2019801A
(sw pkg 4.0.x)

Reference Guide

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

CAUTION

Use this product only in the manner described in this manual. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

CAUTION

The metal detector is heavy. Do not lift nor support the metal detector by hand/manually.

To avoid damage or injury, use only the handling and installation procedures outlined in this reference guide.

WARNING - HAZARDOUS VOLTAGE

Hazardous voltages are present in this equipment when energized. All power sources must be isolated or disconnected before accessing the inside of the enclosure.

Failure to follow these precautions may result in serious injury or death.

CAUTION

If you have a pacemaker or other implanted medical device, please consult your doctor before using this product. Electromagnetic waves can interfere with the operation of your pacemaker or other medical devices.

CAUTION

Metal detectors emit electromagnetic fields, which may interfere with some pacemakers or other implanted medical devices. The end user bears the responsibility to determine if the emitted electromagnetic fields will affect employees with medical devices. If you have an implanted medical device, please consult your doctor before being in the vicinity of the metal detector during operation.

CAUTION

For continued compliance with electrical safety standards, the protective earth connection from the power source must be connected directly to the protective terminal on the wall of the enclosure. This is required to be the FIRST connection to the terminal, and secured with a star lock washer and nut, independent of any other connections to the terminal.

CAUTION

To avoid injury or damage to the equipment, only qualified service technicians are to install the metal detector at customer sites in accordance with local safety codes.

CAUTION

To avoid injury or damage to the equipment, all electrical installations are to be performed by qualified and competent personnel authorized by Eriez Manufacturing Company. All electrical installations are to be in compliance with local safety codes. Ensure that all materials used in the installation of the equipment are suitable and appropriate for purpose.

CAUTION

An external disconnect switch labeled “Metal Detector” must be installed near the metal detector to allow the metal detector to be completely disconnected from the power source during installation and maintenance. All lock-out tag-out procedures and local safety codes are to be followed during metal detector installation and maintenance.

The metal detector must not be positioned in a way that makes it difficult to operate the disconnect switch.

CAUTION

To avoid injury or damage to the equipment, all electrical maintenance on the metal detector is to be performed by qualified and competent service technicians authorized by Eriez Manufacturing Company.

CAUTION

The XTREME metal detector is not designed nor intended for operation in environments classified as hazardous locations/zones. Do not operate the XTREME metal detector in areas where the possibility of explosions or fires exists.

CAUTION

Cleaning procedures may cause false trips of the metal detector, resulting in actuation of any connected reject devices. Ensure personnel and equipment are clear from the path of the reject devices at all times. To avoid an unsafe condition or damage to equipment, remove all power sources (including air supplies) from the metal detector and reject devices prior to wash down.

CAUTION

For installations where the metal detector control screen presents ergonomic challenges or unsafe viewing conditions, it is recommended that a remote display be used to eliminate these issues.

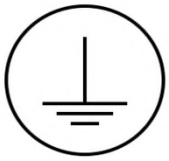
CAUTION

The metal detector will start automatically when power is restored after a power interruption. All external components controlled by relays within the metal detector control will also complete their cycle when the metal detector is re-energized. The end user must determine if a hazard exists and install the proper safety precautions and protocol to ensure that an injury does not occur in the event of a power interruption.

CAUTION

When cleaning the metal detector surfaces, use appropriate personal protective equipment (PPE) for any physical/chemical/biological hazards that may exist due to the end user's production environment. Avoid contact with contaminants on or around the metal detector. Pressure Wash and sanitize metal detector surfaces when maintenance is required.

EXPLANATION OF SYMBOLS

	Cautionary information
	Protective Conductor Terminal
	Hazardous Voltage – Risk of Electric Shock
	Pacemaker warning information
	Pinch Point

RF INTERFERENCE

Radio Frequency (RF) emissions have been tested to the requirements of FCC 47CFR Part 18, and CISPR 11/EN 55011 (Class A, Group 2).
The Eriez Xtreme Metal Detector generates an electromagnetic field which has the potential to escape. This field may interfere with nearby radio frequency equipment.

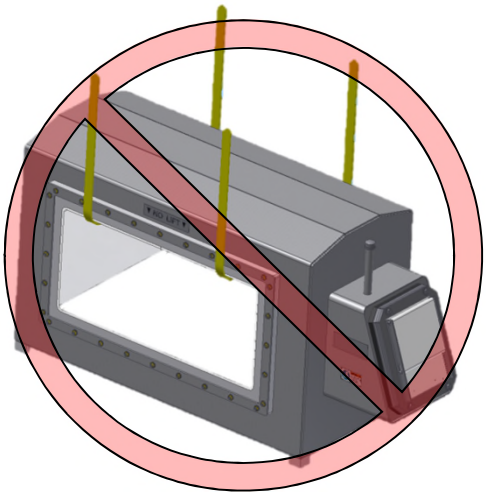
If interference becomes a problem you may need to:

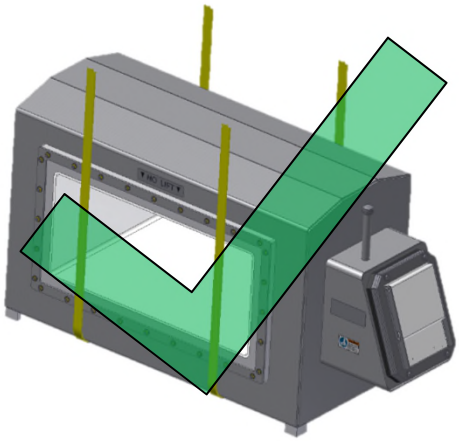
1. Move the Metal Detector or interfering equipment
2. Change the frequency on the Metal Detector
3. Call the Factory for further assistance

HANDLING INSTRUCTIONS

DO NOT LIFT THE METAL DETECTOR BY INSERTING ANYTHING INTO OR THROUGH THE TUNNEL. The inner surface of the tunnel protects the precisely tuned electronic circuit and internal parts. The tunnel liner also protects the internal parts against water damage. The integrity of this liner and seal must be maintained. Any damage or distortion to this surface caused by handling will invalidate the warranty.
When handling, keep the metal detector on the shipping pallet as long as possible. When removing the detector from the shipping pallet LIFT ONLY ON THE DETECTOR HOUSING SURFACES OR SUPPORTING FEET. DO NOT LIFT BY THE CONTROL HOUSING THAT PROTRUDES FROM THE BODY OF THE METAL DETECTOR.

If possible lift the metal detector by using a crane and soft nylon slings running under the entire metal detector housing as seen below. See Vertical Metal Detector with Valve Addendum at the end of this reference guide p104 for information concerning vertical metal detectors.





Larger metal detectors may have eyebolts preinstalled at the factory. When handling with the eyebolts ensure loads are never applied perpendicular to the shank of the eyebolts; they will break.

CAUTION

The metal detector is heavy. Do not lift nor support the metal detector by hand.

To avoid damage or injury, use only the handling and installation procedures outlined in this reference guide.

Never weld any attachment to the metal detector. Do not attempt to drill and/or tap the metal detector for lifting or mounting attachments.

SPECIFICATIONS

EQUIPMENT DESCRIPTION

The Eriez Xtreme Metal Detector is a balanced coil metal detector used to detect metal contaminants/foreign objects in material(s) passed through the aperture.

SUPPLY, MAINS, VOLTAGE

The Xtreme Metal Detector will operate from AC supply voltages over the range of 100 to 240 VAC RMS, 50 or 60 Hz.

Mains supply voltage fluctuations shall not exceed ±10% of the nominal value.

EQUIPMENT CLASSIFICATION

The Xtreme Metal Detector is specified for the following categories:

- Class 1 equipment requiring a protective ground conductor.
- Installation Category (Overvoltage Classification) II
- Pollution Degree 2

MAXIMUM DEMAND

The internal electronics require 60 VA to operate. The power available for external loads (powered from the internal source) is 1250 VA and is limited to 5 amps of current by CB1. Maximum demand will be 1310 VA.

OUTPUTS

There are nine total outputs, each with one set of contacts.

There are four programmable “Form C” (NO-C-NC) relay outputs rated at 5A (due to PCB trace width) up to 250 VAC, 30 VDC each.

- Reject (K1)
- Relay 1 (K3)
- Relay 2 (K2)
- Relay 3 (K4)

All four relays are fail-safe wired; if power is lost, the relays will switch to the activated position.

NOTE: If the power at L1B and L2B is used to power the relays, its maximum available current is 5A, and the voltage will be equal to that applied at L1 and L2 on TB3.

Power at L1B and L2B passes through the circuit breaker switch located on the left side of the control housing.

There are five programmable “Form A” (SPST-NO) solid state relay outputs rated at 500mA up to 40 VDC.

SPECS

- Out 1 (K9)
- Out 2 (K8)
- Out 3 (K7)
- Out 4 (K6)
- Out 5 (K5)

These five outputs can be wired as NPN or PNP. The output can be set to NO or NC under normal running conditions.

REJECT

Reject (K1) is the primary reject device output. It must run via Reject Timer or Overhead A-B when used. All reject log information is based on Reject Timer.

RELAY 1-3

Relay 1(K3), Relay 2 (K2), and Relay 3 (K4) are fully programmable and may use any of the four reject timers. They also may use Overhead A-B or be used as a fault or warning output. See p49 p50 for details regarding I/0 configuration.

OUT 1-5

Out 1 (K9), Out 2 (K8), Out 3 (K7), Out 4 (K6), and Out 5 (K5) are fully programmable and may use any of the four reject timers. They also may use Overhead A-B or be used as a fault or warning output.

TIMERS

There are four independent reject timers. Each reject timer has its own travel (delay) time and reject (duration) time in the range of 0 to 60 seconds or 0 to 1200 tachometer pulses. Each reject timer runs off of time or tach for both travel and duration time. Only Reject Timer can use reject confirmation, a reject index device or be configured for manual reset.

FAULT

All outputs except Reject (K1) can be configured as a fault output.

WARNING

All outputs except Reject (K1) can be configured as a warning output.

OVERHEAD A-B

Overhead A-B runs via Reject Timer and is used for an overhead pusher arm. It can be setup to reject on one or both sides of the conveyor. It can also be setup to always return to the same side of the conveyor when actuated. The functionality of Overhead A-B is based on the hardware used. Additional information on how to setup Overhead A-B is located in the wiring section of this manual.

INPUTS

The Xtreme Metal Detector has eight configurable inputs that can be set to “Active High” or “Active Low”.

Input Voltage
-“High” = 10 to 30 VDC
-“Low” = 0 to 0.9 VDC

Input Impedance = 2.8kΩ

Current Requirement = 3 to 10 mA

TACHOMETER INPUT

Voltage, Current, and Impedance specifications same as above.

Frequency: 50Hz (determined by number of poles on Tachometer and maximum belt speed)

Minimum pulse width = 0.005 seconds (5 mSec)

OPERATING AMBIENT TEMPERATURE RANGE

Integral Control	-10° C (14° F) to 49° C (120° F)
Remote Control	-10° C (14° F) to 54° C (130° F)

STORAGE TEMPERATURE

-10° C (14° F) to 80° C (175° F)

RELATIVE HUMIDITY

0 TO 95%

SPECS

MAXIMUM OPERATING ALTITUDE

2000 meters (6561 feet)

PRODUCT VELOCITY

Minimum: 2 ft/min (0.6 m/min)
Maximum: up to 3000 ft/min (914 m/min)
Note: Actual maximums are dependent on aperture size.

For gravity-fed vertical metal detectors, product velocity is determined by free-fall distance. The maximum free-fall distance is dependent on the system design, especially the distance between the sensing head and reject valve. The standard vertical system is designed for a max Drop Height of 19 in (48 cm) above the sensing head.

ENCLOSURE

The standard enclosure is rated NEMA 4X/PW 12 and IP69K which will withstand the high pressure wash-down standard of 80° C (176° F) water at 100 bar (1450 psi).

MECHANICAL INSTALLATION

Xtreme Metal Detectors are manufactured to very stringent quality standards to ensure that they will provide years of trouble free service. To achieve this trouble free service, the installer must follow the installation procedures outlined in this manual. The details of these procedures are important, and must be followed precisely for proper metal detector operation.

Metal detectors are extremely sensitive to very small changes in the electrical and physical environment. Unstable operation is possible if installed incorrectly. Metal detectors are sensitive to excessive vibration, and may generate a false reject signal when the conveyor starts and stops. These problems can be prevented with proper installation techniques.

Please read all instructions prior to using the metal detector. Problems caused by improper installation techniques are not covered under warranty. Time invested in proper installation will be worthwhile, and will provide trouble free startup and continued reliable service.

CAUTION

To avoid injury or damage to the equipment, only qualified service technicians are to install the metal detector at customer sites in accordance with local safety codes.

INTRODUCTION

The metal detector contains several components which must be physically mounted to a conveyor or suitable stand. These include the sensing head, the control (if remote), and other devices such as a tachometer. Most Xtreme Metal Detectors sensing heads have an integral control, thus simplifying installation and wiring.

Figure 1

The sensing head contains the coils and main electronics. The head must be installed so that the products being inspected can pass through the aperture in a consistent and controllable manner.

It is vital that the sensing head be protected from excessive vibration, physical abuse, electromagnetic interference, static electricity, and corrosive materials. The conveyor belt, chute, or other conveyance device must not contact the metal detector aperture.

Utilizing the control remotely requires that it be mounted to a convenient surface with minimal vibration. It should also be easily accessible in the event an adjustment is necessary. The control enclosure is fitted with mounting tabs that must be isolated to prevent electrical current loops.

HANDLING

The metal detector must be handled with care during installation. Refer to the Handling Instructions for more information.

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LOCATION OF SENSING HEAD

The location of the metal detector sensing head is extremely important. When selecting a location, consider the surrounding processing equipment, product velocity, and rejection of foreign objects. Operator convenience should also be evaluated. Ensure installation guidelines are followed and met before the final location is selected. If there are any questions, please contact Eriez for assistance.

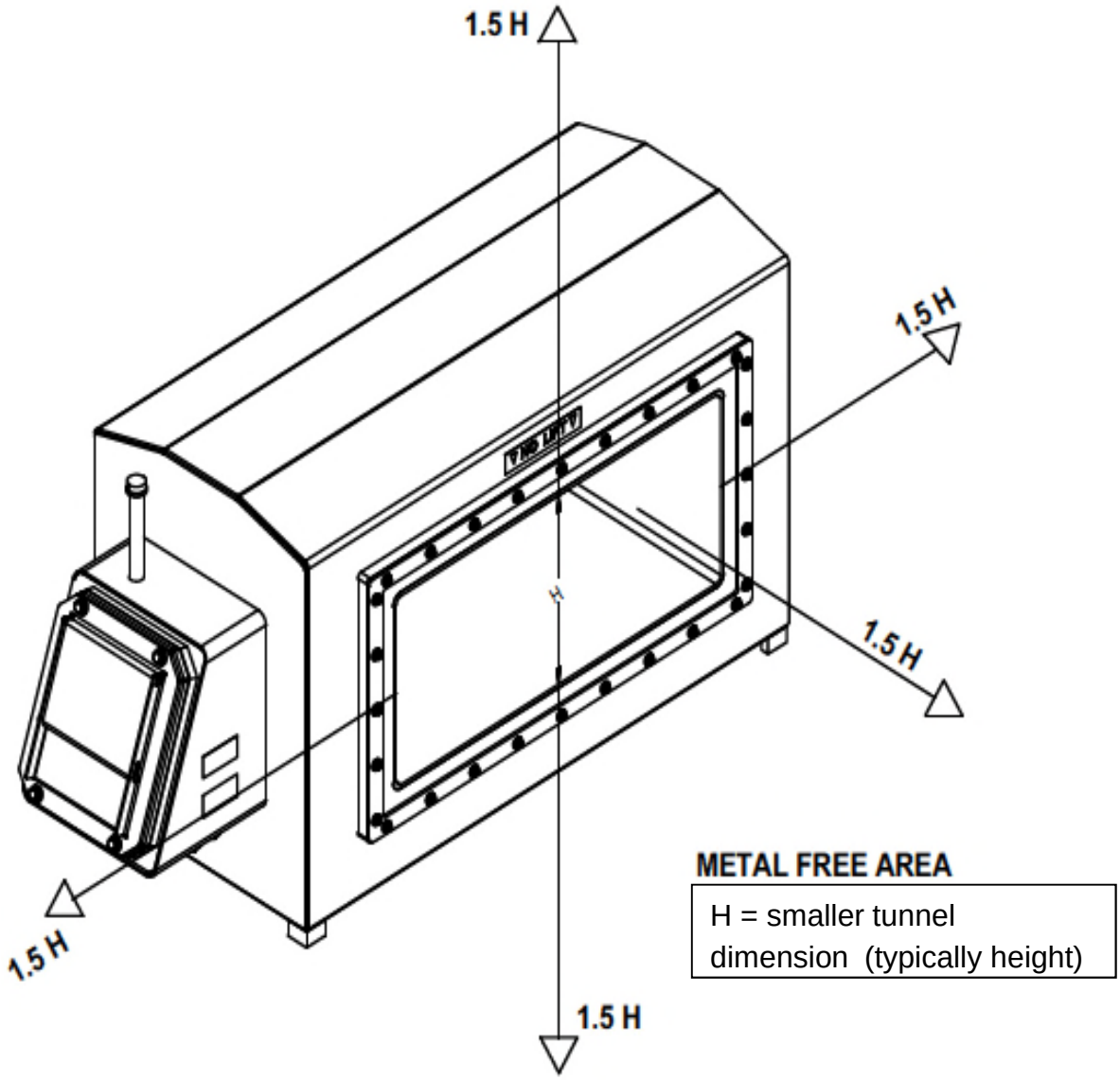
METAL FREE AREA

The metal detector monitors an electromagnetic field to detect metal. This field is predominantly contained within the aperture of the detector. However, some of the electromagnetic field extends out from the inlet and outlet of the aperture. This extended field causes the metal detector to be affected by metal in the vicinity of the aperture. Metal that is not part of the product stream must not be present in this area. The required metal free area depends on the size of the smaller dimension of the aperture. In most circumstances 1.5 times the smaller aperture dimension is a sufficient distance for stationary metal and 2.0 times for moving metal. Testing to determine the metal free distance will help ensure mitigation of false tripping. Refer to Figure 2.

CAUTION

For installations where the metal detector control screen presents ergonomic challenges or unsafe viewing conditions, it is recommended that a remote display be used to eliminate these issues.

Figure 2



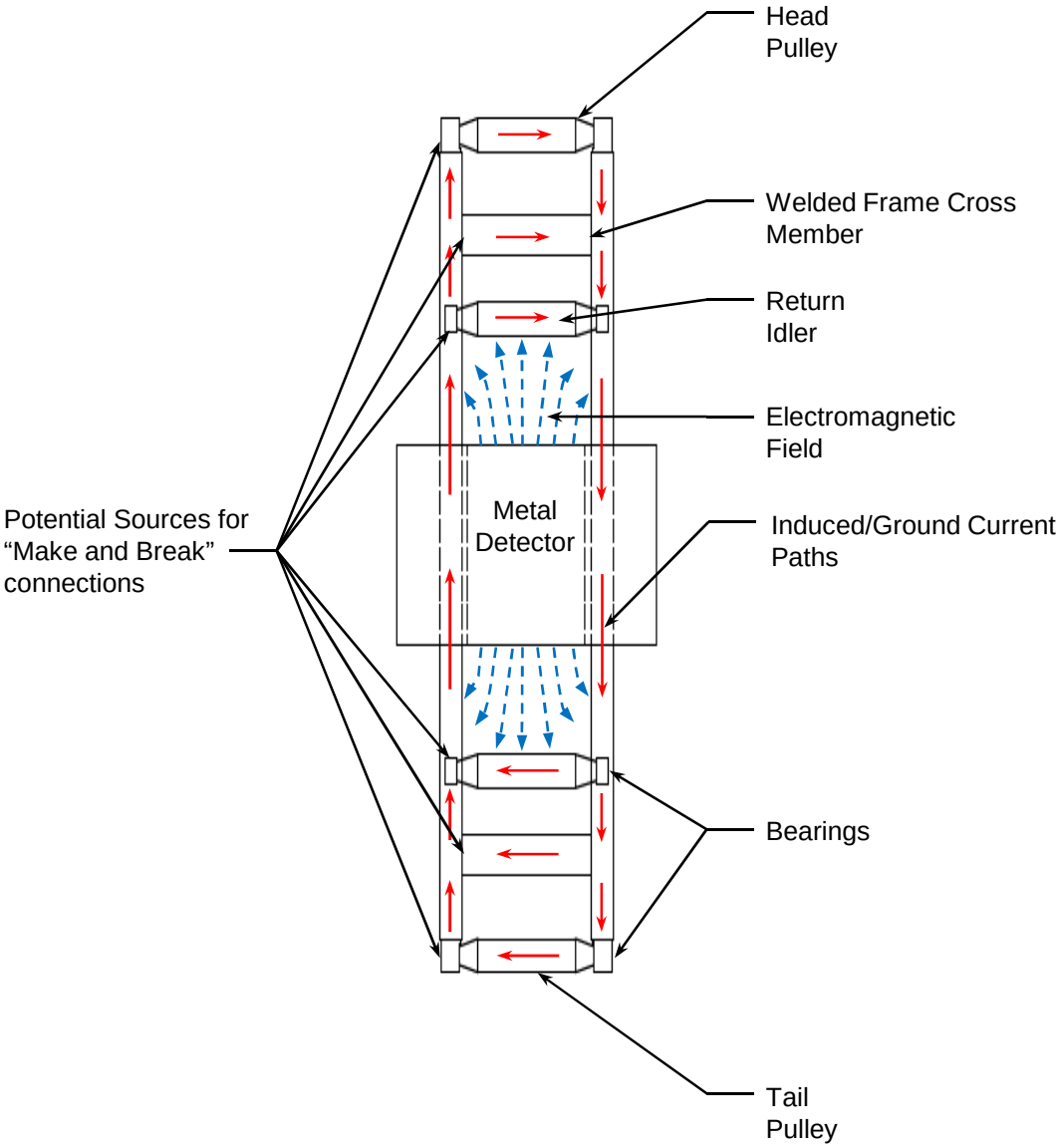
ELECTRICAL CURRENT LOOP

The most frequent problem encountered in metal detector installations is false tripping caused by intermittent electrical current loops. The electromagnetic field dissipates in strength with distance to a point that metal outside the “metal free” area will not cause false detections. Since the field is time varying, it will generate small electrical currents in conductive paths (metalwork) beyond the metal free area. These currents along with ground currents from nearby equipment will not cause false tripping as long as they are constant. If the current is disrupted, the resulting disturbance in the electromagnetic field may cause the metal detector to false trip.

The schematic diagram shown in Figure 3 provides a simplified view of a typical metal detector and conveyor. The arrows represent electrical currents. The bearings supporting the pulleys and idlers turn, causing them to become “make and break” contact points.

Likewise, the cross-members of the conveyor framework represent possible break points. Over time, these connections can work loose or corrode and cause “make and break” connections due to vibration. The interruption or change of the current is a source of electromagnetic interference detectable by the metal detector.

Figure 3



INSULATING CONVEYOR SHAFTS

A continuous electrical path through pulleys and idlers cannot be assured. As a result, current changes cannot be prevented in these components. They must be electrically isolated from the rest of the system by introducing an isolating medium into the conductive path. There are three common methods to accomplish this task.

The method shown in Figure 4 requires machining the end of the shaft to a smaller diameter to allow space for a nylon plastic sleeve. The outside diameter of the sleeve is the same as the inside diameter of the bearing. This sleeve breaks the electrical connection between the bearing and the shaft, thus permanently preventing current flow. **WARNING**: Do not cut through the sleeve when tightening the bearing set screw.

Figure 4

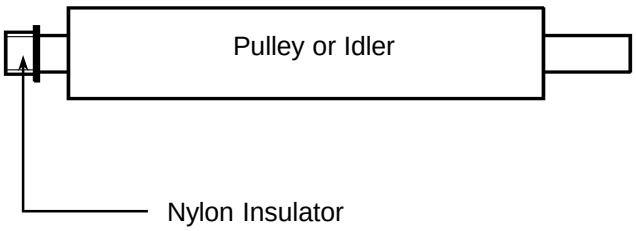


Figure 5 shows a method of insulating the complete bearing block from the conveyor frame. This requires drilling the bolt holes through the bearing block to a diameter large enough to accept an insulating shoulder washer. The bearing block should also be insulated from the conveyor frame with non-metallic insulators extending across the base of the block.

Figure 5

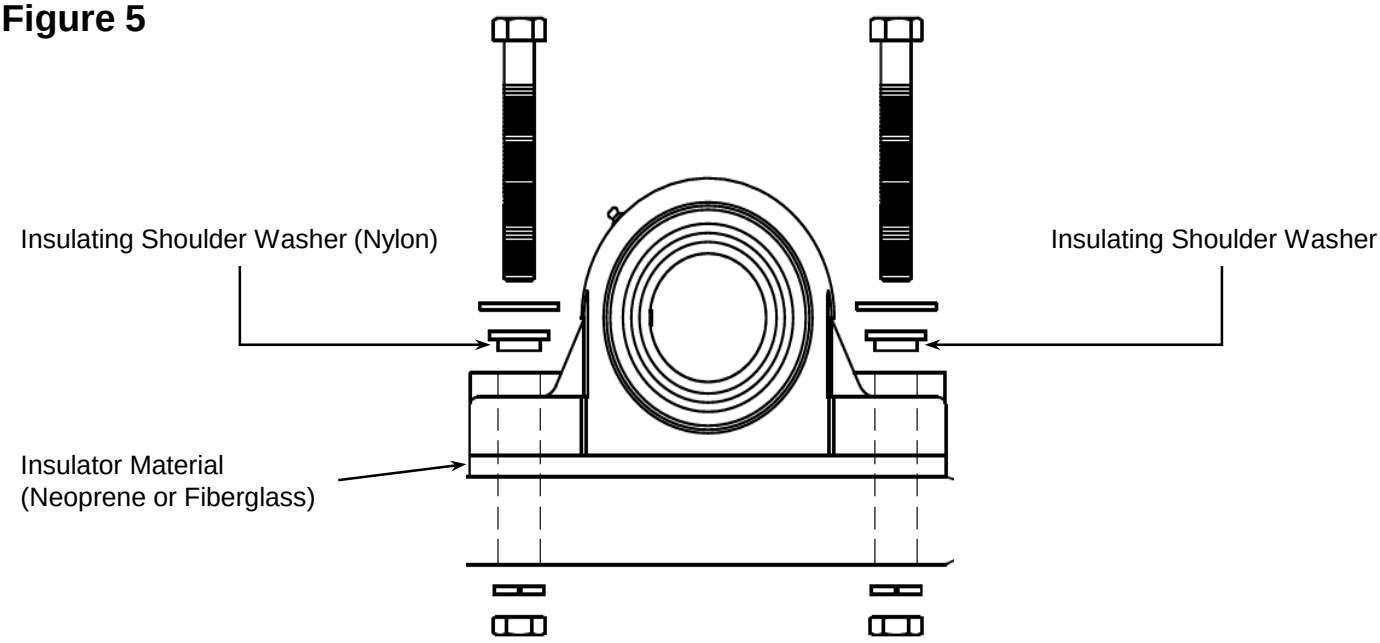
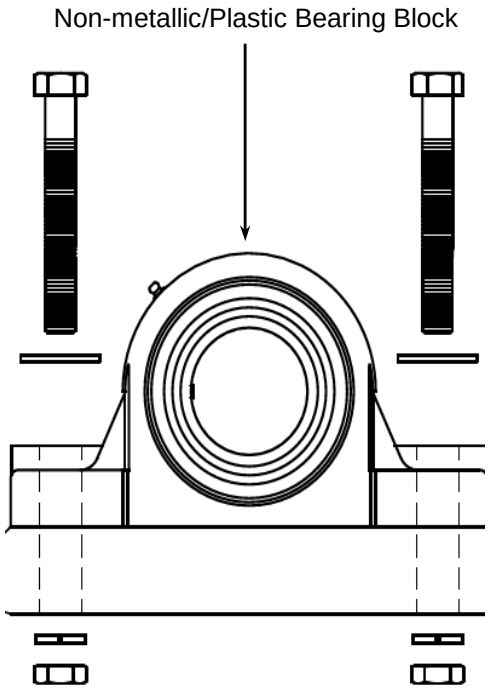


Figure 6 shows the method recommended by Eriez; this is also the simplest method. It requires the bearing block on the end opposite the motor to be replaced with a plastic/non-metallic one.

Figure 6



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All three insulating methods are reliable. However, it only takes a small metal shaving or burr to cut through and short-circuit the insulators. A check of the integrity of the insulation with an ohmmeter will ensure everything is correctly installed. Insulating either end of the shaft will prevent current loops but will also prevent testing with an ohmmeter. For this reason, isolating both ends during testing is recommended.

Build-up of a static electric charge on the conveyor belt can also cause false tripping. A static charge can build up on pulleys or idlers that are insulated on both ends. To prevent this build-up and subsequent false tripping, the insulation must be modified to ensure a ground. After the integrity of the insulators is checked with an ohmmeter, one end of each shaft should be electrically reconnected to the conveyor frame. If the sleeve insulating method has been used, the setscrew of one of the bearings should be extended to make contact with the shaft. This may require drilling a small hole through the sleeve and inserting a sharp pointed setscrew. If the bearing block insulating technique has been used, simply remove one of the shoulder washers on one end of the shaft. If using the plastic bearing block method, the opposite bearing block is metallic and grounded already. The integrity of the insulators can easily be rechecked when using any of the three methods.

NOTE:
If a drive pulley is powered by a metal chain, it is not necessary to remove the insulators on either end of the shaft as described above. The metal drive chain will bleed off any static charge that may accumulate on the pulley. If a non-metallic belt drive is used, insulate the conveyor pulley on the side opposite the drive motor.

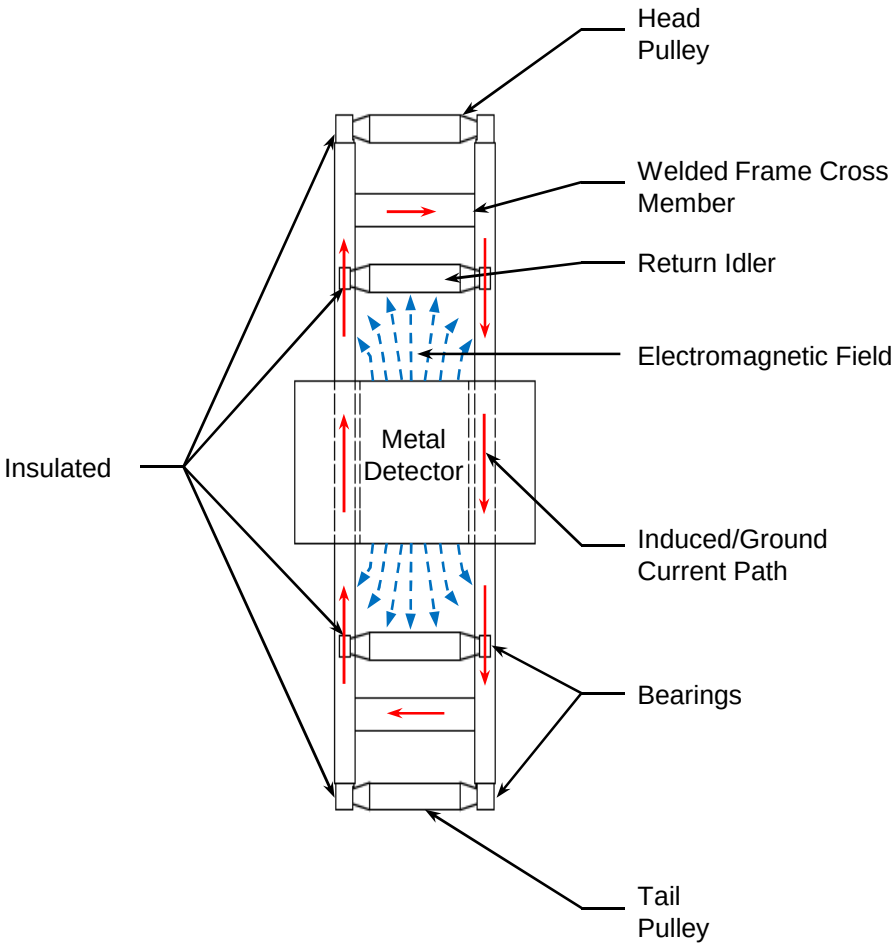
PERMANENT CURRENT LOOPS

Permanent conduction paths (i.e. cross members) in the conveyor frame should be welded securely to provide a reliable path for any current that may be created. Bolted construction may eventually degrade, and is not recommended unless designed and executed by experts in metal detector conveyor construction. Any conduction path that is to remain removable, or that cannot be welded or permanently bolted, must be electrically isolated from the conveyor frame.

Figure 7 shows a conveyor frame properly modified for a metal detector installation. Notice that possible breaks in the current paths no longer exist, and the only current loops in the conveyor frame are running through a permanently welded connection. These current loops will be constant and therefore will not cause false detections.

MECH

Figure 7

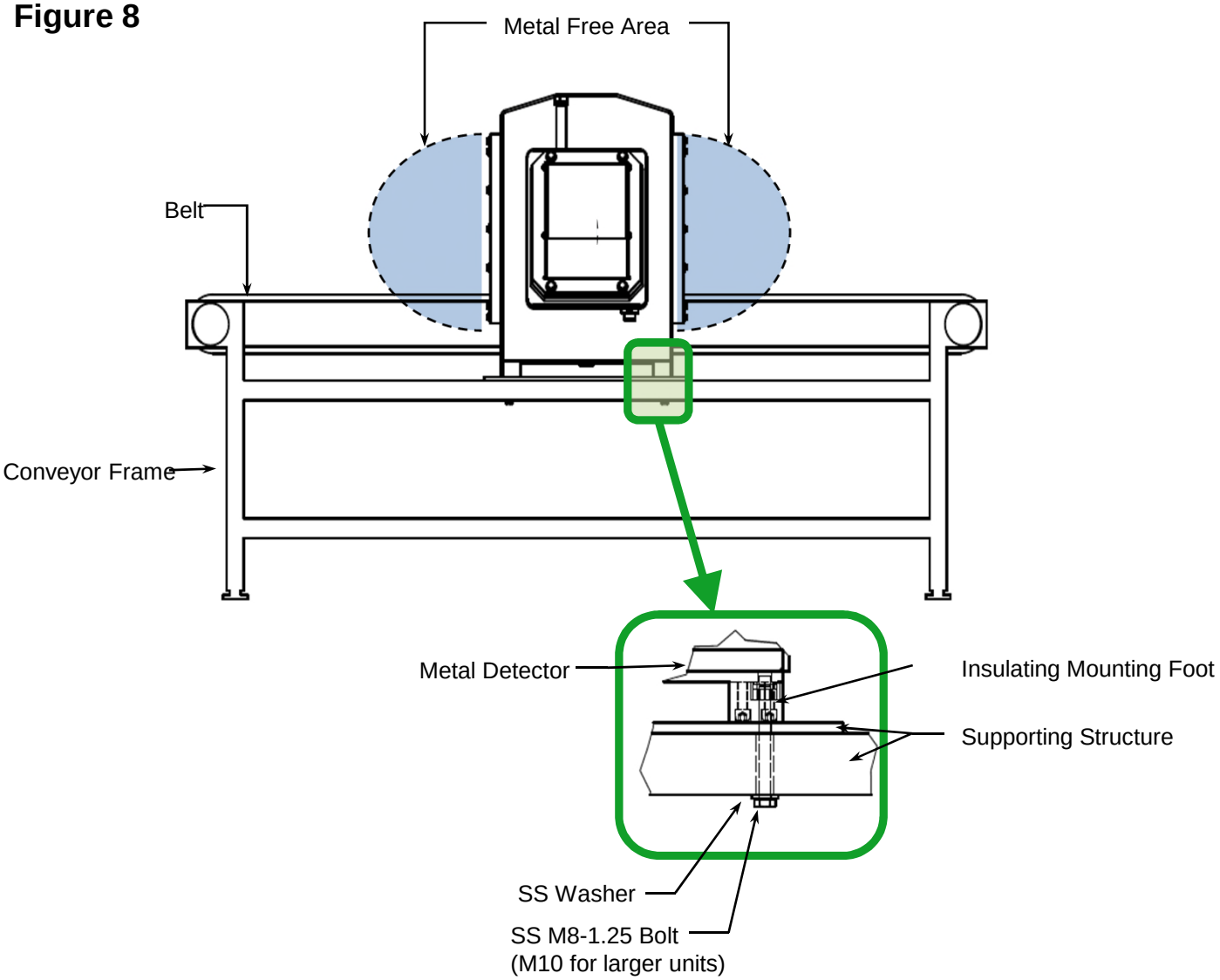


SUPPORTING STRUCTURE

The structure that supports the metal detector sensing head must be strong, rigid, and as free from vibration as possible. Electronically, the metal detector can be configured to ignore most vibration. Improved sensitivity can be obtained by preventing mechanical vibration from reaching the detector head.

Four insulating mounting feet are supplied with the metal detector. These mounting feet must be used to ensure proper operation (Figure 8). All four mounting feet must sit flat on the supporting structure. Do not draw the feet down to the structure by tightening the mounting bolts, as this will put uneven stresses on the sensing head shell which in turn may cause instabilities in operation. If the mounting feet do not rest flat on the supporting structure, shim with appropriate washers until supported evenly.

Figure 8



NOTE:

Only the insulating mounting feet and electrical connections should contact the sensing head. Conduit attached to the metal detector sensing head should utilize plastic fittings (refer to Electrical Installation).

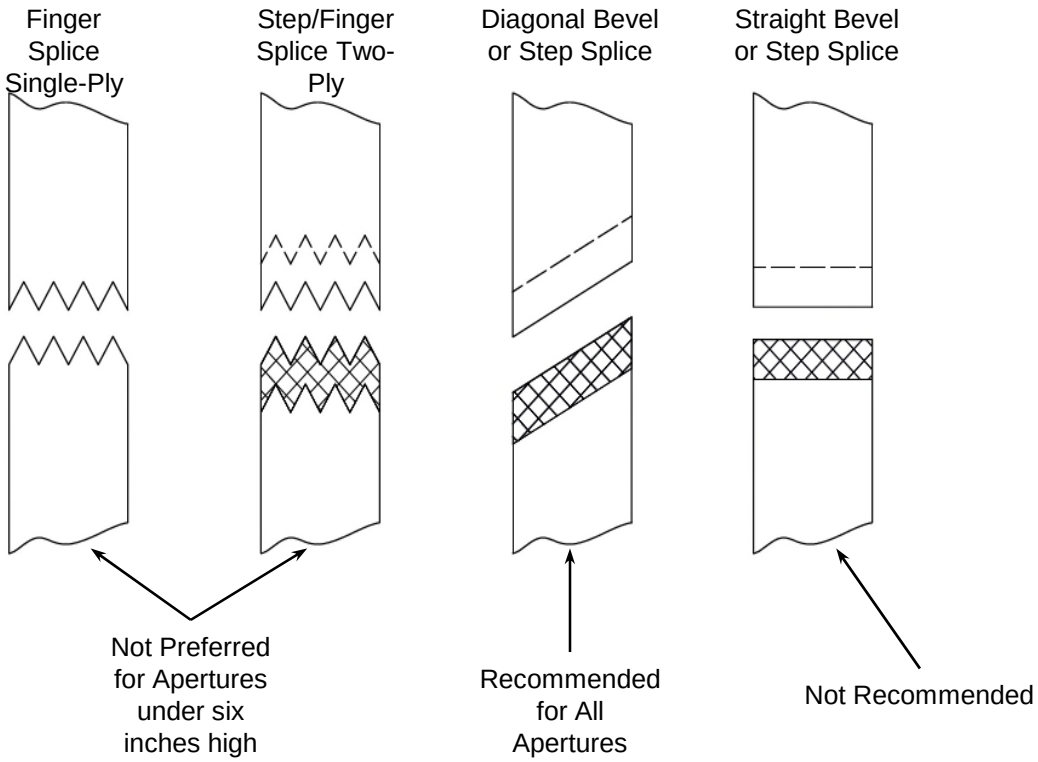
BELTS AND BELT SPLICES

The metal detector's sensing head cannot be disassembled to be fitted around an endless conveyor belt. The conveyor must be designed to return the belt through the aperture, or the belt must be cut and spliced (non-metallic) back together. Splicing the belt with lacing or clamps is not recommended since foreign materials tend to collect at the joint and may eventually cause false detections.

A proven, trouble free choice for metal detector conveyor belts are modular plastic conveyor belts. Eriez recommends and uses this option as they are easily maintained and faulty sections can be changed out quickly. Conductive plastic components, belts, and metallic hinge pins or rods must be avoided. Vulcanized belt splices are the most reliable and are recommended for continuous belt applications where plastic chain cannot be used (Figure 9). If the belt is single-ply, the finger splice configuration should be used. If the belt is multi-ply, a diagonal bevel or step splice configuration is recommended.

MECH

Figure 9



NOTE:

During all splicing it is absolutely necessary to ensure that no foreign material (especially metal) is trapped within the splice. If metal is trapped in the splice, the detector will trip each time the splice passes through the aperture. Since the metal is trapped inside the splice, it cannot normally be located and removed without ruining the belt.

CONVEYOR SLIDER BED

The conveyor belt must be supported as it travels through the metal detector. This is accomplished by providing a stationary slider bed, which must be capable of holding the belt off the aperture liner when fully loaded. The slider bed must not touch the aperture liner.

The slider bed should be made of static-resistant non-metallic material. Anti-static UHMW and phenolic are acceptable choices. Eriez has designed and incorporated a static-dissipative food grade plastic slider bed into our standard and custom metal detector conveyor systems. Most solid plastics cannot be used because these materials tend to generate static electricity as the conveyor belt slides across. "Static-resistant" plastics that incorporate metallic particles cannot be used.

PRODUCT POSITION

The product should always be guided through the center of the aperture, both vertically and horizontally. The product must be centered regardless of the method of conveyance through the metal detector (i.e. conveyor, chute, or vertical pipe). If the same metal detector will be used to inspect multiple products with differing sizes, design the system to center the largest product in the aperture. In such a case, be aware that the sensitivity of the detector to metal of a particular size and type may vary with the product position, and may require different detector settings for the different product sizes and positions in the aperture.

REJECT PROXIMITY SWITCH

A proximity switch indicates when a package is aligned with a reject device. For example, a product in a box may need to align with a reject device such as a pusher arm. Reliable rejection requires that the proximity switch indicate when the alignment is achieved. The normal position for the proximity switch is before the reject device. The metal detector incorporates a timer capable of delaying the output until the product aligns with the reject device. Be certain not to infringe on the required detector "metal-free" area when choosing the location of the proximity switch.

ELECTRICAL INSTALLATION

INTRODUCTION

CAUTION

Electrical installation should be performed only by trained electrical service personnel, authorized by Eriez. Installation wiring should conform to National Electrical Code, or other applicable standards as required by local regulations.

All electrical connections are made within the control enclosure. **Figure 2** (p29) shows the IOC PCB and the electrical connections to the circuit board. For convenience, connections are pull-apart terminal blocks. The pull-apart feature allows the connections to be made outside the enclosure and then snapped back in place. **Figures 3-5** (starting on p33) show example connections for input/output devices and power connections to the metal detector.

ELEC

WARNING – HAZARDOUS VOLTAGE

Hazardous voltages are present in this equipment when energized. All power sources must be isolated or disconnected before accessing the inside of the enclosure.

Failure to follow these precautions may result in serious injury or death.

POWER SOURCE

CAUTION

An external disconnect switch labeled “Metal Detector” should be installed near the metal detector to allow for interruption of the power to the metal detector for service or installation. In 240 VAC systems this switch should interrupt both sides of the line. This switch should include a provision to lockout the switch for service and maintenance.

The metal detector must not be positioned in a way that makes it difficult to operate the disconnect switch.

The wiring from the mains supply panel to the metal detector should be a minimum of 14 AWG, and should include a dedicated earth ground wire for safety and proper operation of the metal detector. The power wiring should be run in a dedicated conduit. The best insurance against electrical noise and false tripping is to run a separate circuit to the metal detector from the main power bus. This circuit should be free of all loads except the metal detector. If this is impractical, reliable operation can often be obtained by powering the metal detector from a "clean" lighting or instrument circuit. This circuit must be free of inductive loads such as motors, solenoids, and motor starters. If the metal detector must be powered by a less than favorable source, a constant voltage transformer with harmonic neutralization can be used to eliminate or reduce false tripping caused by line noise. This transformer should be mounted within 3-5 feet (1 to 1.5 meters) of the metal detector.

The power source is connected to terminals L1 and L2. L1 and L2 are connected through auxiliary circuit breaker 2 to terminals L1B and L2B on the circuit board. These terminals are intended to be conveniently available to the user to power various pieces of auxiliary equipment. The circuit breaker has limited capacity as indicated in the specifications. If a piece of auxiliary equipment requires power in excess of the circuit breaker capacity, the auxiliary equipment must be controlled from an intervening relay and powered from a separate source.

Main Circuit Breaker 1 protects the metal detector electronics. It is located on the right side of the control door inside the control housing.

CAUTION

L1B and L2B are not disconnected by Main Circuit Breaker 1. They are disconnected by Auxiliary Circuit Breaker 2.

The metal detector power source must contain a reliable ground (earth) connection. It must be connected to the protective earth terminal of the metal detector. The metal detector should be grounded at one point through the power supply ground wire. No other ground connections are permitted, including mounting hardware and conduit.

CAUTION

For continued compliance with electrical safety standards, the protective earth connection from the power source must be connected directly to the protective terminal on the wall of the enclosure. This is required to be the FIRST connection to the terminal, and secured with a star lock washer and nut, independent of any other connections to the terminal.

The metal detector is equipped with electronic filter circuits to reduce incoming electrical noise. Inductive loads sharing the same power circuit usually create noise. Although there are filters, there is a limit to what the metal detector can withstand without false tripping.

CONNECTIONS TO INPUT/OUTPUT DEVICES

WARNING – HAZARDOUS VOLTAGE

Hazardous voltages are present in this equipment when energized. All power sources must be isolated or disconnected before accessing the inside of the enclosure.

CAUTION

Verify input power requirements before making any connections.

ELEC

The Xtreme Metal Detector has four mechanical and five solid state relays, for a total of nine programmable outputs, each with one set of contacts.

There are four programmable “Form C” (NO-C-NC) output relays rated at 5A up to 250 VAC or 30 VDC each. These relays are wired as fail-safe. If the power at L1B and L2B is used to power the relays, its maximum available current is 5A and the voltage will be equal to that applied at L1 and L2 on TB3. Power at L1B and L2B passes through Auxiliary Circuit Breaker 2, which is located on the left side of the control door. Connect to L1B and L2B only if the voltage and current ratings are compatible with the auxiliary device to be used.

Reject (Relay K1) has one set of “Form C” (NO-C-NC) contacts. It is located at terminals 1, 2, and 3 on TB1. “Reject” is the primary reject device output. “Reject” must run via Reject Timer or Overhead A-B when used. All reject log information is based on Reject Timer only. Reject Timer is controlled using the “Reject Setup” screen which is found on the Running Product Settings page.

Relay 1 (Relay K3) has one set of “Form C” (NO-C-NC) contacts. It is located at terminals 7, 8, and 9 on TB1.

Relay 2 (Relay K2) has one set of “Form C” (NO-C-NC) contacts. It is located at terminals 10, 11, and 12 on TB2.

Relay 3 (Relay K4) has one set of “Form C” (NO-C-NC) contacts. It is located at terminals 16, 17, and 18 on TB2.

There are five programmable “Form A” (SPST-NO) solid state relays each rated at 500mA up to 40 VDC. These relays can be wired as NPN or PNP. The output can be set to NO or NC under normal running conditions. If +24V is used to power the relays, the maximum current available is 2A. This current rating is controlled by a resettable fuse (F1). Only connect +24V if the voltage and current ratings are compatible with the auxiliary device being used.

NOTE: Terminals 23, 33, and 43 are DC common. Since the metal detector is grounded only by the input power supply ground, these terminals must not be connected to earth ground by an auxiliary device.

Out 1 (Relay K9) has one set of “Form A” (SPST-NO) contacts. It is located at terminals 24 and 26 on TB4.

