

1 hp Right Angle – Drill Governor Controlled

Air Tool Manual – Safety, Operation and Maintenance

SAVE THIS DOCUMENT, EDUCATE ALL PERSONNEL

Model:

**53143 – 850 RPM
– 1/2" Drill Chuck**









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⚠ WARNING

Read and understand this tool manual before operating your air tool. Follow all safety rules for the protection of operating personnel as well as adjacent areas. Always operate, inspect and maintain this tool in accordance with the American National Safety Institute (ANSI) Safety Code for Portable Air Tools – B186.1. For additional safety information, refer to Safety Requirements for the Use, Care and Protection of Abrasive Wheels – ANSI B7.1, Code of Federal Regulation – CFR 29 Part 1910, European Committee for Standards (EN) Hand Held Non-Electric Power Tools – Safety Requirements and applicable State and Local Regulations.

SAFETY LEGEND

	⚠ WARNING Read and understand tool manual before work starts to reduce risk of injury to operator, visitors, and tool.	⚠ WARNING Practice safety requirements. Work alert, have proper attire, and do not operate tools under the influence of alcohol or drugs.	
	⚠ WARNING Eye protection must be worn at all times, eye protection to conform to ANSI Z87.1.	⚠ WARNING Ear protection to be worn when exposure to sound, exceeds the limits of applicable Federal, State or local statutes, ordinances and/or regulations.	
	⚠ WARNING Respiratory protection to be used when exposed to contaminant's that exceed the applicable threshold limit values required by law.	⚠ WARNING Air line hazard, pressurized supply lines and flexible hoses can cause serious injury. Do not use damaged, frayed or deteriorated air hoses and fittings.	

⚠ WARNING

Some dust created by grinding, drilling, and other construction activities contain chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

- Lead from lead-based paints
- Crystalline silica from bricks and cement and other masonry products
- Arsenic and chromium from chemically treated lumber

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

SAFETY INSTRUCTIONS

Carefully Read all instructions before operating or servicing any Dynabrade® Abrasive Power Tool. Products offered by Dynabrade are not to be modified, converted or otherwise altered from the original design without expressed written consent from Dynabrade, Inc.

Tool Intent: Right Angle Drills can be used to drill wood, ceramics, plastics, fiberglass, laminates, hard and soft materials.

Do Not use tool for anything other than intended applications.

Training: Proper care, maintenance, and storage of your tool will maximize performance.

- Employer's Responsibility – Provide Right Angle Drill operators with safety instructions and training for safe use of tools and accessories.
- Remove adjusting keys or wrenches before turning on the tool. A wrench or a key that is left attached to a rotating part of the tool may result in personal injury.
- Always use auxiliary handle for maximum control over torque reaction or kick-back. High torque 3/8" and larger chuck capacity drills are equipped with auxiliary handles.

(continued on next page)

SAFETY INSTRUCTIONS CONT.

Accessory Selection:

- Abrasive/accessory RPM (speed) rating MUST be approved for AT LEAST the tool RPM rating.
- Before mounting an accessory, visually inspect for defects. Do not use defective accessories.
- Use only recommended accessories. See back page of manual and Dynabrade catalog.
- Follow tool specifications before choosing size and type of accessory.
- Only use recommended fittings and air line sizes. Air supply hoses and air hose assemblies must have a minimum working pressure rating of 150 PSIG (10 Bars, g) or 150 percent of the maximum pressure produced in the system, whichever is higher. (See tool Machine Specifications table.)

OPERATING INSTRUCTIONS

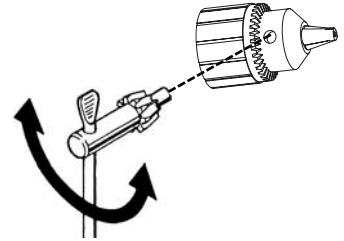
Warning: Always wear eye protection. Operator of tool is responsible for following: accepted eye, face, respiratory, hearing and body protection.

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

- Tool RPM must never exceed abrasive/accessory RPM rating. Check accessory manufacturer for details on maximum operating speed or special mounting instructions.
- Keep hand and clothing away from working end of the air tool.
- Be sure that any loose clothing, hair and all jewelry is properly restrained.
- Secure inlet bushing on air tool with a wrench before attempting to install the air fitting to avoid damaging housing assembly.
- BEFORE MOUNTING AN ACCESSORY, after all tool repairs and whenever a drill is issued for use, check tool RPM (speed) with tachometer with air pressure set at 90 PSIG while the tool is running. If tool is operating at a higher speed than the RPM marked on the tool housing, or operating improperly, the tool must be serviced and corrected before use.

