

—DRAMM— **CHEMDOSE™**



Owners Manual

CD-120

Table of Contents

Warranty	4
Warning	5
How Does My Chemdose Work?	6
Pre Operation Checklist	7
Application	7
Chemical Mixing	8
Operation	9
Charging	10
MS-20E Sprayer Cart Bottom Draw Instructions	11
MS-20E Sprayer Cart & Tank Assembly Diagram & Parts List	12
Chemdose Assembly Diagram & Parts List	13
Chemdose Pump Assembly Diagram & Parts List	14
Troubleshooting	15
Notes	16

— **DRAMM** — **CHEMDOSE**™

<p>Model: CD100 CD120 12 volt 7 AMP</p> <hr/> <p>Serial Number</p>
--

Test Run & Final Inspection
<p>_____ Date Passed Final Systems Test. By: _____</p> <p><input type="checkbox"/> Wands Included</p> <p><input type="checkbox"/> CD120 Bracket Included</p>
Shipped To:
<p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p>

Limited Warranty

Dramm Corporation warrants to the extent of the purchase price, that the Chemdose will be free from defects in materials and workmanship to the original purchaser for a period of six months. Parts subject to wear are not covered under this limited warranty. Defects or damages due to the misuse, non-observance of safety standards, or non-observance of EPA chemical guidelines are not covered under this limited warranty. Please read and follow the instructions and heed warnings stated in the operating manual and on the Chemdose.

Dramm Corporation makes no other further warranty, expressed or implied, and all other or further warranties, including any warranties of merchantability or fitness for a particular purpose are expressly excluded.

In no event shall Dramm Corporation be liable for loss of product, profit or any other special, incidental or consequential damages including, but not limited to, plant damage, property or persons.

This warranty begins on the date of original purchase. If warranty service is required, the equipment must be sent prepaid to:

Chemdose Service
Dramm Corporation
2000 North 18th Street
Manitowoc, WI 54220

Dramm Corporation makes no warranty, expressed or implied, in regard to the efficacy of any pesticide or other chemical which may be applied using the Chemdose.

WARNING

The Dramm CD100 Chemdose applies toxic chemicals. Extreme caution must be used! Read all warnings. Serious injury or death can occur from misuse.

-
- Do not operate machine without reading all warnings and instructions.
 - Owners or Managers: It is your responsibility to inform and instruct any employee who uses this machine in regards to safety and operational procedures.
 - Follow all E.P.A. guidelines and chemical label information when applying chemicals.
 - Use the required personal protection gear when applying chemicals. Consult chemical label or chemical manufacturer when in doubt.
- WHEN SPRAYING:**
- Caution: Use this machine only for chemical application.
 - Be sure to connect correct voltage to receptacle.
 - When applying hazardous chemicals care and logic must be adhered to.
 - Do not charge the unit if it is warm to the touch after use. Allow unit to cool before charging.
 - NEVER use this machine to pump Flammable liquids.
 - Never use any charger but the one provided to charge the battery, damage to the unit or personal injury may result.
 - NEVER operate this machine in an explosive environment. Switch or motor brush arcing may cause an explosion.
 - Exercise normally accepted safety procedures when using electricity.
 - Do not use this machine without proper ventilation.
 - After use - Double rinse pesticide / chemical tank. Clean nozzle and suction line thoroughly. Store unit in a safe location away from children and unauthorized personnel.
 - Mix only the amount of chemical solution which will be used. NEVER - Keep, store or hold over unused chemical solution.
 - Follow all E.P.A. guidelines for re-entry.

How Does My Chemdose Work?

The Dramm Chemdose is a machine designed for precision application of chemical solutions directly to a pot or root zone. This results in less wasteful application of expensive chemicals with little or no overdosing. The Chemdose applies user defined amounts of solution between 10 ml and 90 ml per shot. Complete variability within this range is possible. These shots may be applied individually or may be released at timed intervals. This is useful for dosing to many plants in a small area and prevents undue strain on the user's thumb.

