YORK
PORTABLE MACHINE TOOLS

Cadet
Line Boring Machine
Operating Manual

CONFIDENTIALITY STATEMENT

DOCUMENT NUMBER REV
SPR-MAN-CADET 01

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ABOUT US

Superior Plant Rentals, LLC. (SPR) specializes in portable machining, bore welding, line isolation, and testing solutions, providing equipment and tools manufactured under the highest standards of quality control and engineering expertise along with 24/7 service and support. Designed with the operator in mind, our tools and equipment deliver dependable and precise performance, providing cost-effective solutions and reduced downtime, making them beneficial resources in the Oil and Gas, Mining, Heavy Construction, Shipbuilding, Aerospace, Defense, and Power Generation industries.

SPR rents and sells equipment and tools; we offer our own line of portable ID/OD flange facers, linear/gantry and rotary mills, end prep bevelers, isolation and test plugs, line boring, and bore welders, as well as custom-designed equipment and tools.

Our team includes machining, test and isolation, and engineering experts, all with a thorough working knowledge of applications to support you with our equipment on any job. We understand the urgency of your projects and are committed to delivering the highest quality equipment and tools to satisfy the requirements of your clients.

SPR delivers outstanding customer service, specialized training by seasoned professionals, and tools as tough as the jobs you need them to do.

YORK
PORTABLE MACHINE TOOLS

SUPERIOR
PLANT RENTALS

CLIFF'S BITS
PRECISION GRINDING & TOOLING

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

Superior Plant Rentals LLC.
2910 S Ruby St. Gonzales, LA 70737 | Phone: 225.647.7771

Superior Plant Rentals LLC.
1530 Live Oak Webster, TX 77598 | Phone: 281.554.9400

Superior Plant Rentals LLC.
2160 Wellspring Drive, Beaumont TX 77705 | Phone: 409.853.4382

Superior Plant Rentals LLC.
8233 Leopard Street, Corpus Christi, TX 78409 | Phone: 361.541.5900

Superior Plant Rentals LLC.
2030 Gladwick St., Unit B, Rancho Dominguez, CA 90220 | Phone: 310.356.6105

INTERNATIONAL

SPR York Portable Machine Tools
1641 17th Ave, Campbell River, BC, Canada, V9W 4L5 | Phone: 250.287.7716

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SPECIFICATIONS CHART

Bore Diameters	12 in (304.8 mm)
Variable 2-Speed Bar Drive	30 rpm - 75 rpm and 90 rpm - 230 rpm
Cutting Tool Travel	11 in (279.4 mm)
Rapid Traverse	15 in per min (381 mm per min)
Feed Torque	140 in-lbs (15.8 Nm)
Weight	80 lbs (36 kg)

SAFETY PRECAUTIONS

Please follow this list of general safety guidelines when operating the Cadet Line Boring Machine. Safe machining practices should always be followed when operating SPR machines.

The customer shall ensure that only people thoroughly trained in safe work procedures operate this machine. Rotating machine parts can cause serious injuries, even death!

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 Cadet. Do not wear loose fitting clothing that could get wrapped up in the machine. For maximum protection keep your equipment clean and in good condition. Follow company and OSHA safety rules when operating equipment. Always disconnect the power supply when inserting or adjusting the cutting tool or servicing the machine. Moving machine parts can seriously injure operators. Understand and read all instructions before operating this machine.

WARNING! - MOVING PARTS.
Keep hands, loose clothing, and hair away from rotating or moving parts. Disconnect the power supply from the machine and unplug all equipment 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.

