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***ITW GEMA
INDUSTRIAL POWDER COATING SYSTEMS***

***USERS MANUALS
FOR A
GEMA RECLAIM SYSTEM***

MANUAL PART #128890
DATE: FEBRUARY 7, 2000

Reclaim System - R10, R24, R36 HOPPER

Service Manual

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Introduction

WARNING !

- The user **MUST** read and be familiar with the Safety Section in the manual and the Gema safety literature therein identified.
- This manual **MUST** be read and thoroughly understood by ALL personnel who operate, clean or maintain this equipment ! Special care should be taken to insure that the WARNINGS and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to ALL local building and fire codes and ordinances as well as *NFPA STANDARD 33 AND THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (OSHA)* prior to installing, and/or servicing this equipment.

About This Manual

- Before operating, maintaining or servicing any Gema electrostatic coating system, read and understand all of the technical and safety literature for your Gema products. If you do not have the manuals and safety literature for your system, contact your local Gema representative or Gema.
- All text references to diagrams or illustrations will appear as a circled number (as indicated in the Parts Identification Section), i.e.: Item number five in the Parts Identification will appear as ⑤ throughout the text and all diagrams and illustrations, except where otherwise indicated.
- In the manual, as in all Gema technical and safety literature, the following advisories will be provided where appropriate:
DANGER ! states a clear and present hazard to personnel safety!
WARNING ! states information relevant to personal safety!
A CAUTION ! is information relevant to safeguarding equipment !
A NOTE is information about the procedure in progress !
- The Information in this documents intended ONLY to indicate the components and their working relationship in typical use. These are NOT installation instructions. Each installation is unique and should be directed by a Gema representative or made from the Gema installation drawings provided for your particular installation.
- This manual provides information for the service and maintenance of the R-10, 24, and 36 hoppers. While this book lists standard specifications and procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes, plant requirements, and material delivery requirements, etc., make such variations inevitable. Compare this manual with your Gema system Installation drawings and appropriate Gema equipment manuals to reconcile such differences.
- Careful study and continued use of this manual will provide a better understanding of the equipment and the process, resulting in more efficient operation, longer trouble free service and faster, easier troubleshooting.
- Please conduct the specified tests and checks before requesting service assistance, and have this manual in hand for ready reference when requesting such assistance, We recommend that maintenance or operating personnel who are familiar with the service problem be authorized to contact us when service is required .
- for assistance contact your local Gema Distributor or the Technical Assistance Desk of Gema at (800) - 628 - 0648.

Reclaim System Process

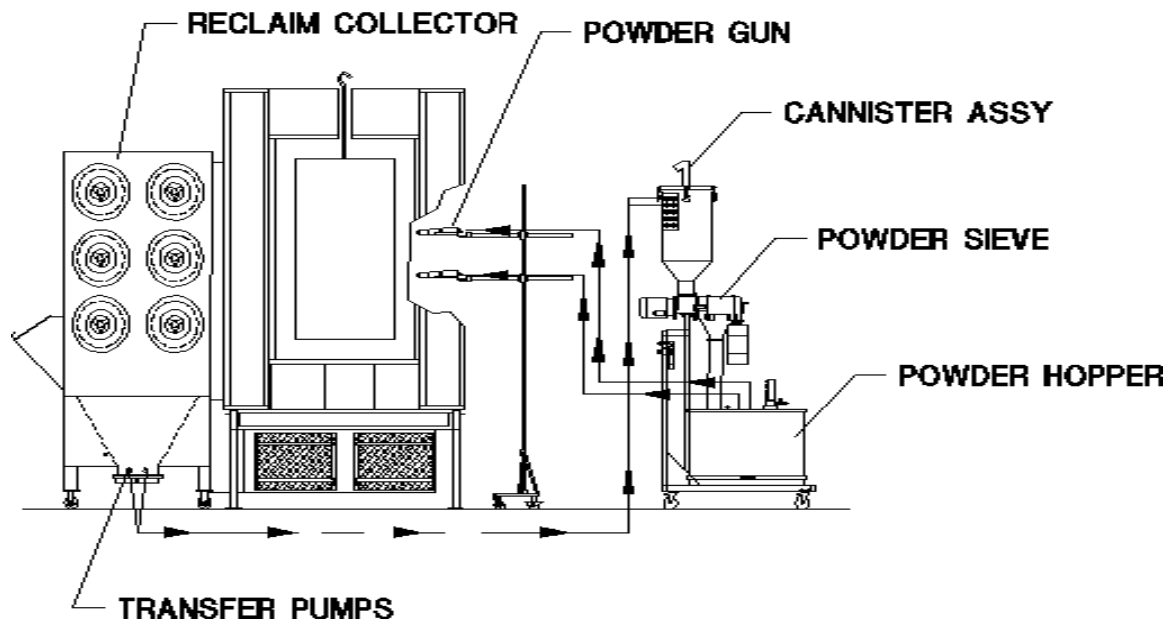
The Reclaim System is the central powder distribution point for the powder coating system. Powder in the hopper is supplied to the powder coating guns by means of gun pumps and powder hose. Any powder sprayed by the gun that did not adhere to the part can be transferred from the powder collection device to the reclaim hopper for respraying. Generally, the reclaim hopper consists of a constant ratio of reclaimed and fresh powder. (See figure 1)

The Reclaim Assembly is comprised of a fluidizing hopper, P1-3 gun pumps, and often some type of powder return device. Options such as level probes, vibratory sieves and rotary sieves are utilized to improve the powder coating quality. Reclaim Assemblies are available in three different hopper sizes, R-10, R-24, and R-36, depending on the size of the powder coating system.

