APPENDIX G: MANUAL

Please see the following pages.

SentryScan Performance Monitoring System

Installation, Operation and Maintenance Manual (4/21/05)

1. Introduction

1.1. Using this Manual

Read and understand this manual in its entirety before installing, operating or servicing the SentryScan. If you need assistance in any form regarding the installation, operation or maintenance of the SentryScan, contact your District Engineer or the SWECO home office immediately. Constant "Service-After-The-Sale" is the keynote of SWECO.

1.2. Telecommunications Agency Requirements

Changes or modifications to SentryScan equipment that are not expressly approved by SWECO could void the user's authority to operate the equipment. SWECO SentryScan devices are designed for installation in enclosed separators. Separators must be closed to contain microwave emissions which could otherwise interfere with other devices. SentryScan transmitters and receivers must be securely mounted to a standard flange in strict compliance with the manufacturer's instructions. Failure to properly install the device could constitute an impermissible modification of the device. In such an event, the responsibility is placed on the modifying party to ensure compliance with telecommunications regulations, and SWECO shall have no liability whatsoever resulting from unauthorized installation of the device.

The use of this device is on a "no-protection, no-interference" basis. That is, the user shall accept government operations of high-powered equipment in the same frequency band which may interfere with or damage this device. On the other hand, devices found to interfere with government operations will be required to be removed at the user's expense. In certain countries, the SentryScan must be switched off when removing the separator's cover. Any usage in separators made of non-metallic materials is prohibited.

1.3. Safety Information

WARNINGS

1. Read and understand this manual in its entirety before installing or operating the SentryScan. Installation, adjustment, repair, and maintenance must be performed by qualified personnel. Do not perform any service other than those contained in this manual unless you are qualified. Failure to follow safe installation and servicing guidelines could result in death or serious injury.
2. Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.
3. When installing the SentryScan, shut off and lock out power to the separator. Follow all local and national electrical codes. To prevent possible shock, ground the separator and the Control Box per local and national electrical codes. Failure to comply could result in severe personal injury or property damage.
4. Verify that the operating environment of the SentryScan is consistent with the appropriate hazardous locations certifications.
5. DO NOT touch unshielded components or terminal strip screw connections with voltage present. Many parts in the Control Box, including printed wiring boards, operate at line voltage. DO NOT TOUCH. Use only electrically-insulated tools while making adjustments.
6. Install all covers before applying power.

CAUTIONS

1. Securely tighten the clamps that hold the SentryScan transmitter and Receiver Modules in place.
2. Do not attempt to disassemble the SentryScan transmitter or Receiver Module. There are no user serviceable parts inside.
3. Do not operate the SentryScan transmitter and Receiver Modules unless they are properly and securely installed in their fittings on the separator.
4. The noise level produced by the Control Box alarm may not be acceptable to your environment. Take every precaution to make certain that safe noise levels are met.

1.4. Overview

1.4.1. Principle of Operation

The SWECO SentryScan Performance Monitoring System alerts operators to the potential for compromised screening performance by detecting when a tear in the screen mesh has occurred. Patent pending SentryScan technology takes advantage of the fact that wire screens pose a natural barrier to the transmission of some microwave signals. This is because the wavelength of the signal is too long to "fit through" any individual screen opening. The result is that an intact screen significantly attenuates the strength of the microwave signal directed at the screen. When a tear occurs in the screen, an elongated opening in the screen is created. When the length of this opening exceeds the critical signal transmission dimension, attenuation drops significantly and the resulting increase in signal strength that is transmitted through the screen causes the system to alarm.

1.4.2. Components

The *transmitter* is mounted in a fitting welded to an opening cut in the separator's frame stack. It produces an electromagnetic signal that floods one side of the screen with low power microwave energy of a specific frequency range.

The *receiver* is mounted in a similar fitting on the other side of the screen from the transmitter. It is designed to precisely measure the signal that is generated by the transmitter.

The *Control Box* contains the power supply, control circuits, operator interface and transmitter and receiver interfaces. Typically it is mounted to a fixed point adjacent to the separator.

All separators with a SentryScan system must have a *conductive gasket* installed on the tension ring of the screen that is being monitored. This special Supertaut Plus II gasket prevents microwave energy from leaking around the edge of the screen assembly.

