





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

REV. 021418

# FM-4P Operation Manual

Thank you for purchasing the FM-4P filter controller-- manufactured in the U.S.A. The FM-4P is our latest controller featuring a digital differential pressure gauge, yet the unit can still use the Murphy differential switch gauge. Also new --an internal backup battery is no longer necessary due to advanced circuitry design. Additionally, the FM-4P now has a 'progressive backwashing' feature which allows every new cycle to start with a different tank for more efficient cleaning.

### **INSTALLATION:**

**Output selector:** Prior to wiring, remove bottom and top face plates, and mount the empty controller enclosure to the filter manifold or where job dictates. On the rear of the main panel circuit board, set the solenoid output selector switch to match the solenoid type you have being A/C or DC/DCL.

**Pressure Differential Gauge:** Depending on the gauge type you have– Murphy Switch Gauge or the Alex-Tronix digital gauge, locate a mounting area, either on the filter manifold, or the FM-4P's enclosure itself. You may require extra color coded (22-18 awg) wire to reach controller terminals.

# WIRING: (Refer to Figures 1, 2, & 3)

**A/C INPUT:** The FM-4P accommodates an input voltage of 120VAC or 12VDC. 220VAC operation is also possible with a specially ordered transformer from the factory. For A/C input, Wire both black primary wires to the hot and neutral wires from the circuit breaker box; primary transformer wires have no polarity. The transformers 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. A safety ground is required by NEC code. Set output switch (on rear of panel) to AC or DC/DCL. NOTE: Setting the switch to DC output when using transformer is only for use with DC non-latching solenoids.

**DC input from alternator:** 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 with a rating of 2 amps must be installed on the positive terminal located at the battery. To ensure power quality, directly connect the wires to the battery terminals. If the power source is noisy, install an inline noise filter. Use solid terminal connections at the battery- no clamps of any kind. Optimum operating voltage is 12.8-13.8 volts. Set output switch (on rear of panel) to DC/DCL. NOTE: <u>Use DC non-latching solenoids for this configuration.</u>

**DC input from solar setup:** Solar set-ups 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 battery (7 amp hour rechargeable) and solar panel we provide. If a non specified battery is used with an underrated panel, 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, and 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 STRIP:

**POWER:** The FM-4P has three sections of wiring terminals- power, solenoids, and gauges. Terminal 1-3 is marked: **Y O Y** (Yellow, Orange, Yellow) and is where the transformer's secondary is factory wired. In the same location (from left to right -terminals 1-2) + and - is also the DC input. When using DC input, the third terminal is not connected. DO NOT CONNECT BOTH THE TRANSFORMER AND



FIG. 1 POWER WIRING CONFIGURATION OPTIONS



FIG. 2 SOLENOID WIRING CONFIGURATION OPTIONS



FIG 3. GAUGE TYPE WIRING CONFIGURATION OPTIONS

DC POWER AT THE SAME TIME.

**STATION OUTPUTS:** For A/C or DC non-latching solenoids, one wire from each solenoid are all connected to "C" (common) terminal. The remaining wires from each solenoid connect to station terminals 1-4 including "M" (master) valve if used. 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 "M" terminal.

**PRESSURE DIFFERENTIAL GAUGE/SENSOR:** This unit can operate using two types of PD gauges -the traditional Murphy switch gauge, and the new Alex-Tronix digital sensor. For the <u>Murphy gauge</u>, connect the N.O. and C on the gauge to the FM-4P terminals both marked: "B" noted under 'GAUGE' These connections have no polarity.

For the digital sensor, match color and connect the wires to the three terminals: Black to "B", White to "W", and Red to "R" noted under 'SENSOR'.

#### **CONTROLS:**

**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-4P will resume operation at the point where the controller was turned off when powered back up.

**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 to for normal operation, as long as FM-4P is correctly programmed.

Select: This pushbutton selects what part within a function you will program.

+ and -: These two pushbuttons allow you to edit any parameters within a function.

**Enter/Manual Start:** Pressing this pushbutton programs the parameters desired. You must press **ENTER** after entering any parameters when programming the unit. Once programmed, if desired, you can manually initiate a backwash when the function knob is on the "STATUS" position.