Out 2 (Relay K8) has one set of “Form A” (SPST-NO) contacts. It is located at terminals 25 and 26 on TB4.

Out 3 (Relay K7) has one set of “Form A” (SPST-NO) contacts. It is located at terminals 27 and 29 on TB4.

ELEC

Out 4 (Relay K6) has one set of “Form A” (SPST-NO) contacts. It is located at terminals 28 and 29 on TB4.

Out 5 (Relay K5) has one set of “Form A” (SPST-NO) contacts. It is located at terminals 30 and 31 on TB4.

Relay 1 - Relay 3 and Out 1 - Out 5 are fully programmable and may use any of four reject timers or Overhead A-B. They can also be used as a fault or warning output. Relay 1- Relay 3 and Out 1- Out 5 are controlled using the “Reject Setup” screen which is found on the Running Product Settings page.

RELAY NOTES

If switched power is needed for an external device in excess of the 5A 240VAC source or the 2A 24VDC source, it must be supplied from an external source using an auxiliary relay. The voltage and ampere ratings for devices switched by the relays should not exceed the relay ratings.

INPUTS

IN 1 – IN 8 are bi-directional opto-coupled inputs, which can be configured for several different functions described in the following pages. Electrical requirements are listed in the Specifications section.

NOTE: Terminals 23, 33, and 43 are DC common. Since the metal detector is grounded only by the input power supply ground, these terminals must not be connected to earth ground by an auxiliary device.

TACHOMETER INPUT

Applications having variable speed product flow and requiring automatic reject timing use this input. A tachometer is used to allow the metal detector control to monitor product speed, and reject according to the distance the product has traveled rather than according to elapsed time since detection. (Note: a “Tachometer Fault” occurs if the input does not receive pulses from the tachometer for a period of time, defined on the “Advanced Reject Settings” screen.)

REJECT INDEX

The metal detector can be used to scan and automatically reject packages. In this application a reject index is used to sense the location of the package so it can be reliably rejected. The device can be a mechanical switch, photo-eye, or any other device that is capable of precisely locating the package.

REJECT CONFIRMATION

The reject confirmation input is used to monitor the function of the reject device. It is usually a limit switch attached to the reject device that indicates it is functioning. For example, if you were using a pusher bar, the reject confirmation switch would be wired to the reject confirmation input and positioned in such a way that it closes as the pusher bar reaches maximum extension.

REJECT RESET

The metal detector has four timers, one of which is a “Reject Timer” connected to the “Reject Relay.” The Reject Timer has the option of being set to either manual or automatic reset mode. Manual Reject Reset is typically used for a stop belt reject. When the Reject Timer is set to manual reject reset and a rejection occurs, a password protected button will appear at the bottom center of the screen to reset the metal detector. Another option is to wire a reject reset button to one of the eight input connections to reset the timer. Typically a momentary push-button switch is used for this purpose. The logic can be set to either NO or NC and the specific input selected. When either manual reset is performed, the Reject Relay will be reset.

PRODUCT COUNTER

A photo-eye or limit switch can be used to detect and count each package that passes through the metal detector. The product count is displayed on the Home screen. Note that a single physical device (e.g. photo-eye) can be used for product counting and for the reject index; in this case the photo-eye output should be connected to two inputs on the metal detector, one configured as Reject Index, and another as Product Counter.

AIR PRESSURE FAILURE

This input configuration can be used to provide an “Air Pressure Failure” fault or warning when the air supply is lost. Connect a pressure switch to the reject devices’ air supply, and configure the input to be active when air pressure is less than the required value.

CONDUIT

Wiring to and from the metal detector should be routed through conduit. High voltage wiring for the power supply and reject devices should not be located in the same conduit as low power sensor wiring (i.e. tachometer and reset switch). Keep all metal detector wiring separate from electrical supplies carrying heavy or switched loads. This is especially important for variable speed motor control wiring. Interference from electrical noise can be greatly decreased by following these guidelines.

The use of metal conduit has the potential to create a ground path unless plastic fittings are used to attach the conduit to the metal detector housing. Always use a plastic fitting for this purpose to avoid potential false trips.

POWER SWITCH

The on-off circuit breakers/switches located inside the control enclosure are intended to be a service convenience only. It is recommended that the metal detector remain ON at all times to provide optimum performance. This also enhances the longevity of the electronic components.

USB, ETHERNET CONNECTORS

ELEC

A USB connector (for exporting report logs) and optional Ethernet connectors (for PLC interface, and Remote Support, if installed) are located on the bottom of the control. These connectors are rated for wash-down, **when the cap is installed and locked, or a matching wash-down rated cable is installed and locked**. Before installing the cap (or cable), ensure the rubber O-ring is in place.

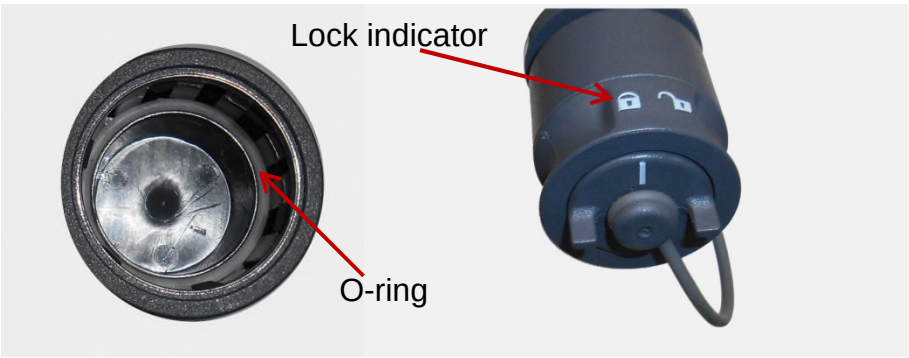


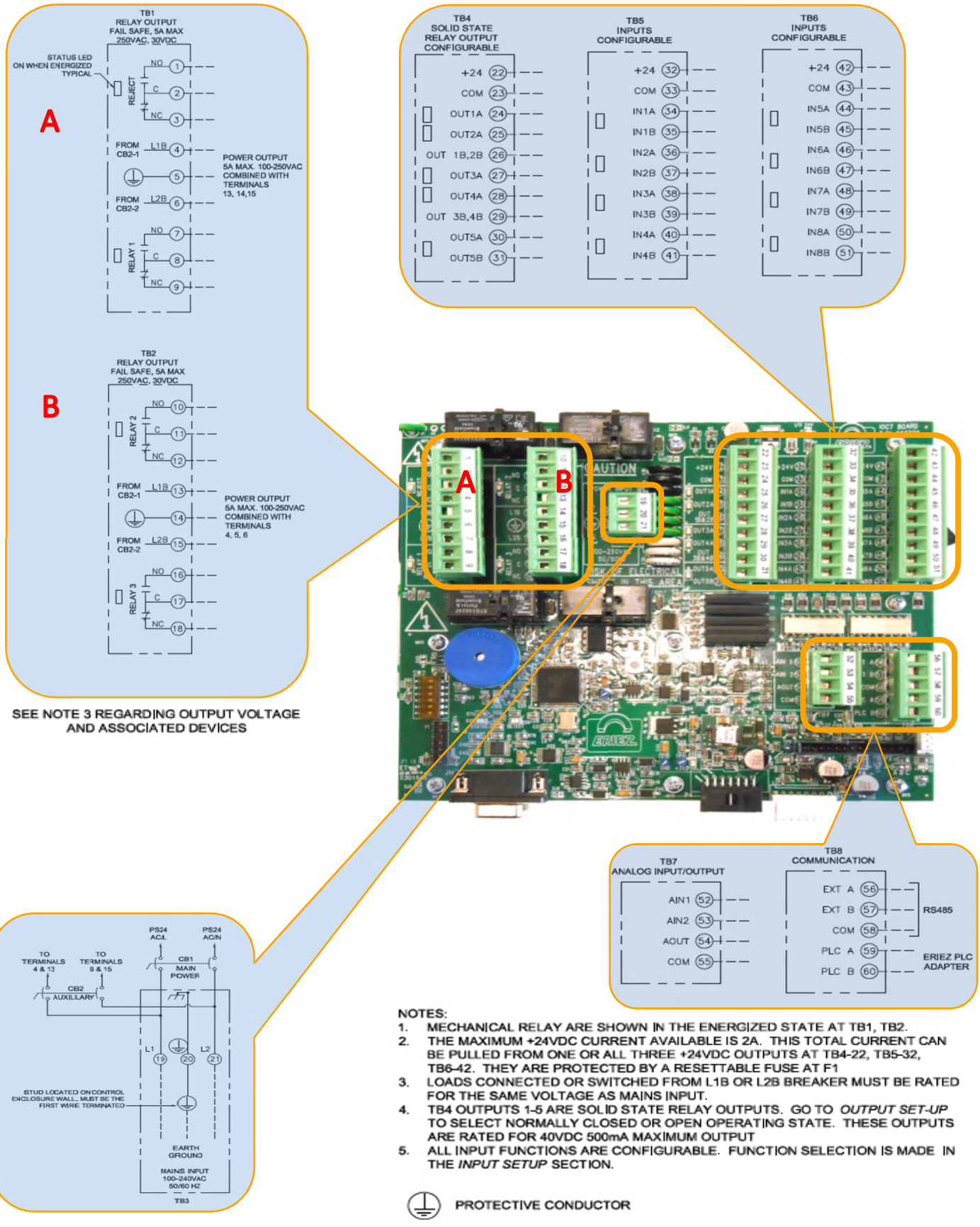
Figure 1. Connector Cap (Inside and outside views)

HOLEPLUGS

On the bottom of the control there are six conduit entry holes. Five of these holes have sealing plugs installed at the factory. The sixth hole has a plastic plug installed. This plastic plug must be removed. If any other plugs are removed they shall be replaced with a non-metallic conduit fitting.

In order to maintain the Type (NEMA) 4X/PW 12 and IP69K rating, plugs must conform to the aforementioned ratings and be installed properly. Once installed and snug, turn the wing nut one and one-half turns or more to compress the rubber gasket. Visually check to ensure the gasket is compressed.

FIGURE 2: TERMINAL CONNECTIONS



NOTES:

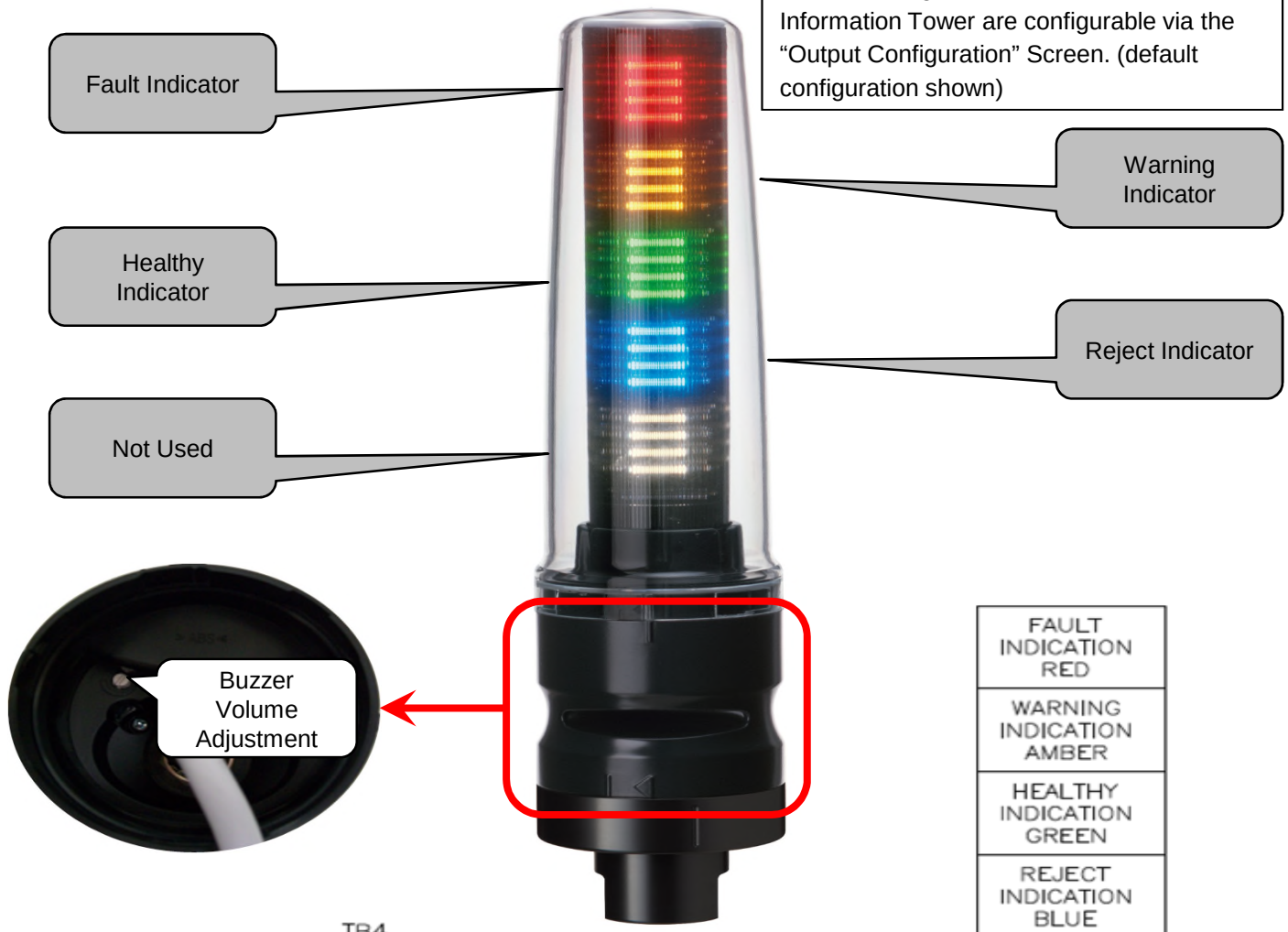
1. MECHANICAL RELAY ARE SHOWN IN THE ENERGIZED STATE AT TB1, TB2.
2. THE MAXIMUM +24VDC CURRENT AVAILABLE IS 2A. THIS TOTAL CURRENT CAN BE PULLED FROM ONE OR ALL THREE +24VDC OUTPUTS AT TB4-22, TB5-32, TB6-42. THEY ARE PROTECTED BY A RESETTABLE FUSE AT F1
3. LOADS CONNECTED OR SWITCHED FROM L1B OR L2B BREAKER MUST BE RATED FOR THE SAME VOLTAGE AS MAINS INPUT.
4. TB4 OUTPUTS 1-5 ARE SOLID STATE RELAY OUTPUTS. GO TO *OUTPUT SET-UP* TO SELECT NORMALLY CLOSED OR OPEN OPERATING STATE. THESE OUTPUTS ARE RATED FOR 40VDC 500mA MAXIMUM OUTPUT
5. ALL INPUT FUNCTIONS ARE CONFIGURABLE. FUNCTION SELECTION IS MADE IN THE *INPUT SETUP* SECTION.

PROTECTIVE CONDUCTOR

ELEC

FIGURE 3: INFORMATION TOWER

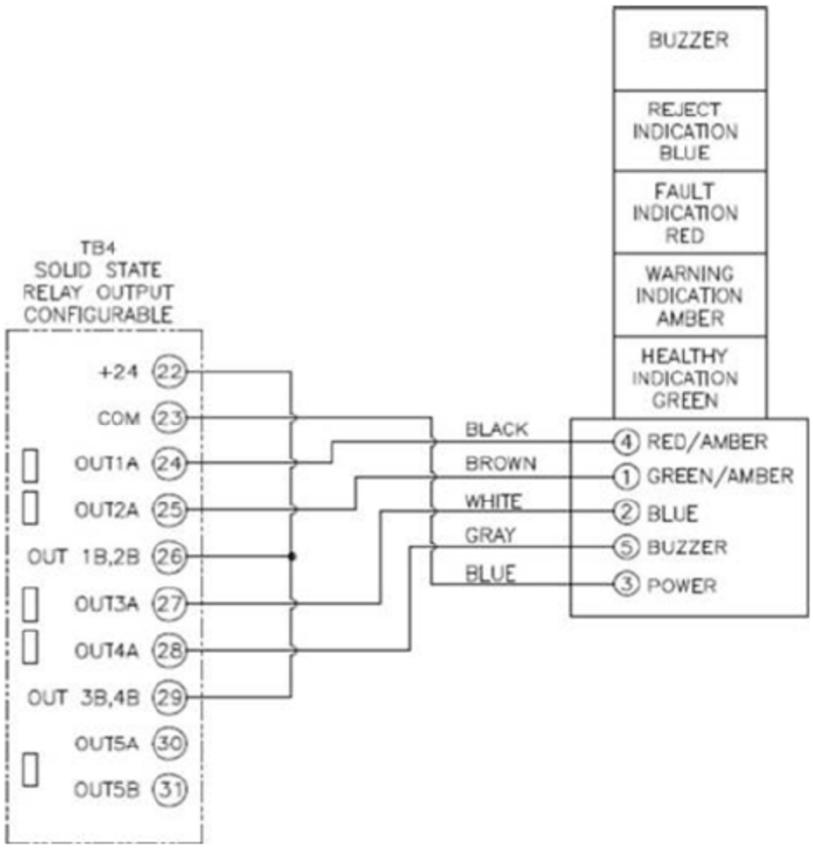
NOTE: The light indicators on the Information Tower are configurable via the "Output Configuration" Screen. (default configuration shown)



ELEC

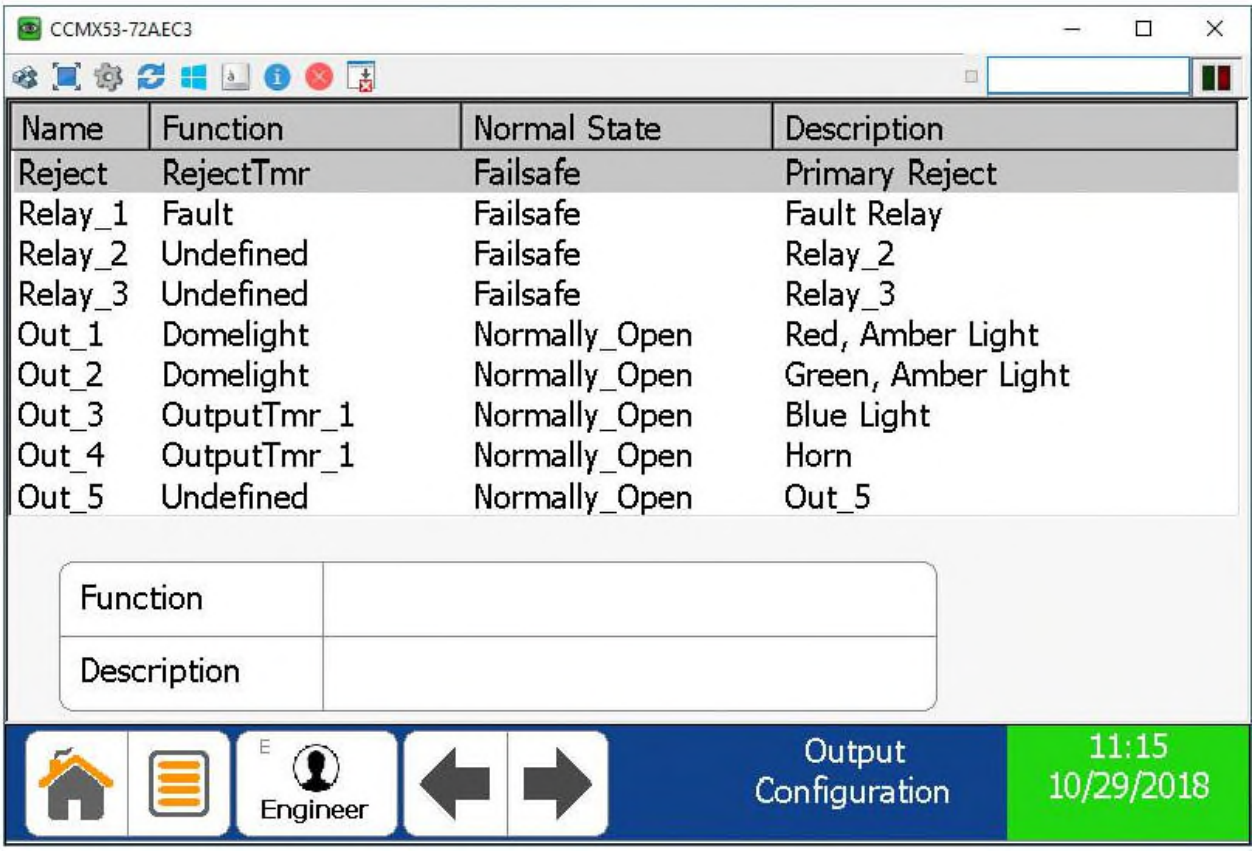
Dome Light with Buzzer

1. The dome light can directly replace the information tower (Fig 3)
2. Software version 3.100 or higher is required.
3. The dome light is rated IP69k.
4. The dome light only shows one color at a time.
    a. The dome light uses a priority hierarchy.
    b. The Reject, typically blue, has the highest priority.
    c. The Fault, typically red, has the second priority.
    d. The Warning, always yellow, has the third priority.
    e. The Ready status, always green, has the lowest priority.
    f. The red and blue are interchangeable for customers that require a red reject, through the output screen.
5. The buzzer is independent of the lights.
6. The dome light part number is P/N 831930.
7. The cable for the dome light is P/N 831931.



ELEC

Dome Light Output Setup



Typical Dome Light Output setup

The dome light uses outputs 1 through 4.

To make the reject light red instead of blue, swap the function of Out_1 and Out_3.

FIGURE 4: OUTPUT CONNECTION EXAMPLES

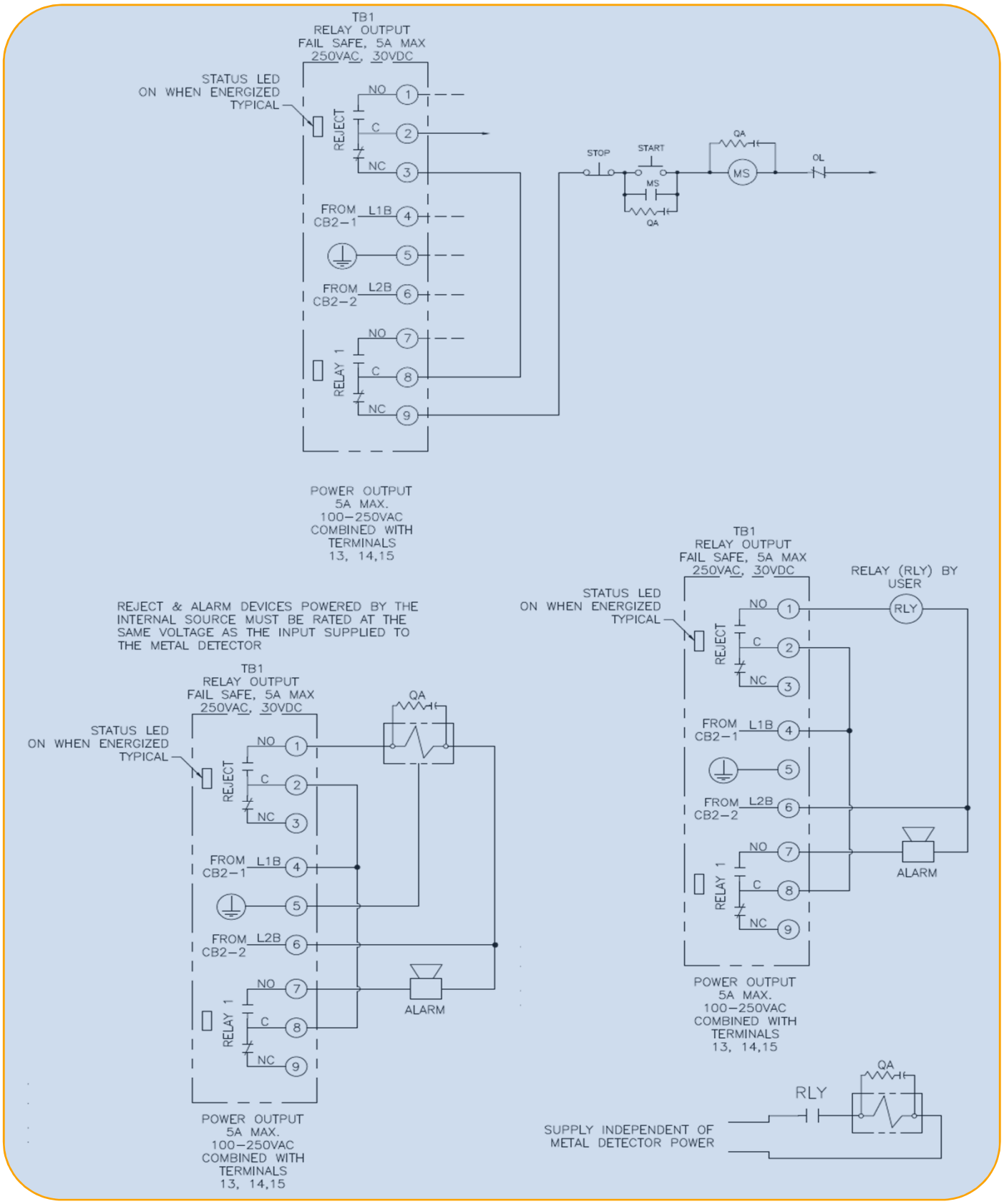
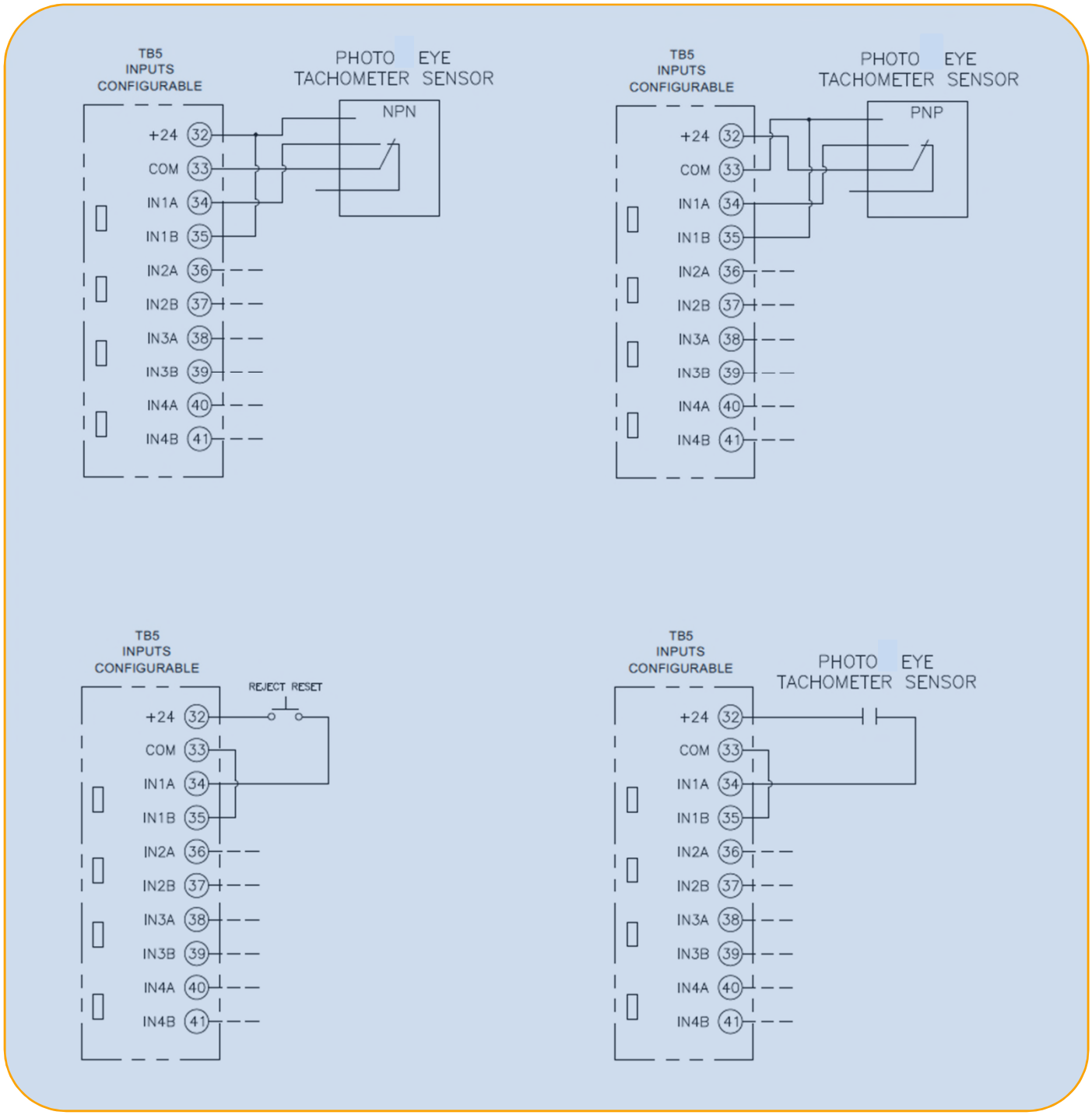
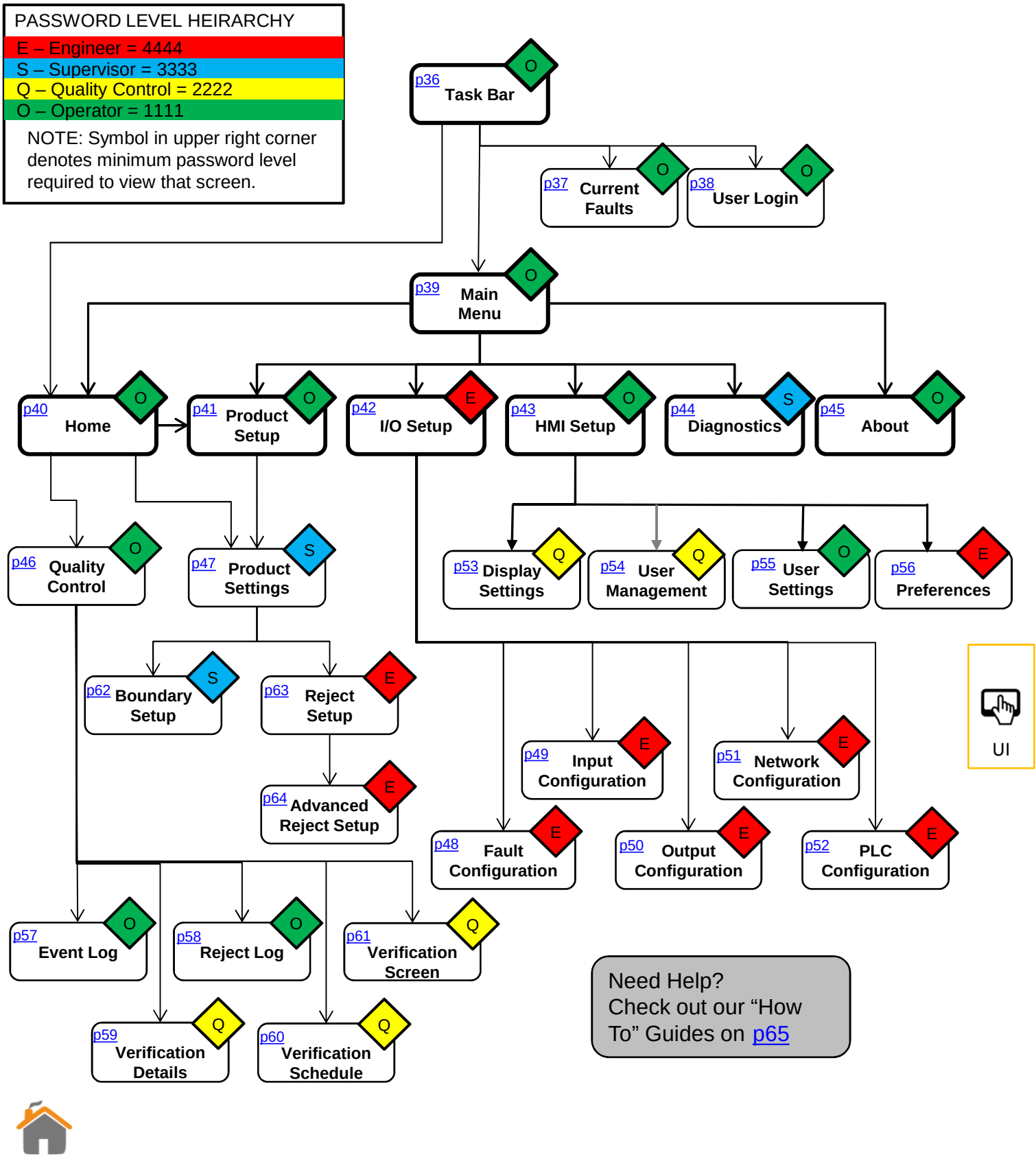


FIGURE 5: INPUT CONNECTION EXAMPLES

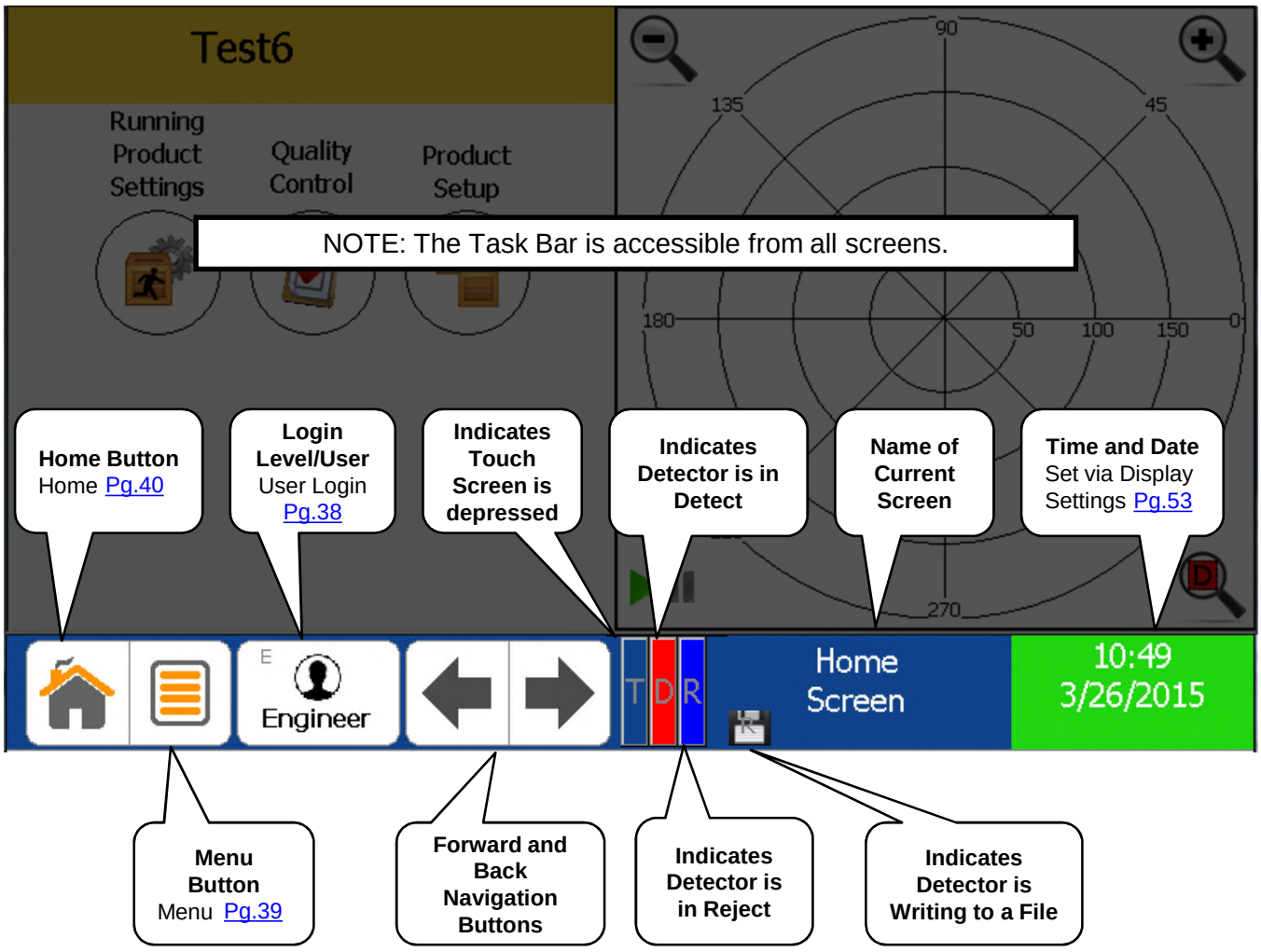


ELEC

MENU MAP

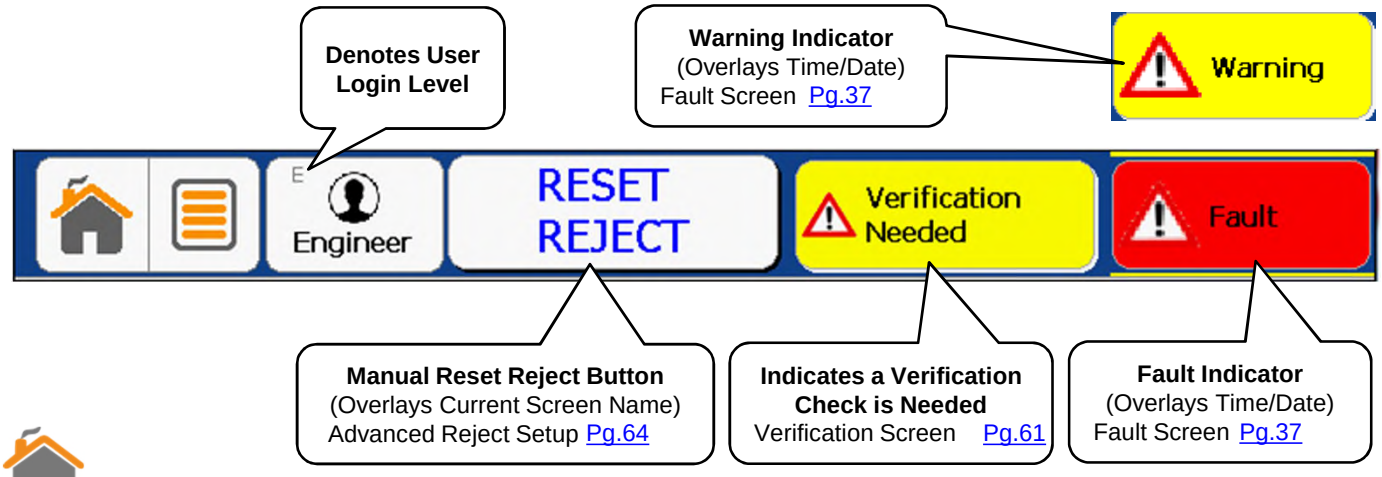

PASSWORD LEVEL HEIRARCHY
E – Engineer = 4444
S – Supervisor = 3333
Q – Quality Control = 2222
O – Operator = 1111
NOTE: Symbol in upper right corner denotes minimum password level required to view that screen.
p36 Task Bar
p37 Current Faults
p38 User Login
p39 Main Menu
p40 Home
p41 Product Setup
p42 I/O Setup
p43 HMI Setup
p44 Diagnostics
p45 About
p46 Quality Control
p47 Product Settings
p53 Display Settings
p54 User Management
p55 User Settings
p56 Preferences
p62 Boundary Setup
p63 Reject Setup
p64 Advanced Reject Setup
p49 Input Configuration
p51 Network Configuration
p48 Fault Configuration
p50 Output Configuration
p52 PLC Configuration
p57 Event Log
p58 Reject Log
p61 Verification Screen
p59 Verification Details
p60 Verification Schedule
UI
Need Help?
Check out our “How To” Guides on p65

TASK BAR

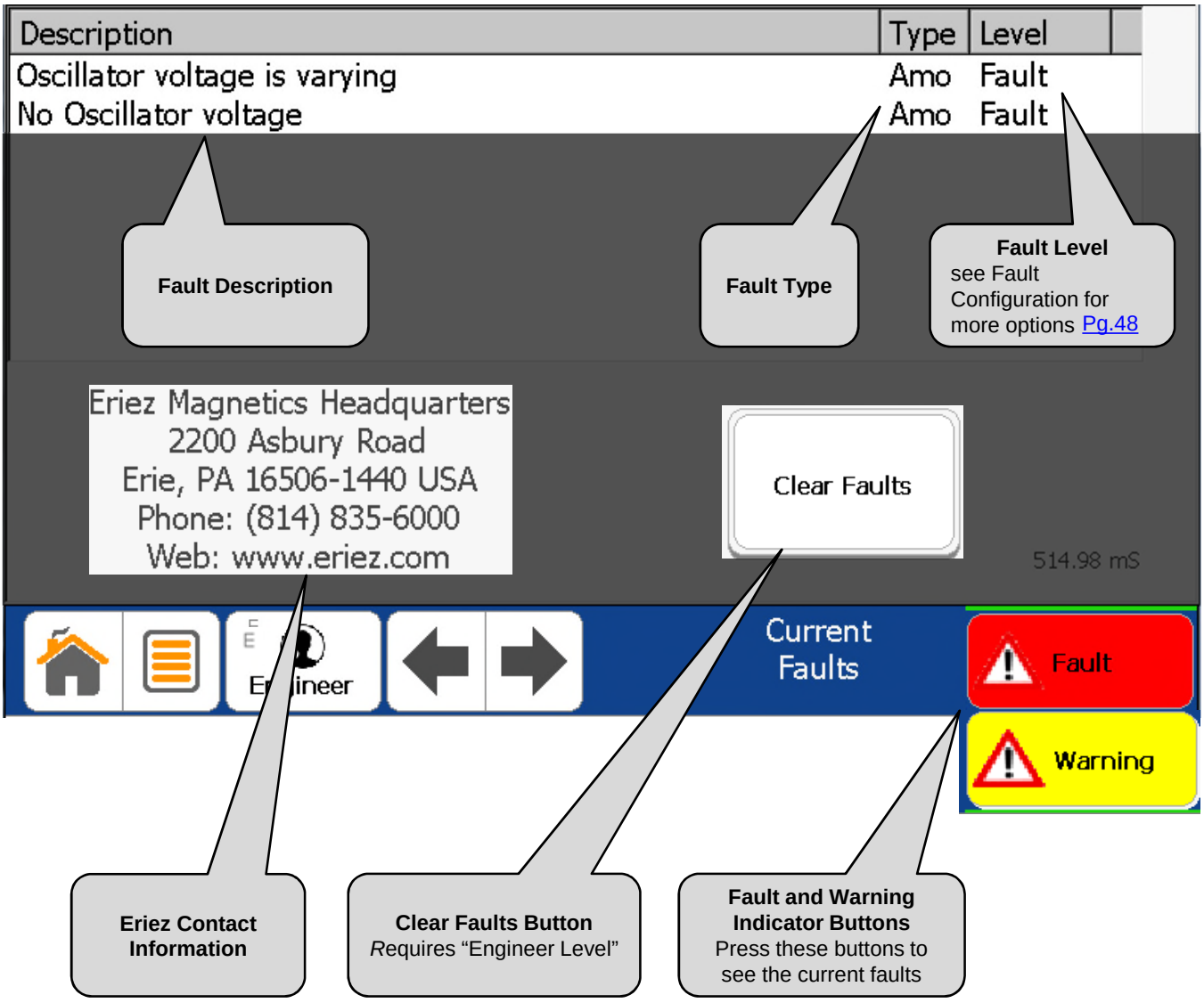


UI

OTHER TASK BAR INDICATORS

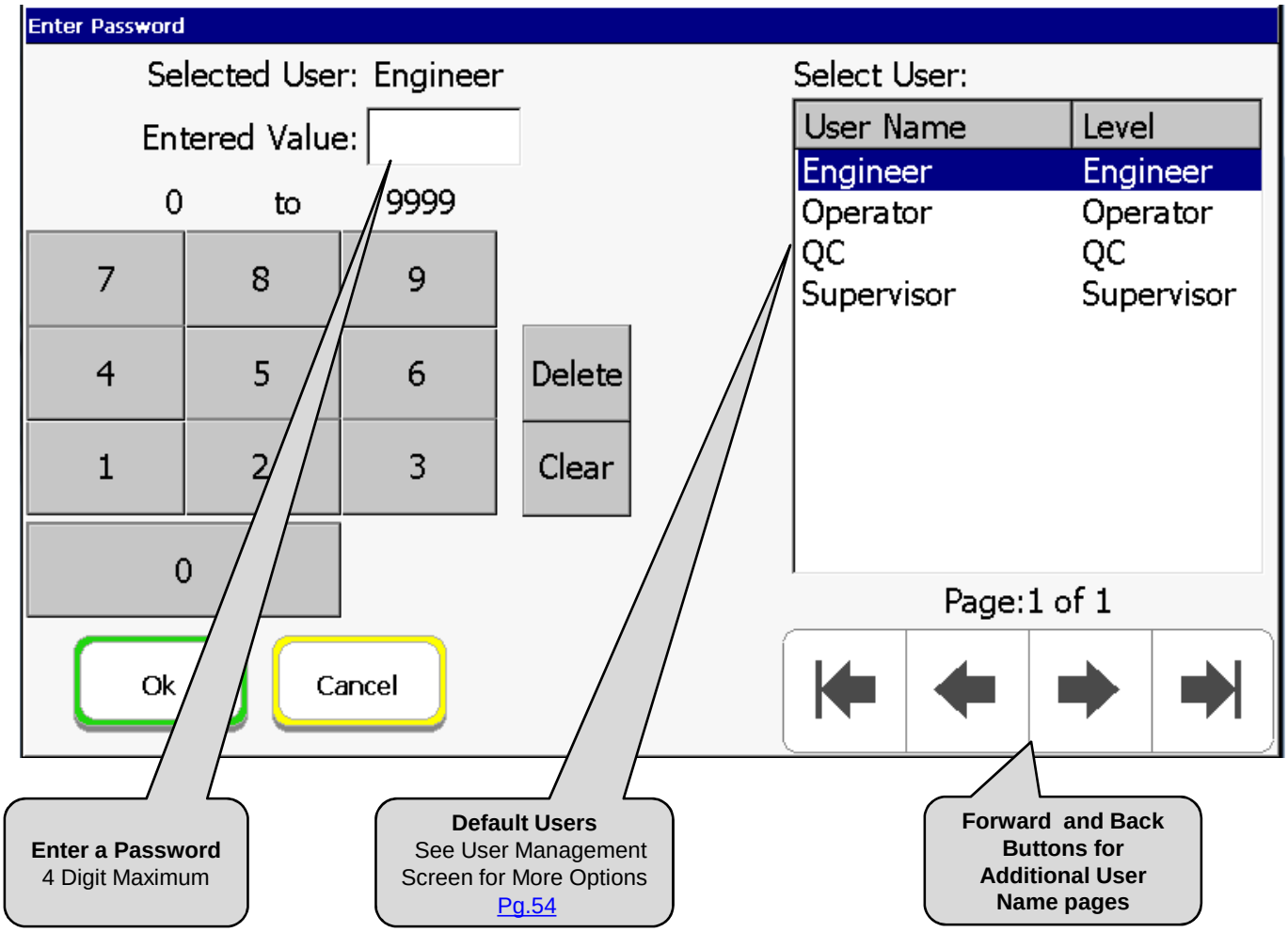


CURRENT FAULTS



NOTE: If a Fault and Warning have both occurred the Fault Indicator will take precedence over the Warning Indicator.

