

# AIR OVER OIL PRESS

## INSTALLATION, OPERATING, & MAINTENANCE INSTRUCTIONS



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## Warranty

Air-Hydraulics, Inc. warrants to the original user that all products manufactured will be free from defects in material and workmanship and will possess the characteristics represented in writing by us. Claim for breach of the above warranty must be made within a period of one year from date of delivery to the user. Upon satisfactory proof of claim, we will make any necessary repairs or corrections, or at our discretion, replace defective parts at the factory, transportation charges prepaid. Charges for correcting defects will not be allowed, nor can we accept goods returned for correction unless we are notified in writing and the return or correction is authorized by us in writing. **The foregoing is in lieu of all other warranties, expressed or implied, including any warranties that extend beyond the description of the product.** This paragraph set forth the extent of our liability for breach of any warranty in connection with the sale or use of our products. It is understood we will not be liable for consequential damages such as loss of profit, or expense, whether based on tort or contract. This warranty is void if the articles covered by the warranty have not been properly installed, maintained and used.

### NOTE

The Air Hydraulic Press has been carefully and accurately built to give long, trouble-free service if properly installed and maintained. Follow carefully the instructions, making sure no dirt or foreign materials are allowed to get into the cylinder or other working parts. If you have any unusual problems regarding controls or tooling, notify AIR-HYDRAULICS, INC., JACKSON, MICHIGAN, at 1-800-837-4355 and our Engineering Department will be glad to assist you.

### PRESS INSTALLATION INSTRUCTIONS

Install incoming air supply (100 P.S.I.) through an approved safety lockout valve which is upstream of FRL unit. The FRL unit consists of a filter, pressure regulating valve, and an air lubricator connected in proper order with arrows indicating the direction of air flow. It should be installed in the air line in a horizontal position as close to the press as possible with the pressure gauge visible from the operating position in front of the press. Connect outlet lubricator to inlet on press (tagged "air inlet").

Turn on air and make sure there are no air leaks. Operate press and verify lubricator is allowing an occasional drop of oil to pass into the air line (Note: the lubricator adjusted at the factory & should not require adjustment). If required, see **Preventative Maintenance** section for adjusting & adding oil to lubricator.

**Caution: Do not use over 100 P.S.I. air pressure.**

#### **C-Series Press & Booster System Explained**

The C-Series Press & Booster System uses a closed hydraulic system. The important thing to remember is there is air on the bottom (rod) side of the working ram cylinder & oil on the top (opposite) side. Secondly, the booster unit is a stacked cylinder assembly. The top cylinder is an intensifier or multiplier, having oil and the lower section of the booster assembly having air on both sides of the piston. A series of seals between the upper and lower cylinder sections separate and isolate the air from oil. An oil reservoir is used to assure the closed hydraulic circuit is free of air and always full of oil. Lastly, the air that returns the ram cylinder also returns or retracts the booster cylinder piston simultaneously to the home position allowing the oil to return to the top side of the booster cylinder assembly.

## **CONTROLS**

Press may be operated by electrical or pneumatic anti-tie-down controls with dual palm button activators. Also available at additional cost are special controls for automatic operation (pressure switch, limit switches, etc.).

## **RESERVOIR**

The reservoir is located at the top inside of the booster cylinder and contains a reserve supply of oil. The oil level should be checked occasionally so that the reservoir is never allowed to become completely empty. Try to keep the reservoir about  $\frac{3}{4}$  full at all times. The proper volume of oil in the hydraulic system is maintained from the reservoir supply. Use Mobile 24 or 25 hydraulic oil to refill the reservoir.

## **RAM STROKE**

This may be adjusted up to two-inches shorter with the downstop nut and the downstop locknut (Part Numbers 26 and 27).

## **MACHINE GUARDING**

Machine guarding is the responsibility of the user. Provisions must be made to protect the operator and other employees from injury from contact with work in progress, moving parts, mechanical motions of the press, etc. AIR-HYDRAULICS, INC. cannot provide "standard" guards for its presses due to the variety of tooling used by press owners. However, AIR-HYDRAULICS, INC. will be happy to install guards and similar safety devices for operator protection. These safety devices must be produced at the request of, and with design approval of the purchaser.

