ADVANCED DETECTION SYSTEMS

ProScan Max II™ Digital Metal Detector

INSTALLATION GUIDE AND OWNER'S MANUAL

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GENERAL INFORMATION

DESCRIPTION

The Advanced Detection Systems ProScan Max II™ is a general purpose, digital metal detector suitable for the detection of ferrous and nonferrous metals in all types of food products, chemicals, plastics, or other products where metal can have an unwanted consequence. In addition to providing excellent product quality control, it provides protection for machinery by letting you know there is metal in your product before it causes costly damage.

The metal detector search head is manufactured to suit specific product requirements, thereby ensuring maximum sensitivity. It is essentially a single oscillator-driven loop with twin receiving coils. All three coils are mounted in a welded stainless steel enclosure and completely filled with epoxy for protection against water and vibration.

When correctly balanced, the signals in the two receiving coils cancel (i.e. they are equal in magnitude and opposite in sign). As metal passes between the oscillator and a receiving coil, the current induced in that coil changes. This causes an imbalance, which is amplified and detected in the electronic control unit.

The ProScan Max II™ metal detector uses surface mount technology and integrated circuits. Automatic balance compensation eliminates the need for manual balancing. Internal computer timing controls reject and alarm devices, and can also be used to stop the conveyor motor upon detection of metal.

The ProScan Max II™ metal detector is a digital detector with a digital interface. All controls and adjustments are made with a touchscreen that also contains pushbutton shortcut keys. Product settings can be stored for quick line changeovers. Other features include multi-password protection and detect counter.

SPECIFICATIONS

AC Supply – 115 volts, 60 Hz, less than 50 VA

Stability - Suitable stability is maintained under the following conditions:
32-115^{o} F (0-45^{o} C)
0-90% humidity
$\pm$ 10% voltage variation

Sensitivity - Sensitivity varies with detector type, size, and product being inspected.
As a result, it is quoted separately for each application.

INSTALLATION

MECHANICAL INSTALLATION

λ The detector must be bolted securely in position, but do not twist or strain it in any way.

λ Nothing should rest on the search head or touch the sides of it.

λ If a conveyor is used, all feet must be firmly on the floor. The conveyor must not rock or move. Twisting of the conveyor when product enters the search head may cause false triggers. An unbalanced conveyor motor could also be a source for unwanted vibration.

λ All cover screws, bolts, etc., in the vicinity of the detector must be tight for correct operation. Two pieces of metal making intermittent contact may cause false triggers.

λ Do not modify the metal detector or its wiring in any way.

λ Do not attach rollers, guide plates, markers, or electronic sensing devices to any part of the search head.

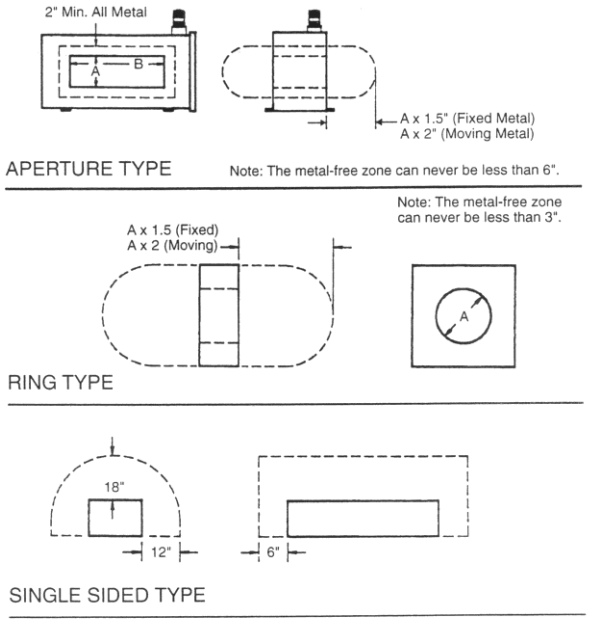
λ Product pipes with emulsions or gravity system product chutes should pass through the center of the detector opening, without touching the walls of the aperture.

λ The product being inspected should pass through the center of the metal detector opening. The product must not make contact with any part of the search head. Non-metallic guides should be used if necessary.

WARNING: Do Not Weld anywhere on the unit with the metal detector head attached. Welding on the unit WILL DESTROY the electronics of the detector and void any and all warranties.

METAL FREE ZONE

The electro-magnetic field is created inside the detector's enclosure; however, some field emanates out of the aperture on both sides and forms the metal free zone ("MFZ"). Generally, the practical size of the leakage is 1½ times the (smaller) aperture dimension, and no metal should be allowed in this area. Large moving metal should be kept 2 times away. Special detectors are available for applications which demand a substantially reduced MFZ.



ELECTRICAL INSTALLATION

WARNING. Whenever wiring is to be done to the terminal strip of the detector, make sure ALL sources of power have been disconnected. Terminals controlling other devices may be powered from sources other than those supplying the metal detector. Caution should be used when working on machinery as components may stop and start automatically without warning.

The metal detector operates from a single phase, 60Hz supply, 115VAC ±10%.

Use a power feed that is free of motor start-up transients or other interference. A dedicated circuit is recommended but not required as long as the power feed is "clean."

If the metal detector is supplied with a conveyor, they should have separate power cords, even if the detector and conveyor require the same voltage. Start-up transients from the conveyor motor could cause interference or even damage the metal detector.

All power supply grounds for the detector, conveyor, and reject devices must originate from a single point. All metal detectors require a good power ground. A good ground helps drain off "noise" that can be on the AC power. Many plants use "conduit" grounding. This is not acceptable because of the possibility of loose connections that can become open connections and cause the ground to "float". The power feed to the metal detector must have a dedicated third wire ground. Multiple grounds should be avoided.

Electrical connections to the metal detector are made via a terminal strip housed inside of the separate "power box". A terminal connections chart is located on page 5 and on the inside of the power box cover.

Main power is applied to the metal detector via Terminals L IN, N IN, and G IN. The remaining terminals are used to wire conveyor stops, reject devices, and alarm systems.

A SPECIAL NOTE ABOUT VARIABLE FREQUENCY DRIVES (VFD) OR INVERTERS:

Variable frequency drives (VFD) are a major source of radio frequency (RF) interference. It can be radiated through the air, through the power feed, and also through the ground connection. The RF interference can prevent the metal detector from operating at its maximum sensitivity. The makers of the drives also sell filters that can help minimize the RF interference. They should be purchased and installed according to the manufacturer's instructions.

In general, the following is recommended for VFD's.

Always purchase and install the manufacturer's filters.
Never run the VFD's power lines and the metal detector power lines in the same conduit or cable trough.
Keep all VFD wiring as far away as possible from the metal detector.
Use shielded cables whenever possible and make sure the shield is grounded.
The VFD, motor, conveyor, etc. should have one grounding point.

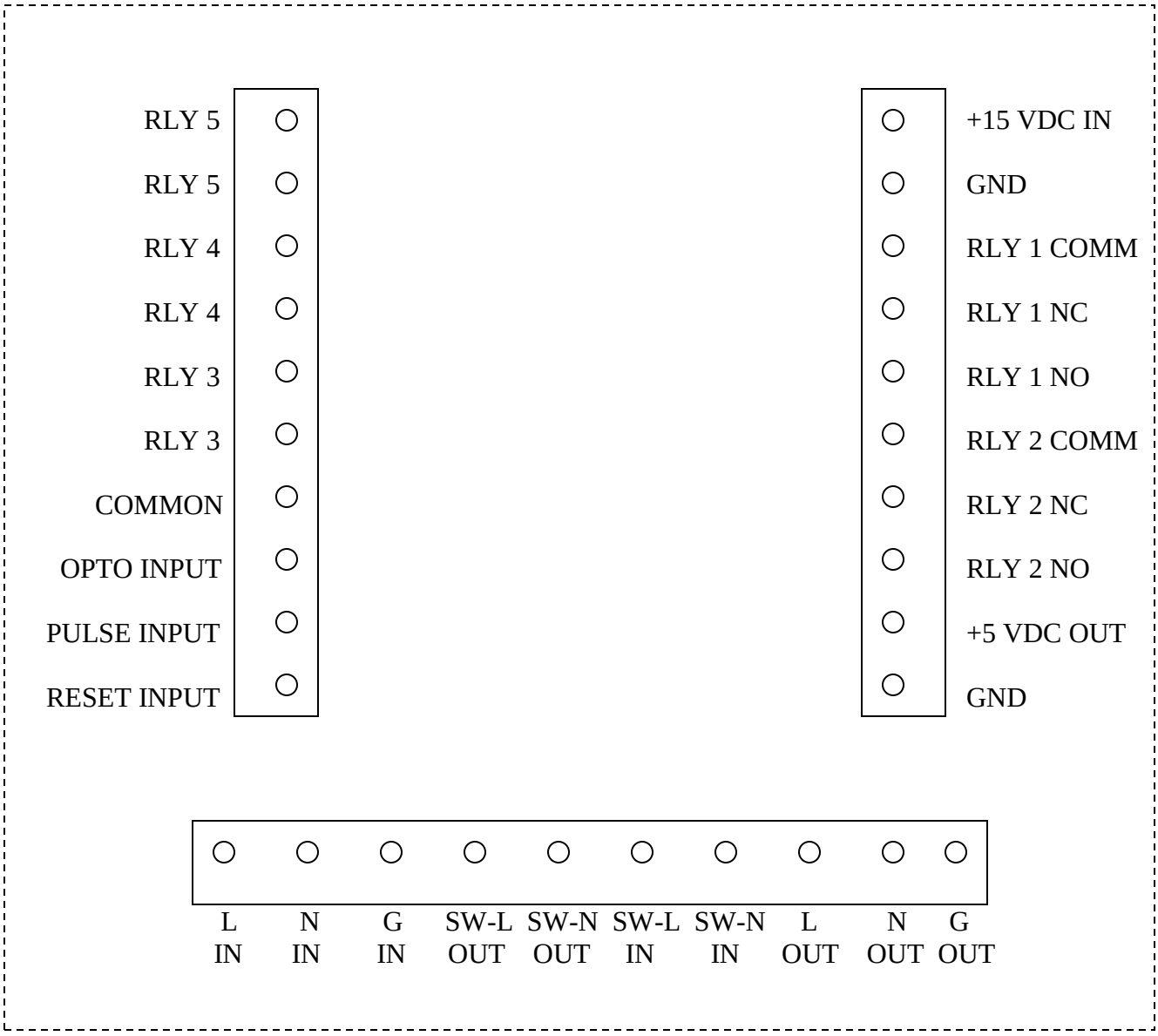
OTHER POSSIBLES SOURCES OF METAL DETECTOR INTERFERENCE

A large part of any metal detector is its main receiving antenna. Any equipment that emits, or radiates, a signal that can be picked up by the receiving antenna can cause a false trigger in the metal detector. Possible sources are; other metal detectors operating at or near the same frequency, induction cap sealers, large motors, and any ungrounded equipment.

