M-D Pneumatics®

M-D Pneumatics®
Compact Rotary Blower Package

Manual 2026 Rev A p/n 002026 0000

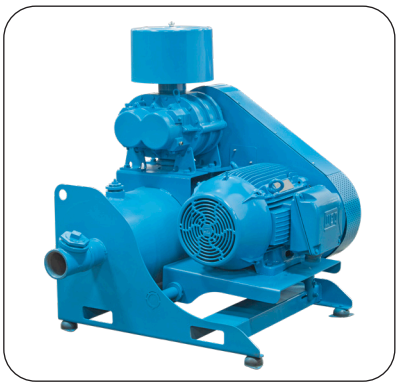
WARNING: Do Not Operate Before Reading Manual

MD
OPERATOR'S MANUAL

Frame Models
- MD 10
- MD 20

CP Series Blowers Available:

3003	4005	5006	6008
3006	4007	5009	



Operator's Manual: MD Compact Rotary Blower Package

800.825.6937 | www.mdpneumatics.com

Original Instructions

Disclaimer Statement:
All information, illustrations and specifications in this manual are based on the latest information available at the time of publishing. The illustrations used in this manual are intended as representative reference views only. Products are under a continuous improvement policy. Thus, information, illustrations and/or specifications to explain and or exemplify a product, service or maintenance improvement may be changed at any time without notice.

Product information and specifications subject to change.

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01 INTRODUCTION

CONGRATULATIONS on the purchase of a **MD Compact Rotary Blower Package** from M-D Pneumatics. Please examine for shipping damage, and if any damage is found, report it immediately to the carrier. If the blower is to be installed at a later date make sure it is stored in a clean, dry location and the blower rotated regularly. Make sure covers are kept on all openings. If blower package is stored outdoors be sure to protect it from weather and corrosion.

MD Compact Rotary Blower Packages are built to exacting standards, and if properly installed and maintained will provide many years of reliable service. Please take time to read and follow every step of these instructions when installing and maintaining the blower package. These instructions are intended to be as straightforward as possible, since getting any piece of equipment up and running in as little time as possible is imperative to production.

Additional manuals may ship with the blower package that provide detailed operation and maintenance instructions for the blower and the electric motor included with the blower package. Please read and understand all operation and maintenance instructions prior to startup.

SCOPE OF MANUAL

The scope of this manual is for MD Compact Rotary Blower Packages. There is a separate manual for the specific rotary positive displacement blower.

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CONVENTIONS AND DATA PLATE

GRAPHIC CONVENTIONS USED IN THIS MANUAL

The following hazard levels are referenced within this manual:

⚠ DANGER

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates a situation that can cause damage to the engine, personal property, and/or the environment or cause the equipment to operate improperly.

NOTE: Indicates a procedure, practice, or condition that should be followed in order for the equipment to function in the manner intended.

⚠ CAUTION

Read manual before operation or bodily harm may result. Attention should be given to the safety related sections of this manual.

DATA PLATE

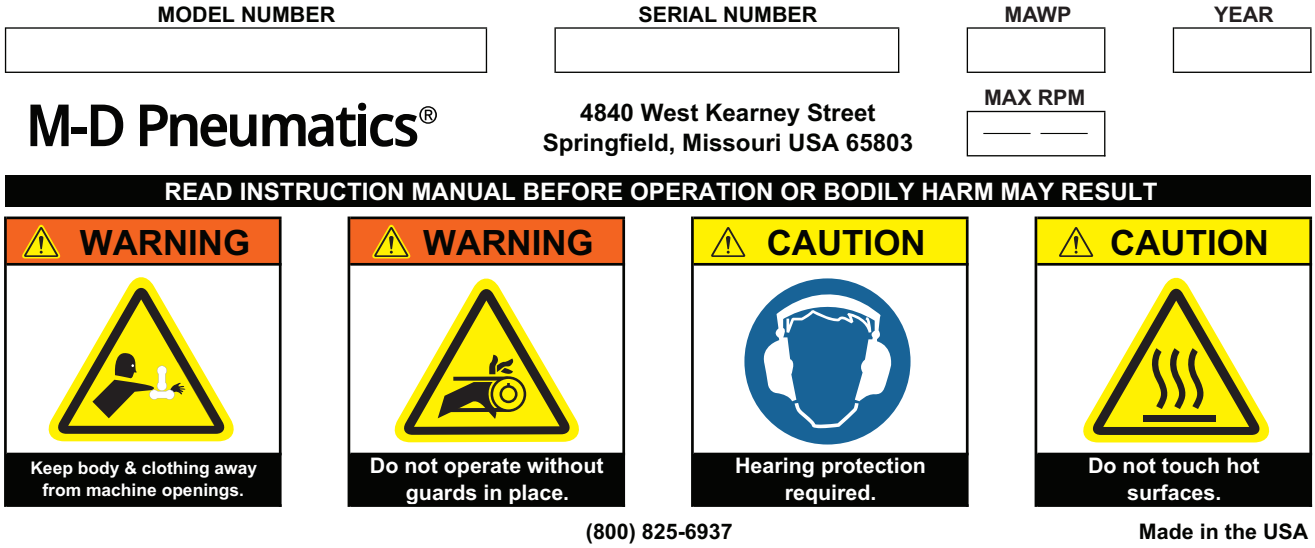

Figure 2-1 – General Operation and Symbols on Data Plate

NOTE: Max RPM and MAWP is only reflected on the blower data plate.

The following information is contained on the data plate:

⚠ WARNING

Keep body & clothing away from machine.

During operation, keep body and clothing away from inlet and outlet of the blower.

⚠ WARNING

Do not operate without guards in place.

⚠ CAUTION

Hearing protection is required while the blower package is in operation. Noise levels may reach as high as 81 dBA.

⚠ CAUTION

Do not touch hot surfaces.

The upper limit of the blower operation is 375°F (190°C). Do not touch the blower while it is in operation and assure blower is cool when not in operation.

