

CSB  
USERS'  
MANUAL

# TEKLEEN

***AUTOMATIC FILTERS, INC.***

2672 S. LA CIENEGA BLVD.  
LOS ANGELES, CA 90034  
310 839 2828 800 336 1942  
FAX 310 839 6878  
[www.tekleen.com](http://www.tekleen.com)  
[info@tekleen.com](mailto:info@tekleen.com)

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# Introduction

## General

**Automatic Filters Inc.** congratulates you for purchasing the **CSB** Electric self-cleaning brush filter. This filter now joins the wide family of filters produced and supplied by **Automatic filters Inc.** for industrial, municipal water, sewage systems, and all types of irrigation applications. All products manufactured by **Automatic Filters Inc.** are easy to install, use and service and don't require special skills to operate them.

We would like to wish you many years of satisfied service.

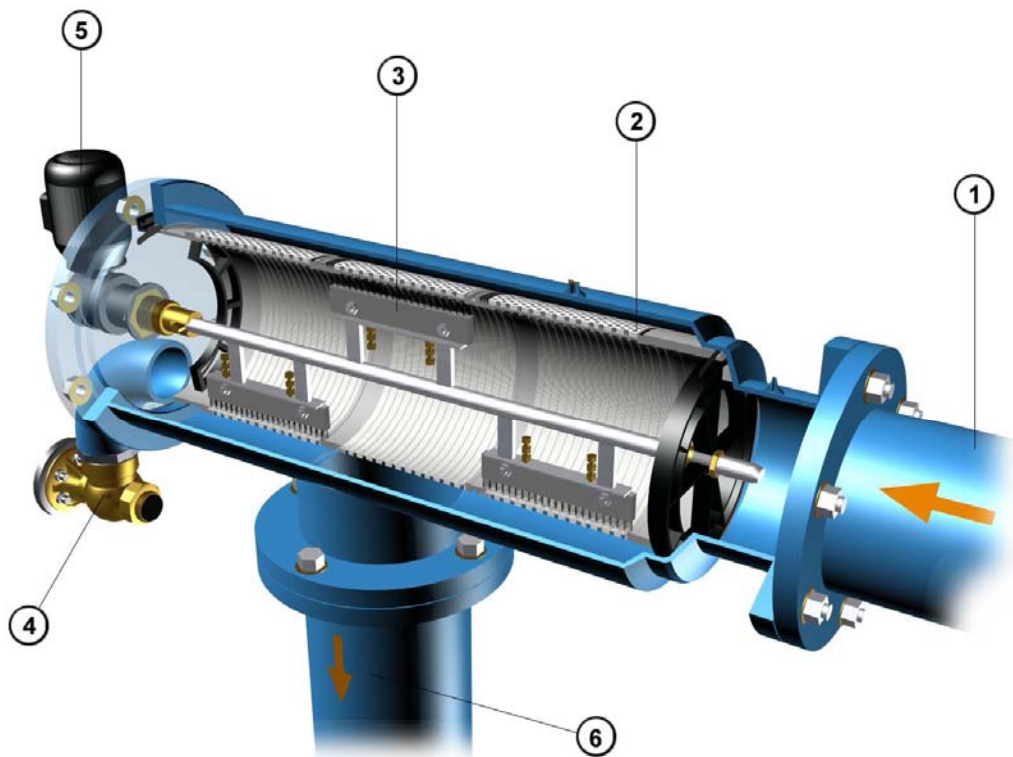
# Description & Operation

## Filter Assembly General Description (Figure 1)

The **CSB** electric self-cleaning brush filter enables high quality filtration at filtering degrees of 200-4000 micron from different types of fluid sources such as sewage, reservoirs, rivers, lakes, and wells.

The **CSB** filter contains the following parts:

- |           |                                     |
|-----------|-------------------------------------|
| 1. Inlet  | 4. Flushing Valve (HYD or Electric) |
| 2. Screen | 5. Electric Motor                   |
| 3. Brush  | 6. Outlet                           |



**Figure 1: Filter Assembly**

## **Filter Operation General Description (Figure 2)**

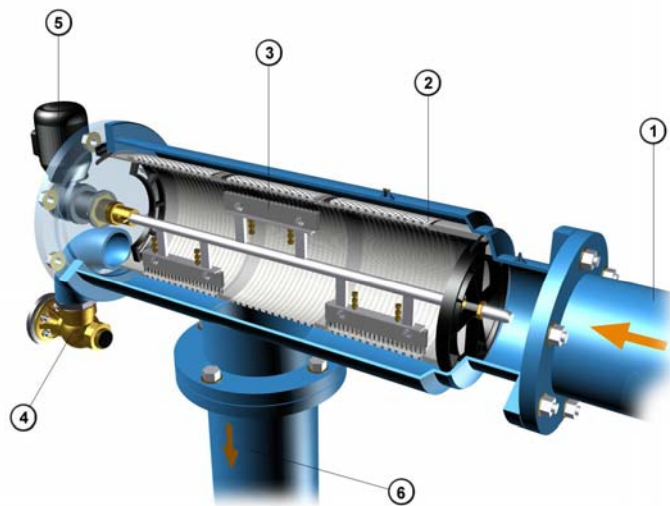
### Filtration

Water enters the filter through the “Inlet” (1) and passes through the screen (2), which purifies the water by separating dirt smaller particles from the water. As more water flows through, dirt builds up on the screen. As dirt builds up on the screen is causing to a differential pressure between the in let and outlet

### Cleaning Process

When the difference in pressure ( $\Delta P$ ) reaches the preset value on the differential pressure indicator, or the dwell time between flushing passed. The controller transmits a signal for a 10 second flushing cycle. The flushing valve (4) opens, pressure is released from the inner side of the fine screen (2) the electric motor (5) simultaneously rotates the brushes (3) around its axis. The brushes wipe all the dirt and efficiently clean the entire internal screen (3) surface.

