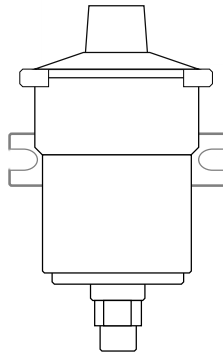


# WALBRO FUEL PUMP GUIDE INSTALLATION & OPERATING INSTRUCTIONS



The instructions in  
this manual apply  
to Dickinson part  
numbers:

**20-000**

**20-002**

**20-002A**

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## I. INTRODUCTION

**Caution! Failure to adhere to the safety warnings listed in this manual could result in damage to property or severe personal injury!**

- **ALWAYS** TURN OFF THE HEATER WHEN REFUELING
- **ALWAYS** ENSURE A FRESH AIR VENT IS PRESENT
- **ALWAYS** INSTALL A TOXIC GAS ALARM
- **ALWAYS** FOLLOW THE OEM INSTALLATION AND OPERATION PROCEDURES.
- **ALWAYS** USE STAINLESS STEEL CHIMNEY PARTS.
- **ALWAYS** USE A DICKINSON VALVES ON DICKINSON STOVES AND HEATERS
- **NEVER** OPERATE A DIESEL HEATER UNATTENDED
- **NEVER** BURN GASOLINE
- **NEVER** LIGHT A HOT BURNER – LIGHTING A HOT BURNER IS AN EXPLOSION HAZARD!
- **NEVER** USE A PRESSURIZED FUEL TANK
- **NEVER** PLUG THE OVERFLOW FITTING

1. Pump inlet
2. Pump outlet
3. Wall mounting bracket
4. Power wires

5. Pump lid
6. Pressure relief
7. Check valve (steel ball)
8. Gasket

9. Magnetic Plunger
10. Plunger internal check valve
11. Spring
12. Spring check valve

13. Pressure regulator (Heavy duty pumps only)
14. Pressure regulator calibration screw

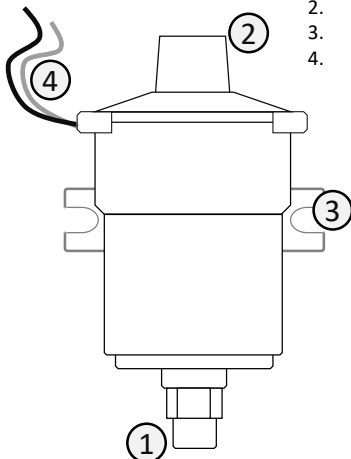


FIG 1

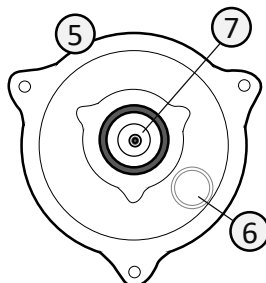


FIG 2

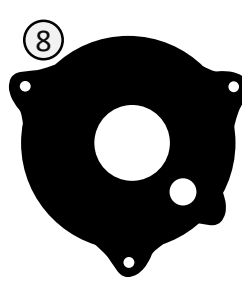


FIG 3

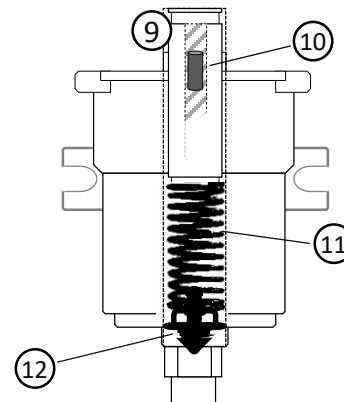


FIG 4

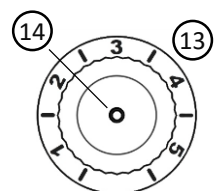


FIG 5

## II. PUMP TYPES

### 20-000 (FRD-2)

Is for a standard installation where the climate is fair and the run from the fuel supply to the pump is less than approx. 6ft vertical and 15ft horizontal.

### 20-002 (FRD-4)

for heater/stove installations in colder climates or where the run from the fuel supply to the pump is more than approx. 6ft vertical and 15ft horizontal.

### 20-002A (FRD-3)

for heater/stove installations where connection to a 24-32 volt power source is preferred.

