INSTRUCTION MANUAL

ADR-50CB

BANTAM REMOTE CLOSURE MONITOR

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WARRANTY

The manufacturer warrants each unit for a period of one year to be free of defects in material and workmanship under normal use and service, the obligation of the manufacturer under this warranty being limited to replacing at the factory of manufacture any part of said unit found to be defective.

This warranty is expressly in lieu of all other warranties and representations, expressed or implied, and all other obligations, liabilities, and consequential damages which might arise out of the utilization.

1 THEORY OF OPERATION

1.0 CIRCUIT OPERATION

This section is extremely simplified in order to present a basic description of circuit operation without getting bogged down in complex pulse timing, forming and phase relationships. The purpose is to familiarize the operating personnel with the function of controls and adjustments.

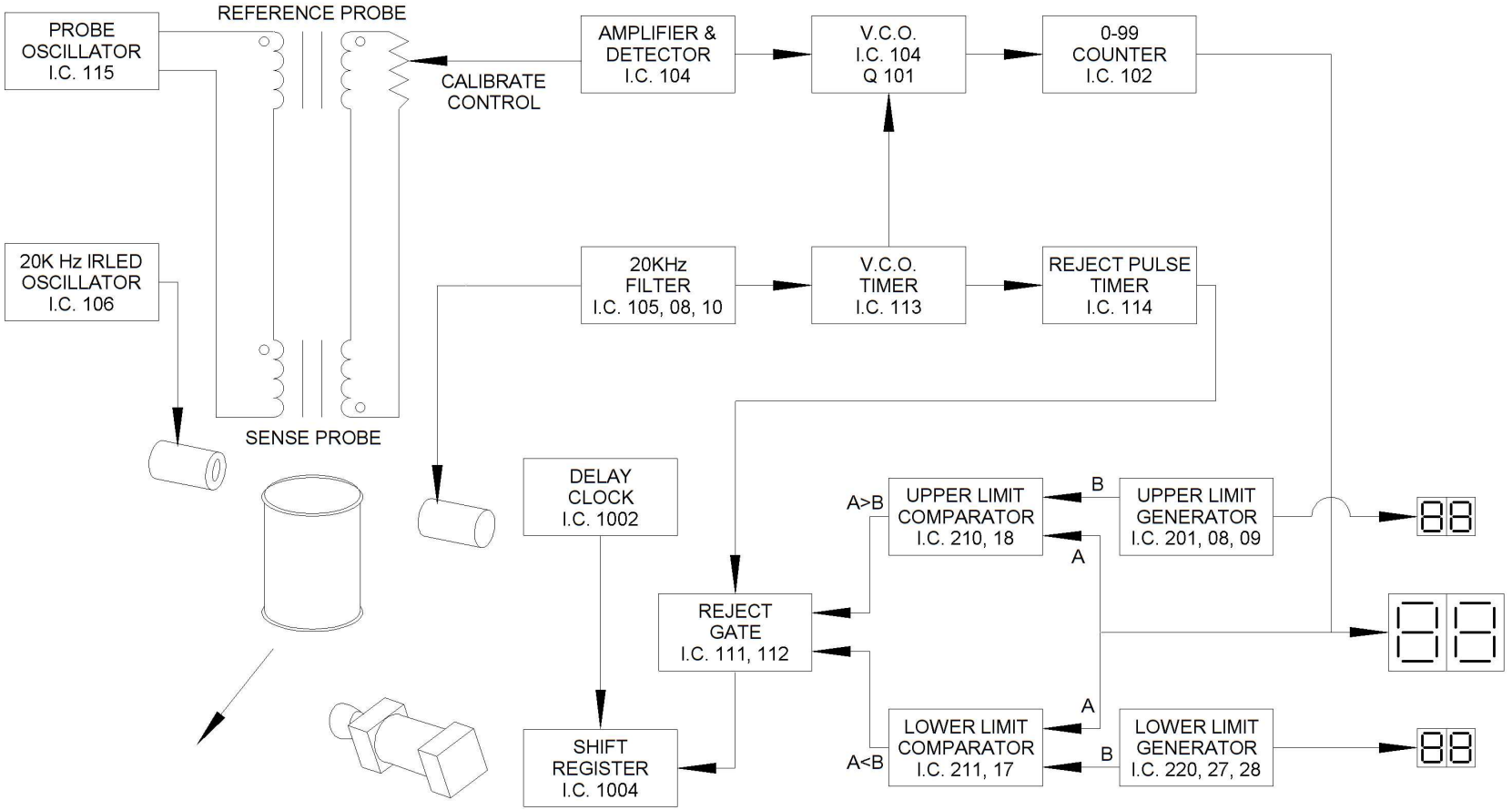
There are two separate sensing functions for the ADR-50C, proximity sensing of the container end and position sensing of the container in relation to the proximity sensor.

1.0.1 The proximity sensing is the heart of the ADR system. The ADR functions by measuring the distance of the center of the lid in relationship to a fixed point above the lid, and comparing that distance to a standard set into the instrument (with the Calibrate Control).

If that distance in a container under test is less than that of the standard, then the absolute pressure in that container is greater than in the standard (vacuum is less than standard). As the internal pressure of the container drops in relation to atmospheric pressure, the closure will be forced in by the atmospheric pressure and the measured distance will increase.

To make this proximity measurement, we use the sense probe (see Simplified Block Diagram). The sense probe, together with the reference probe make up a differential transformer. These two probes are driven by the 12Khz. Oscillator (I.C.-115). Each primary is exactly equal to the other so that the driving signal is divided equally between the two. The secondaries are also equal to each other so that the output of each secondary is equal when the field is not disturbed. The two secondaries are wired series opposed so that when the top of the reference probe is going positive, the bottom of the sense probe is going positive and the sum of the outputs is 0 volts.

This balance condition will remain stable until metal is brought near the face of the sense probe. When this occurs, the electromagnetic field is altered and the coupling of energy between the primary and secondary is changed in the sense probe. Therefore, the output of that secondary is different and the sum output voltage is no longer zero. As metal draws nearer to the face of the probe, the difference voltage increases and the output of the differential transformer becomes proportionally higher.



SIMPLIFIED BLOCK DIAGRAM

FIGURE 1.1

The A.C. output of the transformer is fed through the Calibrate Control to a detector where it is converted to a D.C. voltage proportional to the A.C. voltage level.

This proportional voltage is applied to the control terminal of the Voltage Controlled Oscillator (I.C.-104, Q-101). The output frequency of the V.C.O. is proportional to the D.C. voltage applied to the control terminal of the V.C.O.; as the applied D.C. control voltage increases, the V.C.O. frequency increases.

1.0.2 The enable pulse is the signal that a container is centered under the probe and ready to be measured. When a container passes between the light source and photosensor it blocks the light until the container clears. At that time the photosensor switches to the ON condition. When the photosensor switches ON, that triggers the V.C.O. timer (I.C.-113) which applies a pulse to the enable terminal of the V.C.O.

While the pulse appears on the enable terminal, the output of the V.C.O. is fed to the Counter (I.C.-102) which counts the pulses from the V.C.O. for the duration of the enable pulse. When the pulse ends, the total count is held and will not reset until the next enable pulse is applied. This count is also displayed on the large L.E.D. display.

1.0.3 The total V.C.O. pulse count for the container under test is then fed to the Upper Limit Comparator (I.C.-210, 218) and the Lower Limit Comparator (I.C.-211, 217). This information is compared to the limit information set in on the Upper Limit and Lower Limit Generator. If the lid is closer to the sensor than the preset limit, a reject pulse will be initiated by the Lower Limit Comparator. If the lid position is within acceptable limits, neither comparator will initiate a reject pulse and the container will be passed.