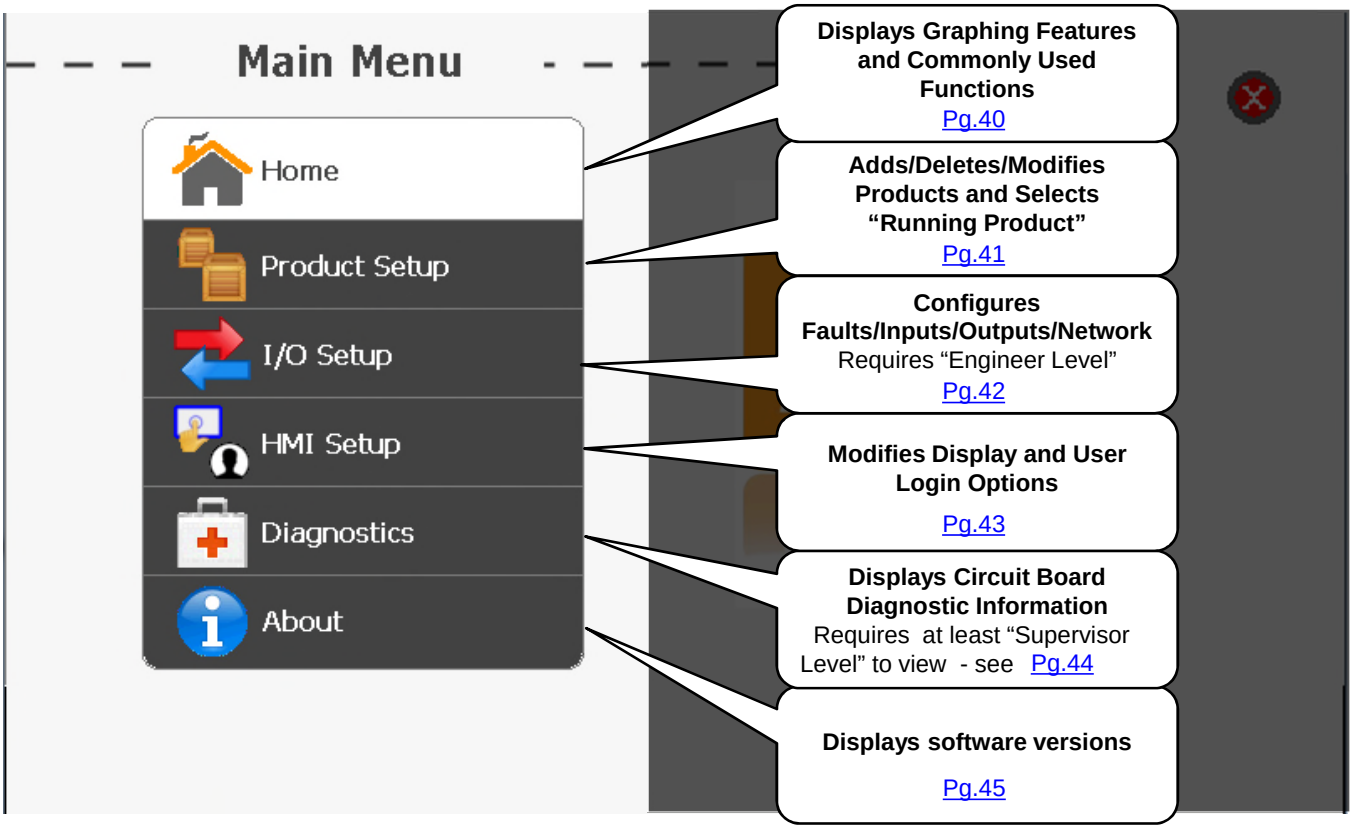
USER LOGIN



UI

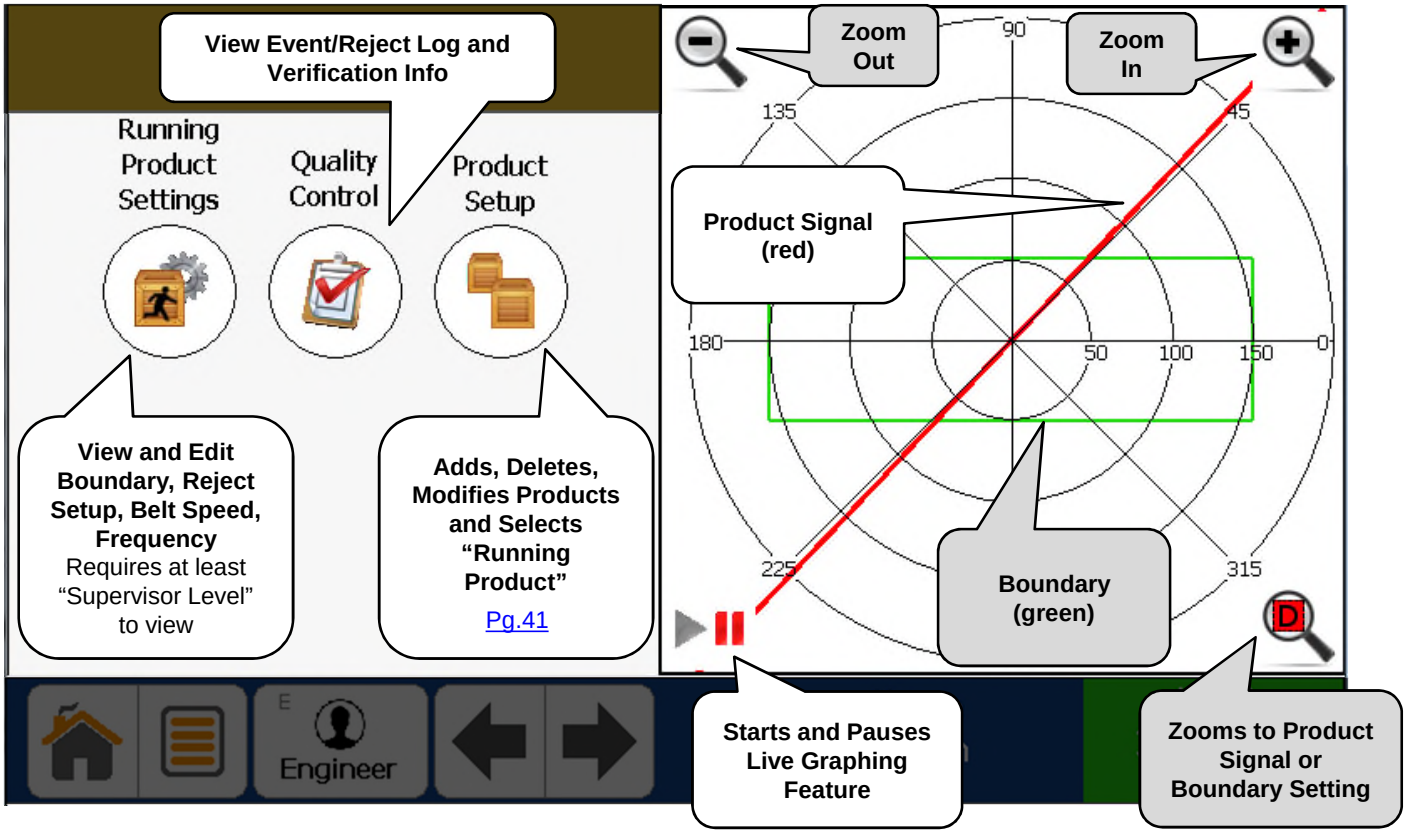
NOTE: Entering an incorrect password will revert you to the “View” level. The “View” level has no user functionality.

MAIN MENU



NOTE: The Main Menu is accessible from the Task Bar.

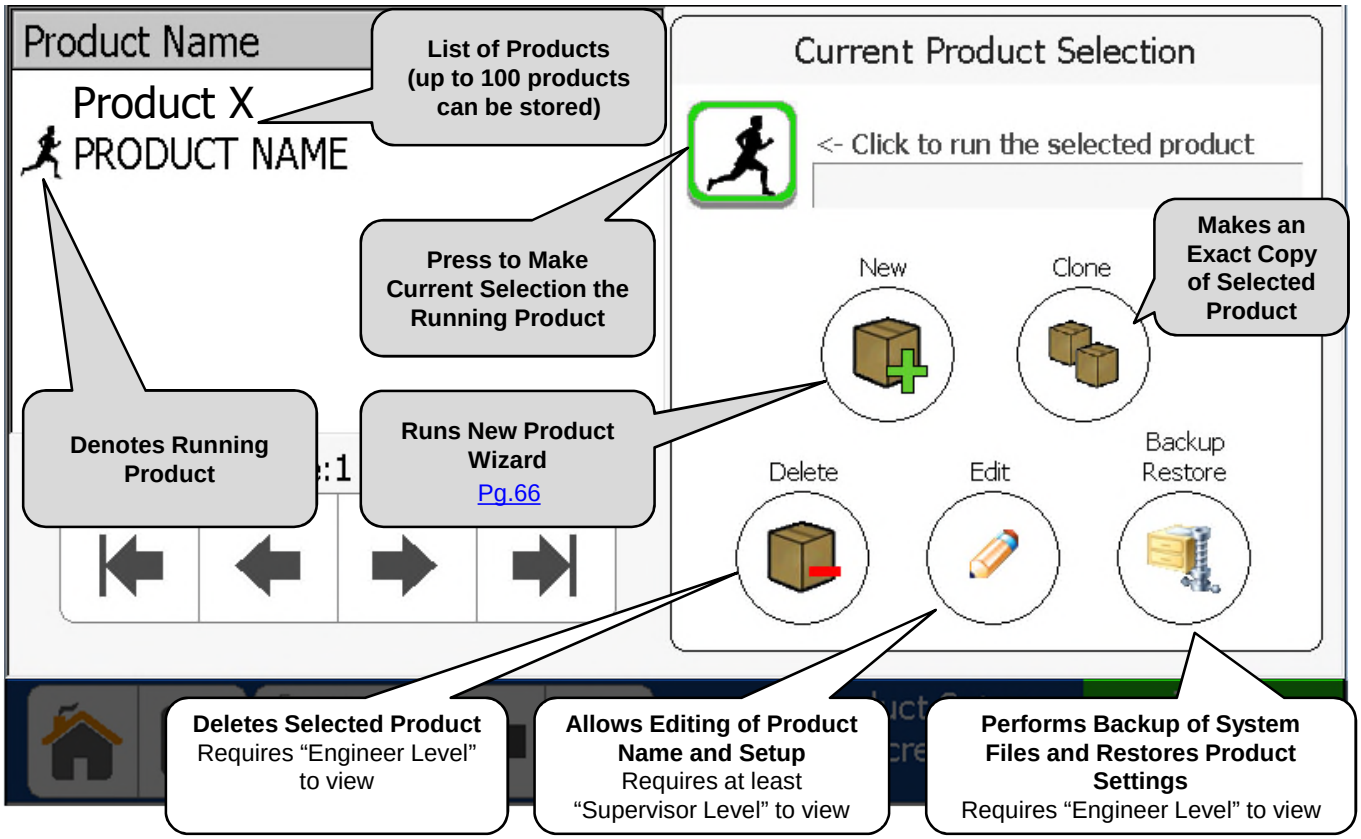
HOME SCREEN



UI

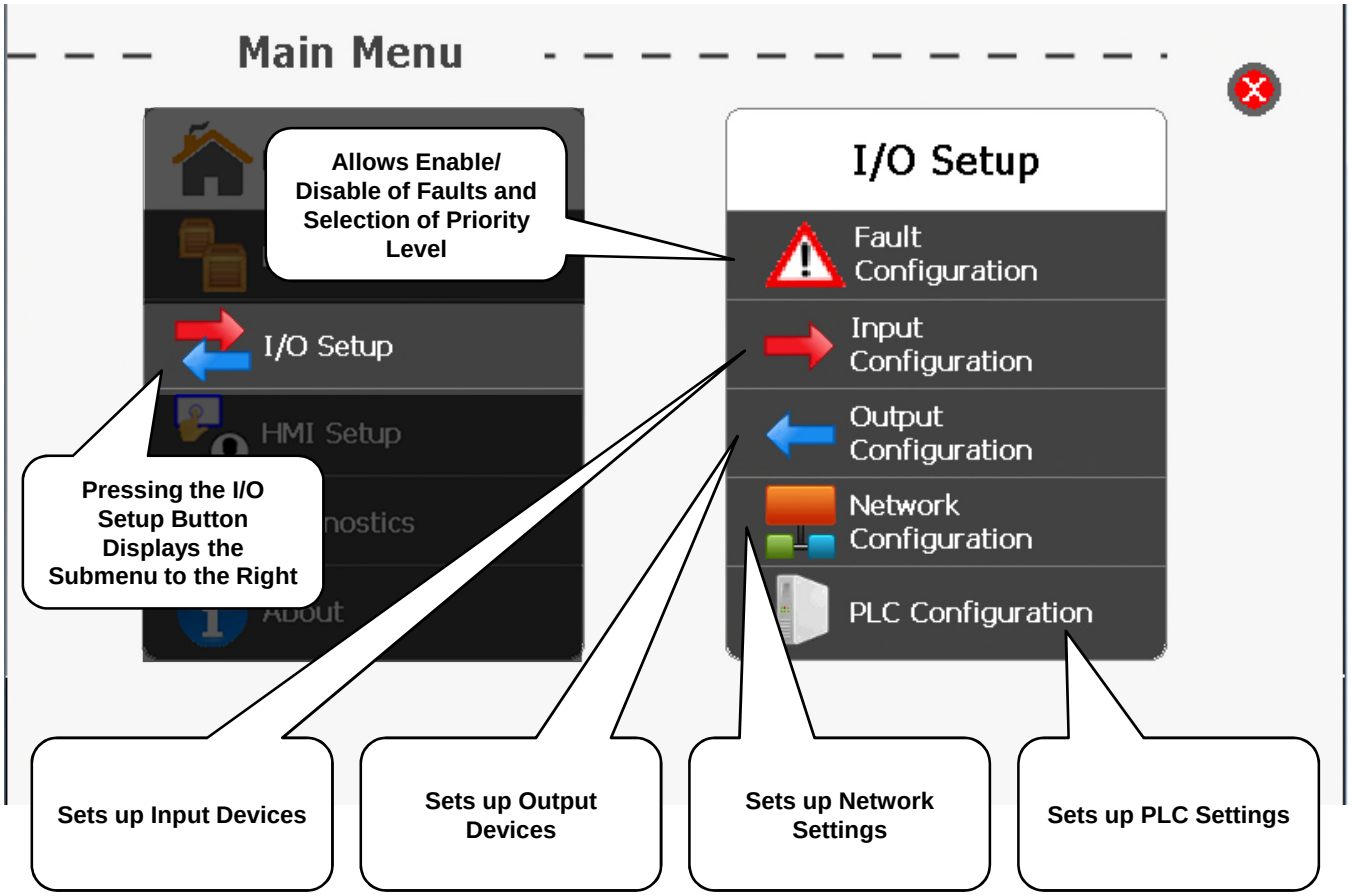
NOTE: This is the default screen when the detector is initially turned on.

PRODUCT SETUP



UI

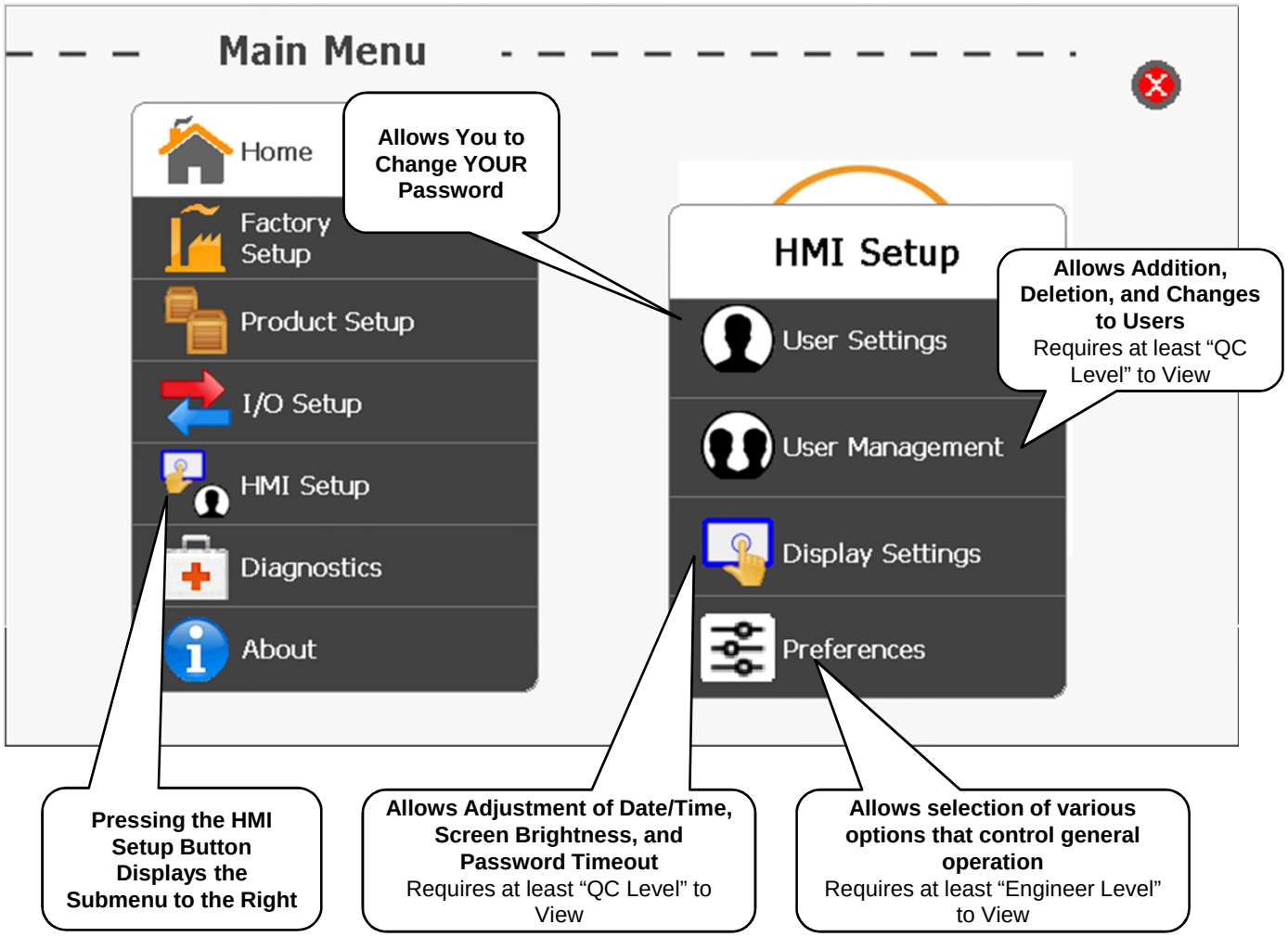
I/O SETUP



UI

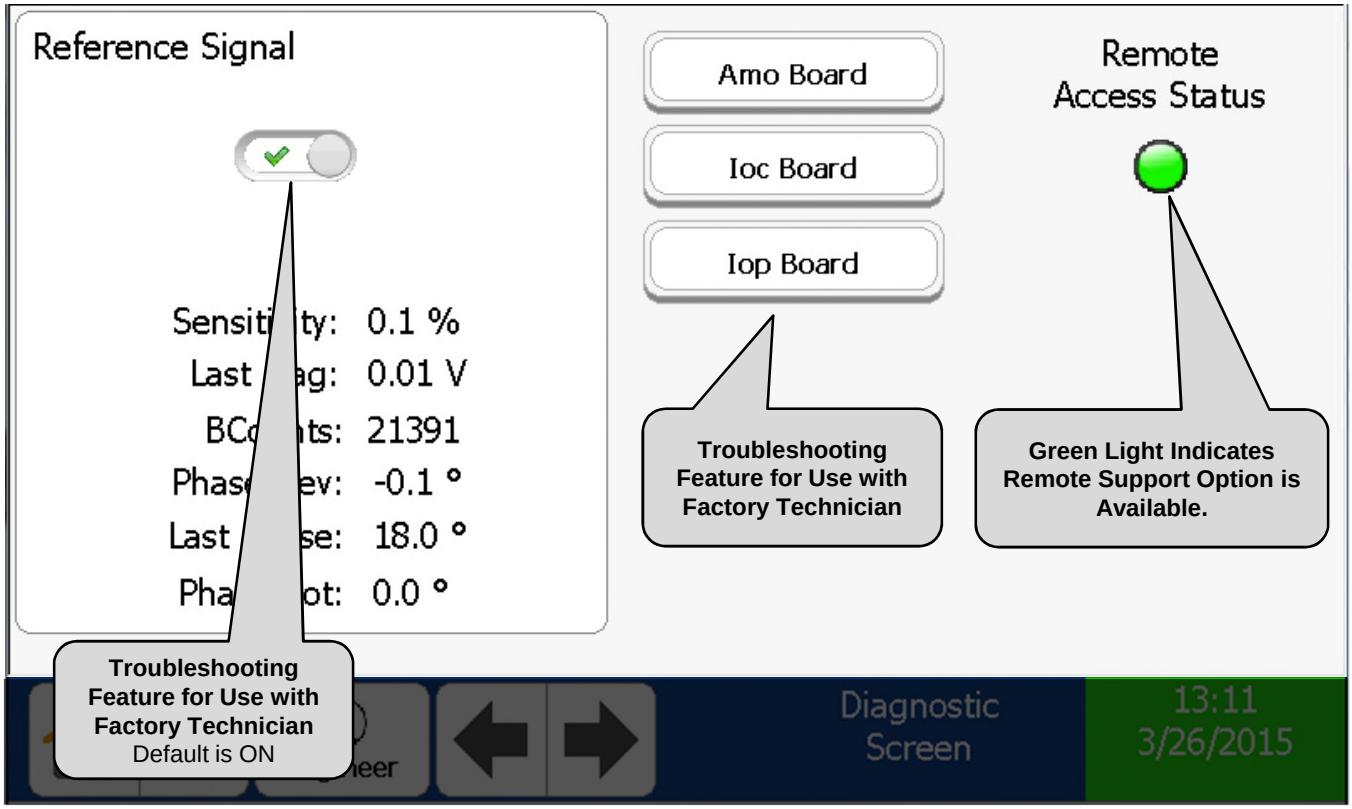
NOTE: This screen requires “Engineer Level” to view.

HMI SETUP


Main Menu
Home
Factory Setup
Product Setup
I/O Setup
HMI Setup
Diagnostics
About
HMI Setup
User Settings
User Management
Display Settings
Preferences
Allows You to Change YOUR Password
Allows Addition, Deletion, and Changes to Users
Requires at least "QC Level" to View
Pressing the HMI Setup Button Displays the Submenu to the Right
Allows Adjustment of Date/Time, Screen Brightness, and Password Timeout
Requires at least "QC Level" to View
Allows selection of various options that control general operation
Requires at least "Engineer Level" to View

UI

DIAGNOSTIC SCREEN

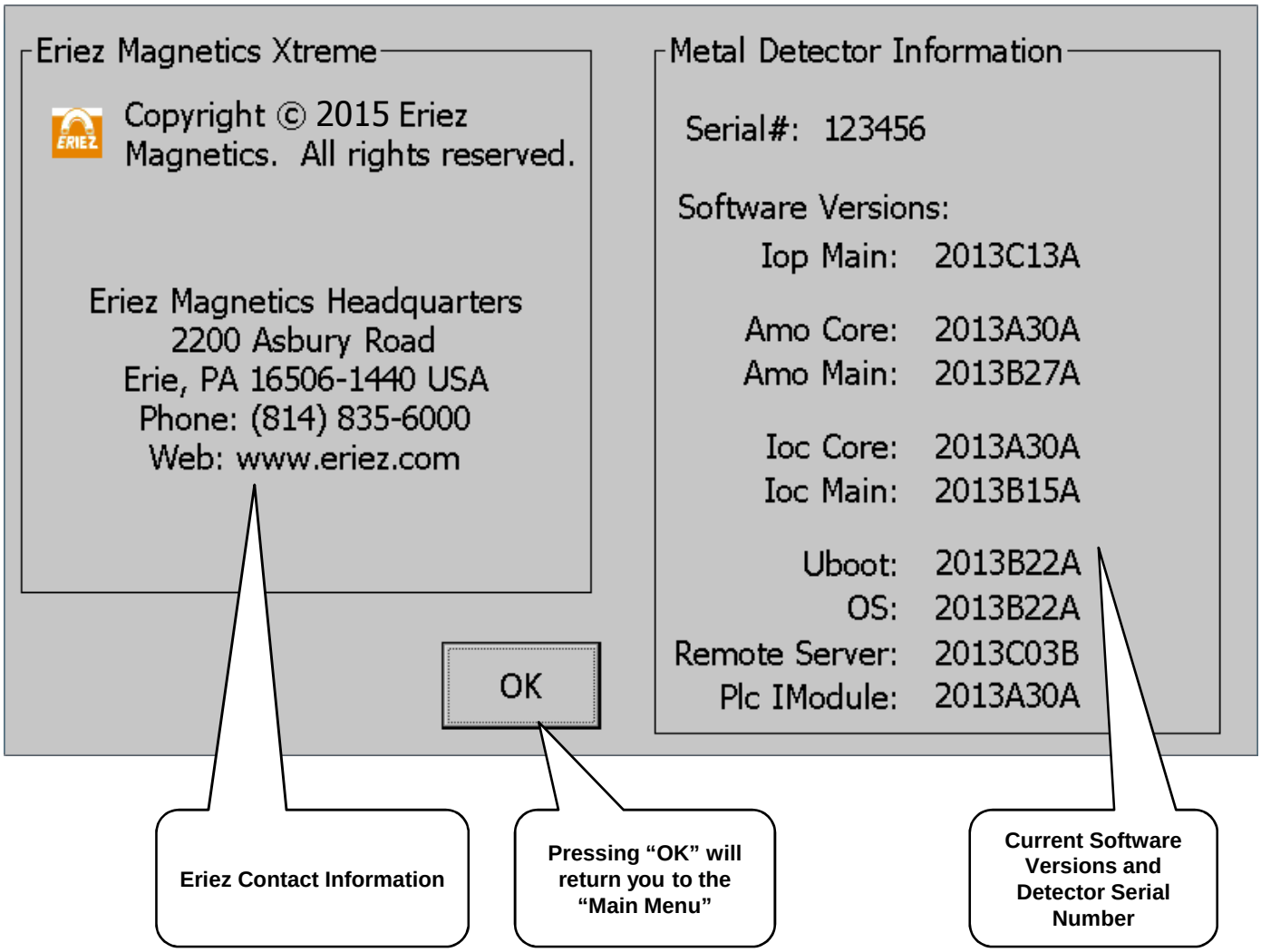


UI

NOTE: Remote Support capability requires that a static IP Address be assigned to the Metal Detector and a Secure Gateway (Purchased Separately) be connected to your LAN..

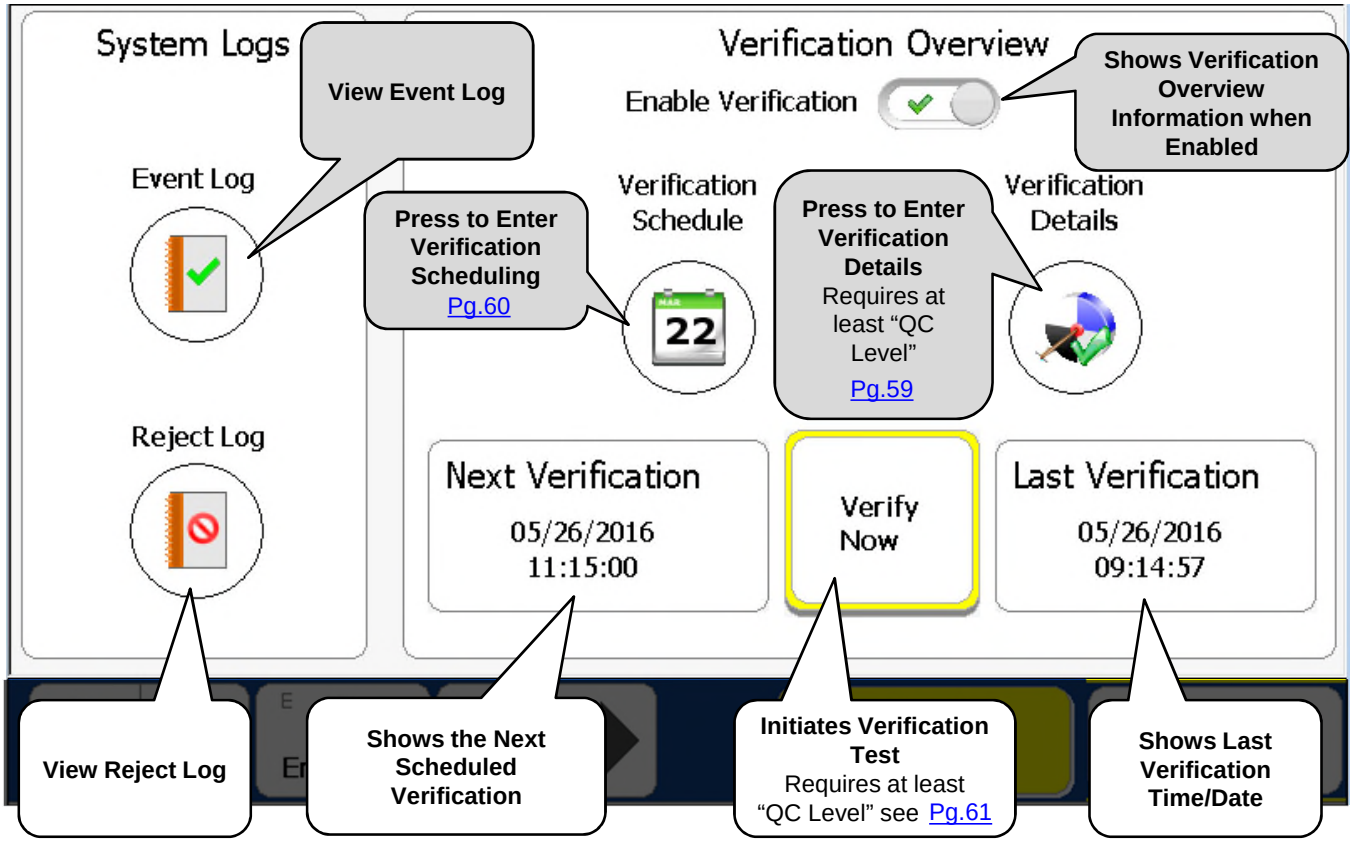
NOTE: This screen requires at least “Supervisor Level” to view.

ABOUT SCREEN



UI

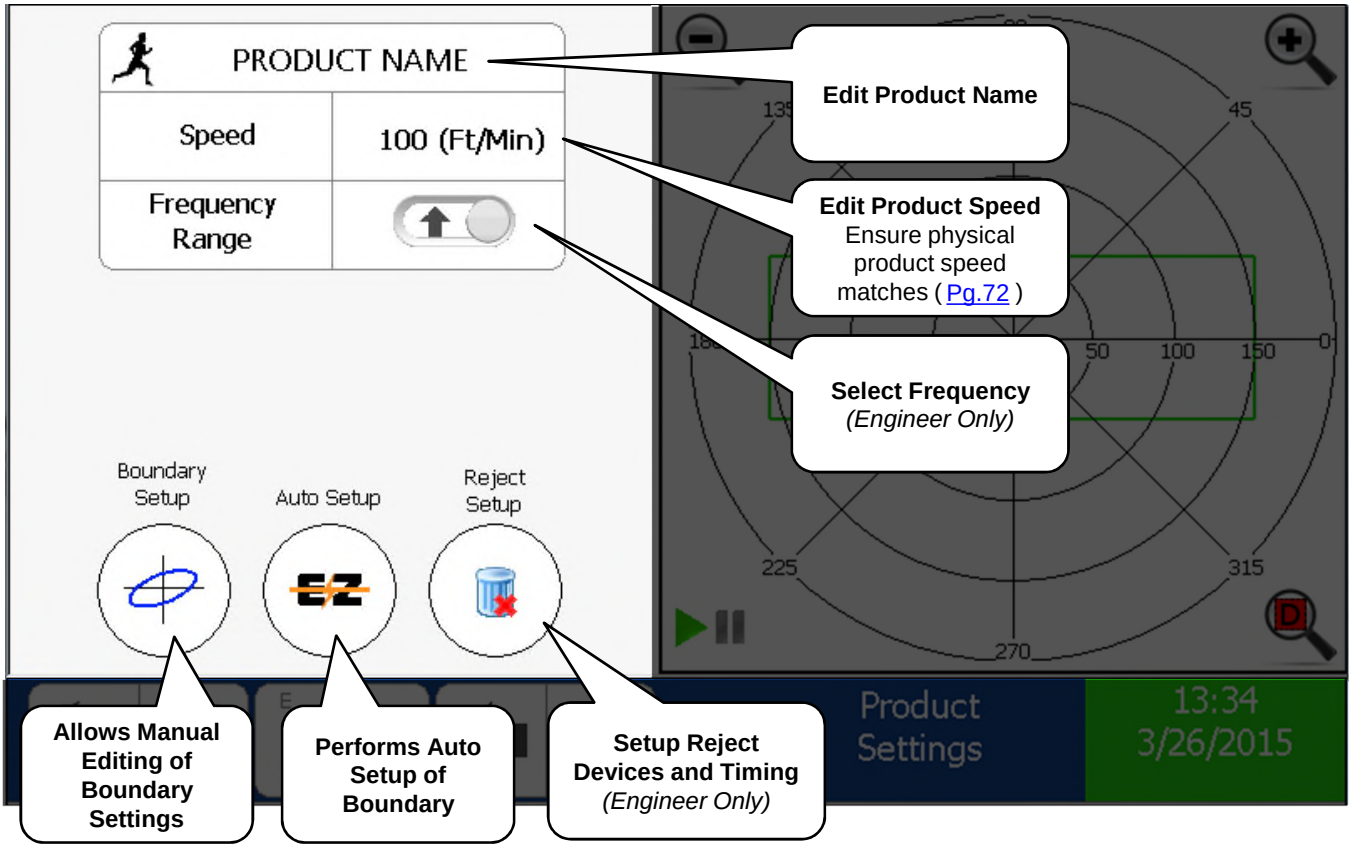
QUALITY CONTROL SCREEN



UI

NOTE: The verification window opens the set number of minutes prior to the next verification check and closes at the time when the verification check is overdue. A warning will be displayed when the window opens and a fault when it closes if the verification check was not completed.

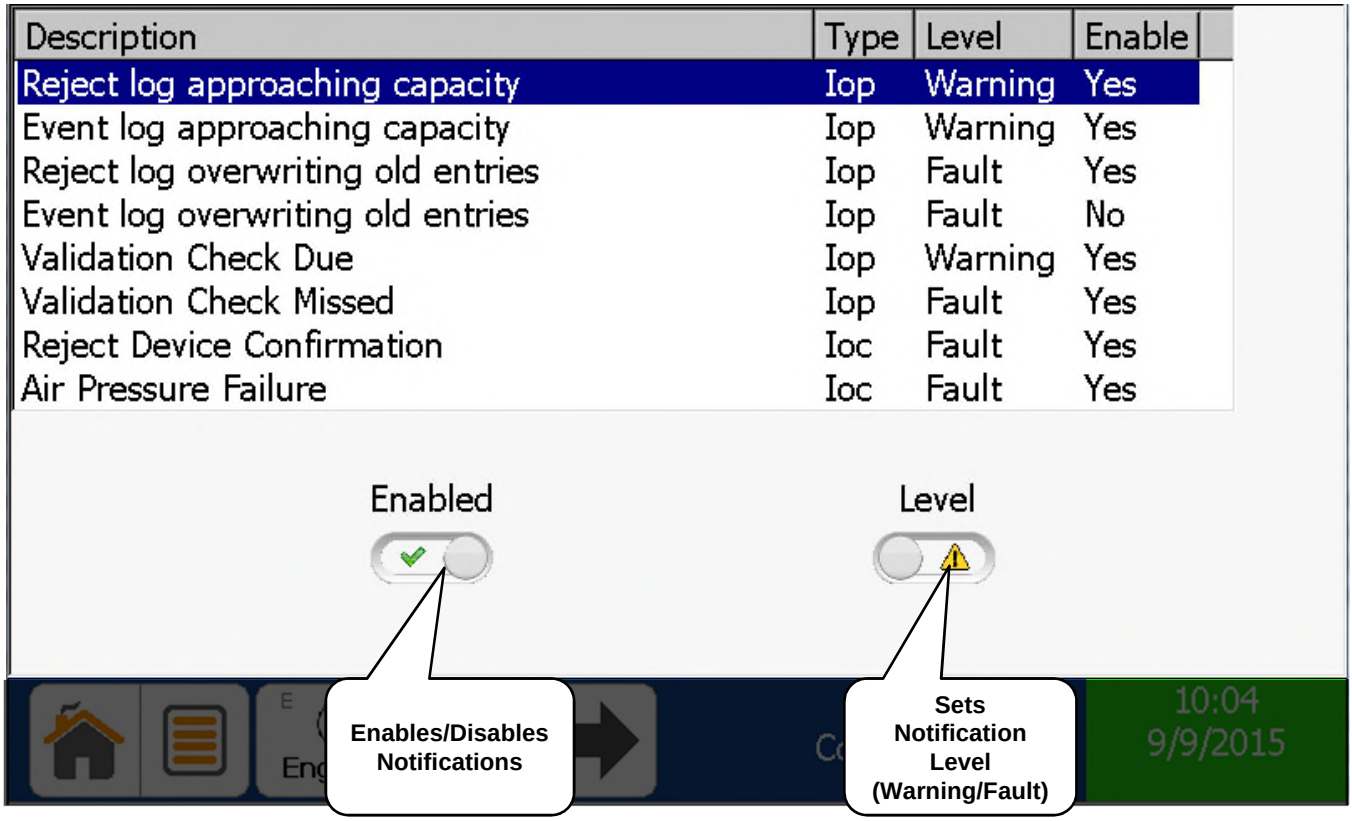
PRODUCT SETTINGS



UI

NOTE: This screen requires at least “Supervisor Level” to view. Some features of this page require “Engineer Level”.

FAULT CONFIGURATION

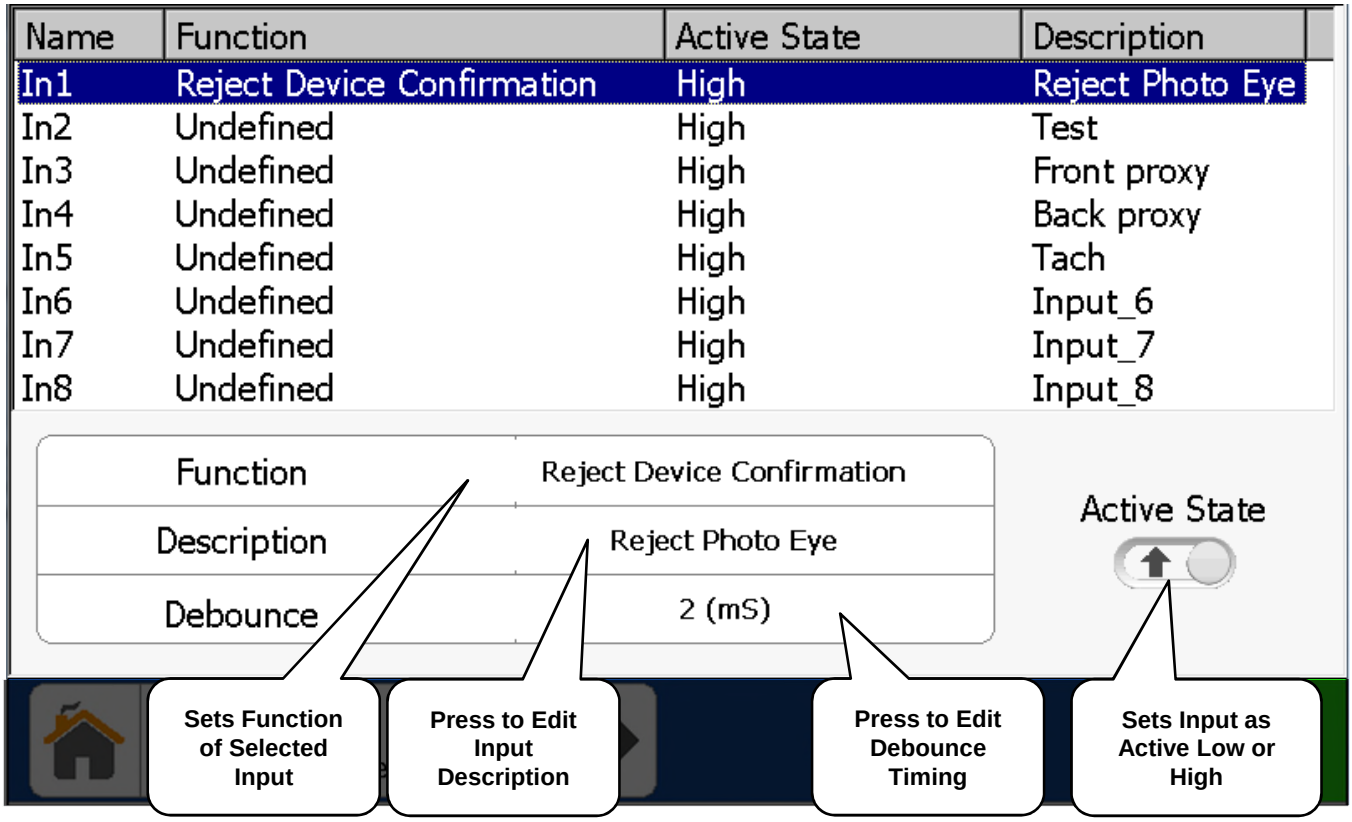


UI

NOTE: If a Fault and Warning have both occurred, the Fault Indicator will take precedence over the Warning Indicator.

NOTE: This screen requires “Engineer Level” to view.

INPUT CONFIGURATION

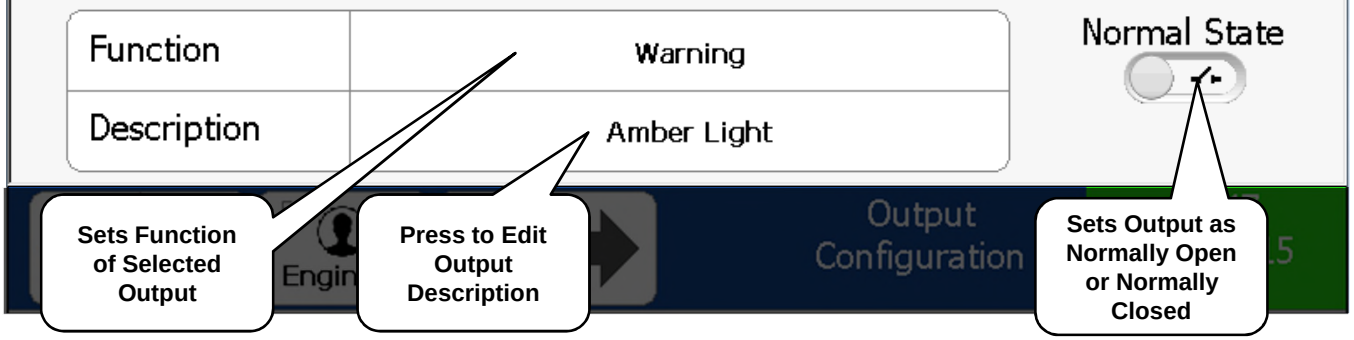


UI

NOTE: This screen requires “Engineer Level” to view.

OUTPUT CONFIGURATION

Name	Function	Normal State	Description
Reject	RejectTmr	Failsafe	Air Blast
Relay_1	Fault	Failsafe	Light
Relay_2	Undefined	Failsafe	Relay_2
Relay_3	Undefined	Failsafe	Relay_3
Out_1	Fault	Normally_Open	Red Light
Out_2	Warning	Normally_Open	Amber Light
Out_3	Fault	Normally_Closed	Green Light
Out_4	OutputTmr_1	Normally_Open	Blue Light
Out_5	OutputTmr_1	Normally_Open	Horn

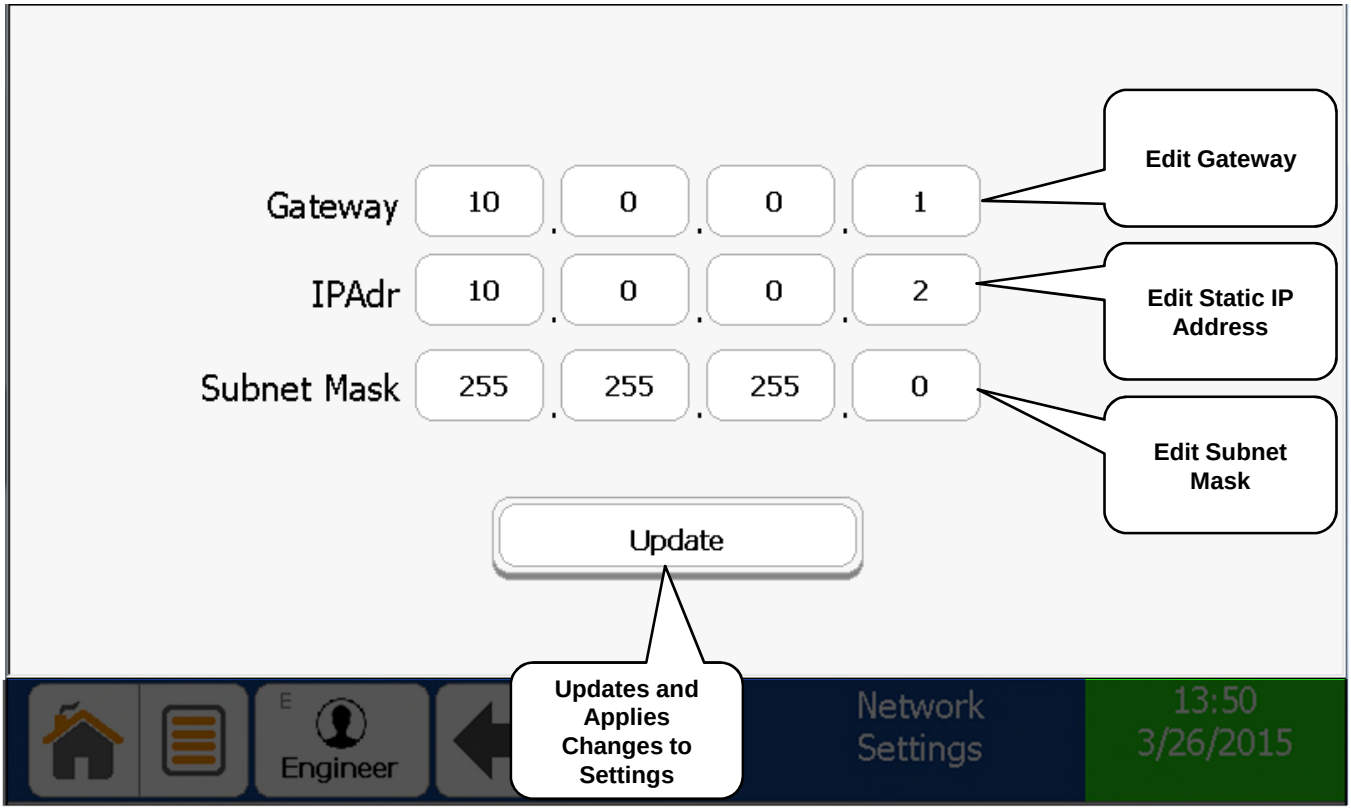


UI

"Reject" functionality is limited to "Reject Timer" or "Overhead A-B".

NOTE: This screen requires "Engineer Level" to view.

