PRICE $15.00

QUICK-TAKE-APART AIRLOCK INSTALLATION/ OPERATION and MAINTENANCE MANUAL

MODEL _____

SERIAL NO

Before using this equipment:

- AVOID INJURY, read and understand all instructions given in this manual
- Familiarize yourself and others with the safety labels installed on this equipment (See section 1.6)
- Designate an accessible place for this manual and keep it available to all users at all times

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SECTION 1: INTRODUCTION

This section provides an overview of the manual and indicates safety procedures to be followed when installing and operating the Q.T.A. Airlock.

1.1 Manual Overview

This manual describes the installation requirements, procedures, and routine maintenance of **Prater's** Q.T.A. Airlock. Refer to this manual before beginning and during installation. Keep the manual available for future reference. Exploded views are located in the rear of the manual. The procedures throughout this manual refer to these exploded views.

Reliable operation, personnel safety, and long service life of this equipment depend on three important considerations:

- The care exercised during installation.
- The quality and frequency of maintenance and periodic inspections.
- A common sense approach to its operation.

To keep operating costs down and profits up, carefully follow the instructions listed for installation, operation, safety, and maintenance.

1.2 Receiving The Unit

When your shipment arrives, thoroughly inspect the Q.T.A. Airlock and all related equipment. In the event of shipping damage, note the problem on the bill of lading or freight bill and make sure you obtain the driver's signature for possible claim against delivering carrier.

NOTE **IT IS THE RECEIVER'S OBLIGATION TO FILE CLAIMS FOR SHIPPING DAMAGE.**

1.3 Before Installation

Be sure the installation crew is aware of installation requirements. If they have any questions or are unsure of proper procedures, clarify the matter to avoid improper installation. Section 2 of this manual covers important steps to ensure safe, vibration-free installation. Personnel responsible for installation should be familiar with these procedures.

In preparing for installation, make sure you provide for all appropriate safety devices. **Prater** Industries, Inc. does not install your machine. It is your responsibility to provide lockout switches, guards, and other safety devices and safety procedures to protect the machine operator or maintenance personnel.

1.4 Before Operation

Make sure operating personnel are well-trained in procedures for operating and maintaining the Q.T.A. Airlock. In particular, make sure they understand the essential safety precautions described in Section 1.6.

1.5 Safety Notices

Basic safety must be considered through all facets of operation and maintenance on any mechanical device. Using proper tools and methods will help prevent accidents and serious injury to you and your fellow workers.

Proper operating procedures and safety precautions are listed throughout this manual. Study them carefully and follow instructions; insist that those working with you do the same. Almost all accidents are caused by someone's carelessness or negligence.

Examples of the three types of safety notices (Warnings, Cautions and Notes) in this manual are listed below:

WARNING **INDICATES A SITUATION IN WHICH PERSONAL INJURY MAY OCCUR.**

CAUTION **INDICATES A SITUATION IN WHICH DAMAGE TO EQUIPMENT OR MATERIAL MAY OCCUR.**

NOTE **PROVIDES HELPFUL INFORMATION FOR PROPER OPERATION OF THE Q.T.A. AIRLOCK.**

1.6 Safety Precautions

WARNING **OPERATORS MUST BE INSTRUCTED NOT TO PUT HANDS, FINGERS OR OTHER FOREIGN OBJECTS IN THE MACHINE, AND NOT TO REMOVE ANY COVER, DOOR, HATCH OR OTHER PROTECTIVE DEVICE. COVERS DOORS, HATCHES AND OTHER PROTECTIVE DEVICES ARE PLACED ON THIS MACHINE FOR THE SAFETY OF THE OPERATOR. ANY ATTEMPT TO DEFEAT THESE DEVICES COULD RESULT IN SERIOUS INJURY.**

WARNING **ELECTRICAL SERVICE TO THE MACHINE MUST BE LOCKED OUT WHILE ANY REPAIRS OR ADJUSTMENTS ARE BEING MADE OR WHILE ANY COVER, DOOR, HATCH OR OTHER PROTECTIVE DEVICE IS NOT IN PLACE.**

The precautions listed in this manual may not be all inclusive and others might occur to you which are peculiar to your operation or industry. In addition, nearly all employers are now subject to the Federal Occupational Safety and Health Act of 1970, as amended, which requires that an employer be kept abreast of the myriad of regulations which will continue to be issued under its authority.

The Q.T.A. Airlock must always be operated in accordance with the instructions and precautions in this manual and on the caution stickers attached to the equipment. Only workers completely familiar with the instructions and precautions in this manual should be permitted to work on the unit. Operators' should thoroughly understand these instructions and precautions before attempting to operate this equipment.