NOTE: A setting of 99 on the Upper Limit will disable the Upper Limit function; a setting of 00 on the Lower Limit will disable the Lower Limit function.

1.0.4 When a reject condition exists, a pulse from the Upper or Lower Limit Comparator coincident with a pulse from the Reject Pulse Timer (I.C.-114) causes an output from the Reject Gate (I.C.-111, 112). This signal is fed to the Reject Control System.*

The circuit consists of a clock (I.C.-1002), a shift register (I.C.-1004) and interfacing devices.

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*If the system is equipped with the VRR-1 Variable Rate Rejector, this signal is fed to the Variable Rate Reject Control instead. The Reject Control System is disabled.

The clock controls the rate at which information passes through the shift register. The clock is a variable (23hz-25khz) oscillator controlled by the Reject Delay Control. The clock signal is continuously applied to the 128 stage shift register which causes the register to step 1 stage for each clock pulse.

When a reject signal is received from the ADR, it is fed to the pulse shaper (I.C.-1001) where it is converted to a short pulse and fed to the pulse synchronizer (I.C.-1003). There it is stored until the next clock pulse when it is fed to the input of the shift register. After 128 clock cycles, a corresponding pulse is fed to the reject pulse shaper (I.C.-1005, Q-1001, 1002).

The shift register output pulse initiates the reject pulse, whose duration is controlled by the Pulse Width Control. The 18 V.D.C., five to fifty-five millisecond pulse is then fed to the reject valve solenoid where it actuates the solenoid and allows air into the reject cylinder.

The only error that can be introduced into the system is introduced in the pulse synchronizer. This error can be no more than $\pm$ one-half clock cycle ($\pm$ ½56 of the total delay).

There are two theoretical limits on the maximum delay possible. Each can be expressed in terms of container diameters of travel during the delay period. The first limit is the shift register capacity. If the rate of container flow is greater than 128 per total delay period, then two consecutive reject containers could fall in the same clock period and there would be only one reject pulse out for the two defective containers.

The other limit is the possible error introduced by the pulse synchronizer. If the delay is set at 128 container diameters of travel, then there would be a possibility of $\pm$ one-half container diameter, which means that the reject ram could hit anywhere from the leading edge to the trailing edge of the container. As a practical matter, if the rejector hits anywhere within the center one-fifth of the container, it should do the job. Therefore a delay of twenty five container diameters would probably work.

The minimum delay possible is approximately fifteen milliseconds, determined by the maximum clock frequency plus mechanical delay in the rejector. At 1,000 c.p.m. the minimum delay is one-fourth container diameter.

We recommend that the rejector be installed at a point between one-half and five container diameters downstream from the point at which the container is centered under the ADR probe.

1.1 DESCRIPTION OF OPERATION

In setting up and calibrating the equipment, care must be exercised to follow the mechanical set-up instructions (pages 3-1 through 3-3), before attempting to calibrate the equipment. The Sense Probe "looks at" an area about 3/4"(20mm) in diameter. If either guide rail or light and photosensor adjustments are incorrect, the measurement will be made off-center where there is less excursion of the closure for a change in internal pressure, and discrimination will be proportionally reduced.

If the sensor foot does not contact the container top firmly, the mechanical "reference point" for comparative measurements will be constantly shifting with line vibration and reliable results will not be achieved.

Now, let's run through a calibration procedure so that we can see what's going on. The mechanical set-up is correct, because it has been checked by you. The line is operating and containers are passing under the ADR-50C.

Set the Disable Switch to the Disable position. This allows the ADR-50C to function normally but blocks the reject pulse to the rejector.

Set the Upper Limit Display to 75 and the Lower Limit Display to 25. Set the Calibrate control fully counterclockwise. Under these conditions you will see a reject flash on the Reject light with each flash of the Position Sense light. (The Position Sense light comes on after each container passes through the light beam and stays on until the next container breaks the beam). Because the Calibrate control is at 0, there is no A.C. input to, and therefore a zero output from the 0-99 counter. The Lower Limit Comparator says this is below 25, and is therefore a reject. A reject pulse is generated and the Lower Limit Red Reject Light comes on. This light will remain on until an Upper Limit reject occurs. It does not extinguish when there is no reject pulse.

As you increase the Calibration Control setting, the amount of A.C. from the probe is increased at the detector, and the V.C.O. oscillates at a higher frequency, feeding a count into the 0-99 counter. Until the count reaches 25 cycles in the count period, each container will continue to indicate a reject. When you reach the point where you are in excess of 25 counts in the count period, the Lower limit comparator will stop initiating reject pulses and the reject light will not flash.

As you continue to increase the Calibrate control setting, you will continue to increase the A.C. at the input to the detector, the V.C.O. frequency and the count in the counter and comparators.

Eventually you will reach the point where the A.C. voltage level at the detector input will yield a count in excess of 75 cycles from the V.C.O. and the Upper Limit comparator will initiate a reject pulse.

At that point the Reject light will flash, the Lower Limit indicator will extinguish and the Upper Limit indicator will come on. As you continue upward in the Calibrate Control readings all containers will become Upper Limit rejects.

When the unit is in use, the operator sets the calibration control so that the relative deflection (large L.E.D. display) is varying about 50. After observing the normal range of lid deflection, the operator then sets the upper and lower limits as required.

2 INSTALLATION

2.0 INTRODUCTION

Installation of the ADR-50CB has been made as simple as possible, to reduce your installation costs and line down time. By following the procedure outlined, installation will be completed quickly and painlessly.

2.1 LOCATION

2.1.1 BANTAM LINE SENSOR HOUSING INSTALLATION

Select the position on the line where the ADR-50CB Line Sensor Housing is to be installed. On lines coming from the closing machine, the ADR-50CB should be located at a point where the containers have cooled as much as possible. This will allow the containers to achieve a fairly uniform internal pressure. Variation in temperature will change the internal pressure of the container, reducing the validity of test results. Also, with greater time after closing, more leakage will occur in defective containers with a better chance of detection.

Where containers are drawn from the warehouse for labeling and shipment, the only consideration is convenience of handling. Most installations are made just before the labeler.

The location selected should be close to a leg or support on the conveyor, at a point of maximum conveyor stiffness. Since the Line Sensor Housing is supported from a single point on the conveyor side, any vibration or movement of the conveyor bed will be transmitted through the support pipe to the Line Sensor Housing. Therefore, care should be used in locating the Line Sensor Housing at a point of minimum movement in the conveyor. Do not mount the Line Sensor Housing support pipe on an adjacent wall or building structural member, since the sensors must move with any motion of the conveyor bed. If excess vibration is encountered, it will be necessary to stiffen the conveyor at the point of attachment.

The ADR-50CB requires about sixteen inches of clear line space. It will be necessary to remove guide rail from one side of the line where the containers are being rejected.

2.1.2 REMOTE CABINET INSTALLATION

The ADR-50CB remote cabinet can be mounted to a wall, column or a fabricated stand near the Line Sensor Housing. It should be mounted in a position where the Line Sensor Housing is in clear view for ease of calibration.

2.2 POWER REQUIREMENTS

The ADR-50CB is wired to accept the power supply of the country of installation. It requires single phase power, 50 or 60 hertz at 1 amp. Standard voltages are 100-120 volt or 200-240 volts. Other voltages are available on special order.

Check your unit to determine that it is wired for your required voltage before installation. A bright orange sticker at the point of power connection will show the correct power supply for your unit. If this sticker is not in place, be certain to verify power requirements.

NOTE: If the unit is supplied with the RIT-800P Regulating Isolation Transformer, the RIT-800P input will be wired for the correct voltage and frequency, and the ADR will be wired for 100-120 volts, regardless of supply voltage.

Power for the ADR-50CB should not be taken from a line used to power heavy motors or motor controllers where electrical "noise" is likely to be present on the line.

