

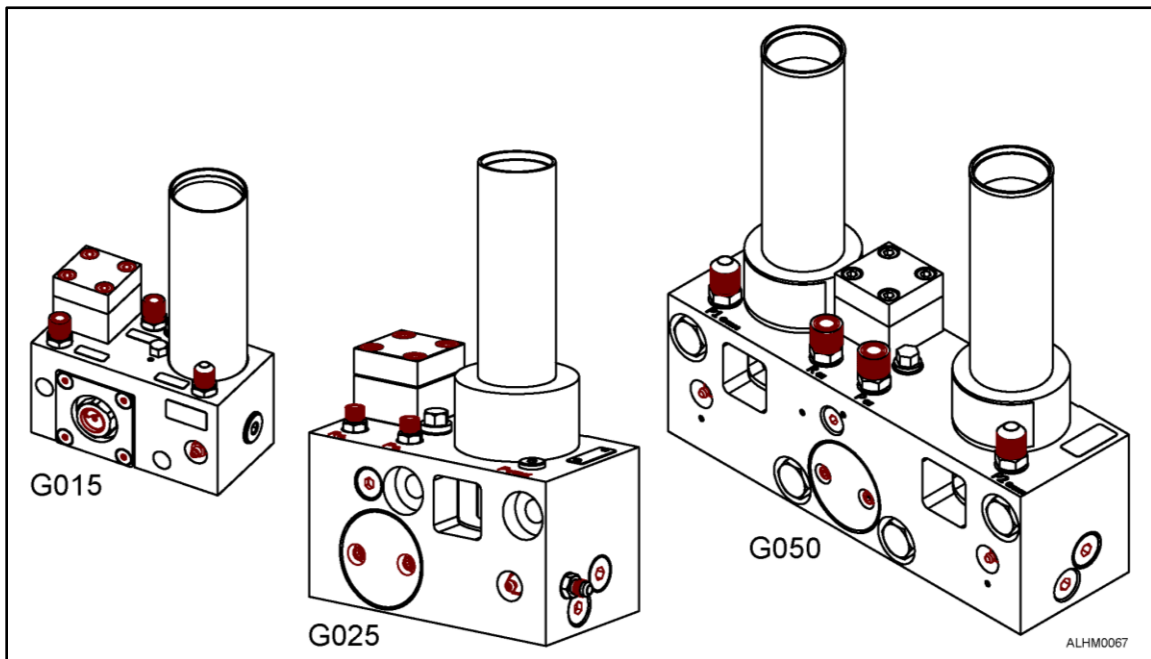


INSTRUCTION MANUAL

AUTO LUBE SYSTEM

Hammer Mounted

Hydraulically Actuated



“Use Genuine NPK Parts”

NPK *...attachments;
designed, built
and backed by NPK.*

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INTRODUCTION

The NPK AUTO LUBE System is designed to automatically provide a supply of grease to the hammer tool bushing - increasing tool bushing life by reducing tool bushing wear. Due to its compact design, it can be mounted directly to the hammer.

The AUTO LUBE system utilizes a hydraulic motor-driven high-pressure pump capable of pushing low viscosity EP2 grease in cold weather. The pump is activated via by-pass hose lines from the hammers pressure and return lines, to run whenever the hammer is operated.

The NPK AUTO LUBE system is comprised of the grease pump assembly, adapter fittings and hoses at the pump, hammer and hammer top bracket. The grease line length varies according to the NPK hammer size. Use 1/4" maximum I.D. line, 5000 psi minimum working pressure with 6 JIC hose ends for the grease line from the pump to the hammer.

For help with any installation problem, or for additional information, call the NPK Service Department at 440-232-7900.

RECOMMENDED UNITS FOR NPK HAMMERS

AUTO LUBE MODEL	PUMP CARTRIDGE	RESERVOIR CAPACITY	HAMMER MODELS
G015	SINGLE CARTRIDGE	14 oz. (400 g)	PH3, PH4 GH4, GH6 E205, E207
G025	SINGLE CARTRIDGE	14 oz. (400 g)	GH7, GH9, GH10, GH12, GH15, GH18 E208, E210A, E213, E216, E220, E225
G050	DOUBLE CARTRIDGE	28 oz. (800 g)	GH23, GH30, GH40, GH50

IMPORTANT SAFETY INFORMATION

READ AND UNDERSTAND ALL SAFETY INFORMATION AND INSTRUCTIONS FOR THE CARRIER AND THE NPK PRODUCT.

SAFE NPK PRODUCT OPERATION



Read and understand the Operator Manuals. Safety notices in NPK Instruction Manuals follow ISO and ANSI standards for safety warnings:



DANGER (red) safety notices indicate an imminently hazardous situation which, if not avoided, **will result in death or serious injury**.



WARNING (orange) safety notices indicate a potentially hazardous situation which, if not avoided, **could result in death or serious injury**.

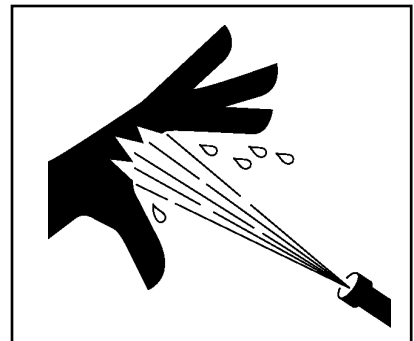


CAUTION (yellow) safety notices indicate a potentially hazardous situation, which, if not avoided, **may result in minor or moderate injury**.



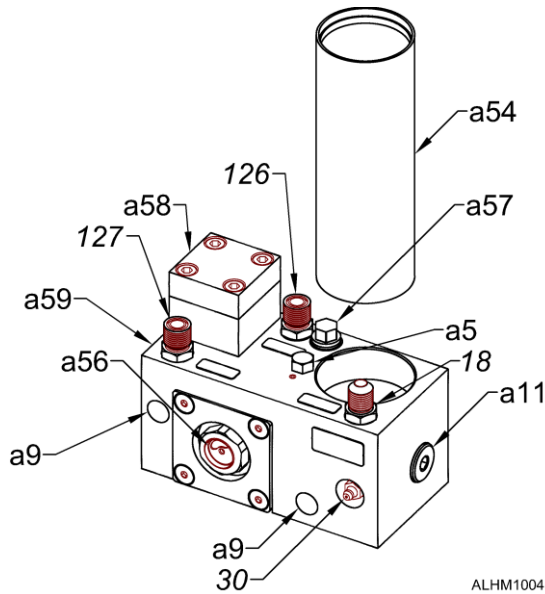
ATTENTION (blue) notices in NPK Instruction Manuals are an NPK standard to alert the reader to situations which, if not avoided, **could result in equipment damage**.

- **Keep all decals clean and visible.** NPK will provide replacement NPK decals free of charge, as needed.
- Keep personnel and bystanders clear of NPK product while in operation. **FLYING DEBRIS CAN CAUSE SERIOUS OR FATAL INJURY.**
- Do not operate NPK product without a suitable shield between the NPK product and operator. **FLYING DEBRIS CAN CAUSE SERIOUS OR FATAL INJURY.**
- Operate the NPK product from the operator's seat only.
- Match the correct NPK model to the carrier according to NPK recommendations.
- Escaping fluid under pressure can penetrate the skin, causing serious injury. Protect hands and body from fluids under pressure. Avoid the hazard by relieving pressure before disconnecting any lines. Search for leaks with a piece of cardboard or other object. If an accident occurs, **see a doctor immediately!** Hydraulic fluid injected into the skin must be surgically removed within a few hours or gangrene may result.



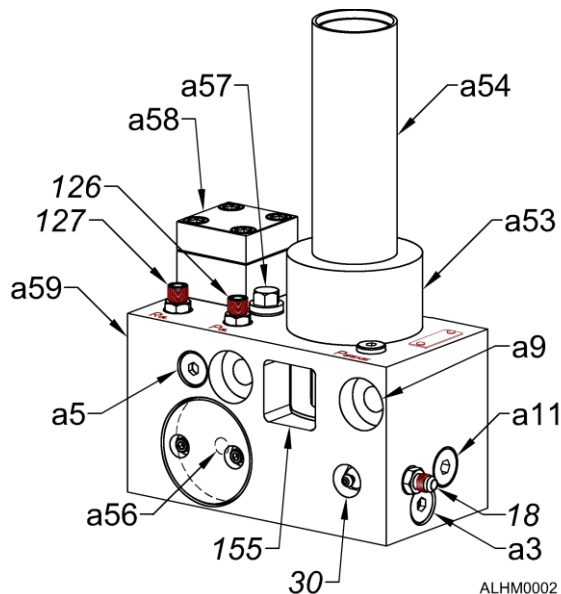
GREASE PUMP ASSEMBLY

G015 SPECIFICATIONS



18	GREASE OUTLET PORT
30	GREASE FITTING
126	INLET (HYDRAULIC) PORT
127	RETURN (HYDRAULIC) PORT
a5	THROTTLE
a9	MOUNTING HOLE
a11	GREASE PUMP ELEMENT
a54	GREASE CARTRIDGE
a56	ECCENTRIC SHAFT
a57	FILTER/ORIFICE ASSEMBLY
a58	HYDRAULIC MOTOR
a59	MAIN HOUSING

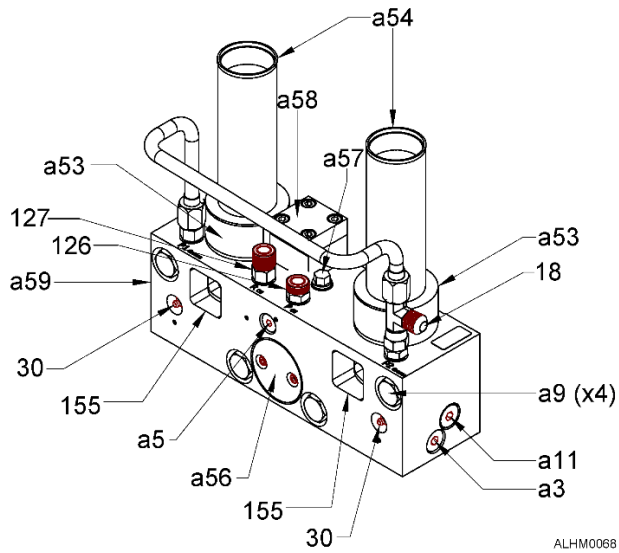
G025 SPECIFICATIONS



18	GREASE OUTLET PORT
30	GREASE FITTING
126	INLET (HYDRAULIC) PORT
127	RETURN (HYDRAULIC) PORT
155	INSPECTION WINDOW
a3	RELIEF VALVE
a5	THROTTLE
a9	MOUNTING HOLE
a11	GREASE PUMP ELEMENT
a53	GREASE CARTRIDGE ADAPTER
a54	GREASE CARTRIDGE
a56	ECCENTRIC SHAFT
a57	FILTER/ORIFICE ASSEMBLY
a58	HYDRAULIC MOTOR
a59	MAIN HOUSING

GREASE PUMP ASSEMBLY

G050 SPECIFICATIONS



18	GREASE OUTLET PORT
30	GREASE FITTING
126	INLET (HYDRAULIC) PORT
127	RETURN (HYDRAULIC) PORT
155	INSPECTION WINDOW
a3	RELIEF VALVE
a5	THROTTLE
a9	MOUNTING HOLE
a11	GREASE PUMP ELEMENT
a53	GREASE CARTRIDGE ADAPTER
a54	GREASE CARTRIDGE
a56	ECCENTRIC SHAFT
a57	FILTER/ORIFICE ASSEMBLY
a58	HYDRAULIC MOTOR
a59	MAIN HOUSING

GREASE PUMP ASSEMBLY

TECHNICAL DATA

HYDRAULIC MOTOR

	G015	G025	G050
HYDRAULIC FLOW (maximum)	.53 gpm (2 lpm)	.53 gpm (2 lpm)	.53 gpm (2 lpm)
WORKING PRESSURE	1300 - 3625 psi (90 - 250 bar)	1300 - 3625 psi (90 - 250 bar)	870 - 4625 psi (60 - 319 bar)
MAXIMUM RETURN PRESSURE	290 psi (20 bar)	290 psi (20 bar)	435 psi (30 bar)
TEMP RANGE	32° - 158°F (0° - 70° C)	32° - 158°F (0° - 70° C)	-4° - 158°F (-20° - 70°)
*ECCENTRIC SPEED @ .47gpm (1.8 lpm)	14 rpm	14 rpm	14 rpm

**Eccentric speed can be adjusted with throttle (see "Throttle Adjustment").*

PUMPING ELEMENT

	G015	G025	G050
DELIVERY RATE PER STROKE	.004 oz (12cm ³)	.004 oz (12cm ³)	.004 oz (12cm ³)
**STROKES AT STANDARD HYDRAULIC FLOW	14 per minute	14 per minute	14 per minute

***Stroke number can be adjusted with throttle (see "Throttle Adjustment").*

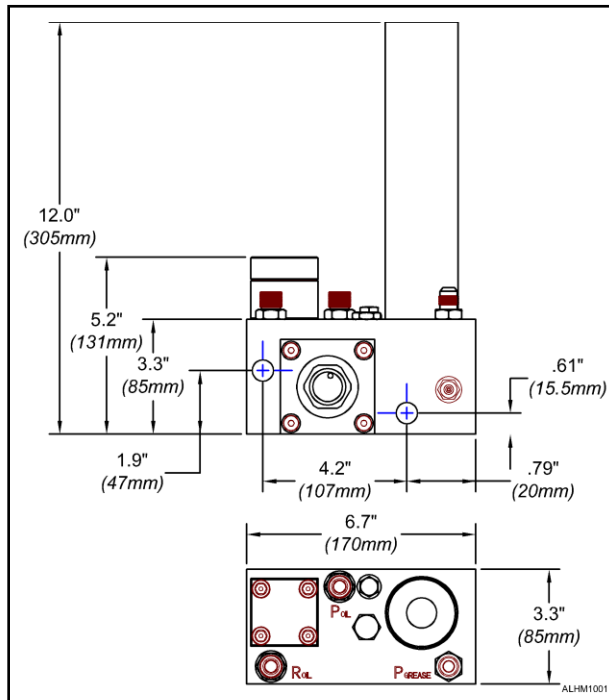
GENERAL

	G015	G025	G050
***WEIGHT	9 lbs. (3.9 kg)	15 lbs. (6.7 kg)	26 lbs. (12 kg)
LUBRICANT	EP2 grease or chisel paste	EP2 grease or chisel paste	EP2 grease or chisel paste
GREASE SUPPLY	Re-fillable cartridge	Re-fillable cartridge	Re-fillable cartridges

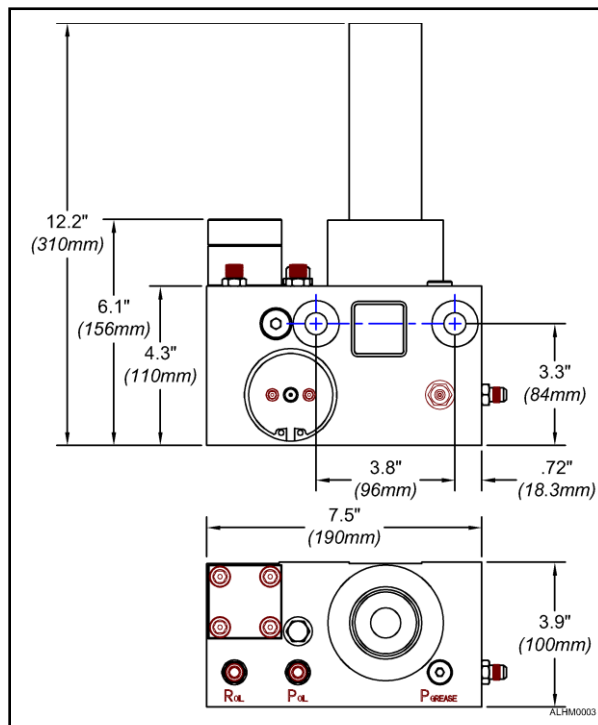
****Weights are measured without cartridges.*

GREASE PUMP ASSEMBLY

G015 MOUNTING SPECIFICATIONS

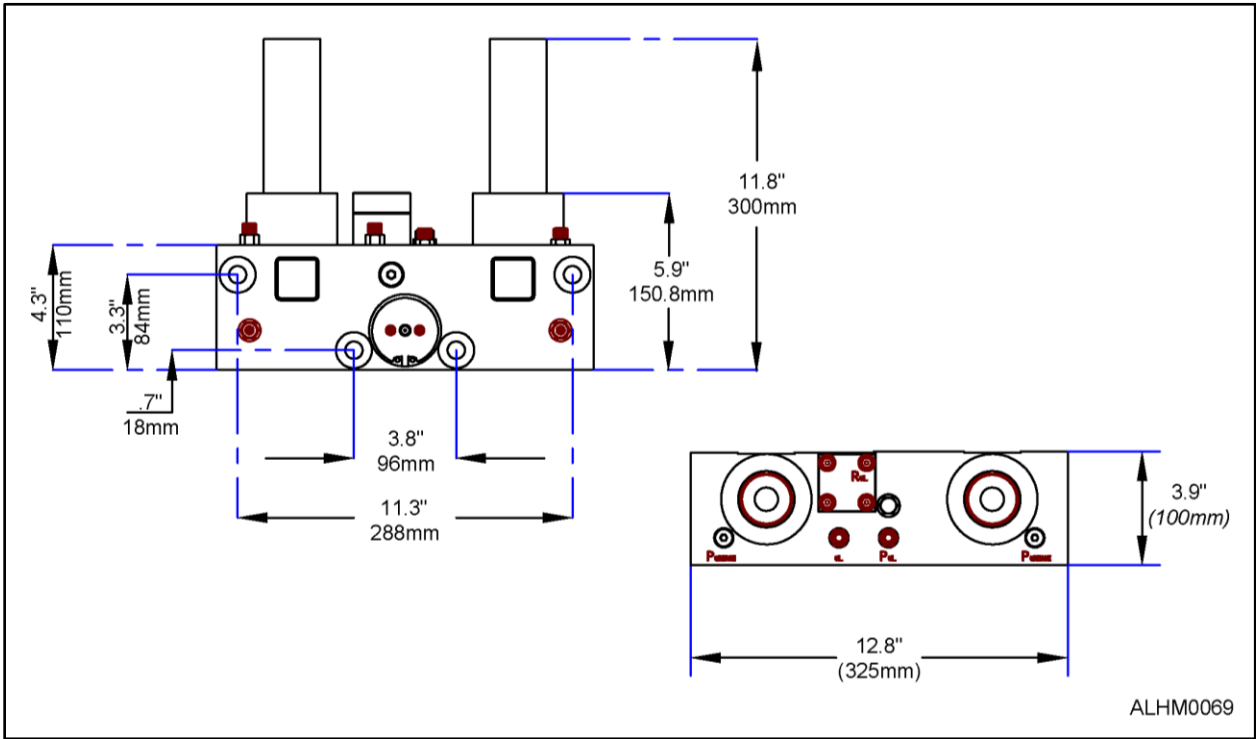


G025 MOUNTING SPECIFICATIONS



GREASE PUMP ASSEMBLY

G050 MOUNTING SPECIFICATIONS



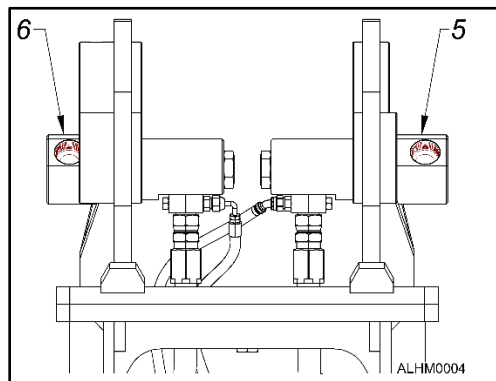
GENERAL DESCRIPTION

The actuated grease pump is used to lubricate hydraulic hammers. Due to the model's design, it can be mounted to the bracket on smaller hammers and the upper support blocks of the larger size hammers.

