

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)

**additional  
products**

- Tube and Joint Testers
- 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

# Model 522400XL & 522400XLBMC (Air Purge) Heat Exchanger Cleaner

For Tube I.D. 3/8" to 1"  
(9.5mm thru 25.4mm)



## Operating and Maintenance Instructions

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# Drills and Brushes

## Condenser and Heat Exchanger Tube Cleaning Drills and Brushes for 5224XL and 5125 Tube Cleaners

**CT Drill**



**Twist Drill**



These drills are carbide tipped for hard deposits.

**El Paso Drill**



For Soft Deposits.

**Drill Tip**



For Gummy Deposits.

**Fulfilled Brush**

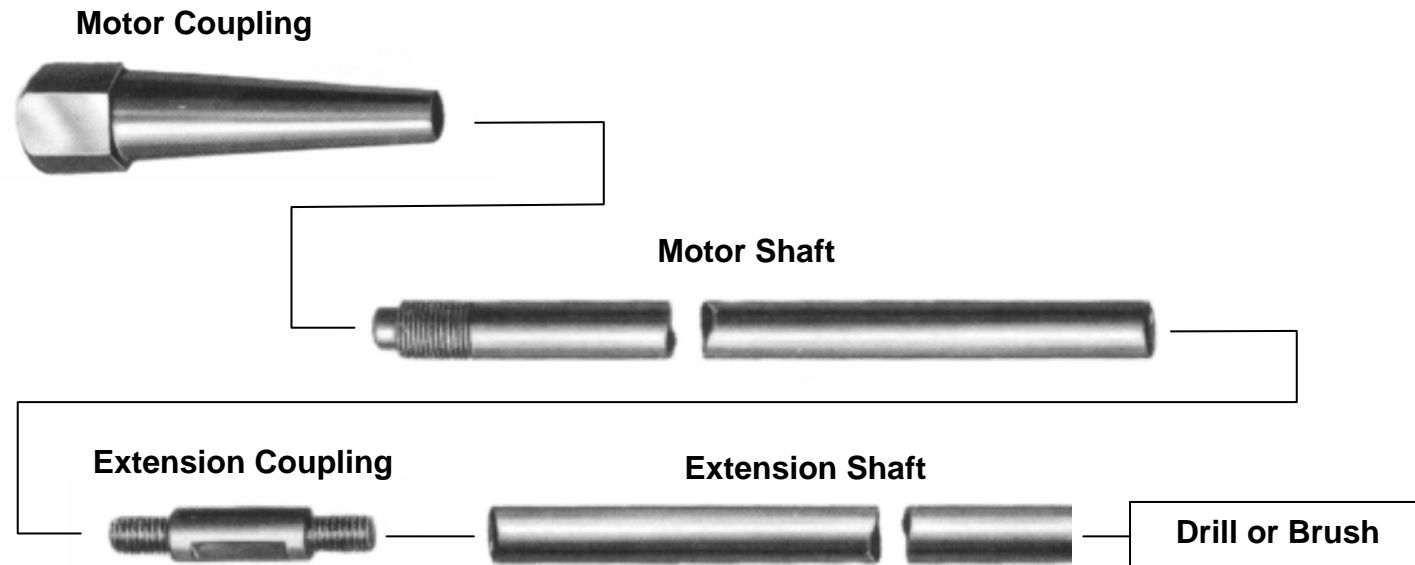


For Powder Deposits and Polishing.

