



Big Blue Extruder



Instruction Set, Parts List and Warranty Information

Rev. 07/01/08

Prices FOB factory. Current as of revision date. Prices & specifications subject to change without notice.

**PLEASE TAKE TIME TO READ THIS
INFORMATION CAREFULLY.**

Thank you for buying the Big Blue Extruder

and welcome to a whole new dimension of extruding! You can do things with this extruder that you can't do with any other. Moreover, everything you do on it will be easier and safer.

The only tool required during normal operation is a single hex key (for the die retaining screws) which is included. All the usual sources of headaches, such as filling, cleaning and changing dies, are done in comfort at your workbench. Most important of all, there are no long, heavy bars to fall on your head or your feet, no post-and-shackle arrangements to slip and cause a disastrous fall, no air compressors or hydraulic pumps with the hazards that accompany them.

First Things First

You should have received two cartons. Please make it your first order of business to check the contents and notify North Star immediately if anything is missing.

Carton #1 should contain, in addition to this instruction booklet, the following items:

1. Extruder with hollow die & center brace mounted
2. Hardware package containing:
 - 5/16" hex key
 - four lag screws and two washers for mounting
3. Set of two more hollow dies and one blank.

Carton #2 contains only the WagonWheel handle.

Everything present and accounted for? Go on to "Mounting the Extruder."

Problem? Turn to "Replacement and Repair Parts Policy" on page 7 or "How To Obtain Service" on page 8.

◆ Brush away all excess clay and clay dust.

◆ Spray the inside of the barrel with a light coat of WD-40® or a similar silicone-based lubricant. (This will help dry the barrel, prevent pitting and also make clay much easier to extrude next time.)

◆ Clean die and die brace thoroughly.

◆ Once every month or so, apply a light coating of any available grease to the shaft under the WagonWheel.

About Quick Release Pins

Never use the extruder without all quick release pins in place. All are important but, of the three, the one that goes through the die retainer and backplate is most urgent. There is a backup method of stopping the barrel in place, but if it should fail the die, die retainer, barrel and clay could fall to the floor and injure you. If the barrel is properly put together and the pin is properly inserted this is not possible.

Note that the lower pin can be inserted from the back (which makes it more out of the way) or the front (which is probably more convenient). NOTICE, HOWEVER, THAT IF THE PIN IS INSERTED FROM THE BACK EXTRA CARE MUST ALWAYS BE USED NOT TO DISLodge IT ACCIDENTALLY WHILE EXTRUDING OR CUTTING.

While this tool can give even very young children experiences that have heretofore been denied them, it is strongly recommended that young children not be permitted to use the extruder without adult supervision.

The absolute minimum level of supervision would be making sure the quick release pins are in place, that hands are kept out of the way and the WagonWheel is not spun at high speed.

ROUTINE MAINTENANCE

(BEFORE EVERY USE)

Looking from the top down inside the housing you will see the barrel stop at the top center of the the back plate. This part must pivot freely to help prevent the barrel from missing the catch groove and falling to the floor, possibly causing injury to the operator. Check it before every use. If it does not swing freely, the reason is most likely clay dust compacted around it or the mounting pin that holds it in place. Remove the barrel assembly and force it back and forth several times with your hand. If it still does not swing freely, remove the barrel stop and the bolt on which it pivots, clean and lubricate both parts, then reassemble.

Make sure all three Quick Release Pins (one holds the WagonWheel Handle, one secures the die retainer to the backplate and one secures the foot to the rack) are secure. The ring end must be inserted all the way and the ball on the other end must be visible.

Never use the extruder unless all Quick Release Pins are firmly in place!

Doing so could allow either the WagonWheel or the barrel to fall to the floor, possibly resulting in injury to the operator.

ROUTINE MAINTENANCE

(AFTER EVERY USE)

◆ All clay should be removed from the barrel. The aluminum barrel will not rust, of course, but wet clay in time will cause it to pit and discolor.

Before you begin,

Some Really Important Stuff

1. NEVER, NEVER, NEVER use the extruder unless all quick release pins are in place. These are the pins that secure the WagonWheel, the barrel assembly and the foot of the ram.

2. Always, always, always: Before removing the barrel, move the ram up as high as it will go. If there is clay remaining in the machine when you start up, you may encounter stiff resistance until the vacuum breaks.

