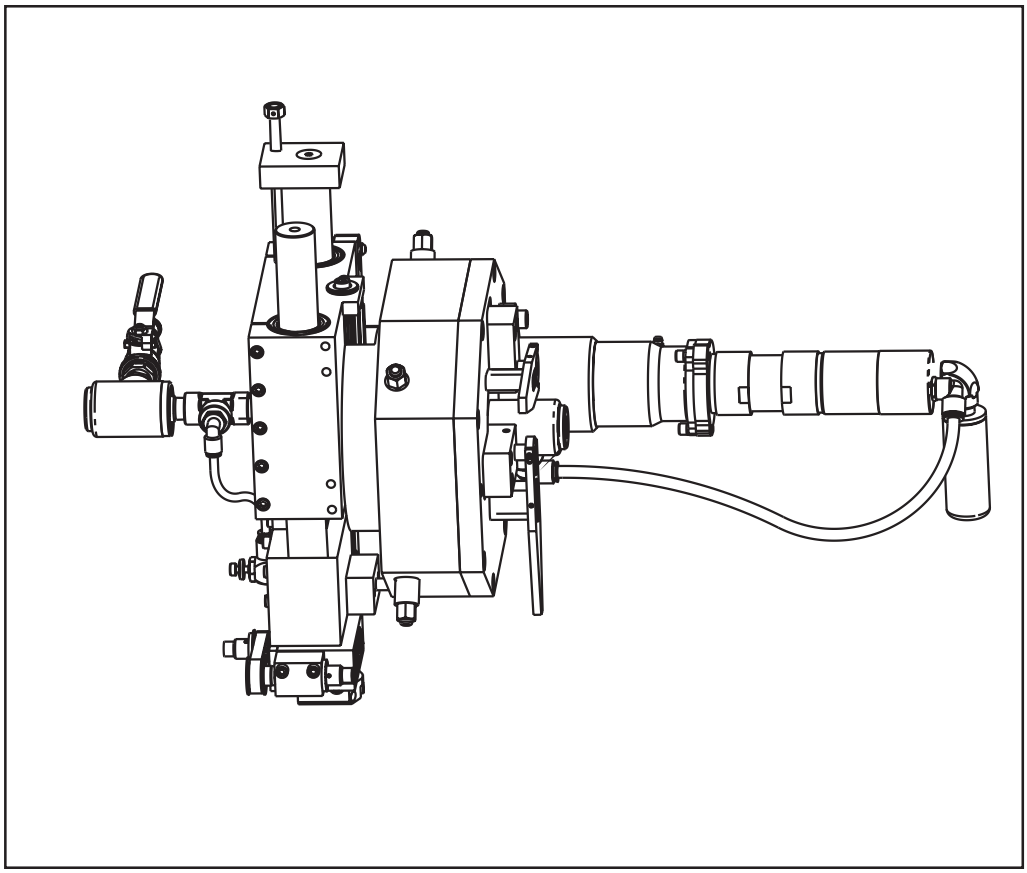

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SAFETY PRECAUTIONS

IN GENERAL:

When using rotating head cutting equipment, basic safety precautions should always be followed to reduce the risk of personal injury.

Operate this tool only in accordance with specific operating instructions.

WARNING: Do not override the deadman switch on the power unit. Locking down, obstructing, or in any way defeating the deadman switch on the power drive unit may result in serious injury.

DRESS CONSIDERATIONS:

Use standard safety equipment. Hard hats, safety shoes, safety harnesses, protective clothes, and other safety devices should always be used when appropriate.

Use safety glasses. Do not operate cutting tools without eye protection.

Dress properly. Do not wear loose clothing or jewelry. They can be caught in rotating and moving parts. Avoid slippery floors or wear nonskid footwear. If you have long hair, wear protective hair covering to contain it.

WORK AREA:

Keep the work area clean. Cluttered work areas and benches invite injuries.

Consider the work area environment. Keep the area well lit. Keep electrical cords, cables, rags, rigging straps, etc. clear of rotating equipment. Do not use power cutting tools in the presence of flammable liquids and gasses.

Keep visitors away. Do not let visitors or untrained personnel at or near operating tools. Enforce eye protection requirements for all observers.

Do not over reach. Keep proper footing at all times.

Stay alert. Watch what you are doing. Use common sense. Do not operate tools when you are tired.

TOOL CARE:

Maintain tools with care. Keep tools in good operating condition. Sharp tool bits perform better and safer than dull tool bits. Well maintained tools function properly when needed.

Check for damaged parts. If a tool has malfunctioned, been dropped or hit, it must be checked for damage. Run no-load tests and feed function checks. Do a complete visual inspection.

Electric motors. Use only with proper AC voltage power sources and observe all normal electric shock hazard procedures.

Do not abuse power and control cords. Pulling or running over cords and cables can result in electrical shock hazards and malfunctions. Keep control and power cords out of all cutting fluids and water.

Hydraulic drives. Observe proper procedures for electrically driven power sources. Avoid damage to hydraulic lines. Keep quick-disconnects clean. Grit contamination causes malfunctions.

Air tools. Check the exhaust muffler. Broken or damaged mufflers can restrict air flow or cause excessive noise. Use air motors only with a filtered, lubricated and regulated air supply. Dirty air, low pressure air or over pressure air will cause malfunctions, including delayed starting.

AREA EQUIPMENT:

Secure work. Whenever possible use clamps, vises, chains and straps to secure pipe.

Make sure the tool is secured; it is safer to have both hands free to operate the tool.

TOOL USE:

Us the right tool and tool bit for the job. Do not use a tool which is incorrect for the job you are doing.

Keep the tool bits fully engaged in the tool bit holders. Loose bits are a safety hazard.

Disconnect power supply during setup and maintenance. Use all stop or shut-off features available when changing or adjusting tool bits, maintaining the tool, or when the tool is not in use.

Remove adjusting keys and wrenches before applying power to the equipment. Develop a habit of checking the tool before turning it on to make sure that all keys and wrenches have been removed.

Do not force tools. Tools and tool bits function better and safer when used at the feed and speed rate for which they were designed.

Do not reach into rotating equipment. Do not reach into the rotating headstock to clear chips, to make adjustments, or to check surface finish. A machine designed to cut steel will not stop for a hand or an arm.

Handle chips with care. Chips have very sharp edges and are hot. Do not try to pull chips apart with bare hands; they are very tough.

Avoid unintentional starts. Do not carry or handle tools with your hand on the operating switches or levers. Do not lay the tool down in a manner which will start the drive. Do not allow the tool to flip around or move when adjusting or changing tool bits.

Store idle tools properly. Disconnect tools from the power source and store in a safe place. Remove tool bits for safe handling of the tool.

GENERAL DESCRIPTION

IN GENERAL:

The Elliptical Manway Machine has been designed to reface the sealing surface of an elliptical manway.

Design and Operating Features:

The precision bearing surfaces stabilize the rotating head to provide long life, low maintenance, and stability.

The auto-feed sprockets provide .006" (.15mm) of radial feed per revolution of headstock.

The drive gears and bearing surfaces are covered for operator safety and are sealed to provide protection from dust and chips.

A modular design concept provides quick, easy maintenance and maximum versatility in the drive and tooling options

Weight: 103 lbs. (47kg)

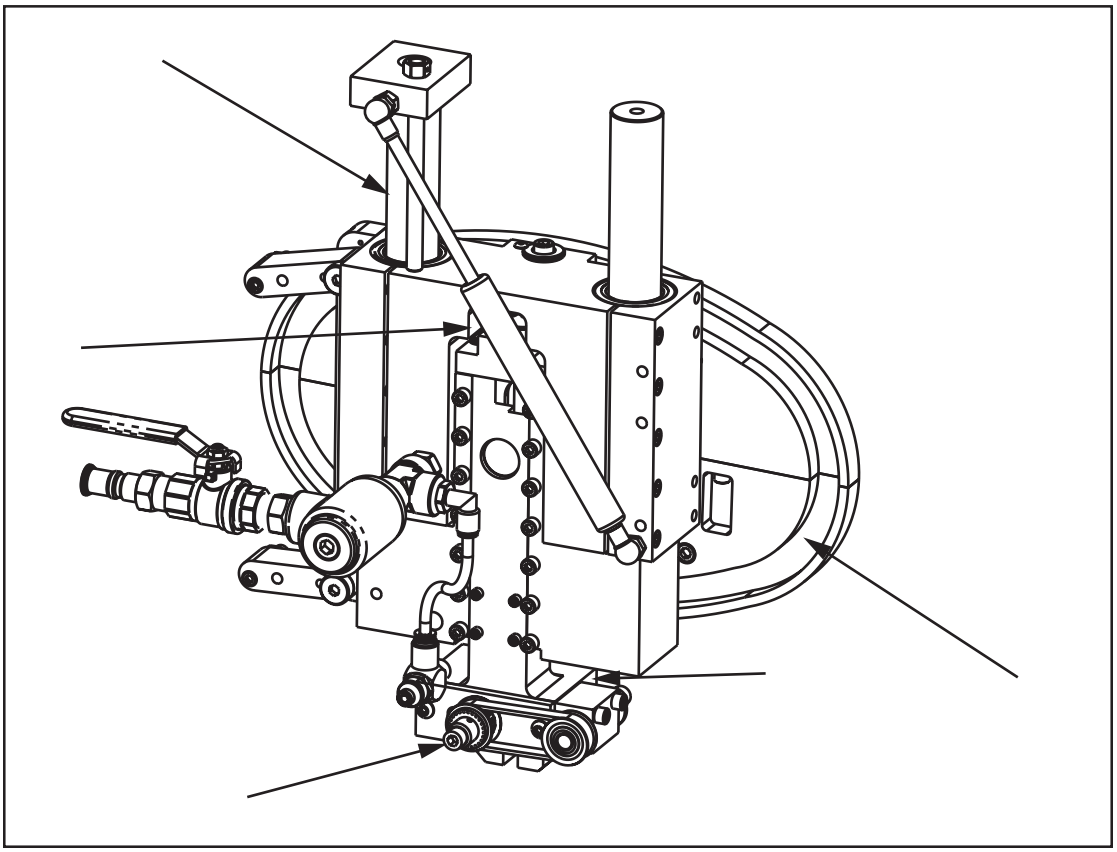
MAINTENANCE

All components should be cleaned and coated with a light film of oil prior to use.

Use a clean, non-detergent oil, preferably SAE 10 (90 SSU) or lighter.

The air supply for the Elliptical Manway Machine air motor requires an adequate filter/regulator/lubricator (FRL) to be used.

NOTE: The air motor warranty is void if damage occurs from contaminated air or lack of lubrication.



If the Elliptical Manway Machine is operated in such a manner that the tool block collects debris while cutting, the tool block should be cleaned after each cutting operation.

Recommended maintenance schedule:

Daily maintenance when the unit is in operation:

Wipe the unit down and spray with a rust preventative under severe humidity conditions.

Visually inspect for loose screws, missing screws, damage, etc.

After every 20 hours of actual operation: Check adjustment of the linear bearings.

After every 40 hours of actual operation: Thoroughly clean and lubricate main gear, drive gear, male and female tool slides, feed screws and tripper block assembly.

Non-scheduled maintenance: Thoroughly clean and check the tool blocks in the event of feed problems.

If the machine is to be stored or if it will remain out of service for a significant period of time (30 days or more), it should be thoroughly cleaned, lubricated and sprayed with a rust preventative prior to storage.

Remove the airline quick disconnect and spray it with a lightweight oil.

Squirt oil into the male disconnect.

Reconnect the airline and turn on the air motor for 1 or 2 seconds to disperse oil throughout the vanes and rotor.

Air motor lubrication:

The air supply must flow through a filter/regulator/lubricator (FRL) unit or separate units before arriving at the motor.

The FRL unit must be maintained as required (frequency dependent upon the basic air supply) to keep the water trap drained, filter cleaned and the lubrication oil reservoir filled so that a drop of oil every 2 to 5 seconds is flowing.

If the Elliptical Manway Machine is to be left idle for 24 hours or more after being run on 'wet' air, it is advisable to squirt oil directly into the motor inlet and run the motor for 2 or 3 seconds.

This will prevent rusting and 'freezing' of the rotor vanes.

Lubricant recommendations:

The drive gears require a high string lubrication grease such as "Chevron Utility Grease, light. high string for gears" (P/N 68-0020).

The slide rails and tool blocks require a light oil such as SAE light machine oil.

