

NEPTUNE PNEUMATIC PISTON PUMP®

Installation Manual and Operating Instructions



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INSPECT SHIPMENT

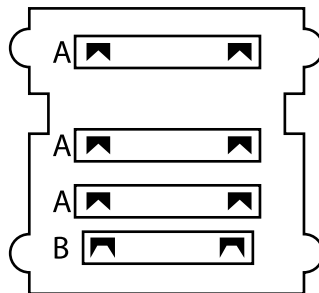
Examine shipped materials. Report and document any damage immediately, before installation. Keep drive motor and components in original shipping cartons until needed.

DIMENSIONS (IN INCHES / METERS)

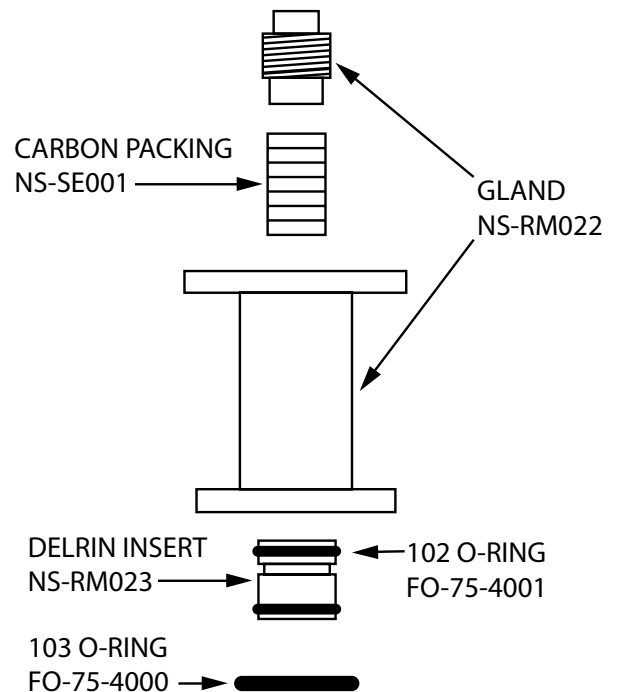
A -Above-well height.....	46.1 in / 1.17 m	F -Foot valve	35.6 in / 0.90 m
B -Pump driver height ..	29.5 in / 0.75 m	G -Intake screen	22 in / 0.56 m
C -Discharge tee height .	12.4 in / 0.31 m	H -Intake screen OD	6.3 in. / 0.16 m
D -Adaptor top	4.17 in / 0.10 m	I - Pump driver OD	8.4 in / 0.21 m
E -Adaptor bottom	2.67 in / 0.07 m	J - Flange OD	7.5 in / 0.19 m

STUFFING BOX ASSEMBLY & PARTS

DELTRIN INSERT NS-RM023



A	↖	↗	U-CUPS
B	↖	↗	SCRAPER



PREPARE TO INSTALL

A Assess caisson condition

A new caisson should be bailed or blown free of cuttings and debris. Determine depth of caisson, static water level and drawdown level at pump's maximum capacity - settings will be based on these measures. Inside diameter must not be smaller than pump.

B Assess fluid condition

Neptune pumps are designed for fluids to 275° F/135° C. Fluids can be viscous and contain gas.

C Lay out components

1. Remove from packaging: In-caisson assembly, well seal, drive piston, discharge tee, pipe nipple, connectors, coiled HDPE riser pipe.
2. Carefully uncoil fiberglass drive rod. CAUTION: Rod coil is under tension. Uncoil in open area. Wear safety glasses and gloves.
3. Connect piston to drive rod. Rod should come with nut and ferrule installed at one end. Strenuously tighten nut to piston assembly. Ferrule must be crimped or mushroomed into rod.
4. Lay out rod with attached piston, well seal, discharge tee, nipple, riser and other parts.