Compressed Air, at 2 cfm, 60 to 120 p.s.i. (4-8 atm.) is required to operate the reject mechanism. For line speeds in excess of 500 c.p.m., the air supply line should be one half inch i.p.s. minimum.

A filter, regulator and oiler must be installed prior to the ADR rejector.

2.3 PRELIMINARY

Unpack the unit and inspect for damage. Observe the arrow on the Delrin lead-in strip at the bottom of the line sensor housing. this indicates the direction of container flow.

Engage the ball joint (1, Figure 2.1) into the docking module (2) and lock (3) the assembly together.

Position the housing over the line at the point where the containers are to be checked. Swing the candy cane around until the cane lifter assembly is flat against the conveyor side and temporarily clamp the mounting plate to the conveyor, so that the pipe is perpendicular to the conveyor bed.

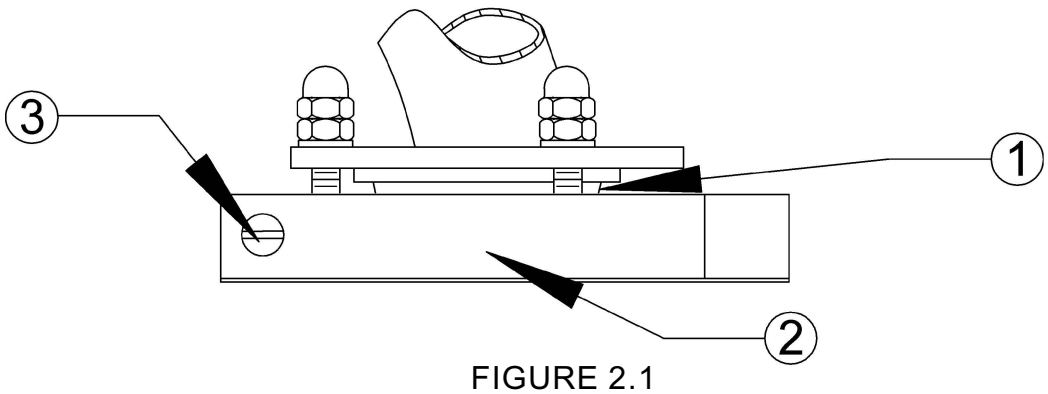


FIGURE 2.1

NOTE: The support pipe may be mounted upstream or downstream from the housing on either side of the conveyor. Check the Delrin lead-in strip for correct line flow direction. If this is wrong, loosen the ball joint and rotate the housing on the candy cane, turning the housing to align the arrow with flow direction.

With the cane lifter mounting bracket clamped to the conveyor, make a preliminary adjustment for container height. Crank the cane lifter to its highest position. Loosen the four nuts clamping the cane lifter to the candy cane pipe and raise the candy cane so that the ADR will clear the tallest container to be checked. Snug, but do not tighten, the pipe clamping ring nuts. Place the tallest container to be checked under the ADR sense probe. Adjust the position of the candy cane pipe in the cane lifter so that the probe clears the top of the container by at least one inch.

Lower the housing with the cane lifter crank until the probe just touches the top of the container. Swing the ADR Bantam housing across the line so that it is centered on the top of the container. Tighten the four nuts to lock the pipe in the cane lifter, and tighten the four acorn nuts to secure them.

Remove the tallest container to be tested from the line and replace with the shortest container to be tested. Check to see that the height adjustment will cover the full range.

Adjust the conveyor guide rails so that there is about 1/4" (6 mm) clearance between guide rails and the containers, where the containers pass under the Bantam head.

Check to see that the rejector can be mounted on one side of the line after the containers have cleared the Bantam head, and that provisions for rejected containers can be made on the other side. If everything is clear, proceed with permanent installation.

2.4 SENSOR FOOT PAD

The ADR-50CB utilizes a variety of sizes of Sensor Foot Pad to reference off of the top of the containers under test. Table 2.1 below shows the size, part number and maximum lid diameter for each Sensor Foot Pad.

MAXIMUM CLOSURE DIAMETER			
NO.	DIAMETER	INCHES	MM
1	200	2.000	50
3	202	2.125	55
5	211	2.687	65
7	203	3.187	80
9	400	4.000	100

TABLE 2.1

The Sensor Foot Pad is approximately square, with the width of the container lid determining the minimum width of the Sensor Foot Pad. Center-to-center minimum distance between containers determines the maximum size of the Sensor Foot Pad. For example, if a glass jar 80mm in diameter with a 38mm diameter lid is being run, any Sensor Foot Pad in excess of 38mm wide, up to 80mm wide could be selected. If a Sensor Foot Pad less than 38mm is selected, the pad would not cover the entire diameter of the lid, while if a pad greater than 80mm is selected, the following container could lift the pad while the measurement is being taken.

It may be necessary to space the containers passing under the ADR in order to assure that a following container will not lift the pad while a measurement is being made.

While Table 2.1 lists the stock sizes of Foot Pads, we can easily supply custom pads to meet specific requirements.

To change Foot Pads, refer to Figure 3.1 while following the directions below.

1. Remove one hinge block at the front of the lead-in strip.
2. Pull the lead-in strip away from the remaining hinge block and allow it to drop.
3. Rotate the Sensor Foot Pad 90° and pull straight down. It will slide off of the probe holder.
4. Remove the lead-in strip from the Sensor Foot Pad by folding it down from the Sensor Foot Pad until it disengages.
5. Hold the replacement Sensor Foot Pad and engage the lead-in in the Sensor Foot Pad hinge. Fold it back so that the Sensor Foot Pad and lead-in are aligned.
6. Reassemble, reversing steps 3 through 1

2.5 PERMANENT INSTALLATION

2.5.1 EQUIPMENT MOUNTING: Attach the cane lifter assembly to the conveyor bed permanently. If there is insufficient stiffness when the unit is attached, stiffen with bolts and spacers to the other side of the conveyor, or as required.

Connect the cable between the Bantam line sensor housing connector at the bottom of the candy cane and the remote housing. Connect the cable between the rejector and the remote housing. Refer to Installation Drawing (Fig. 2.3).

2.5.2 ELECTRICAL INSTALLATION: Bring electric power to the lower left hand entryway in the remote housing (Fig. 2.3, A). We recommend conduit or flexible metallic or non-metallic sealtight conduit. If a rubber jacketed power cord is used, be certain that a waterproof compression bushing is used to seal the entryway.

To gain access to the interior of the remote enclosure, loosen the 4 captive fasteners and remove the ADR-50CRM Waterproof Enclosure and Amplifier assembly from the stainless steel remote cabinet panel. Disconnect the cables from the back of the waterproof enclosure and set the unit aside.

Insert three wire power cable into the remote cabinet (A, Figure 2.3) and route wires to the terminal block (Figure 2.2) in the rear of the remote cabinet.

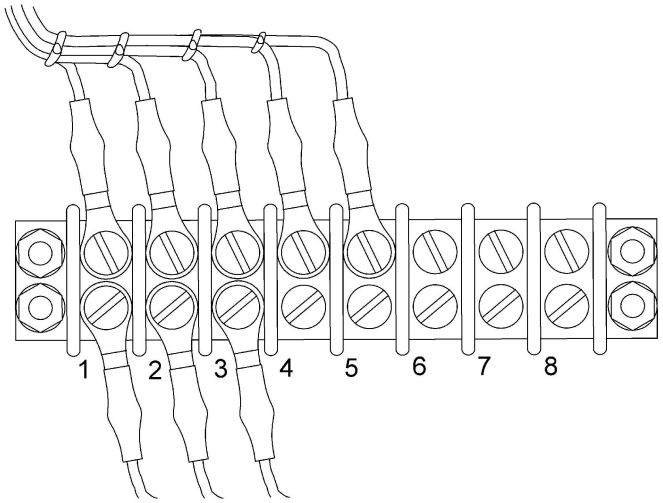


FIGURE 2.2

Wire as shown in Figure 2.2. Terminal 1 is equipment ground (earth), Terminal 2 is power in L-1, and Terminal 3 is neutral L-2.

