Installation, Operation and Maintenance Instructions

METAL DETECTOR
MODEL 1260 ANALOG

ERIEZ HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506–1402 U.S.A.
WORLD AUTHORITY IN SEPARATION TECHNOLOGIES

Introduction

This manual details the proper steps for installing, operating and maintaining the Eriez Model 1260 Analog Metal Detector.

Careful attention to these requirements will assure the most efficient and dependable performance of this equipment.

If there are any questions or comments about the manual, please call Eriez at 814-835-6000 for Model 1260 Metal Detector assistance.

CAUTION

Safety labels must be affixed to this product. Should the safety label(s) be damaged, dislodged or removed, contact Eriez for replacement.

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ERIEZ MODEL 1260 ANALOG METAL DETECTOR

Safety Warnings

THIS DETECTOR SHOULD BE INSTALLED BY QUALIFIED ELECTRICAL AND MECHANICAL PERSONNEL ONLY.

General

- All standard safety procedures should be observed when working on electrically powered equipment.
- Proper care should be taken when connecting or disconnecting the power source.
- When connected to a power source, un-insulated, dangerous voltage is present within the Detector's electronics enclosure which may constitute a risk of electric shock.
- Do not allow moisture to collect in the electronics enclosure or near the power connections. Always close the enclosure and secure the locking mechanism after working with the electronics.
- The user should not attempt to service the Detector. All servicing should be referred to certified service personnel qualified to work on electrical equipment.

Installation

- Do not install this Detector near heat sources such as radiators or air ducts.
- Place the Detector in a location with adequate air circulation to prevent internal heat buildup.

Connections

- As standard, this Detector is set for connection to 115 VAC. If specifically requested, the Detector can be set for 220 VAC. The Detector must be connected only as supplied.
- The power cable should be routed so that it is not likely to be walked on or pinched by items placed upon or against it, paying particular attention to the point where it exists from the Detector.

General Information

Eriez detectors are custom fabricated to suit each user's particular application. Each detector system is subjected to extensive testing both at the sub-assembly level and after final assembly to ensure compliance with performance and electrical safety standards.

Standard Warranty

(Please refer to full warranty information)
Eriez new metal detectors are warranted against defects in workmanship and materials for three years. This warranty does not cover failures due to misuse, neglect, abuse, improper handling, alteration, improper maintenance or accident, and Eriez shall not be liable for any direct, indirect, consequential or incidental damages from use, results of use or inability to use this product. Repairs by any other than Eriez authorized service personnel will void this warranty.

Within the warranty period, the product will be repaired or replaced at Eriez's option, free of charge; shipping costs will be paid by Eriez. Except as mentioned above, no other warranty, expressed or implied, applies. If Modules are not covered by warranty as mentioned above, Customer will be billed for the repair and shipping. Non warranty repairs, Customer must issue a PO # or Credit Card # prior to any repair.

Installation Assistance

Eriez detectors have been designed for installation by qualified personnel with detailed instructions provided with each shipment. When required, a Eriez Field Engineer will supervise or check the installation, activate the system and provide training on periodic adjustments and care of the Detector for user maintenance personnel. Please contact Eriez for Field Service rates.

Technical/Application Assistance

Eriez welcomes your inquiries concerning metal detectors and their application, installation and servicing. If technical or application assistance is needed, contact:

Eriez
2200 Asbury Road, Erie, PA 16506-1402 USA
Phone: 814-835-6000 • 800-345-4946
Email: eriez@eriez.com
Website: www.eriez.com

Description

General

The Model 1260, Long Object Detector, is designed to selectively detect and discriminate between long metal objects and shorter, bulkier ones. In a typical application, this Detector could be used on a conveyor system monitoring the conveyed material for potentially damaging metal rods that could tear a conveyor belt if jammed in a transfer point.

The Detector may be set to detect a rod of a given minimum diameter and length. It will then trip on this diameter rod only when the rod is the selected length or longer. This trip signal would then be used to stop the belt and/or sound an alarm. In addition to the rod control, the unit also has and "Oversize" control. This control is set to trigger on objects larger than the rod diameter, independent of length.

To provide the calibration capability for the detection selectively described, the Detector has three adjustable controls: 1) long object minimum diameter, 2) long object minimum length, and 3) oversize object size.

The Detector makes use of the latest in solid state technology. The design includes a number of innovative features: self-test circuits that monitor the performance of the detection circuitry using light emitting diodes (L.E.D.'s) which indicate the status of the test circuits; wide programming capability to custom tailor the Detector to suit specific application requirements; and solid state relays to provide reliable arc-free switching.

Method of Operation

During normal operation, the transmitter coil is energized to produce a pulsed electromagnetic signal. These signals produce a field that locally permeates the conveyed material. A piece of metal entering this field absorbs energy emitted from the transmitter coil. The metal particle then releases the energy and this change is detected by the receiver coil. This technique provides optimum discrimination between tramp metal and the conveyed material; product effect is non-existent or minimal.

Having detected metal by a waveform change, the signal generated is amplified and filtered through several stages. The signal is then compared to a set threshold determined by the size of metal that must be detected. When the signal exceeds this threshold, a metal signal is generated. In the 1260, once this metal signal is generated a secondary circuit is enabled which times the duration of the metal signal. Given a constant belt speed, the length of the piece can be determined. If this circuit determines that the tramp metal is shorter than programmed, it is allowed to pass with no alarm.

On the other hand, if the secondary circuit determines that the metal is sufficiently long, the metal signal is allowed to trigger the solid state relays at the appropriate time. These solid state relays in turn switch the line voltage to the output alarm terminals of the detector. Various combinations of alarm horns, belt stop relays, alarm beacons, etc., can then be actuated by these switched alarm outputs.

In addition to this protection, the detector will also activate the alarm for any piece of tramp metal considered to be oversized. Such an oversized piece will trigger the alarm regardless of its length.

The detector is influenced only by change. Therefore, stationary structural members, metal belt cords, symmetrical idlers and other objects which do not represent a moving mass to the field are not detected. Metal belt repair clips are passed by the unit with an optional clip detector sensor and inhibitor circuit which is properly adjusted to the clip signal.

Physical Description

Main Control Enclosure

This enclosure houses and protects the Electronic and Interface Modules and also serves as a junction box for conduit and cables running to and from the Detector. As standard, the Detector is housed in a steel NEMA 4 enclosure. Other enclosures are available as options.

Visible and accessible on the front panel are: Power On/ Off Switch, Green Power "On" Indicator Lamp, Red Trip Indicator Lamp that lights when the unit has detected metal and a Reset Button. See Figure 1.

Type: NEMA
Size: 16" x 14" x 6"
Weight: 33 Lbs. (Includes All Electronics)

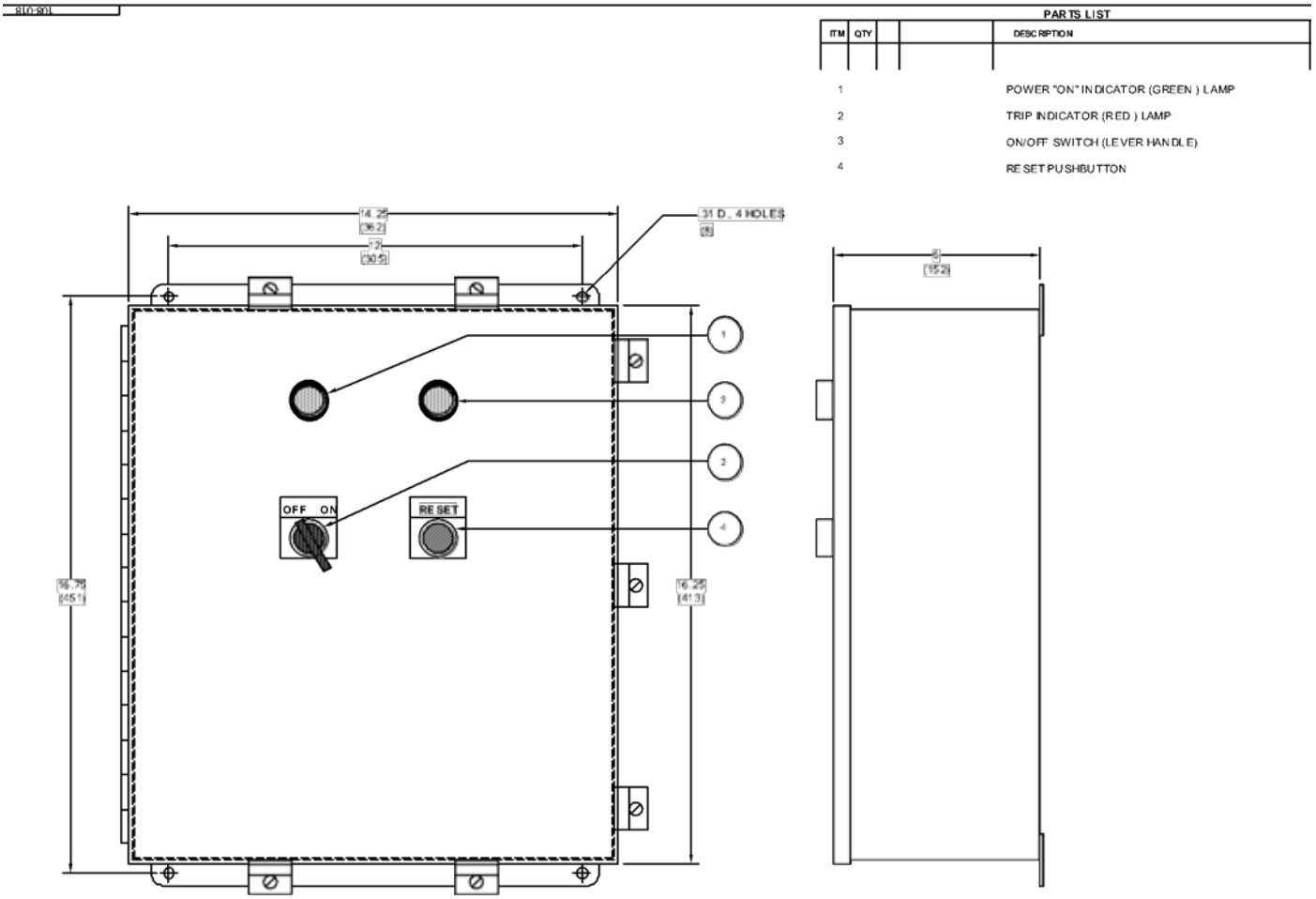


FIGURE 1

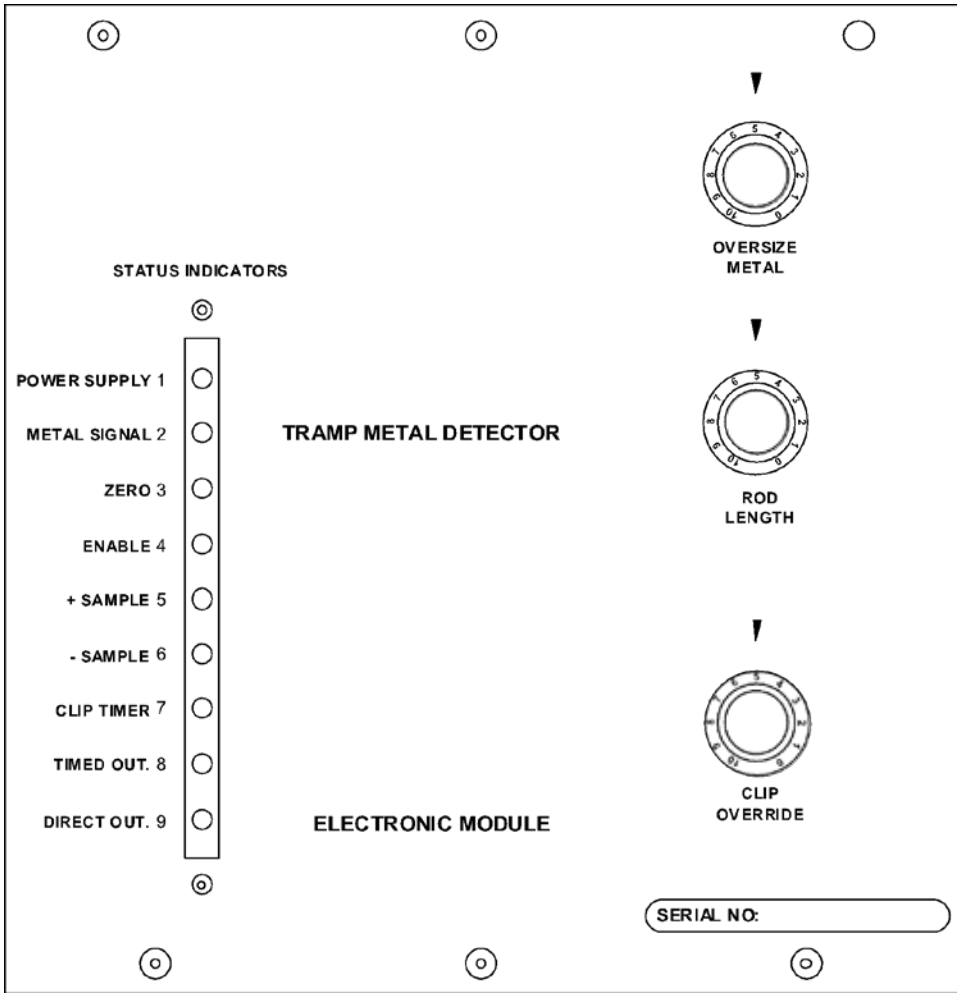
Electronic/ Interface Modules

All the electronics and controls for the detector are contained in two modules, the Interface Module and the Electronic Module shown in Figure 2. The Electronic Module houses the electronic circuitry and components associated with metal signal processing and analysis. Visible on the front panel of the Electronic Module are the “Oversize Sensitivity” control knob, “Rod Length” control knob, “Clip Override” control knob and L.E.D. status indicators used to monitor the status of the detector's self-test circuits. By removing the front cover of the module, all of the electronics are exposed for calibration and troubleshooting. All connections for the Electronic Module are made through a 36-pin connector located along the bottom edge of the modules.

The Interface Module interconnects all external signals and power to the Electronic Module. This module houses the power transformer; solid state relays and interface circuit board. Visible on the face of the Interface Module are system fuses and two terminal blocks for external wiring; all are clearly identified.

The left terminal block, a 7-pin, 7/16" center screw type, is used for all connections handling the A.C. line voltage. The right terminal block, a 13-pin, 3/8" center screw type, connects the Detector’s external transducers and signals.

Electronic Module
Size: 10.5" x 9.5" x 1.5"
Weight: 3.25lbs



Interface Module
Size: 11" x 2.5" x 4"
Weight: 4.75lbs

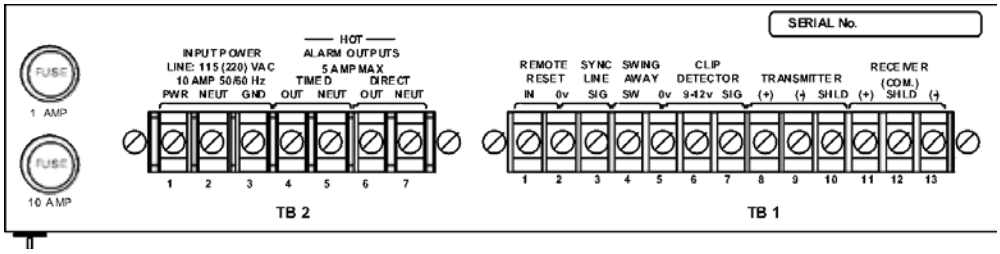


FIGURE 2

Search Coil Assembly

The Search Coil Assembly includes a pair of receiver antennas, a transmitter antenna, mounting frame and interconnecting cables. Each assembly is custom designed to suit its particular application. Please refer to the Frame Assembly Diagram, Figure 4.

Receiver Coil

The receiver coils are typically located under the conveyed material within 2" of the loaded conveyor belt.

Transmitter Coil

The transmitter coil is located opposite and parallel to the receiver coil. The distance between the transmitter and receiver (aperture) is typically 4" greater than the maximum burden depth of the processed material.

Mounting Frame

The mounting frame supports the antennas on trough and slider bed conveyors. Special designs are available to accommodate other types of material handling systems. The swing-away assembly, shown in Figure 4, protects the transmitter from oversized conveyed materials.

Interconnecting Cables

Shielded cables connect the receiver and transmitter to the Main Control Enclosure. 25' of cable between the frame assembly and control unit is supplied as standard. Optimum performance is assured with cable lengths of 25' or under. However, lengths of up to 100' are acceptable where detector sensitivity requirements are minimal.

Clip Detector

(if applicable)

The clip detector consists of a compact sensor head and mounting bracket. The clip detector senses the proximity of repair clips as they pass over the sensor's head. Once the clips are detected, the Metal Detector is desensitized, but not disabled. Any large piece of metal riding on the clips will still trigger the Detector.

Size: 3.5" x 3.5" x 2"
Weight: 1.25 Lbs.

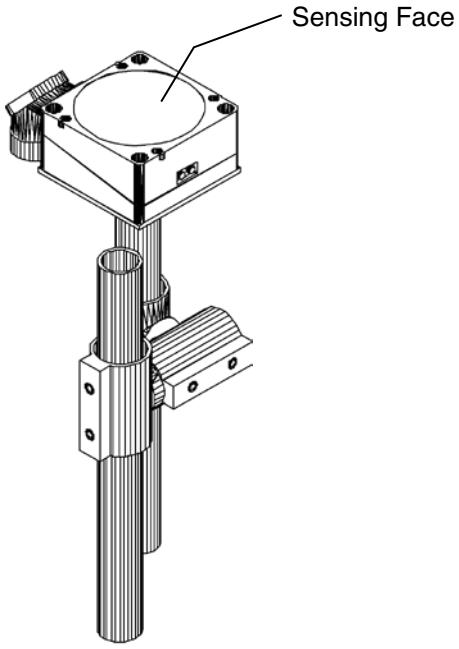


FIGURE 3

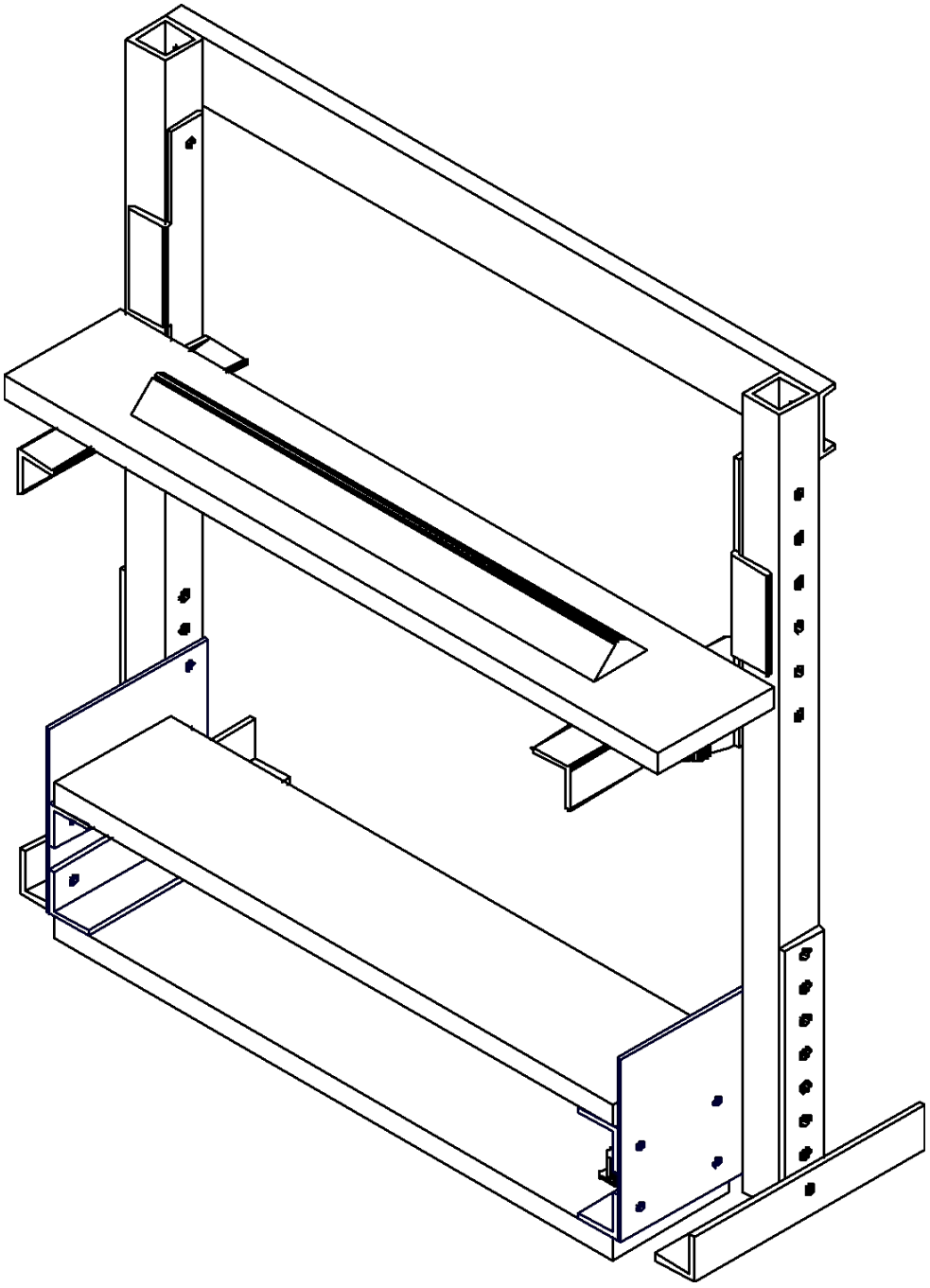


FIGURE 4
Swing Away Frame Assembly Diagram

Installation

PLEASE READ THROUGH COMPLETELY BEFORE BEGINNING WORK!

Unpacking

Upon receipt of the crate(s) containing the Metal Detector System, inspect the contents for physical damage and missing parts. If anything is broken or missing, please contact the carrier and notify the supplier immediately.

