assembly in motor shaft.
10. Insert a screwdriver in a waterway passage of the impeller holding it against rotation and tighten impeller retaining assembly as discussed in paragraph 7 of the "One Piece Adapter" disassembly instructions. The impeller will compress the seal spring to the proper length assuring the correct pressure on the lapped surfaces.
11. Remove any burrs caused by screwdriver on the vane of impeller in waterway passage.
12. Slide motor and impeller into the pump case. Replace any damaged gasket.
13. Tighten casing bolts alternately and evenly.
14. Replace hold-down bolts.
15. Check for free rotation after assembly is completed.
16. Seal all drain openings, using pipe sealant on threads.
17. Reprime before starting. Do not start unit until pump is completely filled with water.

The approved lubricating fluid for seal installation is included with the mechanical seal or repair kit. **DO NOT USE OTHER LUBRICATING LIQUIDS!**

WE RECOMMEND STOCKING A SPARE MECHANICAL SEAL OR REPAIR KIT TO ELIMINATE DOWN TIME.

**PRESSURE AND TEMPERATURE LIMITATION
STANDARD FITTED PUMPS**

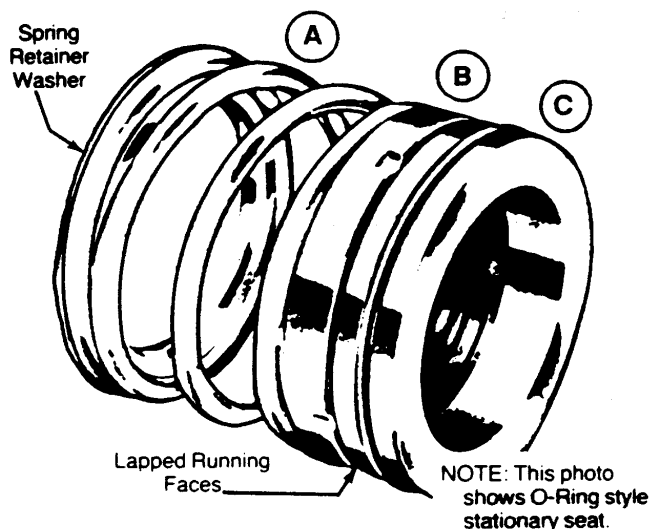
PUMP NO.	PRESSURE		TEMPERATURE	
	STANDARD	OPTIONAL	STANDARD	OPTIONAL
68, 69	75 PSI	N/A	220°F	275°F
51, 61, 74	75 PSI	150 PSI	220°F	275°F
71, 72, 77, 78, 79, 82	75 PSI	N/A	220°F	275°F
11, 13, 60	75 PSI	150 PSI	220°F	275°F
62	165 PSI	165 PSI	220°F	275°F
ALL OTHERS	175 PSI	175 PSI	220°F	275°F
N/A-NOT AVAILABLE				

CAUTION

DO NOT ALLOW EITHER THE DISCHARGE PRESSURE OR THE TEMPERATURE OF THE LIQUID TO EXCEED THE LIMITATIONS LISTED ABOVE.

SCOT

INSTALLATION INSTRUCTIONS TYPE 21 SHAFT SEAL



The seal assembly consists of these components:

- A SPRING
- B ROTARY SEAL HEAD
- C STATIONARY SEAT - May have an O-ring groove in seat (C) or a rubber cup seat (CC).

CAUTION: This seal is a precision product and should be handled accordingly. Be especially careful of the lapped sealing surface of the rotary washer and stationary seat.

THE SEAL IS SUPPLIED WITH A PACKET OF LUBRICANT.

LAPPED RUNNING FACES

The lapped running surfaces of the rotary seal head and stationary seat must be treated with care. **KEEP CLEAN. DO NOT SCRATCH.** Use a clean, soft cloth during installation. Protect the faces. Install both the seat and rotary square to the shaft. Check the stationary seat installation from behind the seal cavity for squareness.

STATIONARY SEAT INSTALLATION (C)

Clean the seal seat cavity of the adapter and lubricate.

Lubricate the seat O-ring or cup and press the stationary seat in seal cavity of the adapter squarely and evenly using an arbor press and the cardboard disc supplied with the seal. Be careful not to scratch or touch the lapped surface of stationary seat.