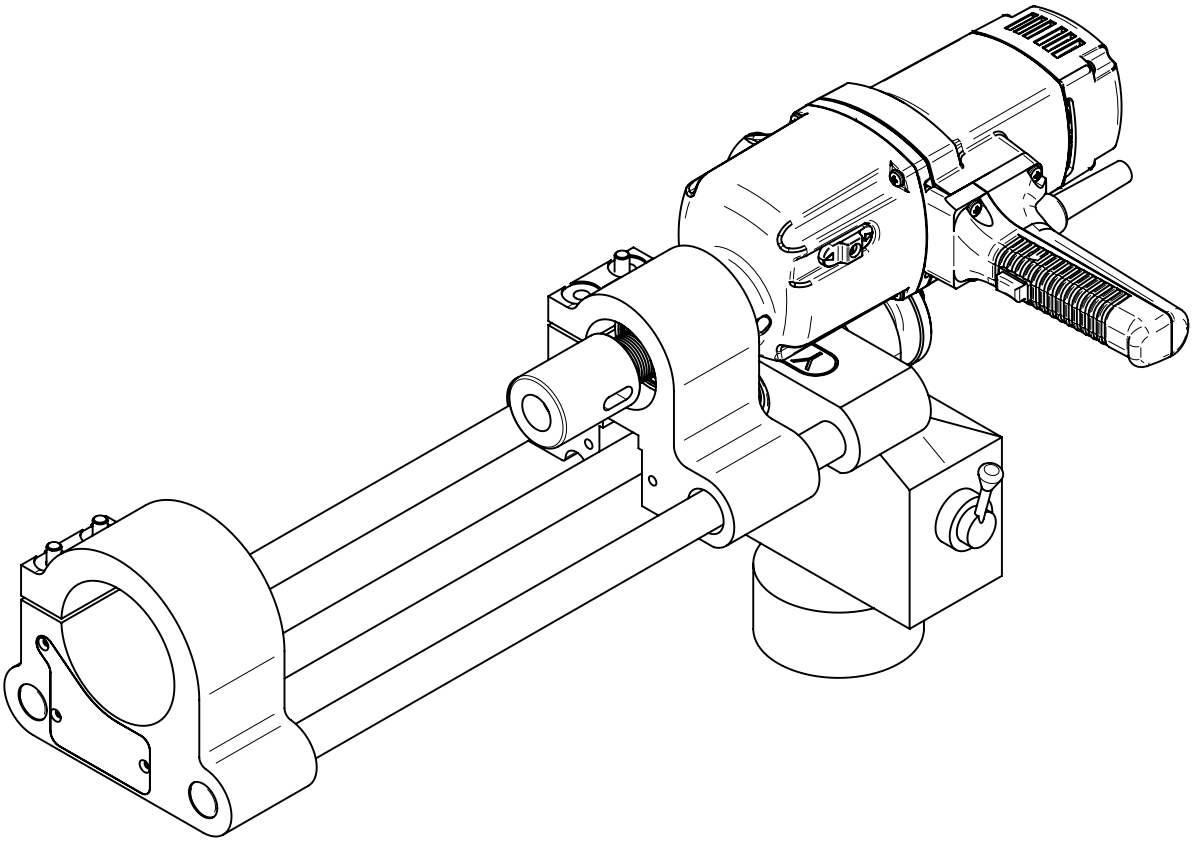
WARNING! - EYE PROTECTION.
Eye protection must be worn while operating or working near powered equipment.

WARNING! - EAR PROTECTION.
Ear protection should be worn while operating or working near loud equipment.

MACHINE SAFETY

- **Do not** rapid traverse into stop limit switches
- **Do not** rapid traverse while cutting.
- **Do not** leave machine unattended while in operation.
- Beware of pinch points. Keep all body parts clear of the machine while it is running.
- Avoid leaving set screws (that are not being used) in the boring bar. They can vibrate loose and become seized in the bearings. This can cause damage to the bearings and feed system.
- Check the bars for any nicks or gouges. Minor nicks can be cleaned up using emery cloth. Do not use damaged bars.
- Wait until the bar has come to a complete stop before changing direction of the bar drive motor.
- The Cadet is designed to shut down if there is a voltage interruption.

