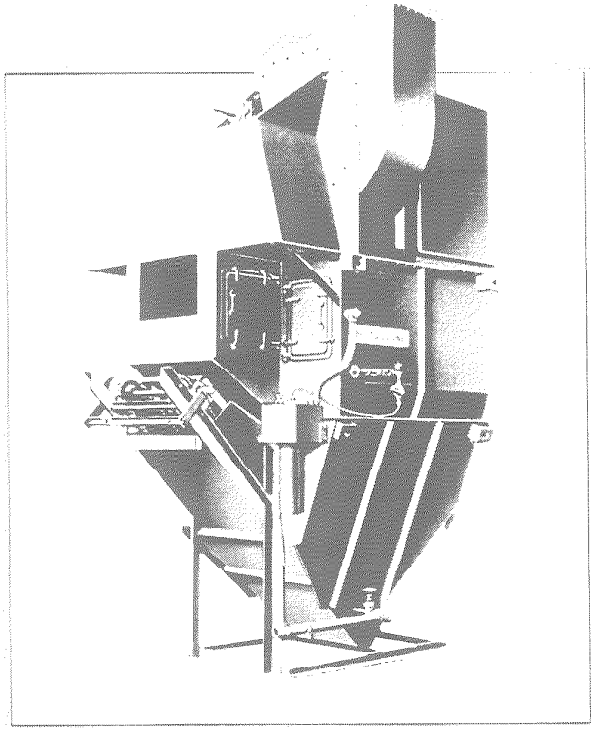

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RotoClone Type "N"

Installation, Operating and Maintenance Instructions

Hydro-static Precipitator
Model B
Arrangement "C"

Design 2 or 3, Size 1½ thru 6
Design 4 or 5, Size 8 thru 28

RotoClone Size No. _____ Serial No. _____

1. Design (2) (3) (4) (5)
2. With water level control (Model "SV") (Model "SV" with Low Water Safety Control) (Model A)
3. (With) (Without) automatic sludge ejector controls
4. Wiring diagram No. _____
5. Operating Line (1) (2) (3) (4) (5)

American AirFilter

RotoClone Type N

Arrangement C.

The Type N RotoClone is a complete dust control unit. Designed to perform its various functions automatically, the RotoClone requires very little maintenance. Like any other mechanical equipment, however, it should have regular attention and be operated according to instructions to insure long life and trouble-free service.

Design 2 and 4 have the exhauster on the clean air side of the Type N RotoClone. In the Design 3 and 5, the exhauster is on the dirty air side and discharges into the Type N RotoClone.

See cover page for Design Number, sludge ejector control device, operating line, type of water level control and wiring diagram that apply to this Type N RotoClone.

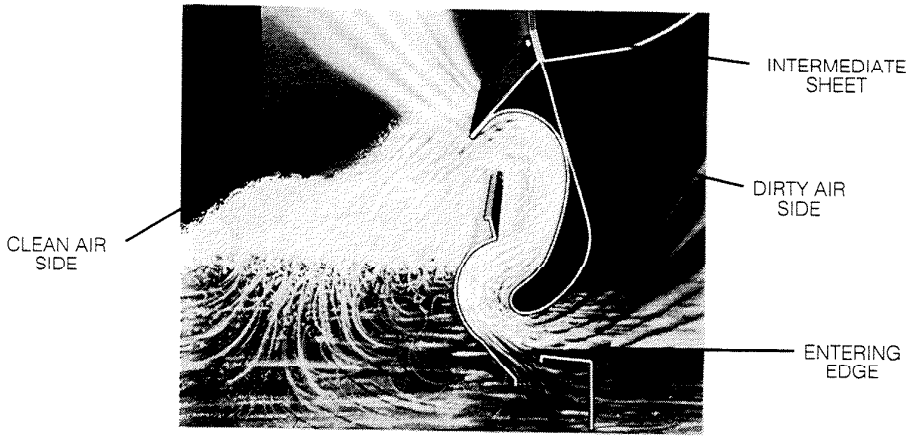


FIG. 1. Cross section of Type N RotoClone Impeller.

OPERATING PRINCIPLE

The Type N RotoClone cleans the air by the combined action of centrifugal force and a thorough intermixing of water and dust-laden air. The dust is separated from the air by means of a water curtain, created by the flow of air through a partially submerged stationary impeller (see Figure 1). Air flowing through the impeller at a high velocity conveys water with it in a very turbulent sheet. Additional water is introduced at the narrowest portion of the impeller opening through a specially designed slot in the bottom. Since there is a certain pressure drop through the impeller, the water flows upward through the slot in an attempt to reach the water level on the clean air side. This water flow upward through the slot creates increased interaction between the dust and water, thus, increased collection efficiency. Since the water flows upward in an attempt to reach the level on the clean air side of the impeller, the impeller opening can be decreased (resulting in higher pressure drop and collection efficiency) by raising the water level in the unit. This is accomplished by means of an exclusive and patented variable water level control box. The centrifugal force exerted by rapid changes in direction of flow causes the dust particles to penetrate the water film and become permanently trapped (Figure 1).

Any entrained moisture in the cleaned air is removed by specially designed, wide-space chevron eliminators made in removable sections for Sizes 1½ through 6 and curved entrainment baffles for Sizes 8 and larger.

The water in the reservoir is continually reused, and since the water curtain is produced by the air flow, no pumps or nozzles are required. The water level is maintained by the overflow weir in the control box as long as a small amount of fresh water is supplied through the make-up water connection or by electrical controls that automatically add water, as required, to compensate for evaporation and water lost as the collected dust is removed from the unit.

Sludge Ejector

The sludge hopper is designed with steep sides to prevent material buildup on the hopper walls. The ejector is constructed for heavy duty service and long life. The chains and sprockets are constructed of wear resistant alloys and the chain speed is slow enough to permit sufficient dewatering of sludge.

There are two types of ejector designs. Sizes 1½ thru 12 have the "W" ejector system. Sizes 16 thru 48 use the "L" ejector system. Figure 8 and 9 show the designs and designate the appropriate replacement parts by part number.

The sludge ejector is operated continuously for most applications. It is driven by a flange-mounted, fractional horsepower motor.

An optional accessory that can be obtained is an automatic sludge ejector timer control. This timer allows the sludge ejector to operate for two hours after the RotoClone shuts down. Materials with slow settling rates can be removed from the unit after RotoClone operation.

Installation Instructions

Read following instructions completely and carefully.

A. FOUNDATIONS

Foundations must be true, level and rigid enough to prevent vibration and to support the weight of the RotoClone with its maximum dust and water load given below.

Size	Maximum Operating Wt. Lbs. (Note 1)	Normal Operating Wt. Lbs. (Note 2)	Water Capacity Gallons	Erecting Weights	
				RotoClone Only	Exhauster Only
1½	6,300	4,800	300	2,000	300
2½	6,400	4,900	300	2,000	400
4	9,500	7,100	470	2,700	500
6	11,400	8,700	540	3,600	600
8	13,200	10,500	530	5,300	800
12	16,500	13,200	650	6,500	1,300
16	28,500	21,600	1,370	8,000	2,200
20	33,600	25,300	1,650	9,400	2,200
24	40,300	30,500	1,950	11,000	3,300
28	46,000	34,800	2,220	12,400	4,000
32	51,100	38,500	2,500	13,700	4,000
36	56,300	42,400	2,775	14,800	4,500
40	64,500	49,200	3,050	19,300	4,500
44	70,200	53,500	3,330	21,300	4,500
48	76,100	58,000	3,610	23,400	4,500

TABLE 1 — RotoClone WEIGHTS

NOTE 1: Weight based on maximum sludge capacity with a sludge weight of 100 pounds per cubic foot.

NOTE 2: Weight based on weight of water, 62.4 pounds per cubic foot.

B. RotoClone ERECTION

1. Set RotoClone on foundation and adjust base until unit is level. Place spirit level on the leveling strips welded on two or more sides of the hopper. Use care in leveling in both directions as the operation of the RotoClone depends on the accuracy of the leveling function.

