

Operating Instructions

Millhog Series - “Ground” Millhog

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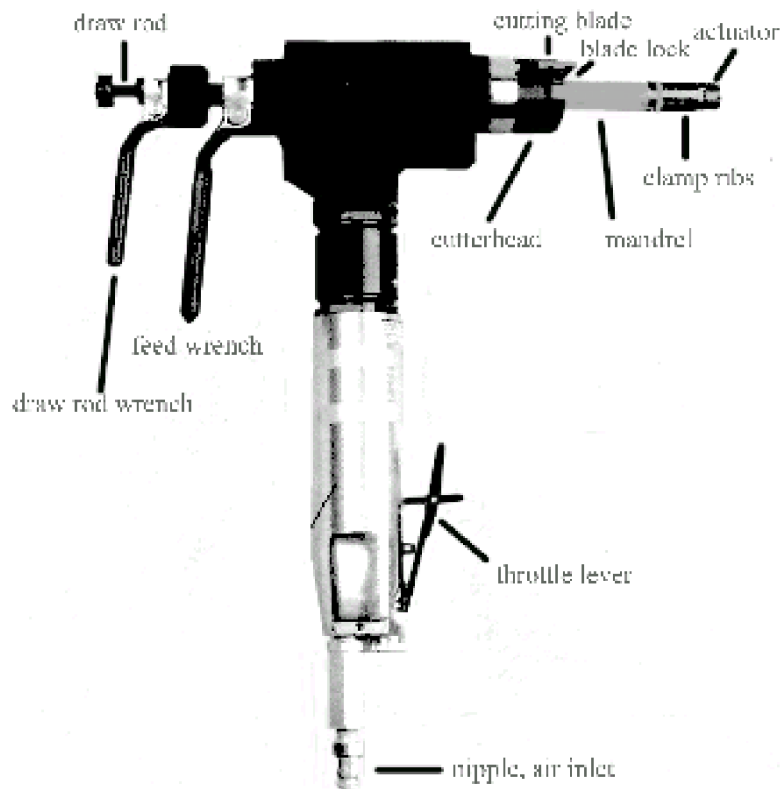
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Agent:

Operating Instructions

Millhog Series - "Ground" Millhog

1. Instruction for putting into use
 - a. Unpacking
 1. Use caution when handling the tool, cutting blades are sharp. Typically they are protected, however, exposed blades can cause injury.
 2. Clean any excess oil, grease or rust preventive from the surface of the tool.
 - b. Air supply
 1. Recommended air pressure, 90 psi (6.2 bar)
 2. Recommended air volume, 25 cfm (708 lt/min.)
 3. Clean, moisture free air is essential for trouble free operation.
 4. Oil laden operating air should be used. Use a light weight air tool motor oil (s.a.e.10).
 5. A hose whip with filter and lubricator is provided with each tool. Be sure air filter is clean and lubricator is full before use. For lubricator adjustment instructions see 4a.
 - c. Illustrated description of function



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1. Instruction for putting into use, continued
 - d. Limitation on ambient conditions
 1. In damp, moist or humid air, extra precaution must be taken in order to provide the tool with moisture free, oil laden air.
 2. In temperatures below 32 degrees Fahrenheit (0 Celsius) a lubricant with antifreeze, such as Marvel Air-Tool Oil , must be used.
 - e. List of contents
 1. Kit contains:
 - Motor gear drive assembly
 - Draw rod assembly
 - Mandrel, .625"
 - Hose, 1/2" w/ filter
 - Carrying case
 - Allen wrench
 - Operating instructions
 - One or more clamp rib sets
 - One or more cutterheads
2. Safety precautions
 - a. Precautions and use of personal protective equipment, eye protection.
 1. Do not connect air until tool is securely fastened to the inside diameter of a pipe or tube.
 2. Use caution when handling the tool, cutting blades are sharp. Typically they are protected, however, exposed blades can cause injury.
 3. Personal protective equipment should include, but not be limited to:
 - Safety glasses
 - Work gloves
 - Work boot, or shoes
 - Long sleeve shirts
 - Long pantsEar protection should be used when operator is exposed to long periods of use.
 - b. Special safety precautions, pinch points
 1. Always disconnect air supply before installing or changing cutting blades, securing to pipe or tube, adjusting, moving, or breaking machine down.
 2. Do not modify or defeat safety devices
 - a. Never tie down throttle lever
 3. Cutting blades are sharp and can cause serious injury, use caution when handling tool when blades are installed

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2. Safety precautions continued
 - b. Special safety precautions, pinch points, cont.
 4. Chips can be hot and sharp. Be careful when clearing from tool.
 5. Moving and stationary parts can pinch or cause serious injury. Pay extra attention to rotating cutting blades as they can not be adequately guarded.
 6. During use, machinery may separate, lurch or fall.
 - c. Explanation of symbols



Caution (refer to accompanying documents).



Safety glasses must be worn.

- d. Disclaimer
 1. If the equipment is used in a manner not specified by ESCO Tool, the protection provided by the equipment may be impaired.
- e. Operating ergonomics
 1. Tool must be mounted at a reasonable working height.
 2. Tool may be used in any orientation.
 3. Operator must be in a position not to be injured as the machinery may separate, lurch or fall. Operator must have both feet on a stable platform. Reaching or leaning is not acceptable operating ergonomics.

3. Operating instructions
 - a. Identification of operating controls and their use
 1. Feed wrench
 - a. Used to advance and retract the cutting blade from the work.
 2. Draw rod wrench
 - a. Actuates the clamping mechanism.
 3. Cutterhead
 - a. Rotates and holds the cutting blades.
 - b. Three sizes available.
 4. Throttle lever
 - a. Locking throttle lever requires deliberate action by the operator to activate the tool.
 - b. Actuating lever starts tool.
 - c. Release of lever stops tool.