Conventions and Data Plate

MODEL NUMBER:	This identifies the specific model and designation of the package.
SERIAL NUMBER:	Each package has a unique serial number. This number is to be used with any service issues and with any contact with the manufacturer.
MAWP:	This states the maximum allowable working pressure (MAWP) of the package.
BLOWER SHAFT SPEED:	This is the shaft speed of the blower.
YEAR:	This states the year that the package was manufactured.
MOTOR SIZE:	This is the size of the motor in horsepower (HP) and kilowatt (kW). This label is placed on the front of the machine. The belt guard shall not be removed while the machine is in operation. Proper lock-out / tag-out procedures must be followed.
MAX RPM:	The maximum RPM at which the blower can be operated

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03

DESCRIPTION

SPECIFICATIONS

For additional bare shaft blower information, refer to the appropriate bare shaft blower manual.

* Discharge temperature will determine the minimum speed at specific pressures.

NOTICE

Maximum ambient temperature is 104° F (40° C).

To permit continued satisfactory performance, a blower must be operated within certain approved limiting conditions. The manufacturer's warranty is, of course, also contingent on such operation. Maximum limits for pressure, temperature and speed are specified here for various blower sizes when operated under the standard atmospheric conditions. Do not exceed any one of these limits.

NOTICE

Special attention must be paid when a blower has a higher than standard ambient suction temperature. Special recommendations for operating parameters and/or additional cooling may be recommended. Consult the factory or local representative for appropriate information.

FLOW / PRESSURE AT A GLANCE

Figure 3-1 can be used as a guide to estimate which blower model and frame size will best suit your operation requirements. For example, the MD10 blower package with a 4007 blower model would achieve 400 SCFM at 6 PSIG. However, if the pressure required for operation were 12 PSIG, the MD20 blower package with either a 5006 or 6008 blower model would achieve 400 SCFM. Chart is for reference only. Please contact M-D Pneumatics or your regional authorized M-D Pneumatics distributor for assistance with blower package selection.

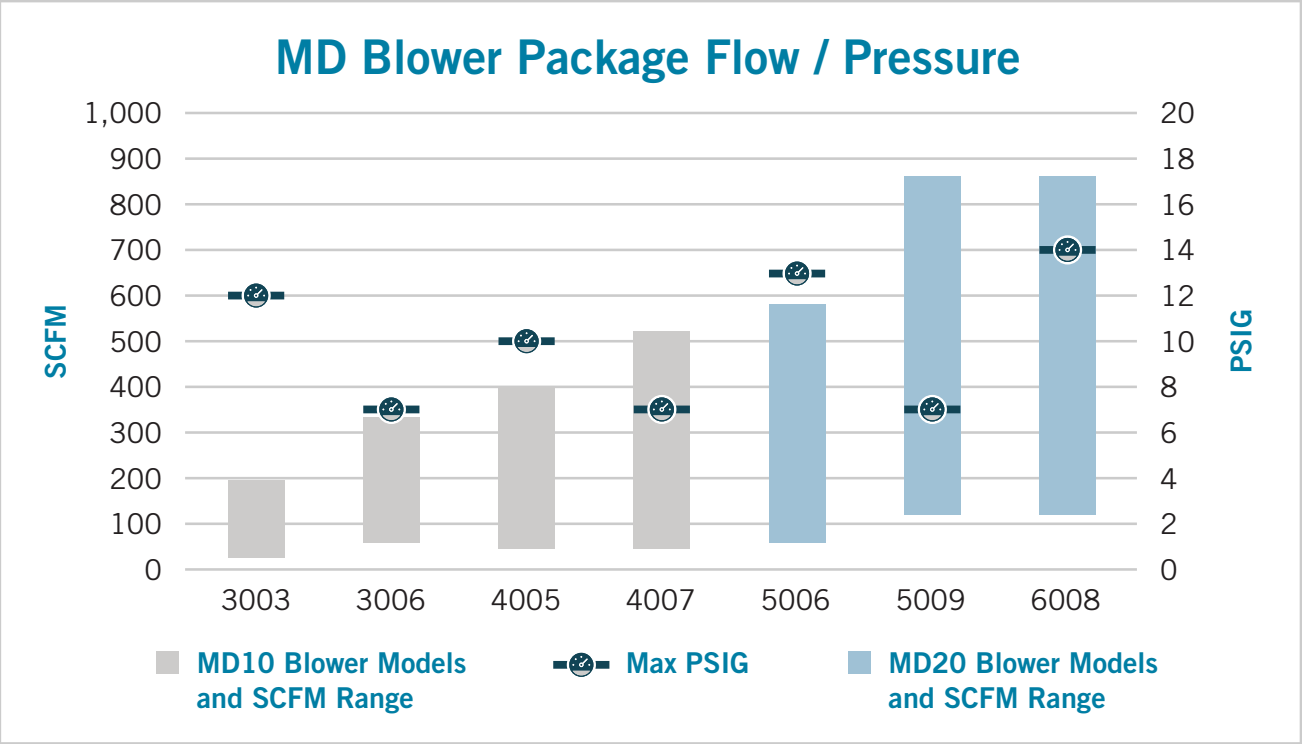

Figure 3-1 – MD Blower Package Flow / Pressure Chart

APPROXIMATE WEIGHTS

MODEL	APPROXIMATE WEIGHT
MD10	950 lb (431 kg)
MD20	1,750 lb (795 kg)

Table 3-1 – Approximate Weights

**Approximate weights may vary slightly based on blower model/filter configuration.*

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INSTALLATION

GENERAL

⚠ DANGER

The blower package is not intended to be used with explosive products or in explosive environments and is not intended to be used in applications that include hazardous and toxic gases. Consult the factory for support.

⚠ DANGER

It is the responsibility of the installer to assure that proper guarding is in place and compliant with all applicable regulatory requirements.

⚠ WARNING

The bare shaft blower can generate excessive noise. Methods to reduce the noise levels by installing inlet and outlet silencers will be required. Even with inlet and outlet silencers, hearing protection will be required.

⚠ WARNING

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

⚠ WARNING

For maximum operating speed in RPM (rotations per minute) and maximum temperature please refer to the manual for your specific blower model on the blower package. Do not exceed these limits. The installation of the blower shall take these critical operating parameters into account and adequate control features implemented.

⚠ WARNING

Upon completion of the installation, and before applying power, rotate the drive shaft by hand. It must move freely. If it does not, look for uneven mounting, piping strain, excessive belt tension or coupling misalignment or any other cause of binding. If blower is removed and still does not move freely, check inside the blower housing for foreign material.