   NOTE: This level can be checked by filling the unit with water until the level reaches the entering edge (Figure 1) of the impeller. This entering edge should be level with the water along its entire length with maximum variation of 1/8" plus or minus. (See Operating Instructions, Item A-2.)

2. For Sizes 1½ thru 6, a pattern for proper orientation of eliminator sections is painted on the side of the RotoClone. For Sizes 8 thru 48, the entrainment baffles are fixed in place as an integral part of the unit and it is not necessary to make any adjustments (Figure 2).

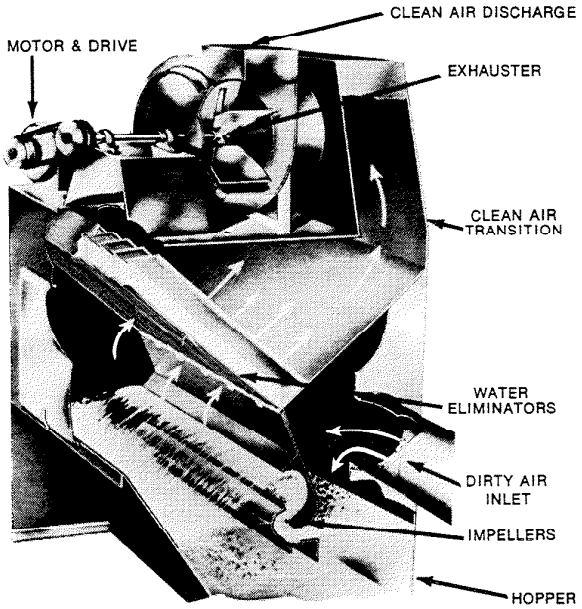


Fig. 2. Cutaway section of typical Type N RotoClone Design 2 and 3 Arrangement C size 1½ thru 6.

3. For RotoClone Sizes 1½ thru 12 which are not shipped with exhausters or for all RotoClone Sizes 16 and larger, three-inch sealing tape is furnished. This tape seals the ⅝ inch nominal gap between the clean air transition and the exhauster inlet.
4. RotoClones, Sizes 16 thru 48 are shipped disassembled in major subassemblies; RotoClone, clean air transition, motor, and exhauster. Necessary gasket material for the flange between the RotoClone and transition section and the three-inch sealing tape noted above are packed in a box with bolts.
5. If necessary, Sizes 16 thru 48 can be shipped with the collecting section and hopper section disconnected.

   Field assembly of collecting section and hopper section will require the following.
   a. Install gaskets on top of hopper external flange.
   b. Set collecting section in place so its bolting flange matches hopper flange. Lower carefully, watching for interference between intermediate sheets and impellers. Walls of interior center section, formed by the two intermediate sheets must be inside impeller bolting surface (Figure 1 and 3).

c. Bolt outside flanges of collecting section and hopper section.
d. Bolt impellers to intermediate sheets. Before tightening, entering edge (Figure 1) of impellers must be in a straight line. Impellers were installed in the hopper section and aligned at the factory. Each impeller section is matched-drilled with holes in intermediate sheet. Pull these bolts tight and check alignment before tightening remainder of bolts thru slotted holes in impellers and drilled holes in intermediate sheets.

C. LUBRICATION

1. All bearings are ball bearings packed with grease before leaving the factory. Do not add grease during installation. See Bearing Manufacturer for greasing instructions and schedules.
2. Gear reducer on sludge ejector drive was filled with oil before shipment. Check for proper oil level. See Maintenance Instructions, A-4.

D. DUCT CONNECTIONS

In order to prevent surging within the RotoClone, three to four duct diameters length of straight run prior to the inlet will provide uniform distribution at the inlet. If an elbow is required due to space limitations, turning vanes must be used in the elbow to evenly distribute the air and prevent surging.

Inlet and exhaust duct must be supported from floor, wall or ceiling; **not** from RotoClone or exhauster. Depending on the application and local conditions, the discharge from the exhauster may be returned to the workroom or discharged to the atmosphere. It may be desirable to have both outside and inside discharges fitted with a selective damper. This will save heat during the winter with recirculation and aid ventilation by discharging outside during the summer months. Where discharge duct is required, it should extend above adjacent roof lines and should discharge vertically upward. As long as there is a drain in the fan housing, a raincap or weather hood need not be used. Cross-section of the discharge duct should not be less than the exhauster outlet area.

E. WATER SUPPLY CONNECTION

Connect a 1" line for Sizes 1½ thru 6 or a 2" line for Sizes 8 and larger at point shown on Figure 4.

F. DRAIN CONNECTION

Connect a 2" drain line for Sizes 1½ thru 12 or a 4" drain line for Sizes 16 and larger at point shown on Figure 4.

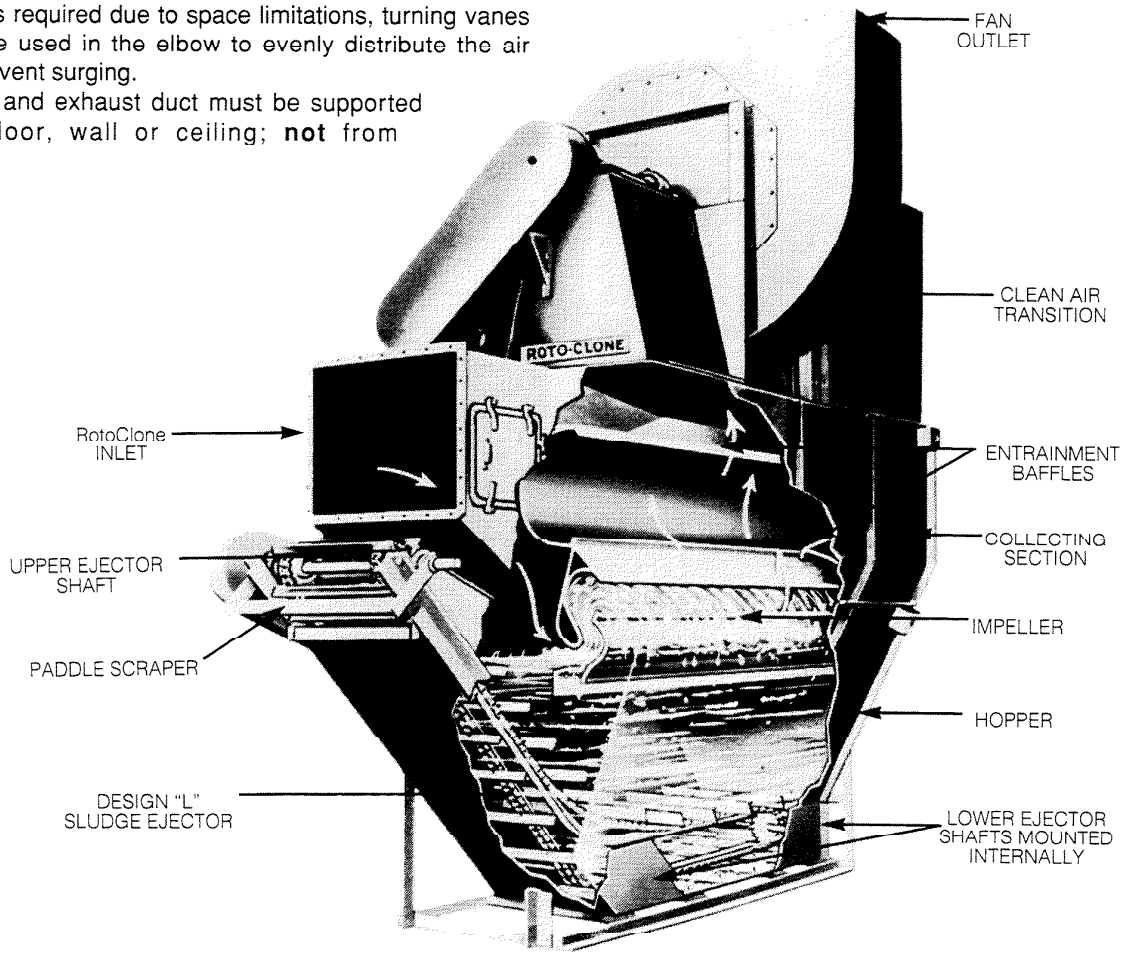


FIG. 3. Cutaway section of typical Type N RotoClone with Design "L2" Ejector and Design 4 and 5.