Various types of reclaims are available depending on the quality of finish required. The most basic requires manual refilling of the powder into the hopper. This is considered a No Option reclaim. If transfer pumps are used to fill the hopper, a Satellite Inlet is required. Neither of these type reclaims utilize a means of sieving the powder. To obtain a higher quality finish, a Vibratory Sieve or Rotary Sieve type reclaim is available.

These various reclaims offer solutions for a variety of powder distribution and overspray recycling options.

(Figure 1)
Typical Rotary Sieve Reclaim.

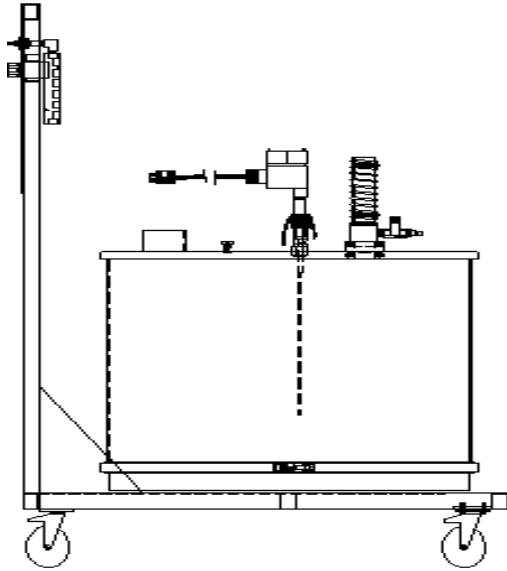


Reclaim Options

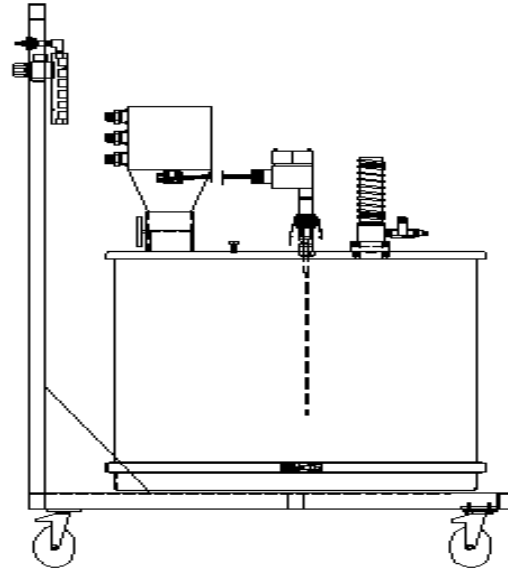
The Gema Reclaim Assembly options are arranged to conform to the simplest of powder coating systems or to the most sophisticated. Gema offers three types of hoppers, R-10, R-24, and R-36. The name of the hopper (R-10) signifies the maximum number of PI-3 Gun Pumps that can be used on that particular hopper. Each type of Hopper can be assembled with any of the following options.

Gema Reclaim Assemblies feature -

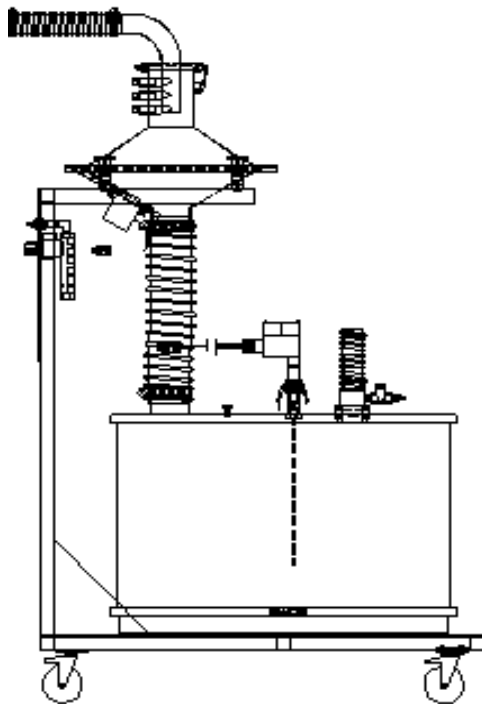
- Up to thirty six PI-3 Pumps (R-36 only)
- Level Probe monitoring
- Manual hopper filling
- Satellite Inlet filling
- Vibratory Sieving
- Rotary Sieving
- Quick Disconnect Pump Air Lines
- Booth attachment for On/Off Line capability