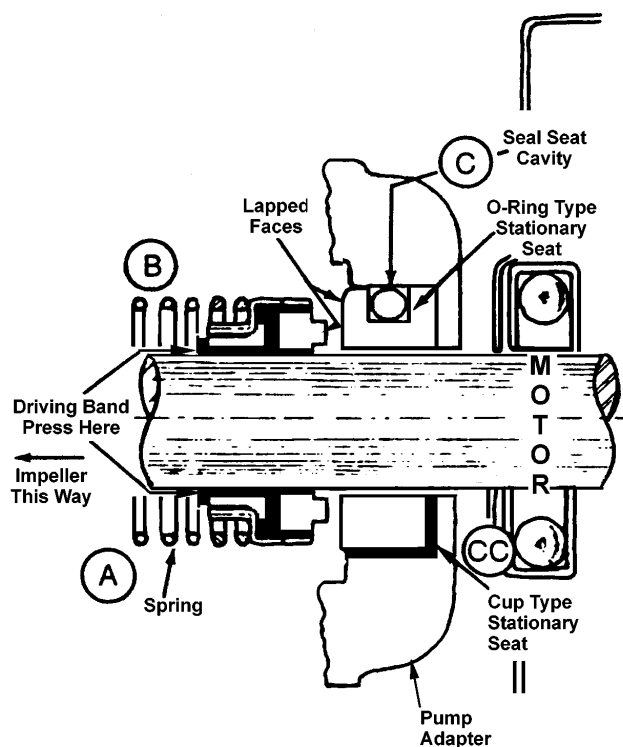
Inspect the face of the stationary seat to be certain there is no dirt on face. If there is any dirt or fingerprints on the face, wipe it off carefully with a soft cloth.

ROTARY SEAL HEAD INSTALLATION (B)

Clean, polish and lubricate the shaft (or shaft sleeve).

Check lapped faces on the stationary seat and rotary seal head. Be certain no dirt is on either face. Lubricate lightly.

Slide the rotary seal head on the shaft with the carbon rotating ring facing the stationary seat. Press the drive band until the head seats firmly against the seat. Install spring (and spring retainer washer if used). Install impeller which will compress the spring to proper length assuring correct pressure on the lapped faces.



CAUTION: Never operate the lapped running faces dry. The liquid being handled ensures proper lubrication.

In some cases a short period of operation is required to clear up slight leakage.

NOTE: The lubricant supplied with the seal is the only approved lubricant. **DO NOT USE OTHER LUBRICATING LIQUIDS!**

HOME OFFICE			
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FACTORY BRANCHES			
• Irvine, CA 92614	• 1881 Kettering	• 949-756-8076	• FAX 949-756-9480
• Ft. Lauderdale, FL 33315	• 77 SW 20th Street	• 954-524-6776	• FAX 954-764-3361

SCOT DIVISION OF
ARDOX CORP.