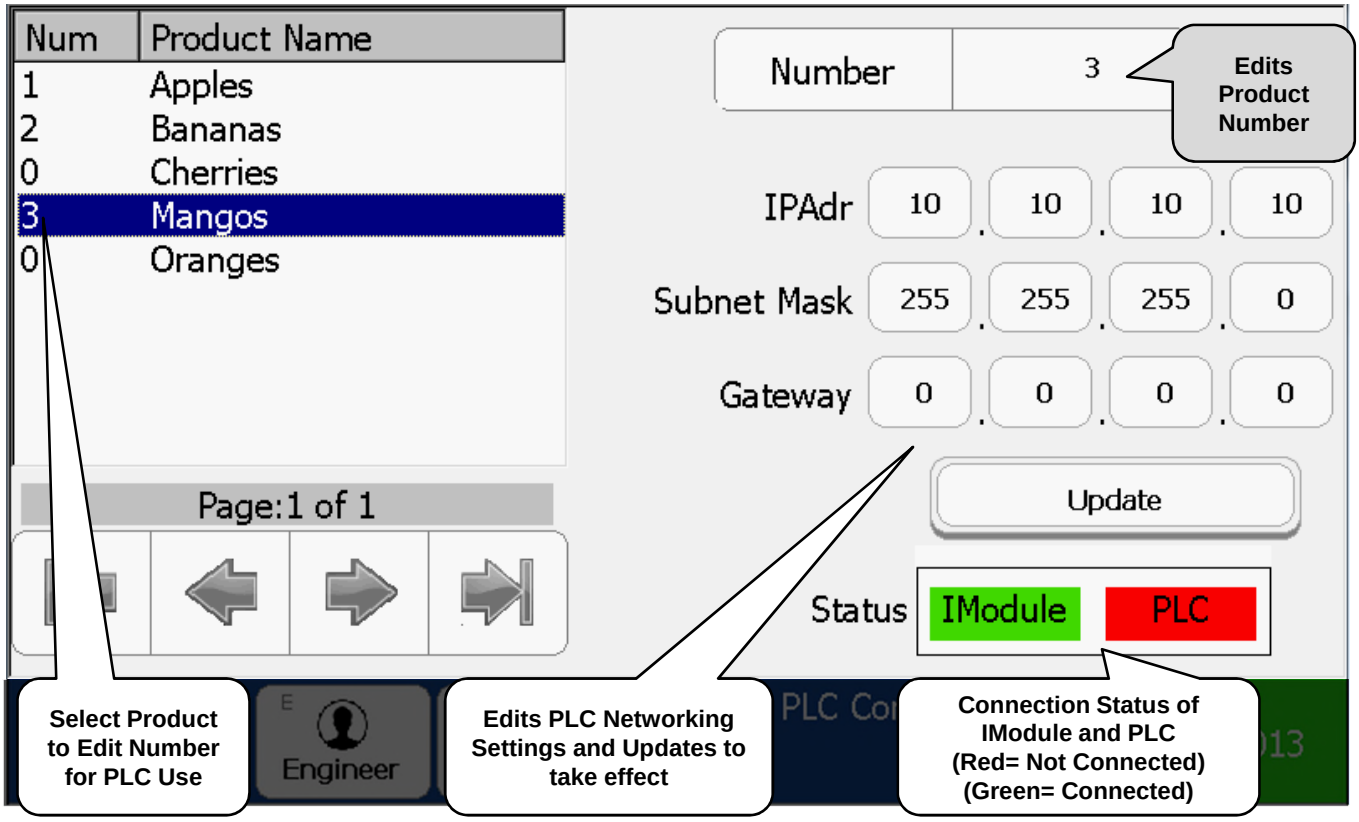
NETWORK CONFIGURATION



UI

NOTE: This screen requires “Engineer Level” to view.

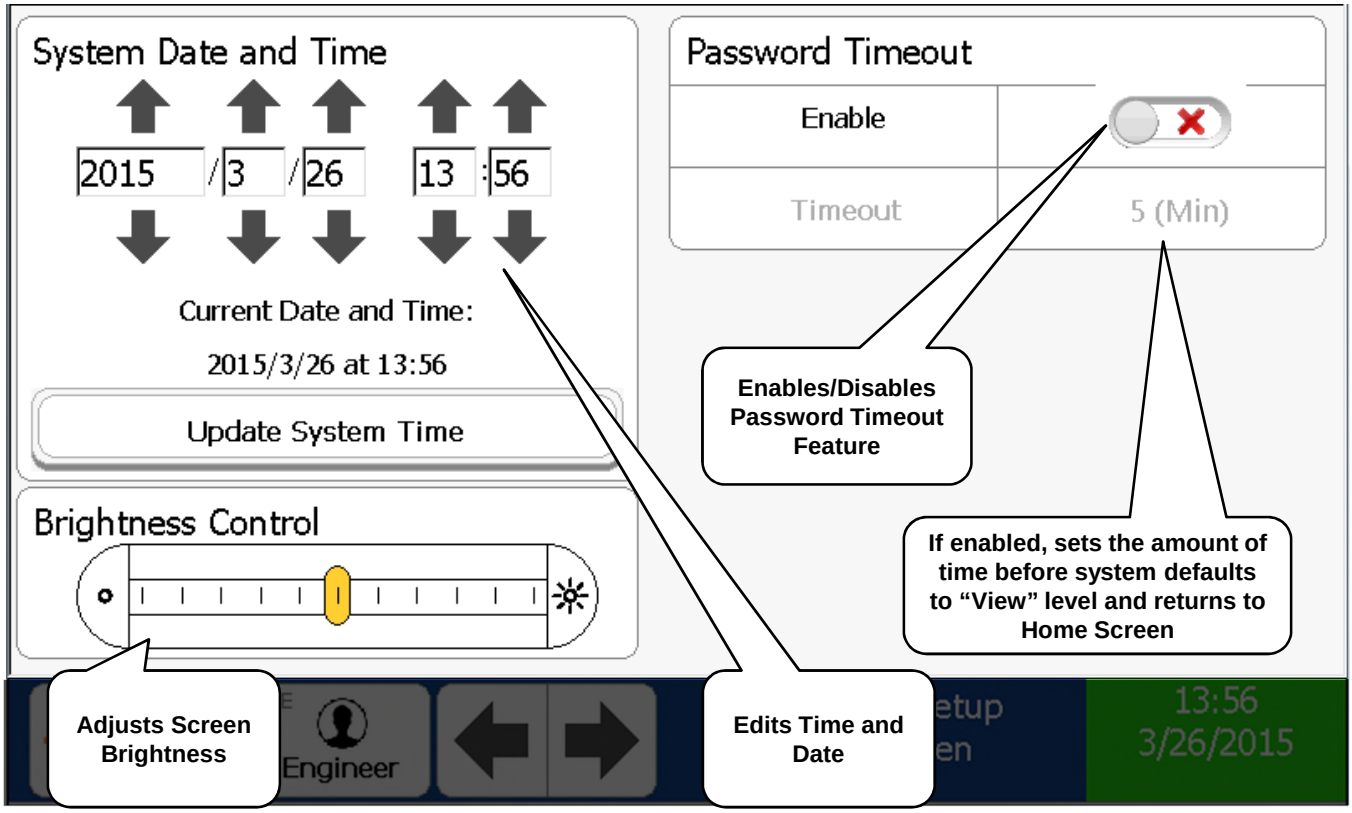
PLC CONFIGURATION



UI

NOTE: This screen requires “Engineer Level” to view.

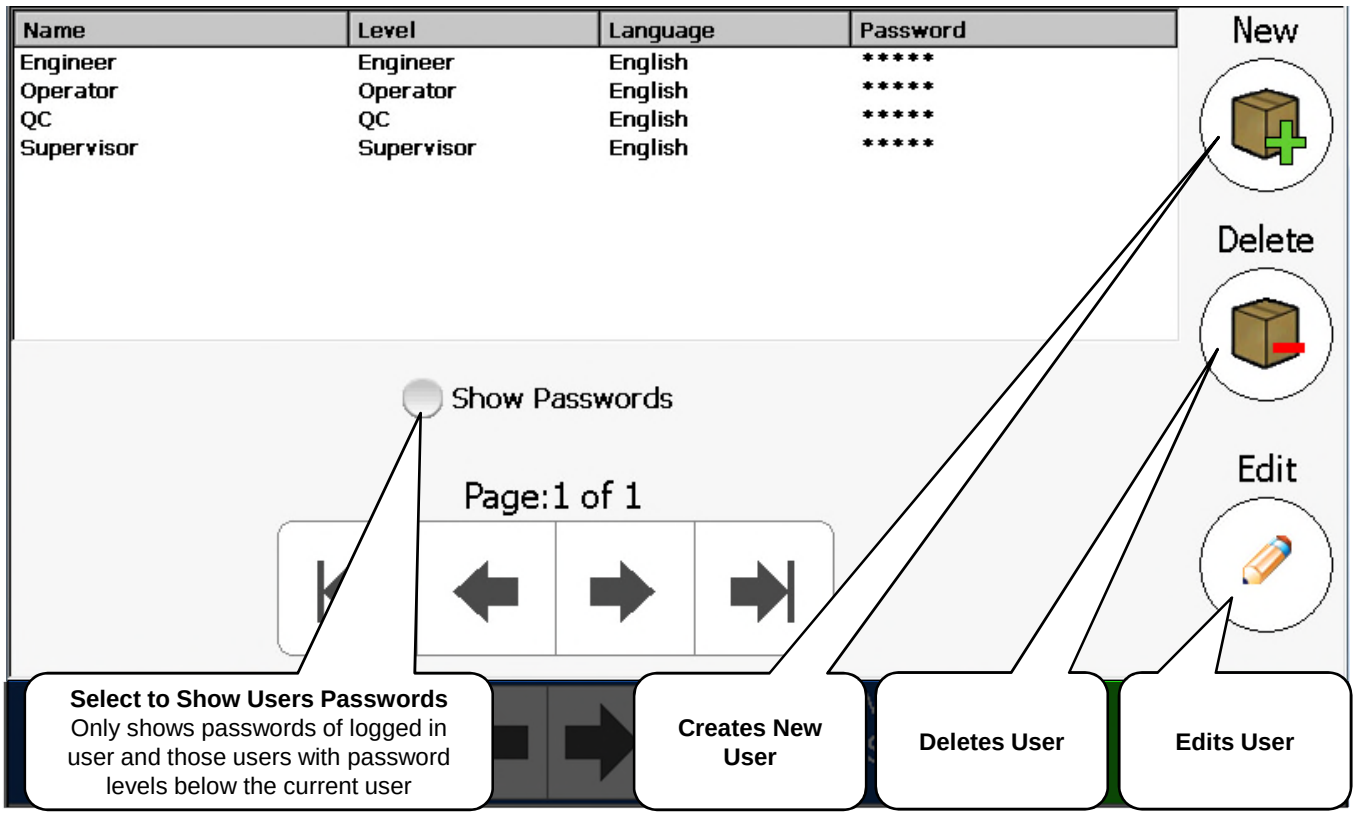
DISPLAY SETTINGS



NOTE: Time is set using a 24 hour clock.

NOTE: This screen requires at least "QC Level" to view.

USER MANAGEMENT

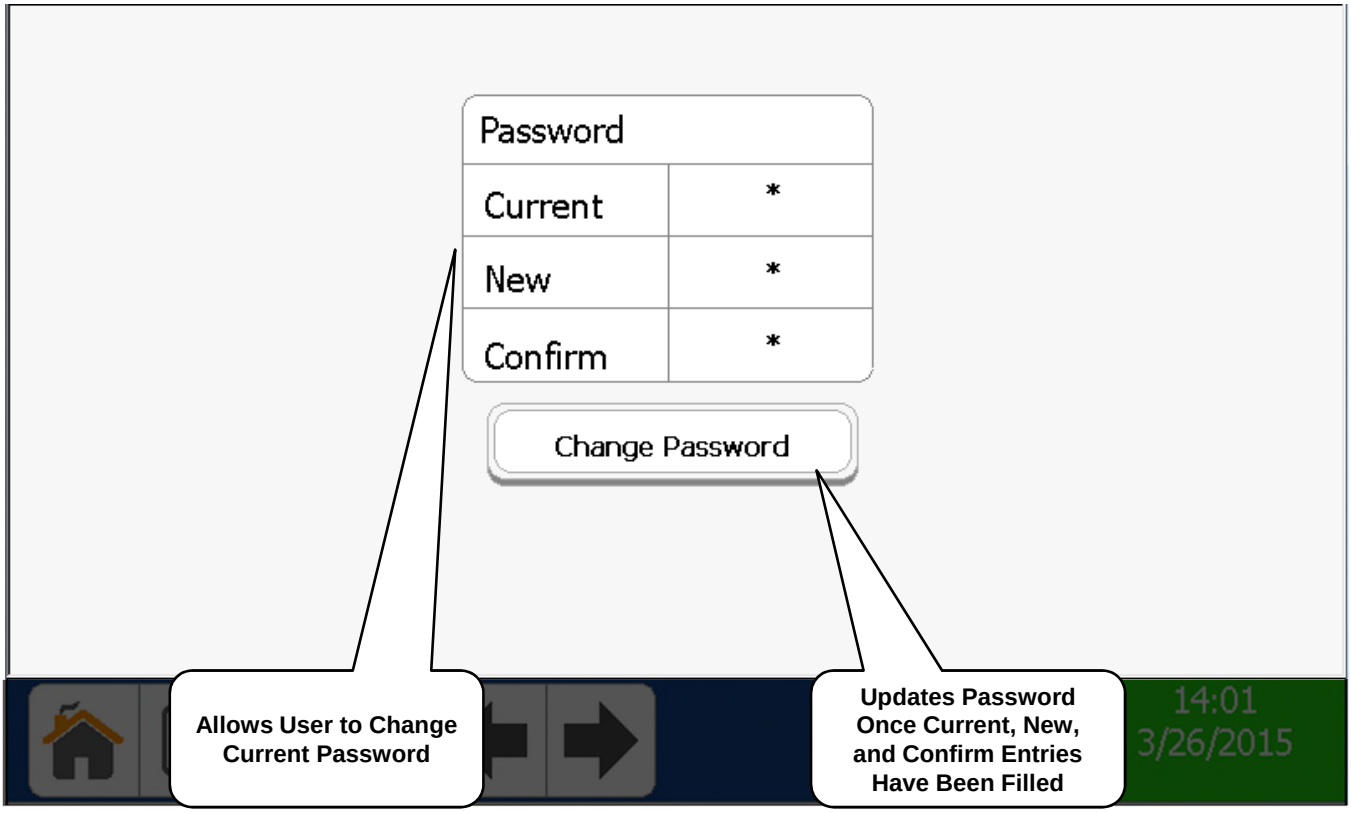


UI

NOTE: A user may Create or Delete users at their level and below. A user may Edit their own information or users below their level.

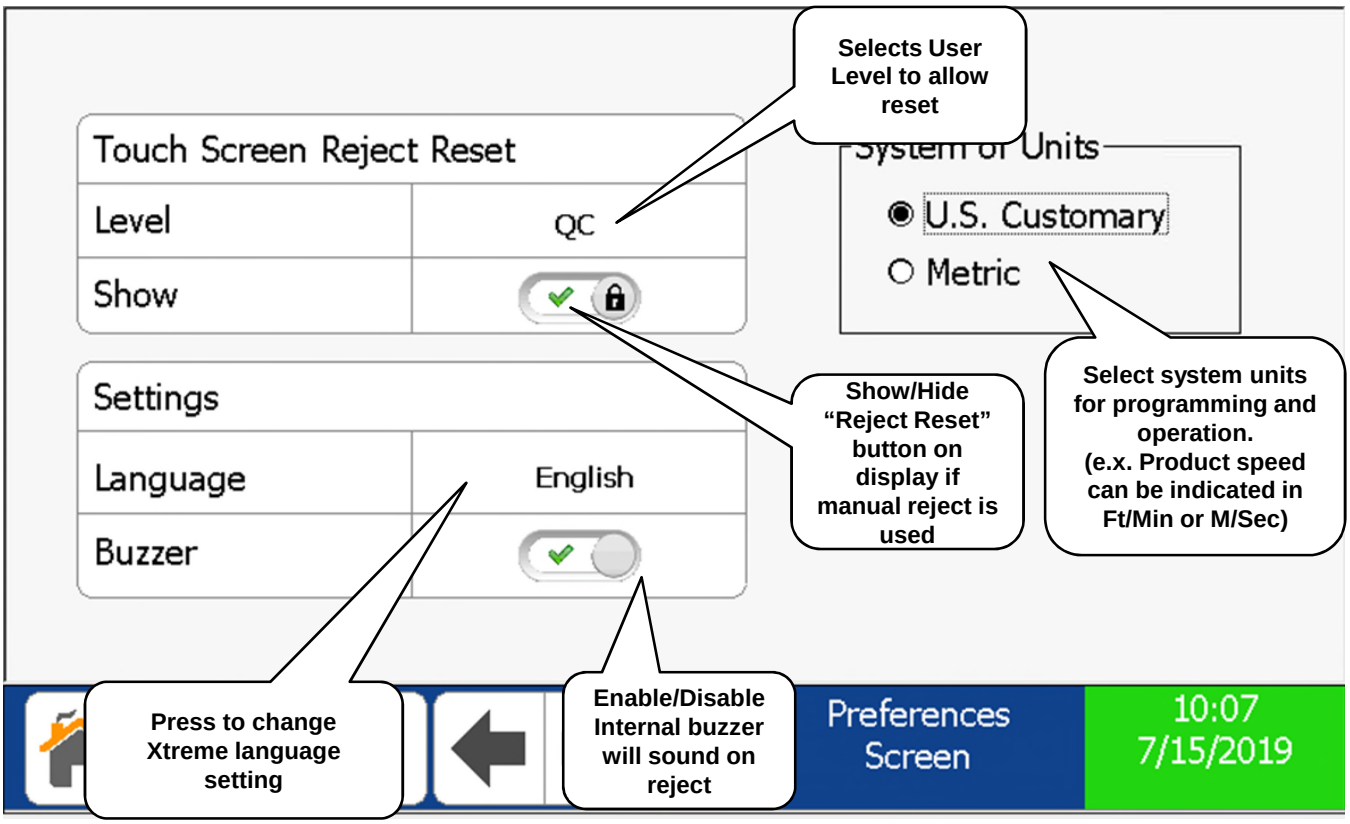
NOTE: This screen requires at least “QC Level” to view.

USER SETTINGS



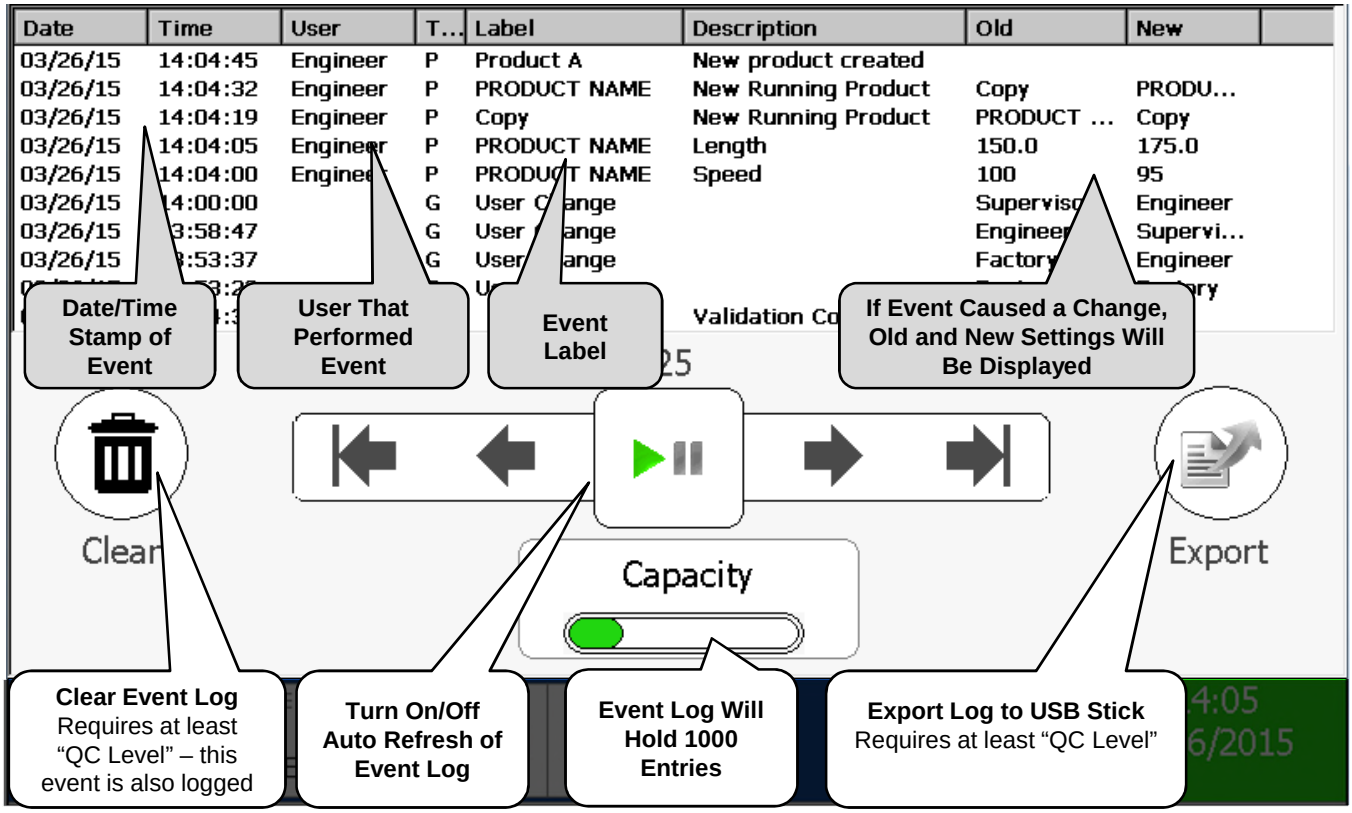
UI

Preferences



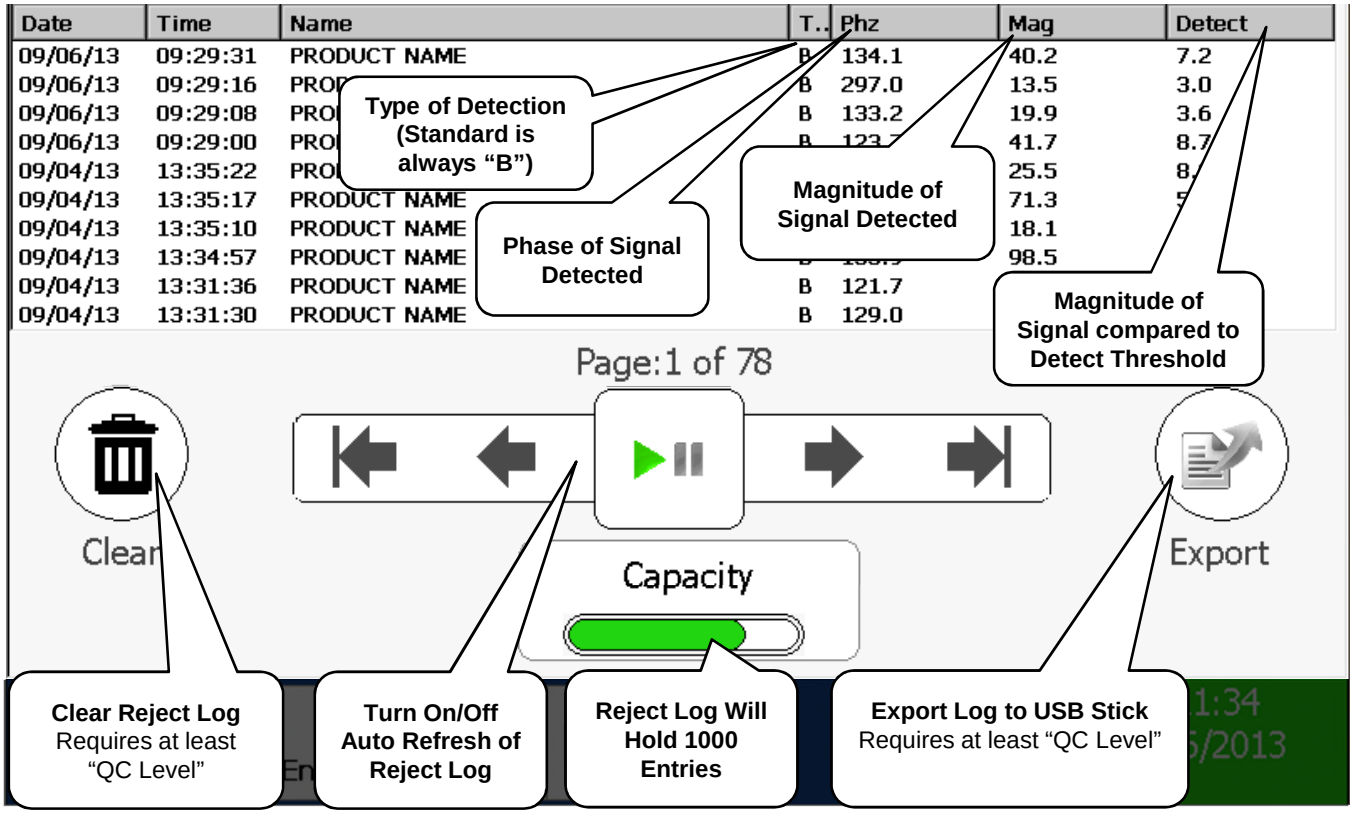
UI

EVENT LOG SCREEN



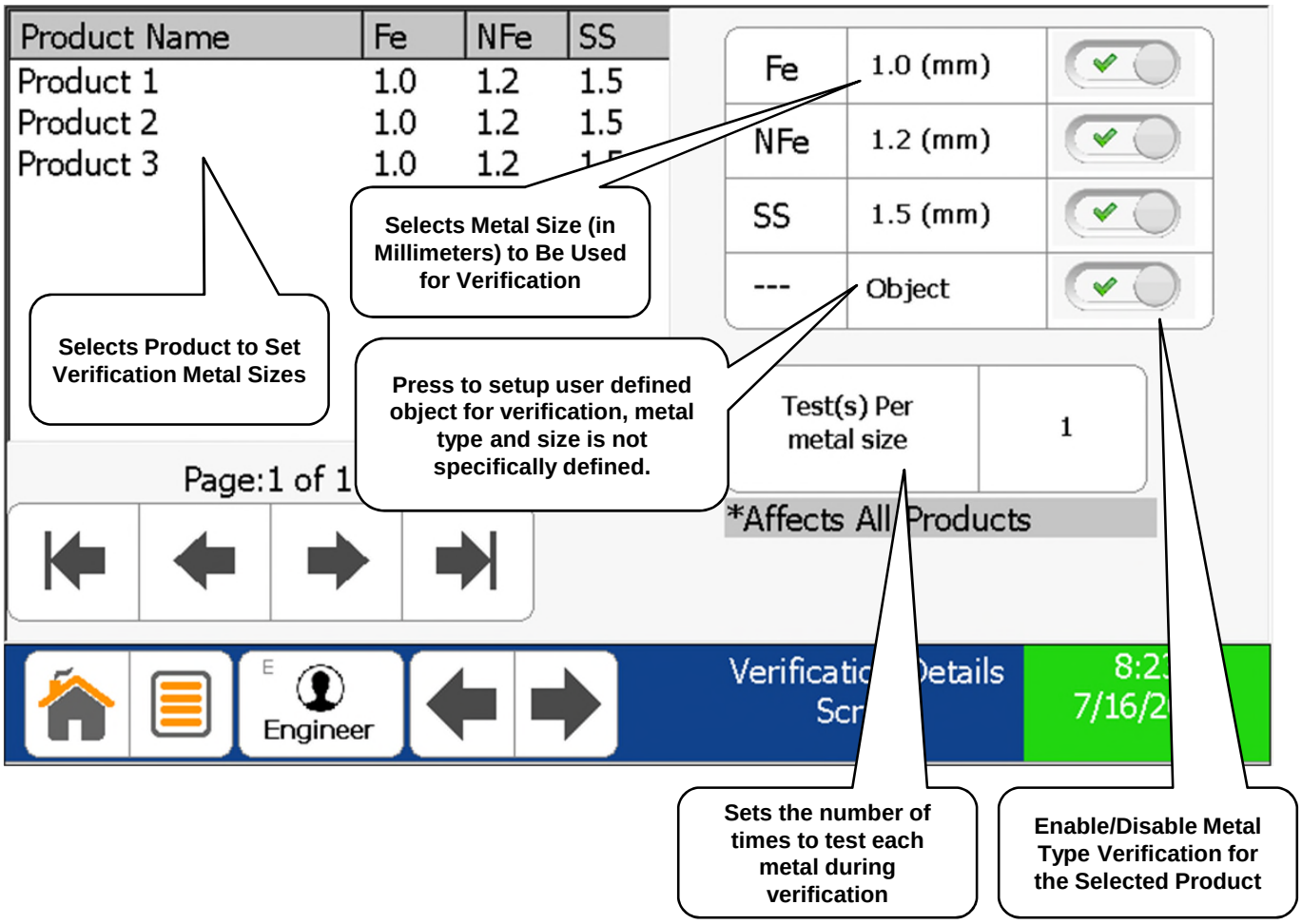
UI

REJECT LOG SCREEN



UI

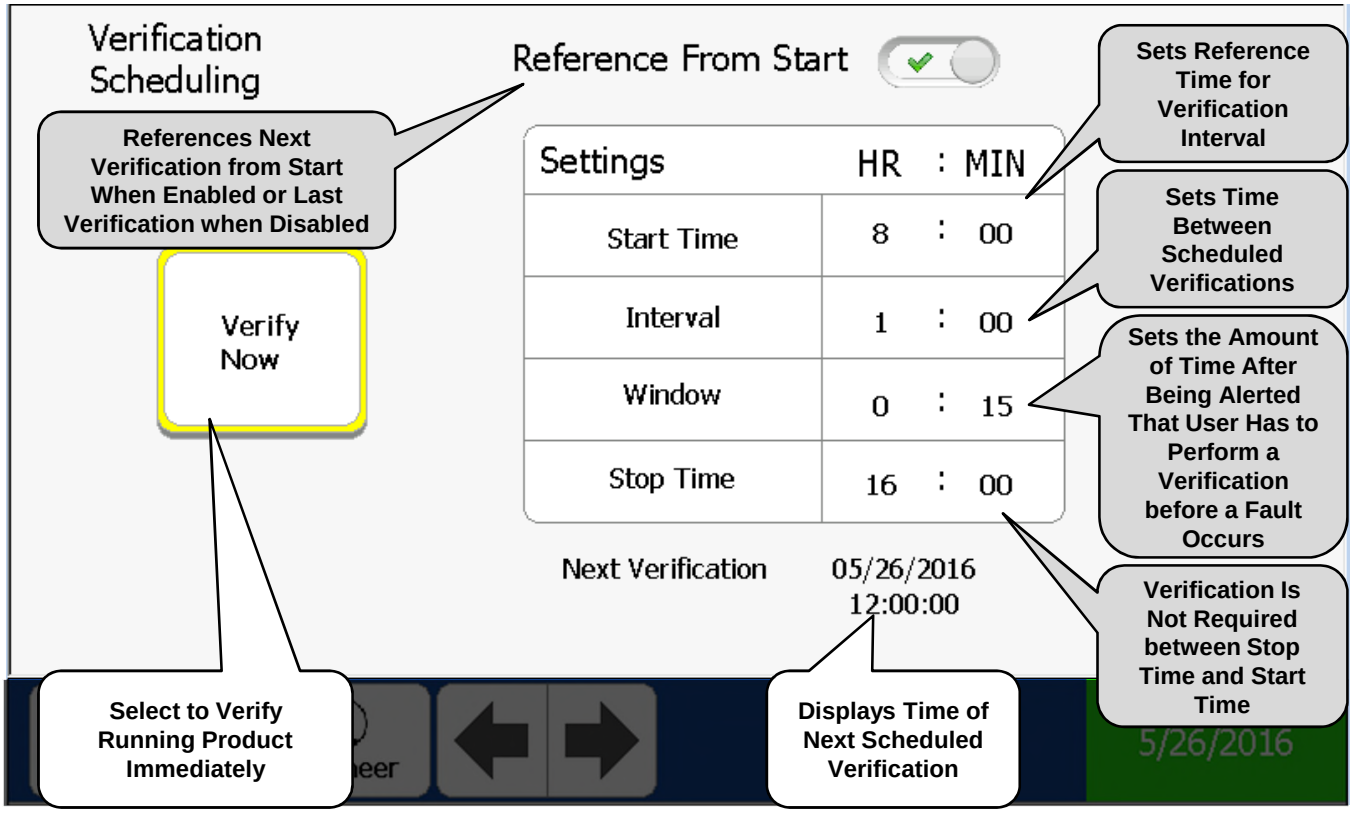
VERIFICATION DETAILS



UI

NOTE: This screen requires at least “QC Level” to view.

VERIFICATION SCHEDULE

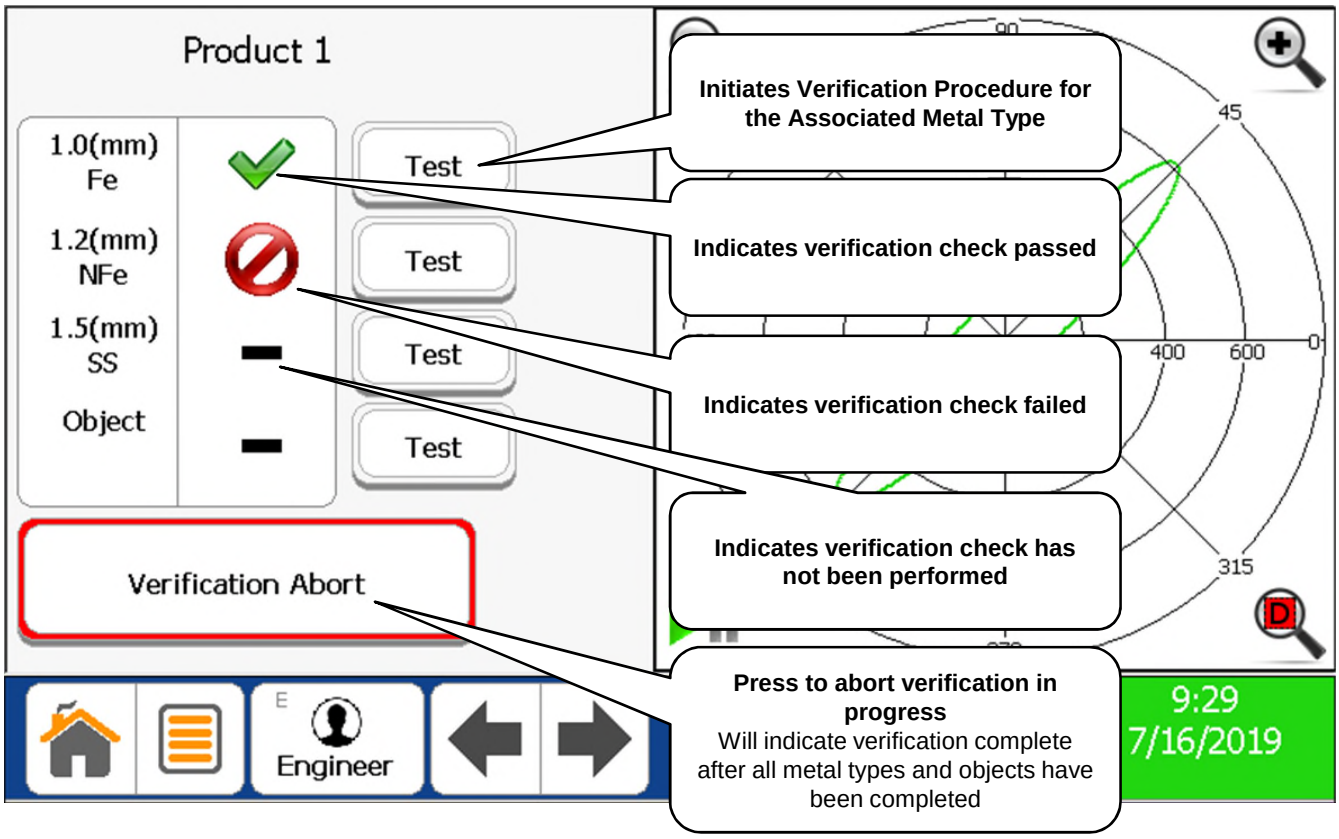


UI

If your company runs 24/7 it is recommended that you set the start time to 00:01 and the stop time to 23:59.

NOTE: This screen requires at least “QC Level” to view.

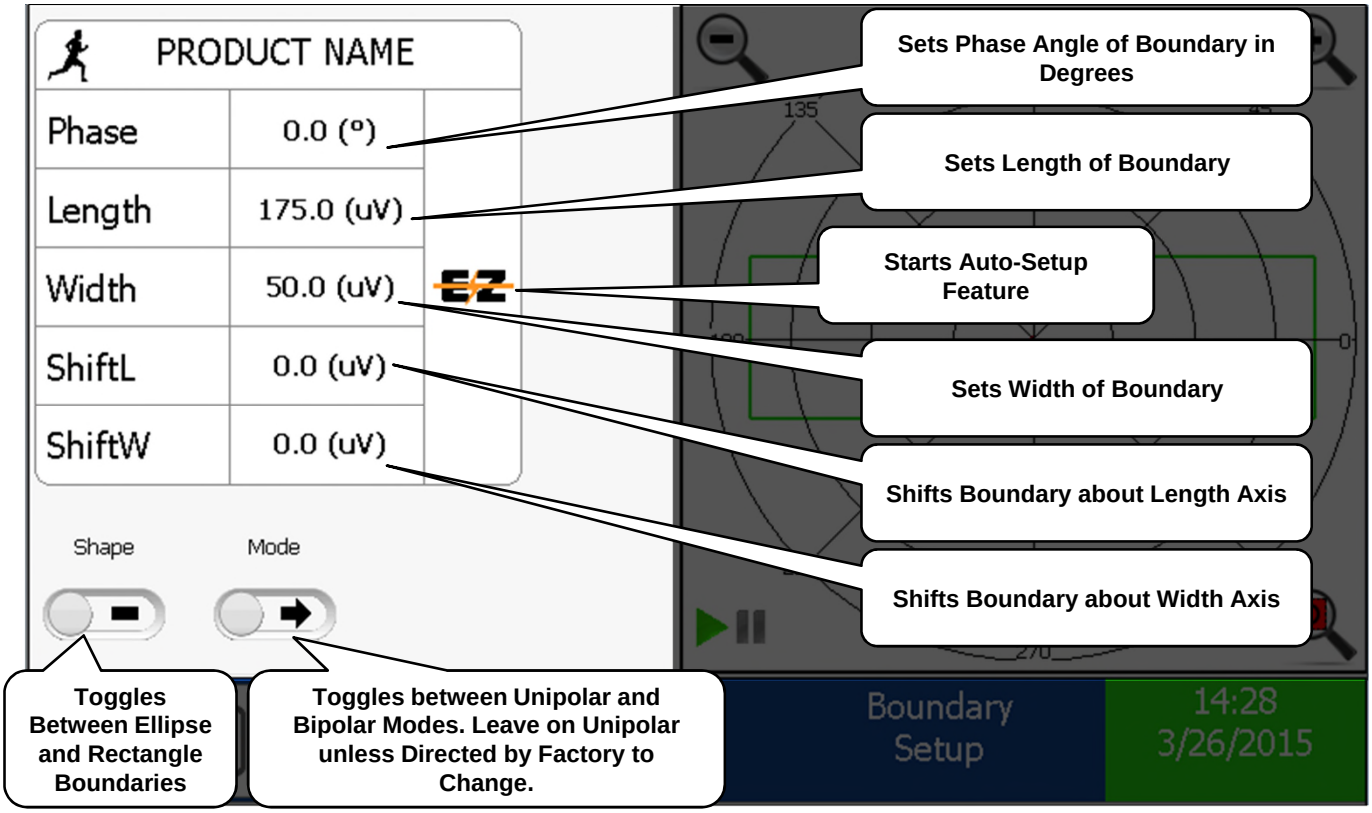
VERIFICATION SCREEN



UI

NOTE: This screen requires at least “QC Level” to view.

BOUNDARY SETUP

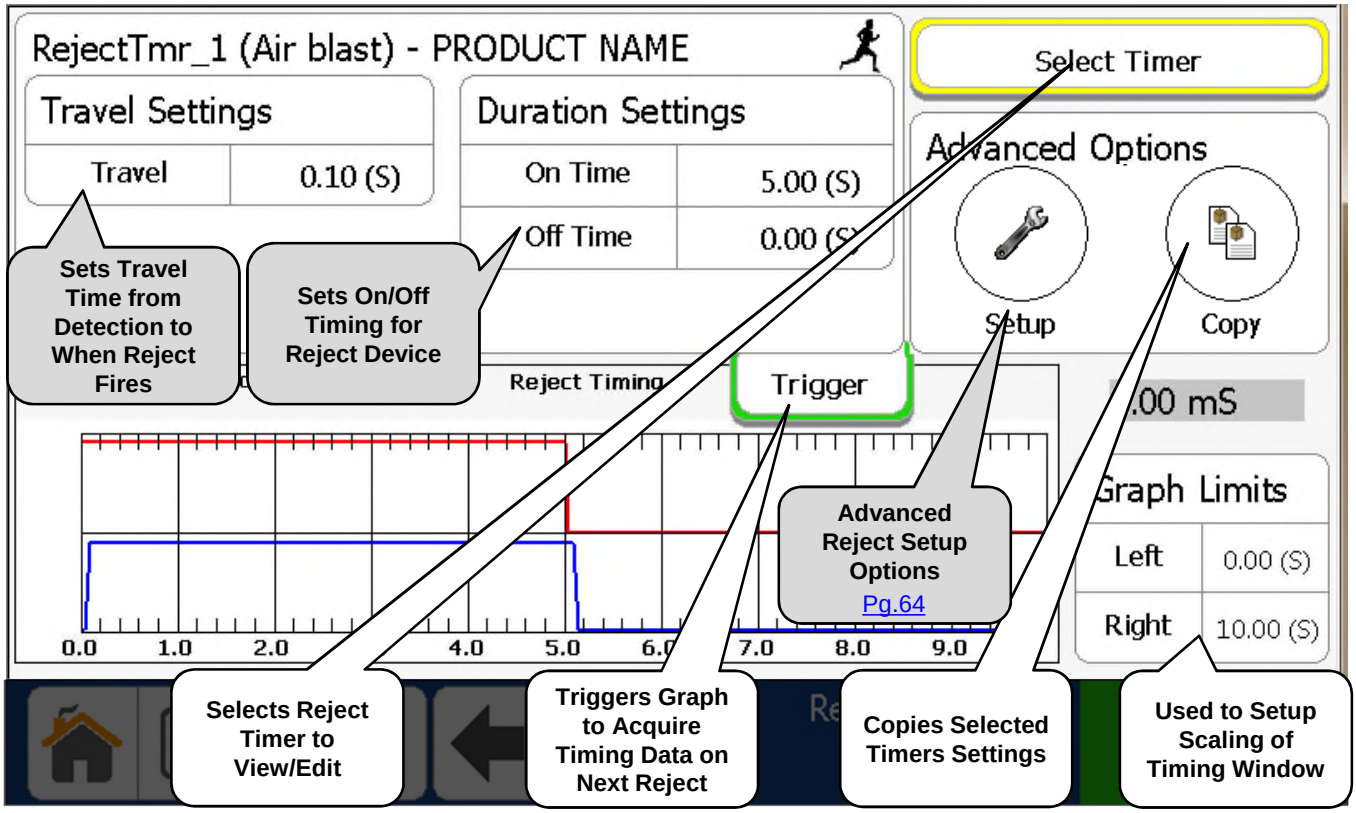


p87 **The Detection Boundary Explained**

NOTE: This screen requires at least “Supervisor Level” to view.

UI

REJECT SETUP

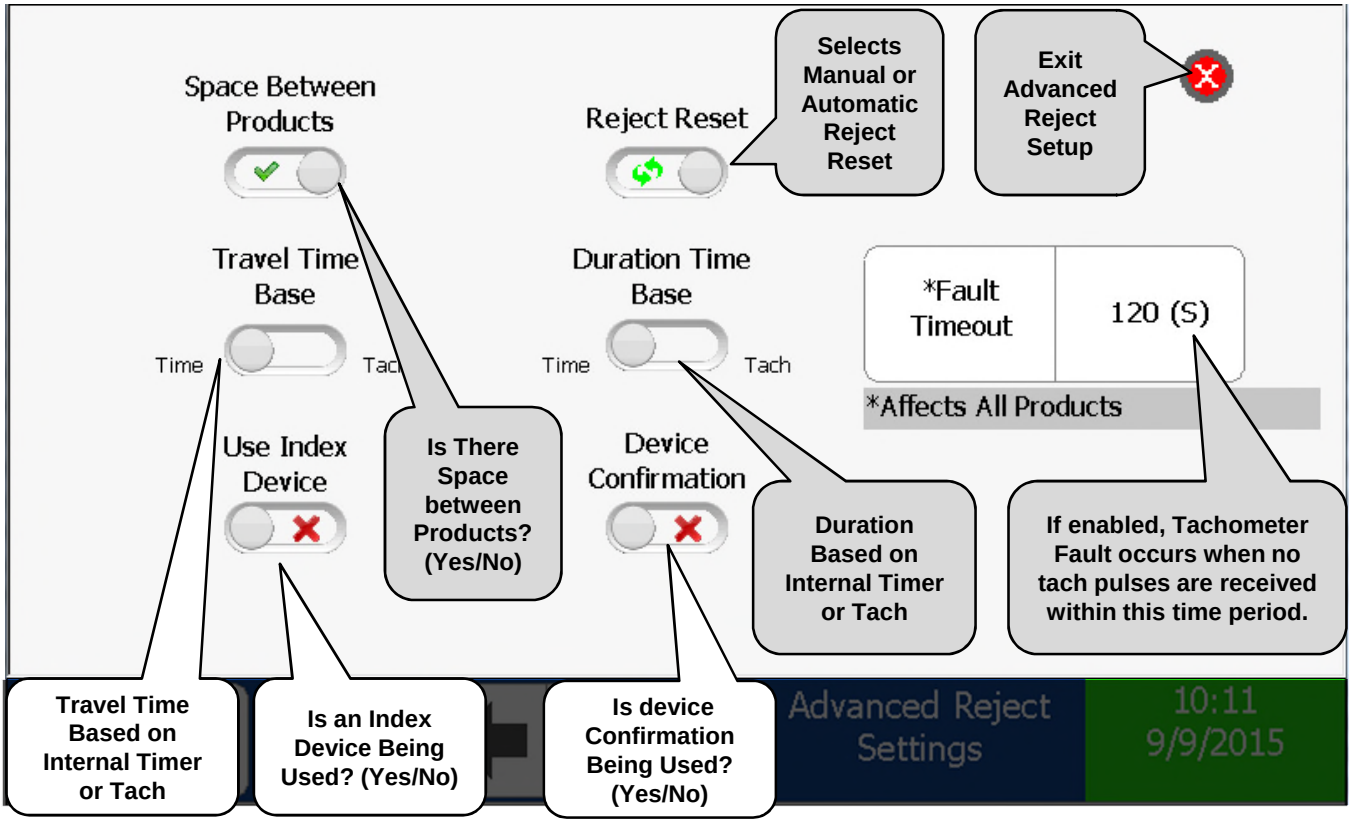


UI

NOTE: Duration Off Time is normally only used for Pusher Arm type reject devices.

NOTE: This screen requires “Engineer Level” to view.

ADVANCED REJECT SETUP



UI

NOTE: This screen requires “Engineer Level” to view.

“HOW TO” GUIDE

PRODUCT	USER	I/O	QC
p66 New Product Wizard (E)	p76 Setup New User (Q)	p78 Setup Output Device (E)	p85 Perform Verification Check (Q)
p67 Clone a Product (E)	p77 Switch Users (O)	p79 Setup Input Device (E)	p86 Export Report Logs (Q)
p68 Rename Product (S)		p80 Setup Product Counting (E)	
p69 Setup Product Boundary (S)		p81 Setup Reject Device (E)	
p70 Change/Run a Product (O)		p82 Setup Remote Support (E)	
p71 Edit Product Settings (E)		p83 Setup Conveyor Running (E)	
p72 Edit Product Speed (E)		p84 Setup Input/Output Follower (E)	
p73 Setup Reject Timing (E)			
p74 Copy Timer Settings (E)			
p75 Perform a Backup (E)			

UI

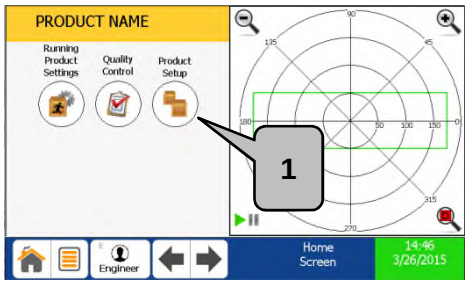
p87 **The Detection Boundary Explained**

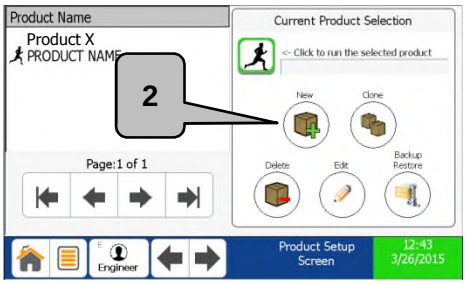
PASSWORD LEVEL HEIRARCHY

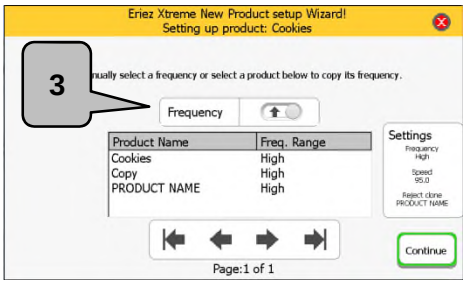
- E – Engineer = 4444
- S – Supervisor = 3333
- Q – Quality Control = 2222
- O – Operator = 1111

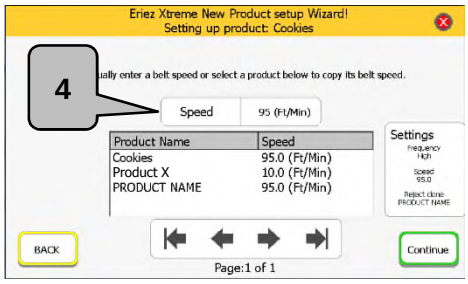
NOTE: Symbol in upper right corner denotes minimum password level required to perform that operation.

