

Exchanger Mill

Operating Manual

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DOCUMENT NUMBER

SPR-MAN-EXM

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SUPERIOR

One Company, *Superior* Results.

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ABOUT US

Superior Portable Machine Tools (SPR) is your go-to source for specialty tools and equipment in the Oil and Gas, Mining, Heavy Construction, Shipbuilding, Aerospace, Defense, and Power Generation industries. With a strong presence across locations in the US and Canada, as well as a global network of dealers, we proudly offer a comprehensive range of cutting-edge machinery. From portable line boring machines and auto bore welders to linear/gantry and rotary milling machines, our lineup covers all your needs. We also provide top-of-the-line Aggressive® clamshells (pipe cutters), ID/OD flange facers, end-prep bevelers, and weld isolation and test plugs. Additionally, our expertise extends to the production and maintenance of heat exchangers, condensers, and boilers through our partnership with Maus Italia. SPR's engineering group is ready to customize existing products or create tailor-made solutions from scratch, and we excel in precision grinding and tooling services, offering a wide assortment of custom and standard tool bits.

We go above and beyond by providing value-added engineering, comprehensive training programs, and unwavering operational support. Rest assured, we prioritize the highest health, safety, and environmental standards in the industry. Our extensive experience in service, deep understanding of equipment requirements, and unwavering dedication to customer satisfaction are the pillars of our commitment to delivering exceptional equipment and unmatched customer care.



WARNING:

SPR is committed to continued product improvement; therefore, the machine you received may be slightly different than the one described herein. This manual and the information provided is a basic guideline for our customers. SPR will do its best to ensure that the information and procedures contained in this manual are correct and up-to-date. Superior cannot guarantee that the information and procedures contained herein are correct for all applications or situations.

The contents of this manual are subject to change without notice. It is the obligation of the user to read all information in this manual, become familiar with the equipment to be used, and exercise the utmost care in equipment operation. **Do not make any modifications to this equipment. Any modifications will void all warranty claims, as well as increase the risk of injury or harm.** Do not operate this equipment if all parts are not functioning at 100% efficiency. Notify us immediately for any needed repairs.



Note: SPR will supply all repair and replacement parts necessary for maintenance and operation of this machine. For repair, service, or additional information, please locate repair and replacement part description/part numbers within the O&M manual in the exploded view section and contact us for ordering.

USA

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SUPERIOR

One Company, *Superior* Results.

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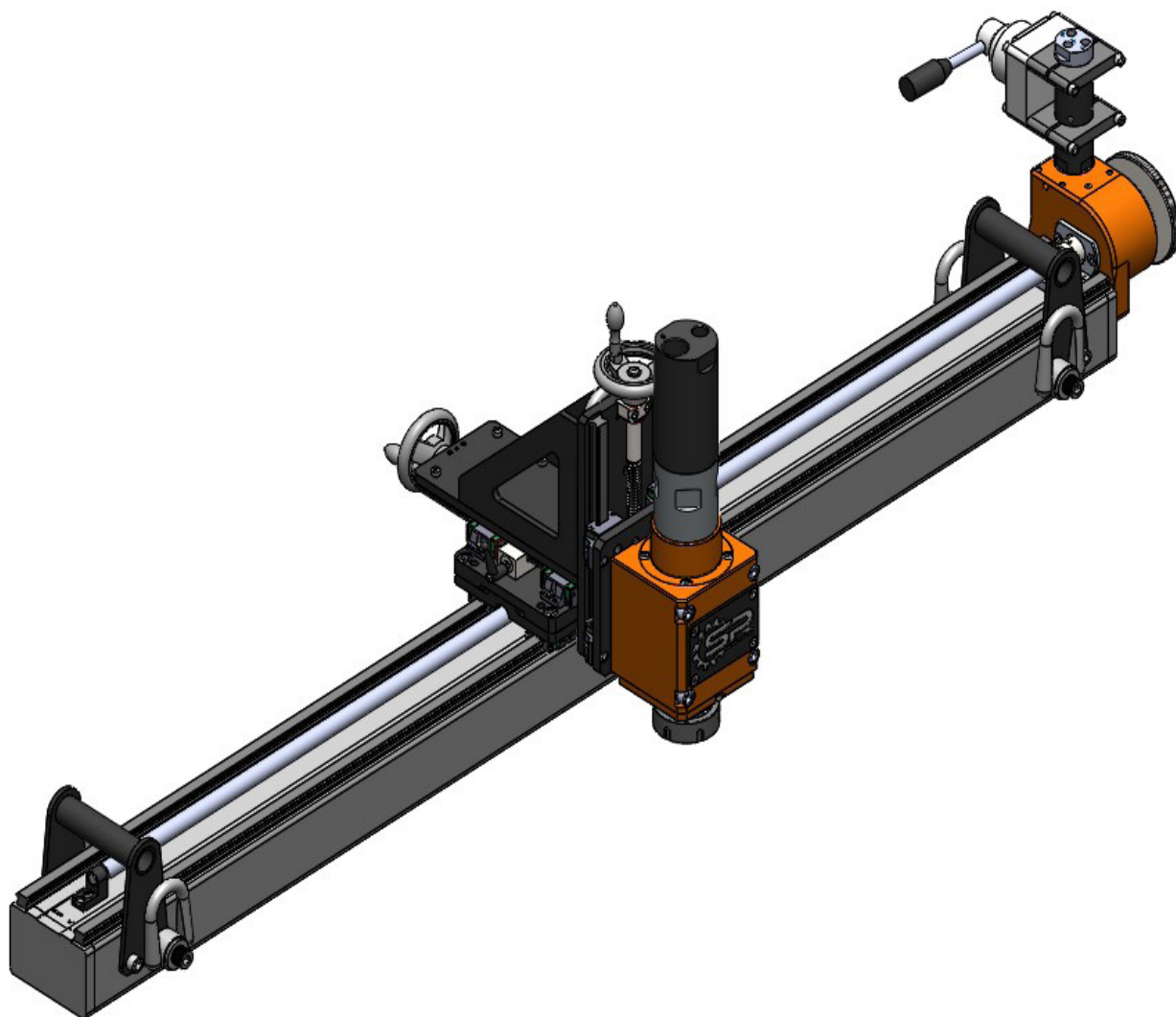
INTRODUCTION

APPLICATIONS

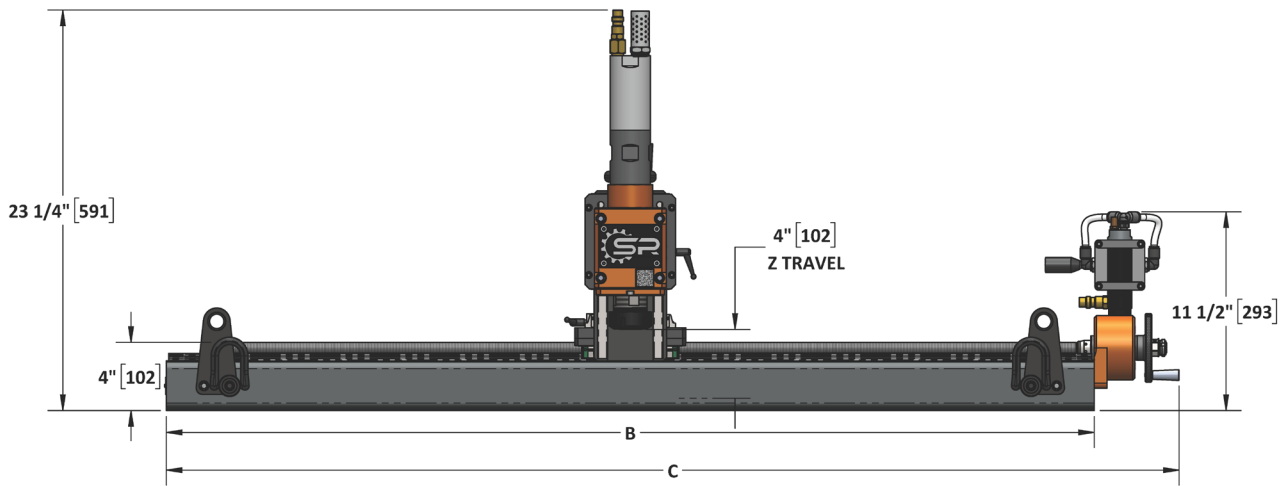
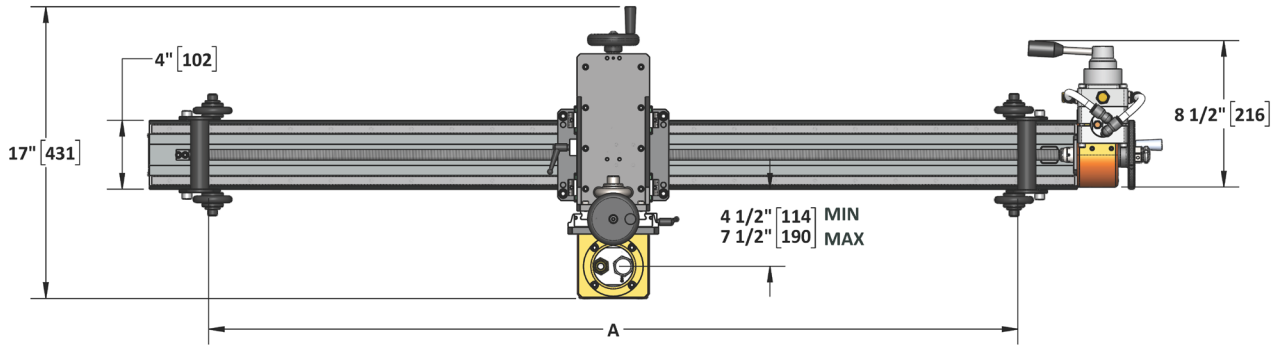
SPR's Exchanger Mill is designed to machine pass partitions and pass grooves on tube heat exchangers with the goal of reducing weight without sacrificing performance. The lightweight design allows the user to set up and align the mill more efficiently than the heavier linear/fly cutting mills commonly used for exchanger applications. Thus, allowing the technicians to complete the work faster, safer, and more cost effective.

