INTRODUCTION

Thank you for purchasing a Stealth Vertex Metal Detector System from Fortress Technology Inc. At Fortress, we are committed to offering the most practical, functional and user-friendly metal detection solutions. Built to customer specifications, Stealth Vertex Metal Detectors are available in a range of aperture sizes and configurations for a variety of industrial applications. This Operator Guide is intended to get you up-and-running within minutes covering the basic setup procedure in addition to the most commonly used system features.

Advanced Stealth Vertex Features:

► Core DSP – high speed Digital Signal Processor technology provides the highest processing power.
► Ultra-Sense – detection of the smallest metal contaminants with the highest sensitivity levels.
► Auto-Test – automated system testing reduces the high costs associated with manual testing.
► Auto-Cal – single pass product learning and automatic calibration allow for quick setup.
► Auto Phase—learns and calibrates to product with both wet and dry characteristics.
► FRAM – provides superior memory stability.
► Modular Design – Interchangeable product parts provide ease of serviceability within a compact housing.
► Password Protection – flexible multi-level security protection for critical parameters preventing unauthorized use.
► Product Information Storage – retained settings and detector naming through power cycles.
► Control Options – display terminal can be made portable or mounted remotely; one terminal can operate numerous Detector units.
► USB – allows quick method to collect reject, fault and event data and able to view on a PC based computer, can also be exported to excel and PDF documents.
► Automated Data Logging Option – CONTACT Software enables Detector communication with a PC; Wireless Ethernet connection available.

Service Support:

Fortress Technology provides the highest standards of customer service in the industry. You simply receive the best, most efficient response whenever you require help! We have a global service team to ensure our customers get the fastest and most reliable service. We believe that through the implementation of regular and preventative maintenance, and by conducting effective training support and guidance, you can reduce break downs, eliminate waste and achieve maximum potential from your Fortress Metal Detection system. Please contact us to find out more about our training programs and preventive maintenance packages. For more information including product brochures and regional contact information, please visit our website:

WWW.FORTRESSTECHNOLOGY.COM or WWW.BALANCEDCOIL.COM

For technical support in the **USA**, please contact: 214-389-9351 or e-mail: service@balancedcoil.com

For technical support in **CANADA** and elsewhere, please contact numbers below or e-mail: service@fortresstechnology.com

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# Table of Contents

**INTRODUCTION** .......................................................................................................................... 1

**SAFETY, CAUTIONS & CLEANING** .............................................................................................. 4

Cleaning Guidelines ............................................................................................................................. 6

**CHAPTER 1: INSTALLATION** ........................................................................................................... 7

1.1. Installation Tools ........................................................................................................................ 7

1.2. Installation Location ..................................................................................................................... 7

1.3. Installation Essentials ................................................................................................................... 7

1.3.1. Metal Free Area ....................................................................................................................... 7

1.3.2. Free Flowing Product ............................................................................................................. 7

1.3.3. Static ....................................................................................................................................... 7

1.3.4. Foot Isolation .......................................................................................................................... 7

1.4. Mechanical Installation .............................................................................................................. 8

1.5. Foot Isolation ................................................................................................................................ 8

**CHAPTER 2: GETTING ORIENTED** ............................................................................................... 9

2.1. Stealth Interface .......................................................................................................................... 9

2.2. Hard vs. Soft Keys ...................................................................................................................... 10

2.3. Menu Navigation ....................................................................................................................... 10

2.4. Editing Menu Options .............................................................................................................. 10

2.5. Main Menu .................................................................................................................................. 11

2.6. Engineering Menu ..................................................................................................................... 11

2.7. Serial Number ............................................................................................................................ 11

**CHAPTER 3: QUICK SETUP TUTORIAL** ....................................................................................... 12

3.1. Start Up Tests—Overview ....................................................................................................... 12

3.2. Frito Stealth Vertex Defaults .................................................................................................... 12

3.3. Power Up Sequence .................................................................................................................... 13

3.4. Initial Signal Check .................................................................................................................... 13

3.5. Product Calibration .................................................................................................................... 14

3.5.1. Product Effect ....................................................................................................................... 14

3.5.2. Quick Product Calibration Procedure .................................................................................... 15

3.5.3. Calibrating to the Case ......................................................................................................... 15

3.5.4. Auto Phase ............................................................................................................................ 16

3.5.4.1. Configuring Auto Phase: ................................................................................................. 16

3.5.5. Confirm Proper Product Calibration ...................................................................................... 17

3.6. Establish Sample Detection ...................................................................................................... 17

3.6.1. Functional Testing ................................................................................................................ 17

3.7. Set Sensitivity Level .................................................................................................................... 18

3.7.1. Sensitivity Adjustment .......................................................................................................... 18

3.7.2. Confirm Sensitivity Level ...................................................................................................... 18
3.8. Password Security ................................................................. 19
  3.8.1. Activate Password Protection ........................................ 19
  3.8.2. Change Password .......................................................... 20
  3.8.3. Password Hard Key Access and Function Setup .......... 20
  3.8.4. Logout .............................................................................. 21
  3.8.5. Wrong / Forgotten Password .......................................... 21

3.9. Product Setup ................................................................. 21
  3.9.1. Renaming Product .......................................................... 21

3.10. Bypass /Reset Functionality .......................................... 21
  3.10.1. Enabling and Disabling Bypass ....................................... 22

3.11. Clearing Latches and Faults ........................................... 22

CHAPTER 4: AUXILIARY FUNCTIONS ............................................. 23
  4.1. Auxiliary Functions—Overview ........................................ 23
  4.2. Halo® Test ................................................................. 23
    4.2.1. Test Menu .............................................................. 23
  4.3. Date and Time Change ...................................................... 24
    4.3.1. Editing the Date and Time ......................................... 24
    4.3.2. Daylight Savings Time Using NTP Server ................. 24
  4.4. Naming the Detector ............................................................ 24
  4.5. USB Data Collection ............................................................ 25
  4.6. Collecting Data using a remote display USB port ........ 25

CHAPTER 5: FAQ’s & APPENDICES .................................................. 27
  5.1. FAQ’s (Frequently Asked Questions) .................................. 27
    5.1.1. Troubleshooting Guide ............................................... 27
    5.1.2. Frito Stealth Vertex Miscellaneous Troubleshooting information .... 28
  5.2. Faults .................................................................................. 28
  5.3. Menu Map ........................................................................... 31
    5.3.1. Sensitivity, Select Product, Calibrate, Test, and Bypass / Reset 31
    5.3.2. Menu ........................................................................... 32
    5.3.3. Engineering Menu ....................................................... 33
  5.4. Electrical Drawings ............................................................ 35
    5.4.1. Vertex Remote Box ..................................................... 35
    5.4.2. Vertex Remote Box Connections .................................. 36
    5.4.3. DSP Board Connections ............................................... 37
    5.4.4. Power .......................................................................... 38
    5.4.5. System Control – I ....................................................... 39

DOCUMENT CONTROL .................................................................... 40
SAFETY, CAUTIONS & CLEANING

Compliance with Safety Standards

This product has been designed to operate safely in accordance with the current technical and safety regulations, including the provisions of the Health and Safety at Work Act, relevant EU legislation and OSHA regulations in addition to any amendments that may become legal requirements.