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Operating Instructions

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3. Operating instructions continued
 - a. Identification of operating controls and their use: continued
 5. Nipple, air inlet
 - a. Accepts valved quick connect coupler for connecting air supply. Air supply must be disconnected before installing or changing cutting blades, securing to pipe or tube, adjusting, moving, or breaking machine down.
 6. Cutting blade
 - a. Consumable item, available in many sizes and configurations.
 - b. Purpose: to machine end preparations on tube or pipe.
 7. Blade lock
 - a. Hold cutting blade to cutterhead.
 8. Clamp ribs
 - a. Secures tool to tube or pipe inside diameter
 - b. Available in many sizes, see accompanying clamp rib chart.
 9. Actuator
 - a. Connects the clamp ribs to the draw rod.
 10. Mandrel
 - a. Provides torque acceptance for entire tool.
 - b. Allows axial movement of tool.
 - c. Provides point of rotation for cutterhead.
 - b. Selection of proper tooling
 1. Clamp rib selection
 - a. Measure inside diameter of tube or pipe. Or using the outside diameter and minimum wall thickness, calculate the inside diameter.
 - b. Using the inside diameter and the accompanying clamp rib chart select the proper clamp rib set.
 - c. Please note G-4 - G-13 uses clamp rib springs while G1, G2, G3 uses bands
 2. Cutterhead selection
 - a. Measure the outside diameter of the tube or pipe.
 - b. Select a cutterhead that either matches the outside diameter or is at least one size larger than the outside diameter.
 - c. Sizes are: 1-1/2", 2", 2-1/4"
 - d. Larger cutterheads may be used, subject to mechanical restrictions.
 3. Cutting blade selection
 - a. Measure the wall thickness of the tube or pipe.
 - b. Select a blade that is wider than the wall thickness.
 - c. Standard sizes are: 3/8", 5/8". Consult factory for other widths.

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3. Operating instructions continued
 - b. Selection of proper tooling
 3. Cutting blade selection, cont.
 - d. Cutting blade configuration should be matched to your welding specification.
 - e. Consult factory for special applications such as: counter boring, seal weld removal , “J” preps, etc.
 - c. Installation of proper tooling
 1. Clamp rib installation.
 - a. Remove stop collar (G-65), using draw rod wrench (G-64) feed the draw rod assembly from mandrel (G-20).
 - b. Slide clamp ribs over the draw rod (G-18) with the T end of the clamp rib towards the actuator.
 - c. Insert the clamp rib into the slots on the actuator.
 - d. Inspect springs or bands, replace if stretched or damaged.
 - e. G1, G2, G3 clamp ribs use a spring steel band. G4 clamp rib uses (1) spring. G5-G13 use (2) springs.
 - f. Reassemble, insert draw rod assembly into mandrel and install the draw rod wrench and stop collar.
 2. Cutterhead removal and installation
 - a. Remove stop collar (G-65), using draw rod wrench (G-64) feed the draw rod assembly from mandrel (G-20).
 - b. Remove (2) cutterhead mounting screws (G-19).
 - c. Using a soft hammer, tap cutterhead to remove from bearing (G-26).
 - d. Select the cutterhead you want to install and align cutterhead mounting screw holes up with the drive shaft (G-27).
 - e. Using the cutterhead mounting screws, evenly tighten. Be sure that the cutterhead seats evenly on the bearing.
 - f. Insert draw rod assembly into mandrel using the draw rod wrench. Install the stop collar.
 3. Cutting blade removal and installation
 - a. Loosen blade lock screw(s) (G-22), do not remove. If more than one blade lock screw has to loosened they should be loosened evenly.
 - b. Cutting blade must be slid to the outside of the cutterhead for removal.
 - c. Insert new cutting blade from the outside of the cutterhead and align so that the blade fully covers the tube or pipe wall.
 - d. Be sure to tighten *all* blade lock screws

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3. Operating instructions, continued
 - d. Mounting the tool to the work
 1. Using the feed wrench extend the mandrel all the way forward (this moves clamp ribs away from cutterhead.
 2. Retract the the mandrel two turns of the feed wrench.
 3. Insert the clamp rib portion of the tool into the end of tube or pipe.
 4. While positioning the cutting blade away, at least 1/4" from the work, tighten the draw rod wrench.
 5. Be sure cutterhead can rotate freely, without coming into contact with the tube or pipe, when first starting tool.
 - e. Air connection
 1. Use the hose supplied with the tool.
 2. This hose has a valved quick connect coupler which will hold back all air that is in the supply hose.
 - a. This feature allows the air supply to be safely removed from the tool at any time.
 3. Connect the air supply.
 - f. Operation of tool
 1. Engage the throttle lever, this will activate the tool.
 2. Using the feed wrench advance the cutting blade towards the work.
 3. Use a steady constant feed creating a continuous chip.
 - a. Using a constant feed allows the heat generated by the cutting action to be removed by the chip. Heat build up is a primary failure mode for cutting tools.
 - b. Engaging a rotating cutting blade with the work surface without feed (rubbing), creates excessive heat build up.
 4. When the desired end prep is accomplished, quickly reverse the feed wrench by reversing the directional pawl, and retract the cutting blade from the work.
 5. Release the throttle lever, this will stop the tool.
 6. Disconnect the air supply.
 7. Release the clamp wrench and remove the tool from the work.
 - g. Tool limits
 1. Size limits
 - a. Minimum inside diameter is 5/8" with standard mandrel.
 1. Minimum inside diameter is 1/2" with optional mandrel.
 - b. Maximum outside diameter is 2-1/4".
 - c. Maximum wall thickness, 5/8" with standard tooling.
 - d. Extremely thin walls may require special tooling to prevent deformation of diameter.

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3. Operating instructions continued
 - g. Tool limits
 2. Material limits
 - a. Difficult materials may require the following to maximize blade life.
 1. Lubrication such cutting oils, soluble oils, soapy water, plain water, etc.
 2. Slow the speed of air motor, using a valve on the air supply.
 3. Multiple cutting blades to balance the tool.
 4. Vary feed rate, often times difficult materials respond to a heavy feed.
4. Maintenance and servicing
 - a. Regular cleaning and lubrication
 1. Hose whip, filter and lubricator
 - a. Inspect filter element by removing nut from end of filter assembly.
 - b. If the filter is dirty or plugged replace it using filter repair kit
 - c. Remove filler plug from lubricator and be sure the adjusting screw is set half way between open and closed.
 - c. Fill lubricator, use a light weight air tool motor oil (s.a.e. 10).
 2. Gear housing grease
 - a. There is no grease fitting on rental tools. This is because of the tendency to over grease. Excess grease can back up into the air motor and cause failure.
 - b. A single pump from a grease gun after every two hundred hours of use is sufficient for all tools equipped with a grease fitting..
 - c. Use Lubriko, M-24 (NL61), or equal.
 3. Lubrication for storage
 - a. Before putting the tool away, fill air inlet with a liberal amount of air tool oil and actuate motor momentarily. This will distribute oil to internal motor parts, preventing rust build up.
 - b. Wipe tool down using soft cloth removing all dirt, grease, oil and chips.
 - c. Lightly coat tool with rust preventive.
 - b. User service
 1. A qualified air tool technician can provide all service for this machine.
 - a. Factory service or assistance is always available, contact us at the numbers below.
 - b. Complete drawings and parts lists are provided in section six.
 1. No special tools are required to perform complete service.

