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Aerospace Group  
Conveyance Systems Division  
Carter<sup>®</sup> Brand Ground Fueling Equipment

**IN64124**

August 15, 1997

Applicable additional manuals:

## **Installation Instructions**

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### **Inline Pressure Control Or Shutoff Valves (Non-digital) And Bypass Pressure Control Or Shutoff Valves (Non-digital)**

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**Model 64124**

**Model 64080**

**Model 64110**

**Model 64002**

**Model 64082**

SUMMARY OF REVISIONS

DATE OF CHANGE	PARAGRAPH/ PAGE	REV LTR	E.O. NO.	REVISION	APPROVE D BY
8/15/97	Page 1	A		Revised to release under EO	

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## 1.0 SCOPE

These installation instructions have been developed for use in mounting Carter brand Model 64124/64080/64110 Inline Valves or 64060/64120 Bypass Valves on any refueling vehicle. There are several optional versions of the 64110 In-line Valve and all versions are covered in these instructions except for the digital version which is covered in separate manual, IN64050. These instructions do not cover all requirements for such an installation which might be dictated by other authorities which have jurisdiction over the use of your vehicle. The responsibility for proper final installation configuration is yours. Consult with the local airport authority or corporate authority for further information.

## 2.0 EQUIPMENT SUPPLIED BY CUSTOMER

The following is a listing of the required equipment supplied by the customer on the refueling vehicle.

All tubing needed to connect the valve to the other components within the system.

On the basic 64110 (no options) the valve is furnished less the solenoid valve and opening and closing orifices. Customer must furnish needle valves to achieve an adjustable opening and closing time.

All mounting hardware required.

## 3.0 GENERAL DESCRIPTION

The face-to-face distance of the ANSI flanged versions of the 4 inch is 9.25 inches while the 3 inch measures 8.0 inches.

The various valves covered by these instructions are described below.

64124 and 64080 - Air Set Pressure Control Valves - These valves are direct acting units requiring an air reference pressure set at approximately 25 psi greater than the desired control pressure. Typically they are connected to a Venturi to provide compensated pressure control at the nozzle(s).

64002 and 64082 - Air Set By-pass Pressure Control Valve - These units are installed as a by-pass control to provide compensated pressure to the nozzle(s). They are essentially the same as the 64124 and 64080 except for a lighter spring and the air reference pressure is used to normally close the valve. As the nozzle pressure increases, these units open to allow more flow to by-pass the pump reducing the control pressure. The bias (difference between the air reference pressure and the desired control pressure) for these units is zero psi, that is the air pressure is set at the desired control pressure. The "B" option for both valves provides an additional control that will allow the unit to open when the pump outlet pressure exceeds the setting of the control.

64110 - This unit is offered in four varieties as noted below.

- ➔ 64110 (no option) - A basic on-off valve for use as a deadman only type valve. This unit requires the addition of a three-way, two position solenoid valve and two needle valves by the customer to effect a proper deadman shutoff valve with adjustable

opening and closing time controls.

**NOTE:**

It might be less expensive to utilize two two-way solenoid valves in lieu of a single 3-way. In that case following the wiring diagram for the 64110A3.

- 64110A1 or 64110B1 - Digital Pressure Control Valve - This unit is covered in IN64050 and will not be discussed further in this document.
- 64110A2 or 64110B2 - Fuel Operated Pressure Control Valve - This unit performs the pressure control function in a system where air is not available and incorporates either 12 or 24 VDC solenoid controls for the deadman function. The pressure control function has a simple adjustment.
- 64110A3 or 64110B3 - Fuel Shutoff Valve - The same as the basic unit except either 12 or 24 VDC solenoid controls and integral orifices are furnished to result in a deadman valve with proper controlled opening and closing.

All of the various units above are available with ANSI flanges or Victaulic inlet and outlet as desired. See Bulletin 64124 for additional ordering information.

#### 4.0 INSTALLATION

##### 4.1 Mounting on the Vehicle

4.1.1 All of the subject units MUST be mounted HORIZONTALLY on the vehicle and all, except for the 64110 (basic unit) and 64110A(B)2 Shutoff Valves, mounted with the Solenoid Valve assembly or the ports labeled “D” and “C” (in the case of older 64124 Valves these ports may be labeled “AIR” and “VENT”) on bottom of the unit (at the 6:00 o’clock position). The two shutoff valve types (64110 and 64110A(B)2) should be installed with the solenoid valves or ports “C” and “D” orientated on the top of the valve (at the 12:00 o’clock position). Failure to comply with this requirement will result in poor performance of the units.