## **NOTICE**

When shutting down the press, the ram should be left in the full up position before turning off the air supply. Should the ram not be in the full up position when the air supply is turned off, the ram may drift after the air supply is turned off until all air from the system is exhausted.

## **Bleeding:**

**Note:** A loss of ram pressure or a jumping action of the ram indicates air in the hydraulic system. The air should be bled from the hydraulic system as follows:

- a. Make sure the reservoir has an adequate supply of oil.
- b. Turn main air line pressure on, with control valve, assure ram is in the full up position.
- c. Remove cap nut from hydraulic booster top cap.
- d. Fill system through pipe plug hole allowing air to bubble out.
- e. When no more signs of air bubbling out and system is full to top, replace pipe plug
- f. Press is now ready for operation.

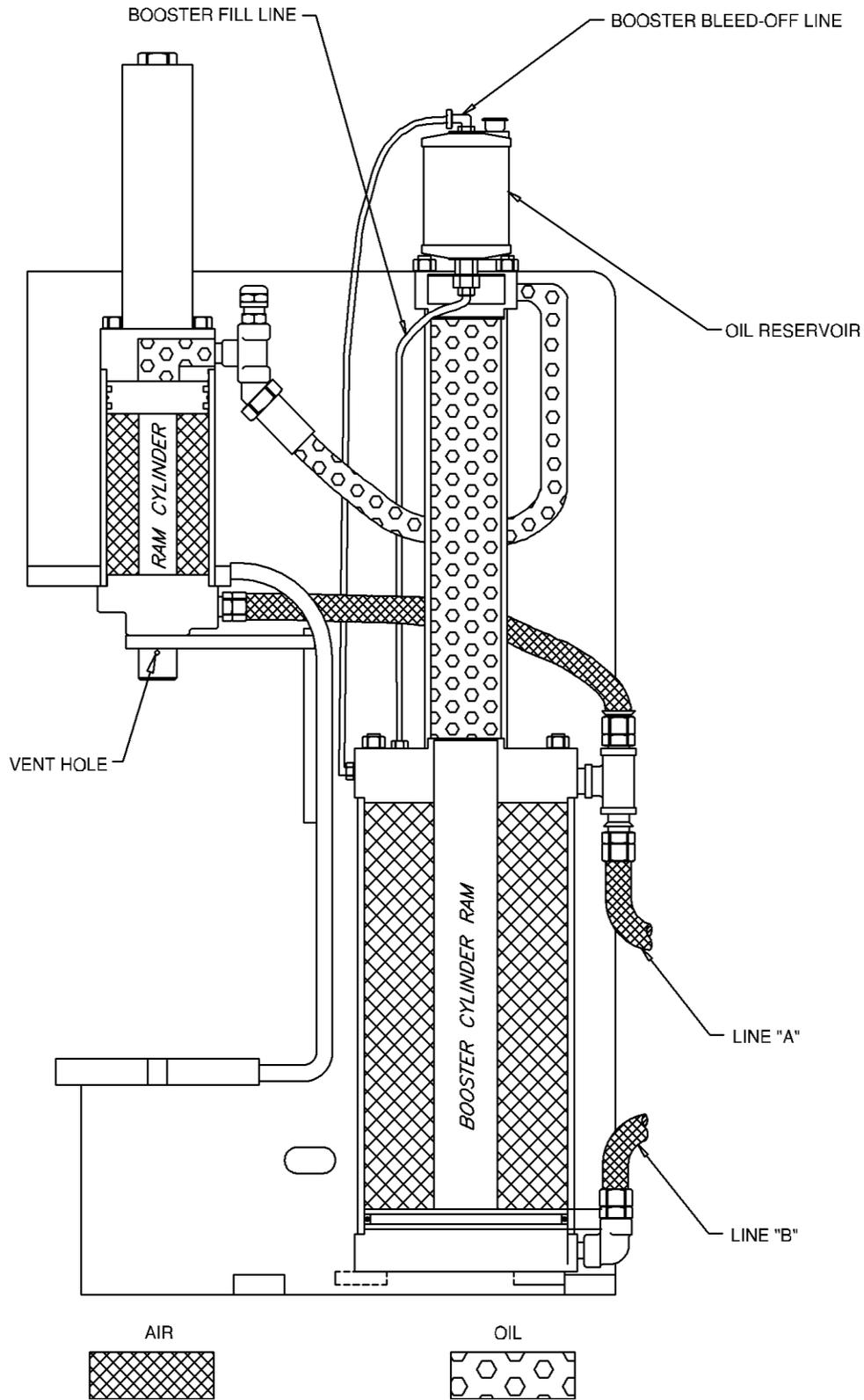
## **Do Not Short Stroke the Press**

The C-Series, C-250, C-300, C400 & C-500 presses uses a sealed air/oil system. As in any press, seals in time wear and may allow air into its closed hydraulic circuit. The C-Press's proprietary self bleeding system will remove any air trapped in the hydraulic oil on each stroke of the press. For this to happen, the working ram **MUST** return to the full up position after each stroke of the press, or the trapped air will build up, decreasing its effectiveness and keep the press from reaching full tonnage.

## **AIR & OIL FLOW FOR AIR-HYDRAULIC PRESSES**

FOR MODEL NUMBERS C-100, C-250, C-300, C-400, and C-500

1. When the valve is energized, line "B" is filled with air, causing the booster piston and ram to rise.
2. As the booster ram enters the oil chamber, pushing the oil out, pressure is developed and transferred to the ram cylinder. This pressure is maintained throughout the stroke.
3. Air from the downward stroke of the ram cylinder and the upward stroke of the booster cylinder is exhausted through line "A" throughout the stroke.
4. The oil which is flowing through the speed control valve enters the ram cylinder and pushes the ram down.
5. When the valve is de-energized, line "A" is filled with air causing the ram cylinder to move up and the booster cylinder to move down.
6. The only function of the booster fill line is to replenish the oil in the event a leak occurs somewhere in the system. The oil enters the chamber through the middle head of the booster cylinder and a small hole in the top of the booster ram.
7. The only function of the booster bleed off line is to return oil back to the reservoir in the event oil does leak by the seal in the booster.
8. The bleed hole which is located near the end of the ram cylinder is for the bleeding of oil in the event any leakage occurs in the seals.