When you receive the Exchanger Mill:

The Exchanger Mill is generally shipped in one crate. Inspect the machine for shipping damage. Verify that all of the parts listed below, or on the Bill of Materials, are present. If any parts are missing, or if you have questions regarding the Exchanger Mill, please contact a Superior Plant Rentals or SPR York location nearest you immediately.



SPECIFICATIONS CHART



Description	EXM-1.6	EXM-3.5	EXM-4	EXM-6	EXM-8
X-Travel Length (A)	20" (508 mm)	41.75" (1060.45 mm)	48" (1219.2 mm)	72" (1828.8 mm)	96" (2438.4 mm)
Y-Travel Length	3" (76.2 mm)	3" (76.2 mm)	3" (76.2 mm)	3" (76.2 mm)	3" (76.2 mm)
Z-Travel Length	4" (101.6 mm)	4" (101.6 mm)	4" (101.6 mm)	4" (101.6 mm)	4" (101.6 mm)
Length of Base (B)	26.63" (676.402 mm)	48" (1219.2 mm)	54.33" (1379.982 mm)	78.33" (1989.582 mm)	102.29" (2598.166 mm)
Overall Length (C)	31.59" (802.386 mm)	53" (1346.2 mm)	59.29" (1505.966 mm)	83.29" (2115.566 mm)	107.25" (2724.15 mm)
Width of Base (D)	4" (101.6 mm)	4" (101.6 mm)	4" (101.6 mm)	4" (101.6 mm)	4" (101.6 mm)
Overall Width (E)	17.625" (447.675 mm)	17.625" (447.675 mm)	17.625" (447.675 mm)	17.625" (447.675 mm)	17.625" (447.675 mm)
Gearbox Width (F)	8.625" (219.075 mm)	8.625" (219.075 mm)	8.625" (219.075 mm)	8.625" (219.075 mm)	8.625" (219.075 mm)
Base Height (G)	4" (101.6 mm)	3" (76.2 mm)	4" (101.6 mm)	4" (101.6 mm)	4" (101.6 mm)
Gearbox Height (H)	10.5" (266.7 mm)	9.5" (241.3 mm)	10.5" (266.7 mm)	10.5" (266.7 mm)	10.5" (266.7 mm)
Overall Height (I)	22" (558.8 mm)	20" (508 mm)	22" (558.8 mm)	22" (558.8 mm)	22" (558.8 mm)
Machine Weight	120 lbs	150 lbs	160 lbs	170 lbs	180 lbs
Shipping Weight	370 lbs	410 lbs	450 lbs	650 lbs	850 lbs
Shipping Dimensions	22" (558.8 mm) x 28" (711.2 mm) x 43" (1092.2)	22" (558.8 mm) x 28" (711.2 mm) x 57" (1447.8 mm)	22" (558.8 mm) x 28" (711.2 mm) x 66" (1676.4 mm)	22" (558.8 mm) x 28" (711.2 mm) x 89" (2260.6 mm)	22" (558.8 mm) x 28" (711.2 mm) x 112" (2844.8 mm)

SAFETY PRECAUTIONS

Please follow this list of general safety guidelines when operating the Exchanger Mill. Safe machining practices should always be followed when operating SPR machines.

Before operating this machine, read the entire operating manual. Inspect machine, cord, and accessories for any damage.

Wear safety glasses, ear plugs, and safety shoes while operating the Exchanger Mill. For maximum protection, keep your equipment clean and in good condition. Follow company and OSHA safety rules when operating equipment.

The motor should always be disconnected from the air supply or drive battery when servicing the machine or when changing cutting inserts, collets, or other components.

Moving machine parts can seriously injure operators. Understand and read all instructions before operating this machine.

For maximum safety and performance, read the entire instruction manual before operating this machine.



WARNING!
MOVING PARTS.

Keep hands, loose clothing, and hair away from rotating or moving parts. Disconnect the air supply from the machine and unplug all equipment prior to adjusting or servicing. If electric, remove power from the machine prior to adjusting or servicing.



WARNING!
ELECTRICAL SHOCK.

Possible shock if not handled properly.



WARNING!
KEEP DRY.

Keep all equipment and components away from any water source.



WARNING!
EYE PROTECTION.

Eye protection must be worn while operating or working near powered equipment.



WARNING!
EAR PROTECTION.

Ear protection should be worn while operating or working near loud equipment.

STANDARD EQUIPMENT

NO.	PartNum	Rev	SprDesc	QTY.
1	15722	1	ASSY BASE EXM 8FT	1
2	15721	1	ASSY BASE EXN 6FT	1
3	15720	1	ASSY BASE EXM 4FT	1
4	15744	2	ASSY BASE EXM 20IN	1
5	14536	1	ASSY MOTOR FEED PNU	1
6	12214	6	ASSY FEED X-AXIS PNU 15-1	1
7	15719	1	ASSY FEED X-AXIS PNU 30-1	1
8	15723	2	ASSY Y-BRACKET EXM	1
9	11537	3	ASSY SPINDLE	1
10	15690	-	COLLET ER40 .375IN	1
11	15691	-	COLLET ER40 .5IN	1
12	15692	-	COLLET ER40 .625IN	1
13	15693	-	COLLET ER40 .875IN	1
14	15694	-	COLLET ER40 1IN	1
15	15689	-	KEY STOCK 1X1X2IN	4
16	15688	-	KEY STOCK 1X1X6IN	4
17	15687	-	TOE CLAMP SET	1
18	14844	-	BRACKET T-SLOT	2
19	10385	-	SCREW CAP .5-13X1	4

ASSEMBLY: 10004 DESCRIPTION: EXCHANGER MILL

PRODUCT DESCRIPTION

SPR's Exchanger Mill is designed to machine pass partitions and pass grooves on tube heat exchangers. With several models from which to choose, advantages include:

- Pneumatic drive
- Lightweight design
- Faster setup time
- Smooth and precise feed operation
- Collets for shank sizes from 3/8" through 1" diameter in 1/8" increments provided
- Lifting cables provided for elevated work

Tools required for operation include:

- Imperial Allen key set
- ER40 Collet Wrench
- 1-7/8" service wrench
- Clamp set
- 3/4" box end wrench
- Imperial feeler gauge set
- Keystock bars

INITIAL SET-UP

1. Remove two same thickness keystock pieces or two T-slot Brackets from the crate.
2. Place keystock/T-slot bracket onto the circular gasket area adjacent to the end where the pass groove or partition meets the circular gasket.
3. Place the other keystock/T-slot bracket on the opposite side of the circular gasket area approximately 180 degrees away, near the pass groove.
4. Using two people or lifting equipment if necessary, pick up the exchanger mill and place the exchanger mill base onto the two keystock/T-slot bracket pieces.
5. Slide the keystock/T-slot bracket and the mill base so that the edge of the mill base on the spindle side is approximately 4.5" away from the edge of the pass groove or partition plate.



