RFM 5 FLOW METER INSTALLATION PROCEDURE

INTRODUCTION

The Raven RFM 5 Flow Meter is designed to work in conjunction with very low volume sprayers (less than 2 GPM [8 lit/min]), such as controlled droplet applicators (C.D.A.) or spinning disks. The Raven RFM 5 Flow Meter is rated to handle flow rates of .1-6 GPM [.4-23 lit/min].

INSTALLATION

The Raven RFM 5 Flow Meter must be plumbed as shown in Figure 1. Note that no hose is used in the system plumbing between the main line hand valve and the by-pass #1 hand valve, nor on either the inlet or outlet of the RFM 5 Flow Meter. The use of flexible hose in these areas may cause the system to oscillate due to the expansion and contraction of the hose with pressure variations.

Attach the Terminal Tab Wire from the RFM 5 Flow Meter to center solenoid valve (If only one or two solenoid valves are used attach to either). This wire provides 12 VDC needed to operate the RFM 5 Flow Meter. It also cuts power to the RFM 5 Flow Meter when the solenoid is shut off.

Mount the Raven Motorized Control Valve with the Motor in the upright position, in the by-pass line as shown in Figure 1.

NOTE: Install Polarity reversal jumper in Motorized Control Valve Cable (Raven P/N 115-0159-415)

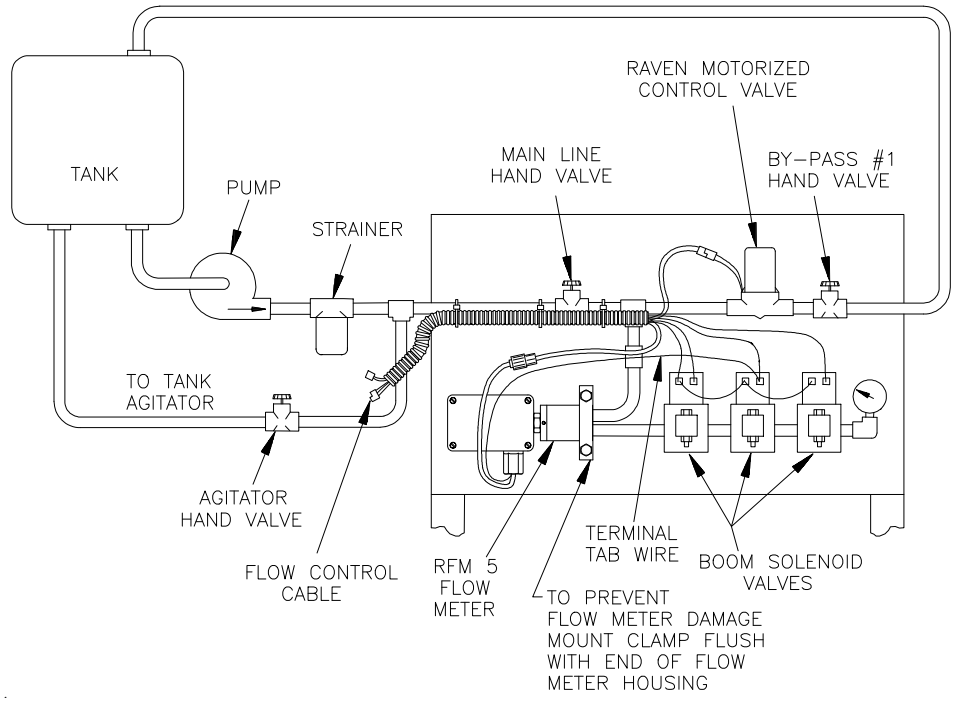


FIGURE 1

SELECTING ORIFICE PLATES:

After determining target application rate at which your chemical should be sprayed, you must insure your orifice plates are capable of applying the chemical at the target rate.

In determining which orifice plates to select, you must know:

1) Nominal Application Pressure	___ PSI (kpa)
2) Target application Rate	___ GPA (lit/ha)
3) Target Speed	___ MPH (km/h)
4) Spacing of CDA's (Spinning Discs)	___ INCHES (cm)

From this information you can then calculate the volume per minute, per orifice plate as follows:

$$\text{GPM (lit/mi.)} = \frac{\text{GPA (lit/ha) X MPH (km/h) X INCHES (Centimeters)}}{\text{5,940 (60,000)}}$$

Example: 1) Nominal Application Pressure = 20 PSI [150 kPa]
2) Target Application Rate = 2 GPA [20 lit/ha]
3) Target Speed = 6 MPH [10 km/h]
4) Applicator Spacing = 72 INCHES [200 Centimeters]

$$\text{GPM per nozzle} = \frac{\text{2 GPA X 6 MPH X 72 INCHES}}{\text{5,940}} = .145$$

$$\text{lit/min per nozzle} = \frac{\text{20 lit/ha X 10 km/h X 200 cm}}{\text{60,000}} = .667$$

From an orifice plate selection chart, select an orifice plate that comes closest to providing the desired GPM output. **NOTE:** (THE FILTER SCREEN USED IN THE LINE STRAINER SHOULD HAVE OPENINGS SLIGHTLY SMALLER THAN THE ORIFICE PLATES). Install the selected orifice plates in the manifold(s) as shown in Figure 12.