Drill Accessory Mounting Instructions

- With power source disconnected from air tool.
- Open chuck jaws wide enough to install bit. Be sure the bit shank and chuck jaws are clean. Dirt particles may prevent the bit from lining up properly.
- Insert the bit into the chuck. Center the bit in the chuck jaws and lift it about 1/16" off the bottom. Tighten the chuck jaws by the hand to align the bit.
- Place the chuck key in each of the three holes in the chuck, turning it clockwise. Tighten securely.
- Remove adjusting keys or wrenches before turning the tool on. A wrench or a key is left attached to a rotating part of the tool may result in personal injury.
- Connect air tool to power source. Be careful NOT to depress throttle lever in the process.
- Do not expose air tool to inlet pressure above 90 PSIG or (6.2 Bars).



Caution: After installing the accessory, before testing or use and/or after assembling tool, the Right Angle drill must be started at a reduced speed to check for good balance. Gradually increase tool speed. DO NOT USE if tool vibration is excessive. Correct cause, and retest to insure safe operation.

- To remove the bit, insert the chuck key into the holes in the chuck and turn counterclockwise.

Bit Selection:

- Use sharp bits. Sharp bits are less likely to bind when drilling.
- Use the proper bit for the job. Check the information on the bit's packaging for proper usage.
- Do not use bits larger than the rated capacity of the drill.

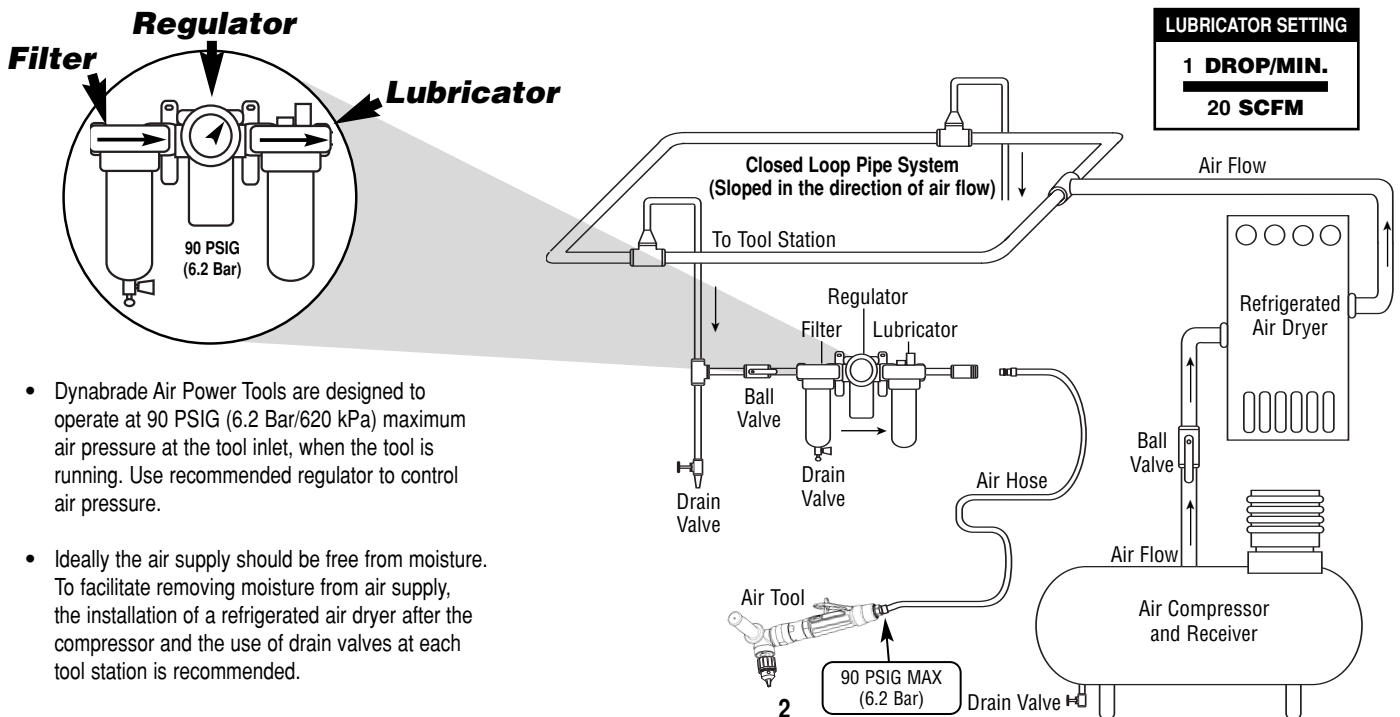
- If the bit binds, the drill will suddenly react in the opposite direction of the rotation of the bit. The operator should prepare for a sudden reaction by holding the tool securely.
- Use proper speed for the size of bit. Larger bits should be run at the lower speed. Driving larger bits at the high speeds will increase the chance of reaction.
- Avoid drilling warped, wet, knotty, and pitchy materials if possible.
- To remove the bit, turn the chuck key counterclockwise in just one hole, then loosen the chuck by hand.
- When removing the bit from the tool avoid contact with the skin and use proper protective glove when grasping the bit or accessory. Accessories may be hot after prolonged use.
- Make sure that work area is uncluttered, and visitors are at a safe range from the tools and debris.
- Air tools are not intended for use in explosive atmospheres and are not insulated for contact with electric power sources.
- Use a vise or clamping device to hold work piece firmly in place.
- Do not apply excessive force on tool or apply "rough" treatment to it.
- Always work with a firm footing, posture and proper lighting.
- Ensure that sparks and debris resulting from work do not create a hazard.
- This tool is rear exhaust. Exhaust may contain lubricants, vane material, bearing grease, and other materials flushed through the tool.

