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Parts order form, parts identification

Version 1 - 060602

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16. Sequence of Operation

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Troubleshooting Tips

- When checking continuity both ends of the harness to be tested should be unplugged. If either end is connected, the results may be inaccurate.
- The freezer's temperature control can be found on a small rectangular box that is mounted behind the right, rear corner of the freezer. Turn the screw clockwise to make the freezer colder, and counter-clockwise to make it warmer.
- The F631 uses many of the same parts in different locations. These parts may be swapped when troubleshooting to determine if the suspected part is faulty. These parts include the 115V motors (used in 4 locations), the encoders (3 locations), and reed switches (4 locations).
- Always keep a small jumper wire or paperclip in your toolbox.
- Unless otherwise noted, always remove power from the machine before testing any wires to avoid electrical shock.
- Anytime the display reads "Out of Order", press the "#" key to access the error message.
- When checking continuity, make sure the power is off. Both ends of the wire harness should be unplugged for an accurate reading. Always plug the meter lead into the back of the connector beside the wires. Pull gently on the wires to ensure the pin is fully inserted into the connector.
- If you require assistance in troubleshooting, please have the serial number, error code and a description of the problem available before calling. The toll free number is 1-888-441-3278.

* Although this manual uses a format similar to standard flowcharts, the shapes and intended uses for them do not follow standard flowchart protocol. The shapes selected for this manual allow the most amount of information in the smallest amount of space. This is done to keep the manual as thin as possible, so it may be easily carried to any location service is required.

Adjusting the vacuum pressure

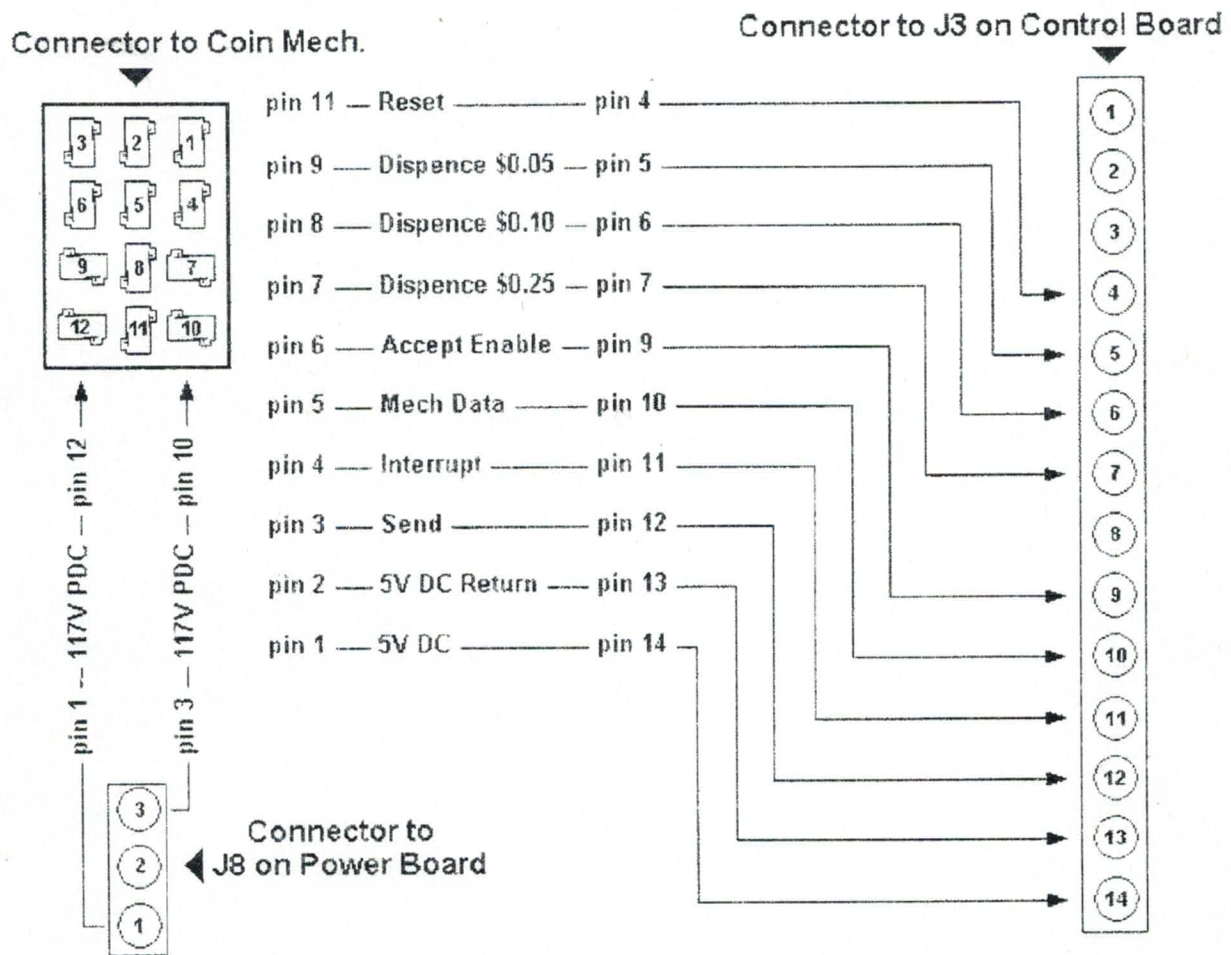
The vacuum box is located under the freezer in the center of the cabinet. The vacuum box is designed with six rows of pressure relief holes, with four holes in each row. The adjustment plate may cover some of the rows on the right. The vacuum box is set up at the factory with three rows open. This should be the proper setting based on 115VAC. If your location has more than 115V, you may need to decrease the pressure by opening more holes. If your location has less than 115V, you may need to close some holes to increase the pressure. The following procedure will help adjust your vacuum pressure correctly.

- 1) Locate the vacuum pressure switch (48 in/wtr), and disconnect one wire from it.
- 2) Check your product bins and identify one selection that is at least half empty.
- 3) Press the "FREE VEND" button on the service keypad and vend the selection.
- 4) Watch the picker hose as it lifts the product.
 - a) If the vacuum shuts off immediately after turning on, close one row of holes and attempt another vend from the same bin. If the vacuum still shuts off too early, the problem may be unrelated to pressure, see the section on "Vacuum Out of Order".
 - b) If the hose "bounces" while lifting the product, open one row of holes and attempt another vend from the same bin. If the hose still bounces open another row of holes until the bounce is gone. If the hose hesitates on the way up but does not bounce, that is acceptable. At this point reconnect the wire that was removed from the vacuum switch. The pressure is now set correctly.
 - c) If the hose raises the product smoothly with little or no hesitation, but no "bounce", the pressure is acceptable. Reconnect the wire that was removed from the vacuum switch. If the problem persists, replace the lower (48 in/wtr) vacuum switch.

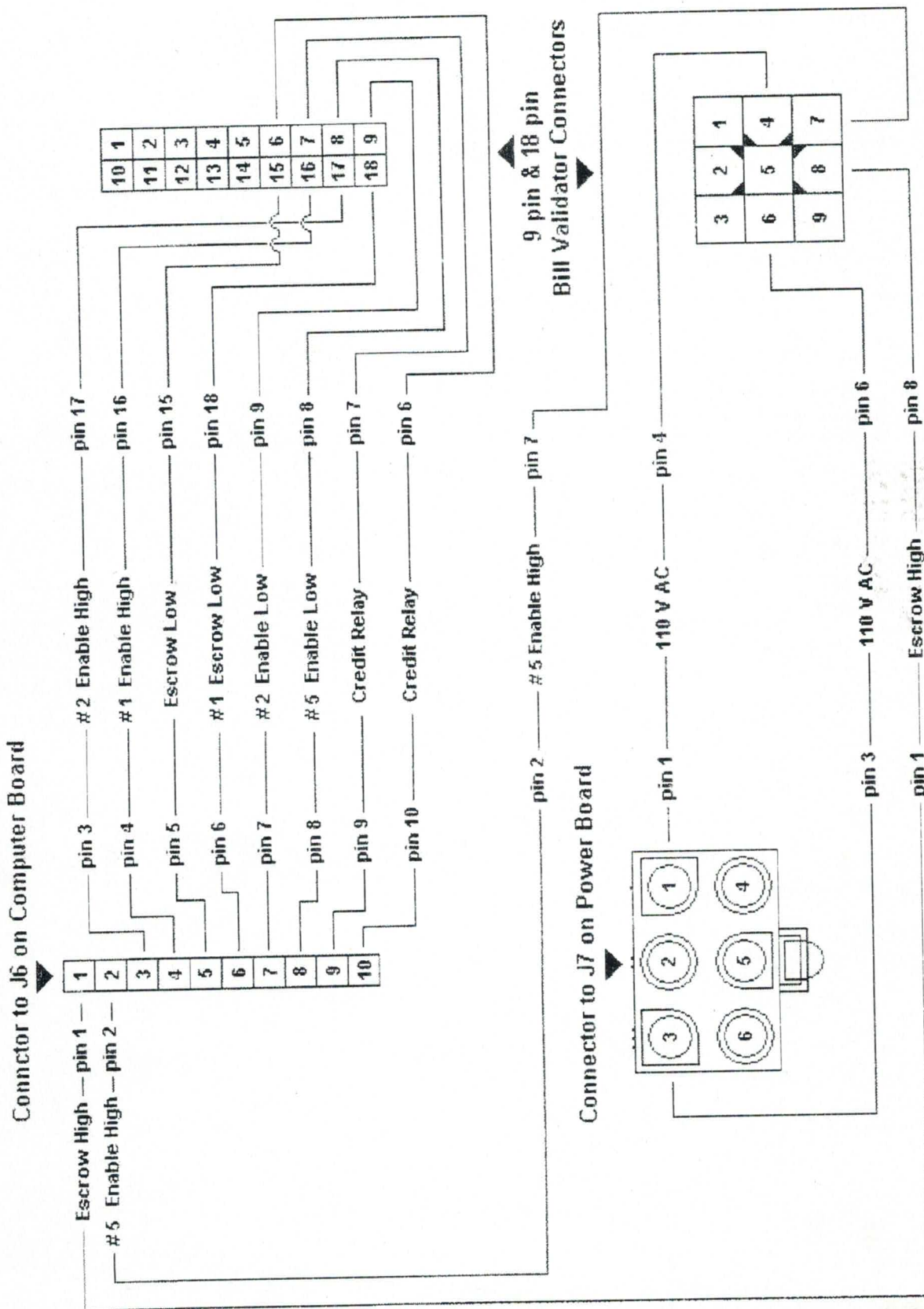
Adjusting With A Vacuum Pressure Gauge

If you have a vacuum pressure gauge that measures in inches of water, disconnect the lower vacuum switch and vend a selection. When the robot starts lowering, place the gauge attachment in a position where the hose will attempt to "vend" it. The pressure on the gauge should be approximately 55 in/wtr. If it reads higher open one row of holes and retest. Repeat until the gauge shows approximately 55 in/wtr. If the gauge reads below 55, close one row of holes and repeat until the gauge reads approximately 55 in/wtr. Reconnect the lower vacuum switch and test the pressure again. The pressure should read between 48-50 in/wtr. If the pressure reads higher than 50 or lower than 48, use a .050" allen wrench to adjust the vacuum switch.

F631 Harness # 5 (part # 19300505) Connections from J8 Power Board & J3 Control Board to Coin Mechanism (117V PDC – Micromech)



F631 Harness # 6 (part # 19300506) Connections from J7 Power Board & J6 Control Board to Bill Validator (110V AC - Micromech)



F631 – Harness #1 (part # 19300501) Computer Board J4 to Power Board J1

This link between the computer & power boards is responsible for triggering the movement of the robot, vacuum & freezer lifter motors. It is not the 110V power supply to the motors; it is a series of low voltage triggers.

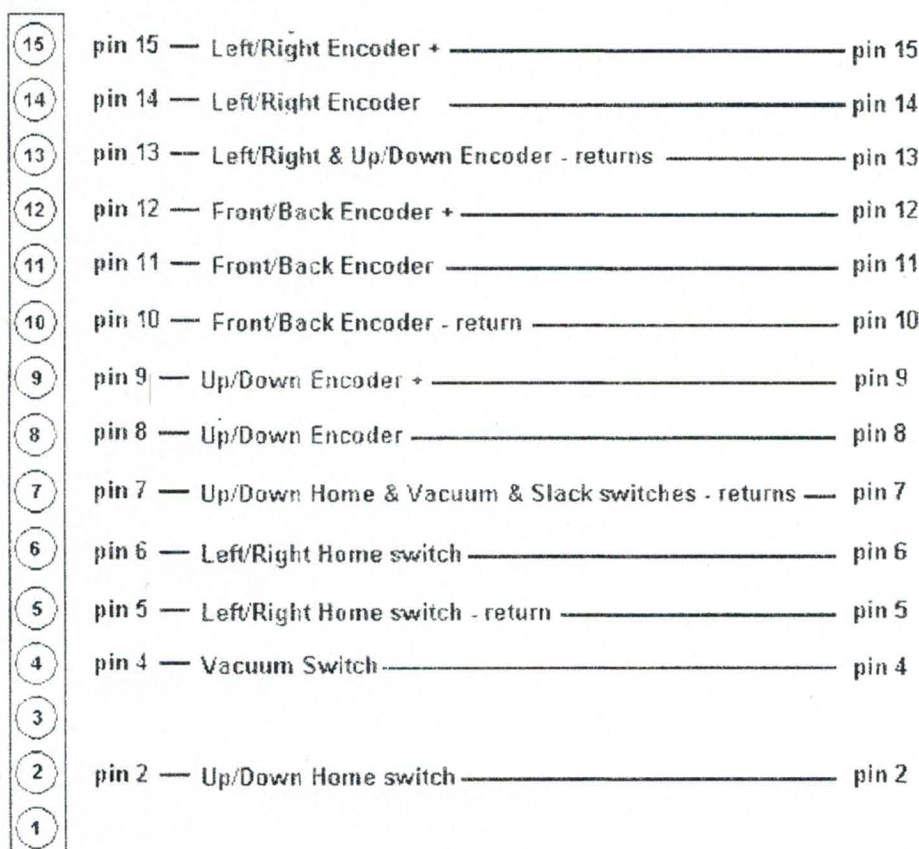
Computer board		Power board	
J4		J1	
12	> Vacuum Motor	>	12
11	> Left/Right Motor (+)	>	11
10	> Left/Right Motor (-)	>	10
9	> Front/Back Motor (+)	>	9
8	> Front/Back Motor (-)	>	8
7	> Ground	>	7
6	> Ground	>	6
5	> Up/Down Motor (+)	>	5
4	> Up/Down Motor (-)	>	4
3	> Freezer Lift Motor (+)	>	3
2	> Freezer Lift Motor (-)	>	2
1	> 5 volt supply	>	1

J4 - Computer board is a vertical connection with pin 12 on the top

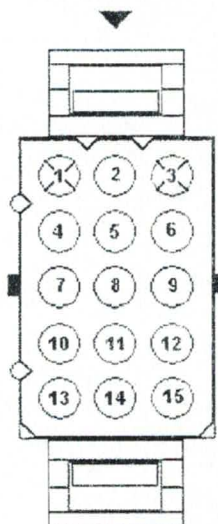
J1 - Power board is a horizontal connection with pin 12 towards the door's front glass & pin 1 closest to the technician when accessing the power board from the inside of the F631's front door.

F631 – Harness #3 (part # 19300503) Computer Board J5 to 15 pin Bulkhead

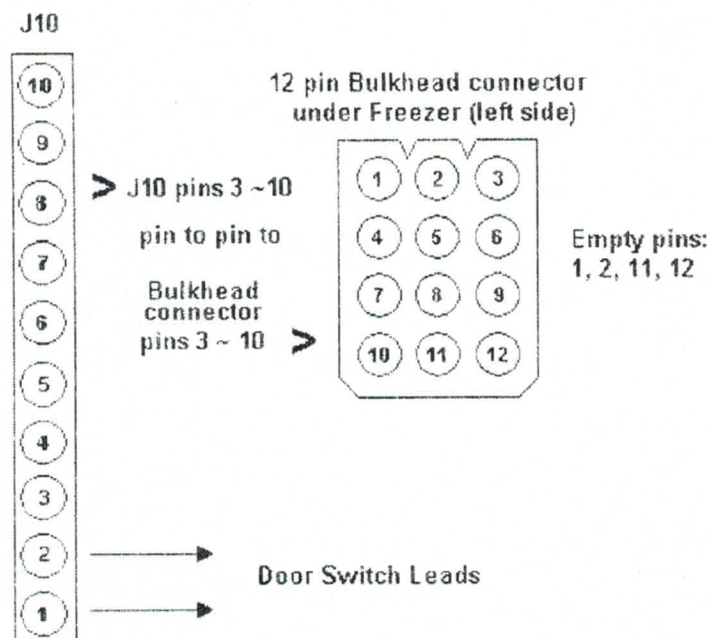
15 pin connector
to J5 connector on Computer Board



15 pin connector
to Bulkhead for
Encoders
& Switches



F631 – Harness #4 (part # 19300504) Computer Board J10 to 12 pin Bulkhead

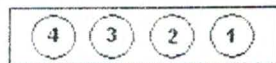


The pins on the Bulkhead connector are being shown from the socket side
> from the wire side, the pin number would run right to left.