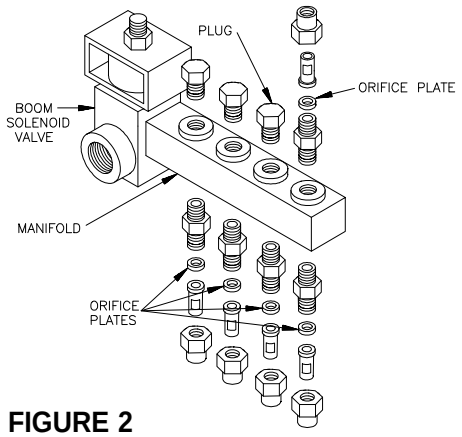


FIGURE 2

VERIFYING FLOW RATE LIMITS:

The volume per minute flow rate of the entire Sprayer must be within the range of the RFM 5 Flow Meter (.1-6 GPM) [.4-23 lit/min].

Calculate total GPM [lit/min] of your sprayer as follows:

Total GPM [lit/min] per orifice X Number of Orifices.

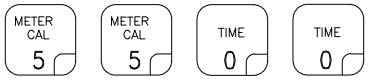
Example: 1) GPM [lit/min] per orifice = .145 GPM [.667 lit/min]
2) Number of Orifices = 5

Total GPM [lit/min] = .145 [.667] X 5 = .725 GPM [3.34 lit/min]

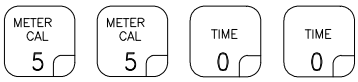
Programming the Console Computer:

The steps to programming the Console are the same as those described in the Console Programming Section of this manual except for METER CAL. It is during this entry that the decimal point must be shifted to increase the accuracy of the system to accommodate the low application rates of CDA systems.

The following is an example of how a meter calibration constant of 5500 would be entered.
The sequence to shift the decimal is to enter: 



as the meter calibration constant.
The sequence to unshift the decimal is to omit the 

that is, simply Enter the meter calibration constant 

Shifting the decimal permits a times 10 resolution of the data. The following table illustrates this resolution:

KEY	UNSHIFTED	SHIFTED
RATE Display	000.0	00.00
RATE 1 CAL	000.0	00.00
RATE 2 CAL	000.0	00.00
VOL/TANK	0000	000.0
TOTAL VOLUME	0000	000.0
FIELD VOLUME	0000	000.0
VOL/MIN	0000	000.0

When entering RATE 1 CAL and RATE 2 CAL, remember that 2 GPA [20 lit/ha] is entered as 2.00 [20.0].

The following Consoles require a four digit Meter Cal number when used with the RFM 5 Flow Meter:

SCS 440	PGM E and Later
SCS 450	PGM A and Later
SCS 460	All
SCS 600	All
SCS 700	PGM D and Later
SCS 710	PGM A and Later
SCS 750	PGM B and Later

All other Consoles require a three digit Cal number. If the Flow Meter has a four digit number, divide by ten (i.e. 5500=550). If the Flow Meter has a three digit CAL number, add a zero (i.e. 550=5500).

MAINTENANCE OF RFM 5 FLOW METER:

The RFM 5 Flow Meter is a precision instrument and extreme care must be used in disassembly and re-assembly. Under no circumstances should the Bearing Adjustment Screws be adjusted, (See Figure 4).

The RFM 5 Flow Meter should be thoroughly cleaned after completion of any given chemical application. Do not change chemicals without flushing the RFM 5 Flow Meter thoroughly. Any plumbing debris, sand, or other solid material will jam the Turbine-Bearing Ring Assembly.

DISASSEMBLY PROCEDURE: (See Figure 3 & 4)

1) Place a vice grip or pipe wrench on the Sensor Flange and another near the inlet-outlet pipes of the Flow Meter Housing, as shown in Figure 3. Unscrew the Sensor Flange from the Flow Meter Housing. **CAUTION**: Do not turn or pry on inlet-outlet pipes of Flow Meter Housing.

2) Remove the O-Ring from inside the Flow Meter Housing.

3) Carefully remove the Turbine-Bearing Ring Assembly from inside the Flow Meter Housing. **CAUTION:** Do not pull or pry on the plastic turbine wheel. It may be necessary to form a wire hook and pull on the Bearing Adjust Screws only.

4) Clean any debris from the Flow Meter Housing and parts. Make sure plumbing is flushed clean.

5) Carefully check that the turbine rotates freely. **CAUTION:** Do not attempt to adjust the turbine end-play. This is factory set to a tolerance of better than .001 [.025 mm].