While every precaution has been taken to ensure the operational safety of the system, it is the responsibility of the owner and/or end-user to ensure that the guarding, safety devices, installation, operation and maintenance of the system comply with all requirements of the local health and safety regulation legislations and codes of practice. It is highly recommended that a formal risk analysis be performed on this equipment prior to its use.

NOTA: El presente Documento de Seguridad está disponible en español. Por comuníquese con service@fortresstechnology.com para obtener una copia.

REMARQUE : Ce document est disponible en Français. S.V.P. contactez service@fortresstechnology.com

Installation, Commissioning and Operation

- The metal detector system must be installed, connected, operated and maintained according to all local regulations and codes as well as the instructions stated in this manual and other specific operating instructions accompanying this manual. The safety warnings and instructions must be read, understood and all safety instructions followed by persons who are involved in the installation and use of the equipment.

- Persons supervising, performing maintenance or installation must be suitably qualified and competent. Operators, sanitation personnel, maintenance personnel, engineers and supervisors should be given opportunity to study and discuss this manual prior to working with the system.

Electromagnetic Radiation

This device is an intentional radiator, which emits a low power radio signal designed for use within an industrial environment. The product complies with Part 15 of FCC Rules (USA) and relevant legislation under CE Marking.

General Safety Guidelines

1. Read and understand the Operation Manual and all safety labels before operating this machine.

2. Only a trained person is to be permitted to operate this machine. Training should include instruction in operation under normal conditions and emergency situations.

3. This machine is to be serviced only by trained and authorized personnel. Follow lockout procedures before servicing.

4. Never reach into the machine for any reason unless the machine is at a COMPLETE STOP and LOCKOUT procedures have been followed.

5. Never leave the machine stopped in such a manner that another worker can start the machine while you are working on or within the machine and follow lockout procedures.

6. Never modify or bypass the function of electrical interlocks or other machine "shutdown" switches or e-stops.
7. Before starting this machine, check that:
   ► All persons are clear of the machine.
   ► No maintenance work is being performed on the machine.
   ► All safety guards are in place.
   ► Keep the floor around the machine clean and free of any scrap, sawdust, oil, grease, etc., to minimize the danger of slipping. Maintain safe working distance and use personal protection equipment as authorized by your supervisor.

8. There is a potential hazard of entanglement in this machine caused by items such as long hair, loose clothing and jewelry. Ensure that your clothing and hair fit closely to your body and that all jewelry, rings and watches are removed.

   **WARNING!**

   **Hazardous Voltages and Air power may be present!** Hazardous voltages can cause severe injury or death. Disconnect and/or lockout all sources of power (electrical and pneumatic) before servicing. Be aware that multiple and/or remote sources of power may be present.

---

**Cleaning and Maintenance**

Always isolate the system from the electrical and pneumatic services before any cleaning and/or maintenance.

**LOCKOUT PROCEDURE:**

1. Announce lockout to other personnel.
2. Turn power OFF at main panel and remove all power plugs.
3. Lockout power in OFF position, lock out all power plugs. Put key in pocket.
4. Remove all sources of air supply and lock the shut off device in OFF position.
5. Ensure all personnel are free and clear of the machine and hazards.
6. Test lockout by turning machine power switch to ON.

During normal operation:

**WARNING AUTOMATED MACHINERY:**

1. Machinery and connected devices may operate without warning at any time.
2. Keep away from the operating area of the reject device while power is applied.
4. Do not tamper with, modify or attempt to override guards or safety switches.
5. Equipment is heavy – use appropriate lifting techniques when handling.
Cleaning Guidelines

The metal detector requires routine cleaning for optimal performance and reliability. Determine whether the system purchased utilizes a Stainless Steel or Epoxy Painted Aluminum construction. For IP69K rated Stainless Steel units, the system can be cleaned using high pressure wash-down. Aluminum units should be cleaned by wipe-down using a damp cloth. Ensure that the General Safety Guidelines are followed during cleaning and verify that all conduit entries are plugged, and cable entries are undamaged and properly tightened before washing the metal detector.

Use of chemical cleaning agents: Contact Fortress prior to the use of aggressive, corrosive or petroleum based cleaning solutions. Chlorine based cleaning agents are likely to cause corrosion on stainless steel components. Petroleum based cleaners or thread locking agents are likely to damage food grade plastics.
CHAPTER 1: INSTALLATION

1.1. Installation Tools

The installation of your Stealth Detector system will only require general tools – there are no special tools required.

1.2. Installation Location

The location of the Metal Detector is very important. The metal detector must be positioned on a solid surface/frame. The Metal Detector must be set up in an area free from radiated electromagnetic interference and must be connected to a power supply that is free from line (mains) borne interference.

Environmental Conditions: Temperature range -5°C to +50°C (23°F to 122°F)

Vertex detectors are built rugged to withstand the harshest production environments with IP69K certified Painted Aluminum construction.

1.3. Installation Essentials

1.3.1. Metal Free Area

No metal can be located in or near the Detector’s aperture (the opening through which product travels). The Metal Free Zone required is equal to 1.5x the smaller dimension of the aperture. For large moving metal (such as rollers/covers) this zone should be at least 2x the smaller dimension.

1.3.2. Free Flowing Product

Product must be free-flowing for the Vertex system to work properly. Product cannot be allowed to backup or plug the pipe area. A food quality pipe should be used for the product transfer.

1.3.3. Static

Static will be present in all applications where non-conductive materials are falling through air. Care should be taken to ground all metal components of the detector system (the valve, frame, pipe flanges, etc.). Although the product pipe used already has an anti-static characteristic, use caution when touching the outside or inside of the plastic pipe section. Charges can exceed 50,000 volts and can be dangerous. Contact Fortress Technology for assistance in reducing or limiting static problems.