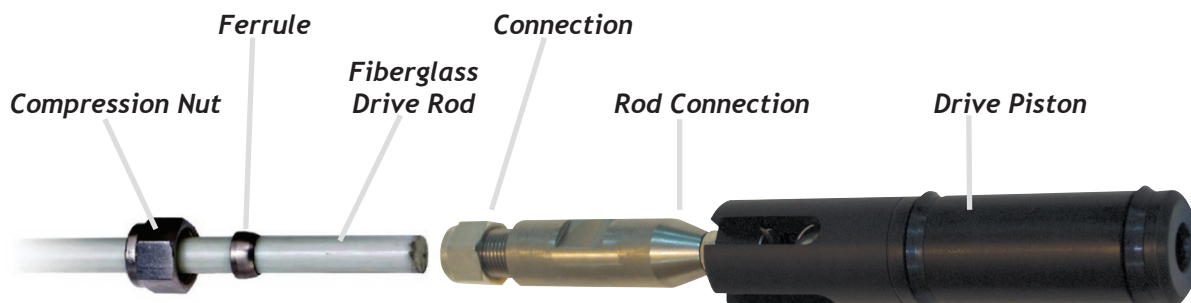
D Installation Depth

To avoid pumping sand or caisson sediment and debris, set bottom intake of cylinder above top of caisson screen or at least 5 feet from caisson bottom.

E Power supply

The Neptune driver will operate between 40 psi and 120 psi of pneumatic air.

Assemble piston to drive rod



INSTALL CAISSON COMPONENTS

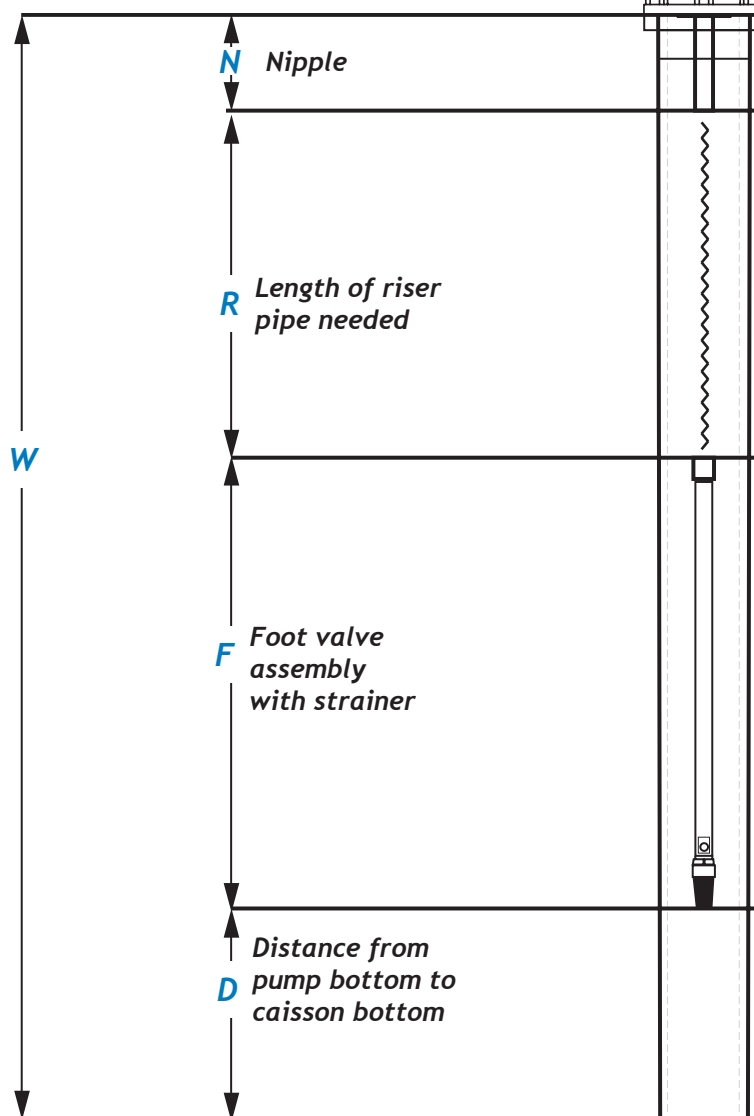
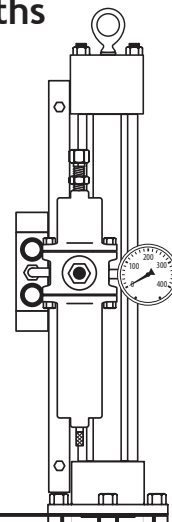
1. Lay out caisson components and determine installation depth (see page 3)
2. Determine length of riser pipe.
(See instruction at right.)
 - a) Important: Measure the combined length of foot valve and strainer screen, including their fittings. Then add length of pipe nipple, plus desired distance from seal to caisson bottom.
 - b) Subtract that combined number from caisson depth.
3. Assemble caisson components (see Page 2 drawing).
 - a) Apply Teflon tape or equivalent to threads during assembly.
 - b) Insert pipe nipple through bottom of well seal.
 - c) Insert discharge tee through top of seal.
4. Open caisson; Remove all debris, caps or other enclosures. Casing must be at proper height to allow component installation and servicing, generally no higher than 4 feet (1.2 meters).
5. Install foot-valve assembly first, into well casing.
6. Install all riser pipe until inlet screen is at specified depth. Attach caisson cap assembly onto riser pipe.
7. Attach caisson cap to top of caisson. Riser pipe is to be suspended from the top of the caisson, not to be standing on bottom.

