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Edition 1
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OPERATIONS AND MAINTENANCE MANUAL FOR MODEL TXA153FP64L/VG-1046 ANGLE GRINDER

NOTICE

Model TXA153FP64L/VG-1046 Angle Grinder is designed for close-quarter work in the metal fabricating industry, shipyards, pipe fabrication, die and mold manufacturing and limited space applications. They are particularly good where conduits, pipes, ducts etc. pass through bulkheads or frames. These small Grinders are very efficient at grinding weld bead and leaving a fine finish.

⚠ WARNING

IMPORTANT SAFETY INFORMATION ENCLOSED - SAVE THESE INSTRUCTIONS

READ AND UNDERSTAND THIS MANUAL BEFORE OPERATING THIS PRODUCT

IT IS YOUR RESPONSIBILITY TO MAKE THIS SAFETY INFORMATION AVAILABLE TO OTHERS THAT WILL OPERATE THIS PRODUCT

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY

PLACING TOOL IN SERVICE

- **Always install, operate, inspect and maintain this product in accordance with all applicable standards and regulations (local, state, country, federal, etc.).**
- **Always use clean, dry air at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet. Higher pressure may result in hazardous situations including excessive speed, rupture, or incorrect output torque or force.**
- **Be sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905-2 for a typical piping arrangement.**
- **Ensure an accessible emergency shut off valve has been installed in the air supply line, and make others aware of its location.**
- **Do not use damaged, frayed or deteriorated air hoses and fittings.**
- **Keep clear of whipping air hoses. Shut off the compressed air before approaching a whipping hose.**
- **Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.**
- **Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel or jet fuel. Use only recommended lubricants.**
- **Keep work area clean, uncluttered, ventilated and illuminated.**
- **Do not remove any labels. Replace any damaged label.**

USING THE TOOL

- **Always wear eye protection when operating or performing maintenance on this tool.**
- **Always wear hearing protection when operating this tool.**
- **Always use Personal Protective Equipment appropriate to the tool used and material worked. This may include dust mask or other breathing apparatus, safety glasses, ear plugs, gloves, apron, safety shoes, hard hat and other equipment.**
- **Prevent exposure and breathing of harmful dust and particles created by power tool use:**
  Some dust created by power sanding, sawing, grinding, drilling and other construction activities contains 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, and**
  - **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.
- **Keep others a safe distance from your work area, or ensure they use appropriate Personal Protective Equipment.**
- **This tool is not designed for working in explosive environments, including those caused by fumes and dust, or near flammable materials.**
- **This tool is not insulated against electric shock.**
- **Be aware of buried, hidden or other hazards in your work environment. Do not contact or damage cords, conduits, pipes or hoses that may contain electrical wires, explosive gases or harmful liquids.**

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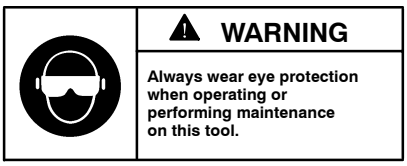
- **Keep hands, loose clothing, long hair and jewelry away from working end of tool.**
- **Power tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.**
- **Keep body stance balanced and firm. Do not overreach when operating this tool. Anticipate and be alert for sudden changes in motion, reaction torques, or forces during start up and operation.**
- **Tool and/or accessories may briefly continue their motion after throttle is released.**
- **To avoid accidental starting - ensure tool is in "off" position before applying air pressure, avoid throttle when carrying, and release throttle with loss of air.**
- **Ensure work pieces are secure. Use clamps or vises to hold work piece whenever possible.**
- **Do not carry or drag the tool by the hose.**
- **Do not use power tools when tired, or under the influence of medication, drugs, or alcohol.**
- **Never use a damaged or malfunctioning tool or accessory.**
- **Do not modify the tool, safety devices, or accessories.**
- **Do not use this tool for purposes other than those recommended.**
- **Use accessories recommended by Ingersoll-Rand.**
- **Do not use this tool if actual free speed exceeds the nameplate rpm.**
- **Before mounting a wheel, after any tool repair or whenever a Grinder is issued for use, check free speed of Grinder with a tachometer to make certain its actual speed at 90 psig (6.2 bar/620 kPa) does not exceed rpm stamped or printed on the nameplate. Grinders in use on the job must be similarly checked at least once each shift.**
- **Always use the recommended Ingersoll-Rand Wheel Guard furnished with the Grinder.**
- **Do not use any grinding wheel, bur or other accessory having a maximum operating speed less than the free speed of the Grinder in which it is being used. Always conform to maximum rpm on grinding wheel blotters.**
- **Inspect all grinding wheels for chips or cracks prior to mounting. Do not use a wheel that is chipped or cracked or otherwise damaged. Do not use a wheel that has been soaked in water or any other liquid.**
- **Make certain the grinding wheel properly fits the arbor. The wheel should not fit too snugly or too loosely. Plain hole wheels should have about 0.007" (0.17 mm) maximum diametral clearance. Do not use reducing bushings to adapt a wheel to any arbor unless such bushings are supplied by or recommended by the wheel manufacturer.**
- **After mounting a new wheel, hold the Grinder under a steel workbench or inside a casting and run it for at least 60 seconds. Make certain no one is within the operating plane of the grinding wheel. If a wheel is defective, improperly mounted or the wrong size and speed, this is the time it will usually fail.**
- **When starting with a cold wheel, apply it to the work slowly until the wheel gradually warms up. Make smooth contact with the work and avoid any bumping action or excessive pressure.**
- **Always replace a damaged, bent or severely worn wheel guard. Do not use a wheel guard that has been subjected to a wheel failure.**
- **Make certain wheel flanges are at least 1/3 the diameter of grinding wheel, free of nicks, burrs and sharp edges. Always use wheel flanges furnished by the manufacturer; never use a makeshift flange or a plain washer. Tighten Flange Nut securely.**
- **Guard opening must face away from operator. Bottom of wheel must not project beyond guard.**
- **Always match collet size with accessory shank size.**
- **Always insert tool shank no less than 3.8″ (10 mm) in the collet. Tighten Collet Nut securely to prevent accessory from working out during operation of the Grinder. Check tightness of Collet Nut before operating the Grinder. Pay particular attention to the fact that allowed speed of a mounted point is lowered when the length of the shaft is increased between end of collet and mounted point (overhang).**
- **Model TXA153 Angle Grinder has a free speed of 15 300 rpm when operated at 90 psig (6.2 bar/ 620 kPa) air pressure. Operation at higher air pressure will result in excessive speed.**