NOTICE

The blower package must be handled using an appropriate device such as a fork lift. Care should be taken to ensure blower package does not overturn during handling and installation.

Unpacking and Handling

The blower package was shipped from M-D Pneumatics in perfect and undamaged condition. Occasionally, damage will occur during shipping. Be sure to carefully inspect the blower package for shipping damage, and if any damage is found, report it immediately to the carrier who will assist with filing a freight damage claim.

To move the blower package to its installation site it is recommended to use the fork lift pockets and leave the blower package on its shipping skid if possible. If not, the forks should extend the width of the blower package and padding should be placed between the blower package and the fork truck boom.

If it is necessary to lift the blower package with a crane or other overhead device, it is recommended to use a spreader bar and chains. The spreader bar should be greater than the width of the blower package and padding should be placed on the edges of the enclosure to prevent chain damage. ***Figure 4-1*** illustrates proper handing and lifting of blower package.

If present, remove shipping braces / materials prior to starting the blower package.

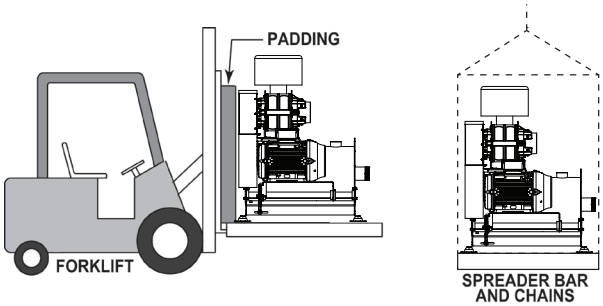

Figure 4-1 – Proper handling and lifting procedure.

⚠ WARNING

The blower package must be handled using an appropriate device such as a fork truck or appropriate lifting device. for approximate weights. Care should be taken to assure blower package does not over-turn during handling and installation.

Storage

In some cases it may be necessary to store the blower package for extended periods of time before placing the unit in operation. When this is required ***see Long-Term Storage on page 31.***

Foundation

The blower package does not need a special foundation, however it does require a solid, level floor and adequate frame support. Bolt the blower package to the floor and seal any cracks around the perimeter.

Location

Install the blower package in a room or outdoor area that supplies adequate space and lighting for routine maintenance. The installation area should also be well ventilated and kept as cool as possible.

Leveling

The MD blower package should be placed on a level, even, flat, vibration-less surface to avoid equipment damage. The blower package shall be level to 1/8” per 10 feet (this equates to a leveling tool with an accuracy of at least 0.001”/in., readily available levels have accuracy of 0.0005”/in.). Level the unit and adjust with shims as required.

NOTICE

An un-level unit can result in improper oil levels and catastrophic failure of the unit.

SAFETY

M-D Pneumatics recommends the use of relief valves to protect against excessive pressure or vacuum conditions. Test these valves at initial start-up to be sure they are properly adjusted to relieve at or below the maximum pressure differential rating of the blower.

⚠ DANGER

It is the responsibility of the installer to assure that proper guarding is in place and compliant with all applicable regulatory requirements.

⚠ WARNING

Avoid extended exposure in close proximity to machinery with high intensity noise levels. Wear adequate ear protection.

NOTE: Use proper care and good procedures in handling, lifting, installing, operating, and maintaining the equipment.

⚠ DANGER

Internal and external rotating parts of the blower package and driving equipment can produce serious physical injuries. The blower package should never be run with the inlet or discharge piping removed. If it becomes necessary to inspect the rotating parts of the blower or to change V-belts, be absolutely sure that all power to the motor controls has been shut off, the motor controls are locked out, and properly tagged before proceeding.

⚠ DANGER

Assure that properly sized vacuum breaks/relief valves are used on the discharge side of the blower package. Also assure that properly sized pressure relief valves are used on the outlet of the blower package. The sizing shall be such to assure that the proper flow can be achieved without exceeding the rated vacuum and pressure ratings.

⚠ DANGER

Blower package housing and associated piping or accessories may become hot enough to cause major skin burns on contact.

⚠ WARNING

Use lock out/tag out procedures to disable the electrical energy source before any service or work is done on the blower package.

LUBRICATION

Every blower from M-D Pneumatics is factory-tested, oil-drained, and shipped dry to its installation point. Fill both independent oil reservoirs to the proper level before operation. Oil reservoirs are under the vacuum.

Shaft bearings at the gear end of the blower are typically splash-lubricated by one or both gears dipping into an oil reservoir formed in the gear end plate and cover. Shaft bearings at the drive end of the blower are lubricated by a slinger assembly dipping into an oil reservoir. Before starting the blower packge, fill the oil sumps as described in ***Filling Procedure on page 11***.

NOTICE

Some units may include blowers with grease on one end instead of oil. These units will feature a zerk fitting for adding grease. In these instances, grease should be added to the drive end when oil is added to the gear end.

⚠ WARNING

Never attempt to change or add lubrication while the blower is running. Failure to heed this warning could result in damage to the equipment or personal injury. Oil must be checked when the blower is NOT running.

⚠ WARNING

Properly dispose of the spent lubricants. Refer to the manufacturer of the lubricant and any regulations to assure proper and safe disposal.

⚠ WARNING

Do not start the blower until you are sure oil has been put in the gear housing and rear cover. Operation of the blower without proper lubrication will cause the blower to fail and void the warranty.

NOTICE

For oil capacities refer to the manual for your specific blower model on the blower package.

Filling Procedure

See Recommended Lubricants on page 34 for suggested lubricants and grease. Before starting the unit, fill oil reservoir as instructed below.

1. Remove the fill plugs or breathers from both gear end and drive end plates.
2. Slowly pour oil through fill until oil appears in the oil sight glass. Bring the oil level to the center of the sight glass.
3. Verify oil level is at proper level in both gear end and drive end sight glasses.
4. Replace the fill plugs or breathers that were removed in step 1.

NOTICE

It is important to maintain the proper oil level in the blower. Severe damage can occur if the blower is overfilled.

Regular lubrication changes are important. Lubricants absorb frictional energy in the form of heat, undergo a shearing process over time, and will begin to thicken. The thickened lubricant will cause more drag, increasing friction and heat, and degrade the lubricant.