4.1.2 If clearance around the 64110, with the solenoid or regulator package, is a severe problem, the solenoid valve assembly can be removed from the valve and mounted near the valve with new connections fabricated to appropriately connect the solenoid valve assembly to the 64110 housing. If the fittings are removed from the units and re-installed, **DO NOT USE TEFLON TAPE**. Use Loctite 59231 Pipe Sealant with Teflon for sealing pipe threads. **CONSULT WITH CARTER FOR DETAILED INFORMATION REGARDING THIS BEFORE TAKING ACTION.**

4.1.3 The 64124/64080/64110A(B)2 will normally be utilized with a Venturi to effect proper compensated pressure control at the nozzle. Otherwise a remote pressure sensing port is required to achieve a modicum of proper pressure control. The ports or connections to the various valves are to be connected to other locations on

the refueling vehicle as noted in the table and figures below.

PART NUMBER	PORT	CONNECT TO	COMMENTS
64124/64080	D 3/8 - 18 NPT	Air Reference Pres- sure Regulator	Port may be labeled "AIR" on older valves. See Figure 1 be- low.
64124/64080 Continued.	C 1/4 - 18 NPT	Slop Tank, main tank on refuelers or inlet side of the pump (outlet of the by-pass valve if present).	If the port is left open leakage will eventually become apparent from this vent signifying that the seals within the valve need repairing.
	B 1/4 - 18 NPT	No connection neces- sary, this is an air bleed port. Port must be plugged.	
	A 3/8 - 18 NPT	Fuel sense point, ei- ther a Venturi or static sense point.	The valve is delivered with a check valve/orifice installed in the port in the body but there is an extended port for installation of the fuel sense connection.
64002/64082	D 3/8 - 18 NPT	A 3-way air operated valve is installed in this port offering three other ports to which the following installa- tions are to be made by the OEM:  A - Connect to the main line from the outlet of the pump.  B - Connect to air ref- erence pressure regu- lator and to the fitting in port B on body.  C - Connect to Venturi or sense port.	See Figure 2 below.

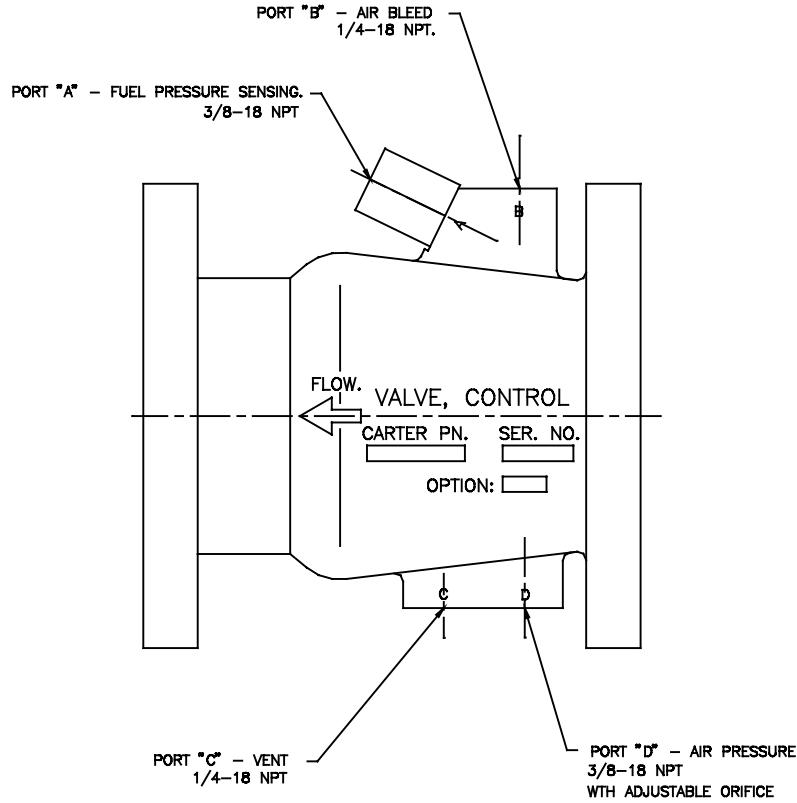


FIGURE 1 - 64124/64080 IN-LINE CONTROL VALVE

PART NUMBER	PORT	CONNECT TO	COMMENTS
	C 1/4 - 18 NPT	Slop Tank, main tank on refuelers or inlet side of the pump (outlet of the by-pass valve if present).	If the port is left open leakage will eventually become apparent from this vent signifying that the seals within the valve need repairing.
	B 1/4 - 18 NPT	Connect this extended port on all units, to the regulated air reference pressure.	See Figure 2 below.
	A 1/4 - 18 NPT	This port is plugged on basic units. On option B units, a controller is installed in this port. The port in the controller (1/4 - 18 NPT) is to be connected to the main line from the outlet of the pump.	See Figure 2 below.

