

ALEX-TRONIX[®]

FILTER MASTER SERIES



FM-32 FILTER BACKWASH CONTROLLER

IMPORTANT: Prior to use, please read manual
in order to avoid system damage.

FM-32 Operation Manual

Thank you for purchasing the FM-32 filter controller-- manufactured in the U.S.A. The FM-32 is our latest filtration system controller including a digital differential pressure gauge; also new, an internal memory backup battery is no longer necessary due to advanced circuitry design. Additionally, the FM-32 now has a 'progressive backwashing' feature which allows every new cycle to start with a different tank for more efficient cleaning.

INSTALLATION:

Chassis Mounting: Prior to wiring, remove the single front panel screw located on the right front panel, then swing open the panel. Visually note the way the four connectors on the wiring harness are connected to the main circuit board. Begin by pulling (**from the connector only**) moving side to side. Remove each connector starting with the smaller daughter circuit board, followed by the larger ones on the main circuit board until they are worked loose and removed (**Do not pull from the wires**).

Loosen the two front panel screws on the left side, slide out panel, and place aside. Mount the empty enclosure to the filter manifold or where job dictates taking care not to damage any wires on the station output circuit board. The specific mounting procedure chosen may require additional fasteners and/or hardware. Ensure the mounting location is secure and free from vibration, chemical vapor, and water spray. Allow clearance for wiring conduit. After mounting, fasten the front panel back in the enclosure, and test that the panel swings freely – re-align if necessary, then plug in the connectors back at their previously noted positions.

Pressure Differential Gauge/Sensor Mounting: There are two instrument choices used to measure differential pressure –The Murphy Switch Gauge or the Alex-Tronix digital sensor. The digital sensor is included with all FM series controllers.

Sensor: Locate an area near the controller where the sensor can be mounted upside down (ports facing towards the ground). Sensor should not be mounted on anything that vibrates, and should be shielded from frost damage as best as possible. The sensor is a delicate instrument. Depending on your region, It is strongly recommended that the sensor itself be frost protected by freeze wrapping material, as well as any tubing or fittings plumbed to instrument. In cold climates, careful consideration should be given to the type of fittings selected in order to easily disconnect the sensor's plumbing during periods of deep freeze.

Gauge: To mount the Murphy gauge, remove the 3" plastic knockout on the bottom of the chassis. Slide the gauge through the bottom of the chassis protruding out taking note that the dial is in a readable position. Place the included clamp over the two mounting studs, and fasten the clamp to the chassis using the provided lock nuts. **Do not over torque these screws** or the gauge may become damaged. If fastened properly, torque should be firm to the point that the gauge will not turn by hand.

WIRING: (Refer to Figure 1A,B)

A/C INPUT (Refer to fig. 1A): The FM-32 can have an input voltage of 120VAC or 12VDC. 220VAC operation is available with a specially ordered transformer from the factory. The transformers primary wires have no polarity; secondary wires are factory pre-wired. Next, connect the safety ground (green wire-- attached to transformer case) to the ground wire returning back to the breaker box. See picture below for details. A safety ground is required by NEC code. Set output switch (on rear of front panel) to AC or DC/DCL. NOTE: Setting the switch to DC/DCL output with this configuration is only for use with DC non-latching solenoids.