Be sure to tighten the entryway bushing to assure waterproof integrity of the cabinet.

Re-install the waterproof enclosure and amplifier assembly.

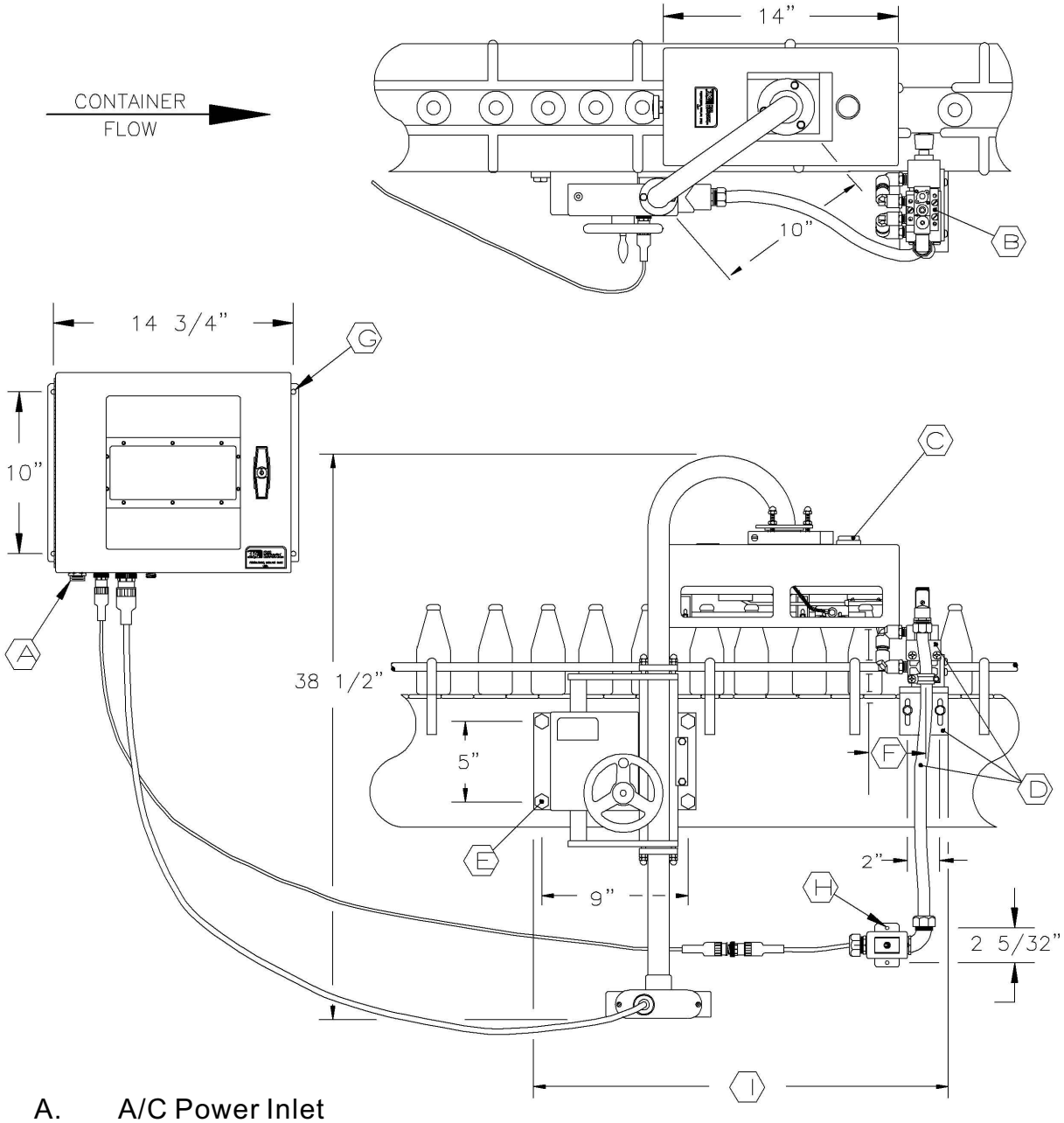
2.5.3. REJECTOR INSTALLATION: If your unit is supplied with the VRR-1 Variable Rate Reject Control, refer to that installation manual for Rejector installation instructions.

Mount the air cylinder rejector to the side of the conveyor at a convenient point one-half to ten container diameters downstream from the Bantam line sensor housing. The rejector should be positioned vertically so that the rubber bumper is slightly below the center of the container to be rejected. Set the rejector so that the stroke is angled downstream about fifteen degrees, not perpendicular to container flow. If necessary, remove a section of guide rail to clear the rejector hammer. Then slide the rejector forward until hammer just clears the container.

Remove the guide rail on the opposite side of the line for a sufficient distance to clear the containers being rejected. This is usually about one-half container diameter plus six inches downstream from the center and one-half diameter upstream. It may be necessary to increase this for higher line speeds.

Attach a filtered air line to the rear of the rejector.

Attach a reject receiving tray or carry-off device for the rejected containers. This completes installation.



A. A/C Power Inlet
B. Rejector air inlet, 1/4" I.P.S. requires 60-150 P.S.I., 3 C.F.M. continuous cycling. Air must be dried and filtered.
C. Bull's Eye Level
D. Air rejector cylinder and mounting bracket assembly. Shipped assembled and wired. May be located on either side of line. Two (2) slots. 9/32" x 1 21/32" located as shown.
E. Cane mounting bracket assembly. Four holes, 7/16" diameter. Located as shown.
F. Distance determined at installation. (Must not exceed maximum distance of reject delay adjustment).
G. Remote Cabinet Assembly. Four holes, 5/16" diameter. Located as shown.
H. Disable switch enclosure assembly. Two (2) holes, 7/32" diameter. Located as shown.
I. Minimum line distance required, 16" (See Note F).

INSTALLATION DRAWING, BANTAM WITH ADR-50CR

3 OPERATION

3.0 MECHANICAL ADJUSTMENTS

The initial mechanical set-up of the ADR is the most critical part of the operation of the unit. Improper adjustments may cause apparent drift and instability, insensitivity, or complete failure. In a large percentage of apparent electronic troubles, the cause is really improper mechanical adjustment.

The new Bantam line sensor housing with it's unique single-point adjustment greatly simplifies the mechanical setup of the ADR.

3.0.1 Swing the Bantam line housing across the conveyor so that the line housing is centered over the container line of travel. Lower the Bantam head until the Sensor Foot Pad (Figure 3.1) just clears the top of a test container. Adjust the Bantam diameter adjustment knob so that a container will pass between the Bantam Guide Rails without touching the rails on either side.

LINE SENSOR SYSTEM

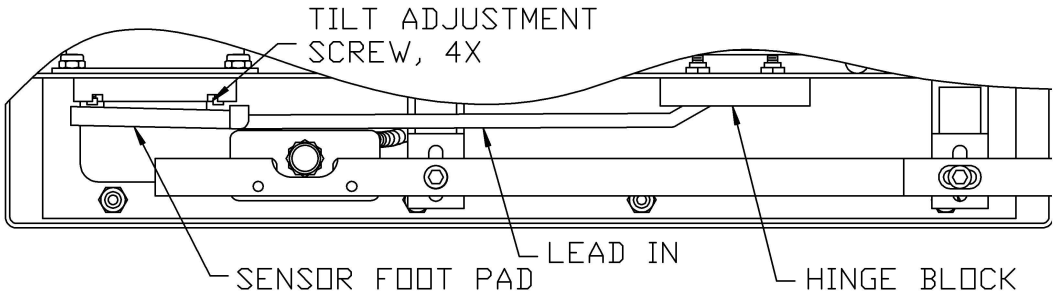


FIGURE 3.1

3.0.2 Level the Bantam line sensor housing by adjusting the three ball joint adjustment screws (Figure 2.1) while referring to the bull's eye level on the top of the housing.

