

INSTALLATION AND OPERATIONS MANUAL

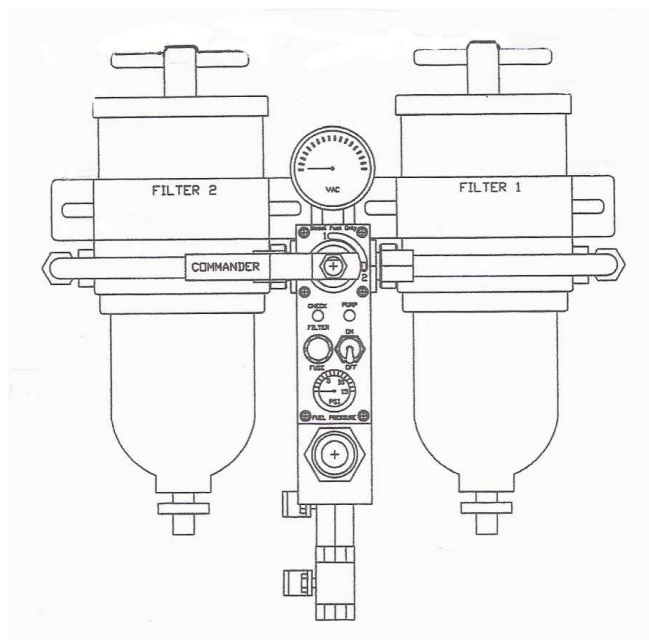
*Filter*BOSS COMMANDER

P/N-FC60,FC90,FC100

Patent # 7481919

“DIESEL ENGINES ONLY”

**THE INSTALLATION AND SETUP
SHOULD BE PERFORMED
BY A QUALIFIED TECHNICIAN**



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MEMBER
ABYC[®]
Setting Standards for Safer Boating

MANUAL *Filter*BOSS COMMANDER
02/24/09

FC60, FC90, and FC100

The *Filter*BOSS COMMANDER

was developed as an upgrade to the original *Filter*BOSS system.

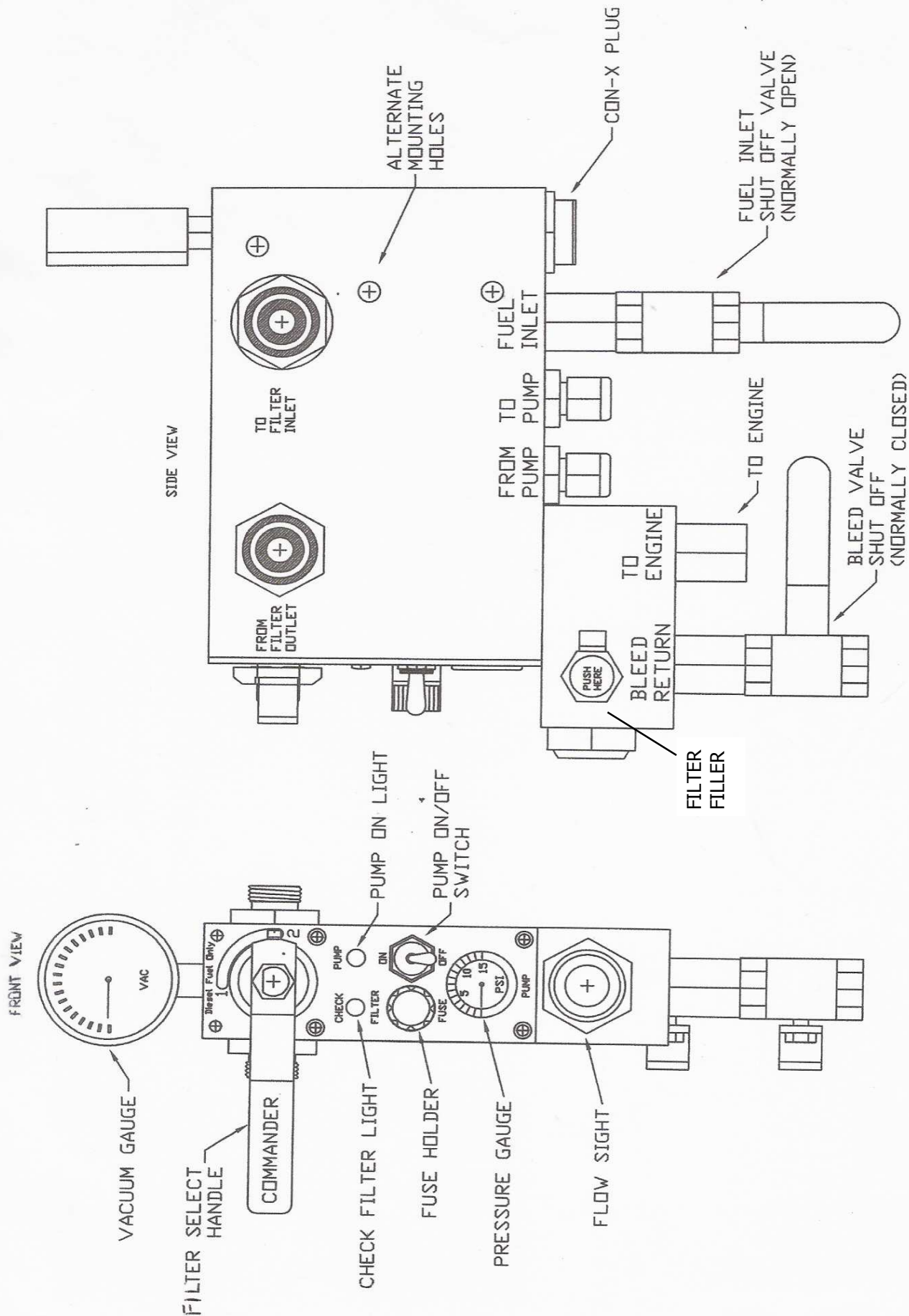
We found that the typical boat operator needs a single and simple onboard system that will allow him/her to deal with the problems of contaminated fuel.

