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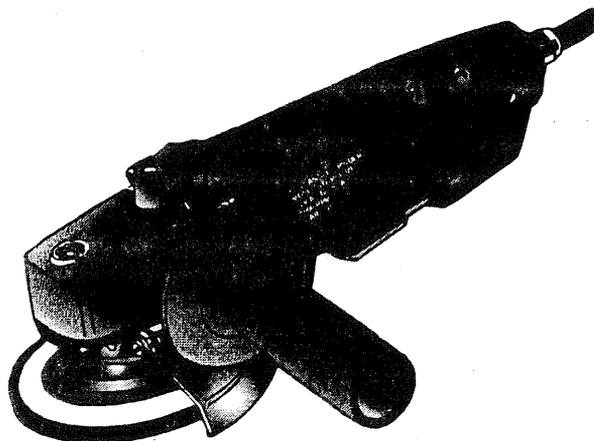
Electric Power Tools

INDUSTRIAL

4 1/2" ANGLE GRINDER

Model 31309

ASSEMBLY & OPERATING INSTRUCTIONS



3130901.cdr

Distributed Exclusively by



**HARBOR FREIGHT
TOOLS**



3491 Mission Oaks Blvd. / Camarillo, CA 93011

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SPECIFICATIONS

Item #	31309
Amps/Volts	5.5 Amps /120 VAC
Power	660 Watts
No load speed	10000 RPM
Weight	6-1/4 lbs.
Overall Dimensions	12" x 4" x 8"

SAVE THIS MANUAL

You will need this manual for the safety instructions , operating instructions, and parts list. Put it in a safe, dry place for future reference. **Keep your invoice with this manual. Write the invoice number on the inside front cover.**

**READ ALL INSTRUCTIONS
BEFORE ASSEMBLING OR
OPERATING THE GRINDER.**

SAFETY WARNINGS & CAUTIONS

WARNING: When using electric tools, machines or equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and personal injury.

READ ALL INSTRUCTIONS BEFORE USING THIS TOOL

1. **KEEP WORK AREA CLEAN.** Cluttered areas invite injuries.
2. **CONSIDER WORK AREA CONDITIONS.** Don't use machines or power tools in damp, wet, or poorly lit locations. Don't expose to rain. Keep work area well lit. Don't use tools in the presence of flammable gases or liquids.
3. **KEEP CHILDREN AND VISITORS AWAY.** All children and visitors should be kept away from the work area. Don't let them handle machines, tools or extension cords.
4. **STORE IDLE EQUIPMENT.** When not in use, tools should be locked up in a dry location to inhibit rust. If possible, store in an area out of reach of children.
5. **DON'T FORCE THE MACHINE OR TOOL.** It will do the job better and more safely at the rate for which it was intended.
6. **USE THE RIGHT TOOL.** Don't force a small tool or attachment to do the work of a larger industrial tool. Don't use a tool for a purpose for which it was not intended.
7. **DRESS PROPERLY.** Don't wear loose clothing or jewelry. They can be caught in moving parts. Protective, electrically non-conductive gloves and non-skid footwear are recommended when working. Wear protective hair covering to contain long hair, preventing it from getting caught in machinery. A shop coat or apron should be worn to protect clothing from sparks and debris.
8. **USE EYE AND EAR PROTECTION.** Use a full face mask if the work you're doing produces metal filings, dust or wood chips. Goggles are acceptable in other situations. Wear a clean dust mask if the work creates a lot of fine or coarse dust. When operating for extended periods of time, use approved ear protection. Safety goggles and ear protectors are available from Harbor Freight Tools.
9. **DON'T ABUSE THE POWER CORD.** Do not yank it to disconnect it from receptacle. Do not move bench-mounted or floor-standing machines with the power cord in the outlet. Keep cord away from heat, oil, and sharp edges.

