SIGNATURE ANALYSIS
AIR OVER OIL PRESS

INSTALLATION, OPERATING,
& MAINTENANCE INSTRUCTIONS

Black & Webster Assembly Equipment Division
545 Hupp Ave. · P.O. Box 831 · Jackson, Michigan 49204
Phone: (517) 787-9444 · Fax: (517) 787-7585
www.airhydraulics.com Email: info@airhydraulics.com

Serial Number: _____

Rev. Original
Manual Part No. UM-SIG-C-20200622

Table of Contents

Warranty

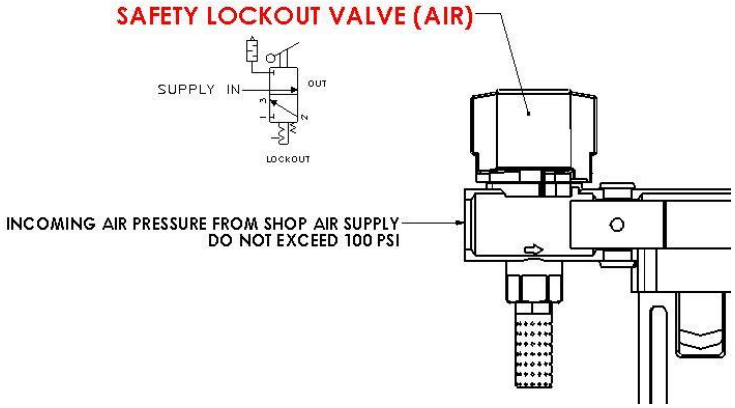
Air-Hydraulics, Inc. warrants to the original user that all products manufactured will be free from defects in material and workmanship and will possess the characteristics represented in writing by us. Claim for breach of the above warranty must be made within a period of one year from date of delivery 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. Make sure you can supply the machine with the proper air requirements to ensure the product functions as advertised. 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”).



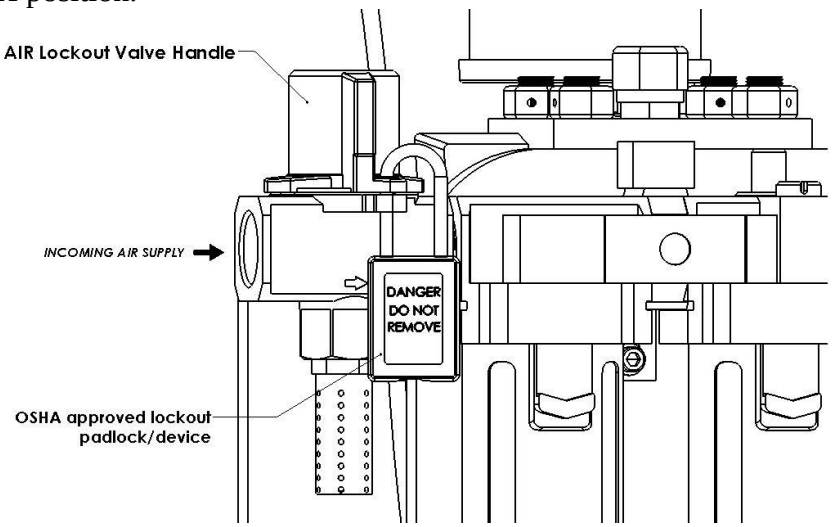
Press	SIG-250	SIG-300/400	SIG-500
Minimum Airline ID Req.	1/2”	3/4”	1”

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.**

To provide electrical power to the machine plug the cord into a wall.

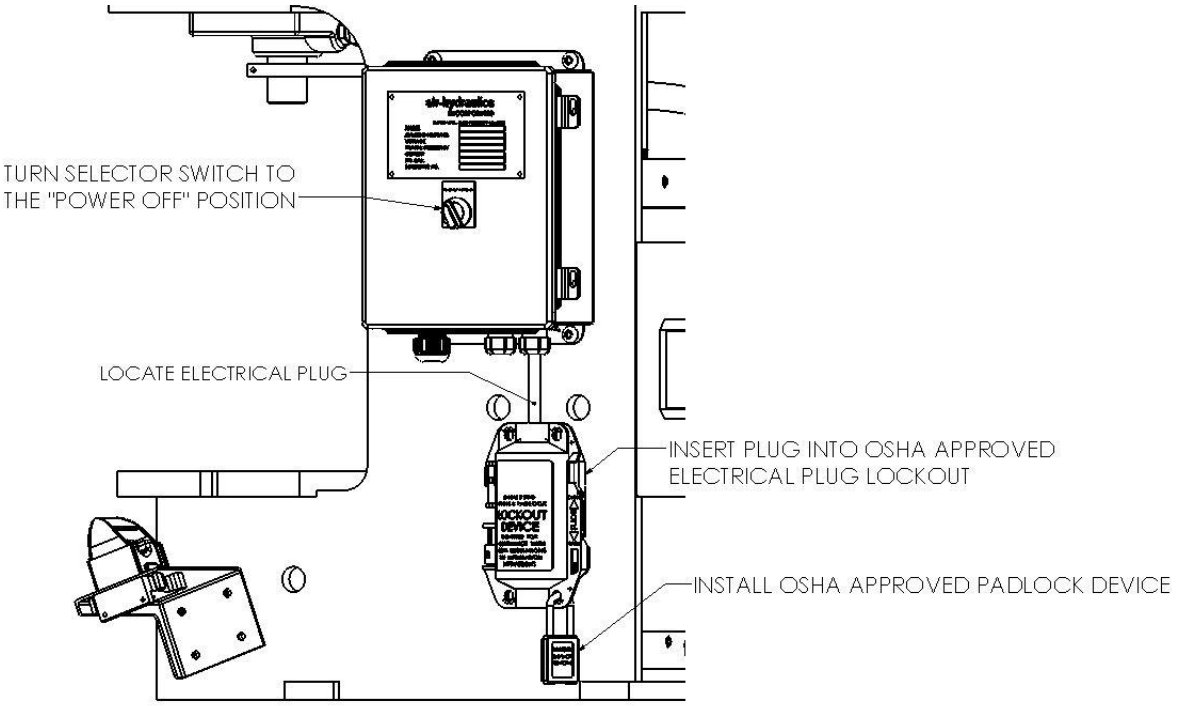
LOCKOUT-TAGOUT PROCEDURE

1. Locate the AIR Lockout valve on the FRL Assembly. Turn the red (or black) knob to the EXH position.



2. Insert an OSHA approved lockout padlock/device into the holes that are now aligned on the AIR Lockout valve.

3. Locate the POWER ON / POWER OFF selector switch on the main enclosure. Turn to "POWER OFF" position.



Note: Your press electrical lockout location may vary from the picture above; however, the process remains the same. See pg. 6 for more details.

