

# OPERATING INSTRUCTIONS & PARTS LIST

## INSTRUCTIONS!

This manual contains important warnings  
and information.  
**READ AND KEEP FOR REFERENCE.**



**Autoquip, Inc.**

## **AQ – Air Motor**

3077-AM20-000



**IMPORTANT:** Before using this equipment, read **SAFETY PRECAUTION**, starting on page 1, and all instructions in this manual. Keep this Service Bulletin for future reference.

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## Symbols

### Warning Symbol



This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

### Caution Symbol




This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

### Note



This symbol alerts you to information relevant to the procedure in progress.

** WARNING**

**EQUIPMENT MISUSE HAZARD**  
Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are not sure, call your Autoquip distributor.
- Do not alter or modify this equipment. Use only genuine Autoquip parts.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Use fluids and solvents that are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Always wear protective eyewear, gloves, clothing, and respirator as recommended by the fluid and solvent manufacturer.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

# Safety

## SAFETY PRECAUTIONS

Before operating, maintaining or servicing any Autoquip, Inc. coating system, read and understand all of the technical and safety literature for your Autoquip Inc. products. This manual contains information that is important for you to know and understand. This information relates to **USER SAFETY** and **PREVENTING EQUIPMENT PROBLEMS**. To help you recognize this information, we use the preceding symbols. Please pay particular attention to these sections.

While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes and plant requirements, material delivery requirements, etc., make such variations inevitable. Compare this manual with your system installation drawings and appropriate Autoquip Inc. equipment manuals to reconcile such differences.


Careful study and continued use of this manual will provide a better understanding of the equipment and process, resulting in more efficient operation, longer trouble-free service and faster, easier troubleshooting. If you do not have the manuals and safety literature for you Autoquip Inc. system, contact your local Autoquip, Inc. representative or Autoquip, Inc. directly.



### **WARNING**

- The user **MUST** read and be familiar with the Safety Section in this manual and the Autoquip, Inc. safety illustration therein identified.
- This manual **MUST** be read and thoroughly understood by **ALL** personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the **WARNINGS** and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to **ALL** local building and fire codes and ordinances as well as **NFPA 33 SAFETY STANDARD, 1995 EDITION**, prior to installing, operating, and/or servicing this equipment

### **WARNING**

- The hazards shown on the following page may occur during the normal use of this equipment. Please read the hazard chart beginning on page 4.

<b>AREA</b> Tells where Hazards may occur.	<b>HAZARD</b> Tells what the hazard is	<b>SAFEGUARDS</b> Tells how to avoid the hazard
<p><b>Spray Area</b></p> 	<p>Fire Hazard</p> <p>Improper or inadequate operating and maintenance procedures will cause a fire hazard</p>	<p>Fire extinguishing equipment must be present in the spray booth area and tested periodically</p> <p>Spray areas must be kept clean to prevent the accumulation of combustible residues.</p> <p>Smoking must never be allowed in the spray area</p> <p>When using solvents for cleaning:</p> <p>Those used for equipment flushing should have flash points equal to or higher than those of the coating material.</p> <p>Those used for general cleaning must have flash points above 100°F (37.8°C).</p> <p>Spray booth ventilation must be kept at the rates required by NFPA33, 1995 Edition, OSHA and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents.</p> <p>Test only in areas free of combustible material.</p> <p>Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury.</p> <p>If used, the key switch by-pass is intended for use only during set-up operations. Production should never be done with safety interlocks disabled.</p> <p>Never use equipment intended for use in waterborne installations to spray solvent based materials.</p>
<p><b>General Use and Maintenance</b></p>	<p>Improper operation or maintenance may create a hazard</p> <p>Personnel must be properly trained in the use of this equipment</p>	<p>Personnel must be given training in accordance with the requirements of NFPA-33, Chapter 16, 1995 Edition.</p> <p>Instructions and safety precautions must be read and understood prior to using this equipment</p> <p>Comply with appropriate local, state and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. OSHA references are Sections 1910.94 and 1910.107. Also refer to NFPA-33, 1995 Edition and your insurance company requirements.</p>