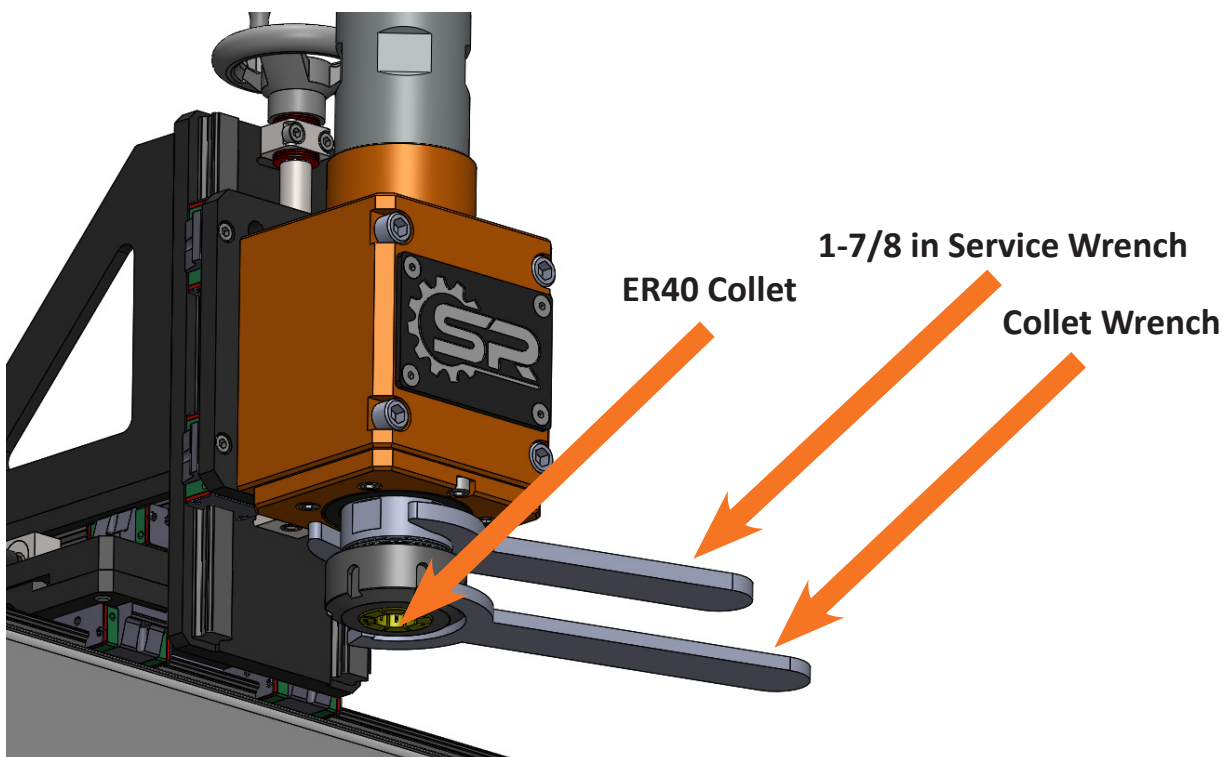
6. Remove the 1/2" x 13 NC threaded studs and nuts; hold down spacers from the mill tie down set provided.
7. Locate a 1/2" x 13 NC threaded hole in the bottom of the exchanger mill base just outside of the flange diameter or use a T-nut to find optimal position.
8. Screw a threaded stud into the hole which will be used to toe clamp the exchanger mill to the flange.
9. Slide a slotted stair step block onto the stud, then screw a nut onto the stud.

10. Place a stair-step block against the bottom base of the mill; lock it into the stairs on the slotted block. With the slotted block grabbing the back side of the flange, tighten the 1/2" nut until the clamps are snug.
11. Repeat steps 7 through 9 for another 1/2" diameter hole on the opposite side 180 degrees away, to toe clamp the mill base on that side of the flange.
12. Using a rigid scale, measure the distance from the edge of the mill base on the spindle side to the edge of the pass groove or partition plate near the outer end by the circular gasket area.
13. Repeat the measurement from the base to the groove on the other side of the flange.
14. Slide and adjust the mill base while keeping it on top of the keystone/T-slot brackets until both measurements taken in steps 12 and 13 are identical and the measurements are between 4" and 5".
15. Once the measurements are the same and between 4" and 5", using the 3/4" box end wrench, tighten the 1/2" nut until the mill base is tight and cannot move.
16. Remove the spindle from the crate, lift it into position onto the angle bracket, and bolt it onto the angle bracket using the four 3/8" - 16 NC bolts provided. Tighten the bolts.

MAKING A CUT

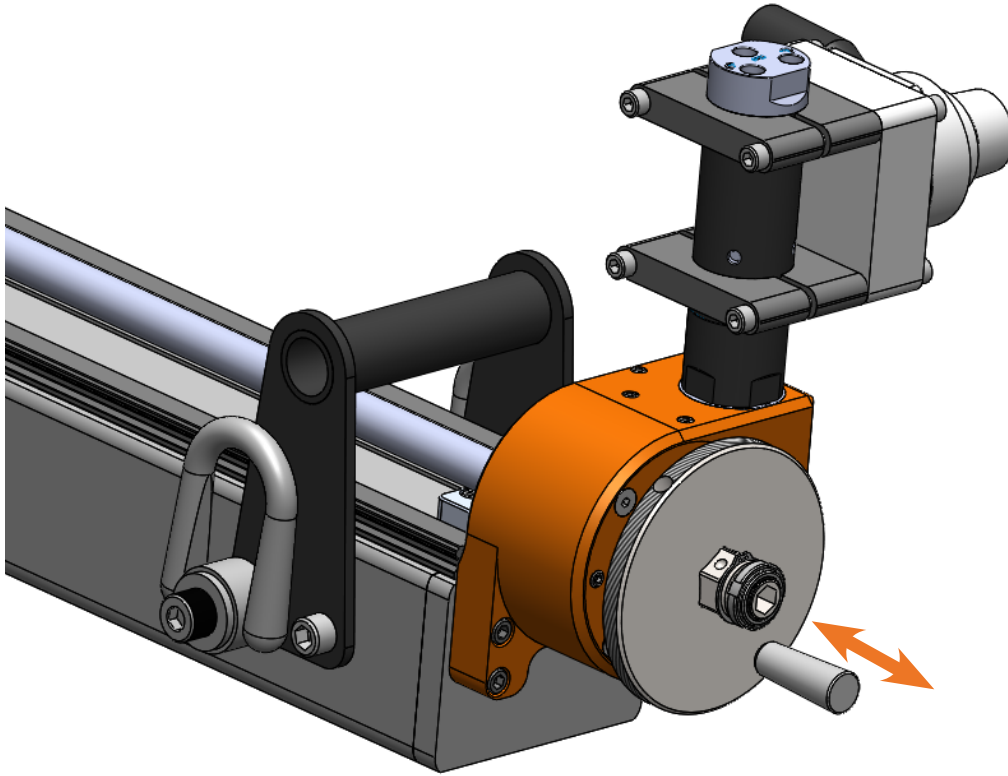
MACHINING A PASS PARTITION PLATE

1. Using a scale or tape measure, measure the cross-section width of the pass partition to be machined.
2. Choose the correct ER40 collet size that matches the width of the pass partition measured above.
3. Place the end mill cutting tool (not included) into the matching ER40 collet.
4. Install the end mill into the ER40 collet and place them into the bottom of the spindle. Use the collet wrench and service wrench to tighten the collet.
5. The Exchanger Mill is similar in operation to any 3-axis milling machine.



6. Before operating, ensure all mounting fasteners are secure.
7. Ensure all pneumatic lines are connected correctly.
8. Start milling spindle away from job to check for correct rotation.
9. Adjust speed and feed to suit tooling and material.

