TM-50
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SERIES B10509 GROOVING TOOL

Operating and Maintenance Instructions

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INTRODUCTION

Thank you for purchasing this Elliott product. More than 100 years of experience have been employed in the design and manufacture of this tool, representing the highest standard of quality, value and durability. Elliott tools have proven themselves in thousands of hours of trouble free field operation.

If this is your first Elliott purchase, welcome to our company; our products are our ambassadors. If this is a repeat purchase, you can rest assured that the same value you have received in the past will continue with all of your purchases, now and in the future.

The Elliott Series B10509 Grooving Tool has been designed for the grooving of drilled holes in tube sheets used in heat exchangers, condensers, and boilers.

The Elliott Series B10509 Grooving Tools are designed and built to be versatile, long-wearing, and to machine an accurate, perfectly round groove at a low cost per hole.

SAFETY

Read and save all instructions. Before use, be sure everyone using this tool reads and understands this manual, as well as any labels packaged with or attached to the tool.

1. **Know Your Elliott Grooving Tool.** Read this manual carefully to learn your tool's applications and limitations, as well as potential hazards, associated with this type of equipment.

2. **Keep Work Area Clean and Well Lighted.** Cluttered, dark work areas invite accidents.

3. **Dress Properly.** Do not wear loose clothing or jewelry. Wear a protective hair covering to contain long hair. It is recommended that the operator wear safety glasses with side shields or a full face shield eye protection. Gloves and water repellant, nonskid footwear are also recommended. Keep hands and gloves away from moving parts.

4. **Use Safety Equipment.** Everyone in the work area should wear safety goggles or glasses with side shields complying with current safety standards. Wear hearing protection during extended use, respirator for a confined space and a dust mask for dusty operations. Hard hats, face shields, safety shoes, respirators, etc. should be used when specified or necessary.

5. **Keep Bystanders Away.** Bystanders should be kept at a safe distance from the work area to avoid distracting the operator and contacting the tool.

6. **Protect Others in the Work Area** from debris such as coolant spray. Provide barriers or shields as needed.

7. **Use Proper Accessories.** Use Elliott accessories only. Be sure accessories are properly installed and maintained. Do not defeat the purpose of a guard or other safety device when installing an accessory or attachment.

8. **Check for Damaged Parts.** Inspect guards and other parts before use. Check for misalignment, binding of moving parts, improper mounting, broken parts or any other conditions that may affect operation. If abnormal noise or vibration occurs, stop the tool immediately and have the problem corrected before further use. Do not use a damaged tool. Tag damaged tools "Do Not Use" until repaired. A guard or other damaged part should be properly repaired or replaced by an Elliott service facility or qualified repairman. For all repairs, insist on only identical replacement parts.

9. **Remove All Wrenches.** Check that all accessory wrenches are removed from the system before turning it on.

OPERATION

(Refer to page 4 for parts identification)

All grooving tools may be operated in standard radial drills, appropriate pneumatic tools, or computer numerically controlled radial heads for multiple drilling operations or with hand-held drive motors for “after-market” retubing projects.

Each size grooving tool operates in a speed range of 100-500 R.P.M. Standard cutting fluids should be used with these tools for optimum performance. Follow standard machine tool cutting speeds and feeds for the material and diameter you are cutting.

To set the cutting depth (see Fig. 1): Loosen the set screw (3) in the housing (10) and thread the housing forward or back until the measurement from the face of the guard (13) to the cutter blade is at the desired depth. Before tightening the set screw (3), ensure the set screw is lined up with the flats on the mandrel adapter (7) to prevent any damage to the adapter threads.