STANDARD EQUIPMENT

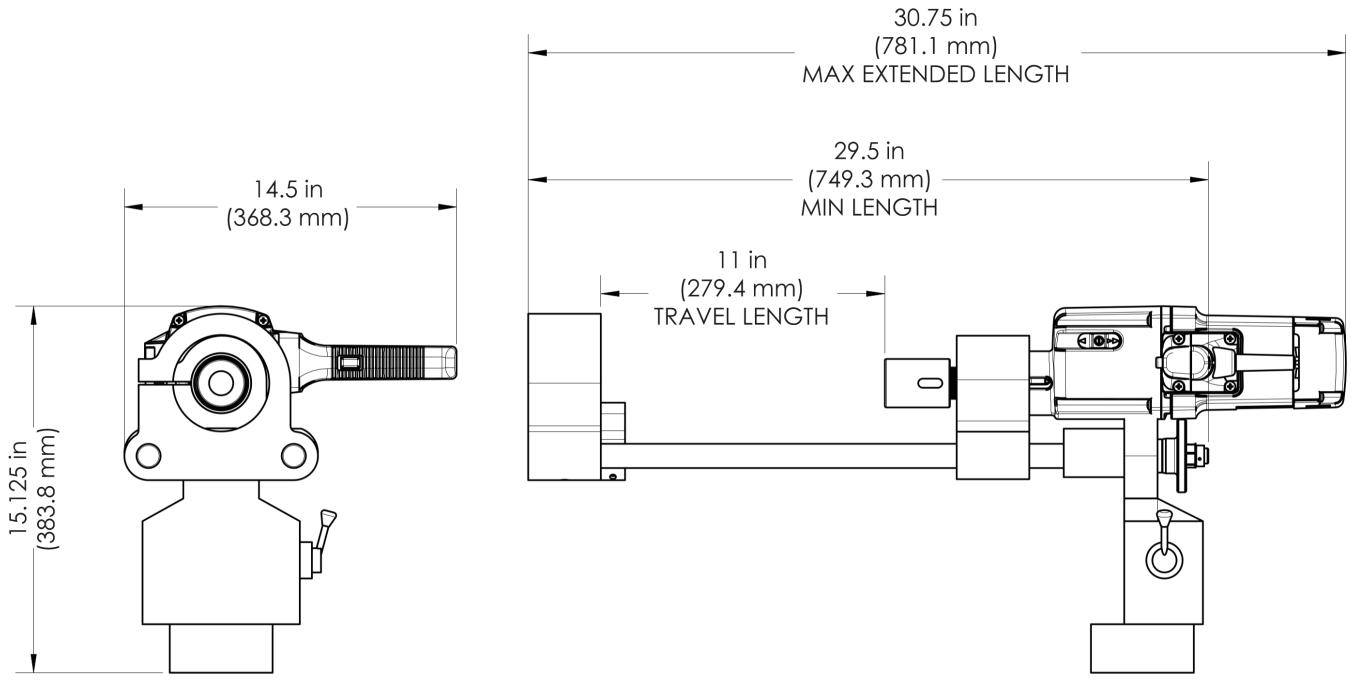


PRODUCT DESCRIPTION

INTRODUCTION

Applications
A general use line boring machine for contractors concerned with maintaining their own equipment. The Cadet features a bi-directional adjustable feed speed with rapid traverse. This is a value packed machine with all the features you would expect but at an affordable price. Ideal for servicing small fleets, the cadet will reduce your heavy equipment downtime and allow you to schedule repairs to suit your needs. Many optional accessories are available allowing a wide range of line boring repairs.

When you Receive the Cadet Line Boring Machine:
Inspect the machine for shipping damage. Verify that all of the parts listed below, or on the Bill of Materials, are present. The Cadet kit is generally shipped in one crate. The boring bars are located in the bottom under a false floor. If any parts are missing, or if you have questions regarding the Cadet, please contact a SPR York Portable Machine Tools or Superior Plant Rentals location nearest you immediately.



The SPR York Cadet features a bar drive motor with a wide range of boring speeds from 30 to 230 rpm. These speeds allow the use of high speed steel or carbide. A full feed system with rapid traverse gives you feed in both directions. The Cadet is a value packed machine with great features at an affordable price. Reduce your heavy equipment down time with the Cadet portable line-boring machine.

The Cadet includes:

- Eibenstock Variable 2-Speed Boring Bar Drive
- Electric Feed Servo Carriage
- Aluminum Chest
- 9/16” Wrench, Drive Screws, Nylon Gear, Wedge

Options:

- 5 Bar Packages - 1 1/4”, 2”, Polished or Chrome. Other Sizes Available
- Carbide Inserts
- Thru-Bar Measuring Kits
- Facing Tool
- Snap Ring Grooving Tool
- Off-Set Bar Drive

