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TECHNICAL MANUAL

OPERATION, MAINTNENACE AND
INSTALLATION

**HOBART LEGACY 30 & 40
QUART MIXERS;
MODELS HL300 & HL400**

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DEPARTMENT OF THE NAVY
NAVY MEDICAL LOGISTICS COMMAND

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Total number of pages in this publication is 142 consisting of the following

Page No.	Change No.
Title and A Pages.....	0
Foreword-1/(Foreword-2 Blank).....	0
i - iv.....	0
Section 1	
Instruction Manual (26 pages)	0
Section 2	
Specifications (10 pages)	0
Section 3	
Service Manual (54 pages).....	0
Section 4	
Replacement Parts Catalog (42 pages)	0
TMDER	0

NOTE

If pages are marked with a change level but no change symbol, such pages contain original text placed on different pages, deleted material, and/or pages that have been added to the manual.

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FOREWORD

This technical manual provides a general description, operation, maintenance and installation information for the HOBART Legacy 30 & 40 Quart Mixers, models HL300 and HL400. This technical manual is intended for the guidance of and use by personnel operating and maintaining the equipment described herein.

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TABLE OF CONTENTS

SECTION 1

INSTRUCTION MANUAL, HOBART LEGACY 30 & 40 QUART MIXERS,
MODELS HL300 & HL400

SECTION 2

SPECIFICATIONS, HOBART LEGACY 30 & 40 QUART MIXERS,
MODEL HL300
SPECIFICATIONS, HOBART LEGACY 30 & 40 QUART MIXERS,
MODEL HL400

SECTION 3

SERVICE MANUAL, HOBART LEGACY 30 & 40 QUART MIXERS,
MODELS HL300 & HL400

SECTION 4

CATALOG OF REPLACEMENT PARTS, HOBART LEGACY 30 & 40
QUART MIXERS, MODELS HL300 & HL400

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

30 & 40 QUART MIXERS

MODELS HL300 & HL400

HOBART

LEGACY[®]

Models
HL300 & HL400
ML-134351
ML-134348

**INSTRUCTION
MANUAL**



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937-332-3000 · WWW.HOBARTCORP.COM

FORM 34975 (May 2007)



LEGACY 30-QUART MIXER

TABLE OF CONTENTS

GENERAL	4
INSTALLATION	5
Unpacking	5
Location	5
Electrical Connections	6
OPERATION	7
Controls	8
Programmable Recipe Timer (Optional).....	9
Bowl Placement	10
Agitator.....	10
Bowl Lift	10
Prepare for Mixing	11
Timer Operation	11
Operating Notes.....	12
HL300 Recipe Timer Operation	13
Using the Recipe Timer	13
View Recipe	14
Programming Recipe Timer	14
HL400 Recipe Mode — To Enter and Exit	16
Reviewing Recipe Steps	16
Running a Recipe	17
Interrupting a Recipe	17
Programming a Recipe	18
Unloading.....	19
Wire Cage	19
CLEANING.....	21
MAINTENANCE.....	22
Lubrication	22
Adjustments	23
TROUBLESHOOTING.....	24
Service.....	24

Installation, Operation and Care of Legacy® 30-Quart and 40-Quart Mixers

SAVE THESE INSTRUCTIONS

GENERAL

The Legacy 30 and 40-quart mixer series are heavy-duty mixers which feature a 3/4-horsepower motor system for the HL300 and a 1.5-horsepower motor system for the HL400. Both mixers feature a SmartTimer™, a manual bowl lift, a #12 attachment hub as standard equipment and are equipped with Stir, plus three mixing speeds. A programmable recipe timer is optional.

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.

A 20-quart bowl and agitators are available for HL300. A 20 and 30-quart bowl and agitators are also available for HL400.

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 in its operating location. There should be adequate space around the mixer for the user to operate the controls and to install and remove bowls. The area above and to the rear of the mixer should allow the top and back covers to be removed for routine maintenance and servicing.

Once in position, the mixer must be leveled:

- Remove the two top cover screws and the top cover.
- Place a level on the top rim (Fig. 1). Slide shims under the base contact surface of the mixer as required to level it front-to-back and side-to-side.
- Do not replace the top cover until installation is completed.



Fig. 1

Check Lubrication Before Use

This mixer is shipped with grease in the transmission. Refer to Lubrication on page 22 for applicable lubrication procedures.

ELECTRICAL CONNECTIONS

⚠ WARNING The electrical cord on the HL300 (single-phase only) 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.

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

For the three-phase HL300 and all HL400 mixers, a hole for the $\frac{3}{4}$ "-trade-size conduit is located at the top of the pedestal. Make electrical connections per the wiring diagram located on the inside of the top cover.

Single-Phase Mixer:

- Connect field supply lead wires to L1 and L2.
- Connect ground wire to ground lug on the mixer.

Three-Phase Mixer:

- Connect field supply lead wires to L1, L2 and L3.
- Connect ground wire to ground lug on the mixer.

Check Initial Operation

1. Apply power to the mixer.
2. Turn the SPEED dial pointer to STIR.
3. Install the bowl and lock into mix position, with the Bowl Support all the way up and bowl guard closed. Momentarily run the machine by pushing the START and then STOP buttons.

OPERATION

⚠ WARNING Moving agitator in bowl. Keep hands, clothing and utensils out while in operation. Do not use without interlocked guard.

The Legacy mixer is equipped with SmartTimer™ controls and a manual bowl lift. Other operating parts (Fig. 2) and their functions are described throughout the Operation section.

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

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

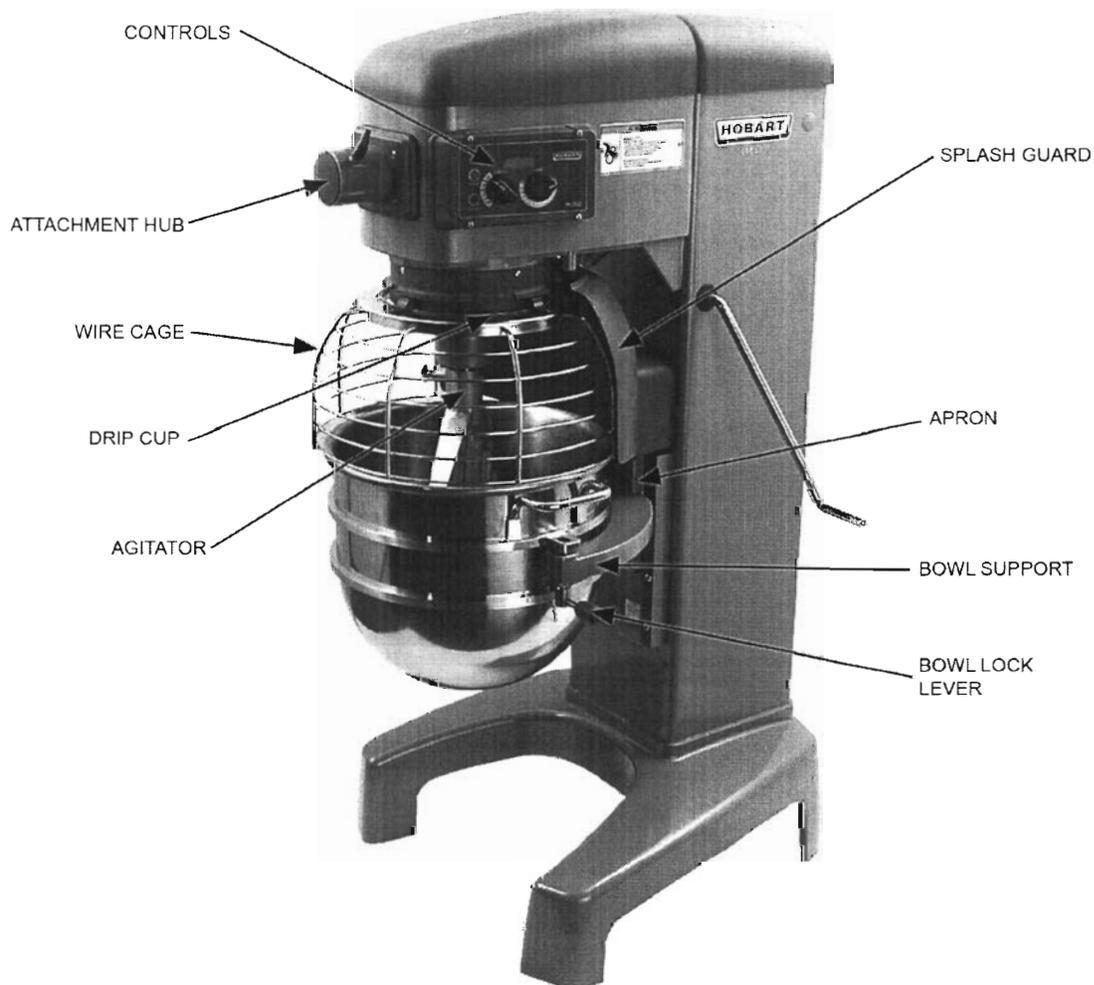
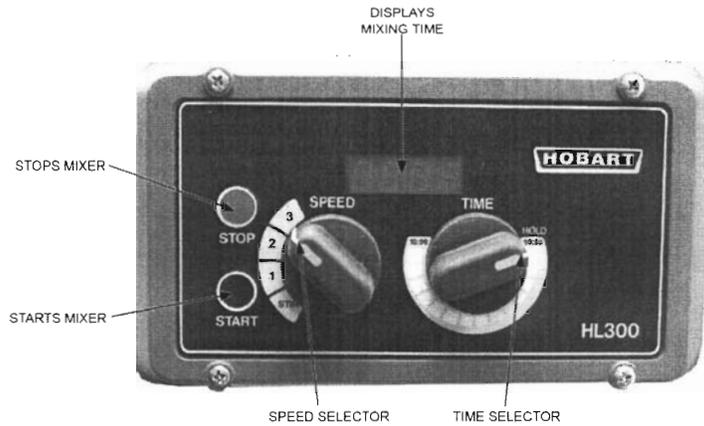


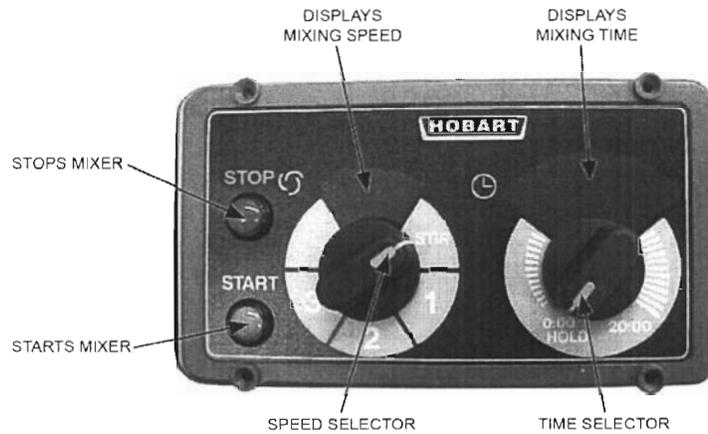
Fig. 2

CONTROLS

Model HL300 (With Three Mix Speeds Plus Stir Speed)



Model HL400 (With Three Mix Speeds Plus Stir Speed)



Model HL300/HL400 Mixer Speeds

STIR (Slow)

STIR speed is for incorporating ingredients at the start of each mixing process.

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.

TIMER

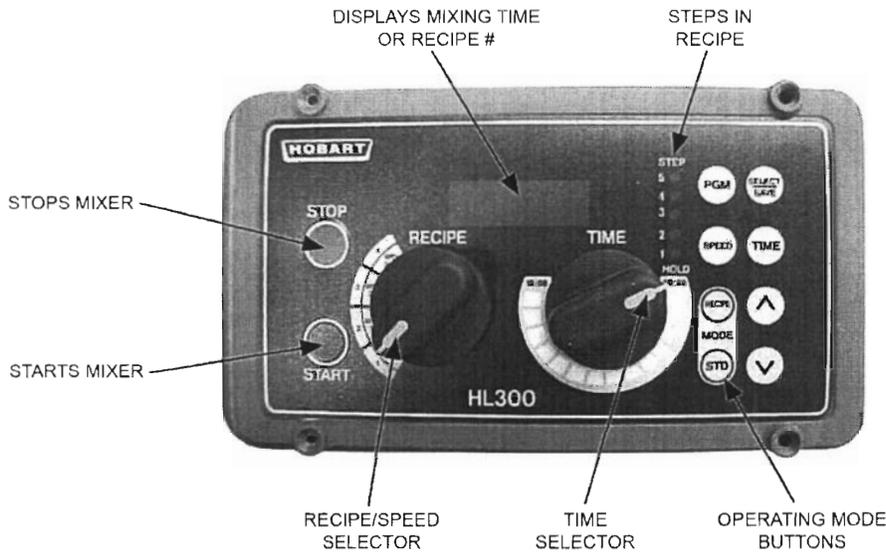
Count up (Hold), 15 minute HL300 count down and 20 minute HL400 count down.

PROGRAMMABLE RECIPE TIMER (OPTIONAL)

HL300 Recipe Timer Specifications

- Maximum number of programmable recipes: 4 recipes.
- Maximum number of steps allowed for each recipe: 5 steps.
- Maximum time allowed for each step in a recipe: 15 minutes.

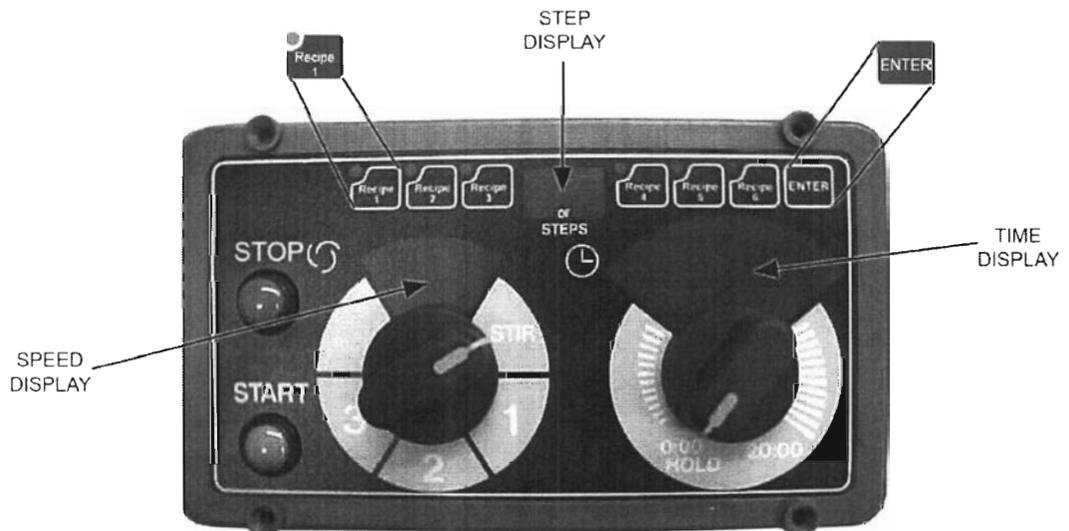
For additional information on use of the programmable recipe timer, refer to pages 13 through 18.



HL400 Recipe Timer Specifications

- Maximum number of programmable recipes: 6 recipes.
- Maximum number of steps allowed for each recipe: 6 steps.
- Maximum time allowed for each step in a recipe: 20 minutes.

For additional information on use of the programmable recipe timer, refer to pages 13 through 18.



BOWL PLACEMENT

The bowl must be installed before the agitator is installed.

To install the bowl, fully lower the bowl support. Position bowl so the alignment pin on the left side of the bowl support fits in the hole in the bowl tab. Place the slotted tab on the bowl into the lower part of the pin. Lower the bowl onto the bowl support and swing the bowl into the locked position.



AGITATOR

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

To Install

1. Open the wire cage.
2. Place the agitator inside the bowl and align the horizontal slot on the agitator with the agitator shaft pin.
3. Slide the agitator up the agitator shaft until it stops and latches. An audible click should be heard when the agitator locks into 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. 3). Slide agitator down off the agitator shaft.

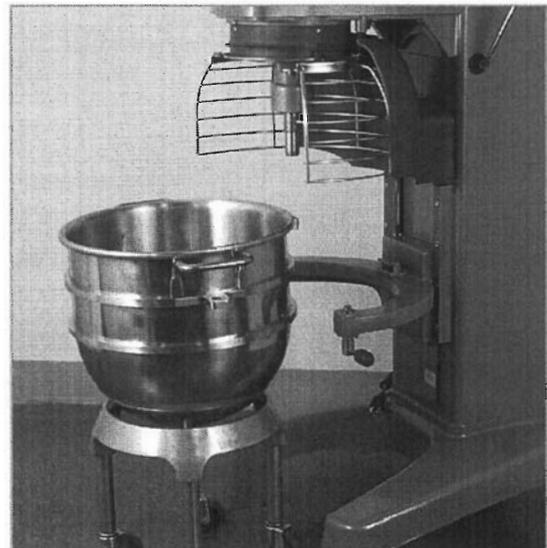


Fig. 3

BOWL LIFT

NOTICE Before lowering the bowl onto a bowl truck, always unlock bowl and swing bowl out slightly.

To raise the bowl, the bowl must be in the locked position. Push down the lift handle until it is locked. To lower the bowl, lift the lift handle slowly.



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 locked position.
4. Place the agitator inside the bowl, then attach it to the agitator shaft.
5. Return the wire cage to front-center position.
6. Push down the lift handle until the lift handle is locked and the bowl reaches the mix position.
7. The mixer is now ready for mixing (Fig. 4).
(See Timer Operation.)



Fig. 4

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).
NOTICE 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.
NOTICE 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.
NOTICE When the timer reaches 15:00 minutes for the HL300 and 20:00 minutes for the HL400, it will rollover to 00:01 and continue counting until the STOP button is pressed.

Using the Count-Down Mode (Timed Mixing)

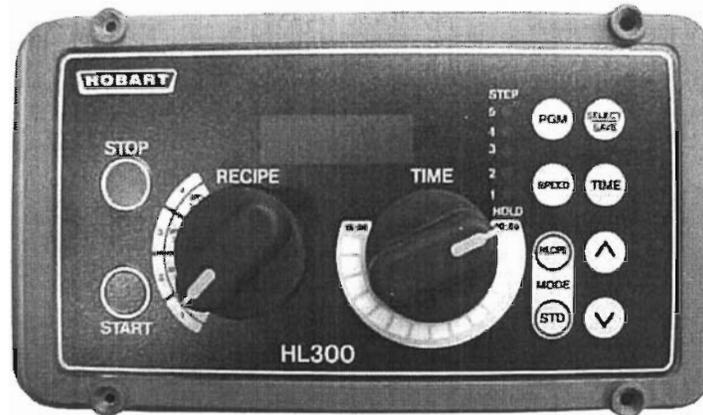
1. Turn the SPEED dial to select a mix speed.
 - a. If the count-up mode was used for the previous batch, the desired time needs to be entered.
 - b. If the count-down mode was used for the previous batch, the previous time will be displayed. If a different time is needed, turn the TIME selector to the desired time.
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 20 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 20 seconds and is stopped after 10 seconds. A new time is entered by turning the TIME selector. The new time will replace the initial 20 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. The count-down timer displays the last-entered 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.
- For the HL400, the SPEED window will display the SPEED dial's current speed selection.
- Turn the TIME selector clockwise to take the mixer out of the hold mode.

HL300 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

HL300 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)

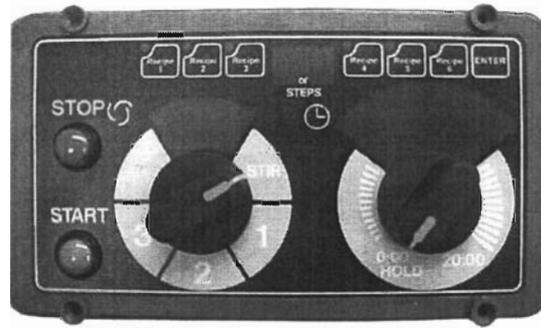
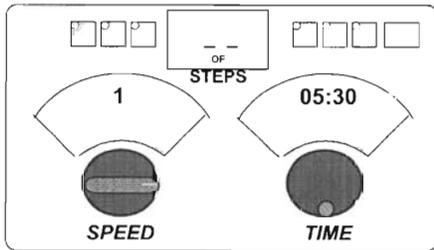
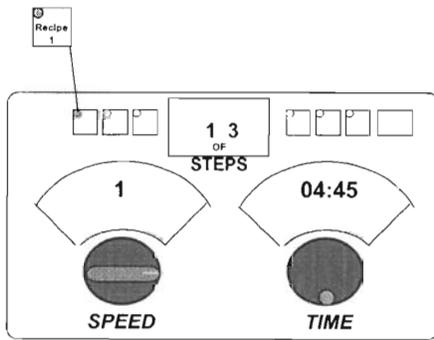
End (default)

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.

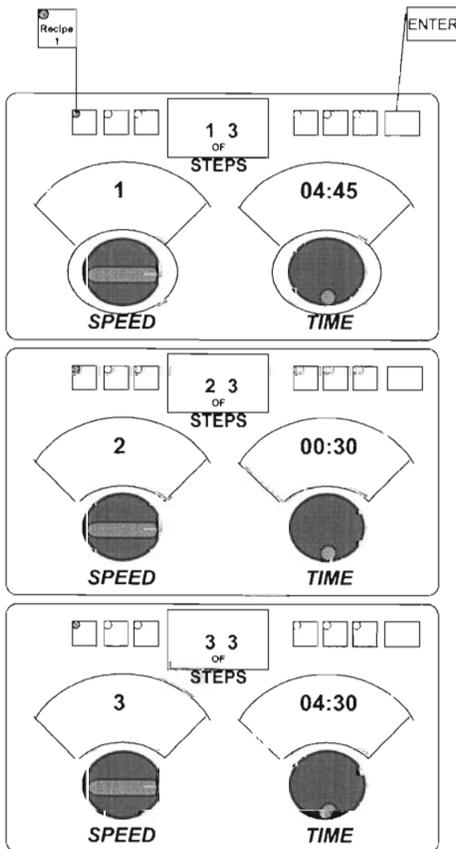
NOTE: LED of step programmed will be flashing.
10. Use arrows to select next step.
11. Repeat setting speed and time for additional steps and use SELECT/SAVE to save settings.
12. After all steps for recipe are programmed, press PGM to exit programming mode. Buzzer sounds and display will show recipe 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.

HL400 Recipe Mode — To Enter and Exit



- To enter recipe mode, press any recipe button. The recipe button lights to indicate you are in Recipe Mode, and the display shows the speed and time for the first step of the recipe.
- To exit Recipe Mode, press the lighted Recipe Button. The light on the recipe button goes off, indicating you are in Standard Timer Mode. The previous time setting for the shown speed will display.

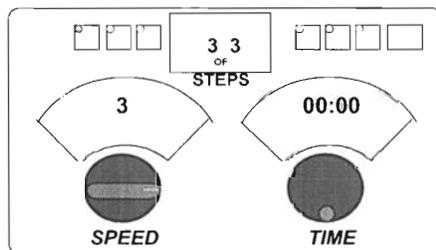
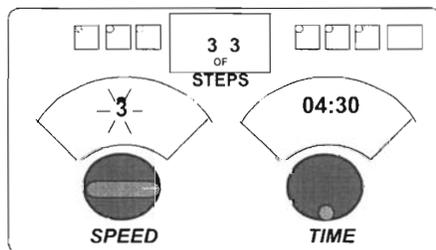
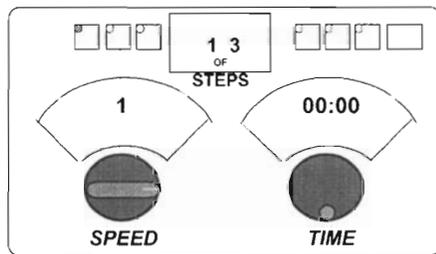
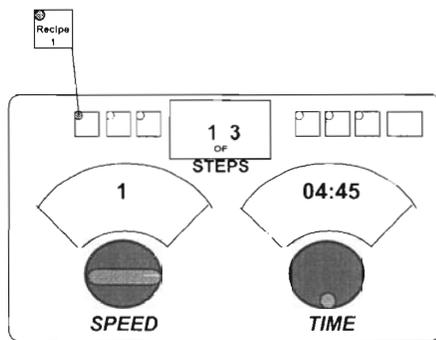
Reviewing Recipe Steps



This allows you to view a recipe without running the mixer. For example, a three step recipe is shown.

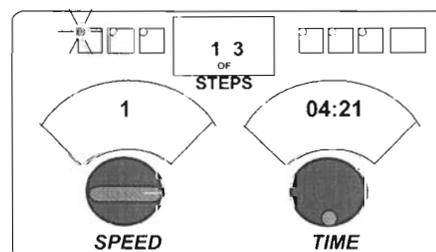
- Select the recipe. The speed and time for the first step of the recipe are displayed.
- Press ENTER to display the next recipe step. Repeatedly pressing ENTER cycles through all the recipe steps.
- Pressing START will begin mixing step 1 of the recipe, regardless of the step displayed.

Running a Recipe



- Select the desired recipe by pressing the recipe button. The button lights and step one of the recipe displays.
- Press START.
- The mixer begins to run step one of the programmed recipe. The timer display indicates the mixer speed and counts down the remaining time.
- When the time expires, the mixer automatically switches to the speed and time for the next recipe step and continues mixing. Mixing steps run in succession at the programmed speed and time.
- The mixer stops after the last step.
- The timer displays revert back to step one for that recipe (as shown at the top of this page). Run the same recipe again by pressing START or select a different recipe.

Interrupting a Recipe



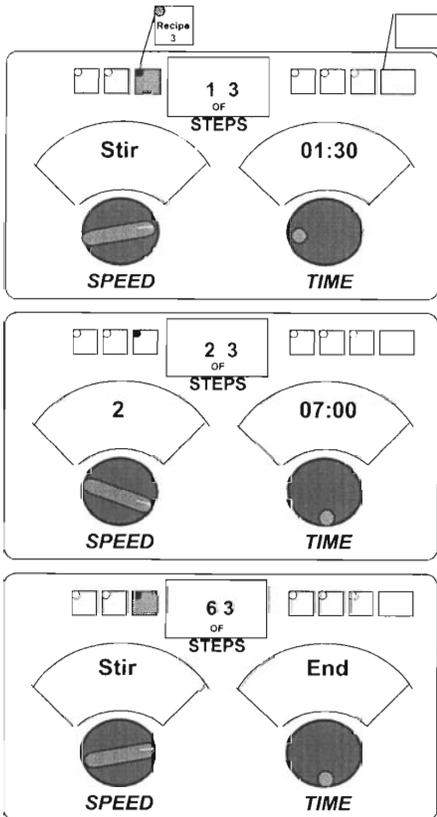
- Mixing can be stopped at any time by pressing STOP.
- The countdown time flashes to indicate the program is interrupted. Press START to resume mixing.
- If you do not wish to resume mixing, press the recipe button twice until it is not lit — this returns to Standard Timer Mode.

Timer will beep between steps and at end of recipe.

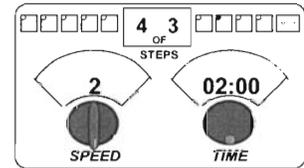
Programming a Recipe

This function allows you to program any of 6 mixer recipes with up to 6 steps in each recipe.

Press and hold Enter key for 3 seconds to get Code mode. There is a short beep to confirm. Speed LED shows "Cd" and select 00:20 on timer LED by potentiometer. Press Enter Key to go to Recipe Program Mode. Mixer makes short beep and all 6 recipe LEDs are turned on.



- Press the recipe key you want to program (1–6). It flashes and other recipe LEDs turn off.
- Set the speed and mix time for step one by turning the speed and time dials; press ENTER to go to the next step. If the recipe was previously programmed, **step 1 of X** displays to indicate the first of up to 6 steps programmed for this recipe. The example shows that Stir speed was previously programmed for 1 minute and 30 seconds.
- Set the speed and time for each step of the recipe, then press ENTER to go to the next step. Repeat for each step.
- If you add more steps than were previously programmed, the step display does not update until the recipe has been saved. The step display can show step 4 of 3 during programming.
- Turn timer dial counterclockwise to **End** to terminate the recipe. This sets the previous step as the last step.
- To save the recipe, press and hold the lit recipe button. You will hear a long beep to confirm.
- Continue programming other recipes; or press ENTER for 5 seconds to exit and return to Standard Timer Mode.



UNLOADING

1. Lift the lift handle slowly to lower the bowl support. Unlock the bowl and swing-out slightly.
2. Open the wire cage assembly.
3. Remove the agitator from the agitator shaft.
4. Remove the bowl from the bowl support.

WIRE CAGE (Fig. 5)

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.
- Close the bowl guard wire cage: rotate it to your right until it stops, closed position.

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



Fig. 5

Remove and Clean Bowl Guard Wire Cage (Fig. 6)

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.

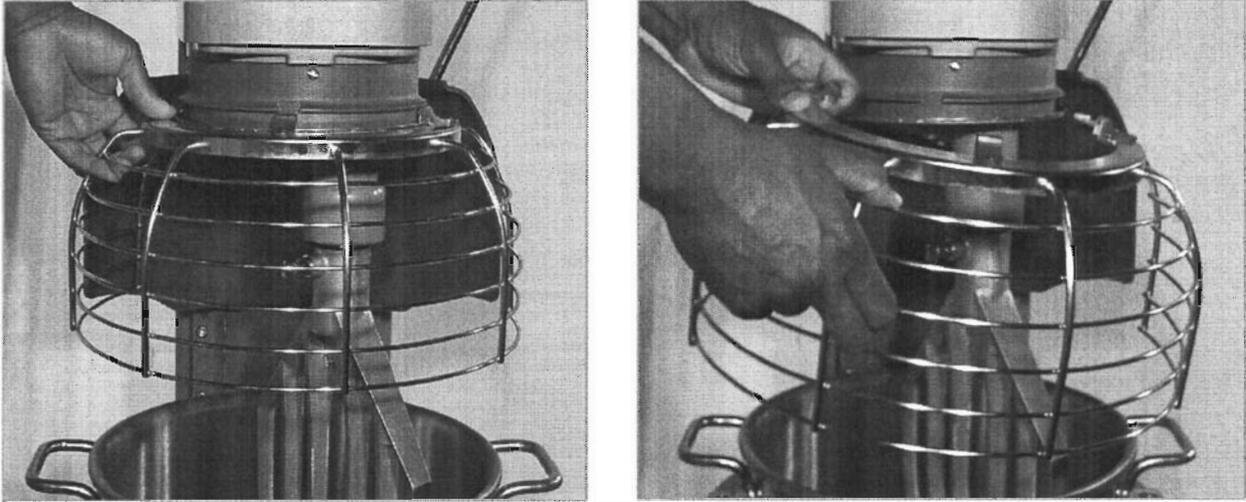


Fig. 6

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.

CLEANING

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

New mixer bowls and accessories (beaters, whips and dough arms) should be thoroughly washed with hot water and a mild soap solution, rinsed with either a mild soda or vinegar solution and thoroughly rinsed with clear water before being used. This cleaning procedure should also be followed for bowls and agitators before whipping egg whites or whole eggs.

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 drip cup (Fig. 2, page 7) should be removed (which is secured with 3 screws) periodically and wiped clean.

For cleaning the Wire Cage refer to page 20.

MAINTENANCE

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

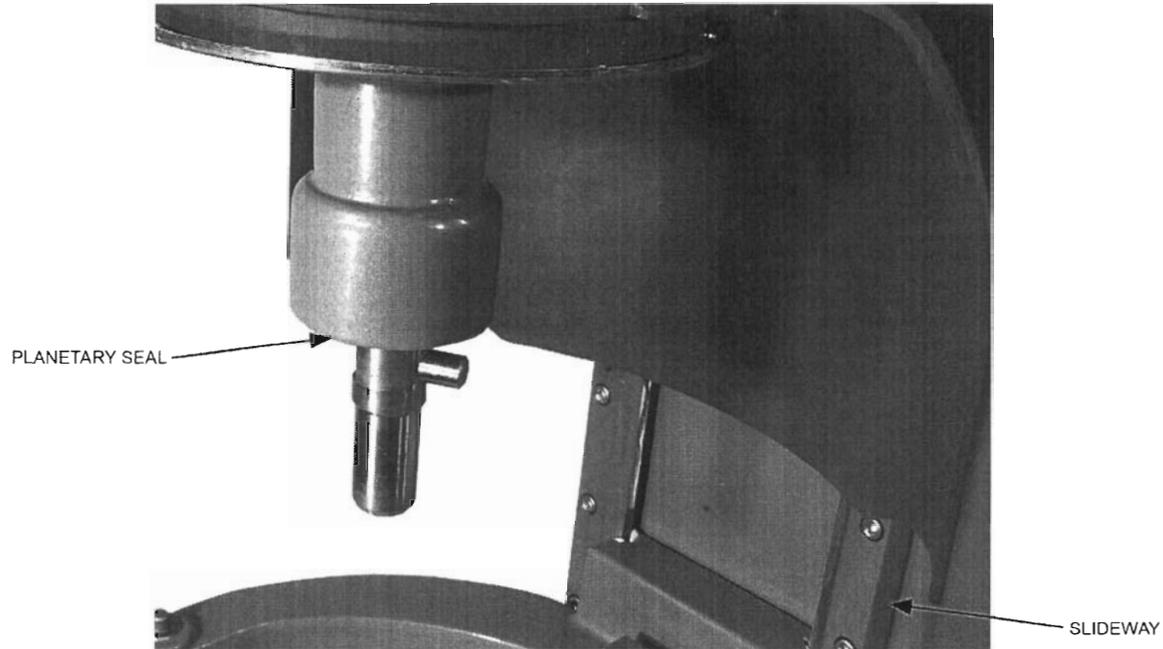


Fig. 7

LUBRICATION

Slideway

The slideways (Fig. 7) should be lubricated approximately twice a year. To reach these areas, fully lower the bowl support. Wipe a thin coat of Lubriplate 630AA on the bowl pad area of the bowl supports and on each slideway.