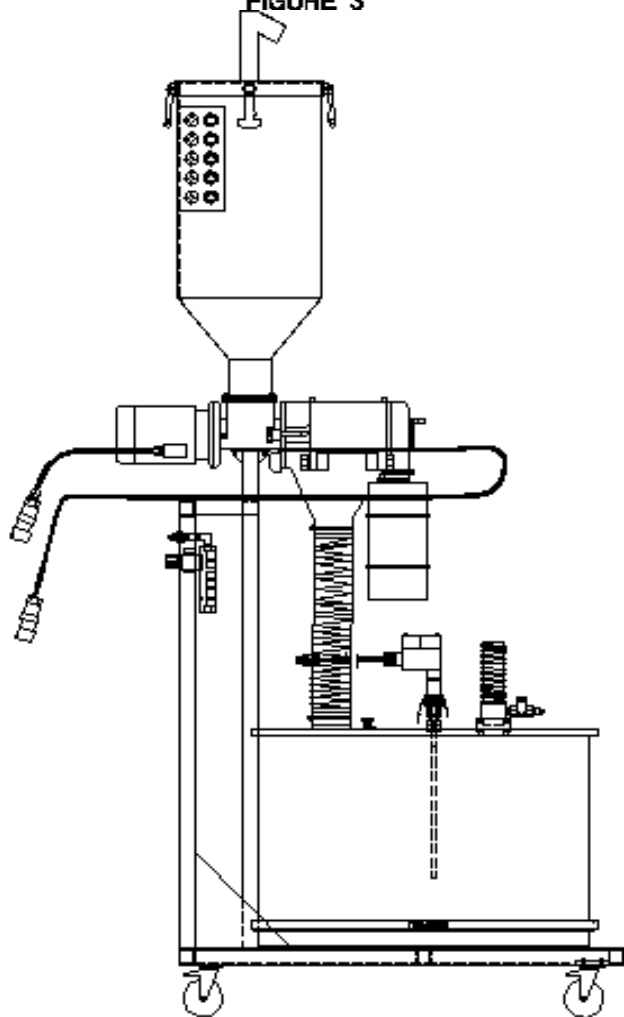
**NO OPTION RECLAIM
FIGURE 2**



**SATELLITE INLET RECLAIM
FIGURE 3**



**VIBRATORY SIEVE RECLAIM
FIGURE 4**

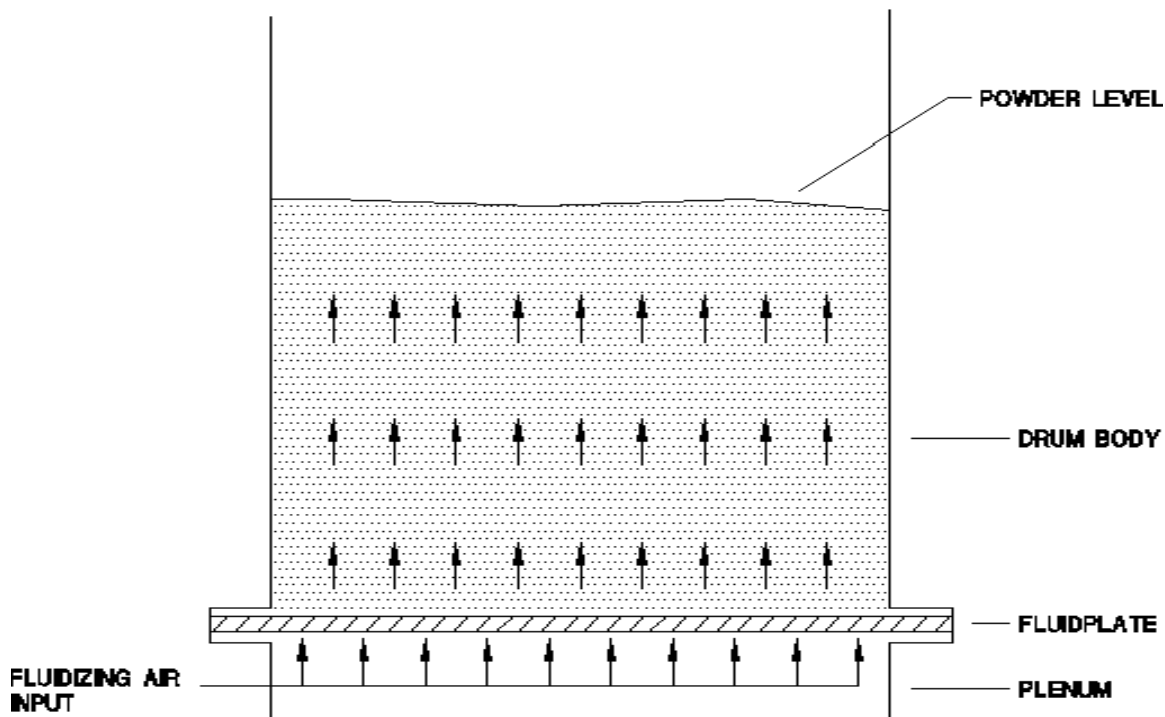


**ROTARY SIEVE RECLAIM
FIGURE 5**

Functional Description

Hopper

Each Hopper consists of an air plenum section, a fluidplate (porous membrane), a drum body and a lid. When assembled, air is introduced into the plenum section, the air then passes evenly through the fluidplate into the drum body. At this point the powder in the drum becomes aerated or fluidized (see figure 6). After fluidization occurs the powder can be easily transported to the gun through the pump.