Tube OD Inch (mm)	Tube Gauge BWG	Tube ID		*CT Drill Part No.	*Drill Stud Part No.	**Drill Tip Part No.	**Drill Coupling Part No.	El Paso	**Twist Drills	*** Brush	Cleaning Shaft OD Inch (mm)	
		Inch	mm									
1/2" (12.7mm)	16	.370"	9.40	5029-359	5039K	Not Available	Not Available	5005-359	Not Available	5024A22	5/16" (7.94mm)	
	17	.384"	9.75					5029-390		5005-390		5024A24
	18	.402"	10.21					5029-390		5005-390		5024A24
5/8" (15.8mm)	12	.407"	10.32	5029-390	5039A	5100-422	5100B	5005-422	5172-426	5024B26	3/8" (9.52mm)	
	13	.435"	11.05	5029-422		5100-468	5100C	5005-468	5172-468	5024B28		
	14	.459"	11.66	5029-446	5039B	5100-480		5005-480	5172-475	5226C30	7/16" (11.1mm)	
	15	.481"	12.22	5029-480		5100-512		5005-512	5172-475	5226C32		
	16	.495"	12.57		5029-512			5039C	5100-512	5005-512		5172-507
	17	.509"	12.93	5029-512		5039C	5100-512		5005-512	5172-507		5226C34
18	.527"	13.39	5029-512		5100-512		5005-512	5172-507	5226C34			
3/4" (19.0mm)	12	.532"	13.51	5029-512	5039D	5100-568	5100P	5005-568	5172-564	5226D36	1/2" (12.7mm)	
	13	.560"	14.22	5029-568		5100-604		5005-604	5172-600	5226D38		
	14	.584"	14.83		5029-568	5100-640	5005-640	5172-632	5226D40			
	15	.606"	15.39	5029-604	5100E	5100-640	5005-640	5172-632	5226D42			
	16	.620"	15.75	5029-604		5100-640	5005-640	5172-632	5226D42			
7/8" (22.2mm)	17	.634"	16.10	5029-640	5039E	5100-691	5100E	5005-640	5172-632	5226D44	5/8" (15.88mm)	
	18	.652"	16.56	5029-640		5100-691		5005-691	5172-689	5226D44		
	12	.657"	16.69	5029-640	5039E	5100-727	5100F	5005-727	5172-725	5226D46		
	13	.685"	17.40	5029-691		5100-727		5005-727	5172-725	5226D46		
	14	.709"	18.01	5029-727	5039E	5100-759	5100F	5005-759	5172-757	5226D48		
	15	.731"	18.57	5029-727		5100-759		5005-759	5172-757	5226D48		
16	.745"	18.92	5029-759	5039E	5100-759	5100F	5005-759	5172-757	5226D50			
17	.759"	19.28	5029-759		5100-759		5005-759	5172-757	5226D50			
1" (25.4mm)	18	.777"	19.74	5029-759	5039F	5100-812	5100G	5005-812	5172-814	5226E52	3/4" (19.05mm)	
	12	.782"	19.86	5029-812		5100-812		5005-812	5172-814	5226E52		
	13	.810"	20.57	5029-812	5039F	5100-848	5100G	5005-848	5172-850	5226E54		
	14	.834"	21.18			5029-848		5100-848	5005-848	5172-850		5226E54
	15	.856"	21.74	5029-848	5039G	5100-880	5100G	5005-880	5172-882	5226E564		
	16	.870"	22.09			5029-880		5100-880	5005-880	5172-882		5226E564
17	.884"	22.45	5029-880	5039G	5100-880	5100G	5005-880	5172-882	5226E564			
18	.902"	22.91			5029-880		5100-880	5005-880	5172-882	5226E564		

\* Drill studs are required for CT type drills.  
 \*\* Drill couplings are required for drill tips and twist drills.  
 \*\*\* Brush standard material is steel, brushes are also available in brass and stainless steel materials.  
 Other size drills and brushes are available, contact Customer Service for details.

# SHAFTING & COUPLINGS



Shaft Outside Diameters	Motor Coupling Part No.	*Motor Shaft Part No.	Ext. Coupling Gasket Part No.	Extension Coupling Part No.	Extension Shaft Part No.
5/16" (7.9mm)	5213C	5213-(FT)	Not Available	Not Available	Not Available
3/8" (9.5mm)	5214C	5214-(FT)	P5034A	501406	5014-(FT)
7/16" (11.1mm)	5215C	5215-(FT)	P5034A	CS113106	5015-(FT)
1/2" (12.7mm)	5216C	5216-(FT)	P5034B	CS113206	5016-(FT)
5/8" (15.9mm)	5218C	5218-(FT)	P5034C	CS113406	5018-(FT)
3/4" (19.1mm)	5219C	5219-(FT)	P5034D	CS113506	5059-(FT)

\* Specify Shaft length in feet. (Other sizes are available, contact Customer Service for details)

## How to order Tube Cleaner Shafting, Accessories, Drills and Brushes:

- Measure the tube ID behind the tube sheet in the unrolled area
- Measure the length of the tube(s) to be cleaned
- Identify the type of deposit to be removed. (Hard, Soft, Gummy or Powder)
- Select proper type and size drill and/or brush for the deposit being removed.
- To select proper size Motor Coupling, Motor Shaft, Gaskets, Extension Couplings, and Extension Shafts refer to the cleaning shaft OD for the drills and/or brushes selected in the right hand column on the following page. Then refer to the shaft OD in the chart above to select the proper components.
- It is recommended to brush the tubes after they are cleaned with a drill to remove any residual debris and to polish the tube's ID.

