

**OPERATING and MAINTENANCE MANUAL**

**SYSTEMS III MSH-4-24-2**

**for**

***SRS, Inc.***

Serial # S0249602-1

***February 2003***

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## **I. GENERAL SYSTEM DESCRIPTION**

This system has been designed utilizing SAFE Systems standard components, which have been assembled into a compact modular arrangement, to provide Abrasive Blasting, Abrasive Recovery, and Classification capabilities for use with steel abrasive blast media.

The components in the system have been selected to maintain reliability, ease of maintenance, and high production in situations where the use of steel abrasive can be employed to reduce costs and environmental problems.

### **COMPONENTS**

The following equipment comprises this system:

1. One (1) SAFE Model MS-4AH, 4-outlet Abrasive Blast Machine.
2. One (1) SAFE 24 ton capacity Abrasive Storage Hopper.
3. One (1) SAFE Model SSI-AI Integrated Abrasive Interceptor/Classifier (Rotary Separator).
4. One (1) SAFE System Secondary Air-Wash Chamber (Fountain Separator).
5. One (1) SAFE Model IV-800 Compressed Air Induction Vacuum Producer Unit.
6. Two (2) SAFE Model VDC-4, 2400 CFM Vacuum Dust Collector.
7. One (1) SAFE System Abrasive Spreader.
8. One (1) Electrical Control Panel and System.

### **NOTES OF CAUTION**

1. Operate the equipment with only trained personnel present at the equipment. A record should be kept of those personnel that have been properly trained.
2. The equipment should be operated in a manner consistent with the instructions and Operating and Maintenance Manuals.
3. This equipment was designed and engineered to be used with steel abrasive only. If you wish to use another type of abrasive, please contact SAFE Systems, Inc. for special instructions and/or equipment changes.

## **WARNINGS**

1. Safety equipment and N.I.O.S.H. approved respiratory devices are required in blast areas.
2. This unit is under pressure during operation. Use extreme caution operating or making any adjustments.
3. All electrical power must be disconnected from the control box prior to providing maintenance to the equipment. This is very important prior to opening all inspection manway hatches or clean-out ports, **except** the manway hatch located on top of the storage hopper. A safety screen is located beneath the storage hopper manway hatch. This safety screen remains in place when the hatch is removed, thus, personnel can safely open this hatch to check the abrasive level in the storage hopper visually without shutting off the power.

## **SET-UP PROCEDURE**

1. Connect power supply, 120 VAC, to electrical control panel and energize. #12 Ga. wire should be used as a minimum.
2. Connect compressed air line(s) from compressor to air supply connection.
3. Connect vacuum hose to proper connection on rotary separator
4. Start air compressor(s) and allow it to build up to maximum air pressure.

The SYSTEMS III MSH is now ready to operate in the vacuum recovery mode.

A start/stop switch is provided on the control panel for the operation of the interceptor/classifier and vacuum producer and spreader when the hopper and blast vessels are full and the operator is ready to either blast or recover abrasive.

## **NOTES:**

1. The SYSTEMS III interceptor/classifier can also be used with SAFE Systems Model ARS-750, ARS-1100 Vacuum Producer Units or other liquid-ring type, or positive displacement type vacuum producers of the same CFM. SAFE Systems includes a single point connection with its ARS-750, ARS-1100 Vacuum Producer only to interlock the ARS-750, ARS-1100 operation with the interceptor/classifier drum for automatic shut down when, and if, required. However, electrical wiring modifications must be made to interlock the operation of the interceptor/classifier drum with the automatic shutdown controls of other liquid-ring vacuum, positive displacement type producers. Contact SAFE Systems service personnel for details.
2. The trash chutes should be emptied every four (4) hours of vacuum operation or as needed.

## **II. OPERATING INSTRUCTIONS**

### **A. MS-4AH BLAST VESSEL**

#### **SET-UP PROCEDURE**

1. Run the blast hose through the pinch valves and connect to the metering valves. Be sure to wire the hose couplings together. Small holes are provided on the base couplings.
2. Connect the remote control deadman cords to their proper receptacles on the bottom side of the control box. Each blast outlet is controlled by the actuator switch (deadman switch) mounted near the blast nozzle. Pressing the switch opens the flow of air and abrasive. Releasing the switch closes the flow.

