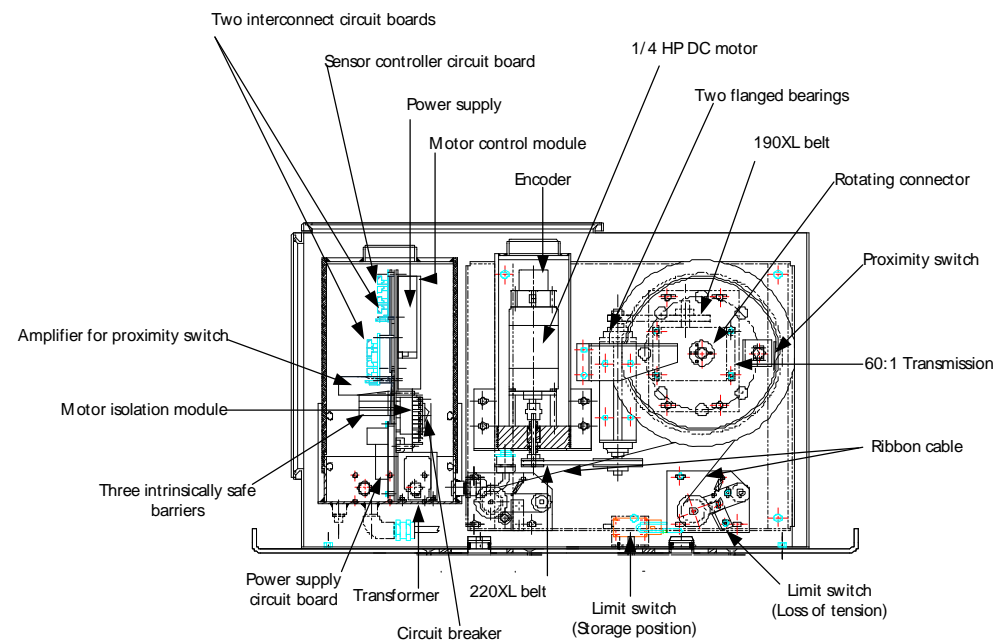


CHECKLIST FOR PERIODIC MAINTENANCE

Perform preventive maintenance inspections on the field unit whenever the unit is open and on a routine basis.

- Visually inspect the following.
 - Lubrication of the two jack shaft flanged bearings
 - Tightness of bolts and screws
 - Oil leaks
 - Belt tension
 - Proper alignment of cable/tape on the idler rollers
 - Proper alignment of cable/tape on the take-up wheel
- Adjust the idler roller or take up wheel position, as necessary, to prevent the cable/tape from rubbing.
- The center of the cable tape at the take-up wheel and the idler roller must be the same distance from the back wall of the field unit.
- Check proper alignment using a small level across the top of the idler roller.
- Observe the operation of the system at both the normal and high speed to verify the cable/tape runs the length of the well and is centered in the middle of the idler roller. This reduces wear and tear during operation of the system.
- Every six months:
 - Use a grease gun to grease the flanged bearings and the two nipples on the jackshaft flanged bearings. Use lithium-based, multi-purpose grease.
 - Grease the shipping and retaining screw and the screw shaft. Use multi-purpose grease. With the source/sensor assembly in the STORE position, turn the shipping/retaining screw IN and OUT to help distribute the grease.
 - Perform a calibration on the process material. The message, "CAL ON PROCESS" displays. After successfully completing this re-referencing, save to the EEPROM.



Bearings

There are three critical bearings in the field electronics. Plan to change out these components according to the following schedule:

Life expectancy in years	Bearing name
7	Motor bearing
15	Sensor bearing
19	Wheel bearing

Note: Only a trained VEGA service representative can change out the three critical components. Contact VEGA or your local representative to arrange for this service. Refer to the SmartScan Installation and Operation Guide for further information.