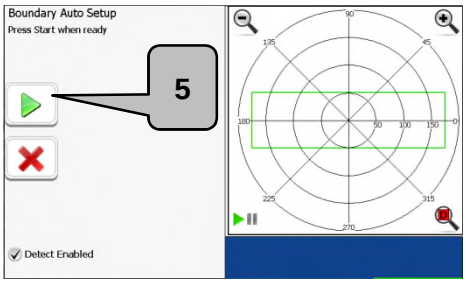
“HOW TO” RUN NEW PRODUCT WIZARD

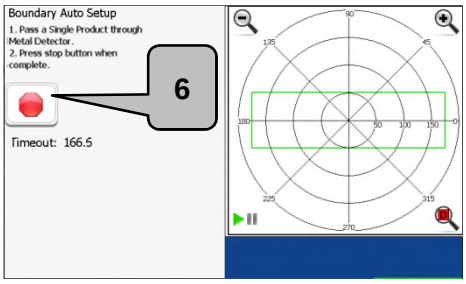


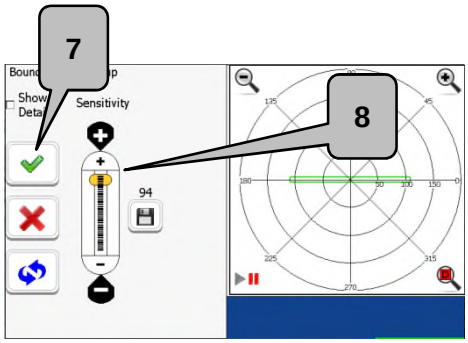












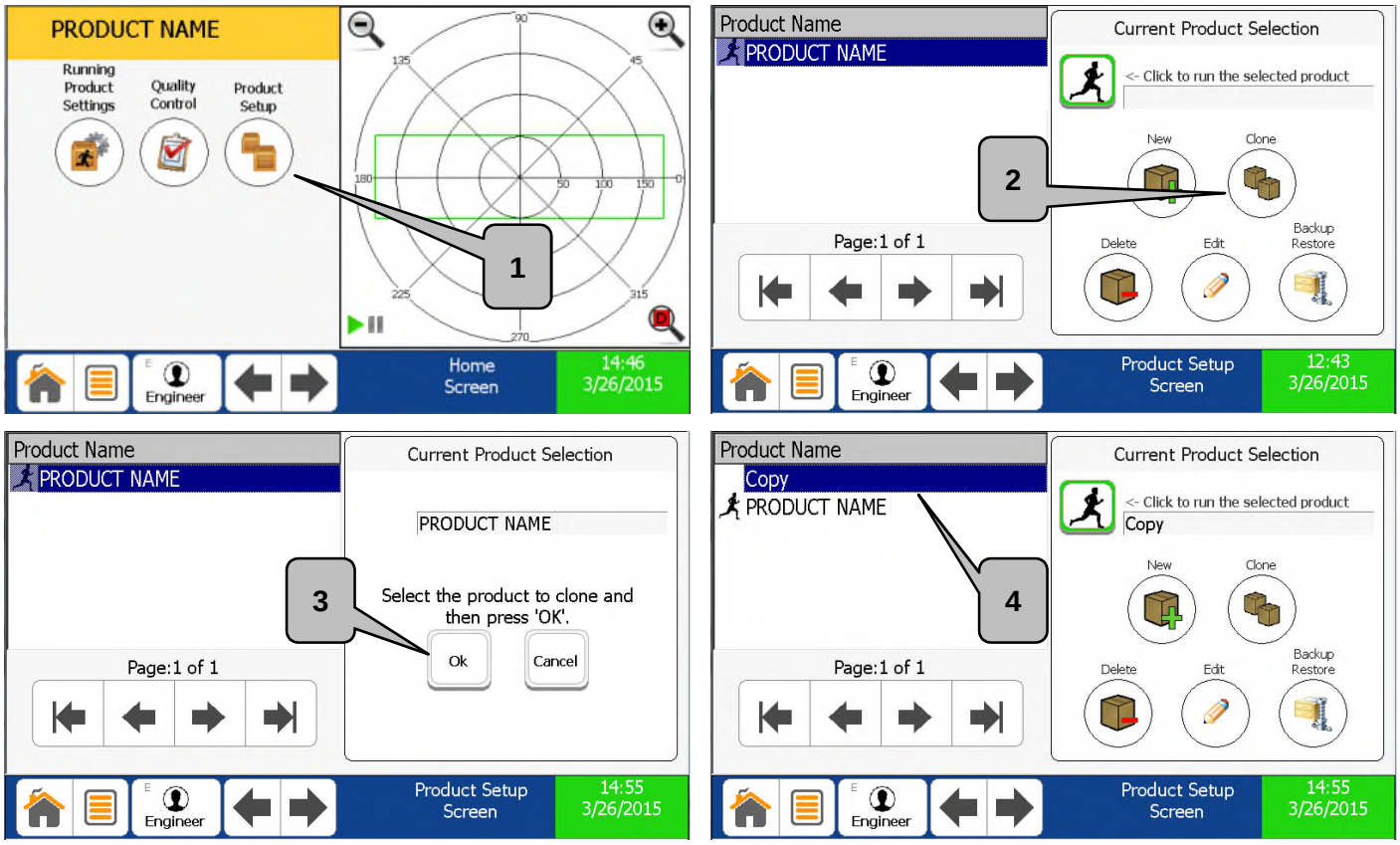
Ensure the belt is running and the product you are setting up is nearby.

1. From the “Home Screen” press “Product Setup”.
2. Press “New” and rename your product.
3. Select Frequency or copy from the list below.
4. Select Speed or copy from the list below. Note: this also copies that product’s reject settings.
5. Press Start and pass a single product.
6. Press Stop after product has passed through the tunnel.
7. If the settings are acceptable, select the “Green Check Box”. If you wish to be more aggressive or conservative with the sensitivities, see step 8.
8. The sensitivity slider is set to 94 as the default. In the vast majority of cases no adjustment is necessary to achieve desired sensitivity levels. The sensitivity slider increases to a maximum of 100 and a minimum of 0.

NOTE: The disk icon under the sensitivity level allows you to save the current setting as the sensitivity default, should the need arise.

UI

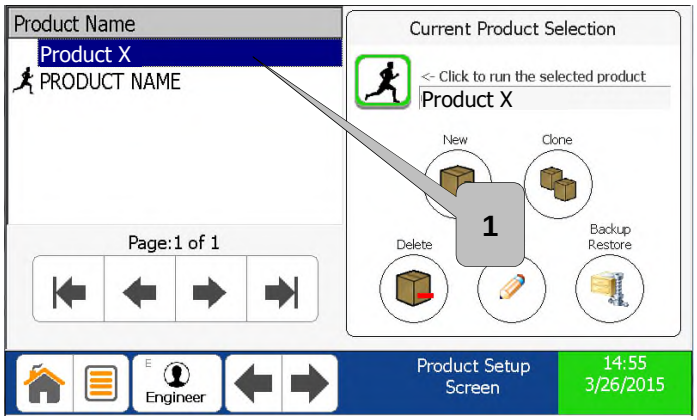
“HOW TO” CLONE A PRODUCT

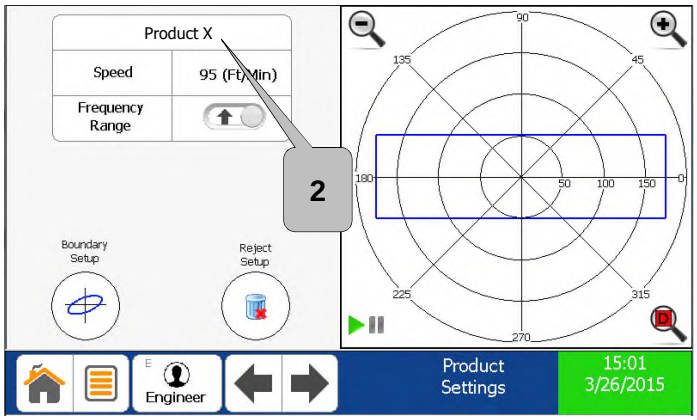


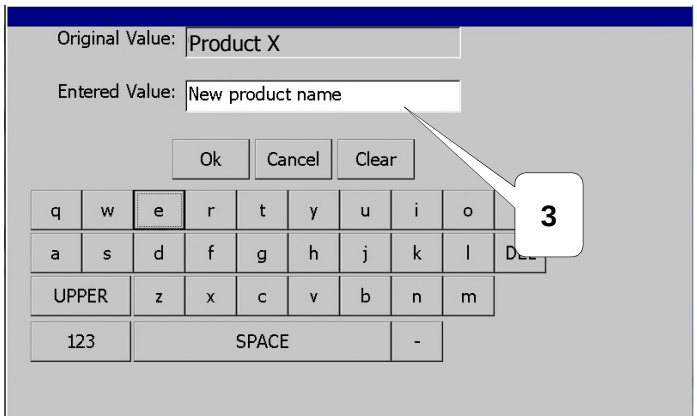
UI

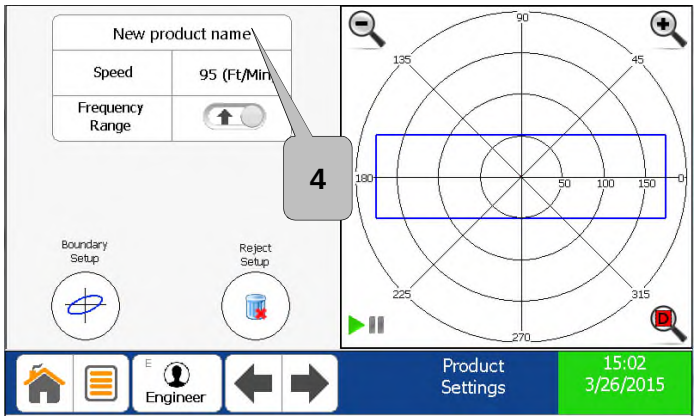
1. **From the Home Screen press “Product Setup”.**
2. **Press Clone.**
3. **Select Product from the list on the left to clone. Once selected, it will be visible under “Current Product Selection”. Press “OK”.**
4. **Rename your new product and it will display in the Product Name list. (See “How To” Rename a Product on the following page)**

“HOW TO” RENAME A PRODUCT





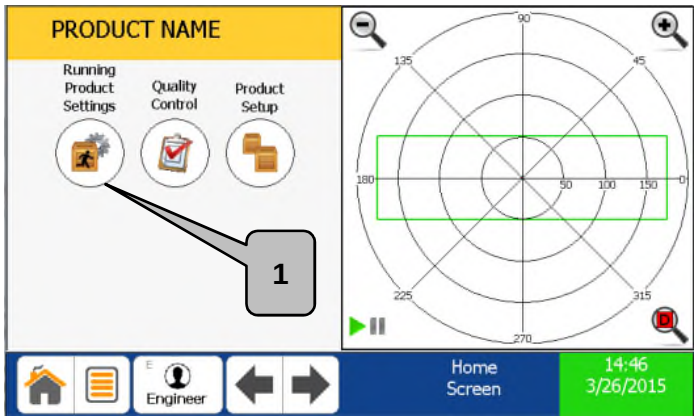


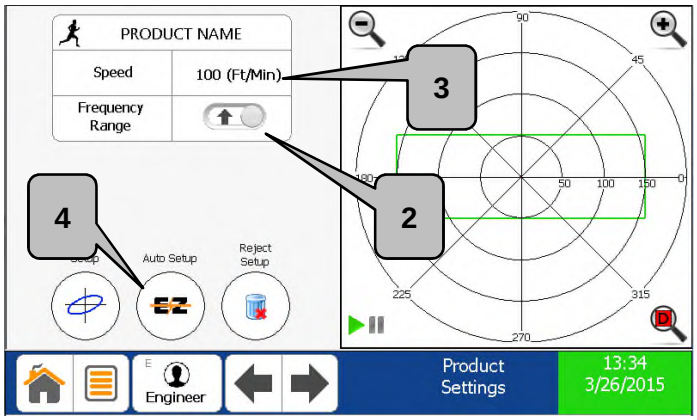


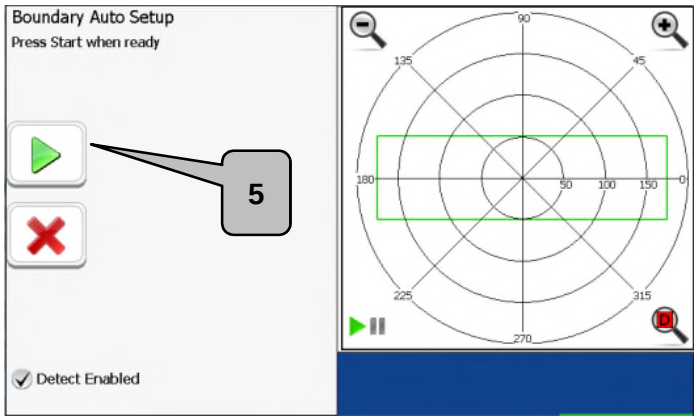
1. **From the “Product Setup” Screen select the product you wish to edit and press “Edit”.**
2. **Press the name of the product at the top of the table to rename the product.**
3. **Rename the product using the keyboard and press “OK”.**
4. **The new product name will display in the table.**

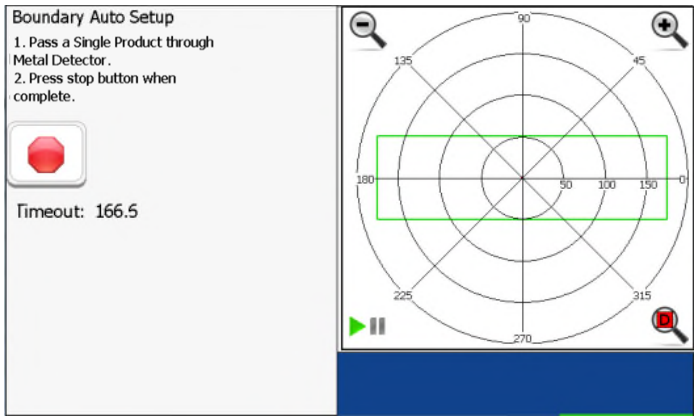
UI

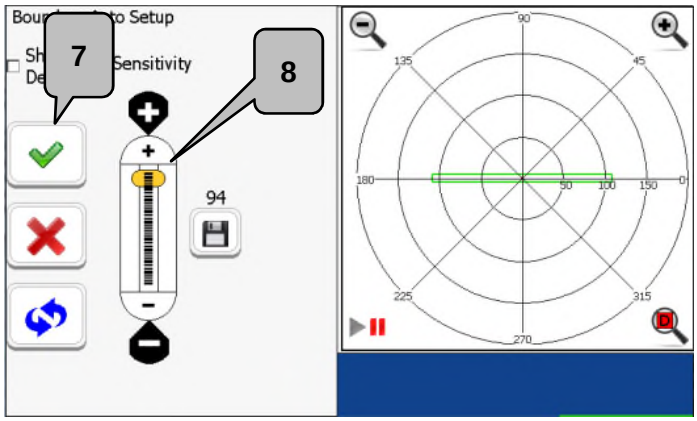
“HOW TO” SETUP A PRODUCT BOUNDARY











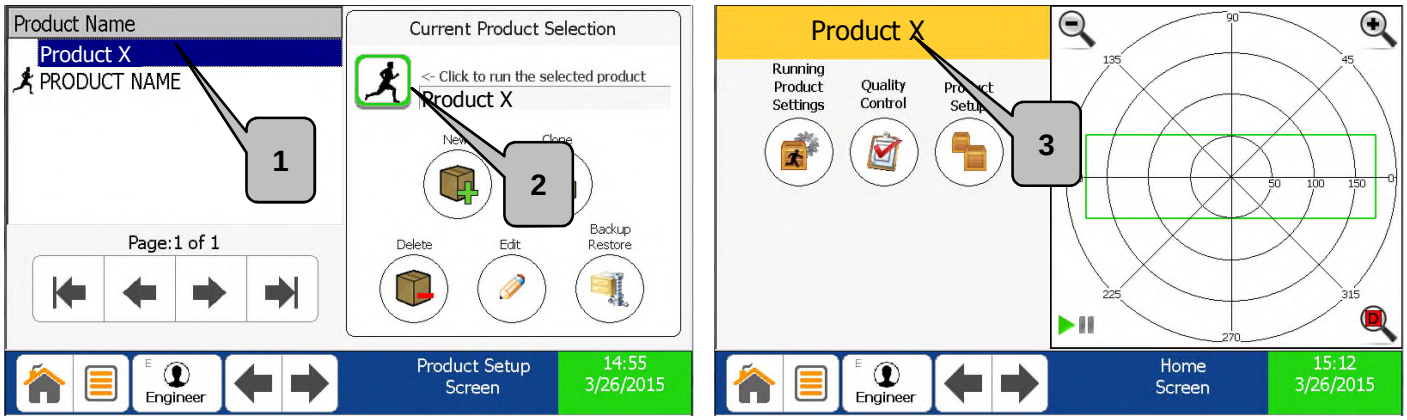
1. From the “Home Screen” select “Running Product Settings”.
2. Select the desired frequency range.
3. Edit product speed. See “HOW TO EDIT PRODUCT SPEED” for more details if needed, on Pg.72
4. Press the “EZ” button.
5. Press the “Start Button”
6. Pass a single product through the aperture, then press the “Stop” button.
7. If the settings are acceptable select the “Green Check Box”.
8. The sensitivity slider is set to 94 as the default. In the vast majority of cases no adjustment is necessary to achieve desired sensitivity levels. The sensitivity slider increases to a maximum of 100 and a minimum of 0.

Ensure the belt is running and the product you are setting up is nearby.

NOTE: The disk icon under the sensitivity level allows you to save the current setting as the sensitivity default, should the need arise.

UI

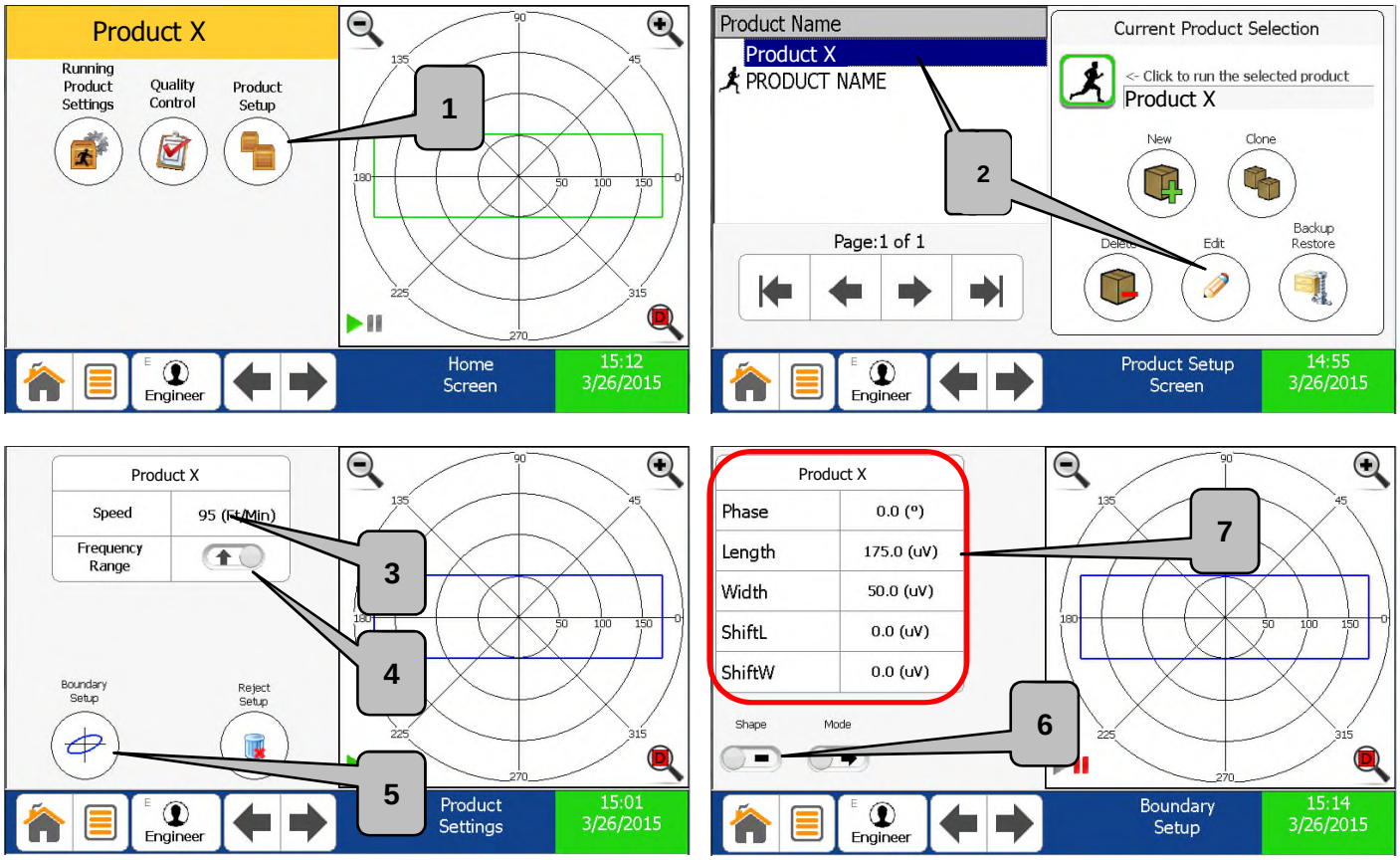
“HOW TO” CHANGE/RUN A PRODUCT



1. **From the “Product Setup” Screen select the product you wish to run.**
2. **Press the “Running Man” button.**
3. **The Home Screen will now be displayed with the new running product.**

UI

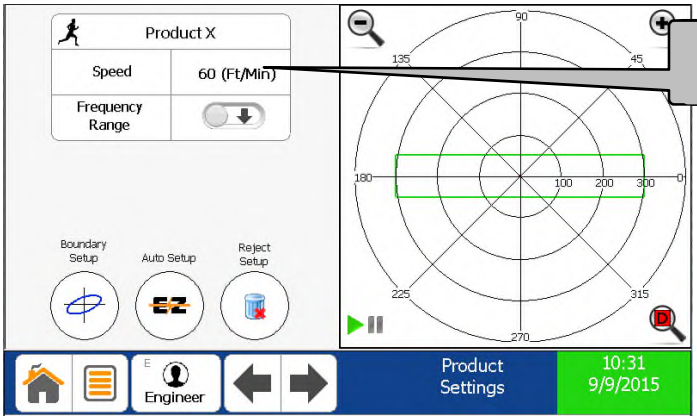
“HOW TO” EDIT PRODUCT SETTINGS

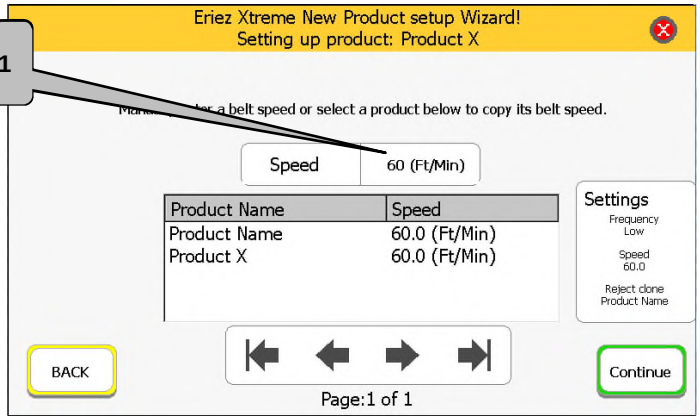


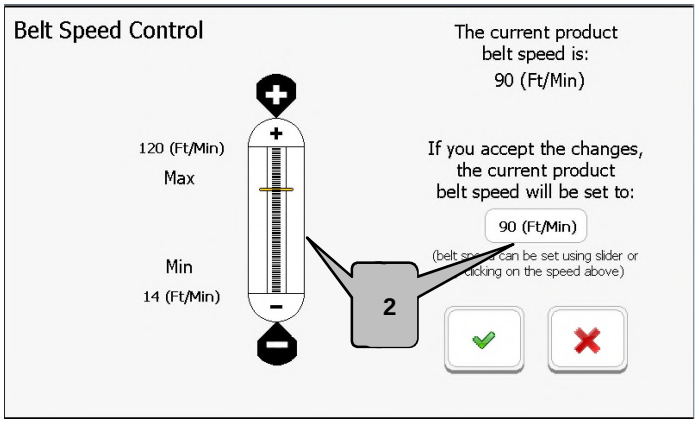
UI

1. **Select “Product Setup”.**
2. **Select product you wish to edit and press the “Edit” button.**
3. **Edit product speed. See “HOW TO EDIT PRODUCT SPEED” for more details if needed, on** **Pg.72** **.**
4. **Select frequency range.**
5. **Select “Boundary Setup”.**
6. **Press to toggle between the rectangle boundary and the ellipse.**
7. **Press desired parameter value to alter the “boundary” shown by the blue rectangle (the boundary rectangle will be blue while editing a non-running product, and the boundary rectangle will be green while editing the running product). See “THE DETECTION BOUNDARY EXPLAINED” for more information, on** **Pg.87** **.**

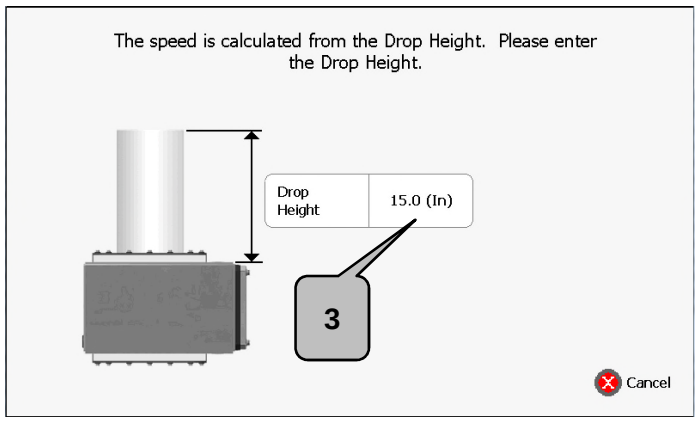
“HOW TO” EDIT PRODUCT SPEED





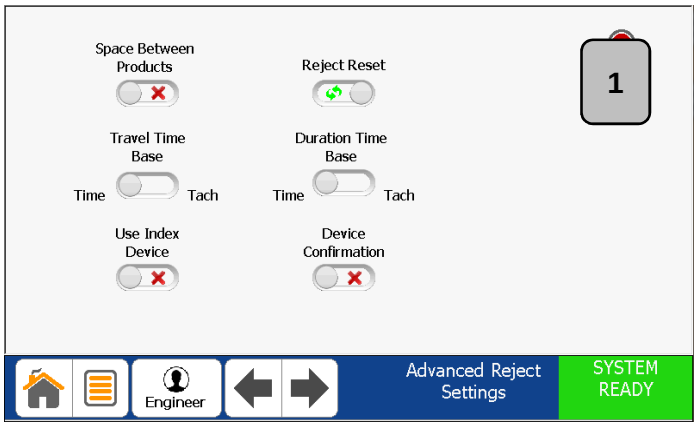


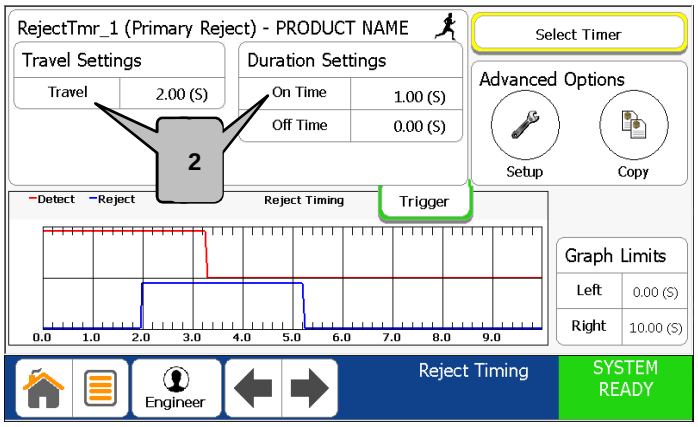
1. From the Product Settings screen, or from the New Product setup wizard, press the current speed setting.
2. If automatic belt speed control is installed, select the desired belt speed using the slider bar or numerical entry box as shown.
3. For a vertical gravity-fed system, the product speed is calculated from the free-fall distance. Enter the Drop Height, measured from the top surface of the sensing head.
4. Otherwise, enter the physical product speed using the numerical keypad. A tachometer is recommended to get an accurate reading.

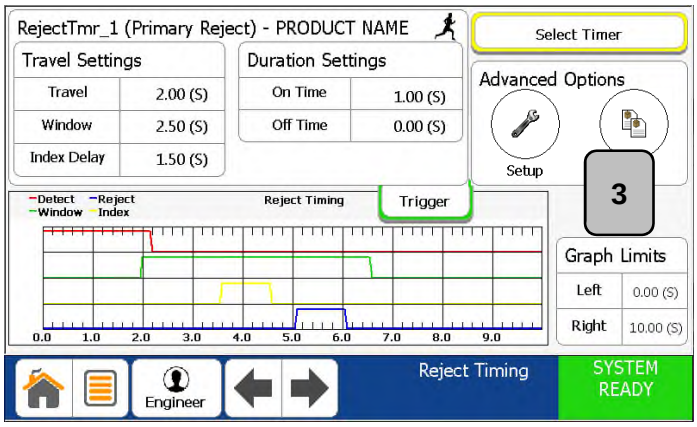


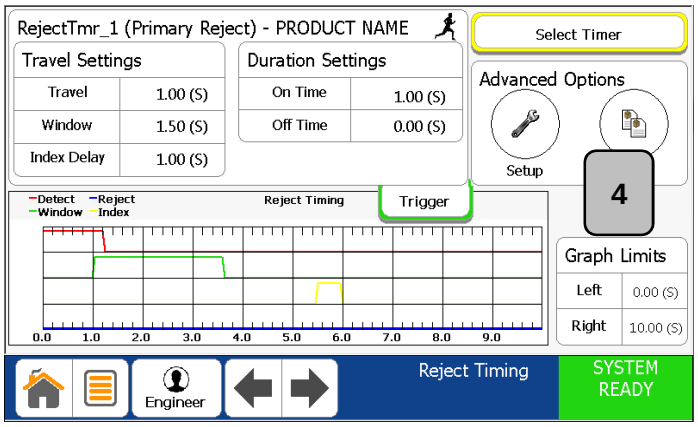
UI

“HOW TO” SETUP REJECT TIMING







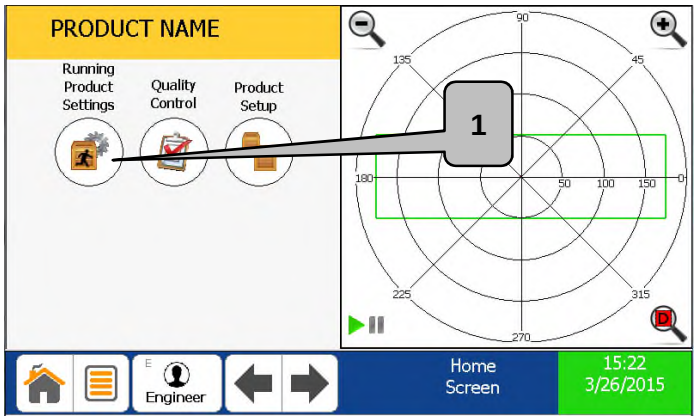


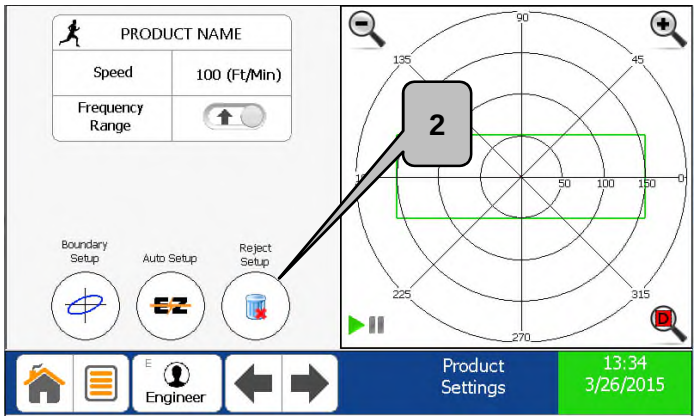
1. **From the “Advanced Reject Settings Screen” make the appropriate selections based on your product. Note that not all options may be available depending on the inputs and outputs that have been setup.**
2. **In this example an index device(i.e. photo eye) is NOT being used. Set the desired “Travel” and “On Time”. The reject device on time(blue) will always be greater than or equal to the detect time(red) regardless of the “On Time” setting. Examples of use would be a stop belt or air blast.**
3. **In this example an index device(i.e. photo eye) IS being used CORRECTLY. Set the desired “Travel” and “On Time”. “Off Time” is usually reserved for Pusher Arm devices. The “Window”(green) opens at the end of the “Travel Time”. The index device(yellow) has to fire within this window. The index delay is used to delay the reject from firing until it has passed the index device and is ready to be rejected.**
4. **In this example an index device(i.e. photo eye) IS being used INCORRECTLY. The index device(yellow) did not fire within the window(green). Thus the reject device did not fire.**

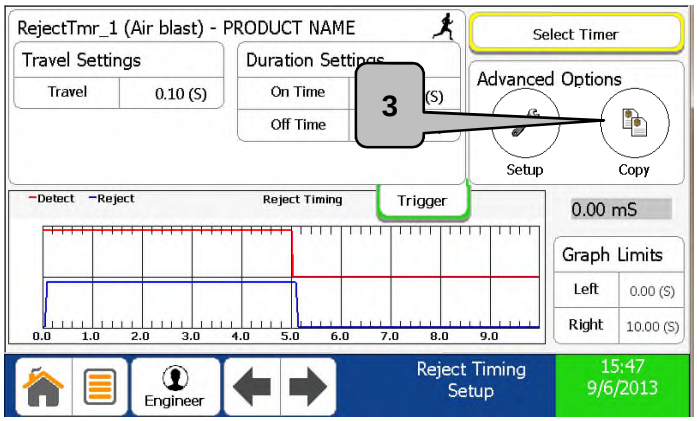
Note: The index trace must be in the low state when no product is present. When product is present, the index trace changes to a high state. This relationship can be set by selecting the “Active State” at the Input Configuration screen. (see p79)

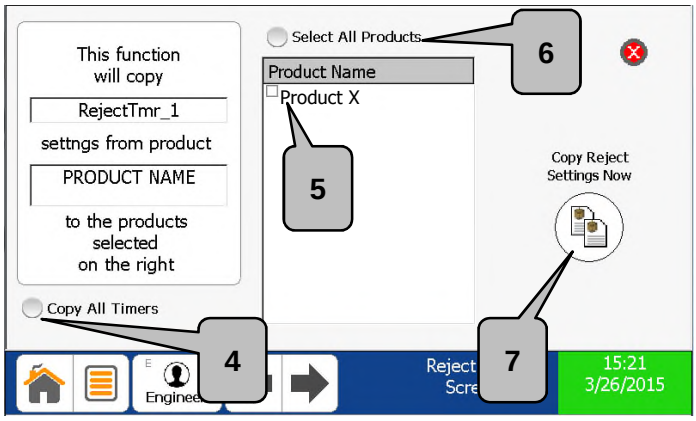
UI

“HOW TO” COPY TIMER SETTINGS







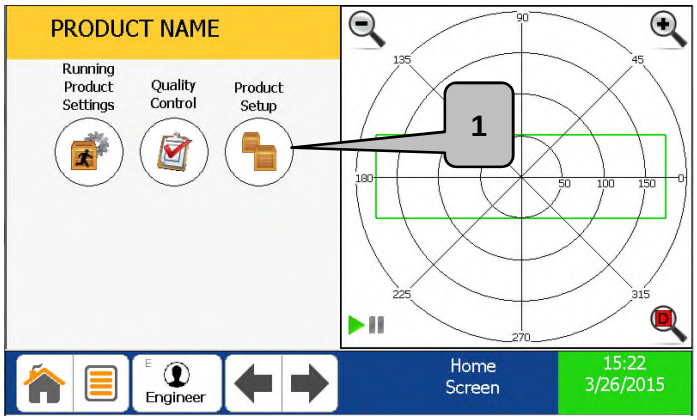


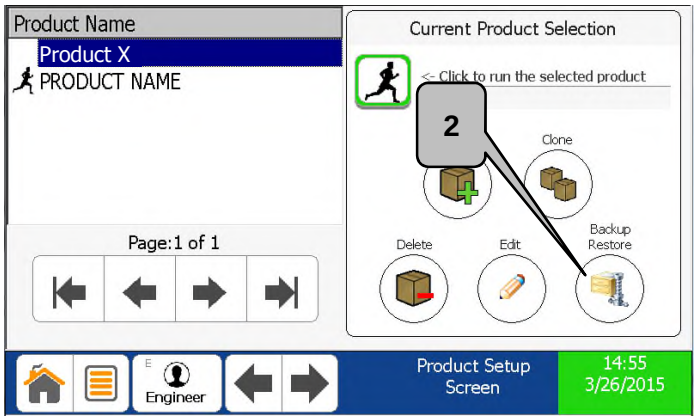
Ensure you have selected and are “running” the product you wish to copy the timer from.

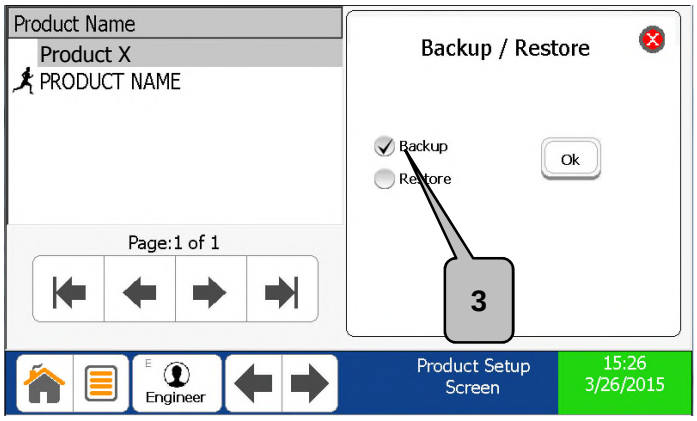
1. **From the “Home Screen” select “Running Product Settings”.**
2. **Select “Reject Setup” and pick the timer you wish to copy.**
3. **Select “Copy” from the Advanced Options.**
4. **Press this option if you wish to copy all timers associated with this product.**
5. **Select product you wish to copy timer to.**
6. **Press this option if you wish to copy to all products.**
7. **Press “Copy Reject Settings Now” to initiate.**

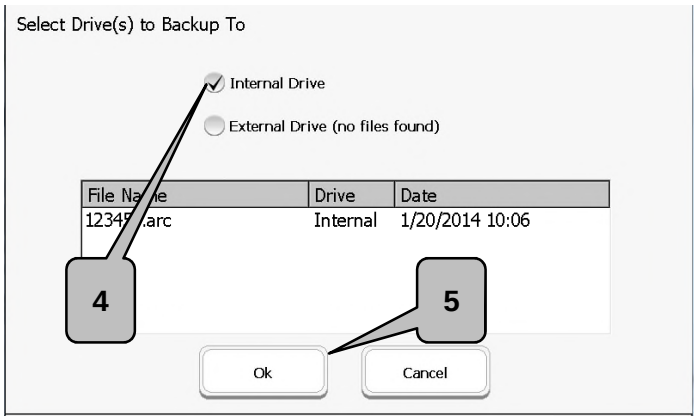
UI

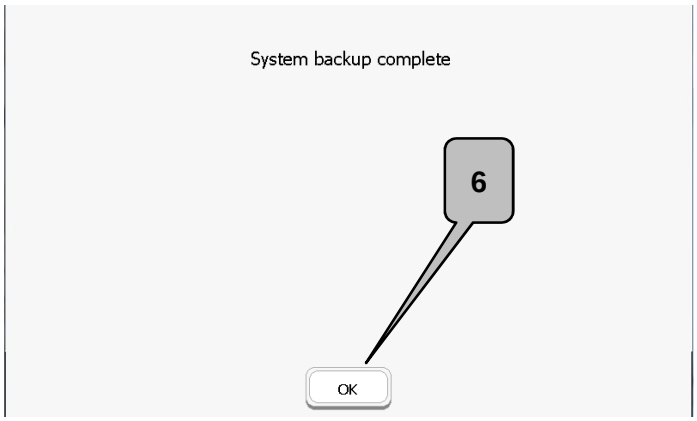
“HOW TO” PERFORM A BACKUP







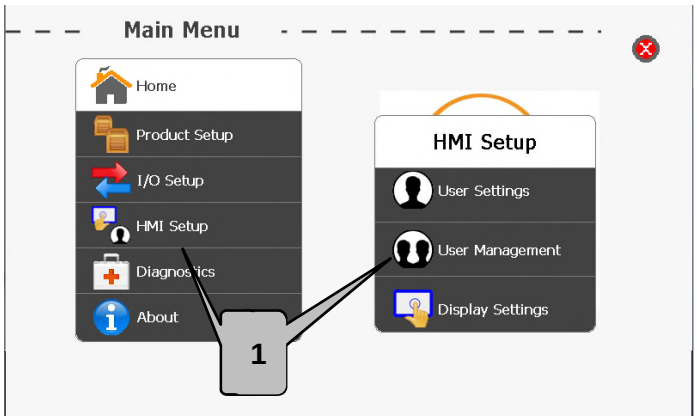


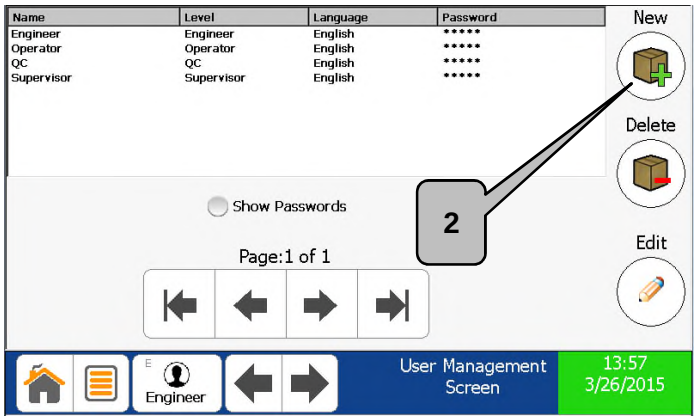


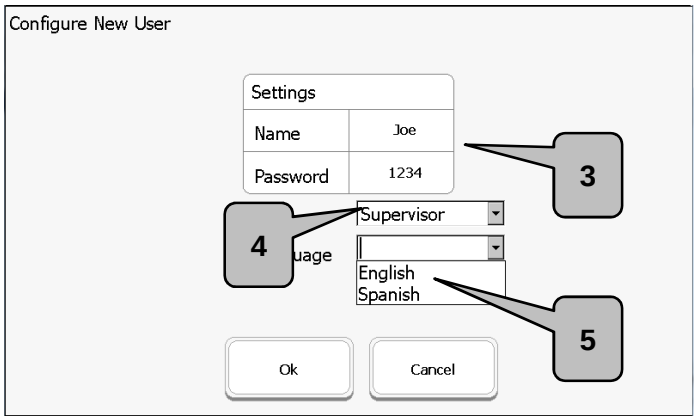
UI

1. From the “Home Screen” press “Product Setup”.
2. Press “Backup Restore”.
3. Select Backup and press “OK”
4. Select appropriate drive to backup to. If using a “USB Stick” select “External Drive”.
5. Press “OK”.
6. “System Backup Complete” will display when finished. Press “OK”.