1.4.3. Definition of Terms

Microwave Signal: An electromagnetic wave having a frequency in the range of 1 GHz to 300 GHz. The SentryScan operates at the low end of this frequency range.

Frequency: A wave characteristic denoting the number of cycles per second. A 1 Ghz signal produces one billion cycles per second. That's about 1,000 times higher frequency than AM radio and 10 times higher than FM radio.

Wavelength: A characteristic denoting the peak-to-peak length of the electromagnetic wave. A 1 GHz signal has a wavelength of about 12" (300mm). Wavelength is inversely proportional to frequency, that is, the higher the frequency the shorter the wavelength.

Signal Strength: A characteristic denoting the amplitude of the electromagnetic wave. Stronger signals have higher amplitudes. The SentryScan operates at very low signal strengths, much less than those produced by a typical cell phone.

Baseline: Even with an intact screen there is some transmission of the microwave signal through the screen. The amplitude of this signal depends on many factors including mesh size and separator size as well as characteristics of the material being processed. During calibration of the SentryScan, the operator sets the baseline to establish the specific level of "background noise" that the SentryScan receiver should expect to measure during normal operation with an intact screen.

Sensitivity: The complex algorithms programmed into the SentryScan's microprocessor constantly monitor the characteristics of the microwave signal picked up by the receiver. When the received signal strength exceeds a predetermined "trip point", the alarm indicating a torn screen is sounded. During calibration of the SentryScan, the operator can set this trip point at any of three different levels by adjusting the sensitivity setting.

2. Installation

2.1. Before You Begin

2.1.1. Unpacking & Handling Instructions

Check the packing and the components for damage when the system is delivered. Notify the freight carrier and SWECO immediately of any damage. A relevant certificate from the driver must be supplied. Inform all parties of any damage that becomes apparent when the packing material is removed.

Do not remove the SentryScan components from the carton until they are at the final installation site. The carton provides protection and prevents damage. Handle the devices carefully after removing them from the carton to avoid damage to the exterior or to internal components.

NOTE: *Never place SentryScan components or tools on the screen surface or damage to the screen may occur.*

2.1.2. Installation Considerations

Before you install a SentryScan Performance Monitoring System, be sure to consider your specific mounting requirements, separator configuration, and process characteristics. Review the following information to ensure a trouble-free, safe, and accurate installation.

2.1.2.1. Multiple Deck Installations

At the time of this printing, SentryScan systems are designed to monitor only one screen in a multiple deck separator. Please contact SWECO for information about monitoring more than one screen in a multiple deck separator.

2.1.2.2. Multiple Separator Installations

SentryScan systems are designed to be used in applications in which more than one separator in a given area of the plant must be monitored. In such cases the following special considerations should be noted.

1. All separators equipped with a SentryScan system must be operated with their cover assemblies in place.
2. When servicing of a separator necessitates the removal of the cover assembly or disassembly of the frame stack, turn off the SentryScan at the Control Box and disconnect the cables leading to the transmitter and Receiver Modules before servicing the separator. Failure to do so may result in false alarms from other SentryScan systems in the area or interference with other equipment.

2.1.1. Separator Considerations

Sentry Scan systems are available either as a factory installed option on new SWECO separators or as a retrofit to previously installed separators. In either case the following issues must be considered.

Materials of Construction: The frame stack and cover assemblies of the separator must be of all metal construction.

Screen Assembly: The screen mesh and tension ring must be of all metal construction. Specifically, synthetic screens are totally unsuitable for use with SentryScan systems.

Slider Decks: A properly calibrated SentryScan system can be used to monitor a screen that is equipped with a slider deck. The slider support can be perforated plate with 5/8" diameter holes or woven wire screen that is no finer than 4 mesh. Recalibration is required if a slider deck is added, removed or modified in any way.

Backing Wires: The presence of a backing wire screen to support the screen mesh being monitored may prevent the SentryScan system from functioning properly. Contact your District Engineer or the SWECO home office for details.

Channel Gasket: The gasket used on the screen assembly must be a Supertaut Plus II conductive gasket specially designed for use with SentryScan systems. This gasket is characterized by its unique co-extruded construction utilizing both white and black elastomeric materials.

