



X13 SLICER

X13
X13A
X13E
X13AE

19877

X13A MODEL SHOWN

- NOTICE -

This Manual is prepared for the use of trained Berkel Service Technicians and should not be used by those not properly qualified.

This manual is not intended to be all encompassing. If you have not attended a Berkel Service School for this product, you should read, in its entirety, the repair procedure you wish to perform to determine if you have the necessary tools, instruments and skills required to perform the procedure. Procedures for which you do not have the necessary tools, instruments and skills should be performed by a trained Berkel Service Technician.

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SERVICE UPDATES

UPDATES

July, 2018

- Added INDEX KNOB.

GENERAL

INTRODUCTION

This manual is for the Berkel X13 Slicer. Procedures in this manual will apply to all models unless specified. Pictures and illustrations will be of model X13A unless otherwise noted.

All of the information, illustrations and specifications contained in this manual are based on the latest product information available at the time of printing.

Models	
X13	Manual slicer with interlocks
X13A	Automatic slicer with interlocks
X13E	Manual slicer without interlocks
X13AE	Automatic slicer without interlocks

OPERATION

Refer to the Instruction Manual for specific operating instructions.

CLEANING

Refer to the Instruction Manual for specific cleaning instructions.

SPECIFICATIONS

Slicer Dimensions

Width: 26-3/4"

Length: 30-1/2"

Height: 25-1/4"

Electrical

115/60/1 (5.5 amps)

Knife Motor

1/2 H.P.

Thickness

Adjustable to slice a thickness up to 1-5/16".

Slicing Speed (Automatic)

Low: 20 slices per minute

Medium: 40 slices per minute

High: 60 slices per minute

Stroke Length (Automatic)

Low: 5 in.

Medium: 9 in.

High: 13 in.

Slicing Capacity

Square: 7-1/2" x 7-1/2"

Round: 8-1/2"

Rectangle: 10-1/2" x 6-3/4"

Knife Dimension

13"(new) to 12-3/4"(min.)

Net Weight

Manual 88 lbs., Automatic 98 lbs.

Shipping Weight

Manual 118 lbs., Automatic 128 lbs.

LUBRICATION

Lubricants	Where Used
Berkel Oil, Part No. 01-404675-00182	In wick for round rail. Lightly coat-pusher arm guide rail, o-rings in knife hub assembly.

TOOLS

Standard

- Standard set of hand tools.
- Metric set of hand tools.
- VOM with A.C. current tester (Any quality VOM with a sensitivity of at least 20,000 ohms per volt can be used).

Special

- Loctite® Primer, Part No. 00-544434-2
- Loctite® 242™, Part No. 00-520228
- RTV 732, Part No. 00-513886-3
- Field Service Grounding Kit (available locally)
- Torque Wrench (in.-lbs.)

Magnet	Polarity
Home Position	(+) North out
Auto Clip Assembly	(-) South out
Timer Assembly	(+) North out
Sharpener	(+) North out
Index Mechanism	(-) South out
Use another magnet on the slicer to verify polarity of a replacement magnet. (Opposites attract)	

REMOVAL AND REPLACEMENT OF PARTS

SHARPENER

Sharpener Removal



WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Press down on lower tab.

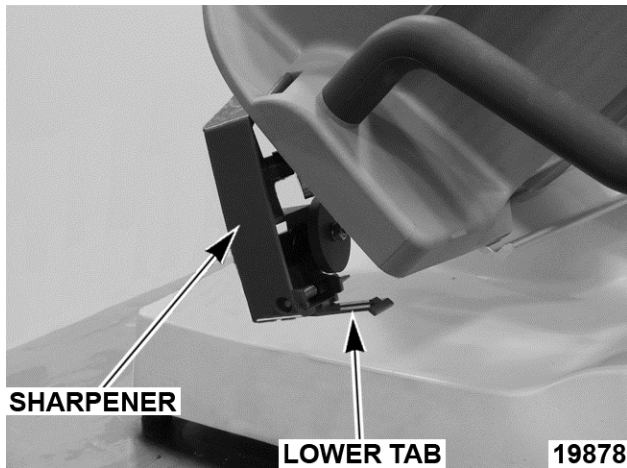
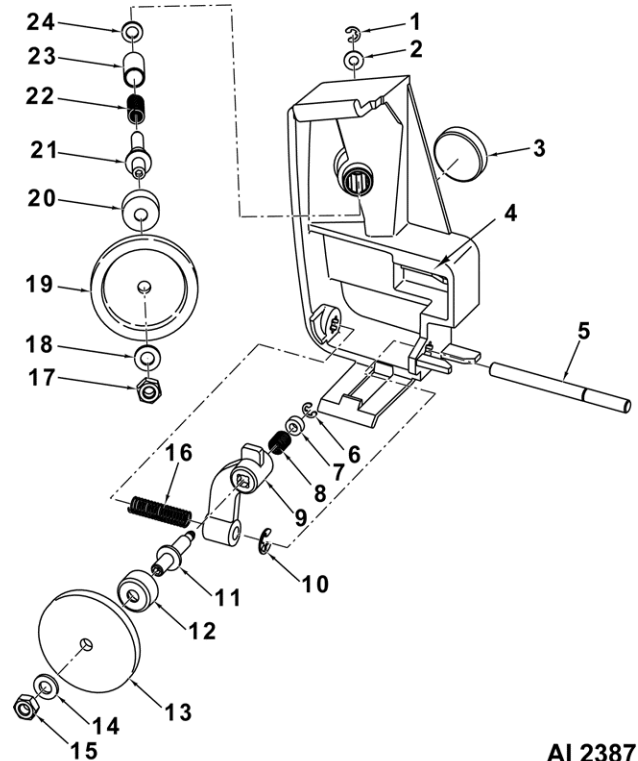


Fig. 1

2. Remove sharpener.
3. Reverse procedure to install.
4. Check slicer for proper operation.

Sharpener Disassembly

NOTE: Remove only those parts required to access part(s) being replaced.



AI 2387

Fig. 2

1. Remove deburring assembly.
 - A. Remove nut (15) and washer (14).

NOTE: Parts (15), (17), (11), and (21) are left hand threaded on some older sharpeners.

 - B. Remove deburring stone (13) and skirt (12).
 - C. Remove e-clip (10), slide out shaft (5) while holding spring (16).
 - D. Remove spring (16) and deburring frame (9) assembly.
 - 1) Remove e-clip (6).
 - 2) Remove bushing (7).
 - 3) Remove spring (8, in compression).
2. Remove sharpening assembly.
 - A. Remove nut (17) and washer (18).
 - B. Remove sharpening stone (19) and skirt (20).
 - C. Remove e-clip (1).
 - D. Remove washer (2), fiber washer (24), bushing (23), spring (22, in compression), and shaft (21).
3. Reassemble sharpener in reverse order.

NOTE: Make sure tab on top of deburring frame (9) goes under lip (4) on sharpener frame upon reinstallation.

4. Reinstall sharpener on slicer.
5. Check for proper knife sharpener operation.

PRODUCT TABLE

Product Table Removal



WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Place product table in home position and turn index knob to "0".
2. Loosen product table knob.

PRODUCT TABLE

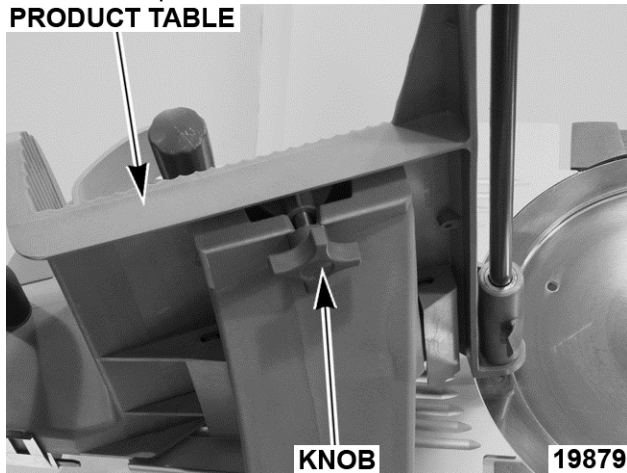


Fig. 3

3. Slide product table off arm.
4. Reverse procedure to install.

NOTE: Make sure that dowel pin enters and rotates actuator arm interlock ("pacman").

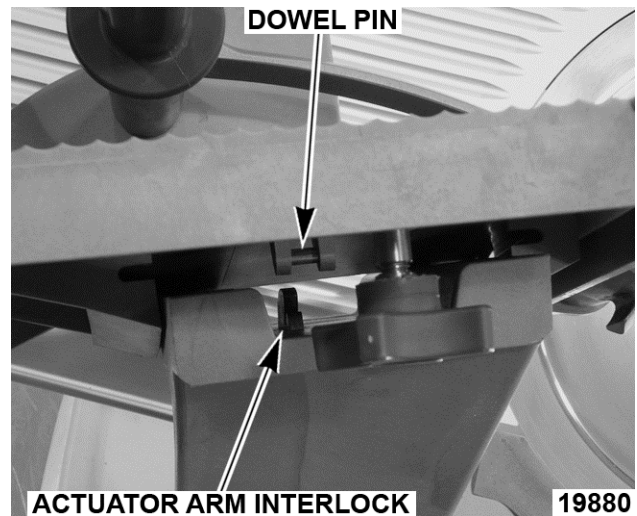


Fig. 4

5. Check slicer for proper operation.

PRODUCT TABLE HANDLE

Product Table Handle Removal



WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove product table as outlined under PRODUCT TABLE.
2. Remove three screws.

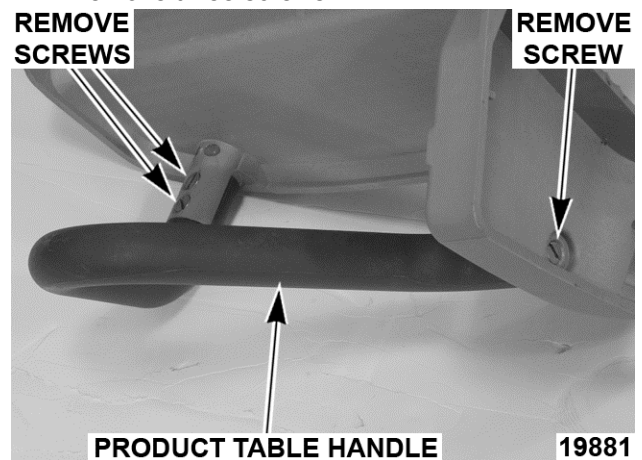


Fig. 5

3. Remove handle.
4. Reverse procedure to install.

NOTE: Seal handle ends with RTV.

5. Check slicer for proper operation.

PUSHER ARM ASSEMBLY

Pusher Arm Removal



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove product table as outlined under PRODUCT TABLE.
2. Remove two guide rail screws.

NOTE: Do not allow guide rail to rotate while removing the screws.

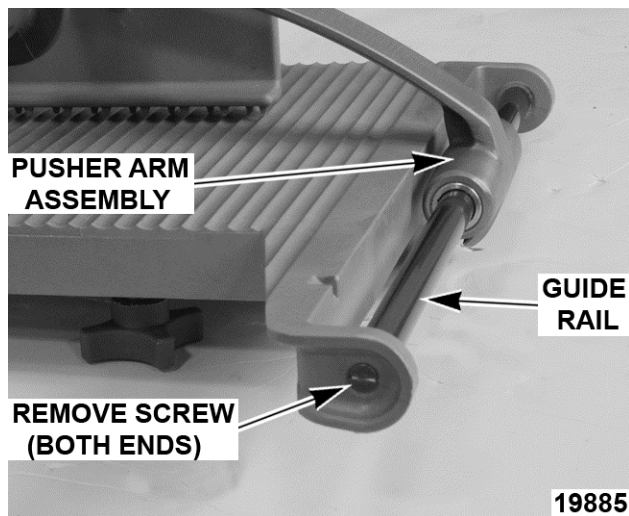


Fig. 6

3. Remove pusher arm assembly from guide rail.
4. Turn pusher handle CCW while preventing pusher from rotating.

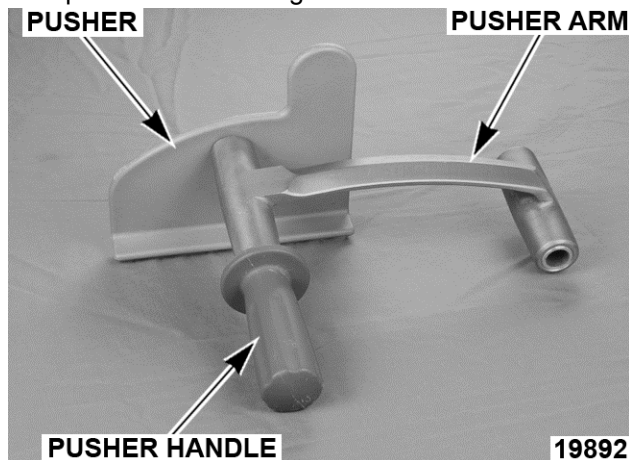


Fig. 7

5. Remove pusher from pusher handle and shaft.
6. Reverse procedure to install.

NOTE: Apply Loctite® primer and Loctite® 242™ to threads of guide rail screws. Screws will backout if Loctite® and primer is not used.

7. Check slicer for proper operation.

ARM ASSEMBLY

Arm Assembly Removal



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

NOTE: X13E and X13AE models are not equipped with interlocks. When working on an E series model, proceed past any step that refers to interlocks.

1. Remove product table as outlined under PRODUCT TABLE.
2. Slide arm assembly all the way to end of stroke (X13E, X13AE).
3. Place slicer on its side, so it is resting on motor housing.
4. Supporting the arm assembly, squeeze the slide bar to the unlocked position and lower assembly.

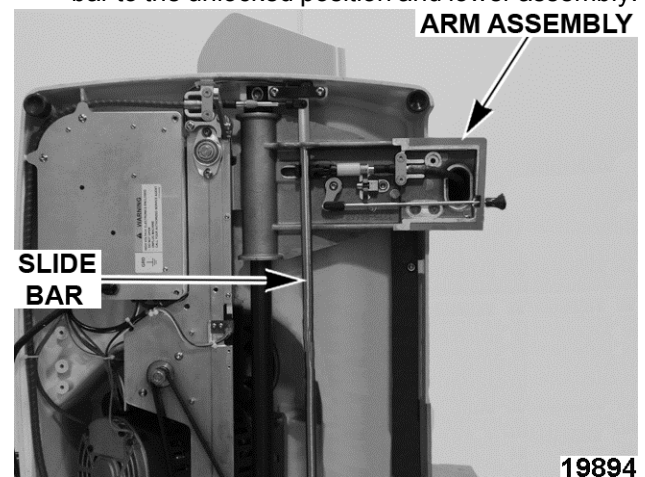


Fig. 8

5. Remove screws and clevis pin, move slide bar guide out of way.

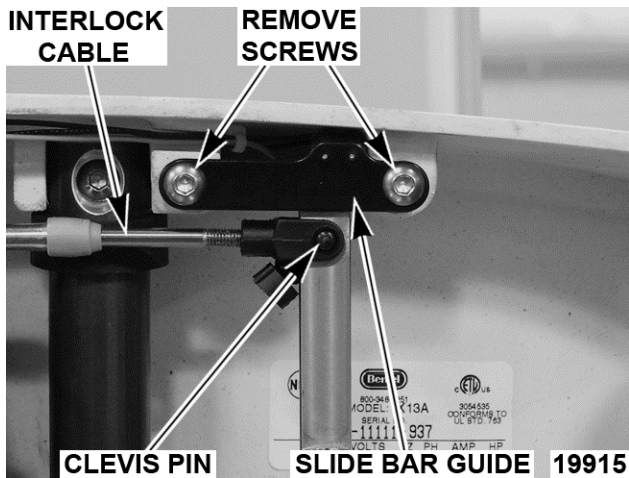


Fig. 9

NOTE: Push interlock cable to the left. DO NOT pull cable out (to the right).