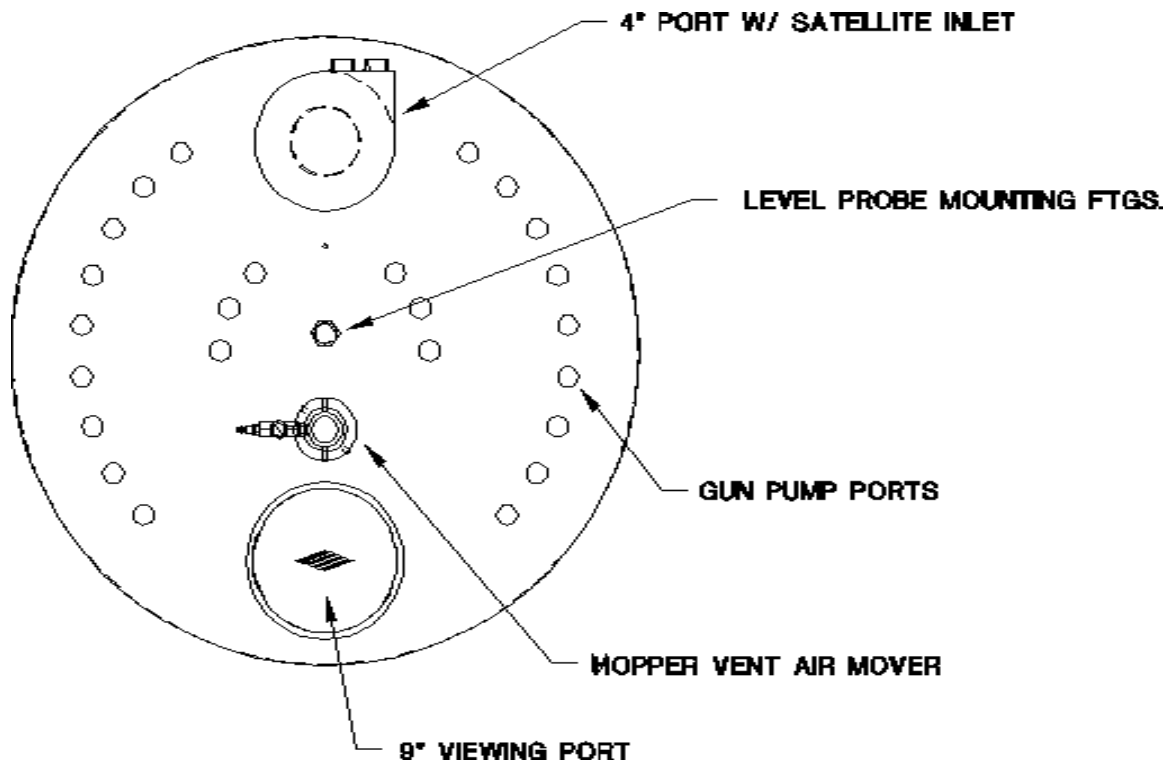


(Figure 6)

For cleaning or color change the hopper can be quickly disassembled by removing a clamping ring. The fluidplate is sandwiched between the plenum section and drum body and is in turn compressed together by the clamping ring. This is typical on all three types of hoppers. On the R-24 & 36 style the fluid plate is also attached to the plenum section in the middle to provide support from the weight of the material.

Each lid will be provided with a 4" diameter powder inlet flange, a 9" dia. viewing port, the maximum number of holes for the gun pumps, a powered vent flange and fittings for level probe mounting. The Satellite inlet mounts directly to the 4" inlet flange on the hopper lid. For Vibratory Sieves, or Rotary Sieves a hose is connected between the dropout of the sieve and the 4" inlet flange. In these cases the powder will pass through the device into the hopper increasing the powder level. In cases where the hopper is manually filled a plug will be supplied for the 4" port. The 9" viewing port is for manual filling or to view the

fluidization and powder level. If required a Quick Disconnect kit will be provided that includes the number of pumps to be used and also the corresponding number of plugs for the unused pump holes. (See figure 7 below)



(Figure 7)

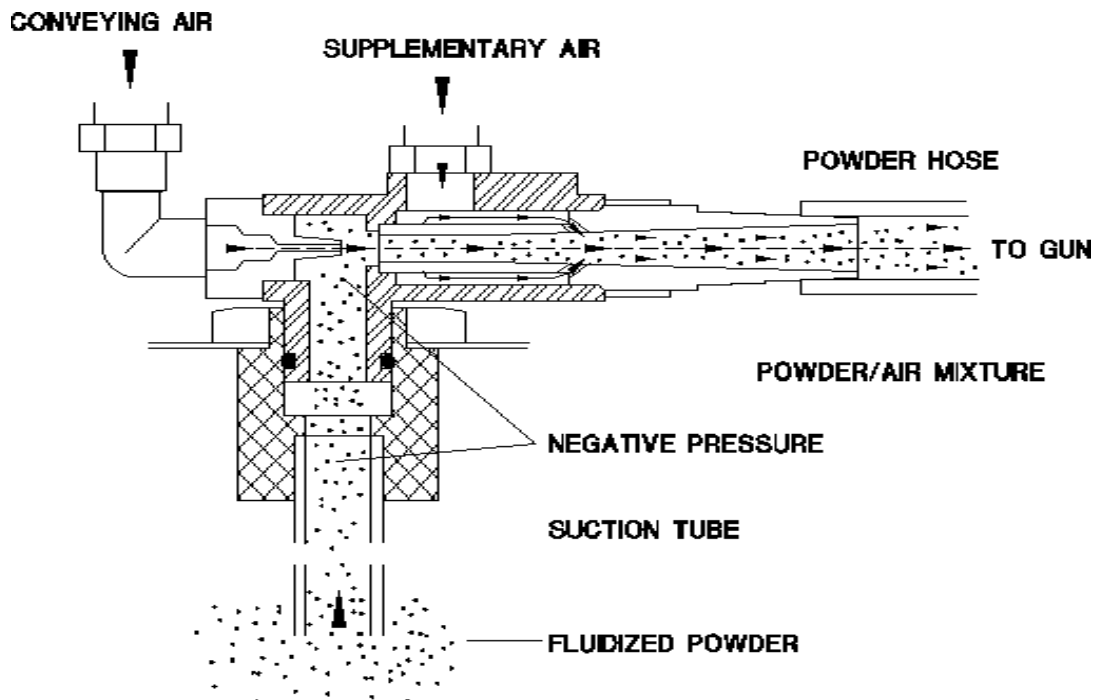
Venting on the hoppers is done through a powered air mover. When the air is introduced into the plenum, fluidizing the material, a positive pressure is created inside the drum body. The vents purpose is to draw slightly more air out of the hopper than is being put in to maintain a negative pressure inside the canister. Each hopper is supplied with a vent air mover and a length of hose for venting back into the collector or booth.