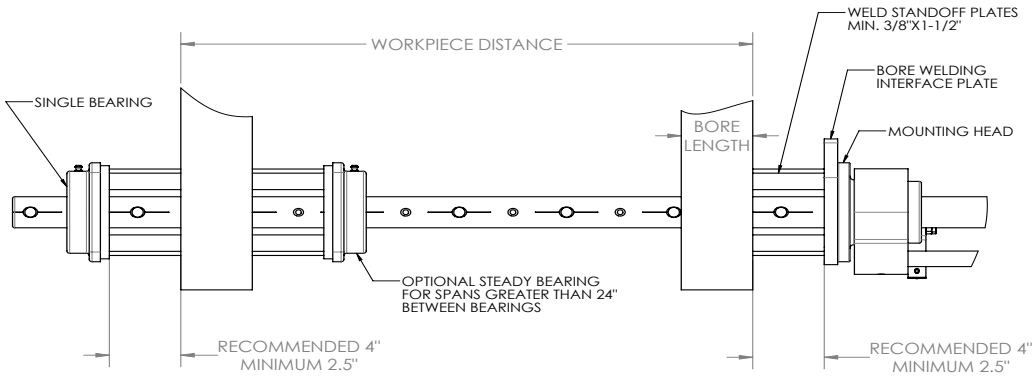
INITIAL SET UP

BAR SETUP

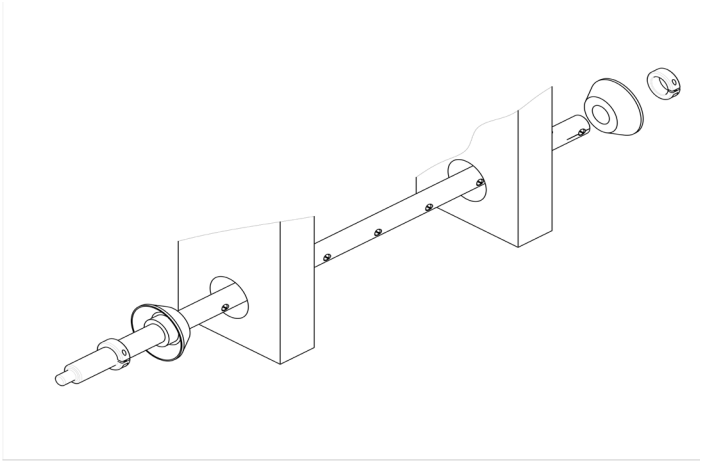
Select the appropriate boring bar and insert it into the holes to be machined.

TO DETERMINE RECOMMENDED BAR LENGTH

TO DETERMINE RECOMMENDED BAR LENGTH
FORMULA: 18" + WORKPIECE + ONE BORE LENGTH = RECOMMENDED BAR LENGTH

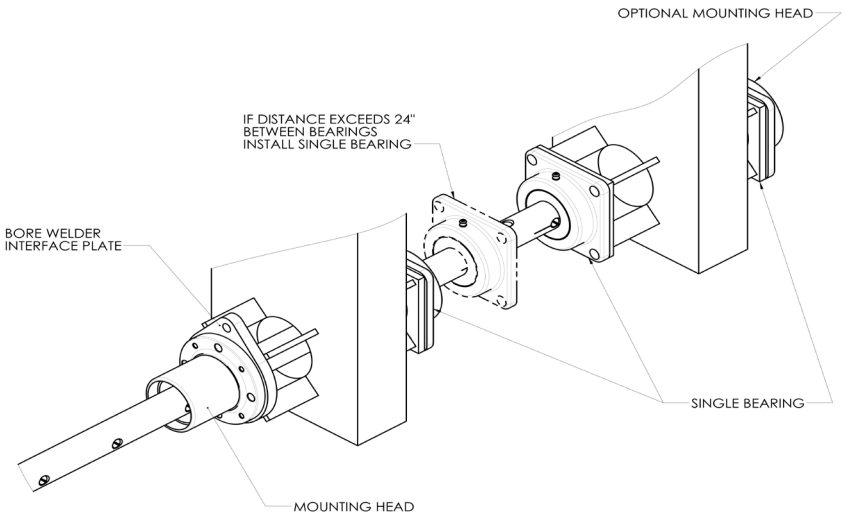


- Slide line-up cones onto the ends of the bar, with the cones facing into the bores that are to be machined.
- Slide a locking collar up to each line-up cone. Tighten the first locking collar onto the bar so that there is approximately 3/16” between a tool hole on the bar and the locking collar.
- Slide the second locking collar along the bar, until the bar is centered in the bore. Both line-up cones should be pulled tight into the bores.



The final tightening is as follows:

- Insert a tool bit or piece of square stock into the hole next to the clamping collar.
- Place a small pry-bar between the tool bit and the locking collar.
- Loosen the locking collar clamp screw.
- Pry the cones and the collar as tight as possible. If this procedure is done correctly, you should not be able to move the bar in either direction.
- Check that the boring bar is in the correct position on the machine that you are boring. Is the bar parallel to any other bores on the machine? Is the bar square to the machine? Depending on the condition of the worn bores, the line-up cones may need to be shimmed to permit the bar to be in the correct plane for boring. Repeat the clamping procedure using shims if required.
- Slide the assembled double bearing-mounting head and bore welder interface plate onto the bar end. On the other end of the bar, slide on a single bearing. Weld the bearings into position using 4 small pieces of flat bar. Be sure to leave enough room to remove the line up cones. Care should be taken to avoid pulling the bearings out of alignment. Too much welding causes binding from excessive heat. We recommend small tack welds. Tack all four pieces (with as small a weld as possible) to the bore welder interface plate and the work piece. Only then can the welds be increased to ¼ to ½ "long. By welding the flat bar on the edge, their removal after the job is made easier. The welds can be broken off after the job by hitting them with a small hammer. The distance between the two bearings should not exceed 2' apart. A third bearing may need to be installed to control vibration and tool chatter while machining.