(See chart for which Hammer Mounted Auto Lube is recommended for each hammer class.)

MODELS	IMPACT ENERGY CLASS	HAMMER MODELS
	ft. lbs.	
G015	500 - 2000	PH06, PH07, PH1, PH2, PH3, PH4
G025	2,500 - 12,000	GH6, GH7, GH9, GH10, GH12, GH15, GH18
G050	13,500 - 20,000	GH23, GH30, GH40, GH50

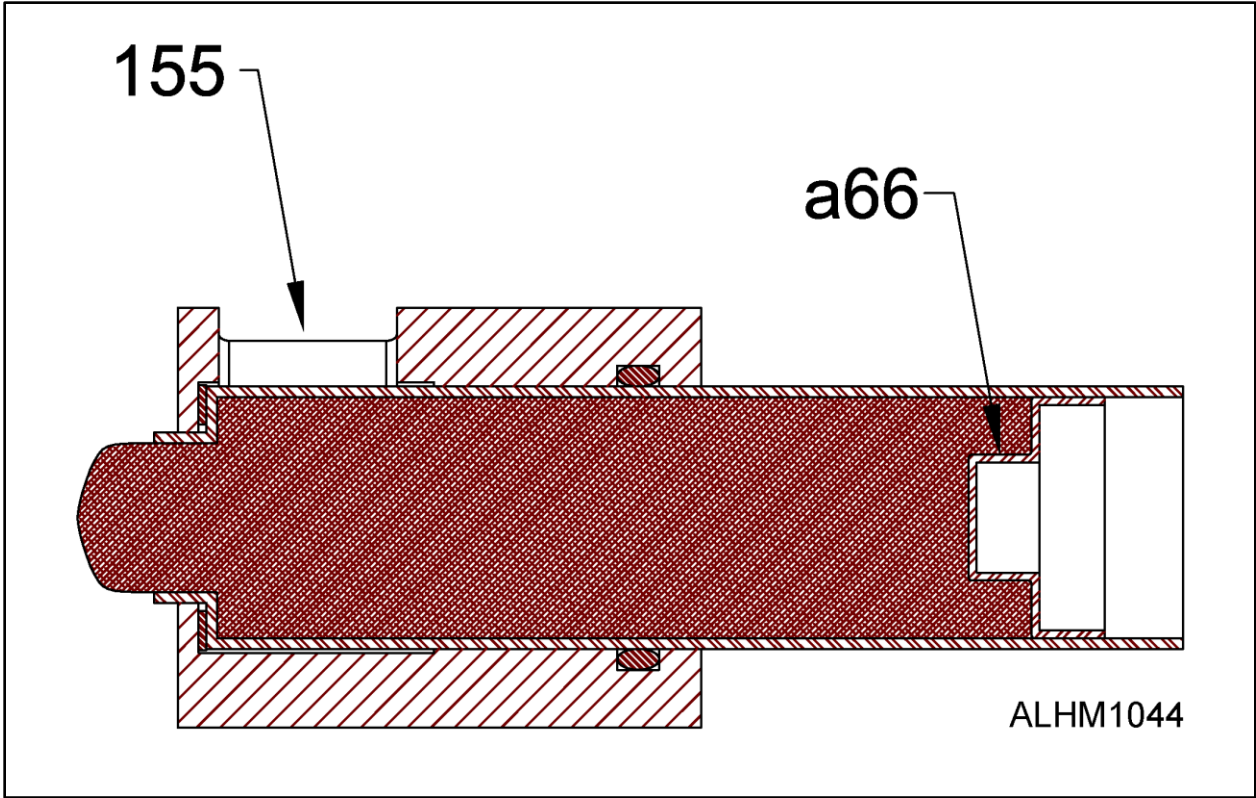
Since this hammer mounted auto lube is driven hydraulically, a continuous lubricant delivery is ensured. The NPK Hammer Mounted Auto Lube System is connected to the hydraulic system of the carrier of the unit via the pressure line (6) of the hammer port Poil (126) of the lube pump housing (a59), see specifications. The delivery rate can be adjusted by adjusting the throttle on the unit.



The hydraulic oil is routed via a filter/diaphragm (a57) to the hydraulic motor (a58), which ensures continuous drive. The hydraulic oil is returned to the circuit via the hammer return line (5), or port Roil (127), equipped with check valve on the lube pump housing, see specifications.

GENERAL DESCRIPTION

Transparent plastic reusable cartridges (a54) serve as a storage reservoir for the lubricant. The lubricant level is checked visually by the follower piston (a66). To be able to check the lubricant level when the cartridge is almost empty, the pump main housing (*G025 and G050 only*) is equipped with an inspection window (155) as shown below.

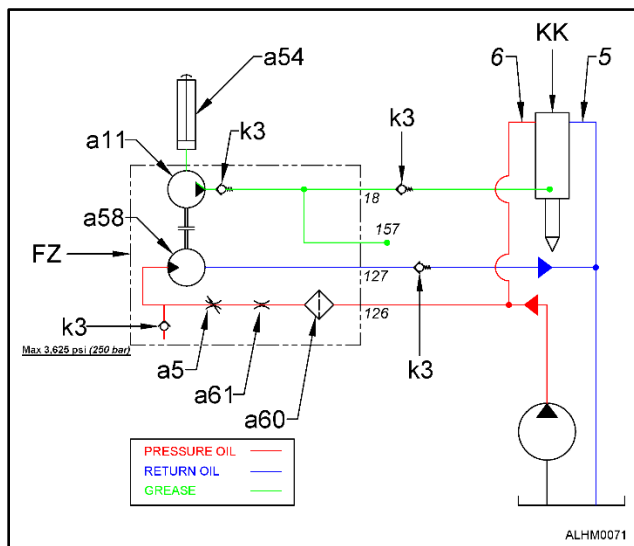


FUNCTIONAL DESCRIPTION

G015

The pressure line (6) to the hammer is connected to the pressure port P_{OIL} (126) of the NPK Auto Lube pump via a tap in connection on the hammer top bracket. The oil is then routed through a filter (a60) with an orifice (a61) to the hydraulic motor (a58), which ensures continuous drive. The hydraulic oil is returned to the hydraulic circuit via the return port R_{OIL} (127) then to a tap in connection on the hammer return line (5) at the hammer top bracket.

The hydraulic motor drives a worm shaft, which transmits the revolutions of the motor to the eccentric shaft. As the eccentric shaft revolves, it strokes the delivery plunger which is part of the pumping element (a11). The stroking of the delivery plunger creates suction and delivery of the lubricant. An integrated check valve (k3) prevents the lubricant from being fed back into the grease pump cartridge. Through the grease port (18), the lubricant is sent to the hammer (KK). Grease cartridges (a54) are used as a storage reservoir for the lubricant. A discharge opening (157) in the main housing for the lubricant, is opposite the cartridge holder.



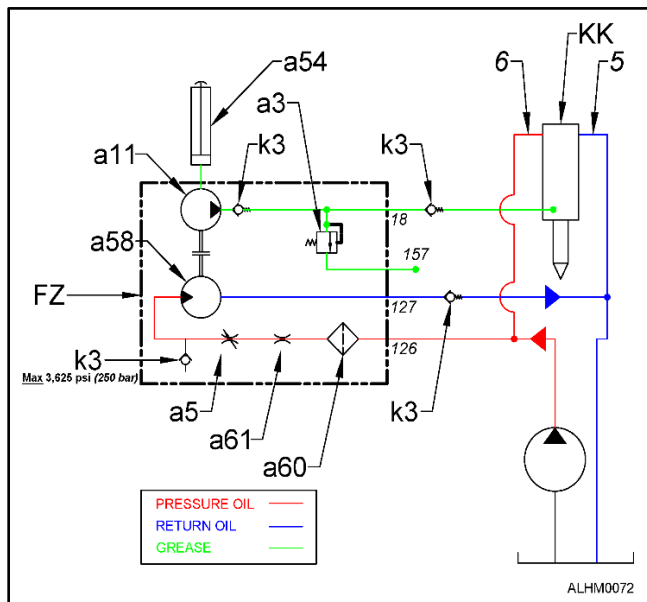
5	HAMMER OUT
6	HAMMER IN
18	GREASE OUTLET PORT
126	INLET (HYDRAULIC) PORT
127	RETURN (HYDRAULIC) PORT
157	GREASE OUTLET
a5	THROTTLE
a11	GREASE PUMP ELEMENT
a54	GREASE CARTRIDGE
a58	HYDRAULIC MOTOR
a60	FILTER
a61	ORIFICE
k3	CHECK VALVE
FZ	AUTO LUBE PUMP ASSEMBLY
KK	HAMMER

FUNCTIONAL DESCRIPTION

G025

The pressure line (6) to the hammer is connected to the pressure port P_{OIL} (126) of the NPK Auto Lube pump via a tap in connection on the hammer top bracket. The oil is then routed through a filter (a60) with an orifice (a61) to the hydraulic motor (a58), which ensures continuous drive. The hydraulic oil is returned to the hydraulic circuit via the return port R_{OIL} (127) then to a tap in connection on the hammer return line (5) at the hammer top bracket.

The hydraulic motor drives a worm shaft, which transmits the revolutions of the motor to the eccentric shaft. As the eccentric shaft revolves, it strokes the delivery plunger which is part of the pumping element (a11). The stroking of the delivery plunger creates suction and delivery of the lubricant. An integrated check valve (k3) prevents the lubricant from being fed back into the grease pump cartridge. Through the grease port (18), the lubricant is sent to the hammer (KK). Grease cartridges (a54) are used as a storage reservoir for the lubricant. The relief valve (a3) for the lubricant is preset to 3,625 psi (250 bar). A discharge opening (157) in the main housing for the lubricant, is opposite the cartridge holder.

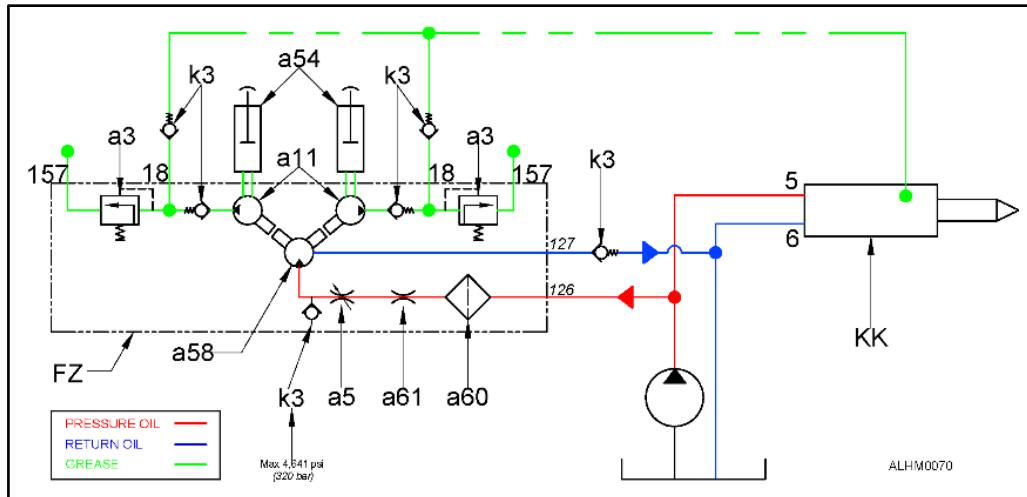


5	HAMMER OUT
6	HAMMER IN
18	GREASE OUTLET PORT
126	INLET (HYDRAULIC) PORT
127	RETURN (HYDRAULIC) PORT
157	GREASE RELIEF VALVE OUTLET
a3	RELIEF VALVE
a5	THROTTLE
a11	GREASE PUMP ELEMENT
a54	GREASE CARTRIDGE
a58	HYDRAULIC MOTOR
a60	FILTER
a61	ORIFICE
k3	CHECK VALVE
FZ	AUTO LUBE PUMP ASSEMBLY
KK	HAMMER

FUNCTIONAL DESCRIPTION

G050

The pressure line (6) to the hammer is connected to the pressure port P_{OIL} (126) of the NPK Auto Lube pump via a tap in connection on the hammer top bracket. The oil is then routed through a filter (a60) with an orifice (a61) to the hydraulic motor (a58), which ensures continuous drive. The hydraulic oil is returned to the hydraulic circuit via the return port R_{OIL} (127) then to a tap in connection on the hammer return line (5) at the hammer top bracket.



The hydraulic motor drives a worm shaft, which transmits the revolutions of the motor to the eccentric shaft. As the eccentric shaft revolves, it strokes the delivery plunger which is part of the pumping element (a11). The stroking of the delivery plunger creates suction and delivery of the lubricant. Integrated check valves (k3) prevent the lubricant from being fed back into the grease pump cartridge. Through the grease ports (18), the lubricant is sent to the hammer (KK). Grease cartridges (a54) are used as a storage reservoir for the lubricant. The relief valves (a3) for the lubricant are preset to 4,060 psi (280 bar).

5	HAMMER OUT
6	HAMMER IN
18	GREASE OUTLET PORT
126	INLET (HYDRAULIC) PORT
127	RETURN (HYDRAULIC) PORT
157	GREASE RELIEF VALVE OUTLET
a3	RELIEF VALVE
a5	THROTTLE
a11	GREASE PUMP ELEMENT
a54	GREASE CARTRIDGE
a58	HYDRAULIC MOTOR
a60	FILTER
a61	ORIFICE
k3	CHECK VALVE
FZ	AUTO LUBE PUMP ASSEMBLY
KK	HAMMER

PREPARATION

BEFORE STARTING

- **CHECK AND MAKE SURE YOU HAVE THE CORRECT NPK INSTALLATION KIT FOR YOUR ATTACHMENT.** Check the hammer model against the NPK Hammer Mounted Grease Pump Assembly description. All NPK Hammer Mounted Grease Pump Assemblies are designed for a specific NPK Hammer. **IF THERE ARE ANY DISCREPANCIES, IMMEDIATELY CONTACT NPK OR YOUR DEALER.**
- **OPEN BOX AND TAKE INVENTORY OF PARTS RECEIVED AGAINST NPK PARTS LIST AND DRAWINGS BEFORE YOU BEGIN.** This will ensure there are no missing or damaged parts, which may affect installation time. NPK takes every precaution to ensure every Hammer Mounted Grease Pump Assembly is shipped complete, but sometimes errors can occur.
 - Remove one part at a time from the box and check off on the NPK parts list. All parts are marked with an NPK part number and balloon item number for ease of identification. Place checked parts in a clean area to prevent damage or contamination. Do not remove protective packaging from parts until ready for use.
 - The Hammer Mounted Grease Pump Assembly can be installed by one technician. Follow safe working practices.
 - No special tools should be required for this installation. Basic hand tools and a welding unit may be required.
 - Review the installation drawings for general understanding of installation.
 - Position the hammer on a flat surface for ease of installation.
 - All work during the installation should be performed in a protected area. The Hammer Mounted Grease Pump Assembly parts must not be exposed to rain, dirt, grinding dust, steam cleaning or other contaminants which can be introduced into the carrier hydraulic system during installation.

PREPARATION FOR WELDING

- Properly ground the negative welder wire as near to the weld area as possible for good penetration.
- Prepare all weld areas by removing dirt, oil, and paint.



Welding may cause a possible fire. Make sure all areas are free from flammable debris!

