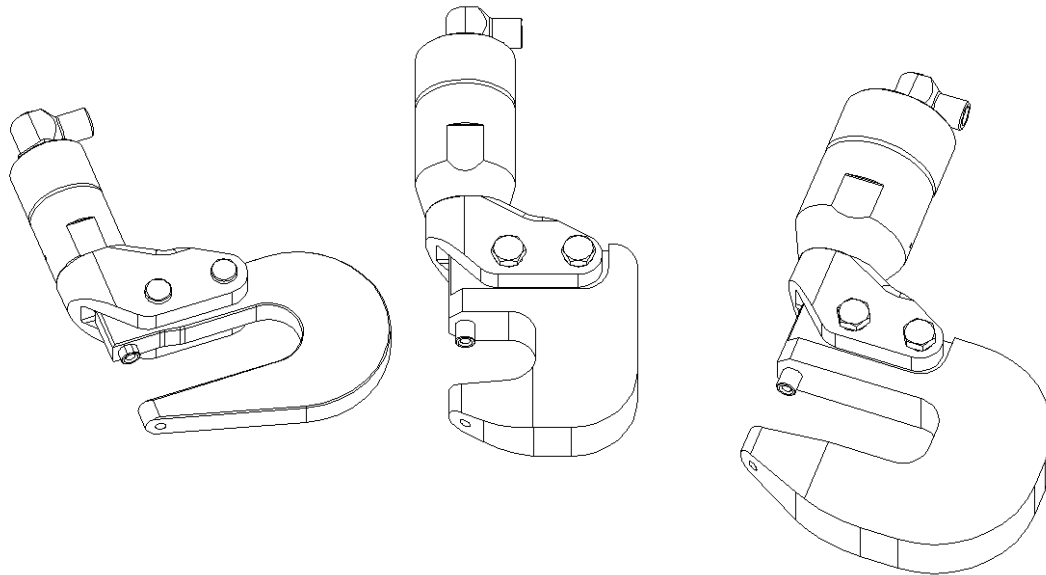




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## **NUMATX MODELS 3060, 3070, 3080 C-SQUEEZER OPERATION MANUAL**

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### 1.0 Overview

Numatx Model 3060, 3070 and 3080 C-Squeezers are hydraulically operated hand held tools, designed to squeeze a variety of rivets. These units are hydropneumatic operated (also known as pneudraulic), in conjunction with Numatx Pressure Intensifiers, such as the Model 3340 and 3320. The aforementioned intensifiers have been sized specifically to work with the Numatx C-Squeezers, during commercial riveting operations. The C-Squeezers, being fully hydraulic, offer the advantages of decreased weight, smaller size, and constant force when compared to traditional pneumatic only squeezers. This reduces operator fatigue, allows for use in more confined areas, and improves control of the squeezing action (feathering operation). The units are built from high quality aircraft grade materials, with parts made on cnc machining centers and features held to close tolerances, for years of dependable operation.

Before using the NUMATX 3060, 3070 or 3080 C-Squeezers, please fully read and understand this operation manual.

### 2.0 Specifications

#### DIMENSIONS

WEIGHT (NO YOKE), 3060-1

WEIGHT (NO YOKE), 3070-1

WEIGHT (NO YOKE), 3080-1

FLUID DISP REQUIRED, 3060-1

FLUID DISP REQUIRED, 3070-1

FLUID DISP REQUIRED, 3080-1

HYDRAULIC PRESSURE, NORMAL

HYDRAULIC PRESSURE, MAX

FORCE AT NORMAL HYD PRESSURE, 3060-1

FORCE AT NORMAL HYD PRESSURE, 3070-1

FORCE AT NORMAL HYD PRESSURE, 3080-1

RIVET SET (COMPRESSION PIN) TRAVEL

#### FIGURE 1

1.25 Lbm (.56 Kg)

1.72 Lbm (.78 Kg)

2.00 Lbm (.91 Kg)

.55 in<sup>3</sup> (9.0 cc)

.97 in<sup>3</sup> (15.9 cc)

1.32 in<sup>3</sup> (21.6 cc)

3,500 psi (24.1 MPa)

4,500 psi (31.0 MPa)

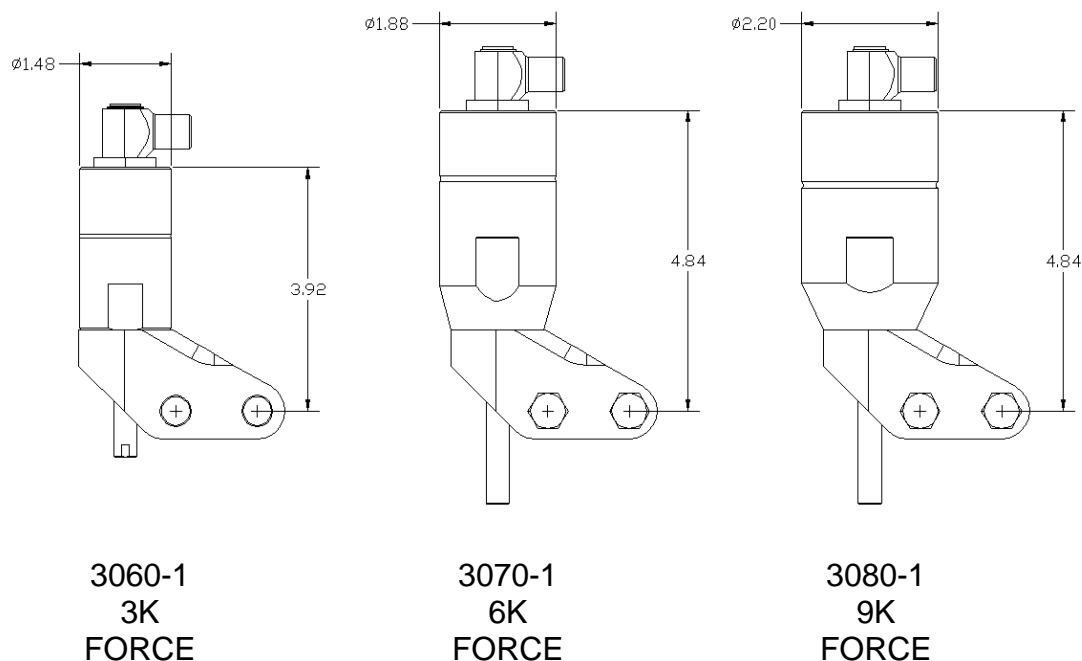
3,480 Lbf (15.5 KN)