For complete portability the Chemdose is battery operated. The battery is a 12 volt 7 amp hour battery. This battery may be recharged with the included battery maintainer in approximately 6 hours. On a full charge, this battery will allow for approximately 16,000 cycles or shots to be applied before recharging is necessary. **IMPORTANT:** Keep track of how many shots are used on a charge as there will be no warning when the machine needs charging. The Chemdose will continue to run after 16,000 cycles but the volume of the output will decrease, changing the precision of each dose. A cycle counter is located on the control face of the Chemdose to help with counting.

The Chemdose cart and tank are designed to fit down standard greenhouse aisles easily. The Chemdose comes standard with 25 feet of co-extruded polyurethane hose. This hose is chemical resistant but not puncture resistant. Be careful of all sharp edges and corners when using the Chemdose.



The Chemdose gun has two buttons, green and red. The green button will fire one shot each time it is depressed. The red button will activate the interval dosing mechanism. Once depressed, the Chemdose will continue to dose the pre-chosen amount at the specified interval until the button is depressed again. The Chemdose includes an assortment of three stainless steel dosing wands designed for different uses: a 16", a 30" and a 36" hanging basket wand. The 16" wand is bent slightly at the end and is designed for treatment of plants on benches. The 30" wand is straight and designed for treatment of plants grown on the floor or ground. The 36" wand has a 90° bend. This wand is perfect for treating hanging baskets. The Chemdose features a wand rack designed to carry the two unused wands while the Chemdose is in operation and all three wands while the Chemdose is not in use.

Pre Operation Checklist

TREATMENT AREA:

- A. Make sure that the treatment area is vacant. No humans or pets should be present.
- B. Post all hazard signs before application.
- C. Follow all E.P.A. and W.P.S. guidelines. Follow all chemical label directions.

CHEMDOSE:

- A. Fit the Chemdose with the proper wand for your application situation. Make sure that the wand does not leak from any of the fittings.
- B. Dial the dosing knob to the correct output setting. Dial the interval to the desired length of time between shots. Make this time long enough to prevent rushing and inaccurate application.
- C. Reset the cycle counter. Make sure to keep track of the number of shots used on a full charge to ensure proper dosing.
- D. Test the Chemdose with clear water. Use each button separately to ensure proper operation of both. Make sure that nothing is blocking the output. Proper flow should be an even, aerated flow.
- E. Uncoil the hose and make sure that there are no kinks in the hose.
- F. Mix chemical solution according to label guidelines. (see "Application and Chemical Mixing" section below)

Application

1. **WARNING:** Follow all EPA Guidelines on the handling, application, and re-entry periods for chemicals. Only crops listed on the label should be treated.
2. Pre Water plants to be treated. Most applications of drench products work best when the plant has been pre-watered. Ensure that the media is thoroughly saturated. Some chemicals can be applied to dry soil. Always defer to the chemical manufacturer recommendations for application.
3. Determine how you will treat the area and whether or not you will be spot treating individual plants or treating all the plants in an area. Choose the correct button for the method you prefer.

Chemical Mixing

The Chemdose is designed to apply precise doses of chemical solution to the pot or root zone of plants. Because this is a precision application it is important to know how much chemical solution is needed per pot. This will help determine the amount of chemical needed in the Chemdose.

1. Determine the amount of chemical solution needed per pot. This may be obtained from the chemical label or from the chemical manufacturer.
2. Determine the number of pots to be treated.
3. Mix the chemical solution according to the label. Most chemical labels will state the rate in amount to be diluted into 100 gallons of water. Mix at the proper ratio for 20 gallons of water.

amount of product per 100 gallons	amount to mix in 20 gallons	amount of product per 100 gallons	amount to mix in 12 gallons
1	0.2	13	2.6
2	0.4	14	2.8
3	0.6	15	3.0
4	0.8	16	3.2
5	1.0	17	3.4
6	1.2	18	3.6
7	1.4	19	3.8
8	1.6	20	4.0
9	1.8	21	4.2
10	2.0	22	4.4
11	2.2	23	4.6
12	2.4	24	4.8

The Chemdose comes standard with a 20 gallon tank. This volume equals 2,560 fluid ounces. This is important in determining the amount of total solution available in the Chemdose and the total number of pots that one tank will treat.

