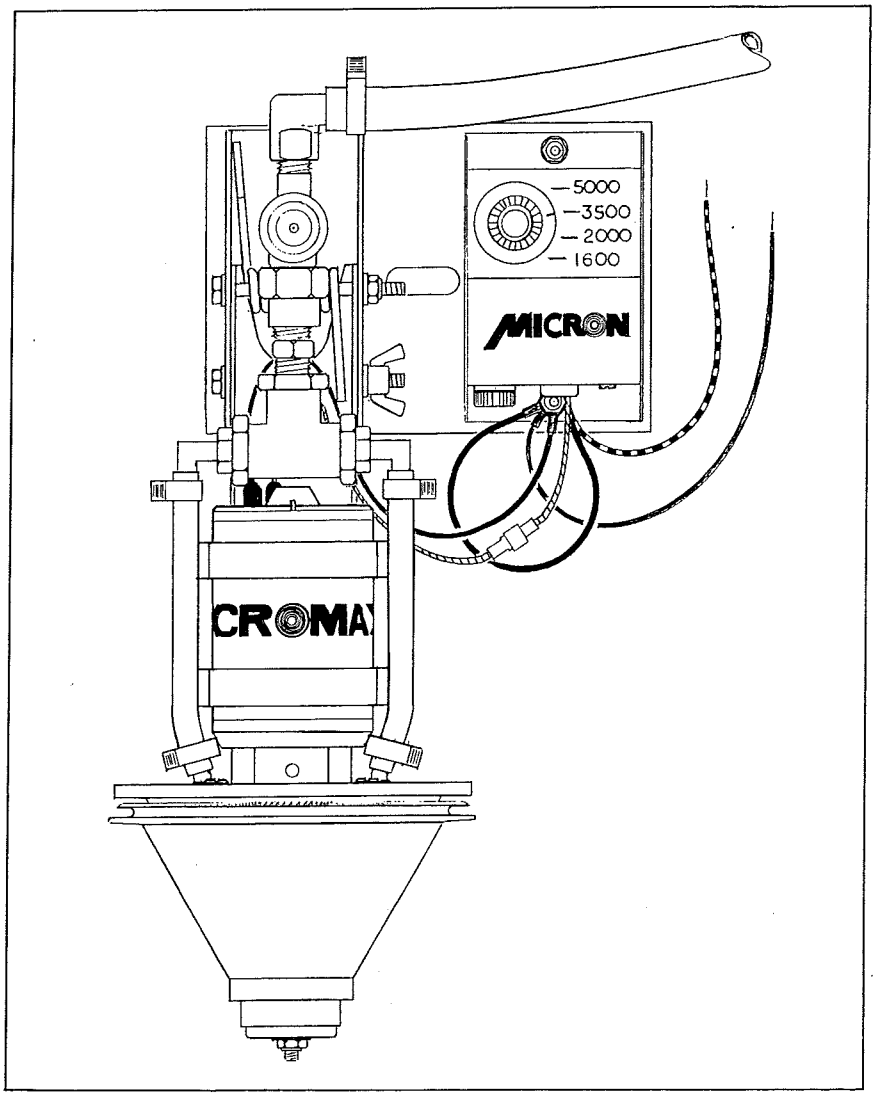
MICROMAX/DR4

NEW and REVOLUTIONARY DIRECT DRIVE!!

Pendeff
620401

CONTROLLED DROPLET APPLICATOR

OPERATING AND INSTALLATION MANUAL



MICRON CORPORATION

A Revolutionary New Way to Apply Pesticides

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Telex 79-2511

CHART TO DETERMINE GALLONS PER ACRE OF TOTAL SPRAY SOLUTION APPLIED

40 INCH SPINNER SPACING

Ground Speed	Flow Rate 64 oz/min	Flow Rate 48 oz/min	Flow Rate 32 oz/min	Flow Rate 16 oz/min	Flow Rate 8 oz/min	Flow Rate 4 oz/min	Flow Rate 2 oz/min
2.5	29.70	22.28	14.85	7.43	3.72	1.86	.93
3.0	24.76	18.57	12.38	6.19	3.10	1.55	.77
3.5	21.22	15.91	10.61	5.30	2.66	1.33	.66
4.0	18.56	13.92	9.28	4.64	2.32	1.16	.58
4.5	16.50	12.38	8.25	4.13	2.06	1.03	.52
5.0	14.86	11.14	7.43	3.71	1.86	.93	.46
5.5	13.50	10.13	6.75	3.38	1.68	.84	.42
6.0	12.38	9.28	6.19	3.09	1.54	.77	.39
6.5	11.42	8.57	5.71	2.86	1.42	.71	.36
7.0	10.60	7.95	5.30	2.65	1.32	.66	.33
7.5	9.90	7.43	4.95	2.48	1.24	.62	.31
8.0	9.28	6.96	4.64	2.32	1.16	.58	.29
8.5	8.74	6.55	4.37	2.18	1.10	.55	.27
9.0	8.26	6.19	4.13	2.06	1.04	.52	.26
9.5	7.82	5.86	3.91	1.95	.98	.49	.24
10.0	7.42	5.57	3.71	1.86	.93	.46	.23
11.0	6.76	5.07	3.38	1.69	.85	.42	.21
12.0	6.18	4.64	3.09	1.55	.78	.39	.19

Controlled Droplet Application

The **MICROMAX** utilizes centrifugal force to create spray patterns instead of hydraulic pressure. This new technology is referred to as CDA, or Controlled Droplet Application. The objective of CDA is to produce the proper size droplet to effectively apply pesticides. The chemical and its target determine the proper size droplet. The purpose of spraying is to cover a given concentration of pesticide uniformly over the target surface. The key to this successful application is determined primarily by droplet size. Herein lies the advantage of CDA as compared to hydraulic atomization. CDA is a proven way to produce uniform droplet size. Hydraulic nozzles, on the other hand, emit droplet sizes that may vary from 10 to 500 microns or larger. This wide variation in droplet size causes inefficient application of the pesticide.

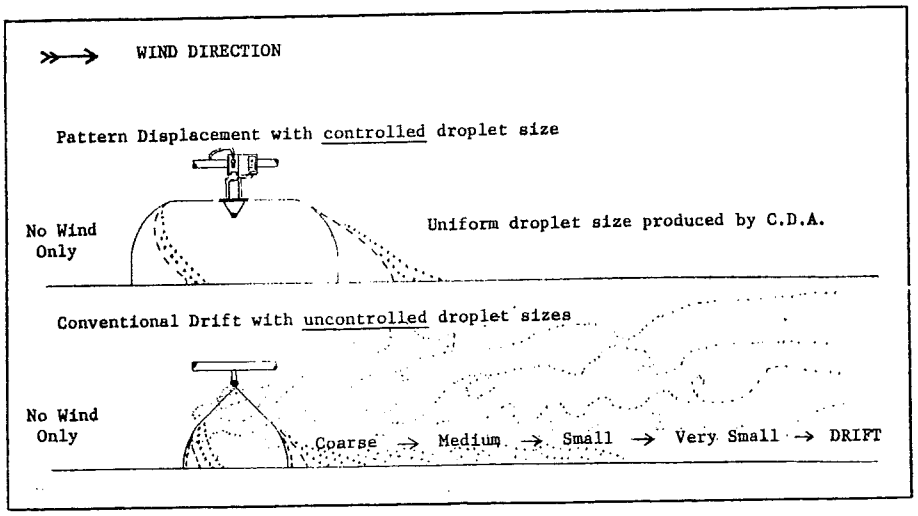
There are four questions that usually arise with regard to CDA:

1. **Question:** What is a micron?
   Answer: A micron is a unit of measurement. 100 microns are equal to .004 of an inch which is approximately the thickness of a human hair. There are 800 microns to 1/32 of an inch or 400 microns to 1/64 of an inch.

2. **Question:** Is adequate coverage possible when applying pesticides at very low spray volumes?
   Answer: Yes. Water acts as a carrier. Its only function is to distribute the pesticide uniformly. Due to the inefficiency of the hydraulic nozzle, large quantities of water are necessary to provide coverage. CDA, on the other hand, will accomplish excellent distribution of the pesticide with a fraction of the spray volume required by hydraulic nozzles.