Site Selection & Preparation

While each application is unique, the guidelines listed below apply to most installations. Follow the steps listed below to choose the best location for the detector:

Choose a location for the detector so the material handling system has ample time to react to tramp metal. Locate the detector far enough in advance of the head pulley so the belt can come to a stop before the metal falls off the end of the belt. If a diverter is used, consider the reaction time of the system and speed of the conveyor belt.

Select a site with minimum vibration. High vibration areas may degrade detector sensitivity and shorten component life.

Locate the Search Coil Assembly away from sources of airborne electrical interference emitted from variable-speed drives, large motors, ballasts, FM radios, induction furnaces and other radio frequency (RF) sources. Because RF energy travels along a straight line (line-of-sight), position the receiver coil or relocate RF sources so they are out of the direct line-of-sight with the top and bottom of the receiver coil. Cables carrying high voltage or varying loads must be enclosed in steel conduit, grounded at both ends and located at least 4' from the detector antennas.

Position the entire search coil assembly so that the bottom of the coil (usually the receiver) is equally spaced between the two adjacent idler rollers. Center the receiver coils or transmitter coil using the cable connector as the center line of the antenna. **Do not center the 2" x 2" uprights.**

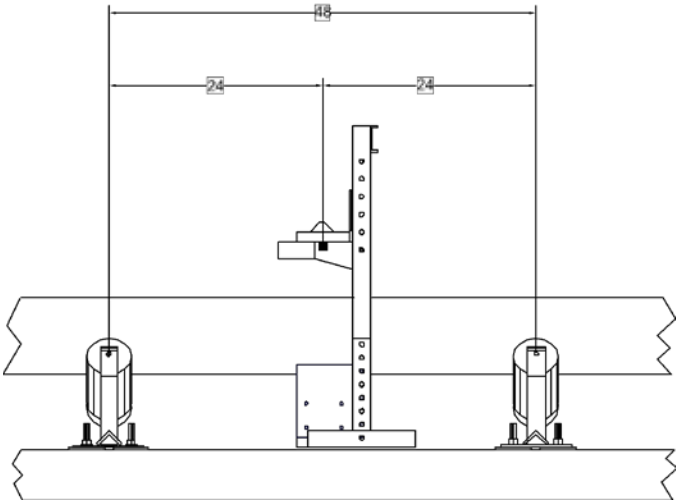


FIGURE 5

The magnetic field generated by the transmitter coil induces eddy currents in nearby metal cross bracing, stairways, handrails and pipes. These eddy currents may cause false tripping if the current path intermittently makes contact. Eddy current loops can be broken by cutting the conductive paths in these structures. Use non-metallic hardware as required to restore structural support. Idler rollers on either side of the antenna assembly are one of the major sources of eddy current interference. An idler isolation kit is provided see Figure 6. For instructions on how to install the isolation kit, refer to the Idler Modification Diagram for details Figure 7.

If the Search Coil Assembly is located where a metal skirt passes through the coils, it must be replaced with a five-foot section of non-metallic material (i.e., wood or plastic).

Remove metallic decking, skirt boards, cross bracing and return idlers below and within 3' of the center line of the receiver coil (upstream and downstream). Relocate or tightly secure moving or vibrating pieces of metal such as cables, conduit and piping within 36" of the Search Coil Assembly.

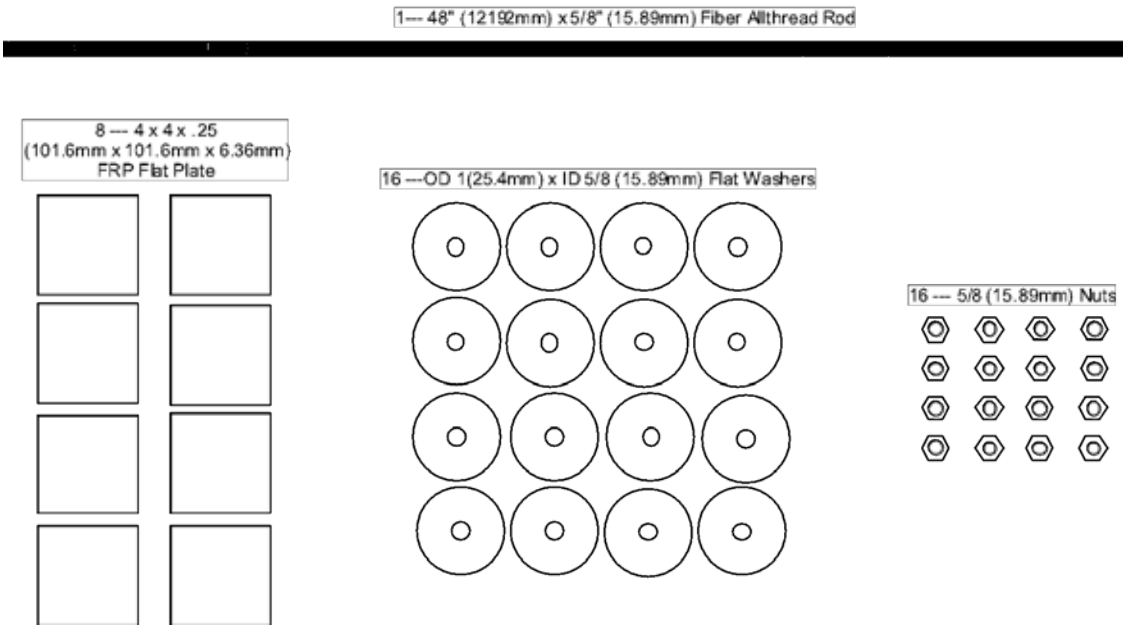
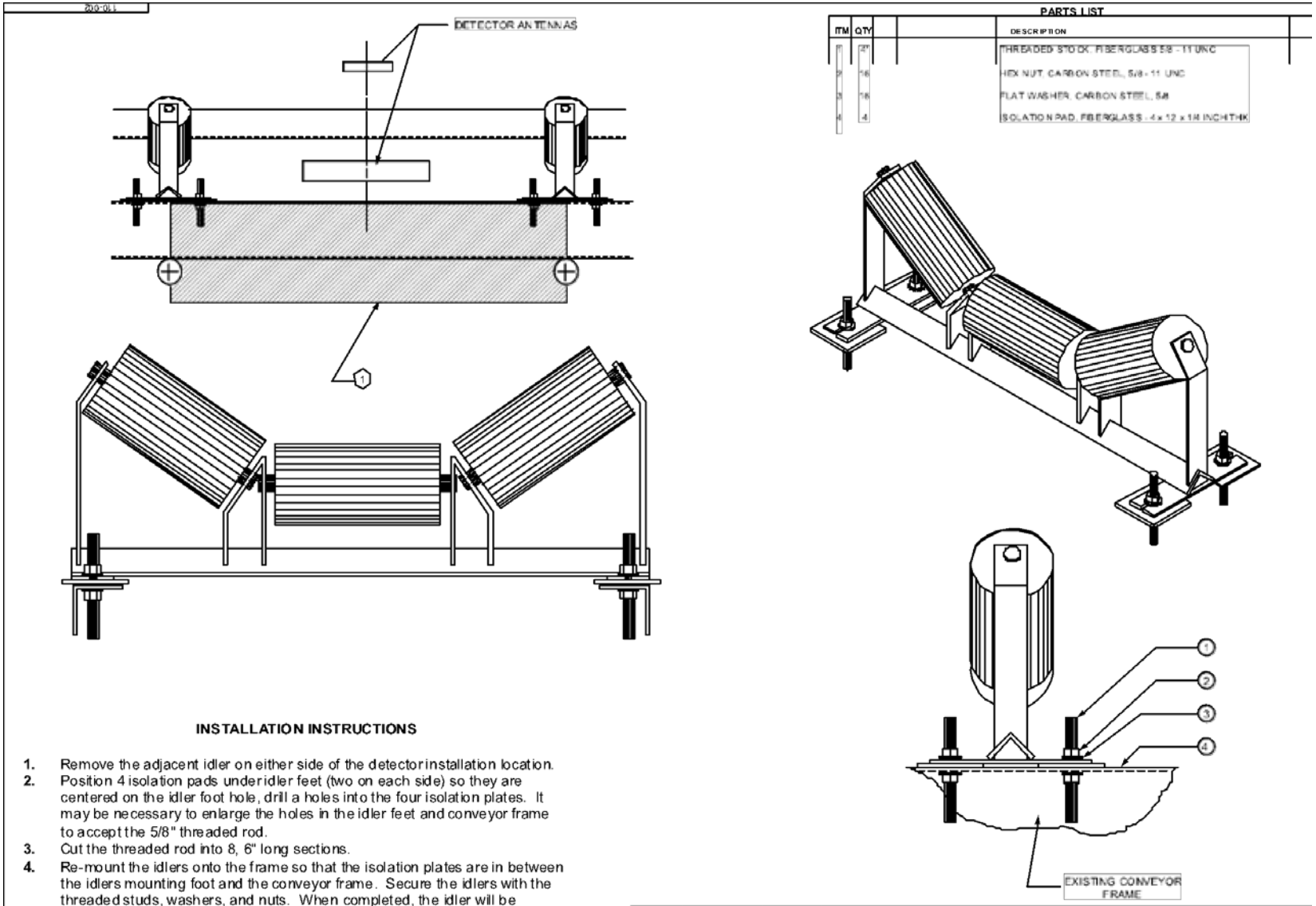


FIGURE 6
Isolation Kit

Isolation Kit contains 8 4"x4" FRP plates, 16 1" diameter flat washers, 16 5/8" nuts and 1 48" long 5/8" threaded rod. Note: When isolation kit ordered by its self the threaded rod may be precut into 4 pieces to aid in packaging. Isolation Kits supplied with unit orders do not have the threaded rod pre cut.



INSTALLATION INSTRUCTIONS

1. Remove the adjacent idler on either side of the detector installation location.
2. Position 4 isolation pads under idler feet (two on each side) so they are centered on the idler foot hole, drill a holes into the four isolation plates. It may be necessary to enlarge the holes in the idler feet and conveyor frame to accept the 5/8" threaded rod.
3. Cut the threaded rod into 8, 6" long sections.
4. Re-mount the idlers onto the frame so that the isolation plates are in between the idlers mounting foot and the conveyor frame. Secure the idlers with the threaded studs, washers, and nuts. When completed, the idler will be electrically isolated from the conveyor frame.

NOTE:
Use caution not to excessively torque the nuts onto the threaded fiberglass studs.

(1) NO METAL DECKING, CROSSBRACING, OR RETURN IDLERS BELOW OR BETWEEN IDLERS ADJACENT TO RECEIVER ANTENNA.

JO		MODEL	PROJECT	TITLE: IDLER MODIFICATION DETAILS
SCALE		DATE		
DRAWN	Jules	06/13/2007		
APPR				
MATERIAL			UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN INCHES	REV C; REVISED 1/11/2011; DWG NO 110-002

FIGURE 7

Mounting – Search Coil Assembly

Note the material flow direction arrows, match marks and other identification on the Detector components before beginning work. Please refer to the Frame Assembly Diagram Figure 13 for installation.

Assemble the top crossbar to the vertical upright supports using four 3/8" x 1" bolts with washers (provided). Be sure the crossbar is located on the upstream side of the upright supports and the base of the metal mounting feet angles point in toward the belt.

Assemble the top transmitter coil (with swing-away brackets attached) to the upright supports. The height of the transmitter coil should be as low as possible without being hit by overburden. The nominal height for the transmitter coil is indicated by dimension “S” on the Frame Assembly Diagram. Use two 3-1/2" bolts with washers (provided). Each of the two bolts contains four flat washers and two nuts. Make sure two washers are located between the swing-away bracket and upright support to insure proper spacing and freedom of movement. The remaining washers are located at the end of each bolt. Hand tighten each bolt with a nut until light drag is exerted on the swing-away bracket. Tighten the second nut against the first nut to serve as a jam nut. Verify that the swing-away brackets are free to move.

CAUTION

If the swing-away assembly is not free to move, damage to the transmitter coil may result if hit by overburden.

Position the upright assembly onto the conveyor frame with the arrow on the transmitter coil pointing in the direction of belt flow.

Assemble the receiver coil (mounting brackets attached) to the upright supports using four 3/8" x 3-1/2" bolts with washers (provided). Position the height of the receiver to allow for 1" distance between the bottom of the belt and the top of the receiver antenna at maximum belt load. Bolt the brackets into place with the nuts and washers facing in toward the belt.

Verify that the search coil assembly is square and all bolts installed are properly tightened.

Position the entire search coil assembly so the bottom receiver coil is equally spaced from the idler rollers on either side.

Weld or bolt the metal support feet to the conveyor frame. Be sure unwanted twists and torques in the frame assembly are corrected before you weld. A twist in the frame may cause the swing-away bracket to pull away from the upright support. This may cause the transmitter coil to bounce from vibration while in operation.

Tightly secure or remove any loose metal in the vicinity of the coils; such as floor plates, broken or unused brackets, etc. Movement of any metal around the coils will appear to be “TRAMP” metal to the detector and will cause false trips. Also, remove any cross bracing in the vicinity of the receiver coil.

Mounting – Main Control Enclosure

After installing the Search Coil Assembly, select a place to mount the Main Control Enclosure for ease of operation. Avoid high vibration areas. Note the length of interconnecting cables and the location of the connectors on the coil. Locate the Control Enclosure on the same side of the conveyor frame as the connectors for ease in routing the cables.

The Enclosure should be positioned so the front panel hinge is on the left side and the indicators are on top.

Fabricate and install a sun/rain shade for added protection over the Enclosure if it is mounted outdoors. Do not obstruct the natural airflow around the Enclosure.

Familiarize yourself with the type of electrical connections required for this installation and any safety precautions before proceeding. Please refer to Appendix A, Control Connection Diagram for information about connections and color code hook-up.

Use an electrician's conduit punch or drill to make either 1/2" or 3/4" conduit entries on the bottom of the Enclosure. The Control Connection Diagram shows where to position each entry. Remember to remove all metal shavings when you are finished. Use caution to not damage the electronics and to ensure that no metal particles enter the electronics. Do not run metal conduit along the sides or near the Search Coil Assembly.

Transmitter and receiver cables should be routed in conduit. **Do not run any power wiring in the same conduit or near the transmitter and receiver cables.**

All line voltage connections terminate at TB2. Install line voltage cables between devices controlled by the Detector including diverters, auxiliary relays, marking devices, alarm horns or motor control equipment and TB2 in the Main Control Enclosure. The direct or timed outputs should not be connected to a Programmable Logic Controller (PLC) or other low voltage computer interface equipment that may require dry contact closures. The direct and timed output contacts are typically programmed as normally “OFF” at the Factory. They may be set to normally “ON” if required. Refer to the System Programming Section for details.

Connect a 115/220 VAC (50/60 Hz), single phase power line with at least 10 amp capacity to TB2. Make sure to connect an electrical ground to terminal #3. The power should be the “cleanest” available and free of significant voltage variations or spikes. Do not connect the Detector to a line which is used for operation of motors or motor controls. Proceed with the Start-Up & Calibration Section before applying power.

CAUTION

The Interface Module is preset at the Factory for 115 or 220 volt (±10%), 50/60 Hz, single phase operation. If the voltage source is different, contact the Factory for instructions to select the proper voltage source.

Swing-Away Switch

(if applicable)

The Swing-Away Cutout Switch (Optional) Figure 8 is a pre-wired switch in a NEMA 4 housing mounted on the swing-away bracket. Its purpose is to prevent the Metal Detector from tripping when the transmitter coil is hit by an overburden of material. Route the free end of this cable in the same conduit as the transmitter cable to the Main Control Enclosure. Refer to Appendix A Control Connection Diagram for hookup.

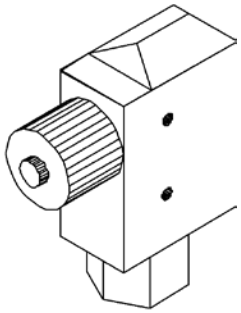


FIGURE 8
Swing-Away Switch In NEMA 4 Housing

Clip Detector

(if applicable)

Install the clip detector unit as follows:

Refer to Control Connection Diagram (Appendix A) and Figure 9 for positioning. If there are idlers adjacent to the search coils, position the Clip Detector Sensor approximately 2" upstream of the nearest upstream idler before the Search Coil Assembly. For slider bed type conveyors, position the Clip Detector Sensor approximately (but no closer than) 2' from the center line of the receiver coil on the upstream side of the Search Coil Assembly. The flat face of the Clip Detector should be facing toward the belt with approximately 1-1/2" to 1" of clearance. **This clearance must be maintained in order to assure proper operation.** The Clip Detector should be a few inches from the edge of the belt. Do not mount the Sensor too far from the edge, as tramp metal lying close to the belt may trigger the sensor and pass through the search coils as a repair splice.

With the Clip Detector Sensor in the proper position below the belt, weld the 3/4" support pipe (provided) to the conveyor frame. The pipe may be cut to the proper size for an easier fit. The multi-axis swivel joint will provide adequate movement for proper adjustment.

It is recommended that the Clip Detector cable running to the Main Control Enclosure be installed in conduit. The same conduit that houses the transmitter coil cable may be used.

Feed the Clip Detector cable into the conduit from the Clip Detector end to the Main Control Enclosure.

Cut off excess cable. Connect wires to terminal block (TB1) using the supplied spade lugs. Refer to the Control Connection Diagram for color code hook-up. Be certain all wires are attached securely and connected to their proper terminals.

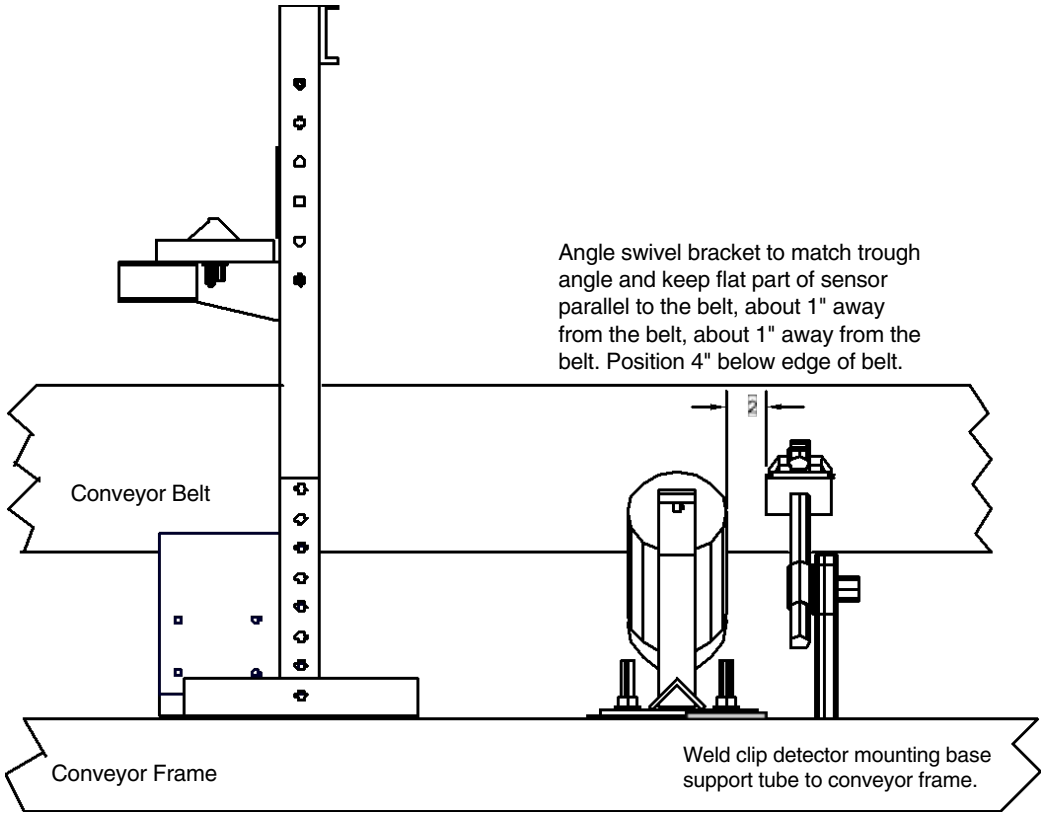


FIGURE 9

When metal repair clips are used, two or more clips close together must pass directly over the Clip Detector Sensor in order to activate it. If a small patch of clips is used on the belt, which would not pass directly over the Clip Detector, reference clips are required, refer to Figure 10. Reference clips are made by installing two or more clips which will pass directly over the Clip Detector to activate it when a small patch passes by. Numerous repair and reference clips on the belt will degrade the Detector's performance because it will frequently be in a desensitized mode. The Clip Delay time must be increased to allow the entire repaired area to pass the first downstream idler roller. If maximum clip time is not enough to allow the repaired area to pass the down stream idler then additional reference clips must be installed to retrigger the clip circuitry prior to the end of the first clip time cycle. For long repairs it better to have more reference clips closer together and shorter clip delay times, this will reduce the length of time the detector is in clip mode for normal splice and for shorter repaired areas. Refer to Clip Detector Time Delay section and Figure 16 Programming Controls and Test Point Locations.