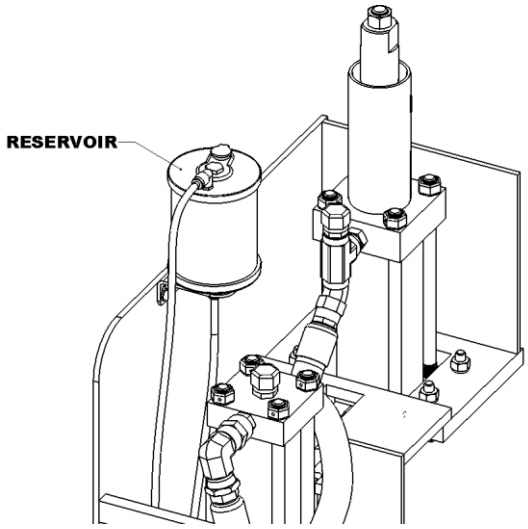
4. Locate the 3-prong electrical plug coming out of the main enclosure. Remove from power and insert the plug into an OSHA approved electrical plug lockout device. Once the plug is in the device, lock the device out with an OSHA approved padlock.

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

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 ¾ 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.



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.

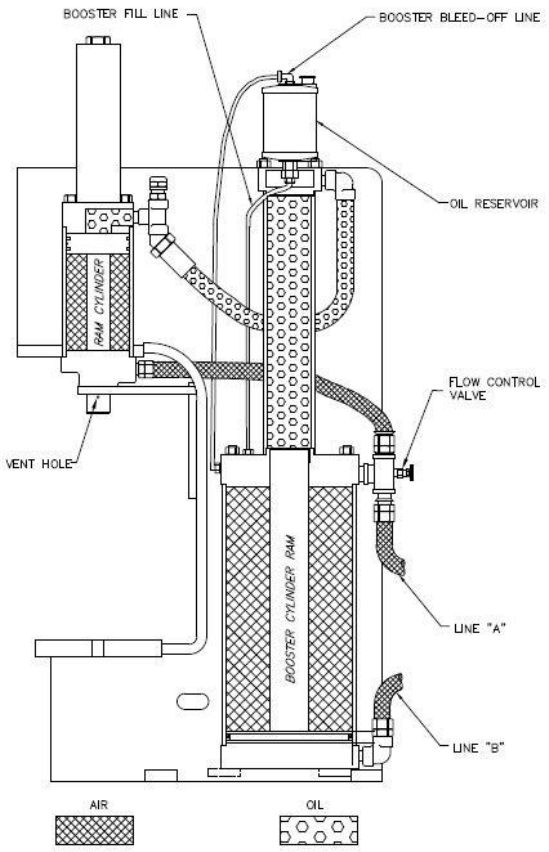
NOTICE

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. If the ram has drifted off of the home proximity switch the press will need to be returned to the home position prior to a cycle being ran.

AIR/OIL FLOW DIAGRAM HOME POSITION

1. When the press is in the home position air is on the underside of the ram cylinder piston as well as the rod side of the booster piston.

2. The oil in the booster cylinder is at rest



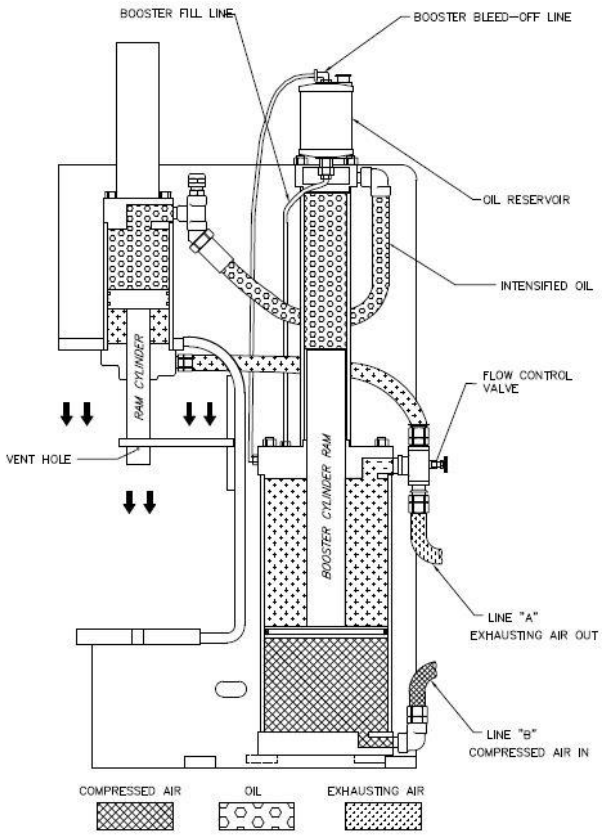
HOME POSITION

AIR/OIL FLOW DIAGRAM CYCLE IN PROGRESS

3. When the valve is energized, line "B" is filled with compressed air, causing the booster piston and ram to rise.

4. 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

5. 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.

