



Air Operated Double Diaphragm Pump

Owner's Manual



⚠ WARNING: Read carefully and understand all ASSEMBLY AND OPERATION INSTRUCTIONS before operating. Failure to follow the safety rules and other basic safety precautions may result in serious personal injury.

Items #111149

READ & SAVE THESE INSTRUCTIONS

Thank you very much for choosing a Roughneck™ product!

For future reference, please complete the owner's record below:

Serial Number/Lot Date Code: _____

Purchase Date: _____

Save the receipt, warranty, and this manual. It is important that you read the entire manual to become familiar with this product before you begin using it.

This pump is designed for certain applications only. Northern Tool and Equipment is not responsible for issues arising from modification or improper use of this product such as an application for which it was not designed. We strongly recommend that this product not be modified and/or used for any application other than that for which it was designed.

For technical questions, please call **1-800-222-5381**.

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Intended Use

These are used for transfer of clean & particulate laden fluids including waste oil in industrial, automotive, chemical processing, oil & gas and marine applications.

The pump design (incorporating internal check valves) allows for high suction lift even at dry start-up and with heavier fluids.

If external components are compatible - these pumps can be submerged in the liquid by simply running the exhaust line above the liquid level.

Packaging Contents

- Air operated double diaphragm pump (1)
- Silencer (1)
- OIPM (1)

Technical Specifications

Specification	#111149
SIZE	1"
CASING	Aluminum
DIAPHRAGM	Hytrel
FLOW RATE	Upto 24 GPM
PUMP INLET/OUTLET (F)	1" Opening
AIR INLET	3/8"
AIR INLET PRESSURE	29 - 100 PSI (2 - 7 BAR)
MAX. PARTICLE SIZE	1/8" (3 mm) or less
LIQUID TEMP.	32-176°F
MAX. AIR CONSUMPTION	900 LPM (31.8 CFM)
WETTED COMPONENTS	Aluminum & Hytrel
RECOMMENDED USE	Diesel fuel, Kerosene, Lubricants, Gear oil, Engine oil, Waste oil, Brake fluid, Naphtha, Mold lubricants, Antifreeze & Waste water

Important Safety Information

⚠WARNING

- Read and understand all instructions. Failure to follow all instructions may result in serious injury or property damage.
- The warnings, cautions, and instructions in this manual cannot cover all possible conditions or situations that could occur. Exercise common sense and caution when using this tool. Always be aware of the environment and ensure that the tool is used in a safe and responsible manner.
- Do not allow persons to operate or assemble the product until they have read this manual and have developed a thorough understanding of how it works.
- Do not modify this product in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the product. There are specific applications for which the product was designed.
- Use the right tool for the job. DO NOT attempt to force small equipment to do the work of larger industrial equipment. There are certain applications for which this equipment was designed. This product will be safer and do a better job at the capacity for which it was intended. DO NOT use

this equipment for a purpose for which it was not intended.

- Industrial or commercial applications must follow OSHA requirements.

⚠WARNING

WORK AREA SAFETY

- Inspect the work area before each use. Keep work area clean, dry, free of clutter, and well-lit. Cluttered, wet, or dark work areas can result in injury. Using the product in confined work areas may put you dangerously close to cutting tools and rotating parts.
- Do not use the pump where there is a risk of causing a fire or an explosion; e.g., in the presence of flammable liquids, gases, or dust. The product can create sparks, which may ignite the flammable liquids, gases or dust.
- Do not allow the pump to come into contact with an electrical source. The tool is not insulated and contact will cause electrical shock.
- Keep children and bystanders away from the work area while operating the tool. Do not allow children to handle the product.
- Be aware of all power lines, electrical circuits, water pipes, and other mechanical hazards in your work area. Some of these hazards may be hidden from your view and may cause personal injury and/or property damage if contacted.

