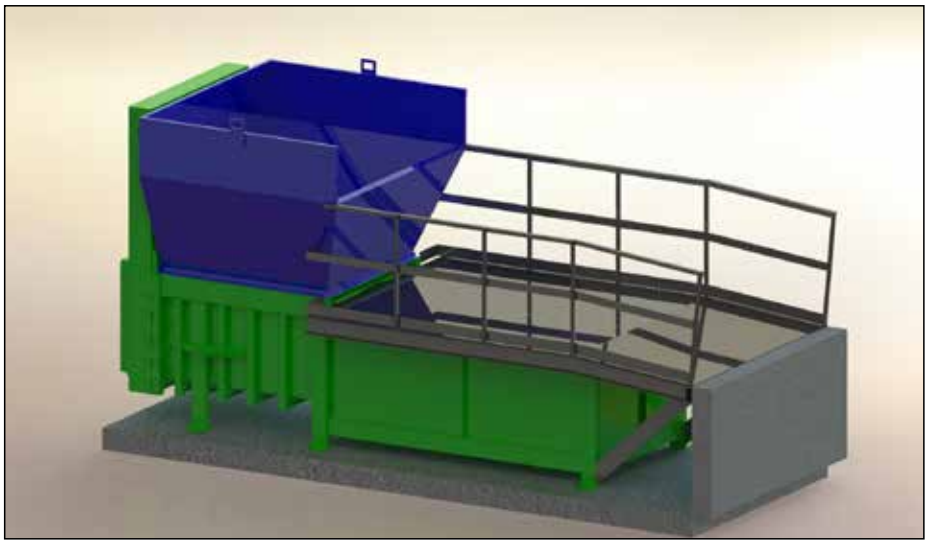
Hydraulic-Powered Pre-crusher/Compactors

Installation, Operation & Service Manual

HEAVY DUTY INDUSTRIAL

INDUSTRIAL



Heavy Duty Industrial Models

PC-3000-D
PC-4000-D
PC-6000-D
PC-7000-D
PC-9000

Industrial Models

PC-3000
PC-4000
PC-6000
PC-7000

ISP Industries, Inc.
Waste Handling Compactors & Dumpers for Wet or Dry Industrial and Commercial Applications

Built with Pride

Stop! Read the Following Safety Information Before Operating the Equipment

SP Industries, Inc., has made every reasonable effort to produce a product that will perform successfully and safely during its expected life span for the owners and persons operating the equipment. To increase the safety while operating this unit, all persons should closely follow these safety tips, as well as the safety guidelines in the ANSI Z245.2 Safety Standards for Stationary Pre-crusher/compactors booklet included with the pre-crusher/compactor and all OSHA guidelines.

1. As per OSHA standards, install safety rails and guards on walk ways, decks, and hopper openings. Check your local OSHA regulations for additional requirements.
2. Erect suitable barriers around cart dumpers, conveyors, etc. to keep personnel clear of hazardous areas during operation.
3. Make sure all access covers are in place before starting the machine.
4. Keep the pre-crusher/compactor working area clean, uncluttered, free of ice and snow, and especially free of oil and grease.
5. Locate the remote control head so the operator can clearly see the charging chamber, although the controls should not be mounted where the operator has access to the charging chamber.
6. Inspect the container binders and make sure they are securely fastened to the container as well as to the pre-crusher/compactor.
7. Secure the container door safety chain before attempting to elevate or transport the container.
8. Securely lock the container to the hoist frame before transporting.
9. **DO NOT** drop solid objects such as steel plate, steel bar, castings, concrete, etc. into the chamber, this type of material will seriously damage the pre-crusher/compactor compaction chamber and/or container; and will void warranty.
10. **DO NOT** stand near the pre-crusher/compactor when the ram is in motion; material may be ejected from the charging chamber and cause serious injury.

Procedures for Electrical Arc Flash and Shock Safety

References:
OSHA 29 CFR 1910 Subpart S; - OSHA 29 CFR 1926 Subpart K; NFPA 70 E-2012

WARNING: ARC FLASH, BLAST, AND SHOCK HAZARD
USE PROPER ELECTRICAL SAFE WORK PRACTICES

Installer and Operator Precautions

1. Prior to intentionally coming into contact with energized electrical conductors or circuit parts of 50 volts or greater with the hands, feet, or other body parts, with tools, probes (energized electrical work) a shock & hazard analysis shall be performed to determine the safe work practices required to perform that work (per the requirements of NFPA 70E - 2012).

2 Those safe work practices shall include at a minimum the identification of:

   a. Electrical shock and arc flash boundaries.

   b. Personal protective equipment to be worn.

   c. Need for electrically insulated measuring equipment & other tools.

3. Energized electrical work shall only be performed by/under supervision of a Qualified Person, as defined by OSHA & NFPA.

4. Qualified Persons shall be trained as defined by OSHA and NFPA.

5. All other workers performing energized electrical work shall be trained at a minimum to:

   a. Understand the specific hazards associated with electrical energy.

   b. Understanding the safety-related work practices and procedural requirements necessary to provide protection from the electrical hazards associated with their respective job or task assignments.

   c. Identify and understand the relationship between electrical hazards and possible injury.

   d. Other specialized work practices to be followed to perform work safely.

   e. Requirements for the use of an Electrical Hot Work Permit

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Pre-crusher/Compactor Safety Rules

Remote Control Head

The remote control head is supplied with a Keyed Off/On Switch, Start Button and a Stop Button. This remote control head must be permanently mounted within three feet of the point of operation.

Funnels
Hoppers
Chutes
Security Chutes

All Access doors and/or safety gates on factory built funnels, hoppers, chutes and security chutes are provided with factory installed interlock switches where required. If the funnel, hopper, etc. is installed at the job site, it is the responsibility of the installer to provide an interlock system so that the pre-crusher/compactor may only run when all safety gates and access doors are closed.

All factory built equipment is safety marked with applicable safety labels required by current ANSI Z245.2 Safety Standards. It is the responsibility of the owner to obtain these labels and apply them to all chutes, hoppers and funnels built by anyone at the site of the pre-crusher/compactor or built elsewhere and brought to the site for installation.

All funnels, hoppers, chutes and security chutes should be mounted to the pre-crusher/compactor with low hydrogen rod welds; smaller units may be bolted securely to the pre-crusher/compactor.

Loading Refuse

1. **DO NOT** enter the charging chamber.
2. **DO NOT** throw solid objects such as steel plate, castings, concrete blocks, etc. into the chamber, this type of material may seriously damage the pre-crusher/compactor and/or container. **Note: This will Void The Warranty.**
3. **DO NOT** operate dumping devices unless area is clear of all personnel. OSHA and the manufacturer require erection of suitable barriers when these devices are used.
4. **DO NOT** stand near the pre-crusher/compactor when the ram is in motion; material may be ejected from the charging chamber and cause serious injury.

To avoid falling into the compaction chamber, stay at a safe distance when loading refuse into the pre-crusher/compactor. After the refuse has been loaded into the chamber, stand at a safe distance during operation.

Tools Required For Pre-crusher/compactor Installation

1. Fork Lift Truck - To unload and position the machine.
2. Hilti Type Drill - For drilling holes in concrete to mount concrete anchors through the pre-crusher/compactor mounting feet.
3. Hand Tools - Various electrical and mechanical tools for connecting hydraulic hoses and electrical wiring.
4. Welder - For welding machine to cement embedded steel anchor pads if applicable or attaching loading hoppers, enclosures, etc.
5. Cutting Torch - To adjust or alter optional knock down chute if needed.

Power Lockout Procedure

The following are the General Industry Safety Division's minimum requirements for establishment of a Power Lockout Procedure.

A written power lockout procedure shall be provided.

All necessary employees shall be instructed on this procedure. Employees shall be instructed in and conform to the following procedures:

1. Alert the operator(s) that power is being disconnected.

2. Before starting repair, service or setup work on engine, motor or power driven equipment, person(s) performing work shall make sure power is disconnected (and any hazardous residual pressure shall be relieved) prior to and during such work. A padlock(s) shall be placed at the point of power disconnect where lockout is required by each person(s) performing work. Individual locks shall be used or an authorized employee of each crew shall be responsible for placing the lock and determining that each crew member is clear before removing the lock, or a supervisor may place a lock for which he has the only key, and assure that all crews are clear before removing the lock. Keys shall be removed at the time of lockout. Before work is started, equipment shall be tested to insure power is off.

