



NMK & NPB Cylinders

Seal Kit Installation
&
Refill/ Bleeding

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Trouble Shooting

Quick check items:

- Compressor on, desired pressure at cylinder ports
- Machine has power
- Oil pooling or low oil indicator pushed out

Is the output Rod extending fully?

NO: With the rod fully retracted check the reservoir view port and see if you can see the top of the piston. If you can't is the low oil indicator sticking out? It will get pushed out over time, so push it in and cycle it once to check.

NO: Check to see if the output rod is damaged if no damage is visible, then add oil. See Oil fill section.

Is the output Rod retracting fully?

NO: With the rod fully retracted check the reservoir view port and see if you can see the top of the piston. If it is full retracted then you may need to bleed some oil out. If the cylinder was not filled recently this sometimes indicates air has mixed with the oil. See Oil fill section.

NO: Check for damage. Extend the rod out and look for nicks or wear mark to indicate the rod might be bent. Also check the seal between the rod and the bearing for damage.

NO: Check your tooling is aligned correctly.

Oil leaking: Excess oil coming out of ports or pooling around the cylinder. If so try locating where it is coming from.

If it is from a port or between the high pressure section and the barrel either above or below it is time for a rebuild.

It is rare a cylinder will leak between the barrels generally check the two side blocks. Oil will normally pool around the barrel edge. As a fitting or screw may have loosened from vibration and just needs tightening. If it is leaking from the barrel edge check them for marks on the barrel if it looks like it may have been hit by something replace the barrel.

Low output force:

The quickest way to test is attach a 3000 PSI gage to the oil fill block. Back the screw off 1 turn counter clockwise.

Options

1 - Now run the cylinder and hold the high power stroke and compare the gage to the chart.

2 – Block the output rod using steel or aluminum block. Extend the low force approach stroke so the rod and blocks touch. Then cycle the high force stroke, and read the gauge.

Oil Pressure (PSI) = Air Pressure (PSI) * Ratio from chart

NMK 2 T	16
NMK 5T	16
NMK 9T	16
NMK 14T	16

NMK 20T	25
NMK 30T	23
NMK 50T	24
NMK 75T	33

If the gauge does not show any pressure or show some pressure and it bleeds off over time you need to rebuild the cylinder.

Rebuilding & Resealing

Making notes and taking pictures of how the tooling and cylinder is mounted is suggested.

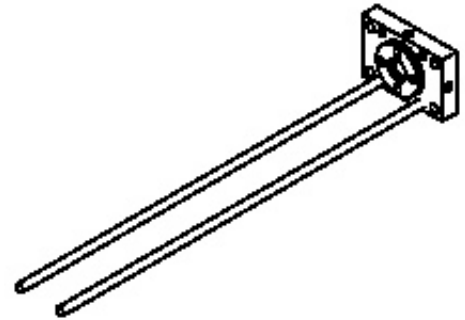
1. Remove any tooling that will prevent the cylinder from being lifted out. Then make sure the cylinder is full retracted before removing the air lines. Failure to do so could result in damage being done to the output rod.
2. On newer cylinders make sure the low oil indicator is pushed in.
3. Then depending on size using an overhead lift secure the cylinder. Then remove the 4 bolts holding it in place. Lift the cylinder off being careful not to let the output rod hit the frame. Lay it flat on your work bench with the air ports facing up and the output rod facing a direction it can be fully extend. Careful not to hit the low oil indicator or fill blocks.
4. Use the work sheet provided as a sample. Measure and record the length of all three barrels. Take notes on what way each port is facing and how the front head is oriented relative to the rest of the ports.
5. The cylinder depending on the size will have anywhere from 1 to 5 gallons of oil inside. If you have a table designed to collect the oil you can move to the step 7.
6. To remove most of the oil and limit the amount of oil left inside. Apply air to port #3 to retract the piston. Now remove all air connections. Remove one of the bleed plugs from around the outside of the high pressure section and screw in the fitting and tube provided in the fill kit. Now apply air to port #1 & #3A, until the oil stops flowing, the cylinder is now empty though some oil will remain inside. Remove all of the air and reinsert the bleed plug.
7. Check the output rod end for damage. We find a lot of the time there will be sharp edges around the end of the rod. Cylinders from the 30-75 ton range and also have a different problem. IF the tooling is not tightened up regularly it will strip the thread and force the end of the rod to expand. Both of these issues and be easily fixed using a fine grit sanding disk on a grinder. Grind any sharp edges off, if there is evidence the thread may be strip we can deal with this later.