The feed screw for the tool block and the tripper block assembly require a SAE 10 light machine oil for normal conditions; and under dusty conditions a silicone, graphite or molybdenum disulfide 'dry' lubricant.

NOTE:	A light film of all purpose grease may be used, but it must be checked for grit contamination frequently.

The air motor requires a Class 2 lubricant, viscosity of 100 to 200 SSU at 100°F (38°C) minimum aniline point of 200°F (93°C).

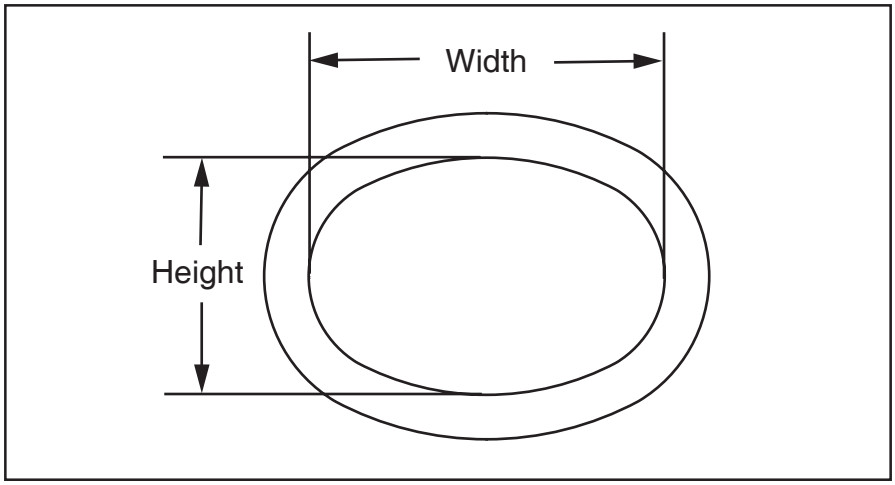
TRI TOOL Inc. - Air Tool Lubricant (P/N 68-0022)

AMOCO - American Industrial Oil No. 32
Atlantic Richfield - Duro Oil S - 150
Chevron - A.W. Machine Oil 32
Exxon - Nuto H32
Shell - Tellus Oil 32

OPERATION

Before attempting to install the Manway Machine (MM) into a manway, there are a few details, safety precautions, and some measurements to be taken.

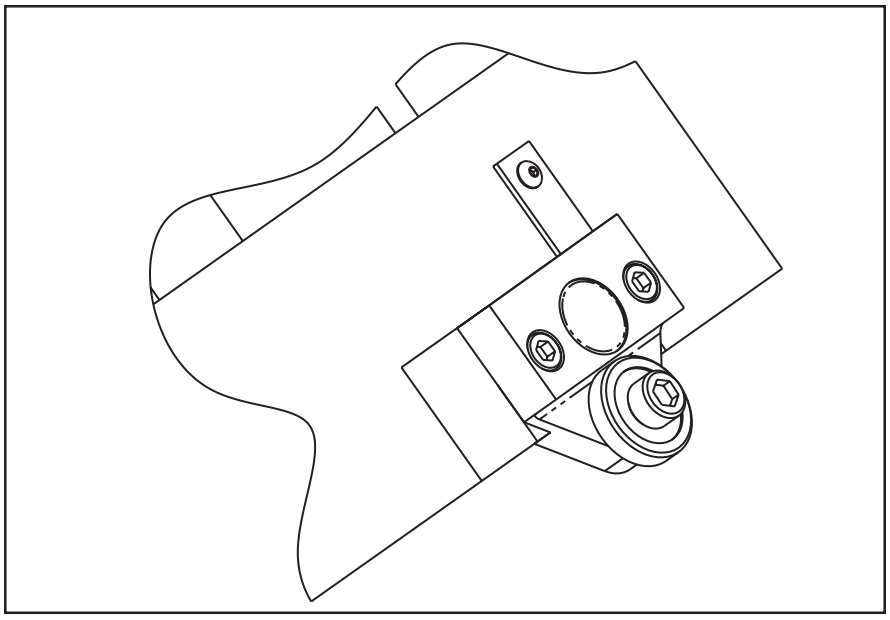
1. Measure the manway's height and width, and record the measurements.



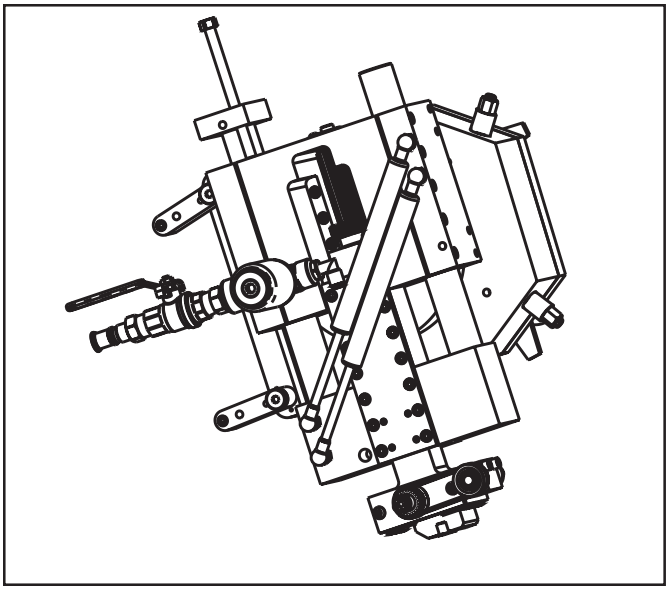
2. Configure the machine either with a template or tracking wheel mode, or inside or outside sealing surface.

NOTE: A template has to be made for each specific manway size and shape for a concentric record finish.

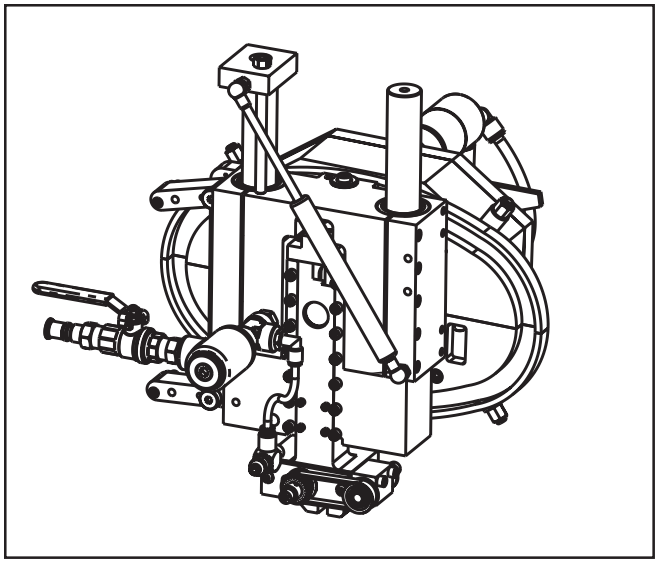
3. To configure the machine with the tracking wheel, install the tracking wheel over the cam follower and secure the two cap screws.



4. There are to be two parallel gas springs pushing outward for tracking the I.D. of the manway.

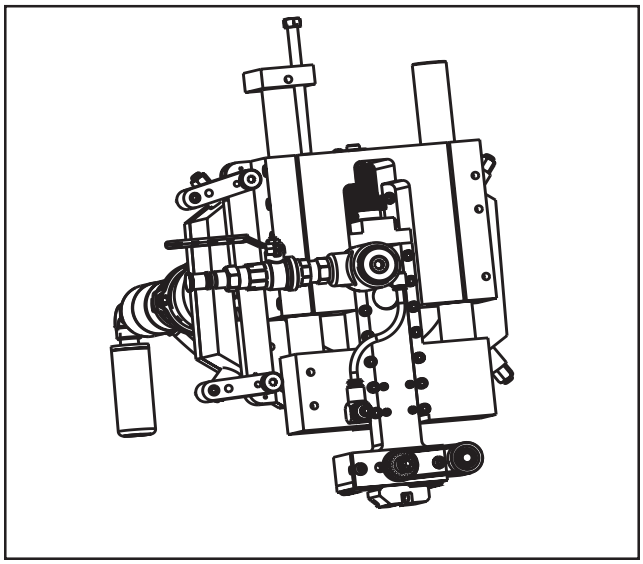


5. To configure the machine with a template, remove the tracking wheel but leave the cam follower installed.
6. There is to be one gas spring installed pushing inward to track the inner surface of the template.

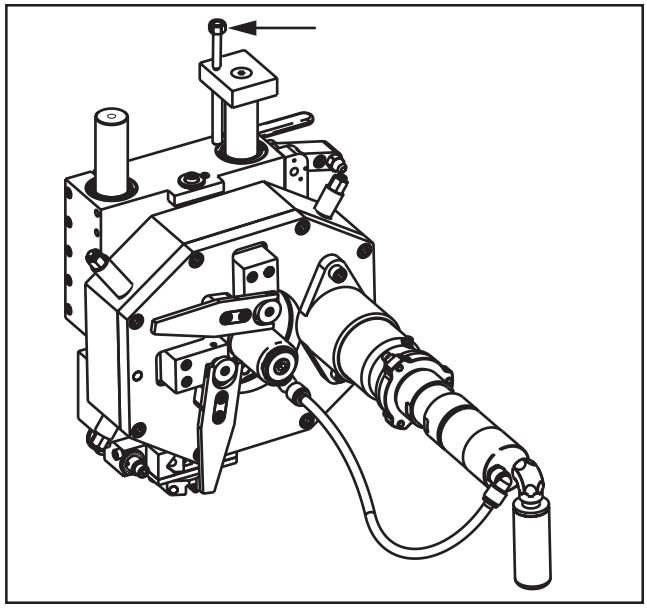


7. If machining the inside face (inside of the vessel) of the manway, remove the drive motor and the shut off valve assembly from the machine.

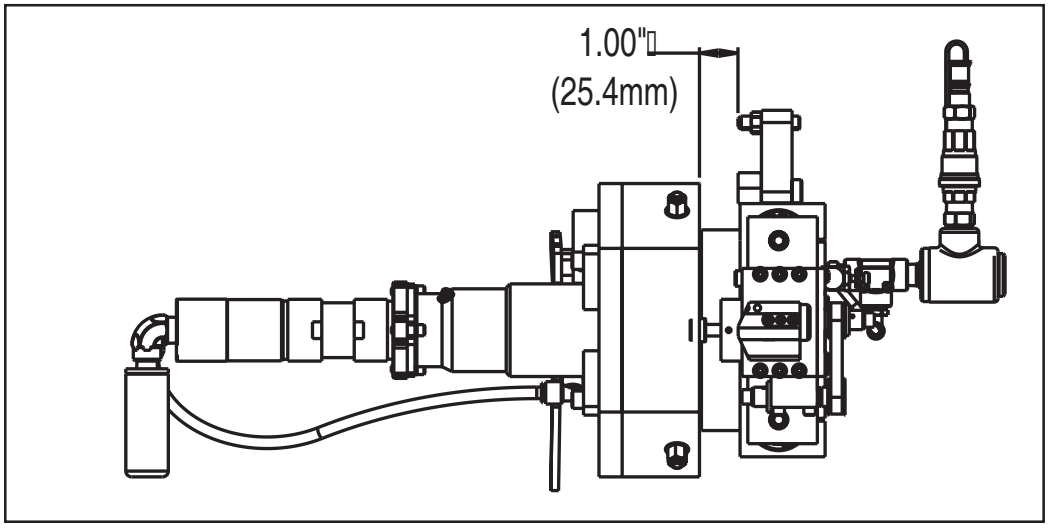
8. If machining the outside face do not remove the motor, but reconfigure the MM with the control valve on the head side of the MM.