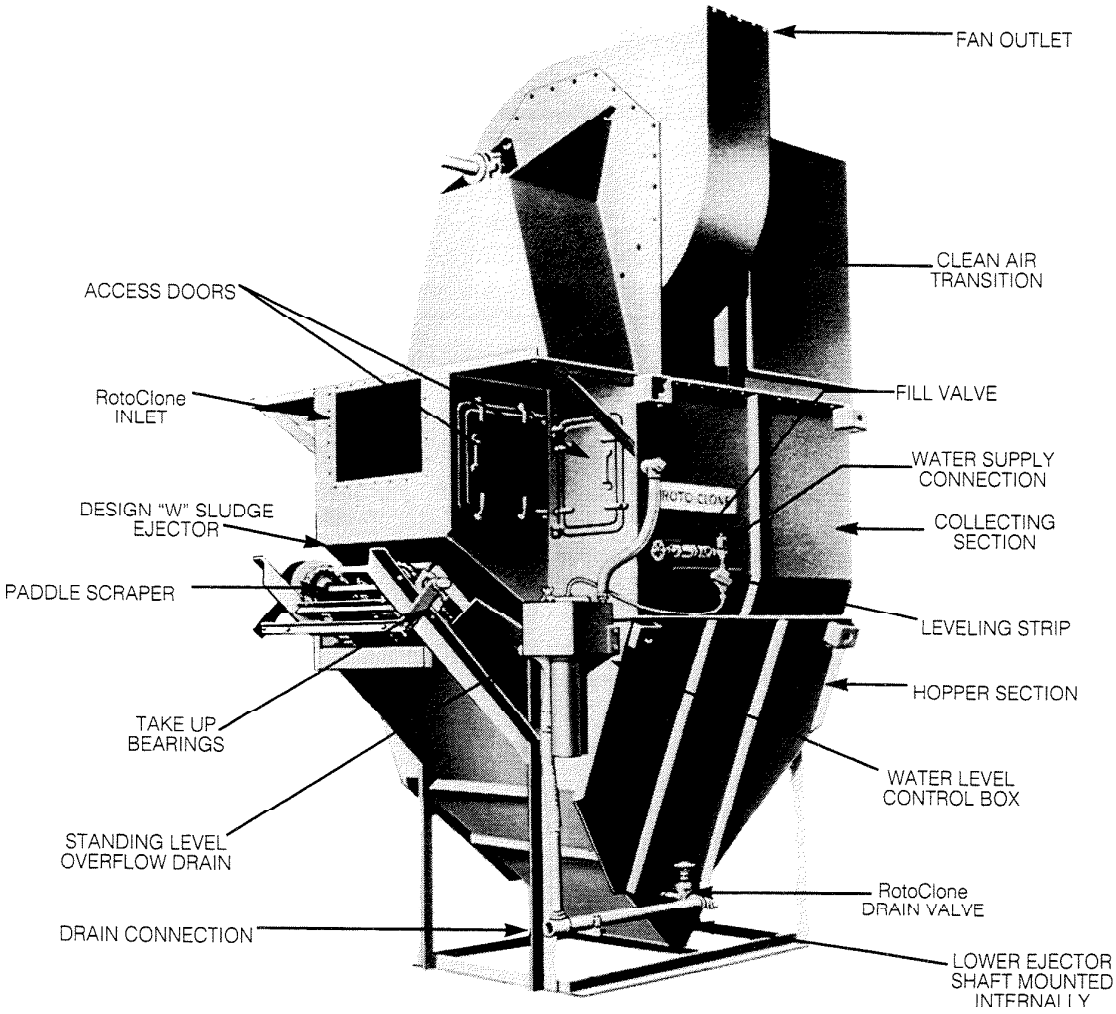


FIG. 4. Typical Type N RotoClone with Design "W2" Ejector.

G. ELECTRICAL CONNECTIONS

Electrical components of the RotoClone are the exhauster motor, sludge ejector motor, motor starters, solenoid valve, and flow switch. Each connection is to be made in accordance with the appropriate wiring schematic enclosed with the RotoClone instruction packet.

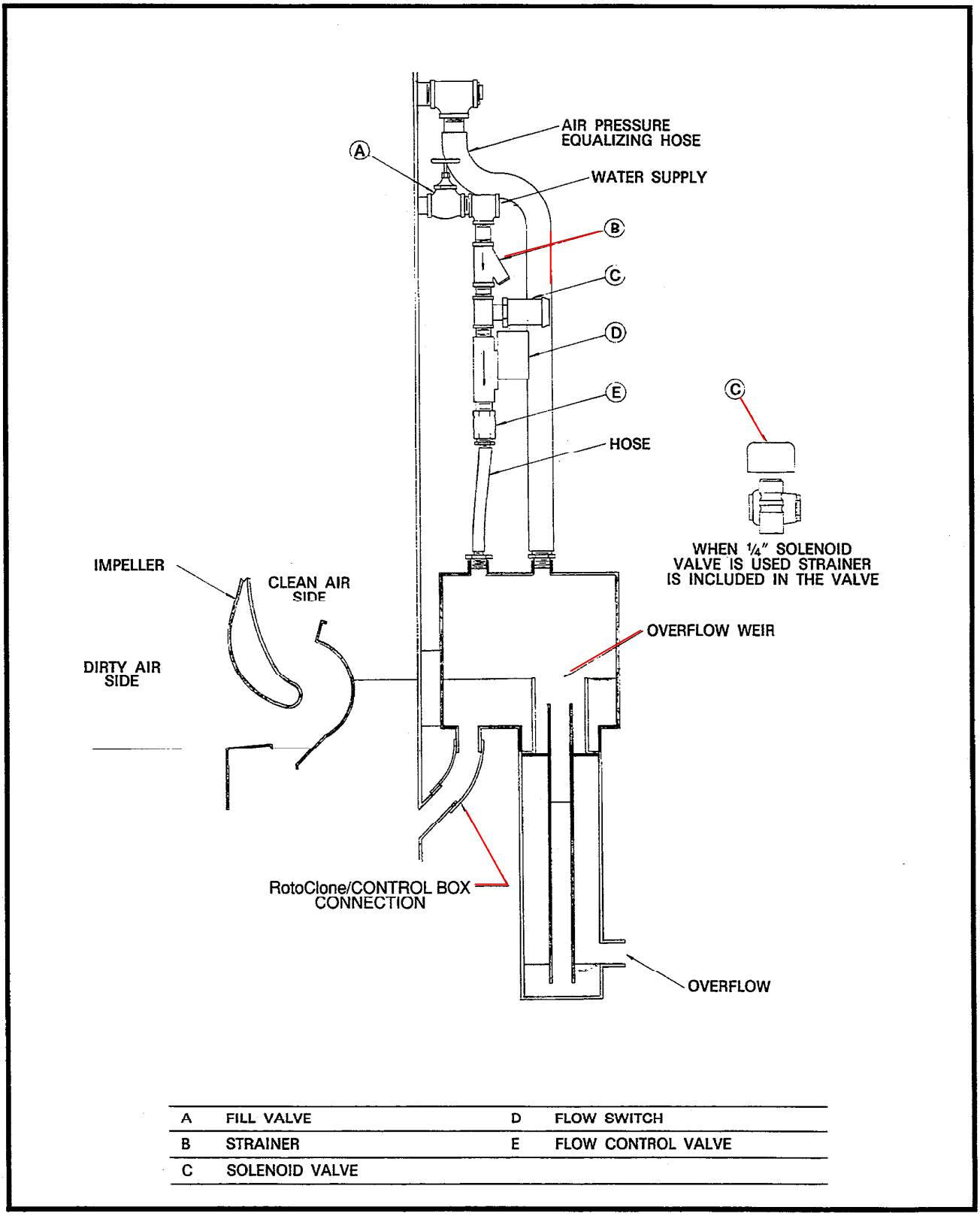
1. Exhauster motor – The motor nameplate will show the connection hookup of the motor leads. CAUTION: After connecting motor leads, insure that the exhauster rotates in the proper direction as indicated by the arrow on exhauster housing .
2. Sludge ejector motor – It is a fractional horsepower, 230/460/60/3, TEFC motor. Either motor nameplate or inside cover of motor will contain the connection hookup diagram of the leads.
3. Motor starter – The exhauster motor starter and sludge ejector motor starter may or may not be supplied by SnyderGeneral Corporation.
4. Solenoid valve – This valve is normally supplied in the water supply line. A ¼" solenoid valve is furnished with Sizes 1½ through 16. A ½-inch solenoid valve is furnished with Sizes 20 through 48.
5. Flow switch – It is an electrical interlocking protective flow switch wired in series with exhauster starter holding coil circuit. This prevents operation of RotoClone until the solenoid water valve is opened. In the event of a water supply failure, the flow switch contacts open and the RotoClone stops. This flow switch is used only on the Model "SV" water level control .