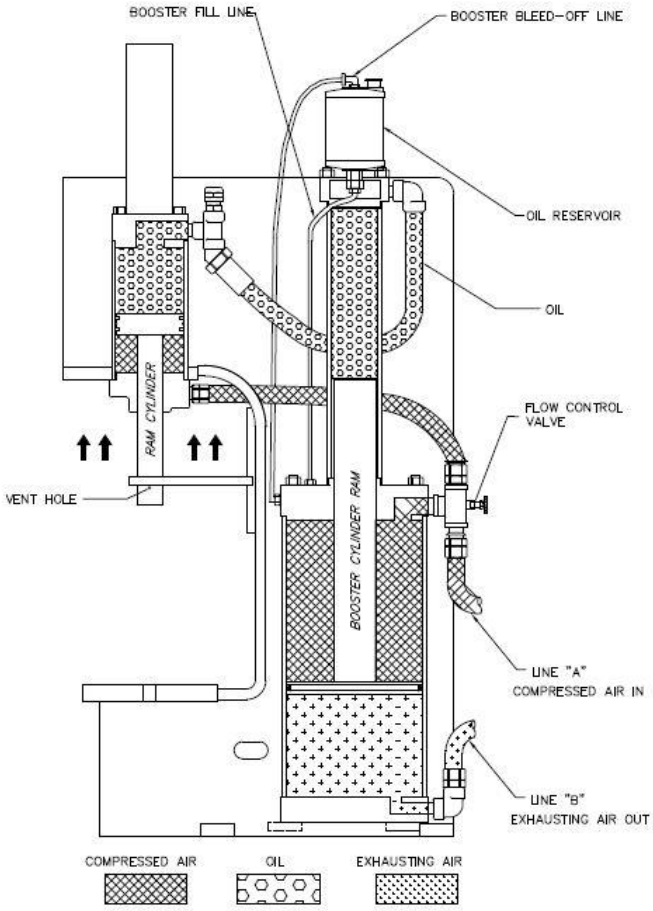


CYCLING POSITION

AIR/OIL FLOW DIAGRAM RETURNING POSITION

6. 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.

7. Oil is returning through the hose back into the oil chamber of the booster cylinder

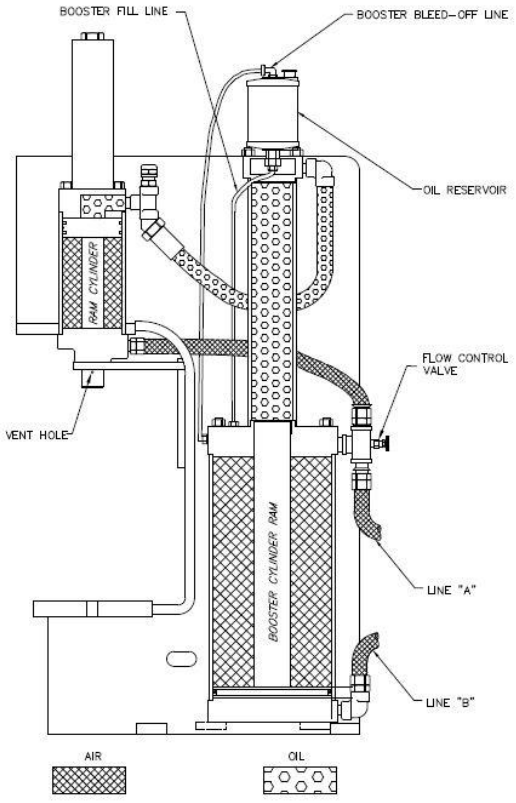


RETURNING POSITION

AIR/OIL FLOW DIAGRAM HOME POSITION

8. When the press is in the home position air is on the underside of the ram cylinder piston as well as the rod side of the booster piston.

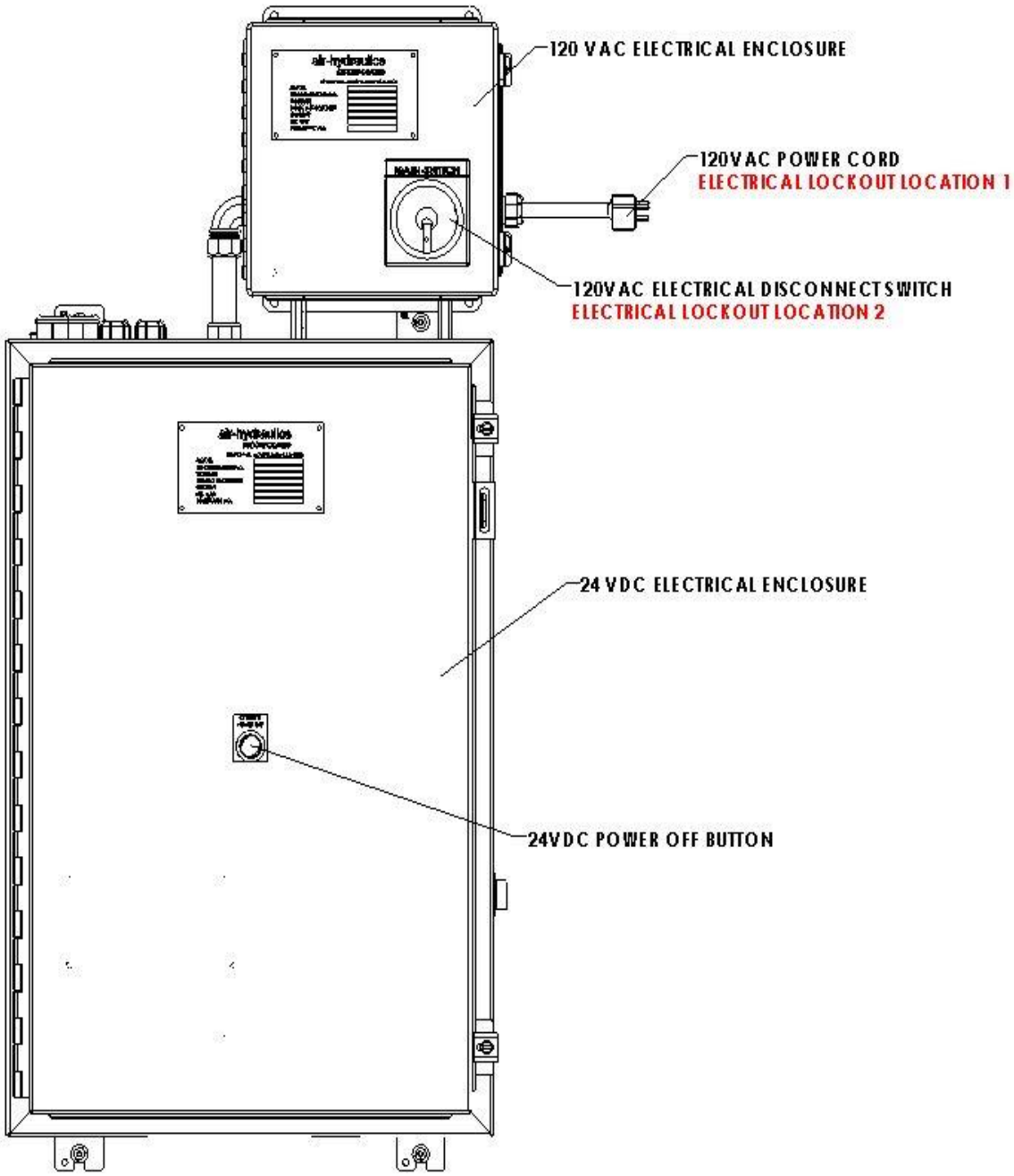
9. The oil in the booster cylinder is at rest