6,185 Lbf (27.5 KN)

8,420 Lbf (37.4 KN)

.550" (14 mm)

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**FIGURE 1 – GENERAL DIMENSIONS**

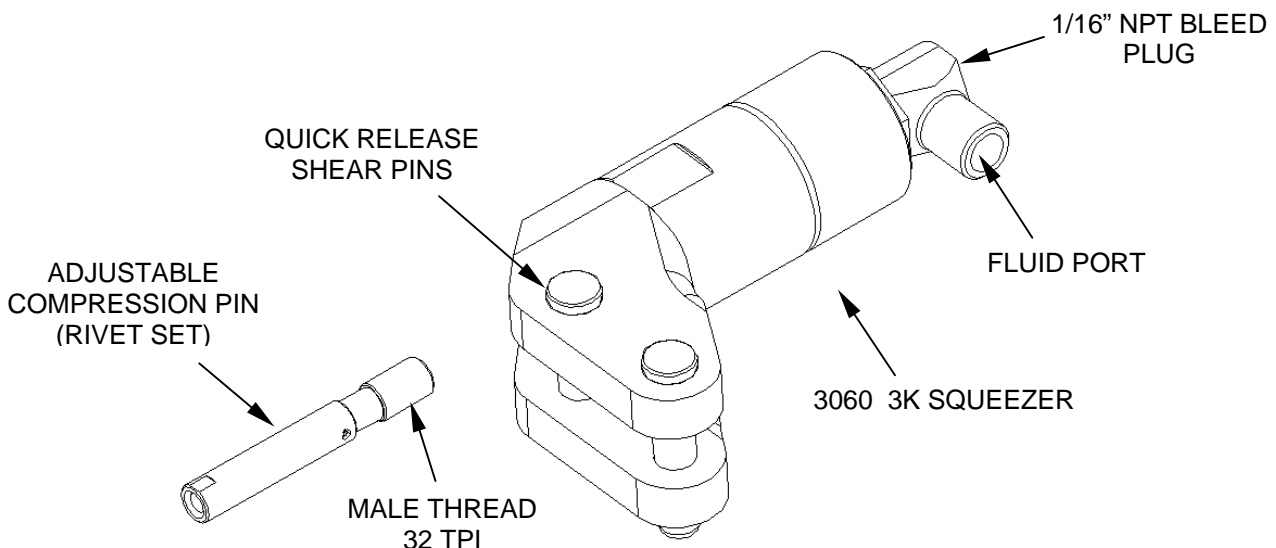
### 3.0 Safety Warnings

- 3.1 NEVER operate the C-Squeezers above 4,500 psi (31.0 Kg/cm<sup>2</sup>). Operating above this specified pressure can lead to failure of the hydraulic hose, hydraulic seals, and fittings. Since the C-Squeezers are intended to be operated with Numatx Pressure Intensifiers, refer to the appropriate Numatx intensifier operating manual for the intensifier maximum air pressure. If the C-Squeezers are used with alternate hydraulic pressurizing means, ensure the squeezer hydraulic pressure is limited to the above referenced limit.
- 3.2 NEVER disconnect the hydraulic line while the line is pressurized.
- 3.3 Use Dexron III or equivalent fluid for the C-Squeezer actuation fluid. Other fluids such as MIL-7808 turbine oil may be suitable, providing the Buna-N (Nitrile) seals are compatible with the alternate fluid.
- 3.4 Properly bleed the C-Squeezer per Section 7 of this manual. The entire system MUST BE PROPERLY BLED FOR OPTIMUM PERFORMANCE.
- 3.5 Use proper eye protection when overhauling this unit.
- 3.6 Do not use substitute components for repair of any portion of the unit.
- 3.7 The system should be properly maintained and examined at regular intervals for damage.
- 3.8 Avoid excessive contact with the hydraulic fluid, to minimize skin irritation. Refer to Section 6 for Dexron III safety data.