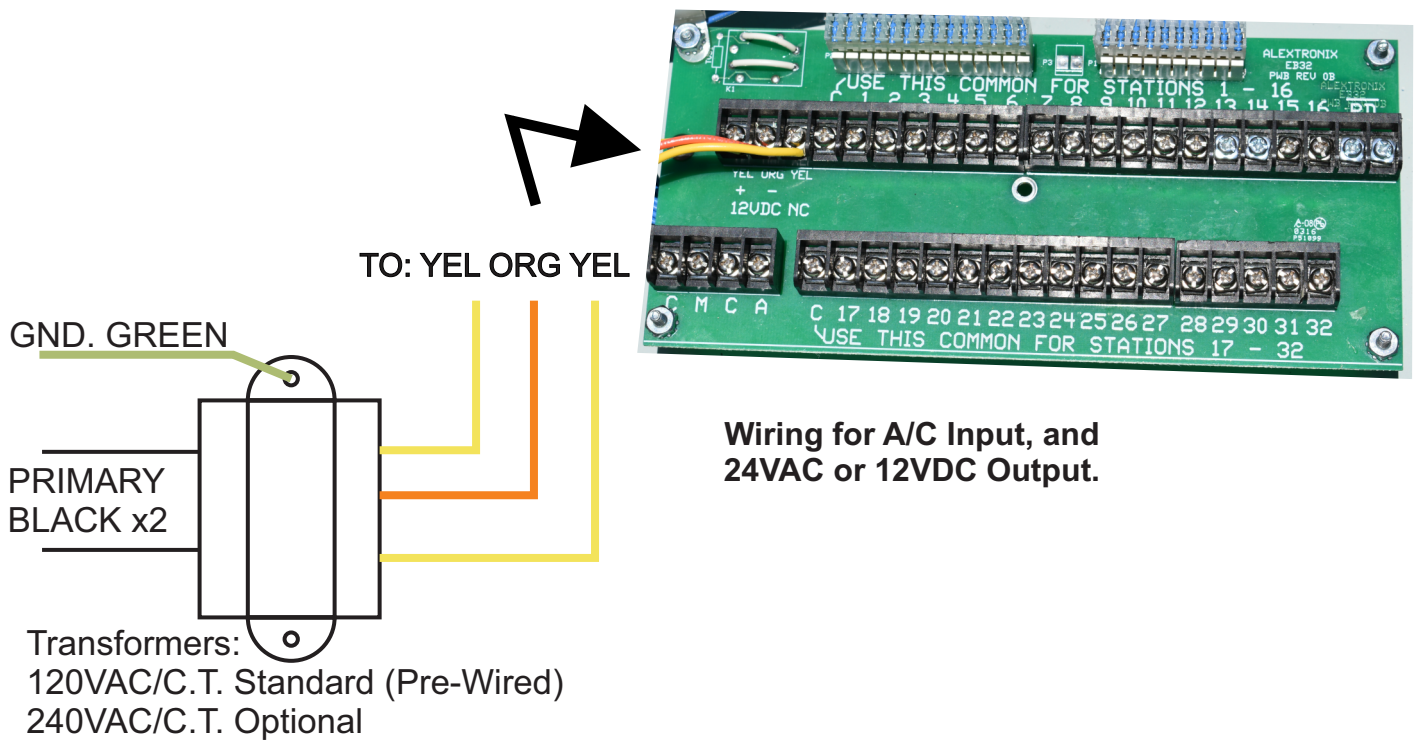


FIG. 1A

Wiring for DC Genset or Solar Power Input,
and 12VDC Non-Latching or 12VDC Latching Solenoid Output.

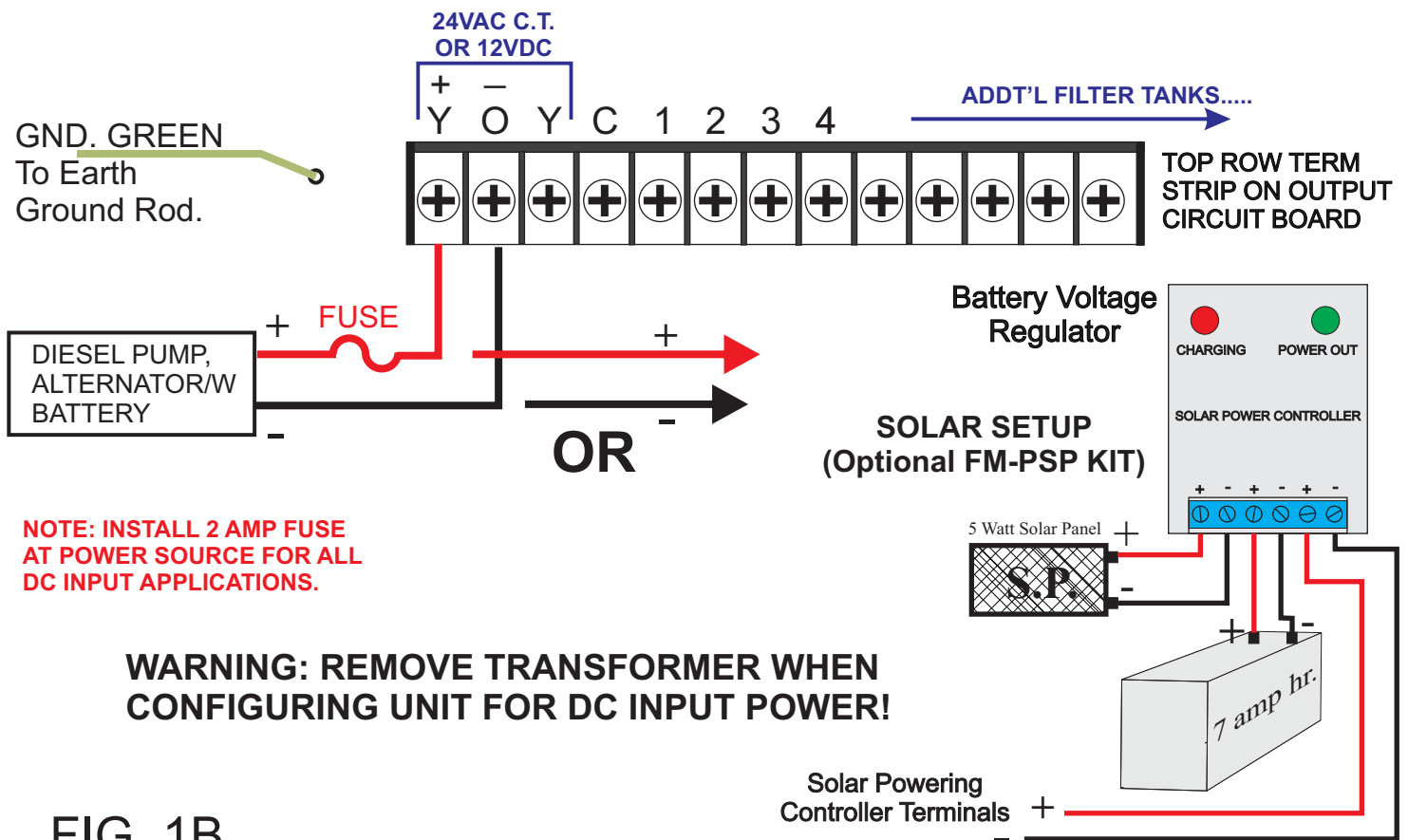
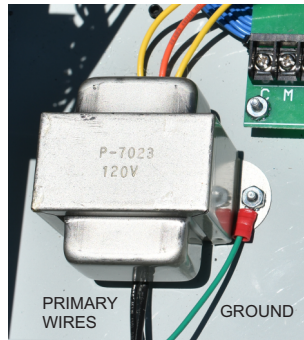