TERMINAL CONNECTIONS

WARNING: Whenever wiring is to be done to the terminal strip of the detector, make sure ALL sources of power have been disconnected. Terminals controlling other devices may be powered from sources other than those supplying the metal detector. Caution should be used when working on machinery as components may stop and start automatically without warning.

POWER INPUT / OUTPUT BOARD



EXPLANATION OF TERMINAL CONNECTIONS

TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION
RLY 5	Solid state relay output #5 AC	+15 VDC IN	Input power for the circuit board
RLY 5	Solid state relay output #5 AC	GND	Input ground for the circuit board
RLY 4	Solid state relay output #4 AC	RLY1 COMM	Common toggle for output relay #1
RLY 4	Solid state relay output #4 AC	RLY1 NC	Normally closed contact for relay #1
RLY 3	Solid state relay output #3 AC	RLY1 NO	Normally open contact for relay #1
RLY 3	Solid state relay output #3 AC	RLY2 COMM	Common toggle for output relay #2
INPUT COMM	Common input for OPTO, PULSE, and RESET inputs	RLY2 NC	Normally closed contact for relay #2
OPTO INPUT	Input for photo eye	RLY2 NO	Normally open contact for relay #2
PULSE INPUT	Input for external timing pulses	+5 VDC OUT	Locally available 5 v source
RESET INPUT	Input for external reset button	GND	Ground for local 5 v source

TERMINAL	DESCRIPTION
L IN	Power input, hot lead
N IN	Power input, neutral lead
G IN	Power input, ground lead
SW-L OUT	Power output to On/Off switch, hot lead
SW-N OUT	Power output to On/Off switch, neutral lead
SW-L IN	Switched power from On/Off switch, hot lead
SW-N IN	Switched power from On/Off switch, neutral lead
L OUT	Power output, hot lead (Used for powering reject devices, etc.)
N OUT	Power output, neutral lead (Used for powering reject devices, etc.)
G OUT	Power output, ground lead (Used for powering reject devices, etc.)

Outputs For Reject and Signal Devices

The detector has internal timing circuitry for the control of a variety of reject and alarm devices. Instructions for setting the reject delay and operate timing are given later in this manual.

The solid state relay outputs 3, 4, and 5 are configurable as normally open or normally closed and can be changed by pressing Menu / Level 3 / Reject Options / Relay Config (See reject menu section for more details). Theses are solid state relays and are designed to control AC voltages only.

In the case of the mechanical relay outputs 1 and 2, all three outputs (COMM, NO, and NC) are provided and can be wired as normally open or normally closed. The voltage can be AC or DC.

All outputs are unpowered, or dead, contacts. In order to use them to control reject or alarm devices, a power source must be supplied. The customer may supply the source or use the switched 115 VAC source available at Terminal L OUT.

Wiring for Conveyor Stop on Detection of Metal

Wire the conveyor motor control relay in series with any relay output that has been configured as normally closed. When metal is detected, the output relay contacts will open and cause the control relay in the motor starter to de-energize and stop the conveyor. This occurs after the delay time has elapsed.

Use the delay time if you want the contaminated product to stop at a particular spot on the conveyor. If you want the conveyor to stop immediately, set the delay time to zero. The conveyor may be restarted by pressing the start button on the conveyor motor starter. The conveyor will not start until the operate time has elapsed.

WARNING: Do not wire full motor voltage through the metal detector contacts. They should be used for control voltage only.

Refer to wiring diagrams (Figures 2 through 5) at the end of this manual for specific voltages.

Wiring for a Reject Device, Light, or Alarm

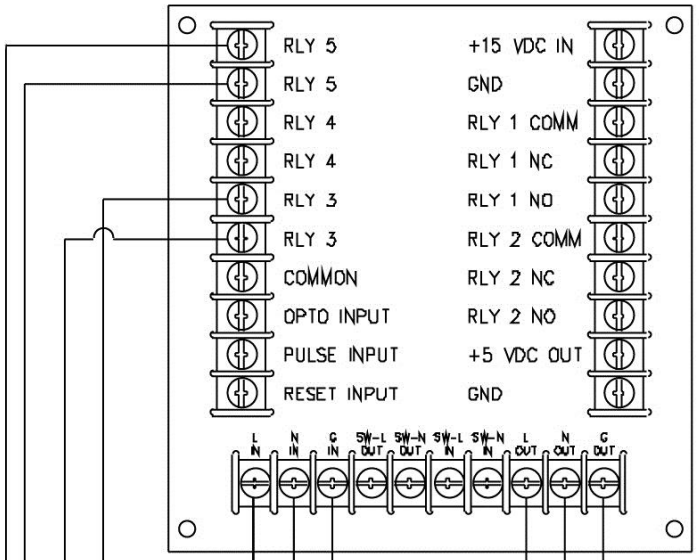
Verify that the device is rated for the correct voltage. Devices that activate when power is applied should use the normally open configuration. Devices that activate by an interruption of power should use the normally closed configuration.

Standard method: All relay outputs can also be used to control reject devices, lights, and alarms. However, these outputs are unpowered, or dead, contacts. A power source must be supplied by an external means or it may be supplied by the metal detector via terminal L OUT.

Connect the power source to one side of the relay output. The device is then connected to the other side of the relay output. The remaining side of the device is connected to Terminal N OUT to complete the circuit. Set delay and operate times as required. Instructions for setting the timing are included elsewhere in this manual.

Refer to wiring diagrams (Figures 6 and 7) at the end of this manual for specific voltages.

WIRING DIAGRAM FOR CONVEYOR WITH STOP ON DETECT
INCOMING VOLTAGE 115V/SINGLE PHASE/60Hz

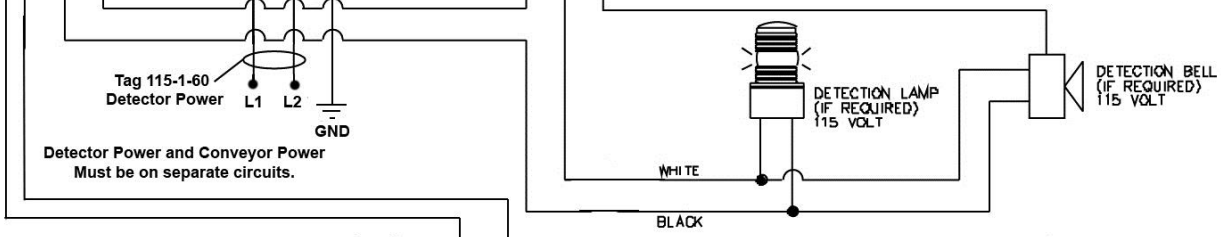


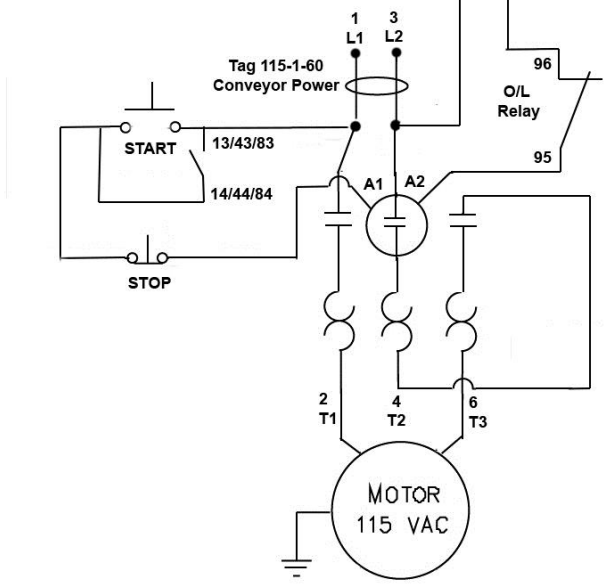
TWO SEPARATE POWER CORDS ARE REQUIRED !!

1) – CONNECTION TO THE DETECTOR CIRCUIT BOARD IS 115 VOLT, SINGLE PHASE, 60 Hz USE AN A.C. LINE FREE OF MOTOR START–UPS (i.e. LIGHTING).
2) – CONNECTION TO THE MOTOR STARTER IS 115 VOLT, SINGLE PHASE, 60 Hz.

NOTE:
ALL GROUNDS ON THE POWER SUPPLIED TO THE DETECTOR, CONVEYOR AND/OR REJECT DEVICES MUST ORIGINATE FROM THE SAME MAIN GROUND. IF THE GROUNDS ON THE SUPPLY POWER ARE FROM DIFFERENT GROUND REFERENCES, FALSE TRIGGERING MAY OCCUR IN THE METAL DETECTOR.

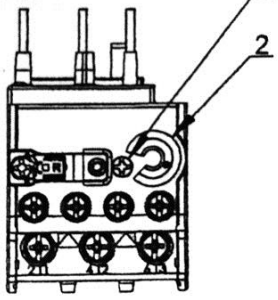
On customer-supplied conveyors, motors, or starters, an isolation relay is required for any voltage other than 115-1-60 when using stop-on-detect.