At the end of the 10 second cycle the flushing valve (4) closes and the operation of the electric motor (5) is stopped. The filter is now ready for the next cycle,



**Figure 2: Filter Assembly**

# **Technical Data**

## **Standard Features**

- Minimum operating pressure: 3 bar (45 psi)
- Maximum operating pressure: 10 bar (150 psi)
- Clean filter pressure loss: 0.1 bar (2 psi)
- Maximum water temperature: 90 °C (200 °F)
- Filtration range: 200 - 4000 micron
- Electric motor: 3-phase 0.5 Hp
- Flush water consumption (at minimum working pressure): 70 liters (18.5 gallons)
- Filter housing materials: carbon steel coated with baked on epoxy, or stainless steel

## **General Technical Data**

Filter Model	M3/h	GPM	Screen Area Sq/ft
CSB 4	100	400	5
CSB 6	200	800	5
CSB 8	300	1,200	5
CSB 10	450	1,800	7
CSB 12	650	2,600	11
CSB 14	1,000	4,000	12.5
CSB 16	1,500	6,000	16

**L** = 90° Connections    **IL** = Inline connections

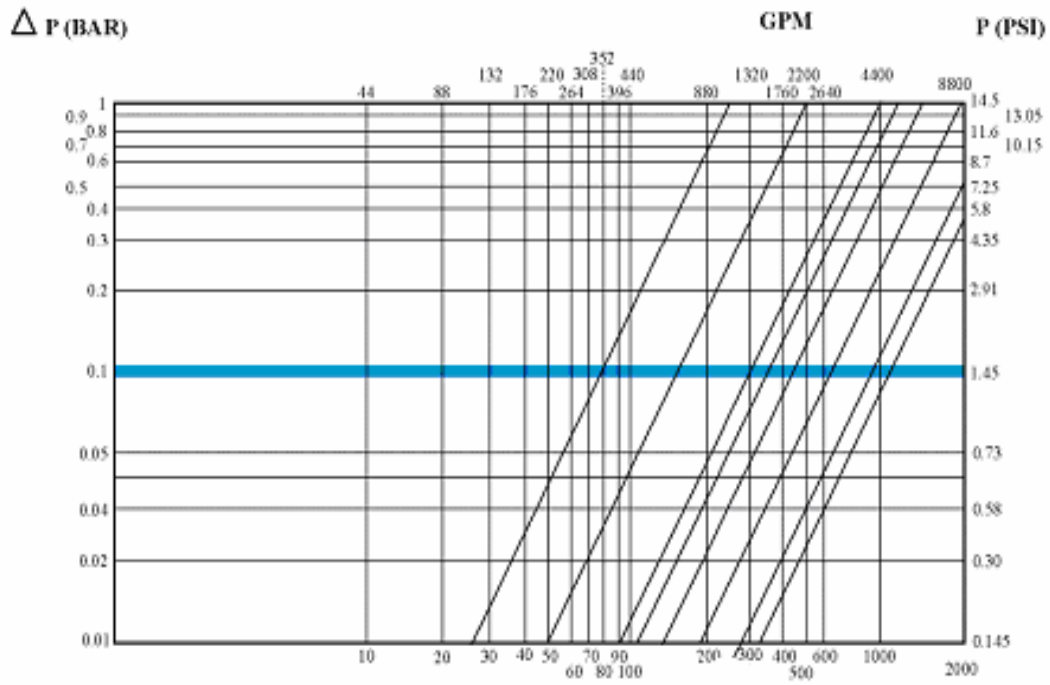
\* Flow rate data are for high quality water at filtration grade of 200 micron.

\*\* Flushing flow rate data are for minimum operational pressure (1 bar / 15 psi).

## **Filtration Grade Conversion Table**

Micron	200	400	800	1500	3000
Mesh	80	40	20	10	5

## Pressure Loss At 200 Micron



# **Initial Installation & Operation**

## **General**

The filter assembly is packed on a wooden platform with all its parts installed.

## **Installation (Figure 3)**

1. Take the filter assembly out of the wood platform.
2. Install the filter assembly to the inlet line and outlet line.
3. Connect a drainpipe to the hydraulic flushing valve outlet opening (at least 80 mm or 3" diameter and no longer than 10m). Confirm that water runs freely out of the drainpipe.
4. Position the control panel in such a way as to be protected against humidity and solar radiation.
5. Connect the control panel to the power source.
6. Check that all connections are properly secured.
7. Check that all bolts and nuts on filter periphery are properly tightened and secured.

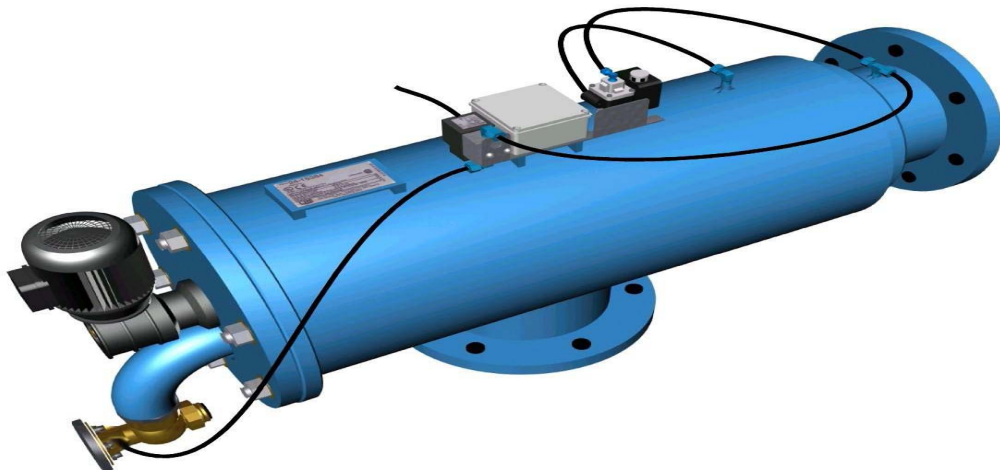


Figure 3: Initial Filter Installation



## **Initial Operation**

1. Gradually open the inlet valve (make sure that the outlet valve, if installed, is open).
2. Check the filter assembly and its connections for leaks.
3. Perform a flushing cycle by disconnecting the high pressure tube from the differential pressure indicator (closing of the electrical circuit) – re-connect it immediately as flushing start.
4. Verify that the motor start spinning **clockwise (if the motor spin to the opposite side, change the connections of the electric phase)** and stop after 10 seconds.
5. Verify that the flushing valve opens and closes after 10 seconds.
6. Perform a flushing cycle by pressing the MANUAL FLUSH switches at the control panel.
7. Perform continues flushing by disconnecting the high-pressure tube from the differential pressure indicator (closing of the electrical circuit) second flushing will start without a delay. Re-connect the high pressure tube.
8. When the filter is clean, verify that the differential pressure between inlet and outlet does not exceed 0.1 bars (1psi)
9. Set the appropriate differential pressure for flushing at the  $\Delta P$  differential pressure indicator to 0.5 bar (7 PSI).