<b>AREA</b> Tells where Hazards may occur.	<b>HAZARD</b> Tells what the hazard is	<b>SAFEGUARDS</b> Tells how to avoid the hazard
<b>Explosion Hazard/ Incompatible Materials</b>  	Halogenated hydrocarbon solvents for example: methylene chloride and 1,1,1-Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can be violent and lead to an equipment explosion.	Aluminum is widely used in other spray application equipment – such as material pumps, regulators, triggering valves etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your material supplier. Any other type of solvent may be used with aluminum equipment.
<b>Toxic Substances</b>  	Certain material may be harmful if inhaled, or if there is contact with the skin.	Follow the requirements of the Material Safety Data Sheet supplied by coating material manufacturer.  Adequate exhaust must be provided to keep the air free of accumulations of toxic materials.  Use a mask or respirator whenever there is a chance of inhaling sprayed materials. The mask must be compatible with the material being sprayed and its concentration. Equipment must be as prescribed by an industrial hygienist or safety expert, and by be OSHA approved.

# INTRODUCTION

## FEATURES

- Aluminum, bronze, steel, and plastic components
- Optional mounting based upon design of tank
  - 3077-020-00 for 2 Gallon Tank
  - 3077-030-00 GRACO5-15 Gallon Tank
  - 3077-040-00 for Binks 5-15 Gallon Tank
  - 3077-050-00 for ITW DeVilbiss 5-15 Gallon Tank
  - 3077-070-00 for 55 Gallon In-Barrel Agitator with Drum Mixer Drive Assy
  - 3077-080-00 for Binks 55 Gallon Barrel Lid
  - 3077-090-00 for GRACO 55 Gallon Barrel Lid
  - 3077-100-00 Mix Tank Configuration (Note: additional information may be required)

\* All of the above come with Air Flow Control package, Agitator Shaft and Adapter

\* Tanks Larger than 10 Gallons may require an optional Agitator Blade Support

\* Tanks Larger than 15 Gallons may require an optional second Agitator Blade

### NOTE

Autoquip also offers a Dual Mode Regulator for Closed Loop Air Control that provides constant RPM regardless of load. As an additional option, the Autoquip Dual Mode Regulator Closed Loop Air Control can be used to maintain pump cycle rate and to relieve the back pressure regulator when the coating is not being applied. By reducing the back pressure and maintaining cycle rate the consumption of the same pump is reduced to 1-2 SCFM while reducing paint shear.

- For 3/8" Port, 3076-AFC3-000 (Std)
- For 1/2" Port, 3076-AFC4-000 (Optional)

## SPECIFICATIONS

### Environmental / Physical

<b>Temperature Range:</b>	<b>14<sup>0</sup>F to 176<sup>0</sup>F (10<sup>0</sup>C to 80<sup>0</sup>C)</b>
<b>Height:</b>	<b>8.25"</b>
<b>Diameter:</b>	<b>8.0"</b>
<b>Weight:</b>	<b>8.4 lbs</b>

### Mechanical

<b>Speed Control:</b>	<b>Variable by Control Pressure Input</b>
<b>Maximum Input Pressure:</b>	<b>90 PSI (6.9 bar)</b>
<b>Torque Output:</b>	<b>31.15 in-lbs @ 50 psi @ 150 RPM 3.52 Nm @ 3.45 bars</b>
	<b>20.23 in-lbs @ 50 psi @ 300 RPM 2.29 Nm @ 3.45 bars</b>
	<b>20.23</b>
<b>Output Shaft:</b>	<b>1/2" O.D.</b>
<b>Pneumatic Connection Air Input:</b>	<b>3/8" O.D. Tube</b>

## OPERATION

With the AQ Air Control, the AQ Air Motor is designed to provide constant torque and speed for the agitator in the paint mix tanks.