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10. **SECURE WORK.** Use clamps or a vise to hold the work if possible. It's safer than using your hands and it frees both hands to operate the tool.
 11. **DON'T OVERREACH.** Keep proper footing and balance at all times. Do not reach over or across machines that are running.
 12. **MAINTAIN TOOLS WITH CARE.** Keep tools sharp and clean for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect tool cords periodically and if damaged, have them repaired by an authorized service facility. Keep handles dry, clean, and free from oil and grease.
 13. **DISCONNECT POWER.** Always disconnect tool from power source when not in use, or when changing accessories such as disks, handle, or sanding attachments.
 14. **OUTDOOR EXTENSION CORDS.** When the equipment is operated outdoors, use only extension cords intended for outside use. See chart under "Extension Cords" for the proper AWG rating depending upon length of the cord.
 15. **STAY ALERT.** Watch what you are doing, use common sense. Don't operate any tool when you are tired.
 16. **CHECK DAMAGED PARTS.** Before using any tool, any part that appears damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and other conditions that may affect its operation. Any part that is damaged should be properly repaired or replaced by an authorized service center unless otherwise indicated elsewhere in the instruction manual. Have defective switches replaced by an authorized service center. Don't use the tool if switch does not turn on and off properly.
 17. **GUARD AGAINST ELECTRIC SHOCK.** Prevent body contact with grounded surfaces: pipes, radiators, ranges, and refrigerator enclosures.
 18. **REPLACEMENT PARTS AND ACCESSORIES.** When servicing, use only identical replacement parts. Only use accessories intended for use with this tool. Approved accessories are available from Harbor Freight Tools.
 19. **DO NOT OPERATE TOOL IF UNDER THE INFLUENCE OF ALCOHOL OR DRUGS.** Read warning labels on prescriptions to determine if your judgment or reflexes are impaired while taking drugs. If there is any doubt, do not operate machine.
 20. **NEVER LEAVE TOOL RUNNING UNATTENDED.** Always turn off power. Do not leave tool until it comes to a complete stop.

SAFETY RULES FOR GRINDERS:

1. Always wear safety goggles or other eye protection when using this tool.
 2. When grinding, always keep guard in place.
 3. Only use grinding wheels and other accessories rated at 10,000 RPM or greater.
 4. Before using, inspect recommended accessory for cracks or flaws. If such a crack or flaw is evident, discard the wheel. The wheel should also be inspected whenever the tool has been dropped.
- NOTE: What appear to be cracks near the wheel hub (both sides) are slits resulting from the manufacturing process.
5. When starting the tool (with a new or replacement wheel installed), hold the tool in a well protected area and let it run for 30 seconds to ensure the integrity of the grinding wheel. NEVER start the tool with persons or the operator in direct line of the wheel.
 6. During operation, treat the tool with care; no bouncing or rough treatment. If the tool inadvertently bounces or hits an object hard, stop the tool at once and inspect the wheel.
 7. Be aware of the position of the cord to avoid coming in contact with the grinding wheel.
 8. Always use guards with depressed center or flaring cut grinding wheels.
 9. Clean the tool periodically according to the procedure given under the **MAINTENANCE** section.

VOLTAGE WARNING

Before connecting the tool to a power source (receptacle, outlet, etc.) be sure the voltage supplied is about the same as that specified on the nameplate of the tool. If one says 240V and the other says 110V then there will be no complications. Never try to plug a 120V tool into a 220V outlet, or the other way around. The plug and outlet have completely different shapes. This is because a power source with a voltage greater than that specified on the tool can result in a **SERIOUS INJURY** to the user— as well as damage to the tool. If in doubt,

DO NOT PLUG IN THE TOOL. Using a power source with voltage (420V) less than the nameplate rating (220V) is harmful to the motor.

EXTENSION CORDS

You may use either a two- or three-prong extension cord. Only use rounded jacket extension cords, preferably listed by the Underwriters Laboratories (UL). Make sure the cord is rated for outdoor use if you plan on using the tool outside; if you plan on indoor use, you may also use an outdoor rated cord. Extension cords rated for outdoor use have the letters "WA" on the cord jacket.

The extension cord must have a minimum wire size depending on the amperage of the tool and the length of the extension cord. This size is signified by its AWG (American Wire Gauge) rating; the smaller the gauge, the greater the cable's capacity. If you are using two or more cords, the total length of the combined cords must be used to determine the minimum AWG rating. Each of the cords used must meet this rating.

