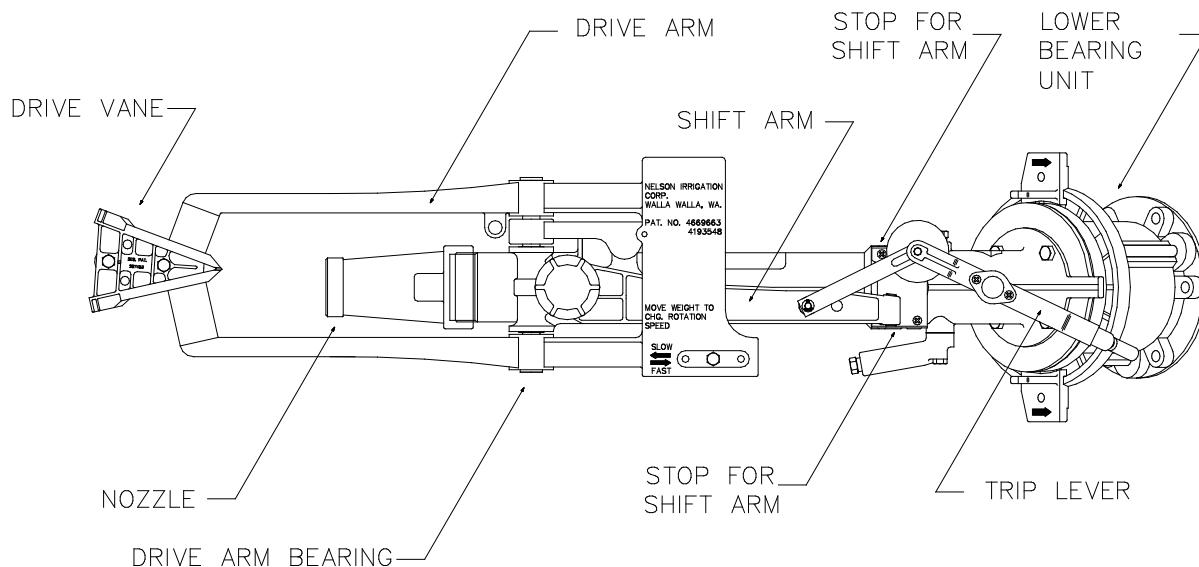


TROUBLE SHOOTING

In normal operation the Nelson Big Gun drive smoothly and at the same speed in both directions. If a Nelson Big Gun is damaged or worn the rotation speed may slow down, move faster in one direction than the other, or the drive arm action may be so weak or irregular that the Big Gun does not rotate at all. Here are some trouble shooting guidelines. They cover the most common problems and they are demonstrated very well in the video that accompanies this manual. Figure 1 shows the main components that will be discussed.

Figure 1. SR100 Big Gun Components

NELSON SR SERIES BIG GUN COMPONENTS



1. Check the Drive Vane

The force of the water hitting the angled side of the drive vane provides the rotational force that drives the Big Gun. If the drive vane is loose, chipped or broken the forces will not rotate the Big Gun at the design speed or even in the correct direction. Replace the drive vane if it is damaged. Do not insert spacers or washers underneath the drive vane. If it appears that this is necessary then the drive arm is probably bent.

2. Check the Drive Arm.

The drive arm swings up and down and brings the drive vane back into the water stream in its correct alignment. If the drive arm is bent the drive vane will not be positioned in the right part of the water stream. Poor rotation will result. There are two simple tests to check if the drive arm is bent over vertically or bent from side to side.

Test along the length of the drive arm — SR100.