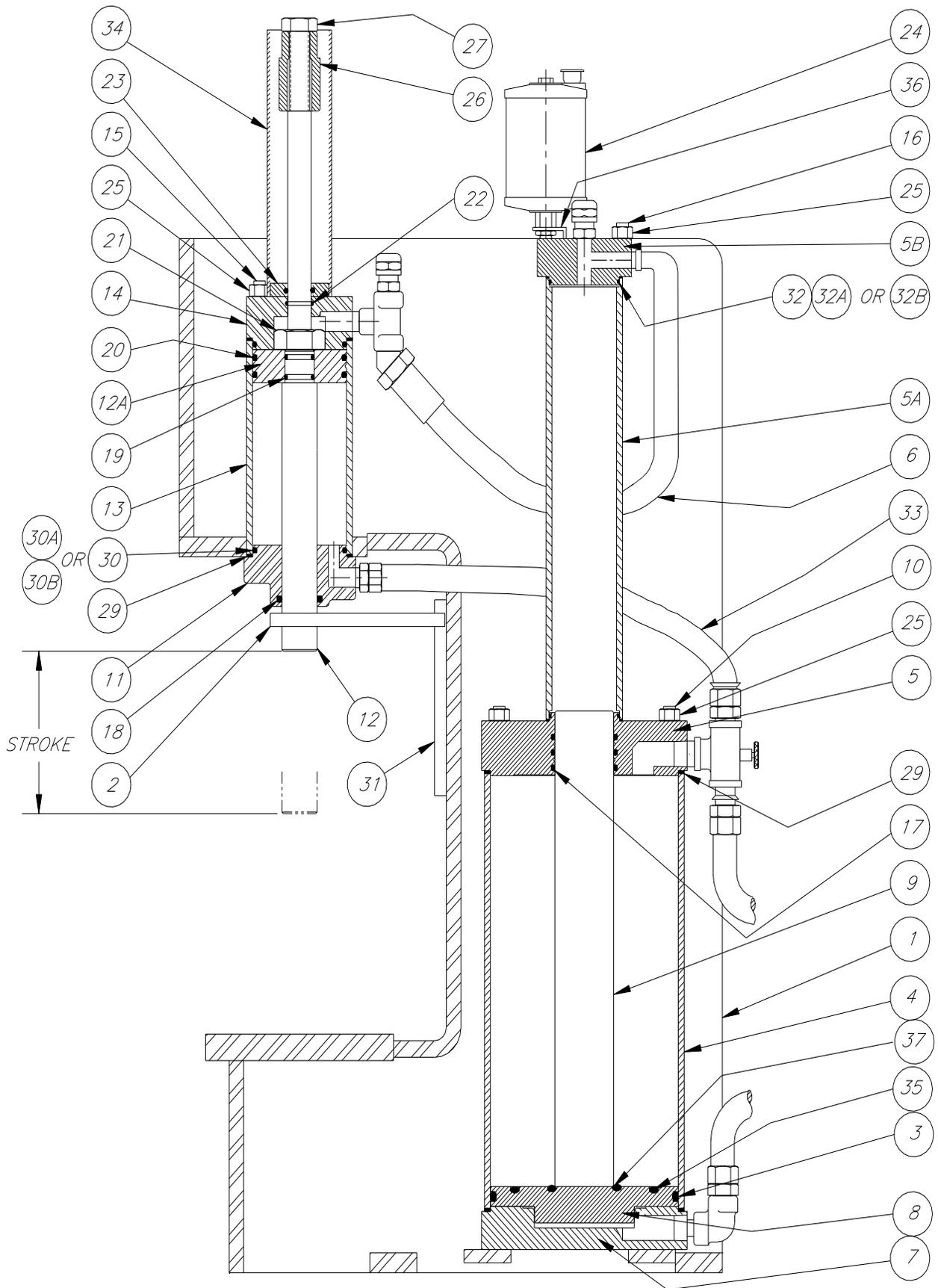
## Air-Hydraulics' C-Press Parts List

Det. #	Part Name	PART NUMBERS				Quant.
		C-250	C-300	C-400	C-500	
1	Frame	C1-2-01	C3-4-01	C3-4-01	C5-01	1
2	Ram Guide	C2-02	C3-4-02	C3-4-02	C5-02	1
3	Air Cyl. Piston Seal	**	**	**	**	1
4	Air Cyl. Body	C2-04	C3-04	C4-04	C5-04	1
5	Air. Cyl. Top Head	C2-05	C3-05	C4-05	C5-05	1
5A	Hyd. Cyl. Body	C2-05A	C3-05A	C4-05A	C5-05A	1
5B	Hyd. Cyl. Top Head	C2-05B	C3-4-05B	C4-05A	C5-05B	1
6	High Press Hose	H-10-21-ASSY	H-C3-4-ASSY	H-C3-4-ASSY	H-C500-31	1
7	Air Cyl. Bottom Hyd.	C2-07	C3-4-07	C3-4-07	C5-07	1
8	Air Cyl. Piston	C2-08	C3-4-08	C3-4-08	C5-08	1
9	Air Cyl. Ram	C2-09	C3-09	C4-09	C5-09	1
10	Air Cyl. Tie Rods	C2-10	C3-10	C4-10	C5-10	4
11	Ram Cyl. Bot. Head.	C2-11	C3-4-11	C3-4-11	C5-11	1
12	Ram	C2-12	C3-12	C4-12	C5-12	1
12a	Ram Cyl. Piston	C2-12A	C3-4-12	C3-4-12	C5-12A	1
13	Ram Cyl. Body	C2-13	C3-13	C4-13	C5-13	1
14	Ram Cyl. Top Head	C2-14	C3-14	C3-4-14	C5-14	1
15	Ram Cyl. Tie Rods	C2-15	C3-15	C4-15	C5-15	4
16	Hyd. Cyl. Tie Rods	C2-16	C3-16	C4-16	C5-16	4
17	Air Cyl. Ram Seal	**	**	**	**	3
18	Ram Seal	**	**	**	**	1
19	Static Seal	**	**	**	**	2
20	Ram Piston Seal	**	**	**	**	2
21	Flex-loc Nut-Ram	FN-0.875-14	FN-1.250-12	FN-1.250-12	FN-1.500-12	1
22	Ram Top Head Seal	**	**	**	**	1
23	Down Stop Plate	C2-23	C3-4-23	C3-4-23	C5-23	1
24	Oil Reservoir	RESERVOIR	RESERVOIR	RESERVOIR	RESERVOIR	1
25	Hex Nuts-Tie Rods	36509	36509	36509	36515	12
26	Down Stop Nut	C2-A28-50-26	C3-4-26	C3-4-26	C5-26	1
27	Down Stop Lock Nut	36513	36368	36368	36372	1
28	Air Cyl. Gaskets	**	**	**	**	2
29	Ram Cyl. Gaskets	**	**	**	**	2
30a	Ram Cyl. Ring Seal	**	**	**	**	2
30b	Ram Cyl. Seal - B/U	~	**	**	~	2