3. Never tighten down hard on the die retainer screws (these are the two bolts that hold the die and die retainer in place). Make them good and snug and no more. These screws go into aluminum threads which must not be stripped out.

4. If you need or want to make the extruding process much easier, spray the inside of the barrel and the top of the die with WD-40® (or any similar silicone-based lubricant or mold release) after each use and before loading clay. It helps much more than you might think.

5. For a number of reasons the barrel of this extruder is made of aluminum, which is fairly soft. With any extruder, dies can sometimes be difficult to remove, particularly if the barrel is partly full of clay. DO NOT SUCCUMB TO THE TEMPTATION TO HAMMER ON THE BARREL OR PRY AGAINST IT WITH A HARD TOOL SUCH AS A SCREWDRIVER. Dies have two extra wide sides to provide some surface to aid in removing them.

6. Don't spin the WagonWheel. Move the ram deliberately and stop when resistance is encountered.

7. In these instructions "up," "down," "top" and "bottom" are used as if the extruder is mounted on a wall and in use, even though that may not be the case.

8. Inspect your extruder before each use. DO NOT USE it if any part is broken or appears worn and likely to break.

9. If you have a question or need technical assistance, call North Star directly. Contact information is in this booklet.

Mounting the Extruder

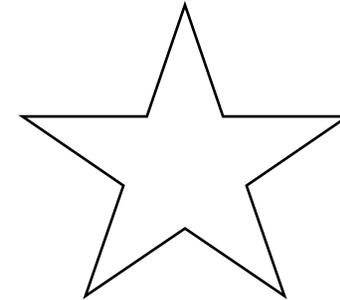
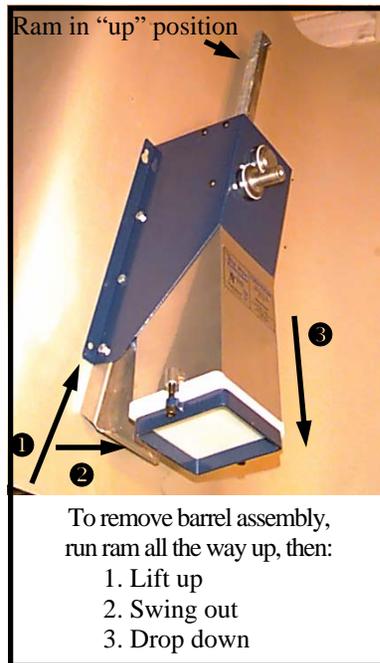
Remove the extruder from the plywood shipping base and install the WagonWheel.

The WagonWheel has a quick release pin attached to it by a short lanyard. Slide the WagonWheel over the shaft at the front of the extruder, line up the holes, then push the quick release pin through them.

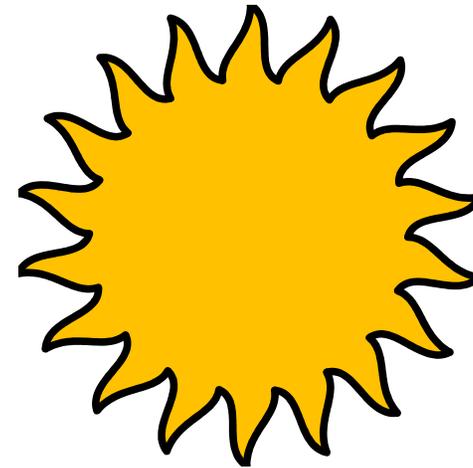
Before you begin mounting the extruder body, remove the barrel, die and die retainer as a unit. Raise the ram up as far as it will go. Remove the lower quick release pin (under the die). Then lift the barrel toward the top of the extruder (about $\frac{1}{2}$ "), pull the bottom out half an inch or so, then slide the whole thing down and out. This extruder was designed to be mounted to a wall. The die should be about waist high or slightly higher. If several people are going to be using it, go by the shortest person.

Before mounting, also remove the WagonWheel.