INSTALLATION PROCEDURES

ORING FACE SEAL FITTING (ORFS) INSTALLATION TIPS

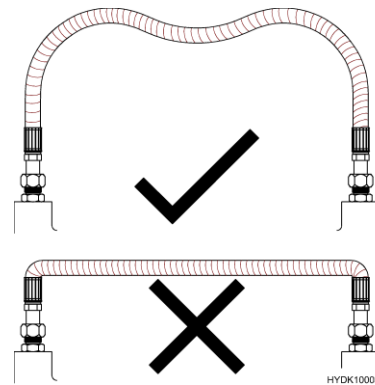
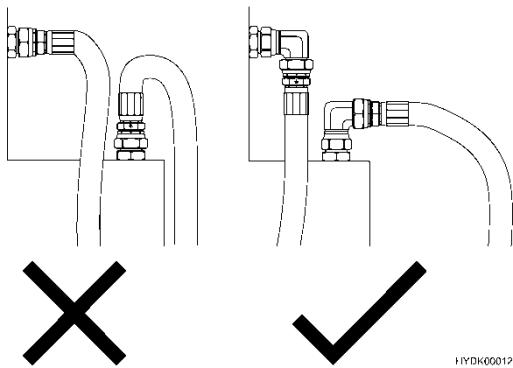
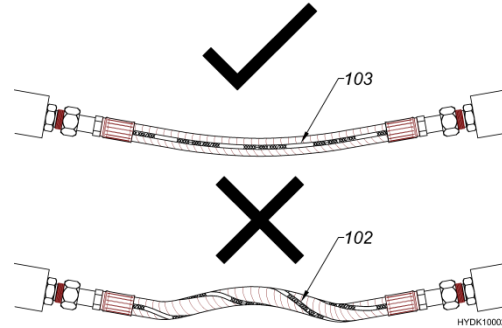
<p>Check o-ring, face of fitting, and tube or hose end for damage and replace if necessary. (RR1) shows a <i>GOOD</i> o-ring, (RR2) shows a <i>NICKED</i> oring, (RR3) shows a <i>BENT</i> oring, (RR4) shows a <i>CUT</i> oring.</p>	<p style="font-size: small; text-align: center;">RR1 RR2 RR3 RR4 HYDK00000</p>																	
<p>Damage (11) to a hose end (OR2) and a fitting end (OR1).</p>	<p style="font-size: small; text-align: right;">HYDK10001</p>																	
<p>Apply a small amount of grease to the oring (RR) and oring groove (BA) to hold the oring in place before assembly.</p>	<p>Make sure the fitting face and the tube or hose face are parallel as displayed above in example. 158 – PARALLEL 159 – NON-PARALLEL</p>																	
<p>Torque fittings as tight as possible by hand with standard wrenches. The face seal will not deform with high torque.</p>	<p>Use two wrenches (t6) to hold the hoses (AO) in place while tightening. Start the carrier and heat oil to operating temperature [140° - 180°F (60° - 80°C)]. Retighten all fittings.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th colspan="2" rowspan="2">ORFS SIZE</th> <th colspan="2">MINIMUM ASSEMBLY TORQUE</th> <th rowspan="2">NPK ORING PART NUMBER</th> </tr> <tr> <th>Ft./Lb.</th> <th>Nm</th> </tr> </thead> <tbody> <tr> <td>Dash</td> <td>Threads</td> <td></td> <td></td> <td></td> </tr> <tr> <td>-6</td> <td>11/16-16</td> <td>25-29</td> <td>34-40</td> <td>L019-6010</td> </tr> </tbody> </table>	ORFS SIZE		MINIMUM ASSEMBLY TORQUE		NPK ORING PART NUMBER	Ft./Lb.	Nm	Dash	Threads				-6	11/16-16	25-29	34-40	L019-6010
ORFS SIZE				MINIMUM ASSEMBLY TORQUE			NPK ORING PART NUMBER											
		Ft./Lb.	Nm															
Dash	Threads																	
-6	11/16-16	25-29	34-40	L019-6010														

INSTALLATION PROCEDURES

HOSE INSTALLATION TIPS

Connect the larger diameter hoses first. Larger hoses are more difficult to bend and maneuver, while the smaller lines are usually more flexible and easier to install.

Do not twist (102) the hoses during installation. Pressure applied to a twisted hose can result in premature hose failure or loose connections. Attach both ends of hose to its connection point. Let the hose find its natural position (103), then tighten both ends of the hose. **Use a back-up wrench.**



Elbows and adapters furnished in the NPK Installation Kit provide easier accessibility to carrier components for maintenance and inspection.

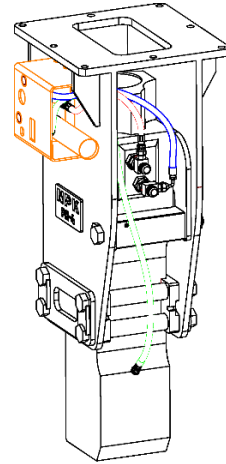
Make sure the hose is routed with the proper bend radius to prevent kinking, flow restrictions or failures at the hose coupling.

INSTALLATION INSTRUCTIONS

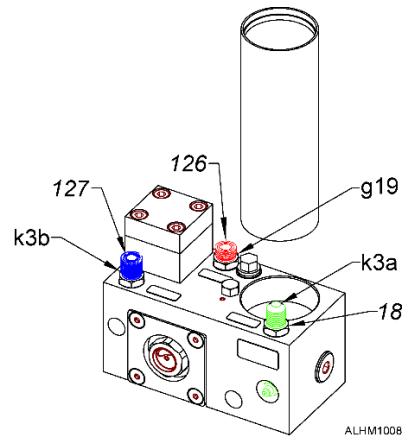
G015

For NPK 500 to 2,000 ft. lb. class hammers (with fixed hammer port connections).

1. The grease pump should be mounted with the grease cartridge (a54) in the horizontal position, with the hammer assembly (DR) in a vertical position (as shown). It must be ensured that neither dirt nor any other type of contamination may fall into the intake area below the cartridge when the cartridge is being re-filled.



2. Remove the existing adapter fittings from the grease pump assembly. Install one ORFS adapter fitting (g19), NPK part number L1213-6600, into the port labeled "P_{OIL}" (126) and one check valve (k3b), NPK part number G025-6300 into port "R_{OIL}" (127). Install one check valve (k3a), NPK part number G100-6300, into the port labeled "P_{GREASE}" (18).



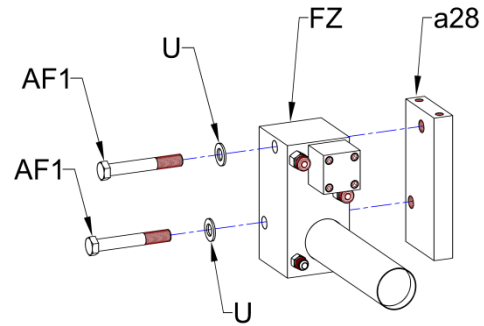
INSTALLATION INSTRUCTIONS

G015

For NPK 500 to 2,000 ft. lb. class hammers (with fixed hammer port connections).

3. Remove the hammer from the bracket. Weld the mounting plate (a28) and drill the access hole in the hammer bracket according to the "Bracket Modification" instructions supplied by NPK. Drill and tap hole in the bracket support block per instructions. For additional information, contact the NPK Service Department at 440-232-7900. Re-install the hammer into the bracket. Bolt the grease pump (FZ) to its mounting plate using the two hex head cap screws (AF1), NPK part number G025-4530 and washers (U), NPK part number G025-4700. Using high strength thread adhesive, torque the hex head cap screws to 80 ft. lbs. (110Nm).

NOTE: Washers (G025-4700) must be installed per fig. 1. (Ref "a" and "b" angles)



ALHM1010

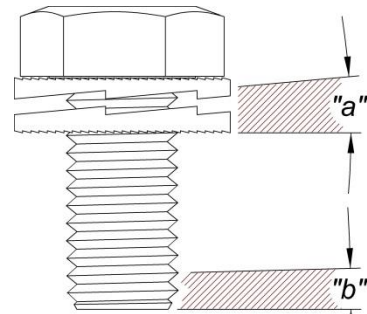
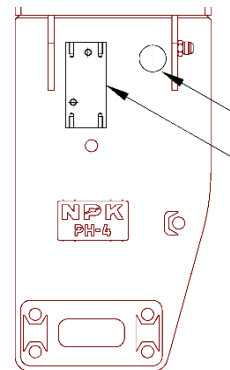


fig. 1

ALHM0046

4. For the bracket modification instructions, please contact the NPK Service Department at 440-232-7900.



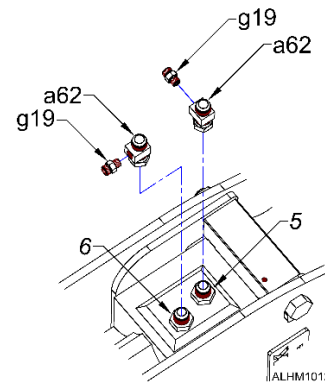
ALHM1038

INSTALLATION INSTRUCTIONS

G015

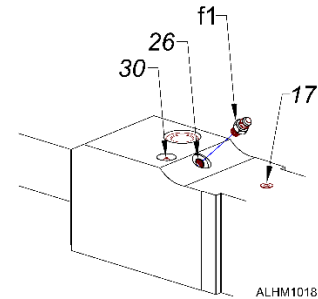
For NPK 500 to 2,000 ft. lb. class hammers (with fixed hammer port connections).

5. Install adapter fittings (g19) into the swivel tees (a62). Install swivel tees onto the existing port fittings in the hammer inlet (6) and outlet (5) ports. Orient the pressure side tee so that the SAE port faces towards the hammer's gas head. Orient the return tee so that the SAE port faces the right-hand side plate of the hammer bracket.



6. Install the straight adapter fitting (f1) into the hammer grease port (26). **NOTE:** The grease fitting (30) is for manual greasing.

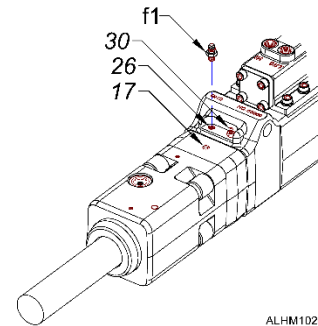
PH SERIES



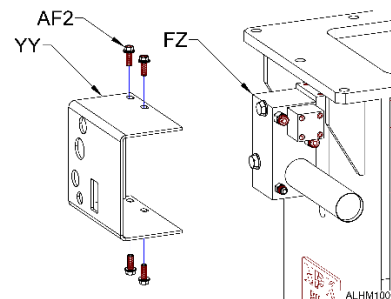
WARNING

DO NOT install the above fitting into the hammer's air connection port (17). It is used in underwater applications. Pumping grease into this port will cause damage to the hammer.

GH SERIES



7. Install the cover plate (YY) over the grease pump assembly (FZ). Use the four hex head cap screws (AF2) to secure cover to the pump mounting plate. Using a high strength thread adhesive, torque the mounting bolts to 44 ft. lbs. (60 Nm).

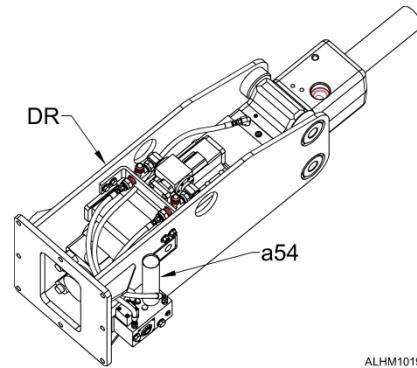


INSTALLATION INSTRUCTIONS

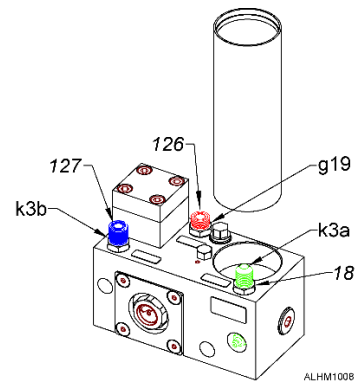
G015

For NPK 500 to 2,000 ft. lb. class hammers (with swivel hammer port connections).

1. The grease pump should be mounted with the grease cartridge (a54) in the vertical position (facing up), with the hammer assembly (DR) in a horizontal position (as shown). *It must be ensured that neither dirt nor any other type of contamination may fall into the intake area below the cartridge when the cartridge is being re-filled.*



2. Remove the existing adapter fittings from the grease pump assembly. Install one ORFS adapter fitting (g19), NPK part number L1213-6600, into the port labeled "P_{OIL}" (126) and one check valve (k3b), NPK part number G025-6300 into port "R_{OIL}" (127). Install one check valve (k3a), NPK part number G100-6300, into the port labeled "P_{GREASE}" (18).



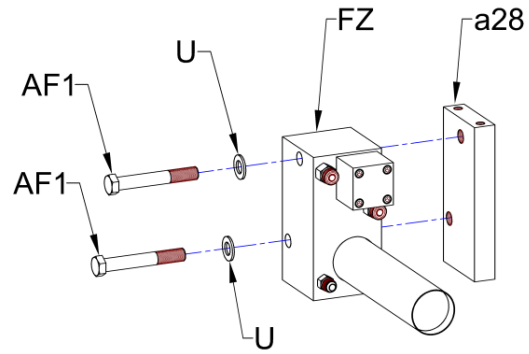
INSTALLATION INSTRUCTIONS

G015

For NPK 500 to 2,000 ft. lb. class hammers (with swivel hammer port connections).

- Weld the mounting plate (a28) and drill the access hole in the hammer bracket according to the “**Bracket Modification**” instructions supplied by NPK. Drill and tap hole in the bracket support block per instructions. For additional information, contact the NPK Service Department at 440-232-7900. Re-install the hammer into the bracket. Bolt the grease pump (FZ) to its mounting plate using the two hex head cap screws (AF1), NPK part number G025-4530 and washers (U), NPK part number G025-4700. Using high strength thread adhesive, torque the hex head cap screws to 80 ft. lbs. (110Nm).

NOTE: Washers (G025-4700) must be installed per fig. 1. (Ref “a” and “b” angles)



ALHM1010

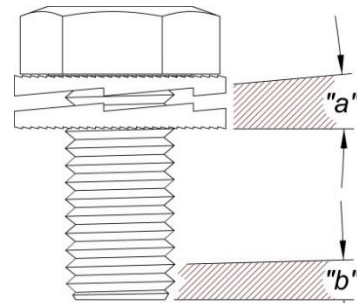
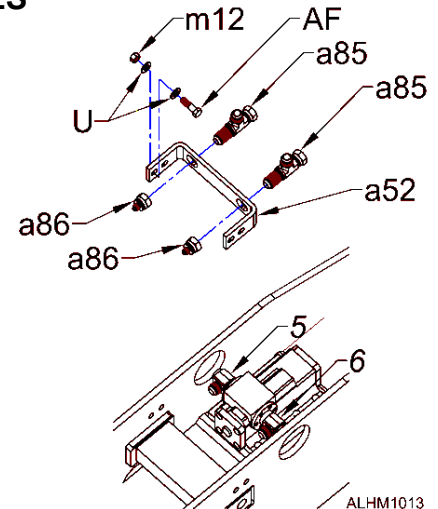


fig. 1

ALHM0046

- Install swivel bulkhead tees onto the existing port fittings on the hammer inlet (6) and outlet (5) ports. Install the bulkhead mounting bracket (a52) onto the bulkhead tees (a85) then orient the assembly so the swivel fittings are pointing towards the hammer gas head. Mark locations for the bulkhead mounting plate bolt holes. Drill holes in the marked locations. Bolt the bulkhead mounting plate to the side plates of the hammer bracket using the nuts (m12), bolts (AF) and washers (U) provided. Install reducing fittings (a86) onto the swivel tees.

GH SERIES



ALHM1013

INSTALLATION INSTRUCTIONS

G015

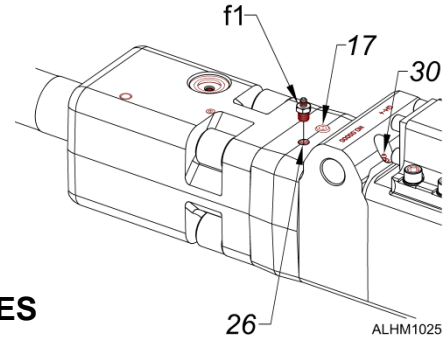
For NPK 500 to 2,000 ft. lb. class hammers (with swivel hammer port connections).

5. Install the supplied straight adapter fitting (f1) or elbow fitting (CF) into the hammer grease port (26). **NOTE:** *The grease fitting (30) is for manual greasing.*

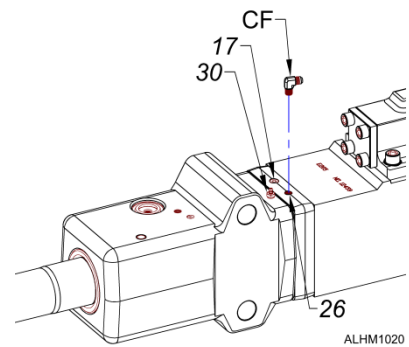


DO NOT install the above fitting into the hammer's air connection port (17). It is used in underwater applications. Pumping grease into this port will cause damage to the hammer.

GH SERIES

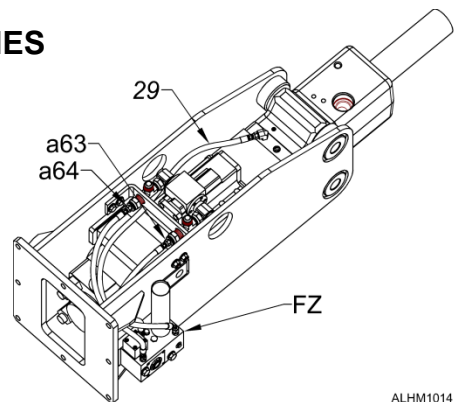


GH SERIES



6. Route the pressure hose (a63) from port "P_{OIL}" on the grease pump (FZ) through the hole in the hammer bracket side plate to the hammer pressure inlet port. Route the return hose (a64) from port "R_{OIL}" on the grease pump through the side plate hole to the hammer return port.

GH SERIES



7. Fill the grease line before installation (see **AUTO LUBE GREASE LINE PRE-FILLING** section of this manual.) Route the grease line (29) from "P_{GREASE}" port on the auto lube pump through the hole in the hammer bracket side plate, under the bulkhead mounting plate to the hammer grease port.
8. Using the protective hose covering (supplied by NPK) wrap the hydraulic hose lines between the auto lube pump and the hammer. **NOTE:** *Cut length to fit.*

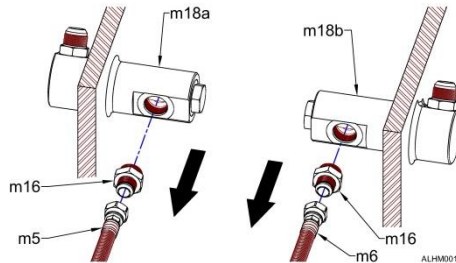
INSTALLATION INSTRUCTIONS

G015

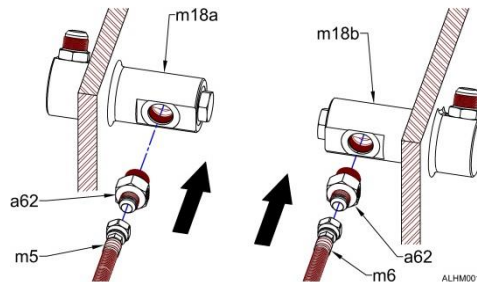
For NPK 2,000 ft. lb. class hammers (with top brackets that include joint fittings).

1.1. For units with SAE style joint fittings.

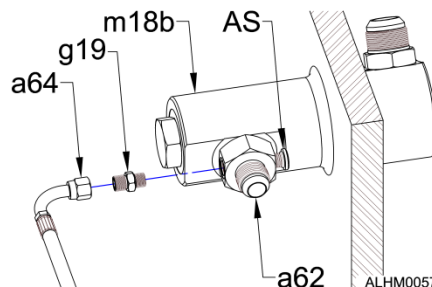
- a. Disconnect the hammer hoses (m5 and m6) from the top bracket joint fittings (m18a, m18b). Remove the existing adapter fittings (m16) and discard.



