

**S6163-CE-FSE-010**

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TECHNICAL MANUAL

OPERATION, MAINTNENACE AND  
INSTALLATION

**HOBART LEGACY 12 & 20  
QUART MIXERS;  
MODELS HL120 & HL200**

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## FOREWORD

This technical manual provides a general description, operation, maintenance and installation information for the HOBART Legacy 12 & 20 Quart Mixers, models HL120 and HL200. This technical manual is intended for the guidance of and use by personnel operating and maintaining the equipment described herein.

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## SAFETY SUMMARY

### GENERAL SAFETY NOTICES

The following general safety notices supplement the specific warnings and cautions appearing elsewhere in this manual. They are recommended precautions that must be understood and applied during operation and maintenance of the equipment covered herein. Should situations arise that are not covered in the general or specific safety precautions, the commanding officer or other authority will issue orders as deemed necessary to cover the situation. No work shall be undertaken on energized equipment or circuits until approval of the commanding officer is obtained, and then only in accordance with Naval Ships' Technical Manual (NSTM) S9086-KC-STM-010/Chapter 300.

### DO NOT REPAIR OR ADJUST ALONE

Under no circumstances shall repair or adjustment of energized equipment be attempted alone. The immediate presence of someone capable of rendering first aid is required. Before making adjustments, be sure to protect against grounding. If possible, adjustments should be made with one hand, with the other hand free and clear of equipment. Even when power has been removed from equipment circuits, dangerous potentials may still exist due to retention of charges by capacitors. Circuits must be grounded and all capacitors discharged prior to attempting repairs. Equipment should be deenergized and properly tagged out according to the ship's Standard Operating Procedures.

### TEST EQUIPMENT

Make certain test equipment is in good condition. If a metal-cased test meter must be held, ground the case of the meter before starting measurement. Do not touch live equipment or personnel working on live equipment while holding a test meter. Do not ground any measuring devices; these devices should not be held when taking measurements.

### INTERLOCKS

Interlocks are provided for safety of personnel and equipment and should be used only for the purpose intended. They should not be battle shorted or otherwise modified except by authorized maintenance personnel. Do not depend solely upon interlocks for protection. Whenever possible, disconnect power at the power distribution source.

### MOVING EQUIPMENT

Personnel shall remain clear of moving equipment. If equipment requires adjustment while in motion, a safety watch shall be posted. The safety watch shall be qualified to administer CPR, have a full view of the operations being performed, and have immediate access to controls capable of stopping equipment motion.

### FIRST AID

An injury, no matter how slight, shall never go unattended. Always obtain first aid or medical attention immediately, and file an injury report in accordance with OPNAVINST 5102.1 series, subj: Mishap Investigation and Reporting.

## RESUSCITATION

Personnel working with or near high voltage shall be familiar with approved methods of resuscitation. Should someone be injured and stop breathing, begin resuscitation immediately. A delay could cost the victim's life. Resuscitation procedures shall be posted in all electrically hazardous areas.

## GENERAL PRECAUTIONS

The following general precautions are to be observed at all times.

1. Install and ground all electrical components associated with this system/ equipment in accordance with applicable Navy regulations and approved shipboard practices.
2. Ensure that all maintenance operations comply with Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, OPNAVINST 5100.19 series.
3. Observe precautions set forth in NSTM S9086-KC-STM-010/Chapter 300 with respect to electrical equipment and circuits.
4. Ensure that protective guards and shutdown devices are properly installed and maintained around rotating parts of machinery and high voltage sources.
5. Do not wear loose clothing while working around rotating parts of machinery.
6. Ensure that special precautionary measures are employed to prevent applying power to the system/equipment any time maintenance work is in progress.
7. Do not make any unauthorized alterations to equipment or components.
8. Before working on electrical system/equipment, use the correct tag out procedure and check with voltmeter to ensure that system is not energized.
9. Consider all circuits not known to be "dead," "live" and dangerous at all times.
10. When working near electricity, do not use metal rules, flashlights, metallic pencils, or any other objects having exposed conducting material.
11. Deenergize all equipment before connecting or disconnecting meters or test leads.
12. When connecting a meter to terminals for measurement, use range higher than expected voltage.
13. Before operating equipment or performing any tests or measurements, ensure area is dry of water or other liquid conductive material and that frames of all motors and starter panels are securely grounded.
14. Ensure that area is well-ventilated when using cleaning compound or solvent. Avoid prolonged breathing of fumes and compound or solvent contact with skin or eyes.

**SECTION 1**

**INSTRUCTION MANUAL**

**HOBART LEGACY**

**12 & 20 QUART MIXERS**

**MODELS HL120 & HL200**



# HOBART

## LEGACY™



### Models

HL120	ML-134296
HL200	ML-134331
HL200	ML-134289

PRIOR ML'S COVERED IN THIS CATALOG

HL200	ML-134308
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## INSTRUCTION MANUAL

701 S. RIDGE AVENUE TROY, OHIO 45374 -0001

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# Installation, Operation and Care of Legacy™ 12 & 20-Quart Mixers

SAVE THESE INSTRUCTIONS

## GENERAL

The Legacy 12-quart mixer is a bench-type mixer which features a SmartTimer™, a manual bowl lift and a #12 attachment hub as standard equipment.

The Legacy 20-quart mixer is a bench-type mixer which features a SmartTimer™, a manual bowl lift and a #12 attachment hub as standard equipment. With the use of special agitators, a 12 quart bowl may be used on the HL200 mixer.

A variety of attachments, agitators and accessories are available. These are described in a separate *Use and Applications Handbook*, which is furnished on the Legacy Mixer Operator Training CD provided with each mixer.

## INSTALLATION

### UNPACKING

Immediately after unpacking the mixer, check for possible shipping damage. If this machine is found to be damaged after unpacking, save the packaging material and contact the carrier within 15 days of delivery.

### LOCATION

Prior to installation, test the electrical service to assure that it agrees with the specifications on the machine data plate.

Place the mixer on a suitable sturdy level surface. There should be adequate space around the mixer for the user to operate the controls and to install and remove bowls.

Holes are located in the base to permanently secure the mixer, although this is not necessary in normal installations.

## **ELECTRICAL CONNECTIONS (Cord Connected Mixers)**

**WARNING:** THE ELECTRICAL CORD ON THIS MACHINE IS EQUIPPED WITH A THREE-PRONGED GROUNDING PLUG WHICH MUST BE CONNECTED TO A PROPERLY GROUNDED RECEPTACLE. IF THE RECEPTACLE IS NOT THE PROPER GROUNDING TYPE, CONTACT AN ELECTRICIAN. DO NOT REMOVE THE GROUNDING PRONG FROM THE PLUG.

**WARNING:** ELECTRICAL AND GROUNDING CONNECTIONS MUST COMPLY WITH THE APPLICABLE PORTION OF THE NATIONAL ELECTRICAL CODE AND/OR OTHER LOCAL ELECTRICAL CODES.

### **Check Initial Operation**

1. Apply power to the mixer by inserting the cord plug into a properly grounded outlet.
2. Install the bowl and raise into mix position, with the bowl support up and bowl guard wire cage closed.
3. Turn the SPEED dial pointer to STIR.
4. Momentarily run the machine by pushing the START and then STOP buttons.

# OPERATION

**WARNING:** MOVING AGITATOR IN BOWL. KEEP HANDS, CLOTHING, AND UTENSILS OUT OF BOWL WHILE IN OPERATION. DO NOT USE WITHOUT INTERLOCKED GUARD.

The Legacy mixer is equipped with SmartTimer™ controls. Refer to Fig. 1 for operating parts and OPERATION section for their functions.

The bowl guard wire cage must be in closed position or the mixer will not operate.

The bowl must remain in mix position on bowl support and the bowl support must be raised (mix position) or the mixer will not operate.

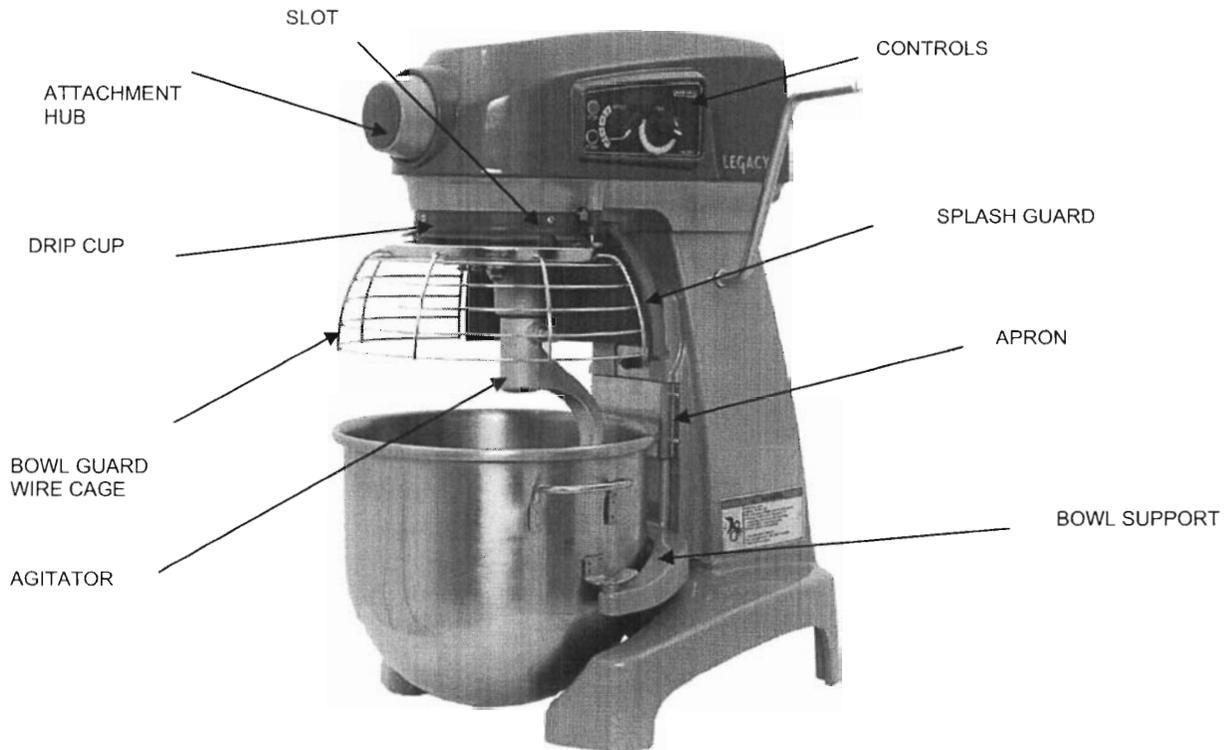
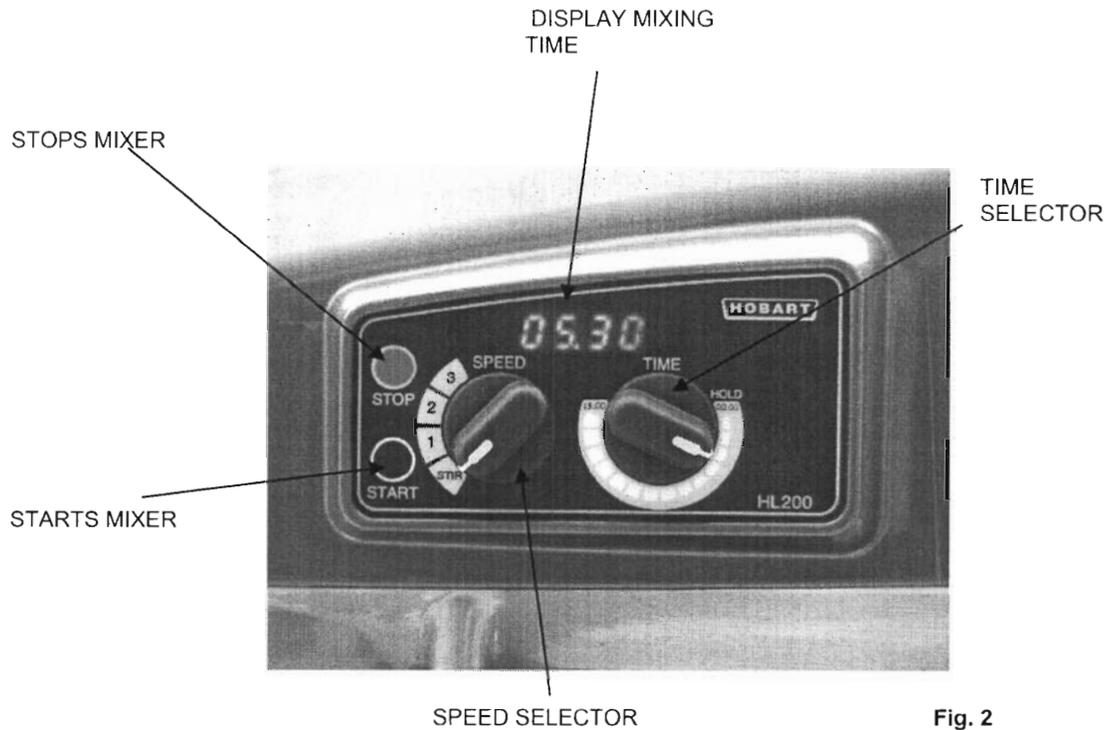


Fig. 1

## Standard Controls

### Models HL120/HL200 (With Three Mix Speeds Plus Stir Speed)



### HL120/HL200 Mixer Speeds

- |                  |  |
|------------------|--|
| STIR (Slow)      | The lowest speed is for incorporating ingredients.   |
| SPEED 1 (Low)    | This speed is for heavy mixtures such as pizza dough, heavy batters and potatoes.          |
| SPEED 2 (Medium) | This speed is for mixing cake batters, mashing potatoes and developing bread dough.        |
| SPEED 3 (High)   | This speed is for incorporating air into light batches, as well as finishing whipped items |

## Recipe Timer (Optional)

Models HL120/HL200 (With Three Mix Speeds Plus Stir Speed)



Fig. 15

The SmartPlus2™ recipe timer has two operating modes, Standard (STD) and RECIPE.

### Standard Mode

Operates exactly as the standard controls utilizing continuous and timed mixing.

### Recipe Mode

- Use mode buttons to switch mixer operation between recipe and standard timed operation.
- Up to 4 recipes can be stored in memory
- Each recipe can contain 5 steps
- Each step can be programmed to operate with the following speeds and time.

#### SPEED SETTINGS

SPd 1 (DEFAULT)  
SPd 2  
SPd 3  
Stir  
PAUS (pause – no mixing)

#### TIME SETTINGS

00:00 – 15:00 minutes (10 second increments)  
End (default)

## BOWL PLACEMENT

The bowl must be installed before the agitator is installed.

To install the bowl, lower the bowl support and position bowl so the alignment pins on the left side of the bowl support fit in the holes in the bowl tab. (Fig. 3) Place the slotted tab on bowl into the lower part of the pin. Swing the bowl into the mix position on bowl support. (Fig. 4)

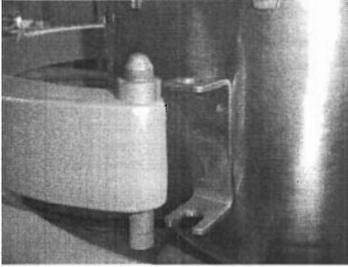


Fig. 3



Fig. 4

## AGITATOR

To install an agitator, the bowl must be on the bowl support.

### To Install

1. Lower the bowl.
2. Open the bowl guard wire cage.
3. Place the agitator inside the bowl and align the horizontal slot on the agitator with the agitator shaft pin.
4. Slide the agitator up the agitator shaft until it stops and latches. An audible click should be heard when the agitator locks in position.

### To Remove

1. Open the bowl guard wire cage.
2. Lower the bowl.
3. Hold the agitator and pull the plunger of the agitator out (Fig. 5). Slide agitator down off the agitator shaft.



Fig. 5

## PREPARE FOR MIXING

1. Place the mixing bowl on the bowl support.
2. Pour ingredients into the bowl.
3. Swing the bowl back to the mix position.
4. Place the agitator inside the bowl, and then attach it to the agitator shaft (Fig. 6).
5. Lift bowl support.
6. Correctly close the bowl guard wire cage.
7. The mixer is now ready for mixing. (See TIMER OPERATION.)

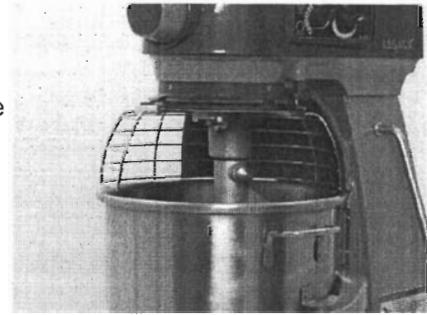


Fig. 6

## STANDARD TIMER OPERATION

### Using the Count-Up Mode (Continuous Mixing)

1. Turn the SPEED dial to select a mix speed (the SPEED setting can be changed at any time during the mixing operation).  
**NOTE:** STIR is to be used for incorporating ingredients. Do not use to develop dough products.
2. Set the timer on hold by turning the TIME selector counterclockwise until HoLd appears in the TIME window.
3. Press the START button to begin mixing. The timer starts counting forward from 00:00.  
**NOTE:** If the wire cage is opened at any time, the mixing operation will stop. To resume the mixing operation, close the wire cage and press the START button.
4. Use the STOP button to stop the mixer; the mixing time is displayed in the TIME window.
5. Press the START button to resume mixing if needed.  
**NOTE:** When the timer reaches 15:00 minutes, the beeper will sound momentarily and timer will rollover to 00:01 and continue counting until the STOP button is pressed.

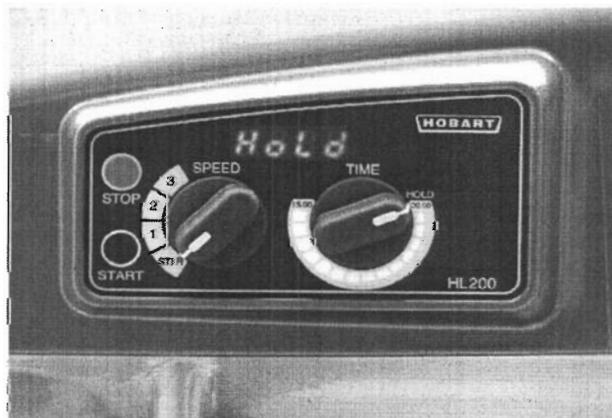


Fig. 7

## Using the Count-Down Mode (Timed Mixing)

1. Turn the SPEED dial to select a mix speed.
  - a. If the count-up mode was used for the previous batch, the desired time needs to be entered.
  - b. If the count-down mode was used for the previous batch, the previous time will be displayed. If a different time is needed, turn the TIME selector to the desired time in 10 second increments.
2. Press the START button to begin mixing; the timer starts counting down from the set time.
  - a. To stop the mixer at any time, press the STOP button. To resume mixing, press the START button. For example: The mixer is started at SPEED 1 for 30 seconds and is stopped after 10 seconds. Pressing the START button will resume the mixing operation.
  - b. If the mixer is stopped and a new time setting is entered, pressing the START button saves the new time setting on the current speed selection.

For example: The mixer is started at SPEED 1 for 30 seconds and is stopped after 10 seconds. A new time is entered by turning the TIME selector. The new time will replace the initial 30 seconds for SPEED 1 after the START button is pressed.
  - c. If the time is changed while mixing, the mixer will operate until the new time expires. The adjustment to the time will not be stored.
  - d. If speed is changed while mixing, the time will change to the previous time for the selected speed and count down.

**NOTE:** If the wire cage is opened at any time, the mixing operation will stop. To resume the mixing operation, close the wire cage and press the START button.
3. When the timer reaches 00:00, the mixer stops; a beeper sounds for 1 second. The count-down timer then displays the last-stored time.

## OPERATING NOTES

- STIR is to be used for incorporating ingredients. Do not use it to develop dough products.
- If the mixer is stopped during a mixing operation, the timer also stops. The timer starts again (with the time remaining) when the START button is pressed.
- Turn the TIME selector clockwise to take the mixer out of the hold mode.

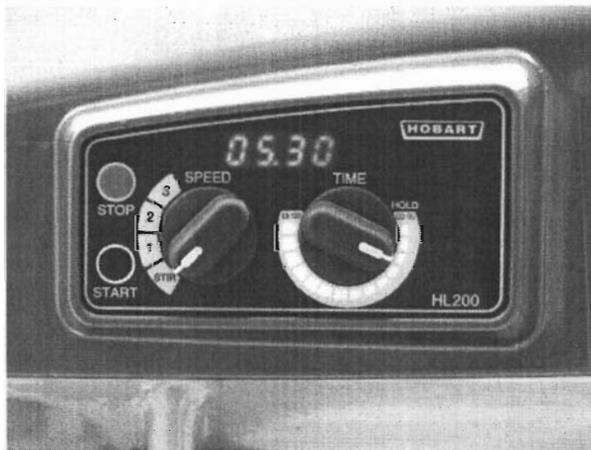


Fig. 8

## RECIPE TIMER OPERATION



### Recipe Timer Notes

- If pause is selected as a mix speed, the mixer START button must be pressed to advance to the next recipe step after the pause time has expired.
- If pause has been selected, the bowl guard can be opened and the time will continue to count down.
- The recipe step can be interrupted and then resumed by pressing the STOP button and then the START button.

**NOTE:** If PAUSE has been selected, the STOP button is disabled.

- The recipe can be terminated by stopping the mixer and pressing the STD button.

### Using The Recipe Timer

1. Press Recipe mode button.
2. Turn the RECIPE selector to select a recipe.
3. Press START; mixer will operate at the programmed speed for the programmed time.
  - a. Speed is displayed momentarily.
  - b. Remaining time for the operating step will be displayed and the step light is flashing.

**NOTE:** Recipe and Time selectors are disabled.

4. Mixer will continue to perform the programmed speeds and times until the recipe steps are completed.

**NOTE:** If pause has been programmed for a step speed, the mixer START button must be pressed to advance to the next recipe step after the pause time has expired.

5. When the timer reaches the end of the last programmed recipe step, the mixer stops; the beeper sounds; the selected recipe is displayed.

## View Recipe

When the mixer is in RECIPE mode, you can view the step settings of any recipe.

1. Press the SELECT/SAVE button.
  - A. Display will alternate between speed and time.
  - B. The LED of the step being displayed will flash.
2. Use the arrow buttons to view the next step.
3. Use the Recipe selector to view other recipes.
4. Press PGM button to return to the RECIPE mode.

**NOTE:** If the mixer is performing a recipe, the recipe will continue to operate in normal recipe mode sequence.

## PROGRAMMING RECIPE TIMER



Fig. 16

HL200 is powered with display showing a mix time (Standard Mode) or recipe number (Recipe Mode).

1. If a mix time is displayed, Press RECIPE mode button. Display corresponds with position of recipe (speed) selector.
2. Press and hold TIME. Continue holding TIME, then press PGM and hold until rP1 is displayed (with step 1 blinking), buzzer sounds and programmed step LEDs are lit.
3. Use arrows to select recipe number (1-4) for programming.
4. Press SELECT/SAVE to enter program mode for the recipe number selected. Buzzer sounds and display alternates between speed and time to indicate programming mode.

## NOTES:

- If a value has been assigned for a step number, that LED will be lit.
- The LED for the selected step will blink.
- If the default value is still assigned to a step, the LED will not be lit.
- When programming, the Recipe and Time Selectors are disabled.

### SPEED SETTINGS

SPd 1 (DEFAULT)

SPd 2

SPd 3

Stir

PAUS (pause – no mixing)

### TIME SETTINGS

00:00 – 15:00 minutes (10 second increments)

End (default)

5. Use arrows to select step number (1 – 5).
6. Press SPEED. All characters will blink and buzzer will sound.
  - A. Use arrows to select the mixing speed for selected step.
  - B. Press SELECT/SAVE to set the speed. SAVE displayed momentarily and buzzer sounds.
7. Display alternates between speed and time to indicate programming mode.
8. Press TIME. Third digit will blink and buzzer will sound.
  - A. Use arrows to select the mixing time (increments of 10 seconds) for selected step.

**NOTE:** If all 5 steps are programmed, the recipe will terminate at the end of step 5. If fewer than 5 steps are used, the default time setting of END will terminate the recipe.
  - B. Press SELECT/SAVE to set the time for the step. SAVE momentarily displayed and buzzer sounds.
9. Display alternates between speed and time to indicate programming mode.

**NOTE:** LED of step programmed will be flashing.
10. Use arrows to select next step.
11. Repeat setting speed and time for additional steps and use SELECT/SAVE to save settings.
12. After all steps for recipe are programmed, press PGM to exit programming mode. Buzzer sounds and display will show recipe number that was programmed with the number blinking.
13. Press PGM to enter run mode. (Buzzer sounds)
14. Press STD to return to standard mode or set recipe selector to the desired recipe.
15. Select the recipe that you programmed and verify proper operation.

## UNLOADING

1. Open the bowl guard wire cage assembly.
2. Lower bowl support.
3. Remove the agitator from the agitator shaft.
4. Slightly lift the bowl off the pin (right side), pull bowl to the front and remove from the bowl support (left side).

## WIRE CAGE

The bowl guard wire cage can be rotated out of the way to add ingredients or to access the bowl and agitator.

Note how the plastic carriers allow the wire cage to ride around the circumference of the planetary drip cup.

- Open the bowl guard wire cage: rotate it to your left (Fig. 9).
- Close the bowl guard wire cage: rotate it to your right until it stops, closed position (Fig. 10).

**NOTE:** The bowl guard wire cage must be returned to the closed position for the mixer to operate.



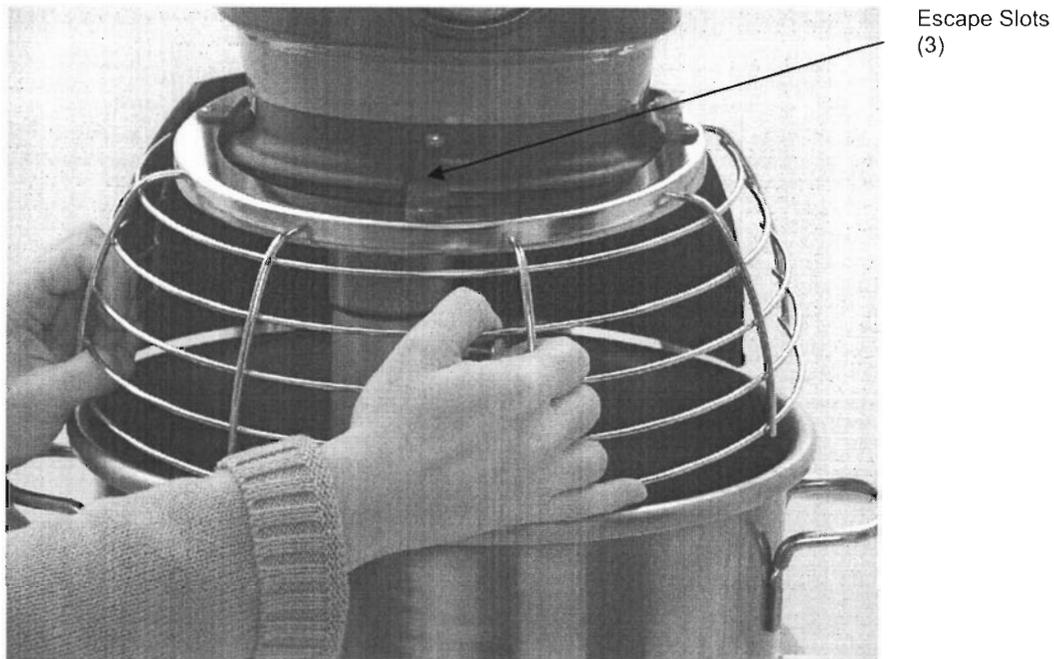
Fig. 9



Fig. 10

### **Remove and Clean Bowl Guard Wire Cage (Fig. 11)**

1. Rotate wire cage to your left until the three carriers align with the carrier escape slots in the circular ridge of the planetary drip cup.
2. Lift the wire cage straight up so the carriers escape from the slots on the drip cup. The bowl guard wire cage can now be removed by pulling toward you.



**Fig. 11**

3. Wash the bowl guard wire cage in a sink, rinse with clear water, and dry with a clean cloth.
4. The splash guard can be wiped off and/or washed with a cloth or sponge using warm, soapy water. Rinse with clear water and dry with a clean cloth.

### **Reinstall Bowl Guard Wire Cage**

1. Position the ring of the bowl guard wire cage so the carriers are positioned above the slots in the planetary drip cup.
2. Lower the bowl guard wire cage so the carriers pass through the slots.
3. Rotate the bowl guard wire cage to your right until it contacts the stop, closed position.

## AGITATORS AND ATTACHMENTS

Attachments for attachment hub and agitators are covered in a separate Hobart Legacy Mixer Use and Application Handbook on the Mixer Operator Information CD. Follow the instructions accordingly.

### Available Agitators and Attachments



**12 & 20 Qt. B Flat Beater**



**12 & 20 Qt. D Wire Whip**



**12 & 20 Qt. ED Dough Hook**



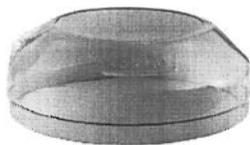
**20 Qt. E Dough Hook**



**12 & 20 Qt. SST Bowl**



**12 & 20 Qt. Scraper**



**12 & 20 Qt. Splash Cover**



**12 & 20 Qt. C Wing Whip**



12 & 20 Qt. P Pasty Knife



12 & 20 Qt. Ingredient Chute



12 & 20 Qt. Table

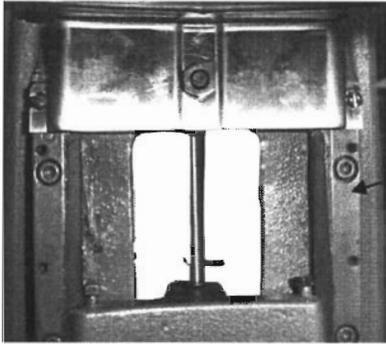
## CLEANING

**WARNING:** UNPLUG MACHINE POWER CORD BEFORE BEGINNING ANY CLEANING PROCEDURES.

The mixer should be thoroughly cleaned daily. DO NOT use a hose to clean the mixer; it should be washed with a clean, damp cloth. The base allows ample room for cleaning under the mixer. The apron (Fig. 1) may be removed for cleaning by loosening the screws. The drip cup (Fig. 1) should be removed (which is secured with 3 screws) periodically and wiped clean. For cleaning the bowl guard wire cage refer to page 15.

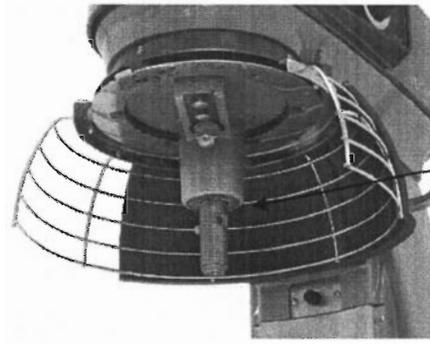
# MAINTENANCE

**WARNING:** UNPLUG MACHINE POWER CORD BEFORE BEGINNING ANY MAINTENANCE PROCEDURES.



Slideway

Fig. 12



Planetary Seal

Fig. 13

## LUBRICATION

### Slideways

The slideways (Fig. 12) should be lubricated approximately twice a year. To reach these areas, fully lower the bowl support and remove the apron, which is secured by slotted screws. Wipe a thin coat of Lubriplate 630AA on the bowl pad area of the bowl supports and on each slideway. Install the apron.

### Planetary Seal

Occasionally, the planetary seal (Fig. 13) may become dry and begin to squeak. To correct this, work a little lubrication (mineral oil) under the lip of the seal.

## ADJUSTMENTS

### Agitator Clearance

The agitator clearance should be checked periodically. The agitator must not touch the bowl and the maximum clearance between the bottom of the bowl and the B flat beater is 1/8" (3 mm); the maximum clearance between the bottom of the bowl and the ED dough arm is 5/16" (8 mm).

Install a bowl and agitator (e.g., beater). If the bowl and beater come into contact before the bowl support reaches its stop, adjust the stop screws. Refer to Adjust the Bowl/Agitator Clearance.

### Measure Clearance

Pour enough flour in the bowl to cover the bottom of the bowl where the beater travels. With the bowl fully raised (beater should not touch the bottom of the bowl), briefly run the mixer at the lowest speed.

Turn off the mixer, disconnect the electrical power supply, and measure the depth of flour where the beater has traced a path. This measurement should be taken at several points around the bowl to assure accuracy.

### Adjust the Bowl/Agitator Clearance

- Remove the apron (which is secured by screws).
- Adjust the clearance by moving the stop screws counterclockwise to increase the clearance or clockwise to decrease the clearance.
- After the adjustments are made, replace the apron and secure it with the screws.
- Carefully operate the bowl lift several times to check the adjustment.

Stop  
Screw

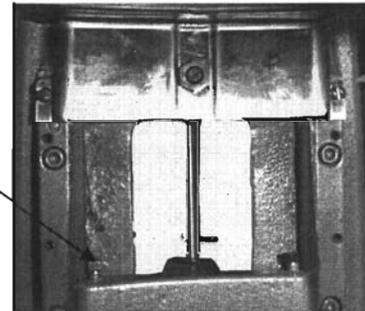


Fig. 14

# TROUBLESHOOTING

Symptoms	Possible Causes
Mixer will not start	Flashing Time Display – See Below Branch circuit protector is in open position - check fuse or disconnect switch. Mixer is overloaded. Wire cage is not in the closed position. Bowl is not in closed (mix) position or if Bowl in not in up position.
Agitator touches bowl	Bowl is not in closed (mix) position. Improper agitator clearance - see Maintenance for adjustment procedure. Agitator is not installed properly
Planetary seal squeaks	Seal requires occasional lubrication - see Maintenance
Timer displays flashing alarm code (Ex. "OL1" – Motor overload)	If the error code is flashing – unplug machine until display is blank then plug back in. If symptoms still exist, contact your local Hobart Service office.

## SERVICE

If service is needed on this equipment, contact your local Hobart Service office.

1-888-4HOBART

**SECTION 2**

**SPECIFICATIONS**

**HOBART LEGACY**

**12 & 20 QUART MIXERS**

**MODELS HL120 & HL200**



**HOBART**701 S Ridge Avenue, Troy, OH 45374  
1-888-4HOBART • www.hobartcorp.com**LEGACY®  
HL120 MIXER****HOBART****STANDARD FEATURES**

- Heavy-Duty ½ H.P. Motor
- Gear Transmission
- Three Fixed Speeds Plus Stir Speed
- Shift-on-the-Fly™ Controls
- Patented soft start Agitation Technology
- 15-Minute SmartTimer™
- Automatic Time Recall
- Large, Easy-To-Reach Controls
- Single Point Bowl Installation
- Ergonomic Swing-Out Bowl
- #12 Taper Attachment Hub
- Open Base
- Stainless Steel Bowl Guard
- Metallic Gray Hybrid Powder Coat Finish

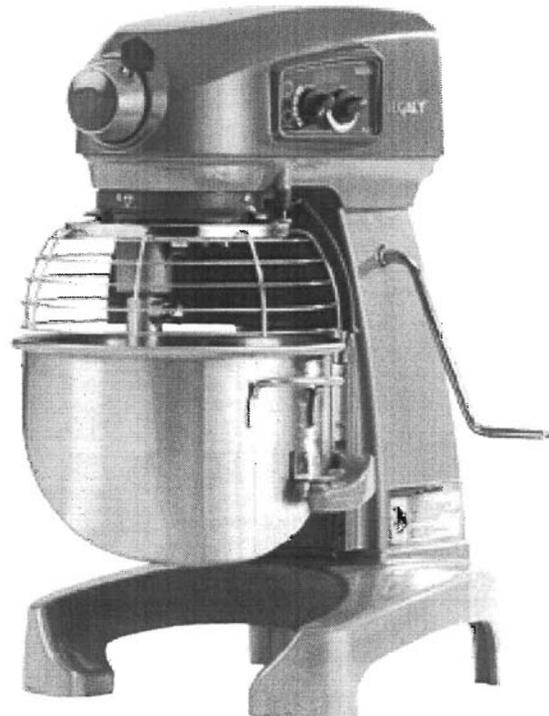
**MODEL**

- HL120 – 12-Quart All Purpose Mixer

Specifications, Details and Dimensions on Inside and Back.

**ACCESSORY PACKAGES - featuring  
Hobart Quick Release™ Agitators**

- Deluxe Accessory Package Includes:**
  - 12 Quart Stainless Steel Bowl
  - 12 Quart "B" Beater
  - 12 Quart "D" Wire Whip
  - 12 Quart Bowl Scraper
  - 12 Quart Ingredient Chute
- Standard Accessory Package Includes:**
  - 12 Quart Stainless Steel Bowl
  - 12 Quart "B" Beater
  - 12 Quart "D" Wire Whip

**LEGACY® HL120 MIXER**

# LEGACY® HL120 MIXER

# HOBART

701 S Ridge Avenue, Troy, OH 45374  
1-888-4HOBART • www.hobartcorp.com

## SOLUTIONS/BENEFITS

### ½ H.P. Motor

Durability

- Heavy-duty to meet the most demanding operations

### Gear Transmission

Durability, Reliability

- Ensures consistent performance and minimum downtime under heavy loads

### Three Fixed Speeds plus Stir Speed

Flexibility, Reliability, Consistency

- For incorporating, blending, mixing ingredients
- Supports consistent results and thorough mixing

### Shift-on-the-Fly™ Controls

Flexibility

- Allows operator to change speeds while mixer is running

### Patented soft start Agitation Technology

Sanitation

- Each speed has a soft transition into a higher speed to reduce the chances of product splash-out

### 15-Minute SmartTimer™

Convenience, Ease of Use, Consistency

- Supports recipe mixing times
- Provides accurate results and eliminates overmixing

### Automatic Time Recall

Productivity, Consistency

- Remembers the last time set for each speed
- Great for multiple batches

### Ergonomic Swing-Out Bowl

Ease of Use, Convenience

- Easy loading and unloading of products
- Single Point Bowl Installation allows for simple mounting and removal of bowl
- Bowl Interlock ensures mixer bowl is properly in place for mixer to operate

### Stainless Steel Bowl Guard

Protection

- Safety interlock prevents operation when front portion of guard is out of position

### Hobart Accessories

Durability, Flexibility, Simplicity

- Hobart Quick Release™ agitators allow for simple installation and removal from agitator shaft
- Hobart accessories are designed for long-term usage under heavy-duty conditions
- Large array of accessories provide multiple uses for recipe and product processing

## HL120 MIXER CAPACITY CHART

Recommended Maximum Capacities - dough capacities based on 70°F. water and 12% flour moisture.

PRODUCT	AGITATORS SUITABLE FOR OPERATION	HL120
CAPACITY OF BOWL (QTS. LIQUID)		12
Egg Whites	D	1¼ pts.
Mashed Potatoes	B & C	10 lbs.
Mayonnaise (Qts. of Oil)	B or C or D	4½ qts.
Meringue (Qts. of Water)	D	¾ pts.
Waffle or Hot Cake Batter	B	5 qts.
Whipped Cream	D or C	2½ qts.
Cake, Angel Food (8-10 oz. cake)	C or I	7
Cake, Box or Slab	B or C	12 lbs.
Cake, Cup	B or C	12 lbs.
Cake, Layer	B or C	12 lbs.
Cake, Pound	B	12 lbs.
Cake, Short (Sponge)	C or I	8 lbs.
Cake, Sponge	C or I	6½ lbs.
Cookies, Sugar	B	10 lbs.
Dough, Bread or Roll (Lt.-Med.) 60% AR	§ ED	13 lbs.☐
Dough, Heavy Bread 55% AR	§ ED	8 lbs.☐
Dough Pie	B & P	11 lbs.
Dough, Thin Pizza 40% AR (max. mix time 5 min.)	§‡ ED	5 lbs.☐
Dough, Med. Pizza 50% AR	§‡ ED	6 lbs.☐
Dough, Thick Pizza 60% AR	§‡ ED	11 lbs.☐
Dough, Raised Donut 65% AR	ED	4 lbs.*
Dough, Whole Wheat 70% AR	ED	11 lbs.☐
Eggs & Sugar for Sponge Cake	B & C or I	5 lbs.
Icing, Fondant	B	7 lbs.
Icing, Marshmallow	C or I	1¼ lbs.
Shortening & Sugar, Creamed	B	9½ lbs.
Pasta, Basic Egg Noodle (max. mix time 5 min.)	ED	—

NOTE: % AR (% Absorption Ratio) - Water weight divided by flour weight. Capacity depends on moisture content of dough. Above capacities based on 12% flour moisture at 70°F water temperature.