“HOW TO” SETUP A NEW USER



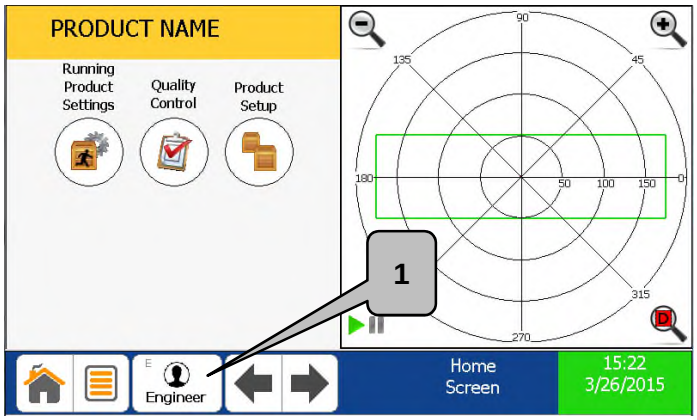


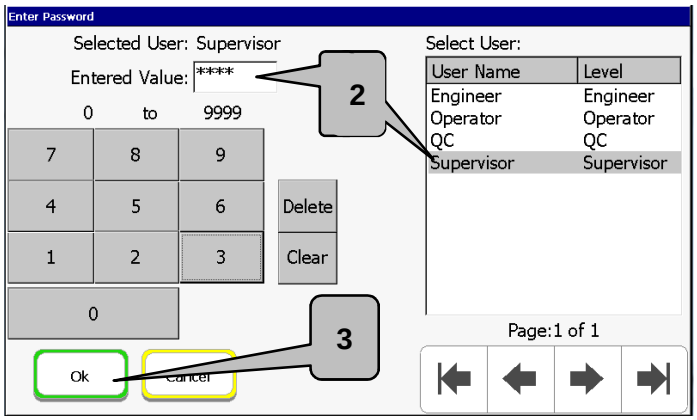


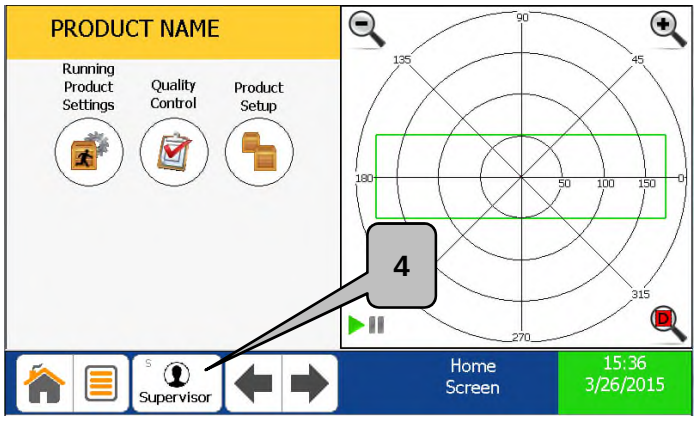
1. **From the “Main Menu” select “HMI Setup” then “User Management”.**
2. **Press the “New” button.**
3. **Input the new user’s name and desired password.**
4. **Select the user login level from the dropdown.**
5. **Select the user language from the dropdown and press “OK”.**

UI

“HOW TO” SWITCH USERS



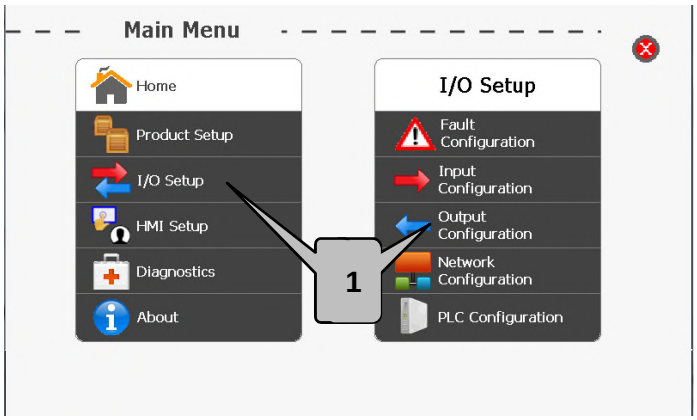


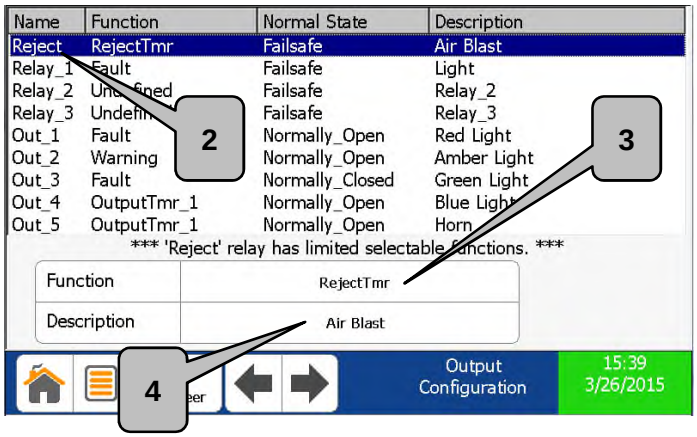


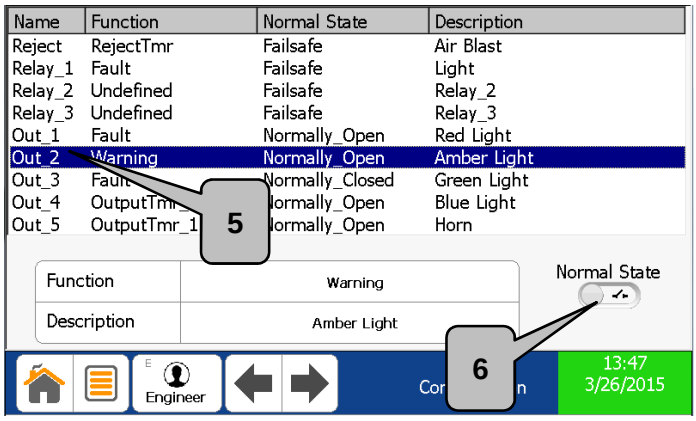
UI

1. **From the Task Bar press the User Login button.**
2. **Select the User Name from the List and enter the password.**
3. **Press “OK”.**
4. **Verify User Login Name appears on User Login button.**

“HOW TO” SETUP AN OUTPUT DEVICE



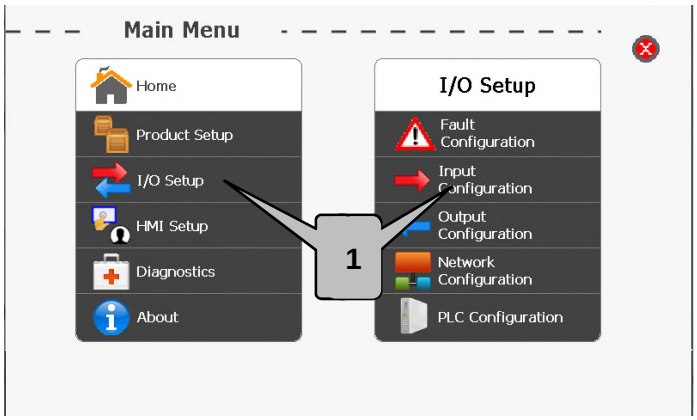


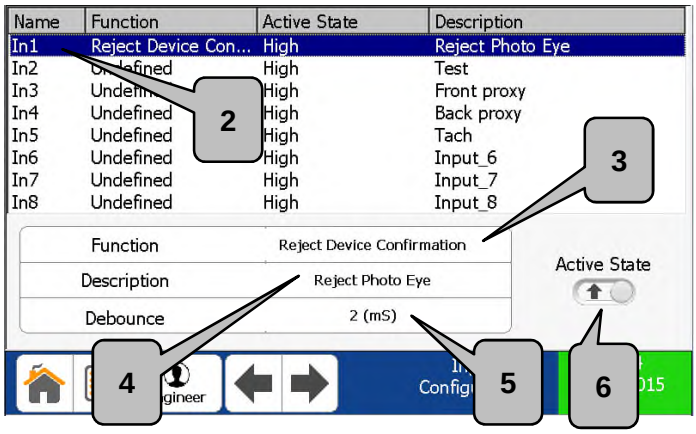


1. **From the “Main Menu” select “I/O Setup” then “Output Configuration”.**
2. **Select the output that the “output device” is wired to.**
3. **Select output device function. The “Reject” output has limited functionality and is the primary reject output. Reject and Relay 1-3 are failsafe wired.**
4. **Enter a description for the output device.**
5. **Out 1-5 are solid state relays and are not failsafe.**
6. **Select the active state (Normally Open/Normally Closed) when using Out 1-5.**

UI

“HOW TO” SETUP AN INPUT DEVICE

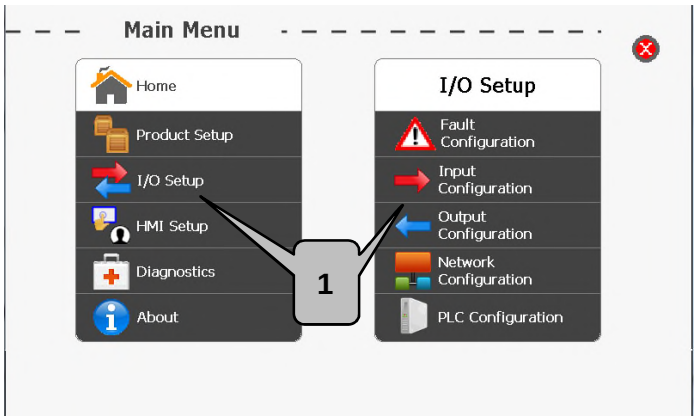


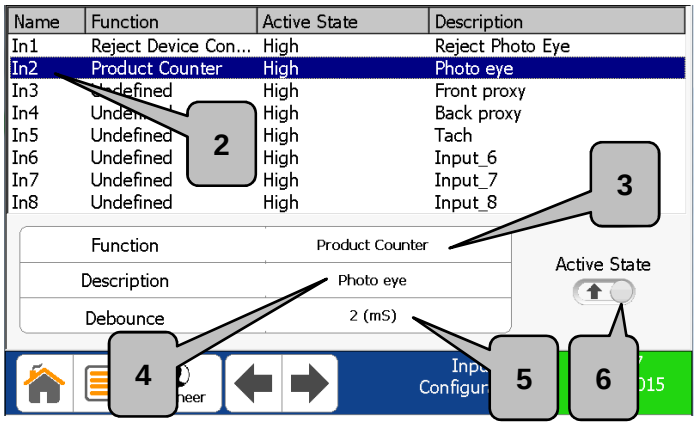


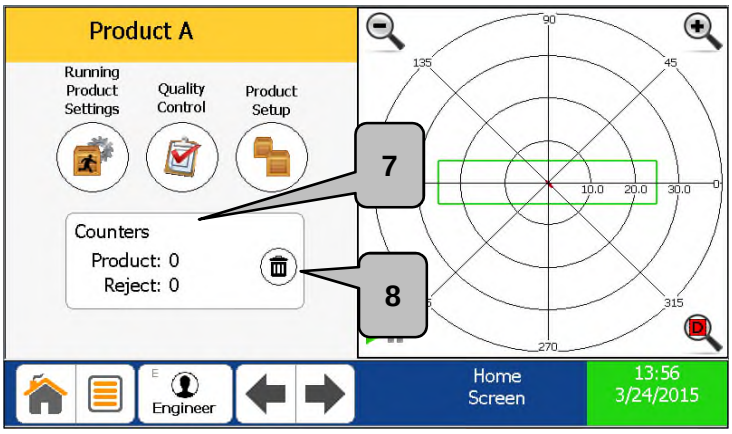
1. From the “Main Menu” select “I/O Setup” then “Input Configuration”.
2. Select the input that the “input device” is wired to.
3. Select the device function (i.e. tachometer, overhead, etc..).
4. Enter a description for the input device.
5. Set the debounce. In the vast majority of cases the 2 mS default is sufficient.
6. Select “Active State” for input device. High = 10-30V Low = 0-0.9V

UI

“HOW TO” SETUP PRODUCT COUNTING



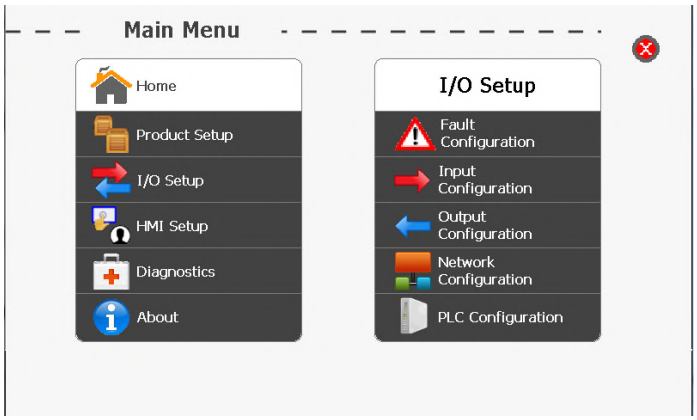


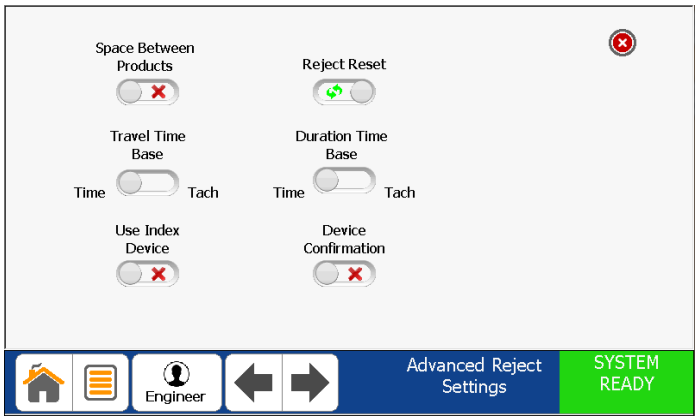


1. From the “Main Menu” select “I/O Setup” then “Input Configuration”.
2. Select the input that the photo-eye is wired to. Note: It is possible to use one photo-eye for two functions (e.g., “Reject Index” and “Product Counter”); in this case, the photo-eye must be wired to two inputs on the IOC circuit board (e.g., “In3” and “In4”).
3. Select “Product Counter” for the device function.
4. Enter a description if desired.
5. Set the debounce. In the vast majority of cases, the 2 mS default is sufficient.
6. Select “Active State” for the photo-eye. “Active State” is state when the product is in front of the photo-eye. High = 10-30V Low = 0-0.9V
7. When the above steps are completed, the “Counters” block will be displayed on the home screen. “Product” counts activations of the “Product Counter” input; “Reject” counts actuations of the primary reject output.
8. Both counts can be cleared by pressing the button shown.

UI

“HOW TO” SETUP A REJECT DEVICE





1. **Ensure reject device and all associated devices (i.e. photo eye, tachometer, etc…) are wired into the control. See Electrical Installation section.**
2. **Configure Input and Output Devices.**
3. **Configure “Advanced Reject Settings” page.**
4. **Setup reject timing**.

“HOW TO” SETUP AN INPUT DEVICE p79

“HOW TO” SETUP AN OUTPUT DEVICE p78

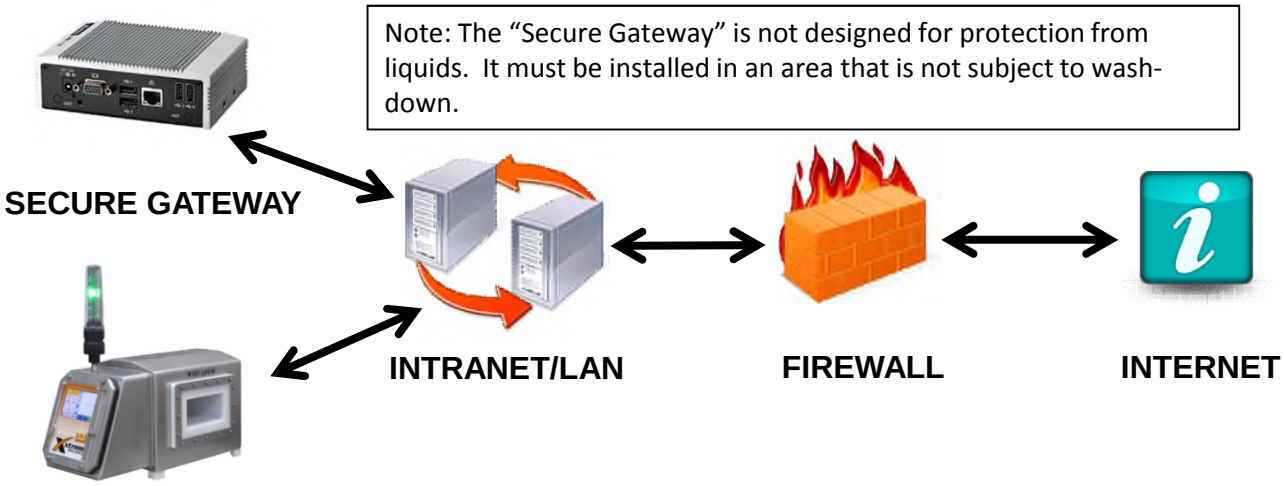
ADVANCED REJECT SETUP p64

“HOW TO” SETUP REJECT TIMING p73

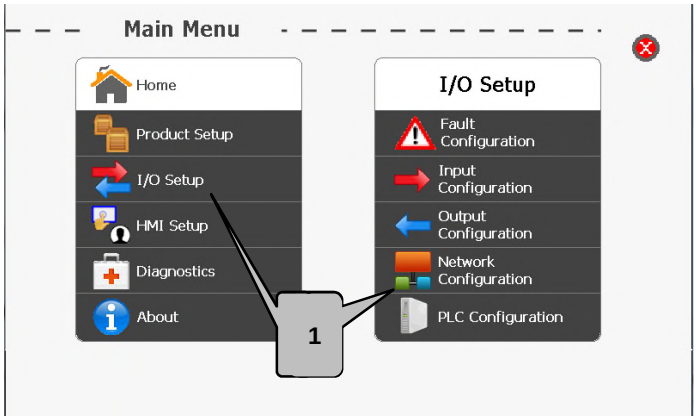
UI

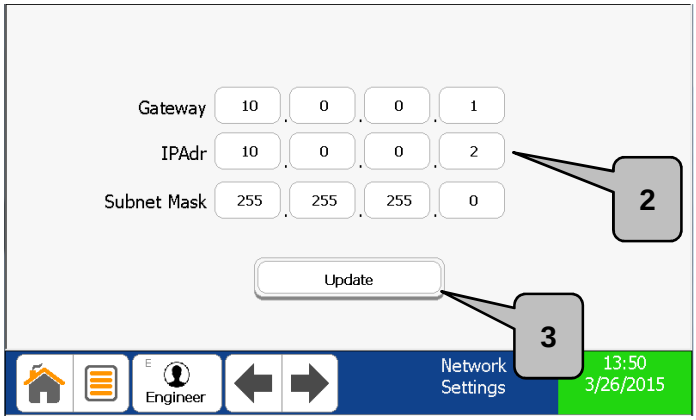
“HOW TO” SETUP REMOTE SUPPORT

1. Connect “Secure Gateway” (Purchased Separately) and Metal Detector to your Intranet/LAN as seen below. (ensure outbound port 5721 on your firewall is open)



2. Configure network settings on the metal detector by following the steps below.

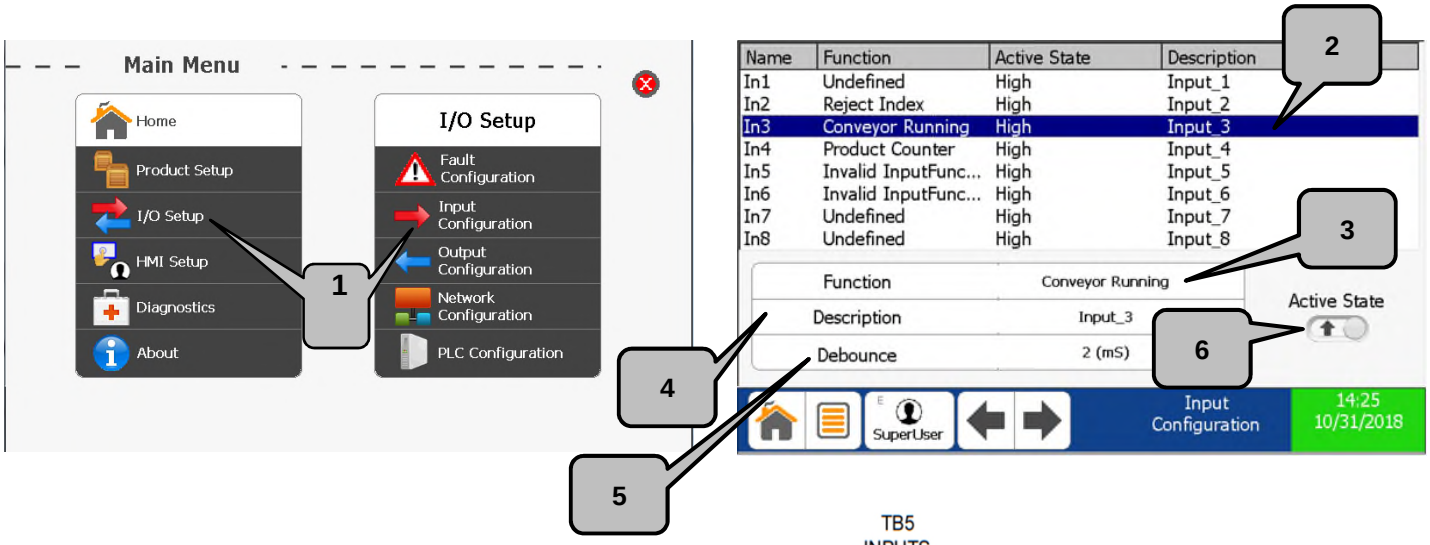


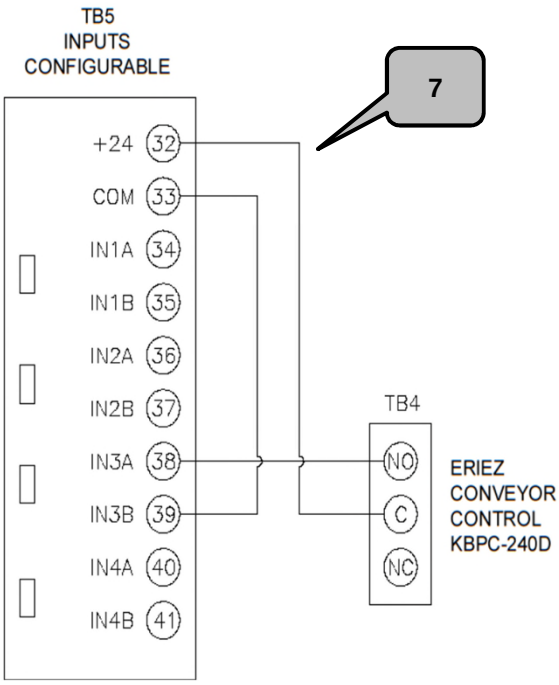


1. From the “Main Menu” select “I/O Setup” then “Network Configuration”.
2. Enter the Gateway, a static IP Address, and the Subnet Mask.
3. Press Update for changes to take effect.

UI

“HOW TO” SETUP CONVEYOR RUNNING



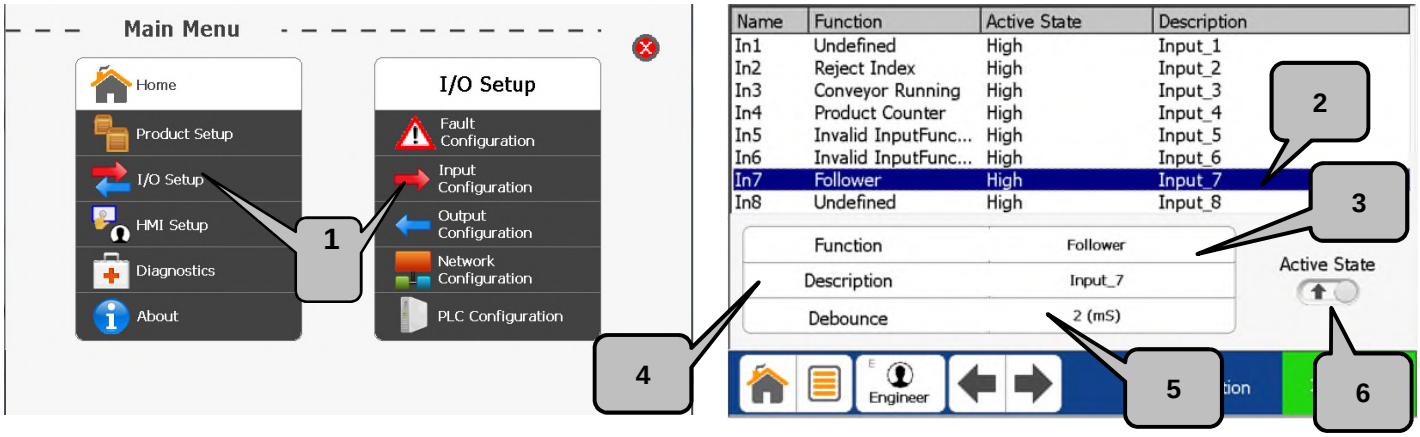


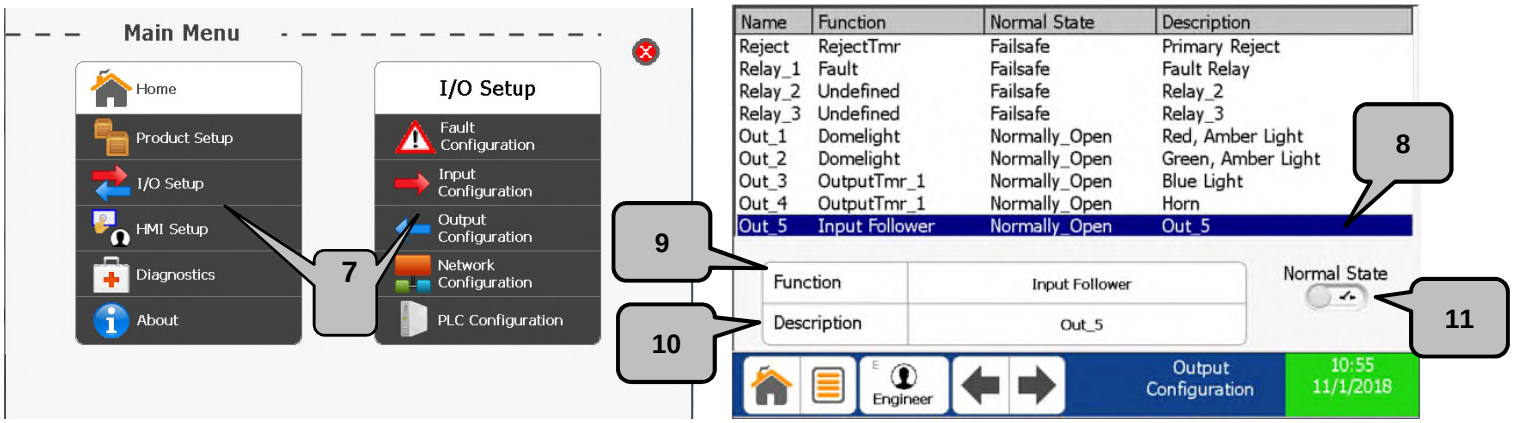
1. **From the “Main Menu” select “I/O Setup” then “Input Configuration”.**
2. **Select the input that the conveyor status is connected to on the IOC board (e.g., “In3”).**
3. **Select “Conveyor Running” for the device function.**
4. **Enter a description if desired.**
5. **Set the debounce. In the vast majority of cases, the 2 mS default is sufficient.**
6. **Select “Active State” as shown. High = 10-30V Low = 0-0.9V.**
7. **Complete the wiring to the desired input between the Xtreme and TB4 located on the Conveyor Control. Use the diagram as a reference, it shows “IN3” being connected as an example.**

UI

“HOW TO” SETUP INPUT/OUTPUT FOLLOWER

The Follower/Input Follower functionality allows a Xtreme digital output to mirror the state of a digital sensor connected to a Xtreme digital input. This provides greater drive capability to a device, connected to the digital output, that monitors the state of the sensor.

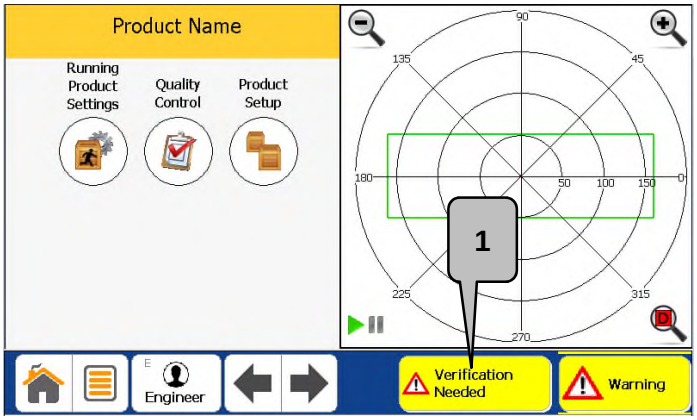


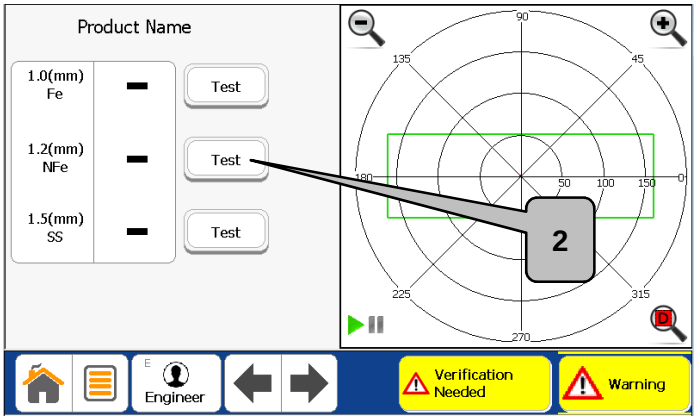


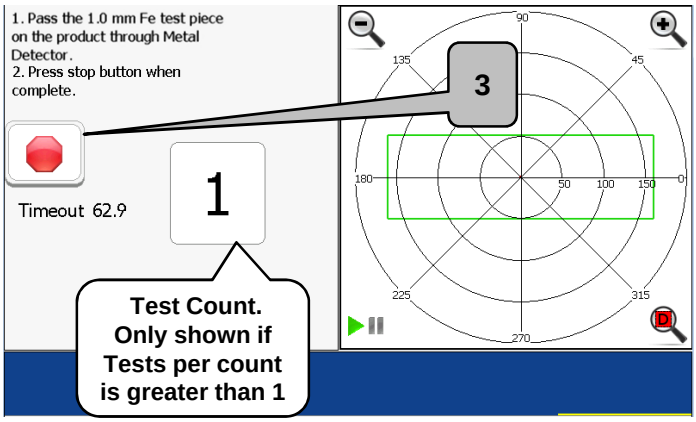
1. From the “Main Menu” select “I/O Setup” then “Input Configuration”.
2. Select the input that the sensor will connect to. (e.g. “In7”)
3. Select “Follower” for the device function.
4. Enter a description if desired.
5. Set the debounce. In the vast majority of cases, the 2 mS default is sufficient.
6. Select “Active State” for the sensor. High = 10-30V Low = 0-0.9V
7. From the “Main Menu” select “I/O Setup” then “Output Configuration”.
8. Select the output that will follow the state of the “Input Follower” input.
9. Select “Input Follower” for the output function.
10. Enter a description if desired.
11. Select whether the output will be normally open or normally closed.
12. Reference p34 and p33 for wiring the Input/Output follower. Use of the internal power sources as shown in the examples is recommended. Some devices connected to Out 1-5 may be sensitive to the inherent solid state leakage current, use Relay 1-3 in lieu of Out 1-5 if leakage current is an issue.

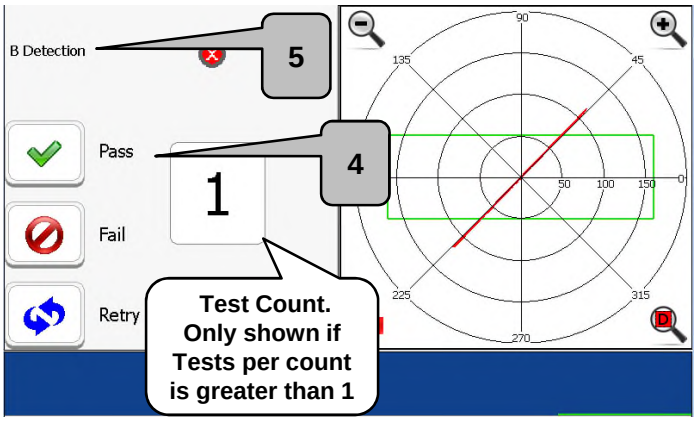
UI

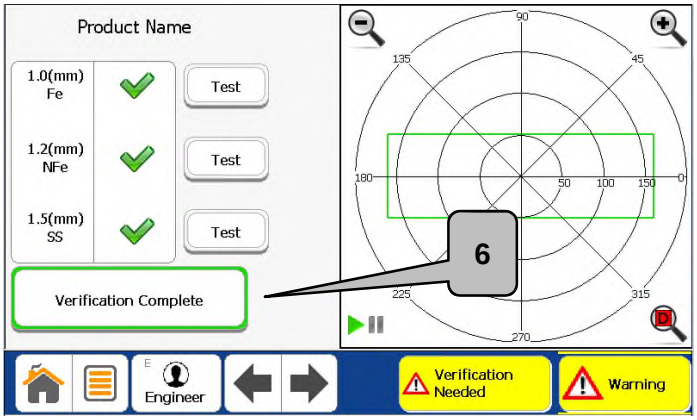
“HOW TO” PERFORM A VERIFICATION CHECK







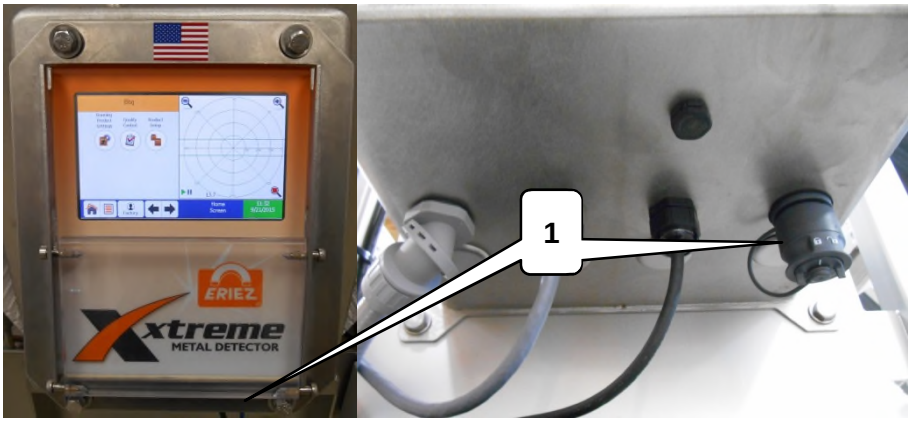


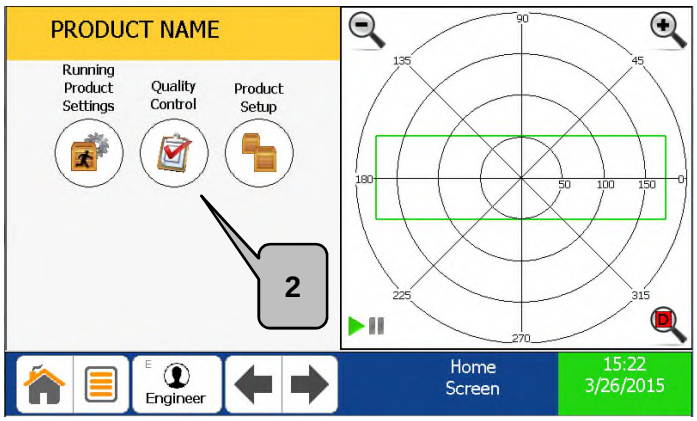


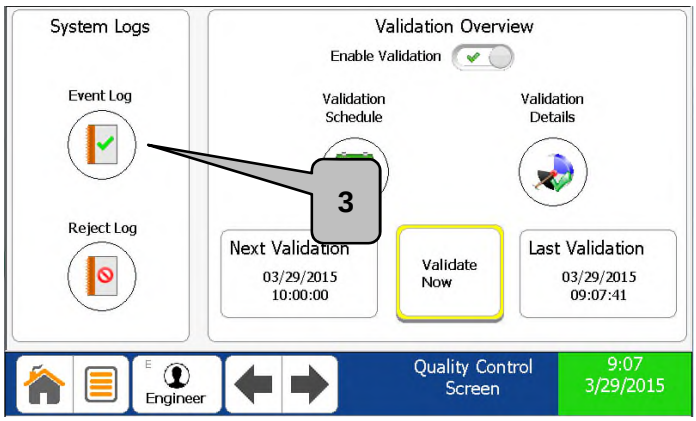
1. **On the task bar press “Verification Needed”.**
2. **Press the metal type you wish to test.**
3. **Pass the listed metal on the product through the aperture and press the “Stop” button.**
4. **Select Pass, Fail, or Retry and repeat the process if necessary for the other metals.**
5. **“B Detection” indicates that a boundary detection occurred. The “B” matches the indicator placed in the reject log for boundary detections.**
6. **Press “Verification Complete” when all metals have been tested.**

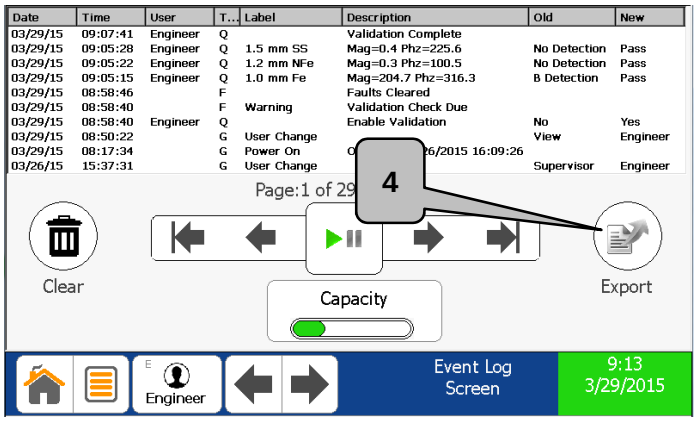
UI

“HOW TO” EXPORT REPORT LOGS









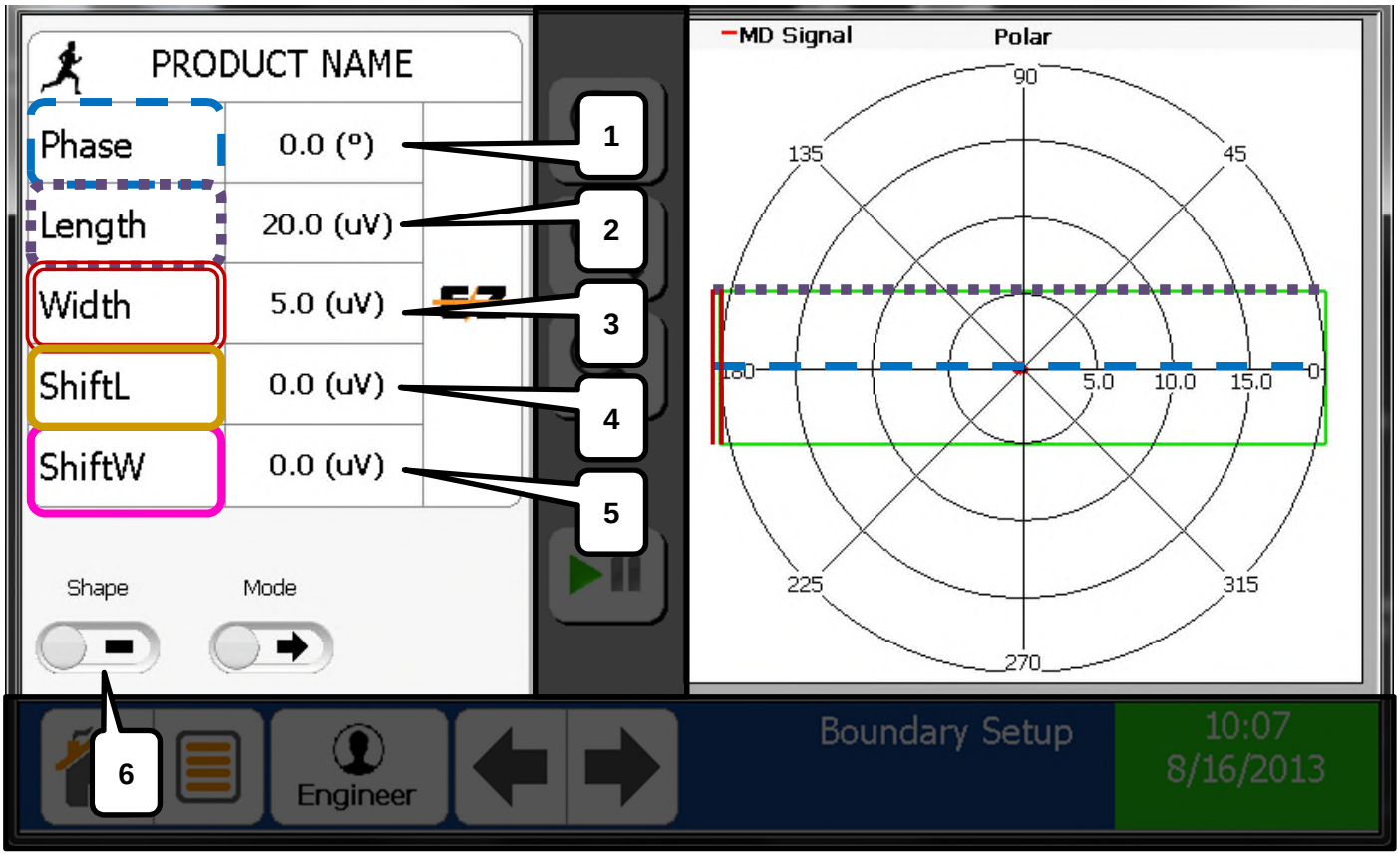
1. **Ensure a USB drive is inserted into the USB connector.**
2. **From the “Home Screen” select “Quality Control”.**
3. **Select which Log you would like to view and export.**
4. **Press export. You now have the option to rename the file. Press “OK” after the “Done exporting Log” window pops up.**

UI

CAUTION

Ensure the USB drive is removed, and the USB connector cap is in place and locked (p28), before any wash-down operation is performed.

THE DETECTION BOUNDARY EXPLAINED

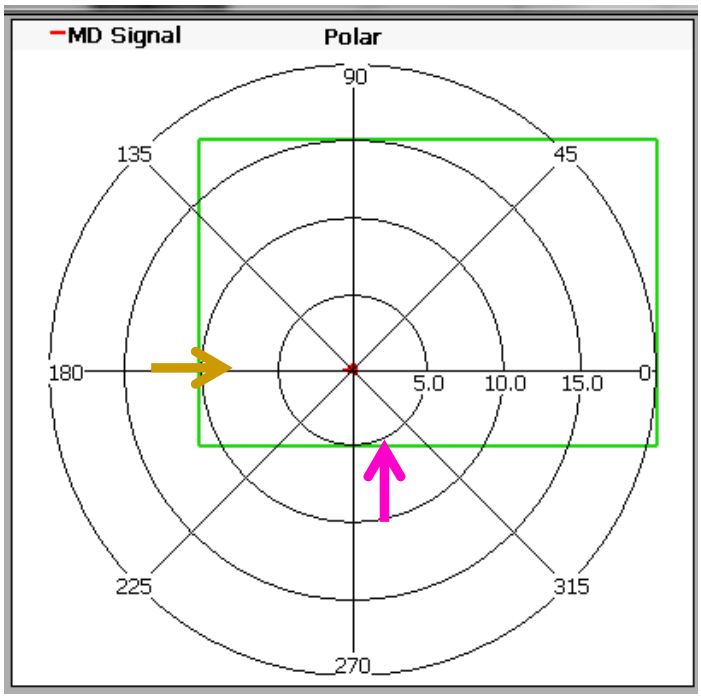


UI

1. **Phase adjustment(degrees). Should align with product signal.**
2. **Length adjustment(uV). Should run parallel to product signal length.**
3. **Width adjustment(uV). Should run parallel to product signal width.**
4. **Shift about the length axis in parallel with selected phase.**
5. **Shift about the width axis in perpendicular with selected phase.**
6. **Detection Boundary shape selection. Default is the rectangle.**

Rectangle

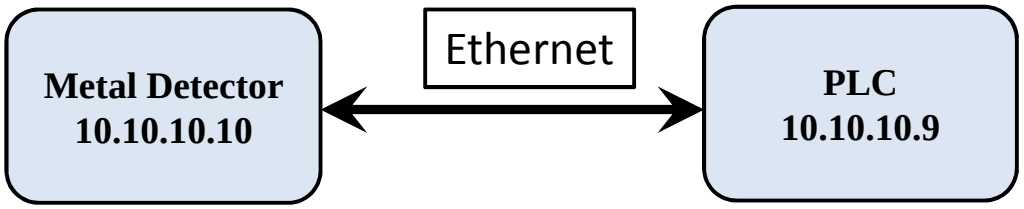
Ellipse



Ethernet IP Interface
Between Xtreme Metal Detector and PLC

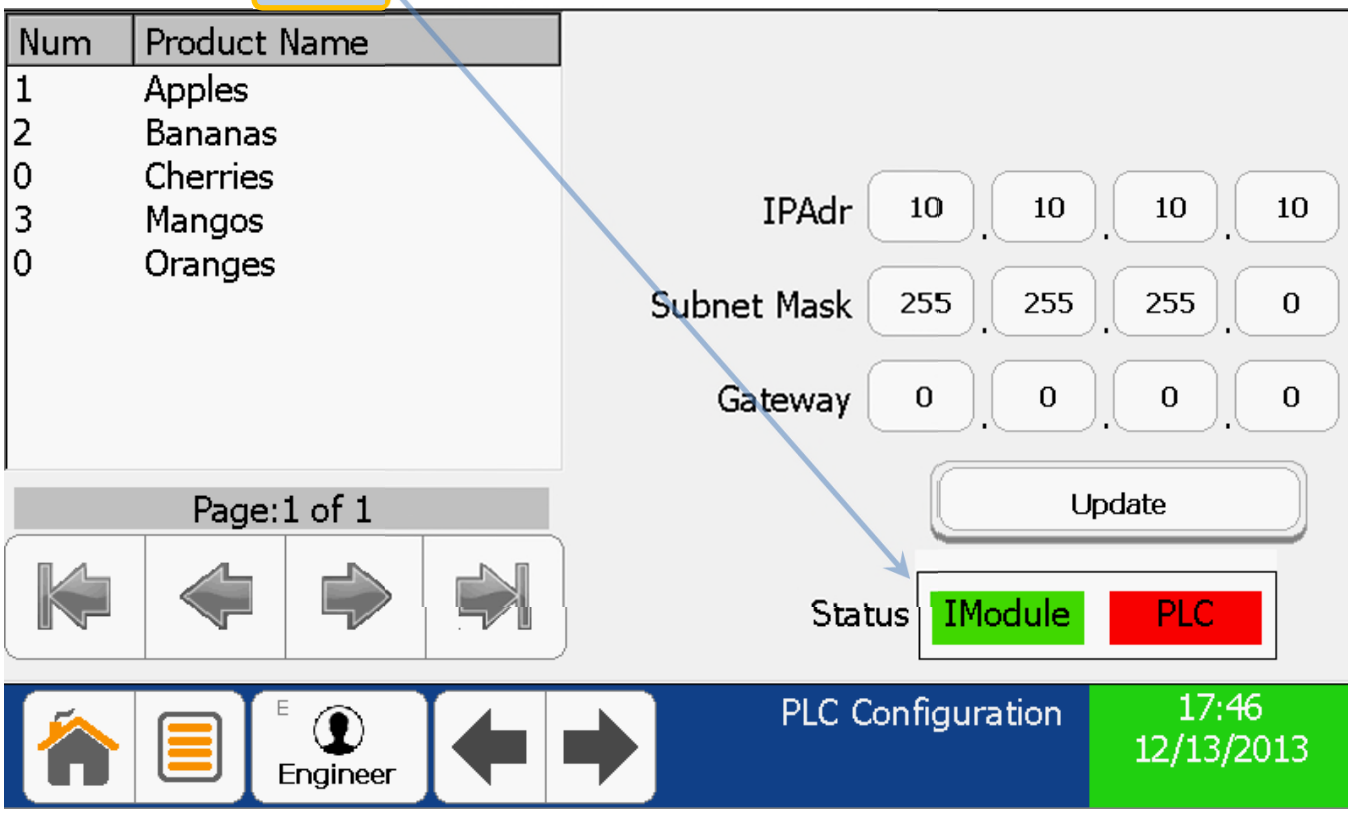
INTRODUCTION

A PLC can be connected to the Xtreme metal detector by means of the factory installed PLC Interface Module. This module allows the PLC to set and retrieve the running product number. It can also retrieve metal detector status information.



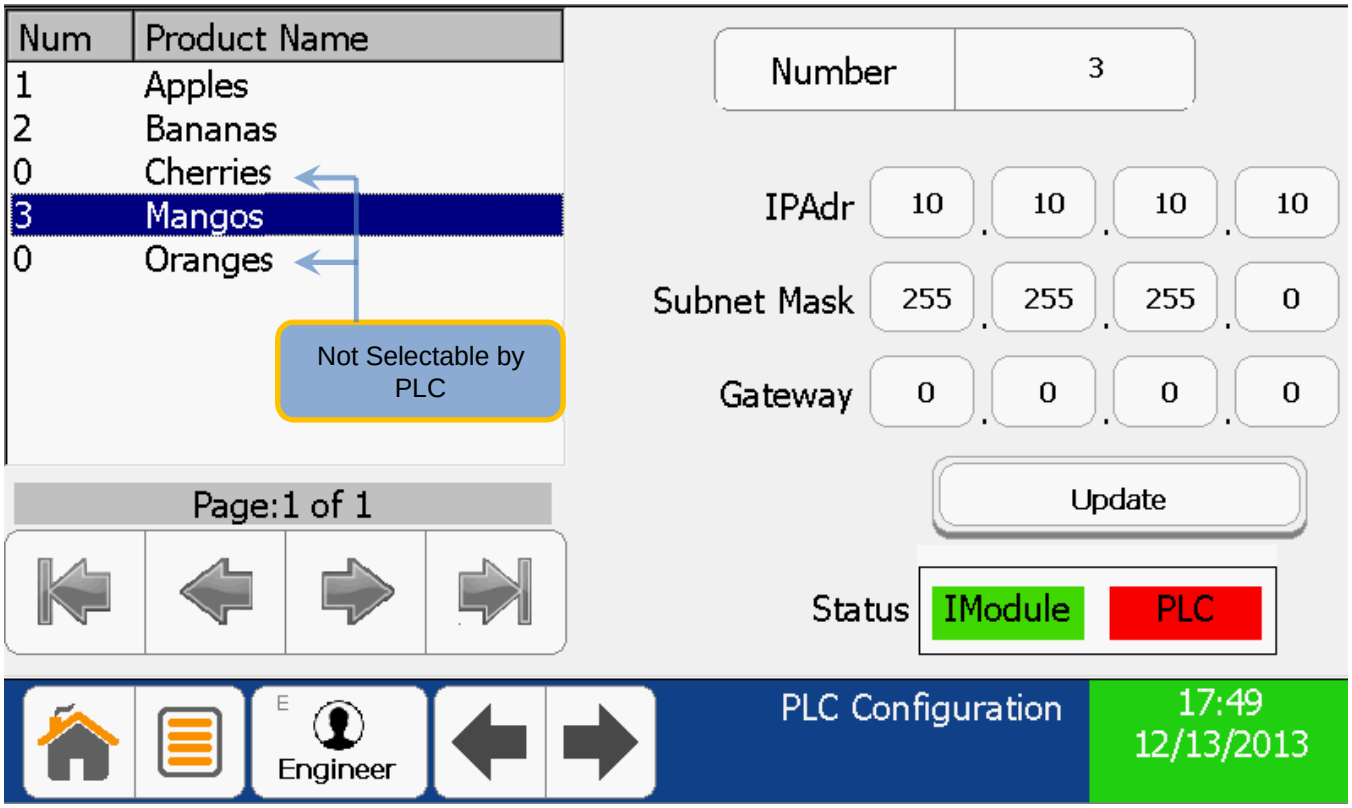
METAL DETECTOR COMMUNICATION SETUP

1. From the metal detector "Main Menu" select "I/O Setup" then select "PLC Configuration.
2. Verify that the "Imodule" status light is green. If red contact the factory for assistance.



