SMART START

Electric & SmartDrive®
Information Packet

For Dual-Shear™ & Quad™
Shredders

IMPORTANT NOTE: *This Smart Start Information Packet is strictly an overview for becoming familiar with the system and* ***IS NOT A SUBSTITUTE*** *for reading and following the complete service manual(s)*

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PURPOSE OF THIS SMART START INFORMATION PACKET

This information packet is intended to promote the safe, correct set-up and integration of the shredding system provided by SSI. It will be augmented by the Operation and Service Manual, which will be supplied at the time of equipment delivery.

Appropriate installation and set-up will have a significant impact on the long-term effectiveness and reliability of the equipment. Please read this information carefully, and consider how the equipment will be installed and used in your facility. This early action on your part will ensure the reduction or elimination of avoidable issues that may not otherwise seem important until much later.

⚠WARNING

Serious injury or death could result from the improper installation, repair or service of this machine.

Repairs and/or service to this machine must only be done by properly trained personnel.

IMPORTANT

It is very important that all personnel operating and maintaining this machine, study the sections of this manual that pertain to their particular task before beginning or damage to the equipment may occur.

SSI provides customer assistance with the operation, maintenance and service of this machine.

HOURS:

Office: Monday-Friday, 7:00 am to 5:00 pm PST
24-hour phone support available.

PHONE:

Voice: 503-682-3633
Fax: 503-682-1704

EMAIL:

info@ssiworld.com
parts-service@ssiworld.com

ADDRESS:

Shipping and correspondence should be sent to the following address:

SSI Shredding Systems, Inc.
9760 SW Freeman Drive
Wilsonville, OR 97070-9286

RETURNED MATERIAL:

Please call for a Returned Material Authorization (RMA) Number before shipping to SSI.
C.O.D. freight and packages will not be accepted.

SSI WARRANTY

For information regarding SSI's warranty policy, please refer to Section 10 in this manual or contact SSI.

SAFETY PRECAUTIONS

Machine operators and maintenance personnel must always comply with the safety precautions given in this manual and on the stickers and tags attached to the machine.

These safety precautions are provided for your safety. Review them carefully before operating the machine and before performing general maintenance or repairs.

Supervising personnel should develop additional precautions relating to the specific work area and local safety regulations.

The equipment manufactured by SSI will provide safe and dependable service if operated in accordance with the instructions given in this manual. Read and understand this manual and any stickers and tags attached to the machine. Failure to do so could result in personal injury or machine damage.

SAFETY SYMBOLS

Safety symbols and signal words, as shown below, are used to emphasize all operator, maintenance and repair actions which, if not strictly followed, could result in a life-threatening situation, bodily injury or damage to the machine.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

This safety alert and signal word indicate an imminently hazardous situation, which, if not avoided WILL result in DEATH or SERIOUS INJURY.

WARNING

This safety alert and signal word indicate a potentially hazardous situation, which, if not avoided COULD result in DEATH or SERIOUS INJURY.

CAUTION

This safety alert and signal word indicate a potentially hazardous situation, which, if not avoided MAY result in MINOR or MODERATE INJURY.

NOTICE

This signal word indicates a situation, which, if not avoided WILL result in PROPERTY/EQUIPMENT DAMAGE.

IMPORTANT

This signal word indicates a situation, which, if not avoided MAY result in PROPERTY/EQUIPMENT DAMAGE.

GENERAL SAFETY PRECAUTIONS

- Establish a training program for all operators to ensure safe operation.
- Do not operate the machine unless thoroughly trained or under the supervision of an instructor.
- Always wear safety equipment such as goggles, hearing protection, head protection and safety shoes while operating or working around the machine.
- Do not inspect or clean the machine while it is running. Always ensure that power is locked out and tagged out before performing maintenance. Accidental engagement of the machine can cause serious injury or death.
- Do not operate a damaged or improperly adjusted machine.
- Never wear loose clothing that can become entangled in the working parts of the machine.
- Keep all parts of your body away from the working parts of the machine.
- Always keep critical markings, such as warning stickers legible.
- To avoid personal injury or machine damage, all maintenance, repair and service must only be performed by properly trained personnel.
- NEVER load any flammable or explosive items into the shredder such as fuel tanks or propane bottles.
- Use appropriate fall prevention techniques when working on machine platforms.
- Always have all shields and guards in place before operating machine.
- Do not process excessively long material that exceeds the top of the feed hopper.
- Never attempt to process materials for which the shredder was not designed.
- Do not put fingers in bolt holes or between other heavy parts.
- Always use extreme caution around electrical components.
- Do not stand above hopper/cutting chamber while in operation.
- Always allow the hydraulic system to cool before performing service work.
- Always release all pressure in air, fuel, oil and cooling systems before disconnecting lines and fittings.
- Always replace fasteners with SSI approved parts or equivalent.
- Keep the area around the equipment clean and clear. Clean up any spills promptly.

MACHINE LOCK OUT

DANGER

Failure to lock out can result in severe personal injury or death.

To ensure safety when servicing or inspecting the equipment, ***all sources of energy*** must be ***switched off, locked out and tagged at the source*** before beginning work. The following four general steps should be followed. Locking out and tagging should be done in accordance with plant rules and OSHA approved procedures.

1. **Turn off all sources of energy and Isolate the machine from these sources of energy**. This might include, but is not limited to, turning off the main breakers, shutting down the diesel etc.

2. **Lock out and tag all sources of energy with approved locks and tags**. Everyone who will be involved with the work must place their own lock on the disconnect device.

3. **Remove or relieve all stored energy.** This might include, but is not limited to, hydraulic pressure, suspended objects, etc. Ensure all moving parts are in the safe position.

4. **Verify that the energy has been turned off.** Try starting the machine using all of the start buttons on the control panel. Make absolutely sure that the machine cannot start unexpectedly. Unintended machine startups can cause serious injury or death.

POSSIBLE SOURCES OF ENERGY

All possible sources of energy must be identified and locked out prior to working on the equipment. The following is a list of common sources of energy. It is possible that other sources of energy exist that are not identified here.

Electrical Energy

Control Voltage

The voltage on the control circuit is typically 24 VDC, but could be higher. Normally, locking out the main disconnect switch isolates this voltage from any control wiring. In some situations, the control voltage can be fed from external circuits and will have to be locked out at its source. In some case control power from other equipment will be present in the SSI supplied panel. Lock out all of the sources of electrical energy before working on the electrical system.

Main Power

The main incoming power will be significantly higher than the control voltage and present a lethal shock hazard. In most cases, locking out the main breakers on the SSI supplied panels will eliminate this voltage from all of the circuits except the incoming leads to the breakers themselves. In other cases, the power will have to be locked out at facility breakers feeding the equipment. Carefully determine power sources and lock out all of them prior to working on the equipment.

On units equipped with diesel engines there are electrical heaters in the hydraulic tank and engine block that are powered from outside sources. Disconnect (unplug) these to eliminate hazards from this source.

Potential Energy (Gravity)

If the shredder is equipped with a ram hopper, the ram itself is a source of potential energy. Lower the ram fully or block it up in the raised position prior to working around or under it.

If the shredder is equipped with hydraulically actuated access doors or maintenance points, always lock them in the open position or actuate them until they are over center and cannot fall closed. Do not trust the cylinder alone to keep them open.

Falling material is a source of potential energy. Make sure that material hanging in or around the hopper or conveyors has been secured prior to working under it.

Hydraulic Energy

The hydraulic pressure decays from all the circuits within a few seconds after the electric motor shuts down, with the exception of any hydraulic cylinders used in ram hoppers, access doors or other devices. These cylinders have counterbalance valves that are designed to hold the pressure in the cylinders to prevent unintended machine motion. Support the suspended load to minimize the pressure retained, and then carefully crack a hose fitting between the cylinder and the counterbalance valve to bleed off any pressure prior to working on these circuits.

Thermal Energy

In addition to the above forms of energy, there are two sources of potentially dangerous temperatures:

- Hot fluids: Hydraulic fluid and gearbox lubrication can reach temperatures capable of burning or scalding flesh.
- Hot Surfaces: The surface temperatures of hydraulic components or gearbox housings reach temperatures capable of causing burns.

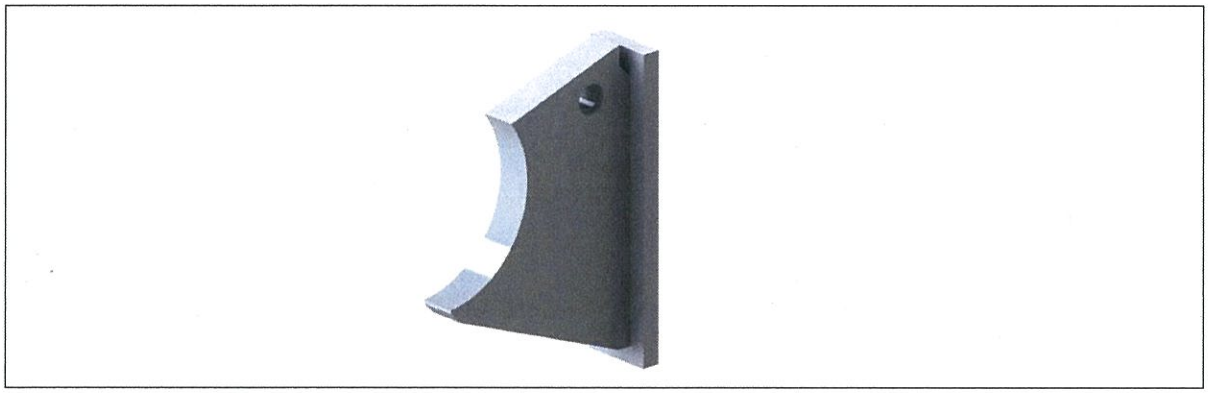
The only way to eliminate these hazards is to wait until the unit has cooled.

Other Sources

There may be sources of pneumatic energy (compressed air), compressed springs or other suspended loads depending on the equipment configuration.

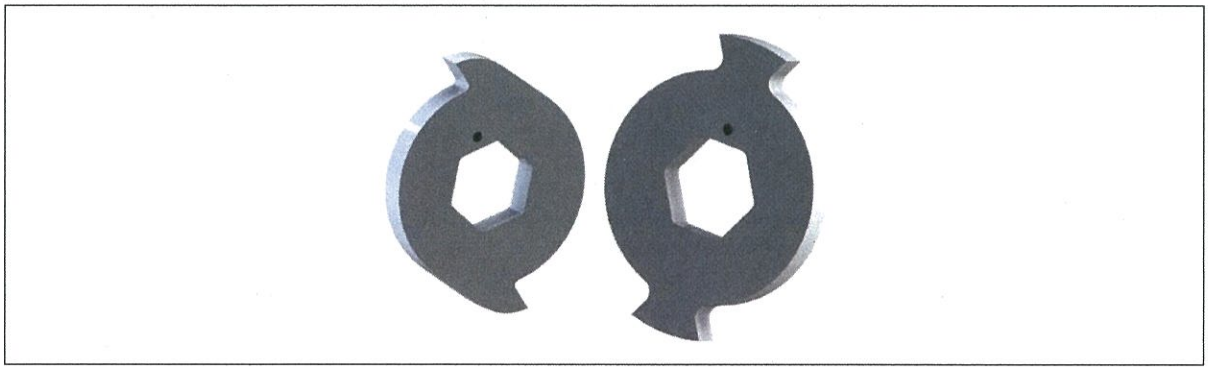
CLEANING FINGER

A flat metal plate with a bar welded on one side and a semicircular notch cut out of the other. The semicircular notch fits closely around the spacer to prevent material from building up between cutters.



CUTTER

A thick metal disk usually containing one or more hooks on the outer edge and a hole in the center. The center hole may be keyed or hexed and allows the disk to be installed on a shaft.

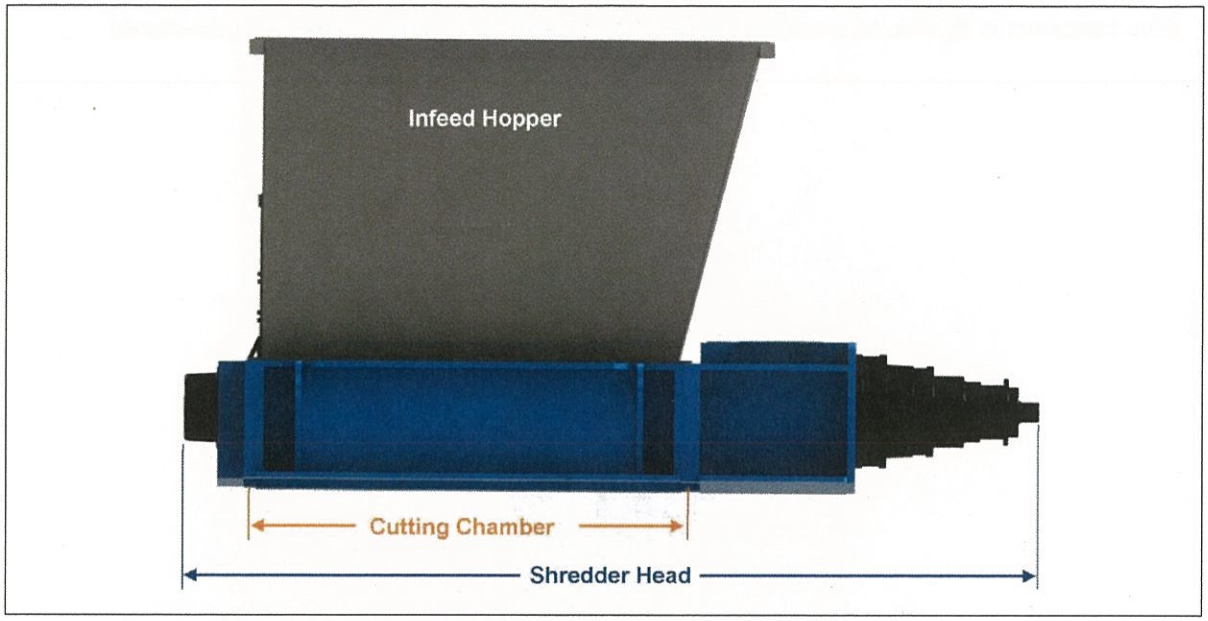


CURRENT RELAY

(Also called instant-trip relay, used on some models) An electrical sensing device that monitors the amperage used by the shredder motor. When the motor amperage exceeds the setting on the relay, the signal to the PLC is removed, causing the shredder to start a reversal.

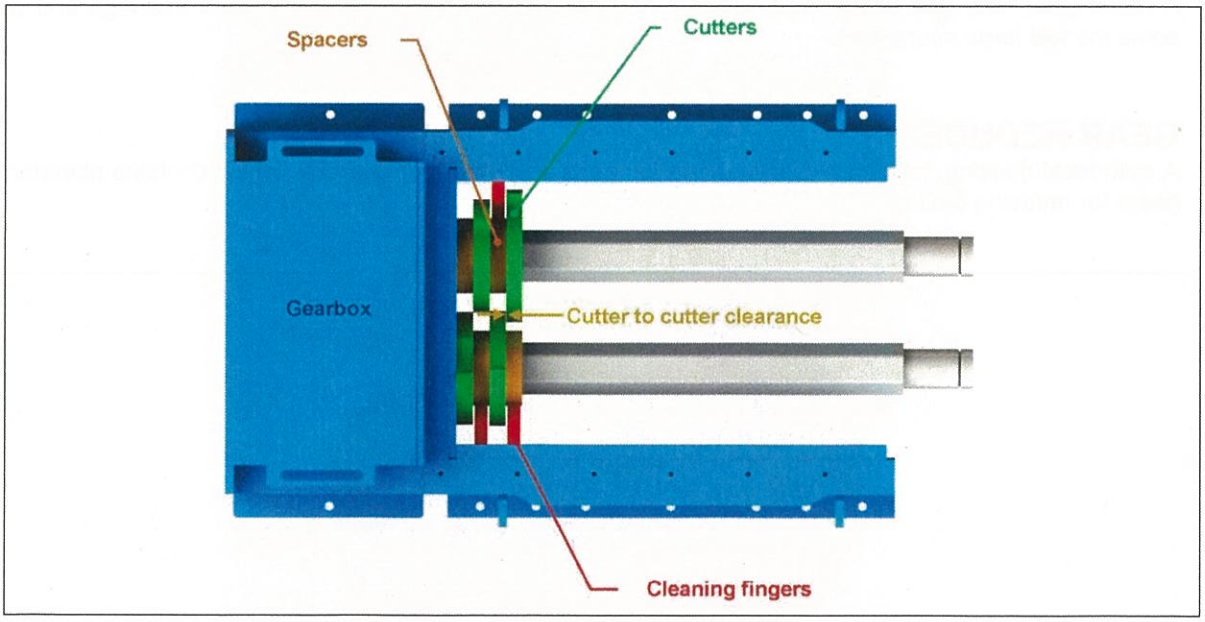
CUTTING CHAMBER

A rectangular area formed by the shredder gearbox, side walls, and end plate which contains the cutters, spacers and cleaning fingers.



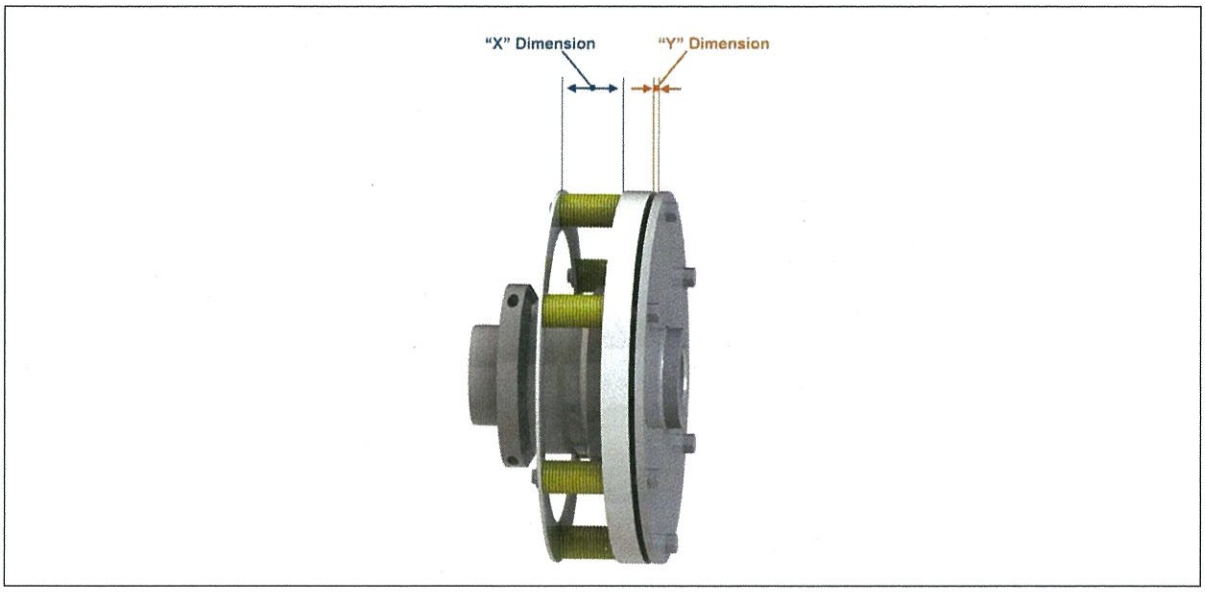
CUTTER TO CUTTER CLEARANCE

The effective shear gap between overlapping cutters in the cutting chamber.



CONTROLLED TORQUE COUPLING (SSP-SEVERE SHOCK PROTECTION)

(Used on some models) A device installed between the electric motor and gear reducer that protects drive components by slipping instantaneously when excessive shredder loads are encountered.

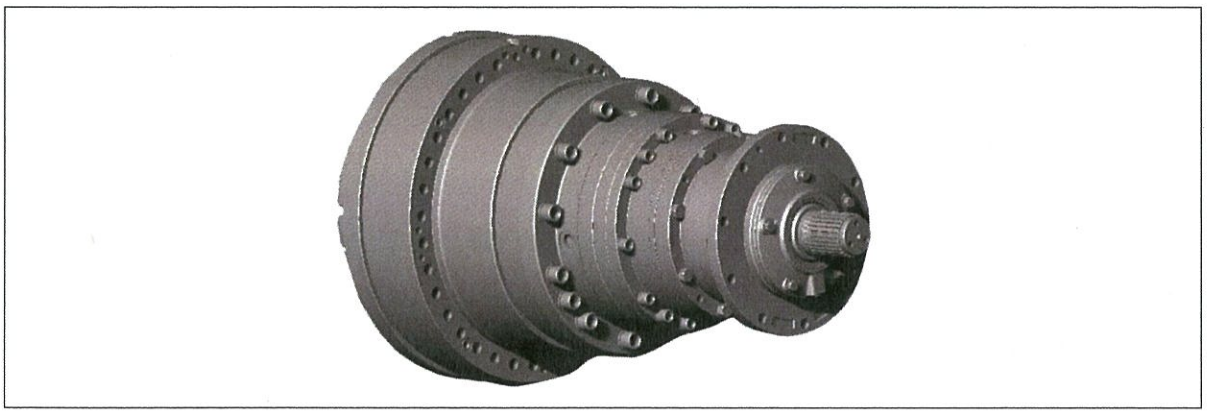


GEARBOX

A rectangular box, part of the shredder frame, which contains the main cutter shaft bearings and on some models large spur gears.

GEAR REDUCER

A cylindrical housing, located between the drive motor and shredder gearbox, which contains planetary gears for reducing the input drive speed to the shredder.



HYDRAULIC POWER UNIT (HPU)

(Used on some models) A unit consisting of motors, pumps, and the hydraulic fluid reservoir to power the shredder or equipment.

JAM REVERSAL

A reversing of the cutter shafts due to shredder overload or non-shreddable objects in the cutting chamber. Its function is to protect shredder components.

JAM SHUTDOWN

A condition where the PLC has stopped the shredder due to repeated jam reversals within a specified time period.

MASTER CONTROL RELAY (MCR)

The safety relay which, can be engaged only when all emergency stops are clear. When turned off, it removes power to the PLC outputs and shuts off the shredder.

NON-SHREDDABLE

An object that the shredder does not have the power to shred due to its size, material, or hardness.

PROGRAMMABLE LOGIC CONTROLLER (PLC)

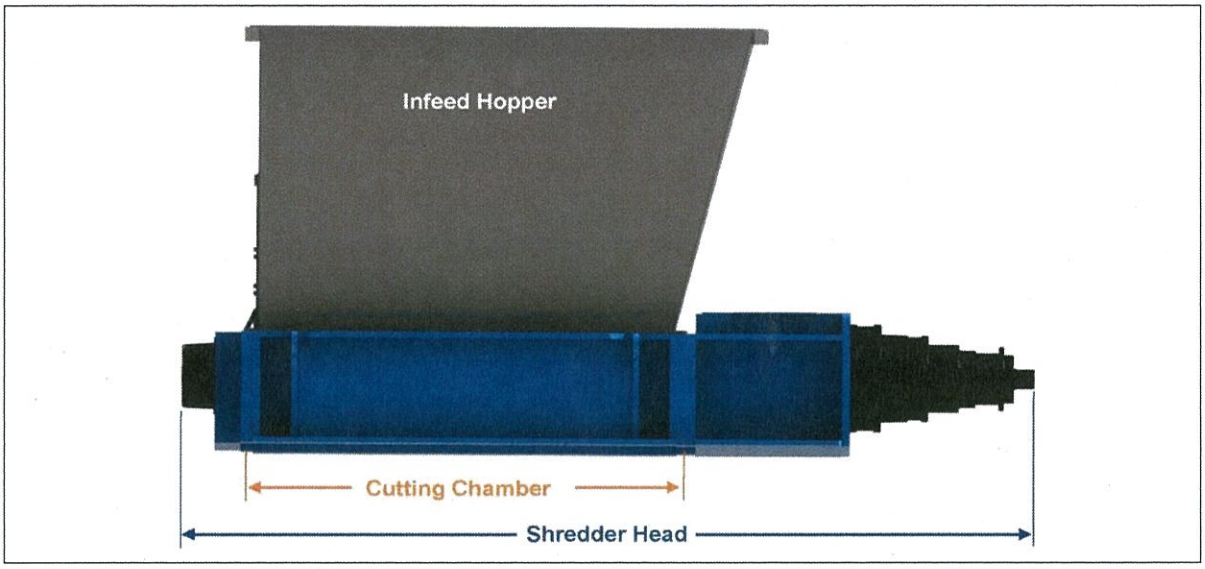
A solid-state electronic device typically located in the control panel. The PLC receives information from sensors and push buttons, processes this information using stored, programmed logic and executes commands to control the operation of machines or processes.

SCREEN

(If equipped.) A heavy duty metal sizing device typically mounted below the cutting chamber which allows shredded material to pass if it is below the size of the screen's openings. Oversized material is re-circulated back to the cutting chamber for further size reduction.

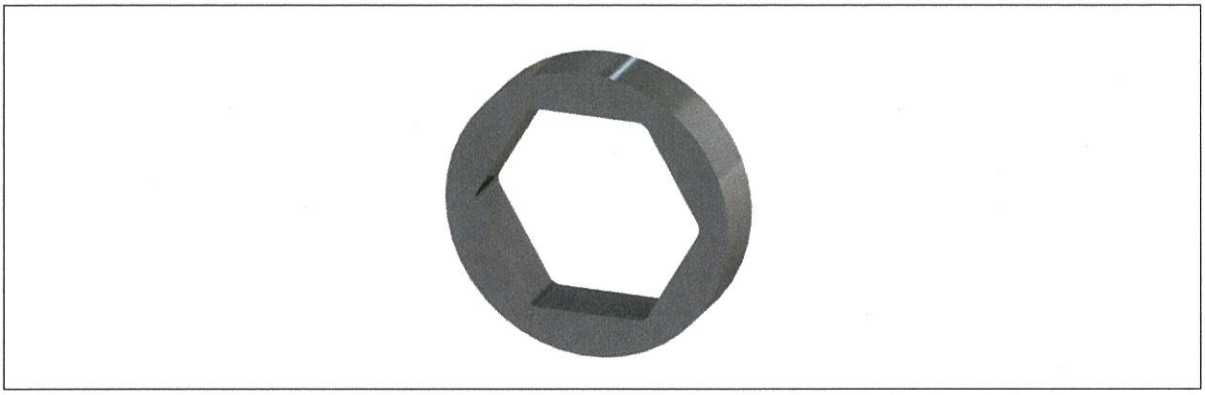
SHREDDER HEAD

An assembly typically consisting of the shredder frame, endplate, shredder gearbox, planetary gear reducer, cutting chamber, and all operating component parts contained therein.



SPACER

A small, non-hooked disk used to hold cutters a precise distance apart. The center hole may be keyed or hexed and allows the spacer to be mounted on a shaft.



SPEED SENSOR

(Used on some models.) A speed-sensing device consisting of a proximity switch, target, and associated wiring. Its purpose is to provide a pulsed signal to the PLC. The PLC will measure the time between pulses and determine when the input shaft exceeds or falls below a pre-set speed.

UNIT

Refers to the shredder head, gear reducer, drive motor, and other components assembled for operation.

It is important to consider things like material flow and equipment placement when setting up the shredder. The following setup considerations will help ensure:

- Safety
- Efficiency
- Ease of service
- Optimum performance

NOTICE

A hopper is required to direct material into the cutting chamber.

HOPPER FEED METHOD

Often the hopper is fed by a conveyor belt, so the rate of input is steady and about as fast as the shredder can process (if a VFD Drive was purchased, the speed of the conveyor can be adjusted according for shredder processing). Sometimes it is fed in batches by wheeled loaders, forklifts, or cranes, but in general, a steady feed rate is preferable. The hopper infeed method depends on several things:

- The type of material
- The size of the material
- The through-put rate
- The required particle size

INFEED HOPPER

The Infeed Hopper directs material into the cutting chamber. It can also hold material waiting to be processed.

- If the machine needs mechanical help to push material to the cutters, SSI offers hoppers with a hydraulic ram.
- If the material must be kept in the cutting chamber, SSI also offers enclosed hoppers.

DISCHARGE CHUTE

The discharge chute directs processed material from the cutting chamber to containers or conveyor belts. It should not cause bridging or snagging.

- Depending upon particle size and throughput, adequate space is required below the cutting chamber.
- Generally, the chute walls are vertical, but occasionally are at a 15° to 30° angle.
- The chute design depends on the material's size, the direction, access, and connections with containers or conveyor belts.

DISCHARGE CONVEYOR

The Discharge Conveyor moves shredded material from the Discharge Chute to downstream equipment. The type of conveyor recommended (rubber belt, steel pan, augers, etc.) depends on:

- Material type
- Material size
- Downstream requirements

NOTICE

A Conveyor Motion Switch should be installed to prevent discharge chute jams.

ELEVATION OF THE UNIT

The elevation of the unit depends on:

- The height of the infeed
- The clearance for the discharge chute
- The height of the discharge conveyor

When appropriate, walkways should be provided for easy access.

HEAD-ROOM OF THE UNIT

The head-room required for the unit depends on:

- Size and shape of the infeed hopper
- Size of the bulk material
- Clearance for other equipment handling the material (e.g. bale size, forklift mast height)
- Service (e.g. removal of the hopper or infeed conveyors)

PLACEMENT OF THE HYDRAULIC POWER UNIT (FOR HYDRAULIC DRIVE SHREDDERS ONLY)

The skid-mounted Hydraulic Power Unit (HPU) is a self-contained unit that is connected to the hydraulic motor with a minimum of two large high-pressure fluid lines and a smaller case drain line. The HPU should be located close to the shredder hydraulic motors. Refer to Hydraulic Connections Section of this manual for connection requirements.

Note: There are limitations on the maximum total length of connections and the height difference between the HPU and the hydraulic motor. See Hydraulic Connections for additional information. If the HPU is going to be located in a separate room, plan for sufficient airflow to dissipate generated heat.

NOTICE

Hydraulic oil must be filtered thru specific filter(s) when filling the reservoir. See Hydraulic Connections and Lubrication Specification Section in the manual for details

CLEARANCE AROUND THE SHREDDER AND HYDRAULIC POWER UNIT (HPU)

For safety, ease of service and maintenance, clearance is needed for removal of the endplate, cutters, and spacers. There should also be room for major repairs such as shaft, gear, bearing, or gear reducer replacement. At least half the shredder head length is needed at both ends, plus room for lifting equipment.

AMBIENT TEMPERATURE

The drive components are designed to operate in an ambient temperature range of 35°F to 100°F.

- If the unit is in an extremely warm area, a means of air circulation should be provided. The drive system temperature should be monitored and additional cooling may be necessary.
- If the unit is in an extremely cold area, the lubricant should be changed to match the temperature (see the Lubricant Specifications section). Also, the unit should be turned on for approximately 20 minutes with no load to warm the oil prior to use.

⚠WARNING

Use appropriate fall protection when working on machine platforms.