Part #	Voltage	Deadhead pressure	Pressure adjust?	Lift (inches)	Draw (amp)	Inlet/outlet thread size
20-000	12 Volt	2 – 3.5 psi	no	24	2.3	1/8-27 NPSF
20-002	12 Volt	6 – 9 psi	yes	24	2.3	1/8-27 NPSF
20-002A	24-32 Volt	6 – 8.7 psi	yes	24	2.0	1/8-27 NPSF

FIG 6

## III. INSTALL GUIDE

### Orientation

The pump is best installed oriented with its outlet pointing upwards. If installing the pump upright is not possible, the pump can be installed on its side. Please note that a pump installed on its side may suffer from increased wear over time and can result in limited pressure.

In order to get fuel flowing through the pump, it will need to be primed before its first use. Once the pump has been primed, its check valves will prevent fuel from being able to flow the wrong way keeping it primed for use.

Install the pump in a well ventilated area where it will not be subject to excessive heat or exhaust.

Using a rubber backing between the pump and the surface it is attached to will help to reduce the noise it makes each time it cycles

### Wiring

We recommend wiring the pump into a 12v control circuit with a 5 amp fuse so that power to the pump can be switched off when it is not in use.

Connect the black ground wire on the pump to the negative terminal of your power source.

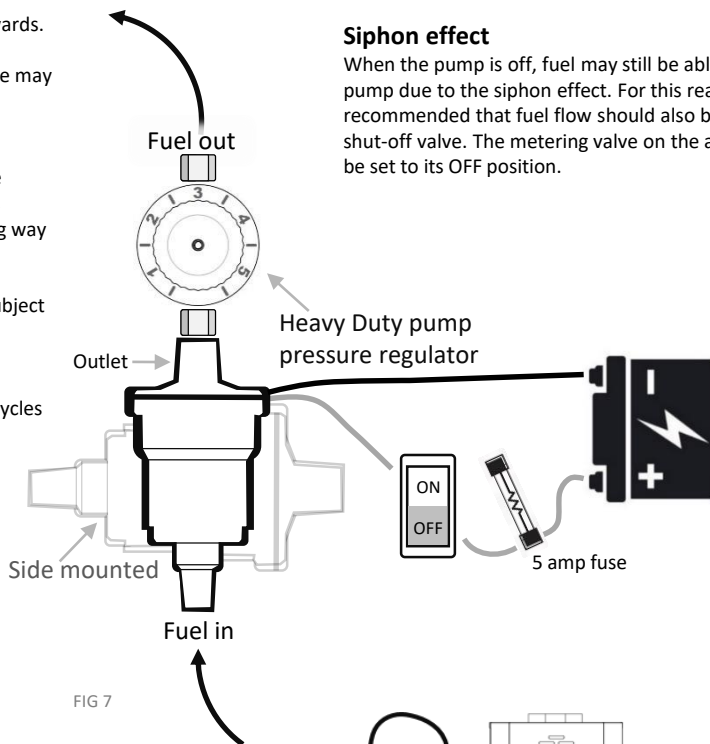


FIG 7

### Check Valves, Fuel filters and shut-offs

When using a low pressure fuel pump to deliver fuel from a main fuel tank, the fuel line must connect as close to the fuel tank as possible and not draw from the engine fuel supply or engine filter. **Use a check valve in the fuel line to prevent the engine drawing fuel away from the appliance.**

When installing a Walbro fuel pump supplied by Dickinson, **the best results will be obtained by locating the pump somewhere it will 'pull' fuel upwards** rather than placing it at the tank to 'push' fuel upwards.

**We carry both standard and heavy duty fuel pumps.** In a mild climate where a fuel run equates to less than a 4 foot vertical rise or 15 feet of horizontal travel, the standard pump should be sufficient. In a colder climate, or where the run requires more than a 4 foot rise or 15 feet of horizontal travel, a heavy duty pump is recommended.