Process Considerations: The separator mounted components of the SentryScan system (i.e., Transmitter Module, Receiver Module, conductive gasket) must not be exposed to process temperatures exceeding 180º F (82º C).

2.1.2. Mounting Considerations

Control Box: Select a mounting location for the Control Box that is within 10' of the separator. Be sure that the location of the Control Box is in close enough proximity to the separator so that the supplied cables are sufficiently long to connect the transmitter and Receiver Modules to the Control Box. If this is not practical, an optional SentryScan Junction Box Assembly is available from Sweco that allows conduit to be run from the Control Box to a junction box mounted on the base of the separator. Contact your District Engineer or the SWECO home office for details. Do not locate the Control Box in such a way that the operator is forced to stand in a position from which he could come in contact with the separator. The Control Box should be at a height

that is convenient for the operator and positioned so that its audible and visual alarm indicators can be easily monitored. If such monitoring is impractical, contact SWECO about remote monitoring options.

Transmitter & Receiver Modules: The frame assemblies immediately above and below the screen being monitored must be equipped with a 4" ferrule fitting. The fittings must be joined to the frames with continuous welds. Locate the fittings in a location along the frame that is just clockwise (as viewed from above) from the discharge spout.

2.2. Mechanical Installation

Installing the Transmitter Module: Insert the Transmitter Module into the ferrule fitting located on the frame that is ***below the screen to be monitored.*** The Transmitter Module should be oriented so that the connector points down towards the floor. Secure the Transmitter Module to the ferrule using a tri-clover clamp. Check to be sure that the Transmitter Module is securely mounted within the ferrule such that there is no looseness.

Installing the Receiver Module: Insert the Receiver Module into the ferrule fitting located on the frame that is ***above the screen to be monitored.*** The Receiver Module should be oriented so that the connector points down towards the floor. Secure the Receiver Module to the ferrule using a tri-clover clamp. Check to be sure that the Receiver Module is securely mounted within the ferrule such that there is no looseness.

Installing the Control Box: Secure the Control Box in the desired location using the mounting holes provided.

2.3. Electrical Installation

2.3.1. General Wiring Practices

When wiring SWECO SentryScan systems, follow the wiring practices required by national and local electrical codes.

2.3.1.1. Grounding the System

The Control Box housing should always be grounded in accordance with national and local electrical codes. Use the equipment only as specified in this manual. Failure to do so may impair the lightning and transient protection provided by the equipment. The most effective grounding method is to connect the grounding lug on the Control Box directly to earth ground with 1 ohm or less impedance. The Internal Ground Connection (Protective Ground Connection), located inside the Control Box housing, is the Internal Ground Connection screw.

NOTE: Grounding the Control Box via threaded conduit connection may not provide sufficient ground.

2.3.1.2. Cable Selection

Power supply cables must be suitable for the supply voltage and approved for use in hazardous areas, where applicable.

2.3.1.3. Hazardous Locations

The SentryScan is currently not designed or rated for use in hazardous atmospheres. Contact your District Engineer or the SWECO home office for details.