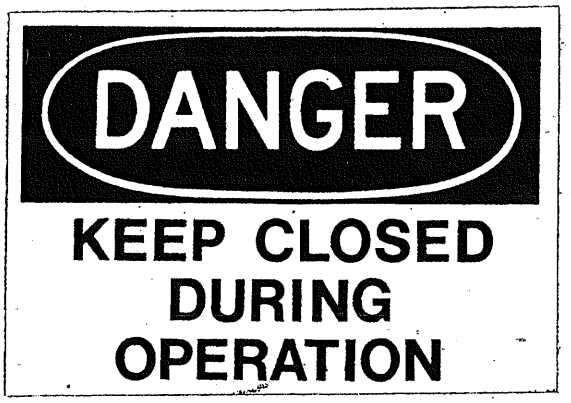
Illustration 1-1 is a checklist of safety precautions and proper operating procedures. Failure to observe and follow the precautions may result in serious personal injury or property damage.

Safety Checklist

- ✔ **ALWAYS** operate Q.T.A. Airlock in accordance with instructions in this manual.
- ✔ **DO NOT** open inspection doors while unit is in motion.
- ✔ **NEVER** work on unit and related components unless electric power and motor drive have been locked out and tagged. The National Electrical Code requires a manually operable disconnect switch located within sight of motor, or a controller disconnecting means capable of being locked if not within sight of the motor.
- ✔ **DO NOT** use the Q.T.A. Airlock for processing of material other than the specific application for which it was designed.
- ✔ **AVOID** poking or prodding into unit openings with bar or stick.
- ✔ **ALWAYS** have a clear view of unit loading and unloading points and all safety devices.
- ✔ **KEEP** area around unit, drive and control station free of debris and obstacles.
- ✔ **NEVER** operate unit without guards and all safety devices in position and functioning.
- ✔ **ALWAYS** allow unit to stop naturally. DO NOT attempt to artificially brake or slow motion of unit.
- ✔ **NEVER** put your hand near or in the inlet or outlet of the airlock while it is operating or stalled.

Illustration 1-1
Prater Q.T.A. Airlock
Safety Check List

Illustration **1-2** shows the safety label used on the Q.T.A. Airlock. This label is important for worker information and must not be removed from the unit.



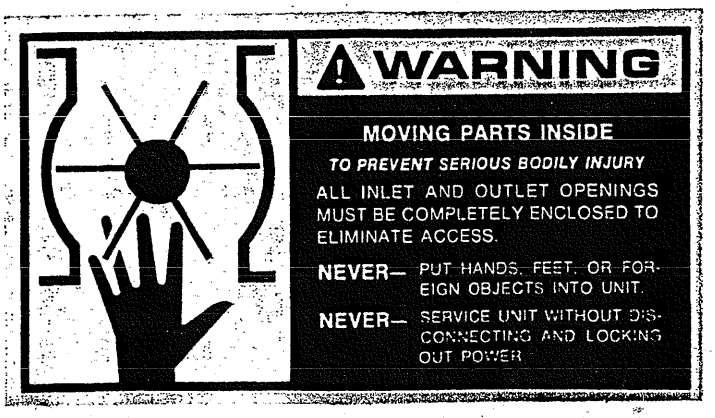


Illustration 1-2
Safety Labels

1.7 Field of Operation

Prater Q.T.A. Airlocks are primarily used to perform three basic functions:

1. Feed free-flowing material from a bin or hopper.
2. Deliver fines from a collector while sealing against air loss.
3. Feed free-flowing material into or out of a pneumatic conveying system against pressure or vacuum.

Prater "C" and "S" Airlocks are the Models generally chosen for application where air leakage or gas loss are important considerations. This includes the transfer of materials through pneumatic conveying systems against pressure.

1.8 Unit Design

Eight blade fully welded rotor is standard for maximum seal.

3/8" blade thickness.

Bosses drilled and tapped for pocket venting.

Heavy cast housing and end plates provide rigidity (Cast iron or Stainless Steel).

Special rotors per request.

Heavy-duty outboard permanently sealed bearing. Double sealed and lubricated for life. Bearings are mounted outboard of seals to permit access to seals and prolong bearing life.

Keyed through-shaft.

All models can be drilled for air purge of seals 0.003"- 0.005" clearances for minimum air leakage.

Bearing retainer and packing gland are part of the end plate assembly. Seals are externally accessible and can be replaced without removing bearings and end plates.

Multiple rows of seals. Super seal, Teflon food grade, and high temperature copper clad seals available.

1.81 Q.T.A.

The Quick Take Apart Airlock has Teflon liners mounted to the end plates, easily removal knobs securing one end plate, a Delrin key between the rotor and the shaft, and a rotor that slides quickly off the shaft and out of the housing.