   CAUTION: For some applications, such as incinerators and dryers, damage to the process or equipment would occur if the RotoClone is stopped during its operating cycle. In such cases, the flow switch should be wired to an alarm bell or signal light to indicate a water supply failure.

H. WATER LEVEL CONTROL OPTIONS

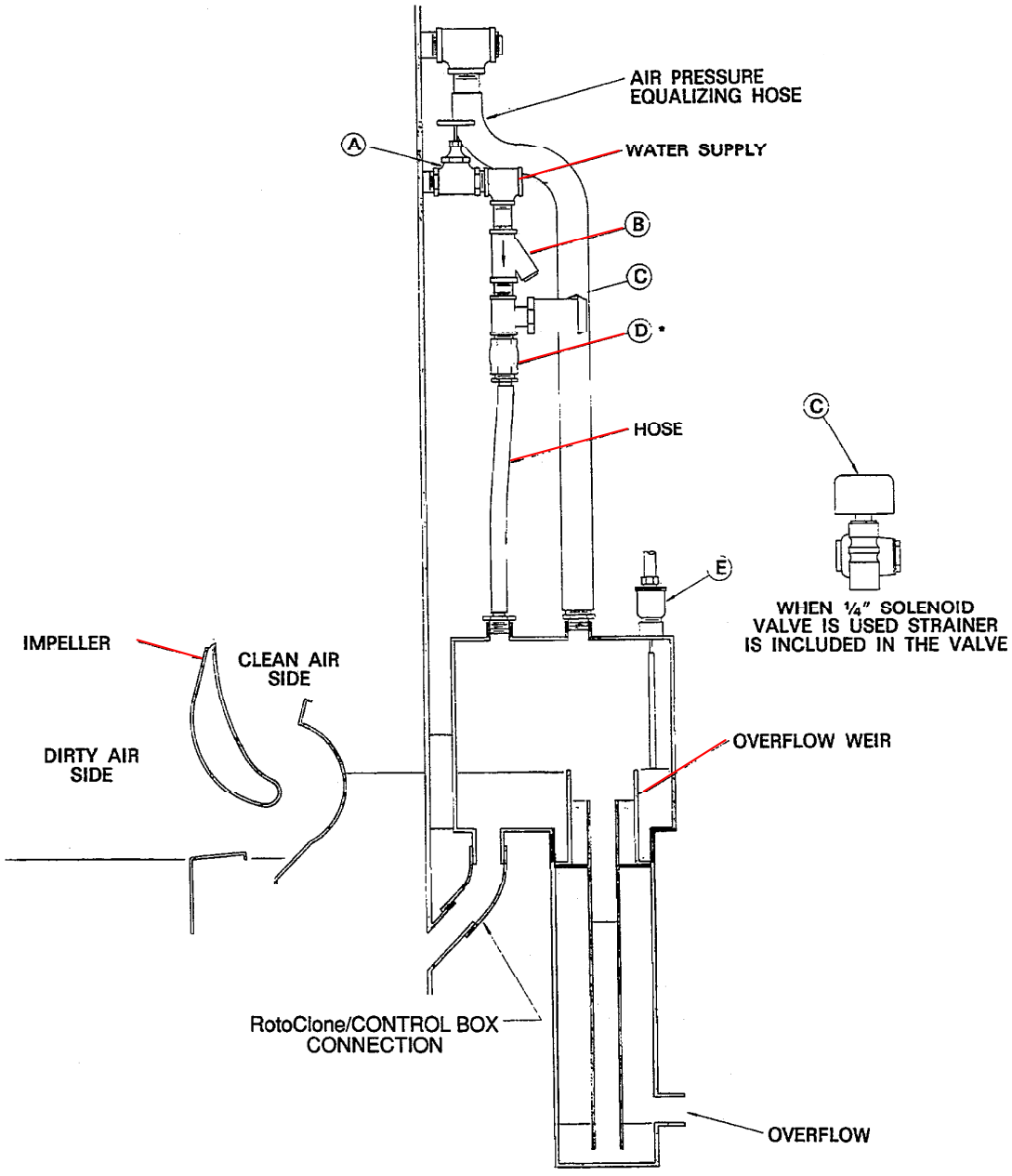
Supply water makeup for the RotoClone is required because of water losses from evaporation, sludge removal, and overflow from the control box. This makeup water will maintain the proper water level in the unit by entering RotoClone through the RotoClone/CONTROL BOX CONNECTION (Figure 5 and 6).

Water Level Control Box Arrangements



A	FILL VALVE	D	FLOW SWITCH
B	STRAINER	E	FLOW CONTROL VALVE
C	SOLENOID VALVE		

FIG. 5. Control, Model "SV" Water Level (Type 'N' Model "B' RotoClone).



*NOT USED ON MODEL 'A' CONTROL

A	FILL VALVE	D	FLOW CONTROL VALVE*
B	STRAINER	E	ELECTRODE
C	SOLENOID VALVE		

FIG. 6. Control, Model "SV" with LWSC or Model "A" Water Level (Type 'N' Model 'B' RotoClone).

There are three types of water level controls on the Type N RotoClone Arrangement C, the Model "SV", Model "SV" with low water safety control, and Model "A". Item 2, Front cover, denotes which control is applicable.

1. Model "SV" Control (Figure 5) – This is the standard water level control for the Type N RotoClone. It prevents operation of the RotoClone when there is insufficient water flow. It also allows a continuous water flow over the running level weir, down the drainpipe, and into the overflow. The water supply system contains a fill valve, solenoid valve, strainer, flow switch and flow control valve. As long as the solenoid valve remains open there will be a constant water flow into the control box.

   The air pressure equalizing hose is connected directly to a port in the top of the control box. This connection permits the air pressure on the clean air side of the RotoClone to equal the air pressure in the control box. Consequently, the water level on the clean air side of the RotoClone and in the control box will be the same.

2. Model "SV" with low water safety control (Figure 6) – This control should be used for magnesium and other explosive dusts. In addition to the standard "SV" controls, this model contains an electrode, electrode holder, and a timing relay. It does not use the flow switch.

   The low water safety control prevents operation of the RotoClone if the water level in the unit is too low.

   The electrode and holder are installed in one of the ports on the top of the control box. This low water safety device is designed to maintain continuous contact with the water in the control box. If the water level in the control box drops below the electrode, a 3 minute timer relay activates. The water level must reach the electrode within three (3) minutes or the RotoClone fan will shut down automatically and the RotoClone operation stops.

   As long as the unit operates, the solenoid remains open. When the fan stops, the solenoid valve closes and the water flow to the control box stops.

   The air pressure equalizing hose is attached to a separate port on top of the control box. This keeps the air pressure on the clean air side in the RotoClone the same as in the control box. Hence, the water level in the RotoClone and the control box will be the same.

   Whenever makeup water is needed in the RotoClone, the water continuously drains into the unit through the hose connection in the bottom of the water level control box.

   This model gives a continuous flow of water over the control box weir.

3. Model "A" Control (Figure 6) – This control box is used when there can be no water overflow from the RotoClone. Makeup water will be added to the system only when the requirement exists. This control also prevents the RotoClone from operating when there is insufficient water level.

   The water supply system contains a fill valve, strainer, solenoid valve, electrode, electrode holder, and a timing relay.