RETURNING EQUIPMENT FOR REPAIR

When calling VEGA to arrange repair service, be ready with the following information:

- Product model code
- Description of the problem
- VEGA Customer Order (C.O.) Number
- Purchase order number for the repair service
- Shipping address
- Billing address
- Date needed
- Method of shipment
- Tax information

1. Call VEGA Nuclear Products Repair at 513-272-0131 between Monday and Friday, 8:00 A.M. to 5:00 P.M. United States Eastern Standard Time.

2. VEGA assigns the job a material return authorization (MRA) number.

Please note: VEGA reserves the right to refuse any shipment that does not have a MRA number assignment.

3. Indicate the MRA on the repair service purchase order.

4. If shipping the entire system, perform the following steps.
- Ensure the source holder is securely locked in the OFF storage position.
 - Place the gauge in a sturdy (preferably wood) container. If it is open or damaged, additional lead shielding may be required. VEGA can provide specific instructions for packaging.
 - You can use a common carrier of your choice, but not the postal service.
 - Bills of lading must note that the shipment contains radioactive material.
 - Ensure that the shipping container is properly identified with the appropriate labels.
 - Notify VEGA as soon as you ship the item and advise them of the carrier, waybill number, and date of shipment.

5. Clearly mark the shipping package with the MRA number.

6. Send the confirming purchase order and the equipment to:

VEGA Americas, Inc.
Attention: Repair Department
4170 Rosslyn Drive
Cincinnati, OH 45209-1599 USA

Note: You must first contact VEGA and receive a material return authorization number (MRA) before returning any equipment to VEGA. VEGA reserves the right to refuse any shipment not marked with the MRA number.

VEGA Customer Service information

To request field service within the United States and Canada, call 513-272-0131. Customers outside of the United States and Canada should contact their local VEGA representative for parts and service.

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VEGA

SMARTSCAN QUICK REFERENCE MAINTENANCE AND DIAGNOSTICS GUIDE

Version 1.0

SAFETY INSTRUCTIONS



Before performing any maintenance on the SmartScan, refer to the Radiation Safety Manual and CD that came with your source holder, the SmartScan Installation and Operation Guide, and your country specific installation standards. Always follow the prevailing safety regulations and accident prevention rules of your company and country.

General

The SmartScan should not be used in temperatures less than -50 °C (-58 °F) or greater than 48 °C (118 °F).

Safety information for EX areas

- This equipment is suitable for use in the following environment:
- CSA Class I, Div 1, Groups C & D
- CSA Class I, Zone 1 Ex d IIB T3
- ATEX II 2G EEx d (ia) IIB T3

Special installation, maintenance, or operating instructions

If it is necessary to open the SmartScan, the following warning applies:

WARNING! EXPLOSION HAZARD – Substitution of components may impair suitability for use in hazardous locations.

WARNING! EXPLOSION HAZARD - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

AVERTISSEMENT: - RISQUE D'EXPLOSION - AVANT DE DÉCONNECTER L'ÉQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX.

WARNING! EXPLOSION HAZARD

If there is any damage to the SmartScan field enclosure, verify that the environment is in a non-hazardous condition before opening. Interaction between the positioning system and the enclosure can cause sparking.

Caution! Open circuits before removing cover. There is more than one live circuit. Refer to the system interconnect drawing. A seal shall be installed within 450 mm (1.48 ft) of the enclosure. Do not operate machine with grounding wire disconnected.

AVERTISSEMENT: - Ouvrir les circuits avant d'enlever le couvercle. Un scellement doit être installé à moins de 450 mm du boîtier. Ne pas mettre l'appareil en marche quand le conducteur de mise à la terre est débranché.

CAUTION! Do not operate the machine with the grounding wire disconnected.



WARNING! The SmartScan contains high voltage components (110VAC and 230VAC). Do not operate this system with an open enclosure. Turn off all power and wait a minimum of 10 minutes before opening the closure(s) or performing any maintenance on the system.

DIAGNOSTICS

Active alarms

The letter "A" flashes in the upper right corner of the operator display on screen 006 when there is an alarm condition.