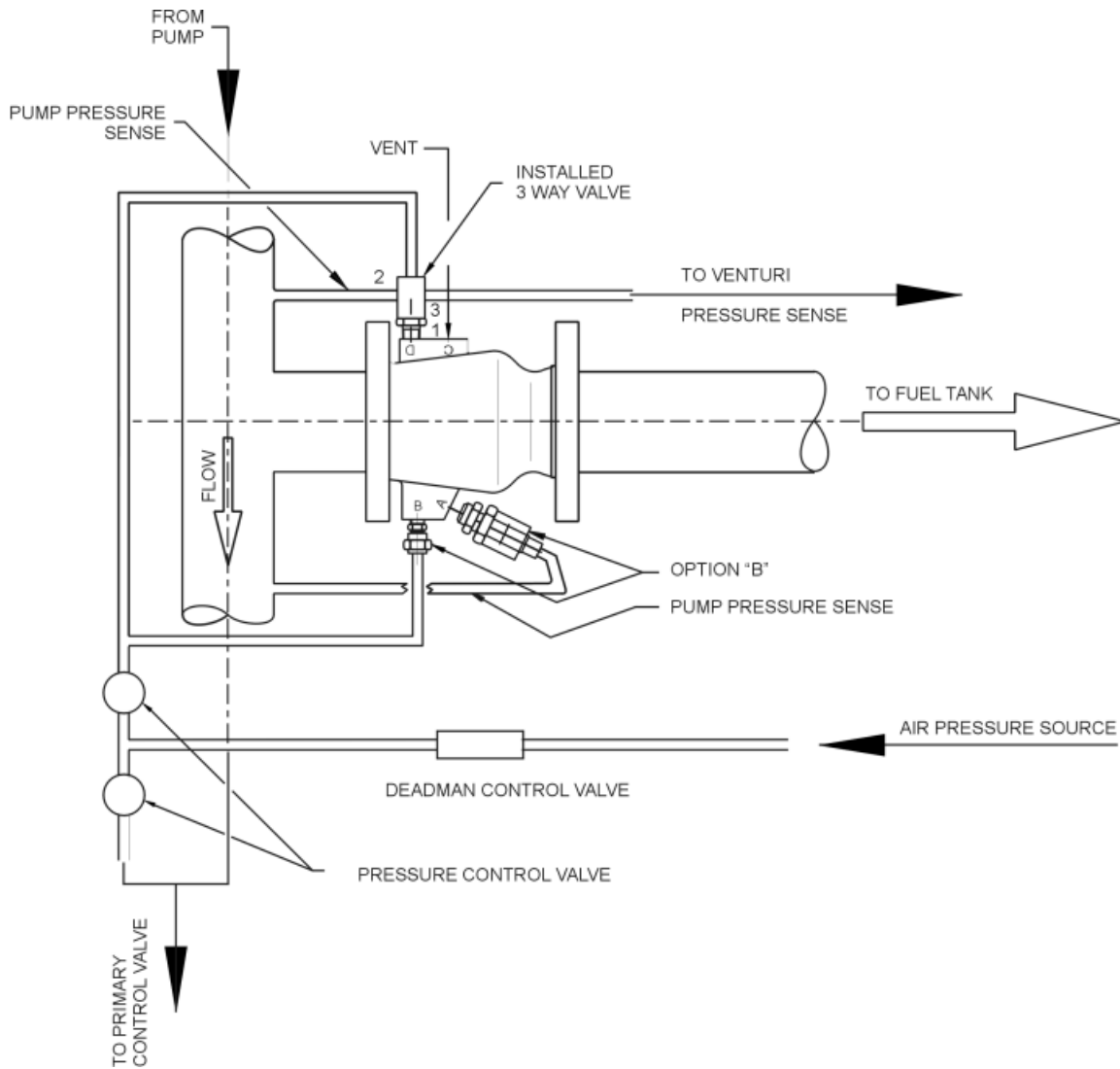


FIGURE 2 - BY-PASS CONTROL VALVE

PART NUMBER	PORT	CONNECT TO	COMMENTS
64110 (basic)	D 3/8 - NPT	Connect to common port of 2-position, 3-way solenoid valve.	See Figure 3 below. Connect normally closed port of 3-way solenoid valve through an adjustable needle valve to port provided in inlet of valve body. Connect normally open port of solenoid valve through an adjustable needle valve to slop tank, fuel storage tank or upstream of fuel pump. The needle valves will be used to provide adjustable opening and closing times for the unit.