**Note:** Although Motor Shafts are available in lengths of up to 18 feet (5.5M) they are not readily available. Motor and Extension shafting are readily available in 5' (1.5M) and 10' (3M) lengths for handling, storage and shipping purposes. (Maximum length to ship UPS is 5' (1.5M))

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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 Model 5244XL and 5244XLBMC (Air Purge) Heat Exchanger Cleaners are designed to provide high-torque for cleaning hard scale, coke, gummy, oily, or rubbery deposits from straight tubes 3/8" to 1" (9.5 to 25.4mm) I.D.. Ideal tools for sugar, pulp, paper mills, chemical plants, and oil refineries.

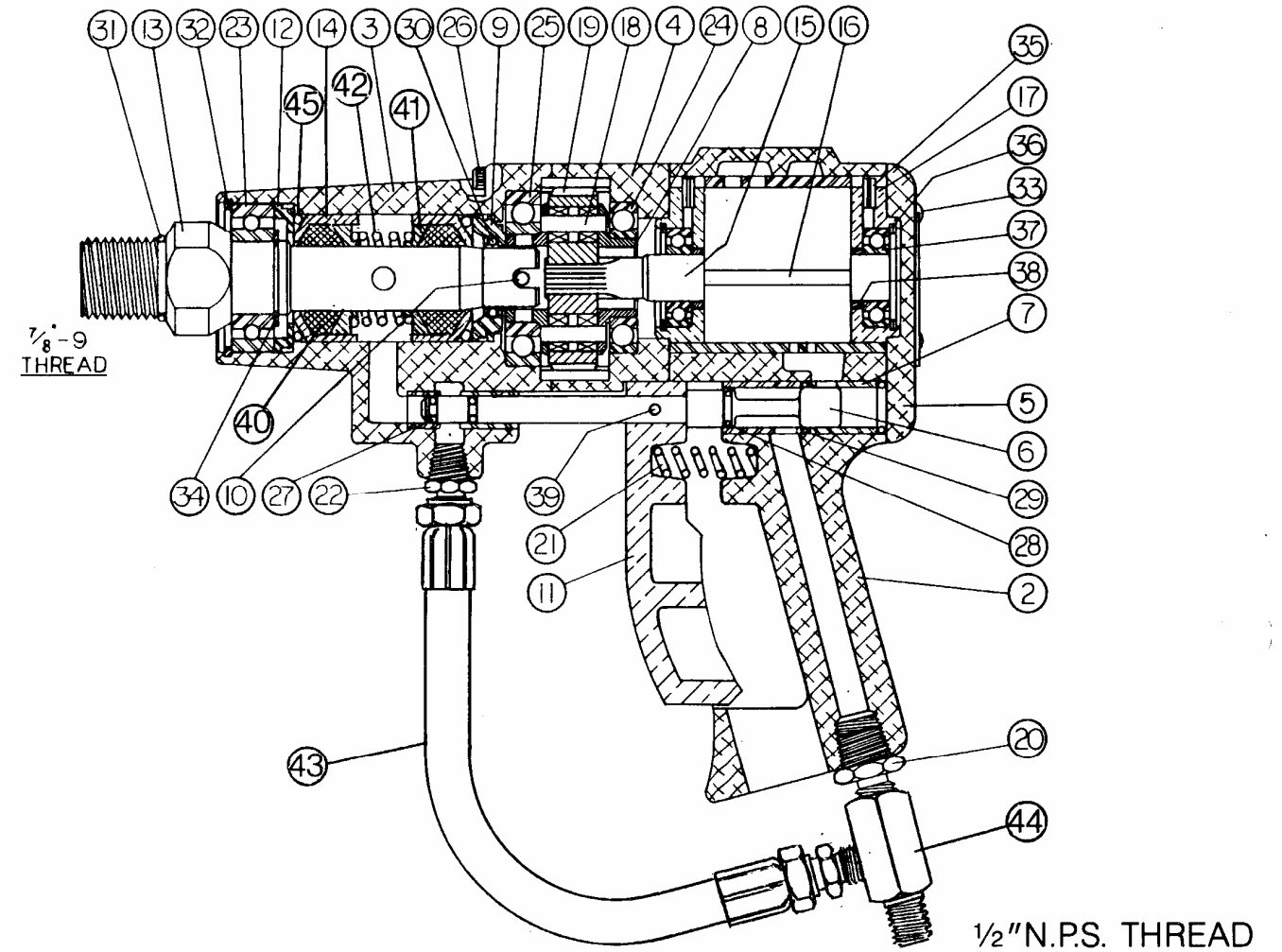
Model 5244XL is water-flush operation – convenient for flushing away heat transfer deposits. Model 5244XLBMC is an air-purge unit, for use where water-flush cannot be used.