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4. Maintenance and servicing, continued
 - c. Servicing by manufacturer or agent
 1. Factory service, return the tool to the Factory address listed below.
 2. Agent service, If applicable return tool to the Agent listed below.
 - a. If unsure of Agent contact the factory.

5. Clamp rib and pad selector chart

Clamp Rib Selector Chart

I.D. Range Inches	I.D. Range Millimeters	I.D. Clamp Rib Set	Vandri Size
.500 – .656	12.7 – 16.6	G-01	1/2" (12.7 mm)
.625 – .780	15.9 – 19.8	G-02	5/8" (15.9 mm)
.750 – .905	19.1 – 23.0	G-03	5/8" (15.9 mm)
.875 – 1.030	22.3 – 26.1	G-04	5/8" (15.9 mm)
1.000 – 1.155	25.4 – 29.3	G-05	5/8" (15.9 mm)
1.125 – 1.280	28.6 – 32.5	G-06	5/8" (15.9 mm)
1.250 – 1.405	31.8 – 35.6	G-07	5/8" (15.9 mm)
1.375 – 1.530	35.0 – 39.8	G-08	5/8" (15.9 mm)
1.500 – 1.655	38.1 – 42.0	G-09	5/8" (15.9 mm)
1.625 – 1.780	41.3 – 45.2	G-10	5/8" (15.9 mm)
1.750 – 1.905	44.5 – 48.3	G-11	5/8" (15.9 mm)
1.875 – 2.030	47.7 – 51.5	G-12	5/8" (15.9 mm)
2.000 – 2.155	51.0 – 54.7	G-13	5/8" (15.9 mm)

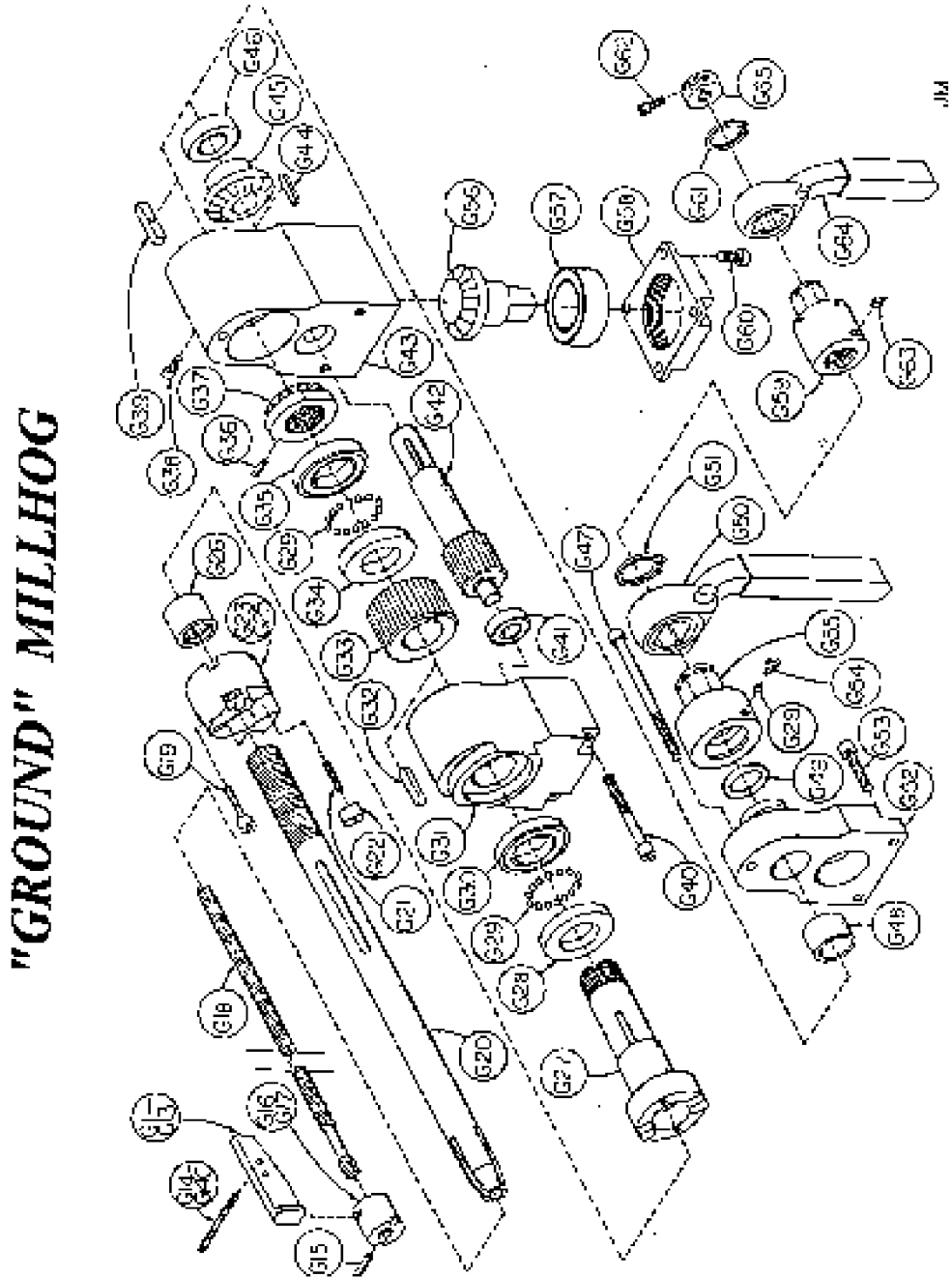
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- 6. Parts List
 - a. Gear assembly



