IMPORTANT: PLEASE REVIEW THIS ENTIRE PUBLICATION BEFORE INSTALLING, OPERATING OR MAINTAINING THE SOLID-STATE HYDRAULIC PRESS ELECTRICAL CONTROL SYSTEM.
SECTION 1 — IN GENERAL

SSC-500 Hydraulic Press Solid-State Control

Safety Precautions

“⚠️ DANGER ⚠️” Danger is used to indicate the presence of a hazard which WILL cause SEVERE personal injury if the warning is ignored.

“⚠️” THIS SAFETY ALERT SYMBOL IDENTIFIES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL ⚠️, BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY, AND CAREFULLY READ THE MESSAGE THAT FOLLOWS.

Efficient and safe machine operation depends on the development, implementation and enforcement of a safety program. This program requires, among other things, the proper selection of point-of-operation guards and safety devices for each particular job or operation and a thorough safety training program for all machine personnel. This program should include instruction on the proper operation of the machine, instruction on the point-of-operation guards and safety devices on the machine, and a regularly scheduled inspection and maintenance program.

Rules and procedures covering each aspect of your safety program should be developed and published both in an operator’s safety manual, as well as in prominent places throughout the plant and on each machine. Some rules or instructions which must be conveyed to your personnel and incorporated into your program include:

⚠️ DANGER Never place your hands or any part of your body in this machine.

⚠️ DANGER Never operate this machine without proper eye, face and body protection.

⚠️ Never operate this machine unless you are fully trained, instructed, and you have read the instruction manual.

⚠️ Never operate this machine if it is not working properly—stop operating and advise your supervisor immediately.

⚠️ Never use a foot switch to operate this machine unless a point-of-operation guard or device is provided and properly maintained.

⚠️ Never operate this machine unless two-hand trip, two-hand control or presence sensing device is installed at the proper safety distance. Consult your supervisor should you have any questions regarding the proper safety distance.

⚠️ Never tamper with, rewire or bypass any control or component on this machine.

A company’s safety program must involve everyone in the company, from top management to operators, since only as a group can any operational problems be identified and resolved. It is everyone’s responsibility to implement and communicate the information and material contained in catalogs and instruction manuals to all persons involved in machine operation. If a language barrier or insufficient education would prevent a person from reading and understanding various literature available, it should be translated, read or interpreted to the person, with assurance that it is understood.

⚠️ FOR MAINTENANCE AND INSPECTION ALWAYS REFER TO THE OEM’s (ORIGINAL EQUIPMENT MANUFACTURER’S) MAINTENANCE MANUAL OR OWNER’S MANUAL. If you do not have an owner’s manual, please contact the original equipment manufacturer.
Safety References

OSHA's ACT AND FEDERAL REGULATIONS

Since the enclosed equipment can never overcome a mechanical deficiency, defect or malfunction in the machine itself, OSHA (Occupational Safety and Health Administration) has established certain safety regulations that the employers (users) must comply with so that the machines used in their plants, factories or facilities are thoroughly inspected and are in first-class operating condition before any of the enclosed equipment is installed.


Duties:
Sec. 5. (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.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

2. OSHA's Code of Federal Regulations, Subpart O, that an employer (user) must comply with include:

Section 1910.211 Definitions
Section 1910.212 (a) General Requirements for all Machines
Section 1910.217 Mechanical Power Presses
Section 1910.219 (b)(1) Mechanical Power-Transmission Apparatus (Flywheel and Gear Covers)


4. OSHA's Publications

These publications can be obtained by contacting:
Superintendent of Documents
US Government Printing Office
P.O. Box 371954
Pittsburgh, PA  15250-7954
Phone: (202) 512-1800
Fax: (202) 512-2250
www.gpo.gov

ANSI SAFETY STANDARDS FOR MACHINES

The most complete safety standards for machine tools are published in the ANSI (American National Standards Institute) B11 series. The following is a list of each ANSI B11 Standard available at the printing of this publication.

B11.1 Mechanical Power Presses
B11.2 Hydraulic Presses
B11.3 Power Press Brakes
B11.4 Shears
B11.5 Iron Workers
B11.6 Lathes
B11.7 Cold Headers and Cold Formers
B11.8 Drilling, Milling and Boring
B11.9 Grinding Machines
B11.10 Sawing Machines
B11.11 Gear Cutting Machines
B11.12 Roll Forming and Roll Bending
B11.13 Automatic Screw/Bear and Chucking
B11.14 Coil Slitting Machines
B11.15 Pipe, Tube and Shape Bending
B11.16 Metal Powder Compacting Presses
B11.17 Horizontal Hydraulic Extrusion Presses
B11.18 Coil Processing Systems
B11.20 Safety Requirements for Manufacturing Systems/Cells
B11.21 Lasers
B11.22 CNC Turning Machines
B11.23 Machining Centers
B11/TR1 Ergonomic Considerations for the Design, Installation and Use of Machine Tools
B11/TR2 Mist Control
B11/TR3 Hazard ID and Control
B11/TR4 Control Reliability
R15.06 Robotic Safeguarding

These standards can be purchased by contacting:
American National Standards Institute, Inc.
11 West 42nd Street
New York, New York 10036
Phone: (212) 642-4900
Fax: (212) 302-1286
www.ansi.org

OR

Association of Manufacturing Technology (AMT)
7901 Westpark Drive
McLean, Virginia 22102
Phone: (703) 827-5211
Fax: (703) 893-1151
www.mfgtech.org

(Continued on next page.)
SECTION 1 — IN GENERAL

NATIONAL SAFETY COUNCIL SAFETY MANUALS AND DATA SHEETS

Other good references for safety on machine tools are the National Safety Council’s Safety Manuals and Data Sheets. These manuals and data sheets are written by various committees including the Power Press, Forging and Fabricating Executive Committee. Copies of the following publications are available from their library:

Manuals
- Safeguarding Concept Illustrations - 6th Edition
- Forging Safety Manual

Data Sheets
- Bench and Pedestal Grinding Wheel Operations 12304-0705
- Boring Mills, Horizontal Metal 12304-0269
- Boring Mills, Vertical 12304-0347
- Coated Abrasives 12304-0452
- Cold Shearing Billets and Bars in the Forging Industry 12304-0739
- Degreasing (Liquid), Small Metal Parts 12304-0537
- Dies, Setup and Removal of Forging Hammer 12304-0716
- Drill Presses, Metalworking 12304-0335
- Drills, Portable Reamer 12304-0497
- Drop Hammers, Steam 12304-0720
- Electrical Controls for Mechanical Power Presses 12304-0624
- Forging Hammer Dies, Setup and Removal of 12304-0716
- Forging Presses, Mechanical 12304-0728
- Gear-Hobbing Machines 12304-0362
- Handling Materials in the Forging Industry 12304-0551
- Kick (Foot) Presses 12304-0363
- Lathes, Engine 12304-0264
- Milling Machines, Metalworking 12304-0364
- Planers, Metal 12304-0383
- Power Press (Mechanical) Point-of-Operation Safeguarding, Concepts of 12304-0710
- Power Press Point-of-Operation Safeguarding: Type A and B Movable Barrier Devices 12304-0712
- Power Press Point-of-Operation Safeguarding: Presence Sensing Devices 12304-0711
- Power Press Point-of-Operation Safeguarding: Pullbacks and Restraint Devices 12304-0713
- Power Presses (Mechanical), Inspection and Maintenance of 12304-0603
- Power Presses (Mechanical), Removing Pieceparts from Dies in 12304-0534
- Power Press, Setting Up and Removing Dies 12304-0211
- Press Brakes 12304-0419
- Robots 12304-0717
- Saws, Metal (Cold Working) 12304-0584
- Shapers, Metal 12304-0216
- Shears, Alligator 12304-0213
- Shears, Squaring, Metal 12304-0328
- Upsetters, 12304-0721

Copies of these manuals and data sheets can be obtained by contacting:

National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
1-800-621-7619 ext. 2199
Fax: (630) 285-0797
www.nsc.org

OTHER SAFETY SOURCES
- National Institute of Occupational Safety and Health (NIOSH)
  4676 Columbia Parkway
  Cincinnati, OH 45226
  Phone: (513) 533-8236
- Robotic Industries Association (RIA)
  P.O. Box 3724
  Ann Arbor, MI 48106
  Phone: (734) 994-6088
  www.robotics.org

For additional safety information and assistance in devising, implementing or revising your safety program, please contact the machine manufacturer, your state and local safety councils, insurance carriers, national trade associations and your state’s occupational safety and health administration.

Warranty, Disclaimer and Limitation of Liability

WARRANTY

Rockford Systems, LLC warrants that this product will be free from defects in material and workmanship for a period of 12 months from the date of shipment thereof. ROCKFORD SYSTEMS LLC’S OBLIGATION UNDER THIS WARRANTY IS EXPRESSLY AND EXCLUSIVELY LIMITED to repairing or replacing such products which are returned to it within the warranty period with shipping charges prepaid and which will be disclosed as defective upon examination by Rockford Systems, LLC. This warranty will not apply to any product which will have been subject to misuse, negligence, accident, restriction and use not in accordance with Rockford Systems, LLC’s instructions or which will have been altered or repaired by persons other than the authorized agent or employees of Rockford Systems, LLC. Rockford Systems, LLC’s warranties as to any component part is expressly limited to that of the manufacturer of the component part.

DISCLAIMER

The foregoing Warranty is made in lieu of all other warranties, expressed or implied, and of all other liabilities and obligations on the part of Rockford Systems, LLC, including any liability for negligence, strict liability, or otherwise, and any implied warranty of merchantability or fitness for a particular purpose is expressly disclaimed.

LIMITATION OF LIABILITY

Under no circumstances, including any claim of negligence, strict liability, or otherwise, shall Rockford Systems, LLC be liable for any incidental or consequential damages, or any loss or damage resulting from a defect in the product of Rockford Systems, LLC.
Operator Safety Precaution Pamphlet - (Attachment for machine operators)

Accompanying this equipment is an 8-1/2” x 11” operator safety precaution pamphlet, Part No. KSC-000, for anyone operating the machine where this equipment will be installed. This precaution pamphlet is to be given to all operators, including setup people, maintenance personnel and supervisors.

This pamphlet should also be attached to the machine, readily accessible and visible to the operator. (A hole in the corner of this precaution pamphlet is provided for attaching purposes.) Additional copies of this precaution are available. Please call, e-mail, write, fax, or use the order form found on a later page in this manual.

When a language barrier or insufficient education prevents a person from reading or understanding the contents of this operator safety precaution pamphlet, you should either translate this information or have it read or interpreted to the person. Make sure that the person understands the information. To order this pamphlet in Spanish, use Part No. KSC-000S; in French, use Part No. KSC-000F.