The chart below is used to determine the rating required according to the length of the cord(s). The amps of your tool are found either in this manual, or on the nameplate of the tool.

AMP RATING	TOTAL EXTENSION CORD(S) LENGTH IN FEET							
	25	50	75	100	125	150	175	200
0-10.0	18	18	16	16	14	14	12	12
10.1-13.0	16	16	14	14	14	12	12	12
13.1-15	14	14	12	12	12	12	12	—

Always inspect extension cords for any damage. If there are any loose, frayed or exposed wires, damaged insulation, or defective connections, replace the cord. Harbor Freight Tools can supply UL listed and outdoor rated cords in multiple AWG ratings if needed.

Unpacking

This Angle Grinder comes fully assembled. When unpacking the Angle Grinder, check to make sure the following parts are included. If any parts are missing or broken, please call Harbor Freight Tools at the number on the cover of this manual. Refer to parts diagram at end of manual. Sort all hardware by like kinds before assembling.

Item #	Description	Qty
1	Grinder Body	1
2	Side Handle	1
3	Wrench	1
4	Grinding Wheel	1
5	Spare Brushes	1

Warning:

There are certain applications for which this tool was designed. Harbor Freight Tools strongly recommends that this tool not be modified and/or used for any application other than which it was designed.

All accessories must be rated for at least the RPM speed recommended on the tool's warning label. Wheels and other accessories running over rated speed can fly apart and cause injury.

For safest operation, it is recommended that only these accessories be used with this product:

Abrasive Cut-Off Discs and Wheels

Flap Wheels

Wire Brushes

Wire Wheel Brushes

Always use an approved and proper guard when using the above mentioned accessories. Each accessory must have the correct arbor size and must fit properly on the shoulder bushing. Make sure accessories are tightened down securely.

CAUTION: NEVER INSTALL A CARBIDE TIPPED OR STEEL CIRCULAR SAW BLADE FOR USE ON THIS ANGLE GRINDER. NEVER INSTALL A WOOD CARVING BLADE, CARVING DISC WITH SAW CHAIN CUTTERS, OR A CUTTING CARVING DISC ON THIS ANGLE GRINDER.

ASSEMBLY:

Handle.

The grinder comes with a HANDLE (#2) which can be screwed into either side or the top (refer to Figure 1.)

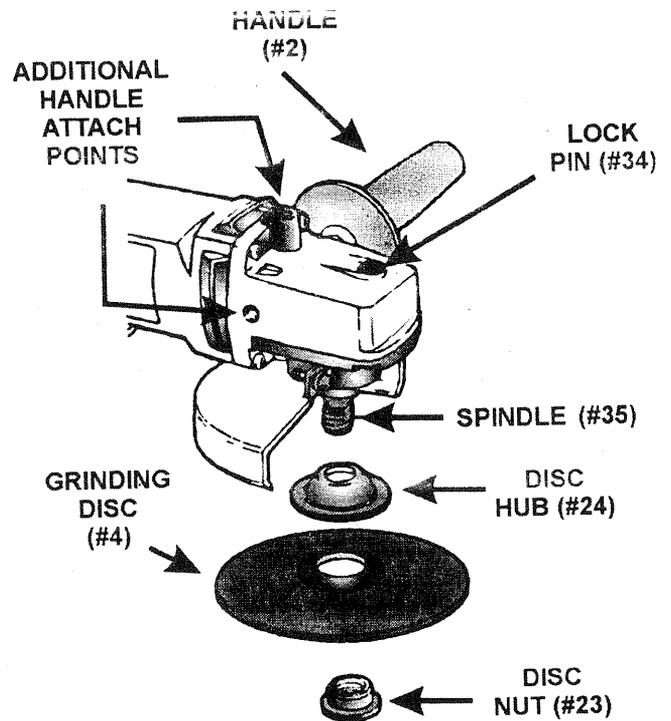
Removing Disks.

WARNING: Always disconnect tool from power source before adding or removing accessories. Use a cloth or glove to protect hands from abrasion. Disks are changed according to the following steps.