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MILLHOG GEAR HEAD ASSEMBLY

G-01	CLAMP RIB SET (.500 - .655)	G-33	DRIVEN GEAR
G-02	CLAMP RIB SET (.625 - .780)	G-34	BEARING RACE
G-03	CLAMP RIB SET (.750 - .905)	G-35	BEARING RACE
G-04	CLAMP RIB SET (.875 - 1.030)	G-36	ROLL PIN
G-05	CLAMP RIB SET (1.000 - 1.155)	G-37	RETAINER NUT
G-06	CLAMP RIB SET (1.125 - 1.280)	G-38	KEY SCREW
G-07	CLAMP RIB SET (1.250 - 1.405)	G-39	TORQUE KEY
G-08	CLAMP RIB SET (1.375 - 1.530)	G-40	HOUSING SCREW
G-09	CLAMP RIB SET (1.500 - 1.655)	G-41	BEARING
G-10	CLAMP RIB SET (1.625 - 1.780)	G-42	DRIVE GEAR
G-11	CLAMP RIB SET (1.750 - 1.905)	G-43	CENTER HOUSING
G-12	CLAMP RIB SET (1.875 - 2.030)	G-44	KEY
G-13	CLAMP RIB SET (2.000 - 2.155)	G-45	DRIVEN BEVEL GEAR
G-14	SPRING FOR G4-G13 RIBS	G-46	BEARING
G-14C	BAND FOR G3 CLAMP RIBS	G-47	HOUSING SCREW
G-14D	BAND FOR G1, G2 CLAMP RIBS	G-48	BUSHING
G-15	ACTUATOR ROLL PIN	G-49	"O" RING
G-16	ACTUATOR FOR.625 MANDREL	G-50	FEED WRENCH
G-17	ACTUATOR FOR.750 MANDREL	G-51	SNAP RING
G-18	DRAW ROD (FOR 1/2")	G-52	FEED ADAPTER HOUSING
G-19	CUTTERHEAD SCREW	G-53	HOUSING SCREW
G-20	MANDREL, 5/8"	G-54	FEED KNOB BALL SCREW
G-21	BLADE LOCK SCREW	G-55	FEED KNOB
G-22	BLADE LOCK 1-1/2", 2-1/4"	G-56	DRIVE BEVEL GEAR
G-23	1-1/2" CUTTERHEAD	G-57	BEARING
G-24	2" CUTTERHEAD	G-58	MOTOR ADAPTER
G-25	2-1/4" CUTTERHEAD	G-59	CLAMP RELEASE SYSTEM
G-26	CUTTERHEAD BEARING	G-60	MOTOR ADAPTER SCREW
G-27	DRIVE SHAFT	G-61	SNAP RING
G-28	BEARING RACE	G-62	SCREW
G-29	BALL BEARING (15 REQ'D)	G-63	SET SCREW
G-30	BEARING RACE	G-64	CLAMP RELEASE WRENCH
G-31	DRIVE SHAFT HOUSING	G-65	DRAW ROD STOP COLLAR
G-32	KEY	AW-01	ALLEN WRENCH SET (NOT SHOWN)

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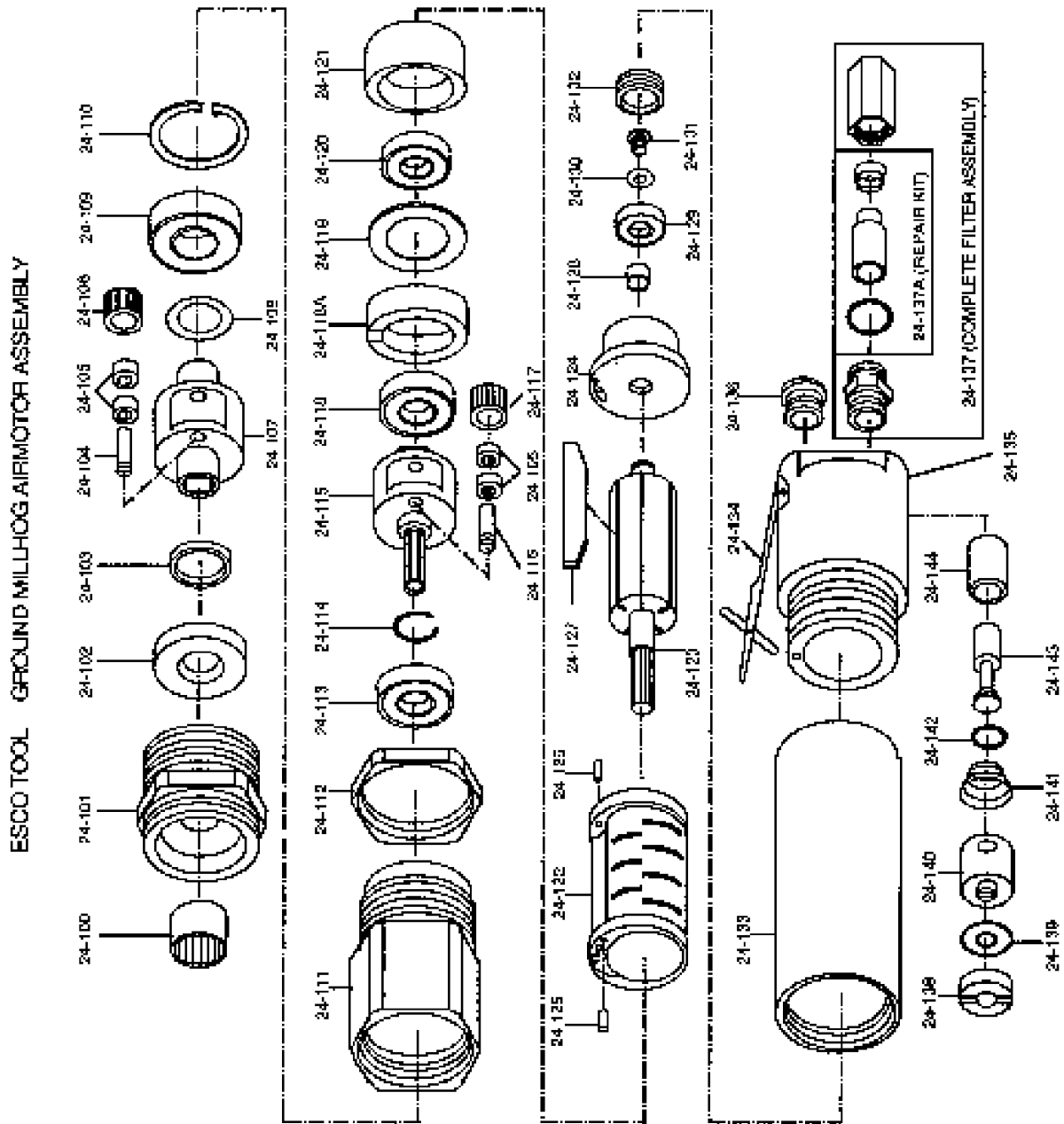
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6. Parts List, continued
 b. air motor