3.0.3 With the conveyor running, pass a container under the Bantam. Swing the housing across the line so that the container passes under the Bantam, centered between the guide rails. Rotate the housing so that the container passes between the Bantam guide rails without touching either rail. Bring the Bantam rails together until they just clear the container at the point of contact.

When the container passes between the Bantam guide rails, be sure that it does not touch the conveyor guide rail on either side. It must not touch the conveyor guide rails, or it will cause the container to tilt or bind as it passes under the Bantam.

When these adjustments are completed, lock the ball joint and cane lifter swivel lock nuts.

3.0.3.1 Notice that the Bantam guide rails move forward as they are closing together. This forward motion carries the light source and photosensor mounted on the guide rails toward the center of the probe. This motion adjusts the position sense function for smaller diameter containers, proportional to the distance between the guide rails.

3.0.4 POSITION SENSE ADJUSTMENT. Observe the mounting of the light source and photosensor assemblies on the guide rails. If the notch on the guide rails faces up, and the photosensor and light source assemblies are above the guide rails, they are set up for glass jars or necked down cans. The position sense infrared light beam will pass very near the top of the container, assuring that it will be interrupted by the metal closure of a glass jar or the necked down portion of a can.There is a fine adjustment of the height of the light beam. This can be adjusted to fit your requirements by adjusting the height of the guide rails at the guide rail supports.

If the notch in the guide rails points down, the photosensor and light source mount below the guide rails and the infrared light beam passes about 1" (25 mm) below the top of the container. To change the position of the light beam, switch the Bantam guide rails to the opposite sides.

TILT LIMIT ADJUSTING SCREWS

BOTTOM VIEW

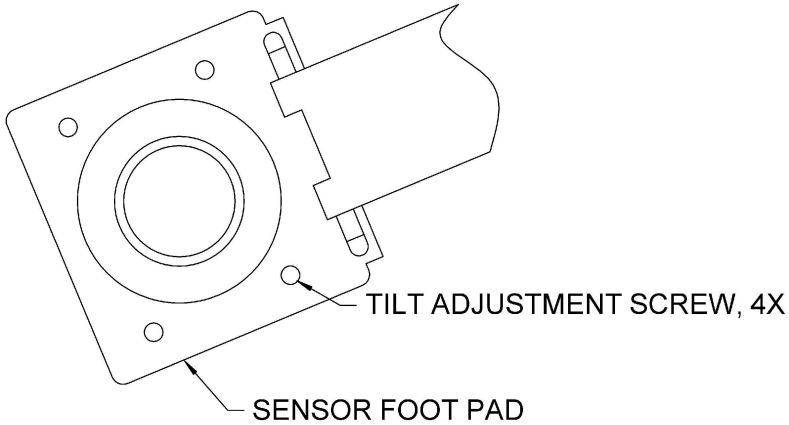


FIGURE 3.2

3.0.5 COCKED CAP DETECTION. The gimbal mount of the sense probe allows the Sensor Foot Pad to tilt as much as 7° off of horizontal to accommodate eccentric container tops. This tilt of the Sensor Foot Pad may be great enough to accommodate the tilt of a cocked cap. The amount of tilt allowed can be reduced by adjusting the Tilt Limit Screws in the sensor housing (Figure 3.2). As supplied, these screws are adjusted to not interfere with the Sensor Foot Pad tilt.

To limit the tilt, drop the lead-in (Figure 3.1) and rotate the Sensor Foot Pad until the holes in the pad align with the socket heads of the tilt-adjust screws. Back the screws out until the reduce the amount of tilt allowed to an amount that will cause the Sensor Foot Pad to lift from the low edge of a cocked cap. This will cause the sensor to give a low reading, causing the jar to be rejected.

When making this adjustment, start with the screws turned all of the way in. then back the screws out until the tilt is restricted. We suggest that you count the number of turns as you back each screw out to assure that the tilt is restricted the same amount in every direction. Back the screws out either 1 or 2 full turns each, in a circular pattern, until you have reached the level of tilt restriction you need.

3.0.6. HEIGHT ADJUSTMENT. With the conveyor running, repeatedly pass a container under the Bantam line housing. Loosen the cane lifter locking nuts and lower the Bantam line housing until the container lifts the Sensor Foot Pad 1/16" (1.5 mm) to 3/32" (2.5 mm). Tighten the cane lifter lock nuts.

When running production you may need to touch up the height adjustment.

Excess of 00 rejects suggest that you need to lower the Bantam line sensor housing to lift the sensor higher.

3.1 CALIBRATION/OPERATION

In the following procedures, you will be setting the equipment to match the condition of your containers on your line. You will make two adjustments - first, you will adjust the ADR-50C to the average deflection of normal or acceptable containers, and secondly, you will set the limits of the normal or acceptable variation in lid deflections. Any container whose lid deflection falls outside the pre-set limits will then be ejected from the line.

3.2 OPERATING CONTROLS

3.2.1 CALIBRATE CONTROL: The calibrate control is the 10 turn precision potentiometer on the front panel. The control adjusts the level of the signal which is received from the probe when a container lid is being sensed. When an average normal container is being sensed by the probe, the received signal level is adjusted so that NO reject signal is present.

3.2.2 LIMIT SWITCHES: The Upper and Lower Limit toggle switches set the limit displays. Their function is to establish the highest and lowest deflection for acceptable containers. Any container falling outside the limits set by the Limit Switches will be rejected. The

Upper Limit switch controls the "Internal Pressure Too High" lid set point, and the Lower Limit switch controls the "Internal Pressure Too Low" set point. (Remember, lower pressure means higher vacuum.)

3.2.3 REJECT DELAY CONTROL: Controls the amount of delay after the decision to reject has been made. This permits installation of the rejector downstream from the point of testing so that the point of rejector impact can be adjusted electrically rather than mechanically.

3.2.4 REJECT PULSE WIDTH: Controls the amount of time power is applied to the rejector solenoid valve of the reject air cylinder. This is not critical at normal line speeds but should be increased for heavy containers and made as short as practical for high line speeds.

3.2.5 REJECT/DISABLE SWITCH: The Reject/Disable switch controls the reject signal to the D.C. Switch Module. In the Disable position, all other functions and displays are normal. The Reject/Disable switch is placed in the Disable position during set-up, and any time it is necessary to stop the rejecting of the ADR-50C without disturbing the set-up.

3.3 DISPLAYS

3.3.1 LARGE L.E.D. TWO DIGIT DISPLAY: Displays relative lid position of each container. For higher speed lines, the unit can be adjusted so that every second, third, etc. container lid position is displayed. When a reject occurs, that number is displayed and held for an extended period unless overridden by another reject.

3.3.2 UPPER & LOWER LIMIT DISPLAYS: The smaller two digit displays show the limits of lid excursion you have selected. When power is applied to the unit, the upper limit will be set on 75 and the lower limit on 25. You can then expand or contract the limits as necessary. If power is interrupted momentarily, the limits will return to 25 and 75 and must be reset.

3.3.3 RED L.E.D. INDICATOR LIGHT DISPLAYS: Red L.E.D.s associated with the Upper and Lower Limit Displays show that the most recent reject exceeded either the upper or lower limit. One or the other will light and will remain lighted until a reject of the other limit occurs.