UL HP Rating	O/L Current Trip Range 120/1/60
1/6	-------
1/4	4.0A - 6.3A
1/3	5.6A - 8.0A
1/2	7.0A - 10A
3/4	10A-15A
1	11A - 17A
1-1/2	15A - 23A
2	22A - 32A
3	25A - 40A

OVERLOAD RELAY

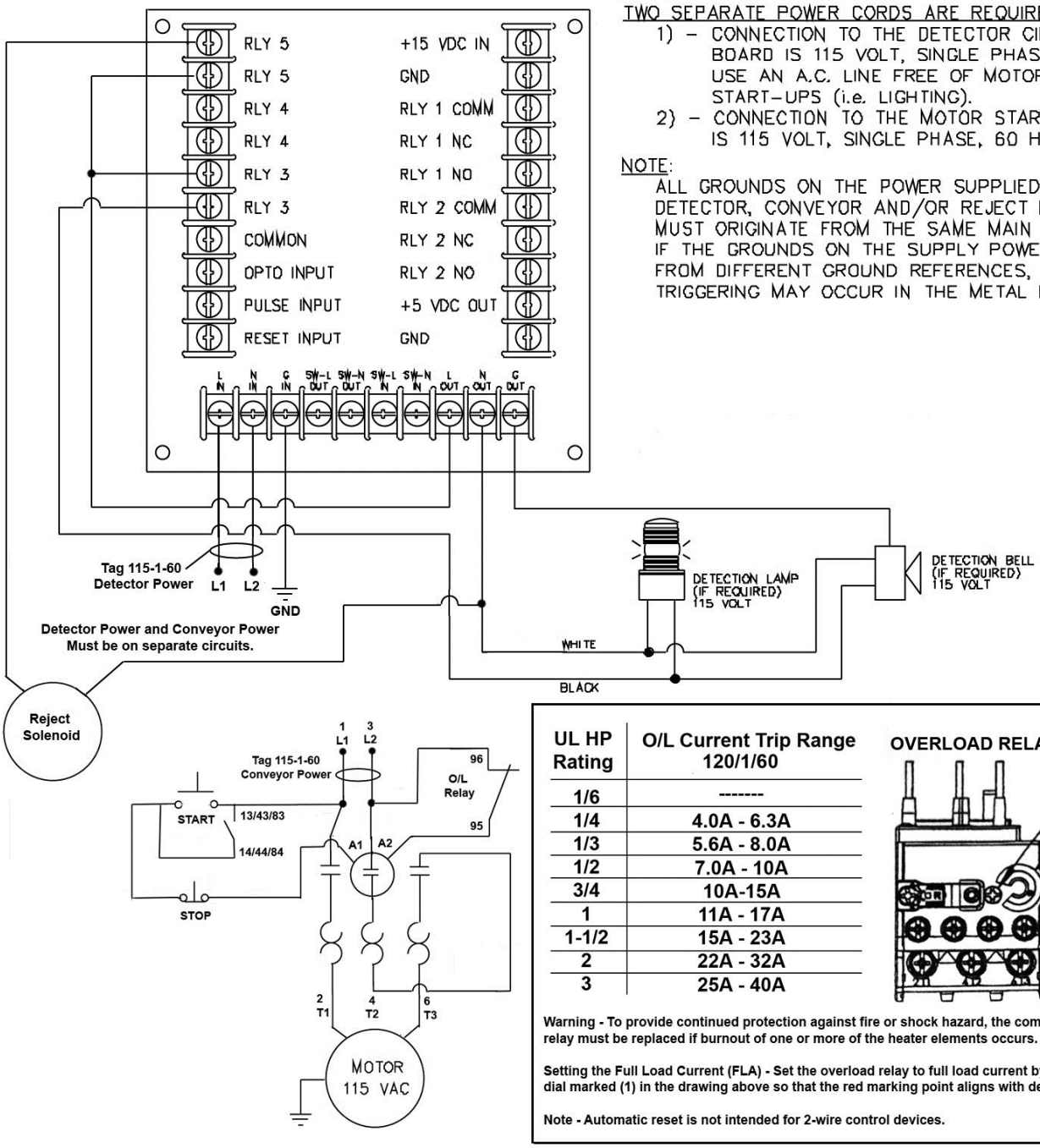


Warning - To provide continued protection against fire or shock hazard, the complete overload relay must be replaced if burnout of one or more of the heater elements occurs.

Setting the Full Load Current (FLA) - Set the overload relay to full load current by adjusting the dial marked (1) in the drawing above so that the red marking point aligns with desired current (2).

Note - Automatic reset is not intended for 2-wire control devices.

WIRING DIAGRAM FOR CONVEYOR WITH REJECT SOLENOID
INCOMING VOLTAGE 115V/SINGLE PHASE/60Hz



TWO SEPARATE POWER CORDS ARE REQUIRED !!

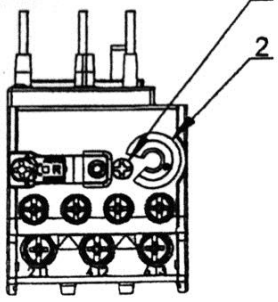
1) – CONNECTION TO THE DETECTOR CIRCUIT BOARD IS 115 VOLT, SINGLE PHASE, 60 Hz USE AN A.C. LINE FREE OF MOTOR START–UPS (i.e. LIGHTING).
2) – CONNECTION TO THE MOTOR STARTER IS 115 VOLT, SINGLE PHASE, 60 Hz.

NOTE:

ALL GROUNDS ON THE POWER SUPPLIED TO THE DETECTOR, CONVEYOR AND/OR REJECT DEVICES MUST ORIGINATE FROM THE SAME MAIN GROUND. IF THE GROUNDS ON THE SUPPLY POWER ARE FROM DIFFERENT GROUND REFERENCES, FALSE TRIGGERING MAY OCCUR IN THE METAL DETECTOR.

UL HP Rating	O/L Current Trip Range 120/1/60
1/6	-------
1/4	4.0A - 6.3A
1/3	5.6A - 8.0A
1/2	7.0A - 10A
3/4	10A-15A
1	11A - 17A
1-1/2	15A - 23A
2	22A - 32A
3	25A - 40A

OVERLOAD RELAY

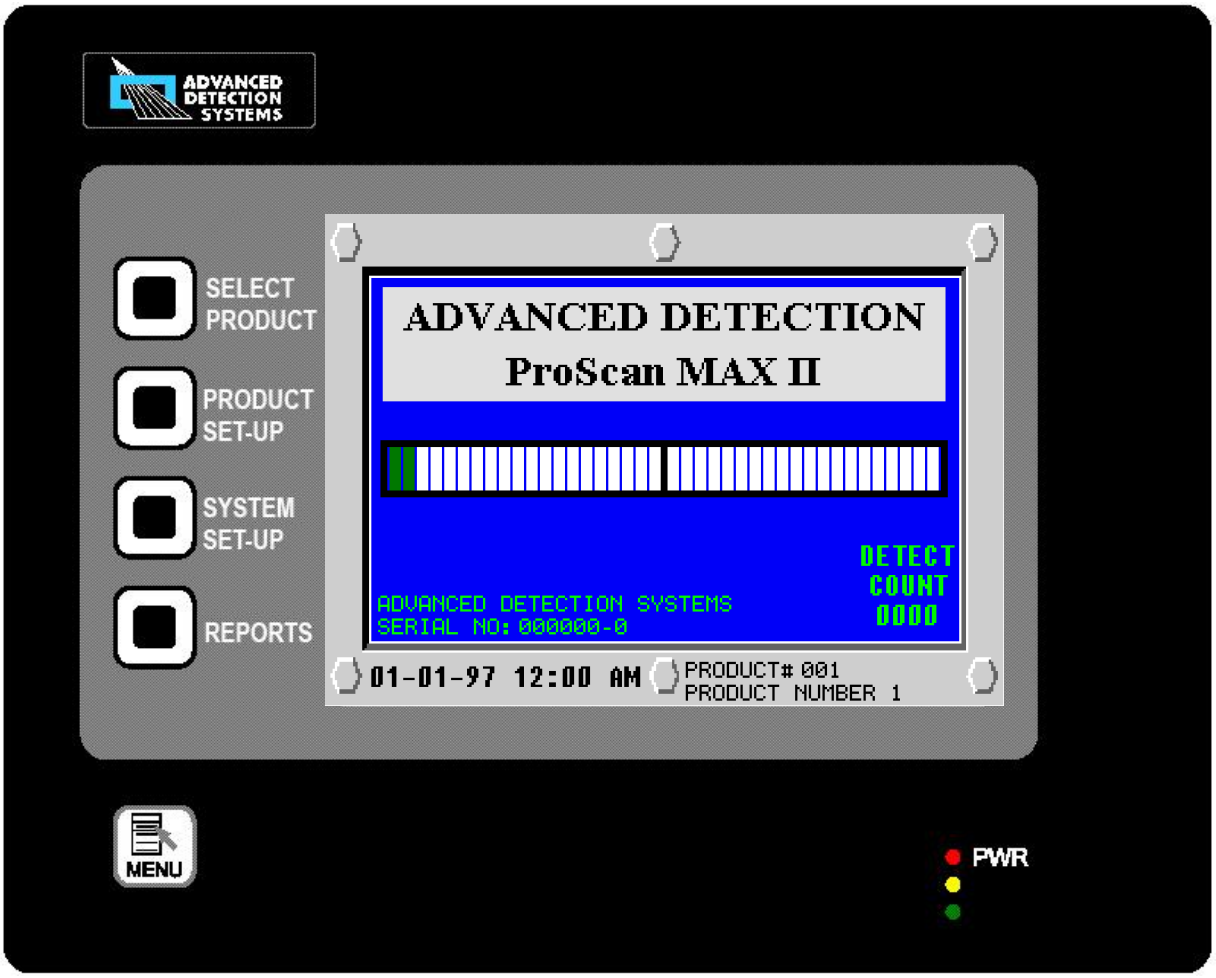


Warning - To provide continued protection against fire or shock hazard, the complete overload relay must be replaced if burnout of one or more of the heater elements occurs.

Setting the Full Load Current (FLA) - Set the overload relay to full load current by adjusting the dial marked (1) in the drawing above so that the red marking point aligns with desired current (2).

Note - Automatic reset is not intended for 2-wire control devices.

FRONT PANEL INDICATORS



NAVIGATING THE MENU

A "Menu Flow Chart" showing all of the possible command screens which can appear on the display would be very large and not practical to include in this manual. We've tried to simplify the menu system by making it very intuitive to follow the screens and buttons. With a little practice, it should become quite easy to find your way around. For purposes of this discussion we will use the “Windows / File / File” method of navigating around the menu. As an example, if we needed to go to the “Reject Options” screen, we would say MENU / LEVEL 3 / PASSWORD / REJECT OPTIONS.