When you have a solid wall, use a $\frac{1}{8}$ " drill to make two pilot holes level with each other where you want to top of the extruder $7 \frac{7}{16}$ " apart. (See diagram at top of next page.) Drive two mounting lag screws most of the way in them and hang the extruder on them. Start the other screws through the bottom holes, then tighten

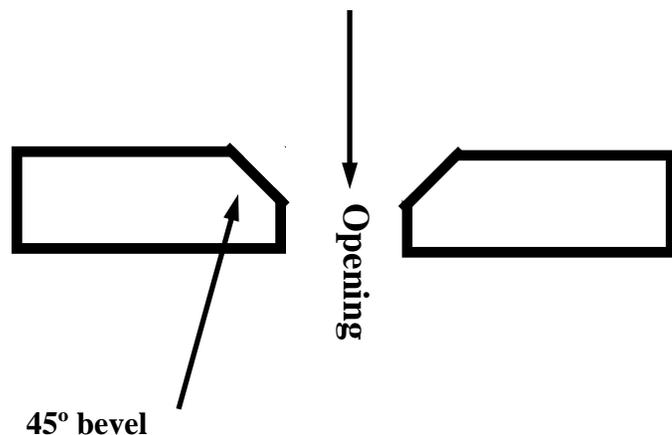


will extrude and handle much easier than



The upper figure would be better still if all the angles, especially the points, were rounded.

the clay curving as it begins to exit. The walls should be as smooth as possible to avoid marking or even tearing the clay as it comes through. Usually the exit side (bottom) of the die needs no further treatment. Often it is helpful to make a 45° bevel around the opening at the top. If such a bevel is made, its depth should not be more than half the thickness of the die.

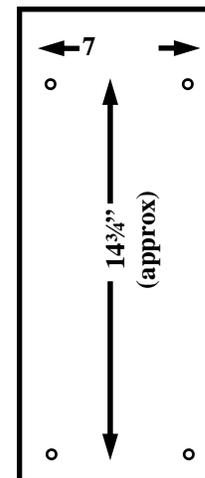


When planning the shape you are going to extrude, there are several rules you should remember but don't be afraid to experiment with breaking them, either.

1. Rounded corners, especially rounded inside corners, extrude more easily and smoothly than square ones.
2. Avoid very sharp angles.
3. Avoid long, thin, unsupported sides or flanges.
4. Allow as much space as possible between similar parts. For example,

all the mounting screws. Use washers only on the two bottom screws.

If you are mounting over 2 x 4 studs, here is one way to do it: Locate two adjacent studs. Measure the distance between them. (16" is common, but they could be 18" or even 24".) Cut a piece of 3/4" plywood with one dimension 24". The other dimension should be about 6" more than the distance between your studs. Center this piece over the studs with the 24" being the vertical dimension. Mount it with heavy wood screws or lag screws. Be very sure to get your fasteners right into the centers of the studs. Then mount the extruder to the plywood as above.



If you are mounting on concrete or concrete block the job will be a little more difficult, but your local hardware store will have a selection of concrete anchors, expanding anchors, etc., as well as (usually) advice about what to use and how to do it.

NO MATTER WHAT YOU ARE MOUNTING TO, THE FASTENERS YOU USE MUST BE CAPABLE OF SUPPORTING A COMBINED WEIGHT OF AT LEAST 300 POUNDS.

The WagonWheel

The WagonWheel may be left in place all the time. When loading clay or changing dies, slide the barrel out and around the side. To remove it at any time, simply pull the pin and slide the handle off the shaft.

Also see the note on page 8 regarding the grasp handle.

Hollow Dies & The Center Brace

Hollow dies are as straightforward as we can make them. The two screws at the ends of the center brace simply drop into the two holes at the ends of the slot in the top of the die. The center screw goes through the hole in the center part of the die and the center brace seats in the slot all the way across the top of the die. Put nuts on these screws from the bottom. Washers are not necessary.

Please note that all screw holes will be tight in the beginning. The screw threads will, after a few uses, wear the holes to a good fit.

The center brace is not used in dies that make a solid extrusion.

Blank Dies

With the extruder you have received one blank for making your own die. Blanks can be shaped with all woodworking tools such as drills, saws, files, rasps, etc. (Do not use a Dremel or similar tool. These turn too fast and will simply melt the material rather than cutting it.) Most potters will limit themselves to making one-piece dies. Dimensions for hollow, or two-piece, dies are much more critical. They are far more difficult to make and usually require special equipment.