Warning: Cutting certain materials can create explosive dust. It is the employer's responsibility to notify the user of acceptable dust levels.

- Some material contains chemicals which may be toxic. Take caution to prevent dust inhalation and skin contact. Follow material supplier safety data.
- Certain materials can cause sparks which can cause fires or explosions. It is the user's responsibility to make sure the work is done on spark free materials.

Report to your supervisor any condition of the tool, accessories, or operation you consider unsafe.

Air System



- Dynabrade Air Power Tools are designed to operate at 90 PSIG (6.2 Bar/620 kPa) maximum air pressure at the tool inlet, when the tool is running. Use recommended regulator to control air pressure.
- Ideally the air supply should be free from moisture. To facilitate removing moisture from air supply, the installation of a refrigerated air dryer after the compressor and the use of drain valves at each tool station is recommended.

Maintenance Instructions

Important: A preventative maintenance program is recommended whenever portable power tools are used. The program should include inspection of air supply lines, air line pressure, proper lubrication and repair of tools. Refer to ANSI B186.1 for additional maintenance information.

- Use only genuine Dynabrade replacement parts to insure quality. To order replacement parts, specify **Model#**, **Serial#** and **RPM** of your air tool.
- 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: **11411** Air Filter-Regulator-Lubricator (FRL) – Provides accurate air pressure regulation and two stage filtration of water contaminant's. Operates 55 SCFM/1,558 LPM @ 90 PSIG with 1/2" NPT female ports.
- Lubricate wick system through the angle gear oil fitting with 2-3 plunges for every 24 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).
- Grease the planetary gear assembly with the **95542** Grease by applying **2-3 plunges** with the **95541** Grease Gun after **every 50 hours** of use for maximum gear life.
- Dynabrade recommends one drop of air lube per minute for each 20 SCFM (example: if the tool specification states 40 SCFM, set the drip rate on the filter-lubricator to 2 drops per minute). Dynabrade Air Lube (P/N **95842**: 1 pt 473 ml) is recommended.

Routine Preventative Maintenance:

- Check free speed of Right Angle drill using a tachometer. This governor controlled Right Angle drill should be speed checked every 20 hours of use or weekly, whichever occurs more frequently.
- DO NOT disassemble the governor for any reason. Reorder correct speed – governor assembly (See Assembly Breakdown) and recheck free speed of tool with a tachometer.
- Mineral spirits are recommended when cleaning the tool and parts. Do not clean tool or parts with any solvents or oils containing acids, esters, ketones, chlorinated hydrocarbons or nitro carbons.
- DO NOT clean or maintain tools with chemicals that have a low flash point (example: WD-40®).
- A Motor Tune-Up Kit (P/N **96532**) is available which includes high wear and medium wear motor parts.
- Air tool labels must be kept legible at all times, if not, reorder label(s) and replace. User is responsible for maintaining specification information i.e.: Model #, S/N, and RPM. (See Assembly Breakdown)
- Blow air supply hose out prior to initial use.
- Visually inspect air hoses and fittings for frays, visible damage and signs of deterioration. Replace damaged or worn components.
- Refer to Dynabrade's Warning/Safety Operating Instructions Tag (Reorder No. **95903**) for safety information.

After maintenance is performed on tool, add a few drops of Dynabrade Air Lube (P/N **95842**) to the air line and start the tool a few times to lubricate air motor. Check for excessive tool vibration.

Handling and Storage:

- Use of tool rests, hangers and/or balancers is recommended.
- Protect tool inlet from debris (see Notice below).
- DO NOT carry tool by air hose, or near the tool throttle lever.
- Protect abrasive accessories from exposure to water, solvents, high humidity, freezing temperature and extreme temperature changes.
- Store accessories in protective racks or compartments to prevent damage.

Machine Specifications

Model Number	Motor HP (W)	Tool RPM	Sound Level	Air Flow Rate CFM/SCFM (LPM)	Air Pressure PSIG (Bars)	Spindle Thread	Weight Pound (kg)	Length Inch (mm)	Height Inch (mm)
53143	1 (746)	850	82 dB(A)	5/35 (991)	90 (6.2)	1/2" - 20	5.5 (2.5)	13-1/8 (333)	5-1/8 (130)

Additional Specifications: Air Inlet Thread 3/8" NPT • Hose I.D. Size 3/8" or 10mm • Air Flow Rate Based At Max HP. • Air Pressure 90 PSIG Max

Notice

All Dynabrade motors use the highest quality parts and materials 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.