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AIR MOTOR PARTS LIST

24-100	BEARING	24-123	ROTOR
24-101	GEAR HOUSING	24-124	BOTTOM PLATE
24-102	NYLON WASHER	24-125	PIN
24-103	SPACER	24-126	PIN
24-104	PIN	24-127	ROTOR BLADES (5/SET)
24-105	BEARING	24-128	BUSHING
24-106	TOP GEAR	24-129	BEARING
24-107	TOP GEAR SPIDER	24-130	WASHER
24-108	WASHER	24-131	SCREW
24-109	BEARING	24-132	RETAINING NUT
24-110	SNAP RING	24-133	MOTOR HOUSING
24-111	GEAR HOUSING	24-134	THROTTLE LEVER
24-112	HOUSING END NUT	24-135	THROTTLE HOUSING
24-113	BEARING	24-136	MUFFLER
24-114	RETAINING RING	24-137	COMPLETE FILTER ASSY.
24-115	LOWER GEAR SPIDER	24-137A	FILTER REPAIR KIT
24-116	PIN	24-138	RETAINING SCREW
24-117	BOTTOM GEAR	24-139	RUBBER GASKET
24-118	BEARING	24-140	REGULATOR
24-118A	BEARING SLEEVE	24-141	SPRING
24-119	WASHER	24-142	"O" RING
24-120	BEARING	24-143	AIR FLOW VALVE
24-121	TOP PLATE	24-144	VALVE BODY
24-122	AIR MOTOR CYLINDER	24-150	COMPLETE AIRMOTOR

Factory:

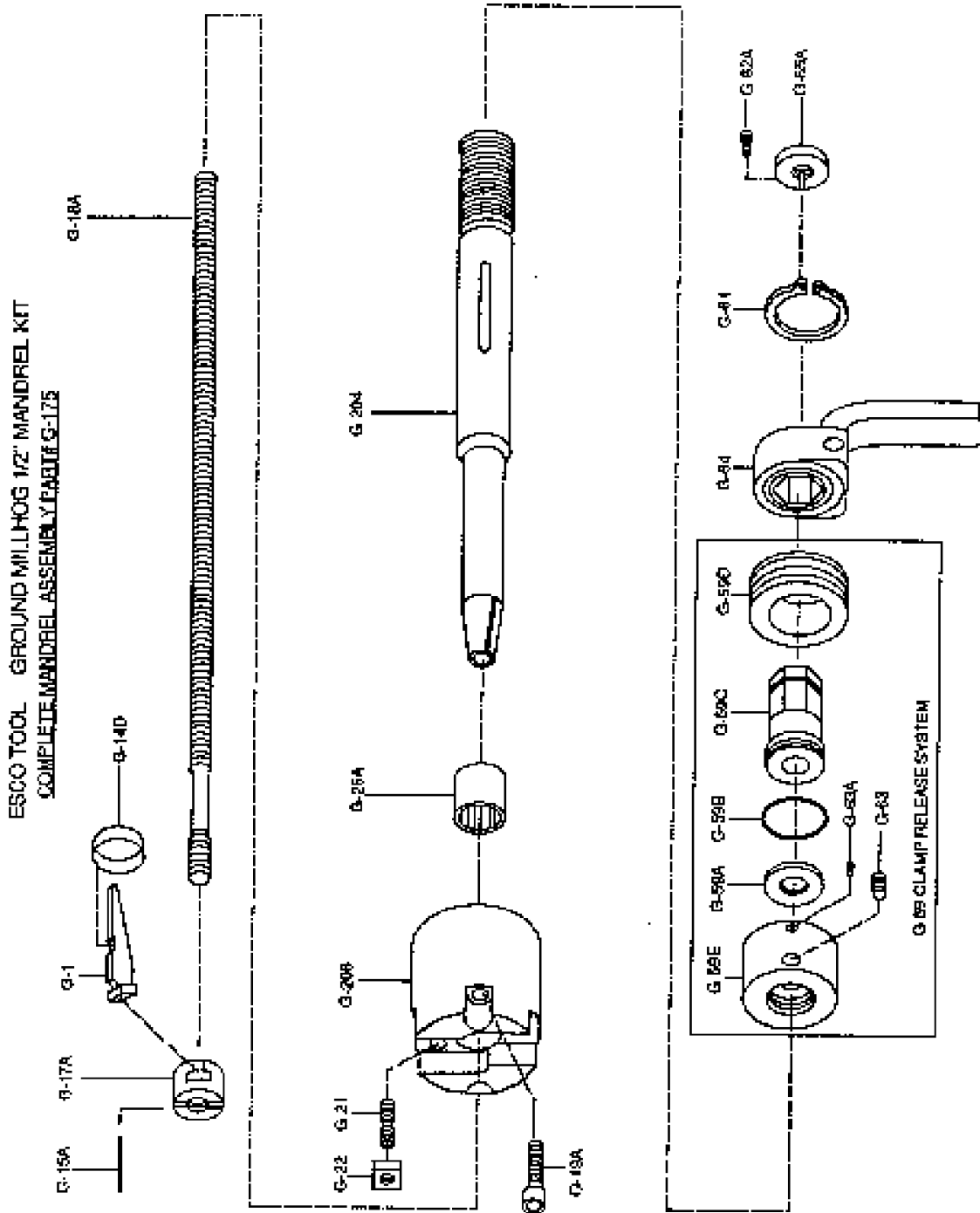
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6. Parts List, continued
c. 1/2" mandrel



