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**BELL** USERS'  
MANUAL

**Tekleen**

# BELL *USERS'* MANUAL



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## SECTION I      INTRODUCTION

### 1.1    Description

The Bell series consists of automatic, self-cleaning screen type water filters. The filtration system features a tank body without a first stage coarse screen, but with only a fine screen, a flushing valve and a hydraulic or electronic controller. (See Filter Specifications Chart, Page 5).

### 1.2    Theory of Operation

Pressurized water enters the filter inlet and travels through a fine stainless steel screen where small contaminants (depending on the provided screen mesh) are filtered out. The clean water then exits the outlet.

When the fine screen becomes contaminated, a pressure differential is sensed causing the automatic controller to open the flushing valve. When the flushing valve opens, an atmospheric pressure path is created causing the clean water to reverse flow through the filter element pushing contaminants off the screen, through the nozzles, through the hydraulic motor and out the flush valve.

The water passing through the angular holes in the motor creates a torsional rotation of the nozzles, thus vacuuming the entire I.D. of the filter element.

When the screen is clean, the unit automatically returns to the full filtering mode.

The entire cleaning cycle takes approximately four to six seconds and uses two gallons of water in filters with a 1" flushing valve and eight gallons of water in filters with a 2" flushing valve. It should be noted that even during the backflush cycle, the filtration process continues uninterrupted.

### 1.3 Recommended Applications

Tekleen BELL water filters are ideal for filtering out sewage, reservoirs, rivers, lakes, wells, and municipal water in both industrial and irrigation applications.

### 1.4 Design Features

Among the many features of the BELL models are positive filtration, 100% separation at all times between the dirty and clean sides, and its avoidance of the danger of forcing contaminated water back into the system, which often happens with a sand media filter or centrifuge. These filters will deliver clean water or no water.

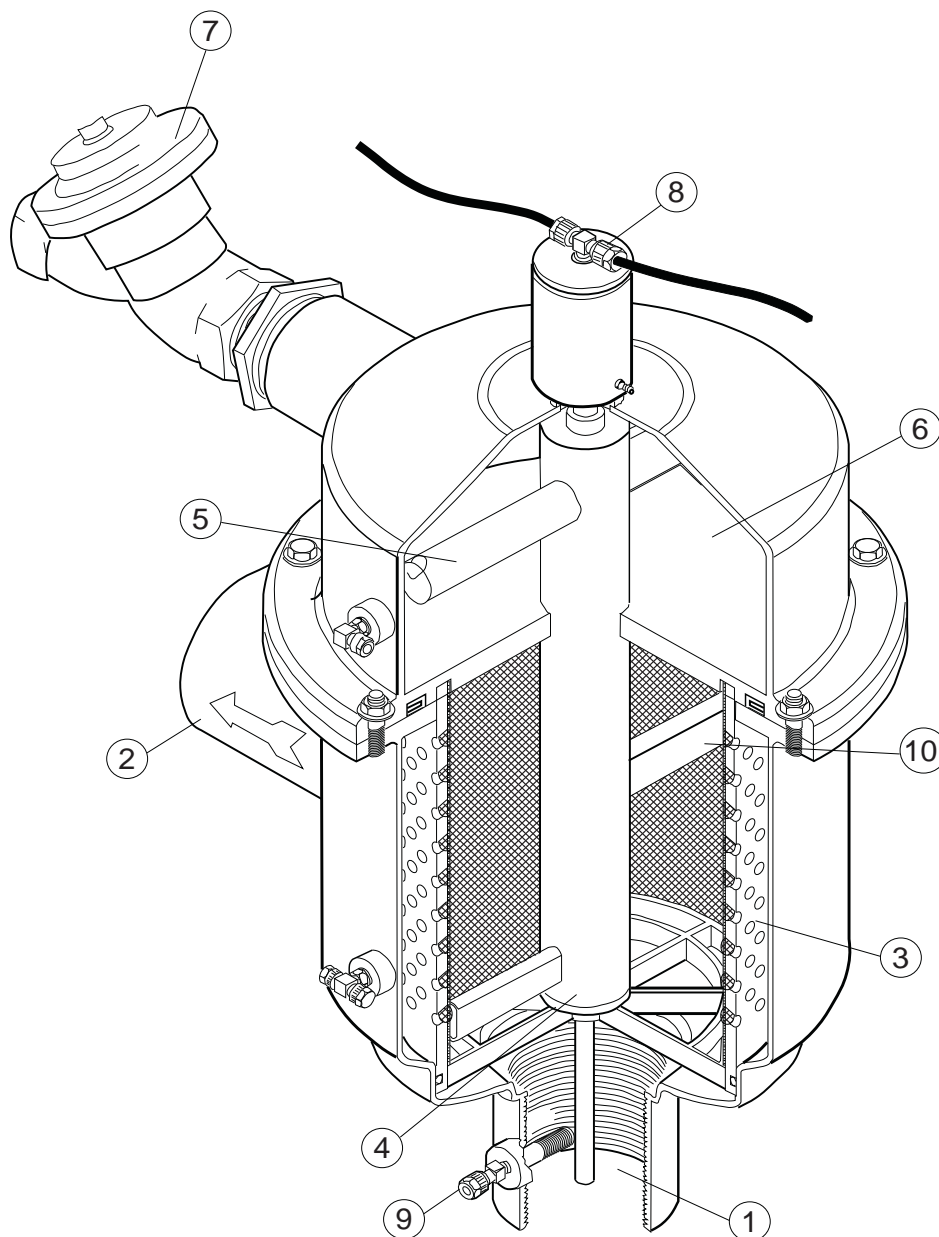
The most predominant feature is its ability to remove organics such as algae, leaves, and other suspended particles.

