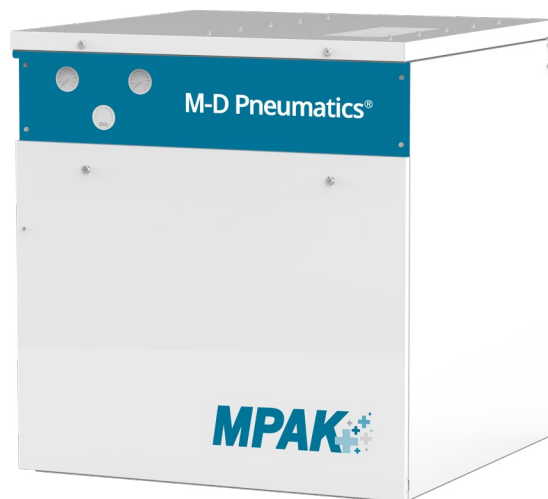


WARNING: Do Not Operate Before Reading Manual

OPERATING AND SERVICE MANUAL

Models

MDF2-A



Disclaimer Statement:

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SAFETY

FOREWORD

M-D Pneumatics blowers are the result of advanced engineering and skilled manufacturing. To be assured of receiving maximum service from this machine, the owner must exercise care in its operation and maintenance. This book is written to give the operator and maintenance department essential information for day-to-day operation, maintenance and adjustment. Careful adherence to these instructions will result in economical operation and minimum downtime.



DANGER

Danger is used to indicate the presence of a hazard which will cause severe personal injury, death, or substantial property damage if the warning is ignored.



Equipment starts automatically



Health Hazard –
Explosive Release of
Pressure



Cutting of Finger or Hand
Hazard – Rotating impeller
blade



High Voltage – Hazard
of Shock, Burn, or Death
Present until Electrical
Power is Removed



Asphyxiation Hazard –
Poisonous Fumes or Toxic
Gases in Compressed Air



Entanglement of Fingers
or Hand/Rotating Shaft

**WARNING**

Warning is used to indicate the presence of a hazard which can cause severe personal injury, death, or substantial property damage if the warning is ignored.

NOTICE

Notice is used to notify people of installation, operation or maintenance information which is important but not hazard-related.

PROHIBITION/MANDATORY ACTION REQUIREMENTS

Do not Operate Compressor with Guard Removed



Lockout Electrical Equipment in De-Energized State



Do Not Lift Equipment with Hook – No Lift Point



Loud Noise Hazard – Wear Ear Protection



Handle Package at Forklift Points Only



Read the Operator's Manual before Proceeding with Task

SAFETY PRECAUTIONS

Safety is everybody's business and is based on your use of good common sense. All situations or circumstances cannot always be predicted and covered by established rules. Therefore, use your past experience, watch out for safety hazards and be cautious. Some general safety precautions are given below:



DANGER

Failure to observe these notices could result in injury to or death of personnel.

- **Keep fingers and clothing away** from blower inlet and discharge ports, revolving belts, sheaves, drive coupling, fans, etc
- **Do not use the air discharge** from this unit for breathing – not suitable for human consumption.
- **Do not loosen or remove** the oil filler plug, drain plugs, covers, or break any connections, etc., in the air or oil system until the unit is shut down and the air pressure has been relieved.
- **Electrical shock** can and may be fatal.
- **Unit must be grounded** in accordance with the National Electrical Code.
- **Open main disconnect switch**, tag and lockout before working on the control.
- **Disconnect the unit** from its power source, tag and lockout before working on the unit – this machine may be automatically controlled and may start at any time.



WARNING

Failure to observe these notices could result in damage to equipment.

- **Stop the unit** if any repairs or adjustments on or around the blower are required.
- **Disconnect the unit** from its power source, tag and lockout before working on the unit – this machine may be automatically controlled and may start at any time.
- **Do not exceed** the rated maximum speed values shown on the nameplate.
- **Do not operate unit** if safety devices are not operating properly. Check periodically. Never bypass safety devices.
- **Ensure proper rotation of blower prior to start-up.** Failure to do so may result in damage to the blower.

02

INTRODUCTION

YOUR KEY TO TROUBLE FREE SERVICE

Thank you for investing in M-D Pneumatics quality. The M-D Pneumatics reputation for rugged dependability has been earned by over many years of service in demanding, industrial operations where downtime cannot be tolerated and efficient blower performance is expected.

Your M-D Pneumatics blower package is a precision engineered blower package that has been carefully manufactured and thoroughly tested at the state-of-the-art M-D Pneumatics Blower Factory.

As with other precision machinery, there are several relatively simple installation, operation and maintenance procedures that you must observe to assure optimum blower performance. There is no guesswork in the manufacture of your highly advanced M-D Pneumatics blower package and there must be none in preparing the blower to get the job done in the field.

The purpose of this manual is to help you properly install, operate and maintain your M-D Pneumatics blower package. It is essential that you review all sections of this manual in preparation for installing your blower package. Follow the instructions carefully and you will be rewarded with trouble-free M-D Pneumatics service... year in and year out.

IMPORTANT M-D Pneumatics TELEPHONE NUMBERS**YOUR AUTHORIZED M-D Pneumatics DISTRIBUTION**

NAME : _____
TELEPHONE : _____
FAX : _____
CONTACT : _____

For the location of your nearest local authorized distributor : <https://www.md-kinney.com/en-us/modals/find-a-distributor>

THANKS...FOR THE PRIVILEGE OF SERVING YOU WITH DEPENDABLE M-D Pneumatics QUALITY.

EQUIPMENT CHECK

Before uncrating, check the packing slip carefully to be sure all the parts have been received. All accessories are listed as separate items on the packing slip, and small important accessories such as lubricants and base covers can be overlooked or lost. After every item on the packing slip has been checked off, uncrate carefully. Register a claim with the carrier for lost or damaged equipment.



WARNING

Customers are cautioned to provide adequate protection, warning and safety equipment necessary to protect personnel against hazards involved in installation and operation of this equipment in the system or facility.

STORAGE

Your M-D Pneumatics Blower Package was packaged at the factory with adequate protection to permit normal storage for up to six (6) months.

If the unit is to be stored under adverse conditions or for extended periods of time, the following additional measures should be taken to prevent damage.

1. Store the blower in a clean, dry, temperature controlled (if possible) area.
2. Make certain inlet (vacuum package only) and discharge air ports are tightly covered to prevent foreign material from entering the air box.
3. All exposed, non-painted surfaces should be protected against rust and corrosion.
4. Provide adequate protection to avoid accidental mechanical damage.
5. In high humidity or corrosive environments, additional measures may be required to prevent rusting of the blower internal surfaces.
6. To prevent rusting of gears, bearings, etc., the oil reservoirs may be filled with normal operating oil.
7. Rotate the blower shaft (10 to 25 turns) monthly during storage. Inspect the blower shaft (near the shaft seal area) monthly and spray with rust inhibitor if needed.
8. For long term storage (over six (6) months), contact M-D Pneumatics Customer Service for recommendations.



CAUTION

Before running the blower, drain the oil and replace to the proper operating level with clean, fresh lubricant.

REMOVING PROTECTIVE MATERIALS



CAUTION

Follow the safety directions of the solvent manufacturer.

Package inlet (vacuum package only) and outlet connections are temporarily capped to keep out dirt and other contaminants during shipment. These

Equipment check

covers must be removed before start-up.

The internal surfaces of all M-D Pneumatics blowers are mist sprayed with a rust preventative to protect the machine during shipment. Remove this film upon initial startup, using any commercial safety solvent. Blower internals can be accessed by removing the flexible coupling on either the inlet or discharge side of the blower. Care must be exercised to lock out the blower to prevent start-up.



WARNING

Rotating components will cause severe injury in case of personal contact. Keep hands away from blower inlet and discharge ports.

On the belt drive, the belt tensioning device has been disabled for shipping. Refer to MAINTENANCE - BELT REPLACEMENT for tensioning procedure.