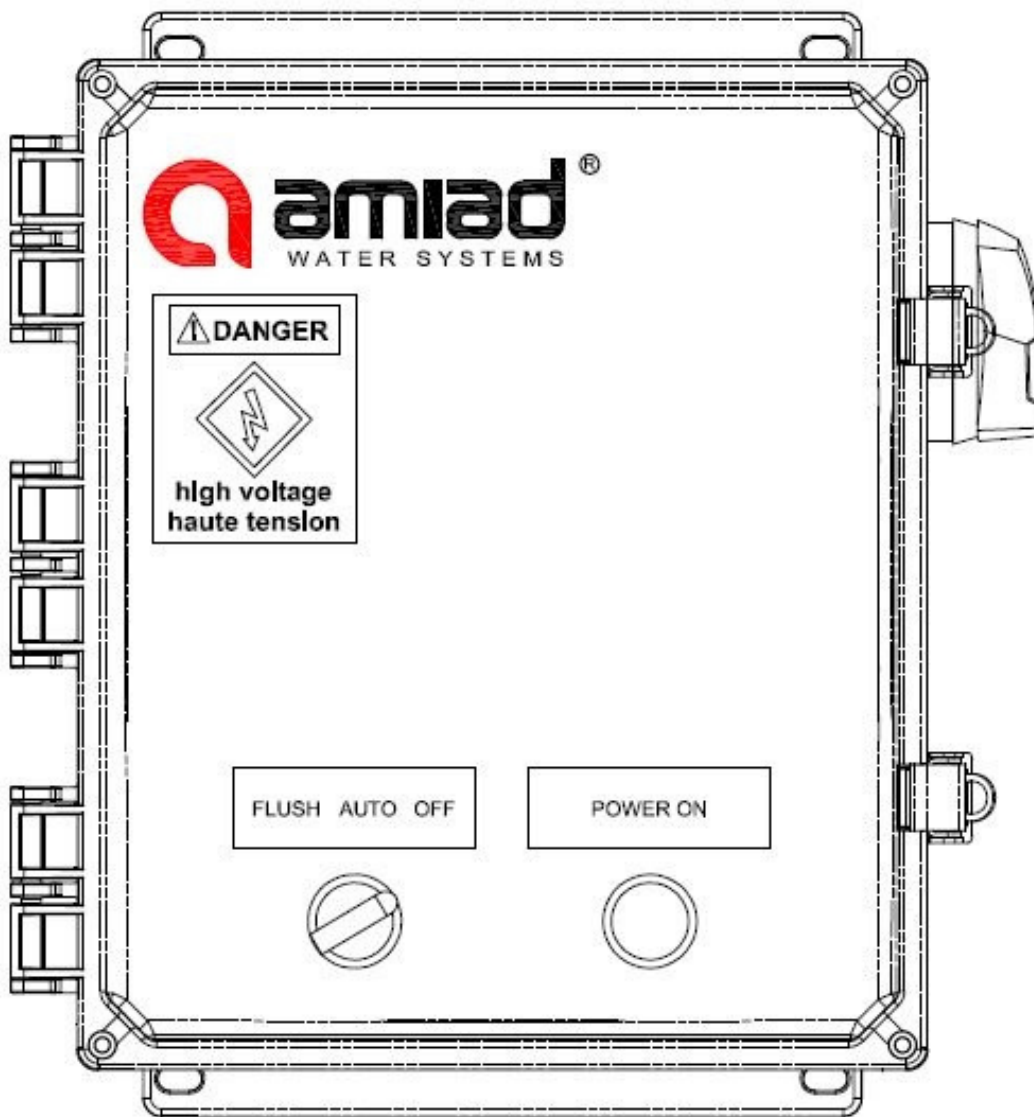
SUCCESSFUL SEAL INSTALLATION

1. **Read entire installation procedure** before beginning installation.
2. **Handle components carefully.** Careless handling of the critical seal components may result in chipping, cracking or breakage.
3. **Do not touch sealing areas.** The sealing faces, O-rings, wedges, and bellows must kept perfectly clean. Even a fingerprint can cause a seal to leak. Primary and secondary sealing areas must be kept clean and undamaged to ensure a proper seal. Rubber gaskets tear easily when handled carelessly.
4. Make sure that the **shaft or sleeve is free of burrs, nicks, grooves, and sharp edges.**
5. **Bleed all trapped gases from the seal cavity before start-up,** otherwise the seal cavity may vapor lock and burn the seal.
6. **All valves must be open on the suction side of the pump** so that the seal is assured of a positive flow of liquid at all times. Failure to do so will also cause the seal to burn.

Amiad USA, INC

Level I Filter Controller

UL 508A Standard



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1. Introduction

Dear Customer,

We are very happy that you decided in favor of our product. We would like to wish you smooth and successful operation with your Filter System. We are sure that it will meet your requirements to the full extent.

If operated and maintained properly, it can be used for many years. Naturally we are dependent on your help as well. Please inform us on possibilities for improvements of our product.

Do you have any questions? We are looking forward to you contacting us:

Amiad USA, Inc.
120-J Talbert Road
Mooresville, NC 28117
704-662-3133

2. Safety



2.1 Intended Use

The concept of intended use also comprises the implementation of the maintenance and service works in due time.

Using the equipment in potentially explosive atmospheres is inadmissible unless otherwise noted.

Any

- Retrofitting or attachment works
- Use of spare parts that are not genuine
- Repairs implemented by companies or persons that are not authorized by the manufacturer implemented without any explicit and written approval of the manufacturer will result in the warranty becoming null and void.

2.2 Personnel selection and qualification



Persons operating or maintaining the Amiad Controller have to

- Be at least 18 years of age
- Be trained sufficiently as regards to the corresponding activities
- Be familiar with the relevant technical rules and safety regulations and observe the same

The End-User will decide on the required qualifications for the

- Operating personnel
- Maintenance personnel
- Service Personnel

The End-User has to ensure that only personnel implements activities on the Amiad Controller which have been commissioned to do so.

Personnel, who are trained, broken in, instructed or personnel within the framework of a general vocational training must only implement activities on the Amiad Controller under constant supervision. Working on electronic components must only be implemented by qualified personnel.

The term qualified personnel comprises of persons able to implement the required activities in each case on the basis of their vocational training and experience, as well as their knowledge of relevant provisions, valid standards, and regulations on the prevention of accidents and, in doing so, able to identify and prevent possible risks. These persons have to be authorized by the operator and by the person responsible for safe operation of the system and have to be instructed as regards to operating the system and the usual procedure.