# 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 Heat Exchanger Cleaner Motor.** 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 repellent, 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 Hands Away From Rotating Shafting.** DO NOT put hands on the shafting, motor coupling, or any tool attachment while it is rotating, as this could result in serious injury.
- 6. Keep Bystanders Away.** Bystanders should be kept at a safe distance from the work area to avoid distracting the operator and contacting the tool.
- 7. Protect Others in the Work Area** from debris such as coolant spray. Provide barriers or shields as needed.
- 8. 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.
- 9. 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.
- 10. Remove All Wrenches.** Check that all accessory wrenches are removed from the system before turning it on.

# 5224-XLBMC Heat Exchanger Cleaner (Air Purge)

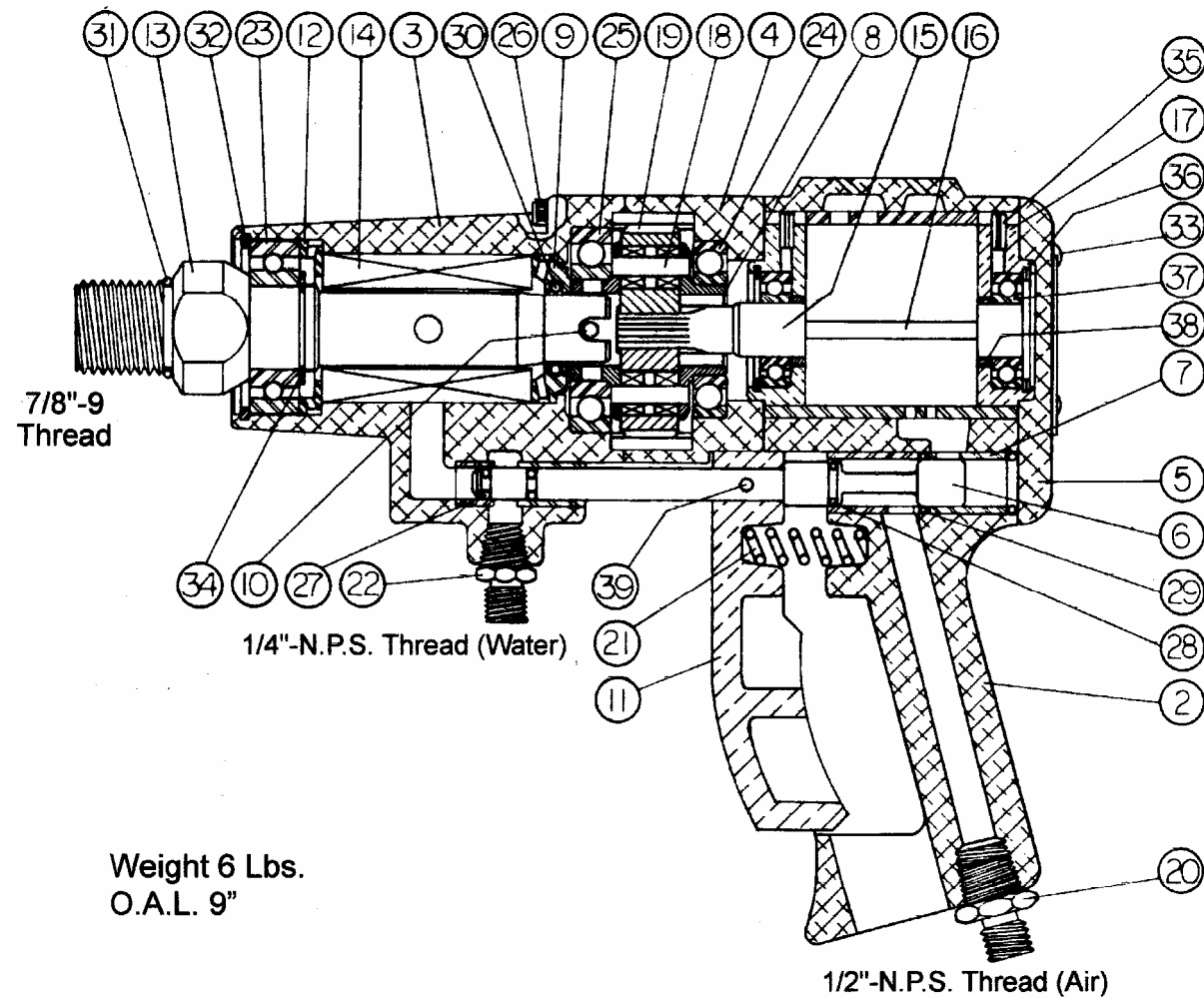


ITEM NO	ITEM NAME	NO. REQ'D	PART NUMBER
1	MOTOR		
2	MOTOR CASE	1	5224-XLA
3	SEAL CASE	1	5224-XLC
4	GEAR CASE	1	5224-XLE
5	MOTOR CAP	1	5224-XLB
6	PLUNGER	1	5224-XLG
7	REAR BUSHING	1	5224-XLH
8	GEAR CASE	1	5224-XLK
9	GEAR SEAL	1	5224-XLR
10	DRIVE PIN	1	5224-7
11	TRIGGER	1	5224-D
12	SPACER	1	5224-H
13	SHAFT	1	5224-R
14	PACKAGING BOX	2	5224-16
15	ROTOR	1	901005
16	VANE	5	901008-P