3. No one other than person(s) placing padlock(s) on power lockout shall remove padlock(s) and restore power. (Exception: Supervisor may remove padlock(s) and restore power after a thorough check to make sure that no person will be exposed to danger.)

4. If it is necessary to work on a machine or installation to be continued by the next shift personnel, the padlock(s) of the original employees shall be removed by those employees in the presence of the oncoming shift who will immediately insert their own padlock(s) into the disconnect. All concerned personnel (operators, repairmen, and supervision) shall be thoroughly informed.

5. A machine connected to an electrical source by a plug-in cord shall be considered in compliance if the plug is disconnected and tagged, provided that the plug is a legal disconnecting means. (Plugs are acceptable as disconnecting means only for portable motors and 100V fixed equipment.)

6. Any equipment component that needs blocking to prevent its movement by gravity or other means must be blocked.

Installation Instructions

Lifting the Pre-crusher/ Compactor Properly

The pre-crusher/compactor can be off-loaded or moved from either the side or small pre-crusher/compactors can be lifted from the chamber end by securing it to the fork lift truck with a chain around the breaker bar:

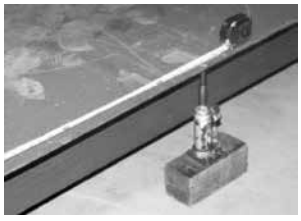
Lifting from the chamber end

Lifting from the side

The fork lift must be large enough to handle the weight of the pre-crusher/compactor. If the fork lift will not lift the unit or if the unit is unbalanced when lifted, the pre-crusher/compactor must be lifted with a larger fork lift or two fork lifts on opposite sides. To balance the pre-crusher/compactor when lifting from the side the forks must be positioned off center, closer to the chamber end, to compensate for the greater weight at this end.

Once the pre-crusher/compactor is in its approximate position, its position can be adjusted without lifting it completely off the concrete. Lift one end of the pre-crusher/compactor and shift it into position with the fork lift.

Leveling the Pre-crusher/ Compactor



1. Set the pre-crusher/compactor on the concrete pad.
2. Place a jack under the front of the compaction floor or floor support. Be sure that the jack is in the center of the floor using a tape measure as shown.
3. Raise the pre-crusher/compactor until both front legs are off the ground.
4. If both legs leave the floor at the same time, the concrete is level. Lower the pre-crusher/compactor and proceed to anchor the pre-crusher/compactor to the concrete.
5. If one leg is higher than the other, the concrete is not level. Lower the pre-crusher/compactor until one leg touches the concrete, then shim the leg which is still raised.
6. Once the leg is shimmed, anchor the pre-crusher/compactor to the concrete.

Anchoring the Pre-crusher/ Compactor

If the installation drawing guide lines are followed, enough clearance will be allowed for servicing internal parts through the rear or optional side access panels. Some units are equipped with top access panels only.

The pre-crusher/compactor must be bolted securely to a concrete slab and located as illustrated on the installation drawing. SP Industries recommends using anchorable mounting pads embedded in the concrete if new concrete is poured or anchors such as Thunderbolt Concrete Anchors if existing concrete is used. The installation drawing shows the mounting hole pattern and anchor pad layout.

CAUTION: If the concrete is not level, all four pre-crusher/compactor mounting pads will not be touching the cement. If this is the case, do not pull the legs to the concrete, the legs which do not touch must be shimmed then fastened securely. If the raised leg is pulled down, the frame could be twisted causing a gap between the ram and floor surface, resulting in undue jamming and premature floor wear.

Hydraulic Connections

The hydraulic connections may have loosened during shipment; therefore, they should be checked for tightness. When connecting the hoses from the power unit to the cylinder(s), apply thread sealant around or apply liquid pipe sealant to all male threads that do not connect to a factory supplied swivel fitting.

CAUTION: When using liquid pipe sealant, do not allow sealant to seep into the pump or valve; severe damage may result.

Hydraulic lines over and above standard hose length, usually ten feet, require schedule 80 pipe and 3,000 lb. pipe fittings. If the lines are more than 20 feet long, pipe with a larger diameter must be used to prevent pressure losses. Vibration can be lessened by using hydraulic hose between the cylinder connection and the pipe line, and between the pipe line and the power unit.

During operation, hydraulic hoses should not rub against an abrasive surface. When the ram changes direction, the pressure change will cause the hoses to move. Rubbing could cause leakage, usually starting in the form of a mist and eventually turning into a steady stream. An explosion could occur if an open flame came in contact with the leaking oil.

Hydraulic Fluid

The reservoir must be filled with a premium grade hydraulic fluid having a viscosity index of approximately 100, and a viscosity of 32 CST @ 40°C or an ISO VG32. Thermostatically controlled immersion oil heaters are recommended for extreme conditions. Also, the fluid must have anti-foam, anti-wear and water separating additives. Acceptable hydraulic fluids for all other conditions are as follows::

ShellT S2M32 Gulf Harmony 32 Shevron Rando HD 32

Exxon Nuto H32 Mobile D.T.E. 24

Electrical Connections

CAUTION: The electrical controls must be connected to the correct power source (230 or 460).

Power to the unit must be provided through a customer furnished fusible disconnect switch which shall be visible and accessible to the operator of the unit. Local electrical codes should be consulted for proper installation specifications.

The voltage that the unit is factory wired for is listed on the decal attached to the main electrical box door.

If the incoming line voltage differs from the power unit factory wired voltage, the motor connections, transformer connections, motor starter overloads, and the size of power line wires, if they are not rated for higher line current, must be changed. The wiring diagram will show the correct wire and overload size.

Initial Cycling

Before the unit is coupled to the container, it should be cycled several times, first in compactor mode, then in pre-crusher mode. During this cycling, observe all pipe and hose connections for leakage. If the pump makes loud or crackling noises and/or the ram jerks, stop the machine and tighten all intake connections to the pump from the tank. After smooth cycling is observed, stop the ram in the RETRACTED POSITION and check the fluid level on the sight gauge. If the sight gauge indicates that the reservoir is not full, add an acceptable type of fluid until the gauge indicates the reservoir is full.

Installation Instructions (cont.)

Container and Pre-crusher/ Compactor Alignment	One inch all around clearance should be observed when the container is connected to the pre-crusher/compactor charge opening, the compactor mating surface of the container should fit flush with the mating surface of the pre-crusher/compactor.If a gap is present on the top or bottom, the front or rear legs of the pre-crusher/compactor and/ or the wheels of the container, must be shimmed until proper alignment is reached. Do not over tighten the container hooks. The container should only be drawn snug against the pre-crusher/compactor.
Hopper Doors	f the pre-crusher/compactor is equipped with a hopper, security chute or safety gate which uses a safety interlock switch, the gate or door must be closed to operate the pre-crusher/compactor. With the interlock switch in a closed position, power will pass to the control system allowing the machine to operate. Adjustable decks and deck extensions must be installed so they are level. The center support arms of the deck must be welded to the pre-crusher/compactor side frame. Safety handrails must be installed on all decks as per OSHA standards.
Photo Electric & Infrared Eye Systems	If the pre-crusher/compactor is equipped with a photo electric eye or infrared eye, the reflector or receiver must be properly aligned opposite the eye to reflect the light beam and the light beam must be free of obstructions.
Additional Safety Rules	To comply with NSWMA (National Solid Waste Management Authority) guidelines for stationary compaction equipment along with current ANSI (American National Standards Institute) Safety Standards, SP Industries, Inc. has made every reasonable effort to adhere to this standard in the design of the machinery, controls, and safety devices of its compaction equipment. If SP Industries Inc. does not install the equipment, it is the responsibility of the owner to comply to the following safety rules.
Remote Control Head	The remote control head is supplied with a Keyed Off/On Switch, Start Button, Stop Button with a Container Full Warning Light, and a Compactor/Pre-crusher Mode Switch. This remote control head must be permanently mounted within three feet of the point of operation.