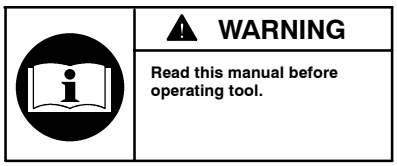
NOTICE

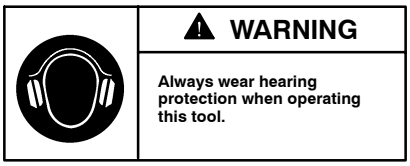
The use of other than genuine Ingersoll-Rand replacement parts may result in safety hazards, decreased tool performance, and increased maintenance, and may invalidate all warranties.

Repairs should be made only by authorized trained personnel. Consult your nearest Ingersoll-Rand Authorized Servicenter.

WARNING SYMBOL IDENTIFICATION







⚠ WARNING

Incorrect combinations of grinding wheel, wheel guard and tool speed could result in injury. Correct combinations are specified below:

Guard Part Number	Wheel Type	Wheel Diameter in. (mm)	Maximum Wheel Thickness in. (mm)	Maximum Speed rpm
AG121-106-4	27	4 (100)	1/4 (6.4)	15 300

LUBRICATION

Ingersoll-Rand No. 10
Ingersoll-Rand No. 50
Ingersoll-Rand No. 63

Ingersoll-Rand No. 67
Ingersoll-Rand No. 68
Ingersoll-Rand No. 77

Always use an air line lubricator with these tools.
We recommend the following Filter-Regulator-Lubricator Unit (FRL):

Inside USA use FRL unit # C18-03-FKG0-28

Outside USA use FRL unit # C18-C3-FKG0

After each two hours of operation, if an air line lubricator is not used, inject 1/2 to 1 cc of Ingersoll-Rand No. 10 Oil into the Air Inlet.

After each eight hours of operation, inject approximately 2 cc of Ingersoll-Rand No. 67 or Ingersoll-Rand No. 77 Grease into the Angle Grease Fitting.

Excessive lubrication will cause grease to work out around the Arbor.

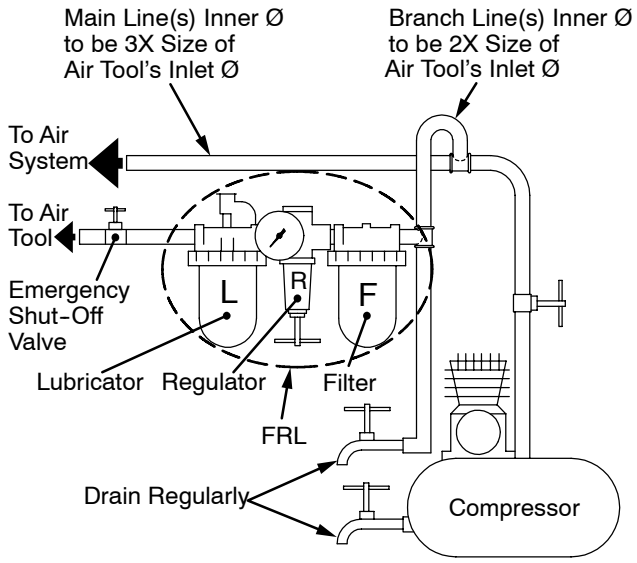
CAUTION

Do not mark any nonmetallic surface of this tool with customer identification codes. Such action could affect tool performance.

INSTALLATION

Air Supply and Connections

Always use clean dry air at 90 psig (6.2 bar/620 kPa) maximum air pressure. Dust, corrosive fumes and/or excessive moisture can ruin the motor of an air tool. An air line filter can greatly increase the life of an air tool. The filter removes dust and moisture. Be sure all hoses and fittings are the correct size and are tightly secured.
See Dwg. TPD905-2 for a typical piping arrangement.