6. Remove screw and washer securing other end of slide bar.
7. Remove slide bar (noting orientation for reinstallation).
8. Push in tab and lift flex cable to disconnect (X13A, X13AE).

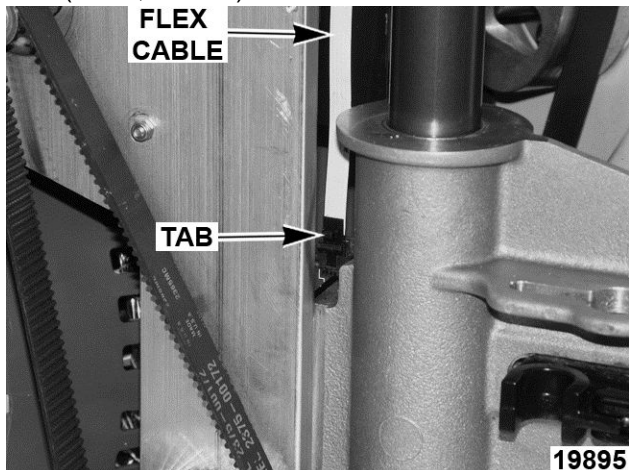


Fig. 10

9. Remove screws and square rail.

NOTE: Reposition arm assembly and remove bottom screw first.

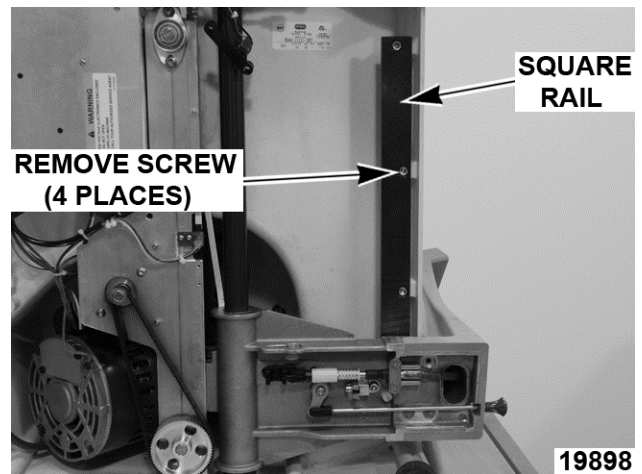


Fig. 11

10. Remove 2 screws securing round rail.

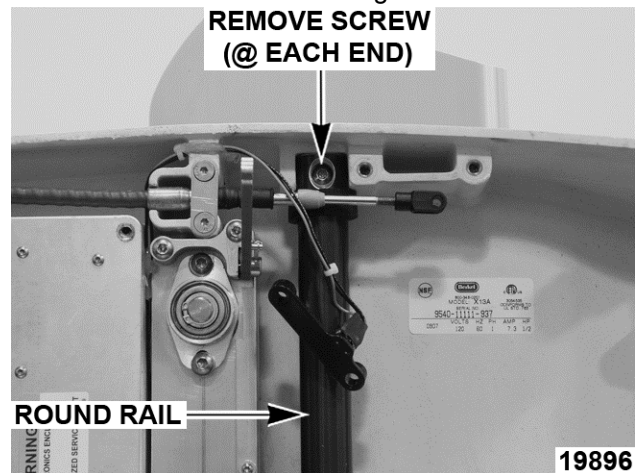


Fig. 12

11. Remove round rail and arm assembly.
12. Reverse procedure to install.

NOTE: Screws go in countersunk side of round rail.

- A. Place primary autodrive belt in clip assembly. (X13A, X13AE)

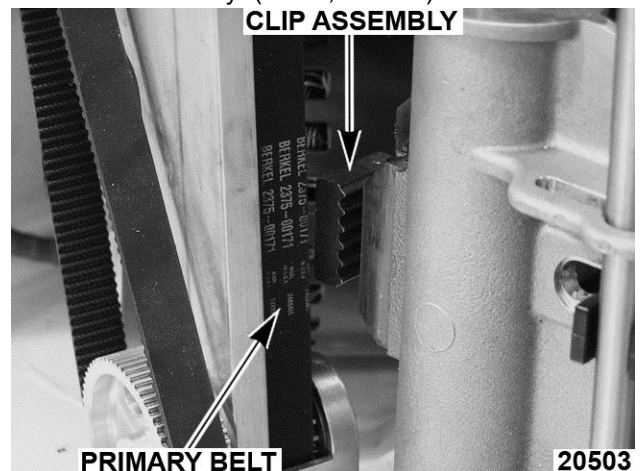


Fig. 13

- B. Reconnect flex cable last, and make sure cable is in front of guide assembly. (X13A, X13AE)

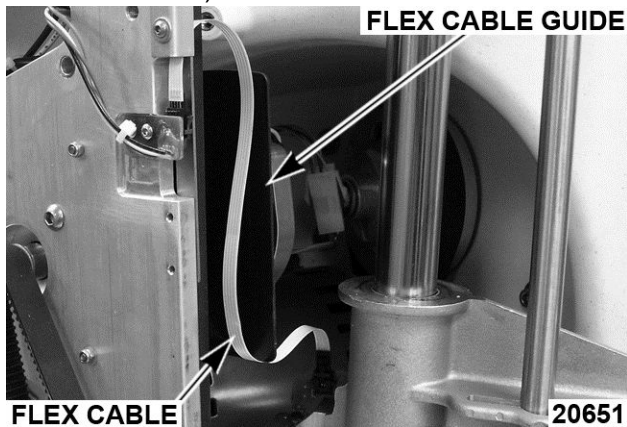


Fig. 14

13. Check slicer for proper operation.

Arm Disassembly

NOTE: Remove only those parts required to access part(s) being replaced.

1. Remove screws and arm sensor.

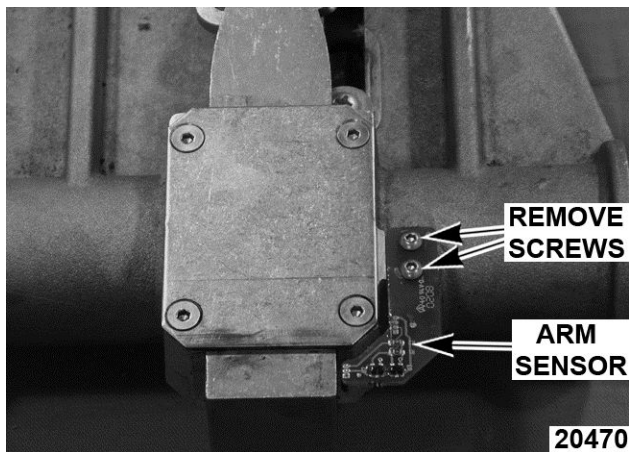


Fig. 15

2. Remove autodrive clutch plate screws.

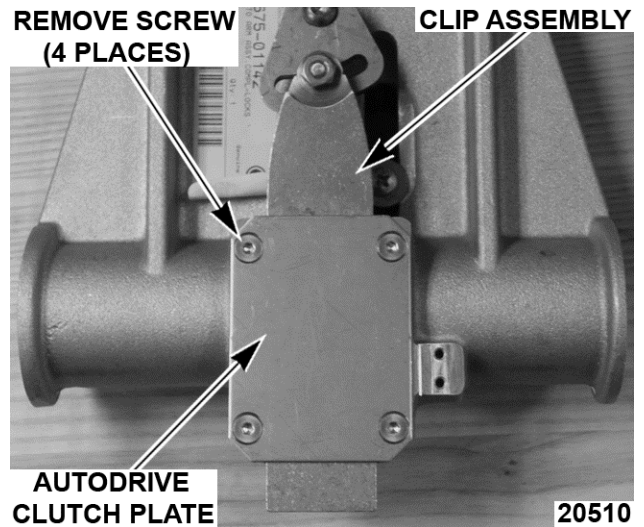


Fig. 16

3. Remove autodrive clutch plate and clip assembly.
4. Remove screw, autodrive clutch crank, and clutch engage rod.

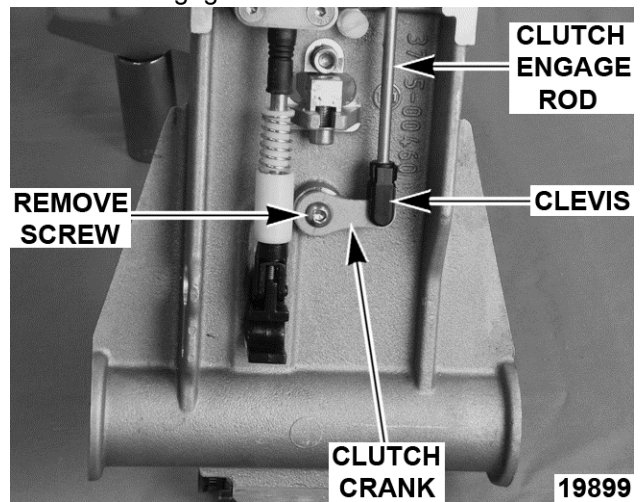


Fig. 17

5. Remove autodrive clutch cam, clutch pivot shaft, and spring disc.

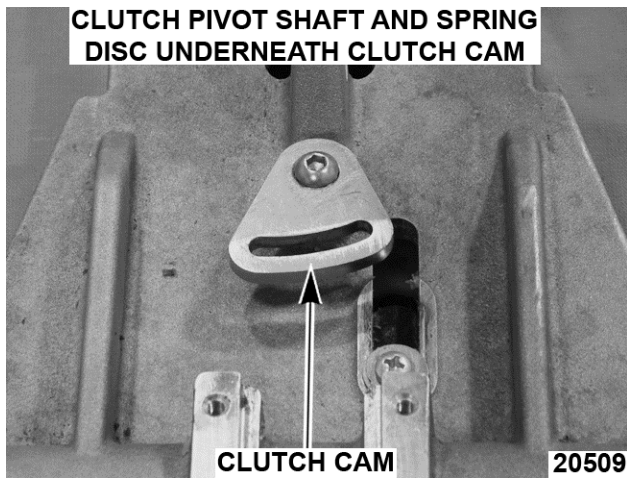


Fig. 18

6. Remove screws, clamp, and clevis pin.

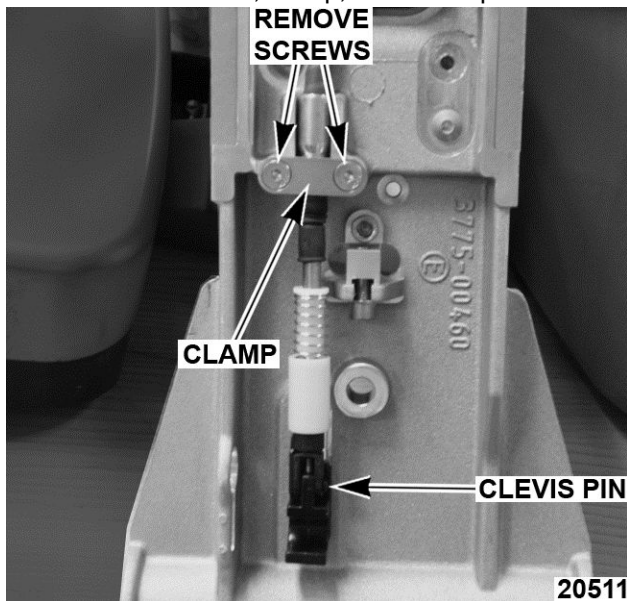


Fig. 19

7. Remove plugs and screws beneath plugs.

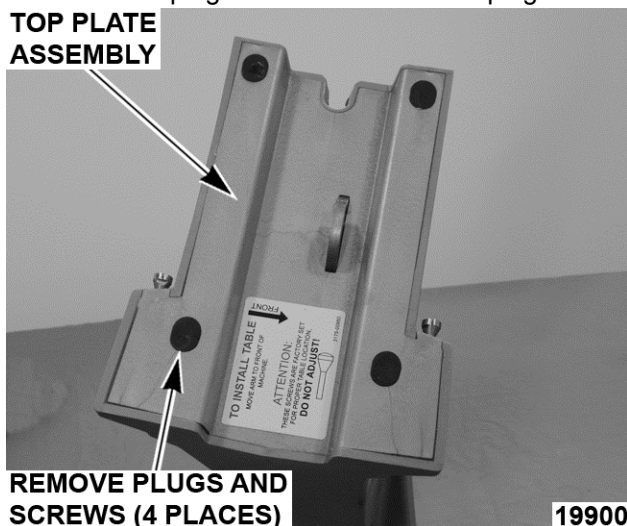


Fig. 20

8. Remove top plate assembly.

NOTE: Top plate assembly edge is sealed with RTV.

9. Reverse procedure to assemble.

10. Check slicer for proper operation.

CENTER PLATE

Center Plate Removal



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Close gauge plate.
2. Move product table to home position.
3. Turn center plate knob CCW until it lines up with post stud.

