

***Automatic Turbo-Disc Single Pod Air-Assist (SPAA)***  
**Addendum to Owner's Manual**

Please refer to the *Automatic Disc Filter Owner's Manual* for an introduction to disc filtration and for a basic operation and instruction guide.

**I. Introduction to the Automatic Turbo-Disc Air-Assist System**

In an effort to employ the Turbo-Disc filters in a wide range of applications it has been determined that by increasing the backpressure (as high as 100 PSI), the cleaning process is more efficient and the backwash duration decreases substantially resulting in less backwash water. This was the motivation to develop the automatic ***Turbo-Disc Booster Systems*** and the ***Turbo-Disc Air Assist Systems***.

The standard automatic Turbo-Disc (ATD) systems typically use water being filtered by the system to backwash the filter. The air-assist systems are equipped with an air accumulator tank and a water reservoir. When the system goes into backwash mode the pressurized air and the water stored in the reservoir combine to create a powerful, high-pressure backwash through the discs. This eliminates the need for an external water source and guarantees the most efficient cleaning.

**II. Air Assist Component Parts**

- A) 2" Automatic *Turbo-Disc* Filter
- B) Water Reservoir - The water reservoir is a Turbo-Disc filter housing with minor modifications. This housing is in line with the ATD filter and fills with "clean" or filtered water to be used for backwash.
- C) Air Accumulator Tank - The air tank is a 9.8-gallon mild steel tank. This tank stores air that is supplied to the system to actuate the backwash valves and to boost the backwash process. The system (and tank) must never exceed 125 PSI but it is recommended that ~100 PSI be maintained in the tank for the most effective backwash.
- D) Centrifugal Pump - 460VAC, 3 Phase, TEFC, 1.5HP (70 GPM @ 25 PSI). The standard SPAA can operate between 40-70 GPM. Single phase and various voltages are available.
- E) 2" PVC gate valve - Throttle valve at start-up until system pressure reads desired pressure. See pump curve for pressure/flow performance curves.
- F) Air Injection Valve - The air injection valve controls the air from the air tank passing through the water reservoir during the backwash cycle. This valve is normally closed.
- G) Air Solenoid - Actuates the backwash valves and supplies the air-override system. Solenoids are equipped with a manual override lever. Turn red lever clockwise to actuate manually.
- H) Air Vent Solenoid - This solenoid is mounted to the 2x2 backwash valve port that is connected to the drain port. It is automatically energized for ~15 seconds after each backwash cycle to vent air from the water reservoir allowing it to fill with filtered water.

- I) Maxim 4 Controller - Preprogrammed by Miller-Leaman, Inc. Backwash can be initiated by pressure differential, timer (4 hr factory setting) or manually activated within the controller. The controller operates on 120VAC.  
*See attached instructions for controller operation.*
- J) Pressure Differential (PD) Switchgauge - Adjusted by turning the knob on the face of the gauge. PD should be set for approximately 1-2 PSI greater than the operating PD. The PD has a 5 second delay before triggering a backwash.
- K) Air Compressor - The compressor is an option to the single pod air-assist system. When the air compressor accompanies the single pod air-assist system it is not mounted to the frame. All necessary connections are included for easy hook-up. The compressor operates on 120 VAC.
- L) Air Pressure Regulator - The air regulator is located on the inlet port of the air accumulator tank. This insures that the tank pressure does not exceed 125 PSI.
- M) Motor Starter box - Starter must be hard wired to 460 VAC. Other voltages (575, 230, 208, 120) are available.

### III. Installation

#### A) Mechanical Connections

- i. Pump Suction: The pipe size that supplies the pump suction should be at least 2" pipe for a 1 1/2" pump suction as recommended by the pump manufacturer. Please verify that the pump suction connections meet the requirements as listed in the Pump Owner's Manual.
- ii. System Discharge: The 2" PVC gate valve at the discharge of the system must be throttled until the system pressure is the same as the design pressure. *See pump performance curve for flow and pressure. Running the pump without backpressure will cause the pump to overload.*
- iii. Backwash/Drain: The 2" (male) NPT drain line should be plumbed to drain to atmosphere. If there is a restriction in this drain line it will prevent the filters from cleaning properly. Do not reduce the drain size below 2" pipe. *The discharge pipe must be securely mounted.*

#### B) Electrical Connections

- i. Motor Starter: The motor starter must be hard wired for 460VAC, 3 Phase.
- ii. Controller: 120 VAC, 1 AMP, standard 3-prong plug
- iii. Compressor (optional): 120 VAC, 15 AMP, standard 3-prong plug (if applicable)

#### C) Controller Settings

- i. Power On: The power switch/circuit breaker is located on the front of the controller inside the enclosure. **See MAXIM controller attachment for operating details.**
- ii. Controller Actuation: The controller can be set to actuate by backflush various methods, individually or simultaneously.
  - 1. Periodic: The time interval between backwashes is set per application requirements.
  - 2. Manual: Manually turning on the backflush cycle from the Status screen controller menu (see MAXIM controller manual).
  - 3. Pressure Differential: The pressure differential gauge must be set to the desired differential. It is recommended to start with approximately 1-2 PSI higher than the "when clean" differential.

#### IV. Start Up

- A) Prime the Pump: A pump is primed when all the air in the suction line and pump volute has been evacuated and replaced with water.
- B) Impeller Rotation: At initial start up it is critical to verify that the impeller is rotating in the correct direction. When looking at the fan from the back of the motor the blades should rotate in the clockwise direction. If it is not then two of the three power lines (3 phase) wired into the starter must be switched. If the flow and pressure are achieved according to the pump performance curve then the impeller rotation direction is correct.
- C) Air pressure: A standard 1/4" male air fitting is located on the regulator assembly on the front port of the air tank. 80-120 PSI is required.
- D) Throttle Discharge Valve: As stated earlier, the discharge is fitted with a throttling gate valve. This gate valve must be throttled until the pump discharge pressure is at the operating pressure as determined by the pump performance curve. Do not leave valve wide open. This will result in an overloaded of the pump.
- E) Controller Settings: It is recommended to manually initiate several backwash cycles to insure proper set up and to become familiar with the system.

#### V. Sequence of Operation Events

- A) Filtration Mode: Water is supplied to the system at the design flow rate not to exceed 70 GPM and at a pressure not to exceed 125 PSI. The 2" PVC gate valve at the discharge of the system must be throttled until the system pressure is the same as the design pressure.

**Note - See the pump performance curve for flow and pressure.**  
**Running the pump without backpressure will cause the pump to overload.**

As the filter produces "clean" water the water reservoir fills with the filtered water.

- B) Backwash Mode: Backwash is initiated by pressure differential, timer or manually. The (2) backwash valves are actuated a second before the air injection valve. This isolates the pump and discharge from the filter for the duration of the backwash. During this time the pump is running at the shut-off head. The stored air and "clean" water are forced through the filter cartridge in reverse causing the debris to exit via the backwash drain. Once filtration is resumed the individual brass solenoid is energized for ~15 seconds allowing the water reservoir to vent the trapped air and fill with "clean" water.

If you have any questions or need assistance with any part of the installation or operation please call 800-881-0320.