31	Ram Guide Key	C1-2-3-4-31	C1-2-3-4-31	C1-2-3-4-31	C5-31	
32	Hyd. Cyl. Seal	**	**	**	**	2
32a	Hyd. Cyl. Seal - B/U	-	**	**	**	2
32b	Hyd. Cyl. Gasket	**	**	**	-	2
33	Low Press. Hose	10LOLA	10LOLA	10LOLA	12LOLA	1
34	Guard Tube	C2-34	C3-4-5-34	C3-4-5-34	C3-4-5-34	1
35	O-Ring Bumper	~	**	**	~	1
36	Reservoir Bracket	C250-100	C250-100	C250-100	C250-100	1
37	Air Cyl. Ram O-Ring	**	**	**	**	1

**\*\*SEALS MUST BE PURCHASED VIA SEAL KITS \*\***

PLEASE CONSULT FACTORY FOR PART NUMBER, PRICING, AND AVAILABILITY  
ITEM 23 IS INCLUDED IN ALL SEAL KITS (INCLUDES FASTENERS)

# Air-Hydraulic's C-Press Parts



## Press Work Area Dimensions

Dim. Key	Part Name	C-100 (discontinued)	C-250	C-300	C-400	C-500
A	THROAT DEPTH	6.25	6.25	6.25	6.25	8.25
B	DAYLIGHT	12.00	12.00	14.43	14.43	14.00
C	RAM DIAMETER	.875	1.000	1.500	1.500	2.750
D	RAM MOUNTING	1/2-13x1.25	5/8-11x1.25	5/8-11x1.25	5/8-11x1.25	1 1/4-12x1.88
E	PLATEN WIDTH	12.50	12.50	14.00	14.00	18.00
F	PLATEN DEPTH	6.00	6.00	8.00	8.00	10.00
G	PLATEN SLOT	5/8x1.50	.62x1.50	.75x1.50	.75x1.50	1.25x.88
H	PLATEN RADIUS	2.00	2.00	2.00	2.00	2.25
J	PLATEN THICKNESS	1.00	1.00	1.00	1.00	1.25
K	PLATEN FLOOR	7.12	7.12	9.00	9.00	9.00
M	FRAME WIDTH	9.50	9.50	11.00	11.00	15.25
N	FRAME DEPTH	18.00	18.00	21.00	21.00	28.00
P	FRAME HEIGHT	32.12	32.12	39.00	39.00	40.00
R	MOUNTING HOLE DEPTH	10.00	10.00	13.00	13.00	16.00
S	MOUNTING HOLE WIDTH	11.25	11.25	12.75	12.75	17.00
T	MOUNTING HOLE	.53	.53	.62	.62	.65
U	OVERALL WIDTH	23.75*	23.75*	25.25*	25.25*	29.50*
V	OVERALL HEIGHT	39.50*	39.50*	46.50*	48.00*	52.00*
W	OVERALL DEPTH	20.00*	20.00*	23.12*	23.12*	29.75*
X	BACK FOOT MOUNTING	1.00	1.00	1.00	1.00	1.25
Y	FRONT FOOT MOUNTING	5.00	5.00	4.00	4.00	6.75