2.3.2. Connecting the SentryScan PLC Interface

2.3.2.1. Wiring Considerations

2.3.2.2. PC Board Connections

2.3.2.3. PLC Interface Logic

2.3.2.4. Control Box Keypad Lockout

2.3.2.5. Signal Tower Considerations

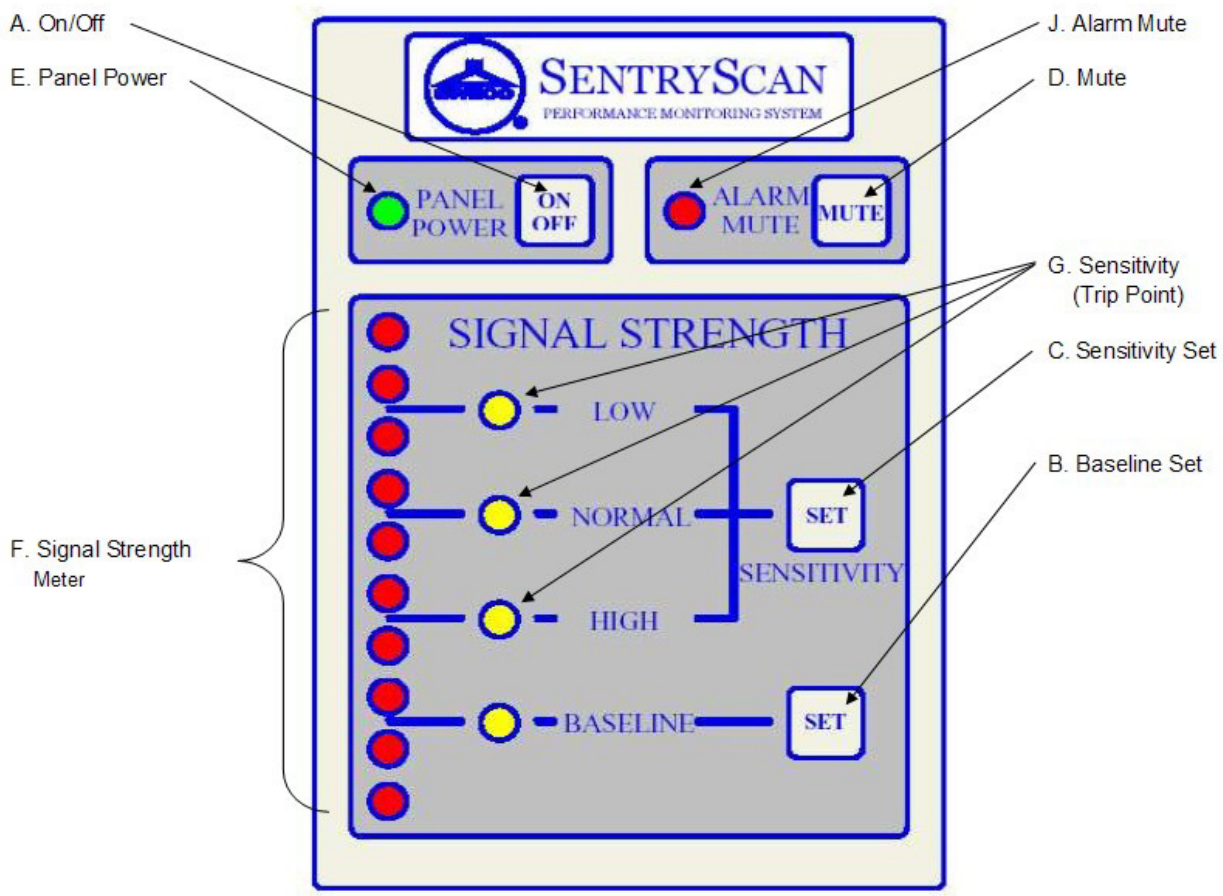
2.3.3. Power Requirements

The wiring should include an external power shut-off switch or an external circuit breaker. This device should be located near the Control Box.

3. Operation

3.1. Operator Interface

The standard SentryScan system is designed for local control and monitoring. The following section deals with operation of the SentryScan by local operators. If this is not practical or desirable for your particular operating scenario, refer to Section about PLC interface functionality. Refer to Figure 3-1 to identify the controls and indicators described below.



3.1.1. Manual Controls

A. *On/Off:* Press and hold to turn on. Press and hold to turn off.

WARNING: The *On/Off* button on the control panel is a "soft switch". It does not interrupt power to the Control Box. Disconnect power to the Control Box at the source before opening or servicing the Control Box.

B. *Baseline Set:* Used during calibration to set the baseline signal strength with an intact screen in normal operate conditions. Must be pressed and held in conjunction with the "Mute" button.

C. *Sensitivity Set:* Used during calibration to set the trip point at which a measured signal strength will cause the alarms to be activated. Press and hold to change the sensitivity setting.

D. *Mute:* Used to silence the audible alarm. Press and hold to mute the alarm.

3.1.2. Indicators

E. *Panel Power:* Green LED that when on indicates that the system is powered up and operating.

F. *Signal Strength Meter:* Series of ten red LED's that function as a bar graph to indicate the relative signal strength currently measured by the SentryScan receiver.

G. *Sensitivity (Trip Point):* Series of three yellow LED's, one each for Low, Normal and High Sensitivity. The system will alarm when the signal strength value exceeds the trip point associated with the selected sensitivity setting.