   According to research, the ideal size for applying pre-plant incorporated herbicides is 250 microns. From a hydraulic nozzle, the maximum number of droplets emitted at this size is about 25% of the total. The **MICROMAX** in comparison, produces a pattern that contains 90-95% droplets of 250 microns when rotating at 2000 rpm. Most pesticides could be applied with less spray volume, provided the droplets are the correct size to reach and cover the target.

3. **Question:** Using low volumes, will drift be a problem?
   Answer: Under high wind conditions, drift is always a problem. However, tests conducted by University of Saskatchewan at Saskatoon, determined that the initial drift from a #8002 nozzle at 30 psi was 10 times greater than the CDA (**MICROMAX**) nozzle. Drift can be caused by much of the spray pattern being made up of small droplets. A spray pattern having a wide range of droplet sizes will drift different distances according to the droplet mass.



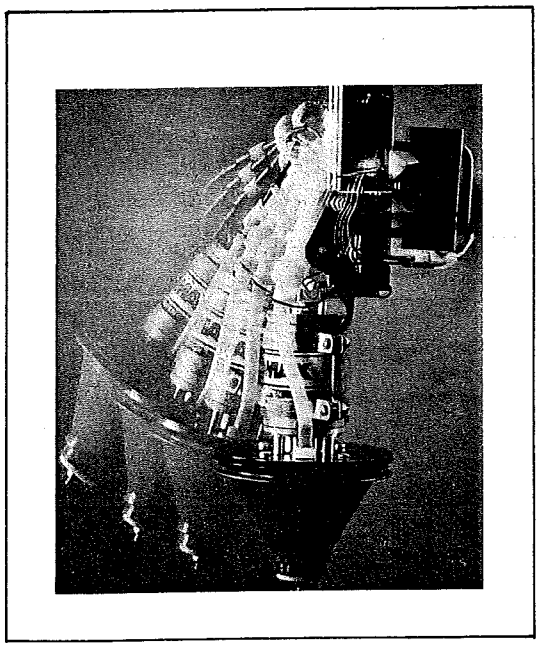
Spraying with CDA under windy conditions can cause spray pattern shift. Droplets from CDA are nearly all the same size and will move equal distances in the pattern, thus producing swath displacement or pattern shift. Pattern shift can be increased or decreased with CDA according to the size droplet required. When using certain chemicals (insecticides) it can be beneficial to decrease droplet size so as to increase lateral movement of the pesticide, providing more coverage inside and under the crop foliage.

4. **Question:** Is it possible to reduce chemical rates?

   Answer: Chemical rates from label recommendations have generally been developed from field tests using hydraulic nozzles. Most rate recommendations have had to compensate for the inefficiencies of the conventional nozzles. As chemical companies do more field research using CDA (**MICROMAX**) nozzles, then the chemical rates will be modified to reflect the improved efficiency. Until label recommendations are changed, it is advisable for the new **MICROMAX** owner to conduct field tests of his own and begin by using the minimum recommended rate as indicated on the chemical label.

Micromax/DR4 Position

The **MICROMAX/DR4** is equipped with a four-position mounting bracket. This feature gives flexibility in the direction of the spray pattern. The position of the unit can be set so that the spray pattern is emitted at different angles. The four positions allow the Micromax nozzle to be operated at horizontal, 15, 30 and 45 degree angles. To change these positions, a bolt under the cradle arm needs to be moved which locates the unit into the different positions.



It is recommended that a horizontal or flat setting be used for applying pre-emergent and pre-plant herbicides. This setting is also used, and strongly recommended, for spraying herbicides in orchards to reduce the possibility of chemical injury to trees.

Angle setting can be beneficial when applying post-emergent herbicides, insecticides, fungicides, defoliants and dessicants. Increasing the angle setting could be desirable as the crop canopy develops, thus enhancing the penetration and coverage of the pesticide.

Additional Feature

The new bracket has a spring loaded break away feature. If the **MICROMAX** nozzle should accidentally make contact with the ground or a stationary object, the break away feature will help in preventing damage to the unit.

Micron Corporation also recommends a boom protection device as discussed in the **MICROMAX** Controlled Droplet Applicator installation instructions.

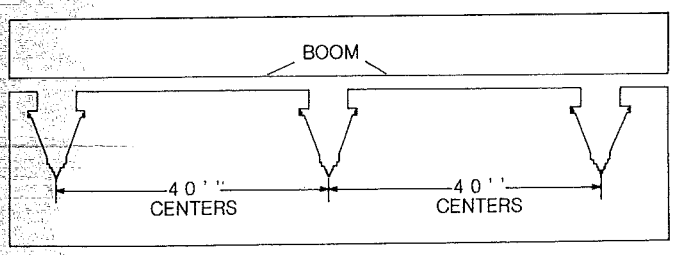
Micromax/DR4 Spacing

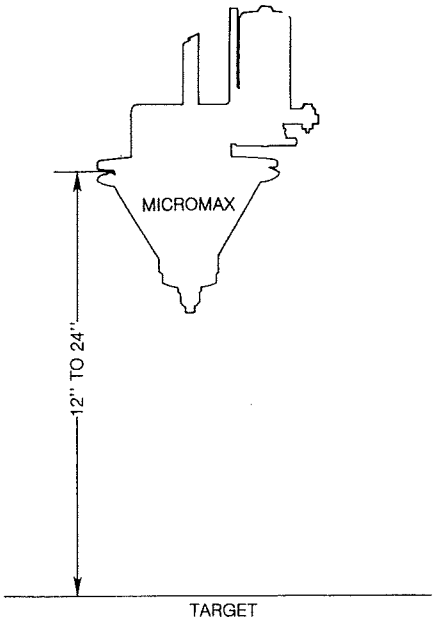
The most ideal spacing between **MICROMAX/DR4** units, for all speeds, is 40 inches. Research has shown that at this spacing, operating at 2000 rpm with a 1 quart flow rate, the **MICROMAX** nozzles have a spray pattern coefficient of variation of 4%; much less than with hydraulic nozzles.

At 1600 and 2000 rpm, wider spacing is possible and is successfully being used. Overlap of pattern can be expected up to 78 inches under ideal spraying conditions. If a spacing over 40 inches is used, then the spray pattern coefficient of variation will increase. It is best to keep the percent variation at a minimum.

When 3500 and 5000 rpm are being used a spacing of 40 inches is recommended. This will provide a consistent spray pattern across the spray boom and will keep the coefficient of variation at its lowest possible point throughout the entire spray pattern no matter what speed the **MICROMAX** units are set in.

Suggested Spacing





Micromax/DR4 Atomizer Speeds

Total spray volume must be sufficient to ensure an adequate coverage of the target area with spray droplets. Adequate coverage with CDA is directly related to droplet size.

Extra Low Speed (1600 rpm)

This speed will deliver a droplet size in the range of 250 to 340 microns, depending on the flow rate used. (Refer to Table 1). The extra low speed is designed to produce larger droplets and should only be used for applying herbicides under adverse spraying conditions. If it is necessary to spray under such conditions, then it might be desirable to produce a larger droplet to minimize swath movement. As droplets increase in size less droplets per square inch of target area are produced. As larger droplets are produced then higher spray volumes should be considered in order to maintain coverage of target area.

Low Speed (2000 rpm)

This speed will deliver a droplet size in the range of 190 to 300 microns, depending on the flow rate used. (Refer to Table 1). This speed is suggested for use with pre-emergent and pre-plant herbicides, foliar fertilizers and soil insecticides. Spray drift from systemic herbicides like 2,4-D, Banvel[R1], Tordon[R2], etc., may cause damage to surrounding crops. Using the **MICROMAX** at the low speed o 2000 rpm will minimize this hazard. Refer to Table 2 to estimate droplets per square inch of target area and also visualize potential coverage.

Medium Speed (3500 rpm)

This speed will deliver a droplet size in the range of 110 to 215 microns, depending on the flow rate used. (See Table 1). This speed is suggested for use with post-emergent herbicides, defoliants and dessicants. Refer to Table 2 to estimate droplets per square inch of target area and also visualize potential coverage.