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1/2" MANDREL KIT PARTS LIST

<u>PART #</u>	<u>DESCRIPTION</u>	<u>PART #</u>	<u>DESCRIPTION</u>
G-01	G1 CLAMP RIB (.500 - .655)	G-59A	WASHER
G-14D	BAND FOR G1, G2 RIBS	G-59B	"O" RING
G-15A	ROLL PIN	G-59C	DRAW NUT
G-17A	ACTUATOR FOR 1/2" MANDREL	G-59D	RETAINER NUT
G-18A	DRAW ROD FOR 1/2" MANDREL	G-59E	FEED STOP HOUSING
G-19A	CUTTERHEAD SCREW	G-61	SNAP RING
G-21	BLADE LOCK SCREW	G-62A	CAP SCREW
G-22	BLADE LOCK FOR 1-1/2"&2-1/4"	G-63	SET SCREW
G-26A	CUTTERHEAD BEARING	G-63A	SET SCREW
G-204	1/2" MANDREL	G-64	CLAMP RELEASE WRENCH
G-206	CUTTERHEAD, 1-1/2 FOR 1/2 MANDREL	G-65A	DRAW ROD STOP COLLAR
G-59	CLAMP RELEASE SYSTEM	G-175	MANDREL KIT, 1/2" COMPLETE

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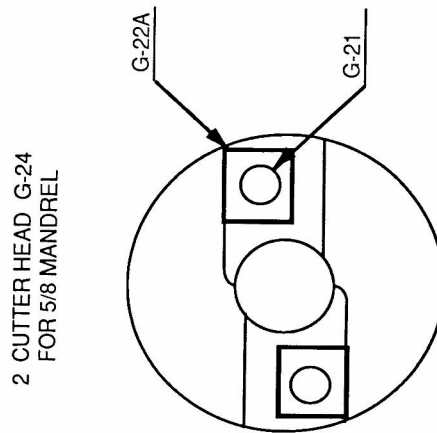
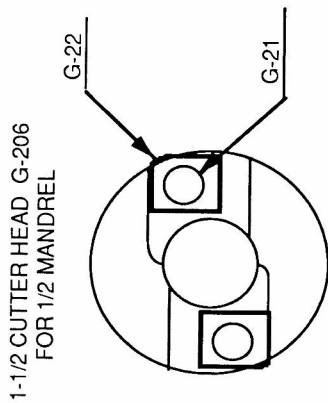
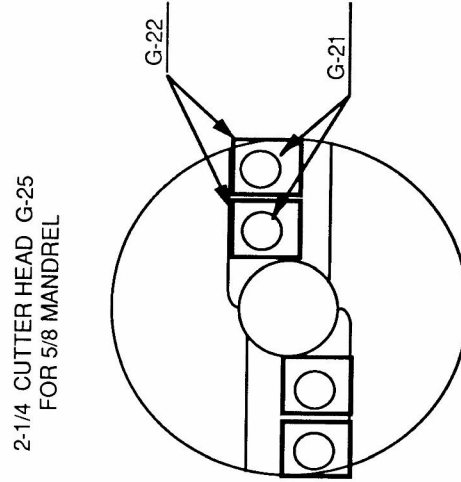
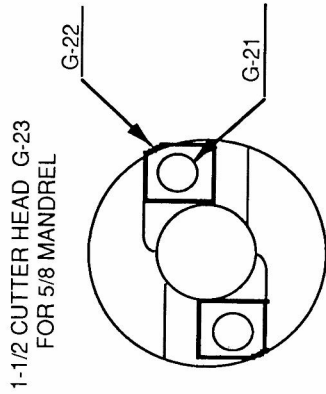
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6. Parts List, continued
d.cutterheads

ESCO TOOL CUTTERHEADS FOR THE GROUND MILLHOG



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CUTTERHEAD PARTS LIST

<u>PART #</u>	<u>DESCRIPTION</u>	<u>PART #</u>	<u>DESCRIPTION</u>
G-21	BLADE LOCK SCREW	G-24	2" CUTTERHEAD
G-22	BLADE LOCK FOR 1-1/2" & 2-1/4" CUTTERHEADS	G-25	2-1/4" CUTTERHEAD
G-22A	BLADE LOCK FOR 2" CUTTERHEAD	G-206	1-1/2" CUTTERHEAD FOR 1/2" MANDREL
G-23	1-1/2" CUTTERHEAD		

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Operating Instructions

Millhog Series - "Ground" Millhog

6. Parts List, continued
e. Blades

SPECIFICATION SHEET FOR ESCO TOOL STANDARD BLADES FOR THE "GROUND" AND "TUBE WEASEL" MILLHOG TOOL



GLB-
FACING
OR LAND



GLR-
FACING
OR LAND
OD RADIUS



GLE-
"J" BEVEL
22 DEGREE +
3/16 RADIUS



GBB-
37-1/2
BEVEL



GBBP-
37-1/2 -
1/4 STEP
PEEL BACK



GCB10S-
10 DEGREE
BORING
1" D CR
LARGER



GBBB-
37-1/2
BORING



GCS-
STRAIGHT
BORING
18 DEGREE
TAPER
1" D CR
LARGER

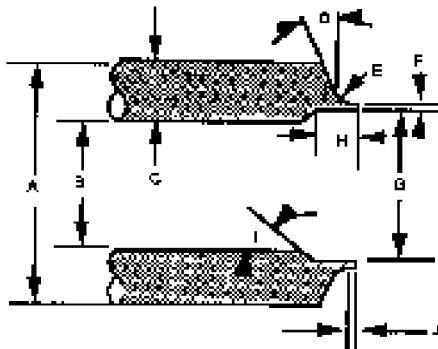


GTS-
TUBE
SEAT



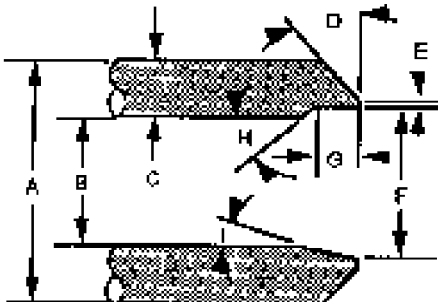
GTSR-
TUBE STUB
REMOVAL

SPECIFICATION FOR "J" PREP CUSTOM BLADES



		STD	YOUR REQ
A	TUBE OD	---	
B	TUBE ID	---	
C	WALL THICKNESS	---	
D	BEVEL ANGLE	22°	
E	RADIUS	3/16	
F	LAND OR FACE	---	
G	BORE DIA.	---	
H	BORE DEPTH	3/8	
I	BORE TAPER	18°	
J	NOSE (STRAIGHT)	---	
K	TAPERED BORE ANGLE INSTEAD OF STRAIGHT BORE (SEE I BELOW)	10°	