⚠WARNING

The shredder contains components, which are too heavy for one person to lift. When servicing, use approved lifting devices or equipment and get assistance from other workers when needed.

⚠WARNING

Do not put fingers in bolt holes or between other heavy parts.

RECEIVING INSTRUCTIONS

Although this shredder was thoroughly inspected, it is possible for equipment to be lost or damaged during shipping. When receiving a shipment, make sure to:

1. Check each item against the shipping manifest to make sure all items were received.
2. Check for evidence of damage to each item. Open the electrical panels and control boxes to check for water seepage. If the shredder is equipped with a SmartDrive VFD, do NOT open the SmartDrive itself.
3. If any damage is found, or if you have not received all the items listed, contact the carrier immediately. Note damage on the Bill of Lading or other documents required by the carrier.

STORING THE UNIT ON SITE

Shredder components are protected from corrosion at the factory using a coating of light oil and rust inhibitor. This is effective for a short time. If the unit is going to be stored outside or in a moist location, it should be covered. If it will be in storage for three weeks or longer:

1. Cover any unpainted surfaces with protective grease or heavy oil.
2. Pump grease into bearing housings. Seal grease fitting with tape to prevent moisture getting in.
3. Fill the oil reservoirs to the top and tag them as “overfilled”
4. Seal any openings in electrical panels or control boxes, and move them under cover.
5. Protect against theft and vandalism.

FOUNDATION / STRUCTURAL REQUIREMENTS

The foundation must support the weight of the shredder, support structure, peripheral equipment, and material being shredded.

IMPORTANT

SSI cannot evaluate foundation stability and design.

If the shredder head is going to be mounted on a support structure, consider the following:

- Footing requirements for load distribution
- Load-carrying capacity of the soil
- Rigidity of the support structure
- Walkways around shredder to aid in servicing the unit

The support structure should be bolted to the foundation. If SSI is supplying the support structure, two, three, or four mount holes will be provided in each pad. ***NOTE: Because of variations in fabrication, mating foundation holes should be matched to the stand after it arrives at the site.***

SSI can provide static foundation load information, as well as other data required for foundation strength analysis in seismically active areas. It is highly recommended that the foundation design be reviewed by a qualified structural engineer who is familiar with all appropriate codes and other requirements.

ASSEMBLY, INSTALLATION INSTRUCTIONS

When assembling Shredding Equipment, including but not limited to stand, shredder and hopper, the following must be taken into consideration.

- Use appropriately rated lifting gear (slings, hooks, chains and lifting machinery) which must be used by qualified personnel.
- Use appropriate lifting points provided on equipment .
- Refer to General Arrangement, Electrical Schematics and Assembly drawings provided in section 11 for assembly detail and dimensions.
- Torque bolts to specifications on Assembly drawings.

ELECTRICAL SYSTEM CONSIDERATIONS

⚠WARNING

Prevent electrical shock injuries and equipment damage. External wiring, connections, and interlock devices must be installed in accordance with the latest national electric codes, local codes, and local electric utility requirements. Only competent, authorized electricians should attempt to install, modify, and maintain the electrical system.

NOTICE

Properly sized and installed wiring is required to prevent fires and equipment damage.

POWER REQUIRMENTS

On shredders with electrical controls provided by SSI, there will be one or more breakers provided in the motor starter panel. Feeders with Amperage capacity equal to or in excess of the breaker size should be used to supply power to the shredder. The breakers are sized per the US National Electric Code and are the minimum that can be used to reliably start the motor(s). Because the shredder is usually the largest electrical load in the building, consult with the local power company or a reputable electrical contractor to determine what facility modifications will be required to supply power for the shredder.

The amount of power used by the shredder and the peak power demand for starting the shredder depends greatly on the equipment provided by SSI and the material being shredded. Contact SSI for an estimate of the expected power use for a specific situation. This estimate cannot be used for sizing the electrical feeder components that are controlled by the breaker size selected, which is in turn controlled by the motor size supplied.

For electric drive shredders, the most common starting method is "across the line" contactors. This type of hardware will generate large "instantaneous" demands on the electrical supply as the motors start. Because of the torque requirements of the shredder, the usual "soft start" options will not work. The SmartDrive electrical package and specific soft start options are available from SSI at an additional cost. Contact SSI for recommendations to meet specific site requirements.

Hydraulic drive shredders can be started with "regular" soft starters and these can be purchased as part of the shredder controls. This reduces the demand charge but does not change the amount of power used by the shredder.

INTERCONNECTION WIRING

NOTICE

SSI does not supply all of the necessary wiring for the shredder and related equipment. Contact SSI to understand what additional power wiring and control wiring will be required on site to install the shredder. SSI is not an electrical contractor and cannot legally do electrical installation work on site.

SSI does not usually install electrical panels on the shredder head or SSI-supplied stands. In most cases the panels are shipped loose and will need to be mounted to the building or other equipment, and all interconnecting wiring will need to be provided. The second page of the SSI electrical schematics is a block diagram that shows the layout of panels and wiring. Contact SSI if there is any question about the wiring needs to be completed.

Remember the following:

- The control panel should be located a safe distance from the shredder, with a direct view of the unit.
- Remote emergency stop switches should be located in operational areas near moving machinery.
- Long wire runs from the electrical panel to the shredder should be avoided.

- Control power wiring should be run in separate conduits from motor leads and other higher voltage wiring.

- For all installations inside the USA, all wiring must meet National Electric Code standards. State and local regulations may also apply. For installations in other countries, the local electrical code must be adhered to.

- Wiring is needed between the power source and SSI circuit breaker. SSI normally provides a circuit breaker as part of the motor starter panel. The power feed needs to be the same capacity as the circuit breaker. Contact SSI for the amperage requirements.

- Wiring is needed between the motor starter panel and all of the motors.

- Other wiring may be needed for accessory equipment.

Refer to the Unit Specifications for the electrical service requirements. Refer to the Electrical Schematic drawings for complete wiring requirements.

ELECTRICAL INTERFACE TO OTHER EQUIPMENT

- Interface to equipment downstream of the shredder. All SSI supplied shredder control panels have an "OK to Run" input that must be "on" to allow the shredder to start. If the SSI panel controls conveyors downstream of the shredder, the last conveyor will not start without this signal. A relay with a "dry contact" will have to be installed on the downstream equipment controls to feed this signal to the shredder controls.

- Most SSI supplied shredder control panels have a discharge conveyor motion switch input. This is designed to monitor the condition of the discharge conveyor to ensure that it can mechanically remove material from under the shredder. To use this input, a 24 VDC proximity switch will need to be mounted where it can detect the motion of the tail shaft of the conveyor. Use of this switch is strongly advised since the shredder can pack a discharge chute very tightly. If it is not used, it can be disabled.

- Interface to equipment feeding the shredder. All SSI supplied shredder control panels have an "OK to Load" output that must be used to control equipment feeding the shredder. This signal only comes on when the shredder is capable of receiving material, which is different from when it is running. Any time the shredder reverses or starts up, this signal will be off for a period of time to allow the shredder to clear itself.

SMARTDRIVE INSTALLATION

If the unit has been shipped with a SmartDrive system, some additional things will have to be considered. If not properly installed, the SmartDrive systems can experience a number of long term issues.

- Control panel location. The control panel is a NEMA 4 enclosure that can be mounted near the shredder and can withstand the environment typically found near the shredder.
- Motor starter panel (SmartDrive) panel location. The SmartDrive panels should be located in a clean area such as a power room that is isolated from the processing area to limit the amount of dust that can enter the drive panels when the panel doors are opened. The drive panels are supplied with air conditioners that remove the heat generated by the drives, but it is much easier to keep the cooling coils clean in an isolated environment. The power room needs air conditioning capable of keeping the ambient temperature of the drive cabinets less than 100°F (38°C).

- Braking resistors (Optional – generally not supplied). If the unit is supplied with braking resistors, the braking resistors need to be mounted in a clean area also, with lots of available air circulation to prevent heat buildup in the resistors and the possibility of fire.

In addition to the considerations above, contact SSI for the following information and review it thoroughly prior to receiving and installing the SmartDrive equipment.

- Electrical Schematics
- SmartDrive Vendor Literature
- Brake Resistor Vendor Literature (if braking hardware is provided)

⚠ DANGER

Check for personnel in cutting chamber before operating the shredder.

⚠ WARNING

Do not operate this machine unless thoroughly trained or under the supervision of an instructor.

CONTROL PANEL OPERATORS

CONTROL POWER OFF / ON Key Switch
Turns control power on and off.

EMERGENCY STOP Button
Immediately disconnects power from all functions.

MCR ON / RESET Button / Lamp
Activates the master control relay supplying control power to the PLC. If the light is on, the emergency stop buttons are clear and the control power is on.

SYSTEM START / RUN Button / Lamp
Starts the Shredder and all equipment controlled by the SSI electrical system when the controls are NOT in the maintenance mode. In maintenance mode, this push button jogs the Shredder forward (all shafts in the forward direction). Maintenance mode is turned on and off on the Maintenance screen.

SYSTEM STOP Button
Stops the shredder and all equipment controlled by the SSI electrical system.

SHREDDER REVERSE Button
Runs the Shredder in reverse for as long as the button pushed.

SYSTEM FAULT / RESET Button / Lamp
Indicates that a fault has occurred. Push the button briefly to silence the alarm. After the fault conditions have been fixed, push and hold this button for more than 2 seconds to reset the fault

LOCAL / REMOTE Selector Switch (IF SUPPLIED)
Used to switch between operating the shredder system from the shredder control panel or from a control panel that is remotely located. This selector switch is often used on Line Control systems and custom controls requested by the customer.

SMARTFEED ON / OFF Selector Switch (IF SUPPLIED)
Turns the SMARTFEED function ON and Off.

RAM OFF / HAND / AUTO Switch (IF SUPPLIED)
Selector switch in OFF position, RAM HPU and RAM do not function. Selector switch in HAND position, RAM is operated manually by pressing and holding RAM EXTEND or RAM RETRACT buttons. Selector switch in AUTO, RAM HPU & RAM operate per the selected RAM program (see STANDARD RAM SETUP screen).

RAM RETRACT Button (IF SUPPLIED)

When RAM OFF/HAND/AUTO switch is HAND position, push the RAM RETRACT button to retract the ram.

RAM EXTEND Button (IF SUPPLIED)

When RAM OFF/HAND/AUTO switch is HAND position, push the RAM EXTEND button to extend the ram.

INFEED CONVEYOR START / RUN Button (IF SUPPLIED)

When in maintenance mode, push and hold this button for 5-seconds to start the infeed conveyor in jog mode. Hold this button for an additional 5-seconds while jogging to latch it in. Also, this button will un-pause the infeed conveyor if it has been paused during system auto operation.

INFEED CONVEYOR STOP Button (IF SUPPLIED)

When in maintenance mode, this button will stop the infeed conveyor if it has been latched in. When in system auto, this button will pause the infeed conveyor.

Human / Machine Interface (HMI) Touchscreen

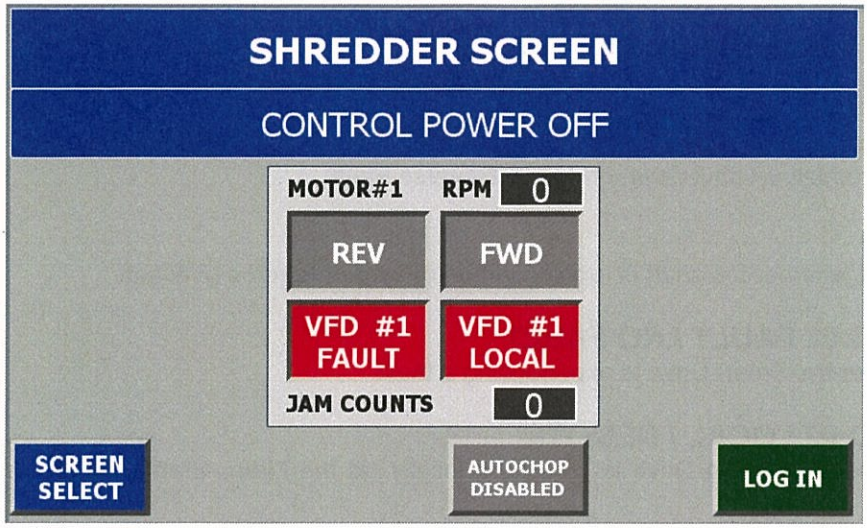
Used to monitor automatic system functions, display ongoing status, specify faults, access system and component history, adjust a variety of operational parameters, and activate maintenance functions.

Some screens and functions are password protected and can only be accessed by authorized personnel.

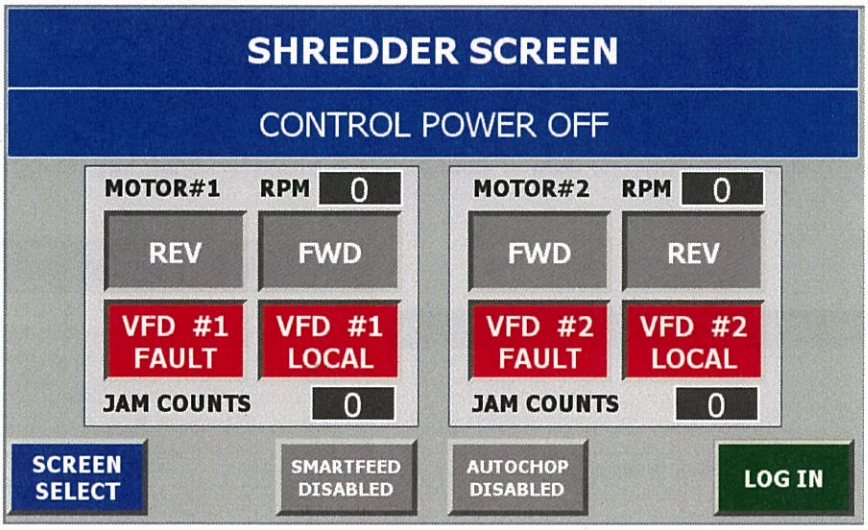
The specific screens and functions are described in the following pages.

SHREDDER SCREEN

SINGLE MOTOR SHREDDER DISPLAY



DUAL MOTOR SHREDDER DISPLAY



The **Shredder Screen** is normally the first screen that appears after turning the ON/OFF key switch to on and touching the power-up screen. From it, all the other screens are accessible.

Information Shown

Shredder Status Line (showing "**CONTROL POWER OFF**" in this graphic)
Displays the status of the shredder. Possible messages are listed in the chart below.

Fault Indicator Bar

When a fault is active, the "Shredder Status Line" changes to the red "Fault Indicator Bar" which will describe the fault. An active fault will prevent the Shredder from running. Clear the fault by pressing the

"System Fault / Reset" push button on the control panel for 3 seconds. The Fault Indicator Bar also shows on all the other screens.

MOTOR#1 RPM / MOTOR#2 RPM
This indicator shows the % speed of the motor shaft.

JAM COUNTS
This indicator shows the value of the jam counter. When this value equals the maximum number of jams allowed, the shredder will shut down on a Jam Reverse Fault.

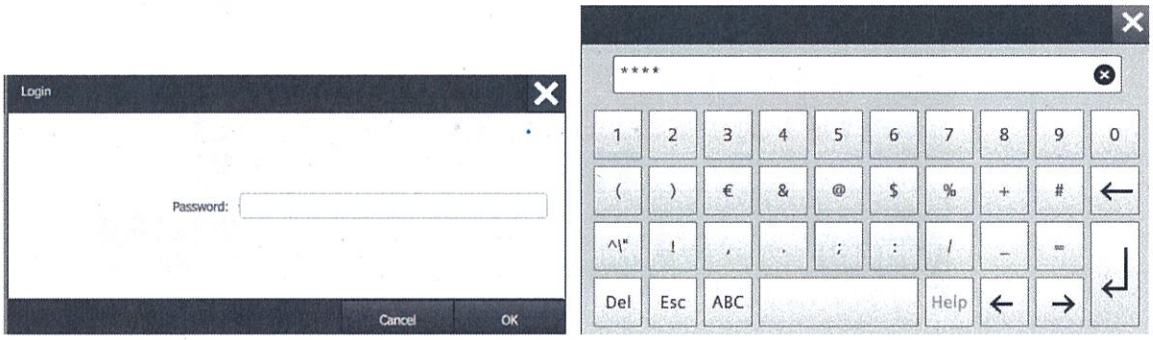
FWD / REV
Used to indicate whether the shaft is running in the forward or reverse direction.

VFD #1 / VFD #2 FAULT / NO FAULT
Indicates whether the Smart Drive is experiencing a fault.

VFD #1 / VFD #2 LOCAL / REMOTE
Indicates whether the Smart Drive is controlled locally (at the Motor Starter Panel) or remotely (at the Control Panel).

LOG IN / LOG OUT
The button color will change depending on the log-in status. When not logged in, the "Log In" button will appear green. After logging in, button will change to red.

a) Press to LOG IN to the HMI as a different user. This allows access to "maintenance only" functions and screens. Enter the four-digit password by touching the corresponding keypads shown on the monitor. The default value is 1234. Press the enter key, to log the password.



b) Press to LOG OUT to only allow access to unsecured screens. If the key switch is turned off, the user will be logged off automatically

SCREEN SELECT
Press to move to the Screen Select screen.

SMARTFEED DISABLED / ENABLED
Press to enable and disable the SMARTFEED function. This is a duplicate button from the SmartFeed screen.

AUTOCHOP DISABLED / ENABLED

Press to enable and disable the AUTOCHOP function. This is a duplicate button from the AutoChop screen.

SHREDDER STATUS

The current status of the Shredder is displayed in the Shredder Status/Fault Line. Possible messages are listed below:

SHREDDER STATUS MESSAGE	DESCRIPTION
CONTROL POWER OFF	The control power keyswitch is not turned to the ON position. No shredder functions are possible with the control power switch turned to the OFF position.
MCR NOT RESET	The Master Control Relay has not been set. Press the button on the main control panel labeled "MCR RESET" to re-initialize the MCR. The control power keyswitch must be turned ON.
HOPPER ACCESS DOOR OPEN	The Hopper access door is not closed properly.
SHREDDER STOPPED	Shredder is in a stopped state.
SHREDDER RUNNING	Shredder is running in manual mode.
SHREDDER COASTING TO STOP	The system has been stopped but the shafts are still winding down.
SYSTEM IN AUTO MODE	The system has been started and is running in Auto. **⚠WARNING** **Shredder may be physically stopped due to loss of downstream enable signal and still be in AUTO mode. If this happens it can restart without warning.**
SYSTEM IN AUTO STOP SEQUENCE	A stop button has been pressed and the system is going through a shutdown sequence.
SYSTEM IN REMOTE MODE	For systems equipped with a local / remote switch, the switch has been set to remote mode, and the shredder system is being controlled from a remote location.
AUTO REVERSE IN PROCESS	Shredder is undergoing a reversal triggered by the reverse button being pressed.
TORQUE REVERSAL	Shredder is undergoing a reversal triggered by high torque.
CLUTCH SLIP REVERSAL	Shredder is undergoing a jam reversal triggered by a clutch slipping.
OK TO RUN SIGNAL LOST	Shredder is stopped because the customer-supplied OK TO RUN enable signal, indicating that downstream equipment is operating, has been lost.

SHREDDER STATUS MESSAGE	DESCRIPTION
FAULT ACTIVE	At least one fault condition is still active. The actual fault condition will be displayed in the Shredder Status/Fault Line.
AUTOLUBE PUMP WARNING	On systems equipped with Autolube, this warning appears if Autolube undergoes a grease dispensing interval but the Autolube motion sensor does not detect a change of state. This could be due to the absense of grease, mechanical failure of the mechanism, or an electrical failure to return a signal to the PLC.
PLANETARY REDUCER TEMP WARNING	On systems equipped with planetary temperature sensors, this warning appears if the temperature sensor installed on the planetary gear reducer goes above the regular operating temperature. This appears only on units with a planetary reducer temperature sensor without a planetary reducer cooler.
SCREEN ASSIST CYLINDER NOT RETRACTED	On systems equipped with a Screen Assist, this message indicates that the cylinder for pulling in the screen has not been fully retracted.
SYSTEM IN AUTO-SMARTFEED	On dual drive systems, this message indicates that the system is running in SMARTFEED mode.
SYSTEM IN AUTO - AUTO-SMARTFEED	On dual drive systems, this message indicates that the system has reached the set number of jam reversals, and the AUTO-SMARTFEED function has temporarily been activated.
SYSTEM IN AUTO-AUTOCHOP	This message indicates that the system is running in AUTOCHOP mode.

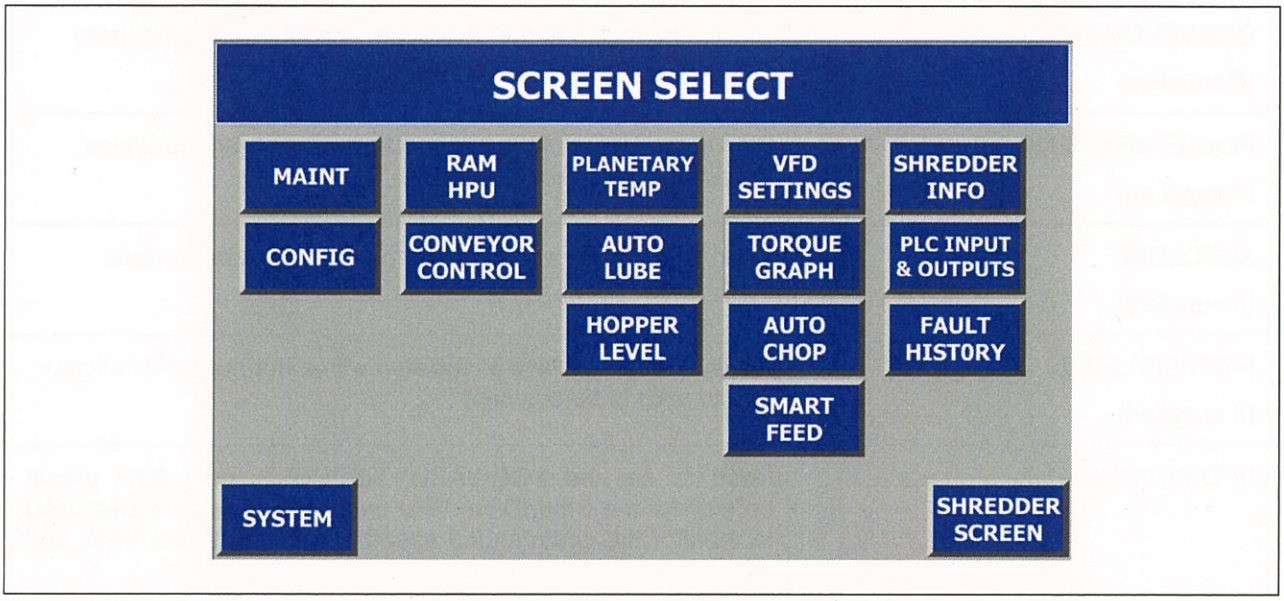
If the shredder or associated system is stopped due to a fault condition, the fault causing the condition will be noted in the Shredder Status/Fault Line. Possible FAULT messages are listed below:

SHREDDER FAULT MESSAGE	CORRECTIVE ACTION REQUIRED
(1) MOTOR #1 SPEED SENSOR FAULT (2) MOTOR #2 SPEED SENSOR FAULT	Shredder has spent too long below low-speed threshold while attempting to start. This fault is active for both forward and reverse starting operations. Can indicate a failure of the speed sensor. For units with SmartDrives, check the status on the VFD Display.
(3) VFD #1 FAULT (4) VFD #2 FAULT	The SmartDrive VFD has faulted. The fault is displayed on the VFD keypad on the door of the motor starter panel. When the fault has been resolved, this fault can be cleared.
(9) MOTOR #1 JAM WHILE JOGGING FAULT (10) MOTOR #2 JAM WHILE JOGGING FAULT	If the shredder is jammed while the motor is being jogged, this fault will be displayed. This fault indicates that the hopper needs to be inspected to see if it contains un-shreddable material. **⚠ DANGER** **Always lock out and tag out all power to panels and electric components before servicing.**
(11) MOTOR #1 JAM SHUTDOWN (12) MOTOR #2 JAM SHUTDOWN	Shredder has undergone more than the allowed number of jam reversals without having run in a forward direction for a preset time. This fault indicates that the hopper needs to be inspected to see if it contains un-shreddable material. **⚠ DANGER** **Always lock out and tag out all power to panels and electric components before servicing.** The values for the number of jams allowed and the forward running time required to clear the jam counter are set on the CONFIGURATION screen.
(13) MOTOR #1 OVERSPEED FAULT (14) MOTOR #2 OVERSPEED FAULT	On shredders equipped with VFDs, this fault indicates that one of the speed switches on the motors had detected excessive speed. This can sometimes be caused by electronic noise in the speed switch circuit. Check grounds and shielding.
(17) PLANETARY OVERTEMP FAULT	If the planetary reducer is equipped with a temperature switch, the maximum operating temperature of the oil has been exceeded.

SHREDDER FAULT MESSAGE	CORRECTIVE ACTION REQUIRED
(18) AUTOLUBE PUMP FAULT	On shredders equipped with an automatic lubrication system (Autolube) this indicates that there is a problem with the grease pump or the grease lines.
(19) SCREEN ASSIST CYLINDER NOT RETRACTED	On shredders equipped with a screen ejection system, the screen cylinder is not fully retracted.
(23) M1 MOTOR OVER TEMPERATURE (24) M2 MOTOR OVER TEMPERATURE	On shredders equipped with motor temperature sensors, these faults indicate that the motor is too hot.
(25) PLUGGED DISCHARGE CHUTE (if supplied)	On shredders equipped with a discharge chute plugged chute indicator, this fault indicates that the discharge is blocked.
(30) HOPPER RAM PRESSURE SWITCH FAULT	If the shredder is equipped with a ram hopper, this fault indicates that the ram pressure switch has failed.
(32) PLANETARY COOLER FAULT - OVERLOAD/COIL	The auxiliary motor starter contact for the gearbox cooler motor has failed to provide a confirmation signal after the starter was commanded to operate. Check operation of the starter and motor overload.
(33) RAM HPU MOTOR FAULT - OVERLOAD/COIL	The auxiliary motor starter contact for the ram pump motor has failed to provide a confirmation signal after the starter was commanded to operate. Check operation of the starter and motor overload
(34) HPU AUX DRIVE FAULT - OVERLOAD/COIL	The auxiliary motor starter contact for the "Auxiliary HPU" electric motor (if provided) has failed to provide a confirmation signal after the starter was commanded to operate. Check operation of the starter and motor overload.
(35)-(44) CONVEYOR FAULT - OVERLOAD/COIL	If provided, the auxiliary motor starter contact for the conveyor motor noted has failed to provide a confirmation signal after the starter was commanded to operate. Check operation of the starter and motor overload.
(45)-(54) CONVEYOR MOTION FAULT	If provided, the motion sensor on the conveyor noted has not changed state with the conveyor running. This can indicate a failure of the conveyor motor starter: by a tripped motor overload or a failure of the conveyor belt itself.
(70) E-STOP AT CONTROL PANEL (71) E-STOP AT MOTOR PANEL (72) E-STOP AT REMOTE PANEL (75) REMOTE E-STOP ACTIVE	The emergency stop button is depressed. Pull the button out to reset.

SHREDDER FAULT MESSAGE	CORRECTIVE ACTION REQUIRED
(73) HOPPER ACCESS DOOR OPEN (74) DISCHARGE CHUTE ACCESS DOOR OPEN (76) SCREEN ACCESS DOOR OPEN	A shredder access door is not closed properly.

SCREEN SELECT SCREEN



This screen shows many features that may not be provided. If a button does not appear on the screen select screen of the installed shredder, that feature is not available.

Some of the screens and many of the adjustments are password protected. Login on the Shredder screen or simply try to access the screen. If a password is required, a login dialog box will pop up (see above)

TOUCH BUTTONS

Press any button to move to the noted screen. Possible screen selections are listed below:

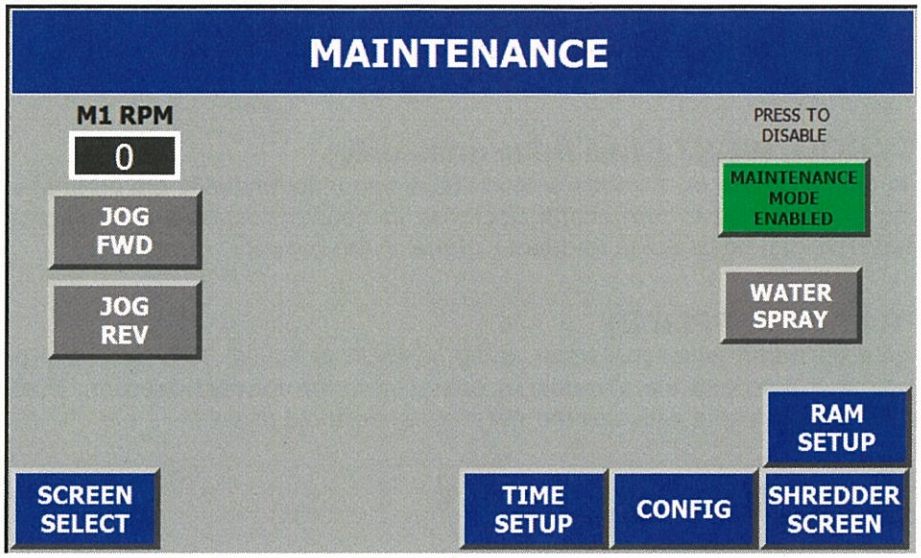
SELECTED SCREEN	SCREEN USAGE
MAINT	Used to change the preset values of various counters and timers associated with certain shredder functions. Access to this screen is only allowed to authorized engineering and maintenance personnel.
CONFIG	Used to change the preset values of various counters and timers associated with certain shredder functions. Access to this screen is only allowed for authorized engineering and maintenance personnel.
RAM HPU (If supplied)	This screen shows the status of all of the equipment on the Hydraulic Power Unit (HPU).
RAM HPU SET UP (If supplied)	Used to check the rotation of the electric motor and pump, along with the extend and retract solenoids. Access to this screen is only allowed to authorized engineering and maintenance personnel.