1.3.4. Foot Isolation

Mounting connections should be isolated electrically or firmly fixed with a thread lock, with preference being 3 isolated and 1 grounded. Loose mounting points can cause false rejections.
1.4. Mechanical Installation

The free-flowing product to be inspected should not come into contact with the aperture. Please ensure that the appropriate pipe is fitted and is not in contact with the aperture surface. (Please contact Fortress if you have any questions regarding this).

**Basic Vertex Unit**

![Basic Vertex Unit Diagram]

1.5. Foot Isolation

Mounting connections should be isolated electrically or firmly fixed with a thread lock, with preference being 3 isolated and 1 grounded.

The mounting torque must be between 12 – 15 in-lbs; overtightening can cause damage to the unit, and under tightening can cause false rejections due to vibration of the loose mounting point.
CHAPTER 2: GETTING ORIENTED

2.1. Stealth Interface

Regardless of the Detector application, the same user-friendly Stealth control interface is utilized; the aim of this chapter is to become familiarized with the terminology and basic operation of the control panel.

The buttons, LED indicators, and display can be categorized as follows:

1. **Detect** – illuminates with a red LED upon detection.
2. **LED Bar Graph** – center-reading meter contains a green and red zone to visually quantify the signal of product, metal, or background noise. The larger the signal the more significant the effect/contamination being detected.
3. **Fault** – flashes upon system fault.
4. **LCD Display** – digital screen shows system status and enables programming via menus.
5. **Soft Keys** – used to edit menu options. Refer to Section 2.2 for further details.
6. **Enter** – used to confirm changes to menu options.
7. **Exit** – cancels any changes and returns to the previous menu.
8. **Menu** – navigates through submenus. Refer to Section 2.3 for further details.
9. **Product** – indicates with a green LED whether a product is running through the Detector; a red LED represents a high product effect reading.
10. **Hard Keys** – dedicated shortcut keys provide quick access to the most commonly used features. Refer to Section 2.2 for further details.
11. **Arrow Keys** – used to navigate within menu options, and increase/decrease values when editing.
2.2. Hard vs. Soft Keys

The keypad has a series of ‘Hard’ and ‘Soft’ Keys which can be defined as follows:

**Hard Keys:**

The Hard Keys perform the same function regardless of where you are within the menu structure. These convenient “shortcut” keys (arranged on the right of the keypad) represent the most commonly used functions including: SENSITIVITY, SELECT PRODUCT, CALIBRATE, TEST, and BYPASS/RESET.

Less common functions are accessed through the MENU key.

**Soft Keys:**

The soft keys change their function according to the menu display, these four keys arranged around the LCD display are used to edit the function being displayed on the LCD next to that soft key.

![Soft Key Diagram]

2.3. Menu Navigation

To move from one menu screen to the next, simply press the MENU key; alternatively, while no entry field is being edited, use the arrow keys (i.e. no flashing cursor is visible).

2.4. Editing Menu Options

After pressing the soft key associated with an option field, a flashing cursor will appear.

To cycle through or edit the value of the option, press the same soft key again or use the UP and DOWN arrow keys located in the circle keypad. The LEFT and RIGHT arrow keys are used to move the cursor across the entry field. To accept the new selection, press the ENTER key; to cancel the new selection and revert to the old one, press the EXIT key.

*NOTE: For a few submenu options, pressing the associated soft key will change the setting without the need to confirm via the ENTER hard key; however, this is not the typical process.*
2.5. Main Menu

Upon powering up your Stealth Metal Detector, you will see the following Main Menu:

The four menu items can be defined as follows:

**S1 - VERTEX: The Current Product Name**

This field shows the name of the product.

**S2 - Sens: Sensitivity Numerical Setting**

The sensitivity number ranges from 0 to 999 and determines the size of metal that can be detected; smaller pieces of metal can be detected with a higher sensitivity setting. Typically, the sensitivity is optimized between 30 and 200. Press S2 to change the sensitivity or press the SENSITIVITY Hard Key to access the Sensitivity Menu. Refer to Section 3.7 for further details.

**S3 – Rej: The Reject Count**

The reject count increments with every reject occurrence (a signal reading of over 100) – press S3 to reset the Reject Count.

**S4 - Sig: Signal Reading**

The signal number displayed represents the relative size of the detection signal; to enable detection, a signal must exceed 100. The Signal Number can be reset by pressing S4. Refer to Section 3.4 for further details.

2.6. Engineering Menu

This menu is not typically shared with customers but must be used for some setup options.

To access the Engineering Menu:

1. Press the Menu hard key three times to reach the Version Menu.
2. Press the S3 soft key

2.7. Serial Number

Each metal detector is assigned a serial number to represent the unit; this serial number is engraved into the metal detector’s case. To view or enter the serial number of the metal detector into the software:

1. Press the Menu hard key three times to reach the Version Menu.
2. Press the S4 soft key next to Setup
3. Press the UP/DOWN key until you see the Serial Number menu.
4. To edit the serial number, press S2 or S4, then use the up/down and left/right keys to edit the values.
CHAPTER 3: QUICK SETUP TUTORIAL

3.1. Start Up Tests—Overview

The aim of this chapter is to outline the initial tests that must be carried out before introducing the Stealth Vertex Detector into production. These preliminary tests ensure system functionality and configure the Stealth Detector for usage with your unique product. This simple setup procedure only takes minutes to complete.

3.2. Frito Stealth Vertex Defaults

The settings below are default for software version 171001 and are specific to Frito installations of V3 or V5 Vertex units.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase</td>
<td>Fixed: 90.00</td>
</tr>
<tr>
<td>Detect Mode</td>
<td>FM</td>
</tr>
<tr>
<td>FM TH</td>
<td>7</td>
</tr>
<tr>
<td>DC Filter</td>
<td>Med</td>
</tr>
<tr>
<td>Coefficient</td>
<td>79</td>
</tr>
<tr>
<td>Auto Phase Time</td>
<td>1</td>
</tr>
<tr>
<td>Auto Phase Threshold</td>
<td>200</td>
</tr>
<tr>
<td>Auto Phase Trigger</td>
<td>5 in 60 seconds</td>
</tr>
<tr>
<td>Detector Power</td>
<td>Low</td>
</tr>
<tr>
<td>Digital Filter</td>
<td>N5</td>
</tr>
<tr>
<td>Halo Board</td>
<td>On</td>
</tr>
<tr>
<td>Halo IP</td>
<td>192.168.010.100</td>
</tr>
<tr>
<td>External IP</td>
<td>192.168.000.059</td>
</tr>
<tr>
<td>External Netmask</td>
<td>255.255.255.000</td>
</tr>
<tr>
<td>External Ports</td>
<td>2</td>
</tr>
<tr>
<td>Internal IP</td>
<td>192.168.010.050</td>
</tr>
<tr>
<td>Internal Netmask</td>
<td>255.255.255.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>Source</th>
<th>Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL3 Relay</td>
<td>Reject-main</td>
<td>+</td>
</tr>
<tr>
<td>PL11-1/2</td>
<td>Bypass</td>
<td>-</td>
</tr>
</tbody>
</table>
3.3. Power Up Sequence

**WARNING!**
Keep away from the operating area of the reject device upon powering up the unit.

Upon applying power to the detector, the unit will power up and go through the following start-up process:

1. The LED signal indicator will have full scale deflection to both sides, then return to the center position. If the unit is in FM mode, the LED signal indicator will only deflect to one side.
2. The display will show the main menu window.
3. The reject device may operate and then return to the normal operating position depending on the settings of your system.