☐ 1st Speed

\* 2nd Speed

† 3rd Speed

§ If high gluten flour is used, reduce above dough batch size by 10%.

‡ 2nd Speed should never be used on 50% AR or lower products.

**USE OF ICE REQUIRES A 10% REDUCTION IN BATCH SIZE.**

**1 gallon of water weighs 8.33 lbs.**

NOTE: Attachment hub should not be used while mixing.



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# LEGACY® HL120 MIXER

## SPECIFICATIONS

### MOTOR:

½ H.P. high torque motor.

100-120/50/60/1 8.0 Amps  
200-240/50/60/1 5.0 Amps

### ELECTRICAL:

100-120/50/60/1, 200-240/50/60/1 – UL Listed.

### CONTROLS:

Magnetic contactor with thermal overload protection. Internally sealed “Start-Stop” push buttons. A 15-minute SmartTimer™ is standard. SmartTimer™ includes **Automatic Time Recall**, which remembers the last time set for each speed.

### TRANSMISSION:

Gear-driven. Gears are constant mesh heat-treated hardened alloy steel along with anti-friction ball bearings. Grease lubricants furnished to all gears and shafts.

### SPEEDS:

	Agitator (RPM)	Attachment (RPM)
Stir	59	33
First (Low)	107	61
Second (Intermediate)	198	113
Third (High)	365	207

### BOWL GUARD:

Heavy-duty stainless steel wire front and solid rear portion. Front portion of guard rotates easily to add ingredients and install or remove agitator. It detaches in seconds for cleaning in dishwasher or sink. Rear portion of guard can be quickly cleaned in position. Guard must be in closed position before mixer will operate. Bowl support interlock provides further protection.

### BOWL LIFT:

Ergonomic style, hand crank operated, self-locking in top and bottom position.

### FINISH:

Metallic Gray Hybrid Powder Coat finish.

### ATTACHMENT HUB:

Comes with front-mounted Hobart standard #12 taper attachment hub for use with #12 size attachments.

### ATTACHMENTS AND ACCESSORIES:

The following are available at extra cost:

- Stainless Steel Bowl
- “B” Flat Beater
- “C” Wing Whip
- “D” Wire Whip
- “ED” Dough Hook
- “P” Pastry Knife
- Bowl Splash Cover
- Bowl Scraper
- Ingredient Chute
- 9" Vegetable Slicer
- Meat Chopper Attachment
- Rubber Foot Pads
- Attachment Tray Support



Hobart Bowl Scraper

Hobart Ingredient Chute



Listed by Underwriters Laboratories Inc. and certified by NSF International.

# LEGACY® HL120 MIXER

# HOBART

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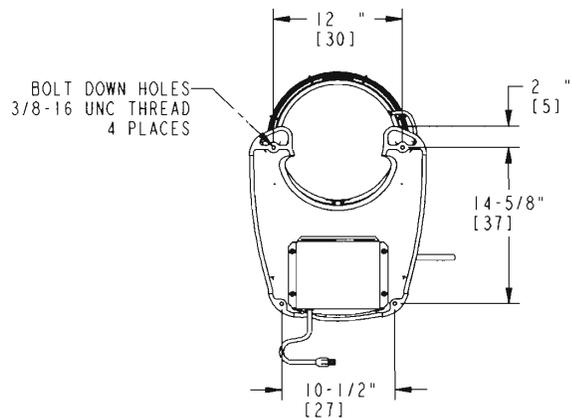
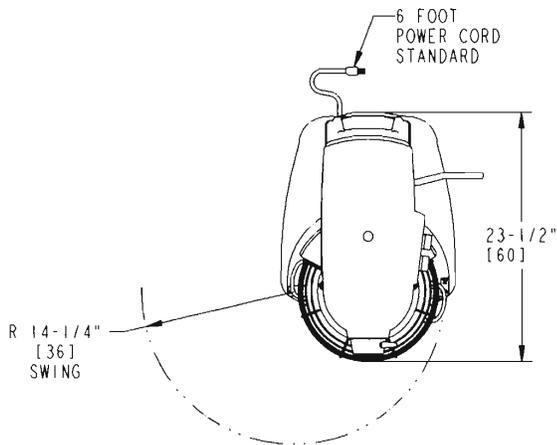
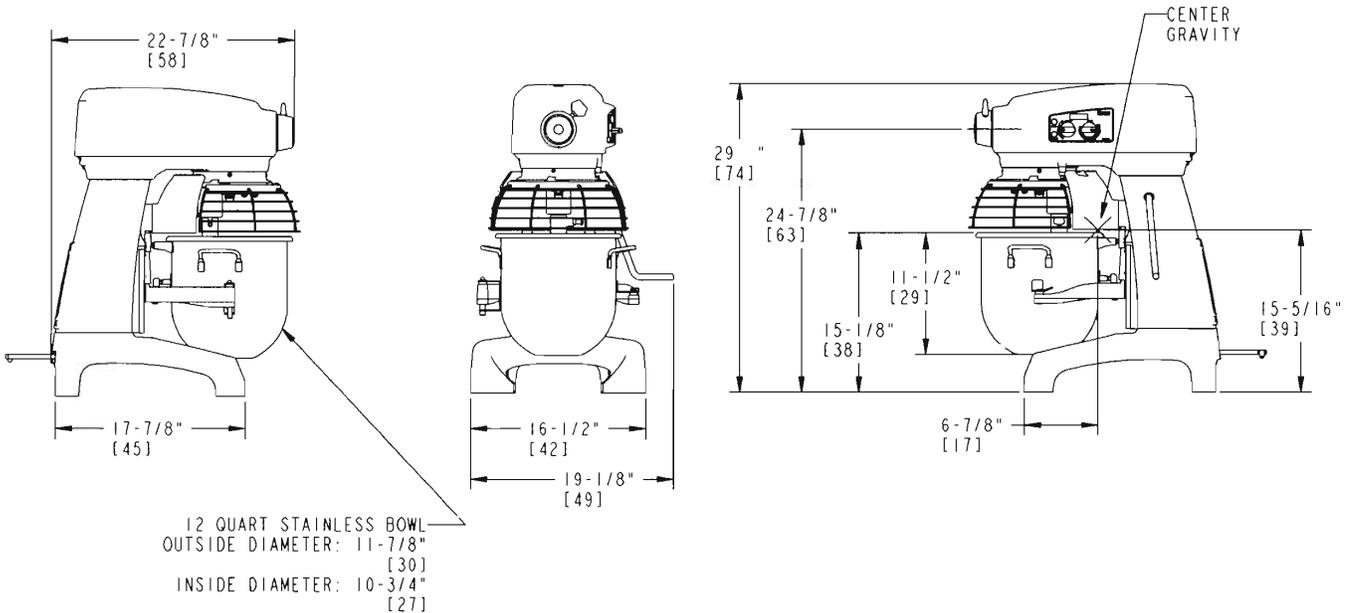
## SPECIFICATIONS

**ELECTRICAL SPECIFICATIONS:** 100-120/50/60/1,  
200-240/50/60/1 – UL Listed.

**WEIGHT:** 189 lbs. net; 204 lbs. domestic shipping.

**WARRANTY:** Unit has full one-year warranty on  
parts, labor and mileage against manufacturer's  
defects. Service contracts are available.

## DETAILS AND DIMENSIONS



### WARNING

ELECTRICAL AND GROUNDING CONNECTIONS MUST  
COMPLY WITH THE APPLICABLE PORTIONS OF  
THE NATIONAL ELECTRICAL CODE AND/OR  
OTHER CODES IN FORCE

### NOTE

MACHINE WEIGHT (LESS BOWL)-----187 LBS  
SHIPPING WEIGHT-----202 LBS  
BOWL WEIGHT-----7-1/2 LBS

As continued product improvement is a policy of Hobart, specifications are subject to change without notice.

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1-888-4HOBART • www.hobartcorp.com**LEGACY®  
HL200 MIXER****HOBART****STANDARD FEATURES**

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- Single Point Bowl Installation
- Ergonomic Swing-Out Bowl
- #12 Taper Attachment Hub
- Open Base
- Stainless Steel Bowl Guard
- Metallic Gray Hybrid Powder Coat Finish

**ACCESSORY PACKAGES - featuring Hobart Quick Release™ Agitators**

- Deluxe Accessory Package Includes:**
  - 20 Quart Stainless Steel Bowl
  - 20 Quart "B" Beater
  - 20 Quart "D" Wire Whip
  - 20 Quart Bowl Scraper
  - 20 Quart Ingredient Chute
- Standard Accessory Package Includes:**
  - 20 Quart Stainless Steel Bowl
  - 20 Quart "B" Beater
  - 20 Quart "D" Wire Whip

**MODELS**

- HL200 – 20-Quart All Purpose Mixer
- HL200C – 20-Quart All Purpose Mixer with Maximum Security Correctional Package

**OPTIONS**

- SmartPlus2™ Programmable Recipe Timer

Specifications, Details and Dimensions on Inside and Back.

**LEGACY® HL200 MIXER**

# LEGACY® HL200 MIXER

# HOBART

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## SOLUTIONS/BENEFITS

### ½ H.P. Motor

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- Ensures consistent performance and minimum downtime under heavy loads

### Three Fixed Speeds plus Stir Speed

#### Flexibility, Reliability, Consistency

- For incorporating, blending, mixing ingredients
- Supports consistent results and thorough mixing

### Shift-on-the-Fly™ Controls

#### Flexibility

- Allows operator to change speeds while mixer is running

### Patented soft start Agitation Technology

#### Sanitation

- Each speed has a soft transition into a higher speed to reduce the chances of product splash-out

### 15-Minute SmartTimer™

#### Convenience, Ease of Use, Consistency

- Supports recipe mixing times
- Provides accurate results and eliminates overmixing

### Automatic Time Recall

#### Productivity, Consistency

- Remembers the last time set for each speed
- Great for multiple batches

### Ergonomic Swing-Out Bowl

#### Ease of Use, Convenience

- Easy loading and unloading of products
- Single Point Bowl Installation allows for simple mounting and removal of bowl
- Bowl Interlock ensures mixer bowl is properly in place for mixer to operate

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#### Protection

- Safety interlock prevents operation when front portion of guard is out of position

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Recommended Maximum Capacities - dough capacities based on 70°F. water and 12% flour moisture.

PRODUCT	AGITATORS SUITABLE FOR OPERATION	HL200
CAPACITY OF BOWL (QTS. LIQUID)		20
Egg Whites	D	1 qt.
Mashed Potatoes	B & C	15 lbs.
Mayonnaise (Qts. of Oil)	B or C or D	10 qts.
Meringue (Qts. of Water)	D	1½ pts.
Waffle or Hot Cake Batter	B	8 qts.
Whipped Cream	D or C	4 qts.
Cake, Angel Food (8-10 oz. cake)	C or I	15
Cake, Box or Slab	B or C	20 lbs.
Cake, Cup	B or C	20 lbs.
Cake, Layer	B or C	20 lbs.
Cake, Pound	B	21 lbs.
Cake, Short (Sponge)	C or I	15 lbs.
Cake, Sponge	C or I	12 lbs.
Cookies, Sugar	B	15 lbs.
Dough, Bread or Roll (Lt.-Med.) 60% AR	§ ED	25 lbs.□
Dough, Heavy Bread 55% AR	§ ED	15 lbs.□
Dough Pie	B & P	18 lbs.
Dough, Thin Pizza 40% AR (max. mix time 5 min.)	§‡ ED	9 lbs.□
Dough, Med. Pizza 50% AR	§‡ ED	10 lbs.□
Dough, Thick Pizza 60% AR	§‡ ED	20 lbs.□
Dough, Raised Donut 65% AR	ED	9 lbs.*
Dough, Whole Wheat 70% AR	ED	20 lbs.□
Eggs & Sugar for Sponge Cake	B & C or I	8 lbs.
Icing, Fondant	B	12 lbs.
Icing, Marshmallow	C or I	2 lbs.
Shortening & Sugar, Creamed	B	16 lbs.
Pasta, Basic Egg Noodle (max. mix time 5 min.)	ED	5 lbs.

NOTE: % AR (% Absorption Ratio) - Water weight divided by flour weight. Capacity depends on moisture content of dough. Above capacities based on 12% flour moisture at 70°F water temperature.

□ 1st Speed

\* 2nd Speed

‡ 3rd Speed

§ If high gluten flour is used, reduce above dough batch size by 10%.

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½ H.P. high torque motor.

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200-240/50/60/1 5.0 Amps**ELECTRICAL:**

100-120/50/60/1, 200-240/50/60/1 – UL Listed.

**CONTROLS:**

Magnetic contactor with thermal overload protection. Internally sealed “Start-Stop” push buttons. A 15-minute SmartTimer™ is standard. SmartTimer™ includes **Automatic Time Recall**, which remembers the last time set for each speed. Optional SmartPlus2™ Programmable Recipe Timer allows operators the ability to program up to 4 recipes with 5 steps per recipe. SmartPlus2™ automatically changes speeds and starts timer count-down without operator intervention.

**TRANSMISSION:**

Gear-driven. Gears are constant mesh heat-treated hardened alloy steel along with anti-friction ball bearings. Grease lubricants furnished to all gears and shafts.

**SPEEDS:**

	Agitator (RPM)	Attachment (RPM)
Stir	59	33
First (Low)	107	61
Second (Intermediate)	198	113
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**BOWL LIFT:**

Ergonomic style, hand crank operated, self-locking in top and bottom position.

**FINISH:**

Metallic Gray Hybrid Powder Coat finish.

**ATTACHMENT HUB:**

Comes with front-mounted Hobart standard #12 taper attachment hub for use with Hobart #12 size attachments.

**ATTACHMENTS AND ACCESSORIES:**

The following are available at extra cost:

Stainless Steel Bowl  
“B” Flat Beater  
“C” Wing Whip  
“D” Wire Whip  
“E” Dough Hook  
“ED” Dough Hook  
“P” Pastry Knife  
Bowl Splash Cover  
Bowl Scraper  
Ingredient Chute  
12 Quart Accessories  
9" Vegetable Slicer  
Meat Chopper Attachment  
Rubber Foot Pads  
Attachment Tray Support

**Hobart Bowl Scraper****Hobart Ingredient Chute**

Listed by Underwriters Laboratories Inc. and certified by NSF International.

# LEGACY® HL200 MIXER

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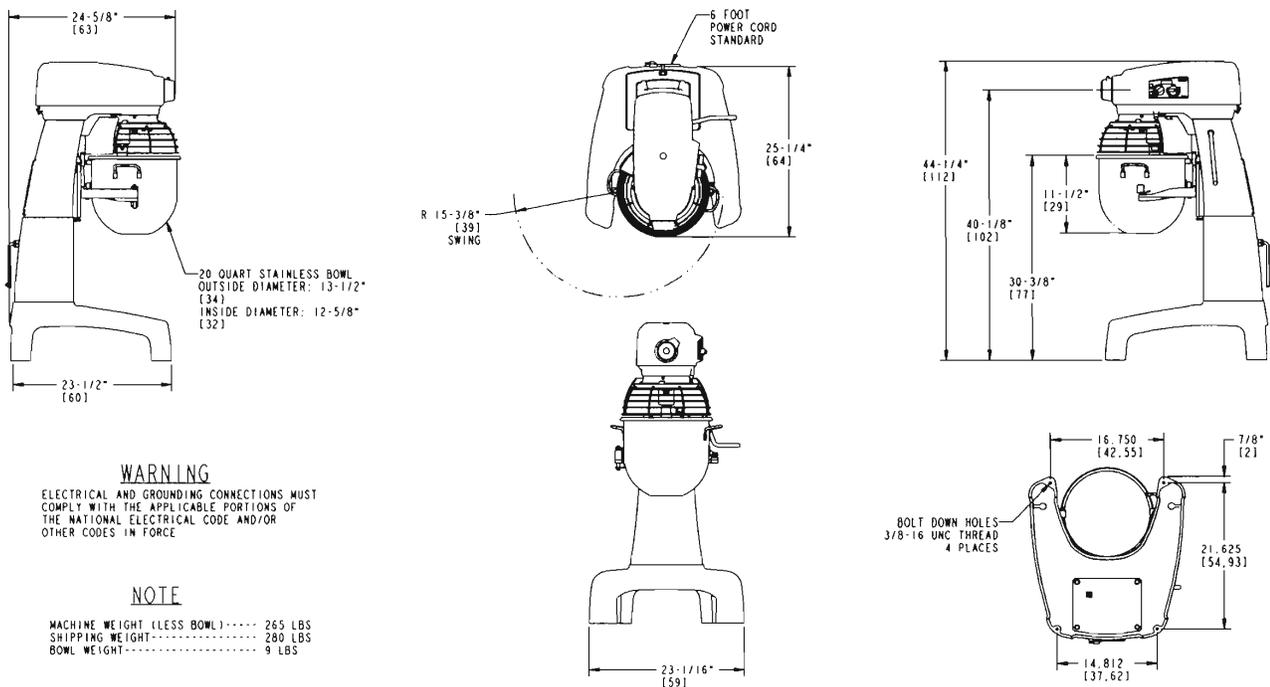
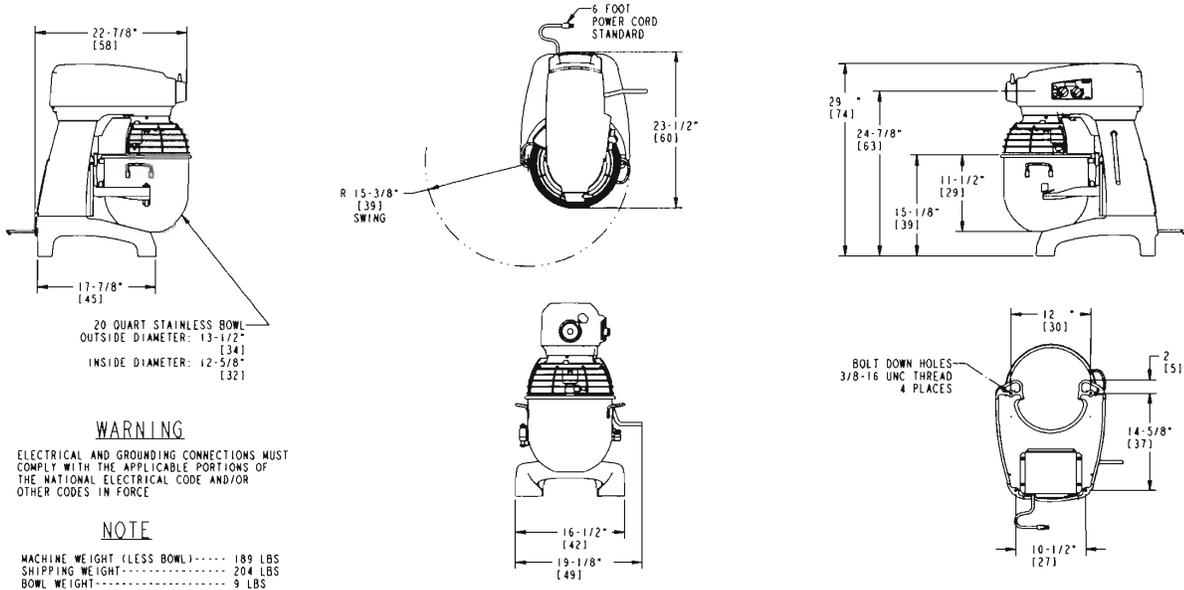
## SPECIFICATIONS

**ELECTRICAL SPECIFICATIONS:** 100-120/50/60/1,  
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**WARRANTY:** Unit has full one-year warranty on  
parts, labor and mileage against manufacturer's  
defects. Service contracts are available.

## DETAILS AND DIMENSIONS



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**SECTION 3**

**SERVICE MANUAL**

**HOBART LEGACY**

**12 & 20 QUART MIXERS**

**MODELS HL120 & HL200**





SERVICE

# SERVICE MANUAL



9969

## Legacy™

HL120            ML-134296

HL200           ML-134289

**- NOTICE -**

This Manual is prepared for the use of trained Hobart Service Technicians and should not be used by those not properly qualified. If you have attended a Hobart Service School for this product, you may be qualified to perform all the procedures described in this manual.

This manual is not intended to be all encompassing. If you have not attended a Hobart 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 Hobart Service Technician.

Reproduction or other use of this Manual, without the express written consent of Hobart, is prohibited.

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# GENERAL

## INTRODUCTION

The HL120 and HL200 mixers utilize a timer board with digital display for the operator interface; and electronic motor drive to control the operation of the mixer.

The timer board allows the operator to select the desired mix time and mix speed for the product. The electronic motor drive stores the last selected mix time for each speed setting. Continuous mixing with count up timing is also available when the Hold Mode is selected.

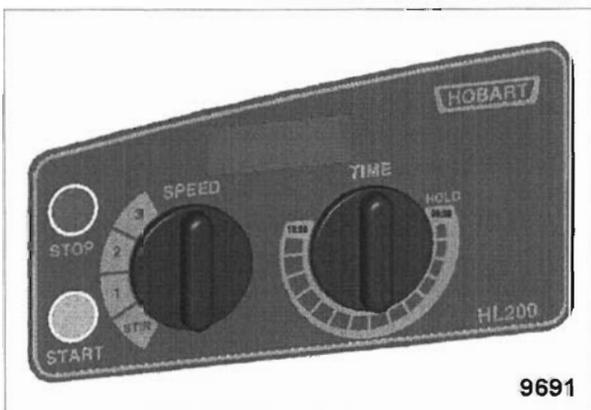
The HL200 models are available with a programmable recipe timer board. A mixer with the recipe timer board allows for the same operation but includes a programming option for the operator to store and retrieve up to four recipes with five steps each (various mix speeds & times).

The electronic motor drive provides high torque variable speed output from the motor to fixed ratio drive gears. By utilizing the motor drive technology, agitator speed is controlled electronically which permits changing mixing speeds anytime during mixer operation.

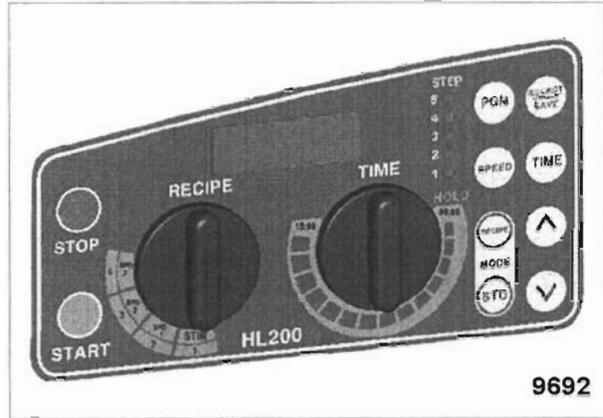
## REFERENCE MATERIAL

- Catalog of Replacement Parts - F43101.
- Instruction Manual for Installation, Operation and Care - F34922.
- Lubrication Manual for current lubricants and quantities - F20067.
- Use and Applications Handbook - F34901.
- Mixer Capacity Chart - All Models - F7701.

## TIMER OPTIONS



STANDARD TIMER BOARD



RECIPE TIMER BOARD

## SPECIFICATIONS

ELECTRICAL DATA		
VOLTAGE*	120/60/1	240/60/1
AMPS	8.0	5.0
MIXER	0.5 H.P.	0.5 H.P.
MOTOR	1.5 HP, 230V 3 phase	1.5 HP, 230V 3 phase

\*Tolerance +/- 10%

OPERATING SPEEDS AND RPM				
Model	Speed	Planetary	Beater	Attachment
HL120	STIR	25	59	33
	1	46	104	61
	2	84	194	111
	3	154	353	205
HL200	STIR	25	59	33
	1	46	107	61
	2	86	198	113
	3	156	366	208

BOWL SIZE	
HL120	12 qt. bowl
HL200	20 qt. bowl

MIXER TORQUE VALUES	
Component	Torque
Base to Pedestal	372-465 in*lb
Transmission Case to Pedestal	372-465 in*lb
Slideways to Pedestal	65 in*lbs
Internal Gear to Transmission Case	65 in*lbs
Transmission Cover Bolts	65 in*lbs
Motor to Transmission Case	24-30 in*lbs
Bottom Planetary Nuts (acorn & shaft nut)	372-465 in*lbs
Top Planetary Shaft Nut	372-465 in*lbs
Planetary Spacer Screws (bowl scraper mounting)	65 in-lbs

MOTOR DRIVE TORQUE VALUES		
Location	Screw Size	Torque
Main Circuit Screws: L1/L, L2/N, GND; U, V & W	M3.5	10.5 in*lb
Control Circuit Screws: Y1, Y1E, PLC, X1, X2, X3 11, 12, 13, FWD, & CM	M2	1.8 in*lb
Control Circuit Screws: 30B & 30C	M2.5	3.5 in*lb

**LUBRICATION**

Component	Lubrication	Quantity
Transmission Case	Mobilith AW- 2 grease	27 oz.
Planetary	Chevron FM EP-2 grease	Coat beater pinion
Planetary Casting Void (area between agitator shaft bearings)	Chevron FM EP-2 grease	2/3 full
Internal Gear	Chevron FM EP-2 grease	Coat
Motor bearings	Pre-lubricated	---
Slideways	Lubriplate 630-AA	Light coat mating surfaces
Beater Shaft Bearings	Pre-lubricated	—

**TOOLS**

**Standard**

- Standard set of hand tools.
- Digital Multi-meter (DMM) with sensitivity of at least 20,000 ohms per volt.
- Clamp-on ammeter

**Special**

- Loctite 7471 primer Part No. 544434-2. Used to accelerate the cure of Loctite 242.
- Loctite 242 Part No. 520228. Used to secure acorn nut to planetary shaft threads.
- Permatex #2 Part No. 508462. Used to seal cover to transmission case.
- RTV 732 Dow clear silicone Part No. 513886 or equivalent. Used to secure bowl guard switch to switch holder.
- Drive Bleeder Tool Part No. 874561 (wire wound resistor in PVC housing with probes). Used to bleed down motor drive bus circuit voltage.
- Field service grounding kit Part No. TL-84919.
- Puller set Part No. 528347 or equivalent. Used to remove bearings from shafts.
- 1/4-20 x 2.0" long bolts (2) required (full thread, hardened preferred). Used as jack screws to lift transmission cover.
- Torque wrench capable of measuring up to 470 in\*lb.
- Thin 3/4" wrench (2) required Part No. TL-17229-1 or equivalent. Used on planetary shaft nut and acorn nut.

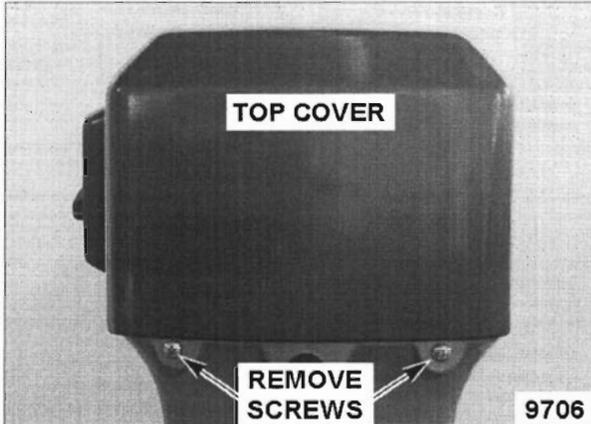
# COVERS

## TOP COVER



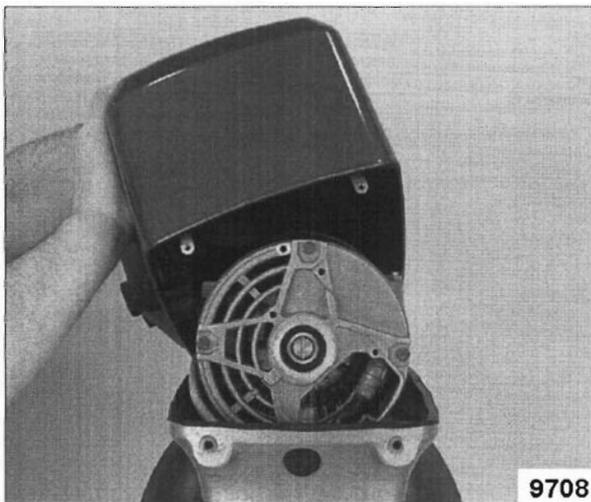
**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

1. Remove attachment hub thumb screw.
2. Remove top cover screws.

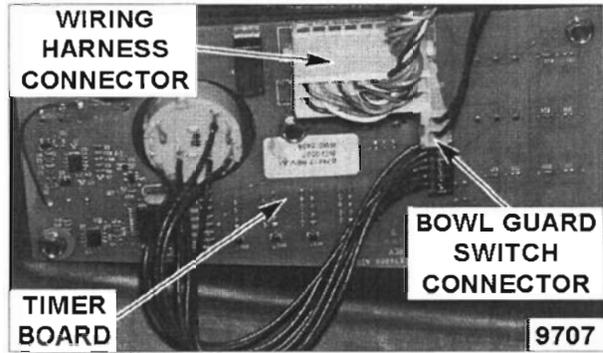


**NOTE:** When removing, raise top cover slowly and ensure timer board wiring does not catch on transmission case and become disconnected or damaged. After top cover is removed, support the cover to relieve strain on timer board wiring.

3. Raise top cover at the rear and tilt to the left to clear transmission case; continue raising top cover to clear motor then push cover forward to clear attachment hub.



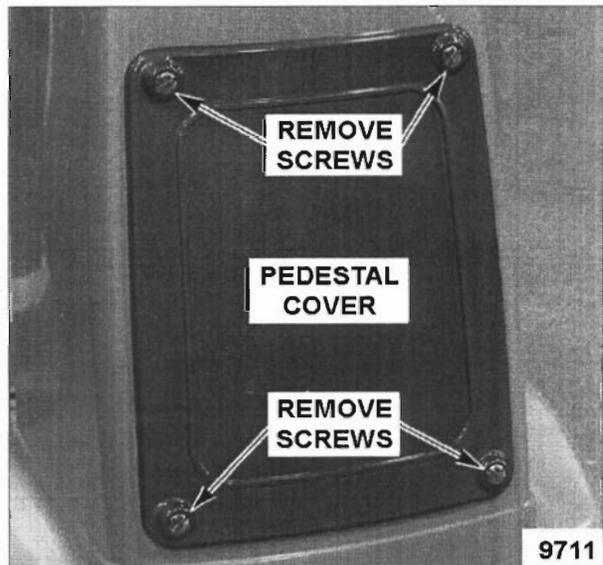
4. Disconnect bowl guard switch and wiring harness connectors from timer board.



5. Reassemble in reverse order and check for proper operation.

## PEDESTAL COVER

1. Remove pedestal cover.



2. Reassemble in reverse order.

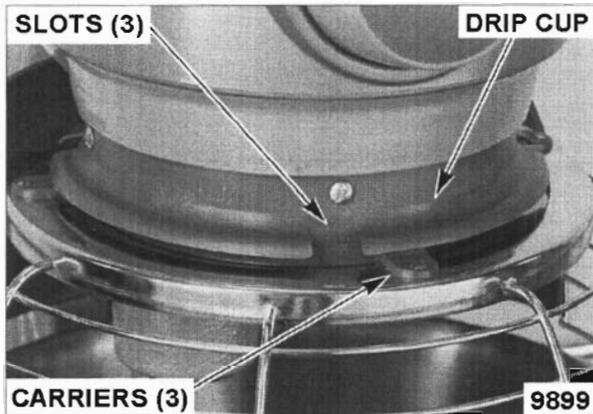
# BOWL GUARD ASSEMBLY

## REMOVAL AND REPLACEMENT

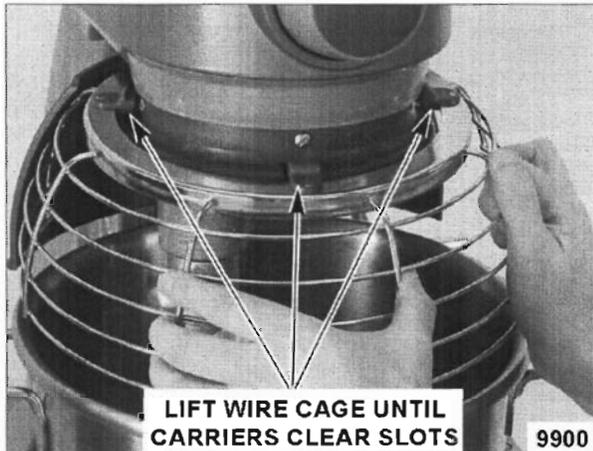


**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

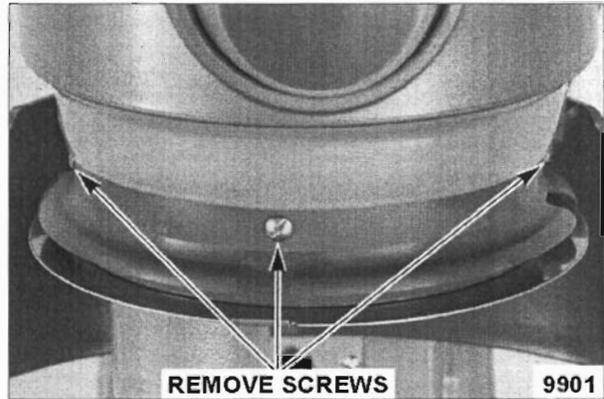
1. Rotate wire cage until the three carriers align with slots in drip cup.



- A. Lift wire cage until carriers clear the slots and remove cage.



2. Lower bowl support and remove agitator.
3. Remove drip cup.



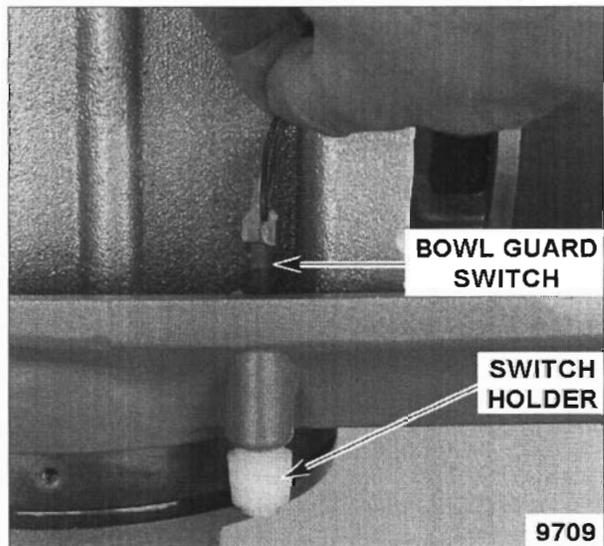
4. Reassemble in reverse order and check for proper operation.

## BOWL GUARD SWITCH - 1LS



**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

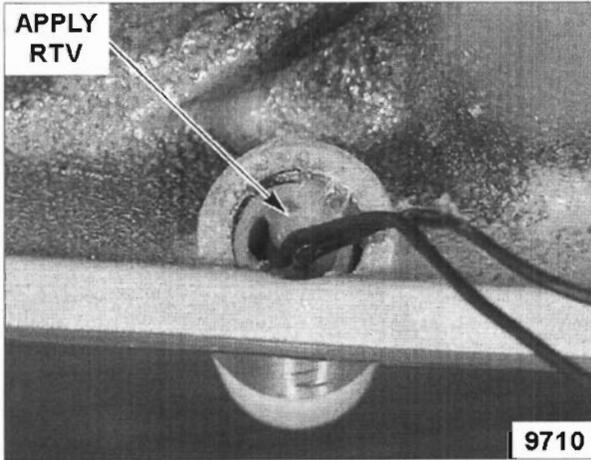
1. Remove TOP COVER.
2. Pull bowl guard switch by the lead wires to remove from switch holder.



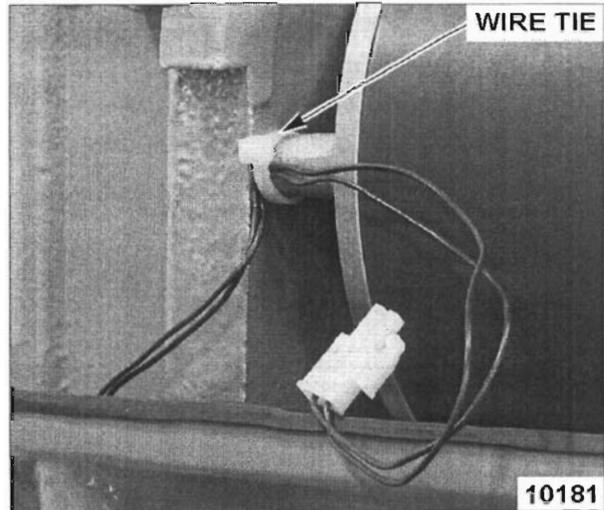
**NOTE:** Bowl guard switch is inserted into switch holder and held in place with a light application of RTV.

3. Remove mounting nuts from replacement bowl guard switch barrel and discard the nuts.

4. To install:
  - A. Check the switch holder for loose debris in the bottom and remove debris.
  - B. Insert bowl guard switch into switch holder. Ensure the switch is fully inserted.
  - C. Apply a bead of RTV 732 at the top of bowl guard switch to secure the switch to the switch holder.



- D. Secure bowl guard switch lead wires to motor post.



5. Install top cover and check for proper operation.

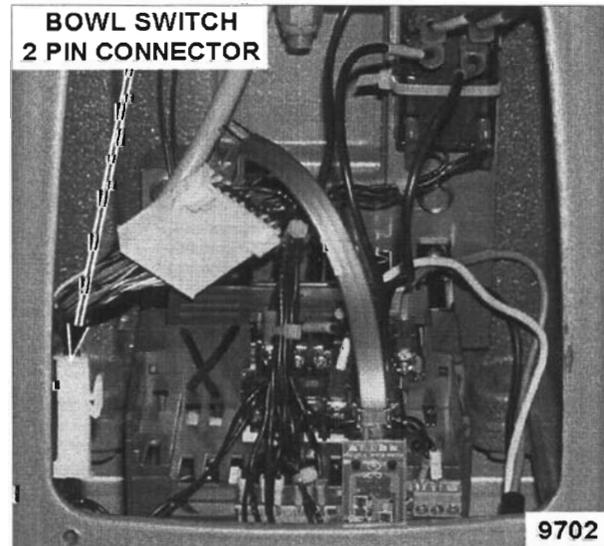
## BOWL SWITCH - 2LS

### REMOVAL

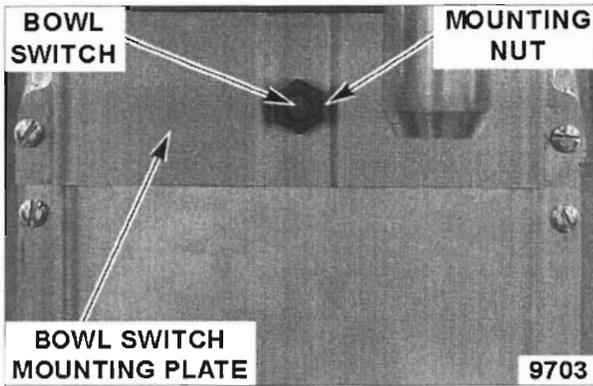


**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

1. Lower bowl, unlock and swing out of way.
2. Remove PEDESTAL COVER.
3. Disconnect bowl switch at 2 pin connector.



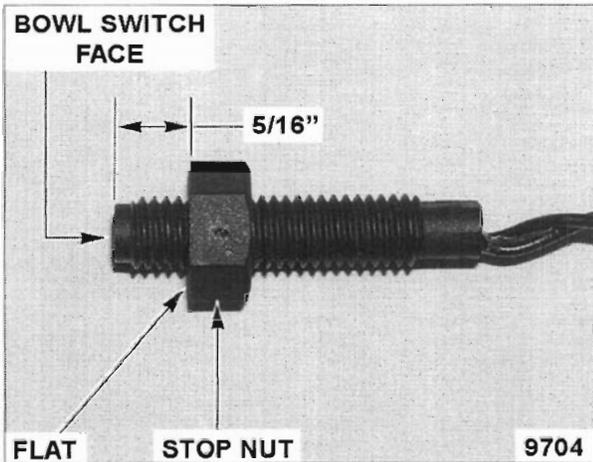
4. Remove mounting nut securing bowl switch to bowl switch mounting plate.