- pin 10 - Freezer Lid Opened Switch
- pin 9 - Freezer Lid Opened Switch Return
- pin 8 - Freezer Lid Closed Switch
- pin 7 - Freezer Lid Closed Switch Return
- pin 6 - Front/Back Home switch
- pin 5 - Front/Back Home switch return
- pin 4 - Health switch
- pin 3 - Health switch return

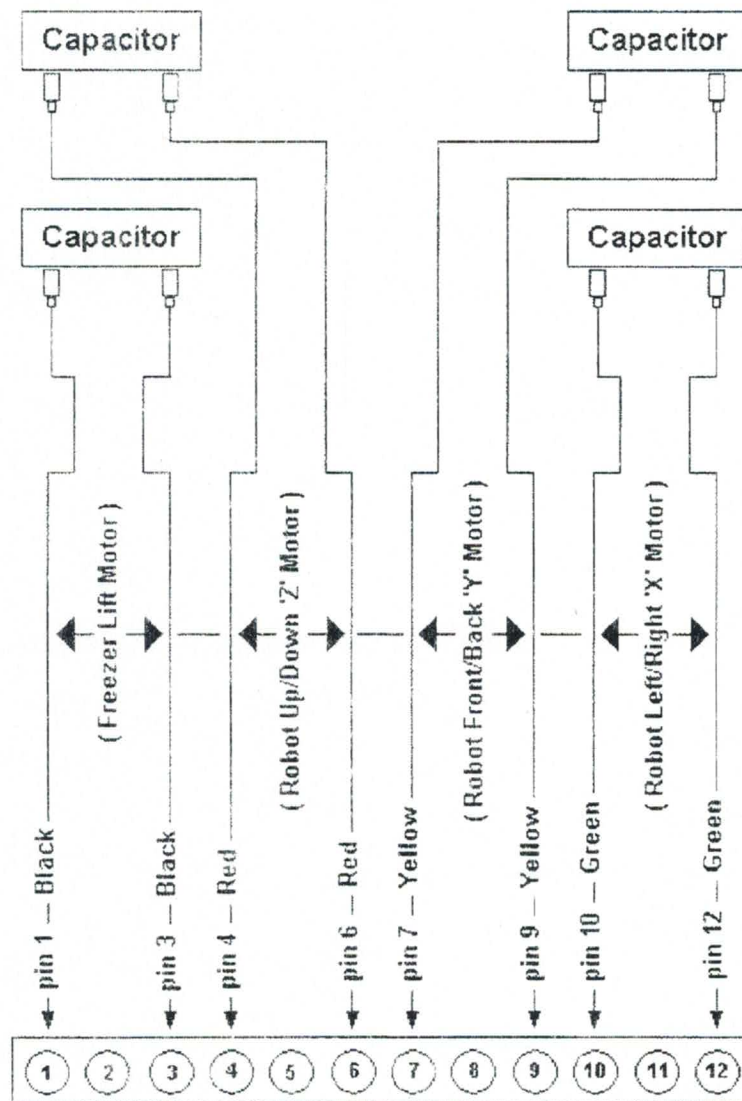
F631 Harness # 7 (part # 19300507)
Power connection from
J6 Power board to J1 Computer board

J1 - Computer board (main power in)



J6 - Power board
(12V AC supply output for Power board)

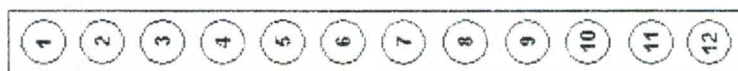
F631 – Harness #8 (part # 19300508)
Power Board J2 to Motor Capacitors



Connector to J2 connection on Power Board

F631 – Harness #9 (part # 19300509) J3 & J5 Power Board to 15 pin Bulkhead connector (Motor Power)

connector to J3 on Power Board



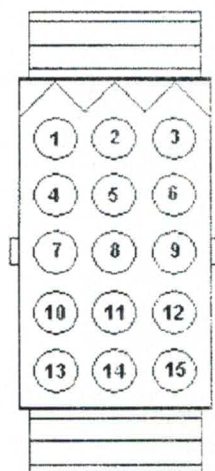
pin 1	Freezer Lift Motor (-)	pin 1
pin 2	Freezer Lift Motor (neutral)	pin 2
pin 3	Freezer Lift Motor (+)	pin 3
pin 4	Up/Down motor (-)	pin 4
pin 5	Up/Down motor (neutral)	pin 5
pin 6	Up/Down motor (+)	pin 6
pin 7	Front/Back motor (-)	pin 7
pin 8	Front/Back motor (neutral)	pin 8
pin 9	Front/Back motor (+)	pin 9
pin 10	Left/Right motor (-)	pin 10
pin 11	Left/Right motor (neutral)	pin 11
pin 12	Left/Right motor (+)	pin 12

connector to J5 on Power Board



pin 3	Vacuum motor (+)
pin 2	Vacuum motor (neutral)
pin 1	Vacuum motor (-)

15 pin Bulkhead connector for Motor Power



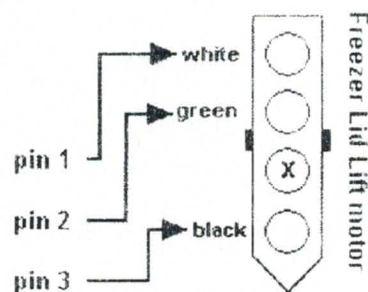
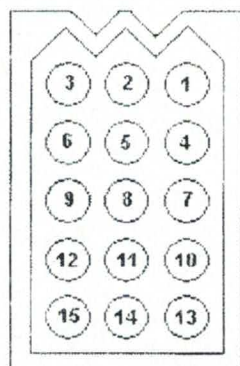
pin 13
pin 14
pin 15

F631 – Harness #10 (part # 19100510)

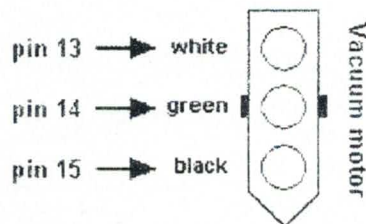
15 pin Bulkhead connectors (2pcs.) to

24 pin Connector for the Robot Ribbon Cable

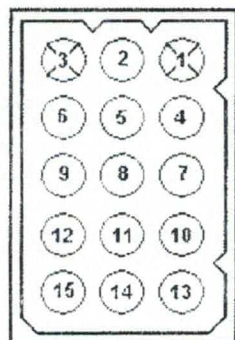
15 pin Bulkhead connector for Motor Power



pin 4	Up/Down motor (-)	pin 1
pin 5	Up/Down motor (neutral)	pin 2
pin 6	Up/Down motor (+)	pin 3
pin 7	Front/Back motor (-)	pin 4
pin 8	Front/Back motor (neutral)	pin 5
pin 9	Front/Back motor (+)	pin 6
pin 10	Left/Right motor (-)	pin 7
pin 11	Left/Right motor (neutral)	pin 8
pin 12	Left/Right motor (+)	pin 9



15 pin Bulkhead connector for Encoders & Switches

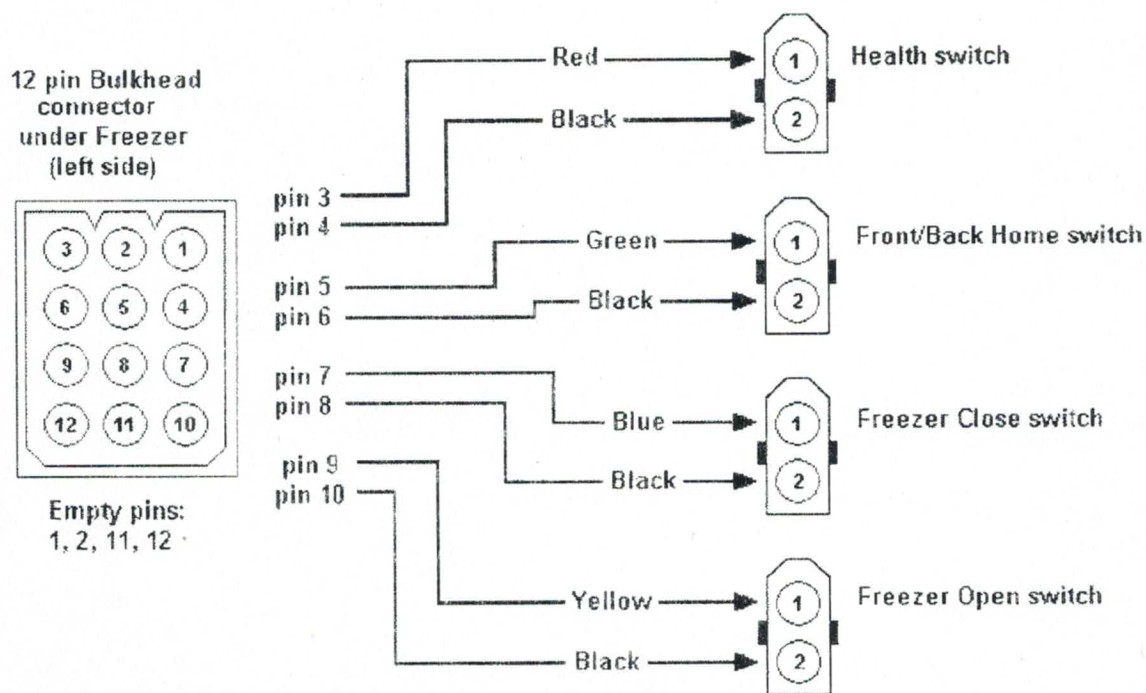


24 pin connector
Left Side Wall
to Robot's ribbon cable



pin 2	Up/Down Home switch	pin 11
pin 4	Vacuum Switch	pin 13
pin 5	Left/Right Home switch - return	pin 14
pin 6	Left/Right Home switch	pin 15
pin 7	Up/Down Home & Vacuum & Slack switches - returns	pin 16
pin 8	Up/Down Encoder	pin 17
pin 9	Up/Down Encoder +	pin 18
pin 10	Front/Back Encoder - return	pin 19
pin 11	Front/Back Encoder	pin 20
pin 12	Front/Back Encoder +	pin 21
pin 13	Left/Right & Up/Down Encoder - returns	pin 22
pin 14	Left/Right Encoder	pin 23
pin 15	Left/Right Encoder +	pin 24

F631 – Harness #11 (part # 19100511)
12 pin Bulkhead connector
to Freezer & Front/Back Home Switches



The pins on the Bulkhead connector are being shown from the socket side
> from the wire side, the pin number would run left to right.

COIN MECH ERROR

The F631 Frozen Merchandiser will not operate without a coin mech. If no mech is connected, a "Coin Mech Error" will appear. If a mech is installed, continue with troubleshooting.

What type of money system is in the machine?
MDB (24V) or micro-mech (110V)?

24V

With the power off, check the connector on the computer board labeled J3. The connector at J3 should have 3 wires. If this connector has more than 3 wires, unplug J3 and locate the plug near the computer board that is the same size with 3 wires. Plug this connector into J3. Locate J7 on the computer board. There should be a 4-pin connector with 1 wire at J7. If not, locate and connect the 4-pin plug to J7. Locate the transformer mounted to the left side of the power box, at the bottom of the door. The short harness from this transformer should be plugged into J7 on the power board. If it is not plugged in, unplug the connector that is in J7 and tie wrap it out of the way. Plug the short transformer harness into J7.

110V

With the power off, check the connector on the computer board labeled J3. The connector at J3 should have 10 wires. If the connector has only 3 wires, then the machine is setup for MDB (24V). To convert the machine to 110V, Unplug the connector from J3 and find the white connector hanging from the bundle with 10 wires. Plug this connector into J3. If there is a connector at J7, unplug it and tuck it out of the way. Locate the power board in the silver box at the bottom of the door. Locate the connector labeled J7 on the power board. The wires from this connector should lead to a bundled harness that leads to the computer board. If the wires from J7 lead to a transformer on the left side of the power box, unplug J7 and find a similar plug coming from the bundled harness. Plug that connector into J7. Turn the power on to check for another coin mech error.

If the problem persists, or if the harnesses are already installed correctly, continue troubleshooting.

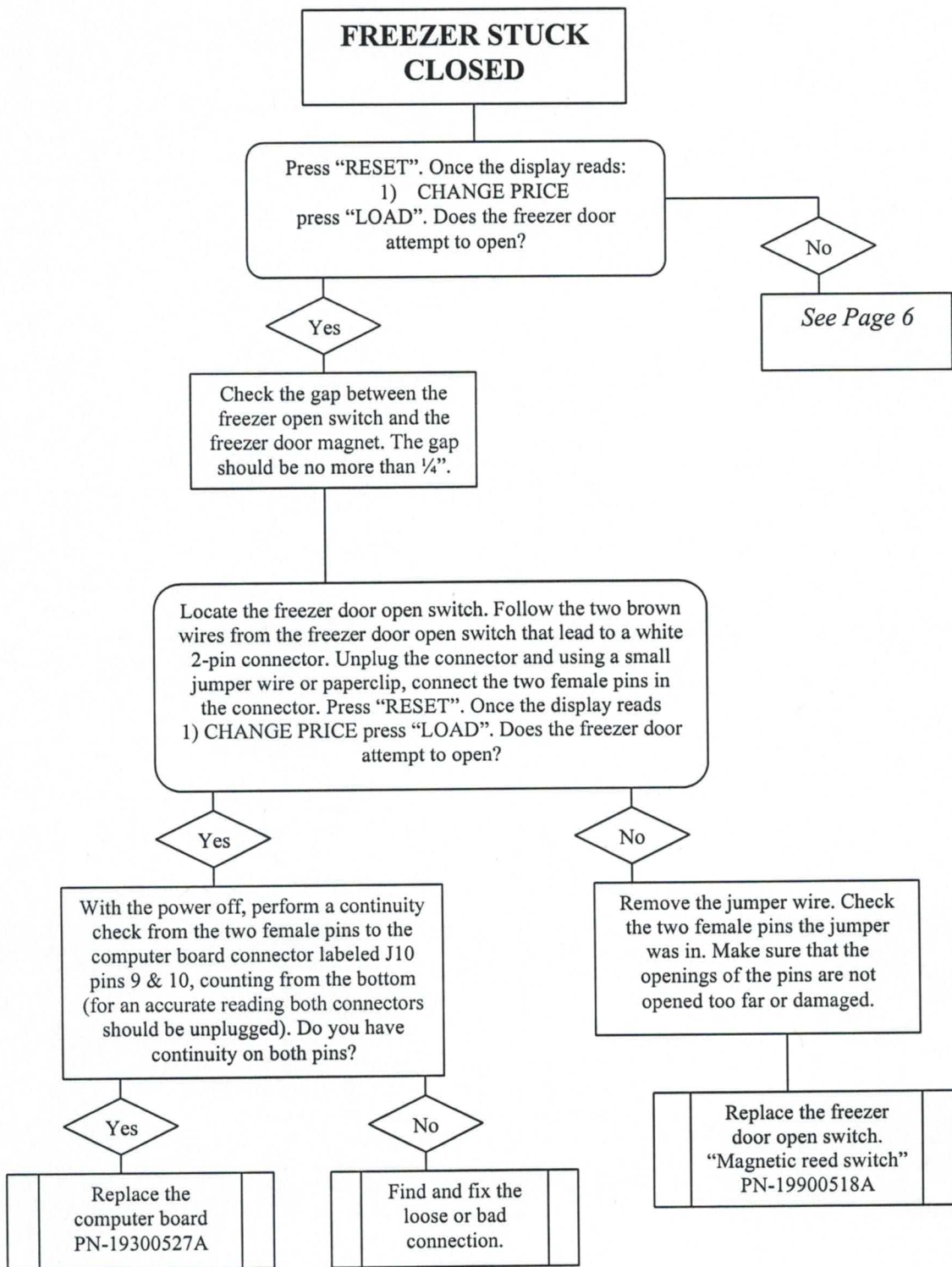
With the power off, unplug J3 from the computer board. Using a jumper wire or paperclip, connect pins 4 and 11 on the J3 connector. The jumper must be in the back of the connector wire the existing wires. Reconnect J3 to the computer board. Restore power to the machine. Does the coin mech error return?

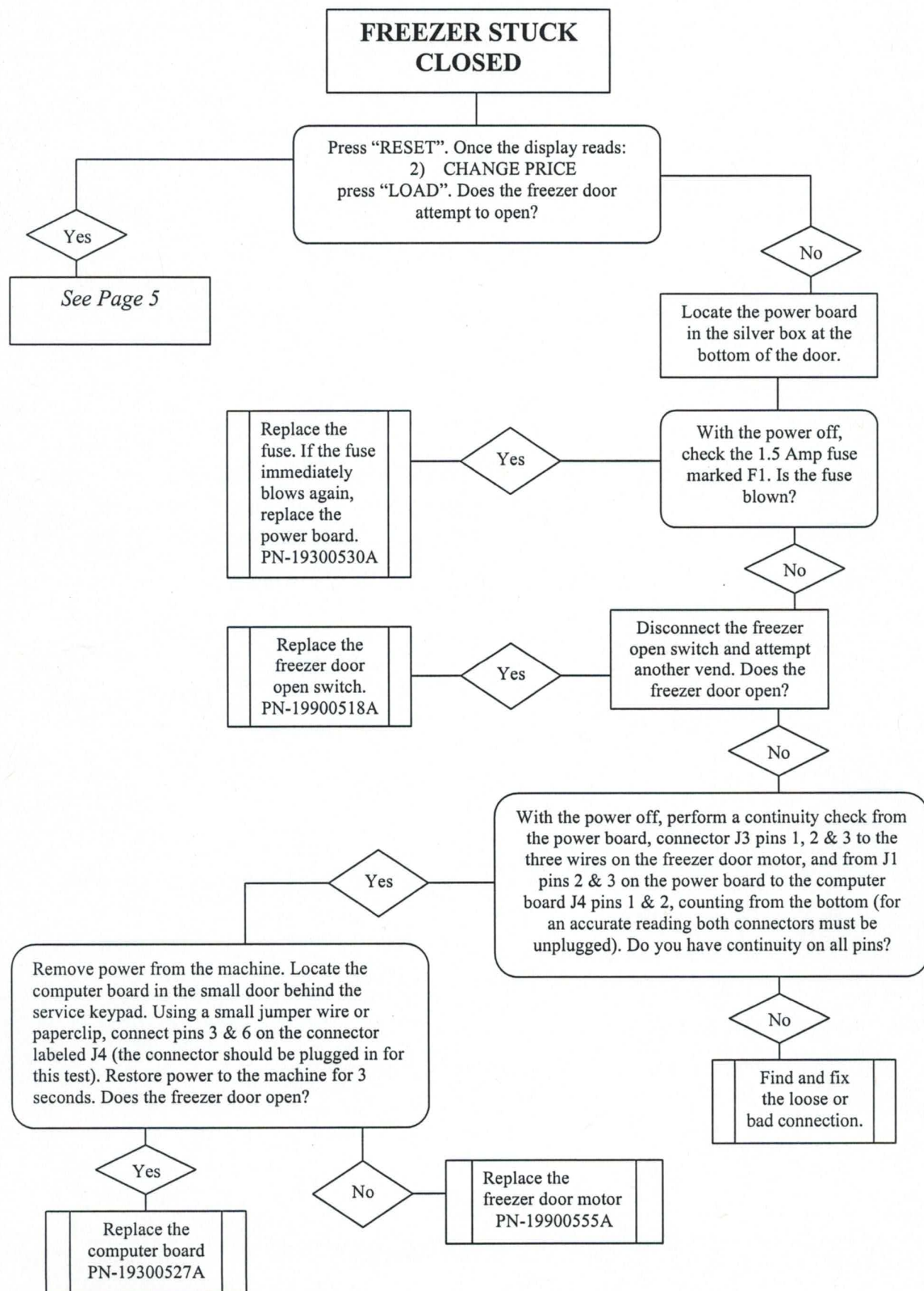
Yes

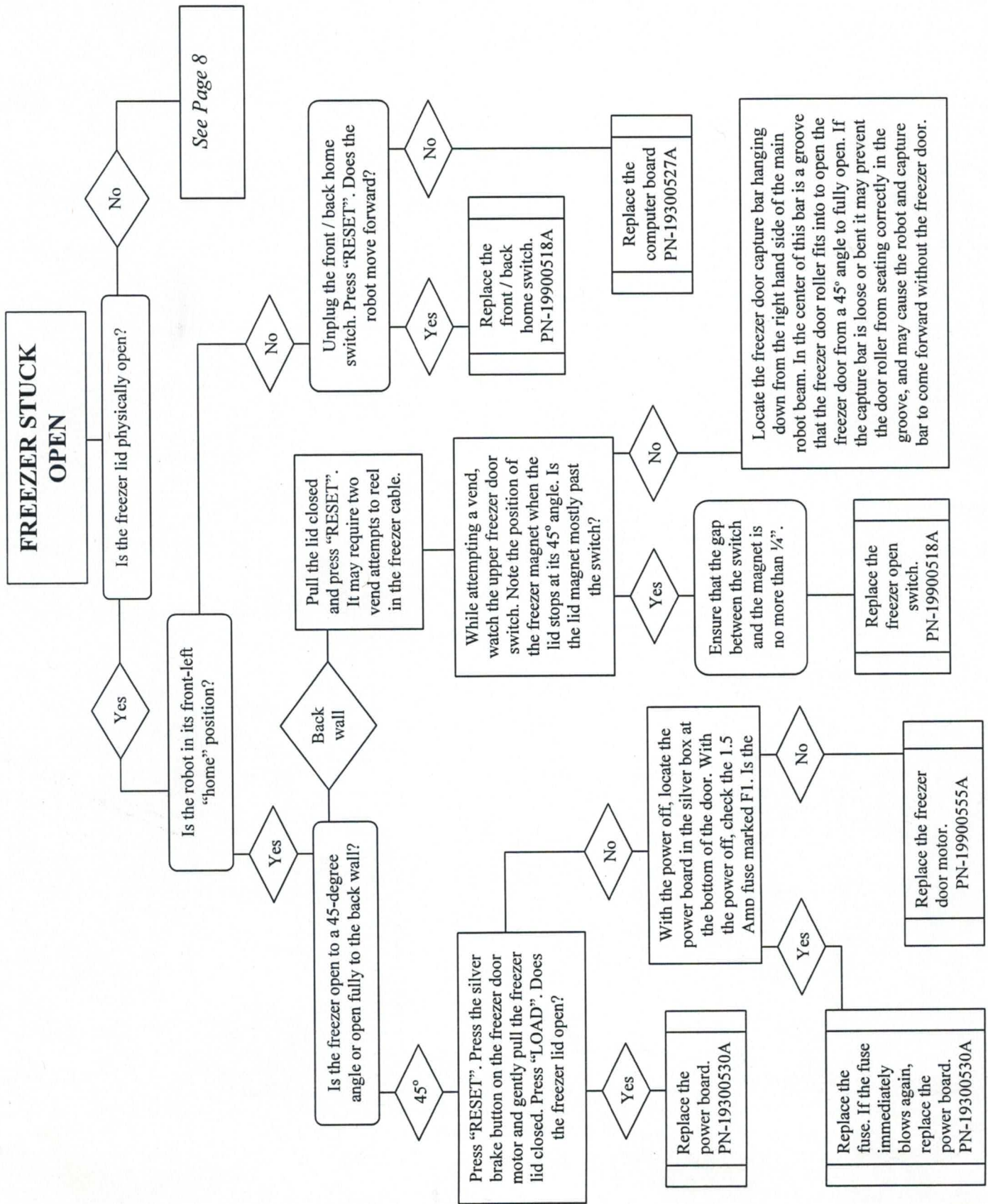
Replace the computer board (PN-19300527A)