H. *Signal Tower:* The signal tower is located on the top of the Control Box. It has three visual and one audible indicator…

- Audible alarm: can be removed if so desired.
- Red beacon: flashes to indicate that a screen fault condition has been detected
- Amber beacon: when flashing indicates a device fault condition, and when steady on indicates that alarm condition is being overridden by PLC input.
- Green beacon: steady on indicates normal operation.

I. *Alarm Mute*: A red LED that when on indicates that a torn screen condition exists but that the audible alarm has been silenced by the operator pressing the Mute button.

3.2. Power Up & Self Test

To turn on the SentryScan system press and hold the On/Off button until a beep is heard and the panel lights illuminate. The SentryScan will immediately and automatically perform a brief self test. All of the panel lights should illuminate simultaneously. The alarm beacon should flash briefly. After completion of the self test the green Panel Power LED should remain on steady.

3.3. Calibration

Calibration must be performed after initial installation. Additionally, the SentryScan system should be recalibrated if any of the following occur:

- A change in screen mesh or wire diameter specifications
- Installation or removal of a slider deck
- Change in separator configuration (number of decks) or size (diameter)
- Change in process material or process material characteristics

NOTE: Before calibrating the SentryScan system, be absolutely certain that there are no pre-existing tears in the screen that is to be monitored. Also, confirm that the channel gasket is a Supertaut Plus II conductive white/black co-extruded gasket specially designed for use with SentryScan systems.

3.3.1. Setting the Baseline

Even with an intact screen there is some transmission of microwave signal through the screen. The amplitude of this signal depends on many factors including mesh size and screen diameter as well as characteristics of the material being processed. By properly calibrating the baseline

setting, the operator establishes the specific level of "background noise" that the SentryScan receiver should expect to measure during normal operation with an intact screen. Use the steps below to correctly calibrate the baseline setting:

1. Read and understand the "Baseline Calibration Considerations" detailed below before calibrating or re-calibrating the baseline setting.

2. Check to be absolutely certain that there are no pre-existing tears in the screen that is to be monitored.

3. Confirm that the separator cover assembly is secured in place and that the channel gasket is a Supertaut Plus II conductive white/black co-extruded gasket specially designed for use with SentryScan systems and that the channel gasket and all mating surfaces are clean and free of material that could otherwise inhibit electrical continuity between the gasket and the mating surfaces.

4. Make sure that all SentryScan components are properly installed and connected. There should be no error conditions indicated on the front panel of the Control Box.

5. Turn on the separator, introduce feed material to the separator, and allow the screening system to achieve steady state conditions.

6. Simultaneously press and hold both the Baseline Set button and the Mute button. Continue pressing both buttons until a "beep" is heard (about 3 seconds) and then release both buttons.

7. After correctly calibrating the baseline setting, the bottom two red LED's on the signal strength meter should be illuminated.

3.3.2. Baseline Calibration Considerations

Read and understand the considerations detailed below before calibrating or re-calibrating the baseline setting.

1. In most operations, there is no need to recalibrate the baseline setting after it has been properly established at time of initial installation unless something changes (see Section 3.3 "Calibration" above).

2. Before recalibrating, check the signal strength meter. If the SentryScan system is properly calibrated, during normal operation under steady state process conditions the bottom two red LED's on the signal strength meter should be illuminated. If this is not the case, recalibration may be necessary.

3. Before recalibrating, try to determine the root cause of the need for recalibration. Consider the following:
    a. A continuous signal strength of fewer than two LED's indicates that less microwave energy is being transmitted through the screen than there was at the time of the last calibration. Inspect the screen surface to see if there are notable anomalies, such as screen blinding, that should be rectified.
    b. A continuous signal strength of more than two LED's indicates that more microwave energy is being transmitted through the screen than there was at the time of the last

calibration. This is a highly unusual situation and is most often attributable to the presence of an actual tear in the screen. Under such conditions recalibration should be conducted only after the most rigorous investigation into potential root causes of the increase in received signal strength has been conducted.

4. If the need for recalibration becomes evident shortly after the separator has been serviced, there is every likelihood that recalibration is not actually necessary. Rather, the SentryScan is merely measuring some difference in conditions after the servicing as compared to those measured before servicing. Before recalibrating consider the following:
    a. If the screen assembly was replaced, was it replaced with a screen assembly having exactly the same specifications for screen mesh and wire diameter?
    b. If the channel gasket was replaced, was it replaced with a Supertaut Plus II conductive white/black co-extruded gasket specially designed for use with SentryScan systems?
    c. Are the channel gasket and all mating surfaces clean and free of material that could otherwise inhibit electrical continuity between the gasket and the mating surfaces?
    d. Are the cover assembly and all frame assemblies properly and securely assembled with all clamp rings properly installed and tightened?