### **WARNING**

Take precautions while operating the filter because the filter might enter a flushing mode automatically, without prior warning.

## **Fine Screen Assembly Removal & Installation (Figure 6 and 7)**

1. Close the inlet and the outlet line valves.
2. Set the main switch at the control panel to "0" position.
3. Verify that filter is drained prior to service.
4. Remove the cover with the motor assembly.
5. Pull the screen assembly with the brushes out of the filter housing assembly
6. Than remove the brush assembly.
7. Remove the seals from the old fine screen assembly.
8. Lubricate upper and lower seals with **silicon grease**.
9. Slide the brush assembly into the screen and only then slide the screen assembly with the brush assembly into the filter housing assembly.
10. Verify that the straight side of the body seal fits into the groove located in the cover.
11. Put the cover into its place on the filter. (Take care that the motor's axis housing is slide on the brush axis) & install nuts and washers
12. Set the main switch at the control panel to "1" position.
13. Open the inlet and outlet line valves.
  
14. Perform a flushing cycle by pressing the MANUAL FLUSH switch at the control panel.
15. Verify that the flushing valves close after 10 flushing cycle and FLUSHING lamp at the control panel extinguishes and Check for leaks.

### **WARNING**

Take precautions while operating the filter because the filter might enter a flushing mode automatically, without prior warning.