The **COMMANDER** system allows:

- Dual Filters
- Fuel Polishing
- Higher fuel flows-up to 180 gph
- Single lever operation
- Modular design for tighter engine/fuel compartments
- External fuel pump allows operator to select pump type and output
- Built in Flow sight
- Filter Filler helper (FC60 & FC90)
- Stainless steel and powder-coated aluminum construction
- 12 or 24 volt operation

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INSTALLATION/OPERATIONS GUIDE COMMANDER FC60,FC90,FC100

PREINSTALLATION—WARNING—READ FIRST

1. Install the COMMANDER between the suction (vacuum) side of the engine driven lift pump and the fuel tank, in an area that has easy access to inspect/service and is away from heat or moving equipment. Refer to the filter manufacturers installation instructions for clearances required for servicing and changing filters
2. Turn off ships power and disconnect the negative (ground) battery cable. Turn off the fuel at the fuel tank. Eye protection is recommended. Have drip pans and absorbent shop cloths available to anticipate spill clean up.
3. Do not smoke or allow open flames near the installation, turn off engine.
4. Use adequate light and ventilation.
5. Before drilling holes or installing mounting hardware, make sure the back side is clear of obstructions such as fuel /hydraulic lines, electrical harnesses, fuel and water tanks, water lines, ships hull?
6. Use proper type fuel lines and connectors.. Double clamp fuel hose connections with 100% stainless steel hose clamps. Use approved pipe thread sealant on pipe thread connections, Do not use Teflon tape.
7. If the fuel outlet port of the COMMANDER is also used by a second engine (GENSET), a check valve may be needed for the second fuel supply (some gensets have self bleeding fuel systems which can cause a false indication with reverse flow).
8. WHEN INSTALLING OR REMOVING FUEL LINE CONNECTIONS FROM THE COMMANDER FILTER PORTS USE A 1 1/4" OPEN END WRENCH ON THE PORT FITTINGS TO KEEP THEM FROM ROTATING WHILE TIGHTENING OR LOOSENING THE CONNECTIONS.

INSTALLING THE COMMANDER-Pre-mounted with 2 filters(see Figure #1)

1. Completely remove any vacuum side filters between the fuel tank and engine fuel lift pump.
2. Using adequate mounting hardware, mount the COMMANDER assembly on a vertical surface structure (bulkhead or wall, do not mount on hull) in the same area that the previous filter was installed. If this is not possible, select an area that is between the upper and lower horizontal planes of the engine and the top of the fuel tank. Mounting the unit too high can cause more lift (vacuum).
3. Using approved fuel hose or tubing, (3/8" I.D. for FC 60, 1/2" I.D. for FC90/FC100 or the manufacturers recommendation) connect the fuel tank supply to the inlet valve, the fuel outlet (to engine) to the engine feed and the bleed return to the fuel tank return. Avoid routing fuel lines near moving parts, sharp edges, and hot surfaces such as exhaust piping. Try to keep the fuel connections to a minimum, this will reduce the possibility of air and fuel leaks. Replace fuel lines that are questionable.

FOR MULTIPLE TANKS See Figure #1A

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INSTALLATION OF THE REMOTE INDICATOR PANEL (see Figure #2)

Locate an area near the helmsman that can be easily seen, has easy access for installing, and the thickness of the material is 1/4" or less. Use tape to position the template and mark the center or center punch the two holes to be drilled. Using a 9/32" drill, drill the two required holes (make sure the area behind the holes is clear of wire, hose's, tanks, etc...). When finished, debur the holes. Apply a small amount of silicon sealant to the backside of the placard, install the green and orange LEDs into the panel. Position the panel assembly over the previously drill holes and feed the led wires and lights through the holes. Install the lock washer and nut, recheck alignment and tighten nuts (the LED has plastic threads-do not over tighten). Wipe off excess sealant.

WIRE HARNESS INSTALLATION (See Figure #3)

1. Run wires in a protected area, support wiring harness with wire ties (run harness away from moving parts and hot areas).
2. Use approved wire connectors or solder (protect connections from corrosion).
3. Use marine grade wire and proper gauge for connections
4. Connect red wire to 12/24 volts positive (+) that is fused/circuit breaker at power source.
5. Connect black wire to 12/24 volt negative ground (-).
6. Connect yellow wire to amber LED red wire.
7. Connect blue wire to green LED red wire.
8. Connect both LED black wires to 12/24 volt ground (-).
9. See figure #5 for optional audible horn & remote fuel pump switch.

POST INSTALLATION START UP AND BLEEDING

1. Temporarily install a fuel hose to the fuel outlet port (to engine port), place open end of hose in suitable container.
2. Open fuel tank shut off valve if installed, and COMMANDER inlet shut off valve (Handle pointing to the 6 o'clock position).
3. Select filter #1 or #2 by rotating the handle on the front of the COMMANDER.
4. Place fuel pump switch to on, you will hear the pump start (check green light on remote early warning panel and COMMANDER for operation)—you will notice the selected filter start to fill with fuel—run the pump until a steady stream of fuel is noticed coming from the hose outlet . This might take a while depending on the amount of bleeding that is necessary.
(Note: if you do not see fuel entering the filter after a minute or two, turn off the pump and recheck the fuel connections (DO NOT OPERATE THE PUMP DRY FOR LONG PERIODS), Depending on the installation, you may need to fill the filter with fuel to help prime the fuel pump. Using your hand, tap on the filter that is being bled, this will help dislodge any air bubbles. Once the filter is bled, rotate the handle to the opposite filter and continue bleeding. Turn off fuel pump when bleeding is completed.
5. Remove the temporary fuel line and install engine fuel line. Momentarily turn on fuel pump until the fuel pressure gauge reads max fuel pressure (5 to 10 psi depending on pump rated pressure output). Turn off pump and check for leaks. If no leaks are noted, turn on fuel pump and bleed engine fuel system per manufacturers maintenance manual. Some engines have self bleeding systems so fuel pressure may not reach rated pressure, turn off fuel pump when finished.
6. To check the bleed port operation, turn on the fuel pump, open the bleed port valve, looking at the flow sight on the front of the COMMANDER. It will start with foamy fuel and then turn clear. Turn off fuel pump when finished.