(Dwg. TPD905-2)

HOW TO ORDER CYCLONE GRINDERS

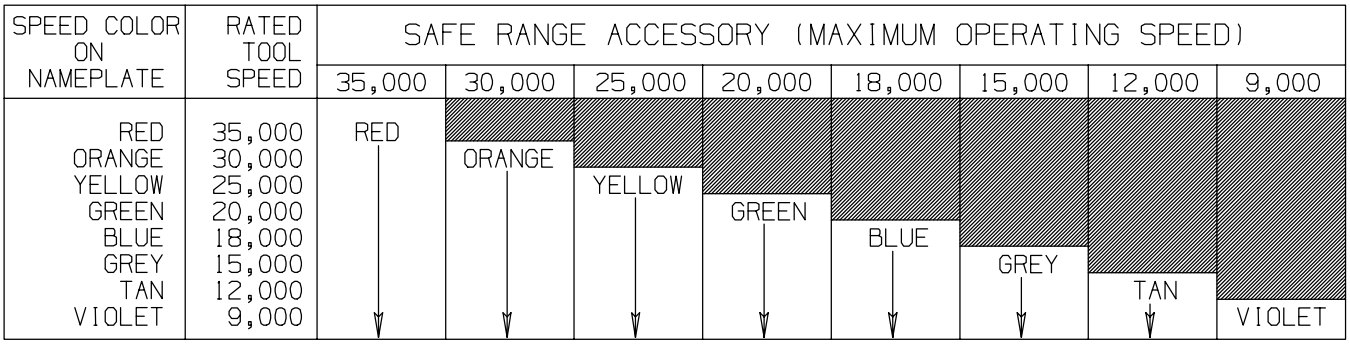
ANGLE GRINDERS with 4" WHEEL GUARD	
Model	**Speed/rpm**
TXA153FP64L/VG-1046 (Front Exhaust)	15 300

NEW GRINDER TO ACCESSORY COLOR MATCHING GUIDE

Ingersoll-Rand has pioneered a new color code system designed to:

1. Simplify the identification of rated tool speed via a unique corresponding color match.
2. Easily communicate the appropriate backing pads and accessories for each tool through a matching color code system on the backing pads and/or other corresponding Grinder accessories.
3. The chart below demonstrates the color code system between the Grinder and the accessory.

(READ FROM LEFT TO RIGHT)