No

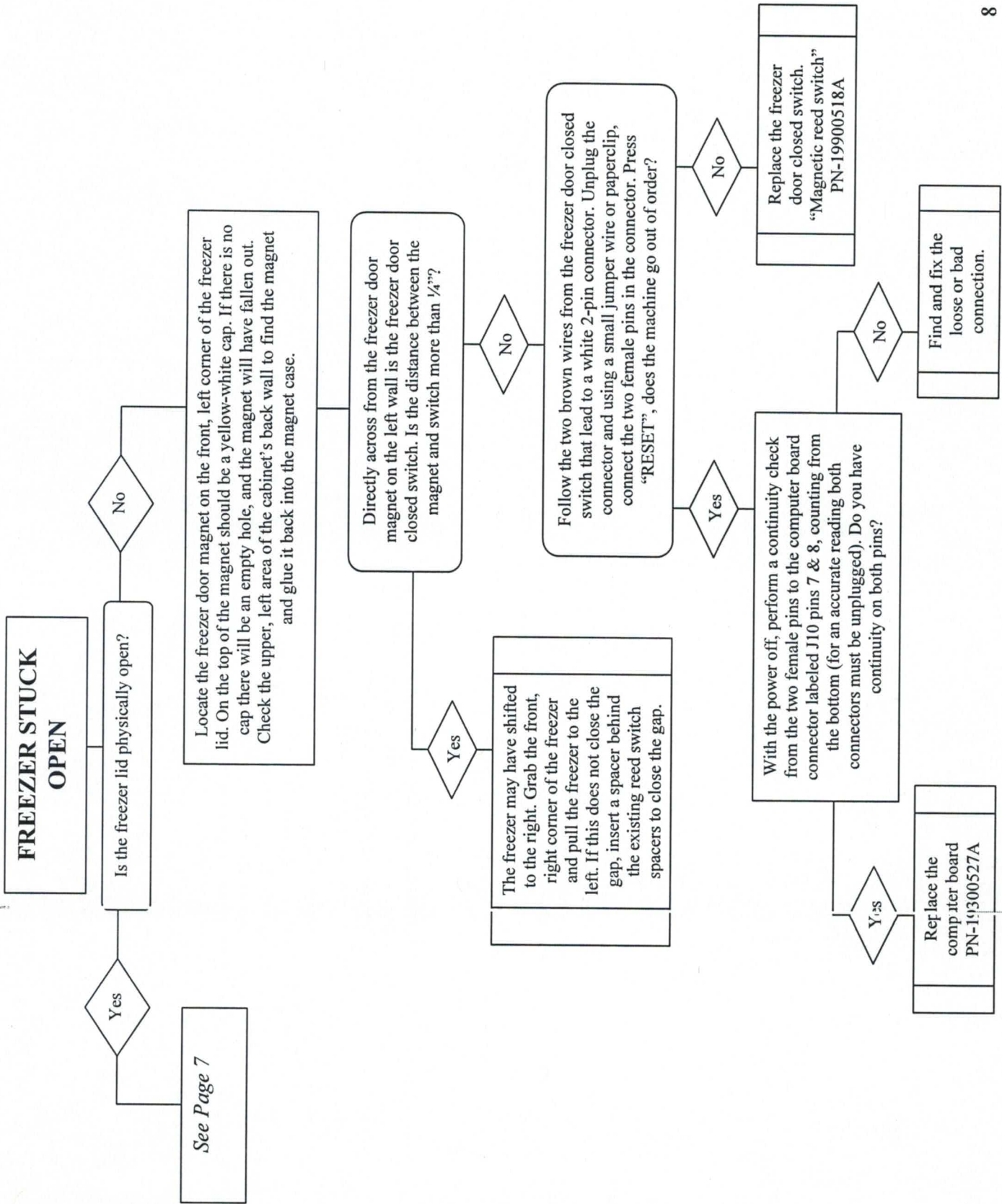
Replace the coin mech.







b3M



FRONT / BACK ENCODER ERROR

Press "Reset" to clear the error. Make a vend.
After the freezer door opens, does the robot
make an attempt to go back?

Yes

Perform a visual check of the front / back
encoder system. Check the disk for dust and
cracks. Make sure that the disk sits between
the two "towers" on the encoder board
without touching either one.

Does the robot go far enough to make
contact with the freezer door?

Yes

Press "Load". As soon as the freezer lid
reaches the "open" switch, quickly lift the lid
all the way to the rear wall. Does the robot
still return to the front with an encoder error?

Yes

Manually move the robot
front to back several times
and check for binding or
broken teeth on the gears on
both sides of the robot.

Replace the
Ribbon Cable
PN-19510300A

No

Press "Close" and manually
close the lid. Check the
alignment of the freezer
cable and roller.

Press "Load". When the lid stops opening,
watch to see if it start lowering before the
robot reaches it.

Yes

Replace the Freezer
Door Motor
PN-19900555A

No

Replace the Freezer
Open Reed Switch
PN-19900518A

No

See Page 10

With the power off, perform a continuity
check on the three pins from the encoder
board to the computer board connector
labeled J5 pins 10, 11 and 12, counting
from the bottom (for an accurate reading
both connectors must be unplugged). Do
you have continuity on all three pins?

Yes

Replace the
Encoder Switch
(board)
PN-19500582A

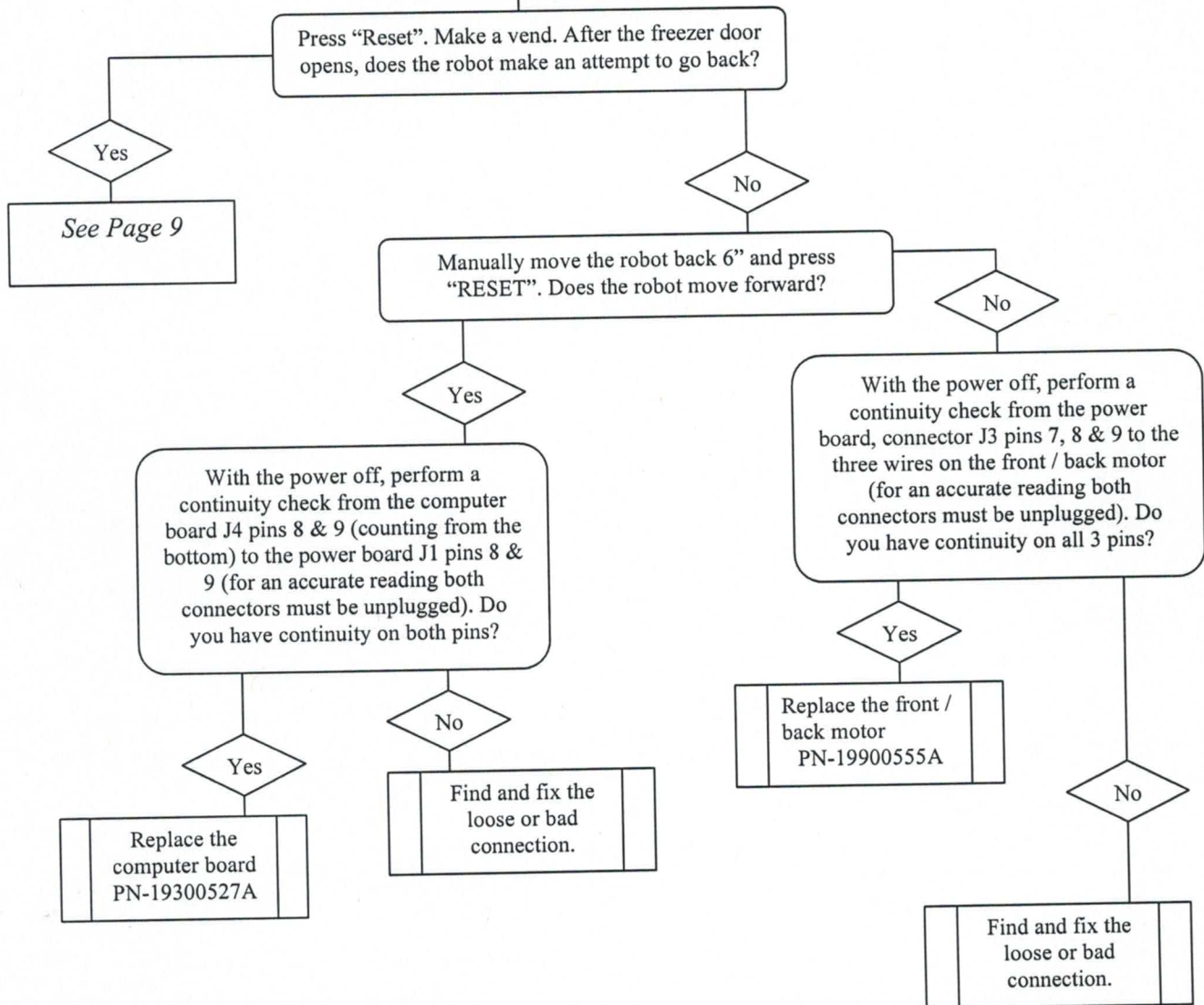
Find and fix the
loose or bad
connection.

No

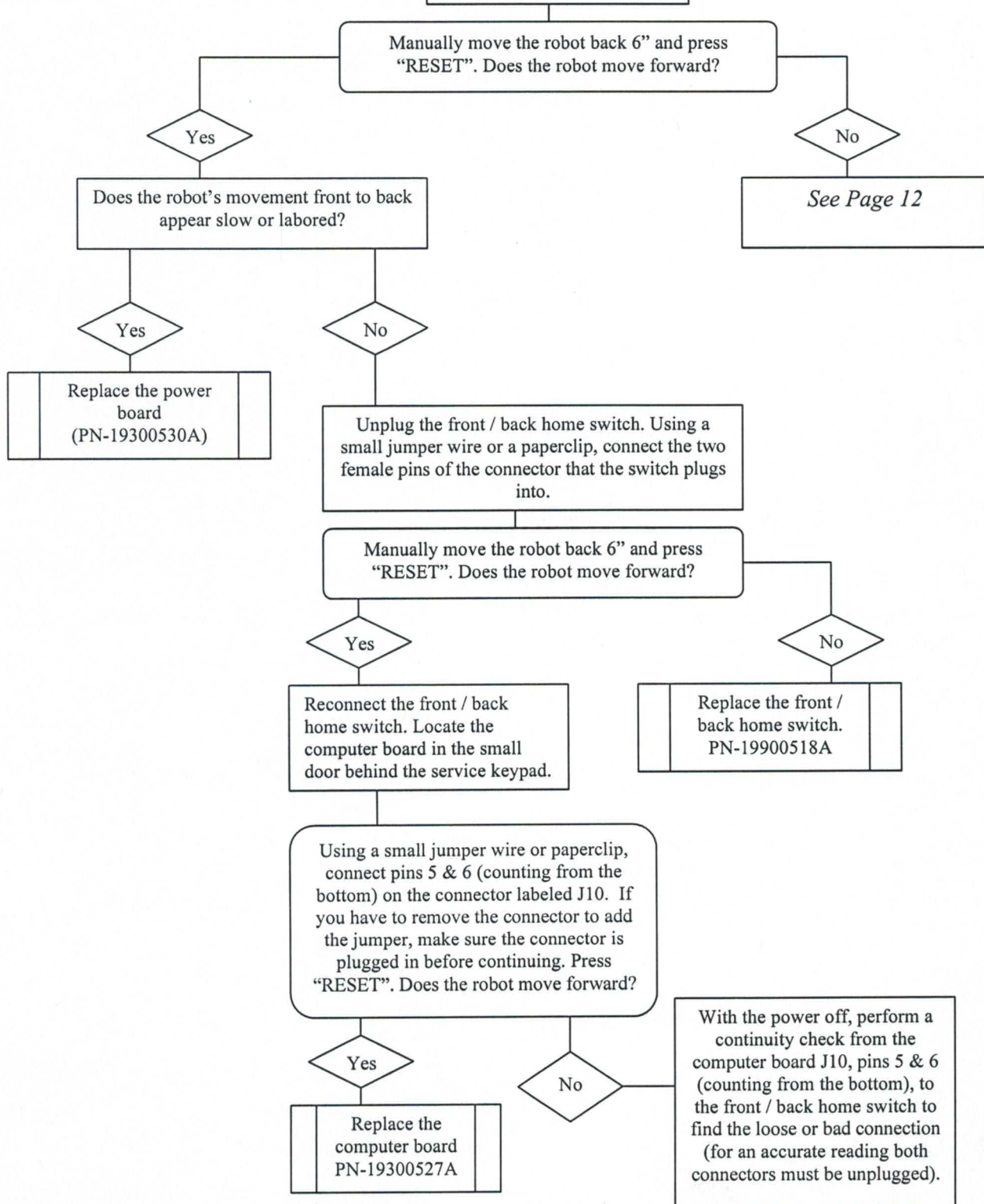
If the problem still
exists after
replacing the
encoder board,
replace the
Computer Board.
PN-19300527A

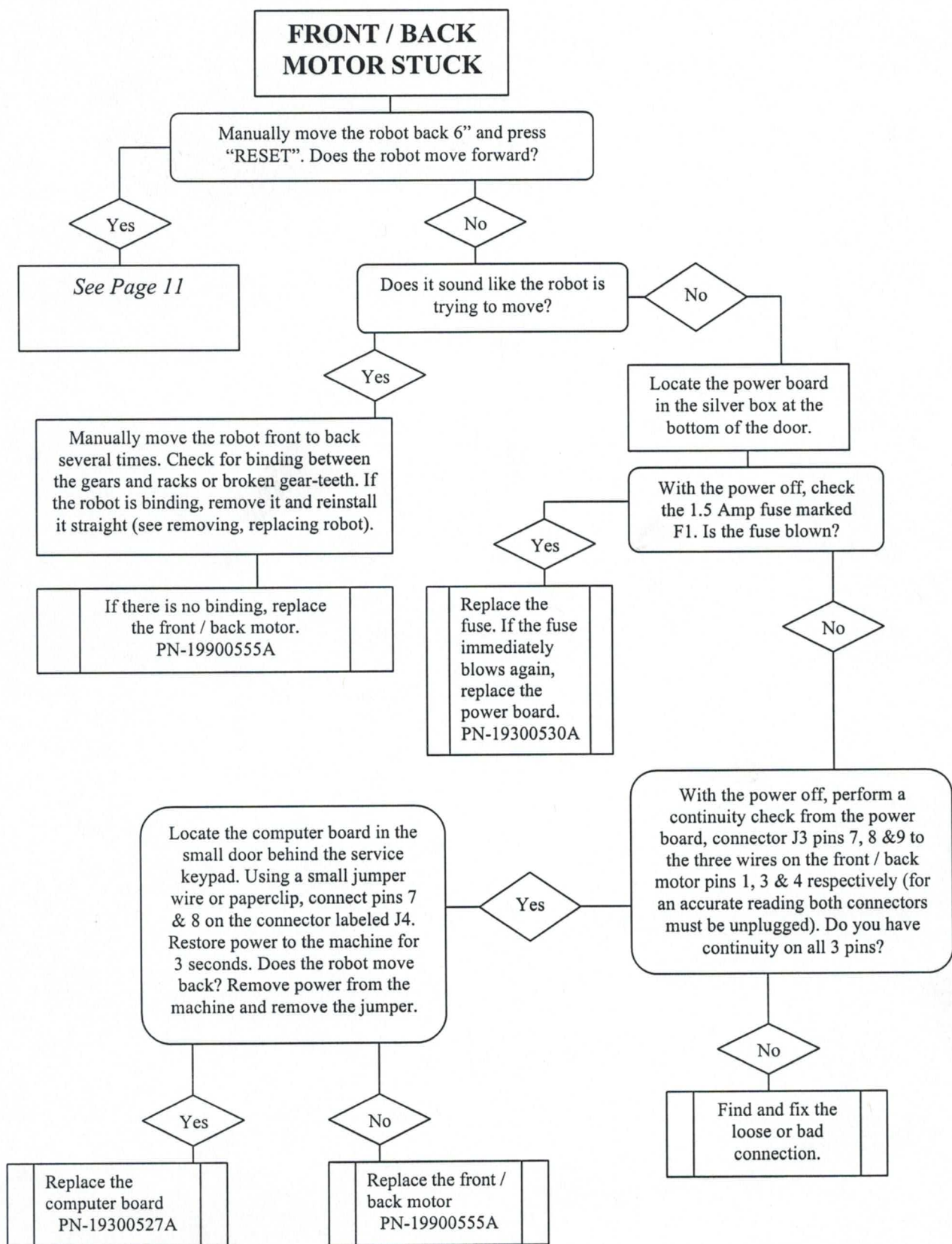
Encoder boards are very sensitive. Sometimes they
can go bad in a parts / toolbox. To ensure a good
board is being used, instead of replacing a suspect
encoder board, try swapping the suspect board with
one of the other encoders on the robot. If the error
changes to a different area, the encoder is bad. If
you swap encoders and the error stays the same,
replace the Computer Board.
PN-19300527A

FRONT / BACK ENCODER ERROR



FRONT / BACK MOTOR STUCK





HEALTH SENSOR ACTIVE

A Health sensor active occurs
when the temperature in the
freezer rises above 15°F/-9°C.

Check the temperature at the
thermometer on the front of the
freezer panel. Is the temperature
below -10°F?

Yes

Look under the freezer on the
left hand side and locate the
plate that has several harness
connectors attached to it.
Locate and unplug the two-pin
connector in the top left corner
of the plate.

Using a small jumper wire or
paperclip, connect the two
female pins in the connector.
Press "RESET", does the
machine go out of order?

Yes

Perform a continuity check from the two
female pins to the computer board
connector labeled J10 pins 3 & 4. Do
you have continuity on both pins?

Yes

Replace the
computer board
PN-19300527A

No

Replace the Health
switch assembly.
PN-19610510A

No

Find and fix the
loose or bad
connection.

Yes

Replace the
thermostat
PN-19600513A

Replace the
thermostat
PN-19600513A

Yes

Call Fastcorp for freezer
repair procedure.

No

Open the freezer door. Is
the freezer cold inside?