High Speed (5000 rpm)

This speed will deliver droplets of nearly 80 microns in size at a flow rate of 4 ounces per minute. The high speed is suggested for use with insecticides and fungicides where lateral movement is beneficial to achieve droplet penetration. This will also improve droplet impingement on both horizontal and vertical target areas. Refer to Table 2 to estimate droplets per square inch of target area and visualize potential coverage.

[1]Trademark Velsicol Chemical Co.

[2]Trademark Dow Chemical Co.

Table 1

DROPLET SIZE DEPENDS ON FLOW RATE AND MICROMAX SPEED

Gallons per Acre			Approximate Droplet Size in Microns			
9.0 mph	4.5 mph	Flow Rate	1600 rpm	2000 rpm	3500 rpm	5000 rpm
.26	.52	2 ozs.	-	-	110	75
.52	1.03	4 ozs.	-	190	130	80
1.04	2.06	8 ozs.	250	195	150	100
2.03	4.13	16 ozs.	260	220	175	120
4.13	8.25	32 ozs.	275	250	200	160
6.19	12.38	48 ozs.	310	275	215	-
8.25	16.50	64 ozs.	340	300	-	-

Table 2

NUMBER OF DROPLETS GENERATED BY MICROMAX WILL AFFECT PESTICIDE COVERAGE

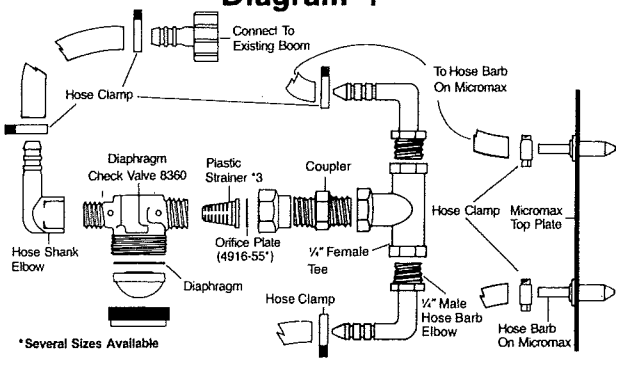
Droplet Size In Microns	Number of droplets per sq. in. when 1 gal. total volume used per acre
70	3300
100	1160
150	340
200	145
250	74
300	42

This Table gives theoretical figures when all droplets generated are equal in size.

Procedure in Determining Flow Rate

The flow rate to each individual **MICROMAX** is constant. This rate is determined by considering the rpm of the **MICROMAX** and the amount of chemical solution applied per acre. (Refer to Gallons per Acre Chart). When operating the **MICROMAX** at 1600 or 2000 rpm speed the flow rate to each unit should not exceed 64 ounces per minute. When units are operating at 3500 rpm the flow rate should not exceed 48 ounces per minute. At 5000 rpm the flow rate should not be more than 32 ounces. The control of the flow rate is accomplished by boom pressure and orifice plates. In order for the check valves to function properly it is best to operate boom pressure in the range of 15 to 20 psi. Higher pressures may be utilized for flow control, however, a larger orifice plate will insure a consistent flow when wettable powders are applied. Orifice plates are inserted into spray line after the diaphragm check valve and strainer, but before the tee fitting that divides the chemical solution into each side of the **MICROMAX**. (See Diagram 1).

Diagram 1



Flow Rate For 1600 RPM Mode

In this mode, the correct flow rate will range between 8 ounces and 64 ounces per minute. Refer to Graph for Determining Flow Rate of Orifice Plates and select orifice plate which will deliver to the **MICROMAX** the desired flow rate. Spraying Systems' #4916-26, #4916-37, #4916-55 and #4916-63 orifice plates are included with each **MICROMAX**; however, other orifice plates may be used to achieve desired flow rate.

Example: The Graph shows if a #4916-63 orifice is selected and operated at 23 psi, the flow rate will be 48 ounces. Figures are based on water as the spray solution and correction can be made by increasing pressure.

Flow Rate For 2000 RPM Mode

In this mode, the correct flow rate will range between 4 ounces and 64 ounces per minute. Refer to Graph for Determining Flow Rate of Orifice Plates and select orifice plate which will deliver to the **MICROMAX** the desired flow rate. Spraying Systems' #4916-20, #4916-26, #4916-37, #4916-55 and #4916-63 orifice plates are included with each **MICROMAX**; however, other orifice plates may be used to achieve desired flow rate.

Example: The Graph shows if a #4916-37 orifice is selected and operated at 21 psi, the flow rate will be .125 GPM. Figures are based on water as the spray solution and correction can be made by increasing pressure.

Flow Rate For 3500 RPM Mode

In this mode, the correct flow rate will range between 2 ounces and 48 ounces per minute. Refer to Graph for Determining Flow Rate of Orifice Plates and select orifice plate which will deliver to the **MICROMAX** the desired flow rate. Spraying Systems' #4916-16, #4916-20, #4916-26, #4916-37, #4916-55 and #4916-63 orifice plates are included with each **MICROMAX**; however, other orifice plates may be used to achieve the desired flow rate.

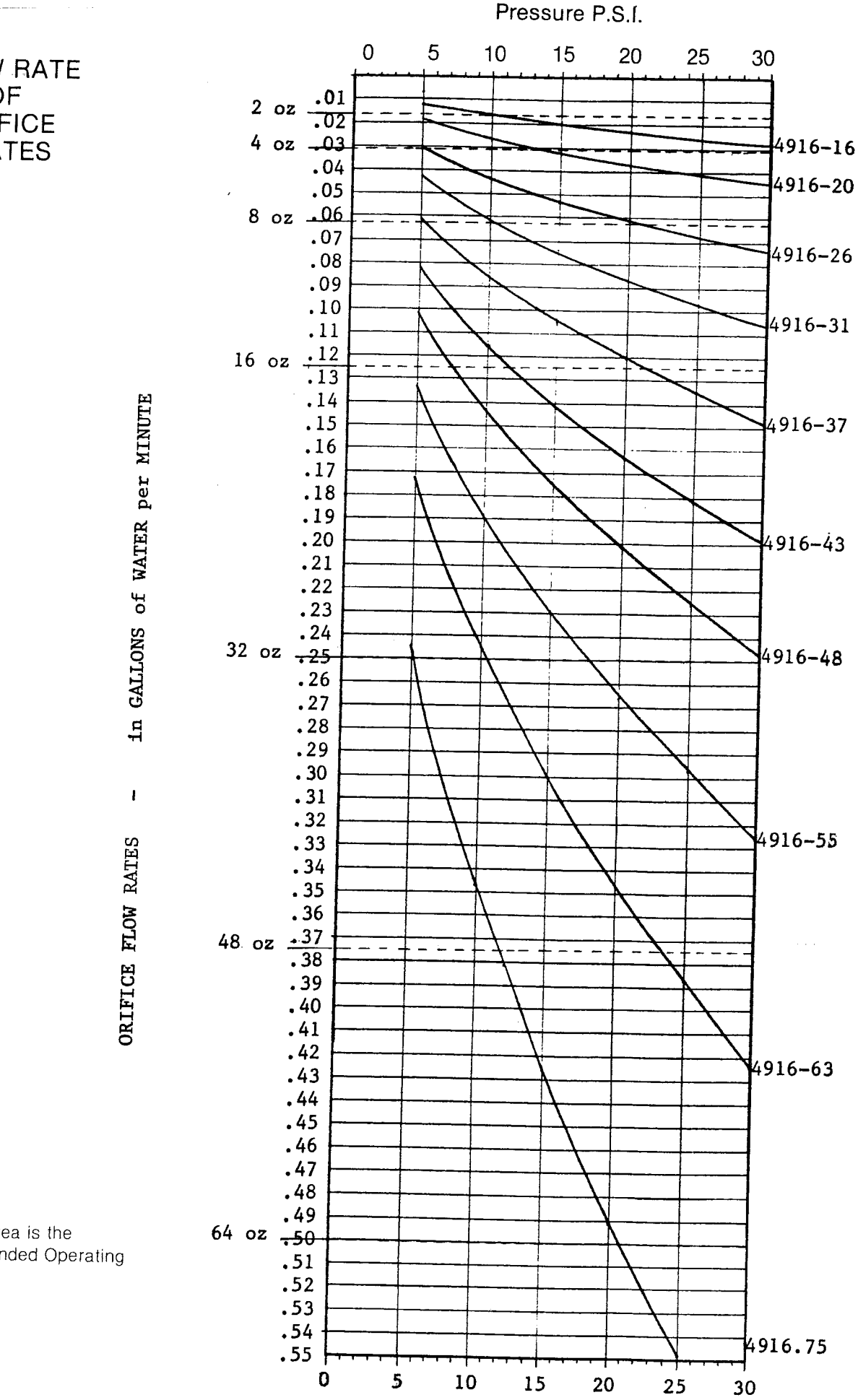
Example: The Graph shows if a #4916-26 orifice is selected and operated at 19 psi, the flow rate will be .061 GPM. Figures are based on water as the spray solution and correction can be made by increasing pressure.

