



DIESEL METERING VALVE INSTALLATION & OPERATING INSTRUCTIONS

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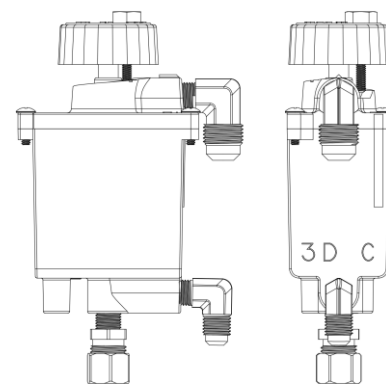


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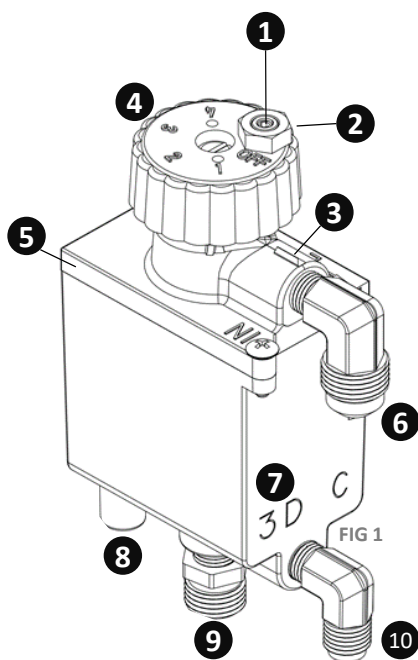
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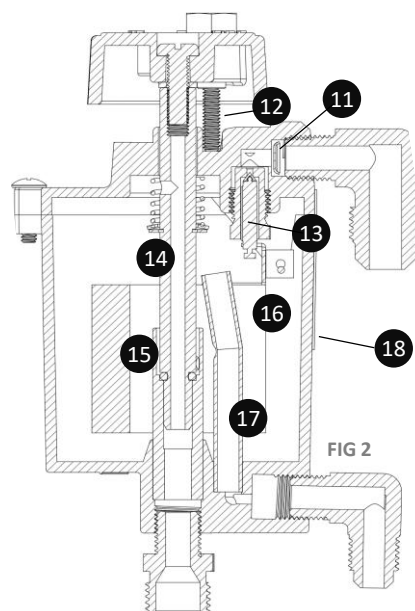
1. INTRODUCTION

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. Locking screw
2. High fire fuse
3. Setting indicator
4. Valve knob
5. Valve lid
6. Fuel inlet
7. Calibration mark
8. Mounting support
9. Fuel outlet
10. Fuel overflow outlet
11. Inlet filter screen
12. Fuel adjustment screw
13. Needle
14. Metering stem
15. Metering stem guide
16. Float
17. Overflow tube
18. Oil level mark



2. VALVE TYPES

Dickinson oil metering valves (also referred to as *carburetors*) come calibrated for several different flow rates and fuel types. Before installing a new valve, make sure it meets the requirements of your appliance.

All Dickinson valves are calibrated for #2 diesel as standard. Valves calibrated for #1 Diesel (Stove oil) and Kerosene are also available. The identifying markings are etched or stamped onto the side of each valve above the fuel return. Use the chart (fig 4) to identify a valve by its calibration mark

