

FRED S. CARVER[®] INC.
HYDRAULIC PRESS EQUIPMENT

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CARVER LABORATORY PRESS
MODEL: MINI-C
CAT#: 3393

INDEX PAGE

INTRODUCTION

INSTALLATION AND OPERATION

SETTING UP

GAUGE

FILLING

OPERATION

DAYLIGHT ADJUSTMENT

OPERATOR SAFETY

MAINTENANCE

PREVENTATIVE MAINTENANCE

PURGING OF AIR

HYDRAULIC UNIT DRAWINGS

OIL INFORMATION

WARRANTY

INTRODUCTION

CARVER LABORATORY PRESS

We are pleased to provide Carver Laboratory Equipment for your operations. Carver presses are accepted standard laboratory equipment for research and development. They are also used for specialized or short-run production situations and quality control tests. Thousands of these presses are in daily use all over the world for numerous applications in the chemical, physical, biological and mechanical fields - wherever pressing is required.

ACCESSORIES:

One of the unique features of this press is the variety of standard accessories available. These include Heating, Heating/Chilling or Channeled Plates, Test Cylinder Outfits, French Pressure Cells, Swivel Bearing Plates, Cage and other filtering equipment; all original apparatus, designed and manufactured by Carver. These accessories assure precision results for many and various applications, such as oil determination tests on food products, crushing analysis on cement core samples, molding plastic quality control specimens, preparing KBr or tracer pellets, etc. A Laboratory Press Safety Shield is also available, which provides operator safety, yet easy access to the press.

Each accessory gives you the practical advantage of a hydraulic press made to order for a definite need. In addition to these standard items, we frequently develop custom accessories and presses for specific customer applications.

CUSTOMER SERVICE:

It is our aim in providing this manual to help you get the utmost service from your press. If at any time you have a question regarding service, repair, custom equipment, applicability of a press for a specific job or the like, 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.

NOTE: CARVER RECOMMENDS THE USE OF A SAFETY SHIELD AND SAFETY GLASSES WHEN OPERATING OUR EQUIPMENT.

INSTALLATION AND OPERATION

To assist in the installation and operation of this press, a complete parts drawing showing the part numbers is included in this manual.

SETTING UP:

The Carver Laboratory Press was carefully designed to have a low center of gravity so that it remains stable under normal operation. For a permanent installation, or as required for certain applications, hold-down bolts may be used to fasten the press to a work bench. Holes are conveniently provided for this purpose in the base directly in front of the columns.

The press is shipped with the hydraulic unit filled with Special Carver 2170 Hydraulic Fluid, and the gauge is packed separately to protect it from damage during shipment. The press should be set on a sturdy bench or table approximately 28" to 30" high - near an electrical outlet, if it is to be equipped with electric heating plates.

GAUGE:

The Carver Press features a gauge union coupling for quick easy alignment and interchangeability of gauges. To attach the gauge, first remove the plastic plug from the coupling and check that a gauge seal, or seals, is in place in the coupling swivel. While holding the coupling swivel to keep it from turning, turn the gauge into the coupling swivel by hand as far as it will go and position it for easy viewing by the operator. Hold the gauge in this position with an open-end wrench on the stem directly under the gauge case, and using another wrench, turn the coupling swivel counter-clockwise until tight. To remove the gauge, hold the swivel in place and turn the gauge counter-clockwise. If leakage occurs after tightening the gauge into the Union Coupling Swivel using only one (1) seal, two (2) seals may be required. (Do **NOT** use more than two (2) seals.)

All Carver gauges are especially calibrated for the specific ram diameter of the Carver hydraulic unit. The Model-C 12 ton ram area is 3.294 inches² and the Model-M 25 ton ram area is 5.157 inches². The standard gauge readings show directly the load or force in pounds as well as metric tons applied between the platen and head of the press. Accordingly, all calibrations show the load in pounds 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 lb. applied load would be equal to 2,500 lbs. per square inch on the material.

Example: $\frac{10,000 \text{ lbs.}}{4 \text{ square inches}} = 2,500 \text{ PSI}$.

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 warranty service. Special gauge and work protection kits are available from Carver.

GAUGES:

A variety of gauges are available from stock having different calibrated ranges from the standard full range gauge normally furnished. If different ranges are desired, a Carver 2096 Two-Gauge Manifold will permit simultaneous mounting of two separate range gauges.

FILLING:

(On "Closed-Style" presses the back of the press must be removed first.) The Hydraulic Unit is shipped with oil in it and should not require any additional oil. In the event there is some oil loss lower the Platen, remove the filler plug and fill with oil only up to the level of the filler hole. For 30 ton, refer to page IS-29, Item #16. Only special Carver 2170 Hydraulic Fluid or a brand name **HYDRAULIC JACK OIL** should be used. Refer to page IS-33 for recommended substitutes. Brake fluid and similar products may damage your unit and void your warranty.

OPERATION

Before attempting to operate the Hydraulic Unit, make certain that the release valve screw is closed finger tight. (For 30 ton presses, the cam release lever should be in the vertical position. Refer to page IS-29, item #25.)

Opening the release valve approximately one-half turn releases pressure and lets the platen down. It may be necessary to push the platen down by hand while the press is new and stiff, but after a short period of use, the platen will return fairly rapidly of its own weight. (For 30 ton presses, pull the cam release lever toward operator. Refer to IS-29, item #25.)

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, but after desired pressure is obtained, an occasional stroke or two will normally maintain the pressure.

NOTE: CARVER RECOMMENDS THE USE OF A SAFETY SHIELD AND SAFETY GLASSES WHEN OPERATING OUR EQUIPMENT.