17	END PLATE	2	901010
18	PIN	2	901017-P
19	PLANET GEAR AND BEARING	2	901020
20	ADAPTER	1	901178-P
21	SPRING	1	P-51252
22	ADAPTER	1	P-5370-H
23	BEARING	1	P-8305-8

ITEM NO	ITEM NAME	NO. REQ'D	PART NUMBER
24	BEARING	1	P-8559-12
25	BEARING	1	P-8588-E
26	SOCKET HEAD CAP SCREW	4	P-8302-72
27	"O" RING	2	P-8309-3
28	"O" RING	1	P-8309-6
29	"O" RING	2	P-8309-8A
30	"O" RING	1	P-8309-13
31	"O" RING	1	P-8309-15
32	RETAINING RING	1	P8368-165
33	BUTTON HEAD SOCKET SCREW	4	P-8597-11
34	RETAINING RING	1	P-8286-78
35	DOWEL PIN	2	P-8383-6
36	RETAINING RING	2	P-8587-106
37	BEARING	2	901011-P
38	ROTOR SPACER	2	901007
39	DOWEL PIN	1	P-8381-6
40	PACKING	2	522415
41	FOLLOWER	2	512517
42	SPRING	1	P-512518
43	AIR PURGE HOSE	1	P-5370-NP
44	AIR PURGE ADAPTER	1	5224-APA
45	O-RING	2	P8309-21
46	Side Handle (Not Shown)	1	5224F

# 522400XL Heat Exchanger Cleaner

# OPERATION



(Refer to pages 7, 8, and 10 for items referenced in instructions listed below)

### GENERAL INSTRUCTIONS:

A clean lubricated air supply must be available at 90 to 125 psi (6.2 to 8.6 Bar), and not less than 45 cfm (1.3 M<sup>3</sup>/min.), at the point of connection to the motor. A shut-off valve should be provided at the air supply connection source. If there is any doubt about the cleanliness of the air supply, a filter should be installed at the supply connection.