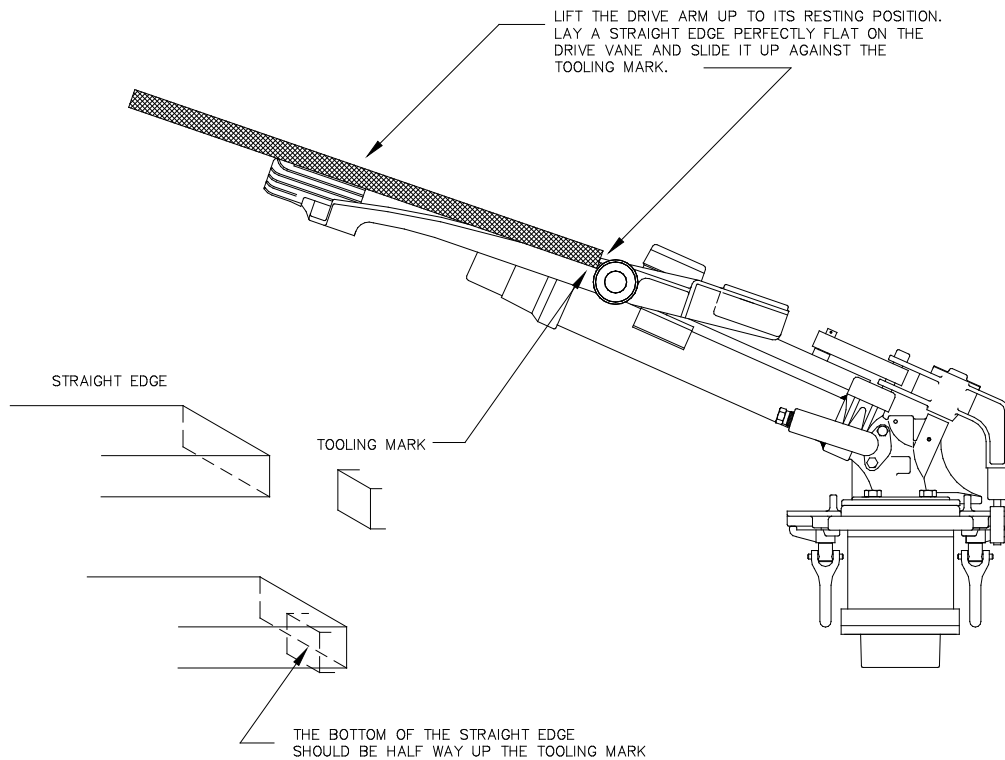


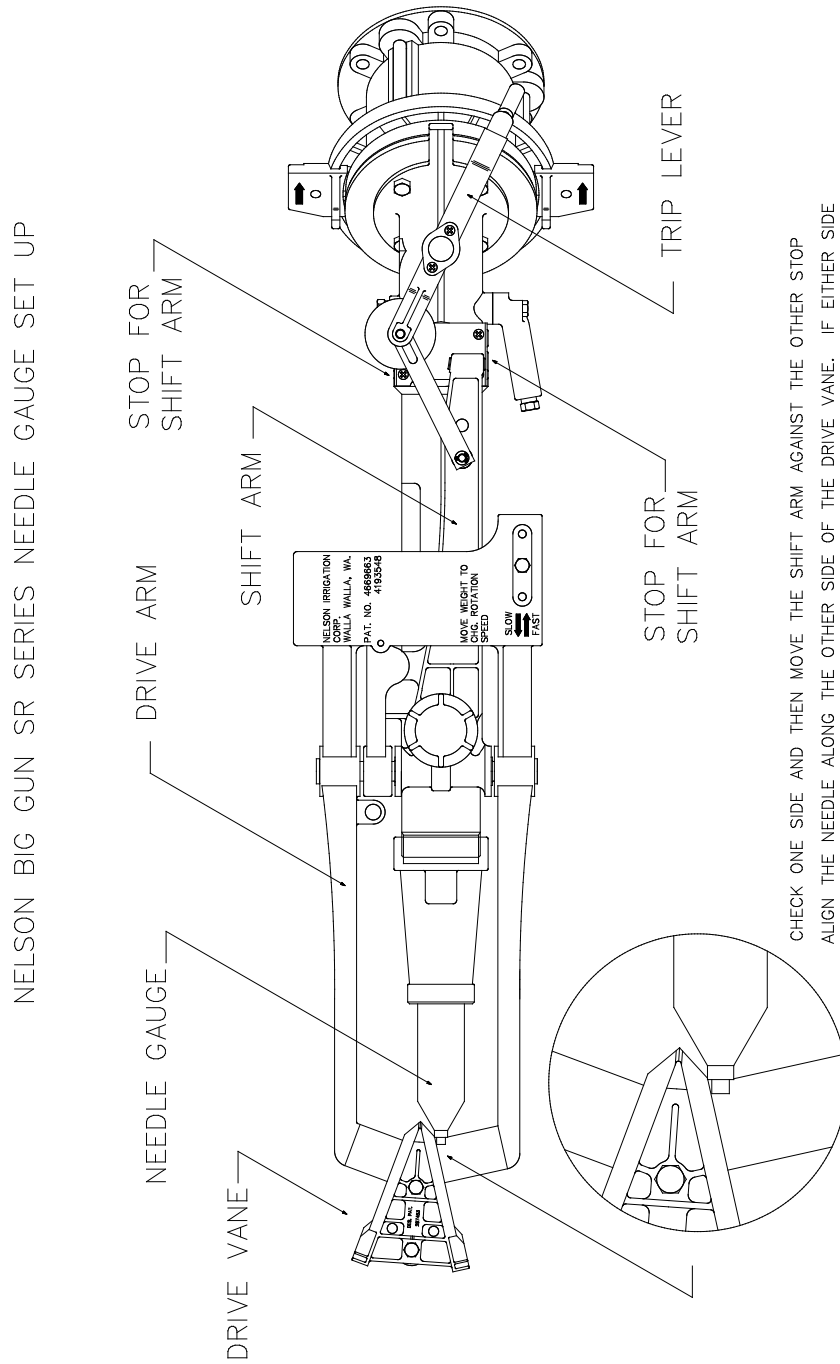
Figure 2. Drive arm test using a straight edge.