Index Key

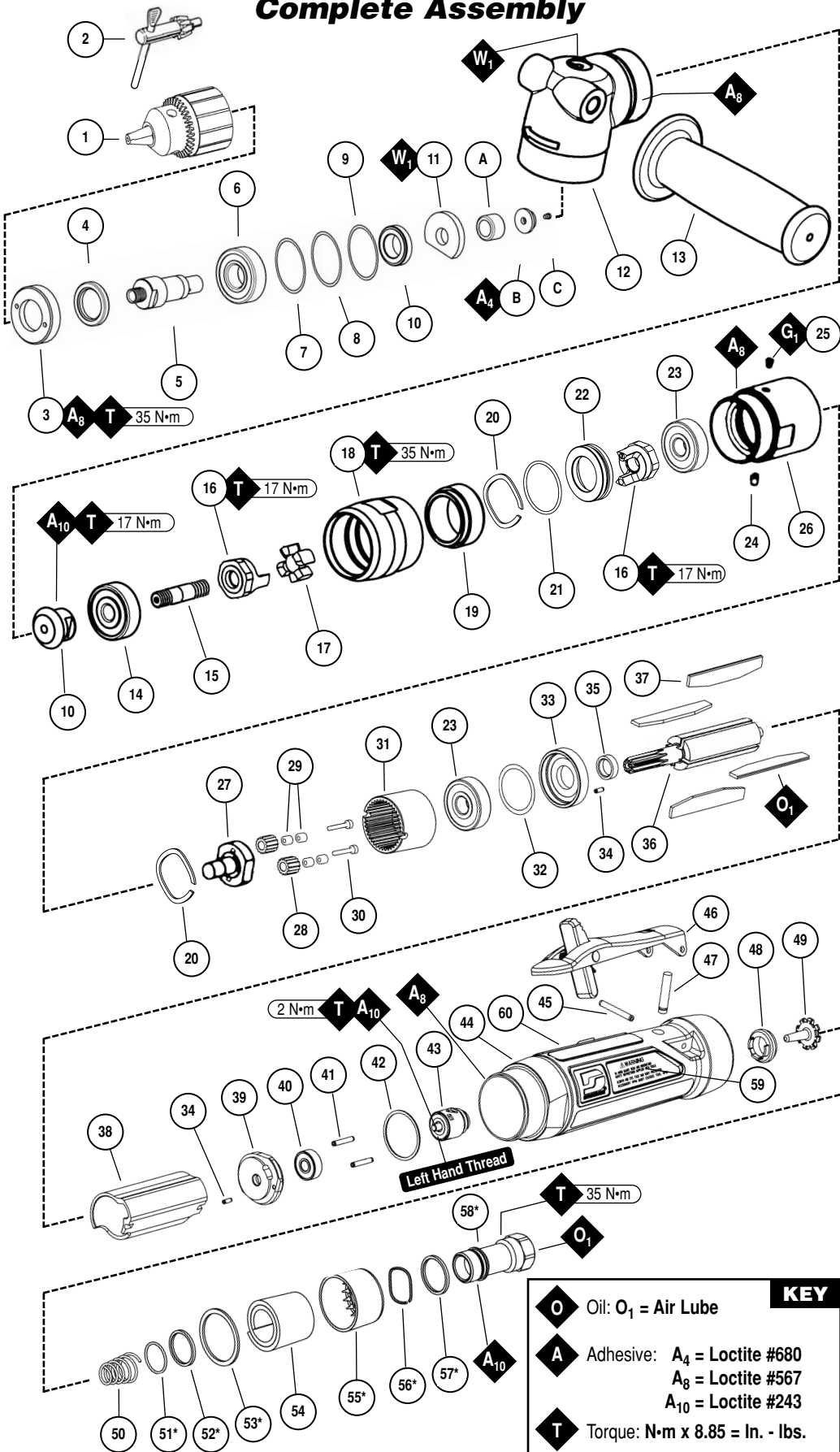
No.	Part #	Description
1	53034	1/2" Drill Chuck
2	53054	Chuck Key
3	50963	Retainer
4	50899	Seal
5	53614	Spindle - 1/2"- 20
6	97679	Bearing
7	97678	Shim (.010" Thick)
8	97677	Shim (.003" Thick)
9	97676	Shim (.001" Thick)
10	53639	Gear Set
11	53608	Wick
12	53600	Right Angle Housing Assy. Includes the following: A 96325 Shell Bearing B 53649 Gear Oil Plate C 01041 Gear Oil Fitting
13	53163	Side Handle
14	01266	Bearing
15	53635	Pinion Adapter
16	51935	Coupling (2)
17	51936	Coupling Insert
18	53650	Lock Ring
19	53651	Spacer
20	96498	Wave Spring (2)
21	95438	O-Ring
22	53620	Adapter
23	54520	Bearing (2)
24	04014	Set Screw
25	01041	Grease Fitting
26	53695	Gear Casing
27	53676	Carrier
28	53193	Gear (2)
29	04026	Needle Bearing (4)
30	53679	Shaft (2)
31	53665	Ring Gear
32	51951	Shim Pack
33	51922	Front Bearing Plate
34	96441	Pin (2)
35	51927	Spacer
36	53667	Rotor
37	51926	Blade (4/Pkg.)
38	51925	Cylinder
39	51923	Rear Bearing Plate
40	02057	Bearing
41	96445	Pin (2)
42	51924	Gasket
43	51930	Governor Assembly
44	All Housings Include: Warning & Specification Labels 20097 Housing - Model 53143	
45	96444	Pin
46	51949	Safety Lever Assembly
47	51946	Valve Stem Assembly (Incl. 96443 O-Ring)
48	51945	Valve Seat
49	51944	Tip Valve
50	51943	Spring
51*	96442	O-Ring
52*	51940	Spacer
53	53682*	Gasket - Standard
	53687	Gasket - For use with overhose
54*	94528	Felt Silencer
55*	53686	Muffler Cap
56*	94924	Wave Spring
57*	53683	Spacer
58*	53681	Inlet Bushing (Incl. 2 - 51938 Screens)