8. Remove the tie rod nuts, if a tie rod unthreads not the length of the thread that came out form the head, it may be different from end to end.
9. Working from the rear head take everything apart recording what barrel each piston came from. DO NOT USE A SCREW DRIVER TO PRY ANYTHING APART. Very low air pressure (5-10 PSI) or a slight rocking back and forth of the barrel will generally get it apart.
10. Record piston rod lengths.
11. There are 2 options depending on how comfortable you are with rebuilding our cylinders. Either remove all of the seals from one piece clean it and reseal it or do all of the piece at the same time. Using a work sheet like the one provided mark the direction that each U-cup seal is facing. When removing the seals be careful not to scratch the surface under them. Record the numbers from the bottom of the U-Cups and the size of all O-rings using an O-Ring gage.
12. Examine all of the parts for wear or damage while rebuilding. Check seal grove for scratch from seal removal that need to be polished out. Any marks can be removed using a piece of emery cloth. Make sure to rewash any pieces to remove metal particles that will shorten seal life. Pay special attention to the output rod. Check for signs of wear or scratches in the chrome. Check the output bearing for wear, some light scratches and wear is normal.
13. Make sure that each piston is tight on the rod and does not spin by hand. The pistons do not need to be removed unless you think there is a problem with the seals inside or if they can be turned by hand.
14. If you think the seal inside the piston is leaking or the piston can be turned by hand it will need to be removed. Look on our web site for more instructions, or contact us.

Resealing

1. Start by cleaning your work area of any dirt and metal filings that could stick to the seals or parts and get inside the cylinder. This will shorten the life of the seal and possibly damage the part permanently.
2. Clean each part in a cleaning tank using solvent to remove anything that could damage the new seals. This will help extend the life of the seals.
3. I suggest sorting all of the seals and placing them with the parts they should be with.
4. Lightly lubricate each seal with the grease provided before installing them.
5. Wipe TELUS 32 oil inside all 3 barrels using a clean rag.
6. Take the high pressure piston install the 2 U-Cups that face towards the rod end of the piston. Grease both wear bands and install them; check to make sure that both ends of the wear band to not touch and that there is a gap between them. Now push the piston though the barrel until the last seal grove is just showing. Install the final U-Cup facing out and push the piston back into the barrel. If the piston does not slide easily a dead blow hammer can be use to knock it though.
7. Follow the step above with the reservoir piston.

8. Plunger piston, if you are rebuilding a 2-9 Ton cylinder it can be installed before reassembly. Larger sizes it is easier to wait until after the barrel is installed.
9. Install any seals not yet installed.
10. I find it easiest to pre-install all seal before starting to build. If you have the ability to build the cylinder vertically in a frame it is much easier.
11. Start with the front head with port 3A on the long side facing up and screw in 2 tie rods until they bottom out. Make sure that they do not stick out the bottom of the holes. Note some tie rods have different amount of thread on each end so follow your notes
12. Continue adding back all of the barrels and heads until complete. Careful not to pinch any seals between the barrels and heads.
13. Once everything is together install the nuts until they touch the head. Then place the cylinder on a flat surface secure the rear head using clamps. Some models require the view ports to be removed from the reservoir head. Other you will need a steel or aluminum block to place under the rear head to lift it to clear anything sticking out of the cylinder sides. Using a dead blow mallet hit the front head until everything is completely square.
14. If you can I recommend laying the cylinder in such a way that if it rolls over while being torque it rolls to the center of the table and not off onto the floor. Using a torque wrench, torque to correct value from the chart while the cylinder is still on the flat surface.