The actuator switch is designed to function as a "deadman" control. The switch should not be tied down, wired or blocked to maintain operation. The actuator switch and control cord are **your life line**. ***Use them properly!*** ONLY operate the switch when needed.

3. Start the air compressor and allow it to build up to a maximum air pressure (150 PSIG).
4. Open valve from compressor to blast machine. **DO NOT** open air supply valve on the blast machine unit until the compressor has reached maximum pressure. This procedure allows the small black tank which controls the remote control system to become pressurized. This tank is supplied with a check valve which keeps the tank under pressure at all times.

The blast machine is now ready to be filled with abrasive. The following procedure should be followed:

***NOTE:\**** The abrasive charge valves will not open when the blast machine is under pressure. Thus, an operator must exhaust the compressed air from the blast vessel.

1. The hopper abrasive maintenance valves located on the interior of the storage hopper must be in the open position (no air pressure on the lines located on hopper).

#### **For Manual operation, reference the following:**

2. Open abrasive charge valve by closing valve 25B and opening 25A. This allows the air pressure to be exhausted from the charge valve and open. The fill cycle requires about four (4) minutes when the blast machine tank is completely empty. When the fill process is complete, perform Step # 2 above in reverse.

#### **For Automatic filling operation, reference the following:**

3. The MSH-4-24-2 is equipped with an automatic remote filling circuit. A deadman switch may be connected to this circuit so that when pushed down and released, it will automatically depressurize the blast machine, open the abrasive charge valves, and let the abrasive from the hopper fill the blast pot. It will then reverse the actions and the charge valves will close and the blast pot will pressurize and the blaster can start blasting again. This whole process takes about five (5) minutes.

## **BLAST OPERATION**

1. Open main air supply valve (RED) and allow the unit to pressurize. Be sure the manway is securely closed. While the unit is pressurizing, open the manifold drain valve (WHITE) slightly to remove excess moisture. **NOTE:** This valve can be left slightly open while blasting if water is present. However, if water is present continuously, beware that compressed air drying equipment has failed. Water in the blast pot may plug the blast outlets.
2. Each operator station is equipped with two (2) valves. Air supply (GREEN) and abrasive supply (BLACK). These valves should be open completely while blasting. Under **NO** circumstances use the abrasive supply valve (BLACK) to meter the amount of abrasive. This will only damage the valve internally. (Refer item 3)
3. To regulate the abrasive flow, turn the ½" nuts on the abrasive metering valve. They will adjust the size of the hole in the rubber orifice. Usually one complete turn of each unit will noticeably change the amount of abrasive being fed to the blast nozzle.
4. To "blow down" an area that has been blasted, close the abrasive supply valve. This will allow only air to pass through the blast hose.

### **To manually depressurize the blast machine. . . .**

1. Close the main air supply valve (RED).
2. Shut down the air compressor.
3. Open exhaust valve (BLUE).

## **MAINTENANCE AND TROUBLE SHOOTING**

The black air reserve tank should be drained daily prior to start up. This tank collects dirt and condensate that could harm the solenoids in the control system. The control system is fitted with a "Y" strainer device.

### **If the unit fails to operate. . . .**

1. Check to make sure power is "on". This is indicated by a green pilot light.
2. Make sure unit is pressurized. See Step # 1 above.
3. Make sure the remote control cords are connected to their proper receptacles in the bottom of the control panel and verify the control cords are not damaged. See Set-Up Procedures, Step # 2.
4. Make sure both the air supply and abrasive supply valves are "on". See Step # 2 above.

### **If power is "on", but, pilot light fails to operate. . . .**

1. Check fuses.
2. Check bulb in light.

### **If One (1) blast outlet operates and others do not. . . .**

1. Check to make sure remote controls cords are connected to their proper receptacles in the bottom of the control panel. See Step # 4 below.
2. Make sure control cord is properly wired in plug.
3. Check the control cord for broken or worn areas.
4. Check the switch mechanism with an ohm meter.