FIG. 1B

FIG. 1 POWER WIRING CONFIGURATION OPTIONS



DC INPUT FROM ALTERNATOR/GENSET (Refer to fig. 1B): For DC operation, remove the A/C transformer, and directly wire DC power into the first two terminals on the terminal strip marked '+' and '-'. An external in-line fuse (purchased separately) with a rating of 2 amps must be installed at the battery's positive terminal. The green chassis ground wire attached to the enclosure must be earth grounded to divert static charge. To ensure power quality, directly connect the wires to the battery terminals. If the power source shows signs of having electrical noise (erratic operation), install an inline noise filter (also purchased separately). Use solid terminal connections at the battery --no jumper clamps of any kind. Optimum operating voltage is 12.8-13.8 volts. Set output switch (on rear of panel) to DC/DCL. NOTE: Use DC non-latching solenoids for this configuration.

DC INPUT FROM SOLAR SETUP (Refer to fig. 1B): Solar set-up configurations are to be used with ***latching solenoids only***. For DC latching operation, remove the A/C transformer, and directly wire DC power into the first two terminals on the terminal strip marked '+' and '-'. Please use the **FM-PSP** solar power kit which includes an enclosure with a solar panel, 7aH battery, and voltage regulator. The green chassis ground wire attached to the enclosure should be earth grounded to divert static charge. If an underrated non specified battery is used with this unit, the battery will eventually become weak, and erratic operation of the controller will result. This could occur after several weeks of normal operation. Manually charging a large car battery on and off every several weeks, then re-connecting it to the controller is not recommended. Optimum operating voltage is 12.8-13.8 volts. Set output switch (on rear of panel) to DC/DCL.

TERMINAL STRIPS (Refer to Fig 2-3):

POWER INPUT TERMINALS: The FM-32 has three wiring terminals- Main harness in chassis, sensor input and cascading terminals located on the rear of the printed circuit board. **Referring to Fig. 2**, the main harness mounted within the enclosure --terminal 1-3 is marked: **Y O Y** (Yellow, Orange, Yellow) and is where the transformer's secondary is pre-wired from the factory. Once again, referring to these same terminals, looking from left to right --terminals 1 & 2 (+ and -) is also DC power input. When using DC input power, **the third terminal is not connected**. **WARNING: NEVER CONNECT BOTH TRANSFORMER AND DC POWER AT THE SAME TIME.**

STATION OUTPUT TERMINALS (See Fig. 2): For A/C and DC *non-latching* solenoids, one wire from each solenoid are all connected to the "C" (common) terminal. The remaining wires from each solenoid (at tank) connect to station terminals 1-12 (or 16) including terminals: "A" (Alarm) and "M" (Master valve) if used. The alarm "A" output can be used as an indicator to enunciate a bell or send a signal to the input of a PLC (programable logic controller). If your system uses a master valve (also referred to as a sustaining valve) the "M" output is wired to that valve's solenoid. Both master and alarm output terminals will follow the same electrical output characteristic as the station terminals.

For *latching solenoids*, the same wiring scheme is followed, except latching solenoids have a polarity; all negative "-" wires need to connect to the "C" terminal; the remaining positive "+" wires connect to the station terminals including the "A" and "M" terminals. Verify what solenoid wire is which polarity -- solenoid wire colors and their polarities are not standardized.