Proper lubrication of the unit is a must for peak performance; therefore, a lubricator (preferably a filter/lubricator) should be installed in the airline immediately downstream of the shut-off valve. A filter-lubricator (PN 901717P) is available from Elliott Tool Technologies. For best results, use 10W/NR Lube Oil (PN 900082P), also available from Elliott Tool Technologies in 16 oz. (0.5 L) cans.

A clean water supply must be provided (preferably city water). Water pressure should not exceed 125 psi (8.6 Bar). A flow rate of at least 30 gpm (114 L/min.) should be available. A shut-off valve should be at the point of connection of the hose whip to the water source. **(IMPORTANT: Never operate Model 522400XL tube cleaner without water supply. Running this tool without water will damage the shaft seal assembly and cause immediate tool failure.)**

Swivel connections are provided on both of the hose whips to provide for easy hookup and eliminate kinks in the hoses. Connect each hose whip to its corresponding connection on the motor and to its supply source. Service ends of the hose whips are furnished with female thread connections; 1/2" NPT (Air) and 1/4" NPT (Water). (Note: Only one hose whip connection is required for the 5224XLBMC air-purge motor.)

### OPERATING INSTRUCTIONS:

Open the air & water supply valves (air only if air-purge). Holding the motor with the threaded shaft end away from you, slowly depress the trigger. The threaded shaft (31) should rotate & water (or air if air-purge) should exit the opening in the threaded shaft. The flow of the water (or air) should increase as the motor R.P.M. increases. If this does not occur, recheck hose connections, or refer to "Troubleshooting" on page 6.

After attaching the motor coupling, the motor shafting, the extension shafting (if req'd.), and the cleaning attachment (drill or brush), insert the shaft into the tube I.D.. **(NOTE: DO NOT activate the motor while the shaft end is outside the tube. Doing so could result in serious injury.)** Maximum length of shafting outside of the tube during the cleaning process is 5 ft. (1.5M).

**(NOTE: If tubes are completely blocked by deposit close to the tube sheet, it is recommended that only a 5 ft. (1.5M) motor shaft be used to clean all of the blocked tubes. Additional 5 ft. (1.5M) shaft extensions can be added for deeper cleaning requirements. Operating the cleaner in completely blocked tubes with a shaft length extending outside of the tube greater than 5 ft. (1.5M) from the tube sheet can result in excessive whipping of the shaft, which could cause serious injury to the operator and/or bystanders.)** If a length of shafting exceeding 5 ft. (1.5M) must be used then support must be provided for the shafting.

**(NOTE: DO NOT support shafting with your hands. Keep hands & clothing clear of rotating shaft & components to avoid serious injury.)** An acceptable means of support for the shafting would be a tube guide that is supported by a height-adjustable stand.

ITEM NO.	ITEM NAME	NO. REQ'D	PART NUMBER	ITEM NO.	ITEM NAME	NO. REQ'D	PART NUMBER
1	Motor with water feed attachment	1	522400XL	21	Spring	1	P512521
2	Motor case	1	5224XLA	22	Adapter	1	P5370M
3	Seal case	1	5224XLC	23	Bearing	1	P8305B
4	Gear case	1	5224XLE	24	Bearing	1	P8559-12
5	Motor cap	1	5224XLB	25	Bearing	1	P8588E
6	Plunger	1	5224XLG	26	Socket head cap screw	4	P8302-72
7	Rear bushing	1	5224XLH	27	"O" Ring	2	P8309-3
8	Gear cage	1	5224XLK	28	"O" Ring	1	P8309-6
9	Rear seal	1	5224XLR	29	"O" Ring	2	P8309-8A
10	Drive pin	1	5224-7	30	"O" Ring	1	P8309-13
11	Trigger	1	5224D	31	"O" Ring	1	P8309-15
12	Spacer	1	5224H	32	Retaining ring	1	P8368-165
13	Shaft	1	5224R	33	Button head socket screw	4	P8597-11
14	Shaft seal assembly	1	P5224-5	34	Retaining ring	1	P8286-78
15	Rotor	1	901005	35	Dowel pin	2	P8383-6
16	Vane	5	901008P	36	Retaining ring	2	P8587-106
17	End plate	2	901009	37	Bearing	2	901011P
18	Pin	2	901017P	38	Rotor spacer	2	901007
19	Planet gear and bearing	2	901020	39	Dowel pin	1	P8381-8
20	Adapter	1	901178P	40	Side Handle (Not Shown)	1	5224F