Installation Instructions (cont.)

Funnels, Hoppers, Chutes, Security Chutes	All access doors and/or safety gates on factory built funnels, hoppers, chutes and security chutes are provided with factory installed interlock switches where required. If the funnel, hopper, etc. is installed at the job site, it is the responsibility of the installer to provide an interlock system, so that the pre-crusher/compactor may only run when all safety gates and access doors are closed. All factory built equipment is safety marked with applicable safety labels required by current ANSI Safety Standards. It is the responsibility of the owner to obtain these labels and apply them to all chutes, hoppers and funnels built by anyone at the site of the compactor or built elsewhere and brought to the site for installation. All funnels, hoppers, chutes and security chutes should be mounted to the compactor with low hydrogen rod welds; smaller units may be bolted securely to the pre-crusher/compactor.
Dumpers	It is the owner's responsibility to provide suitable safety enclosures and/or gates for all dumpers. Safety interlock switches enabling the dumper to be operated only when gates are closed must be mounted on all gates leading to the dumping area. SP Industries, Inc., can provide safety decals to post on or near safety enclosures and gates constructed on the job site. The dumper controls, except on remote units, are mounted in the remote control box with the pre-crusher/compactor controls. The controls consist of a mushroom type Start/Stop Button, similar to the Compactor Start/Stop Button, but tagged "DUMPER, PULL TO START, PUSH TO STOP" and an Up/Down Selector Switch. Pushing either the Dumper Start/Stop Button or the Pre-crusher/Compactor Stop Button will stop the dumper in any position. When the light is "on" in the Dumper Start/Stop Button, this indicates that the dumper motor is running.

Pre-crusher/Compactor Operation

The pre-crusher/compactor has three modes of operation. These are compact, precrush and pinning boost override.

Before operating the pre-crusher/compactor in any mode, a compaction container must be attached to the charge opening.

The controls, other than the pinning boost override system controls, are mounted in the main control panel or a remote control head. Pinning boost override controls are mounted for convenience on the side of the compactor near the charge opening.

Compact Mode

CAUTION: The Power supply to the controls MUST BE TURNED OFF while adjustments in the control panel are made.

1. Set 4SS (Precrush/Compact Mode Switch) in the “compact” position.
2. Set 1TR (Thirty Minute Cycle Timer) as desired. The machine can be set to cycle from one complete cycle to a thirty minute cycling time. Set the timer for 10-15 seconds less than the time needed for the desired number of cycles.
3. 1SS (Off/On Selector Switch) should be set in the “on” position.
4. 2SS (Pin/Off/Run Selector Switch) should be set in the “run” position. 2SS should only be switched when manually jogging the ram back and forth. Usually it is only used by the container hauler.
5. After steps 1-4 are completed, the electrical disconnect may be switched to the “on” position.
6. PUSH THE START BUTTON. In this mode, the machine will continue to run until:
    a. 1TR has timed out, stopping the ram in the retracted position.
    b. The ram is unable to reach the limit switch because of a full load or an obstruction.This will be indicated when the full container light comes on. Before the automatic mode will continue, the Stop Button must be pushed to reset 2TR.
    c. The Stop Button is pushed.

CAUTION: Do not allow personnel unfamiliar with this equipment to make adjustments and modifications to factory settings.

Precrush Mode

In order for the pre-crusher/compactor to be used in the precrush mode, the Pin/Off/Run Switch must be set in the run position, the Keyed Off/On Switch must be in the "On" position and the Precrush/Compact Mode Switch must be in the precrush position. The cycle will begin when the Start Button is pushed and held for approximately one second, then released.

The pre-crusher will continue to run until 1TR has timed out, the Stop Button is pushed, the Keyed Off/On Switch is turned off or the container is full.

1. Set 4SS (Precrush/Compact Mode Switch) in the "Precrush" position.

2. Set 1TR (Thirty Minute Cycle Timer) as desired. The machine can be set to cycle from one complete cycle to a 30 minute cycling time. Set the timer for 8 seconds less than the time needed for the number of complete precrush cycles desired.

3. Set 1CTR (Precrush Counter) to desired number of precrush strokes up to a maximum of nine.

   NOTE: To set the number of precrush cycles that the counter is factory set for, turn 1TR to its maximum setting to record the time needed for the number of complete precrush cycles desired, then reset 1TR for 8 seconds less than the recorded time.

4. Set 1SS (Off/On Selector Switch) to the "On" position.

5. Set 2SS (Pin/Off/Run Selector Switch) to the "Run" position.

6. After steps 1 - 5 are completed, the electrical disconnect may be switched to the "On" position.

7. Push the start button. The pre-crusher cycle will run through the following steps:

   a. If the pre-crusher gate is open when the precrush cycle begins, the ram will move forward into the container to clear any refuse remaining in the chamber. The gate will close, sealing the charge opening, after the ram moves past the gate during its return stroke.The first precrush cycle will start as soon as the ram reaches the retracted position.

   b. The ram moves forward crushing the material in the charge chamber against the gate.

   c. If the pre-crusher counter has been set for more than one precrush cycle, the ram can no longer move forward and the system has reached its maximum pressure, the ram will retract completely and step 2 will be repeated.

   d. When the predetermined number of precrush cycles have been completed, pressure will be released from the ram and the gate will open.

   e. Once the gate is open, the ram will resume its forward movement and compact the material into the container, then begin to retract.

   f. After the ram has retracted approximately two feet past the gate, the ram movement will stop and the gate will close.

   g. When the gate is closed, the ram will continue to retract until the charge chamber is cleared.

As mentioned above, the number of precrush cycles is controlled by counter 1CTR located inside the main control panel. This counter will allow the ram to precrush the material within the charge chamber from one to nine times before the gate will open.

In addition, the unit is controlled with an automatic multi-cycle system which operates as described above. However, when the unit is in the precrush mode additional time must be added to the timer to complete more than one cycle, especially if counter 1CTR is set for more than one precrush cycle.The operator must review the operation and adjust the counter and timer to best suite the waste handling system's needs.

IMPORTANT NOTE: Set 1TR for 8 seconds less than the time needed for the number of complete cycles desired.

Jogging Machine for Pinning Operation and Manual Operation of Precrush Gate

NOTE: Controls are normally mounted on the left front corner of the pre-crusher/ compactor.

1. Use key to turn 2SS (Pin/Off/Run Selector Switch) to the "Off" position. Two operations may now be performed:
   a. Manually raise or lower the gate.
   b. Manually extend or retract the ram.
2. Manually raising or lowering the gate.
   a. Turn 2SS to the "Pin" position and hold.
   b. While holding 2SS, turn and hold 5SS (Pre-crusher Gate Up/Down Switch) in either the "Up" or "Down" position.
3. Manually extending or retracting the ram.
   a. Turn 2SS to the "Pin" position and hold.
   b. While holding 2SS, turn and hold 3SS (Retract-Run-Extend SelectorSwitch) in either the "Retract" or "Extend" position.

NOTE: To pin a load, the gate must be in the completely up position.

Options

Immersion Oil Heater	The heater is adapted to the one inch NPT half coupling at the end of the tank under the electrical box and necessitates the use of a larger transformer. The heater is thermostatically controlled to maintain oil temperature at the desired setting during cold weather. The heater will maintain the temperature only while the disconnect supplying power to the electrical box is in the “on” position.
Advance Warning Light	The advance warning light consists of a pressure regulated switch, an additional relay and a warning light which is mounted in the remote control panel. The purpose of this system is to alert the operator when a pressure less than the maximum operating pressure is reached. The pressure is factory set at 400 PSI below maximum operating pressure. This will allow the advance warning light to indicate when the container is approximately 75% full giving the operator time to contact the hauler to change containers for minimal compactor down time.
Hydraulic Cart & Container Dumper	A hydraulic dumper consists of a side, deck, or remote mounted dumping mechanism; and a separate motor, valve, pump and operating controls. A typical dumper will have its hydraulic components mounted on the same reservoir as the pre-crusher/compactor’s hydraulic components and the operating controls in the same control box as the pre-crusher/compactor’s operating controls. The dumper may be started with or without operating the compactor as long as 2SS is in the “Run” position, 1 SS is in the “On” position and the pre-crusher/compactor stop button is in the closed (up) position.
Low/Hot Oil Warning System	The low/hot oil warning system consists of reservoir mounted, low oil and hot oil sensing devices, a warning light, and an additional relay. The low sensing devices send a signal to the warning light, mounted with the other controls, and shuts the motor/pump off when the oil level is dangerously low or hot. When the light comes on, the reservoir hydraulic fluid must be checked and filled to the proper level as read on the oil sight gauge and/or replaced if damaged from excessive heat. The cause of the low or hot oil condition must be determined and repaired before the motor is started again.