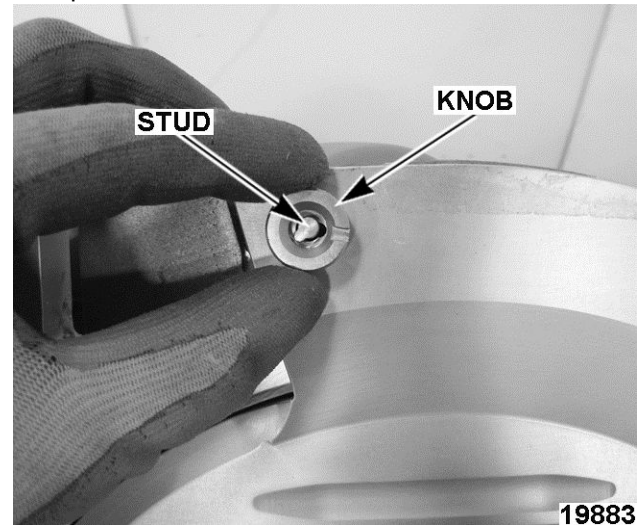


Fig. 21

4. Lift cover out and up.

Center Plate Installation

1. Place center plate on shoulder studs with knob lined up to fit over post stud.

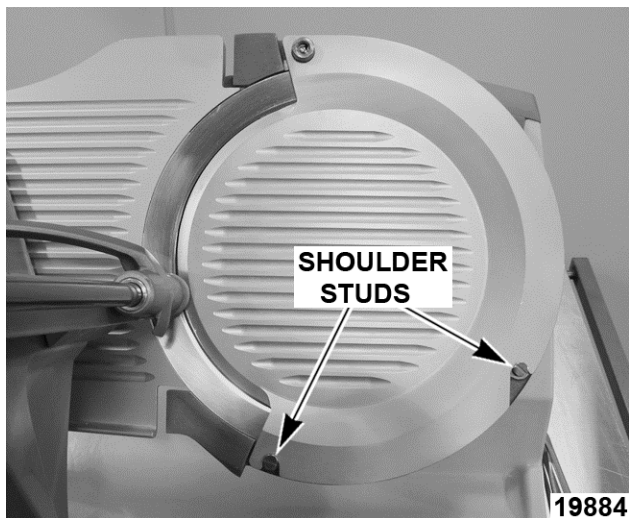


Fig. 22

2. Turn center plate knob CW until resistance stop.
3. Check slicer for proper operation.

Center Plate Knob Removal

1. Remove center plate as outlined above.
2. Remove retaining ring from back side of knob.

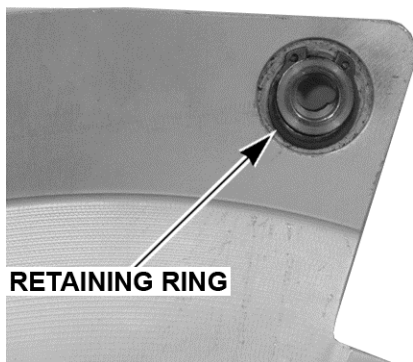


Fig. 23

3. Remove knob.
4. Reverse procedure to install.
5. Check slicer for proper operation.

KNIFE

Knife Removal



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

⚠ WARNING

Electrical and grounding connections must comply with the applicable portions of the National Electrical Code and / or other local electrical codes.

NOTE: Replace knife if it is less than 12-3/4" diameter.

1. Remove product table as outlined under PRODUCT TABLE.
2. Reach under slicer and pull slide bar toward arm assembly.

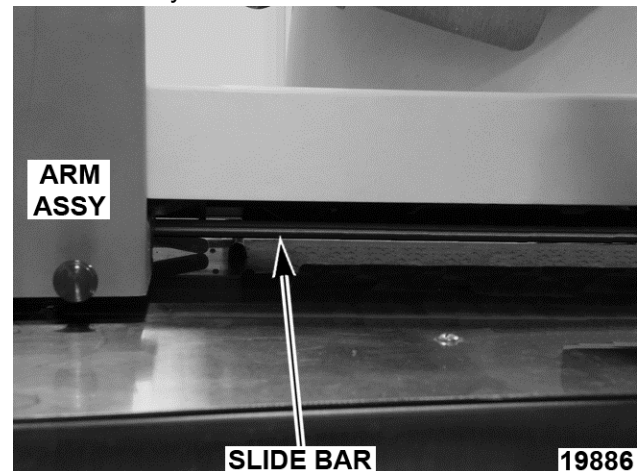


Fig. 24

3. Open gauge plate and tape knife edge.

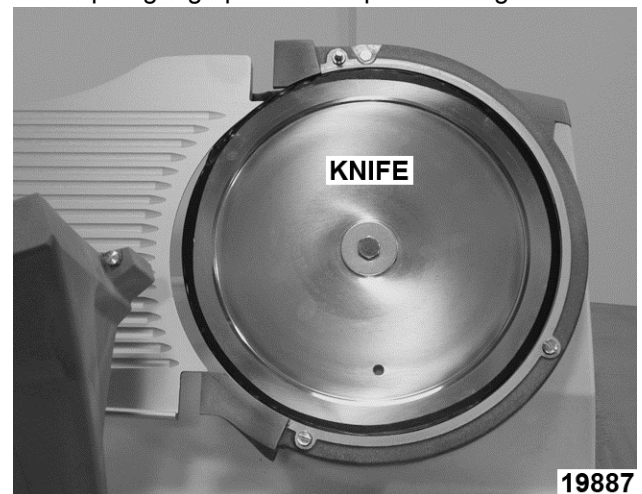


Fig. 25

4. Remove bolt and washer.

NOTE: Place #2 phillips driver in knife hole against lower ring guard mount. Use a rag to protect the ring guard mount and slicer body.

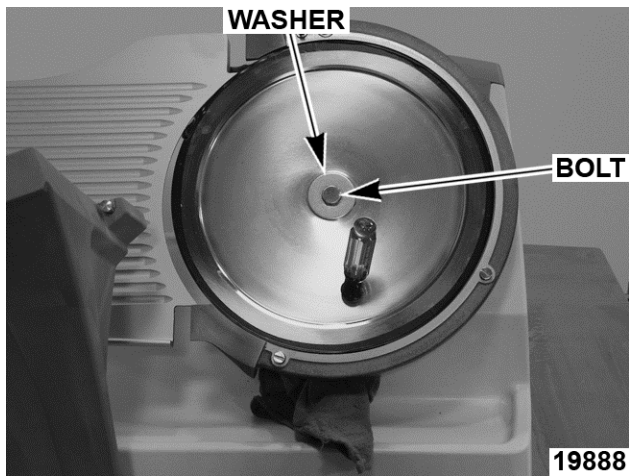


Fig. 26

5. Remove knife.
6. Reverse procedure to install.
7. Torque knife bolt 50 in.-lbs.
8. Check slicer for proper operation.

RING GUARD

Ring Guard Removal



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove knife as outlined under KNIFE.
2. Remove top mounting bolt from ring guard.

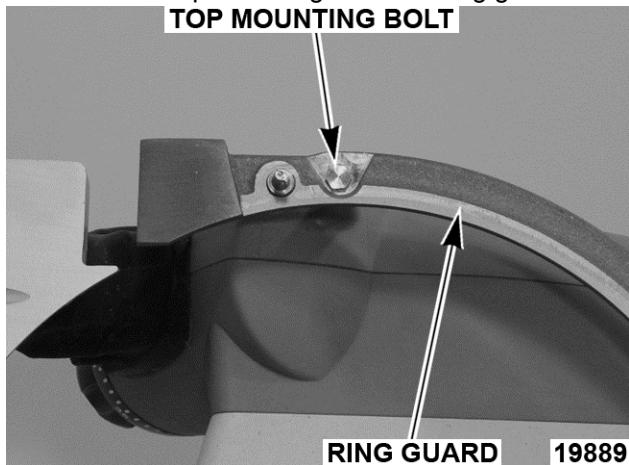


Fig. 27

3. Remove knife motor as outlined under KNIFE MOTOR AND MOUNT ASSEMBLY.

NOTE: Knife motor just needs to be moved out of the way to access bolts and washers.

4. Remove bottom two mounting bolts and washers.

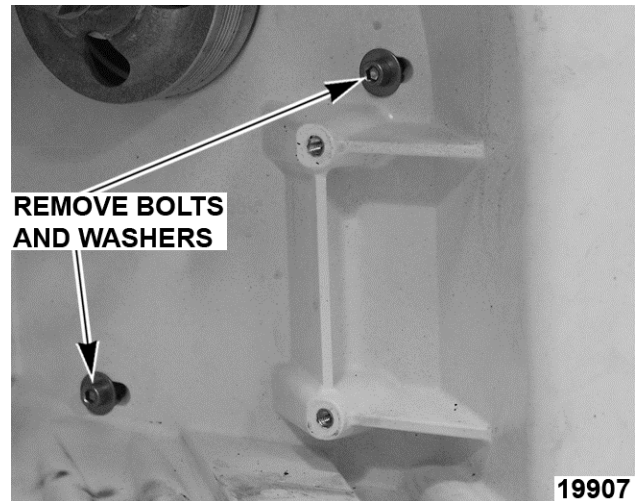


Fig. 28

5. Remove ring guard.
6. Reverse procedure to install.
7. Check slicer for proper operation.

INDEX KNOB



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

Removal

1. Remove index knob cap.
2. Remove nut.

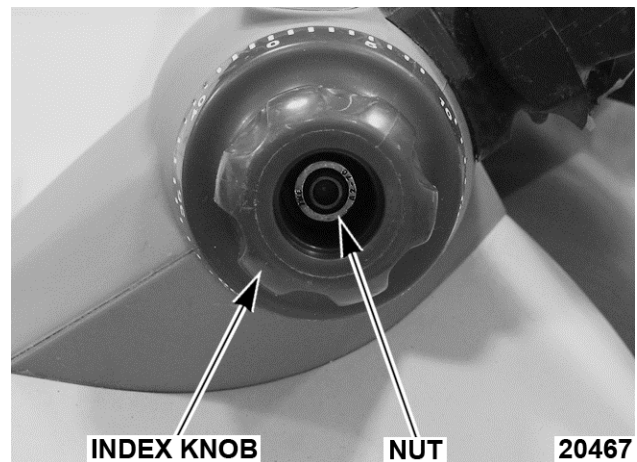


Fig. 29

3. Remove index knob.

Replacement

1. Perform zero adjustment prior to replacing index knob.
2. Replace index knob.

NOTE: Ensure end of cable goes into index knob hole within spiral groove.

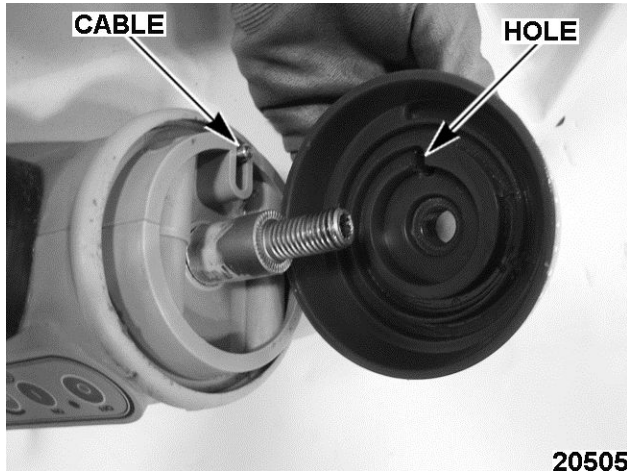


Fig. 30

3. Hold index knob at "0", and adjust index cam up or down to achieve proper height as outlined in GAUGE PLATE ADJUSTMENT.

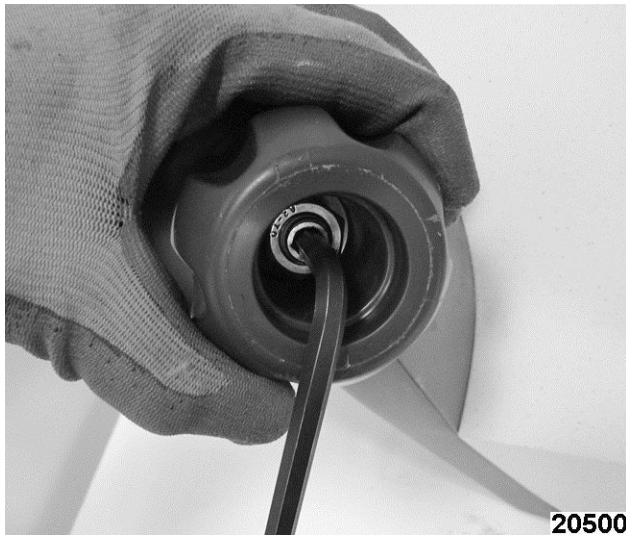


Fig. 31

4. Hold index knob in place and tighten nut to 140 in.-lbs.
5. Perform INTERLOCK CABLES / INDEX KNOB ADJUSTMENTS.
6. Replace cap.
7. Check slicer for proper operation.

BOTTOM COVER (X13A, X13AE)



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

⚠ WARNING

Electrical and grounding connections must comply with the applicable portions of the National Electrical Code and / or other local electrical codes.

1. Place slicer on its side, so it is resting on motor housing.
2. Remove screws and unscrew foot.

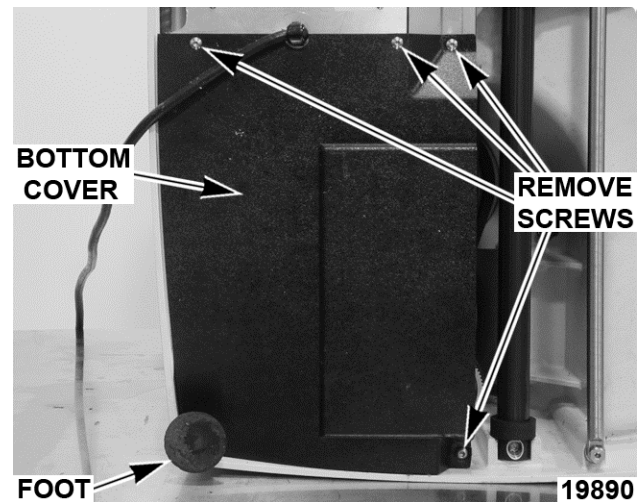


Fig. 32

3. Remove bottom cover.
4. Reverse procedure to install.
 - A. Apply Loctite® primer and Loctite® 2440™ to threads of foot.
5. Check slicer for proper operation.

AUTODRIVE MECHANISM (X13A, X13AE)

Autodrive Mechanism Removal



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove bottom cover as outlined under BOTTOM COVER (X13A, X13AE).