Planetary Seal

Occasionally, the planetary seal (Fig. 7) 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 $\frac{1}{8}$ " (3 mm); the maximum clearance between the bottom of the bowl and the ED dough arm is $\frac{5}{16}$ " (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 screw. Refer to Adjust the Bowl/Agitator Clearance, Figure 8.

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

- Turn the stop screws counterclockwise to decrease the clearance or clockwise to increase the clearance. (Fig. 8)
- Reconnect the electrical power supply.
- Carefully operate the bowl lift several times to check the adjustment.

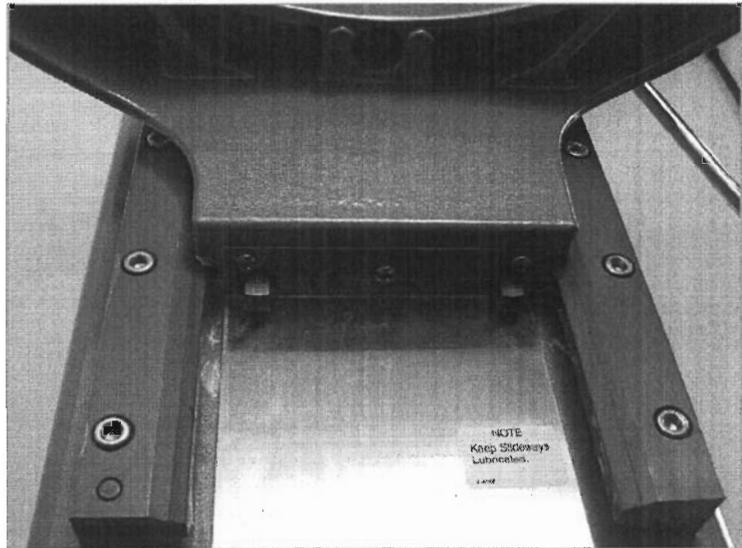


Fig. 8

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 is 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

30 & 40 QUART MIXERS

MODELS HL300 & HL400

HOBART701 S Ridge Avenue, Troy, OH 45374
1-888-4HOBART • www.hobartcorp.com**LEGACY®
HL300 MIXER****HOBART****STANDARD FEATURES**

- Heavy-Duty ¾ 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
- Rubber Foot Pads Provided

ACCESSORY PACKAGES - featuring Hobart Quick Release™ Agitators

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

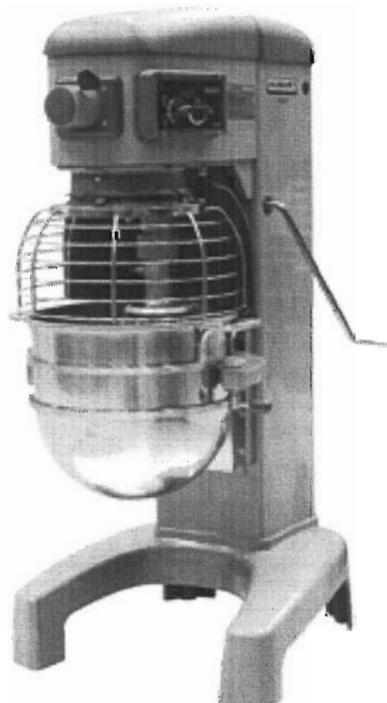
MODELS

- HL300 – 30-Quart All Purpose Mixer
- HL300C – 30-Quart All Purpose Mixer with Maximum Security Correctional Package

OPTIONS

- SmartPlus2™ Programmable Recipe Timer

Specifications, Details and Dimensions on Inside and Back.

**LEGACY® HL300 MIXER**

LEGACY® HL300 MIXER

HOBART

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

SOLUTIONS/BENEFITS

¾ 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

HL300 MIXER CAPACITY CHART

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

PRODUCT	AGITATORS SUITABLE FOR OPERATION	HL300
CAPACITY OF BOWL (QTS. LIQUID)		30
Egg Whites	D	1½ qts.
Mashed Potatoes	B & C	23 lbs.
Mayonnaise (Qts. of Oil)	B or C or D	12 qts.
Meringue (Qts. of Water)	D	1 qt.
Waffle or Hot Cake Batter	B	12 qts.
Whipped Cream	D or C	6 qts.
Cake, Angel Food (8-10 oz. cake)	C or I	22
Cake, Box or Slab	B or C	30 lbs.
Cake, Cup	B or C	30 lbs.
Cake, Layer	B or C	30 lbs.
Cake, Pound	B	30 lbs.
Cake, Short (Sponge)	C or I	23 lbs.
Cake, Sponge	C or I	18 lbs.
Cookies, Sugar	B	23 lbs.
Dough, Bread or Roll (Lt.-Med.) 60% AR	§ ED	45 lbs.☐
Dough, Heavy Bread 55% AR	§ ED	30 lbs.☐
Dough Pie	B & P	27 lbs.
Dough, Thin Pizza 40% AR (max. mix time 5 min.)	§‡ ED	14 lbs.☐
Dough, Med. Pizza 50% AR	§‡ ED	20 lbs.☐
Dough, Thick Pizza 60% AR	§‡ ED	40 lbs.☐
Dough, Raised Donut 65% AR	ED	15 lbs.*
Dough, Whole Wheat 70% AR	ED	40 lbs.☐
Eggs & Sugar for Sponge Cake	B & C or I	12 lbs.
Icing, Fondant	B	18 lbs.
Icing, Marshmallow	C or I	3 lbs.
Shortening & Sugar, Creamed	B	24 lbs.
Pasta, Basic Egg Noodle (max. mix time 5 min.)	ED	8 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

§ 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.



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

LEGACY® HL300 MIXER

SPECIFICATIONS

MOTOR:

¾ H.P. high torque motor.

100-120/50/60/1	9.5 Amps
200-240/50/60/1	5.7 Amps
200-240/50/60/3	2.8 Amps
380-460/50/60/3	1.4 Amps

ELECTRICAL:

100-120/50/60/1, 200-240/50/60/1, 200-240/50/60/3 and 380-460/50/60/3 – 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	58	34
First (Low)	94	54
Second (Intermediate)	174	100
Third (High)	317	183

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 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
- “ED” Dough Hook
- “P” Pastry Knife
- “I” Heavy Duty Wire Whip
- Bowl Splash Cover
- Bowl Scraper
- Ingredient Chute
- 20 Quart Accessories
- 9" Vegetable Slicer
- Meat Chopper Attachment
- Stainless Steel Foot Pads
- Bowl Truck



Hobart Bowl Scraper

Hobart Ingredient Chute



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

LEGACY® HL300 MIXER

HOBART

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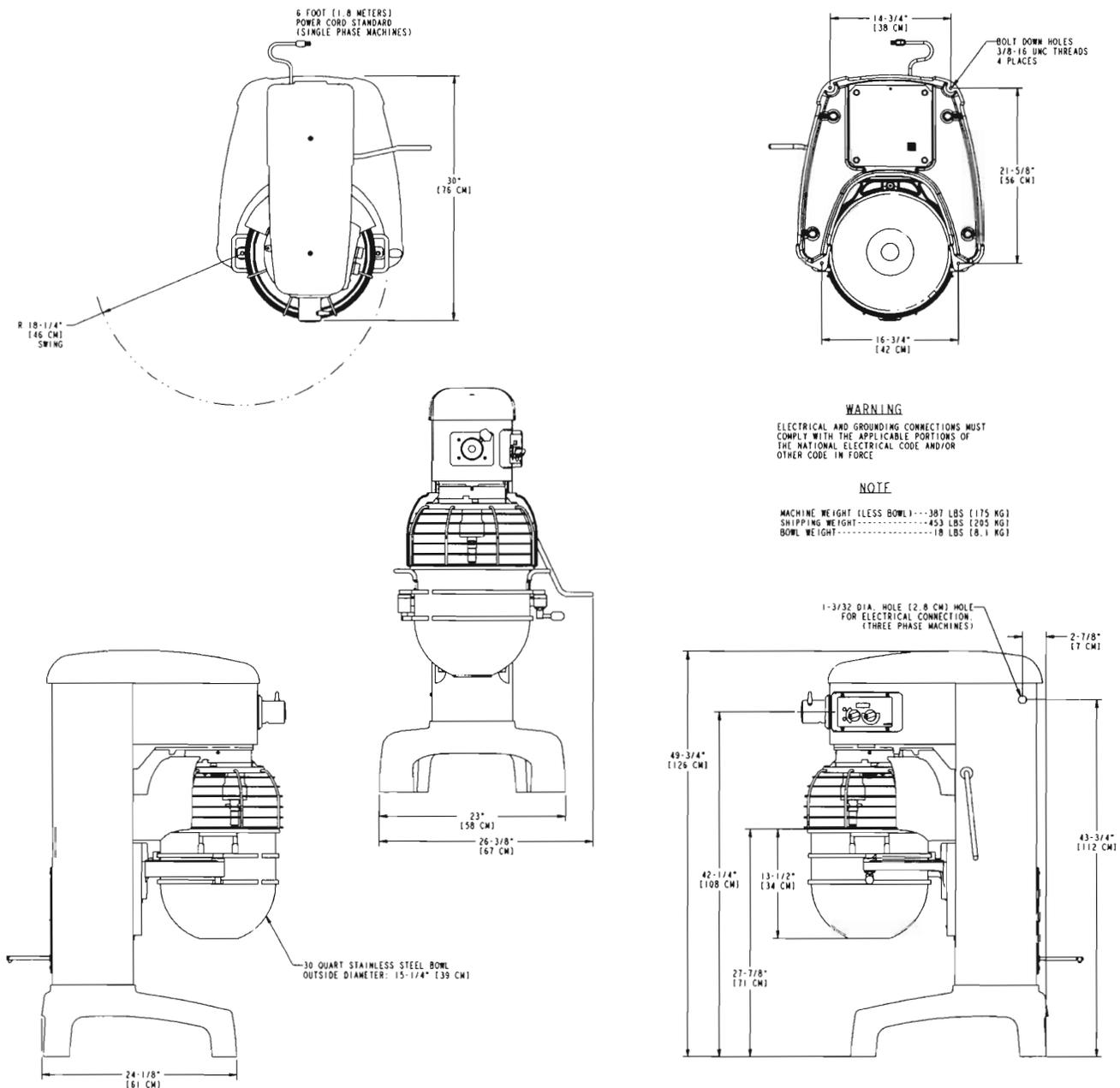
SPECIFICATIONS

ELECTRICAL SPECIFICATIONS: 100-120/50/60/1, 200-240/50/60/1, 200-240/50/60/3 and 380-460/50/60/3 – UL Listed.

WEIGHT: 394 lbs. net; 411 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



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

HOBART701 S Ridge Avenue, Troy, OH 45374
1-888-4HOBART • www.hobartcorp.com**LEGACY®
HL400 MIXER****HOBART****STANDARD FEATURES**

- Heavy-Duty 1½ H.P. Motor
- Gear Transmission
- Three Fixed Speeds Plus Stir Speed
- Shift-on-the-Fly™ Controls
- Patented soft start Agitation Technology
- 20-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
- Rubber Foot Pads Provided

ACCESSORY PACKAGES - featuring Hobart Quick Release™ Agitators

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

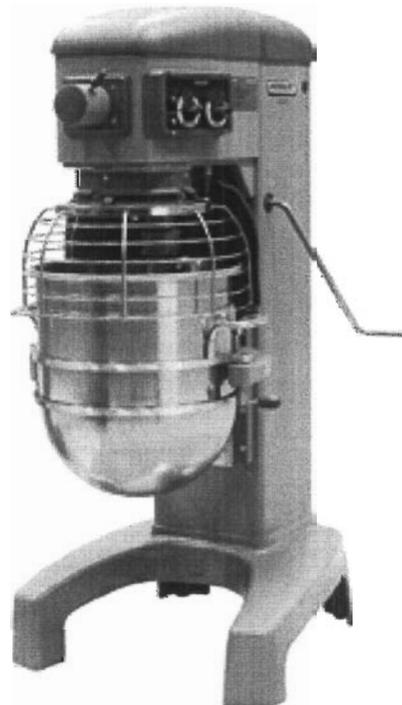
MODELS

- HL400 – 40-Quart All Purpose Mixer
- HL400C – 40-Quart All Purpose Mixer with Maximum Security Correctional Package

OPTIONS

- SmartPlus™ Programmable Recipe Timer

Specifications, Details and Dimensions on Inside and Back.

**LEGACY® HL400 MIXER**

LEGACY® HL400 MIXER



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

SOLUTIONS/BENEFITS

1½ 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

20-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

HL400 MIXER CAPACITY CHART

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

PRODUCT	AGITATORS SUITABLE FOR OPERATION	HL400
CAPACITY OF BOWL (QTS. LIQUID)		40
Egg Whites	D	1¼ qts.
Mashed Potatoes	B & C	30 lbs.
Mayonnaise (Qts. of Oil)	B or C or D	13 qts.
Meringue (Qts. of Water)	D	1½ qt.
Waffle or Hot Cake Batter	B	16 qts.
Whipped Cream	D or C	9 qts.
Cake, Angel Food (8-10 oz. cake)	C or I	30
Cake, Box or Slab	B or C	40 lbs.
Cake, Cup	B or C	45 lbs.
Cake, Layer	B or C	45 lbs.
Cake, Pound	B	40 lbs.
Cake, Short (Sponge)	C or I	25 lbs.
Cake, Sponge	C or I	40 lbs.
Cookies, Sugar	B	30 lbs.
Dough, Bread or Roll (Lt.-Med.) 60% AR §	ED	45 lbs.□
Dough, Heavy Bread 55% AR §	ED	35 lbs.□
Dough Pie	B & P	35 lbs.
Dough, Thin Pizza 40% AR (max. mix time 5 min.) §±	ED	25 lbs.□
Dough, Med. Pizza 50% AR §±	ED	32 lbs.□
Dough, Thick Pizza 60% AR §±	ED	45 lbs.□
Dough, Raised Donut 65% AR	ED	25 lbs.*
Dough, Whole Wheat 70% AR	ED	45 lbs.□
Eggs & Sugar for Sponge Cake	B & C or I	18 lbs.
Icing, Fondant	B	25 lbs.
Icing, Marshmallow	C or I	4½ lbs.
Shortening & Sugar, Creamed	B	35 lbs.
Pasta, Basic Egg Noodle (max. mix time 5 min.)	ED	15 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

§ 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.



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

LEGACY® HL400 MIXER

SPECIFICATIONS

MOTOR:

1½ H.P. high torque motor.

200-240/50/60/1	9.3 Amps
200-240/50/60/3	5.6 Amps
380-460/50/60/3	2.7 Amps

ELECTRICAL:

200-240/50/60/1, 200-240/50/60/3 and
380-460/50/60/3 – UL Listed.

CONTROLS:

Magnetic contactor with thermal overload protection. Internally sealed “Start-Stop” push buttons. A 20-minute SmartTimer™ is standard. SmartTimer™ includes **Automatic Time Recall**, which remembers the last time set for each speed. Optional SmartPlus™ Programmable Recipe Timer allows operators the ability to program up to 6 recipes with 6 steps per recipe. SmartPlus™ 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	58	34
First (Low)	96	56
Second (Intermediate)	179	104
Third (High)	319	185

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 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
- “ED” Dough Hook
- “P” Pastry Knife
- “I” Heavy Duty Wire Whip
- Bowl Truck
- Bowl Splash Cover
- Bowl Scraper
- Ingredient Chute
- 20 & 30 Quart Accessories
- 9" Vegetable Slicer
- Meat Chopper Attachment
- Stainless Steel Foot Pads



Hobart Bowl Scraper

Hobart Ingredient Chute



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

LEGACY® HL400 MIXER

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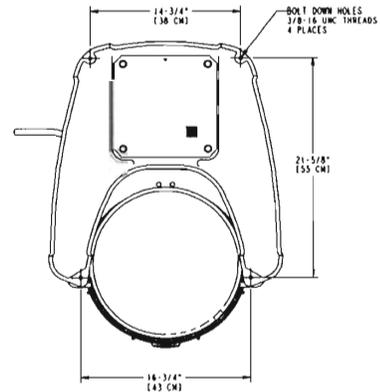
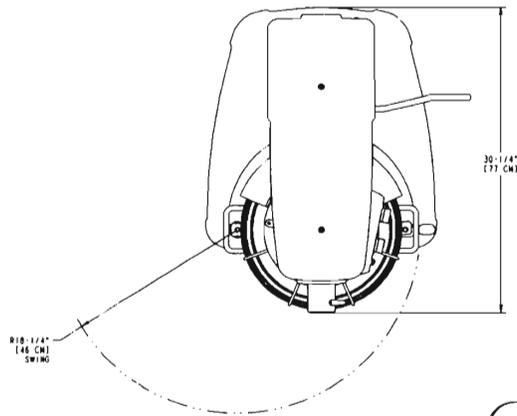
SPECIFICATIONS

ELECTRICAL SPECIFICATIONS: 200-240/50/60/1, 200-240/50/60/3 and 380-460/50/60/3 – UL Listed.

WEIGHT: 404 lbs. net; 421 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

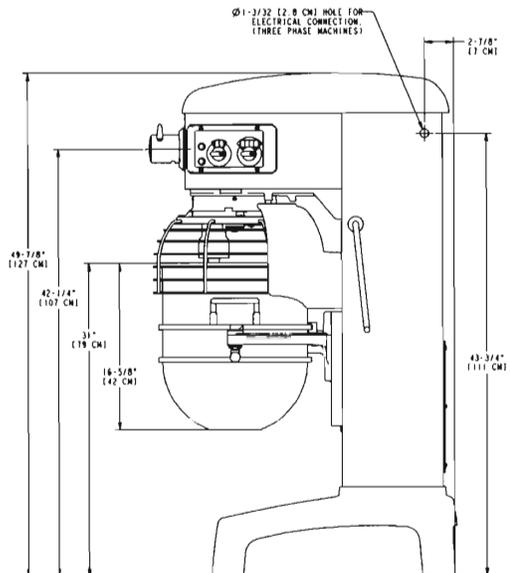
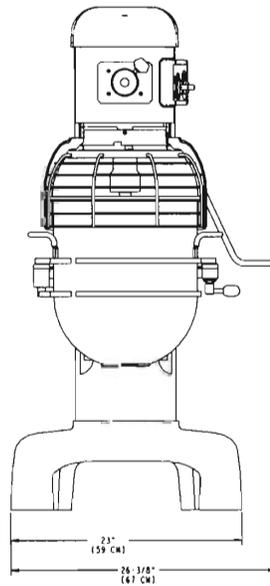
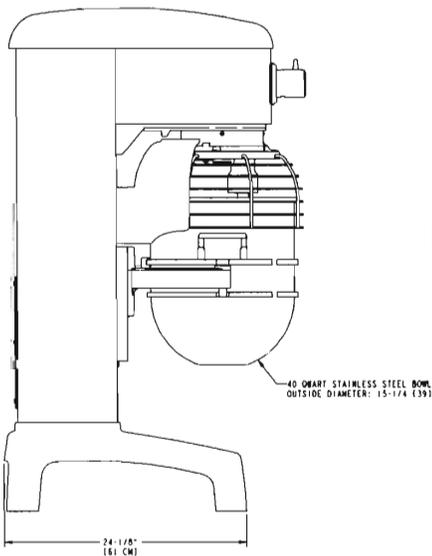


WARNING

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

NOTE

MACHINE WEIGHT (LESS BOWL).....387 LBS (175 KG)
SHIPPING WEIGHT.....453 LBS (205 KG)
BOWL WEIGHT.....18 LBS (8.1 KG)



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

SECTION 3

SERVICE MANUAL

HOBART LEGACY

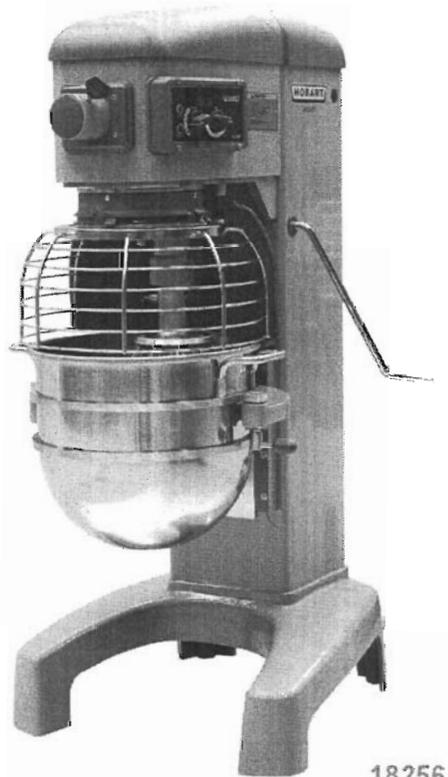
30 & 40 QUART MIXERS

MODELS HL300 & HL400



S E R V I C E

SERVICE MANUAL



18256

Legacy™

HL300	ML-134351
HL300C	ML-134358
HL400	ML-134348
HL400C	ML-134359

- 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.

TABLE OF CONTENTS

GENERAL	3
Introduction	3
Reference Material	3
Timer Options	3
Specifications	4
Lubrication	5
Tools	5
COVERS	6
BOWL GUARD ASSEMBLY	7
BOWL SWITCH	9
TIMER BOARD	10
SPEED SELECTOR SWITCH	11
MOTOR DRIVE	13
MOTOR	15
PLANETARY	17
TRANSMISSION / ATTACHMENT HUB	19
WRAP	26
TRANSMISSION CASE	27
BASE	28
BOWL SUPPORT	29
BOWL LIFT ASSEMBLY	30
BOWL TO BEATER CLEARANCE ADJUSTMENT	31
ELECTRICAL OPERATION	32
Component Function	32
Component Location	33
Motor Drive Layout	34
Sequence of Operation	38
Schematic Diagrams	40
Wiring Diagrams	44
TROUBLESHOOTING	46
Quick Reference Flow Chart	46
General - All Models	47
Alarm Codes	49
INDEX	52

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GENERAL

INTRODUCTION

The HL300 and HL400 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.

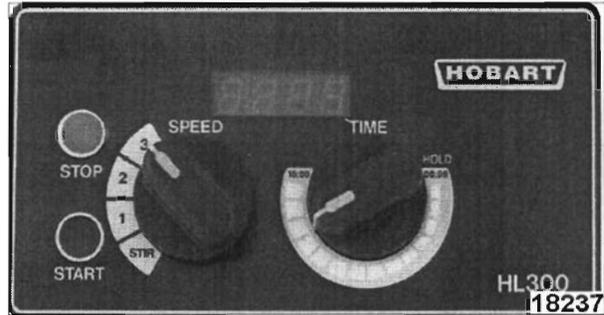
The HL300 and HL400 models are available with an optional programmable recipe timer board. A mixer with the recipe timer board allows for the same operation but includes programming options for the operator to store and retrieve up to four recipes with five steps each for the HL300 and six recipes with six steps each for the HL400.

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

- HL300 Catalog of Replacement Parts - F43136
- HL400 Catalog of Replacement Parts - F43137
- Instruction Manual for Installation, Operation and Care - F34975
- Lubrication Manual for current lubricants and quantities - F20067
- Use and Applications Handbook - F34901
- Mixer Capacity Chart - All Models - F7701

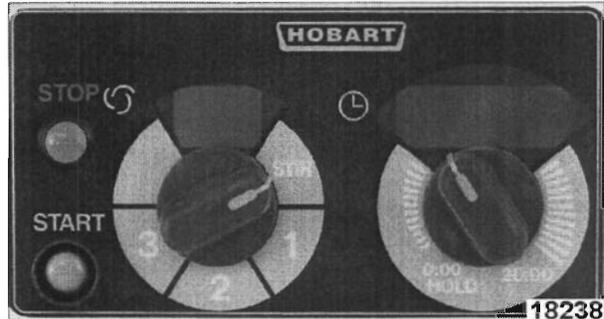
TIMER OPTIONS



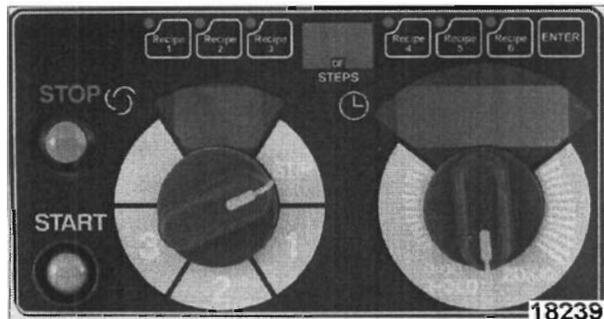
HL300 STANDARD TIMER BOARD



HL300 RECIPE TIMER BOARD



HL400 STANDARD TIMER BOARD



HL400 RECIPE TIMER BOARD

SPECIFICATIONS

HL300 ELECTRICAL DATA				
Voltage*	100-120/50/60/1	200-240/50/60/1	200-240/50/60/3	380-460/50/60/3
Amps	9.5	5.7	2.8	1.4
Mixer	0.75 H.P.	0.75 H.P.	0.75 H.P.	0.75 H.P.
Motor	2.5HP, 230/460V, 3 phase	2.5HP, 230/460V, 3 phase	2.5HP 230/460V, 3 phase	2.5HP, 230/460V, 3 phase

*Tolerance +/- 10%

HL400 ELECTRICAL DATA			
Voltage*	200-240/50/60/1	200-240/50/60/3	380-460/50/60/3
Amps	9.3	5.6	2.4
Mixer	1.5 H.P.	1.5 H.P.	1.5 H.P.
Motor	3.0HP. 208-230/460V, 3 Phase	3.0HP. 208-230/460V, 3 Phase	3.0HP. 208-230/460V, 3 Phase

*Tolerance +/- 10%

OPERATING SPEEDS AND RPM				
Model	Speed	Planetary	Beater	Attachment
HL300	STIR	25	58	34
	1	41	94	55
	2	77	174	101
	3	140	317	185
HL400	STIR	25	58	34
	1	41	94	55
	2	77	174	101
	3	140	317	185

BOWL SIZE	
HL300	30 qt. bowl
HL400	40 qt. bowl

MIXER TORQUE VALUES	
Component	Torque
Base to Pedestal	900-1100 in*lb
Transmission Case to Pedestal	372-465 in*lb
Slideways to Pedestal	175-275 in*lbs
Internal Gear to Transmission Case	175-275 in*lbs
Transmission Cover Bolts	175-275 in*lbs
Motor to Transmission Case	24-30 in*lbs
Bottom Planetary Screw	372-465 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	40 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

- 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.
- RTV 732 Dow grey silicone Part No. 515194 or equivalent. Used to fill seam between wrap and column.
- 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.
- 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 1200 in*lb.

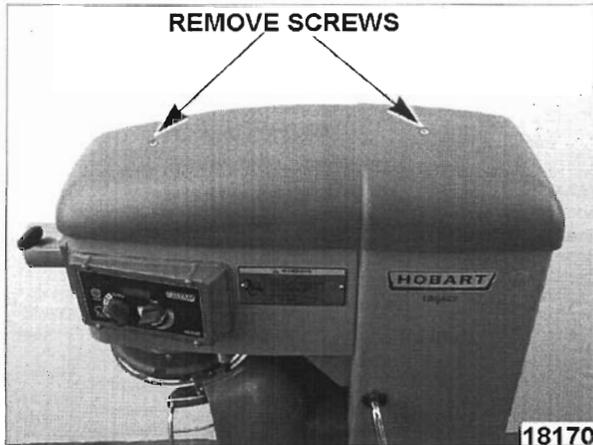
COVERS

TOP COVER

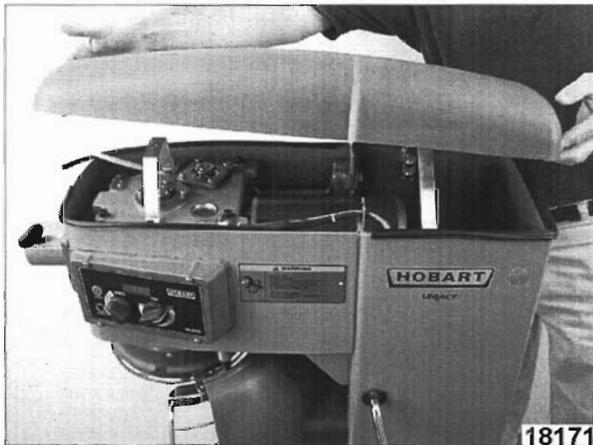


WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

1. Remove top cover screws.

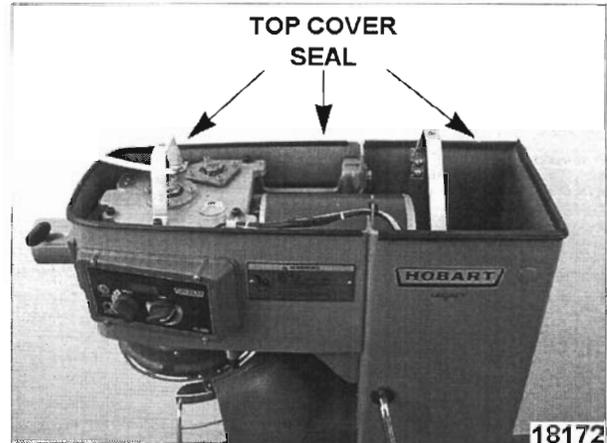


2. Raise top cover and remove.



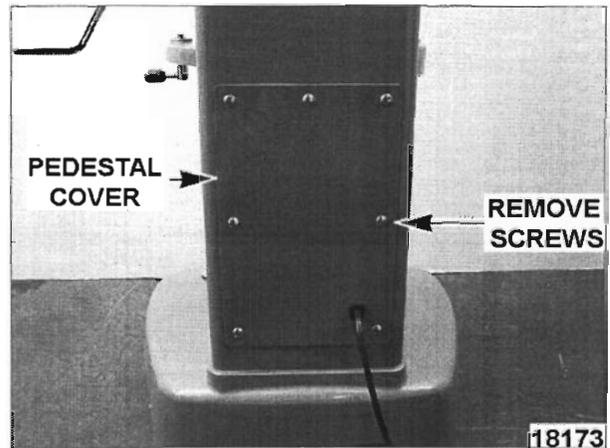
3. Reassemble in reverse order.

NOTE: When re-assembling top cover to mixer, be sure top cover seal is properly seated on mixer.



PEDESTAL COVER

1. Remove pedestal cover.



2. Reassemble in reverse order.

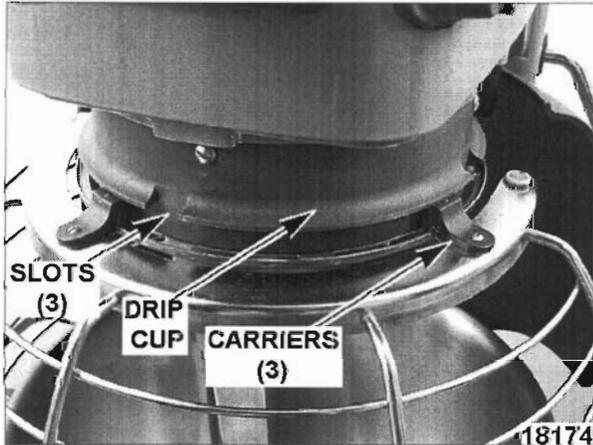
BOWL GUARD ASSEMBLY

REMOVAL AND REPLACEMENT

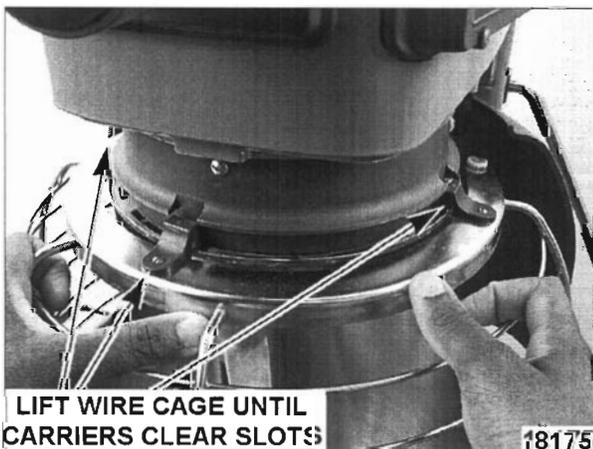


WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

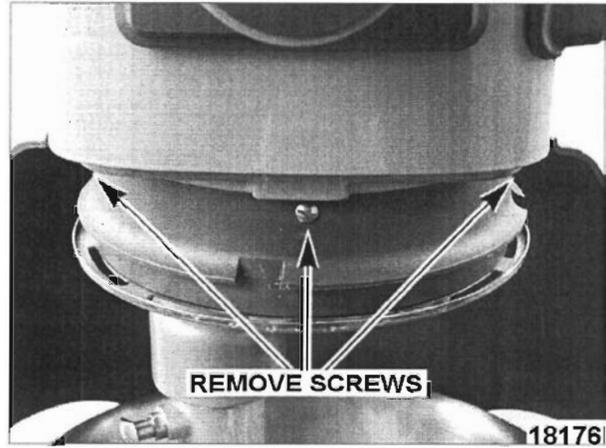
1. Rotate wire cage until the three carriers align with slots in drip cup.