Options(cont.)

Programmable Cycling	The programmable cycling system consists of an additional timing device, an additional relay, extra starter mounted contacts, and a warning strobe light and buzzer mounted on top of the electrical box. **WARNING:** When a programmable cycling system is used, special precautions must taken to make the compaction area off limits to all unauthorized personnel. All safety devices such as warning lights, etc. must be working properly and all chute and hopper doors and gates must be closed and locked when not in use for dumping purposes. Once the compactor has been started, it cycles automatically until the stop button is pushed or the end of the preset cycle time is reached. 1 TR allows the compactor to cycle for its preset amount of time. 3 TR allows the compactor to maintain an “off” condition for its preset amount of time. To operate the programmable system, set the switches in the following positions: 1 TR set for desired “on” time 3 TR set for desired “off” time 1 SS set to “run” position Turn the power to the electrical panel on. Push the Start Button. To immediately stop the cycle at any time, push the Stop Button. In order to make the system inoperative, remove 3 TR from the electrical box.
Photo Electric, Infrared, & Ultra-Sonic Start Systems	The photo electric, infrared, or ultra-sonic start systems consists of a photo electric, infrared, or ultra-sonic eye assembly, a reflector or receiver, and a warning strobe light and buzzer. The controls are set the same as the controls for the automatic mode, page 9-10. The cycle will start automatically after the material in the compaction chamber builds up to a point where it blocks the signal between the eye and the reflector, and the warning light and buzzer have been activated for 15 seconds. The compactor will continue to cycle until 1 TR reaches its preset cycle time, the container is full or the Stop Button is pushed.
Additional Remote Control Station	If the compactor is to be operated from more than one location, additional remote control stations are available. All stations will have Keyed Start Switches, Start and Stop Buttons. In order for the machine to operate properly, ALL Keyed Start Switches must be in the “On” position. All stop buttons MUST be wired in series and be in the closed (up or out) position.

Maintenance

CAUTION: Before performing any maintenance on the pre-crusher/compactor or power unit, shut off the power at the disconnect switch and lock this switch in the "Off" position, **(see Power Lockout Procedure on page 6)**. Do not service the machine if it is possible for someone to start the machine while it is being serviced.

Gate Cylinder Cavity Cleaning

The gate cylinder cavity must be checked monthly for material or trash buildup that may prevent the gate from opening completely. If there is a buildup, the gate cylinder access covers can be removed to clean the cylinder cavities.

Strainer Cleaning

SP Industries Inc. power units use a permanent type oil strainer which may be reused after each cleaning. To keep down time at a minimum while cleaning the dirty strainer, replace it with a spare clean strainer. The dirty strainer may then be cleaned as follows:

1. Soak the strainer in kerosene or other solvent to loosen the contaminant.
2. Lightly scrub the strainer with a soft bristle paint brush. **DO NOT USE A WIRE BRUSH.**
3. Remove embedded contaminants with clean, dry shop air. Direct the flow of air against the inside of the strainer with a perforated support.
4. Again, wash the strainer in a solvent and blow with shop air, then inspect for damage. Holes in the strainer cloth will leak dirt into the pump and valve which may cause malfunctions in the hydraulic system. See the chart below for recommended strainer change frequency.

Usage	Strainer Change Or Clean Frequency
Heavy: 6 Hrs. Per Day	Initial change after 2 weeks Thereafter every 3 months
Medium: 2-6 Hrs. Per Day	Initial change after 3 weeks Thereafter every 6 months
Light: Up to 2 Hrs. Per Day	Initial change after 4 weeks Thereafter every 12 months

Initial Maintenance Check

The first maintenance check should take place with the strainer filter change and include the following:

1. Check and tighten all electrical and hydraulic connections on the power unit, control head, and cylinder.
2. Check and tighten all mechanical fasteners, nuts, bolts, set screws, etc.
3. Drain some hydraulic fluid from the bottom of the reservoir by removing the 3/4” plug from the half coupling under the oil level gauge. Inspect the fluid for the presence of water. Drain all water.
4. Check the wear guide shoes, or Nylatron guide blocks, located on the rear of the ram, for looseness and unreasonable wear. Call a factory authorized representative if wear seems excessive or uneven.
5. Check the gate cylinder cavities for material or trash build up. If material build-up prevents the gate from opening completely, the gate cylinder access cover must be removed and the cavity cleaned out.
6. Check the ram hold down bars for wear. If the gap is greater than 5/16” between the ram top and the hold down bars, contact the factory.

Hydraulic Fluid Changes

Under normal conditions the fluid can be used for an indefinite time. If you suspect that the fluid has been contaminated or has otherwise lost its usefulness, drain off some of the fluid, take it to an oil distributor and have it analyzed.

The bottom of the reservoir should be inspected every 12 to 18 months for sludge deposits. If there is a detectable layer of sludge, the reservoir should be drained, flushed with kerosene or another suitable solvent, then refilled with clean hydraulic fluid.

Cold Weather Operation

Recommended oil may be used for all but extremely cold temperatures. An immersion oil heater is recommended for an area where temperatures are expected to frequently reach 0° F or below.

Troubleshooting

Motor Fails to Start

NOTE: When calling SP Industries for information, you must have the serial number of the pre-crusher/compactor available.

1. Check that all switches are in their proper positions. The Pin/Off/Run Selector Switch must be in the “Run” position. The Off/On Switch must be in the “On” position.
2. If applicable, check to make sure all safety gates or doors are closed to energize interlock switches.
3. Check the container full warning light. If the light is on, the container may be full or the ram may be jammed by an object in the charging chamber. If the container is full, change containers; if the compactor is jammed, clear the jam, see page 10. Once the problem is resolved, push the Stop Button to reset the system, then start the compaction or precrush cycle.
4. Check the 4 amp fuse located in the main control box.
5. Check for proper line voltages going into and out of the transformer.
6. Check for “kicked-out” overloads on the motor starter.
7. Call the dealer, factory or an electrician if 1 through 7 check out, but the motor still fails to start.

Motor Starts But Ram Fails To Move

1. Check the level of hydraulic fluid in the reservoir. If it is low, add hydraulic fluid until it reaches the proper operating level.
2. Check the rotation of the motor. The shaft must rotate in the direction of the arrow decal on the motor housing.
3. Check the motor and pump coupling. The motor coupling must be in contact with and turning the pump coupling.
4. The ram operating limit switch, located inside the machine between the hydraulic cylinders in the forward position (See photo page 21), must be both in an operable condition and actuated by the ram. Adjust the limit switch arm if necessary. If the limit switch is inoperable when the ram moves forward, the unit will shut off and the red full container light will illuminate. If the limit switch is inoperable when the ram is retracted, the ram will stop at the rear position and system pressure will read the same as container full pressure; however, the full container light will not illuminate and the motor will not shut off.

CAUTION: The cylinder may be seriously damaged if the limit switch is improperly adjusted. The limit switch must be actuated 1/2” before the cylinder reaches the end of its stroke. If the arm is not correctly adjusted and the cylinder is reaching the end of its stroke, a loud banging noise will be heard when the ram changes direction.

5. The Timing Relays must be properly set **(see Steps 1 & 2, pages 10 or 11)**.
6. The Directional Control Valve may be stuck in the neutral position or the valve solenoid may be defective. To dislodge the control valve, insert a small rod into the end of the solenoid housing and push in while the motor is running; the ram should move forward. If the ram does not move, the spool may be inoperative.
7. Check whether or not the pump is building pressure. If not, it may be defective. To check the pressure, install a pressure gauge in the 1” tee provided on the pump side of the circuit control module. Take the 1/4” plug out of the tee for pressure gauge installation. (See photo page 20)
8. If 1 through 7 fail to resolve this problem, a cylinder may be defective. Contact the factory for further information.