\*DENOTES APPROXIMATE DIMENSIONS\*

### GENERAL SPECIFICATIONS

Model No.	C-100 (discontinued)	C-250	C-300	C-400	C-500
Tons at 100 PSI Air	1	2-1/2	5-1/2	10	15
Power Ratio (No. x air line PSI= Approx. Force	20	50	110	200	300
Max. Ram Stroke (adjustable 2" shorter)	5-3/16	5-3/16	6	4	6
Cubic in. of Pressurized Air Per Full Stroke Cycle	251	577	1562	1865	4521
Air Cyl. Port Pipe Size - 4 Way Control Valve	3/8	1/2	3/4	3/4	1"
Return Force at 100 PSI		628	1080	1080	2003
<b>AIR CYLINDER</b>					
Inside Diameter	4-1/2	6	8	8	12
Rod Diameter	2	2-1/8	2-1/2	1-7/8	3-1/4
Stroke	8	10-1/4	15-5/8	18-1/2	20-3/16
<b>RAM CYLINDER</b>					
Inside Diameter	2-1/2	3	4	4	5-3/4
Top Rod Diameter	.625	.750	1.000	1.000	1.250
Bottom Rod Diameter	.875	1.00	1.500	1.500	2.750
<b>NET WEIGHT</b>	250	350	500	650	800

## Air-Hydraulics Presses Model's C-100, C-250, C-300, C-400 and C-500

### Preventative Maintenance and Trouble Shooting

1. Before any preventative maintenance is performed, turn off air supplies to press and block up ram, following OSHA and local Lock out/Tag out procedures.
2. Keep the oiler/lubricator filled with Mobil DTE grade 24 or equivalent. Lubricator is adjusted at the factory, but it should be reviewed monthly. The larger the cylinder area, the more lubrication the press needs. Use the following chart for a general rule of thumb.

Model No.	Cycles per drop
C-100 (discontinued)	10
C-250	10
C-300	7
C-400	7
C-500	5

If the press ram is chattering, then you may need to increase lubrication. If you are getting too much oil out of the exhaust air muffler, then you may need to turn down the lubricator.

3. Review and inspect air filter, it should be removed and replaced once the filter element turns tan or a brownish color.
4. Oil should be changed in the press if the color is dark brown or after 5 years, whichever ever comes first
5. Oil Reservoir should be check daily and filled to proper level.
6. Check press for oil leakage at the following indicators;
  - a. Bleed off hole or ram vent hole; a small 1/8" diameter hole located in the front of the machine, at the ram guide. If oil or air is coming out of this hole, this indicates that the seal needs replacing. Note, this hole can not be blocked or covered.
  - b. Booster Bleed-off Line; the 1/8" tube located in the back of the machine, coming from the side of the middle of the booster, going to the TOP of the oil reservoir. If there is oil in this line, this is an indication that the seals need to be replaced.
  - c. Air muffler; an excessive amount of oil coming out of the air muffler is an indicator that the lubricator needs to be turned down and/or seals need to be replaced.
  - d. Oil Reservoir; if you have to fill reservoir frequently, then there is a possibility that seals could be worn and need replacing.
7. Check all safety devices DAILY, for proper operation. If they are not functioning properly, DO NOT USE PRESS!

8. Frequently asked questions:

QUESTION: Why is hydraulic oil is coming out of the reservoir?