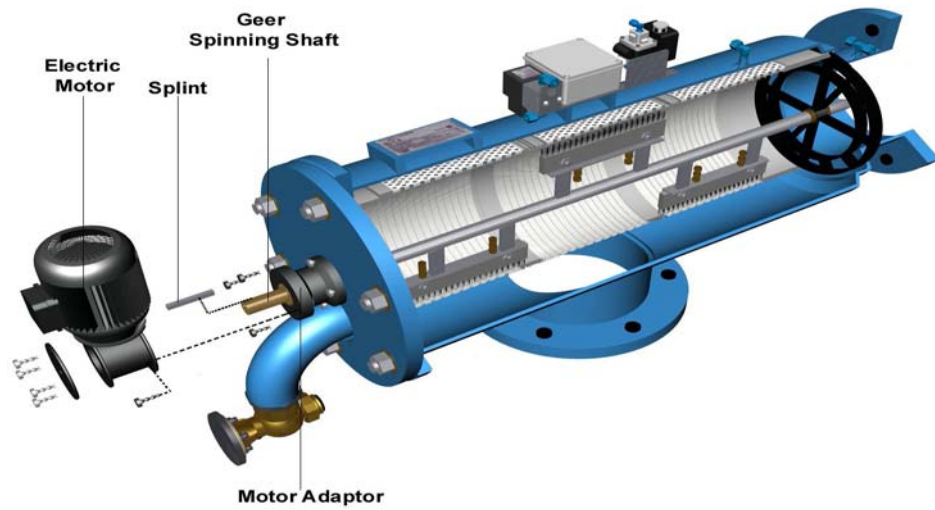


Figure: 4

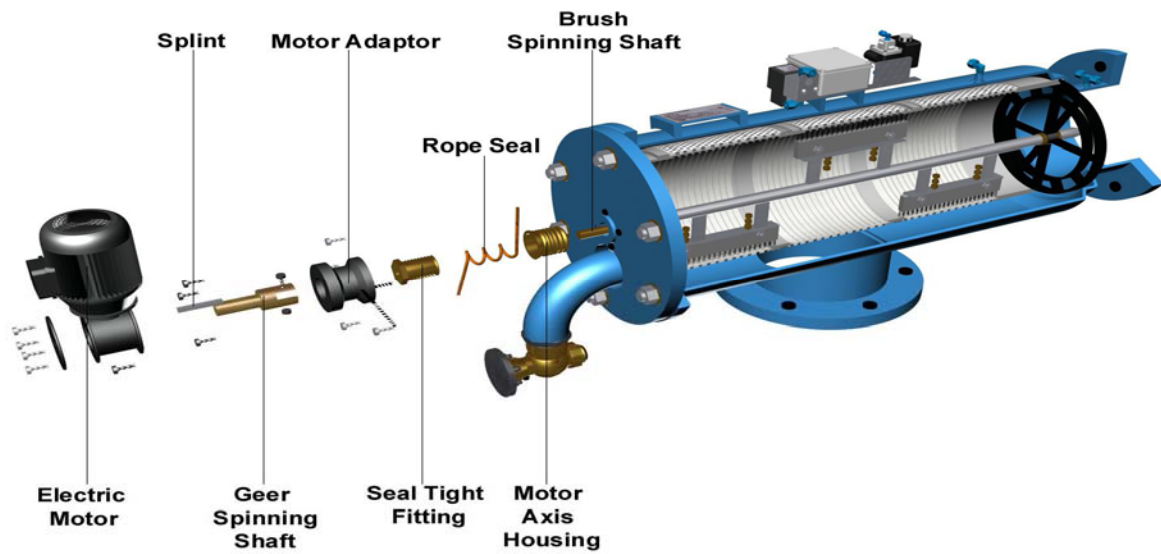
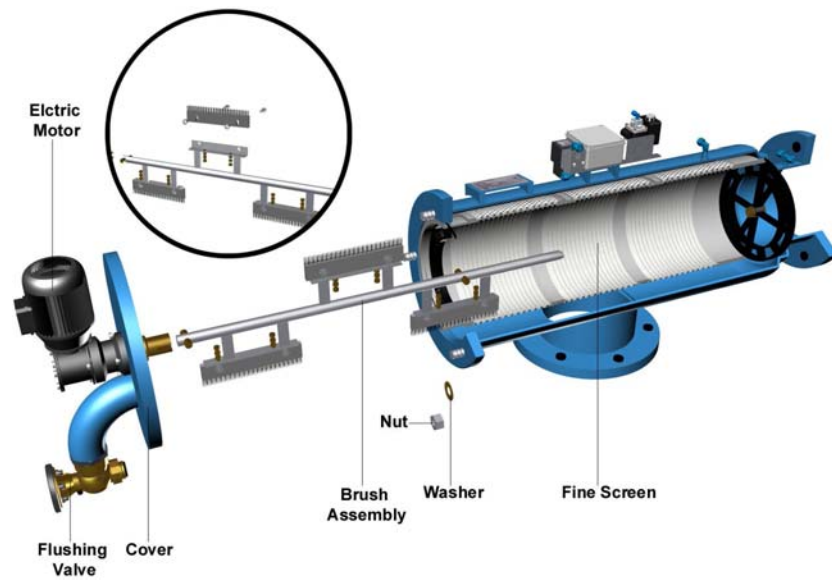
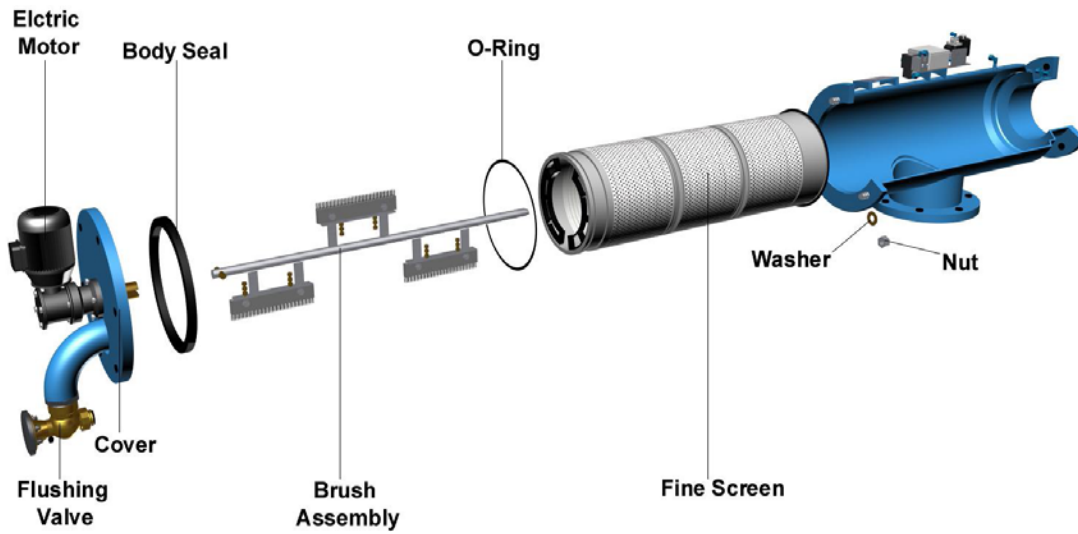


Figure: 5



**Figure 6: Brush Removal & Installation**

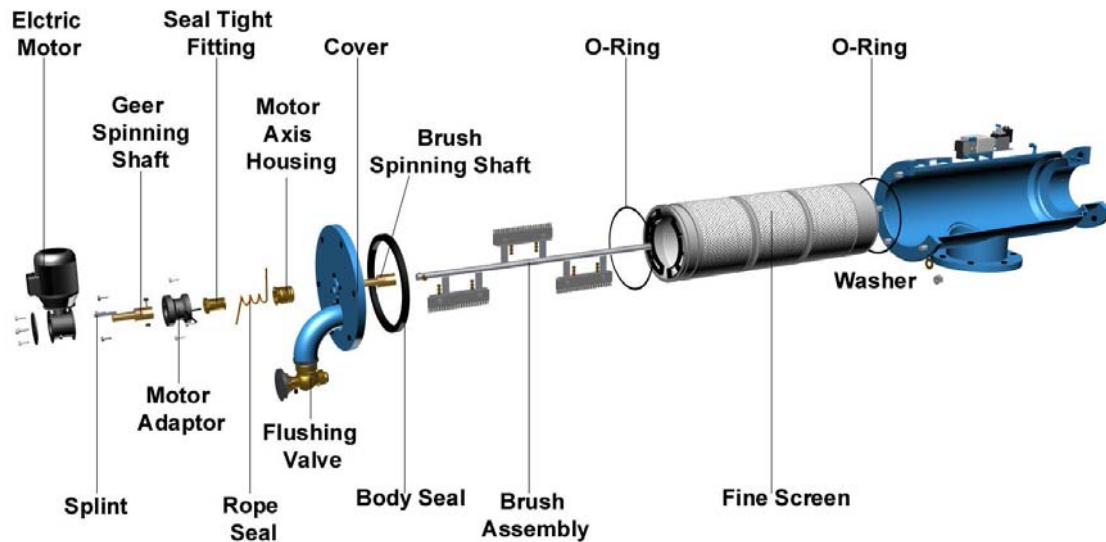


**Figure 7: Fine Screen Assembly Removal & Installation**

## **Periodical Checks (Figure 8)**

Perform yearly Periodical Checks at the beginning of the season, according to the following instructions:

1. Check the condition of the fine screen assembly. If defective, replace according to "**Fine Screen Assembly Removal & Installation**".
2. Check seals condition. Lubricate with **silicon grease**.
3. Remove the brush according to "**brush Removal & Installation**" and check the brushes height. If defective, adjust or replace with a new one.
2. Check condition of the bearings, replace if damaged or deformed.
3. Check existence of grease on the motor axis.
4. Check the filter housing for paint damage and corrosion. If required, clean area with sandpaper and apply a thin layer of basic + epoxy paint.
5. Check for leaks.