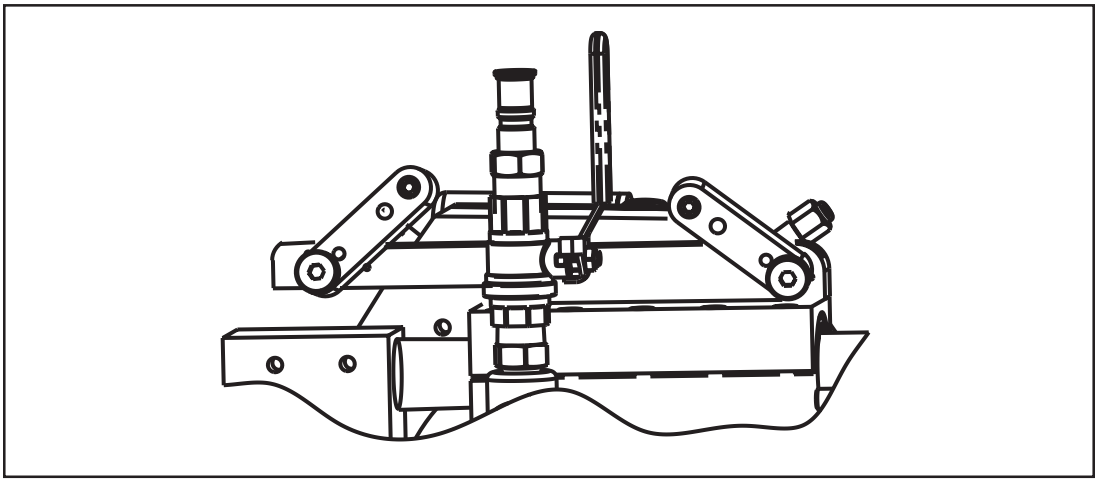
9. Install the MM installation and locking handle into the same mounting holes as the drive motor and rotate it in a manner that the tracking head is in the horizontal position. The tracking wheel or the tool bit will be pointing in the long way (width) of the manway. In outside mode, disregard this step, but position the head in the same orientation.
10. Install a tool bit into the tool holder before retracting the tool holder.
11. Retract the tool holder to its minimum travel until it bottoms out.
12. Set the tracking slide before installation by measuring from the center of the MM to the outside of the tracking wheel, to half of the manway's width, by rotating the hex screw with a 9/16" socket and ratchet (not supplied) or the supplied 9/16" open end wrench.



13. If using the template configuration, there is no adjustment to the tracking slide.
14. Set up the set-up finger length by using a 1” spacer between the MM main housing and the end of the fingers adjusting screws. This distance between each finger has to be as close as possible to each other to minimize the set up time.



15. Rotate all set up fingers to the center of the MM.



16. In outside sealing surface mode, rotate the set-up fingers in a manner that they will touch the sealing surface during insertion of the tool into the manway.
17. Grab the handle and the tool and slide it side ways through the manway. Disregard this step for outside mode.

18. Push the MM through and then pull back on the MM until the set up fingers hit the sealing surface of the manway, rotate the set-up fingers accordingly to accommodate the shape of the manway so that all four fingers touch the sealing surface. In outside mode the MM set up fingers would be touching the sealing surface already.
19. Use the supplied 9/16" open end wrench to tighten the four jackscrews firmly, making sure that the set-up fingers are in contact with the sealing surface of the man-way.
20. Verify that the position of the MM is centered within reason into the manway (+ or – 1/4") for tracking and (+ or – 1/16") for template.
21. Remove the installation handle. Disregard this step for outside mode.
22. Insert a 9/16" socket and ratchet handle onto the tracking slide retracting screw and rotate the screw until the tracking wheel is in contact with the I.D. of the manway, and rotate a few more turns for tracking clearance. Disregard this step for template mode.

NOTE:	If using a template, the tracking slide retracting screw should be removed for better clearance.

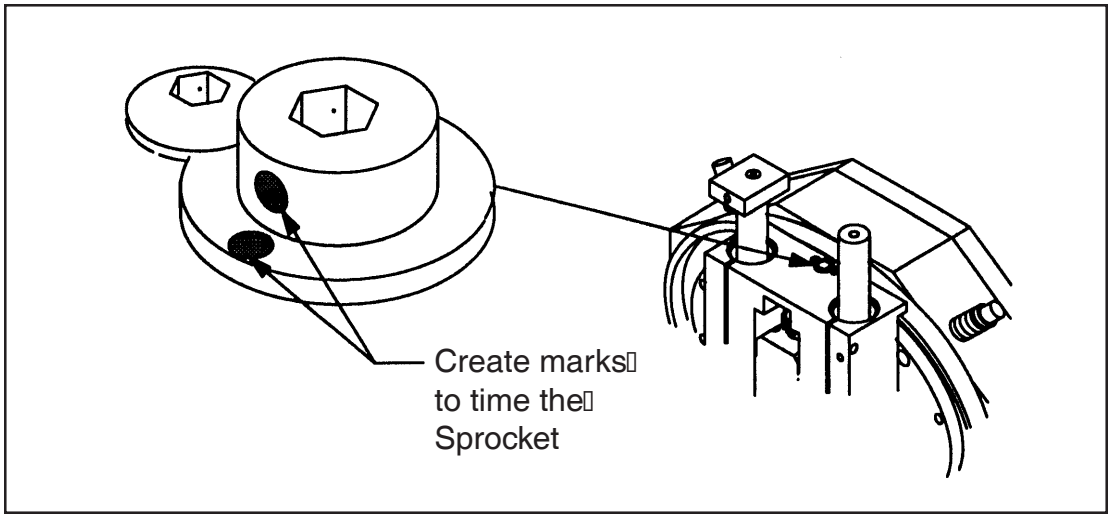
23. Rotate the set-up fingers back toward the center of the MM.
24. Install the drive motor and the shut-off valve.
25. Plug in the air supply to the drive motor.
26. Actuate the valve slowly and let the tool rotate slowly one full rotation to see if there are any restrictions.
27. Rotate the tool to 2 o'clock or 4 o'clock position or until you can see the tool bit holder adjustment screw, then stop it, and let a little air flow into the motor to restraint the head from turning.

NOTE:	The tracking wheel tends to find the highest point of the radius of the ellipse and in the template mode the cam follower tends to find the lowest point of the radius of the ellipse due to the high gas spring pressure.

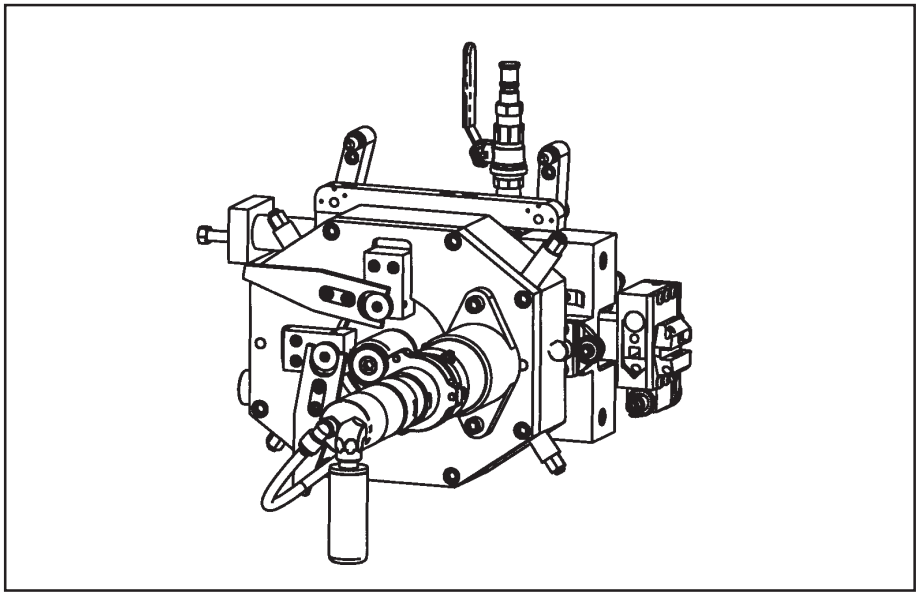
28. Adjust the tool bit height by rotating the tool holder adjustment screw clockwise to bring the tool bit closer to the sealing surface. Each dot on the knob represents .001". In inside mode, use a jointed mirror to see the gap between the tool bit and the sealing face.
29. Adjust the depth of cut to a maximum of .025" for roughing and to .005" to .010" for finishing.

30. Time the feed sprocket by rotating it one point toward the center of the tool. In the outside surface mode, line up the two marks of the tool slide screw and bushing.

NOTE: These two marks are easily made with a black marker when the tool is on a bench, rotate the feed sprocket for correct timing, and mark the location on the screw head and bushing.



31. Engage one feed tripper for a feed rate of .006" / rev. or engage 2 trippers for a feed rate of .012" / rev. In outside mode, actuate the feed trippers with an extended wrench between the manway I.D. and the MM.
32. Start the motor slowly for the first revolution, and then increase the rotation speed to the desired R.P.M. for a good surface finish.
33. When the cut is done, rotate the head so the tracking wheel lines up with the long radius of the manway at 3 o'clock or 9 o'clock position so that when the motor is removed that the tracking wheel does not swing back violently to the long radius of the manway.



34. Shut off the motor.
35. Disconnect the power supply.
36. Remove the motor and the valve assembly. Disregard this step for outside mode.
37. Inspect the sealing surface.
38. If another pass is necessary, return the tool holder back by rotating the feed sprocket or in outside mode by rotating the corresponding screw head with the supplied wrenches.
39. Adjust the tool bit to the desired depth of cut.
40. Install the motor and valve assembly. Disregard this step for outside mode.
41. Start cutting again and repeat until desired finish is obtained.
42. When the cut is completed, locate the tracking wheel to the long end of the radius, remove motor and valve assembly for inside mode only.
43. Install handle.

NOTE:	In the template mode, the handle assembly is the only item to keep the MM head safely in the right orientation for removal and installation since the gas spring pressure tends to bring the head to 12 o'clock or 6 o'clock position.

CAUTION:	No adjustment to the MM should be done in inside mode without the handle installed to restrain the head rotation. In outside/tracking mode all adjustment should be done with the head oriented in the long end of the manway radius. In the outside/template mode the orientation of the head should be on the short end of the manway radius.

44. With the ratchet and 9/16" socket, rotate the tool slide retracting screw to retract the tracking wheel from the manway. In the template mode disregard this step.
45. Loosen the jackscrews, and remove the MM from the manway.

CUTTING SPEEDS

Diameter	RPM for 200 in/min (5080 mm/min)	RPM for 250 in/min (6350 mm/min)	RPM for 300 in/min (7620 mm/min)
12" x 16" Ellipse	4.5	5.6	6.8
Cutting Speeds (approximate)			

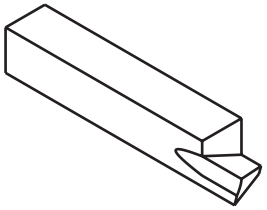
Use 200 surface inches per minute (5080 surface millimeters per minute) for: Stainless steels in general when no coolant is allowed, all heavy-wall tube and some of the chrome/molybdenum steels.

Use 250 surface inches per minute (6350 surface millimeters per minute) for: Mild steels and some thin wall stainless steels when coolants are permitted and applied.

Use 300 surface inches per minute (7620 surface millimeters per minute) for: Aluminum and thin-wall mild steel and tube with coolants.

TOOL BITS

99-4776 Tool Bit, Face, Smooth Finish



TROUBLE SHOOTING

Problem: **The Tool Bit Chatters.**

The tool bit is loose or overextended.
The tool bit is damaged.
The tool holder is too loose in the slides.
The cutting speed is too fast.
The jackscrews are loose in the manway.
Cutting fluid is required.
The main bearing pre-load is loose.

Problem: **There is excessive Tool Bit wear.**

The elliptical manway material is too hard or abrasive.
The cutting speed is too fast.
Cutting fluid is required.
A dull tool bit is causing surface hardening conditions (Stainless pipe or tubing). There is scale or other foreign matter on the pipe or tube, which is dulling the tool bit at the start of the cut.
The tool bit is incorrect for the material being cut.

Problem: **The Tool Bit is diving and the Elliptical Manway Machine is stalling.**

The tool bit is dull, chipped, etc.
The tool holder adjustment slide is too loose.
The tool bit is over-extended.
The tool holder is over-extended.

Problem: **The surface finish is rough.**

The tool bit is dull, chipped, etc.
Metal build/up on the cutting edge of the tool bit is creating a false cutting edge.
Cutting fluid is required.
The cutting speed is incorrect.

Problem: **The tool holder is not feeding.**

The feed pin is broken or out of position.
The feed sprocket shear pin is broken.
The feed screw is stripped.
The feed nut is stripped.

Problem: The Elliptical Manway Machine is slipping on the pipe or tube.

The Jackscrews are not in full contact with the pipe or tube.

The clamping pressure is too light.

Scale and/or other foreign material is present on the pipe or tube.

Weld seams, swelling, or bumps under the jackscrews are preventing full contact.