10. To feed the X-Axis manually, loosen both X-RAIL-CLAMPS and pull the CLUTCH outwards to disengage from the GEAR-BOX.



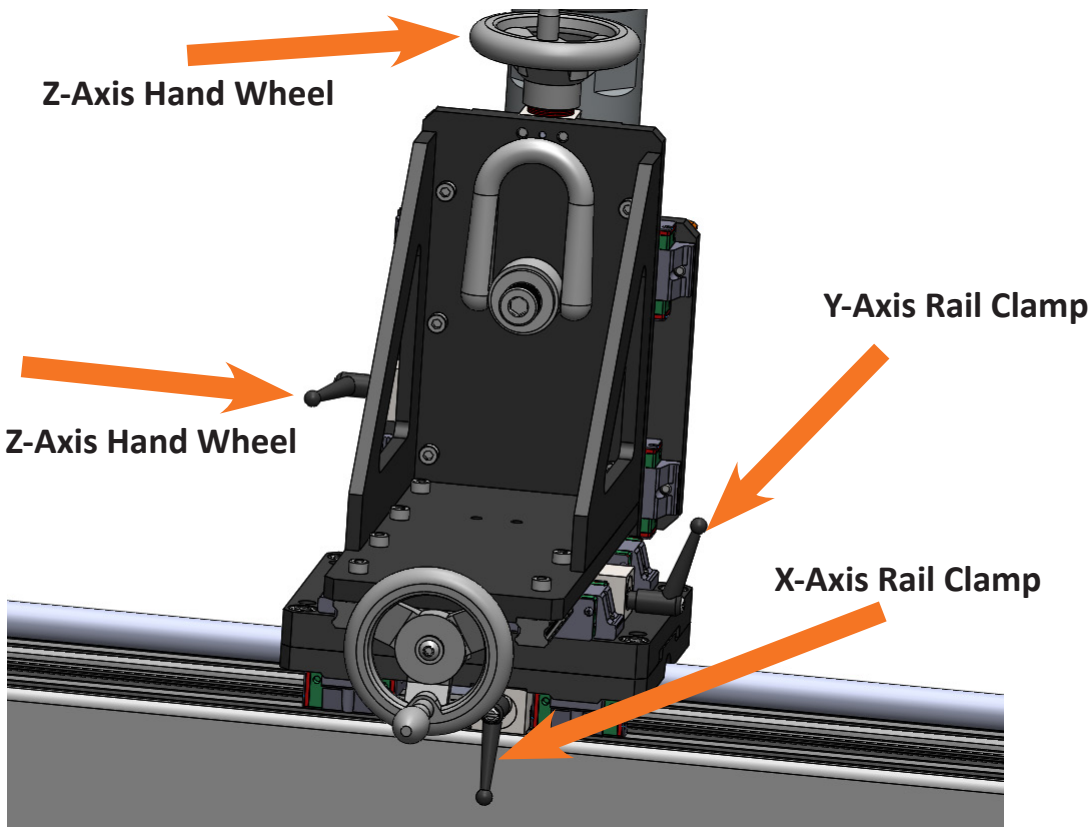
11. To feed the Y-Axis or Z-Axis, loosen RAIL-CLAMPS and turn HAND-WHEEL.
12. To power feed the X-Axis, ensure CLUTCH is engaged by snapping it inward toward the GEAR-BOX.
13. Pressing Forward on the pendant feeds the cutter away from the GEAR-BOX and Reverse moves the cutter towards the GEAR-BOX.
14. Lock out all the RAIL-CLAMPS in non-feeding axes when cutting material.



Vibrations from cuts which are too deep or too fast can cause the RAIL-CLAMPS to slip.

SETTING THE END MILL DEPTH FOR THE FINAL BLEND CUT

1. Undo the Z-Axis Rail Clamp on the angle bracket and use the hand wheel to raise the end mill off the cutting surface.
2. Snug the Rail Clamps so the spindle will remain in position and not fall vertically down.



3. Place a 0.001" or 0.002" feeler gauge between the tip of end mill and the circular gasket surface.
4. Hand crank the Z-Axis hand wheel to move the spindle and end mill downward toward the cutting surface while moving the 0.001" feeler gauge back and forth.
5. Continue this process until the end mill slightly touches and grabs the 0.001" feeler gauge.
6. Pull the feeler gauge until it is no longer under the end mill and remove it.
7. Lock the vertical Rail Clamp to maintain the depth of cut at approximately 0.001" higher than the circular gasket surface.
8. Start the cutting operation on the outside end near the gasket area and continue until the end mill has traveled past the center of the flange.

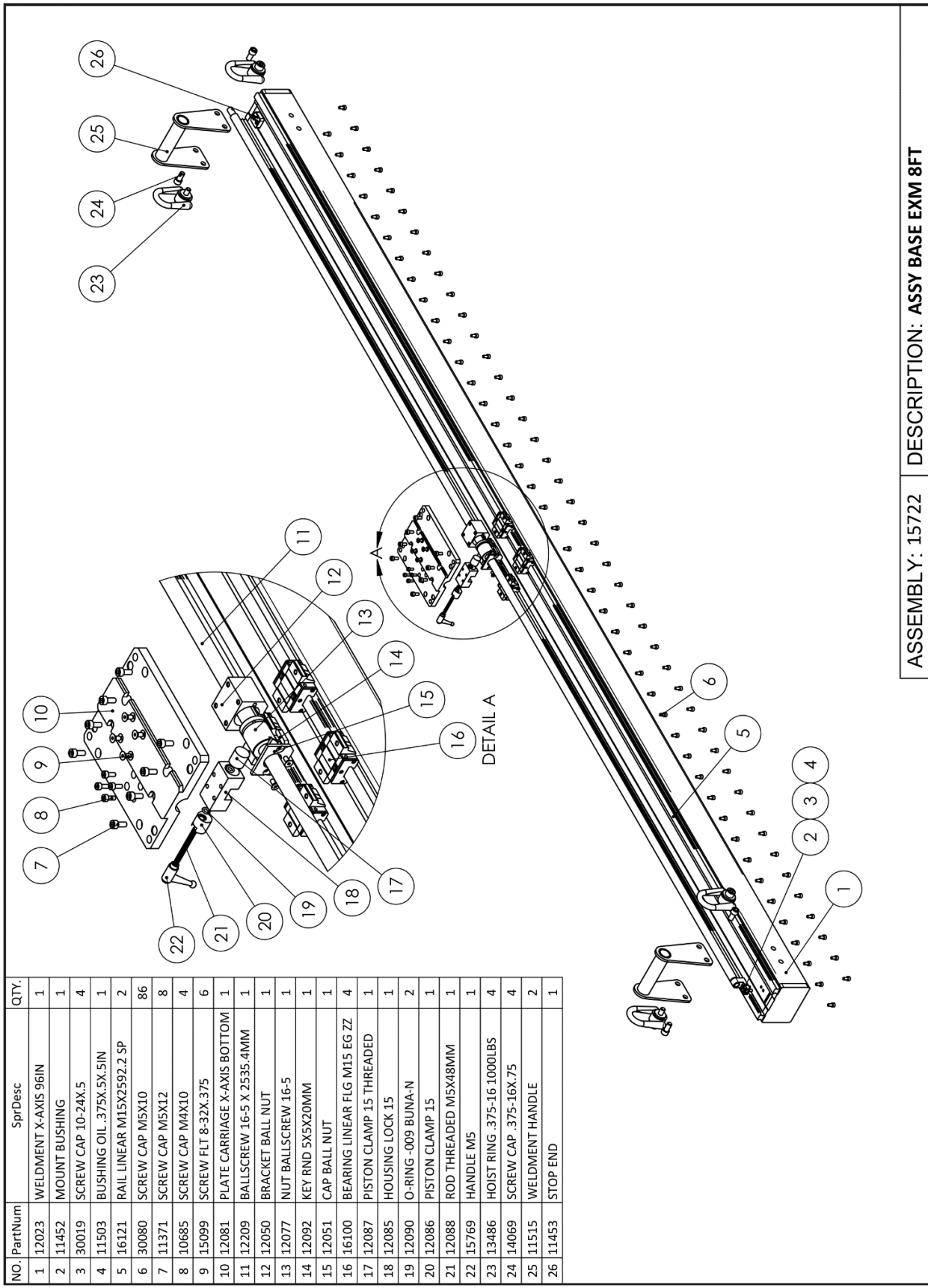
9. While the end mill is traveling the X-Axis cutting, use the Z-Axis hand wheel and periodically turn counterclockwise to raise the end mill.
10. Make sure the end mill has traveled in the X-Axis before making another turn of the wheel.
11. Continue this until the end mill has been backed up enough so that the cutting operation stops.
12. Stop the end mill rotation and turn the air feed off.
13. Using the clutch hand wheel, crank the end mill to the opposite side of the flange where the groove meets the circular gasket area and repeat steps 1 through 12 so that the two pass partition end mill cuts will meet and blend near the middle of the flange.

Note: When the end mill cutting operation meets near the center of the flange, the cut should feather out and blend together nicely.