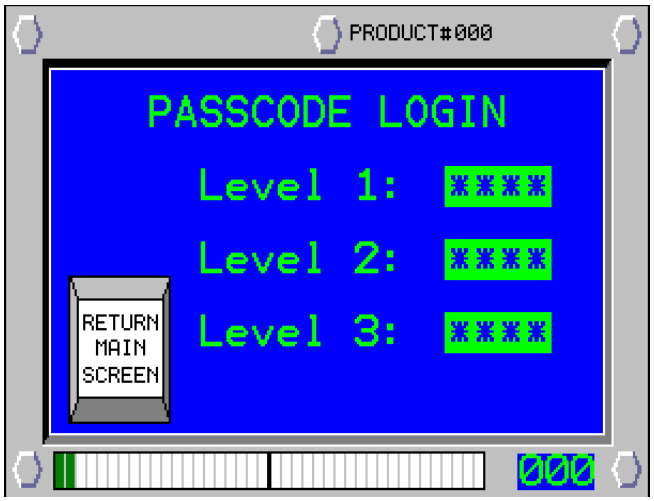
The display itself is a touch sensitive display. It will respond to touches on lighted buttons on the screen. It is not necessary to touch very hard. Try to touch the center of any buttons. In the lower right hand side of the display panel there are three LED’s arranged in a vertical line. They are used for diagnostic reasons for the display only and have no reference to the operation of the metal detector

When power is applied, the metal detector will sequence through a number of self-test screens, ending with the screen shown above. This screen is the “MAIN” screen, and it will appear on the display unless the user has entered one of the menu levels. The "MAIN" display shows which product number the metal detector is ready to inspect in the lower right hand corner. There is also a counter that shows the number of detections that have occurred since the counter was last reset. A real time clock shows the date and time in the lower left corner. All of the operating screens will have a “Main Screen” button that will take the operator back to the “MAIN” screen.

The “MENU” button on the lower left section of the panel is used to display the options when moving from the “MAIN” screen. Once the “MENU” button is pressed the screen will display three different levels of security. Each level is protected by its own password.

LEVEL 1: Allows the operator to change product and change the level 1 password.
LEVEL 2: Allows the operator LEVEL 1 functions as well as access to change all aspects of the product such as sensitivity, reject control and timing, product learn, product naming, etc.
LEVEL 3: Allows the operator LEVEL 2 functions as well as the ability to change system settings and access the maintenance menu.

PLEASE NOTE: All subsequent screen shots will not show the entire panel, but just the touchscreen view.



SECURITY (PASSWORD)

The detector is password protected to avoid unauthorized tampering. The detector has three levels of security; level 1, level 2, and level 3. Each level allows greater access to more operating functions of the detector. The default passwords set at the factory are: Level 1 = 1000, Level 2 = 2000, and Level 3 = 3000. The password can be set at each level by pressing the “”SECURITY” button on each level menu.

Since level 3 allows access to all screens, this manual will proceed with the assumption that we are operating in level 3. In order to enter a level, touch the level desired. A keypad should appear. Enter the four digit password and press the “ENTER” key. Once access has been gained, it will continue until the “LOG OUT” button is pressed or until 10 minutes has passed.

There are four “Shortcut” keys along the left side of the panel. They will take you directly to the screen desired after the correct password has been entered.

PRODUCT SET-UP PROCEDURES

SETTING THE DETECTOR TO COMPENSATE FOR PRODUCT EFFECT

One of the basic principles that should be understood before adjusting the metal detector is product effect. Almost all products inspected are conductive to some degree, and create a signal, which is picked up by the metal detector. This occurs even without the presence of metal. This product effect will cause the detector to false trip, and must be suppressed in order to make reliable detection possible.

Product effect is caused mainly by moisture, but can also result from product acidity, fat, mass, temperature, or salt (when combined with moisture).

Metal detectors are designed to "tune out" or compensate for the signals created by the product. The following section describes how to set up the metal detector and compensate for product effect.

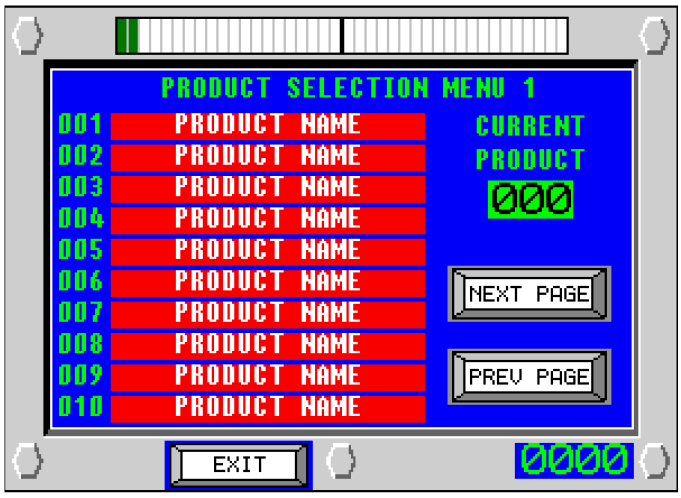
METAL DETECTOR AUTO-LEARN PROCEDURE:

PLEASE NOTE: THERE ARE TWO LEARN METHODS AVAILABLE WITH THIS UNIT, AUTOMATIC FEED AND CONTINUOUS FEED. BOTH WILL BE DESCRIBED BELOW.

It is a good idea to first read the following section "Tips for Successful Auto-Learn" before beginning the auto-learn process.

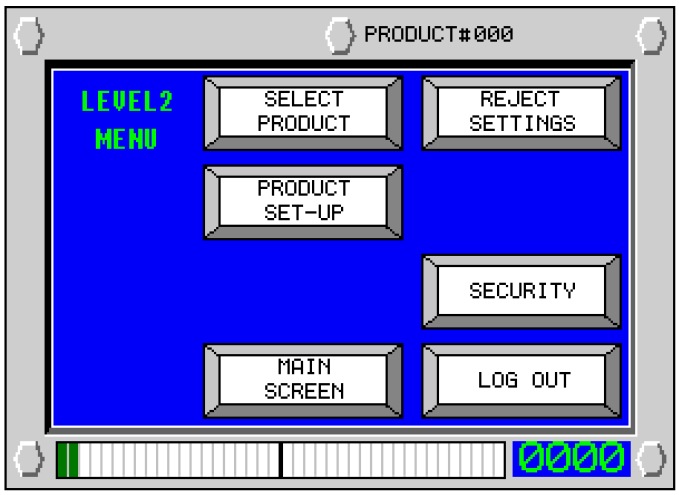
PRODUCT SELECTION: Product selection is available on all 3 password levels. First, navigate to the level menu screen (MENU / LEVEL / PASSWORD). If you wish to change products before performing the learn function, press the “SELECT PRODUCT” button to go to the “PRODUCT SELECTION MENU”. If not, then the learn will over write the current product.

The following screen will appear:

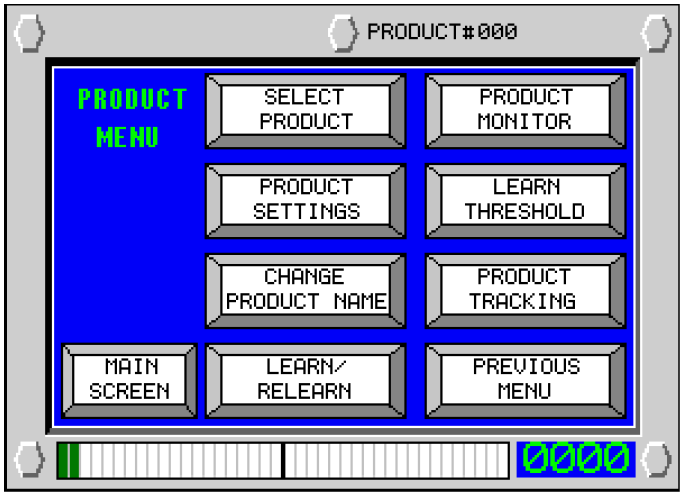


The current product is indicated on the screen along with a list of the first 10 products and their names. Decide what product number you would like to use for the product you are about to learn or select an existing product to relearn. If your number selection is not on the list, you can “Page Up” or “Page Down” to reach the correct number. Press the current product number and it will produce a keypad to enter the product number you have chosen. Enter the number and press the enter key. This will change the current product to your new selection. There is memory in the detector to store settings for 100 different products. Return to the menu by pressing “Exit”.

LEARN/RELEARN: Note, you must be logged in to level 2 or 3 in order to perform the learn function. Logging in on level 2 produces the following screen:



Now press the "PRODUCT SET-UP" button to go to the learn menu. The following screen will appear:

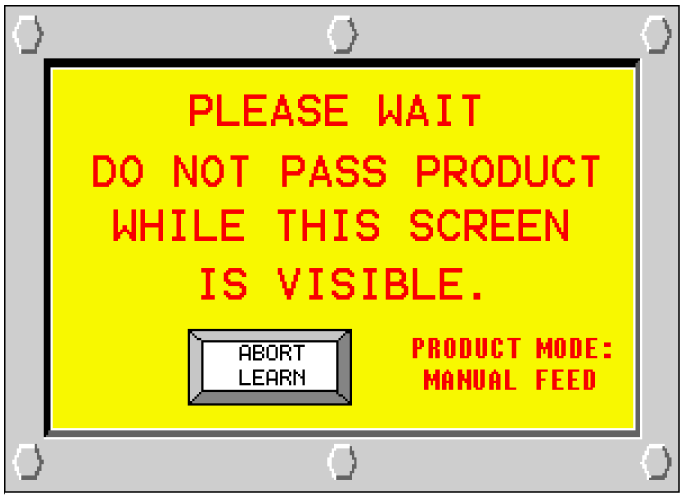


Now press the "LEARN/RELEARN" button to go to the learn menu. The following screen will appear:

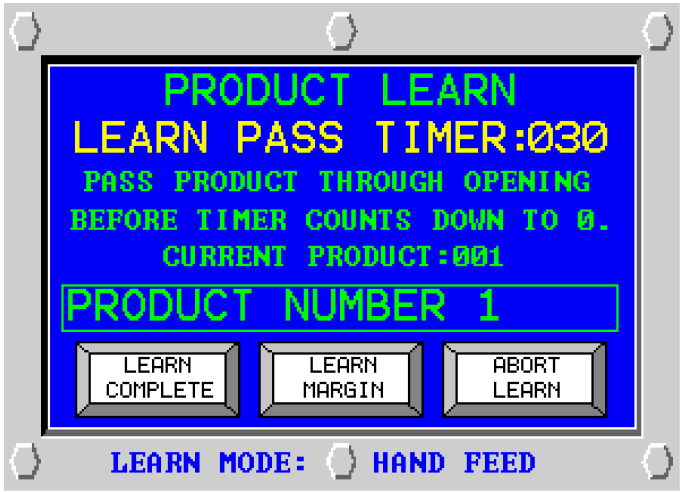
There are two types of learn processes, hand feed and automatic feed. Hand feed is used when there is a small sample of products that are not running continuously at the moment. They may be later during production. An example would be hams. The production line will run continuous hams, but you only have one. In this case you would select "HAND FEED" even though it will be continuous later. Automatic feed is when there is a continuous line uninterrupted line of products. This learn method allows a hands-off learn. A continuous pipeline of liquid or a uninterrupted line of candy bars would be appropriate for this method. Instructions for both methods are described below.