Dull tool bits are causing extra force in the axial and/or radial direction.

Problem: There is a loss of air power.

The air supply pressure is too low.

The air filter is plugged.

The air motor is not properly lubricated.

The exhaust is plugged.

The air line size is insufficient.

The air line is too long.

The air motor is icing up because the water trap in the FRL has not been drained.

Problem: The air motor will not start.

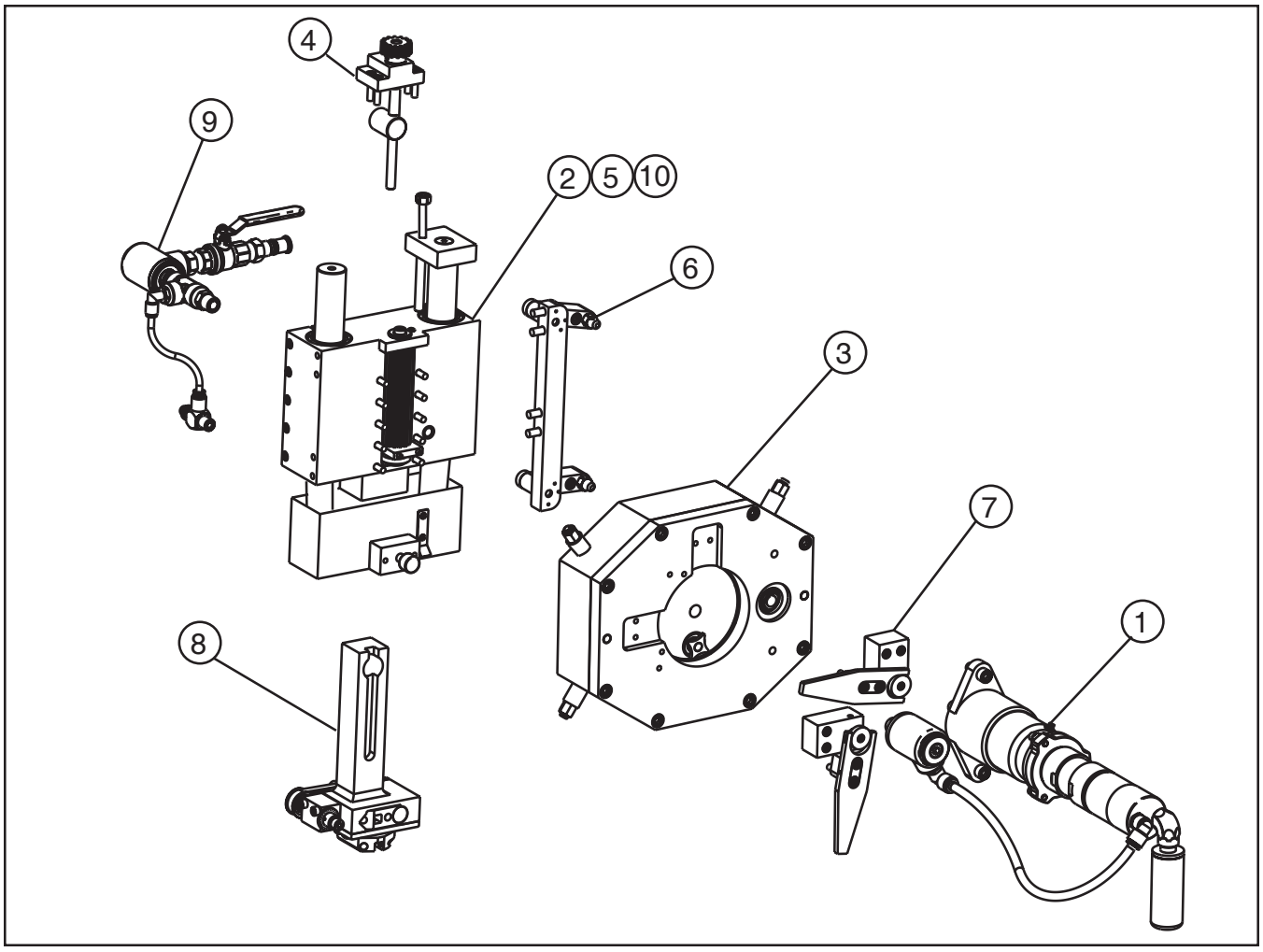
The air power supply is shut off.

The air motor is damaged and will not run free.

The air motor needs lubrication. Add lubrication and do not run the air motor for a few minutes, then try running the motor. Tap on the side of the air motor casing lightly with a piece of wood or with a soft rubber mallet just in case the vanes may be sticking.

Sand or other foreign material may be in the vanes of the air motor.

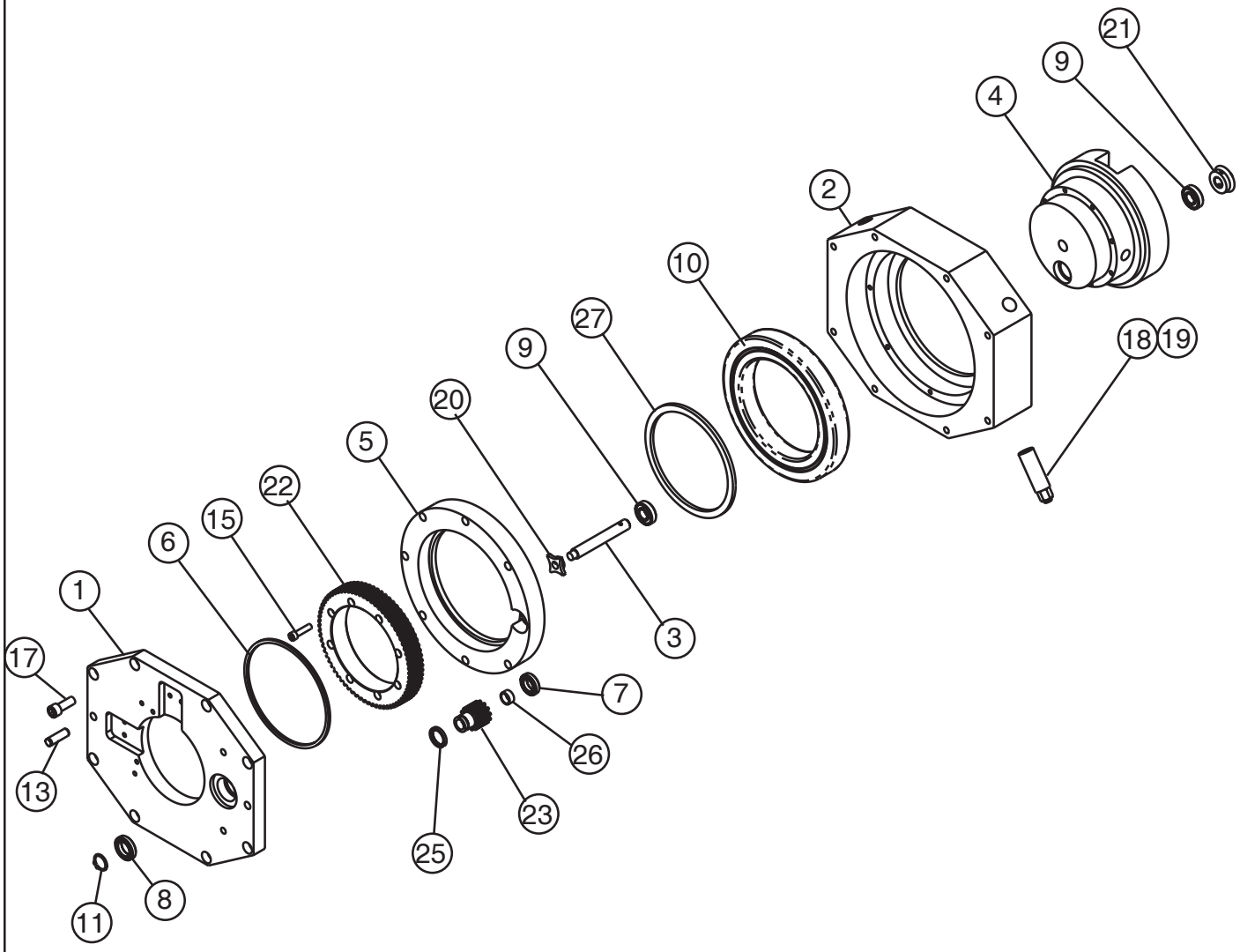
ILLUSTRATED PARTS BREAKDOWN



Parts List, Sub-Assembly (P/N 82-0118)

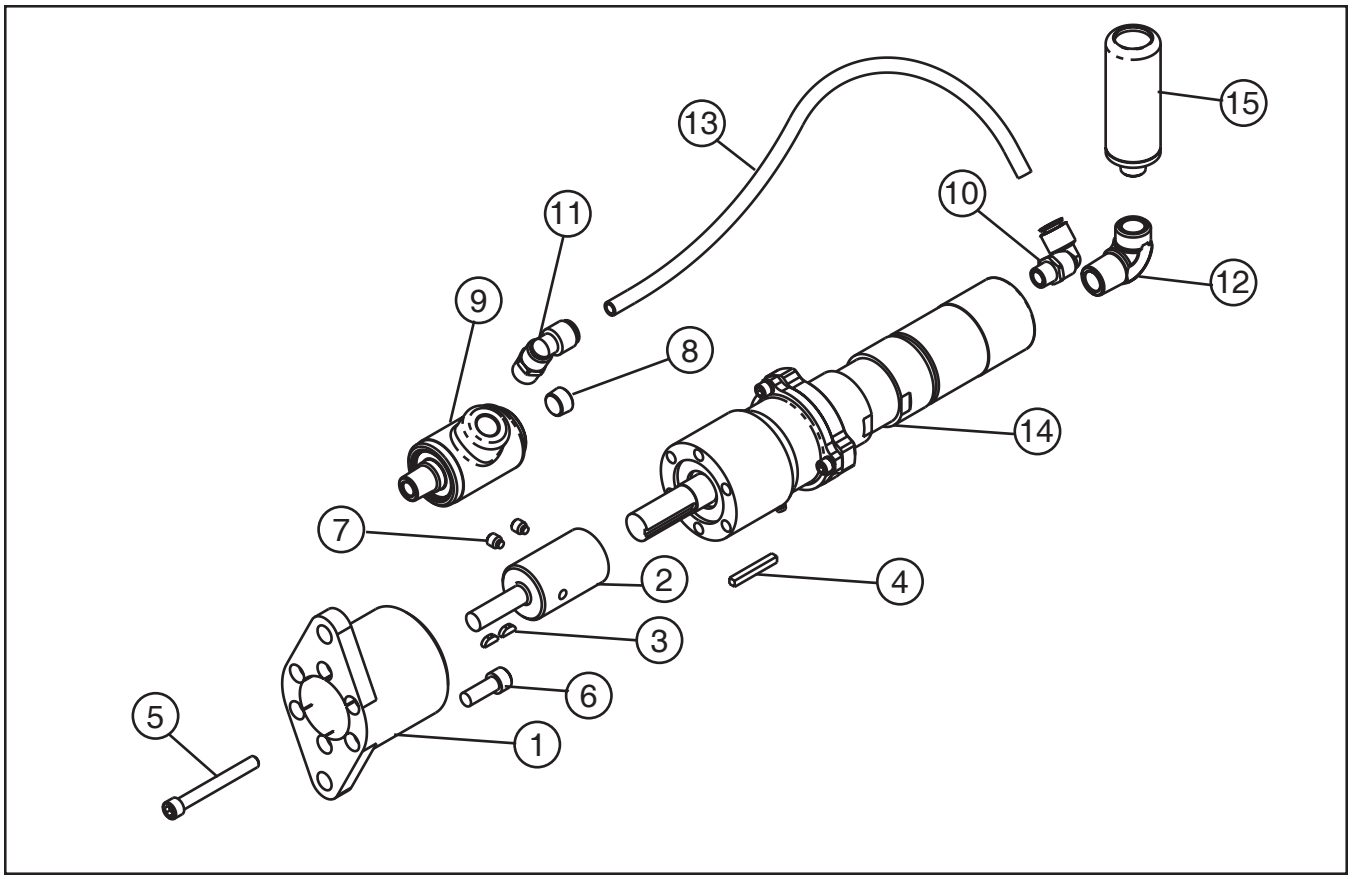
Item No.	Part No.	Description	Qty
1.	04-0109	DRIVE ASSEMBLY	1
2.	19-0769	HOUSING ASSEMBLY, HEADSTOCK	1
3.	19-0770	HOUSING ASSEMBLY, MACHINE	1
4.	33-1837	FEED SCREW ASSEMBLY, HEADSTOCK	1
5.	40-0237	SPRING ASSEMBLY	2
6.	47-1119	BRACKET ASSEMBLY, SET-UP	2
7.	47-1120	BRACKET ASSEMBLY, TRIPPER	2
8.	49-0315	HOLDER ASSEMBLY, TOOL	1
9.	54-0388	PNEUMATICS ASSEMBLY, HEADSTOCK	1
10.	61-0086	WHEEL ASSEMBLY, TRACKING	1