Ounces Needed/Pot	Number of Pots Treated with 20 Gallon Tank
0.5	5120
1	2560
1.5	1707
2	1280
2.5	1023
3	853

WARNING: The Chemdose does not provide agitation for chemical solutions. Only chemicals that will freely dissolve in water should be used. Do not use chemicals that will separate from solution readily, as they will clog the Chemdose and provide uneven application of chemicals.

Operation

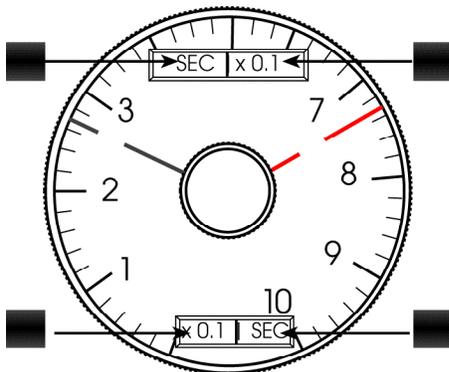
OPERATION:

1. Switch the three position switch from "off" to "on".
2. Determine the amount of solution desired per shot and set the inner timer dial to the corresponding time setting. Use the chart below (figure 1) or on the machine to determine this setting.
3. Set the outer dial to the desired interval time. The scale on this timer may be changed for longer or shorter times by using a paper clip as shown below (figure 2). This timer is factory preset to seconds.
4. Press the green button for one shot. Press the red button to begin interval dosing. Press the red button a second time to stop interval dosing.
5. Keep track of the number of shots per full charge. After 16,000 shots, the volume will decrease from the pump even though the machine will appear to dose correctly.
6. After application, thoroughly clean machine by triple rinsing the tank and flushing the hose with clean, hot water. Make sure that clean water flows through the entire length of the hose.

FIGURE 1

Time in Seconds	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Volume in ML	14	23	32	42	50	59	67	76	82	91
Volume in OZ	0.47	0.78	1.08	1.42	1.69	2.00	2.27	2.57	2.77	3.08

FIGURE 2



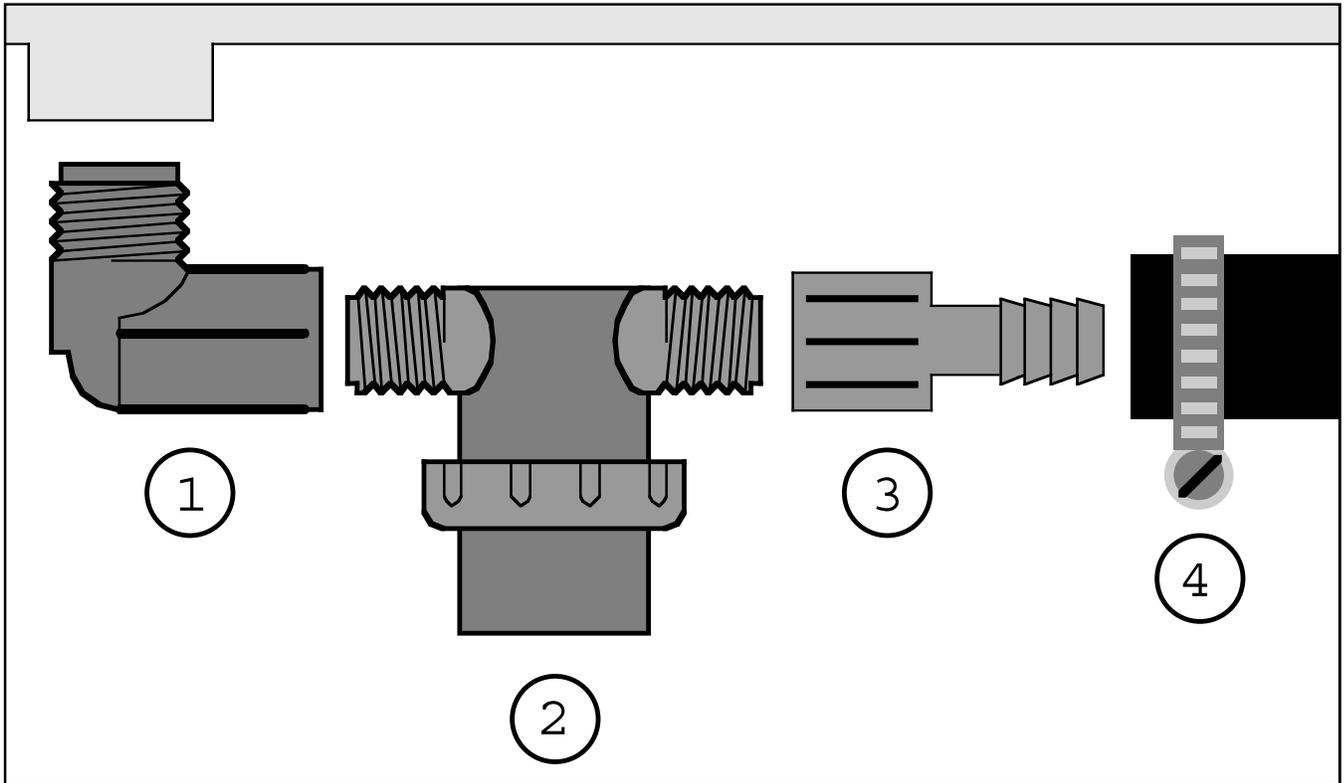
- Using a paper clip or another similar object you can change the scale for the Chemdose spray cycle and delay. Each square around the dial corresponds to the nearest display.
- You can change the Seconds (SEC) to Minutes (MIN) or Hours (HRS).
- You can also change the multiplier of x0.1 to x1.