PLC

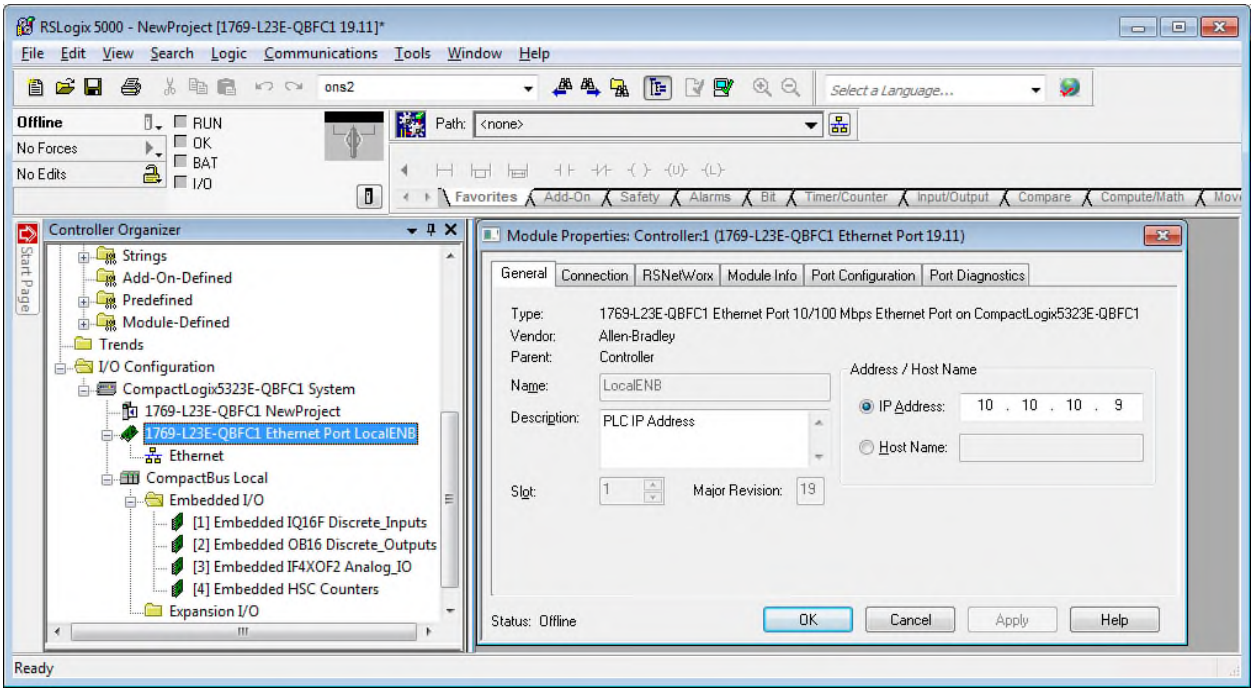
3. Assign product numbers (1, 2, 3 …) to all products that will be remotely selected from the PLC. Assigning 0 to any product makes it un-selectable by the PLC.



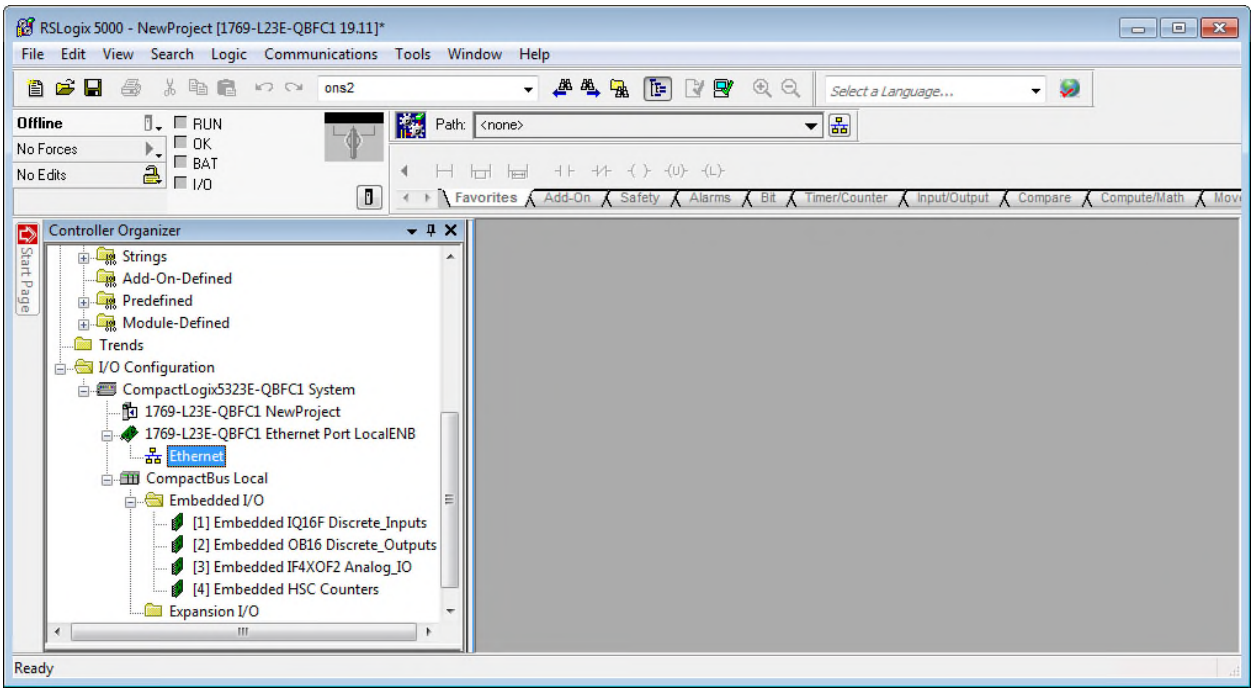
4. Connect an Ethernet cable between the Metal Detector and the desired network. The “red” cat5 cable in the metal detector is for the PLC connection while the “blue” is for remote support (if installed).

PLC COMMUNICATION SETUP

1. In the Controller Organizer window, under I/O Configuration, right click on your controller Ethernet Port LocalENB. Select Properties, select the General Tab, and assign the PLC Ethernet IP Address,(such as 10.10.10.9)

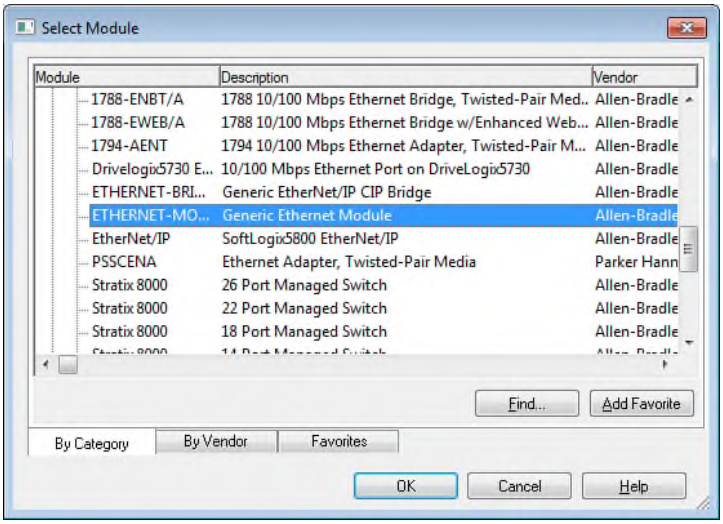


2. In the Controller Organizer window, under I/O Configuration, under your controller, right click on “Ethernet”, select New Module.

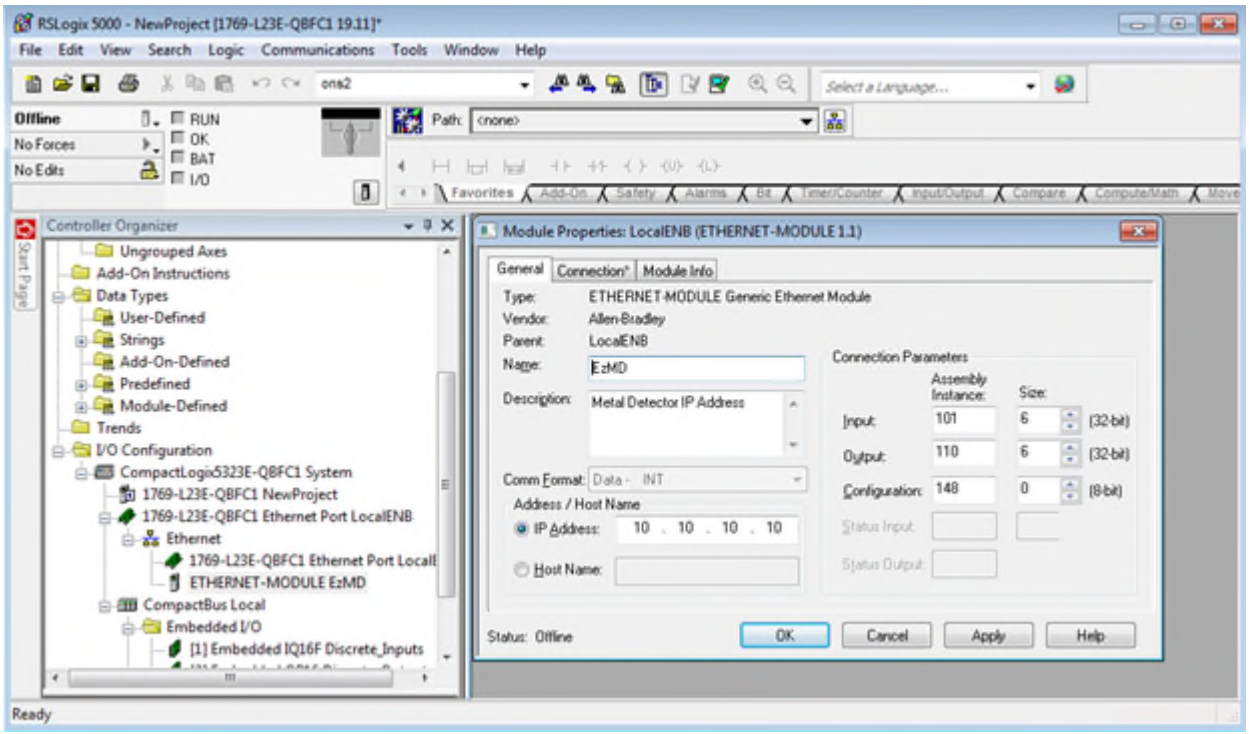


PLC

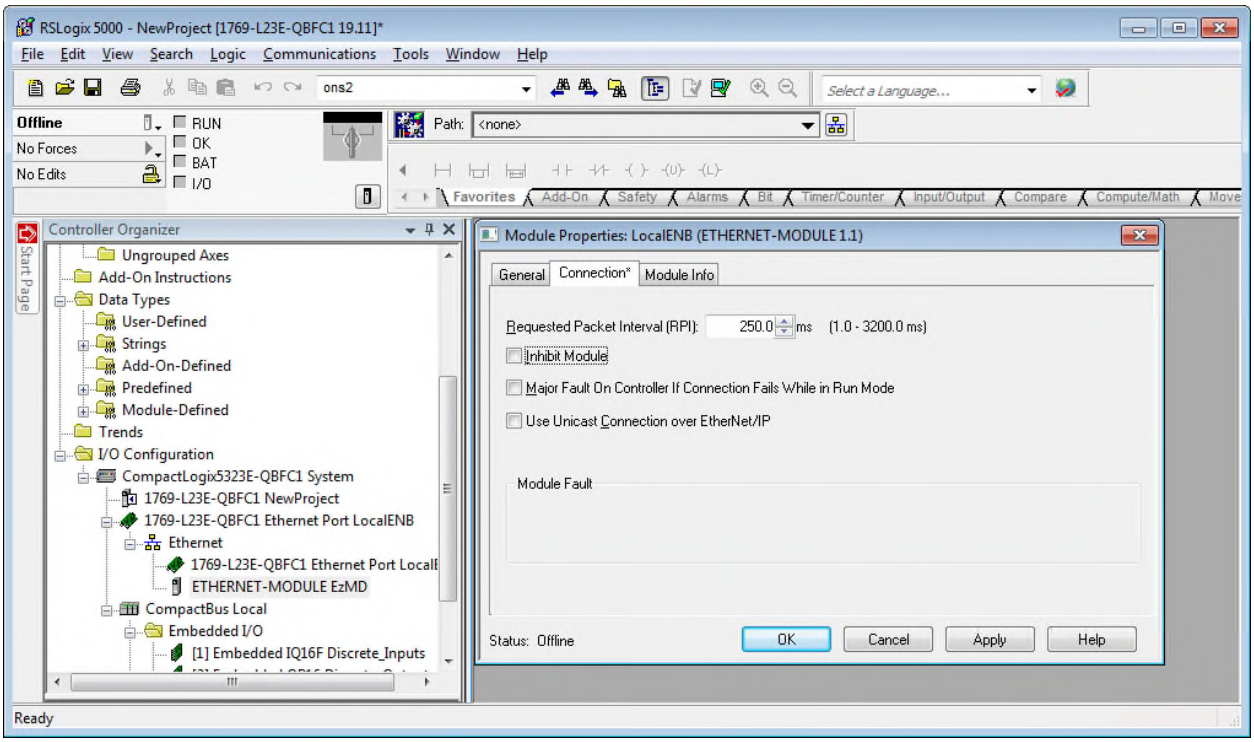
3. From the Select Module dialog box expand Communications and select “Generic Ethernet-Module”. Press “OK”.



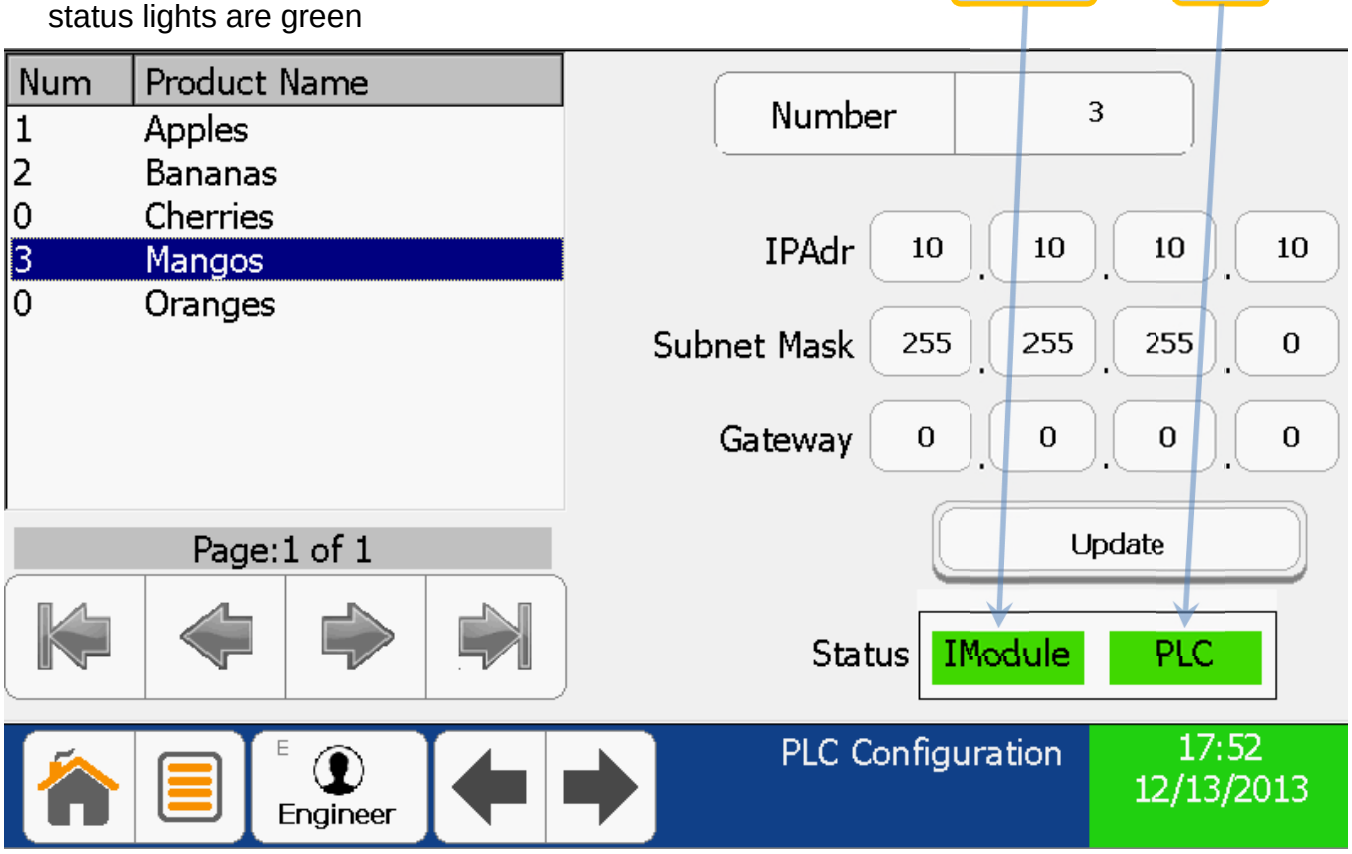
4. On the New Module Properties Page (General tab):
   a. Assign a unique Name (such as EzMD)
   b. Assign the Metal Detector IP Address (such as 10.10.10.10). Please note that this must match the address set on the PLC Configuration page of the metal detector.
   c. Set Assembly Instance Input to 101 and Size to 6.
   d. Set Assembly Instance Output to 110 and Size to 6.
   e. Set Assembly Instance Configuration to 148 and Size to 0.



5. From the “Module Properties: LocalENB” select the Connection Tab.
    a. Set the “Requested Pack Interval” (RPI) to 250 mS.



6. Connect the PLC Ethernet cable to the same network as the metal detector.
7. On the metal detector PLC Configuration screen, verify both the “IModule” and “PLC” status lights are green



PLC PROGRAMMING

1. The PLC communicates with the Metal Detector using two 6-word blocks of memory in the Generic Ethernet Module. Each word is 16 bits.

EzMD:O.	PLC output	EzMD:I.	PLC input
Data[0]	reserved	**Data[0]**	metal detector status
Data[1]	command	**Data[1]**	command confirmation
Data[2]	param 1 to send	**Data[2]**	received param 1
Data[3]	param 2 to send	**Data[3]**	received param 2
Data[4]	param 3 to send	**Data[4]**	received param 3
Data[5]	reserved	**Data[5]**	metal detector heartbeat

2. The PLC initiates all communication with the Metal Detector by **first** filling in the necessary output (send) parameters, **then** writing (a command) to EzMD:O.Data[1].

3. When the Metal Detector responds with the same command and any associated input (receive) parameters, the PLC writes a NO-OP command 0xFF to EzMD.O.Data[1] and the Metal Detector responds with 0x00.

PLC

4. The following Metal Detector commands are available:

DECIMAL	HEX	COMMAND
1	0x0001	**Set Running Product** (for example product 3) MOV 3 to EzMD:O.Data[2] MOV 16#0001 to EzMD:O.Data[1]
	Reply	EzMD:I.Data[0] contains Metal Detector status EzMD:I.Data[1] contains command 16#0001 EzMD:I.Data[5] contains Metal Detector heartbeat
		see Sample Program ladder diagram rung 6
2	0x0002	**Read Running Product** MOV 16#0002 to EzMD:O.Data[1]
	Reply	EzMD:I.Data[0] contains Metal Detector status EzMD:I.Data[1] contains command 16#0002 EzMD:I.Data[2] contains **running product number** EzMD:I.Data[5] contains Metal Detector heartbeat
		see Sample Program ladder diagram rung 5
255	0x00FF	**No operation**
	Reply	EzMD:I.Data[0] contains Metal Detector status EzMD:I.Data[1] contains command 16#0000 EzMD:I.Data[5] contains Metal Detector heartbeat
		see Sample Program ladder diagram rung 8 for automatic no-op insertion

PLC

5. Metal Detector status EzMD:I.Data[0] is updated approximately every second and with every command exchange.
See the sample program rung 0.

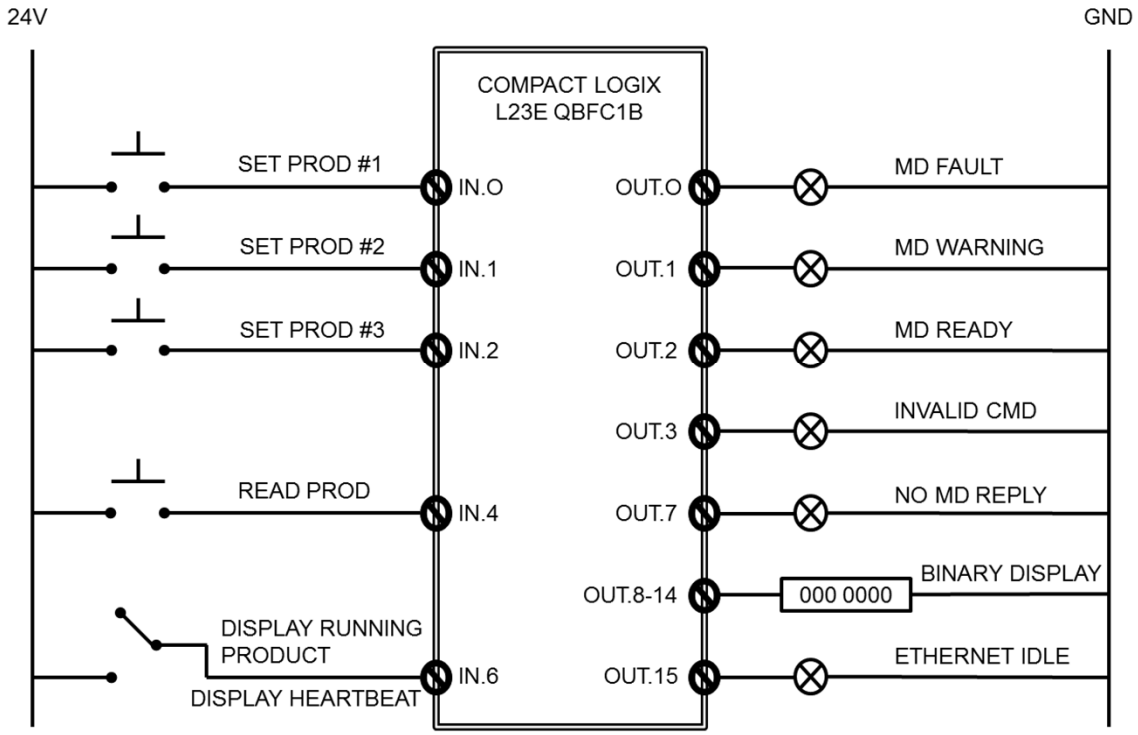
BIT	DESCRIPTION	VALUE=1	VALUE=0
0	metal detector fault	fault	no fault
1	metal detector warning	warning	no warning
2	metal detector ready	ready	not ready
3	invalid Ethernet command	invalid	valid
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15	no reply from metal detector	no reply	reply

6. The Metal Detector increments a 16-bit counter (heartbeat) and sends it back to the PLC EzMD:I.Data[5] with every status update .
See the Sample Program ladder diagram rung 1.

PLC

SAMPLE PLC PROGRAM

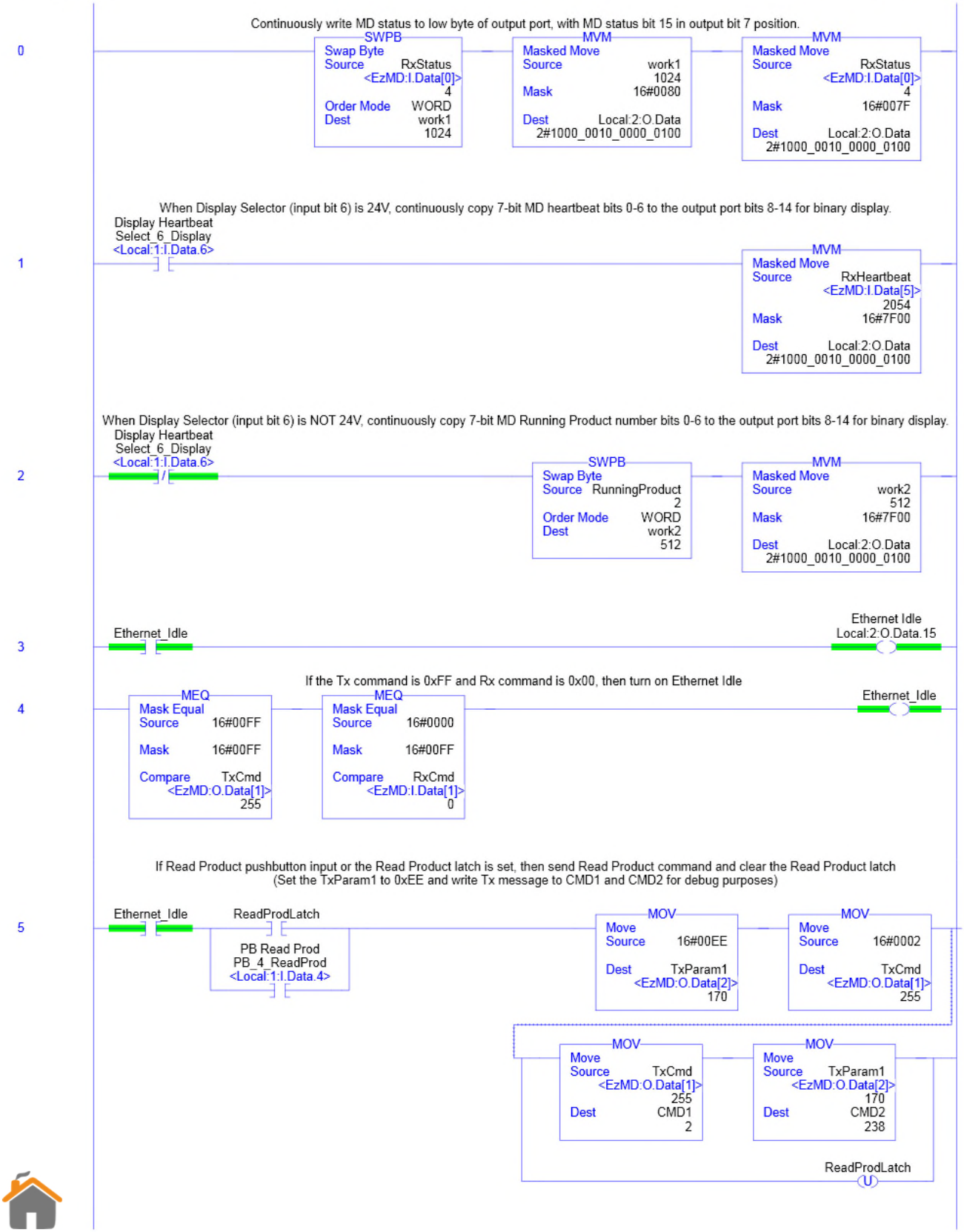
The sample program assumes one generic Ethernet IP module named EzMD, one 16-bit DC input module named Local:1, and one 16-bit DC output module named Local:2.
Inputs and outputs assigned below.
The Ladder diagram, tags, and rung descriptions can be found on the pages that follow.

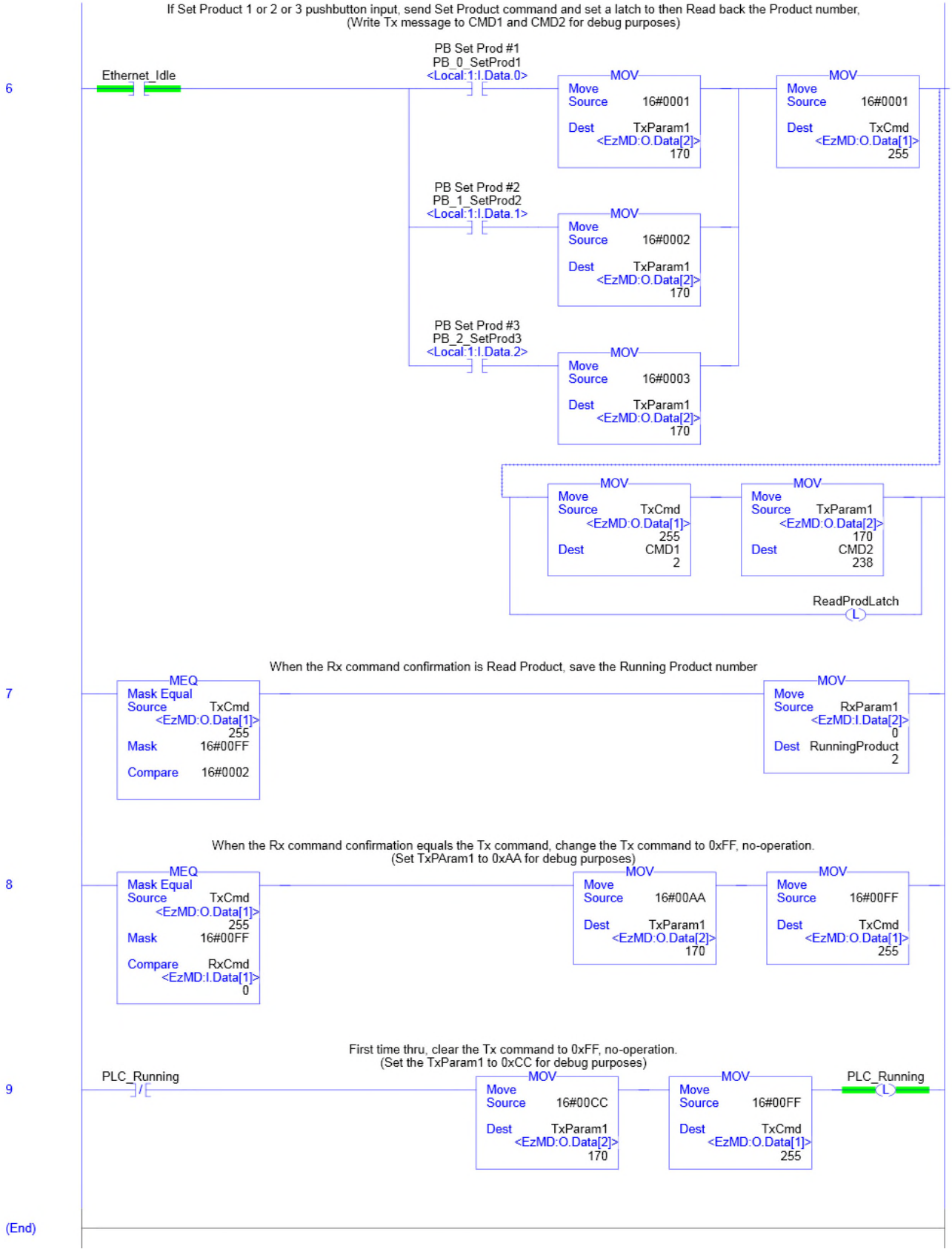


	DC Inputs **`Local:I.Data`**
0	SetProduct #1 (momentary 24V)
1	Set Product #2 (momentary 24V)
2	Set Product #3 (momentary 24V)
3	
4	Read Running Product (momentary 24V)
5	
6	Select data to display 0V = Display running product 24V = Display heartbeat
7	
8-14	
15	

	DC Outputs **`Local:O.Data`**
0	MD Fault
1	MD Warning
2	MD Ready
3	MD Invalid Command
4	
5	
6	
7	No Reply from MD
8-14	7-bit Binary display
15	Ethernet Idle

PLC


0
Continuously write MD status to low byte of output port, with MD status bit 15 in output bit 7 position.
SWPB
Swap Byte
Source RxStatus <EzMD:I.Data[0]> 4
Order Mode WORD
Dest work1 1024
MVM
Masked Move
Source work1 1024
Mask 16#0080
Dest Local:2:O.Data 2#1000_0010_0000_0100
MVM
Masked Move
Source RxStatus <EzMD:I.Data[0]> 4
Mask 16#007F
Dest Local:2:O.Data 2#1000_0010_0000_0100
1
When Display Selector (input bit 6) is 24V, continuously copy 7-bit MD heartbeat bits 0-6 to the output port bits 8-14 for binary display.
Display Heartbeat Select_6_Display <Local:1:I.Data.6>
MVM
Masked Move
Source RxHeartbeat <EzMD:I.Data[5]> 2054
Mask 16#7F00
Dest Local:2:O.Data 2#1000_0010_0000_0100
2
When Display Selector (input bit 6) is NOT 24V, continuously copy 7-bit MD Running Product number bits 0-6 to the output port bits 8-14 for binary display.
Display Heartbeat Select_6_Display <Local:1:I.Data.6>
SWPB
Swap Byte
Source RunningProduct 2
Order Mode WORD
Dest work2 512
MVM
Masked Move
Source work2 512
Mask 16#7F00
Dest Local:2:O.Data 2#1000_0010_0000_0100
3
Ethernet_Idle
Ethernet Idle Local:2:O.Data.15
4
If the Tx command is 0xFF and Rx command is 0x00, then turn on Ethernet Idle
MEQ
Mask Equal
Source 16#00FF
Mask 16#00FF
Compare TxCmd <EzMD:O.Data[1]> 255
MEQ
Mask Equal
Source 16#0000
Mask 16#00FF
Compare RxCmd <EzMD:I.Data[1]> 0
Ethernet_Idle
5
If Read Product pushbutton input or the Read Product latch is set, then send Read Product command and clear the Read Product latch
(Set the TxParam1 to 0xEE and write Tx message to CMD1 and CMD2 for debug purposes)
Ethernet_Idle
ReadProdLatch
PB Read Prod PB_4_ReadProd <Local:1:I.Data.4>
MOV
Move
Source 16#00EE
Dest TxParam1 <EzMD:O.Data[2]> 170
MOV
Move
Source 16#0002
Dest TxCmd <EzMD:O.Data[1]> 255
MOV
Move
Source TxCmd <EzMD:O.Data[1]> 255
Dest CMD1 2
MOV
Move
Source TxParam1 <EzMD:O.Data[2]> 170
Dest CMD2 238
ReadProdLatch
PLC


If Set Product 1 or 2 or 3 pushbutton input, send Set Product command and set a latch to then Read back the Product number,
(Write Tx message to CMD1 and CMD2 for debug purposes)
6
Ethernet_Idle
PB Set Prod #1
PB_0_SetProd1
<Local:1:I.Data.0>
MOV
Move
Source 16#0001
Dest TxParam1
<EzMD:O.Data[2]>
170
MOV
Move
Source 16#0001
Dest TxCmd
<EzMD:O.Data[1]>
255
PB Set Prod #2
PB_1_SetProd2
<Local:1:I.Data.1>
MOV
Move
Source 16#0002
Dest TxParam1
<EzMD:O.Data[2]>
170
PB Set Prod #3
PB_2_SetProd3
<Local:1:I.Data.2>
MOV
Move
Source 16#0003
Dest TxParam1
<EzMD:O.Data[2]>
170
MOV
Move
Source TxCmd
<EzMD:O.Data[1]>
255
Dest CMD1
2
MOV
Move
Source TxParam1
<EzMD:O.Data[2]>
170
Dest CMD2
238
ReadProdLatch
L
When the Rx command confirmation is Read Product, save the Running Product number
7
MEQ
Mask Equal
Source TxCmd
<EzMD:O.Data[1]>
255
Mask 16#00FF
Compare 16#0002
MOV
Move
Source RxParam1
<EzMD:I.Data[2]>
0
Dest RunningProduct
2
When the Rx command confirmation equals the Tx command, change the Tx command to 0xFF, no-operation.
(Set TxPAram1 to 0xAA for debug purposes)
8
MEQ
Mask Equal
Source TxCmd
<EzMD:O.Data[1]>
255
Mask 16#00FF
Compare RxCmd
<EzMD:I.Data[1]>
0
MOV
Move
Source 16#00AA
Dest TxParam1
<EzMD:O.Data[2]>
170
MOV
Move
Source 16#00FF
Dest TxCmd
<EzMD:O.Data[1]>
255
First time thru, clear the Tx command to 0xFF, no-operation.
(Set the TxParam1 to 0xCC for debug purposes)
9
PLC_Running
MOV
Move
Source 16#00CC
Dest TxParam1
<EzMD:O.Data[2]>
170
MOV
Move
Source 16#00FF
Dest TxCmd
<EzMD:O.Data[1]>
255
PLC_Running
L
(End)

PLC

Name	Value	Data Type	Scope
CMD1	2	DINT	MainProgram
Constant	No		
External Access:	Read/Write		
*CMD1 - MainProgram/MainRoutine - *5(MOV), *6(MOV)*			
CMD2	238	DINT	MainProgram
Constant	No		
External Access:	Read/Write		
*CMD2 - MainProgram/MainRoutine - *5(MOV), *6(MOV)*			
Ethernet_Idle	2#1	BOOL	MainProgram
Constant	No		
External Access:	Read/Write		
*Ethernet_Idle - MainProgram/MainRoutine - *4(OTE), 3(XIC), 5(XIC), 6(XIC)*			
Local:2:O		AB:Embedded_OB16:O:0	Eriez_MD_test_ver_19
External Access:	Read/Write		
Local:2:O.Data	2#1000_0010_0000_0100	INT	
*Local:2:O.Data - MainProgram/MainRoutine - *0(MVM), *1(MVM), *2(MVM)*			
Local:2:O.Data.15	1	BOOL	
Ethernet Idle			
*Local:2:O.Data.15 - MainProgram/MainRoutine - *3(OTE)*			
PB_0_SetProd1	2#0	BOOL	MainProgram
PB Set Prod #1			
AliasFor:	Local:1:I.Data.0(C)		
Base Tag:	Local:1:I.Data.0(C)		
Constant	No		
External Access:	Read/Write		
PB_0_SetProd1 - MainProgram/MainRoutine - 6(XIC)			
PB_1_SetProd2	0	BOOL	MainProgram
PB Set Prod #2			
AliasFor:	Local:1:I.Data.1(C)		
Base Tag:	Local:1:I.Data.1(C)		
Constant	No		
External Access:	Read/Write		
PB_1_SetProd2 - MainProgram/MainRoutine - 6(XIC)			
PB_2_SetProd3	2#0	BOOL	MainProgram
PB Set Prod #3			
AliasFor:	Local:1:I.Data.2(C)		
Base Tag:	Local:1:I.Data.2(C)		
Constant	No		
External Access:	Read/Write		
PB_2_SetProd3 - MainProgram/MainRoutine - 6(XIC)			
PB_4_ReadProd	0	BOOL	MainProgram
PB Read Prod			
AliasFor:	Local:1:I.Data.4(C)		
Base Tag:	Local:1:I.Data.4(C)		
Constant	No		
External Access:	Read/Write		
PB_4_ReadProd - MainProgram/MainRoutine - 5(XIC)			
PLC_Running	2#1	BOOL	MainProgram
Constant	No		
External Access:	Read/Write		
*PLC_Running - MainProgram/MainRoutine - *9(OTL), 9(XIO)*			

ReadProdLatch	2#0	BOOL	MainProgram
Constant	No		
External Access:	Read/Write		
*ReadProdLatch - MainProgram/MainRoutine - *5(OTU), *6(OTL), 5(XIC)*			
RunningProduct	2	INT	MainProgram
Constant	No		
External Access:	Read/Write		
*RunningProduct - MainProgram/MainRoutine - *7(MOV), 2(SWPB)*			
RxCmd	0	INT	MainProgram
AliasFor:	EzMD:I.Data[1](C)		
Base Tag:	EzMD:I.Data[1](C)		
Constant	No		
External Access:	Read/Write		
RxCmd - MainProgram/MainRoutine - 4(MEQ), 8(MEQ)			
RxHeartbeat	2054	INT	MainProgram
AliasFor:	EzMD:I.Data[5](C)		
Base Tag:	EzMD:I.Data[5](C)		
Constant	No		
External Access:	Read/Write		
RxHeartbeat - MainProgram/MainRoutine - 1(MVM)			
RxParam1	0	INT	MainProgram
AliasFor:	EzMD:I.Data[2](C)		
Base Tag:	EzMD:I.Data[2](C)		
Constant	No		
External Access:	Read/Write		
RxParam1 - MainProgram/MainRoutine - 7(MOV)			
RxStatus	4	INT	MainProgram
AliasFor:	EzMD:I.Data[0](C)		
Base Tag:	EzMD:I.Data[0](C)		
Constant	No		
External Access:	Read/Write		
RxStatus - MainProgram/MainRoutine - 0(MVM), 0(SWPB)			
Select_6_Display	2#0	BOOL	MainProgram
Display Heartbeat			
AliasFor:	Local:1:I.Data.6(C)		
Base Tag:	Local:1:I.Data.6(C)		
Constant	No		
External Access:	Read/Write		
Select_6_Display - MainProgram/MainRoutine - 1(XIC), 2(XIO)			
TxCmd	255	INT	MainProgram
AliasFor:	EzMD:O.Data[1](C)		
Base Tag:	EzMD:O.Data[1](C)		
Constant	No		
External Access:	Read/Write		
*TxCmd - MainProgram/MainRoutine - *5(MOV), *6(MOV), *8(MOV), *9(MOV), 4(MEQ), 5(MOV), 6(MOV), 7(MEQ), 8(MEQ)*			
TxParam1	170	INT	MainProgram
AliasFor:	EzMD:O.Data[2](C)		
Base Tag:	EzMD:O.Data[2](C)		
Constant	No		
External Access:	Read/Write		
*TxParam1 - MainProgram/MainRoutine - *5(MOV), *6(MOV), *8(MOV), *9(MOV), 5(MOV), 6(MOV)*			
work1	1024	INT	MainProgram

work1 (Continued)
swap status
Constant No
External Access: Read/Write
*work1 - MainProgram/MainRoutine - *0(SWPB), 0(MVM)*

work2	512	INT	MainProgram

swap prod number
Constant No
External Access: Read/Write
*work2 - MainProgram/MainRoutine - *2(SWPB), 2(MVM)*

PLC

MAINTENANCE

INTRODUCTION

No periodic maintenance or adjustment of the metal detector is required. A verification check at the beginning of every shift is recommended.

TROUBLESHOOTING

If metal detector false tripping occurs, refer to the information in the Installation sections of this manual. For further assistance, please contact the factory.
In the event of equipment damage or malfunction, contact the factory for troubleshooting steps, and to obtain spare parts.

CAUTION

To avoid injury or damage to the equipment, all electrical maintenance on the metal detector is to be performed by qualified service technicians authorized by Eriez Manufacturing Company.

WARNING – HAZARDOUS VOLTAGE

Hazardous voltages are present in this equipment when energized. All power sources must be isolated or disconnected before accessing the inside of the enclosure.

CAUTION

A double pole breaker is to be installed between the metal detector and the power source to allow for the metal detector to be completely disconnected from the power source during installation and maintenance. All lock-out tag-out procedures and local safety codes are to be followed during metal detector maintenance.

After any service is performed, verify that all protective earth connections are re-attached, and the enclosure cover is re-installed, before restoring power to the equipment.

CAUTION

For continued compliance with electrical safety standards, the protective earth connection from the power source must be connected directly to the protective terminal on the wall of the enclosure. This is required to be the FIRST connection to the terminal, and secured with a star lock washer and nut, independent of any other connections to the terminal.

MAINT

CLEANING

For proper metal detector operation, the following cleaning requirements must be met:

1. Material must not be allowed to fill the gap between the aperture and the conveyor slider bed.
2. The aperture and conveyor should be free of contamination (especially metal).

Additional cleaning may be needed, based on the sanitary requirements/good manufacturing practices of the customer's production environment.
The metal detector may be cleaned by wipe-down, compressed air, low-pressure wash-down, or high-pressure wash-down, as desired. If liquids will be used for cleaning, ensure external USB and/or Ethernet connectors are capped, or connected to appropriate IP rated cables. If high-pressure water will be used, ensure the wash-down cover is in place over the display, to avoid damage or unintended actuation of the touch screen.

CAUTION

Cleaning procedures may cause false trips of the metal detector, resulting in actuation of any connected reject devices. Ensure personnel and equipment are clear from the path of the reject devices at all times. To avoid an unsafe condition or damage to equipment, remove all power sources (including air supplies) from the metal detector and reject devices prior to high pressure wash down. **Note: Vertical and Web Line Metal Detectors are not rated for high pressure wash down.**

CAUTION

When cleaning the metal detector surfaces, use appropriate personal protective equipment (PPE) for any physical/chemical/biological hazards that may exist due to the end user's production environment. Avoid contact with contaminants on or around the metal detector. Pressure wash and sanitize metal detector surfaces when maintenance is required. **Note: Vertical and Web Line Metal Detector are not rated for high pressure wash down.**

Vertical Metal Detector with Valve Addendum

VMD

VERTICAL METAL DETECTOR SAFETY

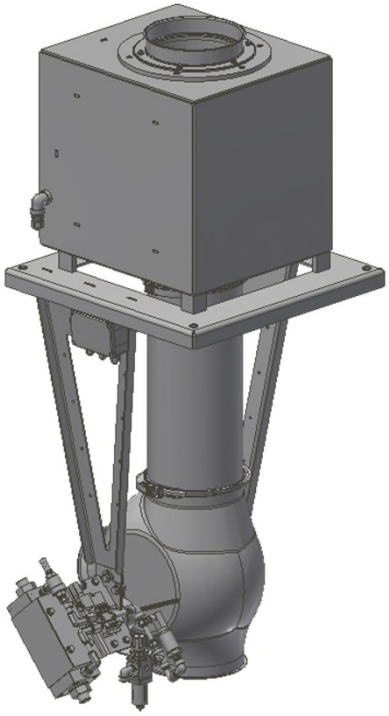
CAUTION

Tip over hazard. Do not move the equipment without appropriate mechanical assistance. Follow all lifting and installation instructions defined in this manual.

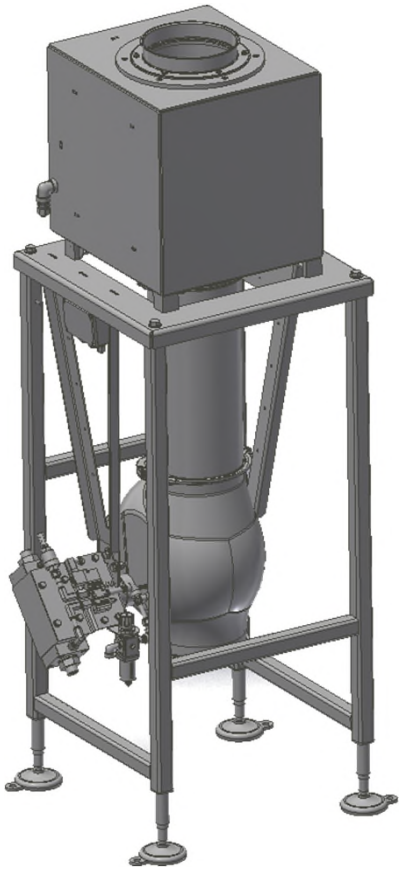
The vertical system with reject valves are rated for NEMA 4X.