INSTALLATION

INSTALLATION

GENERAL

 CAUTION

Do not electric weld on the blower or base; bearings can be damaged by passage of current.

LOCATION

If possible, install the blower in a clean, dry, well-lighted, well ventilated area with plenty of room for inspection and maintenance. It is recommended to maintain a minimum clearance on all sides for control panel access, maintenance and adequate air flow. Refer to Figure-2.1 for dimensions on page 8.

LIFTING UNIT

Proper lifting and/or transporting methods must be used to prevent damage. The blower package is secured to a wood pallet and is to be moved using a tow motor or jack lift.

 CAUTION CAUTION

Lift the package by base only. Do not use other places such as motors, blowers or discharge piping as lifting points.

The eyebolts or lugs provided on the motors are for lifting the motors only and should not be used to lift any additional weight. All eyebolts must be securely tightened. When lifting the motors, the lifting angle must not exceed 15 degrees. Failure to observe this warning may result in damage to equipment or personal injury.

FOUNDATIONS

Place the package on a firm level surface. The package can be fastened to the foundation using the mounting holes found in each foot. Before securing to a foundation, verify the base perimeter contacts the foundation or floor.

DRIVE PREPARATION

The belt drive has been installed, aligned and tensioned at the factory. The package has an integral, automatic belt tensioning device that is disabled for shipping. To activate automatic belt tensioning, refer to page 25. If improper tension is suspected, contact M-D Pneumatics customer service with model and serial number information for drive group and proper tension requirements. Refer to Figure-4.7 & 4.8, page 26.

Installation

Check sheave alignment before operating. Alignment may be affected by inappropriate handling while in transit. Belt drives must be carefully aligned. Motor and blower pulleys must be parallel to each other in the same plane within 1/32 inch.

ELECTRICAL

The blower packages are factory wired internally for use with the voltage specified on the order. For enclosed packages, it is only necessary to connect the supply power and ground wires to the provided wire terminal blocks. The supply power, protective devices and motor starter components should be installed by a qualified electrical professional in accordance with NEC and any applicable local codes.

Layout

The dimensions and weights of the blower packages are indicated in the outline drawings in Figure-2.7 through Figure-2.8. The foundation has to be flat and level (max 0.006-in. on 1-ft.) and free from vibrations and suitable to support the weight of unit when no dynamic loads are involved.

NOTICE

Before mounting the blower package to a metal base contact M-D Pneumatics customer service or an authorized distributor for consultation.

Figure-2.1 below illustrates the recommended layout dimensions for one or more blower packages to allow for adequate installation and maintenance.



WARNING

DO NOT stand in the discharge area of the relief valve while the package is operating.

The doors or the openings of the room must be suitable for the passage of the forklift.

NOTICE

The "L" dimension in Figure-2.1 must allow adequate room to maneuver a forklift during package installation.

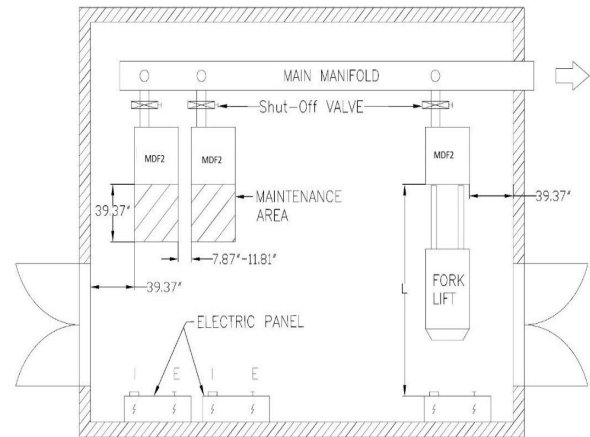


Figure - 2.1

Pipe-Lines

Provide terminal pipes of the plant following the dimensions indicated in the outline drawings indicated in Figure-2.7 through Figure-2.8.

- Install always a shut-off valve on the terminal pipes of the plant to insulate the blower package from the plant during service operations.
- Insert the flex connectors and relevant hose clamps on the terminal pipes as indicated in Figure-2.2.

The flex connector length must be as indicated by "L" dimension in the table at the top of the next page.

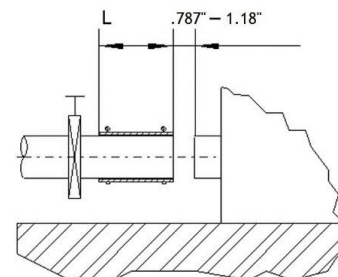


Figure - 2.2

FRAME SIZE	2
L	7.87"

- Position the package discharge pipe at the distance indicated in Figure-2.2.
- Position the flex connectors in the final position and fasten the hose clamps refer to Figure-2.3.

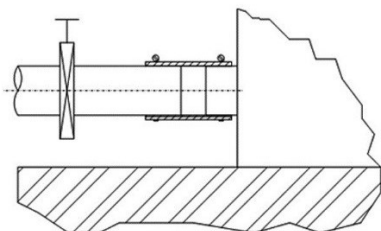


Figure - 2.3

**WARNING**

DO NOT stand in the discharge area of the relief valve while the package is operating.

The diameter of the discharge manifold must be chosen in order to obtain an average gas speed of 98.43 ft/s or below.

ON-SITE**ENCLOSED PACKAGES**

- Enclosed package frame 2 remove the front panel of the noise hood using the key.
- Only lift the package from the front using a fork lift as indicated in Figure-2.4.

FRAME SIZE	2
L	35.43"

Position the package in front of the terminal pipe as indicated as shown in Figure-2.3.

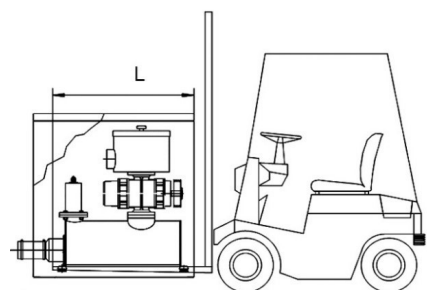


Figure - 2.4

SECURING PACKAGES TO FLOOR**ENCLOSED PACKAGES**

- Remove also the rear panel.
- Drill the floor as indicated in Figure-2.5.
- Fix the feet by expansion bolts.

FRAME SIZE	Expansion Anchor Bolt	Floor Drilling	Floor Drilling
		D in inch	L in inch
2	12*112	0.47	4.13

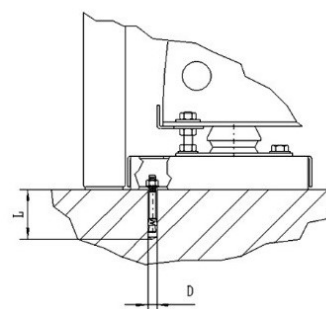


Figure - 2.5

INDOOR INSTALLATION

Provide adequate ventilation of the blower room as shown in flow diagram Figure-2.6 below.

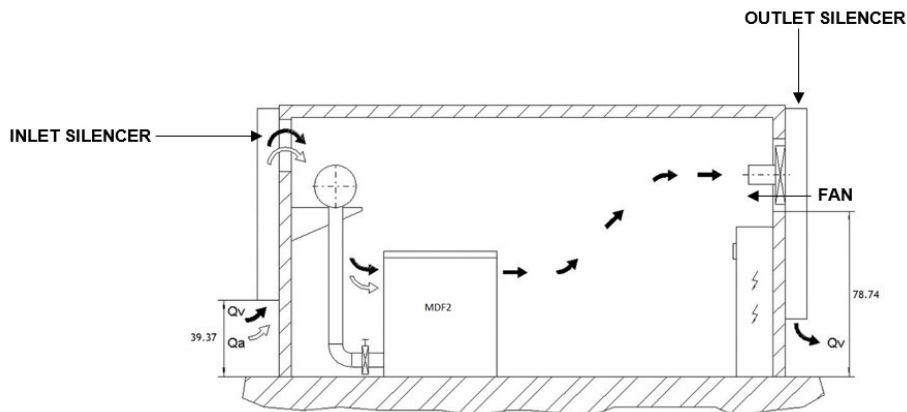


Figure - 2.6

Qa (CFM) total flow rate sucked by the blowers operating simultaneously.