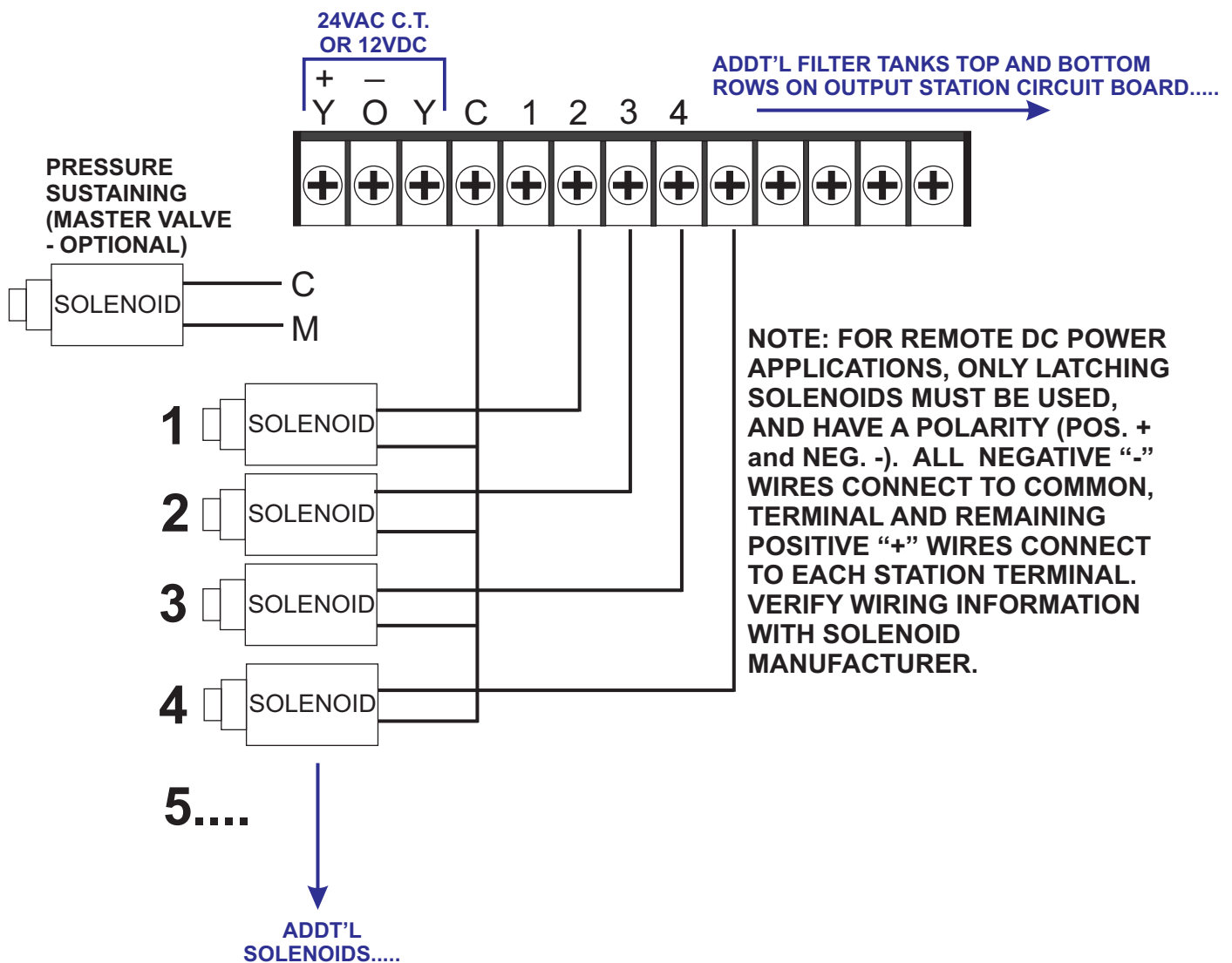
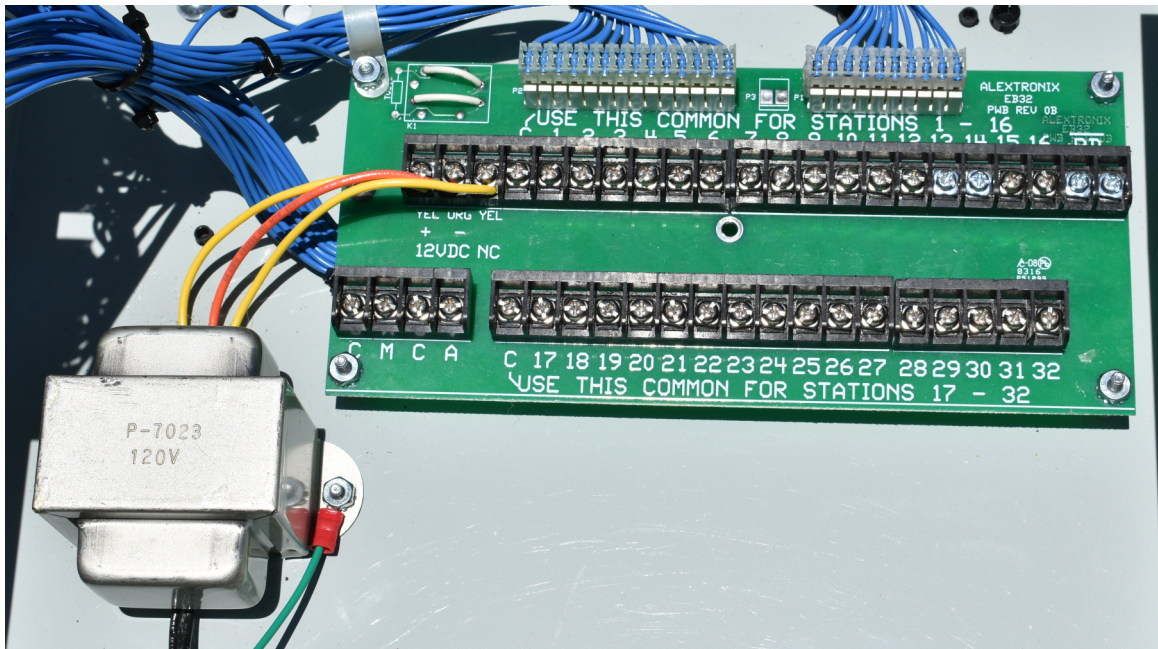