Label Key

No.	Part #	Description
59	00001180	Warning Label
60	00001181	Specification Label

Model:
53143

1 hp Right Angle Drill Complete Assembly



Note: All index numbers with an asterisk are included in P/N 53655 Muffler Assembly.

KEY	
O	Oil: O ₁ = Air Lube
A	Adhesive: A ₄ = Loctite #680 A ₈ = Loctite #567 A ₁₀ = Loctite #243
T	Torque: N·m x 8.85 = In. - lbs.
W	Wicking: W ₁ = Gear Oil
G	Grease: G ₁ = Lubriplate 630 AA

Disassembly Instructions - 1 hp Right Angle Drill

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

Disconnect tool from power source before tool repair.

Right Angle Head Disassembly:

1. Remove side handle and drill chuck.
2. Secure **53600** Right Angle Housing, against both side handle bosses, in a padded vise with spindle facing upward.
3. Using **97782** Pin Wrench (*ordered separately*) or an adjustable pin wrench, remove **50963** Retainer. (**Left Hand Threads**)
4. Remove **50899** Shaft Seal from retainer.
5. Pull spindle and gear assembly from housing.
6. Press spindle through **97679** Bearing and spiral bevel gear.
7. Remove shims and **53608** Wick from right angle housing.
8. Remove **53650** Lock Ring from right angle housing (**Left Hand Threads**) and from **53695** Gear Casing (**Right Hand Threads**).
9. Remove angle head from vise and remove **96325** Bearing by pressing **53649** Gear Oil Plate through housing.
10. Pull pinion gear, bearing and coupler sub-assembly from angle housing.
11. Secure gear, bearing and coupler sub-assembly by the pinion gear wrench flats and remove the **51935** Flexible Coupler (twist counterclockwise).
12. Secure **53635** Adapter using an allen wrench and remove pinion gear (twist counterclockwise).
13. Press **53635** Adapter through **01266** Bearing.
14. Remove **04014** Set Screw from **53695** Gear Casing and remove gear casing (**Right Hand Thread**) from motor housing.
15. Slide **53665** Ring Gear from gear casing.
16. Secure planetary carrier using **53698** Wrench (*ordered separately*) and remove **51935** Coupling (twist counterclockwise).
17. Press planetary carrier thread end through **54520** Bearing.
18. Remove **96498** Wave Spring.
19. Press **53679** Pins from carrier to remove gears.

Right Angle Head Disassembly Complete.

Motor Disassembly:

1. Pull motor assembly from housing.
2. Remove governor assembly by using a slotted screwdriver. (**Left Hand Thread**)
3. Secure **51925** Cylinder using **96209** Motor Repair Clamp (*ordered separately*) and place a 1/8" (3mm) drift pin to the base of the terminal thread and press **51921** Rotor from the **02057** Rear Bearing.
4. Slide **02057** Rear Bearing from **51923** Rear Bearing Plate.
5. Remove **51925** Cylinder and **51926** Blades.
6. Press rotor through **54520** Bearing, **51922** Front Bearing Plate and **51927** Rotor Spacer.
7. Slide **54520** Bearing and shims from **51922** Front Bearing Plate.

Motor Disassembly Complete.

Housing Disassembly:

1. Secure housing using **51989** Repair Collar (*see back cover for Optional Accessories*).
2. Remove inlet bushing with muffler assembly (twist counterclockwise).
3. Remove **53682** Gasket, **51943** Spring, **96442** O-Ring, **51940** Spacer, **94528** Felt Silencer, **53686** Muffler Cap, **94924** Wave Spring and **53683** Spacer from **53681** Inlet Bushing.
4. Remove **51944** Tip Valve and **51945** Valve Seat.
5. Remove housing and **51989** Repair Collar and lay collar on bench with flange facing down so it is supporting throttle lever. Place a 3/32" (3mm) drift pin on **96444** Pin and tap pin thru housing.
6. Remove **51946** Valve Stem Assembly.
7. Remove **96443** O-Ring from **51946** Valve Stem Assembly.