⚠WARNING

PERSONAL SAFETY

- Stay alert, watch what you are doing, and use common sense when operating the tool. Do not use the tool while you are tired or under the influence of drugs, alcohol, or medication. A moment of inattention while operating the tool may result in serious personal injury.
- Dress properly. Do not wear loose clothing, dangling objects, or jewelry. Keep your hair, clothing and gloves away from moving parts. Loose clothes, jewelry, or long hair can be caught in moving parts. Air vents on the tool often cover moving parts and should be avoided.
- Wear the proper personal protective equipment when necessary. Use ANSI Z87.1 compliant safety goggles (not safety glasses) with side shields, or when needed, a face shield. Use a dust mask in dusty work conditions. Also use non-skid safety shoes, hardhat, gloves, dust collection systems, and hearing protection when appropriate. This applies to all persons in the work area.
- Do not overreach. Keep proper footing and balance at all times.

⚠CAUTION

PUMP USE AND CARE

- Do not force the pump. Products are safer and do a better job when used in the manner for which they are designed. Plan your work, and use the correct product for the job.
- Check for damaged parts before each use. Carefully check that the product will operate properly

and perform its intended function. Replace damaged or worn parts immediately. Never operate the product with a damaged part.

- Do not use a product with a malfunctioning switch. Any power tool that cannot be controlled with the power switch is dangerous and must be repaired by an authorized service representative before using.
- Disconnect the power/air supply from the product and place the switch in the locked or off position before making any adjustments, changing accessories, or storing the tool. Such preventive safety measures reduce the risk of starting the tool accidentally.
- Store the pump when it is not in use. Store it in a dry, secure place out of the reach of children. Inspect the tool for good working condition prior to storage and before re-use.
- Use only accessories that are recommended by the manufacturer for use with your product. Accessories that may be suitable for one product may create a risk of injury when used with another tool. Never use an accessory that has a lower operating speed or operating pressure than the tool itself.
- Keep guards in place and in working order. Never operate the product without the guards in place.
- Do not leave the pump running unattended.

Specific Operation Warnings

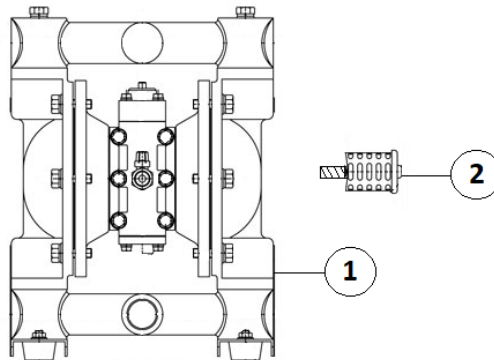
WARNING

- To prevent serious injury or property damage, read and understand owner's manual before operating.
- Wear ANSI Z87.1 compliant goggles and other protective gear while operating.
- Do not use with any liquid besides the intended fluid. See owner's manual for intended fluid.
- Disconnect air hose and relieve air pressure before servicing.
- Always dispose of liquids according to local waste authority guidelines.
- Inspect before each use. Before switching the air supply on, check for any sign of wear, leaks, or loose fittings. Replace as necessary.
- Never use if parts are damaged or broken; replace damaged or broken parts before operating.
- When moving this product, make sure that the internal pressure is released. If the pump is moved while under pressure, any shock imparted by drop page, etc., may damage the pump or even cause an explosion.
- To drive this product, use supply air with minimum moisture content.
- Dry air is needed to operate this pump. Make sure a FRL (Filter, Regulator, and Lubricator) unit is installed in the airline as moisture in the air will damage the pump.
- Not for use by or around children.
- Provide sufficient space around the pump for maintenance.
- The direction of the fluid intake port (IN) and the discharge port (OUT) can be switched opposite from each other by unscrewing the inlet or outlet manifold and then screwing it again in the

opposite direction.