5. Remove bowl switch thru pedestal opening.

### INSTALLATION

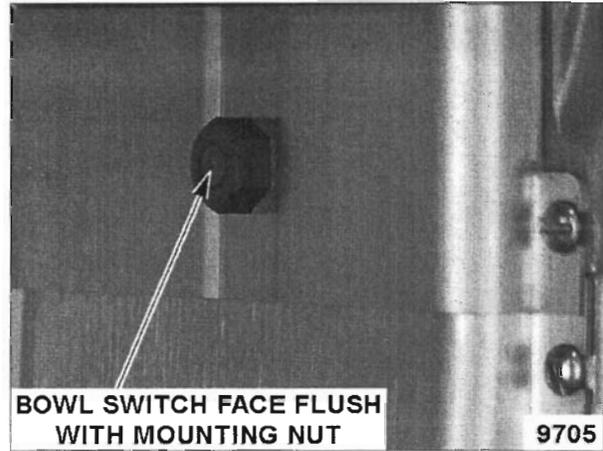
1. Position stop nut with the flat pointing away from bowl switch face. Thread nut onto bowl switch barrel approximately 5/16".



2. Insert bowl switch thru the opening in bowl switch mounting plate. Position mounting nut with the flat pointing toward switch face and secure the bowl switch with mounting nut.
3. Tighten mounting nut by hand. Only tighten enough to prevent bowl switch movement.

**NOTE:** Do not over tighten mounting nut or damage to the bowl switch may occur.

4. Verify bowl switch face is flush with mounting nut.
  - A. If adjustment is necessary



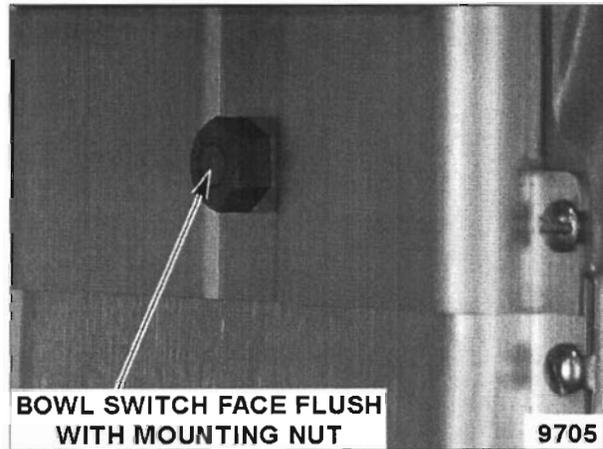
5. Connect bowl switch.

**NOTE:** Secure bowl switch lead wires to wiring harness to ensure bowl lift rod does not interfere with lead wires.

6. Install PEDESTAL COVER and check for proper operation.

### ADJUSTMENT

1. Loosen mounting nut
2. Position stop nut on bowl switch barrel to allow the face of the bowl switch to be flush with mounting nut.
3. Tighten mounting nut.



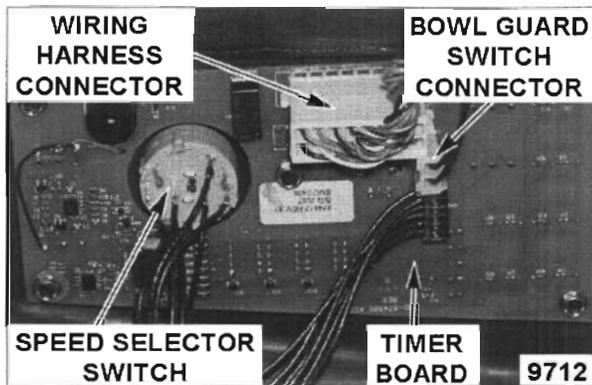
# TIMER BOARD



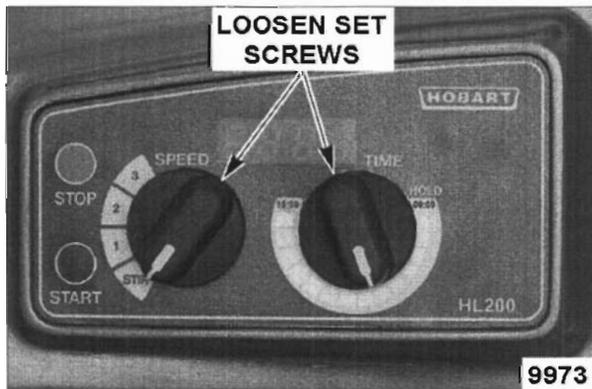
**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

**CAUTION:** Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service grounding kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

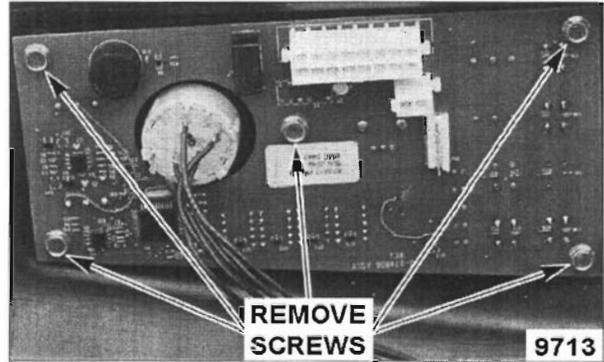
1. Remove TOP COVER.
2. Disconnect bowl guard switch, speed selector switch and wiring harness connectors from timer board.



3. Loosen set screws then pull knobs from shafts.



4. Remove timer board.



5. Reassemble in reverse order and check for proper operation.

**NOTE:** When installing, do not over tighten mounting screws or damage to the timer board may occur.

# SPEED SELECTOR SWITCH



**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

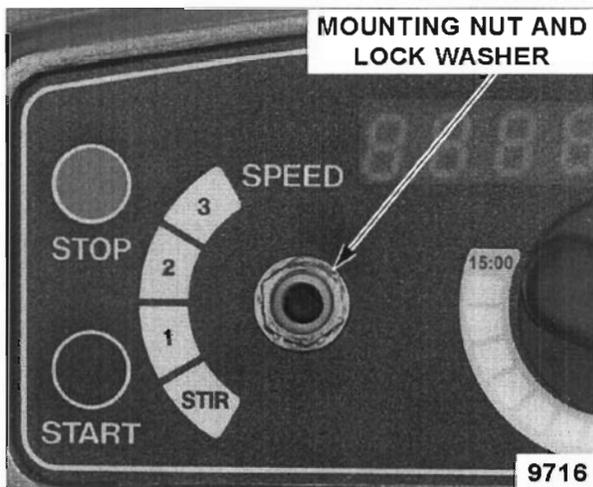
**CAUTION:** Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service grounding kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

## REMOVAL AND REPLACEMENT

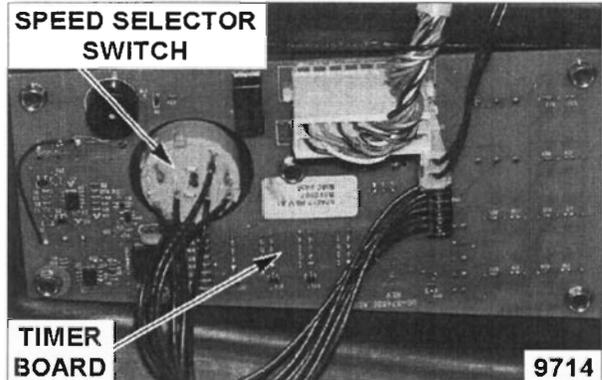
1. Loosen set screw then pull knob from shaft.



2. Remove mounting nut and lock washer.



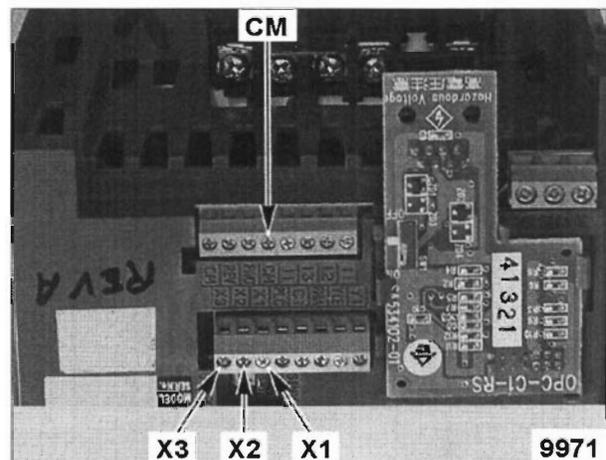
3. Remove TOP COVER.
4. Disconnect speed selector switch from timer board.



5. Reassemble in reverse order and check for proper operation.

## SPEED SELECT SWITCH TEST

**NOTE:** This test will check the speed selector switch thru the timer board and wiring harness connections to the motor drive control circuit terminals X1, X2 and X3 (recipe timer only) to CM.



1. Access motor drive terminal block.
2. Set meter to measure continuity or resistance ( $\Omega$ ).

- A. Check continuity between X1, X2 and X3 (recipe timer only) to CM as shown in the table below for the selected speed.

SPEED	X1 to CM	X2 to CM	X3 to CM*
Stir	Open	Open	Closed
Speed 1	Closed	Open	Closed
Speed 2	Open	Closed	Closed
Speed 3	Closed	Closed	Closed

\*X3 on recipe timer control only.

- 1) If readings agree then the speed selector switch and the connections are functioning properly.
- 2) If readings do not agree then check the speed selector switch, wiring harness connections and terminal connections at the motor drive.

## MOTOR DRIVE

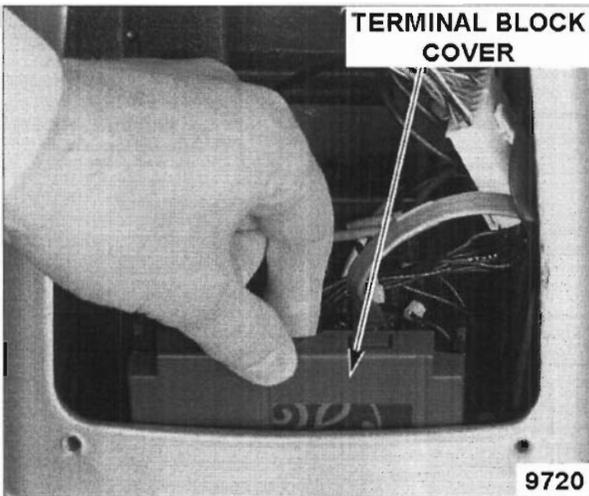


**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

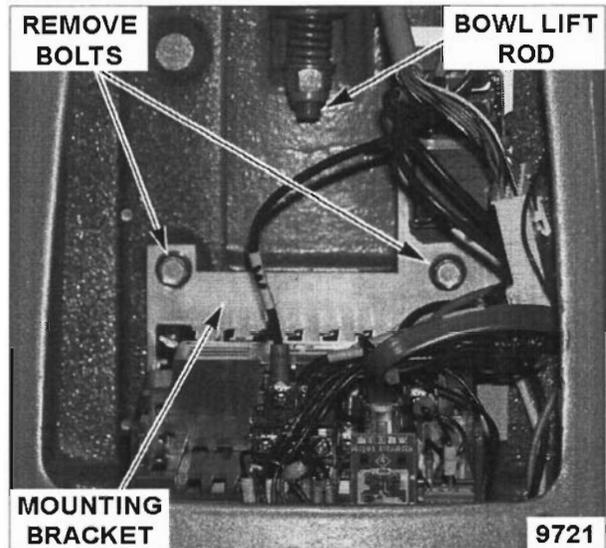
**CAUTION:** Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service grounding kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

### REMOVAL AND REPLACEMENT

1. Remove PEDESTAL COVER.
2. Pull terminal block cover from motor drive to disengage snap catch then remove cover.



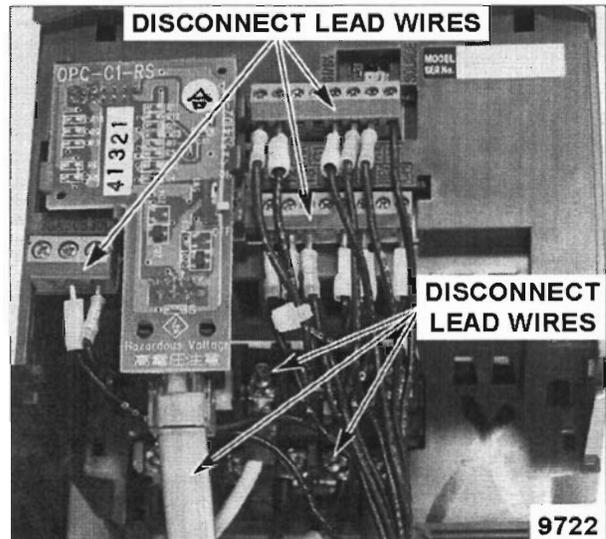
3. Raise the bowl to move bowl lift rod away from motor drive mounting bracket for removal clearance.
4. Perform BUS VOLTAGE BLEED DOWN.
5. Remove bolts securing motor drive mounting bracket to pedestal.



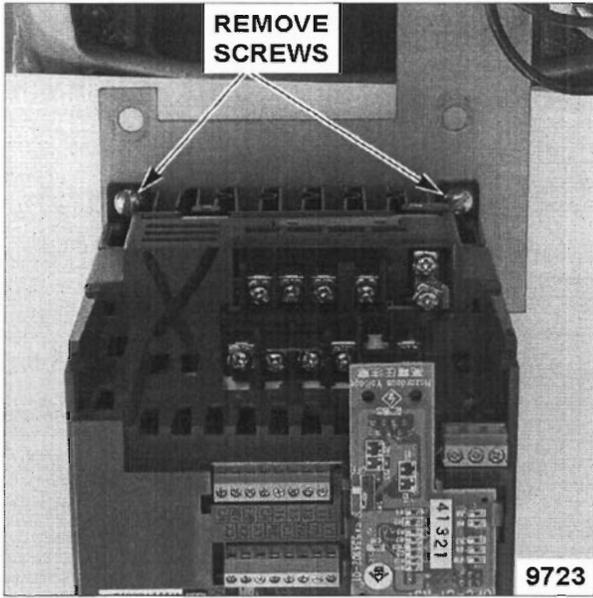
- A. To remove, lift motor drive assembly up into the pedestal then tilt the bottom of the assembly out to clear pedestal opening.

6. Disconnect lead wires from motor drive.

**NOTE:** Refer to MOTOR DRIVE TORQUE VALUES for proper tightening of terminal screws.



7. Remove screws securing motor drive to mounting bracket.



8. Reassemble in reverse order and check for proper operation.

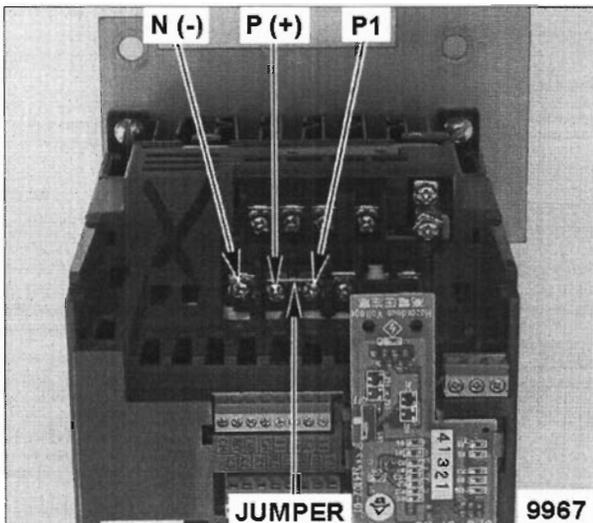
### BUS VOLTAGE BLEED DOWN



**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

**WARNING:** WAIT ONE MINUTE FOR THE CAPACITIVE BUS VOLTAGE TO BLEED DOWN.

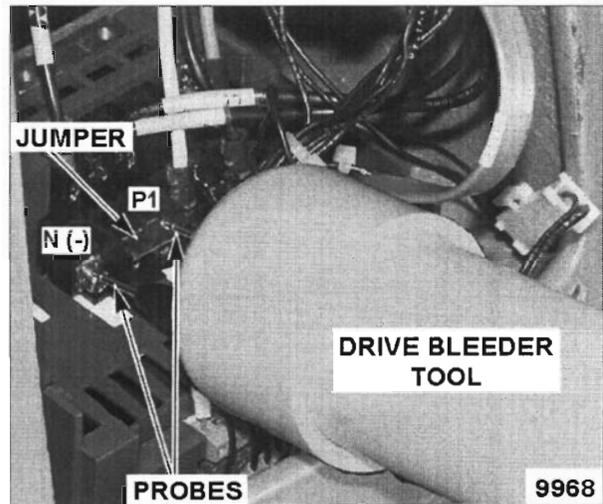
1. Remove PEDESTAL COVER.
2. Remove MOTOR DRIVE terminal block cover.
3. Set DMM to DC voltage.



- A. Measure bus voltage across P (+) & N (-) terminals on motor drive to ensure the voltage is below 50VDC.
- B. If bus voltage is higher than 50VDC:
  - 1) Verify jumper is in place between terminals P (+) and P1 on motor drive.

**NOTE:** Terminal spacing on motor drive does not permit the drive bleeder tool to connect with terminals P (+) & N (-) for bleed down. However, with the jumper connecting P (+) and P1 the same voltage potential exists at both terminals.

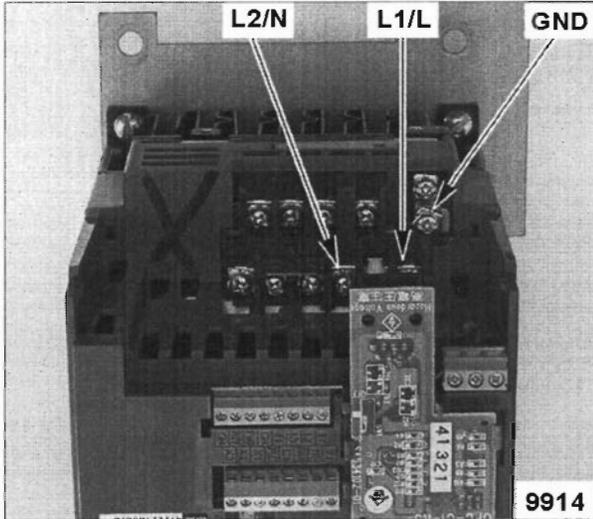
- 2) Place drive bleeder tool across the jumper at P1 & N (-) terminal for at least one minute to discharge the bus circuit.



4. Remove drive bleeder tool.
5. Recheck bus voltage with meter. If necessary, bleed bus circuit until voltage is below 50 VDC.

## BUS VOLTAGE TEST

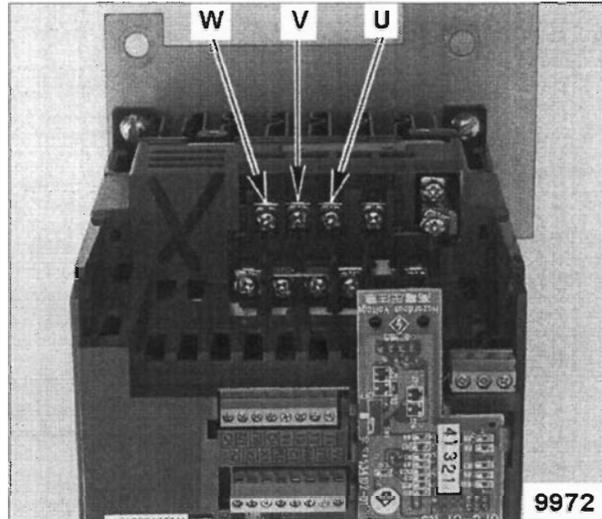
1. Remove PEDESTAL COVER.
2. Remove MOTOR DRIVE terminal block cover.
3. Verify input voltage to motor drive at terminals L1/L & L2/N. Check data plate for correct voltage.



- A. If not correct, see TROUBLESHOOTING.
- B. If correct, proceed to next step.
4. Perform BUS VOLTAGE BLEED DOWN.
5. Set DMM to DC voltage.
  - A. Connect BLK meter lead on N (-) and RED meter lead on P (+) terminals of motor drive.
6. Connect power.
  - A. The DC voltage reading of the meter should be approximately 340VDC. The acceptable DC bus voltage range is 256VDC to 372VDC.
7. Start mixer in Stir (lowest speed) with no load in bowl.
  - A. Repeat procedure operating the mixer in each speed with no load in bowl.

## MOTOR DRIVE INTERNAL RESISTANCE TEST

1. Perform BUS VOLTAGE BLEED DOWN.
2. Disconnect lead wires from motor drive terminals U, V & W.
3. Measure resistance (ohms) between motor drive terminals U, V & W.



- A. If resistance measured is below 1 MΩ, replace motor drive.

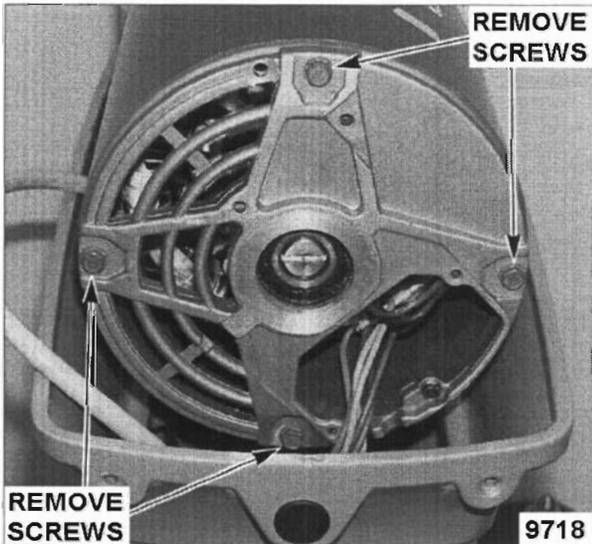
# MOTOR



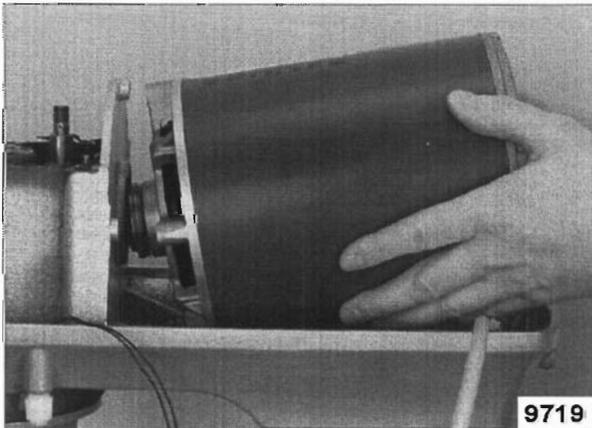
**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

## REMOVAL AND REPLACEMENT

1. Remove TOP COVER and PEDESTAL COVER.
2. Disconnect motor lead wires:
  - A. T1 & T2 from 1CR 6 & 2.
  - B. T3 from motor drive terminal W.
3. Remove motor mounting screws.

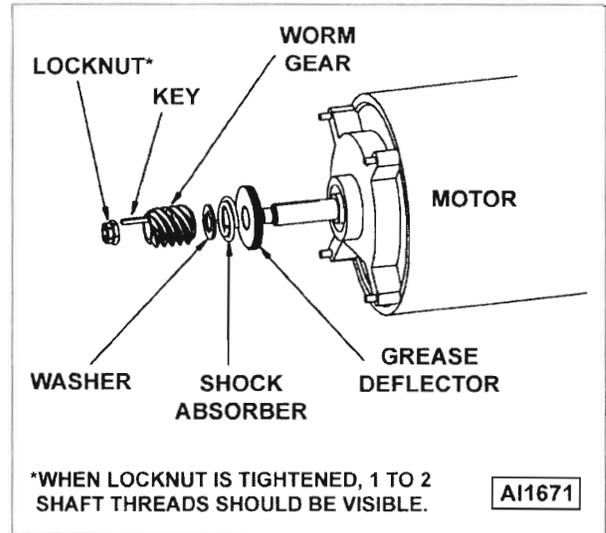


4. Pull motor from transmission case.



- A. Remove locknut from motor shaft then remove the worm gear assembly parts.

5. To Install:
  - A. Install worm gear assembly parts onto motor shaft and secure with locknut.



- B. Coat worm gear with Mobilith AW-2 grease.
  - C. Position motor with lead wires down and install motor to transmission case. Tighten motor mounting screws in an alternating pattern to 24-30 in\*lb of torque.
  - D. Turn motor shaft manually (opposite drive end) to ensure it rotates freely.
6. Connect motor lead wires.
  7. Check for proper operation.

**MOTOR CURRENT**

**NOTE:** Because of the nature of electronic motor drive technology (variable switching frequencies), accurate output voltage measurements from the motor drive to the motor cannot be made with a standard DMM or analog VOM.

**NOTE:** Motor current draw is not the same as the line service current draw of the mixer.

For checking current draw of each phase of the motor, use a clamp-on ammeter.

1. Press stop.
2. Remove TOP COVER.
3. Select the speed setting of Stir and press start.
4. Measure current on each phase of the motor lead wires. Use the motor wiring table to identify motor lead wires.

MOTOR WIRING		
Motor Lead Wires Marked	Wire Color	Motor Drive Terminals
T1	BLU	U (thru 1CR 8/6)
T2	BRN	V (thru 1CR 4/2)
T3	ORG	W (1MTR to terminal)

5. Repeat procedure for all mixer speeds.
  - A. Current may vary between phases but should be balanced. If current draw on any phase is 5% higher or lower than the other phases, verify that the motor drive is properly wired.
    - 1) If wiring is correct, check motor winding resistance.
    - 2) If motor checks ok, replace motor drive.

**MOTOR WINDING RESISTANCE**

If unable to check current draw using the motor current test and the motor is suspect, check the motor winding resistance.

1. Perform BUS VOLTAGE BLEED DOWN.
2. Disconnect motor lead wires:
  - A. T1 & T2 from 1CR at terminals 2 & 6.
  - B. T3 from motor drive terminal W.
3. Measure resistance (ohms) between all three motor leads. Use the motor wiring table to identify motor lead wires.

Motor Lead Wires	Resistance (Ohms)*
T1-T2	2.14
T1-T3	2.14
T2-T3	2.14
* Resistance values at 77°F room ambient. Tolerance is ±10%.	

4. Measure resistance between motor leads and unpainted motor frame surface (ground).
  - A. If resistance measured is below 500K ohm, replace motor.

# PLANETARY



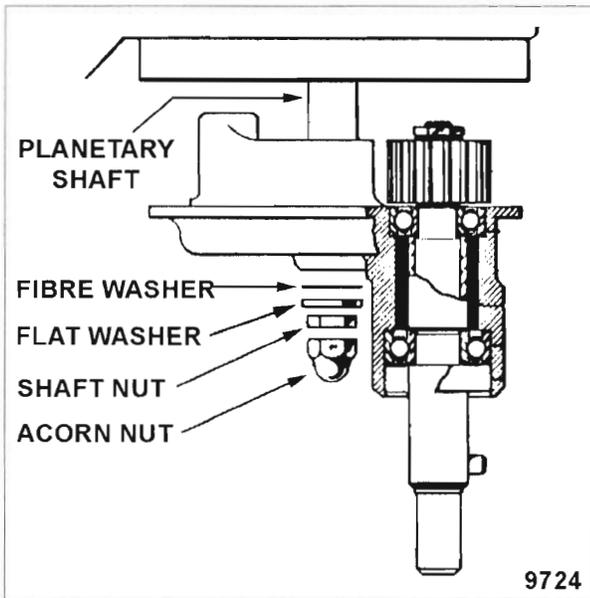
**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

## REMOVAL AND DISASSEMBLY

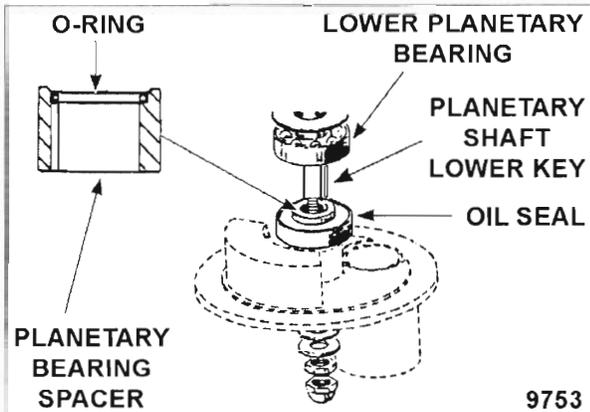
1. Remove wire cage and drip cup as outlined under BOWL GUARD ASSEMBLY.

**NOTE:** Support planetary when removing shaft nut from planetary shaft.

2. Remove nuts and washers from planetary shaft.

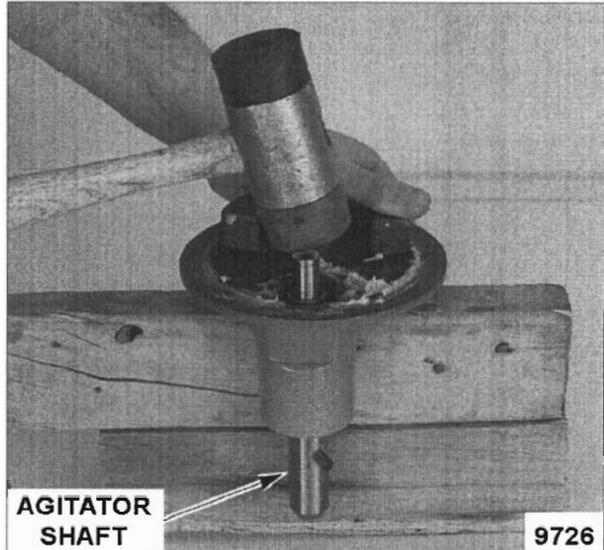


**NOTE:** When removing planetary, the planetary bearing spacer and planetary shaft lower key may come off planetary shaft. Retain these parts for use during assembly.



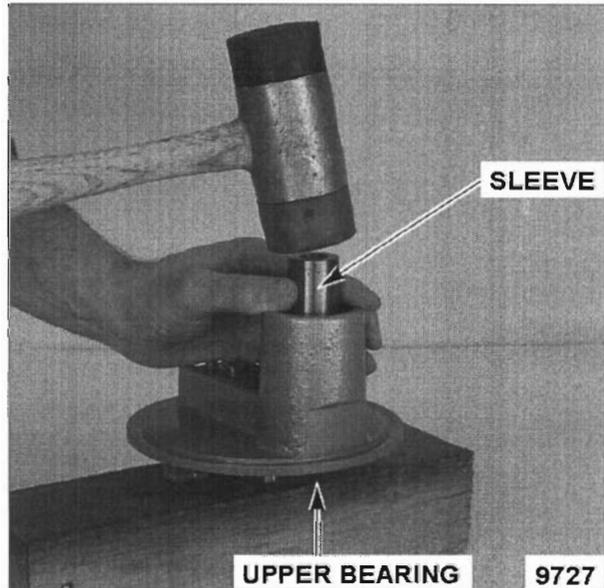
3. Remove retaining ring, beater pinion and key from agitator shaft.

4. Drive agitator shaft from planetary casting.

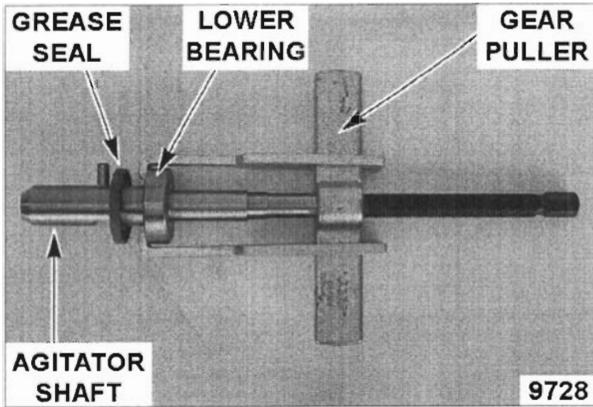


**NOTE:** When removing, an arbor press, soft face hammer or sleeve should be used to remove the bearings.

5. Drive upper bearing from planetary casting.



6. Pull lower bearing from agitator shaft then remove grease seal.

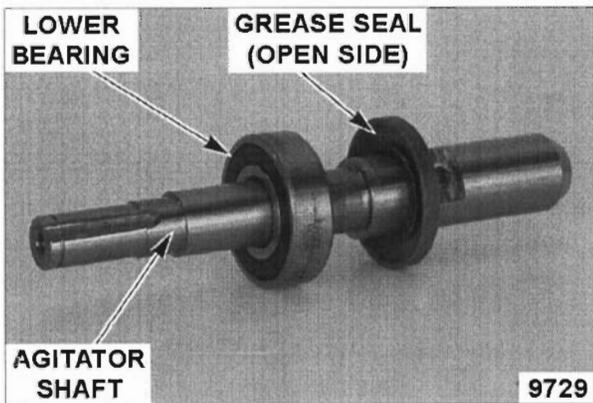


## ASSEMBLY AND INSTALLATION

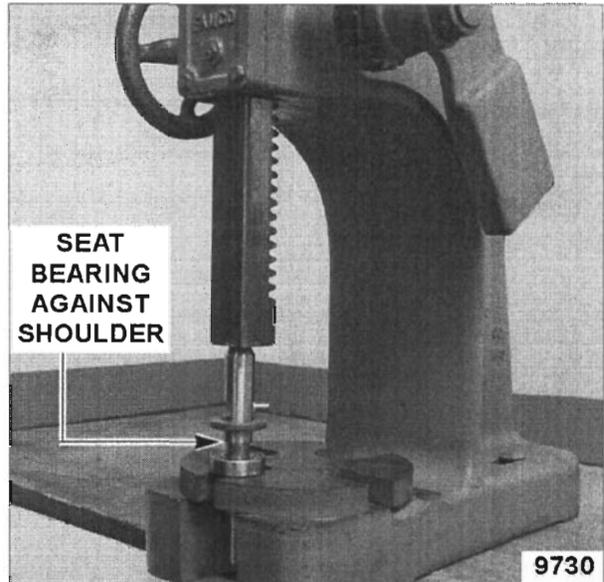
**NOTE:** Ensure all parts are clean before assembly. Remove old grease from parts being reused.

**NOTE:** Press bearings onto shaft at the inner race of the bearing until seated. Do not drive bearing onto shaft.

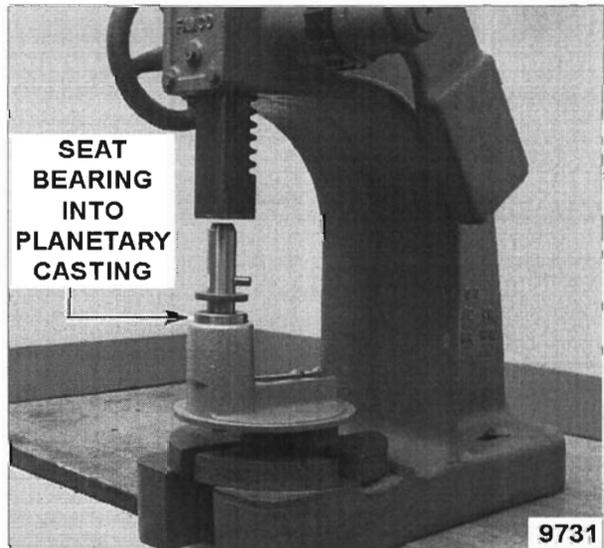
1. Slide grease seal and lower bearing onto agitator shaft.



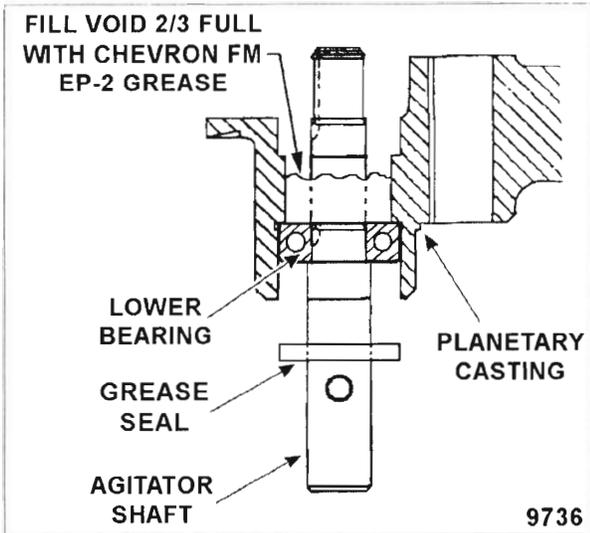
2. Press lower bearing onto agitator shaft until inner race of bearing seats against shoulder of agitator shaft.



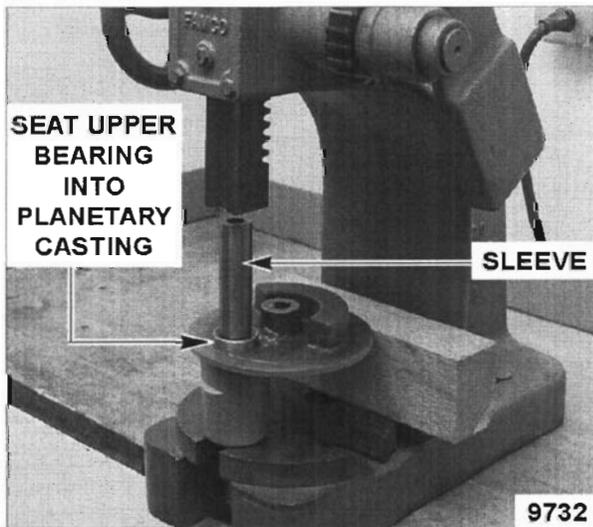
3. Press agitator shaft with lower bearing seated on the shaft into planetary casting until bearing seats against shoulder inside the casting.



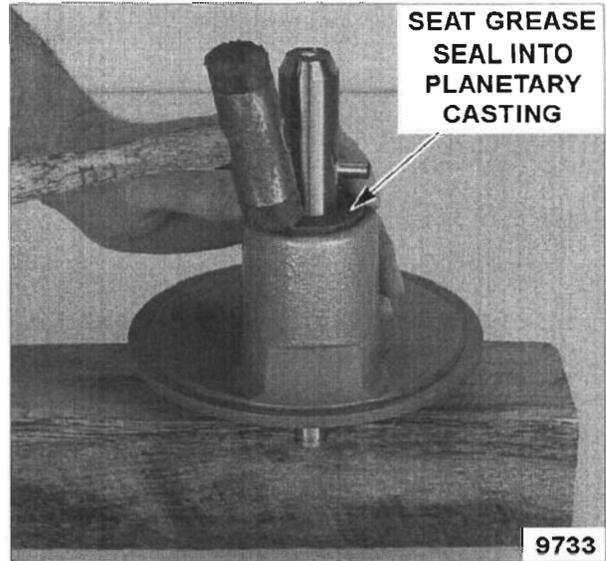
4. Fill planetary casting void 2/3 full with Chevron FM EP-2 grease.