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## 4.0 Assembly

- 4.1 Install an AN816-4D fluid fitting or male QD (PN SS-QC4-D-2PM) into the fluid inlet port. Use Teflon tape on the pipe threads, to ensure there are no hydraulic leaks.
- 4.2 For the Model 3060, install the threaded compression pin (rivet set) into the piston tip. Lubricate the pin shank and threads using suitable grease. Refer to Figure 2. Note that there is intentional play in the pin components, to allow for tolerance stack-up when inserted into the C-Yoke.
- 4.3 For the Model 3070 and 3080, install a fixed compression pin (rivet set) into the intended C-yoke. Lubricate the pin shank using suitable grease. Refer to Figure 3. Note the order of the spring, spring retainer, and retention ring.
- 4.4 Refer to Figure 4 for variations of compression pins that can be used with the C-yokes. The default compression pin used with Numatx PN 3028 yokes is a -15. Some pre-planning on compression pin length may be necessary, factoring in compression pin travel (.550"), C-yoke deflection, and necessary retraction distance for part removal clearance.
- 4.5 Install an appropriate CP-214 compatible C-yoke into the squeezer yoke mount, using the supplied quick release shear pins for the Model 3060, or Grade 9 mounting bolts for the Model 3070 and Model 3080. The Model 3060 can use AN6 bolts, if desired, but the Model 3070 and 3080 **MUST** use extended shank Grade 9 bolts, and these bolts must be pre-tensioned to counter the extreme shear forces generated during the squeezing action.
- 4.6 All CP-214 compatible yokes will have a mounting width of .560" (the width of the yoke that is inserted into the C-Squeezer mount block). Some Heavy Duty (HD) yokes, typically 1.0" thick, may require a slight modification to fit the Numatx C-Squeezers. Refer to figure 5. Numatx Yokes are a direct fit into the yoke mount.
- 4.7 Torque the shear bolts to 160 Lb-In (18.0 N-M).
- 4.8 DO NOT USE ALTERNATE BOLTS for mounting yokes to the Model 3070 and 3080. Fully threaded bolts can fail at the root of the thread, and low alloy bolts may bend when subjected to high bending forces.
- 4.9 Mount an appropriate rivet die in the tip of the compression pin and C-yoke. The C-Squeezers are set up to receive rivet dies with .187 diameter (3/16") shanks.
- 4.10 Connect the C-Squeezer directly to the hydraulic hose, at the AN816-4D fitting. Alternately, attach a female QD (PN SS-QC4-B-2PF) to the hydraulic hose end, and the previously described male QD (PN SS-QC4-D-2PM) at the C-Squeezer. Figure 6 shows a complete squeezing system, with a Numatx 3320-2 pressure intensifier.



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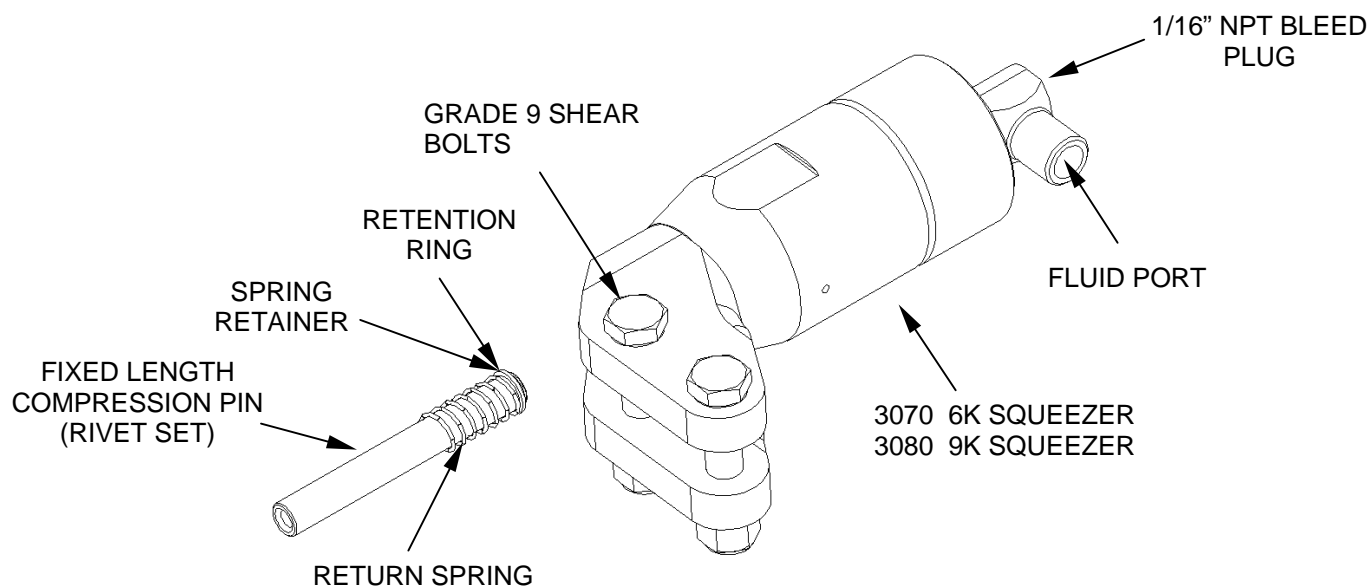