# MAINTENANCE

(Refer to pages 7, 8, and 10 for items referenced in instructions listed below)

## CARE & MAINTENANCE:

This cleaning motor should give good performance for many hours under extreme load provided that it is supplied with proper lubrication as described in the Operating Instructions on page 4. All rotating parts are mounted on ball bearings, which are either pre-lubricated or get their lubrication from the air stream. The vanes (16) are considered a standard replacement item as they receive the most wear. A loss of power is a strong indication of vane wear. To replace the vanes, remove the button head screws (33), then carefully remove the Motor Cap (5), and follow with the removal of the Rotor (15) and Rear End Plate (17). Remove the worn blades & replace with the new set (4 req'd per set). Reassemble the removed items being careful not to over tighten the four button head screws. Should this not restore the power to its original state, check "Troubleshooting" on page 6. If solution still cannot be found, motor may have to be returned to the factory for evaluation.

## REPAIRS RECOMMENDED TO BE DONE AT THE FACTORY:

1. Excessive leakage of air behind the trigger (11) or the unit not shutting off indicates worn O-Rings (28 or 29) or worn Plunger (6).
2. Water leakage around the Plunger (6), or water not shutting off completely, indicates worn O-Rings (27).
3. Excessive gear noise with attendant loss of power, due to damaged or worn gears.
4. Water draining out of the small weep holes in the Seal Case (3) indicates a defective Shaft Seal Assembly (14). Replacement of this seal should not be done in the field. This is a rugged seal, but it can easily be damaged if installed improperly.
5. Motor running rough and causing vibration indicates worn bearings in any one of four locations (23, 24, 25, and 37).

Please note that the above repairs can be made by the customer, but should be done at a clean work area by someone experienced with repairs of pneumatic motors. Elliott Tool Technologies cannot be responsible for damage to the motor, or its components, when repairs are made by the customer.

Prior to returning the motor to the factory for repairs, contact our Customer Service Group for a Returned Goods (RG) Authorization number. Upon receipt of the motor, an evaluation will be performed, and a cost estimate will be returned to you for approval prior to any actual repairs.

# AIR MOTOR TROUBLESHOOTING

	Air Leakage	Air Strainers Clogged	Air Pressure Too Low	Dirty Air	Water In Air	Incorrect Lubrication	Insufficient Lubrication	Hose Too Small	Long Vanes*	Worn Vanes	Rotor Rubbing	Worn Bearing Plates	Worn Valve Seat	Throttle Pin Sticking
<b>Motor Will Not Run</b>		X	X				X		X		X			
<b>Lack Of Power</b>	X	X	X			X		X		X	X	X		
<b>Speed Too Low</b>		X	X					X			X			
<b>High Air Consumption</b>	X									X		X		
<b>Excessive Vane Wear</b>				X		X	X							
<b>Excessive Bearing Wear</b>				X		X	X							
<b>Rusting Of Parts</b>					X	X	X							
<b>Delamination Of Vanes</b>				X	X	X								
<b>Vanes Chipping</b>				X		X	X							
<b>Motor Continues To Run, Throttle Off</b>													X	X

## MOTORS:

**Pneumatic motors** have assemblies built to very close tolerances. Under constant use and with the possibility of foreign parts moving through the air line, these tolerances have a tendency to increase due to vane wear. Air motor maintenance is critical. Dirt should not be allowed to collect around exhaust ports or fitting connections.

**\*NOTE:** If motor is stored in an area of high humidity, vanes may expand in length.

## MOTOR SPECIFICATIONS

Operating Pressure: 90 to 125 psi (6.2 to 8.6 Bar)  
 Air Consumption: 45 cfm (1.3 M<sup>3</sup>/min) @ 90 psi (6.2 Bar)  
 Water Pressure (5224XL only): Max. 125 psi (8.6 Bar)  
 Water Flow Rate: 30 gpm (114 L/min.)  
 Operating Speed: 1500 R.P.M.  
 Maximum HP: 1HP @ 700 R.P.M.  
 Maximum Torque: 7 ft. lbs. (9.5 Nm) @ 700 R.P.M.  
 Approximate Wt.: 8 lbs (3.6 Kg)  
 Overall Length: 9" (228.6 mm)