The entire back flushing mechanism and fine screen assembly is modular and can be removed from the filter body without disruption of the plumbing.

## 1.5 Filter Assembly

The Bell filters contain the following parts:

- |    |                 |     |                         |
|----|-----------------|-----|-------------------------|
| 1. | Inlet           | 6.  | Hydraulic Motor Chamber |
| 2. | Outlet          | 7.  | Flushing Valve          |
| 3. | Filter Screen   | 8.  | Piston                  |
| 4. | Dirt Collector  | 9.  | Mini Filter             |
| 5. | Hydraulic Motor | 10. | Suction Nozzle          |
- (Sprinkler)



## 1.6 Safety Instructions

Prior to installing or handling the filter, carefully read the installation and operation instructions.

1. Confirm filter draining prior to service.
2. Take precautions while lifting, transporting, or installing the filter.
3. Installation of the filter should be performed as to avoid direct water splashing on any of the filter parts and especially on the electronic control unit.
4. Confirm that filter weight, when full, meets the support construction requirements.
5. Prior to installation, confirm that line pressure matches filter's operational pressure. The minimum is 35 psi during flush cycle.
6. During installation, use standard flanges and connections only.
7. Check that all filter flange bolts are properly secured.
8. Please note that the filter enters a flushing mode automatically, without prior warning.
9. Use original parts only while servicing the filter.
10. Any changes or modifications to the equipment voids the warranty.
11. Do not perform any maintenance activities other than those given in this manual.

## 1.8 Filter Specifications Chart

<b>Model #</b>	<b>Connection</b> inches	<b>Screen Area</b> sq. ft.	<b>Max Flow</b> gpm	<b>Empty Wt.</b> lbs.
<b>Bell - 1.5</b>	1.5" NPT	0.5	50	60
<b>Bell - 2</b>	2" NPT	0.5	100	60
<b>Bell - 3</b>	3" NPT	0.5	150	60
<b>Bell - 3L</b>	3" ANSI	0.8	200	80
<b>Bell - 4</b>	4" ANSI	0.8	300	90
<b>Bell - 4L</b>	4" ANSI	1.7	400	150
<b>Bell - 6</b>	6" ANSI	1.7	500	200

Specification: Carbon steel body with baked on powdered epoxy coating. Maximum 150 psi, 150° F, Stainless steel screen mesh 35 $\mu$  to 400 $\mu$ . 2 gallons per rinse with a 1" valve & 8 gallons per rinse with a 2" valve.

## 1.7 Measurement Conversion Table

<b>Mesh</b>	20	40	60	80	100	140	200	325	550
<b>Micron</b>	850	590	250	177	150	105	74	44	25
<b>Inch</b>	.033	.016	.010	.007	.006	.004	.003	.002	.001

## **SECTION II      INSTALLATION AND HOOK-UP**

### **2.1    Mechanical Hook-Up and Orientation**

1.     Install the filter assembly to the inlet line and outlet line.
2.     Check that all connections, bolts, and nuts are properly secured.
3.     Confirm that the mechanical actuator of the flushing valve is closed.
4.     To initialize operation, set the differential pressure sensor at 7 psi (5m).
5.     Open the outlet valve if installed.

### **2.2    GB5 – B or GB6**

See illustrations on Pages 14 and 15.

## **SECTION III      OPERATION AND ADJUSTMENTS**

### **3.1    Start-up**

1.     Gradually open the inlet valve (make sure that the outlet valve, if installed, is closed).
2.     Check the filter assembly and its connections for leaks.
3.     Confirm that the mechanical actuator of the hydraulic flushing valve is fully open when flushing without any restrictions on the line.
4.     Perform a flushing cycle by setting the differential pressure indicator to "0" (closing the electrical circuit). In the GB6 controller, push the start button.
5.     Verify that the hydraulic flushing valve closes after 5 seconds.
6.     When the filter is clean, verify that the differential pressure does not exceed 0.1 bar or about 1.5 psi.
7.     Set the differential pressure indicator to 7 psi or 0.5 bar (recommended).
8.     Perform an additional flushing cycle manually by operating the handle (turn clockwise 90°) located on the solenoid.

### 3.2 Back-Flush Requirements

*The filter needs a minimum flow and pressure during the backflush process to guarantee a fully effective cleaning.*

The minimum flow depends on the size of the filter's flush outlet and the pressure during backflushing. The table below gives an indication of the required flows.

Flush Outlet Size	Flush Flow at 35 psi (gpm)	Flush Flow at 60 psi (gpm)
1"	30	50
2"	130	195

The minimum differential pressure between the filter inlet and the flush outlet should be at least 30 psi.

The capacity of the pump has to be sufficient to keep the inlet pressure over 30 psi during backflushing at a flow of process flow + rinse capacity.

Process flow is 200 gpm and rinse capacity is 90 gpm  
Pressure < 30 psi yields poor cleaning.