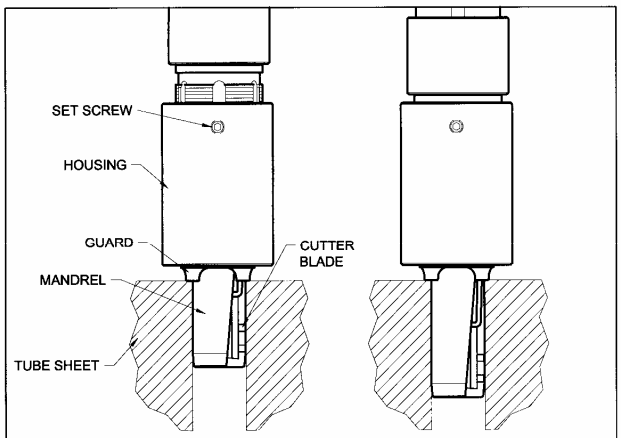

FIG. 1: Setting the cutting depth

To set the groove depth: The actual depth of cut for the groove(s) is controlled by threading the adjustment nut (4) either forward or back to decrease or increase the amount of distance the cutter blade will travel up the mandrel (2) taper. With a mandrel slot taper of 5°, mandrel travel of .125” (3.2mm) equals .011” (0.28mm) increase in cutter blade projection. ***Note: For tool size 5/8” thru 1-1/4”, one revolution of the Adjustment Nut (4) will increase or decrease blade height by .005” (0.13mm). For size 1-1/2” and up, one revolution of the Adjustment Nut will equal .007” (0.18mm) change in blade height.***

Installing/Replacing Cutter Blades: The same cutter blade can be used on all tool sizes from 3/4” (19.1mm) to 3” (76.2mm). Size 5/8” (15.9mm) tool requires a different blade. Standard blade tooth configurations are shown in the chart on page 4. Other blade configurations are available. Contact customer service for details.

To install a cutter blade, slide the tapered end of the blade under the cutter spring (9) and push the blade forward until the hook-end of the cutter spring locks into the groove of the cutter blade.

To remove a cutter blade, pry a flat-end screwdriver under the side of the cutter spring (9). Lift the cutter spring up and slide the cutter blade from the front of the tool’s mandrel.

Mandrel Replacement:

1. Loosen set screw (3) in the housing (10) and unthread the housing all the way off.

IMPORTANT!

Before removing the mandrel adapter (7) in step 2, extreme caution should be taken as this part is under spring tension and could cause serious injury if not removed properly.

2. Stand the mandrel (2) on end with the morse taper end down. Press & hold securely the mandrel adapter (7) while loosening set screw (14) located on opposite side of cutter spring (9). Once the set screw is free of the groove in the mandrel, gradually allow the mandrel adapter to slide up the mandrel until there is no more spring tension. (**NOTE: DO NOT** release the mandrel adapter while there is still spring tension!) Once the mandrel adapter is removed, then the spring retainer (5) can be removed by sliding off the mandrel.
3. To assemble a mandrel, reverse the above steps.