FIGURE 3 – MODEL 3070 AND 3080

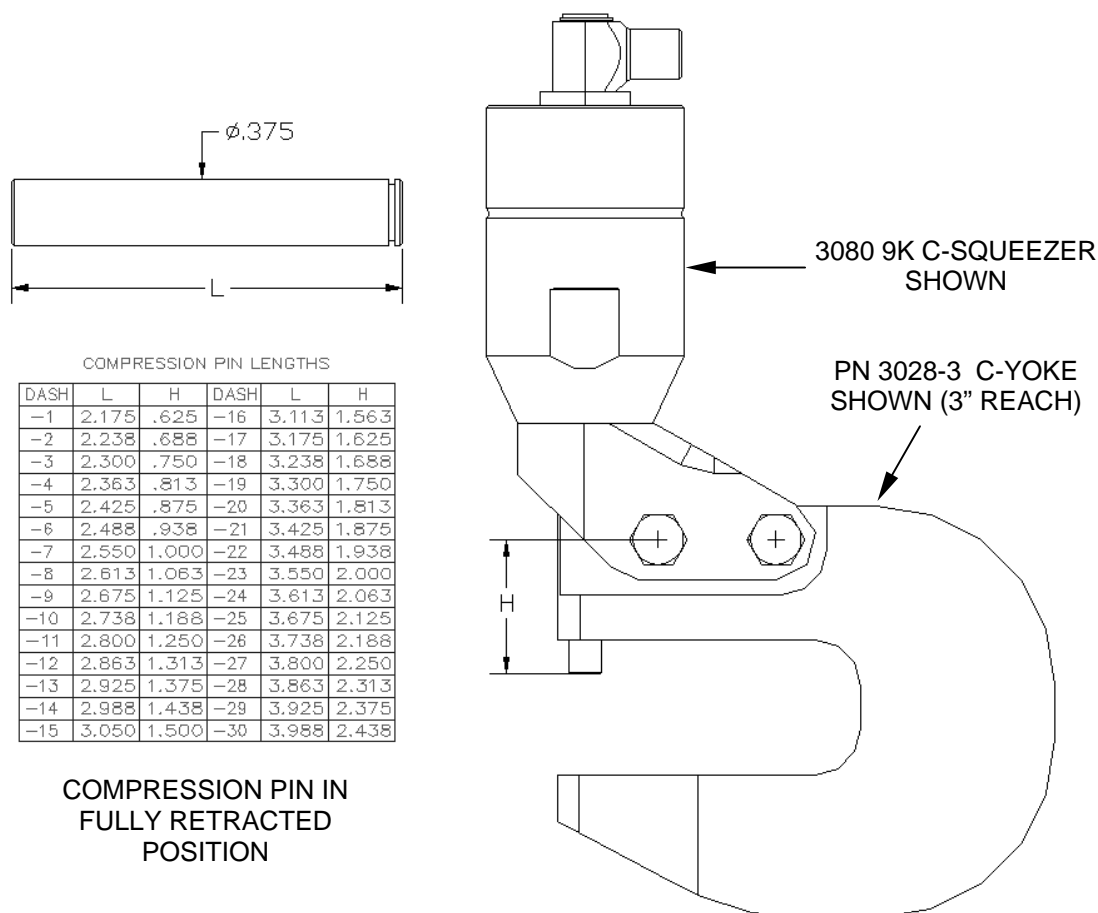
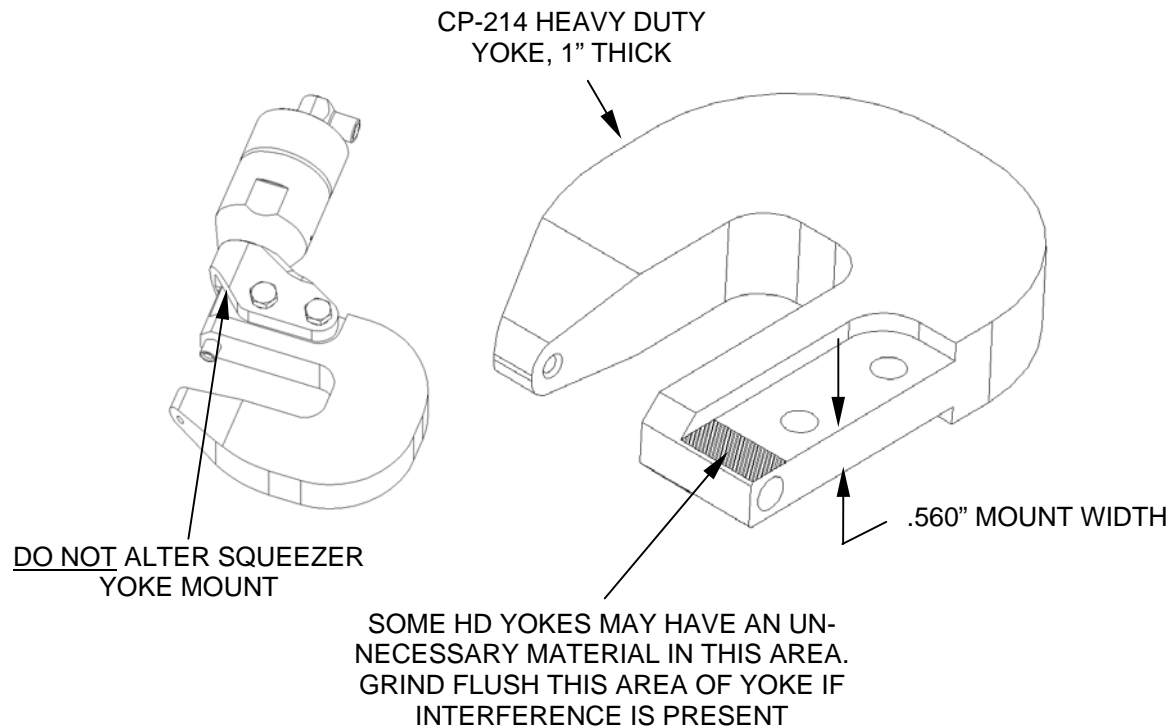
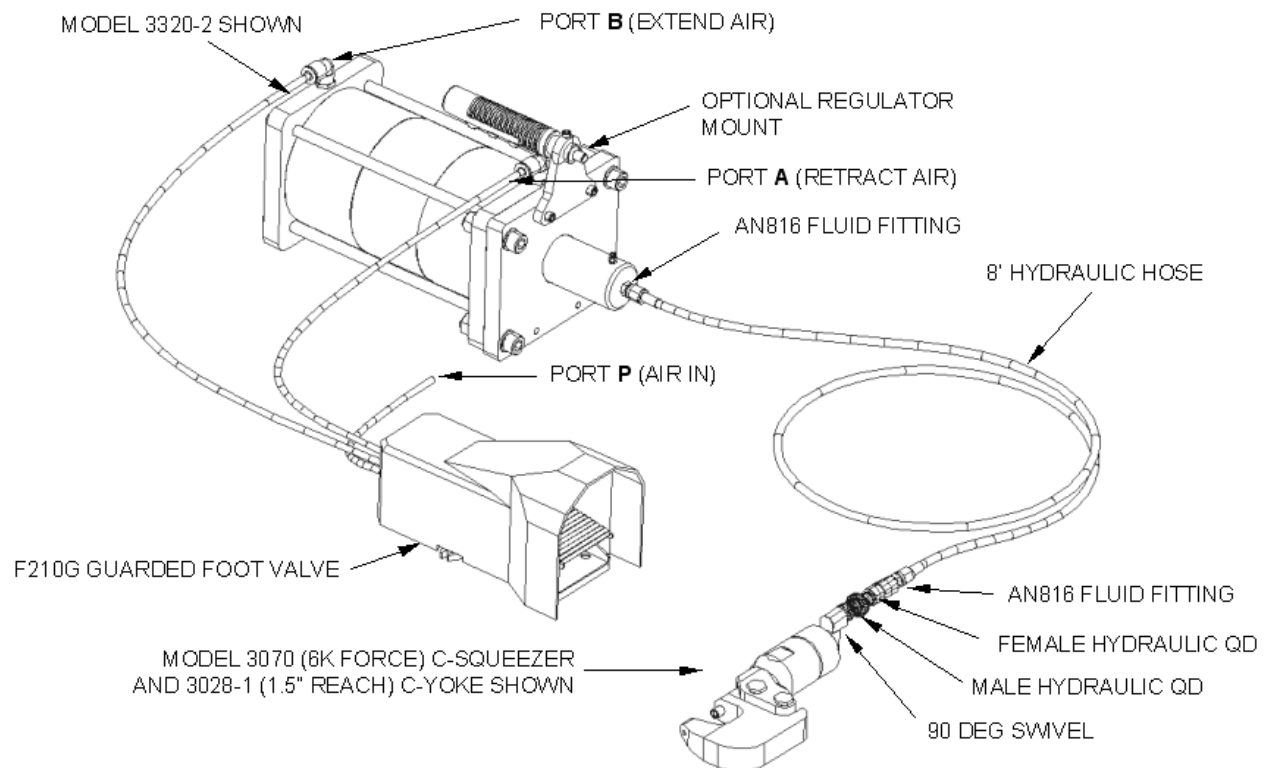