- b. Install the special adapter tee fittings (a62) into the top bracket joint fittings (m18a, m18b). Reconnect the hammer hoses (m5 and m6).



- c. Install straight fitting (g19) into the special adapter fitting. Use the port that closely faces the center of the top bracket, which will allow for the best hose routing. Install #6 SAE plug (AS) in the opposite port.
- d. Install hose line (a64). Route hose from return side joint fitting (m18b), through top bracket burnout, to port labeled "RoIL" on the grease pump (FZ).

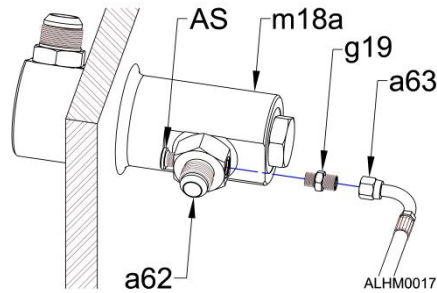


INSTALLATION INSTRUCTIONS

G015

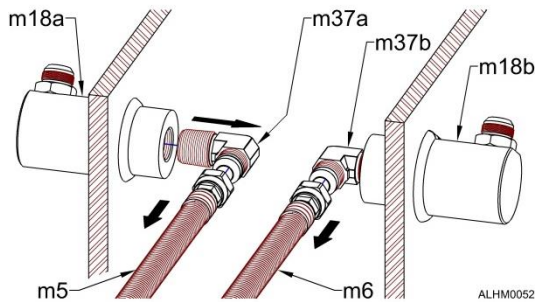
For NPK 2,000 ft. lb. class hammers (with top brackets that include joint fittings).

- e. Install hose line (a63). Route hose from pressure side joint fitting (m18a), through top bracket burnout, to port labeled "POIL" on the grease pump (FZ).

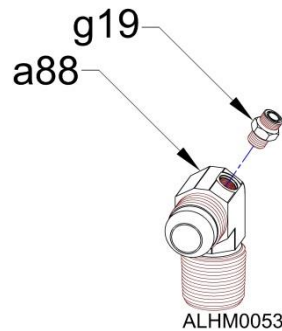


1.2. For units with NPT style joint fittings.

- a. Disconnect the hammer hoses (m5 and m6) from the NPT elbows (m37a and m37b). Remove the elbows from the joint fittings and discard.



- b. Install straight fittings (g19) into the special elbows (a88).

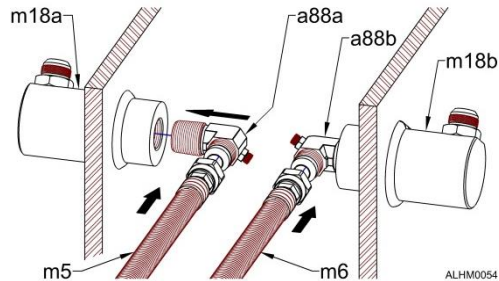


INSTALLATION INSTRUCTIONS

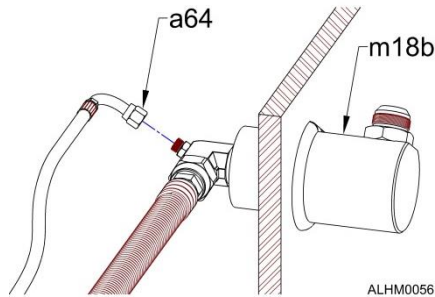
G015

For NPK 2,000 ft. lb. class hammers (with top brackets that include joint fittings).

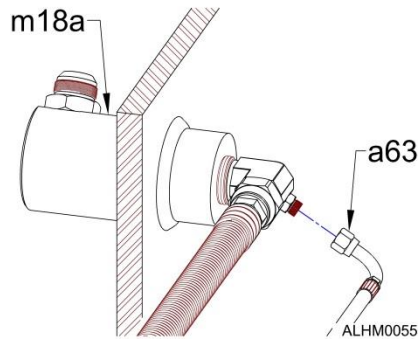
- c. Install special elbows (a88a and a88b) into the joint fittings (a18a and a18b). Reconnect the hammer hoses (m5 and m6).



- d. Install hydraulic hose (a64). Route hose from return side joint fitting (m18b), through top bracket burnout, to port labeled "R_{OIL}" on the grease pump (FZ).



- e. Install hydraulic hose (a63). Route hose from pressure side joint fitting (m18a), through top bracket burnout, to port labeled "P_{OIL}" on grease pump (FZ).



INSTALLATION INSTRUCTIONS

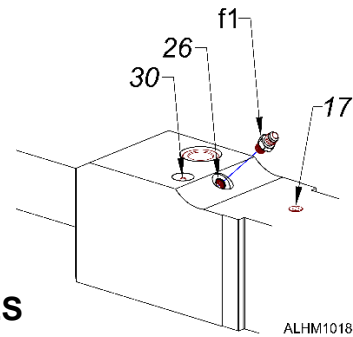
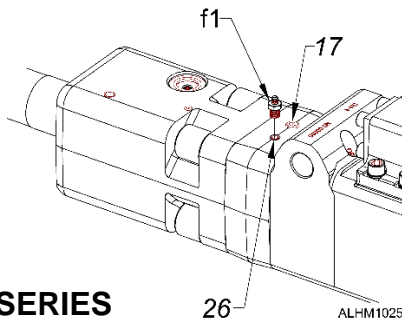
G015

For NPK 2,000 ft. lb. class hammers (with top brackets that include joint fittings).

2. Install the supplied straight adapter fitting (f1) into the hammer grease port (26).



DO NOT install the above fitting into the hammer's air connection port (17). It is used in underwater applications. Pumping grease into this port will cause damage to the hammer.

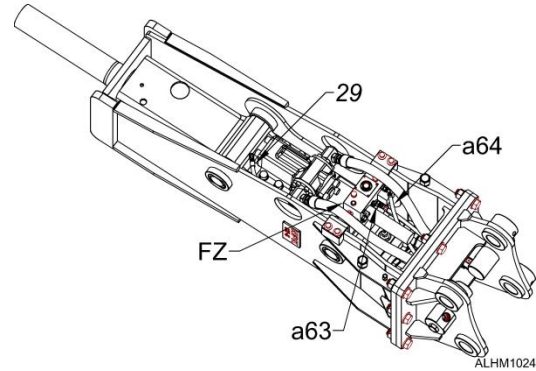


INSTALLATION INSTRUCTIONS

G015

For NPK 2000 ft. lb. class hammers (with top brackets that include joint fittings).

3. Route the straight end of the pressure hose (a63) from port "P_{OIL}" on the grease pump assembly (FZ) through the inside hammer and top bracket burnouts, to the pressure side joint fitting (m18a) adapter tee. Route the 45° end of the return hose (a64) from port "R_{OIL}" on the grease pump through the inside hammer and top brackets burnouts, to the return side joint fitting (m18b) adapter fitting.



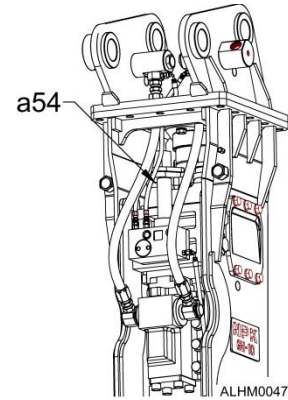
4. Fill the grease line before installation (see the **AUTO LUBE GREASE LINE PRE-FILLING** section of the manual). Route grease hose (29) from port "P_{GREASE}" on the grease pump, under the hammer swivel fitting, to the hammer grease port.
5. Using the protective hose covering (supplied by NPK); wrap the hydraulic hose lines between the auto lube pump and the hammer. **NOTE:** *Cut length to fit.*

INSTALLATION INSTRUCTIONS

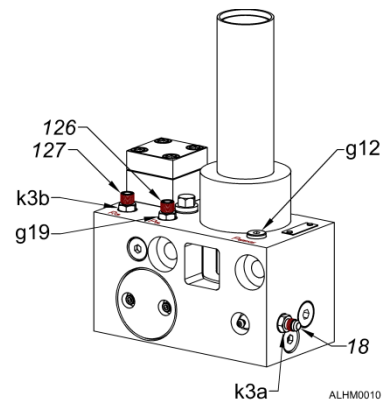
G025

For NPK 2,500 to 12,000 ft. lb. class hammers

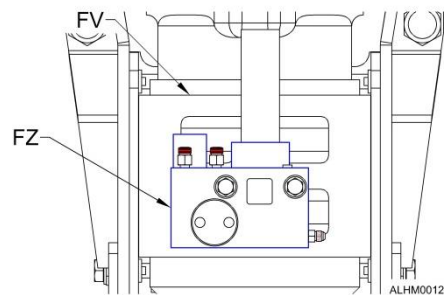
1. The grease pump should be mounted so that the grease cartridge (a54) in the vertical position when the hammer is in operation. It must be ensured that neither dirt nor any other type of contamination may fall into the intake area below the cartridge when the cartridge is being re-filled.



2. Remove the existing adapter fittings from the grease pump assembly. Install one ORFS adapter fitting (g19), NPK part number L1213-6600, into the port labeled "P_{OIL}" (126) and one check valve (k3b), NPK part number G025-6300 into port "R_{OIL}" (127). Plug (g12) port "P_{GREASE}". Remove the plug from the grease outlet port (18) closest to the right side of the front of the pump assembly. Install check valve (k3a), NPK part number G100-6300.



3. Place the Auto Lube pump assembly (FZ) and mounting plate (a28) in NPK's suggested position. Loosely install the grease line and the pressure and return hoses to the hammer and hammer bracket. Tack weld the mounting plate, NPK part number G025-2000 to the upper support block (FV).



INSTALLATION INSTRUCTIONS

G025

For NPK 2,500 to 12,000 ft. lb. class hammers

- Remove the pump assembly and finish welding the mounting plate. *(Weld as much around the perimeter as possible.)* Bolt the grease pump (FZ) to its mounting plate using the two hex head cap screws, NPK part number G025-4530 and washers (U), NPK part number G025-4700. Using high strength thread adhesive, torque the hex head cap screws to 80 ft. lbs. (110Nm).

NOTE: Washers (G025-4700) must be installed per fig. 1. (Ref "a" and "b" angles)

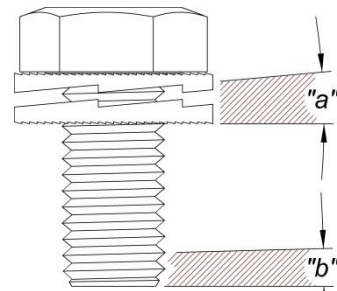
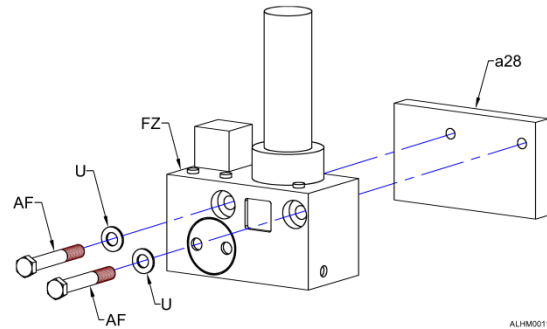
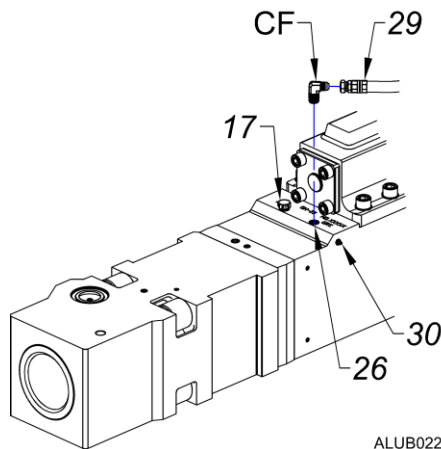


fig. 1

ALHM0046

- Remove the plug from the hammer Auto Lube port (26) and discard. Install adapter elbow (CF) part number L515-6600 into the port. **NOTE:** For manual greasing, use the grease fitting (30) provided.



ALUB022

WARNING

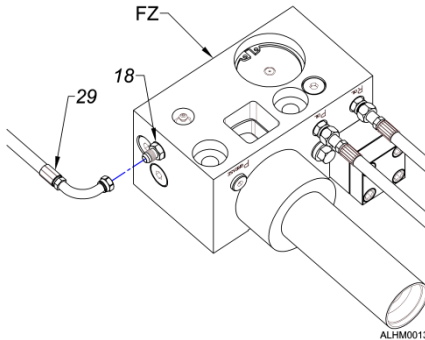
DO NOT install the Auto Lube grease line (29) into the port stamped "A" (17) that is located on the lower left side of the hammer main body. This port is an air line connection port used in underwater applications. Pumping grease into this port will cause damage to the hammer.

INSTALLATION INSTRUCTIONS

G025

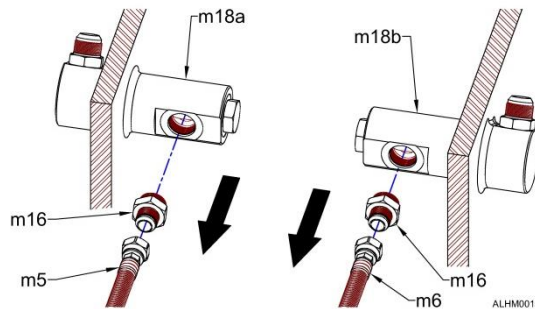
For NPK 2,500 to 12,000 ft. lb. class hammers

6. Pre-fill the grease line (29) before installing (see the grease line pre-filling section of this manual, pages 40 and 41). Route the hose under the hammer swivel fitting and connect to the grease outlet port (18) on the side of the grease pump assembly (FZ).

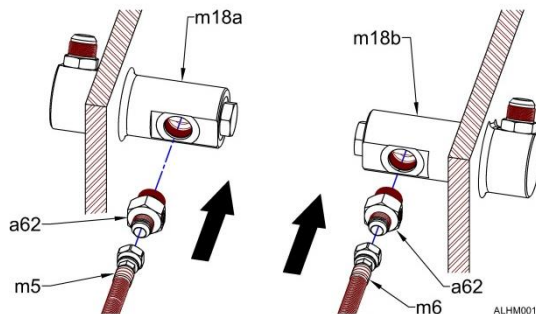


7.1. For units with SAE style joint fittings.

- a. Disconnect the hammer hoses (m5 and m6) from the top bracket joint fittings (m18a and m18b). Remove the existing adapter fittings (m16) and discard.



- b. Install the special adapter tee fittings (a62) into the top bracket joint fittings (m18a, m18b). Reconnect the hammer hoses (m5 and m6).

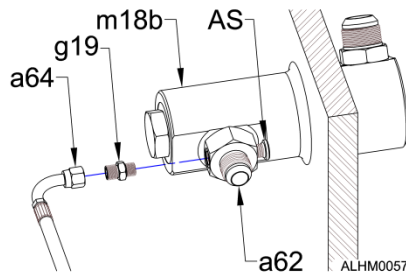


INSTALLATION INSTRUCTIONS

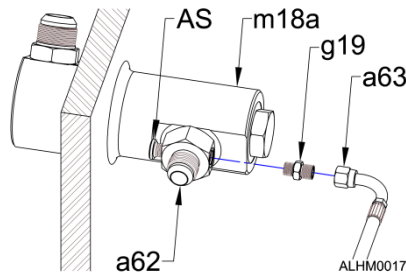
G025

For NPK 2,500 to 12,000 ft. lb. class hammers

- c. Install straight fitting (g19) into the special adapter fitting. Use the port that closely faces the center of the top bracket, which will allow for the best hose routing. Install #6 SAE plug (AS) in the opposite port.
- d. Install hose line (a64). Route hose from return side joint fitting (m18b), through top bracket burnout, to port labeled "ROIL" on the grease pump (FZ).

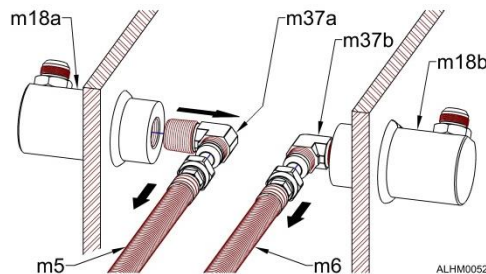


- e. Install hose line (a63). Route hose from pressure side joint fitting (m18a), through top bracket burnout, to port labeled "POIL" on grease pump (FZ).



7.2. For units with NPT style joint fittings.

- a. Disconnect the hammer hoses (m5 and m6) from the NPT elbows (m37a and m37b). Remove the elbows from the joint fittings and discard.

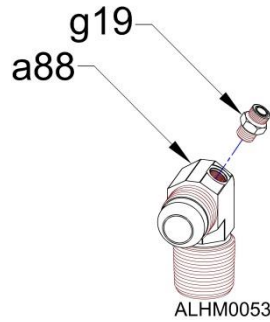


INSTALLATION INSTRUCTIONS

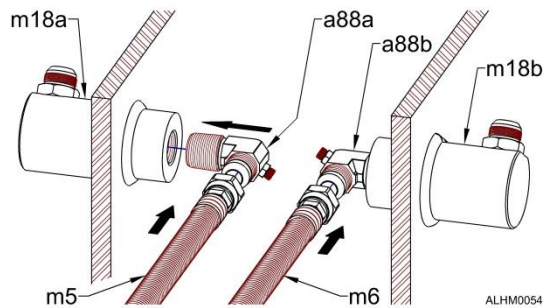
G025

For NPK 2,500 to 12,000 ft. lb. class hammers

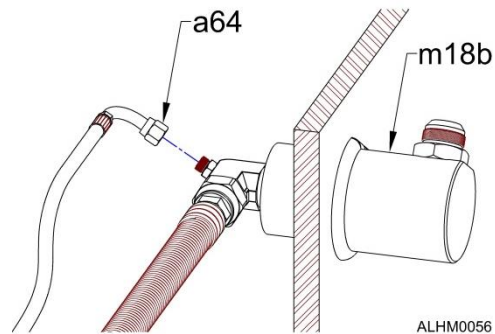
- b. Install straight fittings (g19) into the special elbows (a88).



- c. Install special elbows (a88a and a88b) into the joint fittings (a18a and a18b). Reconnect the hammer hoses (m5 and m6).