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



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



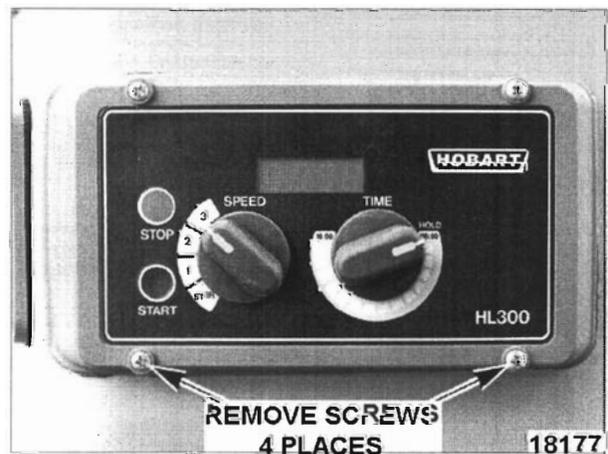
4. Reassemble in reverse order and check for proper operation.

BOWL GUARD SWITCH - 1LS

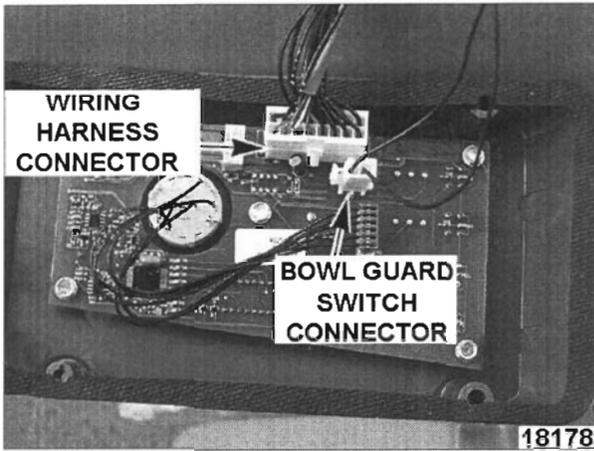


WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

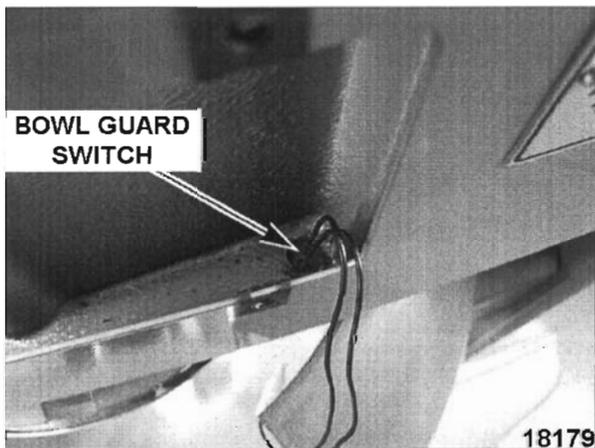
1. Remove TOP COVER.
2. Remove screws securing timer control assembly to wrap.
 - A. Remove timer control assembly from wrap.
 - B. Support timer control assembly.



3. Note connection points of bowl guard switch connector and wiring harness connector. Disconnect both connectors.



4. 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.

5. To install:
 - A. Check 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.
6. Connect bowl guard switch to timer control board.
7. Re-connect wiring harness connector.
8. Reinstall timer control assembly.
9. Reinstall drip cup, wire cage, bowl and top cover.
10. Raise bowl into mix position.
11. Check unit for proper operation.

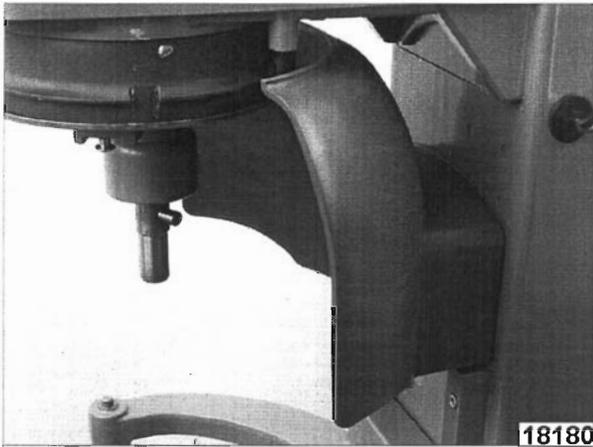
BOWL SWITCH - 2LS

REMOVAL

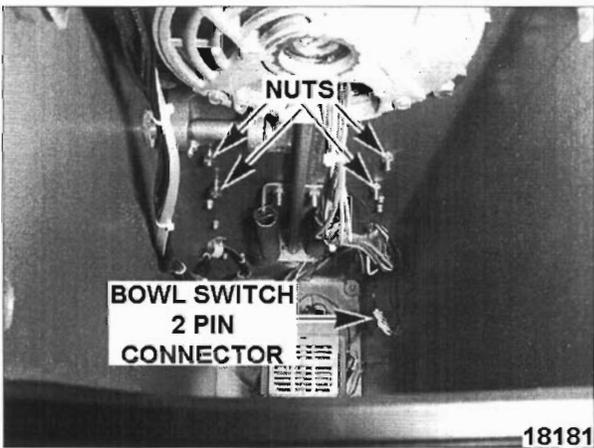


WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

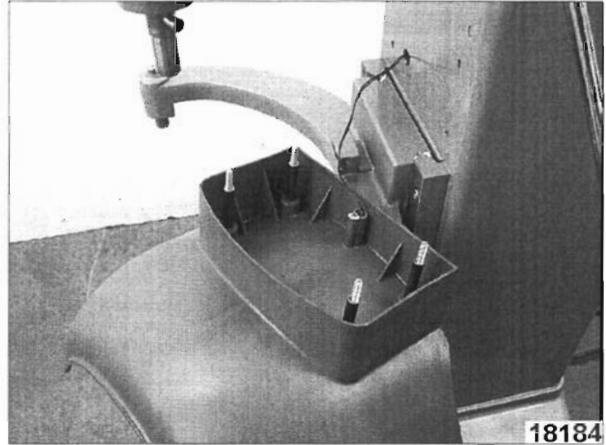
1. Lower bowl and remove.
2. Remove wire cage and beater.



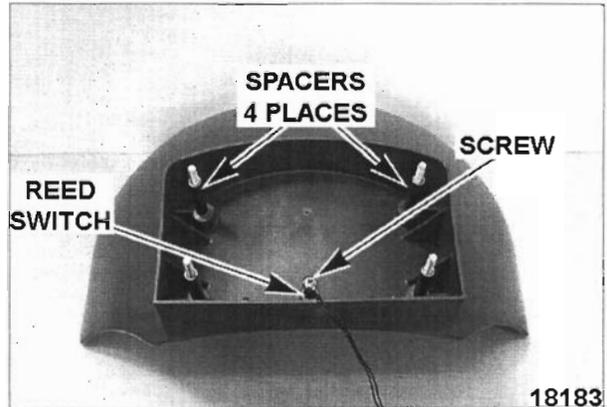
3. Disconnect bowl switch at 2 pin connector.
4. Remove nuts from mixer pedestal.



5. Remove splash guard from mixer.



6. Remove screws securing bowl switch to splash cover.
7. Remove bowl switch.



INSTALLATION

NOTE: When reinstalling splash cover to mixer, make sure spacers are in place.

1. Reassemble in reverse order.
2. Check mixer for proper operation.

TIMER BOARD



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

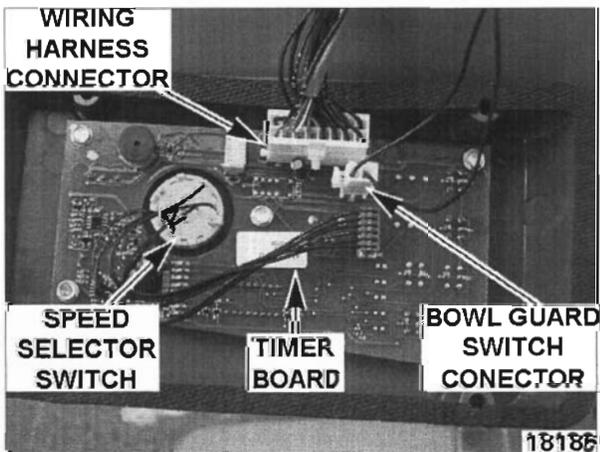
CAUTION: Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service grounding kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

1. Remove TOP COVER.
2. Loosen set screws then pull knobs from shaft.
3. Remove mounting nut and lock washer from speed selector shaft.
4. Remove screws securing timer control assembly to wrap.

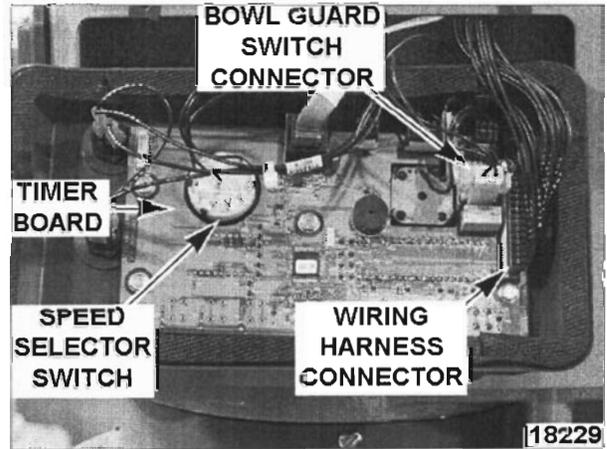


5. Disconnect wiring harness connector, speed selector switch and bowl guard switch connector from timer board.

NOTE: HL300 timer board shown.



NOTE: HL400 timer board shown.



6. Remove timer board.
7. Reassemble in reverse order.

SPEED SELECTOR SWITCH



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

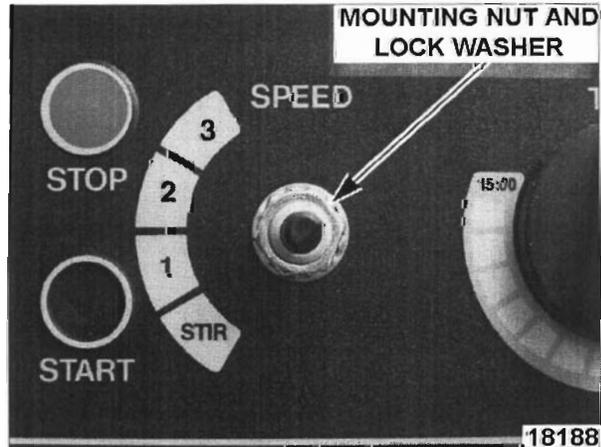
CAUTION: Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service grounding kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

REMOVAL AND REPLACEMENT

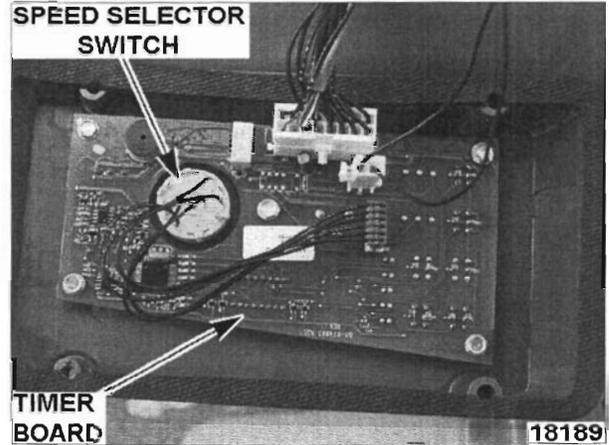
1. Loosen set screw then pull knob from shaft.



2. Remove mounting nut and lock washer.



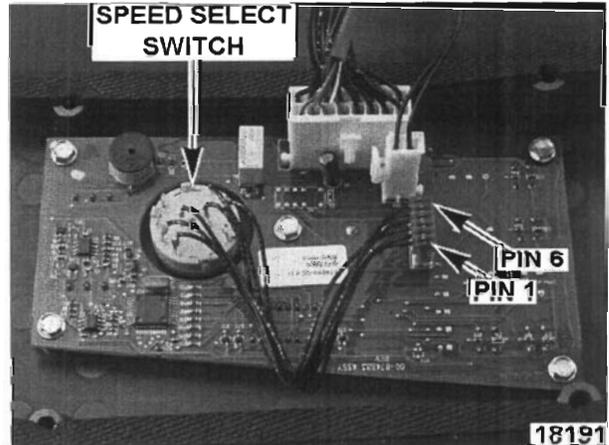
3. Remove screws securing timer control assembly to wrap.
4. Disconnect speed selector switch connector from timer board.



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

SPEED SELECT SWITCH TEST HL300

NOTE: This test will check the speed selector switch.



1. Remove CONTROL PANEL.
2. Disconnect speed select switch wiring from timer board.
3. Set meter to measure continuity or resistance (Ω).

- A. Check continuity between pin 6 (wiper) and pins 1 thru 4.

Speed	Pin 1 to 6	Pin 2 to 6	Pin 3 to 6	Pin 4 to 6
Stir	Open	Open	Open	Open
1	Closed	Closed	Open	Open
2	Open	Open	Closed	Closed
3	Closed	Closed	Closed	Closed

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

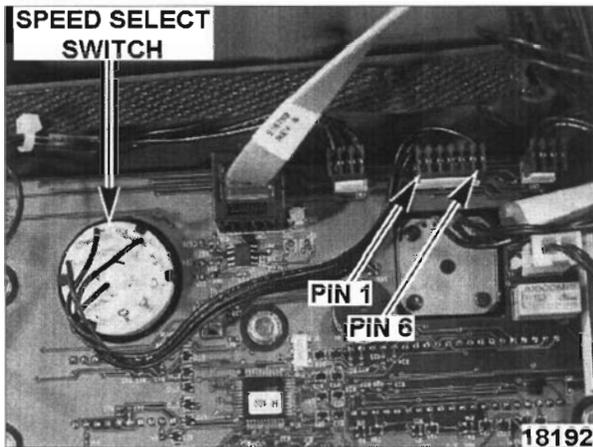
Speed	Pin 1 to 6	Pin 2 to 6	Pin 3 to 6
Stir	Open	Open	Closed
1	Closed	Open	Closed
2	Open	Closed	Closed
3	Closed	Closed	Closed

- B. If readings agree then the speed selector switch is functioning properly.
- C. If readings do not agree then check the speed selector switch, wiring harness connections and terminal connections at the motor drive.

SPEED SELECT SWITCH TEST HL400

NOTE: This test will check the speed selector switch.

1. Remove CONTROL PANEL.



2. Disconnect speed select switch wiring from timer board.
3. Set meter to measure continuity or resistance (Ω).
 - A. Check continuity between pin 6 (wiper) and pins 1 thru 3.

MOTOR DRIVE

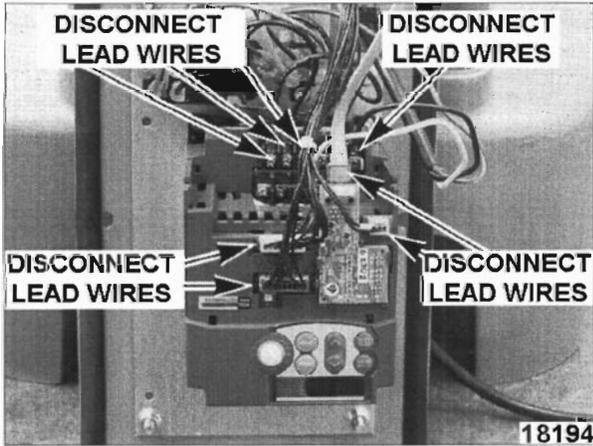


WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

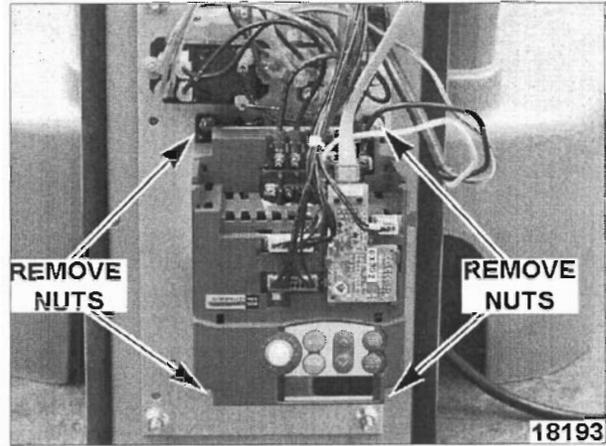
CAUTION: Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service grounding kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

REMOVAL AND REPLACEMENT

1. Remove PEDESTAL COVER.
2. Perform BUS VOLTAGE BLEED DOWN.
3. Disconnect lead wires from motor drive.



4. Remove nuts securing motor drive to mounting plate.



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

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

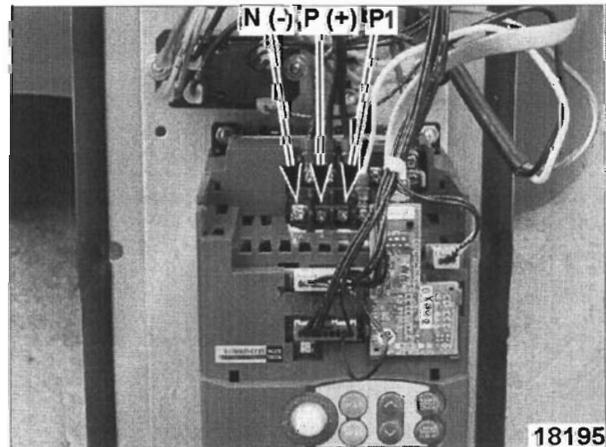
BUS VOLTAGE BLEED DOWN



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.

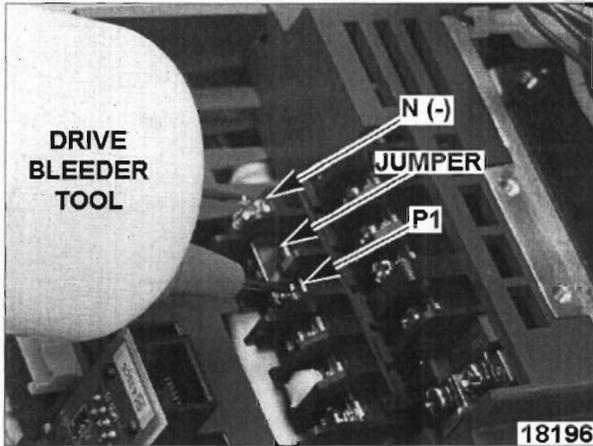
1. Remove PEDESTAL COVER.
2. Set DMM to DC voltage.



- 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.

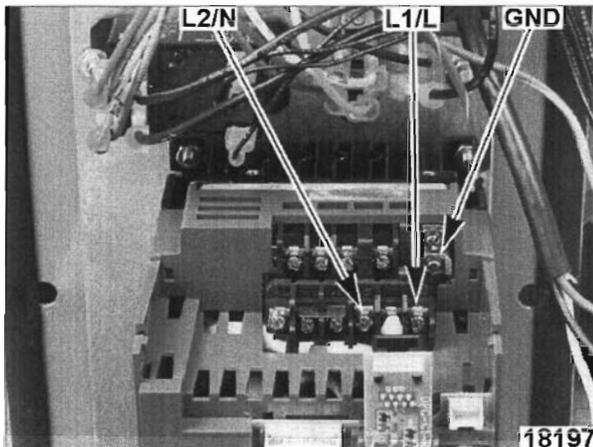
- 2) Place drive bleeder tool across the jumper at P1 & N (-) terminal for at least one minute to discharge the bus circuit.



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

BUS VOLTAGE TEST

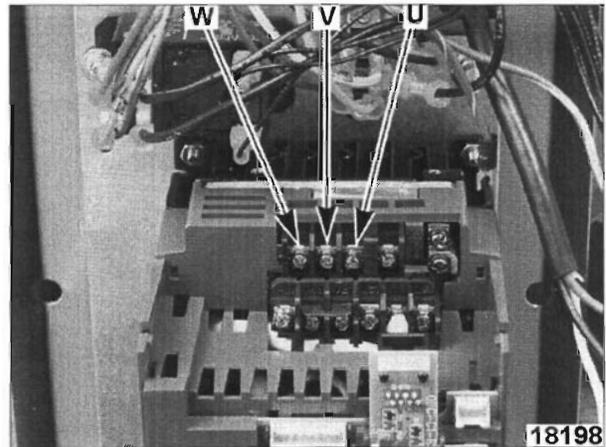
- 1. Remove PEDESTAL COVER.
- 2. Verify input voltage to motor drive at terminals L1/L & L2/N. Check data plate for correct voltage.



- A. If not correct, see TROUBLESHOOTING.
 - B. If correct, proceed to next step.
- 3. Perform BUS VOLTAGE BLEED DOWN.
 - 4. Set DMM to DC voltage.
 - A. Connect BLK meter lead on N (-) and RED meter lead on P (+) terminals of motor drive.
 - 5. Connect power.
 - A. The DC voltage reading of the meter should be approximately 340VDC. The acceptable DC bus voltage range is 256VDC to 372VDC.
 - 6. 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.

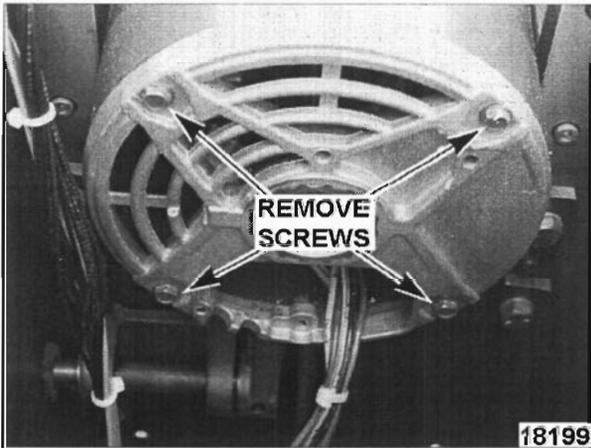
MOTOR



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 T1 thru T9.
3. Remove motor mounting screws.



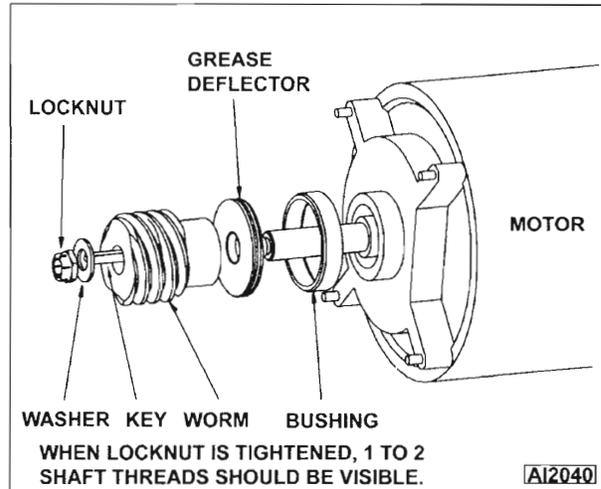
4. Pull motor from transmission case.



- 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 PEDESTAL 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	Motor Drive Terminals
T1	U (thru 1CR 8/6)
T2	V (thru 1CR 4/2)
T3	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	3.40
T1-T3	3.40
T2-T3	3.40
* Resistance values at 77°F room ambient. Tolerance is ±15%.	

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

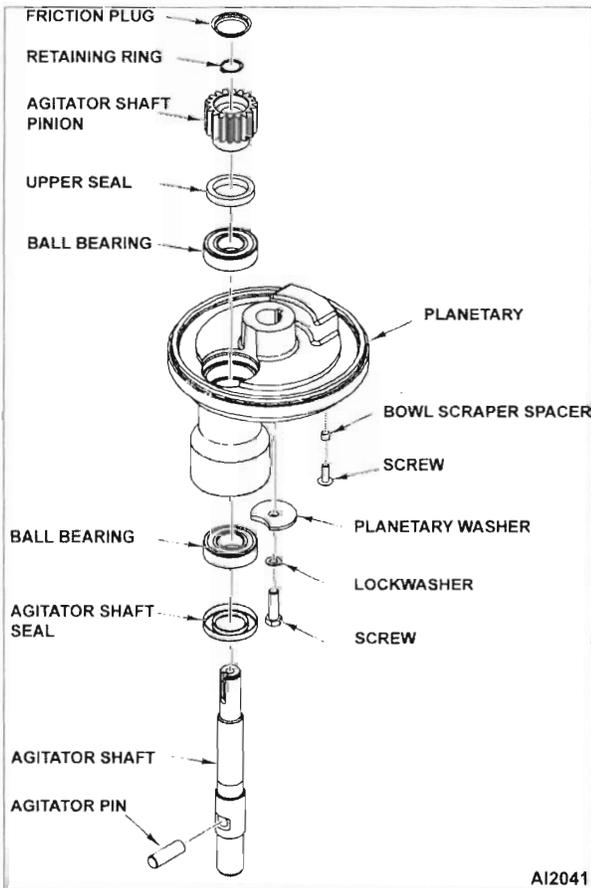
PLANETARY



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

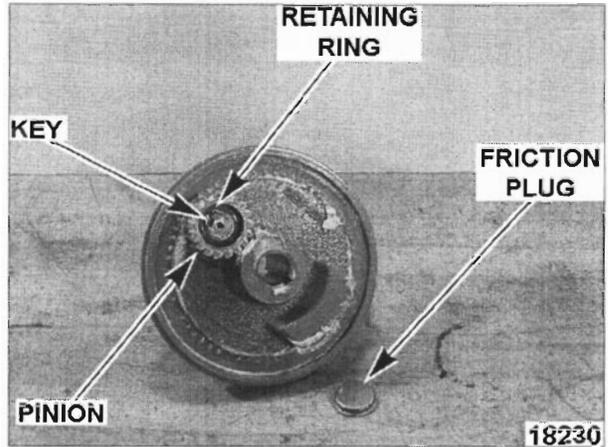
REMOVAL

1. Remove wire cage and drip cup as outlined under BOWL GUARD ASSEMBLY.
2. Remove screw, lock washer and planetary washer.
3. Remove planetary from mixer.



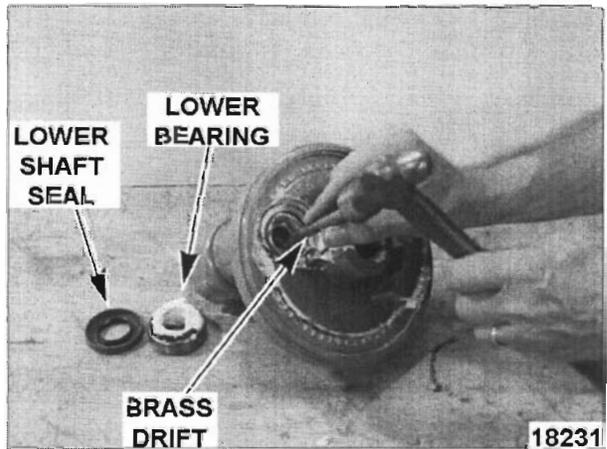
PLANETARY DISASSEMBLY

1. Remove friction plug, retaining ring, agitator shaft pinion, and key from agitator shaft.

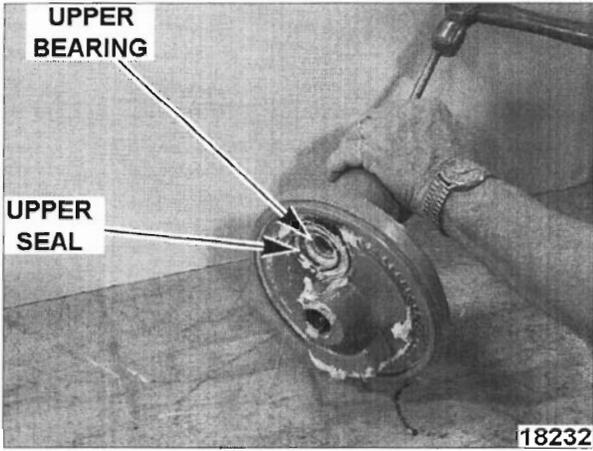


2. Drive agitator shaft, lower ball bearing, and lower seal from planetary.

NOTE: When removing use a brass drift to remove.



3. Drive upper bearing and upper shaft seal from planetary.



ASSEMBLY AND INSTALLATION

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

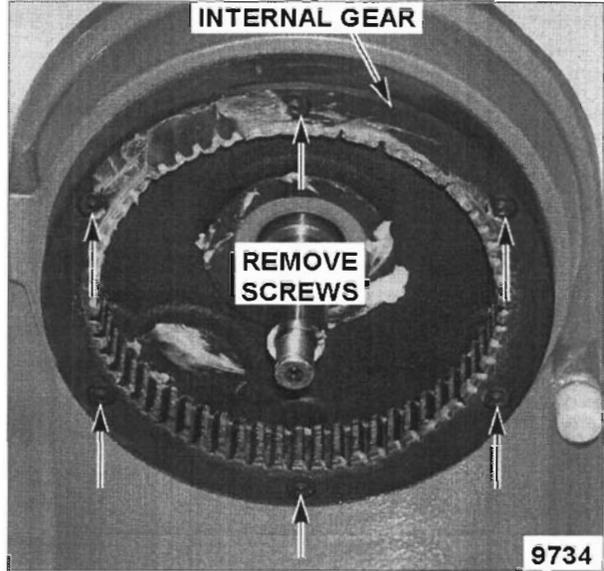
1. Slide agitator shaft seal and lower ball bearing onto agitator shaft.
2. Press lower bearing onto agitator shaft until inner race of bearing seats against shoulder of agitator shaft.
3. Press agitator shaft with lower bearing seated on the shaft into planetary casting until bearing seats against shoulder 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 upper seal into planetary casting until the seal is flush with casting.
7. Insert key and beater pinion onto agitator shaft with shoulder against upper bearing race then secure with friction plug.
8. Coat beater pinion with Chevron FM EP-2 grease.
9. 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 175-275 in*lb of torque.



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

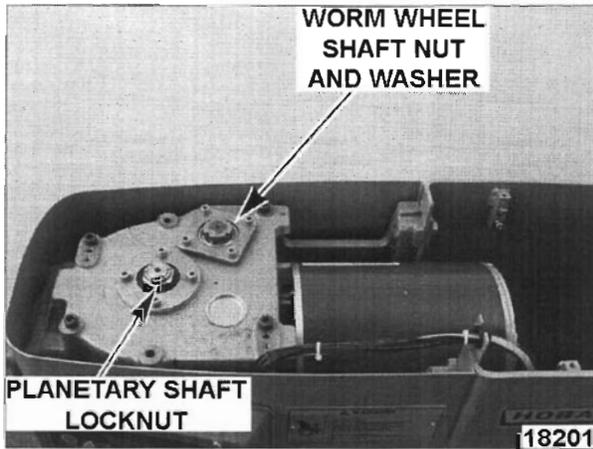
TRANSMISSION / ATTACHMENT HUB



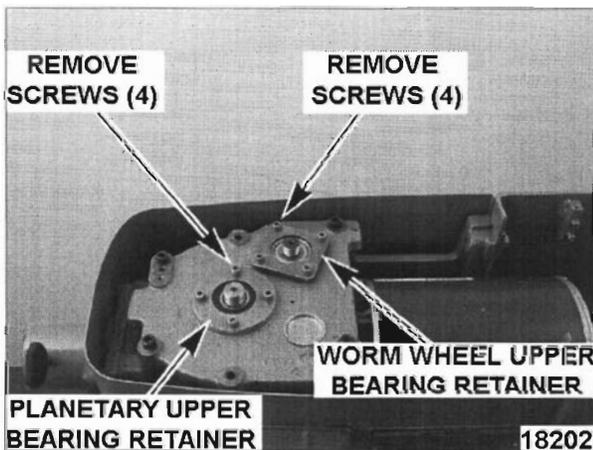
WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

REMOVAL AND DISASSEMBLY

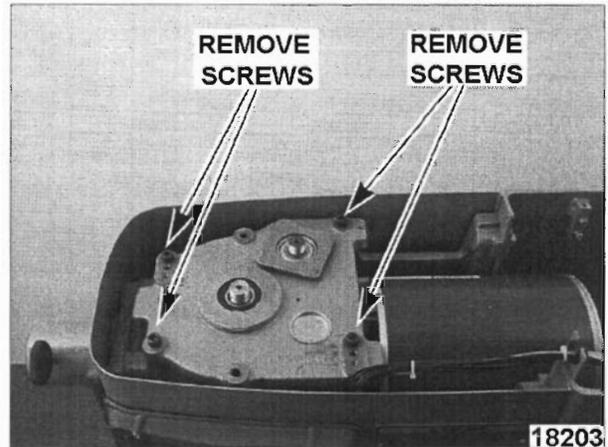
1. Lower bowl support.
2. Remove BOWL GUARD.
3. Remove top cover and front cover strap.
4. Place drive into the service position and ensure capacitive bus voltage is below 50VDC.
5. Perform PLANETARY REMOVAL as outlined in PLANETARY.



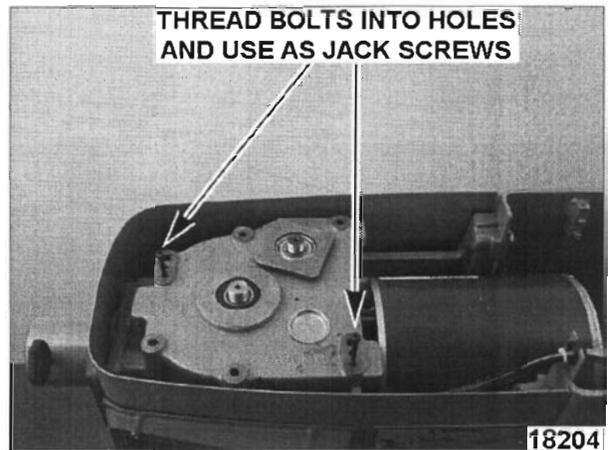
6. Remove planetary upper bearing retainer.
Remove worm wheel upper bearing retainer.