Charging

CHARGING:

1. Plug the charger into a 120 volt 60 Hz (standard voltage, other voltage chargers are available from Dramm).
2. Plug the charger into the charger receptacle on the Chemdose.
3. Switch the three position switch to charge. The "Fast Charge" light should come on, indicating charge. If the "Fault" light comes on, see trouble shooting on page 16.
4. Allow to charge at least 6 hours. There is no need to monitor the charger, because it is a battery maintainer, it will not overcharge the battery.
5. Battery is fully charged when the "Float" light is on.

Ms-120E Sprayer Cart Bottom Draw Instructions



Included in your MS-20E Dramm Electric Sprayer Cart there are several parts which enable you to set up the cart for siphon from the bottom low point of the tank. These parts are for use in conjunction with the Dramm Chemdose.

1. Remove the plug from the tapped hole on the bottom of the tank.

2. Place some of the Teflon® pipe sealant onto both male ends of the filter and the male end of the street elbow.

3. Screw the filter, street elbow and hose barb fitting together. Then screw the assembly into the tank.

4. With the tank in the cart with the outlet to the rear and the Chemdose in place, measure the red suction hose from the sprayer to the hose barb fitting.

5. Cut the suction strainer end of the hose off to the length in step #4

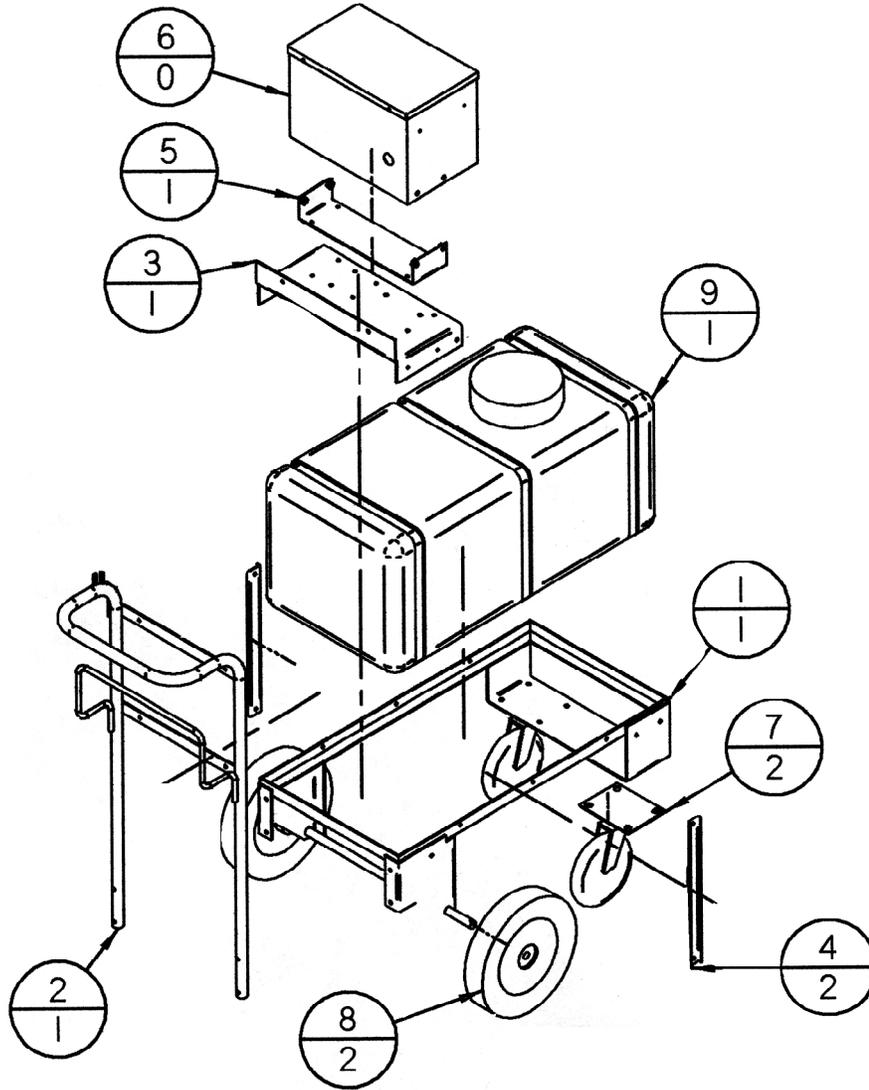
6. Push the suction hose on the barb fitting and secure with the hose clamp.

7. Remove the vent assembly from the tank cap with a screwdriver and place the cap back onto the tank.

8. Place the return line through the hole in the cap.

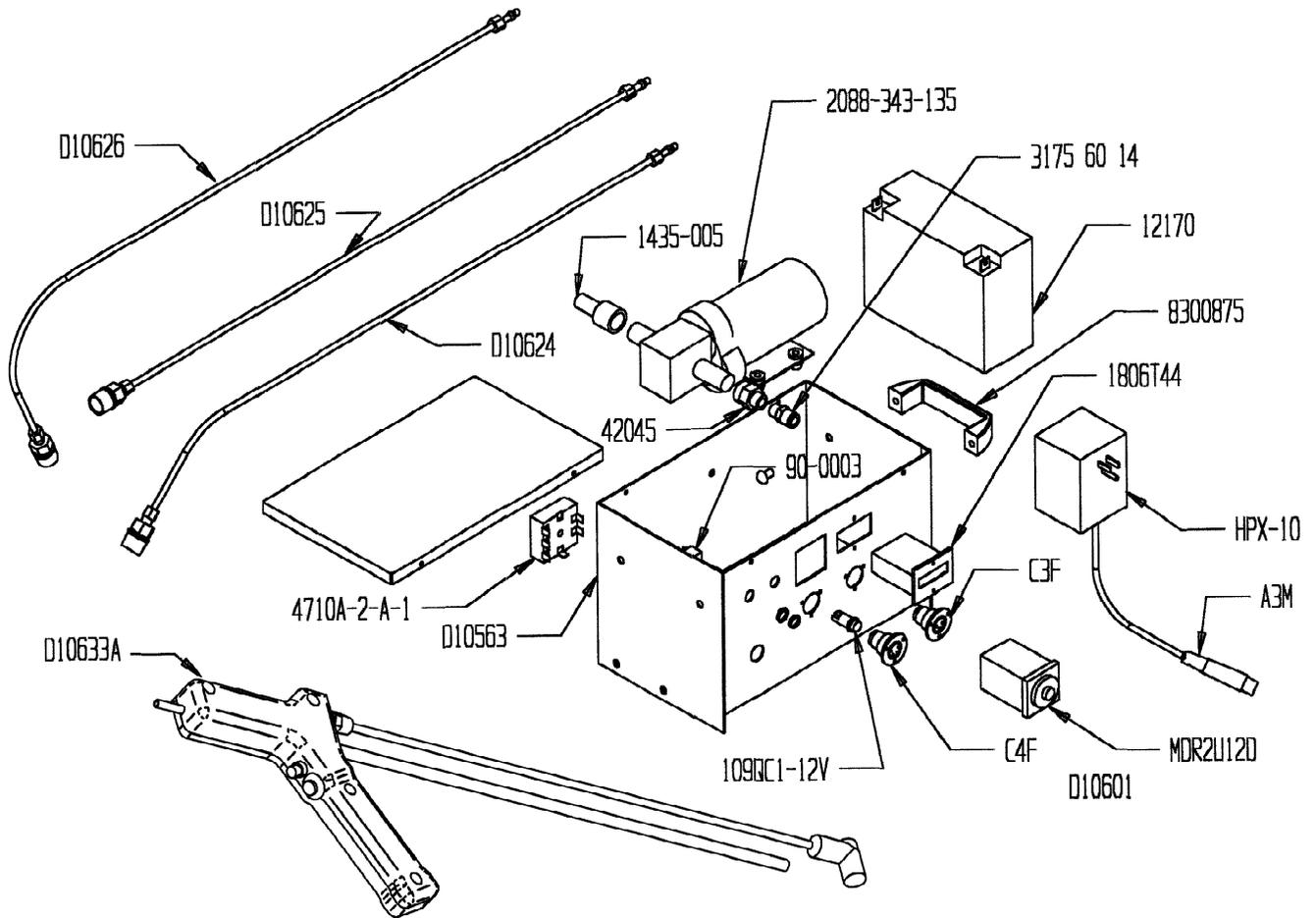
PARTS LIST	
Item Description	Part #
1. Street Elbow	M412-005
2. In-Line Filter	14297
3. Hose Barb Fitting	75190
4. Hose Clamp	6204
Teflon® Pipe Sealant	59214