- On jobs where a third bearing is not possible, use a double bearing on each end of the bar. With a double bearing on each end, the line-boring machine can be placed on either side of the job for maximum visibility.

- Loosen the locking collar clamps and slide the bar out of the bearings, allowing the line-up cones to be removed. If the bar slides through the bearings, you may proceed to the next step. If the bar binds you will need to repeat the previous steps. In some cases, you can loosen the double bearing mounting head bolts on the welding plate, and reposition the bearings using the set screws built into the mounting head. This may help to remove the bind.

- With the bar in position, slide the boring machine onto the double bearing mounting-head, and tighten the nuts. DO NOT OVER TIGHTEN.

- Mount the bar drive motor onto the boring machine. Tighten the nuts to clamp the bar drive motor into place. DO NOT OVER TIGHTEN.

Be sure that extension cords match the power requirements of the machine. Do not operate in wet or explosive conditions.

- Connect the boring bar to the bar drive motor by lining up the dimple in the boring bar with the set screw hole. Feed the coupling onto the stub end of bar until the dimple in the bar is visible through the set screw hole. Insert Allen head set screw in the coupling to secure the bar to the coupling.

- Select a tool port in the boring bar you wish to use. Install an adjusting screw in the tool porthole. Insert the tool bit until it is tight against the adjusting screw. Clamp the tool bit in place using a flat point set screw.

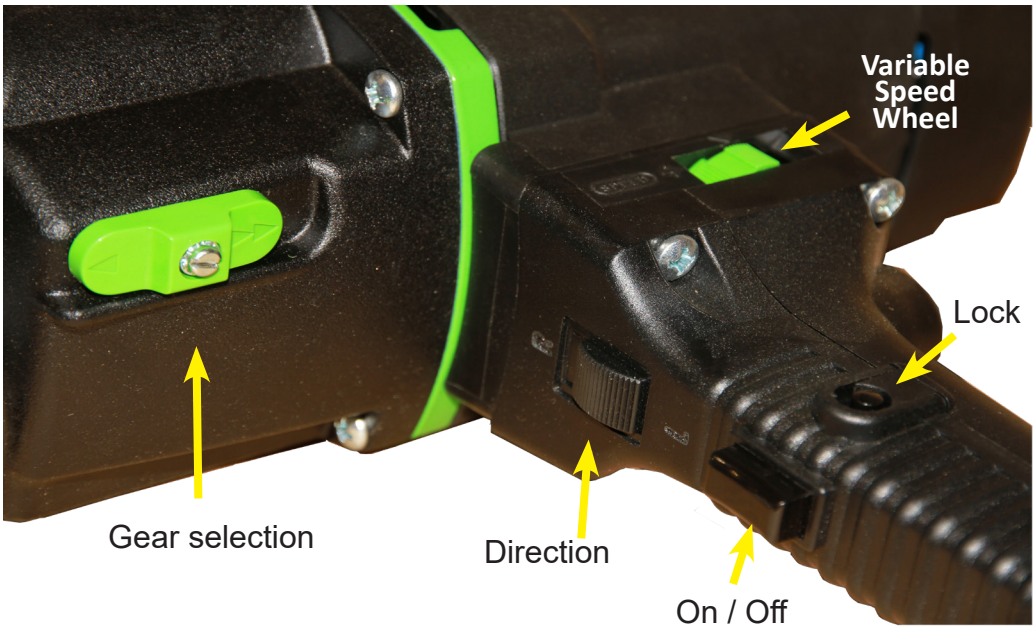
- Always use a #10 extension cord – never stall the bar drive motor as serious damage may occur.

MACHINE OPERATION

Extreme caution should be used operating this machine.
Misuse can cause serious injuries, even death.

Ensure nothing can get caught in the rotating bar e.g. hands, clothing, and extension cords.

Consult the Servo manual for the correct operation of the feed unit.