DAYLIGHT ADJUSTMENT: (For Mini "C" 12 ton press, reference drawing #C-110430.)

The threaded columns allow for adjustment of daylight opening between the platen and the head. In adjusting the daylight, be sure the head is parallel to the top surface of the press base.

To raise the head: Insert a spacer block and pressurize the press to its maximum capacity by manual operation of the Hydraulic Unit. Loosen the thin lock nuts, release pressure and remove the spacer allowing the head to rest on the lock nuts. Turn the two lower column nuts higher on the columns. Raise the head to the desired position and tighten the lower lock nuts finger tight against the head. Measure and equalize the distance from the bottom edge of the head to the top surface of the press base at two points as far apart as possible. Adjust the lower lock nuts as needed to insure parallelism between the head and press base. Turn the lower column nuts finger tight on the head. Insert a steel or heavy duty spacer block, pressurize the press to its maximum capacity and tighten the lock nuts against the head as tight as possible. (This is a good time to check and, if necessary, retighten the base lock nuts.) Release pressure, remove the spacer and the press is now ready to use.

To lower the head: Insert a spacer block and pressurize the press to its maximum capacity. Loosen the lower lock nuts, release pressure and remove the spacer allowing the head to rest on the lock nuts. Measure and adjust the nuts to insure parallelism and proceed as stated above.

NOTE: In all cases, size the spacer block so that the maximum stroke of the Hydraulic Unit is not exceeded.

OPERATOR SAFETY:

1. A Carver Laboratory Press Safety Shield, which is available as an accessory, is recommended to be used with your press.
2. The operator should wear safety glasses or a face mask 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 mask, apron and rubber gloves should be used for the protection of the operator.
4. A testing apparatus or test specimen should be centered on the press platen to prevent tilting of the platen and ejection of the workpiece under pressure and to avoid unequal loading of the press components. Locator plates are available upon request.
5. The press should be bolted to the work table. The use of an extension handle longer than that provided with the standard press may cause the press to be unstable. There are bolt holes provided in the press base for 1/2" through-bolts or lag screws.

MAINTENANCE

Each Carver Laboratory press is thoroughly tested to provide trouble-free performance. Manufacture and assembly are closely controlled in our shop under rigid inspection and tests, from castings to the finished press. By following instructions and with proper care, your press should give many years of satisfactory, trouble-free service.

MAINTENANCE

To maintain constant pressure with any 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 there is a rapid drop in pressure or another difficulty, it may be due to any of the following reasons:

<u>PROBLEM:</u>	<u>POSSIBLE CAUSE:</u>	<u>SOLUTION:</u>
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. (e) Air entrapment.	(a) Tighten hydraulic connections and refill 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. (e) Purge air from system (see below).
No pressure when pumping.	(a) Open release valve. (b) Worn packing in pump unit. (c) Release valve ball missing.	(a) Close release valve. (b) Replace or rebuild Pump Unit Assembly. (c) Replace ball.
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 remedy. (c) Remove hydraulic cylinder unit - replace ram seal.
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 seals).

Refer to the exploded view drawing accompanying this manual for location of seals, packings, and gaskets in the Hydraulic Unit.

NOTE: An occasional cause of hydraulic system malfunction is air entrapment. To purge the system, open release valve 1/2 turn and pump the unit about a dozen times. Close release valve and test. If pressure does not build up, repeat procedure.

CAUTION: To avoid damage to the Hydraulic Unit ram seal, do **NOT** exceed the maximum ram travel of 5-1/8" on the 12 ton rated presses, 6-1/2" on the 25 ton presses and 6" on the 30 ton presses. (Read label on front of Hydraulic Unit.)

SAFETY CONSIDERATION IN THE USE OF LAB PRESSES

The probability for personal injury in the use of a hydraulic press is low because of the slow speed but Carver recommends the use of a Safety Shield and Safety Glasses when operating our equipment. Please realize that failure to follow proper safety practices can result in injury.

The principle factors capable of causing injury are:

1. Failure to center the work in the platen area will result in eccentric loading, tilting and an occasional slip-out of the work piece, which can then become a projectile. This is why Carver recommends the use of a Safety Shield and Safety Glasses.
2. Failure to level the top head of the press after it has been repositioned. This can produce the same problems as in (1) above.
3. Fracture of a specimen or part of the apparatus due to overload. This can produce flying fragments. This is why Carver recommends the use of a Safety Shield and Safety Glasses.
4. Occasional squirting of fat or juice from a pressed specimen. This is why Carver recommends the use of a Safety Shield and Safety Glasses.
5. Contact with hot plates or heated apparatus can produce severe burns, therefore we recommend the use of gauntlet type gloves.

PREVENTATIVE MEASURES

1. Be sure that all apparatus is centered in the platen area before pressing. Carver can supply an alignment frame to assure centering, or the user may paint a circle or square on the surface to indicate the proper position.
2. When the top head has been repositioned, the height on both sides should be measured to be sure the head is not tilted.
3. Always check the pressure rating of the pressed apparatus before use to be sure it is adequate for the anticipated use.

NOTE: The gauge on the Carver Laboratory Press shows the total force exerted by the press. It does not show the pressure on the specimen (PSI). 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. To protect against squirting, the apparatus may be placed inside a can or wrapped in a cloth. The best protection is the Safety Shield available from Carver which has solid steel sides and a clear polycarbonate door.
5. When using a press with hot plates, gauntlet type gloves should be worn to protect the forearms as well as the hands. Steam can sometimes be released from a specimen when pressure is released.
6. Safety glasses should be worn whenever the press is used.
7. In all cases, a Safety Enclosure is recommended.