Motor Starts, Ram Operation Normal, Gate Fails To Move

1. Is the Mode Switch (4SS) in the Precrush position?
2. Check the Ram Retracts Past Gate Limit Switch inside the compactor between the hydraulic cylinders (See Photo Page 21). If the limit switch is loose, stuck, or the arm is held forward or backward by trash accumulation; it will not initiate the cycle for the gate to come down during the ram reverse stroke. This will only allow the machine to function as a compactor. Tighten, free or replace the limit switch as needed.
3. If the gate is down and the ram moves against the gate on the last precrush stroke, but the gate doesn't open.
   - a. Replace the 1/4" plug in the tee entering the circuit control module with a pressure gauge if gauge has not been installed.
   - b. If the pressure is 1800 PSI or higher, the pressure switch may be sticking or malfunctioning. a. Turn the Compact/Precrush Mode Switch to "Compact" mode. Push the Start Button.
     - 1) If the gate goes up:
       - a) Check Relay #6 (Ram Extend Relay) for proper operation.
       - b) If Relay #6 is operating correctly, the pressure switch may be malfunctioning. (See Item 2 on Photo Page 20)
       - c) Check for hydraulic obstructions in the pressure switch.
       - d) Check the pressure switch's electrical mechanism for proper operation.
       - e) Contact the factory for more information.
     - 2) If the gate does not go up:
       - a) Check Gate Open Limit Switch for correct operation. It may be stuck in the up position or the arm may be out of adjustment. (See Photo Page 21)
       - b) Check relay #7 (Gate Open control Relay) for proper operation.
       - c) Contact the factory for more information.

Gate Does Not Come Down During Precrush Stroke

1. Check the Gate Open Limit Switch for correct operation.
2. Check the Ram Retracts Past Gate Limit Switch for proper operation.
3. Check relay #7.
4. Contact the factory for more information.

Gate Does Not Come All The Way Down

Often during the first operation of the day or in cold weather, the gate may not come all the way down. Once the machine has warmed up, it should operate normally. However, if the gate consistently fails to close all the way timer 2TR should be adjusted for more time. It should normally take between 6 and 7 seconds for the gate to close completely.

After The Gate Closes, The Ram Hesitates While Retracting

When the pre-crusher/compactor is started in the precrush mode after the system has been completely shut off, the ram will pause during retraction for approximately eight seconds, then continue to operate normally. This is normal operation if the system is set for more than one precrush cycle.

Servicing Components

CAUTION: Before attempting any repairs on the pre-crusher/compactor or power unit, shut off all electrical power at the disconnect switch and lock this switch in the "off" position, **(see Power Lockout Procedure on page 6)**. Make sure that no one can start the machine while it is being serviced.

The following procedures should be used when replacement of any component is necessary.

Motor

1. Remove the wiring plate from the side of the motor.
2. Loosen and remove the 4 or 6 wire nuts fastening the power wires and the motor leads.
3. Take the electrical lock nut off the fitting where the conduit enters the motor, then drop the conduit out of the hole.
4. Support the pump to keep it fairly stable. Then, remove the 4 bolts holding the motor to the pump mounting bracket and move the bracket away from the motor slightly.
5. Remove the four bolts which hold the motor to the hydraulic tank.
6. Making sure the new motor is of proper size and voltage, use the removal steps above in reverse order to install the new motor. If a C-face motor is in use, the following warning is automatically taken care of by the C-face flange.

WARNING: When installing a motor, the coupling alignment between the pump and the motor must be very accurate. Pump manufacturers recommend an alignment with ±0.005 inch tolerance. Excessive misalignment will usually cause leaking pump shaft seals, short bearing life in the pump and motor, and/or short total pump life. Shim the pump or motor with banding material, small washers, etc., if necessary. (This warning is applicable only when a nose cone has not been used to couple the pump to the motor.)

Pump

1. Remove the bolts from all 3 (inlet port, primary pressure port, and secondary pressure port) 4-bolt pump flanges.
2. Remove the 2 bolts holding the pump to the pump mounting bracket, then remove the pump.
3. Remove the half-coupling from the pump shaft.
4. Install a new pump in reverse order. If a C-face motor is in use, the following warning is automatically taken care of by the C-face mounting nose cone.

WARNING: Care must be taken when aligning the coupling between the pump and motor. Pump manufacturers recommend an alignment with ±0.005 inch tolerance. Excessive misalignment will usually cause leaking pump shaft seals, short bearing life in the pump and motor, and/or short total pump life. Shim the pump or motor with banding material, small washers, etc. if necessary. (This warning is applicable only when a nose cone has not been used to couple the pump to the motor.)

Directional Control Valve

1. Remove the wiring plate, wire nuts, wiring conduit, and conduit fitting.
2. If the unit has a pressure switch mounted on the valve body, remove it at this time.
3. Remove the 4 or 6 mounting bolts holding the valve to the manifold block. Remove the valve.
4. Replace with a new valve in reverse order, making sure all O-rings are installed and properly placed. If an O-ring is left out or pinched between the valve and manifold, the fluid will leak.
5. All valve mounting bolts must be torqued as indicated on the hydraulic schematic.

Relief Valve

If a relief valve must be changed in whole or part, the systems relief pressure must be reset. If the correct factory pressure setting is not known, call the factory for information.

Hydraulic Hoses

SP Industries Inc. compacting units are equipped with SAE rated hose. All hoses must be replaced with hoses of the same type.

The SAE number is stamped or impressed on the outer layer of the hose. If there are any questions, call the factory. Make sure that no part of the hose rubs against an abrasive surface during machine operation. This rubbing could eventually cause a leak, creating a low oil level in the reservoir and a fire hazard.

Limit Switch

When removing a limit switch, the replacement must have the same sequence of normally open and closed contacts. If the switch is wired differently, the electrical system will not perform correctly.

When setting the limit switch actuator, the switch must be actuated before the cylinder bottoms out in either direction. A loud banging noise at the end of the stroke will indicate that the cylinder is bottoming out. This will shorten the life of the cylinder bushings, seals, and packings. The limit switch should be actuated between 1/2 to 1 inch before the end of either stroke.

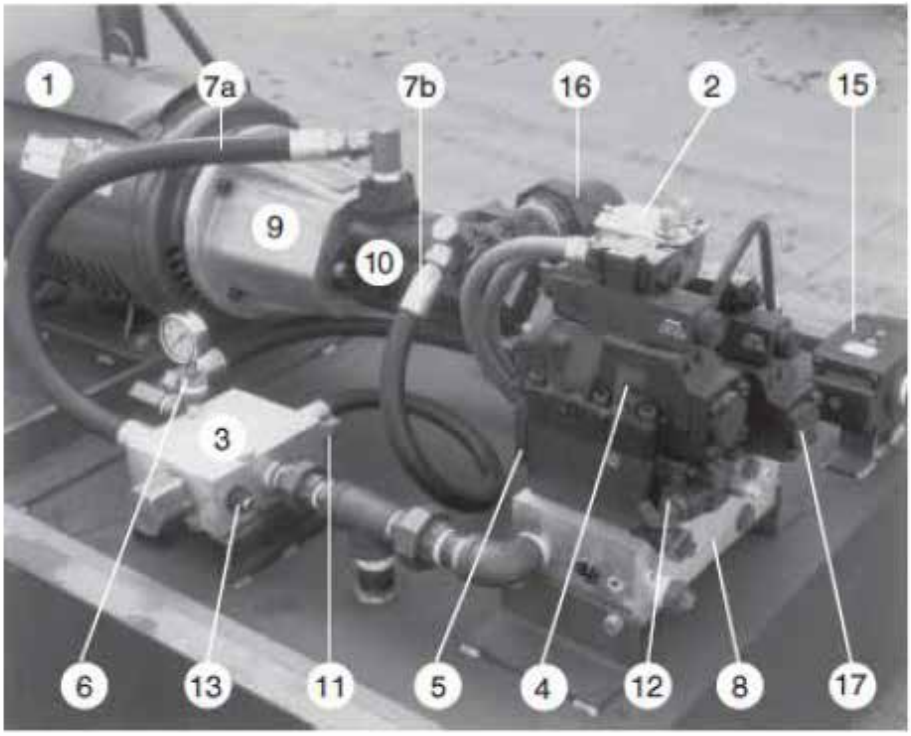
Ram Guide Blocks

The side guides should be adjusted to make firm contact with the pre-crusher/ compactor frame sides.