Qv (CFM) total ventilation flow rate is calculated from the sum No (KW) of the motors operating simultaneously in the local following this relation:

$$Qv = 30 \times No$$

OUTDOOR INSTALLATION

Climatic Conditions	Measures
Strong sunlight	Protect with a canopy
Rainy / Snow	Protect with a canopy
Temperature - 20F to 104F	Use only enclosed blower package and heat inside air before any start-up
Wind > 65.62 ft/s (45 MPH)	Protect with windbreak walls
Hoarfrost	Heat inlet silencer
Dust / Sand storm	Special filter with pre-separator

NOTICE

NOTE: For different climate conditions contact MD-Kinney Inc. or an authorized distributor.

**FRAME-2 BLOWER PACKAGES, ENCLOSED, PRESSURE,
CLOSED-LOOP and VACUUM OVERALL DIMENSIONS**

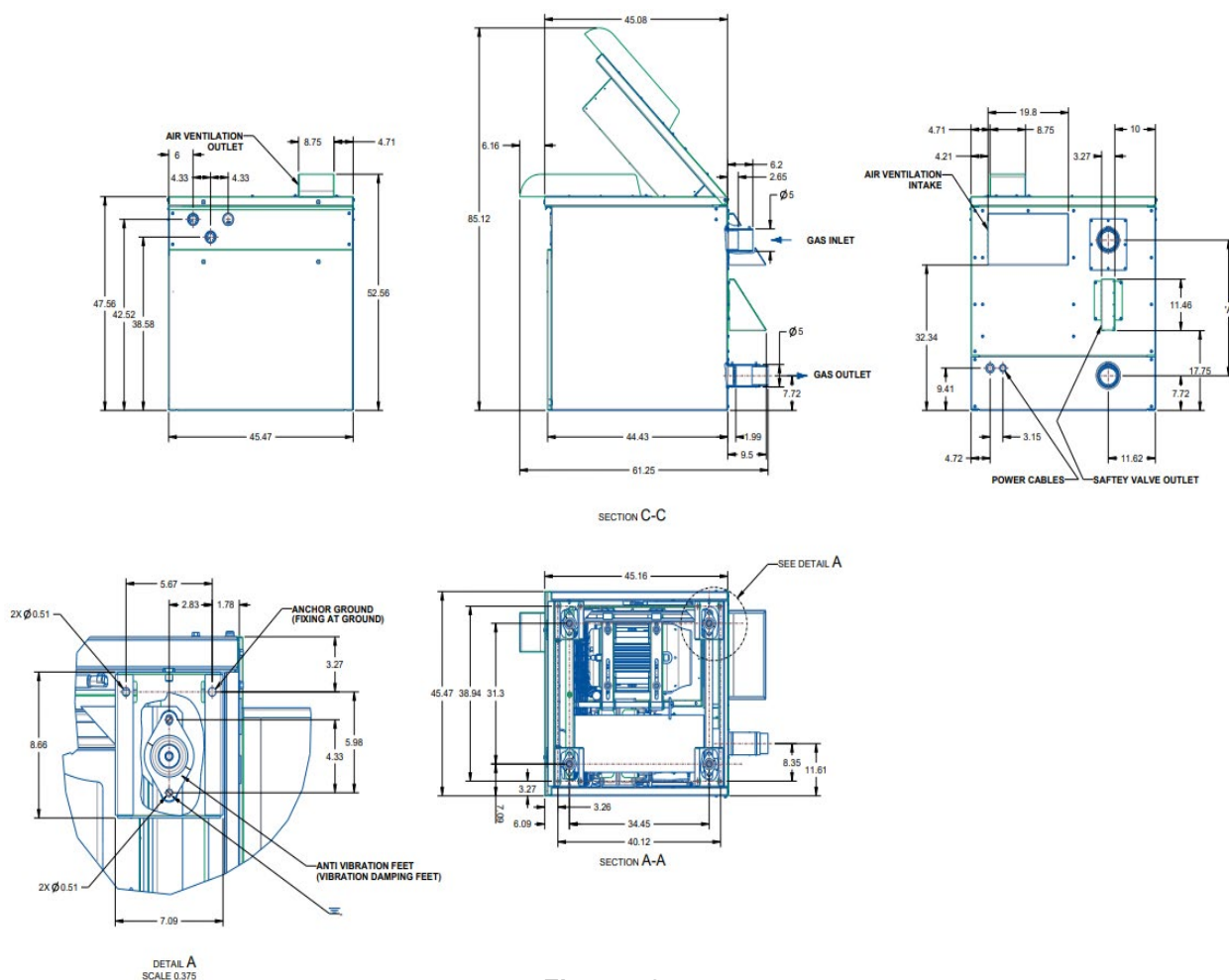


Figure - 2.7

All Dimensions in Inches

FRAME SIZE	Model	A	WEIGHT (lbs) ENCLOSED
2	6008	30.19	1014.13
	5006	29.08	

NOTICE

Weight is without motor.

