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OPERATION AND SERVICE MANUAL



SINGLE-ACTING

PILE HAMMER

MODEL 50

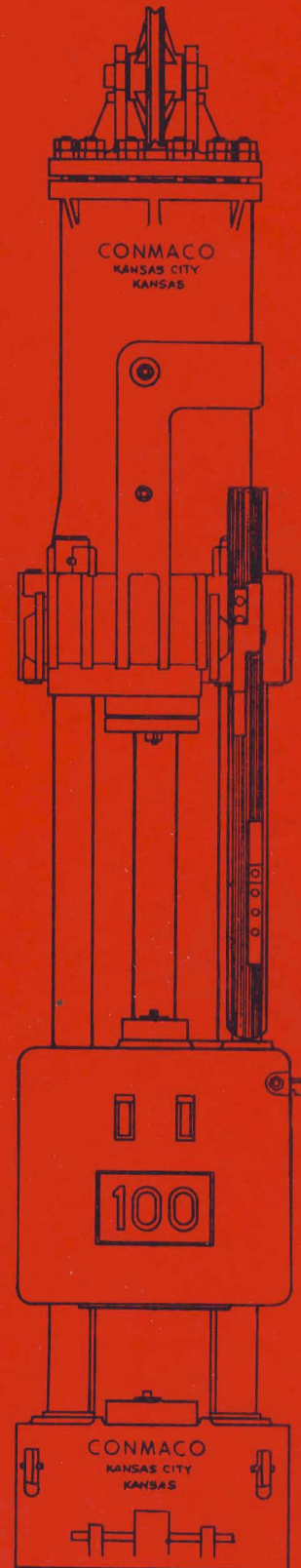
MODEL 65

MODEL 80

MODEL 100

MODEL 115

Read this manual carefully before attempting to operate or repair your CONMACO Pile Hammer. Then keep it handy for ready reference. It contains information regarding operation, maintenance, assembly, and parts replacement.



SPECIFICATIONS

MODEL	50	65	80	100	115
Rated Striking Energy - Ft Lbs	15,000	19,500	26,000	32,500	37,375
Blows Per Minute - Normal Stroke and No Set	60	60	50	50	50
Steam Pressure at Hammer - PSI	80	100	85	100	120
Air Pressure at Hammer - PSI	80	100	85	100	120
Steam Consumption - Lbs Per Hr Dry and Sat.	1,925	2,300	3,000	3,425	3,980
Volume of Free Air - Adiabatic - CFM	565	650	850	950	1,060
Volume of Free Air - Isothermal - CFM	940	1,140	1,475	1,700	2,000
Normal Stroke - Inches	36	36	39	39	39
\sqrt{EW} * Rating	8,660	11,258	14,422	18,027	20,933
Cylinder Diameter - Inches	13-1/2	13-1/2	16-1/2	16-1/2	16-1/2
Area of Piston Head - Square Inches	143.14	143.14	213.83	213.83	213.83
Overall Hammer Length - Feet	13' 0"	13' 0"	15' 0"	15' 0"	15' 0"
Distance Between Jaws - Inches	20	20	26	26	26
Width of Jaws - Inches	8-1/4	8-1/4	9-1/4	9-1/4	9-1/4
Hose Size - Diameter in Inches	2	2	2-1/2	2-1/2	2-1/2
Size of Hoisting Line - Diameter in Inches	3/4	3/4	7/8	7/8	7/8
Weight of Striking Parts - Lbs	5,000	6,500	8,000	10,000	11,500
Net Hammer Weight - Lbs	9,700	11,200	16,703	18,703	20,250
Shipping Weight - Lbs	10,100	11,600	17,453	19,200	21,000

* \sqrt{EW} Square Root of Energy x Striking Weight

These specifications are subject to change without notice.

OPERATION AND SERVICE MANUAL



SINGLE-ACTING

PILE HAMMER

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1 INTRODUCTION

The CONMACO pile hammer combines the latest engineering developments with the best material available for the intended service. It is built for rugged, economical, and trouble-free operation.

The single-acting pile hammer is designed for operation with steam or compressed air. Steam or air is forced into

the cylinder through the steam chest. This drives the piston upward and raises the ram. As the ram reaches the top of its stroke, a wedge on the slide bar trips the valve to cut off the steam or air supply. With the driving pressure discontinued, the ram free falls to strike the helmet cushioning element. At the impact position, the valve is tripped to begin a new cycle.

2 OPERATION

2.1 LEADS.

For best results always use leads to align and control the position of the hammer. Conmaco supplies a complete line of standard leads. In addition, experienced and qualified engineers are available to design special leads for unusual applications.