1.9 Operating Principle

The **Prater** Q.T.A. Airlock has been manufactured with quality materials and workmanship, and if given reasonable care will perform perfectly with a minimum of maintenance. Each part has been machined to close tolerance to assure the best possible fit between all components as well as interchangeability.

The rotor revolves in the housing at low speed and carries material vertically from the inlet to the discharge where it drops out.

1.10 Specifications

1.10.1 Dimensions

Table 1-1

Airlock Dimensions

PAV	6	8	10	12
Rotor Diameter (Inches)	7.493	9.368	11.618	13.991
Rotor Length (Inches)	6.493	8.225	9.862	12.991
Motor Size (HP)	1/2	1/2	3/4	1
Weight (Lbs.)	98	143	215	495
Blades	8	8	8	8

1.10.2 Capacities

Table 1-2

Airlock Capacities (Calculated) in FT^3/MIN

SIZE	AVAILABLE RPM					
	9.5	15	23	9.3	16	22
PAV 6	1.46	2.31	3.54			
PAV 8	2.85	4.50	6.90			
PAV 10				4.93	8.48	11.66
PAV 12				8.83	15.20	20.90

The practical pocket loading for a standard pocket is usually about 80% or less of the numbers in the table.

Example: PAV 8, 15 RPM

Table: 4.50 FT^3/MIN

Effective 80% : 4.50 x .8 = 3.60 FT^3/MIN

1.10.3 CLEARANCES

The rotor has been machined to fit the housing assembly with proper radial and end clearances. These clearances will assure satisfactory operation at temperatures up to 100°F.

In case the operating temperature is significantly different from the ambient temperature the measured gap will be larger under ambient conditions, because the rotor will expand under high temperature conditions.

We recommend calling the **Prater** Customer Service Department (1-800-323-5735) to secure information about the gap enlargement for higher temperatures.

The standard clearances between rotor and airlock housing under "Process Conditions" are shown in Table **1-3.**

Table 1-3
Side and Tip Clearances

AIRLOCK SIZE	OPERATING CLEARANCE IN./SIDE & IN./TIP
6	0.004 - 0.006
8	0.004 - 0.007
10	0.005 - 0.008
12	0.005 - 0.009

NOTES

SECTION 2: INSTALLATION

2.1 Introduction

Proper installation of **Prater's** Q.T.A. Airlock is critical for efficient and productive operation. The proper site preparation and placement of the Q.T.A. Airlock and related equipment will insure that the Airlock operates safely and to its fullest capacity.

The following are important considerations in Q.T.A. Airlock installations:

1. **Location.** Make sure the operating location will provide strong, vibration-free base support and allow easy access to all parts of the Q.T.A. Airlock. See Section **2.2.** The Q.T.A. Airlock should never be located where it is independently supporting equipment or hoppers above or below it. Additional weight applied to the airlock housing can distort it, possibly causing binding of the rotor. Ideally it should have several feet clearance all around it.
2. **Leveling.** The Q.T.A. Airlock must be mounted horizontally on a flat surface if not supplied on an air pick-up base. This flat surface requires sufficient strength to prevent deflections of more than. 0.003" and be large enough to incorporate the full base of the Q.T.A. Airlock with a discharge opening. Section **2.3** and **2.4** explain how to check for proper leveling and prevention of vibration damage during operation.

2.2 Location

There are two essential considerations for the Q.T.A. Airlock location: the foundation below the machine and the free clearance around it.

2.2.1 Foundation

The Q.T.A. Airlock must be supported in a vibration free location. All Q.T.A. Airlocks need a gasket between the mounting surfaces to prevent any leakage of product or air.

2.2.2 Clearance

There should be sufficient open space in all directions around the Q.T.A. Airlock to allow access for maintenance operations.

2.3 Leveling

The base of the unit must be level to prevent vibrations that will accelerate wear. Before tightening fasteners, check for correct unit leveling at the corners of the Q.T.A. Airlock.

To correct level:

1. Insert shims for proper alignment.
2. Re-check level at corners of Q.T.A. Airlock.
3. Tighten all fasteners.

2.4 Vibration

The Q.T.A. Airlock is constructed to run without noticeable vibration. Vibration indicates a problem that must be found and corrected immediately. Left uncorrected, vibration will cause the following:

- Q.T.A. Airlock damage
- Structural damage

There are several conditions that cause vibration, including:

- Uneven base (See Section **2.3**)
- Loose motor fasteners
- Defective motor or Q.T.A. Airlock bearings. (See Section **5**)
- Other equipment transferring vibration thru contact with the Q.T.A. Airlock
- Foreign material in the Q.T.A. Airlock.

2.5 Drive

The Q.T.A. Airlock has been supplied with the proper drive, balanced and properly mounted.