### Operating Recommendations

1. Autoquip Automation Air Motors are designed and built to be safe and reliable when properly used. Advice and approval should be sought from authorized Autoquip Automation personnel before any of our products are used in circumstances other than recommended herein.
2. Compressed air is the only medium to be used.
3. Air pressure should not exceed 90 lb/in<sup>2</sup> (6.9 bar).
4. Motors requiring lubrication must have a lubricator fitted to the air supply. Recommended lubricants are shown below.
5. Each motor should be supplied with air that is adequately filtered to remove fluids and particles above 40 microns.
6. Recommended operating temperature range is 14°F to 176°F (-10°C to +80°C).
7. Motors should be sited and mounted to avoid excessive vibration.
8. Safety or system integrity should not depend upon the assumption that leakage cannot or will not occur.
9. Actual response times for air motors can vary according to ambient conditions and service life.
10. Regular maintenance is essential to ensure continuous satisfactory and safe performance.

### Installation

1. Autoquip Automation Air Motors are precision machines and are susceptible to damage by dirt particles. Cleanliness is essential during installation and servicing.
2. To prevent contamination by dirt or grit **DO NOT** remove the protective caps/plugs from the ports until installed.
3. When the motor has been mounted and the shaft connected, air supply tubes should be fitted to the ports ensuring that no dirt or grit can enter the ports.

### Commissioning

1. Set air pressure to zero.
2. Set any speed restrictor valves to the fully open position
3. Slowly increase air pressure until the shaft rotates under load.
4. For low load applications, increase air pressure by a further 15 – 20 lb/in<sup>2</sup> (1 – 1.25 bar). This may not be necessary for high load applications.
5. Adjust the speed restrictor to give the required speed.
6. The air motor will now be running at the optimum and most efficient setting.

### **WARNING**

**Applying excessive line air pressure and restricting the exhaust port can cause excessive wear on the base of the pistons and damage to the air motor.**

# MAINTENANCE

## Tools Required

- Allen Wrenches:
- Wrenches:
- Dead Blow Hammer
- Vise
- Repair Kit
  - 3077-AM21-000

## Recommended Lubricants

Autoquip uses the following lubricant during the initial assembly of the air motors.

Sta-lube Lithium general purpose grease  
Part No. SL3311

Technical specifications:

Base type: Lithium

N.L.G.I. No: Grade 2

Drop point: 350° F Min.

Water Resistance: Excellent

### **NOTE**

This Air Motor is not approved for food/pharmaceutical applications.

## PRELIMINARY PROCEDURES

Prior to removing the air motor for service or repair, perform the following:

1. Turn the supply air “OFF” to the motor. Disconnect the air lines from the motor.
2. Remove the air motor for service.

### **NOTE**

Proper preventative maintenance is required for consistent operation of the Autoquip air motor. Proper preventative maintenance will vary with each application.

## MAINTENANCE PROCEDURES

Autoquip Automation Air Motors are precision engineered and are designed for a long working life. The consumable (wear) parts are the pistons and seals, which can be replaced as part of a routine maintenance schedule.

For this purpose spare parts kits can be purchased from Autoquip Automation or our authorized distributors, comprised of three assembled pistons, and three sets of the required size O-Rings.

### **NOTE**

The drive shaft and rotary valve assembly are matched during manufacture and should not be removed from the motor body. In the event that they are removed they will require replacement with new parts by and in our factory.

### **NOTE**

As with all precision engineered machines, cleanliness is essential during dismantling and assembly. Before dismantling, the air supply ports must be covered with plastic caps/plugs and the workbench should be clean and free of debris.



## Disassembly

1. Ensure that the air line is disconnected from the motor.
2. Remove the three bolts holding the rear cover to expose the crank area.
3. Remove the three cylinder caps by withdrawing the four bolts on each cap.
4. It is critical to prevent any contamination by dirt or grit. Therefore, the three exposed ports on the cylinder body must be protected (ideally with plastic caps/plugs)
5. Discard the old seals and O Rings, new ones are provided with the repair kit.
6. Clean the crank area and cylinder bores using a suitable solvent to ensure it is free from dirt particles.

## Reassembly

1. Ensure all parts are in a clean, grit-free condition.
2. Insert the replacement piston/seal assemblies ensuring that the seal is at the cylinder cap end.
3. Fit the O Ring in the groove around the outside of cylinder block.
5. Insert the other end of the nylon tubing into the body ports.
6. Locate the three cylinder caps onto the motor body, insert and tighten the four bolts on each cap. Do not apply excessive torque as this may strip the threads. The bolts should be tightened evenly to ensure no leakage of air.
7. Apply a small amount of grease (see note under Recommended Lubricants) to the eccentric crank bearing and on each piston face.
8. Re-connect the air supply, ensuring air pressure is set to zero.
9. To test the motor, slowly increase pressure to approx 15 – 20 lb/in<sup>2</sup> (1 – 1.25 bar). The motor will start to rotate slowly.
10. Disconnect the air supply.
11. Replace rear cover.