To install the hammer in the leads:

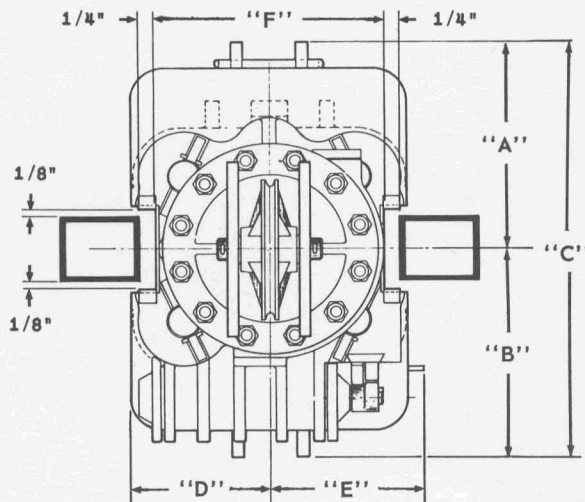
- 1 Position the pile hammer with the steam chest toward the rear.
- 2 Provide at least 1/2 inch face-to-face clearance and 1/4 inch sideways clearance between leads and side channels

as illustrated in Figure 2. The hammer must be free to move the entire length of the leads without binding.

- 3 Protect the hose from abrasion against the leads. Shield all projections that might catch or damage the hose.

2.2 HELMETS.

Conmaco offers a variety of standard helmets to meet all normal requirements, such as pipe, H-beam, wood, pedestal, concrete, and sheeting. Also, our engineers are available to design special helmets for unusual requirements. Detailed information and prices are available on request.



MODEL	50	65	80	100	115
"A"	17-3/4"	22"	19"	23"	25-1/2"
"B"	20-1/4"	21"	21"	25"	27-1/2"
"C"	38"	43"	40"	48"	53"
"D"	12"	12"	15-1/2"	15-1/2"	15-1/2"
"E"	14"	14"	18-1/2"	18-1/2"	18-1/2"
"F"	20"	20"	26"	26"	26"

Figure 2.

Clearance Dimensions.

2.3 LINE LUBRICATOR.

To increase the performance and life of the pile hammer, we recommend the use of an automatic steam or air lubricator. We offer a complete series of line lubricators. Specific data and prices are available on request.

2.4 HOSE.

The **CONMACO** pile hammer requires a good quality pile driver hose. The hose must be resistant to deterioration by steam and oils.

We recommend that you use a swivel joint for the hose connection to the hammer. A swivel relieves any tendency for the hose to twist the joint.

Before connecting the hose to the hammer, blow clean steam or air through the hose to clear any foreign matter. Be sure to secure the hose end to prevent whiplash when blowing the hose out.

Connect the hose to the pile hammer pipe flange (13). Remove protective seals before making hose connections. Do not use a nipple over two inches long to attach to the pipe flange. Provide a sturdy support for the hose to relieve the coupling of the weight of the hose and the

loads caused by the pounding action while the hammer is operating. A length of wire rope tied to the cylinder head is normally sufficient.

2.5 STARTING PROCEDURE.

With the hammer in the leads and the hose connected, check the entire installation.

Thoroughly warm a cold hammer before attempting to use it. Slowly admit steam or air and allow the ram to strike a few gentle blows. This warms the hammer evenly and reduces the stresses caused by unequal expansion of the castings. Rapidly starting a cold hammer may damage the cylinder castings.

A cold cylinder rapidly condenses a large amount of steam supplied to it. Until the cylinder is free of the condensate, the hammer may perform sluggishly. The cylinder and steam chest are automatically drained through hammer operation.

When operating a new hammer (first 40 hours of operation), check all keys and fasteners periodically for tightness. If any keys are loose, they should be tightened immediately to prevent damage to the hammer.

3 LUBRICATION AND PERIODIC CHECKS

3.1 DAILY CHECK AND LUBRICATION.

When in operation, the **CONMACO** pile hammer requires continuous lubrication.

Check the following items and perform the functions indicated each day, and more frequently if indicated by severe operating conditions. Refer to the Lubrication Chart, Figure 6, for additional details.

- 1 Use a line lubricator. See Paragraph 2.3. Check line lubricator and add lubricant.
- 2 Check all steam or air connections.
- 3 Check hammer and leads for binding.
- 4 Lubricate all four columns.
- 5 Lubricate slide bar.