2.6 Air Purge Port

Both end seals have an air purge port (1/8" NPT) which can be connected to a compressed airline. If the product is very dusty, a pressurized clean air stream outflow is required to keep the packing clean. In normal atmospheric conditions, a purge pressure of 2-5 PSI is adequate. The purge air loss will be about 1 SCFM. Inert gas can be used if necessary.

2.7 Electrical Requirements

Install connections to meet all national and local electrical codes. Consult with your local power company before installation.

NOTE **THE NATIONAL ELECTRICAL CODE REQUIRES A MANUALLY OPERABLE DISCONNECT SWITCH LOCATED WITHIN SIGHT OF THE MOTOR, OR A CONTROLLER DISCONNECTING MEANS CAPABLE OF BEING LOCKED IF NOT WITHIN SIGHT OF THE MOTOR.**

Effective October 31, 1989, OSHA requires that all energy disconnect devices be capable of accepting a lock-out/tag-out device. This requirement is mandatory for any new equipment being installed or for replacement, repair, or modification of older equipment. The employer must:

- Produce a written program explaining the procedure
- Conduct an annual inspection to verify compliance
- Provide documented employee training in these procedures.

2.7.1 Electrical Interlocking

As a general guide, the last piece of process equipment is started first with subsequent starts working up the line to the Airlock, used as a feeder, being the last item started and the first item stopped. If used as Bin discharge, it should be started first and stopped last.

2.8 Unit Check

After installation is complete, carefully inspect all work before installation crew leaves to see that all instructions have been properly followed.

SECTION 3: OPERATION

3.1 Introduction

Pre-run inspections and safety checks throughout this section insure that the Q.T.A. Airlock is in proper operating condition. Other aspects of operation covered in this section include: start-up and shut down sequences.

3.2 Safety Check-Up

Before starting the Q.T.A. Airlock check for:

- Foreign material, i.e., nuts, bolts, wire, rags, paper, wood, etc., which may have been left in the Q.T.A. Airlock, or system piping.
- Properly mounted guards.
- Electrical starting equipment, meters, disconnect switches, and other control devices, to see that they are clearly visible and readily accessible.
- Rotation. If Q.T.A. Airlock has a beveled rotor.

3.3 Starting Check List

This checklist should be followed during the initial installation and after any shut down period or maintenance procedure.

1. Check inside Q.T.A. Airlock and remove any foreign material that may have accumulated during shipment and installation.
2. Check rotor for correct direction of rotation relative to material feeding.
3. Make sure gear box lubrication is sufficient.
4. Set up and check compressed air supply if unit is air purged.
5. Make sure no tension from surrounding equipment is placed on airlock housing.
6. First start should be without product. Check seal effectiveness, tighten if necessary.
7. Feed material into Q.T.A. Airlock inlet while unit is in operation.
8. Do not continue to operate when malfunctions occur or problems arise.

NOTES

SECTION 4: MAINTENANCE

4.1 Introduction

The Q.T.A. Airlock is designed to operate with minimum maintenance. Routine inspections and regular maintenance will identify any worn or broken parts before they become a problem. Worn or broken parts are damaging to the Q.T.A. Airlock and its output.

WARNING **DO NOT OPEN Q.T.A. AIRLOCK OR ATTEMPT ANY FORM OF INSPECTION UNTIL THE Q.T.A. AIRLOCK HAS COME TO A COMPLETE STOP AND THE ELECTRICAL DISCONNECT HAS BEEN LOCKED OUT.**

4.2 Routine Inspection

Rotating equipment requires regular routine preventative maintenance procedures.

Regular inspection of the rotor blades should be carried out particularly where abrasive materials are being processed.

The wear pattern on the rotor blades will vary depending upon operating conditions. Visual inspection will show the necessity for change.

4.3 Q.T.A. End Plate and Rotor Removal

WARNING **DO NOT OPEN Q.T.A. AIRLOCK OR ATTEMPT ANY FORM OF INSPECTION UNTIL THE Q.T.A. AIRLOCK HAS COME TO A COMPLETE STOP AND THE ELECTRICAL DISCONNECT HAS BEEN LOCKED OUT.**

1. Turn off the Q.T.A. Airlock and allow the rotor to come to a complete stop.
2. Lock out electrical power to the Q.T.A. Airlock.
3. Remove the 6 hand knobs which secure the end plate (2) to the housing (1).
4. Thread two of the knobs (17) into the tapped holes located in the upper left and lower right corners of the end plate (2) until the end plate disengages from the housing and remove the end plate from the shaft.
5. Slide the rotor (14) off the shaft (13) and out of the housing (1).

4.4 Seal and Bearing Removal

4.4.1 Bearings

The bearing (5, Illustration **6-1** or **6-2**) in the Q.T.A. Airlock is lubricated and sealed at the factory, requiring no further lubrication for the life of the Airlock.