This precaution pamphlet must be reviewed daily.
SECTION 1 — IN GENERAL
SSC-500 Hydraulic Press Solid-State Control

Danger Sign(s) to be Mounted on Machine

Accompanying this equipment is a 5” x 6” polyethylene danger sign, Part No. KSC-054. This sign MUST BE PERMANENTLY MOUNTED IN A PROMINENT LOCATION on the machine where this equipment is installed. This sign must be in a LOCATION THAT IS EASILY VISIBLE to the operator, setup person, or other personnel who work on or around this machine. ALWAYS mount this sign with screws or rivets when installing the enclosed equipment. If a foot switch is ordered, a 5” x 6” polyethylene danger sign, Part No. KSC-055 is provided. This sign must also be mounted according to the above instructions.

If any danger sign becomes destroyed or unreadable, the sign must be replaced immediately. Contact factory for replacement danger sign(s).

Never operate this machine unless the danger sign(s) is in place.

Part No. KSC-054 Danger Sign - Standard
Part No. KSC-054S - Spanish
Part No. KSC-054F - French

Part No. KSC-055 Danger Sign
(Foot) - Standard
Part No. KSC-055S - Spanish
Part No. KSC-055F - French

“Mechanical Power Press Safety” Booklet

A copy of Booklet No. MPPS (“Mechanical Power Press Safety”) is available upon request. This booklet is copied verbatim from the CFR (Code of Federal Regulations) and contains all relevant sections of the OSHA Regulations concerning power presses with which an employer (user) must comply. The enclosed equipment must be installed, used and maintained to meet these regulations. Specifically, any time a foot switch is used, a suitable point-of-operation safeguard or device must be used to prevent bodily injury. In addition, every press must be provided with a point-of-operation safeguard! Please review this booklet and the appropriate ANSI (American National Standards Institute) Safety Standard before installing the enclosed equipment. If you are unfamiliar with these detailed safety regulations, which include regulations on safeguarding the point of operation properly, you may want to attend our regularly scheduled machine safeguarding seminar. To obtain detailed information about this training seminar, please call, fax, write, or check our web site. Our address, telephone, fax number, and web site address are on the front cover of this manual.

(Continued on next page.)
Danger and Warning Labels Provided on Control Box

The illustrated danger and warning labels are affixed to all control boxes provided. All personnel operating or working around the machine, where this control box is installed, must be required to read, understand and adhere to all dangers and warnings. If any of these labels become destroyed or unreadable, labels MUST be replaced. Contact factory immediately for replacement labels and do not operate the machine until the danger and warning labels are all in place.

Photo 1.1
Inside View of SSC-500 Control Box
SECTION 1 — IN GENERAL
SSC-500 Hydraulic Press Solid-State Control

FOR REPLACEMENT SIGNS
CALL, FAX, E-MAIL, OR FACTORY OR USE ORDER
FORM ON A LATER PAGE OF THIS MANUAL.

Rockford Systems, LLC
5795 Logistics Parkway
Rockford, Illinois 61109
Toll Free: 1-800-922-7533 (USA only)
Phone: (815) 874-7891
Fax: (815) 874-6144
Web Site: www.rockfordsystems.com
E-Mail: customerservice@rockfordsystems.com
SECTION 2 — INTRODUCTION

SSC-500 Hydraulic Press Solid-State Control

General Description of Components in the System

A complete control package for hydraulic machines includes the following:

1. Literature folder (see page 14) containing installation manuals, “Operator Safety Precaution” Pamphlet, danger sign(s), electrical control schematics, and our latest catalog

2. Control box - standard (custom or special includes motor controls and/or disconnect switch) with danger and warning signs

3. Palm button assembly (Includes two black palm buttons, two palm button guards, one red emergency-stop button, and mounting boxes. When the “automatic” mode of operation is included, one yellow return/inch-up button with mounting box is furnished.) If multiple operator stations are on a machine, more than one assembly is furnished.

4. Foot switch (optional) - If multiple operator stations are on a machine, more than one foot switch is furnished

5. Supervisory control station (Required when multiple operator stations are used on the machine; one station is required for each operator.)

6. Other required components and safeguarding that may be necessary for machine (See packing list for details)

Individual packages may vary in contents. However, a packing list is always enclosed showing exactly what material was shipped on this order. Please check the components actually received against this packing list immediately. In most cases, this control package system includes two-hand control which can be used as a point-of-operation safeguarding device provided the palm buttons are mounted correctly and at the proper safety distance (see formula on page 19 of this manual). If the optional foot switch is provided, a safeguard must always be used. Examples of safeguards include barrier guards, presence sensing devices, pullbacks, restraints, gates, or two-hand control. The hands or any other part of the body of an operator, maintenance person, setup person, etc., must never be put into the point-of-operation hazard for any reason, at any time.

**These controls can neither cure nor overcome a malfunctioning machine. They cannot compensate for or prevent a mechanical defect or failure of a machine part. These controls cannot prevent a repeat or unintended stroke (cycle) resulting from a mechanical or hydraulic component malfunction, defect or failure of the machine itself.**

Preliminary Steps Before Installation

Before proceeding with the installation of the enclosed equipment, you should undertake the following preliminary steps:

1. Read and make sure you understand this entire Installation Manual.

2. Refer to the front cover, other line drawings and photos, then make a rough sketch of your installation to plan the location of the enclosed equipment on the machine.

3. This may be an opportunity to strip down the entire machine by removing all components, piping, wire, etc. Clean, paint and check the entire electrical, hydraulic, and mechanical systems of the machine for proper adjustment and required replacement parts before proceeding with the installation of the furnished equipment.

4. **Please make sure the machine is in first-class condition.** Before starting any installation, it is essential that the machine is thoroughly inspected. Be sure that all mechanical components and all collateral equipment are in first-class operating condition. Your inspection should be done according to the machine manufacturer’s installation and maintenance instruction manual. If you have any doubts or questions concerning the condition of the machine, contact the machine manufacturer for assistance. Repair or replace all parts not operating properly before proceeding.

**Inspection and maintenance programs must be established and implemented to keep machines in first-class condition. Programs must include thorough inspections of each machine on a weekly basis and records kept of these inspections. Any part of the machine that is worn, damaged or is not operating properly must be replaced immediately or repaired before the machine is used.**

5. Verify that the machine is in first-class condition and operating properly; shut off all power to the machine. All trapped hydraulic pressure must be released in areas of the systems that are being updated or retrofitted before proceeding. Padlock the disconnecting means in the “off” position and do not actuate the machine again until the installation of all package components has been completed. Lockout/tagout energy isolation procedures must always be practiced and enforced.

(Continued on next page.)
Safeguard Interlocks and Other Types Of Interlocks

Safeguard Interlocks
The machine will not operate or must not be operated until you either: (1) Electrically interlock or (2) Mechanically guard the machine’s point of operation with a safeguarding system or device.

When an electrically interlocked method of safeguarding the point of operation is chosen, connect the interlock to the safeguard interlock terminals (P7-5 and P7-6) in the control box (see page 16), and as shown on the control wiring schematic (wire numbers 82 and 83).

Point-of-operation electrically interlocked safeguards, when opened, prevent or stop normal machine operation during operator cycling modes. Examples of these types of interlocks are barrier guard interlocks and gate device interlocks.

When a mechanical guard or device (nonelectrically interlocked) is chosen, the safeguard interlock terminals (P7-5 and P7-6) are not used. In order for the machine to operate with the use of a mechanical guard or device, the safeguard interlock terminals must be connected.

⚠️ The mechanical guard or device must be properly installed, used and maintained and must always prevent all personnel from bodily injury.

⚠️ If the mechanical guard or device is not used, is removed, or is defeated, an electrically interlocked method of safeguarding must be used and connected to the safeguard interlock terminals (P7-5 and P7-6).

⚠️ Never operate this machine without point-of-operation safeguarding.

OTHER ELECTRICAL INTERLOCKS
There are basically two types of electrical interlocks as applied to machine control circuitry:

- Interlocks for the purpose of personnel protection, as explained previously.
- Interlocks intended for the purpose of protecting the machine and its control components.

There are other locations for interlocks that, when opened, prevent all machine functions. Examples of these types of interlocks are safety block electrical cut-off systems, lubricating systems, die protection equipment, and tonnage monitoring systems.

Be sure to connect the various electrical interlocks to the proper terminals (in the control box) according to the machine wiring schematics. If your schematics do not include these electrical interlocks, please send this information to the factory and they can be added to your drawings. There is an additional charge for this service.

Features of the SSC-500 Control - Hydraulic Press

- Redundant/cross-checking microprocessors from different manufacturers
- Two-hand anti-tiedown and concurrent operation
- 1 x 16-character LCD display/membrane keypad operator interface
- Two-speed solenoid valve support
- Four (4) user programmable diagnostic inputs
- Interface provided for light curtain(s)
- Provisions for electrically interlocking safety devices
- Redundant logic system microprocessor
- Isolated microprocessor logic power supply
- Redundant monitored SSR (Solid-State Relay) with captive contact master safety relay
- Unpluggable saddle-clamp circuit board terminal strips
- Supports redundant solenoid valves (self-checking)
- Fused SSR (Solid-State Relay) outputs eliminate costly relay replacement (field-replaceable fuses)
- Seven-digit stroke counter and batch counter with preset
- LCD display choices while in run mode: Mode, Stroke Counter, or Batch Counter

<table>
<thead>
<tr>
<th>Modes of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
</tr>
<tr>
<td>Two-Hand Inch</td>
</tr>
<tr>
<td>Foot-Single Stroke</td>
</tr>
<tr>
<td>Automatic (hand only)</td>
</tr>
<tr>
<td>Auto Single</td>
</tr>
</tbody>
</table>

(Continued on next page.)
SECTION 2 — INTRODUCTION

SSC-500 Hydraulic Press Solid-State Control

SSC-500 Control Box

The SSC-500 Press Control is a full-featured, dual-microprocessor based control for hydraulic presses. This control system is designed to comply with current ANSI Standard B11.2. It is a replacement for existing relay-based or PLC control systems, found in user’s plants or can be furnished for new or rebuilt hydraulic presses.

The basic control consists of a multi-tap voltage control transformer, color-coded terminal strips, ground indicator light, selector switches, keypad/display, a master control relay, and the SSC-500 control module assembly. As standard, this is furnished in a NEMA 12 enclosure. The master-control relay is used to provide a hard-wired emergency-stop function.

When this control box is to be wired to an existing main motor starter, the starter must have a 120 volt coil. If the starter does not have this component and it is not readily available, please contact Rockford Systems, LLC for a replacement magnetic starter.

The system uses redundant inputs from devices such as palm buttons, foot switches, and light curtain(s). The system output to the down solenoid valve(s) is provided by redundant monitored solid-state relay/captive contact relay outputs for trip solenoid(s). These output relays are independently controlled and cross-checked by the microprocessors. This allows control-reliable operation of the outputs in the event of a single control component failure. Each microprocessor also has its own logic power supply. This decreases the possibility of simultaneous control failure because of a fault within the power supply system. All inputs and outputs are optically isolated for electrical noise immunity. The operator provides setup information through the use of the keypad/display and messages are shown on the 16-character LCD display.