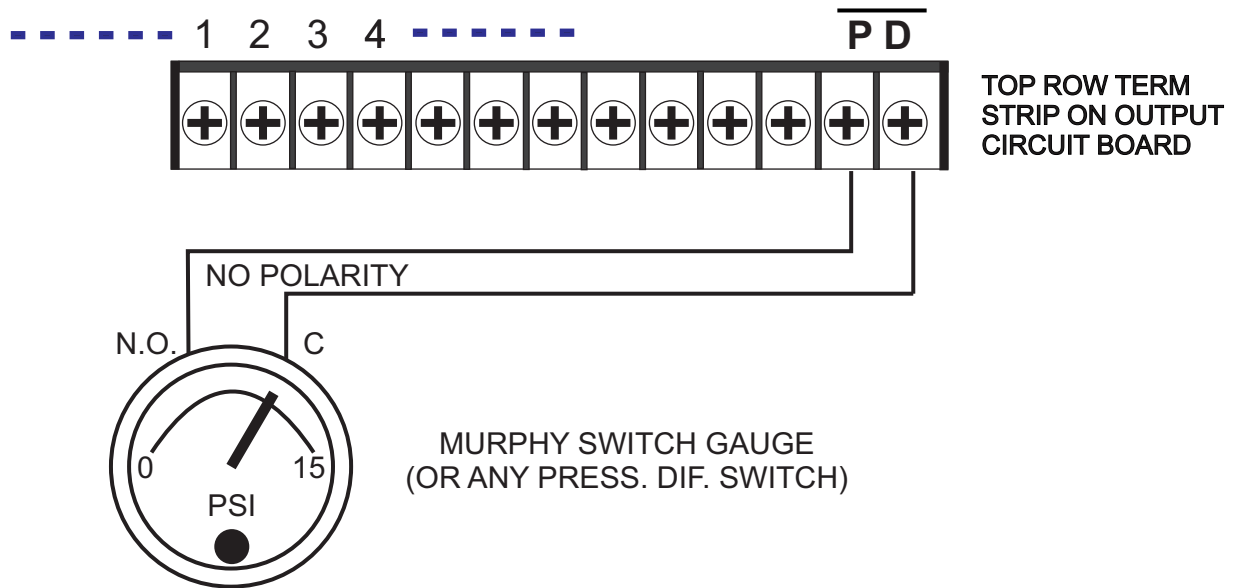
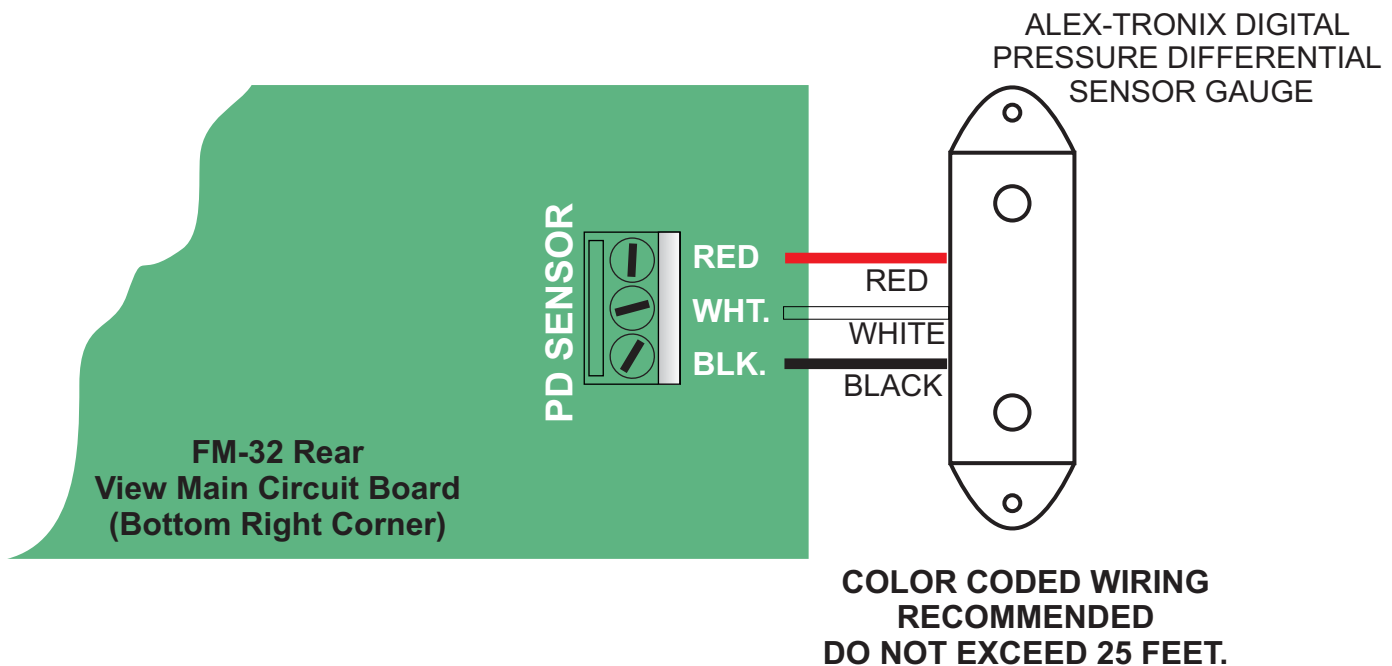