Flow Rate For 5000 RPM Mode

In this mode, the flow rate will generally be between 2 ounces and 4 ounces per minute. Refer to Graph for Determining Flow Rate of Orifice Plates and select orifice plate which will deliver to the **MICROMAX** the desired flow rate. There are pesticides which can be applied in a vegetable oil carrier at the spray volumes of 1 to 3 quarts per acre. Spraying Systems' #4916-16 and #4916-20 orifice plates are included with each **MICROMAX**; however, other orifice plates may be used to achieve desired flow rate. Operating with lower boom pressure will allow the use of larger orifice plates insuring consistent flow of wettable powders.

Example: The Graph shows if a #4916-20 orifice is selected and operated at 15 psi, the flow rate will be .031 GPM. Figures are based on water as the spray solution and correction can be made by increasing pressure.

FLOW RATE OF ORIFICE PLATES



Shaded Area is the Recommended Operating Pressure

Calibration

Step 1: As discussed under the Flow Rate section the amount of chemical solution being fed to each **MICROMAX** nozzle is a constant figure and is achieved by adjusting pressure and orifice size. Flow rate has to be determined before calibration can begin. If this has not been determined, refer to Procedure in Determining Flow Rate. Proceed by inserting desired orifice plate into place with the printing or orifice number toward the **MICROMAX** (See Diagram 1).

Step 2: To calibrate remove hose from barbs on each side of **MICROMAX** top plate. (See Diagram 1). Collect spray solution from both hoses for 60 seconds. It is also possible to insert entire **MICROMAX** nozzle inside a pail, collect and measure spray solution. Adjust pressure, decrease or increase pressure until you are catching desired flow rate for each **MICROMAX** in 60 seconds. Check each **MICROMAX** for proper flow rate.

Note: To calibrate accurately you must determine the following:

1. Ground Speed (mph)
2. Gallons per Acre (GPA)
3. Tank Size

Step 3: Ground speed needs to be determined under actual field conditions and with loaded equipment. A simple method for determining ground speed is as follows:

A. By use of markers (board, can, bottle, wrench, etc.) determine distance travelled in 30 seconds. Usual procedure is to mount vehicle and have driver adjust throttle to a constant spraying speed. After establishing speed, drop marker and 30 seconds later drop another marker.

B. Measure this distance travelled in 30 seconds and use the following formula: $\frac{\text{Distance in feet}}{44} = \text{M.P.H.}$

C. If tractor has an accurate ground speed indicator, A and B can be eliminated.

Step 4: To determine gallons per acre (GPA) refer to Gallons per Acre Chart. To compute the figures already in this chart, or to use spacing not shown, then use the following formula:

$$\text{GPA} = \frac{5940 \times \text{G.P.M. of Nozzle (1)}}{\text{(3) M.P.H.} \times \text{Nozzle Spacing (2)}}$$

Note:
1. G.P.M. will generally be the closest figure to 32 ounces (.25 gpm), 16 ounces (.125 gpm), 8 ounces (.062 gpm) or 4 ounces (.031 gpm).
2. Nozzle spacing will be between 36 inches and 78 inches.
3. M.P.H. was determined in Step 3.

Example: Using #4916-37 orifice at 21 psi flow in G.P.M. is .125. Tractor speed is 5.5 mph.

$$\text{GPA} = \frac{5940 \times .125}{5.5 \times 40} = 3.38$$

Step 5: To determine acres covered per load, divide tank size by gallons per acre being applied.

Example: G.P.A. = 3.38
Tank Size = 200 U.S. gallons

$$\text{Acres per load} = \frac{200}{3.38} = 59.17 \text{ Acres}$$

Step 6: Multiply acres covered per load (Step 5) by the pesticide manufacturers recommended rate per acre.

Example: To apply 1 pint of Treflan per acre following from above example:

Multiply 59.17 x 1 pt. = 59.17 pts.

$$59.17 \text{ pts} = \frac{59.17}{8} = 7.4 \text{ gallons}$$

This is the amount of product to mix into the spray tank.

Step 7: Fill tank according to pesticide manufacturer's recommendations.

You are now ready to start spraying.

Pre-Field Instructions

1. Read all instructions carefully.

2. Turn on **MICROMAX** to check operation and direction of rotation. Make sure the **MICROMAX** is spinning in the direction indicated on the motor; counter-clockwise.

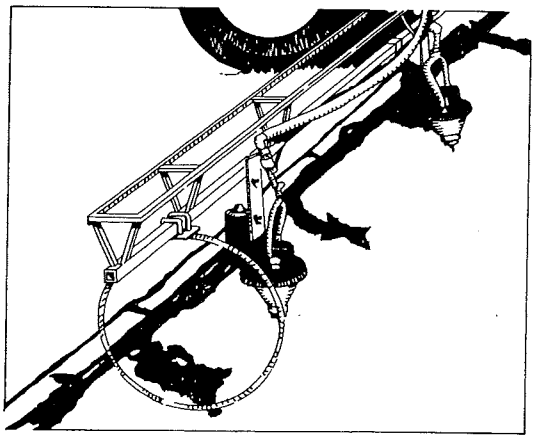
3. Remove hose from **MICROMAX** units and flush complete system. No rust or contaminants within the system can be tolerated. Flush system until nozzle screens are free from all trash. Keeping the system clean is the key to efficient and effective application. Do not use water with sand particles.

4. Orifice plates have to be used in order to meter correct flow rate. Make sure these are in place.

5. Check to see that there are no obstructions to spray pattern.

6. Boom height may need adjustment. **MICROMAX** nozzles produce the most uniform patterns when operated from 12 to 25 inches above target. Swath displacement will be less when spray pattern is kept low. It is important to operate with enough boom height to prevent **MICROMAX** nozzles from dragging or hitting the ground.

7. It is a good idea to provide, at the end of the boom, a device that drops down far enough to protect and prevent the end **MICROMAX** nozzle from dragging or hitting the ground. A narrow Danish Tine extending downward works well. Also, the spray pattern is disrupted very little by this type of guard.



Helpful Hints in Operating Micromax/DR4 Nozzles

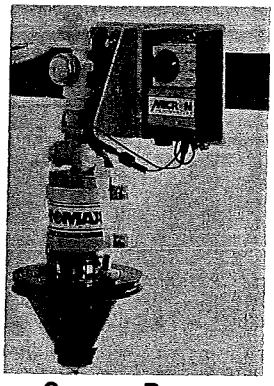
1. Always turn liquid flow off before switching off **MICROMAX**. After the **MICROMAX** nozzles are turned on they should remain on while the sprayer is operating. Control the flow by turning the sprayer valves on and off.
2. It is important not to overfeed the **MICROMAX** nozzle.
3. Operate at low pressures, from 20 psi to 40 psi.
4. Consider wind direction when spraying.
5. When using **MICROMAX** speeds of 3500 rpm or 5000 rpm, wind movement is beneficial. Recommended air velocity is 5 to 10 mph. You can and should apply pesticides on days that are acceptable for conventional application. Wind will impart lateral movement of spray pattern which improves pesticide penetration and coverage of target area where there is dense foliage. Raise boom height above target area to increase lateral movement.
6. When using **MICROMAX** speeds of 3500 rpm or 5000 rpm the droplets produced are 80 to 150 microns in size and tend to diminish in size due to evaporation. Because of the low volume being used, a suitable anti-evaporant such as Propylene Glycol or crop spray oil should be added to the tank mix. Ten percent of the tank mix should be an anti-evaporant not to exceed 1 pint per acre. This will help the droplet maintain its size from the time it leaves the **MICROMAX** until it reaches its target.
7. When using **MICROMAX** speeds of 2000 rpm it is recommended that the boom be located as close to the ground surface as practical but not so low as to affect spray overlap. The droplet issuing points should be a minimum of 12 inches above the target.
8. Centrifugal pumps should be vented to spray tank so that pump becomes self-priming. This prevents any loss of spray solution.
9. Check orifice strainers twice daily and clean as necessary.
10. Check **MICROMAX** flow rate daily, prior to operation. Adjust pressure or replace orifice plate if worn. Orifice plates will change in size with use.
11. After spraying, wash the system and run water through boom and through the entire **MICROMAX** unit to flush chemical spray solution from system. It is suggested that the system be washed daily.
12. Wash and clean before storing. If possible, keep applicator under cover. Also, cover individual **MICROMAX** units with plastic.