The level probe is used to determine and maintain an adjustable powder range inside the drum body. The probe will signal when the powder level drops below a low setpoint. This would typically cause transfer pumps to be activated and replenish the amount of powder inside the hopper. After filling is complete, the powder will trip the high setpoint and turn the transfer pumps off. The level probe is mounted by a quick-connect clamp. With the capability of each hopper to have the level probe quick-connect fitting, the level probe can be removed for cleaning or use in multiple hoppers for color change situations.

Gun Pump (Principle of the injector and the influence of supplementary air.)

When air flows through the nozzle into the cavity, a vacuum is created in the cavity, (see figure below). This vacuum causes powder to be drawn up the suction tube and into the

cavity. A powder / air mixture is created. The forward air velocity at the nozzle conveys powder through to the powder hose and the gun (see figure 8).



(Figure 8)

The concentration of the powder / air mixture, and with it, the powder output depends on the conveying air pressure and the supplementary air pressure, the quality of the powder, the length of the powder hose, the diameter of the powder hose, the number of coils in the hose, the difference in the height between the gun and the injector, and the type of nozzle. Experience with pneumatic material handling technology shows that pneumatic transport of fine solid matter (powder) in the form of tubing (hose) the transporting medium requires a certain volume of air per unit of time. With an 11 mm hose this value is approximately 4 m³/h. To decrease the powder output, the vacuum in the cavity has to be reduced. For that purpose the pressure of the conveying air is also reduced. With the reduction of the conveying air the volume of air in the powder hose sinks to below the optimum value of 4 m³/h. The powder transport becomes irregular, so called “surging” takes place. In order to prevent this from happening supplementary air is added until the volume of air in the powder hose is 4-5 m³/h once more. As the flow meter measures the sum of the conveying air and supplemental air the ball in the flow meter should therefore “float” within the green section of the scale.

Cart Assembly

Each Reclaim Assembly also consists of a cart assembly. This is a mobile cart that supports the hopper and provides pneumatic controls for the hopper and reclaim device. The hopper is located on the deck of the cart. The reclaim device will be mounted to the

cart above the hopper. Swivel casters on the cart allow the Reclaim Assembly to be moved and replaced for color change, or to move with the booth for on/off line situations.

Pneumatics

A single air line is supplied to the reclaim assembly for the operation of the hopper and reclaim device controls. On the R-10 hopper a 3/8" I.D. air line is used. On the R-24 & R-36 reclaims a 1/2" I.D. air line is required. In addition the air lines for the gun pumps will either be ran directly from the gun control cabinet to the pumps or through a quick disconnect tubing assembly. With a quick disconnect tubing assembly one half of the Q.D is mounted on the cart, airlines are then plumbed out to the gun pumps on the lid. The Q.D tube assembly is then used to connect from the cart back to the gun control cabinet.

No Option Reclaim

The no option reclaim refers to the fact that no type of device is used to transfer powder back into the hopper. Filling of the hopper would be done manually by an operator. When no reclaim device is used a plug will be supplied in the 4" powder inlet port on the hopper lid. (See figure 2, page 5).

Satellite Inlet

The satellite inlet is the basic canister used for transferring powder into the hopper. The satellite inlet is equipped with eight inlet ports. The material is transferred into the satellite inlet and drops into the hopper. With a satellite inlet the powder is in no way filtered or screened for trash. With a satellite inlet the air and powder are not separated in the canister, causing the air to be vented out through the hopper vent. (See figure 3, page 5).

Vibratory Sieve

The vibratory sieve is an efficient and cost effective way of sieving the powder to remove any trash (i.e hair, lint, etc.) The powder is transferred in through up to six ports. The powder is then spun, separating the powder and air. The air is vented out through the top of the sieve. The powder then drops onto a vibrating screen where it is sieved. Only a certain size particle will pass through the screen. Everything else is stopped allowing only powder to go back into the hopper for recycling. Any powder or trash that does not pass through the screen is typically vibrated to the outside of the screen. With the vibratory sieve, disassembly is required for trash removal. (See figure 4, page 5).

Rotary Sieve

The rotary sieve is the most effective way to sieve the powder in a system. A rotary sieve has more throughput capacity than the vibratory sieve, but cleaning for color change operations is difficult. The sieve operates by transferring powder into a canister above the sieve. The powder and air are separated and the powder drops into the sieve. After entering the sieve it is then pushed across a screen where the particles pass through. Any trash or large particles are pushed past the screen to a drop out and collected in a scrap

bag. Any powder that passed through the screen enters the hopper and is then recycled. (See figure 4, page 5).

Installation

Cart Dimensions

R-10	length = 32"	width = 23"
R-24	length = 36"	width = 46"
R-36	length = 42"	width = 52"

Hopper specifications

Hopper	R-10	R-24	R-36
Diameter:	21" i.d.	34.25" i.d.	40.25" i.d.
Height : (overall)	22"	22.75"	22.75"
Pumps : (max.)	10	24	36

Hopper Pneumatic Connections

R-10 Hopper - 3/8" i.d. AIR LINE	0-30 psi	0-10 scfm
R-24 Hopper - 1/2" i.d. AIR LINE	0-30 psi	0-10 scfm
R-36 Hopper - 1/2" i.d. AIR LINE	0-30 psi	0-10 scfm

Level Probe Adjustment

Type : Point type (on/off), radio frequency (RF), impedance sensing circuitry.

Sensitivity : Senses process capacitance changes as low as 0.5 pF.

Ambient Temp. Range : -40 to 150°F (-40 to 66°C).

Relay contacts : DPDT contacts, rated at 10 amperes 115V ac or 26V dc, resistive load.