FIG. 2 SOLENOID WIRING CONFIGURATION OPTIONS



SWITCH GAUGE

FIG. 3A



SENSOR

FIG. 3B

NOTE: DO NOT USE BOTH GAUGES AT THE SAME TIME.

FIG 3. GAUGE TYPE WIRING CONFIGURATION OPTIONS



Fig 4- Front Panel Controls

PRESSURE DIFFERENTIAL GAUGE/SENSOR (See Fig. 3A-B): This unit can operate using two types of PD gauges -the traditional Murphy switch gauge, and the new Alex-Tronix digital sensor.

SENSOR: The sensor is supplied with a 24" cable; color coded RED, WHITE, and BLACK. Swing open the front panel and locate the small wiring terminal on the main circuit board marked "SENSOR" located towards the lower right corner of the board. Feed the sensor cable through the chassis bottom, and wire to the corresponding terminals located on the back of the main circuit board (see Fig. 3B). If further distance is required, use 18-22AWG cabled wire (purchased separately). Use stranded wire only if controller is on a mobile filter system (skid). The cable must be no more than 25 feet, and color coded to the existing sensor wires for ease of service. Use butt crimps or wire-nut the colored sensor wires to the corresponding colored wires on the extension cable. **Ensure these connections are water tight.**

GAUGE: Two blue 22 AWG wires/w terminal lugs are included with the gauge. The terminal lugs are fastened to the gauge's terminals marked 'N.O.' and 'C'. (Normally open and common respectively). The other bare ended wires are fed back through the chassis, and are connected to the controller's terminal strip marked 'PD'. These connections have no polarity.

FRONT PANEL CONTROLS: (Refer to Fig. 4)

POWER: Use this switch to turn controller on or off. When power is removed from the unit by any means, all programmed settings are retained. The FM-32 will resume operation at the point where it was turned off when power returns. The unit "freezes" operation and does not have an internal clock when power is unavailable. This should be considered when backwashing by periodic control only.

FUNCTION SELECTOR KNOB: Use this knob to select which function you wish to view or program. There is no specific setting this knob must be set at for normal operation, as long as FM-32 is correctly programmed.

ENT/ADJ.: This pushbutton selects what part within a function you will program. It also will lock in the parameter depending on the function.

DIRECTIONAL ARROWS ↑→↓←: These four push buttons allow you to move within a function to edit any parameters.

MAN. START/ADVANCE: Pressing the Manual start/Advance button initiates backwash irrelevant of where the function selector knob is set to. Repeatedly pressing this push button advances the controller to the next tank until it reaches filter mode allowing you to test the system quickly. Note that which station starts when this button is pressed is dependent on whether the TANK SEQUENCE setting is set to 'SEQUENTIAL' or 'PROGRESSIVE'. If troubleshooting is necessary, it is recommended that the TANK SEQUENCE be set to 'SEQUENTIAL' mode.

FUSE: If a short circuit occurs across any of the station outputs, the fuse located on the rear of the circuit board will blow open, and the following will be shown on the display: "**OUTPUT FUSE OPEN REPLACE OUTPUT FUSE THEN PRESS ENT./SEL.**" You will need to repair the electrical fault condition then replace the fuse with a 1.6Amp 20mm 'Slow-Blo' type fuse.

REAR PANEL SWITCHES:

RESET BUTTON: Should a power surge or brown out condition occur, and the unit behaves erratically or abnormal in some manner, swing open the panel to view the rear circuit board, and press the RESET button. All programmed settings will be retained.

OUTPUT SWITCH: The output switch setting is dependent on the input power configuration, and the type of solenoid the system is utilizing. There are two switch selections, given three solenoid configurations:

“A/C”: Is selected when the input voltage source is 120/240VAC power and the filter system uses 24VAC solenoids.

“DC”: Is selected when the input voltage source is 120/240VAC power and the filter system uses 12VDC *non-latching* solenoids.

“DC”: Is also selected when the input voltage source is 12VDC power from a solar system **or** alternator/genset setup and the system is using 12VDC *latching* solenoids.

PROGRAMMING (FUNCTIONS):

NOTE: If your controller was not installed and factory set by the filter manufacturer, it is strongly advised that you contact the filter manufacturer, and obtain controller setting information prior to operating the system.

STATUS: This function displays what mode the controller is in. Modes are: Filtering, Pre-dwell, Tank Backwashing Number, and Dwell. Unit shown in filtering mode below:

FILTERING
CYCLE COUNT 0013
NEXT START 00 3H 6M
DIFFERENTIAL 03 PSI

The display above shows that the system is in filtering (cleaning) mode, and has already backwashed the system 13 times. The second line displays how many backwash cycles have occurred. After a cycle is complete, the controller reverts back to filtering mode; The third line displays how long it has been since the last backwash cycle started whether manually, by periodic, or by pressure differential. This elapsed time is in days, hours, minutes, and seconds resets after any start of a backwash cycle. The fourth line is differential pressure measurement of the complete filter system displaying 2.3 pounds per square inch (helpful to know if a gauge or sensor is used to initiate backwashing, or to see if the system has excessive pressure on it).