Overview of Sequence of Operation

GENERAL

If the ram is not at the “TOS” (top of stroke) limit switch at power up, or the control selector is changed in mid stroke, the message RETURN RAM will be displayed until the return is depressed. The “TOS,” “BOS” (bottom of stroke), and speed change limit switch inputs can be either N.O. or N.C. as required. (See OPTIONS EDIT programming on page 33.)

OFF

The machine is inoperable in this mode of operation. To initiate any of the following modes of operation, turn the Off/On Selector Switch from the “Off” to the “On” position.

INCH

To initiate this mode of operation, set the Control Selector to “Inch” and set the Actuating Means Selector to the “Hand” position. In this mode of operation, the ram moves down when both palm buttons are depressed concurrently and remain depressed. Ram motion will stop when either button is released; however both buttons must be released and then depressed again in order to reinitiate ram motion. The ram will continue to inch to the “BOS” limit switch. Return the ram to the “TOS” limit switch by depressing the return/inch-up palm button.

TWO-HAND SINGLE STROKE

To initiate this mode of operation, set the Control Selector to “Single” and set the Actuating Means Selector to the “Hand” position. In this mode of operation, depressing and holding the run/inch buttons concurrently causes the ram to make one stroke from the “TOS” limit switch to the “BOS” limit switch and back to the “TOS” limit switch. If either button is released before the machine reaches the “BOS” limit switch, the ram will stop. Both buttons will have to be released and depressed again in order to reinitiate the cycle. Once the machine has reached the “BOS” limit switch, the buttons may be released and the control will provide bottom dwell if programmed (see page 28), and return the ram to the “TOS” limit switch. If the single stroke return mode is enabled, the ram will return to the “TOS” limit switch if either palm button is released prior to reaching the “BOS” limit switch.

FOOT-SWITCH SINGLE STROKE

To initiate this mode of operation, set the Control Selector to “Single” and set the Actuating Means Selector to the “Foot” position. In this mode of operation, depressing the foot switch causes the machine to function in the same manner as described for two-hand single stroke. Foot-switch single stroke requires either a light curtain or the safeguard interlock connection to function. See page 11. If foot trip is enabled in the options edit menu, depressing and releasing the foot switch causes the ram to make one stroke from the “TOS” limit switch to the “BOS” limit switch and back to the “TOS” limit switch.
Overview of Sequence of Operation (continued)

**AUTOMATIC**

To initiate this mode of operation, set the Control Selector to “Automatic” and set the Actuating Means Selector to the “Hand” position. In this mode of operation, press the “Automatic Prior-Action” push button and then both run buttons concurrently (within five seconds). This causes the ram to stroke continuously from the “TOS” limit switch to the “BOS” limit switch, and back to “TOS.” The ram may be stopped and returned to the “TOS” limit switch by pressing the return/inch-up yellow palm button. The automatic mode of operation requires either a light curtain or the safeguard interlock connection to function (see page 11).

**LIGHT CURTAIN**

The light curtain is active during the downstroke portion of the machine cycle in all modes of operation except inch. The light curtain is muted during the ram-return portion of the cycle. The light curtain is muted when the ram reaches the “BOS” limit switch. If a mute point is required prior to bottom of stroke, a light curtain mute limit switch may be used. This input should be set to come on when the upper die is at 1/4” above the piecepart and must remain on until the “BOS” limit switch is reached. (See the schematic diagram supplied with the control for the mute switch connection.) The LIGHT CURTAIN OFF/ON selector is provided so the light curtain can be turned off when another method of safeguarding is used.

**LIGHT CURTAIN ACTIVE ON THE UPSTROKE (OPTIONAL)**

This option allows the light curtain to be active on the upstroke portion of the machine cycle as well as the downstroke (no muting). This option is enabled at the factory.

**PRESSURE OR DISTANCE RETURN**

A key-selector switch is provided for the selecting the method of returning the ram by PRESSURE, PRESSURE/DISTANCE, or DISTANCE. An optional pressure switch can be connected to the return selector switch to facilitate pressure, pressure/distance, or distance return on machines with “BOS” limit and pressure switches. The “BOS” limit switch input can be either N.O. or N.C. as required. (See the OPTIONS EDIT programming on page 33.)

**Optional Software and Overview**

An options module is required with any of these software options:

- PSDI (Presence Sensing Device Initiation)
- User Inputs
- Speed Change
- Auto Single
- Block Valve Monitoring

**PSDI (PRESENCE SENSING DEVICE INITIATION)—REQUIRES OPTIONS MODULE AND LIGHT CURTAIN**

PSDI is an optional mode of operation for hydraulic presses. In this mode of operation, a stroke is initiated by an interruption in the sensing of a light curtain when the light curtain is used as the point-of-operation safeguard. The operator can hand feed parts through the light curtain sensing field, and when the hand(s) is removed from the sensing field, the press will single stroke. This interruption and withdrawal sequence is commonly referred to as a “break.”

To initiate the PSDI mode of operation, set the control selector switch to “Single,” turn the light curtain “On,” and set the PSDI selector switch to PSDI 1 (single break) or PSDI 2 (double break for loading and unloading of pieceparts). At this point, interruption of the light curtain sensing field should not cause the press to stroke. First press the “PSDI Prior Action” push button, then begin PSDI. The press should start and run in the PSDI mode until a stop signal is given or if time expires between breaks. The PSDI prior action push button must then be reinitiated to restart the PSDI mode of operation. See the PSDI Section on page 34 for the sequence of operation and displayed messages.

**PSDI TIMER—REQUIRES OPTIONS MODULE**

The PSDI timer measures the time between breaks. The timer starts timing once the stroke is complete and the slide is at TOS limit switch. If time expires before the next break occurs, the PSDI mode of operation will deactivate. To reactivate the PSDI mode of operation, depress the PSDI prior action push button. The PSDI timer can be programmed from 2 to 30 seconds. See the PSDI TIMER programming section on page 30.
SECTION 2 — INTRODUCTION

SSC-500 Hydraulic Press Solid-State Control

USER INPUTS

Up to four programmable user inputs are available to monitor and diagnose common problems with auxiliary equipment on the machine. See the USER INPUT programming section on pages 31 - 32 for the user input choices. Refer to the wiring schematics for information on wiring the inputs to the proper terminals.

Note: If block valve monitoring is enabled, only three (3) user inputs will be available.

SPEED CHANGE—REQUIRES OPTIONS MODULE

An optional speed change limit switch can be connected to the speed change selector switch to facilitate HIGH, HIGH/LOW, or LOW speed on machines with speed change solenoid valves. (See the schematic diagram supplied with the control for switch connection.) The speed change limit switch can be either N.O. or N.C. and the speed change solenoid valve can be energized for slow or fast as required. (See the OPTIONS EDIT programming on page 33.) The speed change logic will work with either a momentary or maintained limit switch.

AUTOMATIC SINGLE STROKE—REQUIRES OPTIONS MODULE

The automatic single stroke mode of operation is used when a continuous stroke operation is desired but the press is faster than the material feeding equipment. When this mode of operation is ON, each press cycle can be initiated by the material or material feeding equipment. This mode of operation requires a prior-action pushbutton station. To initiate automatic single stroke, set the Mode Selector to “Single” and enable “Automatic Single Stroke” in the programming menu (see ASINGLE MODE programming on page 30). Press the prior-action push button and then both run buttons concurrently (within five seconds). The press will make one stroke and then continue to run in automatic single stroke as long as an input signal is received. The press will operate in the automatic single stroke mode of operation until a signal is given to stop, or when the automatic single stroke timer runs out before an input signal is received (see ASINGLE TMR programming on page 31). The prior-action pushbutton and the palm buttons must be reinitiated to restart the automatic single stroke mode of operation.

BLOCK VALVE MONITORING—REQUIRES OPTIONS MODULE

This valve is used to monitor the state of the hydraulic block valve. When enabled, there must be a switch on the valve wired into User Input #4. Refer to the wiring diagrams supplied with the control for wiring connection. This block valve monitor option uses User Input #4, which leaves only three (3) programmable User Inputs available. (See the OPTIONS EDIT programming on page 33.)
Installation of Control Package Components

LITERATURE PACKET

Included with every shipment is a literature packet. This includes installation manuals, “Operator Safety Precaution" Pamphlet (Part No. KSC-000), danger sign(s) (next page), and electrical schematics. These publications must be available and fully understood by all appropriate personnel, before any retrofit installation begins. Please notify Rockford Systems, LLC immediately if there are any questions about the information received.

Danger Sign (Standard) - Part No. KSC-054

As illustrated on page 7, a 5” x 6” polyethylene danger sign is supplied. It is imperative that this sign be firmly attached to the machine in a location readily visible to all personnel. Suggested mounting instructions are shown on the reverse side of this sign.

This sign must be the first thing mounted to prevent any possibility that it might be overlooked. If this sign becomes destroyed or unreadable, it must be replaced immediately. Contact factory for replacement and do not operate the machine until the danger sign is in place.

Foot Switch Danger Sign - Part No. KSC-055

If a foot switch is ordered, a 5” x 6” polyethylene danger sign is furnished. This sign must be firmly attached to the machine in a location readily visible to all personnel.

CONTROL BOX WITH SSC-500 CONTROL MODULE ASSEMBLY

The control box furnished for your machine may vary with the equipment furnished. The standard control box is furnished with the keypad/display on the front of the enclosure; however, if it is a custom control box with a starter and disconnect, the control box enclosure will be larger. The keypad/display, ground indicator light, off/program/run selector, and selector switches can also be furnished in a remote station. This option provides easier accessibility to the operator.
Control Module Assembly

The solid-state control module assembly (Photo 3.3) is mounted to the panel with four shock/vibration mounts and four 1/4-20 x 1/2” Allen-head bolts. The module case has four keyhole mounting slots that allow for easy removal, without removing the Allen-head mounting bolts, if replacement is required. To remove the module from the shock/vibration mounts, turn power off to the control. Remove all terminal blocks from the left and right sides of the printed circuit board. Loosen the four Allen-head bolts and lift up on the module. Pull the unit straight out.

There are red and green LEDs that allow for visual indication of control operation and the status of inputs and outputs. All LED names are indicated on the cover of the module next to each LED. See photo 3.3. The green power/status LEDs provide indication of proper operation and logic power to both CPUs (Central Processing Units).

Photo 3.4
Control Module without Cover

Photo 3.5
Options Module and Control Module with Top Plates
Control Module Assembly (continued)

The only user serviceable parts on the “dual CPU” board are the EPROM and fuses F1 - F5. If any changes to the circuit boards are required, instructions will be sent with the new parts. See page 39 for instructions on replacing the EPROM.

Photo 3.5
Operator Interface Keypad/Display

The keypad/display assembly (shown here) is used to enter setup information and to monitor machine operation. The keypad/display can be furnished in a remote enclosure up to a maximum of 150’ from the SSC-500 control module. Display mode choices during the machine run cycle are MODE-STATUS, STROKE COUNTER, or BATCH COUNTER. All programming is accessed by a keyed selector switch on the keypad/display unit.