FIGURE 4 – COMPRESSION PIN (RIVET SET)

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**FIGURE 5 – CP214 HD YOKE MODIFICATION**



**FIGURE 6 – C-SQUEEZER SYSTEM**

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## 5.0 Operation

**Traditional pneumatic only squeezers** develop peak squeezing force at approximately the final 1/8" of rivet set (compression pin) travel. This means the squeezers are ALWAYS adjusted so that the rivet set has almost run out of travel as the rivet is about to be compressed. This requires fiddling around with washers/shims or rivet die lengths to achieve the optimum compression pin length for a given rivet length. When a traditional riveter is squeezing well for one rivet length, and a slightly different rivet length is used, the effective compression pin length may need to be adjusted, again with washers/shims/dies.

**Numatx C-Squeezers** output CONSTANT FORCE over the entire stroke range of the compression pin. Thus, Numatx Squeezers can be adjusted to achieve a formed head size via two different methods, with Method 2 being recommended:

**Method 1.** Adjust the effective compression pin length in the traditional manner, whereby the compression pin is nearly running out of stroke as it starts to form the rivet. This can be accomplished by threading in/out the compression pin for the Model 3060, or by shims/washers/die lengths for the Model 3070 and 3080. Providing the rivet material/size is within the basic capability of the squeezer model, and allowing for yoke flex, the desired formed length of the rivet can be achieved by some trial and error.

**Method 2.** Adjust the air pressure supplied to the Pressure Intensifier, within the allowable operating range of the Intensifier. Air pressure and hydraulic pressure will be directly proportional, thus the force of the squeezer is directly proportional to air pressure. Calculated forces for all C-Squeezers are shown in Table 1 below. Once the desired air pressure is achieved for a particular rivet material and rivet diameter, no further adjustment will be necessary to the compression pin length, providing the pin does not run out of travel.