The maximum pressure of the heavy duty pump can exceed the 3 PSI inlet pressure the valve is rated for, and so it is equipped with an adjustable pressure regulator to reduce it

Page 3, fig 9

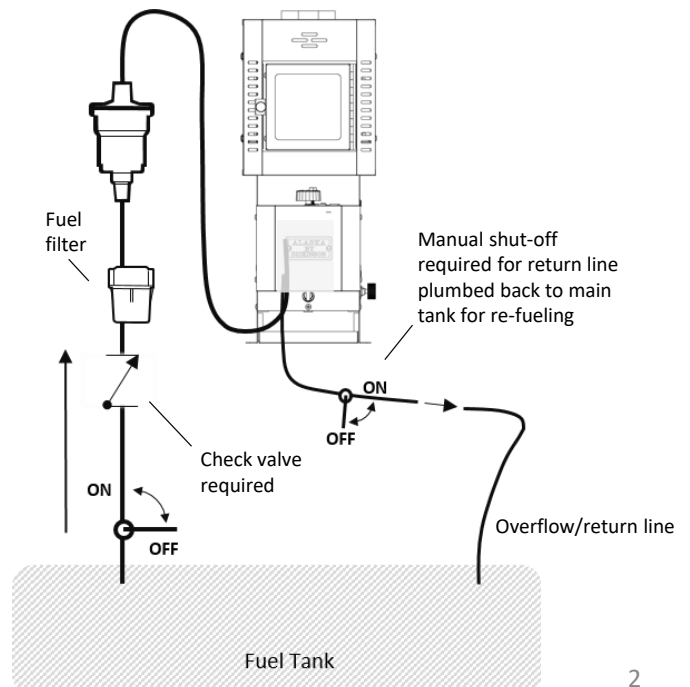


FIG 8

## IV. PRIMING THE PUMP

### Priming the pump

To prime the fuel pump, disconnect the fuel line where it connects to the metering valve on the appliance. Direct the open fuel line into a bucket and switch power on to start the pump.

The pump will push out any air that may be trapped in its lines. Until it has rid itself of all air bubbles, the pump may, vibrate, pulse noisily and eject atomized fuel. Once all air has been bled from the lines, the pump will settle down to a steady flow of fuel without vibration or excessive noise.

Once the pump has filled the valve to its oil level and the lines are pressurized, the pump will continue to pulse albeit less frequently. When the appliance is running, the pump will continue to cycle to maintain pressure in the lines as the burner uses up fuel.

If the pump loses its prime, one or more of the 3 check valves may require cleaning.

See page 4; VI Troubleshooting

### Priming a Heavy Duty pump

Now that your standard pump is upgraded to a heavy duty pump it must be primed again. When priming the heavy duty pump hold down the knob of the pressure regulator to prime the fuel lines and remove any air. Then turn the dial to the lowest setting on the regulator and increase the pressure one increment at a time until the pump is delivering a constant flow.

**Note:** The settings on the pressure regulator do not represent the actual pressure the heavy duty pump is set to (6-9 psi). The numbers represent the variable range of the pump. The dial can be adjusted from the lowest pressure setting (1) up to highest pressure (5) Higher settings are for cold climates & winter weather which thicken diesel fuel, or in case the pump is required to pull more than 4' vertically and/or more than 15 horizontally.

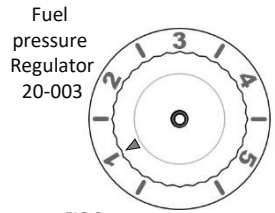


FIG 9

## V. PUMP PRESSURE UPGRADE

If you find you are not getting fuel to the FRD-2 standard pump, you may need to upgrade your pump to a stronger pressure.

To upgrade a Walbro FRD-2 (part #20-000) to a Heavy Duty pump FRD-4 (part #20-002) a factory spring (part #FRD4-SPRING) & regulator (part #20-003) must be installed.

### Pump spring upgrade

- Disconnect all fuel lines and wires attached to the pump.
- Unscrew the 3 t-20 torx screws attaching the pump lid and remove the lid using a twisting motion. Take care not to damage the gasket underneath – the gasket will stick to either the lid or body of the pump and does not need to be removed.
- Inside the pump there is a red rubber spacer. This may detach with the lid or remain seated in the tube opening in the pump body. If the spacer is seated in the tube, gently pull it free.
- Carefully tip the pump on an angle – the pump plunger should slide out from the tube. Pull it free.
- Remove the spring you'll find inside the tube.
- If nothing else comes out, insert a thin rod or screwdriver into the pump 'inlet' to dislodge the spring check valve inside.
- Replace the removed spring that comes out with the new Heavy Duty spring and assemble plunger, spring and spring check valve in the manner shown (fig 10)
- Insert the components carefully while holding the pump upside down. Hold the components firmly in place with a finger to prevent them becoming misaligned.
- When the components have been inserted all the way, flip the pump over still holding everything in place.
- When the pump has been flipped, release the components and realign and attach the lid and gasket.
- Attach the new regulator to the pump outlet (part #20-003)