EXPLODED VIEWS

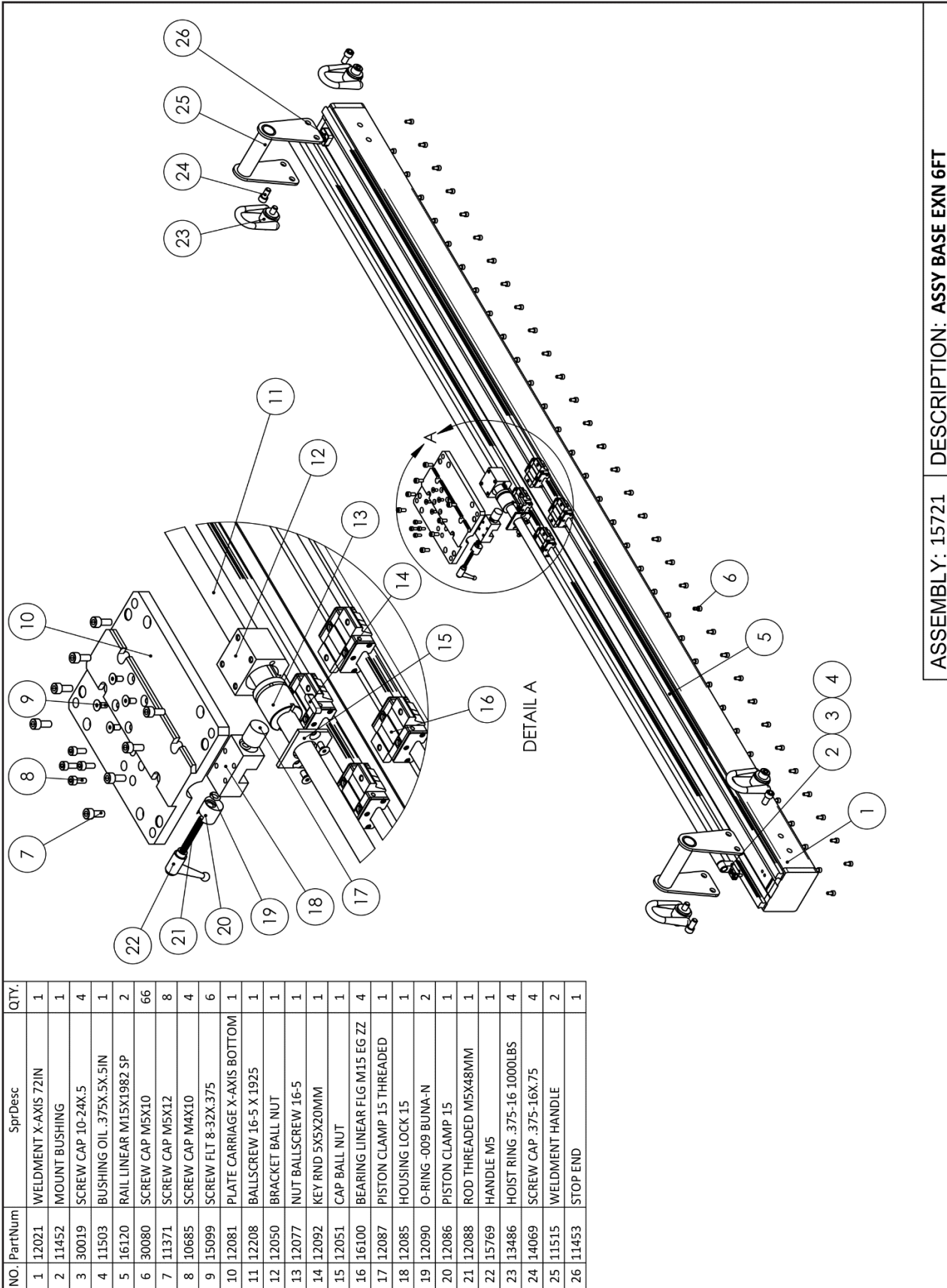
NO.	PartNum	Rev	SprDesc	QTY.
1	15722	2	ASSY BASE EXM 8FT	1
2	15721	2	ASSY BASE EXM 6FT	1
3	15720	2	ASSY BASE EXM 4FT	1
4	15744	3	ASSY BASE EXM 20IN	1
5	14536	1	ASSY MOTOR FEED PNU	1
6	12214	6	ASSY FEED X-AXIS PNU 15-1	1
7	15719	1	ASSY FEED X-AXIS PNU 30-1	1
8	15723	3	ASSY-BRACKET EXM	1
9	11537	3	ASSY SPINDLE	1
10	15690	-	COLLET ER40 .375IN	1
11	15691	-	COLLET ER40 .5IN	1
12	15692	-	COLLET ER40 .625IN	1
13	15693	-	COLLET ER40 .875IN	1
14	15694	-	COLLET ER40 1IN	1
15	15689	-	KEY STOCK 1X1X2IN	4
16	15688	-	KEY STOCK 1X1X6IN	4
17	15687	-	TOE CLAMP SET	1
18	14844	-	BRACKET T-SLOT	2
19	10385	-	SCREW CAP .5-13X1	4

ASSEMBLY: 10004 DESCRIPTION: EXCHANGER MILL



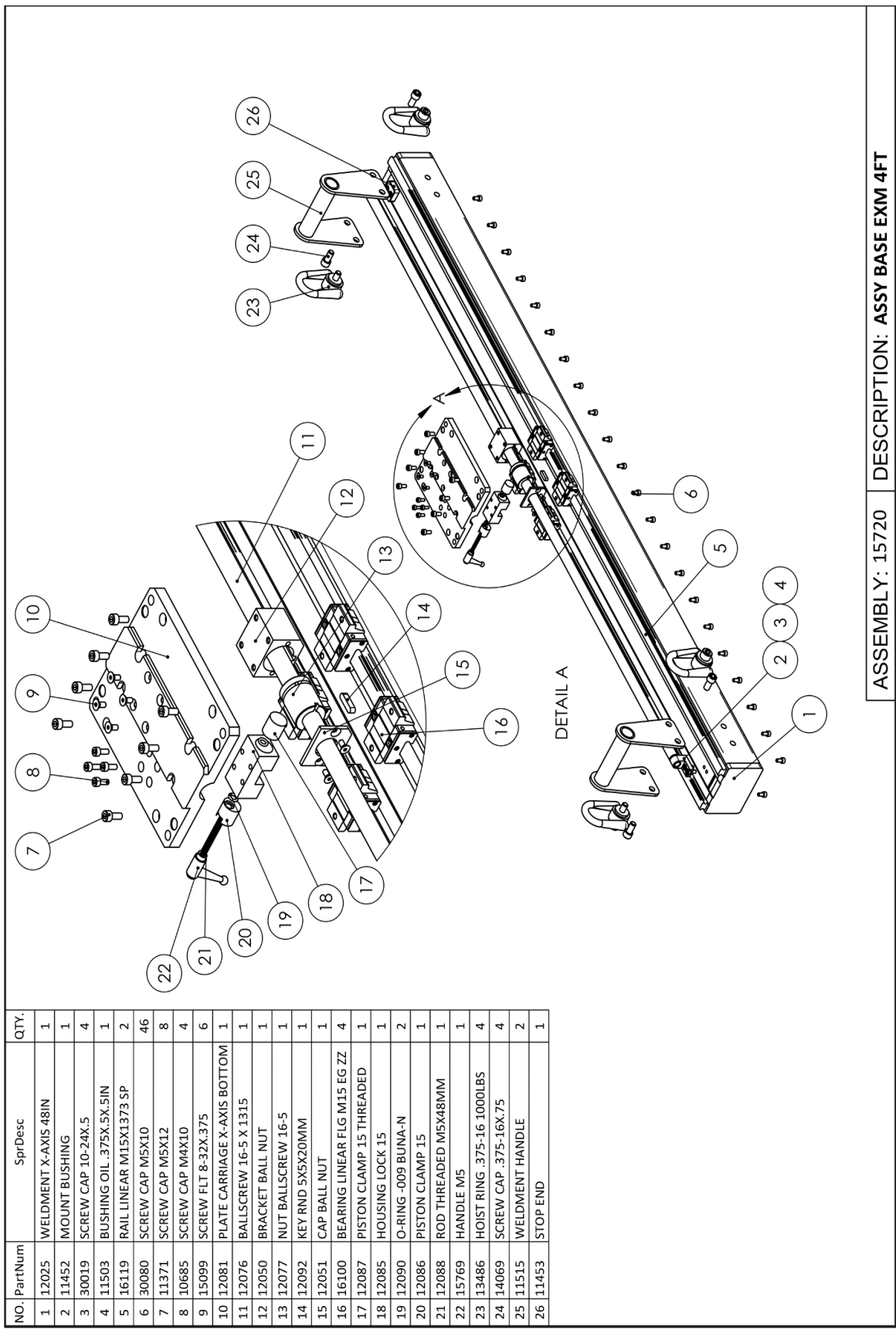
NO.	PartNum	SprDesc	QTY.
1	12023	WELDMENT X-AXIS 96IN	1
2	11452	MOUNT BUSHING	1
3	30019	SCREW CAP 10-24X.5	4
4	11503	BUSHING OIL .375X.5X.5IN	1
5	16121	RAIL LINEAR M15X2592.2 SP	2
6	30080	SCREW CAP M5X10	86
7	11371	SCREW CAP M5X12	8
8	10685	SCREW CAP M4X10	4
9	15099	SCREW FLT 8-32X.375	6
10	12081	PLATE CARRIAGE X-AXIS BOTTOM	1
11	12209	BALLSCREW 16-5 X 2535.4MM	1
12	12050	BRACKET BALL NUT	1
13	12077	NUT BALLSCREW 16-5	1
14	12092	KEY RND 5X5X20MM	1
15	12051	CAP BALL NUT	1
16	16100	BEARING LINEAR FLG M15 EG ZZ	4
17	12087	PISTON CLAMP 15 THREADED	1
18	12085	HOUSING LOCK 15	1
19	12090	O-RING -009 BUINA-N	2
20	12086	PISTON CLAMP 15	1
21	12088	ROD THREADED M5X48MM	1
22	15769	HANDLE M5	1
23	13486	HOIST RING .375-16 1000LBS	4
24	14069	SCREW CAP .375-16X.75	4
25	11515	WELDMENT HANDLE	2
26	11453	STOP END	1