## **B. ROTARY SEPARATOR, INTERCEPTOR/CLASSIFIER SSI-AI**

The Rotary Separator (SSI-AI Interceptor/Classifier), when integrated into the SYSTEMS III MSH, provides an intensive air wash of the recovered abrasive as well as removal of larger contaminants.

The interceptor/classifier consists of a motorized rotating drum which allows the recovered abrasive to fall in a regulated curtain through the air stream created by the vacuum producer unit. Thus fines are removed from the abrasive. Large contaminants are "scalped" by the drum and deposited in an air tight trash chute integrated with the separator. The dirty air (dust laden air that is removed from the grit) flows from the top rear of the separator and is transported to Dust Collector No. 1 (the dust collector labeled No. 1). The clean air leaving Dust Collector No. 1 is transported back to the base of the rotary separator to move the abrasive to the 2nd classifier.

The abrasive cleaning process of the rotary separator can be adjusted by changing the angle of the separator. This is accomplished by raising or lowering the rear of the housing with the jack provided. Raising the level increases the time the abrasive stays in the air stream. Lowering the level decreases the time the abrasive stays in the air stream. This setting needs to be adjusted to match the recovery application.

The operation of the SSI-AI is controlled by the motor starter located on the control panel. This function is interlocked with the IV-800 Compressed Air Induction Vacuum producer unit. The drum must be operating during the vacuum operation. If the drum fails to operate, the vacuum producer will shut down.

**NOTE:** When utilizing a vacuum producer other than the induction vacuum unit provided with the SYSTEMS III MSH (i.e. liquid-ring units) special consideration must be made to insure the drum is operating. There is an electrical interlock between the SYSTEMS III MSH and the provided vacuum or ARS-750, ARS-1100 Vacuum Produce Units only. There is not an electrical interlock between the SYSTEMS III MSH and other vacuum units. Consult SAFE Systems personnel for wiring procedures for these other units.

If the vacuum recovery process takes place without the drum in operation, the drum will fill with abrasive and will result in damage to the unit.



## **MAINTENANCE AND TROUBLE SHOOTING**

### **Drum will not operate:**

1. Make sure electrical power is properly connected.
2. Energize motor starter control switches on control panel.

### **Motor starter is energized but drum will not operate:**

1. Be sure the drum is free from abrasive.
2. Make sure trash chute is empty. Trash high level can interfere with drum operation.

### **Drum is turning but drive motor is excessively hot:**

1. Make sure trash chute is empty. Trash high level can interfere with drum operation.
2. Verify that power supply cord to panel is of sufficient size to handle amperage. See set-up procedure.

**Monthly** Verify drive chain tension. Adjust as necessary.

**Annually** (or 2000 hours of operation) Inspect magnetic wear plate on the interceptor/classifier.

## **C. FOUNTAIN SEPARATOR, 2ND STAGE CLASSIFIER**

The Fountain Separator, 2nd Stage Classifier, has no moving components and requires little or no maintenance.

It is important that sufficient air flow be maintained to allow this wash chamber to properly clean the abrasive. A 60% air / 40% abrasive flow should be maintained to maximize cleaning and recovery rates.

Dirty air (air laden with dust removed from the grit) flows from the top of the 2nd stage classifier and travels to Dust Collector No. 2. The cleaned air then travels to the vacuum system (air induction vacuum if you are using the vacuum system that is mounted on the unit).

The fountain separator has one adjustment point. The target plate rod in the center of the separator can be adjusted up or down. Raise the rod up if there are little or no fines being collected in dust collector #2. Lower the rod if there is too much good abrasive being carried over into dust collector #2.

NOTE: This adjustment may need to be changed to match the needs of different recovery applications.

### **Maintenance - yearly, or every 2,000 hours of operation --**

1. Remove cover and check for wear of target plate and layers of the 2nd stage classifier.
2. Check all gasketed surfaces for leakage.

## **D. COMPRESSED AIR INDUCTION VACUUM MODEL IV-800**

The IV-800 vacuum producer unit is connected to the vacuum piping on the SYSTEMS III MSH unit, but can be removed to allow it to be used as an independent unit.

The SYSTEMS III MSH has a solenoid operated diaphragm valve installed on the air inlet. This valve allows the compressed air required to operate the vacuum to be turned off/on from the SYSTEMS III MSH control panel.