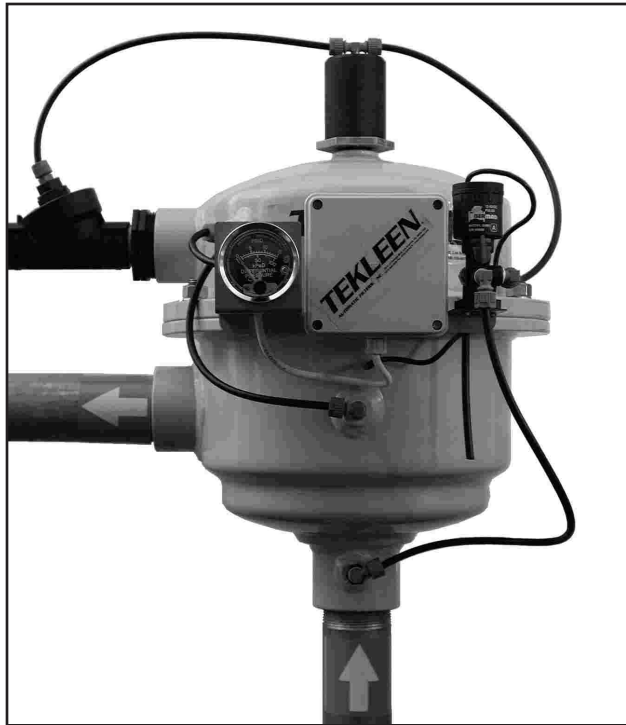
Process flow is 130 gpm and rinse capacity is 90 gpm  
Pressure > 30 psi yields good cleaning.

**IMPORTANT:** inlet pressure during flushing > 30 psi.

## SECTION IV MAINTENANCE

### 4.1 Filter Screen Removal & Installation

1. Close the inlet and the outlet line valves.
2. Disconnect the control line from the filter assembly upper section.
3. Remove the 6 nuts and washers attaching both parts of the filter housing.
4. Carefully remove the control assembly of the filter.
5. Remove the upper part of the filter assembly along with the hydraulic motor, dirt collector and the body seal.
6. Pull the filter screen out of the filter housing assembly.
7. Remove both upper and lower seals from the old filter screen.
8. Remove the screen bearing from the old filter screen's lower section.
9. Install the screen bearing to the new filter screen lower section.
10. Position both upper and lower seals into the new filter screen.
11. Lubricate upper and lower seals with silicon grease.
12. Slide the new filter screen into the filter housing assembly.
13. Verify that the straight side of the body seal fits into the groove located in the filter assembly upper section.
14. Install the upper part of the filter assembly along with the hydraulic motor and dirt collector.
15. Carefully install the control assembly to the filter housing with of the 6 nuts and washers attaching both parts of the filter housing.
16. Continue to cross connect both parts of the filter housing by using the additional five nuts and washers. Do not over tighten.
17. Connect the control lines to the filter assembly housing.
18. Open the inlet and outlet line valves and perform a flushing cycle.
19. Check for leaks.



**Figure 2: Bell Filter with GB5 - B Controller**

#### 4.2 9V Battery Removal and Installation

The 9V battery enables the electronic control unit to operate. The battery can last for 3,000 flushing cycles, but should be replaced, regardless, every six months. Use only alkaline type batteries.

1. Remove the screws on the cover of the electronic control unit.
2. Disconnect the old battery.
3. Connect a new battery according to the correct polarity.
4. Install the electronic control unit cover by replacing the screws.

### 4.3 Solenoid Removal and Installation

The solenoid controls the flushing valve operation.