Operation of the blower package (environment, run time, speed, and pressure) has a direct effect on duty cycles. M-D Pneumatics published cycles are based on worst-case conditions.

Frequently Asked Questions Regarding Lubrication

What is the functional detriment if the "wrong oil" is used?

The lubricant is selected based on bearing / gear speed, and operating temperature. Too light a lubricant increases wear by not separating the sliding surfaces and it will not remove the heat adequately. If the lubricant is too thick, the drag in the bearings is increased causing them to run hotter. Since it is thicker, it will not flow as readily into the gears and it will reduce the available backlash. Lubricants at blower operating conditions are incompressible.

What is the functional detriment if the oil is not serviced?

If the lubricant is not serviced at the proper interval, the shearing action in the bearing and the gears will begin to take their toll and the lubricant will thicken. The unit will run hotter and the wear on running surfaces will increase. Generally, the lubricant will appear dirtier; this is actually material from the unit's internal components. The discoloration comes from overheating the oil additives. M-D Pneumatics now offers a low-cost oil sample analysis program to help anticipate complications and avoid downtime. It provides a comprehensive laboratory analysis of the physical and chemical characteristics of the oil, determines lubricant deterioration, suggests frequency for lubricant renewal, and assists in the detection of mechanical complications prior to disrepair. Please contact M-D Pneumatics for more details.

Hazards Associated With Breakdown or Ignition of Lubrication

⚠ DANGER

There is a risk associated with the lubrication media breaking down and resulting in a hazardous fluid or vapor. There may also be a hazard associated with the ignition of the lubrication media. Refer to the lubrication manufacturer's applicable instruction for safety precautions.

PIPING CONNECTIONS

⚠ WARNING

Pipe loading on the blower should be negligible as pipe loading can cause distortion of the blower. Use proper supports and pipe hangers to assure that there is no loading.

The intake and discharge connections on the blower package are large enough to handle maximum volume with minimum friction loss. If remote blower air intake is used, be certain all external intake piping is internally clean before connecting to the blower package.

1. M-D Pneumatics recommends placing a 16-mesh wire screen backed with hardware cloth at the remote inlet connection of the blower package for the first 50 hours of use, until the blower package is clean.
2. Clean the screen after a few hours of operation and discard of it once the blower package is clean. It is important to dispose of the screen at this time, as it will eventually deteriorate and small pieces going into the blower can cause serious damage.
3. A flex connector at the intake (if piped away) and discharge connections shall always be used.
4. External piping at the intake and discharge connections shall be fully supported.

NPT Sizes

MODEL	INLET	OUTLET	ACCESSORY PORT
MD10	2-½" NPT Unthreaded Pipe	2-½" Male NPT	2" and ¼" Female NPT
MD20	4" NPT Unthreaded Pipe	4" Male NPT	2-½" and ¼" Female NPT

NOTICE

Damage to the blower could occur if there is blockage in the inlet or outlet ports or piping. Care should be taken when installing the blower to ensure there are no foreign objects or restrictions in the ports or piping.

NOTICE

Failure to use flex connectors at discharge connection will cause stress at this location which could cause connection and equipment failures.

AIR INTAKE

To minimize maintenance, install the blower package in an area where it has access to the cleanest air possible. It is important that the air does not contain any flammable or toxic gases as the blower will concentrate these gases. This could result in damage to the unit and surrounding property and lead to personal injury or death.

If it is necessary to pipe in air from a remote source, the piping should be at least the same diameter of the blower inlet. For distances greater than 20 feet (6 m) the pipe diameter should be enlarged to reduce inlet restriction. Excessive restriction will reduce the efficiency of the blower and elevate its discharge temperature. The piping used should also be corrosion resistant, and free of scale and dirt.

⚠ WARNING

Do not use air blowers on explosive or hazardous gases. Each blower model has limits on pressure differential, running speed, and discharge temperature. These limits must not be exceeded. Consult the manual of the blower model being used for details pertaining to the allowable performance criteria.

MOTOR AND ELECTRICAL CONNECTIONS

⚠ WARNING

The motor and connections shall be protected to assure that product and environmental condensation does not come in contact with the electrical connections.

NOTICE

It is the responsibility of the installer to assure that the motor is in compliance with the latest edition of IEC 60204-1 and all electrical connections are performed per IEC 60204-1, this includes overcurrent protection.

All electrical wiring should be performed by a qualified and licensed electrician in compliance with NEC and IEC standards and local codes as applicable. Be sure to investigate the local requirements before installing the blower package. Refer to the name plate on the drive motor for wiring details. The power supply should be adequate and free of parasitic loads that will cause an undervoltage condition during the operation of the blower package. Otherwise, nuisance electrical shutdowns will result.