Delay time: 0-30 sec. delay (on and off)

Fail-Safe Mode : Fail safe low or high level.

Field changeable.

Power Requirements : 95 to 135V ac, 50 to 60 Hz, 3 watts

Electronic Enclosure : Heavy duty cast aluminum housing.

Explosion proof Class I groups C & D

Class II groups E, F & G/ weatherproof

Satellite Inlet Connections

Pneumatic - Up to (8) 3/4" i.d. transfer powder hoses

Electrical - None

Vibratory Sieve Connections

- Pneumatic - Up to (6) 3/4" i.d. transfer powder hoses
- (1) 2" vent hose, 20' length
- Electrical - 110/120 VAC SINGLE PHASE
- 60Hz.
- 1 AMP FLC

Rotary Sieve Connections

- Pneumatic - (2) 1/4" o.d. air lines (supplied on cart pneumatics)
(set regulator between 3-5 psi, flowmeter between 30-70 scfh)
- (1) 2" vent hose, 15' length
- Up to (10) 3/4" i.d. transfer powder hoses
- Electrical - 230 / 460 VAC 3 phase
- 60 Hz.
- 1 AMP FLC

Maintenance Schedule

Periodic

To insure continuous coating quality for a longer period, use conscientious maintenance at regular intervals. This will increase the service life of the equipment, and aid in trouble free operation.

Daily

1. Clean the gun pump
2. Clean the gun
3. Clean or change the powder hose for color changes
4. Visually inspect all components. Adjust and clean if required.

Weekly

1. Clean the powder hopper, injector and gun. Do not refill the powder hopper until coating is to be resumed.
2. Check ground connections between the coating booth, work piece, suspension device for the parts or the conveyor chain.

Cleaning and Repairs

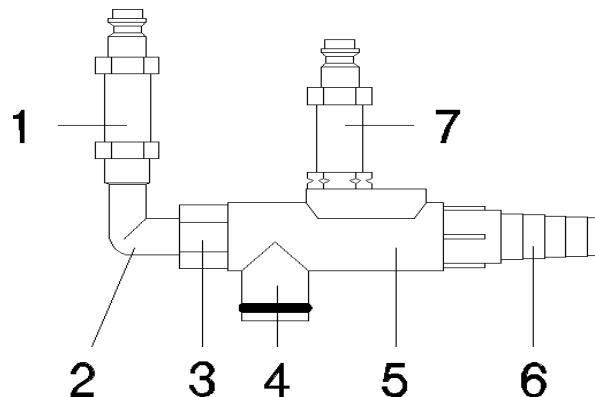
Powder Hopper

1. Disconnect the quick release fitting for the fluidization air.
2. Remove Gun Pumps.
3. Disconnect the ground cable.
4. Remove cover and wipe with a clean, dry brush and a clean dry cloth.
5. Clean fluidizing / suction tube and gun pumps.
6. Empty residual powder into a container.
7. Remove the clamping ring around the plenum and body.
8. Vacuum out powder hopper, especially the fluid plate.
9. Reassemble the powder hopper. **WARNING!** - Notice the fluidplate note "This Side Down" when reassembling the hopper.

NOTE: Do not refill the hopper until coating operations are to be resumed. Do not wash the fluid plate with any solvents or water!

Gun Pump (PI-3)

Cleaning should be done daily before starting work or with a color change.



- | | |
|------------------------------|------------------------------------|
| 1. Conveying air check valve | 5. Pump body |
| 2. Elbow joint | 6. Hose fitting |
| 3. Injector nozzle | 7. Supplementary air check valve * |
| 4. Hopper fitting | |

* The notch indicates the valve inside \emptyset : notch = \emptyset 1.4mm.

(Figure 9)

1. Remove the gun pump from the hopper lid.
2. Pull the hose off the hose fitting (6).
3. Remove the hose fitting (6) from the pump.

4. Clean the hose fitting (6) with the spiral gun brush, and with compressed air that is free of water and oil, check the hose fitting for wear.
5. Clean the pump body (5) with compressed air that is free of water and oil. Any contamination can be seen through the opening of the hopper fitting (4).
6. Reassemble the pump and fit on the hopper lid.

Caution: If the pump is severely fouled, it must be disassembled.

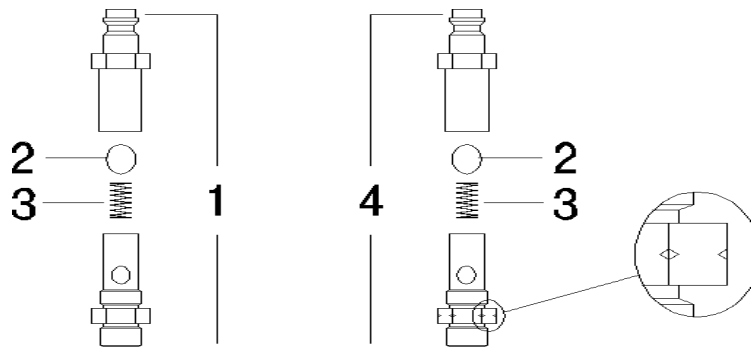
Remove the check valves (1 and 7) and the injector nozzle (3) with the correct sized wrench. Clean the component parts with compressed air and, if necessary, dissolve sintered deposits with nitro-thinners (after dismantling the check valve).

Do not scrape. Do not use acetone !

Gun Pump Check Valves

Cleaning the check valves (1 and 4)

Care should be taken when disassembling the check valves, that the spring and / or the ball are not lost.



Attention : Do not place the ball in solvents !!!