Housing Disassembly Complete.

Assembly Instructions - 1 hp Right Angle Drill

Motor Assembly:

Important: Be sure parts are clean and in good repair before assembling. Follow grease, oil and torque specifications.

1. Place rotor into a padded vise with gear teeth or male thread facing upwards.
2. Slip **51927** Rotor Spacer over rotor shaft and down against rotor body face.
3. Press **96441** Coiled Pin into **51922** Front Bearing Plate. Make certain, coiled pin does not protrude beyond internal bearing surface.
4. Place a .002" shim into the base of **51922** Front Bearing Plate as an initial spacing and slide **54520** Bearing to the front plate base. **Note:** **51951** Shim Pack contains .001" and .002" shims.
5. Press Bearing/Bearing Plate assembly onto rotor.
6. Check clearance between rotor and front bearing plate by using a .001" feeler gauge. Clearance should be between .001" – .0015". Adjust clearance by repeating steps 4,5 and 6 with different shims if necessary.
7. Once proper rotor gap clearance is achieved, install well lubricated **51926** Blades (4) into rotor slots. Dynabrade recommends lubricating blades with **95842** Air Lube.
8. Install **51925** Cylinder over rotor and front plate raised boss. Align coiled pin on front plate to cylinder slot.
9. Press **96441** Coiled Pin into blind hole on **51923** Rear Bearing Plate. Press (2) **96445** Coiled Pins into the back side of rear bearing plate.
10. Peel backing off **51924** Gasket and apply it firmly in place onto **51923** Rear Bearing Plate.
11. Place **51923** Rear Bearing Plate over rotor mandrel and insert raised boss on rear bearing plate into cylinder diameter, while inserting short coiled pin into cylinder slot. Be sure inlet slot on rear bearing plate lines up with inlet slot on cylinder. To correct alignment flip cylinder end to end and repeat step 8 for correct assembly.

Assembly Instructions - (Continued)

- Using **96243** Bearing Press Tool (*ordered separately*) press **02057** Bearing onto rotor and into **51923** Rear Bearing Plate hole until it is seated. **Important:** Cylinder must fit snug between bearing plates. If too tight, rotor will not turn freely. Rotor must be lightly tapped at press fit end until rotor spins freely while still maintaining a snug fit. A loose fit will not achieve the proper preload on motor. While pressing **02057** Bearing, make certain to contact inner race of bearing.
- Add one drop of Loctite® 243 (or equiv.) to governor assembly male thread and screw governor assembly into place (**Left Hand Thread**) with slotted screw head. Torque to 2 N•m/18 lbs. in.
- Install motor assembly into housing, making sure motor drops all the way into housing. **Note:** Align both **96445** Coiled Pins to slots in insert and against **51924** Gasket.

Motor Assembly Complete.

Right Angle Head Assembly:

- Press **01041** Gear Oil Fitting into **53649** Gear Oil Plate. Apply a drop of Loctite® #680 (or equivalent) to the diameter of the gear oil plate and insert sub-assembly into right angle housing.
- Press **96325** Bearing into housing until it is firmly seated against **53649** Gear Oil Plate. **Important:** While pressing **96325** Bearing, make certain to contact outer race of bearing only.
- Add one drop of Loctite® #243 (or equiv.) to male thread of **53635** Adapter and tighten pinion using a **95049** 3/16" Hex Key wrench and the pinion wrench flats until pinion bottoms on adapter. Unthread pinion from adapter for one full thread.
- Using **96244** Bearing Press Tool (*ordered separately*) press **53635** Adapter into **01266** Bearing. **Important:** While pressing **01266** Bearing, make certain to contact inner race of bearing only.
- Add one drop of Loctite® #243 (or equiv.) to male thread of adapter and tighten **51935** Coupler using wrench flats. Torque to 17 N•m (150 lb.-in.).
- Insert sub-assembly into male threaded end of **53600** Right Angle Housing.
- Apply a small amount of Loctite® #567 (or equiv.) to **53600** Right Angle Housing thread, and install **53650** Lock Ring (**Left hand Threads**).
- Install **53665** Ring Gear over **54520** Front Motor Bearing, keeping 2 slots facing outward.
- Install gears with needle bearings and assemble onto planetary carrier by pressing retainer shafts into place.
- Place **96498** Wavy Washer at the base of **53695** Gear Casing female threaded end.
- Slide planetary carrier assembly, with threaded end first, into **53695** Gear Casing and through **54520** Bearing.
- Apply one drop of Loctite® #243 (or equiv.) to threads of **51935** Coupling. Secure planetary carrier using **53698** Wrench (*order separately*) and thread on **51935** Coupling (twist clockwise). Torque to 17 N•m/150 lbs. in.
- Apply a small amount of Loctite® #567 (or equiv.) to male thread of motor housing and thread **53695** Gear Casing over ring gear and onto motor housing. **Important:** Align rotor spline into planet gears to allow carrier to spin freely.
- When slots from ring gear line up with set screw hole, apply a small amount of Loctite® #567 (or equiv.) to male thread of **04014** Set Screw, and install set screw to lock ring gear in place.
- Rotate motor housing and **53650** Lock Ring until throttle lever is located between the 9-11 o'clock position. Throttle lever in this position safe guards against accidental start ups of the tool. Torque **53695** Gear Casing to 35 N•m (310 lb.-in.).
- Place **51936** Coupling Insert into **51935** Coupling. Make certain insert radii in coupling base, to correct alignment remove insert and rotate 90°.
- Secure **53600** Right Angle Housing, against both side handle bosses, in a padded vise.
- Place well lubricated **53608** Wick against **96325** Bearing with flat edge towards pinion gear. (Wick must be completely saturated with Dynabrade **95848** Gear Oil before installation). **Note:** Do not contaminate wick with any other oil or grease product.
- Press **97679** Bearing onto spindle and against shoulder. **Important:** While pressing **97679**, make certain to contact inner race of bearing only.
- Press gear, with teeth facing away from bearing, into spindle and against **97679** Bearing inner race.
- Insert spindle assembly into **53600** Right Angle Housing until **97679** Bearing contacts housing shoulder.
- Rotate spindle while pressing down into housing to check for gear alignment and backlash. Install shims as required (minimum backlash is recommended for maximum gear life. Make certain there is clearance throughout 360° revolution).
- Press **50899** Shaft Seal into **50963** Retainer with base of seal facing outward.
- Apply a small amount of Loctite® #567 (or equiv.) to the male thread of the retainer and thread into place. (**Left Hand Thread**)
- Using **97782** Pin Wrench (*ordered separately*) or an adjustable pin wrench, torque retainer to 35 N•m (310 lb.-in.).

