

.4 Hp/Right-Angle/Planetary Geared/Rear Exhaust
Mini-Dynorbital
Air Motor and Machine Parts

Models:

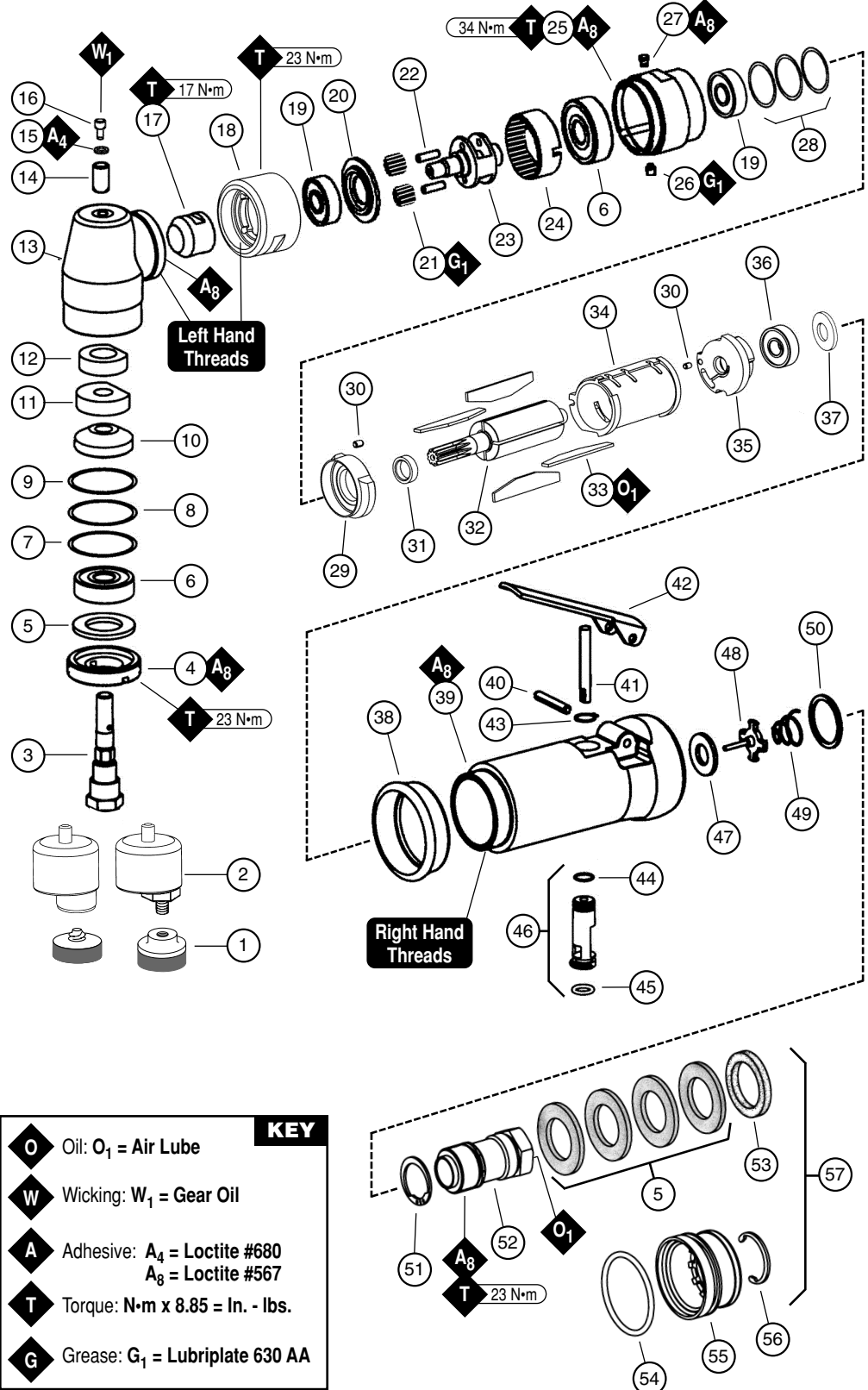
53415 – 3,200 RPM, with Roloc® Mini Orbital Head
53417 – 3,200 RPM

⚠ WARNING

Always operate, inspect and maintain this tool in accordance with the Safety Code for portable air tools (ANSI B186.1) and any other applicable safety codes and regulations. Please refer to Dynabrade's Warning/Safety Operating Instructions for more complete safety information.