7. Remove screws from transmission cover.

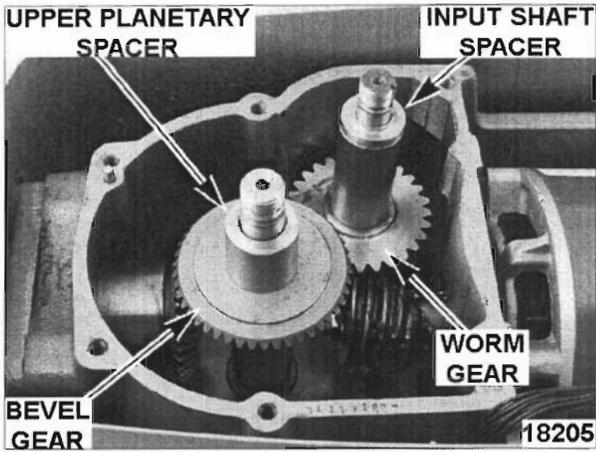


8. To remove transmission cover, use fully threaded (hardened if possible) bolts (2) as jack screws. Turn each bolt 1-2 revolutions and alternate until transmission cover separates from case.

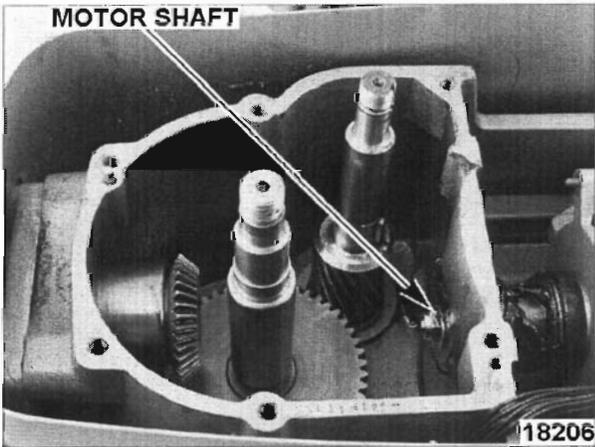


9. Remove upper planetary spacer and input shaft spacer.

10. Remove bevel gear and worm gear.

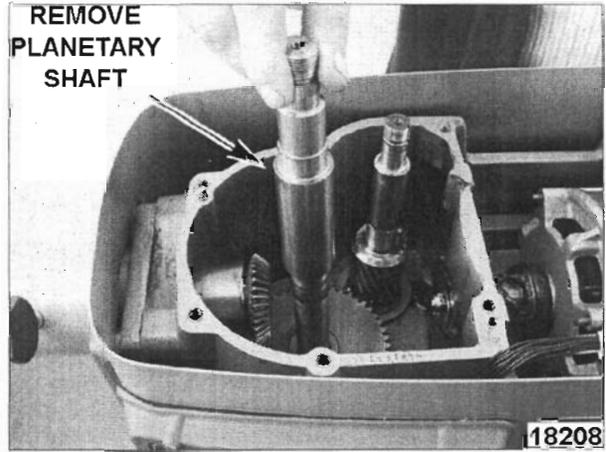
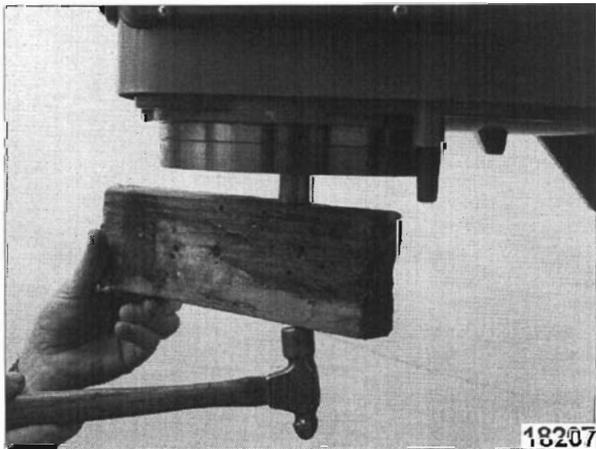


NOTE: In order to remove remaining parts from transmission and attachment hub, it will be necessary to slide motor shaft out of the way.



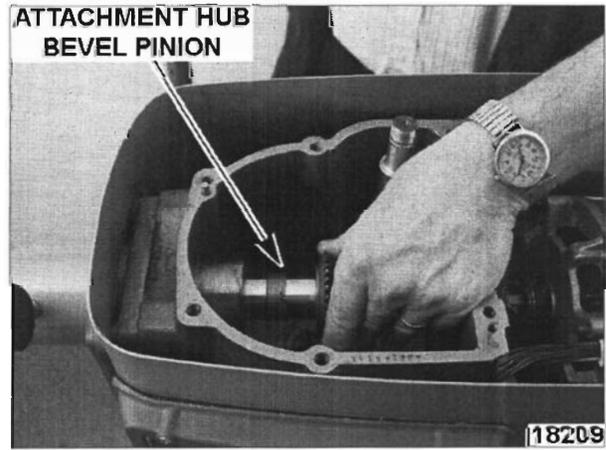
11. Drive planetary shaft from transmission case and remove.

NOTE: Use a block of wood or a soft face/ special hammer when removing planetary shaft.

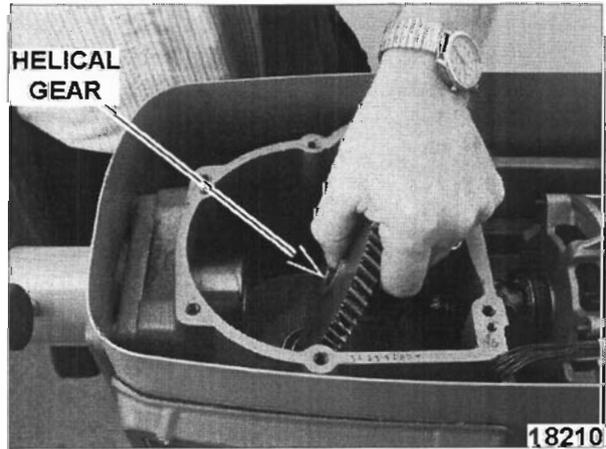


NOTE: Retain key from planetary shaft for use during transmission assembly.

12. Remove bevel pinion from attachment hub.

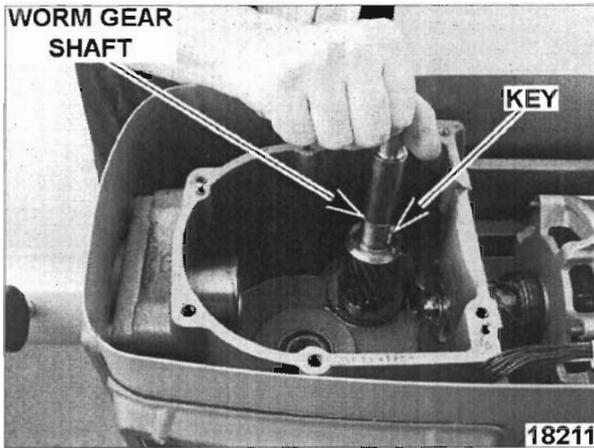


13. Remove helical gear.

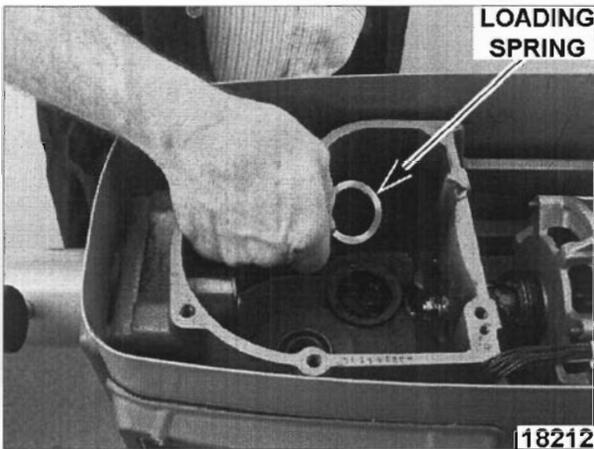


14. Remove worm gear shaft.

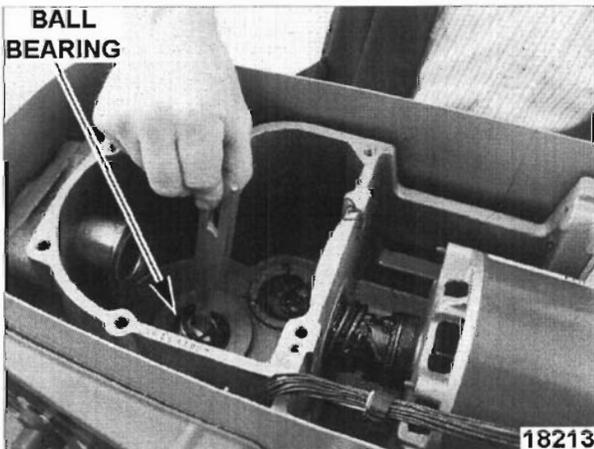
NOTE: Retain key from worm gear shaft for use during transmission assembly.



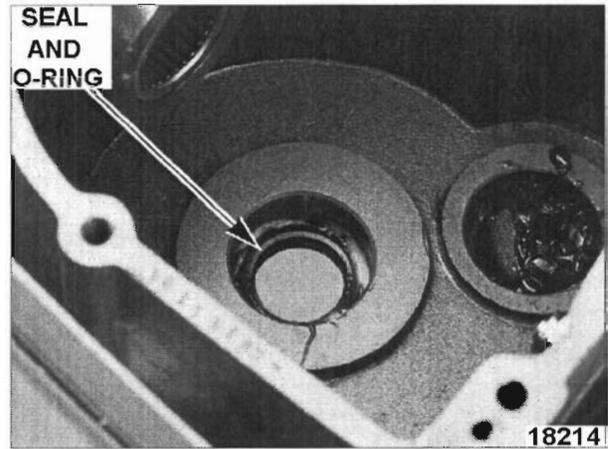
15. Remove loading spring.



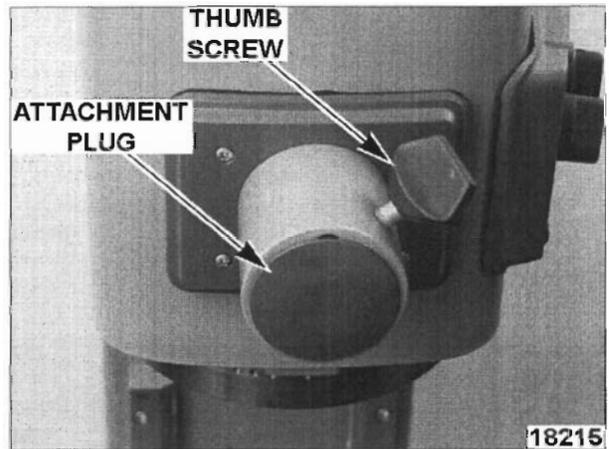
16. Remove ball bearing.



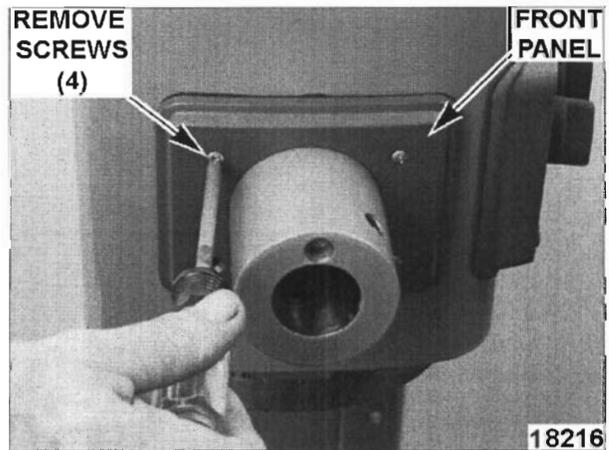
17. Remove planetary seal and ring.



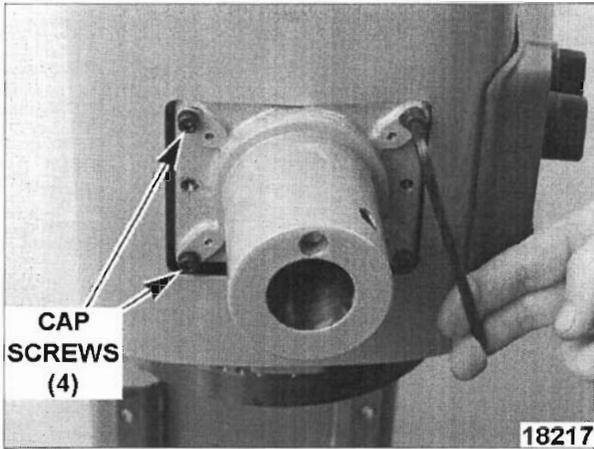
18. Remove thumb screw and attachment plug.



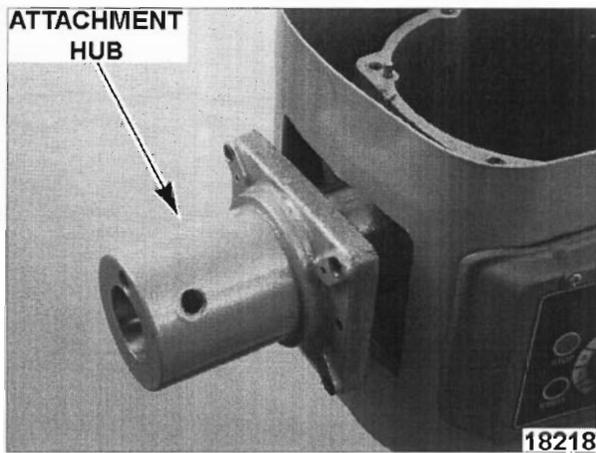
19. Remove screws and front panel.



20. Remove cap screws.



21. Remove attachment hub.

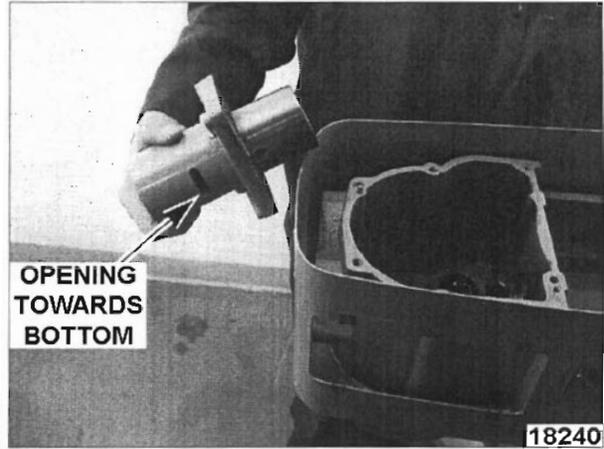


ASSEMBLY AND INSTALLATION

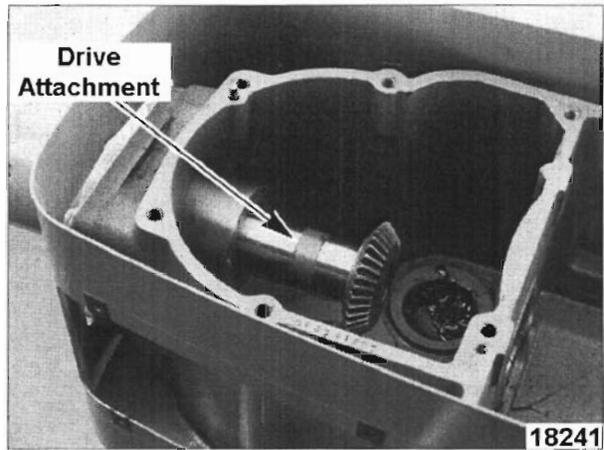
NOTE: Ensure all parts are clean before assembly. Remove old grease from parts being reused.

1. Clean sealant from flat and rounded surfaces of attachment hub and transmission case.
2. Coat surface of attachment hub casting with gasket sealer (Permatex #2) before reassembly.
3. Install attachment hub to transmission case.

NOTE: Be certain to install hub with opening towards bottom.



4. Install washer and gear drive attachment.

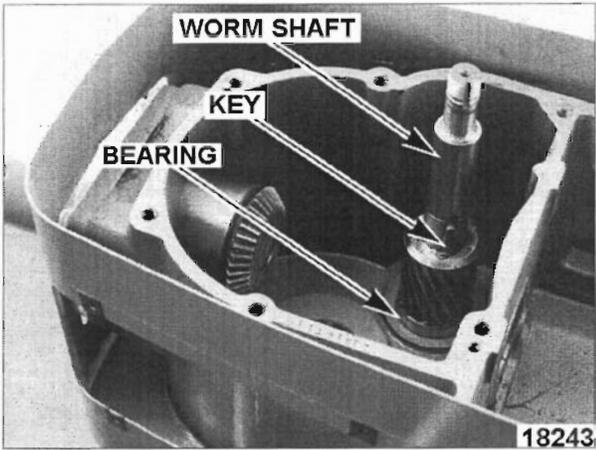


5. Install spring loading washer.

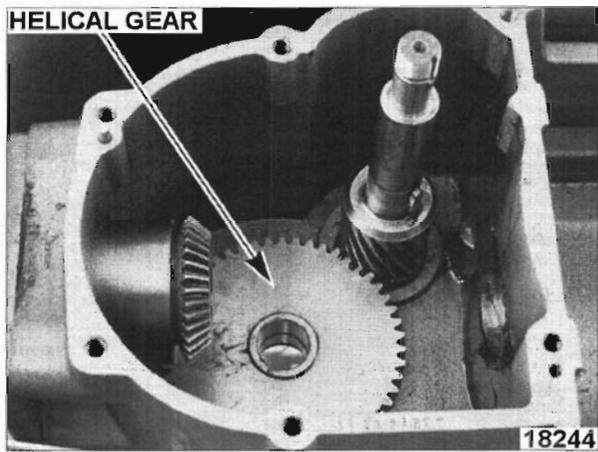


6. Install ball bearing and worm shaft.

NOTE: Be certain to install key onto worm shaft.

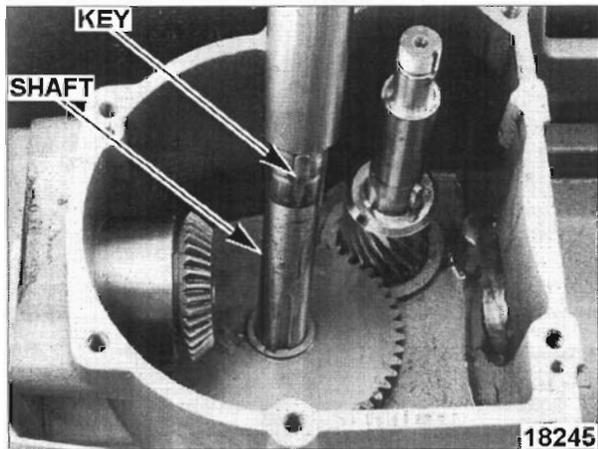


7. Install helical gear.

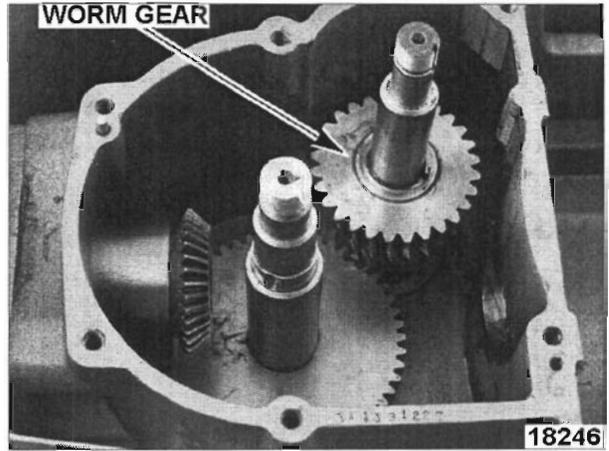


8. Install planetary shaft.

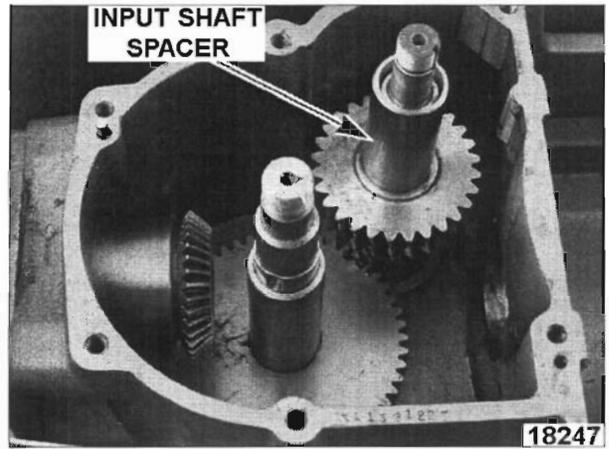
NOTE: Be certain to install key onto planetary shaft.



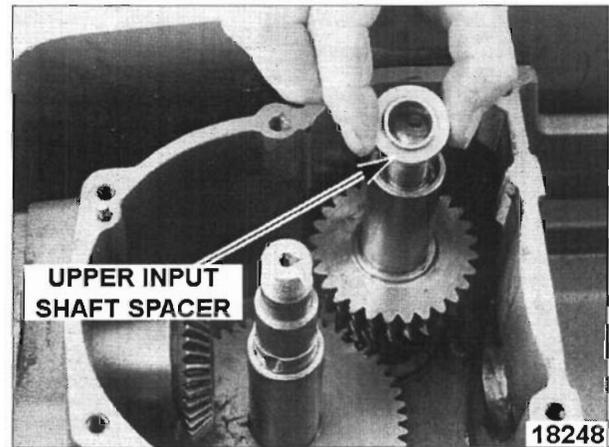
9. Install worm gear on worm gear shaft.



10. Install input shaft spacer on worm gear shaft.

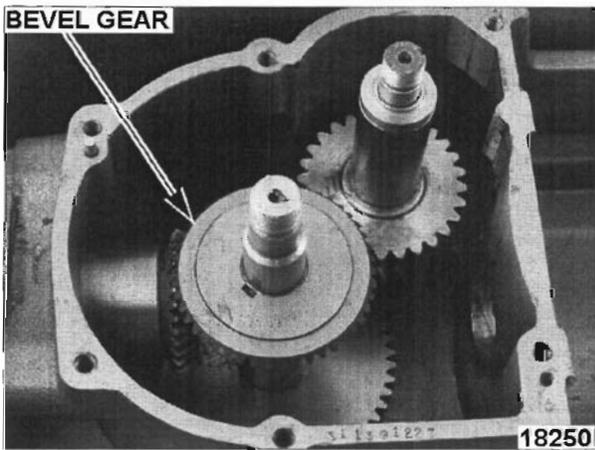
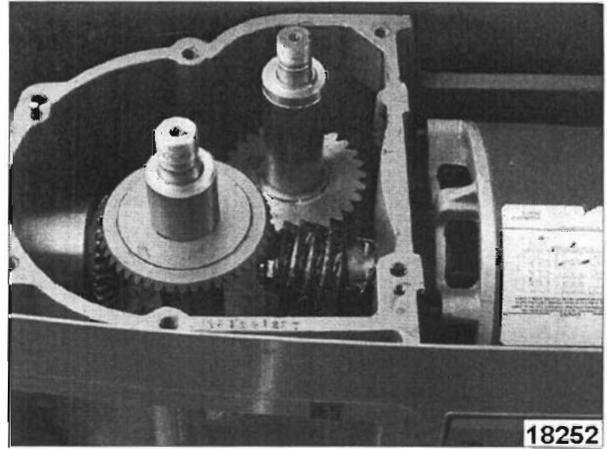
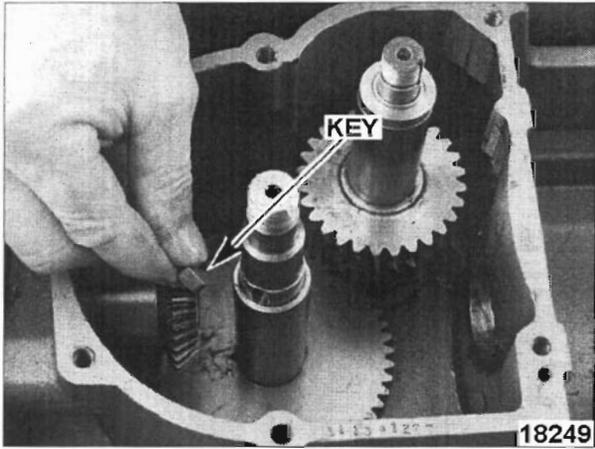


11. Install upper input shaft spacer.

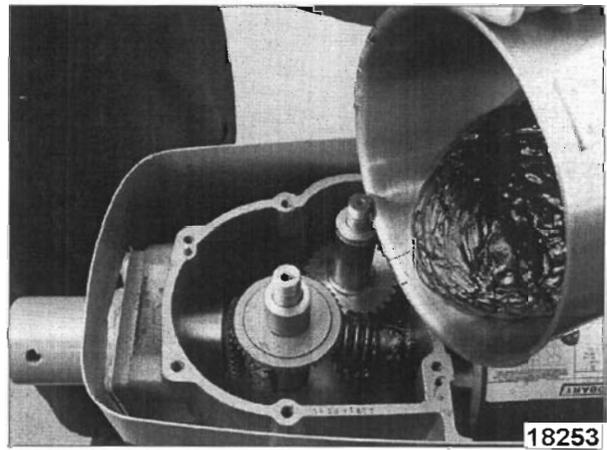


12. Install bevel gear onto planetary shaft.

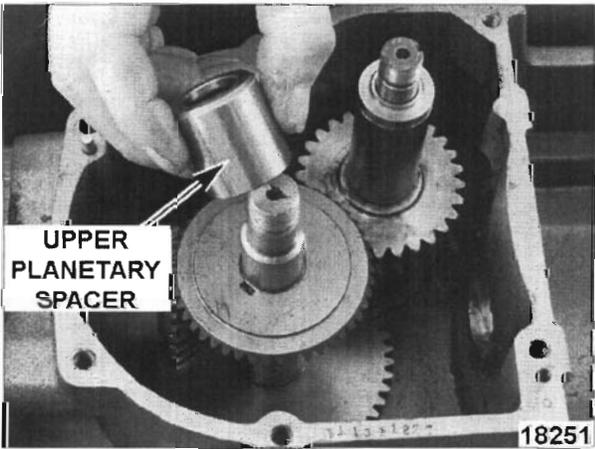
NOTE: Be certain key is in place on planetary shaft.



15. Add 40 oz. Of Mobilith AW-2 grease to transmission case. Coat all gears thoroughly with grease.



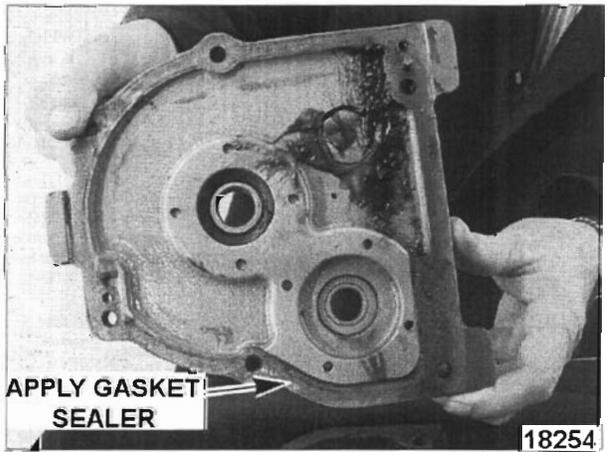
13. Install upper planetary spacer.



16. Clean and dry the mating surfaces of the transmission case and the transmission cover.
17. Apply gasket sealer (Permatex #2) to the perimeter of the transmission cover.

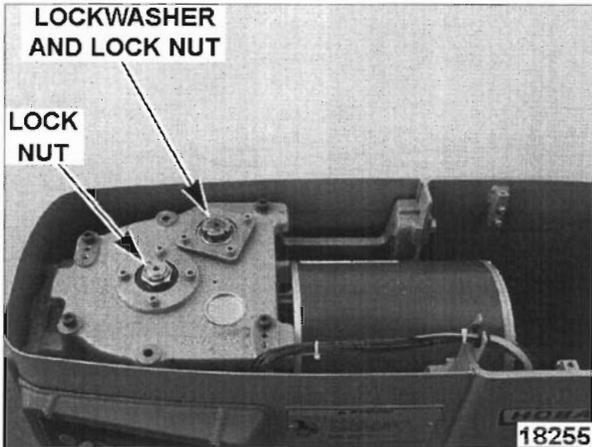
14. Install motor to transmission case.

NOTE: Position motor with lead wires down. Tighten motor mounting screws in an alternating pattern to 24-30 in*lb of torque.



18. Install cover onto transmission case. Tighten screws in an alternating pattern to 175-275 in*lb of torque.

19. Install lock nut on planetary shaft.
20. Install lock washer and lock nut on worm gear shaft.



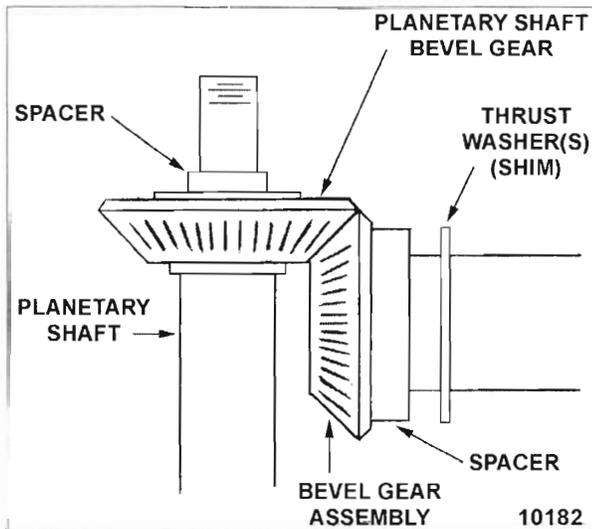
21. Install front cover mounting strap and tighten two screws to 175-275 in*lb.
22. Install PLANETARY.

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.

WRAP

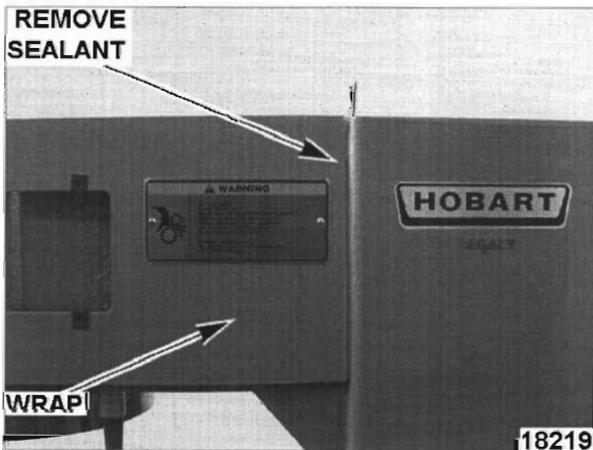
Removal Replacement



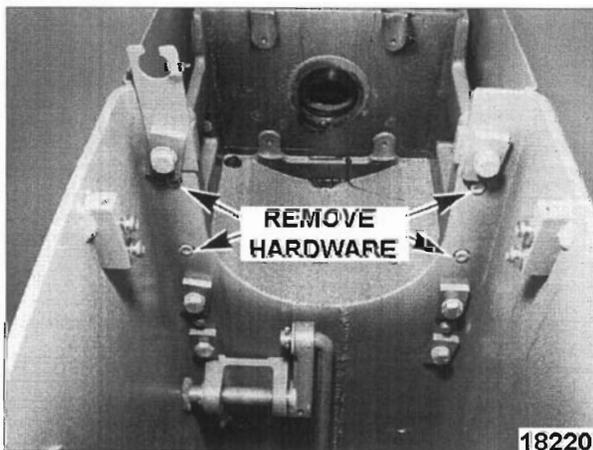
WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

9. Fill seam between wrap and column with aluminum colored RTV-732.
10. Reinstall remaining components that were removed to access wrap.
11. Check for proper operation.

1. Remove top cover.
2. Remove timer control assembly.
3. Remove attachment hub and motor.
4. To prevent paint damage to column, cut through sealant with a sharp knife near column.



5. Remove hardware securing wrap to transmission case.



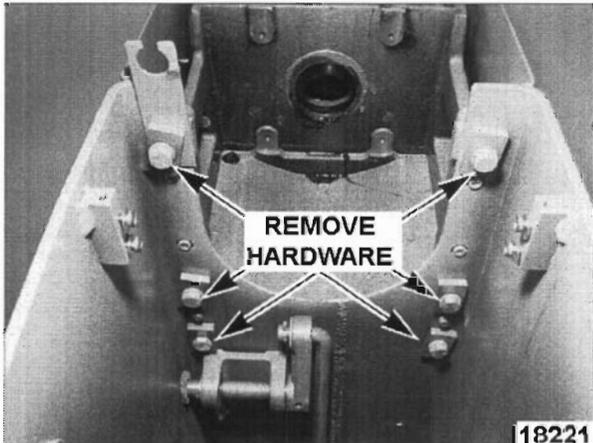
6. Remove wrap.
7. Clean old sealant from column.
 - A. Clean wrap if it is to be reused.
8. Install wrap onto column and secure with hardware.

TRANSMISSION CASE



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

1. Remove top cover.
2. Remove control panel.
3. Remove bowl guard cage, bowl, agitator, and back splash guard.
4. Remove motor.
5. Remove TRANSMISSION / ATTACHMENT HUB.
6. Remove WRAP.
7. Support transmission case.
8. Remove hardware securing transmission case to pedestal.



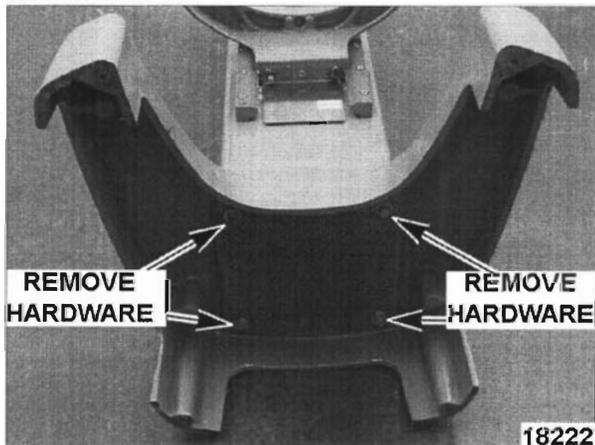
9. Remove transmission case from pedestal.
10. Reassemble in reverse order.
11. Check for proper operation.