- Use a flexible hose to absorb pump vibration.
- Use a hose of same diameter or larger diameter than the pump's ports. If a hose of smaller diameter is used, the pump's performance will be adversely affected and it may even malfunction.
- When pumping a fluid that contains slurry, verify that the particle size is below the slurry limitation. If it exceeds the limitation of slurries indicated in the specifications, attach a strainer to the pump to stop larger particles. Otherwise, such particles may cause the pump to malfunction or they may damage the pump as well.
- Keep the pump away from heat and sharp edges. Check the pump for wear and make certain that all connections are secure

Main Parts of Product



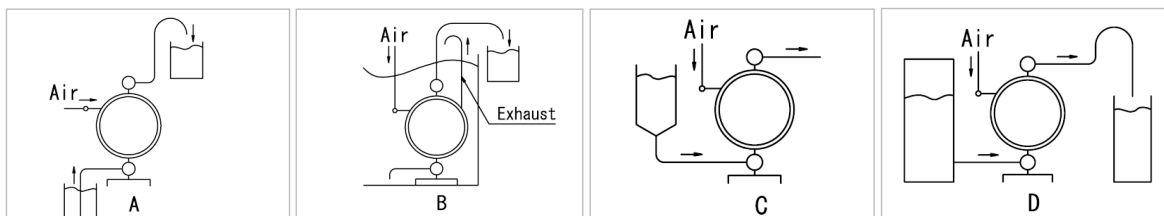
Reference	Subassembly
1	Air Operated Double Diaphragm Pump
2	Silencer

Assembly Instructions

⚠WARNING

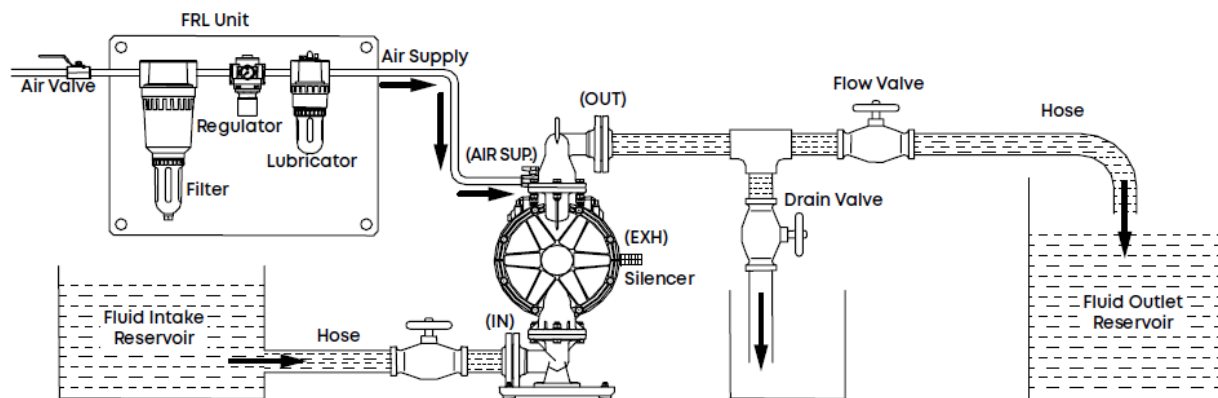
- When installing accessories, make sure that no foreign matter falls into the product, as it could cause malfunction.

1. Pump can be
 - A. Placed over the liquid source.
 - B. Submerged completely in the liquid source.
 - C. Placed below the liquid source.
 - D. Used to empty one source and fill another source at the same time.



2. First, decide where the pump should be installed and secure a suitable space.
3. Install the pump in the designated location.
4. When fixing the pump in place, secure the pump by tightening the bolts** through the base of the pump to the suitable space.
5. Hand tighten the Silencer to the air exhaust valve (EXH) on the body of the pump.
6. Connect a flow valve** and a drain valve** to the fluid discharge port (OUT) of the pump.
7. Connect a valve** to the fluid suction port (IN) of the pump.
8. Connect a hose** to the valve on the fluid suction port (IN) side and to the valve of the fluid discharge port (OUT) side of the pump.
9. Pump can also be installed with a Y-Strainer** at the fluid suction port (IN) to avoid particle size larger than the specified limit from entering into the pump.
10. Connect the hose** on the fluid suction port (IN) side and on the fluid discharge port (OUT) side to the intake reservoir and outlet reservoir respectively.
11. With the air supply turned off, connect the air line into the air inlet (AIR SUP.) on the pump. An FRL unit** (Filter-Regulator-Lubricator) must be used in the air supply, before it is connected to the pump.