6 Lubricate wedges on slide bar.

7 Lubricate piston rod.

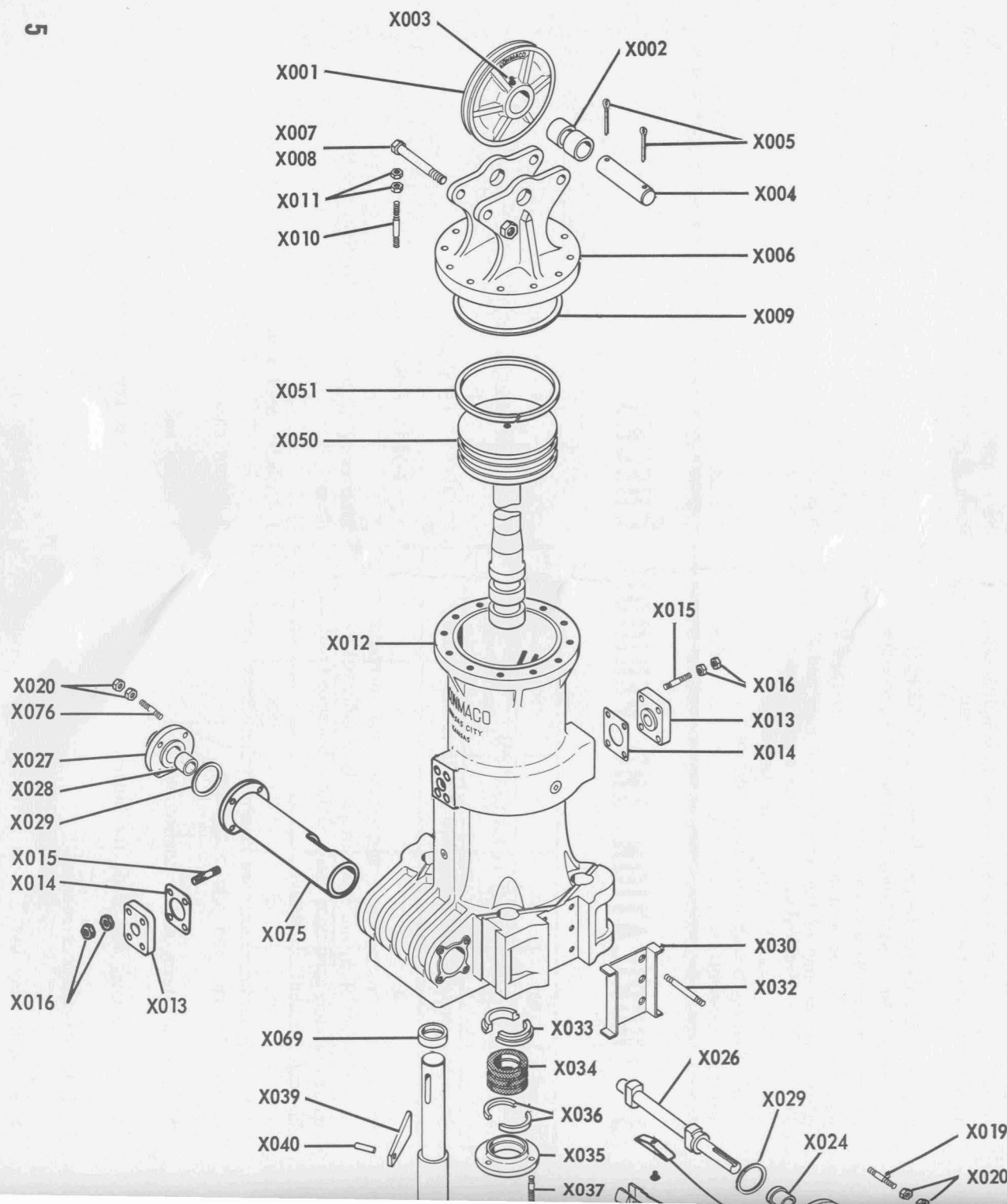
3.2 FORTY HOUR CHECK.

After every 40 hours of operation, check the following items:

- 1 Cylinder head studs and nuts (10 and 11).
- 2 Steam chest studs and nuts (20).
- 3 Upper and lower column keys (29 and 43).
- 4 Slide bar key and lock nuts (62 and 73).
- 5 Ram keys (53).
- 6 Trip key in valve stem (22).