If the keypad/display is supplied in a remote enclosure, please refer to the section on wiring (page 23) and the electrical schematic prints that came with the control box on the proper wiring connection.

Mounting the Control Box

Solidly mount the control box in an accessible location, either on or near the machine to be controlled. A convenient location will keep conduit runs to a minimum length.

Although operation of this control will not be adversely affected by normal machine operation, excessive shock or vibration may require shock mounting in specific applications.

The key must be removed from the off/run/program selector switch after the control is programmed and before the machine is released to production. All keys must be supervisory controlled at all times.
PART NO. CTL-525 - PALM BUTTON ASSEMBLY (if furnished, see Installation Manual No. KSL-071 or KSL-073)

When the standard modes of operation of off, inch, single stroke, automatic, and auto single are furnished, the palm button assembly will consist of four buttons (two run/inch buttons with ring guards, one red emergency-stop button, and one yellow return/inch-up button). Along with these buttons will be four mounting boxes (three double hub and one single hub). Optionally available are the Touchdown™ or chrome “light push” palm buttons. These may be furnished in place of the standard black run/inch palm buttons. The palm buttons can be assembled as shown in Photo 3.7 and mounted according to the requirements of the application. Nipples for connecting and running wire are not furnished.

⚠️ Install the palm “run” buttons in such a way that it requires the use of both hands to cycle the machine.
PALM BUTTON ASSEMBLY (continued)
The two “run” palm buttons, on hydraulic machines, can be used to initiate a machine cycle and as a method of safeguarding the point of operation. ANSI’s B11.2 has established certain requirements for these buttons when used as a safeguarding method. According to ANSI B11.2 - 1995, the total stopping time of the press should include the total response time of the control system and the time it takes the press to cease slide motion. The following formula should be used when calculating the safety distance:

\[
D_s = K (T_s + T_c + T_r + T_{spm})
\]

where:

- \(D_s\) = minimum safety distance between the device and the nearest point-of-operation hazard (inches)
- \(K\) = the hand speed constant = 63 inches/second.
- \(T_s\) = the stop time of the machine tool measured at the final control element.
- \(T_c\) = the response time of the control system.
- \(T_r\) = response time of any hand control device, if provided, including its interface.
- \(T_{spm}\) = the additional time allowed for the stopping performance monitor to compensate for variations in the normal stopping time.

Note: \(T_s + T_c\) are usually measured by a portable or built-in stop-time measuring device.

When applying the two palm “run” buttons to meet the requirements for a “point-of-operation safeguarding device,” make certain these buttons are located on the machine so they meet the minimum safety distance required by the ANSI formula.

Simply stated, safety distance is the mounting and location of the palm buttons at a distance where the operator cannot reach into the point-of-operation hazard before the ram has stopped or completed its downward travel.

To obtain the stopping time, a portable stop-time measurement unit can be used. (For a portable unit, please contact Rockford Systems, LLC)

Red Emergency-Stop Palm Button (Required)
The red emergency-stop button is used to stop the machine anywhere in its cycle. When the operator depresses the button, it should stop the hazardous motion of the machine immediately by shutting off the hydraulic drive pump motor. This palm button assembly includes a double hub mounting box. It can be located between the two “run” palm buttons as part of the operator’s control station. (Please refer to page 18.) This button has a mechanical latch that must be reset after depressing the button.

Note: More than one emergency-stop button may be furnished for additional control stations or for convenience.
SECTION 3 — INSTALLATION OF COMPONENTS

SSC-500 Hydraulic Press Solid-State Control

Yellow Return/Inch-Up Button

The yellow return/inch-up button is used to stop the machine when it is in the “automatic” mode of operation. When the operator depresses the button, almost anywhere in the stroke of the machine, it will return the ram to the up position. This palm button assembly includes a double hub mounting box. It can be located between the two “run” palm buttons, along with the red emergency-stop button, as part of the operator’s control station. (Please refer to page 18.)

Photo 3.9

Automatic Prior-Action Pushbutton Stations [Part No. LLD-700 (continuous) and Part No. LLD-702 (automatic single)]

According to ANSI B11.2 - 1995, control systems that include an automatic cycle mode shall require:

“Selection of the automatic mode; and a prior or deliberate action by the operator; and operation of the actuating means; and an intended action by the operator before an interrupted cycle may be resumed.”

These prior-action stations have a recessed push button that must be depressed and released by the operator before depressing the two palm buttons in order to initiate the continuous or automatic RUN type of press operation. This is sometimes referred to as “walk-away” continuous.

Mount the remote stations on the machine so that it is convenient for the operator to depress and release these push buttons prior to depressing the two palm buttons. These buttons may be mounted as part of the operator’s control station. After releasing the button, the operator has a 5-second time period in which to depress the “run” buttons. If the operator should wait longer than this time setting, the prior action must be depressed and released again.

PART NO. CTD-011 - FOOT SWITCH (optional) (See enclosed Installation Manual No. KSL-001)

If a foot switch control is used, all personnel must be warned that it is NOT a point-of-operation safeguard. It is the responsibility of the employer (user) to always provide an appropriate guard and/or device to prevent bodily injury whenever a foot switch is used to initiate a machine cycle. (See ANSI B11.2 for safeguarding.)

When using a foot switch, please see page 11 for information on electrically interlocking or mechanically guarding the point of operation. When installing the optional foot switch, be sure that the wiring schematics are referenced for proper connections. Be sure to maintain the foot switch in first-class condition. It must always be wired properly and the protection on the top, sides and front must always remain in place.

Photo 3.11

Never use a foot switch to operate this machine unless a point-of-operation guard or device is provided and properly maintained.

The mechanical guard or device must be properly installed, used and maintained. It must always prevent all personnel from bodily injury.

If the mechanical guard or device is not used, is removed or is defeated, an electrically interlocked method of safeguarding must be used and connected to the safeguard interlock terminals (P7-5 and P7-6).
PART NO. LLD-701 - SUPERVISORY CONTROL STATION (Required for multiple operator stations)

When multiple operator stations are required, this supervisory control station is furnished separately for each operator station. Please refer to the electrical control schematics furnished with your order for proper wiring of each station.

Photo 3.12

Other Required Components (Not supplied as part of standard package unless specifically ordered)

MAIN POWER DISCONNECT SWITCH

A main power disconnect switch may have been supplied in this control package shipment, either in a custom control box or separately. This switch is designed to disconnect the primary voltage to the press and lock it out. Please refer to the enclosed wiring schematics for proper wiring of this switch, if furnished separately.

ANSI Standard B11.2 requires that:

1. A main power disconnect switch capable of being locked in the “Off” position shall be provided with every power press control system.

2. If the machine already has a main power disconnect switch, it must be checked for the “locking off” and lockout feature. Some switches use construction which can be easily altered mechanically to comply with this requirement. If this is not possible, or an electrical disconnect switch is not provided, then you must obtain and install a proper disconnect switch. (For proper disconnect switch, please contact Rockford Systems, LLC)

MOTOR STARTER

A nonreversing motor starter may have been supplied with this control package. The main purpose of this starter is to drop out the main drive motor and the hard-wired emergency-stop relay when a power failure occurs. Please refer to the enclosed wiring schematics for proper wiring of this starter. If an existing starter is used, a 120 VAC coil is required.

ANSI Standard B11.2 requires that:

1. The motor start button shall be protected against accidental operation.

2. All mechanical power press controls shall incorporate a type of drive motor starter that disconnects the drive motor from the power source in the event of control voltage or power source failure. It shall also require operation of the motor start button to restart the motor when voltage conditions are restored to normal.

The above requirements are normally met by using a magnetic motor starter. This starter operates with a 120 VAC coil which is powered from the secondary of the control transformer on the control panel. Refer to the electrical schematics supplied to obtain details of how to wire the starter and associated motor start/stop push buttons. If a new magnetic motor starter is required, please contact Rockford Systems, LLC

CUSTOM OR SPECIAL CONTROL BOX

Instead of the standard hydraulic control box, you may have ordered and received a custom or special control box. This box usually includes a magnetic motor starter and disconnect switch complying to the previous requirements. Be sure to wire in primary voltage and components to terminals as indicated on the enclosed wiring schematics. 120 volt electrical power to hydraulic controls, operator controls, solenoids, etc., must be obtained from the furnished transformer with isolated secondary.

COLLATERAL EQUIPMENT

All collateral press room and plant equipment such as spring or air-slide counterbalances, die cushions, feeding equipment, and robots must be safeguarded if they create hazards to personnel.

POINT-OF-OPERATION SAFEGUARDS

For compliance to ANSI B11.2 Safety Standard, please refer to Section 9—Methods of Safeguarding, for examples of point-of-operation safeguards for presses.
Other Required Components (continued)

PRESENCE SENSING DEVICE

According to ANSI B11.2 - 1995, the total stopping time of the press (for presence sensing devices) should include the total response time of the presence sensing device, as stated by the manufacturer, the response time of the interface, the response time of the control system and the time it takes the press to cease slide motion. The following formula should be used when calculating the safety distance:

\[ D_s = K (T_s + T_c + T_r + T_{spm}) + D_{pf} \]

where:

- \( K \) = the hand speed constant = 63 inches/second.
- \( T_s \) = the stop time of the press measured from the final deenergized control element.
- \( T_c \) = the response time of the press control.
- \( T_r \) = response time of the presence sensing device and its interface, if any, as stated by the manufacturer or measured by the employer.
- \( T_{spm} \) = the additional time allowed for the stopping performance monitor to compensate for variations in the normal stopping time.
- \( D_{pf} \) = the added distance due to the penetration factor as recommended in Table 3.1. The minimum object sensitivity is stated by the manufacturer.

If beam blankouts or floating window features are used, these figures should be added to the object sensitivity figure before using the chart.

### Table 3.1

<table>
<thead>
<tr>
<th>Depth Penetration Factor</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEPTH PENETRATION FACTOR</td>
<td>0.0</td>
<td>0.5</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
<td>2.5</td>
<td>3.0</td>
<td>3.5</td>
<td>4.0</td>
</tr>
</tbody>
</table>

This table represents the depth of penetration into the light curtain at which an object will be detected.
Other Installation Considerations

WIRING

National Electrical Code practices, including NFPA-79, are usually followed for wiring the control system, especially color coding and the use of numbered wire markers on both ends of every wire. Color coding is Black for line voltage and control at line voltage, Red for 120 VAC control circuits, Blue for 24 VDC control circuits, White for current carrying ground (commonly referred to as the “Neutral”), and Green for any equipment grounding conductor. All terminal blocks in the control cabinet are color coded for easy identification.