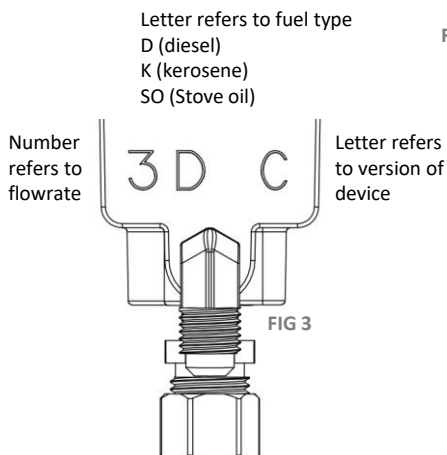


FIG 4

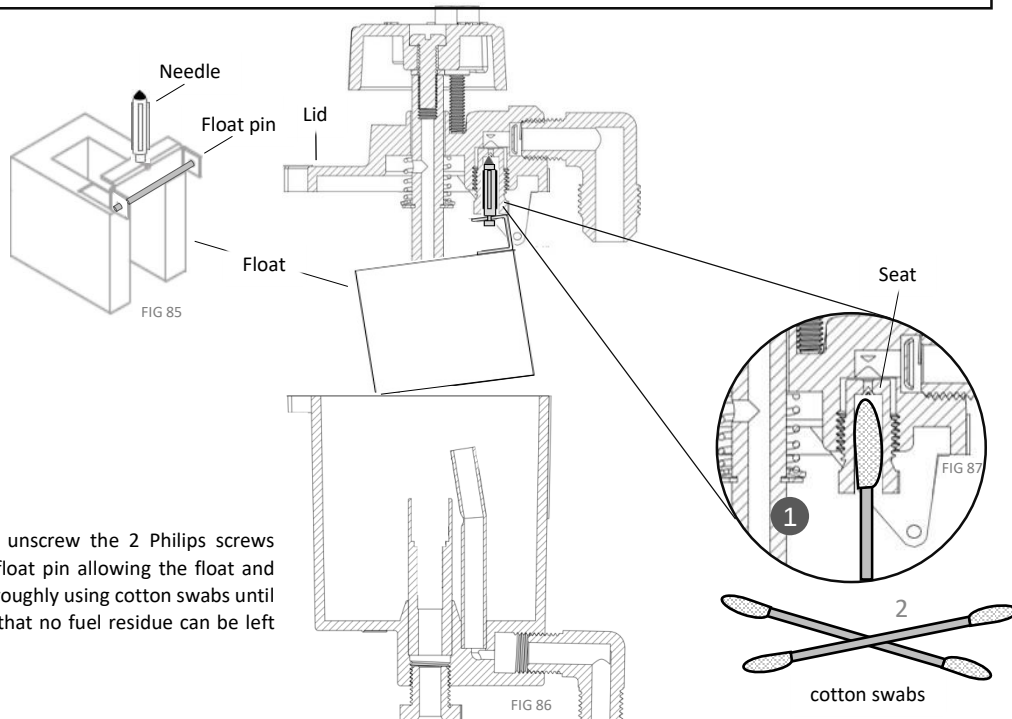
Code	Min. flow cc / min	Max. flow cc / min	On setting 1, fills a teaspoon in	Burner size In inches	Part number
1	3	8	90 seconds	5.5"	905003
2	3.5	9	75 seconds	5.5"	905004
3	4	10	60 seconds	6"	02-000
4	5	15	50 seconds	7"	02-001
5	6	20	40 seconds	7"	02-002

3. BEFORE FIRST USE

Whether a valve is new or just being used for the first time in a season, we always recommend making sure the moving parts inside are clean and working as they should before use.

New valves can be affected too – all valves are calibrated before leaving the factory using diesel fuel. Any leftover fuel residue may dry or 'varnish' onto the parts of the valve mechanism. When the parts of the mechanism become sticky the valve's opening and closing action is restricted. If this happens, the valve can become stuck open - giving the burner too much fuel, or it can become stuck closed – starving the burner of fuel and extinguishing the flame. We recommend performing this step before lighting any burner with a valve unless it has been used recently and presented no problems - including new valves that have not yet been put into operation.

To clean the valve, detach the incoming fuel line and unscrew the 2 Philips screws holding the lid on. With the lid removed, slide out the float pin allowing the float and needle to come free. Clean the seat the needle sits in thoroughly using cotton swabs until they come away completely clean and you're confident that no fuel residue can be left inside the seat.



4. FUEL METERING ADJUSTMENT

Calibrating and adjusting the metering valve

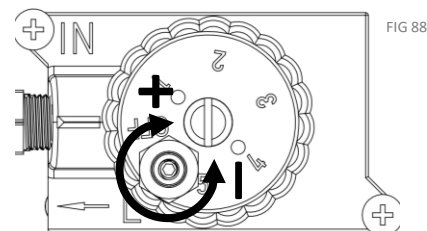
Cleaning the seat of the metering valve will correct the oil level if it was previously inconsistent. If the valve was calibrated or adjusted prior to cleaning, the calibration will need to be adjusted again in order to meter fuel in the correct amounts.

Factory calibration may need to be adjusted depending on the viscosity of your fuel (see page 4, diesel variations)

To calibrate the valve, use a 2mm allen key to turn the calibrating screw in small increments clockwise (to increase fuel flow) or in small increments counter-clockwise (to decrease fuel flow)

Note: to gain access to the calibrating screw, a smaller locking screw will first have to be removed.