The power up sequence will take approximately five seconds. Once complete, the detector will be ready for the initial test and you will see the Main Menu screen as shown below:

3.4. Initial Signal Check

Before moving forward, it is important to ensure that the detector has a quiet and stable starting point. After the Power Up sequence is complete, the LED bar graph should appear in the center.

The detector will always pick up a small signal reading from its surrounding environment; however, in the absence of product passing through the aperture, the signal should not show a value higher than 30.

*NOTE: The Signal reading will display the highest value registered and maintain this value on screen until another detection occurs or until the signal is manually reset.*

To test the initial signal, follow these steps:

1. Verify that no metal is located within or close to the aperture.
2. Turn **ON** the surrounding machines for a simulation of the true operating environment.
3. Reset the signal by pressing **S4**.
Check to see if:
- the detector is in a stable position with no false detections.
- the LED signal indicator maintains a centered position.
- the signal strength showing on the LCD Display has a steady value that does not exceed 30.

If the detector is showing signal of over 30 without any product running, it is advised that you stop and examine the cause before proceeding further.

If all the above checks are satisfied, you may proceed.

### 3.5. Product Calibration

Every product has unique characteristics; the purpose of Product Calibration is to “teach” the metal detector these product attributes known as *product effect*. The detector then *learns* the product to ignore or *phase out* the inherent product effect at a phase point and mode (wet or dry).

#### 3.5.1. Product Effect

Metal detectors detect metal based on measuring electrical conductivity and magnetic permeability. Many products inspected inherently have one or both characteristics within their makeup. For example, any products that are iron enriched like cereals, create a large magnetic signal for which the detector must compensate to detect small pieces of metal. Products with high moisture such as bread, meat, and cheese are electrically conductive and produce large conductive signals – these are referred to as *wet* products. During a *fast* learn process, the Stealth Detector automatically sets its phase point to ignore the product effect signal.

The detector will be set with factory settings which may not necessarily match those needed to run your product (although Fortress strives to preset the detector settings to meet the product application).

To check for product effect, follow these steps:

1. Press S4 to reset the Signal.
2. From the Utilities Page, load and dry cycle the FMD Tune recipe
3. Check the Signal reading and a Product LED illumination. If the detector does not see the product (signal below 60) then the product effect may not affect detection, or the factory settings already match the product.
4. If the MD phase is set to 90.00 and the signal when product is running is below 60 it is recommended that the detector be Calibrated to the case as described in *Section 3.5.3*

   **NOTE:** Normally the Product LED will appear Green upon passing the product through; however, sometimes it may not illuminate at all due to minimal product effect.

5. If the product generates a detection signal you are likely to have a product effect that needs to be calibrated and you should proceed with the Quick Product Calibration in *Section 3.5.2*.
3.5.2. Quick Product Calibration Procedure

To learn a new product or recalibrate at any time simply press the CALIBRATE key twice and let the good product pass through the detector; the detector will automatically learn the correct phase number of the product and determine whether it is wet or dry. Below is a step-by-step breakdown:

1. Press the CALIBRATE hard key on the right side of the Stealth control panel.

2. Press CALIBRATE Hard Key again and the display will show a Fast learn mode.

3. Run a typical product through the detector at normal speed and orientation.

4. The calibration status on the display will change from Fast to Fixed or Auto, indicating that the calibration is complete. The phase number should also change to a new value, indicating that the calibration is successful.

3.5.3. Calibrating to the Case

If the product signal is low, you may calibrate the unit to the case phase point using a similar procedure to the quick calibration procedure.

1. Press the CALIBRATE hard key on the right side of the Stealth control panel.

2. Press CALIBRATE Hard Key again and the display will show a Fast learn mode.

3. Press or tap lightly on the side of the case, away from the aperture, until the product light illuminates.

4. Continue with the slight pressure/tapping of the case until the mode changes from fast back to auto or fixed.
3.5.4. Auto Phase

The Auto Phase option can be used to have the detector automatically track slow product effect changes and product type changes (new flavor for example). It is used to phase out product effect as the product changes through the production line. For example, a facility that runs various types of bread and doesn’t want to re-calibrate when production changes product, or to compensate for product temperature changes.

NOTE: Auto phase is also useful when using metallic formers underneath the Detector, as it will phase out the signal produced by their movement.

3.5.4.1. Configuring Auto Phase:

1. If phasing out a metallic former, you must set the Auto Phase Threshold 50 below the X signal generated by the movement of the former:
   - Press the Menu hard key from the main menu until the Version Menu is displayed.
   - Press the S3 hard key to enter the Engineering menu & view the Noise Menu.
   - Observe the X peak in the Noise Menu as the former moves; record the peak value.
   - Press the Down arrow key to move to the Auto Phase Threshold menu.
   - Set the Threshold 50 below the X peak recorded while the former was moving.
   - Press Enter to confirm.

2. Press the CALIBRATE Hard Key on the right side of the Stealth control panel.

3. Press the S3 Hard Key until auto is displayed.

4. Press ENTER to confirm.

5. Run the products through to get an approximate Phase for each product.

6. If calibrated correctly, the signal should be under 60 (20-30 typical).
3.5.5. Confirm Proper Product Calibration

To ensure that calibration was successful, try the following:

1. Return to the Main Menu by pressing the **EXIT** key.
2. Press **S4** to reset the signal.
3. Pass the Product through the detector.
4. If calibrated correctly, the signal should be under 60 (20-30 typical).

NOTE: It is possible that sensitivity may need to be adjusted to reduce the effect of a difficult product (get signal under 60). Please refer to Section 3.7 for further details.