2.3 Informal Safety Measures

The operating and maintenance instructions have to be kept at the installation site of the Amiad Controller at all times.

In addition to the aforementioned, the generally applicable, as well as the local regulations on the prevention of accidents and on the protection of the environment have to be proved and observed.

2.4 Hazards by electric power and cables



All live components and cables are protected against accidental contact. Before opening any housing covers, connectors and cables, the same have to be de-energized using safe electrical practices outlined in NFPA 79, NEC 70E, and local standards.

2.5 Safety Devices

The operator has to ensure that the following is implemented by trained personnel:

- Disconnect handle is damage free and able to lock out when work is required.
- Latches are secured and door is closed.



Identified deficiencies regarding the safety devices have to be remedied immediately. Commissioning the Amiad Controller has to be disabled if not all safety devices are present and functional.

3. Product Description

It enables users to have a powerful filter controls in a compact design. It is available in a wide array power classes and voltages to meet the needs of the world market. The filter system is driven typically by the differential pressure of the inlet and outlet, but can also use a pushbutton, remote start, or other start signals.

The system is designed specifically for each customer's needs. Refer to drawings/schematics or electrical data plate on the side of the enclosure to determine largest motor to be used and specific technical data.

3.1 Functional Description

Utilizing a start command for the flush cycle, the system is designed to be self-sufficient. There is no need to interfere with the filter as the process uses the highest level of technology to control the filter assembly/assemblies. Typical start command is given by a differential pressure switch, however has available onboard inputs for a variety of different applications. Consult your local Technical Sales Engineer for more details on how to integrate the controller and maximize efficiency.

3.2 Standard Component Description

The following is for the standard configuration and added controls may enhance the capabilities of your controller.

Disconnect Switch

This disconnect switch is for power isolation. It's capable of handling up to 600VAC, CE marked, UL approved, and conforms to most international standards.

Contactors and Overloads

The contactor and overload allows the end-user to have full control over the pump/drive motor. From the factory, the pump/drive motor is controlled to either shut on or off with the flush, but is easily modified to accept different logic schemes. The overloads use solid-state technology to determine if the motor is being overdriven. At the factory these settings are applied and checked before leaving. Raising the overloads current value over the factory settings or removing the overloads from the controls will inhibit the ability of the controller to properly protect the motor. This setting should not be modified without contacting the factory first. It is CE-marked, UL approved, and conforms to most international standards.

Transformer

The transformer steps the high voltage down to a usable low voltage for the control components. It is protected with fuses on the primary side and circuit breakers on the secondary side. Exchanging the short-circuit protection of the controller should be exact one for one. Never increase the short circuit protection of the controller without consulting the Factory Controls Engineer first. It is CE-marked, UL approved, and conforms to most international standards.

Adjustable Flush Interval Timer

This timer allows the end-user to define the minimum flush interval time. This is very important to ensure efficiency of the filter. Standard factory setting is to allot for a flush cycle every day. This timer is a high performance timer with 8A contacts and the ability to set the interval from 0.05s-60hr. It is CE-marked, UL approved, and conforms to most international standards.

Adjustable Flush Duration

The flush cycle can be adjusted through this timer. The ability to set the time as low as 0.15s-3min makes this timer very versatile over a number of different applications. The timer starts from a variety of start inputs. Different filter types require different time durations. Contact your local sales representative for this parameter. It is CE-marked, UL approved, and conforms to most international standards.

Note for first-time startup:

If the Start Input is not cleared within the flush duration, it will come out of flush, and will not go back into flush cycle until a hard reset. This can be done by cycling power.

3-Way Flush-Auto-Off

This front switch allows the user to locally enable a flush cycle, disable/reset the flush cycle or to allow it to run the filter in Auto mode. The flush position is spring return to ensure that the flush cycle is not constant. It is CE-marked, UL approved, and conforms to most international standards.

Power On Light

This LED light is for local indication that the power is on, and ready for flushing. It is CE-marked, UL approved, and conforms to most international standards.

3.3 Transportation

The system can only be transported with the disconnect switch turned to the off position, and the power isolated.

3.4 Communication

Amiad Controller has basic communication using standard dry-contacts for communicating with the end-user. Standard communication includes:

- Major Alarm Dry Contact
- Motor on Dry Contact

If the end-user requires additional logic to incorporate the filter within their system, additional inputs are available. Refer to the schematic for the following conditions:

- Remote Start of the flush cycle
- Remote Stop of the flush cycle allowing only filter mode. If the filter is in flush mode, it will terminate the flush cycle, and return to the filter mode.