### **NOTE**

See pages 11-12 for exploded view and parts list

# Troubleshooting Guide

General Problem	Cause	Solution
1. Loss of Torque/Operation	Wear of Consumable Parts due to scoring of cylinder block and/or piston from dirty air	Filter Air to a minimum of 40 micron
2. Loss of Torque/Operation	Failure of Piston Ring due to exhaust blockage	Replace piston ring and other worn parts and DO NOT RESTRICT EXHAUST. TO CONTROL MOTOR SPEED
3.		
4.		



# PARTS IDENTIFICATION

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY</u>
3077-20-04	Piston Body	3
3077-20-05	Piston Ring	3
3077-20-09	Piston Cap	3
3077-20-23	Socket Head Flat Head Screw	3
3077-20-29	#11 O-Ring	6
3077-20-19	#30 O-Ring	3
3077-20-20	#26 O-Ring	3
3077-20-18	#31 O-Ring	3

ALL ITEMS INCLUDED IN REPAIR KIT PART NUMBER 3077-AM21-000  
PISTONS IN REPAIR KIT ARE PRE-ASSEMBLED AT AUTOQUIP

\*\*3077-20-02 CYLINDERS ARE AVAILABLE FOR A ONE TIME PURCHASE  
TO REPLACE CYLINDERS WITH INTERNAL SLEEVES WHICH ARE NO  
LONGER AVAILABLE. EACH MOTOR WILL REQUIRE (3) BLACK  
ANODIZED CYLINDERS.

THESE CYLINDERS ARE **NOT** INCLUDED WITH THE REBUILD KIT.

# Autoquip Standard Warranty

Autoquip Inc. warrants all equipment manufactured by Autoquip Inc. and bearings its name to be free from defects in material and workmanship on the date of sale by an authorized Autoquip Inc. distributor to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Autoquip Inc., Autoquip Inc. will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Autoquip Inc. to be defective. This warranty only when the equipment is installed, operated, and maintained in accordance with Autoquip Inc.'s written recommendations.

This warranty does not cover, and Autoquip Inc. shall not be liable for general wear and tear, or any malfunction, damage, or wear and tear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Autoquip Inc. component parts. Nor shall Autoquip Inc. be liable for malfunction, damage or wear caused by the incompatibility of Autoquip Inc. equipment with structures, accessories, equipment or materials not supplied by Autoquip Inc., or the improper design, manufacture, installation, operation or maintenance of structure, accessories, equipment or materials not supplied by Autoquip Inc.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Autoquip Inc. distributor for verification of the claimed defect. If the claimed defect is verified, Autoquip Inc. will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Autoquip Inc.'s sole obligation and buyer's sole remedy for any breach of warranty shall be set forth above. The buyer agrees that no other remedy (including, but not limited to incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

Autoquip Inc. makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose in connection with accessories, equipment, material or components sold but not manufactured by Autoquip Inc. These items sold, but not manufactured by Autoquip Inc. (such as electric motors, switches, hose, etc.) are subject to the warranty, if any, from their manufacturer. Autoquip Inc. will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Autoquip Inc. be liable for indirect, incidental, special or consequential damage resulting from Autoquip Inc. supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to breach of contract, breach of warranty, the negligence of Autoquip Inc., or otherwise.

## **FOR AUTOQUIP, INC. CANADA CUSTOMERS**

The parties acknowledge that they required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présent document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

## Autoquip Phone Numbers

### TO PLACE AN ORDER :

Contact your Autoquip distributor, or call this number to identify the distributor closest to you :

(262) 781-6133 Fax (262) 781-6188

*All written and visual data contained in this document reflects the latest product information available at the time of publication.  
Autoquip reserves the right to make changes at any time without notice.*

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