Housing Assembly (P/N 19-0770)



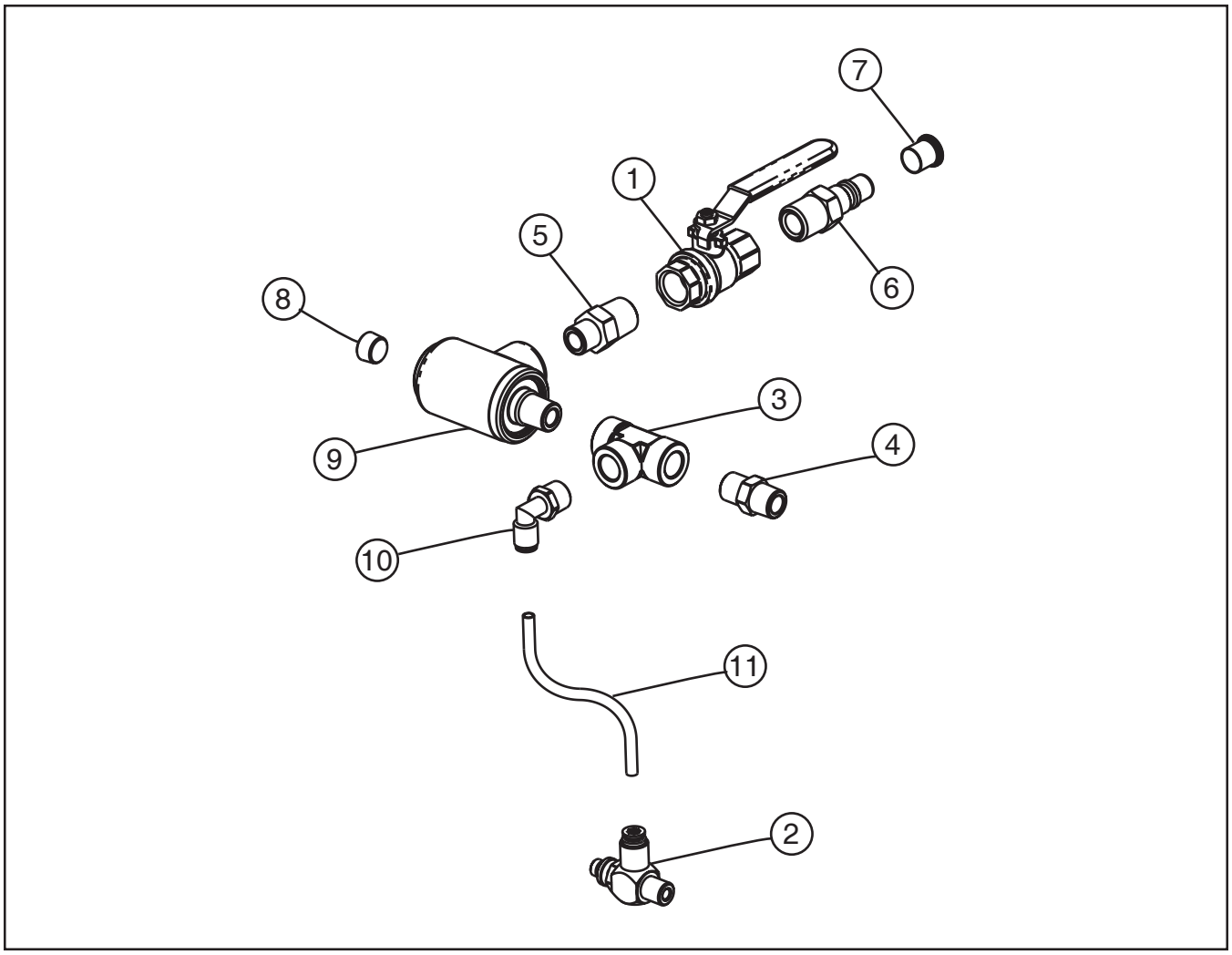
Parts List, Housing Assembly (P/N 19-0770)

Item No.	Part No.	Description	Qty
1.	19-0645	HOUSING, DRIVE COVER	1
2.	19-0646	HOUSING, MAIN	1
3.	20-0538	SHAFT, TRIPPER	1
4.	20-0539	SPINDLE	1
5.	24-1207	PLATE, BEARING RETAINER	1
6.	28-0276	SEAL, FELT	1
7.	29-0064	BEARING, BALL	1
8.	29-0080	BEARING, BALL	1
9.	29-0182	BEARING, BALL	2
10.	29-0296	BEARING, BALL	1
11.	30-2152	RING, RETAINING	1
12.	32-0036	PIN, ROLL	1
13.	32-0108	PIN, DOWEL	2
14.	32-0126	PIN, GROOVE	1
15.	33-0042	SCREW, CAP (1/4-20 X 1”)	7
16.	33-0043	SCREW, CAP (1/4-20 X 1 1/4”)	8
17.	33-0071	SCREW, CAP (3/8-16 X 1”)	12
18.	33-1416	JACKSCREW ASSEMBLY	4
19.	33-1417	JACKSCREW ASSEMBLY	4
20.	38-0121	SPROCKET	1
21.	39-0621	GEAR	1
22.	39-0699	GEAR	1
23.	39-0706	GEAR	1
24.	41-0137	HANDLE	1
25.	44-0400	SPACER	1
26.	44-0401	SPACER	1
27.	44-0406	SPACER, DRIVE GEAR	1
28.	54-0304	PLUG, PRESSURE	1



Parts List, Drive Assembly (P/N 04--0109)

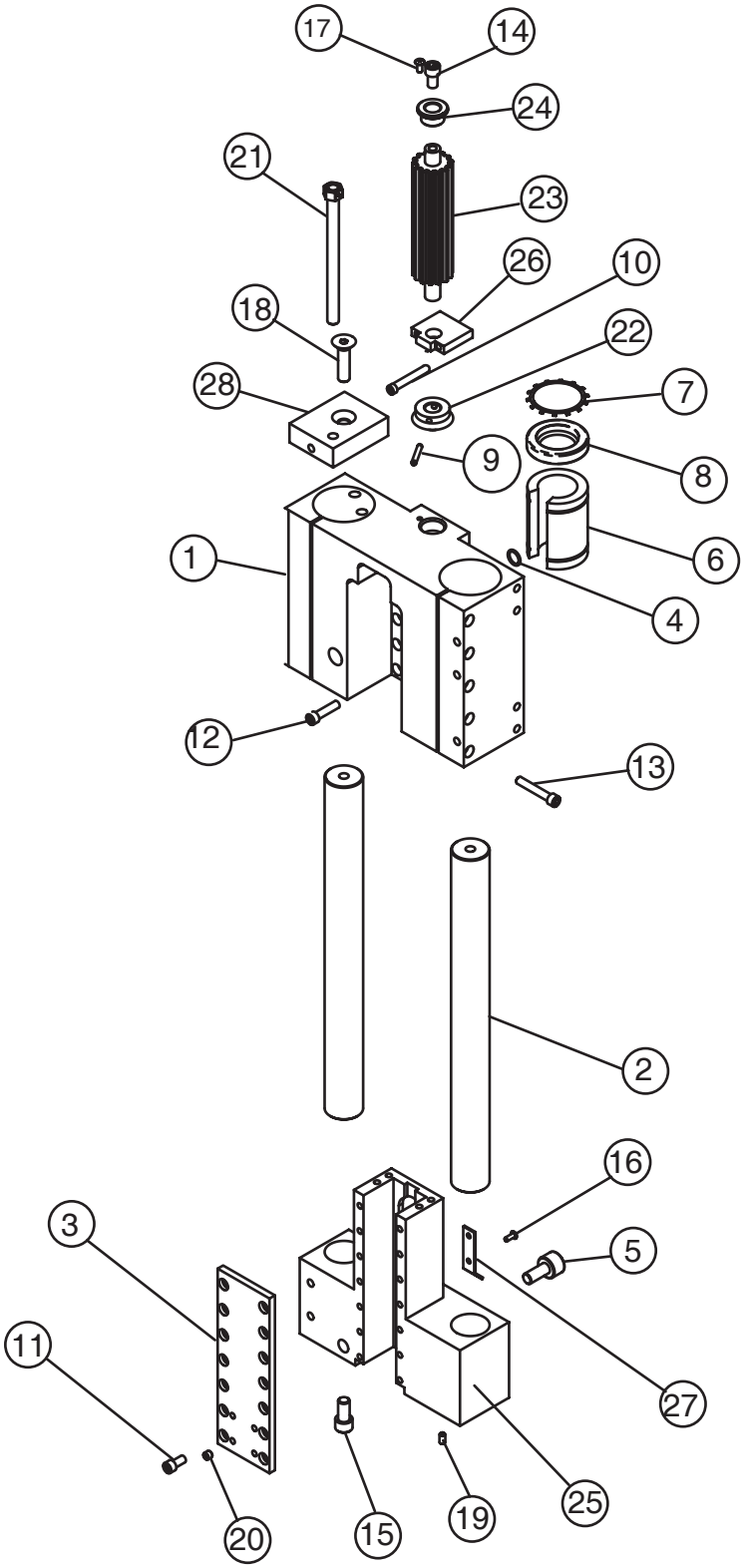
Item No.	Part No.	Description	Qty
1.	27-0410	HOUSING, DRIVE	1
2.	27-0443	ADAPTOR, DRIVE	1
3.	31-0004	KEY	2
4.	31-0030	KEY	1
5.	33-0063	SCREW, CAP (5/16-18 X 2 3/4")	6
6.	33-0071	SCREW, CAP (3/8-16 X 1")	2
7.	33-1301	SCREW, SET, HALF DOG (5/16-18 X 3/8")	2
8.	54-0304	PLUG, PRESSURE	1
9.	54-0339	UNION, ROTATING	1
10.	54-0359	FITTING, ELBOW	1
11.	54-0384	FITTING, ELBOW	1
12.	54-0395	FITTING, ELBOW	1
13.	55-0186	TUBING, 3/8"	16"
14.	57-0184	MOTOR, AIR	1
15.	91-0158	MUFFLER	1



Parts List, Pneumatics, Headstock (P/N 54-0388)