No

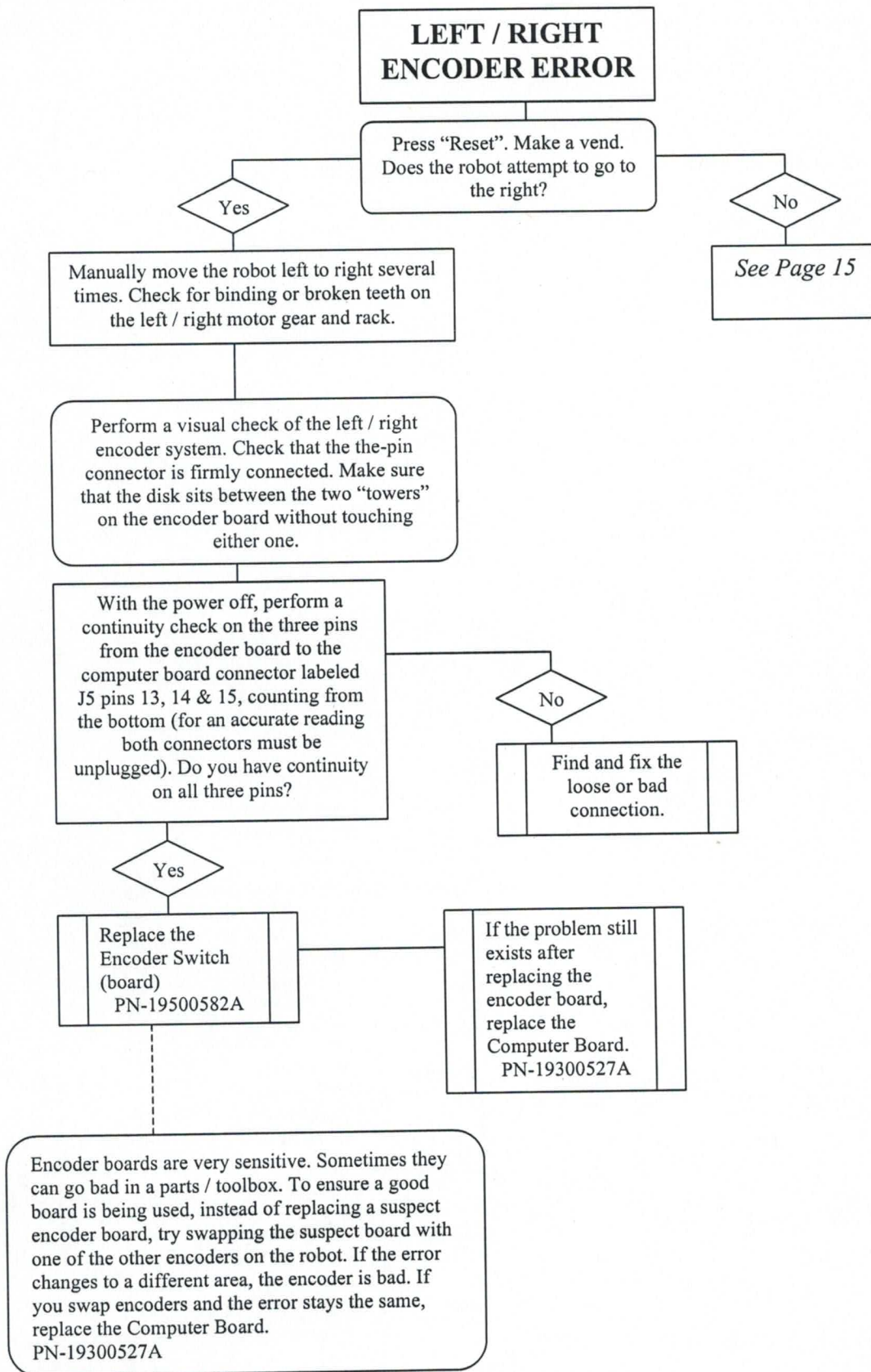
Check that the main power cord is
plugged in. Locate the off-white,
angled plug under the freezer and
make sure it is plugged into the
junction box on the left hand side.

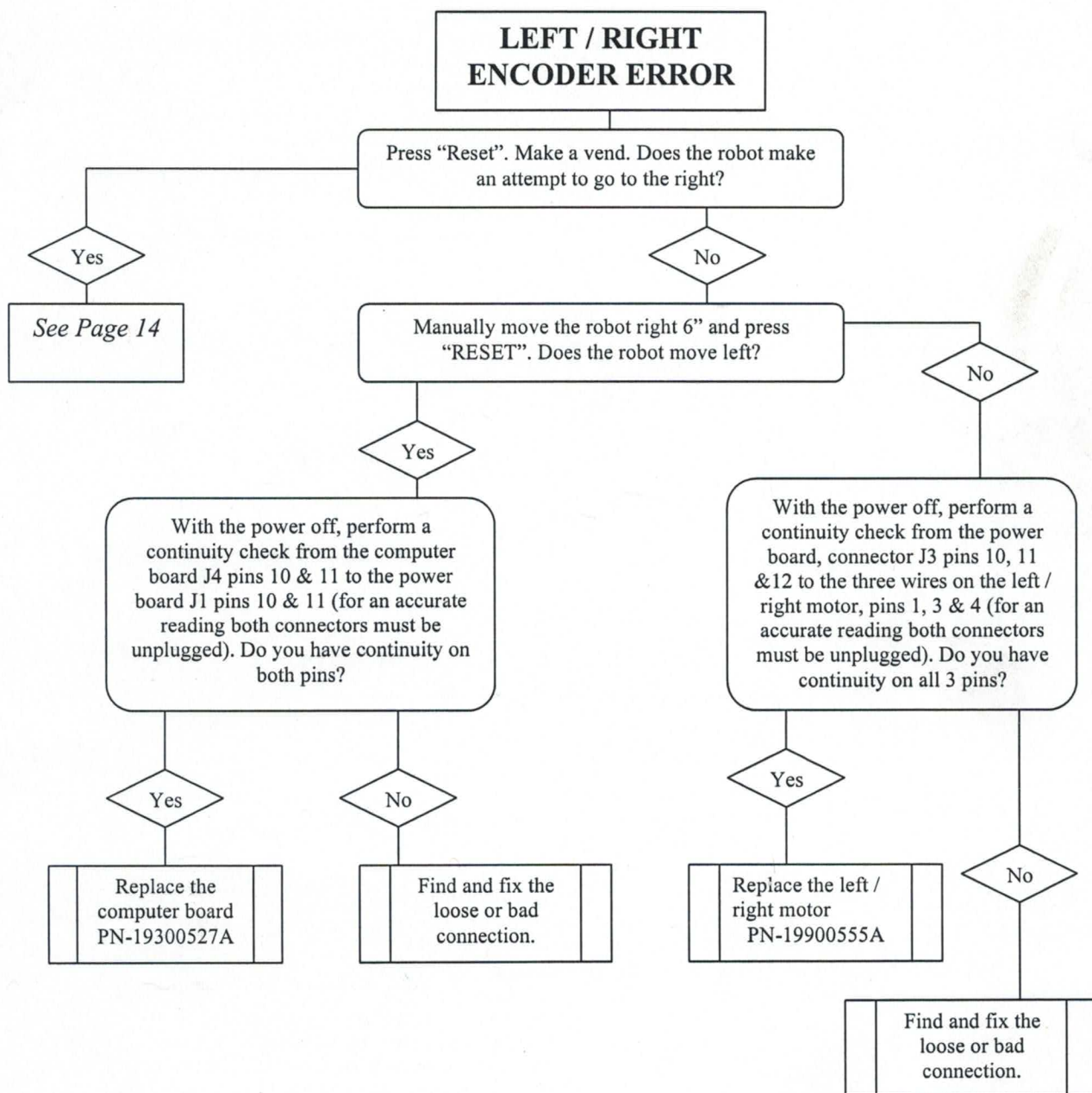
Unplug the off-white, angled plug from the
junction box. With the freezer closed, look
over the right, rear corner of the freezer.
Approximately 2" below the freezer lid is a
rectangular box with a gold-colored screw in
the top. This is the thermostat, bracket, and
temperature control. Unplug the two wires
from the thermostat and connect them together
using a jumper wire or paperclip. Make sure
any exposed wire or paperclip is cover with
electrical tape before proceeding. Return
power to the freezer and wait 15 minutes. Is
the freezer temperature dropping?

No

Remove the jumper / paper-clip and follow
the two wires down about 20". On some
freezer models there will be a second
connection. Unplug the two connectors and
connect them together using a jumper wire
or paperclip. Make sure any exposed wire
or paperclip is cover with electrical tape
before proceeding. Return power to the
freezer and wait 15 minutes. Is the freezer
temperature dropping?

No





LEFT / RIGHT MOTOR STUCK

*See front to
over-ride and
check motor*

Manually move the robot to the right 6" and press
"RESET". Does the robot move left?

Yes

Does the robot's movement front to back
appear slow or labored?

Yes

Replace the power
board
(PN-19300530A)

No

Unplug the left / right home switch. Using a
small jumper wire or a paperclip, connect the
two female pins of the connector that the
switch plugs into.

Manually move the robot to the right 6" and press
"RESET". Does the robot move left?

Yes

Reconnect the left / right home
switch. Locate the computer
board in the small door behind
the service keypad.

Using a small jumper wire or paperclip,
connect pins 5 & 6 (counting from the
bottom) on the connector labeled J5. If
you have to remove the connector to add
the jumper, make sure the connector is
plugged in before continuing. Press
"RESET". Does the robot move left?

Yes

Replace
computer board
PN-19300527A

No

See Page 17

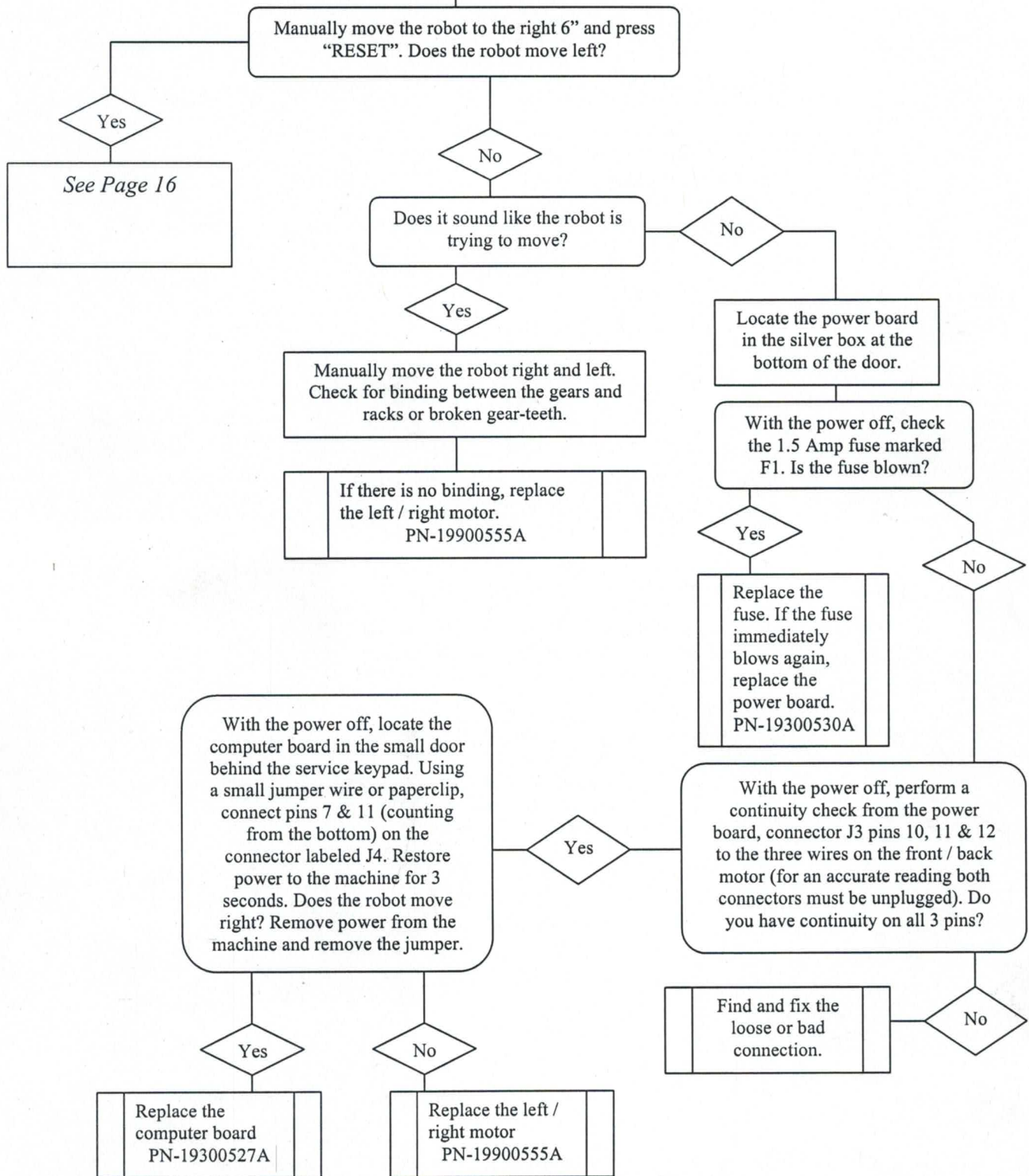
No

Replace the left / right
home switch.
PN-19900518A

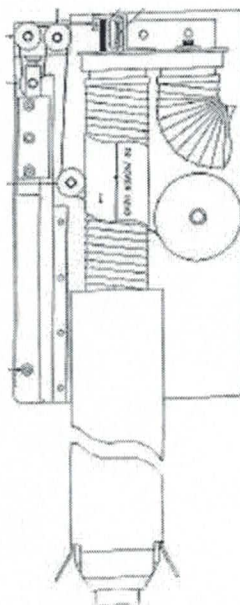
No

With the power off, perform a
continuity check from the
computer board J5, pins 5 & 6
to the left / right home switch to
find the loose or bad connection
(for an accurate reading both
connectors must be unplugged).

LEFT / RIGHT MOTOR STUCK

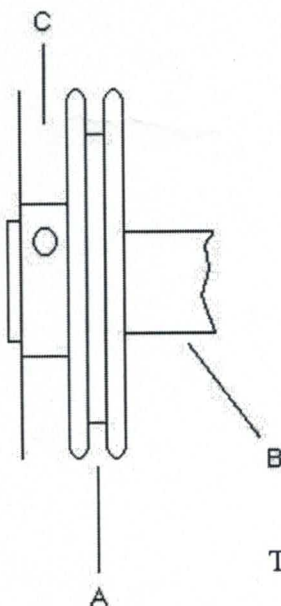


An Out Of Product error is given when all bins are flagged as being empty, or inactive. Immediately after pressing "RESET" the display will list all out of product bins and bin errors that have occurred since the last Load. Check the bins listed to see if they are empty. If there are more than 3 products in the bins listed, proceed with troubleshooting.



Disk / Reel

TS-1-1



TS-1-2

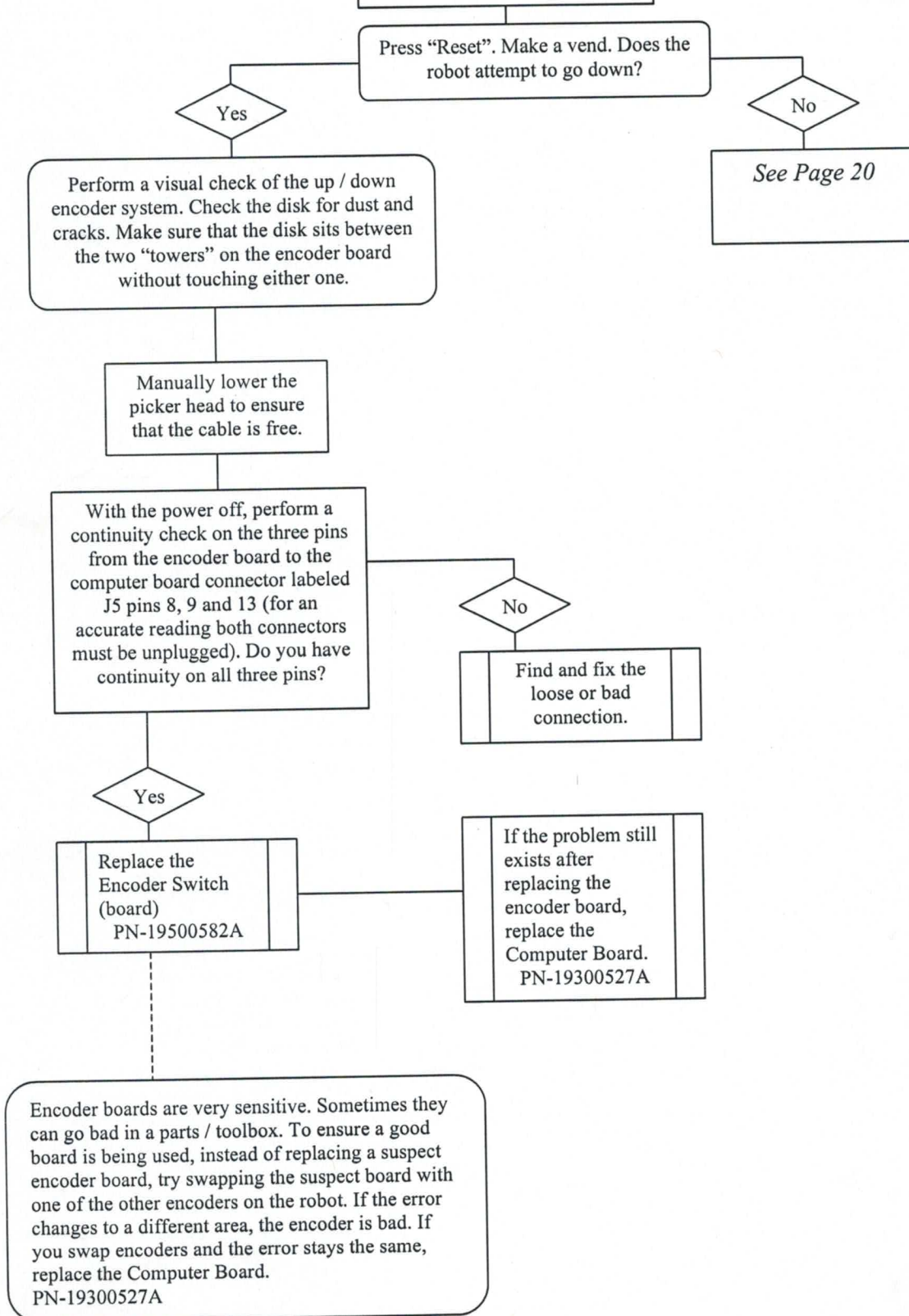
OUT OF PRODUCT

Scroll through the Main Menu to
3) EDIT SELECTION
Enter the selection for one of the bins
labeled as out of product. Press the (*) key
twice so that the display reads:
"Edit Bins"
Press the (#) key
The display will show "Program bin #1"
Press the (#) key
The freezer lid will open and the robot will
move to the location.
The display will show "Move the robot"
Press the (#) key
The robot will home and the display will
read "Bin height: Short? (Tall).
Make sure that if the bin is tall that it shows
tall on this screen. Press the (#) key to
accept and then exit this menu.