4.4.2 Packings

Three rings of square section, molded, split ring, self-lubricating packing (7, Illustration **6-1** or **6-2**) are provided in each packing seat, followed by an adjustable packing gland (6). The packings used in the Q.T.A. Airlock are one of the following:

1-602-	-1 TEFLON
1-602-	-2 SUPER SEAL
1-602-	-3 COPPER CLAD

4.4.3 Self Adjusting Packing Glands

Your **Prater** Airlock is equipped with a self-adjusting packing gland. This is a unique feature which maintains constant pressure on the packing as it wears making periodic adjustment of packing pressure unnecessary. The pressure has been set during final assembly and inspection at the factory and should be satisfactory for the life of the packing.

When the packing(s) has completed its useful life replacement can be made quickly and conveniently by following the simple instructions listed below while referring to Illustration **6-3**.

Advance both spring release nuts (12) along spring release screws (11) until spring retainers (9) are disengaged from the packing gland (6).

Disengage packing gland (6) from spring retainers (9) by rotating it 90 degrees. Slots are provided in the packing gland (6) to allow.

Slide packing gland (6) along the rotor shaft towards bearing (5) until packing gland (6)is free of end plate (2).

Add new packings as required.

To re-assemble the packing gland to its operating position, it may be necessary to further compress springs (10) by advancing spring release nuts (12) against spring release retainers (9) until packing gland (6) can be re-engaged with spring retainer (9).

Once this is done, follow the above described procedure in reverse order.

4.4.4 Lantern Rings

Under certain operating conditions, especially when the Airlock is handling abrasive dust, it may be desirable to purge the packing gland with compressed air or inert gas. This is accomplished by installing a lantern ring. (8, Illustration **6-1** or **6-2**) in the gland in place of the inner-most ring of packing (7), immediately adjacent to the rotor side of each end plate (2). The ring is so designed as to distribute the air or gas evenly in a thin film around the shaft. Lantern rings are generally made of brass, but in aluminum or stainless steel Airlocks, they are nylon.

4.5 Beveled Rotors

The Q.T.A. Airlock may be equipped with a rotor having the trailing edges and tips beveled at 15° relief angle, leaving a 1/16" to 1/8" flat surface.

In this instance, it is important that the rotation of the rotor be in such a manner so that the square edge of the rotor leads, and the beveled edge trails. On all units, unless otherwise specified, this will result in a clockwise rotation of the rotor when viewed from the drive end of the Airlock.

SECTION 5: TROUBLESHOOTING

This section covers the more common day-to-day operating problems for the ***Prater*** *Q.T.A. airlock.*

WARNING DO NOT OPEN Q.T.A. AIRLOCK OR ATTEMPT ANY FORM OF INSPECTION UNTIL THE Q.T.A. AIRLOCK HAS COME TO A COMPLETE STOP AND THE ELECTRICAL DISCONNECT HAS BEEN LOCKED OUT.

5.1 Introduction

This section is offered as a general guide to analyzing problems. If after reviewing this section you have not identified your problem, contact **Prater** Customer Service Department at 1-800-323-5735 for further assistance.

5.2 Start-Up Problems

Prater equipment is made of high quality materials and assembled by skilled workers who take pride in their work. However, even on the best equipment there can still be start-up or operational problems.

If trouble occurs, please check the following:

1. Check the power source for sufficient power as specified on the nameplate. Check the wiring connections and the motor protection devices, i.e. fuses, circuit breakers, and overload elements. Replace fuses, if blown, and reset the circuit breakers or overload elements, if tripped.
2. The motor may be burned out. If it is, it will need to be repaired or replace.
3. The gears in the gear case may have seized up due to the lack of oil. Replace the gears or the gear case.
4. Check for jamming of the rotor. If jammed the Airlock may need to be disassembled, and cleaned. Do not attempt this until the unit has been locked out. The bearings or seals may need to be replaced.

5.3 Unusual Drive or Motor Noise

1. Check the oil level in the gear case. If it needs to be filled, see the Appendix in the rear of this manual.

5.4 Unusual Airlock Noise

1. Check the motor's amp draw to determine whether material build-up on the rotor or housing is overloading the motor. If the build-up is excessive, clean the rotor and housing after locking out the unit.
   - Check for the correct direction of rotation. A rotor with relieved tips rotating in the wrong direction will cause material build-up.
   - Some materials are susceptible to build-up and may cause a squealing noise as the rotor turns. This will be normal for some types of material and should not be a cause for concern if it does not cause a motor overload or damage the rotor.
2. The rotor may be rubbing on housing. Check for external loads on the inlet and outlet flanges. The Airlock is not to be used as a support for loads other than the drive assembly and line adapter.