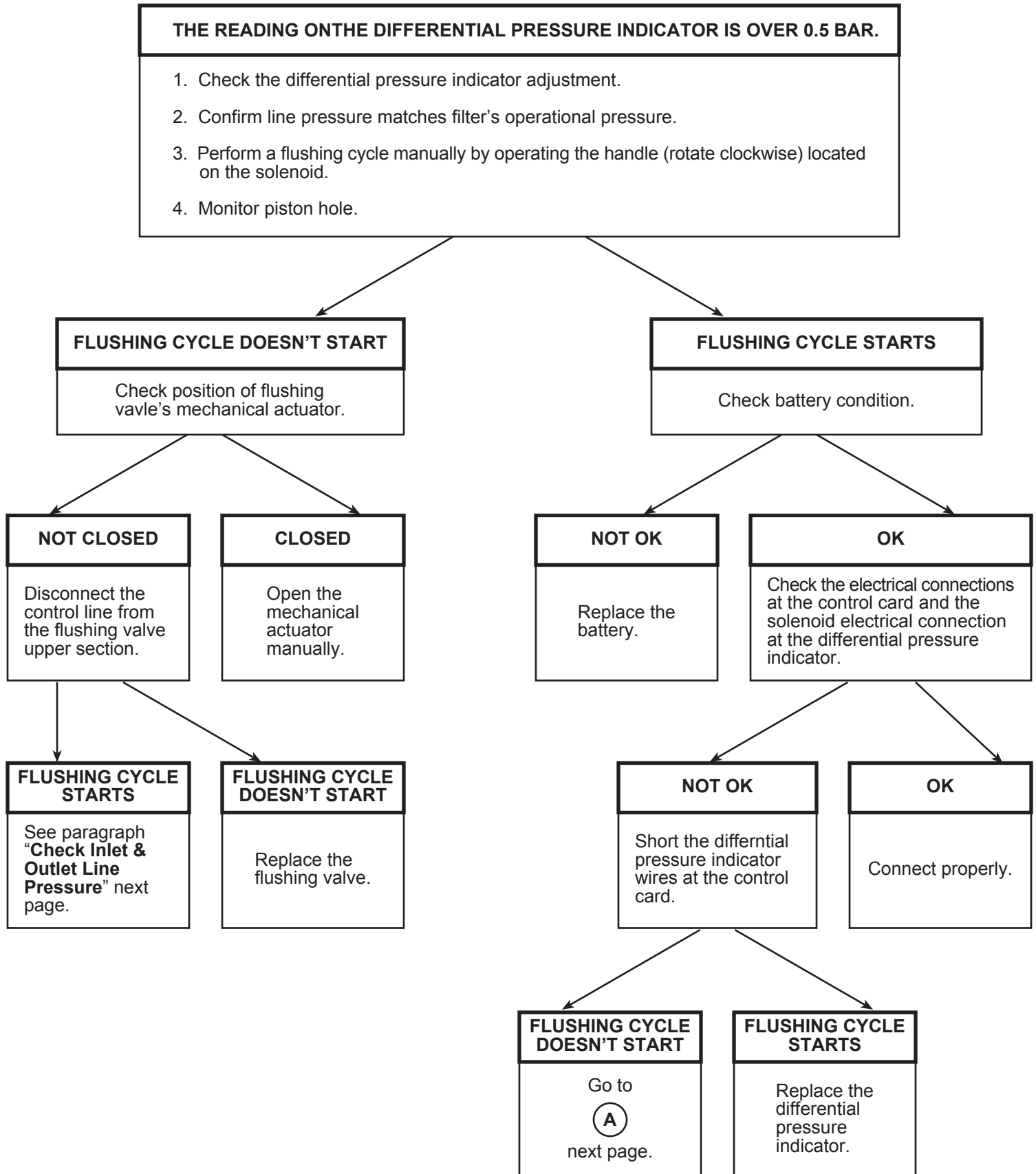
1. Disconnect the solenoid control lines.
2. Disconnect the electrical wiring from the control card terminal (white, red, and black wires).
3. Remove the two screws located on the solenoids lower section.
4. Pull the solenoid out of the control assembly.
5. Insert a new solenoid into the control assembly.
6. Install the two screws into the solenoid lower section.
7. Connect the electrical wiring to the control card terminals (white, red, and black wires) (see enclosed drawing).
8. Connect the solenoid control lines.