3.6. Establish Sample Detection

Now that the Detector is set and calibrated for the product to be run, a manual test is highly recommended to see how well the system is working.

The detector’s response in the event of metal contamination can be simulated using the supplied Test Samples. The testing procedure is intended to confirm the detector’s performance and the operation of the Reject System thus ensuring that contaminated product will be correctly handled.

3.6.1. Functional Testing

For the next steps you will need to utilize the test samples (Frito Lay uses 1.5 ferrous and 2.4 stainless cards) included with your Stealth Vertex Metal Detector. Follow these steps to test the detector and Reject Device:

1. Drop a test sample card through the detector by inserting it into the weigher Funnel above the unit.
2. Check to see if the signal reading exceeds 100, indicating a correct detection.
3. Verify that the alarm horn sounds and that the red LED on the detector screen turns on. This means that the test card was detected.
4. Monitor the operation and accuracy of the Reject Device in removing the contaminated product from the production flow.

The Sensitivity will need to be adjusted given the following signal reading scenarios:

1. If the signal shows a very high result (over 1000), it is advisable to lower the sensitivity.
2. In the unlikely event of the detector not detecting the test sample, try increasing the sensitivity to the point where background signal for good product is approximately 60.
3.7. Set Sensitivity Level

The Detector’s sensitivity level determines the size of metal that can be detected. Smaller fragments of metal are detectable at higher sensitivity levels; however, higher sensitivity levels also make the metal detector more susceptible to outside interference and product effect.

The goal is to optimize the Sensitivity so that it is maximized at a safe level without compromising overall system performance.

► The factory default for Sensitivity is 100
► The Sensitivity number value can range from 0 to 999
► The typical Sensitivity setting used ranges between 30 to 200

General rule: Sensitivity should be set up to satisfy the following conditions:

1. Average product signal/Background running signal -should not exceed 60. This will minimize chances of false rejects.
2. The signal generated from the test samples running in the center of aperture should be greater than a minimum signal of 115. This ensures that the sample is reliably and consistently detected.

3.7.1. Sensitivity Adjustment

To adjust the sensitivity, follow these steps:

1. Press the SENSITIVITY Hard Key on the right side of the Stealth control panel.
2. Press S3 and a flashing cursor will appear.
3. Press the UP/DOWN arrow keys (+/-) to adjust the sensitivity, the LEFT/RIGHT arrow keys can be used to scroll the cursor between digits.
4. Press ENTER to confirm.

3.7.2. Confirm Sensitivity Level

To ensure that a proper sensitivity level was successfully applied, try the following:

1. Return to the Main Menu by pressing the EXIT key.
2. Press S4 to reset signal.
3. Pass a typical product through the detector.
4. Check the signal reading – if it is below 60, you may increase the Sensitivity further (a signal between 40 to 60 is acceptable). If the Signal reading is above 60, you should lower the Sensitivity.
3.8. Password Security

Password protection prevents an unauthorized user from tampering with the metal detector; the Stealth allows you to configure password protection. You can set passwords to three levels:

- Level 0 = Factory Setting, no password protection
- Level 1 = Very limited access
- Level 2 = Some access including functions open to level 1
- Level 3 = Access to all the functions, able to change passwords; and assign functions to other levels

NOTE: In order to turn on or configure the password protection the level 3 password holder must be present

3.8.1. Activate Password Protection

To enable or disable password security, follow these steps:

1. From Main Menu press the MENU key once to show the Password Menu.
2. Press S3 to turn Password Protection ON. You will be prompted to enter the level 3 password
3. Enter the level 3 password, then press ENTER
4. The password protection should now be on as shown below:

5. The system is set up with default passwords that can be changed:
   - Level 1 - 1000
   - Level 2 - 2000
   - Level 3 - 1208
3.8.2. Change Password

To change your passwords, follow these steps:

1. From Main Menu, press the **MENU** key once to access the Password Menu.
2. From the Password Menu press **S4** to enter the Password Setup.
3. The level 3 password holder must be present to enter the password before changing any passwords.
4. Press **S3** to select the level for which the password needs to be changed.
5. Press one of the lower soft keys (**S2** or **S4**) to modify the password – a password is made up of numeric characters.
6. Press the **UP/DOWN** arrow keys (+/-) to change each character; **LEFT/RIGHT** arrow keys are used to scroll the cursor between characters.
7. Press **ENTER** to confirm the new password and **EXIT** to return to the Password Menu.

*Info: Record the new password in a safe place.*

3.8.3. Password Hard Key Access and Function Setup

To set up Password access levels for functions, follow these steps:

1. From the password menu press **S4** to enter the password Setup.
2. Press the **UP/DOWN** arrow keys (+/-) to scroll through the functions. To change access level for a function press **S3** then press **UP** (+) to change to 1, 2 or 3.
3. Press **ENTER** to confirm the new setting.
4. Press **UP/DOWN** keys to continue or **EXIT** to return to the Password Menu.

Assignable Functions:

- Sensitivity (Hard Key Access)
- Select Product (Hard Key Access)
- Calibrate (Hard Key Access)
- Test (Hard Key Access)
- Bypass / Reset (Hard Key Access)
- Clear faults
- Clear reject count
- Clear reject latch
- Data synchronize
- Date and Time
3.8.4. Logout

The logout function found in the S2 position of the Password Menu reinstates password protection after you have completed adjustments to the metal detector settings. Password protection will be reinstated automatically if no key is pressed for 5 minutes.

3.8.5. Wrong / Forgotten Password

If you enter an incorrect password, the following menu screen will appear:

![Password Incorrect Menu](image)

Press S2 to try again. If you have forgotten your password, press S4 and the detector will display a Seed Number which Fortress engineers can decode for you. Please be prepared to offer proof of your authority when calling in to obtain the correct code.

3.9. Product Setup

The Stealth Vertex allows you to store settings for a product in its memory.

3.9.1. Renaming Product

The Main Menu displays the name of the product currently being run; by default, the Product Name is set to VERTEX. To change the default product name to a more suitable or descriptive one, follow these steps:

1. Press the SELECT PRODUCT key on the right side of the Stealth control panel.
2. Press one of the lower soft keys (S2 or S4) alongside the product name to edit the name.
3. A flashing cursor will appear on the first letter; press the UP/DOWN arrow keys (+/-) to change the alphanumeric characters. The LEFT/RIGHT arrow keys are used to scroll the cursor between characters.
4. Press ENTER to confirm.