SPECIFICATION FOR "V" PREP CUSTOM BLADES



		STD	YOUR REQ
A	TUBE OD	---	
B	TUBE ID	---	
C	WALL THICKNESS	---	
D	BEVEL ANGLE	37-1/2°	
E	FACE OR LAND	---	
F	BORE DIA.	---	
G	DEPTH OF BORE	3/8	
H	TAPER ANGLE	18°	
I	BORE ANGLE	10°	

Cutting Blades

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GBB-1	BLADE 3/8" BEVEL TIN
GBB-2	BLADE, 5/8" BEVEL TIN
GBB-3	3/8" 30 DEGREE BEVEL BLADE
GBB-4	5/8" 30 DEGREE BEVEL BLADE
GBBP-1	5/8" 37-1/2 DEG+1/4" PEEL BACK
GCB-1	BLADE, 3/8" COUNTER BORE TIN
GCB-2	BLADE, 5/8" COUNTER BORE TIN
GCB10S-1	3/8" 10 DEGREE BORING BLADE
GCB10S-2	5/8" 10 DEGREE BORING BLADE
GCBS-1	3/8"STRAIGHT BORE 18 DEG TAPER
GCBS-2	3/8"STRAIGHT BORE 18 DEG TAPER
GJB-1	3/8" "J" BEVEL 22 DEG+3/16 RAD
GJB-2	5/8" "J" BEVEL 22 DEG+3/16 RAD
GLB-1	BLADE, 3/8" LAND TIN
GLB-2	BLADE, 5/8" LAND TIN
GLRB-1	3/8" FACING BLADE W/ OD RADIUS
GLRB-2	5/8" FACING BLADE W/ OD RADIUS
GRBB-1	3/8"37-1/2 DEGREE BORING BLADE
GRBB-2	5/8"37-1/2 DEGREE BORING BLADE
GRS-1	BLADE, 3/8" SHARPENING & TIN
GRS-2	BLADE, 5/8" SHARPENING TIN
GTSR-1	3/8" TUBE STUB REMOVAL BLADE
GTSR-2	5/8" TUBE STUB REMOVAL BLADE
GTSS-1	BLADE, 3/8" TUBE SEAT
GTSS-2	BLADE, 5/8" TUBE SEAT

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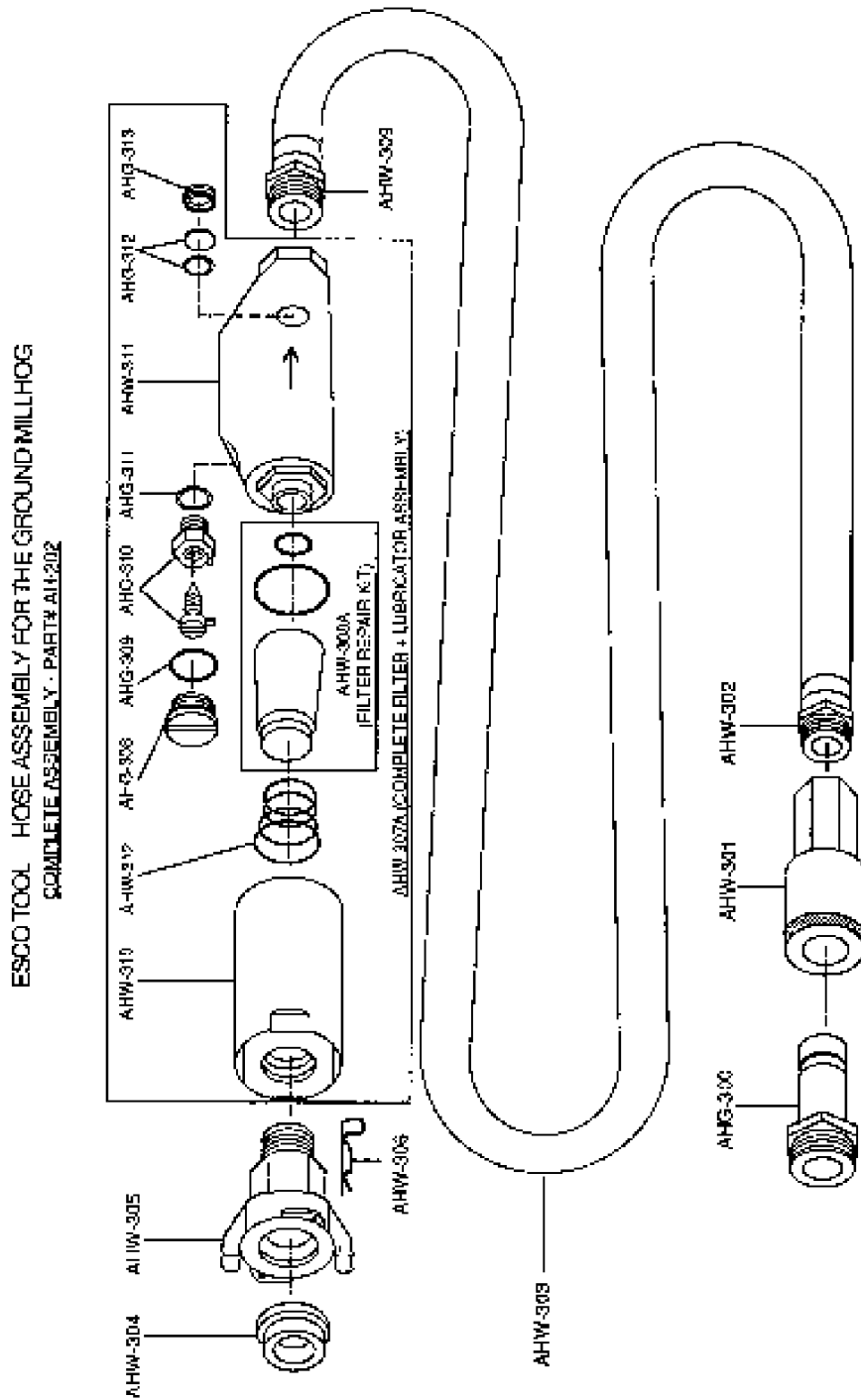
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6. Parts List, continued
 f. Air hose