If the bottom of the straight edge rests half way up the tooling mark, the drive arm is not bent along its length. The tolerance is 1/16 " or about 1 mm. If the drive arm is bent it can be bent back into shape, but care is required.

The SR150 and SR200 can be checked in a similar way. The SR150 has a gun site on the drive vane and an X on the tooling mark to site onto.

Test the arm for a side to side bend.

This test involves using a needle gauge specifically made for this purpose or a steel rule. Both methods are shown in the video. The procedure for using a needle gauge is shown in figure 3.



WARNING ! REMOVE THE BIG GUN TO A WORK BENCH FOR THIS OPERATION. DO NOT ADJUST THE BIG GUN WHILE IT IS IN ITS OPERATING POSITION

Figure 3. Nelson SR Series Big Gun Needle Gauge Set Up.

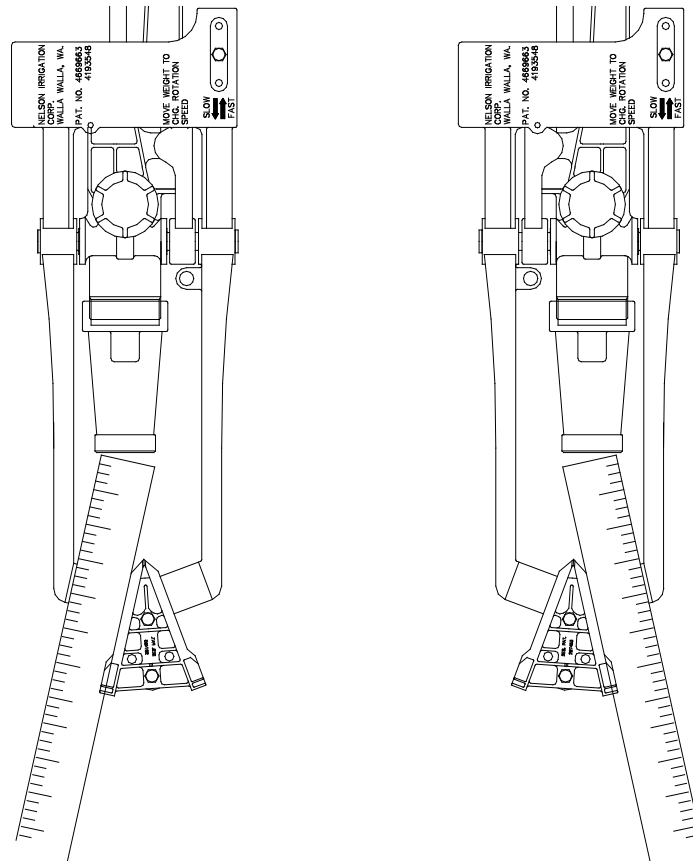
Needle Gauge Instructions.
See figure 3.