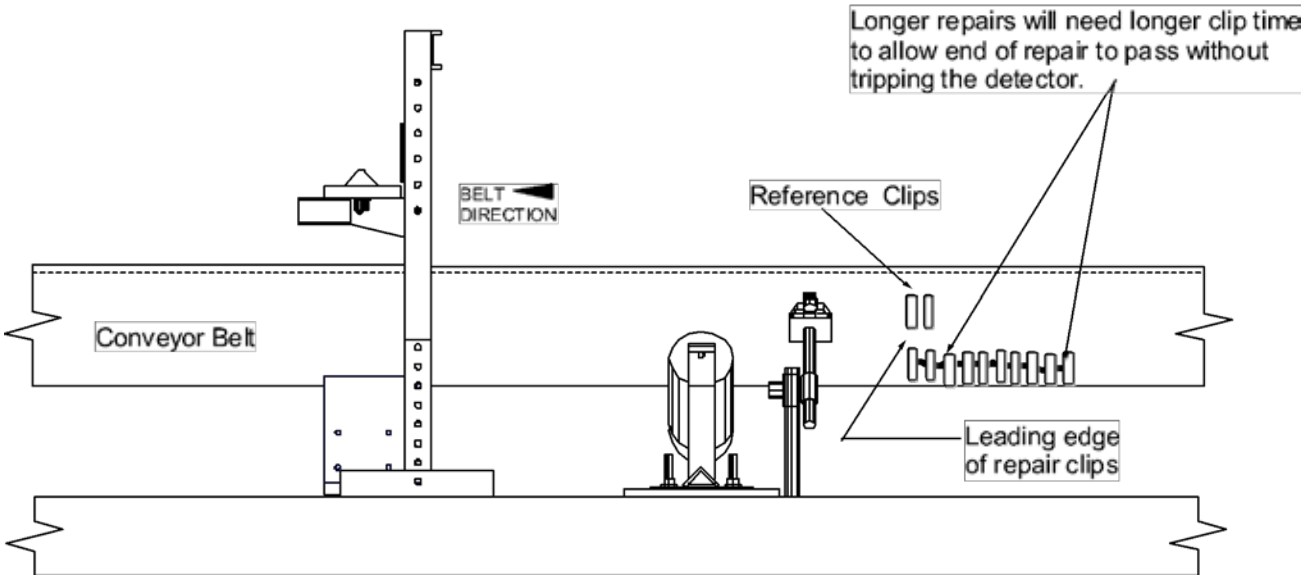


FIGURE 10

Spray Marking Device

(if applicable)

The Marking Device is a pressurized, solenoid activated liquid spray system which pinpoints the location of tramp metal to eliminate costly search and down time. The parts included with the spray making system are depicted in Figure 11. Colorant is available in a variety of color, white is supplied. Contact the factory for colors and pricing.

Specifications

Tank Pressure Rating: 50 psig (maximum working pressure)
Tank Capacity: 2.5 Gallons (liquid)
Operational Voltage: 115/220 VAC (50/60 Hz), 15 Watts
Air: Plant air or any source of 100 to 200 psig inert gas

Installation Instructions

Refer to the Frame Assembly Drawing for mounting of the Marking Device on the conveyor belt Figure 14.

Position the solenoid support upright and cross arm as shown. Distance from the coils should be 3' to 6'. Clamp in place temporarily.

Adjust the support bracket of the solenoid spray valve so that the nozzle is pointed directly on the center of the conveyor belt. The nozzle may be positioned as shown or on the opposite side of the arm. Bolt the bottom of the support frame to the conveyor frame.

The solenoid control cable is connected to the Interface Module Timed Output (Terminal TB2, Pins 4 & 5) Refer to Appendix A Control Connection Diagrams Figure A6.

Connect the hose between the tank outlet and the solenoid valve.

Connect the facility air source to the tank regulator inlet. Be sure the facility air source is shut off and no pressure is in the tank.

Remove the top of the spray tank.

The spray solution is supplied by the User. The recommended mixture is five (5) fluid ounces of colorant, Chrome Yellow (or other contrasting color) manufactured by Tenneco Chemical (or equivalent) mixed with a two (2) gallon solution of water and antifreeze appropriate for local climate conditions (minimum of 25% antifreeze). Antifreeze needs to be added even in areas where there is no chance of freezing. The antifreeze solution keeps the colorant from being absorbed into the material it was sprayed on so the marked area stays visible. **DO NOT USE PAINT. Paint will clog the spray valve.**

Mix the solution and pour it into the holding tank. Replace the cap.

Verify that the pressure regulator valve is closed prior to turning on the facility air.

Apply the facility air and adjust the pressure regulator between 60 and 100 psig, as noted on the pressure gauge on top of the holding tank.

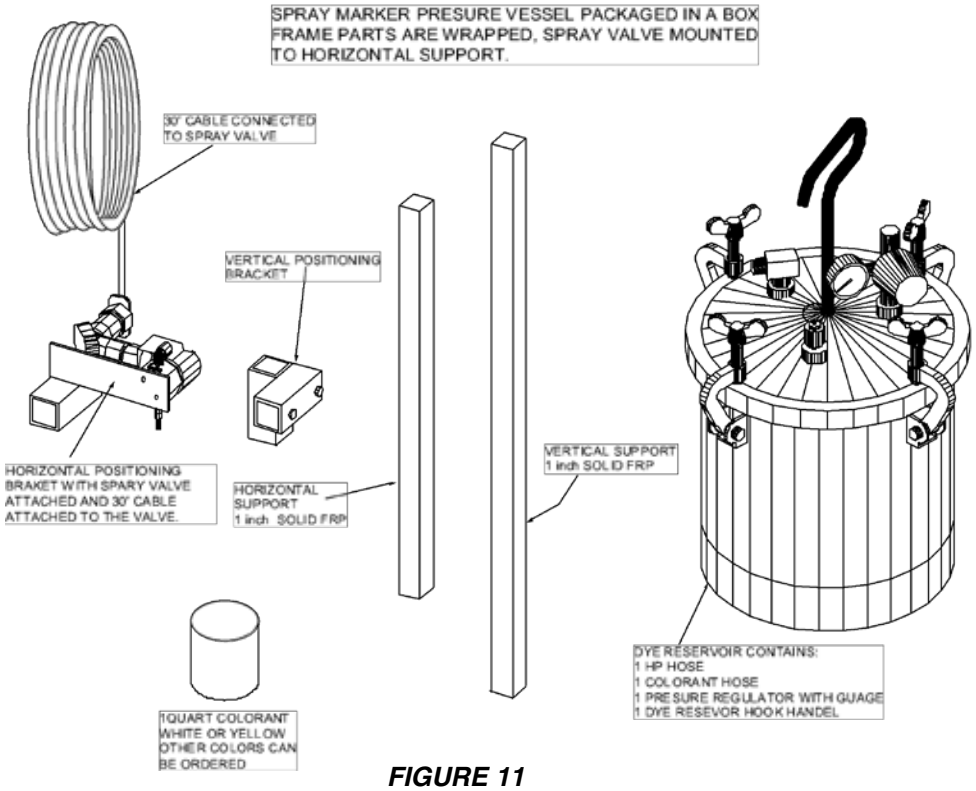


FIGURE 11

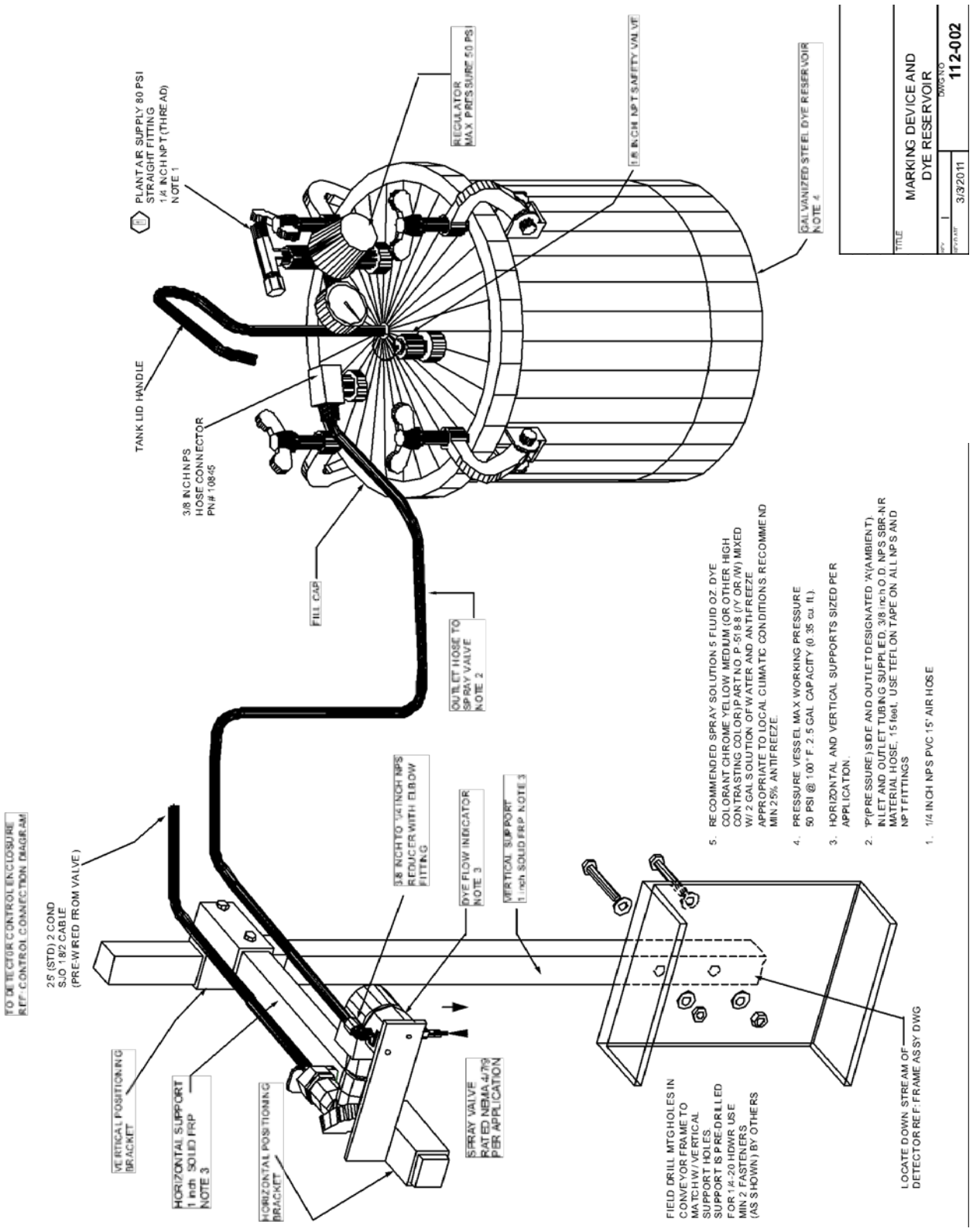

PLANT AIR SUPPLY 80 PSI
STRAIGHT FITTING
1/4 INCH NPT (THREAD)
NOTE 1
REGULATOR
MAX PRES SURE 50 PSI
1/4 INCH NPT SAFETY VALVE
GALVANIZED STEEL DYE RESERVOIR
NOTE 4
TANK LID HANDLE
3/8 INCH NPS
HOSE CONNECTOR
PN# 10845
FILL CAP
OUTLET HOSE TO
SPRAY VALVE
NOTE 2
TO DETECTOR CONTROL ENCLOSURE
REF: CONTROL CONNECTION DIAGRAM
25' (STD) 2 COND
SJO 18/2 CABLE
(PRE-WIRED FROM VALVE)
3/8 INCH TO 1/4 INCH NPS
REDUCER WITH ELBOW
FITTING
DYE FLOW INDICATOR
NOTE 3
VERTICAL SUPPORT
1 inch SOLID FRP NOTE 3
VERTICAL POSITIONING
BRACKET
HORIZONTAL SUPPORT
1 inch SOLID FRP
NOTE 3
HORIZONTAL POSITIONING
BRACKET
SPRAY VALVE
RATED NEMA 4/7/9
PER APPLICATION
FIELD DRILL MTG HOLES IN
CONVEYOR FRAME TO
MATCH W/ VERTICAL
SUPPORT HOLES.
SUPPORT IS PRE-DRILLED
FOR 1/4-20 HDWR USE
MIN 2 FASTENERS
(AS SHOWN) BY OTHERS
LOCATE DOWN STREAM OF
DETECTOR REF: FRAME ASSY DWG
5. RECOMMENDED SPRAY SOLUTION 5 FLUID OZ. DYE
COLORANT CHROME YELLOW MEDIUM (OR OTHER HIGH
CONTRASTING COLOR) PART NO. P-5188 (Y OR /W) MIXED
W/ 2 GAL SOLUTION OF WATER AND ANTIFREEZE
APPROPRIATE TO LOCAL CLIMATIC CONDITIONS. RECOMMEND
MIN 25% ANTIFREEZE.
4. PRESSURE VESSEL MAX WORKING PRESSURE
50 PSI @ 100° F. 2.5 GAL CAPACITY (0.35 cu ft).
3. HORIZONTAL AND VERTICAL SUPPORTS SIZED PER
APPLICATION.
2. "P" (PRESSURE) SIDE AND OUTLET DESIGNATED "A" (AMBIENT).
INLET AND OUTLET TUBING SUPPLIED, 3/8 inch O.D. NPS SBR-NR
MATERIAL HOSE, 15 feet. USE TEFLON TAPE ON ALL NPS AND
NPT FITTINGS
1. 1/4 INCH NPS PVC 15' AIR HOSE
TITLE
MARKING DEVICE AND
DYE RESERVOIR
DWG NO
112-002
3/3/2011

FIGURE 12

Calibration of Spray Marking Device

The initial delay time that is set can be calculated using the belt speed and the distance between the center of the receiver antenna and the spray nozzle or use a stop watch to time a mark on the belt as it moves from the center of the receiver antenna to the spray nozzle. This is the Delay Before ON time. Set the ON Time to 1 second. It is easier to adjust the timing of the spray marker with an empty belt. Use a sample piece of tramp metal large enough to trigger the detector. With the belt up to full speed place the tramp metal on the belt far enough before the metal detector antennas that the metal has come to rest on the belt and is not moving relative to the belt. What should happen is when the piece of metal reaches the spray area the first time is the spray will be just after the piece of metal if it is shorten the Delay Time a few 10th of a second and try it again. The metal should be centered in the in the marked area. Once the metal is centered repeat the procedure with a full belt to see if the metal is still in the marked area. If not adjust the timing so the metal is centered in the marked area.

Refer to Sections Delay Before Alarm and Time Alarm On to set the desired timing for marking a predetermined location.

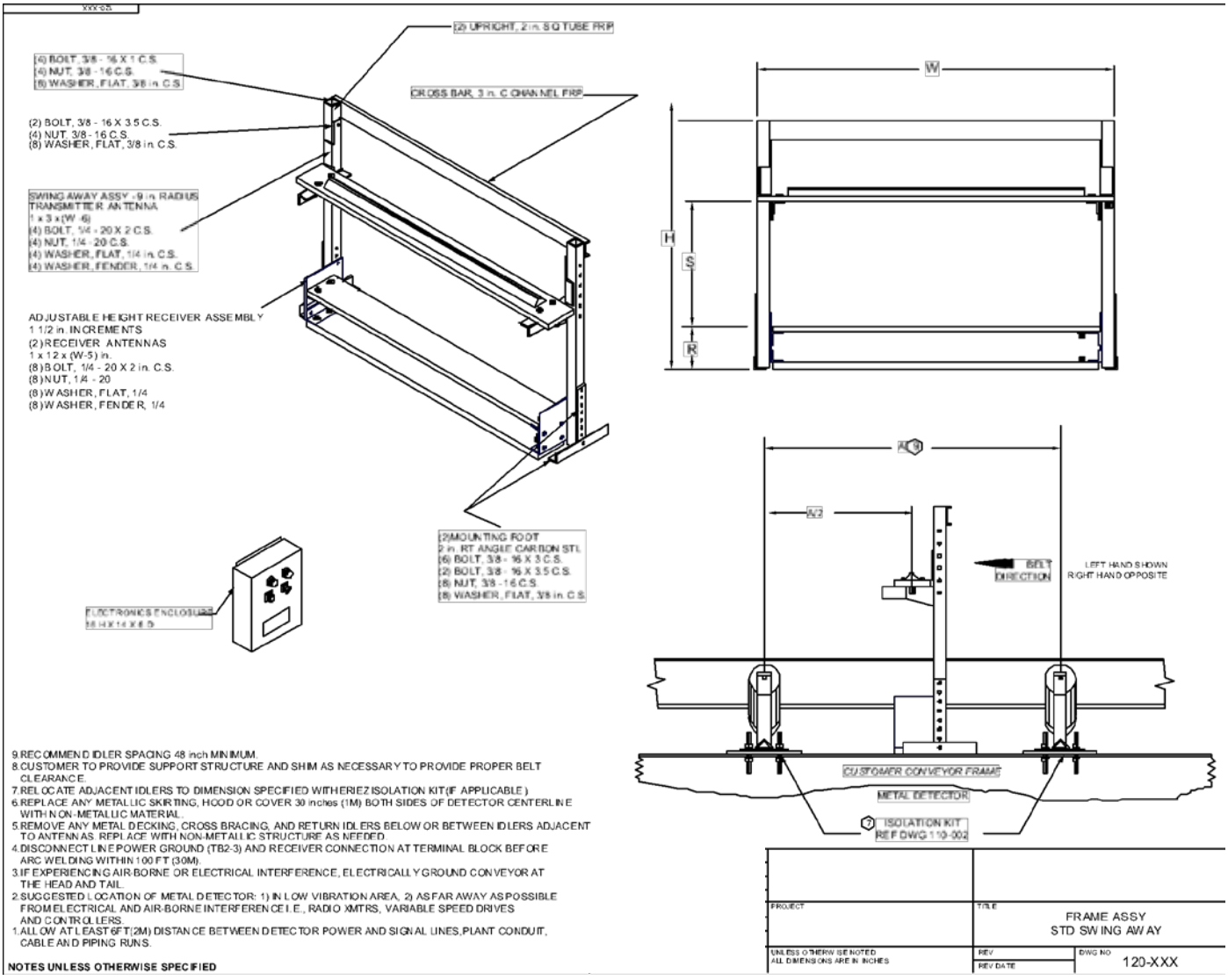


FIGURE 13

Flag Drop Marker

(if applicable)
The Flag Drop Marker is device which drops a tag or flag onto the belt which pinpoints the location of tramp metal to eliminate costly search and down time.

Specifications
Plastic NEMA 4X box which holds the electronics and flag
One set of 3 flags
Operational Voltage: 115/220 VAC (50/60 Hz), 15 Watts

Installation Instructions
Refer to the Figures 14 for assembly and mounting and Figure 15 for positioning of the Flag Marking Device on the conveyor belt.

Attach the upright support to the upright. Position the frame upright in front of the first down stream idler roller. Lay the upright support on the top of the C channel and adjust the upright so that it is straight up and down. Clamp in place now drill the a hole in the side of the C channel to secure the bottom of the upright and drill a couple of holes through the upright support and top of C channel and secure the support to the conveyor C channel.

Attach the frame cross bar with gusset to the upright.

Mount the NEMA box to the cross bar. Position the box on the cross bar so that the flag will drop on the product where the edge of the product touches the belt, (if the product comes to the edge of the belt then position the box so the flag is far enough in so that the flag does not fall off of the belt).

Route the power cord across the cross bar and down the upright, secure cord with ty-raps. Make connections to the Metal Detector electronics Ref Appendix A Figure A12.

Calibration of Flag Drop Marker
Refer to Sections Delay Before Alarm and Time Alarm On to set the desired timing for marking a predetermined location.

The initial delay time that is set can be calculated using the belt speed and the distance between the center of the receiver antenna and the flag drop marker flag or use a stop watch to time a mark on the belt as it moves from the center of the receiver antenna to the flag drop maker flag. This is the Delay Before ON time. The ON Time is preset at the factory to about 1/2 second. It is easier to adjust the timing of the flag marker with an empty belt. Use a sample piece of tramp metal large enough to trigger the detector. With the belt up to full speed place the tramp metal on the belt far enough before the metal detector antennas that the metal has come to rest on the belt and is not moving relative to the belt. What should happen is when the piece of metal reaches the flag drop area the first time is the flag will be just after the piece of metal if it is shorten the Delay Time a few 10th of a second and try it again. The flag should drop and hit the metal. The delay time for the flag will vary depending on the distance it has to fall. On an empty belt the flag will have to travel farther before it hits the metal than on a full belt. Because of the distance the flag has to travel between an empty belt and a full belt will cause the flag to be either in front of the metal or behind the metal. So when looking for metal look about 12" on either side of the flag if the metal is not visible and is buried in the product.