OPERATIONAL CHECK (this should routinely be done as part of a pre-departure check)

1. Start and warm up engine. Check the COMMANDER vacuum gauge at idle, it should read around (0) zero. Increase engine rpm slowly to max rpm, check vacuum gauge, it should still read around (0) zero psi. (Note: If vacuum reads high check for restrictions.) On some installations the fuel tank is mounted several feet below the engine lift pump. This will increase the vacuum the engine lift pump will need to pull fuel to the pump. Also, as the fuel tank quantity is reduced, the vacuum required will increase. If ok reduce engine rpm.
2. Turn the fuel inlet shut off valve on COMMANDER to the off position. Within a short time the vacuum gauge needle will start to move in a counter clockwise rotation. At or between 7 and 10" hg, the vacuum switch will activate. Verify that the "check filter" light on the remote panel and on the COMMANDER is "on". This will test the system operation. Now shut down engine and monitor vacuum gauge; the needle should remain steady at the point when you shut down the engine-if it returns to zero quickly there may be a leak in the system. If the vacuum gauge needle started to move and stopped before the check filter light came on there may be a large air leak-recheck the connections. If the test is ok, repeat this test using the opposite filter.
3. If the operational check is satisfactory proceed to normal operation.

NORMAL OPERATION—Bleed Valve-closed—Fuel Inlet-open—Select Filter

1. During normal operation only one filter is selected. As the filter starts to clog the vacuum will increase. At 7 to 10 " hg the vacuum switch will activate and the "CHECK FILTER" will illuminate on the remote early warning panel and the Commander panel. The helmsman or crew member should do the following:
 - a. Turn on the fuel pump switch on the COMMANDER.
 - b. Rotate handle to the opposite filter. **See Figure #4**
 - c. After 5 minutes turn off fuel pump.
 - d. Determine if you should change the clogged filter or wait until you get to your destination.

CHANGING FILTER (ENGINE ON)

1. Rotate the filter selector handle to the opposite filter. With the clogged filter offline follow the manufacturers filter replacement instructions.
2. Bleeding method #1: Before installing the filter cover, fill the filter with fuel, re-install the cover. Filter is ready for service.
Bleeding method #2: Close filter lid, turn on fuel pump, open bleed valve on bleed port. Next rotate the filter selector back to the filter that was changed. The flow site will turn foamy and then turn clear. Once the filter is bled, close the bleed port valve and wait 5 minutes before turning off the pump. Filter is ok for service. This method should be done at the dock or on anchor for the first time to test you engine fuel system and to get familiar with the procedure.

DRAINING WATER FROM FILTER (ENGINE ON)

1. Take the contaminated filter offline by rotating handle to the opposite filter.
2. Open water drain valve on the bottom of contaminated filter (follow filter mfg's draining procedure) until the water is drained out (some filters require to open the top of the filter or that you open a vent plug). Close water drain valve when finished.
3. Bleeding method #1: Before installing the filter cover, fill the filter with fuel, re-install the cover. Filter is ready for service.
Bleeding method #2: Close filter lid, turn on fuel pump, open bleed valve on bleed port. Next rotate the filter selector back to the filter that was changed. The flow site will turn foamy and then turn clear. Once the filter is bled, close the bleed port valve and wait 5 minutes before turning off the pump. Filter is ok for service. This method should be done at the dock or on anchor for the first time to test your engine fuel system and to get familiar with the procedure.

FUEL POLISHING/CLEANING

1. Select the tank you want to clean, make sure the return is selected to the same tank.
2. Turn on the COMMANDER pump, open the bleed port shut off valve.
3. View the flow sight and you should see fuel movement.
4. Operate in the polishing/cleaning mode until you are satisfied that you have cleaned your fuel. The best time to clean your fuel is after returning to the dock from a trip or while you are sailing. The general rule is to filter 2 to 3 times the quantity of fuel in a 8 hour period.
5. If the filter clogs while you are polishing/cleaning select the opposite filter and change the dirty filter.

CHECK YOUR FUEL WHILE TAKING ON NEW FUEL

1. Select the supply and return to the tank you are going to fill, pump 5 gallons into the tank before turning on the Commander pump (just in case the tank is empty)
2. Before you observe the fuel from the tank, check the online filter for condition. If ok, turn on the COMMANDER pump and open the bleed return valve. The COMMANDER will pump fuel from the tank you are filling through the filter and back to the tank.
3. Pump in 20 gallons or so and recheck the online filter. This will give you an idea about the condition of the fuel you have just pumped in your tank. If the fuel looks clean, continue filling the tank. If the fuel looks dirty or there is a lot of water in the bowl, let the fueling company know what the problem is and that you need to fix the problem before continuing. If your tank was empty, it is possible that the first couple of gallons could be the junk at the bottom of your tank.

NOTE: Be careful with the water in the fuel, this will shut down an engine and do major internal damage. If you do not have a water detector,. Make it a practice to check the online filter for water in the first 10 minutes of use or after you switch tanks while on your way, as well as during normal operation.

INSPECTION

BEFORE CRUISING

We recommend that you test your system for pressure and vacuum leaks as part of your pre-departure check or after fuel system maintenance has been performed.

Pressure leaks can be tested by turning on the fuel pump and pressurizing your fuel lines from the COMMANDER to the engine and the engine secondary filter. If there are no external leaks, turn off pump and the pressure reading on the condition gauge should remain steady. (most new engines have self bleeding systems and will bleed down).

Vacuum leaks can be checked by performing the post operational check. This will test your indication system and check the integrity of the fuel system from the COMMANDER inlet shut off valve to the engine. The engine compartment is usually very hot and rubber hose connections do shrink and crack. This may cause air to be pulled into the fuel system when the fuel filter starts to clog and will give a false reading on the vacuum gauge. Your engine may shut down without warning. By performing a vacuum test you will be able to check your system for operation and integrity.

WHILE CRUISING

During normal operation the filters should be checked while on your way. The check intervals should be based on the amount of contaminants or water that is noticed in the inspection bowl or based on the vacuum increase. After refueling, the operator should monitor the filter bowl for water and contamination for the first 15 minutes just in case a bad batch of fuel is taken on. When switching fuel tanks the operator should monitor the filter bowl for water and contamination.