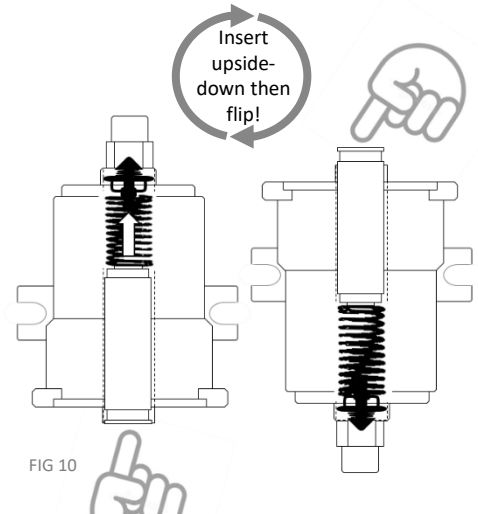


FIG 10

## VI. TROUBLESHOOTING

### Fuel flow & check valves

If the pump develops an issue with fuel flow, it may be because one of 3 check valves inside it have seized up and will no longer allow fuel to pass through them. See below for the location of each check valve and how to determine if they are in working order.

1. **Spring Check Valve:** A spring loaded plastic assembly. Depress the spring gently – on a working check valve the spring will contract and expand as you'd expect.
2. **Plunger Check Valve:** Inside the plunger is a check valve. Although it cannot be accessed, shaking the plunger should make an audible sound as the check valve inside moves back and forth, indicating a functional check valve.
3. **Lid Check Valve:** On the underside of the lid, in its center, you'll see a inset steel ball – this is the 3<sup>rd</sup> check valve. Test the check valve by pushing on the ball – it should give way easily and spring back into place.



FIG 11

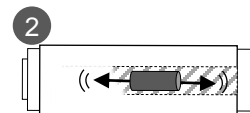


FIG 12

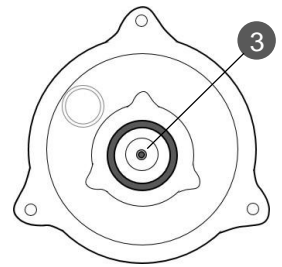


FIG 13

### Calibrate pressure regulator

The settings on the pressure regulator do not represent the actual pressure the heavy duty pump is set to (6-9 psi). The numbers represent the variable range of the pump. The dial can be adjusted from the lowest pressure setting (1) up to highest pressure (5) Higher settings are for cold climates & winter weather which thicken diesel fuel, or in case the pump is required to pull more than 4' vertically and/or more than 15 horizontally.

If the settings on the pressure regulator are not providing the fuel reduction or increase required, the regulator can be adjusted. Use a 2mm (0.75") allen key to turn the calibrating screw inset into the center of the regulator dial. Turn clockwise to increase pressure, and counter-clockwise to decrease it. This adjustment reduces or increases the pressure of each numbered setting on the dial. Adjust the calibration screw in small increments if a pressure adjustment is required.

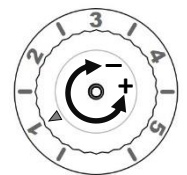


FIG 14

## VII. TROUBLESHOOTING CONT'D

### Vibrating, noisy & chattering pumps

If the pump continues to show signs of air in the fuel lines (Vibrating, chattering or getting hot) this indicates that there is a leak present allowing air in. A leak indicated in this manner will be found between the pump and the source of its fuel. Even a leak too small to drip fuel can allow enough air in to prevent the pump from priming. Investigate leaks and tighten all connections methodically in order to trace the source of a pressure side leak.