HOME POSITION

CONTROLS

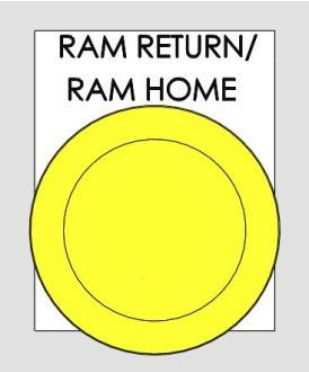
The press has 2 electrical enclosures typically located on the right hand side of the press. The smaller 10x10 enclosure located near the top of the machine with an electrical disconnect switch is powered by 110v AC. Inside this enclosure is a 24v DC power supply that provides power to the larger enclosure located below. There is a power off button located on the front left side of the press in the operator enclosure as well as the large 24v DC enclosure. These power off buttons will shut the power going to the 24v DC circuits only, as well as the sigpod. The 110v AC power can only be disconnected by unplugging the machine or utilizing the yellow and red electrical disconnect switch. FOLLOW ALL LOCKOUT/TAGOUT PROCEDURES WHEN PERFORMING ELECTRICAL MAINTENANCE ON MACHINE.



EMERGENCY STOP:

Each machine is equipped with an **EMERGENCY STOP** button. This button will cause all ram movement to cease and will disable outputs 0-7 on the PLC. This button is a detented push/pull button. After the button is pushed and the press is ready to be taken out of the emergency condition simply pull the emergency stop button and press the yellow "Ram Return/Ram Home" button to return the ram to the home position. Only take the press out of the emergency condition once all hazards and operator hands/limbs have been cleared of the press working area.

Ram Return Function:



If the ram return button is pressed at any time in the cycle the press ram will begin to retract until it is in the home position. The button will become illuminated once the home proximity switch is met via the ram guide.

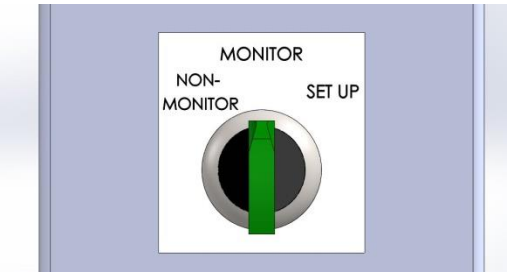
Fault Push to Acknowledge:

If the press detects a fault in the press cycle the FAULT PUSH TO ACKNOWLEDGE button will illuminate red. The press will need to be cleared of all faults prior to an operator running another press cycle. To clear a fault first see if the press is in the home position. If not return the ram and then press the illuminated button, doing so will acknowledge the fault and reset the press to a ready to cycle condition.

Air-Hydraulics Signature Analysis Press
Sequence of Operation

Modes of Operations

1. Monitoring Mode;

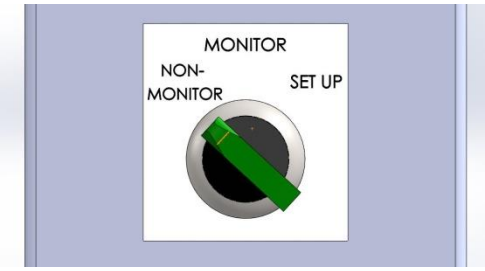


Touch buttons are pushed simultaneously by the operator; the ram extends and remains extended. Upon ram reaching pressure or the timer or dwell cycle, (adjustable) as set in the Sig-Pod device, the ram returns to the home position, ending the press cycle, even though operator continues to hold down on the palm buttons. At any time during the cycle, including the press dwell portion, if the operator lets go of one or both touch buttons, the ram immediately stops, and returns to the home position canceling the cycle. A “Fault” light and button will illuminate and before the next press cycle can commence, the Fault button will need to be pressed, acknowledging that the cycle was not properly completed and the part or assembly is suspect non-conforming.

The Sig Pod unit is controlling the return of the ram, not the pressure switch or the adjustable press dwell timer (located in the enclosure), during a normal press cycle. The pressure switch and the adjustable press dwell timer are inactive.

If the press cycle causes the Sig Pod to register a fault or FAIL a “Fault” light and button will illuminate and before the next press cycle can commence, the Fault button will need to be pressed, acknowledging that the cycle was not properly completed and the part or assembly is suspect non-conforming.

2. Non-monitoring Mode;



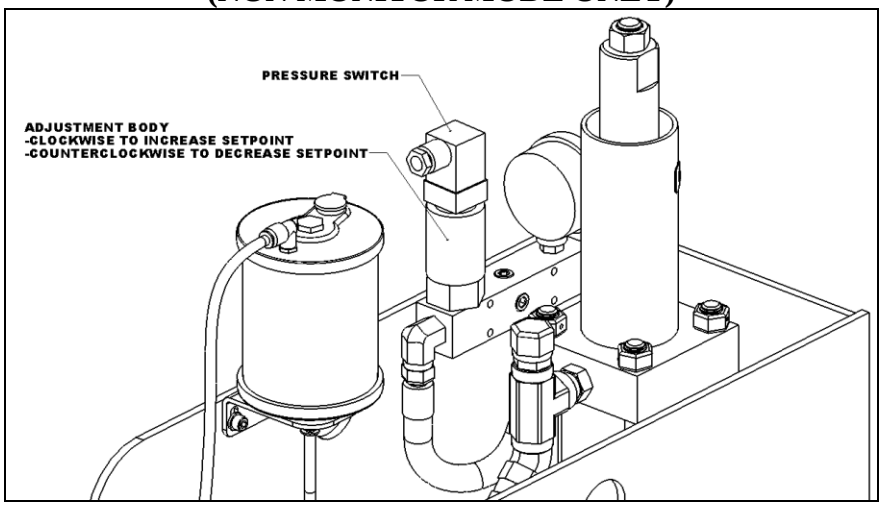
Touch buttons are pushed simultaneously by the operator; the ram extends and remains extended. Upon ram reaching pressure, the timer or dwell cycle, (adjustable, 0 - 10 seconds) is initiated. Once timed out, the ram returns to the home position, ending the press cycle, even though operator continues to hold down on the touch buttons. At any time during the cycle, including the dwell portion, if the operator lets go of one or both touch buttons, the ram immediately stops and returns to the home position canceling the cycle. A “Fault” light and button will illuminate and before the next press cycle can commence, the Fault button will need to be pressed, acknowledging that the cycle was not properly completed and the part or assembly is suspect non-conforming.