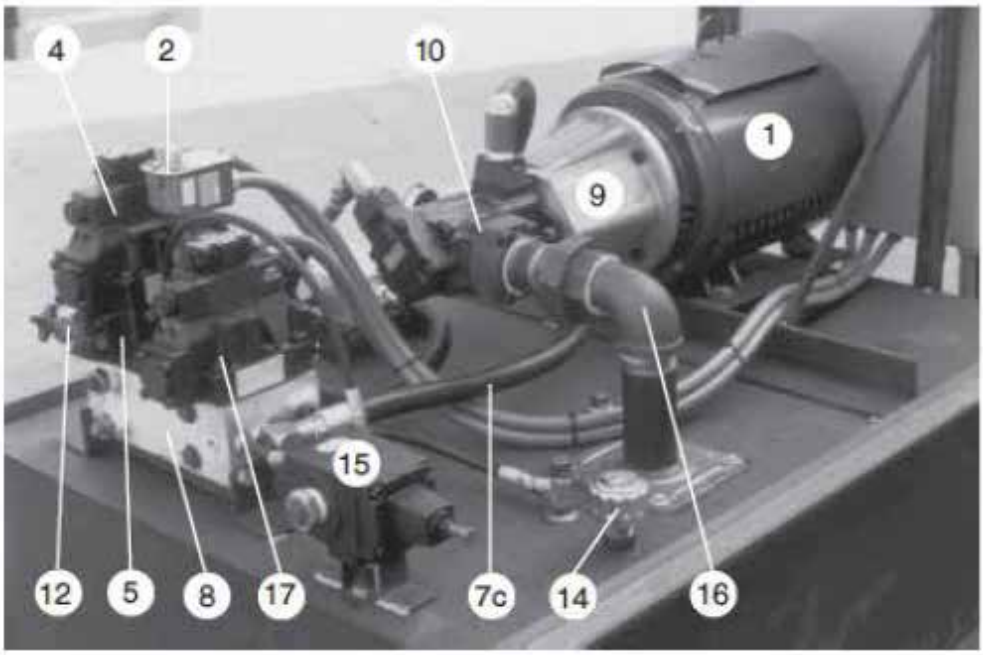
Top guides should be adjusted 1/2 turn clockwise after meeting the guide rail squarely. Bottom guides should be adjusted with an 1/16” to 1/8” gap between the block and the guide rail. Over tightening these blocks may result in excessive wear.

Servicing Components (cont.)

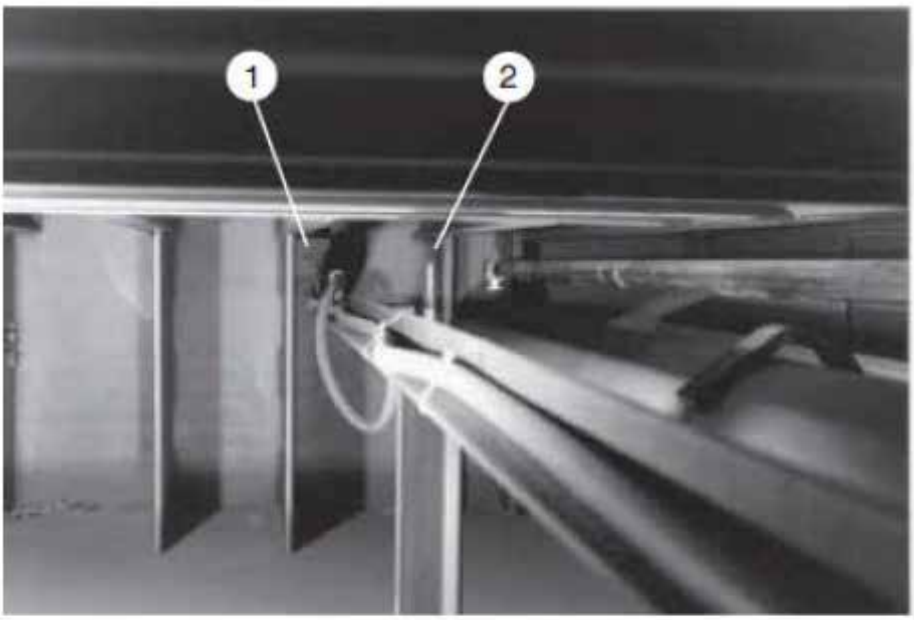
Cylinder Piston Seals	Loss of power in the hydraulic system may be caused by any one or more of the following: 1. Defective relief valve (broken spring, scored ball, etc.) 2. Defective pump (pump seals, defective vanes or gears, etc.) 3. Defective directional valve (scored spool, etc.) 4. Leakage through rod end of the cylinder (rod seals, scored rod) 5. Internal cylinder leakage through the piston seals. SP Industries Inc. recommends that before making an attempt to replace the piston seals, check items one through three. If these parts are in good condition and a power loss is still experienced, the piston seals will most likely have to be replaced. If the internal cylinder walls are found to be scored with deep scratches and grooves, new seals will not eliminate the leakage; the entire cylinder must be replaced. New piston seals must be of the same make and model. Extreme care must be taken not to score, tear, or otherwise damage the seals during installation.
Relays	Install the same type of relay with the hole locater in the right position.
Timers	Install the same type of timer adjusted to the proper setting.
Starters	Install the same size starter with a 120 volt coil. All wires must be installed in the correct positions.
Motor Overloads	Install the correct size and make overload. Overload charts are provided with each starter.
Transformers	Install a transformer with the same KVA rating. Connect the wires in their correct positions.
Circuit Boad	If the wires are not numbered, number them before removing to assure that all wires will be attached to the new board correctly.
Switches	Install the same type of switch. If one is not available use a switch which performs the same functions in the exact same manner.