- | | |
|--------------------------------|-----------------------------|
| 1. Check valve (without notch) | 3. Spring |
| 2. Ball | 4. Check valve (with notch) |

(Figure 10)

The PI-3 pump should be cleaned at least once a day.

Normally it can be disassembled as shown in the previous page (Figure 7).

Once a week or in case of heavy contamination

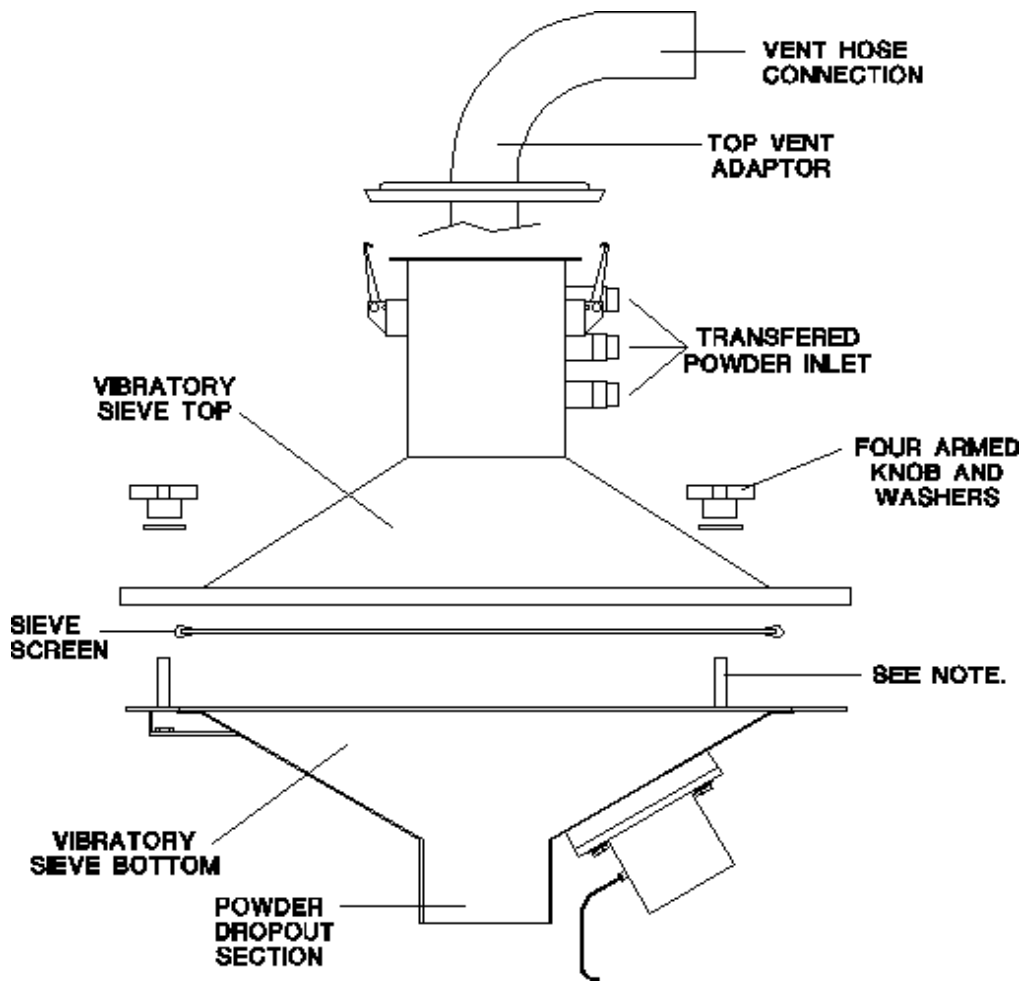
The gun pump should be disassembled totally. See also the spare parts drawings on the following pages.

Vibratory Sieve

1. Disconnect any incoming transfer hoses.
2. Remove the vent hose from the top vent adapter piece.
3. Disconnect the two clamps holding the top vent adapter piece.
4. Remove the top vent adapter piece and clean.
5. Loosen and remove the (4) steel hand knobs and washers.
6. Lift and remove the top portion of the sieve and clean.
7. Remove and discard any scrap material on the screen.
8. Remove the screen and clean with compressed air free of oil and water.
9. Clean the bottom portion of the sieve body.
10. Change the 4" dropout hose if changing colors.
11. Reassemble the sieve.

NOTE: The screen has a ground strap that is connected to a stud on the bottom portion of the sieve. This must be reinstalled to insure safe operation of the sieve.

(Figure 11)



Parts Identification

Ordering Spare Parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

1. Type, and serial number of your powder coating equipment.
2. Order number, quantity, and description of each spare part

Example

1. Type MPS 1-F, Serial No: xxxx xxxx
2. Order No: 106429, 5 pieces, fine wire fuse

When ordering cable or hose material the length required must also be given.

All dimensions of plastic powder hoses are given as external diameter (o.d.), and internal diameter (i.d.): e.g. \varnothing 8 / 6 mm, 8 mm outside dia. (o.d.) / 6 mm inside dia. (i.d.)