Note: Caution: keep pipe clear of dirt and debris. Blackhawk recommends using a sling, hoist, or lifting clamp for the installation of the riser pipes and pump.

8. Piston should be connected to fiberglass

How to Measure Riser-Pipe Lengths

- Add together length of nipple (N), length of foot valve assembly with strainer (F) and desired distance from bottom of pump to bottom of caisson (D).
- Subtract that number from the distance between well seal and caisson bottom (W).



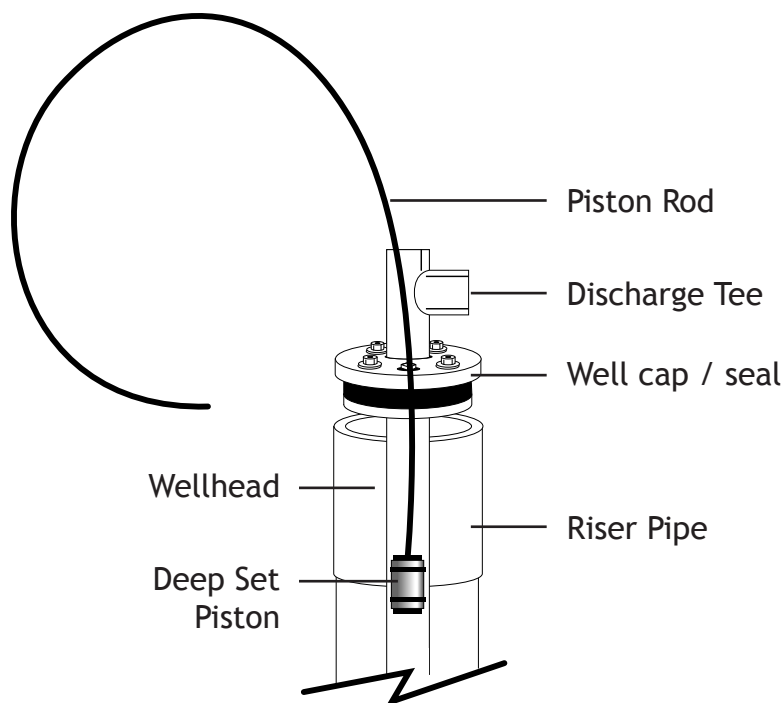
INSTALL CAISSON COMPONENTS

drive rod. Be careful. If still coiled, rod is under tension and can be dangerous if not properly handled.