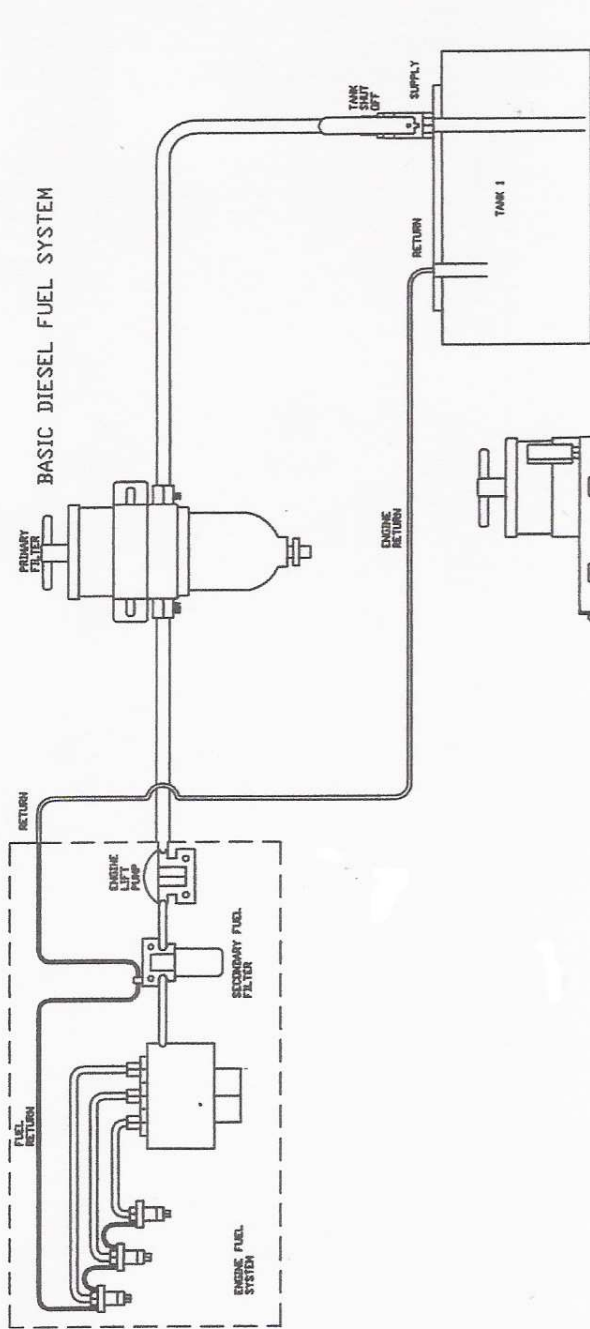
SERVICING

The COMMANDER should be kept clean and can be sprayed with a light oil or protectant along with a coat on fittings and tubing. Be sure to wipe off any excess. Check hose clamp connections. Check for loose bolts or screws and check fittings for security. Exercise the shut off valves and filter selector handles for operation, this also lubricates the internal moving parts. Before departure turn on the fuel pump and open the bleed valve. Check the flow sight for air. If ok, check the opposite filter.

WARNING *PLEASE READ*

ENGINE DRIVEN FUEL PUMP FAILURE (DIAPHRAGM TYPE)

The fuel pump in the COMMANDER will supply fuel pressure to keep your engine running; BUT make sure the engine driven fuel pump is not leaking externally or leaking internally into the engine oil sump. Check your oil quantity and make sure it is not rising. Over servicing a diesel engine oil sump may cause a “runaway engine” condition.



DUAL FILTER COMMANDER INSTALLATION

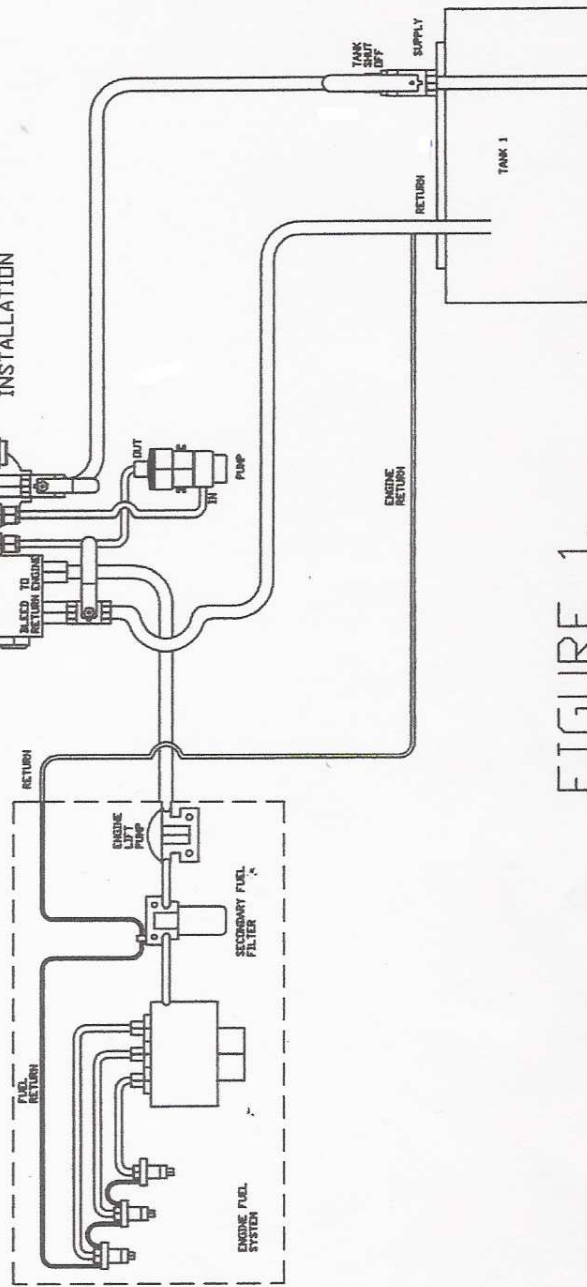
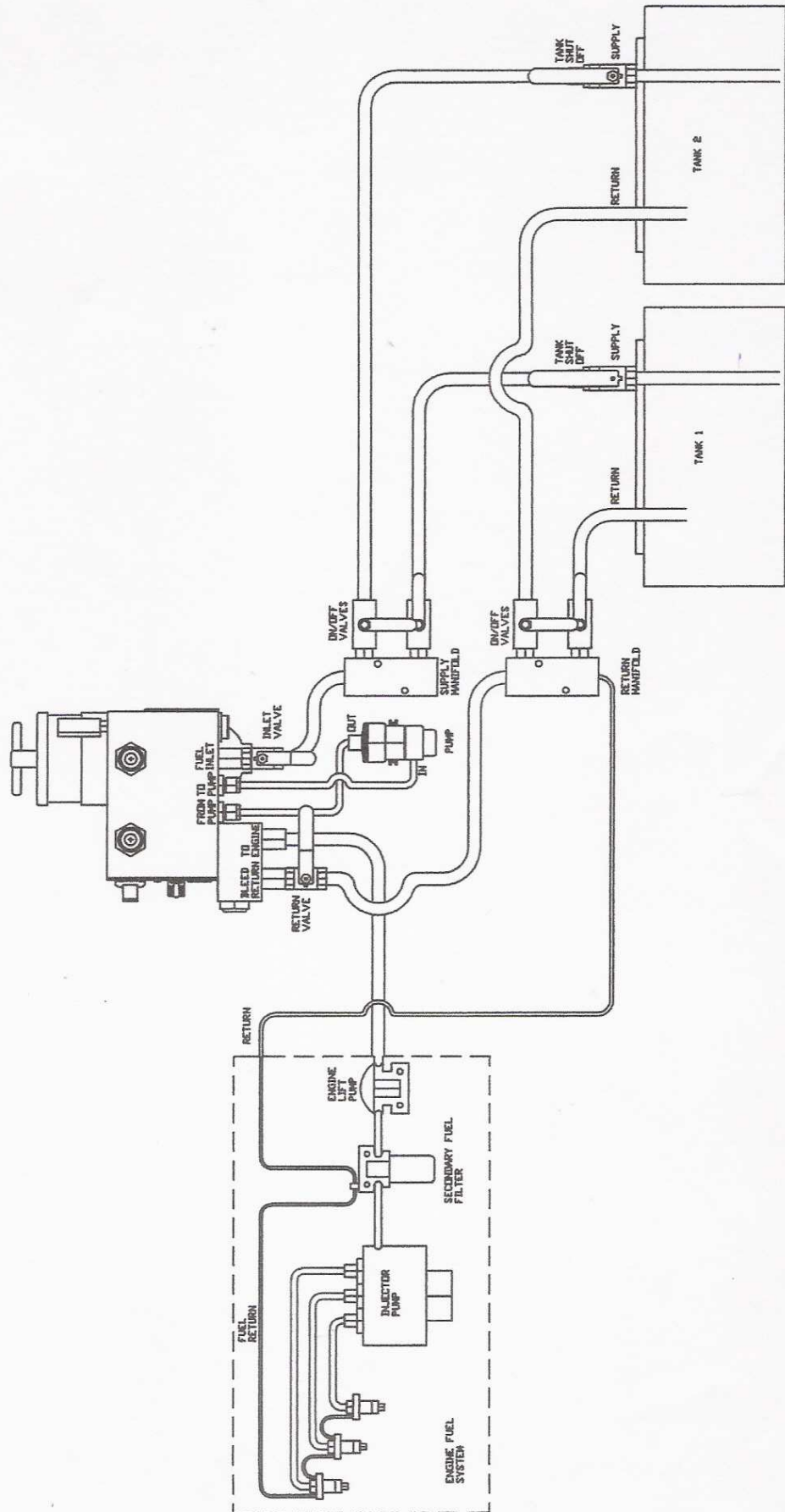