PART NUMBER	PORT	CONNECT TO	COMMENTS
64110 (basic) Continued.	C & A 1/4 - 18 NPT  B 1/4 - 18 NPT	Furnished plugged.  Air breather furnished.	

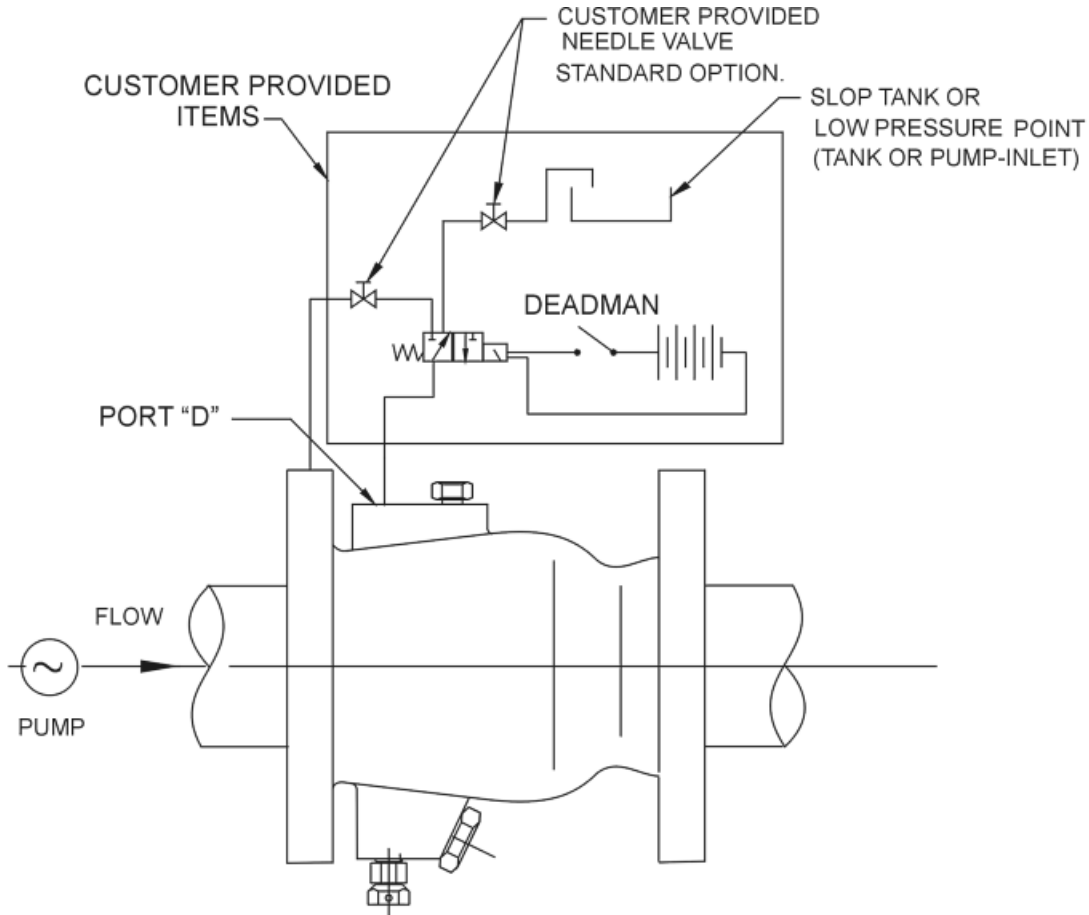


FIGURE 3 - 64110 (BASIC, NO OPTIONS) SHUTOFF VALVE  
(Customer furnishes solenoid, opening and closing orifice controls)

PART NUMBER	PORT	CONNECT TO	COMMENTS
64110A2 or B2	D	Used in Carter installation connecting to solenoid valves and relief valve.	See Figure 4 below. The port left open in the relief valve is to be connected to the inlet side of the pump. The open port in the solenoid manifold is to be connected to the slop tank, storage tank or inlet side of the pump.