DIMENSIONS*

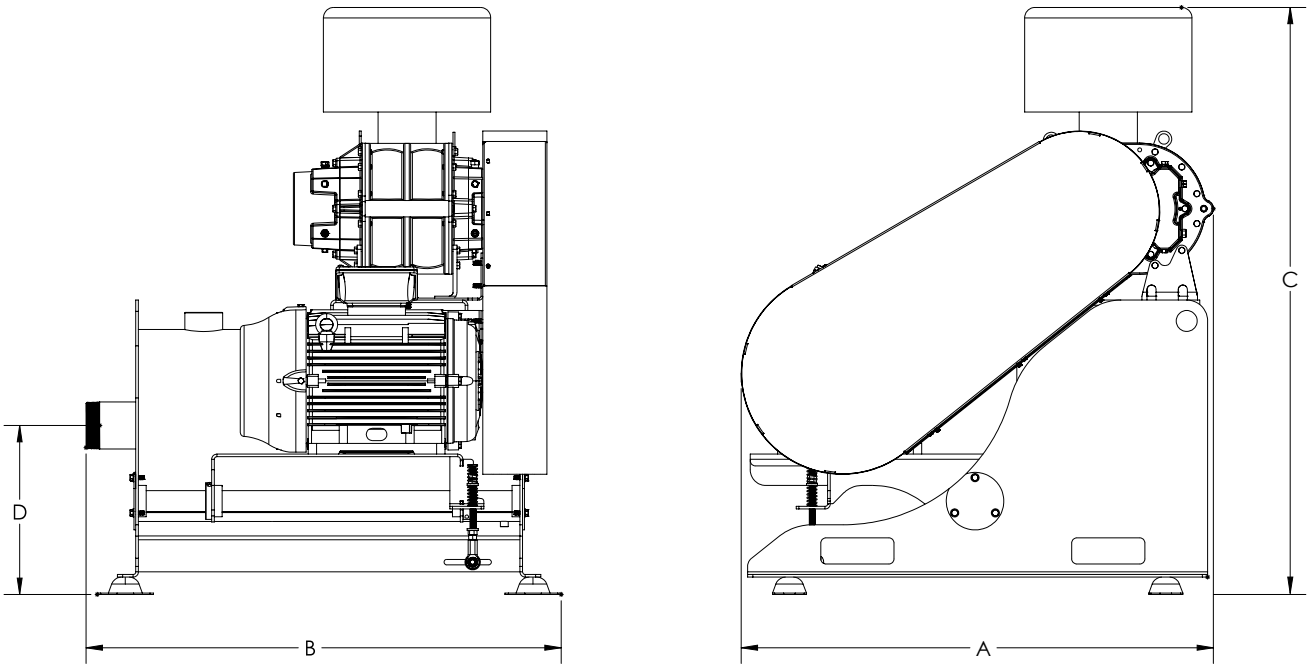

Figure 4-2 – MD20 Blower Package Dimension Drawing

MODEL	A	B	C	D
MD10	32.25 in. (870 mm)	37.75 in. (960 mm)	45.25 in. (1,190 mm)	13.66 in. (347 mm)
MD20	45.25 in. (1,150 mm)	45.5 in. (1,155 mm)	56.25 in. (1,430 mm)	16.16 in. (410 mm)

Table 4-1 – MD Blower Package Dimensions

**Dimensions may vary slightly based on blower model/filter configuration, tallest configuration dimensions listed.*

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OPERATION

GENERAL

⚠ DANGER

The blower is not intended to be used with explosive products or in explosive environments. The blower is not intended to be used in applications that include hazardous and toxic gases. Consult the factory for support.

⚠ WARNING

Do not operate without guards in place.

⚠ WARNING

For maximum operating speed in RPM (rotations per minute) and maximum temperature please refer to the manual for your specific blower model on the blower package. Do not exceed these limits. The installation of the blower shall take these critical operating parameters into account and adequate control features implemented.

START-UP CHECKLIST

M-D Pneumatics recommends that these start-up procedures be followed in sequence and checked off (☑) in the boxes provided in any of the following cases.

• During initial installation • After any shutdown period	• After maintenance work has been performed • After blower package has been moved to a new location

DATES CHECKED:				
☐☐☐☐	Check the unit for proper lubrication. Proper oil level is critical. ***See Lubrication on page 11*** and ***see Recommended Lubricants on page 34*** for information on acceptable lubricants for the product.			
☐☐☐☐	Check the V-belt drive for proper belt alignment and tension.			
☐☐☐☐	Carefully turn the rotors by hand to be certain they do not bind.			
☐☐☐☐	“Bump” the unit with the motor to check rotation (counterclockwise when facing the shaft) and to be certain it turns freely and smoothly.			
☐☐☐☐	Start the blower and operate it for 30 minutes at no load. During this time, feel the cylinder for hot spots. If minor hot spots occur, ***see Troubleshooting on page 32***.			
☐☐☐☐	Apply the load and observe the operation of the blower for 1 hour.			
☐☐☐☐	If minor malfunctions occur, discontinue operation and .			

⚠ WARNING

Disconnect power. Make certain power is off and locked out before touching any rotating element of the blower, motor, or drive components.

Starting

Check the oil for proper level at both ends of the blower. Add or drain oil as necessary to bring the oil to the correct level. Too much oil, particularly on the gear end, can result in excessive heat generation. Too little oil will possibly result in failure of the timing gears, bearings, and mechanical seals.

OPERATING

The upper temperature limits for blower operation are between 350° to 375°F (175° to 190°C), measured in the exhaust gas stream with a low mass thermocouple. When this temperature limit switch is installed, as the temperature exceeds the predetermined temperature, the blower will stop and cannot be restarted until the temperature drops below the trip setting of the temperature switch.

⚠ DANGER

The blower is not intended to be used with explosive products or in explosive environments. The blower is not intended to be used in applications that include hazardous and toxic gases. Consult the factory for support.

⚠ WARNING

Physical harm may occur if human body parts are in contact or exposed to the process vacuum. Assure that all connections are protected from human contact.

⚠ WARNING

If rated vacuum or pressure levels are exceeded, process fluids will migrate to other parts of the blower and blower package.

⚠ CAUTION

Do not touch hot surfaces.

The upper limit of the blower operation is 375ºF (190ºC). Do not touch the blower while it is in operation and assure blower is cool when not in operation.

⚠ CAUTION

Use of a thermowell insulates the thermocouple. Invalid and delayed readings will result. This can result in ineffective protection devices.

NOTICE

The upper limits are not intended for continuous operation. Consult with factory for detailed information assistance.

STOPPING

⚠ CAUTION

Do not stop the blower if there are high outlet pressures on the discharge side. Relieve the pressure from the discharge piping prior to shutting down the blower.

PRESSURE RELIEF VALVE

The blower package includes a pressure relief valve (or PRV) to prevent over pressurizing of the blower, silencer, check valve, and discharge piping. The pressure relief valve is a high flow, reliable spring based piston type with adjustable pressure rating.

The pressure relief valve will open any time the operating pressure of the blower reaches the set pressure of the valve. It is important to note that the opening of the relief valve is an indication that something is wrong in the downstream piping blower package, from a closed isolation valve to a buildup of material in a discharge pipe, or some other type of obstruction. If the valve opens, indicated by a popping sound and the rush of air escaping, shut down the blower package immediately and determine the cause of obstruction in the discharge piping.

Do not simply tighten the valve to the point that the valve closes.