- Step 1: Depress the LOCK PIN (#34) and turn the disk counter clockwise until the LOCK PIN engages.
- Step 2: Using the WRENCH (#3) (refer to parts diagram), loosen the DISC (#23) by turning it counter clockwise.
- Step 3: Unscrew the DISC NUT and remove, then remove the GRINDER DISC (#4) from the SPINDLE (#35).

Installing Disks:

- Step 1: Place the new GRINDER DISC on the spindle against the DISC NUT HUB (#24).
- Step 2: Screw the DISC NUT clockwise back into place by hand, then tighten with the WRENCH.



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Figure 1 - Handle and Disk Assembly

OPERATION:

Starting the Grinder:

WARNING: Ensure the GRINDER is not locked ON before plugging it in. Squeeze and release the PADDLE SWITCH (#25) once before plugging it into the power source (refer to Figure 2).

To start the grinder, depress the PADDLE SWITCH. To turn the grinder off, release the PADDLE SWITCH. To lock the GRINDER in the ON position, engage the POWER LOCK (#28) located at the back of the GRINDER. To release the POWER LOCK, squeeze and release the PADDLE SWITCH again.

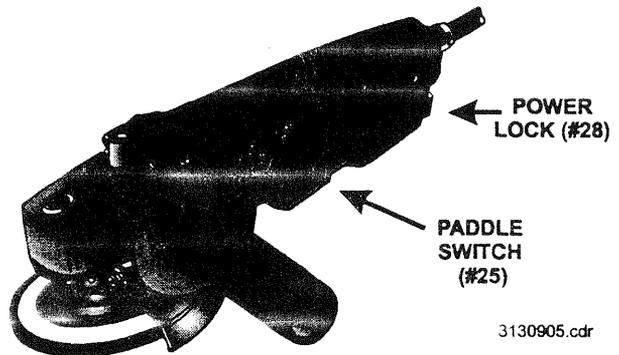


Figure 2 - Starting and Stopping the Grinder

Using the Grinder:

When using the abrasive disc, hold the grinder at an angle of 10 to 15° relative to the work surface. (Refer to Figure 3.) When only the outer edge of the disc is used, a rough cut surface will result. If the disc is pressed flat against the work, the grinding action will be irregular or bumpy and the tool will be difficult to control.

The HANDLE MUST BE USED AT ALL TIMES to maintain complete control of the tool. Place it on either side or the top where it will afford the best leverage and work visibility.

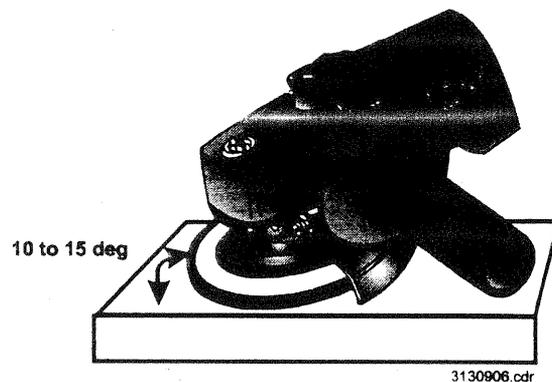


Figure 3 - Proper Work Angle

NOTE: Motor may heat up with prolonged medium to heavy use. To avoid motor burnout, do not operate beyond a 15 to 20 minute duty cycle when using heavy force.

MAINTENANCE:

WARNING: DO NOT DISASSEMBLE.
This tool should be serviced by a qualified technician only. Incorrect re-assembly can result in electric shock, fire, or further damage to the tool.

Always keep the grinder clean.

Dust and grit containing particles from metal grinding often accumulate on interior surfaces and could create an electrical shock hazard if not frequently cleaned out. On a regular basis, blow dust and grit out of the motor housing using compressed air. Never blow compressed air at greater than 14 PSI. Always wear goggles and dust mask when using compressed air.