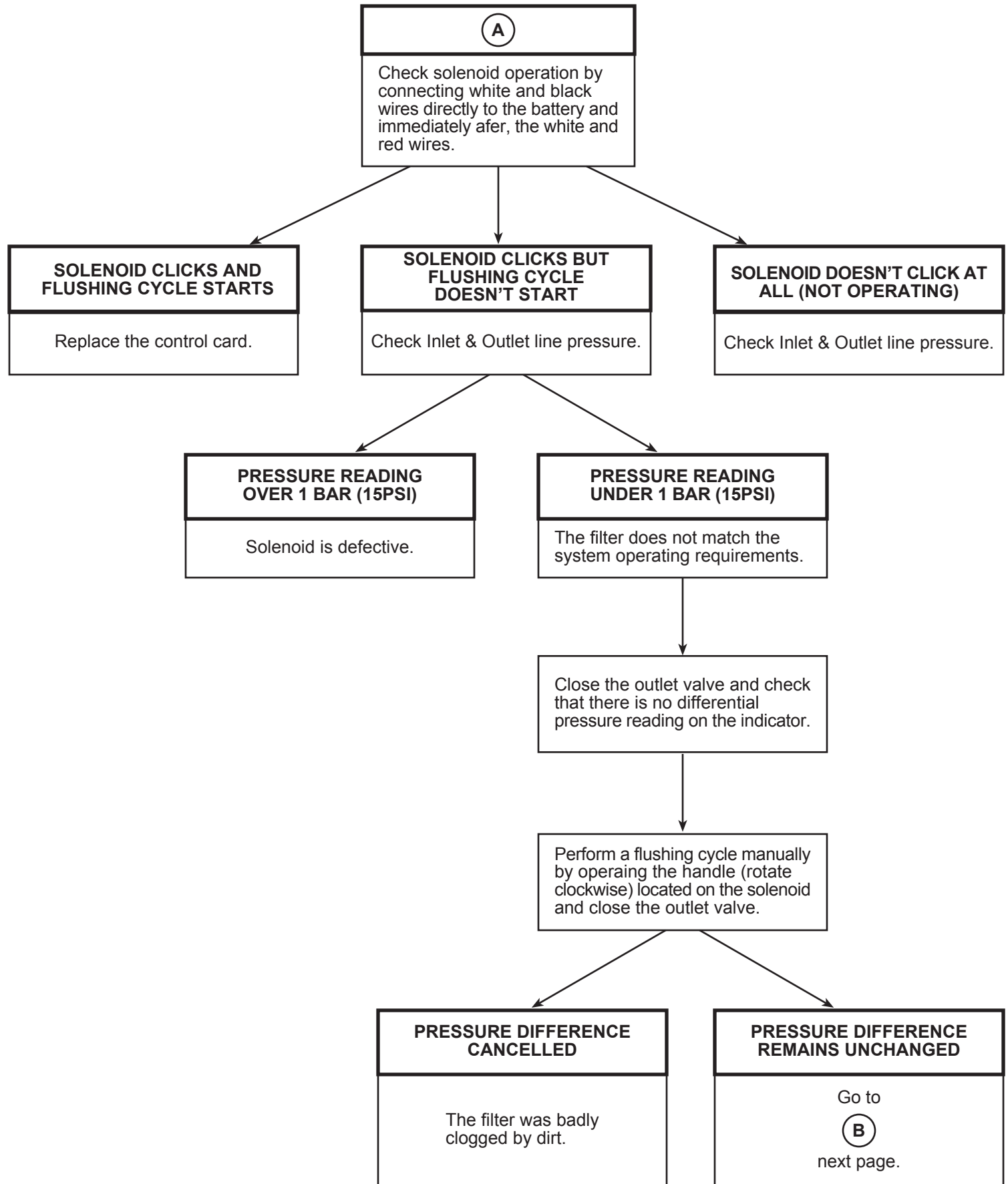
### 4.4 Periodic Checks

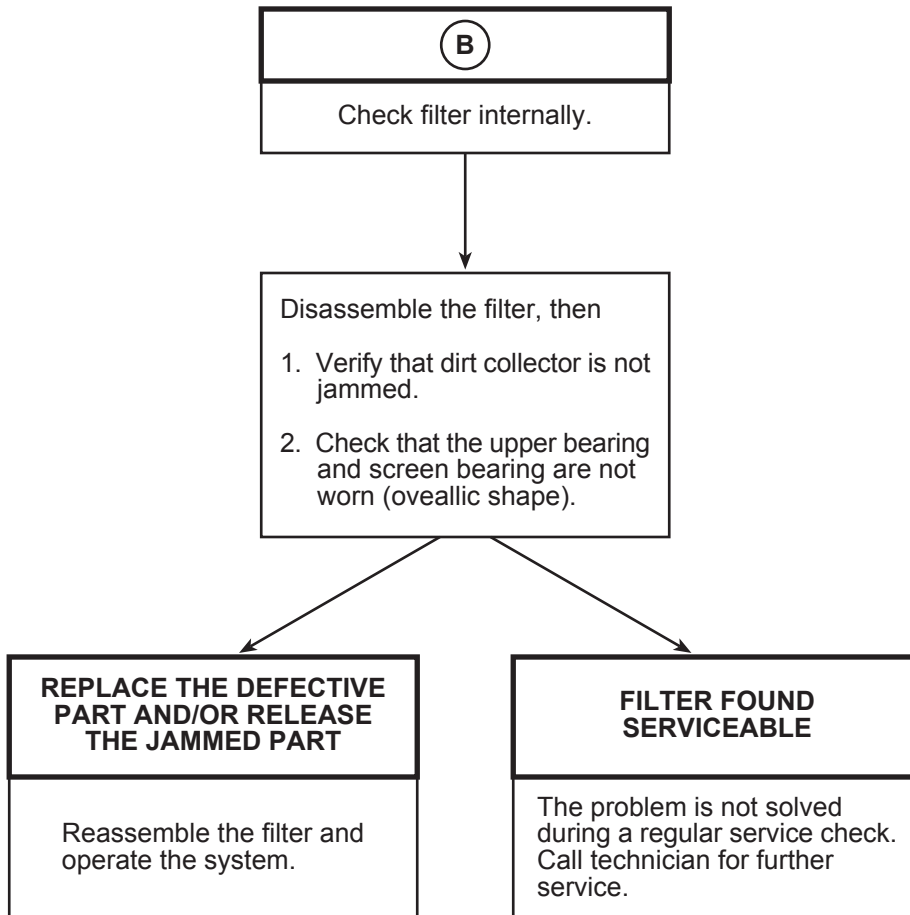
Perform quarterly checks according to the following guidelines:

