



Installation, Operation, and Maintenance Manual

Manual Hydraulic Presses 12-Ton and 25-Ton
Unheated Two and Four Post

Catalog\Model Number

Two Post Presses: 3850\Mini C, 3851\Model C, 3664\Model M (Special), 3853\Model M, 3968\12-10

Four Post Presses: 3969\12-12, 3855\25-20, 3970\30-12



For best performance, please review this manual before installing or operating this machine.



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Carver Press



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Guidelines: Hazards, Risks, And Safety

Your press is equipped with safety features to reduce the risk of hazards. These safety features must not be viewed as all-inclusive since the final installation of this press occurs at your facility under your unique working conditions. Conduct a Risk Assessment at your facility to understand and protect against potential hazards. Consult the Occupational Safety and Health Administration website (www.osha.gov) for guidance. The end user is responsible to ensure that all guarding, safety devices, etc. adequately protect personnel and comply with local and national standards. Under OSHAA's 5 (a) (1) General Duty Clause:

"(A) Each employer --

(1) shall furnish to each of his employees' employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.

(2) Shall comply with occupational safety and health standards promulgated under this Act."

The terms **NOTICE**, **CAUTION**, **WARNING**, and **DANGER** have specific meanings in this manual.

- **NOTICE** indicates a statement of company policy directly or indirectly related to the safety of personnel or protection of property.
- **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
- **WARNING** indicates a potentially hazardous situation which, if not avoided could result in death or serious injury.
- **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This word will be limited to the most serious situation(s).

The term **IMPORTANT** emphasizes areas where equipment damage could result or provides additional information to make a step or procedure easier to understand. Disregarding information marked **IMPORTANT** would not be likely to cause personal injury.

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1.1 Introduction

We are pleased to supply CARVER Laboratory Equipment for your facility. CARVER presses are used in many applications including research and development, specialized or low volume development situations, and quality testing. Thousands of presses are in use all over the world for numerous applications in the chemical, physical, biological, and mechanical fields wherever pressing is required.

1.2 Accessories

CARVER, INC. offers a variety of standard accessories for your press including Heated Platens, Heating and Cooling, or Cored Platens, Test Cylinder Outfits, French Pressure Cells, Swivel Bearing Plates, and Cage Equipment. All original **CARVER** accessories are designed and manufactured by **CARVER, INC.** These accessories ensure precise results for many applications, such as oil determination tests in food products, crushing analysis on cement core samples, molding of plastic quality control specimens, and preparing **KBr** or tracer pellets, etc.

Each accessory allows you to tailor the hydraulic press to your specific application. In addition to these standard items, we also manufacture custom presses and accessories for unique applications.

1.3 Customer Service

The intent of this manual is to familiarize the operator and maintenance personnel with this equipment and help your organization get the maximum service from your press. If you have any questions regarding installation, service, repair, custom equipment, or applications, please do not hesitate to call or write for the information required. Prices for presses, accessories, or repair parts will be furnished promptly on request.

2.1 Principal Factors that Can Result in Injury

1. Failure to center the work over the ram in the platen area, resulting in eccentric loading, tilting, and possible movement of the work piece, which can then become a projectile.
2. Failure to level the top head of the press after it has been repositioned, which can produce the same results as in Number One, above.
3. Fracture of a specimen or part of the apparatus due to overload, resulting in flying fragments.
4. Occasional squirting of liquid from a pressed specimen.

2.2 General Operating Safety

1. Management should promote safe practices and safe machine operating procedures by establishing an effective plant safety program.
2. A knowledgeable and well-trained safety coordinator should be responsible for plant safety requirements, regulations, and enforcement.
3. The safety coordinator must investigate all accidents and "close calls". The causes should be analyzed, corrective action taken accurate records maintained.
4. Establish machine safety rules and inform each employee of his responsibilities.
5. Display in prominent locations, the procedures to be followed in case of accidents. List names, addresses, and phone numbers of physicians, hospitals and personnel who are to be notified.
6. It is the employer's responsibility to provide an adequate work area around the machine that is clean, safe, and uncluttered.
7. Provide safe and convenient methods and procedures for material handling.

8. Do not allow a machine to be operated if it is poorly maintained, malfunctioning or in need of guards or safety devices that protect the operator from potential hazards.
9. Pay strict attention to all caution, warning, and danger signs.
10. Do not wear loose clothing or jewelry of any kind which could get caught in moving parts.
11. Never reach into moving parts to clear a jam of any type.

2.3 Safeguarding the Point-Of-Operation

1. It is the employer's responsibility to evaluate each machine operation and to determine and implement the best method of protecting the operator from injury at the point-of-operation.
2. Each machine application must be examined and evaluated to determine which type offers maximum operator protection for each machine application.
3. The employer should become familiar with the many and various types of safety devices available to determine which type offers maximum operator protection for each machine application.
4. Never allow machine guards or safety devices to be bypassed or removed.
5. Do not release the machine for production before installing and testing all protective guards, covers and safety devices.
6. Evaluate all point-of-operation guards, safety devices and work procedures frequently while the machine is in operation. Immediately correct any unsafe condition.

2.4 Supervision and Safety Enforcement

1. All levels of management must enforce every safety rule and regulation. To make machine safety effective, every violation should be reported, recorded and result in appropriate disciplinary action.
2. Never allow any operator, regardless of his experience, to start a new job assignment without a complete and detailed explanation of the job and the safe procedures to be followed.
3. It is the supervisor's responsibility to maintain absolute authority over the machine controls. The actuation of the main disconnect switch, mode selector switch and other keyed switches should always be under his supervision. The keys should always be removed and in the supervisor's possession to prevent unauthorized use or adjustment of the machine.
4. Conduct frequent inspections of the machine operations. Be sure the operator and helpers are using proper safety devices and are working safely.
5. Never allow machine guards or safety devices to be removed, altered, or bypassed.
6. Never allow untrained personnel to operate the machine.
7. Never allow personnel who are under the influence of drugs or alcohol, or otherwise not physically or mentally alert, to operate the machine.
8. Never allow minors to operate or assist in the operation of a machine.
9. Be alert to unsafe machine or operating conditions. A poorly maintained machine or a machine that is malfunctioning should be shut down until the unsafe condition has been corrected.

2.5 Inspection and Maintenance

1. To maintain a high level of machine reliability and to obtain advance warning of any possible hazards or malfunctions, a daily, weekly, and monthly program of machine inspection and preventive maintenance should be established.
2. A check list should be used, and records maintained of all maintenance and repair work performed.
3. Only highly qualified, competent personnel should be assigned this job of inspection and maintaining the machine. They should be specifically instructed and have thorough understanding of the controls and the operating and maintenance procedures outlined in this manual.

4. Establish and follow a safe shutdown procedure for machine inspection.
5. To ensure optimum performance and safe operating condition of the machine, careful inspections of the electrical and hydraulic systems should be made.
6. Auxiliary equipment and safeguards must be inspected and maintained in safe operating condition.
7. Releasing the machine for production after inspection and maintenance should be the responsibility of qualified personnel assigned by management.
8. Never perform maintenance or repair work until you are sure the power is turned off at the main control panel and cannot be turned back on without your knowledge. Use a padlock or other safe lockout device.

2.6 Training

1. All personnel who will be associated with the operation of the machine must read and have complete understanding of the contents of this manual.
2. Management must assume the responsibility of training all personnel associated with machine operation to eliminate accidents and injuries.
3. Only employees who understand and can communicate their knowledge of the machine, its operation, its dies, and safety requirements, should be assigned the responsibility of training.
4. A supervisor must be knowledgeable in machine operation, machine guarding, safety guidelines, operator supervision, job instructions, and causes of accidents. He is also responsible for promoting safe working habits and attitudes of machine operators.
5. An operator-training program should include specific instructions in safety, safety devices, guarding, proper use of the machine and correct procedures in performing every machine job.
6. No operator should be given a machine assignment that they do not fully understand.
7. Only thoroughly trained and responsible personnel should be allowed to operate or work on the machine.