3.4. Sensitivity Selection

Complex algorithms programmed into the SentryScan's microprocessor constantly monitor the characteristics of the microwave signal picked up by the receiver. Received signal strengths that exceed the baseline signal strength level may be an indication of a torn screen. However, variations in environmental and operating conditions may cause some fluctuation in received signal strength even when the screen is intact. For this reason the SentryScan control algorithm allows the operator to set a trip point at any of three different relative signal strength levels. When the received signal strength exceeds this trip point, the alarm indicating a torn screen is sounded. The trip point is selected using the Sensitivity Set button.

3.4.1. Setting the Sensitivity

1. Read and understand the "Sensitivity Selection Considerations" detailed below before changing the sensitivity setting.

2. To change the sensitivity setting, simultaneously press and hold the Sensitivity Set button. Continue pressing the button until the sensitivity setting changes to the next level in the scroll sequence.

3. If the sensitivity is still not set to the desired level, release the button and then press and hold it again.

3.1.1. Sensitivity Selection Considerations

Read and understand the considerations detailed below before establishing or changing the sensitivity setting.

1. In most operations, there is no need to change the sensitivity setting after it has been properly established at time of initial installation unless something changes (see Section 3.3 "Calibration" above).

2. Before changing the sensitivity, check the signal strength meter. If the SentryScan system is properly calibrated, during normal operation under steady state process conditions the bottom two red LED's on the signal strength meter should be illuminated. If this is not the case, recalibration of the baseline may be necessary (see Section 3.3.1).

3. To determine the proper sensitivity setting, observe the signal strength meter while the separator is operating under steady state conditions. It is normal to see some variance in the signal strength. Identify the uppermost red LED that blinks on intermittently. Select the yellow LED to the right that is just above the uppermost blinking red LED and set the sensitivity to the level that corresponds with that yellow LED.

4. In general, set the SentryScan to the most sensitive level that allows operation without false alarms.

5. In some applications false alarms may occur at process startup, that is, before material is fed to the separator and before the process has reached steady state. In such instances the operator has three choices, listed in order of preference:

    a. Connect the SentryScan Control Box to your plant PLC system utilizing the "Remote Override" input of the PLC interface. When this contact is closed, the local alarms are disabled, and the amber beacon is illuminated.
    b. Leave the SentryScan on during startup, but until steady state is achieved temporarily mute any false alarms that occur.
    c. Temporarily turn off the SentryScan during startup and turn it on only after steady state is achieved.
    d. Reduce the sensitivity setting, that is, set the trip point to a higher relative signal strength so that the system does not alarm during startup. Note that selecting this option will reduce system sensitivity and may inhibit the system's ability to reliably identify tears in the screen.

3.2. Interpreting the Signal Strength Meter

The signal strength meter is a series of ten red LED's that function as a bar graph to indicate the relative signal strength currently measured by the SentryScan receiver. The more LED's illuminated, the higher the signal strength. During normal operation under steady state process conditions, the bottom two red LED's on the signal strength meter should be illuminated. If this is not the case, recalibration of the baseline may be necessary. It is normal to see some variance in the signal strength, indicated by intermittent illumination of the LED's. Note that the signal strength displayed by the LED's does not represent an absolute scale, rather it is a floating scale dependent on the baseline setting. Users who have a need to monitor the "absolute" signal strength value can connect the SentryScan 4-20mA output to their process control and monitoring system.

3.3. Alarms

3.3.1. Alarm Protocol

The SentryScan Control Box has two types of alarms, a visual flashing beacon and an audible horn. Both will activate when the SentryScan detects a condition consistent with a torn screen. This occurs when the signal strength picked up by the receiver consistently exceeds the baseline signal strength by an amount that is determined by the sensitivity setting.