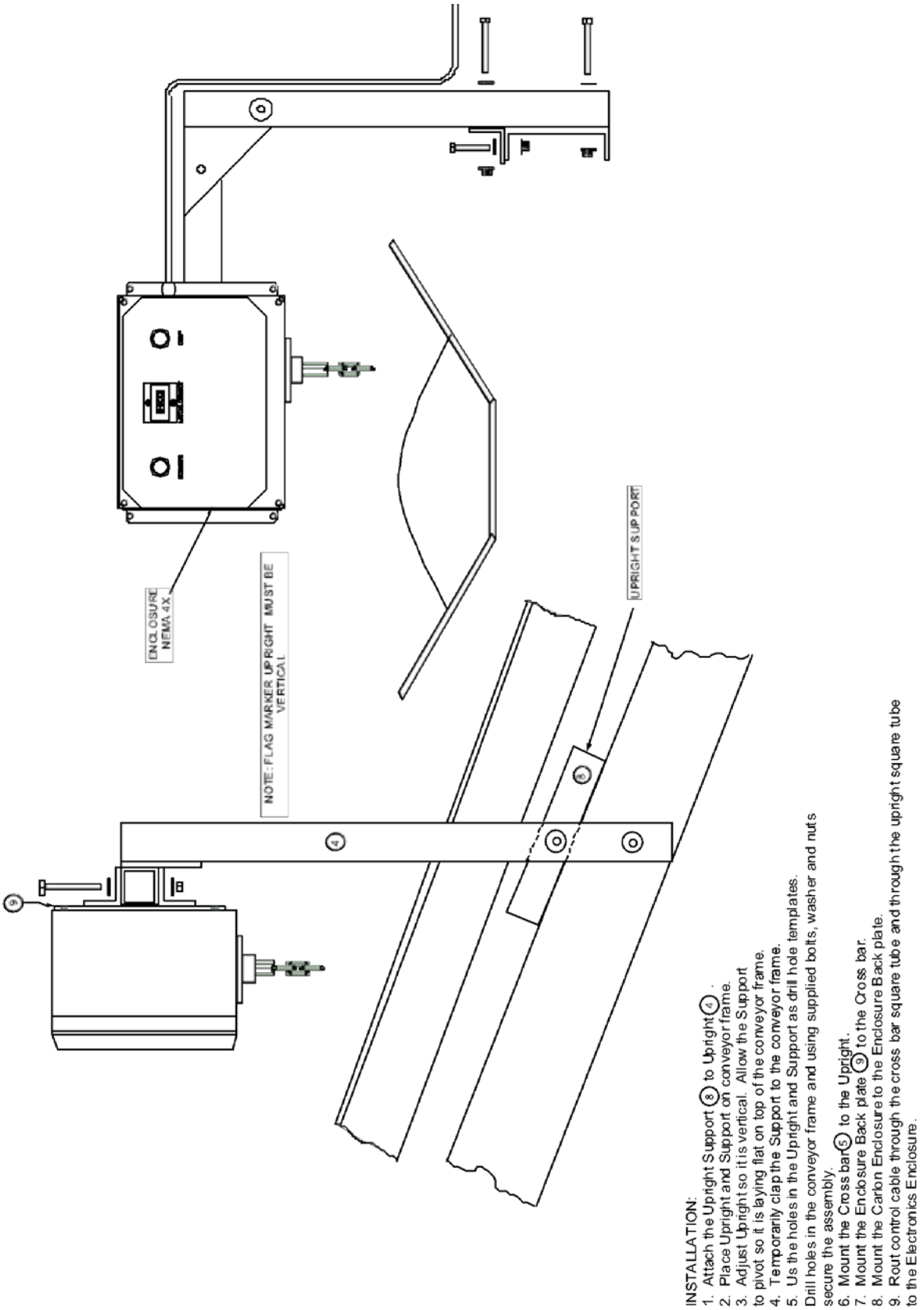


FIGURE 14
Mounting of the Flag Drop Marker

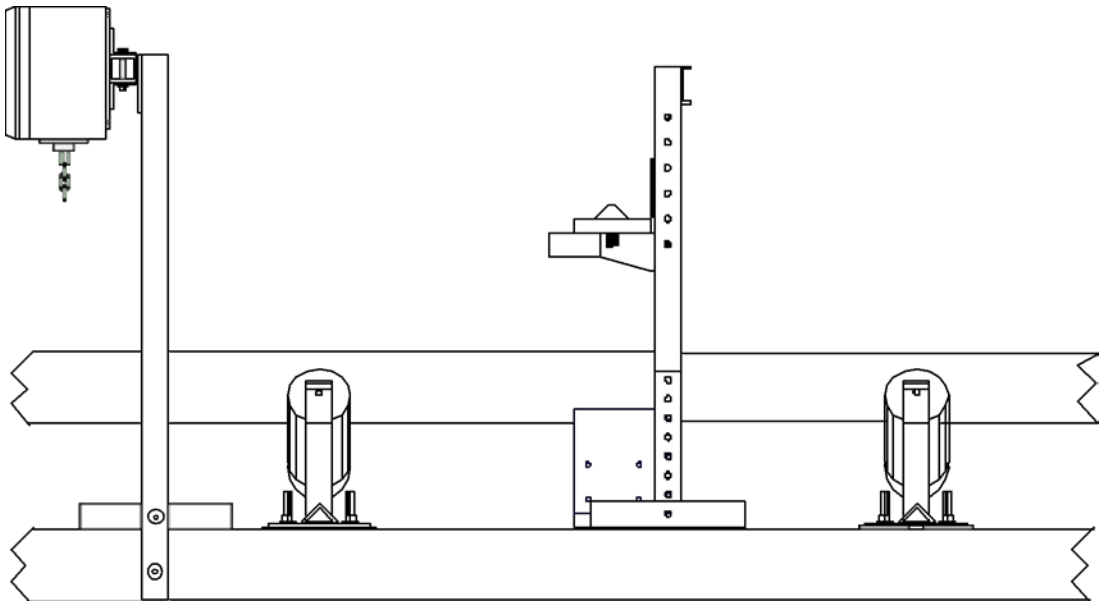


FIGURE 15
Positioning the Flag Marker

Start-up & Calibration

Start-up

Before turning on the system, locate the switches and lights on the door panel and the controls inside the cabinet.

The power switch is located on the lower left-hand corner of the door panel. Place it on the “ON” position. The green “ON” indicator should light at this time.

If the green “ON” does not come on, return the power switch to the “OFF” position and inspect the light bulb and fuses; also check the power and wiring for proper connections.

Approximately 5 seconds after power “ON”, the No. 1 status indicator (power supply) located on the front panel of the Electronic Module will light (reference Figure 2). This indicates that the power supply is fully operational and all the electronics are enabled.

If the power supply L.E.D. status indicator or the “ON” indicator does not light, refer to Troubleshooting Flow Diagram #1 for instructions. Until the power supply L.E.D. is lit, calibration of the unit cannot begin.

Main Detector Unit – Metal Sensitivity Calibration

Before proceeding with the calibration procedure, obtain four samples of tramp metal as listed below. These samples will be used in the calibration and should represent the type of tramp metal most likely expected to be found in the conveyed material.

1. Tramp metal sample smaller than oversize piece to be detected.
2. Tramp metal sample equal to the oversize piece to be detected.
3. Rod correct diameter but shorter than length to be detected.
4. Rod correct diameter and equal in length to be detected.

NOTE

During all test and calibration, the test samples must be fully passed through the detection field. In addition, the samples must be traveling at a uniform rate through the area two feet ahead and two feet behind the receiver antenna. This is necessary for the detector to properly analyze and measure the length of the rod.

Before proceeding with the calibration, two points must be checked. The #2 LED must be out all of the time. Second the #7 LED must be off except when belt clips are to be passed. Do not run a test when either of these two LEDs is on.

Rod Diameter Calibration

Unless specified otherwise by the customer, for maximum protection, the rod diameter sensitivity is calibrated to detect the smallest diameter rod practical for the antenna assembly aperture. Remove the Electronic Module cover (Refer to section Removing/Replacing Cover) to expose the circuit board. Refer to Figure 16 Programming Controls and Test Points.

Set the “Oversize Sensitivity” R101 to “0” and “Oversize Gain” to “1”. This sets the oversize to a piece of metal much greater than the actual oversize metal needed, but setting the oversize to maximum will assure the unit trips on the rod diameter and not the oversize signal. Set the Rod Diameter R187 to “5” and Rod Gain to “0”.

With the belt stopped, momentarily place the shorter of the two test rods in the field about half the distance between the top antenna and the belt, then remove. The LED #2 light should light and when the rod is removed it should go out. Turn the Rod Gain down to 9 and repeat the test. Keep turning the Rod Gain down until the #2 light does not light. Turn the Rod Gain back to one higher number. Next turn R187 Rod Diameter from 5 to 6 and repeat the test. Keep increasing the Rod Diameter until the rod does not turn the #2 light on and then move back to the previous number. If the Rod Diameter is turned all the way to 10 and the #2 still turns on then reduce the Rod Gain S4 by one number and then turn the Rod Diameter to a lower number where the #2 light consistently turns on every time the rod is placed in the field.

NOTE

If the metal sample is left in the filed too long the automatic zeroing circuit will begin to cancel the signal out.

Oversize Calibration

Rod Length Calibration

Main Detector Unit – Clip Detector Calibration

(if applicable)
Turn the “Clip Override” control knob fully clockwise to position 10 on the dial. This knob is located on the front panel of the Electronic Module as shown in Figure 2.

Observe the reference clips to see if they are passing within 1" of the Clip Sensor Head when the belt is empty. Adjust the Clip Detector if it is not within this distance making sure that the clips or the belt do not hit the Clip Detector Sensor Head when the belt is fully loaded. If the clip is located properly, the Clip Timer, status indicator No. 7, located on the Electronic Module will light for approximately 1 second each time the clips pass over the Clip Detector Head.

NOTE

If the Clip Detector is spaced more than 1" from the passing clips, erratic performance may occur.

If the Detector is tripping on the clips with a “Clip Override” setting of 10, refer to Clip Gain section.

Gradually turn the clip control knob counterclockwise to a lower setting until the unit trips on the largest set of repair clips on the belt.

Turn the clip control knob clockwise one number higher as a safety factor.

NOTE

This setting should be periodically checked to compensate for shifting of the conveyor belt. Turn the control knob to a “0” setting if the clip detector is not used.

Operation

The Detector may be programmed to operate in a manual or an automatic reset mode; the standard mode of operation is manual reset.

Manual Reset

In the manual reset mode, once the unit has tripped, the Detector’s Direct Output provides a continuous alarm indication to alert the operator of detected metal and/or to stop the belt. To reset the unit, the reset button located on the front panel must be manually depressed.

Automatic Reset

The Detector may be converted to an “Automatic Reset Mode”. In this mode the Detector will momentarily signal when tripped then self-reset according to the placement of the programming switches. For complete programming instructions, refer to Manual/Auto Resets.

Remote Reset

Provisions have been made to externally reset the Detector from a remote location. Wire a normally open set of contacts across the remote reset terminals TB1 pins 1 & 2 located on the Interface Module. Upon closure of the contacts, the unit will reset.

Excessive Electrical Interference

The Metal Detector has a unique circuit that distinguishes electrical noise from a legitimate metal signal. When this circuitry “sees” interference that lasts longer than .1 second or that interferes more than 25% of the time, the Detector will turn off L.E.D. status indicator No. 4 each time the interference occurs. In addition, the incoming “noisy” signals are blocked from downstream circuitry to reduce the chance of any false tripping.

If an excessive amount of electrical interference occurs, the source of the interference must be found and corrected. Excessive interference will reduce the Detector’s sensitivity and may false trigger the system. Such interference problems are usually associated with motor phase to ground shorts, severely arcing brushes on motors, poor ground conditions, etc.

System Programming

General

The Detector provides a wide range of programming capability. The Detector can be individually tailored to the customer's specific requirements; taking into account the type and size of metal to be detected, the type of material being conveyed and the mode and combination of alarm signals required. Refer to Programming Controls Summary for an overview of switch functions Table 6 and Programming Controls & Test Point Locations Figure 16 for component locations.

Removing/Replacing Cover

To program the Electronic Module, the cover must be removed. Remove the control knobs with the 1/16" Allen wrench (provided). Unscrew the six screws securing the cover with the 5/64" Allen wrench (provided).

When replacing the cover, it is essential to re-index the control knobs. Before tightening the set screw, line it up with the flat of the shaft. The knob, when properly indexed, will indicate 10 in a full clockwise position and 0 in a full counterclockwise position.

Metal Gain

When a piece of tramp metal passes over the search coils, a change in the received signal occurs. This change is extremely small and must be amplified to produce a suitable signal to trigger the relay driver circuitry.

The amount of gain required in the receiver circuitry depends on the following factors:

- Coil Length
- Coil Aperture
- Belt Speed
- Type of Metal to be Detected
- Size, Shape and Orientation of the Metal to the Search Coil

The internal gain of the Detector is adjusted by a rotary switch, S4, located inside the Electronic Module (refer to Figure 13 Programming and Test Point Locations). Each step in gain represents an increase over the last step. Ideally, the gain is adjusted to pick up the desired piece of tramp metal with the "Metal Sensitivity" control knob located on the outside of the Electronic Module set to 5.

If the gain must be changed, use a sample of tramp metal the same size as the piece to be detected and follow the procedures listed below:

Remove the control knobs and cover of the Electronic Module as indicated in Section Removing/Replacing Cover.

Set the "Metal Sensitivity": control knob (R56) to its rotational midpoint (if the cover was not removed, the "Metal Sensitivity" would be 5)

Check that the clip timer, status indicator No. 7, is not lit during any portion of this test. If the clip timer is lit, the data will be incorrect.

Pass the sample piece of tramp metal completely through the coils at a height midway between the transmitter and receiver coils and at a speed near that of the conveyed material under normal operating conditions. Increase or decrease the gain of the system with the rotary switch as needed until the Detector will trip just as the sample metal is passed between the coils. The larger numbers on the gain setting switch correlate to a higher gain, the lowest gain being 1 and the highest 0 (representing 10). If the unit never trips, refer to Troubleshooting Flow Diagram #1.

If all other functions are properly programmed, replace the cover and knobs. Re-index the control knobs as indicated in Section Removing/Replacing Cover.

Recalibrate the "Metal Sensitivity" control knob as instructed in Section Main Detector Unit – Metal Sensitivity Calibration.

Clip Gain

When belt repair clips are used on a conveyor belt, the repair clips represent a stronger metal signal than the tramp metal. In this situation, it is necessary to reduce the gain of the system to allow the clips to pass. Rotary Switch S5, shown in Figure 15, establishes the gain whenever the clip detector circuit is energized. In the event that Switch S5 is set higher than S4, the system will choose the smaller gain setting of the two for the clip gain.

For calibration of the clip gain, follow these steps:

Run the belt at normal running speed and maximum belt load.

Verify that the clip timer, status indicator No. 7, lights each time a clip passes the sensor head. If it does not, adjust the clip sensor head as described in Section Clip Detector.

Record the settings for the "Metal Sensitivity" control knob and the Clip Override control knob. Adjust the "Clip Override" control knob, shown in Figure 2, to a setting of 5.

Remove the cover as described in Section Removing/Replacing Cover without changing the setting on the "Clip Override" control knob.

Adjust the Clip Gain, Switch S5 shown in Figure 15, to the highest gain that does not trip the Detector when the clips pass. If the unit continues tripping even at the minimum clip gain of 1, the desensitized length of the belt may be too short. In other words, the system is switched back to full sensitivity before the clips are completely out of the Detector's field. To correct, increase the clip detector time delay as described in Section Clip Detector Time Delay.

If all other functions are properly programmed, replace the cover as described in Section Removing/Replacing Cover. Return the controls to recorded settings.

Calibrate the "Clip Override" as described in Section Main Detector Unit – Clip Detector Calibration.

Clip Detector Time Delay

If the clip detector is used, the length of belt desensitized to permit the clips to pass can be adjusted by properly programming the clip detector time delay switches S1-5, 6, 7. The locations of these switches are shown in Figure 13. The range of delay times is from .10 seconds to 1.91 seconds as tabulated in Table 1. These switches are set at the factory according to available information but further fine tuning can be done on site as needed. As long as the Detector is desensitized, the status indicator No. 7, will remain lit. No. 7 light should turn on just before the upstream idler roller and turn of just after the first downstream idler roller after the metal detector antennas assembly. Keep clip time to a minimum.

Position			Time
5	6	7	sec + - 20%
C	C	C	.28
O	C	C	.56
C	O	C	.77
O	O	C	1.06
C	C	O	1.33
O	C	O	1.61
C	O	O	1.82
O	O	O	2.10

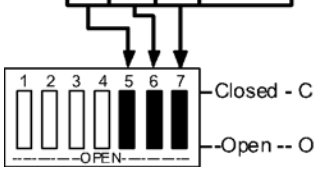


TABLE 1
Clip Time Delay (Switch S1)

Delay Before Alarm

The timed output alarm can be accurately programmed with a time delay before turn on. This allows the conveyed material to travel for a programmed period before the timed output alarm signal is energized. Typically this feature is used in conjunction with a marking device or diverter gate to delay the system until the detected tramp metal has reached the auxiliary equipment. Switches S2-1 through S2-5 control this time delay from .01 to 22.0 seconds. Refer to Table 2 for tabulation of the delay time versus switch settings and Figure 15 for the switch locations.

Time Alarm On

The timed output can be accurately programmed to remain energized for a timed period once it is switched on. This feature can activate a diverter gate, sound an alarm for a given period, command a marking device to spray a given length of the belt, etc. Switches S3-1 through S3-5 control this time delay from .01 to 22.0 seconds. Refer to Table 2 for a tabulation of the delay time versus switch settings and Figure 15 for the switch locations.

Standard or Fail – Safe Output Operation

As standard, the alarm outputs of the Detector will energize when tramp metal is detected. In this mode, the solid state relay is programmed to operate in a Normally "OFF" condition. The outputs will not energize until metal is detected.

Provisions have been made to program the Detector to operate in a fail-safe mode. In this mode, the outputs of the Detector are always energized and de-energize when tramp metal is detected or when power to the Detector is turned off. In the fail-safe mode, the solid state relay is programmed to operate in a Normally "ON" condition.

Both outputs can be independently programmed. The direct output (status indicator No. 9) and timed output (status indicator No. 8) will monitor the alarm's output condition. If the status indicator is lit, its associated output is energized. Switch S2-6 controls the direct output and S3-6, the timed output as shown in Table 3. To operate the solid state relay condition in a Normally "OFF" condition, open the appropriate switch. Conversely, to operate the relay in a Normally "ON" condition, close the switch.

Position					Time
1	2	3	4	5	sec + - 20%
C	C	C	C	O	.01
O	C	C	C	O	.14
C	O	C	C	O	.30
O	O	C	C	O	.44
C	C	O	C	O	.52
O	C	O	C	O	.65
C	O	O	C	O	.81
O	O	O	C	O	.94
C	C	C	O	O	1.10
O	C	C	O	O	1.20
C	O	C	O	O	1.40
O	O	C	O	O	1.50
C	C	O	O	O	1.60
O	C	O	O	O	1.70
C	O	O	O	O	1.90
O	O	O	O	O	2.00
C	C	C	C	C	.14
O	C	C	C	C	1.60
C	O	C	C	C	3.30
O	O	C	C	C	4.90
C	C	O	C	C	5.70
O	C	O	C	C	7.10
C	O	O	C	C	8.90
O	O	O	C	C	10.00
C	C	C	O	C	12.00
O	C	C	O	C	13.00
C	O	C	O	C	15.00
O	O	C	O	C	16.00
C	C	O	O	C	17.00
O	C	O	O	C	19.00
C	O	O	O	C	21.00
O	O	O	O	C	22.00

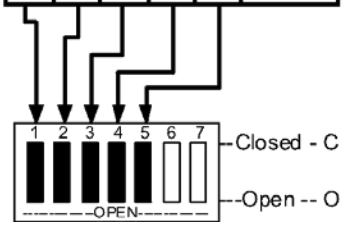


TABLE 2
S2 - Delay Before Alarm
S3 - Time Alarm On

Position	Contact Mode
6	
C	Normally ON
O	Normally OFF

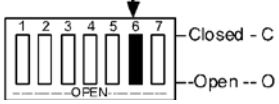


TABLE 3
Timed Output Reset
(Switch S2 & S3)

Manual/Auto Resets

Manual Reset

In the manual reset mode, once the unit has tripped, the Detector's Direct Output provides a continuous alarm indication to alert the operator of detected metal and/or to stop the belt. To reset the unit, the reset button located on the front panel must be manually depressed.

Automatic Reset

The Detector may be converted to an “Automatic Reset Mode”. In this mode, the Detector will momentarily signal when tripped then self-reset.

The direct output can be programmed to automatically reset by shorting the remote reset terminals TB1 pins 1 & 2, located on the front of the Interface Module. To “short”, install a jumper from pin 1 to pin 2, Appendix A Figure A17. Open Switch S2-7, Figure 15.

The operating mode of the timed output is governed by the position of Switch S3-7 as shown in Table 4. With the switch in the open position, the timed output operates in the Automatic Reset Mode. When the switch is closed, the timed output will follow the mode programmed on the direct output.

Position	Mode
7	
C	Manual Reset
O	Automatic Reset

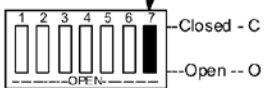


TABLE 4
Timed Output Reset (Switch S3)

Reset Override

If required, the Detector can be programmed so the system is disabled during the reset period. This means the Detector is prevented from tripping as long as a reset signal is provided, either manually on the front panel or remotely through a set of external contacts.

With S2-7 in the open position, the reset signal does not disable the Detector. Closing S2-7 will program the Detector so it is disabled while a reset signal is applied. Refer to Table 5.

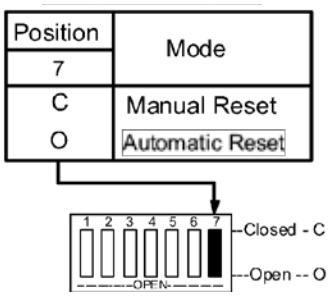


TABLE 5
Timed Output Reset (Switch S2)

Sampling

The Detector Sampling Mode is set at the factory to make the Detector sensitivity selective between various materials as required for each particular application. **Switches S1-1 through S1-4 inclusive are preset and are not to be adjusted by the user.**

Fine Frequency Setting

The Detector is calibrated to operate at an optimally selected transmitting frequency when using a 50 or 60 Hz line frequency. This frequency can be fine-tuned over a 5% range by adjusting potentiometer R7, shown in Figure 16. However, this is not usually necessary as all units are calibrated at the factory prior to shipment.

The operating frequency of the Detector can best be measured at the zero gate test point “Z”, shown in Figure 16. The signal switches between 0V and +15V as referenced to 0V of the system (Test Point 0V). If viewed on an oscilloscope, this signal would be high one pulse width and low for seven.

Programming Controls Summary

Control	Position	Function	Comment
S1	1	Sampling Mode	Allows the detector to detect metal and ignore conveyed product. Factory preset. **DO NOT ADJUST.**
	2		
	3		
	4		
	5	Clip Time Delay	Selects the length of time the detector remains desensitized for the clips. Refer to Table 1.
	6		
	7		
S2	1	Delay Before Alarm	Controls timed output. Selects the time from when metal is detected until timed output is energized. Refer to Table 2 for position settings and times.
	2		
	3		
	4		
	5		
	6	Direct Output Normal On/Off Select	Sets direct output contacts as normally “ON” or “OFF”. Refer to Table 3 for settings. Be aware of downstream circuit effect before operating this switch.
	7	Belt Reset Override	Used to disable metal detection as reset signal is applied. Refer to Table 5 for settings and times.
S3	1	Time Alarm On	Controls timed output. Selects how long the output remains energized. Refer to Table 2 for position settings and times.
	2		
	3		
	4		
	5		
	6	Timed Output Normally On/Off Select	Sets timed output contacts as normally “ON” or “OFF”. Refer to Table 3 for settings. Be aware of downstream circuit effect before operating this switch.
	7	Timed Output Reset Mode	Determines if timed output will reset manually or automatically. Refer to Table 4 for settings.
S4		Rod Gain	Course gain adjustment for rods, without repair clips in sensing zone. “1” least gain; “0” most gain.
R187		Rod Diameter	Rod sensitivity “0” for smaller and “10” for larger metal.
S5		Oversize Gain	Course gain adjustment for oversize metal, “1” least gain; “0” most gain.
R101		Oversize Metal	Oversize sensitivity, “0” for smaller and “10” for larger metal.
R167		Rod Length	Sets length of rod the detector will trip on.
R90		Clip Override	Attenuates (reduces) metal sensitivity to allow repair clips to pass through detector. “10” most attenuation, “1” least attenuation.
R7		Fine Frequency Adjust	Permits fine adjustment of Detector’s operating frequency.