WARNING:	BEFORE OPERATING THE MACHINE Be sure that all personnel in your company who will have contact with hydraulic machine equipment thoroughly read and understand this installation and Operation manual.
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2.7 Reporting a Safety Defect

NOTICE:	If you believe that your equipment has a defect, which could cause injury, you should immediately discontinue its use and inform CARVER, INC. , at our address listed in this manual.
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3.1 Two Post Press Description

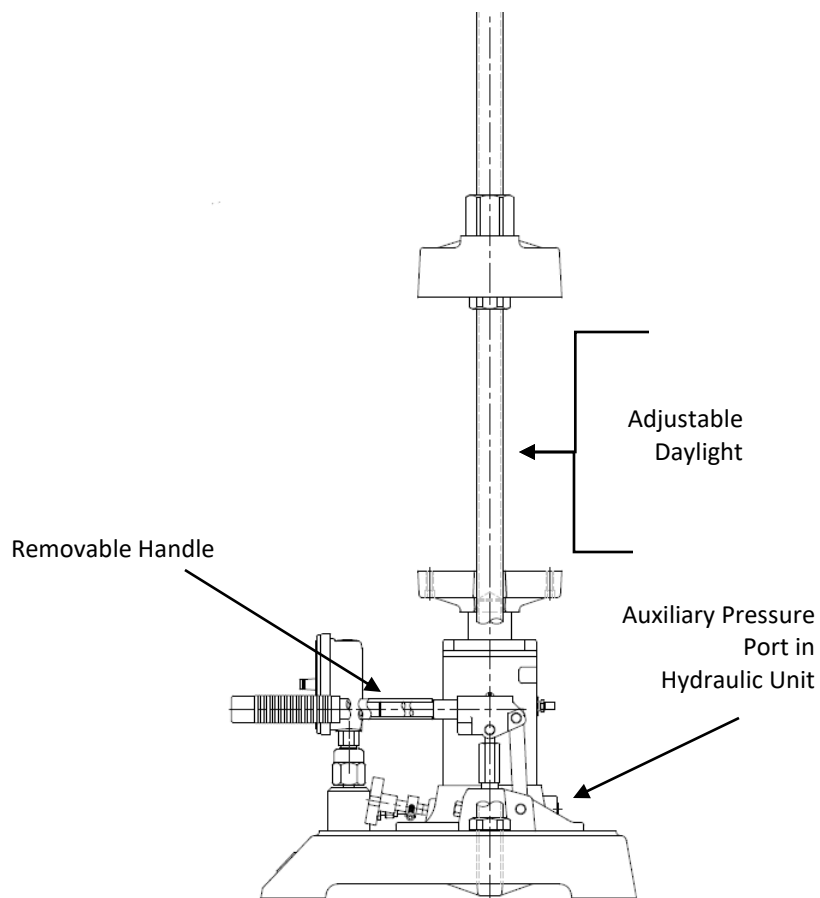
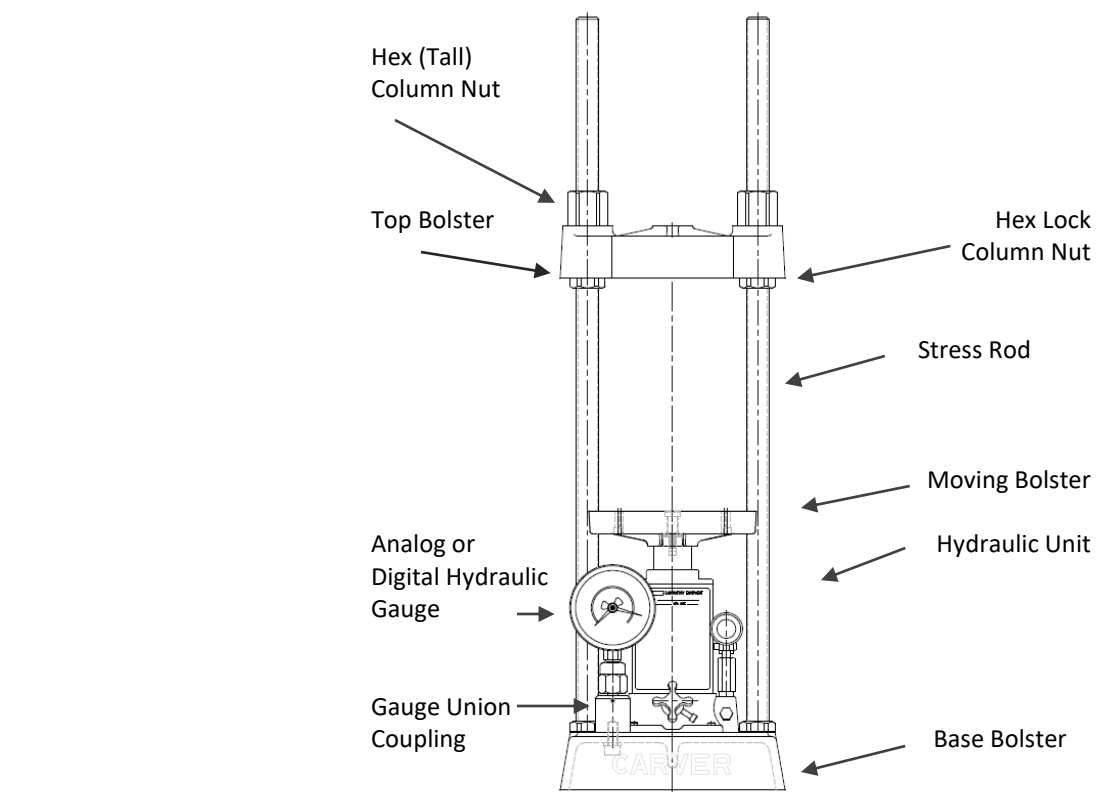
TABLE 3-1 UNHEATED PRESSES WITH SAFETY SHIELD

CATALOG#	3850	3851	3664	3853	3968
MODEL	MINI C	MODEL C	M (Special)	MODEL M	12-10
CLAMP FORCE	12 US Tons 24,000 Pounds 11 Metric Tons	12 US Tons 24,000 Pounds 11 Metric Tons	25 US Tons 50,000 Pounds 22.5 Metric Tons	25 US Tons 50,000 Pounds 22.5 Metric Tons	12 US Tons 24,000 Pounds 11 Metric Tons
WORK AREA (In)	6 x 6	6 x 6	9 x 9	9 x 9	10 x 7
RAM STROKE (In)	5.1	5.1	6.5	6.5	5.1
RAM DIAMETER (In)	2.047	2.047	2.56	2.56	2.047
RAM AREA (In ²)	3.29	3.29	5.15	5.15	3.29
DAYLIGHT OPENING (In)	.75-7	.75-18	¾ - 11 ¼	.75-16	1-16
WIDTH x DEPTH (In)	12 x 15	16 x 15	14.5 x 18 ¾	18 x 23	17 x 18
HEIGHT (In)	25	39		42	39
WEIGHT - Unheated (Pounds)	135	200	315	350	420

3.2 Four Post Press Description

TABLE 3-3 UNHEATED PRESSES WITH SAFETY SHIELD

CATALOG	3969	3855	3970
MODEL	12-12	25-12	30-12
CLAMP FORCE	12 US Tons 24,000 Pounds 11 Metric Tons	25 US Tons 50,000 Pounds 22.5 Metric Tons	30 US Tons 60,000 Pounds 27 Metric Tons
WORK AREA (In)	12 x 12	12 x 12	12 x 12
RAM STROKE (In)	5.1	6.5	6
RAM DIAMETER (In)	2.047	2.56	3.00
RAM AREA (In ²)	3.29	5.15	7.07
DAYLIGHT OPENING (In)	1-15	1-14	1-17
WIDTH x DEPTH (In)	21 x 28	21 x 28	24 x 28
HEIGHT (In)	41	42	45
WEIGHT-Unheated (pounds)	585	600	625



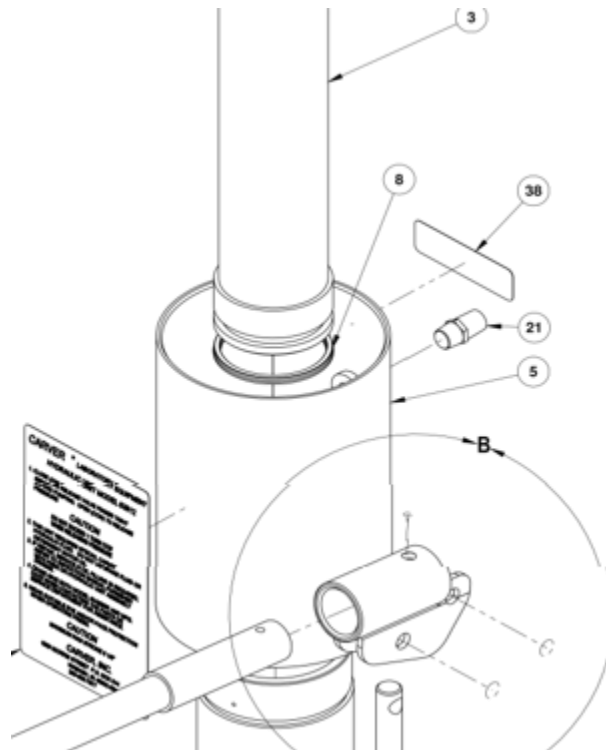
3.3 Setting Up

This equipment is top heavy. This equipment must be secured to a stable foundation before operating.