DIFFERENTIAL SETTING: Use this setting to program the trigger point for the digital sensor gauge based on the ‘SENSOR/GAUGE TYPE’ setting. (Refer to section: *SENSOR/GAUGE TYPE*.)

If the SENSOR/GAUGE TYPE function is set for “*SWITCH GAUGE*” then this display will show: “*SET DIFFERENTIAL PSI ON GAUGE*” and no adjustable parameter on the display is available. See example below:

UNIT SET FOR: GAUGE

SET DIFF. PRESSURE
ON GAUGE

Therefore, you will not be able to make any PD adjustments on the controller, but only from the switch gauge itself. If the SENSOR/GAUGE TYPE function is set for "SENSOR", then a differential trigger setting is available for adjustment. Press **ENT./SEL.** and **↑ ↓** arrows to program the backwash trigger point of the sensor:

UNIT SET FOR: SENSOR

ADJUST DIFFERENTIAL
SETPoint-> 7 P.S.I.

7 PSI is the default setting if programmed for 'SENSOR'. Press **ENT./SEL.** when finished.

PRE-DWELL TIME: This is a delay time which turns on the master "M" station if used, for a brief period to build system pressure, in order to ensure valves open and close on systems with smaller pumps. Press **ENT./SEL.** and **↑ ↓** arrows to set the delay time (up to 180 seconds) before the unit goes into backwash mode. Press **ENT./SEL.** when finished.

BACKWASH TIME: This sets the cleaning duration for each filter tank. Press **ENT./SEL.** and **↑ ↓ ← →** arrows to set the delay time (up to 59 minutes, and 59 seconds) per tank. Press **ENT./SEL.** when finished.

DWELL TIME: This sets idling time between tank backwashes in order to maintain system pressure, and allow valves enough time to open and close as backwashing progresses. **ENT./SEL.** and **↑ ↓** to set the delay time (up to 180 seconds). Press **ENT./SEL.** when finished.

PERIODIC TIME: The periodic time is the maximum interval of time that you want your system to filter before initiating a backwash cycle. It is a backup in case your PD is defective. It can be set up for 30 days, 23 hours, and 59 minutes in one minute intervals. **NOTE: The FM12/16 will immediately start another backwash cycle if the periodic time set is less than the total backwash cycle time.** Press **ENT./SEL.** and **← → ↑ ↓** to set the delay time. Press **ENT./SEL.** again when finished.

PD DELAY TIME: Intermittent surge pressures in a filter system can occur which could trigger a backwash cycle unnecessarily. Adding PD delay time alleviates unnecessary backwashing, and allows 'gauge bouncing' to stabilize before a legitimate pressure reading is taken by the controller. Press **ENT./SEL.** and **↑ ↓** to set the delay time (up to 180 seconds). Contact filter manufacturer for optimum setting.

TANK ASSIGN: This display has two separate programmable banks. To select between banks 1-16, and 17-32, press the up and down arrows **↑ ↓**. Depending on how many filter tanks your system has, you can activate/deactivate any of them --up to 32. The display will show a bank of "X's". Press **ENT./SEL.** and **← →** to move along to a specific tank number, then use **↑ ↓** to activate or deactivate a tank;

when finished, press **ENT./SEL.**

TANK SEQUENCE: There are two orders for backwashing filter tanks --*Sequential* and *Progressive*. Sequential backwashing traditionally starts with Tank 1, 2 ...4 in order every time a new cycle starts. Progressive backwashing starts by cleaning a different tank every time a new cycle starts i.e. 1,2,3,4 then 2,3,4,1 then 3,4,1,2, etc, etc. This can be used to help all tanks clean evenly and keep water flow consistent while filtering. Press **ENT./SEL.** and **↑ ↓** to choose the order, then **ENT.ADJ.** to lock in. Note: for purposes of troubleshooting, it is suggested that this setting stay in sequential mode in order to quickly switch from station to station.

CYCLE COUNT RESET/M.S. CONFIG.: This is a dual function display. The upper part of the display allows you to reset the backwashing cycle count to zero, as seen on the STATUS display. The lower part of the display activates master or slave configuration settings when cascading units.

Reset Cycle Count: To reset the count to zero, press **ENT./SEL.** - ***NO** asterisk begins to flash. Press the right arrow **→** over to ***YES**. The cursor then moves back to ***NO**, and the count has been reset.

SOLENOID TYPE: The FM-32 is compatible to 24VAC and 12VDC non-latching **or** latching solenoids. Default solenoid setting is in the *NON-LATCHING* mode. To configure output for 12VDC latching solenoids press **ENT./SEL.** and **↑ ↓** and select 'LATCHING', then press **ENT./SEL.** again. Additionally, the output switch must also be properly set (located on rear panel) Refer to '**Output switch**' in text.

SENSOR/GAUGE TYPE: To switch between the traditional Murphy switch gauge and the Alex-Tronix digital sensor, press **ENT./SEL.** **↑↓**, and press **ENT./SEL.**.. The FM-32 is set to 'sensor' by default.