- 5.1 For the Model 3060 Squeezer, refer to Figure 7 when adjusting the compression pin length. **Do NOT exceed the reference dimension of 1.06"**, shown in Figure 7, otherwise damage to the threaded pin/piston may occur under load.
- 5.2 For Model 3070 and 3080, refer to Figure 4 to adjust the compression pin length. Shorter or longer rivet dies may also be used to statically adjust the pin length.
- 5.3 To squeeze a rivet, depress the foot pedal (or actuate a control valve) connected to the intensifier. The pressure intensifier will displace hydraulic fluid along the length of the hydraulic hose, forcing the piston in the squeezer to move.
- 5.4 To retract the squeezer compression pin, release the foot valve (or other control valve). The piston of the intensifier will return to a retracted state, allowing the fluid in the squeezer to return to the intensifier.

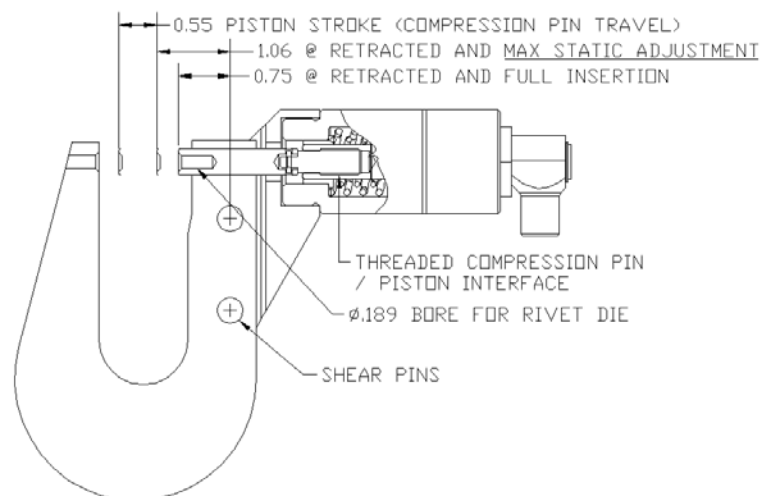


FIGURE 7 – MODEL 3060 COMPRESSION PIN TRAVEL

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CALCULATED FORCES FOR MODEL 3060, 3070 AND 3080 C-SQUEEZERS  
 USING MODEL 3320-2 PRESSURE INTENSIFIER AT PRESSURES GIVEN BELOW  
 80 PSI AIR PRESSURE PRODUCES NORMAL HYD PRESSURE OF 3,500 PSI

DESCRIPTION	AIR PRESSURE (PSI)					
	40	50	60	70	80	90
MODEL 3060 3K SQUEEZER FORCE (Lbf)	1,740	2,174	2,609	3,044	3,479	3,914
MODEL 3070 6K SQUEEZER FORCE (Lbf)	3,093	3,866	4,639	5,412	6,185	6,958
MODEL 3080 9K SQUEEZER FORCE (Lbf)	4,209	5,262	6,314	7,366	8,418	9,471

**TABLE 1 – SQUEEZER FORCES**

## 6.0 Maintenance

The NUMATX Model 3060, 3070 and 3080 C-Squeezers have been manufactured to give maximum service with minimum care. In order that this may be accomplished, the following recommendations should be followed.

- 6.1 The squeezer system should be full of oil and properly bled per Section 7.
- 6.2 Use only Dexron III or compatible fluid. See Dexron III safety Data below.
- 6.3 Oil the Low Pressure (LP) piston daily, using 4-6 drops of a quality air tool oil. Alternately, use an in-line oiler (Filter/Regulator/Lubricator - FRL).
- 6.4 Keep the unit clean and free of excessive moisture, to minimize wear on moving parts. Prevent dirt from entering the air inlet QD of the intensifier.
- 6.5 It is recommended to use dry filtered air as a pressure source to the intensifier, which will extend the seal life of the intensifier piston.
- 6.6 The system should be routinely inspected for oil leaks. Check the bleed fittings of the intensifier and forming heads to ensure they are tight. DO NOT OVERTIGHTEN.
- 6.7 The bleed plug in the squeezer may be removed to examine the fluid level.
- 6.8 Avoid dropping any portion of the unit, as this may cause damage to close tolerance parts.
- 6.9 Section 9 shows exploded parts lists for all of the C-Squeezers.

## DEXRON III OIL SAFETY DATA

### First Aid

**Skin:** Wash thoroughly with soap and water as soon as possible. Casual contact requires attention.

**Ingestion:** Seek Medical attention, immediately. DO NOT INDUCE VOMITING.

**Eyes:** Flush with copious amounts of water. If irritation develops, consult a physician.

**Inhalation:** No significant adverse health effects are expected to occur on short term exposure. Remove from contaminated area. Apply artificial respiration if needed. If unconscious, consult a physician.

### Fire

Suitable extinguishing media: CO<sub>2</sub>, dry powder, foam or water fog. DO NOT use water jets.



## Environment

**Waste Disposal:** In accordance with local, state and federal regulations.

**Spillage:** Prevent entry into drains, sewers and water courses. Soak up with inert material. Store waste fluid in an appropriate container for disposal.

**Handling:** Eye protection required. Protective gloves recommended. Chemically resistant boots and apron recommended. Use in well ventilated area.

**Combustibility:** Slightly combustible when heated above flash point. Will release flammable vapor which can burn in open or be explosive in confined spaces if exposed to a source of ignition.