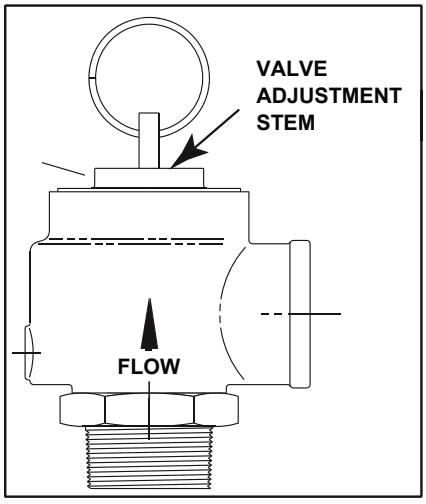

Figure 5-1 – Pressure Relief Valve Detail

The recommended setting for the pressure relief valve is 10% greater than the operating gauge pressure of the blower, but not less than 1 PSIG (7 kPa) above the operating gauge pressure of the blower. The valve is set to the proper pressure at the factory, however changes can occur during shipment so it is important that the valve be tested at initial start-up. Setting adjustments may also be necessary when the blower package is moved, or if there is a change in process parameters.

If the pressure relief valve setting needs to be adjusted, follow the procedure shown below:

1. Turn off and lock out blower package power.
2. Avoid overtightening the valve during installation.
3. Setting may be varied approximately + or - 10% of original setting by removing the hood and running pressure screw in or out as desired.

NOTICE

Re-tighten locknut after each adjustment

4. Valve may be cleaned by removing disc and cleaning seat surface with a soft cloth. Seating surface may be lapped in case of leakage by using a fine grit compound.
5. Restore power and start the blower package.

RECOMMENDED SHUTDOWN PROCEDURE TO MINIMIZE RISK OF FREEZING OR CORROSION

When an air piping blower package has high humidity or moisture, water condensation can occur after the blower is shut down and it begins to cool. Condensation creates an environment favorable to corrosion of the iron internal surfaces and to ice formation in cold weather. Both conditions can close the operating clearances, causing the blower package to fail upon future start-up.

The following shutdown procedure minimizes the risk of moisture condensation, corrosion, and freezing.

1. Isolate the blower from the moist blower package piping, allowing the blower to intake atmospheric air. Operate the blower under a slight load, allowing the blower to heat within safe limits. The heat generated by the blower will quickly evaporate residual moisture.

2. For extended shutdown, inject a small amount of a light lubricating oil or a spray lubricant into the inlet of the blower just before shutdown. The lubricant will provide an excellent protective coating on the internal surfaces. If using a spray lubricant, take care to prevent the applicator tube from getting sucked into the blower. The applicator tube will damage the blower, likely to a degree where repair would be required.

3. If the blower is being taken out of commission for an extended period of time, ***see Long-Term Storage on page 31***.

NOTICE

Take care not to overload or overheat the blower during this procedure.

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MAINTENANCE

GENERAL

Regular inspection of the blower package and its installation, along with complete checks on operating conditions, will pay dividends in added life and usefulness. Also, service the drive per manufacturer's instructions and lubricate the coupling or check belt drive tension. Use thermometers and gauges to make sure that blower operating temperature and pressure remain within allowed limits.

⚠ DANGER

The blower and parts may contain hazardous media. Assure that blower and parts are evacuated of hazardous media prior to servicing.

⚠ CAUTION

The electrical service must be isolated and de-energized prior to maintenance. Apply appropriate procedures to assure electrical supply is de-energized and cannot be inadvertently energized during maintenance.

Assure piping and product is isolated prior to maintenance of blower. Apply appropriate procedures to assure piping and product is isolated and that inadvertent opening of valves cannot occur during maintenance.

⚠ CAUTION

During routine maintenance, inspect and assure that guards are in place and secure.

NOTICE

Current regulations require Material Safety Data Sheet to be completed and forwarded to M-D Pneumatics on any unit being returned for any reason which has been handling or exposed to hazardous gases or materials. This is for the protection of the employees of M-D Pneumatics who are required to perform service on this equipment. Failure to do so will result in service delays.

Pay special attention to lubrication of timing gears and bearings according to the information in ***Lubrication on page 11***.

When a blower is taken out of service, it may require internal protection against rusting or corrosion. The need for such protection must be a matter of judgment based on existing conditions as well as length of downtime. Under atmospheric conditions producing rapid corrosion, protect the blower immediately. ***See Long-Term Storage on page 31***.

REGULAR MAINTENANCE

A well-designed maintenance program will add years of service to the blower package.

Check a newly installed blower package frequently during the first month of operation, especially lubrication. With the blower at rest, check the oil level in both the gear (drive) end and free (non-drive) end of the blower and add oil as needed.

Complete oil changes are recommended every 4,000 – 8,000 operating hours, or more frequently depending on the type of oil and operating temperature. Blowers with mechanical seals on the rotors can generally run the full 8,000 hours before an oil change is required. Also change the oil more frequently if pumping corrosive vapors or where excessive operating temperatures are encountered. The following is recommended as a minimum maintenance program.

DAILY	WEEKLY	MONTHLY
1. Check and maintain oil level, and add oil as necessary. 2. Check for unusual noise or vibration (***See Troubleshooting on page 32***).	1. Clean all air filters. A clogged air filter can seriously affect the efficiency of the blower package and cause overheating and oil usage.	1. Inspect the entire blower package for leaks. 2. Inspect the condition of the oil and change if necessary. 3. Check drive belt tension and tighten if necessary. 4. Inspect the relief valve to make sure it is operating properly.

Proper oil drain schedules require oil be changed before the contaminant load becomes so great that the lubricating function of the oil is impaired or heavy disposition of suspended contaminants occurs. To check the condition of the oil, drain a sample into a clean container and check for the presence of water or solids. Slight discoloration of the oil should not necessitate an oil change.

OIL LEVEL, FILL AND DRAIN

The MD blower package is designed for oil to be added directly to the blower. Oil can be drained by removing the drain plug. Oil is added via the oil plugs on the covers. Some units may include blowers with grease on one end instead of oil. These units will feature a zerk fitting for adding grease. In these instances, grease should be added to the drive end when oil is added to the gear end. Check oil level only when the machine is shut down.

AIR FILTER

The air filter included with the MD blower package is designed for minimum pressure loss and proper filtration of atmospheric inlet air. The air filter element is a disposable pleated paper, radial fin type. M-D Pneumatics recommends regular replacement of the filter when it is visibly dirty or when pressure loss exceeds 15 inches (38 cm) of water column pressure loss.

NOTICE

DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER ELEMENT.

This can result in damage to the filter media and reduce its filtration effectiveness. Never operate the blower package without adequate inlet air filtration or unwarrantable damage to the blower can occur.