SELECTED SCREEN	SCREEN USAGE
CONVEYOR CONTROL (If supplied)	Shows the status of the conveyors and allows jogging them individually while in maintenance mode.
PLANETARY TEMP (If supplied)	Shows the status of the temperature sensors and provides indications for troubleshooting.
AUTOLUBE (If supplied)	Used to configure and troubleshoot the Autolube system.
HOPPER LEVEL (If supplied)	Allows the time delays associated with a hopper level indicator (photo-eye) to be adjusted
VFD SETTINGS	Used to set the FORWARD, REVERSE, and JOG preset speeds for the SmartDrive VFD units. This screen is also used to monitor the commanded speed being sent to the VFD, and the actual running speed and torque.
TORQUE GRAPH	Shows the status of the shredder's shaft torque values, and allows the operator to see how hard the shredder is working.
AUTOCHOP	Set parameters associated with the AutoChop function provided on hydraulic and SmartDrive shredders. This screen and the button calling it will not be present on standard electric shredders.
SMARTFEED	This screen button will be displayed if the option is available for the shredder. This allows the shredder to operate in SmartFeed mode where one shaft becomes the main processing shaft and the other shaft meters material into the processing shaft.
SHREDDER INFO	Shows collected shredder performance data and data for the individual shafts.
PLC INPUTS & OUTPUTS	Used to check the status of PLC input/output points, and analog signals. Provided for information only; it is not possible to force the I/O ON or OFF from this screen. If the PLC has more I/O than will fit on a single screen, buttons to call additional screens will be provided on the first screen.
FAULT HISTORY	Shows a history of the last 100 fault conditions detected, including the date and time of the fault.
SYSTEM	Shows the status of other equipment that can keep the shredder from running.
SHREDDER SCREEN	Touch to return to the Shredder Screen.

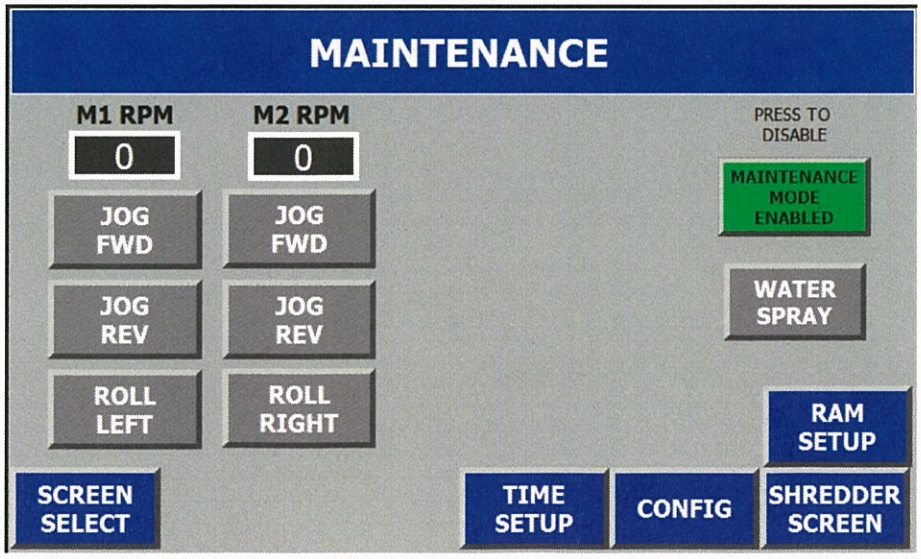
MAINTENANCE SCREEN

NOTE: *This screen can only be accessed if the user is logged in.*

SINGLE MOTOR SHREDDER DISPLAY



DUAL MOTOR SHREDDER DISPLAY



MAINTENANCE MODE DISABLED / ENABLED

Pressing the Maintenance Mode button will place the system in Maintenance Mode. In Maintenance Mode, none of the equipment can be operated in automatic, but individual motors can be jogged for maintenance purposes. The shredder will not run continuously in maintenance mode. This is only to be used for testing and troubleshooting purposes.

FWD / REV

These are display lights that turn on green when the shredder's maintenance mode is disabled, and the shredder is in auto going either forward or reverse.

JOG FWD / REV

Used during maintenance to jog shafts individually while the button is pushed. A 5-second warning horn will sound. The number shown is the current motor speed (RPM). The max motor speed during jogging can be set on the VFD SETTINGS screen.

ROLL LEFT / ROLL RIGHT (Dual Drive units only)

This function is only provided on shredders which have two independently driven shafts. These buttons are used during maintenance to turn shafts clockwise or counterclockwise at the same time while the button is pushed. This can be useful to re-orient material in the hopper.

WATER SPRAY (IF SUPPLIED)

This button lights up green when the water spray solenoid is active. This generally occurs when the shredder system is in auto and the shredder is operating in the forward direction. Pressing this button when the shredder is not in auto activates the water spray solenoid as well.

TIME SETUP

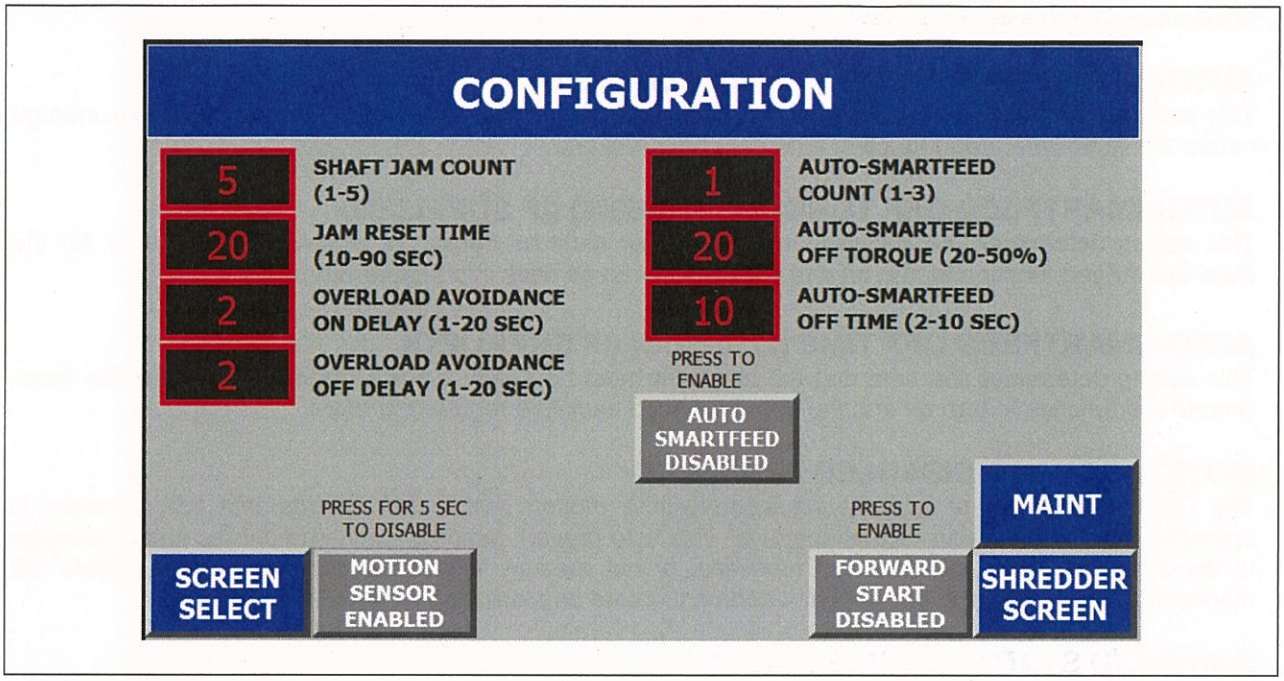
Press this button to go to the time setup screen.

RAM SETUP (IF SUPPLIED)

Press this button to go to the RAM SETUP screen.

CONFIGURATION SCREEN

NOTE: *This screen can only be modified if the user is logged in.*



SHAFT JAM COUNT (1-5)

Used to set the number of consecutive jam reversals allowed before a jam reversal fault is declared. The allowed range is from 1 to 5. Contact SSI for recommended settings.

JAM RESET TIME (10-90 SEC)

Used to set the number of seconds the shredder must run in a forward mode with no further jams before the jam counter is reset to zero. The allowed time range is from 10 to 90. Contact SSI for recommended settings.

OVERLOAD AVOIDANCE ON DELAY (1-20 SEC)

This feature is to prevent overfeeding of the shredder based on its load. It will pause the infeed conveyor (and/or the OK TO LOAD signal) when the load threshold (heavy load) has been exceeded for the indicated number of seconds. This is a settable time between 1 to 20 seconds. Set the Overload Avoidance on Delay long enough to allow for momentary surges in load, but short enough to stop the infeed into the shredder before the shaft reaches a jam reversal condition.

OVERLOAD AVOIDANCE OFF DELAY (1-20 SEC)

This feature is the amount of time that the infeed conveyor remains paused (or the OK TO LOAD signal remains off) after the load has dropped below the load threshold setting (Overload Avoidance Off Delay). This is a settable time between 1 to 20 seconds. Set this time long enough to ensure recovery from the high load condition but still maintain adequate throughput.

AUTO-SMARTFEED DISABLED / ENABLED (IF SUPPLIED)

Auto-SmartFeed utilizes SmartFeed to process material that might otherwise lead to repeated jams, resulting in a jam shutdown.

On shredders equipped with Auto-SmartFeed, this function will automatically start the shredder in SmartFeed mode after the preset number (AUTO-SMARTFEED COUNT) of clutch slips or torque reversals are met. SmartFeed will disengage and return to regular operation if the torque drops below the

set value of the AUTO-SMARTFEED OFF TORQUE for the preset time on the AUTO-SMARTFEED OFF TIME setting. However, all subsequent jams before the Auto-SmartFeed function turning off will result in the shredder continuing to operate in Auto-SmartFeed mode, until the material is cleared, or the shredder shuts down due to a Jam Shutdown.

AUTO-SMARTFEED COUNT (1-3) (IF SUPPLIED)

This setting determines the number of clutch slips and or torque reversals the shredder must undergo before the Auto-SmartFeed function automatically turns on.

AUTO-SMARTFEED OFF TORQUE (10%-50%) (IF SUPPLIED)

This setting determines the torque that the shredder must be below, for a predetermined time, for the Auto-SmartFeed function to turn off and the shredder to go back into regular run mode.

AUTO-SMARTFEED OFF TIME (2-10 SEC) (IF SUPPLIED)

This setting determines the time that the shredder must be below a predetermined torque for the Auto-SmartFeed function to turn off and the shredder to go back into regular run mode.

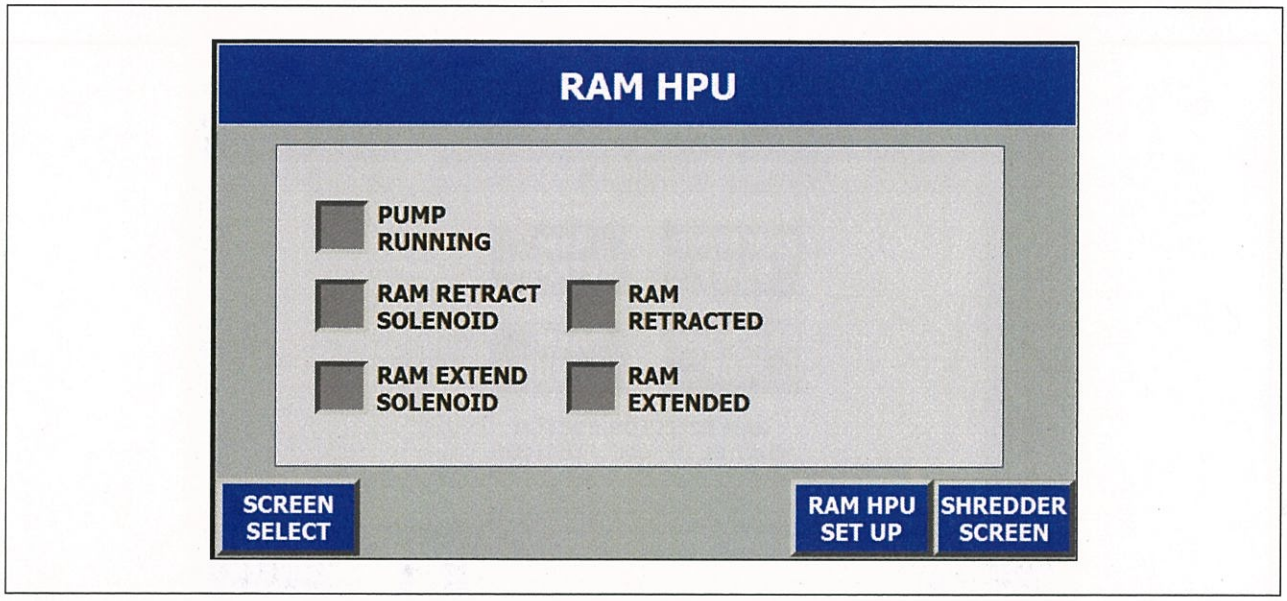
MOTION SENSOR DISABLED / ENABLED

The Discharge Conveyor may be equipped with a motion switch that detects that the conveyor is operating correctly and can receive material. This is to prevent jammed discharge chutes and/or damage to the conveyor. If the switch is not functional or not present, this button can be used to disable the monitoring of the motion switch so that it does not create an alarm and shut the system down.

FORWARD START DISABLED / ENABLED

Normally the shredder starts in reverse first, then comes on in forward. In some situations, it is desirable to start in forward, eliminating the reverse run. This button is used to turn off and on the forward start.

RAM HPU SCREEN (IF SUPPLIED)



PUMP RUNNING
Green when the hopper ram HPU motor is running

RAM RETRACT SOLENOID
Green when the hopper ram is extending.

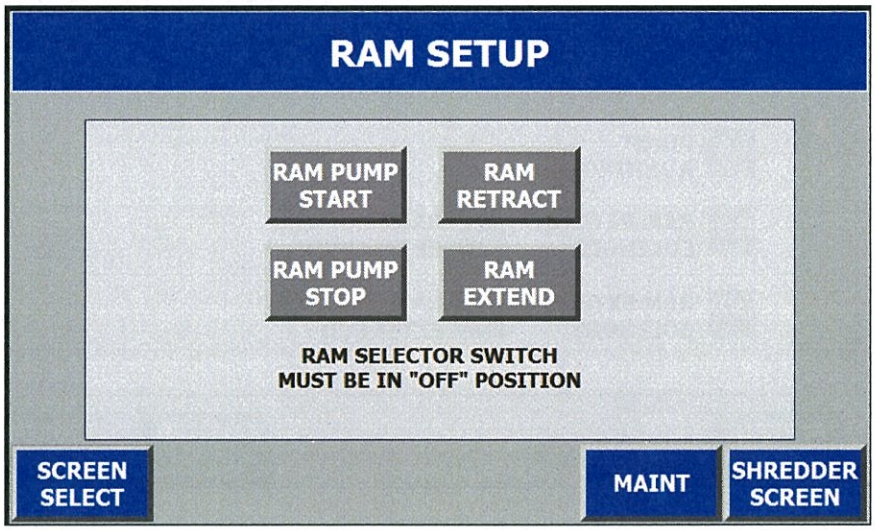
RAM EXTEND SOLENOID
Green when the hopper ram is retracting.

RAM RETRACTED
Green when the hopper ram is fully retracted.

RAM EXTENDED
Green when the hopper ram is fully extended or at high pressure.

RAM SETUP SCREEN (IF SUPPLIED)

NOTE: *This screen can only be modified if the user is logged in.*



*The ram selector switch must be in the "OFF" position to activate the functions below.

RAM PUMP START

Press to run the ram HPU motor. This button will turn green when the RAM PUMP is running.

RAM PUMP STOP

Press to stop the ram HPU motor. This button will momentarily turn red when it is pressed.

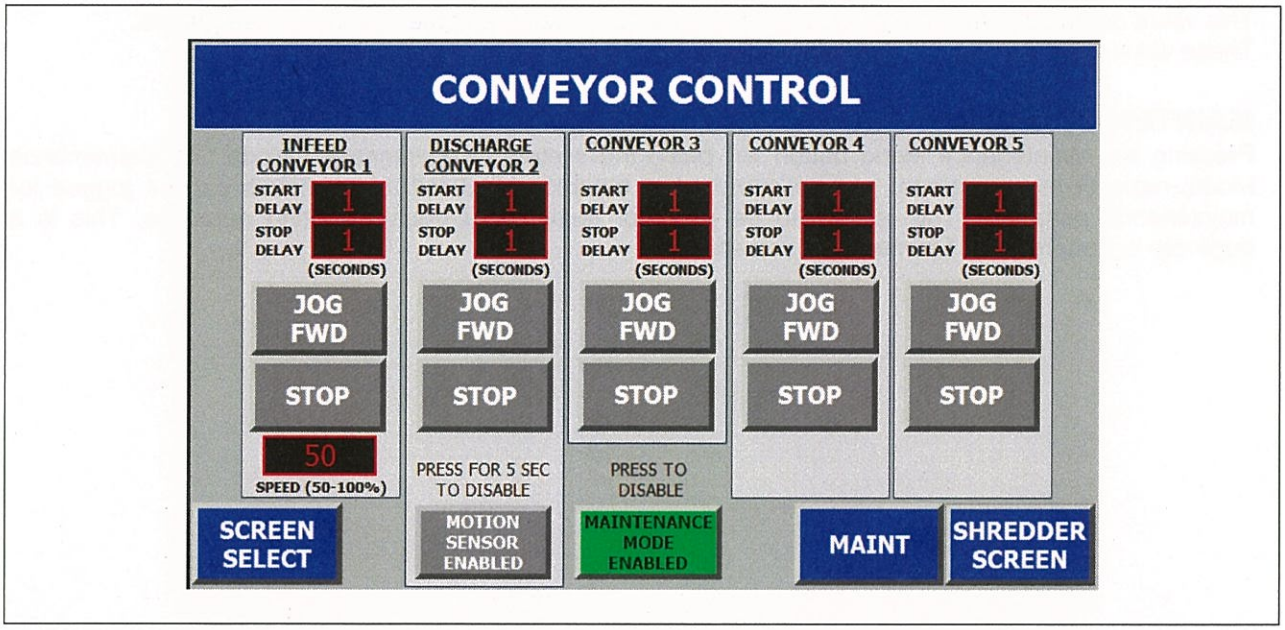
RAM RETRACT

Press this button when the RAM PUMP is running to manually retract the ram.

RAM EXTEND

Press this button when the RAM PUMP is running to manually extend the ram.

CONVEYOR CONTROL SCREEN (IF SUPPLIED)



This screen shows conveyors that may not be provided. If a specific conveyor or function does not appear on the actual screen of the installed shredder system, that conveyor or function is not controlled by this system.

JOG FWD

Touch these buttons to jog the indicated component when the system is in Maintenance mode. Touch and hold for 5-seconds to start the conveyors. Continue to hold for 5-seconds to latch in the indicated component. This is very useful for tracking conveyor belts. The button for that component will turn light green when running.

FWD

The JOG FWD button will disappear and a FWD light display will appear in its place when the system is running in auto.

STOP

Touch to stop the indicated component.

SPEED (50-100%)

Touch to adjust the speed of the conveyor. This function is available only on conveyors equipped with VFDs.

CONVEYOR MOTION SENSOR DISABLED / ENABLED

One or more of the conveyors may be equipped with a motion switch that detects that the conveyor is operating correctly and can receive material. This is to prevent jammed discharge chutes. If the switch is not functional or not present, this button can be used to disable the motion switch so that it does not create an alarm and shut the system down.

START DELAY (SECONDS)

This value determines the length of time before the indicated component starts in a sequence. These values can only be changed if the user is logged in.

STOP DELAY (SECONDS)

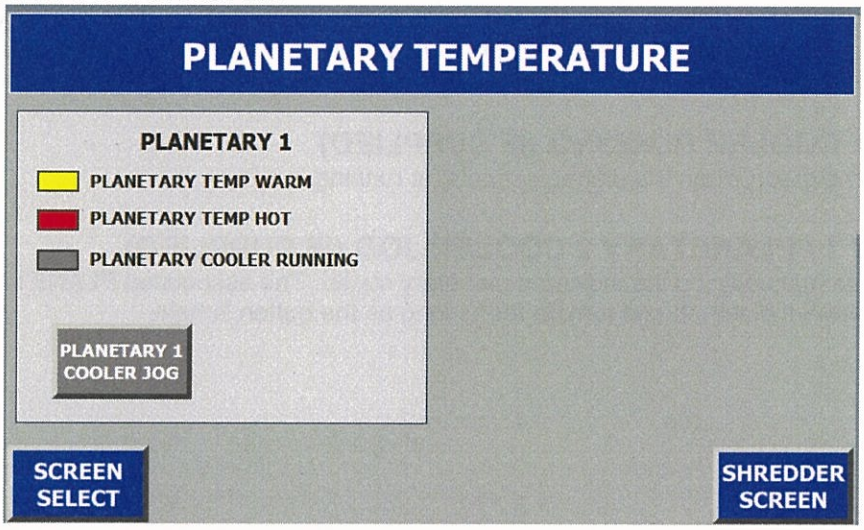
This value determines the length of time before the component equipment stops in a sequence. These values can only be changed if the user is logged in.

MAINTENANCE MODE DISABLED / ENABLED

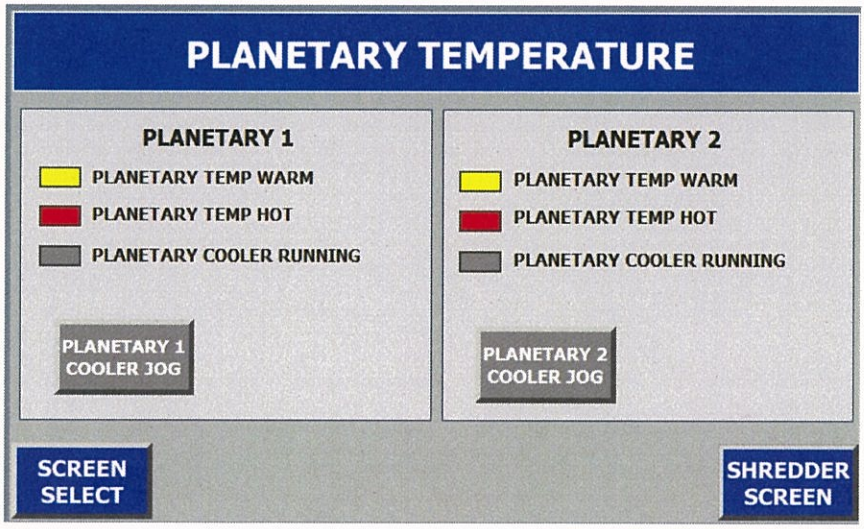
Pressing the Maintenance Mode button will place the system in Maintenance Mode. In Maintenance Mode, none of the equipment can be operated in automatic, but individual motors can be jogged for maintenance purposes. This is only to be used for testing and troubleshooting purposes. This is a duplicate button from the Maintenance screen.

PLANETARY TEMPERATURE SCREEN (IF SUPPLIED)

SINGLE MOTOR SHREDDER DISPLAY



DUAL MOTOR SHREDDER DISPLAY



This screen shows planetary cooler features that may not be provided. If the planetary cooler indicators and buttons do not appear on the screen of the installed system, this means the feature is not available.

PLANETARY TEMP WARM

Turns yellow to indicate that the planetary oil has exceeded the normal operating temperature. On systems equipped with planetary coolers, this will result in the planetary cooler turning on to cool the oil inside. On systems not equipped with planetary coolers, this will result in a PLANETARY TEMPERATURE WARNING. The system will continue to operate, but it is recommended that the material infeed rate be reduced until the warning is no longer active.

PLANETARY TEMP HOT

Turns red to indicate that the planetary oil has exceeded the maximum operating temperature. This will result in a PLANETARY TEMPERATURE FAULT. The system will shut down to allow the planetary oil to cool under no load. This is a rare occurrence, and usually only occurs when the shredder is being run very hard in a high ambient temperature environment. When restarted, it is recommended that the material infeed rate be substantially reduced to avoid this fault recurring.

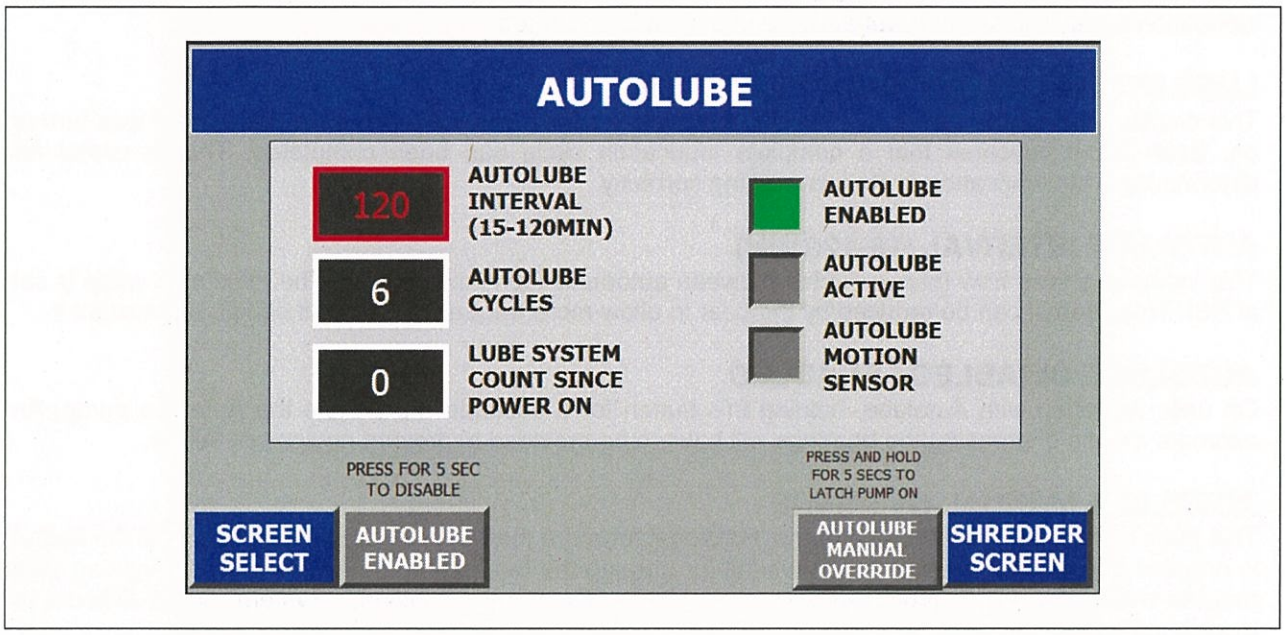
PLANETARY COOLER RUNNING (IF SUPPLIED)

The indicator turns green when the planetary cooler is running.

PLANETARY 1 / PLANETARY 2 COOLER JOG (IF SUPPLIED)

Touch and hold to manually jog the indicated planetary cooler. The associated PLANETARY COOLER RUNNING indictor should turn on for as long as the button is held.

AUTOLUBE SCREEN (IF SUPPLIED)



This screen shows information about the lubrication pump and allows troubleshooting the lubrication system.

The Autolube system consists of a grease pump, a distribution block and a proximity sensor located on the distribution block. The proximity sensor sends a pulse to the PLC every time all the connected bearings have been lubricated once. Changing the amount of off time between pump runs (interval) and the number of times the proximity switch pulses (cycles) controls the amount of grease. The following table shows the recommended intervals and cycles for each model of shredder.

Model	M55	Q55	M70	Q70	M85	Q85	M100	Q100
Interval	420	420	420	420	120	120	120	120
Cycles / Interval	1	2	2	3	1	1	2	3
Model	M120	Q120	M140	Q140	M160	T160		
Interval	120	120	120	120	120	120		
Cycles / Interval	4	5	4	6	6	9		

AUTOLUBE ENABLED

This indicator is on if the grease system is enabled and functioning in automatic mode. Autolube can be disabled in the "Configuration Screen".

AUTOLUBE ACTIVE

This indicator is on if the grease pump is running.

AUTOLUBE MOTION SENSOR

This indicator shows when the proximity sensor on the lubrication divider block is on. If the autolube motion sensor does not change state after the Autolube becomes active, this means grease is not being dispersed through the system and a fault will be triggered.

AUTO LUBE CYCLES

This accumulation shows the number of times the proximity switch turns on and off to equal one full lubrication cycle. This value is set at SSI and cannot be changed.

LUBE SYSTEM COUNT SINCE POWER ON

This displays the accumulation of the proximity switch counts since the power to the system was turned on. Each count indicates that a complete lubrication cycle has been completed. This is useful for determining if the lubrication system is working correctly.

AUTOLUBE INTERVAL (15-120MIN)

This indicator shows how many minutes between automatic lubrication cycles. The maximum value is set at SSI. This interval can be reduced by the user to allow more frequent greasing if conditions warrant it.

AUTOLUBE DISABLED / ENABLED

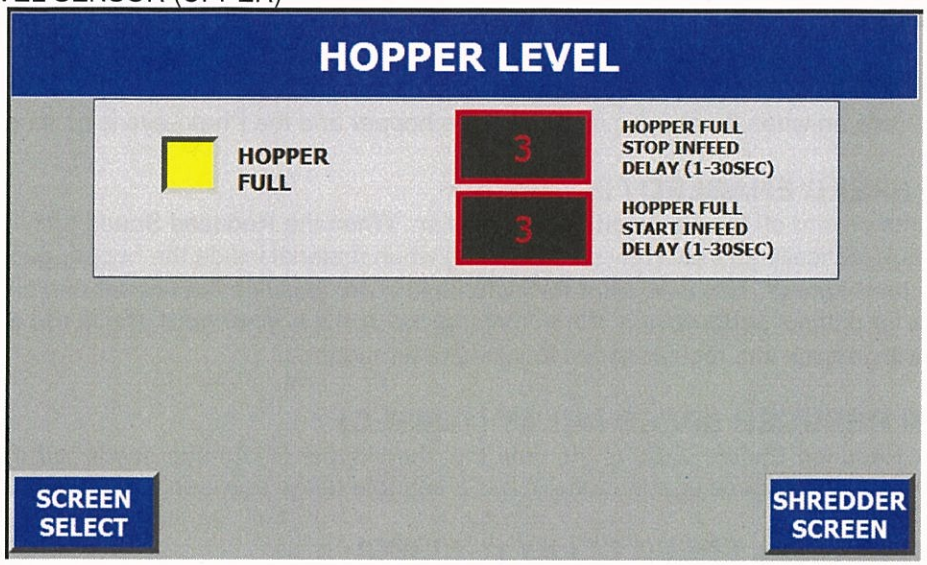
On units equipped with Autolube, holding this button for 5 seconds will disable the Autolube pump. An alternate means of greasing the bearings will have to be provided to prevent equipment failure.