FIGURE 1.

FilterBoss COMMANDER
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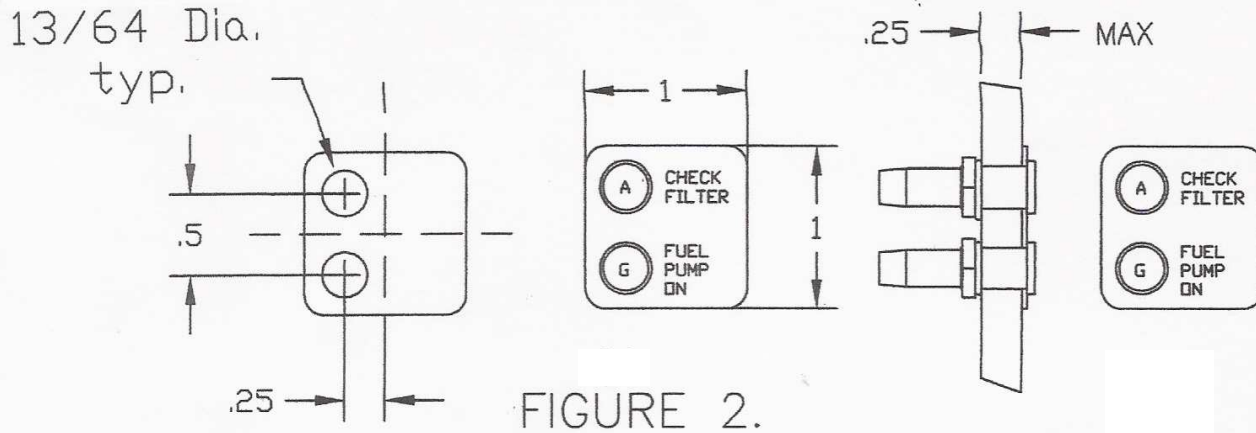
COMMANDER INSTALLATION WITH MULTIPLE FUEL TANKS