Index Key

No.	Part #	Description
1	54031	Pad - Model 53415
	54018	Pad - Model 53417
2	54029	Orbital Head - Model 53415
	54028	Orbital Head - Model 53417
3	02034	1/4"-28 Spindle (Female)
4	02035	Lock Ring
5	01486	Felt Silencer (5)
6	54520	Bearing (2)
7	97116	Shim
8	97117	Shim
9	97118	Shim
10	02599	Gear
11	02044	Wick - Bottom
12	02045	Wick - Top
13	02031	Housing (includes: Gear oil fitting, plate and needle bearing)
14	02033	Needle Bearing
15	02041	Gear Oil Plate
16	01041	Gear Oil Fitting
17	02600	Pinion - 20,000 RPM
18	50019	Lock Nut
19	02649	Bearing (2)
20	50022	Spacer
21	06213	Gear (2)
22	54472	Gear Shaft (2)
23	50023	Planetary Carrier
24	54468	Ring Gear
25	50024	Gear Case
26	01041	Grease Fitting
27	50784	Set Screw
28	54529	Shim Pack (3/pkg.)
29	01478	Bearing Plate
30	50767	Pin (2)
31	01479	Spacer
32	54553	Rotor
33	01480	Blades (4)
34	01476	Cylinder
35	02676	Bearing Plate
36	02696	Bearing
37	02679	Shield
38	01547	Collar
39	53422	Housing - 53415
	53423	Housing - 53417
40	12132	Pin
41	01449	Valve Stem
42	01448	Throttle Lever
	01462	Safety Lock Lever
43	95558	Retaining Ring
44	95730	O-Ring
45	01024	O-Ring
46	01469	Speed Regulator Assy.
47	01464	Seal
48	01472	Tip Valve
49	01468	Spring
50	01564	Air Control Ring
51	95711	Retaining Ring
52	01578	Inlet Adapter
53	01379	Bronze Muffler
54	96065	O-Ring
55	01446	Air Deflector
56	95620	Retaining Ring
57	94535	Muffler Assembly



KEY	
O	Oil: O ₁ = Air Lube
W	Wicking: W ₁ = Gear Oil
A	Adhesive: A ₄ = Loctite #680 A ₈ = Loctite #567
T	Torque: N•m x 8.85 = In. - lbs.
G	Grease: G ₁ = Lubriplate 630 AA

Important Operating, Maintenance and Safety Instructions

Carefully read all instructions before operating or servicing any Dynabrade® Abrasive Power Tool.

Warning: Hand, wrist and arm injury may result from repetitive work motion and overexposure to vibration.

Important: All Dynabrade rotary vane air tools must be used with a Filter-Regulator-Lubricator to maintain all warranties.

Operating Instructions:

Warning: Eye, face, respiratory, sound, and body protection must be worn while operating power tools. Failure to do so may result in serious injury or death. Follow safety procedures posted in workplace.

1. With power source disconnected from tool, securely fasten abrasive/accessory on tool.
2. Install air fitting into inlet bushing of tool. **Important:** Secure inlet bushing of tool with a wrench before attempting to install the air fitting to avoid damaging valve body housing.
3. Connect power source to tool. Be careful not to depress throttle lever in the process.
4. Air tools are not intended for use in explosive atmospheres and are not insulated for contact with electrical power sources.

Maintenance Instructions:

1. Check tool speed regularly with a tachometer. If tool is operating at a higher speed than the RPM marked on the tool, the tool should be serviced to correct the cause before use.
2. Some silencers on air tools may clog with use. Clean and replace as required.
3. All Dynabrade rotary vane air motors should be lubricated. Dynabrade recommends one drop of air lube per minute for each 10 SCFM (example: if the tool specifications state 40 SCFM, set the drip rate of your filter-lubricator at 4 drops per minute). Dynabrade Air Lube (P/N 95842: 1 pt. 473 ml.) is recommended.
4. It is strongly recommended that all Dynabrade rotary vane air tools be used with a Filter-Regulator-Lubricator to minimize the possibility of misuse due to unclean air, wet air or insufficient lubrication. Dynabrade recommends the following: **11405 Air Line Filter-Regulator-Lubricator** — Provides accurate air pressure regulation, two-stage filtration of water contaminant's and micro-mist lubrication of pneumatic components. Operates up to 40 SCFM @ 100 PSIG has 3/8" NPT female ports.
5. Lubricate wick system through the angle gear head gear oil fitting with **2-3 plunges for every 8 hours of use, to achieve maximum gear life. Important: Use only the recommended angle gear oil for the wick system. Do not contaminate the wick with any other oil or grease product (order 95848 Gear Oil and 95541 Gun).**
6. Lubricate planetary gears through the gear casing grease fitting with **2-3 plunges for every 50 hours of use, to achieve maximum gear life (order 95542 Grease and 95541 Gun).**
7. Use only genuine Dynabrade replacement parts. To reorder replacement parts, specify the **model #, Serial #, and RPM** of your machine.
8. A Motor Tune-Up Kit (P/N 96179) is available which includes assorted parts to help maintain motor in peak operating condition. Please refer to Dynabrade's Preventative Maintenance Schedule for a guide to expectant life of component parts.
9. Mineral spirits are recommended when cleaning the tool and parts. Do not clean tool or parts with any solvents or oils containing acids, esters, keytones, chlorinated hydrocarbons or nitro carbons.