AUTOLUBE MANUAL OVERRIDE

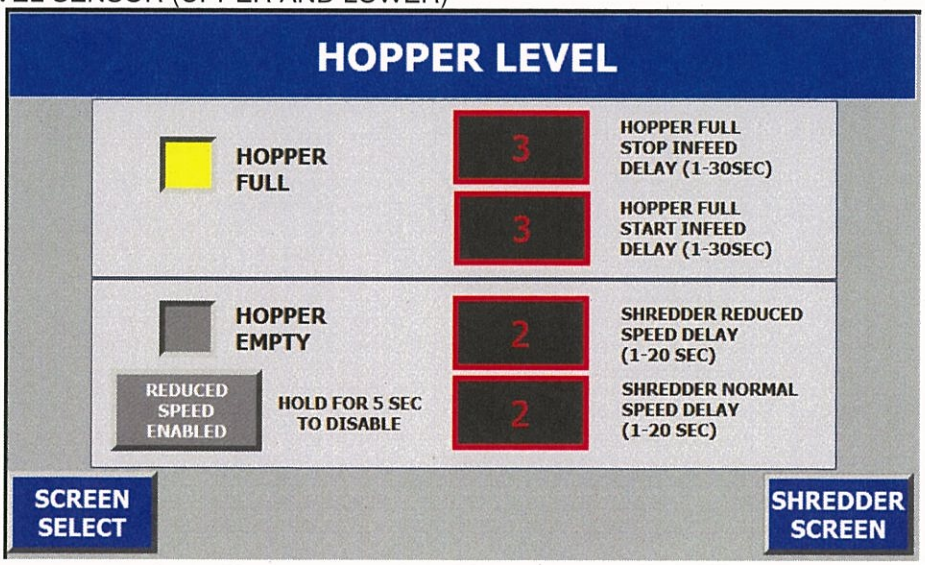
This push button jogs the Autolube pump. Holding it for more than 5-seconds will turn it on until the button is pressed again. This function is very useful for purging the bearings of contamination and making sure that the bearings are fully lubricated with new grease. Turning the "Autolube System" on for 8 hours or more once a month is recommended.

HOPPER LEVEL (IF SUPPLIED)

HOPPER LEVEL SENSOR (UPPER)



HOPPER LEVEL SENSOR (UPPER AND LOWER)



HOPPER FULL

This indicator turns on when there is material in the hopper and the Photo-eye is blocked.

HOPPER FULL STOP INFEED DELAY (1-30SEC)

The stop infeed delay is the time that the Hopper Photo-eye needs to be blocked to turn off the OK To Load signal. It has a settable range between 1 to 30 seconds. This signal is often tied to an infeed conveyor to stop the conveyor, or an indicator light to notify an operator to stop feeding the shredder.

HOPPER FULL START INFEED DELAY (1-30SEC)

The start infeed delay is the time that the Hopper Photo-eye needs to be clear to turn the OK To Load signal back on. It has a settable range between 1 to 30 seconds. This signal is often tied to an infeed conveyor to restart the conveyor, or an indicator light to notify an operator to start feeding the shredder.

HOPPER EMPTY

This indicator turns on when there is no material in the hopper and the Photo-eye is no longer blocked.

REDUCED SPEED ENABLED / DISABLED

This button turns on and off the Reduced Speed function. When the Reduced Speed function is on, the shredder will automatically go into a low speed setting when material inside the hopper goes below the hopper empty level sensor. This is to allow for material to build up inside the hopper and create sufficient head pressure for optimal performance. When material inside the hopper goes above this level sensor, the shredder will go back into regular speed to increase throughput.

SHREDDER REDUCED SPEED DELAY (1-20SEC)

The Shredder Reduced Speed Delay is the time that the Hopper Photo-eye needs to be un-blocked for the shredder to go into reduced speed mode. It has a settable range between 1 to 20 seconds.

SHREDDER NORMAL SPEED DELAY (1-20SEC)

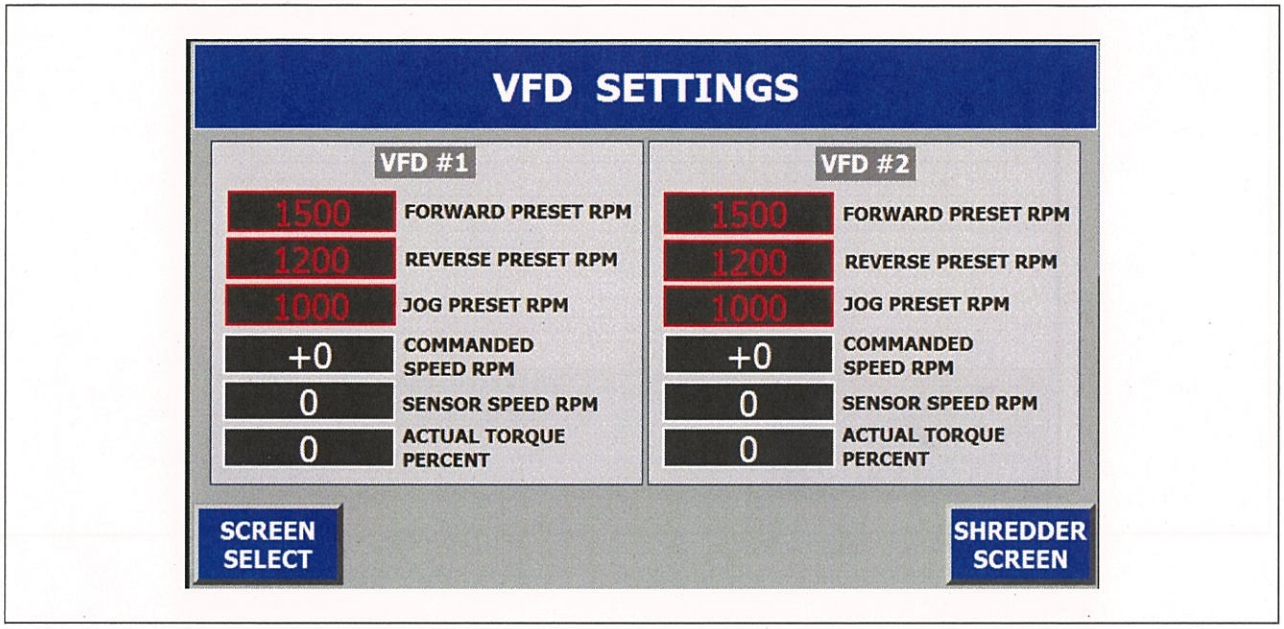
The Shredder Normal Speed Delay is the time that the Hopper Photo-eye needs to be blocked for the shredder to go back to normal speed mode. It has a settable range between 1 to 20 seconds.

VFD SETTINGS SCREEN

NOTE: *This screen can only be modified if the user is logged in.*

Used to set the FORWARD, REVERSE, and JOG preset speeds for the SmartDrive VFD units.

This screen is also used to monitor the commanded speed being sent to the VFD, and the actual running speed and torque.



FORWARD PRESET RPM

Used to set the FORWARD speed for the SmartDrive VFD.

REVERSE PRESET RPM

Used to set the REVERSE speed for the SmartDrive VFD.

JOG PRESET RPM

Used to set the JOG speed for the SmartDrive VFD. Go to the MAINTENANCE screen to jog the shaft.

COMMANDED SPEED RPM

This is the speed the VFD is being told to operate

SENSOR SPEED RPM

This is the speed of the shaft calculated from the speed switch

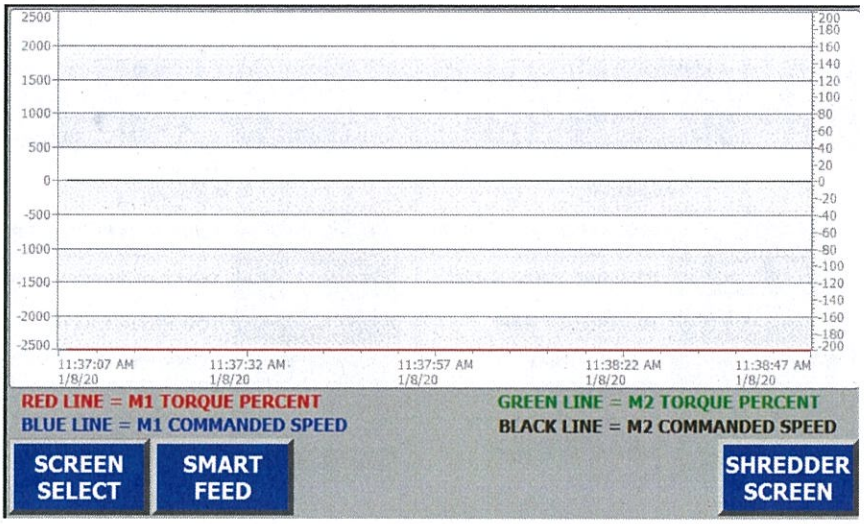
ACTUAL TORQUE PERCENT

This shows the torque that the drive is currently generating.

If Multiple motors / VFDs are present, there will be a button to access each VFD.

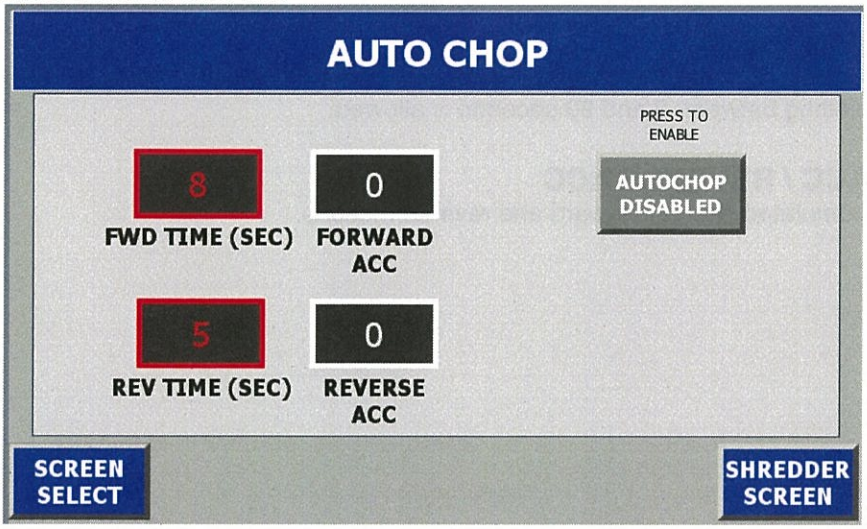
TORQUE GRAPH SCREEN

The torque graph shows the commanded speed and torque of the shredder shafts. It is very helpful for adjusting the SmartFeed because it is possible to see the relationship between these two and see any surging.

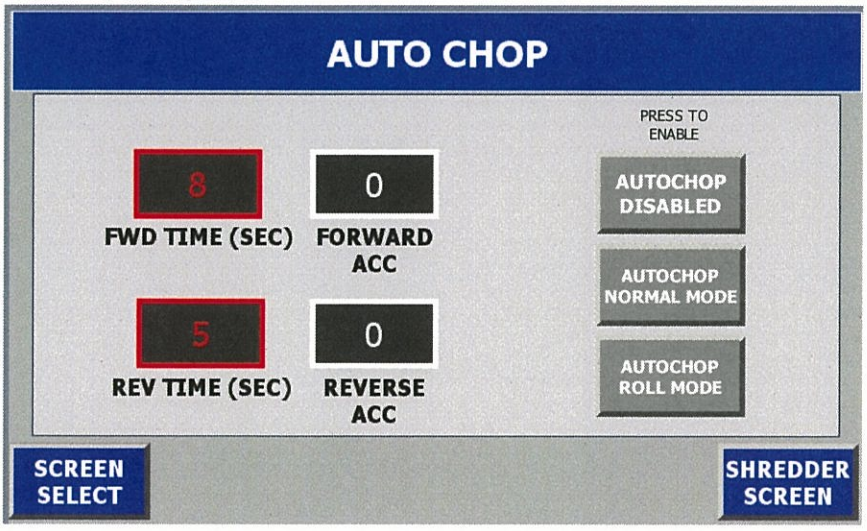


AUTOCHOP SCREEN (IF SUPPLIED)

SINGLE MOTOR SHREDDER DISPLAY



DUAL MOTOR SHREDDER DISPLAY



AUTOCHOP DISABLED / ENABLED

Determines if the Autochop function is on or off.

NORMAL MODE DISABLED / ENABLED

When the Autochop function is enabled and the Autochop Normal Mode is selected, the shredder shafts will reverse periodically based on the timers shown on this screen. This function is used to reduce the particle size being produced or slow the production rate to match equipment downstream of the shredder.

ROLL MODE DISABLED / ENABLED

When the Autochop function is enabled and Roll Mode is selected the shafts will rotate in the following sequence:

1. Both shafts run forward together

2. Shaft #1 runs reverse and shaft #2 runs forward
3. Both shafts run forward together
4. Shaft #2 runs reverse and shaft #1 runs forward

FWD / REV TIME (SEC)

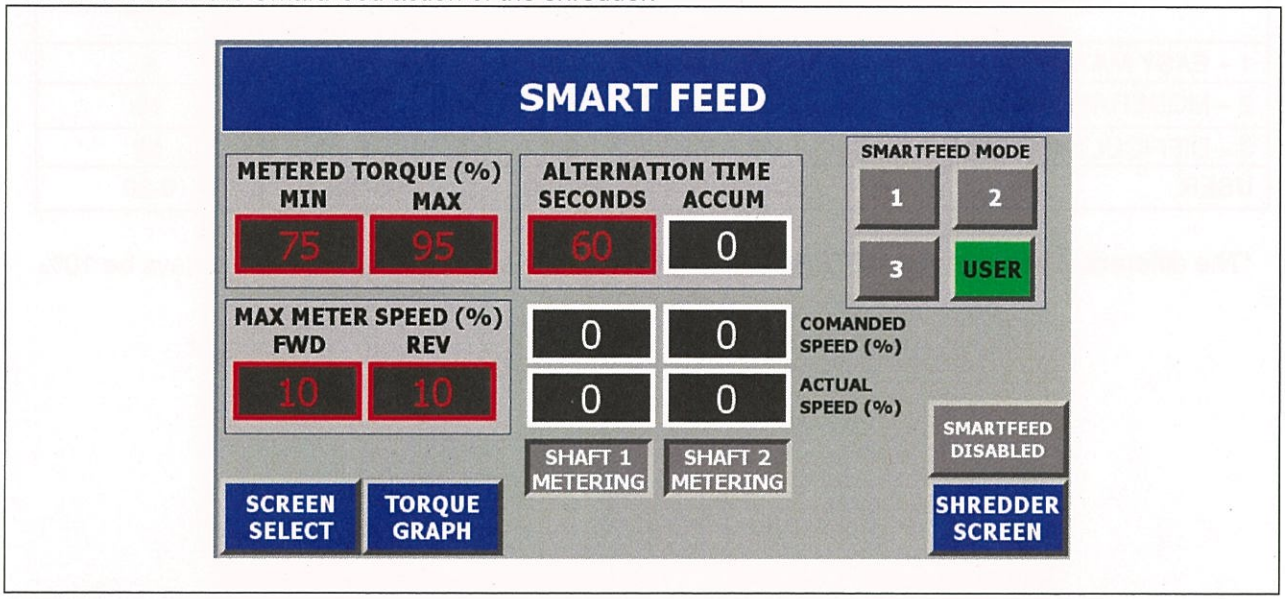
Used to set the length of time the shredder runs during the “forward” / "reverse" part of the Autochop sequence. Any setting between 3 and 99 seconds is allowed.

FORWARD ACC / REVERSE ACC

Displays the accumulated time for forward and reverse motions.

SMARTFEED SCREEN (IF SUPPLIED)

Used to control the SmartFeed action of the shredder.



SMARTFEED ENABLED / DISABLED button

Press to enable and disable the SMARTFEED function. There is a duplicate button on the main Shredder screen.

METERED TORQUE (%), MIN / MAX

Used to set minimum and maximum torque values of the main shaft. These values are used to determine the rate of speed change of the meter shaft. The range of actual speed of the meter shaft is determined by "MAX METER SPEED (%), FWD / REV" setting. When the main shaft drops to the minimum torque, the meter shaft begins to speed up to the "MAX METER SPEED (%), FWD" setting. At the maximum torque, the meter shaft reverses at "MAX METER SPEED (%), REV" setting.

MAX METER SPEED (%) FWD / REV

Used to set the range of speeds that the meter shaft can go from the "FWD" setting to the "REV" setting. Note that the meter shaft will reverse when the main shaft torque gets too high.

ALTERNATION TIME, (SEC) / ACCUM

This setting allows the user to determine the alternation time for when the Main shaft and Meter shaft interchange.

COMMAND SPEED (%)

This indicates the commanded speeds of both the Main shaft and Meter shaft.

ACTUAL SPEED (%)

This indicates the actual speeds of both the Main shaft and Meter shaft.

SHAFT 1 METER / SHAFT 2 METER

These indicators determine which shaft is currently acting as the Meter shaft.

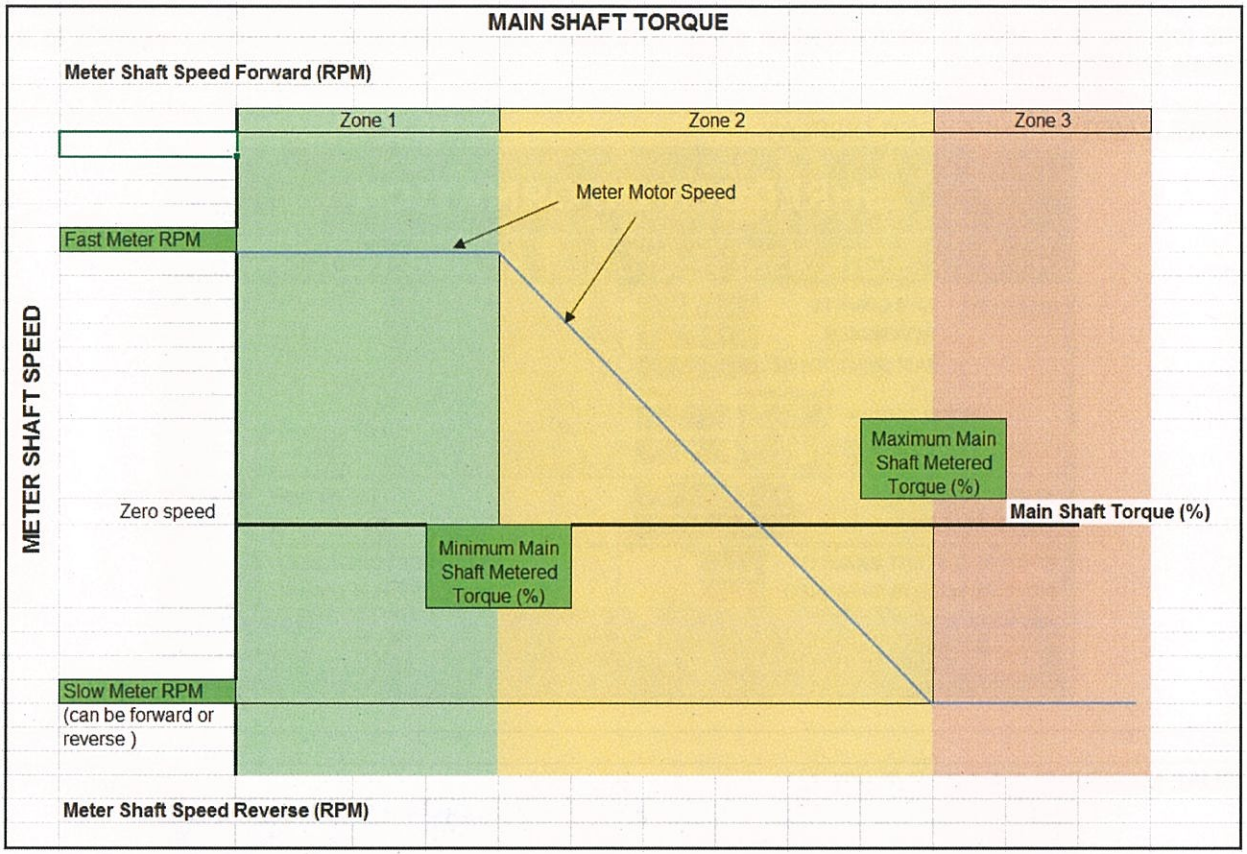
SMARTFEED MODE Settings: 1, 2, 3, USER

This consists of 3 factory preset settings, and 1 user defined setting for custom tuning. The settings and, therefore, values selected on this screen are active any time the shredder is in SmartFeed operation.

SMARTFEED MODE	METERED TORQUE (%)		MAX METER SPEED (%)	
	MIN	MAX	FWD	REV
1 – EASY MATERIAL	70	95	15	5
2 – MODERATE MATERIAL	60	80	10	10
3 – DIFFICULT MATERIAL	40	60	5	15
USER	20-100	40-120	0-20	0-20

*The differential between the METERED TORQUE (%) MIN and MAX values must always be 10%

The speed of the Meter Shaft is controlled by the torque that the Main Shaft is experiencing. The following chart shows the relationship between the two.



Example Values:

Main Shaft Torque Minimum = 80%
Main Shaft Torque Maximum = 100%
Max Meter RPM FWD = 10%
Max Meter RPM REV = 10%

Zone 1: When the Main Shaft torque is less than the "Main Shaft Torque Minimum", the Meter Shaft speed is at the "Max Meter RPM FWD". Example: meter shaft is turning forward at 10%

Zone 2: When the Main Shaft torque is between the "Main Shaft Torque Minimum" and the "Main Shaft Torque Maximum", the shaft speed varies linearly between the "Max Meter RPM FWD" and the "Max Meter RPM REV". The example at 90% Main Shaft Torque, the Meter Shaft is turning at 0% forward

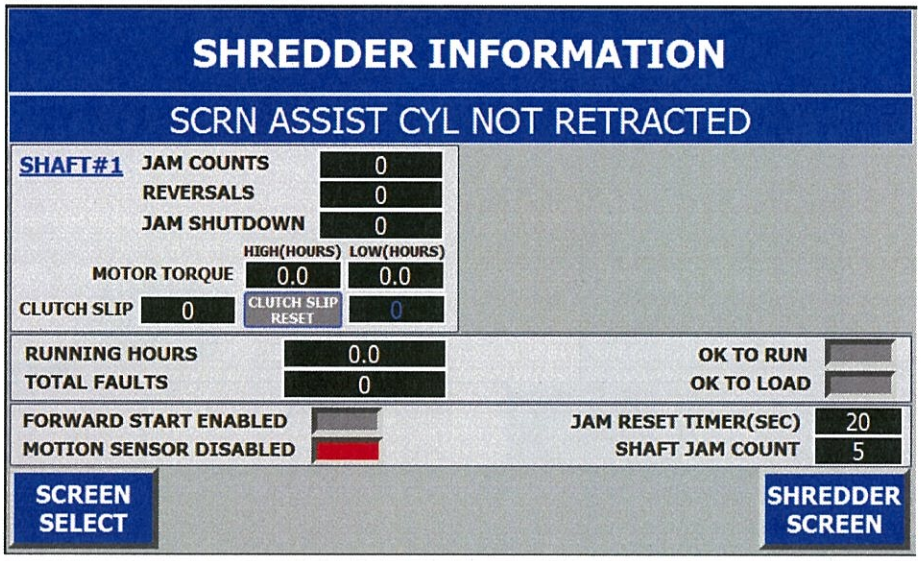
Zone 3: When the Main Shaft torque is above the "Main Shaft Torque Maximum", the shaft speed stays at the "Max Meter RPM REV". Example: if the Main Shaft Torque is at 100% or higher, the Meter Shaft is turning at 10% in reverse.

These buttons are preset settings for SMARTFEED MODE 1 is for easy material, MODE 2 is for moderate material, and MODE 3 is for difficult material. The USER MODE can be configured by the operator.

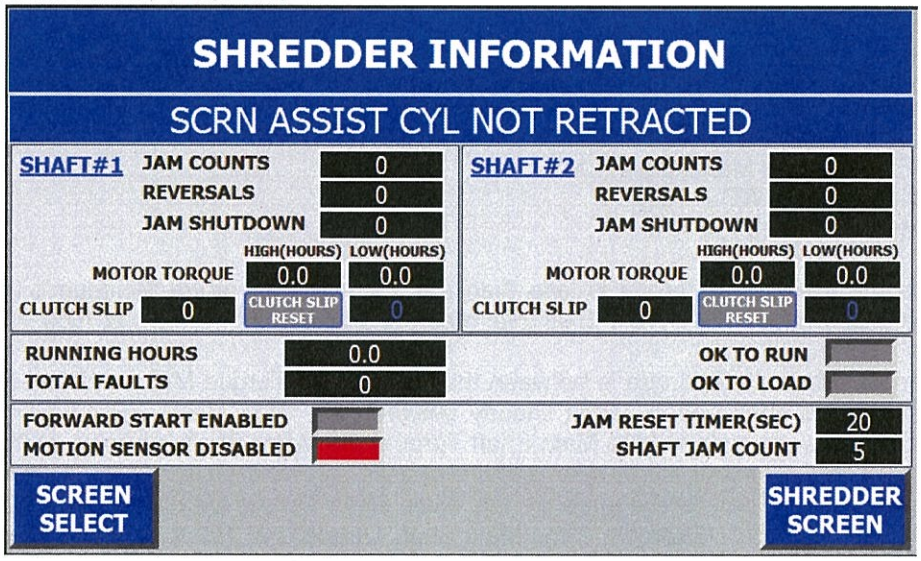
SHREDDER INFORMATION SCREEN

The PLC records the number of hours that have been run in automatic mode, as well as several other key operational items. This data is very useful for determining how the shredder is running. The information in the top field is specific to each shredder shaft. The lower section displays information pertaining to the whole shredder unit.

SINGLE MOTOR SHREDDER DISPLAY



DUAL MOTOR SHREDDER DISPLAY



Shredder Status Line (showing "CONTROL POWER OFF") in this graphic)
Displays the shredder operating status. This is the same information as found on the Shredder Status Line on the "Shredder Screen".

JAM COUNTS
This is the "current number" of jams for that particular shaft since the jam clear timer has finished. This value indicates how frequently the shaft is jamming while processing the current material.

REVERSALS (TORQUE)
Displays a running count of the number of shaft reversals due to motor torque, since the system was put into service. A shaft will go into a reversal if the motor torque draw exceeds 150% of the set VFD maximum torque for 3 seconds.

JAM SHUTDOWN
Displays the number of Jam Shutdown Faults, for this shaft, since the system was placed into service. A Jam Shutdown is triggered when enough jam reversals occur to exceed the Shaft Jam Count setting, without that shaft running in forward for at least the duration displayed in the Jam Reset Time field. See the Configuration screen.

MOTOR TORQUE – HIGH(HOURS)
Displays a running time that the torque has been above the Hi-Torque setting, since the system was placed into service. The Hi-Torque setting is the threshold above which a jam reversal is triggered. See the Configuration screen.

MOTOR TORQUE – LOW(HOURS)
Displays a running time that the torque has been above the Low-Torque Setting, since the system was placed into service. The Low-Torque setting is the threshold above which Overload Avoidance is triggered. See the Configuration screen.

Note: all the functions related to clutch apply only to shredders supplied with a friction clutch

CLUTCH SLIP (REVERSALS)
Displays a running count of the number of shaft reversals, due to clutch slip, since the system was put into service.

CLUTCH SLIP RESET (REVERSALS)
Displays a running count of the number of shaft reversals, due to clutch slip, since the last time the counter was reset. Touch and hold the red button to reset this counter to 0. This is a useful tool in determining if one shaft, or the other, is experiencing excessive loads, or has a Coupling adjustment problem.

GENERAL SHREDDER INFORMATION – LOWER SECTION

RUNNING HOURS
This is the "hour meter" for the shredder. This value is used to determine the maintenance tasks outlined in the "Maintenance Schedule" section in this manual.

TOTAL FAULTS (EXCLUDING JAMS)
This indicates how many faults have shut down the shredder since it was new. This does not include shaft jam faults; they are recorded in the Jam Shutdown display field(s).

OK TO RUN
Displays the status of the Ok to Run Input (from downstream equipment if used).

OK TO LOAD
Displays the status of the Ok to Load Output (Permissive to upstream equipment, if used).

FORWARD START ENABLED
Displays the status of the Forward start option, (selected on the Configuration Page).

MOTION SENSOR DISABLED
Displays the status of the Motion Sensor option, (selected on the Configuration Page).

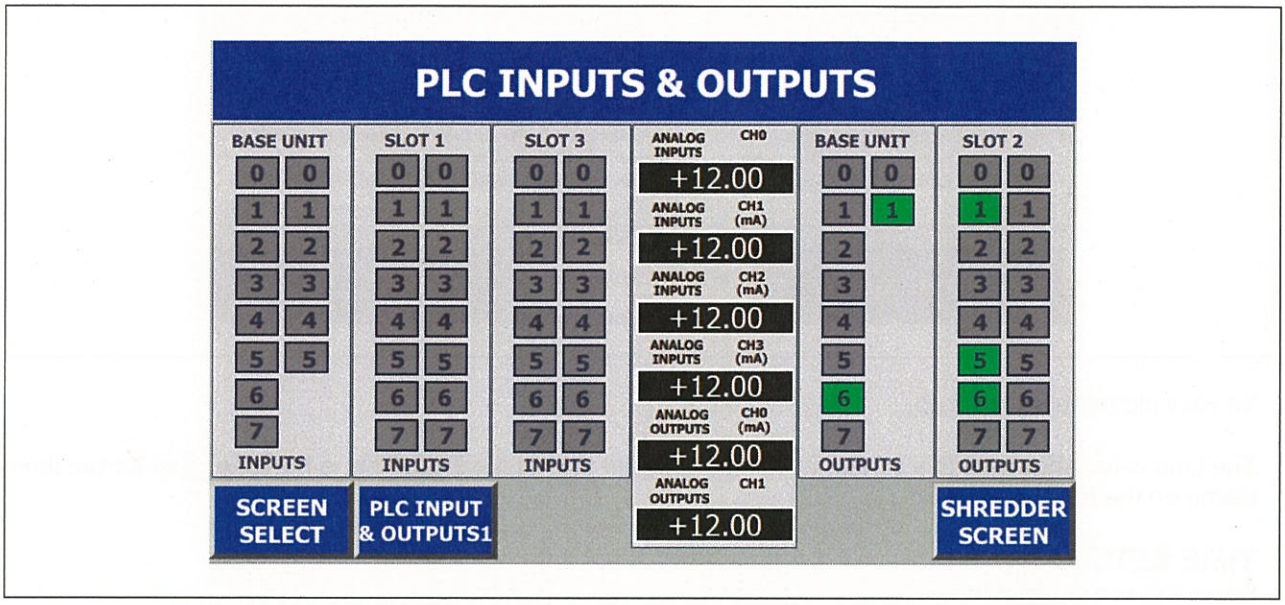
JAM RESET TIMER(SEC)
Used to set the number of seconds the shredder must run in a forward mode with no further jams before the jam counters are reset to zero. Allowed time range is from 10 to 90. Contact SSI for recommended settings. Note that this is also adjustable from the (Shredder Configuration Screen)

SHAFT JAM COUNT
Used to set the number of consecutive jam reversals on a shaft allowed before a jam fault is declared. Allowed range is from 1 to 5 for Electric shredders. Contact SSI for recommended settings.
Note that this is also adjustable from the (Shredder Configuration Screen)

PLC INPUTS, OUTPUTS AND ANALOG SCREENS

These screens are used to display the actual status of PLC "real world" inputs and outputs. The respective lights will come ON when the noted input or output is active. These screens are a very powerful troubleshooting tool to identify if devices are working correctly. For example, if output is on, the device controlled by that output is not turning on, could indicate a problem with the wiring or the external device.