Installation Summary:

1. Bolt press to bench.
2. Rotate gauge and tighten coupling.
3. Remove plug in jack and replace with sintered breather. (Part number 21 shown in the drawing snip. Located on the back side of the hydraulic reservoir).

IMPORTANT: DO NOT operate the hydraulic unit with the solid shipping plug in the oil fill hole or damage to the hydraulic unit may occur.

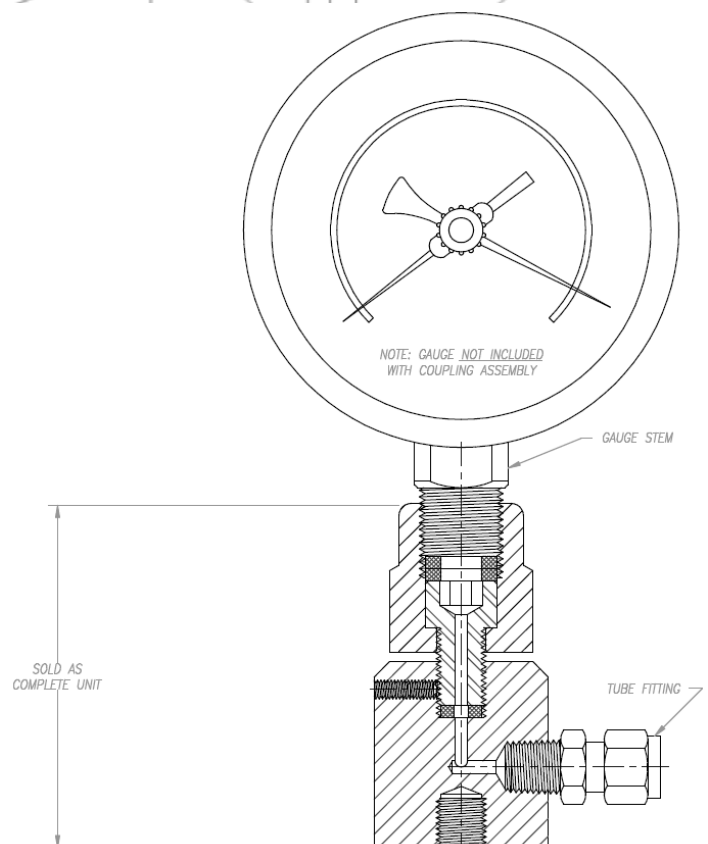


3.4 Adjusting Gauge to Operating Position

The coupling swivel must be held stationary while only the gauge is rotated counterclockwise to loosen the assembly. Allowing any rotation of the coupling swivel during loosening will result in a leak between the coupling swivel and coupling base. Should a leak occur refer to the troubleshooting section in the maintenance chapter for the corrective action.

This **CARVER** press features a gauge union coupling for quick and easy alignment and interchangeability. While holding the coupling swivel to keep it from turning, turn the gauge into the coupling swivel until finger tight and position it for easy viewing by the operator. Hold the gauge in this position with a 7/8" open-end wrench on the stem directly under the gauge case, and using a second wrench, turn the coupling swivel counterclockwise until tight. If leakage occurs after tightening the gauge into the union-coupling swivel, an additional seal may be required. (Reference drawing 110478B).

IMPORTANT: DO NOT use more than two (2) seals at one time.



Drawing 110478B (Extract)

IMPORTANT: Loosening the Gauge

It is very important to hold the coupling swivel stationary and turn only the gauge stem counterclockwise to loosen or remove the gauge.

IMPORTANT: Tightening the gauge

Tighten the gauge coupling by holding the gauge stem stationary and turning the gauge swivel counterclockwise until it is tight.

3.5 Ram Force Calculation

All **CARVER** gauges are calibrated for the specific ram diameter of the hydraulic unit. The Mini "C" and Model "C" 12-ton ram is 3.294 square inches, and the Model "M" 25-ton ram area is 5.157 square inches. The standard gauge readings display the load, or force, in pounds as well as metric tons applied between the platen and head of the press. All calibrations show the load in pounds-force applied by the press to the material being pressed. For example: a 10,000 lb. load applied to material having an area of one square inch would be equal to a pressure of 10,000 lbs. per square inch applied to the material. Or, if the material being pressed has an area of four-square inches a 10,000 lbs. applied load would be equal to 2,500 lb. per square inch on the material.

Check press description charts for correct Ram Diameter and Ram Area.

EXAMPLE: $\frac{10,000 \text{ lbs. force (44480 Newtons)}}{4 \text{ square inches (258.08 square mm)}} = 2,500 \text{ PSI (172.35 bar)}$

CARVER gauges are highly sensitive, precision instruments. Care should be taken to avoid sudden decompression, shock loading, over-pressurization, etc., which will result in damage to the gauge and void the warranty.

A variety of standard gauges are available with different calibrated ranges. The standard gauge provided with your press is calibrated for full press tonnage. If an additional gauge is required, for a lower operating range, a **CARVER** Two-Gauge Manifold will permit simultaneous mounting of two separate gauges.

3.6 Filling The Oil Reservoir

The hydraulic unit is filled with oil at **CARVER, INC.** and should not require additional oil. In the event there is some oil loss, lower the platen, remove the sintered breather plug, and fill with oil to the level of the filler hole. Only special **CARVER # 2170** Hydraulic Fluid, or a brand name filtered **HYDRAULIC JACK OIL**, should be used. Refer to Section 6 for recommended substitutes.

IMPORTANT: Brake fluid and similar products may damage your unit and will void the **warranty**.

SECTION FOUR

OPERATION

4.1 Operator Safety

1. A press safety shield is standard equipment and is required by **CARVER** for safe operation of your press.
-  2. The operator should wear safety glasses or a face shield when performing operations under high load conditions to prevent eye or face injury should a test specimen burst and scatter.
3. When using caustic or acid test specimens, a face shield, apron, and rubber gloves should be used for the protection of the operator.
4. The testing apparatus or test specimen must be centered, both front to back and left to right on the press bolster. This will prevent tilting of the bolster and possible ejection of the work piece under pressure. Always avoid uneven loading of the press components. Locator plates are available from **CARVER, INC.**
5. **CARVER, INC.** recommends bolting the press to a worktable whenever possible.

WARNING: The use of an extension handle longer than provided with the standard press may cause the press to be unstable, and may cause an "over pressure" condition, resulting in damage to the hydraulic unit.

6. Always check the pressure rating of the apparatus to be pressed prior to pressing; to be sure it is rated for the applied pressure.
7. To protect against squirting fluid, the apparatus may be placed inside a can or wrapped in a cloth. The best protection is the CARVER safety shield, which has steel sides and a clear polycarbonate door.

IMPORTANT: The gauge on the CARVER laboratory press shows the total force exerted by the press. It DOES NOT show the pressure (PSI) on the specimen. To find the PRESSURE (P) on the specimen, the observed FORCE (F) reading on the gauge must be divided by the specimen AREA (A), per the equation $P=F/A$. When using a CARVER test cylinder outfit, use the ID measurement to find the actual AREA (A) of the specimen.

4.2 Safety Guidelines for Operators

This section of the manual is directed to all personnel who are associated with the operation of CARVER INC. Presses. Whether you have years of experience working with presses or whether you are new on the job, this section is for your benefit. General and specific safety guidelines and caution notes are included here and throughout the manual for your protection and to help you avoid injury to yourself and to your co-workers. Since it would be impossible to cover every situation that could arise, the following list of points is not intended to be complete, nor does the order in which they are listed relate to their importance. It is your responsibility to immediately report any unsafe condition or unusual machine performance to your supervisor.