   The electrode and holder are installed in one of the ports on the top of the box. This low water safety device is designed to be in continuous contact with the water in the control box. When the water level drops below the electrode, the solenoid valve opens to supply the required makeup water to the system. When the control box water level is again in contact with the electrode, the solenoid valve closes and stops the makeup water flow. This prohibits a continuous water overflow at the weir.

   If the water level has not reached the electrode within three (3) minutes, the timer will turn off the RotoClone exhauster and stop the RotoClone operation.

NOTE: Since make-up water is only added to replace evaporated water losses and sludge removal water losses, dissolved solids will build up in the scrubbing water which can cause increased rates of corrosion. It is recommended that the reservoir be purged occasionally and pH readings be taken once a week (with litmus paper) and adjusted to 6.5 - 7.5.

This range is appropriate for most dusts except aluminum, magnesium, and titanium, which oxidize and leave a high hydrogen ion content. A high H content equals a low pH. This can be kept in the 6 - 6.5 range with an automatic (solenoid valves on drain and makeup) purge system which lets in fresh water once each one to four hours. For each gallon of fresh water, a gallon of low pH water is released.

Be aware that most collected dusts are either inert or biodegradable. However; dusts which are toxins or heavy metals may not be purged to the sewage system. Be sure to read the applicable regulations on this matter.

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1. FLOW CONTROL VALVE

The Model "SV" and Model "SV" with low water safety switch contain a flow control valve in the makeup water controls (see Figure 4 or 5). It will deliver a continuous water flow rate to the water level control box at a minimum water pressure of 10 psig. Should the flow rate not maintain the water level due to the materials being sludged out, report to your AAF representative who can provide a replacement.

J. SLUDGE CONTAINER

A suitable container must be provided under the sludge ejector spout to catch the continuously ejected sludge. It should be water tight and arranged for ready removal and easy dumping when filled.

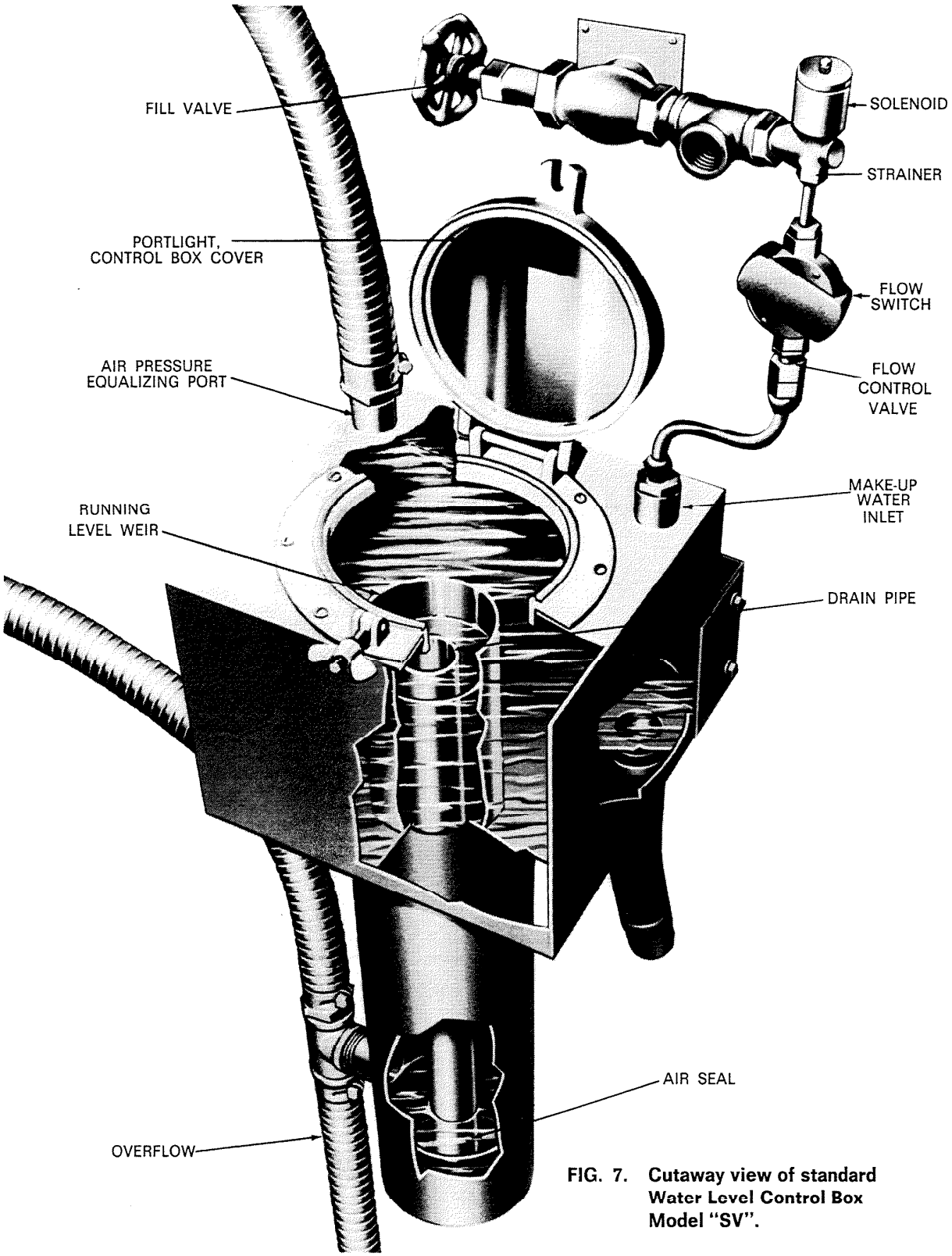


FIG. 7. Cutaway view of standard Water Level Control Box Model "SV".

Operating Instructions

A. TO FILL RotoClone

1. Be certain Gate Valve in RotoClone drain (Figure 4) is closed.
2. Open Fill Valve (Figure 7) and add water until it reaches the standing level overflow drain (Figure 4) connected from side of ejector chute to drain by a rubber hose.

   For Design 3 and 5, no standing overflow can be provided so fill until water reaches a point 2" below the running level weir in control box. This level is marked on the outside of the control box pipe. When filling for the first time:

   a. First bring water level to entering edge of the impeller (Figure 1) and check that RotoClone was properly leveled during erection. (See Item B-1, Installation Instructions.)

   b. Pour one gallon of water down control box drain pipe to make an air seal at the bottom of the pipe (Figure 7).
3. Close and tighten control box cover. It must be air tight or incorrect water level in RotoClone will result.

B. TO START RotoClone

1. Check control box cover and be certain cover is tight.
2. Start ejector motor.
3. Check water supply.
4. Press start button for the RotoClone exhauster. Solenoid valve in the water supply line should be interlocked to open simultaneously with fan start-up.

C. TO STOP RotoClone

1. For units without solenoid valve in the make-up water line, close lever-operated valve in the water line.
2. Press stop button for RotoClone exhauster. Solenoid valve in the water supply line should be interlocked to close simultaneously with fan stoppage.
3. Do not stop ejector for two hours after RotoClone has stopped. If the automatic sludge ejector timer control is provided, the sludge ejector will stop automatically at the end of two hours.

Maintenance Instructions

A. ROUTINE MAINTENANCE

To insure proper operation of the RotoClone, these procedures should be followed as a minimum. More frequent cleaning may be required for certain applications.

1. Water Level Control Box:

a. Observe water in control box frequently. Be certain that water level is at the running level weir (Figure 7). Observe frequently through glass port light in control box top. **DO NOT** open port light when unit is running because air leakage will alter water level.

b. Open port light each week while RotoClone is stopped and remove any accumulations in the box, check air equalizing port for pluggage, check running level weir, electrode (if supplied), and drain pipe for build-up and wear (Figure 5 and 6). Clean cover glass and secure portlight, carefully tightening holddown nut.

c. Remove strainer in water makeup line after first 24 hours of service and clean. Clean monthly thereafter.

2. Eliminator Plates (Design 2 and 3):

a. Inspect each week and remove any accumulations. Cleaning methods will vary with material collected. Hosing in place is effective for many materials. Removal of plates and scraping or washing may be necessary. After cleaning install correctly. See diagram painted on side of RotoClone.