ANSWER: There are excessive amounts of air in top side of the ram cylinder or in the top of the oil side of the booster. With the ram in the home position, bleed oil side of system by unscrewing the two caps until all air has been exhausted. Do not remove caps. See page 4 of manual sent with machine. This could be caused by short stroking the press, preventing the ram from returning to the home position. It may also be caused by ram drifting down; overtime the reservoir appears to be empty, refilling it at this time will overfill the system. If this does not solve the problem, then seals need to be replaced. They are either installed incorrectly or need replacing.

QUESTION: Hydraulic oil levels in the reservoir go up and down when press is cycled.

ANSWER: There is a small amount air trapped in the hydraulics system. You need to bleed the air out of the system, see page 4 of manual

QUESTION: After several cycles, I lose ram pressure or force.

ANSWER: The air volume to the press is not adequate or the filter(s) needs replacing. Make sure you have a minimum of 3/4" air line to the press from the drop. Check air pressure drop at inlet when press cycles; it should not drop below 75 psi. Increase air volume to press.

QUESTION: Hydraulic oil is in the vent tube, the tube that comes out of "top" of the reservoir and goes down into the "side" of the air cylinder top head (middle of the booster); is that normal?

ANSWER: No, this indicates that the hydraulic seals in the air cylinder top head are worn and eroded and need to be replaced. Assure that new seals are installed properly. If installed upside down or are damaged while being installed, the problem will remain.

QUESTION: I'm not sure, but I think air is getting in my hydraulic system. How can I test this?

ANSWER: There are two places which air can by pass seals and enter into the closed hydraulic system; through the booster or the ram. The ram cylinder can be tested in the following manner: Make sure ram is in the retracted mode. Remove the ram guide from the ram, exposing the 1/8" by- pass hole, located on the front side of the ram. Place soapy water over the 1/8" hole (similar to finding leaks in a natural gas line). If it blows a bubble, air is "by passing" the seal and entering the hydraulic system. The bottom seal of the ram cylinder needs replacing. When assembling the ram guide, be sure the slit is in position over the hole & not plugging it. You can test the booster again by applying air to the booster through the ram retraction side. Remove the 1/4" tube going to the top of the

reservoir and coming out of the side of the booster cylinder (air side) top cap. Put the tube in jar of water, if it blows a bubble, the bottom seal in the booster needs replacing.

QUESTION: During the first cycle of the press, after being shut down over the weekend, oil will erupt from the reservoir top. What is causing that?

ANSWER: To prevent the eventual drifting down or closing, when the air supply to this press is turned OFF, the die set or tooling should be blocked in an OPEN position due to weight of tooling attached to the ram of this press. This will keep the closed hydraulic circuit of this press from becoming imbalanced, misleading the circuit to siphon oil from reservoir top unnecessarily, which could damage the press.

QUESTION: After several cycles, I get oil bubbling out of the oil reservoir and there is air coming out of the vent hole of the ram.

ANSWER: The problem is in your Ram Cylinder. The "U" Cup seals are installed incorrectly, damaged or worn, and/or the "O"-rings (located where the piston attaches to the ram) are in need of repair, replacement or are missing. Air is coming from the rod/bottom of the cylinder, going up through the button "U" seal on the piston, or through the "O"-rings; allowing air to enter into the closed hydraulic system, therefore, being relieved through the reservoir. If the oil is bubbling to the point of over flowing, then the seals/"O"-rings are extremely damaged, or the seals are installed backwards or are missing.

QUESTION: There is air building up in my reservoir. I can feel it when I put my finger over the hole, but it is NOT bubbling up through the oil in the reservoir.

ANSWER: The problem may be in the booster. You can further test this by applying air to the booster through the ram retraction side (top port). Remove the 1/4" tube going to the top of the reservoir and coming out of the side (not the top) of the booster cylinder (air side) top cap. Put the tube in jar of water, if it blows a bubble, the bottom seal in the booster needs replacing or was installed incorrectly.