**Figure 8: Periodical Checks**

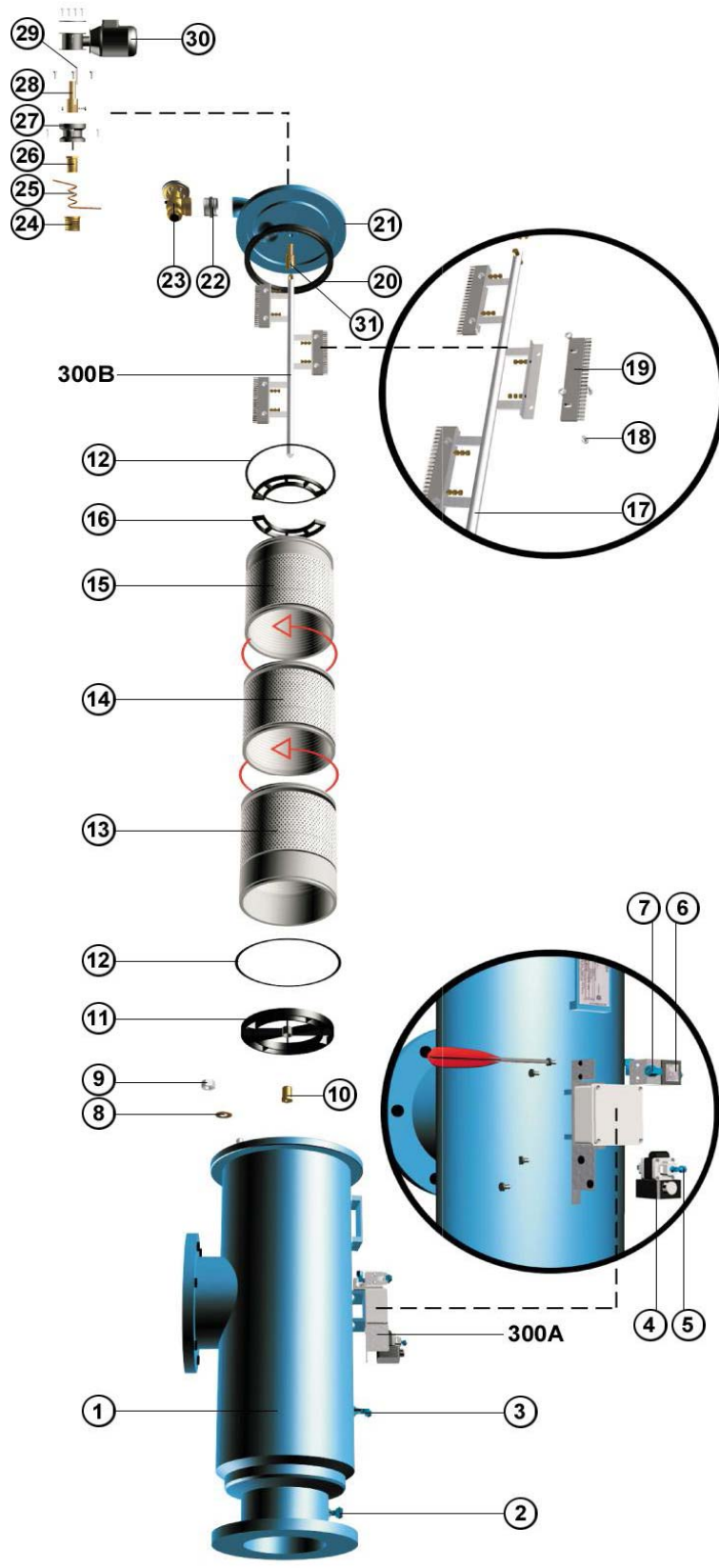


Figure 9

## Filter Parts

No.	Description
01	Filter body
02	8 mm x 1/4" "T" Connection
03	Pressure Difference Indicator
04	Pressure Difference Indicator
05	8 mm x 1/4" "T" Connection
06	Solenoid Valve
07	1/8" x 8 mm Control Fitting Connector
08	Washer
09	Nut
10	Lower Screen Bearing
11	Lower Screen Handle
12	Screen O-ring
13	Fine Screen Lower Section
14	Fine Screen Middle Section
15	Fine Screen Upper Section
16	Upper Screen Handle
17	Brush Assembly Axis
18	Brush Unit Tightening Screw
19	Brush Unit
20	U – Ring (body seal)
21	Body Cover
22	2" Connecting Nipple
23	2" Flushing Valve
24	Seal Housing Nut
25	Special Rope Seal
26	Seal Tightening Nut
27	Motor Adaptor
28	Spinning Shaft
29	Shaft Splint
30	Electric Motor
300A	Terminal connections Assembly
300B	Brushes Assembly

# Appendixes

## Appendix 1 – Control Panel & Electrical Wiring Schematic Drawing

REV. 00

### A. PANEL CONTROLS DESCRIPTION.

1. Main switch - Marked [ MAIN ]  
Enable Connection of the LINE voltage supply to the control unit, at this state green lamp indicator [ ON ] will lit.
2. Lamp indicator (Green) - Marked [ ON ]  
Indicates 24Vac internal supply.
3. Lamp indicator (Red) - Marked [ FAULT ]  
Indicates MOTOR over load failure. (Flushing disabled!)
4. Lighted Push-button switch (Orange) - Marked [ FLUSH ]  
Enable filter manual FLUSH operation.

### B. INTERNAL CONTROLS DESCRIPTION.

1. OL , Motor over load protection 0.63-1amp. with aux. contacts.
2. e1 , 1 amp. Line protectors that serve as a main protect for the control unit.
3. e2 , 2 amp. Line protector which serve as a 24Vac protect for the control unit.
4. C1 , power relay which controls filter motor.
5. TR1 , Multi voltage / 24Vac transformer.
6. TP , Sets Differential pressure switch sense time.
7. TF , Sets the flushing time.
8. TD , Sets the interval time between flushes.

### C. TERMINAL CONNECTIONS.

TB 1-4 : Line supply 380-480Vac+GND,3 phase,50-60Hz. inlets.  
 TB 5-8 : 380-480Vac+GND,3 phase,50-60Hz. M1 - motor supply voltage outlets.  
 TB 9/10 : SV , Flushing solenoid outlets. (24V/10W COIL)  
 TB 11/12 : DP , Differential pressure switch inlets.  
 TB 13/14 : SET inlets , enable/disable interval timer TD.