Detach the fuel line leading from the metering valve to the burner where it connects to the valve. This will allow fuel to drip straight down from the outlet of the metering valve so it can be measured. Follow the steps below and use the allen key to adjust the valve flow-rate to match the correct flow-rate for your valve listed on the chart (page 1, FIG 4)



Use 2mm (0.78") allen key to first remove the locking screw. Then turn the calibrating screw in small increments clockwise (to increase flow) or counter-clockwise (to decrease flow)

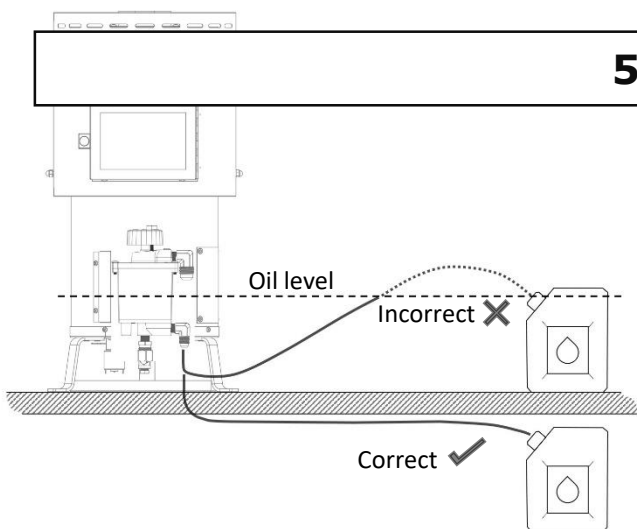
To check the fuel flowrate of your valve;

- Place a container under the metering valve to catch dripping diesel fuel.
- Detach outlet to burner connection (see page 9) to remove the copper fuel line.
- Bend the copper fuel line slightly to one side so the valve can drip straight down.
- Cross reference your valve code (Example: 3D) on table 1 to find out how long it should take to fill 1 teaspoon with the dripping fuel.
- Determine the length of time it takes to fill a 5ml teaspoon on the lowest setting of the valve knob (1)

To calibrate the fuel flowrate of your valve;

- Use a 2mm (.075") Allen wrench to completely remove the locking screw from the center of the brass fitting on the valve knob (fig. 2) set it aside. You'll see a second screw lower down in the brass nut – this is the adjustment screw.
- Turning the adjustment screw clockwise » will increase fuel flow. Turning it counter-clockwise « will decrease fuel flow (fig. 3)
- Turn the screw in small increments of no more than a ¼ turn and measure the flow rate after each adjustment until the valve fills one 5ml teaspoon in the correct time indicated in table 1.
- Once the valve has been calibrated correctly, re-attach the fuel line to the outlet. Make sure the fuel line is clear all the way into the burner before reattaching. Don't forget to replace the locking screw to make sure the set screw stays in the position it was adjusted to.

5. RETURN LINE



Dickinson metering valves are equipped with a fuel return (also called the overflow fitting) adjacent to the fuel outlet. **The Fuel return is a safety feature that ensures your valve will never overfill with fuel.** This ¼" elbow fitting provides an outlet for any surplus fuel that has entered the metering valve.

Under normal operation you should not see more than a few drops of fuel coming out of the return fitting. Fuel exiting the overflow fitting usually indicates an issue with the valve mechanism or overpressure.

The return line relies on gravity to transport fuel away from the valve. For this reason it's not always possible to reroute surplus fuel back to its original source. Always ensure the return line has no upward travel or air pockets that might prevent fuel from passing along its length.

NEVER CAP OR PLUG THE OVERFLOW FITTING, FUEL MUST ALWAYS BE ABLE TO ESCAPE FROM THE VALVE VIA THIS FITTING

6. PUMP & HEAD PRESSURE

Dickinson metering valves have an operational pressure range of 2-4psi. Fuel can be delivered to your metering valve either with a gravity fed system or a fuel pump. The fuel pressure must not exceed 4 psi.

Pressures over 4 psi will overpower the float mechanism inside the metering valve that opens and closes the fuel inlet. Over pressure will result in continuous fuel flow unchecked by the metering valve, which unchecked can lead to overheating. If you have a pump that generates more than 3 psi you must also install a regulator (part # 20-003) in line after the pump to reduce pressure before it reaches the metering valve.

On a gravity fed system every 0.7 vertical meters (2.3 feet) the fuel drops adds roughly 1 psi to the head pressure. Any gravity fuel delivery systems with more than 9 feet of vertical travel will also require a fuel pressure regulator be installed in line.

7. DIESEL VARIATIONS & ALTERNATIVE FUELS

All standard Dickinson metering valves are calibrated to meter no. 2 diesel fuel.

Thinner fuels such as stove oil require a specially machined metering stem to reduce their flow to the correct range.

No. 2 Diesel (D)

Dickinson diesel valves are calibrated and quality controlled using no. 2 diesel fuel at 3 psi of pressure before leaving the factory. However, because diesel fuels vary from region to region, further adjustments to the metering valve may be required to compensate for fuel that may be thinner or thicker than the testing fuel used by Dickinson

Stove Oil / no. 1 Diesel (SO)

Dickinson valves can be converted to meter no. 1 diesel (also known as stove oil) by exchanging the fuel metering stem inside the valve.

Kerosene (K)

Dickinson valves can be converted to meter Kerosene by exchanging the fuel metering stem inside the valve.