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"HOSE ASSEMBLY PARTS LIST

<u>PART #</u>	<u>DESCRIPTION</u>	<u>PART #</u>	<u>DESCRIPTION</u>
AHG-300	NIPPLE, 1/4" x 3/8"	AHW-304	SEAL
AHG-308	FILLER PLUG	AHW-305	CHICAGO FITTING, 1/2"
AHG-309	FILLER PLUG "O" RING	AHW-306	SAFETY PIN
AHG-310	OIL ADJUSTING VALVE ASSY.	AHW-307A	COMP. FILTER & LUBE ASSY.
AHG-311	VALVE GASKET	AHW-308A	FILTER REPAIR KIT
AHG-312	SIGHT DISK & SEAL	AHW-309	HOSE BARB 1/2" x 1/2"
AHG-313	SIGHT DISK LOCK NUT	AHW-310	FILTER HOUSING
AHW-301	COUPLER	AHW-311	LUBRICATOR HOUSING
AHW-302	HOSE BARB, 3/8" x 1/2"	AHW-312	SPRING
AHW-303	HOSE, 1/2" x 6'	AH-202	COMPLETE AIR HOSE

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Operating Instructions

Millhog Series - "Ground" Millhog

7. MSDS for Marvel Air Tool Oil
- a. Marvel Mystery Oil Co., Inc.
331 North Main Street
Port Chester, New York 10573
914-937-4000
 - b. Product name: Marvel Air Tool Oil
Revision date: June 14, 1989
Transportation Emergency No.: 914-937-4000
Chemical Name: Fuel and Oil additive
NFPA Code: Health-O, Flammability-1, Reactivity-0 CAS No. N\A Mixture

Section 1-Hazardous Ingredients

Solvents - Mineral spirits-30%-cas # 64742 47-8
Naphthenic base oil distillate-67%-CAS # 64741 96-4 64742 63-8
OSHA-ACGIH see section 4 - Exposure limit 5 mg/m³

Section 2-Physical Data

Vapor pressure: 2mm Hg. @ 68
Specific gravity: .9
Water Solubility: negligible
Percent volatile: not determined
Vapor density: not determined
Evaporation rate: not determined
Odor: Mild
Appearance: red color liquid

Section 3-Fire and Explosion Data

Flash point: 140 F
Upper flammable limit: not determined
Lower flammable limit: not determined
Extinguishing media: CO₂, dry chemical, foam, water, spray, water fog
Unusual fire & explosion hazards: do not store or mix with strong oxidants

Section 4-Health Hazard / Routes of Entry

Eye irritation: mild
Skin irritation: One or more components of this material may cause skin irritation. Prolonged or repeated contact may cause redness, burning, drying and cracking of the skin.
Ingestion: Pulmonary aspiration hazard if swallowed
Exposure limits: Threshold Limit Value (TLV)=5 mg/m³ as a mist.
Comment: This material is not known to contain any chemical listed as a carcinogen or suspected carcinogen by IRAC or the National Toxicology Program (NTP). In accordance with the current OSHA Hazard Communication Standard criteria, this product does not require a cancer hazard warning.

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7. MSDS for Marvel Air Tool Oil continued
- Section 5-Emergency First Aid Procedures
- Eye: flush with water until irritation subsides
 - Skin: wash with soap and water
 - Oral: do not induce vomiting, give milk or water to dilute stomach contents
- Section 6-Stability
- Stability: stable
 - Incompatibility: oxidizing agents
 - Polymerization: will not occur
- Section 7-Spill or leak Procedures
- Spill procedures: recover free liquid, add absorbent to spill area
 - Waste disposal: keep product out of sewers and watercourses. Disposal should be in compliance with local, state and National laws.
- Section 8-Special Protection
- Ventilation: mechanical ventilation as needed
 - Gloves: use chemical resistant gloves if needed to avoid prolonged or repeated skin contact
- Section 9-Special Precautions
- Keep away from heat and open flame, contains refined petroleum distillates, if swallowed do not induce vomiting, if ingested call physician immediately.
- Section 10-Transportation Information
- DOT shipping name: petroleum lubricating oil
 - DOT hazard class: combustible liquid
 - DOT ID number: NA 1270
 - NFC ID number: 155250

All information, recommendations, and suggestions appearing herein concerning this product are based upon data obtained from the manufacturer and / or recognized technical sources; However, Marvel Oil Company, Inc. makes no warranty, representation or guarantee as to the accuracy or completeness of the material set forth herein. It is the users responsibility to determine the safety, toxicity and suitability if his own use, handling and disposal of the product. Additional product literature is available upon request. Since actual use by others is beyond our control, no warranty, express or implied, is made by marvel as to the effects of such use, the results to be obtained or the safety and toxicity of the product , nor does Marvel assume any liability arising out of the use by others of the product referred to herein. The data in this MSDS relate to the specific material designated herein and do not relate to use in combination with any other material or in any process.

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**Operating Instructions
Millhog Series - "Ground" Millhog**

March 2001

**ESCO TOOL • MEDFIELD, MA • USA
MILLHOG SERIES - GROUND MILLHOG
90 PSI (6.2 BAR) INLET PRESSURE
DISCONNECT AIR SUPPLY BEFORE SERVICING**



**Understand all
before using**



instructions

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Operating Instructions Millhog Series - “Ground” Millhog

ESCO Tool Guarantee

Guarantee: The manufacturer guarantees its products to be free from defects in material or workmanship for a period of one year from date of shipment from its factory. Said guarantee will not apply if equipment is used in conditions of service for which it is not recommended. The manufacturer is not responsible for damage to its products through improper use, physical damage, poor operating practice, or normal wear.

If any device is found unsatisfactory under the guarantee, the buyer must notify ESCO Tool in writing and after receipt of shipping instructions, buyer must return it directly to ESCO Tool, 50 Park Street, Medfield, Massachusetts 02052, USA, shipping charges prepaid. Such equipment will be replaced or put in satisfactory operating condition, free of all charges except transportation. The correction of any factory defect by repair or replacement by the manufacturer shall constitute fulfillment of all obligations to the purchaser. Manufacturer's guarantee is void if unauthorized repairs are made to its products.

Manufacturer shall not be liable for consequential damage in case of failure to meet the conditions of any Guarantee or Shipping Schedule, nor will claims for labor, loss of profit, repairs, or other expenses incidental to replacement be allowed.

No other representations, guarantees or warranties, expressed or implied, are made by the manufacturer in connection with the manufacture and sale of its equipment.

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