BASE



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

1. Remove PEDESTAL COVER.
2. Perform BUS VOLTAGE BLEED DOWN.
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. Position mixer to gain access to mounting hardware.
6. Remove hardware.



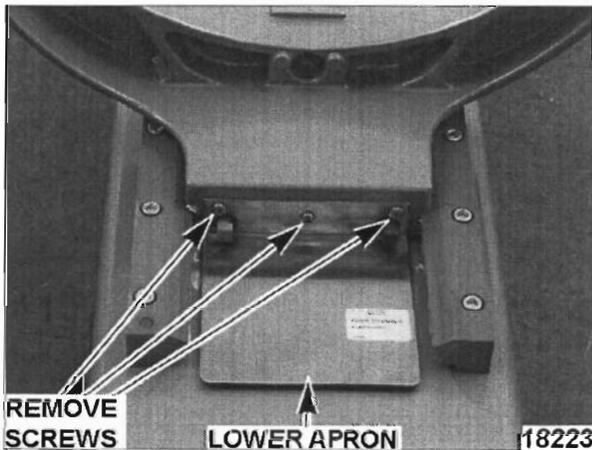
7. Remove base from pedestal.
8. Reassemble in reverse order. Tighten bolts in an alternating pattern to 900-1100 in*lb of torque.
9. Check for proper operation.

BOWL SUPPORT

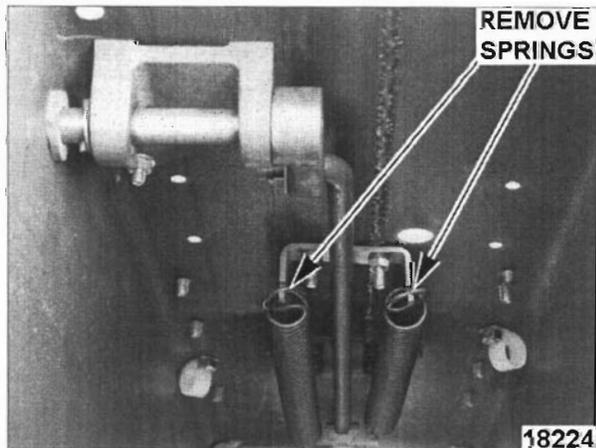


WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

1. Remove PEDESTAL COVER.
2. Remove bowl guard, bowl, agitator and back splash guard.
3. Place bowl lift handle in up position.
4. Remove LOWER APRON.

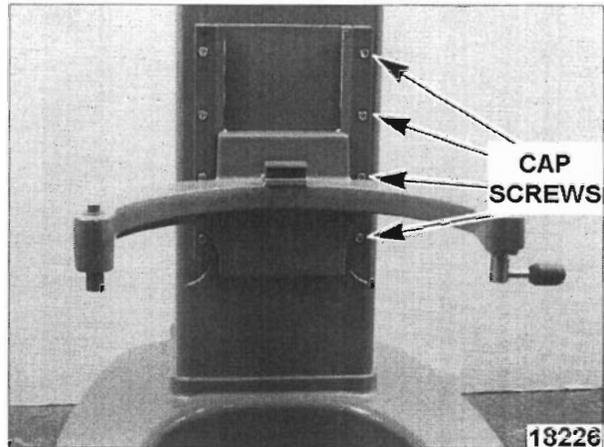


5. Remove bowl lift springs.



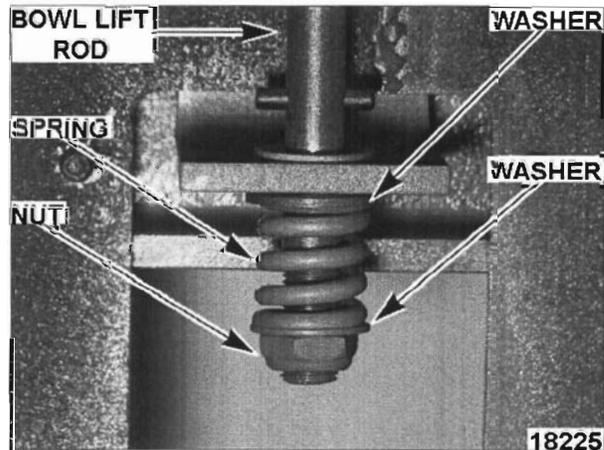
6. Lower bowl lift handle.

7. Remove mounting screws 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. Remove stop nut, spring, and washers 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 175-275 in*lb of torque.
13. Perform BOWL LIFT HANDLE ADJUSTMENT as outlined under SERVICE PROCEDURES AND ADJUSTMENTS.

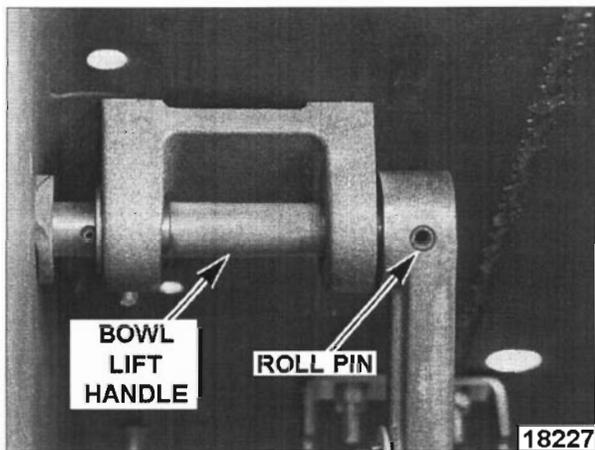
BOWL LIFT ASSEMBLY



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

REMOVAL AND REPLACEMENT

1. Remove bowl guard, bowl, agitator and back splash guard.
2. Remove TOP COVER.
3. Remove MOTOR.
4. Remove roll pin from bowl lift arm.

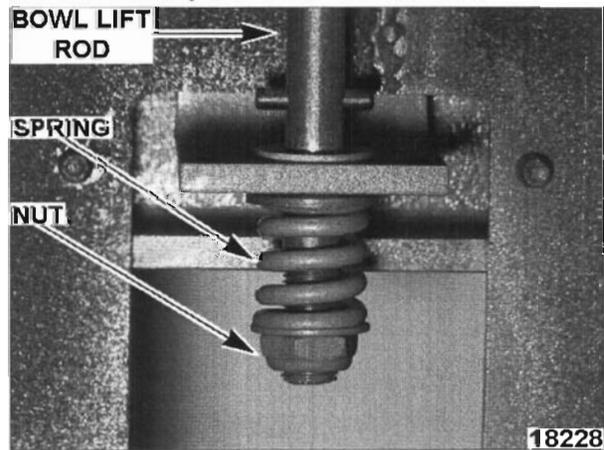


5. Remove bowl lift handle from pedestal.
6. Reassemble in reverse order.
7. Perform BOWL LIFT HANDLE ADJUSTMENT.

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.

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 $\frac{1}{2}$ turn. To *decrease* lift handle force, turn nut counterclockwise approximately $\frac{1}{2}$ turn.
 - B. Verify bowl lift arm operation and repeat the adjustment as necessary.



BOWL TO BEATER CLEARANCE ADJUSTMENT

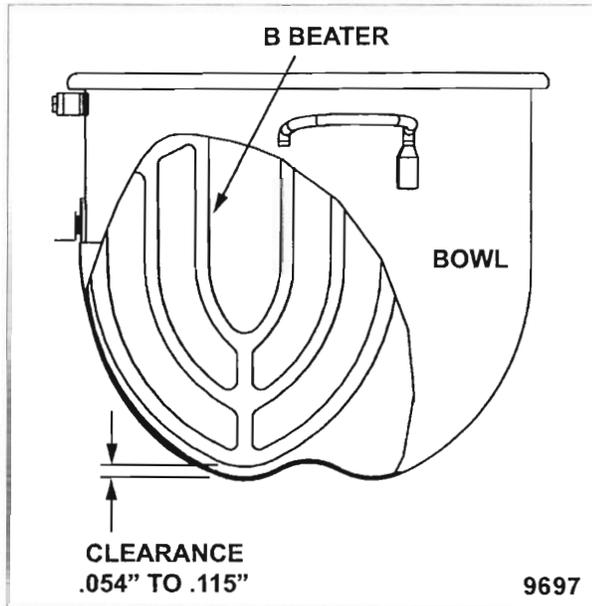


WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES.

6. Check for proper operation.

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).



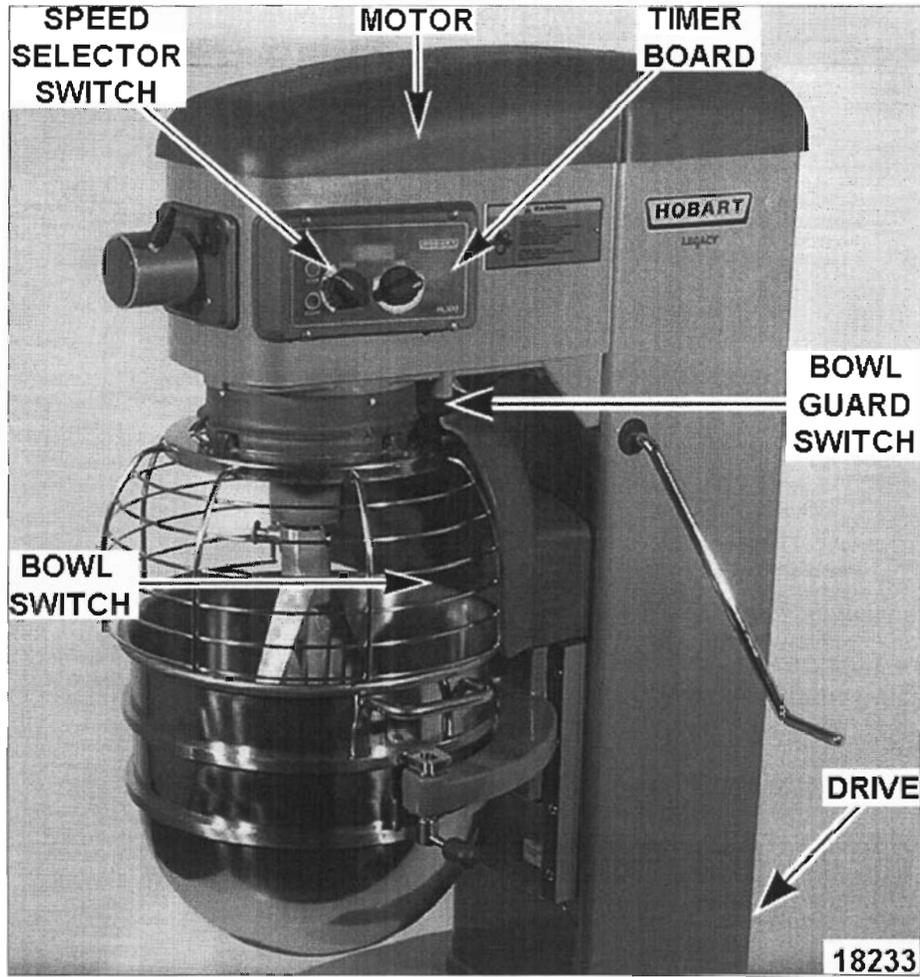
- A. If adjustment is required, continue with procedure.
2. Remove beater, unlock bowl and swing out of way.
3. Remove apron from pedestal.
4. Adjust each bowl height screw equally to obtain the correct bowl to beater clearance.
 - A. Turn screw clockwise to increase or counterclockwise to decreases 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.

ELECTRICAL OPERATION

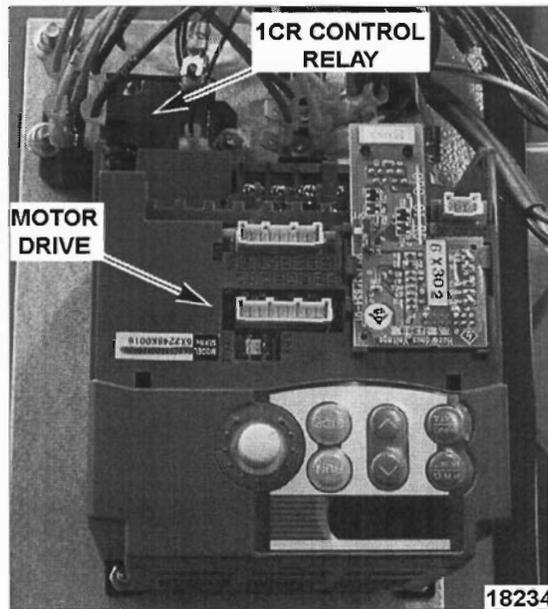
COMPONENT FUNCTION

- Motor Drive** 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.
- 1MTR Motor** Turns transmission to mix product.
- Timer Board** 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.
- Recipe Timer Board** 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.
- 1PB Start Switch** N.O. - Provides initial power to control circuit (momentary on).
- 2PB Stop Switch** N.C. - Removes power from control circuit (momentary off).
- Time Adjustment Potentiometer** Sets mix time from 00:10 seconds to 15:00 minutes (countdown mode only) or selects Hold Mode (continuous mixing with count up timing).
- Buzzer** 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.
- Speed Selector Switch** Sets agitator speed; or recipe number 1 thru 4 (recipe timer board only).
- 1CR Control Relay** 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.
- 1LS Bowl Guard Switch** N.O. - Ensures bowl guard covers mixing bowl (reed switch closed) before mixer operation can begin.
- 2LS Bowl Switch** N.O. - Ensures bowl is raised into mixing position (reed switch closed) before mixer operation can begin.

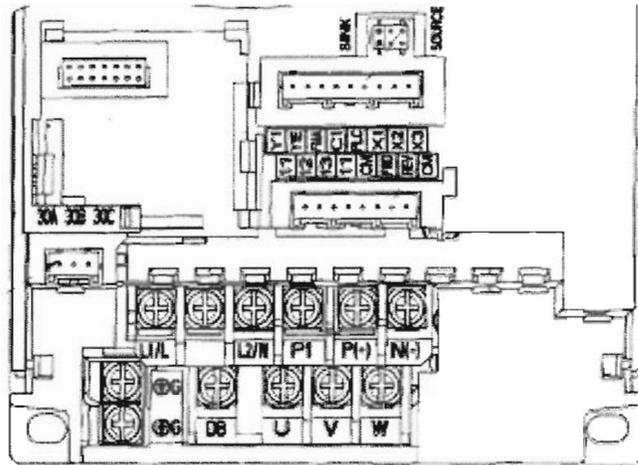
COMPONENT LOCATION



MIXER WITH STANDARD TIMER BOARD - HL300 SHOWN



MOTOR DRIVE LAYOUT HL300



--- 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 = 0VDC 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.

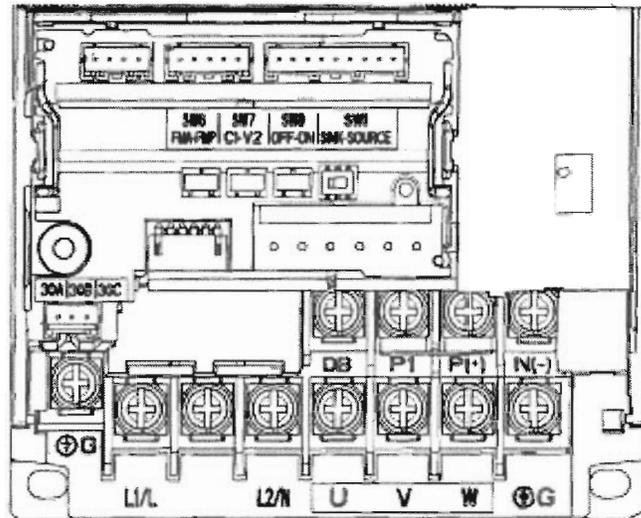
MAIN CIRUCIT TERMINALS

- L1/L = LINE 1 AC VOLTAGE IN.
- L2/N = LINE 2 OR NETURAL.
- L3L/L = LINE 3 AC VOLATGE IN.
- G = GROUND
- U
- V = 3 PHASE VOLTAGE
- W OUTPUT TO MOTOR*

* OUTPUT VOLTAGE DEPENDS ON SPEED SETTING AND MIX LOAD.

18257

MOTOR DRIVE LAYOUT HL400



--- LEGEND ---

CONTROL CIRCUIT TERMINALS

- Y1 = COMMON (0VDC) OUTPUT TO BUZZER.
- Y1E = COMMON (0VVDC) 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.
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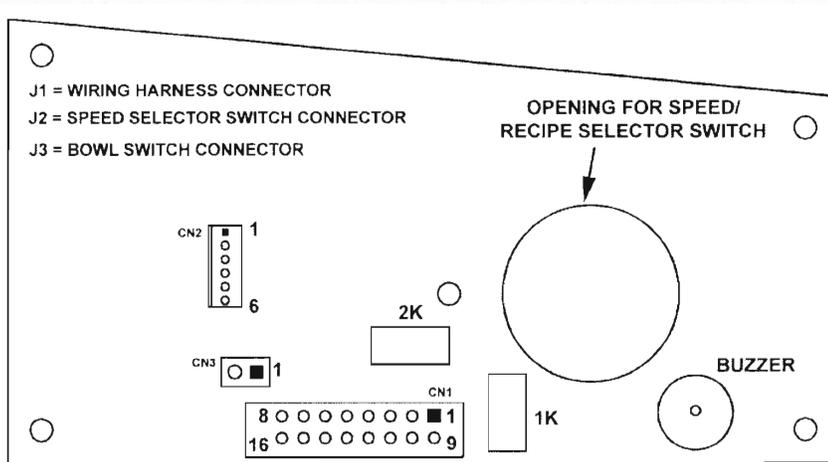
MAIN CIRUCIT TERMINALS

- L1/L = LINE 1 AC VOLTAGE IN.
- L2/N = LINE 2 OR NETURAL.
- L3/L = LINE 3 AC VOLATGE IN.
- G = GROUND
- U
- V = 3 PHASE VOLTAGE
- W OUTPUT TO MOTOR*

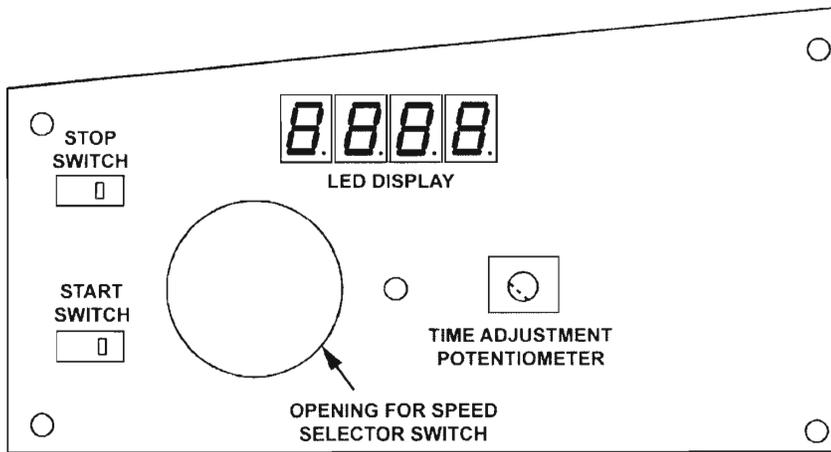
* OUTPUT VOLTAGE DEPENDS ON SPEED SETTING AND MIX LOAD.

18258

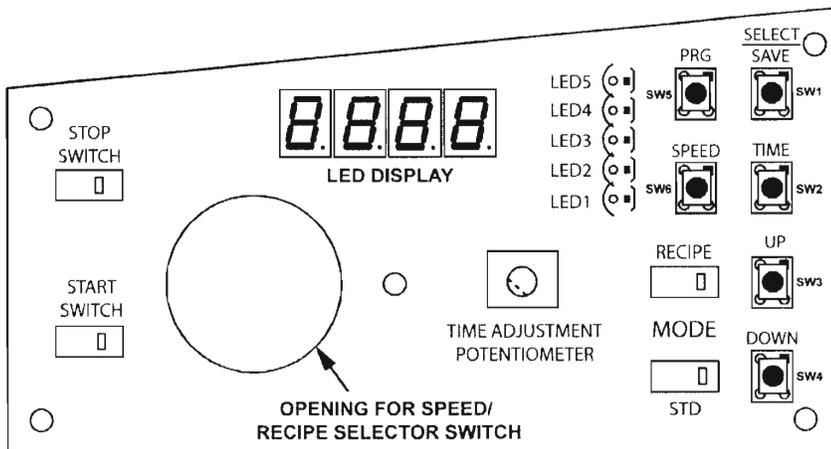
TIMER BOARD LAYOUT - HL300



REAR VIEW - TIMER BOARD OR RECIPE TIMER BOARD



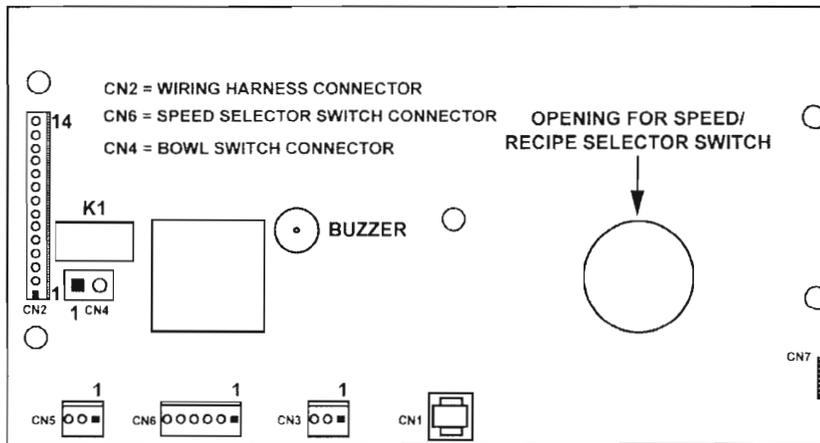
FRONT VIEW - TIMER BOARD



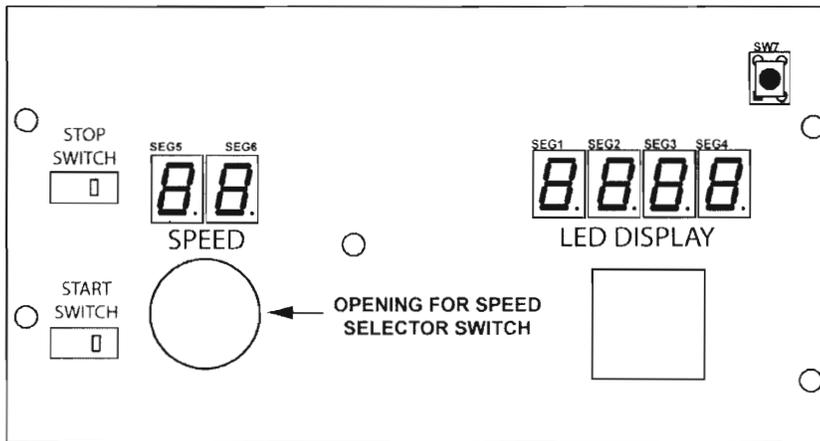
FRONT VIEW - RECIPE TIMER BOARD

A12051

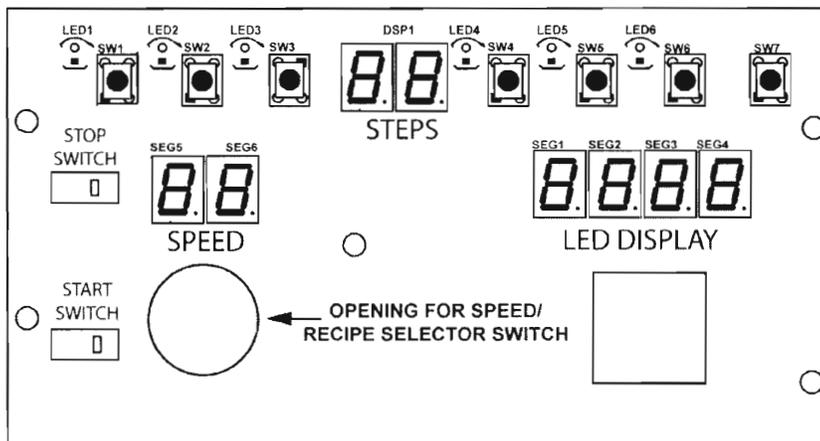
TIMER BOARD LAYOUT - HL400



REAR VIEW - TIMER BOARD OR RECIPE TIMER BOARD



FRONT VIEW - TIMER BOARD



AI2052

FRONT VIEW - RECIPE TIMER BOARD

SEQUENCE OF OPERATION

HL300 Mixer - Standard Timer Board

Refer to wiring diagram AI2036 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).

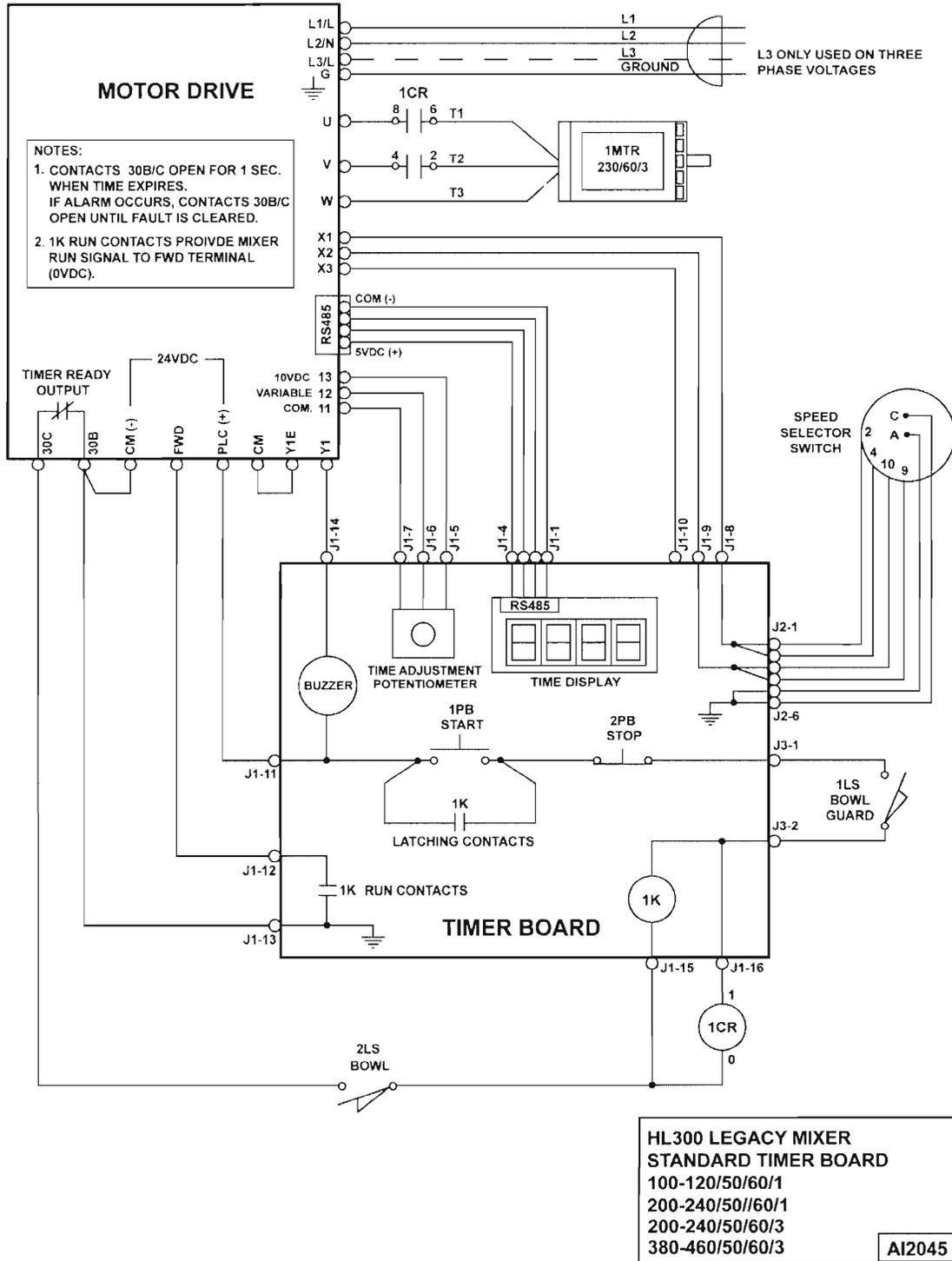
- A. 1K relay coil initially energized thru 2PB stop switch and 1LS bowl switch.
 - 1) 1K run contacts close and provide the common signal (0VDC) to motor drive FWD.
 - 2) When 1PB start switch is released, 1K relay coil remains energized thru 1K latching circuit contacts.
 - B. 1CR relay coil energized 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.