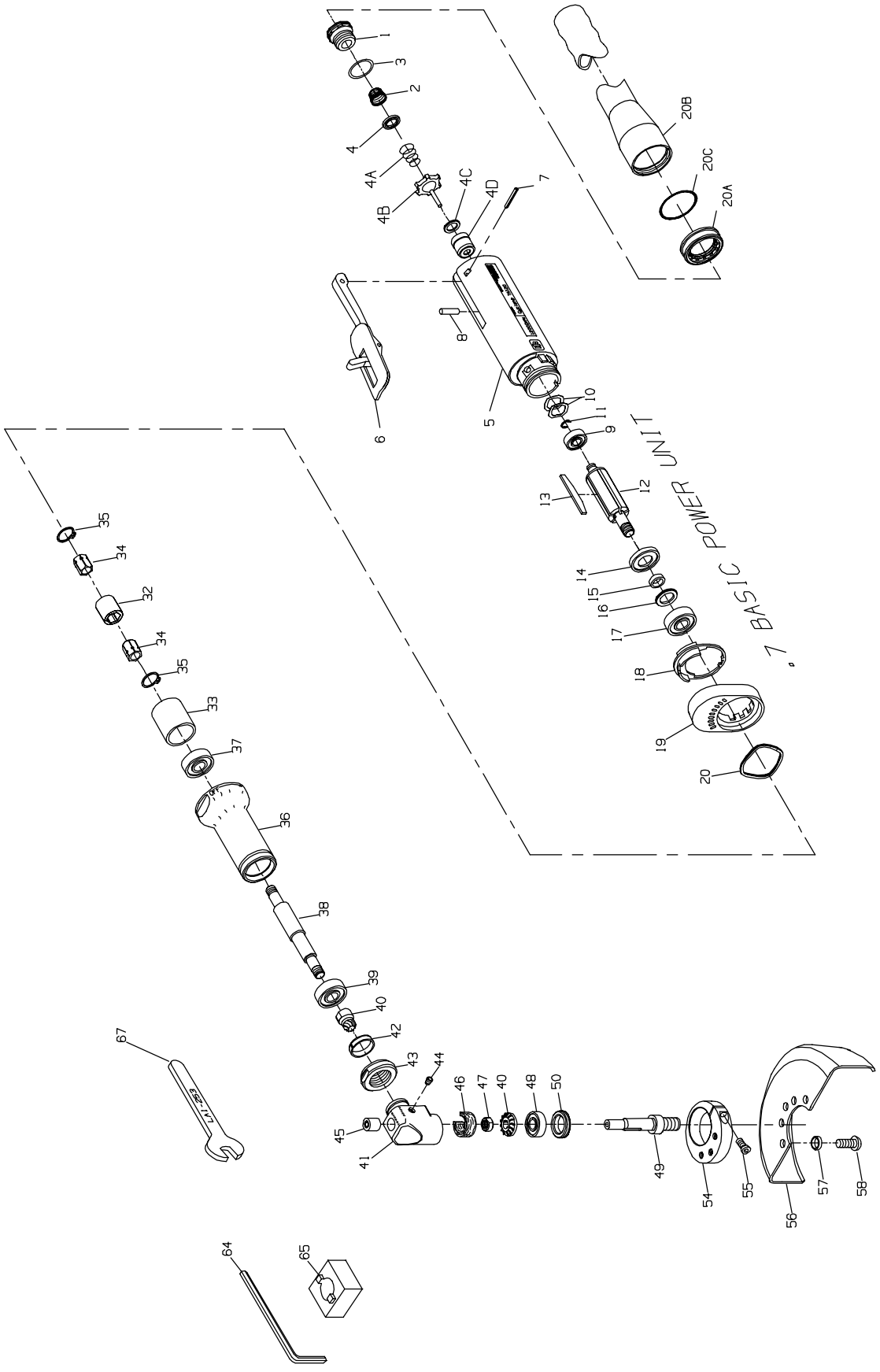


(Dwg. TPD1146-1)

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

When the life of the tool has expired, it is recommended that the tool be disassembled, degreased and parts be separated by material so that they can be recycled.



(Dwg. TPA1475-2)

		PART NUMBER FOR ORDERING
	1 Inlet Assembly	LG2-A465
•	2 Inlet Screen	R1602-61
•	3 Inlet Seal	R18LF-21
	4 Throttle Valve Spring Seat	LG3-592
	4A Throttle Valve Spring	7L-51
	4B Throttle Valve	LG2-302
	4C Throttle Valve Seat	LG2-303
	4D Valve Cartridge	LG2-300A
	5 Motor Housing	LG2-40
	6 Locking Throttle Lever Assembly	LG2-A400
	* Lever Lock	LG1-402
	* Lock Spring	LG1-405
	* Lock Pin	5UT-757
	7 Throttle Lever Pin	61H-120
	8 Throttle Valve Plunger	LG2-191
•	9 Rear Rotor Bearing	R120-127
•	10 Rear Rotor Bearing Spacer(2)	400-25-191
•	11 Rear Rotor Bearing Retainer	LG1-118
	12 Rotor	LG2-53-4
•	13 Vane Packet (set of 4 Vanes)	DG21-42-4
	14 Front End Plate	LG2-11
	15 Front End Plate Spacer	LG2-65
•	16 Front Seal Cup Assembly	61H-A32
•	17 Front Rotor Bearing	LG2-24
	18 Flow Ring (blue)	LG3-103-3
•	19 High Profile Flange	LG2-23
	20 Flange Clamp	LG2-29
	20A Exhaust Hose Adapter	LG2-184
	20B Exhaust Hose	3RL-284
	20C Exhaust Hose Retainer	6WT-203
	* Warning Label	LG2-99
	* Nameplate	VG-1047
•	32 Arbor Coupling	LE2-304

		PART NUMBER FOR ORDERING
	33 Clamp Sleeve	LE2-176
	34 Spindle Bearing Nut (2)	LE2-85
	35 Coupling Retaining Ring (2)	RX3-729
	36 Extension Housing Assembly	LA2-A20
•	37 Rear Spindle Bearing	LE2-24
	38 Spindle	LA2-4
	39 Front Spindle Bearing	LG1-24
	40 Bevel Pinion and Bevel Gear (sold only as a matched set)	LA1-A552-1.5A
+	41 Angle Housing Assembly	LA1-A550S
	42 Clamp Spacer	LA1-46
	43 Clamp Nut	LG1-27
	44 Grease Fitting	D0F9-879
•	45 Upper Arbor Bearing	AG210-693
•	46 Wick	LA1-561
	47 Bevel Gear Nut	AG210-578A
•	48 Lower Arbor Bearing	AG210-24
	49 Arbor	LA1-6-NN
	50 Arbor Bearing Cap	AG210-531
	54 Wheel Guard Adapter Assembly	LA1-A710
	55 Wheel Guard Adapter Screw	804-634
	56 Wheel Guard (4")	AG121-106-4
	57 Guard Lock Washer (3)	R2-320
	58 Guard Mounting Screw (3)	LA1-667
	64 Arbor Wrench (3/16" hex wrench)	AG220-340
	65 Arbor Bearing Cap Wrench	AG210-29
	67 Clamp Nut Wrench (1-3/16")	LA1-253
	* I-R No. 10 Oil (4 oz. bottle)	10Z4
	* I-R No. 63 Oil (4 oz. bottle)	63Z4
	* I-R No. 67 Grease (1 lb. can)	67-1LB
	* I-R No. 77 Grease (1 lb. can)	77-1LB

* Not illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service

\+ The LA1-A550S Angle Housing Assembly is furnished with two Wicks. Use Wick (LA1-561) **with** the notch.

⚠ WARNING

Always wear eye protection when operating or performing maintenance on this tool.

Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.