PART NUMBER	PORT	CONNECT TO	COMMENTS
	B & C	Plugged by Carter	
	A 3/8 - 18 NPT	Connect port in check valve to Venturi or fuel sense port.	

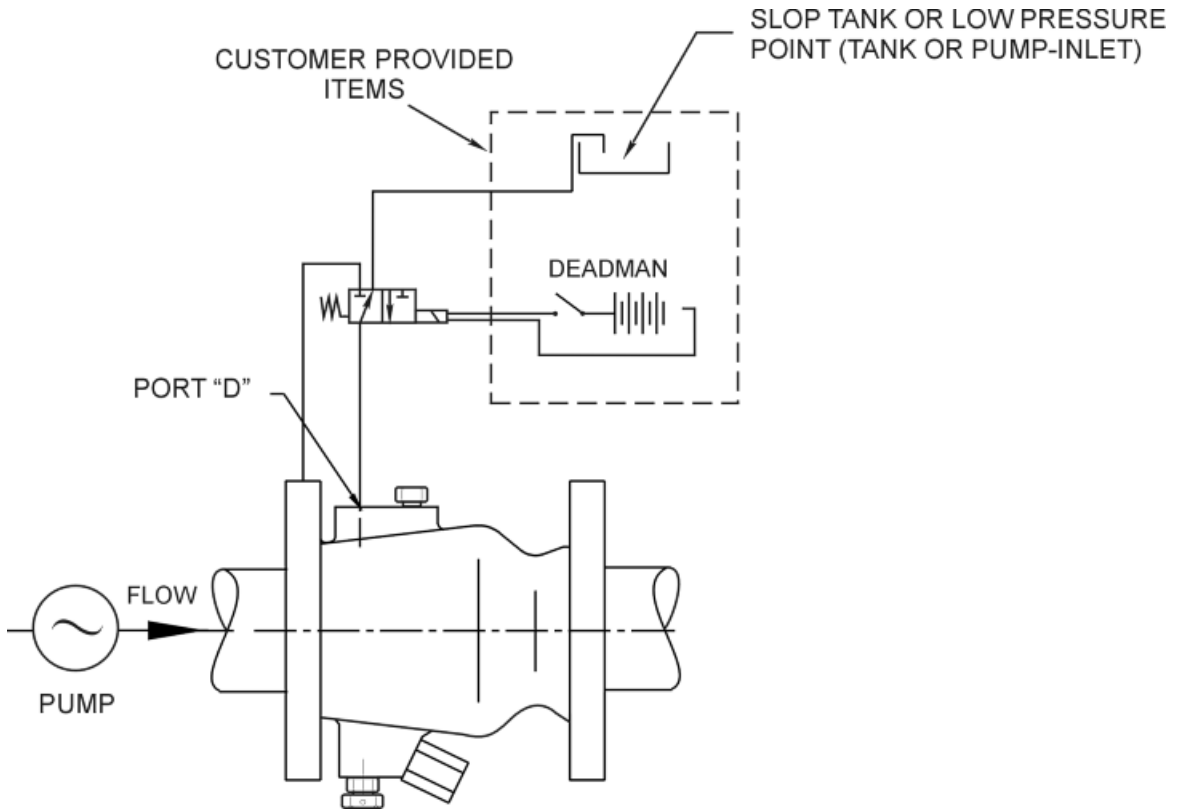


FIGURE 4 - 64110A(B)2 FUEL SET PRESSURE CONTROL VALVE

PART NUMBER	PORT	CONNECT TO	COMMENTS
64110A3 or B3	D	Used in Carter installation connecting to solenoid valves.	See Figure 5 below. The open port in the solenoid manifold is to be connected to the slop tank, storage tank or inlet side of the pump.
	A & C	Plugged by Carter	
	B	Breather installed by Carter	