It is important that the compressed air supply be of sufficient capacity (800 CFM and 100 PSIG at the vacuum which typically means 125 PSIG at the air inlet connection of the machine) to allow the vacuum producer to operate properly. Insufficient compressed air capacity will seriously hinder the performance of the vacuum producer and will result in clogged vacuum lines, etc.

### **MAINTENANCE and TROUBLE SHOOTING -**

#### **If compressed air is turned on to the unit but produces insufficient suction. . . .**

1. Make sure diaphragm air supply valve is operational.
2. Make sure air compressor(s) is of sufficient volume and pressure to operate vacuum (800 CFM at 100 PSI located at the vacuum) or more. This typically means that 125 PSIG must be supplied at the compressed air inlet pipe that is connected to the air compressor(s).
3. Make sure compressed air supply lines are of sufficient size to supply the correct volume of air.
4. Make sure nozzles are correctly aligned. Adjustment screws are provided for this function. There should be  $\frac{3}{4}$ " - 1" gap between nozzles.
5. Check differential pressure gauge of dust collector to see if filters are clogged.

Please note that all vacuum units have been tested for compressed air flow at 90 - 100 p.s.i.g. prior to shipment. Please contact SAFE Systems personnel for test results, if required.

## **E. VACUUM DUST COLLECTOR MODEL VDC-4**

### **INTRODUCTION**

Two (2) dust collectors, Model VDC-4, are provided with the System III Model MSH. The Cartridge Dust Collector is an aspirated cartridge, self-cleaning unit designed to remove airborne dust coming from the *customer-supplied* collection tank or hopper. It is not intended to collect abrasive. The abrasive should be vacuumed up into a *customer-supplied* collection tank. See the system configuration drawing #074M01 in this VDC manual.

**NOTE:** It is VERY IMPORTANT that the dust hopper not be allowed to overfill as that may result in carryover damaging the filters, the dust collector housing and/or even destruction of the vacuum pump.

The VDC-4 is designed for operation under vacuum up to a maximum of 29" Hg. The incoming air passes from the outside to the inside of the cartridges; enters the upper or clean air plenum; and exits through the clean air outlet. Cartridges are cleaned in sequence by back flushing with compressed air through the clean air plenum. A short burst of compressed air creates this momentary airflow reversal which is limited to only one (1) cartridge at a time. Therefore, the unit continues to collect dust while its cartridges are being cleaned.

### **CONTROL SYSTEMS**

A solid-state Sequential Controller located in the control box determines the order in which the solenoid valves will be operated; the length of time that each valve will be opened; and the time interval between such valve openings. The solid state controller operates continuously whenever electrical power is supplied to it.

The dust collector is equipped with a compressed air regulator/filter and a pressure gauge. This filter/regulator is intended to remove only minor amounts of water and dirt. Periodic draining of condensate from the compressed air reservoir (manifold) and regulator/filter is recommended.

**NOTE:** It is very important that only clean, dry air be supplied to the dust collector. Wet air will drastically shorten the life of the filters.

### **COMPRESSED AIR REQUIREMENTS**

Recommended operating pressure is 90 to 105 PSIG.

The total usage of compressed air is a variable that is dependent upon the amount and type of dust being collected; the size of the dust collector; the condition of the filter cartridges; the set points of the RATE and DURATION timers in the Sequential Controller and the pressure in the air reservoir (manifold). When the DURATION timer is set at its normally recommended time of 0.1 second, the approximate amount of air usage will be as follows:

Number of Cartridges	Air Usage per Pulse in Cubic Feet Free air (when RATE timer is set at 60 seconds)
4	0.9

The air usage rate in CFM of free air depends upon the setting of the RATE timer. If the timer is set at one (1) minute, the rate will be 0.9 CFM. If the timer is set at twenty (20) seconds, the rate will be 3 times greater, or 2.7 CFM.

## **SAFETY PRECAUTIONS**

SAFE Systems, Inc. relies on the skills and expertise of its customer and any consulting engineers and/or installing contractor hired by that customer to properly design and install the dust collection system of which the Dust Collector is a part. Please take precautions as required to minimize the inherent risk of dust combustion, fires, and explosions. Be sure to read this manual thoroughly and comply with all precautionary statements relative to worker safety.