3.3.2. Muting Alarms

Once the SentryScan detects a condition consistent with a torn screen, the alarms will activate and remain active. At times it may be desirable to mute the audible alarm while the cause of the alarm is investigated. This is accomplished by pressing and holding the “Alarm Mute” button briefly until the alarm is silenced. Note that the red beacon will continue to flash as a reminder that the SentryScan has detected a condition that is consistent with a torn screen.

3.3.3. Corrective Action

After the SentryScan system has alarmed, corrective action should be taken as soon as practical to determine the root cause of the fault. A general model for corrective action is shown below:

CAUTION: The corrective action protocol shown below is a model to be used as general guideline only. It is the responsibility of each SentryScan user to analyze their own specific process and environmental conditions to arrive at a corrective action protocol that results in a safe and thorough investigation.

1. Shut off the material feed to the separator and wait for material in process to work its way through the system such that the separator is clear of residual material.

2. Turn off and lockout power to the separator and turn off the SentryScan system at Control Box.

3. Disconnect the cable leading to the SentryScan Receiver Module and remove the Receiver Module from the separator frame by removing the tri-clover clamp.

4. Disassemble the separator to the extent necessary to gain access to and remove the screen being monitored.

5. Replace the screen assembly with one that meets the necessary specifications. Make certain that the channel gasket on the tension ring of the screen assembly is a Supertaut Plus II conductive gasket specially designed for use with SentryScan systems and that the channel gasket and all mating surfaces are clean and free of material that could otherwise inhibit electrical continuity between the gasket and the mating surfaces.

6. Reassemble the separator.

7. Re-install the SentryScan Receiver Module into the ferrule fitting located on the frame that is just above the screen to be monitored. The Transmitter Module should be oriented so that the connector points down towards the floor. Secure the Receiver Module to the ferrule using a tri-clover clamp. Check to be sure that the Receiver Module is securely mounted within the ferrule such that there is no looseness. Connect the appropriate cable from the junction box to the connector on the Receiver Module.

8. Turn on the SentryScan at the Control Box.

9. Apply power to the separator, introduce process material to the separator, and allow the system to reach steady state processing conditions.

10. Note the reading on the SentryScan signal strength meter. The bottom two red LED's on the signal strength meter should be illuminated. If this is not the case, or if the SentryScan system alarms again, refer to Section 4.3, Troubleshooting.

11. Closely examine the removed screen for any holes or tears. Typically, tears detected by the SentryScan system will be approximately ½" to 1" long at the time they are detected. Tears this small are not always readily apparent at first glance, particularly if process material is coating or blinding portions of the screen surface. For this reason visual inspections of the screen must be conducted in a careful, thorough manner.

NOTE: The SentryScan system is capable of detecting tears only after they reach approximately ½" to 1" in their longest dimension. Actual tear length resolution is a function of many factors including process conditions, screen mesh specifications and the SentryScan sensitivity setting. Due to the motion of SWECO separators, small tears typically propagate very quickly to the size at which they can be detected by SentryScan systems. Nevertheless, it should be noted that when the SentryScan system alarms it is possible that a smaller tear existed in the screen for some period of time before the alarm actually activated. For this reason, material that was processed just before the SentryScan alarmed should be evaluated for quality conformance.

4. Maintenance

Use only the procedures and new parts specifically referenced in this manual to ensure specification performance and certification compliance. Unauthorized procedures or parts may affect product performance and the output signal used to control a process.

4.1. Error Messages

The SentryScan system has built-in diagnostics and self-tests that generate error codes if certain failures occur. Table 4-1 lists these codes and what they mean.

Table to be added later

4.2. Troubleshooting

The following is a guide to check problems that might arise under normal operation. Consult other portions of this manual for instructions regarding the action to be taken.

CAUTION: Follow all safety guidelines listed in this manual!