9. Insert piston and drive rod into riser assembly. Gradually feed rod through the riser pipe toward the foot-valve assembly.

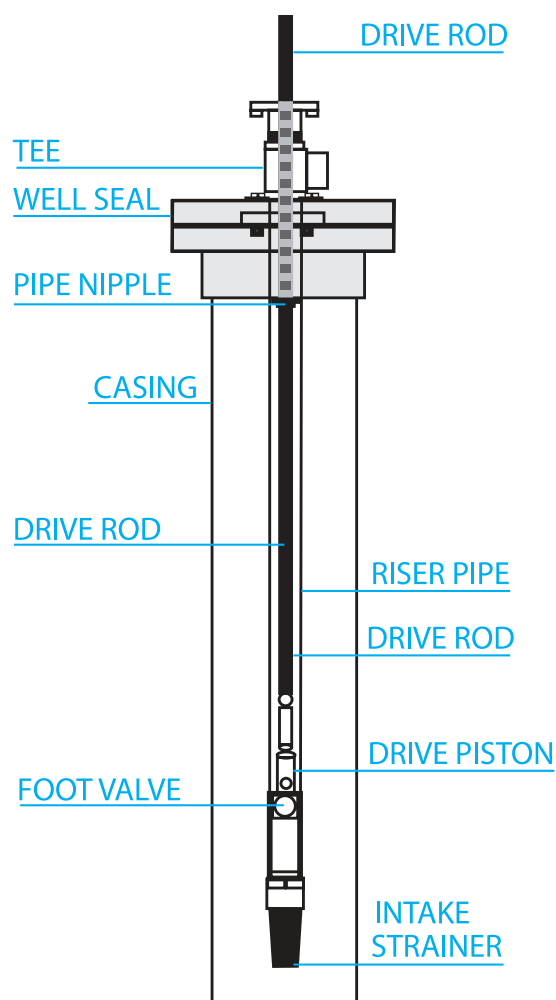
(NOTE: If riser pipe assembly is sufficiently larger than piston, the piston and rod can be installed through the discharge tee at surface (See drawing below.)

10. Firmly grip the drive rod. Pump by hand to fill the riser with liquid. This step ensures the piston is correctly positioned in the foot-valve assembly.
11. Make certain the piston has bottom out in the foot valve. Mark the rod at the top of the tee.