- 2 Ton – 7ft/lb
- 4 Ton - 30 ft/lb
- 9 Ton – 60 ft/lb
- 14/20 Ton – 250 ft/lb
- 30 Ton – 350 ft/lb
- 50-75 Ton 1000ft/lb

Topping up (cylinder is low on oil with no air inside)

1. Using a Power Products Fill kit, or any type of oil pump.
2. Prep the fill kit. Start by bleeding all of the air out of the oil pump. If air is pumped into the system it will affect performance and may require you to remove the cylinder from its mounting.
3. Start by turn the valve screw off in the fill block; attach the fill pipe to the fitting on the block. Turn the screw 1 turn open.
4. If you have a newer cylinder and view ports in the top start pumping oil until you see the top of the reservoir piston.
5. Turn the valve screw off in the fill block; remove the fill pipe.

Filling (rebuild or air inside the cylinder)

1. Remove older model cylinders without screw top bleeding from its frame.
2. If a rebuild we recommend you put air on each port one at a time and listen and feel for air leaks before adding oil.
3. Put cylinder on its side with port you will be bleeding from facing up.
4. Remove the bleed gold coloured Zero Leak plug or Flush plug from the side of high pressure section. Screw in Ball Valve then attach the tube making sure it is running to a container to catch the air and oil.
5. Hook Up Air:
Port # 1: 30 PSI air
Port #2: NO AIR
Port #3: Line air (min 60 PSI)
Port #3A: Line air (min 60 PSI)
6. Attach Oil fill hook-up, and then back out the hex screw (counter clockwise) on the fill block. It is not meant to be removed, only needs to be backed out 1 or 2 turns.
7. Start pumping oil in with the ball valve open, until the oil flows out with no air bubbles. Then close the ball valve.
8. Continue pumping oil until the output rod moves out a few inches.
9. Open the ball valve and lift one end up then the other, to get the air out.

For Larger cylinders not so easily lifted

CAUTION output rod will extend quickly make sure there is clearance for rod length. When the cylinder is laying flat with ball valve open you can remove Air pressure from port #3A to allow the output rod to extend out, then re apply pressure to 3A to get the output rod to retract, it may be necessary to reduce or remove pressure from Port #1.

10. Continue cycling and/or lifting the ends until all the air is removed on the first fill. Then close the ball valve and repeat steps 6-8 until no more air comes out.

11. Final fill, close the ball valve, continue adding oil until the output rod extends out an inch. Remove air from Port #1 and open ball valve output rod should retract. Once it has stop and the oil has stopped flowing close the ball valve. If model has sight glasses look in make sure you see the piston is full up reapply pressure to port #1, open ball valve and watch piston for the top of the piston to be in the middle of the sight glass. If you don't have sight glasses remove a 1/8 cup from 4 ton and a little more on bigger models, to make room for expansion.
12. Remove all air pressure, then remove the ball valve and reinstall the plug. Remove oil fill adapter and attach a 3000PSI gauge to oil fill nipple for testing. Now secure the cylinder so it cannot move while testing.
13. Check Lengths OUTPUT ROD

(a) Air on #3A & #3, measure length_____

(b) Air on #3A & #2, measure length_____

(c) Air on #1 & #2, measure length_____

(if rod did not extend model either does not have a check valve or it is installed wrong. Remove air from #2 and apply it to #3 and output rod should extend.)

Power Stroke = (b)-(a)

Total Stroke = (c)-(a)

14. With the output rod fully extended cycle the high pressure stroke and read the pressure, let stand 5 min and look for any drop in pressure. If there is a large drop in pressure this signals a leak. If you get no pressure put air back on only #3A & #3, then move #3A to #1 once output rod is full extended move #3 to #2 and take reading if still nothing this signal a problem. Contact me for more support.
15. Cycle the cylinder a few time (in the factory we run between 500-1000 cycles in a testing frame, less are need in the field 5 is fine if being reinstalled.) The last step to make sure everything is good and there is no small leaks put air on Port #1 & Port #2 record the high pressure gauge reading, let it stand for an hour at high pressure, check for a drop. If no drop or very little drop it is ready for reinstall.