The vertical metal detector comes in three (3) primary configurations as shown below:

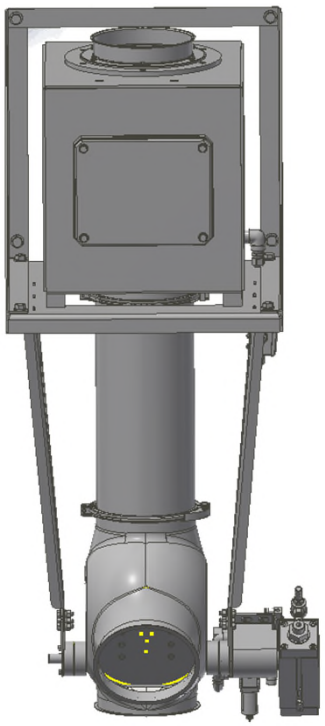
Ceiling Mount Unit



Floor Mount Unit



Wall Mount Unit

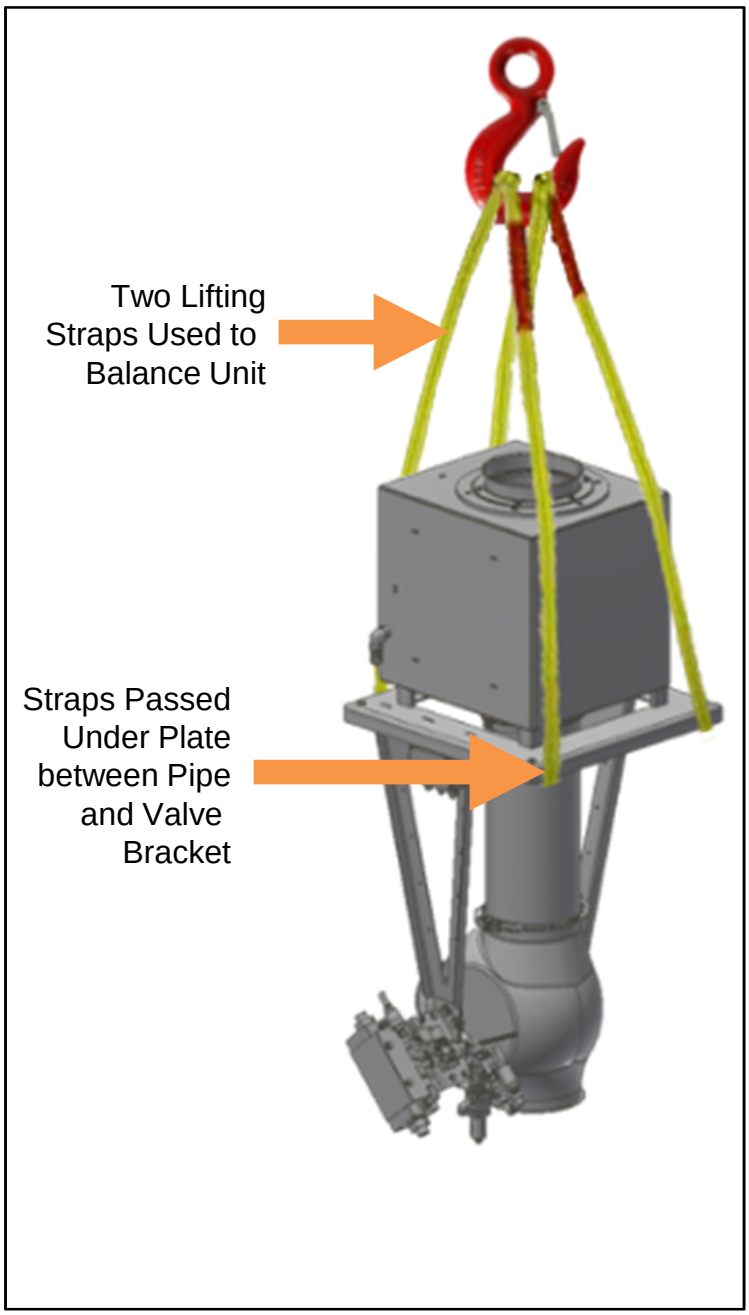


VMD

LIFTING

Raise the unit by lifting from the underside of the plate. DO NOT lift from the head.

Lifting the unit improperly may damage the unit and void any warranty.



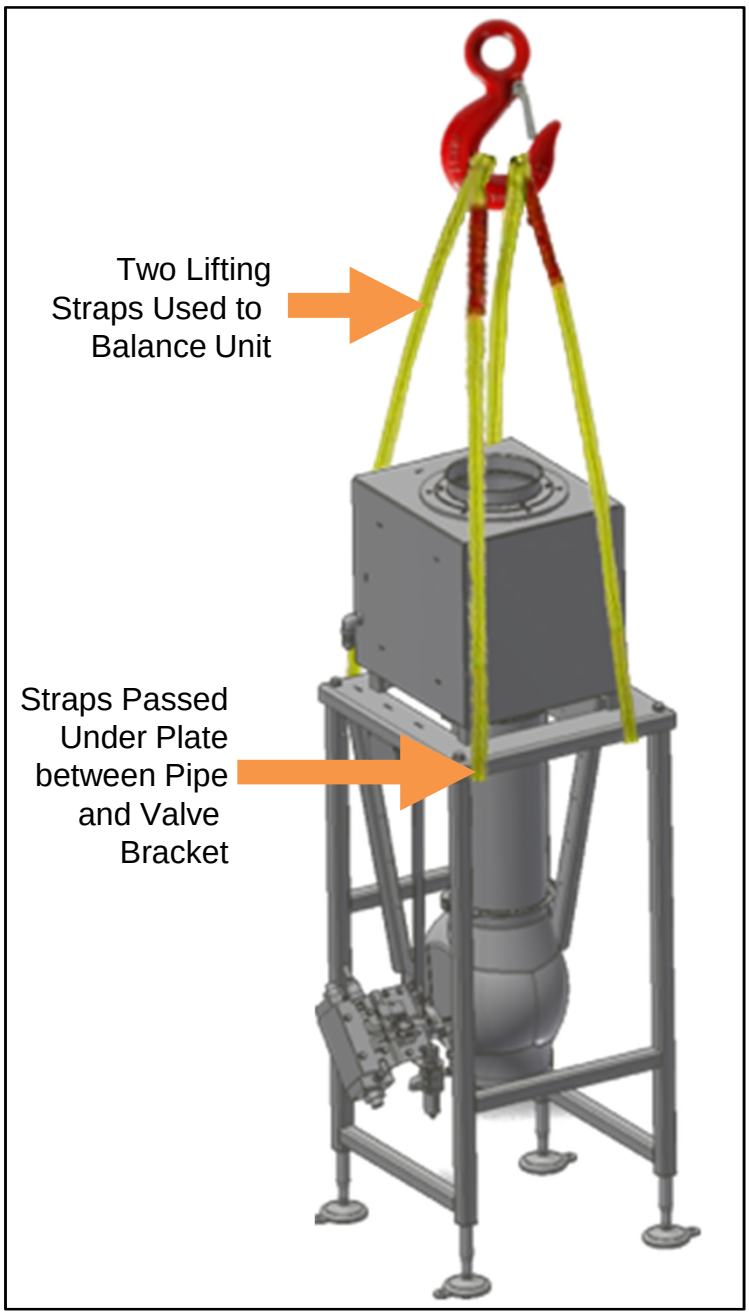
Example Lift Method: Ceiling Mount

VMD

LIFTING

Raise the unit by lifting from the underside of the plate. DO NOT lift from the head.

Lifting the unit improperly may damage the unit and void any warranty.



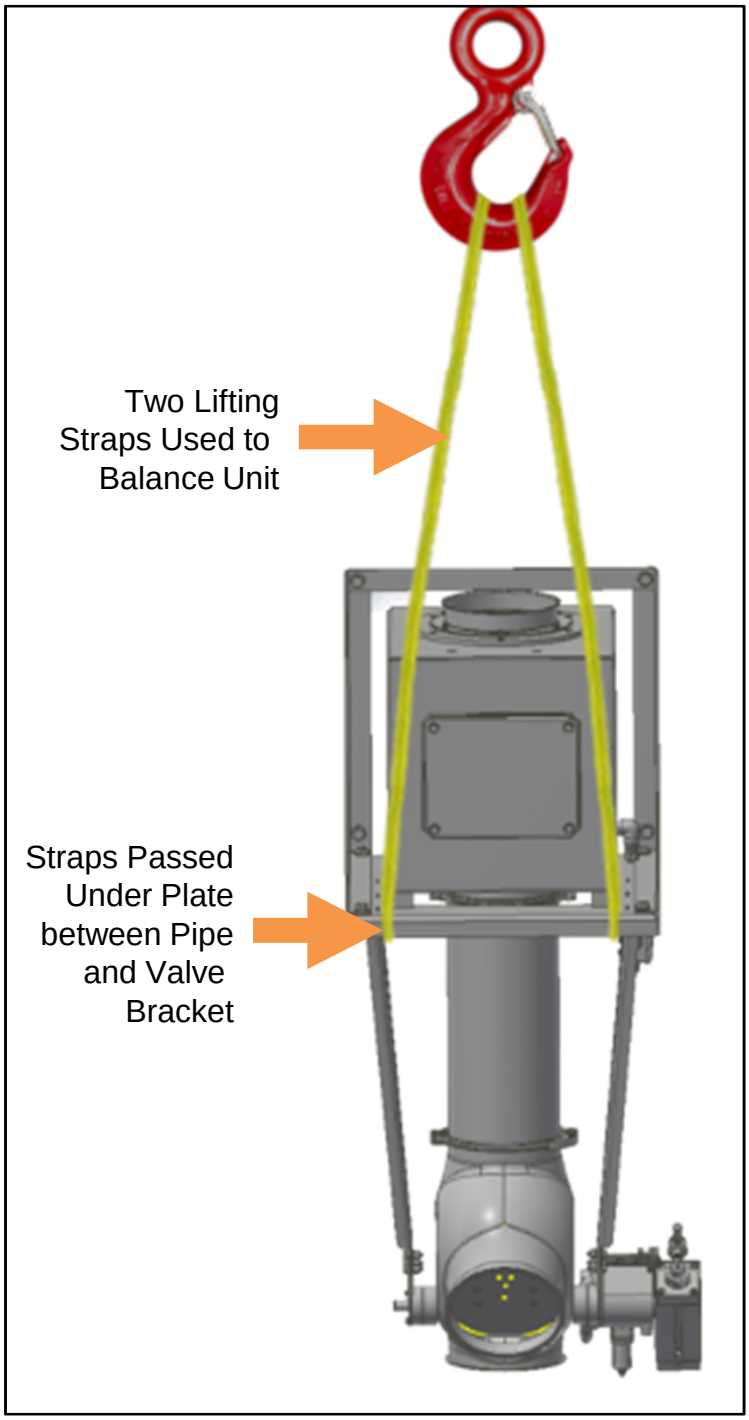
Example Lift Method: Floor Mount

VMD

LIFTING

Raise the unit by lifting from the underside of the plate. DO NOT lift from the head.

Lifting the unit improperly may damage the unit and void any warranty.



Example Lift Method: Wall Mount

VMD

INSTALLATION

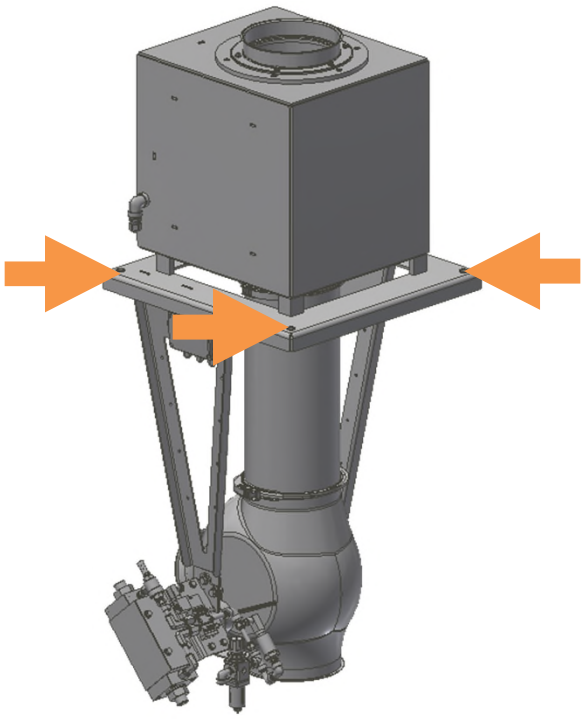
MOUNTING

Ceiling Mount

Use 1/2” diameter bolts to secure the customer-provided vertical mounting apparatus to the metal detector plate.

Ensure four (4) included shoulder washers are in place at each mounting point when mounting.

Shoulder washers required for proper installation and operation



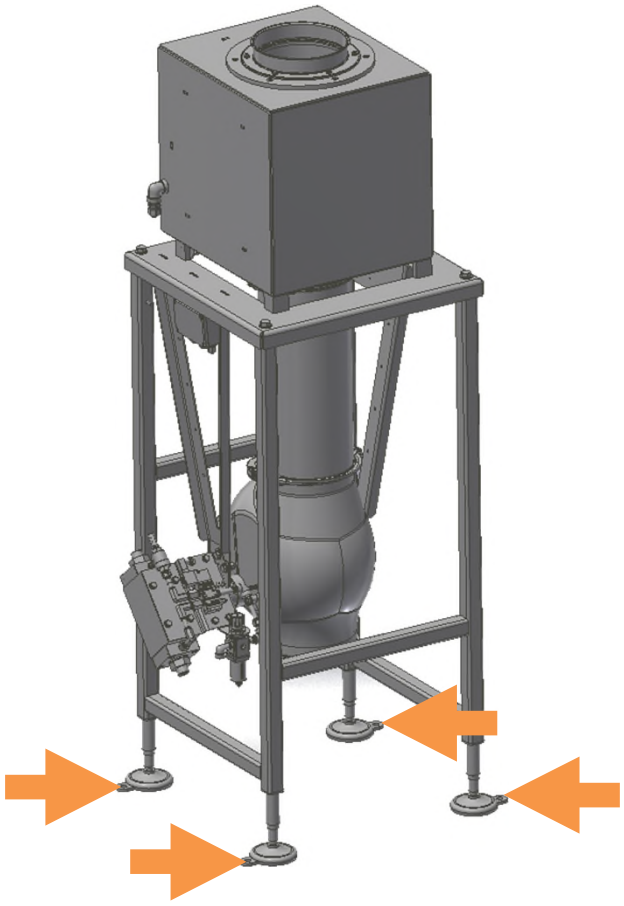
VMD

INSTALLATION

MOUNTING

Floor Mount

Secure all four (4) feet to the floor using 9/16” bolts. Do not operate equipment unless ALL FOUR feet are secured.



Mounting holes provided on each foot

VMD

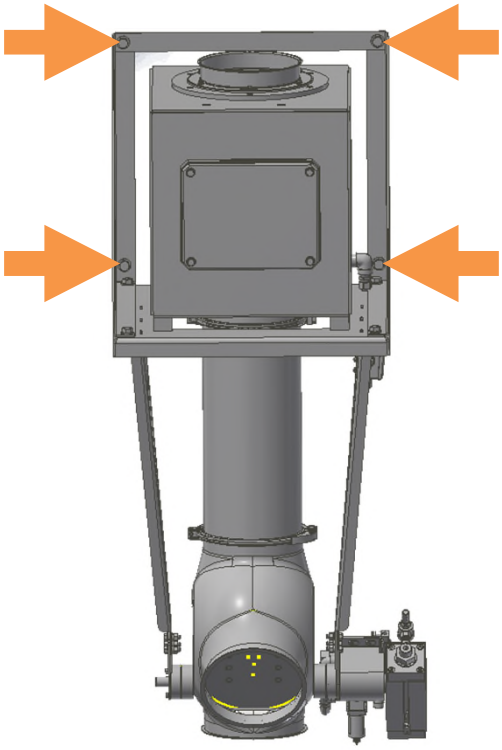
INSTALLATION

MOUNTING

Wall Mount

Secure wall bracket to a stable wall using four (4) 5/8” bolts.

All four mounting bolts must be installed before operating the metal detector.



VMD

INSTALLATION

AIR SUPPLY

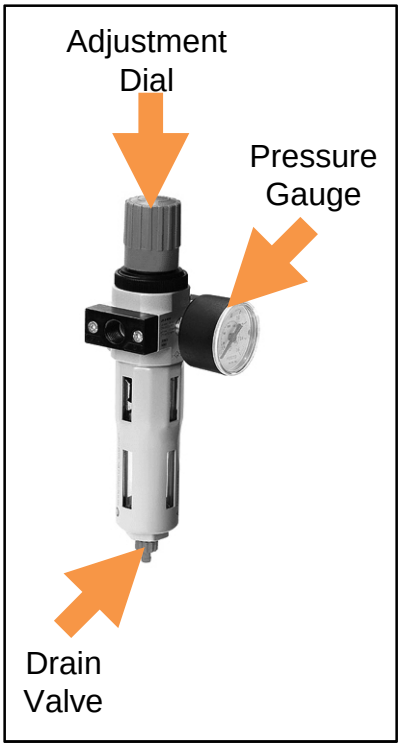
The reject mechanism is operated by an air supply. The connection for air is located externally on the right hand side of the unit. A quick release coupling is provided for connecting an air pipe of 1/4 NPT threads to the unit.

An air regulator is located on the reject valve assembly, mounted on a bracket. A minimum pressure of 90 psi (6.2 bar) is required from the incoming air supply, up to a maximum of 150 psi (10 bar).

The output pressure from the air regulator is preset in the factory to supply 80 psi (5.5 bar). Check the regulator's gauge. If the pressure gauge is displaying an incorrect pressure level then it should be adjusted. The air pressure must be set between 70 and 80 PSI to properly reject metal.

To do this, lift the regulators adjustment dial and turn it clockwise to increase the pressure or counterclockwise to reduce the pressure.

Regularly activate the drain valve to release any moisture that may have accumulated in the regulator.



WARNING

- The pressure applied to the system must not exceed 150 psi (10 bar).
- Do not block drain valve located at the bottom of the air regulator.
- The maximum operating temperature of the air regulator must not exceed 125 F.

PIPE CONNECTIONS

All pipe connections use Jacobs fittings.

All piping must be secured for proper operation of the equipment.

When the diverter flap is operating there is a danger of crushing injuries. With pipe sizes larger than 3.15 inches (80mm) it is possible to reach into the diverter mechanism from the openings. The installation arrangement must prevent any possibility of reaching into the diverter mechanism.

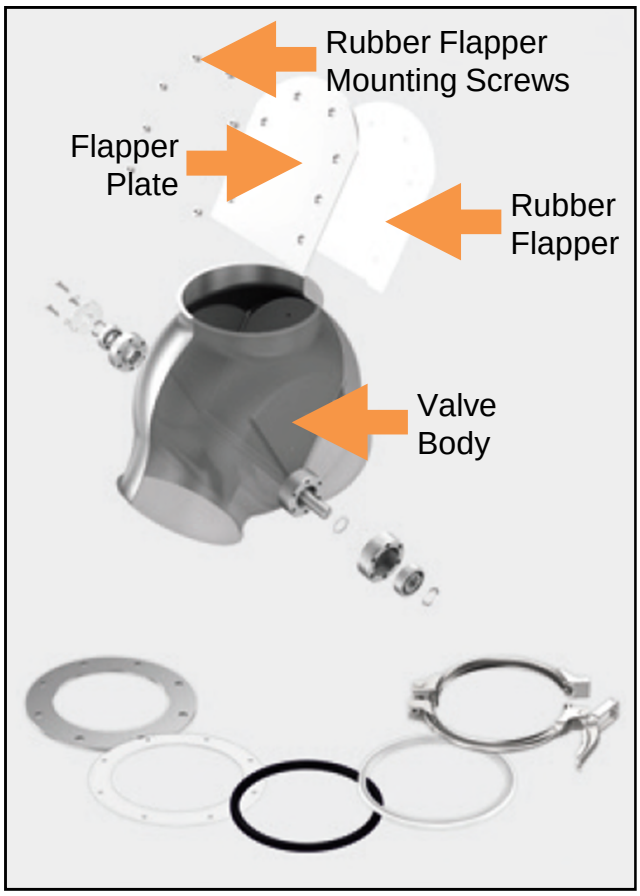
MAINTENANCE

CAUTION

Moving parts can crush or cut. Lock out power and air supply before servicing.

FREQUENCY

The reject valve should be inspected every 10,000 rejects or monthly. NOTE: The flapper seals are replaceable, while the flapper plates are not. Should the flapper plates wear, the valve body assembly must be replaced.



PROCEDURE

1. Remove air and turn off power to system.
2. Remove product flow pipe.
3. Visually inspect the rubber flap for wear.
4. Visually inspect the screws used to hold the rubber flap in place.
5. Verify that the rubber flap is sealing in normal and reject positions.
6. Visually inspect the unit to look for any binding when moving the flap from normal to reject positions.

PRESSURE MONITORING

Pressure switch is preset at factory. A fault will occur if air is not on or air pressure is too low. Consult factory for pressure switch adjustments.

REJECT CONFIRMATION

A proximity switch is located on the actuator. If the valve does not properly move during a reject, a reject confirmation fault will occur.

VMD

Vertical Actuator Shock – 4”, 6”, 8” Systems

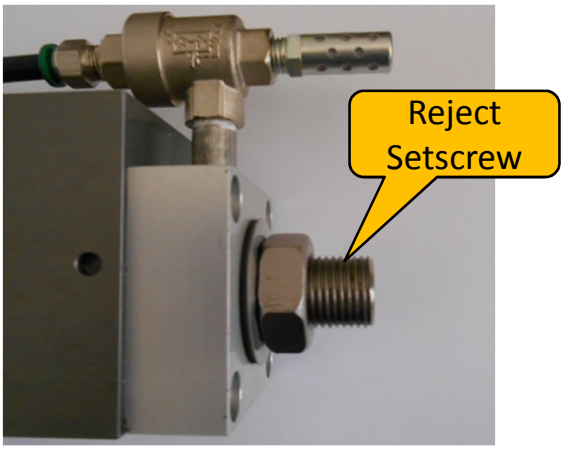
CAUTION

Moving parts can crush or cut. Lock out power and air supply before servicing.

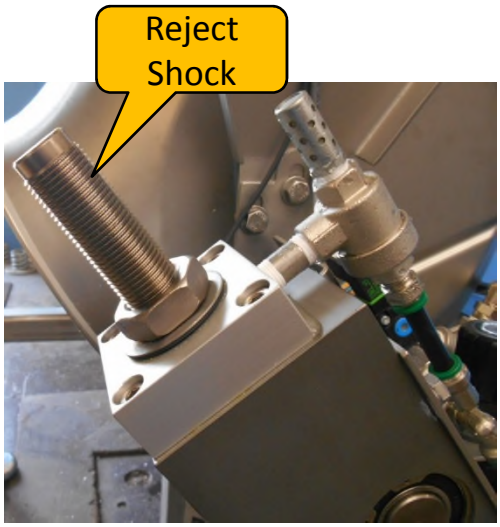
Introduction

The vertical metal detector system now ships with an actuator shock that reduces the amount of vibration generated when the reject valve cycles after detecting metal. Reducing vibration significantly reduces the possibility of false tripping the unit. Earlier shipments of the vertical system may not have the actuator shock installed. On the 4”, 6”, and 8” systems the actuator is installed on the reject side. On the 10” system a shock is installed on both ends of the actuator. The 10” system also has two actuators installed.

To determine whether or not the shock is installed reference the photos below. The photo on the left is a unit without the shock. The reject setscrew is shorter and threaded completely to the end. The photo on the right has the shock installed. The reject setscrew is longer and the last ¼” is not threaded.



No shock on actuator
4”, 6”, 8” units



Actuator shock installed
(End of setscrew not threaded)

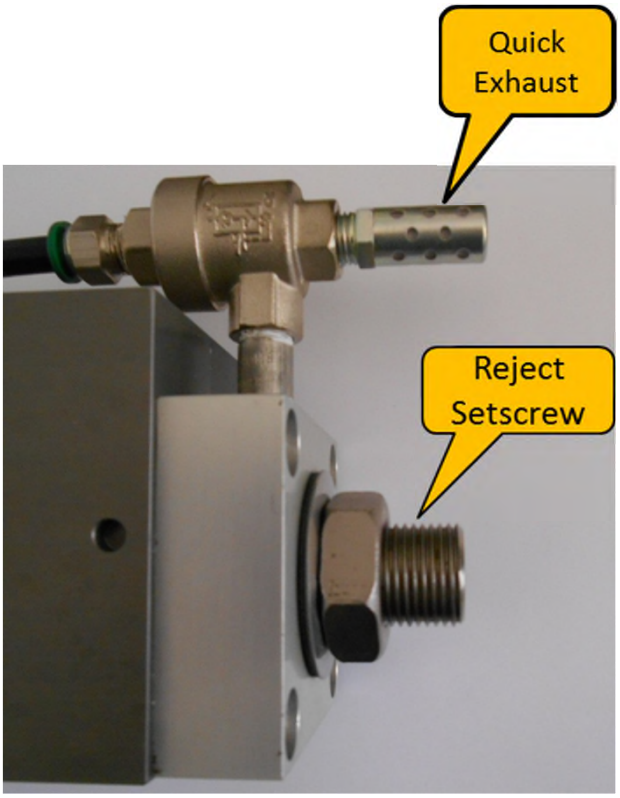
VMD

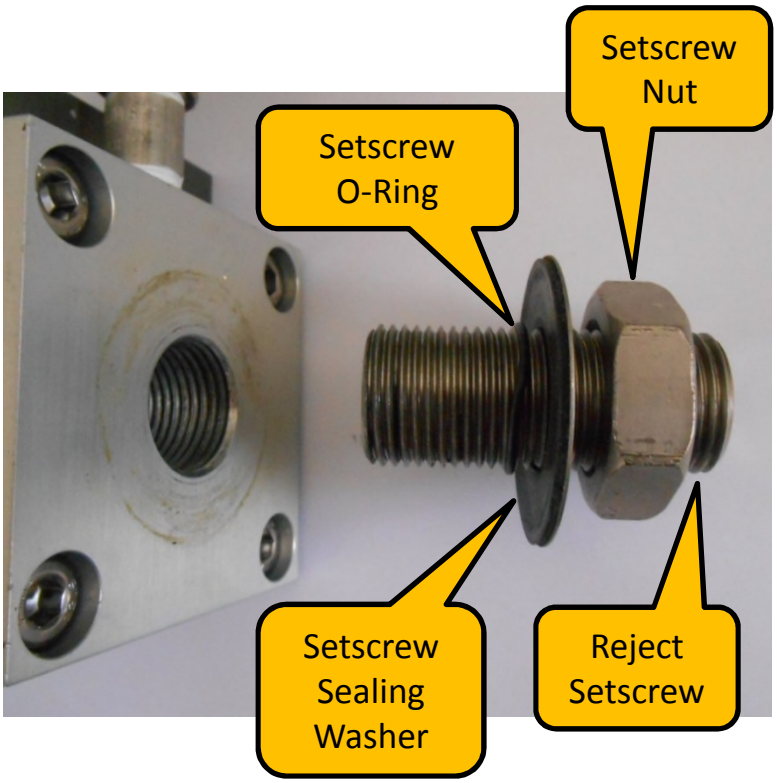
Vertical Actuator Shock – 4”, 6”, 8” Systems

Removing the set screw on 4”, 6”, and 8” units

If it’s desired to install the shock please follow the instructions below for the removal of the set screw and the installation of the shock into the actuator:

1. Remove air pressure from system.
2. Remove reject set screw nut
3. Remove the reject set screw.
4. Remove the sealing washer and O-ring from the set screw.





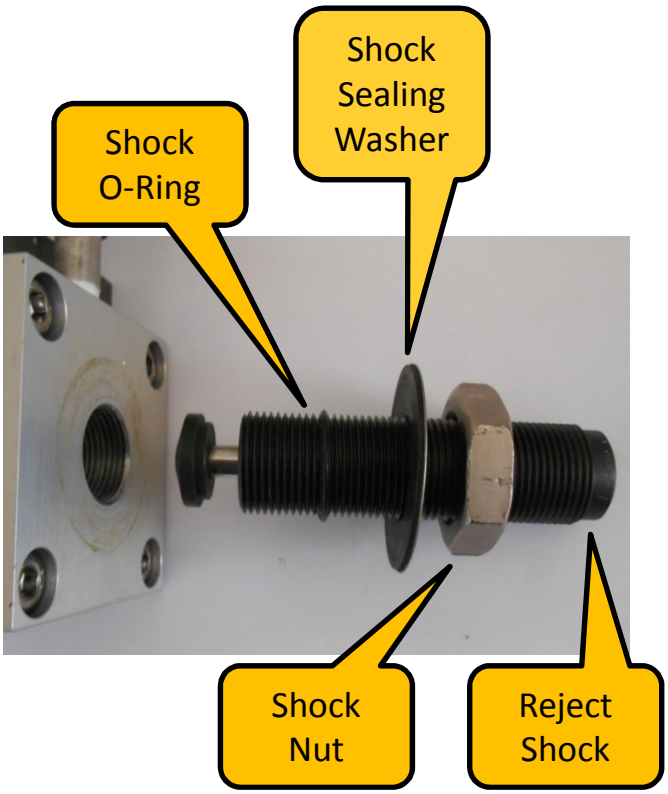
VMD

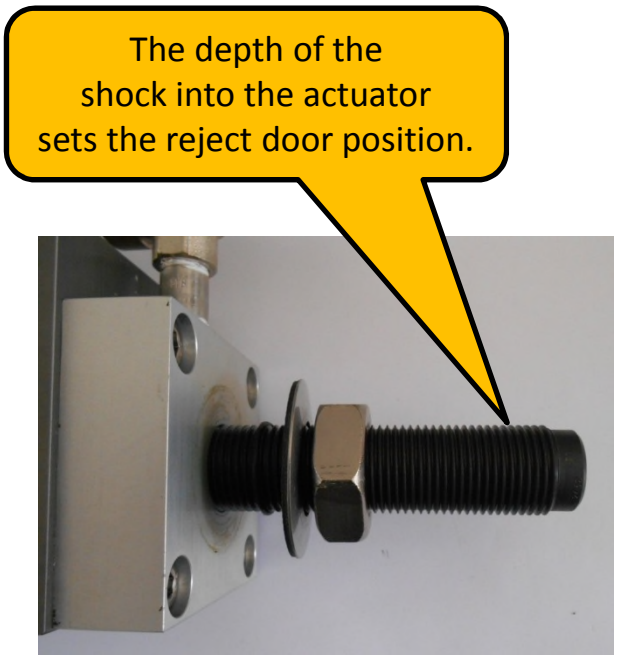
Vertical Actuator Shock – 4”, 6”, 8” Systems

Installing Shock on 4”, 6”, and 8” units

If it’s desired to install the shock please follow the instructions below for it’s installation into the actuator:

1. Install O-Ring, sealing washer, and nut onto shock..
2. Screw the shock about one inch into the actuator, keep the hardware loose.





VMD

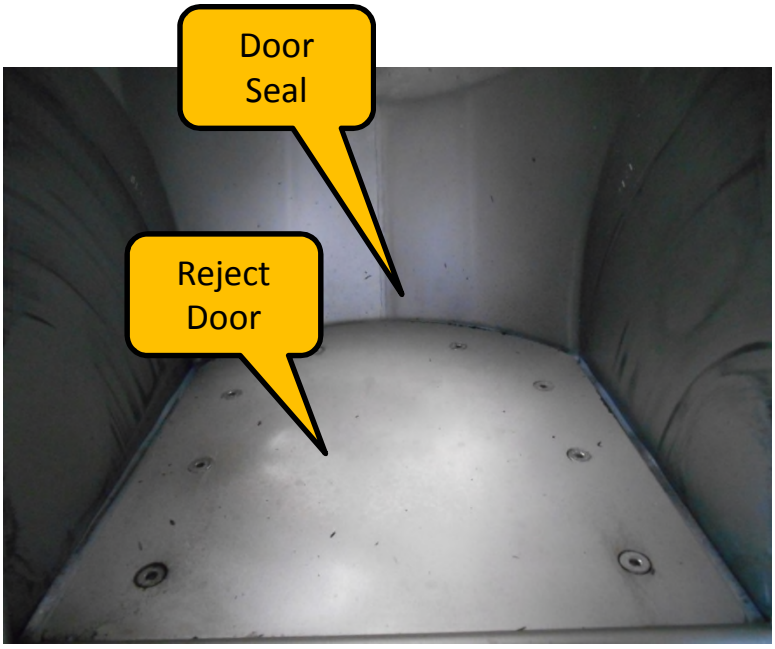
Vertical Actuator Shock – 4”, 6”, 8” Systems

Adjusting shock on 4”, 6”, and 8” units

1. Note the position of the reject door and the door seal
2. As the shock is screwed into the actuator the door will raise up.
3. With the air off, push down on the door so the shock is compressed while adjusting the shock position.
4. Set the shock to a position that the door seal is just starting to bend at the back of the reject door.

Cont’d on next page.

Note: DO NOT PLACE ANY BODY PART INTO THE VALVE WHILE AIR IS APPLIED!!!

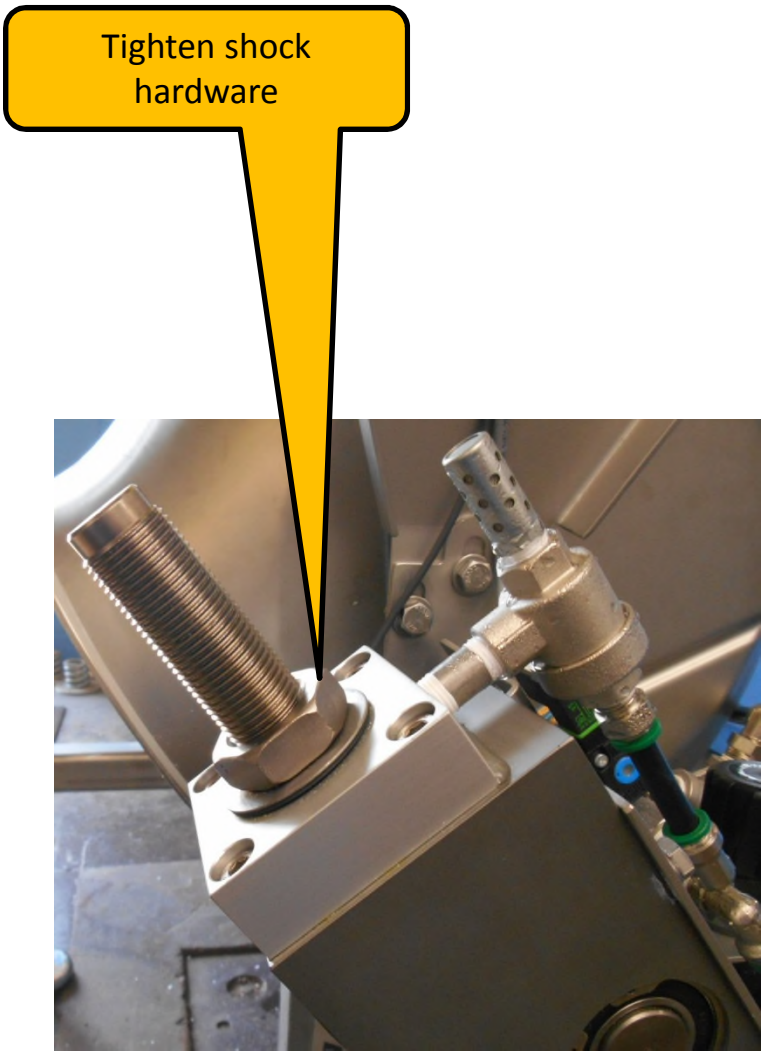


VMD

Vertical Actuator Shock – 4”, 6”, 8” Systems

Adjusting reject shock on 4”, 6”, and 8” units (Cont’d)

5. Once the door position is set push the O-ring against the actuator.
6. Push the sealing washer against the actuator.
7. Tighten the shock nut while holding the shock in position with an Allen wrench
8. Apply air pressure to the system.
9. The air pressure should be set between 70 and 80 psi.
10. When the air is applied the door should return to the good product position.
11. Turn off the metal detector, the door should move to the reject position, verify proper door operation, adjust shock as needed.
12. Turn on the metal detector and test the system.

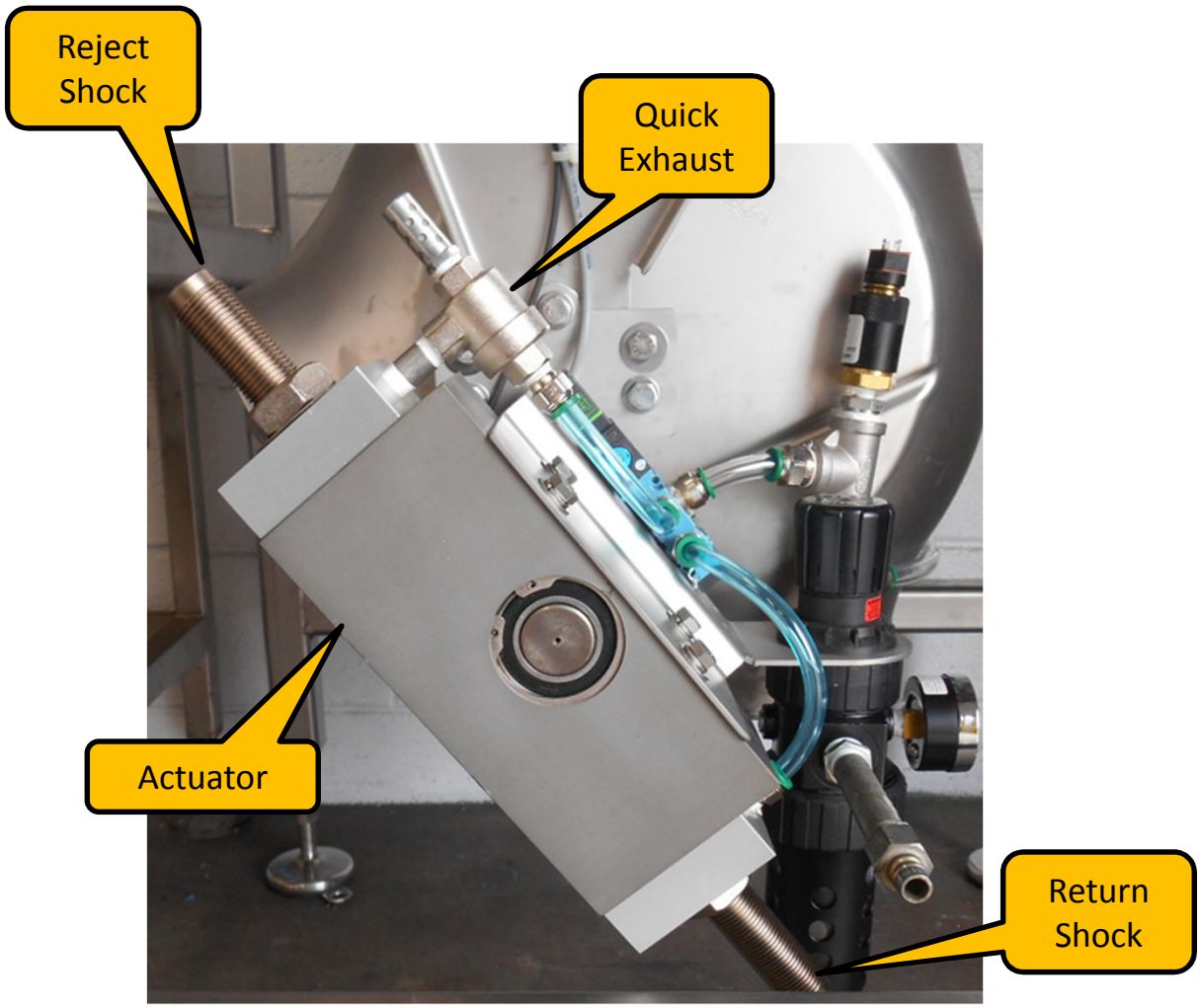


VMD

Vertical Actuator Shocks - 10” System

Introduction:

1. The 10” vertical system uses two actuators one on each side of the valve.
2. Each actuator uses two shocks, one for the reject and one for the return.
3. The reject shocks are next to the quick exhausts.
4. The return shocks are on the opposite side away from the quick exhausts.
5. Remove air pressure from the system before performing any service.



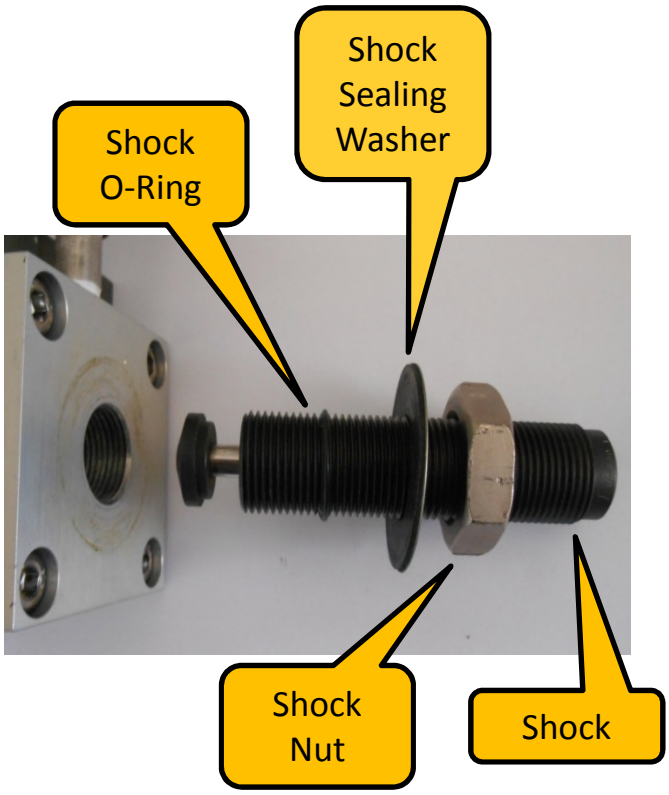
VMD

Vertical Actuator Shocks - 10” System

Removing and Replacing Shocks

If it’s desired to replace the actuator shocks please follow the instructions to remove the existing shocks:

1. Remove air pressure from system.
2. Remove shocks from actuator.
3. Remove the nut, sealing washer and O-ring from each shock removed.



VMD

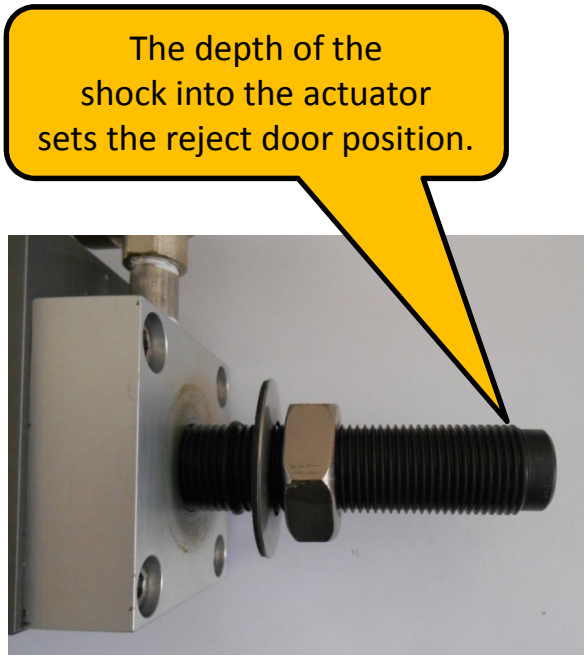
Vertical Actuator Shocks - 10” System

Replacing reject shocks (Cont’d)

1. Install the O-ring, sealing washer and nut onto the shock.
2. Screw the shock about an inch into the actuator, keep the hardware loose
3. Start with one of the two reject shocks.
4. Adjust one reject shock until the door is in the proper position (See: Adjusting reject shock on 10” units).
5. Once the first shock is set adjust the second reject shock to match its position.
6. The goal is for both shocks to resist the door equally.

Replacing return shocks (Cont’d)

1. Install the O-ring, sealing washer and nut onto the shock.
2. Screw the shock about an inch into the actuator, keep the hardware loose
3. Start with one of the two return shocks.
4. Adjust one reject shock until the door is in the proper position (See: Adjusting return shock on 10” units).
5. Once the first shock is set adjust the second reject shock to match its position.
6. The goal is for both shocks to resist the door equally.



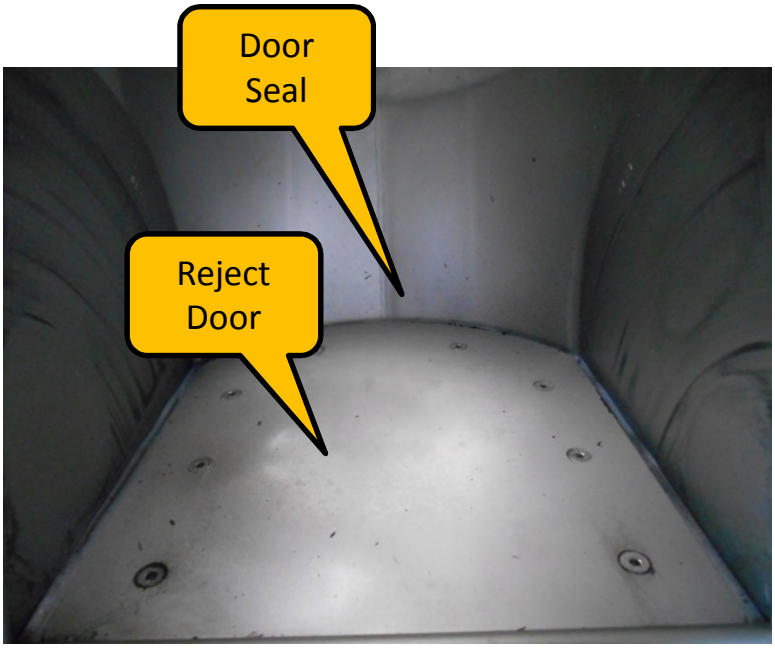
VMD

Vertical Actuator Shocks - 10” System

Adjusting reject shock on 10” units

1. Note the position of the reject door and the door seal
2. As the shock is screwed into the actuator the door will raise up.
3. With the air off, push down on the door so the shock is compressed while adjusting the shock position.
4. Set the shock to a position that the door seal is just starting to bend at the back of the reject door.

Note: DO NOT PLACE ANY BODY PART INTO THE VALVE WHILE AIR IS APPLIED!!!

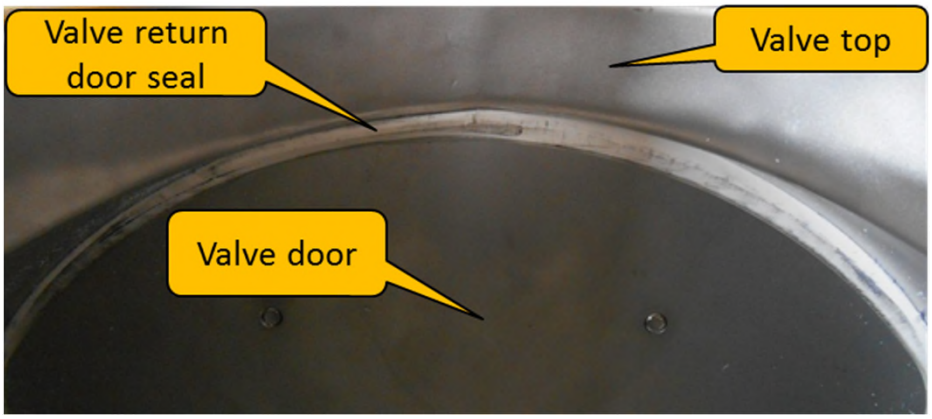


VMD

Vertical Actuator Shocks - 10” System

Adjusting return shock on 10” units (Cont’d)

1. Push the door to the return position.
2. Adjust the door so the return door seal is just under the valve top.
3. Start with one of the two return shocks
4. Adjust one return shock until the door is in the proper position.
5. Once the first return shock is set, adjust the second return shock to match its position.
6. The goal is for both shocks to resist the door equally.
7. Once the door position is set push the O-ring against the actuator.
8. Push the sealing washer against the actuator.
9. Tighten the shock nut while holding the shock in position with an Allen wrench.



VMD

Vertical Actuator Shocks - 10” System

Testing shocks on 10” units (Cont’d)

1. Insure all four shocks are set and secure.
2. Apply air pressure to the system, the air pressure should be set between 70 and 80 PSI.
3. When air is supplied the door should move to the good product position.
4. Turn off the metal detector, the door should move to the product reject position.
5. For each position verify proper door position, adjust shocks as needed.
6. Turn on the metal detector and test the system.

Note: Some safety warning labels or guarding may have been removed before photographing this equipment.

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