TABLE 6
Programming Controls Summary

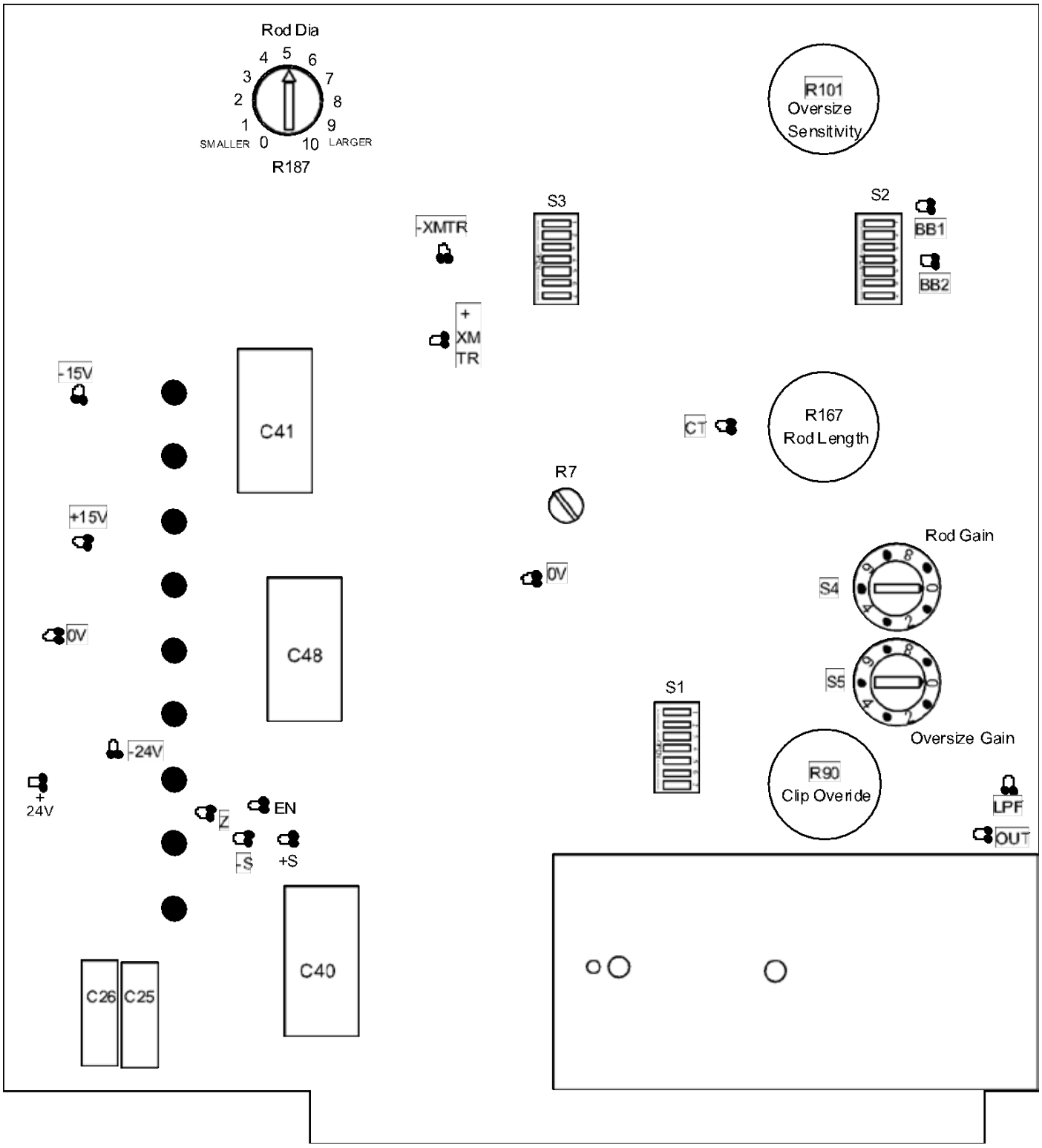

Rod Dia
4 5 6
3 7
2 8
1 9
SMALLER 0 10 LARGER
R187
R101
Oversize
Sensitivity
S3
S2
-XMTR
BB1
BB2
+
XM
TR
-15V
C41
CT
R167
Rod Length
R7
+15V
0V
Rod Gain
S4
0V
C48
S5
S1
Oversize Gain
-24V
R90
Clip Overide
LPF
+
24V
Z
EN
OUT
-S
+S
C40
C26
C25

FIGURE 16

Troubleshooting

Status Indicators

In order to facilitate troubleshooting of the Detector, a number of self-test circuits have been designed to monitor the condition of the detection circuitry. The results of these test circuits are visible to the operator through L.E.D.'s on the front panel of the Electronic Module (refer to Figure 2). These L.E.D.'s are referred to as Status Indicators. For a description of all L.E.D. monitors and their normal operating condition, refer to the Status Indicator Summary (Table 7) on the following page.

Troubleshooting Flow Diagrams

NOTE

Before working with Troubleshooting Diagrams, check all terminals, connectors and cables for open circuits and correct as required.

To aid in troubleshooting the Detector, two easy to follow, step-by-step, flow diagrams were designed. Troubleshooting Flow Diagram #1 deals with insufficient metal sensitivity. This diagram is used if the unit detects metal, but is not sensitive enough for the required application or if the Detector does not respond to metal at all.

Refer to Troubleshooting Flow Diagram #2, if the unit continually false trips (triggers with no metal in the field).

Electronic Module Troubleshooting

In the event that the unit does not operate and the trouble has been traced to the Electronic Module, the equipment may be sent back to the factory for repair. If the plant can not operate with out a metal detector for the time it takes to repair the equipment then a replacement module may be obtained, either purchase of a new module or a refurbished exchange module, in either case the module can be shipped overnight, minimizing down time.

Maintenance Kit

Prior to shipment, a maintenance kit is packed in the Main Control Enclosure.

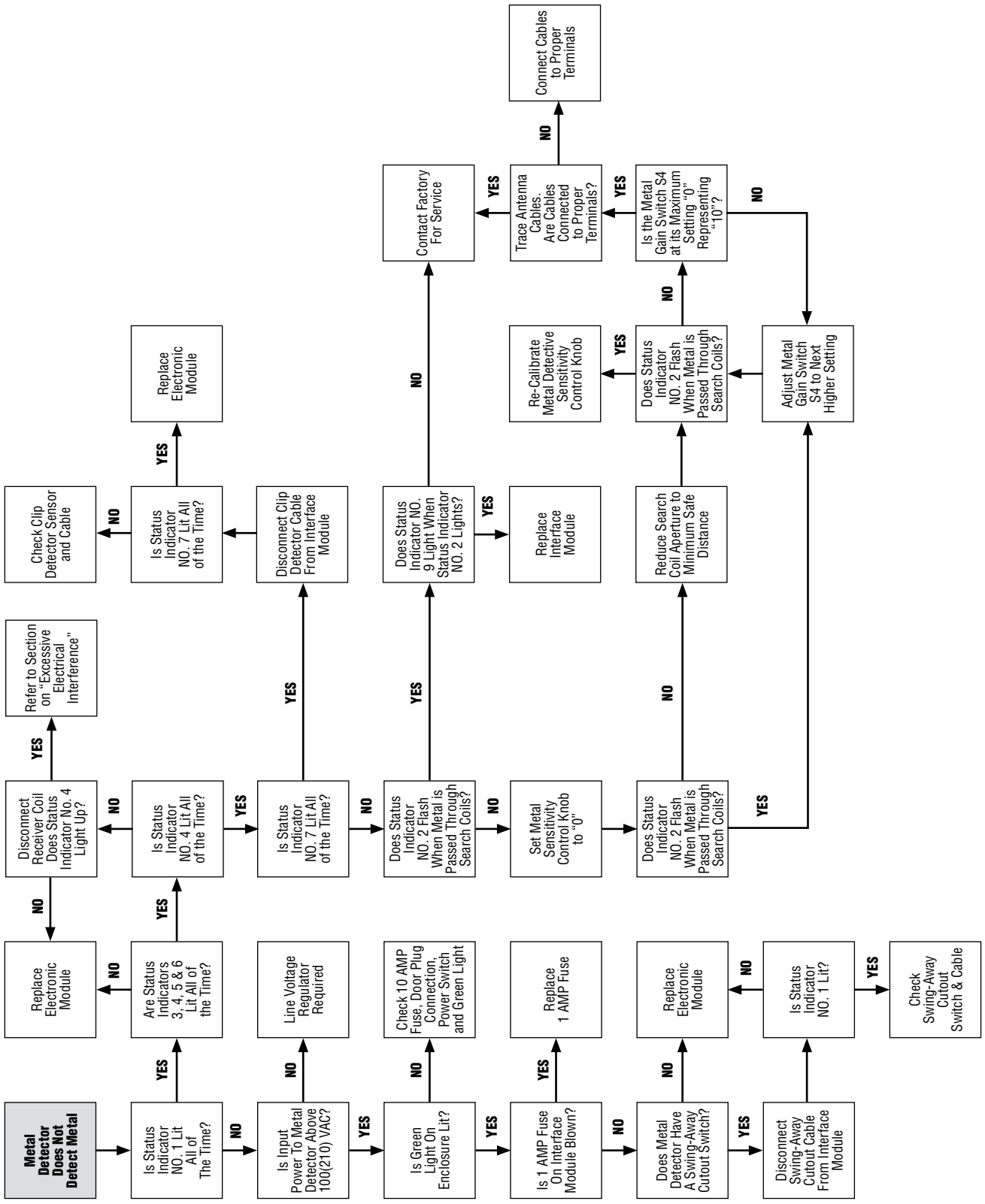
This kit contains all parts necessary for basic maintenance. The items included are as follows:

(1) 1 Amp Fuse
(1) 10 Amp Fuse
(2) Spare Bulbs
(1) 1/16" Allen Key Wrench
(1) 5/64" Allen Key Wrench

L.E.D. Number	Identification	Normal Condition	Comments
1	Power Supply	ON	Indicates detector power supply operational; must be lit for unit to detect metal. Will not light when power supply malfunctions, low line voltage is present or optional transmitter swing away switch is activated. LED lights approximately 5 seconds after power is turned on.
2	Metal Signal	OFF	Indicates signal analyzer output is above the threshold limit, usually when detectable metal is in sensing zone.
3	Self-Test	ON	Indicates specified internal Electronic Module circuits are functioning normally. Must be lit for unit to detect metal.
4	Self-Test		
5	Self-Test		
6	Self-Test		
7	Clip Timer	OFF	Indicates repair clip is in proximity of the clip detector head. LED remains lit for the period detector was programmed to allow clips to clear the sensing zone.
8*	Timed Out	OFF	Indicates the condition of the timed alarm output. If the LED is lit, the timed alarm output is energized with the line voltage.
9*	Direct Out	OFF	Used to diable metal detection as reset signal is applied. Refer to Table 5 for settings and times.

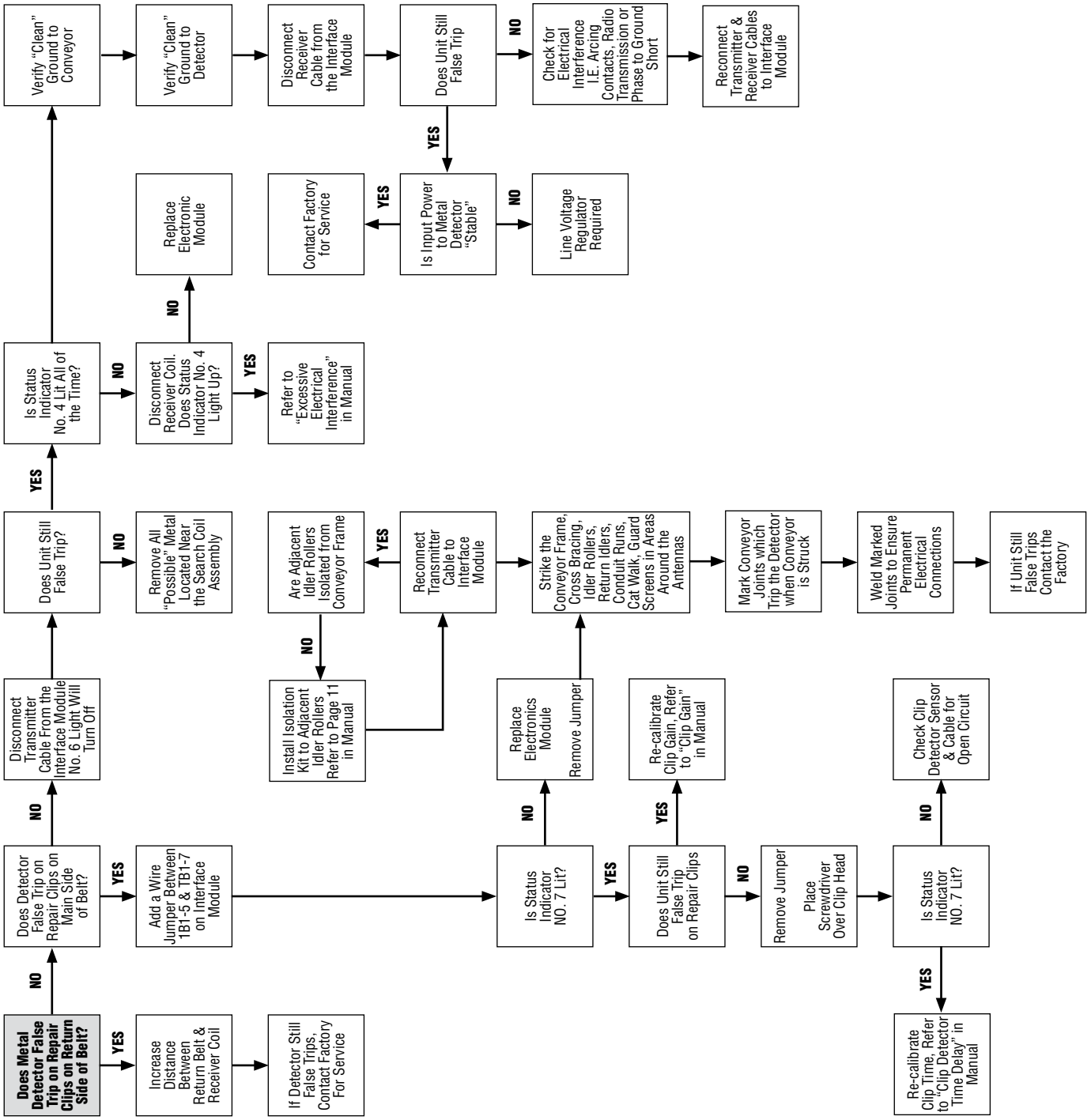
* When programmed to operate in a fail-safe mode (output normally “ON”), the LED’s will be lit.

TABLE 7
Electronics Module Status Indicator Summary



MODEL 1260 TROUBLE SHOOTING FLOW DIAGRAM #1

Insufficient Metal Sensitivity

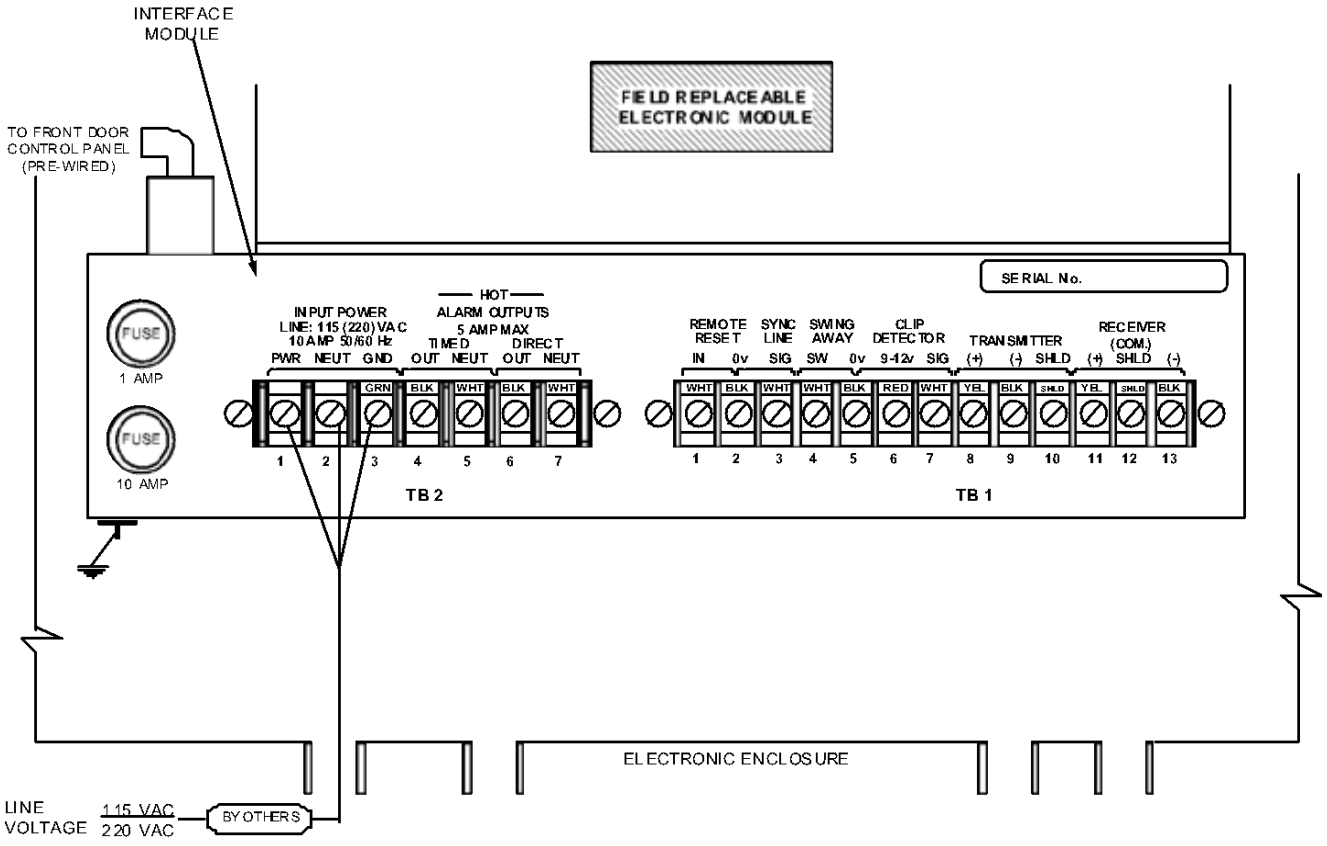


MODEL 1260 TROUBLE SHOOTING FLOW DIAGRAM #2

False Tripping

APPENDIX A

Control Connection Diagrams



POWER INPUT CONNECTION

TB 2-1 115 OR 220 VAC

TB 2-2 NEUT OR 220 VAC

TB 2-3 GROUND

NOTE: WIRE COLOR WILL VARY WITH LOCAL ORDNANCES, POWER CABLES NOT SUPPLIED.