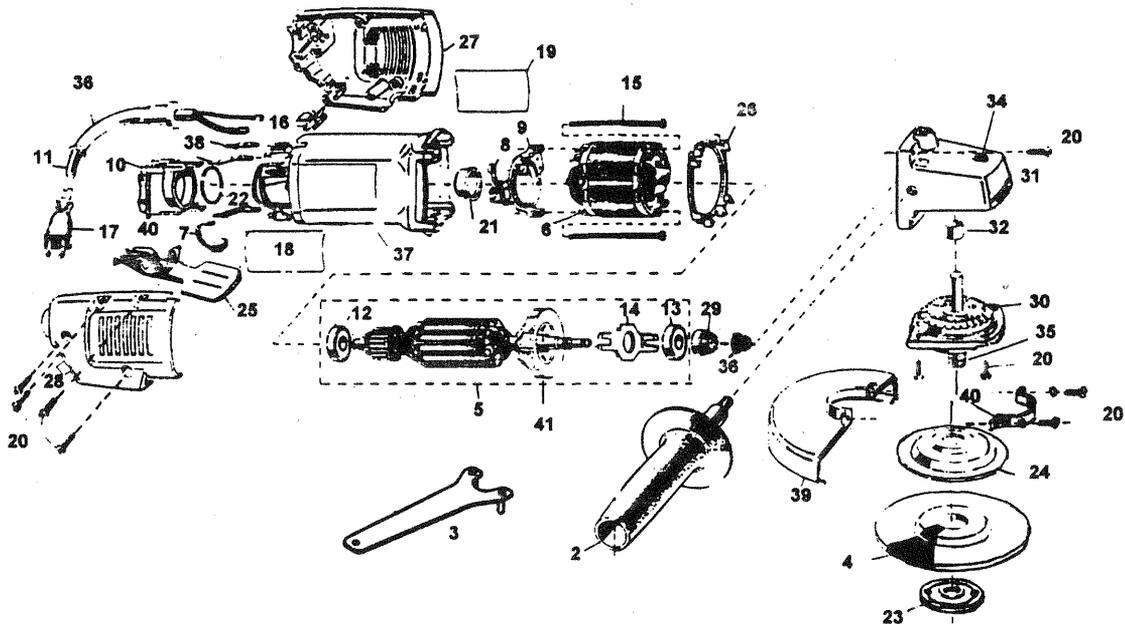
CAUTION: Never use solvents or other harsh chemicals for cleaning the non-metallic parts of the tool. Use a clean, dry rag only.

Lubrication.

Tools are properly lubricated at the factory and are ready for use. Tools should be re-lubricated regularly every sixty days to six months, depending on use. NOTE: Tools used constantly on production or heavy-duty jobs and tools exposed to heat may require more frequent lubrication.) Lubrication should only be attempted by qualified technicians.

Brush Replacement.

This tool is equipped with the Harbor Freight brush checkpoint system. When brushes become worn, the tool will automatically stop and prevent damage to the motor. Brushes should be replaced only by a qualified technician.



PARTS LIST:

Item #	Description	Qty
1	GRINDER BODY	1
2	HANDLE	1
3	SPANNER WRENCH	1
4	GRINDING WHEEL	2
5	ARMATURE	1
6	STATOR	1
7	BRUSH	1
8	BRUSH SPRING	1
9	BRUSH ASSEMBLY	1
10	SWITCH	1
11	CORD	1
12	BALL BEARING	1
13	BALL BEARING	1
14	BEARING RETAINER	1
15	TIGHTENING SCREW	2
16	TT1 SYSTEM TERMINAL	1
17	PLUG	1
18	LABEL	2
19	NAME PLATE	5
20	MACHINE SCREW	10

Item #	Description	Qty
21	BEARING SLEEVE	1
22	O-RING	1
23	FLANGE NUT	1
24	DISC HUB	1
25	PADDLE SWITCH	1
26	FAN SHROUD	1
27	END CAP	1
28	POWER LOCK	1
29	PINION	1
30	GEAR CASE COVER ASSY	1
31	FRONT CAP	2
32	SLIDE BEARING	1
33	CORD PROTECTOR	1
34	LOCK PIN	1
35	SPINDLE	1
36	HEXAGON RING	1
37	CASE	1
38	CONTACT STRIPS	1
39	GUARD	1
40	LEFT GUARD CLAMP	1
41	FAN	1