## Properties

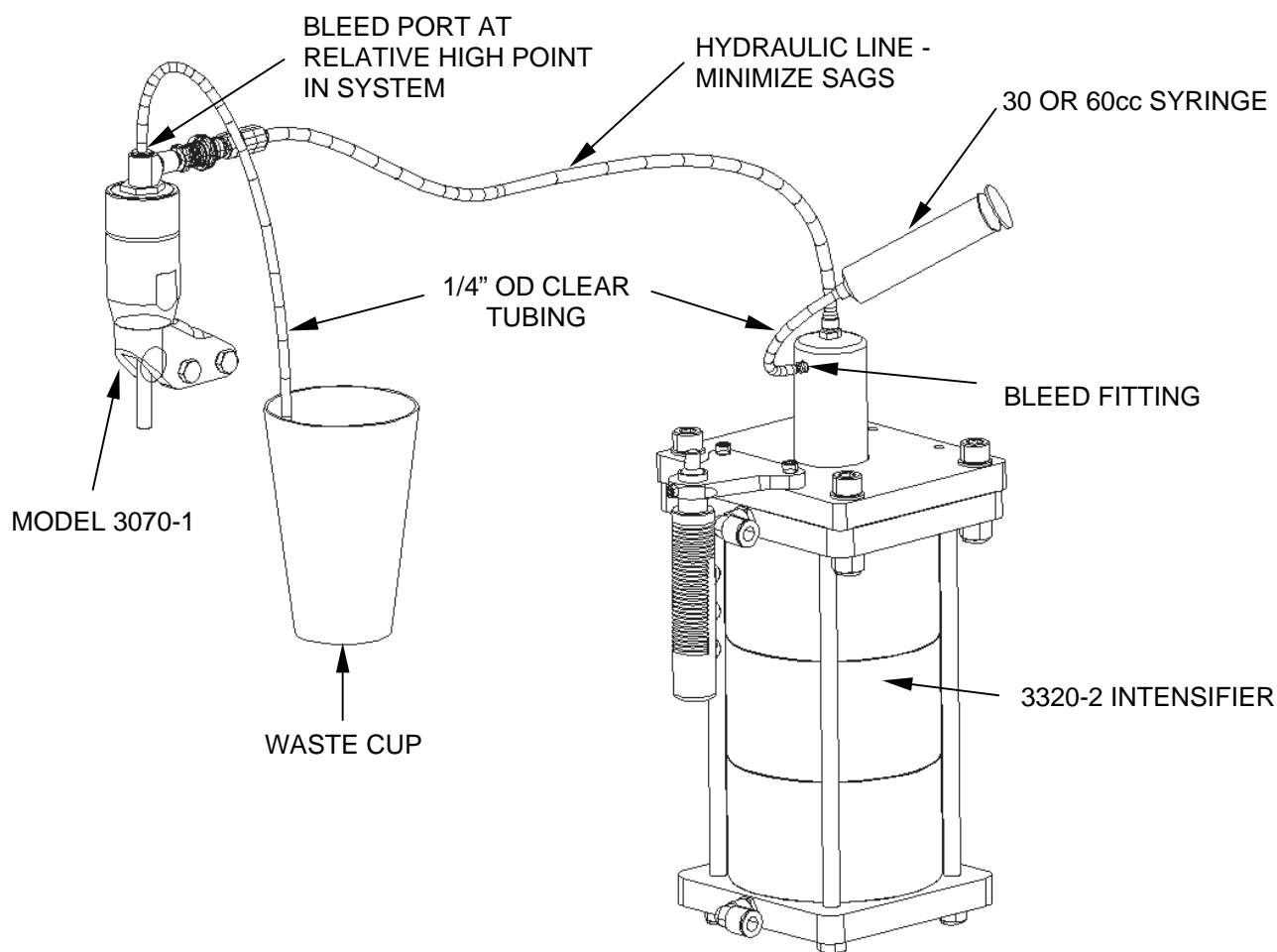
Specific gravity:	0.863	Weight per gallon:	7.18 lbs.
Flash point:	>200°C (392°F)		

## 7.0 Bleeding the Riveter System

In order to develop maximum force and full compression pin extension, entrapped air bubbles must be removed from the system. Bleeding the system is similar to bleeding brakes on a car. If a QD is used in the system, and is disconnected routinely, the bleeding frequency will be higher than a system without a QD. Bleeding the unit may take some patience and as much as 1/2 hour of time. It may be necessary to pass the equivalent of several 30cc charges of fluid through the unit to fully dispel any trapped air. If the unit does not seem to be performing properly, it is likely not fully bled of all air. Refer to Figure 8.