Housing Assembly:

- Secure housing using **51989** Repair Collar (*see back cover for Optional Accessories*) with inlet facing upward.
- Slide **96443** O-Ring onto **51946** Valve Stem and slide sub-assembly until o-ring passes through housing hole. Make certain valve stem assembly slides freely after the o-ring passes through the hole.
- Install **51945** Valve Seat by aligning 3 male prongs with three deep slots on insert. Make certain valve seat is pressed flat against base of pocket. **Note:** Add a few drops of Dynabrade Air Lube (P/N **95842**) to pocket walls before inserting **51945** Valve Seat.
- Install **51944** Tip Valve as shown.
- Pre-assemble muffler, slide **53683** Spacer over **53681** Inlet Bushing and up against the hex head base. Slide **94924** Wave Spring over **53681** Inlet Bushing and up against spacer. Pre roll **94528** Felt and install it in **53686** Muffler Cap. Support felt in felt/muffler cap assembly and slide **53681** Inlet Bushing thru the inside until the muffler cap assembly seats against the **94924** Wave Spring. Flare the felt and place **51940** Spacer over male thread and set **96442** O-Ring into groove at the base of thread. Return felt to unflared form. Slide **51943** Spring into bushing and up to the two **51938** screens.
- Place **53682** Gasket over felt silencer and against **53686** Muffler Cap.
- Apply one drop of Loctite® #243 (or equiv.) to **53681** Inlet Bushing Thread.
- Align small inside diameter of **51943** Spring to cone point on **51944** Tip Valve and thread inlet bushing and sub-assembly into place. Torque bushing to 35 N•m/310 lbs. in.
- Remove housing from **51989** Repair Collar and place repair collar onto the bench top with the part number identifier against the bench. Align the throttle lever holes to housing pinhole and rest the housing and throttle lever onto the legs of the repair collar. Press **96444** Coiled Pin into lever hole and center into housing.

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 inlet with throttle lever depressed. Operate tool for 30 seconds to allow air lube to properly lubricate internal motor components. Motor should now be tested for proper operation at 90 PSIG max. If tool operates at a higher RPM than marked on the tool or if vibration and sound levels seem abnormal, the tool should be serviced to correct the cause before use.

Preventative Maintenance Schedule

For All 1 hp Right Angle Drills

This service chart is published as a guide to expectant life of component parts. The replacement levels are based on average tool usage over one year. Dynabrade Inc. considers one year usage to be 1,000 hours.

Parts Common to all Models:

LEGEND	
T	Included in Tune-Up Kit
X	Type of wear, no other comments apply.
L	Easily lost. Care during assembly/disassembly.
D	Easily damaged during assembly/disassembly.
R	Replace each time tool is disassembled.