1. Install and wire the main disconnect switch (unless one already exists or is furnished in a custom control) using black wire. Follow wiring instructions shown on the electrical schematics. Make certain this switch is capable of being locked in the “Off” position only.
2. Install and wire the motor starter (unless one already exists or is installed in a custom control box) using black wire for the power; red and white wires for the coil and interlock circuit; and blue for the motor forward connection to the SSC-500 control module.
3. All necessary outputs from the SSC-500 control module are wired from the green printed circuit board to the terminal block. All necessary inputs need to be wired to the green printed circuit board terminal strip P2 for installation.
4. Run two black power lines (any two lines) from the load side of the disconnect switch (or from the line side of the motor starter) to the control enclosure. Connect the two black wires to the proper terminals on the control transformer (see electrical schematic or transformer nameplate for proper connections for different primary voltages).
   Note: If a custom control box with a disconnect has been provided, this step is not necessary.
5. Run a green ground wire from the incoming system ground to the control panel.
6. Wire the motor starter and start/stop control according to the connection schematics.
   Note: If a custom control box with a starter has been provided, this step is not necessary.

Keypad/Display - Remote

If the keypad/display is furnished in a remote station, an optional seven-conductor shielded cable can be run in conduit or sealtite with other low voltage signal conductors. This cable carries low voltage signals and should not be located near or in the same conduit or raceway with conductors for main power feeds or motor leads. 25’ of cable is supplied as standard and can be cut to length if required. Do not splice or interrupt signals. The cable should be wired directly into the SSC-500 control module terminal strip P5, as shown in the schematic prints that were sent with the control box. Please contact Rockford Systems, LLC if a longer cable is required.

Palm Button Assembly

These palm buttons are normally wired as an assembly with the blue wires routed from the control box to the nearest palm button and then the others, as required, within the units. Wires between the two “run/inch” buttons are not connected back to the control box. If “Touchdown™” (proximity) palm buttons are furnished, please refer to the enclosed Installation Manual No. KSL-071 and the connection print.

If the palm button assembly is not bolted directly to the machine frame, then a separate green ground wire should be run from the control box to all palm buttons. Attach one end of the wire to each mounting box by a lug under one of the mounting bolts and the other end of the wire to the “GND” terminal in the control box to assure proper grounding.

These operator controls should be mounted in a convenient location, keeping ergonomics in mind. To comply with ANSI Standards for “two-hand controls,” the “run/inch” buttons must be located according to the “minimum safety distance” requirements of each individual machine as defined by the standard (see page 19 of this manual). A stop-time measurement unit is necessary for checking stopping time before installation begins. The palm button assembly must be fixed at the proper safety distance so that only a supervisor or safety engineer is capable of relocating them.

Supervisory Control Station (See page 21)

When two or more two-hand or foot switch operating stations are required on one machine, one supervisory control station is required at each operator station. This remote control station consists of one “station on” indicator light and a key-locked “off/on” selector switch in an enclosure. The “on” position allows the operator to use that station and the “off” position deactivates only that station. If all the supervisory control stations are in the “on” position, all two-hand palm buttons must be depressed within the timing period set in the Anti-Tiedown (page 29) program in order to initiate a machine stroke. These supervisory control stations must be wired to prevent actuation of the clutch if all operating stations are turned off and controls are operational. See wiring schematics for proper wiring of these supervisory control stations.
SECTION 3 — INSTALLATION OF COMPONENTS

SSC-500 Hydraulic Press Solid-State Control

Do not operate the press if the ground indicator light does not illuminate when the station is turned on.

Press Ground

The machine frame must always be firmly connected to ground in order to ensure that the control potential will never exceed 120 volts above ground. Run a green grounding wire from the control box to some convenient location directly on the machine frame. Connect one end solidly to the frame using a mounting bolt or other convenient means of attachment. Scrape any paint, rust, etc., from the area, to ensure an adequate ground connection. Connect the other end to the “GND” terminal in the control box.

Note: All exposed metal components, which may be touched by personnel during normal operation or adjustment, must be firmly grounded to the machine frame. The disconnect switch and motor starter should also be grounded if they are mounted separately.

SECTION 4—PROGRAMMING

Setup of Control System

The flowchart in Figure 4.1 outlines the order and method of setting up and programming the SSC-500 control system on a hydraulic press after installation. Refer to the LCD display on the control box or remote operator station.

Figure 4.1
Initial Setup Procedure Flowchart

<table>
<thead>
<tr>
<th>Step</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Up Control</td>
<td>See Page 24</td>
</tr>
<tr>
<td>Program User Inputs</td>
<td>See Pages 29 - 30</td>
</tr>
<tr>
<td>Program Standard Settings</td>
<td>See Pages 26 - 29</td>
</tr>
<tr>
<td>Program Additional Settings</td>
<td>See Pages 30 - 33</td>
</tr>
<tr>
<td>Ready for Production</td>
<td></td>
</tr>
</tbody>
</table>

Initial Setup Procedure

After completing the installation of the control box and control components, the SSC-500 control system must be initially programmed in order to get the machine up and running. To do this, please follow the Initial Setup Procedure below.

1. Turn the main power disconnect switch for the control to the ON position and start the main motor. The following information is displayed on the LCD:

   VERSION X.0
   (X.0 = current keypad/display firmware version)
   SHC - X.0
   OPTION XX
   (XX = current options available)
   SAFEGRD IN PLACE

2. After this information is displayed, press ENTER on the keypad if the answer is YES to the SAFEGRD IN PLACE question.

3. READY TO START (Press Motor Start)

   The display message will indicate the position of the Program/Run selector switch as follows:
   If the selector switch is in the OFF position, the display message is OFF.
   If the selector switch is in the RUN position, the display message is SINGLE - STOP
   If the selector switch is in the PROG position, the display message is CLEAR STROKE.

4. Proceed to the Programming Overview on page 25.

Figure 4.2 - Initial Information on Display

(Continued on next page.)
Standard Programming Overview

The following sections outline the standard programming of the SSC-500 control system on hydraulic machines after installation of all components has been completed.

MAIN PROGRAM MENU

All programming is done by selecting PROG (Program) on the key selector switch as shown in Figure 4.3. Turn the keyed selector switch to the PROG position.

The LCD display will display one of the following program options from the list as shown. At the top of the list is CLEAR STROKE.

Pressing the ▼ and ▲ buttons on the keypad will scroll through the program options that can be modified. When the program option you want to edit is displayed, press ENTER. Once the required information is entered and the ENTER key is pressed again, the display returns to the main menu list. If incorrect information has been entered, return to the setting and reenter the correct information.

STANDARD PROGRAM SELECTION

CLEAR STROKE ................................................................. 26
CLEAR BATCH ................................................................. 27
BATCH PRESET ............................................................... 27
BOTTOM DWELL ms ..................................................... 28
DECOMPRES TMR ms ..................................................... 28
ANTI-TIE-DOWN ms ...................................................... 29
SING RETURN MODE ..................................................... 29

OPTIONAL PROGRAM SELECTION

PSDI TIMER sec ............................................................ 30
ASING MODE ................................................................. 30
ASING TMR sec ............................................................ 31
USER INPUTS ............................................................... 31 - 32
  INPUT #1 .................................................................... 32
  INPUT #2 .................................................................... 32
  INPUT #3 .................................................................... 32
  INPUT #4 .................................................................... 32
OPTIONS EDIT ............................................................... 33

Figure 4.3
Main Program Menu Flowchart

(Continued on next page.)
**CLEAR STROKE**

Select the **PROG** position on the Program/Run selector switch. Press the ▼ and ▲ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays **CLEAR STROKE**.

The display now reads: **UP ARROW CONFIRM**

Press the ▲ button on the keypad to clear the stroke counter, or press the ENTER button to abort the clear and return to the main menu level. The LCD again displays **CLEAR STROKE**.

**Function**

The 7-digit stroke counter is used to count strokes in the single or automatic modes of operation only and can be displayed when the Program/Run selector switch is in the **RUN** position.

---

**QUICK REFERENCE TABLE - FACTORY SETTINGS AND VALID RANGES**

<table>
<thead>
<tr>
<th>Program Setting</th>
<th>Valid Entry Range</th>
<th>Factory Preset Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Stroke</td>
<td>Clear/Abort</td>
<td>_</td>
</tr>
<tr>
<td>Clear batch</td>
<td>Clear/Abort</td>
<td>_</td>
</tr>
<tr>
<td>Batch Preset</td>
<td>0000000 - 9999999</td>
<td>0000000</td>
</tr>
<tr>
<td>Bottom dwell ms</td>
<td>0 - 3000 ms</td>
<td>0</td>
</tr>
<tr>
<td>Decompress timer</td>
<td>25 - 250 ms</td>
<td></td>
</tr>
<tr>
<td>Anti-Tiedown timer</td>
<td>100 - 7000 ms</td>
<td>250 ms</td>
</tr>
<tr>
<td>Single Return Mode</td>
<td>Off/On</td>
<td>Off</td>
</tr>
<tr>
<td>PSDI Timer</td>
<td>002 - 30 sec.</td>
<td>002 sec</td>
</tr>
<tr>
<td>Automatic single stroke mode</td>
<td>Off/On</td>
<td>Off</td>
</tr>
<tr>
<td>Auto single timer</td>
<td>005 - 120 sec. ms</td>
<td>005 sec.</td>
</tr>
<tr>
<td>User inputs</td>
<td>Input #1 - #4</td>
<td>Lube Flt/Off/E-Stop</td>
</tr>
</tbody>
</table>

---

**Figure 4.4**

**CLEAR STROKE** Programming Flowchart

```
CLEAR STROKE

↓ Enter

UP ARROW CONFIRM

↓ Press the UP arrow to confirm the clear or enter to abort

↓ or

↓ Enter

↓ MAIN MENU
```

Selects the Program Menu Item **CLEAR STROKE**

Display now reads...

(Continued on next page.)
CLEAR BATCH

Select the PROG position on the Program/Run selector switch. Press the ▼ and ▲ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays CLEAR BATCH.

The display now reads: UP ARROW CONFIRM
Press the ▲ button on the keypad to clear the batch counter, or press the ENTER button to abort the clear and return to the main menu level. The LCD again displays CLEAR BATCH.

Function

The 7-digit batch counter is used to count strokes in the single or automatic modes of operation only and can be displayed when the Program/Run selector switch is in the RUN position.

BATCH PRESET

Select the PROG position on the Program/Run selector switch. Press the ▼ and ▲ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays BATCH PRESET.

The display now reads: XXXXXXX
Where XXXXXXX = a number between 0 and 9999999.

Press the ▼ and ▲ buttons on the keypad to increase or decrease the batch preset. Pressing and holding the arrow keys will change the numbers at a rapid rate. Press ENTER to program the batch preset to the displayed number and return to the main menu level. The LCD displays BATCH PRESET again.

Function

The machine will cycle until it reaches this batch preset count. When the batch counter reaches this preset number, the machine top stops and the message PRESET REACHED is displayed. Press ENTER to clear both the message and the batch counter.

Entering 0 will disable the BATCH PRESET.
SECTION 4 — PROGRAMMING

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BOTTOM DWELL ms
Select the PROG position on the Program/Run selector switch. Press the ▼ and ▲ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays BOTTOM DWELL ms.
The display now reads: XXX
Where XXX = a number between 0 and 60 seconds
Press the ▼ and ▲ buttons on the keypad to increase or decrease the BOTTOM DWELL timer. Pressing and holding the arrow keys will change the numbers at a rapid rate. Press ENTER to program the BOTTOM DWELL timer to the displayed time and return to the main menu level. The LCD again displays BOTTOM DWELL ms.