**Air-Hydraulics "C" Series Presses & "B" Series Booster and Cylinder Packages**  
**Air Pressure vs. Press Force vs. Hydraulic Oil Pressure**

Model #	C-250		C-300		C-400		C-500	
	B-250		B-300		B-400		B-500	
Force rating in Tons @ 100 psi	2-1/2		5-1/2		10		15	
Air Pressure (PSI) at Press's Regulator	Press or Ram (cylinder rod) force in U.S. lbs	Hydraulic PSI Gauge reading	Press or Ram (cylinder rod) force in U.S. lbs	Hydraulic PSI Gauge reading	Press or Ram (cylinder rod) force in U.S. lbs	Hydraulic PSI Gauge reading	Press or Ram (cylinder rod) force in U.S. lbs	Hydraulic PSI Gauge reading
40	2,000	319	4,400	409	8,000	728	12,000	545
45	2,250	359	4,950	460	9,000	819	13,500	613
50	2,500	399	5,500	512	10,000	910	15,000	682
55	2,750	438	6,050	563	11,000	1,001	16,500	750
60	3,000	478	6,600	614	12,000	1,092	18,000	818
65	3,250	518	7,150	665	13,000	1,183	19,500	886
70	3,500	558	7,700	716	14,000	1,274	21,000	954
75	3,750	598	8,250	767	15,000	1,365	22,500	1,022
80	4,000	638	8,800	818	16,000	1,456	24,000	1,090
85	4,250	677	9,350	870	17,000	1,547	25,500	1,159
90	4,500	717	9,900	921	18,000	1,638	27,000	1,227
95	4,750	757	10,450	972	19,000	1,729	28,500	1,295
100	5,000	797	11,000	1,023	20,000	1,820	30,000	1,363
<b>Intensifier's Multiplier</b>	<b>50</b>	<b>7.97</b>	<b>110</b>	<b>10.23</b>	<b>200</b>	<b>18.2</b>	<b>300</b>	<b>13.63</b>

**Notes:**

Not all presses have hydraulics pressure gauges. It depends on the control package purchased with the press.

To use this table, identify press's or cylinder's model and hydraulics oil pressure from your gauge. Example, if you have a Model C-400 Press and the air pressure at the Press's regulator is reading 80 psi, the hydraulics pressure gauge, should be reading approx. 1,456 psi and the force of the press's ram should be approx. 16,000 lbs. or 8 tons.

This assumes that the hydraulics oil pressure is metered or taken from the top side of the Work (Ram) Cylinder, through the 1/4" NPT Sensor Port. Depending on what options were purchased with your machine, some machines have the hydraulic gauge already installed.

Torque Specs for Cylinder Fasteners and Hardware		
Model	RCA Mounting Bolt (each)	RCA & BCA Tie Rod/Nut (each)
C-250	75 ft.lb.	105 ft.lb.
C-300	75 ft.lb.	115 ft.lb.
C-400	75 ft.lb.	115 ft.lb.
C-500	227 ft.lb.	245 ft.lb.

## Oil Drain for Cylinder Rebuild

1. Insure work ram is in full up position & booster piston is full down.
2. Block work ram in up position
3. Remove air supply at lockout valve
4. Remove air hose "A" from bottom of work ram & booster middle head Tee
5. Insert a pipe plug in bottom head of work ram "B"
6. Leaving "Tee" fitting "C", on top port of work ram, remove hose from lower part of same "Tee" (expect some oil mess)
  - a. Raise hose up as soon as removed from end fitting to decrease oil run out & plug end of hose.
  - b. Remove "Tee" from top of ram cylinder head & plug port
7. Remove pipe fittings from middle & bottom head of booster at back
8. Remove booster mount hex screws from side of frame at top & bottom heads
9. Take booster out from top. Oil can now be drained into container from hose attached to booster.
10. Remove bolts from bottom of main work ram, allowing it to drop thru frame of press.
11. Cylinders can now be rebuilt. Refer to manual for refill instructions.
12. When rebuilding cylinders, torque tie rod & hex nuts to chart on page 13