96532 – Tune-Up Kit

Index #	Part Number	Description	Number Required	High Wear 100%	Medium Wear 70%	Low Wear 30%	Non-Wear 10%
1	53034	Drill Chuck	1				X
2	53054	Chuck Key	1				X
3	50963	Retainer	1				X
4	50899	Seal	1	R			
5	53614	Spindle	1				X
6	97679	Bearing	1		X		
7	97678	Shim (.010" Thick)	1				X
8	97677	Shim (.003" Thick)	1				X
9	97676	Shim (.001" Thick)	1				X
10	53639	Gear Set	1			X	
11	53608	Wick	1		X		
12	53600	Right Angle Housing Assy.	1				X
A	96325	Shell Bearing	1		X		
B	53649	Gear Oil Plate	1				X
C	01041	Gear Oil Fitting	1				X
13	53163	Side Handle	1				X
14	01266	Bearing	1		X		
15	53635	Pinion Adapter	1				X
16	51935	Coupling	2				X
17	51936	Coupling Insert	1			X	
18	53650	Lock Ring	1				X
18	53651	Spacer	1				X
20	96498	Wave Spring	2		T		
21	95438	O-Ring	1				T
22	53620	Adapter	1				X
23	54520	Bearing	2		T		
24	04014	Set Screw	1		L		
25	01041	Grease Fitting	1			X	
26	53695	Adapter	1				X
27	53676	Carrier	1			X	
28	53193	Gear	2			X	
29	04026	Needle Bearing	4			X	
30	53679	Shaft	1			X	
31	53665	Ring Gear	1			X	
32	51951	Shim Pack	1		T		
33	51922	Front Bearing Plate	1			X	
34	96441	Pin	2			X	
35	51927	Spacer	1		T		
36	53667	Rotor	1			X	
37	51926	Blade (4/pkg.)	1	T			
38	51925	Cylinder	1			X	
39	51923	Rear Bearing Plate	1			X	
40	02057	Bearing	1		T		
41	96445	Pin	2			X	
42	51924	Gasket	1		T		
43	51930	Governor Assembly	1				X
44	20097	Housing	1				X
45	96444	Pin	1		T		
46	51949	Safety Lever Assembly	1			X	
47	51946	Valve Stem Assembly	1		T		
48	51945	Valve Seat	1				X
49	51944	Tip Valve	1		T		
50	51943	Spring	1				X
51	96442	O-Ring	1		T		
52	51940	Spacer	1				X
53	53682	Gasket	1				
54	94528	Felt Silencer	1	T			
55	53686	Muffler Cap	1				X
56	94924	Wave Spring	1				X
57	53683	Spacer	1				X
58	53681	Inlet Bushing	1				X

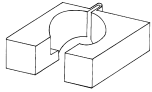
Optional Accessories

FIND THE MOST CURRENT OFFERING OF SUPPORT DOCUMENTS AND ACCESSORIES @ WWW.DYNABRADE.COM



DynaSwivel®

- Swivels 360° AT TWO PIVOT POINTS allowing the air hose to drop directly to the floor while providing superb tool handling.
- 95461** – 3/8" NPT



51989 Repair Collar

- Specially designed collar for use in vise to prevent damage to valve body of tool during disassembly/assembly.



Dynabrade Air Lube

- Formulated for pneumatic equipment.
- Absorbs up to 10% of its weight in water.
- Prevents rust and formation of sludge.
- Keeps pneumatic tools operating longer with greater power and less down time.

95842: 1 pt. (473 ml)
95843: 1 gal. (3.8 L)



Bearing Press Tool

- Used to install bearings.

96243: For installing 02057 Bearing.
96244: For installing 01266 Bearing.



Dynabrade Angle Gear Oil

- Specifically formulated to saturate wick system in right angle gear head.

95848: 2 oz. tube
95541: Push-Type Gear Oil Gun



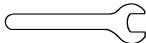
97782 Retainer Repair Tool

- Tool has a 3/8 in. square socket for use with 3/8 in. drive; breaker bar, ratchet head, or torque wrenches.



96209 Motor Repair Clamp

- Specially designed clamp to secure motor cylinder before disassembly.



95281 – 19mm open-end wrench.



96532 Motor Tune-Up Kit

- Includes assorted parts to help maintain and repair motor.

01905 Drop-In Motor - 850 RPM

- Allows quick and easy replacement. No motor adjustments needed.



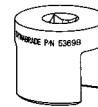
53621 Over Hose Assembly

- Over Hose Assembly directs exhaust away from operator.



30335 Air Supply Hose

- 3/8 in. I.D. x 60 in. Wide air supply hose, includes: 3/8 in. NPT male and female threaded fittings.



53698 Carrier Wrench

- Carrier Wrench has a 3/8 in. square socket for use with 3/8 in. drive; breaker bar, ratchet head, or torque wrenches.



95542 Grease 10 oz.

- Multi-purpose grease for all types of bearings, cams, gears.
- High film strength; excellent resistance to water, steam, etc.
- Workable range 0° F to 300° F.

95541 Push-type Grease Gun

- One-hand operation.

Reference Contact Information

1. American National Safety Institute – ANSI

25 West 43rd Street
Forth Floor
New York, NY 10036
Tel: 1 (212) 642-4900
Fax: 1 (212) 398-0023

2. Government Printing Office – GPO

Superintendent of Documents
Attn. New Orders
P.O. Box 371954
Pittsburgh, PA 15250-7954
Tel: 1 (202) 512-1803

3. European Committee for Standardization

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