If the PLC has more inputs or outputs that can be shown on a single screen, buttons for calling additional screens will be provided.



PLC INPUTS

PLC inputs screen shows the status of the digital (on / off) signals coming into the PLC.

PLC OUTPUTS

PLC Outputs screen shows the status of the digital outputs from the PLC

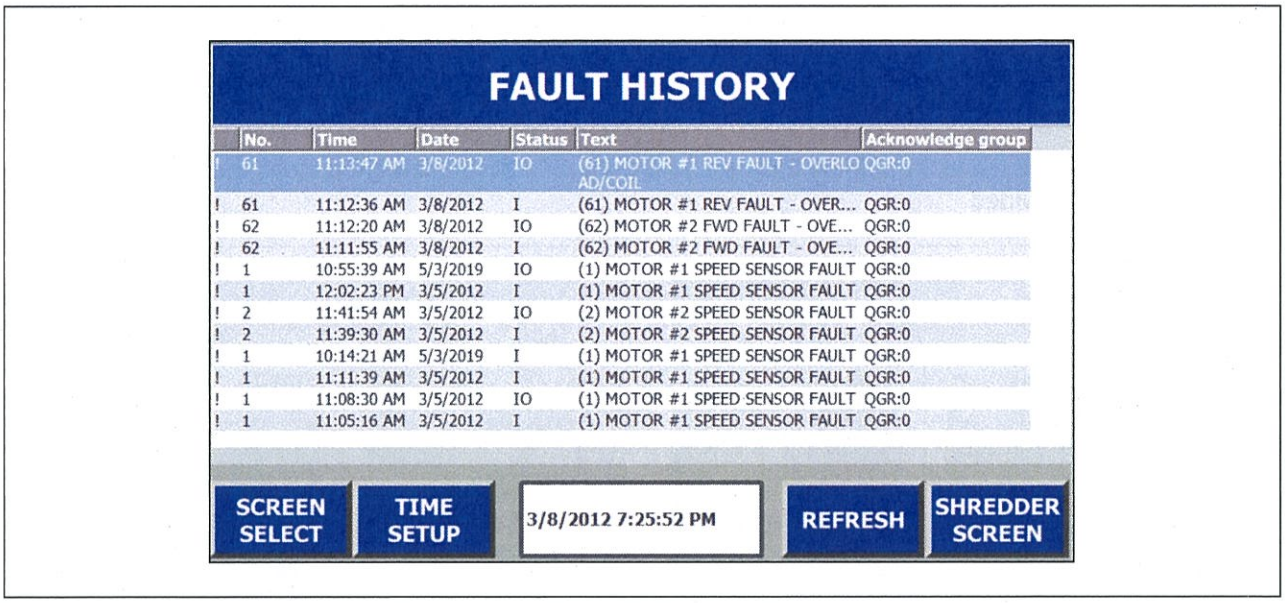
PLC ANALOG

PLC Analog Screen shows the status of all the analog inputs and outputs on the PLC. These can represent speed references, torque values etc. This screen shows the voltage or milliamps currently being input or output from the analog cards.

For SmartDrive units, the speed reference has a 12mA central (null) position, which is a 0-rpm speed command. The speed reference RPM increases in value when it is greater than 12 mA, up to the maximum forward speed reference at 20mA. The speed reference signal increases RPM in the REVERSE direction for values less than 12mA, increasing in REVERSE RPM up to the maximum reverse speed reference of 4 mA.

FAULT HISTORY SCREEN

This screen displays a listing of the alarm conditions experienced by the shredder since installation.



To view older faults, scroll up.

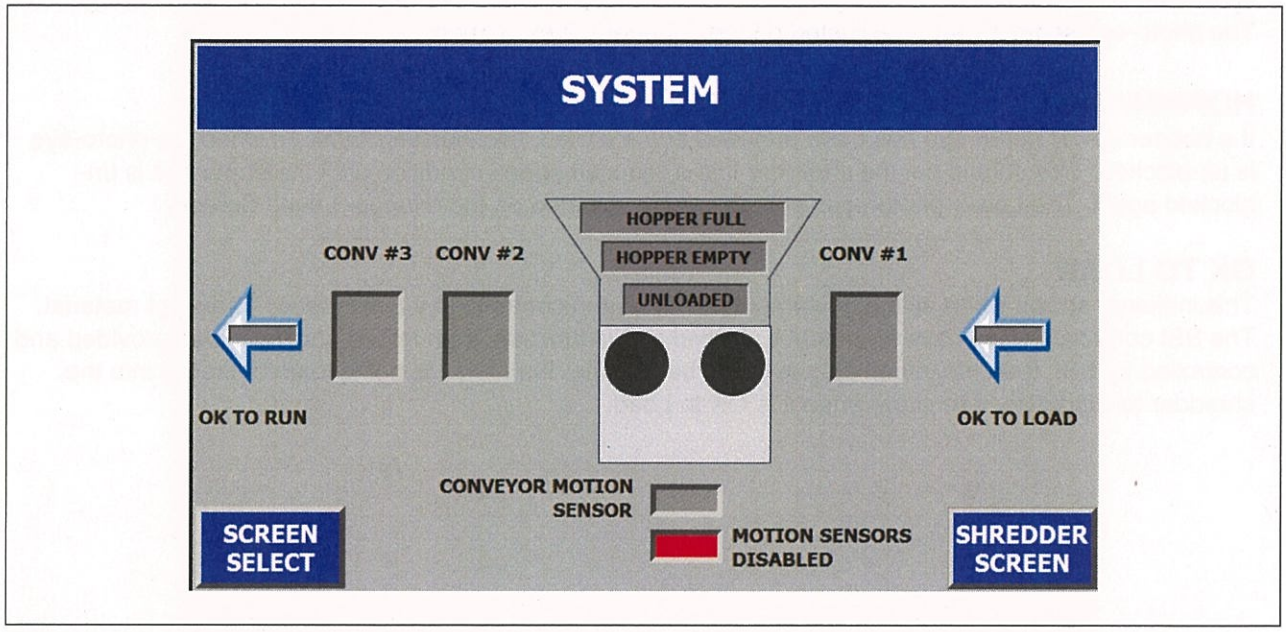
The time value shown on this screen is the currently set time in the PLC. This is the time used for the time stamp on the fault history.

TIME SETUP

Press this button to go to the time setup screen. This requires logging in.

SYSTEM SCREEN

The system screen shows various signals and devices that can affect whether the shredder is running or not.



OK TO RUN

This is a signal from any equipment downstream of the shredding system that tells the PLC that it is OK to Run and start producing material. The SSI controls always have an input assigned to this function. If there is no equipment after the shredder, this input must be jumpered to allow the entire system to run.

CONV #3, CONV #2, CONV #1

If conveyor controls have been provided by SSI, the appropriate indicators will be visible. The indicators flash when the device is starting up and come on solid when they run.

DISCHARGE CONV. MOTION SENSOR

This indicator shows that a signal is being received from the proximity switch mounted on the discharge conveyor tail shaft. SSI controls always have an input assigned to this function. If there is no switch mounting to the discharge conveyor, or there is not a discharge conveyor, then this function must be disabled on the Configuration Screen. SSI strongly recommends a motion switch on the discharge conveyor because shredders can pack the discharge chute so tightly that it can crush the conveyor.

MOTION SENSORS DISABLED

If the motion sensor has been disabled, this indicator will show red.

LOADED / UNLOADED

This indicator turns red when the shredder has been loaded enough that it is in danger of reversing. This is part of the "Overload Avoidance" logic built into the "OK to Load" signal. When this occurs, the "OK to Load" signal will turn off. This should turn off any infeed conveyors. The overload avoidance settings can be adjusted on the "Configuration Screen".

HOPPER FULL (UPPER PHOTO-EYE)

If a hopper Upper photo-eye has been provided and installed, this indicator turns on when the photo-eye is blocked. This should turn off the "OK to Load" signal if the photo eye remains blocked long enough. The photo-eye settings can be adjusted on the "Hopper Level" Screen.

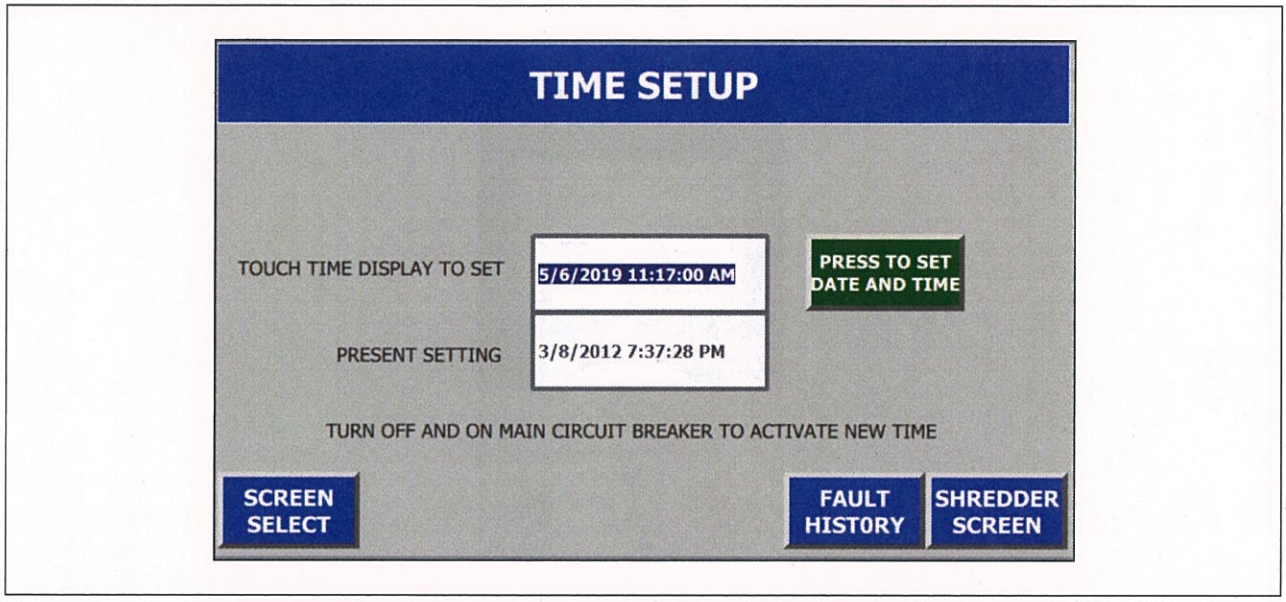
HOPPER EMPTY (LOWER PHOTO-EYE)

If a hopper Lower photo-eye has been provided and installed, this indicator turns on when the photo-eye is un-blocked. This should put the shredder into a reduced speed condition until the photo eye is un-blocked again. The Lower photo-eye settings can be adjusted on the "Hopper Level" Screen.

OK TO LOAD

This indicator shows when all the equipment provided and controlled by SSI is ready to accept material. The SSI controls always have an output assigned to this function. If an infeed conveyor was provided and controlled by SSI, then the infeed conveyor will be running. If material is being loaded directly into the shredder this indicator can show when it is OK to Load.

TIME SETUP SCREEN



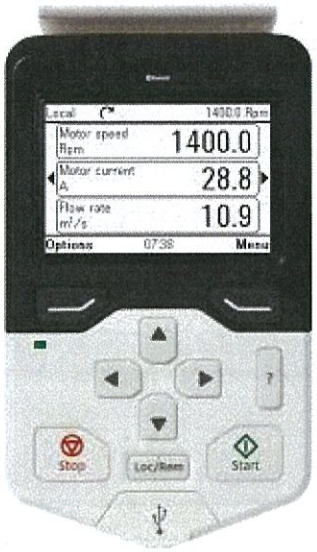
(UPPER) TIME DISPLAY

Pressing this display allows the user to enter in the proper date and time.

PRESS TO SET DATE AND TIME (BUTTON)

After the date and time have been correctly entered in to the upper Time Display, pressing this button will store the correct date and time.

SMART DRIVE VFD LOCAL CONTROL



ACS880 KEYPAD

FOR MORE INFORMATION, SEE SECTION 12: VENDOR LITERATURE.

⚠WARNING

Do not operate the machine unless thoroughly trained or under the supervision of an instructor.

⚠WARNING

Always wear safety equipment such as goggles, ear, head protection and safety shoes at all times.

⚠WARNING

Always have all shields and guards in place before operating the machine.

OPERATING PRINCIPLES

A rotary shear shredder has a row of cutters mounted on two shafts, inside a heavy steel frame. The cutters are hooked and held apart by small disks called spacers. Cutters and spacers are arranged so that the cutters on one shaft mesh with the cutters on the other. The shafts turn slowly in opposite directions, allowing them to grab material and pull it down through the shredder. The distance between cutters is very small, usually .010 in. (.25 mm) (refer to SSI Stack Sheet in Section 11). The cutters do not touch.

The shredder can work in several ways:

1. The cutters act like scissors and shear material between them (example: tires and paper).
2. The cutters pinch the material so that it breaks (example: dry wood).
3. The material is torn apart as the cutters turn at different speeds (example: textiles).

Sometimes the shredder cannot shred a piece of material, or it grabs too much material at once and becomes overloaded. When this happens, the shredder stops and reverses direction. After a few seconds the cutter shafts begin turning again in the forward direction. If the problem is not solved, the shafts will keep reversing until the programmable controller decides that there is a jam and stops the shredder, or until the material is processed.

Over time, the cutters may wear down and not work as well. Eventually cutters need to be replaced. The time it takes to reach this point depends on the type and amount of material being shredded (refer to the "Evaluating cutter Wear" section in the Preventive Maintenance part of the manual).

STARTING THE UNIT

Before starting work, be sure to:

1. Perform daily maintenance checks (refer to Maintenance Schedule).
2. Make sure there are no people in or near the shredder.
3. Make sure there are no objects in the shredder that are not supposed to be there.
4. Turn the control power keyswitch to ON.
5. Call out a warning to people around you.

6. Press the MCR ON / RESET button. This turns on the master control relay. If the MCR fails to energize, make sure the emergency stop buttons are pulled out. The status display on the touch screen will read, "MCR NOT RESET." when MCR is not on
7. The shredder controls will always control the shredder, but might also control other devices. Normal operation of all the devices is started with the SYSTEM START / RUN push button. If all of these devices are ready to run, press and hold the SYSTEM START / RUN button. A warning horn will sound for five seconds. At the end of five seconds, the shredding system will start.

8. Listen for noises that sound like parts of the shredder scraping or bumping together. If you hear any, stop the machine and lock out the power. Then try to fix the problem. (If the shredder is equipped with a screen, refer to the Screen Removal and Inspection section for instructions on screen adjustment.)

9. If a Ram hopper has been supplied, make sure the ram hopper works. Turn the ram selector switch to MANUAL to start the ram hydraulic pump. Use the RAM EXTEND and RAM RETRACT buttons to make sure there are no unusual noises or other problems with the ram.

10. If the ram is to be used (If supplied), turn the ram selector switch to AUTO.

IMPORTANT

Using the ram is NOT always the best option.

OPERATING THE SHREDDER

After completing ALL the steps above:

1. Feed the shredder using only the correct conveyors or loaders. Do not feed the shredder by hand. It is better to feed the shredder steadily than to feed it large batches all at once.

2. If the machine is reversing often or jams out, stop feeding it. If it jams out, turn the machine off and look for a non-shreddable object in the cutting chamber.

3. If there is a jam, the SYSTEM FAULT light will start to glow. This means that the PLC has shut the shredder down.

4. Any time the PLC finds a problem, it will shut down the shredder and fault code will be displayed on HMI. Find the problem and fix it before resetting the fault. Then continue shredding.

STOPPING THE SHREDDER

1. Stop feeding the shredder.

2. Keep running the shredder until the cutting chamber, discharge chutes, and conveyors are empty.

3. Press the STOP button on the control panel. If the unit is part of a system press SYSTEM STOP button.

IMPORTANT

Do not use the emergency stop. It is ONLY for emergencies.

4. (If Ram Supplied) When the shredder is turned off, and the ram is in automatic, the ram will retract fully and stop. Turn the ram selector switch to OFF.

5. Turn the panel key switch to OFF and remove the key.

JAM SHUTDOWNS

- The PLC monitors both the motor amperage and pulses from the friction clutch proximity switch. If the amperage is too high for too long, or if the pulses from the proximity switch come too slowly (indicating a slipping clutch), then the shredder reverses.

- If the shredder reverses a preset number of times without going forward for the jam clear time, the PLC shuts down the shredder and Fault / Reset button light turns on. The number of times is set on the touch screen and is typically set to 5 times for an electric shredder.

- If a jam is indicated, determine the cause of the jam before restarting the machine.

- If a non-shreddable object is in the cutting chamber, shut off and lock out the main power supply. (Refer to the Locking Out section.) Then remove the object and restart the machine.

- If the machine is overloaded, simply reset and restart it. Do not feed more material into the hopper until the current material has cleared.

- To reset a shredder jam, press and hold the SYSTEM FAULT button, press the fault reset button the touch screen, or turn the control power keyswitch to OFF and back to ON. Restart the shredder using the steps listed earlier.

RAM OPERATION (IF SUPPLIED)

The ram may operate either in HAND or AUTO mode. The RAM HPU screen on the HMI shows the status of the ram HPU and the motion solenoids.

Hand Mode

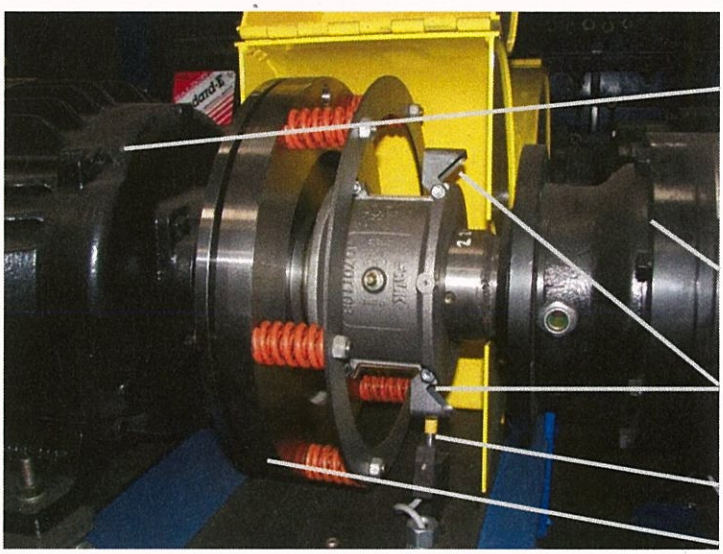
Select HAND on the ram selector switch. Press and hold EXTEND to lower the ram. Press and hold RETRACT to raise it. The ram will continue moving until it either gets to the end of its normal motion, or hits something with enough force to cause it to stop.

Auto Mode

Select AUTO on the ram selector switch. The ram will move up and down until the shredder starts to shred. A current sensor monitors the load on the shredder motor. If the motor is loaded (high current), the PLC stops the ram. When the load is removed (current drops), the ram will extend again. The ram should not extend unless the shredder is running forward.

The speed switch is an inductive proximity sensor that detects the speed of the shaft between the friction coupling and the planetary gearbox. The purpose is to detect when the shredder shaft has stopped turning due to an un-shearable object in the cutting chamber. The speed monitoring system will promptly turn off the motor to prevent excessive heat build up at the coupling.

The speed sensor is triggered by two flags on the coupling. Each flag sends a pulse to the PLC for a total of two pulses per revolution. By looking at the frequency of the pulses, the PLC can calculate the speed of the shaft. If the speed drops below about 2/3 of the normal speed of the motor, the motor is immediately de-energized.



SPEED SWITCH ADJUSTMENT AND TESTING

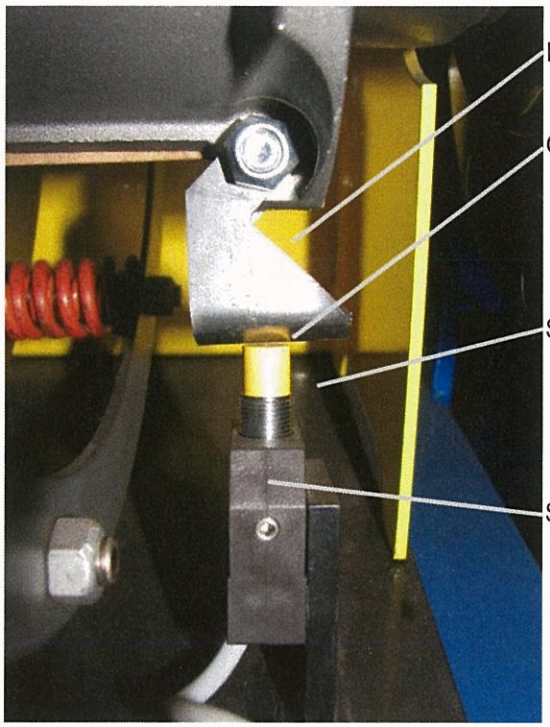
1. Shut down and Lock out the shredder.

> **⚠ DANGER**
> **Failure to lock out can result in severe personal injury or death.**

2. Open the coupling guard to expose the torque controlled coupling and the speed sensor.

3. Inspect the top of the speed sensor. If the top surface is not yellow plastic with lettering, then the flags have contacted the speed switch and ruined it. If the switch has been contacted, replace the switch.

4. Turn the friction coupling by hand to position one of the two flags over the speed switch.



5. If the speed sensor is mounted with the plastic bracket, loosen the allen screw. If the speed sensor is held with two lock nuts, loosen the lock nuts to adjust the sensor. Do not loosen the sensor more than necessary.

6. Move the speed sensor right and left so that it is positioned in the middle of the flag.

7. Move the sensor vertically until the gap is approximately 1/16 inch (1.5mm), about the thickness of a thin coin.

8. Turn the friction coupling 180 degrees to position the second flag over the speed sensor. The gap should be the same. If not, the flags are not the same distance from the shaft centerline and will have to be modified so that they are.

9. Carefully tighten the allen screw or the locking nuts. It is necessary to turn the bottom nut the same number of turns as the top nut to keep from moving the speed sensor and effecting the gap.

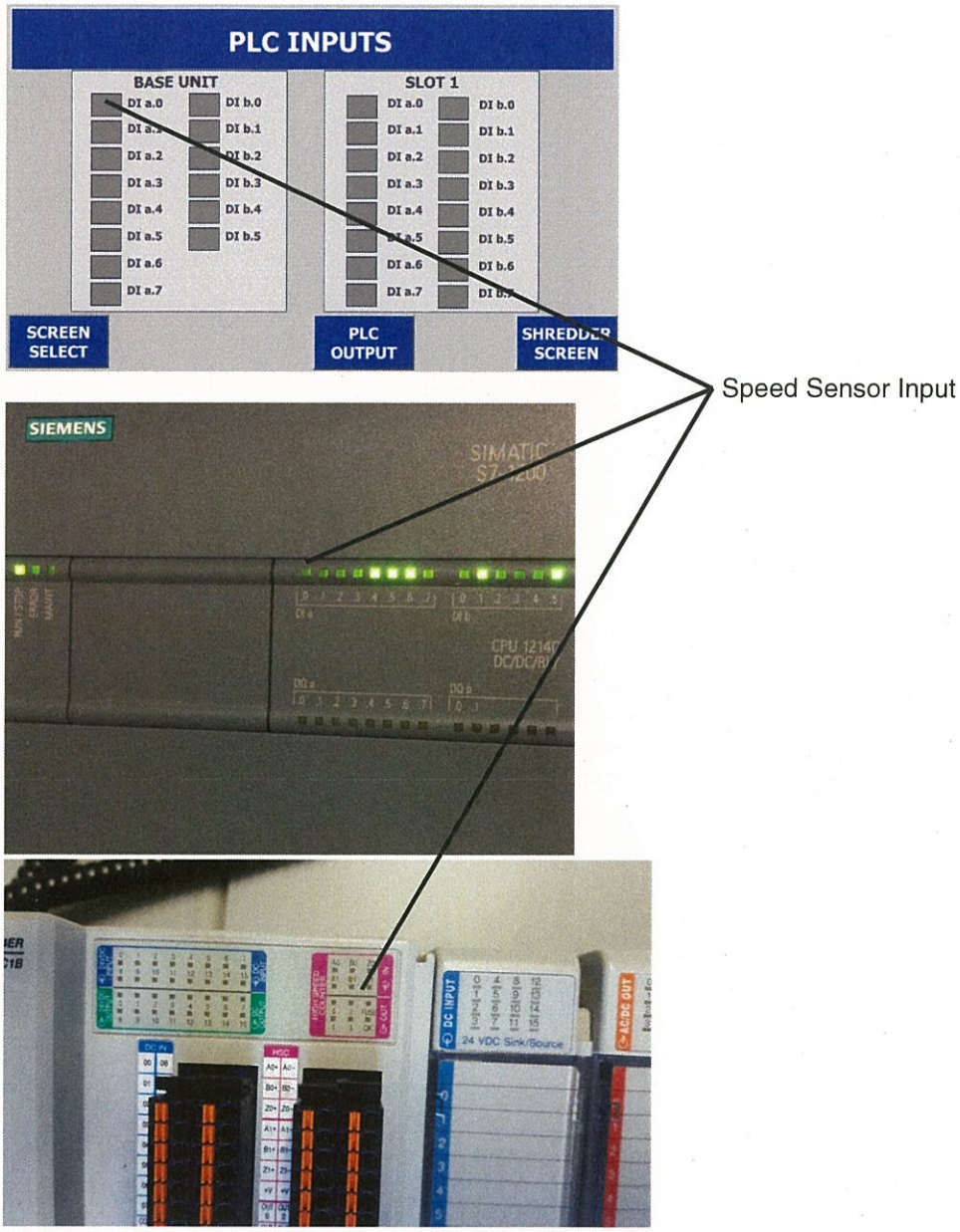
10. Check BOTH of the flags for correct gap and alignment prior to closing the guard.

11. Turn the friction coupling by hand until one of the flags is directly over the speed sensor.

12. Close and secure the coupling guard

13. Remove the lockouts and turn on the power to the shredder and reset the MCR.

14. On the touch screen hit the “SCREEN SELECT” and “PLC INPUT” to show the status of the PLC inputs. Alternatively, open the door of the control panel and look at the PLC. The photo below shows the several brands of PLC, the PLC installed may be different.



14. If the speed sensor in question is for motor #1, speed sensor input, It should be "on" (lighted). If not, the speed sensor or the wiring to the sensor is bad and the signal is not getting back to the PLC. If the speed sensor is for motor # 2, check Base Unit input #4. If the PLC supplied is not Siemens, refer to the schematics to determine the input for the second motor.

15. If the input is lighted, push and hold the reverse jog push button until the motor starts.

16. On the touch screen hit the "SCREEN SELECT" and "ROTOR STATUS" to show the information about the rotor. The Motor RPM indicator should read within 200 RPM of the normal speed of the motor. For 60hz installations that would be 1800 RPM, for 50 Hz installations it would be 1500 RPM.

17. If the speed is approximately one half of the correct speed, only one flag is tripping the speed sensor.

18. If the speed is zero, but the input was "on" in step 14, the prox switch is not functioning and should be replaced.

TEMPERATURE SWITCH ADJUSTMENT

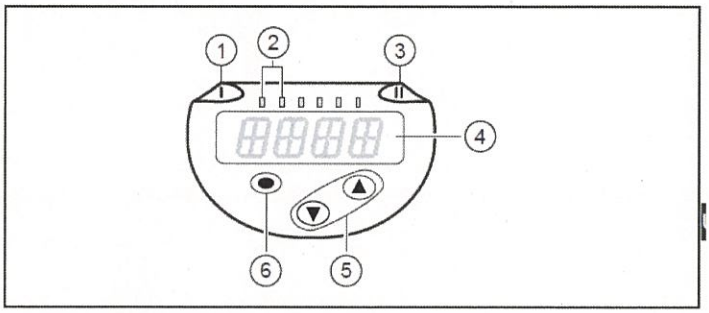
A programmable temperature switch is used to monitor oil temperatures. When the temperature exceeds a preset value, the relay trips, opening (turning off) a circuit on the input side of the PLC. On this signal, the controller performs a function such as turning on the cooling fans or shutting down due to hot oil temperatures.

The temperature switches are located on the drive planetary gear reducers. The temperature switch must be set using the procedure outlined below.

1. The control power key switch must be 'ON" for the temperature switch to have power. Stop all devices from operation prior to setting the temperature switch.

2. Refer to the chart below for general programming instructions on the temperature switch.

6 Operating and display elements



1, 2, 3: Indicator LEDs
• LED 1 = switching status OUT1 (lights if output 1 is switched) • LED 2 = temperature in the indicated unit of measurement • LED 3 = no function
4: Alphanumeric display, 4 digits
• Display of current temperature in red or green colour. • Display of the parameters and parameter values.
5: Buttons up [▲] and down [▼]
• Select parameters • Change parameter values (hold button pressed) • Change of the display unit in the normal operating mode (RUN mode) • Locking / Unlocking (press buttons simultaneously > 10 seconds)
6: Button [●] = Enter
• Change from the RUN mode to the main menu • Change to the setting mode • Acknowledge the set parameter value

Locking / unlocking:
The unit can be electronically locked to prevent unwanted adjustment of the set parameters: Press both push buttons for 10s. Indication goes out (= acknowledgement of locking / unlocking).
Units are delivered from the factory in the unlocked state.

3. Change the units to degrees Fahrenheit to complete the following procedure. If Celsius is the preferred units, change back to Celsius after configuring the unit.

   To adjust the units to °F:
   1) Press the ENTER to get to the Menu
   2) Press the DOWN ARROW / UP ARROW button until the display reads 'EF'.
   3) Press the ENTER button.
   4) Press the DOWN ARROW / UP ARROW button until the display reads 'Uni'.
   5) Press Enter to select the parameter.
   6) Hold the DOWN ARROW or UP ARROW button until the display stops flashing.
   7) Press the DOWN ARROW / UP ARROW button until the display shows '°F''.
   8) Press ENTER to accept the setting.
   9) After 15 seconds, the Temperature Switch will return to operational mode. The display will read the current temperature at the port.

4. Use the ENTER and DOWN ARROW / UP ARROW buttons (similar to the adjustment of the units) to adjust the parameters to the settings listed below.

SP1	180°		Temperature Switch 1 Setting
rP1	179°		Reset setting
SP2	200°		Temperature Switch 2 Setting
rP2	199°		Reset setting
EF			Extended functions (press ENTER to enter this menu to access the rest of the parameters)
rES		---	Restore to factory settings – do not use!
OU1		Hnc	Switch 1 Configuration
OU2		Hnc	Switch 2 Configuration
dS1		default*	not used
dr1		default*	not used
dS2		default*	not used
dr2		default*	not used
FOU1		default*	not used
FOU2		default*	not used
Uni °F			Fahrenheit or Celsius
P-n		PnP	PnP for sinking inputs on PLC
Lo			Displays minimum recorded temperature (not adjustable) hold SET to clear
Hi			Displays maximum recorded temperature (not adjustable) hold SET to clear
COF		default*	not used
oILr		rEd	red display
diS		rd2	rotated 180 degrees

default* - parameter not used, accept the default value

5. After 15 seconds, the temperature switch will return to operational mode. The display will read the current temperature.