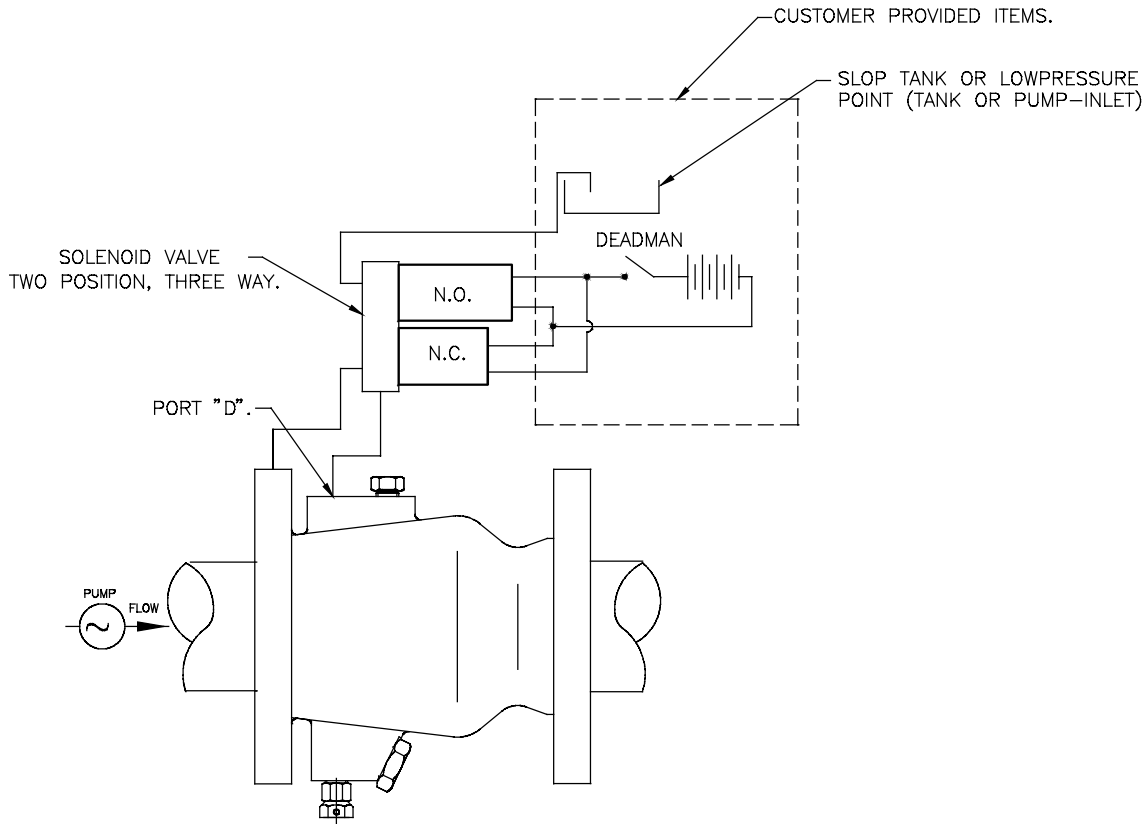


FIGURE 5 - 64110A(B)3 FUEL SHUTOFF VALVE  
(Furnished with integral solenoid controls)

4.2 Air Bleeding

4.2.1 64124/64080 In-line Valves - Once the physical installation is complete and the vehicle is filled with fuel, upon first pressurization by the pump, the plug in port B must be loosened to bleed air from the fuel sense line and from the internal cavity of the 64124/64082. Cycling the deadman on and off will cause the valve to open and close and facilitate bleeding.

4.2.2 64002/64082 By-pass Valves - The fittings connected to the C port on the 3-way valve (one connected to the sense line) must be loosened to effect bleeding air from the line. Cycling the deadman will facilitate the operation. On valves with the B op-

tion the fitting connecting the controller and the main line from the pump should also be loosened to bleed air from the line.

4.2.3 64110A(B)3 Shutoff Valves - If possible, loosen the unused fitting (plug) on the end of the Solenoid Valve Manifold Block as a bleeding point. Alternatively, loosen the fitting on the side of the Manifold Block next to the shorter of the two Solenoid Valves to which the stainless steel tubing is attached. With pressure applied to the inlet of the valve, activate the Deadman Control to apply pressure to this line. Air will escape from the loosened fitting. Fuel will soon appear.

4.2.4 64110 (basic) Shutoff Valve - Loosen the fitting installed in port D.