FIGURE A1
Power Input

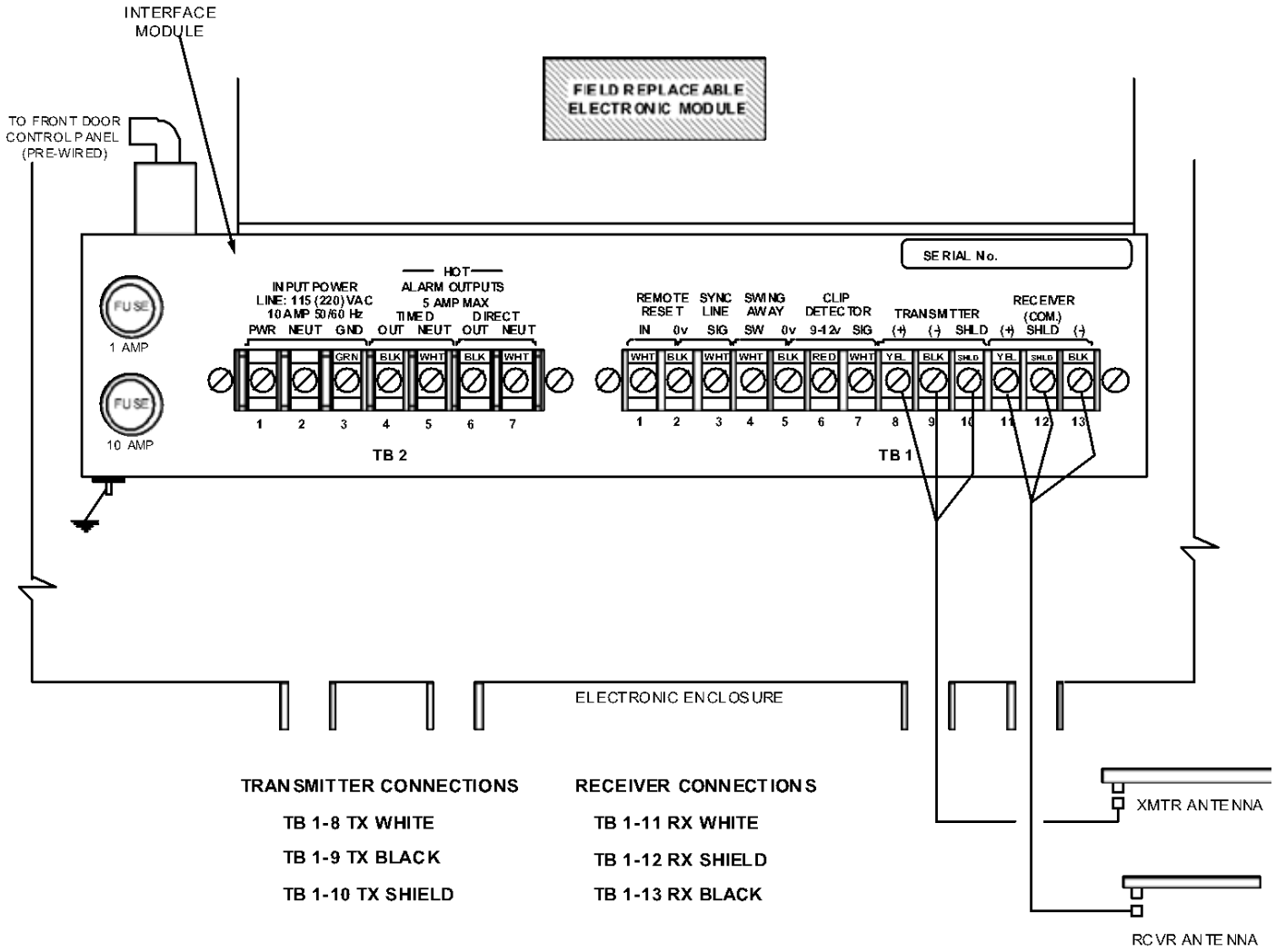


FIGURE A2
Transmitter and Receiver Antenna

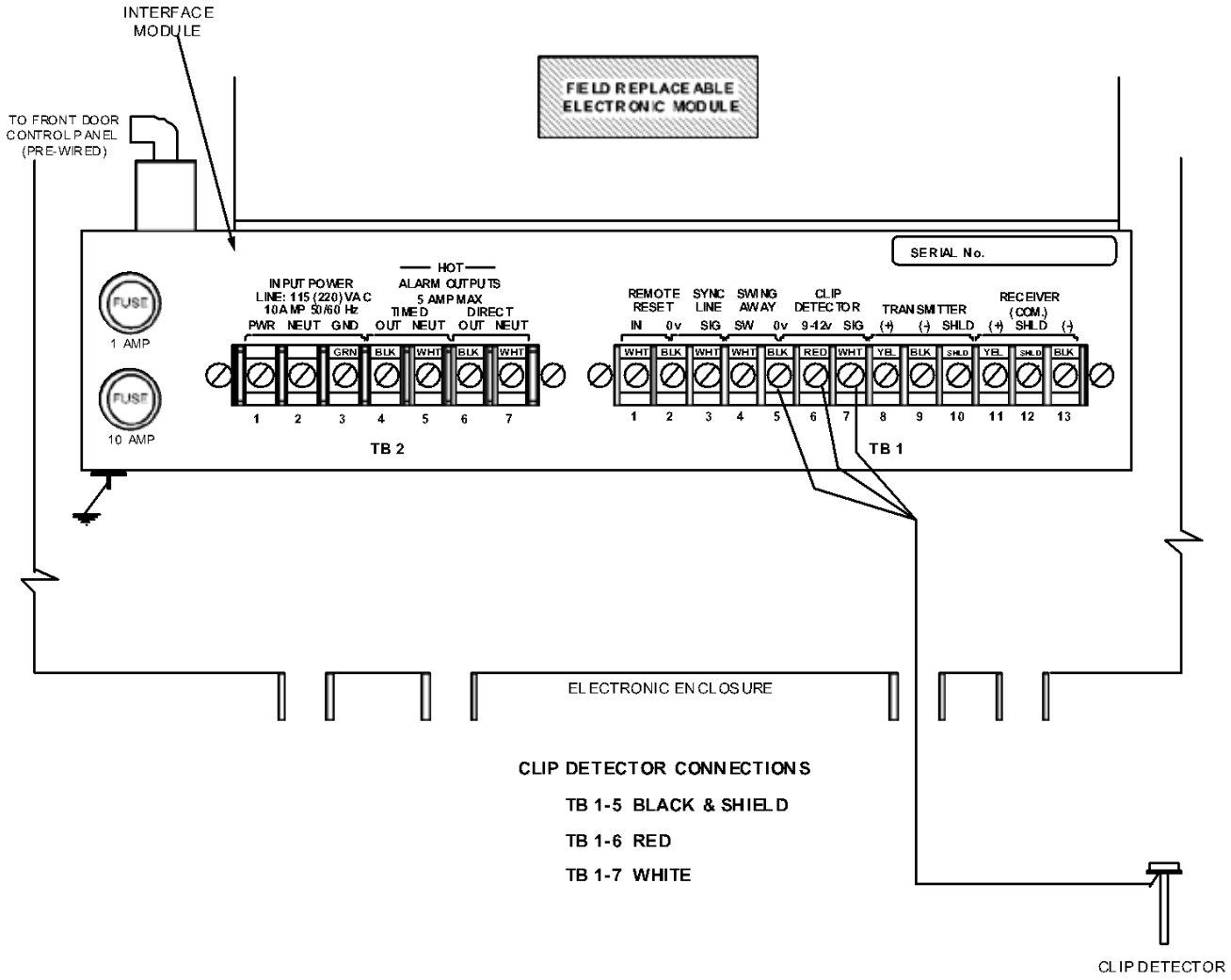
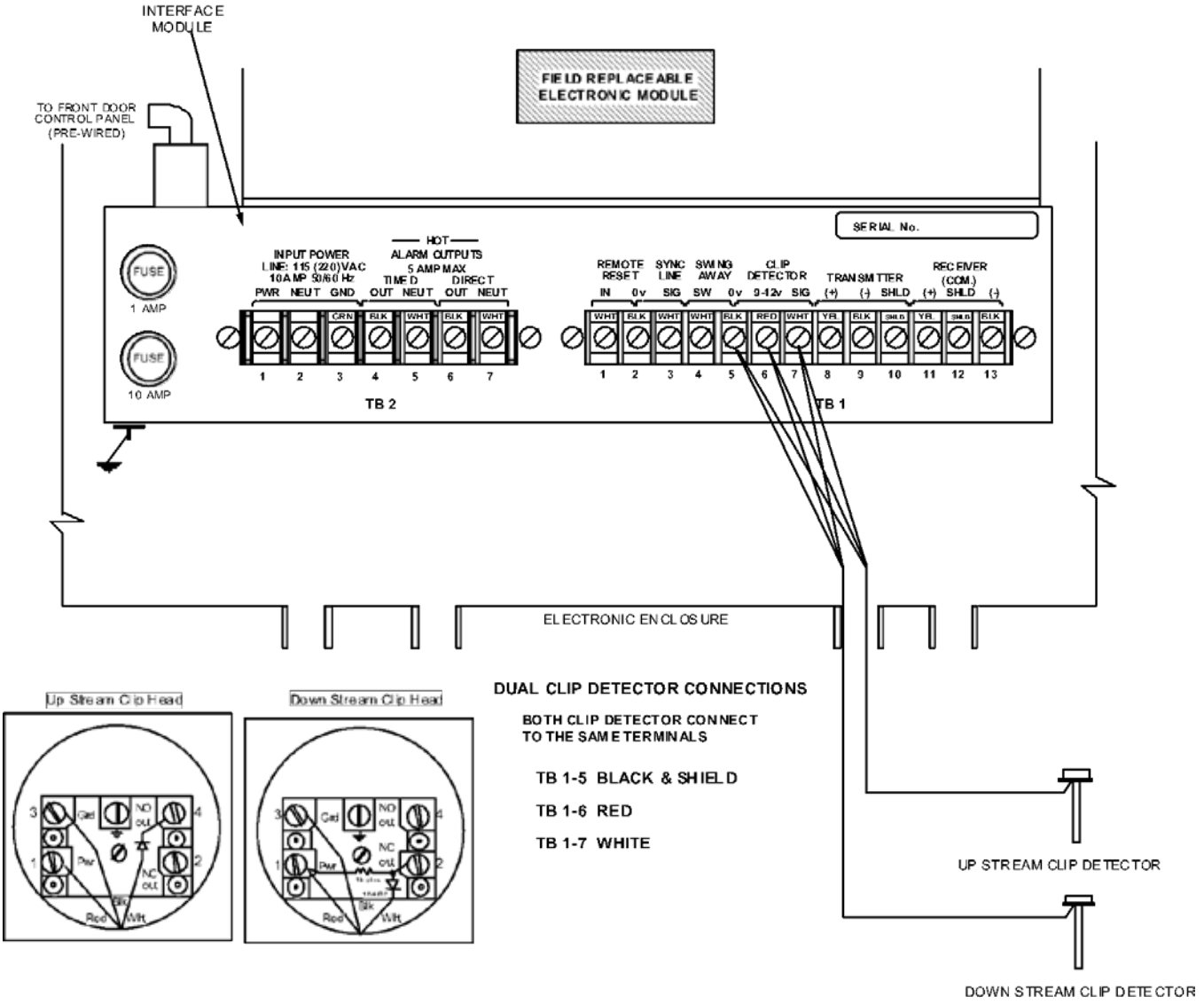


FIGURE A3
Clip Detector

Used on variable speed conveyors



Clip heads need to be modified as shown above. Also J6 & J8 on the Electronics Module must be made. Normally Jumpers J5 and J7 are made for single clip operation. Refer to Figure 16 Programming Controls and Test Point Locations.