3.3.4 POSITION SENSE (GREEN) L.E.D. INDICATOR LIGHT: This L.E.D. lights when the light from the I.R.L.E.D. light source is sensed by the photosensor. It is used to:

1. Verify operation of the light source and photosense circuits of ADR-50C.

2. Make Position Sense adjustments in setting up for container diameter.

3. Check operation and set-up while containers are being tested.

3.3.5 REJECT (ORANGE) L.E.D. INDICATOR LIGHT: Indicates that a reject has been sensed, even when the rejector is disabled.

3.4 REJECT ADJUST

NOTE: For units supplied with the VRR-1 Variable Rate Reject Control, the ADR reject system is not used. Disregard section 3.4.

Set the ADR to assure reject containers. Set the Calibrate control to 0 (fully counterclockwise) and set the lower limit to 25. Set the Pulse Width and Reject Delay controls to mid-range. Set the Reject/Disable switch to Reject and apply air pressure to the rejector air cylinder.

With the conveyor running, pass a container through the ADR and observe the position of the container when the rejector ram extends. If the container has passed the rejector, reduce the delay setting; if it has not reached the rejector, increase the delay setting. Repeat the process until the container is rejected from the line with a consistent, positive motion.

Continue passing the reject container through the ADR and reduce the Pulse Width control setting until you notice a change in the trajectory of the container off of the line. Then increase the setting slightly.

Then pass two containers, tightly spaced, through the ADR. The unit should move both off of the line smartly. If not, increase the pulse width setting.

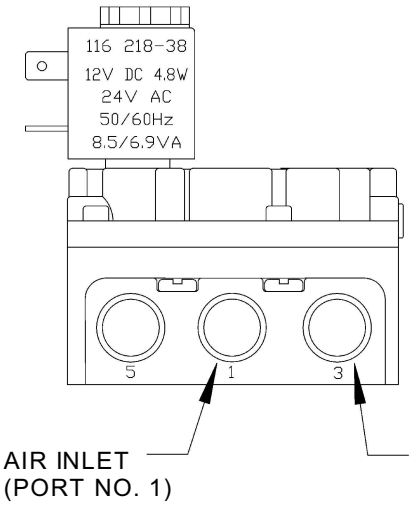
3.4.1 HIGH SPEED LINES

At line speeds in excess of 800 c.p.m., we recommend use of the HSR-2000 High Speed Rejector. This unit should be installed with a regulator, filter and oiler. Operating pressure should be set between 50 p.s.i. and 60 p.s.i.

3.4.2 LOW SPEED LINES

On low speed lines carrying large containers or glass, operation can be improved by putting a regulator on the air line and reducing air pressure. Air pressure should be set between 60 p.s.i. (minimum operating pressure) and 70 p.s.i. You can further slow operation of the B-103-12 Air Rejector by installing the restrictor valve (provided with the cylinder) in the exhaust port (See figure 3.3).

EXHAUST RESTRICTOR VALVE INSTALLATION



NOTE:
OPTION - An Exhaust Speed Control can be installed in Port. No.3. The speed and force of operation of the cylinder may be increased or decreased with adjusting screw.

FIGURE 3.3

3.5 CALIBRATION

After adjustment of the reject system, place the Reject/Disable switch in the Disable (down) position. When production is underway and the line is running normally, proceed as follows:

3.5.1 Observe the "Position Sense" light. The light should blink with the passage of each container. (No minimum spacing is required between cans, but it may be necessary to space glass if the Position Sense light does not come on after each container.)

3.5.2 Set the Lower and Upper Limit displays to 25 and 75 respectively. Observe the Reject light for pulses, indicating a reject signal. Set the Calibrate control fully clockwise, and observe the Upper Limit Light. It should remain on. Reset the Calibrate control fully counterclockwise. The Upper Limit Light should extinguish and the Lower Limit Light should come on. This preliminary check indicates that the instrument is functioning properly.

3.5.3 Raise the Calibrate control setting until numbers begin to appear on the large L.E.D. Displays. On cans with deep countersink, it may require several turns of the control before numbers other than 00 appear. Until the numbers appearing exceed 25, you will get a number displayed for each container and the reject light will flash for each container.

When you raise the calibrate control so that the numbers exceed 25, there will be a delay of several seconds before the numbers begin to change. When a reject occurs, the displayed number for that reject is held, blanking the display for any acceptable container for several seconds. This held figure will be overridden by a subsequent reject during the holding period.

If the numbers are changing too rapidly to be recognized, the ADR-50C can be adjusted to display the relative lid position of every second, third, etc. up to every ninth container. This does not affect the operation of the unit. Every container is checked and compared to the upper and lower limit settings.

To make this change, remove the Front Panel assembly from the Waterproof enclosure. Remove the Sense (rear) circuit board from the panel assembly and place the board on a bench with the 15 pin receptacle facing you on the left end of the board. To the right of pins 6-8 of that connector, you will see a circular hole pattern numbered 1-9. There is a jumper connected between the center position and hole 1. Remove that jumper and reconnect to hole 2 and center to display every second container deflection, hole 3 and center to display every third container, etc.

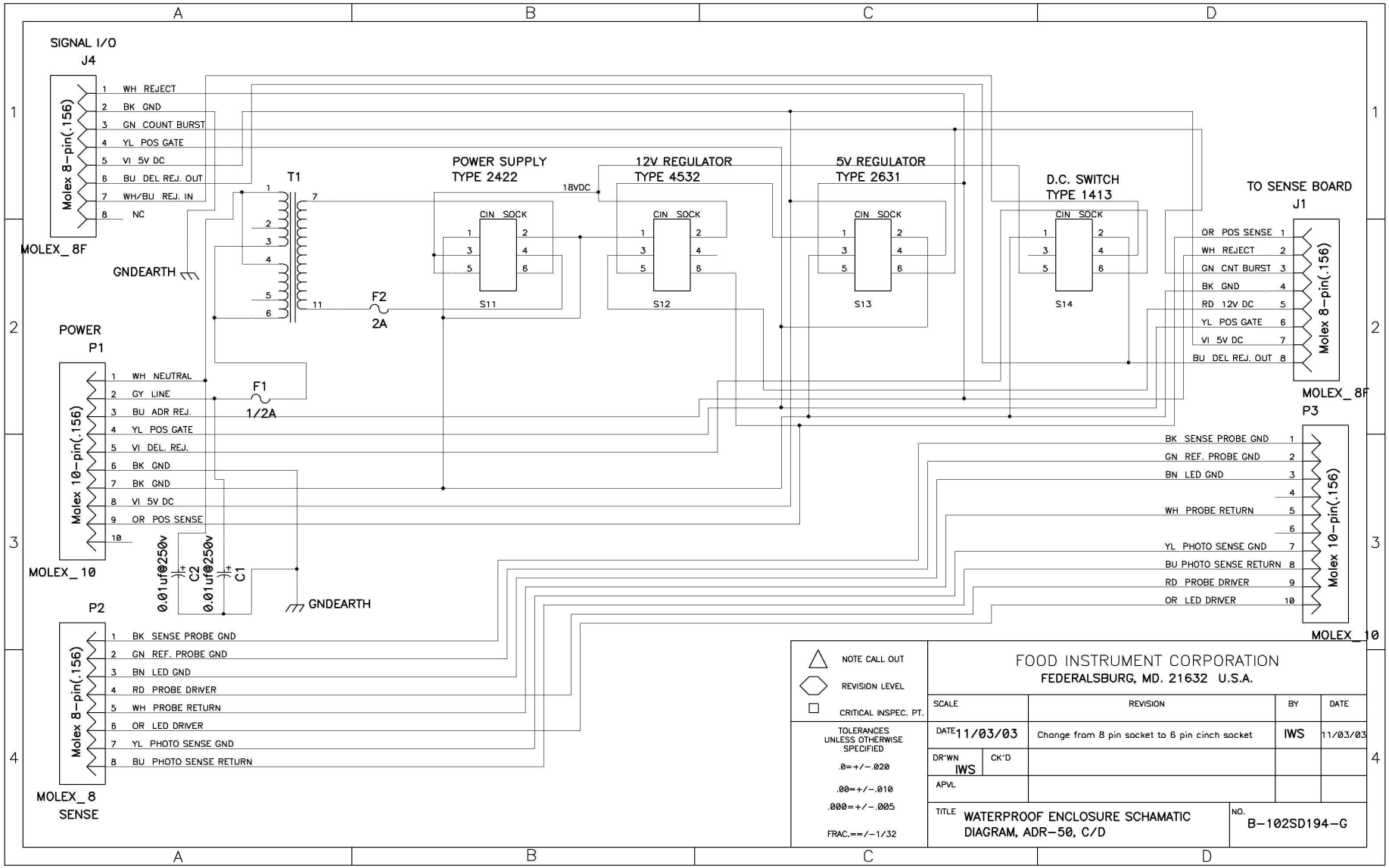
Continue to raise the Calibrate Control until the relative lid position display is varying around 50.