Safety Instructions:

Products offered by Dynabrade should not be converted or otherwise altered from original design without expressed written consent from Dynabrade, Inc.



- **Important:** User of tool is responsible for following accepted safety codes such as those published by the American National Standards Institute (ANSI).
- Operate machine for one minute before application to workpiece to determine if machine is working properly and safely before work begins.
- Always disconnect power supply before changing abrasive/accessory or making machine adjustments.
- Inspect abrasives/accessories for damage or defects prior to installation on tools.
- Please refer to Dynabrade's Warning/Safety Operating Instructions Tag (Reorder No. 95903) for more complete safety information.
- **Warning:** Hand, wrist and arm injury may result from repetitive work, motion and overexposure to vibration.

Notice

All Dynabrade motors use the highest quality parts and metals available and are machined to exacting tolerances. The failure of quality pneumatic motors can most often be traced to an unclean air supply or the lack of lubrication. Air pressure easily forces dirt or water contained in the air supply into motor bearings causing early failure. It often scores the cylinder walls and the rotor blades resulting in limited efficiency and power. Our warranty obligation is contingent upon proper use of our tools and cannot apply to equipment which has been subjected to misuse such as unclean air, wet air or a lack of lubrication during the use of this tool.

One Year Warranty

Following the reasonable assumption that any inherent defect which might prevail in a product will become apparent to the user within one year from the date of purchase, all equipment of our manufacture is warranted against defects in workmanship and materials under normal use and service. We shall repair or replace at our factory, any equipment or part thereof which shall, within one year after delivery to the original purchaser, indicate upon our examination to have been defective. Our obligation is contingent upon proper use of Dynabrade tools in accordance with factory recommendations, instructions and safety practices. It shall not apply to equipment which has been subject to misuse, negligence, accident or tampering in any way so as to affect its normal performance. Normally wearable parts such as bearings, contact wheels, rotor blades, etc., are not covered under this warranty.

Model Number	Motor HP (W)	Motor RPM	Sound Level	Maximum Air Flow CFM/SCFM (LPM)	Air Pressure PSIG (Bars)	Spindle Thread	Weight Pound (kg)	Length Inch (mm)	Height Inch (mm)
All Models	.4 (298)	3,200	84 dB(A)	3/21 (595)	90 (6.2)	1/4"-28 Female	1.7 (.8)	7 (177)	4.5 (114)

Additional Specifications: Air Inlet Thread 1/4" NPT • Hose I.D. Size 1/4" or 8mm

Disassembly / Assembly Instructions – .4Hp/Right-Angle/Planetary Geared/Mini-Dynorbital

Important: Manufacturer's warranty is void if tool is disassembled before warranty expires.

Notice: Dynabrade recommends the use of the 52296 Repair Collar (sold separately) during the disassembly and assembly of the Right-Angle Mini-Dynorbital Sander. All of the special tooling referred to in these instructions can be ordered from Dynabrade. Please refer to the parts page for the proper part identification.