2. Push in tab and lift flex cable to disconnect.

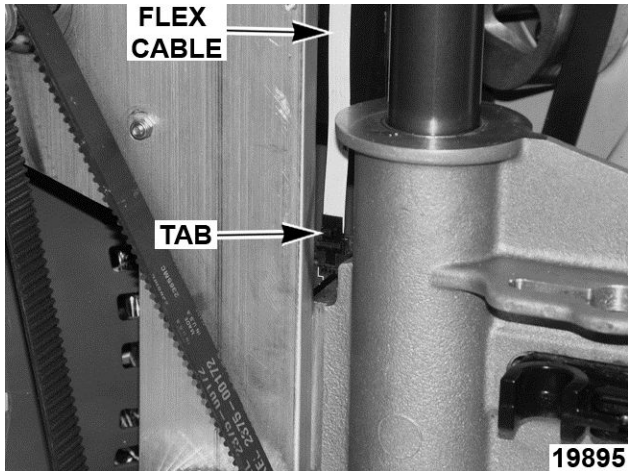


Fig. 33

3. Remove screws mounting J4 cable.

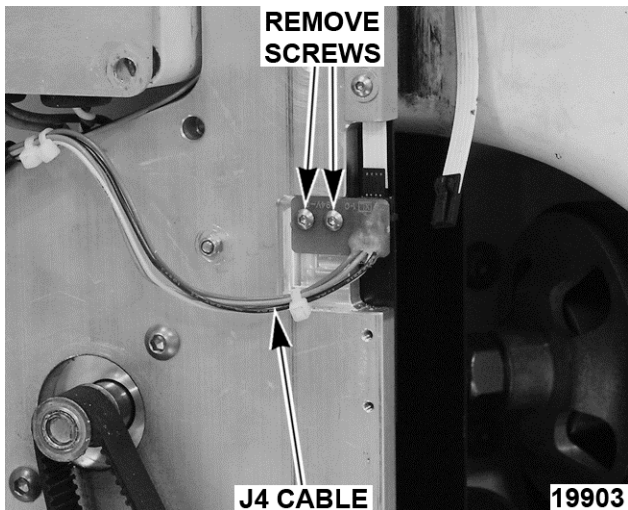


Fig. 34

4. Remove screws securing autodrive assembly.
 - A. Kickstand assembly is free to remove.

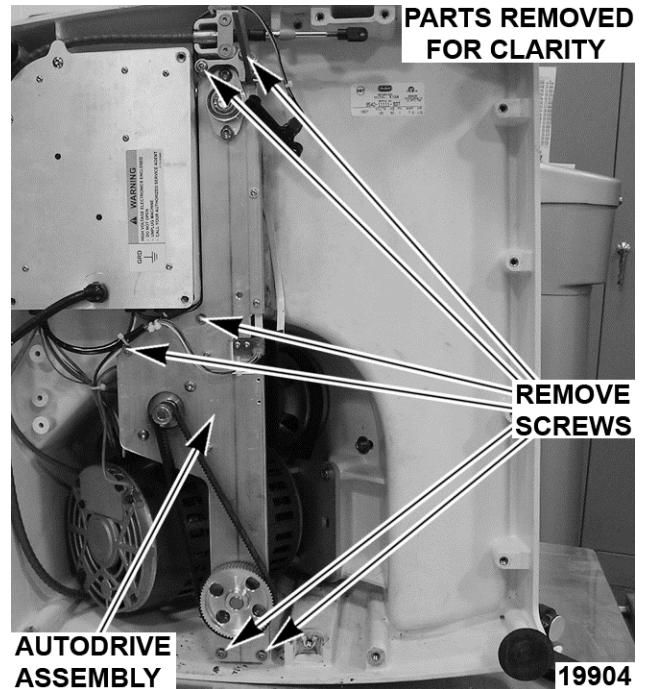


Fig. 35

5. Remove autodrive assembly.

Autodrive Mechanism Disassembly

NOTE: Remove only those parts required to access part(s) being replaced.

1. Remove screws securing autodrive motor.

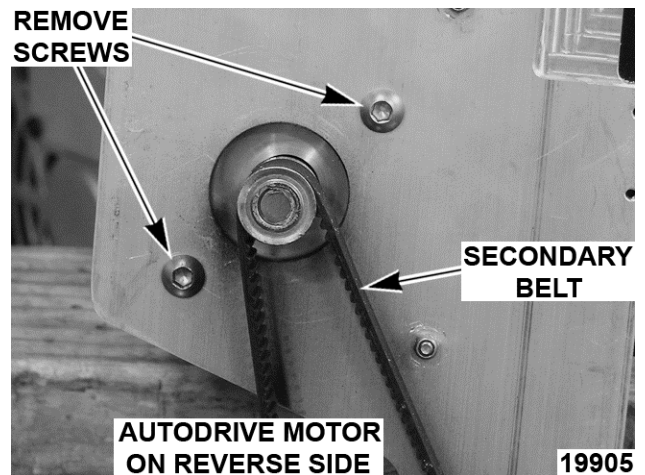


Fig. 36

2. Remove autodrive motor and secondary belt.
3. Remove screws and washers securing autodrive transmission housing.

NOTE: Transmission housing on opposite side.

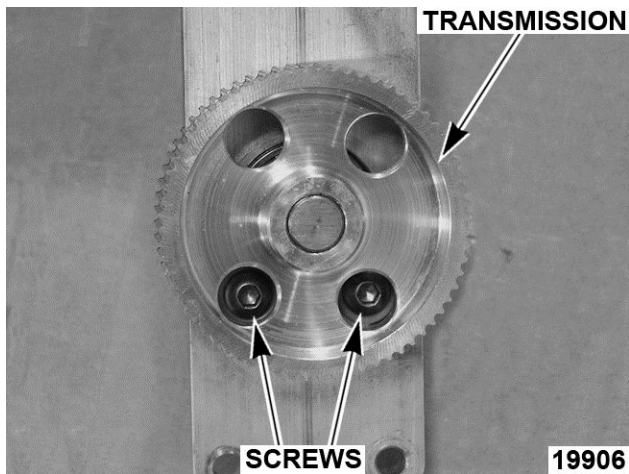


Fig. 37

4. Remove autodrive transmission housing, primary belt, and transmission.
5. Remove screws and washers securing tensioner assembly.

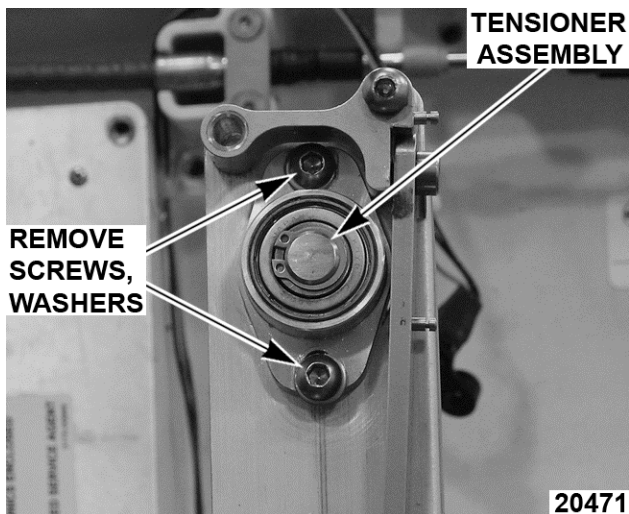


Fig. 38

6. Remove tensioner assembly.
 7. Reverse procedure to assemble.
 - A. Set primary belt tension by applying hand pressure to tensioner assembly.
- NOTE:** If the primary belt was replaced, you will need to adjust the eccentric pin as outlined under Eccentric Pin Adjustment.
8. Check slicer for proper operation.

Autodrive Mechanism Installation

1. Reverse removal procedure to install.
2. Place primary autodrive belt in clip assembly.

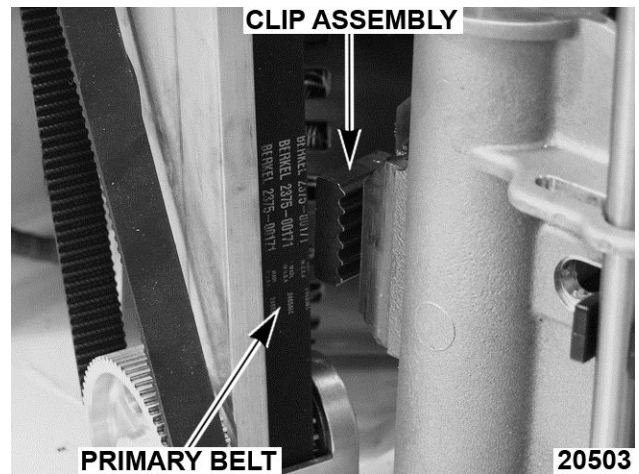


Fig. 39

- A. Reconnect flex cable last, and make sure cable is in front of guide assembly.

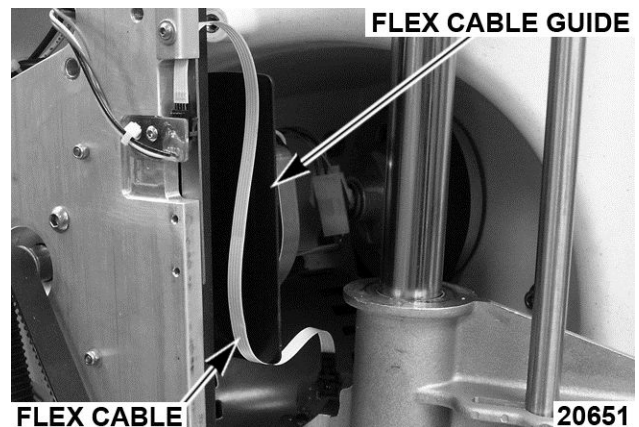


Fig. 40

3. Check slicer for proper operation.

KNIFE MOTOR AND MOUNT ASSEMBLY

Motor and Mount Assembly Removal



WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove bottom cover as outlined under BOTTOM COVER (X13A, X13AE).
2. Remove autodrive assembly as outlined under AUTODRIVE MECHANISM (X13A, X13AE).
3. Access control board as outlined under CONTROL BOARD.
 - A. Remove motor wires from control board.

4. Remove screws securing motor and mount assembly to slicer.

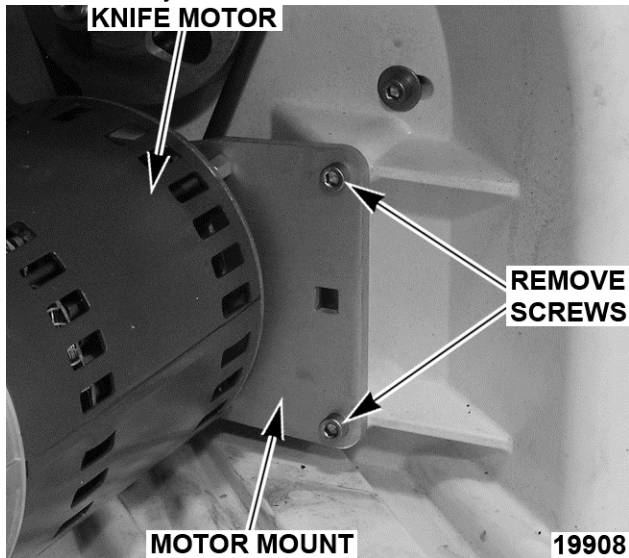


Fig. 41

5. Remove motor and mount assembly.
6. Remove screws securing mount to motor.

NOTE: Orientation of motor mount to motor capacitor for reassembly/ installation.

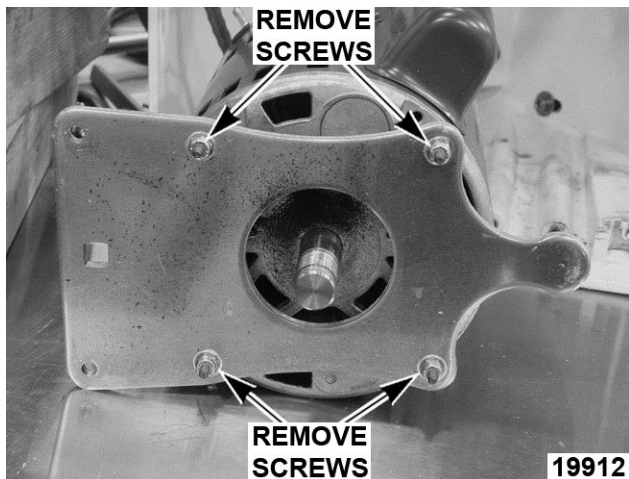


Fig. 42

7. Remove mount from motor.

Motor and Mount Assembly Installation

1. Install motor mount to motor.
2. Install motor and mount assembly with drive belt around motor shaft.

NOTE: Make sure tab on motor mount enters slot in slicer base.

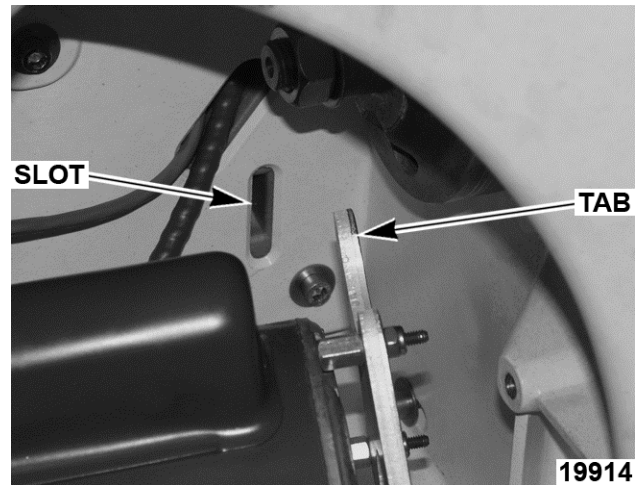


Fig. 43

3. Install drive belt as outlined under DRIVE BELT.
4. Connect motor lead wires to control board.
5. Check slicer for proper operation.

DRIVE BELT

Drive Belt Removal



WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

NOTE: Some knife hub assemblies are secured with an e-clip instead of a nut.

1. Remove knife motor as outlined under KNIFE MOTOR AND MOUNT ASSEMBLY .
2. Remove drive belt from knife hub.

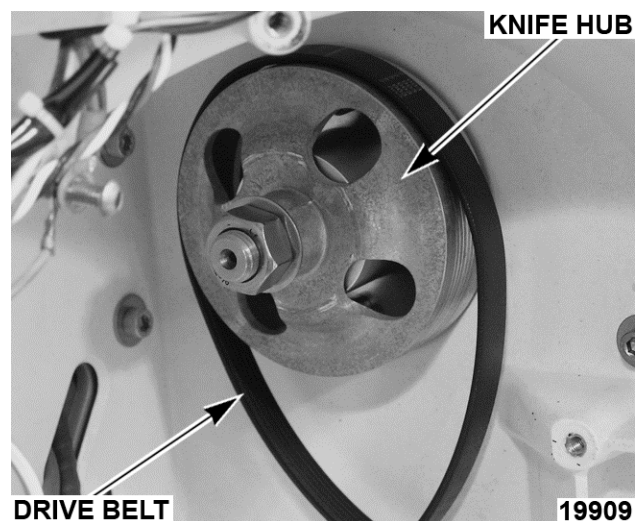


Fig. 44

Drive Belt Installation

1. Install knife motor as outlined under KNIFE MOTOR AND MOUNT ASSEMBLY.
 2. Pull belt tight and walk onto knife hub.
- NOTE:** Make sure belt is seated properly on motor shaft grooves and knife hub. Knife belt should be centered on knife hub and completely on motor shaft.
3. Check slicer for proper operation.

KNIFE HUB ASSEMBLY

Knife Hub Assembly Removal



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

NOTE: Some knife hub assemblies are secured with an e-clip instead of a nut.

1. Remove knife as outlined under KNIFE.
2. Remove autodrive assembly as outlined under AUTODRIVE MECHANISM (X13A, X13AE).
3. Remove knife motor as outlined under KNIFE MOTOR AND MOUNT ASSEMBLY.
4. Remove screws securing knife hub assembly to slicer wall.