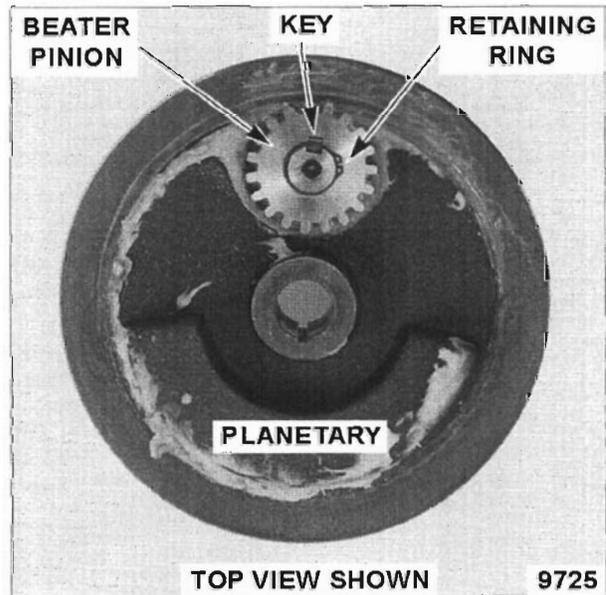
5. Press upper bearing into planetary casting until bearing seats against shoulder inside the casting.



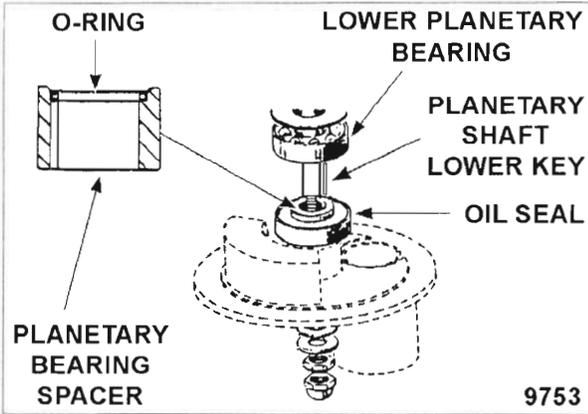
6. Install grease seal into planetary casting until the seal is flush with casting.



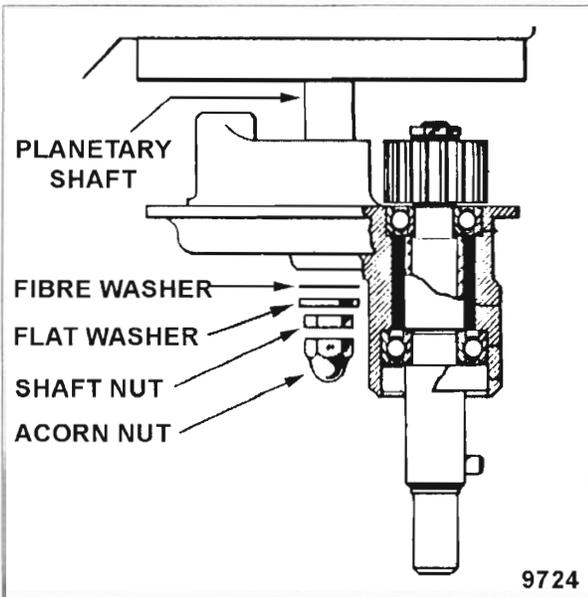
7. Insert key and install beater pinion onto agitator shaft with shoulder against upper bearing race then secure with retaining ring.



8. Coat beater pinion with Chevron FM EP-2 grease.
9. Verify planetary bearing spacer and planetary shaft lower key are installed on planetary shaft.



10. Thread shaft nut onto planetary shaft and tighten to 372-465 in\*lb of torque.
  - A. Apply Loctite 7471 primer to shaft threads then Loctite 242.
  - B. Thread acorn nut onto planetary shaft, hold the shaft nut in place then tighten acorn nut to the same torque as shaft nut.



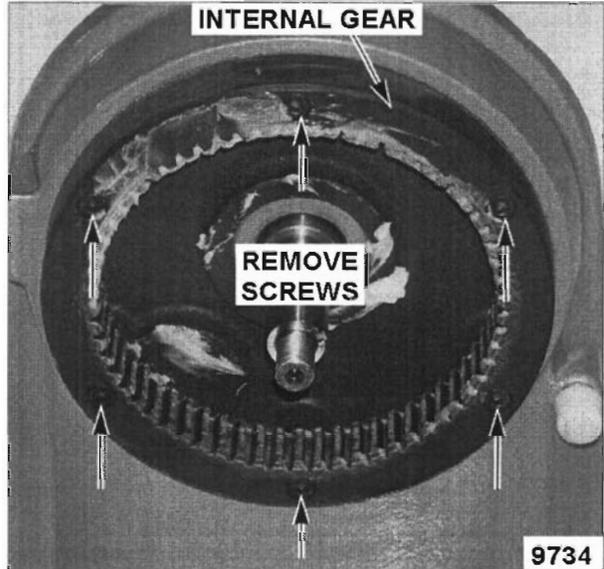
11. Check for proper operation.

## INTERNAL GEAR



**WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.**

1. Remove PLANETARY.
2. Remove internal gear from transmission case.



3. To Install:
  - A. Install internal gear with threaded holes for drip cup screws (3) to the front and sides of mixer. Tighten internal gear mounting screws in an alternating pattern to 65 in\*lb of torque.



- B. Coat internal gear with Chevron FM EP-2 grease.
4. Install PLANETARY.
5. Check for proper operation.

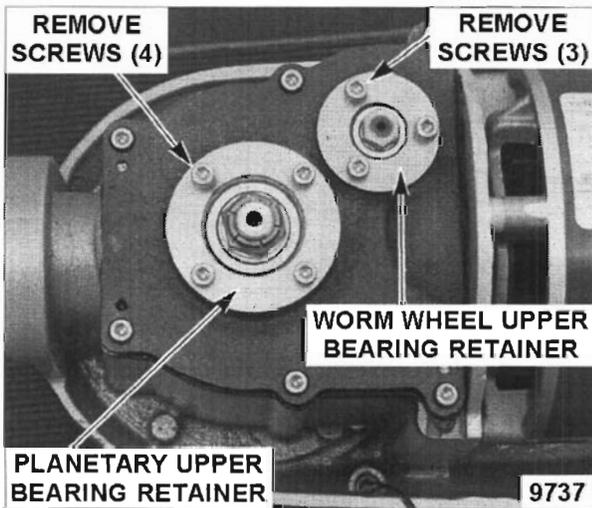
# TRANSMISSION / ATTACHMENT HUB



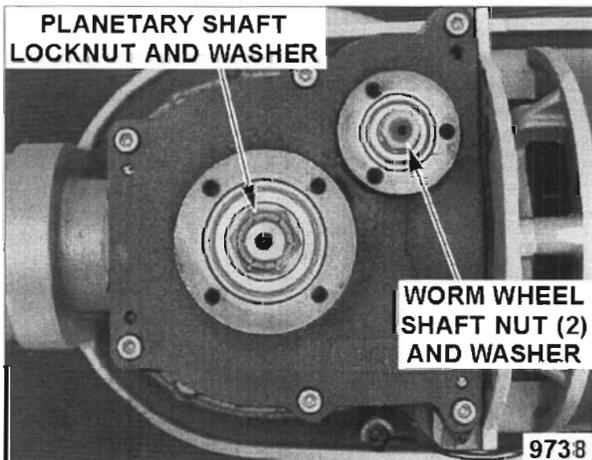
**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

## REMOVAL AND DISASSEMBLY

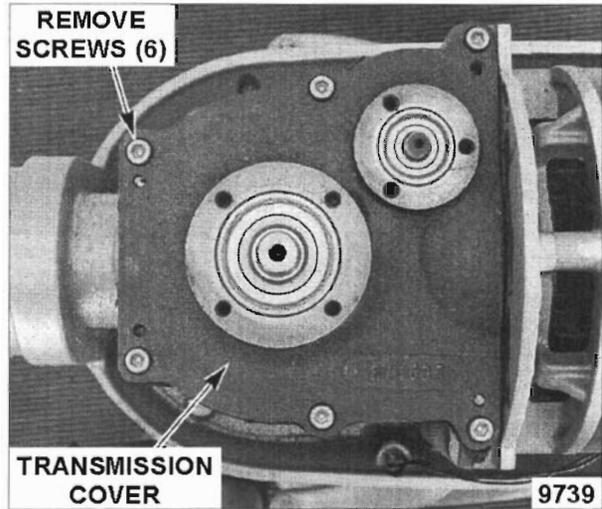
1. Remove TOP COVER.
2. Remove PLANETARY.
3. Remove planetary upper bearing retainer and bearing gasket. Remove worm wheel upper bearing retainer.



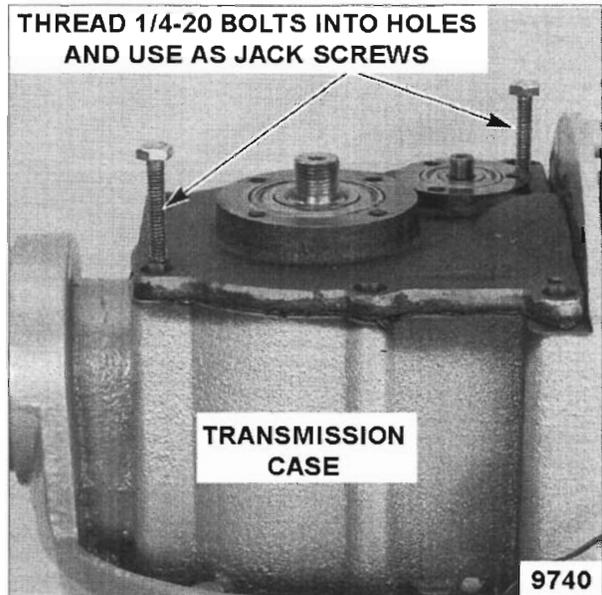
4. Remove nuts and washers from planetary shaft and worm wheel shaft.



5. Remove screws from transmission cover.

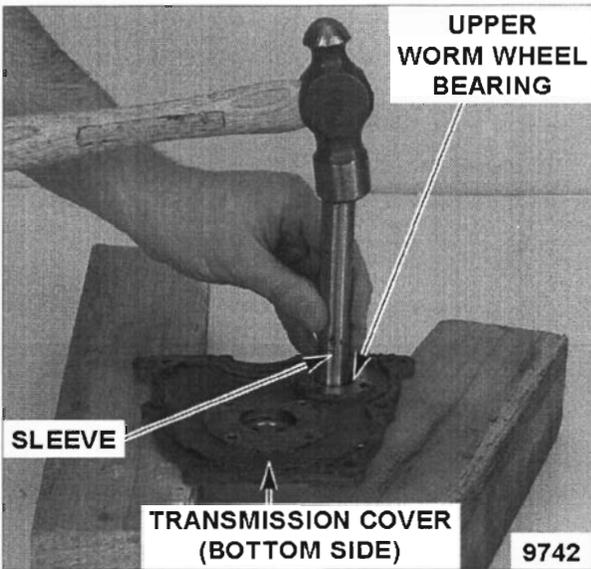
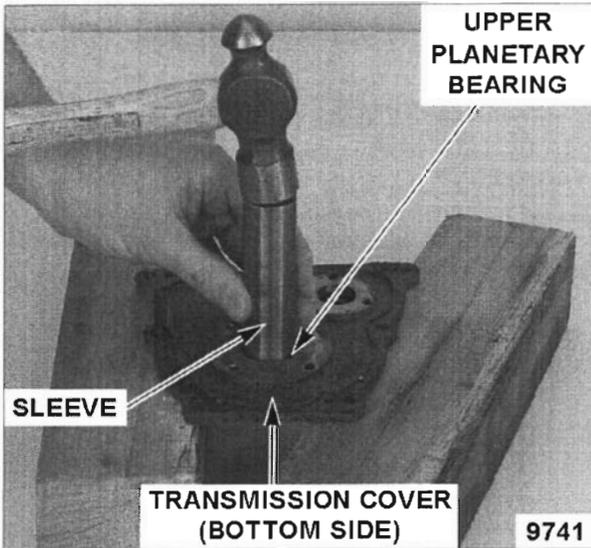


6. To remove transmission cover, use 1/4-20 bolts (2) as jack screws. Turn each bolt 1-2 revolutions and alternate until transmission cover separates from case.

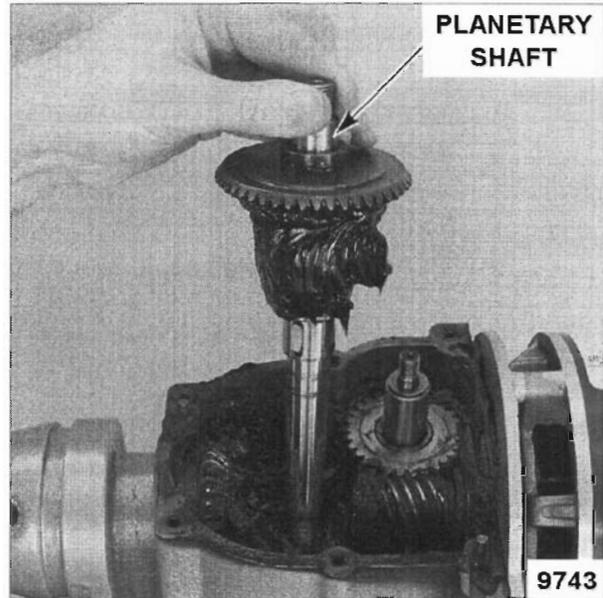


7. Drive planetary and worm wheel upper bearings from transmission cover.

**NOTE:** Grease on the worm wheel upper bearing (open side) may cause the upper worm wheel shaft washer to stick to the bearing. If found, remove the washer and retain for use during assembly.

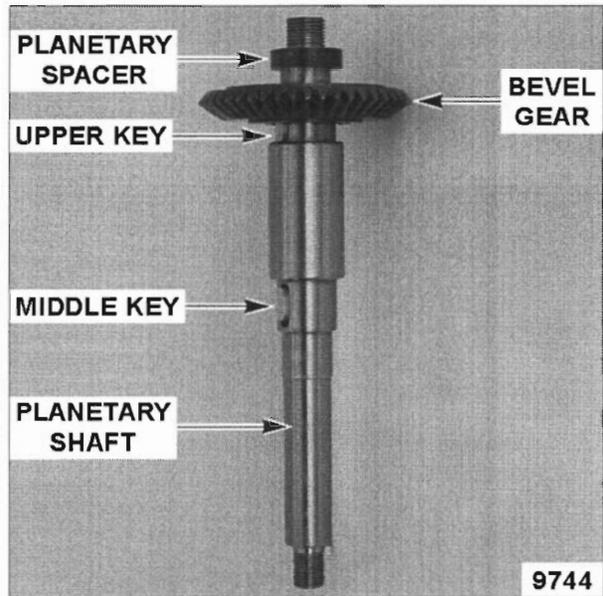


8. Remove planetary shaft from transmission case.

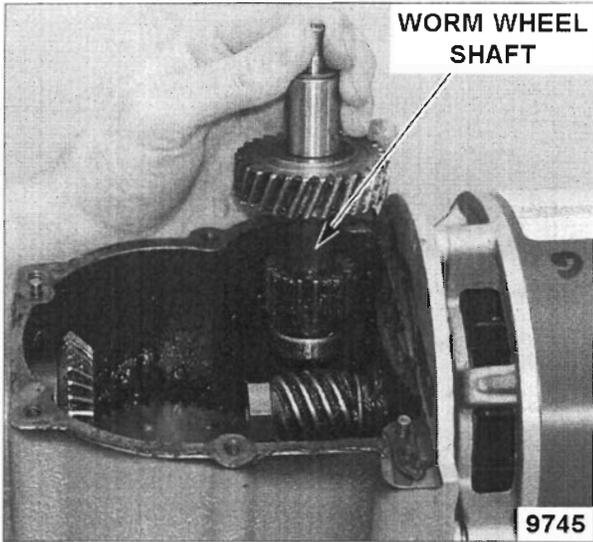


A. Remove planetary spacer, bevel gear and keys from shaft.

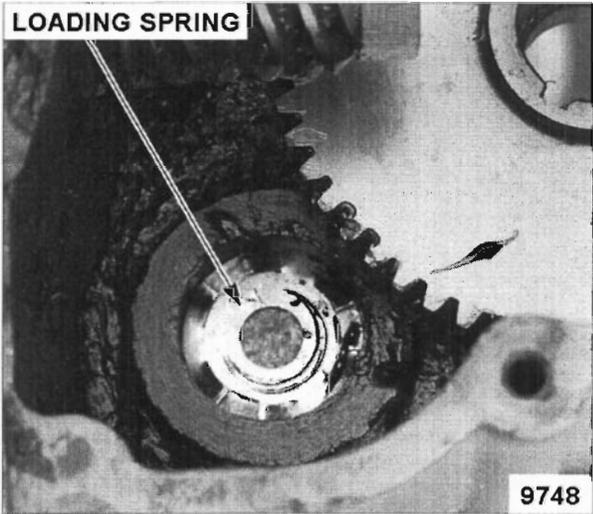
NOTE: Bevel gear is a slip fit on shaft.



9. Remove worm wheel shaft from transmission case.

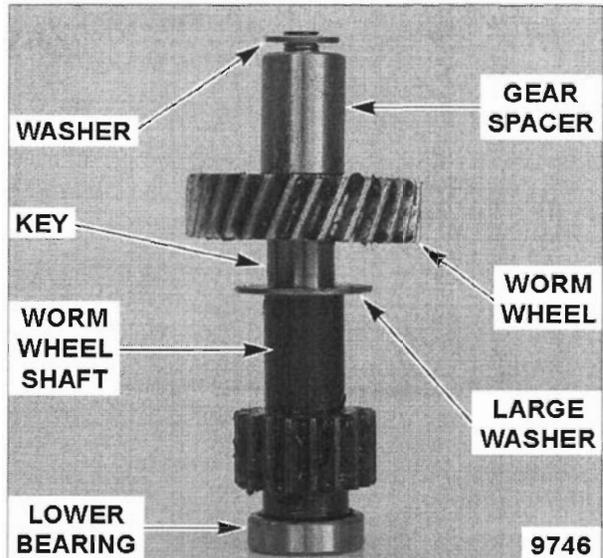


A. Remove loading spring from transmission case.

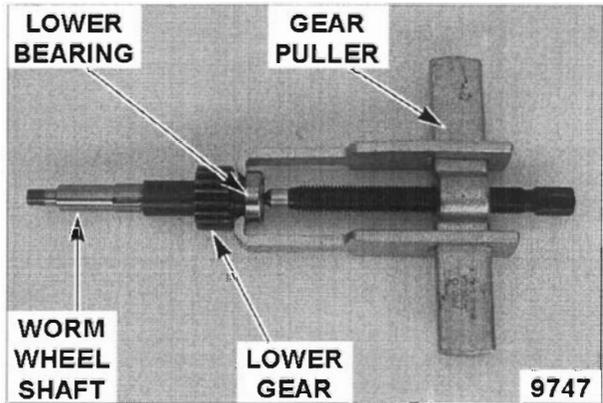


B. Remove washers, gear spacer, worm wheel, and key from worm wheel shaft.

**NOTE:** Worm wheel and lower gear are both slip fits on shaft.

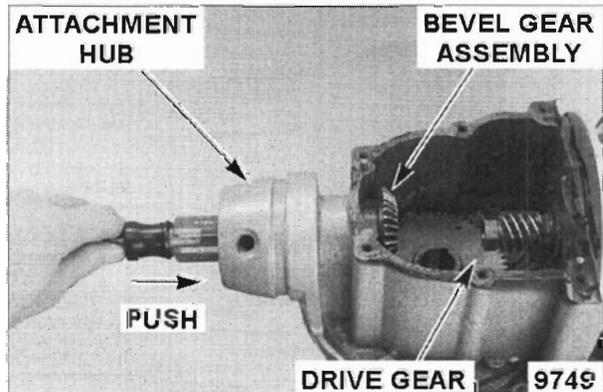


C. Pull lower bearing from worm wheel shaft then remove lower gear and key.

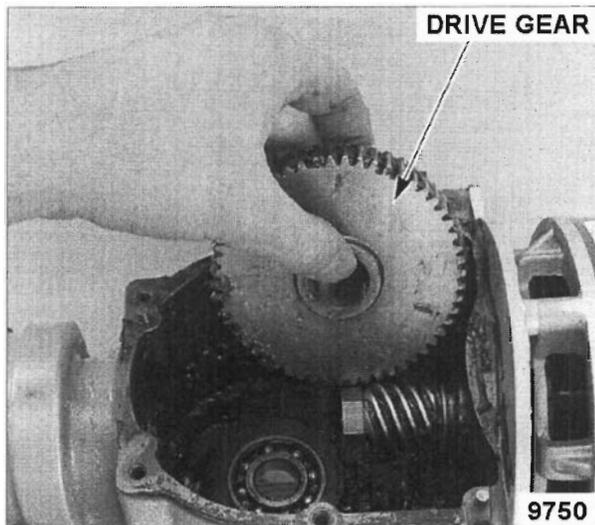


10. Slide drive gear away from attachment hub for bevel gear assembly clearance. Use a soft face tool to push the bevel gear assembly out of the attachment hub then remove the assembly.

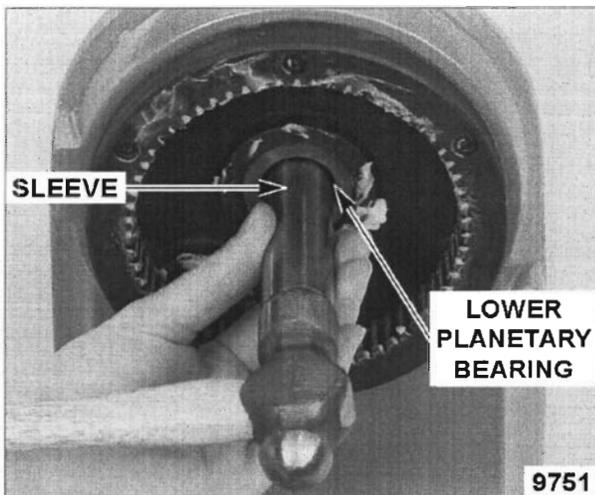
**NOTE:** If thrust washer(s) are installed on bevel gear assembly, retain for use during transmission assembly and installation.



11. Remove drive gear from transmission case.



12. Drive lower planetary bearing from transmission case.



13. Remove oil seal from transmission case.

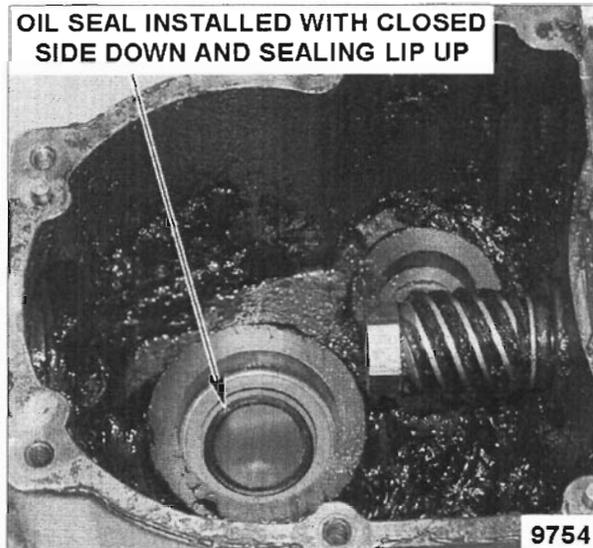


## ASSEMBLY AND INSTALLATION

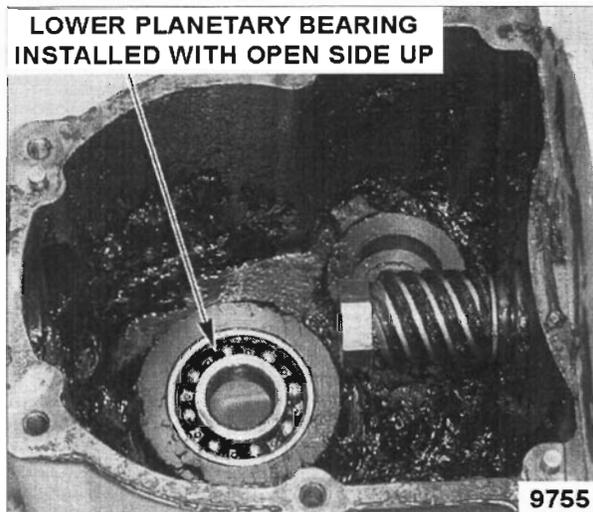
**NOTE:** Ensure all parts are clean before assembly. Remove old grease from parts being reused.

**NOTE:** Use a sleeve as a pressing tool to press the oil seal and bearing into the transmission case.

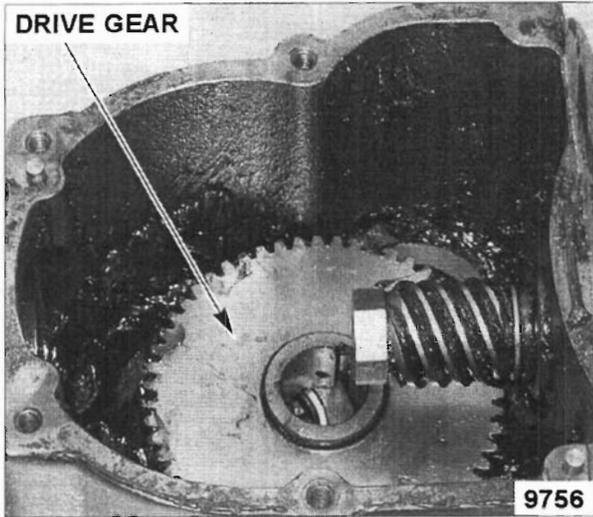
1. Press oil seal into the transmission case until the seal is flush with the base of the opening.



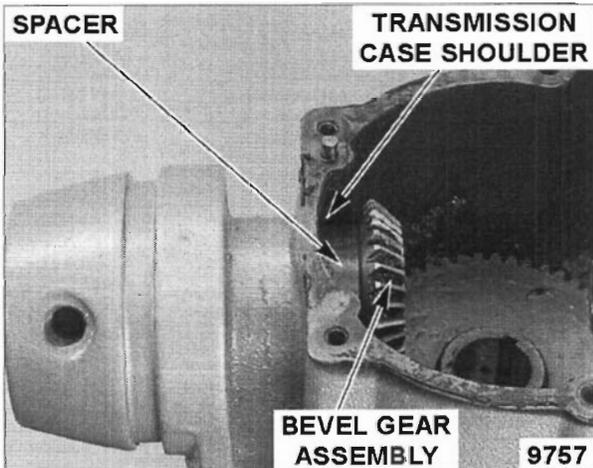
2. Press lower planetary bearing into transmission case until bearing is flush with the opening.



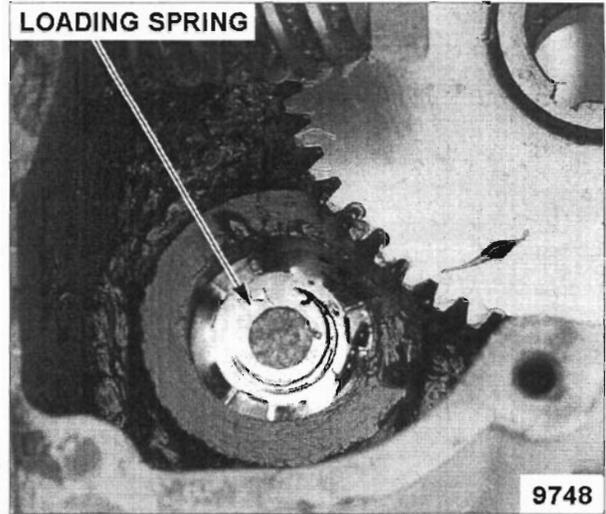
3. Place drive gear inside transmission case. Slide drive gear away from attachment hub for bevel gear assembly clearance.



4. Install thrust washers (if removed during disassembly) onto the bevel gear assembly. Insert bevel gear assembly into hub then push the assembly in until it touches the transmission case shoulder.



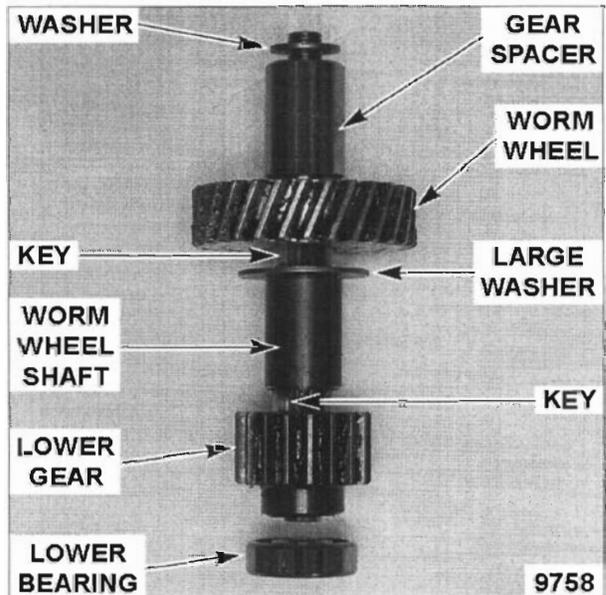
5. Insert loading spring into transmission case.



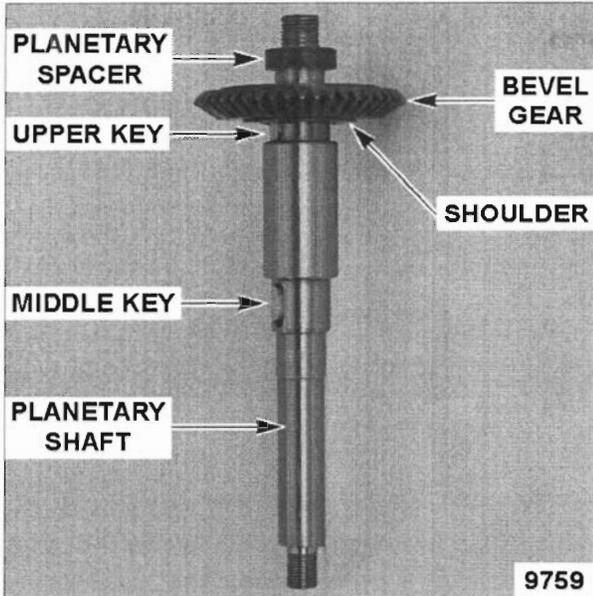
6. Assemble worm wheel shaft:

**NOTE:** Worm wheel and lower gear are both slip fits on shaft.

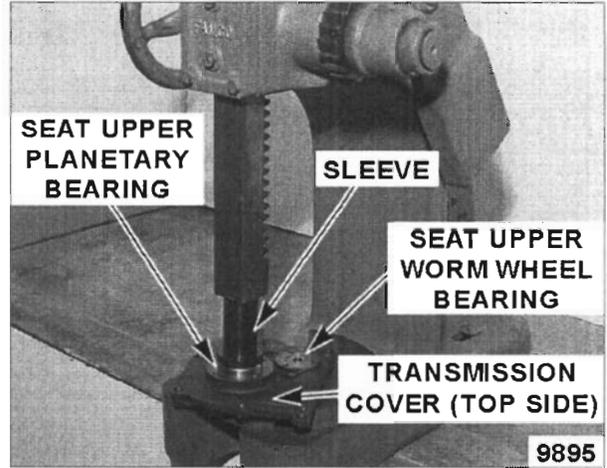
- A. Insert key onto shaft and install lower gear with shoulder toward lower bearing.
- B. Press lower bearing onto shaft.
- C. Install large washer onto shaft.
- D. Insert key onto shaft and install worm wheel.
- E. Install gear spacer and washer onto shaft.



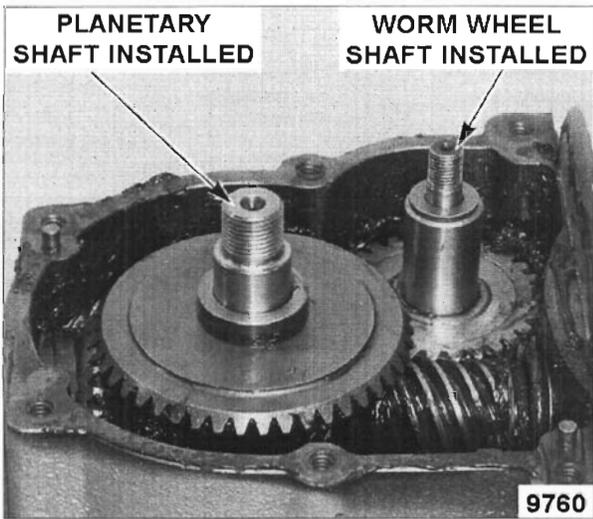
7. Center drive gear over lower planetary bearing.
8. Install worm wheel shaft into transmission case.
9. Assemble planetary shaft:
  - A. Insert keys onto shaft and install bevel gear with shoulder of gear facing down.
  - B. Install planetary spacer onto shaft.



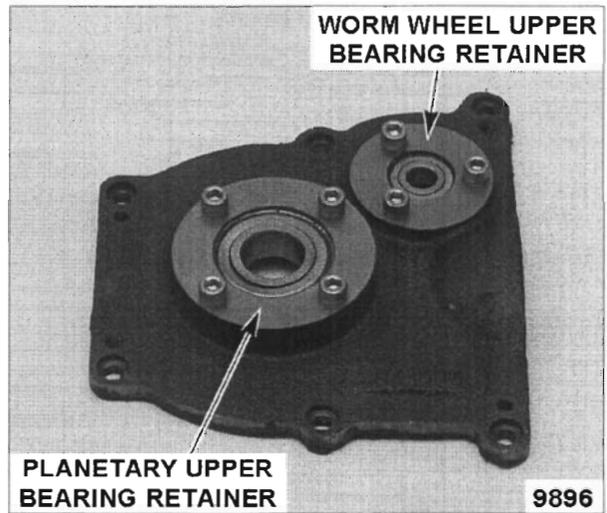
C. Install planetary shaft into transmission case.



11. Place bearing gasket over upper planetary bearing then install planetary and worm wheel upper bearing retainers.

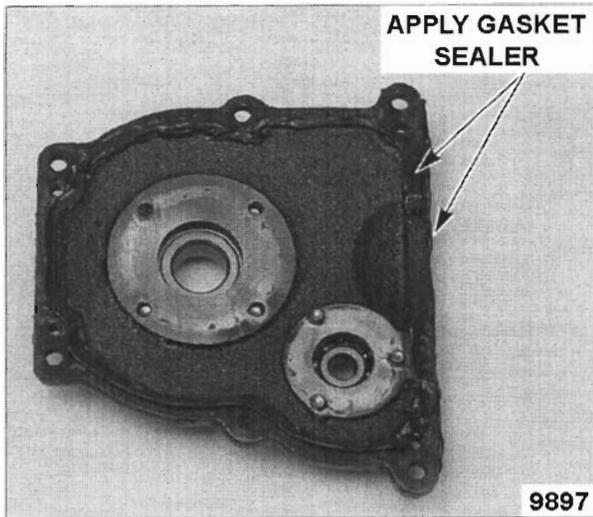


10. Press planetary and worm wheel upper bearings into transmission cover until each bearing seats against shoulder inside the cover. Worm wheel upper bearing is installed with open side down.

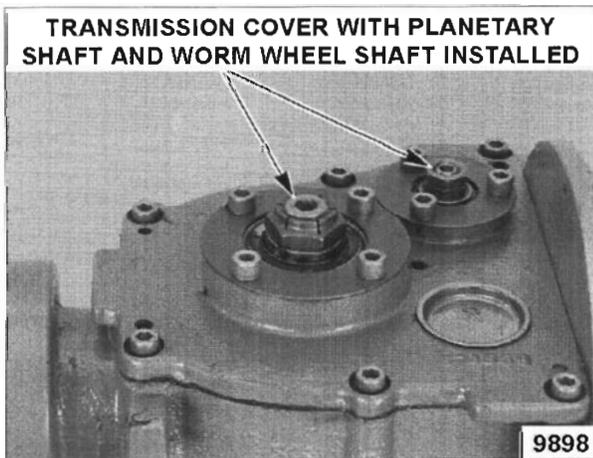


12. Clean and dry the mating surfaces of the transmission case and the transmission cover.

13. Apply gasket sealer (Permatex #2) to the bottom and rear mating surfaces of transmission cover.



14. Add 27 oz. of Mobilith AW-2 grease to transmission case. Coat all gears thoroughly with grease.
15. Install cover onto transmission case. Tighten screws in an alternating pattern to 65 in\*lb of torque.
16. Install washer and locknut onto planetary shaft and tighten locknut to 372-465 in\*lb of torque.
17. Install washer and the bottom worm wheel shaft nut onto worm wheel shaft and tighten the nut. Install top worm wheel shaft locking nut and tighten the nut.



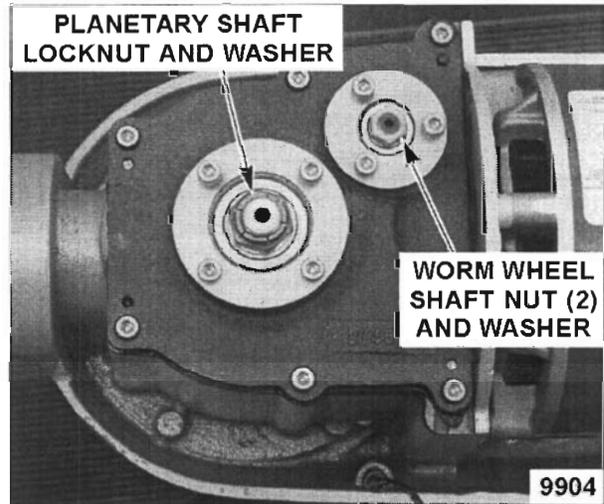
18. Install PLANETARY.

## QUAD O-RING

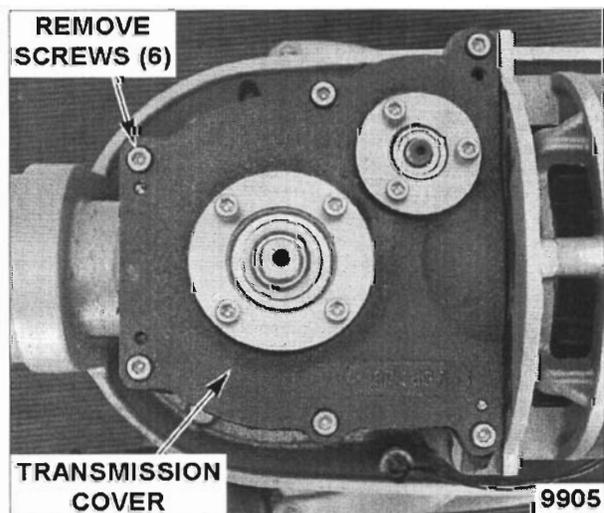


**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

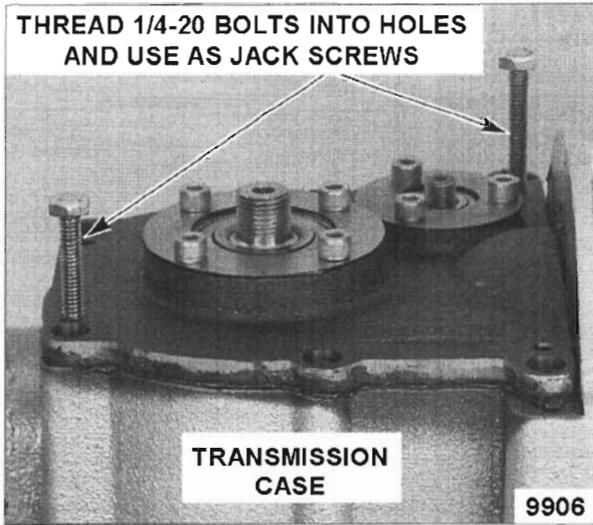
1. Remove TOP COVER.
2. Remove PLANETARY.
3. Remove nuts and washers from planetary shaft and worm wheel shaft.