- For short term operation press on/off switch.
- Long term operation press on/off switch, keep pressed and engage the lock-on button.
- To switch off, press on/off switch to release lock on mode.

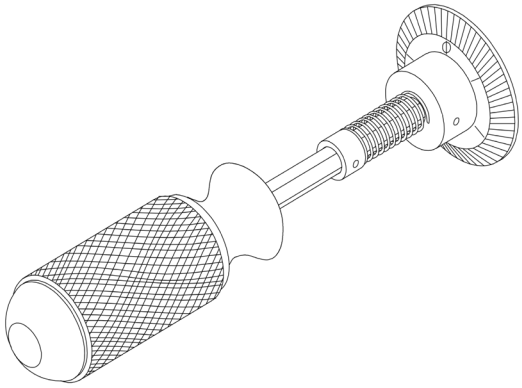
The machine is equipped with two selecting wheels. One for speed and one for torque. On this version the torque control has been disabled.

The machine is equipped with mechanical two-speed gearbox. Select the required speed by pressing-in, shifting and engaging. The position of the lower speed is in direction of the working spindle. Change the speed only when the machine is not running, and support the speed changing by slightly rotating the work spindle.

Take a rough cut then re-adjust the tool bit by performing the following:

- Measure bore after a taking a rough-cut. (Optional Thru-Bar Measuring Tool)
- Loosen the tool bit clamping screw slightly.

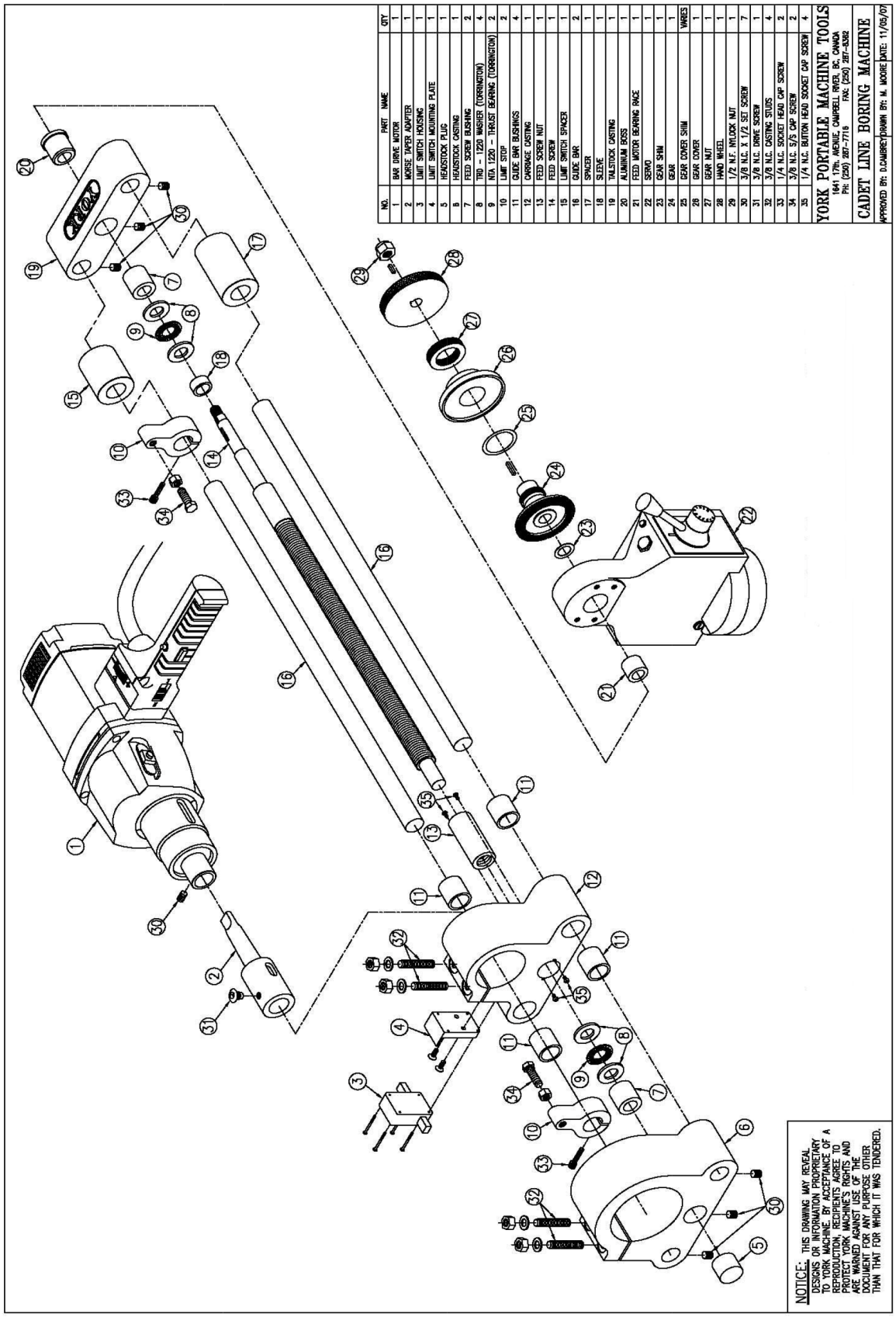
The SPR York Calibration tool allows accurate adjustment of the cutting tool in increments of .001". The calibration tool inserts into an adjusting screw behind the tool bit. Across the center of each tool port is a scribed index line. As you turn the calibration tool clockwise, you are advancing the tooling .001" for each graduation. (Note advancing the tool bit .001" will increase the bore diameter .002”).