**Not supplied with the pump



Before Each Use

⚠WARNING

- An FRC (Filter-Regulator Combination) unit must be used in the Air supply, before it is connected to the pump.
- Set the regulator in between 29 - 100 PSI (2-7 Bar) inlet pressure, but never more than 100 PSI (7 Bar) or less than 29 PSI (2 Bar).
- Make sure that all connections are secure.
- Tighten the nuts and bolts for rigid assembly.
- Apply thread sealant on all threaded connections to ensure leak-proof operation.

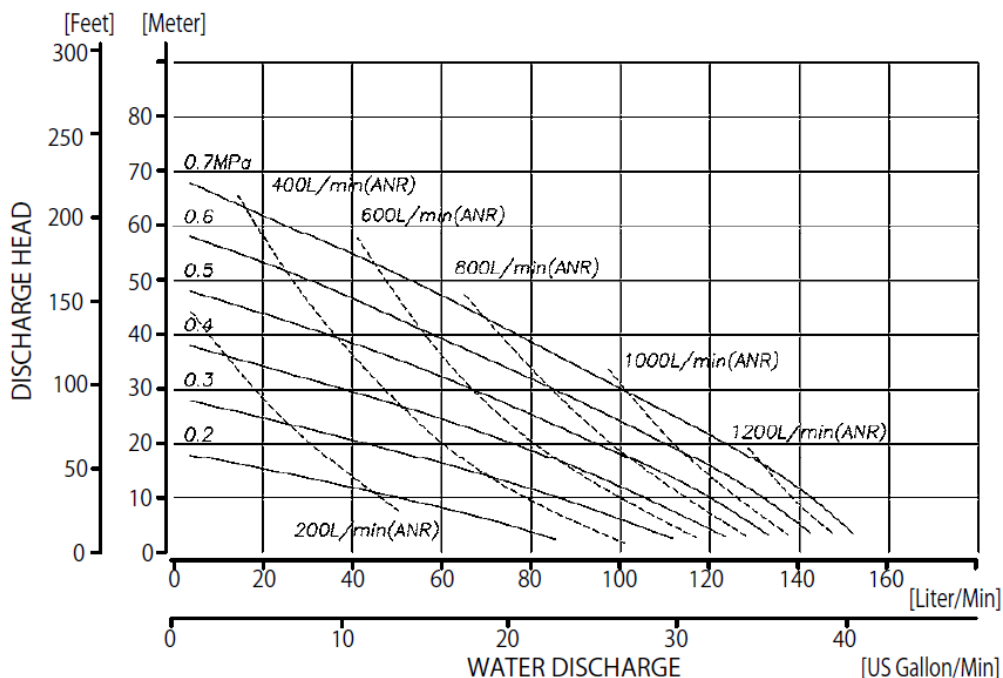
Operating Instructions

⚠WARNING

- Wear ANSI Z87.1 compliant goggles and other protective gear while operating.
- Do not use with any liquid besides the intended fluid. See owner's manual for intended fluid.
- Always dispose of liquids according to local waste authority guidelines.
- Inspect before each use. Before switching the air supply on, check hoses for any sign of wear, leaks, or loose fittings. Replace as necessary.
- Never use if parts are damaged or broken; replace damaged or broken parts before operating.
- When moving this product, make sure that the internal pressure is released. If the pump is moved while under pressure, any shock imparted by drop page, etc., may damage the pump or even cause an explosion.
- To drive this product, use supply air with minimum moisture content.
- Make sure that all connections are secure.

1. Start the air supply from the compressor.
2. Open the air valve in front of the FRL unit partially and adjust the pressure of supplied air with regulator to within the permissible range (29 - 100 PSI / 2-7 Bar).
3. Open the flow valve on the discharge side and verify that fluid is being pumped to the discharge side.
4. Now, fully open the air valve.
5. If required, adjust the supply air pressure with regulator to within the permissible range (29 - 100 PSI / 2-7 Bar).
6. Shut-down the pump by cutting off the air supply when the dispensing is complete.