The press dwell timer is the device which signals the press control logic to return the press. The pressure switch is adjustable, and the press dwell timer can be adjusted to -0-, which would cause the press ram to operate solely on the hydraulic pressure being achieved.

3. Set-up Mode;

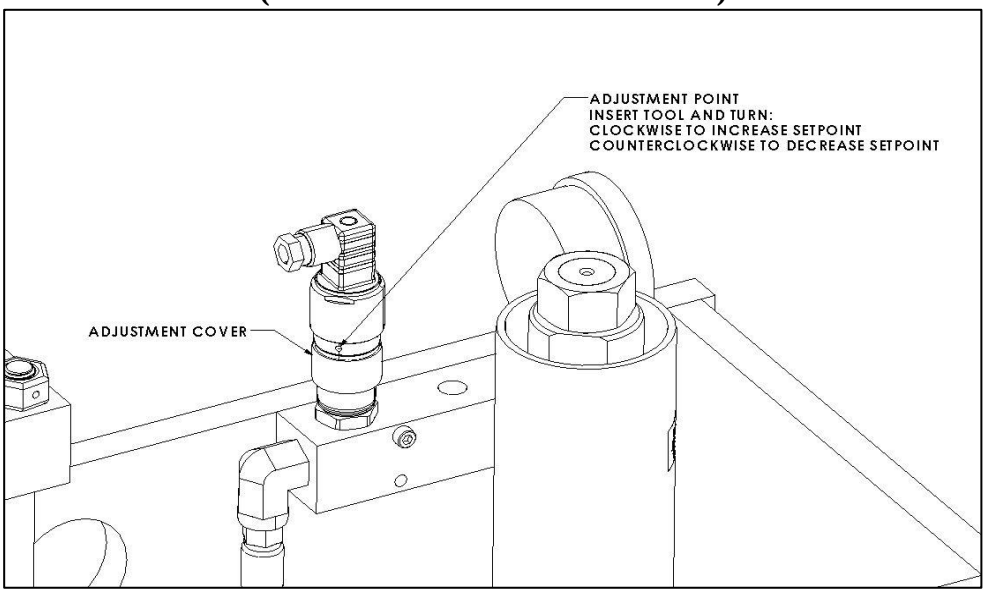
Touch buttons are pushed simultaneously by the operator; the ram extends and remains extended. At any time during the cycle, if the operator let's go of one or both touch buttons the ram stops immediately. The operator then has two choices; press both touch buttons again to continue the ram's stroke or activate the "Ram Return" button to retract the ram to the home/start position. This "jog" sequence, utilizes a (3) position, closed center, pneumatic valve, and is useful during set ups, calibrating and troubleshooting the Sig-Pod device and tooling changeovers, having the ability to stop the ram's extending motion at any point without it retracting. **The automatic ram return feature and fault monitoring are disabled during this mode of operation.**

Pressure Switch Adjustment: Models SIG-250, SIG-300, SIG-500
(NON MONITOR MODE ONLY)



1. **Turn Pressure switch adjustment body to max set point (clockwise turns). Set press dwell timer (TMR1/TR1) to minimum setting (located in electrical enclosure).**
2. **Set Air Regulator to desired PSI for application force requirements (see pg. 21 for chart)**
3. **Have one operator initiate the press cycle and hold their hands on the palm buttons until hydraulic pressure gauge stops moving**
4. **With the operators hands still activating the press cycle have another operator start to decrease the set point (Counterclockwise turns) on the pressure switch until the ram returns to the home position.**
5. **Adjust timer if needed for press ram dwell sequence**

Pressure Switch Adjustment: Model SIG-400 ONLY
(NON MONITOR MODE ONLY)