CONMACO

SINGLE-ACTING PILE HAMMER



PART NUMBER CODE

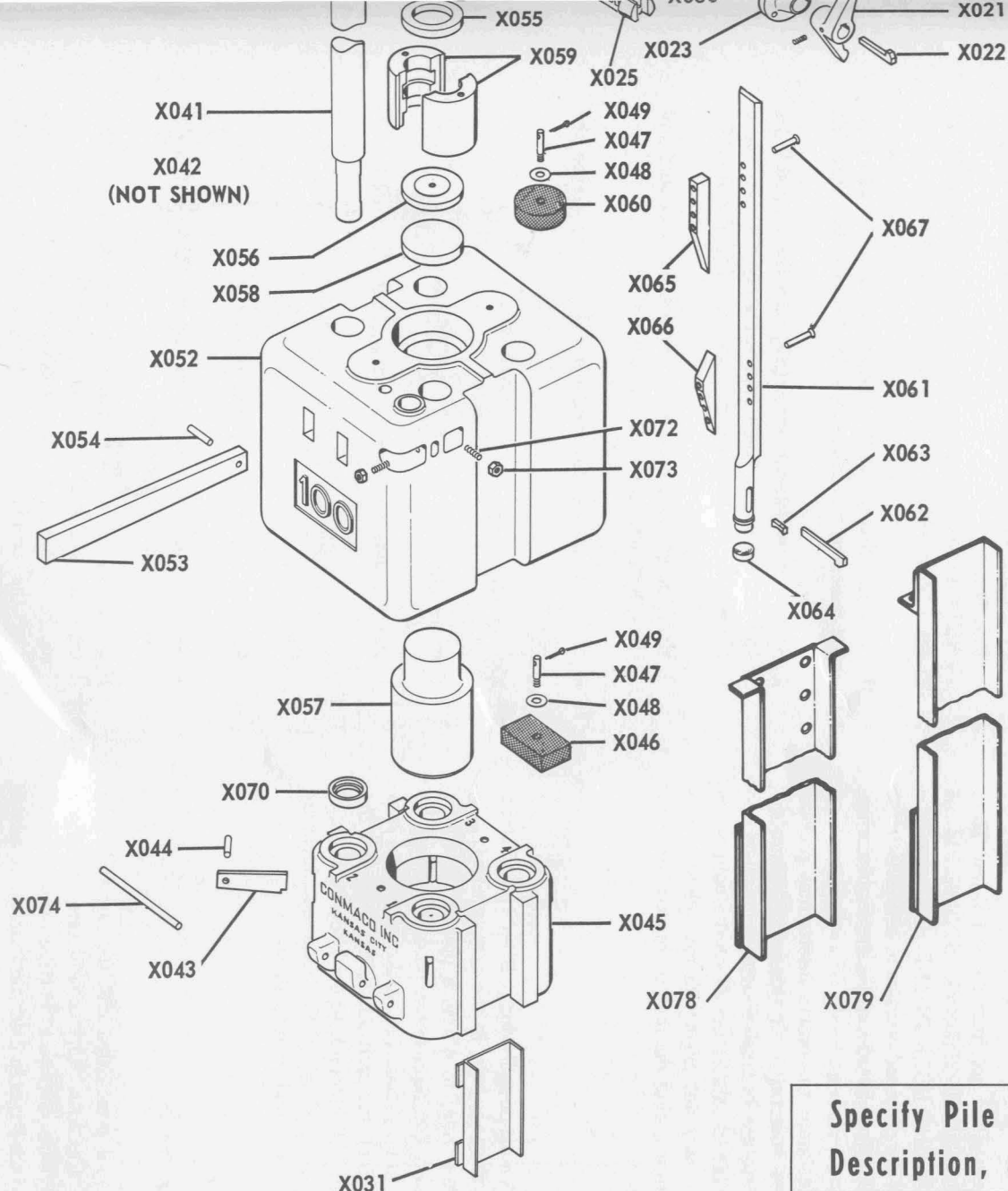
SIZE { 20 - MODEL 50
 30 - MODEL 65
 50 - MODEL 80
 70 - MODEL 100
 80 - MODEL 115

X0 00
 | |

 PART NUMBER

EXAMPLE:
 7025 - MODEL 100, VALVE, PART NO. 25

PART NO.	NO. REQ	DESCRIPTION
X001	1	Head Sheave
X002	1	Head Sheave Bushing
X003	1	Head Sheave Grease Fitting
X004	1	Head Sheave Pin
X005	2	Head Sheave Pin Keeper
X006	1	Cylinder Head-Sheave Type
X007	2	Cylinder Head Cross Bolt
X008	2	Cylinder Head Cross Bolt Nut
X009	1	Cylinder Head Gasket
X010	12	Cylinder Head Stud
X011	24	Cylinder Head Stud Nut
X012	1	Cylinder
X013	2	Pipe Flange
X014	2	Pipe Flange Gasket
X015	8	Pipe Flange Stud
X016	16	Pipe Flange Stud Nut
X019	4	Steam Chest Stud
X020	16	Steam Chest Stud Nut
X021	1	Trip
X022	1	Trip Key
X023	1	Open Steam Chest Head
X024	1	Open Steam Chest Head Bushing
X025	1	Valve
X026	1	Valve Stem
X027	1	Blind Steam Chest Head
X028	1	Blind Steam Chest Head Bushing
X029	2	Steam Chest Head Gasket
X030	2	Stub Side Channel, Upper
X031	2	Stub Side Channel, Lower
X032	6	Side Channel Rivet Stud (Makes Two)