LUBRICATION

Whenever one of these Grinders is disassembled for overhaul or replacement of parts, lubricate the tool as follows:

1. Always wipe the Vanes (13) with a light film of oil before inserting them into the vane slots.
2. Inject 0.5 to 1.0 cc of Ingersoll-Rand No. 10 Oil into the air Inlet Assembly (1) after assembly.
3. Whenever a new Wick (46) is installed, soak the Wick in approximately 1-1/2 cc of Ingersoll-Rand No. 63 Oil. **Do not substitute any other oil.**
4. Whenever the motor is disassembled, remove the old grease and refill the cavity behind the Rear Rotor Bearing (9) with 3/4 cc of Ingersoll-Rand No. 68 Grease.

DISASSEMBLY

General Instructions

1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. When grasping a tool or part in a vise, always use leather-covered or copper-covered vise jaws to protect the surface of the part or tool and help prevent distortion. This is particularly true of threaded members and housings.
3. Do not remove any part which is a press fit in or on a subassembly unless the removal of that part is necessary for repairs or replacement.
4. Do not disassemble the tool unless you have a complete set of new gaskets and O-rings for replacement.
5. Do not press any needle bearing from a part unless you have a new needle bearing on hand for installation. Needle bearings are always damaged during the removal process.

Disassembly of the Angle Head

1 Using a 9/64" hex wrench, loosen the Wheel Guard Adapter Screw (55) and remove the Wheel Guard Adapter Assembly (54) from the Angle Housing Assembly (41).

2. Using the Arbor Bearing Cap Wrench (65), unscrew and remove the Arbor Bearing Cap (50). This is a **left-hand thread.** Rotate the Cap Wrench **clockwise** to remove the Cap.

NOTICE

In the following step, do not allow the Angle Head to rotate when separating it from the Motor. Components may fall from the Angle Head.

3 Using the Clamp Nut Wrench (67), loosen the Clamp Nut (43) and pull the Angle Housing Assembly (41) away from the Extension Housing (36). This is a **left-hand thread**. Rotate the Nut Wrench **clockwise** to loosen the Nut.

4. Grasp the Arbor (49) and pull the assembled Arbor out of the Angle Head. If the Wick (46) needs replacement, pull it out of the Angle Housing.
5. If the Upper Arbor Bearing (45) needs replacement, support the Angle Head on the table of an arbor press, bearing end down, and press the Bearing out of the Angle Head.
6. Grasp the Arbor in copper-covered or leather-covered vise jaws with the wheel end downward. Using an adjustable wrench, unscrew and remove the Bevel Gear Nut (47) and lift the Bevel Gear off the Arbor.
7. If the Lower Arbor Bearing (48) must be replaced, use a piece of tubing to support the Bearing on the table of an arbor press and press the Arbor from the Bearing.

Disassembly of Extension Assembly

1. Being careful not to distort the Housing, grasp the tool in copper-covered or leather-covered vise jaws with the Spindle (38) upward. Using a 1-1/2" wrench on the flats of the Extension Housing (36), unscrew and remove the assembled Housing. Remove the Arbor Coupling (32) and Clamp Sleeve (33).
2. Using snap ring pliers, remove the Coupling Retaining Ring (35) from the Spindle Bearing Nut (34) in the large end of the Extension Housing.
3. After removing the Retaining Ring, push on the Nut end of the Spindle until the assembled Spindle exits the angle head end of the Extension Housing. The Rear Spindle Bearing (37) will remain in the Housing and the Nut will pass through the Bearing.
4. If the Front Spindle Bearing (39) must be replaced, use a 1/2" wrench on the flats of the Bevel Pinion and the Spindle Bearing Nut to unscrew and remove either the Pinion or Nut. Using an adjustable wrench on the flats of the Spindle, remove whichever component remained threaded onto the Spindle. Press the Bearing from the Spindle.
5. If the Rear Spindle Bearing must be replaced, press the Bearing out the large end of the Extension Housing.

Disassembly of the Motor

1. Pull the Flange (19) and Flow Ring (18) off the front of the Motor Housing (5).
2. Grasp the Spindle Bearing Nut (34) and pull the assembled motor out of the Motor Housing. Remove the two Rear Rotor Bearing Spacers (10) from the bottom of the Housing.
3. Remove the Vanes (13) from the Rotor (12).
4. Remove the two Rear Rotor Bearing Spacers (10) from the bottom of the Motor Housing.
5. Grasp the Rotor in copper-covered or leather-covered vise jaws with the Bevel Pinion or Spindle Bearing Nut upward. Using a 1/2" wrench, unscrew and remove the Nut.
6. If the Front Rotor Bearing (17) must be replaced, support the Front End Plate (14) between two blocks on the table of an arbor press. Place the blocks as close to the body of the Rotor as possible and press the Rotor from the Bearing and End Plate. Remove the Front End Plate Spacer (15) and Front Seal Cup Assembly (16) from the hub of the Rotor.
7. If the Rear Rotor Bearing (9) must be replaced, use snap ring pliers to remove the Rear Rotor Bearing Retainer (11).
8. Using a bearing puller, pull the Rear Rotor Bearing off the hub of the Rotor.