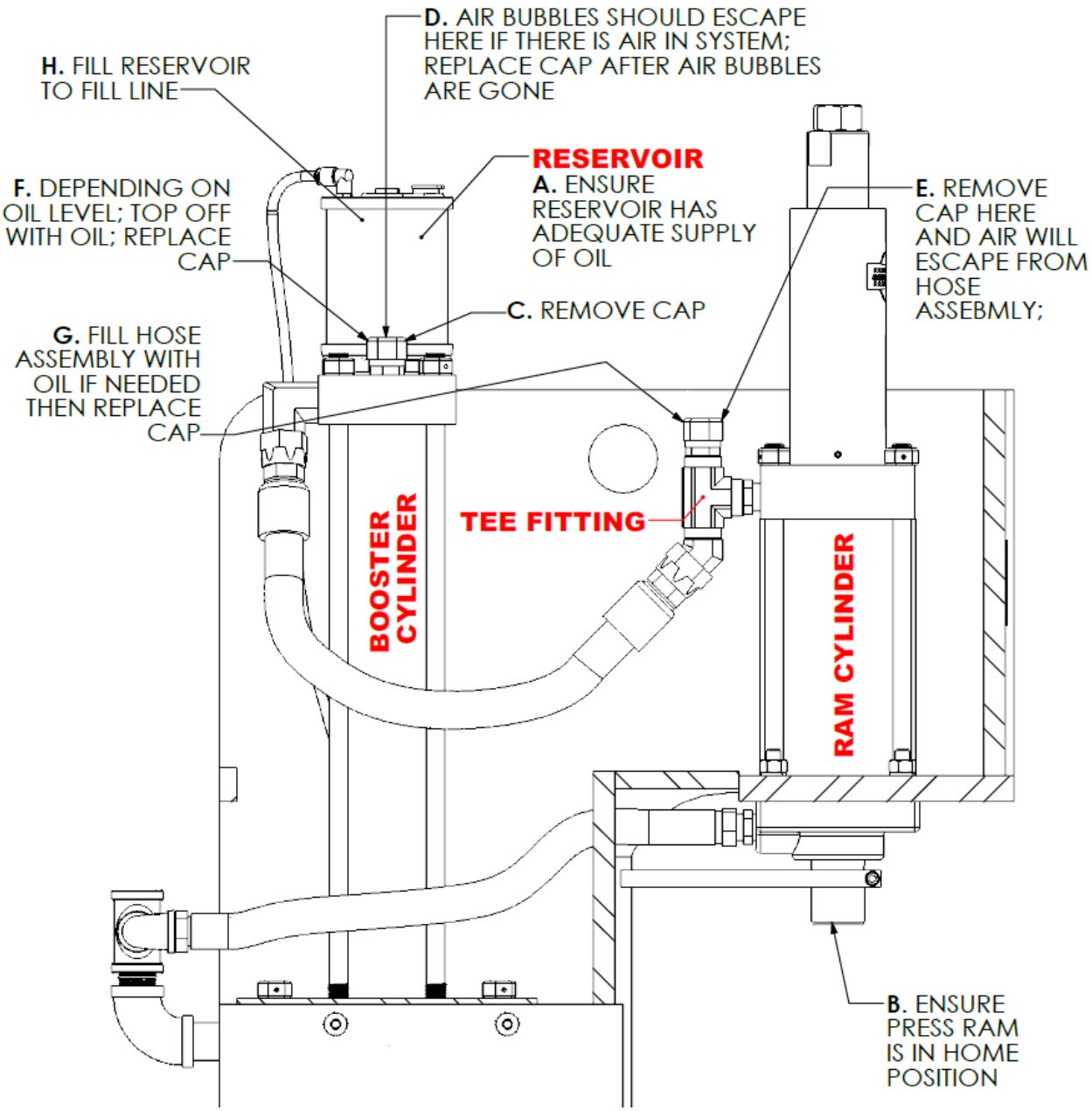


1. **Slide down adjustment cover and adjust pressure switch to max set point (clockwise turns). Set press dwell timer (TMR1/TR1) to minimum setting (located in electrical enclosure).**
2. **Set Air Regulator to desired PSI for application force requirements (see pg. 17 for chart)**
3. **Have one operator initiate the press cycle and hold their hands on the palm buttons until hydraulic pressure gauge stops moving**
4. **With the operators hands still activating the press cycle have another operator start to decrease the set point (Counterclockwise turns) on the pressure switch until the ram returns to the home position.**
5. **Adjust timer if needed for press ram dwell sequence**

Bleeding Instructions:

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; let air/oil bleed out.
d. Air Bubbles should appear if there is an air pocket in the system.
e. Remove Cap located at ram cylinder assembly to bleed air pocket in hydraulic hose
f. Fill with oil depending on level in booster; replace cap when done.
g. Fill hose with oil then replace cap
h. Fill Reservoir to marked fill line



DENOTES APPROXIMATE DIMENSIONS*

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

Air-Hydraulics Presses
Model's SIG-250, SIG-300, SIG-400 and SIG-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-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, which ever comes first

5. Oil Reservoir should be check daily and filled to proper level.

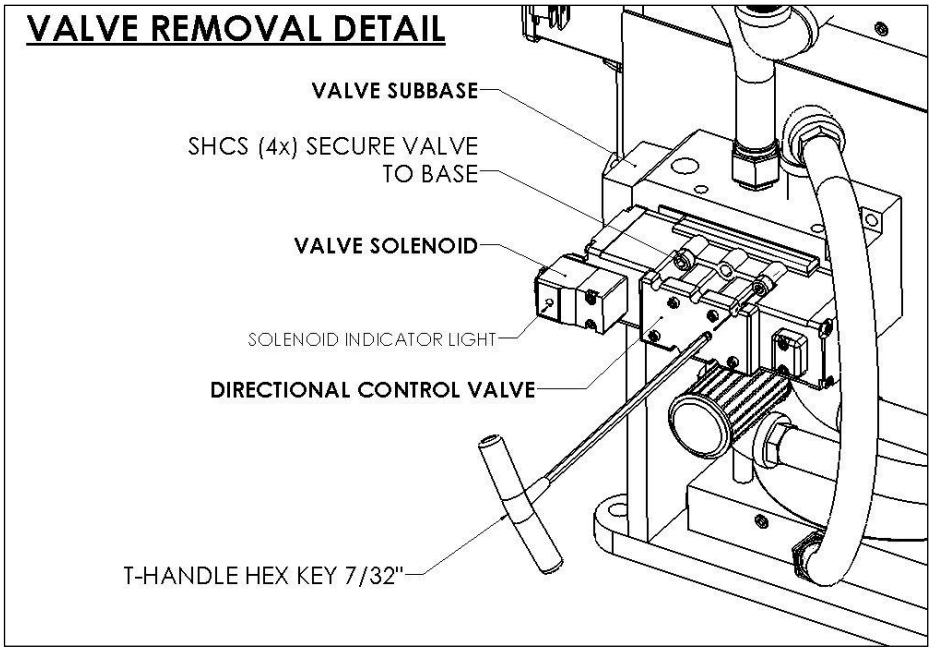
6. Check press for oil leakage at the following indicators;
    a. Bleed off hole or ram vent hole; a small 1/8” diameter hole located in the front of the machine, at the ram guide. If oil or air is coming out of this hole, this indicates that the seal needs replacing. Note, this hole can not be blocked 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!

Control Package Preventative Maintenance

With reference to the control package, very little maintenance is required, with the exception of testing on a daily basis. However, the air filter should be drained monthly and cleaned, more often if air quality is poor. The filter canister may accumulate liquid and debris which should be drained and canister itself removed to be cleaned prior to reaching the filter element itself. Instruction of how to remove the filter canister is on the filter's canister itself. Cleaning should be done with a damp rag and mineral spirits. A visual inspection should be made on a weekly basis for the obvious problems and along with lose mufflers, connectors, fasteners, bolts, etc. Lubricator should visually check prior to the start of every shift. If empty or low, it should be refilled. Lubricant should be a MOBIL DTE24 or equivalent.