ASSEMBLY: 15722 DESCRIPTION: ASSY BASE EXM 8FT



ASSEMBLY: 15721 DESCRIPTION: ASSY BASE EXN 6FT

NO. PartNum	SprDesc	QTY.
1 12021	WELDMENT X-AXIS 72IN	1
2 11452	MOUNT BUSHING	1
3 30019	SCREW CAP 10-24X.5	4
4 11503	BUSHING OIL .375X.5X.5IN	1
5 16120	RAIL LINEAR M15X1982 SP	2
6 30080	SCREW CAP M5X10	66
7 11371	SCREW CAP M5X12	8
8 10685	SCREW CAP M4X10	4
9 15099	SCREW FLT 8-32X.375	6
10 12081	PLATE CARRIAGE X-AXIS BOTTOM	1
11 12208	BALLSCREW 16-5 X 1925	1
12 12050	BRACKET BALL NUT	1
13 12077	NUT BALLSCREW 16-5	1
14 12092	KEY RND 5X5X20MM	1
15 12051	CAP BALL NUT	1
16 16100	BEARING LINEAR FLG M15 EG ZZ	4
17 12087	PISTON CLAMP .15 THREADED	1
18 12085	HOUSING LOCK 15	1
19 12090	O-RING -.009 BUNA-N	2
20 12086	PISTON CLAMP .15	1
21 12088	ROD THREADED M5X48MM	1
22 15769	HANDLE M5	1
23 13486	HOIST RING .375-16 1000LBS	4
24 14069	SCREW CAP .375-16X.75	4
25 11515	WELDMENT HANDLE	2
26 11453	STOP END	1

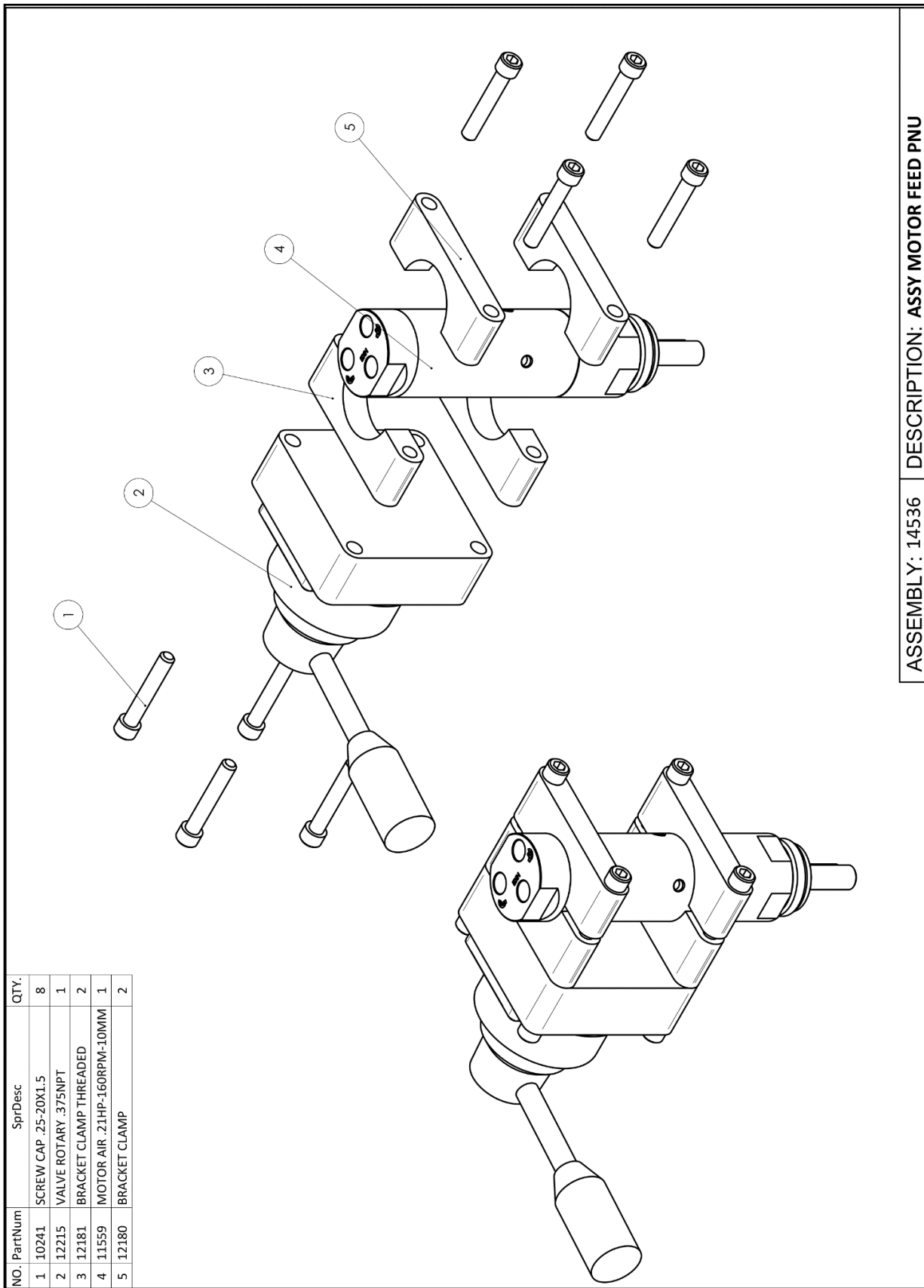


ASSEMBLY: 15720 DESCRIPTION: ASSY BASE EXM 4FT

NO.	PartNum	SprDesc	QTY.
1	12025	WELDMENT X-AXIS 48IN	1
2	11452	MOUNT BUSHING	1
3	30019	SCREW CAP 10-24X.5	4
4	11503	BUSHING OIL .375X.5X.5IN	1
5	16119	RAIL LINEAR M15X1373 SP	2
6	30080	SCREW CAP M5X10	46
7	11371	SCREW CAP M5X12	8
8	10685	SCREW CAP M4X10	4
9	15099	SCREW FLT 8-32X.375	6
10	12081	PLATE CARRIAGE X-AXIS BOTTOM	1
11	12076	BALLSCREW 16-5 X 1315	1
12	12050	BRACKET BALL NUT	1
13	12077	NUT BALLSCREW 16-5	1
14	12092	KEY RND 5X5X20MM	1
15	12051	CAP BALL NUT	1
16	16100	BEARING LINEAR FLG M15 EG ZZ	4
17	12087	PISTON CLAMP 15 THREADED	1
18	12085	HOUSING LOCK 15	1
19	12090	O-RING -009 BUINA-N	2
20	12086	PISTON CLAMP 15	1
21	12088	ROD THREADED M5X48MM	1
22	15769	HANDLE M5	1
23	13486	HOIST RING .375-16 1000LBS	4
24	14069	SCREW CAP .375-16X.75	4
25	11515	WELDMENT HANDLE	2
26	11453	STOP END	1

NO. PartNum	SprDesc	QTY.
1 15742	WELDMENT X-AXIS 20IN	1
2 11452	MOUNT BUSHING	1
3 30019	SCREW CAP 10-24X.5	4
4 11503	BUSHING OIL .375X.5X.5IN	1
5 16123	RAIL LINEAR M15X668 SP	2
6 30080	SCREW CAP M5X10	22
7 16100	BEARING LINEAR FLG M15 EG ZZ	4
8 12051	CAP BALL NUT	1
9 12092	KEY RIND 5X5X20MM	1
10 12077	NUT BALLSCREW 16-5	1
11 12050	BRACKET BALL NUT	1
12 15577	BALLSCREW 16-5X20IN	1
13 11453	STOP END	1
14 12087	PISTON CLAMP 15 THREADED	1
15 12085	HOUSING LOCK 15	1
16 12090	O-RING -009 BUINA-N	2
17 12086	PISTON CLAMP 15	1
18 12088	ROD THREADED M5X48MM	1
19 15769	HANDLE M5	1
20 11371	SCREW CAP M5X12	8
21 10685	SCREW CAP M4X10	4
22 15099	SCREW FLT 8-32X.375	6
23 12081	PLATE CARRIAGE X-AXIS BOTTOM	1
24 13486	HOIST RING .375-16 1000LBS	4
25 11515	WELDMENT HANDLE	2
26 14069	SCREW CAP .375-16X.75	4