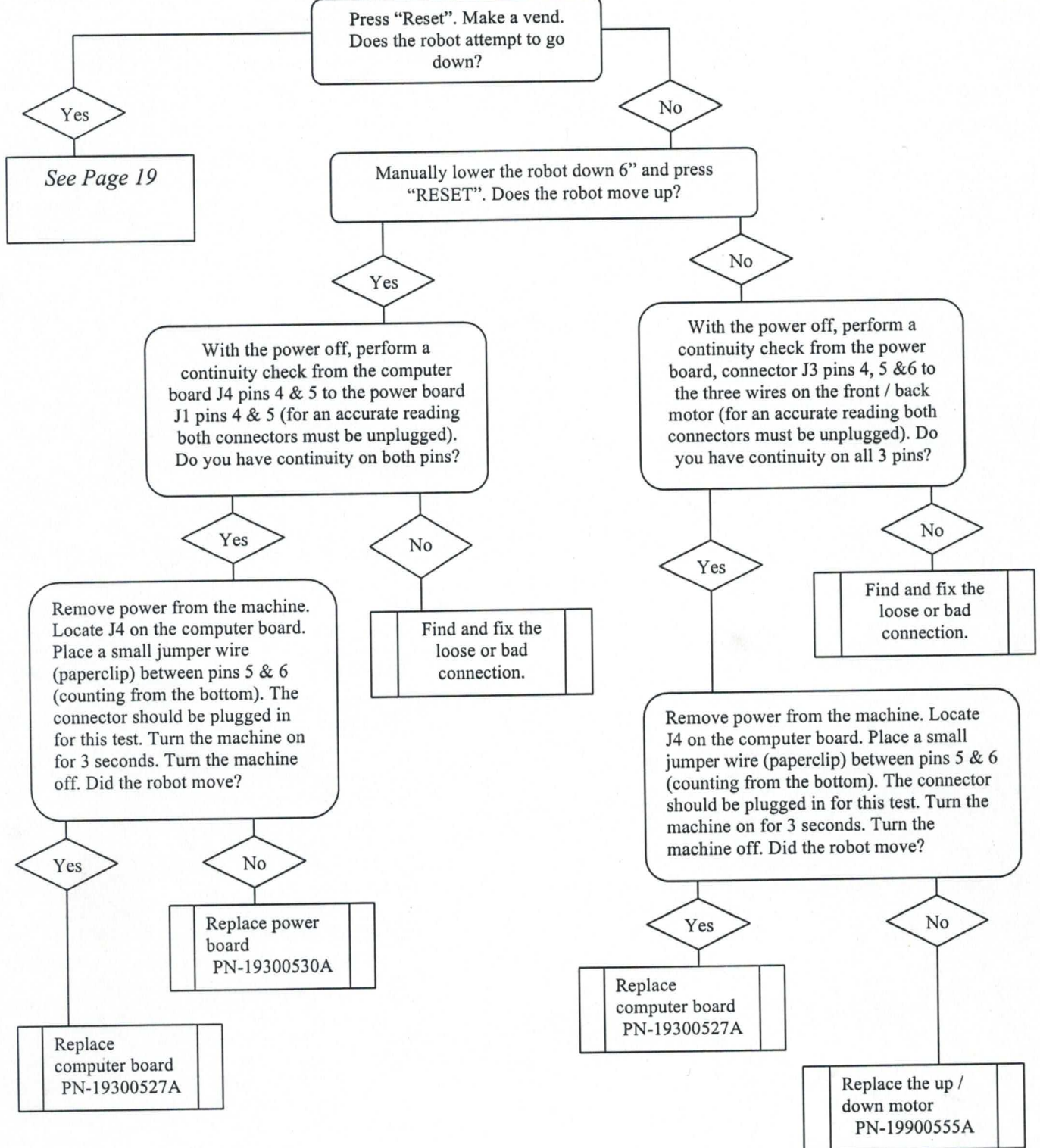
If the location is programmed correctly, locate the up / down
encoder disk / reel assembly (shown in Figure TS-1-1 & TS-1-2).
The up / down cable should wrap around the reel counter-
clockwise. The cable should be wrapped around the pulley part of
the reel (A) not behind the reel on the motor shaft (B) or the reel
"neck" (C).

Remove power from the machine. If the cable is
wrapped around the motor shaft or the reel
"neck", pull the robot all the way forward until
it hits the stopper screws at the front of the left
wall and right wall racks. Press the small silver
brake button on the up / down motor and allow
the picker head to drop until the cable is
completely unwrapped from the reel (you may
have to gently pull down on the picker hose
while holding the brake to fully unwind). It
may be necessary to remove the up / down
encoder disk / reel assembly if the cable is
caught behind it. Restore power to the machine.
The robot should wind the cable correctly on
the reel although the machine will go out of
order. Manually slide the robot back 6" and
press "RESET". The robot should home and the
machine should be back in service. Press
"LOAD" to clear any out of product bins.

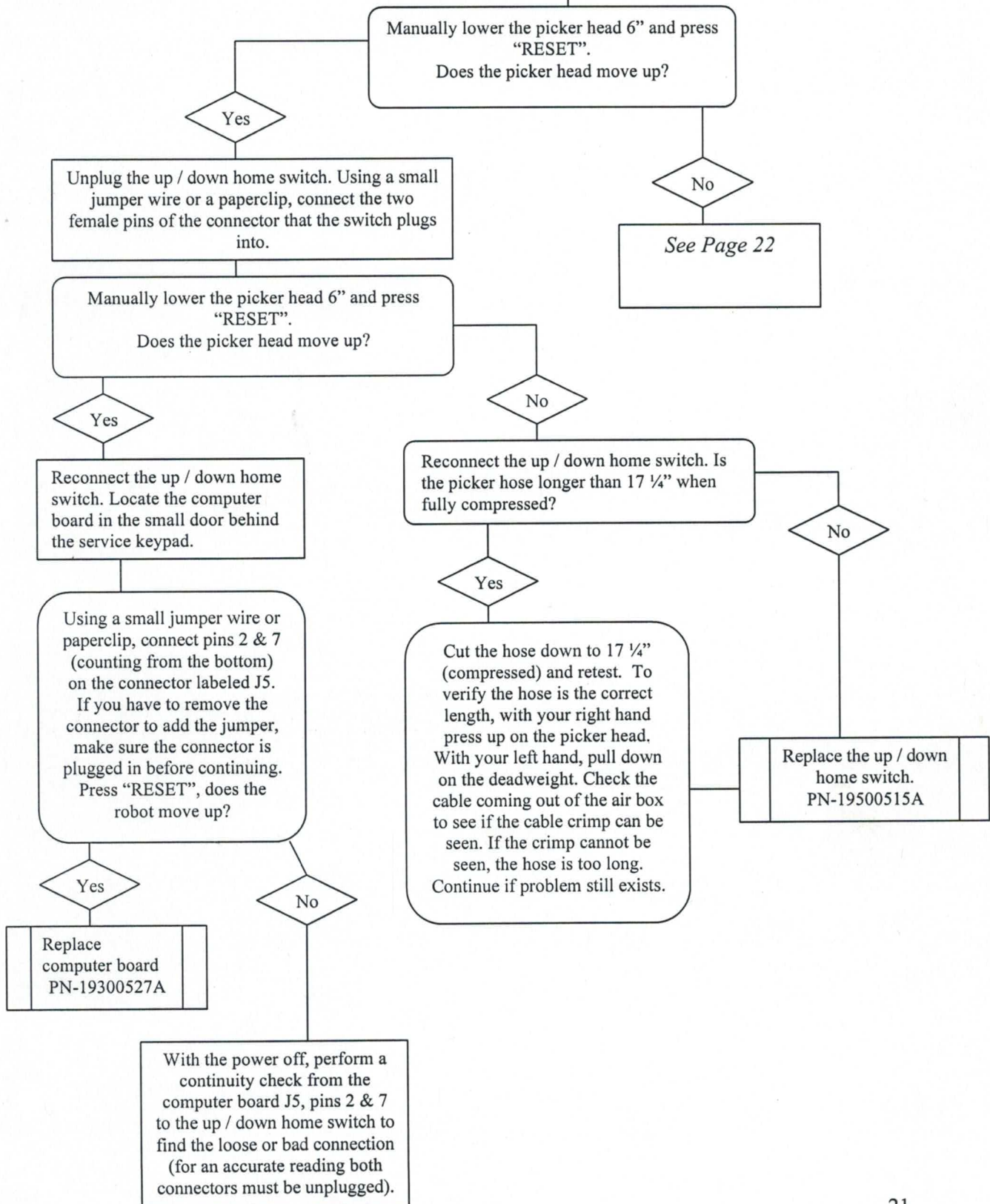
UP / DOWN ENCODER ERROR

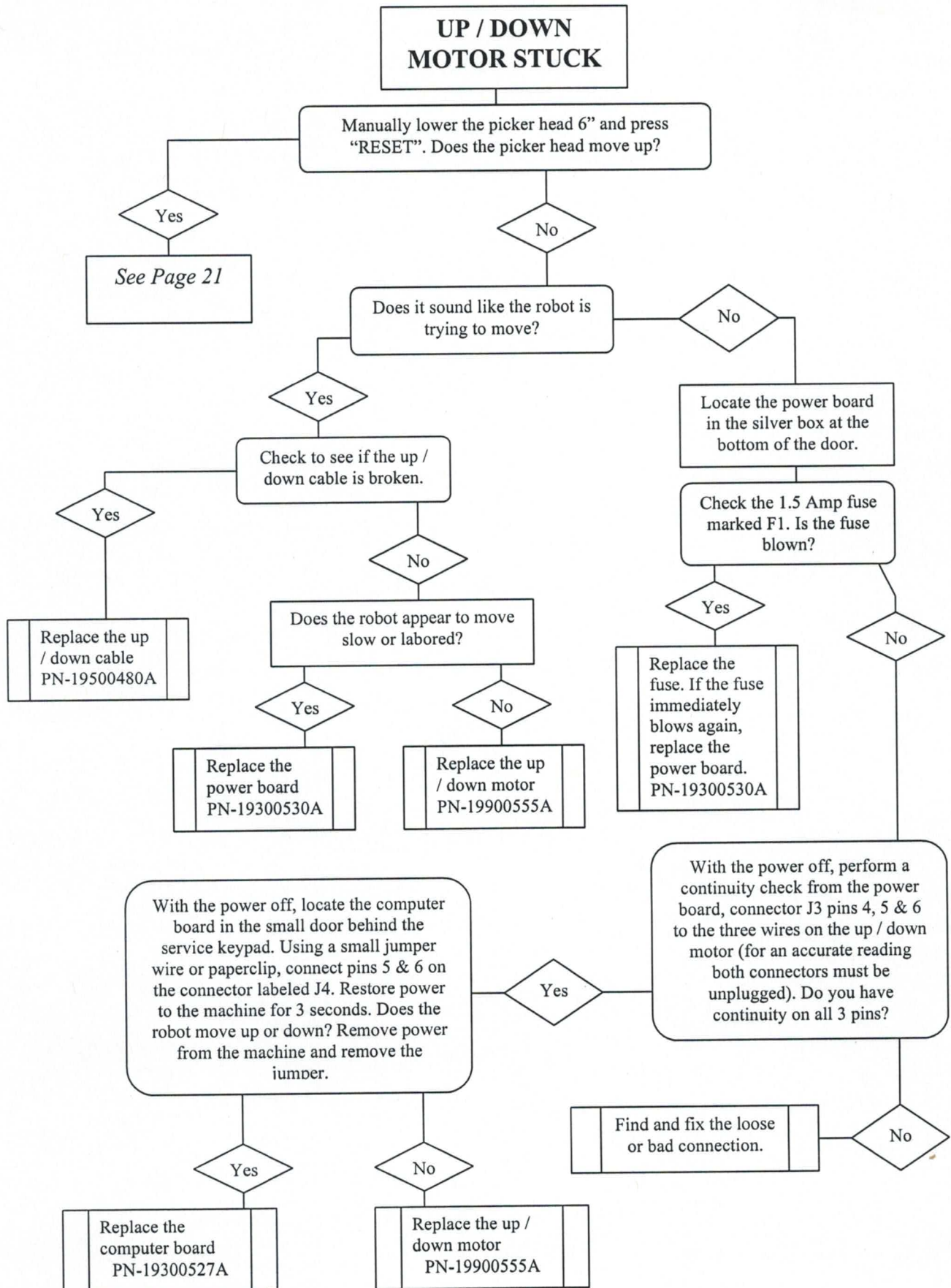


UP / DOWN ENCODER ERROR



UP / DOWN MOTOR STUCK





A Vacuum Out Of Order is caused by three consecutive bin errors. Immediately after pressing "RESET" the display will list all bin errors that have occurred since the last Load. Make a note of these bins and press the star (*) key to so that the display shows: 1) CHANGE PRICE then press "LOAD and "CLOSE" to clear the bin errors.

VACUUM OUT OF ORDER

Check both vacuum switches
Attempt to vend one of the items that was listed as a bin error. Does the vacuum turn on?

Yes

No

Does the picker tip land fully on the product in a way that would allow a good seal?

See Page 24

Yes

No

Check the Voltage coming into the machine. The easiest place to get a voltage reading is under the freezer on the left side, in the junction box. If necessary, remove one of the light fixture (black) plugs. Is the voltage at least 110VAC?

Refer to the F631 Operator's Manual section labeled 3) EDIT SELECTION for information on adjusting the bin locations. Check the other bins also as it takes three bin errors to create a Vacuum Out of Order.

Yes

No

Disconnect one of the wires from the lower (48") vacuum switch. Attempt a vend. Does the machine vend correctly?

The F631 requires a 115V-15A dedicated circuit. Anything less than 110V may not provide enough power to properly run our vacuum motor. Try moving the machine to a better outlet or unplug or move anything sharing the power at this outlet.

Yes

No

Leave the 48" vacuum switch unplugged and see Adjusting The Vacuum Pressure on page 41 of the Operator's Manual. When possible replace the lower (48") vacuum switch.

Search the entire vacuum hose for holes. Follow the vacuum hose from the vacuum box up to the robot. Cut the tie wrap holding the hose to the robot. Pull the hose off the robot and stretch the last 2 to 3 inches of the hose. Are there any holes in the hose?

No

Yes

With the power off, perform a continuity check from the computer board J5, pins 4 & 7 to the 38" vacuum switch (for an accurate reading both connectors must be unplugged). Do both wires have continuity?

No

Using a pair of cutting pliers, cut the end of the hose off from the point of the hole. Reconnect the hose to the robot and secure with a tie wrap.

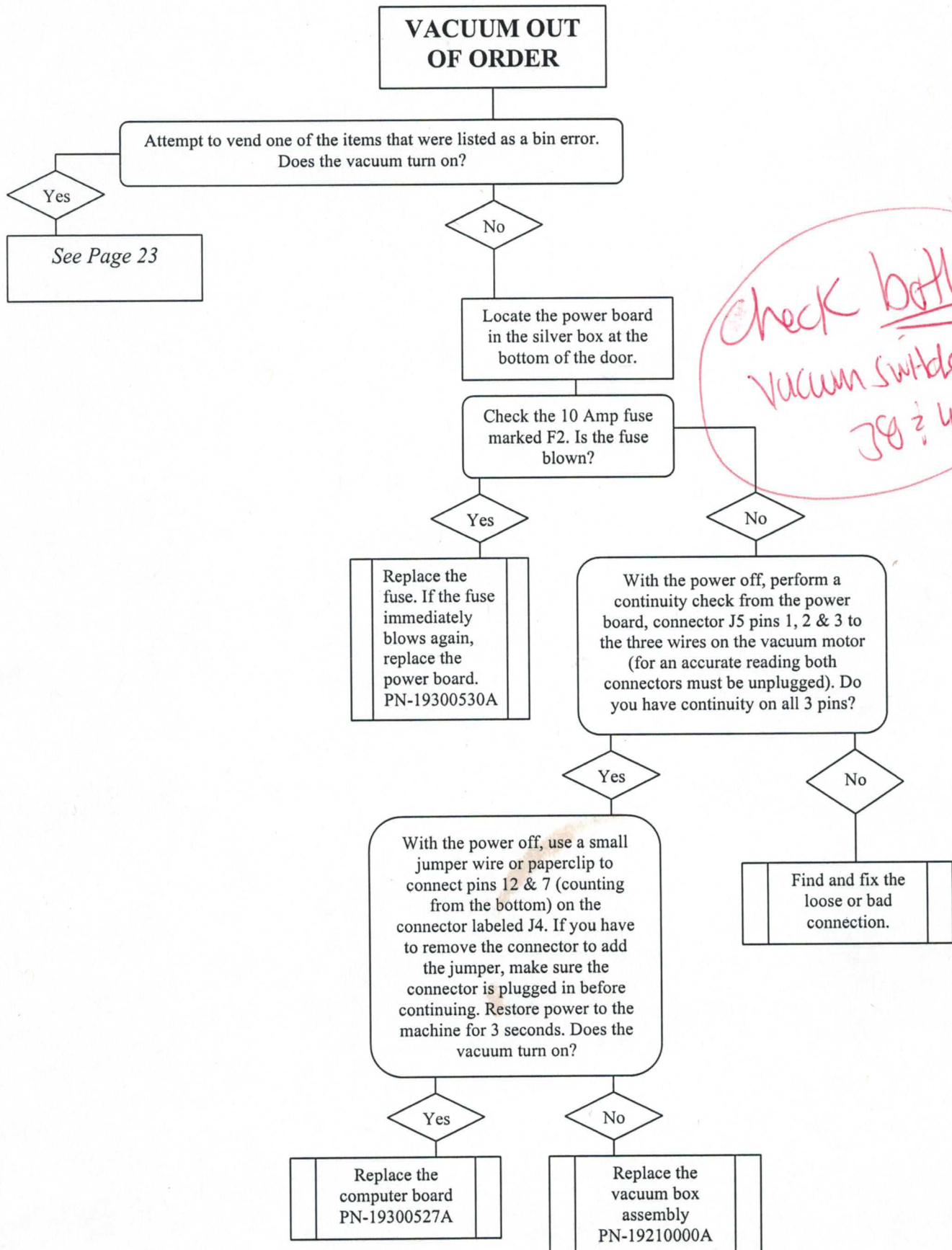
Yes

Replace the top (38") vacuum switch.
PN-19500557A

Find and fix the loose or bad connection.

Holes in this part of the hose are generally caused by insufficient length between the robot and the hose clamp on the right wall. To prevent a recurrence of this problem, slide the robot to the right rear corner. Loosen the clamp on the right wall and pull some extra hose through. When you have enough that there is a little play, retighten the clamp.

NOTE



VACUUM SENSOR ERROR

Perform a visual inspection of the slack removal system for the up / down cable. Look for obvious signs of problems such as the cable being off a pulley, or the slack switch arm being under the deadweight arm (see diagram below). The deadweight should press up on the slack switch arm. Correct any faults found and attempt a vend.

Locate the snap action (slack) switch at the top right of the robot. Make sure that the two sets of wires (1-blue pair, 1-white pair) are connected to pins 1 & 3.

With the power off, disconnect pins 1 & 3 of the slack switch and perform a continuity check across them. Do you have continuity across pins 1 & 3 on the slack switch?

Yes

Replace the
slack switch
PN-19500566A

No

Locate the computer board in the small door behind the service keypad. Unplug the connector labeled J5.

With the power off, perform a continuity check from the blue to the white wires that were connected to the slack switch. Do you have continuity?

Yes

Locate the 38" vacuum switch. To find the switch, cut the tie wrap holding the right hand hose to the robot.

With the power off, unplug both wires from the 38" vacuum switch. Perform a continuity check across the two pins at the bottom of the vacuum switch. Do you have continuity?