ELECTRICAL WIRING DIAGRAM – FAN CONTROLLER

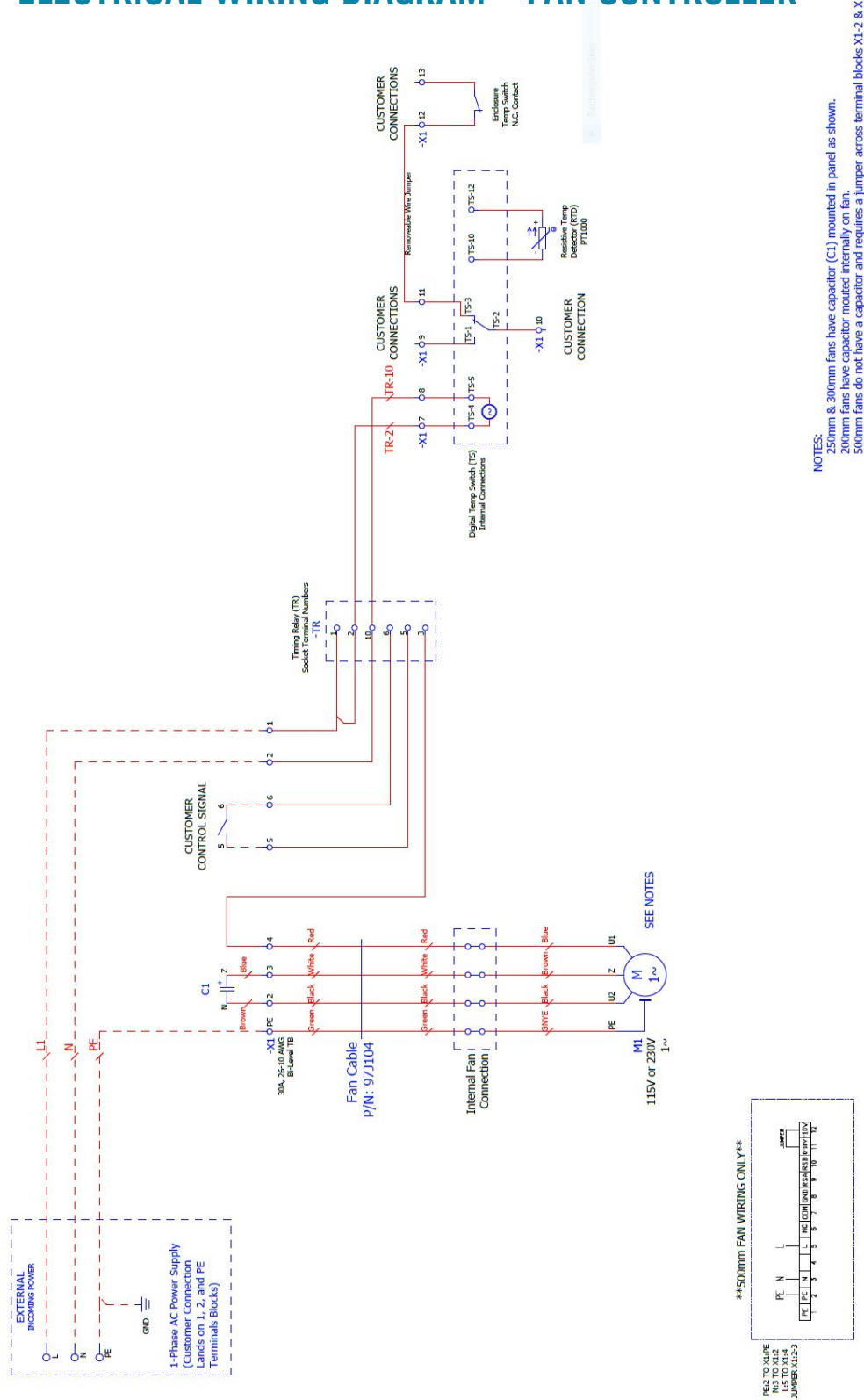


Figure - 2.8

ESTIMATED 60Hz. BLOWER DRIVE MOTOR FULL CURRENT RATINGS**3 thru 50 HP Blower Packages****ESTIMATED BLOWER DRIVE MOTOR FULL CURRENT RATINGS ESTIMATED**

230 VOLT, 60 HZ		
HP	Input Voltage	Motor AMPS (Estimated)
15	230	46.2
20	230	59.4
25	230	74.8
30	230	88
40	230	114
50	230	143

460 VOLT, 60 HZ		
HP	Input Voltage	Motor AMPS (Estimated)
15	460	17.4
20	460	23.7
25	460	29.0
30	460	33.7
40	460	46.1
50	460	56.5

NOTE: Estimated motor amperage is based on 2023 National Electrical Code (NEC) NFPA 70:2023. No corrections have been performed on these estimates for blower package supply wire sizing which must be based on applicable minimum NEC and UL-508A requirements.

ESTIMATED FAN MOTOR AND CONTROL BOX – ESTIMATED AMPERAGE**FAN MOTOR AND CONTROL BOX – ESTIMATED AMPERAGE**

Package Frame Size	Fan Size	Input Voltage (Hz.)	AMP. Draw
2	250 mm	115V (60Hz.)	1.47

Estimated amperage is based on control box power supply input amperage and fan motor nameplate full load amperage. No corrections have been performed on these estimates for blower control box supply wire sizing which must be based on applicable NEC and UL-508A requirements.

05

OPERATION

Future operating problems can be avoided if proper precautions are observed when the equipment is first put into service.

Before starting under power, the blower should be turned over by hand to make certain there is no binding, or internal contact.

Each size blower has limits on pressure differential, running speed, temperature rise, and discharge temperature which must not be exceeded.

**WARNING**

Operating beyond the specified operating limitations will result in damage to the unit.

It is important that the pressures and temperatures are measured directly at the ports of the blower to avoid error that may be caused by intervening pipe runs, fittings, etc.

Relief valves are supplied to protect against excessive pressure or vacuum conditions. These valves should be tested at initial startup to be sure they are adjusted to relieve at or below the maximum pressure differential rating of the blower. Refer to pages 34 and 35 for details.

In some instances, pressure may be relieved at a lower point than the blower maximum in order to protect the motor or the equipment by the blower.

Discharge temperature switches are required to protect against excessive inlet restriction or inlet temperatures. Blower damaged caused by failure to wire the fan controller to the drive motor starter or VFD will void the blower warranty.

Check valves are installed at the factory in the discharge line on pressure blowers and in the inlet line on vacuum blowers to protect the blower from motoring backwards when shut down under load.

For enclosed packages, always operate the package with the panels closed for optimum cooling and noise control. Operating with panels removed will cause over heating and excess noise levels.

NOTICE

Blower speed, line losses, elevation, and increased inlet temperatures will affect the maximum operating limitations.

PIPING

Inlet and discharge connections on all blowers are large enough to handle maximum volume with minimum friction loss. Reducing the pipe diameter on either inlet or discharge for a vacuum or pressure package will only create additional line loss and increase the overall pressure differential.

Excessive weight and thermal expansion of piping and fittings will cause internal misalignment and premature wear. Never allow the blower package to carry the weight of the pipe. A spool or sleeve-type expansion joint must be installed between the unit and the piping. Where a flexible connection is not possible, the weight of the rigid connection must be separately supported. All system piping must be cleaned internally before connecting the blower.

⚠ CAUTION

Blower, discharge silencer and all piping and tubing may be at high temperature during and after operation.

LUBRICATION**⚠ WARNING**

The blowers are shipped dry from the factory. Do not attempt to operate the blower before following proper lubrication instructions. Permanent damage to the gears, bearings and seals will occur.

M-D Pneumatics manufactures many different sizes of positive displacement blowers. Please refer to OIL CHANGE for proper lubricating instructions. For the enclosed package, the lubricant is filled through fill hoses on the left hand side under the top hinged cover. The packages are furnished with the first fill of M-D MAX Lubricant.

AIR FILTERS AND FILTER SILENCERS

Servicing frequency of filter elements is not time predictable. A differential pressure indicator, with a continuous gauge reading is supplied on pressure packages. The pressure indicator will tell how much of the service life of the filter element has been used. It will also eliminate both premature

filter servicing and premature blower failure due to a plugged filter when the filter pressure drop is used to establish maintenance points. Change inlet filter elements @ 10 in – H₂O differential pressure.

⚠ WARNING

Servicing the air filters is one of the most important maintenance operations to be performed to insure long blower life.

PERFORMANCE LIMITS AND WORKING CONDITIONS**Operating Environments**

Your blower package is suitable to operate only in a dust free environment with non-explosive or corrosive atmosphere of air or nitrogen.

⚠ WARNING

Your blower package is not suitable to operate in ambient conditions with explosive, toxic or dangerous gases

⚠ WARNING

Your blower package is not suitable to ingest liquids into the intake. Severe damage will occur.

FRAME SIZE	Blower	RPM		Pressure Differential[psi]	Vacuum [inch-Hg]	Temperature Rise[°F]	AWP [psi]
		MAX	MIN	MAX	MAX	MAX	MAX
2	5006-2	2850	700	14	14	195	15
	6008-2	2350	700	14	14	240	15

Figure - 3.1 performance Limits

Po Atmospheric pressure

P1 Blower inlet absolute pressure

P2 Blower outlet absolute pressure

T1 Blower inlet temperature

T2 Blower outlet temperature

Operation

1. Resonance phenomena in the plant is possible when speed of rotation is close to the minimum.
2. 320°F for blowers /R-F.
3. Discharge temperature switches are strongly recommended to protect against excessive inlet restriction and inlet temperatures.