4. Operation

4.1 Initial Operation

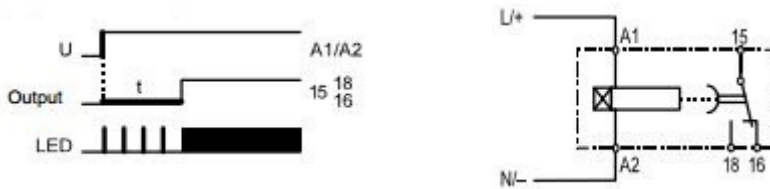
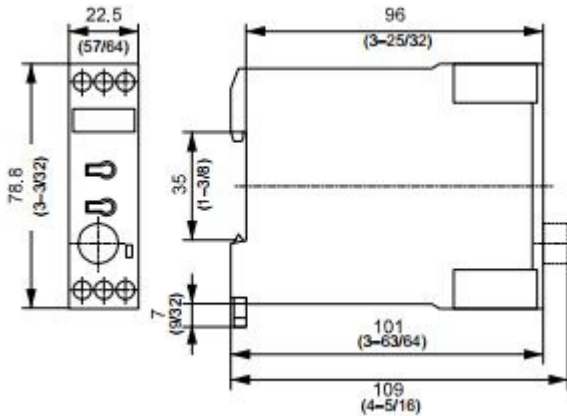
- Always use the appropriate PPE when working with electrical components.
- With the electrical source isolated, connect the appropriate electrical connections to the Amiad Controller. Check on the data plate to ensure the appropriate power supply is connected.
- Add necessary short circuit protection as required on schematic.
- Ensure pump is appropriately supplied with water
- Ensure Stop connections are installed.
- Check the motor data plate and ensure that the motor overloads are set to the FLA on the data plate.
- Check to make sure that Circuit breakers within panel are switched to the off position.
- Before switching power on to the panel, use a meter to ensure the correct voltage is being applied to the panel.
- Switch power on the panel.
- Check for leaks within the pipes and tighten if necessary.
- Before switching circuit breakers on check voltages on the secondary of the transformer to ensure the correct voltage.
- Apply power to the control circuit by switching on the circuit breakers.
- Check configuration of Inputs and Outputs if applicable
- Check timers to ensure appropriate flush parameters.

4.2 Deactivation

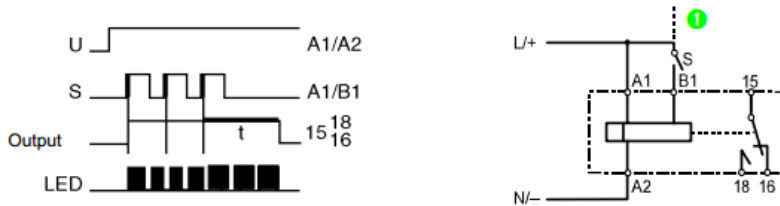
- Turn disconnect to the off position.
- Turn all Circuit breakers to the off position.
- Apply appropriate lockout/tag out measures to ensure that nobody accidentally switches power on.

5. Electro-mechanical Controls

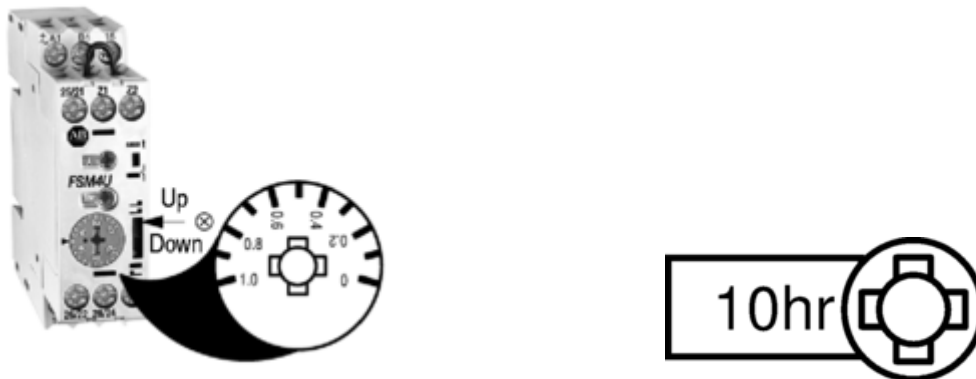
Standard settings are set at the factory. These settings are tailored around a specific application. There is however a wide range of flexibility with this product.



Above is the timing chart for the Flush Interval Timer.



Above is the timing chart for the Flush Duration Timer



This adjustable interval timer has a small dial for adjusting timing settings in 12 convenient larger ranges, and a larger dial for adjusting through the specific range for both timers.



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