4. Remove screws from transmission cover.

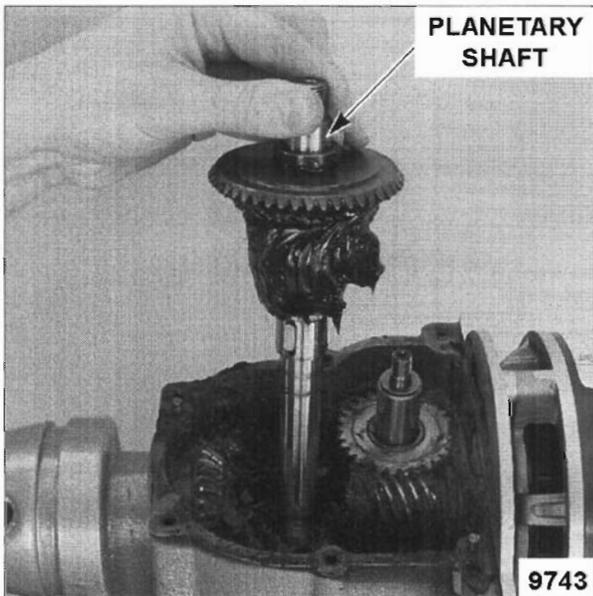


5. To remove transmission cover, use 1/4-20 bolts (2) as jack screws. Turn each bolt 1-2 revolutions and alternate until transmission cover separates from case.

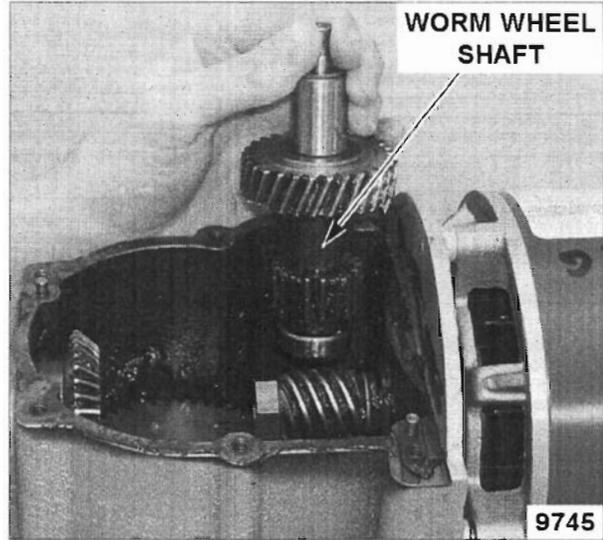


**NOTE:** Grease on the worm wheel upper bearing (open side) may cause the upper worm wheel shaft to stick to the bearing. If found, remove the washer and retain for use during assembly.

- Remove planetary shaft from transmission case.

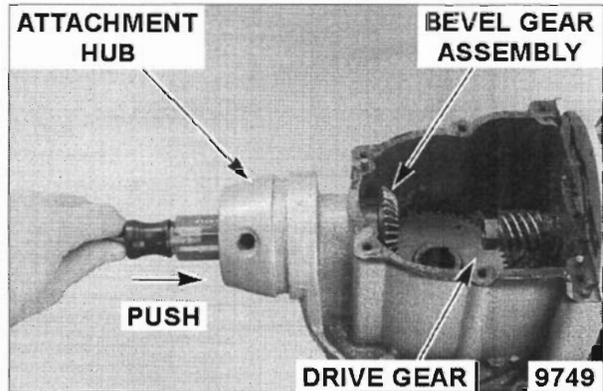


- Remove worm wheel shaft from transmission case.

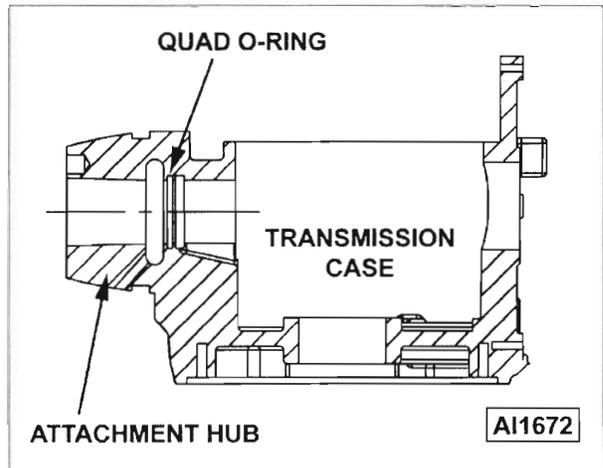


- Slide drive gear away from attachment hub for bevel gear assembly clearance. Use a soft face tool to push the bevel gear assembly out of the attachment hub then remove the assembly.

**NOTE:** If thrust washer(s) are installed on bevel gear assembly, retain for use during transmission assembly and installation.

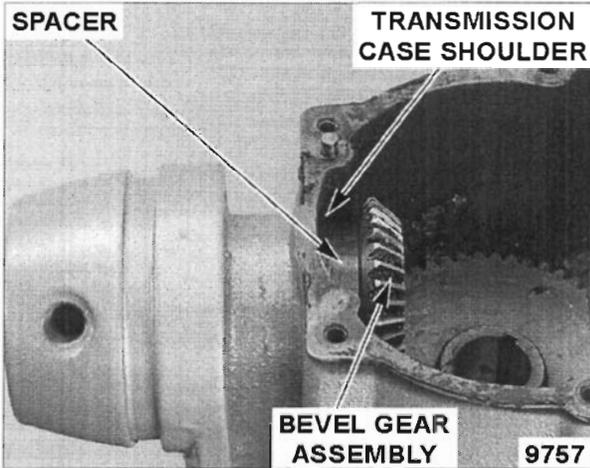


- Remove quad o-ring from attachment hub.

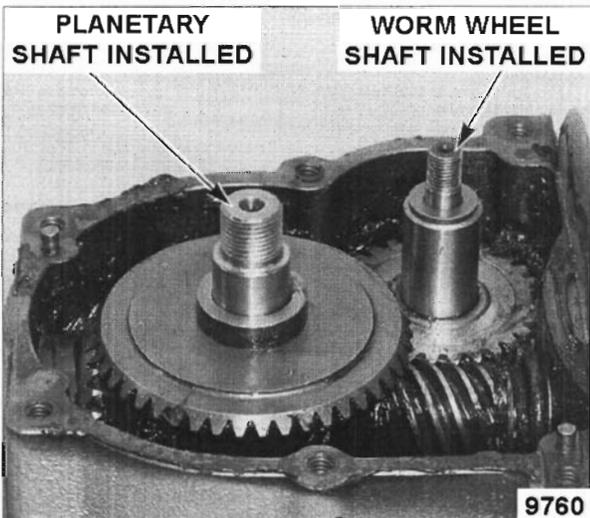


- Install quad o-ring into attachment hub.

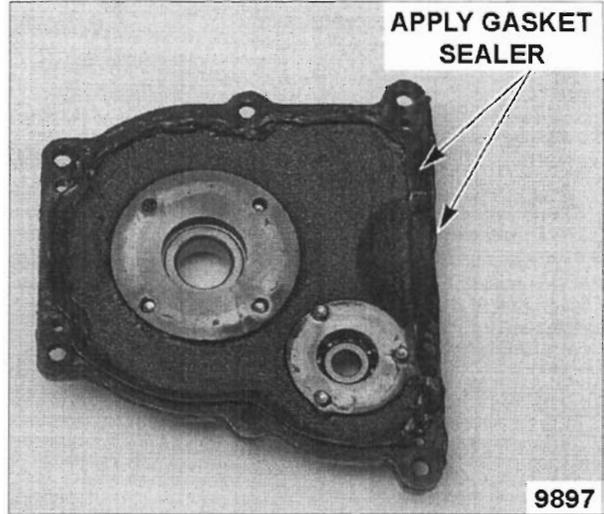
11. Install thrust washers (if removed during disassembly) onto the bevel gear assembly. Insert bevel gear assembly into hub then push the assembly in until it touches the transmission case shoulder.



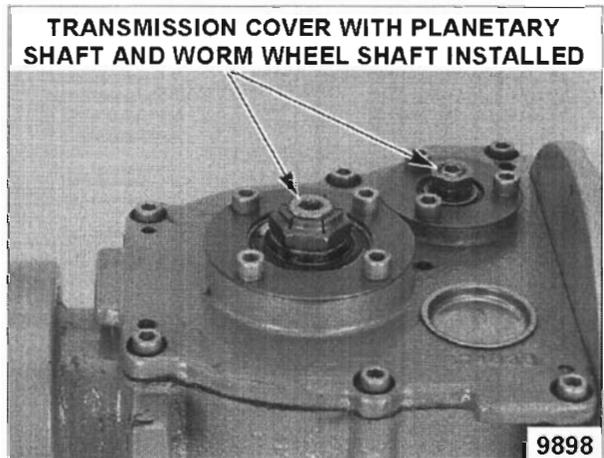
12. Center drive gear over lower planetary bearing.
13. Install worm wheel shaft and planetary shaft into transmission case.



14. Clean and dry the mating surfaces of the transmission case and the transmission cover.
15. Apply gasket sealer (Permatex #2) to the bottom and rear mating surfaces of transmission cover.



16. Coat all gears thoroughly with Mobilith AW-2 grease.
17. Install cover onto transmission case. Tighten screws in an alternating pattern to 65 in\*lb of torque.
18. Install washer and locknut onto planetary shaft and tighten locknut to 372-465 in\*lb of torque.
19. Install washer and the bottom worm wheel shaft nut onto worm wheel shaft and tighten the nut. Install top worm wheel shaft locking nut and tighten the nut.



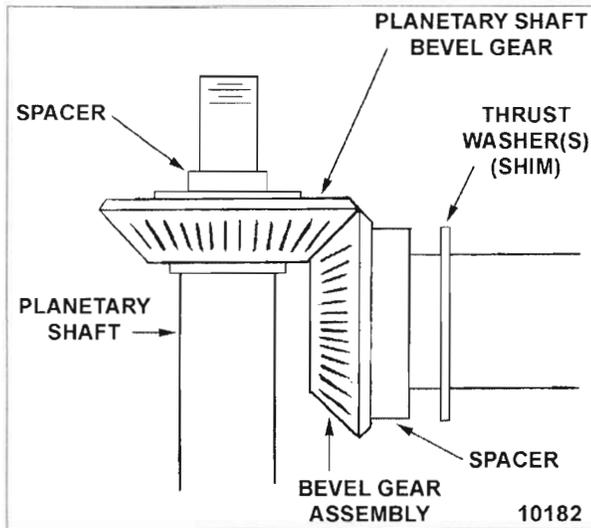
20. Install PLANETARY.

## BEVEL GEARS MESHING ADJUSTMENT



**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

**NOTE:** For proper gear meshing, the teeth between the bevel gear assembly (attachment hub) and the planetary shaft bevel gear should engage with a clearance of .005" to .020" and be aligned as shown below.



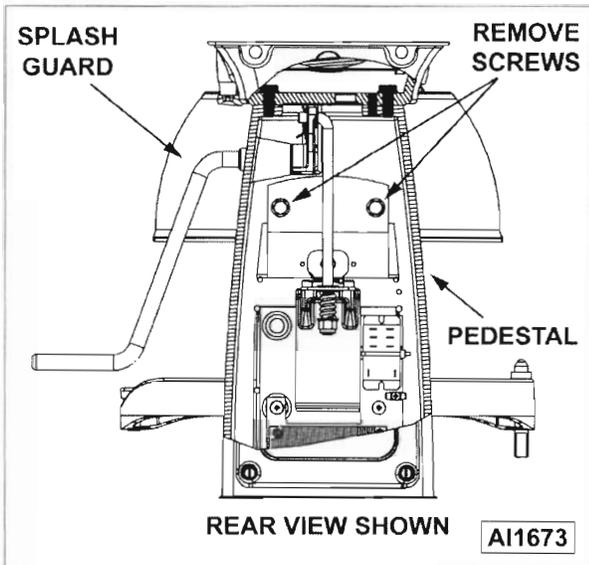
1. Remove attachment hub plug.
2. To determine if clearance is within tolerance, use bevel gear assembly movement as an indicator. Push on the bevel gear assembly while checking for movement (.005" to .020").
3. If movement is out of tolerance then access the bevel gears as outlined under TRANSMISSION / ATTACHMENT HUB.
  - A. Inspect bevel gear teeth for wear; and bevel gear alignment.
    - 1) If the gear teeth are excessively worn or damaged, install replacement bevel gears and check clearance and alignment.
      - a. If ok, reassemble and check for proper operation.
    - 2) If the gears are not worn or damaged, continue with procedure.
4. To adjust clearance:
  - A. Remove the bevel gear assembly and add or remove thrust washer(s) behind the spacer until clearance is within tolerance.
5. Reassemble as outlined under TRANSMISSION / ATTACHMENT HUB.

# TRANSMISSION CASE

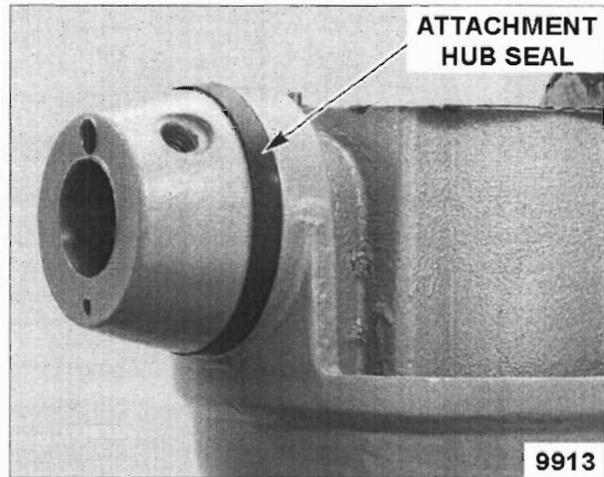


**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

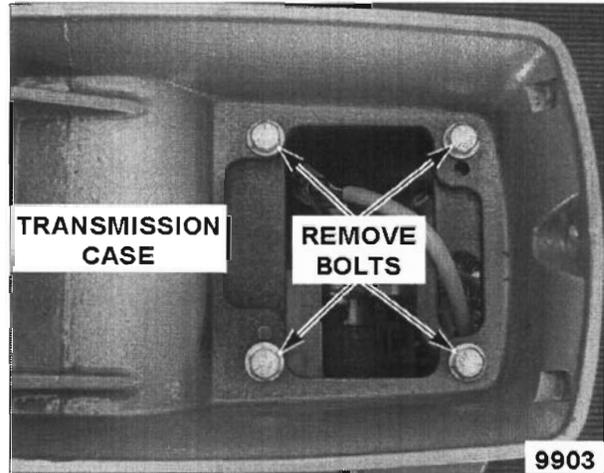
1. Remove bowl guard cage, agitator and bowl.
2. If replacing transmission case, remove the following components. If replacing pedestal, proceed to Step 3.
  - A. Remove TRANSMISSION / ATTACHMENT HUB.
  - B. Remove INTERNAL GEAR.
  - C. Remove splash guard from pedestal.



E. Remove attachment hub seal.

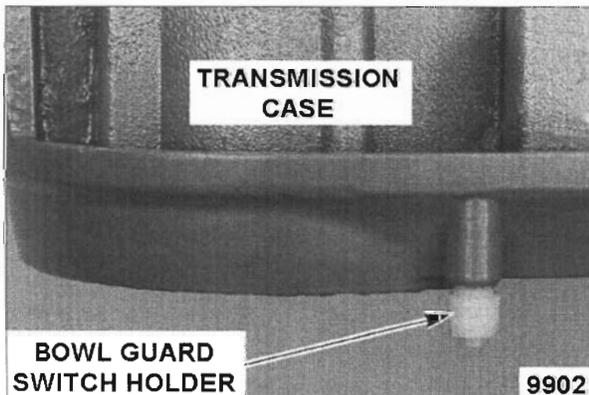


3. Remove MOTOR.
4. At the joint between transmission case and pedestal, cut through paint with a sharp knife to prevent paint damage.
5. Remove transmission case from pedestal.

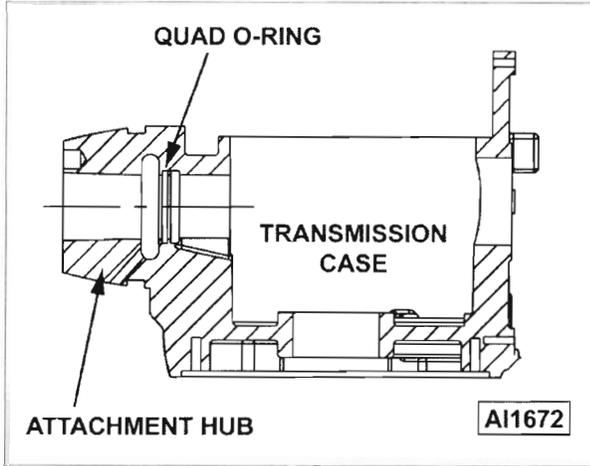


- D. Remove BOWL GUARD SWITCH.
  - 1) Remove bowl guard switch holder (threaded) from transmission case.

**NOTE:** Prevent damage to switch holder surface during removal.



6. Install transmission case onto pedestal. Tighten bolts in an alternating pattern to 372-465 in\*lb of torque.
  - A. If a replacement transmission case was installed:
    - 1) Install a new quad o-ring into attachment hub.



- 2) Install attachment hub seal.

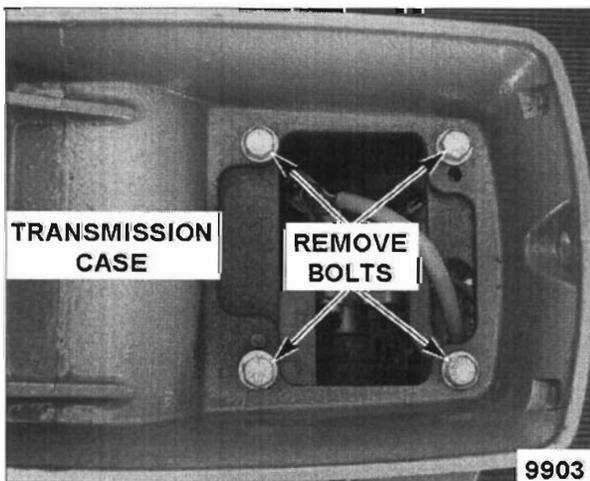
7. Install MOTOR.
8. Thread bowl guard switch holder into transmission case.
  - A. Install BOWL GUARD SWITCH.
9. Install splash guard onto pedestal.
10. Install INTERNAL GEAR.
11. Reassemble TRANSMISSION / ATTACHMENT HUB.

## PEDESTAL



**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

1. Remove transmission case as outlined under TRANSMISSION CASE.



2. Remove bowl lift assembly as outlined under BOWL LIFT ASSEMBLY.

3. Remove bowl support as outlined under BOWL SUPPORT.
  - A. Remove screws securing left side slideway to pedestal.

**NOTE:** If paint fills the joint between the slideway and pedestal, cut through paint at the joint with a sharp knife to prevent paint damage.

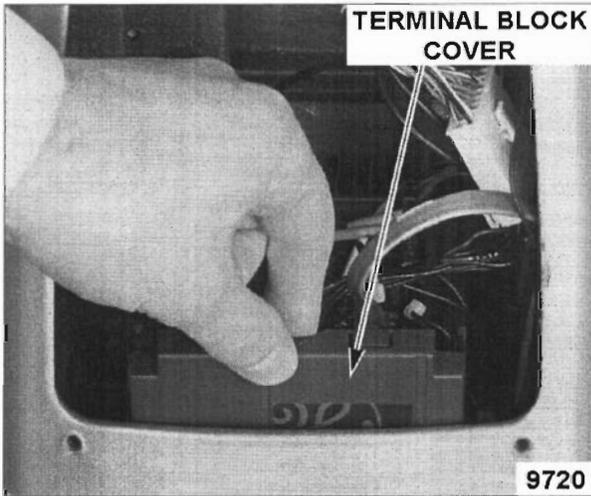
**NOTE:** Two dowel pins locate the left side slideway to pedestal.
4. With motor drive assembly removed from pedestal, pull wiring harness down through pedestal and remove thru pedestal opening.
5. Remove base as outlined under BASE.
6. Reassemble in reverse order and check for proper operation.

# BASE

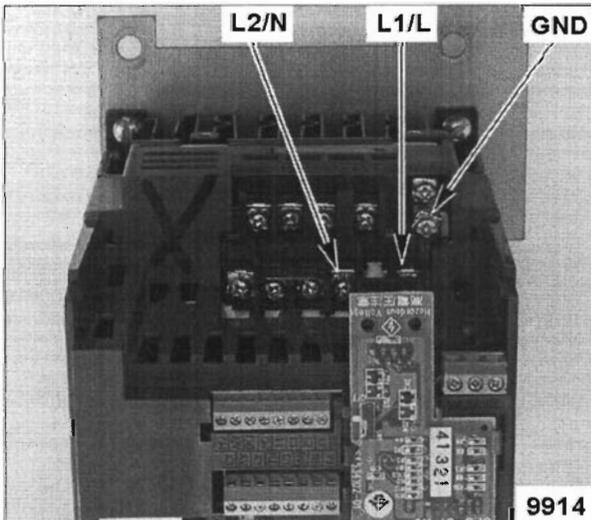


**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

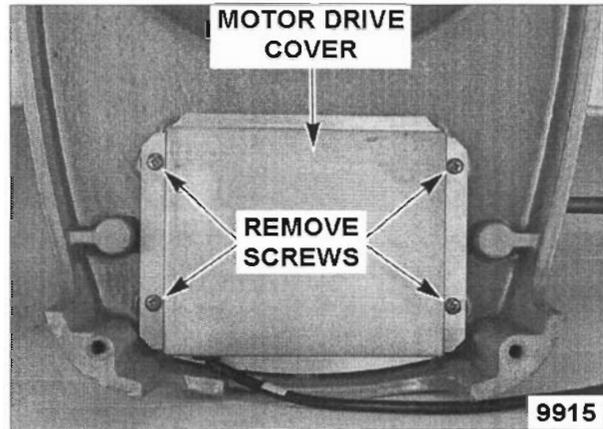
1. Remove PEDESTAL COVER.
2. Pull terminal block cover from motor drive to disengage snap catch then remove cover.



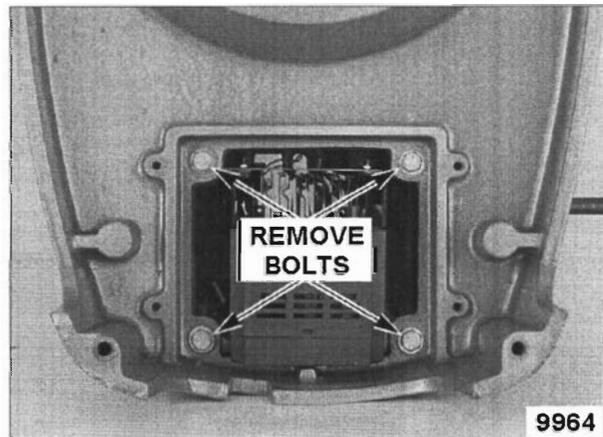
3. Disconnect input voltage lead wires from motor drive terminals L1/L, L2/N and GND.



4. At the joint between base and pedestal, cut through paint with a sharp knife to prevent paint damage.
5. Place mixer on its back to access motor drive cover underneath the base then remove cover.



6. Remove base from pedestal.



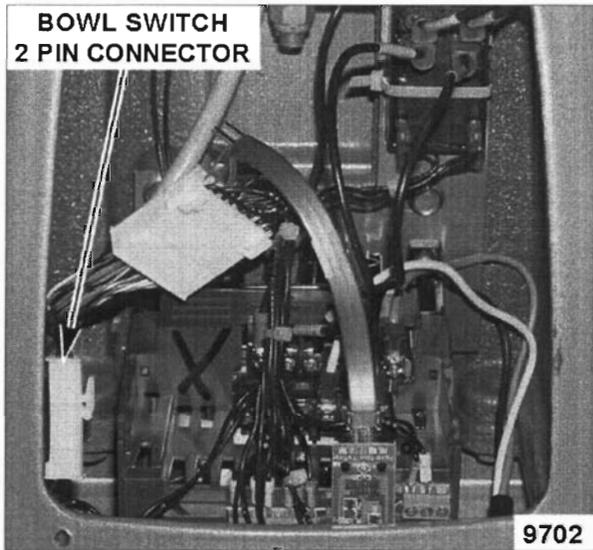
7. Reassemble in reverse order. Tighten bolts in an alternating pattern to 372-465 in\*lb of torque.
8. Check for proper operation.

# BOWL SUPPORT

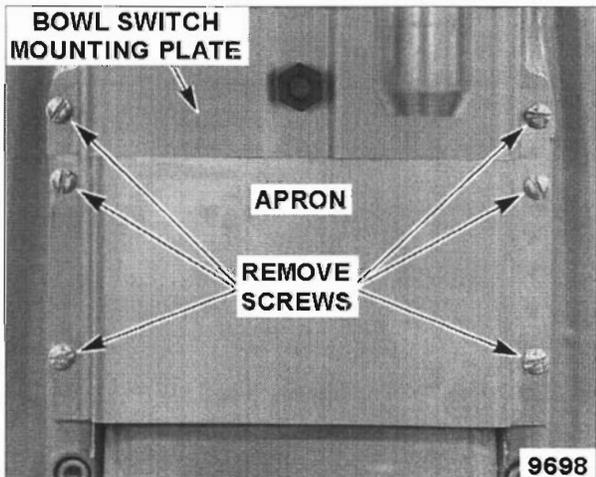


**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

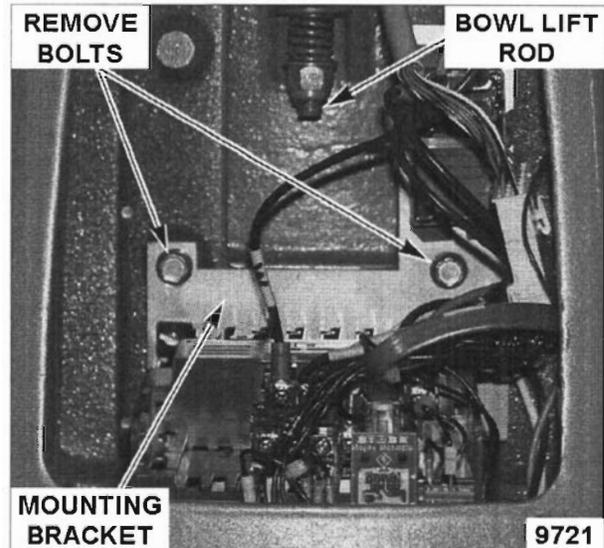
1. Remove PEDESTAL COVER.
2. Disconnect bowl switch at 2 pin connector.



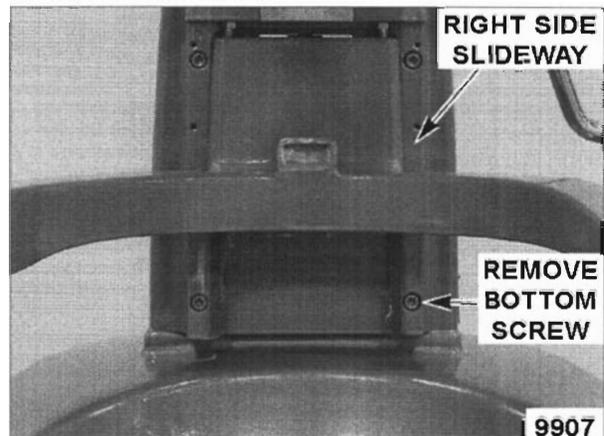
3. Remove bowl guard cage, agitator and bowl.
4. Remove bowl switch mounting plate and apron from pedestal.



5. Raise bowl support to move bowl lift rod away from motor drive mounting bracket for removal clearance.
6. Remove bolts securing motor drive mounting bracket to pedestal.

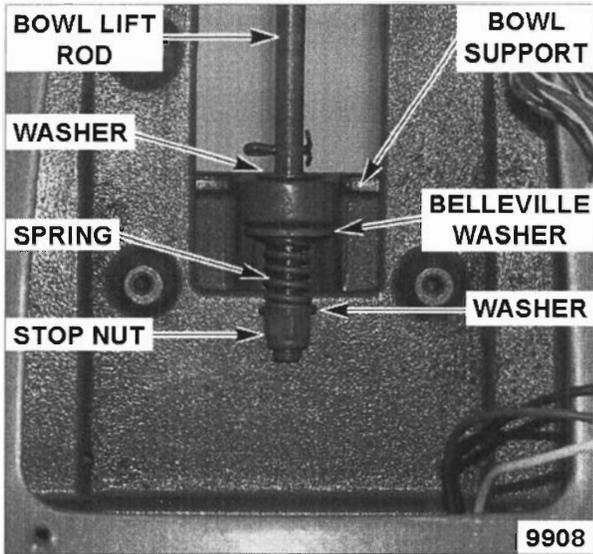


- A. To remove, lift motor drive assembly up into the pedestal then tilt the bottom of the assembly out to clear pedestal opening.
7. Remove bottom mounting screw from right side slideway.

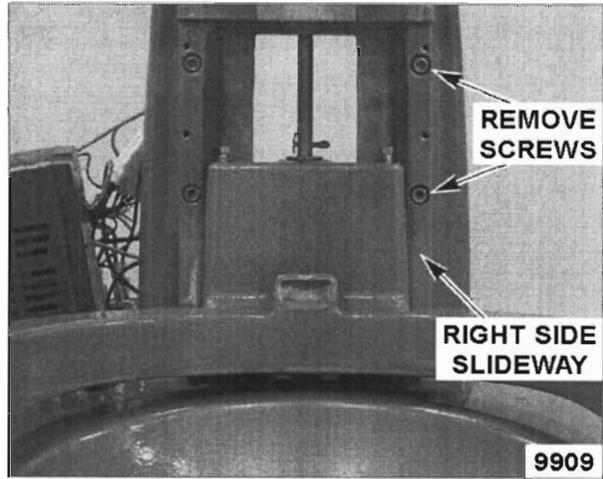


**NOTE:** If paint fills the joint between the slideway and pedestal, cut through paint at the joint with a sharp knife to prevent paint damage.

8. Lower bowl support then remove stop nut, washers and spring from bowl lift rod.



9. Remove right side slideway then remove bowl support.



10. Remove old grease from slideways and mating surfaces of bowl support.
11. Apply light coat of Lubriplate 630-AA to mating surfaces of slideways.
12. Reassemble in reverse order. Tighten slideway mounting screws to 65 in\*lb of torque.
13. Perform BOWL LIFT HANDLE ADJUSTMENT as outlined under SERVICE PROCEDURES AND ADJUSTMENTS.

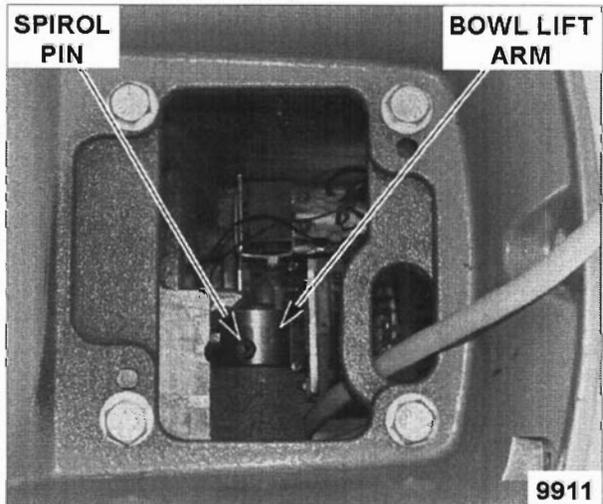
## BOWL LIFT ASSEMBLY



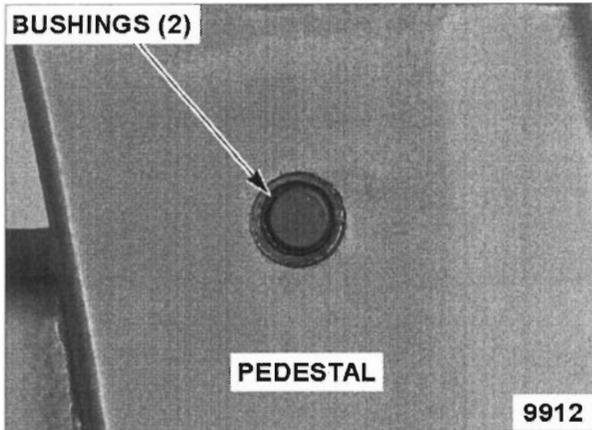
**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

### REMOVAL AND REPLACEMENT

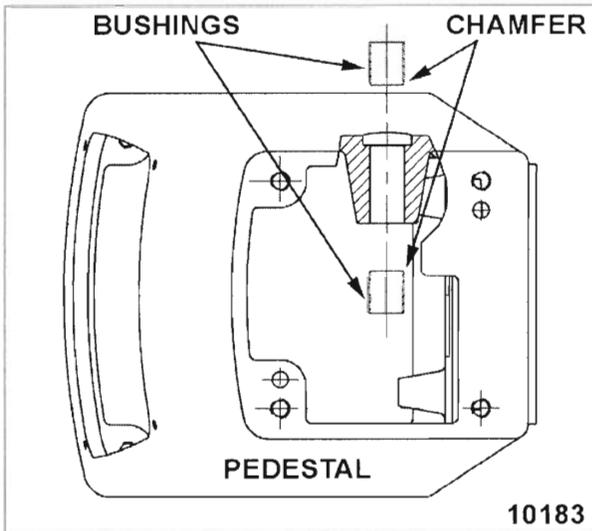
1. Remove bowl guard cage, agitator and bowl.
2. Remove TOP COVER.
3. Remove MOTOR.
4. Drive spirol pin from bowl lift arm.



5. Pull handle out of pedestal then remove two bushings.

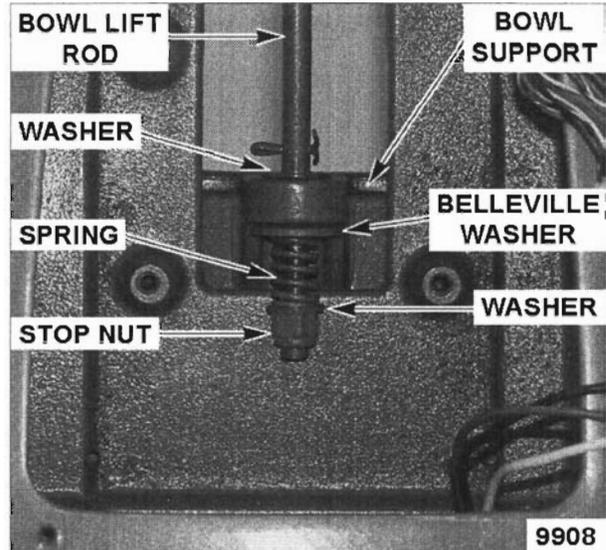


**NOTE:** When installing, press bushings into the opening until flush.



**TOP VIEW SHOWN**

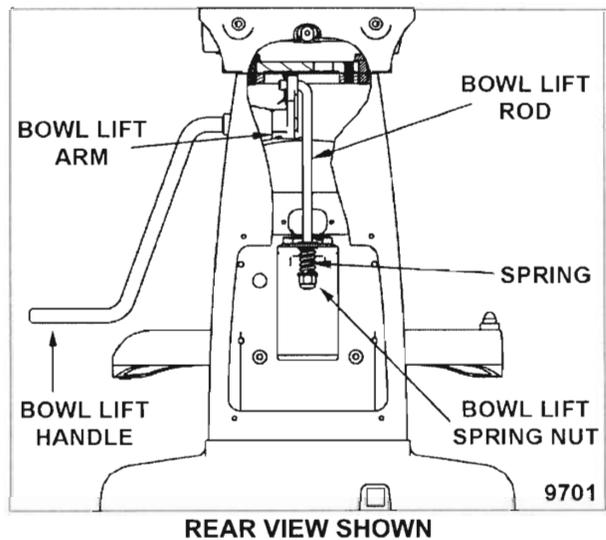
6. Remove cotter pin securing bowl lift rod to bowl lift arm.
7. Lift bowl support and remove stop nut, washers and spring from bowl lift rod.



8. Reassemble in reverse order.
9. Perform BOWL LIFT HANDLE ADJUSTMENT.

### BOWL LIFT HANDLE ADJUSTMENT

**NOTE:** The bowl lift handle is in the up position when bowl is down. To raise the bowl, pull the bowl lift handle down. When the bowl support stops against the pedestal, the spring on the bowl lift rod is compressed to exert spring tension on the bowl lift arm and hold the bowl in position.

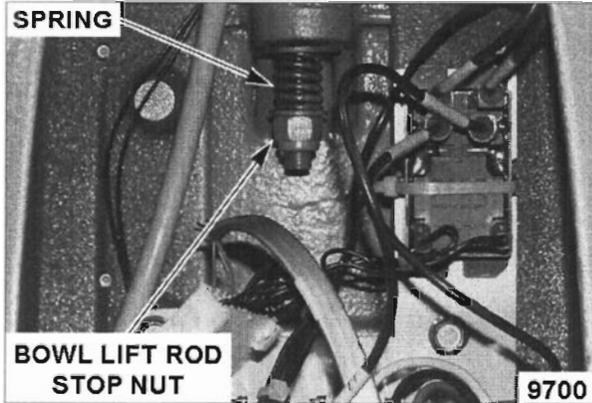


**REAR VIEW SHOWN**

1. Raise bowl. Verify bowl stays in the up position.
  - A. If force required is not too difficult for the operator and bowl stays in the up position, bowl is adjusted properly.

- B. If adjustment is required, continue with procedure.
- 2. Verify BOWL TO BEATER CLEARANCE ADJUSTMENT before adjusting bowl lift arm.
- 3. Remove PEDESTAL COVER.
- 4. Raise bowl to access the bowl lift rod stop nut.

- A. To *increase* lift handle force, turn nut clockwise approximately 1/2 turn. To *decrease* lift handle force, turn nut counterclockwise approximately 1/2 turn.
- B. Verify bowl lift arm operation and repeat the adjustment as necessary.



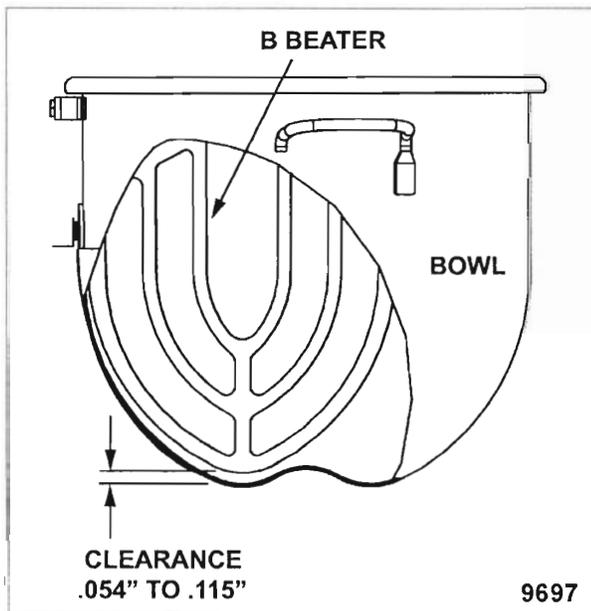
## BOWL TO BEATER CLEARANCE ADJUSTMENT



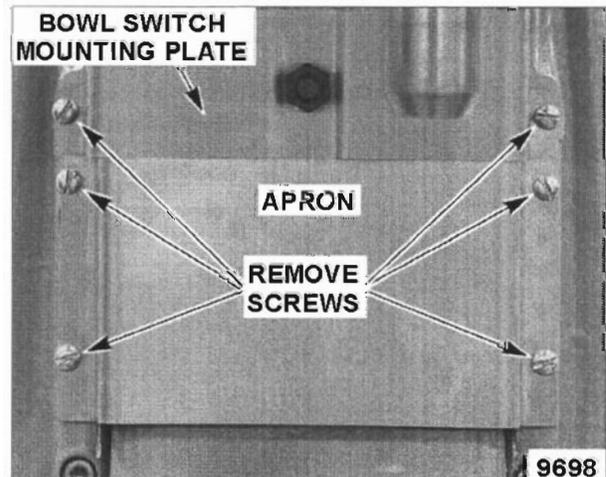
**WARNING:** DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

**NOTE:** Set the bowl to beater clearance using B beater.

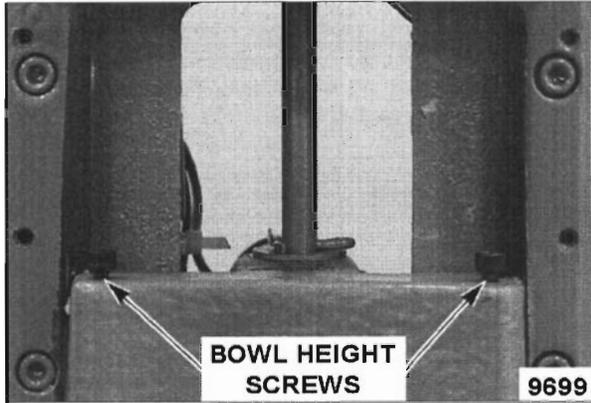
- 1. Verify bowl to beater clearance is between 0.054" to 0.115" (allowable tolerance).