Re-tighten the tool bit clamping set screw. It is important that only a flat point set screw be used. A regular cup point will tend to bite into the tool bit: this may move the tool bit away from the adjusting screw and cause an oversize hole to be bored.

Use Micro 100 brazed carbide tooling for maximum cutting tool performance. Micro 100 tools are available from the factory or from SPR York’s Southeast office at 1-800-979-1131.

EXPLODED VIEWS



NO.	PART NAME	QTY
1	BAR DRIVE MOTOR	1
2	MORSE TAPER ADAPTER	1
3	LIMIT SWITCH HOUSING	1
4	LIMIT SWITCH MOUNTING PLATE	1
5	HEADSTOCK PLUG	1
6	HEADSTOCK CASTING	1
7	FEED SCREW BUSHING	2
8	TRD – 1220 WASHER (TORRINGTON)	4
9	NTA 1220 – THRUST BEARING (TORRINGTON)	2
10	LIMIT STOP	2
11	GUIDE BAR BUSHINGS	4
12	CARRIAGE CASTING	1
13	FEED SCREW NUT	1
14	FEED SCREW	1
15	LIMIT SWITCH SPACER	1
16	GUIDE BAR	2
17	SPACER	1
18	SLEEVE	1
19	TAILSTOCK CASTING	1
20	ALUMINUM BOSS	1
21	FEED MOTOR BEARING PACE	1
22	SERVO	1
23	GEAR SHIM	1
24	GEAR	1
25	GEAR COVER SHIM	VARIES
26	GEAR COVER	1
27	GEAR NUT	1
28	HAND WHEEL	1
29	1/2 N.F. NYLOCK NUT	1
30	3/8 N.C. X 1/2 SET SCREW	7
31	3/8 N.C. DRIVE SCREW	1
32	3/8 N.C. CASTING STUDS	4
33	1/4 N.C. SOCKET HEAD CAP SCREW	2
34	3/8 N.C. 5/5 CAP SCREW	2
35	1/4 N.C. BUTTON HEAD SOCKET CAP SCREW	4

YORK PORTABLE MACHINE TOOLS
1641 17th. AVENUE, CAMPBELL RIVER, BC, CANADA
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CADET LINE BORING MACHINE

APPROVED BY: D.CAMBRE DRAWN BY: M. MOORE DATE: 11/05/07

NOTICE: THIS DRAWING MAY REVEAL DESIGNS OR INFORMATION PROPRIETARY TO YORK MACHINE. BY ACCEPTANCE OF A REPRODUCTION, RECIPIENTS AGREE TO PROTECT YORK MACHINE'S RIGHTS AND ARE WARNED AGAINST USE OF THE DOCUMENT FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS TENDERED.

