



HS - METAL DETECTOR
SYSTEM SERVICE CHECKLIST
Serial Number: A-_____

I THE SENSOR

With the cables disconnected from the sensor, using a DMM on its highest resistance range, and checking both polarities.

- a) _____ Insulation between the bottom plate and building ground has a resistance $>20\text{ M}\Omega$.
- b) _____ Insulation between the top plate and bottom plate has a resistance $>20\text{ M}\Omega$.
- c) _____ The resistance between the center pin and the shield of the transmitter cable connector, on the sensor, is $>20\text{ M}\Omega$.
- d) _____ The resistance between the center pin and the shield of the receiver cable connector, on the sensor, is $>20\text{ M}\Omega$ or $<1\text{ k}\Omega$.

VISUAL INSPECTION

- e) _____ The caulking around the cavity covers on both portions of the sensor is intact, and not abraded.
- f) _____ The heads of the screws holding the cavity covers in place are completely covered with caulking.
- g) _____ The bolts holding the receive head to the spacer blocks are 1/8 turn tighter than snug. The insulators between them and the receiver have not been crushed, cracked, or cold formed (deformed by pressure).
- h) _____ The bolts holding the transmitter to the support frame aren't over-torqued or twisting the transmitter.
- i) _____ The sensor isn't vibrating or being shaken or jolted.
- j) _____ The areas directly to both sides of the sensor have no large metal surfaces capable of moving in reference to it.
- k) _____ The cable connectors are not damaged, and the caulking seal on them has not been broken.
- l) _____ Effective field width not exceeded.
- m) _____ Height of aperture not altered.
- n) _____ No sudden temperature changes. (Cold sensor - hot product, warm sensor - temporary cold air flows.)
- o) _____ Insertion of non-conductive items (i.e. a hand) into the aperture does not cause the system to trigger.

- p) _____ The sensor is clean, no oil or heavy corrosion is present.

II THE CONTROL CABINET

- a) _____ All external seals have been installed and are not damaged.
- b) _____ The internal connections are tight and clean.
- c) _____ Excessive amounts of moisture or dirt are not present inside the box.
- d) _____ The door is being kept closed, all locks are snug.

III CALIBRATION

The Oscillator [orange or white thumb tab]

- a) _____ The HD-STD switch is in the HD position for a heavy duty system, or in the STD position for a standard duty system.
- b) _____ Adjustment of the screwdriver control approximately 1/4 of the way down from the top of the card should cause the level transmitted (left hand meter at the top of the control panel) to decrease.

The Driver [red thumb tab]

- c) _____ The screwdriver adjustment on this board should be set to cause the transmitter level to be as close to 250 as possible.

The Trimming Capacitor C-3

- d) _____ Control (found on the lower panel, right side) causes the receive level (upper panel, right meter) reading to decrease when adjusted in either a clock-wise or counter-clockwise direction. Adjustment in both directions is possible.

The Receive Sensor Head

- e) _____ The receive level has been adjusted for a 1.00 reading (0.35 on the systems having a transformer on the receiver card - green thumb tab. - right most card in the cabinet.

IV CARD TEST LEVELS

All voltage tests are performed with the black jack on the output card used as common ground. The meter used able to read accurately at 9 to 22 kHz.

The Regulator Card [yellow thumb tab]

- a) _____ The top red jack has positive 21 to 25 V-dc. (Nominal 23 .6 V)
- b) _____ The blue jack has negative 21 to 25 V-dc (Nominal -23.6 V)
- c) _____ The absolute voltage difference between the two above levels is less than 1 V

- d) ____ The lower red jack has positive 9.7 to 10.1 V-dc

The Oscillator Card [orange thumb tab]

- e) The red jack has a range of 2-2.75 V-ac on the "F" card and >2 V-ac on the "A" & "B" cards.

The Driver Card [red thumb tab]

- f) ____ The red jack has a voltage greater than 2 V-ac

The Output Card [brown thumb tab]

- g) ____ The red jack has a voltage as close to 250 mV as possible and is within 10% of the value on the transmit meter (top panel left side).

The Receiver Card [green thumb tab]

- h) ____ The red jack has a positive 0.80 - 1.50 V-dc (300 – 400 mV-dc for the transformer receivers)

- i) ____ The above level matches the receive signal readout on the top panel right side.

- j) ____ The gray jack has a voltage 6 to 60 mV-ac

V THE CABLES

Resistive Check

- a) ____ The D.C. resistance between the center pin and shield connection of a cable completely disconnected from the system is greater than 20 M Ω when checked in both DC polarities.
- b) ____ The D.C. resistance center pin to center pin, end to end, is less than 500 m Ω .
- c) ____ The D.C. resistance shield to shield, end to end, is less than 500 m Ω .

Physical Check

- d) ____ No cuts, scrapes, or bare sections in coaxial PVC cover.
- e) ____ The connectors have no physical damage, and are properly installed.
- f) ____ Cable and connectors are of proper type.

VI THE POWER LINE

The Connections

- a) _____ C1 is connected to the hot input line.
- b) _____ C2 is connected to the neutral input line.
- c) _____ The ground light is lit.

The tests

- a) _____ The AC voltage is stable and between 110 and 130 V-ac.
- b) _____ The AC sine wave is free of line and load spikes in excess of 3 V.

VII THE INSTALLATION

Conveyors

- a) _____ No bad bearings.
- b) _____ No static on the belt and product guides.
- c) _____ All metal to metal connections excepting the drive system, are tightly fixed in place.
- d) _____ No part of the conveyor system is placed against the sensor at any point other than the underside of the lower head.
- e) _____ The moving drive system components do not touch the inside of their guards.
- f) _____ The belt or belts are free of metal and running true.
- g) _____ The system provides rigid construction or sensor isolation.
- h) _____ The product does not rub against the sensor.
- i) _____ Belt speed between 0.2 and 2 m/s.

Chutes

- j) _____ The speed of the product does not exceed 2 m/s.
- k) _____ The chute is not in contact with the sensor.
- l) _____ No static is being built up on the outside of the