Alarm type	Description
Low Limit Alarm	The process density (SpG) reaches the low limit of the curve.
High Limit Alarm	The process density (SpG) reaches the high limit of the curve.
Calibration Alarm	The process has instantly changed by 10% or greater. If this alarm continues, recalibrate as necessary.
Applications Code Range Error	The address pointer has gone to an invalid address. This causes the processor to lock-up. Turn the field equipment power OFF and then ON to reset the processor.
Sensor Failure or Loading Alarm Detected	The sensor assembly does not detect a signal.
EEPROM Checksum error detected	Data in the EEPROM is corrupt.
EEPROM Upload Error Detected	Jumper was not present on JP17 before uploading to the EEPROM.
Calibrate Alert	Displays the number of months since performing the last calibration.
Source Wipe	Displays the number of months since performing the last source wipe.

To acknowledge active alarms:

- From screen 006, select ACTIVE ALARM(S) and press ENTER.
Note: The alarm information displays the highest priority alarm first.
- Select YES and press ENTER. The A stops flashing on the display after acknowledging all alarms.

Troubleshooting checklist

- Verify with operations personnel that there are no changes to the process.
- Verify that all connectors to the circuit boards are fully seated. All I.C. chips should be fully inserted and all proper ground leads should be attached.
- Verify the power supplies are operating within the specific tolerances before replacing any circuit boards.
- Check relevant programming parameters to ensure that they have not changed.

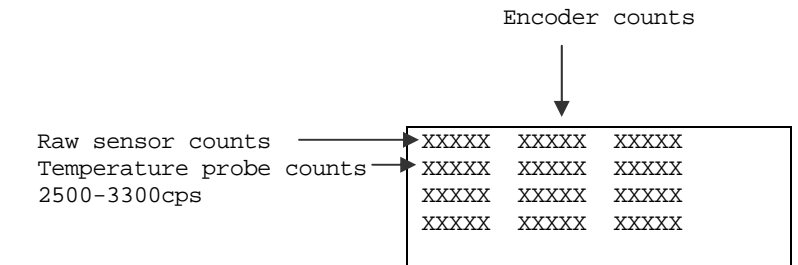
Troubleshooting the position system

Positioning system and electronic errors display in the lower right-hand corner of the screen.

Code	Error	Description
ENCR	Does not detect encoder pulses (causes system to stop moving)	<ol style="list-style-type: none"> Obstruction in pipe – clear pipe Increase number to 2,000 on screen 529, item 1854
BELT	Belt break error detected	Verify that all belts are on pulleys and shaft couplings are tight. If the belt is broken, follow the procedure to replace the cable and tape assembly.
FAIL	Communication failure between the SmartPro and the sensor controller board.	Performing the following: <ul style="list-style-type: none"> Check the LEDs Reset the SmartPro Reset the field unit Note: If the CPU fails, the field unit continues to operate using the last command received.
RLY+	No communication error. This is a default condition.	The motor power relay is energized and working normally. This is not a communication problem.
RLY-	No communication error. Motor power relay is de-energized.	Some motion error has been detected and the motor power relay is de-energized. The motor drive will not engage.
T_LS	Top limit switch	The upper limit switch has tripped
B_LS	Bottom limit switch	The bottom limit switch has tripped
REMT	Remote mode	The is remotely controlled by the DCS inputs.
LOCL	Local mode	The gauge is not being controlled remotely using the DCS inputs and is in local control mode.

Troubleshooting the motor drive

- Using the hand-held terminal, press SELECT to choose the mode of operation.
- Press ENTER.
- Press NEXT SCREEN.
- Drive the sensor down – the encoder counts should increase.
- Drive the sensor up – the encode counts should decrease.
Note: If the encoder counts increase and decrease as expected, the motor drive is operating correctly. If this does not occur, there is a possible encoder problem. Contact VEGA Field Service for further assistance.
- Press NEXT SCREEN.
- Press NEXT SCREEN.



Note: The environment around the field electronics must be in a non-hazardous condition before using the HHT to troubleshoot.