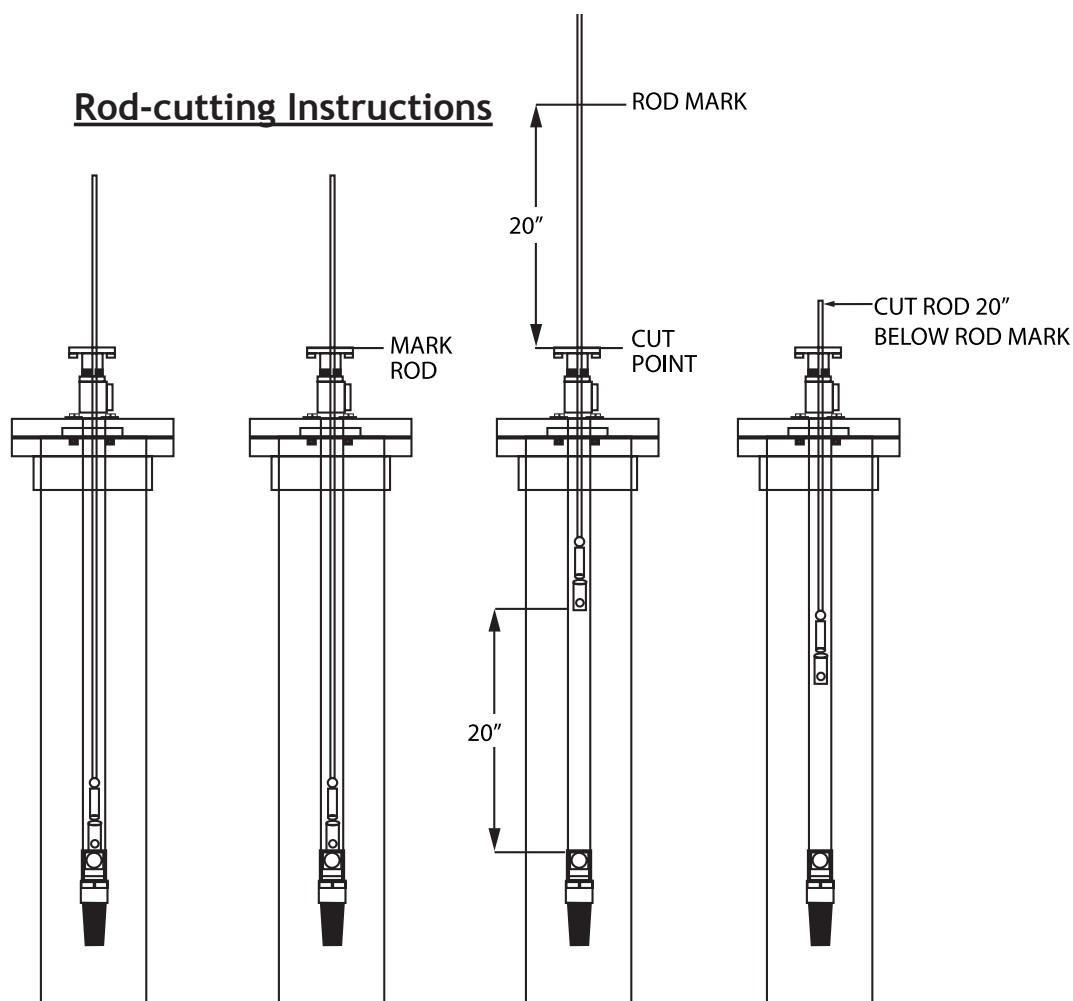
Piston and rod can be installed through discharge tee if riser pipe is larger than piston.

Rod Attaches to Drive Motor



INSTALL DRIVER

1. Pull up the drive rod; note mark on tee (Page 5, Step 11)
2. Mark the rod again, 20 inches below first mark. See drawing below.
3. If the drive rod cannot be removed from the riser, lightly clamp vice-grip pliers to the rod to prevent it from slipping back into the riser.
4. With hacksaw, cut rod at the lower mark. Cut all the way around rod to prevent splintering.
5. Install nut and ferrule on rod, if necessary. Insert rod into driver coupling. Strenuously tighten nut to coupling. The ferrule must be crimped or mushroomed into the rod. Reconnect rod to drive motor.
6. Before attaching driver, see System Startup (Page 7)



Piston must bottom out in foot valve (fig. 1). Mark rod at top of tee with dry marker (fig. 2). Cut rod 20 inches below mark (fig. 3). The cut rod should extend above tee (fig. 4).