4.3 Before Starting Machine

1. Never operate the machine until you have read and fully understand the safety, control description and operating sections in this manual.
2. Inspect the machine before each shift for loose, worn, or broken parts. Report any unsafe conditions to your supervisor immediately and do not operate the machine until the necessary repairs are made.
3. An important part of machine safety is good preventive maintenance. Keep your machine clean and in good condition by cleaning daily.
4. Clean your work area frequently. Keep it uncluttered and free of loose tools, discarded work pieces, rags, wires, oil, grease, water, or anything that can inhibit your movement or cause you to trip or fall.
5. Be sure machine safety shield and other safety devices are correctly installed in their proper position.
6. It is your employer's responsibility to evaluate each machine operation and to determine and implement the best method of protecting you from injury at the point-of-operation in accordance with current federal, state, and local codes and standards.
7. Never attempt to bypass or remove any point-of-operation guard or safety device on your machine.
8. Be alert for possible hazards or safety irregularities that could cause injury.

4.4 Machine Operation

1. Pay attention to the warning and caution signs on the machine.
2. Do not reach around, under or over any safety shields or guards.
3. Never bypass, remove, or alter any machine safety shields, guards or other safety devices.
4. Never stack parts or other objects on the bolsters or platens. Use part containers and scrap bins of sufficient size to accommodate the job.

5. Use care and judgment in the work you are doing. Take the time to evaluate the operation - **Is it safe? Are you working a safe procedure?**
6. Always stay alert. Do not become overconfident and careless. Avoid inattention, pre-occupation, and distractions.
7. If you leave the machine for any length of time, always check to make sure the set-up parameters are as you left them before restarting the machine.
8. Know who or where to call for immediate help in the event of any emergency or injury.
9. Have all injuries treated, no matter how small.

4.5 Operating the Hydraulic Press

NOTICE: If your press is equipped with the Digital Gauge option, the gauge must be powered up before it will display the applied force. To power up or “turn on” the digital gauge press the “ON” button for one second. For other Digital Gauge options refer to the PG-7 operator’s manual included with the press.

1. Rotate the release valve knob clockwise until it is hand tight.
2. Close the press by pumping the handle of the hydraulic unit. Please keep in mind that no hydraulic unit will maintain constant pressure without some additional pumping. This is especially true when pressing against a soft or yielding material. Some pumping is required to offset normal packing leakage. After the desired pressure is obtained, an occasional stroke or two will normally maintain the pressure.
3. To open the press, rotate the release valve counterclockwise approximately one-half turn. The release valve stop should allow for less than one full rotation.

IMPORTANT: DO NOT rotate the release valve more than one full turn in the counterclockwise direction. (Release valve stop screw will contact Jack base at the full open position).

4.6 Daylight Adjustment

Threaded columns allow for daylight adjustment between the moving bolster and top bolster.

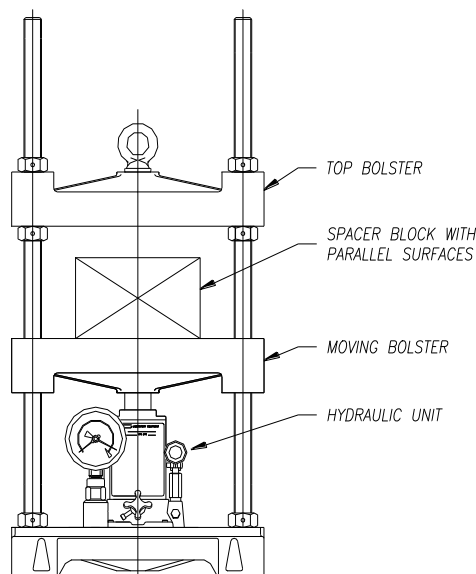


FIGURE 4-1

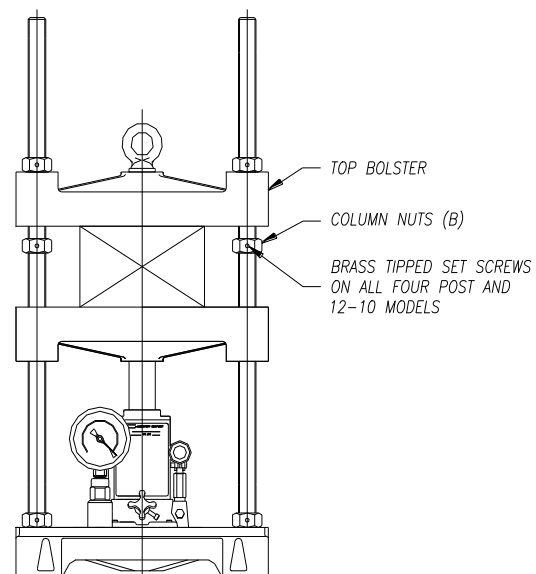


FIGURE 4-2

To Raise the Top (Head) Bolster:

1. Insert a spacer block with parallel surfaces between the moving bolster and top bolster (spacer must be tall enough to build force on the spacer), pump the hydraulic unit to build force to the maximum capacity of the press (FIG 4-1).
2. With the press at maximum applied force, loosen the column nuts (B) located directly below the top bolster. (FIG 4-2) On Four Post and Model 12-10 presses, a brass tipped set screw must be loosened on each nut before nuts are loosened.

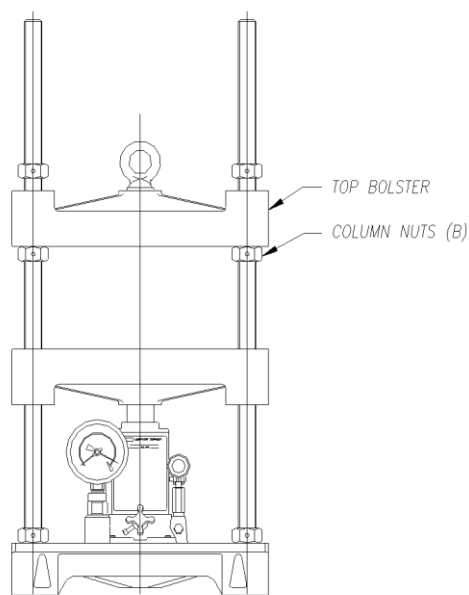


FIGURE 4-3

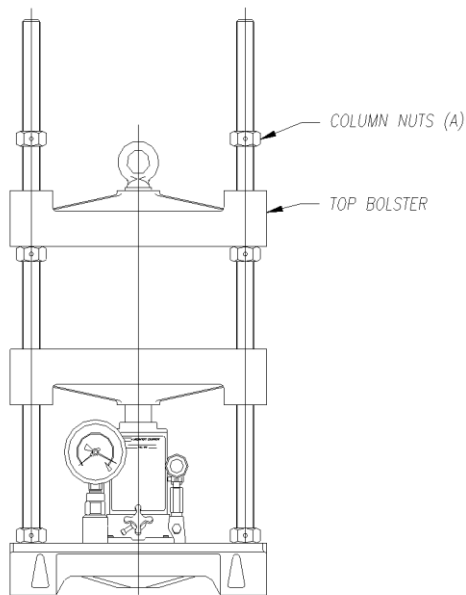


FIGURE 4-4

3. Release hydraulic force and remove the spacer, allowing the top bolster to rest on the lower column nuts (B) (FIG 4-3).
4. Move the upper column nuts (A) to the position required creating the desired daylight (FIG 4-4).
5. Insert the spacer block on the moving bolster and raise the top bolster against the upper column nuts (A) (FIG 4-5) and tighten the lower column nuts (B) (Fig 4-6) finger tight against the bottom of the top bolster.