- d. Install hydraulic hose (a64). Route hose from return side joint fitting (m18b), through top bracket burnout, to port labeled "ROIL" on the grease pump (FZ).

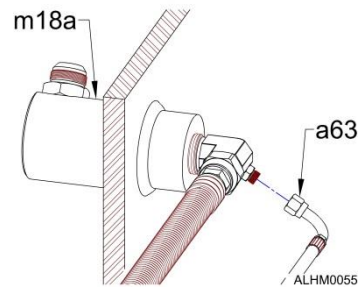


INSTALLATION INSTRUCTIONS

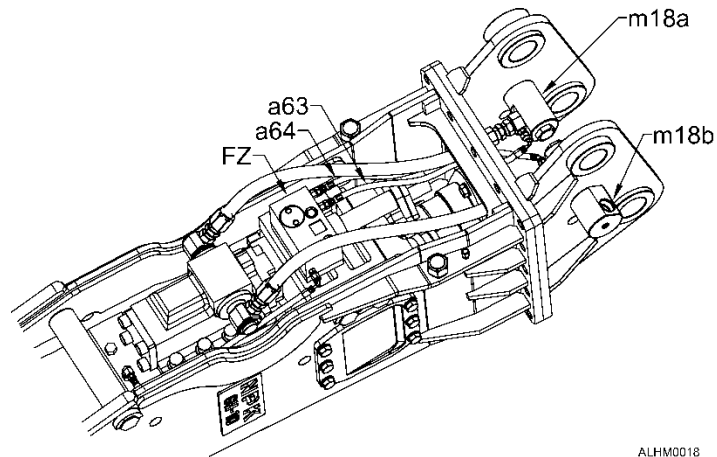
G025

For NPK 2,500 to 12,000 ft. lb. class hammers

- e. Install hydraulic hose (a63). Route hose from pressure side joint fitting (m18a), through top bracket burnout, to port labeled "POIL" on the grease pump.



8. Wrap hydraulic lines (a63 and a64) together using a protective hose covering (supplied by NPK). For best fit, cut to appropriate length.

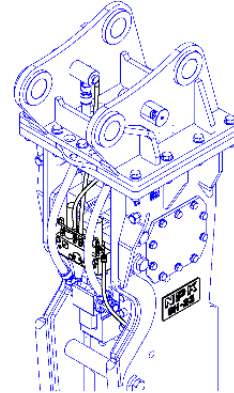


INSTALLATION INSTRUCTIONS

G050

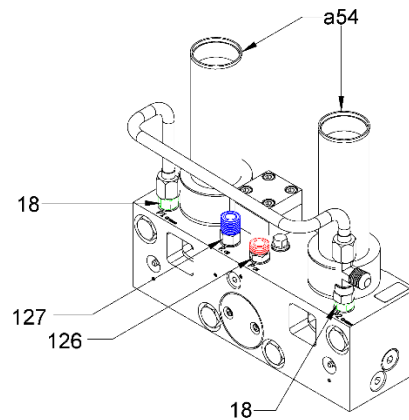
For NPK 13,500 to 20,000 ft. lb. class hammers

1. The grease pump should be mounted so that the grease cartridges (a54) are in the vertical position when the hammer is in operation. It must be ensured that neither dirt nor any other type of contamination may fall into the intake area below the cartridge when the cartridge is being re-filled.



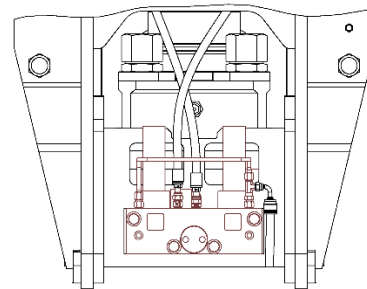
ALHM0073

2. Remove the existing adapter fittings from the grease pump assembly. Install one ORFS adapter fitting, NPK part number L1213-6600, into the port labeled "P_{OIL}" (126) and one check valve, NPK part number G025-6300 into "R_{OIL}" (127). Remove the plugs from the grease outlet ports (18). Install check valves, NPK part number G100-6300.



ALHM1043

3. Place the auto lube pump assembly (FZ) and mounting plate (a28) in NPK's suggested position. Loosely install the grease line and the pressure and return hoses to the hammer and hammer bracket. Tack weld the mounting plate, NPK part number G025-2000 to the upper support block.



ALHM1039

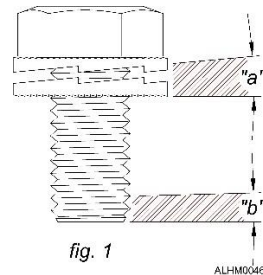
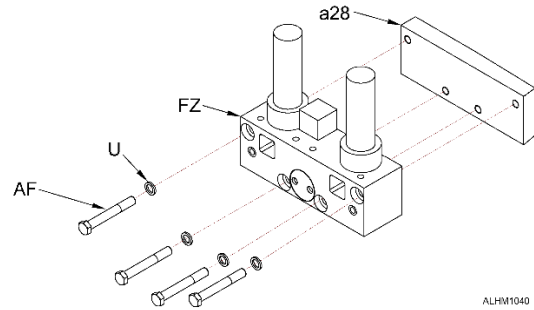
INSTALLATION INSTRUCTIONS

G050

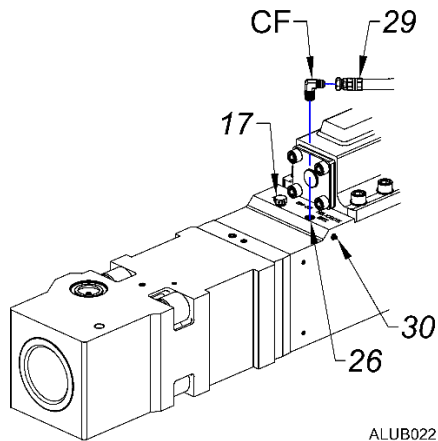
For NPK 13,500 to 20,000 ft. lb. class hammers

4. Remove the pump assembly and finish welding the mounting plate. (*Weld as much around the perimeter as possible.*) Bolt the grease pump (FZ) to its mounting plate using the two hex head cap screws (AF). NPK part number G025-4530 and washers (U), NPK part number G025-4700. Using high strength thread adhesive, torque the hex head cap screws to 80 ft. lbs. (110 Nm).

NOTE: Washers (G025-4700) must be installed per fig. 1. (Ref "a" and "b" angles)



5. Remove the plug from the hammer auto lube port (26) and discard. Install adapter elbow (CF) part number L515-6600 into the port. **NOTE:** For manual greasing, use the grease fitting (30) provided.



WARNING

DO NOT install the auto lube grease line (29) into the port stamped "A" (17) that is located on the lower left side of the hammer main body. This port is an air line connection port used in underwater applications. Pumping grease into this port will cause damage to the hammer.

6. Pre-fill the grease line (29) before installing. Route the hose under the hammer swivel fitting and connect to the grease outlet port (18) on the side of the grease pump assembly (FZ).

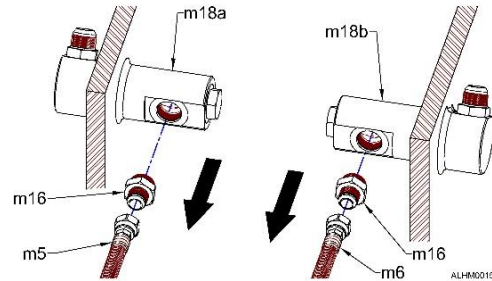
INSTALLATION INSTRUCTIONS

G050

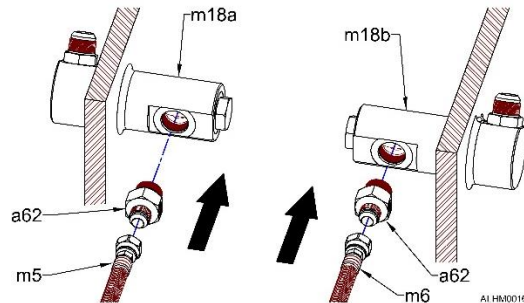
For NPK 13,500 to 20,000 ft. lb. class hammers

7.1. For units with SAE style joint fittings:

- a. Disconnect the hammer hoses (m5 and m6) from the top bracket joint fittings (m18a and m18b). Remove the existing adapter fittings (m16) and discard.

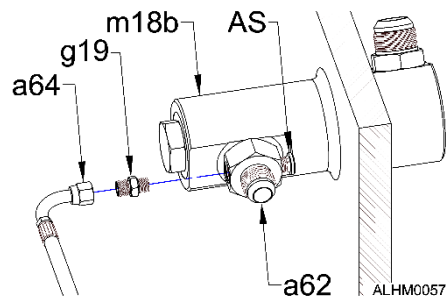


- b. Install the special adapter tee fittings (a62) into the top bracket joint fittings (m18a, m18b). Reconnect the hammer hoses (m5 and m6).

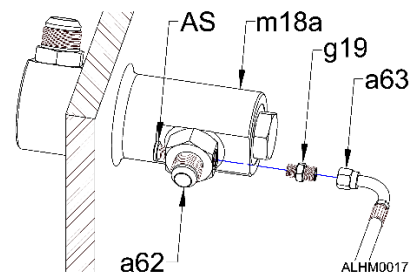


- c. Install straight fitting (g19) into the special adapter fitting. Use the port that closely faces the center of the top bracket, which will allow for the best hose routing. Install #6 SAE plug (AS) in the opposite port.

- d. Install hose line (a64). Route hose from return side joint fitting (m18b), through the top bracket burnout, to port labeled "Roil" on the grease pump (FZ).



- e. Install hose line (a63). Route hose from pressure side joint fitting (m18a), through the top bracket burnout, to port labeled "Poiil" on grease pump (FZ).



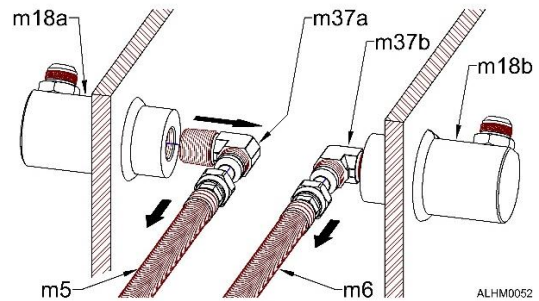
INSTALLATION INSTRUCTIONS

G050

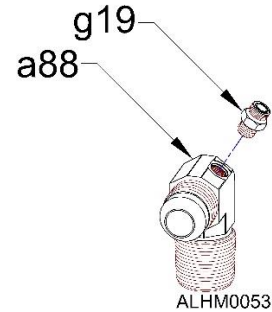
For NPK 13,500 to 20,000 ft. lb. class hammers

7.2. For units with NPT style joint fittings:

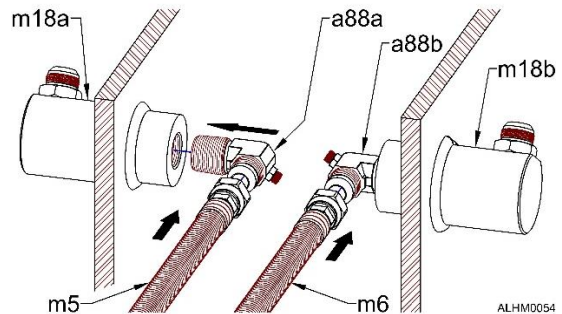
- a. Disconnect the hammer hoses (m5 and m6) from the NPT elbows (m37a and m37b). Remove the elbows from the joint fittings (m18a and m18b) and discard.



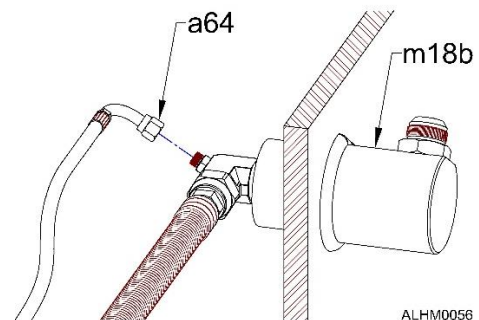
- b. Install straight fittings (g19) into the special elbows (a88).



- c. Install special elbows (a88a and a88b) into the joint fittings (m18a and m18b). Reconnect the hammer hoses (m5 and m6).



- d. Install hydraulic hose (a64). Route hose from return side joint fitting (m18b), through the top bracket burnout, to port labeled "Roil" on the grease pump (FZ).

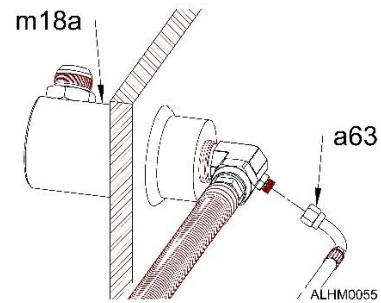


INSTALLATION INSTRUCTIONS

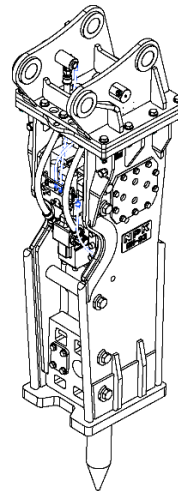
G050

For NPK 13,500 to 20,000 ft. lb. class hammers

e. Install hydraulic hose (a63). Route hose from pressure side joint fitting (m18a), through the top bracket burnout, to port labeled "Poil" on the grease pump.



8. Wrap hydraulic lines together using a protective hose covering (supplied by NPK). For best fit, cut to appropriate length.

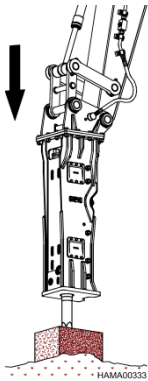
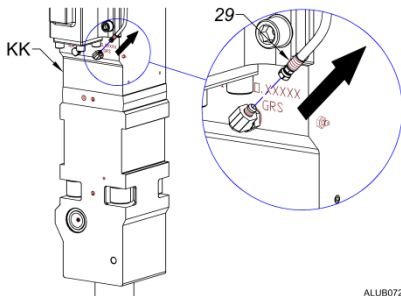
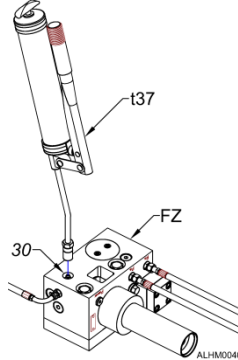


BEFORE START-UP

AUTO LUBE GREASE LINE PRE-FILLING

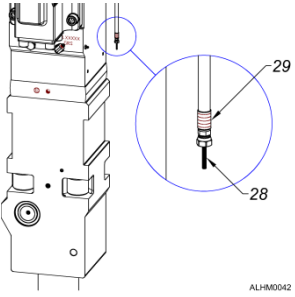
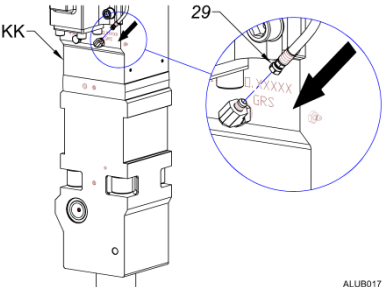
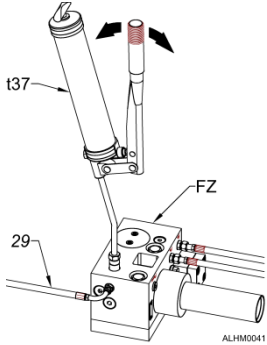
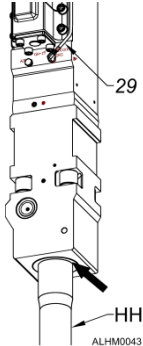
It is **mandatory** that the supply line from the Auto Lube main pump to the connection on the hammer is primed with grease before it is used. **Failure** to do this will result in no grease being administered to the hammer tool for a period of time. This can and will result in severe galling of the tool and tool bushing.

PRIMING THE GREASE LINE

<p>1. Place the hammer in a vertical position, applying enough down force to push the tool up into the hammer.</p>	
<p>2. Turn the machine off.</p>	
<p>3. Make sure there is a full grease cartridge installed in the Auto Lube assembly. Use a premium quality grade EP-2, high temperature grease with wear inhibiting additive.</p>	
<p>4. Remove the grease line (29) at the hammer (KK).</p>	
<p>5. Attach a grease gun (t37) or power greaser to the grease fitting (30) on the front side of the pump assembly (FZ).</p>	

BEFORE START-UP

PRIMING THE GREASE LINE

<p>6. Pump grease through the pump to the grease line (29) until a steady stream of grease (28) is realized at the opposite (hammer) end.</p> <p>6a. It is also possible to purge the grease line to the hammer by disconnecting it at the hammer then pumping grease through the grease fitting provided on the grease pump assembly.</p>	 <p>ALHM0042</p>
<p>7. Re-attach the grease line (29) to the hammer (KK).</p>	 <p>ALUB017</p>
<p>8. Pump twenty more shots of grease using the grease gun (t37) or power greaser into the pump assembly (FZ). This will prime the hammer cavity and pre-lube the tool.</p>	 <p>ALHM0041</p>
<p>9. Look for grease coming out around the tool (HH) at the tool bushing (see arrow).</p>	 <p>ALHM0043</p>

NOTE: If the Auto Lube has run out of grease, the above procedure should be used to purge all the air out of the line (29) before using the hammer. Failure to do this will result in an intermittent supply of grease to the hammer.

UNDERWATER USE

1. Underwater use is acceptable, but caution should be given as not to damage the unit by striking it blindly below water level.
2. Caution should be given as not to allow water to get into the pump assembly when changing a grease cartridge. **DO NOT** attempt to change a grease cartridge while the unit is underwater.

AUTO LUBE TROUBLESHOOTING

If the NPK Auto lube unit is not pumping grease correctly, the following steps may be taken to diagnose and correct the problem.