3.5.4 Observe the range of numbers displayed and then set the Upper & Lower Limits to bracket the range of readings.

3.5.5 Throw the Reject/Disable Switch to the Reject position. Then start lowering the Upper Limit until a container is rejected. Raise the Upper Limit four or five points. Check the rejected container for proper vacuum or pressure. Use this as a guide to determine Upper Limit setting. Repeat this procedure to determine proper Lower Limit setting.

NOTE: To disable the Upper Limit function, set the Upper Limit to 99. To disable Lower Limit function, set the Lower Limit to 00. Disabling either limit will not affect operation of the other limit.

This ADR-50CB is now calibrated and ready for operation.


SIGNAL I/O
J4
Molex 8-pin(.156)
1 WH REJECT
2 BK GND
3 GN COUNT BURST
4 YL POS GATE
5 VI 5V DC
6 BU DEL REJ. OUT
7 WH/BU REJ. IN
8 NC
MOLEX_8F
GNDEARTH
T1
F2
2A
POWER SUPPLY
TYPE 2422
18VDC
12V REGULATOR
TYPE 4532
5V REGULATOR
TYPE 2631
D.C. SWITCH
TYPE 1413
CIN SOCK
S11
S12
S13
S14
TO SENSE BOARD
J1
OR POS SENSE 1
WH REJECT 2
GN CNT BURST 3
BK GND 4
RD 12V DC 5
YL POS GATE 6
VI 5V DC 7
BU DEL REJ. OUT 8
MOLEX_8F
POWER
P1
Molex 10-pin(.156)
1 WH NEUTRAL
2 GY LINE
3 BU ADR REJ.
4 YL POS GATE
5 VI DEL. REJ.
6 BK GND
7 BK GND
8 VI 5V DC
9 OR POS SENSE
10
F1
1/2A
MOLEX_10
0.01uf@250v
C2
0.01uf@250v
C1
GNDEARTH
P3
BK SENSE PROBE GND 1
GN REF. PROBE GND 2
BN LED GND 3
4
WH PROBE RETURN 5
6
YL PHOTO SENSE GND 7
BU PHOTO SENSE RETURN 8
RD PROBE DRIVER 9
OR LED DRIVER 10
Molex 10-pin(.156)
MOLEX_10
P2
Molex 8-pin(.156)
1 BK SENSE PROBE GND
2 GN REF. PROBE GND
3 BN LED GND
4 RD PROBE DRIVER
5 WH PROBE RETURN
6 OR LED DRIVER
7 YL PHOTO SENSE GND
8 BU PHOTO SENSE RETURN
MOLEX_8
SENSE
NOTE CALL OUT
REVISION LEVEL
CRITICAL INSPEC. PT.
TOLERANCES UNLESS OTHERWISE SPECIFIED
.0=+/-.020
.00=+/-.010
.000=+/-.005
FRAC.=+/-1/32
FOOD INSTRUMENT CORPORATION
FEDERALSBURG, MD. 21632 U.S.A.
SCALE
REVISION
BY
DATE
DATE 11/03/03
Change from 8 pin socket to 6 pin cinch socket
IWS
11/03/03
DR'WN IWS
CK'D
APVL
TITLE WATERPROOF ENCLOSURE SCHAMATIC DIAGRAM, ADR-50, C/D
NO. B-102SD194-G

4 ADR-50CB TROUBLESHOOTING GUIDE

4.0		PRIMARY POWER TROUBLESHOOTING
	NOTE:	Insure that a single ground wire goes back to the electrical panel.
		Insure that the ADR-50C is not connected to any motor supply voltages.
		Insure that the ADR-50C is connected directly to the AC power source through a panel breaker.
	4.0.1	Check for a tripped breaker or a bad fuse in breaker panel.
	4.0.2	Check AC power input for water in connectors, frayed wires, or broken wires.

4.1		AC POWER SUPPLY TROUBLESHOOTING (Fuses blow when AC Power is applied)
	CAUTION:	DO NOT APPLY AC POWER AT THIS TIME.
	4.1.1	Remove 10 front panel screws using 7/64" Allen Wrench in spare parts kit.
	4.1.2	Separate amplifier assembly (front panel and attached circuit boards) from waterproof enclosure.
	4.1.3	Unplug two cable connections on back of circuit board and set amplifier assembly aside.
	4.1.4	Remove Power Supply Module, DC Switch Module, and 12V Regulator Module.
	4.1.5	Ground common lead of VOM meter to waterproof enclosure and set VOM to measure 200 K OHMS.
	4.1.6	Measure Pin 6 of the Power Supply socket. If infinite resistance is not measured, remove 6 sub-chassis screws, and inspect for broken or frayed wires and repair as needed.
		Reinstall sub-chassis and 6 screws, DO NOT ALLOW ANY WIRE TO BE PINCHED DURING INSTALLATION.
	4.1.7	Measure Pin 5 of 12 V Regulator socket.
		If meter measures 0 OHMS, replace 5 V Regulator Module with a good 5 V Regulator from Spare Parts Kit.
	4.1.8	Reinstall 12 V Regulator Module.
	4.1.9	Measure Pin 3 of Power Supply socket.
		If meter measures 0 OHMS, replace 12 V Regulator Module with a good 12 Regulator from Spare Parts Kit.

	4.1.10	Reinstall DC Switch Module.
	4.1.11	Measure Pin 3 of Power Supply socket.
		If meter measures 0 OHMS, replace DC Switch Module with a good DC Switch from Spare Parts Kit.
	4.1.12	Measure pin 5, J-1 of sub-chassis cable.
	4.1.13	If meter measure 0 OHMS, replace 12 V Regulator.
	4.1.14	Measure pin 7, J-1 of sub-chassis cable.
	4.1.15	If meter measure 0 OHMS, replace 5 V Regulator.
	4.1.16	Install fuses in waterproof enclosure as required.
	WARNING:	Caution should be used when power is applied.
	4.1.17	Apply AC power, watch for smoke or sparks, smell enclosure for burning wire insulation.
	4.1.18	DISCONNECT POWER, check to see if fuses are blown.
	4.1.19	If fuses did not blow, replace Power Supply module with a good Power Supply from Spare Parts Kit.
	4.1.20	If fuse(s) did blow, remove fuses, check pin 1 of P1 to pin 6 of P1 for a short. Also check pin 2 of P1 and pin 6 of P1 for a short.
	4.1.21	If there is a short, return waterproof enclosure to Food Instrument Corporation.
	4.1.22	If there are no shorts, replace transformer.