- With pressure applied to the inlet of the valve, activate the Deadman Control to apply pressure to the line. When most of the air is bled, slowly tighten the fitting to build pressure within the control cavity of the valve. This will cause the valve to open. After the valve has opened, re-loosen the fitting. If loose enough, the valve will stroke closed and exhaust some trapped air from the internal control cavity. Repeat this step until you are satisfied that all the air is removed from the control line and from the control cavity of the valve.
- 4.2.5 64110A(B)2 Fuel Set Pressure Control Valve - Bleed the same as for 64110A(B)3 above. In addition bleed the same as for 64124 above.
- 4.3 Electrical Connections
- 4.3.1 64110 Valves furnished with electrical deadman control - The Solenoid Valve assembly has two (2) electric connectors attached to the two Solenoid Valves (one per Solenoid Valve). These connectors have ½" female NPT ports for connecting a conduit fitting, or other style fitting, for carrying incoming wires.
- 4.3.2 Remove these connectors by removing the single screw at the center of each connector. With the screw removed (whether or not the connector has been pulled from the valve body) the cover will come off of the connector revealing the wiring connection points within the connector.
- 4.3.3 There are three connection points within the connector. The center one, marked "GND", will not be used in this installation. Two wires will be used to connect each solenoid valve to one side of the battery while the other two are connected to the deadman switch as shown in Figure 4 & 5. (That are four (4) wires total for each 64124/64082.) THE TWO WIRES CAN BE CONNECTED TO THE TWO POINTS WITHIN THE CONNECTOR IN ANY ORDER. The solenoid valve will work the same in either case.
- 4.3.4 To connect the two wires, strip about 3/16 inch of insulation from the end of the wires, loosen the center screw of each connection point such that the stripped wire will enter the side of the connections point, insert the wire, and tighten down the center screw to clamp the bare wire in place.
- 4.4 Pressure, Opening and Closing Control Setup
- 4.4.1 64124/64080 Air Set In-line Valves - The only operation needed to achieve the correct pressure control is, once the system is connected to a flow test rig, is to adjust the air reference pressure to 25 psi above the desired control pressure, establish the desired optimum flow rate for the system, adjust the valve downstream of the nozzle connection until the valve begins to control. The resultant control pressure should be that desired. The closing time is adjustable by an orifice screw located in port D, the air reference port. It is necessary, after checking the closing time to disconnect the air line and remove the fitting to get to the adjustment. Counter-clockwise turning of the orifice screw with decrease the closing time and overshoot. It should be adjustable over a range of from 2 - 5 seconds. Refer to Service Manual

SM64124 or SM64080 for more information on testing the units.

- 4.4.2 64110A(B)2 Fuel Set In-line Valves - The system is to be attached to a flow test rig. Activate the deadman switch to open the valve and establish flow for at least 2 minutes to bleed the system. The fuel control pressure is adjustable by opening or closing the knob on the small relief valve mounted on the solenoid valve manifold (bottom of the unit). Counter-clockwise movement of the relief valve knob will reduce the pressure control level. Be sure that the valve downstream of the nozzle on the test rig is shut down sufficiently to cause the valve to control. It is suggested that a low flow rate (150 gpm or so) be set up at first to assure the need to control. If the system is wide open the valve will never sense the need to control and will remain wide open. Fixed orifices are supplied to provide the industry standard opening and closing times of from 5 - 10 seconds for the former and 2 - 5 for the latter
- 4.4.3 64110A(B)3 Shutoff Valves - Fixed orifices are supplied to provide the industry standard opening and closing times of from 5 - 10 seconds for the former and 2 - 5 for the latter.
- 4.4.4 64110 basic Shutoff Valve - OEM is to furnish orifices in the form of adjustable needle valves as mentioned earlier. The needle valve connected directly to the slop tank primarily controls the closing time and the one in the inlet of the valve that is connected to the solenoid valve primarily controls the opening time. Adjust each to achieve the desired times. Adjustment of one will have a slight

affect upon the other time. Trial and error is the only way to achieve this adjustment.

- 4.4.5 64002/64082 By-pass Control Valves - Aircraft Control Pressure - Apply air reference pressure equal to the amount of desired control pressure. It is suggested that a low flow rate into the test rig (150-300 gpm or so, depending upon valve size) be set up at first to assure the need to control. If the system is wide open the valve will never sense the need to control and will remain closed.

On option B units, the pump outlet pressure at which the unit will open can be varied using the following method:

- a). Loosen the locking nut on the Controller Assembly mounted in Port A.
- b). Turn the hexagon body clockwise to its stop.
- c). Turn the hexagon body counter-clockwise one full rotation.
- d). With the pump on, open the deadman to establish flow through into the test rig, then keeping the deadman activated, close the flow with a valve downstream of the in-line valve. The by-pass valve will go fully open.
- e). Turn the body counter-clockwise to achieve the desired relief pressure at the outlet of the pump.
- f). Tighten the lock nut.