### D. INSTALLATION.

**General** – The control unit & Filter junction box are supplied with 16mm flexible conduit glands.

1. Connect the line supply cable (4x1-1.5mm) to the control unit terminals :

**IMPORTANT !** Line supply **MUST** be protected by 3x4amp. Protectors.

TB1 - GND. wire.  
 TB2 - R Phase wire.  
 TB3 - S Phase wire.  
 TB4 - T Phase wire.

**Warning !** The control unit is wired & tested with 380V phase supply Voltage.  
 For other phase supply voltage TR1 must be wired accordingly :

380 V ----- TR1 tags No. 1 & 2  
 415 - 420 V ----- TR1 tags No. 1 & 3



440 V ----- TR1 tags No. 1 & 4  
 480 V ----- TR1 tags No. 1 & 5

2. Connect the motor supply cable (Using 4x0.75-1mm) between control board and Filter junction box terminals. (Through flexible conduit gland)

Control board

Filter Junction box

TB5 - Motor GND. wire. (Yellow/green wire) -----→ TB5  
 TB6 - Motor U wire. -----→ TB6  
 TB7 - Motor V wire. -----→ TB7  
 TB8 - Motor W wire. -----→ TB8

**IMPORTANT! Verify good connection to MOTOR GROUND.**

3. Connect the flushing solenoid & differential pressure switch cable (Using 3/4x0.75mm) Between control board and filter junction box terminals. (Through flexible conduit gland)

- a. Using 4x0.75 cable.

Control board

Filter Junction box

TB9 - Solenoid live. -----→ TB9  
 TB10 - Solenoid natural.-----→ TB10  
 TB11 - differential pressure switch live. -----→ TB11  
 TB12 - differential pressure switch natural. -----→ TB12

- b. Using standard 3x0.75mm cable.

Control board

Filter Junction box

TB9 - Solenoid live. -----→ TB9  
 TB10 - Solenoid natural.-----→ TB10 & TB12 jumpered.  
 TB11 - differential pressure switch live. -----→ TB11  
 TB12 – no connection needed.

## E. OPERATION.

### Motor synchronization must be carried out as follows :

- Switch the [MAIN] switch to ON = 1 position and Verify that L1 [ON] indicator lights.
- Press pushbutton [MANUAL FLUSH] momentarily and Verify that L2 [FLUSH] indicator lights and the motor activated simultaneously.

Check the motor axis rotation (Which drives the filter dirt collector), **The rotation must be at the same arrow label direction.**

If not , switch the [MAIN] switch to OFF = 0 position , and exchange between two of the Motor phase and check again.(e.g. Between motor connection to TB 6-7 or TB 7-8 in the control board or in the filter junction box.)

## F. TIMERS FUNCTION.

**TP** - Differential pressure sense timer. (Factory set to 5 sec.)

Note that in case of differential pressure signal continuation the system will flush every TP Time set.

**TF** – Flush timer. (Factory set to 10 sec.)

NOTE that the practical flushing time is the time required for the hydraulic piston to Complete its movement due to a given line pressure. In order to minimize the flushing Time/waste of flushed water set TF respectively.

**TD** – Interval flush timer. (Factory set to 10 hours & enabled - TB 13/14 shorted)

NOTE that the TD timer can be disabled by removing the short wire from TB 13/14-SET inlets)

## G. FLUSH MODE.

In FLUSH mode the control unit will activate the flushing mechanism (The motor & solenoid valve) for fixed time set by TF timer while [FLUSH] indicator lights.

Flush mode is activated in three conditions:

- a. Pressing switches [MANUAL FLUSH].

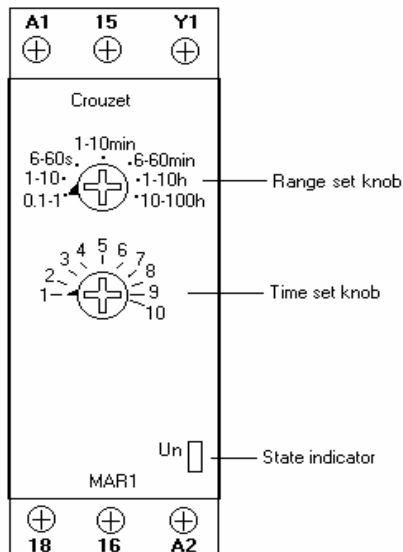
NOTE that if you pressed pushbutton [MANUAL FLUSH] and no reaction detected check the Over load protection [OL] , Or other line protectors [e1/e2].

- b. Low differential pressure signal for 5 sec. set by TP timer

- c. Elapsed time of TD timer (IF ENABLED BY SET INLETS!)

NOTE That TD can be set in the range of 1-100HR.

## CROUZET - MAR1 ON-DELAY INDUSTRIAL TIMER REVIEW.



### 1. Operation.

The MAR1 is a standard on-delay industrial timer , ranging from 0.1 second to 100 hours on-delay. On connecting the supply voltage (24Vdc/24-240Vac) to A1/A2 terminals the timer will begin the set

on-delay time count. On elapsed set time the timer will activate the internal relay. Resetting the timer done by disconnecting the supply voltage.