HAND FEED LEARN/RELEARN: The learn screen gives instructions to pass the product through the opening. It also shows which product is selected at the time.

After selecting "HAND FEED" the following screen will appear:



Do not place anything in the opening when this screen is visible. After a few seconds this screen will be replaced by the following screen:

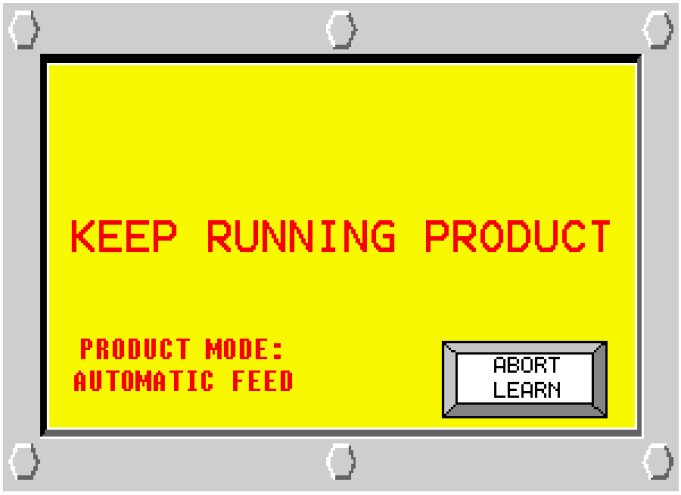


When the “PLEASE WAIT” screen goes off, place the product on the conveyor belt and allow it to pass through the detector aperture. If the product has enough signal, the “PLEASE WAIT” screen will appear again. When the detector has enough samples, the “LEARN SUCCESSFUL” screen will appear. The detector will usually require 2-3 passes of the product. Some products with large signals may require more passes. Some products have almost no signal and it is more difficult for the detector to “learn”. If, when passing the product through the detector, the “PLEASE WAIT” screen does NOT appear, then allow the learn timer to reach zero. The detector will then resort to default settings for the best sensitivity.

If, during the learn process, the detector head was bumped or someone’s watch, ring, or hands get too close to the detector opening, then press the “ABORT LEARN” button to discontinue the learn session and begin again.

LEARN MARGIN: There is an additional button on the learn screen named “LEARN MARGIN”. This has to do with the consistency of the product. When the detector learns the product signal it sets the detect point at some level above the product signal. When metal comes through the detector it makes a large enough signal to go above the detect point and the detector “sees” metal. If the product is very consistent, the learn margin can be set close to the product signal. If the product is not consistent at all, the learn margin must be set farther from the product signal to allow for varying product signals. The learn margin is variable from 1-250. The default margin is set at the factory to 25. This will handle most products and would not normally need to be changed. If, after successfully learning a product, the detector occasionally triggers on good product, it may be necessary to increase the margin. A setting of 1 setting is very “tight” and a setting of 100 is very “loose”. In general, if the setting is too “tight” it will result in false triggers, and if the setting is too “loose”, it will result in reduced sensitivity.

AUTOMATIC FEED LEARN/RELEARN: After selecting “HAND FEED” the following screen will appear:



When the “Keep Running Product” screen appears, be sure the conveyor belt is running and allow product to pass through the detector aperture. When the detector has enough samples, the “LEARN SUCCESSFUL” screen will appear.

If, during the learn process, someone’s watch, ring, or hands get too close to the detector opening, then press the “ABORT LEARN” button to discontinue the learn session and begin again.

TIPS FOR SUCCESSFUL AUTO-LEARN

Follow these hints to assure the best results when learning product:

1. Pick a sample product that is representative of products that will be run during production.

2. If products vary in size, pick the largest representative product. This will give you the "worst case" in background product signal. In this case, the final set-up of the metal detector will be more conservative. This means it will be slightly less efficient at detecting smaller metal contaminants, but will result in fewer false detections.

3. Make sure the learn procedure is done under the same conditions as production. For example, if the product being inspected is hard frozen, make sure the sample used to learn is hard frozen. Variations in product temperature can change the product signal a great deal.

4. Partial thawing of hard frozen products will give uncertain phase values. For all practical purposes, partially frozen meat products should not be used for auto-learning.

5. Make sure the sample product is uncontaminated by metal. If, by chance, a contaminated product is chosen for the learn procedures, then the metal detector will "think" that metal contamination is acceptable, and not reject it.

6. If the package is irregularly shaped, make sure to pass the package through the search head with the same orientation as the packages will go through the detector during production. Package orientation has a large effect on product signal.

7. Keep moving metal objects away from the metal detector head during learn. Putting hands near the detector aperture can cause poor results especially if the operator is wearing rings, watches, or other metal objects.

8. Remember that during the learn time the metal detector is learning what is acceptable. During this time keep vibration, metal, and any other items, including hands, away from the metal detector.

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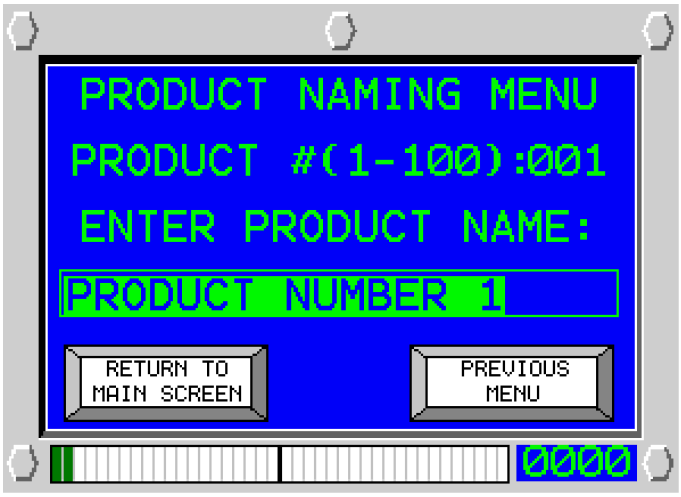
ADDITIONAL ITEMS FOR PRODUCT SET-UP

NAMING THE PRODUCT

After the learn process has been completed, the operator should enter a name for the product. Name selection is available in level 2 or 3. At either menu select the "CHANGE PRODUCT NAME" button to go to the "PRODUCT NAMING MENU". The following screen will appear:



The default name for each product is Product 1, Product 2, etc. Press the Product Name to make the keyboard appear. Enter the name you have chosen for this product, up to 20 characters, and press the enter key on the keyboard. The name has now been changed and the "PREVIOUS MENU" button can be pressed to return to the level 3 menu. If you elect to change the name in the future, the same process should be followed.

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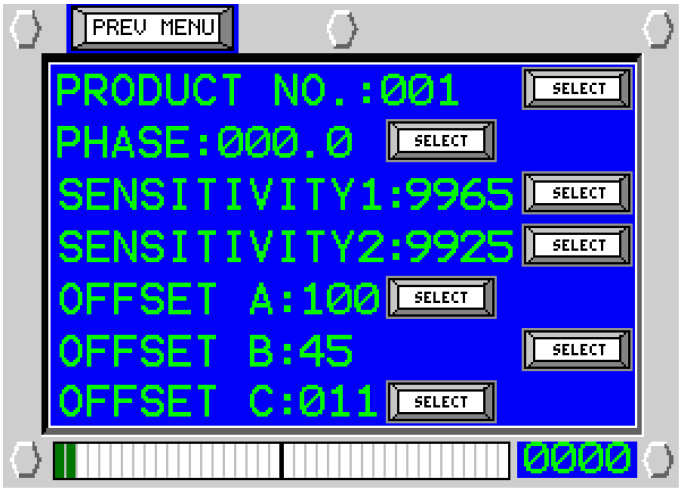
PRODUCT SETTINGS

A variety of settings are stored in the detector's memory for each product. The product settings can be changed through the level 2 or 3 menus. To view the settings or to make changes go to MENU / LEVEL 2 / PASSWORD / PRODUCT SETTINGS. The following screen will appear:



You may also use the shortcut key "Product Settings" to the left of the control panel. A brief description of each setting is shown below.

PHASE SETTING

As mentioned earlier in this manual, the metal detector attempts to "tune out" the signal coming from the product itself. During the learn process, the metal detector selects the correct phase setting, from 0-180, that most effectively reduces the signal coming from the product. Think of the phase control as the tuning dial on a radio. Only instead of tuning in a station, it is tuning out the product. This phase is set most accurately by the learn process and generally should not have to be adjusted by the user.

SENSITIVITY 1 & SENSITIVITY 2

The metal detector has two channels of sensitivity. During the learning process, the metal detector assigns the signal from the product to one channel of sensitivity and the signal from the metal to the other channel of sensitivity. Each channel is adjustable from 0-9999. The metal detector increases the sensitivity on the metal channel and decreases the sensitivity on the product channel. If you check the sensitivity after learning a product, you will see that one sensitivity is higher than the other. The lower sensitivity is the product and the higher sensitivity is the metal. Based on the phase setting, described above, the metal detector will select one channel for product and the other for metal. Therefore, the sensitivity to metal is not always on the same channel and can be determined only by examining both channels to see which is higher. While the channels are mostly independent of each other, there is some crossover between the two.

OFFSET A

It is adjustable from 1-100 and is set during the learn process and should not need to be adjusted.

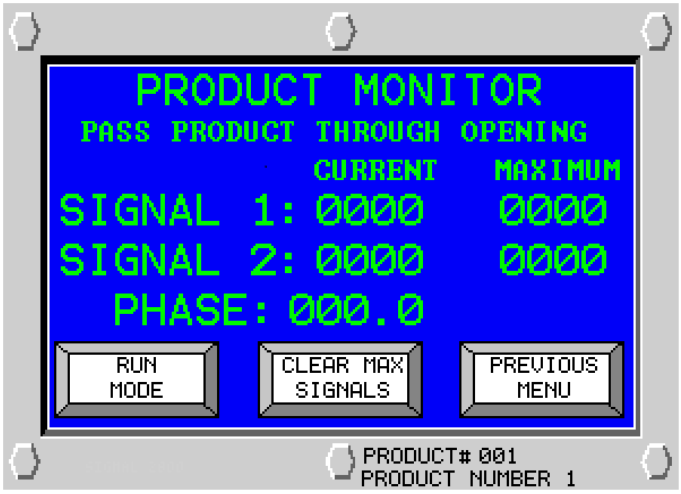
OFFSET B

OFFSET B is determined during the learn process and should not need to be adjusted.

OFFSET C

It is adjustable from 0-11 and is set during the learn process. It should not need to be set by the operator.