- 4.5 Installation/Adjustment of 64067 Maximum Rate of Flow Pilot

The 64067 Rate of Flow Pilot can be used only with Carter 64124/64080 Air Reference In-line Control Valves and 64110A2 Fuel Set Control Valve.

4.5.1 Installation - Refer to Figure 6. The choice of the locations for obtaining the 2-10 psi differential may not be at the Venturi as shown. It is important that no less than 2 nor more than 10 psi differential be used.

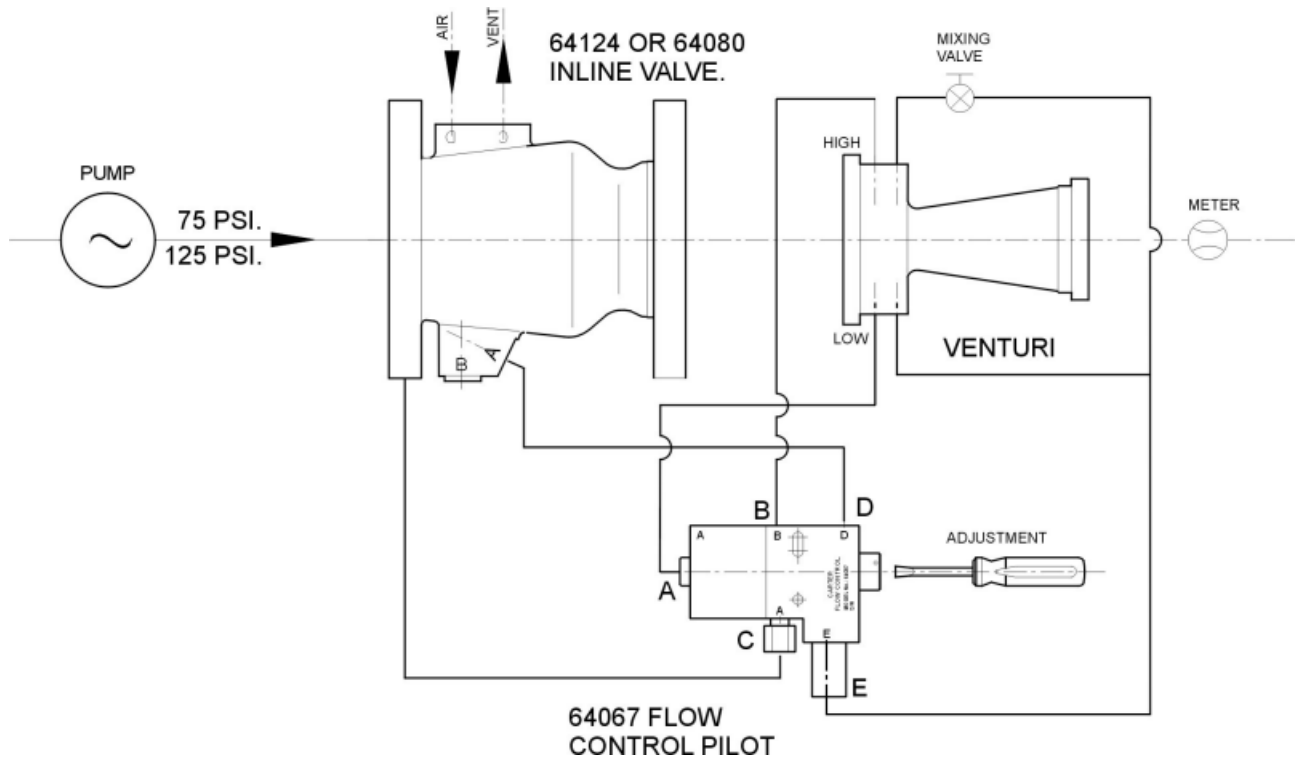


FIGURE 6 - 64067 INSTALLATION

DO NOT USE TEFLON TAPE on any fittings.. Use Loctite 59231 Pipe Sealant with Teflon for sealing pipe threads.

4.5.2 Bleeding - Bleed as noted in 64124 above plus loosen the fittings installed in ports A, B, C & E of the 64076 during the deadman activating cycling process.

4.5.3 Adjustment of rate of flow - In a system capable of producing a flow

rate greater than the amount at which the rate is to be limited, establish maximum flow capable. Note screw driver shown in Figure 4. Clockwise turning of the screw will reduce the rate of flow at which the unit will control. Allow time for the system to stabilize after each adjustment. Continue adjustment until desired flow rate is achieved.

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