## **WARNINGS**

Take special care whenever the door of the control box is open. With power ON, one side of the A.C. line is common. The full line voltage can appear from any electrical point on the circuit board to the metal enclosure or to ground.

Do not collect combustible materials along with dust from ferrous grinding or other spark-generating operations. Sparks caused by such operations may start a fire in the combustible dust.

Under no circumstances should anyone be allowed to discard a lighted cigarette or other burning material into an inlet hood or ducting of the dust collection system.

It is the responsibility of the user to comply with all applicable national and local fire and safety codes.

The Dust Collector does not contain explosion vents, although they are available by special order. Refer to NFPA 68 "Guide for Explosion Venting" or your insurance underwriter for recommendations regarding the sizing and installation of explosion vents.

## **UTILITIES SUPPLY AND CONNECTION**

### **COMPRESSED AIR SUPPLY**

A ¾" pipe, compressed air supply line is recommended to run the dust collector. The dust collector is equipped with a regulator/filter and a pressure gauge. This regulator/filter is intended to remove only minor amounts of water and dirt. Periodic draining of condensate from the air reservoir and regulator/filter is recommended. It is very important that only clean, dry air be supplied to the dust collector. Wet air will drastically shorten the life of the filters.

Recommended operating pressure is 90 to 105 PSIG.

### **ELECTRICAL CONNECTIONS**

The sequential controller that controls the VDC-4 is located in the main control box and is powered by 120 VAC.

## **OPERATION AND MAINTENANCE**

### **INITIAL CHECK-OUT AND START-UP**

Open the manual shutoff valve and set the pressure regulator to deliver air at 90 to 105 PSIG.

Open the door of the control box. Set the RATE (OFF) timer for five (5) seconds. Set the DURATION (ON) timer for 0.10 second.

About one (1) second after the line pilot lamp lights, the output load lamp at Terminal No. 1 should light for 0.1 second and the first diaphragm valve should "pulse". Five (5) seconds after that, there should be a pulse for one tenth of a second, etc. Keep watching to make certain that the lamps at all the terminals (through the terminal to which the reset wire is connected) light and that all the diaphragm valves are heard to pulse. Five (5) seconds after the lamp at the terminal to which the reset wire is connected has lit, the lamp at Terminal No. 1 should again light and the cycle should start over.

The cleaning cycle described in the paragraph above will continue to repeat so long as the Sequential Controller has power.

Pre-coating of cartridges with a suitable filter aid material is recommended. A simple feeder and qualified material are available from the manufacturer. With the controls set to pulse continuously at 5-second intervals, feed the filter aid material five (5) to ten (10) pounds per cartridge through an open hopper discharge device or into the inlet duct. Repeat as frequently as desired. Appropriate filter aid material will both increase efficiency and increase cartridge life.

Reset the RATE (OFF) timer to sixty (60) seconds. Check the DURATION (ON) timer. It should be set for 0.1 second. Close the door of the Control Box. Tighten all door clamps.

Make sure air outlet hole is open before starting dust collector and any equipment hooked up to dust collector.

### **NORMAL OPERATION AND MAINTENANCE**

The dust collector requires only an occasional visual check to make sure that nothing has gone wrong and replacement of the cartridges when necessary.

DO NOT use the hopper as a receptacle for the temporary storage of the collected dust. It is merely a large funnel from which the dust must be removed on a continual basis. If dust is allowed to collect in the hopper, it will tend to re-entrain in the air stream, re-depositing on the cartridges and shortening their life. If the dust being collected is sticky or has long fibers in it, check the hopper frequently to make sure that the dust has not bridged across and plugged the outlet.

After each dumping of dust from the dust collector, make sure the butterfly valve is completely closed to the last notch on the handle indicator. This can be difficult but failure to completely close this valve may cause damage to the hopper shell.

## CARTRIDGE INSTALLATION

When the pressure drop across the cartridges is between six (6) to eight (8) inches on the Magnehelic gauge, cartridges should be replaced as described in the following instructions. Prior to installing new filters, verify that the cartridges have not been damaged during shipment, storage or transporting of the unit.