At some point, the spool on the valve will wear and need to be replaced. "When," depends on several factors, quality of air and cycles. The primary indicators for replacement of the valve will be that the press will begin to lose force or the ram will not extend and in some instances return, even though the signal is being sent from the control device. Ram Drift is also a sign that the spool in the valve is not functioning properly. It is advisable to keep on hand, an extra valve if down time is critical to your production. The valve, attached to the valve base and gasket, are the only replacement components required. Replacing just the valve itself, takes less than (10) minutes. Whenever maintenance is performed on the press and it's controls, the press should be locked out from its two power supplies, the shop (compressed) air and the electricity.



NOTE: *your valve may differ from the photo represented below, but the removal process is the same. T-Handle Key changes to 3/16 when removing the SIG-500 Valve from the sub-base.*

When ordering replace parts, please include the model number and serial number of the press itself.

NOTE: On occasion, the control package will be modified or customized to fit the customer's application. If this is the case, then the operator's and maintenance instruction for these modifications will be added as an addenddum to this manual.

Testing the control package:

The press's control package and safety feature should be checked and tested daily and before each shift. **Prior to testing, be sure, fingers or hands are out of the path of the ram, tooling, fixturing or other pinch points which would be created by the extending the ram.** This can be completed by attempting to initiate the press's cycle with only one of the activator switches. If the press cycles, with only one switch activated, **DO NOT OPERATE PRESS. LOCK IT OUT**, following your factory's Machine Lockout procedures.

The second test, is performed by starting the press's cycle, with both hands when in either Monitor ON or Monitor OFF Mode. Remove one hand from one of the activator switches. The press's ram should return to the home position immediately and the fault button should illuminate. If not, **DO NOT OPERATE PRESS, LOCKOUT IT OUT**, following your factory's Machine Lockout procedures. Repeat this test, but remove or release the opposite activator switch. Again, the press's ram should return to the home position immediately. Again, if it does not, **DO NOT OPERATE PRESS, LOCKOUT IT OUT**, following your factory's Machine Lockout procedures. If any of these test fail, the control system requires immediate attention. Contact the factory. **The two hand, non-tie down control module, is not designed to be repaired once it leaves the factory. It must be returned to the factory to be evaluated, then repaired or replaced.**

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.

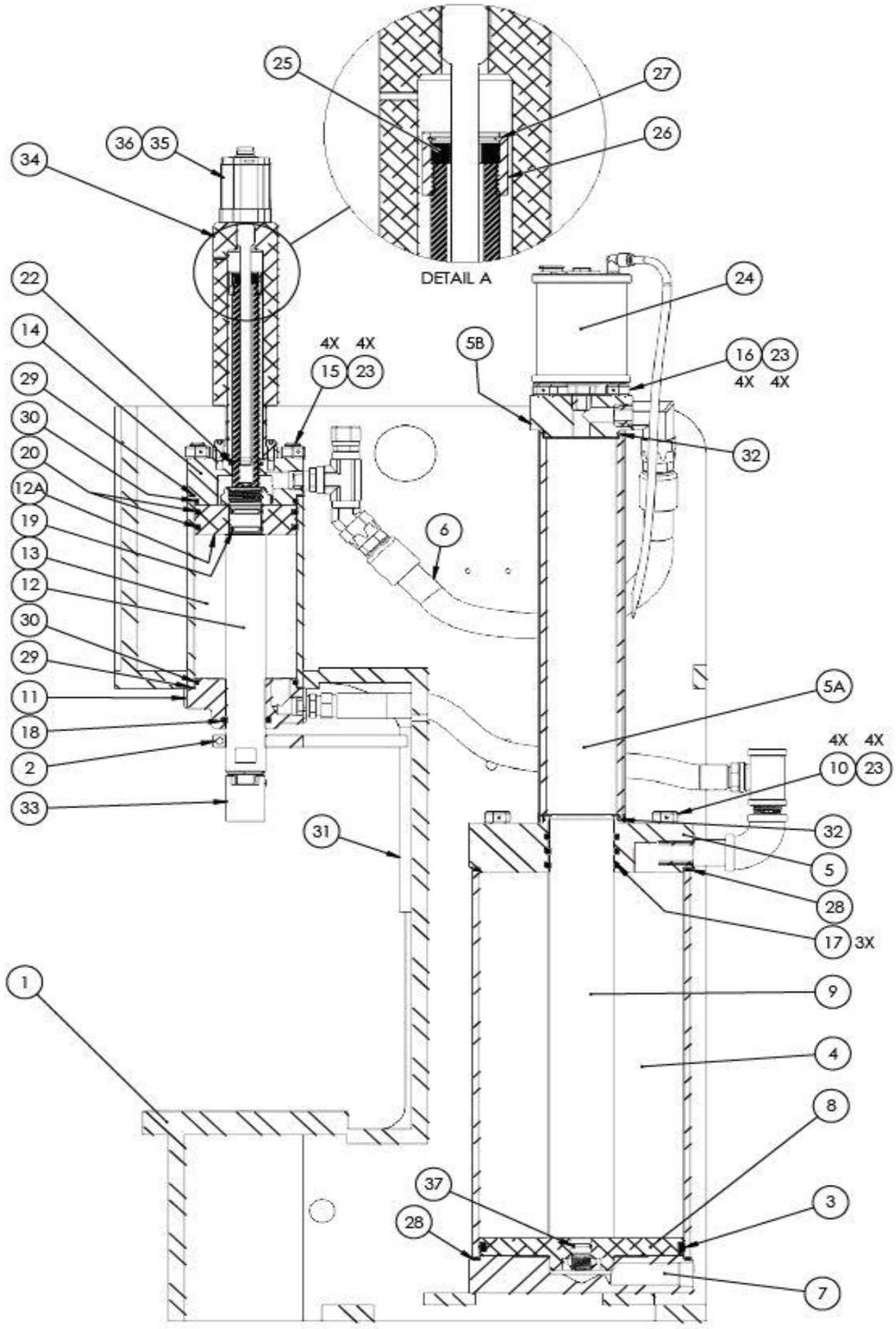
ANSWER: The problem is in your Ram Cylinder. The "U" Cup seals are installed incorrectly, damaged or worn, and/or the "O"-rings (located where the piston attaches to the ram) are in need of repair, replacement or are missing. Air is coming from the rod/bottom of the cylinder, going up through the button "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.