Forbidden Uses

Forbidden Use	Risk	Measures
Operation in explosive atmosphere	Fire and explosion	Forbidden Uses
Suction of explosive gases		
Suction of toxic and dangerous gases	Environment pollution	
	Risk of operator's health	
Operation with shut off valve locked	Overheating	
	Fire	
	Blower stall and ejection of parts	
Operation with noise hood fan motor not working	Overheating	Forbidden Uses
	Fire	
	Blower stall and ejection of parts	
Suction of liquids	Blower stall and ejection of parts	Install a liquid separator on the suction nozzle of the blower
Operation with wrong direction of rotation	Ejection of dangerous substances	Inform the qualified personnel charged with the blower package
	Blower stall and ejection of parts	
Operation with speed higher than the maximum one	Blower stall and ejection of parts	Use suitable limits to the motor speed when it is supplied with frequency converter
Operation with speed lower than the minimum one		
Operation with pressure (P1) higher than the maximum one	Ejection of dangerous substances	Inform the qualified personnel charged with the blower package
Operation with pressure (P1) lower than the minimum one	Blower stall and ejection of parts	
Operation with pressure (P2-P1) higher than the maximum one	Blower stall and ejection of parts	
Operation with pressure ratio (P2/P1) higher than 2	Overheating	
Operation with temperature (T1) higher than the maximum one	Fire	
	Blower stall and ejection of parts	
Operation with temperature (T1) lower than the minimum one	Blower stall and ejection of parts	

Forbidden Use	Risk	Measures
Operation with temperature (T2) higher than the maximum one	Overheating Fire Blower stall and ejection of parts	Inform the qualified personnel charged with the blower package
Operation with temperature (T2-T1) higher than the maximum one	Blower stall and ejection of parts	

RESIDUAL RISK

Hazard	Residual risk
UNI EN 1012-1 Compressor	ENCLOSED PACKAGES
Cutting, severing, drawing in, trapping, entanglement, friction and abrasion	None with sound hood closed.
Fluid ejection	Discharge of relief valve Label C.9 on the sound hood Advice in the manual
Ejection of parts	None with sound hood closed
Loss of stability	None
Electric installation	None, only for the principal motor supplied directly by M-D KINNEY and for the fan motor.
Electrostatic phenomena	
External influences on electrical equipment	
Thermal safety	None with sound hood closed.
Noise	None with sound hood closed.
Suction of liquids	Forbidden use can cause the risk of suction of liquids.
Gas	Forbidden use can cause the risk of suction of dangerous gases.
Fire and explosion	Overcoming the operation limits can cause the risk of fire and explosion. Operation with shut-off valve locked can produce the risk of fire. Improper maintenance can cause the overheating and the risk of fire.
Failure of energy supply	None

PACKAGE STARTUP CHECKLIST

This startup procedure should be followed during the initial installation and after any shutdown periods or after the blower has been worked on or moved to a new location. It is suggested that the steps be followed in sequence and checked off ☒ in the boxes provided.

- ☐ 1. Complete the Blower Startup Checklist provided in this manual (see pages 19 and 20).
- ☐ 2. Remove all packing material.
- ☐ 3. Ensure the placement of the package follows the illustration provided.
- ☐ 4. Ensure the motor is installed correctly and wiring is done correctly by certified electrician.
- ☐ 5. Activate belt tensioner.
- ☐ 6. All piping connected to the blower is fastened correctly without any weight load exerted on the package.
- ☐ 7. Ensure no debris is obstructing the piping and blower. Debris that is suctioned into the blower can cause blower failure.
- ☐ 8. Jog motor to check that rotation is in proper direction, and to be certain motor and blower turn freely and smoothly. Refer to rotation arrow on blower side of belt guard.

M-D Pneumatics®		Blower Start-Up Checklist Page 1 <i>Service Center Technician</i>				
CUSTOMER				DATE		
PHONE #				P.O. #		
CONTACT				START-UP DATE		
ADDRESS						
MODEL/SIZE		BARE SERIAL #		PKG. SERIAL #		
PKG VOLTAGE/Hz		MOTOR HP/kW/RPM		MOTOR I.D. #		
MOTOR MFR./FRAME		MOTOR NP @Volts/Hz		MOTOR NP AMP		
VFD CATALOG #		VFD SERIAL #		VFD @Volts/Hz		
VFD MOTOR kW/HP		VFD INPUT Amps		LINE REACTOR MODEL #		
Package		Line Power		LESS STARTER		
☐ NAMEPLATE	_____	☐ LINE VOLTAGE	_____	☐ MCC/STARTER TYPE	_____	
☐ INLET FILTER	_____	☐ LINE AMPERAGE	_____	☐ MCC/STARTER VENDOR	_____	
☐ ENCLOSURE PANELS	_____	☐ LINE WIRE SIZE	_____	☐ MCC /STARTER SIZE	_____	
☐ HI VOLT TERM BLOCKS	_____	☐ # LINE CONDUCTORS	_____	☐ MCC /STARTER O/L TYPE	_____	
☐ LO VOLT TERM. BLOCKS	_____	☐ GRND WIRE SIZE	_____	☐ STARTER O/L SET POINT	_____	
☐ FUSES	_____	☐ # GRND CONDUCTORS	_____	☐ STARTER CONTROL VOLTS	_____	
☐ SHIPPING BLOCKS	_____	☐ LINE REACTOR	_____	☐ OTHER	_____	
☐ BELT TENSION LOCK	_____	☐ DISCONNECT TYPE	_____		_____	
☐ BLOWER LUBE	_____	☐ DISCONNECT AMP	_____		_____	
☐ SILENCER	_____	☐ OTHER	_____		_____	
☐ UNLOADER VALVE	_____		_____		_____	
System/Process & Control		System Piping		Equipment Room		
☐ SYSTEM TYPE	_____	☐ INLET PIPE DIA.	_____	☐ AMBIENT PRESSURE	_____	
☐ PROCESS TYPE	_____	☐ INLET PIPE LENGTH	_____	☐ AMBIENT TEMP	_____	
☐ SYSTEM CONTROL	_____	☐ # INLET PIPE VALVE's	_____	☐ CONTAMINATES	_____	
☐ PROCESS CONTROL	_____	☐ # INLET PIPE EL's	_____	☐ VENTILATION	_____	
☐ PROCESS CYCLE ON	_____	☐ DISCH PIPE DIA.	_____	☐ PERIMETER CLEARANCE	_____	
☐ PROCESS CYCLE OFF	_____	☐ DISCH PIPE LENGTH	_____	☐ FOUNDATION	_____	
☐ FLOW CONTROL TYPE	_____	☐ # DISCH PIPE VALVE's	_____	☐ GROUT	_____	
☐ PRESS. CONTROL TYPE	_____	☐ # DISCH PIPE EL's	_____	☐ LEVEL	_____	
☐ OTHER	_____	☐ OTHER	_____	☐ SOFT FOOT	_____	
	_____		_____	☐ ANCHORS	_____	
	_____		_____	☐ OTHER	_____	
NOTES						
CUSTOMER ACCEPTANCE: ☐ O&M MANUALS ☐ OPERATION ☐ MAINTENANCE ☐ SAFETY /PROTECTIVE DEVICES						
CLIENT				TITLE		
TECHNICIAN				TITLE		
				DATE		
				DATE		

[illegible]

Operation Checklist Schedule

CHECK	PARAMETER	FREQUENCY				NOTE
		Hours	Days	Weeks	Months	
OPERATION CONDITIONS	Differential pressure		1			package in operation
	Absorbed power		1			
	Cooling liquid flow		1			
LUBRICATION	Oil level		1			package out of operation
	Oil Leakage			1		
	Oil change	4000			6	
	Motor bearing re-greasing					
FILTER	Vacuum		1			< 0.5 psi
	Clogging				2	> 0.87 psi
TRANSMISSION	Wear	2000				package out of operation
	Belt tension	2000				
	Belt change	15000			24	

Figure - 3.2 Operation Checklist Schedule


WARNING

First oil change to be done after 500Hrs of running

NOTE: In case of double indication follow the most limiting one for the application.

Relief Valve Setting

- Enclosed Blower Packages, remove the access panel located on the rear panel of the cabinet.


WARNING

- When setting the valve don't get fingers or other objects between turns of the spring. Injuries can occur and obstruct proper operation of the valve.
- Do not approach opening of SPF silencer with clothes or other elements which could be sucked inside the pipe.

Pressure Operation /P and /C (RVP valve)

- Completely load the spring by screwing down the nut **E**.
- Throttle outlet flow of the blower package to reach the rated outlet pressure.
- Unscrew the nut **E** until the valve begins to open.
- Screw the nut **E** one turn and lock it with the lock nut.
- Air discharging from the valve is hot and will cause severe burns.

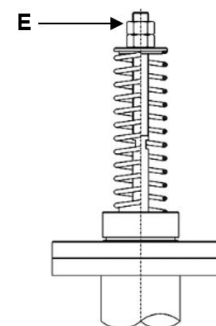


Figure - 3.3

Operation

- Position the rear panel of the noise hood.
- Position the access panel on the rear of the noise hood.