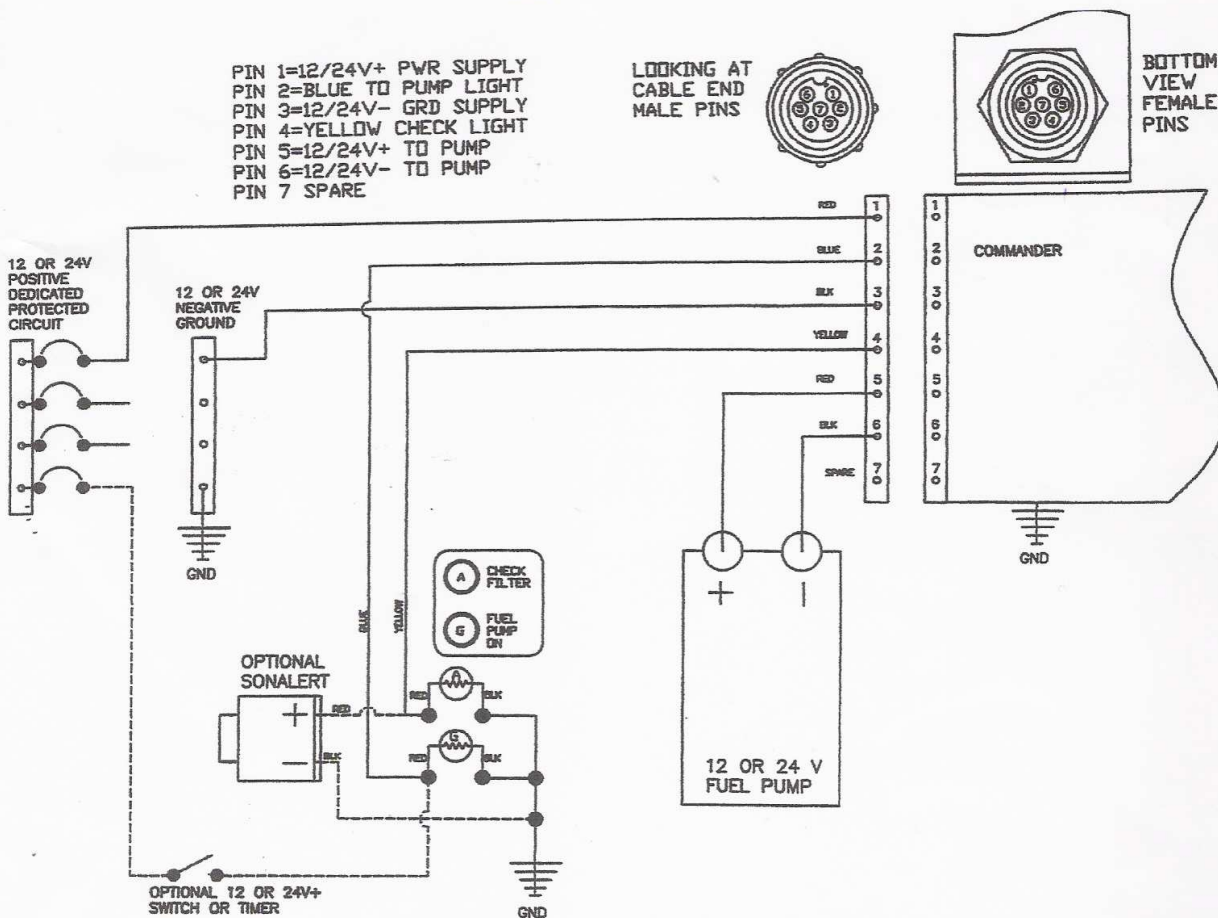
FilterBoss COMMANDER
KTI SYSTEMS Inc.
SOUTHWICK MA

FIGURE 1A.