Shut off electrical power to the dust collector.

Refer to drawing #078M02 in this section for a graphic depiction.

The cartridges are removed and installed through the main access door of the Dust Collector. Open the door using the container-style handle. Remove the top nut and loosen the second, locking nut, on the top of the dust collector. This will allow the threaded rod (adjustment rod) to lower to a position where the top of the threaded rod is flush with the top of the bottom nut. This will allow the four (4) legged filter platform to turn like a "Lazy Susan".

NOTE: Do not remove the second nut completely or the rod will drop down into the lower part of the hopper.

Remove and reinstall the filters on this turn-table platform. Once all new filters are in place, line the filters up with the capture rings located in the top of the dirty air chamber of the dust collector. Slowly tighten the nut on the top of the dust collector, which will raise the filters until they are sealed against the top of the dirty air chamber.

IMPORTANT: While tightening the nut, make sure the filters are rising straight and that they are all lined up correctly in their appropriate capture ring. This is best done with two people, one person tightening the nut while the other observes the filter line-up. Tighten the nut until the filters are tight and will not slide or move. Be careful not to over tighten the filters as this may cause the filters to collapse.

Once the desired tightness (approximately forty-five (45) ft. lbs. of torque) is achieved, install the second nut and tighten it down against the first nut to act as a jam nut so the adjustment rod can not loosen.

Close and fasten the access door and pre-coat the filters as described below. Pre-coating the cartridges with a suitable filter aid material will both increase efficiency and increase cartridge life. Filters are expensive. The cost of pre-coat material could save many dollars in filter costs. A simple feeder and qualified pre-coat material are available from SAFE Systems.

With the controls set to pulse continuously at five (5) second intervals, feed five (5) to ten (10) pounds of filter pre-coat material per cartridge through an open hopper discharge device or into the inlet duct. Repeat as frequently as desired.

Reset the RATE (OFF) timer to sixty (60) seconds. Check the DURATION (ON) timer. It should be set for 0.1 second. Close the door of the Control Box. Tighten all door clamps.

## **F. SPREADER**

The spreader is installed to provide a means of utilizing the maximum storage capacity of the system provided. The design utilizes the rotary vane type technology. The spreader is located inside top of the storage hopper. An external drive is located on top of the hopper for ease of maintenance.

A screen is located directly underneath the manway cover, on the top of the hopper. This screen enables the operator to safely open the manway and visually determine the abrasive level without totally shutting off the power to the unit. It is important to note that a limit switch is located on the top exterior of the storage hopper next to the manway. This limit switch will shut down the spreader and disconnect power from the hopper level probes whenever the manway cover is opened.

The spreader rotates at a speed of approximately 12 RPM and is intended to operate whenever an operator is recovering abrasive. A centrally located bearing supports the entire spreader and does not require any lubrication. Also, there are three (3) arms connected to the centrally located bearing by three (3) bolts.

The spreader unit can be maintained from inside the hopper and/or by removing the secondary air wash (Fountain Separator) chamber.

**NOTE:** All power **MUST** be shut off prior to removing the screen underneath the manway, should that be necessary. The spreader will not operate when the manway located on top of the storage hopper is removed from the opening. This design is extremely important for safety purposes.

A manual single phase motor starter is located inside the control box. In order for the spreader to operate, the switch must be in the "on" or "up" position.

Please refer to the drawings in this section for a pictorial of this spreader.



## **G. ELECTRICAL CONTROL SYSTEM**

The electrical control panel is a factory wired unit that is supplied with all interconnecting wiring to operate the various components of the SYSTEMS III MSH. Only a single point connection is required for the main power source. #12 GA wire should be used as a minimum.

Manual motor starters are provided for the start/stop operation of the interceptor/classifiers.

The control panel houses four (4) level control relays. The Blast Vessel High Level, Blast Vessel Low Level, and Hopper Low Level are provided for indication only. The Hopper High Level is provided to shut down the operation of the interceptor/classifier and air induction vacuum/alternate vacuum when the storage hopper compartment is full.

The solenoid valves to operate the blast outlets are also installed in the control panel.