Pressure Operation /P (VSM /P valve)

NOTICE

Screwing in nut A reduces time. Unscrewing the nut A increases time.

- Set the valve closing time at 10-15 seconds by screwing nut.
- After adjusting the time setting, lock nut **A** by using nut **B**.
- Completely load the spring by screwing down nut **C**.
- Throttle outlet flow of blower package to reach the rated outlet pressure.
- Unscrew nut **C** until the valve begins to open.
- Screw the nut **C** one turn and lock it with the lock nut.
- Enclosed Blower Packages, Frames 2 position the rear panel of the noise hood.

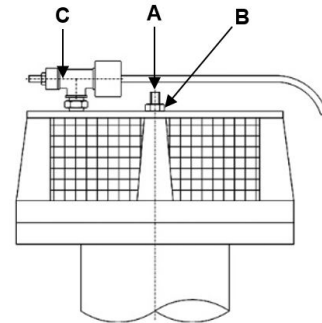


Figure - 3.4



WARNING

NOTE: Air coming from the valve is hot and will cause severe burns.

Vacuum Operation /V (RVV Valve)

- Unloosen nut **D** and completely load the spring by screwing the rod.
- Throttle inlet flow of the blower package to reach the rated inlet pressure.
- Unscrew the rod until the valve begins to open.
- Screw the rod one turn and lock it with the lock nut **D**.
- Enclosed Vacuum Packages, Re-attach the valve cover panel on the rear panel of the noise hood.

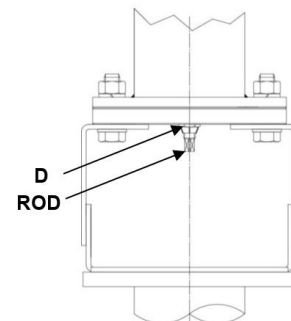


Figure - 3.5

Inlet Silencer Setting

The suction silencer is set before delivery for the working conditions confirmed in order acknowledgement.

MAINTENANCE



WARNING

- Stop the blower package and auxiliary system and remove the differential pressure if possible.
- Verify the deceleration of the package is even and without vibration.
- Disconnect the electric supply switch then lock-out and tag-out in the open position. Store the key in a safe location per lock-out and tag-out policy.
- Isolate the blower package from the plant air piping system.
- System air or gas contained in the piping system may be hot and toxic. Wait until the blower package returns to ambient temperature (<104°F) before starting to service the blower package.

NOTICE

For enclosed blower packages in all frame sizes, always verify the oil level is at the halfway point on the oil level plugs located on each blower sump (see Figure-4.2). For Frame 2 always verify the oil level through sight glass located on the front cabinet panel (see Figure-4.2). This is for reference only.

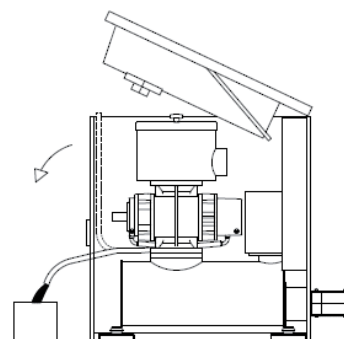


Figure - 4.1

Oil Change

The first oil change must be performed after 500 working hours. For enclosed blower packages, Frame 2 drain oil using the hose or hoses as indicated in Figure-4.1.

For enclosed blower packages, fill both the oil sumps with new oil (see Figure-4.3 on page 24) for quantity required. Always verify proper lube level at sump cover sight glasses.

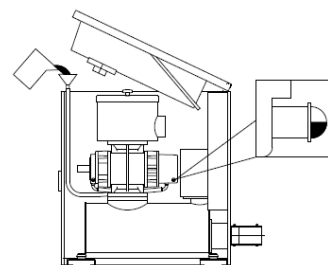


Figure - 4.2

MD Frame 2	Blower	Oil Quantity (ounce)		
		Gears side	Drive side	Total
2	5006-2 (Vertical Flow)	18.3	10.2	28.5
	5006-2 (Vertical Flow)	7.1	5.4	12.5
	6008-2 Vertical Flow)	25.5	18.0	43.5
	6008-2 (Vertical Flow)	16.9	9.0	25.9

Figure - 4.3 Oil Quantity Table

M-D Pneumatics LUBRICANT ORDER INFORMATION

MD BLOWER LUBRICANTS SPECIFICATIONS:	
PRODUCTS	MD MAX
VISCOSITY INDEX	150
@40°C, CST	232
@100°C, CST	25.4
FLASH POINT °F (°C)	485 (252)
POUR POINT °F (°C)	-44 (-43)

NOTE: MD One Vapor Pressure: (mm Hg) 100°F <0.00004; 200°F <0.00018

MD BLOWER LUBRICANTS OPTIONS					
MD OIL TYPE	1 QUART	1 GALLON	5 GALLON	55 GALLON BARREL	CASE 12 QUARTS
MD MAX	16444-MD3-Q	16444-MD3-G	16444-MD3-5G	16444-MD3-B	16444-MD3-Q-C

Figure 4.4 Synthetic Lubricant Table

Re-order Part numbers for MD Series Factory-Recommended Synthetic Lubricants.

MOTOR BEARINGS RE-GREASING

Only for the motors provided with the greasing devices DE and NDE (see Figure-4.5) check the motor instructions manual. In default of the specific instruction of the motor manufacturer use the table below for the grease quantity and re-greasing interval in hours of operation.

NEMA FRAME	Bearing	Grease g/ bearing	3600 rpm	1800 rpm
254/6T	6309 (BALL)	13	20000	25000
284/6T	6311 (BALL)	18	14000	25000
324/6T	6312 (BALL)	21	12000	25000

CAUTION

Excess grease causes bearing overheating, resulting in bearing failure.

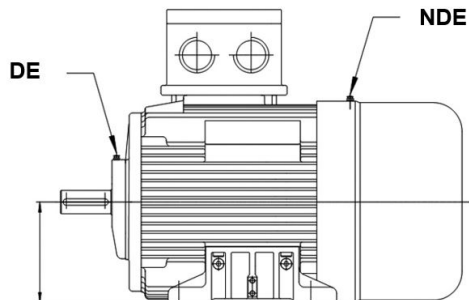


Figure - 4.5

Check the V-Belt Tension

WARNING

Excessive V-belt tension could damage the blower and the motor. Please refer to M-D Pneumatics for details.

Elastic Belt Tensioning Device for V-Belts

Use this solution for groups with extensible belts, such as poly-V, Eagle. When the belt tensioning unit is elastic, a device for transport safety is needed.

NOTE: Tension to NEW value, test and possibly re-tension. Record the new and used frequency on the appropriate sticker.

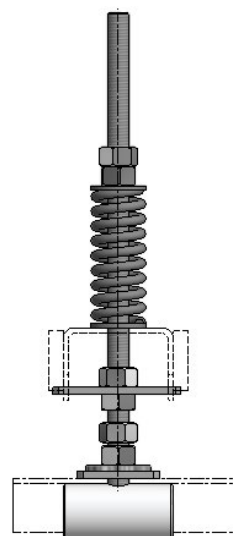


Figure - 4.6

DANGER

Open main disconnect switch, tag and lockout before working on equipment. Failure to do so could result in injury or death of personnel.

BELT REPLACEMENT

1. For enclosed blower packages, remove the front panel of the noise hood.
2. For all blower packages, remove the belt guard by unscrewing the brass fasteners. Do not remove the screws indicated with arrows in Figure-4.7.
3. Completely release tension on the spring of the belt tensioner device by unscrewing the nuts **N1** in Figure-4.8.
4. Fit the safety transport plates **43** as indicated in Figure-4.8.
5. Lock the lower safety transport plate with the lower nut **N2**.
6. Unscrew the upper nut **N1**. Loosen nut **N3** until it contacts the motor slide rail or plate (see Figure-4.8). Assure the belt guard slot does not contact the motor shaft.
7. Raise nut **N4** and upper plate **43** to contact the motor slide rail or plate.
8. Replace the V-belts.