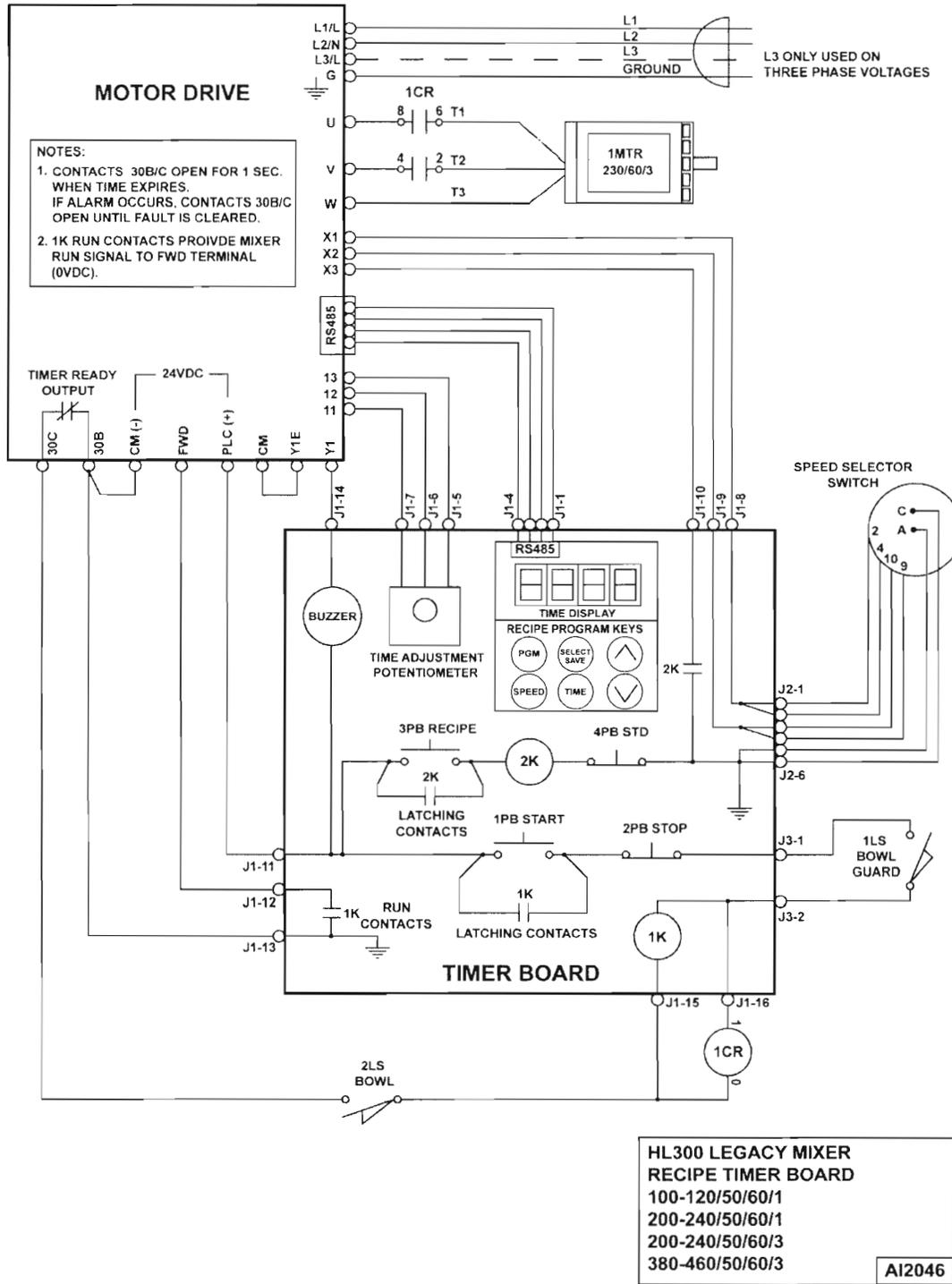
- 3) Motor drive timer ready contacts 30 B/C open for 1 second to remove common signal (0VDC) from control circuit and then re-close.
 - 4) Remaining mix time is shown in display.
10. When timer reaches 00:00 minutes (countdown mode only).
- A. Motor drive timer ready contacts 30 B/C open for 1 second 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

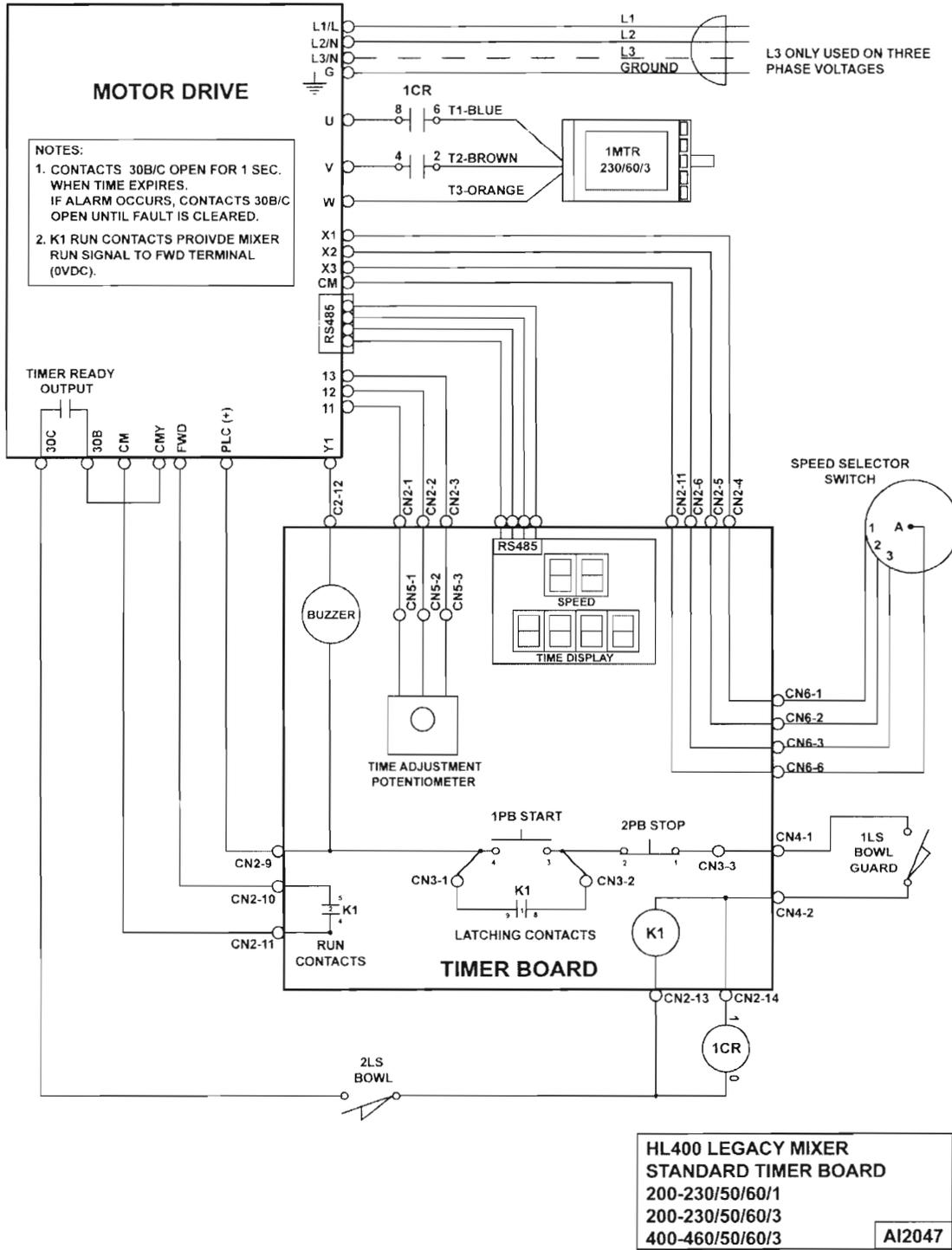
HL300 Mixer - Standard Timer Board



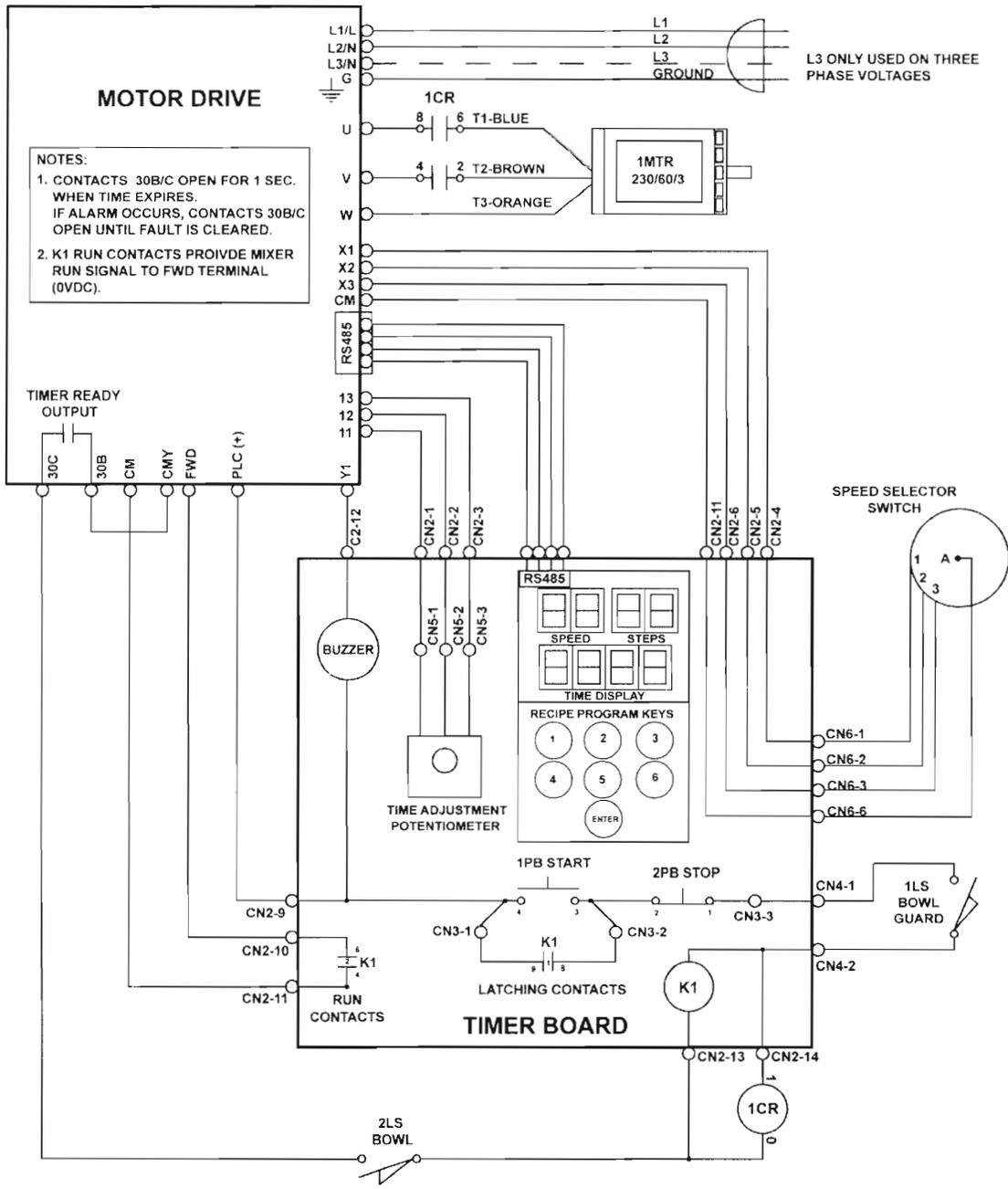
HL300 Mixer - Recipe Timer Board



HL400 Mixer - Standard Timer Board



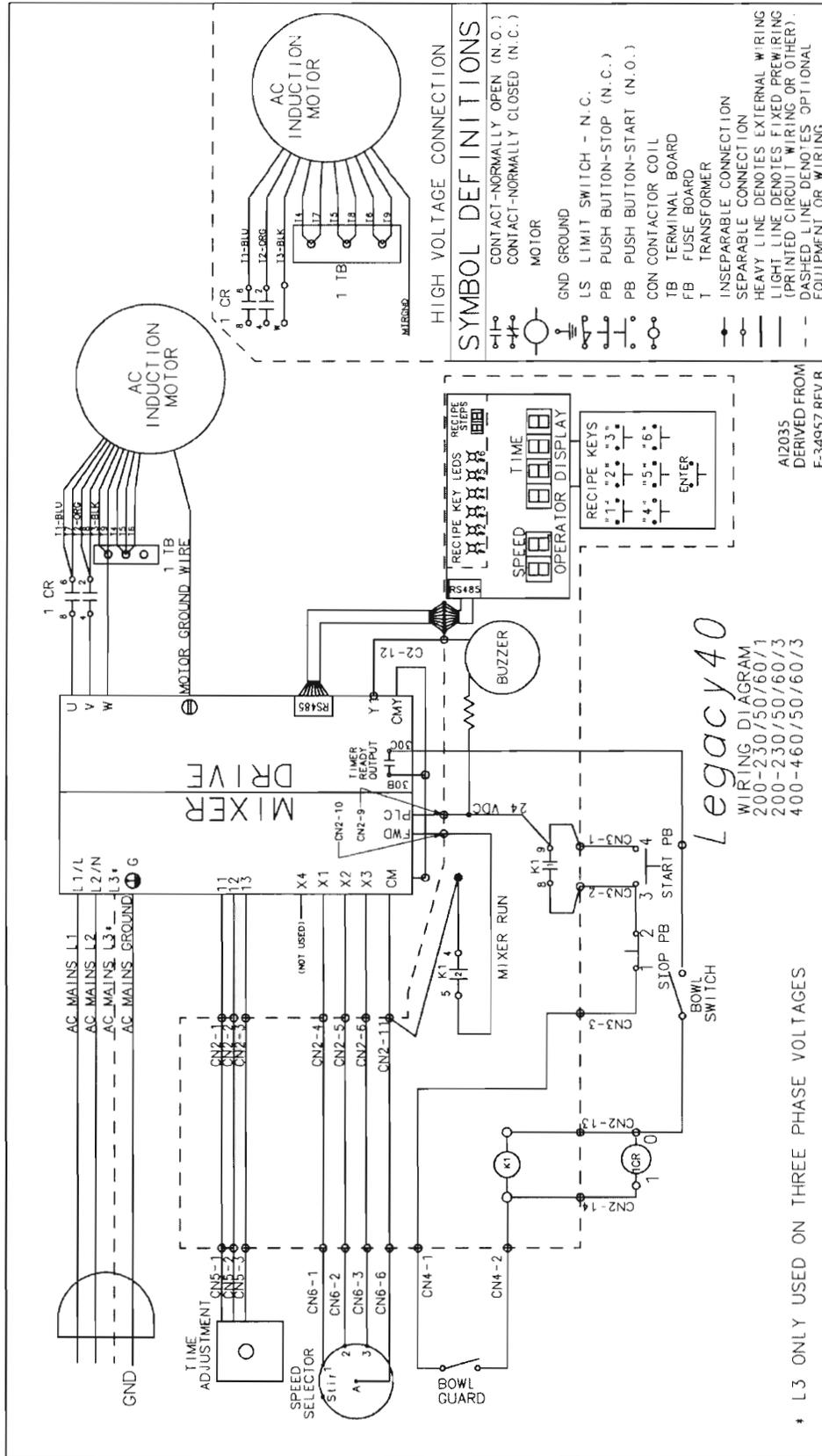
HL400 Mixer - Recipe Timer Board



**HL400 LEGACY MIXER
 RECIPE TIMER BOARD**
 200-230/50/60/1
 200-230/50/60/3
 400-460/50/60/3

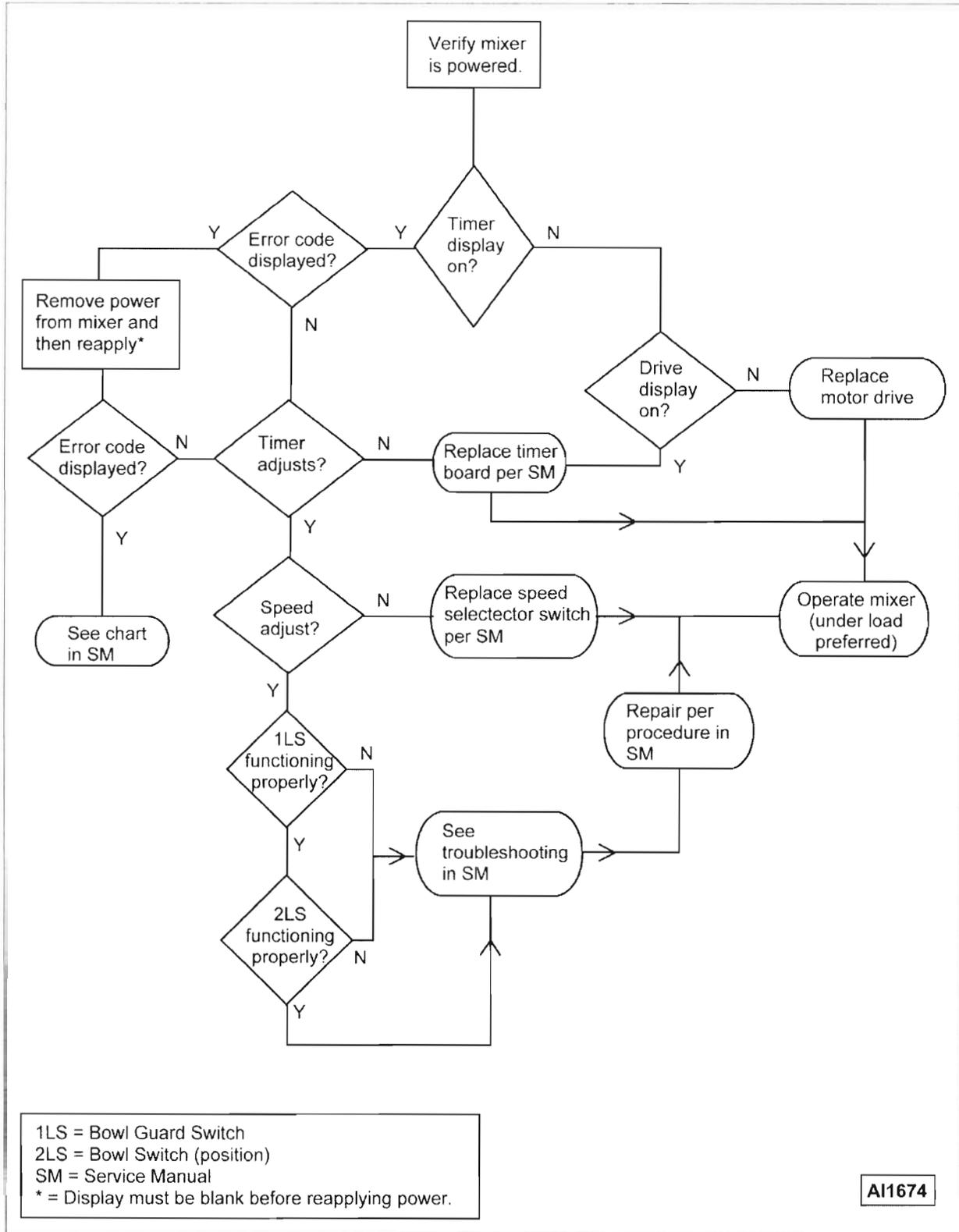
A12048

HL400 Mixer



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

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

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.	1. Timer board malfunction (time adjustment potentiometer; or other problems with the board). 2. Wiring harness connections from motor drive RS485 to timer board are disconnected or malfunctioning. 3. Motor drive malfunction (timer ready contacts 30 B/C are not opening for 1 second at the end of timed cycle).
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 OC2 OC3	Over current (Protects motor drive)	1. Low supply voltage. 2. Momentary power interruption. 3. Batch size too large. 4. Motor drive terminals U, V or W short-circuited or grounded.	1. Check supply voltage to mixer. 2. Cycle power to mixer. Wait till display goes out then reconnect power. 3. Reduce batch size. See REFERENCE MATERIAL under GENERAL. 4. Check motor lead wire connections. 5. Check motor resistance. 6. Check resistance between motor drive terminals U, V & W.
OU1 OU2 OU3	Over voltage (DC Bus voltage $\geq 373V$)	1. High supply voltage.	1. Check supply voltage to mixer.
LU	Under voltage (DC Bus voltage $\leq 255V$)	1. Low supply voltage. 2. Momentary power interruption. 3. Motor drive malfunction.	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. 2. Cycle power to mixer. Wait till display goes out then reconnect power. 3. Check DC bus circuit voltage at terminals P(+) & N (-). If voltage reading is consistently low and supply voltage is within tolerance, replace motor drive.

ALARM CODES			
Alarm Code	Fault Description	Possible Causes	Suggested Actions
OPL or OP1	Output phase loss to motor.	<ol style="list-style-type: none"> Lead wire or connection malfunction to motor. Open circuit in motor windings. Single phase motor installed; or motor not wired for 3 phase. 1CR control relay malfunction. Motor drive malfunction (no output voltage; or output voltage phase lost). 	<ol style="list-style-type: none"> 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). Check motor resistance. Motor drive requires a 3 phase AC motor. Verify this type of motor is installed and is wired for 3 phase. 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. Replace motor drive.
OH1	Over heating at heat sink. (Protects motor drive)	<ol style="list-style-type: none"> Motor drive heat sink temperature above 194°F. Motor drive malfunction. 	<ol style="list-style-type: none"> Disconnect power to mixer and allow motor drive to cool. Check bottom cover vent for clogging. Check motor drive heat sink fins for clogging. Remove debris. Reduce room ambient temperature; or move mixer to a cooler location (away from heat sources). If over heating occurs repeatedly, replace motor drive.
OL1 OL2	Electronic thermal overload relay tripped. (Protects motor)	<ol style="list-style-type: none"> Mixing in Stir speed. Batch size too large. Low supply voltage causing low motor torque. Motor malfunction. Motor drive malfunction. 	<ol style="list-style-type: none"> Select Speed 1 or Speed 2 for mixing. Reduce batch size. See REFERENCE MATERIAL under GENERAL. Check supply voltage to mixer. Check motor resistance. Replace motor drive.

ALARM CODES			
Alarm Code	Fault Description	Possible Causes	Suggested Actions
OLU	Motor drive over loaded. (Protects motor drive)	<ol style="list-style-type: none"> 1. Batch size too large. 2. Motor drive ambient temperature above 122°F. 	<ol style="list-style-type: none"> 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).
Er1	Memory error.	<ol style="list-style-type: none"> 1. Momentary power interruption or power loss while motor drive was storing data. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. RS485 wiring connections loose, disconnected or malfunctioning. 2. Timer board malfunction. 3. Motor drive malfunction. 	<ol style="list-style-type: none"> 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. Replace timer board (if harness ok). 4. Replace motor drive (if timer board and harness ok).
Er3	CPU error.	<ol style="list-style-type: none"> 1. Motor drive malfunction. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Momentary power interruption or power loss while motor drive was storing data. 	<ol style="list-style-type: none"> 1. Cycle power to mixer. Wait till display goes out then reconnect power. If this does not clear the alarm code, replace motor drive.
Lin	Input phase loss	<ol style="list-style-type: none"> 1. Main circuit power input wires broken. 2. Terminal screws for the main circuit power input at the inverter are not tight enough. 3. Single-phase voltage applied to three phase input of inverter. 	<ol style="list-style-type: none"> 1. Measure input voltage. 2. Tighten terminal screws to the recommended torque. 3. Check the inverter type. Apply three-phase power. Three phase inverter cannot be driven by single-phase power supply.

INDEX**- A B C -**

Attachment Hub	19
Bevel Gears Meshing Adjustment	25
Base	28
Bowl Guard Assembly	7
Bowl Guard Switch	7
Drip Cup	7
Removal and Replacement	7
Wire Cage	7
Bowl Lift Assembly	30
Bowl Lift Handle Adjustment	30
Removal and Replacement	30
Bowl Support	29
Bowl Switch	9
Component Function	32
Installation	9
Removal	9
Bowl to Beater Clearance	31
Bowl Height Screw	31
Control Relay	32
Covers	6
Pedestal Cover	6
Top Cover	6

- D E F -

Electrical Operation	32
Component Function	32
Component Location	33
Motor Drive Layout	34
Schematic Diagrams	40
Sequence of Operation	38
Wiring Diagrams	44

- G H I -

General	3
Introduction	3

- J K L -

Lubrication	5
-------------	---

- M N O -

Motor	15
Component Function	32
Motor Current	16
Motor Winding Resistance	16
Removal and Replacement	15
Motor Drive	13
Bus Voltage Bleed down	13
Bus Voltage Test	14
Component Function	32
Internal Resistance Test	14
Motor Drive Layout	34
Motor Drive Torque Values	5
Removal and Replacement	13

- P Q R -

Pedestal	27
Planetary	17
Assembly and Installation	18
Internal Gear	18
Removal and Disassembly	17
Reference Material	3

- S T U -

Schematic Diagrams	40
Sequence of Operation	38
Specifications	4
Bowl Size	4
Electrical Data	4
Motor Drive Torque	5
Operating Speeds and RPM	4
Torque Values	5
Speed Selector Switch	11
Component Function	32
Removal and Replacement	11
Speed Select Switch Test	11, 12
Timer Board	9
Component Function	32
Timer Options	3
Timer Options	3
Tools	5
Transmission / Attachment Hub	19
Assembly and Installation	22
Bevel Gears Meshing Adjustment	25
Removal and Disassembly	19
Transmission Case	26
Troubleshooting	46
Alarm Codes	49
General - All Models	47
Quick Reference Flow Chart	46

- V W X Y Z -

Wiring Diagrams	44
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SECTION 4

CATALOG OF REPLACEMENT PARTS

HOBART LEGACY

30 & 40 QUART MIXERS

MODELS HL300 & HL400



CATALOG OF REPLACEMENT PARTS



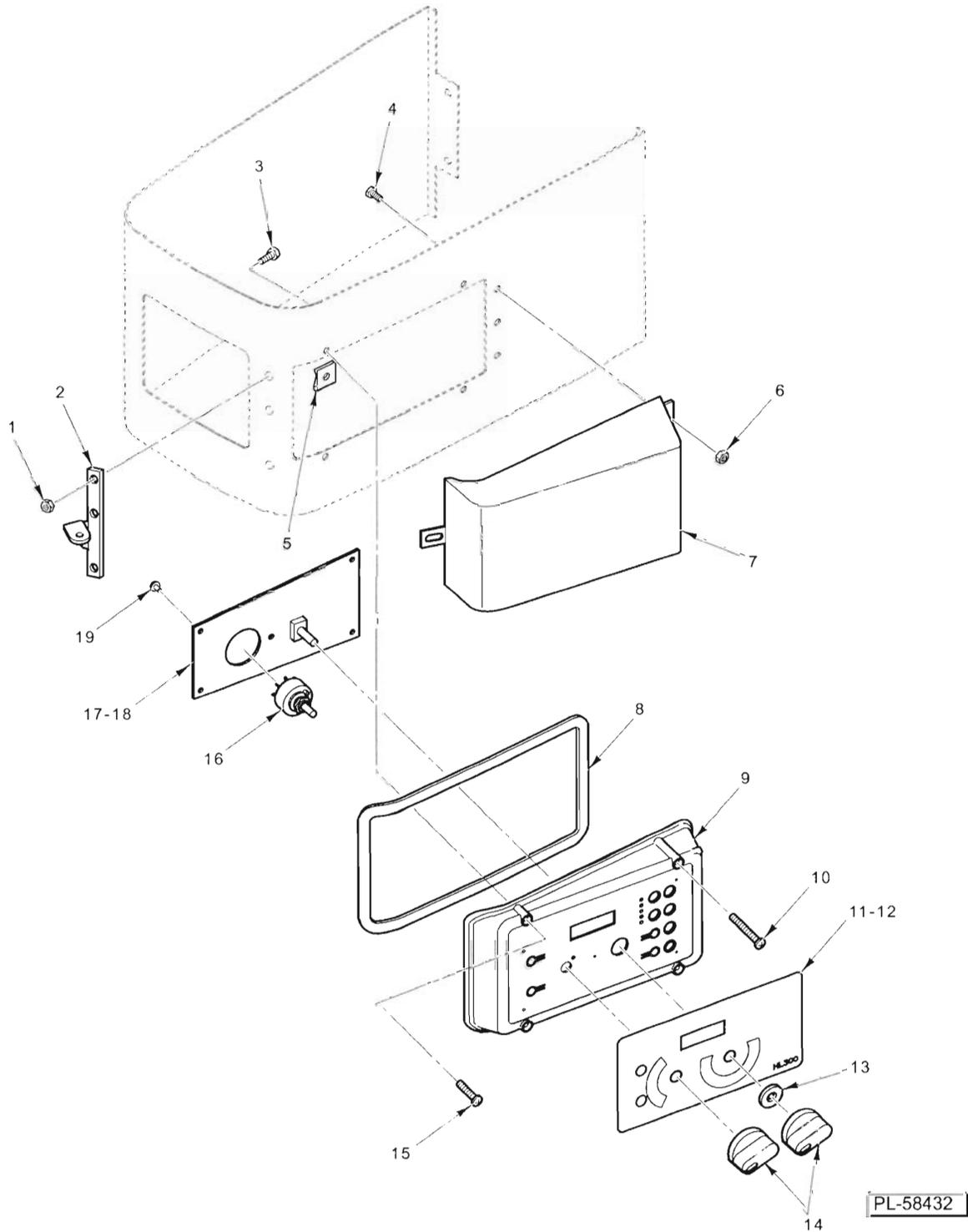
HL300 LEGACY MIXER

HL300
HL300C

ML-134351
ML-134358

Table Of Contents

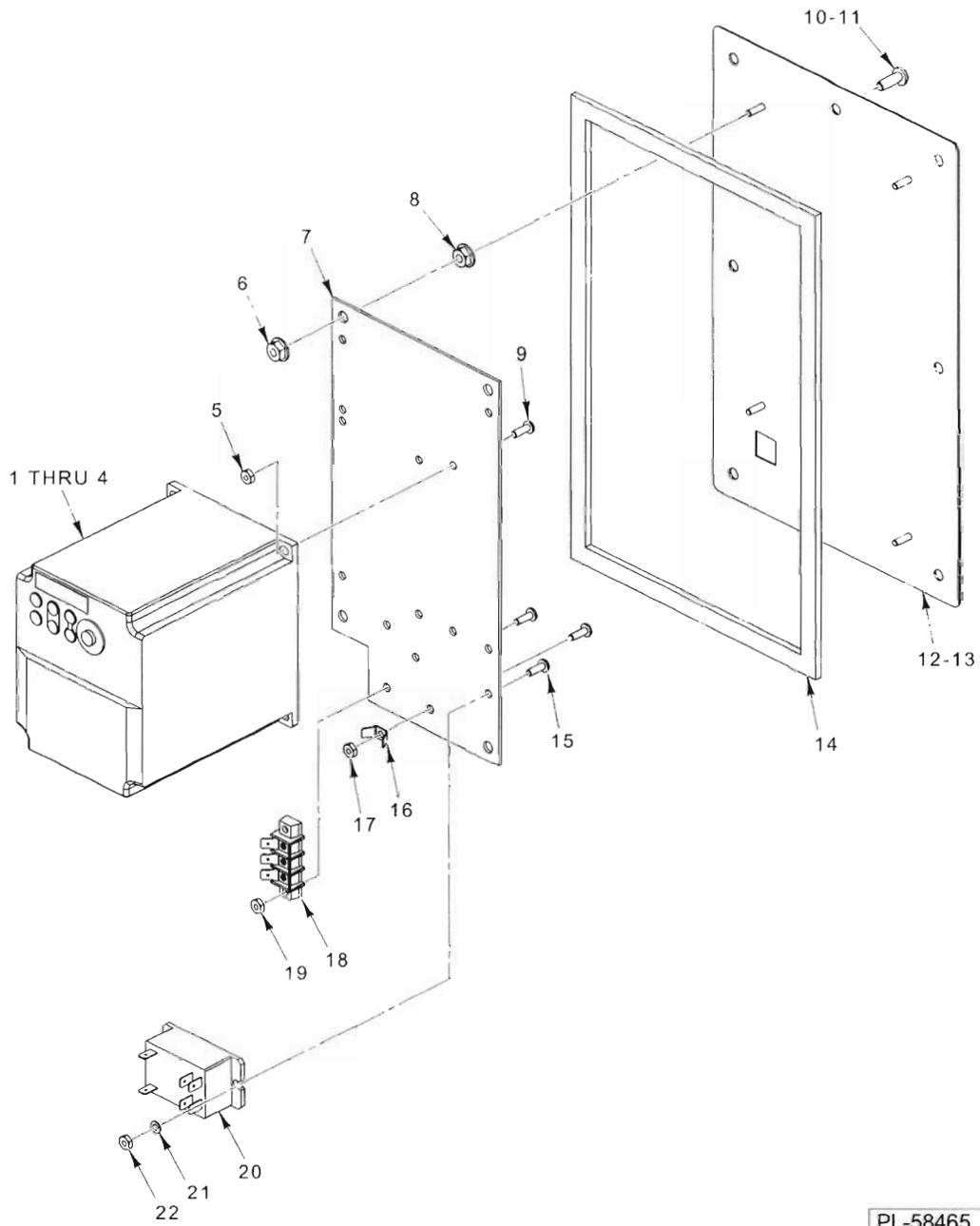
5	CONTROL PANEL
7	ELECTRICAL COMPONENTS
9	BASE AND PEDESTAL
10	ATTACHMENT HUB
11	TRANSMISSION CASE AND MOTOR
13	TRANSMISSION
15	PLANETARY
17	BOWL AND BOWL GUARD
19	BOWL SUPPORT
20	AGITATORS AND ACCESSORIES



CONTROL PANEL

CONTROL PANEL

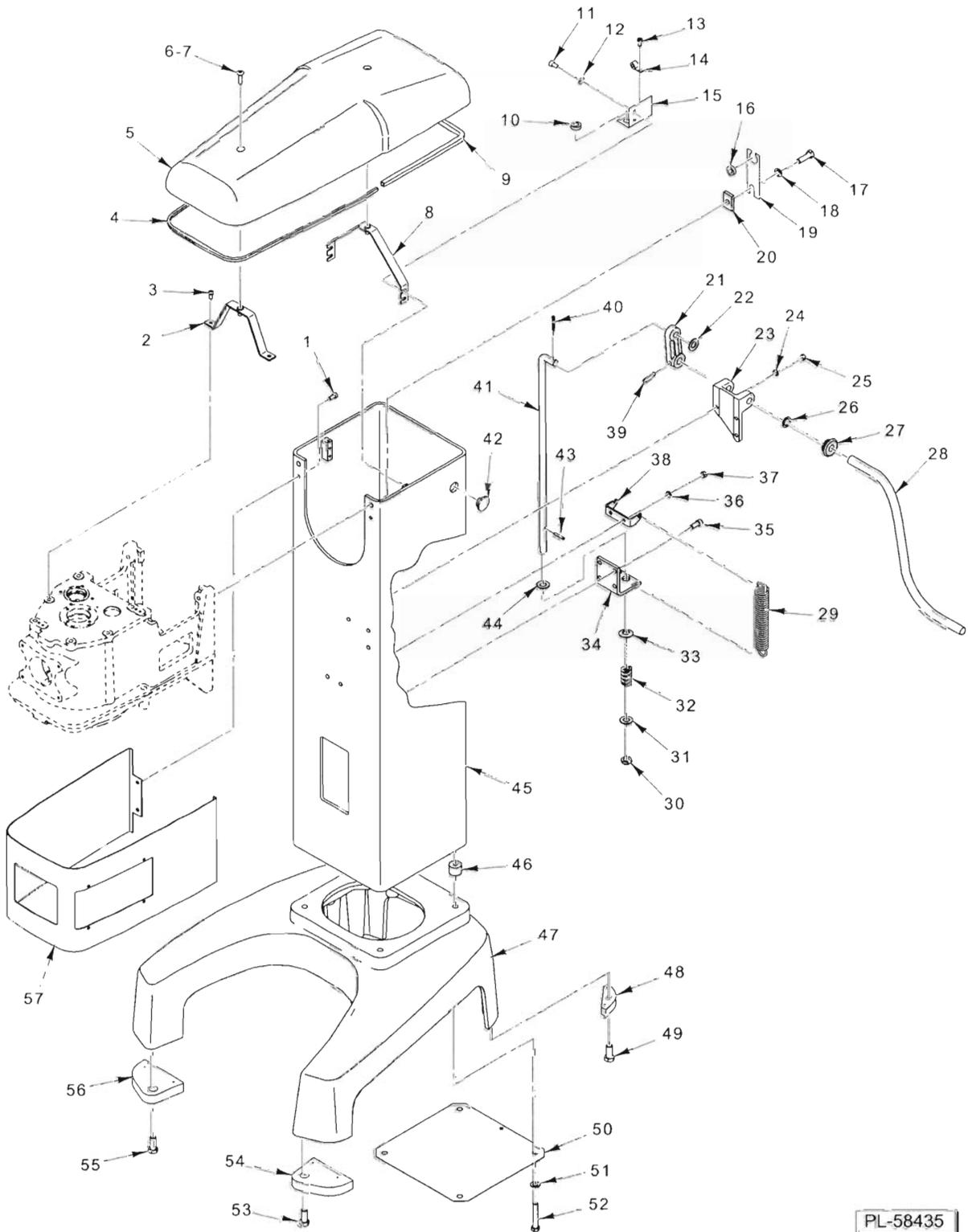
ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58432			
1	NS-038-13	Lock Nut 10-24 (ML-134358).....	3
2	00-916759	Latch (ML-134358)	1
3	SC-128-69	Mach. Screw 10-24 x 3/8 Tx. Button Hd. (ML-134358).....	3
4	SC-128-69	Mach. Screw 10-24 x 3/8 Tx. Button Hd. (ML-134358).....	3
5	00-874338	Fastener – Self Retaining	4
6	NS-038-13	Lock Nut 10-24 (ML-134358).....	3
7	00-916760	Cover – Security (ML-134358).....	1
8	00-916613	Seal – Control Panel.....	1
9	00-916621	Panel – Control.....	1
10	SC-128-40	Mach. Screw 8-32 x 2 1/4 Phil. Oval Hd. (SST)	2
11	00-916765	Overlay – Standard.....	1
12	00-916766	Overlay – Recipe	1
13	WS-031-55	Washer.....	1
14	00-874809	Knob	2
15	SC-128-39	Mach. Screw 8-32 x 1 1/2 Phil. Oval Hd. (SST).....	2
16	00-874831	Switch – Speed Selector Assembly	1
17	00-874883	PCB Assembly (Standard).....	1
18	00-874806	PCB Assy. (Recipe Timer).....	1
19	SD-039-23	Self-Tapping Screw 6-32 x 1/4 Hex Hd. Type RL	5
	00-916566-00001	Harness – Switch.....	1