6. Note: Programmed correctly the indicator lights will operate as follows:

Switch #1	Below 180°	On
	Over 180° F	Off
	Below 179° F	On
Switch #2	Below 200° F	On
	Above 200° F	Off
	Below 199° F	On

7. For additional information, refer to the vendor literature section of the service manual.

Component	Ambient Temp. Range	Recommended Lubricant
Ram Hydraulic Power Unit (if equipped) **	35°F - 100°F	Hydraulic Oil: ISO 46 Viscosity Index – 90 min. (AW-46-20)
Screen Eject Assist Hydraulic Power Unit	35°F - 100°F	Hydraulic Oil: ISO 46 Viscosity Index – 90 min. (AW-46-20)
Planetary Gear Reducer	50°F - 100°F 10°C - 38°C	Gear Oil: ISO grade 220 / AGMA grade 5 EP (Approx. SAE 50)
	15°F - 85°F -10°C - 30°C	Gear Oil: ISO grade 150 / AGMA grade 4 EP (Approx. SAE 40)
	15°F - 110°F -10°C - 45°C	Synthetic Gear Oil Poly-Alpha-Olefin (PAO) EP 220
Shredder Head Gearbox	35°F - 100°F 2°C - 38°C	Gear Oil: ISO grade 220 / AGMA grade 5 EP (Approx. SAE 50)
	0°F - 85°F -18°C - 30°C	Gear Oil: ISO grade 150 / AGMA grade 4 EP (Approx. SAE 40)
Electric Motor Bearings	All	Refer to Section 12 Vendor Literature for motor manufacturer recommendations
Endplate Bearings, Conveyor Bearings and other Pressure Fittings	-30°F - 150°F -34°C - 65°C	Grease: NLGI grade 2 ISO VG 220

Recommendations for lubricants meeting these specifications can be obtained by calling your local lubricant distributor.

****Important Note:**

Hydraulic oil cleanliness is vital to prevent premature wear on all hydraulic components. Prior to filling the HPU reservoir, the oil must be subjected to a particle count and water content analysis. If the particle count exceeds 18/16/13, per ISO 4406 (1999), or the water content exceeds 0.1%, the oil must be not be used until it is externally filtered to meet the cleanliness requirements.

It is often the case that new oil, direct from the drum, will not meet this standard. Do not assume that these cleanliness requirements will be met just because the oil is new. The analysis described above is required regardless of the source of the oil.

UNIT SPECIFICATIONS

Model	**5000ED**		**Customer Name**	**Anvil 29**
	400 HP	(298 kW)	**Customer Order**	**420.2525**
Serial No.	**S0732**		**Job No**	**C20.0971**

Electrical		
Voltage/Phase/Freq.	460/3/60	
Control Voltage	24 VDC	
Planetary Gear Reducer		
Manufacturer	Brevini	Brevini
Model	PDL143S	PDL143S
Ratio	65.5:1	65.45:1
SSP Coupling		
Manufacturer	Falk	
Model	1100T41	
Spring Setting	2.67 in	(67.9 mm)
Cutter Stack		
Start Clearance	0.25in	(6.4mm)
Stack Order	see S0732.xls	
Cutter Diameter	26.1 in	(663 mm)
Thickness (Nominal)	2.50 in	(64 mm)
Endplate Hub Bolt Torques		
Jacking Bolt Torque	50 ft-lb	(68 Nm)
Gearbox Bearing Nut Torque		
Bearing Lock Bolt Torque	40 ft-lb	(54 Nm)
Oil Capacities		
Shredder Gear Box	200 gal	(757 L)
Planetary Gear Reducers	6.0 gal	(23 L)

Shredder Dimensions		
Cutting Chamber Width	52 in	(1321 mm)
Cutting Chamber Length	101 in	(2555 mm)
Cutting Chamber Height	31 in	(786 mm)
Hopper Infeed Height	159 in	(4039 mm)
Overall Height	164 in	(4166 mm)
Overall Width	74 in	(1878 mm)
Overall Length	234 in	(5944 mm)
Stand Height	60.00 in	(1524 mm)
Weights		
Shredder Assembly	59,000 lb	(26,550 kg)
Heaviest Piece - Installation		
Part Name	Shredder Head	
Part Weight	40,000 lb	(18,000 kg)
Maintenance weights		
Planetary Reducer	1,420 lb	(640 kg)
Shaft (drive)	2,600 lb	(1,170 kg)
Cutter	250 lb	(115 kg)
Endplate	2,500 lb	(1,125 kg)

Shaft Speeds	Synchronous	Maximum
Right Hand Shaft	28 rpm	32 rpm
Left Hand Shaft	21 rpm	24 rpm

Shaft Torque (Peak)		
Right Hand Shaft	68,700 ft-lb	(93,200 Nm)
Left Hand Shaft	91,700 ft-lb	(124,300 Nm)
Cutter Force at Tip (Peak)		
Right Hand Shaft	63,200 lbs	(281,000 N)
Left Hand Shaft	84,200 lbs	(375,000 N)
Cutter Tip Speed at Tip (Maximum)		
Right Hand Shaft	219 ft/min	(1.12 m/s)
Left Hand Shaft	165 ft/min	(0.84 m/s)

Revised: 1/26/21 CSH

	0732-5000HD	Orig'l Order#:
Model:	**5000-HD**	
Customer:	**ANVIL29**	**JOB #:**
Order #:		

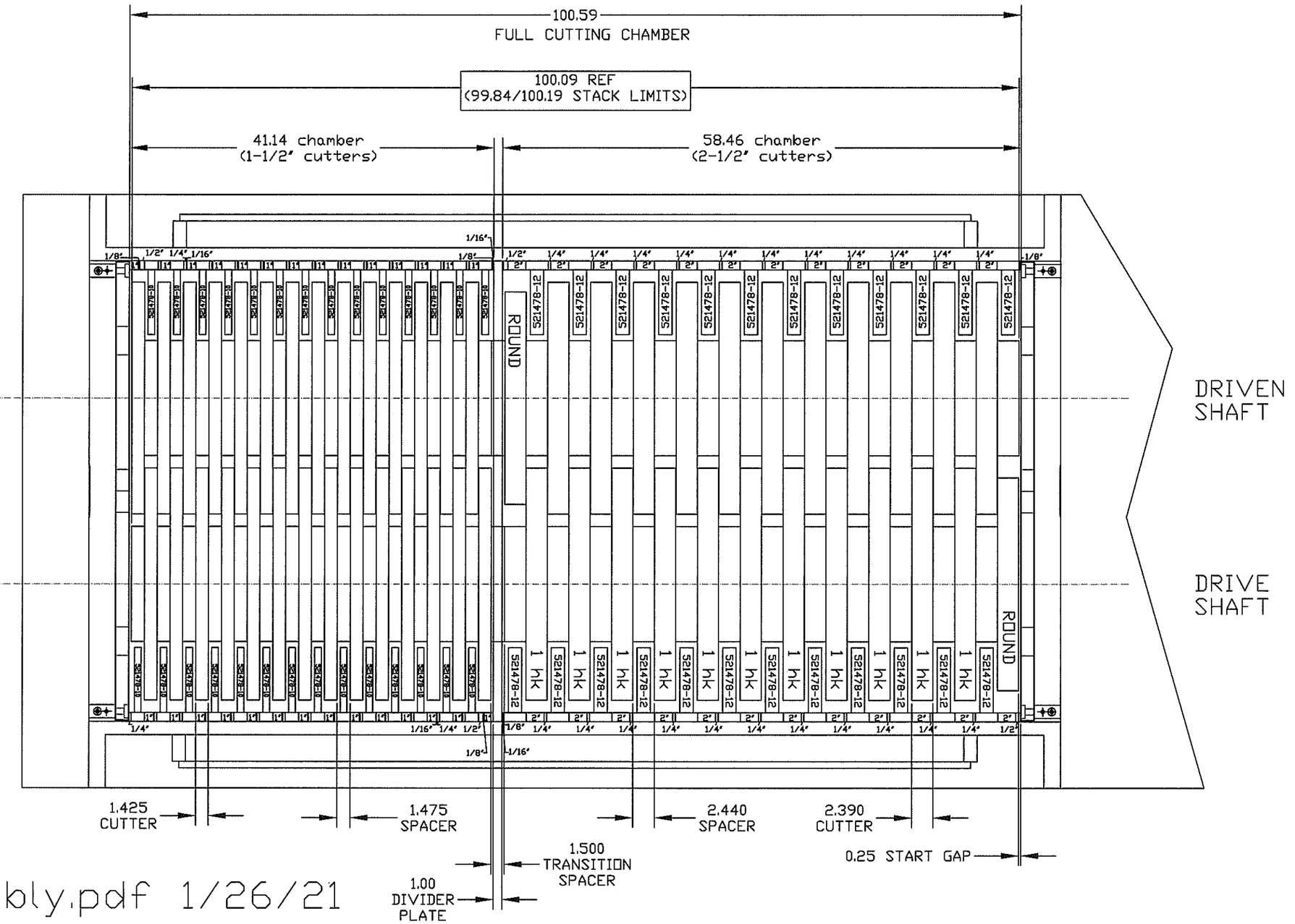
Stack Order:	
TYPE:	**KEYED***

DRIVEN SHAFT 2-HK 2-HK	**DRIVE SHAFT 2-HK 1-HK**
	R
1	**8** A
2	**7** B
3	**6** A
4	**5** B
5	**4** A
6	**3** B
7	**2** A
8	**1** B
1	**8** B
2	**7** A
3	**6** B
R	**SS**
SS	***8**
***1**	***7**
***2**	***6**
***3**	***5**
***4**	***4**
***5**	***3**
***6**	***2**
***1**	***7**
***2**	***6**
***3**	***5**
***4**	***4**
***5**	***3**
***6**	
TOTAL QTY	**54**

Cutter/Spcr Part#'s	
Round	522908
Spacer	521109
Spacer	521109
1-HK	522250FM5
2-HK	522907
2-HK	522907
2-HK	522907

Cutter Stack Notes:	
Cutter Shear Gap (in)	0.025
*= 1-1/2" CUTTERS	

* With any cutter having an odd number of hooks, an 'A' position cutter is rotated 180 degrees from a 'B' position cutter.
Cutters with an even number of hook are not effected, because they are symmetrical.



CLEANING FINGER GROUP

p/n	description	matl	qty
521478-10	CLEANING FINGER, 3/4"	A36	28
521478-12	CLEANING FINGER, 1-1/2"	A36	24
524173-16	SPACER BAR, 1/16"	A36	36
524173-14	SPACER BAR, 1/8"	A36	12
524173-13	SPACER BAR, 1/4"	A36	60
524173-12	SPACER BAR, 1/2"	A36	8
524173-01	SPACER BAR, 1"	A36	32
524173-05	SPACER BAR, 2"	A36	28

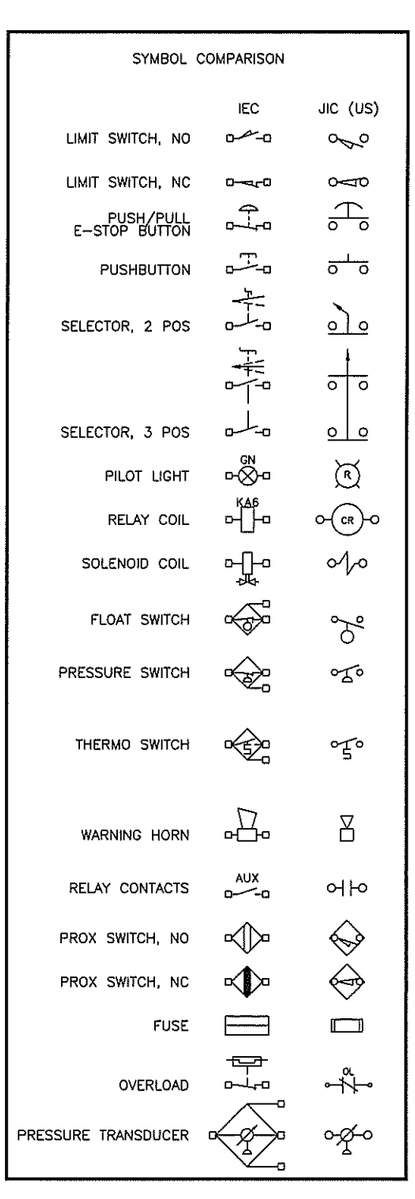
S0732 stack assembly.pdf 1/26/21

1.1–00
1.1–01
1.1–02
1.1–03
1.1–04
1.1–05
1.1–06
1.1–07
1.1–08
1.1–09
1.1–10
1.1–11
1.1–12
1.1–13
1.1–14
1.1–15
1.1–16
1.1–17
1.1–18
1.1–19
1.1–20
1.1–21
1.1–22
1.1–23
1.1–24
1.1–25

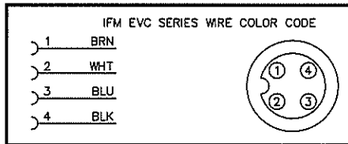
SCHEMATIC INDEX

TITLE	SECTION	SHEETS
SCHEMATIC INDEX	1	1
BLOCK DIAGRAM & PANEL LAYOUT	2	6
MOTOR POWER SCHEMATIC	3	2
24VDC POWER DISTRIBUTION AND SAFETY	4	3
24VDC CONTROL DEVICE SCHEMATIC	5	2
CP1 PLC INPUT/OUTPUT SCHEMATIC	6	1
MSP1 PLC INPUT/OUTPUT SCHEMATIC	7	1
JB1 PLC INPUT/OUTPUT SCHEMATIC	8	1

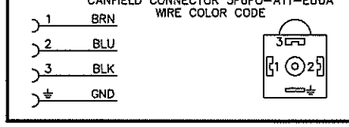
SYMBOL COMPARISON



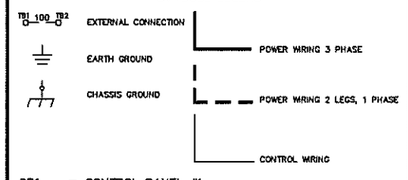
IFM EVC SERIES WIRE COLOR CODE



CANFIELD CONNECTOR 5F6FO–A11–EU0A WIRE COLOR CODE



SYMBOLS LEGEND



CP1 = CONTROL PANEL #1
MSP1 = MOTOR STARTER PANEL #1
MSP2 = MOTOR STARTER PANEL #2
JB1 = JUNCTION BOX #1
ICJB = INFEED CONVEYOR JUNCTION BOX
REM = REMOTE DEVICES AND/OR PANELS
CUST = CUSTOMER CONNECTION

WIRE COLOR CHART AS PER UL508A, NEC AND MANUFACTURERS STANDARDS FOR IDENTIFICATION OF CONTROL WIRING WITHIN ENCLOSURES AND RACEWAYS

FUNCTION	INSULATION COLOUR
PROTECTIVE EARTH	GREEN/YELLOW
POWER VAC	BLACK
NEUTRAL	WHITE OR LIGHT BLUE
CONTROL UNDER 32VDC	DARK BLUE
CONTROL RETURN 0VDC	WHITE/BLUE
CONTROL VAC	RED
CONTROL RETURN 0VAC	WHITE

ALL CABLE CORES TO BE LABELED AT BOTH ENDS WITH UNIQUE ID TAGS.

WIRE GUAGE CHART AS PER UL508A, NEC AND MANUFACTURERS STANDARDS
MINIMUM CONTROL AND LOW VOLTAGE DC CONDUCTORS IN ALL ENCLOSURES AND RACEWAYS IS 16AWG

ALL WIRE AND MULTICORE CABLES ARE SIZED BASED ON THE NEC TABLE 310.15(B)

REV	DESCRIPTION	SHT	DATE	INIT
0	FOR RELEASE – DR15406	–	01/07/21	RCS

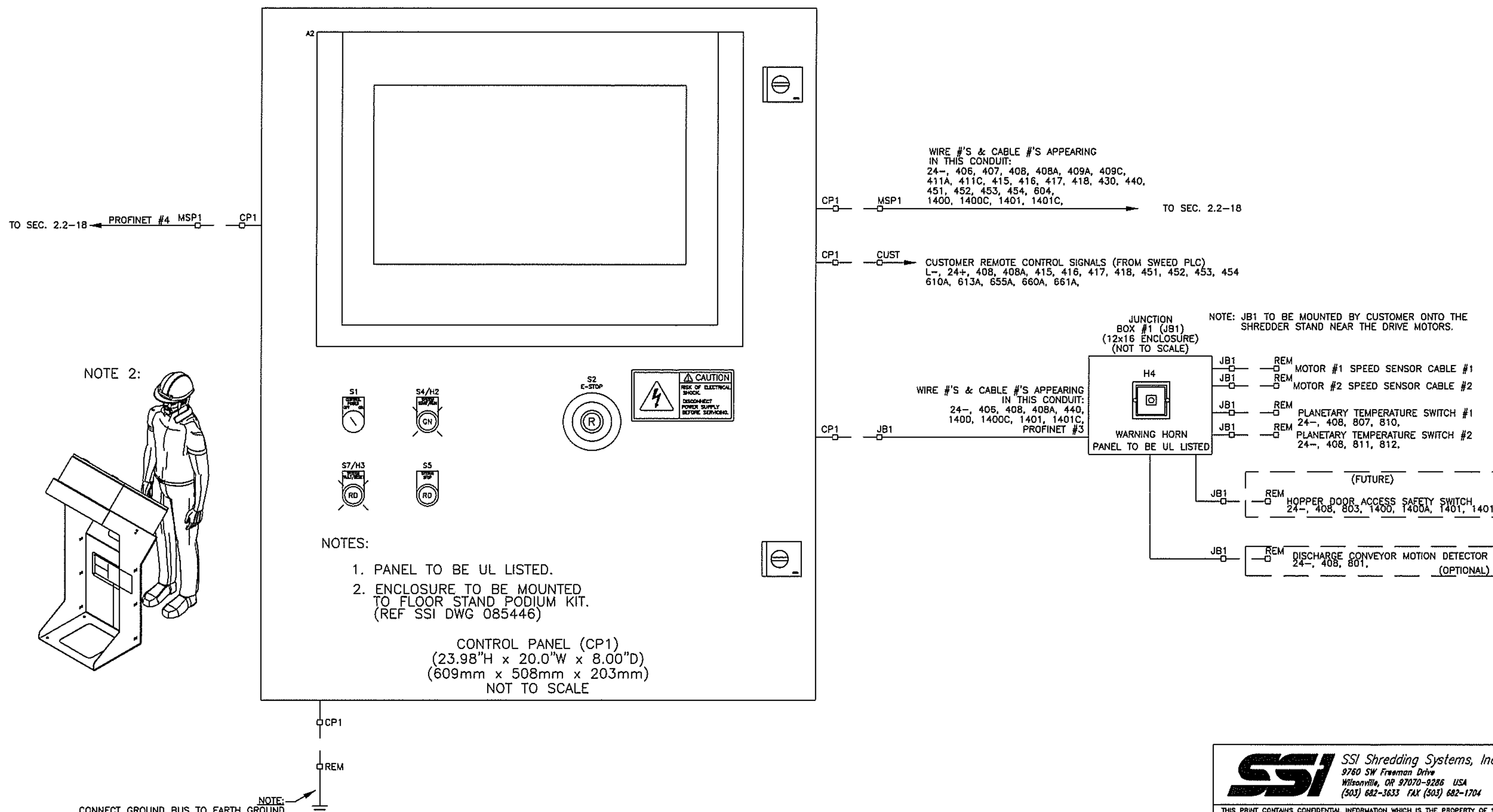
SSI Shredding Systems, Inc.
9760 SW Freeman Drive
Wilsonville, OR 97070-9286 USA
(503) 682-3633 FAX (503) 682-1704

SHREDDER ELECTRICAL SYSTEM
SCHEMATIC INDEX

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

	MODEL	DRAWING NUMBER	SHEET	REV.
ANVIL29				
PROGRAM #030057	S0732-5000SD	03-0056-B	1.1	0

2.1-00
2.1-01
2.1-02
2.1-03
2.1-04
2.1-05
2.1-06
2.1-07
2.1-08
2.1-09
2.1-10
2.1-11
2.1-12
2.1-13
2.1-14
2.1-15
2.1-16
2.1-17
2.1-18
2.1-19
2.1-20
2.1-21
2.1-22
2.1-23
2.1-24
2.1-25


TO SEC. 2.2-18
PROFINET #4
MSP1
CP1
A2
NOTE 2:
S1
S4/H2
GN
S7/H3
RD
S5
RD
S2
E-STOP
R
CAUTION
RISK OF ELECTRICAL SHOCK.
DISCONNECT POWER SUPPLY BEFORE SERVICING.
NOTES:
1. PANEL TO BE UL LISTED.
2. ENCLOSURE TO BE MOUNTED TO FLOOR STAND PODIUM KIT. (REF SSI DWG 085446)
CONTROL PANEL (CP1)
(23.98"H x 20.0"W x 8.00"D)
(609mm x 508mm x 203mm)
NOT TO SCALE
CP1
MSP1
WIRE #'S & CABLE #'S APPEARING IN THIS CONDUIT:
24-, 406, 407, 408, 408A, 409A, 409C, 411A, 411C, 415, 416, 417, 418, 430, 440, 451, 452, 453, 454, 604, 1400, 1400C, 1401, 1401C,
TO SEC. 2.2-18
CP1
CUST
CUSTOMER REMOTE CONTROL SIGNALS (FROM SWEED PLC)
L-, 24+, 408, 408A, 415, 416, 417, 418, 451, 452, 453, 454 610A, 613A, 655A, 660A, 661A,
JUNCTION BOX #1 (JB1) (12x16 ENCLOSURE) (NOT TO SCALE)
NOTE: JB1 TO BE MOUNTED BY CUSTOMER ONTO THE SHREDDER STAND NEAR THE DRIVE MOTORS.
CP1
JB1
WIRE #'S & CABLE #'S APPEARING IN THIS CONDUIT:
24-, 405, 408, 408A, 440, 1400, 1400C, 1401, 1401C, PROFINET #3
H4
WARNING HORN
PANEL TO BE UL LISTED
JB1 REM MOTOR #1 SPEED SENSOR CABLE #1
JB1 REM MOTOR #2 SPEED SENSOR CABLE #2
JB1 REM PLANETARY TEMPERATURE SWITCH #1 24-, 408, 807, 810,
JB1 REM PLANETARY TEMPERATURE SWITCH #2 24-, 408, 811, 812.
(FUTURE)
JB1 REM HOPPER DOOR ACCESS SAFETY SWITCH 24-, 408, 803, 1400, 1400A, 1401, 1401A,
JB1 REM DISCHARGE CONVEYOR MOTION DETECTOR 24-, 408, 801,
(OPTIONAL)
CP1
REM
NOTE:
CONNECT GROUND BUS TO EARTH GROUND WITH CONDUCTOR SIZE SPECIFIED IN LOCAL CODE FOR CP1 FULL LOAD AMPERAGE.

NOTES:

1. PROFINET CABLES INTERNAL TO MOTOR STARTER PANELS & EXTERIOR TO CONTROL ENCLOSURES TO BE SHIELDED CABLE.
2. PROFINET CABLE AND DEVICE CONNECTIONS SHOWN ON SHEET 5.1.

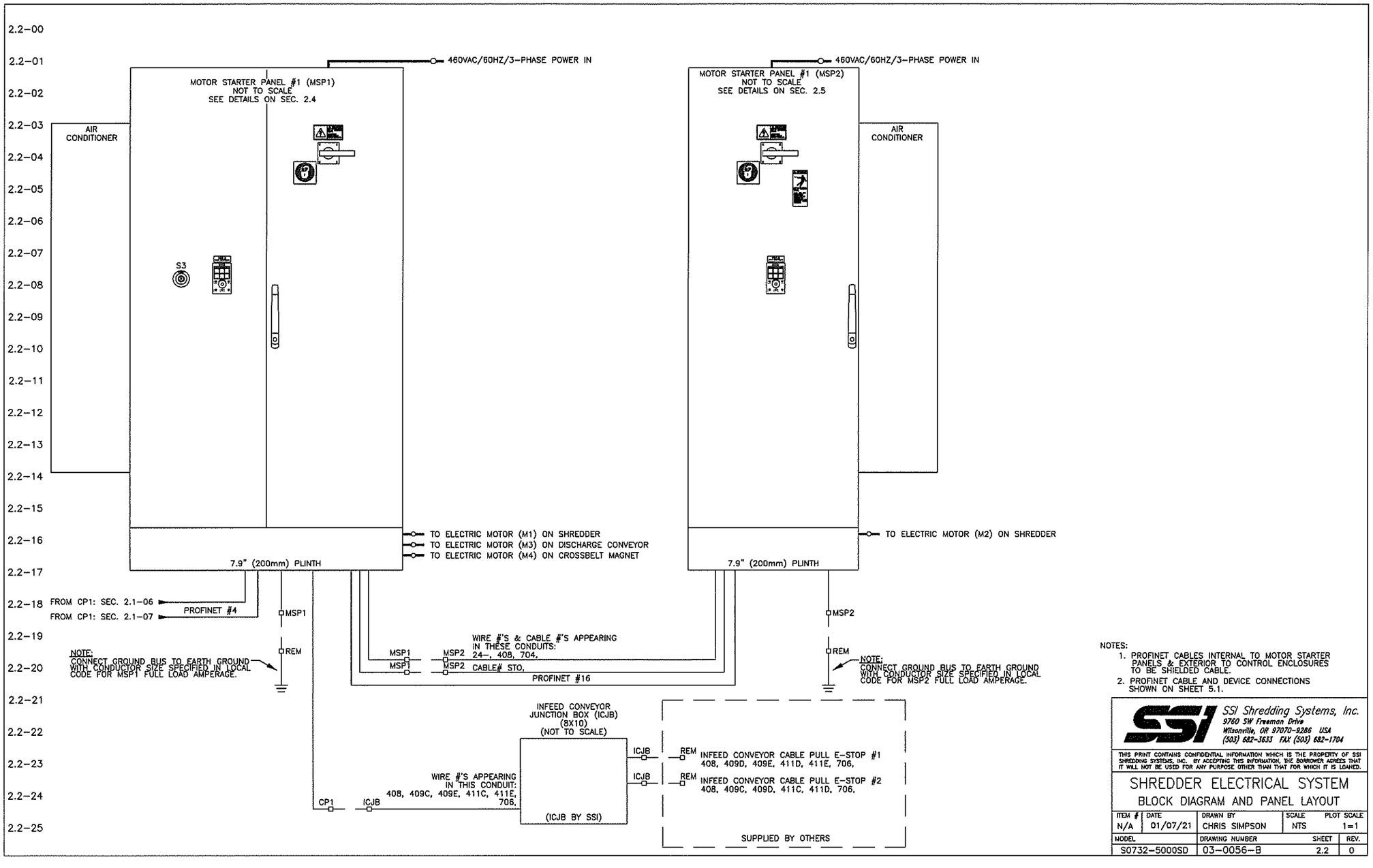
SSI Shredding Systems, Inc.
9760 SW Freeman Drive
Wilsonville, OR 97070-9286 USA
(503) 682-3633 FAX (503) 682-1704

SHREDDER ELECTRICAL SYSTEM

BLOCK DIAGRAM AND PANEL LAYOUT

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	2.1	0



NOTES:

1. PROFINET CABLES INTERNAL TO MOTOR STARTER PANELS & EXTERIOR TO CONTROL ENCLOSURES TO BE SHIELDED CABLE.
2. PROFINET CABLE AND DEVICE CONNECTIONS SHOWN ON SHEET 5.1.