PRODUCT MONITOR: The detector is equipped with a Product Monitor, allowing the user to view the measured signals of the product. The Product Monitor displays the product values for Signal 1 and 2, which correlate to Sensitivity 1 and 2, along with the product phase. The Product Monitor is helpful in determining variations in your product and is vital for the manual calibration of the unit for advanced users. Product Monitor is accessed through the Product Menu screen.



MANUALLY ADJUSTING SENSITIVITY

To manually configure the sensitivity of your detector using the Product Monitor, it is first necessary to understand the correlation between the sensitivity settings and the product monitor values. The detector has a detection threshold value of 10000. To achieve a detection, the *value of the product + the sensitivity value + the contaminant value* must equal or exceed 10000. To determine a sensitivity value, run a sample product AND a standardized contaminant (test wand) through the unit and record the values from the product monitor. If the product and the contaminant have a combined value of 1000 for example, then a sensitivity of 9001 will cause the detector to trip. Keep in mind that variations in product effect must be considered, and the sensitivity needs to be adjusted accordingly to factor in those variations. This procedure is utilized for Sensitivity 1 and 2, using the Product Monitor Signal 1 and 2 values, respectively.

Please Note: A detection will occur if either signal 1 or signal 2 exceeds the detection threshold.

PRODUCT TRACKING

Product tracking is used when the product being inspected will slowly change during the course of a run. The change may be a gradual change in product temperature, moisture content, or mass. It is important to note that the change must be gradual. If the product changes suddenly, the detector will trigger. The default setting of the product tracking system is "OFF". If you find that the detector begins to trip after the product changes slightly during the day, go to the level 3 menu and press the "PRODUCT TRACKING" button to go to the "PRODUCT TRACKING MENU". Turn it on by pressing the "ON OFF" button. Product tracking is a method of averaging the signal coming from the product so that as the signal changes gradually during the day, the allowed signal will gradually change also. The product tracking menu allows the operator to select how many samples to use for the averaging process. The number of samples is adjustable from 50 to 250. The slower the rate of change, the larger number of samples should be used. It may be a trial and error method to find out what is best for your application. To change the product count, touch the count number once to highlight the number and again to bring up the keypad. Enter the number of samples and press the enter key. Press the "PREVIOUS MENU" button to return to the level 3 menu. Consult factory if you are having large variances with your product.

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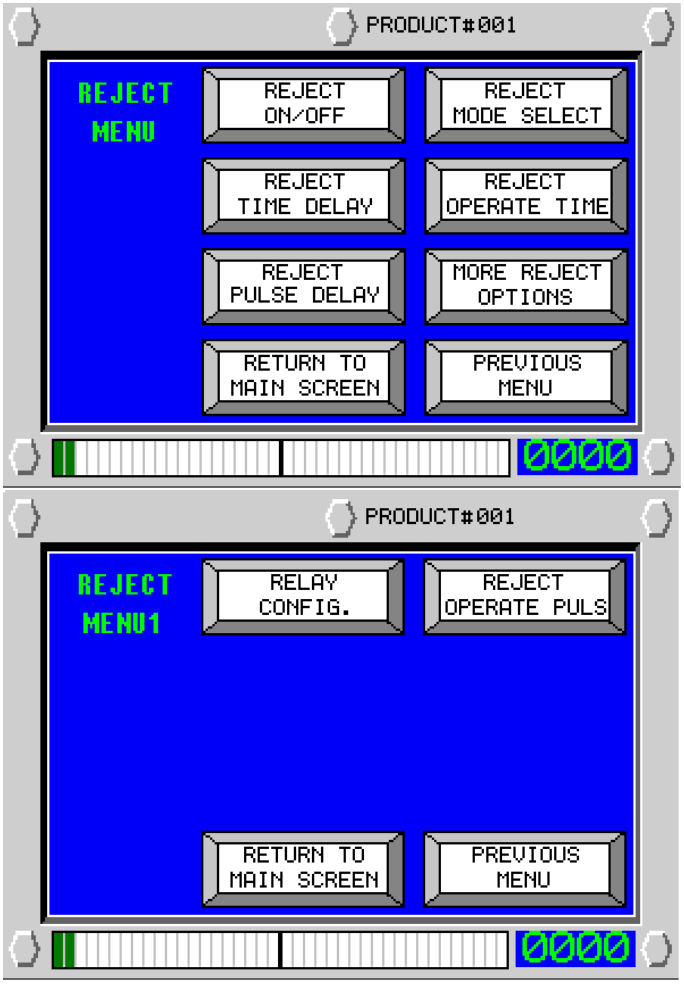
REJECT AND SIGNAL DEVICES TIMING AND OPTIONS

A brief description of each reject term is shown below.

The “REJECT OPTIONS” menu can be reached by MENU / LEVEL / PASSWORD / REJECT OPTIONS. Level 2 or 3 gives access to reject settings.

The reject menu appears below. Please note there are 2 pages:



Reject delay time - Sets the time between detection of metal and the activation of the reject device. It can be adjusted in tenths of a second from 0-30 seconds.

Reject operate time - Sets the time that the reject device stays activated. It can be adjusted in tenths of a second from 0-30 seconds.

On detection of metal, the reject device, light, and or alarm will activate after the "delay" time has elapsed. The reject and signal devices will continue to operate until the "operate" time has elapsed.

Similarly, a conveyor that has been wired to stop upon detection will do so after the "delay" time has elapsed. Unlike rejects, however, the conveyor must be restarted by depressing the start button on the conveyor's motor starter. The conveyor will not start until the metal detector operate time has elapsed.

Reject Mode Select - After metal has been detected the metal detector output can be delayed by timing circuits as described above. This works well for conveyor belts that move at a constant speed. In the case of variable speed drives or conveyors that stop and start occasionally another method of timing is preferred. A pulse counter circuit is the best alternative. The detector can be set to activate the outputs by time, by pulse count, or manually. In the manual mode, the metal detector will stay in the reject position until an external button, customer supplied, is activated.

Pulse Count - In the pulse mode the reject timing is controlled by a pulse generator attached to one of the conveyor pulleys. The generator creates 100 pulses per revolution of the conveyor pulley. The metal detector has internal circuitry that will count the selected number of pulses before the reject device is activated. It will also count pulses to set the operate time.

Reject On/Off - Enables or disables all of the detector outputs. It is especially useful to have the reject device disabled during the product set-up process.

Relay Configuration – Relay outputs 1 & 2 are mechanical relays that have all three connections (NO, NC, & COMM) supplied to the terminal strip. The reject device can be attached to the proper connections.

Relay outputs 3, 4, and 5 are solid state relays used for AC power. They can be configured as normally open (NO) for devices that require power to operate or as normally closed (NC) for devices that require an interruption of power to operate. Pressing the "RELAY CONFIG" will bring up the "RELAY CONTACT SETUP" screen. After changing the configuration of the relays, you MUST press the "SAVE SETTINGS" button to make the change permanent.

The metal detector is usually mounted on a conveyor that transports product to be inspected through the aperture of the search head. A reject device such as an air blast or sweep arm is located some distance from the metal detector. In order for the device to reject just the contaminated product, at the correct time, timing parameters need to be set. In general, longer reject operate times result in more product being rejected, and a greater insurance that the product containing the contaminating metal is diverted from the product stream. Shorter operate times save product from the reject bin at the cost of a greater chance of contaminated product not being rejected. In gravity type or pipeline applications it is usually recommended to keep the "delay" time at "0" or as short as possible because the product is moving fast and the detector and the reject device are close together. The "operate" time should also be short to minimized rejected product.

Setting the Timing of the Reject Device

To determine the settings for delay and operate timing, run a product with a metal contaminant sample through the detector. Follow the hints on "**Tips for Setting the Reject Timing**" below.

If you change product, be sure that the delay and operate timing is appropriate for the new product size.

Tips for Setting the Reject Timing

1. Always set up reject times after determining the settings for a product.

2. Always run the packages in the same orientation as during actual production.

3. If the product is a package, put the metal sample at the mid-point of the package in the orientation that it will go through the metal detector.

4. Use a metal sample that is typical for the expected size of metal to be detected by a given metal detector width and height. The best samples to use are the test spheres that are shipped with the metal detector. If ferrous, nonferrous, and nonmagnetic stainless samples are on hand, use the ferrous test sample.

5. If the package is long compared to the dimension of the metal detector, make the operate time slightly longer than the time needed to get the package off the line. Make the delay time slightly shorter than is needed to allow the package to get to the rejection point. This is necessary to provide compensation for two metal detection situations:

The metal is at the leading edge of the package. In this case, the rejection device may operate slightly sooner than when the package actually arrives at the rejection point. The longer operate time will keep the reject on while the package is catching up to the reject point.

The metal is at the back end of the package. The package will almost be beyond the rejection point when the reject mechanism operates.

6. If product is loose on the belt, such as cuts of meat or poultry, the reject operate time should be enough to allow "one metal detector depth" of product to be rejected. This is the amount of product that fits in the distance between the front edge of the metal detector and the back edge of the detector.

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ADDITIONAL FEATURES

DATE/TIME SET-UP

The metal detector has an internal "real-time" clock that keeps track of the current date and time. It is set at the factory and normally would not need to be adjusted. However, to compensate for different time zones and for changes in Daylight Savings Time, etc. it can be adjusted by going to MENU / LEVEL 3 / PASSWORD / MAINTENANCE / MORE MAINT OPTIONS / CHANGE DATE TIME

PRINT/REPORT FUNCTIONS

Event list - The metal detector maintains a file named the “DATA LOGGER”. The log keeps track of all events that affect the metal detector operation. This list can be accessed at any time by simply plugging into the USB port on front of the detector and downloading the file to a laptop computer. The data log can be cleared by going to MENU / LEVEL 3 / PASSWORD / REPORTS or by using the shortcut key “Reports” to the left of the control panel.

CONTRAST ADJUST

The contrast of the metal detector display can be adjusted by going to MENU / LEVEL 3 / PASSWORD / MAINTENANCE / MORE MAINT OPTIONS / DISPLAY ADJUST.