REMOVE SCREW (4 PLACES)

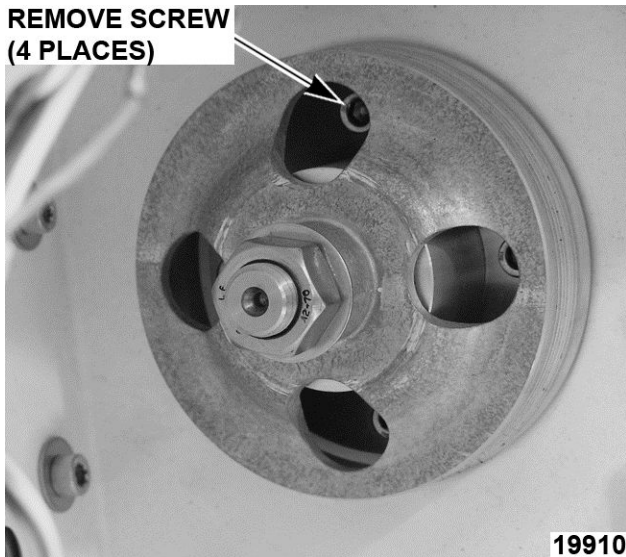


Fig. 45

5. Supporting hub, tap knife end of assembly with a rubber mallet.
 - A. Remove hub assembly and spindle mount.

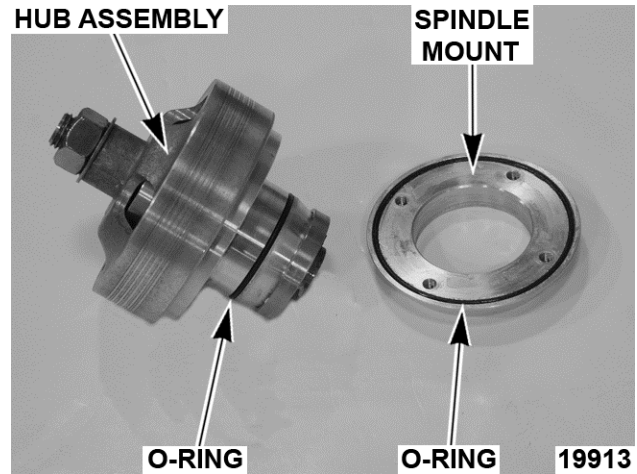


Fig. 46

6. Reverse procedure to install.
 - A. Lightly coat o-rings with Berkel.

NOTE: Line up screw holes when pressing spindle mount onto hub assembly.

- B. Torque bolts 50 in.-lbs.

7. Check slicer for proper operation.

CONTROL BOARD

Control Board Removal



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove bottom cover as outlined under BOTTOM COVER (X13A, X13AE).
2. Remove screws.

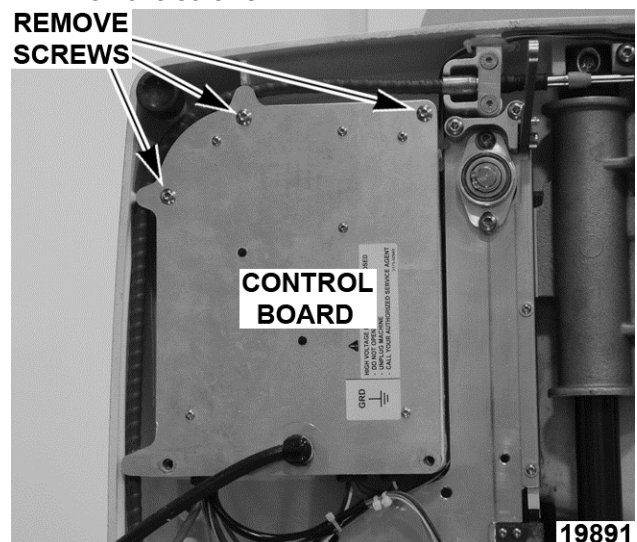


Fig. 47

3. Disconnect all lead wires to the board, noting their color and location.
4. Remove control board.
5. Reverse procedure to install.
6. Check slicer for proper operation.

KICK STAND

Kick Stand Removal



WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Place slicer on its side, so it is resting on motor housing.
2. Remove spring and bolt securing kick stand to slicer.

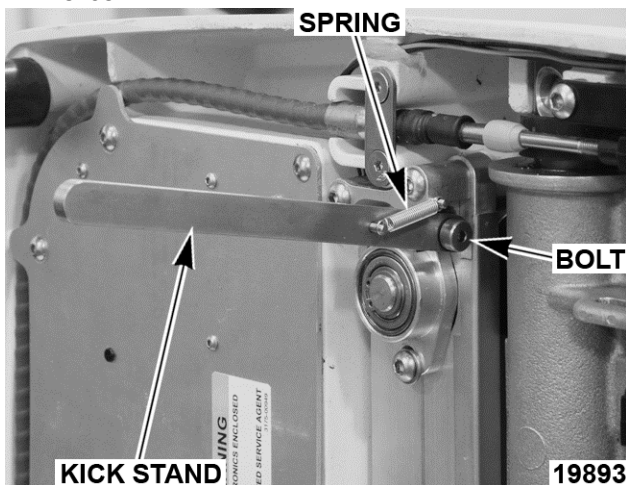


Fig. 48

3. Remove kick stand.
4. Reverse procedure to install.
5. Check slicer for proper operation.

GAUGE PLATE ASSEMBLY

Gauge Plate Assembly Removal



WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Open gauge plate and tape knife.

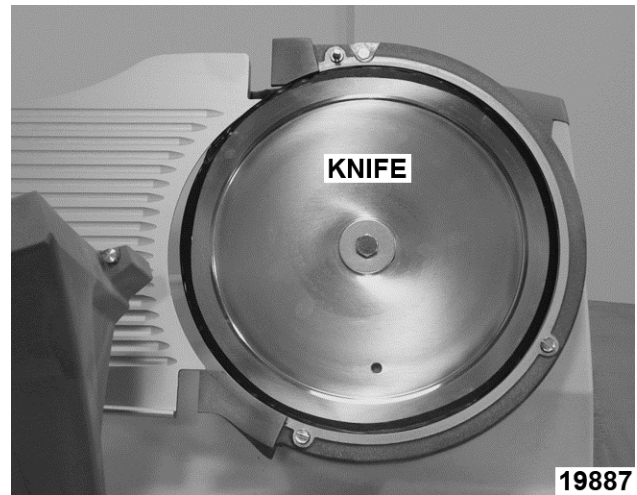


Fig. 49

2. Remove gauge plate bolts.

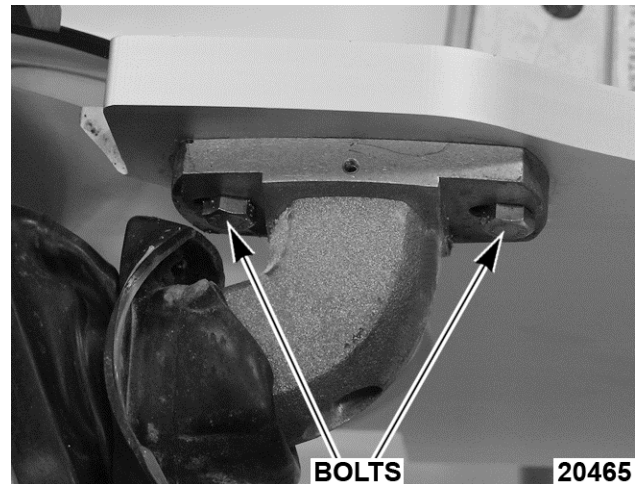


Fig. 50

3. Remove gauge plate.
4. Reverse procedure to install.
5. Check that gauge plate is in adjustment as outlined under GAUGE PLATE ADJUSTMENT.
6. Check slicer for proper operation.

INDEX MECHANISM

Index Mechanism Removal



WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

NOTE: Index mechanism can be ordered and replaced as a whole assembly.

1. Remove knife as outlined under KNIFE.

2. Open gauge plate.
3. Tape knife.

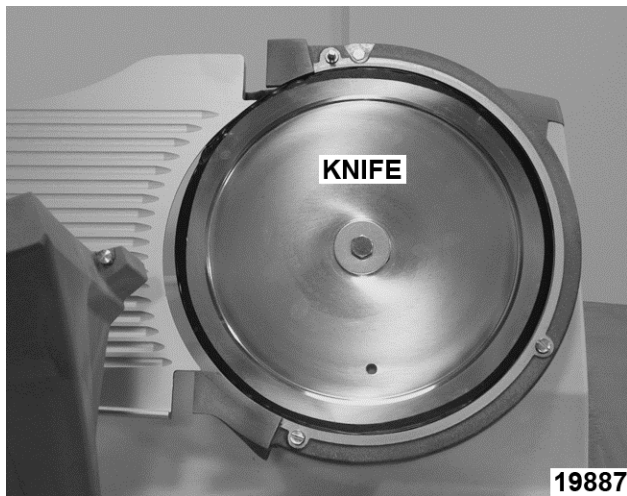


Fig. 51

4. Remove gauge plate bolts.

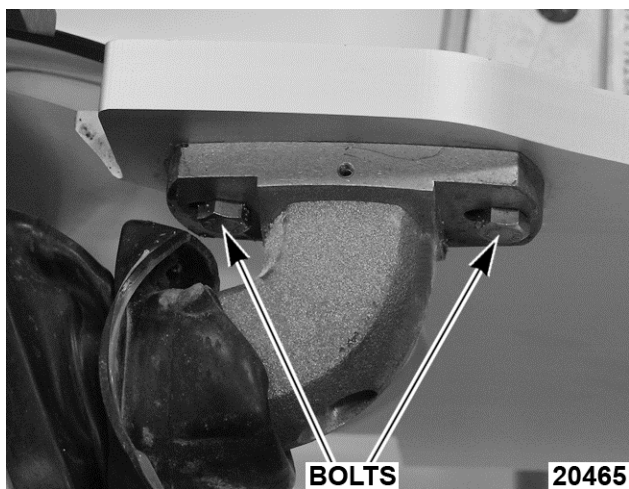


Fig. 52

5. Remove gauge plate.
6. Place slicer on its side, so it is resting on motor housing.
7. Remove pin to disconnect clevis from slide bar.

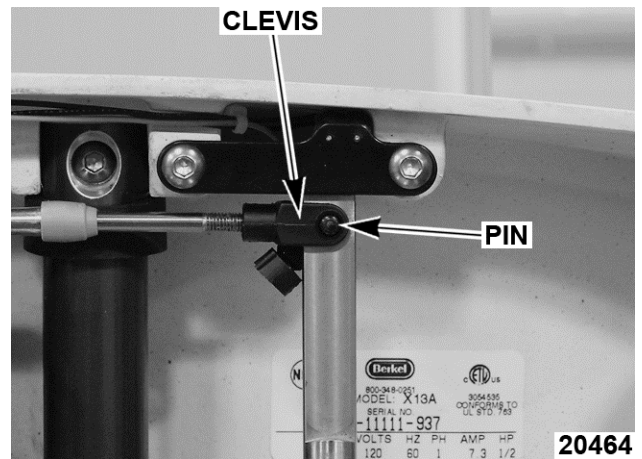


Fig. 53

8. Remove screws and clamp.

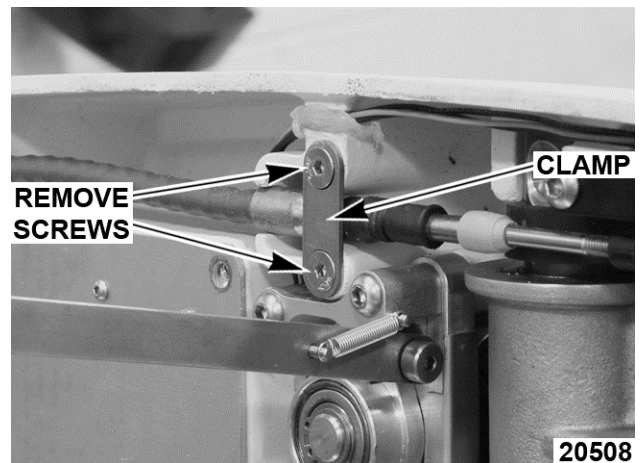


Fig. 54

- A. Remove cable from zipties.
9. Unplug wire harness from control board.
10. Remove knife motor as outlined under KNIFE MOTOR AND MOUNT ASSEMBLY.
11. Remove mounting screws and washers holding upper housing to slicer base.

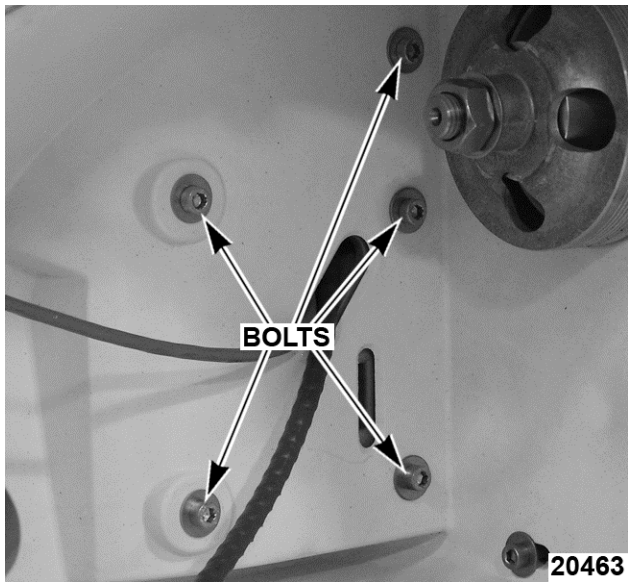


Fig. 55

12. Remove index mechanism

Index Mechanism Installation

1. Reverse removal procedure to install.
2. Torque mounting screws holding upper housing to slicer base 60 in.-lbs.

NOTE: Two long screws go in bottom two holes.

3. Check gauge plate for proper adjustment as outlined under GAUGE PLATE ADJUSTMENT .
4. Check slicer for proper operation.

SERVICE PROCEDURES AND ADJUSTMENTS

⚠ WARNING

Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to the test.

PRODUCT TABLE ADJUSTMENTS



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Place slicer on its side, so it is resting on motor housing.
2. Angle to knife.
 - A. Loosen mounting screw.

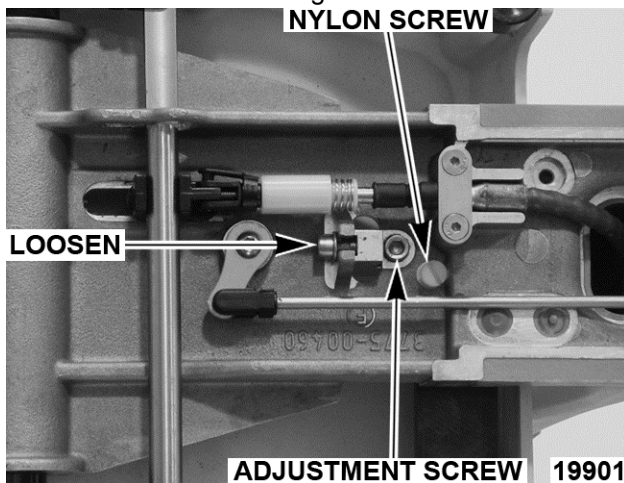


Fig. 56

- B. Turn adjustment screw until product table is at a right angle with gauge plate.

NOTE: Adjustment screw raises/ lowers roller bearing above square rail and nylon screw takes slack out below square rail.

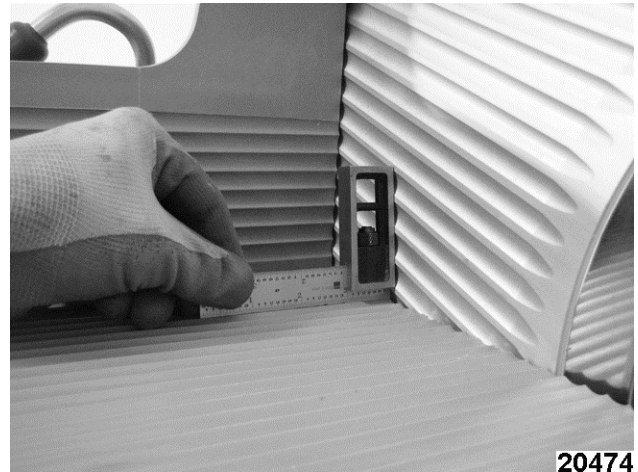


Fig. 57

- 1) Tighten mounting screw.
3. Clearance with gauge plate.
 - A. Close gauge plate.
 - B. Check for 1/8" gap between gauge plate and product table at "V" and leading edge.