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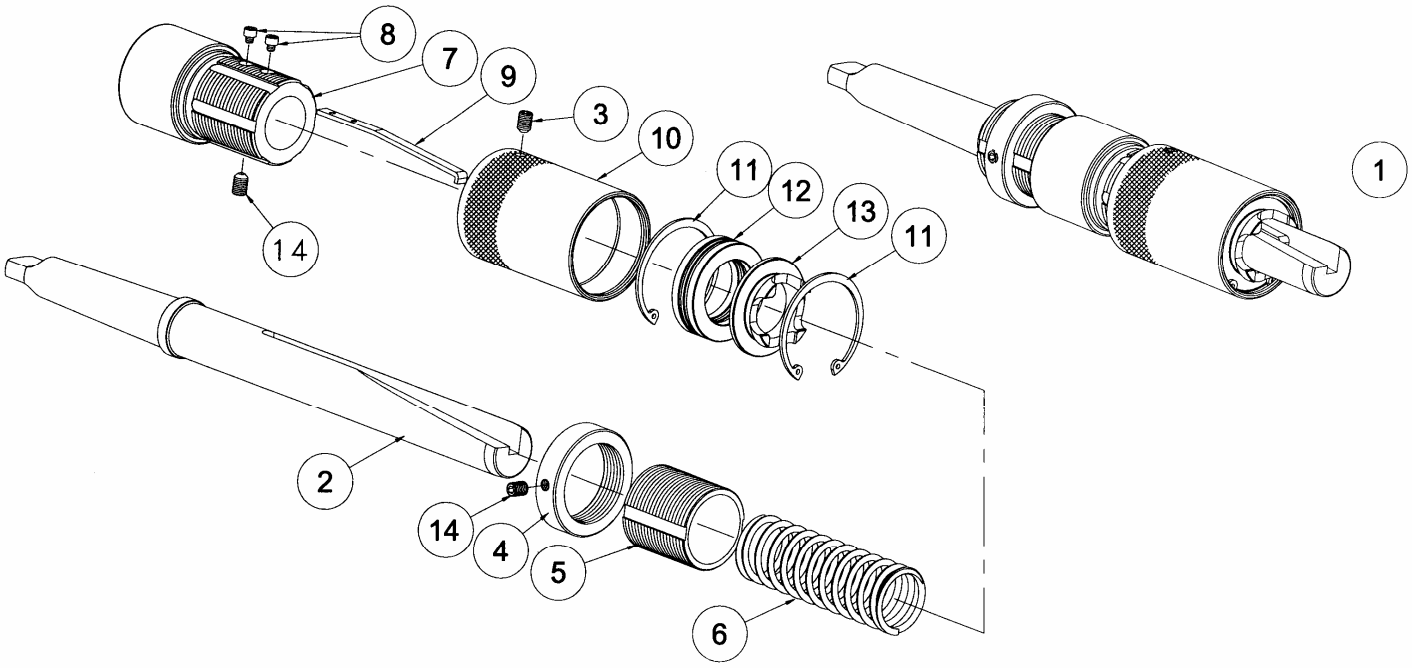
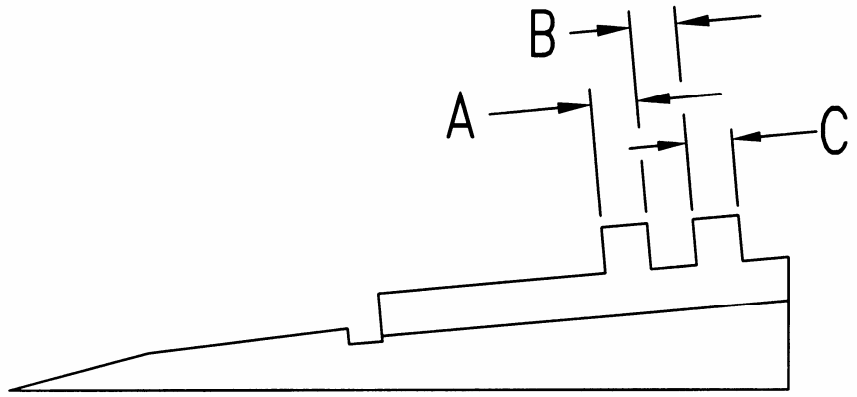


		Tool Size								
Item No.	**Description**	**5/8**	**3/4**	**7/8**	**1**	**1-1/4**	**1-1/2**	**1-3/4**	**2**	**2-1/2**
1	Assembly	B10509-625	B10509-750	B10509-875	B10509-1000	B10509-1250	B10509-1500	B10509-1750	B10509-2000	B10509-2500
2	Mandrel	16-GS6214	16-GS7516	16-GS8716	16-GS10016	16-GS315	16-GS381	16-GS444	16-GS508	16-GS635
3	Set Screw	128P	128P	128P	128P	128P	128P	128P	128P	128P
4	Adjustment Nut	16-AN6215	16-AN7515	16-AN8715	16-AN10015	16-AN31515	16-AN38115	16-AN44415	16-AN50815	16-AN63515
5	Spring Retainer	16-ML6213	16-ML7513	16-ML8713	16-ML10013	16-ML31513	16-ML38113	16-ML44413	16-ML50813	16-ML63513
6	Spring	16-S158	16-S190	16-S222	16-S254	16-S315	16-S381	16-S444	16-S508	16-S635
7	Mandrel Adapter	16-SL6211	16-SL7511	16-SL8711	16-SL10011	16-SL315	16-SL381	16-SL444	16-SL508	16-SL635
8	Cap Screw (2)	5-40 X 1/4	6-32 X 1/4	6-32 X 1/4	6-32 X 1/4	6-32 X 1/4	6-32 X 1/4	6-32 X 1/4	6-32 X 1/4	6-32 X 1/4
9	Cutter Spring	16-ST6211	16-ST7511	16-ST7511	16-ST7511	16-ST7511	16-ST7511	16-ST7511	16-ST7511	16-ST7511
10	Housing	16-S6203B	16-S7503B	16-S8703B	16-S10003B	16-S315B	16-S381B	16-S444B	16-S508B	16-S635B
11	Retaining Ring (2)	16-W30	16-W35	16-W42	16-W47	16-W52	16-W60	16-W65	16-W78	16-W90
12	Thrust Bearing	16-1103	16-1104	16-1105	16-1106	16-1107	16-1108	16-1109	16-1111	16-1113
13	Guard	16-TB6203	16-TB7503	16-TB8703	16-TB10003	16-TB315	16-TB381	16-TB444	16-TB508	16-TB635
14	Set Screw (2)	128L	128L	128L	128L	128L	128L	128L	128L	128L