- X034 1 Packing Set
- X035 1 Gland
- X036 1 Gland Bushing
- X037 3 Gland Stud
- X038 6 Gland Stud Nut
- X039 4 Upper Column Key
- X040 4 Upper Column Key Keeper
- X041 2 Column, Position 1 or 3
- X042 2 Column, Position 2 or 4
- X043 4 Lower Column Key
- X044 4 Lower Column Key Keeper
- X045 1 Standard Base
- X046 2 Lower Bumper
- X047 4 Bumper Stud
- X048 4 Bumper Stud Washer
- X049 4 Bumper Stud Pin
- X050 1 Piston
- X051 2 Piston Ring
- X052 1 Ram
- X053 2 Ram Key
- X054 2 Ram Key Keeper
- X055 1 Ram Key Ring
- X056 1 Ram Plate
- X057 1 Ram Point
- X058 1 Ram Cushion
- X059 1 Split Bushing
- X060 2 Upper Bumper
- X061 1 Slide Bar
- X062 1 Slide Bar Key
- X063 1 Slide Bar Key Block
- X064 1 Slide Bar End Block
- X065 1 Upper Wedge
- X066 1 Lower Wedge
- X067 8 Wedge Rivet
- X069 4 Cylinder Column Inserts
- X070 4 Base Column Insert
- X072 2 Slide Bar Key Set Screw
- X073 2 Slide Bar Key Set Screw Nut
- X074 2 Lock Bar
- X075 1 Steam Chest Sleeve
- X076 4 Blind Steam Chest Stud
- X078 2 Side Channel
- X079 2 Long Side Channel
- X080 1 Valve Stem Spring with Rivet

Specify Pile Hammer Model Number, Part Number, Description, and Shipping Instructions On All Orders.

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Kansas City, Kansas 66119
A. C. 913 371-3930

708 Engineers Road
Belle Chasse, Louisiana 70037
A. C. 504 363-8330

3501 East 118th Street
Chicago, Illinois 60617
A. C. 312 731-4800

Figure 3. Replacement Parts.

4 MAINTENANCE AND PARTS REPLACEMENT

Before disassembling any portion of the Pile Hammer, refer to the exploded diagram, Figure 3, to become familiar with the parts and their relationships. Specific instructions for disassembly and assembly are given in the following paragraphs.

4.1 COLUMN KEYS.

Replacement column keys (39 and 43) are furnished extra long. After old keys are removed, insert new keys and drive in tight. After key position is established, mark the location of the column key keeper hole, remove the key, and drill the hole for the column key keeper (40 and 44).

Lower column keys (43) are inserted and driven from inside the base. **THE END OF THE KEY MUST BE FLUSH WITH THE RAM POINT HOLE IN THE BASE.** In some instances, the keys are provided oversize to compensate for key seat wear, and must be fitted to the individual hammer.

Excessively worn columns or column inserts may prevent the keys from being driven tight. In this event, restore the shoulder or seat to the original dimensions. Unless the distance between the shoulders on all of the columns is the same, the base may not align with the cylinder. This may score the columns, bind the ram, or, in extreme cases, break the columns.

4.2 RAM KEYS.

All ram keys (53) must be individually fitted to each ram. Plane the edge of the ram key, in the area where it will contact the ram key ring, to obtain a precise fit. If the small end of the ram key does not extend far enough to expose the drilled hole, reduce the thickness of the ram cushion (58) 1/64 inch for each additional inch that the ram key must extend. If the ram keys drive too far through the ram, place a steel shim of the required thickness between the ram plate and ram cushion.

4.3 RAM POINT.

The ram point (57) is press fitted into the ram (52) with pressure of 50 to 100 tons. Replacement ram points are furnished oversize with the neck portion rough turned approximately 3/8 inch larger in diameter than the standard finished diameter of the ram point bore. It is to be machined to fit the individual ram. Lubricate both surfaces, ram point and ram, with Molykote type G lubricant before pressing in the ram point.