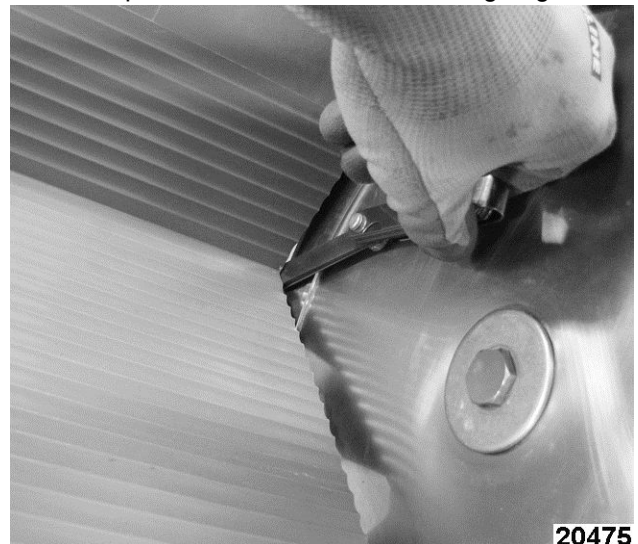


Fig. 58

- 1) If out of adjustment, remove product table and tighten or loosen table adjusting screws accordingly.

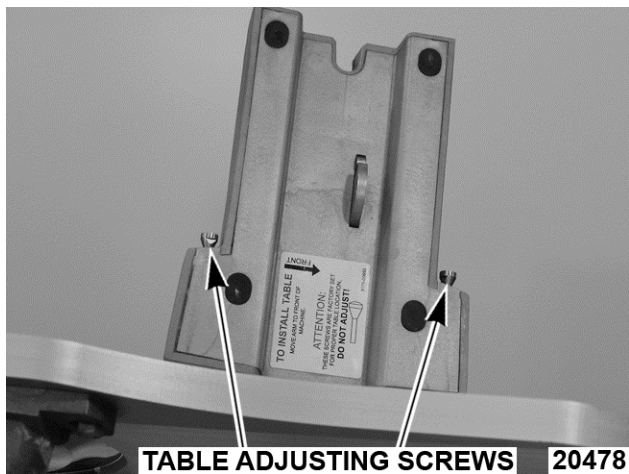


Fig. 59

4. Proper carriage travel.

- A. Apply Loctite® 2440™ to nylon screw and adjust to zero clearance with square rail without binding.

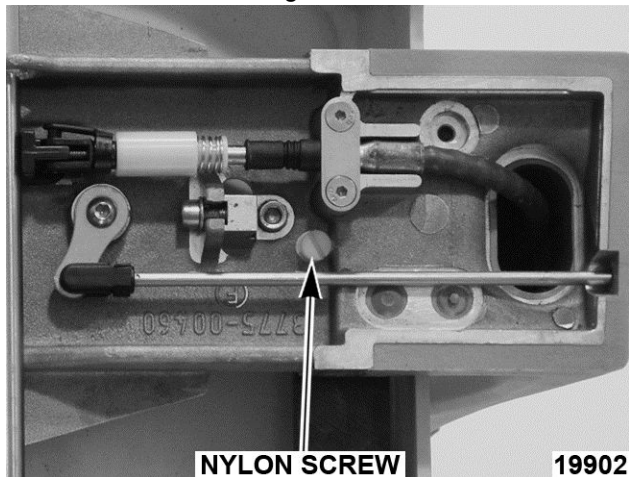


Fig. 60

- B. Stand slicer up and ensure carriage moves freely.

- 1) Adjust nylon screw if travel is sloppy or binding occurs.

INTERLOCK CABLES / SUPPORT ARM ADJUSTMENT



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

NOTE: With product table installed, slide bar should be centered in carriage hole.

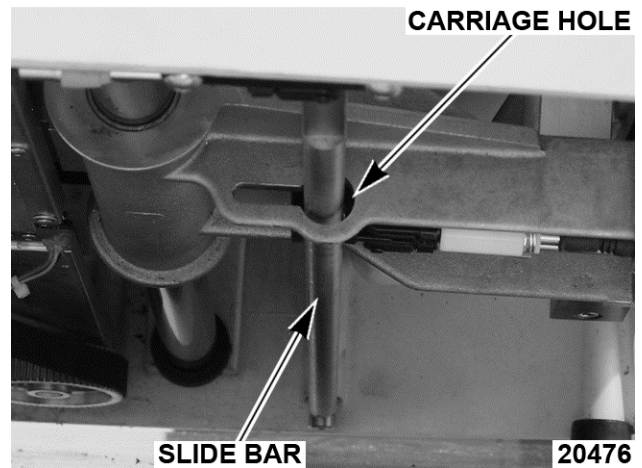


Fig. 61

1. Remove clevis pin, then slide bar from clevis.

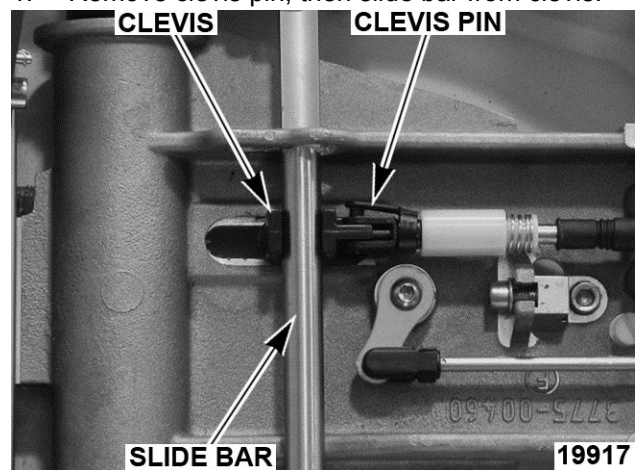


Fig. 62

2. Turn clevis in or out to adjust.

NOTE: On X13A units the slide bar activates a switch on the slide bar guide when product table is installed.

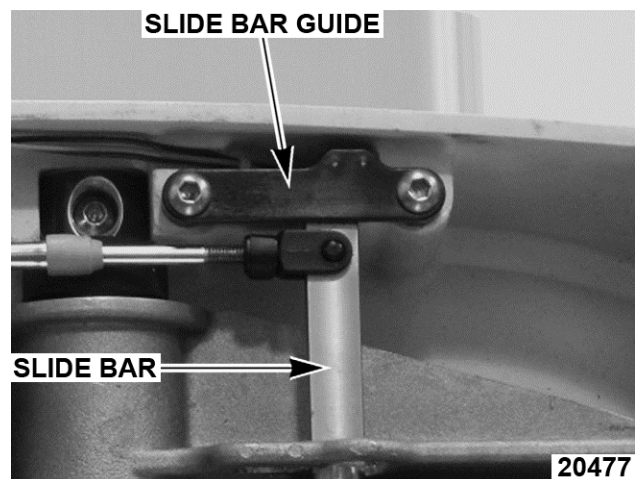


Fig. 63

3. Check slicer for proper operation.

INTERLOCK CABLES / INDEX KNOB ADJUSTMENTS



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Insert cable into index knob.
 - A. Disconnect clevis pin and remove clevis from interlock slide bar.

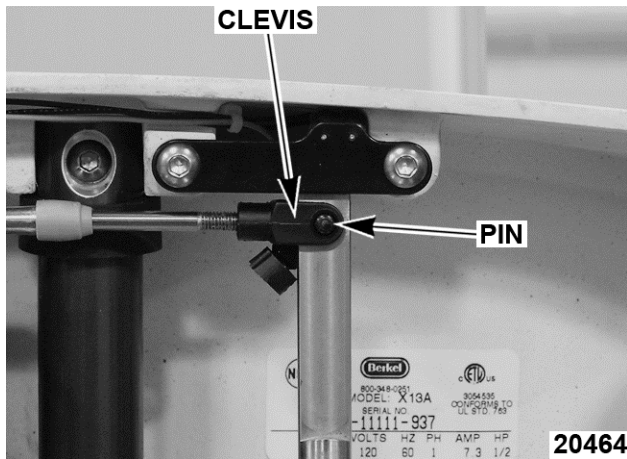


Fig. 64

- B. Remove INDEX KNOB.
- C. Push cable until it stops.
- D. Adjust gauge plate to knife height as outlined under GAUGE PLATE ADJUSTMENT.
- E. Replace INDEX KNOB.

NOTE: Make sure end of cable goes into index knob hole within spiral groove.

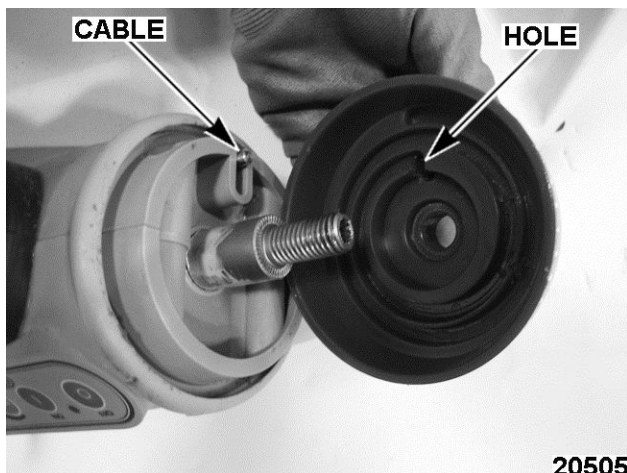


Fig. 65

- F. Torque nut to 140 in.-lbs.
2. Attach cable to slide rod.
 - A. Install product table as outlined under PRODUCT TABLE.
 - B. Pull clevis to retract cable from index knob until index knob turns freely.
 - C. Open index knob 1/4 turn and push cable in as far as it will go.
 - D. Turn clevis until hole aligns with hole in interlock slide rod.
 - E. Turn clevis CW one full revolution.
 - F. Attach clevis to interlock slide rod with clevis pin.

GAUGE PLATE ADJUSTMENT



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

⚠ WARNING

The slicer knife is very sharp. Exercise extreme caution when working near the knife.

1. Gauge plate to knife gap.
 - A. Pull rubber boot away from adjustment block.
 - B. Loosen bolts and slide gauge plate into position.

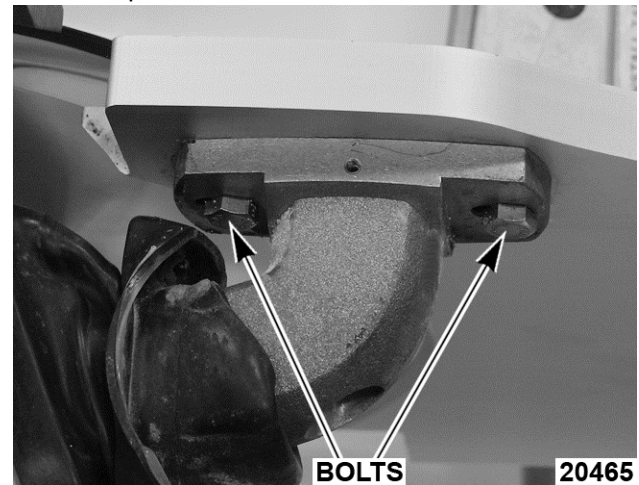


Fig. 66

NOTE: Gauge plate to knife gap should be 1/8" at center of gauge plate. As knife wears, gap at top and

bottom of gauge plate will increase. Maintain 1/8" gap at center and an even gap top to bottom.



Fig. 67

- C. Tighten bolts.
 - D. Place boot back into place and seal with RTV.
2. Gauge plate to knife angle.
- A. Remove center plate and pull slide bar towards arm assembly to unlock index knob.

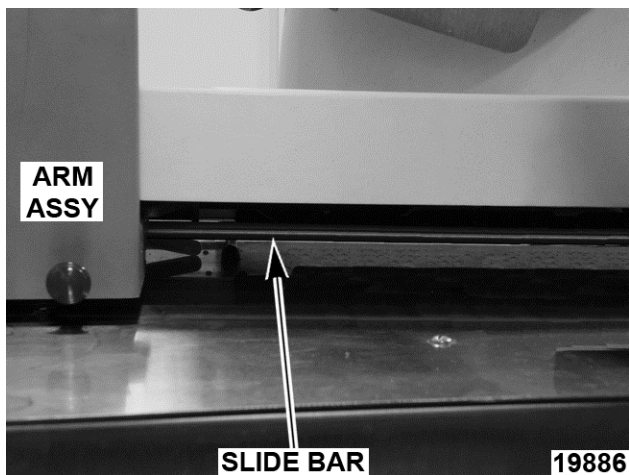


Fig. 68

- B. Turn index knob until 3 contact points are met at top of gauge plate.

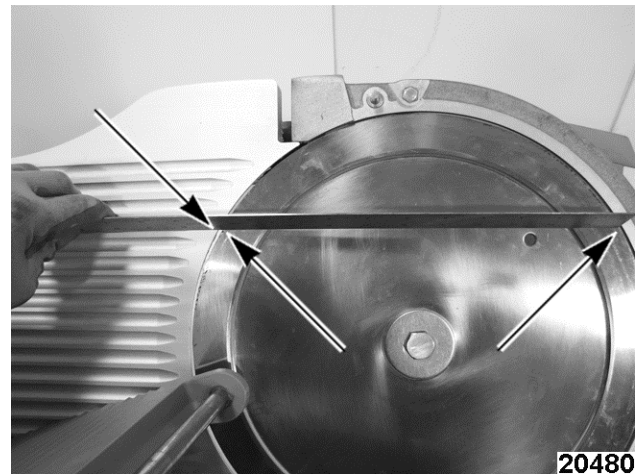


Fig. 69

- C. Pull rubber boot away from adjustment block.
- D. Loosen top and bottom set screws.

NOTE: Bottom set screw is underneath adjustment block. (opposite top set screw)

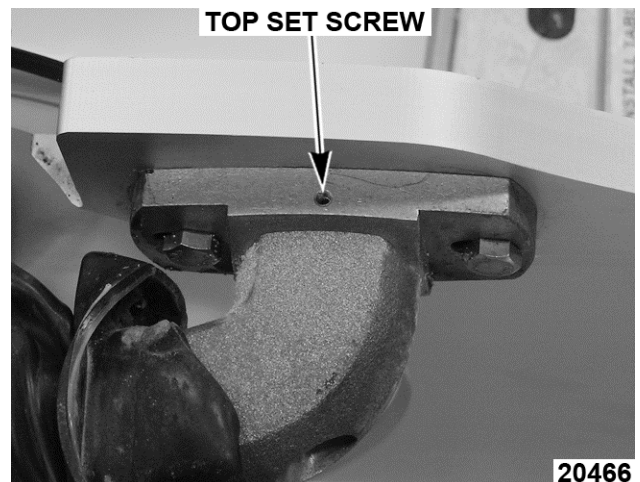


Fig. 70

- E. Loosen center bolt and adjust gauge plate so that bottom is 0.015" above top of gauge plate.
- F. Tighten bolt and set screws.
- G. Recheck that gauge plate is still in proper adjustment.
- H. Place boot back into place and seal with RTV.