FIGURE A4
Dual Clip Detector

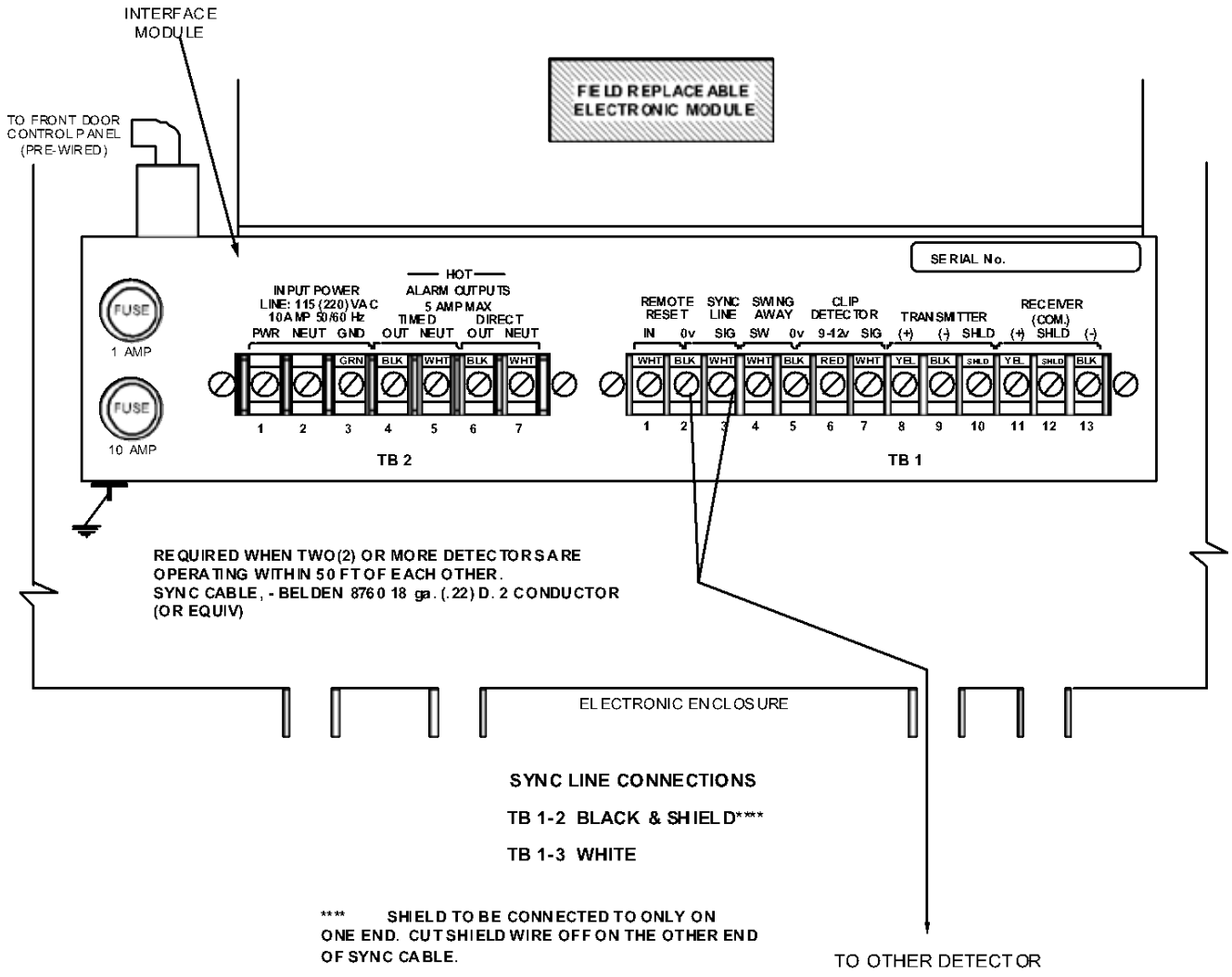


FIGURE A5
Synchronization

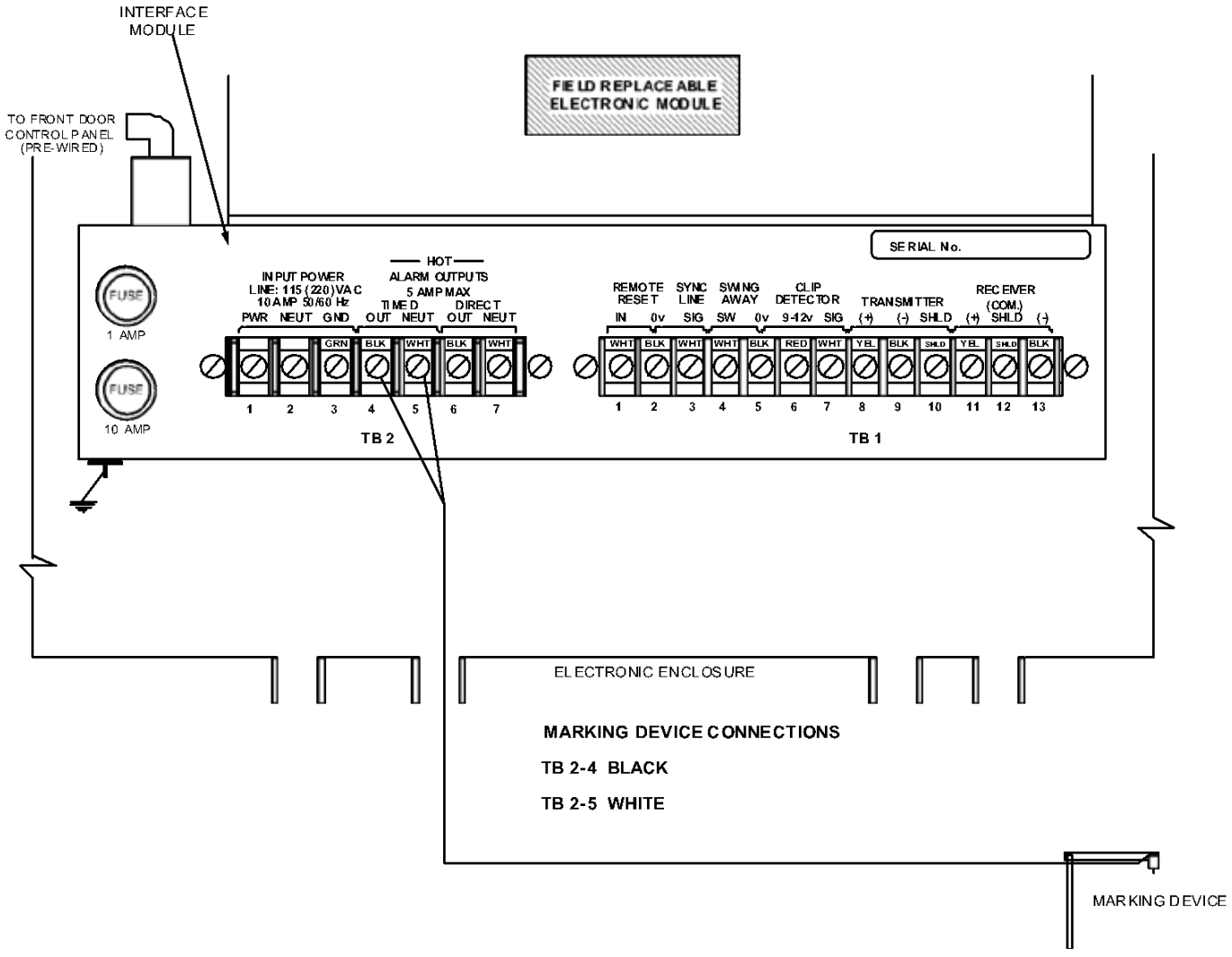


FIGURE A6
Spray Marker

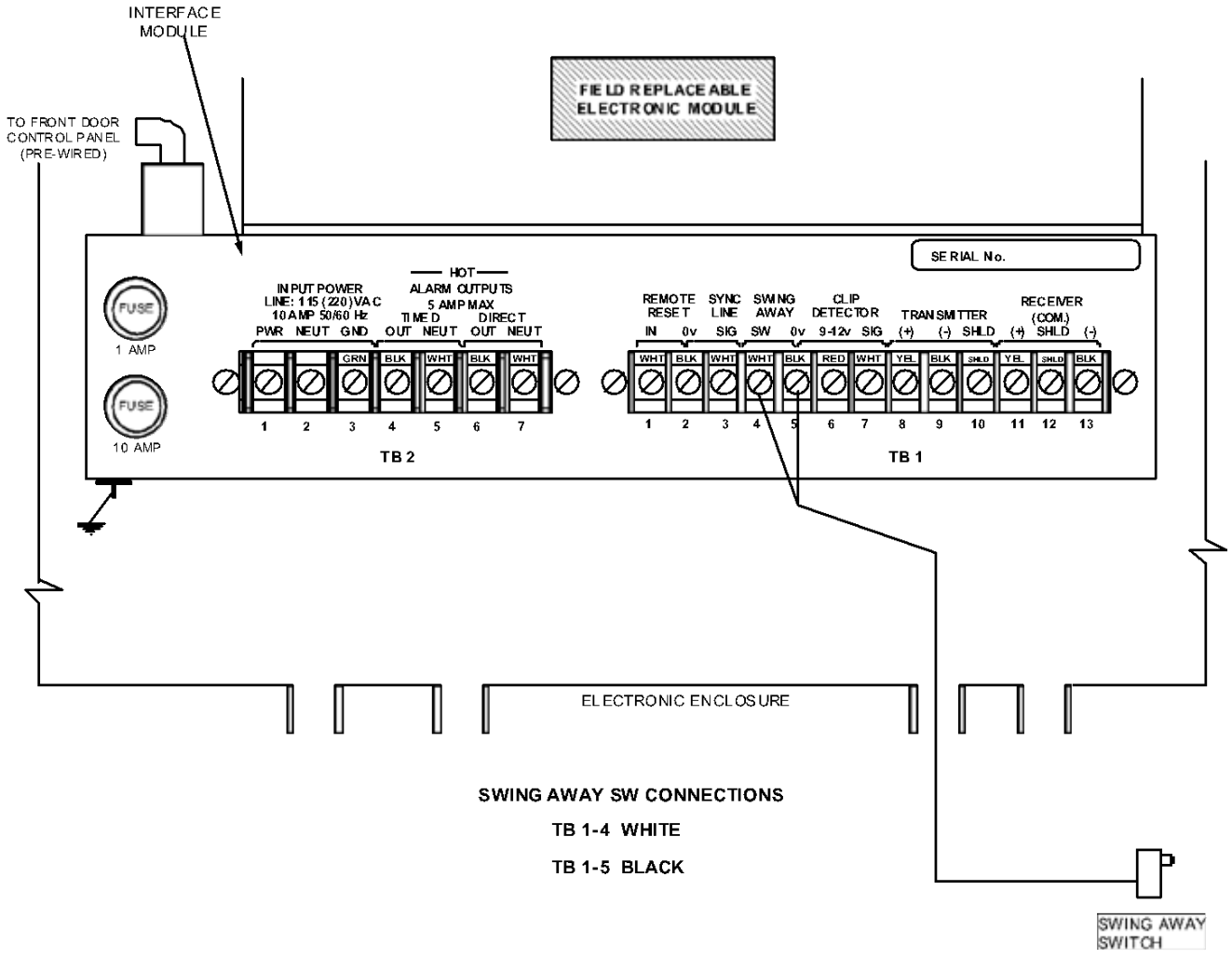


FIGURE A7
Swing Away Switch

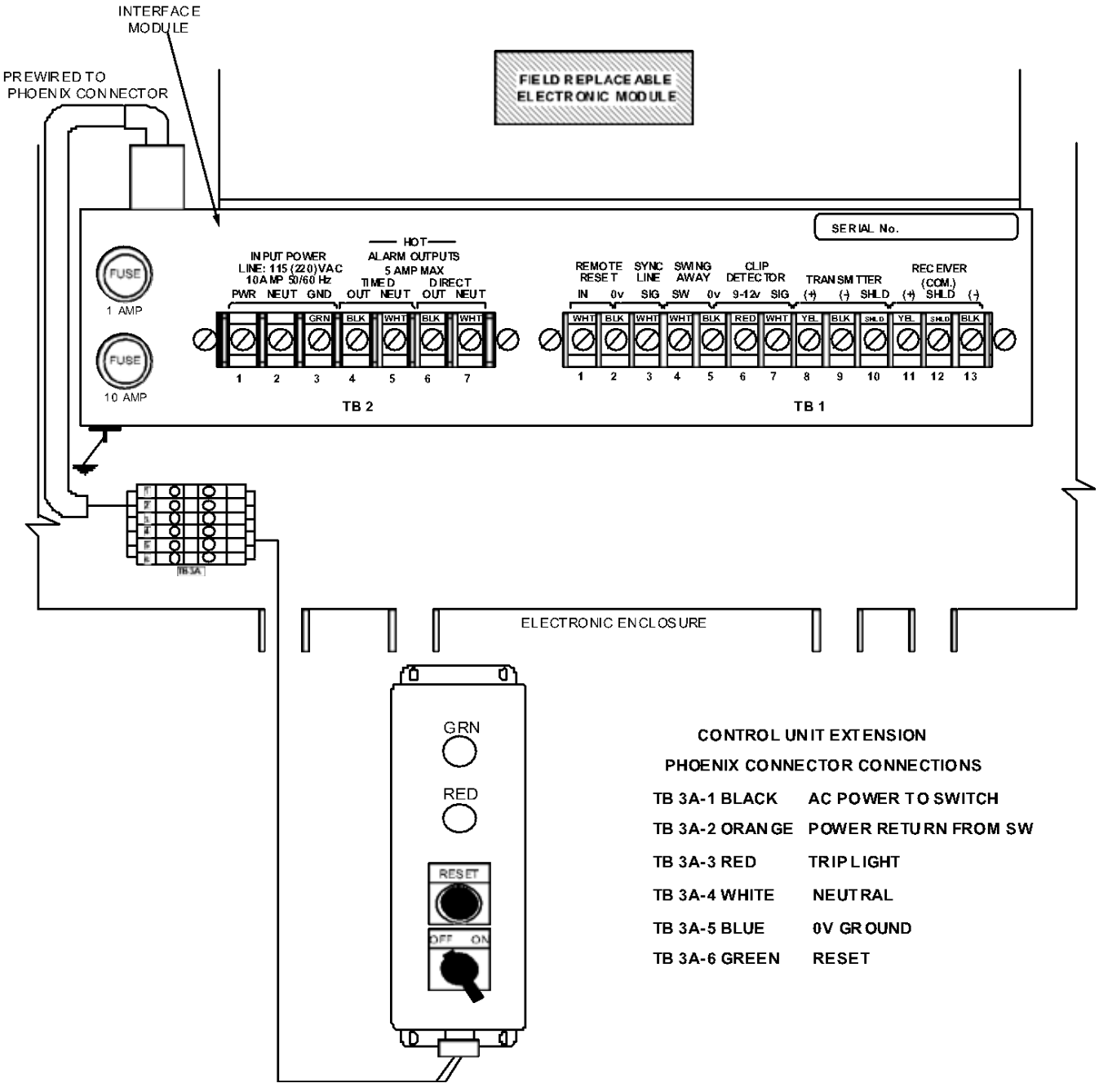


FIGURE A8
Control Unit Extension

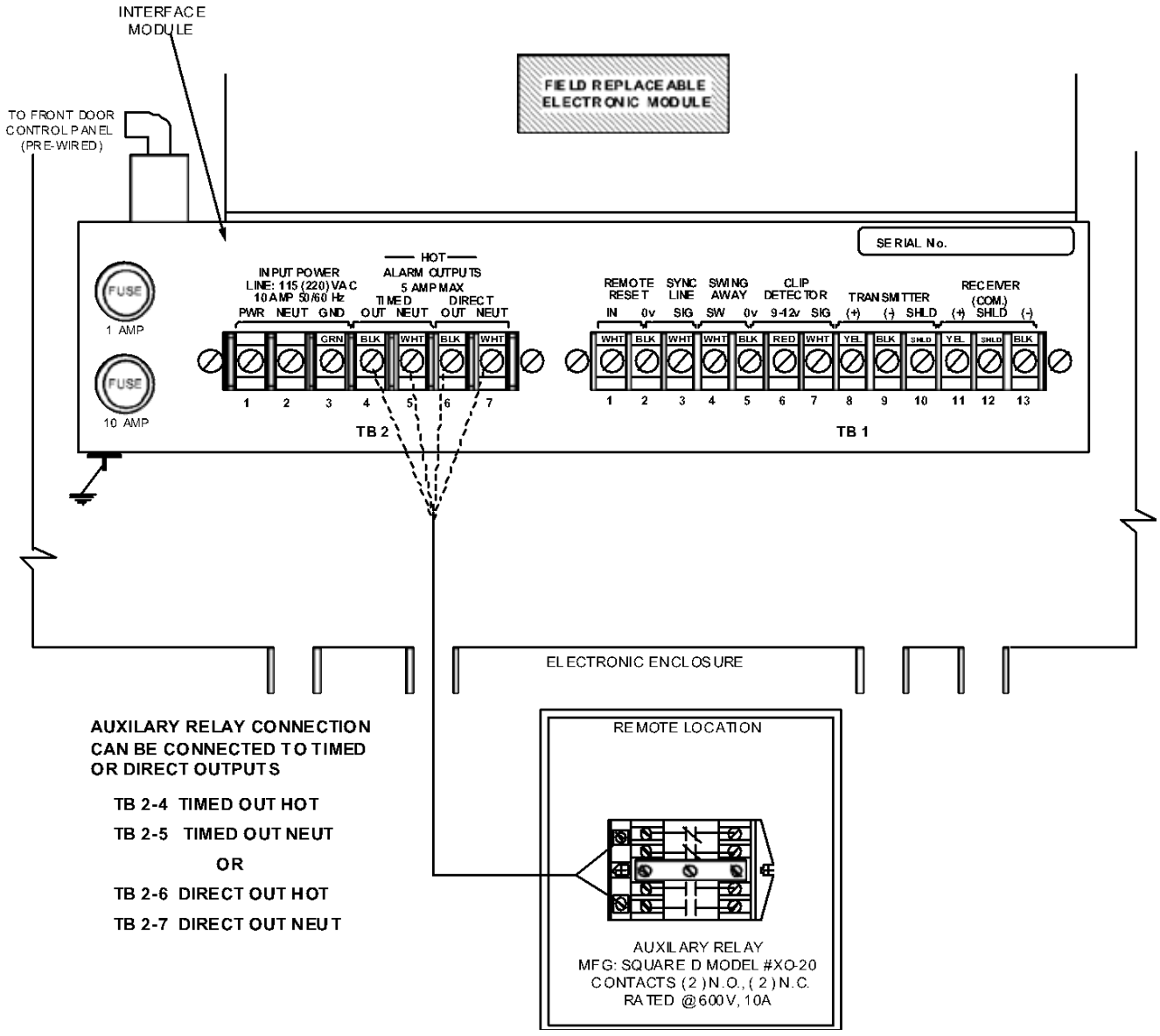
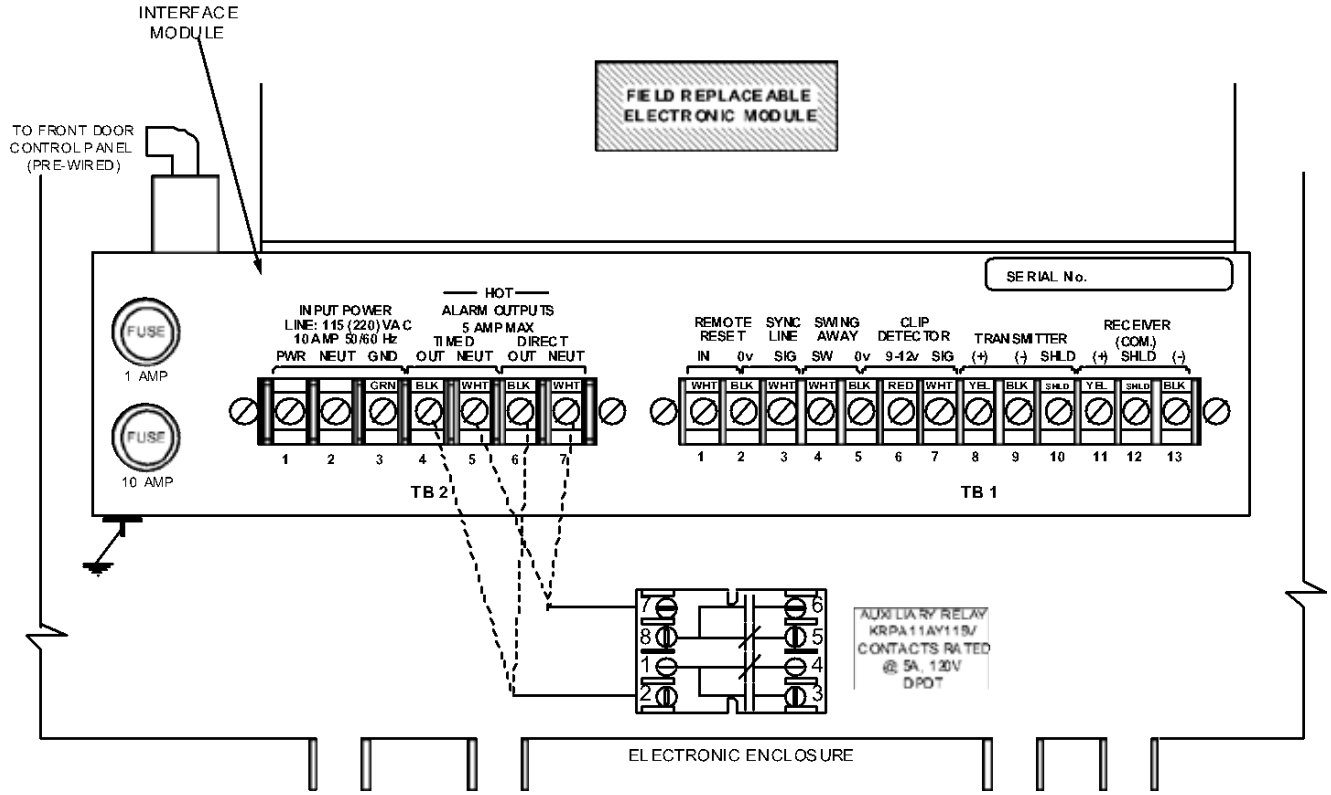


FIGURE A9
Auxiliary 2 or 4 Relay Sq D 115 VAC or 220 VAC



AUXILARY RELAY CONNECTION CAN BE CONNECTED TO TIMED OR DIRECT OUTPUTS

TB 2-4 TIMED OUT HOT

TB 2-5 TIMED OUT NEUT

OR

TB 2-6 DIRECT OUT HOT

TB 2-7 DIRECT OUT NEUT

FIGURE A10

Auxiliary Relay KRPA 115 VAC or 220 VAC

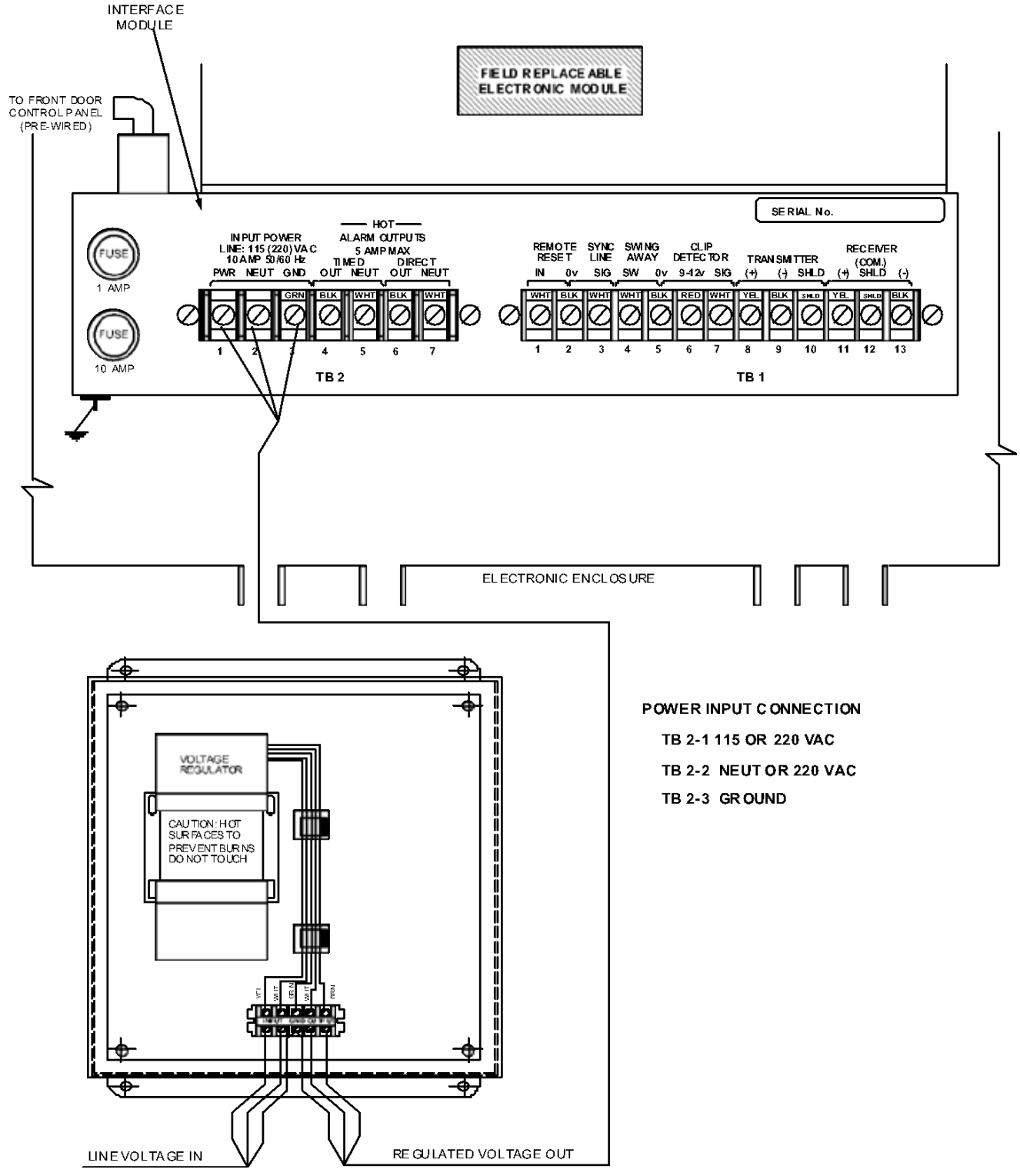
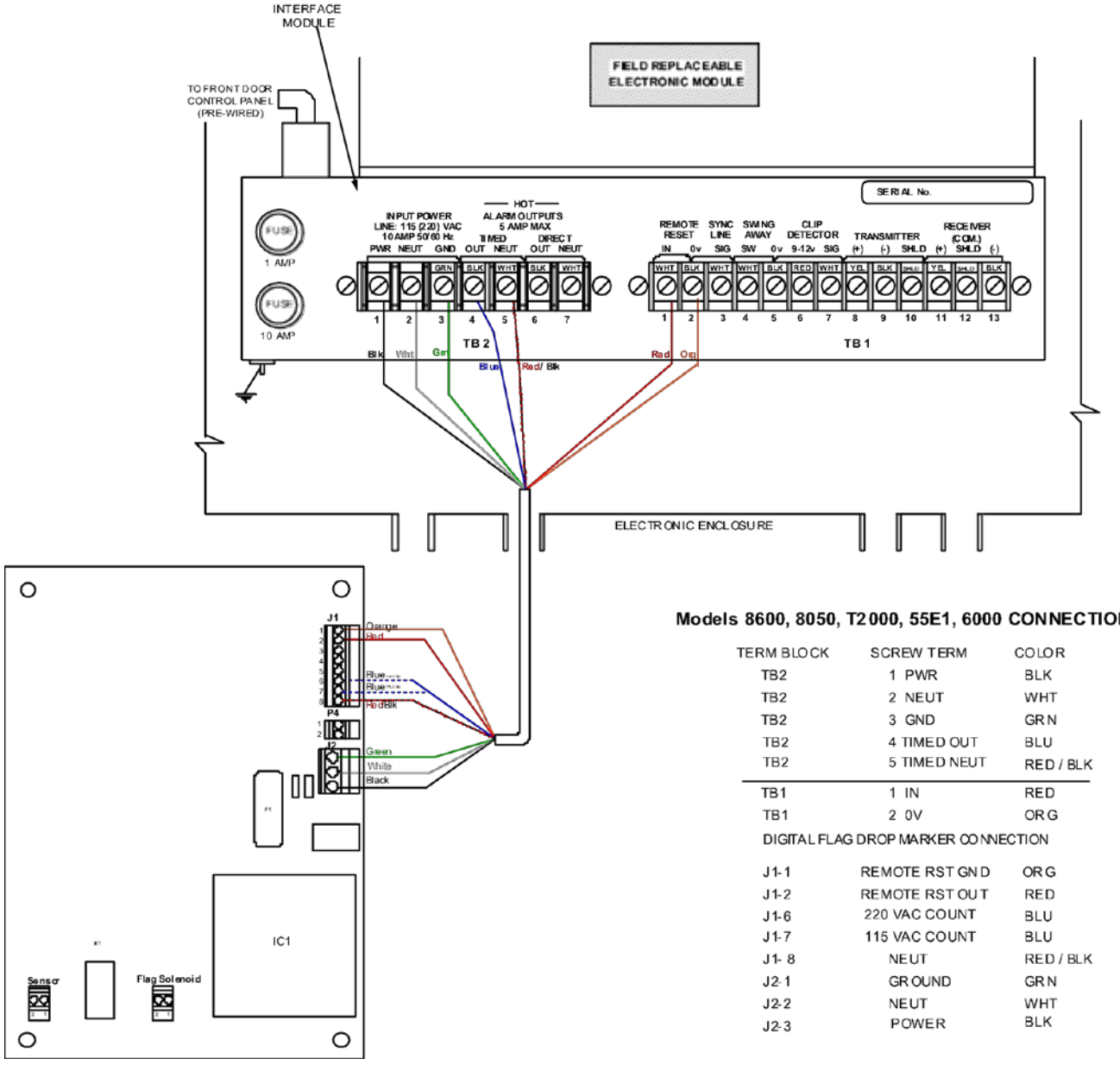


FIGURE A11
Voltage Regulator



Models 8600, 8050, T2000, 55E1, 6000 CONNECTIONS

TERM BLOCK	SCREW TERM	COLOR
TB2	1 PWR	BLK
TB2	2 NEUT	WHT
TB2	3 GND	GRN
TB2	4 TIMED OUT	BLU
TB2	5 TIMED NEUT	RED / BLK
TB1	1 IN	RED
TB1	2 0V	ORG

DIGITAL FLAG DROP MARKER CONNECTION

J1-1	REMOTE RST GND	ORG
J1-2	REMOTE RST OUT	RED
J1-6	220 VAC COUNT	BLU
J1-7	115 VAC COUNT	BLU
J1-8	NEUT	RED / BLK
J2-1	GROUND	GRN
J2-2	NEUT	WHT
J2-3	POWER	BLK