Custom Dies

North Star Equipment will cut custom dies, both hollow and solid, for a very reasonable charge. All that is required is a completely dimensioned full-size drawing of the extrusion desired. Allow five working days turnaround. Contact North Star directly using the phone and/or fax numbers given elsewhere in this booklet.

Clay Considerations

For the most part, clay that will throw well on the wheel will extrude well.

Ideally it will be well aged, very plastic and without air pockets.

Obviously, more grain, in the form of larger grog, sand, and other irreducible particles, will wear dies and limit the detail that can be extruded. Pockets of trapped air will cause ripples, holes, and tears in the extrusion. Clay that is harder than throwing consistency will cause unneeded wear on both you and the extruder and extrusions from very soft clay will slump, deform, and generally be next to impossible to handle.

Making Your Own Dies

You have received one blank die for this extruder and more blanks are readily available from your dealer or North Star Equipment. Blanks always have a small divot in the middle of the top side to mark the center of the extrusion area.

One-piece (solid) dies are generally easy to make. Dies are made of a plastic material that is very long-lasting and does not stain or discolor clay. In addition, it is easy to work with tools most potters have available. Nearly any tool that will work wood will also work this plastic. It can be drilled, cut with nearly any type of hand saw, filed, rasped or sanded.

Experimentation will teach more about making dies that all the writing in the world, but there are a few rules that apply.

Generally, the side walls of openings should be absolutely vertical. This will minimize (but not eliminate)

Using The Extruder

Horizontally

Most commercial and industrial extruders work in the horizontal plane. For certain extrusions that you may do, this unusual (to potters) way of extruding may make sense.

Particularly when the shape being made is complex, contains fine detail or must be controlled as it comes from the die it may help to have the machine laying down rather than on a wall. The design of this extruder makes it easy.

Lay it on a table or workbench, being sure to leave plenty of room for the clay. Fasten it firmly in place with lag screws or wood screws. Now, construct or improvise a long, narrow platform which is 1/4" or less lower than the bottom of the extrusion. The smoother and more slippery the top of this platform is, the better it will work when you run clay out on it.

If the part you are making is very long or delicate, put a couple of layers of newspaper or waxed paper on the platform to allow the clay to slide along as it exits the extruder.

It is often very helpful to have several top boards for this platform. Simply use them as ware boards. Put one board and the extruded clay aside to work on later, put another board in place and keep extruding.

Caution

Remember that all safety precautions still apply when you are using the extruder horizontally. The machine must be held firmly in place and all the quick release pins used. Never compromise your safety!

Mounting Dies

Your extruder came with one of the hollow dies mounted in place as it would be if you were going to use that one just so you can see how it's mounted. There is nothing tricky about dies or mounting. The process was intended to be as transparent and instinctive as possible.

Please note, however, that there is a specific top and bottom to both dies and the die retainer. The top of a hollow die contains a single narrow slot from one corner to the opposite corner. All dies, hollow and solid, have a shallow shoulder around the upper side which matches the inside of the barrel. When you mount the die, you will feel a very positive movement as it drops into the correct position. The two circular indentations in opposing edges are to give clearance to the die retaining screws.

Look at the die retainer closely. You will see that the lugs the mounting screws go through are closer to one edge than the other. **THAT CLOSER EDGE IS THE TOP.** If installed upside down, the barrel will not sit flat on your table.

Loading Die and Clay

THE RAM MUST BE ALL THE WAY UP. Remove the lower quick release pin. Remove the barrel unit and stand the barrel on end on your workbench with the die up. Use the hex key ("allen wrench") that came with the extruder to remove the two bolts holding the die and die retainer to the barrel. Set the bolts and die retainer aside and remove the die.

Choose the die you are going to use, make sure the center brace is securely mounted (if it is a hollow die) and drop it in place. The center brace must be up - inside the barrel. Replace the die retainer and die retainer screws.

Tighten them just until they are snug. REMEMBER THAT THESE SCREWS ARE GOING INTO ALUMINUM THREADS. DO NOT OVERTIGHTEN THEM.

Turn the barrel over so the open end is up. (If it doesn't sit flat, the die retainer is on upside down.) If you wish, you can load a full 25 pound pug by just slamming it on a wedging table or other flat surface a couple of times to make it a bit slimmer. Drop it into the barrel, making sure the clay is no higher than the top of the barrel.