INSTALLATION Instructions

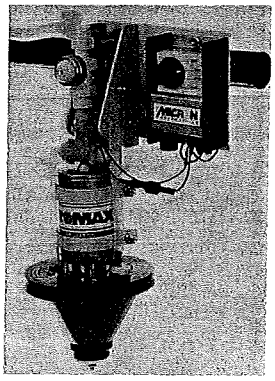
Prepare Boom for Mounting

1. MICROMAX nozzles can be mounted to round, square or angle iron booms. Boom should be rigid in construction. If boom is lightweight it should be stabilized and reinforced. (See Figure 1).

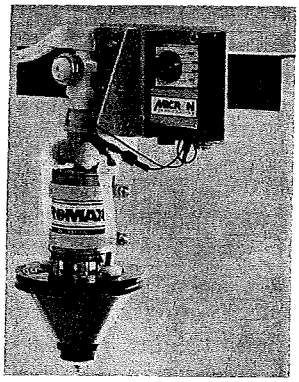
Figure 1 Mounting Micromax



Square Boom



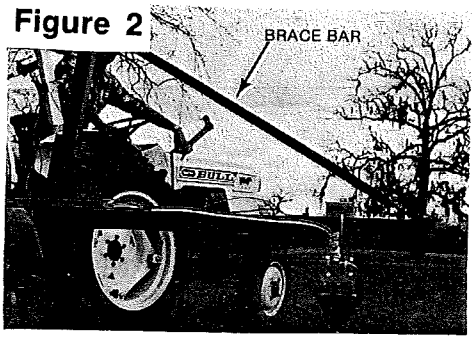
Round Boom



Angle Iron Boom

2. Boom bounce should be kept to a minimum. Brace bars, nylon support ropes or springs can help a great deal in preventing boom bounce. (See Figure 2).

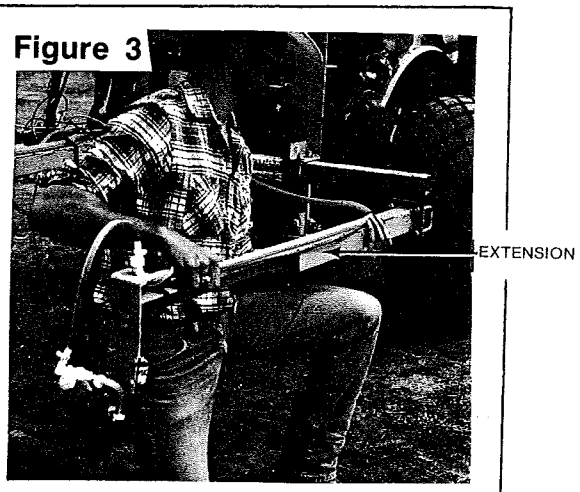
Figure 2



3. Mark the location of each MICROMAX unit along the boom. Location depends on what spacing or centers has been decided on. The total boom width or swath width desired can affect spacing to some degree, but keep in mind that 40 inches is the most ideal spacing. If an odd number of MICROMAX units are used, locate center of sprayer boom and measure out the desired spaces, marking each location on both sides of the boom. If even number of MICROMAX units are used, then locate center of sprayer boom, measure half the desired spacing and proceed out on each side of boom.

4. Extension Arms are very important. If there is any obstruction along the boom (such as tires, etc.) which might disrupt the spray pattern, an Extension Arm needs to be attached to the boom (see Figure 3). This arm can be manufactured out of any $1\frac{1}{2}$ inch or larger angle iron. Channel iron and round or square tubing may also be used. This will give the best support. The Extension Arm needs to be rigid enough to minimize MICROMAX bounce and long enough to prevent any obstruction of the spray pattern. To prevent spray pattern disruption, the MICROMAX needs to be located at least $3\frac{1}{2}$ feet from any obstruction.

Figure 3



Assembly of Micromax/DR4

1. Tools required to assemble **MICROMAX:**

   (a) End wrench 11/32"
   (b) Box wrenches 3/8" and 1/2"
   (c) Medium size Phillips screwdriver
   (d) Deep socket 1/2" on certain booms

2. With motor straps removed from cradle arm, place motor into cradle so that wire leads are near the cradle and towards the left hand side of cradle center. Correct position of motor in cradle is when registering tab and center of top motor boss are in line with cradle center line, and vertical position is correct when cradle tab's bottom edge aligns with lower motor gasket. (See Figure 4).

   Position straps, install No. 10-32 screws, nuts and washers and tighten with 3/8" box wrench and Phillips screwdriver. Recheck motor for correct position and be sure that inlet hose barbs are evenly spaced on each side of cradle straps allowing equal room for hose connection.