MS-20E Sprayer Cart & Tank Assembly Diagram



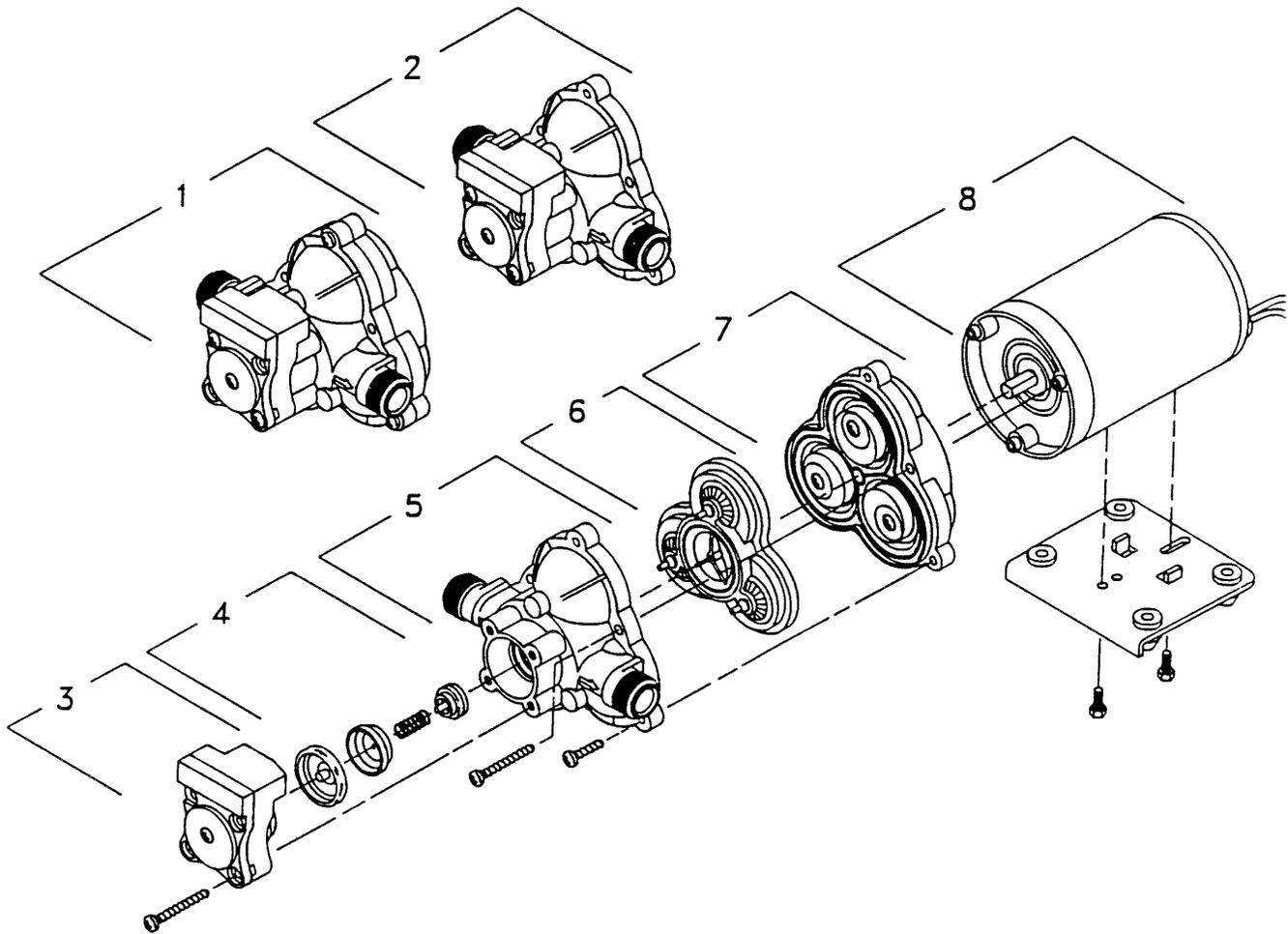
Item #	Document #	Description	Quantity
1	DII093A	MSO 20 Cart	1
2	DII096	Handle Assembly	1
3	DIII20A	MSO Pump Bracket	1
4	DIII21	Side Leg	2
5	DIII59	Chemdose Bracket	1
6	DI0563	Chemdose Box	1
7	1899041	6" Caster	2
8	SNI0275-OP 5/8	10 X 2 Wheel	2
9	SP0020-LC	20 Gallon Tank	1