Yes

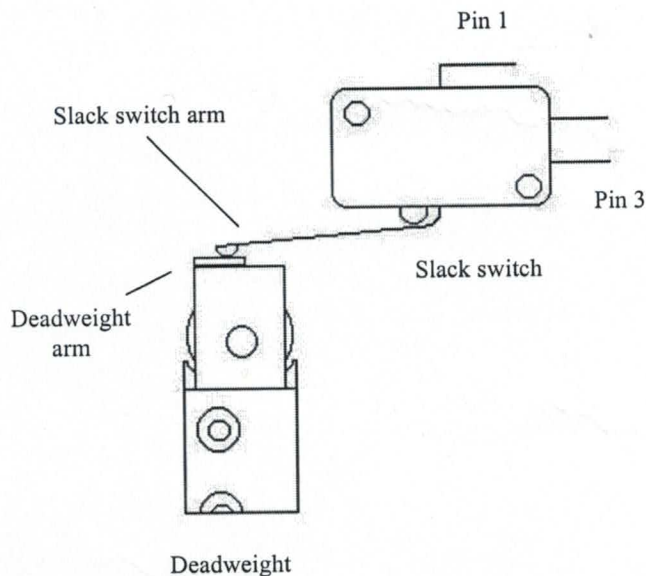
Replace the
38" vacuum
switch
PN-19500557A

No

Replace the
computer board
PN-19300527A

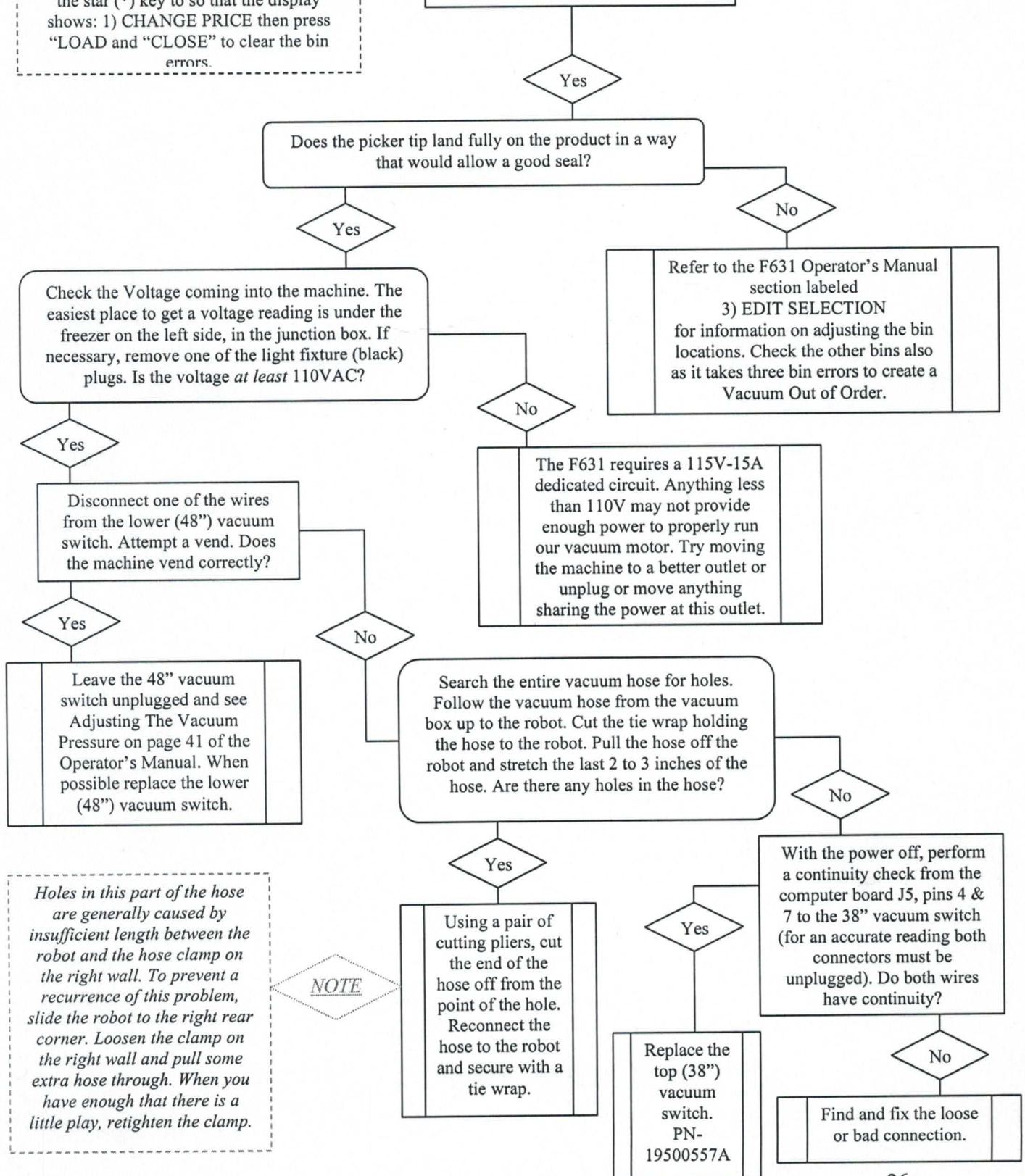
No

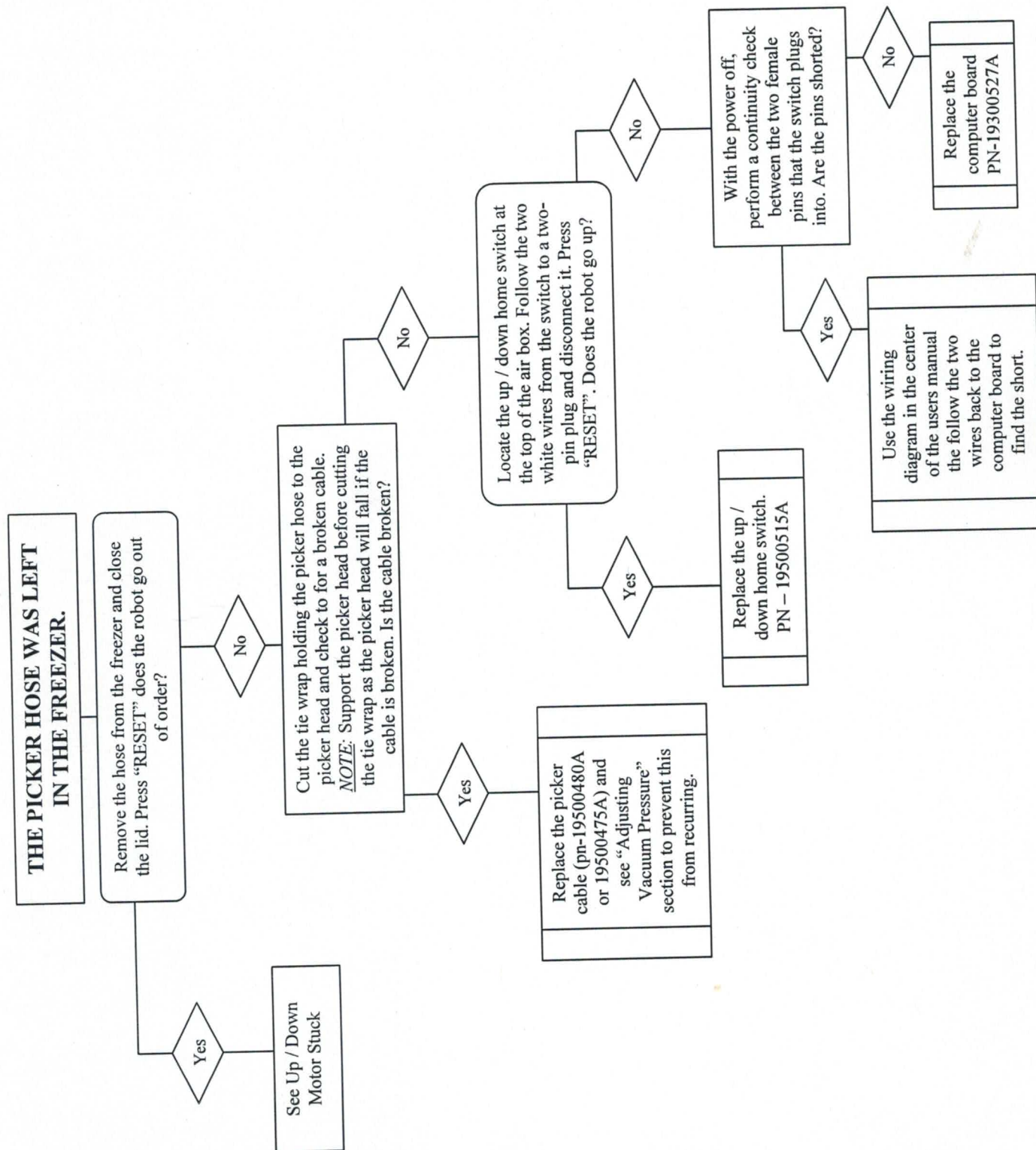
Find and fix the
short in these
two wires.



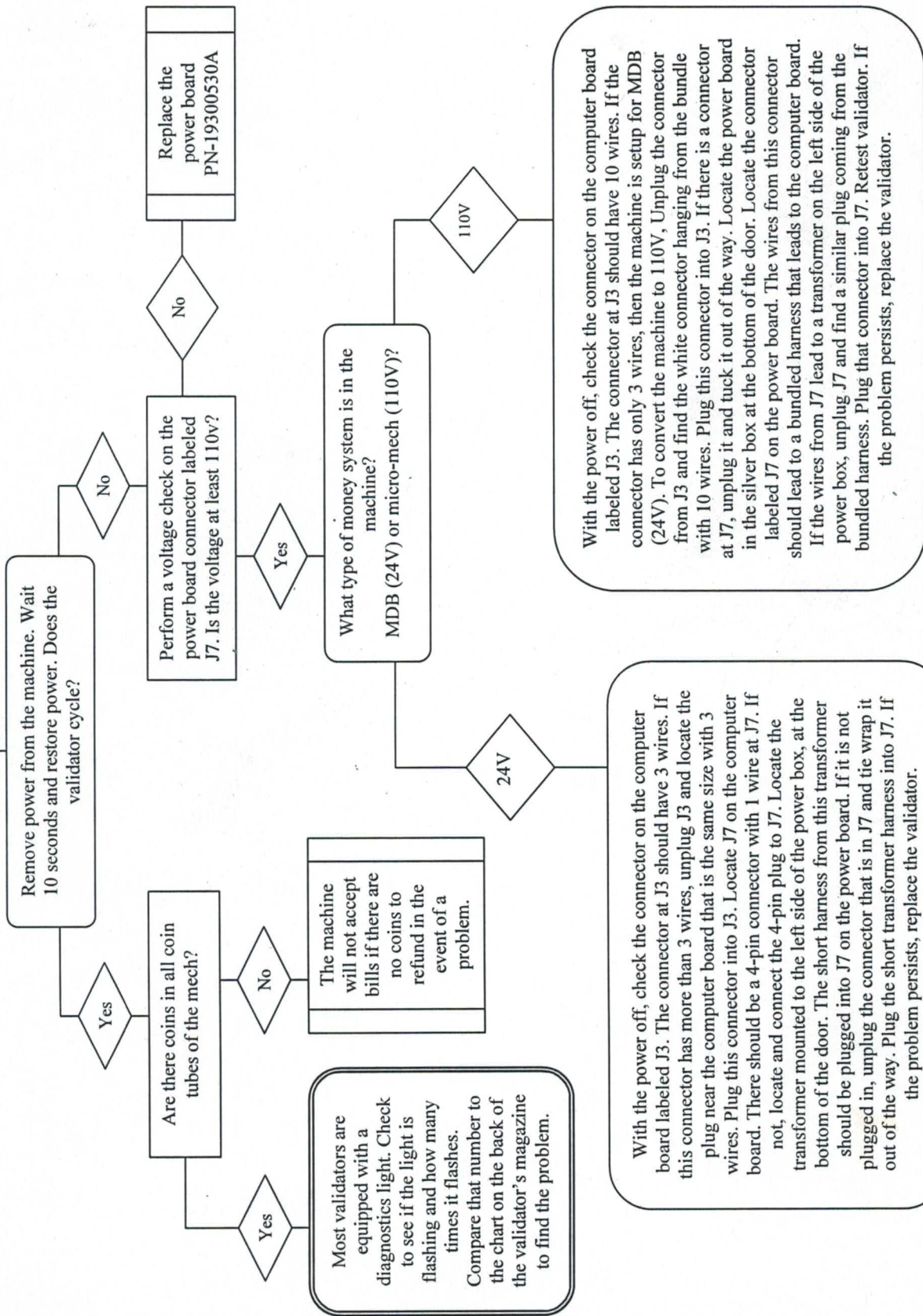
A Vacuum Out Of Order is caused by three consecutive bin errors. Immediately after pressing "RESET" the display will list all bin errors that have occurred since the last Load. Make a note of these bins and press the star (*) key to so that the display shows: 1) CHANGE PRICE then press "LOAD and "CLOSE" to clear the bin errors.

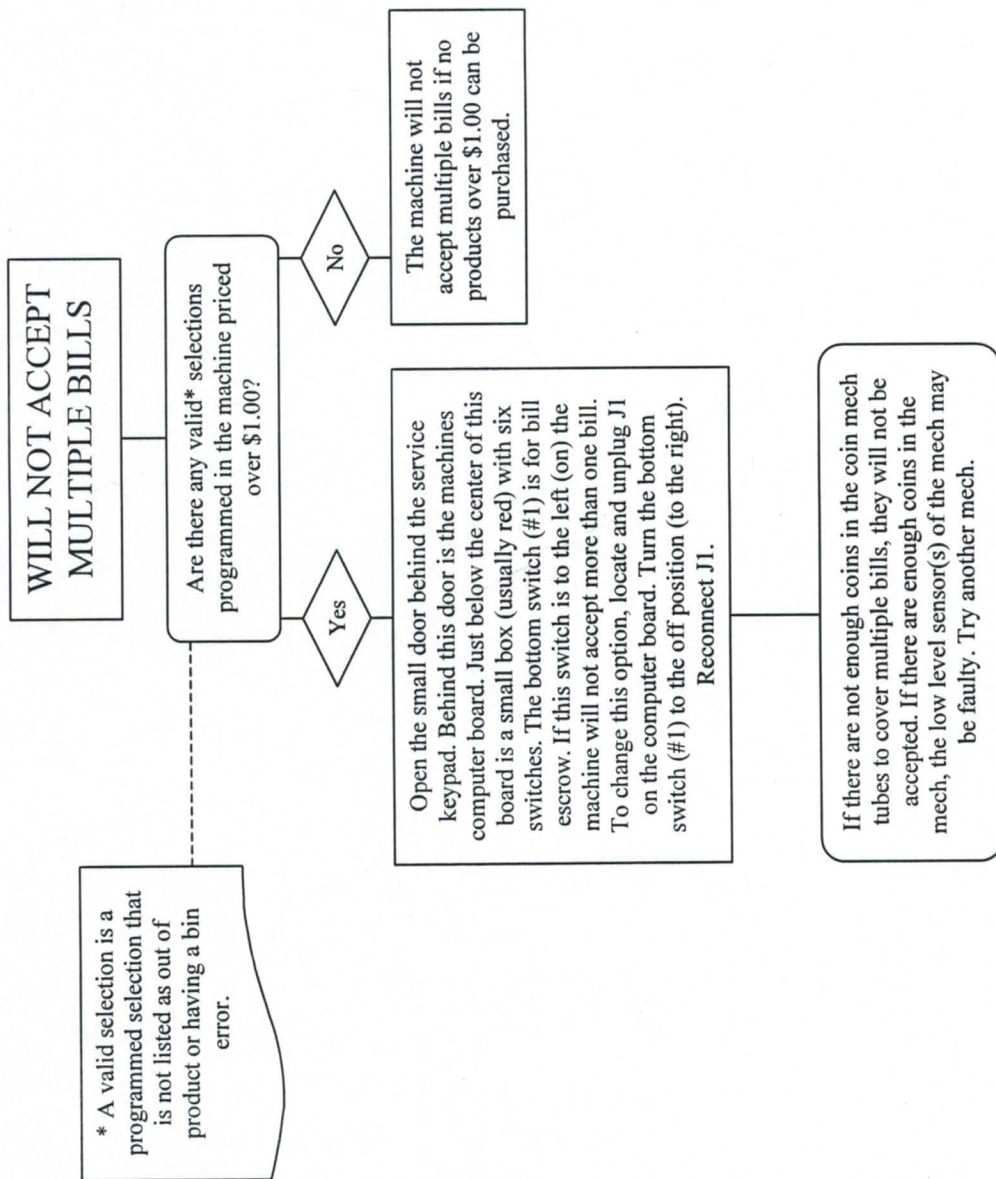
VACUUM SHUTS OFF WHILE ROBOT TRAVELS UP





WILL NOT ACCEPT ANY BILLS





NON-FATAL ERRORS

Problem: Blown fuse.

Troubleshooting: Make sure there is no power to the power (TRIAC) board before replacing fuses. Try replacing the fuse. If the fuse blows immediately upon restoring power to the board replace the power board (PN-19300530A).

Problem: Buzzer not working.

Troubleshooting: Replace computer board (PN-19300571A).

Problem: Cable is wrapped around the up / down encoder, disk and reel.

Troubleshooting: Locate the brake on the front / back motor. Release the brake and pull the robot forward until it makes contact with the screws on the front / back racks. Locate the brake on the up / down motor. Release the brake and pull down on the picker head until it is past the bottom of the freezer and all of the cable is off the encoder and reel. If the head will not go all the way down, it may be necessary to remove the encoder, disk / reel and cover to unwrap the cable. Pull out the service switch and the robot will wind itself up the correct way. The machine will then go out of order with a "fwd / bck motor stuck". Locate and release the front / back motor brake and slide the robot back about six inches. Press "RESET". The robot should "home" itself and the display should read either PLEASE INSERT MONEY or 1) CHANGE PRICE. Although most cable problems are related to high vacuum pressure (see adjusting the vacuum pressure). This type of problem may be caused by a faulty slack switch. Vend a selection. If the robot goes to the location, drops down to the product and continues to let out more cable, **immediately turn off the power** and replace the slack switch (pn-19500566A).

Problem: Cannot pass the "1) CHANGE PRICE" menu option.

Troubleshooting: Possible causes for this problem include:

- If the computer boards memory fails, it may be necessary to press the "*" key to access the menu.

- The customer keypad may be connected upside down on the computer board (J8).
- On several Coin-Co validators, such as the BA30SA, there is a polarity conflict with the F631. On the BA30SA, remove the validator from the machine. Slide the control board out of the plastic case. Locate the connector labeled P14. Unplug P14, turn it 180° so that the wires are reversed and plug it back in. Slide the computer board back into its plastic case. Reinstall the validator and retest.

Problem: Display always reads “PLEASE INSERT MONEY”

Troubleshooting: Locate the service switch and unplug both wires from it. Jump the two wires together with a small jumper wire or paper clip. Does the display read 1) CHANGE PRICE?

YES: Reconnect the two wires to the two pins facing down on the service switch and retest. If the problem persists replace the service switch (pn-19300543A)

NO: Locate the computer board and find the connector labeled J10. Using a small jumper wire or paperclip, connect pins 1 & 2 together (counting from the bottom). If you have to pull the connector off the board to insert the jumper make sure to add the jumper to the back of the connector with the wires already in the connector. Plug the connector in.

Does the display read 1) CHANGE PRICE?

YES: There is a bad pin or a break in one of the two wires going from J10 to the service switch. Find and fix the break.

NO: Replace the computer board (PN-19300527A).

Problem: Display blank / Display illegible

Troubleshooting: Possible causes for this problem include:

- a faulty display (pn-19310520A for before SN-8018 or pn-19300521A for SN-8018 and later)
- a faulty computer chip (pn-19301334A)
- or a faulty computer board (pn-19300527A)

- A bad harness or loose connection between the display board and the computer board connector labeled J2.

Problem: Freezer door left fully opened and the robot is at its front home position.

Troubleshooting: Check the space between the upper freezer door switch and the magnet on the freezer lid. If the gap is too large or if the switch is too weak, the switch may pick up the magnet too late. If this happens the capture bar hanging from the robot on the right may miss the roller on the freezer lid. This would allow the robot to push the lid open but the capture bar would not be able to pull the freezer lid closed (switch PN-19900518A).

Problem: How can I exit FREE VEND / TEST VEND?

Troubleshooting: FREE VEND and TEST VEND are both entered and exited in the same way. Press the button one time to enter and one time to exit.

Problem: Keeps money and vends nothing.

Troubleshooting:

- Ensure that there is nothing obstructing the airflow in the picker head. Drop the picker head down about 20". Bend the hose up and look into the picker head for obstructions.
- If the vacuum pressure is extremely high, the machine may not be able to tell when the product falls off. If the vacuum stays running without product, the vacuum pressure should be reduced. See adjusting vacuum pressure. Also, the lower (48") vacuum pressure switch should be replaced.

Problem: Keypad not working (If using a Coin-Co BA30SA see below*).

Troubleshooting: If the keypad does not work at all, or if certain rows or columns of buttons don't work, the problem is either in the keypad or the computer board. To

determine which unplug the questionable keypad and connect the other keypad plug in its place. Do all the keys work on the second keypad?