1. Secure the Big Gun in a vise on a work bench.
2. Remove the nozzle and in its place screw on the needle gauge and needle gauge holder
3. Move the trip lever over to one of its stops making sure that the shift arm travels over to a stop and the drive arm has also swung completely to one side.
4. Pull the needle gauge out until it touches the drive vane. See the drawing detail for the correct alignment. If the alignment is out, tap the stop for the shift arm with a hammer until the alignment is correct.
5. Move the trip lever over to the opposite side making sure that the shift arm travels over to the other stop and the drive arm has also swung over completely to the other side.
6. Pull the needle gauge out until it touches the drive vane and if adjustment is necessary tap the shift arm stop with a hammer until the alignment is correct.
7. Unscrew the needle gauge holder and remove the holder and the needle gauge. Reinstall the nozzle.
8. Please note that this operation is potentially very dangerous if carried out with the gun in its operating position. If water pressure was turned on the Big Gun would fire the needle gauge out like a cannon.

The steel rule method is shown in figure 4. The method is useful on all SR models of the Big Gun.

STEEL RULE METHOD FOR CHECKING
 THE DRIVE ARM FOR SIDE TO SIDE BENDS

FOR SR100, SR150, AND SR200 MODELS



PLACE THE STEEL RULER AGAINST THE DRIVE VANE IN ONE OF ITS LOWEST SLOTS. PUSH THE DRIVE ARM FULLY OVER TO ONE SIDE AND SLIDE THE RULER UNTIL IT TOUCHES THE NOZZLE. NOTE THE LOCATION WHERE THE TIP OF THE RULER TOUCHES THE NOZZLE. REMOVE THE RULER AND PUSH THE DRIVE ARM OVER TO THE OTHER SIDE. SLIDE THE RULER UNTIL IT TOUCHES THE NOZZLE. THE POINT WHERE THE RULER TOUCHES THE NOZZLE SHOULD BE EXACTLY OPPOSITE THE SAME LOCATION ON THE OTHER SIDE.

Figure 4. Steel Rule Method for checking side to side bends.

3. Check the Drive Arm Bearings.

If the drive arm bearings are rusty, seized or if a seal is broken the drive arm will not move up and down freely. It will have a weak stroke and the gun may rotate poorly. Figure 4. shows a simple test to see if the drive arm bearings are in good order.