Performance curve



After Each Use

⚠WARNING

- Switch off the air supply after each use.
- Always dispose of liquids according to local waste authority guidelines.

Close the air valve of the pump and shut off the supply air.

Maintenance

⚠WARNING

- Close the air supply before beginning any maintenance work.
- Use PTFE tape at threaded connections to prevent leakage of fluid.

Maintain the pump by adopting a program of conscientious repair and maintenance in accordance with the following recommended procedures. It is recommended that the general condition of any tool be examined before it is used. Keep your pump in good repair. Keep handles dry, clean, and free from oil and grease. The following chart is based on a normal operation schedule.

The pump is designed to require minimal maintenance.

Maintenance Interval	Maintenance Point
Daily before operating	Make sure that all connections are secure.
After the first 20 operating hours	
After the first 50 operating hours or every week	
On regular interval	a) Inspect the balls, O-Ring, and valve seats from in and out of the manifold for damage. Replace any damaged or worn parts immediately. b) Inspect the diaphragm and center rod for damage. Replace immediately if found damaged or worn. c) Inspect the valve body assembly. Replace immediately if found damaged or worn d) Since air-operated double diaphragm pumps work with compressed air; air quality and air moisture are critical to maintaining the pump's health. Regularly check the air filter, which becomes dirty and clogged with poor air quality. Moisture in the air should also be monitored to ensure proper pump flow. e) For elastic components (O-Rings & Diaphragm): Check the pump's elastic components every two months for swelling / cracking or any other damage to safeguard against uneven wear. f) Consistently inspect the pump's suction side / discharge side. It is common for debris material to build up and clog the pump flow

Troubleshooting

⚠WARNING

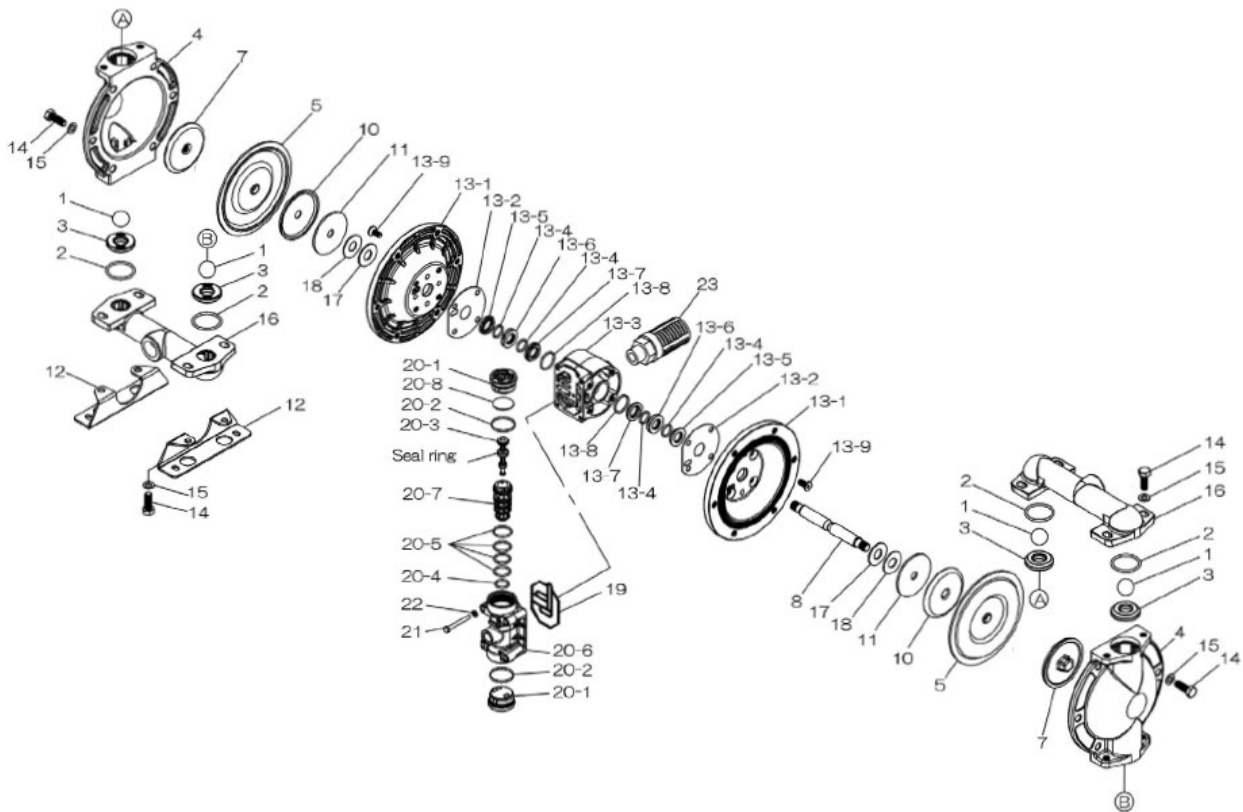
- Drain the pump completely before changing accessories, cleaning, or servicing.