Dickinson does not manufacture metering valves or stems for bio-diesel or any other alternative fuel types except the ones mentioned here

8. SAFETY SHUT-OFF

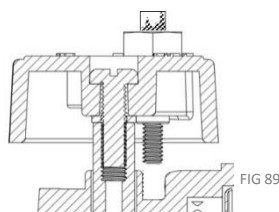
The thermal mechanical safety shut-off (also called a high-fire fuse) will automatically shut off your valve should the appliance generate enough heat to trigger it. If this happens, the solder joint holding the ferrule inside the fitting will melt. When this solder joint fails, the safety shut off will decouple, dropping the spring loaded control knob into its 'off' position to shutting off the valve. **If the thermal mechanical safety shut-off is tripped, you must immediately shut off fuel flow at the main fuel tank or day-tank. Never open the lid or door of an overheating appliance – allow excess fuel to burn itself out first!**

Resetting the high-fire fuse

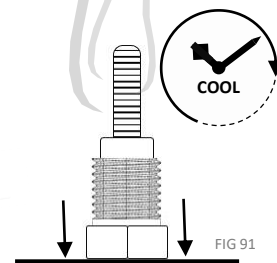
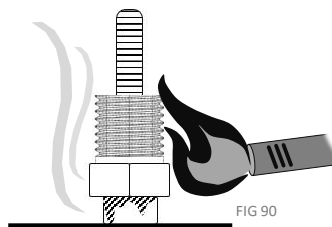
The valve knob is equipped with a safety fuse designed to come apart & stop fuel supply if it becomes overheated. If the appliance runs too hot and shuts off, check the fuse for signs that it has been sprung due to overheating (fig 89) To reset the fuse, place it upside down in a pan until its solder melts and the nut drops back into place (fig 90) **Allow the fuse ample time to cool before handling after resetting!** (fig 91)

If a fuse has lost all its low-temperature solder it will not be possible to reset it.

Replacement fuse part #02-060



Before the fuse is reset and reattached, make sure you have cleaned & calibrated the metering valve to prevent the appliance from overheating again!



9. TROUBLESHOOTING

Problem

No fuel getting to burner

Valve needle is stuck closed
Clogged inlet screen
Fuel line under burner is blocked

Fuel flow is too slow

Fuel is shut-off
Fuel is too cold
Valve needs to be calibrated
Valve metering stem groove is plugged

Metering valve gives too much fuel

Valve Needle is stuck open
Valve needs to be calibrated
Fuel is too thin

Stove/Heater running too hot

System has reached operating temperature and requires less fuel

Stove/Heater overheating

Valve Needle is stuck open
Valve needs to be calibrated
NEVER OPEN DOOR OR LID OF AN OVERHEATING BURNER!
Valve Needle is stuck open
Fuel pressure is too strong
Flue is blocked

Flame goes out unexpectedly

Valve is shut off or burner is starved of fuel
Valve has overheated
Valve needle is stuck closed
Valve Needle is stuck open
Fuel pressure is too strong
Overflow is blocked
Overflow line has air pocket
Overflow line flows uphill
Overflow line is kinked or pinched
Fuel pressure is too strong

Fuel coming from valve overflow

Fuel leaking from top of metering valve

Solution

Disassemble valve and polish needle seat with cotton swab – **see page 2**
Remove valve inlet fitting and clean steel mesh filter screen beneath
Remove fitting plug beneath burner and check fuel line for blockage
Check to see if fuel is reaching the metering valve
Run heater until fuel lines reach room temperature.
Calibrate valve using adjustment screw – **see page 3**

Locate groove and clean out with stiff bristled brush

Disassemble valve and polish needle seat with cotton swab – **see page 2**
Calibrate valve using adjustment screw – **see page 3**
Change fuel type or install alternative fuel metering stem – **see page 4**

Adjust fuel down

Disassemble valve and polish needle seat with cotton swab – **see page 2**
Calibrate valve using adjustment screw – **see page 3**
Shut off fuel supply at valve and tank. Allow fuel to burn itself out.
Disassemble valve and polish needle seat with cotton swab – **see page 2**
Reduce pump/head pressure to between 3 - 3.5 psi.
Shut off valve and allow unit to cool down before cleaning flue pipes
Always allow burner to cool completely before re-lighting
Replace or reset valve's Thermal Mechanical Safety Shut-off - **See page 4**
Disassemble valve and polish needle seat with cotton swab – **see page 2**
Disassemble valve and polish needle seat with cotton swab – **see page 2**
Reduce pump/head pressure to between 3 - 3.5 psi.
Overflow fitting must remain open
Prime the overflow line to eliminate air pockets
Disconnect and reconfigure line
Examine overflow line for damage
Reduce pump/head pressure to between 3 - 3.5 psi.