ELECTRICAL COMPONENTS

ELECTRICAL COMPONENTS

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58465			
1	00-916761	Controller (100/120 V., 50/60 Hz., 1 Ph.).....	1
2	00-916762	Controller (200/230 V., 50/60 Hz., 1 Ph.).....	1
3	00-916763	Controller (200/230 V., 50/60 Hz., 3 Ph.).....	1
4	00-916764	Controller (380/480 V., 50/60 Hz., 3 Ph.).....	1
5	WS-023-48	Washer.....	4
6	NS-038-04	Lock Nut 1/4-20.....	4
7	00-916871	Plate – Controller Mounting.....	1
8	NS-038-04	Lock Nut 1/4-20.....	4
9	SC-018-34	Mach. Screw 8-32 x 1/2 Phil. Pan Hd.....	4
10	SC-053-46	Mach. Screw 1/4-20 x 3/4 Slotted Truss Hd. (SST) (ML-134351).....	7
11	SC-128-74	Mach. Screw 1/4-20 x 5/8 Tx. Button Hd. (SST) (ML-134358).....	7
12	00-916772-00001	Cover – Back & Studs (100/120 V. & 200/230 V., 1 Ph.).....	1
13	00-916772-00002	Cover – Back & Studs (200/230 V. & 380/480 V., 3 Ph.).....	1
14	00-557188	Foam – Tape.....	AR
15	SC-018-34	Mach. Screw 8-32 x 1/2 Phil. Pan Hd.....	5
16	00-065890-00090	Terminal.....	1
17	NS-009-12	Nut 8-32 Hex.....	1
18	00-916269	Block – Terminal.....	1
19	NS-009-12	Nut 8-32 Hex.....	2
20	00-087714-042-5	Relay (2-Pole, 30 Amp.).....	1
21	WS-023-48	Washer.....	2
22	NS-009-12	Nut 8-32 Hex.....	2
	00-874833-00001	Cord & Plug Assy. (Standard).....	1
	00-874833-00002	Cord & Plug Assy. (Recipe Timer).....	1
	FE-026-34	Strain Relief – Electrical.....	1
	00-916649	Harness – Main Wiring.....	1

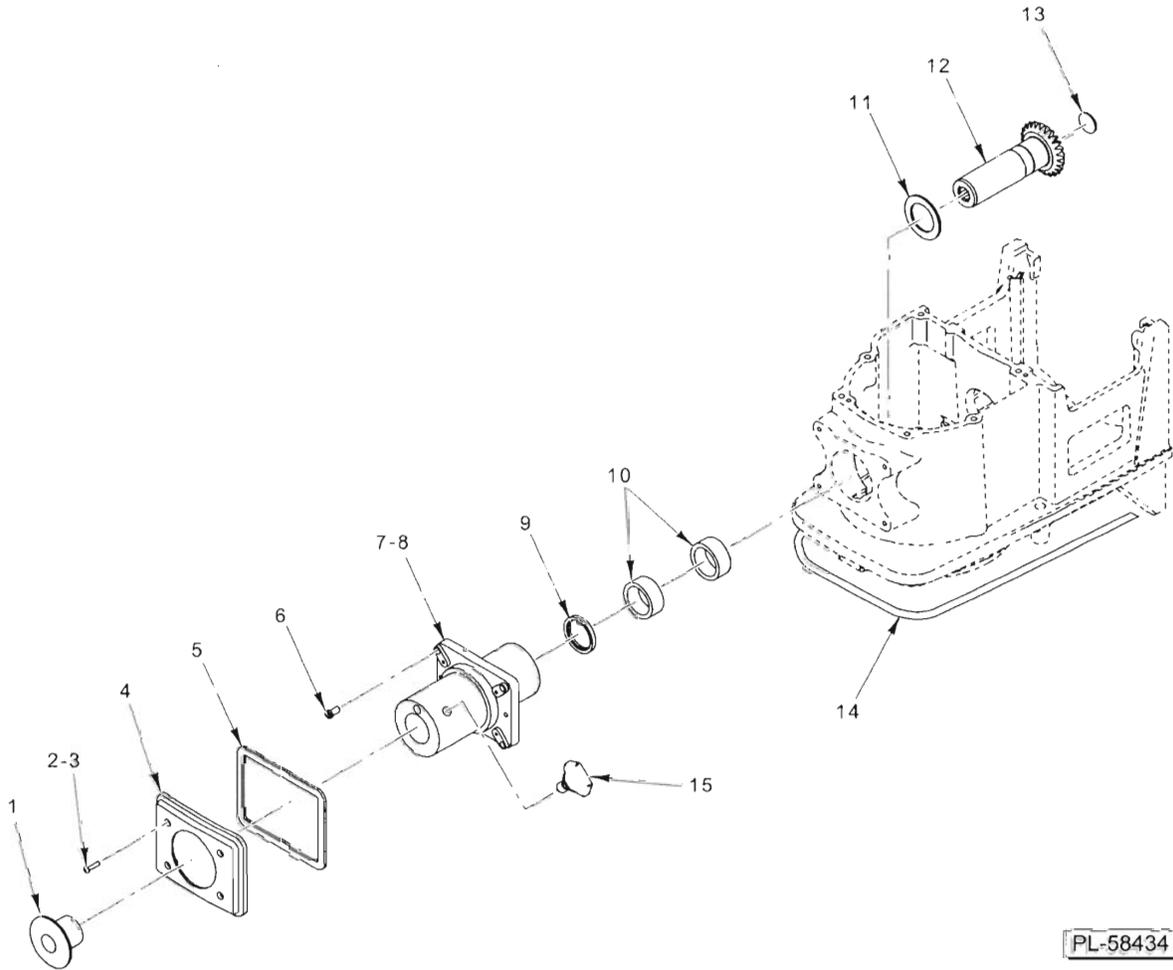


PL-58435

BASE AND PEDESTAL

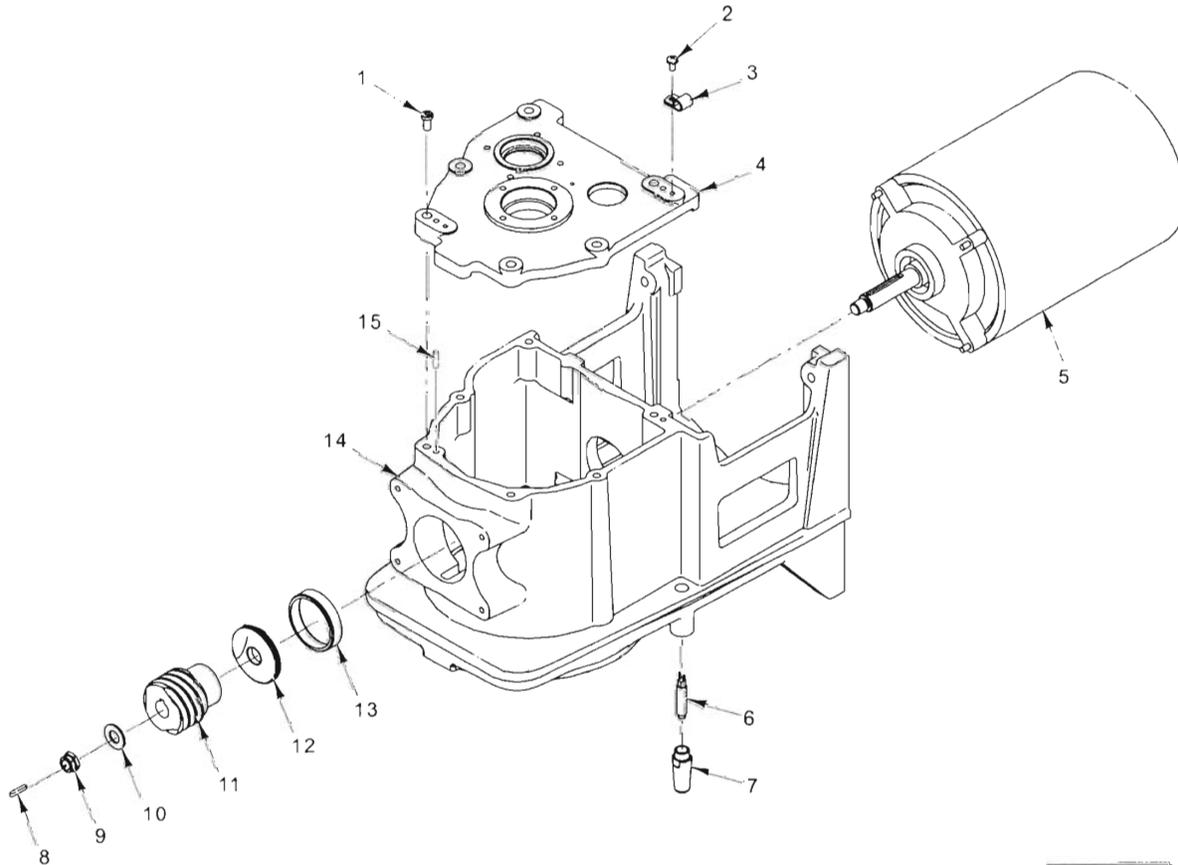
BASE AND PEDESTAL

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58435			
1	SC-089-01	Cap Screw 1/4-20 x 1/2 Hex Socket Hd.....	2
2	00-916452	Strap – Front Cover Mounting	1
3	SC-089-19	Cap Screw 3/16-18 x 1 3/8 Hex Socket Hd.	2
4	00-874512-00003	Seal – Top Cover	1
5	00-916440	Cover – Top.....	1
6	SC-120-29	Mach. Screw 1/4-20 x 1 Phil. Oval Hd. (ML-134351)	2
7	SC-128-64	Mach. Screw 1/4-20 x 1 Tx. Flat Hd. (SST) (ML-134358)	2
8	00-916454	Strap – Rear Cover Mounting	1
9	00-916535-00001	Seal – Top Cover	1
10	FE-021-13	Bushing – Split Electric	1
11	SC-089-01	Cap Screw 1/4-20 x 1/2 Hex Socket Hd.....	4
12	WS-003-19	Washer.....	4
13	SD-019-23	Self-Tapping Screw 10-16 x 3/8 Phil. Pan Hd., Type B	1
14	00-078758-00009	Clamp – Cable	1
15	00-916813	Plate – Electric Connection.....	1
16	FE-021-13	Bushing – Split Electric	1
17	SC-118-09	Cap Screw 3/8-16 x 1 1/4 Hex Hd.	6
18	WL-004-06	Lockwasher 3/8 Helical.....	6
19	00-916815	Plate – Wire Routing.....	1
20	00-271340	Bar – Reinforcing	6
21	00-916467	Arm – Bowl Lift.....	1
22	WS-008-47	Washer.....	1
23	00-916442	Block – Bowl Lift Bearing	1
24	WL-003-38	Lockwasher 1/4 Helical.....	3
25	NS-013-02	Nut 1/4-20 Hex	3
26	WS-020-01	Washer (SST)	1
27	00-271343	Grommet – Handle	1
28	00-916482	Handle – Bowl Lift.....	1
29	00-916463	Spring – Bowl Lift.....	2
30	NS-031-39	Stop Nut 1/2-20	1
31	WS-008-47	Washer.....	1
32	00-070104	Spring – Bowl Lift.....	1
33	00-070131	Washer – Cup Bowl Lift	1
34	00-916469	Bracket – Bowl Lift Support	1
35	SC-040-14	Cap Screw 3/16-18 x 3/4 Hex Socket Hd.	4
36	WL-003-38	Lockwasher 1/4 Helical.....	2
37	NS-013-02	Nut 1/4-20 Hex	2
38	00-916449	Hook – Bowl Lift Spring	1
39	RP-002-26	Pin – Roll	1
40	PC-006-13	Cotter Pin.....	1
41	00-916468	Rod – Bowl Lift.....	1
42	PB-005-30	Plug – Button	1
43	RP-002-10	Pin – Roll	1
44	WS-008-47	Washer.....	1
45	00-916364-00004	Column	1
46	00-916508	Lug – Threaded Column	4
47	00-916213-00004	Base.....	1
48	00-916309	Pad – Rear.....	2
49	SC-110-36	Cap Screw 3/8-16 x 1 Hex Hd.	2
50	00-916987	Cover – Bottom.....	1
51	WS-018-24	Washer.....	4
52	SC-097-53	Cap Screw 3/8-16 x 2 1/4 Hex Hd.	4
53	SC-110-36	Cap Screw 3/8-16 x 1 Hex Hd.	1
54	00-916308	Pad – Front (RH)	1
55	SC-110-36	Cap Screw 3/8-16 x 1 Hex Hd.	1
56	00-916307	Pad – Front (LH).....	1
57	00-916387	Wrapper – Transmission.....	1
	00-916546	Kit – Corrosion Protection Pad.....	1
	00-916353	Kit – Foot Pad (Incls. Items 48, 49, & 53 thru 56).....	1



ATTACHMENT HUB

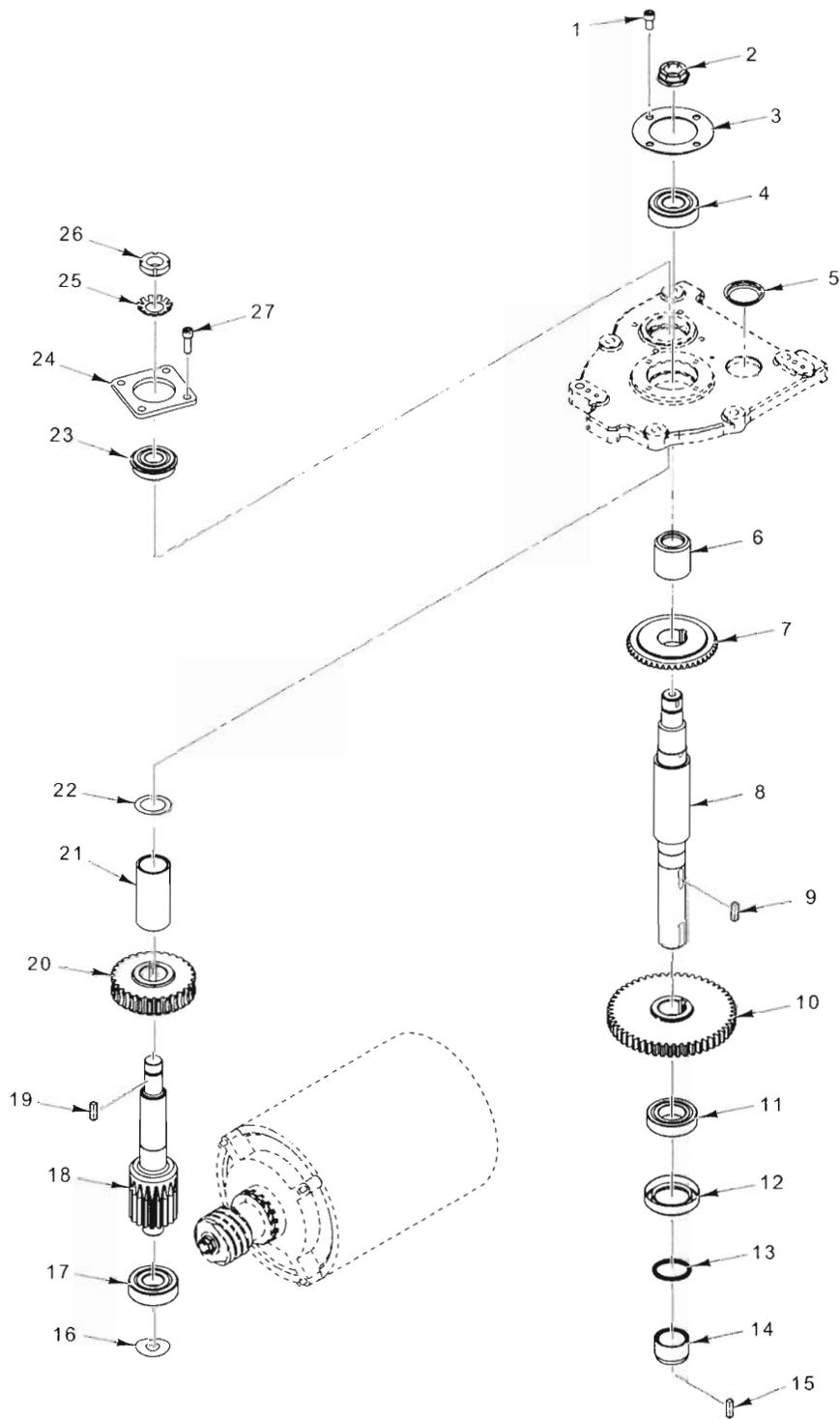
ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58434			
1	00-114824-00001	Plug – Attachment.....	1
2	SC-079-04	Mach. Screw 8-32 x 3/4 Phil. Oval Hd. (SST) (ML-134351).....	4
3	SC-128-65	Mach. Screw 8-32 x 3/4 Tx. Flat Hd. (SST) (ML-134358).....	4
4	00-873973-00002	Panel – Front.....	1
5	00-875813	Seal – Front Cover.....	1
6	SC-040-09	Cap Screw 1/4-20 x 1 1/4 Hex Socket Hd.....	4
7	00-916662-00002	Hub – Attachment.....	1
8	OR-001-09	O-Ring.....	1
9	00-916733	Seal – Attachment Hub.....	1
10	BN-005-11	Bearing – Needle.....	2
11	00-061920-00009	Washer.....	1
12	00-916601-00002	Gear – Drive Attachment (Incls. Item 13).....	1
13	PL-003-17	Plug – Expansion.....	1
14	00-874925-00005	Seal – Neopreme.....	1
15	00-108197-00001	Screw – Thumb.....	1



PL-58437

TRANSMISSION CASE AND MOTOR

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58437			
1	SC-040-15	Cap Screw $\frac{5}{16}$ x 18 x $\frac{1}{4}$ Hex Socket Hd.	6
2	SC-018-62	Mach. Screw 10-24 x $\frac{3}{8}$ Phil. Pan Hd.	1
3	00-078752-00003	Clamp - Cable	1
4	00-916324	Cover - Top	1
5	00-916446	Motor	1
6	00-087711-00352	Switch - Reed	1
7	00-916533	Holder - Reed Switch	1
8	00-012430-00069	Key $\frac{3}{16}$ x $\frac{3}{16}$ x $1\frac{39}{64}$	1
9	NS-032-23	Lock Nut $\frac{7}{16}$ -20 Special	1
10	WS-021-08	Washer	1
11	00-916338	Worm - Motor	1
12	00-916388	Deflector - Grease (LH)	1
13	00-916445	Bushing - Motor	1
14	00-916326-00003	Transmission	1
15	00-011800-00187	Dowel	2

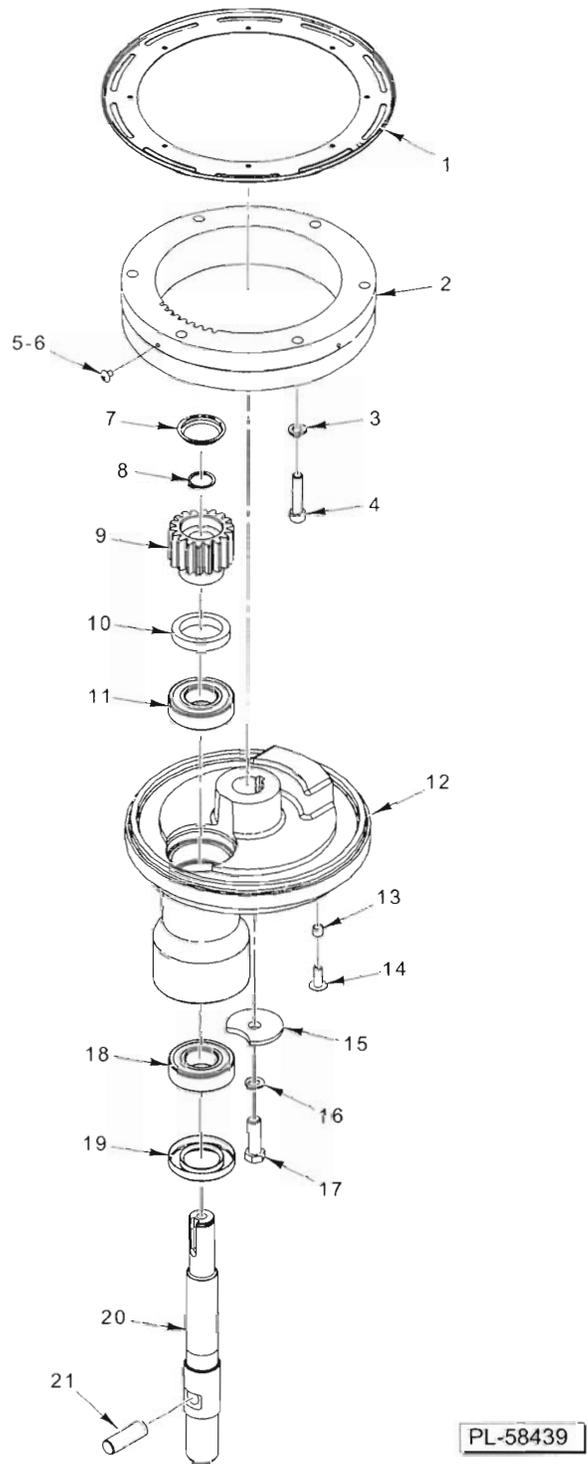


PL-58438

TRANSMISSION

TRANSMISSION

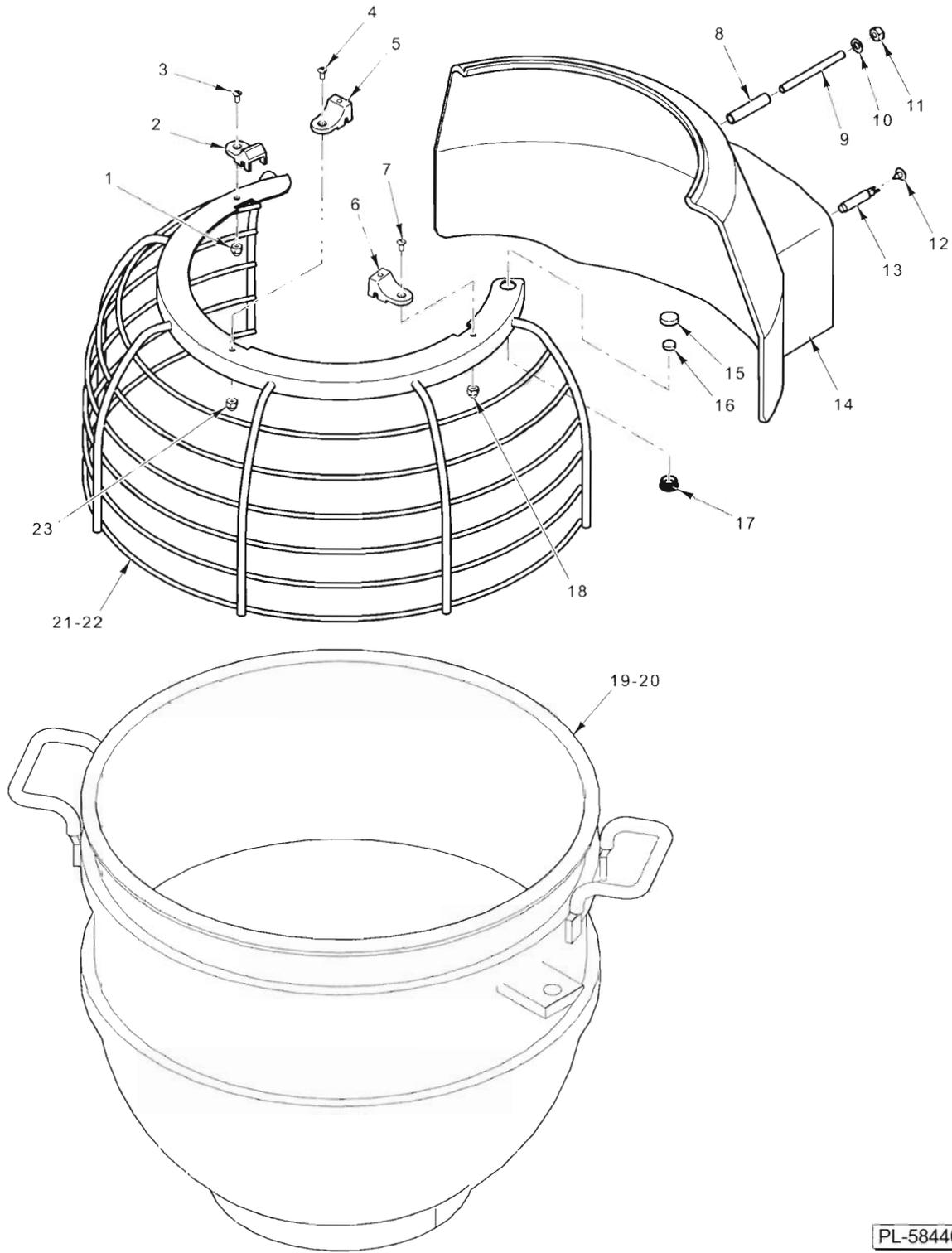
ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58438			
1	SC-089-01	Cap Screw 1/4-20 x 1/2 Hex Socket Hd.....	4
2	NS-032-32	Lock Nut 3/4-16	1
3	00-916439-00002	Retainer – Planetary.....	1
4	BB-005-34	Bearing – Ball	1
5	00-064871	Plug – Friction.....	1
6	00-916665	Spacer – Upper Planetary	1
7	00-070020-00002	Gear – Bevel (46T)	1
8	00-916667	Shaft – Planetary	1
9	00-012430-00136	Key.....	1
10	00-916666	Gear – Helical (51T)	1
11	BB-015-08	Bearing – Ball	1
12	00-110334	Seal – Planetary	1
13	00-067500-00068	O-Ring	1
14	00-916663	Spacer – Lower Planetary	1
15	00-012430-00158	Key.....	1
16	SL-005-04	Spring – Loading.....	1
17	BB-020-06	Bearing – Ball	1
18	00-916340	Shaft – Worm Gear.....	1
19	00-012430-00138	Key.....	1
20	00-916339	Gear – Worm	1
21	00-916357	Spacer – Input Shaft.....	1
22	00-916358	Spacer – Upper Input Shaft.....	1
23	BB-021-21	Bearing – Ball	1
24	00-916438	Retainer – Wormwheel	1
25	WL-012-04	Lockwasher.....	1
26	NS-034-04	Lock Nut 3/4-16	1
27	SC-089-02	Cap Screw 1/4-20 x 3/4 Hex Socket Hd.....	4



PLANETARY

PLANETARY

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58439			
1	00-916363	Flange – Drippcup	1
2	00-916416-00001	Gear – Internal	1
3	WL-003-48	Lockwasher ⁵ / ₁₆ Helical	6
4	SC-089-19	Cap Screw ⁵ / ₁₆ -18 x 1 ³ / ₈ Hex Socket Hd.	6
5	SC-066-13	Mach. Screw 8-32 x ¹ / ₄ Phil. Truss Hd. (SST) (ML-134351)	3
6	SC-128-73	Mach. Screw 8-32 x ¹ / ₄ Tx. Button Hd. (ML-134358)	3
7	00-064871	Plug – Friction	1
8	RR-004-06	Retaining Ring	1
9	00-916461	Pinion – Agitator Shaft	1
10	00-916563	Seal – Upper Agitator Shaft	1
11	BB-020-06	Bearing – Ball	1
12	00-916435	Planetary	1
13	00-874770	Spacer – Bowl Scraper	2
14	SC-053-46	Mach. Screw ¹ / ₄ -20 x ³ / ₄ Slotted Truss Hd. (SST)	2
15	00-070047-00001	Washer – Planetary	1
16	WL-006-27	Lockwasher ³ / ₈ Helical	1
17	SC-062-58	Cap Screw ³ / ₈ -24 x 1 ¹ / ₄ Hex Socket Hd.	1
18	BB-017-36	Bearing – Ball	1
19	00-110335	Seal – Agitator Shaft	1
20	00-916457	Shaft – Agitator	1
21	00-070019	Pin – Agitator	1

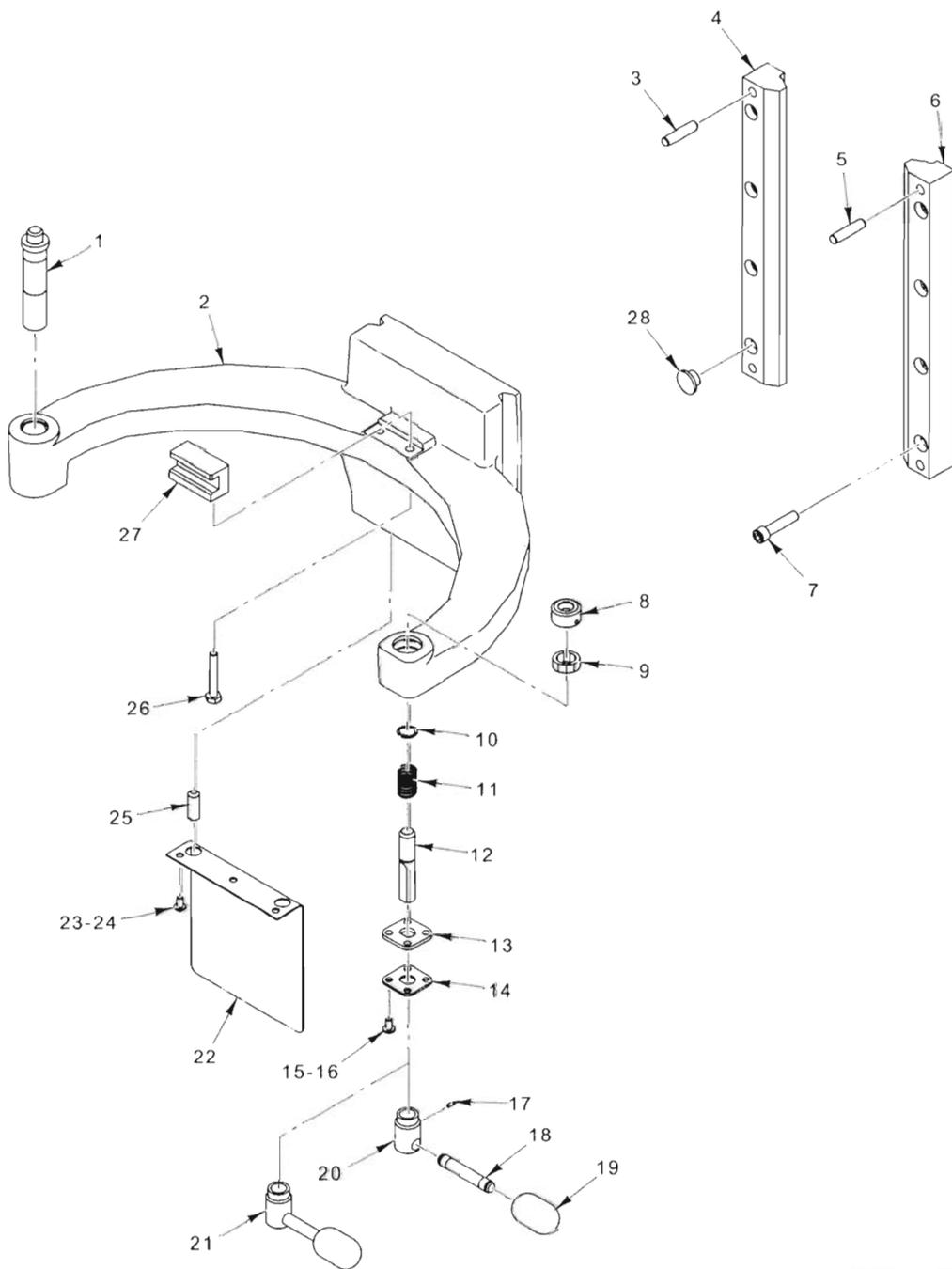


PL-58440

BOWL AND BOWL GUARD

BOWL AND BOWL GUARD

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58440			
1	NS-048-96	Crown Nut 6-32 (SST)	1
2	00-916424-00002	Carrier – Wire Cage Bypass	1
3	SC-129-39	Mach. Screw 6-32 x 5/16 Slotted Oval Hd. (SST)	1
4	SC-129-39	Mach. Screw 6-32 x 5/16 Slotted Oval Hd. (SST)	1
5	00-916424-00001	Carrier – Wire Cage Standard	1
6	00-916424-00001	Carrier – Wire Cage Standard	1
7	SC-129-39	Mach. Screw 6-32 x 5/16 Slotted Oval Hd. (SST)	1
8	00-916610	Spacer – Splash Guard	4
9	00-916671	Rod – Splash Guard	4
10	WS-003-19	Washer	8
11	NS-013-02	Nut 1/4-20 Hex	4
12	SD-034-19	Self-Tapping Screw 10-16 x 3/8 Phil. Truss Hd., Type AB	1
13	00-087711-00352	Switch – Reed	1
14	00-916407	Guard – Splash Back	1
15	00-874887	Holder – Upper Magnet	1
16	00-874875	Magnet – Disc	1
17	00-874886	Holder – Lower Magnet	1
18	NS-048-96	Crown Nut 6-32 (SST)	1
19	00-916617	Bowl Assy. (20 Qt.)	1
20	00-916616	Bowl Assy. (30 Qt.)	1
21	00-916423-00001	Cage – Wire Weldment (ML-134351)	1
22	00-916423-00002	Cage – Security (ML-134358)	1
23	NS-048-96	Crown Nut 6-32 (SST)	1
	00-916422-00001	Wire Cage Assy. (Incls. Items 1 thru 7, 15 thru 18, 21, & 23) (ML-134351)	1
	00-916422-00002	Wire Cage Assy. (Incls. Items 1 thru 7, 15 thru 18, 22, & 23) (ML-134358)	1