Mounting the Barrel

Mounting the loaded barrel and die is simplicity itself and exactly the reverse of the way you removed it. With the ram all the way up, simply slide the top of the barrel into the housing and up an inch or so. Then push back on the bottom to let the die retainer drop into the lip of the catch plate. Now engage the lower quick release pin. **DO NOT GO ON UNTIL IT IS IN PLACE!**

Grasp Handle

Near one end of the cross member of the WagonWheel there is a small hole. This is to hold the grasp handle if you choose to use it. Put a nylon washer on the threaded stud of the grasp handle, push it through the mounting hole, put on another washer and then the nut. Tightening this nut can be a bit tricky. Pull it down until the grasp handle does not wobble but is still loose enough that it turns with your hand. (We strongly suggest that if young children are using the extruder the grasp handle not be used.)

A Few Other Notes, Tricks & Tips

Notes

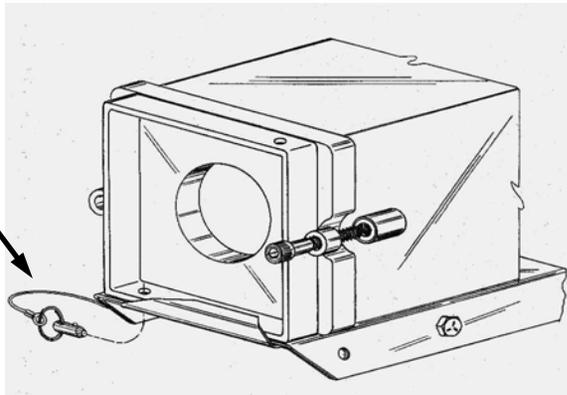
Never use or permit this extruder to be used unless all three quick release pins are firmly in place.

For now, the quick release pin holding the foot to the rack will seldom be touched except to check it. The reason for having it at all is less than clear and has generated some comment. The reason, however is this: the gears on this extruder are very powerful, able to generate several tons of pressure. It is our intention to put that to work in some other ways in the near future.

For a detail of the lower (barrel) quick release pin, see the following sketch. This one, above all, must be in place when the extruder is in use.

Lower (barrel) quick release pin.

Can be inserted from either side, but from the back usually works better.



Warranty Information

This extruder is warranted against defects in materials and workmanship for a period of one year from date of purchase. This warranty extends to the original purchaser only.

INCIDENTAL AND CONSEQUENTIAL DAMAGE OR LOSS: North Star has no control over the way this equipment is used and therefore assumes no liability whatsoever for any loss or damages arising from the use of this extruder.

REPAIR GUARANTEE: The Warranty (Purchase Record) Form must be completed online at www.NorthStarEquipment.com within 30 days of receipt of product. If repair is needed, contact North Star directly, even if you purchased it from your local dealer. If the warranty registration is on file, repair parts and instructions will be promptly furnished without charge. If it is necessary for a machine to come back to the factory for repairs (seldom needed), you must pack it and prepay inbound shipping. (United Parcel Service is usually most economical from within the U.S. and Canada.) It will be repaired, rebuilt or replaced at our option and returned freight prepaid at North Star's expense.

RETURN PRIVILEGE: Any guaranteed North Star product (not custom items) may within 10 days of receipt be returned for full refund less shipping charges if it is unsatisfactory in any way, *provided it is complete with all parts and documentation, in new condition and in original packing.* No reason need be given. Should you wish to exercise this option, simply repack the item carefully in its original carton and return it to the dealer from whom you bought it. Every dealer is authorized to refund your purchase price in full. If you bought it directly from the factory, a return authorization number (RAN) must be

obtained from North Star and you must prepay return shipping. Note that repair warranties extend only to the equipment and related metal parts. Dies, etc., are not warranted beyond arrival in good condition.

REPLACEMENT AND REPAIR PARTS POLICY: If any parts are needed, they will be sent by Priority Mail within two working days at North Star's expense. If parts are needed more quickly by some other method of shipment you must prepay the cost of shipping only with a major credit card.