Function
When the ram reaches the BOS limit switch, the down valve stays energized until the bottom dwell timer (if programmed) times out. Once the time runs out, the up valve will energize, returning the ram to the TOS limit switch.

DECOMPRESS TIMER
Select the PROG position on the Program/Run selector switch. Press the ▼ and ▲ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays Decompress.
The display now reads: XXX
Where XXX = a number between 025 and 250 ms.
Press the ▼ and ▲ buttons on the keypad to increase or decrease the Decompress timer. Pressing and holding the arrow keys will change the numbers at a rapid rate. Press ENTER to program the Decompress timer to the displayed time and return to the main menu level. The LCD again displays Decompress Tmr ms.

Function
When the ram reaches the BOS limit switch, the down valve will deenergize causing the decompress timer (if programmed) to time out. Once the time runs out, the up valve will energize, returning the ram to the TOS limit switch.
ANTI-TIEDOWN ms

Select the PROG position on the Program/Run selector switch. Press the ▼ and ▲ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays ANTI-TIEDOWN ms. The display now reads: XXXX

Where XXXX = a number between 100 and 7000 ms. (1 to 7 Seconds) Press the ▼ and ▲ buttons on the keypad to increase or decrease the ANTI-TIEDOWN timer. Pressing and holding the arrow keys will change the numbers at a rapid rate. Press ENTER to program the ANTI-TIE-DOWN timer to the displayed time and return to the main menu level. The LCD again displays ANTI-TIEDOWN ms.

Function

When beginning a machine stroke, all actuating means [palm buttons or foot switch(es)] must be operated concurrently. This means that the operator(s) must depress all actuating means within the set time in order to start the machine stroke. As soon as any one of the actuating means is operated, the timer starts. The time for this setting depends on the number of operators. The range of 100 - 7000 ms allows enough time for single or multiple operators to operate all actuating means. The typical setting for one operator is 250 ms or 1/4 of a second (factory setting).

SING RETURN MODE

Select the PROG position on the Program/Run selector switch. Press the ▼ and ▲ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays SING RETURN MODE. The display now reads one of the following:

OFF
ON

Press the ▼ and ▲ buttons on the keypad to change the mode options. Press ENTER to turn on or turn off SINGLE RETURN MODE and return to the main menu level. The LCD again displays SINGLE RETURN MODE.

Function

In this mode of operation (if programmed), depressing and holding the run/inch buttons concurrently will cause the ram to move from the TOS limit switch to the BOS limit switch. If either button is released prior to reaching the BOS limit switch, the ram will return to the TOS limit switch until both buttons are released and reinitiated.
Optional Programming Overview (requires options module)

PSDI TIMER sec

Select the **PROG** position on the Program/Run selector switch.
Press the ▼ and ▲ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays **PSDI TIMER sec**.
The display now reads: **XX**
Where **XX** = a number between 02 and 30 sec.

Press the ▼ and ▲ buttons on the keypad to increase or decrease the **PSDI** timer. Pressing and holding the arrow keys will change the numbers at a rapid rate. Press ENTER to program the **PSDI** timer to the displayed time and return to the main menu level. The LCD again displays **PSDI TIMER sec**.

**Function**
The **PSDI** timer starts timing once the stroke is complete and the ram is at the TOS limit switch. If the timer expires before the next break occurs, the **PSDI** mode will deactivate. To reactivate the **PSDI** mode of operation, depress the **PSDI** prior action push button.

ASINGLE MODE (Automatic Single Stroke)

Select the **PROG** position on the Program/Run selector switch.
Press the ▼ and ▲ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays **ASINGLE MODE**.
The display now reads one of the following:

AUTO/SINGLE OFF
AUTO/SINGLE ON

Press the ▼ and ▲ buttons on the keypad to change the mode options. Press ENTER to turn on or turn off **ASINGLE MODE** and return to the main menu level. The LCD again displays **ASINGLE MODE**.

**Function**
The **ASINGLE** or Automatic Single Stroke Mode of operation is used when a continuous stroke operation is desired but the press is faster than the material feeding equipment. When this mode is ON, each press cycle can be initiated by the material or material feeding equipment. This mode requires a prior action station* and the **ASINGLE** timer for the **ASINGLE** input. See **ASINGLE** TMR programming description.
Refer to the wiring diagram sheet 2 for information on wiring the **ASINGLE** inputs.

*Contact factory for this station if it was not supplied
ASINGLE TMR Sec (Automatic Single Stroke Timer, Seconds)
Select the PROG position on the Program/Run selector switch.
Press the \( \downarrow \) and \( \uparrow \) buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays ASINGLE TMR sec.
The display now reads: XXX
Where XXX = a number between 005 and 120 sec.
Press the \( \downarrow \) and \( \uparrow \) buttons on the keypad to change the timer value. Pressing and holding the arrow keys will change the time at a rapid rate. Press ENTER to program the ASINGLE TMR timer to the displayed time and return to the main menu level. The LCD again displays ASINGLE TMR sec.

Function
If the timer expires between successive inputs, the press will not operate. The prior-action push button must be reinitiated and the palm buttons reactivated. Refer to the wiring diagram sheet 2 for information on wiring the ASINGLE inputs. See ASINGLE MODE description above for more information.

USER INPUTS
The SSC-500 has four (4) programmable user inputs.* These inputs are 24VDC sinking (NPN) type. There are three (3) parameters that can be programmed for each input.

Programmable Parameters
1. FAULT MESSAGE: When the input is activated, a fault message is displayed. This fault message is assigned to the input according to its function. Figure 4.11 shows a list of fault messages that can be assigned to each input. Select any message for each input.
2. LOGIC: This setting is used to change the logic that activates the input. The programming choices are NO (Normally Open), NC (Normally Closed), and OFF (Disabled). Select one of these for each input.
3. STOP TYPE: When the input is activated, the machine cycle will stop in one of two ways. E-STOP (Emergency Stop) will immediately stop the cycle in progress. T-STOP (Top Stop) will stop the cycle in progress at the top of the stroke. Select which type of stop is required for each input.

Note: If block valve monitoring is enabled, only three (3) user inputs will be available.

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Note: If block valve monitoring is enabled, only three (3) user inputs will be available.

* These inputs are programmable and can be used to control various functions of the press. The programming options include the ability to change fault messages, logic settings, and stop types for each input.

Figure 4.13
ASINGLE TMR sec Programming Flowchart

Figure 4.14
User Input Fault Messages Chart

<table>
<thead>
<tr>
<th>Fault Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUBE FLT</td>
<td>Lube Fault</td>
</tr>
<tr>
<td>HIGH LUBE FLT</td>
<td>High Lube Fault</td>
</tr>
<tr>
<td>LOW LUBE FLT</td>
<td>Low Lube Fault</td>
</tr>
<tr>
<td>LOW LUBE LEVEL</td>
<td>Low Lube Level</td>
</tr>
<tr>
<td>MAIN MTR OL FLT</td>
<td>Main Motor Overload Fault</td>
</tr>
<tr>
<td>LUBE MTR OL FLT</td>
<td>Lube Motor Overload Fault</td>
</tr>
<tr>
<td>AUX MTR OL FLT</td>
<td>Auxiliary Motor Overload Fault</td>
</tr>
<tr>
<td>GUARD OPEN FLT</td>
<td>Guard Open Fault</td>
</tr>
<tr>
<td>REAR GUARD FLT</td>
<td>Rear Guard Fault</td>
</tr>
<tr>
<td>LEFT GUARD FLT</td>
<td>Left Guard Fault</td>
</tr>
<tr>
<td>RIGHT GUARD FLT</td>
<td>Right Guard Fault</td>
</tr>
<tr>
<td>FEEDER FLT</td>
<td>Feeder Fault</td>
</tr>
<tr>
<td>LOAD MONITOR FLT</td>
<td>Load Monitor Fault</td>
</tr>
<tr>
<td>SAFETY BLK FLT</td>
<td>Safety Block Fault</td>
</tr>
<tr>
<td>DIE PROTECT FLT</td>
<td>Die Protection Fault</td>
</tr>
<tr>
<td>STOCK BUCKLE</td>
<td>Stock Buckle</td>
</tr>
<tr>
<td>END OF STOCK</td>
<td>End Of Stock</td>
</tr>
<tr>
<td>EXTRN CNTRL FLT</td>
<td>External Control Fault</td>
</tr>
</tbody>
</table>

(Continued on next page.)
USER INPUTS (continued)

INPUT #1 (2, 3, 4)
Select the PROG position on the Program/Run selector switch.
Press the ↓ and ↑ buttons on the keypad to scroll through the program options. Press ENTER when the LCD displays INPUT # 1. Programming is the same for all four inputs.
The display now reads: X FLT
Where X FLT is a fault message from the list in Figure 4.8 on page 28.
Press the ↓ and ↑ buttons on the keypad to scroll through the list of fault messages. Press ENTER to program the fault message displayed.
The display now reads one of the following:
OFF (Disabled)
N.O. (Normally Open)
N.C. (Normally Closed)
Press the ↓ and ↑ buttons on the keypad to change the logic options. Press ENTER to program the input logic displayed.
Next, the LCD displays one of the following:
E-STOP (Emergency Stop)
T-STOP (Top Stop)
Press the ↓ and ↑ buttons on the keypad to change the stop type.
Press ENTER to program the input logic displayed and return to the main menu level. The LCD displays INPUT #1.

Figure 4.15
INPUT #1, 2, 3, 4 Programming Flowchart*

Function
The user inputs can be programmed to monitor and diagnose common problems with auxiliary equipment on the machine. Examples are main clutch/brake air pressure, dual solenoid pressure switch, lube system pressure or level switches, motor overloads, load monitors, stock buckle, and end of stock sensors. Refer to the wiring diagram sheet 2 for information on wiring the inputs to the proper terminals.

*Note: If block valve monitoring is enabled, only three (3) user inputs will be available.
OPTIONS EDIT

The optional modes that can be configured using the options menu are—TOS LS LOGIC (N.O./N.C.), BOS LS LOGIC (N.O./N.C.), FOOT TRIP (OFF/ON), SC SOL ON (SLOW/FAST), SC LS (N.O./N.C.), HI ON BOS (OFF/ON), AND VALVE LS (N.O./N.C.).

OPTIONS EDIT

Turn the main power disconnect switch off. Select the OFF position on the PROG/RUN key selector switch. Push and hold the ENTER button on the keypad and turn the main power disconnect switch ON. Hold the ENTER button until the display switch reads back OPTIONS EDIT. Release the ENTER button.

The display now reads: TOS LS N.O.
Press the ENTER key to toggle between N.O. and N.C.

Press the ▼ and ▲ buttons to scroll to the next option.