### 2. Range and time setting.

Range set knob

Time set knob

1-----2-----3-----4-----5-----6-----7-----8-----9-----10

0.1 - 1 second .....	0.1 -----	1 second
1 - 10 seconds .....	1 -----	10 seconds
6 - 60 seconds .....	6 -----	60 seconds
1 - 10 minutes .....	1 -----	10 minutes
6 - 60 minutes .....	6 -----	60 minutes
1 - 10 h .....	1 -----	10 hours
10 - 100 h .....	10 -----	100 hours

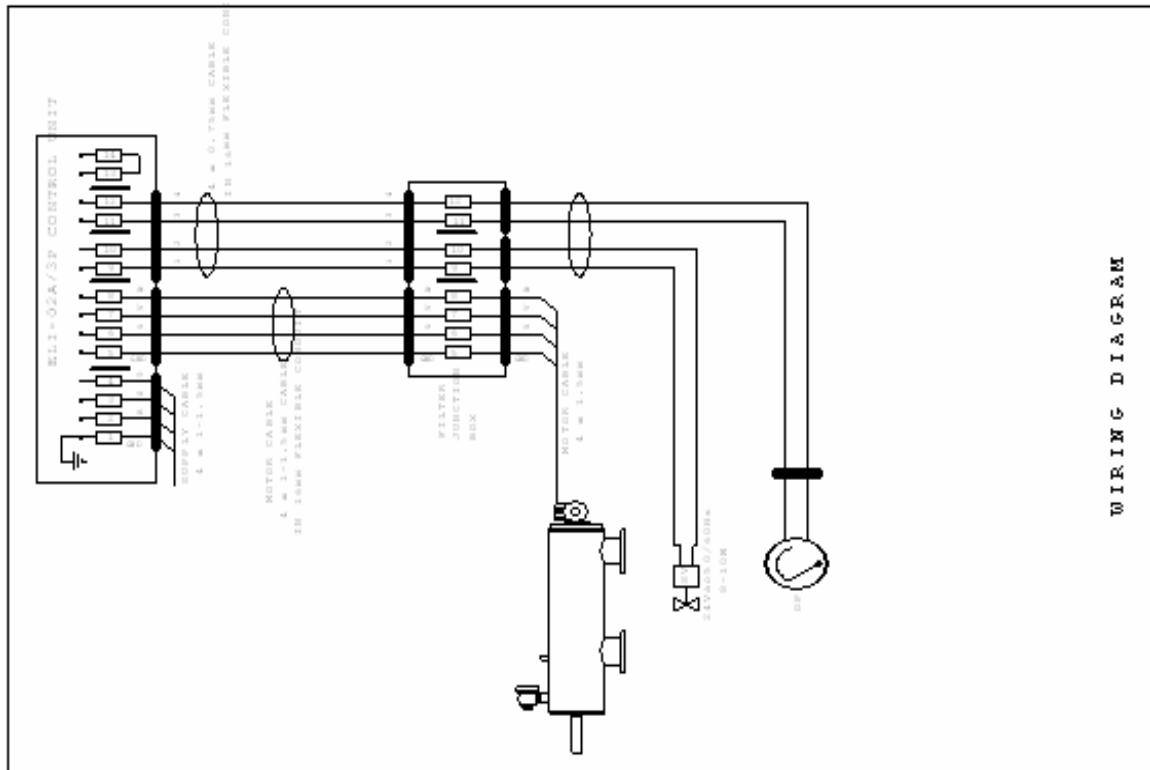
**NOTE :** On 6-60 time range multiply the time set scale by 6.

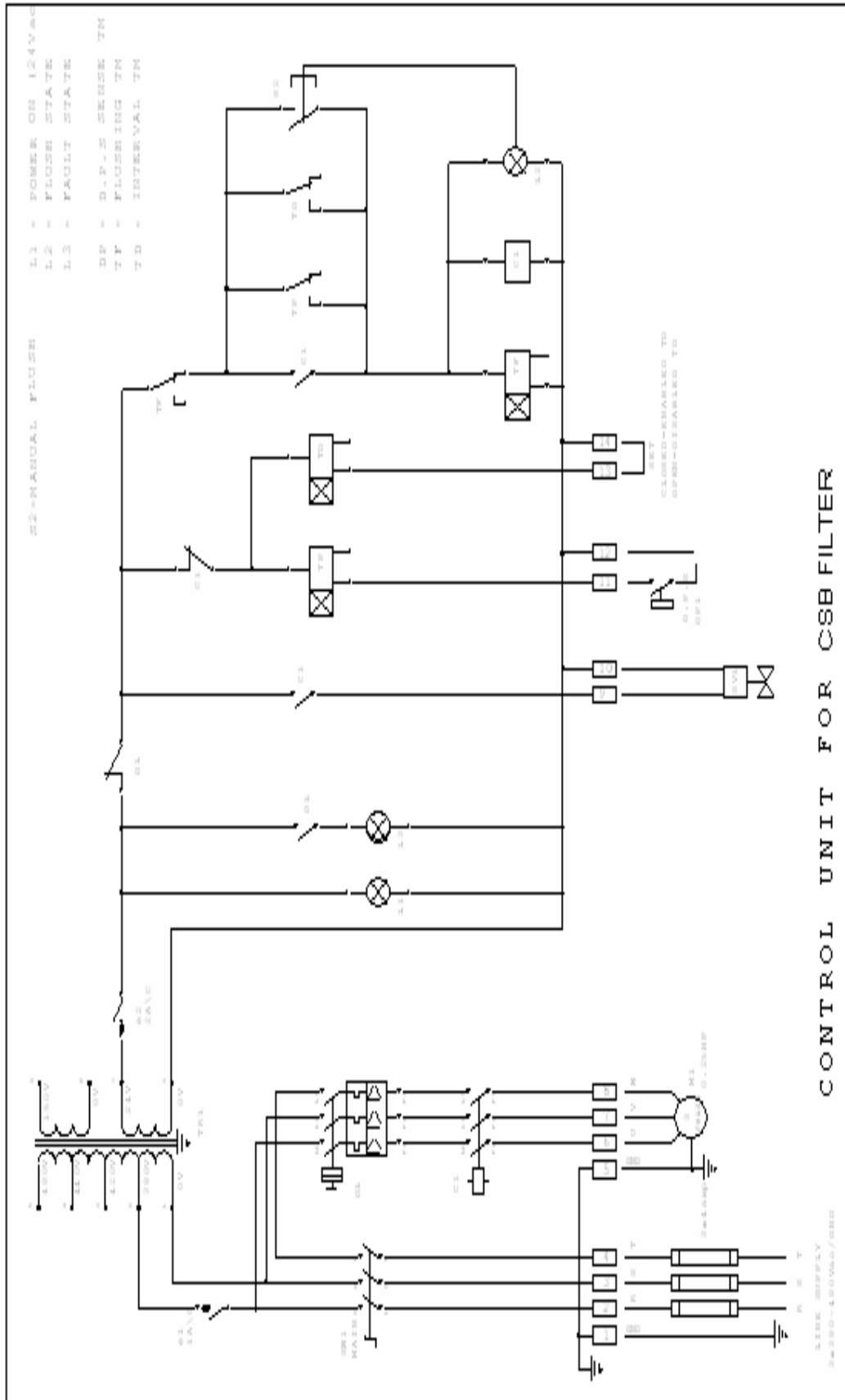
**Example – On-delay of 18 seconds is required.**