Remove and replace filter element as follows:

1. Turn off and lock out power to the blower package.
2. Remove the filter retainer housing nut and washer.
3. Remove the filter cover housing off the threaded stud.
4. Remove the element off the filter base plate.
5. Clean inside of filter base plate and housing as necessary, taking care not to sweep any debris into the blower intake piping.
6. Place a new or cleaned element on the filter base plate.
7. Install filter retainer housing with the nut and washer that were removed in step 3.
8. Unlock the power and start the blower package.

V-BELTS

The MD blower package features an automatic v-belt tensioning system that provides constant belt tension using the weight of the motor. This system ensures maximum belt life while minimizing maintenance. The pivoting motor mounting plate is stabilized with a support rod that includes a spring and adjustable nuts. The function of the spring is to provide resistance during start up when the package is installed with a direct online motor starter.

The adjustable nuts, located underneath the motor mounting plate, function as a support for the motor plate in the event of belt failure. The adjustable nuts should be position 1-$^{7}/_{8}$″ below the motor mounting plate when the belts are new for the MD 10 blower package and 2″ for the MD 20 blower package. This clearance allows for normal stretching over the life of the belts.

Replacing V-Belts

1. Remove spring from motor support rod. Take note of the position of the nuts holding the spring in place.
2. Remove the belt guard by removing the screw on the top side of the guard and then lift the guard up and then out.
3. Remove tension from the belts by lifting and **SECURING** the motor.

⚠ WARNING

When belts are removed the motor plate is free to fall if not supported.

4. Replace belts and gently allow belts to support the weight of the motor.
5. Reinstall the belt guard by lining up the hole on the bottom side of the guard with the studs on back panel of the belt guard. Reinstall the screws on the top side of the belt guard.
6. Reinstall the spring and tighten the spring retaining nuts to their original position.

V-Belt Troubleshooting

PROBLEM	POSSIBLE CAUSES	SOLUTION
Belts slip (sidewalls glazed)	Not enough tension	Replace belts; apply proper tension.
Drive squeals	Shock load	Apply proper tension.
	Not enough arc of contact	Increase center distance.
	Heavy starting load	Increase belt tension.
Belt(s) turned over	Broken cord caused by prying on sheave	Replace set of belts and install correctly.
	Overloaded drive	Redesign drive.
	Impulse loads	Apply proper tension.
	Misalignment of sheave and shaft	Re-align drive.
	Worn sheave grooves	Replace sheaves.
	Excessive belt vibration	Check drive design. Check equipment for solid mounting. Consider use of banded belts.
Mismatched belts	New belts installed with old belts	Replace belts in matched sets only.
Breakage of belt(s)	Shock loads	Apply proper tension; recheck drive.
	Heavy starting loads	Apply proper tension; recheck drive. Use compensator starting.
	Belt pried over sheaves	Replace set of belts correctly.
	Foreign objects in drives	Provide drive guard.
Rapid belt wear	Sheave grooves worn	Replace sheaves.
	Sheave diameter too small	Redesign drive.
	Mismatched belts	Replace with matched belts.
	Drive overloaded	Redesign drive.
	Belt slips	Increase tension.
	Sheaves misaligned	Align sheaves.
	Oil or heat condition	Eliminate oil. Ventilate drive.

SPARE PARTS

Should adjustments or replacement be needed, repairs can often be performed locally as described in this manual after obtaining the required parts. Personnel should have a good background of mechanical experience and be thoroughly familiar with the procedures outlined in this manual. For major repairs not covered in this manual, contact the nearest M-D Pneumatics service representative.

When ordering parts, supply the blower package nameplate information, as well as the item number and parts description as per the parts lists and assembly drawings. Repair kits are available for all models. These kits contain all the seals, bearings, O-rings, locks, and special retaining screws necessary for an overhaul. For convenience when ordering parts, complete the **Operating Data Form** included on the inside, back cover of this manual.

In developing a stock of spare parts, consider the following factors:

- The degree of importance in maintaining the blower package in a “ready” condition
- The time lag in parts procurement
- Cost
- Shelf life (seals and O-rings)

FACTORY SERVICE AND REPAIR

With proper care, M-D Pneumatics blower packages will give years of reliable service. The parts are machined to very close tolerances and require special tools by mechanics who are skilled at this work. Should major repairs become necessary, contact the factory for the location of the nearest service facility.

NOTICE

Current regulations require Material Safety Data Sheet to be completed and forwarded to M-D Pneumatics on any blower package being returned for any reason that has been handling or involved with hazardous gases or materials. This is for the protection of the employees of M-D Pneumatics and the service facilities who are required to perform service on this equipment. Failure to do so will result in service delays.

NOTICE

When returning a blower package to the factory for repair under warranty, please note the factory will not accept any blower package that arrives without authorization. Contact Customer Service Department for return authorization.

LONG-TERM STORAGE

Any time the blower package will be stored for an extended period, ensure that it is protected from corrosion and nature by following these steps:

1. Disconnect power to the unit.
2. Cover all openings of open drip-proof motors to prevent the entrance of rodents, insects, and foreign material.
3. Remove and store inlet filter assembly.
4. Spray the interior (lobes, housing, and end plates) of the blower with rust preventative. Rotate the shaft while spraying to ensure complete coverage. This should be repeated as conditions dictate and at least on a yearly basis.
5. Spray all exposed surfaces, including the inlet and discharge flanges with rust preventative.
6. Seal inlet and discharge ports (Discharge may be done at silencer discharge) with a nonporous, secure cover. Prior to securing, attach a desiccant bag to inlet blower cover to prevent condensation from occurring inside the blower. Make sure any desiccant bag (or bags) is attached to the cover so that they can easily be removed prior to startup of the blower.
7. Fill each oil reservoir completely with oil.
8. Firmly attach a very prominent tag stating that the reservoirs are full of oil and must be drained and refilled to proper levels prior to startup.
9. Apply a rust preventative grease to the drive shaft.
10. During storage, ensure that the blower does not experience excessive vibration.
11. Store the blower in a climate controlled space if possible, at a minimum ensure it will only be exposed to dry conditions.
12. Rotate the drive shaft by hand monthly in order to prevent seals from setting in one position.
13. At the end of the storage period, follow the unpacking and startup procedures and be sure to reattach the inlet filter assembly. If stored for more eighteen months, please contact M-D Pneumatics before placing the blower package into service.