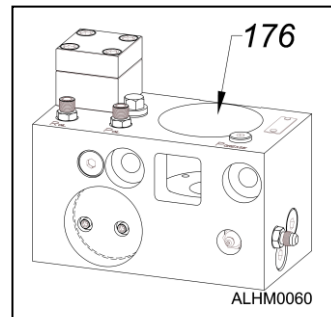
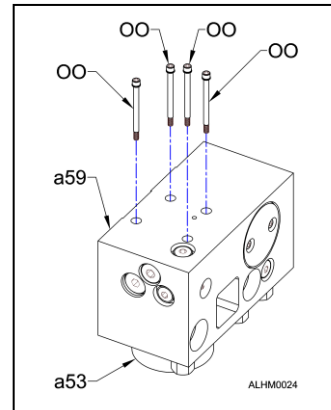
PROBLEM	CAUSE	REMEDY
Eccentric shaft does not rotate, pump does not supply lubricant.	No pressure at P oil port of Auto lube pump assembly.	Check the pressure setting of the hydraulic circuit.
	Filter/Diaphragm assembly and throttle contaminated.	Clean the filter/diaphragm and throttle assemblies.
	Throttle is closed.	Turn the throttle adjustment approximately 1-1/2 turns counterclockwise. Start hydraulic system, then re-adjust the throttle to the proper speed when the unit is working again, see "Throttle Adjustment".
	Hydraulic motor faulty.	Replace the hydraulic motor.
Eccentric shaft rotates, pump does not supply lubricant.	Grease cartridge empty.	Replace cartridge.
	Air bubbles in the grease cartridge.	Unscrew the grease cartridge from the adapter. Push the follower piston of the cartridge by hand until bubble free lubricant comes out. Re-install the cartridge. DO NOT overtighten!
	O-ring on bottom of cartridge missing or torn.	Replace o-ring.
	Flat seal is missing or damaged.	Replace the flat seal.
	The pumping element is faulty, worn out, or plugged.	Replace the pumping element.
	Debris between the supply hole in the bottom of the grease cartridge adapter.	Clean passageway.
Grease comes out of the discharge opening of the relief valve.	Grease system back pressure is too high.	Check the hammer or the grease line leading to the hammer for blockage.
	Relief valve is faulty.	Replace relief valve.
Grease comes out of the lateral relief valve hole.	The pumping element is faulty, worn out, or plugged.	Replace the pumping element.
Oil leak from relief portion side of the auto lube.	Over pressurizing the unit.	Check machine settings. Replace ring and valve sleeve.

GREASE CARTRIDGES

CHANGING THE CARTRIDGE ADAPTER (G025 ONLY)

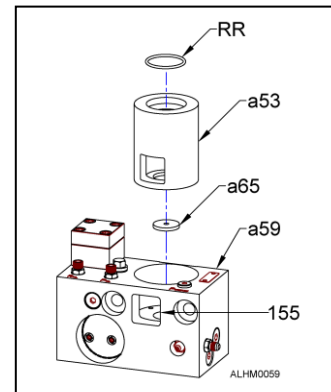
DISASSEMBLY

1. To remove the adapter (a53) from the pump housing (a59), remove the four socket head cap screws (OO) found on the bottom of the pump housing using a 4mm hex key wrench.
2. After removing the cap screws, you can pull the adapter (a53) from the pump housing (a59). If the adapter is seized, use penetrating lubricant to loosen.
3. Before you insert a new cartridge adapter, make sure that the flat seal (a65) situated below the adapter in the pump housing is in good condition. If there is damage to the seal, replace it at this time. See “CHANGING THE FLAT SEAL”.



REASSEMBLY

1. Inspect the lubricant passage (176) for contamination. It is important that no contamination is found in the intake area. This can result in pump failure.
2. To reassemble the cartridge adapter into the pump housing, insert the adapter and install the four M5 socket head cap screws (OO). Torque the four cap screws to 6 ft. lbs. (8 Nm), lubricated. **NOTE:** Ensure all components are clean of debris before installing.
3. Install new o-ring (RR).

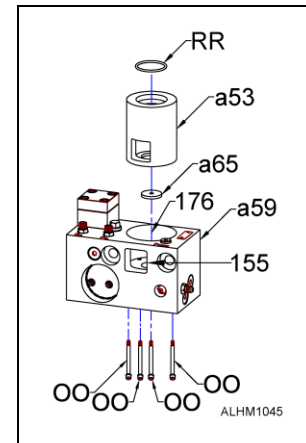


NOTE: Make sure that the inspection window (155) in the pump housing and the cartridge adapter line up.

GREASE CARTRIDGES

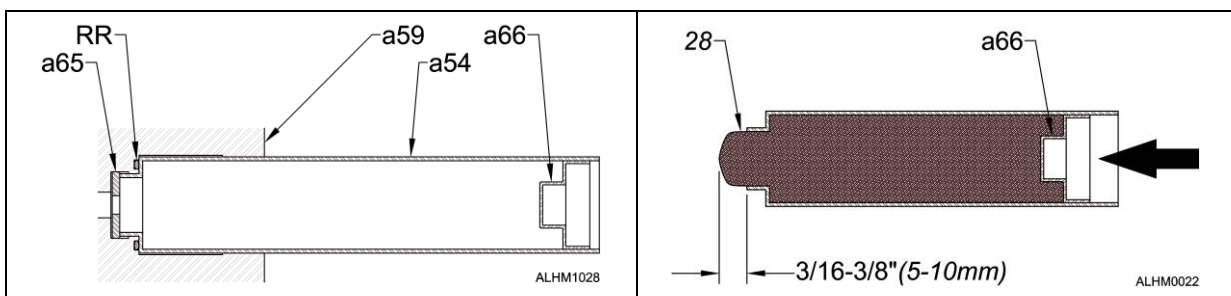
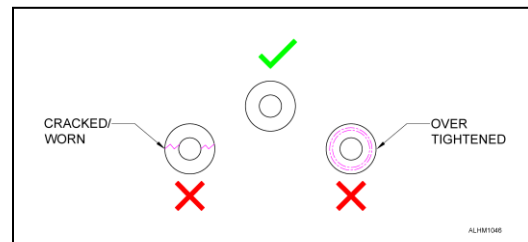
CHANGING THE FLAT SEAL

1. Remove the grease cartridge.
2. Remove the cartridge adapter (a53).
3. Using a pick, remove the flat seal (a65) and o-ring (RR).
4. Inspect the lubricant passage (176) for contamination.
5. Apply a light coat of grease to the new flat seal and o-ring, then install.
6. Re-install the cartridge adapter.
7. Re-insert the grease cartridge.



CHANGING THE GREASE CARTRIDGE

1. Remove the old grease cartridge.
2. Before installing the grease cartridge (a54), make sure the flat seal (a65) is present and not damaged. If the flat seal is missing or damaged, see “**CHANGING THE FLAT SEAL**”.
3. Inspect the lubricant passage for contamination.

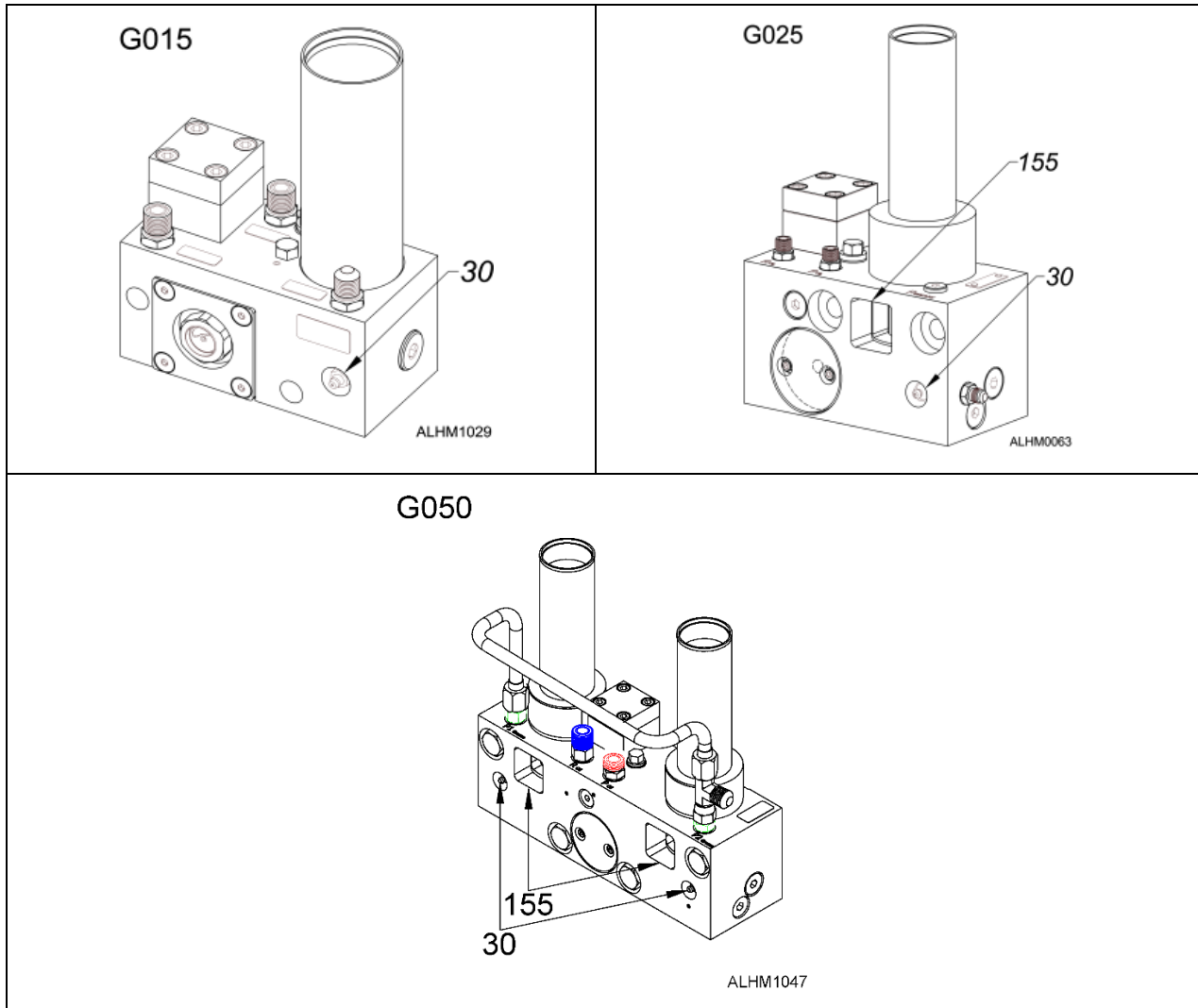


4. To accelerate priming, first remove the cap from the cartridge opening. Then, using the cartridge follower piston (a66), press the grease (28) out $3/16$ " – $3/8$ " (5 – 10 mm).
5. Next, insert the cartridge into the pump housing by pressing it slightly then threading it in by hand. **DO NOT OVERTIGHTEN! DAMAGE TO FLAT SEAL WILL OCCUR!**

GREASE CARTRIDGES

CHANGING THE GREASE CARTRIDGE

1. In the case of a new unit being used, fill the lubricant passage through the grease fitting (30) provided on the front side of the pump assembly.



2. If the cartridge piston is at the bottom of the cartridge, the latter must be replaced. The follower piston can be easily checked through the inspection window (155) on the front side of the pump assembly (G025 only).

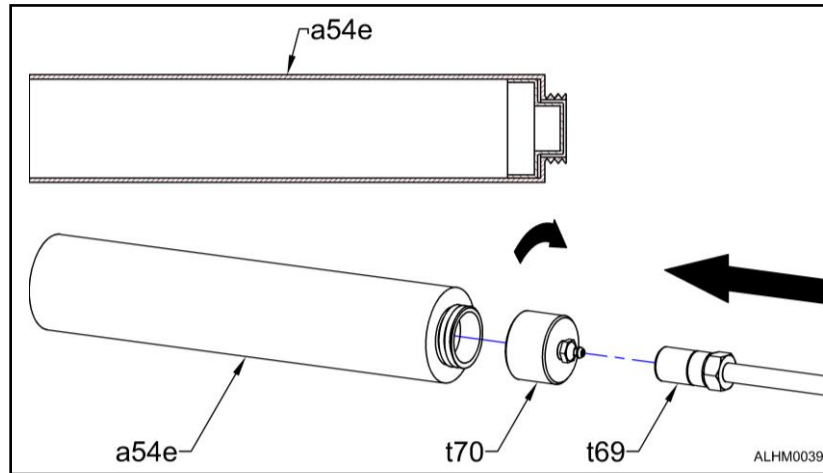
ATTENTION

When replacing the grease cartridge, make sure that no contamination enters the intake area of the pump assembly. This can result in pump damage. Clean any contaminated grease from the end of the cartridge prior to install.

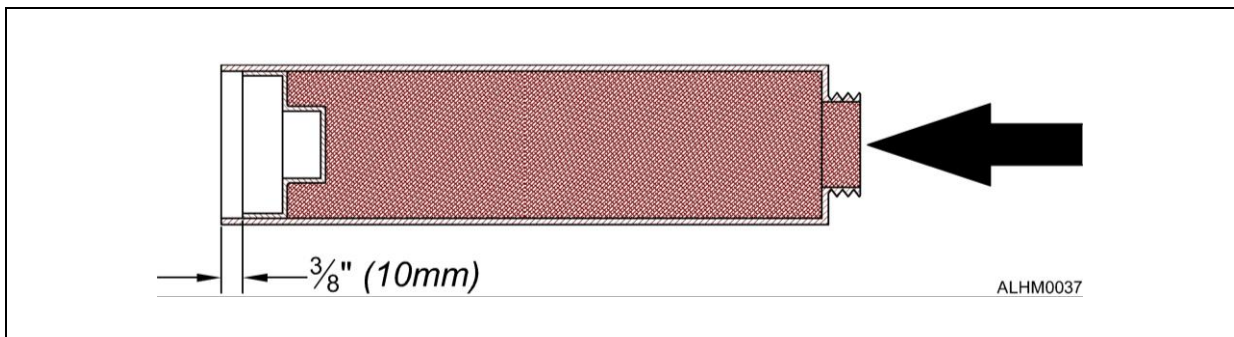
GREASE CARTRIDGES

GREASE CARTRIDGE REFILLING

1. Screw cartridge fill adapter (t70), NPK part number G025-8055, (supplied with start-up kits), onto the empty grease cartridge (a54e).



2. Push nozzle (t69) of the grease gun into the cartridge re-fill adapter (t70).
3. Pump grease into empty cartridge until the follower piston is approximately 3/8" (10mm) from the end.



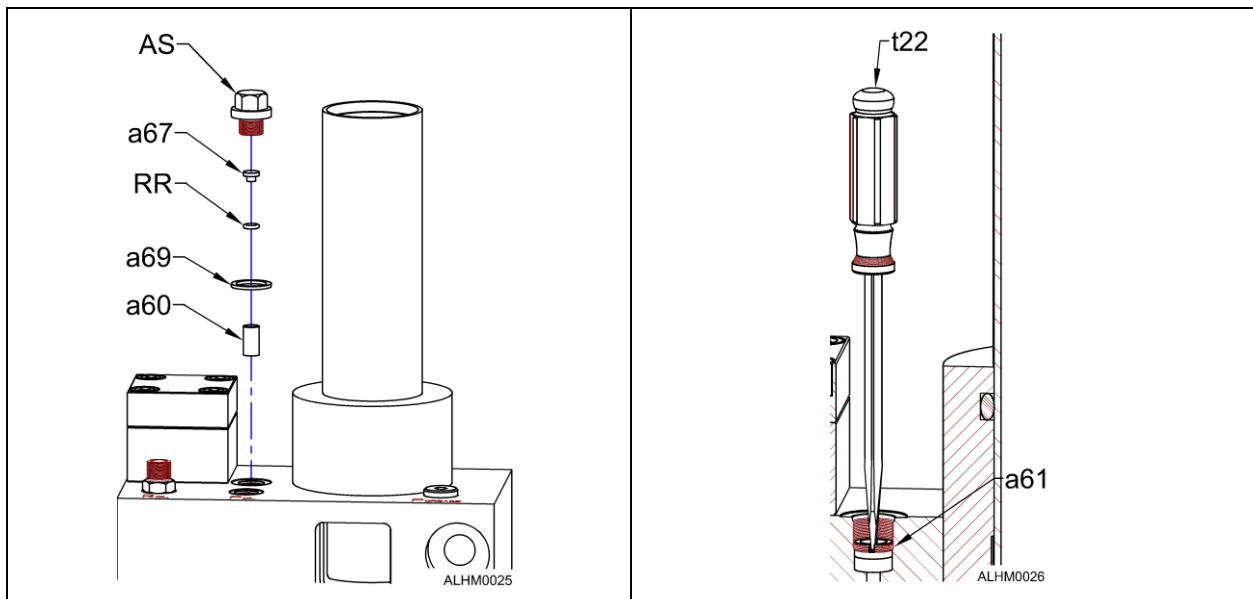
NOTE: Fill the cartridge free of air bubbles.

REPLACEMENT OF THE FILTER AND DIAPHRAGM

For replacement of the filter and diaphragm, you must first remove the plug (AS). Then you can remove the filter thrust piece (a67), oring (RR), sealing ring (a69) and strainer (a60). Use a slotted screwdriver (t22) to remove the diaphragm (a61).

NOTE: Upon re-installation, make sure that the sealing edge of the diaphragm is not damaged.

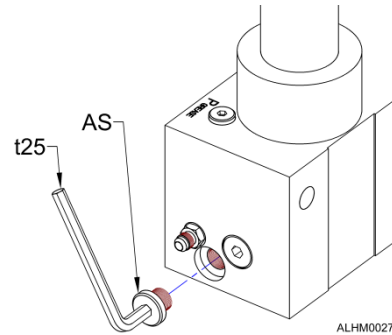
After re-installing the diaphragm, you can insert the strainer, the oring, and the thrust piece. Keep them in place using the plug and sealing ring.



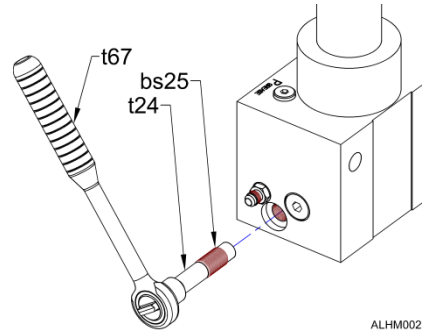
REPLACEMENT OF THE (LUBRICANT) RELIEF VALVE

(G025 ONLY)

To protect the circulation of the lubricant (or grease), the pump includes an integrated pressure relief valve. This opens at a pressure of 4060 psi (280 bar). To replace the pressure relief valve, you first have to remove the plug (AS) using a hex key wrench (t25). Then using a ratchet (t67) and 9mm socket (t24), remove the relief valve cartridge assembly (bs25).