4.4 SIDE CHANNEL.

To remove stub side channels, upper, (30), from the cylinder:

- 1 Drill away the countersunk head of the channel rivet studs.
- 2 Straighten the channel ears.
- 3 Remove the channel.
- 4 Remove the remaining portion of the channel rivet stud by drilling a hole into the stud and remove by using an Easy-Out.

To install channels:

- 1 Place the channel in the jaws on the cylinder and align the holes in the channel with those in the cylinder.
- 2 Screw channel rivet studs (32) into the tapped holes and cut off with a torch approximately 3/4 inch above the surface of the channel.
- 3 Heat the exposed portion of the channel rivet stud and rivet flush with the channel web surface.
- 4 Heat the channel ears and bend them over against the cylinder.

4.5 SLIDE BAR.

Remove the slide bar (61) as follows:

- 1 Remove slide bar key set screw and nut (72 and 73).
- 2 Remove slide bar key (62) and slide bar key block (63).
- 3 Remove trip key (22) and trip (21).
- 4 Move the slide bar toward the top and remove after the slide bar clears the cylinder.

If a slide bar is loose in the ram, insert sufficient steel shims under the slide bar end block (64) to take up the slack. Be certain that slide bar key and slide bar key block are of the correct thickness to position the slide bar properly before adding the shims. The distance between the finished upper surface on the ram and the upper corner of the lower wedge (66) on the slide bar must correspond to the dimensions shown in Figure 5.

4.6 VALVE OR VALVE STEM REPLACEMENT.

Replace and adjust the valve as follows:

- 1 Remove trip key (22) and trip (21) from valve stem (26).
- 2 Remove blind steam chest head (27).
- 3 Remove valve (25) and valve stem (26).
- 4 Mark on the outer end of the steam chest the centerline of the input port. See Figure 4.
- 5 Mark the centerline of the valve land on the end of the new valve. See Figure 4.
- 6 Install the valve and valve stem in the steam chest and align the marks. This centers the valve land over the input port.
- 7 Slide the trip on the valve stem and position so the trip arms are equal distance from the slide bar. Be careful to keep the valve land centered on the input port.
- 8 Mark the position of the keyway on the valve stem.
- 9 Remove the valve stem and mill keyway.
- 10 Reinstall trip on valve stem and install trip key.

11 Replace blind steam chest head.

12 Check overall hammer dimensions per Figure 5.

4.7 VALVE SLEEVE.

DISREGARD FOR UNITS NOT EQUIPPED WITH VALVE SLEEVE.

To remove valve sleeve (75):

- 1 Disassemble valve, valve stem, and trip in accordance with paragraph 4.6.
- 2 Remove open steam chest head (23).
- 3 Remove valve sleeve (75).

To install valve sleeve:

- 1 Inspect all components for wear or damage. Replace as indicated.
- 2 Install new valve. Be sure alignment hole in valve sleeve flange mates with dowel on steam chest.
- 3 Reinstall remaining parts in reverse order of disassembly. Use new steam chest head gaskets. Be sure valve is properly oriented in relation to trip.