3. RotoClone Housing:

After one month's operation, drain RotoClone and check for build-up on any surface. Check all impeller surfaces and hopper walls carefully and wash down with water hose if required. Frequency of this operation can be extended until proper cycle for a given application has been determined.

4. Sludge Ejector:

The two basic types of sludge ejectors are the Type "W2" and the Type "L2". The Type "W2" (Figure 9) is used on RotoClones Sizes 1½ thru 12 and has one submerged shaft assembly.

The Type "L2" (Figure 10) is used on RotoClone Sizes 16 thru 48. It has two submerged shaft assemblies.

Prior to 1971 the Type "W" and Type "L" ejector systems had external bearings for the submerged shafts and a V-belt drive assembly on the ejector drive.

The Type "W2" and "L2" do not have external bearings in the submerged shafts or V-belt drives for the ejector assemblies.

a. Chain Tension:
   1) Type "W2" ejector (Size 1½ thru 12) chains should be checked weekly. Take up slack in both ejector chains evenly by moving the upper bearings from the lower bolt hole to the upper bolt hole (Figure 4). If the slack remains, remove one link and move the bearing back to the lower

bolt hole. Each time the RotoClone is drained, check for condition of shaft bushings, and sprockets on the ejector Figure 9).

2) Type "L2" ejector (Size 16 thru 48) chains should be checked periodically or when the unit is drained for cleaning. The ejector return run of chain is suspended to maintain tension and reduce frequency of take-up. If necessary, remove links from each chain before upper run sags enough to interfere with lower run operation (Figure 10).

b. Submerged Shafts:
Check Type "W2" and "L2" shafts, sprockets, and bushings when unit is drained (Figure 9 and 10).

c. Upper Shafts:
Grease bearings on the upper ejector and paddle scraper shaft each week.

d. A shear pin protects the chain and paddle assembly. See Figure 10, Item 28, for location and size.

CAUTION: When shear pin breakage occurs, immediately investigate the cause of trouble. Do not exchange proper shear pin with solid pin.

e. The oil in the speed reducer should be drained at the end of the first ten days for 24 hours per day operations or at the end of 30 days when operation is eight (8) hours per day. The case should then be thoroughly flushed with light flushing oil. Fill to oil level with new oil of the proper grade. After this, change oil every 2500 hours or every six months whichever occurs first.

1) To prevent loss of oil while units are in transport, the reducers are shipped with a brass pin in vent or filler plug. **This pin must be removed before the reducer is operated.**

2) A drain plug at or near the bottom (base flange) of the reducer housing is provided for oil removal.

3) Use Cities Service Oil Trojan Compound L-4, Gulf Oil's E.P. Lubricant #145, Shell's Valvata Oil #J78, Mobile Oil Co.'s Mobil Cycl. Oil #600 W or equal.

f. Once each month inspect the paddle scraper for correct positioning against ejector paddle; the scraper bumpers, ejector chain and sprockets for wear.

5. Exhauster:

a. Check exhauster for excessive vibration each month while checking V-Belt drive. Be certain exhauster is rotating in proper direction.

b. Check exhauster wheel and housing every three months and remove any accumulation.

c. Remove old grease from bearings every six months, replacing with medium (No. 2) grade S.R.I. grease. Excessive grease will cause bearings to overheat. If too much grease has been added, remove grease fitting and run exhauster, until excessive grease is driven from the bearing. Replace fitting.

6. V-Belt Drive

a. Check belt tension each week for the first month of operation; monthly thereafter. Refer to Exhauster IOM for correct tension. Loose belts reduce air flow through the RotoClone and cause excessive belt wear.

7. Replacement Part Stock:

a. Sludge ejector chains and sprockets are subject to considerable abrasion in many applications. Life will vary from 6 months to more than 3 years. Stocking of ejector parts as indicated on ejector parts list will prevent expensive shutdown. Parts list shown in Figure 9 is for "W2" ejectors on Sizes 1½ thru 12. Figure 10 is parts list for "L2" ejectors on Sizes 16 thru 48.

b. Replacement of impeller and eliminator sections will be required at prolonged intervals. Routine inspection will give ample warning for replacement requirements.

WHEN ORDERING REPLACEMENT PARTS GIVE: PART NAME, NUMBER, RotoClone SIZE, TYPE, AND SERIAL NUMBER.

B. CORRECTION OF POOR RotoClone OPERATION

Most difficulties that may be encountered in RotoClone operation will be discovered and corrected by one or more of the following:

1. Reduction in air flow at exhaust hoods:

a. Reduced exhauster speed due to belt slippage.

b. Accumulations in ducts or hoods due to sticky nature of dust or settling in ducts caused by low conveying velocities.

c. Addition of more exhaust points to the system.

d. During winter when doors and windows are closed insufficient makeup air to the exhaust system will create high negative pressure in room.

e. High water level in RotoClone can be observed through closed portlight in control box. Water level above running level weir can be caused by:

1) Plugged drain line from control box.

2) Open or leaky fill valve that allows water feed into RotoClone at a high rate raising level over running level weir ¼" or more.

3) Air leak in control box due to portlight cover not closed tight or failure to pour water in drain pipe to provide water seal (See Item A-3, Operating Instructions).

4) Malfunctioning solenoid valve on Model "A" control box.

f. Plugged eliminator plates or accumulations in impellers or dirty air chamber.

g. Plugged air equalizing hose.

2. Reduced dust collection efficiency can be caused by:

a. Extreme reduction in air flow indicated in Item B-1, Maintenance Instruction.

b. Corrosion or abrasion to impeller sections.

c. Low water level in RotoClone. Can be observed through closed portlight. Water level below running level weir can be caused by:

1) Open or leaky drain valve.

2) Insufficient water supply due to plugged strainer in makeup water line. Prolonged periods of low water pressure can reduce water supply rate below water evaporation rate in RotoClone. Evaporation will be greatest on hot, dry days.

3) Incorrect flow control valve. Contact AAF representative for replacement.

4) Solenoid valve sticking in closed position.

5) Accumulation on electrode in Model "SV" with low water safety control or Model "A".

6) The unit out of level. (See Item B-1, Installation Instructions.)

3. Water entrainment in Exhauster Discharge:

a. Rain or snow draining into exhauster housing during erection or shut down.

b. Incorrect position of water eliminator plates in Design 2 or 3.

c. Excessive air flow through RotoClone. Overrating can be checked by measuring the pressure drop across the RotoClone. This can be done by subtracting the static pressure directly upstream of the inlet of the RotoClone from the static pressure directly downstream of the exhaust plenum (between the RotoClone and the exhauster on draw-thru systems). If the pressure drop of the RotoClone exceeds the maximum allowable for the particular operating line the RotoClone was sized for (see Item 5, Front Cover for operating line selected for this unit), this usually indicates excessive air flow. The maximum allowable pressure drop for each operating line can be determined from the operating line chart in Figure 7. The maximum allowable pressure drop for a particular operating line occurs at its intersection with the "maximum pressure drop" line.

To stop entrainment caused by excessive air flow, increase static pressure or reduce exhauster speed.

d. A plugged air equalizing hose will cause the water level control box to maintain a too-high water level in the unit. Clean the hose and readjust the water level (See Item A2, Operating Instructions).

e. Surging of the RotoClone is a rocking of the water from end to end in the unit. This can be caused by running the unit well below its rated capacity. Contact the local AAF sales representative for assistance.

1) Surging can also be caused by a duct elbow at the RotoClone inlet. Three to four duct diameters length of straight run will give an even air flow at the inlet. If an elbow is required due to space limitations, turning vanes in the elbow will evenly distribute the air and eliminate surging.

f. If the unit is out of level water entrainment will result. (See Item B-1, Installation Instructions .)