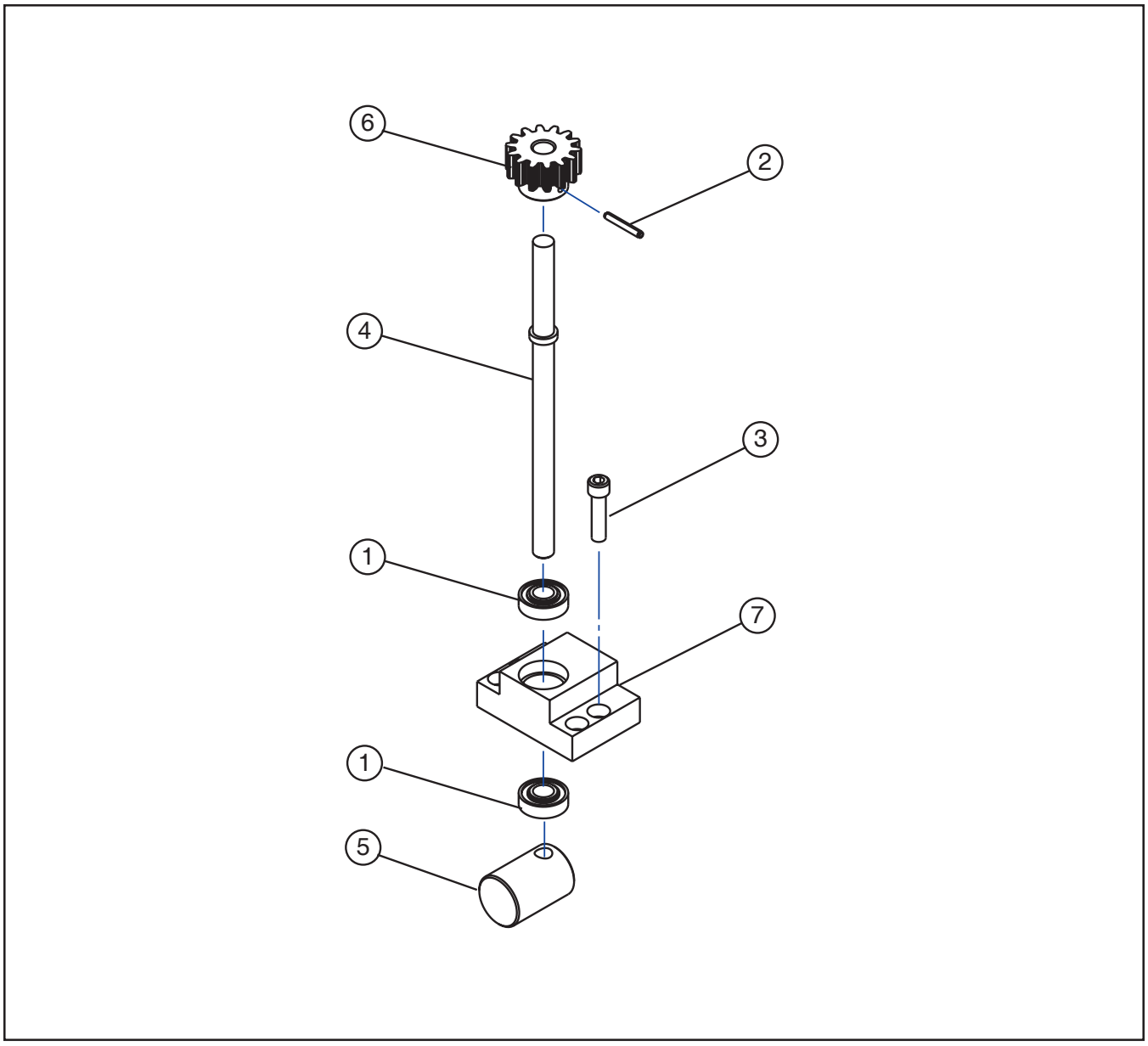
Item No.	Part No.	Description	Qty
1.	53-0016	VALVE, BALL SHUT OFF	1
2.	53-0062	VALVE, FLOW CONTROL	1
3.	54-0028	TEE, PIPE	1
4.	54-0034	NIPPLE	1
5.	54-0050	NIPPLE	1
6.	54-0126	COUPLING, MALE	1
7.	54-0201	CAP. YELLOW	1
8.	54-0304	PLUG, PRESSURE	1
9.	54-0339	UNION, ROTATING	1
10.	54-0358	FITTING	1
11.	55-0180	TUBING,1/4”	13.5”

Housing Assembly, Headstock (P/N 19-0769)



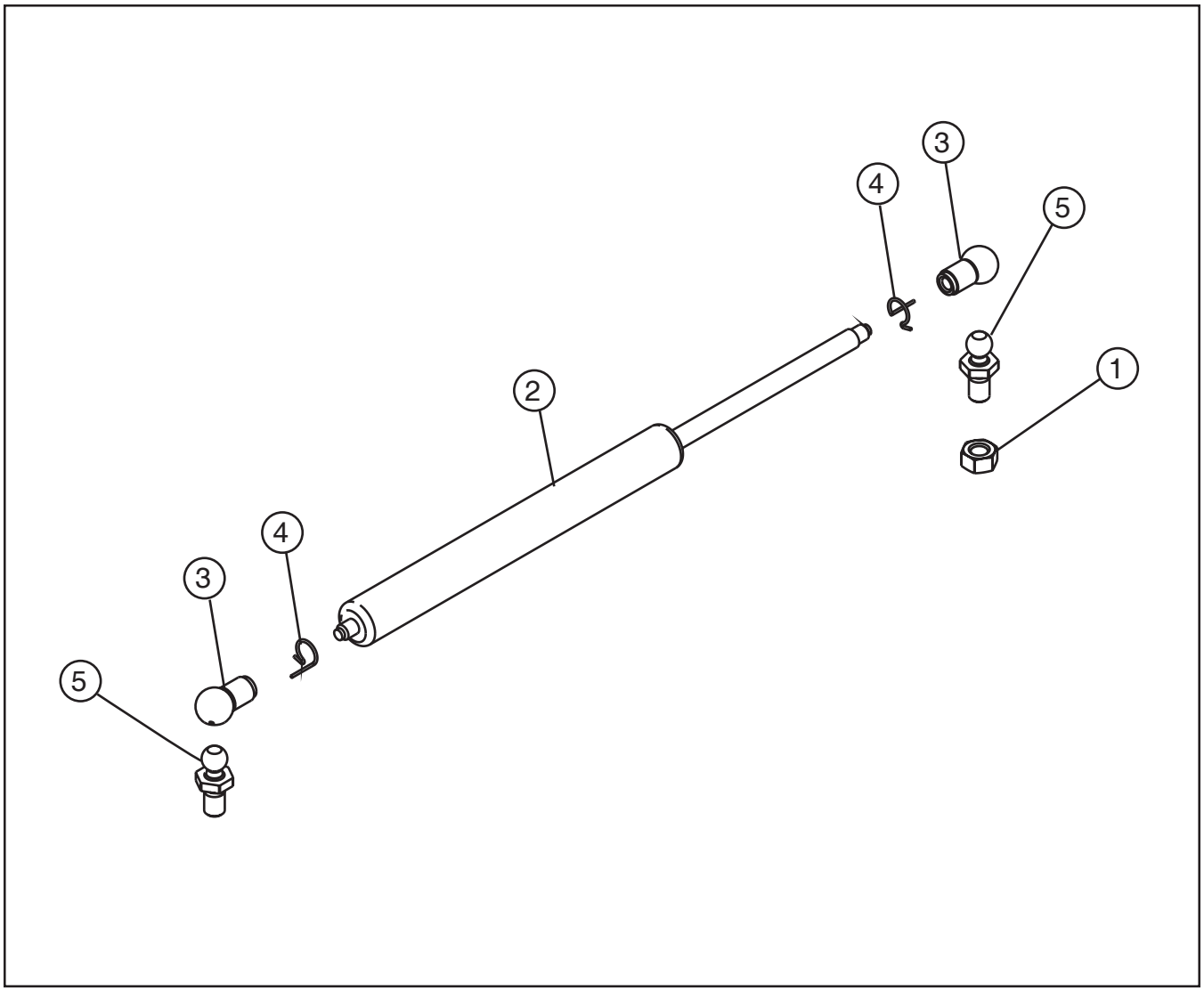
Parts List, Housing Assembly, Headstock (P/N 19-0769)

Item No.	Part No.	Description	Qty
1.	19-0647	HOUSING, GUIDE	1
2.	20-0537	SHAFT, GUIDE	2
3.	24-1209	PLATE, RETAINING, TOOL HOLDER	1
4.	28-0275	O-RING	1
5.	29-0219	CAM FOLLOWER	1
6.	29-0318	BUSHING, BALL	4
7.	30-2294	RING, RETAINING	4
8.	30-2295	SEAL, DUST	4
9.	32-0036	PIN, ROLL	1
10.	33-0034	SCREW, CAP (10-24 X 1 1/2”)	2
11.	33-0038	SCREW, CAP (1/4-20 X 1/2”)	14
12.	33-0042	SCREW, CAP (1/4-20 X 1”)	10
13.	33-0044	SCREW, CAP (1/4-20 X 1 1/2”)	10
14.	33-0052	SCREW, CAP (5/16-18 X 1/2”)	1
15.	33-0069	SCREW, CAP (3/8-16 X 3/4”)	2
16.	33-0269	SCREW, BUTTON HEAD (#6-32 X 3/8”)	2
17.	33-0273	SCREW, BUTTON HEAD (#8-32 X 3/8”)	1
18.	33-0382	SCREW, FLAT (3/8-16 X 1 1/2”)	1
19.	33-0490	SCREW, SET, CUP POINT (10-24 X 3/8”)	1
20.	33-2261	SCREW, SET, (1/4-20 X .215”)	4
21.	33-1871	SCREW ASSEMBLY	1
22.	39-0621	GEAR	1
23.	39-0704	GEAR, FEED	1
24.	45-0279	BUSHING, FLANGE	1
25.	47-0841	BRACKET, TOOL HOLDER	1
26.	47-0842	BRACKET, BEARING	1
27.	47-0924	BRACKET, DEFLECTOR	1
28.	48-0829	BLOCK, MOUNTING	1



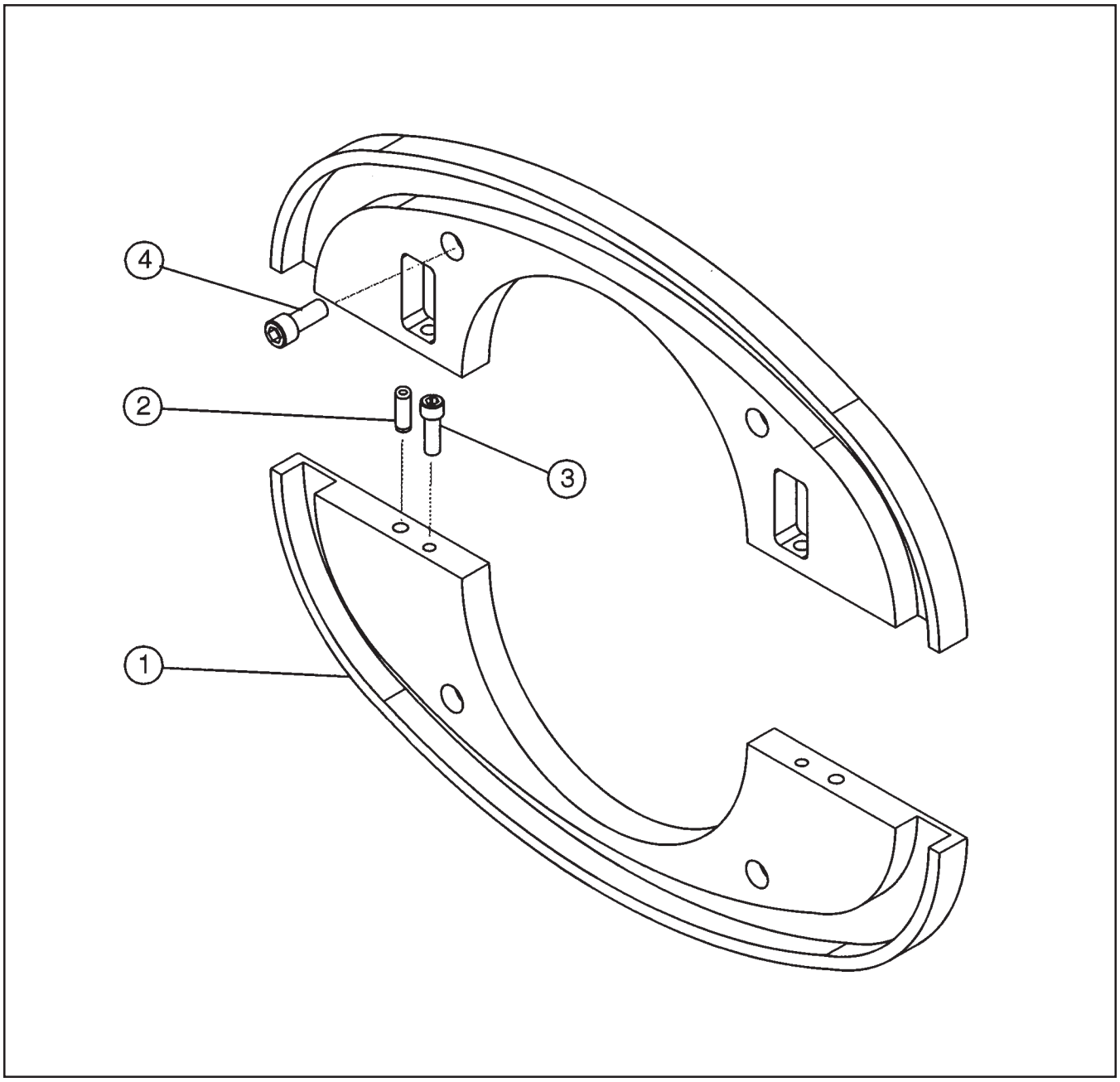
Parts List, Feed Assembly, Headstock (P/N 33-1837)