- A. If adjustment is required, continue with procedure.
- 2. Remove beater, unlock bowl and swing out of way.
- 3. Remove bowl switch mounting plate and apron from pedestal.



4. Adjust each bowl height screw equally to obtain the correct bowl to beater clearance.



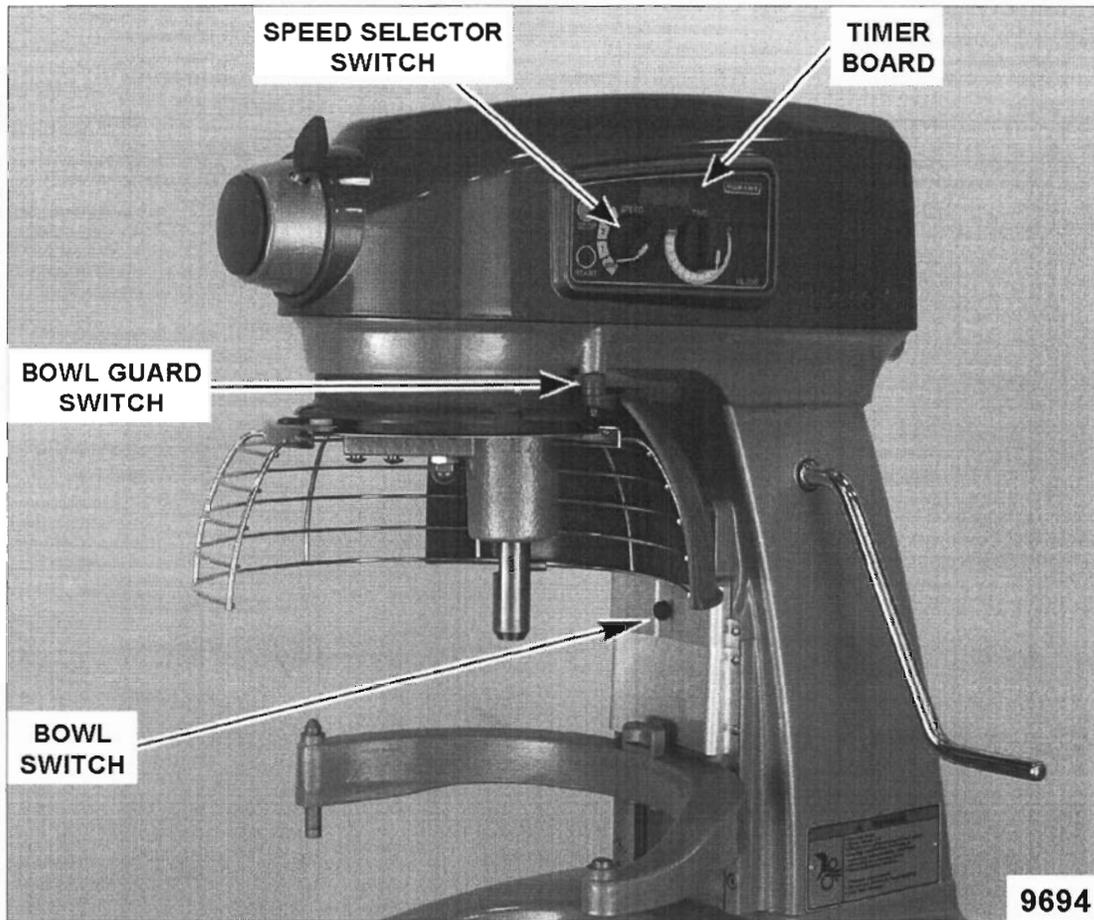
- A. Turn screw clockwise to increase or counterclockwise to decrease the clearance. Each half turn of the set screw equals approximately 0.025" of travel.
  - B. Swing bowl into locked position and install beater.
  - C. Check bowl to beater clearance for correct dimension.
  - D. Repeat the adjustment as necessary until the correct bowl to beater clearance is achieved.
5. Install apron.
  6. Check for proper operation.

# ELECTRICAL OPERATION

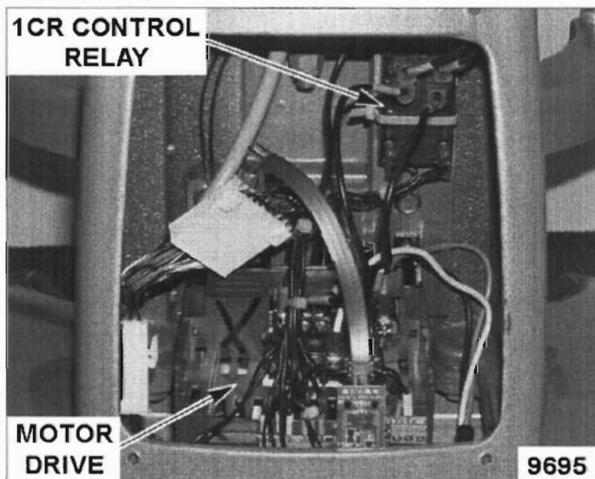
## COMPONENT FUNCTION

<b>Motor Drive</b> .....	Supplies power to 1MTR motor thru 1CR contacts, stores mixing time for each speed setting and controls motor speed. Removes power from control circuit thru N.C. timer ready contacts 30 B/C when mix time expires and sounds buzzer (countdown mode only). Monitors current, voltage, frequency and temperature during operation. Removes power from motor and displays alarm code on timer board if value exceeds the alarm setting.
<b>1MTR Motor</b> .....	Turns transmission to mix product.
<b>Timer Board</b> .....	Provides remote motor drive control and operator interface. Displays mix time and alarm codes. Includes: 1PB start switch, 2PB stop switch, time adjustment potentiometer, 1K relay and buzzer.
<b>Recipe Timer Board</b> .....	Provides the same control functions as the timer board but includes a programming option for the operator to store and retrieve up to four recipes with five steps each (various mix speeds & times). Includes: 3PB recipe mode switch, 4PB standard mode switch and 2K relay.
<b>1PB Start Switch</b> .....	N.O. - Provides initial power to control circuit (momentary on).
<b>2PB Stop Switch</b> .....	N.C. - Removes power from control circuit (momentary off).
<b>Time Adjustment Potentiometer</b> .....	Sets mix time from 00:10 seconds to 15:00 minutes (countdown mode only) or selects Hold Mode (continuous mixing with count up timing).
<b>Buzzer</b> .....	Signals end of mix time (countdown mode only) or signals 15:00 minutes of continuous mix time has elapsed (count up mode only). Buzzer sounds for one second then stops.
<b>Speed Selector Switch</b> .....	Sets agitator speed; or recipe number 1 thru 4 (recipe timer board only).
<b>1CR Control Relay</b> .....	Removes power from 1MTR motor when relay coil is de-energized by motor drive timer ready contacts 30 B/C (mix time expires or alarm), 2PB stop switch, 1LS bowl guard switch or 2LS bowl switch.
<b>1LS Bowl Guard Switch</b> .....	N.O. - Ensures bowl guard covers mixing bowl (reed switch closed) before mixer operation can begin.
<b>2LS Bowl Switch</b> .....	N.O. - Ensures bowl is raised into mixing position (reed switch closed) before mixer operation can begin.

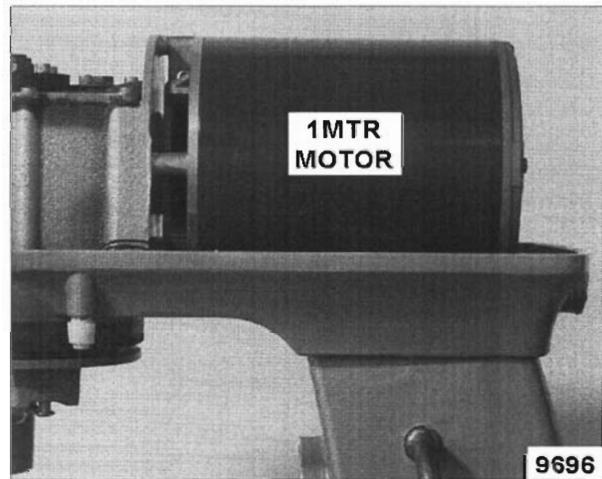
**COMPONENT LOCATION**



MIXER WITH STANDARD TIMER BOARD - HL200 SHOWN

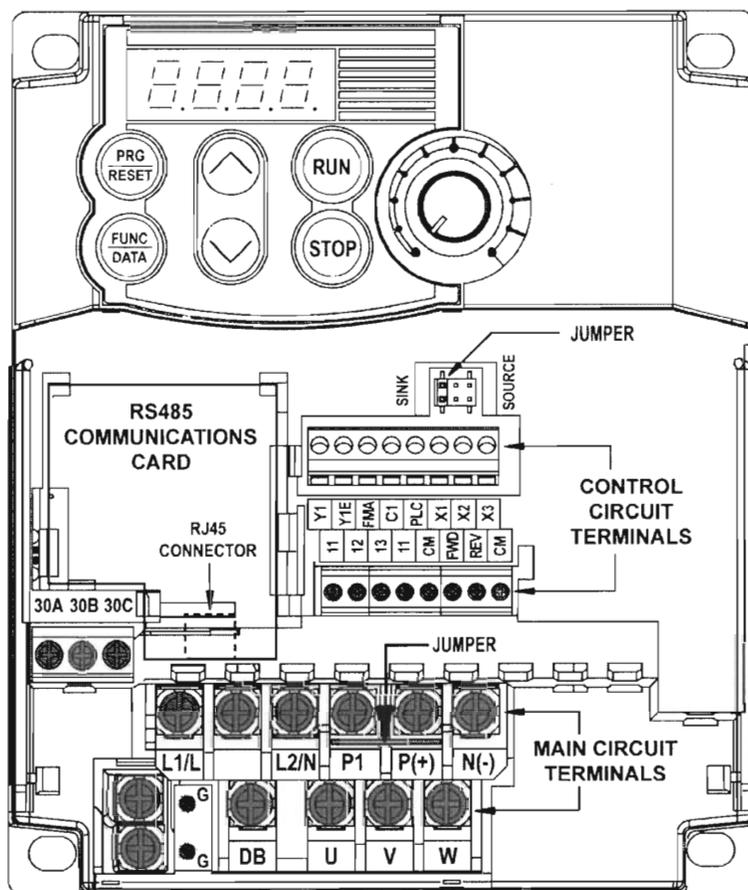


REAR VIEW SHOWN



RIGHT SIDE VIEW SHOWN

**MOTOR DRIVE LAYOUT**



--- LEGEND ---

CONTROL CIRCUIT TERMINALS

- Y1 = COMMON (0VDC) OUTPUT TO BUZZER.
- Y1E = COMMON (0VDC) OUTPUT TO Y1.
- PLC = 24VDC OUTPUT TO CONTROL CIRCUIT.
- X1 = 0VDC OR 24VDC (ON/OFF) INPUT
- X2 FROM SPEED SELECTOR SWITCH
- X3 (X3 ON RECIPE TIMER BOARD ONLY).
- 11 = COMMON OUTPUT TO TIME ADJ. POTENTIOMETER.
- 12 = 0 TO 10VDC INPUT TO MOTOR DRIVE FROM TIME ADJ. POTENTIOMETER.
- 13 = 10VDC OUTPUT TO TIME ADJ. POTENTIOMETER.
- CM = COMMON.
- FWD = INPUT TO MOTOR DRIVE TO ACTIVATE 3 PHASE VOLTAGE OUTPUT TO MOTOR (0VDC = ON).
- 30B/C = TIMER READY N.C. RELAY CONTACTS. PROVIDES COMMON (0VDC) OUTPUT TO CONTROL CIRCUIT.
- RS485 = COMMUNICATIONS BETWEEN MOTOR DRIVE AND TIMER BOARD.

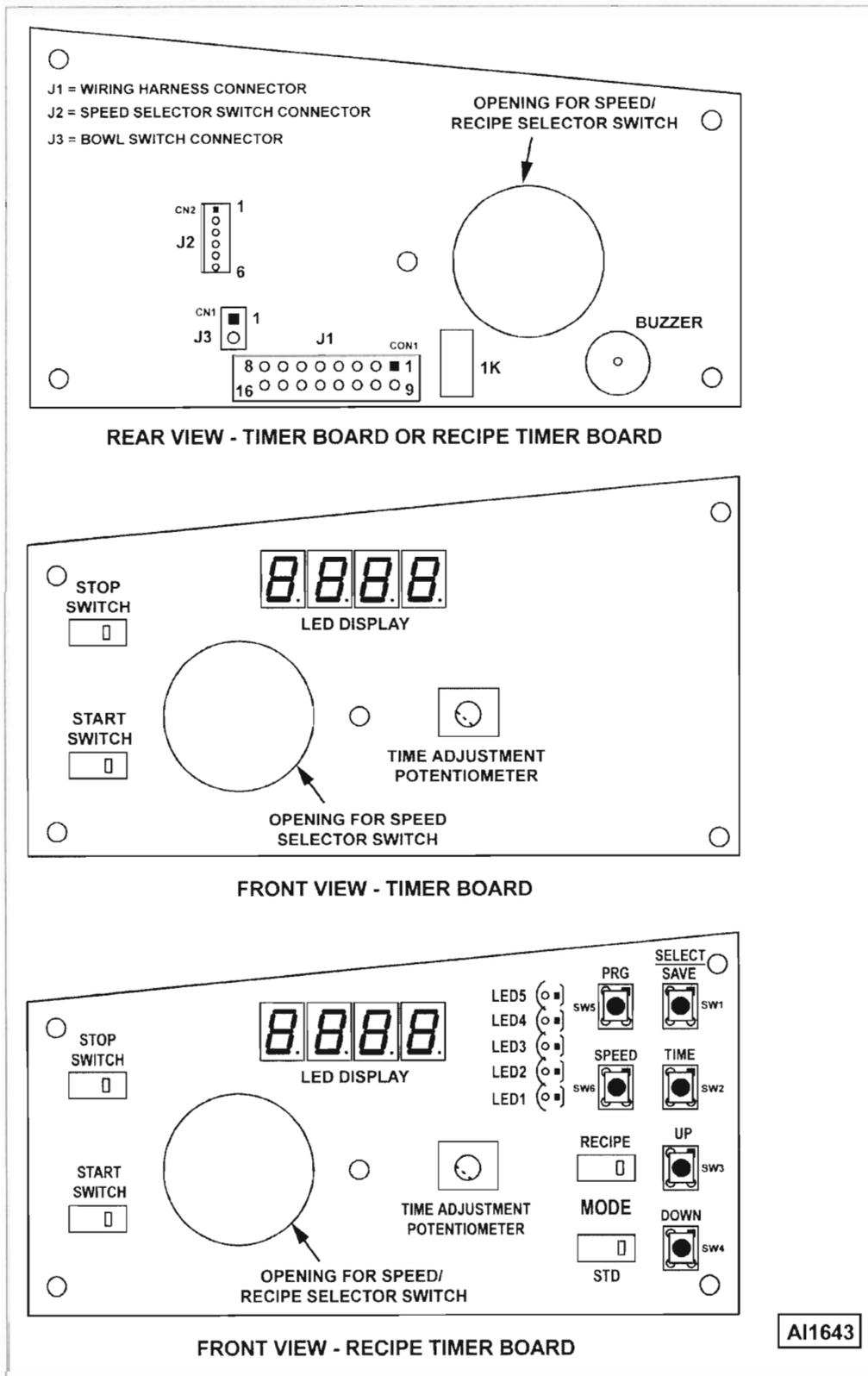
MAIN CIRCUIT TERMINALS

- L1/L = LINE 1 AC VOLTAGE IN.
- L2/N = LINE 2 OR NEUTRAL.
- G = GROUND.
- U
- V = 3 PHASE VOLTAGE
- W OUTPUT TO MOTOR\*.

\*OUTPUT VOLTAGE DEPENDS ON SPEED SETTING AND MIX LOAD.

AI1642

**TIMER BOARD LAYOUT**



## SEQUENCE OF OPERATION

### Mixer - Standard Timer Board

Refer to schematic diagram AI1644 for the electrical sequence of operation.

**NOTE:** The position of the time knob selects timer mode (countdown or count up). Set mix time between 00:10 seconds and 15:00 minutes, press 1PB start switch and timer counts down to zero then stops.

Rotate the time knob CCW until timer displays Hold and enters count up mode. Press 1PB start switch and the timer counts up continuously until 2PB stop switch is pressed.

1. Conditions.
  - A. Mixer connected to correct supply voltage and is properly grounded.
    - 1) Motor drive energized and self check performed.
    - 2) Motor drive passes self check and displays mix time or Hold.
 

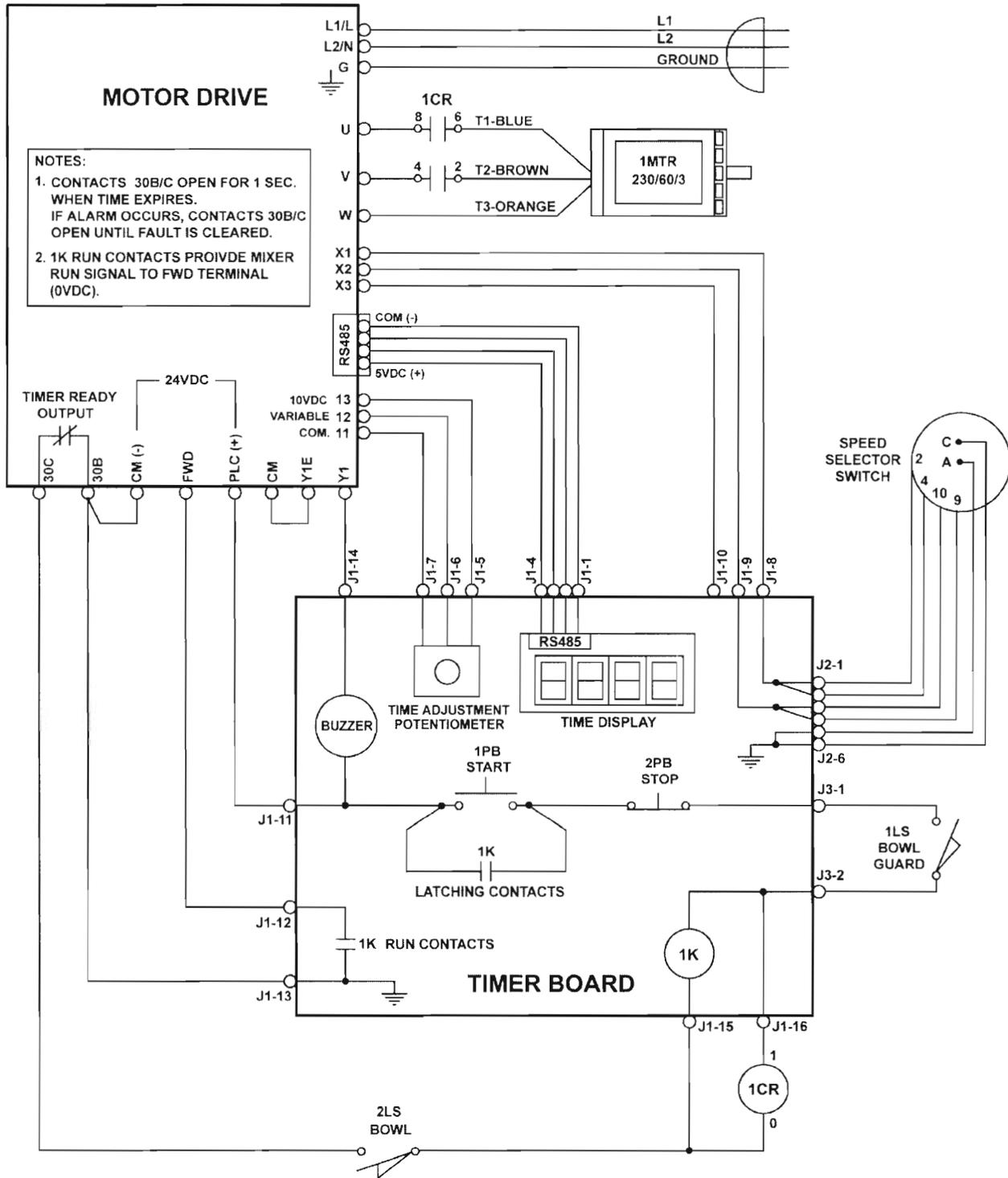
**NOTE:** The mix time will be the last time setting used for the speed selection (stir, speed 1, speed 2, speed 3).
    - 3) Motor drive PLC provides 24VDC to control circuit.
    - 4) Motor drive timer ready N.C. contacts 30 B/C provide the common to control circuit (common = 0VDC).
  - B. 1PB start switch N.O. contacts open.
    - 1) 1K N.O. latching circuit contacts open.
    - 2) 1K N.O. run contacts open.
  - C. 2PB stop switch N.C. contacts closed.
  - D. 1CR relay N.O. contacts 8/6 & 4/2 open.
  - E. 1LS bowl guard switch open.
    - 1) Wire cage of bowl guard open.
  - F. 2LS bowl switch open.
    - 1) Bowl down and swung out.
2. Bowl placed on support as instructed in operator manual.
3. Bowl swung in, raised to mix position and locked.
  - A. 2LS bowl switch closed.
4. Wire cage of bowl guard closed.
  - A. 1LS Bowl guard switch closed.
5. Set time and speed.
6. 1PB start switch operated (closed).
  - A. 1K relay coil initially energized thru 2PB stop switch and 1LS bowl switch.
    - 1) 1K run contacts close and provide the common signal (0VDC) to motor drive FWD.
    - 2) When 1PB start switch is released, 1K relay coil remains energized thru 1K latching circuit contacts.
  - B. 1CR relay coil energized and 1CR contacts 8/6 & 4/2 close.
7. With the common signal (0VDC) present at FWD, motor drive controls and monitors mixer operation.
  - A. Motor drive activates U, V, & W 3 phase voltage output to 1M motor.
 

**NOTE:** The motor drive varies the frequency and voltage output depending on speed setting and mix load.
  - B. Speed selector switch routes the motor drives internal voltage signals of 0VDC or 24VDC to motor drive X1 & X2.
    - 1) Motor drive evaluates the voltage signals at X1 & X2 and selects the speed.

- C. 1M motor is energized thru 1CR contacts.
  - D. Timer starts (countdown or count up).
    - 1) Depending on time knob position, the time adjustment potentiometer provides 0VDC to 10VDC from J-6 to motor drive 12.
8. Motor remains energized until one of the following occurs.
- A. 2PB stop switch opened.
  - B. 1LS bowl guard switch opened.
  - C. 2LS Bowl switch opened.
  - D. Timer reaches 00:00.
9. When 2PB stop switch is opened; or bowl guard is opened; or bowl is unlocked or lowered.
- A. 1CR relay coil de-energized and 1CR 8/6 & 4/2 contacts open.
    - 1) Power removed from 1M motor.
  - B. 1K relay coil de-energized and 1K latching circuit contacts open.
    - 1) 1K run contacts open and remove common signal (0VDC) from motor drive FWD.  
With signal removed from FWD, motor drive stops mixer operation.
    - 2) Motor drive de-activates U, V, & W 3 phase voltage output.
    - 3) Motor drive timer ready contacts 30 B/C open for 1 second to remove common signal (0VDC) from control circuit and then re-close.
    - 4) Remaining mix time is shown in display.
10. When timer reaches 00:00 minutes (countdown mode only).
- A. Motor drive timer ready contacts 30 B/C open for 1 second to remove common signal (0VDC) from control circuit and then re-close.
  - B. 1CR relay coil is de-energized and 1CR 8/6 & 4/2 contacts open.
    - 1) Power is removed from 1M motor.
  - C. 1K relay coil de-energized and 1K latching circuit contacts open.
    - 1) 1K run contacts open and remove common signal (0VDC) from motor drive FWD.  
With signal removed from FWD, motor drive stops mixer operation.
    - 2) Motor drive de-activates U, V, & W 3 phase voltage output.
    - 3) Motor drive activates Y1 and provides the common for 1 second to energize buzzer (buzzer sounds) then turns off.  
  
**NOTE:** The common from Y1 is provided thru the electronic control circuit of the motor drive and the external jumper connection between Y1E and CM.
    - 4) Mix time shown in display.
  - D. Mixer is ready for next time and speed operation or bowl removal.
11. When timer reaches 15:00 minutes (count up mode only).
- A. Motor drive activates Y1 and provides the common for 1 second to energize buzzer (buzzer sounds) then turns off.
  - B. Timer resets to 00:00. Timer and mixer operation continue until 2PB stop switch is pressed or power is removed from mixer.

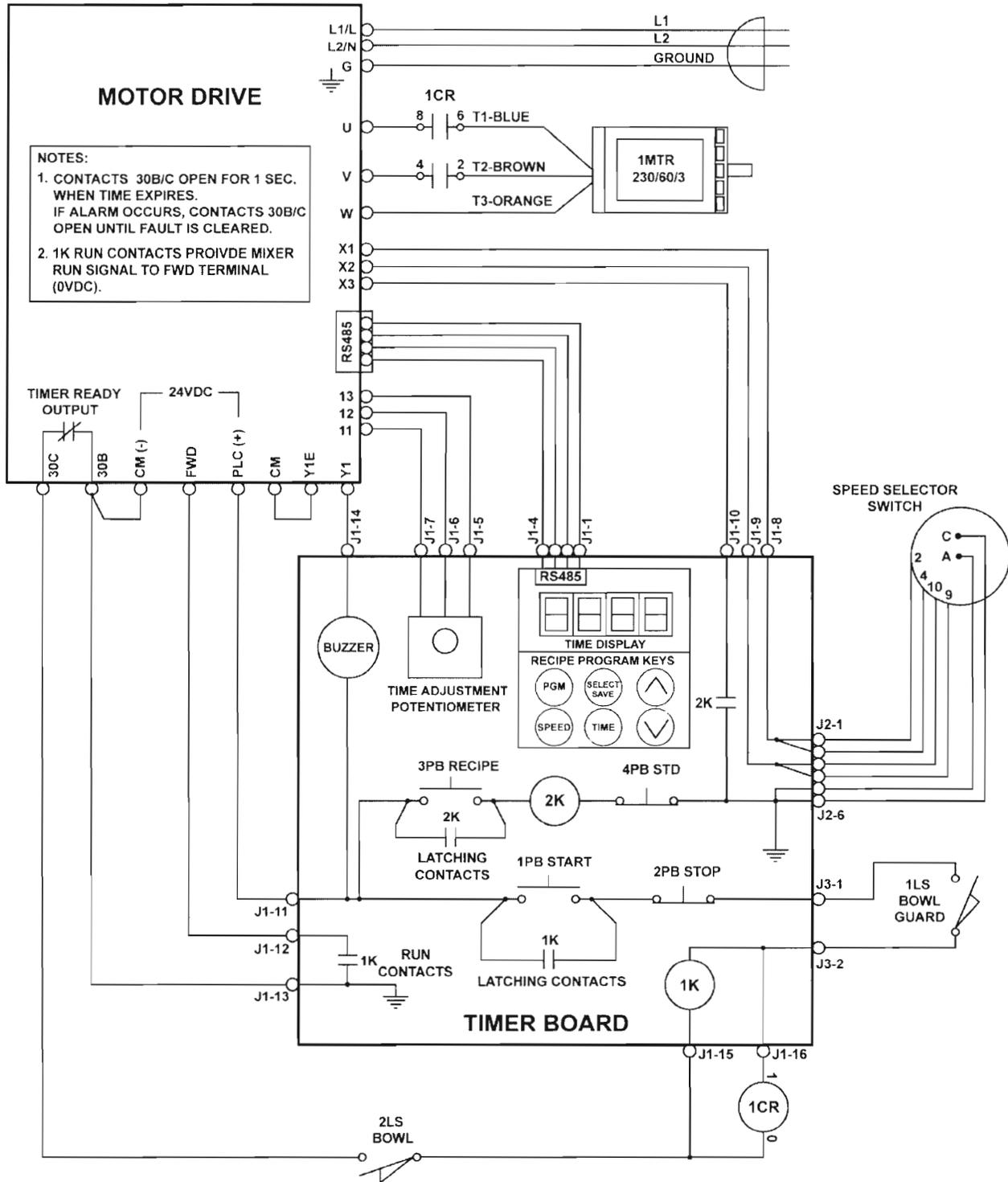
**SCHEMATIC DIAGRAMS**

**Mixer - Standard Timer Board**



**HL120 & HL200 LEGACY MIXERS  
STANDARD TIMER BOARD  
120/60/1  
240/60/1** A11644

Mixer - Recipe Timer Board

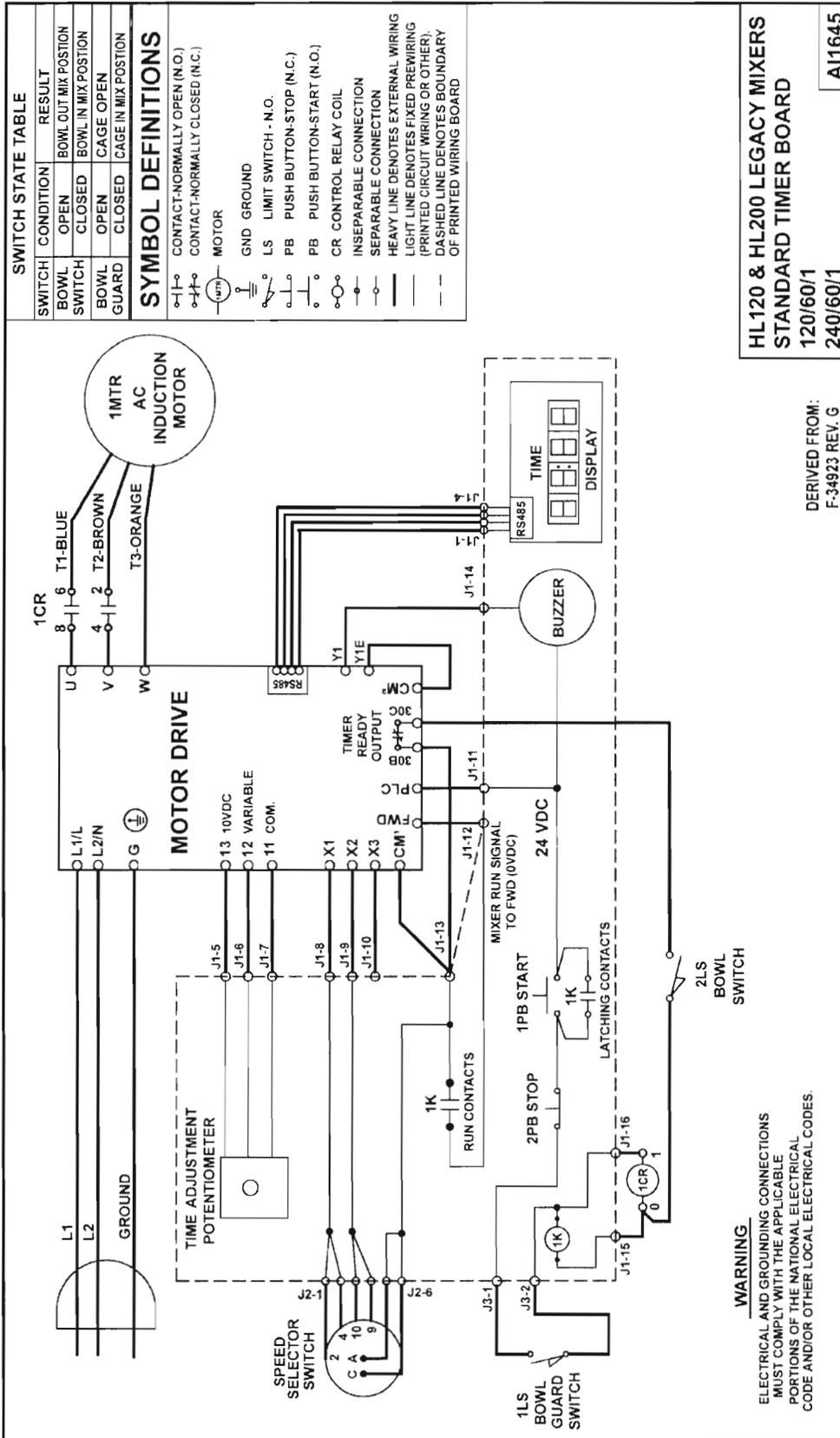


**NOTES:**  
 1. CONTACTS 30B/C OPEN FOR 1 SEC. WHEN TIME EXPIRES. IF ALARM OCCURS, CONTACTS 30B/C OPEN UNTIL FAULT IS CLEARED.  
 2. 1K RUN CONTACTS PROVIDE MIXER RUN SIGNAL TO FWD TERMINAL (0VDC).