Chemdose Parts Exploded View



Item #	Description	Item #	Description
109QC1-12V	Pilot Light	D10624	Bench Wand
1435-005	1/2 NPT X 1/2" Barb	D10625	Floor Wand
1806T44	Counter Panel Mount DC	D10626	Hanging Basket Wand
2088-343-135	Pump	D10633A	Grip and Hose
3175 60 14	fitting 1/4 mntp to 3/8 o.d.	HPX-10	Battery Charger
4710A-2-A-1	One Shot Timer	MDR2U120	Timer
90-0003	Switch	12170	Battery 12 volt 17AH
A3M	Plug 3 pin male	42045	1/2 x 1/4 fpt pipe coupling
C3F	Receptacle 3 pin female	8300875	"U" Handle
C4F	Receptacle 4 pin female		
D10563	Steel Box		

2088 Series Pump Exploded View



PUMP PARTS LIST

REFERENCE #	PART NUMBER	DESCRIPTION
1	94-236-11	Complete Pump Head
2	94-231-05	Upper Housing / Switch assembly
3	94-230-05	Switch kit
4	94-237-05	Check Valve Kit
5	94-231-30	Upper Housing Kit
6	94-232-05	Valve Kit
7	94-238-03	Diaphragm / Drive Kit
8	11-111-00	Motor

Chemdose Troubleshooting

PROBLEM	CAUSE	REMEDY
Unit will not run	Battery not charged	Fully charge battery
	Blown fuse	Check for cause and repair, then replace fuse
	Switch or timer settings incorrect	Review manual operating procedures
Pump will not prime	In line strainer clogged	Remove strainer bowl and clean filter
	Leak in suction side of pump	Check all connections and repair any leaks
	Inlet tubing restricted or kinked	
	Debris in pump valves	Disassemble pump and clean out debris
	Damaged pump valves	Disassemble pump and replace valves
Incorrect volume	Check battery charge level	Recharge battery
	Clogged nozzle	Disassemble, clean and re-install
	Confirm the correct timer setting	Check chart on unit and step time
Charger "Fault" signal	Improper voltage	Use voltage adapter
	Damaged Battery Charger	Get a replacement charger from Dramm