Item No.	Part No.	Description	Qty
1.	29-0084	BEARING, BALL	2
2.	32-0027	PIN, ROLL	1
3.	33-0042	SCREW, CAP (1/4-20 X 1”)	4
4.	33-1817	SCREW, FEED (3/8-40 UNEF LH)	1
5.	35-0390	NUT	1
6.	39-0620	GEAR, PINION	1
7.	48-0801	BLOCK, FEED	1



Parts List, Spring Assembly (P/N 40-0237)

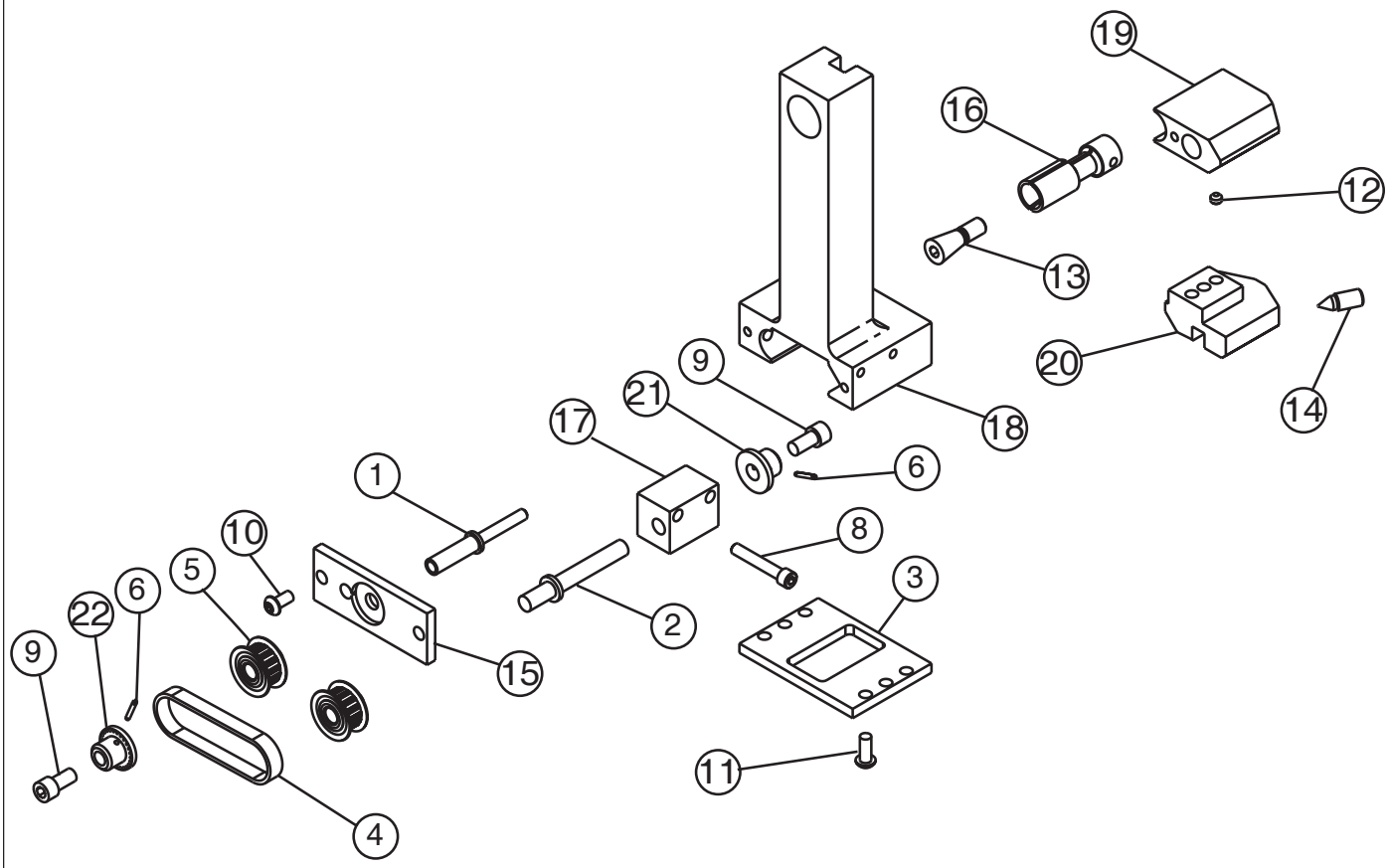
Item No.	Part No.	Description	Qty
1.	35-0007	NUT, HEX	2
2.	40-0197	SPRING, GAS	1
3.	40-0199	STUD, BALL	2
4.	40-0200	CLIP, SAFETY	2
5.	40-0231	FITTING, END	2



Parts List, Template Assembly (P/N 24-1838)

Item No.	Part No.	Description	Qty
1.	24-1835	PLATE, TEMPLATE	1
2.	32-0140	PIN, DOWEL	2
3.	33-0040	SCREW, CAP (1/4-20 X 3/4”)	2
4.	33-0054	SCREW, CAP (5/16-18 X 3/4”)	4

Tool Holder (P/N 49-0315)

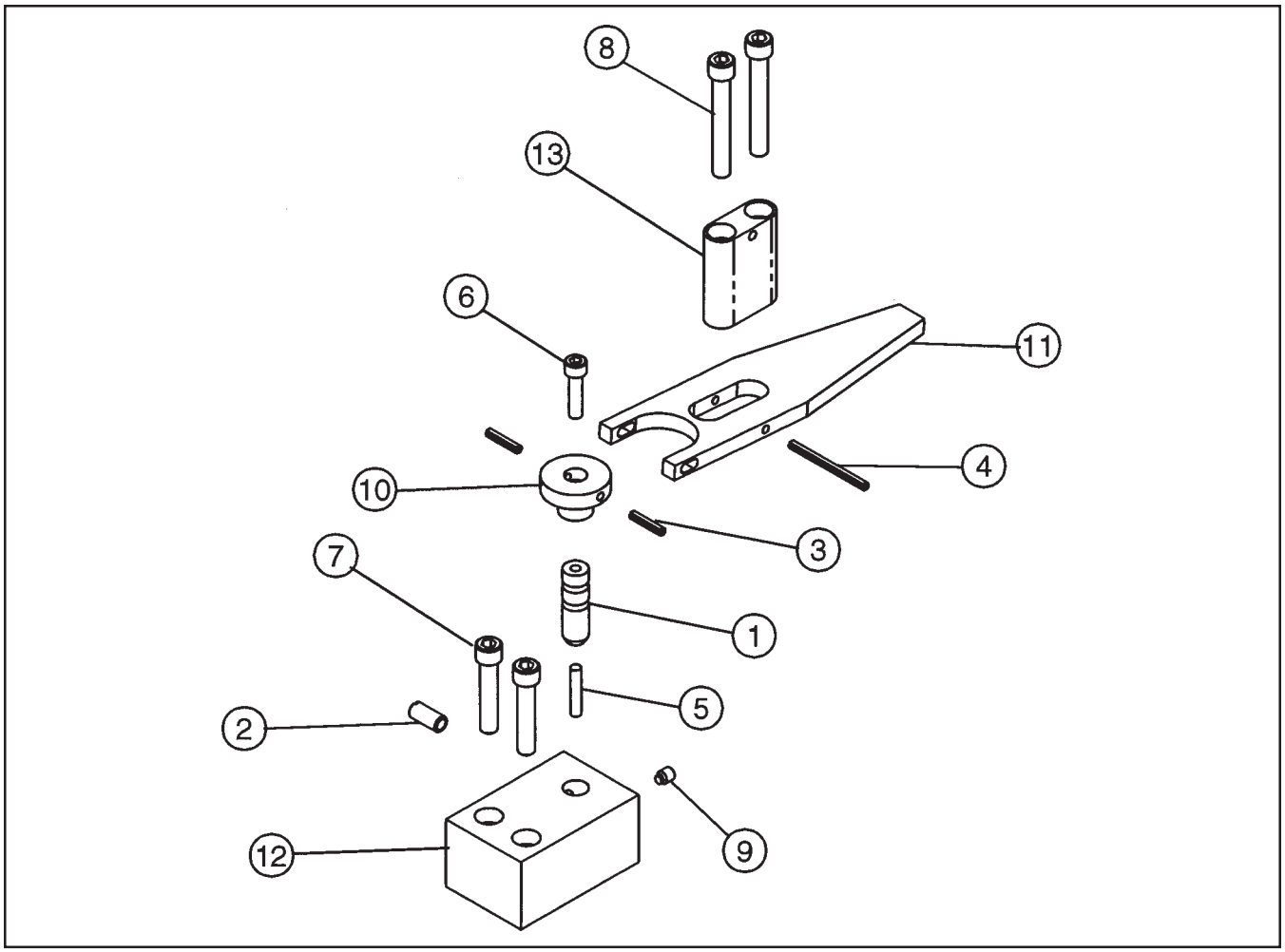


Parts List, Tool Holder (P/N 49-0315)

Item No.	Part No.	Description	Qty
1.	20-0575	SHAFT, TOOL ADJUSTMENT	1
2.	20-0576	SHAFT, PULLEY	1
3.	24-1208	PLATE, RETAINING, TOOL HOLDER	1
4.	30-2517	BELT, ADJUSTMENT	1
5.	30-2518	PULLEY	2
6.	32-0017	PIN, ROLL	2
7.	33-0042	SCREW, CAP (1/4-20 X 1”)	11
8.	33-0044	SCREW, CAP (1/4-20 X 1 1/2”)	2
9.	33-0053	SCREW, CAP (5/16-18 X 5/8”)	3

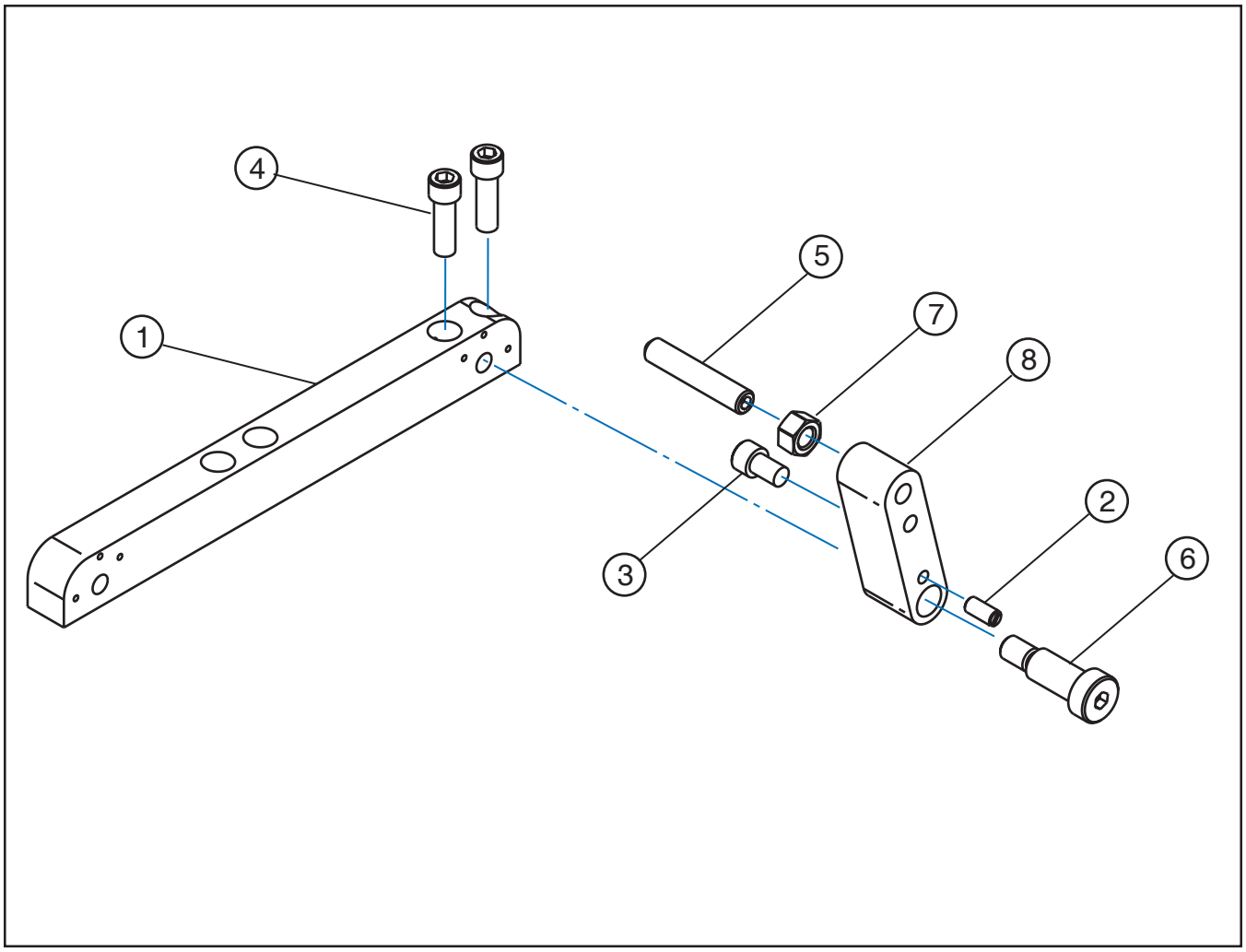
Parts List, Tool Holder (P/N 49-0315)