Motor Disassembly:

1. Shut the air supply and disconnect the sander from the air supply hose. **Important:** Hold the air inlet adapter with a wrench before removing the air fitting so as to prevent damage to the composite housing.
2. Hold the motor housing in a vise by using the 52296 Repair Collar to provide protection for the housing. Position the tool so that the angle head is pointing up.
3. Use a 34mm or an adjustable wrench to remove the 50024 Gear Case by turning it counterclockwise.
4. Pull the motor assembly out of the motor housing.
5. Fasten the 96346, 2" Bearing Separator around the portion of the 01476 Cylinder that is closest to the 02676 Bearing Plate.
6. Place the bearing separator on the table of the 96232, #2 Arbor Press so that the gear end of the rotor is pointing toward the floor.
7. Use a 3/16" dia. flat end drive punch as a press tool to push the rotor out of the 02696 Bearing. The 02696 Bearing can be removed from the 02676 Bearing Plate with the 96210 Bearing Removal Tool and the arbor press.

8. Use the arbor press to remove the **01478** Bearing Plate and **02649** Bearing from the rotor.
9. Remove the **02649** Bearing and the **54529** Shims from the **01478** Bearing Plate.
10. Slip the **01479** Spacer off the rotor.

Motor Disassembly Complete.

Angle Head Disassembly:

1. Shut the air supply and disconnect the sander from the air supply hose.
2. Hold the **02031** Housing in a vise by using the **52296** Repair Collar to provide protection for the housing. Position the housing so that the **02035** Lock Ring is facing up.
3. Use the **50971** Lock Ring Tool to remove the **02035** Lock Ring, by turning it counterclockwise.
4. Pull the shaft, the **54520** Bearing, the gear and the shims out of the housing.
5. The bearing and gear can be pressed off the spindle with the **96232**, #2 Arbor Press.
6. If it's necessary the **02033** Needle Bearing can be removed by using a 5/16" dia. flat end drive punch to push the **02041** Gear Oil Plate, and **01041** Gear Oil Fitting out of the **02031** Housing.

Angle Head Disassembly Complete.

Valve Disassembly:

1. Use the **52296** Repair Collar to hold the motor housing in a vise so that the inlet adapter is pointing up.
2. Remove the valve components by loosening the inlet adapter. Remove the **01468** Spring, **01472** Tip Valve, and **01464** Seal.
3. Reposition the motor housing in the vise so that the throttle lever, and the **12132** Pin are accessible. Remove the pin and lever by using a 2.5mm dia. drive punch.
4. Use retaining ring pliers to remove the **95558** Retaining Ring and push the **01469** Speed Regulator Assembly out of the motor housing.

Valve Disassembly Complete.

Planetary Gear Case Disassembly:

1. Shut the air supply and disconnect the sander from the air supply hose.
2. Hold the motor housing in a vise by using the **52296** Repair Collar to provide protection for the housing. Position the tool so that the angle head is pointing up.
3. Use a 34mm or an adjustable wrench to remove the **50019** Lock Nut from the gear case by turning it counterclockwise.
4. Remove the **50784** Set Screw from the **50024** Gear Case.
5. Pull the planetary gear assembly from the **50024** Gear Case.
6. Fasten the **96346**, 2" Bearing Separator between the rear **54520** Bearing and the **54468** Ring Gear to remove the bearing from the planetary carrier. Place the separator on the table of the **96232** Arbor Press so that the **02600** Pinion is pointing toward the floor. Use a 3/8" dia. flat end drive punch as a press tool to push the planetary carrier out of the **54520** Bearing.
7. Remove the shafts and gears from the planetary carrier.
8. Remove the **02600** Pinion by carefully holding the **50023** Planetary Carrier in a vise with aluminum or bronze jaws. Use an adjustable wrench to remove the pinion by turning it counterclockwise.
9. Use the bearing separator and the arbor press to remove the front **54520** Bearing.

Planetary Gear Case Disassembly Complete.

Important: Clean and inspect parts for wear or damage before assembling.

Planetary Gear Case Assembly:

1. Press the front **54520** Bearing onto the threaded end of the **50023** Planetary Carrier.
2. Hold the planetary carrier in a vise with aluminum or bronze jaws. Install the **02600** Pinion onto the planetary carrier. (Torque to 17 N•m/150 in. lbs.)
3. Apply a small amount of the **95542** Grease to the needle bearings, the planetary gears, and the gear shafts. Install these into the planetary carrier.
4. Install the **54468** Ring Gear over the planetary gear assembly positioning it so that the notches in the ring gear will align with the lock screw and grease fitting openings in the **50024** Gear Case.
5. Press the rear **54520** Bearing onto the **50023** Planetary Carrier until the outer race of the bearing touches the ring gear.
6. Install the complete planetary gear assembly into the **50024** Gear Case. Apply a small amount of the Loctite® #567 (or equivalent) to the **50784** Set Screw and install it.
7. Install the **01547** Insulator Collar onto the **50024** Gear Case.
8. Apply a small amount of the Loctite® #567 (or equivalent) to the threads of the housing and install the **50024** Gear Case onto the housing. (Torque to 28 N•m/250 in. lbs.)
9. Lubricate planetary gears through the **01041** Grease Fitting, applying 2-3 plunges of the **95542** Grease with the **95541** Grease Gun initially, and add grease after every 50 hours of use.