DETECT COUNTER

The detect counter is used to indicate the number of times metal has been detected since the counter was last reset. Reset the counter during product changeover for more accurate product run information. To reset the counter go to MENU / LEVEL 3 / PASSWORD / REPORTS / CLEAR DETECT COUNTER

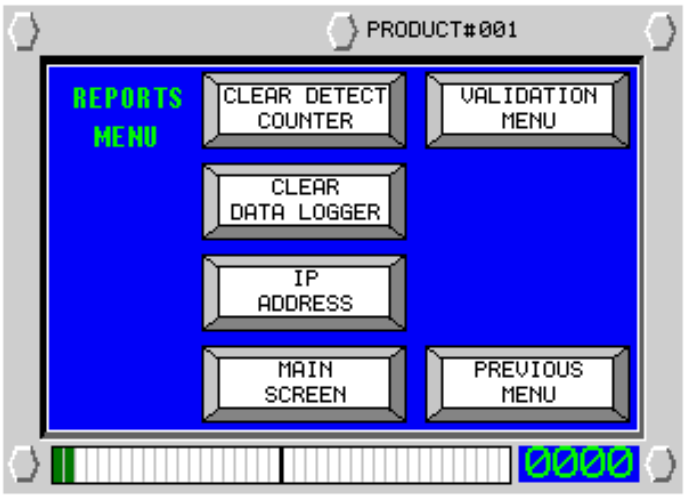
MAINTENANCE MENU

The maintenance menu allows the user access to the system settings that do not normally need to be adjusted. It can be reached by MENU / LEVEL 3 / PASSWORD / MAINTENANCE. It can also be reached by using the shortcut key “System Settings” on the left side of the control panel. The items on the maintenance menu are; OFFSETS D, E, F & G. These levels should not be changed by the user unless instructed to do so by the factory. Another item, the “Learn Threshold” sets the sensitivity of the metal detector during the “Learn” function. This should not be changed without consulting the factory.

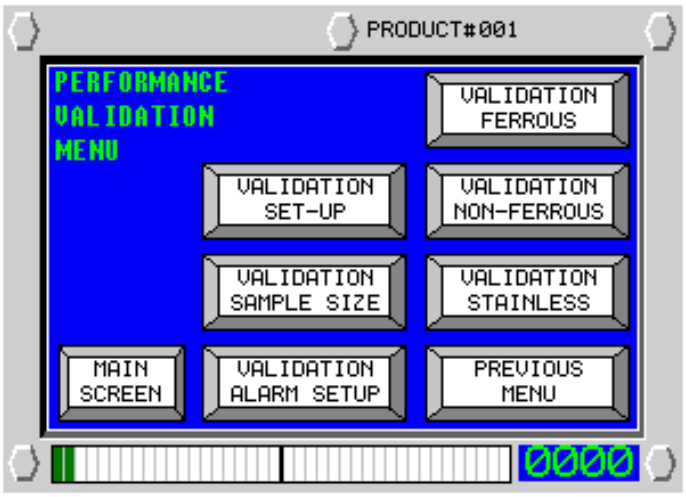
The “Learn Timeout” adjustment sets the amount of time that the detector will continue to look for signals coming from the product during the “Learn” function. If there is not a detectable signal before the countdown reaches zero, the detector assumes that the product does not generate a signal and will default to the most sensitive settings for dry products The button marked “More Maintenance” will lead to a second maintenance menu to set date/time, adjust display contrast, etc.

PERFORMANCE VALIDATION

The performance validation feature allows the use to set up periodic reminders that the product must be tested with the metal samples. When enabled, this feature reminds the user that performance validation is due. Access to the performance validation feature is through the 'Reports' hard key on the left. When pressed, the following screen appears:

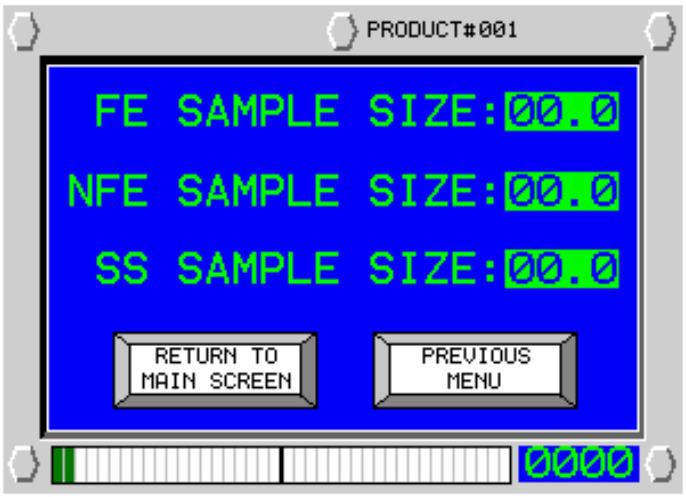


Select 'Validation Menu'. The following screen will appear:



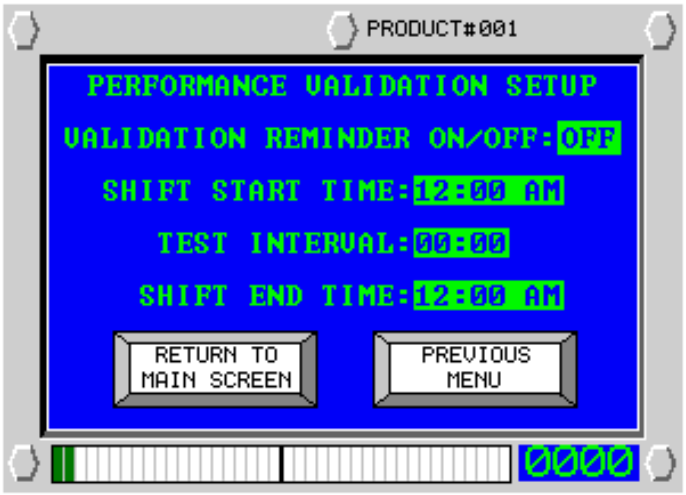
Refer back to this menu for all subsequent performance validation set-ups.

Select ‘Validation Sample Size’ and the following screen will appear:



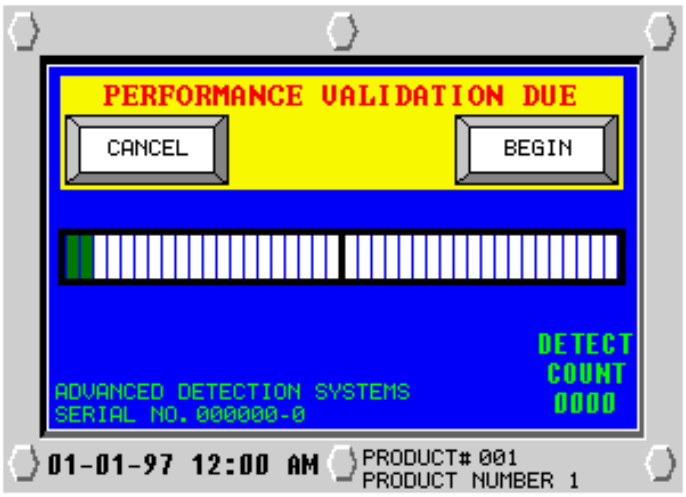
Enter the size of the test wand you will be using during the test. This value will be saved in memory and listed on the data logger along with a time and date stamp upon successful completion of the ferrous test. Enter the desired values for each metal type.

Enter ‘Validation Set-Up’ and the following screen will appear:

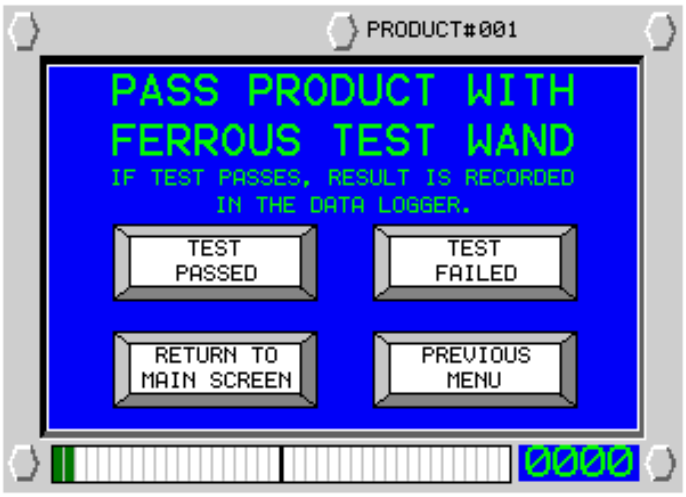


Please note: the correct date and time must be entered before attempting to set the shift times and interval. Please refer to the maintenance section of this manual.

Enter the desired shift start time, test interval and end time. Then, turn the validation reminder on. The performance validation reminder is now active. When the current time matches the test interval the following performance reminder screen will appear:

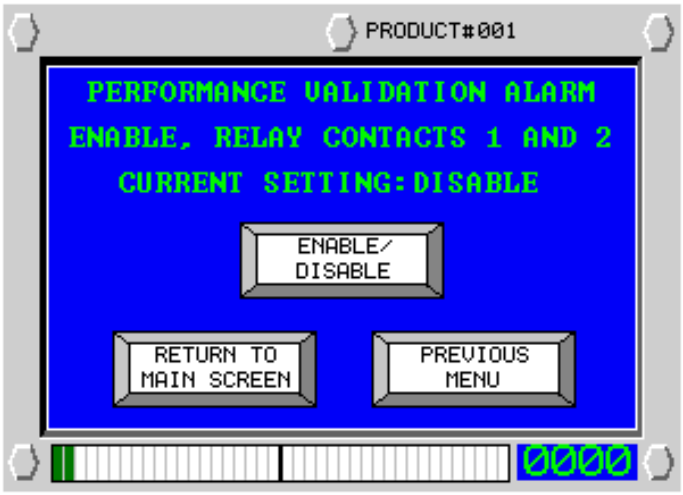


Selecting 'Cancel' simply returns the system to the main screen. Selecting 'Begin' navigates the user back to the 'Performance Validation Menu' screen shown previously. Please note: the user will be prompted for the level 3 access password when selecting 'Begin'. From the 'Performance Validation Menu' screen select 'Validation Ferrous'. The following screen will appear:



Test the product with the ferrous test wand. If a detection occurs press 'Test Passed'. If it did not or an unwanted detection occurs press 'Test Failed'. The data logger will record the ferrous test wand size entered previously and the date and time of the detection only if a detection occurs and the user presses 'Test Passed'. Otherwise no recording to the data logger is made noting the performance validation test. When the test is complete the user will be sent back to the 'Performance Validation Menu'. Select the 'Validation Non-Ferrous' Button and repeat the process. Repeat entire process for stainless.

If the user desires more than a visual reminder that performance validation is due, an alarm contact can be connect to output relay 1 or 2. Those relay outputs are normally tied to the reject device, so the user must enable the performance validation alarm. From the 'Performance Validation Menu' select 'Validation Alarm Setup'. The following screen will appear:



Press the Enable/Disable to enable the relay. The relay will toggle when the performance reminder screen appears and clear when the user selects either Cancel or Begin. An alarm and/or light can be wired to the relay.