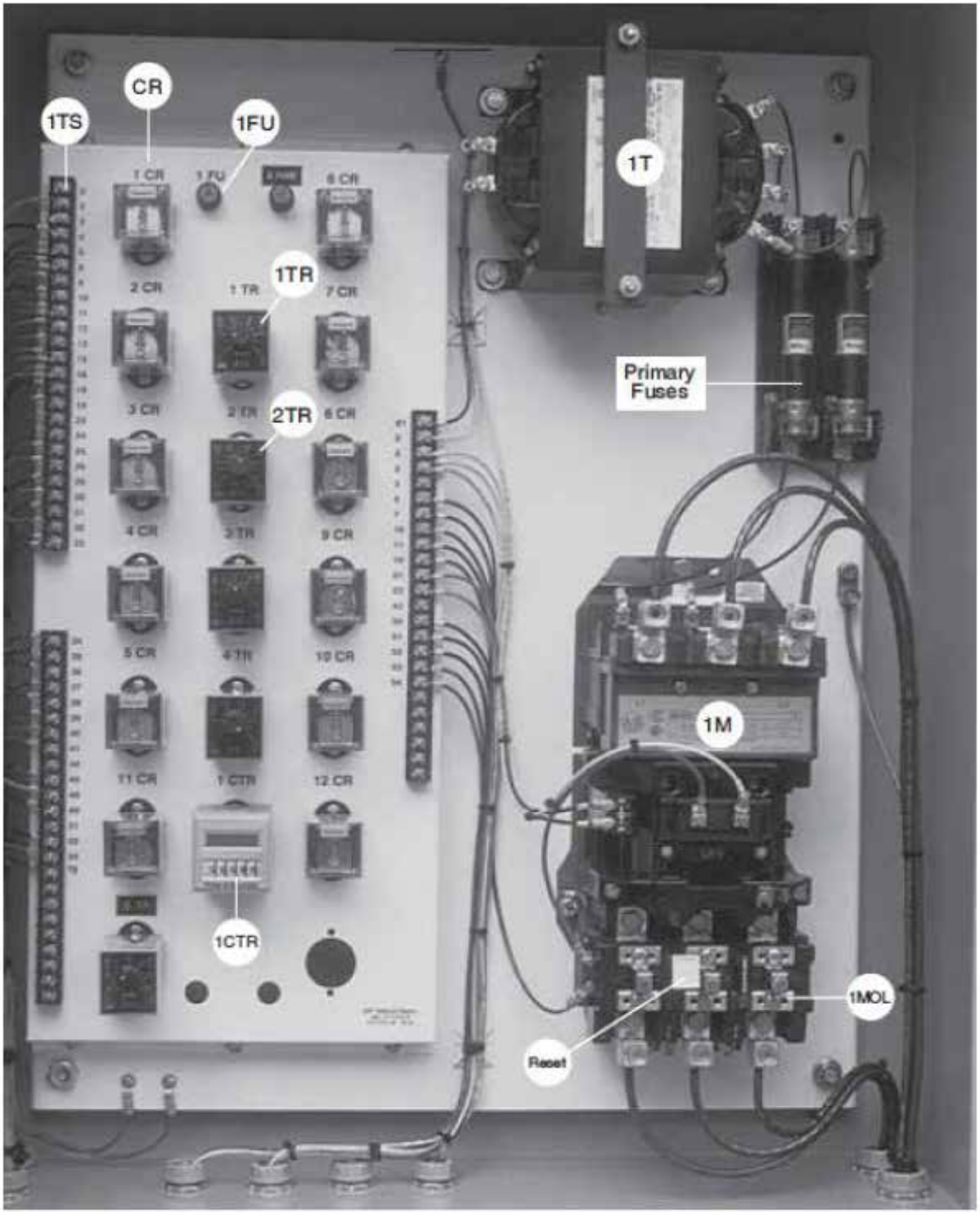
1. Motor (30 HP Shown)
2. Pressure Switch
3. Circuit Control Module
4. Gate Directional Valve
5. Pressure Reducing Valve
6. System Pressure Gauge Port
7. Pressure Hoses (7a, 7b, 7c)
8. Manifold
9. Nose Cone
10. Pump
11. System Relief Valve
12. Gate Pressure Gauge Port
13. Hi-Lo Adjustment
14. Filler/Breather
15. Dump Valve
16. Pump Inlet Line (Filter In Tank)
17. Precrusher Ram Directional Valve



3LS Gate Limit Switch



1. 1LS Limit Switch for changing direction of ram travel.
2. 2LS Ram Retracts Past Gate Limit Switch



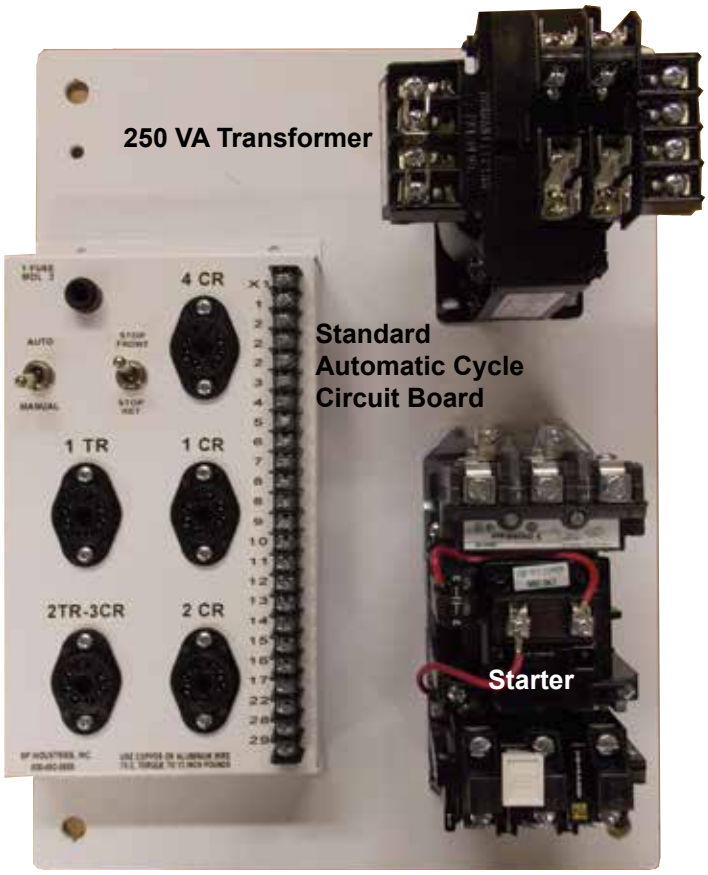
1TS	Terminal Strip (3 Each)	1T	Transformer
1FU	Fuse	1M	Motor Starter
1MOL	Overloads	1CTR	Counter
1TR	Cycle Timer	2TR	Gate Down Timer
CR	Control Relays		Primary Fuses

Component Photo References

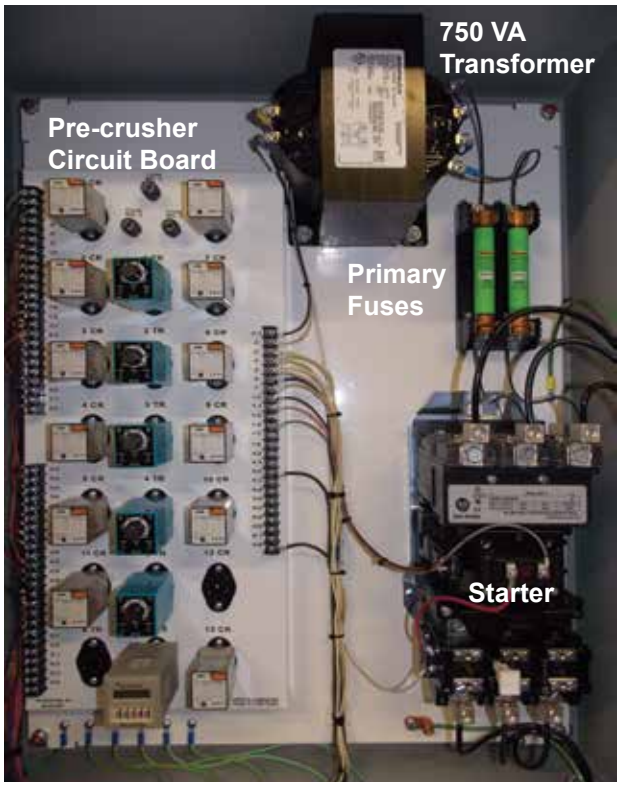
Automatic Cycle with Advance Warning Light and Dumper Remote Control Station

Pinning/Boost Override System Controls (mounted on the side of the pre-crusher/compactor)

Standard Automatic Cycle Remote Control Station



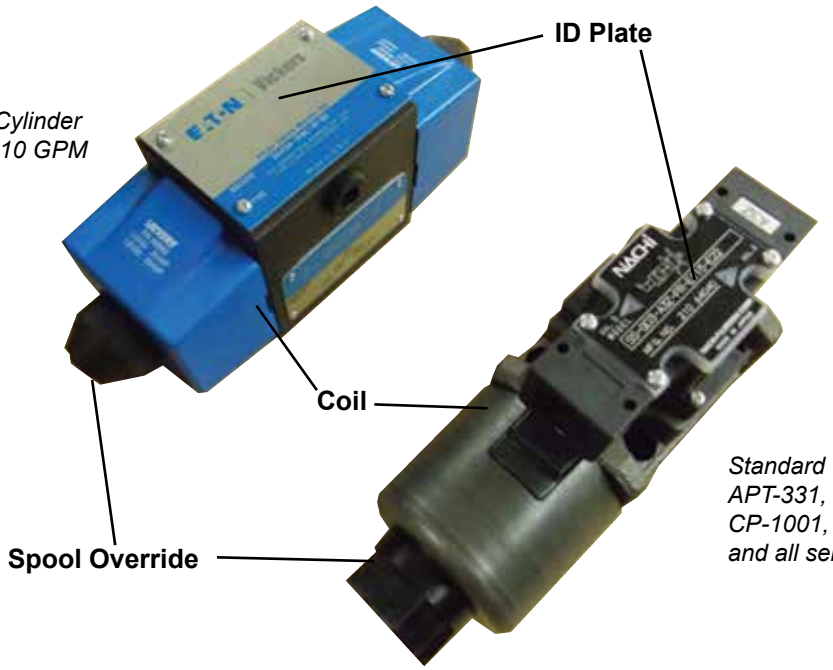
Standard Automatic Cycle Control Panel for Stationary Pre-crusher/compactors