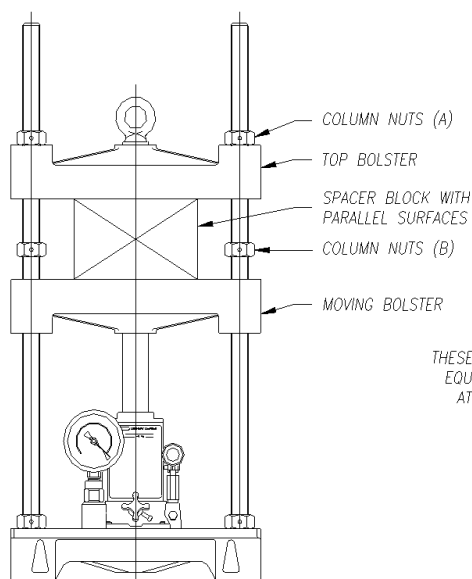


FIGURE 4-5

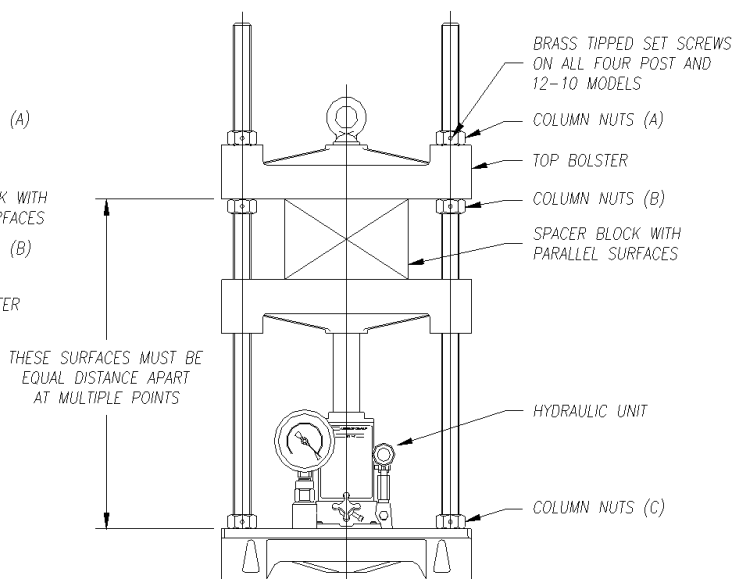


FIGURE 4-6

6. Measure and equalize the distance from the bottom surface of the top bolster to the top surface of the base bolster at two points (four points on Four Post presses) as far apart as possible (FIG 4-6). Adjust the lower column nuts (B) as needed to insure parallelism between the top bolster and base bolster. Turn the upper column nuts (A) finger tight against the top bolster.
7. Pump the hydraulic unit to build force to the maximum capacity of the press.
8. Tighten the lower column nuts (B) against the bottom surface of the top bolster as tight as possible.
9. Retighten the column nuts (C) on top of the base bolster.
10. Tighten brass tipped set screws in nuts (if your press is a Four Post, or model 12-10). Open press and remove spacer, the press is now ready to operate.

To Lower the Top (Head) Bolster:

1. Insert a spacer block with parallel surfaces between the moving bolster and top bolster (spacer must be tall enough to build force on the spacer) (FIG 4-1), pump the hydraulic unit to build force to the maximum capacity of the press (FIG 4-2).
2. With the press at maximum applied force, loosen the column nuts (B) located directly below the top bolster. Move these column nuts (B) to the position required creating the desired daylight. On Four Post and model 12-10 presses, a brass tipped set screw must be loosened on each nut before nuts are loosened.
3. Release hydraulic force and remove the spacer allowing the top bolster to rest on the lower column nuts (B) (FIG 4-3).
4. Tighten the upper column nuts (A) finger tight against the top surface of the top bolster.
5. Follow steps 6 thru 10 as described above.

IMPORTANT:	Four Post Models utilize a set screw in the column nuts. These must be loosened prior to adjusting daylight and retightened after adjusting daylight.
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WARNING:	After adjusting the daylight, be sure the top bolster is parallel to the top surface of the base bolster before applying pressure.
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WARNING:	Spacer block must be centered on moving bolster both left to right and front to back. Be certain that spacer is strong enough to withstand maximum applied force of press and that its area is great enough to prevent coining the bolster surface.
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IMPORTANT:	In all cases, size the spacer block so that maximum stroke of the hydraulic unit is not exceeded. For Model "C" and Mini "C" 12-Ton Presses, the maximum stroke is 5.1". for the Model "M" 25-Ton Press, the maximum stroke is 6.5".
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5.1 Maintenance Introduction

Every **CARVER** Laboratory Press is thoroughly tested to provide trouble-free performance. Manufacturing and assembly processes are closely controlled in our factory under rigid inspection and testing procedures. Follow these instructions, and with proper care, your press should give many years of trouble-free service.

5.2 Troubleshooting

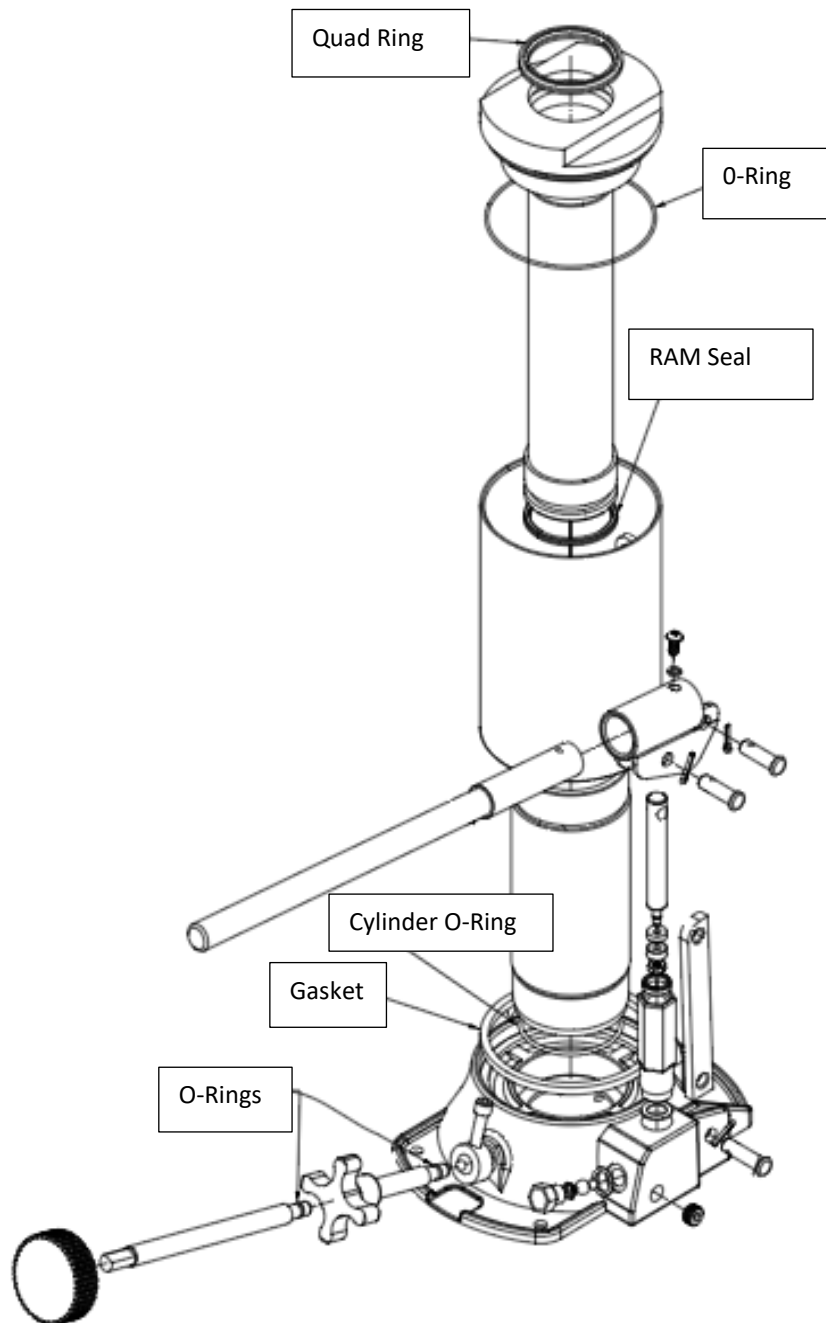
To maintain constant pressure, the hydraulic unit may require occasional pumping, especially when pressing against a soft or yielding material. If the pressure drops slowly as shown on the gauge, it should be considered normal. If you are experiencing problems with the operation of your hydraulic unit, refer to Tables 5-1 and drawing 110479B (in the appendix).