Type N RotoClone Performance Curves

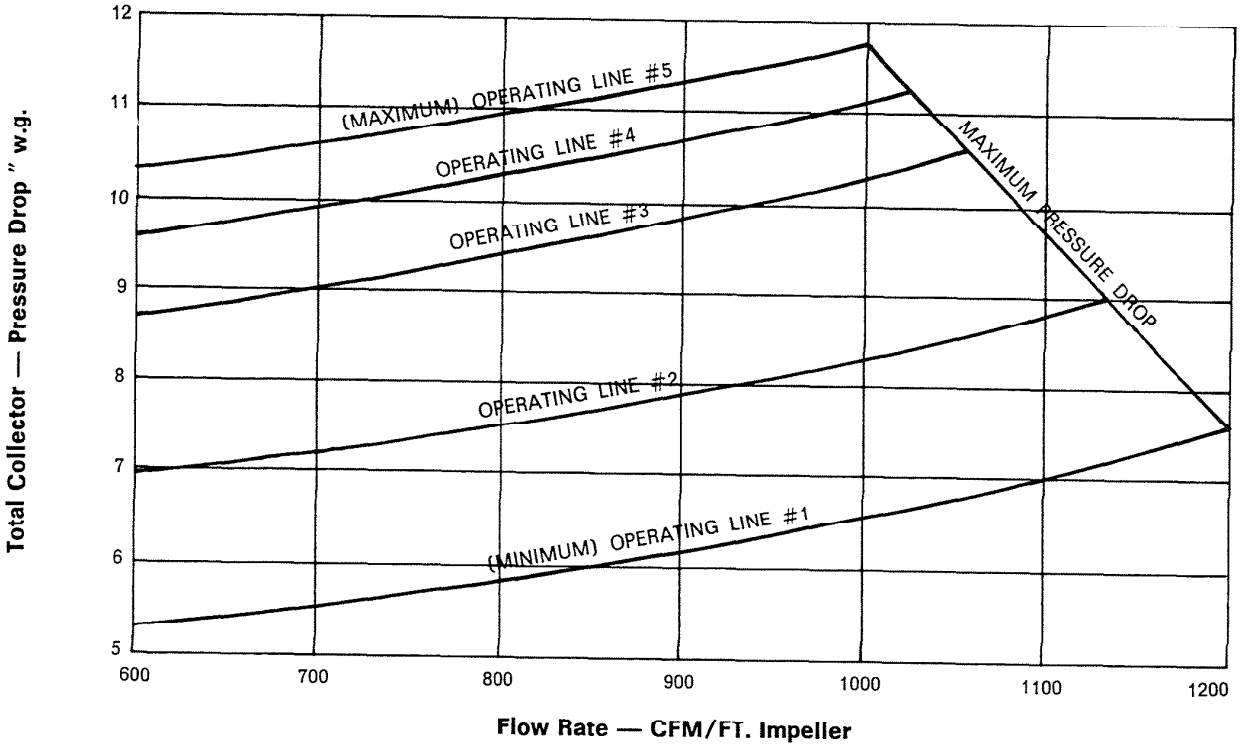
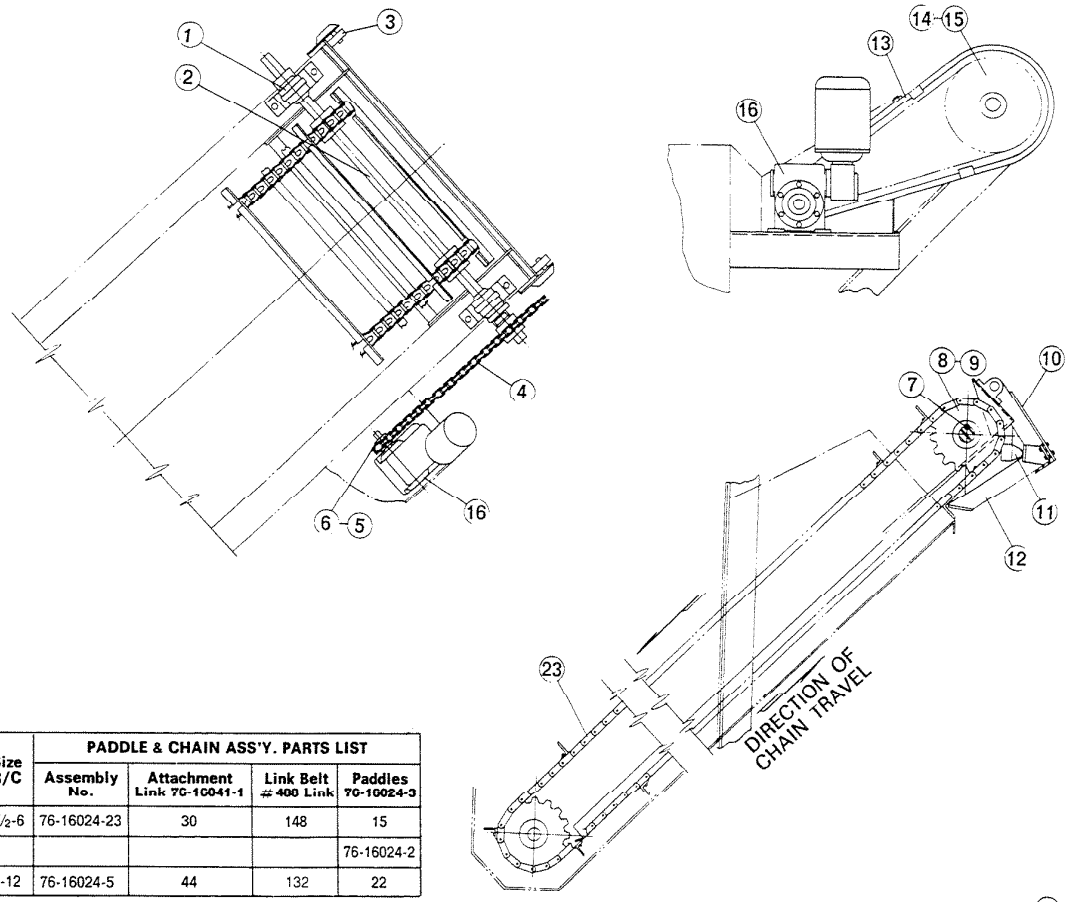


FIG. 8

Typical chart of Type N RotoClone pressure loss for exhaust volume variations and given operating lines. The Type N RotoClone MUST OPERATE ON ONE OF THE OPERATING LINES. RotoClone size multiplied by cfm./ft. impeller gives rating in cfm.

OPERATING LINE	MAXIMUM PRESSURE DROP IN. W.G.
1	7.5
2	9.0
3	10.6
4	11.2
5	11.7

If further help is required there is an American Air Filter Representative available to check the operation of your RotoClone and answer any questions concerning erection, operation, or maintenance.



Size R/C	PADDLE & CHAIN ASS'Y. PARTS LIST			
	Assembly No.	Attachment Link 76-16041-1	Link Belt # 400 Link	Paddles 76-16024-3
1½-6	76-16024-23	30	148	15
				76-16024-2
8-12	76-16024-5	44	132	22

1. SIZE 1½ THRU 6
2. SIZE 8 THRU 12
3. SPROCKET PART NO. 2003283 FOR USE ONLY WITH SPEED REDUCER WITH 1" OUTPUT SHAFT SERIAL NOS. 83000 AND EARLIER.
4. FOR SERIAL NOS. 83001 AND LATER.
5. SPEED REDUCER MUST BE ORDERED WITH SPROCKET PART NO. 2302040 (1¼" BORE) FOR SERIAL NOS. 83000 AND EARLIER.