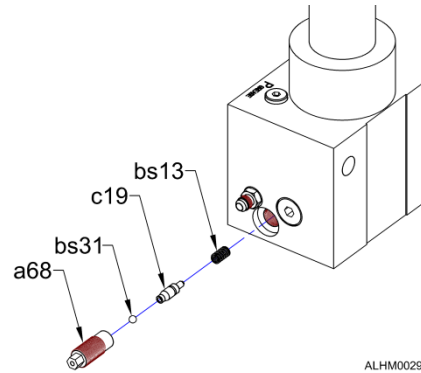


NOTE: When installing the assembly, make sure that the ball (bs31), plunger (c19) and spring (bs13) are arranged correctly in the relief valve housing (a68).



Further, when tightening the relief assembly, make sure to fit it correctly in the pump housing as it seals against a flat surface.

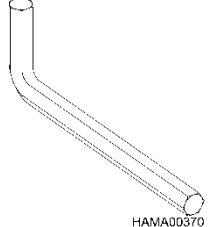
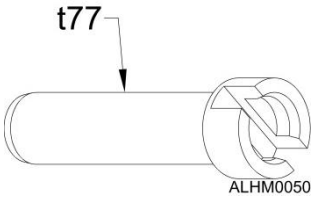
After installing the relief valve cartridge, install the plug and sealing ring.



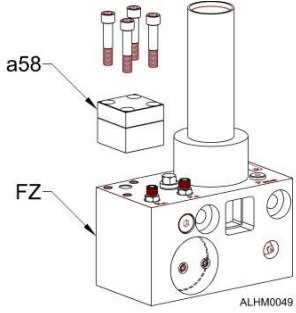
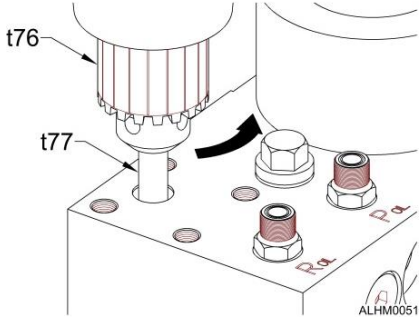
PUMP CARTRIDGE TEST PROCEDURE

If the pumping element (pump cartridge) is suspected to be faulty, it may be desirable to test the cartridge without running the hammer.

TOOLS REQUIRED:

<p>6 mm Hex Key Wrench</p>	
<p>Electric or air powered drill Drive Shaft (t77) – NPK Part Number G025-5075</p>	

PROCEDURE:

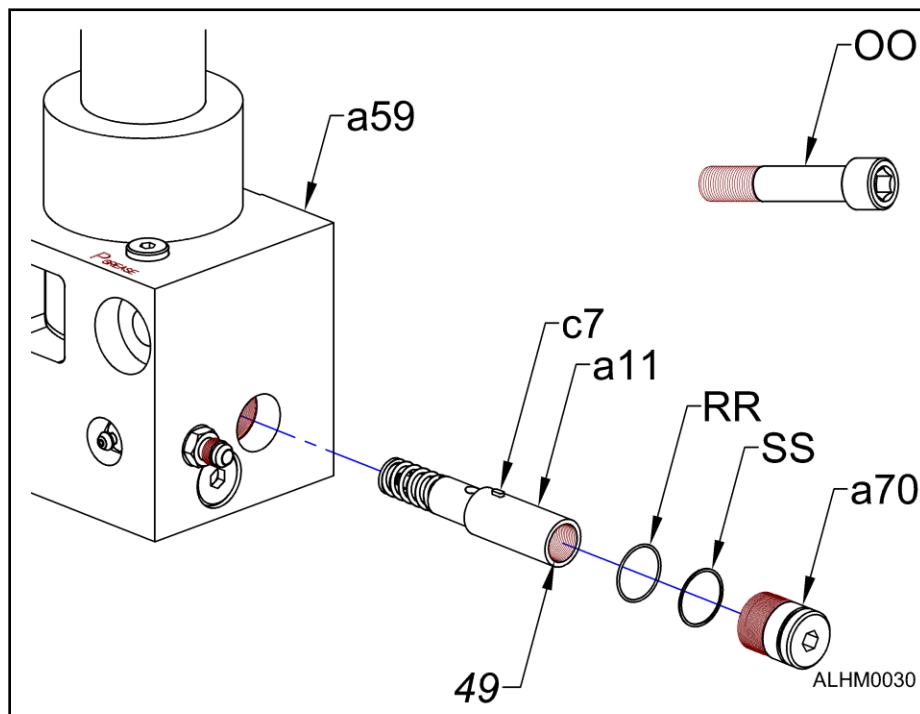
<ol style="list-style-type: none"> 1. Remove hydraulic motor (a58) from the pump assembly (FZ). <i>(Be mindful of the two small o-rings under the motor.)</i> 2. Install a grease cartridge. (Make sure flat seal is in place.) (When reinstalling motor, the bolt torque is at 17ft. lbs. (23 Nm.) 	
<ol style="list-style-type: none"> 3. Install driveshaft (t77) into drill motor (t76). Couple opposite end of driveshaft with the worm shaft of the pump unit. 4. Turn worm shaft counterclockwise. If grease is pumped out of grease delivery port, pump cartridge is good. If grease does not appear, replace the cartridge (see “REPLACEMENT OF THE PUMP CARTRIDGE”, next page.) 5. If the eccentric does not spin when turning the drive shaft, the issue lies within the eccentric. If the eccentric does spin and no grease is present, the issue is with the hydraulic motor. 	

REPLACEMENT OF THE PUMP CARTRIDGE

⚠ WARNING

When removing the pump cartridge, make sure the hydraulic and lubricant systems are depressurized.

To be able to remove the pump cartridge from the pump housing, you must remove the lock screw (a70) using an 8mm hex key wrench. To pull out the pumping element, use a 12mm bolt (OO) or the pulling device (p/n G025-1030). Screw the bolt or device into the thread (49) at the outside end of the pump cartridge (a11).



NOTE: *When installing the new pump cartridge, be cautious that no dirt gets into the pump. Also, the key (c7) located on the pumping element housing must be in the groove in the housing. The pumping element can only be installed one way.*

Then insert the pump cartridge into the body bore so that the key locks into the groove in the pump housing. Install and lubricate the oring (RR) and backup ring (SS) on the lock screw (a70). Secure the pump cartridge with the lock screw (a70).

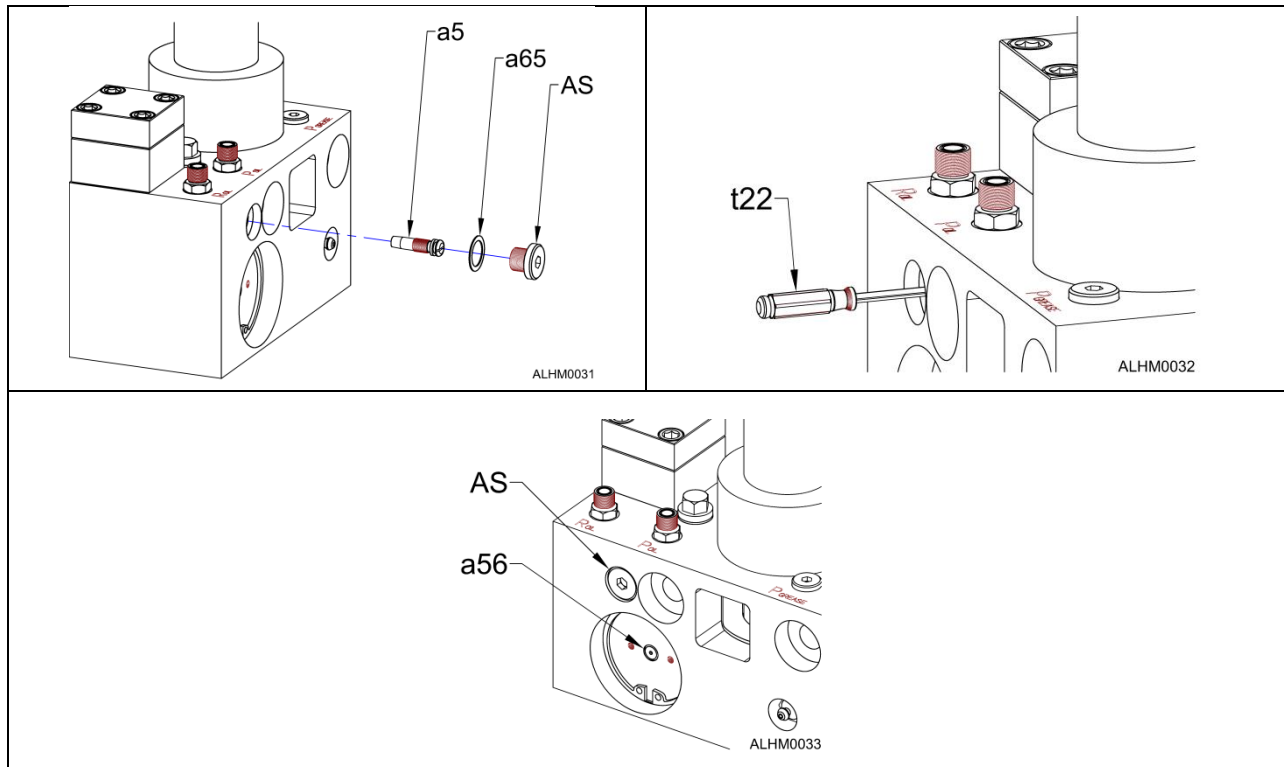
NOTE: *When using chisel paste, you must replace the pump cartridge after approximately 1000 to 1500 service hours due to the solids content.*

THROTTLE ADJUSTMENT

ADJUSTMENT OF FLOW TO THE HYDRAULIC MOTOR

To adjust the hydraulic motor's flow rate, you must first depressurize the hydraulic system. You will then need to remove the plug (AS) and the flat seal (a65) covering the throttle (a5). You can then adjust the throttle using a slotted screwdriver or an Allen wrench depending on the model. By turning the throttle counterclockwise, you will increase the flow rate to the hydraulic motor, thus increasing the lubricant flow rate. Before starting the unit, reinstall the plug and flat seal.

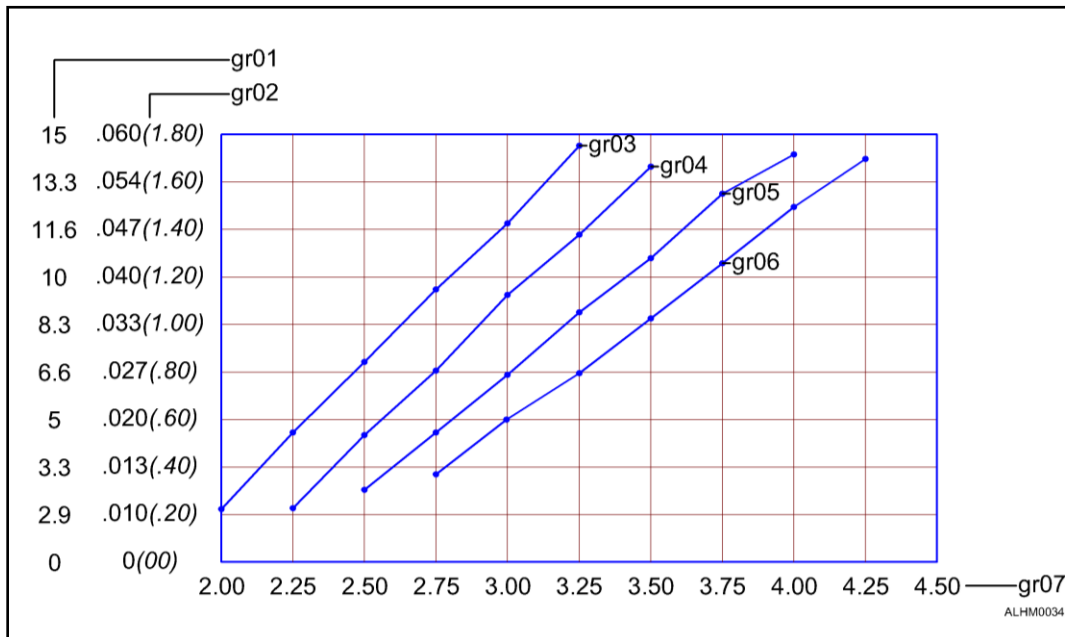
Use the visible eccentric shaft (a56) to check for proper working order. The number of revolutions of the eccentric shaft or the number of strokes of the delivery plunger enables you to calculate the precise delivery rate.



THROTTLE ADJUSTMENT

ADJUSTMENT OF FLOW TO THE HYDRAULIC MOTOR

The following diagram shows the guide values for adjustment of the throttle. Before adjustment, screw the throttle clockwise in until it stops (*do not jam it in*). By turning the throttle counterclockwise, you can adjust to the desired delivery rate.



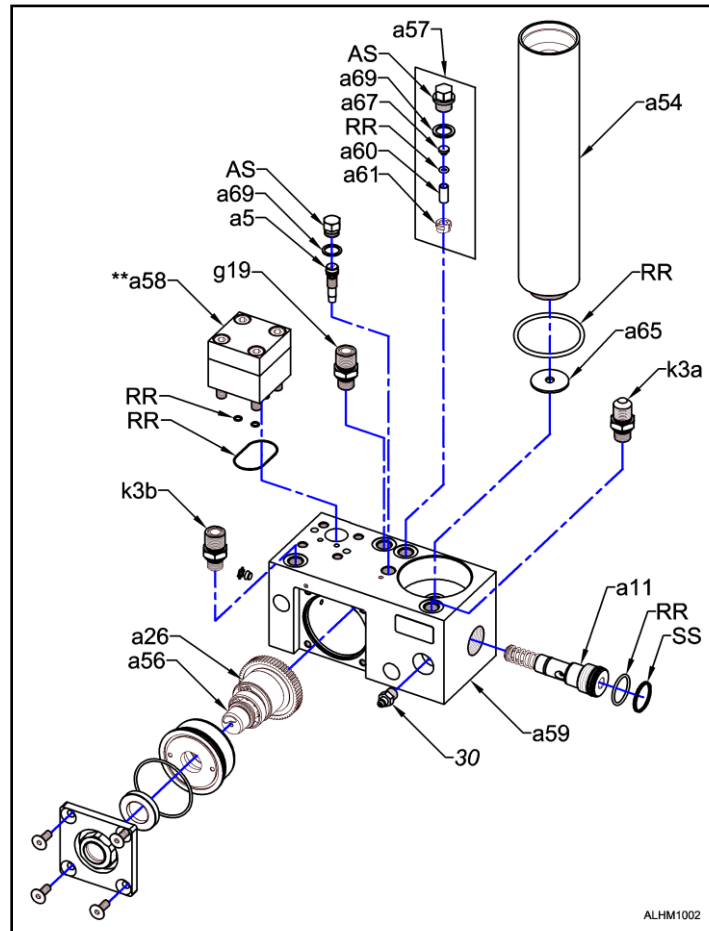
gr01	Eccentric revolutions per minute
gr02	Delivery rate of the G025-5040 – fl. oz./min. (<i>cu.cm/min</i>)
gr03	4350 psi (300 bar)
gr04	3625 psi (250 bar)
gr05	2900 psi (200 bar)
gr06	2175 psi (150 bar)
gr07	Turns of the throttle adjustment

NOTE: *Adjustment of the eccentric's revolutions is made by an adjusting throttle. Each pump must be adjusted individually. The values of the throttle rotations in the table above are to assist adjustment.*

If the required delivery rate is not known, you can assume a range between .016 fl. oz./min. (*0.5 cu.cm/min.*) and .034 fl. oz./min. (*1.0 cu.cm/min.*) for most hydraulic hammers.

10 to 11.5 full turns of the throttle screw (from closed) will give an eccentric speed of 35 – 40 RPM's and an output of 1.44 lbs./hr. (*.65 kg/hr.*).