Planetary Gear Case Assembly Complete.

Valve Assembly:

1. Install the **01469** Speed Regulator Assembly into the motor housing, and hold it in place with the **95558** Retaining Ring.
2. Use the **52296** Repair Collar to hold the motor housing in a vise so that the air inlet is pointing up.
3. Insert the **01449** Valve Stem into the speed regulator assembly so that the hole in the valve stem aligns with the air inlet hole in the motor housing.
4. Install the **01464** Seal so that it lays flat. Use a needle nose pliers to grasp the nylon portion of the **01472** Tip Valve and install it so that the metal pin fits into the hole of the **01449** Valve Stem.
5. Install the **01468** Spring so that the smaller end fits against the back of the tip valve.
6. Refer to the parts breakdown for part identification and the sequence of assembly. Apply a small amount of Loctite® #567 (or equivalent) to the male threads of the inlet adapter and tighten the inlet adapter. (Torque to 23 N•m/200 in. lbs.)

Valve Body Assembly Complete.

Motor Assembly:

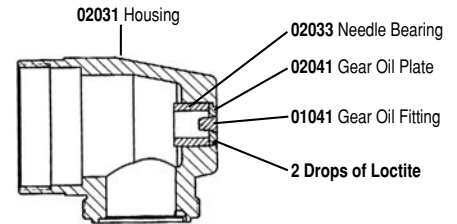
1. Set the rotor on the tool plate of the **96232**, #2 Arbor Press so that the gear end is pointing up.
2. Slip the **01479** Spacer onto the **54553** Rotor.
3. Select .003" (.08mm) thick shims from the **54529** Shim Pack and place these into the **01478** Bearing Plate.
4. Install the **02649** Bearing into the bearing plate and use the **96240** Bearing Press Tool so that the raised I.D. of the press tool is against the inner race of the **02649** Bearing onto the rotor.
5. Install the pinion onto the rotor, making it hand tight.
6. Check the clearance between the rotor and the bearing plate with a .001" thick feeler gauge. Clearance should be .001" to .0015" (0.03-0.04mm). If it's necessary, readjust clearance by repeating steps 3-5 with different thickness shims.

- Once the proper rotor/plate clearance is achieved wrench tighten the pinion. (Torque to 17N•m/150 in. lbs.)
- Apply the **95842** Dynabrade Air Lube (10W/NR or equivalent) to the **01480** Blades and install them onto the rotor.
- Use the **96216** Bearing Press Tool so that it pushes against the outer race of the **02696** Bearing and install it into the **02676** Rear Bearing Plate with the arbor press.
- Place the pinion on the tool plate of the arbor press so that the rear portion of the rotor is pointing up.
- Install the **01476** Cylinder so that it rests against the **01478** Bearing Plate. **Note:** Make sure that the air inlet passage of the cylinder will properly aligned with the air inlet passage in the **02676** Bearing Plate.
- Use the **96216** Bearing Press Tool so that it pushes against the inner race of the **02696** Bearing and install the bearing/plate assembly onto the rotor with the arbor press. **Important:** Carefully press the bearing/plate assembly onto the rotor until it touches the **01476** Cylinder. A "snug" fit should exist between the bearing plates and cylinder. If the fit is too tight, the rotor will not turn freely and will cause damage to the bearings. If it is too loose, the proper bearing preload will not be achieved.
- Apply a small amount of grease to the seal of the **02696** Rear Bearing and place the **02679** Shield against the seal of the bearing.
- Install the motor assembly into the housing so that the air passage node of the **02676** Bearing Plate aligns with the air passage notch on the inside of the housing.
- Apply a small amount of Loctite® #567 (or equivalent) to the threads of the motor housing and use a 34mm (or an adjustable wrench) to connect the angle head assembly to the motor housing. (Torque to 34 N•m/300 in. lbs.)

Motor Assembly Complete.