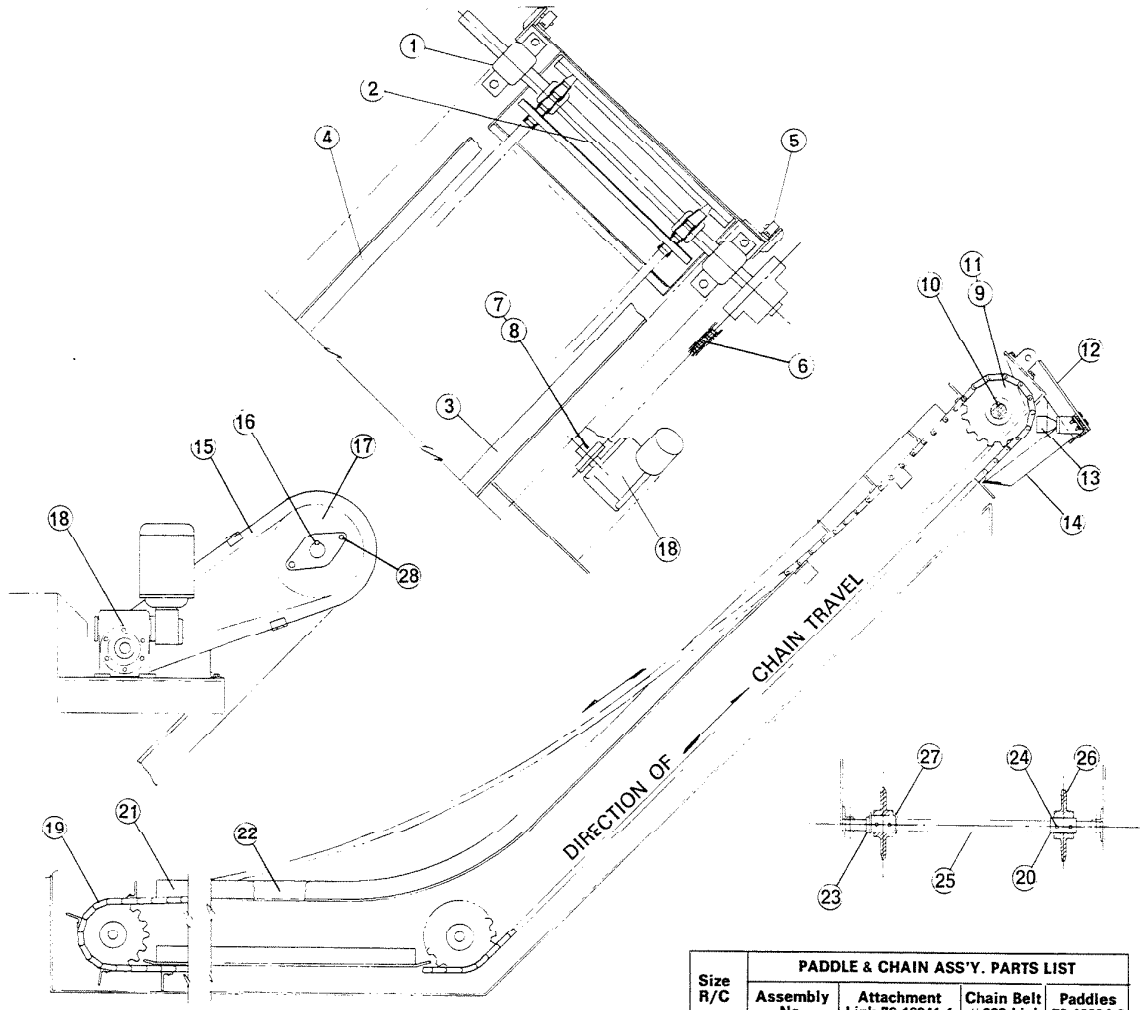
*RECOMMENDED FOR SPARE PARTS

Item	Name	Part No.	No. Req'd.
1	BEARING*	2001873 1 5/16" BORE	2
2	SHAFT*	76-868026-1	1
3	BEARING	LINK BELT PS-U212N ¾" BORE	2
4	CHAIN	2002053 RC #50	1
5	SPROCKET	2003283 #50, 1" BORE 3	1
5	SPROCKET	2302040 #50, 1¼" BORE 4	1
6	KEY	93-23024-6 ¼" SQ. x 1⅞"	1
7	KEY*	93-25221-14 ½" SQ. x 2½"	2
8	SPROCKET*	76-16046-1	2

Item	Name	Part No.	No. Req'd.
9	SET SCREW	2004034 3/8"16 x ¾"	4
10	SUPPORT ASS'Y.	76-148197-1	1
11	BUMPER	2001972	2
12	BLADE ASS'Y.	76-148205-1	1
13	CHAIN GUARD ASS'Y.	76-127597-1 1 76-127605-1 2	1
14	SPROCKET	2003358 #50 1 15/16" BORE	1
15	KEY	93-25221-21 ½" SQ. x 3⅞"	1
16	SPEED REDUCER	76-013442-1 (1¼" OUTPUT SHAFT) 5	1

Item	Name	Part No.	No. Req'd.
17	BUSHING*	76-896365-1	1
18	SET SCREW	2017135	4
19	SPROCKET*	76-879098-1	2
20	COLLAR ASS'Y.	76-879072-1	1
21	SHAFT	76-879080-1	1
22	BUSHING*	76-896357-1	1
23	CHAIN & PAADLE ASS'Y.*	SEE TABLE	

FIG. 9 SLUDGE EJECTOR TYPE "N" MODEL 'B' RotoClone TYPE "W-2"— (PARTS LIST)



Size R/C	PADDLE & CHAIN ASS'Y. PARTS LIST			
	Assembly No.	Attachment Link 76-16041-1	Chain Belt #988 Link	Paddles 76-16024-2
16	76-16024-7	42	208	21
20	76-16024-8	72	218	36
24	76-16024-9	80	244	40
28	76-16024-10	120	242	60
32	76-16024-11	132	268	66
36	76-16024-12	218	220	109
40	76-16024-13	236	238	118
44	76-16024-14	254	256	127
48	76-16024-15	272	274	136

1. SIZES 12 THRU 28.
2. SIZES 32 THRU 48.
3. SPROCKET PART NO. 913350 FOR USE ONLY WITH SPEED REDUCER WITH 1¼" OUTPUT SHAFT SERIAL NOS. 83000 AND EARLIER.
4. FOR SERIAL NOS. 83001 AND LATER.
5. SPEED REDUCER MUST BE ORDERED WITH SPROCKET PART NO. 2302107 (1⅜" BORE) FOR SERIAL NO. 83000 AND EARLIER.

*RECOMMENDED FOR SPARE PARTS

Item	Name	Part No.	No. Req'd.
1	BEARING*	2001873 1 15/16" BORE	2
2	SHAFT*	76-868026-1	1
3	GUIDE ASS'Y.	76-882720-6	1
4	GUIDE ASS'Y.	76-882720-6	1
5	BEARING	LINK BELT PS-U212N ¾" BORE	2
6	CHAIN*	2002103 RC #80	1
7	SPROCKET	913350 #80 1¼" BORE (3)	1
7	SPROCKET	2302107 #80 1⅜" BORE (4)	1
8	KEY	93-23024-15 1¼ SQ. x 2"	1
9	SPROCKET*	76-16046-1	2
10	KEY	93-25221-14 ½" SQ. x 2½"	2
11	SET SCREW	2004034 ⅜-16 x ¾"	4
12	SUPPORT ASS'Y.	76-148197-1	1
13	BUMPER	2001972	2
14	BLADE ASS'Y.*	76-148205-1	1
15	CHAIN GUARD ASS'Y.	76-127613-1	1
16	KEY	93-25221-21 ½" SQ. x 3⅞"	1
17	SPROCKET	923706 #80 1 15/16" BORE	1
19	SPEED REDUCER	76-910434-1 (1¾" OUTPUT SHAFT (5))	1
19	CHAIN & PADDLE ASS'Y.	SEE TABLE	
20	BUSHING	76-896357-1 (1) 76-896357-3 (2)	2
21	GUIDE ASS'Y.	76-882720-4	1
22	GUIDE ASS'Y.	76-882720-3	1
23	COLLAR ASS'Y.*	76-879072-1 (1) 76-879072-2 (2)	2
24	SET SCREW	2017135 ⅜""-16 x ⅜"	4
25	SHAFT*	76-879080-1 (1) 76-879080-2 (2)	2
26	SPROCKET*	76-879098-1 (1) 76-879098-2 (2)	4
27	BUSHING ASS'Y.	76-896365-1 (1) 76-896365-2 (2)	2
28	SHEAR PIN	¼" DIA. COMM. ROD (NO NECK)	2

FIG. 10 SLUDGE EJECTOR TYPE "N" MODEL 'B' RotoClone TYPE "L-2"— (PARTS LIST)

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