Use the following table to troubleshoot problems before contacting service personnel or your local dealer. If the problem continues after troubleshooting, call your local dealer for assistance.

Failure	Corrective Action
Pump does not run	
The exhaust port (silencer) of pump is clogged with sludge.	Check and clean the exhaust port and silencer.
Air is not supplied.	Start the compressor, and open the air valve and air regulator.
The supply air pressure is low.	Check the compressor and the configuration of air piping.
Air leaks from connection parts.	Check the connection parts and tightness of bolts.
Air hose and the filter is clogged with sludge.	Check and clean the air hose and the filter.
The flow valve on the discharge side (OUT) is not open.	Open the flow valve on the discharge side (OUT).
The fluid hose is clogged with sludge.	Check and clean the fluid hose.
The pump is clogged with sludge.	Disassemble the casing, check and clean
Pump runs, but fluid does not come out	
The suction lift or discharge head is long.	Confirm the hose configuration and shorten the length.
The discharge-side fluid hose (including the strainer) is clogged	Check and clean the fluid hose.
The pump is clogged with sludge.	Disassemble the casing, check and clean.
The valve on the suction side (IN) is not open.	Open the valve on the suction side (IN).
The ball and valve seat are worn out or damaged.	Disassemble the manifold, check and replace parts
Flow (discharge volume) decreased	
The supply air pressure is low.	Adjust the supply air pressure with regulator.
Air hose and the filter is clogged with sludge.	Check and clean the air hose and the filter.
The discharge-side (OUT) flow valve opens differently.	Adjust the discharge-side (OUT) flow valve.
Air is taken in together with fluid.	Replenish fluid and check the configuration of the suction-side (IN) hose.
Cavitation occurs.	Adjust the supply air pressure or shorten the suction lift.
Chattering occurs.	Adjust the supply air pressure. Reduce inlet flow valve to adjust liquid pressure and volume.
The fluid hose (including the strainer) is clogged with sludge.	Check and clean the fluid hose and strainer.
The exhaust port (silencer) of the pump is clogged with sludge.	Check and clean the exhaust port and silencer.
The pump is clogged with sludge.	Disassemble the casing, check and clean
Liquid leakage from exhaust port(silencer)	
The diaphragm is damaged.	Disassemble and check the pump and replace the diaphragm.
The fastening nuts for the center disk are loose. Disassemble and check the pump.	Tighten the nuts.

High air consumption during operation	
The seal ring and sleeve are worn out.	Disassemble the valve body assembly, check and clean. Replace parts as necessary.
Irregular noise	
The supply air pressure too high.	Adjust the supply air pressure.
The spool oscillates, and occur ball chattering.	Adjust the supply air pressure. Reduce inlet flow valve to adjust liquid pressure and volume.
The pump is clogged with sludge with particles of larger than the permissible diameter.	Disassemble the casing, check and clean.
Irregular vibration	
The supply air pressure is too high.	Adjust the supply air pressure.
The spool oscillates, and occur ball chattering.	Adjust the supply air pressure and exhaust pressure.
Connection parts and pump mounting are loose.	Check each connection part and tighten the bolts.