TROUBLESHOOTING

WARNING: Whenever wiring is to be done to the terminal stop of the detector, make sure ALL sources of power have been disconnected. Terminals controlling other devices may be powered from sources other than those supplying the metal detector. Caution should be used when working on machinery as components may stop and start automatically without warning.

Most faults found with metal detector installations occur in the conveyor system or in the surroundings of the machine. As a result, the best way to troubleshoot a detector is to go through the mechanical and electrical installation sections.

There should be one ground to the detector, conveyor, and reject.

The metal detector should be installed away from pulleys and motors.

All conveyor feet should be firmly on the floor to prevent rocking.

There should be no fixed or moving metal within the metal-free zone.

Nothing should be in contact with the inside of the metal detector aperture.

Voltage sags or surges greater than 10% can cause false triggers.

Two pieces of metal making intermittent contact in the vicinity of the detector will cause false triggers. Check for loose nuts and bolts.

INTERMITTENT FALSE TRIPS

Observe the surroundings.

When the detector trips, try to figure out what could be causing it.

Look for two pieces of metal making intermittent contact in the vicinity of the metal detector.

Look for starting/stopping of nearby machinery.

Verify that the electrical ground to the detector is making solid connection.

Check for static electricity around the metal detector. Control static by using an antistatic spray or by grounding the slider bed and conveyor belt.

Check the conveyor belt for a build-up of grease or grime, or for embedded metal. Such metal can be located by running the belt without product and marking the belt each time the detector triggers. If the marks appear in the same spot, loosen the belt and thoroughly clean the top and bottom of the belt.

If the detector has a remote mounted control cabinet, make sure that the connecting cable is securely fastened to prevent movement.

Check to see if the rejection device is binding when it moves, causing excessive vibration.

CONSTANT FALSE TRIPS

Check to make sure that the product being inspected has not changed in any way. If a product changes in moisture, temperature, or mass it will change the product signature and the current settings could fall outside of the allowable margins, causing false triggers. If this occurs, return to the set-up portion of the manual and reset the detector for the new product parameters, or re-learn the product.

Check to make sure that there are no devices in the area that are transmitters of radio frequencies. They will interfere with the detector and cause false triggers.

Check for metal in the metal-free zone.

Call the factory for support.

CONVEYOR WILL NOT START

Verify that there is correct power supplied to the conveyor motor starter.

If the detector is used to stop the conveyor, make sure that the detector has been reset. Also check that you are using the correct outputs and that they are configured as normally closed.

Check that the overload relay in the motor starter has not been tripped. If the overload continues to trip, increase the current setting slightly. **CAUTION**: If the setting is too high, it will not protect the motor in the event of an overload.

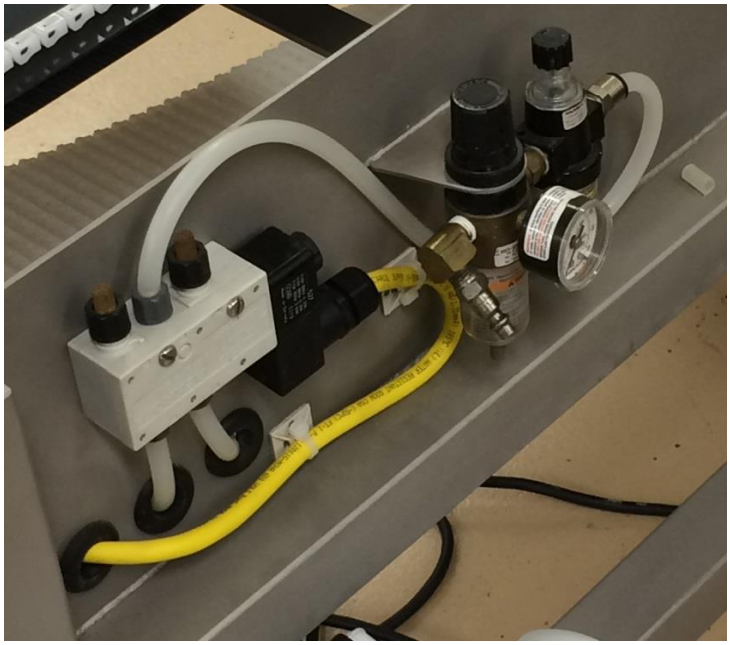
SWEEP ARM ADJUSTMENT PROCEDURE FOR PROSCAN METAL DETECTOR EQUIPPED UNITS.

Sweep arms are a commonly installed reject device on Advanced Detection Systems units. It is often necessary to adjust the sweep arm velocity beyond the standard factory settings.

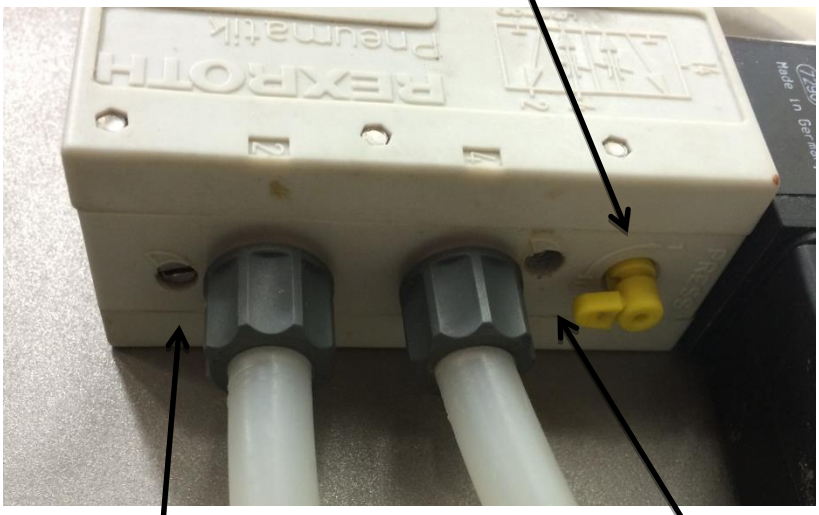
On the side of the conveyor frame, you will see an air regulator and control solenoid. Air pressure for the sweep arm should be approximately 80-100psi. This is adjusted using the air regulator control knob located on the top of the regulator assembly.

Changing the air pressure does not affect the speed or return rate of the sweep arm.

Located next to the regulator, and connected to it, is the reject control solenoid.



The yellow button activates the solenoid manually, without tripping the metal detector.



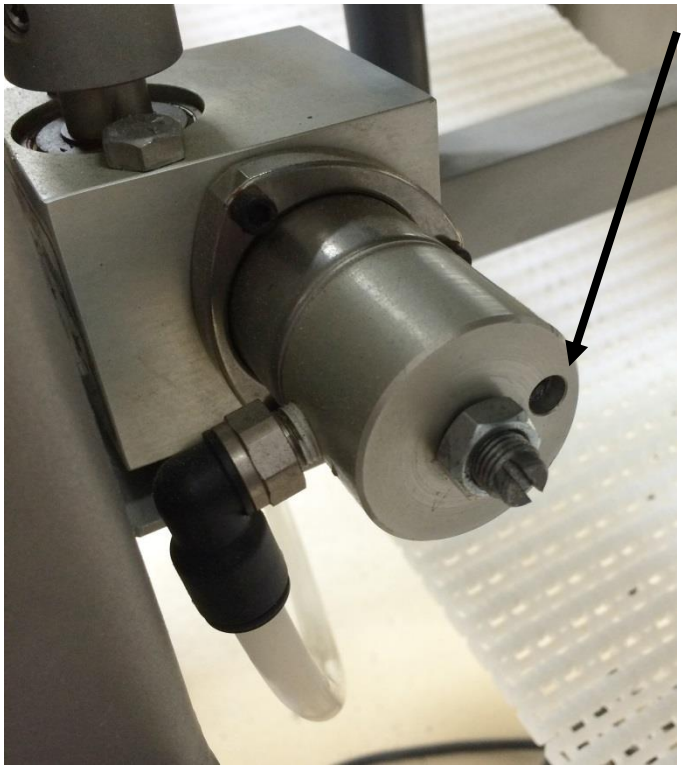
By adjusting these two set screws, you can control sweep arm speed. These set screws will not change the activation reaction time or the amount of time the arm is extended. These variables are adjusted using the **Reject Delay Time** and **Reject Operate Time** in the metal detector menu.

This set screw controls the retreat rate, or the speed in which the sweep

This set screw controls the attack rate, or the speed in which the sweep arm extends.

By adjusting the sweep arm speed on either the retreat or attack rate, it may be necessary to adjust the cushioning screws located on the air cylinder to prevent the arm "slamming". The cylinder relies upon internal air pressure to create a cushion, slowing the speed of the arm as it retracts or reaches the limits of its range of motion.

Located next to the master set screw is a small recessed set screw. There are two, each located on the ends of the cylinder. One controls the cushion for the arm on extension, the other controls the cushion for the arm on retraction. When adjusting these set screws, use small increments, ¼ to ½ turns only. **Over adjustment can damage the unit.**



These set screws should only be adjusted with the assistance of the factory.

If you experience the sweep arm traveling too far, or not far enough, it may be necessary to adjust the range of motion, or stroke, of the arm. This is done by loosening the lock nut in the center of the cylinder and adjusting the large screw.

Troubleshooting: If you experience the sweep arm retracting too far, or not far enough, and the cylinders **have not been adjusted prior**, check the sweep arm attachment point on the cylinder shaft. If the cushions are not soft enough, the arm will "slam", and over time the arm will slip on the shaft. Do not adjust cylinder throw to compensate for this, adjust the cushioning then loosen and reposition the sweep arm on the cylinder shaft.
Contact the factory at 414-672-0553 if you have any questions regarding sweep arm adjustments.

HANDLING, MOVING, AND TRANSPORTING THE UNIT

When moving the detector, be sure the unit is powered off. Exercise caution to avoid tipping the unit. When lifting the unit with a forklift, be sure the unit is balanced and no wires are pinched. Lift unit from the conveyor frame.

If you are removing the head or moving the unit with a hoist, DO NOT sling straps through the aperture opening, this will cause serious damage to the head. Hoisting straps should be located around the underside of the metal detector head or on the conveyor frame. **Detectors on conveyors are top-heavy during lifting.**

If transporting the unit crating is recommended. Wheels should be locked, and the unit secured to the shipping pallet with tie-down straps. Call the factory if you have any questions regarding the transporting of a unit.

WARNING: Do Not Weld anywhere on the unit with the metal detector head attached. Welding on the unit WILL DESTROY the electronics of the detector and void any and all warranties.