Disassembly of the Inlet and Throttle

1. Using a 15/16" wrench or six point socket, unscrew and remove the Inlet Assembly (1).
2. Remove the Inlet Seal (3) and Inlet Screen (2) from the Inlet.
3. Remove the Throttle Valve Spring Seat (4), Throttle Valve Spring (4A) and Throttle Valve (4B) from the Motor Housing (5).
4. If the Throttle Valve Seat (4C) must be replaced, insert a hooked tool through the central opening of the Seat and, catching the underside of the Seat, pull it from the Housing.
5. If the Cartridge Case (4D) must be replaced, insert two hooked tools through the central opening of the Case approximately 180 degrees apart, and, catching the underside of the Case, pull it from the Housing.
6. Press the Throttle Lever Pin (7) from the Housing and remove the Throttle Lever (6). Remove the Throttle Valve Plunger (8).

ASSEMBLY

General Instructions

1. Always press on the **inner** ring of a ball-type bearing when installing the bearing on a shaft.
2. Always press on the **outer** ring of a ball-type bearing when pressing the bearing into a bearing recess.
3. Whenever grasping a tool or part in a vise, always use leather-covered or copper-covered vise jaws. Take extra care not to damage threads or distort housings.
4. Except for bearings, always clean every part and wipe every part with a thin film of oil before installation.
5. Apply a film of O-ring lubricant to every O-ring before installation.
6. Unless otherwise noted, always press on the stamped end of a needle bearing when installing a needle bearing into a recess.

Assembly of the Throttle and Inlet

1. Insert the Throttle Valve Plunger (8) into the Motor Housing (5).
2. Position the Throttle Lever (6) on the Motor Housing and using an arbor press, press the Throttle Lever Pin (7) into the Housing and Lever. The Lever will retain the Plunger in the Housing.
3. If the Cartridge Case (4D) was removed, lubricate the outside and the throttle stem end of the Case with O-ring lubricant. Using a wooden dowel, push the Case, open end trailing, into the Motor.
4. If the Throttle Valve Seat (4C) was removed, use a 5/8" wooden dowel with a flat end to push the Seat into the Motor Housing.
5. Push the small end of the Throttle Valve Spring (4A) onto the end of the Throttle Valve (4B) with the short stem until the Spring snaps into position around the hub and remains there. Install the dish end of the Throttle Valve Spring Seat (4) onto the large end of the Throttle Valve Spring.
6. Holding the Housing with the Lever downward, make sure the Plunger is out of the way and insert the assembled Throttle Valve, long stem end leading, into the housing recess.
7. Push the Inlet Screen (2), closed end leading, into the bushing of the Inlet Assembly (1). After moistening the Inlet Seal (3) with o-ring lubricant and being careful not to nick the Seal on the threads of the Inlet, install the Seal on the Inlet.
8. Thread the Inlet Assembly into the Housing and tighten it between 20 to 25 ft-lb (27.1 to 33.9 Nm) torque.

Assembly of the Motor

1. If the Rear Rotor Bearing (9) was removed, stand the Rotor (12) upright on the table of an arbor press with the threaded end downward. Place the threaded rotor hub into a hole drilled into a flat, smooth block so that the Rotor rests against the large rotor body. Press the Rear Rotor Bearing onto the hub of the Rotor.
2. Install the Rear Rotor Bearing Retainer (11) in the groove on the hub of the Rotor.

3. Install the Front End Plate (14), counterbored end trailing, onto the threaded hub of the Rotor. Using finger pressure, press the Front Seal Cup Assembly (16), felt end trailing, onto the end of the Front End Plate Spacer (15) that is opposite the large internal bevel. Continue pressing until the felt end is flush with the end of the Spacer. Saturate the felt with Ingersoll-Rand No. 50 Oil. Place the assembled Spacer, Seal Assembly trailing, onto the threaded hub of the Rotor. Make sure the Seal Assembly enters the recess in the Front End Plate.

NOTICE

Before performing the next step, be aware that the Front Rotor Bearing is a flush ground bearing and must be installed in a specific manner. The end of the Bearing with a black stain or hash marks must be away from the Spacer.

4. Stand the small hub of the Rotor on the table of an arbor press with the threaded end upward and press the Front Rotor Bearing (17) onto the hub of the Rotor.
5. Grasp the assembled Rotor in copper-covered or leather-covered vise jaws with the threaded rotor hub upward.
6. Thread the Spindle Bearing Nut (34) onto the Rotor and using a torque wrench, tighten the Pinion or Nut between 14 and 19 ft-lb (19.0 and 25.8 Nm) torque.
7. Inject approximately 0.7 cc of Ingersoll-Rand No. 68 Grease into the small recess at the bottom of the motor housing bore. Drop the two Rear Rotor Bearing Spacers (10) into the bottom of the motor housing bore.
8. Wipe each Vane (13) with a light film of oil and insert a Vane into each vane slot in the Rotor.
9. Grasp the Spindle Bearing Nut and insert the assembled Rotor into the Motor Housing (5).
10. Assemble the Flow Ring (18) with the Flange (19) before installing the Flange on the Housing. Mate the Flow Ring to the end of the Flange without perforations. Align the notched projection on the edge of the Flow Ring with the letter “F” on the Housing.
11. Carefully install the assembled Flange, Flow Ring leading, onto the front of the Motor Housing. Make certain the Ring properly engages the Housing.