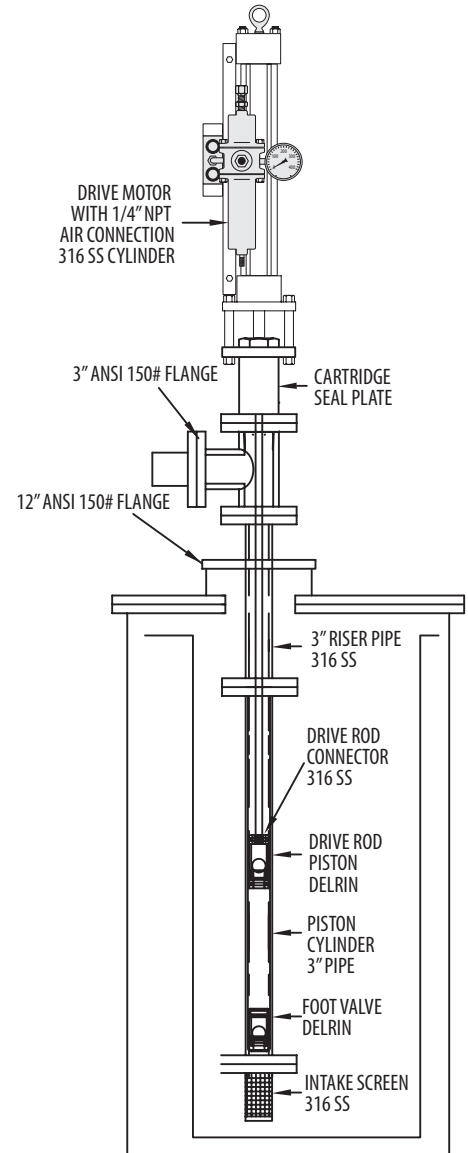
STARTUP & MAINTENANCE

SYSTEM START UP

1. Attach temporary hose to discharge tee. Drain liquid into large receptacle for disposal.
2. Connect air supply to regulator's push-to-connect fitting.
3. Turn on air supply; set regulator to between 40 psi and 100 psi. Pressure will depend upon depth of caisson and fluid viscosity.
4. Adjust air-valve's speed mufflers with Allen wrench to roughly 10 strokes per minute. For best performance, adjust speed mufflers equally.
5. Operate pump until liquid runs fully clear of sand and silt.
6. Adjust and balance speed mufflers to desired stroke rate; 20 strokes per minute is optimal for long pump life. Do not exceed 40 spm.
7. Turn off air supply. Complete all permanent discharge connections.

CRITICAL: Never operate pump with discharge valve closed or discharge pipe clogged. This will cause seal and system failure, potential damage or injury, and will void warranty.

8. Start pump; check stroke rate.



REQUIRED MAINTENANCE

1. Check pump periodically for pressure, draw down, cycle rate and performance.
2. Visually inspect pump. Make sure polished metal drive rod is clean and free of dirt, stains and sticky residue.
3. Check for adequate liquid discharge.
4. Lubrication required to avoid drive-motor failure. Attach continuous rod oiler to seal plate - strongly recommended. Waterproof lithium grease may be injected lightly into Zerk fitting, but do not over-grease - no full strokes.

TROUBLESHOOTING

OBSERVATION

CAUSE

SOLUTION

– Pump not operating

- No power.
- Restricted liquid discharge.
- Piston drive disconnected.

- Check to see that the power supply is on, and that all connections are sound
- Open discharge valve.

– Pump driver operating (cycling), but not pumping liquid.

- Restricted liquid discharge.
- Piston drive disconnected.

- Check for closed valve, clogged discharge or any other obstruction.
- Remove obstruction and restart pump.
- Make sure drive rod is connected.
- If separated at compression fitting, a replacement drive rod ferrule will be required. (Ferrules cannot be re-crimped).

– Driver cycles properly but pump not pumping liquid.

- Plugged bottom intake.

- Disconnect liquid discharge hose/pipe from pump's discharge tee. Hold latex glove (or other inflatable object) over discharge tee mouth. Seal with a tight grip. Allow pump to operate. If no discharge, raise pump strainer from mud.

– Glove does not inflate or deflate as pump cycles.

- Drive rod may have been cut incorrectly.
- Riser pipe string may have a leak.
- Drive rod disconnected from drive motor.
- Check balls do not seal.

- Remove and re-cut or adjust rod length as per installation instructions.
- Check pipe connections and check for cracks or leaks. Repair or replace compromised pipe or fittings.
- Pull piston and inspect check balls.

– Glove inflates more and more as pump cycles.

- No liquid at pump intake.

- Check to make sure that there is liquid to pump.



TROUBLESHOOTING

OBSERVATION

CAUSE

SOLUTION

– Glove inflates on up stroke and deflates on down stroke, and does not inflate more and more with every stroke.

– Foot valve assembly/pipe string not water tight.