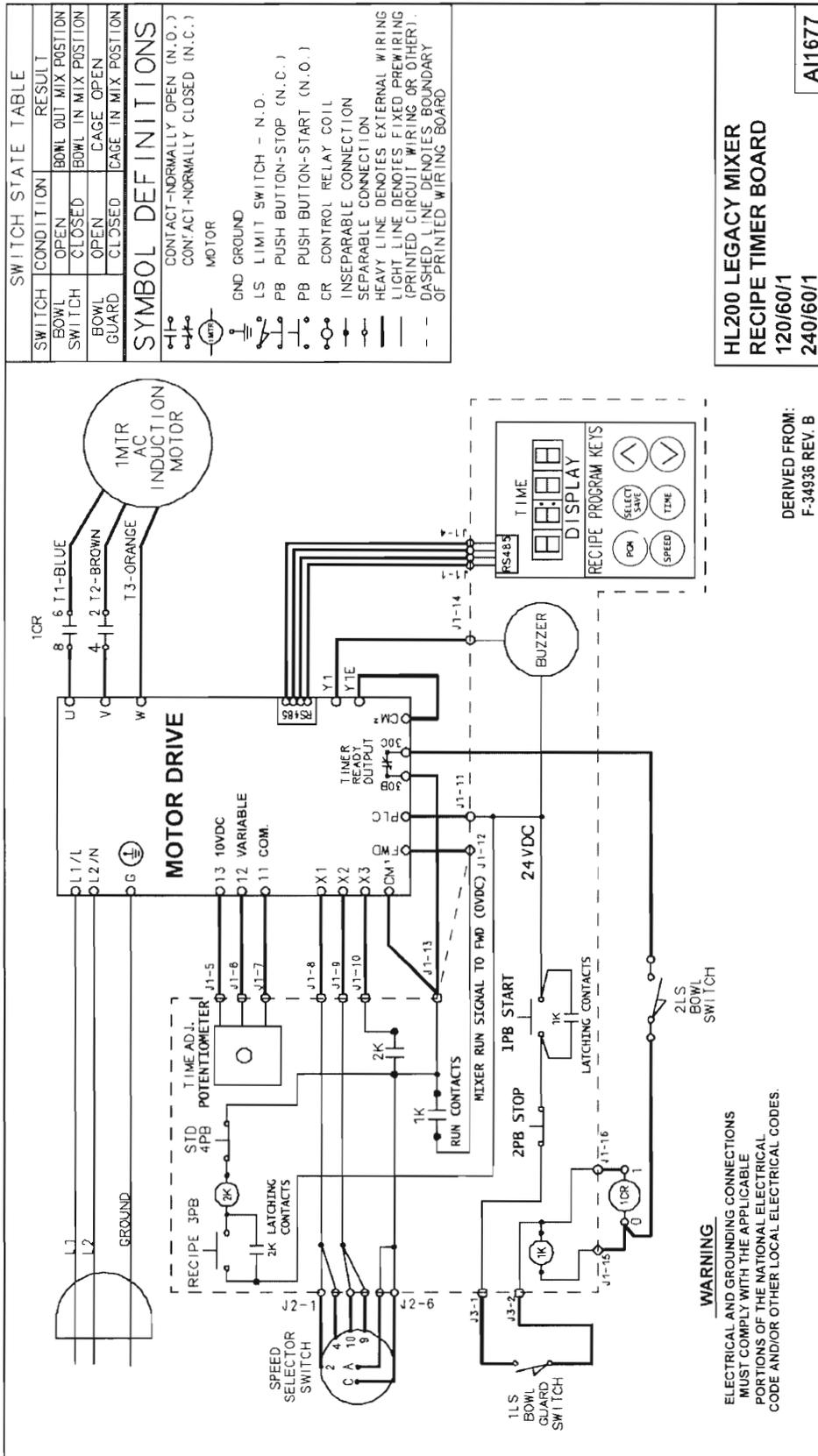
**HL200 LEGACY MIXER  
 RECIPE TIMER BOARD  
 120/60/1  
 240/60/1** **A11676**

**WIRING DIAGRAMS**

Mixer - Standard Timer Board



Mixer - Recipe Timer Board

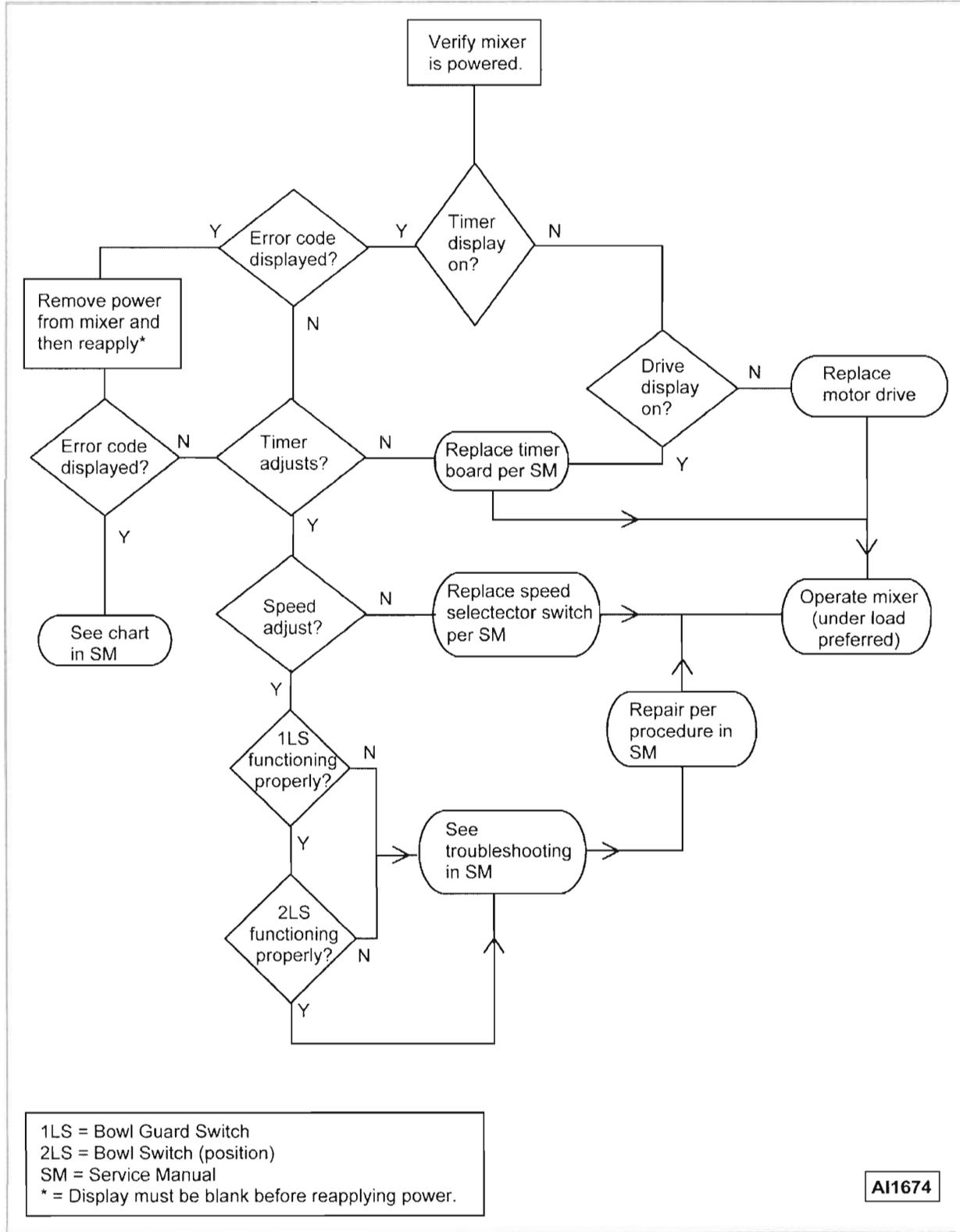


HL200 LEGACY MIXER  
RECIPE TIMER BOARD  
120/60/1  
240/60/1

AI1677

# TROUBLESHOOTING

## QUICK REFERENCE FLOW CHART



**NOTE:** If ALARM code is displayed on timer board, refer to ALARM CODES for complete description.

GENERAL - ALL MODELS	
SYMPTOM	POSSIBLE CAUSE
Mixer will not run (no timer board display).	<ol style="list-style-type: none"> <li>1. No voltage to machine.</li> <li>2. Timer board malfunction.</li> <li>3. Wiring harness connections loose or malfunction.</li> <li>4. Motor drive malfunction.</li> </ol>
Mixer will not run (timer board display on).	<ol style="list-style-type: none"> <li>1. 1LS bowl guard switch open or malfunction. Verify magnet in place on bowl guard and bowl guard switch operation.</li> <li>2. 2LS bowl switch open or malfunction. Verify magnet in place on bowl (rear) and bowl switch operation.</li> <li>3. Timer board malfunction. 1K run contacts are open (no input signal to motor drive FWD terminal); 1PB start switch or 2PB stop switch malfunction.</li> <li>4. 1CR control relay malfunction.</li> <li>5. Motor drive malfunction (timer ready contacts 30 B/C are open).</li> <li>6. Motor malfunction.</li> <li>7. Wiring harness connections loose or malfunction.</li> </ol>
Mixer will not run, but timer board counts up/down when start button is pushed.	<ol style="list-style-type: none"> <li>1. 1CR control relay malfunction.</li> <li>2. Wiring harness connections loose or malfunction.</li> <li>3. Timer board malfunction.</li> <li>4. Motor drive malfunction (timer ready contacts 30 B/C are open).</li> <li>5. Motor malfunction.</li> </ol>
Mixer runs, but stops when 1PB start switch is released.	<ol style="list-style-type: none"> <li>1. Timer board malfunction (1K latching contacts not closing).</li> </ol>
Mixer runs continuously, but will stop when 2PB stop switch is held IN, or bowl guard is opened, or bowl is lowered.	<ol style="list-style-type: none"> <li>1. Timer board malfunction (1PB start switch momentary contacts not opening; or 1K latching contacts not opening).</li> </ol>
Mixer motor hums and does not run.	<ol style="list-style-type: none"> <li>1. Supply voltage out of tolerance.</li> <li>2. 1CR control relay malfunction.</li> <li>3. Motor drive malfunction.</li> <li>4. Motor malfunction.</li> <li>5. Transmission malfunction.</li> <li>6. Batch size too large. See REFERENCE MATERIAL under GENERAL.</li> </ol>
Mixer shuts off during operation.	<ol style="list-style-type: none"> <li>1. Supply voltage out of tolerance.</li> <li>2. Batch size too large. See REFERENCE MATERIAL under GENERAL.</li> <li>3. Wiring incorrect from motor drive to motor.</li> <li>4. Motor overheated or malfunction.</li> <li>5. Motor drive overheated or malfunction.</li> <li>6. Timer board malfunction.</li> <li>7. 2LS bowl switch open or malfunction.</li> <li>8. 1LS bowl guard switch open or malfunction.</li> </ol>

GENERAL - ALL MODELS	
SYMPTOM	POSSIBLE CAUSE
Mixer lacks power.	<ol style="list-style-type: none"> <li>1. Supply voltage out of tolerance.</li> <li>2. Batch size too large. See REFERENCE MATERIAL under GENERAL.</li> <li>3. Wiring incorrect from motor drive to motor.</li> <li>4. Motor drive malfunction.</li> <li>5. Motor malfunction.</li> <li>6. Transmission malfunction.</li> </ol>
Mixer motor runs backwards.	<ol style="list-style-type: none"> <li>1. Wiring incorrect from motor drive to motor.</li> <li>2. Motor drive malfunction.</li> </ol>
Mixer noisy.	<ol style="list-style-type: none"> <li>1. Motor malfunction.</li> <li>2. Transmission gears worn (improperly meshing), low on grease or damaged.</li> <li>3. Bevel gear assembly or planetary shaft bevel gear worn (improperly meshing) or damaged.</li> <li>4. Internal gear and beater pinion of planetary are worn (improperly meshing) or low on grease.</li> <li>5. Worn bearings (agitator shaft, planetary shaft or worm wheel shaft).</li> <li>6. Wiring incorrect from motor drive to motor.</li> <li>7. Motor drive malfunction.</li> </ol>
Mixer runs, but planetary does not rotate.	<ol style="list-style-type: none"> <li>1. Key sheared at: <ol style="list-style-type: none"> <li>A. Worm on motor shaft.</li> <li>B. Worm wheel shaft.</li> <li>C. Middle key on planetary shaft.</li> <li>D. Lower key on planetary shaft.</li> </ol> </li> <li>2. Planetary or worm wheel shaft broken.</li> </ol>
Mixer planetary operates, but attachment hub does not rotate.	<ol style="list-style-type: none"> <li>1. Upper key sheared on planetary shaft.</li> <li>2. Bevel gear assembly or planetary shaft bevel gear worn (improperly meshing) or damaged.</li> </ol>
Agitator will not turn.	<ol style="list-style-type: none"> <li>1. Key sheared at beater pinion on agitator shaft.</li> </ol>
Not mixing ingredients at bottom of bowl.	<ol style="list-style-type: none"> <li>1. Bowl to beater clearance set incorrectly.</li> <li>2. Batch recipe incorrect. See REFERENCE MATERIAL under GENERAL.</li> <li>3. Incorrect agitator for recipe.</li> </ol>
Mixer appears to run in wrong speed.	<ol style="list-style-type: none"> <li>1. Speed selector switch malfunction.</li> <li>2. Motor drive X1, X2, X3 or CM terminal connections loose, wired incorrectly or wiring harness malfunction.</li> <li>3. Motor drive malfunction.</li> <li>4. Motor malfunction.</li> </ol>
Mixer runs in one speed only. (Changing speed selector switch has no affect)	<ol style="list-style-type: none"> <li>1. Speed selector switch malfunction.</li> <li>2. Motor drive X1, X2, X3 or CM terminal connections loose, wired incorrectly or wiring harness malfunction.</li> <li>3. Motor drive malfunction.</li> <li>4. Motor malfunction.</li> </ol>

GENERAL - ALL MODELS	
SYMPTOM	POSSIBLE CAUSE
Timer board problems: Can not adjust time. Can not select Hold Mode (continuous mixing with count up timing). Timer display does not count up. Timer display does not count down. Timer display blank. Segment missing from timer display. Mixer will not shut off at end of timed cycle.	<ol style="list-style-type: none"> <li>1. Timer board malfunction (time adjustment potentiometer; or other problems with the board).</li> <li>2. Wiring harness connections from motor drive RS485 to timer board are disconnected or malfunctioning.</li> <li>3. Motor drive malfunction (timer ready contacts 30 B/C are not opening for 1 second at the end of timed cycle).</li> </ol>
Grease leaking from planetary.	1. Spacer o-ring on planetary shaft.
Grease leaking from attachment hub.	1. Quad ring in attachment hub.

**NOTE:** The motor drive constantly monitors its operation while the mixer is running. If an alarm occurs during mixer operation, the motor drive recognizes a fault condition and immediately tries to reset the fault twice within 0.5 second intervals. If mixer operation continues, the automatic reset was successful. If the alarm was not reset, the motor drive enters Alarm Mode and displays a 3-digit alarm code that corresponds to the fault. The mixer will not operate until the alarm is cleared. To manually reset, cycle power to mixer. Wait till display goes out then reconnect power.

ALARM CODES			
Alarm Code	Fault Description	Possible Causes	Suggested Actions
OC1	Over current  (Protects motor drive)	1. Low supply voltage.	1. Check supply voltage to mixer. 2. Cycle power to mixer. Wait till display goes out then reconnect power.
OC2		2. Momentary power interruption.	
OC3		3. Batch size too large.	3. Reduce batch size. See REFERENCE MATERIAL under GENERAL.
		4. Motor drive terminals U, V or W short-circuited or grounded.	4. Check motor lead wire connections. 5. Check motor resistance. 6. Check resistance between motor drive terminals U, V & W.
OU1	Over voltage	1. High supply voltage.	1. Check supply voltage to mixer.
OU2	(DC Bus voltage		
OU3	≥373V)		
LU	Under voltage  (DC Bus voltage ≤ 255V)	<ol style="list-style-type: none"> <li>1. Low supply voltage.</li> <li>2. Momentary power interruption.</li> <li>3. Motor drive malfunction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check supply voltage to mixer. Leave DMM connected and check for sudden drops in supply voltage when mixer is turned ON (under load) along with other equipment on the same line.</li> <li>2. Cycle power to mixer. Wait till display goes out then reconnect power.</li> <li>3. Check DC bus circuit voltage at terminals P(+) &amp; N (-). If voltage reading is consistently low and supply voltage is within tolerance, replace motor drive.</li> </ol>

ALARM CODES			
Alarm Code	Fault Description	Possible Causes	Suggested Actions
OPL	Output phase loss to motor.	1. Lead wire or connection malfunction to motor. 2. Open circuit in motor windings. 3. Single phase motor installed; or motor not wired for 3 phase.	1. Check motor lead wire connections for tightness and continuity. If connections are loose then tighten. If a problem is found with the lead wires from motor drive to motor, replace the malfunctioning component (wiring harness; or motor). 2. Check motor resistance. 3. Motor drive requires a 3 phase AC motor. Verify this type of motor is installed and is wired for 3 phase.
		4. 1CR control relay malfunction.	4. Check for 24VDC at 1CR relay coil. If voltage is present but 1CR contacts 6/8 or 2/4 are not closing, replace 1CR control relay. If 24VDC is not present, check voltage at motor drive terminals 30C to PLC and verify 1LS bowl switch and 2LS bowl guard switch are closed. If a problem is found with 1LS, 2LS or motor drive, replace the malfunctioning component.
		5. Motor drive malfunction (no output voltage; or output voltage phase lost).	5. Replace motor drive.
OH1	Over heating at heat sink.  (Protects motor drive)	1. Motor drive heat sink temperature above 194°F.	1. Disconnect power to mixer and allow motor drive to cool. 2. Check bottom cover vent for clogging. Check motor drive heat sink fins for clogging. Remove debris. 3. Reduce room ambient temperature; or move mixer to a cooler location (away from heat sources).
		2. Motor drive malfunction.	4. If over heating occurs repeatedly, replace motor drive.
OL1	Electronic thermal overload relay tripped.  (Protects motor )	1. Mixing in Stir speed. 2. Batch size too large. 3. Low supply voltage causing low motor torque.	1. Select Speed 1 or Speed 2 for mixing. 2. Reduce batch size. See REFERENCE MATERIAL under GENERAL. 3. Check supply voltage to mixer.
		4. Motor malfunction.	4. Check motor resistance.
		5. Motor drive malfunction.	5. Replace motor drive.
OLU	Motor drive over loaded.  (Protects motor drive)	1. Batch size too large. 2. Motor drive ambient temperature above 122°F.	1. Reduce batch size. See REFERENCE MATERIAL under GENERAL. 2. Check bottom vent cover for clogging. Check motor drive heat sink fins for clogging. Remove debris. 3. Reduce room ambient temperature; or move mixer to a cooler location (away from heat sources).

ALARM CODES			
Alarm Code	Fault Description	Possible Causes	Suggested Actions
Er1	Memory error.	1. Momentary power interruption or power loss while motor drive was storing data.	1. Cycle power to mixer. Wait till display goes out then reconnect power. If this does not clear the alarm code, replace motor drive.
Er2	Timer board communication error.	1. RS485 wiring connections loose, disconnected or malfunctioning.	1. Check plugs for proper insertion into sockets (RJ45 and 16 pin). 2. Check RS485 lead wire connections J1-1 thru J1-4 for tightness and proper insertion into 16 pin sockets and plugs from motor drive to timer board. If no continuity, replace the malfunctioning harness.
		3. Timer board malfunction. 4. Motor drive malfunction.	3. Replace timer board (if harness ok). 4. Replace motor drive (if timer board and harness ok).
Er3	CPU error.	1. Motor drive malfunction.	1. Cycle power to mixer. Wait till display goes out then reconnect power. If this does not clear the alarm code, replace motor drive.
ErF	Data save error during undervoltage.	1. Momentary power interruption or power loss while motor drive was storing data.	1. Cycle power to mixer. Wait till display goes out then reconnect power. If this does not clear the alarm code, replace motor drive.

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**- NOTES -**

# CONDENSED SPARE PARTS LIST

HL120 AND HL200 LEGACY MIXERS	
Part No.	Description
23482	Seal, Grease
87711-352	Switch, Reed
87714-67-1	Relay
114695	Seal, Oil
874809	Knob
874816	Carrier
874816-2	Carrier, Slotted
874831	Switch, Speed Selector
874847	Housing, Magnet
874886	Holder, Lower
874887	Holder, Upper
874875	Magnet, Disc
874883	PCB, Timer (Std. Timer Board)
OR 001-3	Quad Ring

**SECTION 4**

**CATALOG OF REPLACEMENT PARTS**

**HOBART LEGACY**

**12 & 20 QUART MIXERS**

**MODELS HL120 & HL200**





# CATALOG OF REPLACEMENT PARTS



## LEGACY MIXER

HL120	ML-134296
HL200	ML-134289
HL200	ML-134331
HL200C	ML-134312

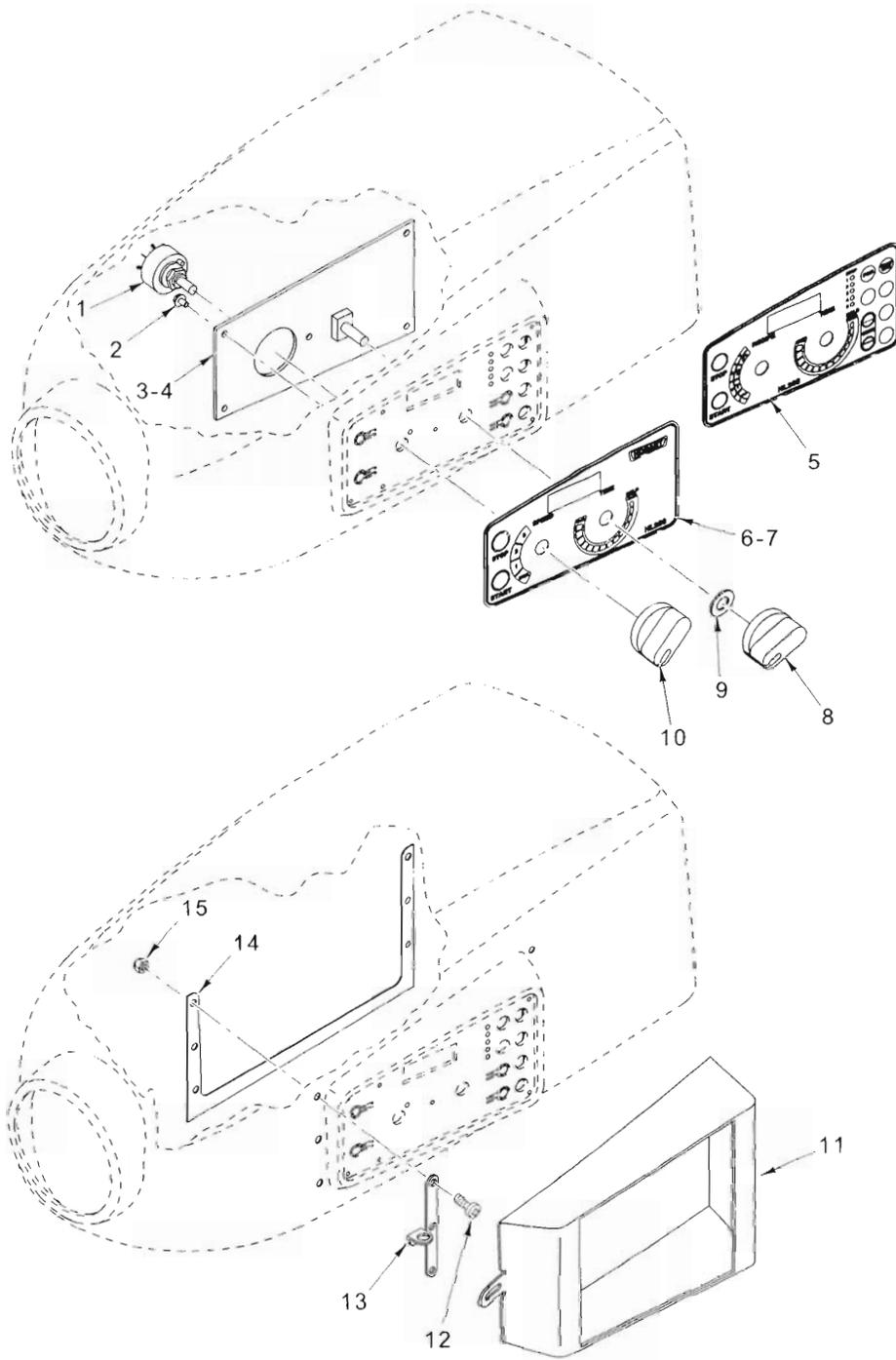
### PREVIOUS MLS COVERED IN THIS MANUAL

HL200	ML-134308
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7	ATTACHMENT HUB
9	BASE AND PEDESTAL
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12	BOWL SUPPORT
13	TRANSMISSION CASE AND MOTOR
15	TRANSMISSION
17	PLANETARY
19	BOWL AND BOWL GUARD
21	AGITATORS AND ACCESSORIES
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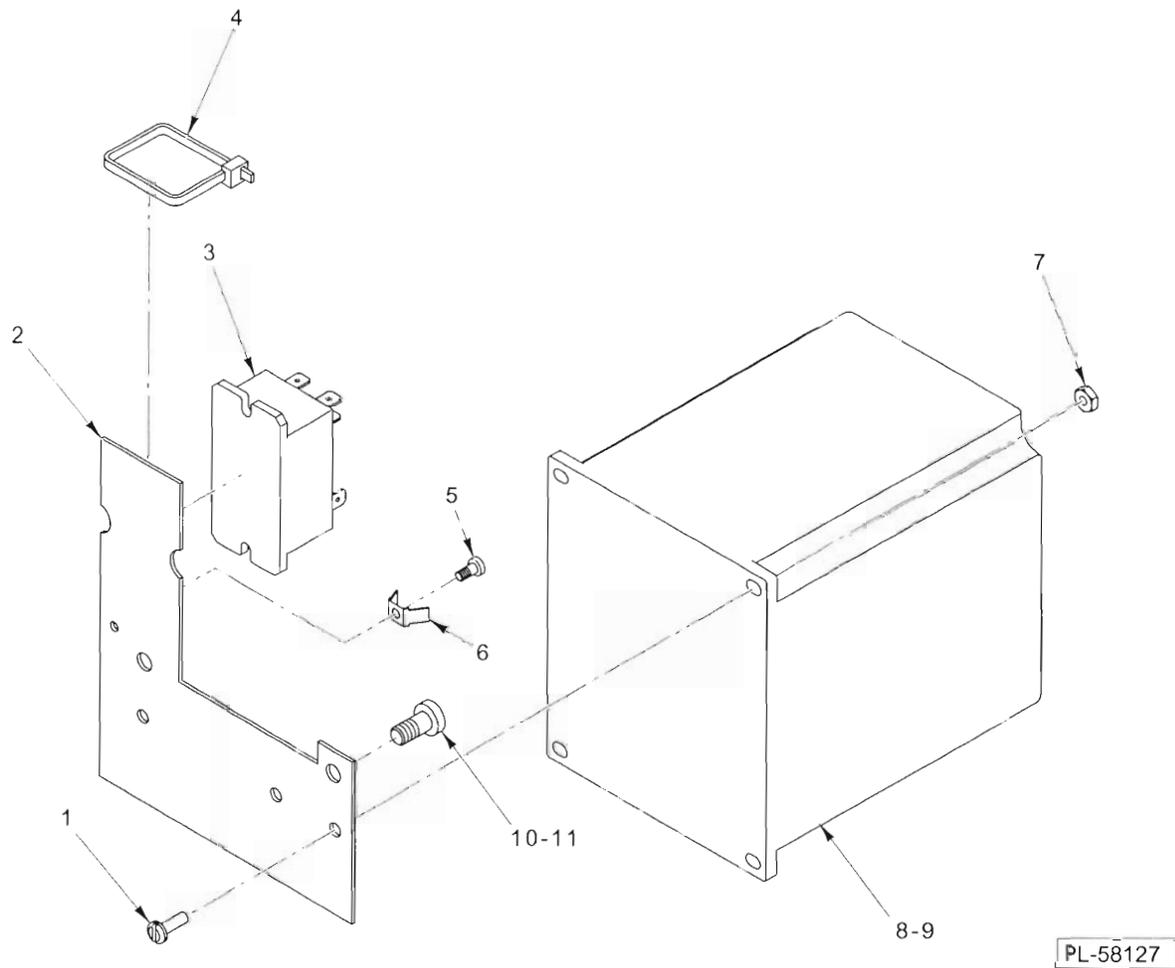


PL-58126

**CONTROL PANEL**

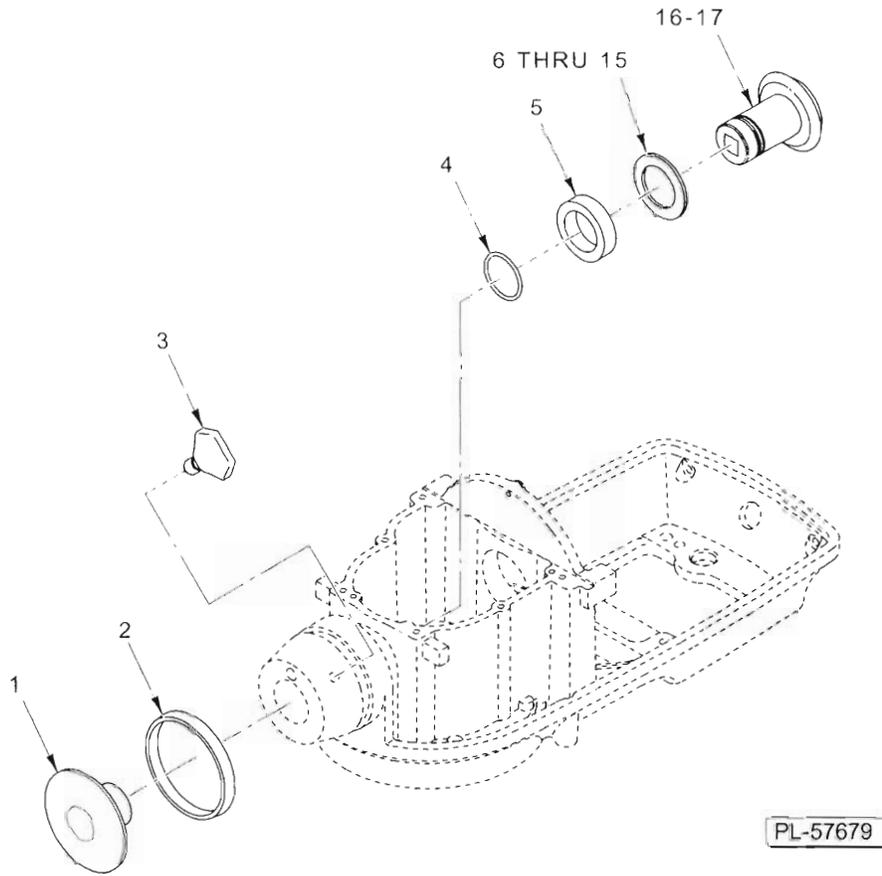
**CONTROL PANEL**

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58126			
1	00-874831	Switch – Speed Selector Assy. ....	1
2	SD-039-23	Self-Tapping Screw 6-32 x 1/4 Hex Washer Hd., Type RL.....	5
3	00-874883	Board – Timer .....	1
4	00-874806	Board – Timer (Recipe) (ML-134289).....	1
5	00-874811	Overlay (W/Recipe Timer) (ML-134289).....	1
6	00-874881	Overlay (W/O Recipe Timer) (ML-134289, ML-134308, ML-134331, & ML-134312).....	1
7	00-874868	Overlay (ML-134296).....	1
8	00-874809	Knob .....	1
9	WS-031-44	Washer.....	1
10	00-874809	Knob .....	1
11	00-874921	Cover – Weldment (ML-134312) .....	1
12	SC-128-62	Mach. Screw 10-24 x 1/2 Tx. Button Hd. (ML-134312).....	6
13	00-874923	Latch (ML-134312) .....	1
14	00-874931	Plate – Backer (ML-134312).....	1
15	NS-038-13	Lock Nut 10-24 Hex (ML-134312) .....	6



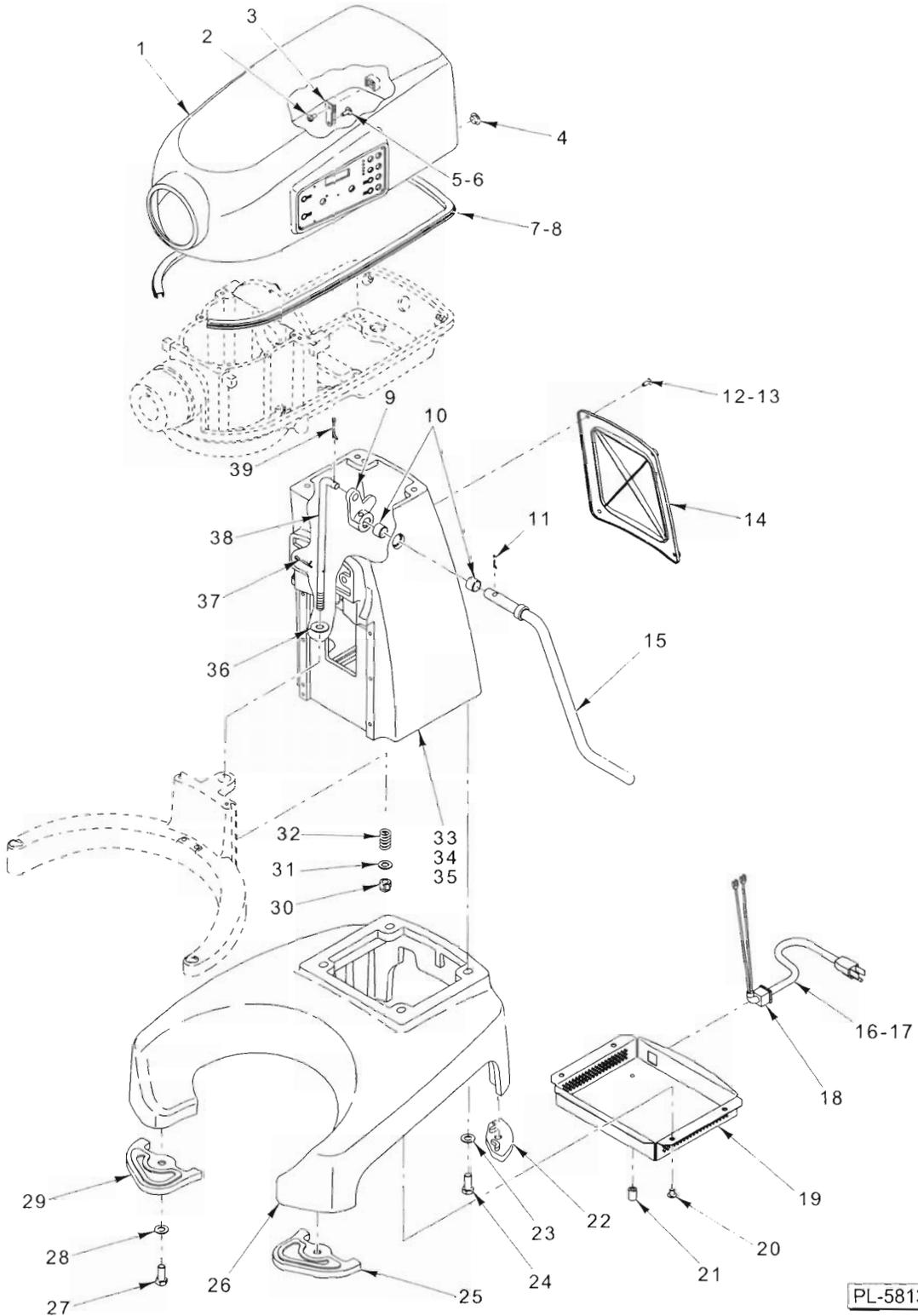
**ELECTRICAL COMPONENTS**

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58127			
1	SC-018-38	Mach. Screw 8-32 x 1/2 Slotted Pan Hd. ....	2
2	00-874763	Bracket – Controller .....	1
3	00-087714-042-5	Relay (2 Pole, 30 Amp.).....	1
4	00-539847	Tie – Cable 8 In.....	1
5	SD-015-37	Self-Tapping Screw 6-32 x 1/4 Phil. Pan Hd., Type TT.....	1
6	00-065890-00090	Terminal (2-Tab).....	1
7	NS-009-12	Mach. Nut 8-32 Hex.....	2
8	00-874775-00002	Motor Drive (120 V.).....	1
9	00-874776-00002	Motor Drive (240 V.) (ML-134289, ML-134296, ML-134331, & ML-134308) .....	1
10	SC-114-80	Mach. Screw 1/4-20 x 3/8 Slotted Pan Hd. ....	2
11	SC-089-01	Cap Screw 1/4-20 x 1/2 Hex Socket Hd. (ML-134308 & ML-134331).....	2



**ATTACHMENT HUB**

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-57679			
1	00-114824-00001	Plug - Attachment.....	1
2	00-874925-00004	Seal - Neopreme.....	1
3	00-108197-00001	Screw - Thumb 1.125.....	1
4	OR-001-03	O-Ring - Quad.....	1
5	00-874837	Spacer.....	1
6	00-012746-00005	Washer - Thrust (0.080).....	AR
7	00-012746-00006	Washer - Thrust (0.106).....	AR
8	00-012746-00007	Washer - Thrust (0.092).....	AR
9	00-012746-00008	Washer - Thrust (0.086).....	AR
10	00-012746-00009	Washer - Thrust (0.098).....	AR
11	00-012746-00010	Washer - Thrust (0.112).....	AR
12	00-012746-00012	Washer - Thrust (0.119).....	AR
13	00-012746-00013	Washer - Thrust (0.121).....	AR
14	00-012746-00016	Washer - Thrust (0.129).....	AR
15	00-012746-00019	Washer - Thrust (0.115).....	AR
16	00-435065-00002	Bevel Gear Seal Assy. (Incls. Item 17).....	1
17	PL-003-17	Plug - Expansion.....	1

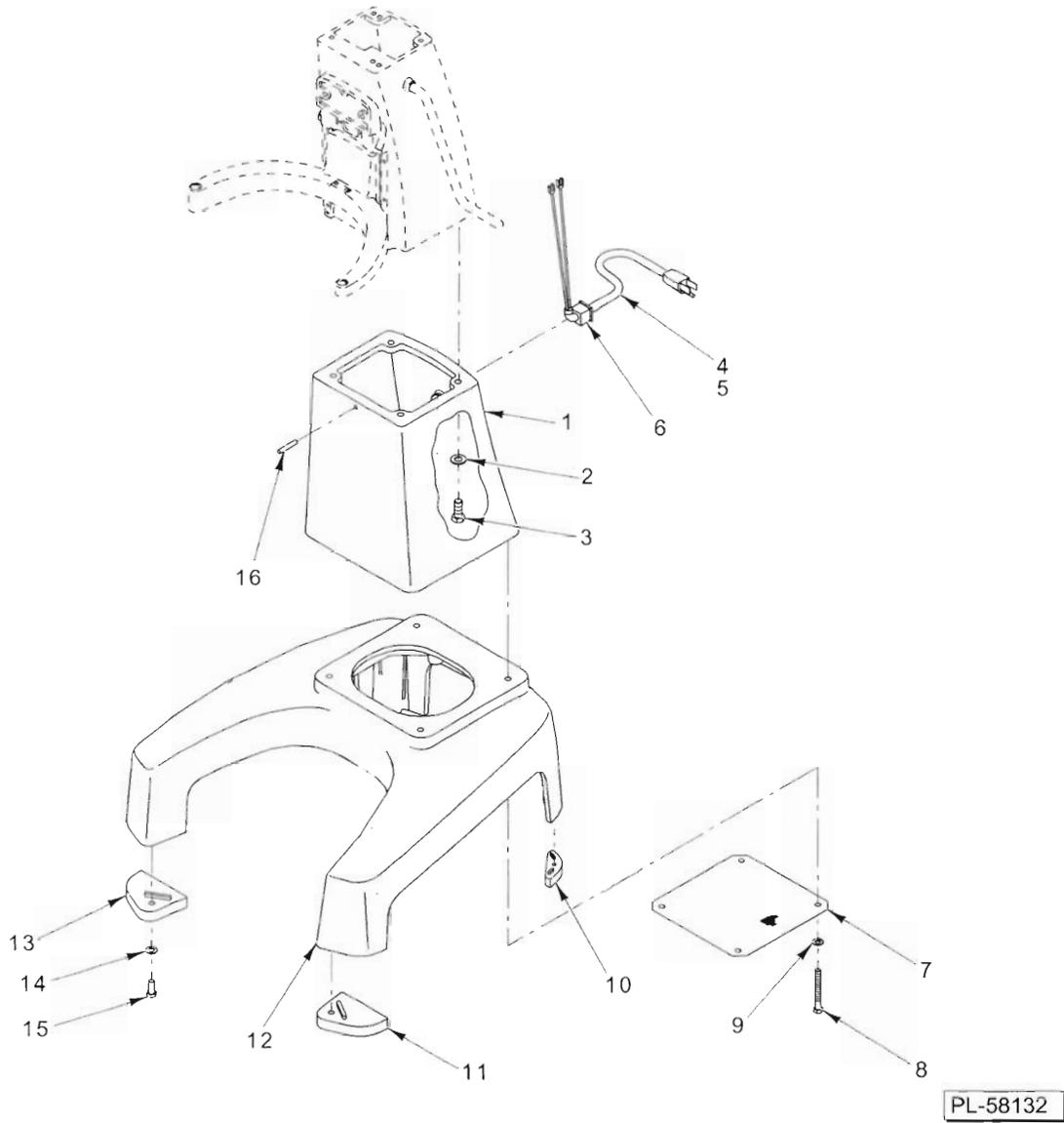


PL-58131

**BASE AND PEDESTAL**

## BASE AND PEDESTAL

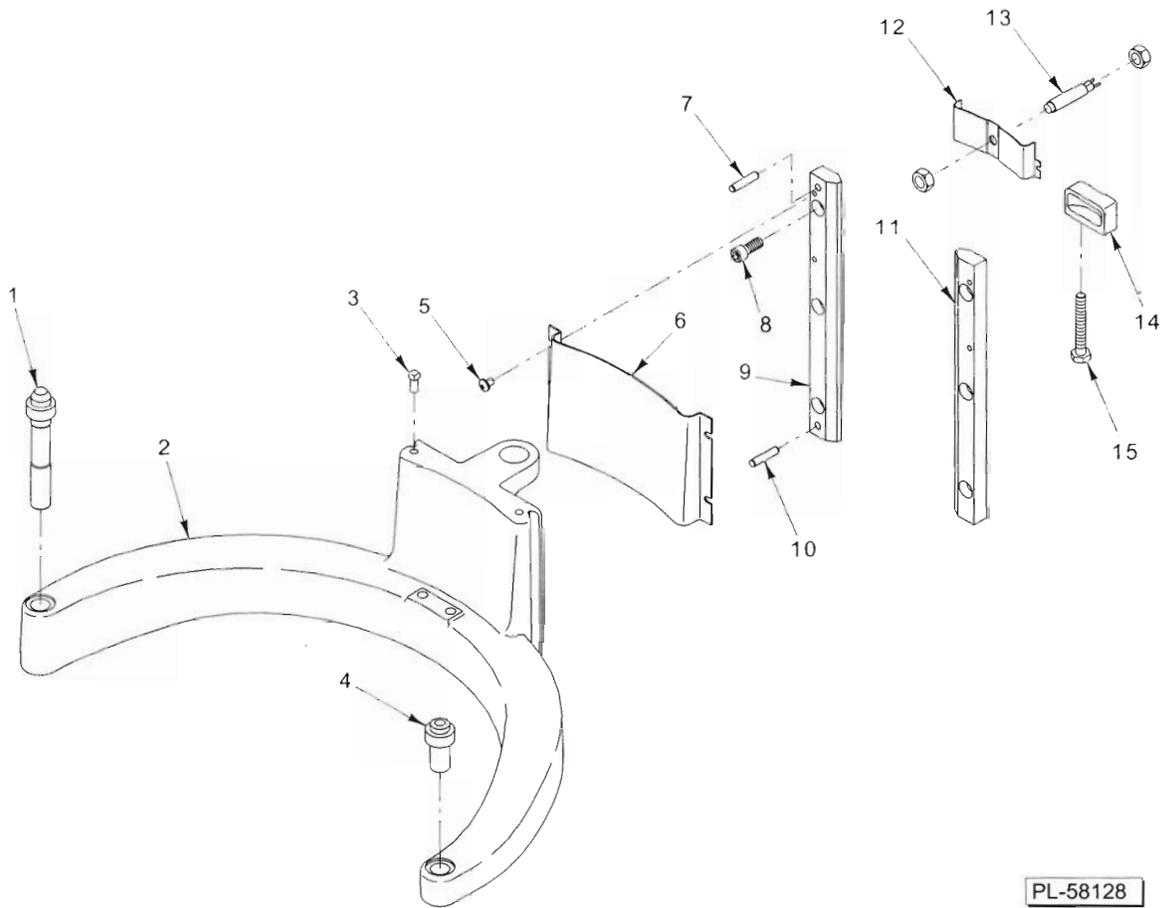
ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58131			
1	00-916262	Cover – Top .....	1
2	SD-024-01	Self-Tapping Screw 10-24 x 3/8 Slotted Pan Hd., Type TT .....	2
3	00-874829	Tab – Cover Mounting .....	2
4	00-874857	Plug – Hole .....	1
5	SC-066-20	Mach. Screw 10-32 x 1/2 Phil. Truss Hd. (SST) .....	2
6	SC-128-81	Mach. Screw 10-32 x 1/2 Tx. Button Hd. (ML-134312) .....	2
7	00-874925-00001	Seal – Neopreme .....	1
8	00-874925-00002	Seal – Neopreme .....	1
9	00-874756	Arm – Bowl Lift .....	1
10	00-479510	Bushing – Bowl Lift .....	2
11	PS-004-15	Pin – Spirol (1/4) .....	1
12	SC-015-34	Mach. Screw 10-24 x 1/2 Slotted Oval Hd. ....	4
13	SC-128-75	Mach. Screw 10-24 x 5/8 Flat. Hd. (SST) (ML-134312) .....	4
14	00-874749	Cover – Pedestal (Back) .....	1
15	00-874745-00002	Handle & Bushing – Bowl Lift .....	1
16	00-874833-00001	Cord & Plug Assy. (120 V.) .....	1
17	00-874833-00002	Cord & Plug Assy. (220 V.) (ML-134289 & ML-134296) .....	1
18	FE-026-34	Relief – Strain (Electrical) (ML-134289, ML-134296, & ML-134312) .....	1
19	00-874760	Cover – Controller (ML-134289, ML-134296, & ML-134312) .....	1
20	SC-114-80	Mach. Screw 1/4-20 x 3/8 Phil. Pan Hd. (ML-134289, ML-134296, & ML-134312) .....	4
21	FE-026-43	Bushing – Electric Snap (ML-134296 & ML-134289) .....	1
22	00-874879	Pad – Rear (ML-134289, ML-134296, & ML-134312) .....	2
23	WS-018-24	Washer (ML-134289, ML-134296, & ML-134312) .....	4
24	SC-118-11	Cap Screw 3/8-16 x 7/8 Hex Hd. (ML-134289, ML-134296, & ML-134312) .....	4
25	00-874896	Pad – Front (RH) (ML-134289, ML-134296, & ML-134312) .....	1
26	00-874720-00002	Base (ML-134289, ML-134296, & ML-134312) .....	1
27	SC-118-12	Cap Screw 3/8-16 x 3/4 Hex Hd. (ML-134289, ML-134296, & ML-134312) .....	4
28	WS-018-34	Washer (ML-134289, ML-134296, & ML-134312) .....	4
29	00-874878	Pad – Front (LH) (ML-134289, ML-134296, & ML-134312) .....	4
30	NS-036-15	Stop Nut 3/8-24 Special .....	1
31	WS-006-26	Washer .....	1
32	00-012782	Spring .....	1
33	00-874723-00002	Pedestal .....	1
34	00-874925-00003	Seal – Neopreme .....	1
35	SC-100-08	Mach. Screw 1/4-20 x 3/8 Hex Washer Hd. ....	2
36	WS-006-26	Washer .....	1
37	PC-003-55	Cotter Pin 1/8 .....	1
38	00-874748	Rod – Bowl Lift .....	1
39	PC-003-55	Cotter Pin 1/8 .....	1