Assembly of the Extension Housing

1. If the Rear Spindle Bearing (37) was replaced, proceed as follows:
   a. Stand the Extension Housing (36) on the table of an arbor press with the small end downward.
   b. Press the Bearing into the Housing until the trailing end of the Bearing is 1.408” to 1.418” (35.7 mm to 36.0 mm) below the face of the large end of the Extension Housing.
2. If the Front Spindle Bearing (39) was replaced, stand the Spindle (38) on the table of an arbor press, small threaded end upward. Being careful not to damage the threads on the large end of the Spindle, press the Bearing, stained or marked end trailing, onto the Spindle until it seats against the shoulder of the shaft.
3. Using an adjustable wrench on the flats of the Spindle and a 9/16” wrench on the Bevel Pinion (40), thread the Pinion onto the Spindle against the Bearing and tighten it between 14 and 19 ft-lb (19.0 and 25.8 Nm) torque.
4. Using an adjustable wrench on the Spindle and a 1/2” wrench on one of the Spindle Bearing Nuts (34), thread Nut without the Coupling Retaining Ring (35), counterbored end leading, onto the Spindle. Tighten the Nut between 14 and 19 ft-lb (19.0 and 25.8 Nm) torque.
5. Insert the assembled Spindle, Nut end leading, into the small end of the Extension Housing. Push the assembly into the Housing until the Front Spindle Bearing bottoms on the housing shoulder.
6. Using snap ring pliers, install the Coupling Retaining Ring on the Spindle Bearing Nut protruding into the large end of the Extension Housing.
7. Grasp the assembled motor in copper-covered or leather-covered vise jaws with the Spindle Bearing Nut (34) upward. Coat the inside of the Arbor Coupling (32) with approximately 1 cc of Ingersoll-Rand No. 68 Grease and install the Coupling over the Bearing Nut. Position the Clamp Sleeve (33) over the Coupling in the Motor Housing.
8. Insert the Spindle Bearing Nut in the assembled Extension Housing into the Arbor Coupling and thread the Extension Housing onto the Motor Housing. This is a **left-hand thread;** rotate the Extension Housing counterclockwise to tighten it. Tighten the Housing between 20 to 25 ft-lb (27.1 to 33.9 Nm) torque.

Assembly of the Angle Head

1. If the Upper Arbor Bearing (45) was removed and a new Bearing must be installed, proceed as follows:
   a. Support the machined face of the Angle Head (41) on the table of an arbor press with the upper arbor bearing bore upward.

NOTICE

When installing the Bearing in the next step, always press on the stamped or closed end of the Bearing.

b. Press a new Upper Arbor Bearing into the bore, flush with the top of the Angle Housing.

2. If the Lower Arbor Bearing (48) is being installed, it is necessary to note the identification marks on the Lower Arbor Bearing. One side of the Bearing has black stains or black hash marks across the inner and outer races. Using a sleeve that contacts the inner ring of the Lower Arbor Bearing, press the Bearing, **black stain or hash mark side leading,** onto the Arbor (49).

NOTICE

The Bevel Gear and Bevel Pinion in the next step are specially matched sets. Some sets are color coded for manufacturing purposes only. Only the Gear and Pinion set furnished as a replacement part or the same Gear and Pinion set removed from one tool is a matched set. A Bevel Gear from one tool and a Bevel Pinion from another tool with the same color code IS NOT A MATCHED SET. Replace these parts only as a matched set. Failure to do so will result in unsatisfactory tool performance and damage to the Bevel Gear and Bevel Pinion.

3. Slide the Bevel Gear (40), geared face trailing, onto the small threaded end of the Arbor, aligning the integral keys or spline of the Gear with the slotted keyways or spline in the Arbor.
4. Thoroughly clean the small threads on the Arbor above the Bevel Gear and the threads in the Bevel Gear Nut (47).
5. Apply a thin coat of Loctite 271 w/t Primer®* (M. I. Hernon Grade 427) to the threads of the Bevel Gear Nut and the Nut threads on the Arbor. Thread the Bevel Gear Nut onto the Arbor to retain the Bevel Gear and tighten the Nut to 8 to 9 ft-lb (10.8 to 12.2 Nm) torque.
6. Form the Wick (46) into a horseshoe shape and fully insert it into the U-shaped cavity in the Angle Head. Make certain the notch enters the Housing first. Saturate the Wick with approximately 1.5 cc of Ingersoll-Rand No. 63 Oil. **Do no substitute any other oil.**
7. Inject 3 cc of Ingersoll-Rand No. 67 or Ingersoll-Rand No. 77 Grease into the Upper Arbor Bearing and Wick cavity in the Angle Head. **Do not substitute any other grease.**
8. Carefully grasp the assembled motor in copper-covered or leather-covered vise jaws with the Throttle Lever **downward**.
9. Install the motor Clamp Nut (43), threaded end trailing, onto the motor end of the Angle Head. Spread the Clamp Spacer (42) and install it, beveled end trailing, onto the motor end of the Angle Head against the Clamp Nut.
10. Position the output end of the Angle Head upward and 180 degrees opposite to the Throttle Lever and thread the Clamp Nut onto the Extension Housing. Using the Clamp Nut Wrench (67), tighten the Nut to 20 to 25 ft-lb (27 to 34 Nm) torque. This is a **left-hand thread**, turn **counterclockwise** to tighten.
11. Thoroughly clean the internal threads of the Angle Head and the threads on the Arbor Bearing Cap (50).
12. Insert the assembled Arbor into the Angle Head, bevel gear end first, making sure the teeth on the Bevel Gear and Pinion mesh. Rotate the Arbor manually to determine they are rotating smoothly.
13. Carefully apply a uniform coat of Vibra-Tite VC3 No. 205® ** to both sets of threads and allow the compound to cure for 12 to 15 minutes.
14. Using the Arbor Bearing Cap Wrench (65), install the Arbor Bearing Cap and tighten to 12 to 15 ft-lb (16.2 to 20.3 Nm) torque. The Bearing Cap has a **left-hand thread**: turn **counterclockwise** to install.
15. Position the Wheel Guard (56) against the dished face of the Adapter Assembly and using a 1/8" hex wrench, install the three Guard Mounting Screws (58) and Lock Washers (57). Tighten the Screws to 2.5 to 3.0 ft-lb (3.4 to 4.1 Nm) torque.
16. Position the Wheel Guard Adapter Assembly (54), flat surface leading, on the hub at the spindle end of the Angle Head and using a 9/64" hex wrench, tighten the Wheel Guard Adapter Screw (55) to 3.5 to 4.0 ft-lb (4.7 to 5.4 Nm) torque.