3.10. Bypass /Reset Functionality

The Stealth Vertex Metal Detector is equipped with a system Bypass to allow for cleaning. While the Bypass is enabled, the reject device is disabled, and no detection or reject will occur.
3.10.1. Enabling and Disabling Bypass

To Bypass the reject functionality:

1. Press the **Bypass / Reset** hard key
2. Press **S2** soft key next to ON.
3. If password protection is turned on the operator password must be entered.
4. While in bypass mode, the screen illumination will flash on and off and the reject will not function.

To turn Bypass OFF:

1. Press the **S4** soft key next to OFF
2. The reject will function normally, and the screen will stop flashing.

3.11. Clearing Latches and Faults

If Reject Latch is enabled, or if a fault has occurred, it may be cleared by pressing the soft key next to **clear** for faults or **Reset Reject Latch** for a reject.

When clearing faults, if the fault condition has not been corrected, the fault will re-appear. Always investigate the source of the fault before clearing it.
CHAPTER 4: AUXILIARY FUNCTIONS

4.1. Auxiliary Functions—Overview

Now that your Stealth Vertex Metal Detector has been calibrated and tested successfully, you are ready to integrate the system into production. The aim of this chapter is to highlight and explain the optional features you have with the Stealth Metal Detector – the functionality of these features elaborated upon in the Reference Manual along with other features that are not covered in this guide.

4.2. Halo® Test

It is highly recommended that the sensitivity of the Detector is checked routinely as part of the quality control procedure, using manual testing with test samples. However, the Stealth Vertex offers automated testing to confirm the Detector’s performance as well as the response of the reject mechanism.

**Halo Auto Test:** Performs short interval testing of the Detector’s sensitivity and reject system without any operator involvement; reducing the high cost of frequent manual testing. Auto Test works by injecting a simulated metal signal (identical to test metal sphere sample) that generates a rejection.

4.2.1. Test Menu

All Test options can be accessed through the test menu by pressing the TEST hard key.

1. To run a Ferrous test, press the **S3** key from the Test menu
2. To run a Stainless test, press the **S4** key from the Test menu
3. If Reject Latch has been enabled, clear the latch by pressing the **S4** soft key next to Reset Reject Latch
4. A successful test should result in rejecting the ‘contaminated’ test product, and a signal above 100. If the test is not successful, the detector may not be operating correctly, and a service technician should inspect it.
4.3. Date and Time Change

4.3.1. Editing the Date and Time

1. At the Main Menu press the UP ARROW until you reach the version menu, then S4 key next to setup
2. Use the DOWN (-) arrow key to get to the Date and Time menu.
3. Press S2, a flashing cursor will appear; use the LEFT/RIGHT arrow keys to scroll the cursor between the characters and UP/DOWN (+/-) keys to change the characters.

NOTE: The detector can be connected to an NTP Server to accommodate Daylight Savings time. Do Not Forget to change the time when Daylight Saving Time begins or ends if you are not using the NTP Server option.

4.3.2. Daylight Savings Time Using NTP Server:

To set up daylight savings time you will need to connect the detector to an NTP server. Windows and Mac computers can be configured to serve as an NTP server for your detector but must be connected via Ethernet to the detector.

1. Once your PC is configured to be an NTP server, connect the Fortress metal detector to your PC through Ethernet. Your PC and the metal detector must be on the same network.
2. From the main menu, scroll to the Version Menu, then press S4 to enter the setup menu
3. Use the UP/DOWN arrow keys to scroll to the Date and Time Menu, then press S3 to enter the Setup menu
4. Press S4 to toggle the option for daylight savings time on or off; press enter to confirm
5. Press the down arrow to view the Time zone Menu, and press S2 to change
6. Press the down arrow and enter the IP address of your PC
7. After a short amount of time the exclamation mark beside the IP address should disappear and the date and time should sync.

4.4. Naming the Detector

This name will be visible in CONTACT Reporter software to identify then detector. The name of the metal detector can be made more suitable or descriptive to production, line or plant.

Follow these steps:

1. At the Main Menu press the UP hard key to navigate to the Version Menu
2. Press the S4 soft key next to “setup”.
3. Press the UP/DOWN arrow keys until you see detector’s Name.
4. Press one of the lower soft keys (S2 or S4) alongside the detector’s name to edit the name.
5. A flashing cursor will appear on the first letter; press the UP/DOWN arrow keys (+/-) to change the alphanumeric characters. The LEFT/RIGHT arrow keys are used to scroll the cursor between characters.
4.5. USB Data Collection

The Stealth metal detector series all can collect operational data that can be collected in two ways:

1. Network collection through the built in Ethernet port, which will require proprietary software from Fortress (Contact Manager) to manage the collection and display of data. Contact Fortress for further information regarding network data collection system options.

2. Data collection via USB drive & Contact Reporter. See Section 4.6 for more information.

NOTE: The detector must have the time set for the data collection to work properly.

4.6. Collecting Data using a remote display USB port

1. Connect an external Stealth display with an USB port via the X6 Display communications port as shown below

2. Insert USB key into the USB port located on the display

3. When the USB key is inserted the data will begin to sync automatically. The time of this sync will vary depending on the amount of new data being transferred.
4. You can cancel the synching at any time by pressing S4.

5. When complete you will be prompted that the sync is finished. At this point you can remove your key and continue to sync another metal detector or bring your USB key to the computer to view the data.

NOTE: If the USB key is removed during the sync, damage to the USB key may occur.
CHAPTER 5: FAQ’s & APPENDICES

5.1. FAQ’s (Frequently Asked Questions)

5.1.1. Troubleshooting Guide

When a malfunction occurs, it may not be serious and could be corrected easily. The following describes the most common problems and solutions; please refer to the following before calling Technical Support.

**WARNING!**

Shock Hazard: Only qualified service personnel should remove the Detector cover.