FIGURE A12
Flag Drop Marker

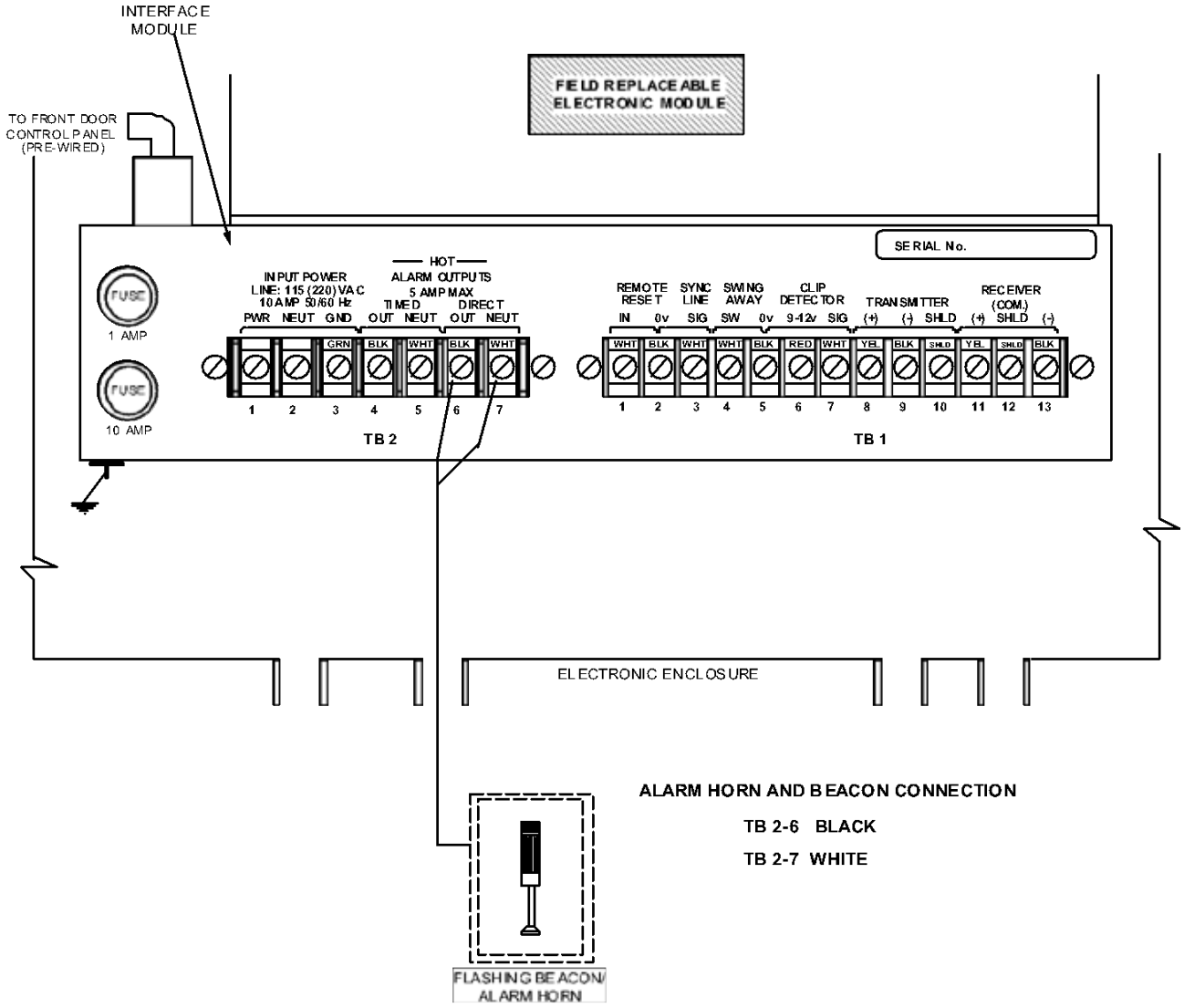


FIGURE A13
Alarm Horn & Flashing Beacon

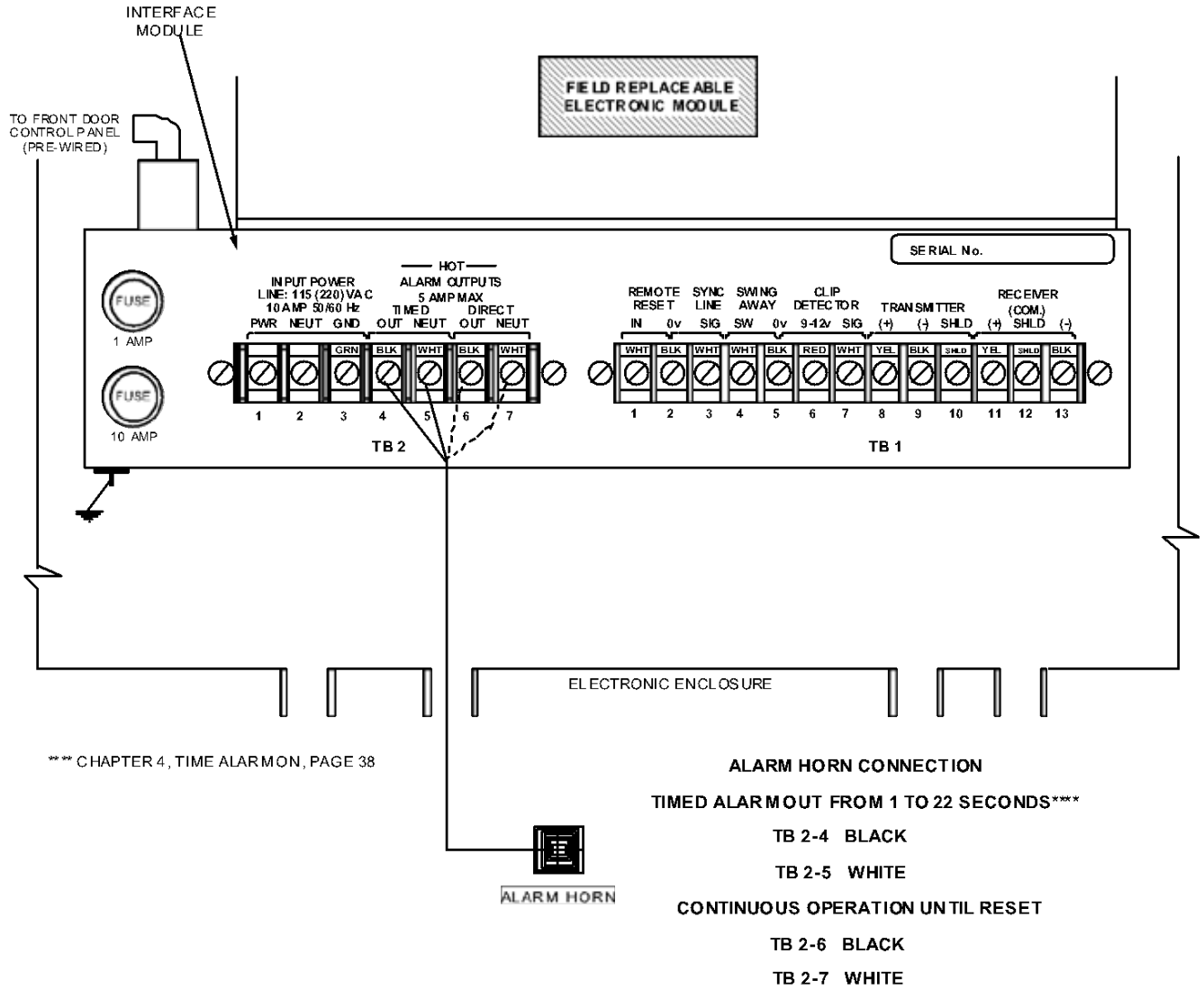


FIGURE A14
Alarm Horn

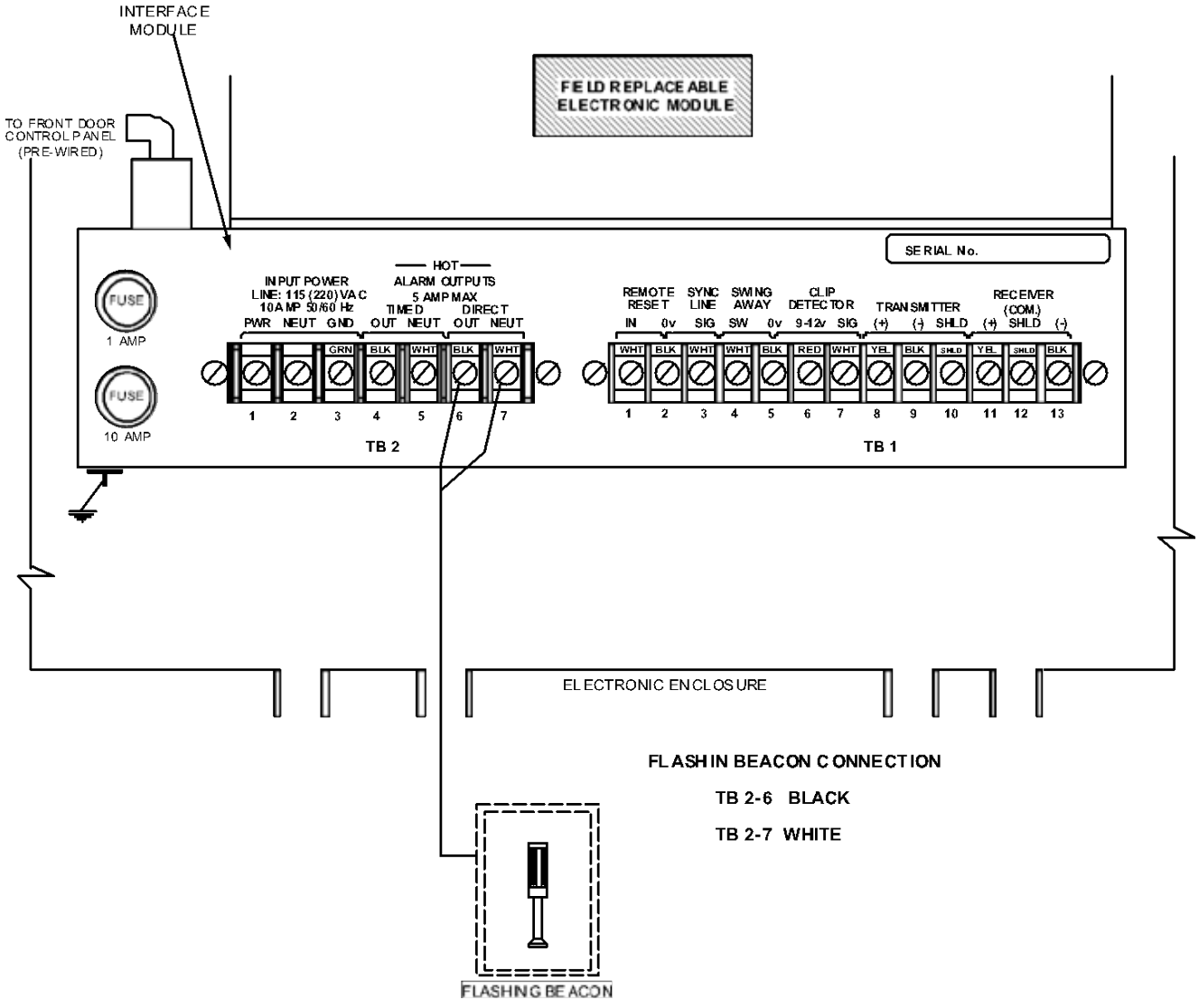


FIGURE A15
Flashing Beacon

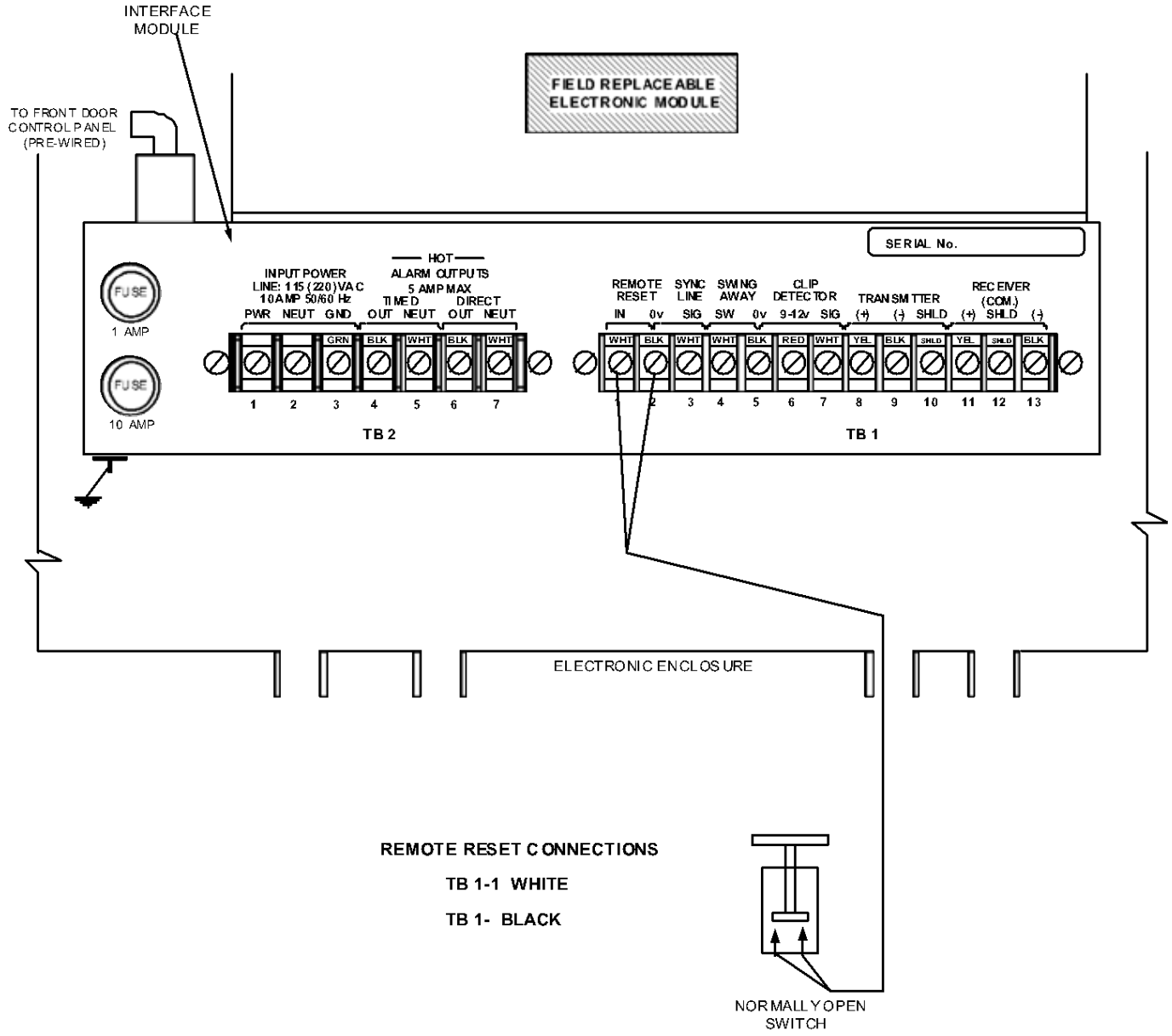
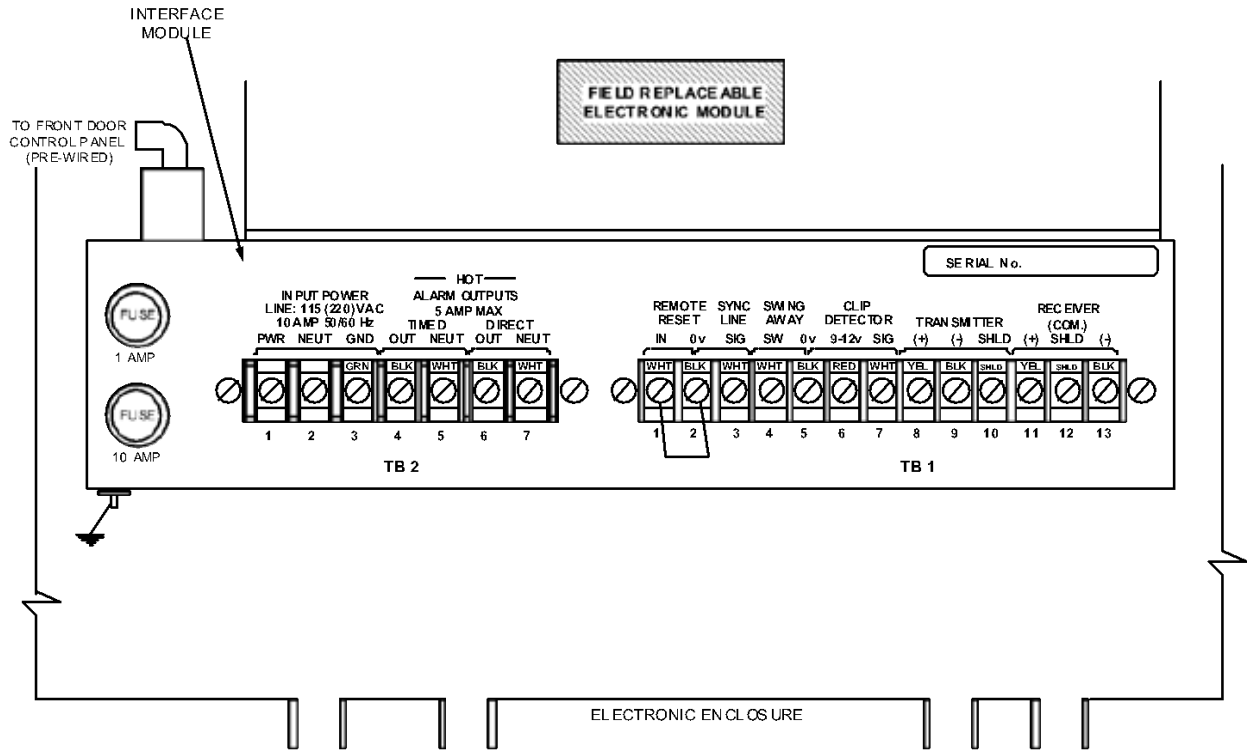


FIGURE A16
Remote Reset Switch



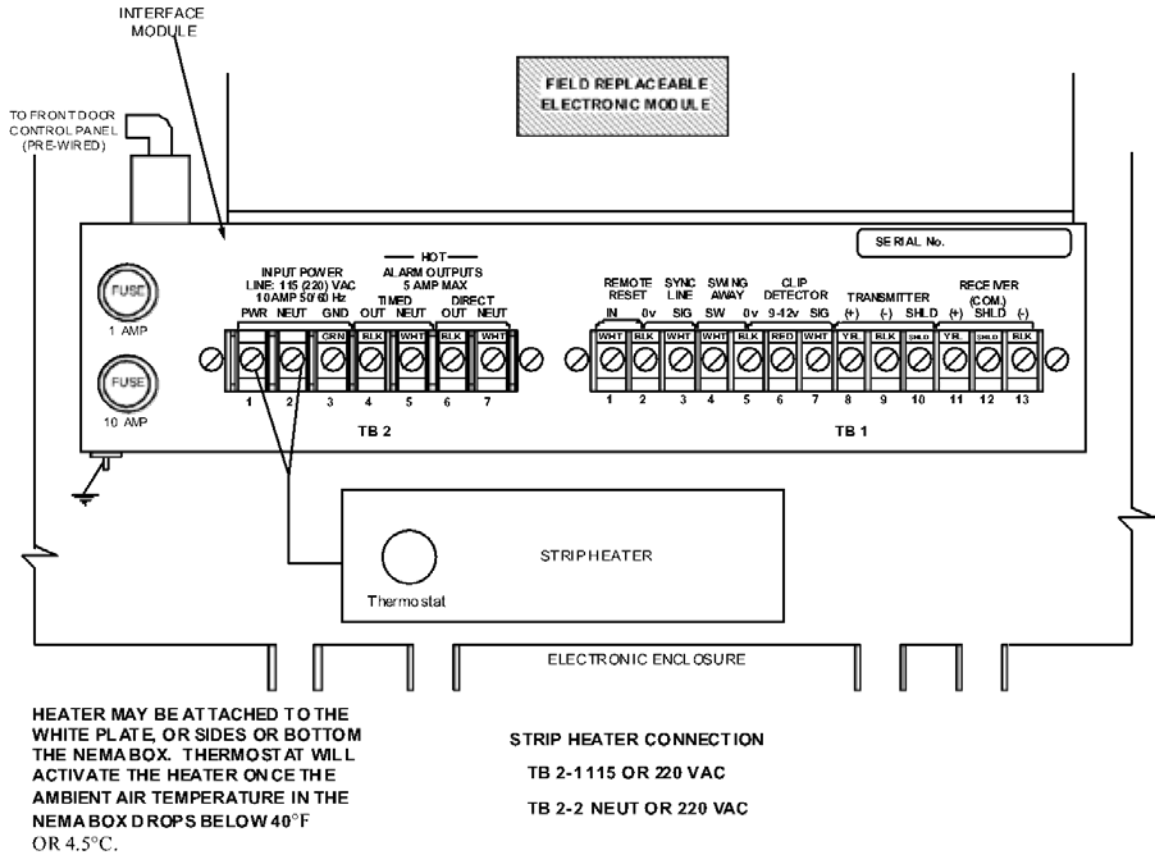
NOTE: SWITCH S2-7 MUST BE OPEN. IF S2-7 IS CLOSED THEN THE DETECTOR WILL NOT TRIP. REFER TO SECTION RESET OVERIDE.

REMOTE RESET CONNECTIONS

TB 1-1 WHITE

TB 1-2 BLACK

FIGURE A17
Automatic Reset



HEATER MAY BE ATTACHED TO THE WHITE PLATE, OR SIDES OR BOTTOM THE NEMA BOX. THERMOSTAT WILL ACTIVATE THE HEATER ONCE THE AMBIENT AIR TEMPERATURE IN THE NEMA BOX DROPS BELOW 40°F OR 4.5°C.

STRIP HEATER CONNECTION

TB 2-1 115 OR 220 VAC

TB 2-2 NEUT OR 220 VAC

FIGURE A18

Strip Heater 115 vac or 220 vac

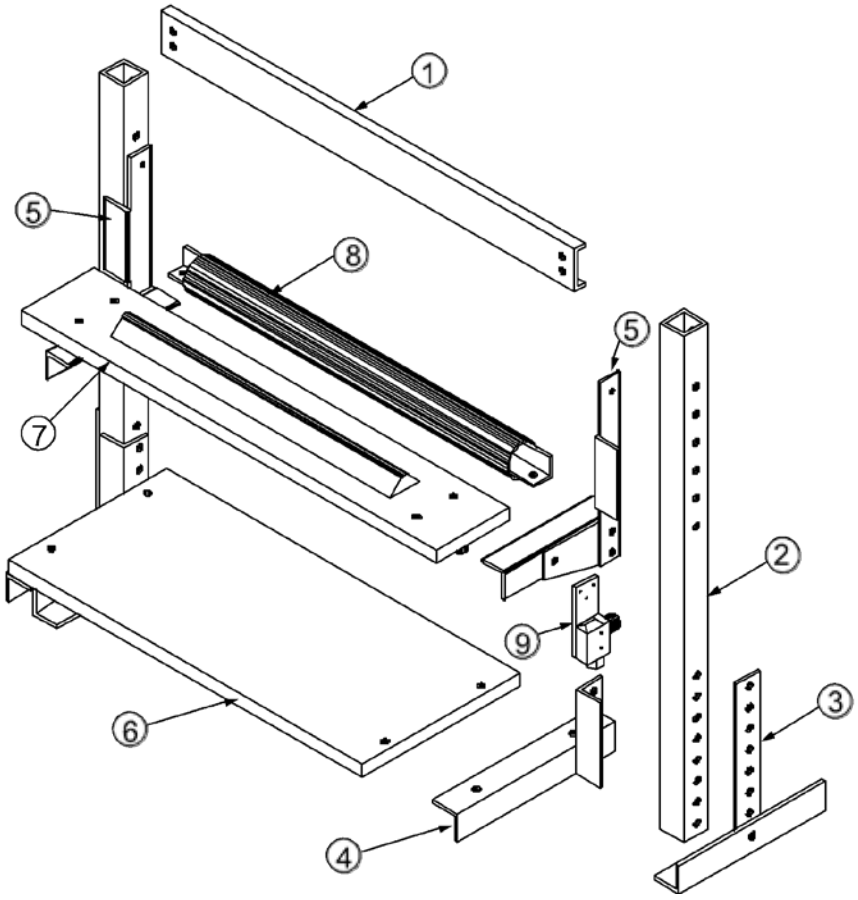
APPENDIX B

Service, Parts, Repairs

Search Coil Assembly Swing Away

Model 1260 Frame Assembly

1 Crossbar
2 Upright Pair
3 Mounting Feet Carbon Steel
4 Receiver Bracket Pair
5 Transmitter Bracket Pair
6 Receiver Antenna
7 Transmitter Antenna
8 Roughing Guard
9 Swing-Away Switch



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