3. Gauge plate to knife height.

NOTE: Top of gauge plate should be 0.030" above knife when fully closed.



Fig. 71

- A. Fully close index knob.
- B. Remove index knob cap and loosen nut one and a half turns.

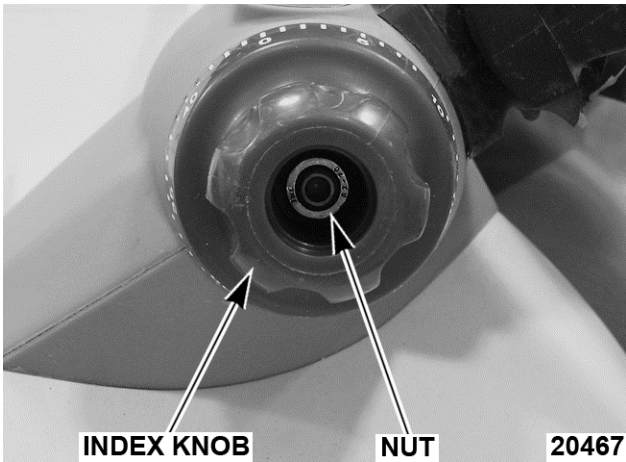


Fig. 72

- C. Hold index knob at "0", and adjust index cam up or down to achieve proper height.



Fig. 73

- D. Hold index knob in place and tighten nut to 140 in.-lbs.
- E. Replace cap.

SHARPENING



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Install sharpener as outlined under SHARPENER.
2. Open gauge plate all the way.
3. Push product tray toward knife until built-in stop in sharpener is actuated and hold for 5 seconds.
4. Bring product tray back to home position.
5. Check slicer for proper operation.
6. Repeat procedure if knife is not sharpened to satisfaction.

CENTER PLATE CHECK



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Check for even mark with straight edge as knife is spinning at top, middle, and bottom of center plate.



Fig. 74

2. If center plate needs adjustment, shim post stud and shoulder studs.

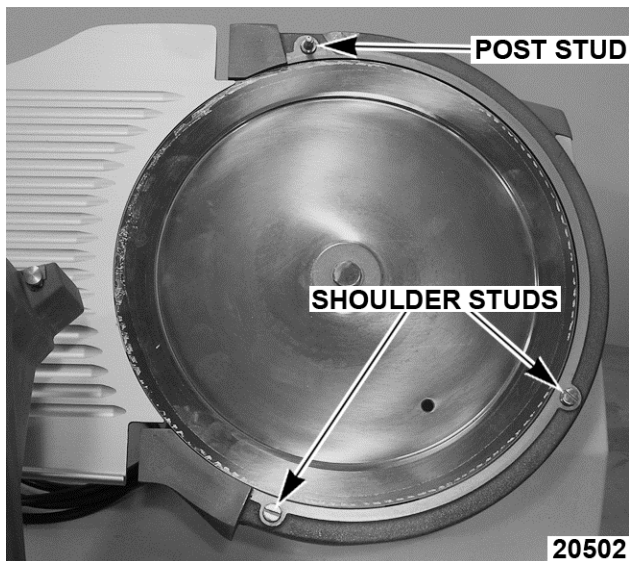


Fig. 75

3. Apply Loctite® 2440™ to post stud after set.

AUTODRIVE ASSEMBLY ADJUSTMENTS (X13A, X13AE)



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

Eccentric Pin Adjustment

NOTE: Eccentric pin is in adjustment when pulling clutch engage rod there is resistance during last 1/4 to 1/8 of stroke. The resistance is the clip assembly gripping the primary belt.

1. Place primary belt in auto clip assembly.

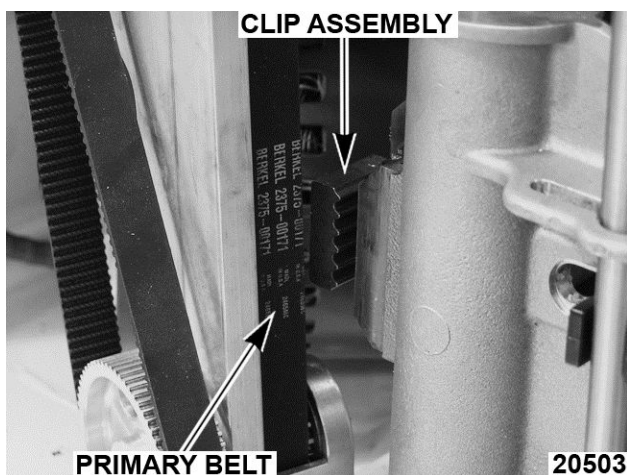


Fig. 76

2. Remove screws and square rail.

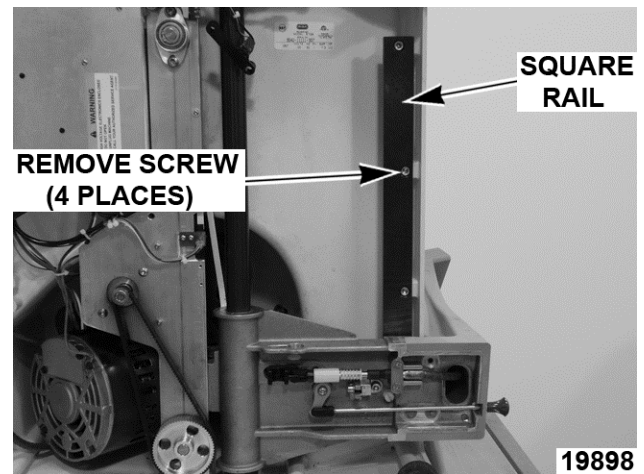


Fig. 77

3. Loosen nut and adjust eccentric pin accordingly 1/4 turn at a time.

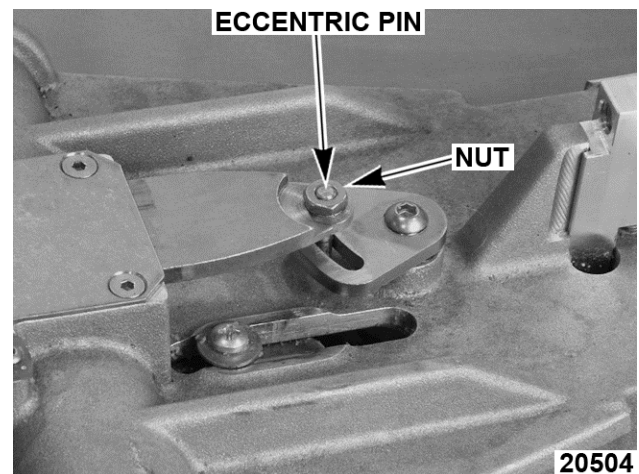


Fig. 78

4. Tighten nut.
5. Recheck proper operation of clutch engage rod.
6. Install square rail.
7. Check slicer for proper operation.

WICK REPLACEMENT



⚠ WARNING

Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove arm assembly as outlined under ARM ASSEMBLY.
2. Remove round rail from transport arm.
3. Remove old wick from inside transport arm.

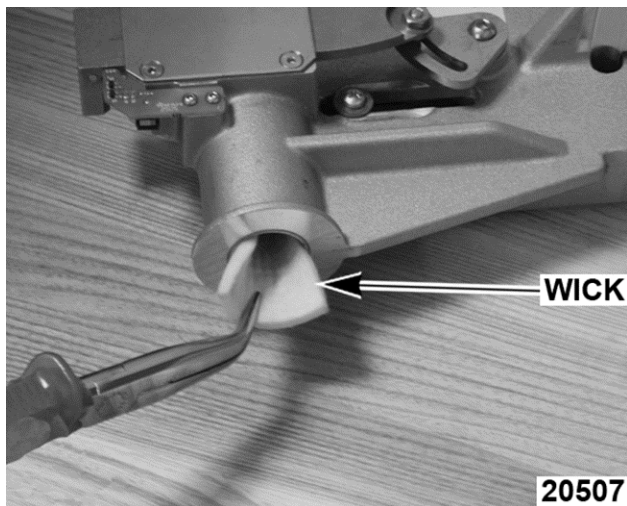


Fig. 79

4. Coat new wick with Berkel oil and install in transport arm.
5. Reverse procedure to install.
6. Check slicer for proper operation.

SLIDE BAR SWITCH TEST (X13, X13A)

⚠ WARNING

Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to the test.

NOTICE

Certain components in this system are subject to damage by electrostatic discharge (ESD) during field repairs. An ESD kit is required to prevent damage. The ESD kit must be used anytime the circuit board is handled.

1. Remove product table as outlined under PRODUCT TABLE.
2. Place slicer on its side, so it is resting on motor housing.
3. Remove screws to access control board.

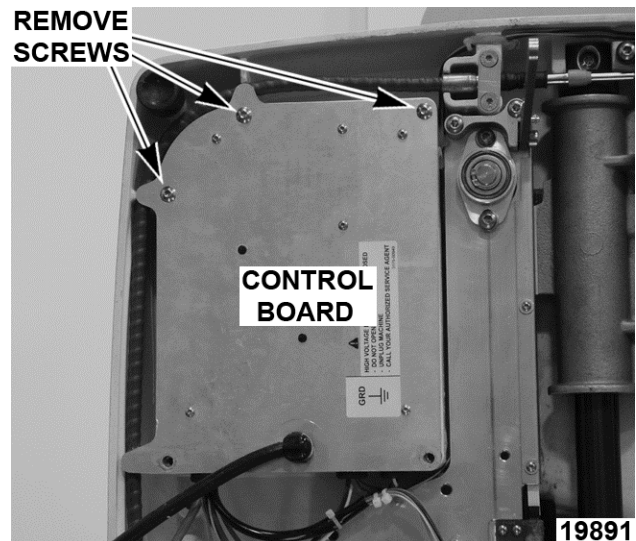


Fig. 80

4. Plug slicer in.
5. Verify 5VDC between J4-1 and J4-5.
 - A. If voltage is not present, check all connections.
 - B. If connections are good, replace control board.
6. Verify 5VDC between J4-4 and J4-5.
7. Supporting the arm assembly, squeeze the slide bar to the unlocked position and lower assembly.

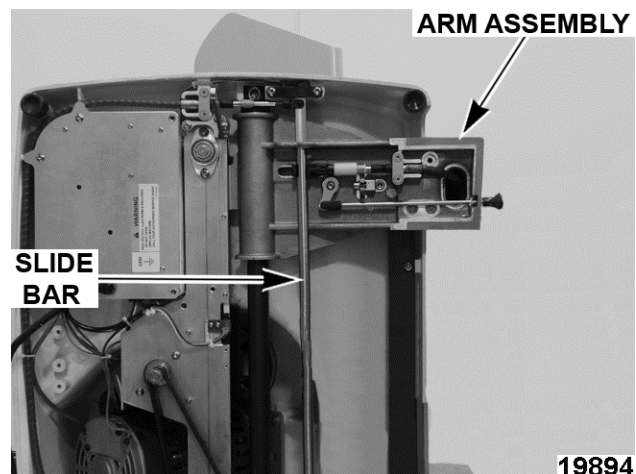


Fig. 81

- A. Verify 0VDC between J4-4 and J4-5 anytime slide bar is squeezed into the unlocked position.
 - B. Verify 5VDC when slide bar is released again.
8. If voltage is not present, replace slide bar switch.

CARRIAGE SENSOR TEST (X13, X13A)

⚠ WARNING

Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to the test.

1. Place slicer on its side, so it is resting on motor housing.
2. Remove screws to access control board.

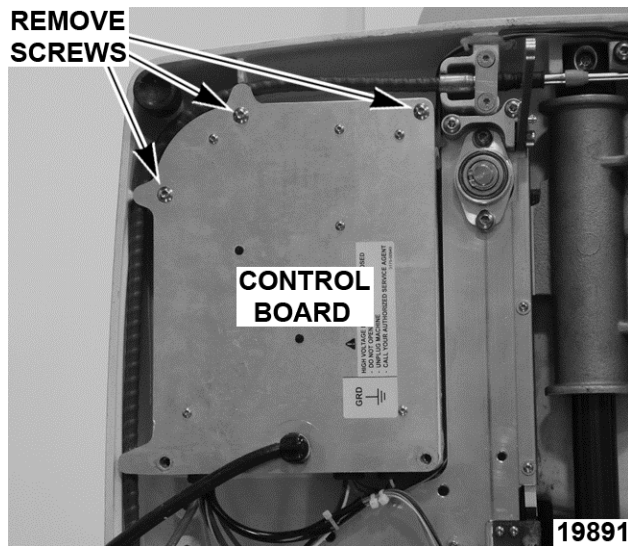


Fig. 82

3. Plug slicer in.
4. Verify 5VDC supply voltage between J4-1 and J4-5.
 - A. If voltage is not present, check all connections.
 - B. If connections are good, replace control board.
5. Verify 0VDC between J4-2 and J4-5 in manual mode (clutch engage rod in).
6. Verify 5VDC between J4-2 and J4-5 in auto mode (clutch engage rod out).
7. Verify 5VDC between J4-3 and J4-5 when arm assembly is in home position.
 - A. 0VDC should be present anytime arm assembly is away from home position.

8. If voltages are not all present, replace carriage sensor.

KNIFE MOTOR OHM TEST

⚠ WARNING

Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to the test.

1. Place slicer on its side, so it is resting on motor housing.
2. Remove screws to access control board.

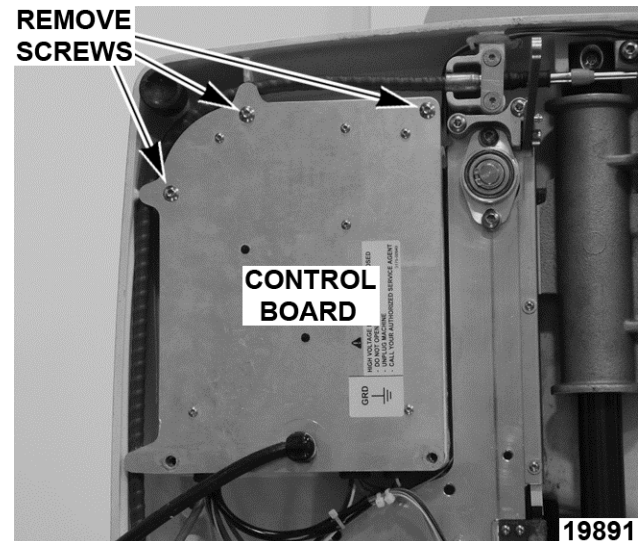


Fig. 83

3. Connect a volt/ohm meter to both disconnected motor lead wires (P1 and P2) and verify ohm readings per chart.

MOTOR RESISTANCE			
Volts	Hertz	Min.	Max.
115	60	1.21	1.33

4. If ohm readings are out of spec, replace motor.

CIRCUIT BREAKER TEST

⚠ WARNING

Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to the test.