KEYWORDS FOR COMMON G015 AUTO LUBE COMPONENTS

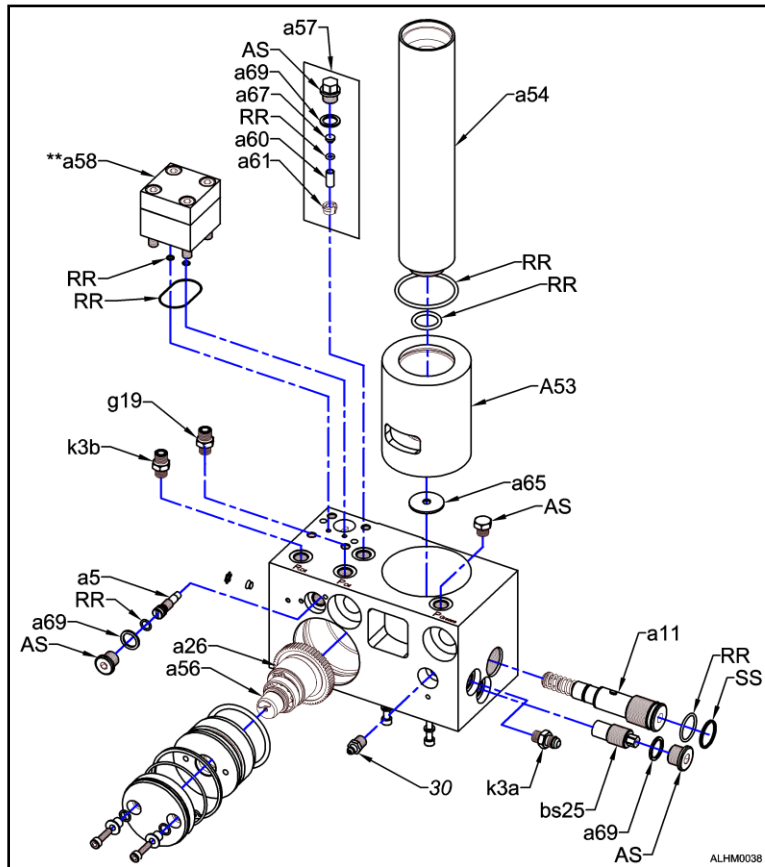


30	GREASE FITTING
a5	THROTTLE
a11	PUMPING ELEMENT
a26	ECCENTRIC
a54	GREASE CARTRIDGE
a56	ECCENTRIC SHAFT
a57	FILTER/ORIFICE ASSEMBLY
a58	HYDRAULIC MOTOR
a59	MAIN HOUSING
a60	FILTER
a61	ORIFICE

a65	FLAT SEAL
a67	FILTER THRUST PIECE
a69	SEAL RING
AS	PLUG
g19	ADAPTER FITTING ORSm x SAEm
k3a	CHECK VALVE JICm x SAEm
k3b	CHECK VALVE ORSm X SAEm
RR	O-RING
SS	BACKUP RING

****NOTE:** The bolts used to attach the hydraulic motor (a58) are to be torqued to 17 ft. lbs. (23 Nm).

KEYWORDS FOR COMMON G025 AUTO LUBE COMPONENTS

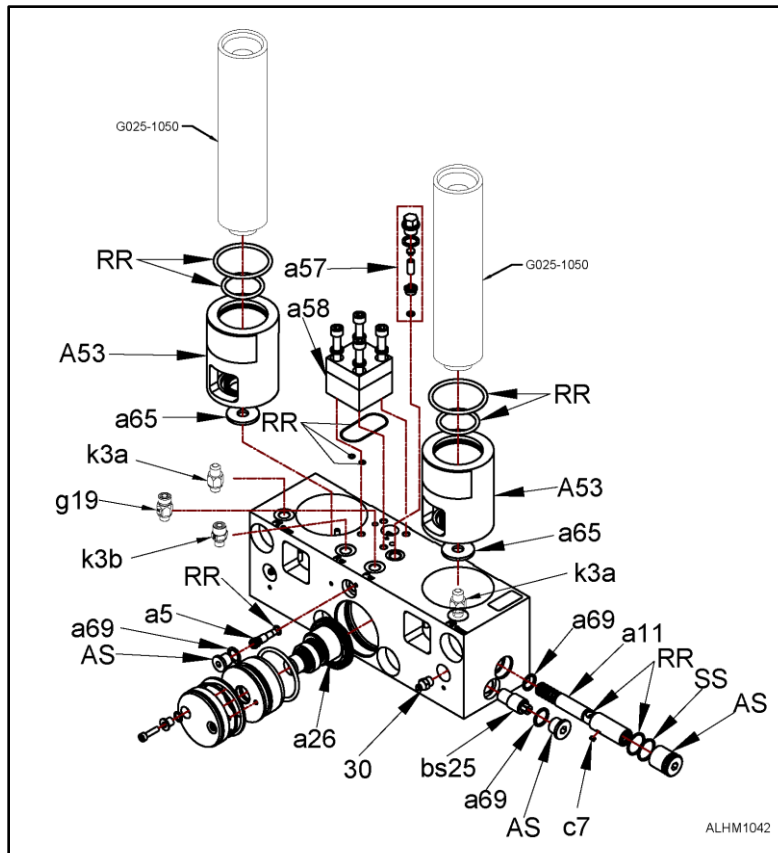


30	GREASE FITTING
a5	THROTTLE
a11	PUMPING ELEMENT
a26	ECCENTRIC
a53	CARTRIDGE ADAPTER
a54	GREASE CARTRIDGE
a56	ECCENTRIC SHAFT
a57	FILTER/ORIFICE ASSEMBLY
a58	HYDRAULIC MOTOR
a59	MAIN HOUSING
a60	FILTER
a61	ORIFICE

a65	FLAT SEAL
a67	FILTER THRUST PIECE
a69	SEAL RING
AS	PLUG
bs25	RELIEF VALVE
g19	ADAPTER FITTING ORSm x SAEm
k3a	CHECK VALVE JICm x SAEm
k3b	CHECK VALVE ORSm X SAEm
RR	O-RING
SS	BACKUP RING

****NOTE:** The bolts used to attach the hydraulic motor (a58) are to be torqued to 17 ft. lbs. (23 Nm).

KEYWORDS FOR COMMON G050 AUTO LUBE COMPONENTS

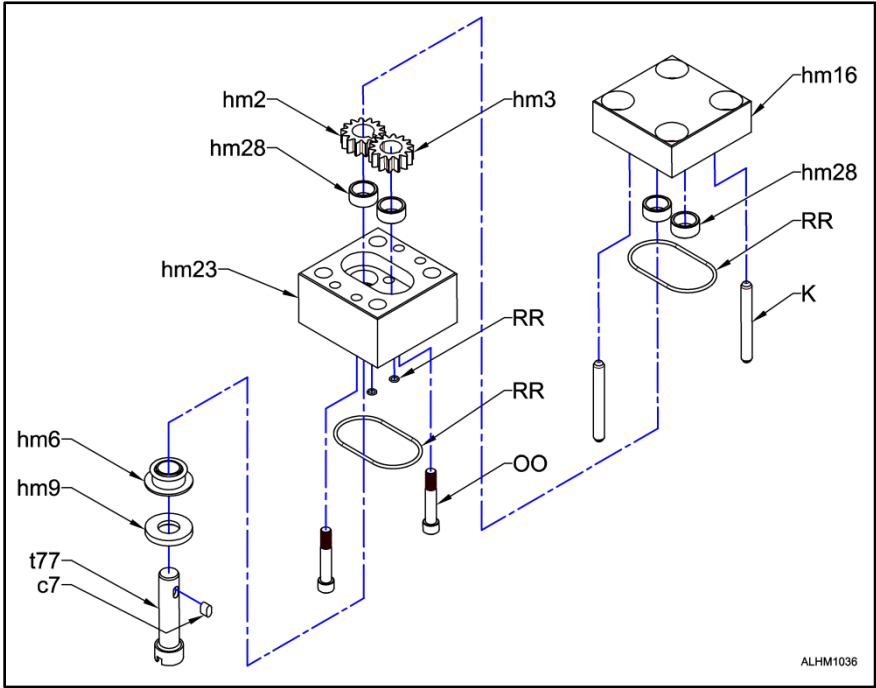


30	GREASE FITTING
a5	THROTTLE
a11	PUMPING ELEMENT
a26	ECCENTRIC
a53	CARTRIDGE ADAPTER
a54	GREASE CARTRIDGE
a56	ECCENTRIC SHAFT
a57	FILTER/ORIFICE ASSEMBLY
a58	HYDRAULIC MOTOR
a59	MAIN HOUSING
a60	FILTER
a61	ORIFICE

a65	FLAT SEAL
a67	FILTER THRUST PIECE
a69	SEAL RING
AS	PLUG
bs25	RELIEF VALVE
c7	KEY
g19	ADAPTER FITTING ORSm x SAEm
k3a	CHECK VALVE JICm x SAEm
k3b	CHECK VALVE ORSm X SAEm
RR	O-RING
SS	BACKUP RING

****NOTE:** The bolts used to attach the hydraulic motor (a58) are to be torqued to 17 ft. lbs. (23 Nm).

KEYWORDS FOR COMMON HAMMER MOUNTED AUTO LUBE HYDRAULIC MOTOR COMPONENTS



c7	KEY
hm2	DRIVE GEAR
hm3	DRIVEN GEAR
hm6	SHAFT SEAL
hm9	WASHER
hm16	MOTOR END CAP
hm23	GEAR HOUSING
hm28	BUSHING
K	DOWEL PIN
OO	CAP SCREW
RR	O-RING
t77	DRIVE SHAFT

NOTE: Hydraulic pump parts not sold separately.

WARRANTY STATEMENTS

"Use Genuine NPK Parts"

6/08

NPK WARRANTY AUTOLUBE SYSTEM

APPLICATION FOR WARRANTY MUST BE MADE WITHIN 30 WORKING DAYS OF FAILURE / REPAIR.

BASE WARRANTY (6 months)

NPK CONSTRUCTION EQUIPMENT, INC. ("NPK") warrants that new AUTOLUBE assemblies sold by NPK will be free from defects in material or workmanship for a period of six (6) months, starting from the date of delivery to the first user.

MAIN COMPONENT EXTENDED WARRANTY (12 months)

The MAIN COMPONENT EXTENDED WARRANTY covers failure of the MOTOR and DRIVE ASSEMBLY, resulting from defects in material or workmanship in those parts under normal use and service for the period starting with the expiration of the BASE WARRANTY and ends twelve (12) months from the date of delivery to the first user. NPK MAIN COMPONENT EXTENDED WARRANTY **does not** cover labor, travel expenses or the replacement or repair of any other part damaged due to MOTOR or DRIVE ASSEMBLY failure or repair thereof.

THIS WARRANTY DOES NOT APPLY TO:

- REPLACEMENT PARTS, which are covered by other NPK warranties, or hose assemblies and fittings which are not supplied by NPK.

NPK RESPONSIBILITY

NPK will, at its option, repair or replace with a new or reconditioned part, any warranted part that fails by reason of defective material or workmanship, free of charge delivered at a place of business of an NPK Dealer. Note: Parts replaced under warranty become the property of NPK.

During the six (6) month BASE WARRANTY period, NPK will pay the cost of labor at 75% of the posted shop rate that is necessary to install any repaired or replacement warranted part during normal working hours. Overtime rates and travel expenses will not be reimbursed.

USER RESPONSIBILITY

- **Photos must accompany all warranties submitted to NPK. These photos can be 35mm, polaroid, or digital.**
- The installer, user, operator, repairer, assumes responsibility to read, understand and comply with NPK's written INSTRUCTION MANUAL.
- Returning Warranty Registration to NPK at the time of installation.
- All costs associated with shipping the AUTOLUBE unit to an authorized NPK Dealer or other authorized location. NPK is not responsible for any expense incurred in field repair.

THESE WARRANTIES DO NOT COVER FAILURES RESULTING FROM:

- Installation, alteration, operation, maintenance, repair or storage which NPK judges improper.
- Operation after discovery of defective or worn parts.
- Unreasonable delay in making a repair after being notified of a potential product problem.
- Use of grease containing abrasive compounds.
- Contamination.

THESE WARRANTIES SPECIFICALLY EXCLUDE:

- Installations not approved by NPK.
- Replacement due to normal wear.
- Repairs by other than an authorized NPK Dealer.
- Use of parts not sold by NPK. **THE USE OF "WILL FIT" PARTS WILL VOID ALL NPK WARRANTIES.**
- Labor charges that are deemed excessive by NPK.
- Parts shipping charges in excess of those which are usual and customary. (Air freight, unless pre-approved, will not be covered.)
- Duties, brokerage fees, and local taxes.

WARRANTY REPAIRS DO NOT EXTEND THE STANDARD WARRANTY PERIOD.

LIMITATIONS AND EXCLUSIONS

Violation of any federal, provincial, state or local laws, ordinances, rules or regulations, or removal or alteration of product serial numbers void NPK's written product warranties. **Application for warranty must be made within 30 days of failure / repair.**

THIS PRODUCT MUST BE USED IN A SAFE AND LAWFUL MANNER IN COMPLIANCE WITH APPLICABLE OSHA REGULATIONS.

The written product warranties made by NPK set forth NPK's only obligations with respect to any claims of failure, defects or deficiencies in products sold by NPK. **NPK MAKES NO OTHER WARRANTIES OR REPRESENTATIONS WHATSOEVER, EXPRESS OR IMPLIED, OF THE QUALITY, PERFORMANCE, DURABILITY, MATERIALS, WORKMANSHIP, SUITABILITY, CONDITION, DESIGN OR UTILITY OF PRODUCTS SOLD BY NPK, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, ALL SUCH OTHER WARRANTIES AND REPRESENTATIONS BEING HEREBY EXPRESSLY EXCLUDED. NPK SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, COSTS, LOSSES OR LIABILITIES ON ACCOUNT OF DELAY OR DOWNTIME.**

DISCLAIMER REGARDING OTHER REPRESENTATIONS OR WARRANTIES

No person is authorized to grant any other warranties or to assume any other liability on NPK's behalf unless made or assumed in writing by an officer of NPK. No person is authorized to grant any warranties or to assume any liabilities on the seller's behalf unless made or assumed in writing by the seller.

Internet: www.npkce.com

As used in this warranty the term NPK means NPK CONSTRUCTION EQUIPMENT, INC., WALTON HILLS, OHIO, U.S.A.

WARRANTY STATEMENTS

"Use Genuine NPK Parts" 6/08

NPK WARRANTY HYDRAULIC and MOUNTING INSTALLATION KITS

APPLICATION FOR WARRANTY MUST BE MADE WITHIN 30 WORKING DAYS OF FAILURE / REPAIR.

PARTS WARRANTY (90 days)

NPK CONSTRUCTION EQUIPMENT, INC. ("NPK") warrants that new hydraulic and mounting installation kits sold by NPK will be free from defects in material or workmanship for a period ending on the earliest of (a) the expiration of ninety (90) days, starting from the date of installation or (b) the expiration of six (6) months from the date of shipment of the kit by NPK. **NPK Installation Kit Warranty does not cover labor or travel expenses.**

THIS WARRANTY DOES NOT APPLY TO:

- Installation on carrier other than specified on Kit Bill of Materials.
- REPLACEMENT PARTS, which are covered by separate warranty.

NPK RESPONSIBILITY

NPK will, at its option, repair or replace with a new or reconditioned part, any warranted part that fails by reason of defective material or workmanship, free of charge delivered at a place of business of an NPK Dealer. Note: Parts replaced under warranty become the property of NPK.

USER RESPONSIBILITY

- **Photos must accompany all warranties submitted to NPK. These photos can be 35mm, polaroid, or digital.**
- The installer, user, operator, repairer, assumes responsibility to read, understand and comply with NPK's written INSTALLATION, OPERATOR and SERVICE INSTRUCTIONS.
- If hydraulic kit has been in your inventory over 6 months, call NPK for upgrade information before starting installation.
- All labor costs.
- Any expense incurred by field repair.
- Returning Warranty Registration to NPK at the time of installation.
- Perform post-installation inspection and make adjustments as necessary.
- Supplying a hydraulic oil sample from the carrier machine upon request by NPK.

THESE WARRANTIES DO NOT COVER FAILURES RESULTING FROM:

- Installation, alteration, operation, maintenance, repair or storage which NPK judges improper.
- Not performing DAILY VISUAL INSPECTIONS and RETIGHTENING as specified in the NPK MANUALS.
- Operation after discovery of defective or worn parts.
- Unreasonable delay in making a repair after being notified of a potential product problem.

THESE WARRANTIES SPECIFICALLY EXCLUDE:

- Operation of products not sold by NPK.
- Installation not approved by NPK.
- Replacement due to normal wear.
- Use of parts not sold by NPK. **THE USE OF "WILL FIT" PARTS WILL VOID ALL NPK WARRANTIES.**
- Parts shipping charges in excess of those which are usual and customary. (Air freight, unless pre-approved, will not be covered.)
- Duties, brokerage fees, and local taxes.

WARRANTY REPAIRS DO NOT EXTEND THE STANDARD WARRANTY PERIOD.

LIMITATIONS AND EXCLUSIONS

Violation of any federal, provincial, state or local laws, ordinances, rules or regulations, or removal or alteration of product serial numbers void NPK's written product warranties. **Application for warranty must be made within 30 days of failure / repair.**

THIS PRODUCT MUST BE USED IN A SAFE AND LAWFUL MANNER IN COMPLIANCE WITH APPLICABLE OSHA REGULATIONS.

The written product warranties made by NPK set forth NPK's only obligations with respect to any claims of failure, defects or deficiencies in products sold by NPK. **NPK MAKES NO OTHER WARRANTIES OR REPRESENTATIONS WHATSOEVER, EXPRESS OR IMPLIED, OF THE QUALITY, PERFORMANCE, DURABILITY, MATERIALS, WORKMANSHIP, SUITABILITY, CONDITION, DESIGN OR UTILITY OF PRODUCTS SOLD BY NPK, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, ALL SUCH OTHER WARRANTIES AND REPRESENTATIONS BEING HEREBY EXPRESSLY EXCLUDED. NPK SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, COSTS, LOSSES OR LIABILITIES ON ACCOUNT OF DELAY OR DOWNTIME.**

DISCLAIMER REGARDING OTHER REPRESENTATIONS OR WARRANTIES

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WARRANTY STATEMENTS

"Use Genuine NPK Parts" 6/08

NPK WARRANTY REPLACEMENT PARTS

APPLICATION FOR WARRANTY MUST BE MADE WITHIN 30 WORKING DAYS OF FAILURE / REPAIR.

REPLACEMENT PARTS WARRANTY (90 days)

NPK CONSTRUCTION EQUIPMENT, INC. ("NPK") warrants that new Replacement Parts sold by NPK will be free from defects in material or workmanship for a period of ninety (90) days, starting from the date of installation. NPK Replacement Parts Warranty **does not** cover labor or travel expenses. Note: Unexpired New Product Warranty has priority over Replacement Parts Warranty.

THIS WARRANTY DOES NOT APPLY TO:

- Wear items such as upper and lower tool bushings, impact ring, retaining bars and pins.
- Tools (covered under separate Tool Warranty).

NPK RESPONSIBILITY

NPK will, at its option, repair or replace with a new or reconditioned part, any warranted part that fails by reason of defective material or workmanship, free of charge delivered at a place of business of an NPK Dealer. Note: Parts replaced under warranty become the property of NPK.

USER RESPONSIBILITY

- **Photos must accompany all warranties submitted to NPK. These photos can be 35mm, polaroid, or digital.**
- The installer, user, operator, repairer, assumes responsibility to read, understand and comply with NPK's written INSTALLATION, OPERATOR and SERVICE INSTRUCTIONS.
- All labor costs.
- Any expense incurred by field repair.
- Supplying a hydraulic oil sample from the carrier machine upon request by NPK.

THESE WARRANTIES DO NOT COVER FAILURES RESULTING FROM:

- Installation, alteration, operation, maintenance, repair or storage which NPK judges improper.
- Not performing DAILY VISUAL INSPECTIONS and/or RETIGHTENING of fasteners after initial 20 operating hours after repair.
- Exceeding the tool and/or tool bushing wear limit.
- Underwater operation.
- Operation after discovery of defective or worn parts.
- Unreasonable delay in making a repair after being notified of a potential product problem.

THESE WARRANTIES SPECIFICALLY EXCLUDE:

- Installations not approved by NPK.
- Replacement due to normal wear.
- Use of parts not sold by NPK. **THE USE OF "WILL FIT" PARTS WILL VOID ALL NPK WARRANTIES.**
- Parts shipping charges in excess of those which are usual and customary. (Air freight, unless pre-approved, will not be covered.)
- Duties, brokerage fees, and local taxes.

WARRANTY REPAIRS DO NOT EXTEND THE STANDARD WARRANTY PERIOD.

LIMITATIONS AND EXCLUSIONS

Violation of any federal, provincial, state or local laws, ordinances, rules or regulations, or removal or alteration of product serial numbers void NPK's written product warranties. **Application for warranty must be made within 30 days of failure / repair.**

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