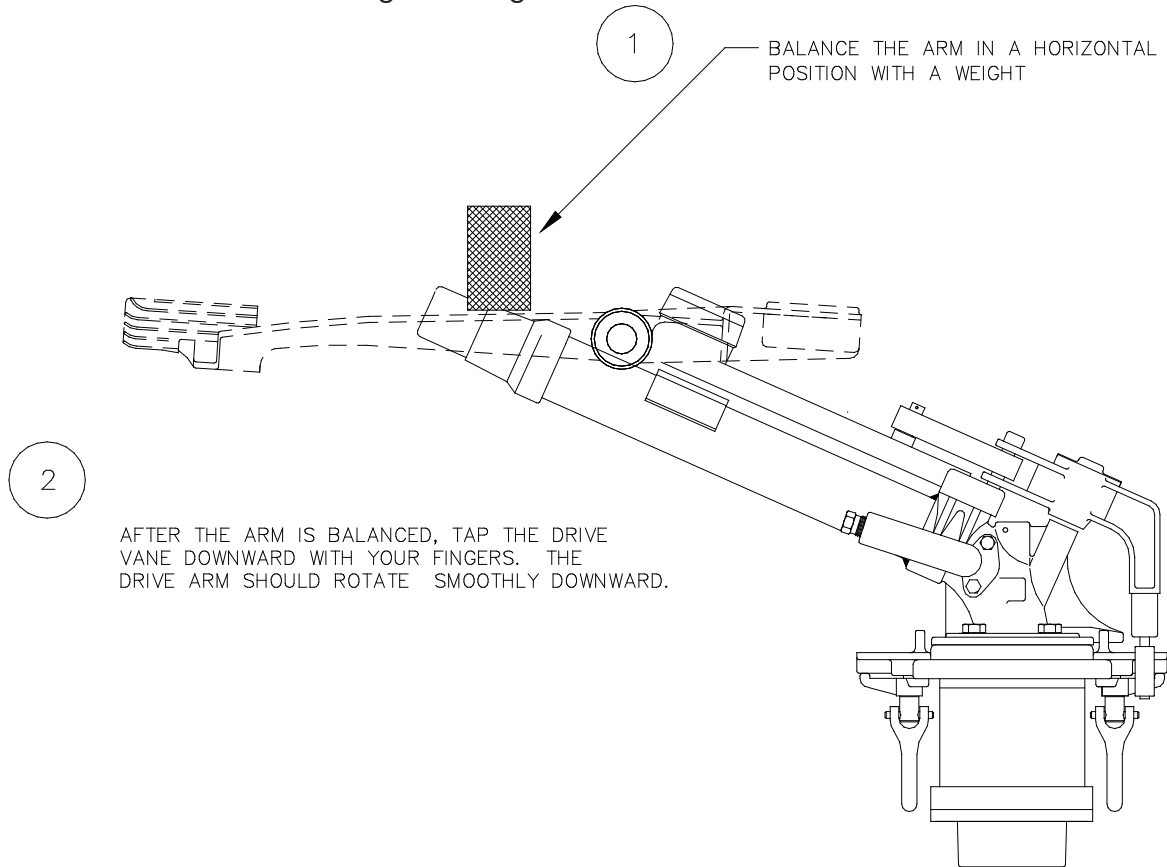


Figure 4. Drive Arm Bearing Test.

4. Lower Bearing Unit

The lower bearing unit has a long operating life. If the Big Gun is old or if it has been operated in adverse conditions the bearings and seals may need to be replaced. The lower bearing unit can be tested by measuring how much force is required to rotate the Big Gun. Figure 5 outlines the procedure.

FORCE GAUGE TEST

1. TURN ALL WATER PRESSURE OFF
2. PLACE THE FORCE GAUGE AGAINST THE END OF THE NOZZLE
3. PUSH THE GAUGE GENTLY UNTIL THE GUN JUST STARTS TO ROTATE.
4. WATCH THE GAUGE AND NOTE THE MAX FORCE. IT SHOULD BE WITHIN THE LIMITS IN THE TABLE BELOW.

| | FORCE | |
|---------------|------------|------------|
| | LBS | KG |
| SR100 or F100 | 0.75 – 2.5 | 0.35 – 1.1 |
| SR150 or F150 | 3.50 – 7.0 | 1.60 – 3.2 |
| SR200 or F200 | 4.00 – 6.5 | 1.80 – 3.0 |