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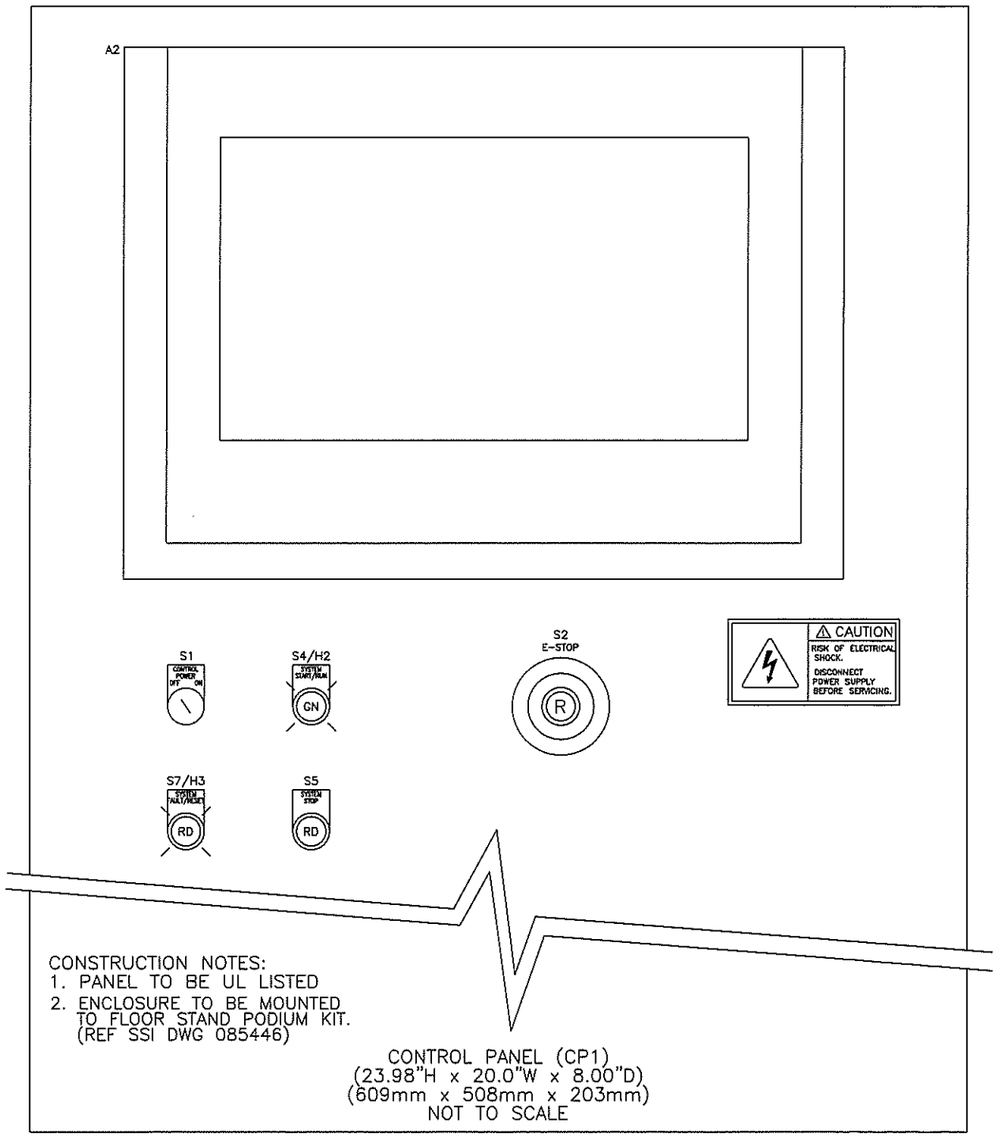
Wilsonville, OR 97070-9286 USA
(503) 682-3633 FAX (503) 682-1704

SHREDDER ELECTRICAL SYSTEM
BLOCK DIAGRAM AND PANEL LAYOUT

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	2.2	0

2.3–00
2.3–01
2.3–02
2.3–03
2.3–04
2.3–05
2.3–06
2.3–07
2.3–08
2.3–09
2.3–10
2.3–11
2.3–12
2.3–13
2.3–14
2.3–15
2.3–16
2.3–17
2.3–18
2.3–19
2.3–20
2.3–21
2.3–22
2.3–23
2.3–24
2.3–25



CONSTRUCTION NOTES:
1. PANEL TO BE UL LISTED
2. ENCLOSURE TO BE MOUNTED TO FLOOR STAND PODIUM KIT. (REF SSI DWG 085446)

CONTROL PANEL (CP1)
(23.98"H x 20.0"W x 8.00"D)
(609mm x 508mm x 203mm)
NOT TO SCALE

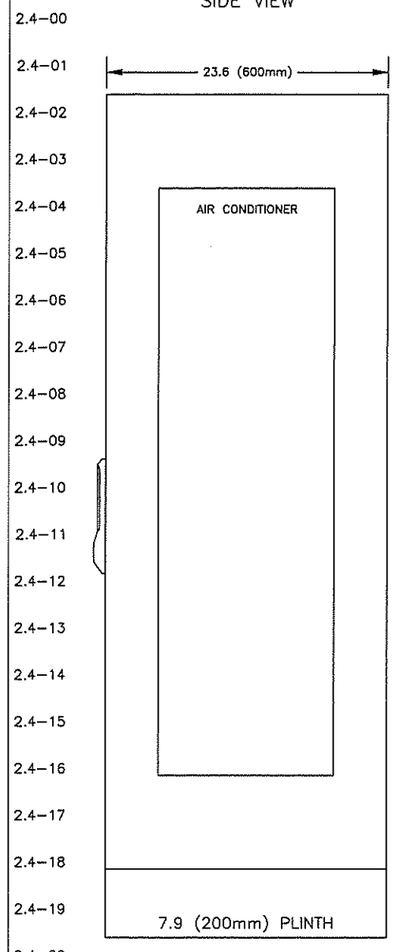
SSI Shredding Systems, Inc.
9760 SW Freeman Drive
Wilsonville, OR 97070-9288 USA
(503) 682-3633 FAX (503) 682-1704

SHREDDER ELECTRICAL SYSTEM
CONTROL PANEL LAYOUT

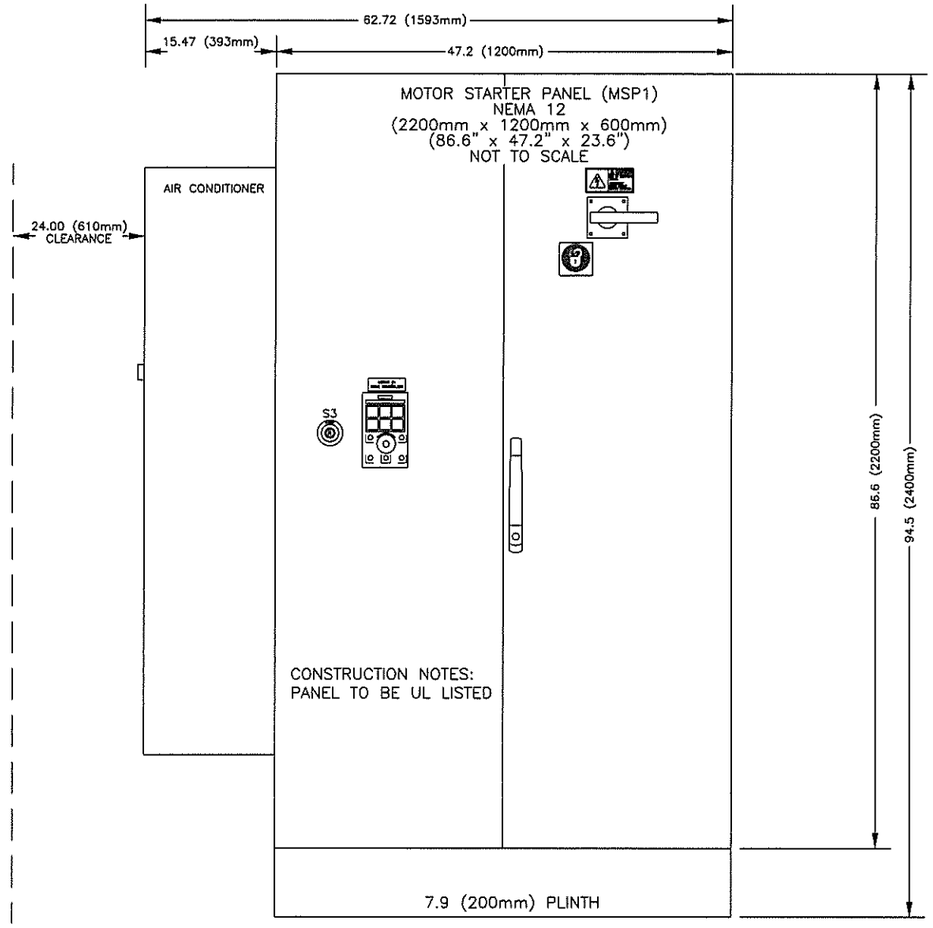
ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

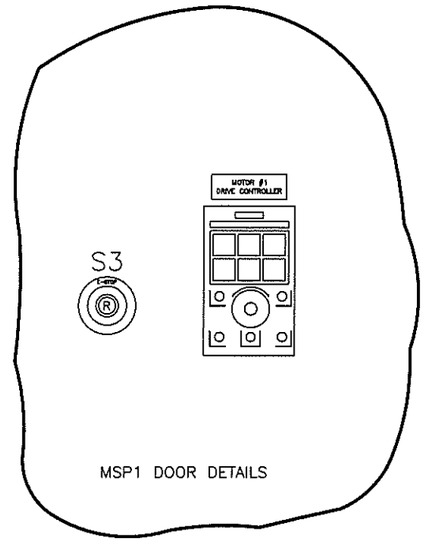
MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	2.3	0

SIDE VIEW



FRONT VIEW





MSP1 DOOR DETAILS

SSI Shredding Systems, Inc.
9760 SW Freeman Drive
Wilsonville, OR 97070-9286 USA
(503) 682-3633 FAX (503) 682-1704

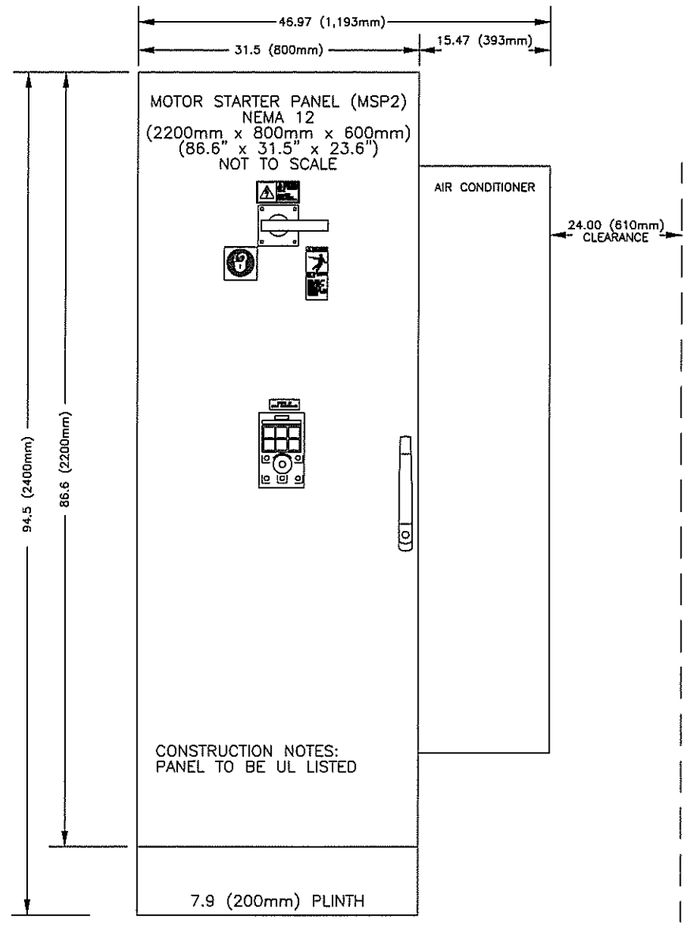
SHREDDER ELECTRICAL SYSTEM
(MSP1) MOTOR PANEL LAYOUT

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

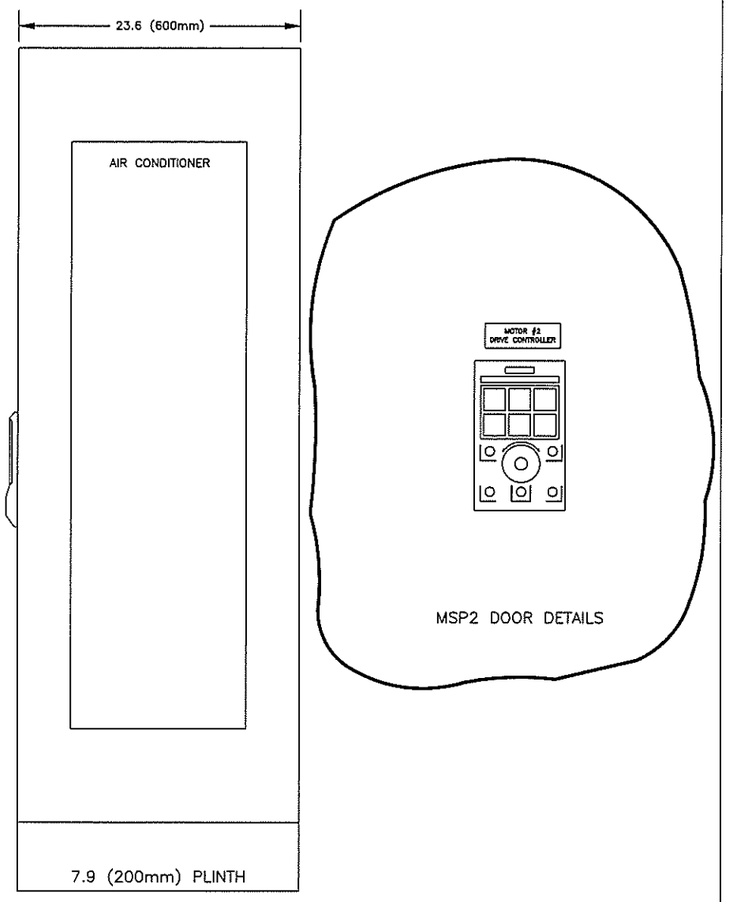
MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	2.4	0

2.5–00
2.5–01
2.5–02
2.5–03
2.5–04
2.5–05
2.5–06
2.5–07
2.5–08
2.5–09
2.5–10
2.5–11
2.5–12
2.5–13
2.5–14
2.5–15
2.5–16
2.5–17
2.5–18
2.5–19
2.5–20
2.5–21
2.5–22
2.5–23
2.5–24
2.5–25

FRONT VIEW



SIDE VIEW



MSP2 DOOR DETAILS

SSI Shredding Systems, Inc.
9760 SW Freeman Drive
Wilsonville, OR 97070-9286 USA
(503) 682-3633 FAX (503) 682-1704

SHREDDER ELECTRICAL SYSTEM
(MSP2) MOTOR PANEL LAYOUT

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	2.5	0

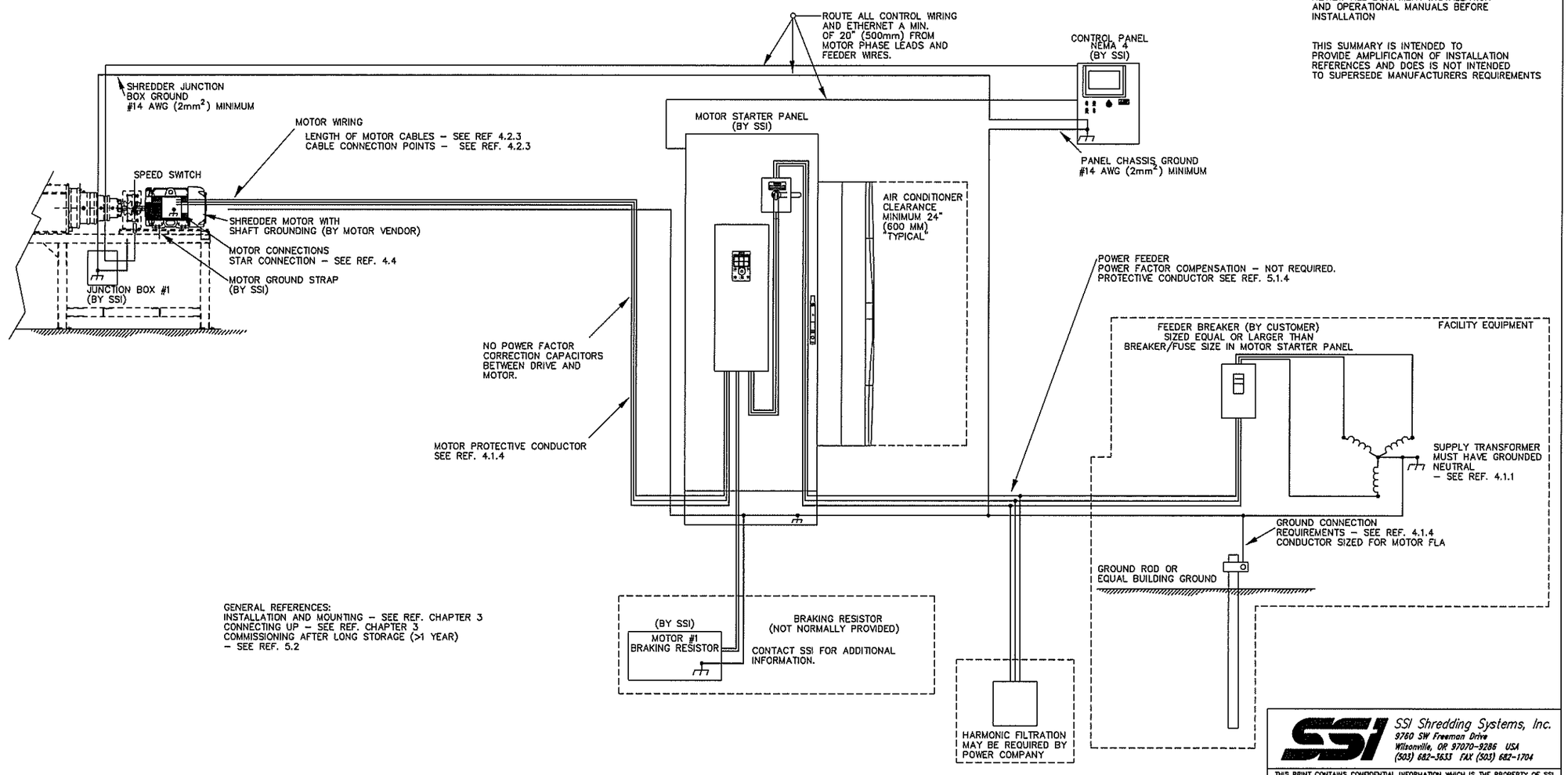
REFERENCE: HARDWARE MANUAL 01/2018 SIEMENS A5E33294624B AJ

NOTES

INSTALLATION MUST COMPLY WITH LOCAL ELECTRICAL CODES

REVIEW ALL EQUIPMENT INSTALLATION AND OPERATIONAL MANUALS BEFORE INSTALLATION

THIS SUMMARY IS INTENDED TO PROVIDE AMPLIFICATION OF INSTALLATION REFERENCES AND DOES IS NOT INTENDED TO SUPERSEDE MANUFACTURERS REQUIREMENTS



GENERAL REFERENCES:
INSTALLATION AND MOUNTING – SEE REF. CHAPTER 3
CONNECTING UP – SEE REF. CHAPTER 3
COMMISSIONING AFTER LONG STORAGE (>1 YEAR) – SEE REF. 5.2

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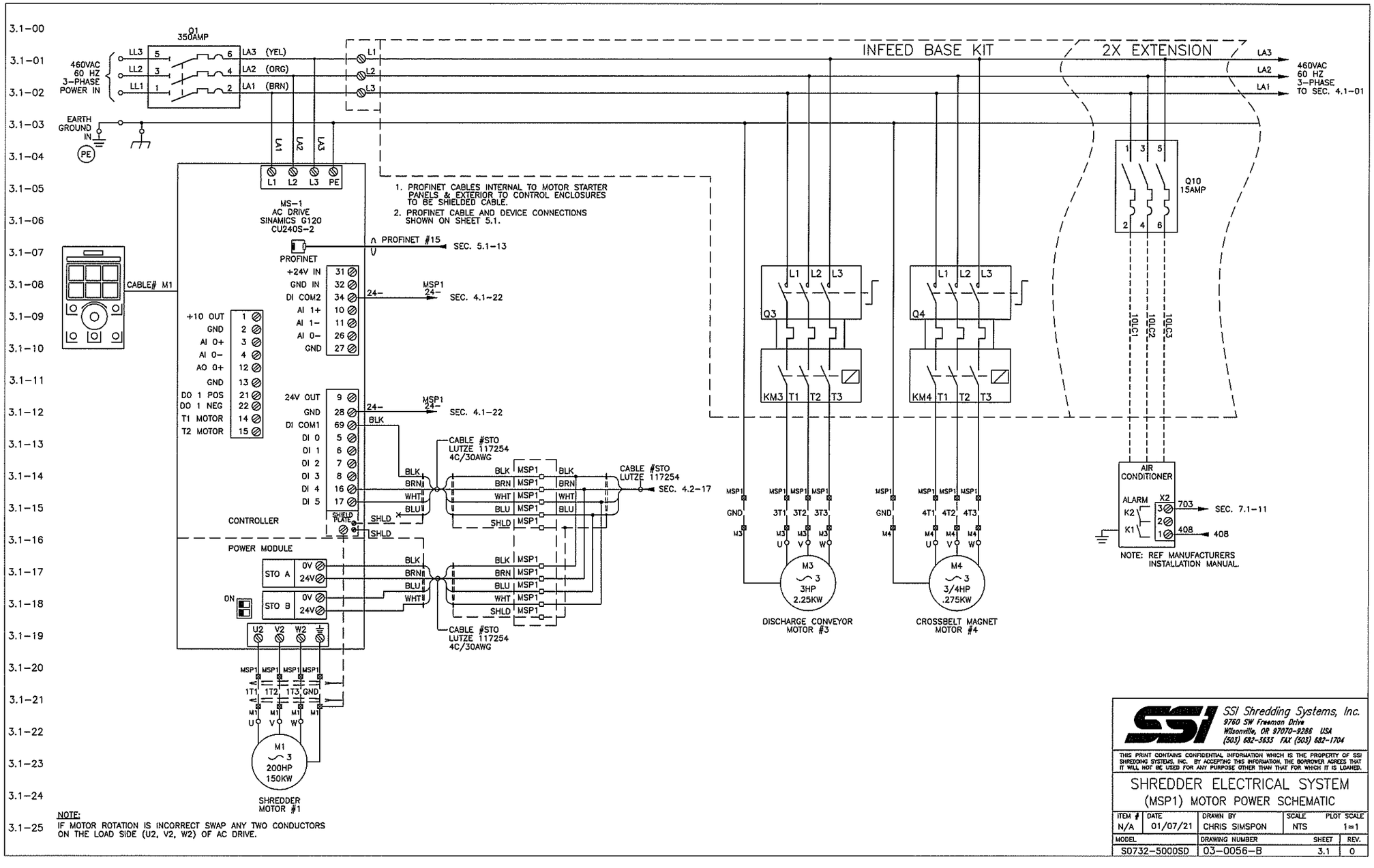
SHREDDER ELECTRICAL SYSTEM
G120 DRIVE INSTALLATION DIAGRAM

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	2.6	0



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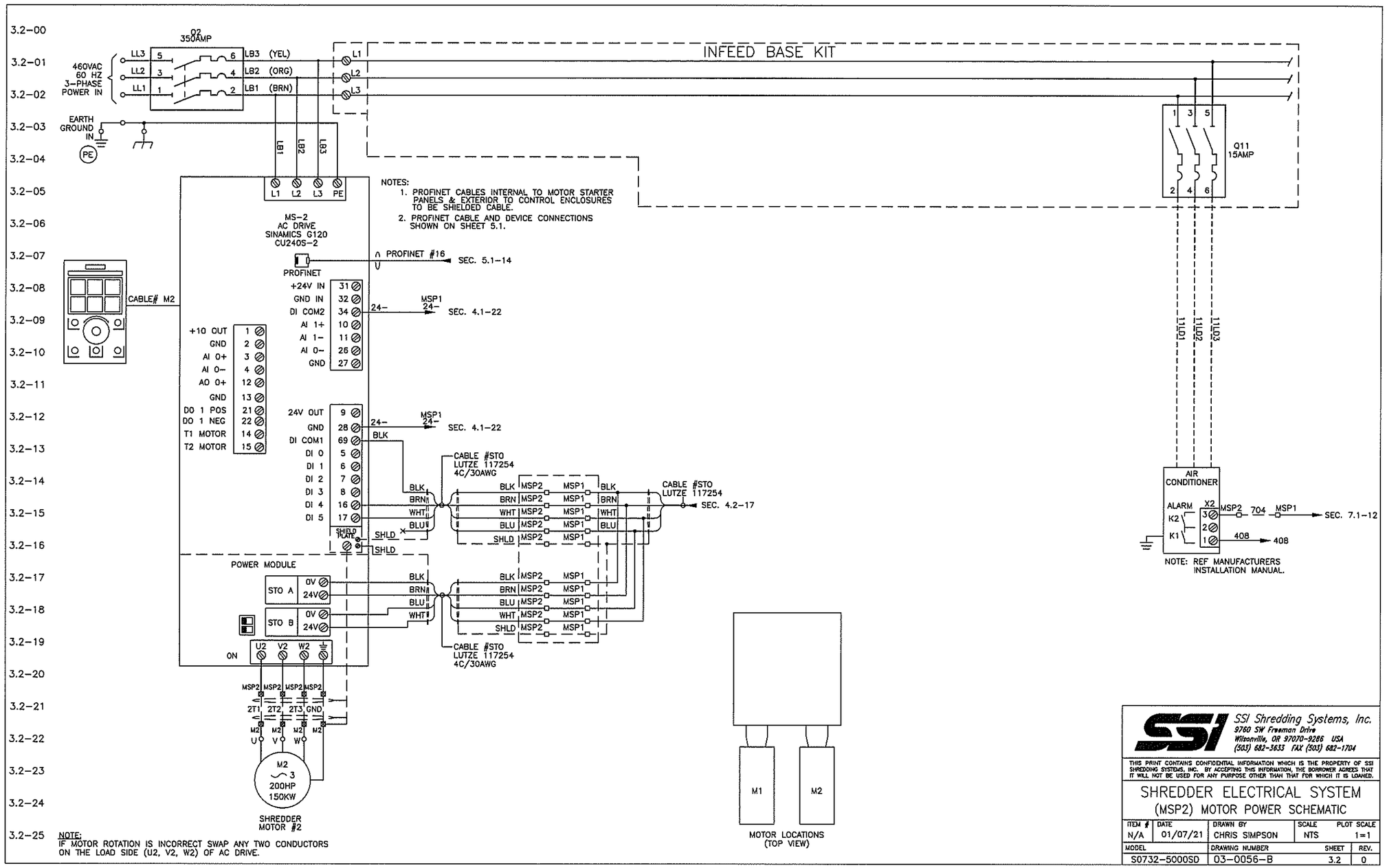
SHREDDER ELECTRICAL SYSTEM
(MSP1) MOTOR POWER SCHEMATIC

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMSPON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	3.1	0



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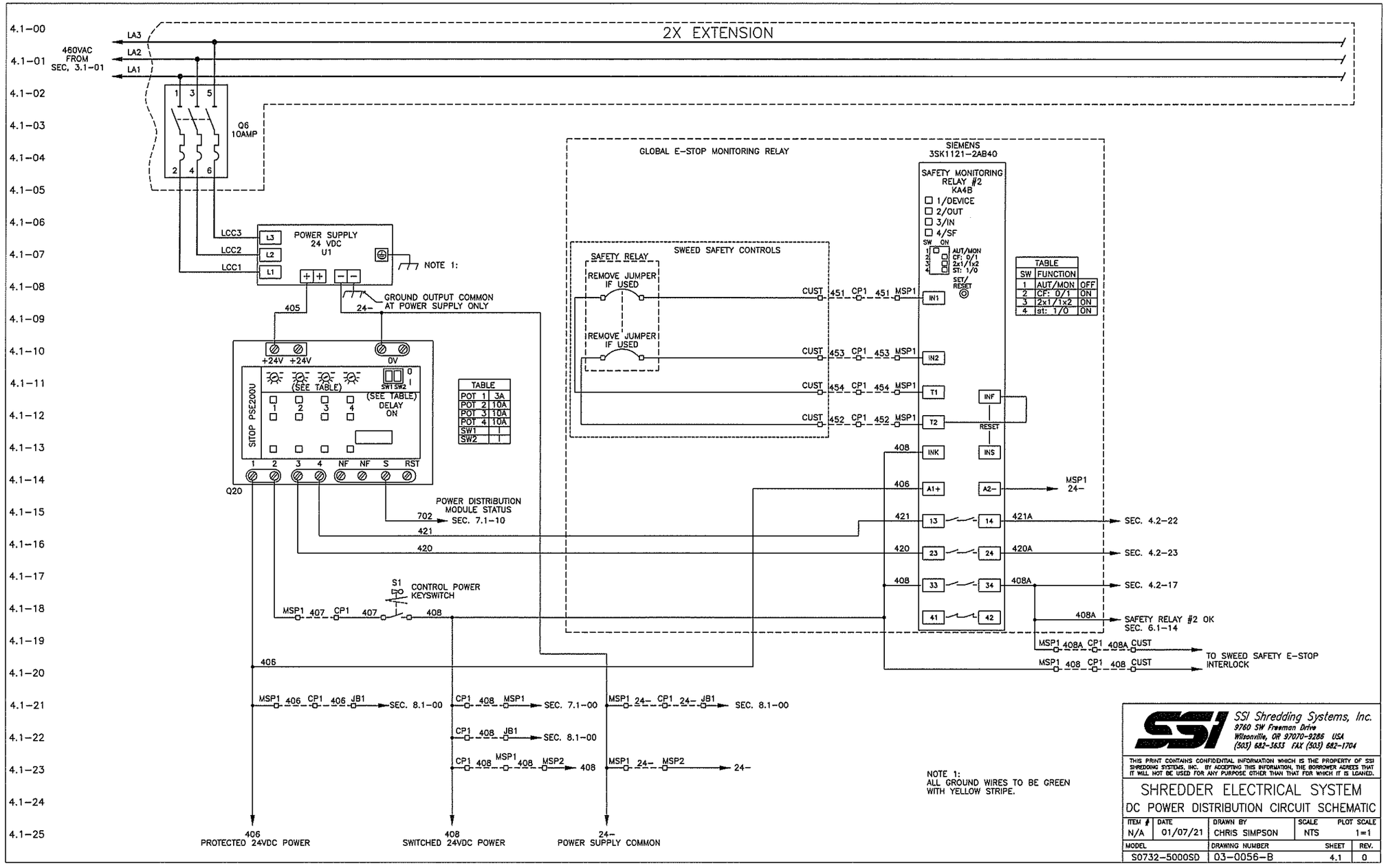
SHREDDER ELECTRICAL SYSTEM
(MSP2) MOTOR POWER SCHEMATIC