START AT NOTE-9 AT INITIAL START-UP

9. Loosen nut **N4** and remove the upper plate **43** (save the plate for future use) and lower the motor slide rail or plate.
10. Tighten the V-belts to specification (see Figure-4.9 and 4.10).
11. Reinstall the upper plate **43** to running height (3/8" to 1/2" below the slide rail plate and lock in place using nuts **N4** and **N3**.
12. Reinstall the V-belt guard.
13. Reinstall the front panel of the noise hood.

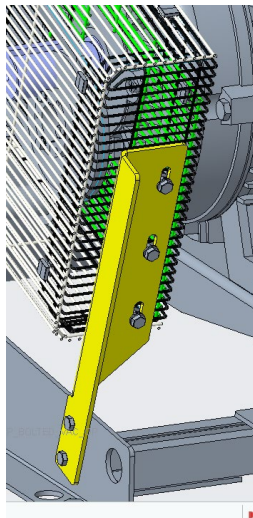


Figure - 4.7

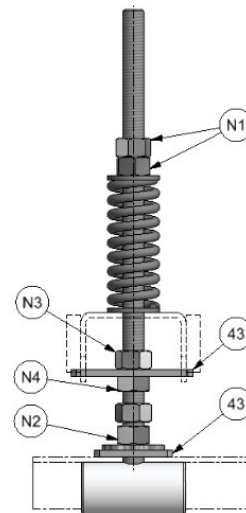
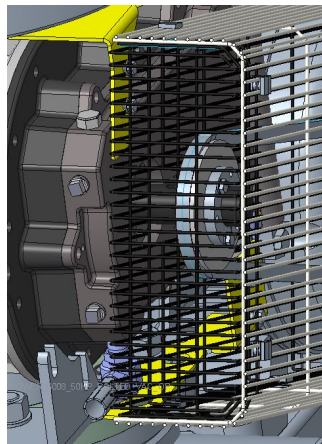


Figure - 4.8

V-BELT TENSIONING REQUIREMENTS

	Small Sheave Diameter Range (inches)	Small Sheave RPM Range	Speed Ratio Range	Recommended Deflection Force (lbs.)	
				Minimum	Maximum
3VX	2.20	1200 - 3600	2.00 to 4.00	2.8	4.1
	2.35 – 2.50	1200 - 3600		3.2	4.7
	2.65 – 2.80	1200 - 3600		3.5	5.1
	3.00 – 3.15	1200 - 3600		3.8	5.5
	3.35 – 3.65	1200 - 3600		4.1	6.0
	4.12 – 5.00	900 - 3600		4.8	7.1
	5.30 – 6.90	900 - 3600		5.8	8.6
5VX	4.40 – 4.65	1200 – 3600	2.00 to 4.00	9.0	13.0
	4.90 – 5.50	1200 – 3600		10.0	15.0
	5.90 – 6.70	1200 - 3600		11.0	17.0
	7.10 – 8.00	600 – 1800		13.0	19.0
	8.50 – 10.90	600 – 1800		14.0	21.0
	11.80 – 16.00	400 - 1200		15.0	23.0

Figure 4.9 Recommended deflection force per belt

DEFLECTION DISTANCE

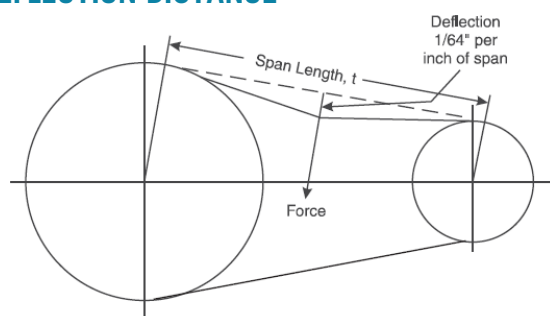


Figure - 4.10

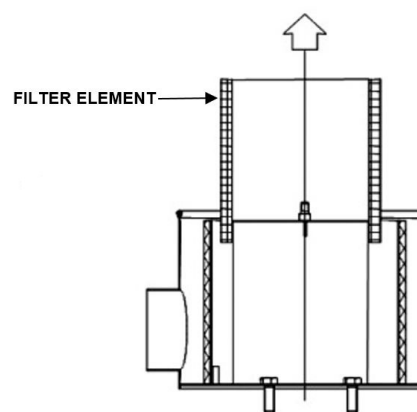


Figure - 4.11

FILTER REPLACEMENT

FRAME 2

- For enclosed packages, open the roof panel.
- Loosen the cover knob of the inlet silencer and remove the cover.
- Replace the filter element as shown in Figure-4.11.
- Position the silencer cover and tighten the knob.
- Close the roof panel.

REPLACING THE SHAFT SEAL

- Disassemble the inlet filter.
- Disassemble the V-Belts as shown in BELT REPLACEMENT.

⚠ WARNING

DO NOT hammer the shaft of the pulley.

Maintenance

- Empty the cooling circuit (only R/F) and disconnect the relevant piping.



WARNING

Dispose of the used oil in accordance with local regulations.

- Drain the oil from the sump
- Remove the key and disassemble the sump.
- Replace the seal ring POS.43, clean the housing of the seal ring and replace the ring.



WARNING

DO NOT damage the lip of the ring during this step.

- Reassemble the sump onto the cover using a new gasket.
- Refill the sump with new lubrication oil (see OIL CHANGE).
- Reassemble the belts (see BELT REPLACEMENT).

Recommended Spare Parts

In the table below are indicated the recommended spare parts for normal use of the blower package according to forecast timing. For the spare parts for the blower, refer to the blower manual.

Parts	Description	Recommended Quantity Required per Time Interval				
		Estimated Replacement Interval (hours)	Start-up	2 year	5 year	10 year
Blower Package	Filter element		1	2	5	10
	V-belt (set)		1	1	2	4
	Transmission pulleys		1	1	2	4
	Flex tube for /P, /V, /C (set)		1	1	2	4
	Flex tube for /V, /C (set)		1	1	2	4
	Flex tube for /C (set)		1	1	2	4
	VRC Flapper		1	1	2	4
	Starting valve diaphragm		1	1	2	4
	Starting valve diaphragm		1	1	2	4

When ordering replacement parts, always specify package type, serial number and date of manufacture of the package.



WARNING

Use only M-D KINNEY original spare parts and accessories.

NOTICE

M-D KINNEY will not be liable for any damage, breakdown and injury due to use of non-original spare parts or accessories.

TROUBLESHOOTING

SAFETY PRECAUTIONS

1. Do not operate blower with open inlet or outlet port.
2. Do not exceed specified vacuum or pressure limitations.
3. Do not operate above or below recommended blower speed range.
4. Blower is not to be used where non-sparking equipment is specified.
5. Do not operate without belt guard.
6. The blower and blower discharge piping may be extremely hot and can cause skin burns on contact.
7. Prolonged exposure may require ear protection.

TROUBLESHOOTING

No matter how well the equipment is designed and manufactured, there may be times when servicing will be required due to normal wear, the need for adjustment, or various external causes. Whenever equipment needs attention, the operator or repairman should be able to locate the cause and correct the trouble quickly. The Troubleshooting Chart below is provided to assist the mechanic in those respects.

QUICK REFERENCE TABLE

PROBLEM	POSSIBLE CAUSES	SOLUTION
Knocking	- Unit out of time. - Distortion due to improper mounting or piping strains. - Excessive pressure differential. - Worn gears. - Worn bearings.	- Retime impellers. - Check mounting alignment and relieve pipe strains. - Reduce to manufacturer's recommended pressure. Examine relief valve, re-set if necessary. - Replace timing gears. - Replace bearings
Excessive blower temperature	- Too much oil in gear case. - Too low operating speed. - Clogged filter or muffler. - Excessive pressure differential. - Worn impeller clearances - Internal contact	- Reduce oil level. - Increase blower speed. - Remove cause of obstruction. - Reduce pressure differential across the blower. - Replace impeller. - Correct clearances.
Impeller end or tip drag.	- Insufficient assembled clearances. - Case or frame distortion. - Excessive operating pressure. - Excessive operating temperature.	- Correct clearances. - Check mounting and pipe strain. - Remove cause. - Remove cause.
Lack of volume.	- Slipping belts. - Worn clearances.	- Tighten belts. - Re-establish proper clearances
Excessive bearing or gear wear.	Improper lubrication.	Correct lubrication level. Replace dirty oil.
Loss of oil.	- Headplate, gear case or drive cover vents plugged. - Worn seal.	- Clean vents. - Replace seals.