TABLE 5-1 TROUBLESHOOTING 12- & 25-TON HYDRAULIC UNITS

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Rapid drop in pressure	a) Low oil level due to leakage. b) Open release valve. c) Worn or dislodged internal packing. d) Dirty valve seat	a) Tighten hydraulic connections & fill with oil. b) Close release valve. c) Replace packing or seals where necessary. d) Remove release valve & clean valve seat. Hydraulic unit may require flushing with solvent, such as agitene.
No pressure when pumping	a) Open release valve. b) Worn packing in pump. c) Release valve ball missing. d) Release valve contaminated. e) Air entrapment.	a) Close release valve. b) Replace or rebuild hydraulic unit pump. c) Replace ball. d) Remove and clean. e) Purge air from system (see Air Bleed Procedure in Section 5).
Slow drop in pressure	a) Open release valve b) Worn release valve seat. c) Worn ram seal	a) Close release valve. b) Contact factory for replacement. c) Replace ram seal.
Ram will not retract	a) Defective ram seal	a) Install rebuild kit
Oil leakage in gauge coupling	a) Loose gauge fitting. b) Gauge not sealing.	a) Tighten gauge fitting. b) Add copper gauge seal (maximum of two)

NOTICE: location of seals, packing, and gaskets in the 12- & 25-ton hydraulic units. These drawings are included separately with this manual.

Drawing to show location of the seals and gaskets.



5.3 Pressure Loss

All hydraulic systems will lose some pressure and will require additional pumping to maintain pressure for extended periods of time.

PRESSURE LOSS DUE TO YIELDING MATERIAL

There are other factors that can affect the pressure holding capacity of your press such as yielding material. If you are pelletizing powders, extracting fluids, or using a heated process to melt or laminate plastics, the pressure will drop off because the pressure and or temperature is causing the material to yield.

In this type of process, it will be necessary to pump the hydraulic unit frequently at first, then occasionally to maintain a constant pressure on your process. If you suspect a problem in the hydraulic unit is causing pressure loss remove the molds and product and close the press with nothing in the daylight or use a metal spacer with parallel surfaces if the daylight is set larger than the ram stroke.

The pressure loss at mid-scale on the gauge should not exceed 800 lbs. in 10 minutes and at full scale the pressure loss should not exceed 600 lbs. in 20 minutes. If your hydraulic unit loses pressure faster than the specifications listed above, you will need to rebuild or replace your hydraulic unit. (See section 5.7 Rebuilding the Hydraulic Unit).

PRESSURE LOSS DUE TO LEAKS AROUND TUBE FITTINGS

Consult the Carver Service Department.

PRESSURE LOSS DUE TO LEAKING AT THE GAUGE UNION COUPLING

Refer to drawing 110478B, located in the appendix.

An external leak in the gauge equipment will cause significant pressure loss and must be corrected before the unit will build or hold pressure.

The most common problem encountered with the gauge coupling results from improper procedures when loosening the gauge. It is very important to hold the coupling swivel stationary and turn only the gauge counterclockwise to loosen or remove the gauge.

If the coupling swivel can turn, usually the socket head cap screw will loosen resulting in a leak between the coupling swivel and the coupling base. To correct this problem, you will need to loosen and remove the gauge from the coupling swivel then remove the copper washers from inside the coupling swivel.

After the washers are removed, you will see the top of the socket head cap screw. Before turning the socket head cap screw, you must loosen the socket set screw (inside the small hole on the side of the coupling base) or the socket head cap screw and the coupling base will be damaged.

After loosening the socket set screw, gauge coupling by holding the gauge stationary and turning the gauge swivel counterclockwise until it is tight.

If the gauge coupling leaks between the gauge and coupling swivel you may need to add a second copper washer. (A maximum of two washers can be used). Using thread sealant is not recommended because the threads on the gauge stem are a straight thread not standard tapered pipe thread and are not designed to create a seal. Tighten the socket head cap screw as tight as you can get it by hand using a hex Allen wrench, and then retighten the socket set screw.

Reinstall the washer or washers in the gauge socket and thread the gauge in by hand stopping with the gauge aligned in the proper position for operating the press.

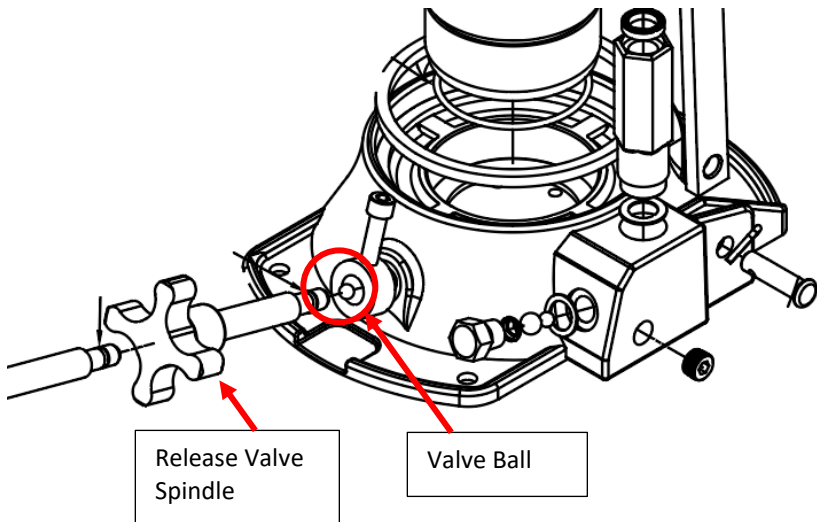
Reinstall the washer or washers in the gauge socket and thread the gauge in by hand stopping with the gauge aligned in the proper position for operating the press. Then tighten the gauge coupling by holding the gauge stationary and turning the gauge swivel counterclockwise until it is tight.

If the gauge coupling leaks between the gauge and coupling swivel you may need to add a second copper washer. (a maximum of two washers can be used). Using any type of thread sealant is not recommended because the threads on the gauge stem are a straight thread not standard tapered pipe thread and are not designed to create a seal.

5.4 Units Fail to Build or Hold Pressure

(Reference drawing 110479B in the appendix.)

If the unit will not build or hold pressure, the release valve ball may be missing. This can occur if the release valve has been loosened and the release valve spindle has been removed momentarily. When the release valve spindle assembly is unscrewed all the way, oil will leak out and the 7/32" ball will usually come out of the unit. With the oil coming out the operator may not notice the ball coming out of the unit.



It is a good idea to determine if the ball is in place before assuming the unit needs to be rebuilt. A missing release valve ball will prevent the unit from building or holding pressure. To check for the ball, you will want to have some rags available because oil will come out of the unit. Also have a flashlight to check for the ball inside the unit (The ball will usually come out but not always).

WARNING: Before removing the release valve spindle assembly, the hydraulic ram should be retracted all the way (all the way down) with no pressure in the cylinder; the pressure gauge on the press should show 0 force. If there is pressure in the cylinder when the release valve spindle assembly is removed, pressurized oil and the ball will be forced out of the hydraulic unit and personal injury could occur.

Loosen the release valve stop screw and unscrew the release valve spindle assembly until it comes out of the unit. If the ball does not come out, use the flashlight to see if the ball is still in the release valve port. Work quickly to minimize oil loss. If the ball is present, simply place it back in the port and reinstall the release valve. If the ball is missing, temporarily reinstall the release valve until you can get a replacement ball.

5.5 Hydraulic Unit - Air Bleed Procedure

An occasional cause of hydraulic system malfunction is air entrapment in the hydraulic circuit. This will cause erratic action and may appear as pump failure. To purge the system, open the release valve 1/2 turn. Close the release valve and test. If pressure does not build properly, repeat this procedure.

IMPORTANT: To avoid damage to the hydraulic unit ram seal, **DO NOT** exceed the maximum ram travel:

<u>TONNAGE</u>	<u>STROKE</u>
12	5.1"
25	6.5"

(Refer to the label on the front of the hydraulic unit).

5.6 Refilling the Hydraulic Oil Reservoir

Before checking the oil level, be sure the ram is fully lowered.

REFILLING THE HYDRAULIC RESERVOIR ON 12- & 25-TON UNITS

Before checking the oil level, be sure the ram is fully lowered. The oil fill port is on the back of the hydraulic unit at approximately 2/3 of the height of the hydraulic unit. You will need to use a wrench to unscrew the breather from the port. The proper oil level is slightly below the fill port. If the unit is over filled, oil can be forced out through the breather plug when the pressure is released which will cause oil to collect around the entire base. If your unit appears to have oil collecting around the base, you can perform a simple test to see if the oil is overflowing from the reservoir breather plug. Clean all oil residue from the back of the hydraulic unit then tape a piece of paper below the breather plug. If the unit is overfilled oil will appear on the paper after a few cycles. Some oil will need to be drained from the reservoir to correct the problem.

5.7 Rebuilding 12- & 25-Ton Hydraulic Units

Kits are available from **CARVER INC.** to rebuild the 12- and 25-ton hydraulic units. Each kit includes a complete set of seals and gaskets, plus oil to refill the unit.