OPERATING CHARACTERISTICS

This FM-32 can initiate a backwash cycle by PD or Periodic time *or both*, as well as manually. When a backwash initiates, the FM-32 switches from filtering mode, the controller goes into backwash and individually cleans each tank. The systems pressure differential drops when the cleaning cycle is complete, and the tanks are deemed "washed". If the pressure does not drop, troubleshooting of the filter system itself should be performed, starting with solenoid and valve maintenance. Additional troubleshooting resources can be found on the tech support portion of our website page:

www.alextronix.com

ALARM: The FM-32 has an alarm output (terminal "A") located on a separate terminal strip located on the station output board. The of triggering of an alarm condition works in tandem with the pressure differential gauge/sensor and activates as follows:

For Murphy Switch Gauge: If immediately after a backwash cycle, the PD gauge remains closed (filters weren't sufficiently cleaned), *one count is registered* within the controller. With that condition in mind, after three consecutive counts (cycles), on the fourth start cycle, the display will show: "ALARM-ENT/ADJ. TO RESET", and the "A" output on the terminal strip will activate. If within the three consecutive cycles the gauge opens for 5 seconds, and closes again, the controller will not register a count, and no alarm condition will occur.

For Alex-Tronix Digital Sensor: If immediately after a backwash cycle, the sensor's differential pressure remains equivalent or above of the set point (filters weren't sufficiently cleaned), *one count is registered* within the controller. With that condition in mind, after three consecutive counts (cycles), on the fourth start cycle, the display will show: "ALARM-ENT/ADJ. TO RESET", and the "A" output on the terminal strip will activate. If within the three consecutive cycles the sensor falls below the set point for 5 seconds, and rises at or above set point again, the controller will not register a count, and no alarm condition will occur.

FUSE: If a short circuit occurs across any of the station outputs, the fuse located on the rear of the circuit board will blow open, and the following will be shown on the display: **“OUTPUT FUSE OPEN REPLACE OUTPUT FUSE THEN PRESS ENT./SEL.”** You will need to repair the electrical fault condition then replace the fuse with a 1.6Amp 20mm ‘Slow-Blo’ type fuse.

TROUBLESHOOTING:

BLOWN FUSE DISPLAY INDICATION: Should the fuse ever blow, the following symptoms should be examined:

- Solenoids defective or draw excessive current defective when operated for long periods.
- Primary voltage too high.
- Short circuit in solenoid wiring.
- Solenoid mechanically stuck in position caused by dirt or wear drawing excessive current.

FUSE REPLACEMENT: Should the fuse ever need replacement, a spare is available located on the rear main circuit board. The protection fuse is marked ‘1.6A SLOBLO’. If extra fuses are needed, see ‘specifications’ below.

CLEARING CONTROLLER MEMORY: To bring the controller to it’s initialized and cleared memory state:

- 1) Turn power off until display disappears.
- 2) Hold down the MANUAL START/ADVANCE pushbutton.
- 3) Turn on the power and continue to hold down the push button until MEMORY CLEARED is displayed, then reverts to the function display.
- 4) All functions will need to be re-programmed as needed.

ELECTRICAL SPECIFICATIONS:

***Primary power consumption:120VAC A/C input mode: 125ma. Idle. 400ma. Max. (50W) @50/60Hz.**

***Idle power consumption in DC mode: 15ma. idle. 2.4A operating latching Solenoids - Max.**

***Total and maximum current output: up to 1.5 Amps standard. Optional high power 3 amp output available.**

***Operating input voltage options: 120VAC/12VDC standard, 240VAC (Optional)**

***Operating output voltage: 24VAC, 12VDC, 12VDCL (Auto polarity reversing two wire pulse)**

***Pressure Differential options: Differential pressure switch gauge or digital sensor.**

***Fuse type: 20mm 1.6 AMP slo blo type.**

For in-depth troubleshooting literature, please visit our website: www.alex-tronix.com “Tech Support” link for helpful support bulletins, or contact us for any questions during normal business hours (Pacific Time) toll free at: 1-888-224-7630. For questions regarding your filter system, contact the manufacturer.

WARRANTY

Suppliers and end users of this product agree to the following terms, conditions and limitations of warranty and liability coverage:

Alex-Tronix warrants the FM-32 to be free from original defects for two years from the date of original sale. The manufacturer shall replace, free of charge any part found defective under normal use and service within the guarantee period, provided the product is installed, used, and maintained in accordance with any applicable instructions or limitations issued by Alex-Tronix. Components supplied replacement parts are warranted for 90 days from the date of shipment. The manufacturer assumes no liability for incidental or consequential damage sustained in the adoption or use of our engineering data, service, or products. Liability is therefore limited to the repair of the product manufactured by Alex-Tronix. No agent or representative of Alex-Tronix has the authority to waive or add to this agreement. Altered products, or use of products in a manner not intended shall void this warranty. For warranty service, ship unit pre-paid to the address below. Controllers damaged in transit due to improper packaging are not covered by warranty.

For warranty repair, send defective product freight pre-paid to:

Alex-Tronix Controls Div. GNA Industries - 4761 W. Jacquelyn Ave. Fresno, CA. 93722 - Tel: (888)-224-7630 Fax: (559) 276-2890
www.alextronix.com - orders@alextronix.com