Item No.	Part No.	Description	Qty
10.	33-0285	SCREW, BUTTON HEAD (1/4-20 X 1/2”)	2
11.	33-0286	SCREW, BUTTON HEAD (1/4-20 X 5/8”)	6
12.	33-0498	SCREW, SET, CUP POINT (1/4-20 X 3/16”)	5
13.	33-1720	SCREW, WEDGE	1
14.	33-1723	SCREW, CLAMPING	2
15.	43-0417	COVER, TOOL HOLDER	1
16.	46-0357	SLEEVE, CLAMPING	1
17.	48-0883	BLOCK	2
18.	49-0259	BRACKET, TOOL HOLDER	1
19.	49-0277	HOLDER, TOOL	1
20.	49-0314	HOLDER, TOOL	1
21.	50-0017	DIAL	1
22.	50-0018	DIAL	1



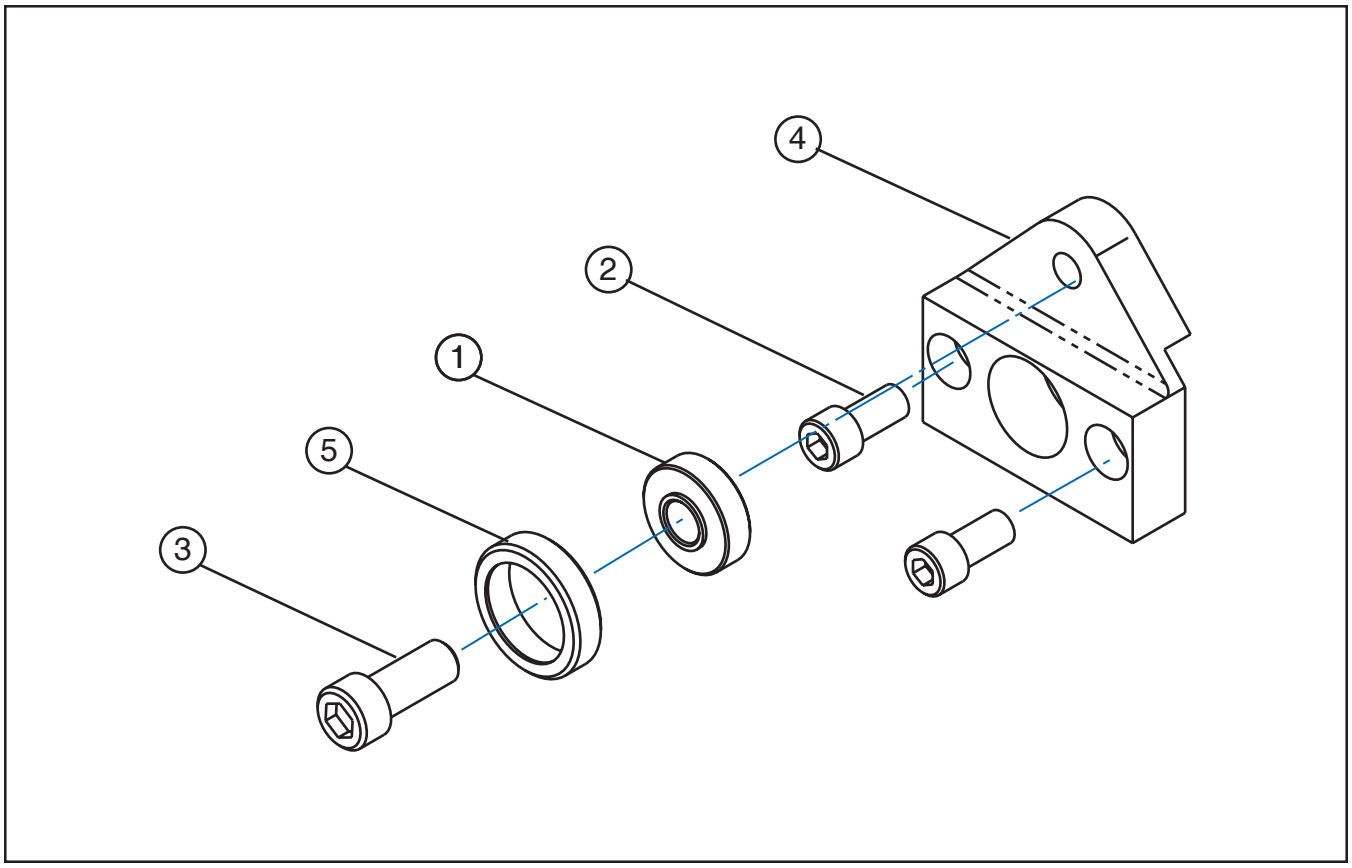
Parts List, Tripper Bracket Assembly (P/N 47-1120)

Item No.	Part No.	Description	Qty
1.	20-0142	SHAFT, TRIPPER	1
2.	30-0125	PLUNGER, BALL	1
3.	32-0025	PIN, ROLL	2
4.	32-0030	PIN, ROLL	1
5.	32-0084	PIN, DOWEL	1
6.	33-0030	SCREW, CAP (10-24 X 3/4”)	1
7.	33-0043	SCREW, CAP (1/4-20 X 1 1/4”)	2
8.	33-0045	SCREW, CAP (1/4-20 X 1 3/4”)	2
9.	33-0954	SCREW, SET, HALF DOG (10-24 X 1/4”)	1
10.	42-0144	KNOB	1
11.	47-0926	LEVER, TRIPPER	1
12.	48-0802	BLOCK, TRIPPER	1
13.	48-0818	BLOCK, SUPPORT	1



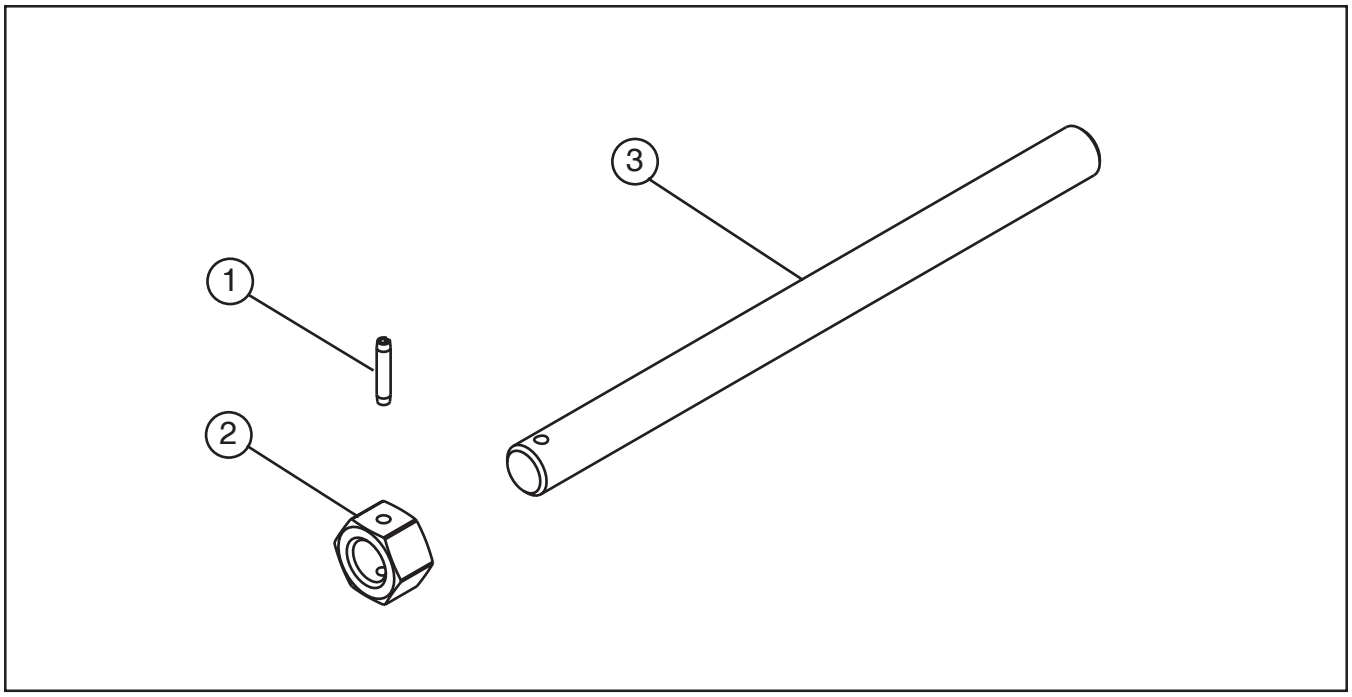
Parts List, Set-Up Bracket Assembly (P/N 47-1119)

Item No.	Part No.	Description	Qty
1.	26-1433	BAR, SET-UP FINGER	1
2.	30-0125	PLUNGER, BALL	2
3.	33-0052	SCREW, CAP (1/4-20 X 17/32”)	2
4.	33-0056	SCREW, CAP (5/16-18 X 1”)	4
5.	33-0537	SCREW, SET, CUP POINT (3/8-16 X 2”)	2
6.	33-0965	SCREW, SHOULDER (1/2X1”)	2
7.	35-0019	NUT, HEX	2
8.	47-0923	BRACKET, SQUARING	2



Parts List, Tracking Wheel Assembly (P/N 61-0086)

Item No.	Part No.	Description	Qty
1.	29-0206	BEARING, BALL	1
2.	33-0038	SCREW, CAP (1/4-20 X 1/2”)	2
3.	33-1997	SCREW, CAP	1
4.	47-1118	BRACKET, WHEEL	1
5.	61-0085	WHEEL, TRACKING	1



Parts List, Screw Assembly (P/N 33-1871)

Item No.	Part No.	Description	Qty
1.	32-0016	PIN, ROLL	1
2.	35-0119	NUT, HEX	1
3.	23-0364	ROD, THREADED	1

RECOMMENDED SPARES

Part No.	Description	Qty
14-0019	SHAFT, ASSEMBLY TRIPPER	1
30-2517	BELT, ADJUSTMENT	1
32-0084	PIN, TRIPPER	2
33-0965	SCREW, SHOULDER (1/2 X 1”)	2
33-1723	SCREW, CLAMPING	1
33-1817	SCREW, FEED	1
35-0390	NUT, FEED	1
38-0121	SPROCKET	1
61-0085	WHEEL, TRACKING	2

WRENCH KIT

Wrench Kit (P/N 05-0362)

Part No.	Description	Qty
36-0003	WRENCH, L, 3/32” HEX	1
36-0005	WRENCH, L, 1/8” HEX	1
36-0007	WRENCH, L, 5/32” HEX	1
36-0008	WRENCH, L, 3/16” HEX	1
36-0009	WRENCH, L, 7/32” HEX	1
36-0010	WRENCH, L, 1/4” HEX	1
36-0011	WRENCH, L, 5/16” HEX	1
36-0018	WRENCH, T, 1/8” HEX	1
36-0021	WRENCH, T, 3/16” HEX	1
36-0023	WRENCH, T, 1/4” HEX	1
36-0024	WRENCH, T, 5/16” HEX	1
36-0076	WRENCH, COMBINATION, 9/16”	1
36-0250	BALL HEX DRIVER (3/16 X 18”)	1
36-0249	BALL HEX DRIVER (1/4 X 18”)	1
36-0251	WRENCH ASSEMBLY, SPANNER	1