5.5 High Temperature

Motors operating under rated load (amp draw) and ambient conditions, as specified on the nameplate, may feel warm when touched. If overheating is suspected, check the following:

1. Check for proper operation of the feeder bearings. See paragraph **5.6.**
2. Check for excessive material build-up in the rotor. See paragraph **5.4** step 1.
3. Verify that the electrical overload elements are properly sized per the full load amp specification on the motor nameplate. Oversized elements will not protect the motor from overload.
4. Check for proper ventilation around the motor. Material or dust build-up on the exterior of the motor may hamper ventilation.
5. Check the oil level in the gear case. If it needs to be filled, see the Appendix in the rear of this manual.

5.6 Airlock Bearing Malfunction or Failure

1. Disassemble the bearing from the Airlock.
   - Check for wear, dirt or material in the bearings. If there is damage, replace the bearings.

5.7 Leaking Air Purge Seals

1. Check to insure that a compressed air supply has been installed to the Airlock. Never operate an Airlock that has air purge seals without purge air. If the Airlock has been operated without the air purge operating, the seals are probably damaged and need to be replaced.
2. Check for proper operation and adjustment. The air should be set 3-5 PSI above the conveying system operating pressure. If the air is set too low, material will not be properly cleaned from the air purge diffusers and will damage the seals. The seals should be replaced.

5.8 Leaking Packing Seals

1. The packing seals may be damaged or worn. Remove the seals and replace them.

5.9 Air Loss

1. Check for the correct rotor-to-housing and rotor-to-end plate clearance. If there is too much clearance, air loss through the clearances will result.
2. Check the condition of the seals. See paragraph **5.7** and **5.8.**

5.10 Material Not Flowing

1. Check for material build-up in the rotor pockets. Clean the Airlock rotor after the unit has been locked out.
2. Check for correct rotor-to-housing and rotor-to-end place clearance. If there is too much clearance, air loss through the clearances may cause the material to bridge above the Airlock decreasing the material flow.
3. Vented shear protectors are designed to minimize the changes for material bridging above the Airlock by venting the displaced air from each pocket as it fills, as well as any air leakage through the clearances. A vented shear protector may need to be installed for your application.
4. If a vented shear protector is installed, check the condition of the long seal flap. If it is worn or sheared off due to incorrect installation or incorrect rotor rotation, it will need to be replaced.
5. Check for the correct Airlock RPM.

SECTION 6:
PARTS LIST

CARBON OR STAINLESS STEEL
PAV 6 Q C/S TO 12 Q C/S

PART NO.	DESCRIPTION
1.	HOUSING
2.	END PLATE
3.	END CAP (NON-DRIVE)
4.	ADAPTER PLATE
5.	BEARING
6.	PACKING GLAND
7.	PACKING (*)
8.	LANTERN RING (*)
9.	SPRING RETAINER
10.	SPRING
11.	RELEASE SCREW
12.	RELEASE NUT
13.	SHAFT
14.	8 BLADE ROTOR
15.	LOCK KNOB
16.	WASHER
17.	HAND KNOB
18.	ROTOR KEY
19.	PIPE PLUG