4.2	DC POWER SUPPLY TROUBLESHOOTING (No L.E.D.s or digits on front panel light, fuses are good.)	
		DO NOT APPLY AC POWER AT THIS TIME.
	4.2.1	Remove 10 front panel screws using 7/64" Allen wrench in Spare Parts Kit.
	4.2.2	Separate amplifier assembly (front panel and attached circuit boards) from waterproof enclosure.
	4.2.3	Unplug two cable connections from back of circuit board and set amplifier assembly aside.
	NOTE:	Make all measurements (Steps 4.2.4 - 4.2.11) and tabulate results. Then compare to conditions in Table 4-A.
	WARNING:	Caution should be used when power is applied due to shock hazard.

	NOTE:	(-) Negative meter lead should be grounded to Waterproof Enclosure.
	4.2.4	Apply power and measure violet wire of sub-chassis cable for a (+) positive 5 VDC supply.
	4.2.5	Measure the red wire of sub-chassis cable for a (+) positive 12 VDC supply.
	4.2.6	Disconnect AC power.
	4.2.7	Remove the 12 V regulator module.
	WARNING:	Caution should be used when power is applied due to shock hazard.
	NOTE:	(-) Negative Meter Lead should be grounded to Waterproof Enclosure.
	4.2.8	Reconnect AC power and measure pin 2 of the 12 V Reg. module socket for (+) positive 18 VDC.
	WARNING:	Caution should be used when measuring AC voltages due to shock hazard.
	NOTE:	Change meter to measure AC voltage.
	4.2.9	Put meter leads on terminal 7 (purple wire), and terminal 11 (brown wire) of the transformer. Measure for 16 VAC.
	4.2.10	DISCONNECT AC power from the white connector of AC power cable.
	NOTE:	Change meter to measure resistance.
	4.2.11	Using VOM, measure black and white wires of AC power cable for approximately 60 OHMS.
	4.2.12	Check Table 4-A.

TABLE 4-A

MEASUREMENTS TAKEN	TABULATED RESULTS AND CONDITIONS FOUND					
5 VDC 12 VDC 18 VDC 16 VAC 60 OHM	0 0 0 0 infinite	0 0 0 0 60 OHM	0 0 0 16 VAC 60 OHM	0 0 18 VDC 16 VAC 60 OHM	0 12 VDC 18 VDC 16 VAC 60 OHM	5 VDC 12 VDC 18 VDC 16 VDC 60 OHM
Replace or Check	Trans-former and/or Input to Trans-former	Trans-former and/or Wiring to P.S.	P.S. Module	12 V Reg.	5 V Reg.	Amplifier Assembly

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4.3 AMPLIFIER ASSEMBLY TROUBLESHOOTING

	TROUBLE	POSSIBLE SOLUTIONS
4.3.1	Green Position Sense L.E.D. does not light light.	Recheck Section 4.4, Pan Assembly Repair. Inspect and Repair Broken or frayed wires and connections to Sense Board. Replace (In Order) Sense Board. Delay Board. Check and/or Replace Section 4.4, Pan Assembly repair.
4.3.2	Upper Limit or Lower Limit will not adjust correctly.	Check and/or Replace Solder connection on on switches. Replace Display Board.
4.3.3	Center digits read "00" with a can correctly positioned under ADR and calibration control full clockwise after position sense has been blocked then unblocked (green L.E.D. light on front panel goes out then comes on).	Recheck Section 4.4, Pan Assembly. Repair Sense Cable, #C-1A. Inspect and Repair as Needed Amplifier Assembly Wire Harness for broken or frayed wires. Waterproof Enclosure to Sense Board Cable.
4.3.4	Center digits do not read “00" with no container under ADR and position sense triggered.	Replace (in Order) Sense Board. Calibration Control Pot. Display Board. Recheck Section 4.4 Pan Assembly Repair.
4.3.5	Reject (yellow) L.E.D. Does not light for a reject.	Replace (In Order) Sense Board. Delay board. Pan Assembly Wire Harness Connection.

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	TROUBLE	POSSIBLE SOLUTIONS
4.3.6	Reject L.E.D. (Yellow light) stays lit.	<u>Check</u> Section 3, Operation, Light & Photocell Adjustment. Vertical Misalignment of Light & Photocell. Insert Holders. <u>Inspect for Broken or Frayed Wires</u> Pan Cable, #C-1A. Amplifier Assembly Wire Harness. Waterproof Enclosure to Sense Board Cable. Connections between Sense & Display Board. <u>Replace (In Order)</u> Sense Board. Delay Board. Display Board.
4.3.7	Reject Cylinder does not operate.	<u>Check</u> Air Supply. Reject/Disable Switch to Reject. Pulse Width Adjustment too Low. <u>Inspect and Repair</u> Power Cable from Subchassis to Sense Board. Amplifier Assembly Wire Harness and Connectors from broken or frayed wires. <u>Replace</u> 1. D.C. Switch. 2. Sense Board. 3. Delay Board. 4. Display Board. 5. Reject Switch. 6. Pulse Width Pot. 7. Delay Pot. 8. Air Cylinder Coil. 9. Air Cylinder.

	TROUBLE	POSSIBLE SOLUTIONS
4.3.8	Lower Limit (Red L.E.D.) Reject light does not light. -OR- Upper Limit (Red L.E.D.) Reject light does not light.	Check That a Lower or Upper Limit has passed. Inspect Connections between Sense and Display Board. Connections between Sense and Delay Board. Replace Sense Board. Delay Board. Display Board.

4.4	PAN ASSEMBLY TROUBLESHOOTING	
	TROUBLE	POSSIBLE SOLUTIONS
4.4.1	ADR does not read “00" when no can is present under probe.	Replace Sense and Reference Probe Pairs. NOTE: Probes must be changed as matched pairs.
4.4.2	ADR reads “00" with can positioned under sense probe and calibration turned full clock wise.	Check Pin Terminals for loose or poor connections in Pan Assembly Connector. Check and/or Replace Pan Cable, #C-1A. Replace Sense and Reference Probe Pairs. NOTE: Probes must be changed as matched pairs.
4.4.3	No Green Position Sense Light on Front Panel.	
4.4.3.1		Clean Position Sense Insert Lenses with Dry Cloth

	4.4.3.2	<u>Check Red Light Source Insert</u> 2.1 Set OHM meter to Diode test. 2.2 Place meter leads on 3 violet and Pin 4 Black of pan connector, and record resistance reading. 2.3 Reveres connections and record resistance reading. 2.4 Remove one lead and connect to Pan Assembly and record reading. 2.5 Compare results with Table 4-B. <u>Check Yellow Photosensor Insert</u> 3.1 Set OHM meter to Diode test. 3.2 Place meter leads on Pin 2 Blue wire, and Pin 1 Yellow wire on Pan Connector. 3.3 Using sunlight, flashlight or low watt age incandescent bulb, shine light directly in to yellow insert lense and record resistance read ing 3.4 Reverse connections and repeat Step 3.3. 3.5 Remove on meter lead and connect to Pan Assembly, and repeat Step 3.3. 3.6 Compare results with Table 4-B, (Pg. 4-10). 3.7 Check Pin Terminals for loose wire in Pan Assembly. 3.8 Check and/or replace Pan Cable, #C-1A.

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INSERT TESTED	METER LEAD CONNECTIONS			
	LEAD TO PAN	FORWARD RESISTANCE		REVERSE RESISTANCE
RED LIGHT SOURCE INSERT	INFINITE	<3K OHMS		>20K OHMS
YELLOW PHOTO-SENSOR INSERT	INFINITE	LIGHT <3K OHMS	DARK >5K OHMS	LIGHT OR DARK >20K OHMS

If measurements are different than above table, replace inserts as required.