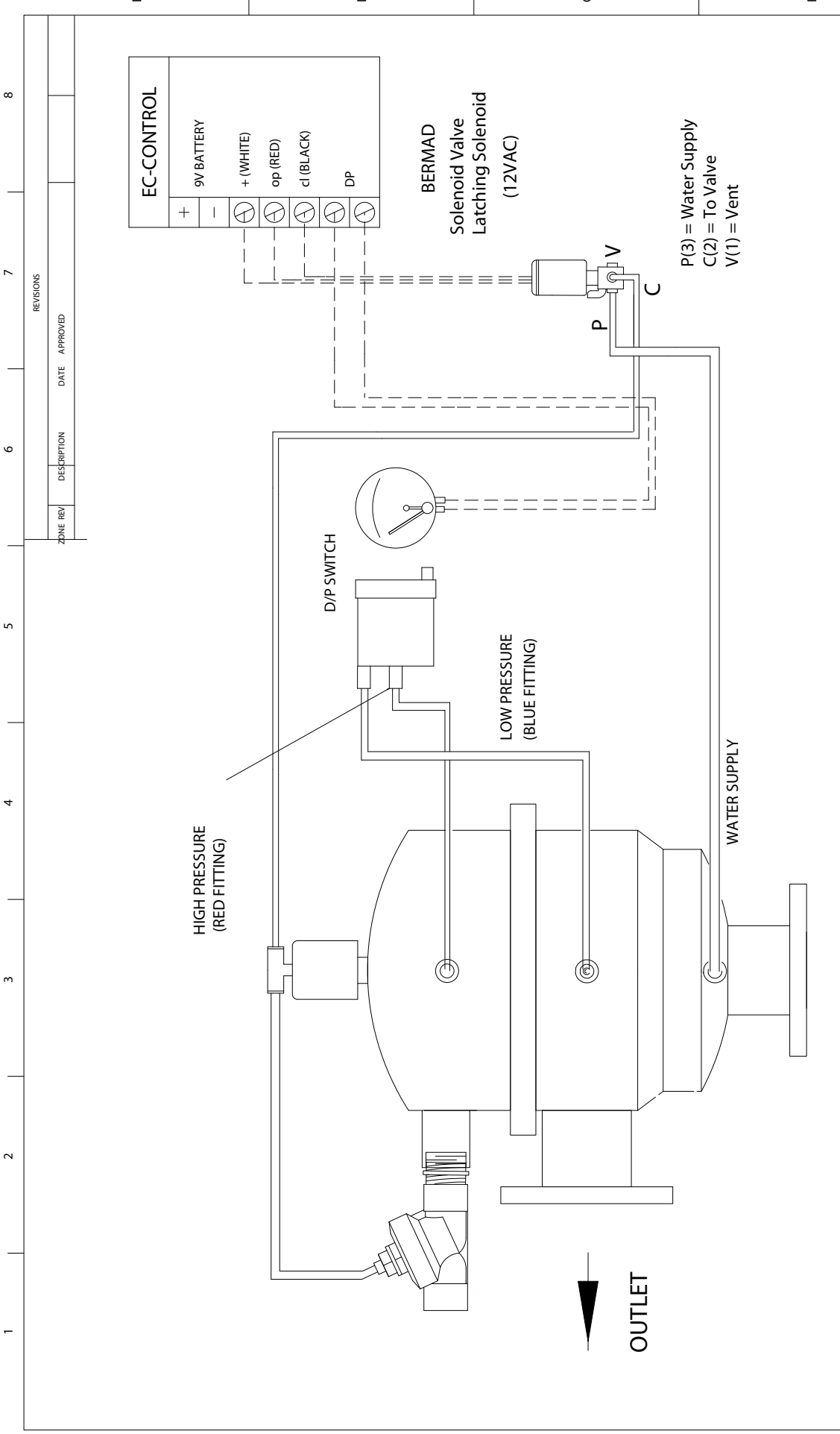
1. Unscrew the lower filtering nozzle and visually check for obstructions (Part No. 10, Figure 1, Page 3).
2. Check the condition of the 9V battery located inside the electrical control unit. If defective, replace according to the direction previously discussed in this manual.
3. Check the condition of the filter screen. If defective, replace according to the direction previously discussed in this manual.
4. Check proper operation of the upper bearing and screen bearing. If any of the bearings are worn, replace with new ones.
5. Check the filter body for paint damage and corrosion. If damaged, clean the area with sand paper and apply a thin layer of basic epoxy paint.
6. Check for leaks.

## SECTION V TROUBLESHOOTING GUIDE









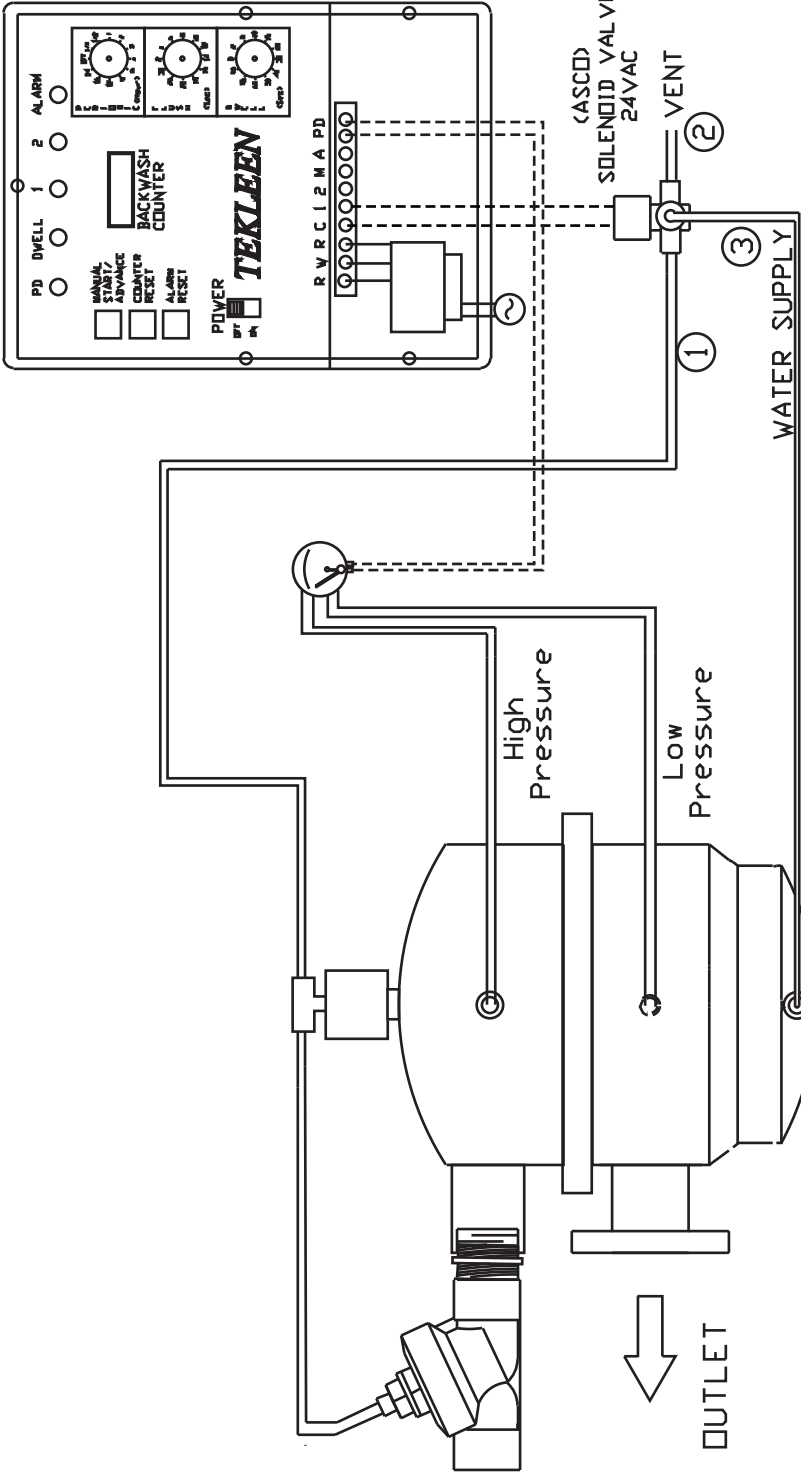
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMALS - ANGULAR XX + .05 XXX + .01		DATE 9-11-03	TITLE BELL FILTER SETUP W/ GBS CONTROLLER Latching Solenoid (12VDC)
DRAWN DMITRY POLISHCHUK	CHECKED	DESIGN	DWG NO. BELL-GB5
SIZE A	REV 0	SHEET OF	AUTOMATIC FILTERS, INC. 2672 S. La Cienega Blvd. Los Angeles, CA 90034 (310) 839-2828 FAX (310) 839-6878