Parts Diagram



Parts List

Reference	Part Number	Quantity
1	Ball	4
2	O-Ring	4
3	Seat	4
4	Out chamber	2
5	Diaphragm	2
7	Center disk	2
8	Center rod	1

Reference	Part Number	Quantity
10	Center disk	2
11	Washer	2
12	Base	2
13	Body assembly	1
13-1	Air chamber	2
13-2	Gasket	2
13-3	Body	1
13-4	O-Ring	4
13-5	Guide bush C	2
13-6	Guide bush B	2
13-7	Guide bush A	2
13-8	O-Ring	2
13-9	Bolt (Flat head with washer)	8
14	Bolt (M10)	20
15	Washer (M10)	20
16	Manifold	2
17	Cushion	2
18	Cushion	2
19	Gasket	1
20	Valve body assembly	1
20-1	Cap	2
20-2	O-Ring	2
20-3	Spool assembly	1
20-4	O-Ring	1
20-5	O-Ring	4
20-6	Valve body	1
20-7	Sleeve	1
20-8	Cushion	1
21	Bolt (M6)	4
22	Washer (M6)	4
23	Silencer	1

Replacement Parts

- For replacement parts and technical questions, please call Customer Service at **1-800-222-5381**.
- Not all product components are available for replacement. The illustrations provided are a convenient reference to the location and position of parts in the assembly sequence.
- When ordering parts, the following information will be required: item description, item model number, item serial number/item lot date code, and the replacement part reference number.
- The distributor reserves the rights to make design changes and improvements to product lines and manuals without notice.

Limited Warranty

Northern Tool and Equipment Company, Inc. ("We" or "Us") warrants to the original purchaser only ("You" or "Your") that the Roughneck product purchased will be free from material defects in both materials and workmanship, normal wear and tear excepted, for a period of **one year** from date of purchase. The foregoing warranty is valid only if the installation and use of the product is strictly in accordance with product instructions. There are no other warranties, express or implied, including the warranty of merchantability or fitness for a particular purpose. If the product does not comply with this limited warranty, Your sole and exclusive remedy is that We will, at our sole option and within a commercially reasonable time, either replace the product or product component without charge to You or refund the purchase price (less shipping). This limited warranty is not transferable.

Limitations on the Warranty

This limited warranty does not cover: (a) normal wear and tear; (b) damage through abuse, neglect, misuse, or as a result of any accident or in any other manner; (c) damage from misapplication, overloading, or improper installation; (d) improper maintenance and repair; and (e) product alteration in any manner by anyone other than Us, with the sole exception of alterations made pursuant to product instructions and in a workmanlike manner.

Obligations of Purchaser

You must retain Your product purchase receipt to verify date of purchase and that You are the original purchaser. To make a warranty claim, contact Us at 1-800-222-5381, identify the product by make and model number, and follow the claim instructions that will be provided. The product and the purchase receipt must be provided to Us in order to process Your warranty claim. Any returned product that is replaced or refunded by Us becomes our property. You will be responsible for return shipping costs or costs related to Your return visit to a retail store.

Remedy Limits

Product replacement or a refund of the purchase price is Your sole remedy under this limited warranty or any other warranty related to the product. We shall not be liable for: service or labor charges or damage to Your property incurred in removing or replacing the product; any damages, including, without limitation, damages to tangible personal property or personal injury, related to Your improper use, installation, or maintenance of the product or product component; or any indirect, incidental or consequential damages of any kind for any reason.

Assumption of Risk

You acknowledge and agree that any use of the product for any purpose other than the specified use(s) stated in the product instructions is at Your own risk.

Governing Law

This limited warranty gives You specific legal rights, and You also may have other rights which vary from state to state. Some states do not allow limitations or exclusions on implied warranties or incidental or consequential damages, so the above limitations may not apply to You. This limited warranty is governed by the laws of the State of Minnesota, without regard to rules pertaining to conflicts of law. The state courts located in Dakota County, Minnesota shall have exclusive jurisdiction for any disputes relating to this warranty.



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www.northerntool.com

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