Det. #	Part Name	PART NUMBERS				QUANT.
		SIG-250	SIG-300	SIG-400	SIG-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	1
11	Ram Cyl. Bot. Head.	C2-11	C3-4-11	C3-4-11	C5-11	1
12	Ram	C2-LPT6	C3-LPT6	C4-LPT6	C5-LPT6	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	SIG Ram Cyl. Top Head	C2-LPT8	C4-LPT8	C4-LPT8	C4-LPT8	1
15	Ram Cyl. Tie Rods	C2-15	C3-15	C4-15	C5-15	1
16	Hyd. Cyl. Tie Rods	C2-16	C3-16	C4-16	C5-16	1
17	Air Cyl. Ram Seal	**	**	**	**	1
18	Ram Seal	**	**	**	**	1
19	Static Seal	**	**	**	**	1
20	Ram Piston Seal	**	**	**	**	1
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	Hex Nuts-Tie Rods	36509	36509	36509	36515	16
24	Oil Reservoir	RESERVOIR	RESERVOIR	RESERVOIR	RESERVOIR	1
25	LVDT Magnet	C4-LPT3	C4-LPT3	C4-LPT3	C4-LPT3	1
26	LVDT Magnet Mount	C2-LPT4	C4-LPT4	C4-LPT4	C4-LPT4	1
27	Magnet Snap Ring	C4-LPT2	C4-LPT2	C4-LPT2	C4-LPT2	1
28	Air Cyl. Gaskets	**	**	**	**	2
29	Ram Cyl. Gaskets	**	**	**	**	2
30	Ram Cyl. Tube Seal	**	**	**	**	2
31	Ram Guide Key	C1-2-3-4-31	C1-2-3-4-31	C1-2-3-4-31	C5-31	1
32	Hyd. Cyl. Seal	**	**	**	**	1
33	Loadcell (w/conditioner)	SS1122-5K	SS1122-20K	SS1122-20K	SS1122-30K	1
34	LVDT Mount	C4-LPT4	C4-LPT4	C4-LPT4	C4-LPT4	1
35	LVDT	C4-LPT1	C4-LPT1	C4-LPT1	C4-LPT1	1
36	LVDT Cable	C4-LPT9	C4-LPT9	C4-LPT9	C4-LPT9	1
37	Air Cyl. Ram O-Ring	**	**	**	**	1

****MUST BE PURCHASED AS A SEAL KIT. CONTACT FACTORY FOR PRICING & AVAILABILITY**


DETAIL A
25
27
26
36
35
34
22
14
29
30
20
12A
19
13
12
30
29
11
18
2
33
4X 4X
15 23
6
24
5B
16 23
4X 4X
32
5A
4X 4X
10 23
32
31
5
28
17 3X
1
9
4
8
37
28
3
7

ELECTRICAL SYSTEM SPARE PARTS LIST			
PART I.D.	**DESCRIPTION**	**PRESS SERIES**	**QTY**
1606XLE240EN	24 VDC Power Supply	All Models	1
440R-D23171	Non-Tiedown Module	All Models	1
AGC-1	Fuse, 1 Amp	All Models	2
AGC-3	Fuse, 3 Amp	All Models	1
AGC-10	Fuse, 10 Amp	All Models	1
201253-02-24V	CONTROL RELAY, 24 VDC, 4P	All Models	1
700S-EF440EJC	SAFETY IEC RELAY; 24VDC 4/4	All Models	3
GT5Y-2SN1D24	Adjustable Timer Relay, 24 VDC	All Models	1
ECAB-800F-X10	N.O. Contact Block	All Models	1
OTBVR81(QD)	Palm Buttons	All Models	2

POWER SYSTEM SPARE PARTS LIST			
PART I.D.	**DESCRIPTION**	**PRESS SERIES**	**QTY**
FRL-LK140-N04	Lockout Valve	SIG -250	1
FRL-LK160-N06	Lockout Valve	SIG -300/400	1
FRL-LK200-N10	Lockout Valve	SIG -500	1
FRL-F140-N04	Filter w/ Element	SIG -250	1
FRL-F160-N06	Filter w/ Element	SIG -300/400	1
FRL-F200-N10	Filter w/ Element	SIG -500	1
FRL-L140-N04	Lubricator	SIG -250	1
FRL-L160-N04	Lubricator	SIG -300/400	1
FRL-L200-N04	Lubricator	SIG -500	1
FRL-IR100-4	Precision Regulator, ½”	SIG -250	1
FRL-IR180-6G	Precision Regulator, ¾”	SIG -300/400	1
FRL-IR180-8G	Precision Regulator 1”	SIG -500	1
FRL-G070-K10	Gauge 0-160, 1/8” Npt	ALL MODELS	1
FRL-104104-F04	Flow Control Valve	SIG -250	1
FRL-104104-F06	Flow Control Valve	SIG -300/400	1
FRL-104104-F10	Flow Control Valve	SIG -500	1
PPC- H25VXXG0B9D	Valve, 4/3, 24Vdc, 1/2" NPT	SIG -250	1
PPC- H35VXXG0B9D	Valve, 4/3, 24Vdc, 3/4" NPT	SIG -300/400	1
PPC- W7077C6331W	Valve, 4/3, 24Vdc, 1" NPT	SIG-500	1
FRL-AF40P-060S	Replacement Filter Element	ALL MODELS	1
PPC-PS4041B9P	Replacement Valve Solenoid Kit	SIG -250, 300, 400	2
411B0416	Replacement Solenoid**	SIG-500	2
661K87-W	Pilot Light Kit**	SIG-500	2

****Must be ordered together as a set**

Black & Webster Assembly Equipment Division
545 Hupp Ave. · P.O. Box 831 · Jackson, Michigan 49204
Phone: (517) 787-9444 · Fax: (517) 787-7585
www.airhydraulics.com Email: info@airhydraulics.com
M-F 8:00am-5:00pm

Air-Hydraulics "C" Series Presses & "B" Series Booster and Cylinder Packages

Air Pressure vs. Press Force vs. Hydraulic Oil Pressure

Model #	C-250 / B-250		C-300 / B-300		C-400 / B-400		C-500 / 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
Intensifier's Multiplier	**50**	**7.97**	**110**	**10.23**	**200**	**18.2**	**300**	**13.63**

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.

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.