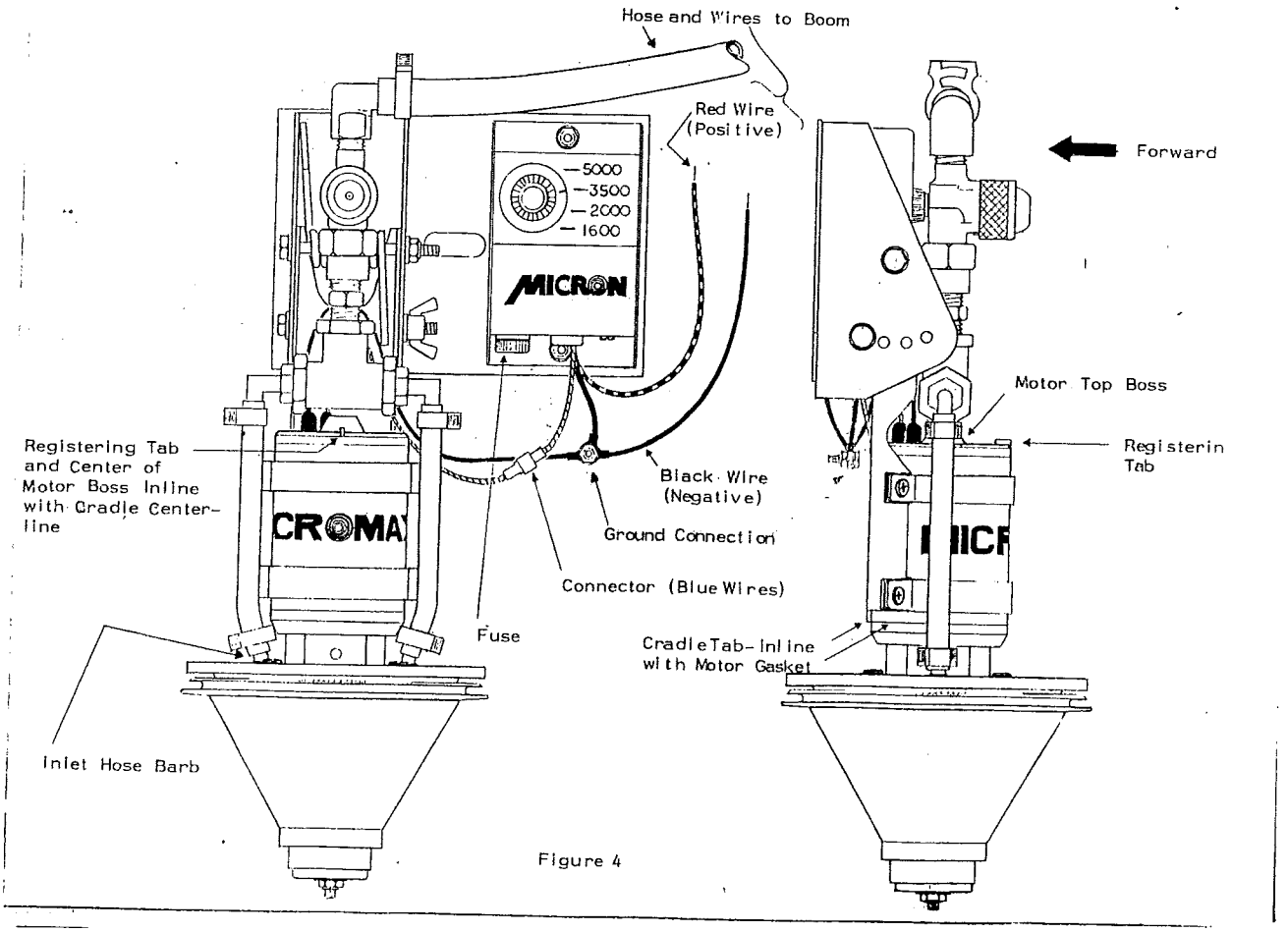


Figure 4

3. Before mounting Speed Control to back plate, check **MICROMAX** boom location to be sure there is clearance for the Speed Control on right side of motor. This is the preferred position. If there is not enough clearance, then the Control will have to mount on the left side. Mount Speed Control to back plate with wire leads out the bottom. Because of the close area around the bottom stud, an 11/32" open end wrench will be needed. This bottom stud is also used as ground terminal. Connect black ground wire from Speed Control to this stud before tightening nut. (See Figure 4). If there is not room for the Speed Control on the right or left side of motor, then the plate can be turned up so that Speed Control is above the motor on its side.

4. The bolt that holds the cradle arm into its horizontal or angle setting has a wing nut with it. Be sure wing nut is on side with Speed Control. If Speed Control is mounted on left side of motor, then this wing nut will have to be changed over so that the Speed Control will not interfere with bolt removal. The **MICROMAX** unit is shipped in a horizontal position and this bolt is moved to outer holes to increase **MICROMAX** angle setting. In order for bolt to enter these holes freely, a 3/16" drill bit may be needed to remove excess paint.

5. Mounting **MICROMAX/DR4** to the boom is accomplished by first holding the Speed Control with back plate against the boom, inserting U-bolt around the boom and through the slotted holes in the back plate. The bracket which is attached to **MICROMAX** (slotted holes) is then placed over the U-bolt flush against Speed Control back plate. The washers and half inch nuts are then tightened down to secure entire unit to boom. A U-bolt insert is provided and used only when unit is being attached to round boom. If insert is used, then angle side is placed against the boom with U-bolt passing through the two holes.

6. The cradle arm is held in the position bracket with a bolt and spring. If, for some reason, this spring should need to be reassembled, the following procedure can be used to obtain tension on the spring. (See Figure 5). Slip small tubing or tool over spring up to bent portion of spring leg. Put small box end wrench over other spring leg and pry down by resting middle part of the wrench over coil. Bring box wrench and tubing together spreading the legs of spring. Place spring into cradle arm so that bolt can be tapped through position bracket into cradle arm and through spring.

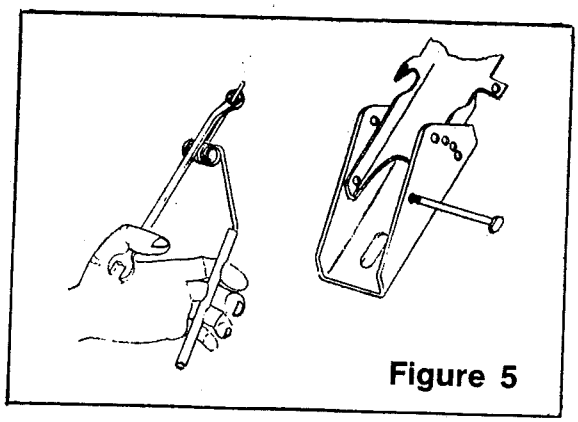


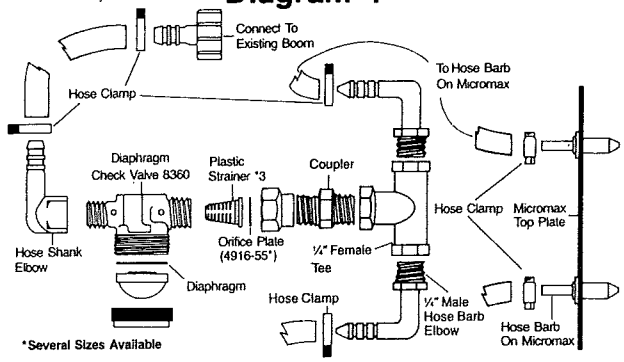
Figure 5

Boom Hose Assembly

1. When retrofitting old sprayers it is mandatory that the plumbing system be thoroughly cleaned and if boom piping is old or rusted it is advisable to replace it with new 3/8" boom hose.

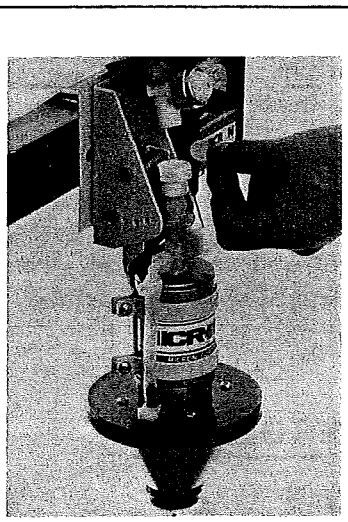
2. If mounting **MICROMAX/DR4** to an existing spray boom, simply block off the unnecessary spray tips or nozzle bodies with blanks. Blanks are provided in Retro Fit Kit, along with check valve and needed hose assembly. Check valve prevents nozzle from filling up and dripping when the flow to boom is shut off at the tractor. (See Diagram 1).

Diagram 1



3. The assembly has a short length of 3/8" hose with barb connection. This connection will allow the assembly to be plumbed directly into the nearest nozzle body on spray boom. (See Figure 6).

4. Attach hose tee with connector to check valve with strainer and desired orifice plate in place. To complete the assembly, connect both 1/4" feeder tubes to hose bard on each side of **MICROMAX**. (See Figure 7).



5. Line strainers are necessary and a boom flush-out provision is also advisable. (See Schematic). Flushing boom and **MICROMAX** system is recommended whenever equipment is going to sit idle for any length of time.

Electrical Wiring

1. Review specification of tractor electrical system and check for alternator capacity. Most tractor alternators will have enough amperage output to handle the additional **MICROMAX** equipment. Amperage requirement for each **MICROMAX** unit will range from 1 to 2.5 amps and up to 3 amps when very high flow rates are used with high atomizer speeds (See Amperage Requirement Chart).

	Amperage Requirement At Four Atomizer Speeds			
Flow Rate	1600 rpm	2000 rpm	3500 rpm	5000 rpm
4 oz.	.65	.75	1.00	1.75
8 oz.	.75	1.00	1.50	2.00
16 oz.	1.00	1.25	1.75	2.50
32 oz.	1.25	1.50	2.00	3.00

2. It is advisable to divide wiring into two circuits left and right boom. Do not put more than 8 Micromax units on a circuit. Heavy duty push-pull switches, rated 65 amps or more, are recommended. (See A Typical Wiring HookUp Diagram). A switch manufactured by Standard Motor Products, Inc., Part #DS-175, or its equal, is suggested). Switches are also available from Micron Corporation.

3. After switches are mounted into control panel they need to be wired into the positive battery terminal and grounded to tractor frame or drive train. This wiring should be 8 gauge or heavier. Wiring from switch to boom needs to be 8 gauge on both the positive and ground wire. At the boom the wire size may be reduced to 12 gauge. Positive and ground wire should run along the entire length of boom.