- Machinery and devices may operate without warning at any time.
- Keep away from the operating area of the reject device while power is applied.
- Keep hands clear of moving parts.
- Do not tamper with, modify or attempt to override guards or safety switches.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Check</th>
</tr>
</thead>
</table>
| Detector is falsely rejecting | - Ensure there is no metal in the aperture or rejected product  
- Investigate various symptoms of false triggers to determine the source. Perform the Initial Signal Check described in Section 3.4 to determine whether false triggering is coming from the weigher, outside environment, or product.  
- Make sure all electrical conduits are routed as far away from the detector housing as possible to cut down on interference  
- Look for ground loops: if metallic weigher chutes are not isolated from each other or the frame they will cause rejects when they move  
- Re-calibrate the unit to the case  
- Adjust sensitivity, FM threshold or filtering if rejects continue, but ensure that a sample card test and halo test is performed after any adjustments to ensure detection. |
| The Reject device is malfunctioning | - On the Display Panel confirm that the Signal level is exceeding 100 and the red detection light is turning ON in the event of reject activation.  
  Warning: Keep away from operating area of the reject device.  
- Check if the solenoid and actuator/cylinder is changing state upon a Signal of 100 or greater. If not, check whether the reject cable is properly wired to the Digital Board reject output |
| Detector not detecting Test Card Samples | - This indicates that the detector will not detect metal samples of the size of the cards  
- Your filtering may be incorrect: adjust by one increment at a time until the metal sample can be detected i.e. n6 to n7 then test  
- Your Sensitivity may need to be increased  
- If the detector does not respond to filtering or sensitivity, you may adjust the FM Threshold  
- Contact Fortress for further assistance |
5.1.2. Frito Stealth Vertex Miscellaneous Troubleshooting information

► The signal during a normal run must be under 100 or the FMD will trip, a desirable signal during a normal run is less than 50

► The lower the running signal, the better. Higher filter = Lower Signal

► Always run a manual or halo test to check detection after adjusting any Sensitivity or Filter settings

► A signal reading of 32767 is the highest possible signal and indicates that the unit has been power cycled or there is a large piece of metal in the aperture

► The detector phase should be calibrated close to 90.0 (+/- 3). This will rarely need to be adjusted

5.2. Faults
<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Fault</td>
<td>► There is no signal or the signal is saturated.</td>
<td>► Check connections between SHB and DSP Board</td>
</tr>
<tr>
<td></td>
<td>► There may be connection issues between the SHB and DSP board</td>
<td>► Check Power connections to SHB</td>
</tr>
<tr>
<td>Halo Board</td>
<td>► The Halo board is turned on but the DSP cannot communicate with it</td>
<td>► Ensure Halo board and DSP are on the same network, and that the halo board is connected to an internal network port on the DSP</td>
</tr>
<tr>
<td></td>
<td>► The Halo board is turned on but the DSP cannot communicate with it</td>
<td>► Check connections from Halo board to DSP</td>
</tr>
<tr>
<td></td>
<td>► The Halo board is turned on but the DSP cannot communicate with it</td>
<td>► Check Links on DSP are present to power Halo board</td>
</tr>
<tr>
<td></td>
<td>► Ensure Halo board and DSP are on the same network, and that the halo board is connected to an internal network port on the DSP</td>
<td>► Ensure LED1 on SD030 halo board is flashing (indicates power &amp; working board)</td>
</tr>
<tr>
<td>IO Board</td>
<td>► If the Optional IO Board is used and turned on, this indicates the DSP cannot communicate with it</td>
<td>► Ensure the IO Board and DSP are on the same network and the IO board is connected to an internal network port</td>
</tr>
<tr>
<td></td>
<td>► If the Optional IO Board is used and turned on, this indicates the DSP cannot communicate with it</td>
<td>► Check connections from IO board to DSP</td>
</tr>
<tr>
<td>Internal USB</td>
<td>► Internal USB is missing or corrupted</td>
<td>► Ensure the internal USB is present on the DSP board &amp; replace with formatted USB if missing</td>
</tr>
<tr>
<td></td>
<td>► If USB is present, replace with formatted USB drive</td>
<td></td>
</tr>
<tr>
<td>Date Time</td>
<td>► The Date &amp; Time have not been set</td>
<td>► Set the date &amp; time</td>
</tr>
<tr>
<td></td>
<td>► The DSP battery for the real time clock is missing or low and the time is not accurate</td>
<td>► Replace DSP battery with new CR2032 coin cell battery</td>
</tr>
<tr>
<td>Low Battery</td>
<td>► DSP battery for real time clock is missing or low</td>
<td>► Replace DSP battery with CR2032 coin cell battery</td>
</tr>
<tr>
<td>Large Metal</td>
<td>► The large metal threshold limit has been exceeded</td>
<td>► Verify that no metal is located within the detector aperture</td>
</tr>
<tr>
<td></td>
<td>► The large metal threshold has been set too low.</td>
<td>► Increase the Large Metal Threshold</td>
</tr>
<tr>
<td></td>
<td>► Feature is enabled within the Engineering Menu</td>
<td></td>
</tr>
<tr>
<td>Excess Reject</td>
<td>► The number of rejects has exceeded the limit set within the software.</td>
<td>► Check rejected product for metal contaminants</td>
</tr>
<tr>
<td></td>
<td>► Feature is enabled within the Engineering menu</td>
<td>► Make sure the Detector is calibrated for the running product &amp; surrounding machinery</td>
</tr>
</tbody>
</table>

Continued next page
<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
</table>
| Reject Bin Full | ► The reject bin is full (this may prevent product from being successfully rejected into the bin) | ► Check the bin and empty rejected product – handle according to operational procedures  
► Check that the sensor in the bin is not misaligned  
► Check the polarity of the input |
| Test Signal    | ► Test signal was not detected during a test procedure                         | ► Check the Sensitivity and perform a manual test  
► Call Fortress for assistance |
| Phase Limit    | ► The phase limit was exceeded during a calibration or auto phase procedure    | ► Check the phase point and perform a fast or phase to case calibration |
| Prod Memory    | ► Product memory may be corrupted                                              | ► Cycle power to clear memory  
► Reset the product record via Reset in the Engineering menu > Product Setup menu |
| Balance        | ► The balance of the input coil is too high or incorrect  
► There may be metal located within the detector aperture                         | ► Ensure no metal is in the metal detector aperture  
► Check the connections and cables for damage between the SHB and DSP  
► Check if LD3 (yellow LED) on the DSP board is illuminated. If it is, call Fortress for assistance |
| Reference      | ► The reference Voltage is too low or not present                              | ► Check the connections and cables for damage between the SHB and DSP  
► Call Fortress for assistance |
5.3. Menu Map

This menu map is for Stealth Vertex Software Version 171001; other versions may differ in operation.