Angle Head Assembly:

- Press the **01041** Gear Oil Fitting into the **02041** Gear Oil Plate.
- Carefully apply two drops of Loctite® #680 (or equivalent) to the recessed area of the **02031** Housing and press the gear oil plate along with gear oil fitting into the housing. (Allow 30 minutes for the adhesive to cure.)
- Press the **02033** Needle Bearing into the housing.
- Position the **96239** Bearing Press Tool so that it rests against the inner race of the **54520** Bearing and press the bearing onto the spindle.
- Align the hex shaped I.D. area of the gear with that of the spindle and press the gear into place.
- Apply a small amount of Loctite® #567 (or equivalent) to the mating threads of the **02031** Housing. Connect the housing to the **50019** Lock Nut. Be aware of the right and left hand threads.
- Place the **52296** Repair Collar around the motor housing and position the tool in a vise so that the **02031** Housing is pointing up.
- Use a 34 mm or adjustable wrench on the **50019** Lock Nut while holding the angle housing stationary with one hand. **Note:** The throttle lever can be positioned in 360° to the desired location. Allow for additional rotation when tightening the lock nut. (Torque to 34 N•m/300 in. lbs.)
- Reposition the tool assembly in the vise so that the opening in the angle housing, for the **02035** Lock Ring is facing up.
- Soak the wicks in the **95848** Gear Oil before installing them into the **02031** Housing. Install the top wick first followed by the bottom wick. Position truncated side of each wick toward the end of the pinion gear.
- Install the spindle/gear assembly into the angle housing. Apply a slight amount of pressure down on the spindle while rotating it back and forth checking for the proper backlash or fit between the gears. A slight amount of backlash or clearance should exist between the bevel and pinion gears. When a tight fit exist, then add shims as needed placing the required thickness of shims between the outer race of the **54520** Bearing and the bearing seat in the housing.
- Place the **01486** Felt Silencer (1) into the **02035** Lock Ring, and apply a small amount of Loctite® #567 (or equivalent) to the threads of the **02035** Lock Ring. Use the **50971** Lock Ring Wrench to install the lock ring onto the **02031** Housing. (Torque to 23 N•m/200 in. lbs.)



Angle Head Assembly Complete. Tool Assembly Complete. Please allow 30 minutes for adhesives to cure before operating tool.

Important: Before operating, place 2-3 drops of Dynabrade Air Lube (P/N **95842**) directly into air inlet with throttle lever depressed. Operate tool for 30 seconds to determine if tool is operating properly and to allow lubricating oils to properly penetrate motor. Motor should now be tested for proper operation at 90 PSIG. If motor does not operate properly or operates at a higher RPM than marked on the tool, the tool should be serviced to correct the cause before use.

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Optional Accessories



96179 Motor Tune-Up Kit

- Includes assorted parts to help maintain and repair motor.



Dynaswivel®

- Swivels 360° at two locations which allows an air hose to drop straight to the floor, no matter how the tool is held.

94300 1/4" NPT.



Dynabrade Air Lube

- Formulated for pneumatic equipment.
- Absorbs up to 10% of its weight in water.
- Prevents rust and formation of sludge.

95842: 1pt. (473 ml)

95843: 1 gal. (3.8 L)



95542 Grease 10 oz.

- Multi-purpose grease for all types of bearings, cams, gears.
- Workable range 0° F to 300° F.



95541 Push-type Grease Gun

- One-hand operation.



Dynabrade Angle Gear Oil

- Specifically formulated to saturate wick system in right angle gear head.
- Easy to apply using Dynabrade P/N **95541** Oil Gun. Apply 3 plunges every 8 hours of operation into tools lubrication fitting.

95848: 2 oz. tube

95849: 10 oz. tube

Special Repair Tools



52296 - Repair Collar



96216, 96239, 96240
Bearing Press Tools



96346 - Bearing Separator (2")



96210 - Bearing Removal Tool



96262 - 14mm Open-End Wrench



96232 - Arbor Press (#2)

Visit Our Web Site: www.dynabrade.com

Email: Customer.Service@Dynabrade.com



DYNABRADE, INC., 8989 Sheridan Drive • Clarence, NY 14031-1490 • Phone: (716) 631-0100 • Fax: 716-631-2073 • International Fax: 716-631-2524
DYNABRADE EUROPE S.à.r.l., Zone Artisanale • L-5485 Wormeldange—Haut, Luxembourg • Telephone: 352 76 84 94 1 • Fax: 352 76 84 95 1

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