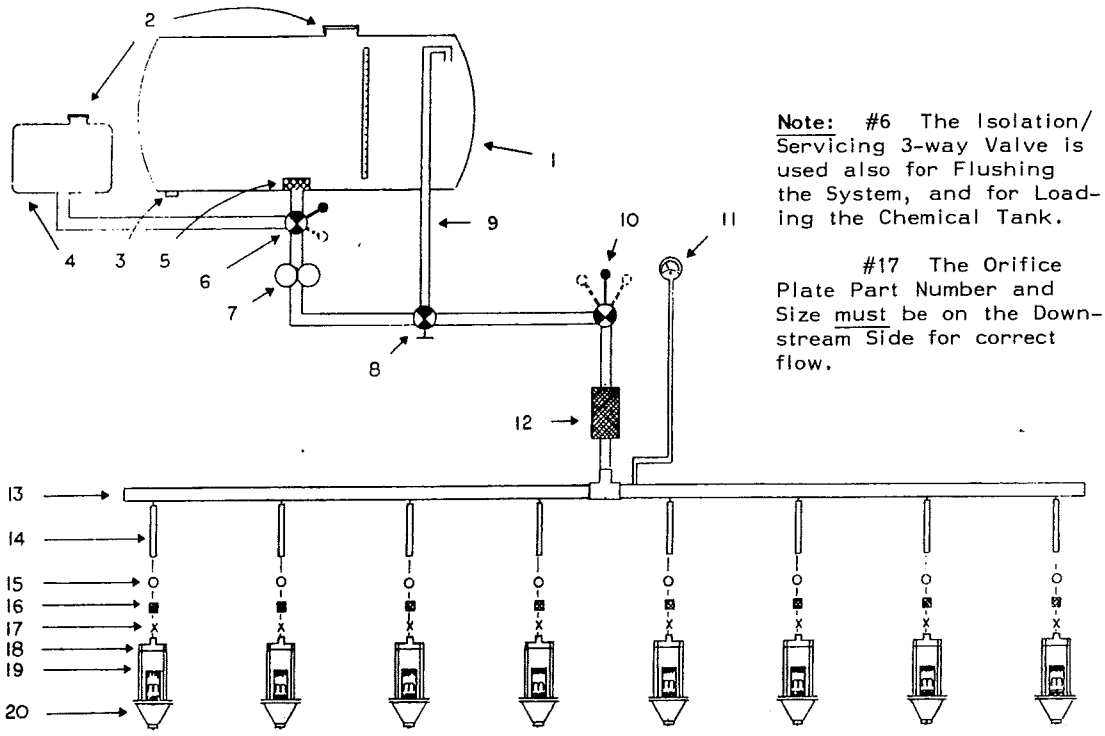
4. Caution: DO NOT GROUND the SPEED CONTROLLER. Attach small black (12 inch length with eyelet) lead in ground wire to the Motor and Speed Controller ground wires with bolt through all three eyelets. The black lead in wire is then spliced into the boom ground wire. Splice red positive lead wire from Speed Controller into positive boom wire. Although mechanical wire splices may be used, it is better to attach each wire directly and solder each splice or joint. Wrap with tape for splice protection.

5. The MICROMAX motor and Motor Control has been protected with a 4 amp slow blow fuse. When replacement is needed, use only slow blow fuses. (Use only Buss #MDL4, Littelfuse #313004 or 3AG4AS-B).

IMPORTANT:

To prevent voltage drop and loss of current, check all electrical connections regularly. Connections should be cleaned of chemical corrosion and tightened to insure good electrical contact.

A TYPICAL SCHEMATIC HOSE HOOKUP

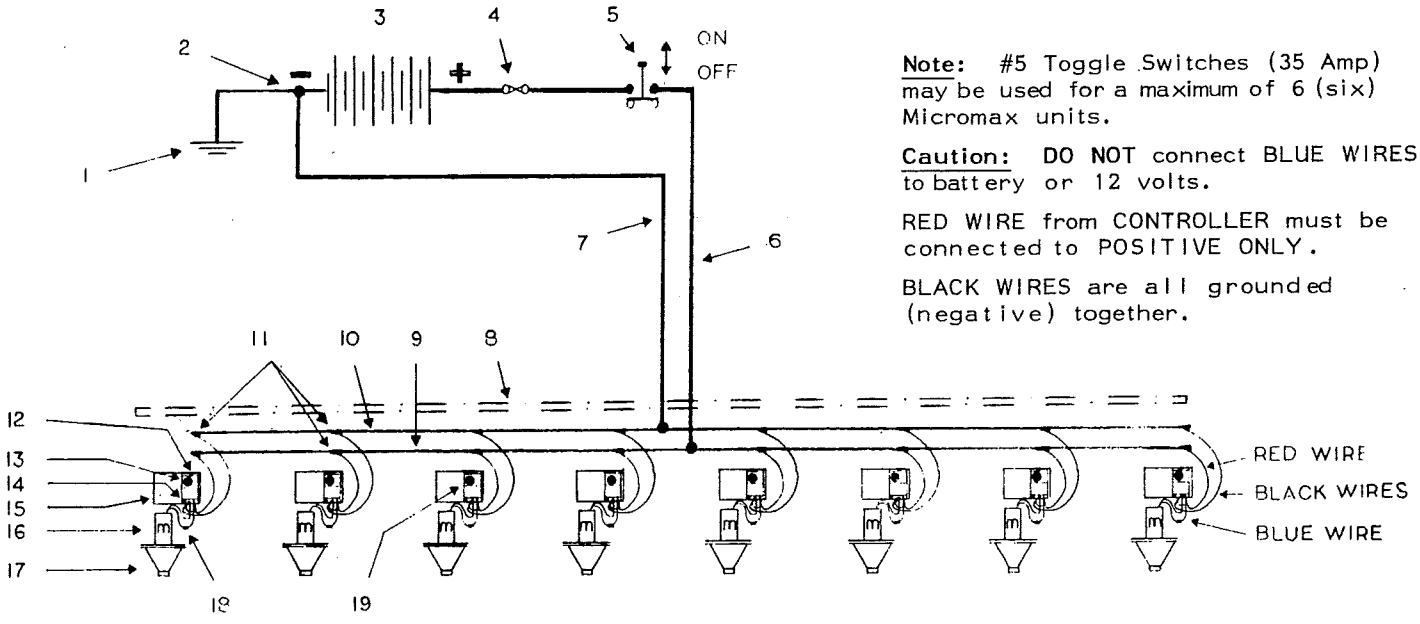


Note: #6 The Isolation/Servicing 3-way Valve is used also for Flushing the System, and for Loading the Chemical Tank.

#17 The Orifice Plate Part Number and Size must be on the Downstream Side for correct flow.

1. Chemical Tank
2. Tank Fillers
3. Tank Sump/Drain
4. Flush Tank
5. Suction Filter
6. Isolation/Servicing Valve
7. Pump
8. Regulating Valve
9. ByPass Return/Agitator
10. On/Off Valve
11. Pressure Gauge
12. Line Strainer
13. Supply Tube mounted on Spray Boom not less than 3/4" I/Dia.
14. Flexible Hose EVA
15. Diaphragm Valve
16. Filter
17. Orifice Plate
18. Tee/Elbow
19. Flexible Hose EVA 3/8" O/Dia. Max.
20. Micromax

A TYPICAL WIRING HOOKUP



Note: #5 Toggle Switches (35 Amp) may be used for a maximum of 6 (six) Micromax units.