Pre-crusher Control Panel

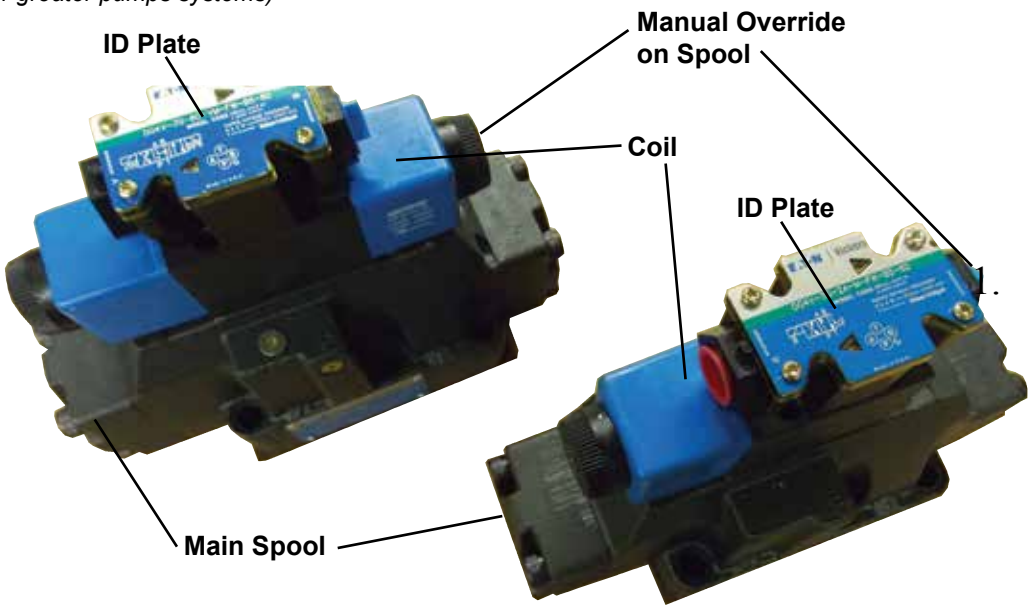
Component Photo References

Valve for Double Cylinder Dumper with 6 or 10 GPM Pump System



Standard Valve for:
APT-331, CP-331, CP-711,
CP-1001, CP-2002, CP-2101,
and all self-contained models

Standard Directional Valve for:
CP-6002, CP6002-D,
CP-7002, CP-7002-D
Pinning/Boost Override System
(on 7.5 GPM or greater pumps systems)



Standard 3/4" Directional Valve for:
CP-2101-HD, CP2102,
CP-3101, CP-3101-HD,
CP-4101, CP-4101-HD,
CP-6101,
CP-2202, CP-3002,CP-4002

Component Photo References

One Circuit Pressure Switch

Component Photo References

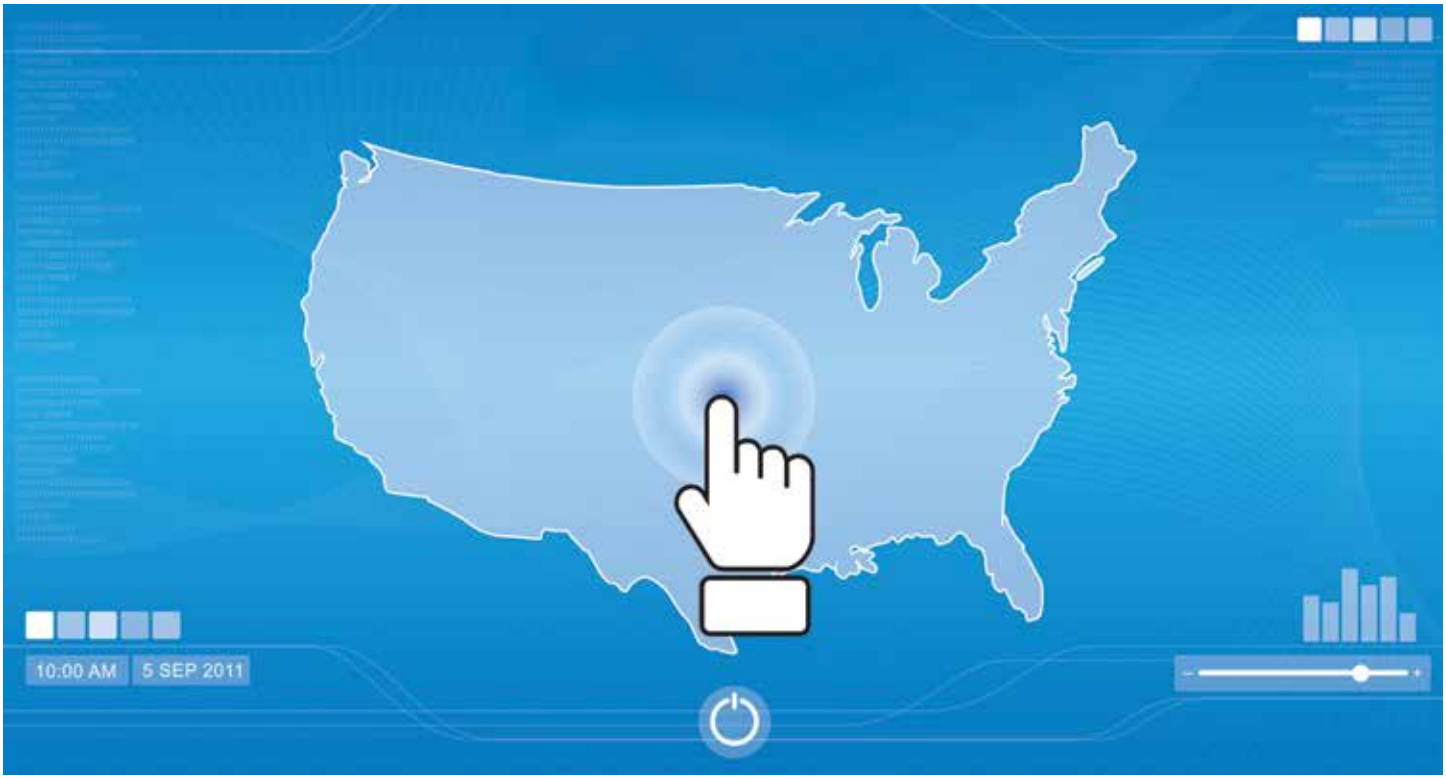
1 and 2 are closed at extend only
3 and 4 are open at extend only
5 and 6 are open at retract only
7 and 8 are closed at retract only

802T-NPTE

All Automatic Cycle 802T-NPTE:

LS#	*W#*
1	*X*
2	*X*
3	*8*
4	*12*
5	*8*
6	*10*
7	*8*
8	*11*

SP Industries Products & Service Nationwide



"Let Your [Index] Finger do the Walking"

SP Industries products and services are available nationwide from our sales and service staff and our network of authorized factory-trained dealerships.

For more information or to discuss your specific application requirements, click the map above or call our home office 8am-5pm EST.

Our new EM Series are 100% electromechanical:

- *Completely eliminate hydraulic fluid and hoses*
- *Free up floor space*
- *Eliminate bulky power units*
- *Provide safer operation with 24-volt control system*
- *Eliminate the risk of hydraulic fluid contamination*

Designed for environmentally conscious institutional, commercial, and industrial work environments, EM Series units require less maintenance, and remove the potential for fires, leaking seals, and other hazards associated with hydraulic systems.

SP Industries designs and manufactures a comprehensive standard line of industrial and commercial grade compactors with pre-crushers, transfer station equipment and cart dumpers to meet small to large capacity operations.

We also offer a wide variety of specialized systems to handle wet waste, food products, metal scrap collection, fluid recovery, newsprint recycling and other difficult and/or voluminous materials.

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