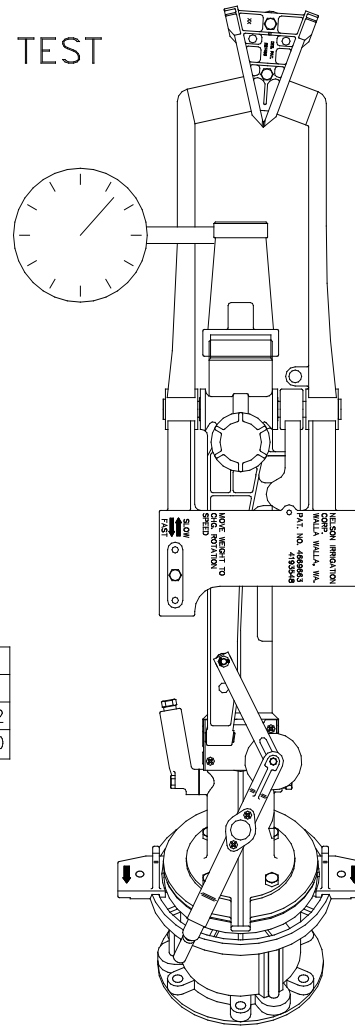
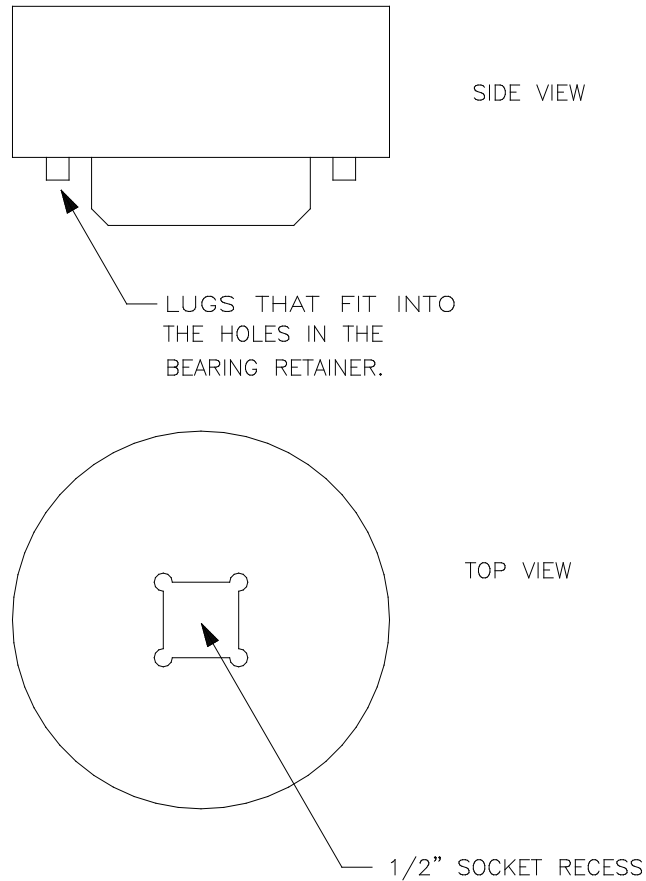


Figure 5. Lower Bearing Unit Test

If the lower bearing unit needs to be repaired a tool is available to remove the retainer nut on the SR100. It is called the HD Retainer Nut Tool. Figure 6 shows the tool and some notes on its use.

HD 100 RETAINER NUT TOOL
 FOR REMOVING BEARING RETAINER PART #7003



1. WHEN USING THE TOOL TO INSTALL THE BEARING RETAINER USE A TORQUE WRENCH WITH A SETTING OF 110 FOOT POUNDS (150 NEWTON METRES)
2. THIS TOOL REPLACES THE METHOD SHOWN IN STEP 12 IN THE OPERATION AND MAINTENANCE INSTRUCTIONS, SHEET OM-SR100

Figure 6. HD 100 Retainer Nut Tool.

5. Check the Trip Lever Assembly

Move the trip lever from side to side. The trip lever and shift arm should spring over quickly and without resistance. Check that the mechanism does not catch on any components and that the moving parts have the correct clearances. A common problem arises when users replace some of the small bolts with bolts that are too long. The bolts then rub on parts of the body or mechanism causing resistance to the movement.

6. Checking Nozzles

Taper bore nozzles and taper/ring nozzles have a long life with very little wear. Ring nozzles will wear faster so the diameters should be checked if pressure in the system is dropping. The actual diameter is stamped on the nozzle.

If nozzles wear unevenly (making an oval) or if a solid object in the water takes a nick out of one side of the nozzle, a reactionary force can be created which will try to rotate the gun. Any damaged nozzles should be replaced.

7. Diffuser Nozzles

If poor drive arm action is experienced check for a diffuser nozzle that is incorrectly aligned. Diffuser nozzles are an option on the Nelson 100 series Big Guns and they are used in low pressure situations to help diffuse the water stream.. A diffuser nozzle is very similar to a ring nozzle except the ring has a different orifice. The orifice is not round so the stream of water coming out of the nozzle is not cylindrical. If the nozzle is not orientated correctly the stream of water will not be aimed at the drive vane correctly. It is very important that the ring is orientated correctly. There are markings on the ring which show which side faces out and the "UP" marking should always point to the top of the nozzle. Loosen the cap and rotate the ring if this is not the case. Retighten the cap.

8. Drive Arm Weights

The position of the weight on the drive arm is adjustable on the Nelson SR series Big Guns. If the weight is put in a forward setting, the drive arm will have a slower stroke and the Big Gun will rotate slower. If the weight is put in a rear setting the drive arm will have a faster stroke and the Big Gun will rotate faster. The factory setting for the drive arm weight is in the middle position.