YES: Replace the faulty keypad (PN-19310350A for the service keypad and 19300571A for the insert for the customer keypad).

NO: Replace the computer board (PN-19300527A)

**COIN-CO BA30SA:* If using a Coin-Co BA30SA, unplug the validator and retest. If the machine works without the validator there is a polarity conflict with the F631. On the BA30SA, remove the validator from the machine. Slide the control board out of the plastic case. Locate the connector labeled P14. Unplug P14, turn it 180° so that the wires are reversed and plug it back in. Slide the computer board back into its plastic case. Reinstall the validator and retest.

Problem: Keypad works incorrectly.

Troubleshooting: The reason for improper keypad function is the reversal of the keypad connectors or installing the connectors upside down. The ribbons used to connect the keypads have writing stamped on only one side. When installing the plug, the writing should be to the left side of the board. The service keypad on the inside of the door should be the upper of the two connectors with the customer keypad on the lower.

Problem: Machine loses memory.

Troubleshooting: See "Machine must be setup".

Problem: Motor continuously runs until overheating.

Troubleshooting: Replace the power board (pn-19300530A).

Problem: Motor keeps blowing fuse.

Troubleshooting: Replace the power board (pn-19300530A).

Problem: Motor runs very slowly in one direction.

Troubleshooting: Replace power board (pn-19300530A).

Problem: Not accepting coins.

Troubleshooting: a) Check for coins that may be jammed in the tubes or the receiver.

b) Locate the connector labeled J8 on the power board. Perform a voltage check (**DC**) at the two wires in the connector (J8). Does the meter read 110-115 volts **DC**?

YES: Check the connector on the computer board labeled J3. If the coin mech is a micro-mech (110v), the connector should be white. If the coin mech is MDB (24v), the plug should be red. If the wrong connector is plugged into J3, the other end of the harness should also be checked. Locate the power box, the silver box at the bottom of the door. Remove the cover from the box. If the machine is setup to offer MDB, there will be a transformer mounted to the left side of the power box. To use MDB, the short harness from the transformer should be connected to J7 on the power board (labeled AC to lights). If another plug is already there, disconnect it a tie or wrap it out of the way. If you are using a 110v mech, the transformer should not be plugged in, instead use the plug from the bundled wires at J7. If the mech still does not accept coins, replace the mech.
NO: Replace the power board (pn-19300530A).

Problem: Picker cable is coming off pulleys, stripping or breaking.

Troubleshooting: a) These are all caused by very high vacuum pressure. See adjusting the vacuum pressure. Also, to help reduce the possibility of the cable being damaged or broken, Fastcorp has added a ½" x 1" piece of Velcro to the pulley z-bracket which holds the first two pulleys. When the Velcro is attached to the bracket above the first pulley, it prevents the cable from jumping off the first and keeps any slack inside the picker hose. This allows the cable outside the hose to remain on all the pulleys regardless of pressure and slack. However, if the bouncing is not corrected, the weight of the picker head alone may cause cable to break.

b) The second reason a cable may come off a pulley is if the deadweight (that slides up and down on the left side of the robot) cannot slide freely. The weight is

designed to keep the slack out of the system. If the weight cannot slide down for any reason, the slack it causes would push the cable off the pulleys.

Problem: Picker head bounces when lifting product.

Troubleshooting: The vacuum pressure is too high. See adjusting the vacuum pressure.

Problem: Picker head drops after completing a vend.

Troubleshooting:

a) If the picker head drops slowly:

The up / down motor brake may be bad. Grab the picker head and lightly pull down. If the picker goes down easily replace the up / down motor (pn-19900555A)

b) If the picker head drops quickly:

If the vacuum pressure is very high, the pressure inside the picker hose will pull the hose up faster than the up / down motor can turn. This will keep any cable slack inside the picker hose. When the vacuum finally shuts off after delivering the product, the picker head will drop until the cable is taut. To fix this problem, see adjusting the vacuum pressure.

Problem: "PLEASE CLOSE FREEZER DOOR"

Troubleshooting: Locate the freezer door magnet on the front left corner of the freezer lid. Look at the top of the magnet. There should be a small white-yellow cap on the top of the magnet. If there is a hole in the top of the magnet, the cap has fallen off and the magnet has fallen out. Check the upper, left area of the back wall of the cabinet to see if the magnet is stuck on the wall. If you find the magnet, drop it back into the case with some glue and allow it to dry. If there is a cap on the magnet, check the space between the magnet and the switch on the wall directly across from the magnet. If the gap is larger than 1/4" the freezer may have shifted to the right. To close the gap either pull the front of the freezer to the left and secure (if it appears to have shifted), or add a spacer behind the switch. If the gap is 1/4" or less see the troubleshooting section labeled "FREEZER STUCK OPEN" for further instructions.

Problem: Product is too hard / too soft.

Troubleshooting: The temperature control / adjustment is on the thermostat behind the freezer. With the freezer lid closed, look over the right rear corner of the freezer. Just below the top of the freezer a small rectangular shaped piece with a gold colored screw in the top center. The rectangular piece is the thermostat and mounting bracket. The screw is the temperature adjustment. Turn the screw *clockwise* to make the freezer colder and *counter-clockwise* to make the freezer warmer.

Problem: Robot binds with the freezer lid.

Troubleshooting: Locate the freezer door magnet on the front, left corner of the freezer lid. Manually open the freezer door to a 45-degree angle. At this point on the left wall of the machine is the freezer open switch. Close the door and press "LOAD". Does the magnet stop below or before the freezer open switch?

YES: Replace the Freezer open switch (pn-19900518A).

NO: Press close to end the load procedure. Press "LOAD" again and watch the freezer lid. Does the freezer lid appear to be closing or lowering as the robot starts to go back?

YES: The freezer door motor has a bad brake. Replace the freezer door motor (pn-19900555A)

NO: Check the gear teeth on the robot to ensure that none are broken. Check the path of the gears on the rack for any obstructions that may be preventing the robot from smooth travel.

Problem: Robot only goes halfway to the bin.

Troubleshooting: Check the cable path from where the cable leaves the air box and winds through the series of 6 pulleys. If the cable is off any pulley put it back on. The cable ends at the up / down reel. Check the reel to ensure that the cable is wrapped on the reel and not behind it. If the cable is wrapped behind the reel, locate the brake on the front / back motor. Release the brake and pull the robot forward until it makes contact with the screws on the front / back racks. Locate the brake on the up / down motor. Release the brake and pull down on the picker head until it is past the bottom of the freezer and all of the cable is off the encoder and reel. It may be necessary to remove the encoder, disk /

reel and cover to unwrap the cable. Pull out the service switch and the robot will wind itself up the correct way. The machine will then go out of order with a "fwd / bck motor stuck". Locate and release the front / back motor brake and slide the robot back about six inches. Press "RESET". The robot should "home" itself and the display should read either PLEASE INSERT MONEY or 1) CHANGE PRICE.

Problem: Takes a \$5.00 bill but only credits 2 or 3 dollars.

Troubleshooting: Remove the validator from the machine. Check the switch settings on the side of the validator and ensure that it is set for short pulse communication. If the problem persists, replace the bill validator.

Problem: Tries to lift an empty bin from the freezer.

Troubleshooting: If the robot is trying to lift:

- a) The short bins – Use the 3) EDIT SELECTION option in the main menu to change the bin height of the affected bins to short.
- b) The cone bins – At the bottom of the cone bins is a triangular shaped wedge to help level the sharp angle the cones would normally stack with. The robot may think this wedge is another product. To correct this use the 3) EDIT SELECTION option in the main menu to adjust the product height to (at least) 3-inches.
- c) Check under the affected bin for ice. If ice builds up around the edges of the freezer and must be cleaned, place something over the bins to prevent the ice from falling into the freezer. If it does fall into the freezer it may settle under the bins and force the bottom of the bin into the vending area. The robot will "assume" anything in the vending area is a vendable product.

Problem: Vacuum will not turn on.

Troubleshooting: see vacuum out of order page 2.

Problem: Vends / delivers multiple products (makes multiple attempts).

Troubleshooting: Locate the vacuum pressure adjustment on the face of the vacuum box under the freezer. Loosen the screws holding the adjustment plate and slide the plate to the left covering one row of holes. Vend a selection. Does the machine vend correctly?

YES: Leave the machine with its new setting.

NO: Disconnect the right-hand hose from the air box on the robot. Inside of the air box is the 38-in/wtr vacuum pressure switch. Between the two wires at the bottom of the switch is a small allen screw used for adjustment. Using a .050" allen wrench, turn the screw very slightly counter-clockwise. Reattach the hose and vend a selection. Does the machine vend correctly?

YES: Leave the machine with its new setting.

NO: Disconnect the right-hand hose from the air box on the robot. Inside of the air box is the 38-in/wtr vacuum pressure switch. Remove the two wires from the bottom of the switch. These wires are signal wires, they can be handled without risk of shock. Vend a selection. When the vacuum turns on, press and hold these two wires together. Keep them together until the vacuum shuts off. Did the vacuum stay running all the way to the delivery bin?

YES: Replace the 38 in/wtr vacuum pressure switch (PN-19500557A).

NO: Replace the ribbon cable (PN-19510300A).

Problem: Vends / delivers multiple products (makes single attempt).

Troubleshooting: If there is moisture on the product when it is loaded, the product may freeze together. In some cases this will lead to bin errors as the product will be too heavy or awkward for the robot to lift from the bin. If the product is very light and frozen together, the machine may be able to lift several and vend them all together as one. It may be necessary to eliminate any plain paper wrapped products. If the problem persists it may be necessary to review your transporting and loading procedures to cut down on the amount of moisture allowed on the product or in the freezer.

Appendix A

Parts Order Form

Common Parts Identification

Parts / Price List

GROUP (A-D):A
*=Abort #=Enter

d) Press the letter of the account you wish the sales be recorded into (A,B,C, or D) and press "#".

e) Enter additional blocks of time if desired; if not, press "*" to exit the screen. Press "A" to exit the next screen, and "A" once more to return to the main menu.

SEQUENCE OF OPERATION

HOW THE FREEZER DOOR IS OPENED

The door is raised by the freezer door motor, located just above the floor on the right side of the cabinet. This motor reels the cable in until the door is open approximately 45°. At this point, the magnet on the left, front corner of the freezer is "sensed" by the switch on the wall.

HOW THE ROBOT MOVES BACK

The robot is guided by two parallel racks attached to the left and right sides of the cabinet, about 25 inches above the freezer door. The front/back motor, located on the left side of the left/right beam, moves the beam backwards by using a gear along the horizontally mounted rack. The opto-encoder disk, located on the shaft of the front/back motor, signals the computer how far the beam has moved as it passes through an infrared diode, located on the opto-encoder. The opto-encoder enables the computer board to judge distance traveled by the robot. This black disk with slots rotates between the LED, creating distinct on/off pulses which the computer equates to distance traveled. Each pulse represents approximately 1/16 of an inch. The front/back motor is turned off when the computer counts the number of pulses assigned to a particular selection number when the product location was programmed.

At the same time, a capture bar located on the right side of the left/right beam pushes the freezer door open the rest of the way. This motion activates the pulley and "dead weight" system located on the right side of the cabinet next to the freezer. This system prevents the freezer door cable from building excess slack that could lead to freezer door malfunctions.

HOW THE ROBOT MOVES TO THE RIGHT

The carriage is moved by a gear attached to the left/right motor along a horizontally mounted rack located behind the left/right beam. The opto-encoder disk located on the shaft of the left/right motor signals the computer how far the beam has moved as it passes through an infrared diode. The opto-encoder is an infrared diode and sensing device that enables the computer board to judge distance traveled by the robot. A black disk with slots passes between the LED, creating distinct on/off pulses which the computer equates to distance traveled. Each pulse represents approximately 1/16 of an inch. The left/right motor shuts off when the computer counts the number of pulses assigned to that particular selection number when the product location was programmed.

HOW THE PICKER HEAD IS LOWERED

The picker head is a weighted component attached to the end of a self-retracting hose.

The picker head is raised and lowered by the up/down motor, located on the back of the carriage. The opto-encoder disk, located on the shaft of the up/down motor signals the computer how far the picker head has moved as it passes through an infrared diode.

The opto-encoder is an infrared diode and sensing device that enables the computer board to judge distance traveled by the robot. This black disk with slots passes between the LED, creating distinct on/off

pulses which the computer equates to distance traveled. Each pulse represents approximately 1/16 of an inch.

The computer counts pulses and looks for the preprogrammed floor height or last product height. It also looks for activation of the slack switch signifying that the picker head has contacted product.

HOW THE VACUUM IS TURNED ON

A mechanical switch located on the upper left side of the carriage determines when the picker tip has contacted product. When the picker tip touches product, slack is created on the picker cable. This slack is "captured" by a slack removal dead weight and a gap is formed between the dead weight and the slack switch sensing arm. The computer is signaled to turn off the up/down motor and turn on the vacuum motor. After the picker has retrieved product the computer monitors the vacuum switch to determine if the product was retrieved properly. If the product is dropped, the vacuum pressure in the system will drop, and the vacuum switch will respond with an open circuit to switch off the vacuum motor. The computer instructs the robot to make two additional attempts to retrieve the product before putting the bin out of order.

HOW THE PICKER HEAD IS LIFTED

The picker head is raised when the up/down motor turns counter-clockwise to reel in the cable. This picker cable has two magnets attached to it that the up/down home switch senses when the picker head reaches its origin position. The vacuum switch continues to monitor air pressure in the air box to ensure that the product has not been dropped.

HOW THE CARRIAGE MOVES LEFT

After the up/down home switch has been activated by the magnet on the cable, the carriage then travels left until a magnetic reed switch is activated. The reed switch is located on the left side of the left/right beam and senses a magnet attached to the left side of the carriage, when it reaches its origin position.

HOW THE ROBOT COMES TO THE FRONT

Once the carriage reaches its origin at the left/right home switch, the front/back motor starts to drive the robot assembly towards the front of the cabinet until it reaches its home position, determined by the front/back home switch. The switch is located on the top, left side of the cabinet just under the left track. The switch senses a magnet located on the left side of the left/right beam 6 ½ inches from the top of the cabinet.

HOW THE ROBOT DROPS THE PRODUCT

Once the robot reaches the front/back home position with the vacuum running, the vend is considered to be complete. At this point, the vacuum will turn off and the product will drop into the product retrieval bin for the customer.

SELF-DIAGNOSTICS & TROUBLESHOOTING:

When an error occurs, "out of order" and the service phone number will appear (if programmed). The F631's self-diagnostics appear by pressing the "#" button on the customer keypad. The section below lists the errors and the troubleshooting of those errors. Use the section called "The Operating Cycle" to further clarify any sequence of the operation cycle. All unfamiliar component names or component locations can be verified by cross-referencing the Parts and Components section of this manual. After identification of faulty component refer to the "Repair Procedures" section of the manual.

BIN ERRORS

With the F631 FM, a customer will never lose money due to the robot not retrieving a product. The robot's vacuum switch tells the computer whether a product has been retrieved by identifying the increase in vacuum when a product is attached to the picker head. The robot will make three attempts to retrieve it after the third attempt the money is returned. If that selection is chosen, the customer will be told to select another product. This error type will not shut down the machine, rather, the bin number with the selection number will appear on the screen as soon as the machine is serviced. It is important to inspect the bin and programming to verify that the selection will properly dispense your product.

BIN ERROR TROUBLESHOOTING

- a) Bin was loaded improperly (see Loading section)
- b) Robot was programmed off center of the bin (see Programming section, 3) Edit Selection)
- c) Low vacuum pressure
- d) Faulty vacuum switch

POWER BOX FUSES:

The power box, located in the center base of the door, has three fuses: The fuse numbered F3 (closest to reach) protects the computer board (2.0 Amps.) The middle fuse numbered F1 (the middle fuse) protects the A/C motors, (1.5Amps). The fuse farthest to the back, numbered F2, protects the vacuum motor (10/Amps).

REPLACING A FUSE:

- a) Unplug the main power in the rear of the machine.
- b) If possible, locate wire crossing or short before replacing fuse (see wire schematic).
- c) Remove Power Box cover
- d) Locate the blown fuse
- e) Replace fuse with proper rating only, do not substitute fuse ratings
- f) Reinstall Power Box Cover
- g) Check corresponding circuit for short circuit.

ADJUSTING THE VACUUM PRESSURE:

The vacuum pressure is preset at the factory for optimum balance between vacuum pressure and product weight, however, voltage variances will alter vacuum pressure. Too much vacuum will cause the picker head to jump up as a product is touched, too little vacuum will cause the product to fall off. If necessary, adjust

the vacuum by closing the holes on the front plate of the vacuum box to increase the pressure or open additional holes on the vacuum to lower the vacuum pressure.

ENCODER ERRORS

TYPES: 1)Front/Back Encoder Error
2)Left/Right Encoder Error
3)Down/Up Encoder Error

The F631 FM has a total of three encoder systems. Each encoder system is responsible for the motion along one axis. The encoder switch and disk are attached each of the three motor shafts on the robot. This system is responsible for measuring the distance traveled by the robot. If an encoder system has malfunctioned, the robot will generally "jerk" in the direction of the faulty encoder and return to home position, or the robot will not go to the exact location programmed. An encoder error occurs when the computer is unable to count the pulses when the robot is traveling **away from the home position**. An encoder error occurs from one of the following:

ENCODER TROUBLESHOOTING

- a) A faulty encoder switch/dust build-up on the diode of the switch.
- b) The adhesive holding the encoder disk to the bushing is broken and the disk is spinning freely.
- c) The Molex connector or pin in the switch is loose.
- d) Damaged wire harnessing/loose connection in any wire junction.
- e) Something is impeding the path of the robot or a bad motor.

MOTOR STUCK ERROR

TYPES: 1)Front/Back Motor Stuck
2)Left/Right Motor Stuck
3)Down/Up Motor Stuck
4)Freezer Motor Stuck (open or closed)

A motor stuck error occurs when the robot is unable to travel **to the home position**. This can occur for the following reasons:

MOTOR STUCK TROUBLESHOOTING:

- a) A faulty reed or home switch
- b) A loose connection to reed switch or motor
- c) A gear or rack problem
- d) A blown fuse
- e) A faulty motor
- f) A faulty Triac/Power board

If a motor gets stuck in any direction, it will push for six seconds before shutting off with an "Out of Order" message on the screen.

FREEZER MOTOR STUCK TROUBLESHOOTING

A freezer motor stuck error can occur from the following:

- a) Too much space between switch and magnet or misalignment of switch and magnet.
- b) Faulty freezer reed switch
- c) Blown fuse
- d) Broken/stuck freezer cable
- e) Missing freezer lid magnet
- f) Loose connection to or faulty freezer motor

VACUUM SYSTEM ERROR TROUBLESHOOTING

A "Vacuum Out of Order" error occurs when the robot makes three unsuccessful attempts at three consecutive bins. This can occur for the following reasons:

- a) Programming error or encoder error.
- b) Insufficient voltage or amperage
- c) Large cut or tear in the hose
- d) Faulty vacuum switch in the robot (set too high)
- e) Faulty vacuum switch near the vacuum motor (set too low)
- f) Faulty vacuum motor
- g) Object is caught in vacuum system

HEALTH SENSOR ACTIVE TROUBLESHOOTING

A "Health Sensor Active" error occurs when the health switch determines the freezer temperature to be too high. A health sensor active error can be caused by the following:

- a) Freezer above 15°F/-9°C
- b) Loose connection between the computer board and the health switch
- c) Faulty health switch

REPAIR PROCEDURES

CHANGING THE UP / DOWN CABLE

NOTE: All letters and labels refer to Figure 1-2.