EARLY WARNING PANEL

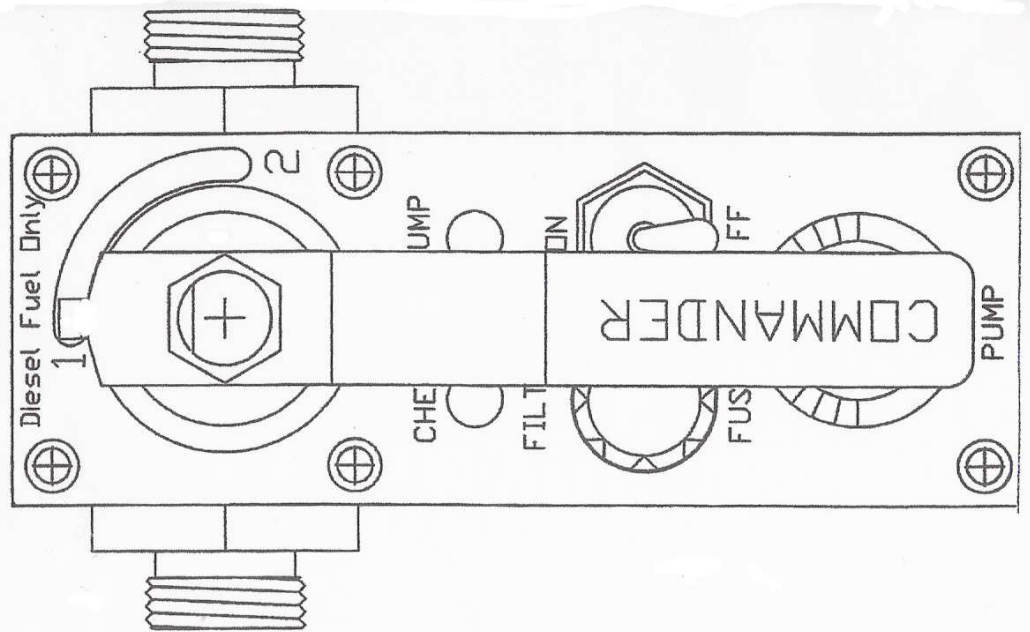


WIRING DIAGRAM



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FILTER #1



FILTER #2

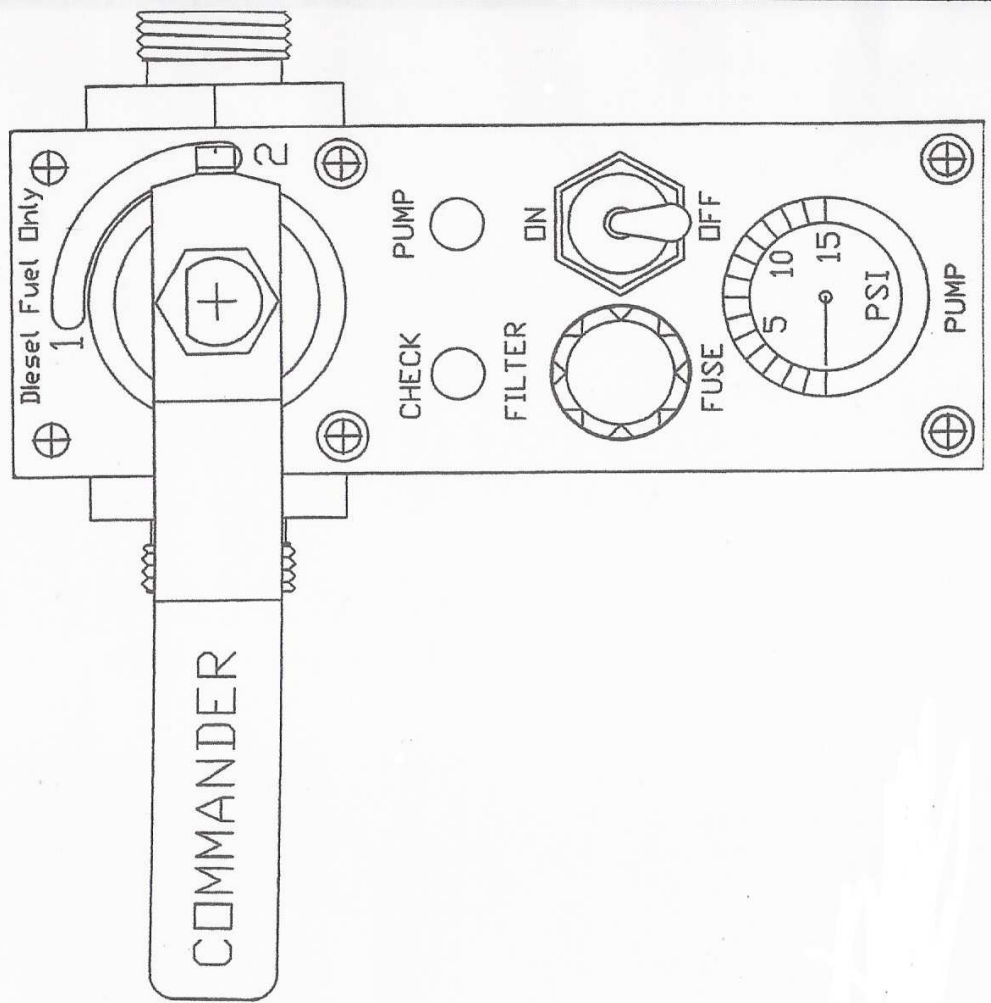


FIGURE 4