Kits available from CARVER INC. for rebuilding these units are:

#3729 for rebuilding the 12-ton units.

#3730 for rebuilding the 25-ton units.

NOTICE: To open the hydraulic unit, you will need a bench vice large enough to hold the base of the hydraulic unit and a 48" pipe wrench to unscrew the top cap. Eventually the sealing surfaces, which are machined in the cast iron base, will wear out. If this is the case, the kit will not correct the problem and the hydraulic unit will need to be replaced.

SECTION SIX

HYDRAULIC OIL

6.1 Recommended Hydraulic Oils for Carver Presses

The hydraulic fluid is a special grade which conforms to MIL-SPEC #17672-A.

CARVER Special Hydraulic Fluid (Catalog #2170) is supplied in one-pint (.47 liters) containers. Contact **CARVER, INC.** Parts department for information.

Any good grade of mineral base hydraulic oil with anti-wear and anti-foaming additives in the viscosity range of 150 SSU @ 100° F. (38° C) and a viscosity index of 90 + can be used, provided it is filtered prior to being added to the hydraulic reservoir.

IMPORTANT: DO NOT use fire retardant ester base oil, transmission fluid, brake fluid, or water-glycol mixes. Always add clean oil to the reservoir from a clean container through a filter.

RECOMMENDED SUBSTITUTES

Standard Oil	Stanoil 21
Mobil	DTE 24
Exxon	Terrestic 32
Texaco	Rando HD 32
Amoco	PQ 32
Other	Any brand name Hydraulic Jack Oil with above specifications

7.1 Technical Assistance

Normal business hours are between 8:00 a.m. and 4:30 p.m. Eastern Standard Time.

CARVER INC. PARTS DEPARTMENT
(260) 563-7577
E-mail: carverpress@acscorporate.com

The parts department at CARVER INC. is ready to provide the parts to keep your equipment up and running. Original replacement parts ensure operation at design specifications. Please have the model and serial number of your equipment available when you call. Consult the parts list included in your information packet for replacement part numbers.

CARVER INC. SERVICE DEPARTMENT
(260)-233-6900
E-mail: wabashservice@acscorporate.com

CARVER INC. has a qualified Service Department ready to install, start-up, or service your press. Gauge calibration services are available. Contact the service department for details. Yearly calibration and preventative maintenance by a CARVER INC. service technician is recommended.

CARVER INC. EQUIPMENT/PRESS SALES DEPARTMENT
(260)-563-7577
E-mail: carverpress@acscorporate.com

CARVER INC. products are sold through a worldwide network of independent sales representatives and distributors, as well as in-house sales personnel. Contact our sales department for the name of the sales representative or distributor nearest you.

Returned Material Policy

1. Prior to the return of any material, get an authorization number (RMA) from the Service Department.
2. A reason for requesting the return must be given.
3. All returned material is subject to a 15% restocking charge.
4. All returns must be shipped prepaid.
5. Include the invoice number and date, or purchase order number and date.

No credit will be issued for material that is not within the manufacturer's warranty period, and/or in new and unused condition, suitable for resale.

Warranty

CARVER, INC. warrants all equipment we manufacture to be free from defects in workmanship and materials when used under recommended conditions. The Company's obligation under this warranty is limited to those parts which, within twelve (12) months from delivery of equipment to original purchaser, are returned to the factory with transportation prepaid, and upon examination shall be found to be defective.

CARVER neither assumes, nor authorizes any other persons to assume any liability in connection with the sale of its equipment, except under the conditions of this warranty.

This warranty does not cover any labor charges for replacement of parts, adjustment, repair, or any other work done. This warranty shall not apply to any apparatus which, in our opinion, has been subjected to misuse, negligence, or pressures in excess of the limits recommended, or which shall have been repaired or altered outside of the factory.

Replacement of defective material(s) will be FOB from the **CARVER INC.** factory. Replacement of component parts not manufactured by **CARVER INC.** will be limited to the warranty of the manufacturer of such parts.

WARRANTY RETURNS

1. Prior to the return of any material, authorization must be given by **CARVER, INC.** An RMA number will be assigned for the part or equipment to be returned. Please contact the Service Department for warranty claims.
2. Reason for requesting the return must be given.
3. All returns are to be shipped prepaid.
4. The invoice number and date, or purchase order number and date, must be supplied.
5. After inspecting the material, a replacement or credit will be given at **CARVER's** discretion, if the item is found to be defective in materials or workmanship and **CARVER, INC.** manufactured it. Purchased components are covered under their specific warranty terms.

CARVER®

Laboratory Accessories for Carver Presses



FLOOR STANDS — Designed for most vintage models

Catalog/Item Number	Description	Dimensions H x W x D	Weight
223160C	Press Stand AccuStamp presses	30" x 23.5" x 23.5"	150#
223171D	Press Stand (2 & 4 column presses)	30" x 19" x 19"	125#
223215C	Press Stand (2 & 4 column presses with 6" casters)	30" x 36" x 36"	260#
223219D	Press Stand for Standard Auto Series presses (excluding 48 ton models)	30" x 47" x 22.5"	280#
223229C	Press Stand for Standard Auto Series presses with 6" casters (excluding 48 ton models)	30" x 47" x 22.5"	280#



SAFETY SHIELDS

Catalog/Item Number	Description (Fits most vintages with or without heat)
3404	Mini "C" Presses
3295	Model "C" Presses
3253	Model "M" Presses
3322	Presses with 10" x 7" Work Area
3418	Presses with 12" x 12" Work Area
4427	Presses with 15" x 15" Work Area



Repair parts for (gray) Carver hydraulic units. Repair kits contain hydraulic oil, seals, gaskets, pins, fittings, valve parts and jack handle bracket for quick maintenance. (restrictions apply, visit carverpress.com for details)

- No. 3729 12 ton hydraulic unit repair kit
- No. 3730 25 ton hydraulic unit repair kit
- No. 319002 pump assembly for 12 & 25 ton jacks

ACCESSORIES

Catalog number
cross reference index

HEATING/COOLING

Platens for Model C Presses

(also available in deg C upon request)

- 2101** Set of (2) 6" x 6" heated, aluminum platens, thermostatically controlled, 150° to 500°F (Specify 115 or 230V)
- 2102.1** Set of (2) 6" x 6" heated, steel platens, thermostatically controlled, 150° to 500°F, (Specify 115 or 230V)
- 3796** Set of (2) 6" x 6", heated, steel platens, digitally controlled, 650°F, 115V
- 4286** Set of (2) 6" x 6", heated, steel platens, digitally controlled, 650°F, 230V
- 2103.1** Set of (2) 6" x 6" heated and cooled, steel platens, thermostatically controlled, 150° to 500°F with hoses (Specify 115 or 230V)
- 2104** Set of (2) 6" x 6" aluminum cooling plates, with valve and hose assemblies



- 3772** Set of (2) 6" x 6" heated & cooled steel platens, digitally controlled, 650°F, 115V
- 3988** Set of (2) 6" x 6" heated & cooled steel platens, digitally controlled, 650°F, 230V
- 2105** Set of (2) 6" x 6" aluminum steam plates, with insulation and braided hoses

Platens for Model M Presses

(also available in deg C upon request)

- 2107.1** Set of (2) 9" x 9" heated, steel platens, thermostatically controlled, 150° to 500°F, (Specify 115 or 230V)
- 3973** Set of (2) 9" x 9", heated, steel platens, digitally controlled, 650°F, 230V

- 2108.1** Set of (2) 9" x 9" heated and cooled, steel platens, thermostatically controlled, 150° to 500°F with hoses (Specify 115 or 230V)
- 2109** Set of (2) 9" x 9" steel steam heating plates, with insulation and braided hoses
- 3972** Set of (2) 9" x 9", heated and cooled, steel platens, digitally controlled, 650°F, 230V

Platens for four-column presses

(also available in deg C upon request)

- 3906** Set of (2) 12" x 12", heated, steel platens, digitally controlled, 650°F, 230V
- 3749** Set of (2) 12" x 12" heated and cooled steel platens, digitally controlled, 650°F, 230V
- 6316** Set of (2) 15" x 15", heated, steel platens, digitally controlled, 650°F, 230V

Accessories for Many Applications

MOLDS AND DIES

(See page 10 & 13)