(*) SPECIFY MATERIAL WHEN ORDERING

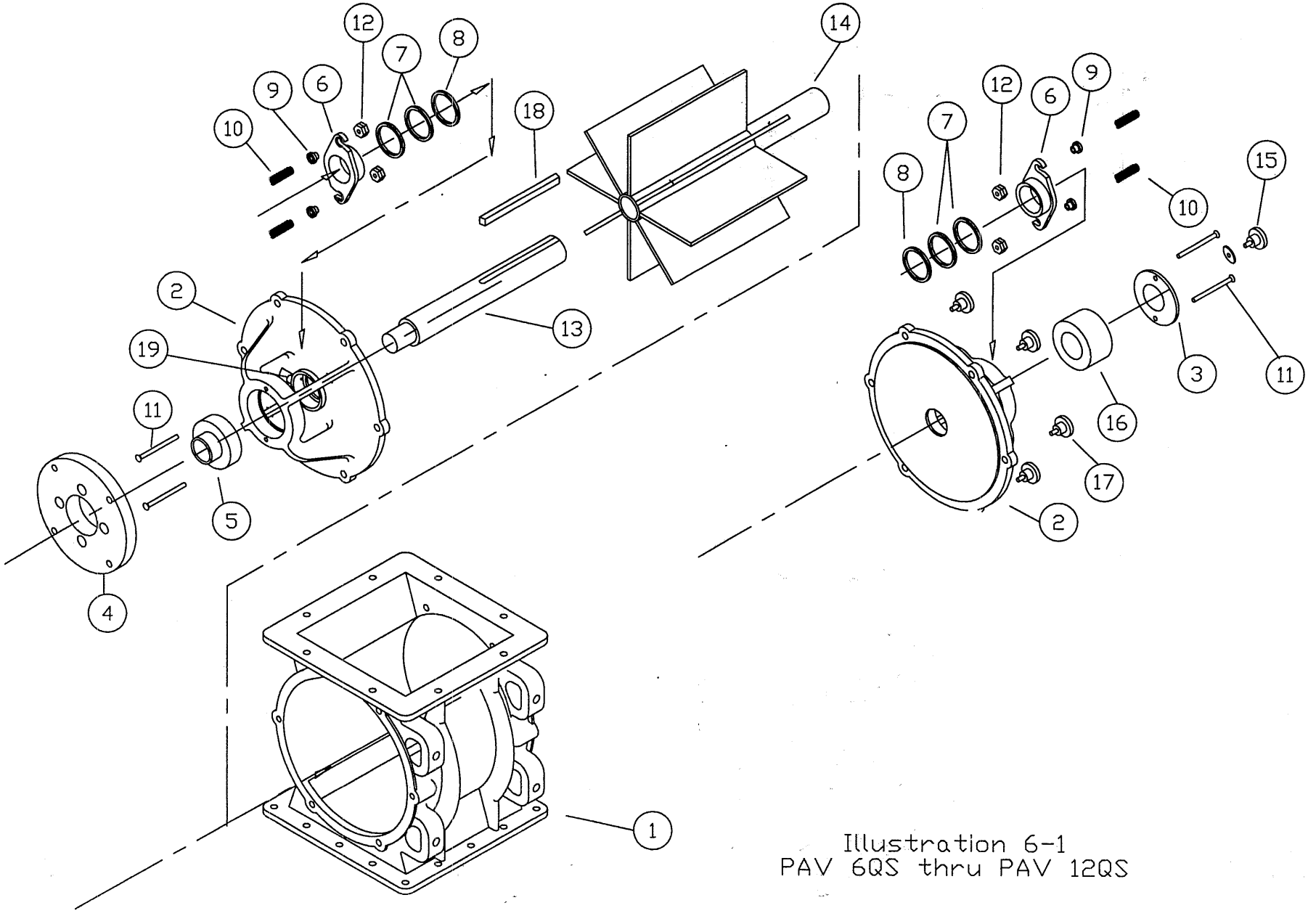


Illustration 6-1
PAV 6QS thru PAV 12QS

PARTS LIST

SELF ADJUSTING PACKING GLAND

PART NO	DESCRIPTION
2.	AIRLOCK END PLATE
5.	BEARING
6.	PACKING GLAND
9.	SPRING RETAINER
10.	COMPRESSION SPRING
11.	SPRING RELEASE SCREW
12.	SPRING RELEASE NUT