OTHER PROBLEMS AND CAUSES

Operating problems	List of Causes (see table page 32)
The motor does not start up and there is no noise	1-3-4
The motor does not start up, but humming noise heard	2-3-4-5-6-7
Automatic cut off just after start up	3-4-5-6-7-13-14-15-16
Inlet pressure different from the rated value	13-14
Capacity zero  WARNING STOP BLOWER PACKAGE IMMEDIATELY	13-14-17-18-20-21-22
Outlet pressure different from the rated value  WARNING STOP BLOWER PACKAGE IMMEDIATELY	5-8-13-14-15-16
Outlet temperature different from the rated value  WARNING STOP BLOWER PACKAGE IMMEDIATELY	15-19-20-22-23
High absorbed power	3-5-6-7-15-16-17-18-19-20-21-22
Oil and/or liquid leakage	5-11-12-23
High oil temperature	5-6-7-9-24-25
Unusual noises and/or vibrations  WARNING STOP BLOWER PACKAGE IMMEDIATELY	5-6-7-9-24-25
Relief valve does not close	15-16-17-18-19-20
Start valve does not close	26-27-28

TROUBLESHOOTING

Ref. No.	Cause	Solution	Ref.
1	At least two of electric connections have been cut off	Check the fuses, terminal boards and connection cables and if required replace them	4.6
2	One electric connection has been cut off	See point 1	4.6
3	Incorrect electric connection	Check electric system	4.6
4	Faulty motor	Check the electric motor	4.6
5	Rotors making contact	Check the internal clearances of the rotors and of the gears	6.7.4
6	Scale deposits in the compression chamber	Clean the compression chamber and the rotors	6.7.2
7	Intake of foreign particles	Remove the foreign particles and check the clearances	6.7.4
8	Rotors are worn	Check the internal clearances	6.7.4
9	Bearings are worn	Replace the bearings	(1)
10	Gaskets are worn	Replace the gaskets	(1)
11	Drive shaft seal is worn	Replace the seal	6.7.1
12	Oil level plugs are broken	Replace the oil levels	
13	Filter clogged	Clean or replace it	6.3
14	Inlet piping is clogged (only /C)	Check piping and remove obstruction	(2)
15	Outlet piping is clogged	Check piping and remove obstruction	(2)
16	Shut-off valve closed	Open it	(2)
17	Check valve positioned in wrong direction	Correct it	(2)
18	Wrong relief valve setting	Reset it	5.4
19	Small pipe line section	Increase it	4.1
20	Wrong transmission ratio	Correct it	6.5
21	V-belts drive	Check V-belts tension / replace V-belts	6.3
22	Wrong direction of rotation	Correct it	5.2
23	High oil level	Correct it	6.1
24	Motor secured properly	Fix it	6.4
25	Package secured properly	Fix it	4.3.1 4.3.2
26	No counter pressure	Adjust the starting valve Generate the counter pressure	5.4.2 (2)
27	Faulty diaphragm	Replace it	
28	Diaphragm chamber leaking	Make it air tight	

1. Refer to blower manual.
2. Contact factory for assistance.

WARRANTY – BLOWER PRODUCTS

Subject to the terms and conditions hereinafter set forth and set forth in General Terms of Sale, M-D Pneumatics (the Seller) warrants products and parts of its manufacture, when shipped, and its work (including installation and start-up) when performed, will be of good quality and will be free from defects in material and workmanship. This warranty applies only to Seller's equipment, under use and service in accordance with Seller's written instructions, recommendations and ratings for installation, operating, maintenance and service of products, for a period as stated in the table below. Because of varying conditions of installation and operation, all guarantees of performance are subject to plus or minus 5% variation. (Non-standard materials are subject to a plus or minus 10% variation).

PRODUCT TYPE	TYPE OF APPLICATION	
	ATMOSPHERIC AIR OR PROCESS AIR WITHOUT LIQUIDS PRESENT	PROCESS GASES OTHER THAN AIR, OR ANY LIQUID INJECTED APPLICATION
New (QxTM models only)	30 months from date of shipment, or 24 months after initial startup date, whichever occurs first.	Consult Factory
New (all other models)	24 months from date of shipment, or 18 months after initial startup date, whichever occurs first	18 months from date of shipment, or 12 months after initial startup date, whichever occurs first
Repair	12 months from date of shipment, or remaining warranty period, whichever is greater	12 months from date of shipment, or remaining warranty period, whichever is greater

THIS WARRANTY EXTENDS ONLY TO BUYER AND/OR ORIGINAL END USER, AND IN NO EVENT SHALL THE SELLER BE LIABLE FOR PROPERTY DAMAGE SUSTAINED BY A PERSON DESIGNATED BY THE LAW OF ANY JURISDICTION AS A THIRD PARTY BENEFICIARY OF THIS WARRANTY OR ANY OTHER WARRANTY HELD TO SURVIVE SELLER'S DISCLAIMER.

All accessories furnished by Seller but manufactured by others bear only that manufacturer's standard warranty.

All claims for defective products, parts, or work under this warranty must be made in writing immediately upon discovery and, in any event within one (1) year from date of shipment of the applicable item and all claims for defective work must be made in writing immediately upon discovery and in any event within one (1) year from date of completion thereof by Seller. Unless done with prior written consent of Seller, any repairs, alterations or disassembly of Seller's equipment shall void warranty. Installation and transportation costs are not included and defective items must be held for Seller's inspection and returned to Seller's Ex-works point upon request.

THERE ARE NO WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF PURPOSE.

After Buyer's submission of a claim as provided above and its approval, Seller shall at its option either repair or replace its product, part, or work at the original Ex-works point of shipment, or refund an equitable portion of the purchase price.

The products and parts sold hereunder are not warranted for operation with erosive or corrosive material or those which may lead to build up of material within the product supplied, nor those which are incompatible with the materials of construction. The Buyer shall have no claim whatsoever and no product or part shall be deemed to be defective by reason of failure to resist erosive or corrosive action nor for problems resulting from build-up of material within the unit nor for problems due to incompatibility with the materials of construction.

Any improper use, operation beyond capacity, substitution of parts not approved by Seller, or any alteration or repair by others in such manner as in Seller's judgment affects the product materially and adversely shall void this warranty.

No employee or representative of Seller other than an Officer of the Company is authorized to change this warranty in any way or grant any other warranty. Any such change by an Officer of the Company must be in writing.

The foregoing is Seller's only obligation and Buyer's only remedy for breach of warranty, and except for gross negligence, willful misconduct and remedies permitted under the General Terms of Sale in the sections on CONTRACT PERFORMANCE, INSPECTION AND ACCEPTANCE and the PATENTS Clause hereof, the foregoing is BUYER'S ONLY REMEDY HEREUNDER BY WAY OF BREACH OF CONTRACT, TORT OR OTHERWISE, WITHOUT REGARD TO WHETHER ANY DEFECT WAS DISCOVERED OR LATENT AT THE TIME OF DELIVERY OF THE PRODUCT OR WORK. In no event shall Buyer be entitled to incidental or consequential damages. Any action for breach of this agreement must commence within one (1) year after the cause of action has occurred.

January, 2024

M-D Pneumatics®

**For Service & Repair, Technical
Support, or Product Sales contact:**

[https://www.md-kinney.com/en-us/modals/
find-a-distributor](https://www.md-kinney.com/en-us/modals/find-a-distributor)



Manual MPAK+ Rev A p/n MDB-100
1/24