Test Cylinders, Pellet Dies, and Molds

2090-0	Test cylinder outfit, 1.125" I.D.
2090-1	Set of 12 filter pads for 1.125" ID TCO's
2091-5	Test cylinder outfit all stainless steel, 2.25" I.D.
2091-1	Set of 12 filter pads for 2.25" ID TCO's
237005	Stainless steel pan for either TCO size
4417	6mm pellet die 440 stainless steel
4946	12mm pellet die 440 stainless steel
3619	13mm pellet die for KBr pellets
4369	25mm pellet die 440 stainless steel
3902	31mm pellet die, 440 stainless steel
3876	40mm pellet die, 440 stainless steel
5456	2" ID Proppant Crush Test Cylinder based on ISO 13503-2:2006(E) Page 7 & 13
2092	Swivel bearing plate (Requires safety shield)
2095	KBr buffer plate
818744C	Pharmaceutical pellet die holder

ASTM Molds

(See page 7)

4079	4" x 4" chase assembly, Teflon
4080	4" x 4" chase assembly, Stainless steel
4081	4" x 4" chase assembly, Brass
4082	6" x 6" chase assembly, Teflon
4083	6" x 6" chase assembly, Stainless steel
4084	6" x 6" chase assembly, Brass
4085	8" x 8" chase assembly, Teflon
4086	8" x 8" chase assembly, Stainless steel
4087	8" x 8" chase assembly, Brass
4161	(100) 6" x 6" mylar sheets for 4"x 4" molds
4162	(100) 8" x 8" mylar sheets for 6" x 6" molds

4163	(100) 10" x 10" mylar sheets for 8" x 8" molds
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Tile Molds and Color Dispersion Disc Molds

(See page 13)

818698D	4" x 4" tile mold, 1mm, 2mm or 5mm thick, Stainless steel
818699D	6" x 6" tile mold, 1mm, 2mm or 5mm thick, Stainless steel
818700D	10" x 10" tile mold, 1mm, 2mm or 5mm thick, Stainless steel
818701D	50mm x 50mm tile mold, 1mm, 2mm or 5mm thick, Stainless steel
818702D	100mm x 100mm tile mold, 1mm, 2mm or 5mm thick, Stainless steel
818703D	150mm x 150mm tile mold, 1mm, 2mm or 5mm thick, Stainless steel
818704C	50mm diameter color dispersion disc, .1mm, .2mm or .5mm thick, Stainless steel
818705D	100mm diameter color dispersion disc, .1mm, .2mm or .5mm thick, Stainless steel

TESTING/PROCESSING

Polished Plates

(For laminating applications)

235020	Plate with #8 mirror finish, 1 side polished, 6" x 6" x .03" thick
235021	Plate with #8 mirror finish, 1 side polished, 9" x 9" x .03" thick
235022	Plate with #8 mirror finish, 1 side polished, 9" x 12" x .03" thick
235023	Plate with #8 mirror finish, 1 side polished, 12" x 12" x .03" thick

Heated Test Cylinders

2472	Heating jacket with 1.125" test cylinder
2417	Heating jacket with 2.25" test cylinder

SAFETY SHIELDS

(See page 14)

3404	For most Mini C Presses
3295	For most Model C Presses
3253	For most Model M Presses
3322	For most presses with 10" x 7" platens
3418	For most presses with 12" x 12" platens
4427	For 3690 and 3693 with 15" x 15" platens



ANALOG GAUGES/ THERMOMETERS
(See page 13)

Gauges for Model B/C

381005	Gauge normally furnished with Model C press, 0 - 24,000 lbs applied force, 11 metric tons, 200 lb increments
381042	Model B/C gauge, 0 - 500 lbs, .225 metric tons, 5 lb increments
381001	Model B/C gauge, 0 - 1,000 lbs, .45 metric tons, 10 lb increments
381002	Model B/C gauge, 0 - 2,000 lbs, .9 metric tons, 20 lb increments
381003	Model B/C gauge, 0 - 5,000 lbs, 2.25 metric tons, 50 lb increments
381004	Model B/C gauge, 0 - 10,000 lbs, 4.5 metric tons, 100 lb increments

Gauges for Model K/M

381008	Gauge normally furnished with Model M press, 0 - 50,000 lbs applied force, 22.5 metric tons, 500 lb increments
381006	Model K/M Gauge, 0 - 5,000 lbs, 2.25 metric tons, 50 lb increments
381007	Model K/M Gauge, 0 - 10,000 lbs, 4.5 metric tons, 100 lb increments
381176A	Model K/M Gauge, 0 - 1,000 lbs, .45 metric tons, 10 lb increments

Two Gauge Manifold

(See page 13)

2096 CC	Two gauge manifold
2096 CC-1	(mini C only)



Dial Thermometers

385001	Dial face thermometer 150°F to 750°F
385019	Dial face thermometer 50°C to 400°C

HYDRAULIC UNITS

(Specify press Serial Number)

3912	12 ton hydraulic unit
3925	25 ton hydraulic unit
321007	Pump and reservoir for 30 ton presses
3467	Hydraulic cylinder for 30 ton presses
3729	12 ton repair kit (gray only)
3730	25 ton repair kit (gray only)
2170	Carver hydraulic fluid (pint size)

AUTOPAK™ POWER UNITS

(See page 16)

3946NE	AutoPak/12, for 12 ton existing manual presses.
3947NE	AutoPak/25, for 25 ton existing manual presses.
3948NE	AutoPak/30, for 30 ton existing manual presses.

FLOOR STANDS

(See page 14)

223160C	Press stand for AccuStamp presses
223171D	Press stand for 2 column and 4 column presses
223215C	Press stand for 2 column and 4 column presses with casters
223219D	Press stand for standard Auto Series presses (excluding 48 ton models)
223229C	Press stand for standard Auto Series presses with casters (excluding 48 ton models)

Consult factory for other accessories not listed here

Carver reserves the right to change specifications without notice. Presses and accessories may differ from photos shown. Carver strongly recommends the use of a safety shield and personal protection equipment when operating Carver equipment.

IF THE PUMP DOES NOT DRAW OIL FROM THE RESERVOIR:
THE FRONT (3/4" Ø) BALL IS GETTING STUCK,
PREVENTING OIL FLOW INTO THE PUMP CHAMBER.

PUMP PISTON
PUMP CHAMBER

FAULTY SEAT AT $\frac{5}{16}$ " Ø BALL
WILL CAUSE HANDLE RISE.

FAULTY SEAT AT $\frac{7}{32}$ " Ø BALL: _____

- 1) POSSIBLY NOT BUILD PRESSURE.
- 2) POSSIBLY CAUSE HANDLE SKIP.

RAM

— BREATHES

- OIL IN RESERVOIR

- EFFECTIVE AREA OF RAM

- FAULTY SEAT HERE:
 - 1) WILL NOT BUILD PRESSURE.
 - 2) BLEEDS PRESSURE.

RELEASE VALVE

THIS DRAWING IS PROVIDED TO ILLUSTRATE THE OPERATIONAL FUNCTION OF THE CARVER 12 & 25 TON HYDRAULIC UNITS.
(SOME COMPONENTS ARE NOT SHOWN IN THEIR ACTUAL LOCATIONS)

2		GRW	1/13/22	ADDED TROUBLE SHOOTING NOTES
1		GRW	1/8/04	ADDED TEXT TO IDENTIFY SPECIFIC AREAS
REV.	ECN NUMBER	BY	DATE	DESCRIPTION

OWN BY GWM	DATE 1/22/96	<u>CARVER*</u> CARVER, INC.		P.O. BOX 544 WARRIOR, OKLAHOMA 73090-0544
CHG'D BY	DATE	TITLE HYDRAULIC UNIT SCHEMATIC/SECTION VIEW		
UNLESS OTHERWISE NOTED		MATERIAL	REV'D	SCALE 1" = 1'
TOLERANCES X/XX = ± .005 X/XX = ± .015 X/XX = ± 1/32		MODEL#	ORDER/SERIAL NO.	REV. 110479B 2

1995-1996

NOTE: TIGHTENING THE GAUGE
TIGHTEN THE GAUGE COUPLING BY HOLDING
THE GAUGE STEM STATIONARY AND TURNING
THE GAUGE SWIVEL COUNTERCLOCKWISE
UNTIL IT IS TIGHT.

CHANGE PART NUMBER ON PRINT TO INCLUDE LETTER

CARVER • CARVER, INC. P.O. BOX 544
WARSAW, INDIANA 46088-0544

GAUGE UNION COUPLING ASSEMBLY

1104788