Troubleshooting

Problem	Cause	Solution
SentryScan does not turn on	not holding On/Off button long enough	press and hold the On/Off button for at least 5 seconds
	no line power	check external power shut-off switch or external circuit breaker
No signal strength indicated	change in screen specifications	if screen specification or configuration changes (e.g., mesh count, wire diameter, material, backing wire, slider deck) the SentryScan must be recalibrated (see Section 3.3)
	severely blinded screen	clean or replace screen
	severely coated transmitter or receiver	clean Transmitter and Receiver Modules (see Section 4.3.3)
SentryScan alarms immediately after power up	torn screen	inspect screen for evidence of a tear
	change in screen configuration	if screen specification or configuration changes (e.g., mesh count, wire diameter, material, backing wire, slider deck) the SentryScan must be recalibrated (see Section 3.3)
	wrong channel gasket	check to be sure channel gasket is a Supertaut Plus II conductive white/black co-extruded gasket specially designed for use with SentryScan systems.
	dirty channel gasket	check to be sure that the channel gasket and all mating surfaces are clean and free of material that could otherwise inhibit electrical continuity between the gasket and the mating surfaces.
	process not at steady state (specialized applications)	See Section 3.1.1 item 5 and consult SWECO on how best to handle such situations.
SentryScan alarms intermittently	torn screen	inspect screen for evidence of a tear
	incorrect sensitivity setting	consider reducing the sensitivity setting (see Section 3.4)
	incorrect baseline setting	check the baseline calibration (see Section 3.3)
	Interference	check for interference from other microwave frequency devices

SentryScan does not detect torn screen	incorrect sensitivity setting	consider increasing the sensitivity setting (see Section 3.4)
	incorrect baseline setting	check the baseline calibration (see Section 3.3)
	wrong channel gasket	check to be sure channel gasket is a Supertaut Plus II conductive white/black co-extruded gasket specially designed for use with SentryScan systems.

4.3. Preventive Maintenance

There are a few basic things that should be checked periodically to prevent problems from arising with the SentryScan system.

4.3.1. Periodic Inspection

Check the following at least every 1,000 hours of operation (more often in severe duty operations) and every time the separator is serviced…

□ Check all cable connections.

□ Inspect all cables for any kinking or abrasion.

□ Check tightness of tri-clover clamps on the SentryScan transmitter and Receiver Modules.

It is recommended that the SentryScan transmitter and Receiver Modules be submitted for detailed internal testing, calibration and verification after every 10,000 hours of operation. Refer to Section 4.3.4 Testing & Calibration for details.

4.3.2. Product Buildup & Coating

If you have a process that produces condensate or is prone to coating, periodically check the SentryScan Transmitter and Receiver Modules for product buildup. Use the procedure listed in Section 4.3.3 Cleaning & Sanitizing to gain access for inspection. Check the Transmitter and Receiver Module housings and the ferrule fittings on the separator frames for product buildup. If buildup appears, remove it with a solvent that will not damage the PTFE polymer (i.e. Teflon®) housings.

4.3.3. Cleaning & Sanitizing

If your SentryScan is used in a food or dairy application, the Transmitter and Receiver Modules must be cleaned and sanitized regularly. Frequency of cleaning and sanitizing depends on product and local laws and regulations.

DANGER: The use of water and/or cleaning solutions increases the risk of electrical shock. Disconnect and lock out all power sources to the separator and the SentryScan prior to cleaning.

NOTE: These instructions are only guidelines. Contact your local health inspector for specific laws and regulations for your area and process.

- □ Shut off the material feed to the separator and wait for material in process to work its way through the system such that the separator is clear of residual material.

- □ Turn off and lockout power to the separator and turn off the SentryScan system at Control Box.

- □ Disconnect the cables leading to the SentryScan transmitter and Receiver Module and remove the modules from the separator frames by removing the tri-clover clamps.

- □ A typical cleaning and sanitizing procedure is usually done in the following order:
  Rinse: Remove any residual product.
  Clean: Use a detergent solution to clean all surfaces.
  Rinse: Remove all detergent solution.
  Sanitize: Use a sanitizing solution to sanitize unit.

- □ Reverse the above steps to re-assemble the system.

NOTE: Sanitizing agents may be corrosive to the PTFE polymer (i.e. Teflon®) housings. Select a sanitizing agent that is compatible with these materials. Limit exposure of these items to reduce effects agents may have.

4.3.4. Testing, Calibration & Verification

Testing, calibration and verification of SentryScan devices at the component level must be performed by qualified individuals who have been specially trained to work competently and safely on SentryScan devices and who posses an understanding of microwave technology. Specialized test equipment and customized SentryScan test fixtures are also required.

SWECO offers factory certified service of SentryScan devices (refer to Section **X.X** Obtaining Service). SentryScan users who desire to perform their own component level servicing should contact SWECO for information on how to obtain the necessary training and test fixtures.