PARTS

Item #	Qty	Part Number	Description
1	1	CAD-001-110	2 Speed Bar Drive (110 Volt)
		CAD-001-230	2 Speed Bar Drive (230 Volt)
2	1	414-004	Morse Taper Adaptor
3	1	SER-59097	Limit Switch Housing Assembly
4	1	CAD-028	Limit Switch Mounting Plate
5	1	414-005	Headstock Plug
6	1	CAD-006	Head Stock Casting
7	2	414-007	Feed Screw Bushing
8	4	414-008	Thrust Washer
9	2	414-009	Thrust Bearing
10	2	CAD-010	Limit Stop
11	4	414-011	Guide Bar Bushings
12	1	CAD-012	Carriage Casting
13	1	CAD-015	Feed Screw Nut
14	1	CAD-017	Feed Screw
15	1	CAD-002	Travel Limit Spacer (Short)
16	2	414-016	Guide Bar
17	1	CAD-003	Travel Limit Spacer (Long)
18	1	414-018	Sleeve
19	1	CAD-019	Tailstock Casting (C/W Serial #)
20	1	CAD-020	Boss
21	1	CAD-018	Feed Motor Bearing Race
22	1	See Supplement Parts List	SERVO TYPE 140 Feed Drive (110 Volt)
23	1	SER-01251	Gear Shim
24	1	SER-3201	Brass Bevel Gear
25	Varies	SER-0589 / SER-01252	Gear Cover Shim
26	1	CAD-021	Gear Cover
27	1	SER-59254	Gear Nut
28	1	414-042	Hand Feed Wheel
29	1		1/2” NF Nylock Nut
30	7		3/8” x 1/2” NC Set Screw
31	1	414-003	Button Head Drive Screw
32	4	414-072	SS Casting Studs
33	2		1/4” NC SS Socket Head Cap Screws
34	2		3/8” NC SS Cap Screws
35	4		1/4” Button Head Socket Cap Screws

Bar Speed Chart

Bore Diameter															
Ideal	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5
Bar Drive RPM	800	600	480	400	343	300	267	240	218	200	185	171	160	150	141

Bore Diameter															
Ideal	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5	16
Bar Drive RPM	133	126	120	114	109	104	100	96	92	89	86	83	80	77	75

Note: The *ideal* brazed cutting tool speed in mild steel = 300 ~ 400 Surface feet per minute (S.F.M.)

$$\frac{4 \times C.S}{\text{Diameter}}$$

C.S. = Cutting Speed

Sample: 4 x 300 C.S. = 1200 / 4" (Diameter.) = 300 RPM

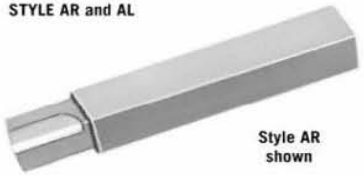
Roughing Bores!

For roughing bores, use quality Micro 100 brazed carbide cutting tools. Keep tooling sharp, and for best results, grind chip breaker. Increase feed speed until you can hear bar drive start to labor.

Micro 100®

	Left Hand	Right Hand
1/4"	AL-4	AR-4
3/8"	AL-6	AR-6
1/2"	AL-8	AR-8

STYLE AR and AL



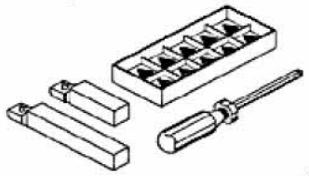
Style AR shown

Finishing Bores!

York Carbide Insert Tool Package 1/2"

The York insert tool places the carbide-cutting surface into the center of the bore - substantially improving cutting tool performance while extending tool holder life. Our tool holders use standard inserts that are readily available from most cutting tool suppliers. Insert tooling takes the guesswork out of tool geometry and improves the overall performance of your line-boring machine.

Kit Part# ITK-000
ITK-003 Replacement Insert (Round)
ITK-004 Replacement Insert (Sharp)
ITK-005 Replacement Micro 100 Insert



MAINTENANCE

GENERAL MACHINE MAINTENANCE

Do not lubricate the lead screw and guide bars. Oil or other lubricants will attract and hold dirt and grinding dust. Periodically clean the lead screw and the machine with compressed air. Wipe the guide bars and machine after each use Dirt and grit can severely shorten the life of the machine. Do not spray anything into the electric motor body.

BAR DRIVE

Monitor the temperature of the bar drive housing. Feel the back and sides of the motor. Air should be blowing out while running. Periodically the drive assembly should be cleaned, inspected, and greased when necessary.

CARRIAGE INSPECTION

If there is play in the casting replacement bushings may be needed. A loose sleeve on the feed screw may be remedied by pressing in the bushing

PROPER HANDLING

Do not drop, hit, or otherwise abuse your line boring machine. 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 the tool bits seem to be tearing rather then cutting replace your cutting tool bits right away. Also listen to how the cut sounds and weather there is chatter. This also could indicate a dull cutter. 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 is 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

SUPERIOR

YORK PORTABLE MACHINE TOOLS

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CLIFF'S BITS PRECISION GRINDING & TOOLING

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