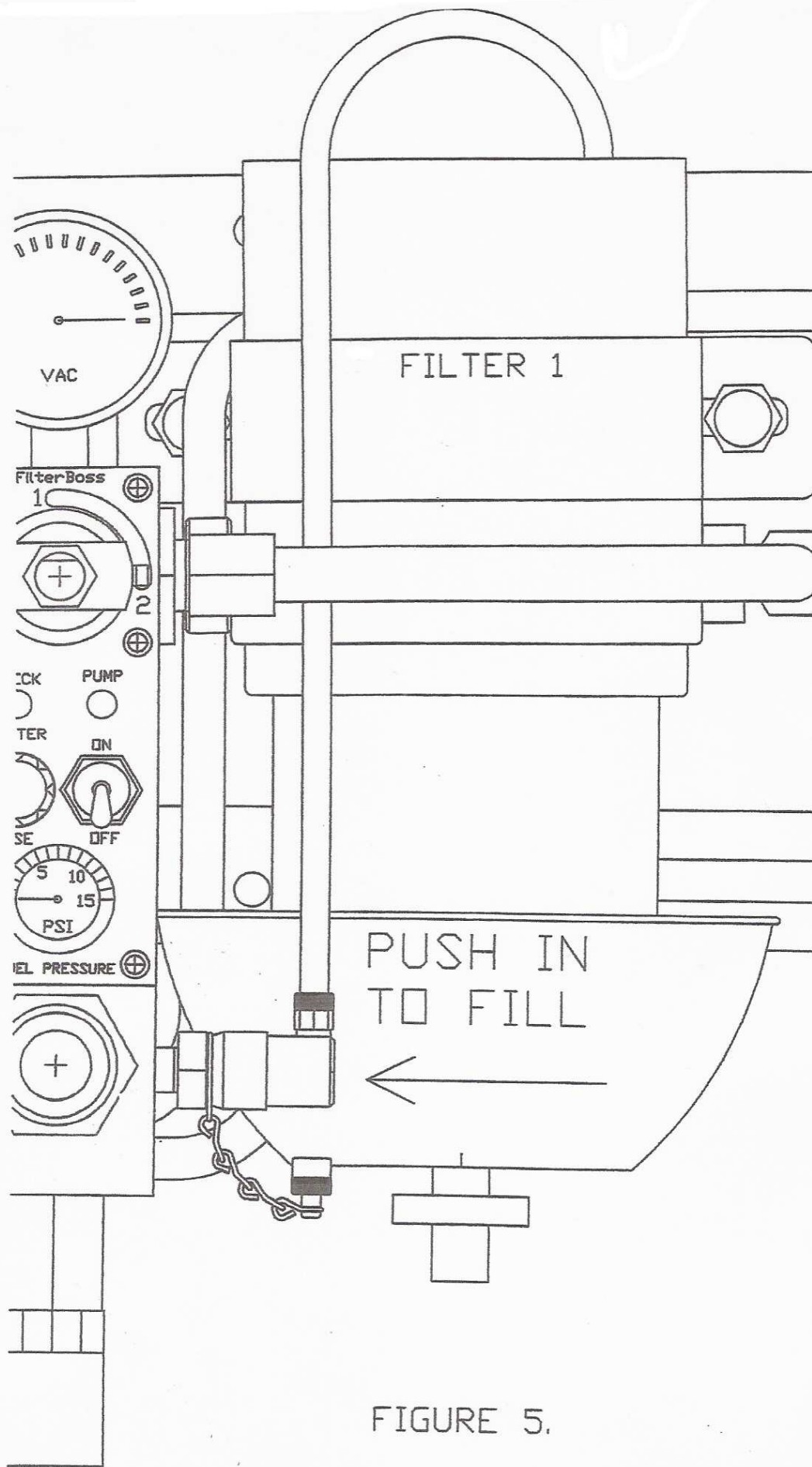
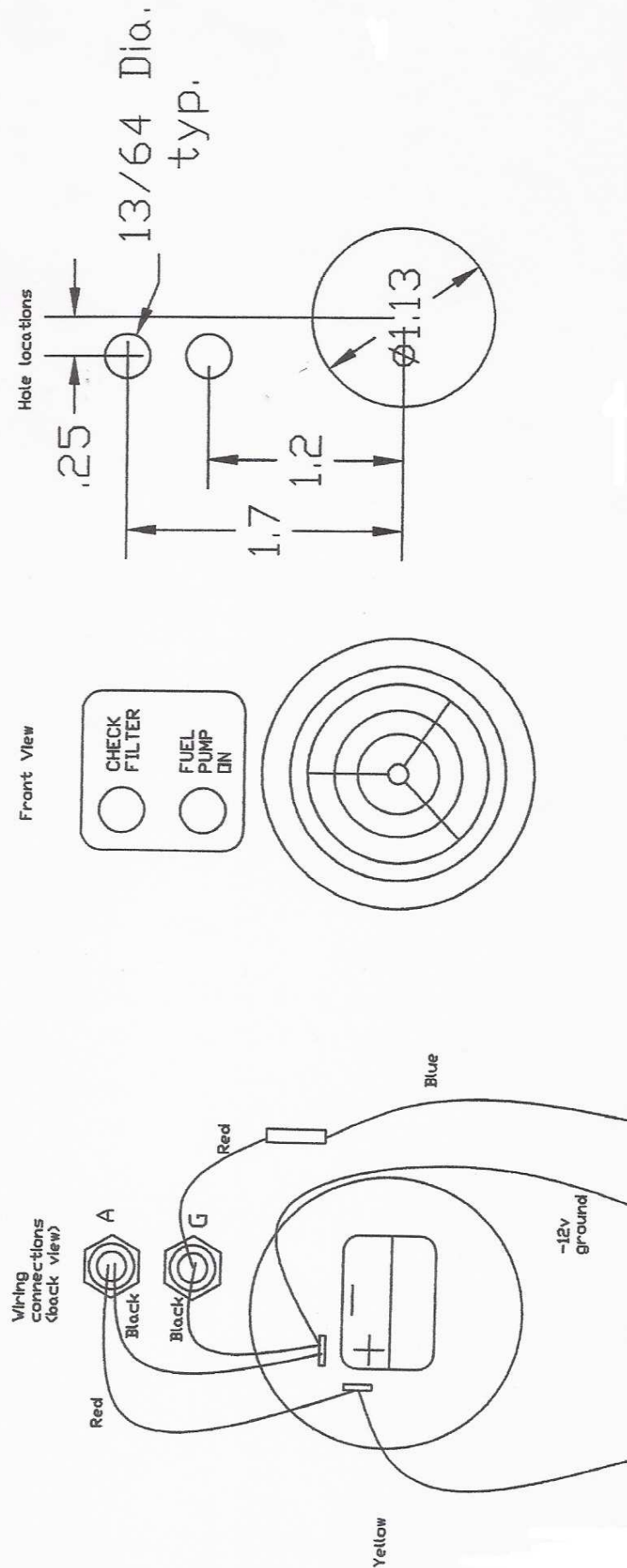
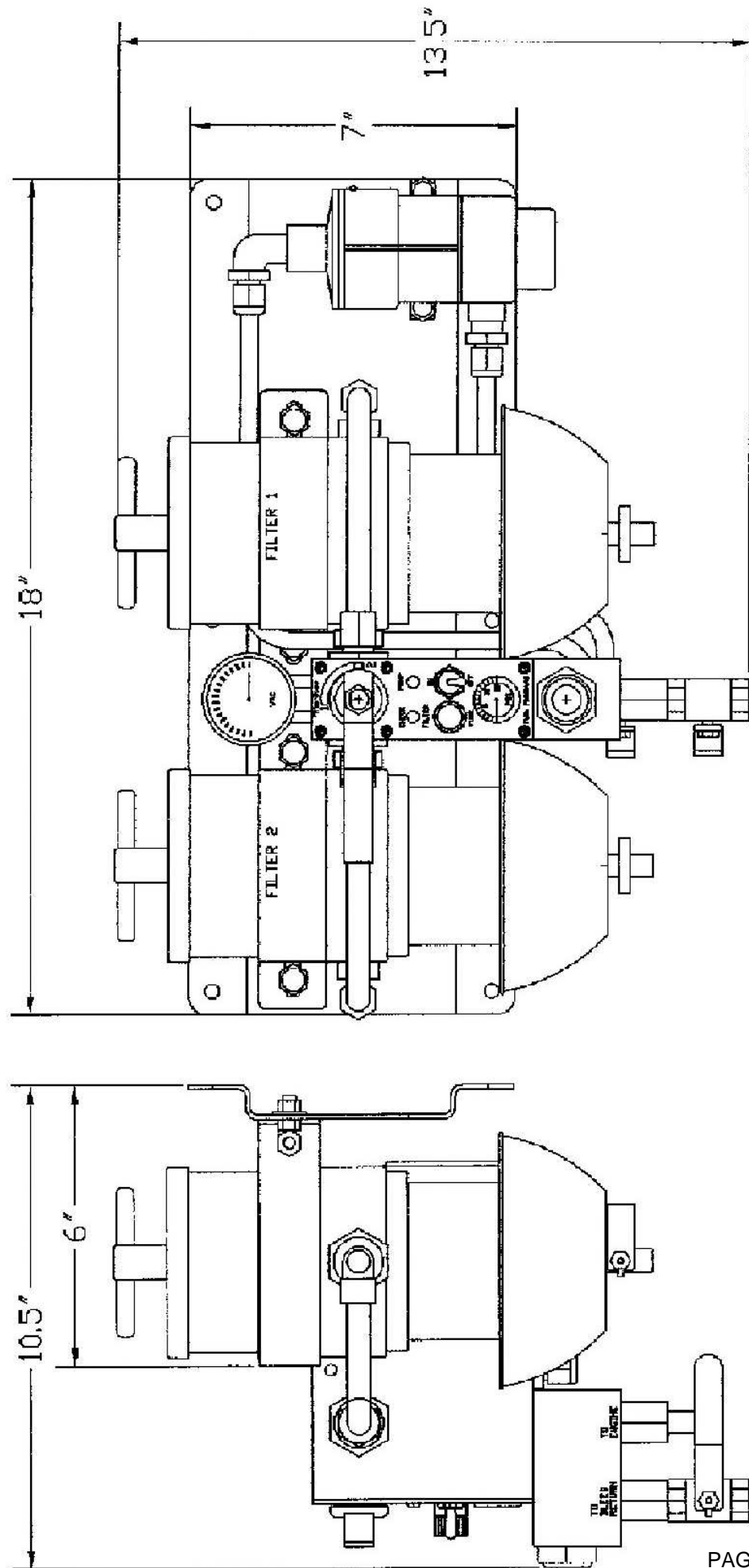


FIGURE 5.



Early Warning Panel mounting
with Sonalert



COMMANDER DIMENSIONS