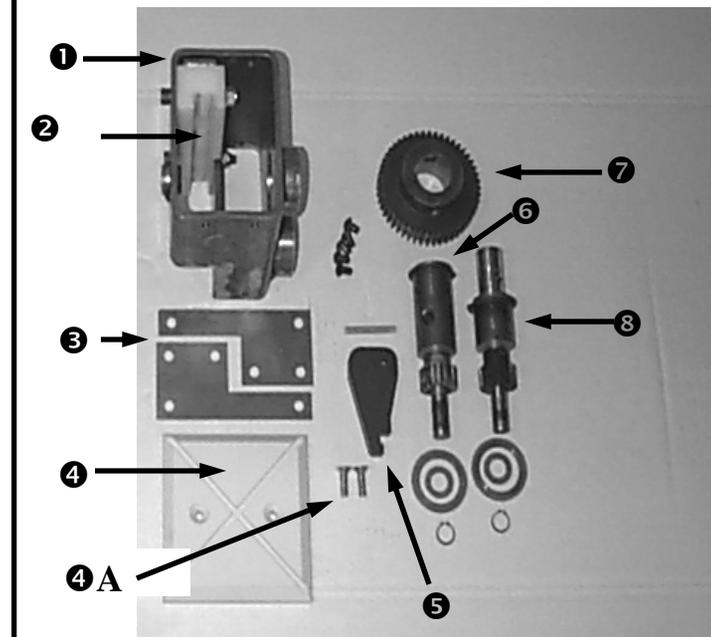
OBTAINING FACTORY REPAIRS

No merchandise can be accepted at the factory unless it has an RAN (return authorization number) marked prominently on the outside of each carton. Merchandise without an RAN must be refused.

Should a return be necessary, which is almost never the case, contact the factory for the shipping address, shipping instructions and RAN. From any point within the United States this Extruder can be shipped to the factory by UPS for less than \$25.00.

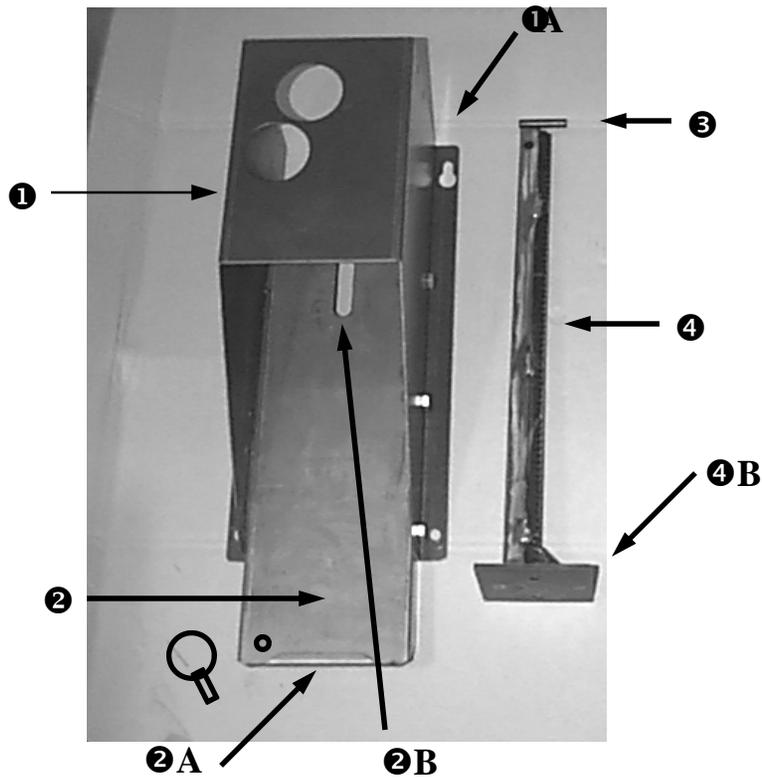
The factory mailing address is:

North Star Equipment, Inc.
P.O. Box 189
Cheney, WA 99004 USA



Parts nomenclature & replacement list (con't)

Number	Name and (part number)	# req'd	
1	Gear box housing	1	
2	UHMW rack guide	1	
3	Gear box shim (not always used)	2	
4	Plunger ram	1	
4A	Stainless screws for #4	2	
5	Barrel stop (w/ mounting pin above)	1	
6	Pinon shaft and gear	1	
7	Large gear	1	
8	Crank shaft and gear	1	
	Barrel (shown on previous page)	1	