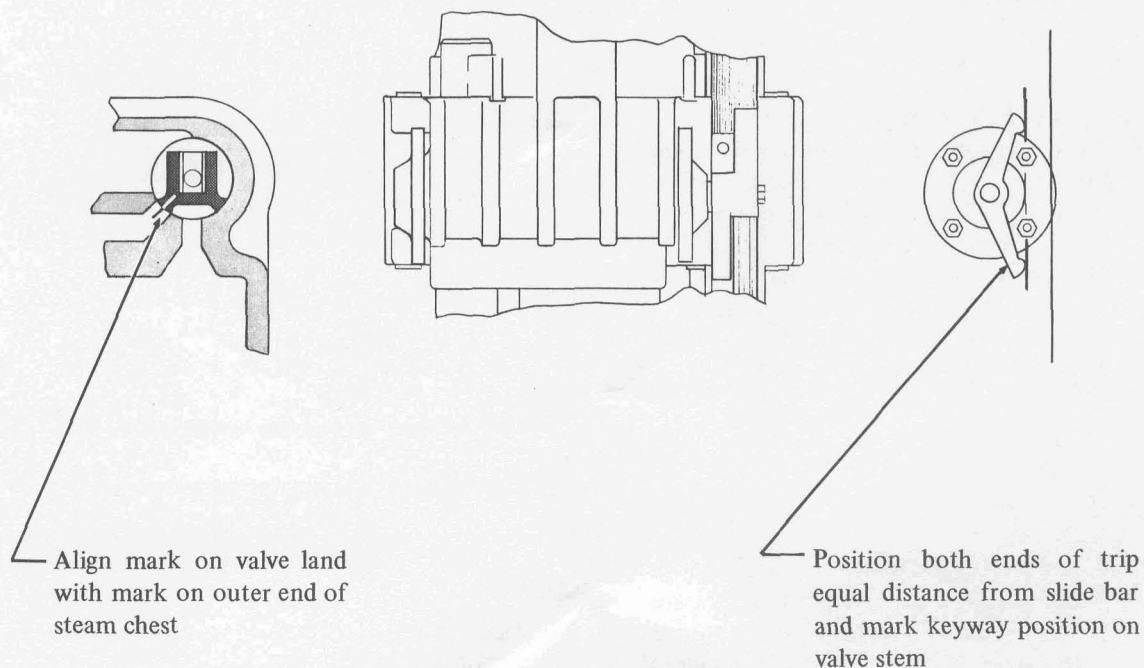


Figure 4. Steam Chest Valve.

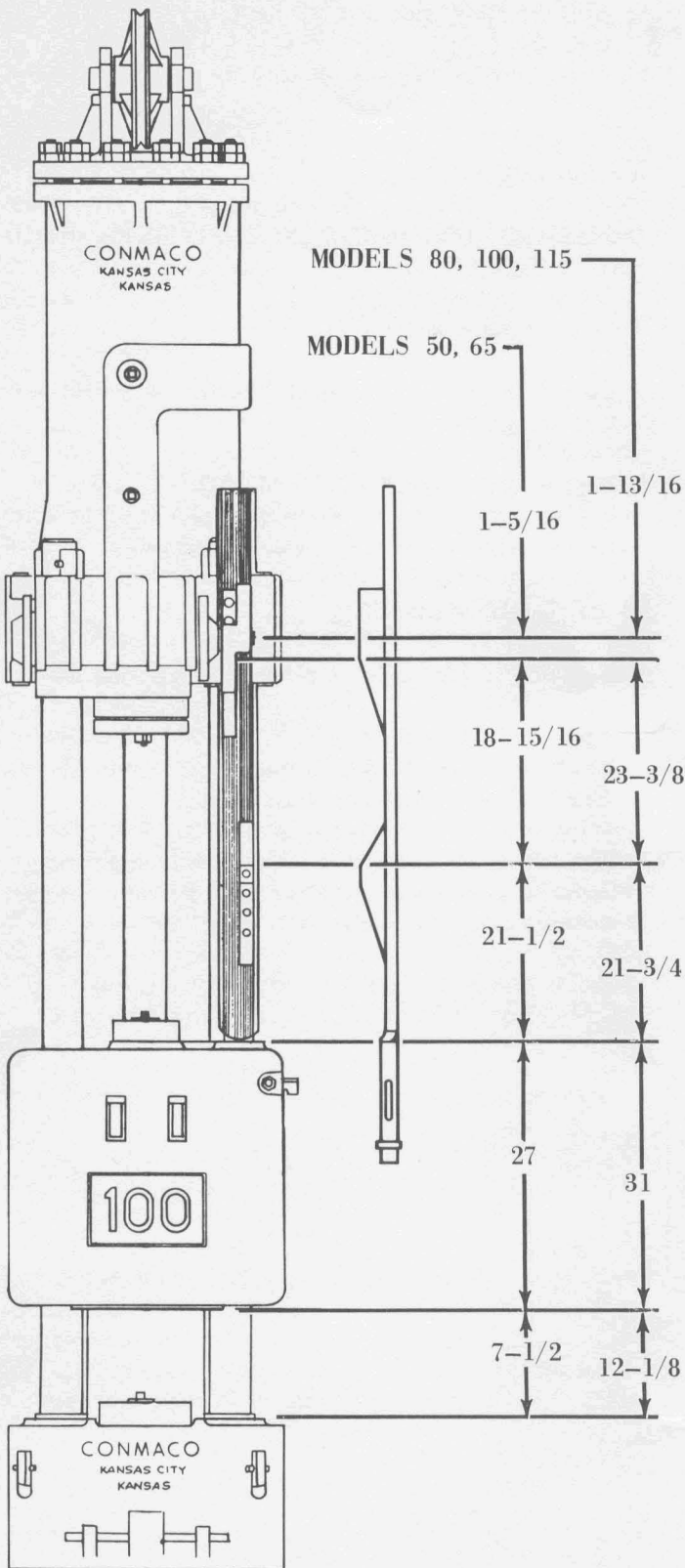


Figure 5.

Overall Adjustment Dimensions.