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	3.2	0



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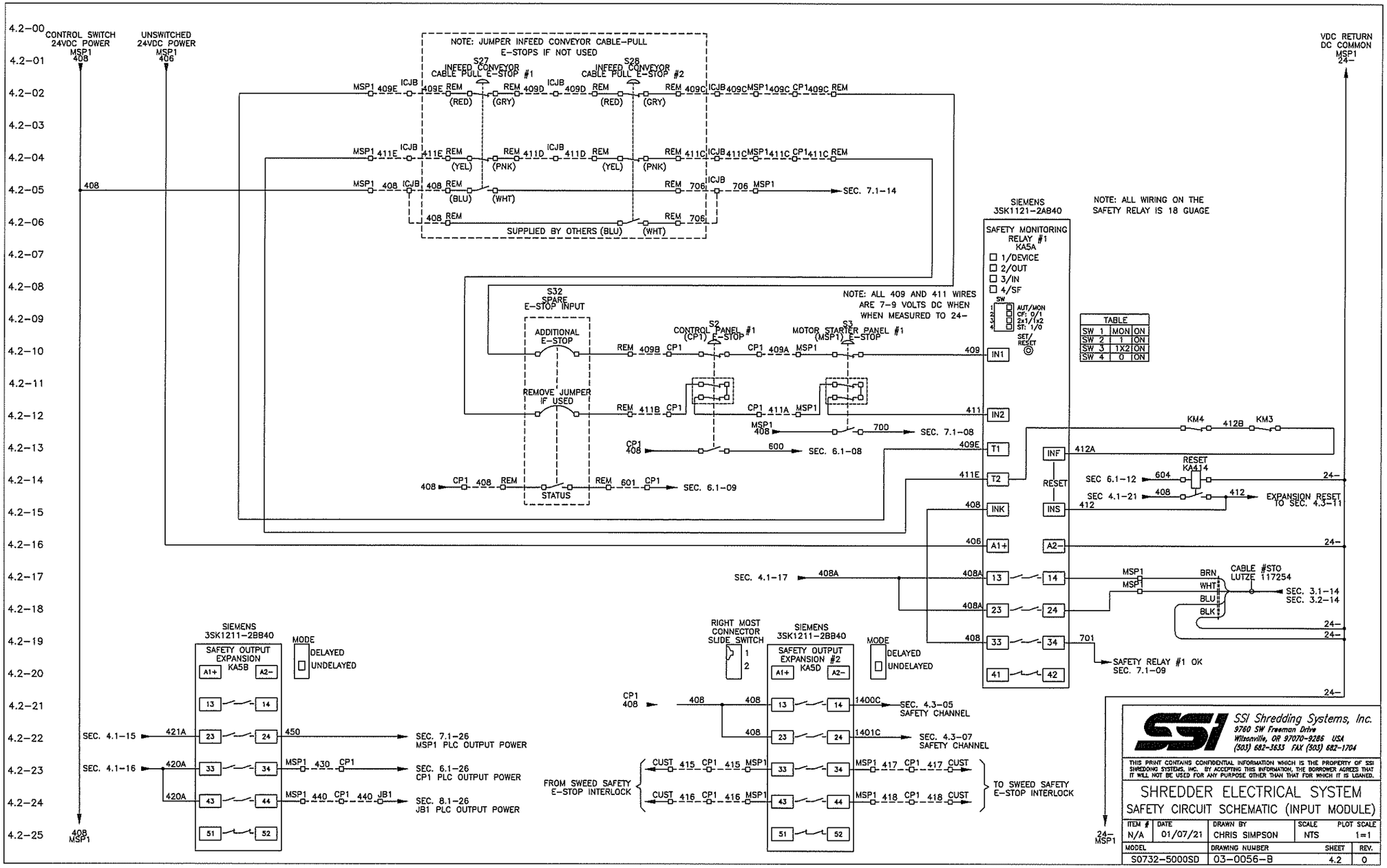
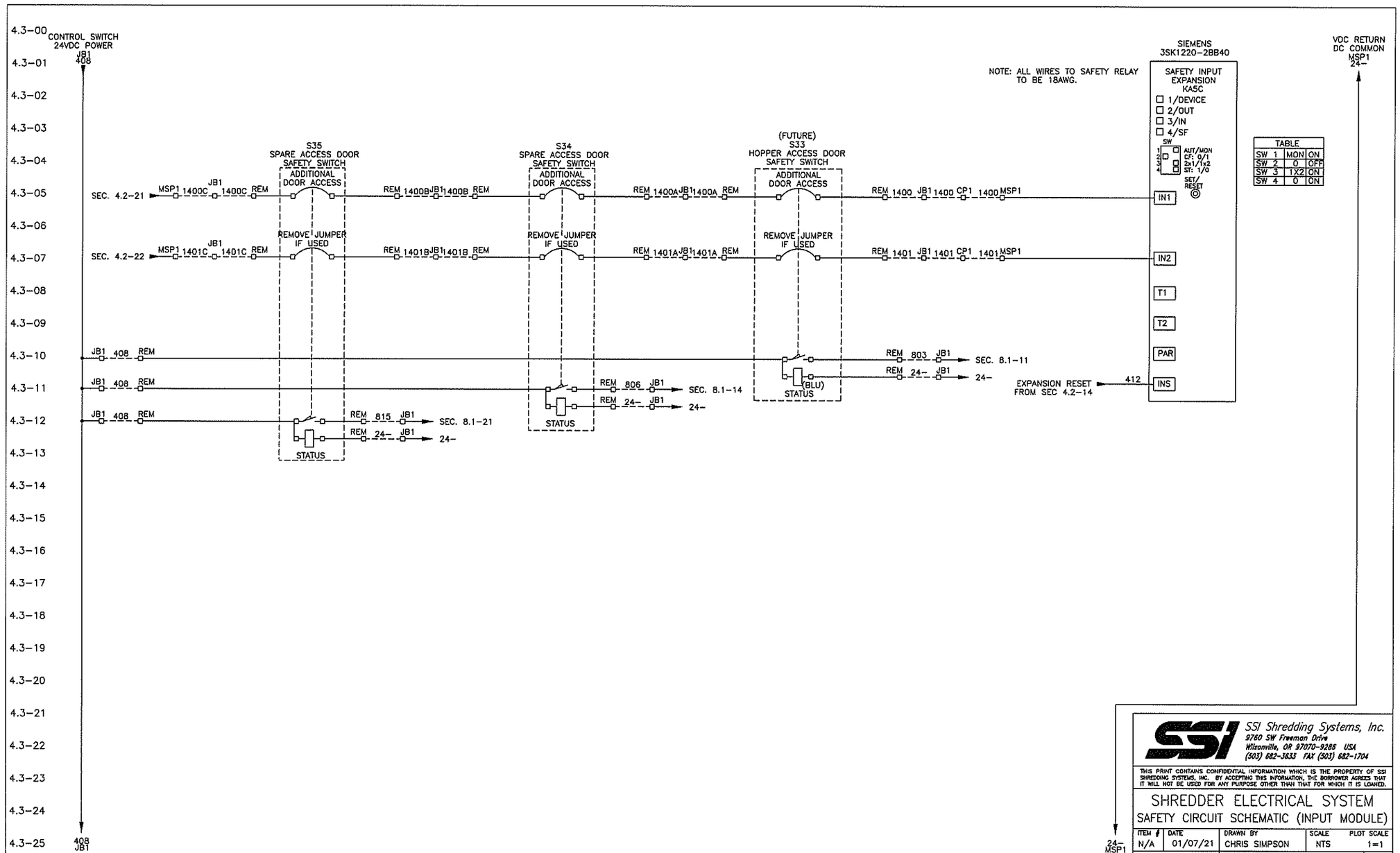
SHREDDER ELECTRICAL SYSTEM
DC POWER DISTRIBUTION CIRCUIT SCHEMATIC

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	4.1	0


4.2-00
4.2-01
4.2-02
4.2-03
4.2-04
4.2-05
4.2-06
4.2-07
4.2-08
4.2-09
4.2-10
4.2-11
4.2-12
4.2-13
4.2-14
4.2-15
4.2-16
4.2-17
4.2-18
4.2-19
4.2-20
4.2-21
4.2-22
4.2-23
4.2-24
4.2-25
CONTROL SWITCH 24VDC POWER MSP1 408
UNSWITCHED 24VDC POWER MSP1 406
VDC RETURN DC COMMON MSP1 24-
NOTE: JUMPER INFEED CONVEYOR CABLE-PULL E-STOPS IF NOT USED
S27 INFEED CONVEYOR CABLE PULL E-STOP #1
S28 INFEED CONVEYOR CABLE PULL E-STOP #2
SEC. 7.1-14
SUPPLIED BY OTHERS (BLU) (WHT)
S32 SPARE E-STOP INPUT
ADDITIONAL E-STOP
REMOVE JUMPER IF USED
STATUS
S2 CONTROL PANEL #1 (CP1) E-STOP
S3 MOTOR STARTER PANEL #1 (MSP1) E-STOP
NOTE: ALL 409 AND 411 WIRES ARE 7-9 VOLTS DC WHEN WHEN MEASURED TO 24-
SIEMENS 3SK1121-2AB40
SAFETY MONITORING RELAY #1 KA5A
1/DEVICE
2/OUT
3/IN
4/SF
AUT/MON CF: 0/1 2x1/1x2 ST: 1/0
SET/ RESET
NOTE: ALL WIRING ON THE SAFETY RELAY IS 18 GUAGE
TABLE
SW 1 MON ON
SW 2 1 ON
SW 3 1X2 ON
SW 4 0 ON
SEC. 6.1-08
SEC. 6.1-09
SEC. 7.1-08
KM4 412B KM3
RESET KA414
SEC 6.1-12
SEC 4.1-21
EXPANSION RESET TO SEC. 4.3-11
SEC. 4.1-17
CABLE #STO LUTZE 117254
SEC. 3.1-14
SEC. 3.2-14
SAFETY RELAY #1 OK SEC. 7.1-09
SIEMENS 3SK1211-2BB40
SAFETY OUTPUT EXPANSION KA5B
MODE DELAYED UNDELAYED
SEC. 4.1-15
SEC. 4.1-16
SEC. 7.1-26 MSP1 PLC OUTPUT POWER
SEC. 6.1-26 CP1 PLC OUTPUT POWER
SEC. 8.1-26 JB1 PLC OUTPUT POWER
RIGHT MOST CONNECTOR SLIDE SWITCH
SIEMENS 3SK1211-2BB40
SAFETY OUTPUT EXPANSION #2 KA5D
SEC. 4.3-05 SAFETY CHANNEL
SEC. 4.3-07 SAFETY CHANNEL
FROM SWEED SAFETY E-STOP INTERLOCK
TO SWEED SAFETY E-STOP INTERLOCK
SSI Shredding Systems, Inc.
9760 SW Freeman Drive
Wilsonville, OR 97070-9286 USA
(503) 682-3633 FAX (503) 682-1704
THIS PRINT CONTAINS CONFIDENTIAL INFORMATION WHICH IS THE PROPERTY OF SSI SHREDDING SYSTEMS, INC. BY ACCEPTING THIS INFORMATION, THE BORROWER AGREES THAT IT WILL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS LOANED.
SHREDDER ELECTRICAL SYSTEM
SAFETY CIRCUIT SCHEMATIC (INPUT MODULE)
ITEM # N/A
DATE 01/07/21
DRAWN BY CHRIS SIMPSON
SCALE NTS
PLOT SCALE 1=1
MODEL S0732-5000SD
DRAWING NUMBER 03-0056-B
SHEET 4.2
REV. 0



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SHREDDER ELECTRICAL SYSTEM
SAFETY CIRCUIT SCHEMATIC (INPUT MODULE)

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	4.3	0

5.1–00
5.1–01
5.1–02
5.1–03
5.1–04
5.1–05
5.1–06
5.1–07
5.1–08
5.1–09
5.1–10
5.1–11
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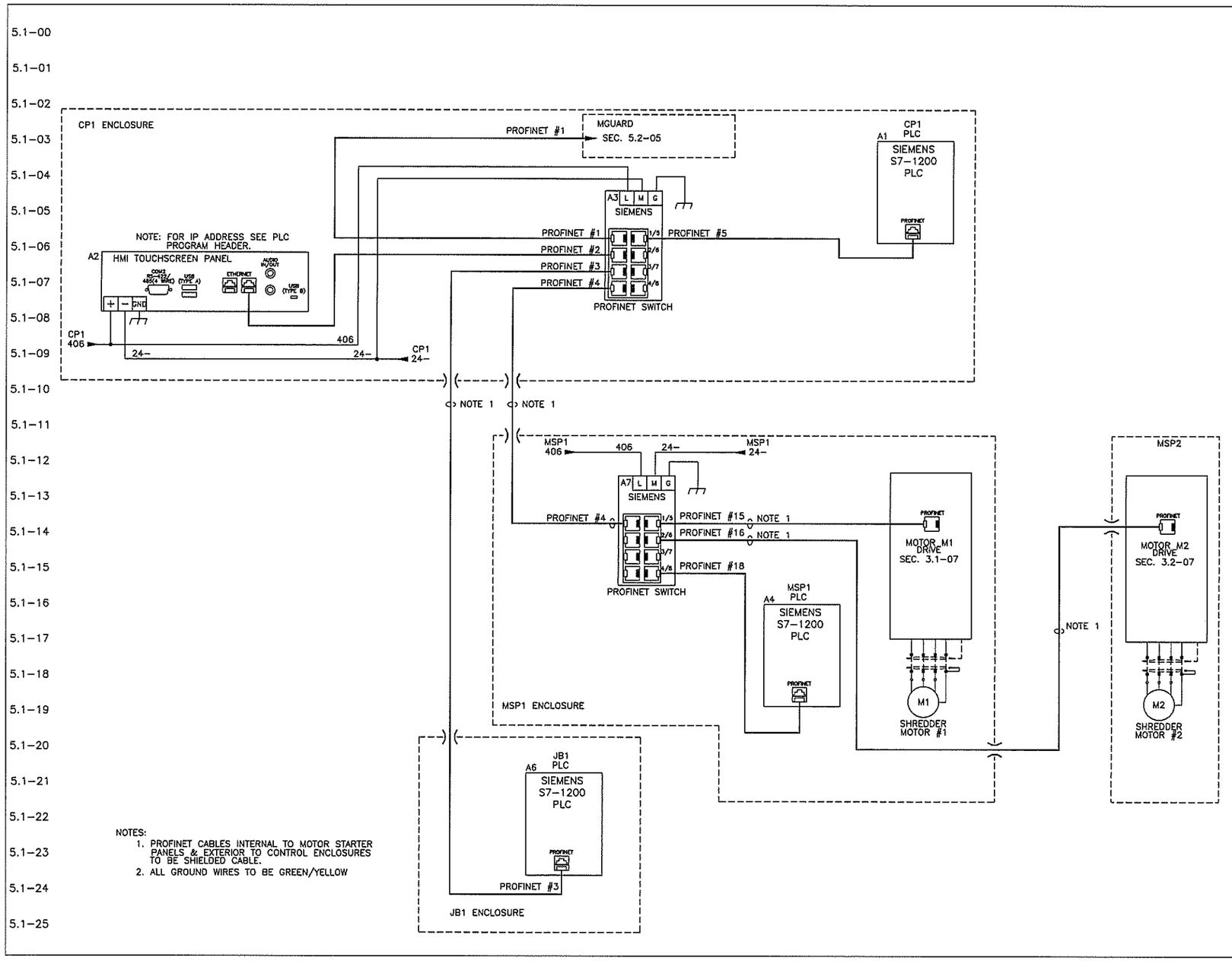
5.1–24
5.1–25



NOTES:
1. PROFINET CABLES INTERNAL TO MOTOR STARTER PANELS & EXTERIOR TO CONTROL ENCLOSURES TO BE SHIELDED CABLE.
2. ALL GROUND WIRES TO BE GREEN/YELLOW

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SHREDDER ELECTRICAL SYSTEM
COMMUNICATIONS BLOCK DIAGRAM

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732–5000SD	03–0056–B	5.1	0

5.2–00
5.2–01
5.2–02
5.2–03
5.2–04
5.2–05
5.2–06
5.2–07
5.2–08
5.2–09
5.2–10
5.2–11
5.2–12
5.2–13
5.2–14
5.2–15
5.2–16
5.2–17
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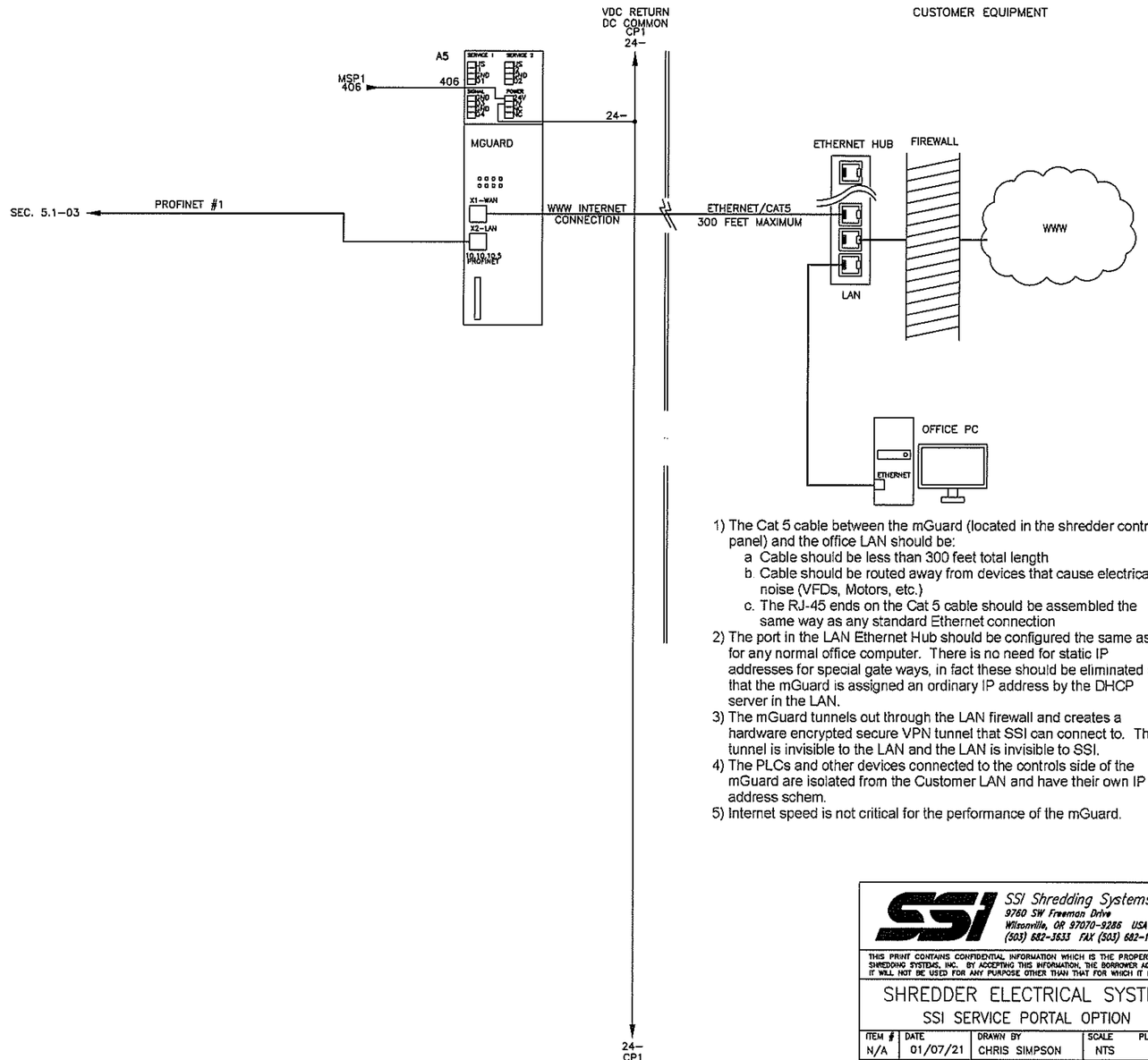
5.2–19
5.2–20
5.2–21
5.2–22
5.2–23
5.2–24
5.2–25



1) The Cat 5 cable between the mGuard (located in the shredder control panel) and the office LAN should be:
   a. Cable should be less than 300 feet total length
   b. Cable should be routed away from devices that cause electrical noise (VFDs, Motors, etc.)
   c. The RJ-45 ends on the Cat 5 cable should be assembled the same way as any standard Ethernet connection
2) The port in the LAN Ethernet Hub should be configured the same as for any normal office computer. There is no need for static IP addresses for special gate ways, in fact these should be eliminated so that the mGuard is assigned an ordinary IP address by the DHCP server in the LAN.
3) The mGuard tunnels out through the LAN firewall and creates a hardware encrypted secure VPN tunnel that SSI can connect to. The tunnel is invisible to the LAN and the LAN is invisible to SSI.
4) The PLCs and other devices connected to the controls side of the mGuard are isolated from the Customer LAN and have their own IP address schem.
5) Internet speed is not critical for the performance of the mGuard.

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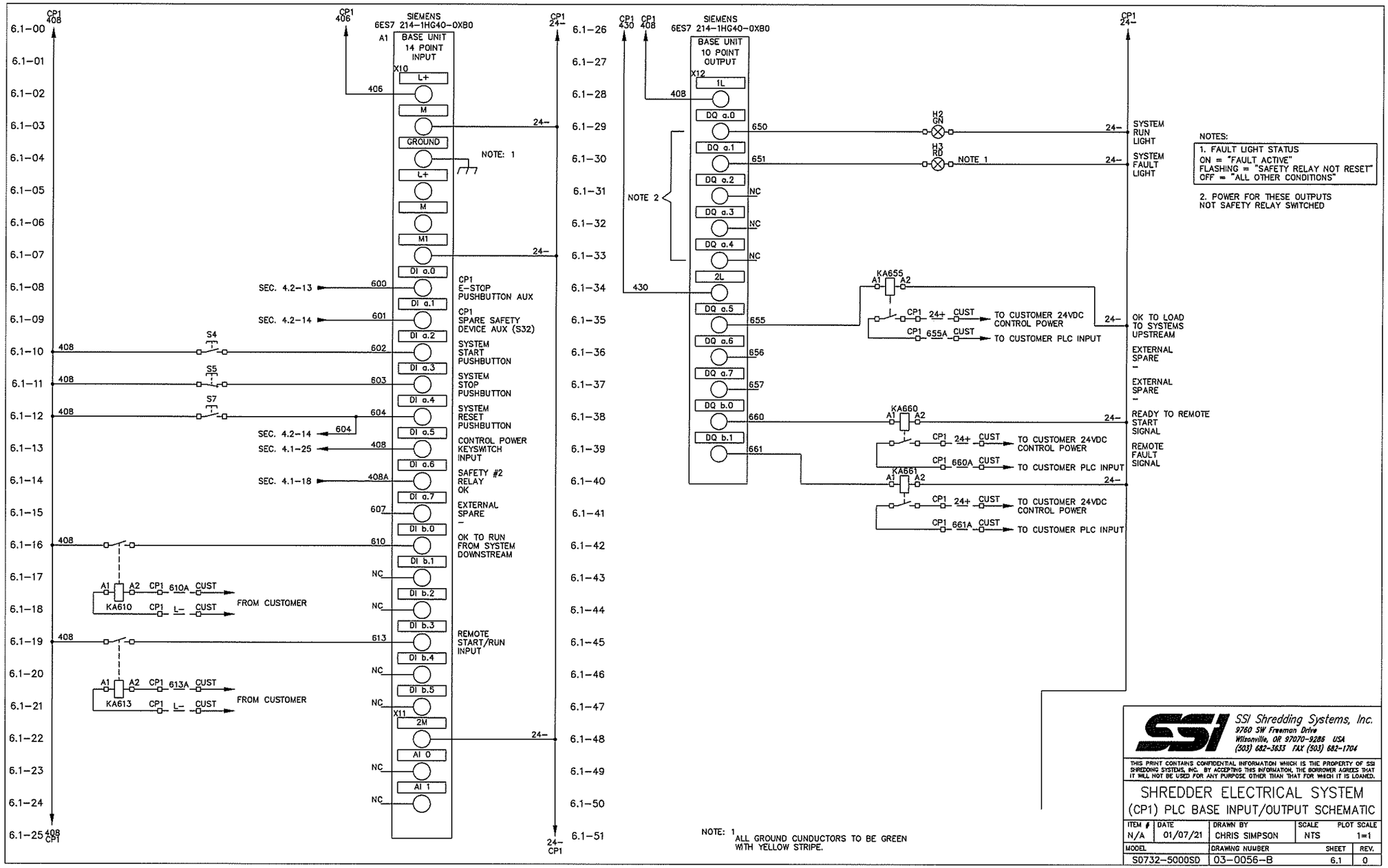
SHREDDER ELECTRICAL SYSTEM
SSI SERVICE PORTAL OPTION

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732–5000SD	03–0056–B	5.2	0



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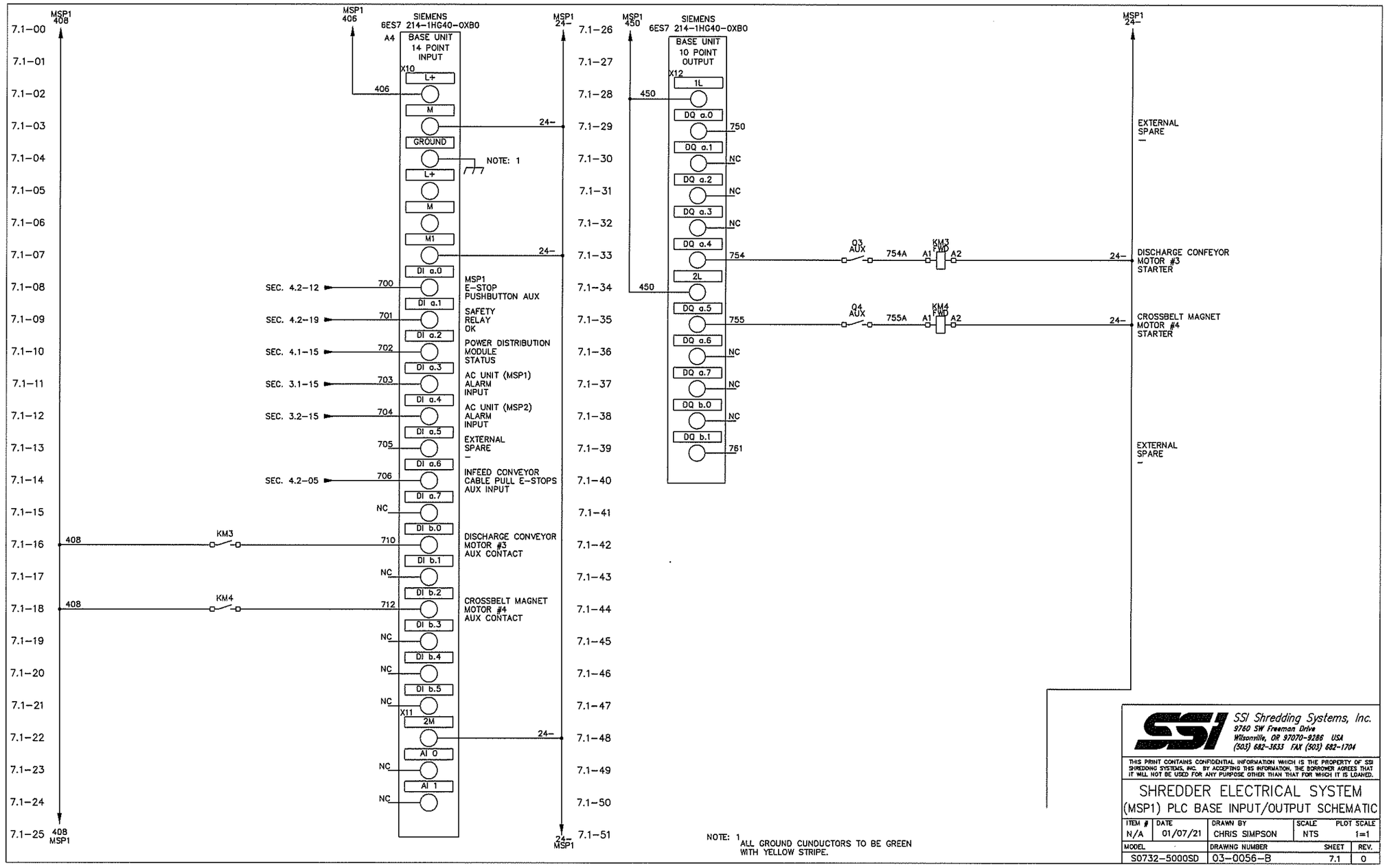
SHREDDER ELECTRICAL SYSTEM
(CP1) PLC BASE INPUT/OUTPUT SCHEMATIC

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	6.1	0



NOTE: 1 ALL GROUND CUNDUCTORS TO BE GREEN WITH YELLOW STRIPE.

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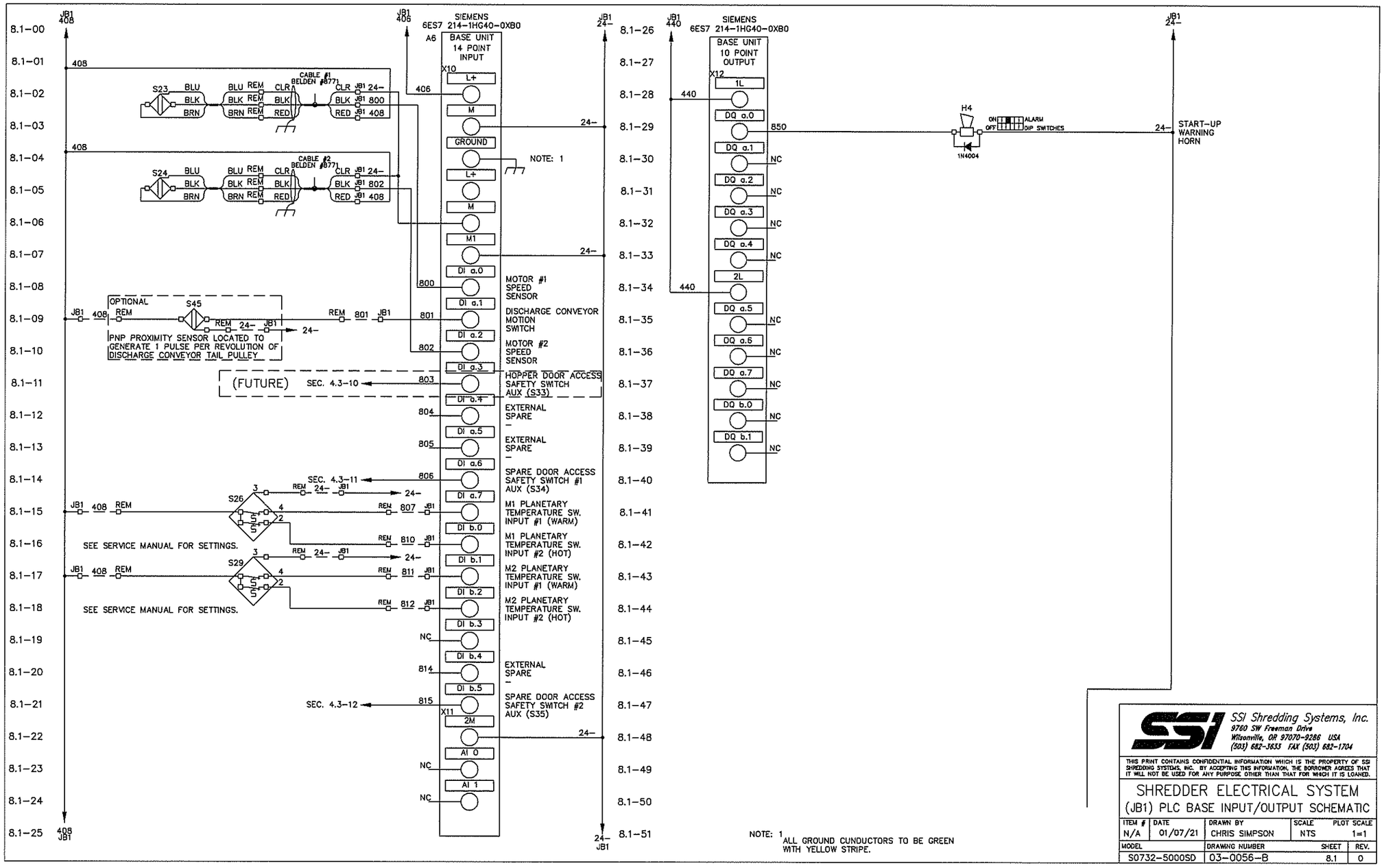
SHREDDER ELECTRICAL SYSTEM
(MSP1) PLC BASE INPUT/OUTPUT SCHEMATIC

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	7.1	0



NOTE: 1 ALL GROUND CUNDUCTORS TO BE GREEN WITH YELLOW STRIPE.

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SHREDDER ELECTRICAL SYSTEM
(JB1) PLC BASE INPUT/OUTPUT SCHEMATIC

ITEM #	DATE	DRAWN BY	SCALE	PLOT SCALE
N/A	01/07/21	CHRIS SIMPSON	NTS	1=1

MODEL	DRAWING NUMBER	SHEET	REV.
S0732-5000SD	03-0056-B	8.1	0