* Product of Loctite Corporation.

** Product of N.D. Industries.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Low power or low free speed	Insufficient air pressure	Check air line pressure at the Inlet of the tool. It must be 90 psig (6.2 bar/620 kPa).
	Clogged muffler elements	Disassemble the tool and agitate bare Motor Housing and Flange in a clean, suitable, cleaning solution. If elements cannot be cleaned, replace the Motor Housing and/or the Flange.
	Plugged Inlet Screen	Clean the Inlet Screen in a clean, suitable, cleaning solution or replace the Screen.
	Worn or broken Vanes	Install a **complete** set of new Vanes.
	Loose Clamp Nut or Arbor Housing	Tighten the Nut or Housing between 20 and 25 ft-lb (27 and 34 Nm) torque.
	Worn or broken Motor Housing	Replace the Motor Housing.
	Internal air leakage in the Motor Housing indicated by high air consumption/low speed or air leaking out the front and rear exhaust simultaneously	Replace the Motor Housing.
	Grit buildup under the Throttle Lever restricting full Throttle Valve Plunger movement	Remove the Throttle Lever and clean the groove in the Motor Housing.
	Bent stem on Throttle Valve	Replace the Throttle Valve.
	Front Seal Cup Assembly dragging against the shield of the Front Rotor Bearing	Reposition the Front Seal Cup Assembly.
Excessive runout	Bent Arbor	Replace the Arbor.
	Worn or damaged Upper Arbor Bearing or Lower Arbor Bearing	Replace the worn or damaged Bearing.
Scoring of End Plate	Worn Front End Plate Spacer or Front End Plate	Install a new Front End Plate Spacer and Front End Plate.
	Worn Front Rotor Bearing	Install a new Front Rotor Bearing.
Leaky Throttle Valve	Dirt accumulation on Throttle Valve or Throttle Valve Seat	Disassemble, inspect and clean parts.
	Worn Throttle Valve or Throttle Valve Seat	Replace the Throttle Valve and/or Throttle Valve Seat.
	Excessive dirt build-up beneath the Throttle Lever	Clean out the slot area.
	Bent Throttle Valve Plunger	Replace the Plunger.
Front Rotor Bearing runs hot	Incorrect installation of the Front Seal Cup Assembly	Reposition the Front Seal Cup Assembly flush with the face of the Front End Plate Spacer.
	Front End Plate Spacer rubbing the bore of the Front End Plate	Replace the Front End Plate and Front End Plate Spacer combination.
	Incorrect Front Rotor Bearing installation orientation	If a black stain or black hashmarks are not visible on the face of the Bearing when it is assembled with the End Plate and Rotor, the Bearing is installed backwards. If possible, remove the Bearing and install it correctly or replace the Bearing.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Slow tool idle	Bent or leaky Throttle Valve	Replace the Throttle Valve.
Air leakage around Flow Ring	Damaged, mutilated or missing Flange Clamp	Replace the Flange Clamp.
	Damaged Flow Ring	Replace the Flow Ring.
Rough operation/vibration	Improper lubrication or dirt buildup	Disassemble the Tool and clean in a suitable cleaning solution. Assemble the Tool and inject 3 cc of the recommended oil into the Inlet and run the Grinder long enough to coat the internal parts with the oil.
	Worn or broken Rear Rotor Bearing or Front Rotor Bearing	Replace the worn or broken Bearings. Examine the Front End Plate, Front End Plate Spacer Front Seal Cup Assembly and Rear Rotor Bearing Spacers and replace any damaged parts. If the rear end plate is damaged, replace the Rotor.
	Worn or broken Upper Arbor Bearing or Lower Arbor Bearing	Replace the worn or broken Bearing.
	Worn or broken Bevel Gear or Bevel Pinion	Examine the Bevel Gear and Bevel Pinion. If either is worn or damaged, replace both the Gear and the Pinion because they are a matched set and must not be used separately.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.