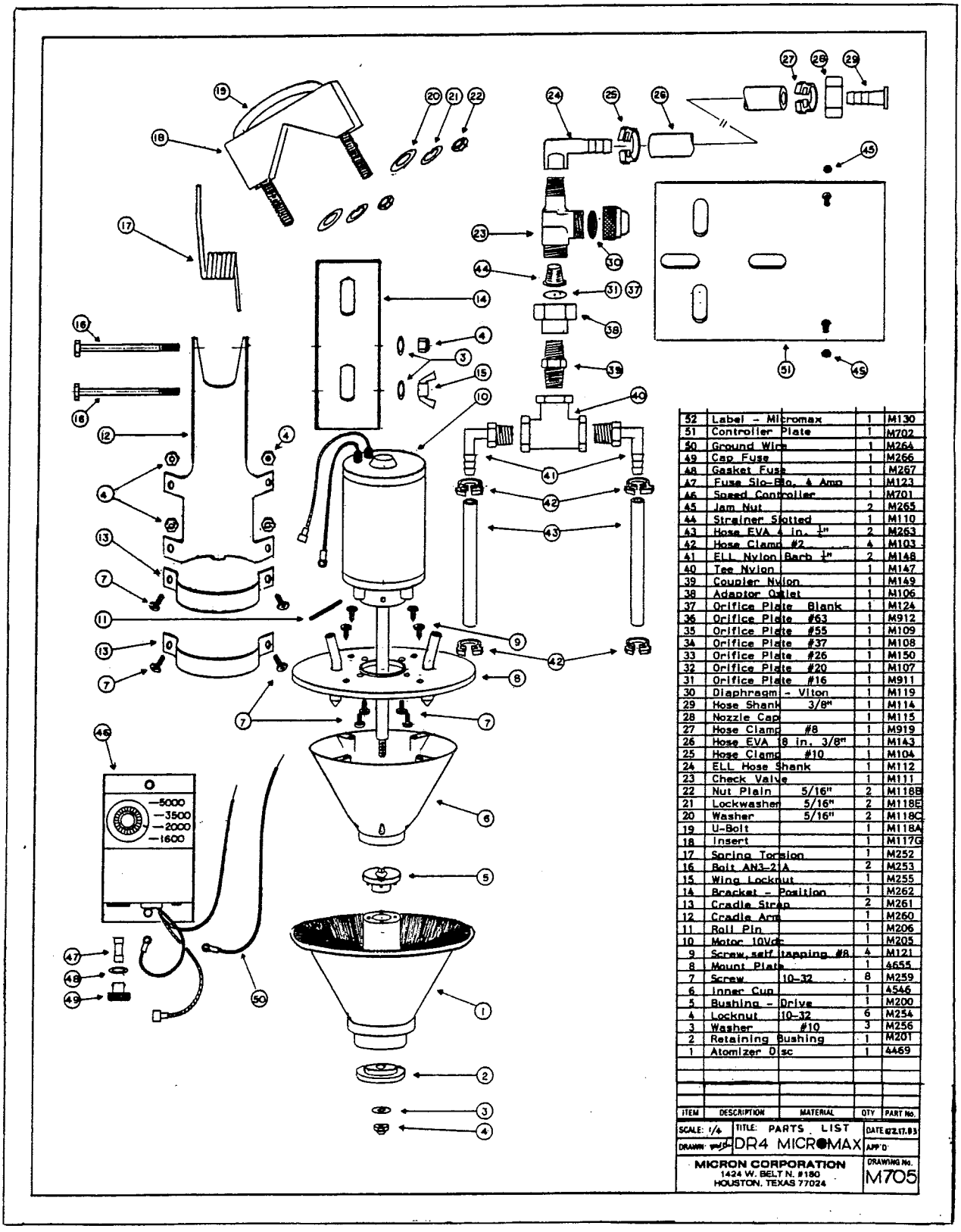
Caution: DO NOT connect BLUE WIRES to battery or 12 volts.

RED WIRE from CONTROLLER must be connected to POSITIVE ONLY.

BLACK WIRES are all grounded (negative) together.

1. Battery Ground
2. Connect Ground Wire to Battery Ground
3. 12Vdc Battery
4. Fuse (optional)
5. Push-Pull Switch(65 Amp)
6. Positive Wire to Boom(8 awg)
7. Ground Wire to Boom (8 awg)
8. Spray Boom
9. Positive Boom Wire(12 awg)
10. Ground Boom Wire (12 awg)
11. Solder All Connections
12. Controller Attachment Screws (Use Lower Screw for Ground)
13. Controller - Constant Speed
14. Fuse (in Controller) 4 Amp Slo-Blo
15. Controller Plate
16. Electric P.M. Motor (10 Vdc)
17. Micromax
18. Connector Plug for Blue Wires
19. Controlled Speed Selector

awg = gauge



ITEM	DESCRIPTION	MATERIAL	QTY	PART No.
52	Label - Micromax		1	M130
51	Controller Plate		1	M702
50	Ground Wire		1	M264
49	Cap Fuse		1	M266
48	Gasket Fuse		1	M267
47	Fuse Slo-Blo, 4 Amp		1	M123
46	Speed Controller		1	M701
45	Jam Nut		2	M265
44	Strainer Slotted		1	M110
43	Hose EVA 4 in. 1/4"		2	M263
42	Hose Clamp #2		4	M103
41	ELL Nylon Barb 1/4"		2	M148
40	Tee Nylon		1	M147
39	Coupler Nylon		1	M149
38	Adaptor Outlet		1	M106
37	Orifice Plate Blank		1	M124
36	Orifice Plate #63		1	M912
35	Orifice Plate #55		1	M109
34	Orifice Plate #37		1	M108
33	Orifice Plate #26		1	M150
32	Orifice Plate #20		1	M107
31	Orifice Plate #16		1	M911
30	Diaphragm - Viton		1	M119
29	Hose Shank 3/8"		1	M114
28	Nozzle Cap		1	M115
27	Hose Clamp #8		1	M919
26	Hose EVA 18 in. 3/8"		1	M143
25	Hose Clamp #10		1	M104
24	ELL Hose Shank		1	M112
23	Check Valve		1	M111
22	Nut Plain 5/16"		2	M118B
21	Lockwasher 5/16"		2	M118E
20	Washer 5/16"		2	M118C
19	U-Bolt		1	M118A
18	Insert		1	M117G
17	Spring Torsion		1	M252
16	Bolt AN3-21A		2	M253
15	Wing Locknut		1	M255
14	Bracket - Position		1	M262
13	Cradle Strap		2	M261
12	Cradle Arm		1	M260
11	Roll Pin		1	M206
10	Motor 10Vdc		1	M205
9	Screw, self tapping #8		4	M121
8	Mount Plate		1	4655
7	Screw 10-32		8	M259
6	Inner Cup		1	4546
5	Bushing - Drive		1	M200
4	Locknut 10-32		6	M254
3	Washer #10		3	M256
2	Retaining Bushing		1	M201
1	Atomizer Disc		1	4469

SCALE: 1/4	TITLE: PARTS LIST	DATE 12.17.93
DRAWN: WJS	DR4 MICROMAX	APP'D:
MICRON CORPORATION 1424 W. BELT N. #180 HOUSTON, TEXAS 77024		DRAWING No. M705

Conditions of Sale

Chemical Application: The exclusive remedy of the user or buyer and the limit of the liability of this company or any other seller for any and all losses, injuries or damages resulting from the use, operation or handling of the rotary atomizer (including claims based in contract, negligence, strict liability, other tort or otherwise) shall be the purchase price paid by the user or buyer for the rotary atomizer. In no event shall this company or any other seller be liable for any incidental or consequential damages. Further understood is that this company or any other seller assumes no responsibility or liability for the effectiveness and the safety of the chemical applied through the **MICROMAX/DR4**. The buyer and all users are deemed to have accepted the terms of this limit of liability which may not be varied by any verbal or written agreement.

One Year Limited Warranty

For one year from date of purchase, Micron Corporation will replace any **MICROMAX/DR4** unit or part found to be defective in workmanship for the purchaser(s). There is no warranty when the **MICROMAX/DR4** has been misused and improperly cared for. During one year units or parts qualifying for replacement under the warranty should be returned for adjustment. Any claim for adjustment must be verified with sales slip establishing date of purchase and location of purchase.

Units or parts qualifying for adjustment during this period should be sent to Micron Corporation, 1424 West Belt Drive North, Suite 180, Houston, Texas 77043.
Telephone: (713) 932-1405

We make no other express warranty, nor is anyone authorized to make any on our behalf. Implied warranties, including those of merchantibility and fitness for a particular purpose, are limited to one year from purchase and to the extent permitted by law any and all implied warranties are excluded. This is the exclusive remedy and liability for consequential damages under any and all warranties are exclused to the extent exclusion is permitted by law.