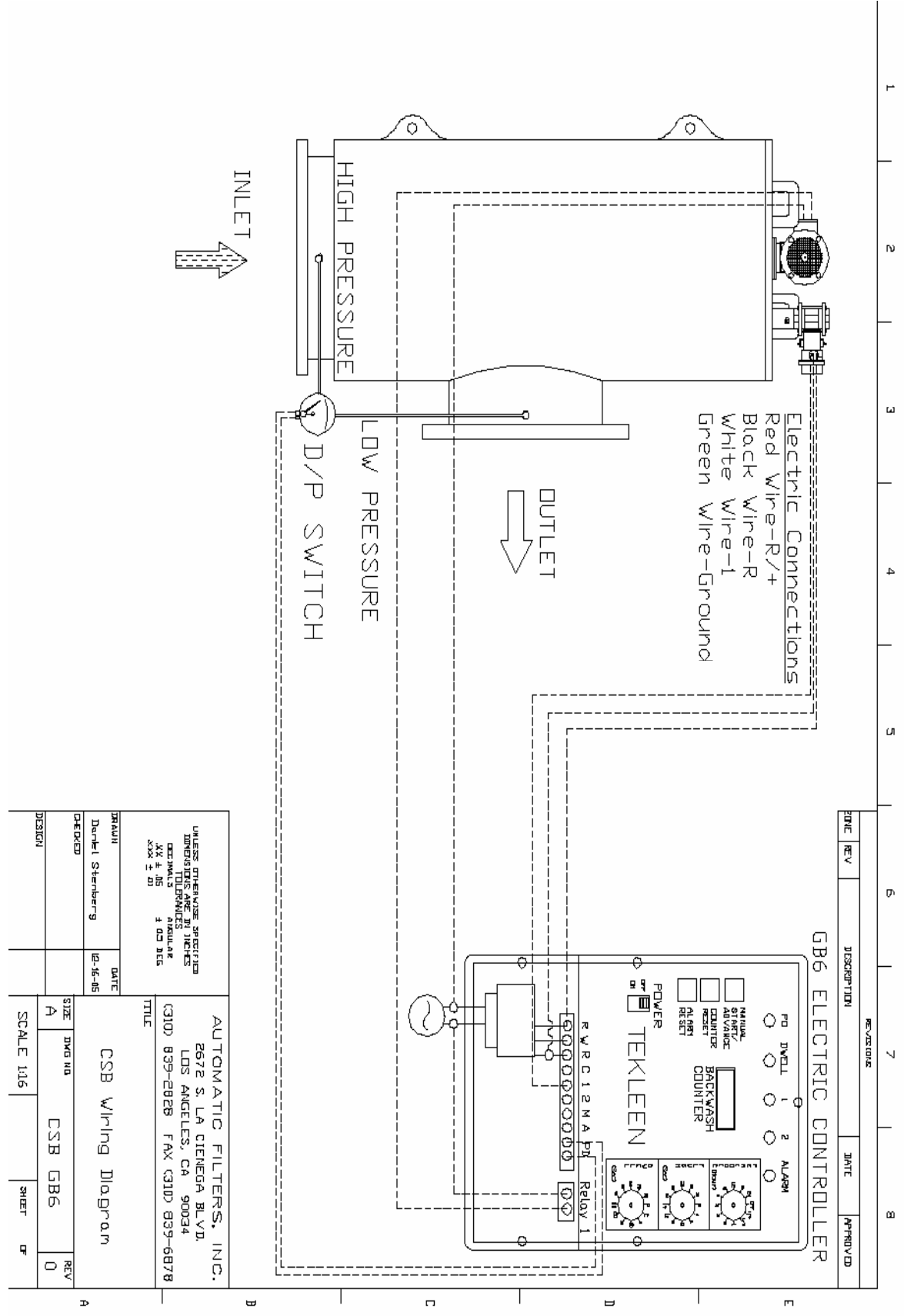
- a. Set the time range knob to 6-60s position.
- b. Set the time set knob to 3. (3x6 = 18 seconds.)

### 3. State indicator Un signals.

- a. **No light** = The timer is in off state. (No supply on A1/A2 terminals)
- b. **Blinking light** = The timer is counting/On delay.
- c. **Steady light** = The timer reached the time set. (Internal relay energized)







REV	DESCRIPTION	DATE	APPROVED

UNLESS OTHERWISE SPECIFIED  
 DIMENSIONS ARE IN INCHES  
 ANGULAR  
 XX ± .05  
 XXX ± .01

**AUTOMATIC FILTERS, INC.**  
 2672 S. LA CIENEGA BLVD.  
 LOS ANGELES, CA 90034  
 (310) 839-2928 FAX (310) 839-6878

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Should such products prove defective within one year as of the day it left AUTOMATIC FILTERS INC. premises, and subject to receipt by AUTOMATIC FILTERS INC. or its authorized representative, of written notice thereof from the purchaser within 30 days of discovery of such defect or failure - AUTOMATIC FILTERS INC. will repair or replace or refund the purchase price, at its sole option, any item proven defective in workmanship or material.

AUTOMATIC FILTERS INC. will not be responsible, nor does this warranty extend to any consequential or incidental damages or expenses of any kind or nature, regardless of the nature thereof, including without limitation, injury to persons or property, loss of use of the products, loss of goodwill, loss of profits or any other contingent liabilities of any kind or character alleged to be the cause of loss or damage to the purchaser.

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This warranty does not extend to components, parts or raw materials used by AUTOMATIC FILTERS INC. but manufactured by others, which shall be only to the extent warranted by the manufacturer's warranty.

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