5.3.1. Sensitivity, Select Product, Calibrate, Test, and Bypass / Reset

- **Sensitivity Menu**: Sensitivity 100
- **Select Product Menu**: Product: 1
  - Name: VERTEX
- **Calibrate Menu**: Phase: 90.00
  - Fixed
  - dry
- **Test Menu**: Test Vertex
  - FE
  - Signal: 0
  - SS
- **System Bypass**: System Bypass: off
  - ON
  - OFF
5.3.2. Menu

Password Menu
- Password: Off
- Login: Setup

Fault Setup
- Setup
- Log

Version
- Vertex: 2017/1001
- Setup

Product Screen
- VERTEX Rej: 0
- Sens: 100 Sig: 22
- Vertex: 2017/1001

Date and Time
- Date and Time: Setup 2016/08/29 10:58:28

Detection Information
- Frequency: 312
- Ref: 1487 Bal: 143

Ethernet Addresses
- Internal
- External

Serial Number
- Serial Number: 1234567890ABC

Detector Name
- Detector Name: "DETECTOR001"

Fault Mask
- Fault: Enabled
- Cause: Reference

Fault Log
- Log: no faults
- Age: 0
- Clear

Date and Time
- Timezone UTC -5.00

NTP Server
- NTP Server IP: 000.000.000.000

External IP
- IP: 192.168.010.059
- MIB-99-55-53-c-b-a0

Internal IP
- Internal IP: 192.168.010.050

External Netmask
- External Netmask: 255.255.255.000

Internal Netmask
- Internal Netmask: 255.255.255.000

External Gateway
- External Gateway: 000.000.000.000

External Port Config
- External Ports: 1

Daylight Savings
- Daylight Savings Time: off

Password Menu
- Change Password 1
- Password - Sensitivity
- Hard Key Access Sensitivity: 3
- Password - Sel Prod.
- Hard Key Access Select Product: 3
- Password - Calibrate
- Hard Key Access Calibrate: 3
- Password - Test
- Hard Key Access Test: 3
- Password – Sel Unit
- Hard Key Access Bypass/Reset: 3
- Password – Clear Faults
- Password Access Clear Faults: 3
- Password – Clear Rej Count
- Password Access Clear Rej Count: 3
- Password – Clear Rej Latch
- Password Access Clear Rej Latch: 3
- Password – Sync
- Password Access Data Synchronize: 0
- Password – Date/Time
- Password Access Date and Time: 0
5.3.3. Engineering Menu

- **Sensitivity Menu**
  - Sensitivity: 100
  - Signal: 0

- **Password Menu**
  - Password: Off
  - Logout: Setup

- **Fault Setup**
  - Setup: Log

- **Version**
  - Version: 2017/1001

- **Sensitivity Menu**
  - Sensitivity: 100

- **Thresholds**
  - Threshold R: 0 X: 0

- **Reject Disable**
  - Reject Disable: off
  - Power-Up Reject: off

- **DC Filter**
  - DC Filter: med

- **Product Records**
  - Delete All Product Records: Delete

- **Balance**
  - R: 200 X: 150

- **Halo Setup**
  - Halo Board: setup

- **Reject Setup**
  - Reject Setup: Dur: 0.25

- **Emulation**
  - Emulate Panel: no
  - Emulate Bypass: off

- **Factory Settings**
  - Factory Settings: Save Restore

- **Product Setup**
  - Save: Reset

- **Auto Phase Setup**
  - Auto Phase Time: 1.0
  - Spread: 200

- **Auto Phase Trigger**
  - Auto Phase Trigger: 5 sec

- **Dry Phase Limit Setup**
  - Dry Phase Limit: 90.00
  - Spread: 45

- **Wet Phase Limit Setup**
  - Wet Phase Limit Setup: 0.00
  - Spread: 45

- **Product High Reject**
  - Reject on Prod High: off

- **Product High Threshold Setup**
  - Product High: 28000
  - R: 10000 X: 10000

- **Detector Power**
  - Detector Power: low

- **Digital Filter**
  - Digital Filter: n5
  - Sens: 150
  - Sig: 0

- **Input Menu**
  - Input/Output Setup: Input Setup

- **Output Menu**
  - Output: PL3 relay Pol: +

- **IO Board**
  - IO Board Type: off
  - IP: 192.168.010.0

- **CIP Menu**
  - CIP: Select

- **Search Head Board**
  - Search Head Board

Continued next page
Detection Mode
Detect Mode: FM
Th: 7
Est: 1

Large Metal
Large Metal
Threshold: 0

Peak Signal
Peak Signal
Reset Mode: detect

Test Menu
Manual
Manual2
Halo
Halo2

Test Mode
Test Mode: prompt
Interval (min): 0

Test Timeout
Test Prompt Timeout
Delay (min): 5

Minimum Test Time
Minimum Test Time (sec): 0.1

Manual and Halo test setup
Test Setup Manual
Halo

Manual2 and Halo2 test setup
Test Setup Manual2
Halo2

Test setup Menu
Test: 1
Passes: 0

Acknowledge/Operator Code Menu
Acknowledge Test: off
Operator Code: off

Halo Mode Menu
Halo Mode: mid

Test: 1
Passes: 0

Acknowledge/Operator Code Menu
Acknowledge Test: off
Operator Code: off

Halo Mode Menu
Halo Mode: mid

Test: 1
Passes: 0

Acknowledge/Operator Code Menu
Acknowledge Test: off
Operator Code: off

Halo Mode Menu
Halo Mode: mid

Test: 1
Passes: 0

Acknowledge/Operator Code Menu
Acknowledge Test: off
Operator Code: off

Halo Mode Menu
Halo Mode: mid
5.4. Electrical Drawings

5.4.1. Vertex Remote Box
5.4.2. Vertex Remote Box Connections

Types of Cables:
X3: CABLE(PH-09XQ-02) M12 ROTHENBURGER Coded X1 M2 LONG (P954) M/ST

Diagram:
- Vertex Remote Box Connections
- Vertex Metal Detector
- PWR HMI REBY
- X1 XO X3 X4 X5 X6

Diagram Description:
- Connections between Vertex Remote Box and Vertex Metal Detector
- Specific cable types and connections illustrated
- Diagram includes labeled terminals and connections points
5.4.3. DSP Board Connections
5.4.5. System Control – I
## Document Information

<table>
<thead>
<tr>
<th>Document Number:</th>
<th>MAN-ST-EN-VERTEX-MAINTENANCE</th>
<th>Document Name:</th>
<th>STEALTH VERTEX MAINTENANCE MANUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner / Dept:</td>
<td>Manuals</td>
<td>Current Revision Level:</td>
<td>000</td>
</tr>
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</table>

## Revision History

<table>
<thead>
<tr>
<th>REVISION</th>
<th>CHANGES</th>
<th>RELEASE DATE</th>
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</thead>
<tbody>
<tr>
<td>000</td>
<td>New manual for Maintenance. Includes menu map of operator and engineering menus and setup/configuration information</td>
<td>11/30/2018</td>
</tr>
</tbody>
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