	Specifications						
Tool No.	**Hole Size in. (mm)**	**O.A.L. in. (mm)**	**Wt. Lbs. (kg)**	**Operating Speed R.P.M.**	**Max.CuttingDepth in. (mm)**	**Mandrel Size in. (mm)**	**Morse Taper**
B10509-625	5/8 (15.9)	12.75 (323.9)	3.5 (1.6)	100-500	2 (50.8)	5/8 (15.9)	No. 3
B10509-750	3/4 (19.0)	12.75 (323.9)	3.8 (1.7)		2 (50.8)	3/4 (19.0)	No. 3
B10509-875	7/8 (22.2)	13 (330.2)	4.5 (2.0)		2 (50.8)	7/8 (22.2)	No. 3
B10509-1000	1 (25.4)	13 (330.2)	4.8 (2.2)		2 (50.8)	1 (25.4)	No. 3
B10509-1250	1-1/4 (31.8)	13 (330.2)	6.8 (3.1)		2 (50.8)	1-1/4 (31.8)	No. 3
B10509-1500	1-1/2 (38.1)	13.81 (350.8)	8.9 (4.0)		1.50 (38.1)	1-1/2 (38.1)	No. 4
B10509-1750	1-3/4 (44.5)	13.81 (350.8)	12.9 (5.9)		1.50 (38.1)	1-3/4 (44.5)	No. 4
B10509-2000	2 (50.8)	13.81 (350.8)	17.9 (8.1)		1.50 (38.1)	2 (50.8)	No. 5
B10509-2500	2-1/2 (63.5)	13.81 (350.8)	20.5 (9.3)		1.69 (42.9)	2-1/2 (63.5)	No. 5

CUTTER BLADE INFORMATION



Cutters “A” and “C” have 1/8” (3.17mm) cutter widths.
Standard spacings “B” are: 3/16” (4.76mm), 1/4” (6.35mm), 3/8” (9.52mm), 7/16” (11.1mm) and 1/2” 12.7mm).

Size	Tool Number	Replacement Cutter Blades Spacing Configuration			
		Ferrous and Non Ferrous		Stainless Steel	
		1/8” X 1/4” X 1/8” (3 X 6.35 X 3mm)	1/8” X 3/8” X 1/8” (3 X 9.53 X 3mm)	1/8” X 1/4” X 1/8” (3 X 6.35 X 3mm)	1/8” X 3/8” X 1/8” (3 X 9.53 X 3mm)
5/8” (15.88mm)	B10509-625	16-ST6203S	16-ST6203	16-ST6203S	16-ST6203
3/4” (19.05mm)	B10509-750	GT100-31-3	GT100-31-4	GT100-31-3S	GT100-31-4S
7/8” (22.23mm)	B10509-875				
1” (25.4mm)	B10509-1000				
1-1/4” (3.75mm)	B10509-1250				
1-1/2” (38.1mm)	B10509-1500				
1-3/4” (44.45mm)	B10509-1750				
2” (50.8mm)	B10509-2000				
2-1/2” (63.5mm)	B10509-2500				

Other cutter blade sizes are available, contact Customer Service for details.

Elliott offers a complete line of precision tube tools, including:

tube expanders

- Boiler Expanders
- Heat Exchanger Expanders
- Condenser Expanders
- Refinery Expanders

tube rolling motors & torque controls

- Electric
- Pneumatic

tube cleaners

- Air & Water Driven Motors (Internal/External Drives)
- Jiffy Guns ("Shoot-Thru" Devices)
- Roto-Jet (Rotating Flex Shaft)

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- Tube Plugs (High & Low Pressure)

retubing tools

- Tube Gauges
- Tube Cutters
- Manual Tools
- Spear Type Tube Pullers
- Collet-Type Tube Pullers
- CYCLGRIP Tube Extractors
- Grooving Tools
- End-Prep Tools

metal working products

- Back Chamfering Tools
- Carbide Roller Burnishing Tools
- Diamond Burnishing Tools
- Elliptical Deburring Tools
- Fine Boring Tools
- Internal Recessing Tools
- Magic Vise
- Mechanical Joining Tools
- Roller Burnishing Tools
- Single Blade Reamers

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