- 1) Unplug the machine.
- 2) Cut the tie wrap holding the left hose to the robot air box. Hold the weighted picker head so it doesn't fall to the floor. Cut the tie wrap holding the hose to the picker head.
- 3) Remove the screw and nut (labeled A) in the lower left of the carriage, and remove the deadweight.
- 4) Remove the cover from over the Encoder wheel (B).
- 5) Remove the metal encoder bracket and the black wheel from the carriage. Work the cable free from the wheel and unthread it from the pulleys.
- 6) Insert the soft eyelet of the new cable up through the air box and over the first pulley (C).
- 7) Loop the cable around the second pulley (D), so that it leads to the left.
- 8) Go over pulley (E), and lead the cable down.
- 9) Lead the cable through the deadweight pulley (F) from left to right, than up and over pulley (G).

- 10) Slowly pull cable and guide the deadweight into its tracks until the retaining screw and nut can be replaced (A).
- 11) Run the cable down and around pulley (H) and over to the encoder wheel. See figure 1-1 for cable / wheel attachment.
- 12) Reinstall screw holding the cable to the wheel and the wheel to the axle.
- 13) Reinstall the hose to the air box, making sure that the cable hangs out through the bottom of the hose.
- 14) Reconnect the cable and the hose to the picker head, with cable-end pulley (I).
- 15) Any excess cable should be wound around the bottom of the reel, by depressing the brake on the back of the motor, and turning the wheel counter-clockwise by hand. Make sure that the cable winds around the rear reel (track), and not the outer reel.
- 16) Reinstall encoder and bracket to the carriage, making sure that the encoder wheel is aligned so it rotates through the encoder switch, and replace the encoder cover.
- 17) Make sure that the hose is straight. If not is not, twist at either end. Put new tie wraps on the hose and make sure they are very tight.
- 18) *Before plugging the machine in, make sure that the cable is properly on all pulleys. If not, the cable will break after the first few vends.*

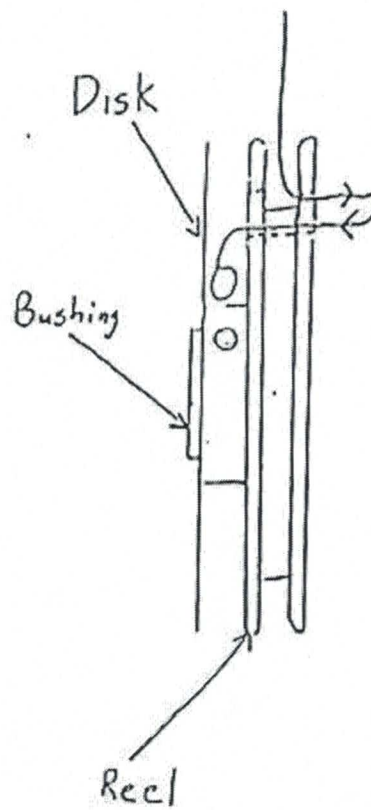


Figure 1-1

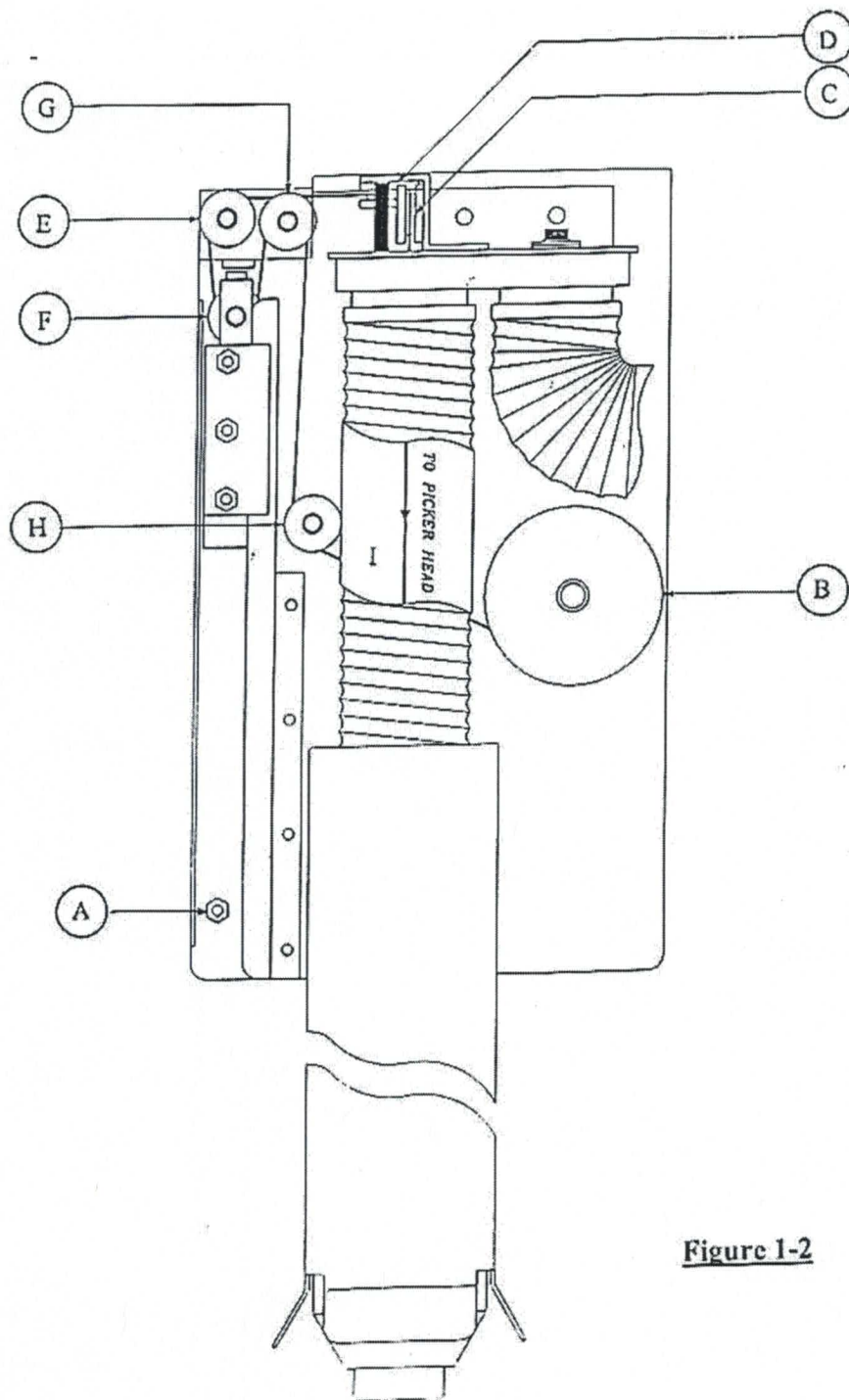


Figure 1-2

CHANGING THE FREEZER CABLE

1. Being careful not to lose e-clip, remove it from the freezer pin, located on the right, front corner of the freezer lid. Remove the roller wheel and pulley from the freezer pin and pull out the cable that is attached to the pulley.
2. Lift the lid of the freezer to the fully opened position and using a nut driver or socket wrench, remove the four screws holding the freezer deadweight system to the wall, (middle right hand side of the wall at freezer lid level).
3. Lift slack system up about 10 inches and re-install one screw into the weld nut in the wall.
4. Remove the two screws holding the freezer motor bracket to the wall, located below the freezer on the right side.
5. Using a Philips head screwdriver, remove the screw holding the reel to the motor shaft and the screw holding the cable to the reel. Note the path of the cable before removing it from the reel.
6. Run eyelet of new cable over and through the pulley in the upper, right, rear corner of the cabinet, (pulley A) through the front and out the back.
7. Run cable behind the rear pulley of the deadweight system, (pulley B) located just above freezer lid level.
8. Reach down along the deadweight system and lift the small deadweight to the top and run the cable under the pulley; (pulley C) through the back and out the front.
9. Run cable over the front pulley in the deadweight system, (pulley D) just above freezer lid level; through the back and out the front.
10. Lightly pull the eyelet end of the cable until the pulley end is up at the top pulley and drop the eyelet end down the side of the freezer and through the notch in the right freezer support.
11. Run the cable through the reel as shown in figures A and B and re-install screw to reel to secure cable.
12. Put the reel onto the motor shaft and re-install the screw to hold it on and re-attach the motor bracket to the wall.
13. Re-attach the pulley to the front, right side of the freezer, followed by the larger one inch roller and secure it with the E-clip.
14. By depressing the small silver brake on the back of the motor, wind the top of the reel towards the back so that the cable winds under the reel until it is tight. Look under the freezer at the cable path from the motor to the first pulley and make sure that it is not dragging on anything (if it hooked on the bottom of the freezer it will snap the first time that the machine is run).
15. Remove the screw holding the deadweight system to the wall, drop it back to its original position and re-install the four screws.
16. Place the machine into service mode and press "load". You may have to press "reset" and "load" again to get all of the slack out of the cable if the machine goes out of order.

Figure A

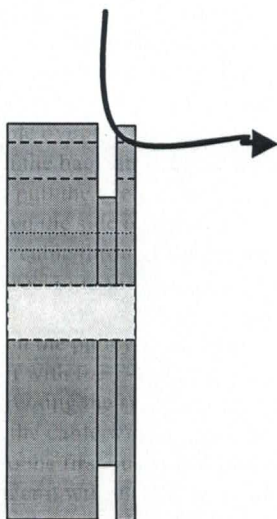


Figure B

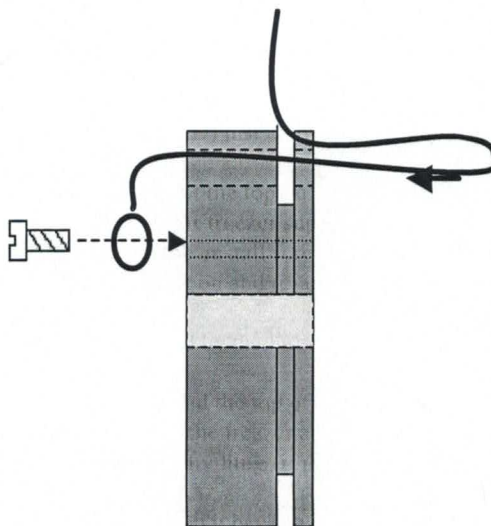
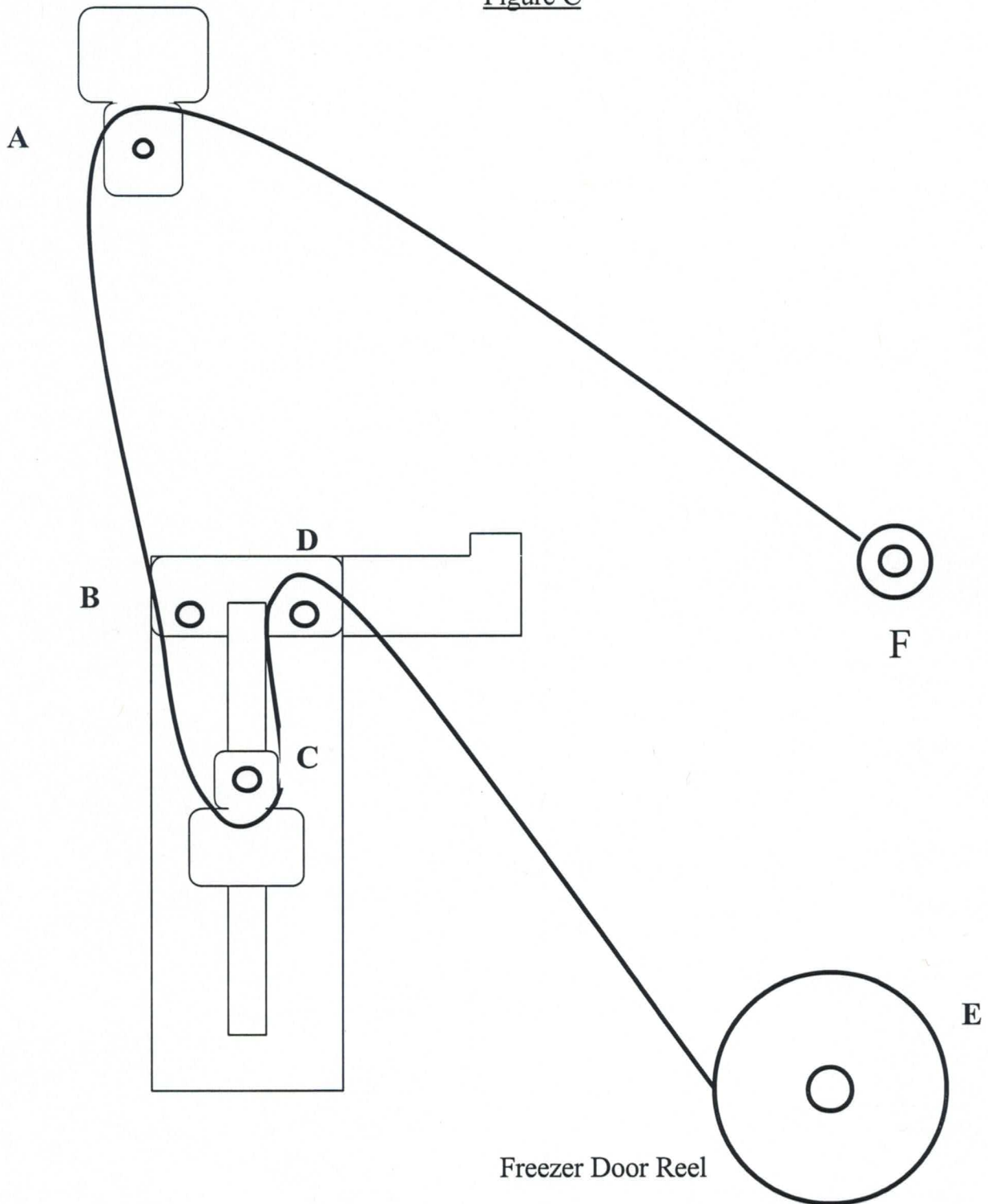


Figure C



REMOVING THE FREEZER

1. Unplug the freezer (cord located underneath the freezer.)
2. Cut the tie wraps that secure the long hose to the robot and to the freezer front panel.
3. Remove the screws from the left and right sides of the front panel and remove the panel from the cabinet.
4. Remove the face plate of the thermometer and the screw that holds the thermometer to the front panel and place it under the freezer.
5. Remove the clamps on the lower left and right corners of the freezer.
6. Remove the door lock from the right side of the cabinet.
7. Remove the hose clamp located on the right side of the cabinet (approx. 10 inches down from the top.)
8. Unplug the health switch connector from the bulk-head bracket located under the freezer. (top left connector in the bracket).
9. Remove the freezer door cable by pulling off the e-clip, roller and washer from the front right corner of the freezer.
10. Slide freezer out until only the rear two corners are supported.
11. Lower the front of the freezer until it is resting on the floor. Then, carefully slide the back of the freezer off the supports and onto the floor.

REPLACING THE FREEZER

1. Make sure the vacuum hose is on the floor of the machine and not resting on top of the vacuum motor. Check that the thermometer and white power cord are out of the way.
2. Put rear corners of the freezer onto rails.
3. Lift front of the freezer up so that the freezer is level, then push the freezer back evenly until it up against the stops at the rear of the rails.
4. Replace the right and left freezer clamps on the front of the right and left freezer supports.
5. Re-install the thermometer into the freezer front panel. Be sure to put on the clear face plate and mounting screw.
6. Put the freezer front panel into the cabinet and re-install screws.
7. Replace the machine door lock.
8. Move the robot to the front by pushing in the break on the front/back motor and pulling the beam forward.
9. Affix the vacuum hose to the right nozzle of the robot by using an 11 inch tie wrap.
10. Push robot to the left, rear of the cabinet, then affix the hose clamp to the right side of the cabinet. This is to ensure that there is enough length in the hose for the robot to travel to the far left corner of the freezer. Be sure to leave a little slack in the hose.
11. Put the freezer cable back on the freezer pin located on the right side of the freezer bar. Then place the washer, wheel and e-clip over the pin followed.
12. Tie wrap the hose to front of panel using large tie wraps.
13. Tie wrap freezer motor wire to bottom of the front panel using small tie wraps.
14. Tie wrap main wire bundle to the lower left corner of the front panel using a large tie wrap.
15. Plug the freezer into electric box and the health switch into the bulk-head bracket.

REMOVING THE ROBOT

1. Disconnect power to robot by unplugging cord going to the main power box. The plug is located below the freezer on the left wall of the cabinet labeled "Power to Power Box".
2. Remove the plastic plate on the left side of the cabinet which secures the robot's ribbon cable to the wall by using a socket wrench or nut driver (8 screws). If the robot inhibits removal of screws, it can be manually moved by lightly depressing the brake, located on the back of the front/back motor.
3. Disconnect the large 24 pin and smaller 2 pin connector, located on the back of the plastic plate.
4. Remove the hose clamp from the upper right side of the cabinet by using the same socket or nut-driver. Do not remove clamp from hose (its position is critical).
5. Cut the tie wrap holding the hose to the robot and pull the hose off.
6. Remove the safety screws that prevent the robot from running forward and off its supports. These screws are located on the right and left angles near the front of the cabinet.
7. Lightly depress motor brake on the front/back motor and slide robot forward until it comes off the supports. Be sure to have a good grip on the robot.

REPLACING THE ROBOT

1. Be sure that the machine is unplugged.
2. Cover the front/back motor brake with a piece of tape in order to keep pressure on it.
3. Lift robot with hose facing towards you and place rear rollers onto left and right tracks, (make sure that one set of rollers is below the tracks)
4. Begin easing the robot to the rear of the cabinet until the front set of black rollers are going up onto the tracks. These rollers must go onto the tracks at the same time to ensure that the robot is in evenly.
5. Slide the robot back a few inches and place the robot stop screws into the tracks. Slide the robot forward until the rollers touch the stops. If either one of the top two rollers is more than 1/8" from the stop screw, remove the screws, ease the robot about half way out, and try to push the robot back into the cabinet evenly.
6. Once the robot is in evenly, reconnect the large 24 pin and smaller 2 pin connector on the left wall. Mount the plastic plate back onto the wall. Be sure to tighten the robot safety stops.
7. Re-install the hose clamp to the right side and tie wrap the hose to the robot, making sure that it is not twisted.
8. Re-plug machine, edit programmed selections and re-adjust locations if necessary.

REPLACING THE UP/DOWN OPTO ENCODER:

1. Remove the opto-encoder shield from the front of the carriage.
2. Unplug the Opto-Encoder by pulling on the small brown plug.
3. Using an 11/32 inch nut driver, reach around the carriage and unscrew the 2 bolts that hold the opto-encoder and bracket to the carriage.
4. Using a 1/4 inch nut driver, unscrew the opto-encoder from the metal bracket and replace it.
5. Install the encoder bracket to the carriage and plug the connector back on. Be sure the opto-disk is located in between the towers on the opto-encoder.
6. Replace the opto-encoder cover.

REPLACING THE LEFT/RIGHT OPTO ENCODER

1. Using a ¼ inch nut driver, reach around the robot to the rear of the left/right motor and unscrew the 2 bolts closest to the left and right sides of the motor (located under the motor).
2. Slide the opto-encoder and bracket under the axle that runs parallel behind the beam of the robot.
3. Pull the brown plug of the opto-encoder.
4. Using a ¼ inch nut driver, unscrew the opto-encoder from the mounting bracket and replace it.
5. Place the plug onto the new opto-encoder.
6. Carefully slide the opto-encoder and the bracket under the axle of the robot and into position. Make sure the opto-disk is centered between the opto-encoder towers before screwing the bracket on.

REPLACING THE FRONT/BACK OPTO-ENCODER

1. Manually slide the carriage over to the right by pressing the motor brake.
2. Using an ¼ inch nut driver, remove the two screws holding the opto-encoder bracket to the robot beam.
3. Lower the bracket and remove brown plug.
4. Using a small standard head screw driver or ¼" nut driver, unscrew the opto-encoder from the bracket and replace.
5. Plug in the new opto-encoder and refasten the bracket to the beam.
6. Make sure the opto-disk is in between the towers of opto-encoder.