- 7.1 Place the unit so that the intensifier and the hydraulic hose are below the forming head. Try to minimize low points in the hydraulic hose, which could create space for an air pocket. The air lines to the intensifier do not need to be hooked up, providing that the intensifier air cylinder is fully retracted. The bleed port on the forming head should be as close to the relative high point in the system as possible, to preclude the possibility of an air pocket. Installing the squeezer in a vise may help position the bleed port. Remove the squeezer bleed plug, and install a 1/4" clear tube into the port, to channel excess fluid to a waste cup.
- 7.2 Slightly open the bleed fitting on the intensifier approximately 1 to 1-1/2 turns. Do not overly open this fitting, or else residual fluid may exit the intensifier due to gravity.
- 7.3 Attach a 1/4" O.D. tubing to the syringe, and fill the syringe with Dexron III fluid.
- 7.4 Make sure all air bubbles are out of the syringe and attached tubing before hooking it up to the bleed fitting of the intensifier. To do this, position the syringe so that the tubing is facing upward, and allow a small quantity of fluid to be dispelled from the syringe, force any air bubbles fully out of the syringe and attached tubing.
- 7.5 Inject the fluid into the intensifier bleed fitting. If it is difficult to force the fluid into the unit, SLIGHTLY open the bleed fitting in approximately 1/2 turn increments.
- 7.6 Observe the tubing connected to the squeezer head, watching for fluid exiting the clear tube. Continue injecting hydraulic fluid until no air bubbles are seen in the fluid exiting the forming head. An unfilled system requires several 30cc syringe injections.
- 7.7 When finished injecting fluid, tighten the bleed fitting of the intensifier BEFORE removing the tubing from each bleed fitting. This will prevent additional air from entering the system.
- 7.8 Remove the clear tube at the squeezer head, and check the fluid level at the port. Fluid may be added to "top off" the unit.
- 7.9 Reinstall the squeezer plug and tighten. Use Teflon tape on the pipe threads.
- 7.10 Wipe up any excess fluid which may be present on the intensifier and forming head.

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**FIGURE 8 – SYSTEM BLEEDING**

## 8.0 Contact Information

NUMATX welcomes any comments, suggestions or questions regarding this product.

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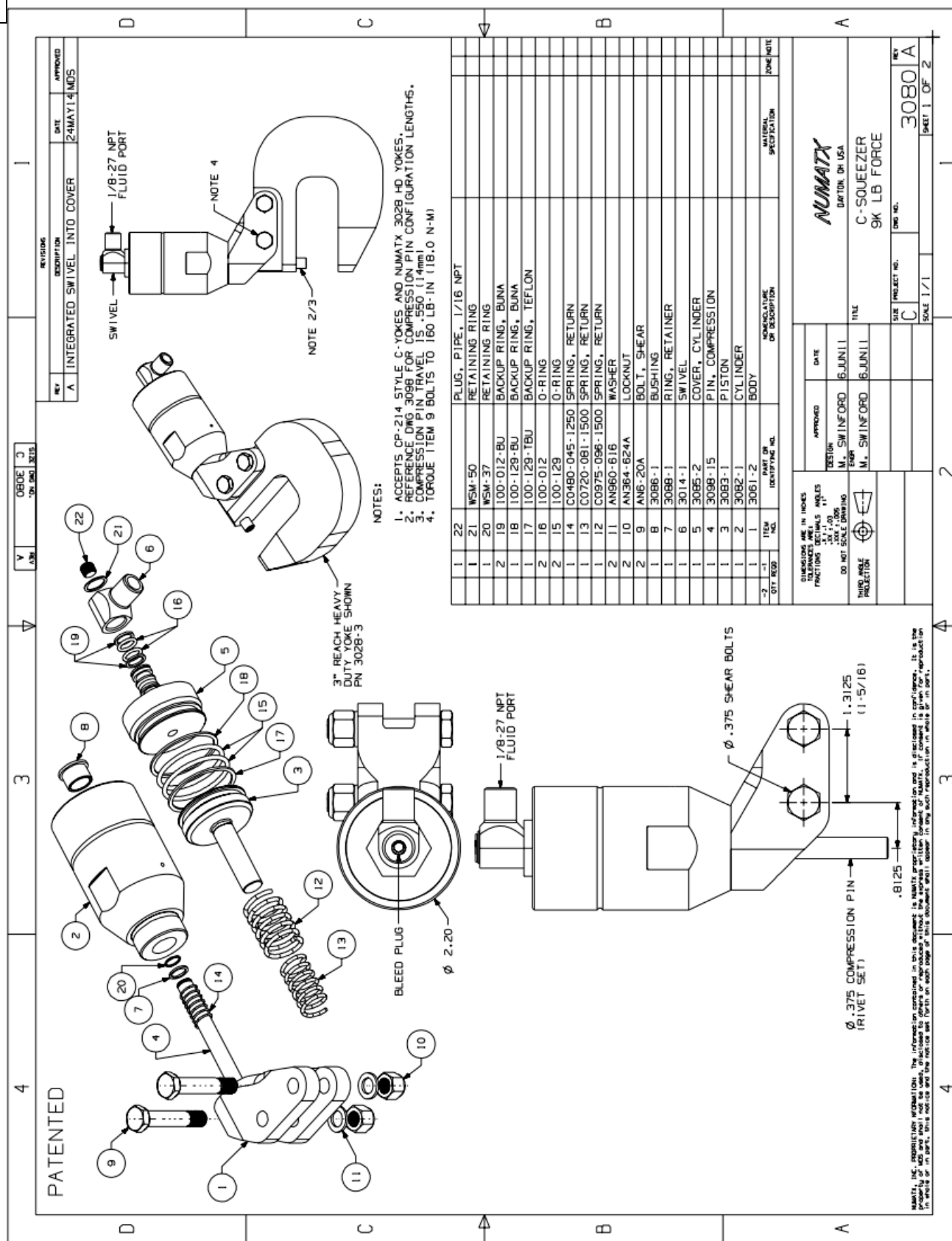
[numatx@att.net](mailto:numatx@att.net)

## 9.0 Parts Lists

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