**FLOOR BASE AND PEDESTAL (ML-134308& ML-134331)**

**FLOOR BASE AND PEDESTAL (ML-134308 & ML-134331)**

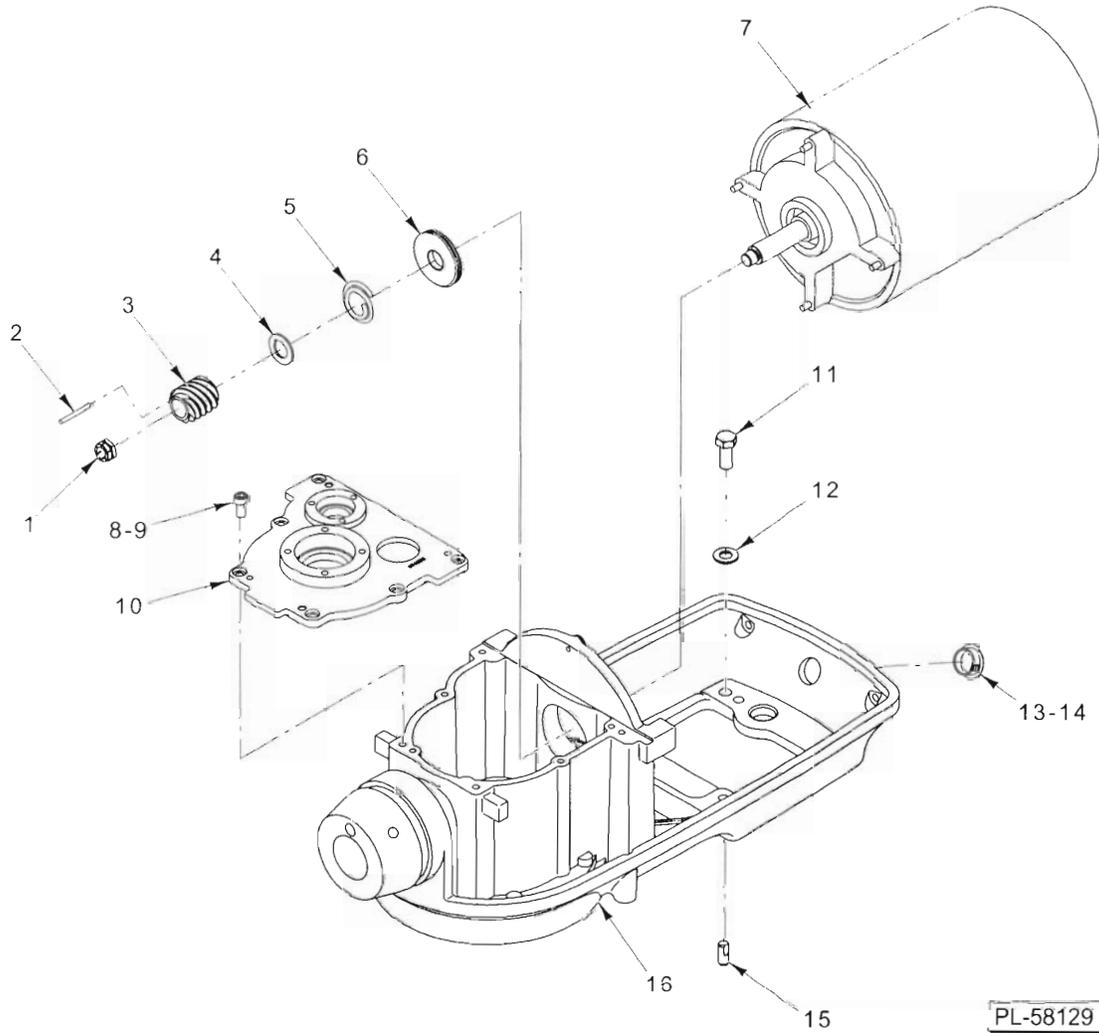
ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58132			
1	00-916222-00002	Block – Riser.....	1
2	WS-018-24	Washer.....	8
3	SC-118-10	Cap Screw 3/8-16 x 1 Hex Hd.....	4
4	00-874833-00001	Cord & Plug Assy. (120 V.).....	1
5	00-874833-00002	Cord & Plug Assy. (220 V.).....	1
6	FE-022-84	Relief – Strain (Electrical).....	1
7	00-916330	Screen – Air Floor.....	1
8	SC-124-91	Cap Screw 3/8-16 x 2 1/2 Hex Hd.....	4
9	WS-018-24	Washer.....	8
10	00-916309	Pad – Rear.....	2
11	00-916308	Pad – Front (RH).....	1
12	00-916213-00002	Base.....	1
13	00-916307	Pad – Front (LH).....	1
14	WS-018-34	Washer.....	4
15	SC-118-12	Cap Screw 3/8-16 x 3/4 Hex Hd.....	4
16	PG-005-25	Pin – Grooved.....	1



PL-58128

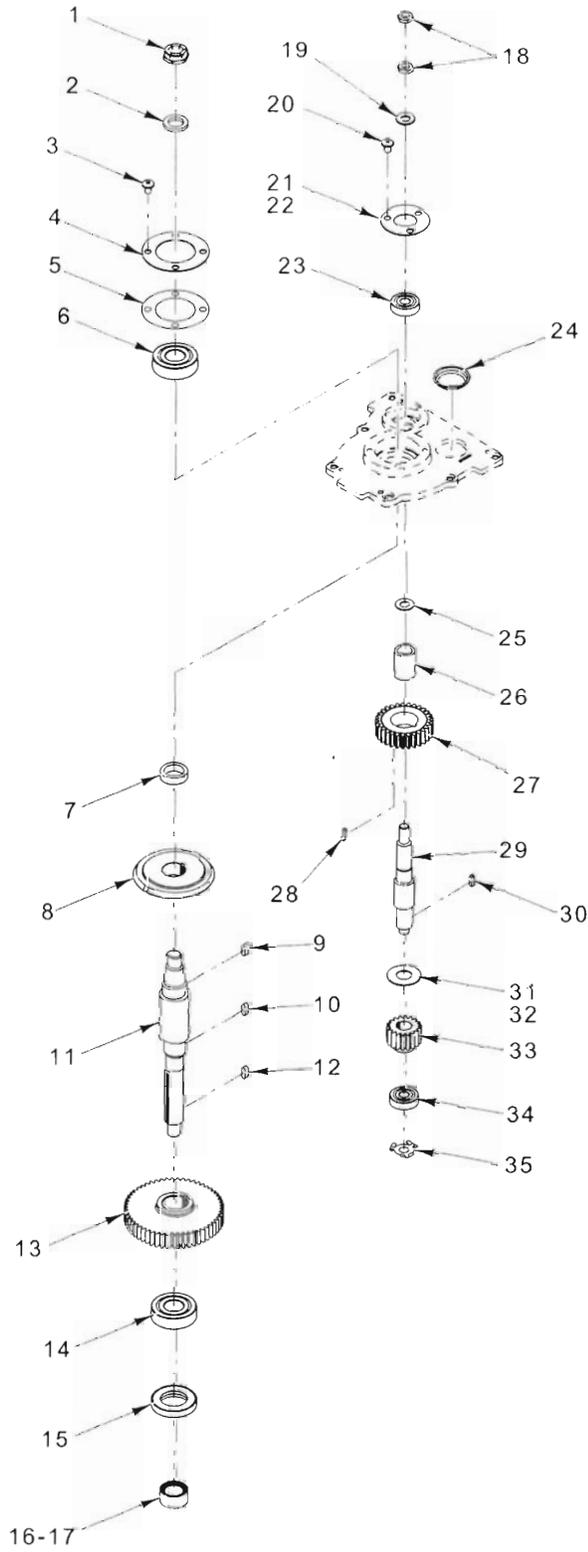
### BOWL SUPPORT

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58128			
1	00-874726	Pin - Bowl (LH).....	1
2	00-874841-00002	Support - Bowl.....	1
3	SC-129-22	Set Screw 1/4-20 x 1/4 Sq. Hd. Cup Pt.....	2
4	00-874727	Pin - Bowl (RH).....	1
5	SC-122-59	Mach. Screw 8-32 x 1/4 Phil. Pan Hd. (SST).....	4
6	00-874742	Apron.....	1
7	00-011800-00187	Dowel.....	2
8	SC-040-09	Cap Screw 1/4-20 x 1 1/4 Hex Socket Hd.....	6
9	00-874738-00001	Slideway - Bowl Lift (LH).....	1
10	00-011800-00187	Dowel.....	2
11	00-874738-00002	Slideway - Bowl Lift (RH).....	1
12	00-874884	Cover - Bowl Interlock.....	1
13	00-087711-00352	Switch - Reed.....	1
14	00-874842	Hold Down - Bowl (Rear).....	1
15	SC-062-69	Cap Screw 1/4-20 x 1 3/4 Hex Hd.....	2
	PB-004-97	Cap.....	4



**TRANSMISSION CASE AND MOTOR**

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58129			
1	NS-032-23	Lock Nut $\frac{7}{16}$ -20 Special .....	1
2	00-012430-00004	Key $\frac{1}{8}$ x $\frac{1}{8}$ x $1\frac{1}{4}$ .....	1
3	00-291221	Worm – Gear 60 Cycle .....	1
4	00-012754	Washer.....	1
5	00-012757	Absorber – Shock Spring.....	1
6	00-874820	Deflector – Grease (LH).....	1
7	00-874634	Motor.....	1
8	SC-089-01	Cap Screw $\frac{1}{4}$ -20 x $\frac{1}{2}$ Hex Socket Hd. (HL200).....	6
9	SC-089-02	Cap Screw $\frac{1}{4}$ -20 x $\frac{3}{4}$ Hex Socket Hd. (HL120).....	6
10	00-874755	Cover – Transmission .....	1
11	SC-118-11	Cap Screw $\frac{3}{8}$ -16 x $\frac{7}{8}$ Hex Hd.....	4
12	WS-018-24	Washer.....	4
13	00-874857	Plug.....	1
14	00-874876	Plug – Cupped Expansion .....	1
15	00-270776	Dowel.....	2
16	00-874783	Transmission Case – Lower .....	1

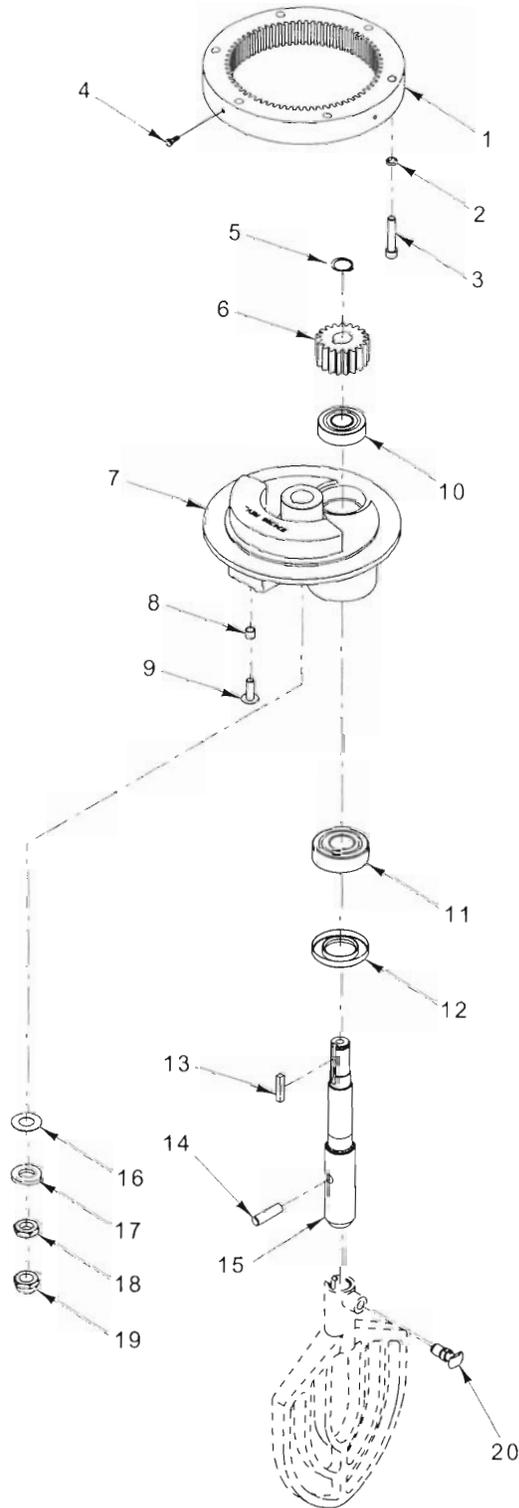


PL-58130

**TRANSMISSION**

## TRANSMISSION

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58130			
1	NS-032-37	Lock Nut $\frac{5}{8}$ -18 Special .....	1
2	WS-031-41	Washer.....	1
3	SC-114-80	Mach. Screw $\frac{1}{4}$ -20 x $\frac{3}{8}$ Phil. Pan Hd. ....	4
4	00-874787	Retainer – Planetary Bearing.....	1
5	00-874795	Gasket – Bearing.....	1
6	BB-005-34	Bearing – Ball .....	1
7	00-874793	Spacer – Planetary .....	1
8	00-124733-00002	Gear – Bevel (46T, 14P).....	1
9	00-874873-00001	Key.....	1
10	00-874873-00002	Key.....	1
11	00-874635	Shaft – Planetary .....	1
12	00-012430-00017	Key $\frac{1}{8}$ x $\frac{1}{8}$ x $2\frac{7}{16}$ .....	1
13	00-874778	Gear (55T, 14P).....	1
14	BB-020-06	Bearing – Ball Fafnir 204K.....	1
15	00-114695	Seal – Oil.....	1
16	00-437342	Spacer – Bearing .....	1
17	00-067500-00078	O-Ring .....	1
18	00-012710	Nut – Retaining .....	2
19	WS-006-36	Washer (ML-134289, ML-134308, ML-134331, & ML-134312).....	1
20	SC-114-80	Mach. Screw $\frac{1}{4}$ -20 x $\frac{3}{8}$ Phil. Pan Hd. ....	3
21	00-874788	Retainer – Bearing.....	1
22	BB-005-02	Bearing – Ball .....	1
23	BB-005-01	Bearing – Ball Fafnir 200K.....	1
24	00-064871	Plug – Friction.....	1
25	WS-006-26	Washer.....	1
26	00-874780	Spacer – Gear .....	1
27	00-874934	Gear – Worm (29T).....	1
28	00-012430-00024	Key $\frac{1}{8}$ x $\frac{1}{8}$ x $1\frac{1}{2}$ .....	1
29	00-874779	Shaft – Worm Wheel.....	1
30	00-012430-00024	Key $\frac{1}{8}$ x $\frac{1}{8}$ x $1\frac{1}{2}$ .....	1
31	WS-010-36	Washer (ML-134296 & ML-134289) .....	1
32	WS-006-26	Washer (ML-134308, ML-134331, & ML-134312).....	1
33	00-874777	Gear (18T, 14P) .....	1
34	BB-005-01	Bearing – Ball Fafnir 200K.....	1
35	SL-002-08	Spring – Loading.....	1

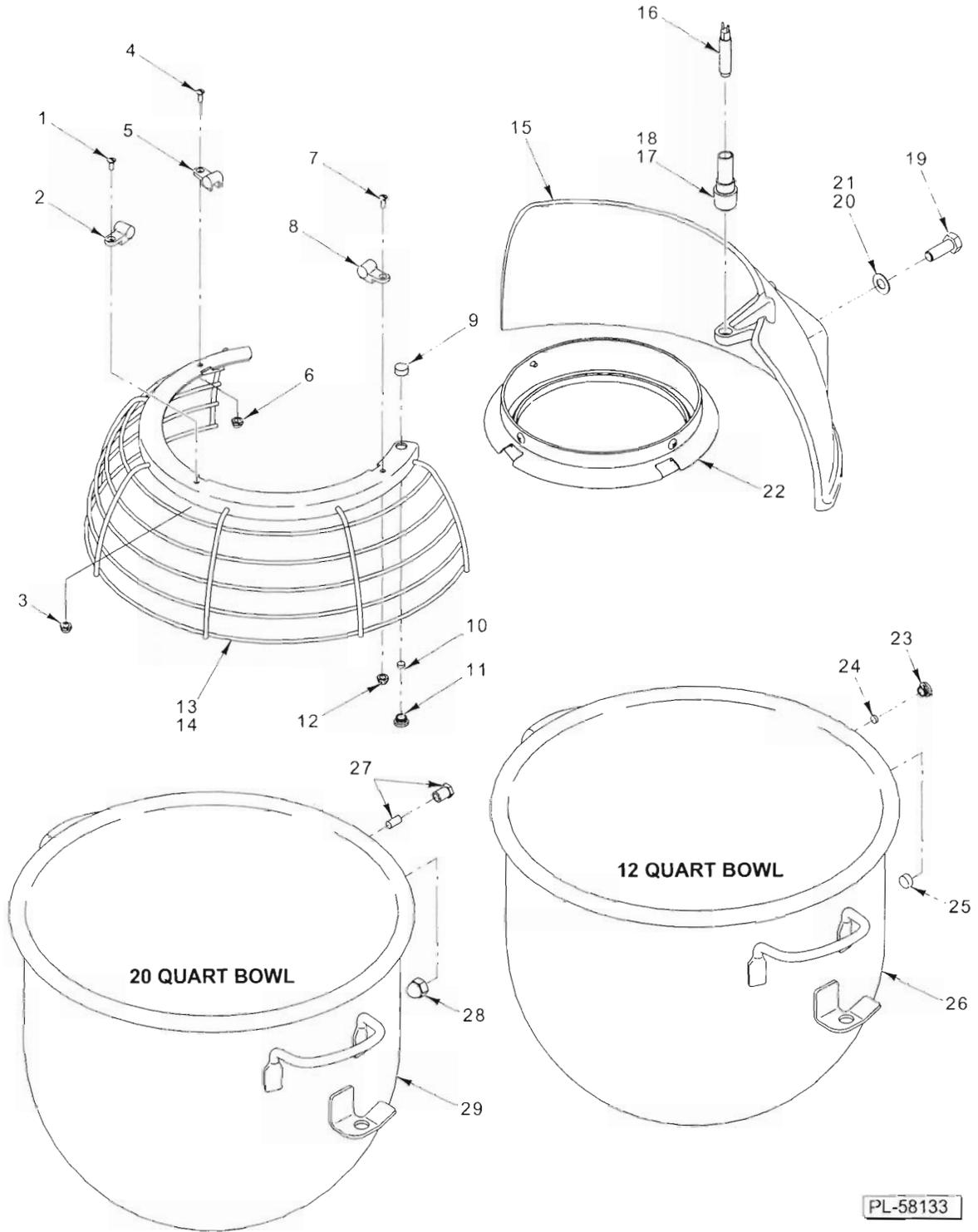


PL-57685

PLANETARY

**PLANETARY**

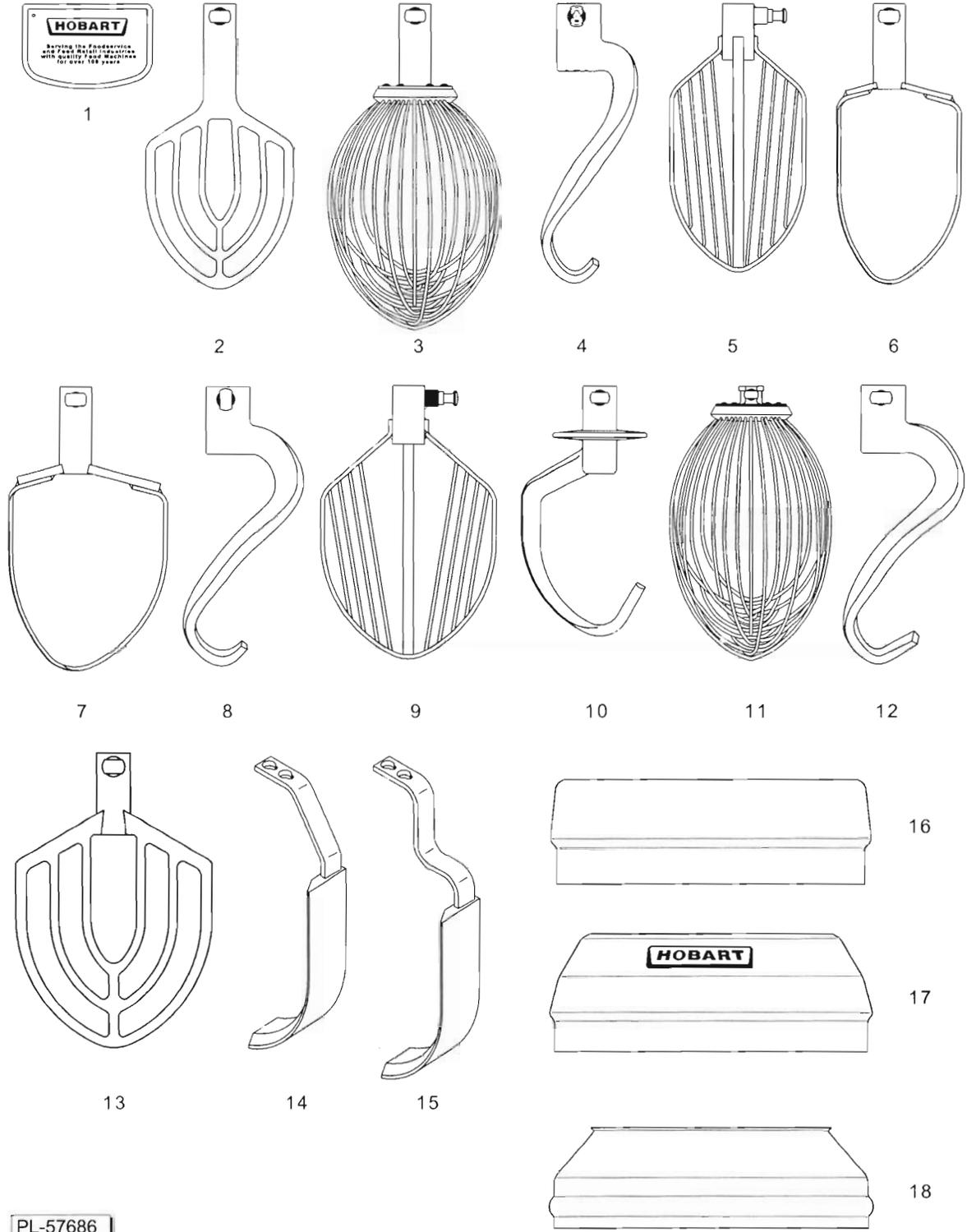
ILLUS.	PART NO.	NAME OF PART	AMT.
PL-57685			
1	00-438524-00002	Gear – Internal.....	1
2	WL-003-35	Lockwasher 1/4 Helical.....	6
3	SC-040-09	Cap Screw 1/4-20 x 1 1/4 Hex Socket Hd.....	6
4	SC-066-13	Mach. Screw 8-32 x 1/4 Phil. Truss Hd. (SST).....	3
5	RR-004-18	Ring – Retaining.....	1
6	00-015217	Pinion – Beater (19T).....	1
7	00-874766-00002	Planetary.....	1
8	00-874770	Spacer Bowl Scraper.....	2
9	SC-053-46	Mach. Screw 1/4-20 x 3/4 Slotted Truss Hd. (SST).....	2
10	BB-018-17	Bearing – Ball Hoover/NSK 6203 DDU.....	1
11	BB-005-34	Bearing – Ball Hoover/NSK 6204 DDU.....	1
12	00-023482	Seal – Grease 1 In. Dia. Shaft.....	1
13	00-012430-00055	Key 3/16 x 3/16 x 1.....	1
14	00-065062-00001	Pin – Dowel.....	1
15	00-874739	Shaft – Agitator.....	1
16	00-124946	Washer 1/32.....	1
17	WS-030-83	Washer.....	1
18	00-010928-00002	Nut.....	1
19	00-024715-00003	Acorn Nut 1/2-20.....	1
20	00-874753	Plunger Assy.....	1
	00-874767	Planetary Subassy. (Incls. Items 5 thru 15).....	1



**BOWL AND BOWL GUARD**

**BOWL AND BOWL GUARD**

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58133			
1	SC-129-39	Mach. Screw 6-32 x 5/16 Slotted Oval Hd. ....	1
2	00-874816	Carrier – Wire Cage.....	1
3	NS-048-96	Crown Nut 6-32.....	1
4	SC-129-39	Mach. Screw 6-32 x 5/16 Slotted Oval Hd. ....	1
5	00-874816-00002	Carrier – Wire Cage (Slotted).....	1
6	NS-048-96	Crown Nut 6-32.....	1
7	SC-129-39	Mach. Screw 6-32 x 5/16 Slotted Oval Hd. ....	1
8	00-874816	Carrier – Wire Cage.....	1
9	00-874887	Holder – Magnet (Upper).....	1
10	00-874875	Magnet – Disc.....	1
11	00-874886	Holder – Magnet (Lower).....	1
12	NS-048-96	Crown Nut 6-32.....	1
13	00-874822	Wire Cage Assy. (Incls. Items 1 thru 12).....	1
14	00-874822-00002	Wire Cage Assy. (Incls. Items 1 thru 12) (ML-134312).....	1
15	00-874815	Guard – Splash.....	1
16	00-087711-00352	Switch – Reed.....	1
17	00-874786	Holder – Switch Reed.....	1
18	00-874839	Pin – Sensor.....	1
19	SC-118-18	Cap Screw 1/4-20 x 7/8 Hex Hd.....	2
20	WS-003-19	Washer (HL200).....	2
21	WS-003-46	Washer (HL120).....	4
22	00-916408	Cup – Drip & Flange.....	1
23	00-874887	Holder – Magnet (Upper).....	1
24	00-874875	Magnet – Disc.....	1
25	00-874886	Holder – Magnet (Lower).....	1
26	00-874864	Bowl Assy. (12 Qt.) (SST) (Packaged) (Incls. Items 23, 24, & 25).....	1
27	00-874847	Housing & Magnet.....	1
28	NS-025-11	Crown Nut 3/8-24.....	1
29	00-874834	Bowl Assy. (20 Qt.) (SST) (Packaged) (Incls. Items 27 & 28).....	1

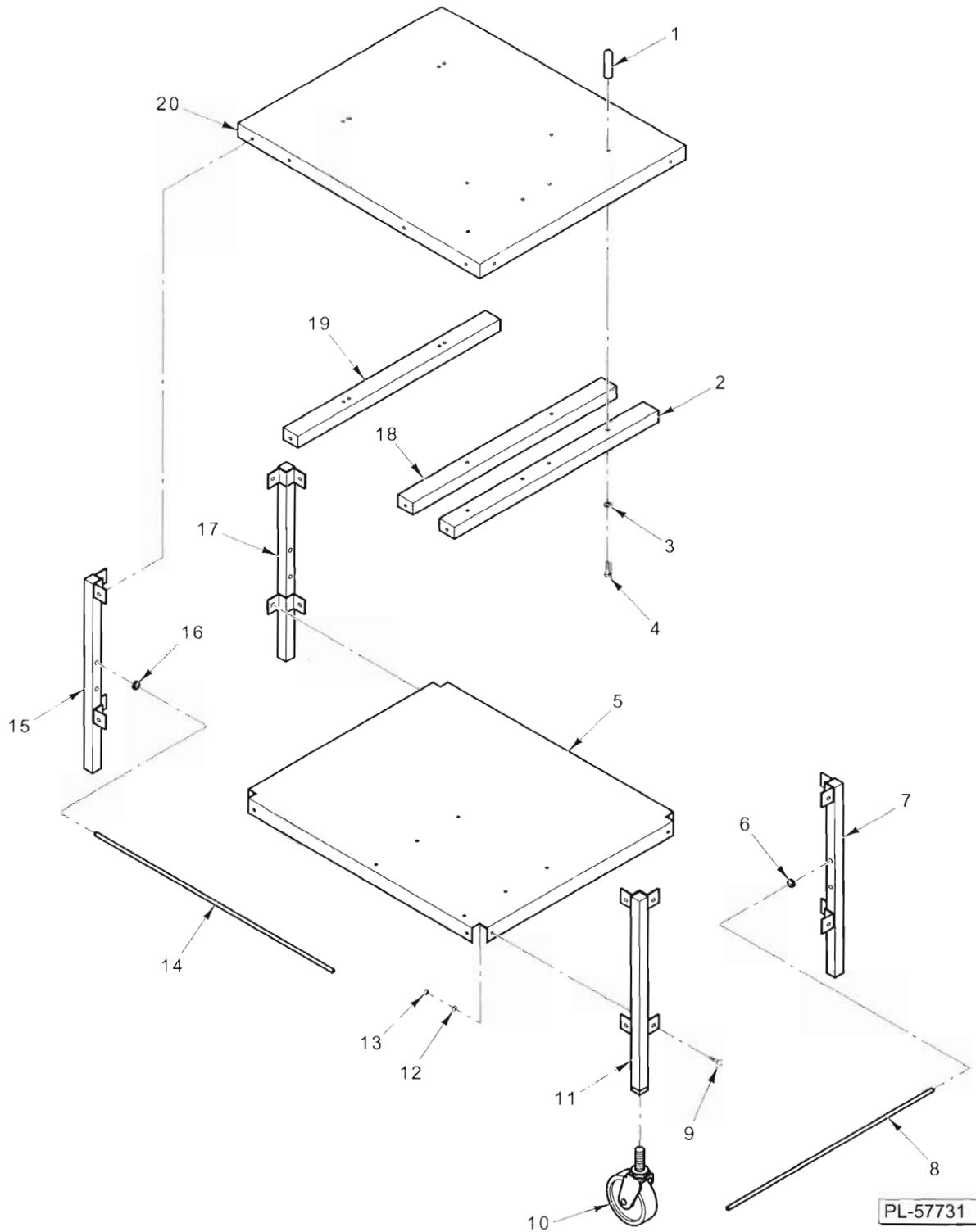


PL-57686

**AGITATORS AND ACCESSORIES**

**AGITATORS AND ACCESSORIES**

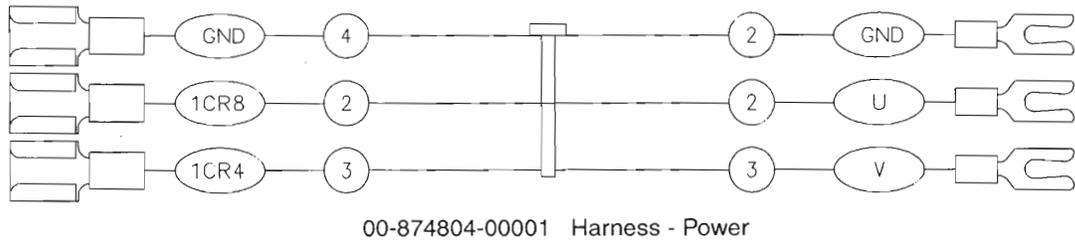
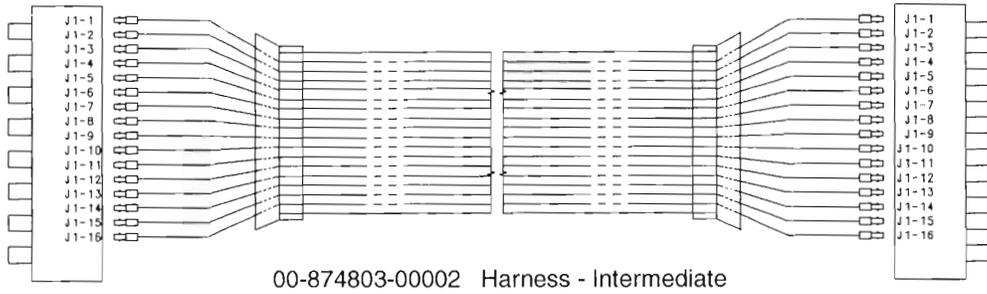
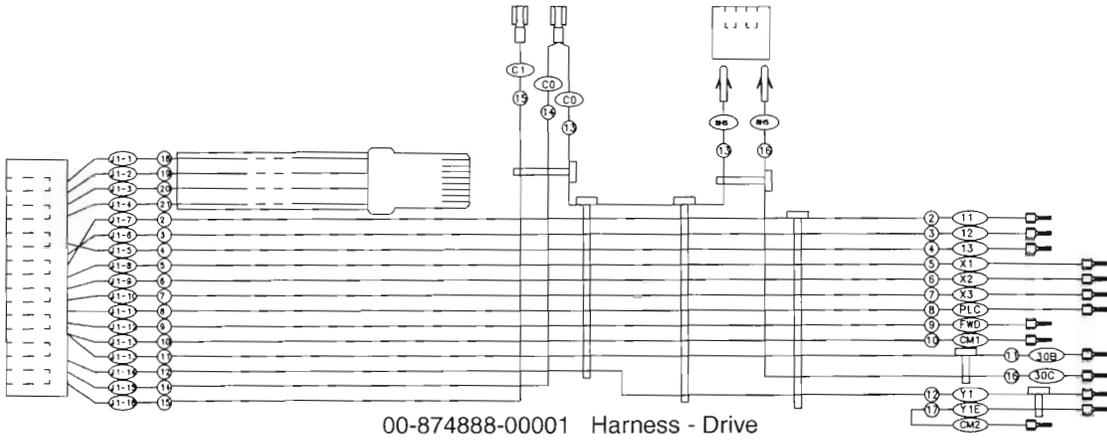
ILLUS.	PART NO.	NAME OF PART	AMT.
PL-57686			
1	00-118801	Scraper – Bowl (Handheld).....	1
2	00-874828	"B" Beater (12 Qt.) (Packaged) (Incls. Item 1).....	1
3	00-873360	"D" Wire Whip (12 Qt.) (Packaged) (Incls. Item 1).....	1
4	00-873343	"ED" Dough Arm (12 Qt.) (Packaged) (Incls. Item 1).....	1
5	00-875893	"C" Whip (12 Qt.) (Packaged) (Incls. Item 1).....	1
6	00-873370	Pastry Knife (12 Qt.) (Packaged) (Incls. Item 1).....	1
7	00-873294	Pastry Knife (20 Qt.) (Packaged) (Incls. Item 1).....	1
8	00-873313	"EDA" Dough Arm (20 Qt.) (Packaged) (Incls. Item 1).....	1
9	00-873331	"C" Whip (20 Qt.) (Packaged) (Incls. Item 1).....	1
10	00-873335	"E" Dough Arm (20 Qt.) (Packaged) (Incls. Item 1).....	1
11	00-874792	"D" Wire Whip (20 Qt.) (Packaged) (Incls. Item 1).....	1
12	00-874791	"ED" Dough Arm (20 Qt.) (Packaged) (Incls. Item 1).....	1
13	00-874790	"B" Beater (20 Qt.) (Packaged) (Incls. Item 1).....	1
14	00-873373	Scraper (12 Qt.) (Packaged).....	1
15	00-874836	Scraper (20 Qt.) (Packaged).....	1
16	00-438078	Splash Cover (12 Qt.) (Packaged).....	1
17	00-438079	Splash Cover (20 Qt.) (Packaged).....	1
18	00-875677	Splash Cover (20 Qt.) (SST) (Packaged).....	1
	00-874885	Ingredient Chute (Packaged).....	1
	00-874899	Tray – Support (Packaged).....	1



MIXER TABLE (ML-134299)

**MIXER TABLE (ML-134299)**

ILLUS. PL-57731	PART NO.	NAME OF PART	AMT.
1	00-124075	Post.....	4
2	00-124067	Support – Cross Top.....	1
3	WL-004-06	Lockwasher <sup>3</sup> / <sub>8</sub> Helical.....	8
4	SC-037-71	Cap Screw <sup>3</sup> / <sub>8</sub> -16 x <sup>3</sup> / <sub>4</sub> Hex Hd.....	8
5	00-123427	Shelf – Table.....	1
6	00-124076	Grommet.....	4
7	00-124073	Leg – Rear (LH).....	1
8	00-124074-00002	Rod (Short).....	2
9	SC-094-26	Bolt <sup>1</sup> / <sub>4</sub> -20 x <sup>1</sup> / <sub>2</sub> Sq. Neck Rd. Hd.....	22
10	00-205003	Caster – Locking.....	4
11	00-124070	Leg – Rear (RH).....	1
12	WS-005-01	Washer.....	22
13	NS-013-02	Nut <sup>1</sup> / <sub>4</sub> -20 Hex.....	22
14	00-124074-00001	Rod (Long).....	4
15	00-124071	Leg – Front (RH).....	1
16	00-124076	Grommet.....	8
17	00-124072	Leg – Front (LH).....	1
18	00-875983	Support – Cross Top.....	1
19	00-124069	Support – Cross Top.....	1
20	00-875982	Top.....	1



PL-58135

**WIRING HARNESES**

## NAVSEA/SPAWAR TECHNICAL MANUAL DEFICIENCY/EVALUATION REPORT (TMDER)

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