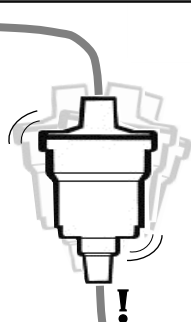


FIG 15

All connections between the fuel source and the pump are potential leak points where air might be drawn into a system and cause the pump to chatter & fail to pressurize. Check connections at the fuel filter, check valve and any other connections that are present. As air leaks are harder to spot than fuel leaks, methodically tightening connections in turn until the pump can stabilize is the most reliable way to troubleshoot potential air leaks.

Do not leave the pump running while you troubleshoot its operation. A pump with air inside it can become damaged if left to operate. Disconnect power to the pump while troubleshooting connections and switch the pump on only to test the tightened connections.

Fuel tank

### Troubleshooting guides

Problem	Possible causes	Solution
<b>Pump does not tick or pulse</b>	Make sure pump is connected to appropriate power source	The pump must be connected to the power input it is rated for in order to cycle
	Blown fuse	Replace fuse if blown
	Disconnected pump wiring	Reconnect any disconnected wiring
	Pump only whines but does not pulse	Voltage under 12v may cause the pump to fail to cycle
	Pump circuit board failure	Contact pump manufacturer
<b>Pump ticks but no fuel comes out</b>	Pump is pulsing but plunger isn't moving	Disassemble and lubricate pump interior with WD-40
	Pump is under or over powered	Ensure pump is connected to appropriately rated power source
	Fuel is unable to reach pump	Make sure the pump is not being asked to deliver fuel higher/farther than specified on <b>page 2: PUMP TYPES</b>
	Pump is unable to deliver fuel	make sure pump is configured to pull fuel, rather than push fuel from below
	Pump mounted on side or with inlet pointing down	Pumps mounted other than with the inlet pointing 'up' may struggle to supply fuel in some configurations
<b>Pump ticks constantly, chattering or vibrating</b>	Fuel is too thick/cold	Fuel stored outdoors or in the cold may need to warm up before the pump is able to cycle it
	Fuel tank is empty or disconnected	Make sure fuel is always accessible to the fuel pump when on, do not allow fuel pump to run dry
	Air is entering the fuel lines somewhere between the pump and the fuel tank	Seek out fittings, filters or regulators and other potential leak points and tighten these methodically until the leak has been stopped
	Pump housing or gasket are damaged and won't seal	Look for damage to the pump lid or its gasket which may cause a leak
	Pump is not primed	Follow pump priming instructions on <b>page 3</b>
<b>Pump emits vapor or atomized fuel</b>	Pump is being starved of fuel	Make sure the pump for the appliance is drawing directly from the fuel tank and not from engine supply lines or engine filters.
	Air is entering the fuel lines somewhere between the pump and the fuel tank	Seek out fittings, filters or regulators and other potential leak points and tighten these methodically until the leak has been stopped
	Pump expelling an air pocket	Once any small air pockets are expelled pump should operate normally
<b>Pump does not stop pulsing</b>	Fuel tank is running low on fuel	Shut off appliance and refill tank when it has become safe to do so.
	Pump is pushing fuel through valve to valve's overflow	Check valve overflow container for fuel and clean valve needle & seat
	Pump is providing too much pressure	Adjust pressure down or adjust calibration <b>page 3, fig 14</b>
	Pump continues to pulse with no visible overflow	Check fuel lines between pump and appliance for fuel leaks
<b>Pump action feels or sounds weaker than normal</b>	Pump is operating correctly but is being robbed of fuel	Check other draws on fuel and make sure the pump is drawing directly from the fuel tank
	Pump could be receiving too much power	Voltage over 12v may cause the pump not to fully cycle
	Plunger or check valve are obstructed	Clean pump using directions on <b>page 3: fuel flow &amp; check valves</b>
	Pump could be receiving too little power	Voltage under 12v may cause the pump to fail to cycle
<b>Pump is off but fuel still flows</b>	Damage or debris is obstructing the plunger	Plunger may not be able to move if debris or burrs are preventing it
	Pump can continue to flow due to the siphon effect	Use an in line shut-off valve to prevent the pump from siphoning fuel
<b>Pump does not work after cleaning or service</b>	Pump must be re-primed	Prime pump according to instructions on <b>page 3</b>
	Pump components may not have been correctly inserted or oriented	Ensure check valves and components are installed as shown on <b>page 3 fig 10</b>