#### **PROGRAMMING (FUNCTIONS):**

**STATUS:** This function displays what mode the controller is in. Typical modes can include: Filtering, Pre-dwell, Tank Backwashing Number, and Dwell. Unit shown in filtering mode below.



**PD DIFFERENTIAL SETTING:** Use this setting to set the trigger point for the sensor gauge based on the SENSOR/GAUGE TYPE function. If the function is set for *"PD GAUGE"* then this display will show: *"SET DIFFERENTIAL PSI ON GAUGE"* and no adjustable parameter is available. If the SENSOR/GAUGE TYPE function is set for *"SENSOR"*, then a differential trigger setting will be available for adjustment. Press SELECT, +, and - to set the backwash trigger point of the sensor. 7

PSI is the default setting if programmed for 'SENSOR'. Press ENTER when finished.



**PRE-DWELL TIME:** This is a delay time used to build system pressure in orchestration with the pressure sustaining master valve, in order to ensure valves open and close on systems with smaller pumps. Press SELECT, +, and - to set the delay time (up to 255 seconds) before the unit goes into backwash mode.

**BACKWASH TIME:** This sets the cleaning duration for each filter tank. Press SELECT, +, and - to set the delay time (up to 255 seconds) per tank. Press ENTER 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. Press SELECT, +, and - to set the delay time (up to 99 seconds). Press ENTER when finished.

**PERIODIC TIME:** This sets backwashing *cycle intervals*. It is independent from the PD gauge initiation; however, if the gauge triggers a backwash cycle before a periodic interval initiates, the periodic's interval time clock will reset to zero, and begin timing up again. After a cycle is complete, the controller reverts back into filtering mode, the periodic time resets to zero, and periodic timing begins again.

**PD DELAY TIME:** Intermittent surge pressures in a filter system can occur which could trigger a backwash cycle unnecessarily. Adding PD delay time alleviates unnessessary backwashing, and allows 'gauge bouncing' to stabilize before a legitimate pressure reading is taken. Press SELECT, +, and - to set the delay time (up to 255 seconds). Contact filter manufacturer for correct setting.

**TANK ASSIGN:** Depending on how many filter tanks there are, you can activate/deactivate any of them --up to four. Press select, and move along to each tank number, then use "+" or "-" to activate or deactivate that tank; when finished, press enter.

**BACKWASH TANK SEQUENCE:** There are two orders for backwashing --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 through all tanks while filtering.

**BACKWASH CYCLE COUNT:** This function displays how many backwashes have occurred since it was last cleared. To reset the count to zero, press select, then select over to 'Y', and press enter.

**SOLENOID TYPE:** The FM-4P is compatible to 24VAC and 12VDC non-latching, and 12VDC latching solenoids. Default solenoid setting is in the NON-LATCHING mode. To change to Latching (12VDC only), press select twice, and press enter. You must also set the output switch (located on rear panel) to the correct configuration. Your options are as follows: For 120/240VAC power supply input, the output switch can be set for 24VAC or 12VDC solenoids. For 12VDC power supply input whether from a genset or solar panel set up.

**SENSOR/GAUGE TYPE:** To switch between the traditional Murphy switch gauge and the Alex-Tronix Sensor, select to either one, and press enter.

#### **OPERATING CHARACTERISTICS**

The unit can initiate a backwash cycle by PD or Periodic time or both, and manually. When a backwash initiates, the FM-4P moves out of filtering mode, and individually washes each tank. The systems pressure differential drops when cycle is complete, and the tanks are deemed clean. 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 sought out on the tech support page on the web at: www.alextronix.com

**FUSE REPLACEMENT** : Should the fuse ever blow, the following symptoms should be examined:

- · Solenoids defective or become defective when heated for long periods.
- Primary voltage too high.
- Short circuit in solenoid wiring.

#### CAUTION: Replace fuse with same type only! - 20mm 1.6amp Slow Blow.

For any questions or help regarding this controller please contact us at 1-888-224-7630. For questions regarding you 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 F4P 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:

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