1 2 3 4 5 6 7 8

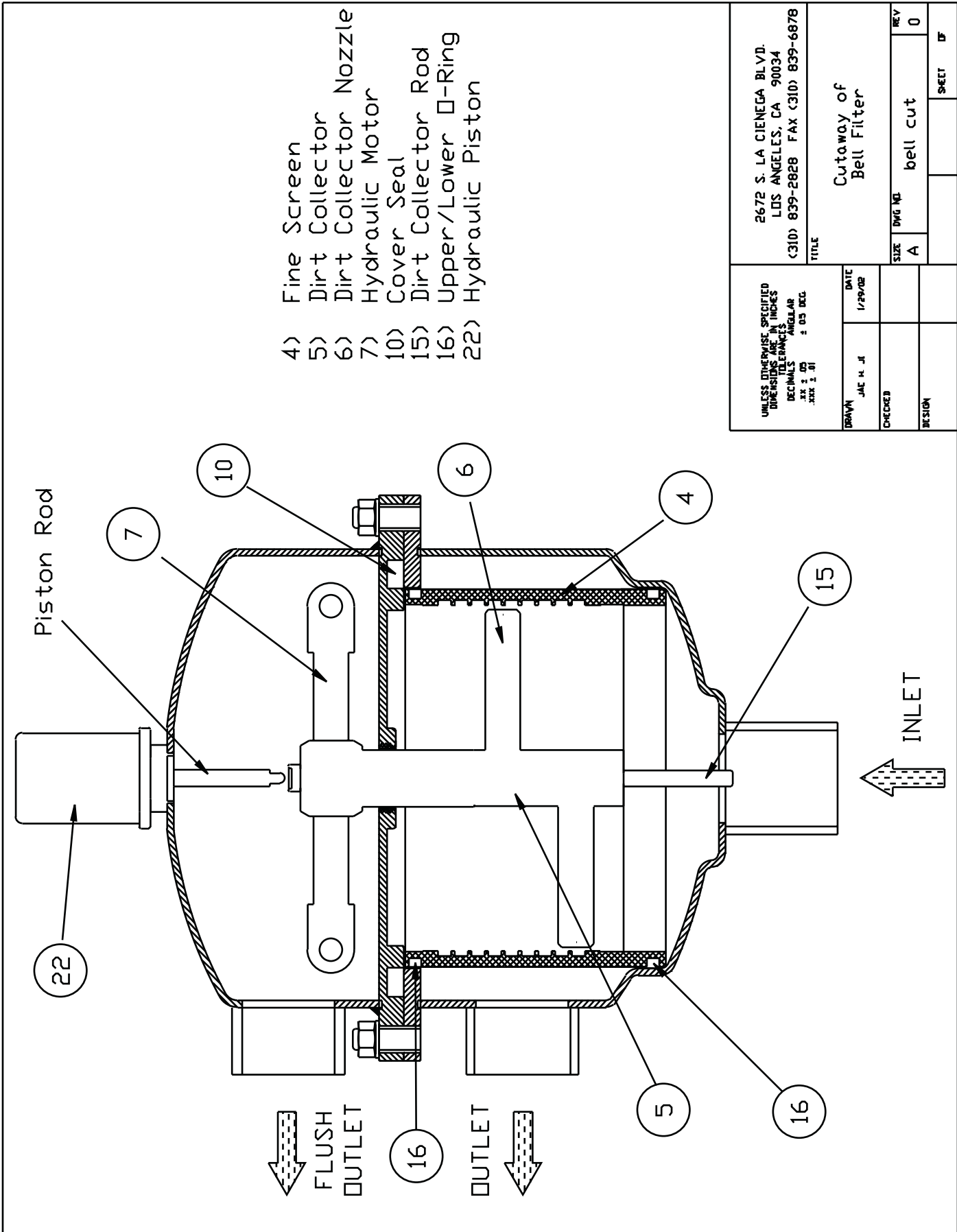
E D C B A

REVISIONS		DATE	APPROVED
ZONE	REV	DESCRIPTION	

### GB6 ELECTRIC CONTROLLER

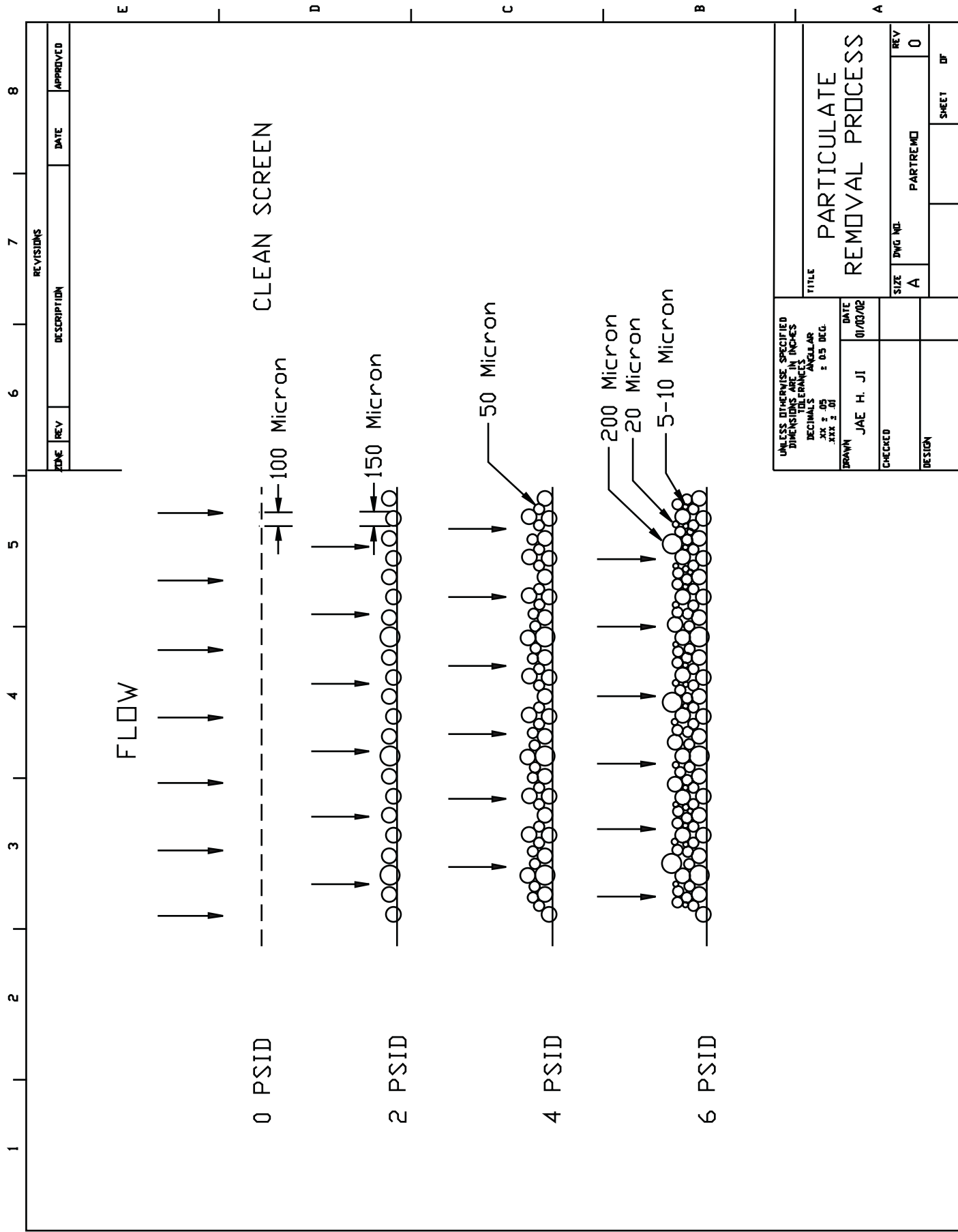


<b>AUTOMATIC FILTERS, INC.</b> 2672 S. La Cienega Blvd. Los Angeles, CA 90034 (310) 839-2828 FAX (310) 839-6878		<b>TITLE</b> BELL Series w/ GB6 electronic Controller	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES DECIMALS ANGULAR .xx ± .05 ± .05 DEG. .xxx ± .01		<b>DATE</b> 10/2/01	<b>REV</b> 0
<b>DRAWN</b> JAE H. JI	<b>CHECKED</b>	<b>SIZE</b> A	<b>DWG. NO.</b> Bell-gb6 Flanged
<b>DESIGN</b>			<b>SHEET</b> OF



- 4) Fine Screen
- 5) Dirt Collector
- 6) Dirt Collector Nozzle
- 7) Hydraulic Motor
- 10) Cover Seal
- 15) Dirt Collector Rod
- 16) Upper/Lower O-Ring
- 22) Hydraulic Piston

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMALS ANGULAR .XX ± .05 ± .03 DEC .XXX ± .01		2672 S. LA CIENEGA BLVD. LOS ANGELES, CA 90034 (310) 839-2828 FAX (310) 839-6878	
DRAWN	JAE H. JR	DATE	1/29/02
CHECKED			
DESIGN			
TITLE		Cutaway of Bell Filter	
SIZE	DWG NO	REV	0
A	bell cut		
		SHEET	DF



# PRESSURE DROP DATA