4.8 PISTON

To remove a piston:

- 1 Remove ram keys (53).
- 2 Remove cylinder head (6).
- 3 Install eye bolt in piston and lift piston to raise rod end from ram.
- 4 Remove split bushing (59).
- 5 Remove ram key ring (55).
- 6 Remove gland (35) and gland bushing (36).
- 7 Remove packing (34).
- 8 Remove junk ring (33).
- 9 Remove piston (50).

Reinstall piston in reverse order.

CAUTION

ASSEMBLE WITH THE PISTON ROD PROJECTING BEYOND THE SPLIT BUSHING. THE PISTON ROD — NOT THE SPLIT BUSHING — SHOULD BEAR ON THE RAM PLATE.

4.9 CYLINDER REPLACEMENT.

To remove a cylinder:

- 1 Remove valve gear in accordance with paragraph 4.6.
- 2 Remove slide bar in accordance with paragraph 4.5.
- 3 Remove piston in accordance with paragraph 4.8.
- 4 Remove upper column keys (39).
- 5 Lift cylinder from columns (41 and 42).

NOTES

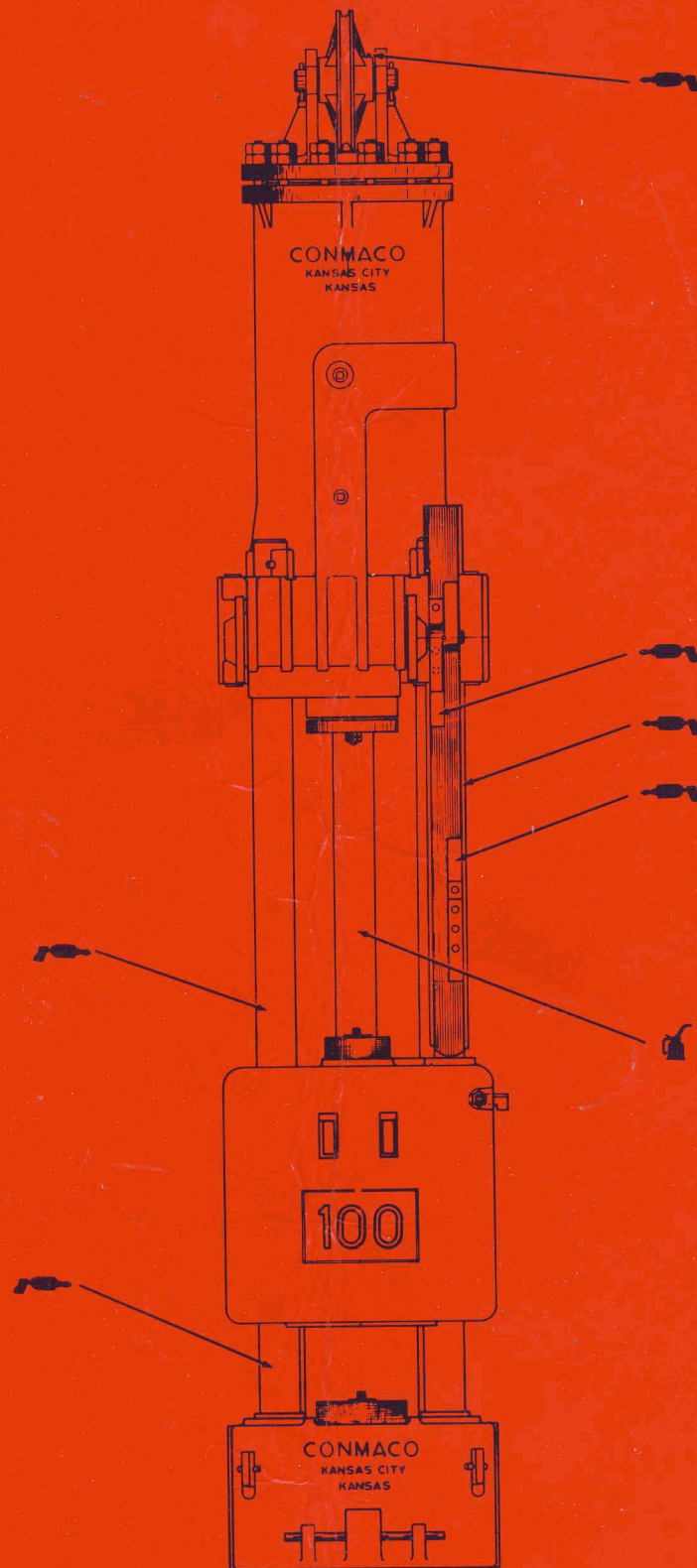


Figure 6. Lubrication.

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