1. Place slicer on its side, so it is resting on motor housing.
2. Remove screws to access control board.

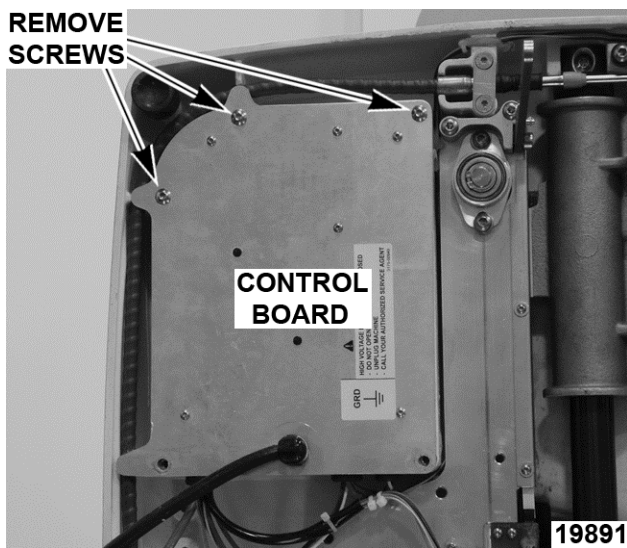


Fig. 84

3. Plug slicer in.
4. Verify 120VAC between J1-1(power cord neutral) and circuit breaker voltage in, circuit breaker voltage out.
5. If voltage is not present at circuit breaker voltage in, replace the power cord.
6. If voltage is present at circuit breaker in but not out, replace circuit breaker.

ELECTRICAL OPERATION

COMPONENT FUNCTION

Keypad Assembly	Controls electrical power to knife motor on all models and auto motor on automatic models.
Thermal Switch	Shuts down slicer if knife motor overheats.
Carriage Sensor (X13AE, X13A)	Detects when carriage is in home position and detects when auto mode has been engaged.
Slide Bar Switch	Detects when product table is installed/ removed.
Control Board	Controls operation of all electrical components.
Circuit Board	Provides circuit protection for power supply.
Automatic Motor (X13A, X13AE)	Drives automatic slicing mechanism.
Timer Assembly (optional)	Provides auto shutoff feature if no slicing for 15 seconds.

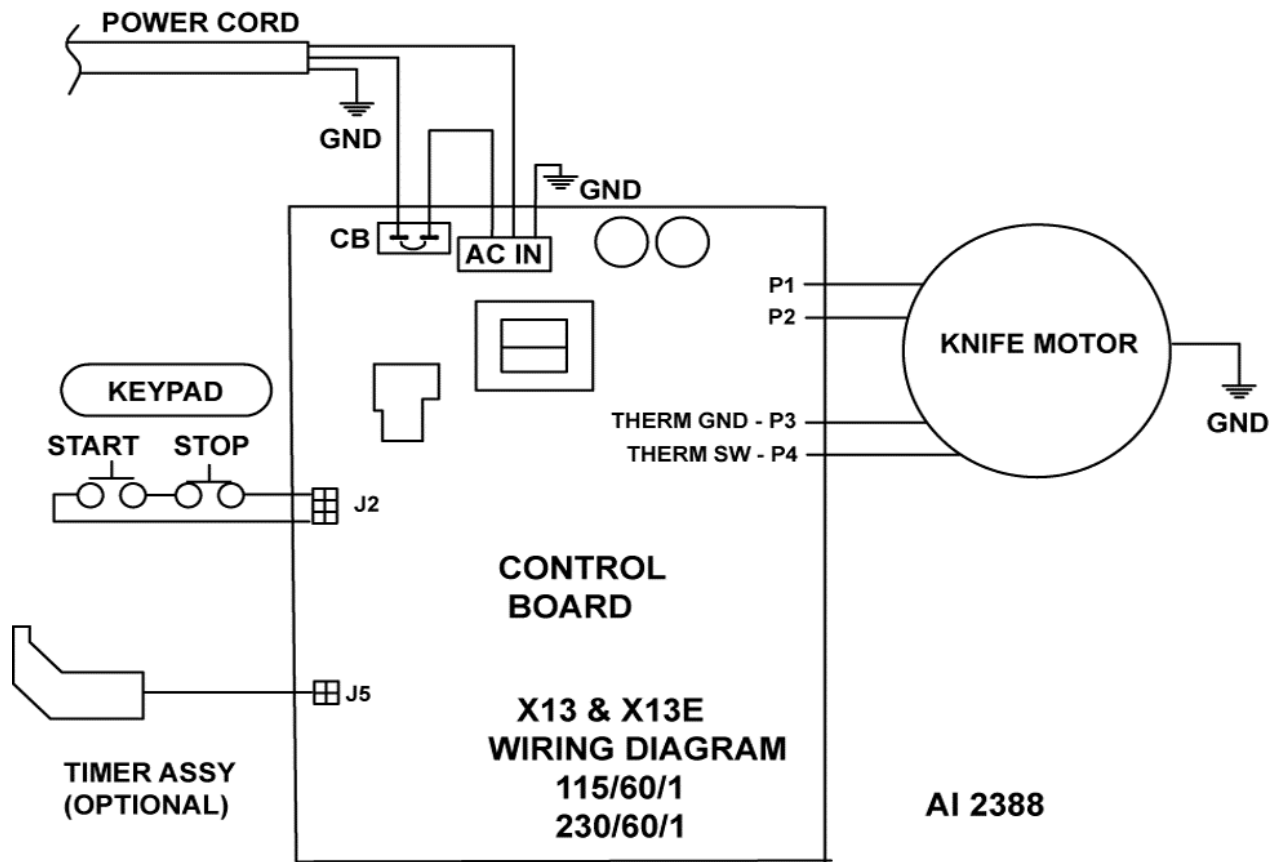
ERROR CODE TEST

1. Error codes are designated by the number of times the red pilot light on the keypad flashes. To reset, push the STOP button.

No. of Flashes	Problem	Probable Cause
1	High temperature detected on control board.	Replace control board.
2	Over current detected in control board.	DC motor shorted or control board malfunction: Replace both control board and DC motor.
3	Knife motor over temperature.	Check for malfunctioning knife motor.
4	Auto motor internal hall effect malfunction.	Replace DC motor.
5	Auto motor internal hall effect transition malfunction.	Replace DC motor.
6	Encoder input not active.	Replace DC motor.
7	Unable to find home.	Malfunctioning carriage switch, or malfunctioning plate flex cable, or no magnet in base.
8	Carriage moving too fast or slow.	Check J9 cable, or check flex cable, or clean round rail.
9	Clutch disengaged while running.	Re-engage auto or adjust eccentric pin.
10	Slide bar guide switch not engaged.	Check or adjust slide bar guide switch.

WIRING DIAGRAMS WITH SEQUENCE OF OPERATIONS

X13 & X13E Sequence of Operation

**X13 & X13E Wiring Diagram**

NOTE: Knife can be started with carriage in any position.

Start Conditions:

1. Correct voltage supplied to slicer.
2. Red power LED lit.
3. Carriage tray secured.

Manual Sequence:

1. Press start button - start switch closed.
2. 15VDC is applied to control board.

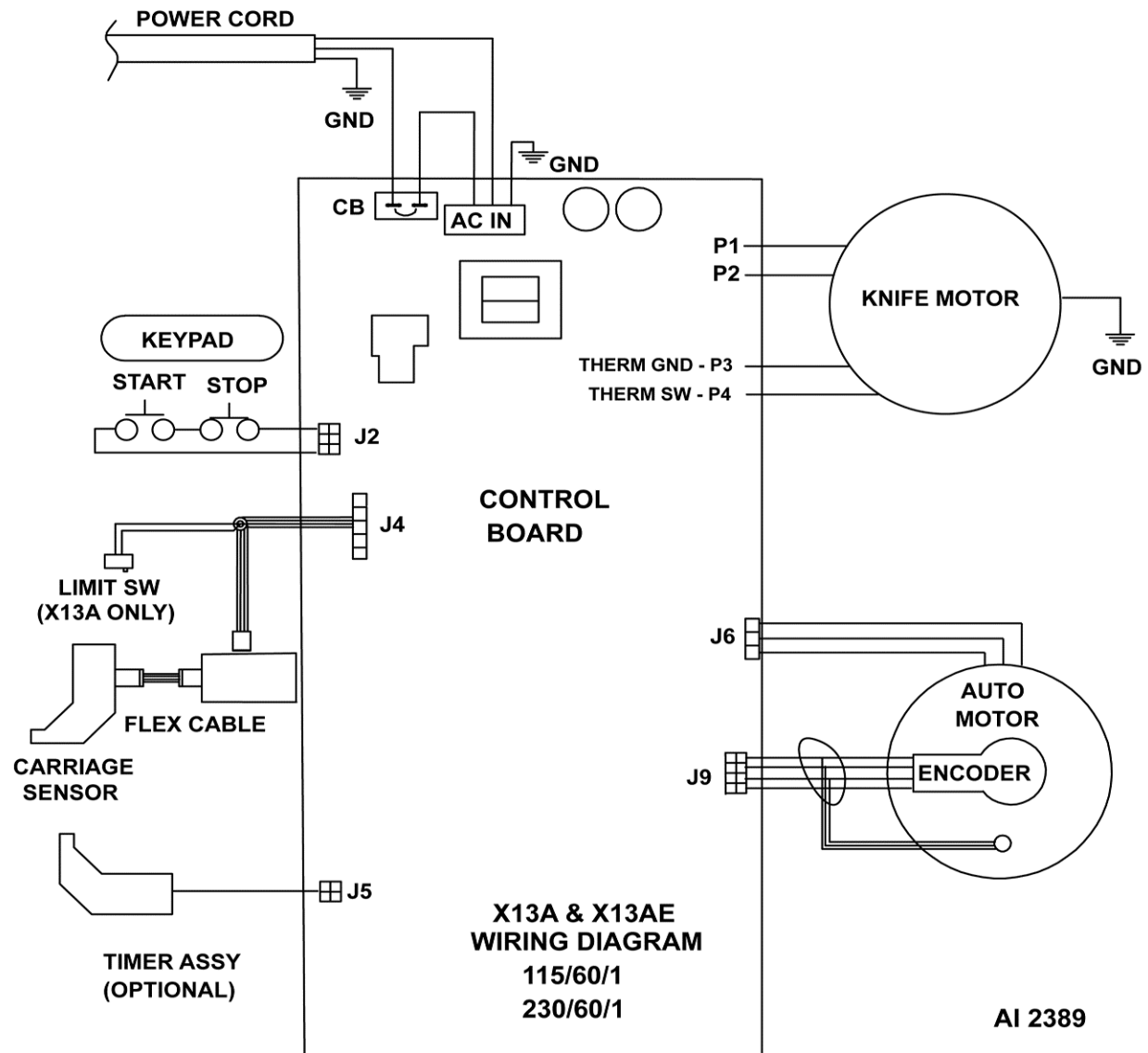
3. Knife motor energized.

4. Knife motor continues to run until stop button is pressed.

NOTE: Slicers equipped with timer assembly will shut off after 15 seconds of no slicing.

5. Press stop button - stop switch opens.
6. 15VDC is removed from control board.
7. Knife motor de-energized.

X13A & X13AE Sequence of Operation

**X13A & X13AE Wiring Diagram****Notes:**

1. Knife can be started with carriage in any position.
2. Slicer cannot be switched from manual operation to automatic with knife motor energized.
 - A. When auto engage lever is engaged with knife motor running, hall effect switch will signal control board to de-energize knife motor.

Start Conditions:

1. Correct voltage supplied to slicer.
2. Red power LED lit.
3. Carriage tray secured.
 - A. (X13A only) Slide bar switch closed; control board signaled that carriage is in place.

Manual Sequence:

1. Press start button - start switch closed.
2. 15VDC is applied to control board.
3. Knife motor energized.
4. Knife motor continues to run until stop button is pressed.

NOTE: Slicers equipped with timer assembly will shut off after 15 seconds of no slicing.

5. Press stop button - stop switch opens.
6. 15VDC is removed from control board.
7. Knife motor de-energized.

Automatic Sequence:

1. Conditions:

- A. Correct voltage supplied to slicer.
- B. Red power LED lit.
- C. Carriage tray secured.
 - 1) (X13A only) Slide bar switch closed; control board signaled that carriage is in place.
- D. Auto engage lever pulled out into engaged position.
 - 1) Hall effect switch signals board that auto mode has been selected.

NOTE: Default settings are slow speed and full stroke. However slicer will remember last settings unless power has been removed from the slicer.

- 2. Select speed - LED will indicate selection.
- 3. Select stroke length - LED will indicate selection.
- 4. Press start button - start switch closed.
- 5. 15VDC is applied to control board.
- 6. Knife motor energized.
 - A. Knife motor continues to run until stop button is pressed.

NOTE: Slicers equipped with timer assembly will shut off after 15 seconds of no slicing.

- 7. Auto motor energized.
 - A. Motor finds home position.
 - 1) Hall effect switch is positioned under magnet and control board is signaled.
 - B. Carriage begins to move at selected speed and stroke.
- 8. Press stop button - stop switch opens.
- 9. 15VDC is removed from control board.
- 10. Knife motor de-energized.
- 11. Auto motor de-energized after returning to home.

TROUBLESHOOTING

TROUBLESHOOTING TABLE

SYMPTOM	POSSIBLE CAUSE
Knife motor will not start.	<ol style="list-style-type: none"> 1. No power to slicer. 2. Keypad malfunction. 3. Thermal switch open. 4. Motor malfunction.
Slicer will not shut off.	<ol style="list-style-type: none"> 1. Keypad malfunction. 2. Control board malfunction.
Hard to slice.	<ol style="list-style-type: none"> 1. Dull knife. 2. Adjustment screw binding on square rail. 3. Oil wick not properly lubricated.
Wedged shaped slices.	<ol style="list-style-type: none"> 1. Gauge plate not properly adjusted. 2. Product not stable in product table.
Noisy.	<ol style="list-style-type: none"> 1. Bearing malfunction. 2. Oil wick not properly lubricated. 3. Motor malfunction. 4. Belt mis-aligned.
Noisy in automatic mode.	<ol style="list-style-type: none"> 1. Belts not properly tensioned. 2. Belts worn. 3. Auto motor malfunction.
Knife motor running, knife not turning.	<ol style="list-style-type: none"> 1. Knife belt malfunction. 2. Knife hub assembly malfunction.
Knife running or starting at less than rated RPM (slow).	<ol style="list-style-type: none"> 1. Motor malfunction. 2. Drive belt malfunction. 3. Bearing malfunction.
Automatic slicing not engaging.	<ol style="list-style-type: none"> 1. Product table not properly seated. 2. Flex cable damaged/ disconnected. 3. Slide bar switch out of adjustment/ malfunction. 4. Carriage sensor malfunction. 5. Magnet on auto clip arm misaligned. 6. Auto belt malfunction. 7. Keypad malfunction. 8. Control board malfunction. 9. Auto motor malfunction.