ASSEMBLY: 15744 DESCRIPTION: ASSY BASE EXM 20IN



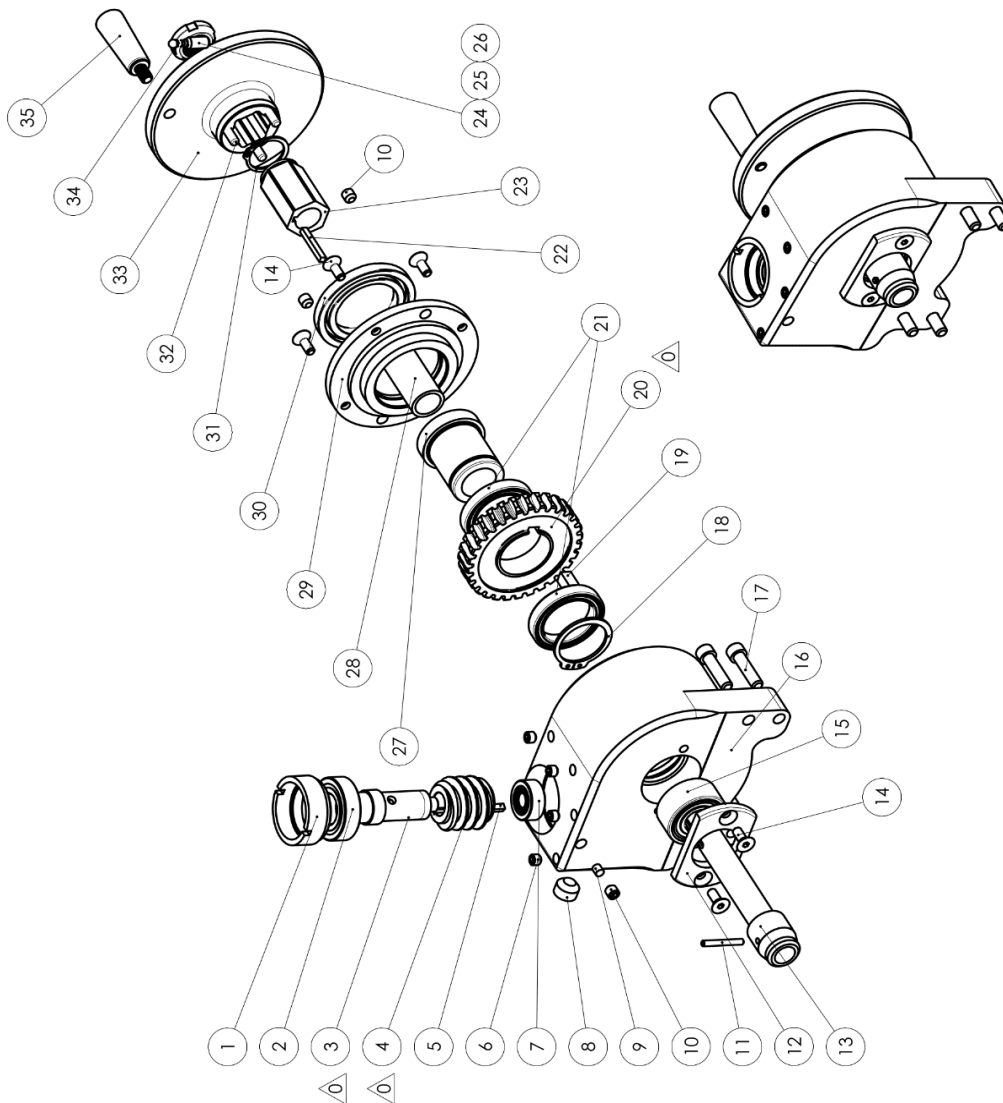
ASSEMBLY: 14536 DESCRIPTION: ASSY MOTOR FEED PNU

NO.	PartNum	SprDesc	QTY.
1	10241	SCREW CAP .25-20X1.5	8
2	12215	VALVE ROTARY .375NPT	1
3	12181	BRACKET CLAMP THREADED	2
4	11559	MOTOR AIR .21HP-160RPM-10MM	1
5	12180	BRACKET CLAMP	2

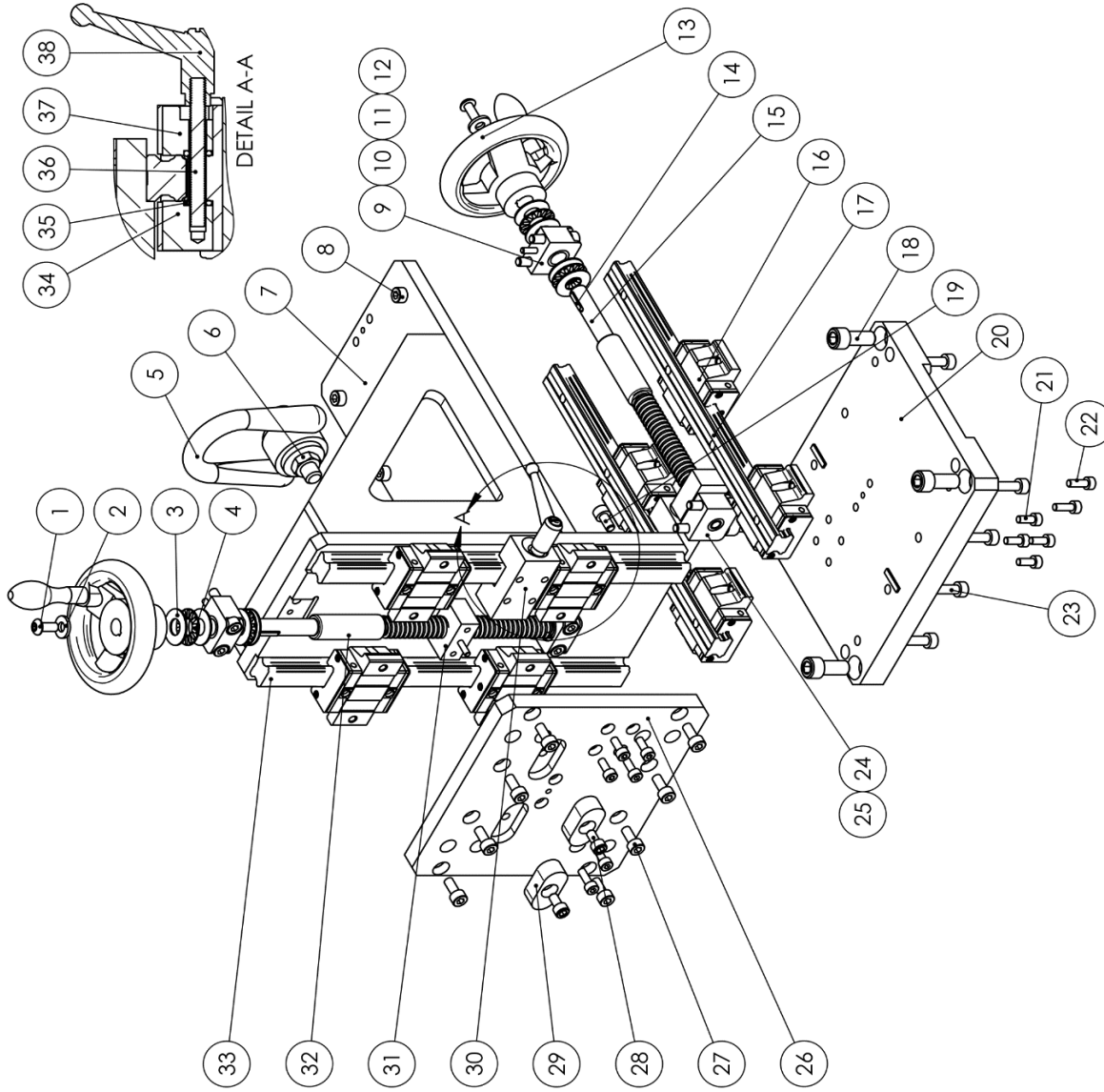
NO.	PartNum	SprDesc	QTY.
1	11483	EXTENSION SHAFT 15MM	1
2	12788	CAP BEARING	1
3	11436	PIN SHEAR .125X.875IN	1
4	13997	SCREW SET FLT .25-20X.25	5
5	11195	INSERT NYL .188	1
6	11522	SCREW SET CUP .5-13X.375	1
7	10655	SCREW SET FLT M6-1X5	4
8	11532	BEARING DEP .313X.875X.34IN	1
9	11557	KEY SQR .125X.125X.5IN	1
10	12078	WORM W12D	1
11	13012	SHAFT MOTOR FEED PNU .625IN	1
12	10797	BEARING DEP 17X35X10 2RS	1
13	11526	ADAPTOR MOTOR MOUNT	1
14	11484	SHAFT HOLLOW TORQUE 30MM	1
15	11513	SPACER .591X.75X1.749IN	1
16	11442	CAP HOUSING X-AXIS	1
17	11520	OIL SEAL 1.4375X2.25X.25	1
18	50312	RING RETAIN EXT .875IN	1
19	50333	PIN DOWEL .188X.75IN	3
20	11426	CLUTCH HEX 4IN	1
21	11521	NUT SHAFT LOCK M15-1	1
22	ET-050	BALL BEARING 0.188IN	1
23	50271	SPRING CMP .018X.180X1IN	1
24	51326	SCREW SET FLT .25-20X.5	1
25	11558	HANDLE REVOLVE .25-20	1
26	11448	HUB HEX 15MM KEVED	1
27	11560	KEY .125X.125X1IN	1
28	11529	BEARING DEP 30X42X7MM	2
29	12079	GEAR WORM 12DP-30T 15-1	1
30	11533	KEY .25X.25X.48IN	1
31	11530	RING RETAIN EXT 30MM	1
32	30035	SCREW CAP .25-20X1	4
33	12919	HOUSING FEED X-AXIS HYD	1
34	11528	BEARING ANG DBL 15X35X15.9MM 2Z	1
35	14093	SCREW FLT 10-24X.5	6