To place a Spare Parts Order: call 1-800-345-8451 or
FAX order to 1-800-345-8464

WARRANTY

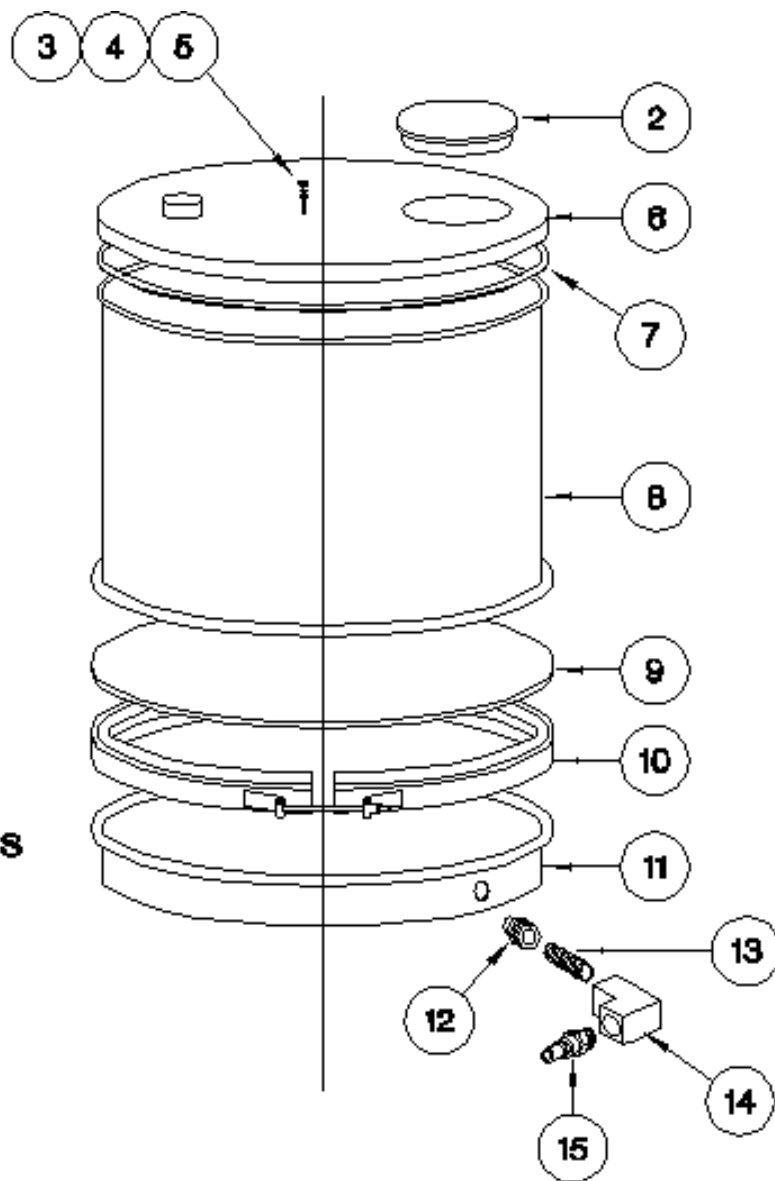
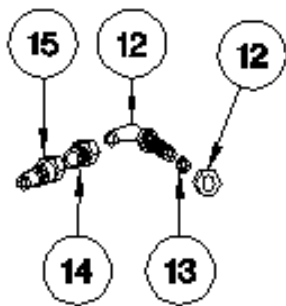
Spare Parts: One hundred eighty (180) days from the date of purchase, or for the balance of the system warranty. Rebuilt parts or repairs will have a warranty period of ninety (90) days.

**Use of parts manufactured by any supplier other than Gema
voids all warranty !**

Powder Hopper (R-10, 24, & 36)

Item	Description	R10	R-24	R-36
1	Hopper Assy,R-10,Seal	121074		
1	Hopper Assy,R-10,Seal,SI	121076		
1	Hopper Assy,R-10,LP	120975		
1	Hopper Assy,R-10,LP,SI	121075		
1	Hopper Assy,R-24,Seal		121300	
1	Hopper Assy,R-24,Seal,SI		121299	
1	Hopper Assy,R-24,LP		121301	
1	Hopper Assy,R-24,LP,SI		119091	
1	Hopper Assy,R-36,Seal			121795
1	Hopper Assy,R-36,Seal,SI			121794
1	Hopper Assy,R-36,LP			121793
1	Hopper Assy,R-36,LP,SI			119111
2	Plug, Hole, 9" dia.	113987	113987	113987
3	Nut, Knurled, M6 Thd.	106432	106432	106432
4	Washer, Lock	111737	111737	111737
5	Nut, Hex, M6 Thd.	107481	107481	107481
6	Hopper Lid	120971	118664	118674
7	Lid Gasket	117088	118692	118693
8	Drum, Round, Powder Hopper	117079	119018	119019
9	Membrane, Fluidizing	117087	119068	119069
10	Ring, Clamping	117089	119016	119017
11	Hopper Plenum	117080	119023	119024
R-10 Hopper Fluidization Fittings				
12	Fitting, Bulkhead	106586		
13	O - Ring	111751		
14	Fitting Adapter	121136		
15	Fitting, Quick Disconnect	106539		
R-24 & R-36 Fluidization Fittings				
12	Fitting, Bulkhead		107322	107322
13	Fitting, Nipple		107338	107338
14	Fitting, Elbow	110439	110439	
15	Fitting, Quick Disconnect		105795	105795

**R-10 HOPPER ONLY
FLUIDIZATION FITTINGS**



Vibratory Sieve Spare Parts

Item	Description	Part Number
1.	Sieve Assembly, Vibratory, 22"	118979
2.	Sieve Bottom	118843
3.	Sieve Screen Assembly, 18", 36 mesh	118986 (standard)
	Sieve Screen Assembly, 18", 26 mesh	122065
	Sieve Screen Assembly, 18", 46 mesh	121477
4.	Sieve Top	118844
5.	Washer 3/8"	118854
6.	Four Arm Knob 3/8-16 unc	118855
7.	Latch	111242
8.	Vibrator, M-60	118857
9.	Sieve Vent Adapter	118846
10.	Gasket, Neoprene	120284