The Spreader motor starter is located inside the control box. It is housed in a gray box with a manual switch located on its exterior. In normal operation, this switch should be in the "ON" or up position.

## **MAINTENANCE AND TROUBLE SHOOTING**

### **Power is turned on but the unit will not operate:**

1. Check condition of fuses F1 and F2. Replace if required.
2. Check overload on motor starter. Reset if required.
3. Check overload on drum drive motor. Reset if required.

### **Unit operates but drum motor runs hot:**

1. Check power supply for proper size.
2. Check to make sure trash chutes are empty.

## **SHUT-DOWN PROCEDURE**

### **Vacuum Recovery Process**

1. Allow vacuum hoses to clear of abrasive.
2. Stop interceptor/classifier and induction vacuum with switch on control panel.

### **To Depressurize The Blast Machine**

1. Close the main supply valve (RED).
2. Shut down the air compressor.
3. Open exhaust valve (BLUE).

### **NOTES:**

The blast machine exhausts at high pressure. Be sure the immediate area is clear of your fellow workers before opening.

Compressed air must be supplied to the SYSTEM III MSH unit when vacuuming with liquid-ring vacuum units and blasting is not taking place. This is to allow the abrasive charge valves in the hopper compartments to stay in the closed position to allow the hopper to remain sealed under negative pressure and to allow pulse cleaning of the dust collector.

### **III. LUBRICATION SCHEDULE**

#### **Monthly**

##### **Rotary Separator**

1. Check gearbox lubricant level. Add Mobil Gear 636, or equal, as required.
2. Lubricate flange bearings with EP2, or equal.
3. Lubricate pillow block bearings with EP2, or equal.
4. Lubricate drum bearings with EP2, or equal.

##### **Spreader**

1. Lubricate gearbox with Mobil Gear 636, or equal, as required.

#### **Annually, or every 2,000 hours of operation**

##### **Rotary Separator**

1. Change gearbox lubricant.

##### **Spreader**

2. Change gearbox lubricant.

***Please refer to the Lubrication Chart (drawing #077M13) following this page for lubrication point locations.***

#### **IV. GENERAL NOTES and STORAGE PERIODS**

##### **STORAGE PREPARATION:**

1. Remove all abrasive from the hopper compartments.
2. Remove all abrasive from the blast machine.
3. Drain all manifolds and moisture traps.
4. Empty trash chutes.
5. A tarp is recommended if the unit is to be stored outside or exposed to the weather.

##### **GENERAL NOTES:**

1. The Systems III MSH unit can be moved by crane when fully loaded. However, consideration must be made of the gross weight of the unit when completely filled with abrasive (approximately twenty-four (24) tons). Empty weight of the unit is 14,000 pounds.
2. A tarp or other weather cover should be installed over the top of the hopper for protection from the weather.
3. When blasting leaded paints, all wastes may be considered hazardous. Please verify and comply with all City, State and Federal codes.

**V. RECOMMENDED SPARE PARTS LIST**

<u>Description</u>	<u>Quantity to Stock for each MSH</u>	<u>SAFE Part Number</u>
FLM-15 fuse	2	
FLM-5 fuse	2	
Solenoid valve	1	31004710
Timer board (Goyen)	1	22010010
Diaphragm valve (Goyen)	1	31004430
Filter cartridge	8	10000001
Deadman switch	1	69110000
110-24 transformer	1	22012261
1¼" ball valve	2	31000390
Indicator light IDCC 6 volt	2	29032200
Warrick level probe IDIEO	1	21005612
Pressure gauge	1	31008160
Magnehelic gauge	1	32002020
AMV-3 washers	3	44001780
AMV-2 base 1½"	2	62030011
C-1 hose coupling	3	62030065
QG washers	6	35000040
1¼" 2-ply blast hose	50'	15475520
7/16" blast nozzle	2	74401009
Q-3 hose coupling	3	74620013
HE-3 nozzle holder	3	74630013
O-ring U-cup kit	2	44000506
Pinch valve complete	2	69020015
4" vacuum hose	15'	15475540
Toggle switch (D-M)	3	69110002

## VI. DRAWING INDEX

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