ASSEMBLY: 12214 DESCRIPTION: ASSY FEED X-AXIS PNU 15-1

ASSEMBLY: 15719 DESCRIPTION: ASSY FEED X-AXIS PNU 30-1



NO. PartNum	SprDesc	QTY.
1	ADAPTOR MOTOR MOUNT	1
2	BEARING DEP 17X35X10 2RS	1
3	SHAFT MOTOR FEED PNU .5IN	1
4	GEAR WORM W12	1
5	KEY SQR .125X.125X.5IN	1
6	SCREW SET FLT M6-1X5	4
7	BEARING DEP .313X.875X.34IN	1
8	SCREW SET CUP .5-13X.375	1
9	INSERT NYL .188	1
10	SCREW SET FLT .25-20X.25	5
11	PIN SHEAR .125X.875IN	1
12	CAP BEARING	1
13	EXTENSION SHAFT 15MM	1
14	SCREW FLT 10-24X.5	6
15	BEARING ANG DBL 15X35X15.9MM 2Z	1
16	HOUSING FEED X-AXIS HYD	1
17	SCREW CAP .25-20X1	4
18	RING RETAIN EXT 30MM	1
19	KEY .25X.25X.48IN	1
20	GEAR WORM 12DP-30T 30-1	1
21	BEARING DEP 30X42X7MM	2
22	KEY .125X.125X.1IN	1
23	HUB HEX 15MM KEYS	1
24	SCREW SET FLT .25-20X.5	1
25	SPRING CMP .018X.180X1IN	1
26	ET-050 BALL BEARING 0.188IN	1
27	SHAFT HOLLOW TORQUE 30MM	1
28	SPACER .591X.75X1.749IN	1
29	CAP HOUSING X-AXIS	1
30	OIL SEAL 1.4375X2.25X.25	1
31	RING RETAIN EXT .875IN	1
32	PIN DOWEL .188X.75IN	3
33	CLUTCH HEX 4IN	1
34	NUT SHAFT LOCK M15-1	1
35	HANDLE REVOLVE .25-20	1



NO.	PartNum	SprDesc	QTY.
1	14083	SCREW BUT 10-24X.5	2
2	15093	WASHER FLT NO. 10	2
3	50012	WASHER THR .375X.813X.031IN	8
4	50011	BEARING THR .375X.813X.078IN	4
5	13486	HOIST RING .375-16 1000LBS	1
6	15471	NUT JAM .375-16	1
7	15875	WELDMENT Y-BRACKET EXM	1
8	10220	SCREW CAP M5X16	14
9	15878	BLOCK BUSHING .5	2
10	10387	SCREW CAP M5-8X25	8
11	10874	PIN DOWEL .125X.5	4
12	11503	BUSHING OIL .375X.5X.5IN	2
13	11473	HAND WHEEL 3IN	2
14	11534	KEY .094X.5	2
15	15877	LEADSCREW .5-10X3.5	1
16	16100	BEARING LINEAR FLG M15 EG ZZ	8
17	16125	RAIL LINEAR M15X219 SP	2
18	11326	SCREW CAP .313-18X.75	4
19	30080	SCREW CAP M5X10	2
20	12083	PLATE CARRIAGE X-AXIS TOP	1
21	10685	SCREW CAP M4X10	8
22	10495	SCREW CAP M4X12	4
23	10720	SCREW CAP M5-8X20	8
24	12072	BLOCK BUSHING .25	2
25	11501	BUSHING FLG .25X.375X.5IN	2
26	11449	PLATE CARRIAGE Z-AXIS	1
27	11371	SCREW CAP M5X12	8
28	11535	SCREW CAP 10-24X.375	2
29	30057	KEY RND 15X30X10MM	2
30	12085	HOUSING LOCK 15	2
31	11390	NUT ACME .5-10	2
32	15876	LEADSCREW .5-10X4.5	1
33	16122	RAIL LINEAR M15X244 SP	2
34	12087	PISTON CLAMP 15 THREADED	2
35	12090	O-RING -009 BUNA-N	4
36	12088	ROD THREADED M5X48MM	2
37	12086	PISTON CLAMP 15	2
38	15769	HANDLE M5	2

ASSEMBLY: 15723 DESCRIPTION: ASSY Y-BRACKET EXM

MAINTENANCE

GENERAL MACHINE MAINTENANCE

During heavy operation, use a brush regularly to clean chips away from the machine. Thoroughly clean the machine after use. Dirt and grit can severely shorten the life of the machine.

MONITOR THE TEMPERATURE

Monitor the temperature of the spindle and gearbox housing during operation. Heat buildup on the housing is an indication that the bearings need lubrication or maintenance and should be handled immediately to insure proper life of the tool.

Note: Heat buildup can also be the result of improperly set bearing clearances. If this problem exists, it is recommended that you contact the factory.



THREAD INSPECTION

Inspect all visible thread areas for excessive wear. Parts that have worn threads should be replaced before damage to the mating thread assemblies occurs.

DRIVE ASSEMBLY

It is recommended that each machine drive assembly be cleaned, inspected, and greased after approximately 600 hours of use. This will help isolate seal or bearing problems. The inspection should be performed by a qualified individual.

AIR MOTOR

Clean and lubricate the air motor assembly periodically. Light, high-quality oil is recommended, in conjunction with an automatic oiling system. An in-line hose/oiler must be used with all pneumatic SPR machines to keep the air motor warranty in effect.

If automatic oiling is not available, add a few drops of oil to the air inlet at the end of each hour of operation. Do not put an excessive amount of oil in the air inlet or sludge will build up and cause problems. If you are interested in our Air Caddy/In-line oiler please contact our sales office.

PROPER HANDLING

Do not drop, hit, or otherwise abuse your Exchanger Mill. This equipment is designed as a portable machining assembly, and as such, is not designed to withstand excessive abuse. Care for your equipment will increase your utilization, the life of the machine, and minimize your repair cost.

TOOL BITS

Remember that tool bits (cutting tools) in good condition perform better. Do not try to use dull tool bits or force the tool bits into the work piece. If excessive back pressure exists, if the tool bits seem to be tearing rather than cutting, or if the chips begin to turn blue or brown, replace your cutting tool bits right away. When possible, leave unused tool bits in their packages to prevent them from being damaged. Please store tool bits that have been taken from their original package in a safe place.

WARRANTY

Superior Plant Rentals, LLC (SPR) warrants that the equipment manufactured by it will: (i) conform to SPR's written specifications and descriptions, and (ii) be free from substantial defects in design, materials, and workmanship for a period of one year from date of shipment to the original buyer, or six months from date of placing in service by buyer, whichever date is earlier.

During this period, if any equipment is proved to SPR's satisfaction to be defective, SPR will, at our sole and absolute discretion, and as SPR's sole warranty liability and buyer's sole remedy, repair, replace, or credit buyer's account for any equipment that fails to conform to the warranties, provided that: (i) SPR is notified in writing within 10 days following discovery of such failure with a detailed explanation of any alleged deficiencies; (ii) SPR is given a reasonable opportunity to investigate all claims; and (iii) SPR's examination of such equipment confirms the alleged deficiencies and that the deficiencies were not caused by accident, misuse, neglect, improper use, unauthorized alteration, repair, or improper testing.

Shipping cost of the alleged defective equipment to SPR is to buyer's account. However, if SPR agrees that the equipment is defective, then pursuant to this warranty, SPR will reimburse buyer its shipping cost to return the equipment to SPR.

The warranty against defects does not apply to: (1) consumable components or ordinary wear items, and (2) use of the equipment with equipment, components, or parts not specified or supplied by SPR or contemplated under the equipment documentation.

The following actions will void the one-year warranty:

1. Repairs or attempted repairs have been made by persons other than SPR personnel, or authorized service repair personnel;
2. Repairs are required because of normal wear;
3. The tool has been abused or involved in an accident;
4. There is evidence of misuse such as overloading of the tool beyond its rated capacity, use after partial failure, or use with improper accessories.
5. Damage to the motor due to lack of oiler/mister while tool was in use (pending motor type).

NO OTHER WARRANTY IS VALID



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