Parts nomenclature & replacement list

Number	Name	# req'd	
1	Outer housing	1	
1A	Upper mounting hole (part of #1)	N/A	
2	Backplate	1	
2A	Barrel catch (part of #2)	N/A	
2B	Slot for barrel stop (part of #2)	N/A	
3	Rack stop roll pin	1	
4	Rack gear	1	
4B	Rack foot (part of #4)	1	
5	Lower (barrel) quick release pin	1	

HOW TO OBTAIN SERVICE FOR ANY NORTH STAR PRODUCT

If the warranty form is on file and the and you are the original purchaser, contact the factory by telephone or fax. If calling, be prepared to describe the part or problem in detail. It may be helpful if you have a telephone at the machine.

If you live in North America

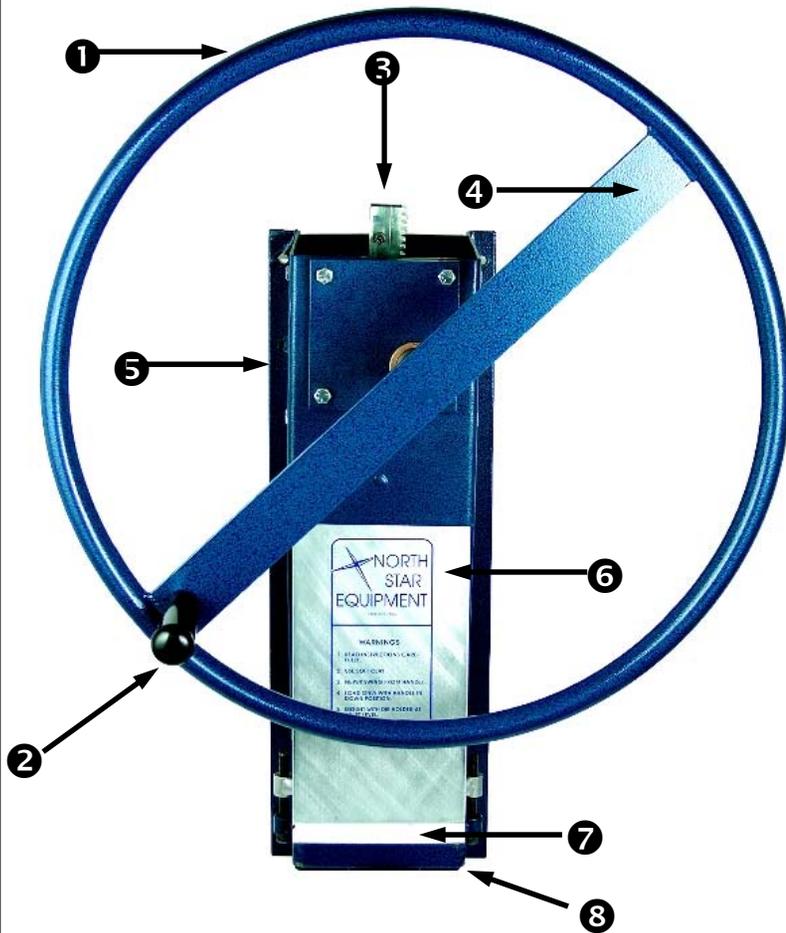
(Continental United States, Alaska, Hawaii, Puerto Rico, U.S. Virgin Islands, all of Canada)

The factory toll-free telephone number is (800) 231-7896. North Star's offices are open from 8:00 to 5:00 PST Monday through Friday except major holidays. The toll-free fax number is (800) 447-3293. The fax number is answered 24 hours a day every day of the year.

From outside North America

The factory telephone is (509) 235-9200 and the fax number is (509) 235-9203. See the paragraph above for hours. Remember to add the country code for the United States and be sure to give us full information about the problem. We will also need your name, address, telephone number and, if you have one, your fax number.

Large Parts Nomenclature



Contact North Star Equipment for Current Prices on Parts.

1	WagonWheel handle
2	Grasp Handle (use is optional)
3	Rack gear (part of ram or plunger)
4	Cross member of WagonWheel handle
5	Outer housing
6	Barrel
7	Die
8	Die retainer
	Input shaft is behind center of WagonWheel
	Not clearly visible: die retainer screws
	Not clearly visible: quick release pins (3)
	Not visible: stainless steel backplate