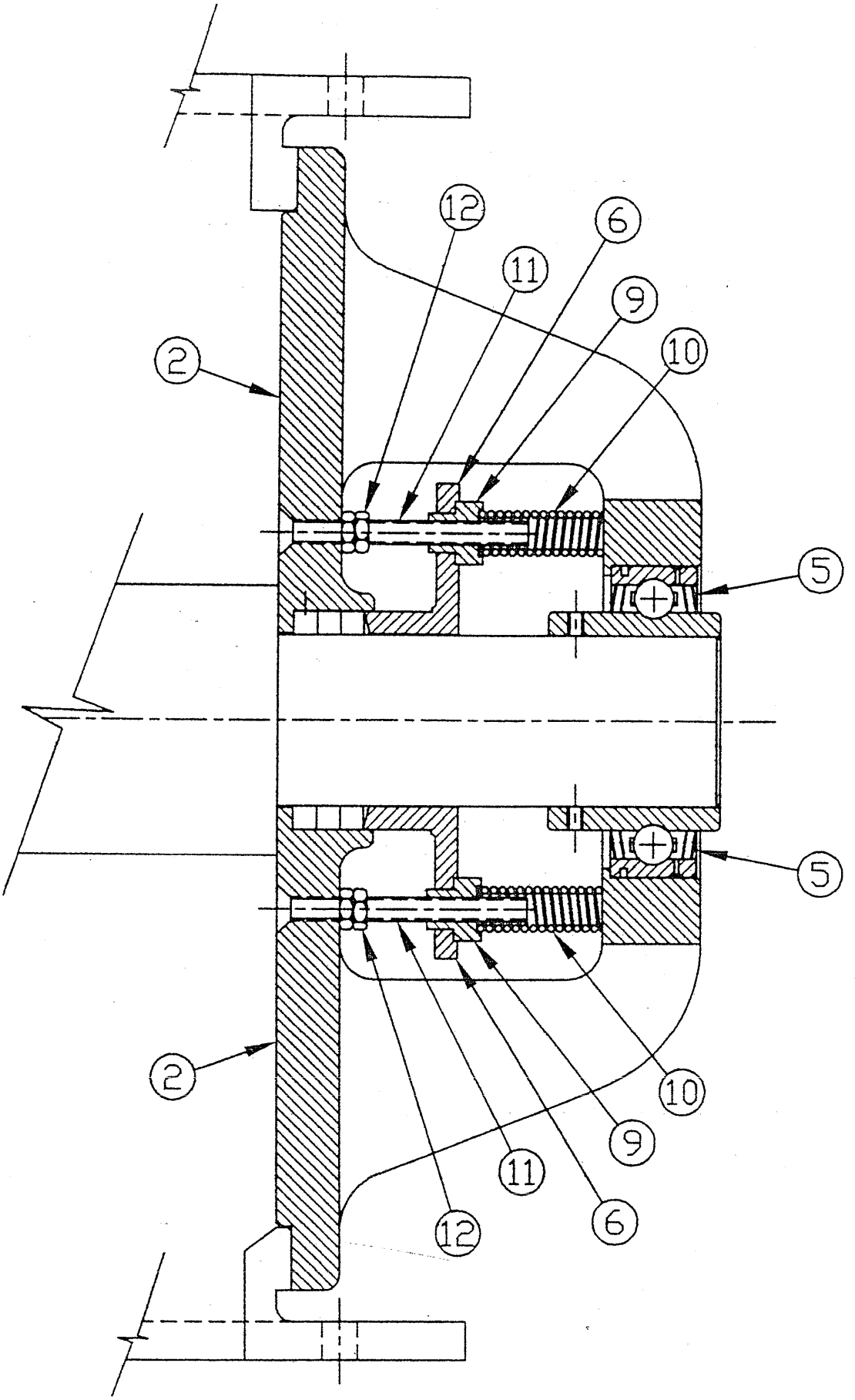


Illustration 6-2

APPENDIX
GEARMOTOR MAINTENANCE AND LUBRICATION

Gear reducers are designed with a steel worm, cut integral on input shaft, mating with a bronze worm gear. The combination gearmotor and separate reducer are designed with a steel worm, cut integral on the input shaft, mating with a bronze worm gear as the first stage. The second state gears are helical, cut from steel, hardened and then honed to close tolerances.

The single reduction and combination gearmotor and separate reducer are designed with tapered roller bearings on the input, intermediate and final output shaft.

Mountings

Before servicing the gearmotor, check diagrams on tags supplied to see that oil level plug is installed in proper location and oil level is correct for position in which gearmotor is to operate.

If any change is necessary, the vent plug will also have to be located above the new oil level.

Rotation

To reverse the direction of rotation of a 3 phase A-C Gearmotor, interchange any two of the lines going to the motor. If it is a 2 phase gearmotor, interchange the wires of one phase. Four wire, 2 phase gearmotors have lead marking conforming NEMA Standards.

D-C Gearmotors may be reversed by interchanging the armature leads. In all cases connection diagrams are furnished with the motors.

Lubrication and Maintenance Information

Lubrication is extremely important for satisfactory operation of gearhead motors, therefore proper oil level must be maintained in the gear case at all times. Oil levels are indicated by red head plugs.

The satisfactory performance of gears and bearings in gear motors and reducers depends on clean lubricant, free from dust, grit, sludge and moisture. Depending on operation conditions, the lubricant will eventually become contaminated and should be drained periodically.

When first put into operation, the lubricant in a new case becomes contaminated with a grit and metal particles unavoidably left in the unit as a result of machining and from tooth surfaces during run-in periods.

A run-in period of about one (1) week operation should be sufficient before the original lubricant is drained and new lubricant of recommended viscosity group installed.

During operation, the oil level should be periodically checked. With oil level too high, excessive churning occurs and this causes overheating and rapid deterioration of the lubricant. With oil level too low, excessive friction in bearings and on gear teeth may result.

Gears must breathe as operating temperatures increase or decrease. Where surrounding atmosphere is humid, this breathing action results in condensation of moisture inside the gear case. This can cause rusting of metal surfaces, and sludging of oil may follow. In such cases, attention should be given to the ventilation of both inside and outside of the gear case and to more frequent changing of the lubricant.

It is impossible to select one gear lubricant of petroleum origin which is usable over a wide range of temperatures, such as minus (-) 65°F to plus (+) 165°F, such as is required for some installations. When such conditions are encountered it is necessary to change lubricants depending upon the ambient (surrounding air) temperatures at the time of motor operation. Use lubricants of the proper type, as required by the ambient temperature in which the motor will operate.

Standard grease types:

- Shell Alvania #2
- Mobil Temp #1

Drain and flush gear case after each 1500 hours of normal operation, or at least every 6 months. If operated out-of-doors, lubricant changes should be made seasonally, using the proper grade for the temperature range encountered. If operated continuously, drain and flush after each 500 hours of operation.

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