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TROUBLESHOOTING

Although M-D Pneumatics blowers are well designed and manufactured, problems may occur due to normal wear and the need for readjustment. The following chart lists symptoms that may occur along with probable causes and remedies.

SYMPTOM	PROBABLE CAUSE	REMEDIES
Loss of oil	Gear housing not tightened properly	Tighten gear housing bolts.
	Lip seal failure	Disassemble and replace lip seal.
	Insufficient sealant	Remove gear housing and replace sealant.
Excessive bearing or gear wear	Improper lubrication	Correct oil level. Replace dirty oil. ***See Lubrication on page 11***.
	Excessive belt tension	Check belt manufacturer's specifications for tension and adjust accordingly.
Lack of volume	Slipping belts	Check belt manufacturer's specifications for tension and adjust accordingly.
	Worn lobe clearances	Check for proper clearances.
	Speed too low	Increase blower speed within limits.
	Obstruction in piping	Check system to ensure an open flow path.
Knocking	Unit out of time	Re-time.
	Distortion due to improper mounting or pipe strains	Check mounting alignment and relieve pipe strains.
	Excessive pressure differential	Reduce to manufacturer's recommended pressure. Examine relief valve and reset if necessary.
	Worn gears	Replace timing gears.
Excessive operating temperature	Excessive pressure differential	Reduce pressure differential across the blower.

SYMPTOM	PROBABLE CAUSE	REMEDIES
Rotor end or tip drag	Insufficient assembled clearances	Correct clearances.
	Case or frame distortion	Check mounting and pipe strain.
	Excessive operating pressure	Reduce pressure differential.
	Excessive operating temperature	Reduce pressure differential or reduce inlet temperature.
Vibration	Belt or coupling misalignment	Check carefully. Re-align if necessary.
	Lobes rubbing	Check cylinder for hot spots, and then check for lobe contact at these points. Correct clearances.
	Worn bearings or gears	Check condition of gears and bearings. Replace if necessary.
	Unbalanced or rubbing lobes	Possible build-up on casing or lobes, or inside lobes. Remove build-up and restore clearances.
	Driver or blower loose	Check mounting and tighten if necessary.
	Piping resonance	Check pipe supports, check resonance of nearby equipment, and check foundation.
	Blower rotors out of time	Remove blower and check timing.

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RECOMMENDED LUBRICANTS

RECOMMENDED LUBRICANTS FOR BLOWERS AND VACUUM BOOSTERS

Positive displacement blowers and vacuum boosters require proper lubrication for bearings, seals and gears to operate effectively and efficiently. Oil is distributed from the oil reservoir to the critical components by means of oil slingers that are attached to the rotor shaft. In certain models of CP Series blowers, a high-performance grease rated for high temperatures is used on the drive-end bearings.

MD full synthetic lubricants are recommended for blowers and vacuum boosters. MD lubricants are specifically formulated using unique additives that provide maximum protection and extend the life of your product over mineral oils or semi-synthetic lubricants.

⚠ WARNING

Do not overfill the oil sumps. Overfilling can result in gear damage or oil leaks.

⚠ CAUTION

Units are shipped without oil in the sumps. Ensure adequate oil has been added before operating.

MD oils are suitable for a wide range of operating temperatures that are based on model, operating speed and discharge temperature of the product.

FOR OXYGEN-ENRICHED SERVICE

Blowers and vacuum boosters operated in oxygen enriched applications should only use non-flammable, PFPE full synthetic lubricants. Blowers and vacuum boosters used in hydrogen service should only MD full synthetic oil

NOTE: Oxygen-enriched service only applicable for PD Plus blowers and vacuum boosters.

⚠ CAUTION

M-D Pneumatics and Kinney does not accept responsibility for damage caused by use of lubricants that are not recommended by M-D Pneumatics and Kinney.

MD BLOWER & BOOSTER LUBRICANTS SPECIFICATIONS				
PRODUCTS	**MD ONE**	**MD PLUS**	**MD MAX**	**MD FG**
VISCOSITY INDEX	150	154	157	141
@40°C, CST	99.1	231.7	340.9	99.3
@100°C, CST	14.4	27.6	37.2	13.9
FLASH POINT °F (°C)	510 (266)	480 (249)	491 (255)	515 (268)
POUR POINT °F (°C)	- 44 (-43)	-49 (-45)	-54 (-48)	-60 (-51)

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

MD BLOWER & BOOSTER LUBRICANTS OPTIONS					
MD OIL TYPE	**1 QUART**	**1 GALLON**	**5 GALLON**	**55 GALLON BARREL**	**CASE 12 QUARTS**
MD ONE	16444-MD1-Q	16444-MD1-G	16444-MD1-5G	16444-MD1-B	16444-MD1-Q-C
MD PLUS	16444-MD2-Q	16444-MD2-G	16444-MD2-5G	16444-MD2-B	16444-MD2-Q-C
MD MAX	16444-MD3-Q	16444-MD3-G	16444-MD3-5G	16444-MD3-B	16444-MD3-Q-C
MD FG	16444-MD1-Q-FG	16444-MD1-G-FG	16444-MD1-5G-FG	16444-MD1-B-FG	16444-MD1-Q-C-FG

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 *(Qx™ 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.

May 2008

OPERATING DATA FORM / PRODUCT REGISTRATION

It is to the user's advantage to have the requested data filled in below and available in the event a problem should develop in the blower or the system. This information is also helpful when ordering spare parts.

Model No. _____ V-Belt Size _____ Length _____

Serial No. _____ Type of Lubrication _____

Startup Date _____ _____

Pump RPM _____ Operating Vacuum _____

Pump Sheave Diameter _____ Any other Special Accessories Supplied or in use:

Motor Sheave Diameter _____ _____

Motor RPM _____ HP _____ _____

NOTES: _____

_____

_____

_____

IMPORTANT

All blowers manufactured by M-D Pneumatics are date coded at time of shipment. In order to assure you of the full benefits of the product warranty, please complete, tear out and return the product registration card. You may also register your product online at www.mdpneumatics.com or contact Customer Service.

M-D Pneumatics®

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

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