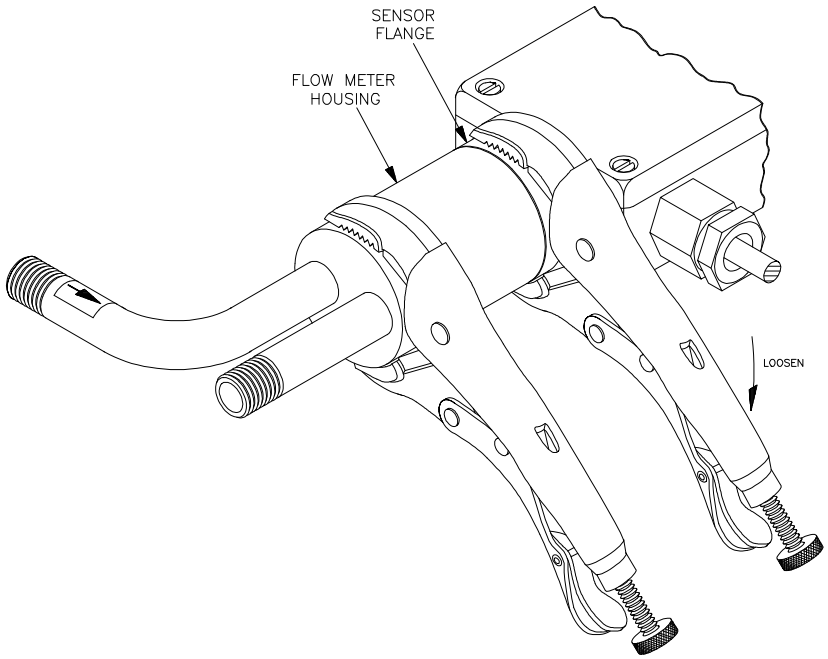


FIGURE 3

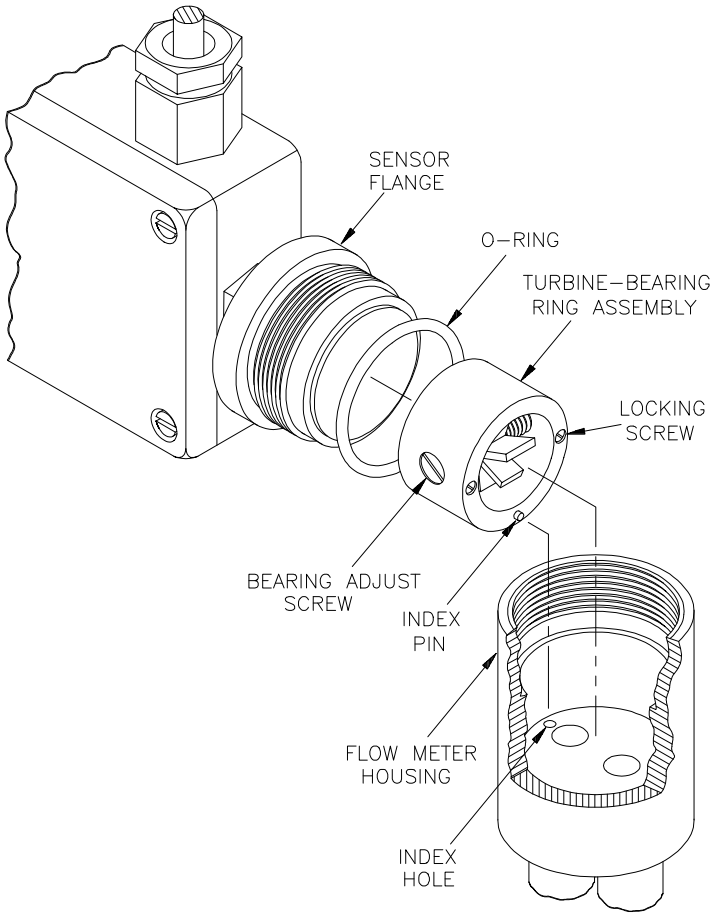


FIGURE 4

RE-ASSEMBLY PROCEDURE: (See Figure 4)

1) Place Turbine-Bearing Ring Assembly into Flow Meter Housing and rotate Flow Meter Housing to the upright vertical position as shown in Figure 13. **CAUTION:** The Flow Meter Housing has an Index Hole and the Turbine-Bearing Ring Assembly has an Index Pin. These must be aligned when the Turbine-Bearing Ring Assembly is RE-ASSEMBLED in the Flow Meter Housing. A slight rotation may be required to seat the Index Pin into the Index Hole. **CAUTION:** Do not twist or pry on the plastic turbine wheel. A small screw driver or pencil may be used to push on the Bearing Adjust Screw only.

2) Lightly grease the O-Ring and place it in the Flow Meter Housing.

3) Thread the Sensor Flange onto the Flow Meter Housing. Tighten by hand until the Sensor Flange meets the Flow Meter Housing. When properly tightened, the inlet pipe will point away from the sensor cable as shown in Figure 3.