– Water stays in riser pipe (and drive rod and drive piston have been deemed OK).

– Drive rod/drive piston assembly tough to remove from foot valve assembly riser pipe. Suction pull back.

– Pump driver moving erratically when operating.

– Plugged intake

– With drive rod and drive piston out of riser pipe, fill riser pipe with water. Water drains out quickly.

– Foot valve assembly/pump intake clogged.

– Pump intake may be clogged.

– Loose connections.

– Downhole drive rod length incorrect.

– Raise pump

– Remove riser pipe and foot valve assembly and inspect, replace, and/or repair.

– Remove riser pipe and foot valve assembly and inspect. Clean piston and foot valve. Raise pump out of mud.

– Follow directions for clogged intake foot valve.

– Check all connections to be sure they are tight.

– Check rod length and adjust as per installation instructions.

WARRANTY, TERMS, & CONDITIONS

Limited Warranty

Pumps (excluding seals) manufactured by Blackhawk Technology Company (Blackhawk) are warranted, to the original user only, to be free of defects in material and workmanship for one year from the date of invoice.

Terms and Conditions

Final delivery date will be determined at time of order. All prices are in U.S. dollars, F.O.B. Glen Ellyn, IL USA. A copy of Buyers Purchase Order is required at time of order. "Delivery time on all specials will be determined after receipt of order." Terms are Net 30 days. Total quoted price does not include freight charges. Freight will be prepaid and added to Blackhawk Technology's final invoice to buyer. A service charge of 1.5% per month will be applied to all past-due invoices. Pricing is valid for 30 days. Notwithstanding anything contained herein to the contrary, the parties agree that the terms and conditions set forth in the limited warranty of Blackhawk Technology Company shall supersede any of the terms and conditions otherwise set forth.

Blackhawk's liability under this warranty shall be limited to repairing or replacing at Blackhawk's option, without charge, F.O.B. Blackhawk's factory, any product that Blackhawk manufactures. Blackhawk will not be liable for any costs of removal, installation, transportation or any other changes that arise in connection with a warranty claim. Products that are sold but not manufactured by Blackhawk are subject to the warranty provided by manufacturer of said products and not by Blackhawk's warranty. Blackhawk will not be liable for damage or wear to said products by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with Blackhawk's printed installation and operating instructions.

To obtain service under this warranty, the defective product must be returned to Blackhawk together with proof of purchase and installation date, failure date, and supporting installation data. Unless otherwise provided, contact will be made to Blackhawk for instructions prior to return of defective product. Any defective product to be returned to Blackhawk must be sent freight prepaid; documentation supporting the warranty claim/or a return Material Authorization must be included if so instructed.

Blackhawk will not be liable for any incidental or consequential damages, losses, or expenses arising from

installation, use, or any other causes. There are not expressed or implied warranties, including mechanical ability of fitness for a particular purpose, that extend beyond those warranties described or referred to above.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, and some jurisdictions do allow limitations on how long implied warranties may last. Therefore, the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights that vary from jurisdiction to jurisdiction.

In the event of perceived failure of a Blackhawk Technology Company product, please follow this warranty claim procedure:

1. Verify that the problem is due to the suspected product and not another part of the system. You may call Blackhawk technical support for advanced troubleshooting assistance.
2. If you confirm that a Blackhawk product is defective, detail in writing the exact nature of the failure.
3. The product must be accompanied by notation of a dated proof of purchase, installation date, failure date and supporting installation data that are satisfactory to Blackhawk.
4. Return the product, the written description of the failure, and supporting notation to Blackhawk's home office, 21W211 Hill Avenue, Glen Ellyn, IL 60137, along with your address and a daytime phone number. Purchaser must prepay all delivery costs or shipping charges, as well as any other charges encountered in shipping any defective Blackhawk product under this warranty policy. No shipment will be accepted collect.
5. Any return from Blackhawk will be sent via Blackhawk's preferred shipping agent. Special shipping arrangements are available at the customer's expense.