The display now reads: BOS LS N.O.
Press the ENTER key to toggle between N.O. and N.C.

Press the ▼ and ▲ buttons to scroll to the next option.

The display now reads: FOOT TRIP OFF
Press the ENTER key to toggle between OFF and ON.

Press the ▼ and ▲ buttons to scroll to the next option.

The display now reads: SC SOL ON=SLOW
Press the ENTER key to toggle between SLOW and FAST.

Press the ▼ and ▲ buttons to scroll to the next option.

The display now reads: SC LS N.O.
Press the ENTER key to toggle between N.O. and N.C.

Press the ▼ and ▲ buttons to scroll to the next option.

The display now reads: HI ON BOS=OFF
Press the ENTER key to toggle between OFF and ON.

Press the ▼ and ▲ buttons to scroll to the next option.

The display now reads: VALVE LS N.O.
Press the ENTER key to toggle between N.O. and N.C.

After the correct information has been entered, select the RUN position on the PROG/RUN key selector switch.

(Continued on next page.)
Sequence of Operation

**SINGLE BREAK**
When the slide is at the TOS limit switch and waiting for the prior action, the display reads **PSDI 1 — STOP**. To arm the PSDI mode, press the prior action push button. The display reads **PSDI 1 — ARMED**. The PSDI Timer begins to time. The operator must break (interrupt) the light curtain sensing field and remove hand(s) and arm(s) from the sensing field to initiate a stroke before the timer expires. If the timer expires, the display reads **PSDI 1 — STOP**. The prior action push button must be pressed again to reactivate the PSDI mode of operation. The sensing field must be interrupted for at least .2 seconds to qualify as a break. See page 30 for programming information on the PSDI timer.

**DOUBLE BREAK**
When the slide is at the TOS limit switch and waiting for the prior action, the display reads **PSDI 2 — STOP**. To arm the PSDI mode, press the prior action push button. The display reads **PSDI 2 — ARMED #1**. The PSDI Timer begins to time. The operator must break (interrupt) the light curtain sensing field and remove hand(s) and arm(s) from the sensing field. The display then reads **PSDI 2 — ARMED #2**. The PSDI timer begins to time again. The operator must break the light curtain sensing field a second time and remove hand(s) and arm(s) from the sensing field to initiate a stroke before the timer expires. If the timer expires, the display will read **PSDI 2 — STOP**. The prior action push button must be pressed again to reactivate the PSDI mode of operation. The sensing field must be interrupted for at least .2 seconds to qualify as a break. See page 30 for programming information on the PSDI timer.

**PSDI Messages**
The following messages are displayed while the PSDI mode of operation is activated.

<table>
<thead>
<tr>
<th>MESSAGE</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PSDI 1 — STOP</strong></td>
<td>Single break. The slide is at TOS limit switch waiting for a the prior action push button to be depressed.</td>
</tr>
<tr>
<td><strong>PSDI 1 — DOWN</strong></td>
<td>Single break. The slide is moving down.</td>
</tr>
<tr>
<td><strong>PSDI 1 — UP</strong></td>
<td>Single break. The slide is moving up.</td>
</tr>
<tr>
<td><strong>PSDI 2 — UP</strong></td>
<td>Double break. The slide is at TOS limit switch waiting for a the prior action push button to be depressed.</td>
</tr>
<tr>
<td><strong>PSDI 2 — STOP</strong></td>
<td>Double break. The slide is moving down.</td>
</tr>
<tr>
<td></td>
<td>Double break. The slide is moving up.</td>
</tr>
<tr>
<td></td>
<td>Single break. The slide is at TOS limit switch waiting for a break. The PSDI timer is timing.</td>
</tr>
<tr>
<td><strong>PSDI 2 — ARMED #1</strong></td>
<td>Double break. The slide is at TOS limit switch waiting for first break. The PSDI timer is timing.</td>
</tr>
<tr>
<td><strong>PSDI 2 — ARMED #2</strong></td>
<td>Double break. The slide is at TOS limit switch waiting for second break. The PSDI timer is timing.</td>
</tr>
<tr>
<td><strong>PSDI REQUIRES LC</strong></td>
<td>The light curtain is turned off or is red when PSDI is enabled. Check the status of the light curtain and make sure it is on or green.</td>
</tr>
</tbody>
</table>
SECTION 6 — OPERATING CONSIDERATIONS

SSC-500 Operation Checklist

1. Is all wiring to the machine, the solid-state control module, and keypad/display correct when verified with the drawings sent with the solid-state control? ................................................................. Y or N

2. When powering up the solid-state control module, do the five (green) LEDs (Power and CPU status) on the front of the control module turn on? ......................................................................................................................... Y or N

3. Does the “POWER-ON” screen display the message: “SAFEGRD IN PLACE” when the main power disconnect switch is turned on? ................................................................................................................................. Y or N

4. In normal run modes, such as SINGLE, does the machine make cycles without any faults appearing on the display? ............ Y or N

Production Mode Of Operation

During production, with the machine in the selected run mode of operation, the screen can display information. This information can be displayed by pressing the ▼ and ▲ buttons on the keypad. The display options are as follows:

1. MODE- STOP / UP / DOWN
2. STOP TIME
3. STROKE COUNTER
4. BATCH COUNTER

Machine Shut Down

When the machine is ready to be shut down, follow this sequence: (1) Shut off the main motor starter. (2) Turn off the main power disconnect switch.

Electrical Troubleshooting

All troubleshooting, as well as installation, must be performed by qualified and properly trained personnel. Also, when a defective component is found, do not operate the machine until that component has been replaced with an exact replacement part.

1. This procedure is written as a general guide for troubleshooting most hydraulic control systems. In all cases, please refer to the individual control wiring schematic for particular test points and terminal numbers.

2. Each control system may be slightly different depending on the various functions provided. Be sure to follow the schematic and select the proper modes of operation when troubleshooting.

TROUBLESHOOTING OUTLINE

Use the control drawing schematic in conjunction with the following troubleshooting outline:

1. No Ground Light Illumination - Possible Causes:
   - No Ground Connection
     - If the ground connection checks OK, the ground light should be on.
     - If it is still not on, replace the light.
   - No Voltage
     - No line voltage - check the line voltage on the transformer primary.
     - No control voltage - check transformer primary connections (wiring) and the secondary for 120 VAC.
     - Fuse blown - replace with the proper size and amperage per the control drawing.
     - Using an ohm meter, locate the reason for the blown fuse before reapplying power.

2. Motor Does Not Start - Possible Causes - Open electrical interlocks. The circuit can be arranged to accommodate machine protective electrical interlocks, overload interlocks, and safety block interlocks. These interlocks are strategically located to prevent machine operation when open. Please refer to the schematic for the location of the various miscellaneous interlocks.
   - Motor starter does not energize.
     - Motor starter operating coil is not 120 VAC.
     - Motor overload tripped, no heaters or improperly rated heaters or overloads.
     - Motor start/stop push buttons improperly wired or defective.
   - Motor starter contact defective.
     - Motor should start if the above checks OK. If the motor fails to continue to run when the start button is released, check the motor starter holding contact for proper wiring and function.

(Continued on next page.)
# FATAL FAULT MESSAGES FOR SSC-500

FATAL fault messages can NOT be cleared. An E-STOP is required for the press brake to recover. The problem should be fixed and then power restored to the machine.

Table 7.1

<table>
<thead>
<tr>
<th>MESSAGE</th>
<th>CAUSE</th>
<th>ACTION TO TAKE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NV-RAM FLT</td>
<td>CPU #1 had trouble reading or writing the nonvolatile (NV) RAM memory and could not repair the data. The battery socket or RAM chip could be inoperative.</td>
<td>Turn the main power off and back on. All variables are reset to factory default and will need to be reprogrammed. Contact factory for technical support.</td>
</tr>
<tr>
<td>SSR #1, K1 ON FLT</td>
<td>The processor did not detect, through feedback, that the SSR #1 (Solid State Relay) turned ON, or that K1 relay contacts did not turn ON after K1 was energized.</td>
<td>Check SSR#1 output fuse (F2). Check K1 output LED. Make sure the K1 relay is energizing. One or more components may be defective. Contact factory for technical support.</td>
</tr>
<tr>
<td>SSR #1, K1 OFF FLT</td>
<td>The processor did not detect, through feedback, that the SSR #1 (Solid State Relay) turned OFF, or that K1 relay contacts did not turn OFF after K1 was deenergized.</td>
<td>Check SSR#1 output fuse (F2). Check K1 output LED. Make sure the K1 relay is deenergizing. One or more components may be defective. Contact factory for technical support.</td>
</tr>
<tr>
<td>SSR #2 ON FLT</td>
<td>The processor did not detect, through feedback, that the SSR #2 (Solid State Relay) turned ON.</td>
<td>Check SSR#2 output fuse (F2). One or more components may be defective. Contact factory for technical support.</td>
</tr>
<tr>
<td>SSR #2 OFF FLT</td>
<td>The processor did not detect, through feedback, that the SSR #2 (Solid State Relay) turned OFF.</td>
<td>Check SSR#2 output fuse (F2). One or more components may be defective. Contact factory for technical support.</td>
</tr>
<tr>
<td>VALVE SW ON FLT</td>
<td>The block valve monitoring switch did not turn ON.</td>
<td>Check the state of the controls on the block valve monitoring switch. Contact factory for technical support.</td>
</tr>
<tr>
<td>VALVE SW OFF FLT</td>
<td>The block valve monitoring switch did not turn OFF.</td>
<td>Check the state of the controls on the block valve monitoring switch. Contact factory for technical support.</td>
</tr>
</tbody>
</table>

CPU = Central Processing Unit  
LED = Light Emitting Diode  
SSR = Solid State Relay  
F = Fuse
## SECTION 7 — FAULT MESSAGES

### SSC-500 Hydraulic Press Solid-State Control

### SECTION 7 — FAULT MESSAGES

**FATAL FAULT MESSAGES FOR SSC-500**

<table>
<thead>
<tr>
<th>MESSAGE</th>
<th>CAUSE MANIFESTATION</th>
<th>ACTION TO TAKE</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEYPAD FLT</td>
<td>KEYPAD failure.</td>
<td>Check for correct wiring to the keypad and terminals.</td>
</tr>
<tr>
<td>RUN/INCH PB FLT</td>
<td>RUN/INCH palm button failure.</td>
<td>Check for correct wiring to the palm buttons and terminals.</td>
</tr>
<tr>
<td>FOOT SW FLT</td>
<td>FOOT SWITCH failure.</td>
<td>Check for correct wiring to the foot switch and terminals.</td>
</tr>
<tr>
<td>BOS LIMIT SW FLT</td>
<td>The Bottom Of Stroke Limit Switch is stuck ON or OFF.</td>
<td>Check the status LED on the BOS limit switch input. Check all wiring to the switch. Check 24 VDC power supply.</td>
</tr>
<tr>
<td>TOS LIMIT SW FLT</td>
<td>The Top Of Stroke Limit Switch is stuck ON or OFF.</td>
<td>Check the status LED on the TOS limit switch input. Check all wiring to the switch. Check 24 VDC power supply.</td>
</tr>
<tr>
<td>TOS TIMEOUT FLT</td>
<td>The Top Of Stroke Limit Switch did not come ON within 10 seconds of the UP solenoid valve coming on.</td>
<td>Check the status LED on the TOS limit switch input. Check all wiring to the switch. Check 24 VDC power supply. Make sure the UP solenoid valve is energizing and that there is hydraulic system pressure.</td>
</tr>
<tr>
<td>TONNAGE P.S. FLT</td>
<td>The Tonnage Pressure Switch is stuck ON.</td>
<td>Check the status LED on the tonnage pressure switch input. Check all wiring to the switch. Check 24 VDC power supply.</td>
</tr>
<tr>
<td>AUX CPU FLT</td>
<td>CPU #2 fault.</td>
<td>Internal circuitry failure, consult factory.</td>
</tr>
</tbody>
</table>

**GENERAL FAULT MESSAGES FOR SSC-500**

GENERAL fault messages can be cleared by touching ENTER on the keypad/display.

<table>
<thead>
<tr>
<th>MESSAGE</th>
<th>CAUSE/SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAND OR FOOT ONLY</td>
<td>The initiating means is in the HAND/FOOT mode. This selection is only allowed in the Sequence-Stop Mode. Set selector to HAND or FOOT, or change selector to SINGLE.</td>
</tr>
<tr>
<td>NO INTERLOCKS</td>
<td>The selected operation requires different interlocks to function. The required interlocks are not currently available. (See interlock information on page 11.)</td>
</tr>
<tr>
<td>RETURN RAM</td>
<td>The ram is not at TOS (Top of Stroke). Press any palm button to return the ram to TOS.</td>
</tr>
<tr>
<td>PRESET REACHED</td>
<td>The BATCH PRESET count was reached. Press ENTER to clear both the message and the batch counter.</td>
</tr>
<tr>
<td>PSDI REQUIRES LC</td>
<td>The light curtain is turned off or is red when PSDI is enable. Check the status of the light curtain and make sure it is turned on. The message will clear when the light curtain is on.</td>
</tr>
</tbody>
</table>
This control system can never cure nor overcome a misadjusted, worn, broken or malfunctioning part or mechanical failure. Inspect all parts for adjustment, excessive wear, looseness or breakage. Do not operate this machine until all parts are adjusted, repaired or replaced.

Visual inspections and examinations of the entire machine must be made at least once per shift by qualified personnel.

Machines must always be inspected and tested on a weekly basis to determine the condition of the mechanical, hydraulic, and electrical system. Necessary maintenance and repair must be done before the machine is operated again, and the employer must maintain records of both the inspections and the maintenance work performed.

After any maintenance, always operate the machine numerous times in all modes before allowing the operator to start production. Always make sure all point-of-operation safeguarding is in place, adjusted and operating properly for the job and the operator.

**ANSI Regulations for Inspections**

ANSI B11.2 - 1995 Inspection and Maintenance

7.3 The employer shall have the responsibility to establish and follow a systematic program of periodic and regular inspection of production systems utilizing presses to ensure that all their parts, auxiliary equipment, and safeguarding are in safe operating condition and adjustment.

E7.3 The employer should consider the manufacturer’s instructions and recommendations in determining maintenance programs.

The employer should determine the period between inspections based on their use and the manufacturer’s recommendations.

**ANSI Regulations for Operator Training**

ANSI B11.2 - 1995 Instructions to Operators

10.2 The employer shall instruct operators in the proper care and use of the press production system.

E10.2 The instructions should include but not be limited to:

1. A description of the assigned task;
2. The function of controls to be encountered in performing the assigned task;
3. The hazards associated with the assigned task;
4. The designated method of feeding;
5. The designated method of safeguarding;
6. The methods of function-testing or otherwise assuring the proper function of safeguarding means.

Operators should be instructed to report inconsistent or unpredictable performance of the press production system.

**Electrical Controls**

Switch the main power disconnect to the “Off” position and lockout before inspecting or maintaining electrical controls. Make a periodic inspection of the control box and electrical machine components for loose or broken wires. Relays and switches must be examined for burned or worn contacts. Look for loose or broken conduit and cable fittings. The control box and other components must be kept closed and locked. Keys must be removed to prevent someone from opening and tampering with the control box, and to prevent exposure to the dirt, chips and oil present in most plants.
The maintenance and inspection sections in this manual cannot be all-inclusive. Always refer to the original equipment manufacturer’s maintenance manuals or the machine owner’s manual. If you do not have an owner’s manual, contact the machine manufacturer.

Care of Keypad/Display
To clean the keypad/display, use a clean soft cloth with soap and warm water. Do not use oily rags, solvents, or ammonia-based glass cleaner.

Replacement of the “U4” EPROM

1. Shut off power to the main motor. Turn the main disconnect switch to the OFF position and lock it out. Open the door of the control enclosure. Remove the eight screws on the cover of the SSC-500 Control Module (See Photo 3.3 on page 16). When they are removed, pull the cover straight off over the relays and transformers.

2. Locate the “U4” main EPROM (see Photo 3.4 on page 16 and Photo 8.1 below). It is located below the K2 Solenoid Relay on the “dual CPU” (Control Processing Unit) board.

3. Carefully remove the existing EPROM by pulling it straight out of the socket. Be careful not to bend the legs. Set aside the EPROM that was removed.

4. Prior to inserting the new EPROM, match the small notch in the top of the EPROM to the notch in the socket. Verify that the notch in the EPROM and the socket are lined up. Very carefully insert the new “U4” EPROM into the socket. Be careful not to bend any legs on the EPROM while pushing it into the socket. Make sure all the legs on the EPROM are properly seated into the socket. The legs must not be bent under or over the socket.

5. Replace the cover and the screws on the SSC-500 Control Module. Close the control enclosure door.

6. Turn the disconnect switch to the ON position. The Initial Setup Procedure must be completed before proceeding. Please see page 24 of this manual.
OSHA 1910.217 Section (c) under General Requirements states:

(i) It shall be the responsibility of the employer to provide and insure the usage of “point-of-operation guards” or properly applied and adjusted point-of-operation devices on every operation performed on a mechanical power press.

This means that for every mechanical power press that is being used in United States industry, there must be protection for the operator by a guard or a device (safeguard). This protection may also be accomplished by the use of a combination of guards and devices.

When updating a power press, the most important decision is the selection of the proper guard or device. The following are methods of safeguarding part revolution power presses.

**Barrier Guards on Power Presses**

OSHA 1910.217 Section (c), General Requirements, (c)(2) Point of Operation Guards and Table 0-10
(Ref. enclosed MPPS, pages 19 - 20)

**Two-Hand Control on Power Presses**

OSHA 1910.217 Section (c)(3)(vii) Two-Hand Control (Ref. MPPS, pages 15 and 16)

**Light Curtain Presence Sensing Devices on Power Presses**

Light Curtain or Radio Frequency
OSHA 1910.217 Section (c)(3)(iii)(a)
Presence Sensing (Ref. enclosed MPPS, pages 16 - 17)

**Pullback (Pull-out) on Power Presses**

OSHA 1910.217 Section (c)(3)(iv)(b) Pull-out
(Ref. MPPS, page 18)
SECTION 9 — METHODS OF SAFEGUARDING MACHINES

SSC-500 Hydraulic Press Solid-State Control

Restraint (Holdout) on Power Presses

OSHA 1910.217 Section (c)(3)(vi)
Restraint or Holdout
(Ref. MPPS, page 18)

Type “A” or “B” Gate on Power Presses

OSHA 1910.217 Section (c)(3)(ii)(c)
Gate or Movable Barrier Device
(Ref. MPPS, page 18)

Auxiliary Safeguarding on Power Presses

Auxiliary safeguarding is additional protection from injuries for all personnel in the machine area. It is used in conjunction with primary safeguarding devices. Auxiliary safeguarding also involves the guarding of other components or hazardous openings on machines.

Auxiliary safeguards include such items as point-of-operation side end barriers when light curtains are used, pressure sensitive floor mats, workpiece tables or horizontal light curtains. Light curtains can be used horizontally to prevent an operator or other persons from standing between the vertical plane of light and the point-of-operation hazard.

Danger signs, used for warning, can be mounted on the machine in a position that is readily visible to the operator, setup person or other personnel. Hand tools can be used as auxiliary safeguarding. They are often used when feeding and retrieving small pieceparts. Hand tools themselves are NOT a point-of-operation safeguarding device.

Other Safety Considerations

Other areas of machine safety must be considered in order to comply to the OSHA Regulations and ANSI Standards as we know them. This includes, but is not limited to, items such as a main power disconnect switch, which must be provided for each machine, and a magnetic type motor starter for the main drive motor and slide adjust motor. Mechanical power-transmission apparatus of the machine, such as rotating flywheels, gears, sprockets, chains, and shafts, must be covered in accordance with OSHA 1910.219. As with all machinery, best safety practices must be a continuing program. The operator, die setter and all personnel must be fully trained and instructed on all safety procedures and have full knowledge of the safeguarding device being used.

Note: The preceding point-of-operation safeguarding options are explained in OSHA’s 1910.217 Standard for Mechanical Power Presses, ANSI’s B11.2 booklet entitled “Safety Requirements for the Construction, Care and Use of Hydraulic Power Presses.” Also see Rockford Systems’ booklet entitled “Mechanical Power Press Safety” (MPPS).

When using the devices described, for point-of-operation protection, sides and rear of hazardous area must be guarded to protect the operator and other employees in the machine area (OSHA Section 1910.212).
SECTION 11 — RETURN MATERIALS AUTHORIZATION FORM

SSC-500 Hydraulic Press Solid-State Control

To return material for any reason contact the sales department in our organization at 1-800-922-7533 for an R.M.A. Number. All returned materials shipments must be prepaid. Complete this form and send with material to 5795 Logistics Parkway, Rockford, IL 61109. Make sure the R.M.A. Number is plainly identified on the outside of the shipping container.

Company ____________________________________________________________

Address ________________________________________________________________________________________________

City __________________________ State __________________________ Zip __________

Phone __________________________ Fax __________________________

Contact Name __________________________ Representative __________________________

Items Authorized To Return on R.M.A. No. __________________________ Original Invoice No. __________ Date __________

Part No. Serial No. Description
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Service Requested ☐ Full Credit ☐ 25% Restocking ☐ Repair & Return ☐ Warranty Replacement

Reason for return (describe in detail):
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Return Materials Authorized by __________________________ Date __________

(Continued on next page.)

Rockford Systems, LLC
Call: 1-800-922-7533
This instruction manual references signs and literature available for your machines. This order form is for your convenience to order additional signs and/or literature as needed. (This order form is part of your installation manual so please make a copy of it when ordering.)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
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For prices and delivery, please use address, phone or fax number listed on the front cover of this manual.

Your Signature ___________________________ Date ________________________

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