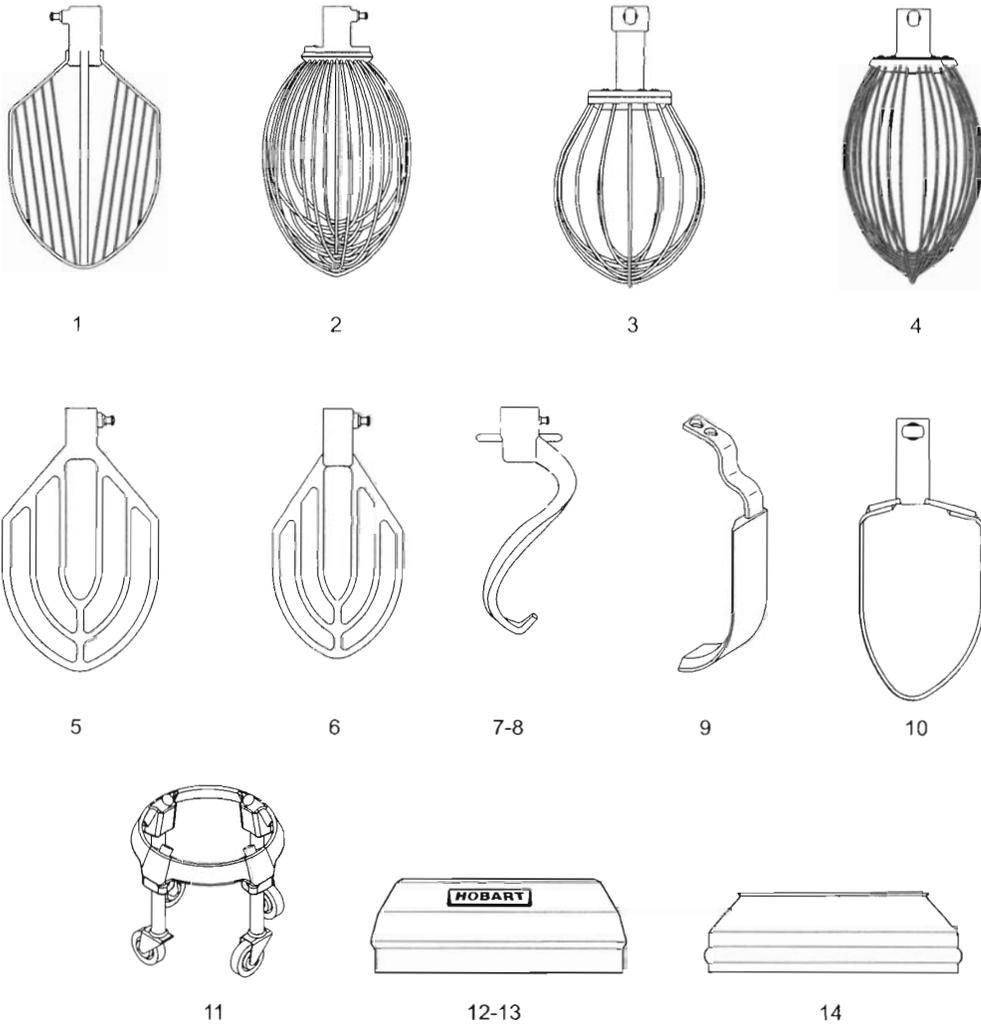


PL-58436

BOWL SUPPORT

BOWL SUPPORT

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58436			
1	00-916516	Pin – Bowl (LH).....	1
2	00-916497	Support – Bowl	1
3	00-011800-00141	Dowel $\frac{1}{16}$ x $1\frac{3}{16}$	2
4	00-916365-00001	Slideway – Bowl Lift (LH).....	1
5	00-011800-00141	Dowel $\frac{1}{16}$ x $1\frac{3}{16}$	2
6	00-916365-00002	Slideway – Bowl Lift (RH)	1
7	SC-089-19	Cap Screw $\frac{5}{16}$ -18 x $1\frac{3}{8}$ Hex Socket Hd.	8
8	00-916501	Ramp	1
9	00-916502	Bushing – Split.....	1
10	RR-012-30	Retaining Ring	1
11	00-916488	Spring – Compression	1
12	00-916505	Pin – Bowl (RH)	1
13	00-916550	Glide – Bowl Release	1
14	00-916506	Plate – Bowl Release.....	1
15	SC-093-23	Mach. Screw 10-24 x $\frac{3}{8}$ Phil. Pan Hd. (SST) (ML-134351).....	4
16	SC-128-64	Mach. Screw $\frac{1}{4}$ -20 x 1 Tx. Flat Hd. (ML-134358).....	4
17	SC-047-74	Set Screw 8-32 x $\frac{1}{4}$ Hex Hdls., Cup Pt.....	1
18	00-916552	Shaft – Bowl Pin Handle (ML-134351)	1
19	00-875356	Handle – Lift Lever (ML-134351).....	1
20	00-916503	Block – Bowl Handle (ML-134351)	1
21	00-916504-00002	Handle – Bowl Release (ML-134358).....	1
22	00-916470	Apron – Lower	1
23	SC-093-23	Mach. Screw 10-24 x $\frac{3}{8}$ Phil. Pan Hd. (SST) (ML-134351).....	3
24	SC-128-69	Mach. Screw 10-24 x $\frac{3}{8}$ Tx. Button Hd. (ML-134358)	3
25	SC-129-59	Set Screw $\frac{3}{8}$ -16 x 1	2
26	SC-097-15	Cap Screw $\frac{1}{4}$ -20 x $1\frac{5}{8}$ Hex Hd.....	2
27	00-916515	Catch – Rear Bowl.....	1
28	PB-004-96	Cap	8



PL-58466

AGITATORS AND ACCESSORIES

ILLUS.	PART NO.	NAME OF PART	AMT.
1	00-916573	"C" Wire Whip (30 & 40 Qt.) (Packaged)	1
2	00-916598	"D" Wire Whip (20 Qt.) (Packaged)	1
3	00-916520	"I" Wire Whip (30 & 40 Qt.) (Packaged)	1
4	00-916421	"D" Wire Whip (30 & 40 Qt.) (Packaged)	1
5	00-916372	"B" Beater (30 & 40 Qt.) (Packaged)	1
6	00-916582	"B" Flat Beater (20 Qt.) (Packaged)	1
7	00-916827	"ED" Dough Arm (20 Qt.) (Packaged)	1
8	00-916618-00001	"ED" Hook (30 & 40 Qt.) (Packaged)	1
9	00-916838	Bowl Scraper (30 Qt.) (Packaged)	1
10	00-916481	"P" Pastry Knife (30 & 40 Qt.) (Packaged)	1
11	00-916883	Bowl Truck Assy.	1
12	00-438079	Splash Cover (20 Qt.) (Packaged) (Lexan)	1
13	00-438080	Splash Cover (30 Qt.) (Packaged) (Lexan)	1
14	00-875677	Splash Cover (20 Qt.) (Packaged) (SST)	1
	00-916684	Chute - Ingredient (20 Qt.) (Packaged)	1
	00-438607	Chute - Ingredient (30 Qt.) (Packaged)	1



CATALOG OF REPLACEMENT PARTS

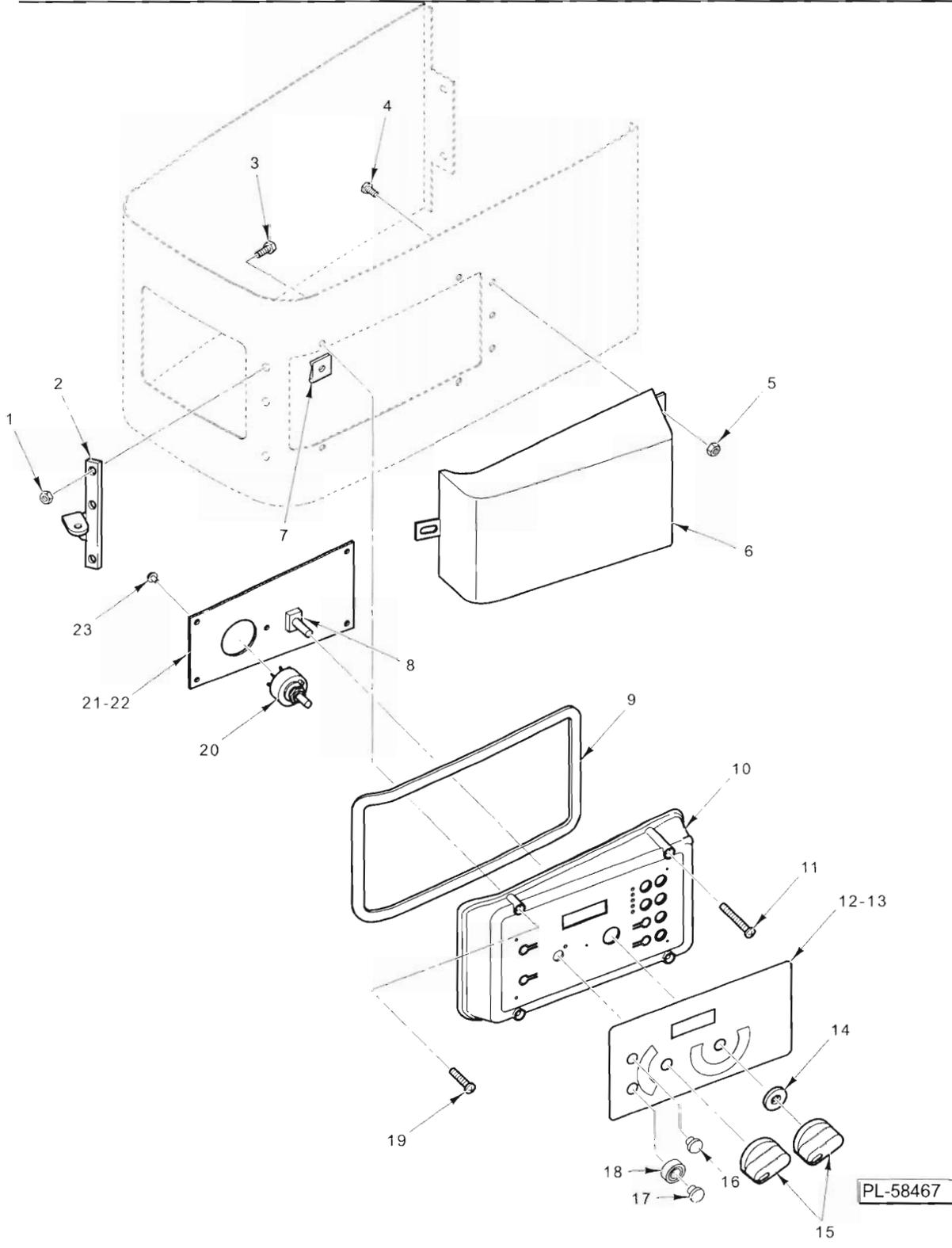


HL400 LEGACY MIXER

HL400	ML-134348
HL400C	ML-134359

Table Of Contents

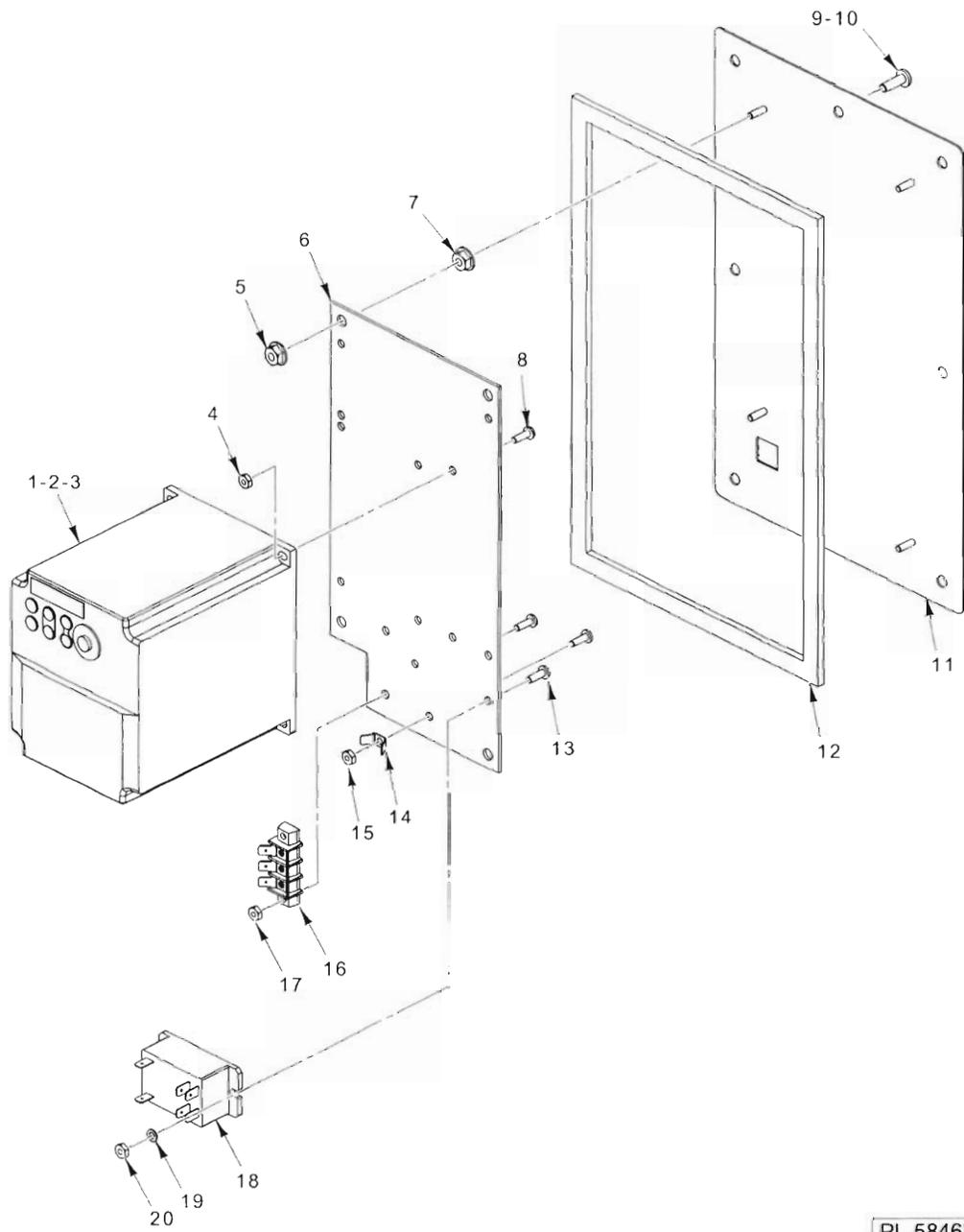
5	CONTROL PANEL
7	ELECTRICAL COMPONENTS
9	BASE AND PEDESTAL
10	ATTACHMENT HUB
11	TRANSMISSION CASE AND MOTOR
13	TRANSMISSION
15	PLANETARY
17	BOWL SUPPORT
19	BOWL AND BOWL GUARD
20	AGITATORS AND ACCESSORIES



CONTROL PANEL

CONTROL PANEL

ILLUS. PL-58467	PART NO.	NAME OF PART	AMT.
1	NS-038-13	Lock Nut 10-24 (ML-134359).....	3
2	00-916759	Latch (ML-134359).....	1
3	SC-128-69	Mach. Screw 10-24 x 3/8 Tx. Button Hd. (ML-134359).....	3
4	SC-128-69	Mach. Screw 10-24 x 3/8 Tx. Button Hd. (ML-134359).....	3
5	NS-038-13	Lock Nut 10-24 (ML-134359).....	3
6	00-916760	Cover – Security (ML-134359).....	1
7	00-874338	Fastener – Self Retaining.....	4
8	00-916594	Potentiometer Assy.....	1
9	00-916613	Seal – Control Panel.....	1
10	00-916622	Panel – Control.....	1
11	SC-128-40	Mach. Screw 8-32 x 2 1/4 Phil. Oval Hd. (SST) (ML-134359).....	2
12	00-916575	Overlay – Standard.....	1
13	00-916528	Overlay – Recipe.....	1
14	WS-031-55	Washer.....	1
15	00-874809	Knob.....	2
16	00-916592	Switch – Sealed Dome (Stop).....	1
17	00-916593	Switch – Sealed Dome (Start).....	1
18	00-916958-00002	Guard – Switch.....	1
19	SC-128-39	Mach. Screw 8-32 x 1 1/2 Phil. Oval Hd. (SST) (ML-134348).....	2
20	00-916923	Switch Assy. – Selector.....	1
21	00-916611	PCB Assy. (Standard).....	1
22	00-916491	PCB Assy. (Recipe Timer).....	1
23	SD-039-23	Self-Tapping Screw 6-32 x 1/4 Hex Hd. Type RL.....	5
	00-916566-00001	Harness – Switch.....	1

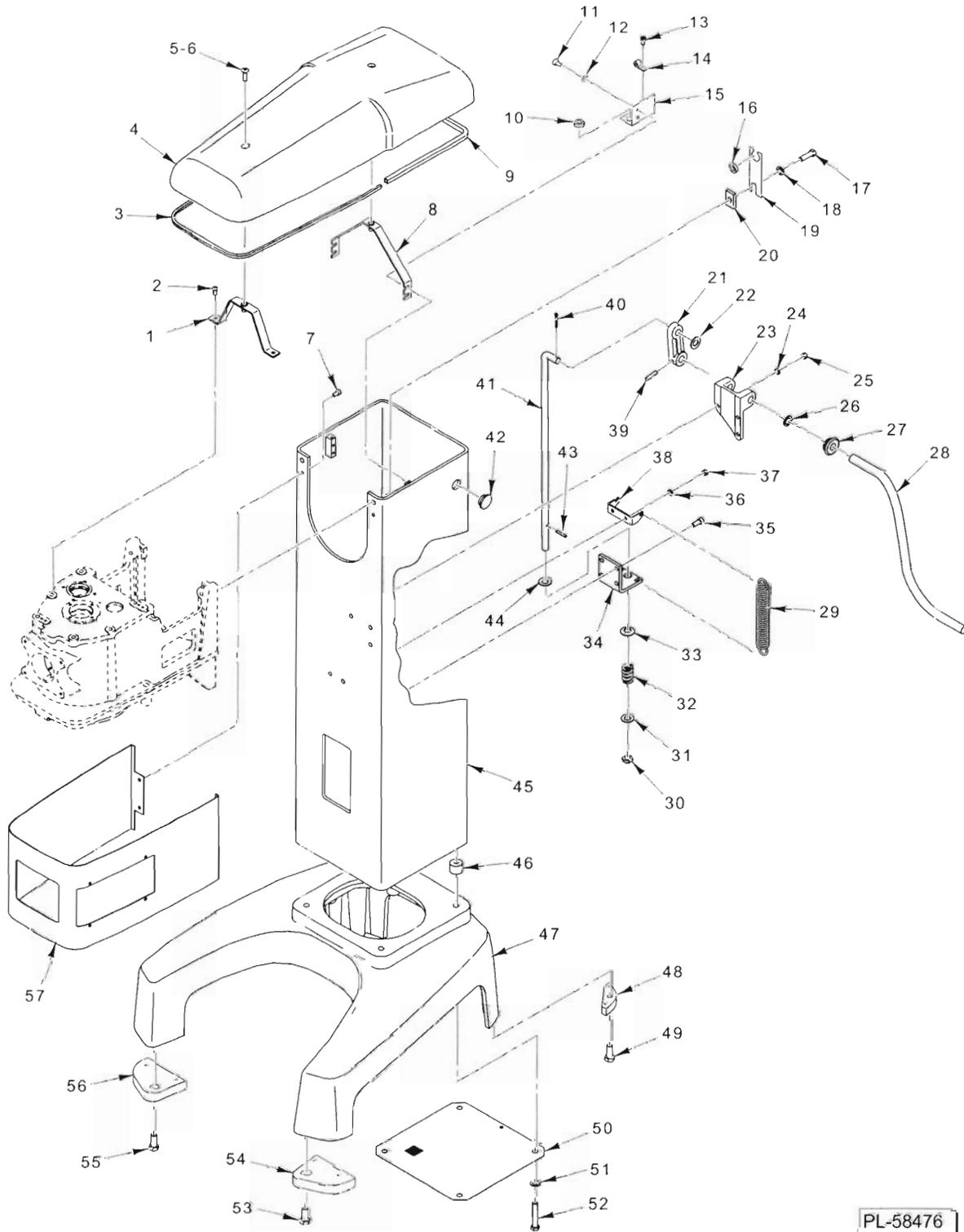


PL-58468

ELECTRICAL COMPONENTS

ELECTRICAL COMPONENTS

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58468			
1	00-916526-00001	Controller (200/230 V., 50/60 Hz., 1 Ph.).....	1
2	00-916527-00001	Controller (200/230 V., 50/60 Hz., 3 Ph.).....	1
3	00-916527-00002	Controller (380/480 V., 50/60 Hz., 3 Ph.).....	1
4	NS-009-12	Nut 8-32 Hex.....	4
5	NS-038-04	Lock Nut 1/4-20.....	4
6	00-916871	Plate – Controller Mounting.....	1
7	NS-038-04	Lock Nut 1/4-20.....	4
8	SC-018-34	Mach. Screw 8-32 x 1/2 Phil. Pan Hd.....	4
9	SC-053-46	Mach. Screw 1/4-20 x 3/4 Slotted Truss Hd. (SST) (ML-134348).....	7
10	SC-128-74	Mach. Screw 1/4-20 x 5/8 Tx. Button Hd. (SST) (ML-134359).....	7
11	00-916772-00002	Cover – Back & Studs (200/230 V., 50/60 Hz., 1 Ph.).....	1
12	00-557188	Foam – Tape.....	AR
13	SC-018-34	Mach. Screw 8-32 x 1/2 Phil. Pan Hd.....	5
14	00-065890-00090	Terminal.....	1
15	NS-009-12	Nut 8-32 Hex.....	1
16	00-916269	Block – Terminal.....	1
17	NS-009-12	Nut 8-32 Hex.....	2
18	00-087714-042-5	Relay (2-Pole, 30 Amp.).....	1
19	WS-023-48	Washer.....	2
20	NS-009-12	Nut 8-32 Hex.....	2
	00-874833-00002	Cord & Plug Assy.....	1
	FE-026-34	Strain Relief – Electrical.....	1
	00-916769	Harness – Main.....	1

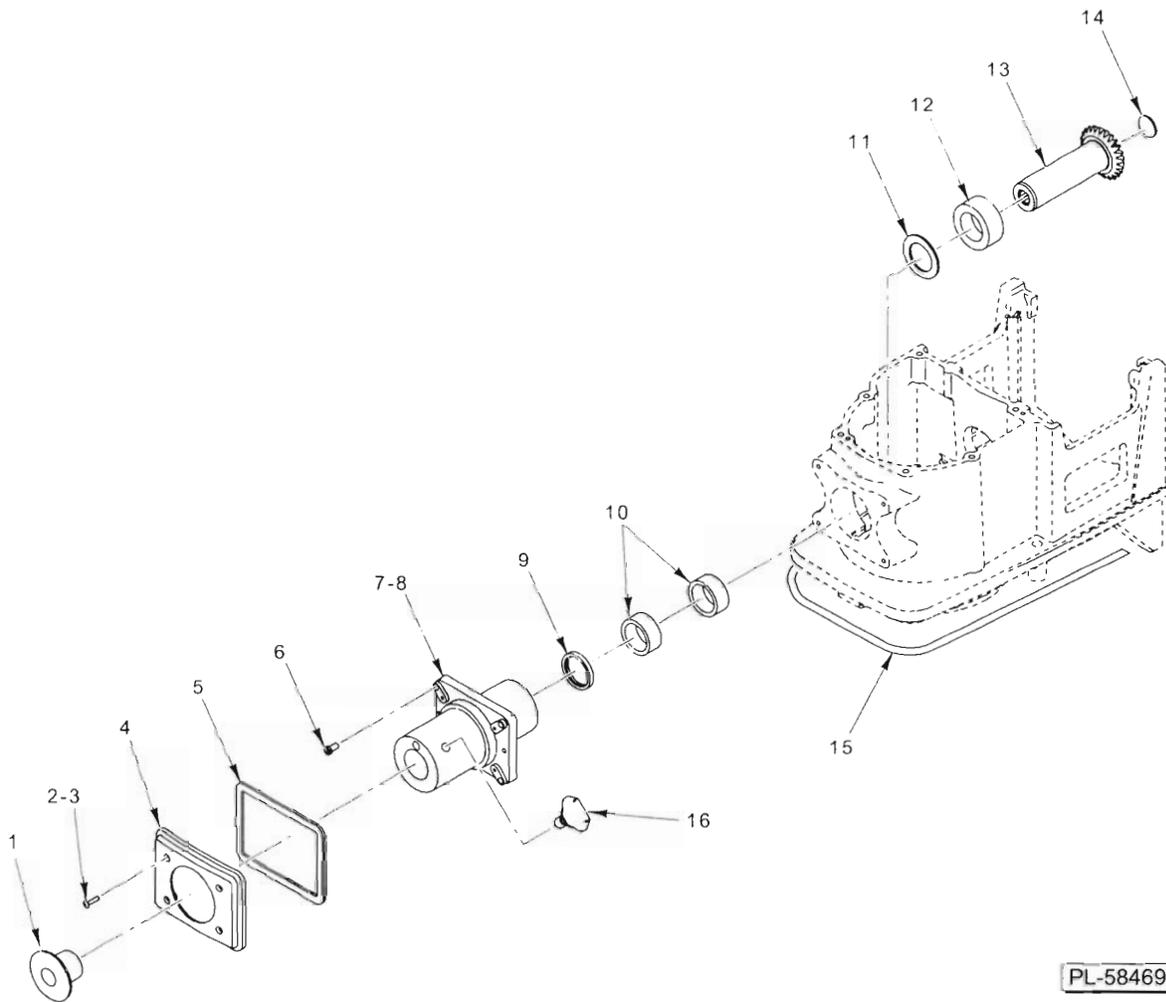


PL-58476

BASE AND PEDESTAL

BASE AND PEDESTAL

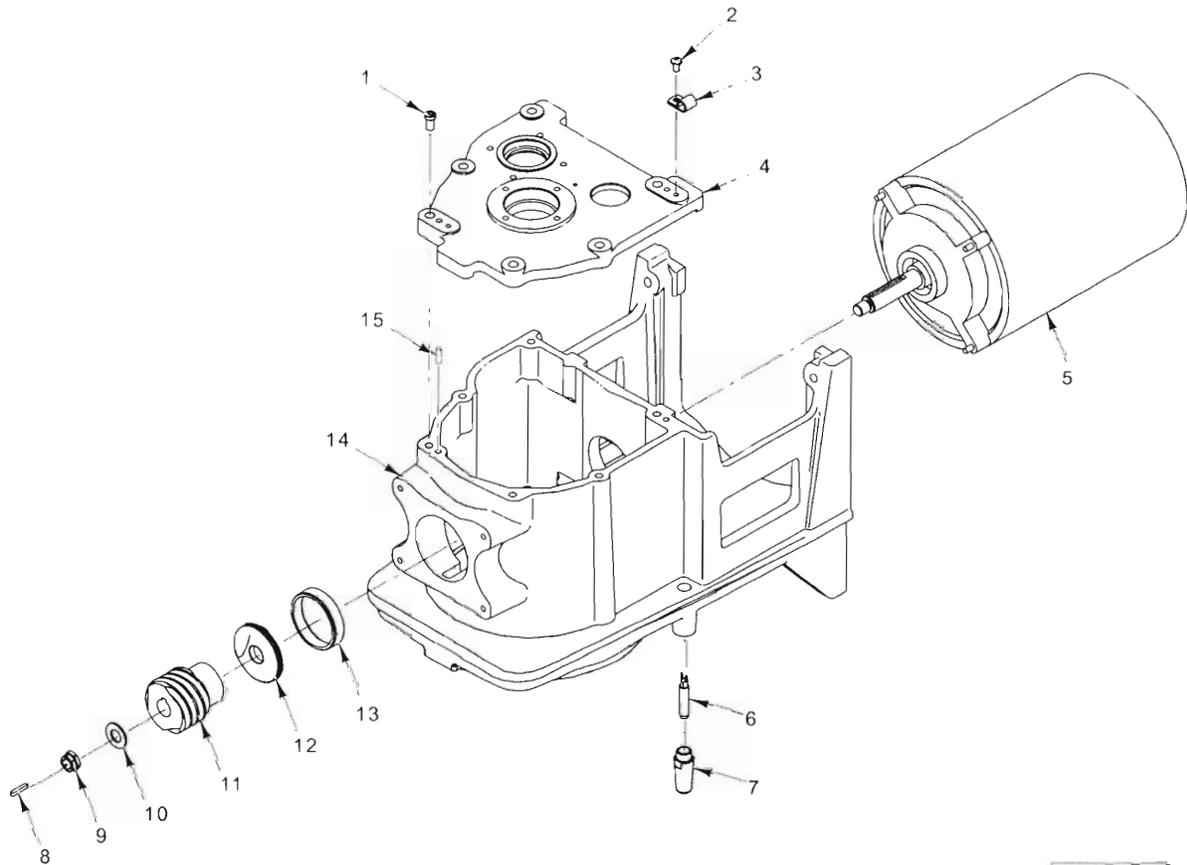
ILLUS. PL-58476	PART NO.	NAME OF PART	AMT.
1	00-916452	Strap – Front Cover Mounting	1
2	SC-089-19	Cap Screw $\frac{5}{16}$ -18 x $1\frac{3}{8}$ Hex Socket Hd.	2
3	00-874512-00003	Seal – Top Cover	1
4	00-916440	Cover – Top	1
5	SC-120-29	Mach. Screw $\frac{1}{4}$ -20 x 1 Phil. Oval Hd. (ML-134348)	2
6	SC-128-64	Mach. Screw $\frac{1}{4}$ -20 x 1 Tx. Flat Hd. (SST) (ML-134359)	2
7	SC-089-01	Cap Screw $\frac{1}{4}$ -20 x $\frac{1}{2}$ Hex Socket Hd.	2
8	00-916454	Strap – Rear Cover Mounting	1
9	00-916535-00001	Seal – Top Cover	1
10	FE-021-13	Bushing – Split Electric	1
11	SC-089-01	Cap Screw $\frac{1}{4}$ -20 x $\frac{1}{2}$ Hex Socket Hd.	4
12	WS-003-19	Washer	4
13	SD-019-23	Self-Tapping Screw 10-16 x $\frac{3}{8}$ Phil. Pan Hd. Type B	1
14	00-078752-00009	Clamp – Cable	1
15	00-916813	Plate – Electric Connection	1
16	FE-021-13	Bushing – Split Electric	1
17	SC-118-09	Cap Screw $\frac{3}{8}$ -16 x $1\frac{1}{4}$ Hex Hd.	6
18	WL-004-06	Lockwasher $\frac{3}{8}$ Helical	6
19	00-916815	Plate – Wire Routing	1
20	00-271340	Bar – Reinforcing	6
21	00-916467	Arm – Bowl Lift	1
22	WS-008-47	Washer	1
23	00-916442	Block – Bowl Lift Bearing	1
24	WL-003-38	Lockwasher $\frac{1}{4}$ Helical	3
25	NS-013-02	Nut $\frac{1}{4}$ -20 Hex	3
26	WS-020-01	Washer (SST)	1
27	00-271343	Grommet – Handle	1
28	00-916482	Handle – Bowl Lift	1
29	00-916463	Spring – Bowl Lift	2
30	NS-031-39	Stop Nut $\frac{1}{2}$ -20	1
31	WS-008-47	Washer	1
32	00-070104	Spring – Bowl Lift	1
33	00-070131	Washer – Cup Bowl Lift	1
34	00-916469	Bracket – Bowl Lift Support	1
35	SC-040-14	Cap Screw $\frac{9}{16}$ -18 x $\frac{3}{4}$ Hex Socket Hd.	4
36	WL-003-38	Lockwasher $\frac{1}{4}$ Helical	2
37	NS-013-02	Nut $\frac{1}{4}$ -20 Hex	2
38	00-916449	Hook – Bowl Lift Spring	1
39	RP-002-26	Pin – Roll	1
40	PC-006-13	Cotter Pin	1
41	00-916468	Rod – Bowl Lift	1
42	PB-005-30	Plug – Button	1
43	RP-002-10	Pin – Roll	1
44	WS-008-47	Washer	1
45	00-916364-00004	Column	1
46	00-916508	Lug – Threaded Column	4
47	00-916213-00004	Base	1
48	00-916309	Pad – Rear	2
49	SC-110-36	Cap Screw $\frac{3}{8}$ -16 x 1 Hex Hd.	2
50	00-916549	Screen – Air Floor	1
51	WS-018-24	Washer	4
52	SC-097-53	Cap Screw $\frac{3}{8}$ -16 x $2\frac{1}{4}$ Hex Hd.	4
53	SC-110-36	Cap Screw $\frac{3}{8}$ -16 x 1 Hex Hd.	1
54	00-916308	Pad – Front (RH)	1
55	SC-110-36	Cap Screw $\frac{3}{8}$ -16 x 1 Hex Hd.	1
56	00-916307	Pad – Front (LH)	1
57	00-916387	Wrapper – Transmission	1
	00-916546	Kit – Pad Corrosion Protection	1
	00-916353	Kit – Foot Pad	1



PL-58469

ATTACHMENT HUB

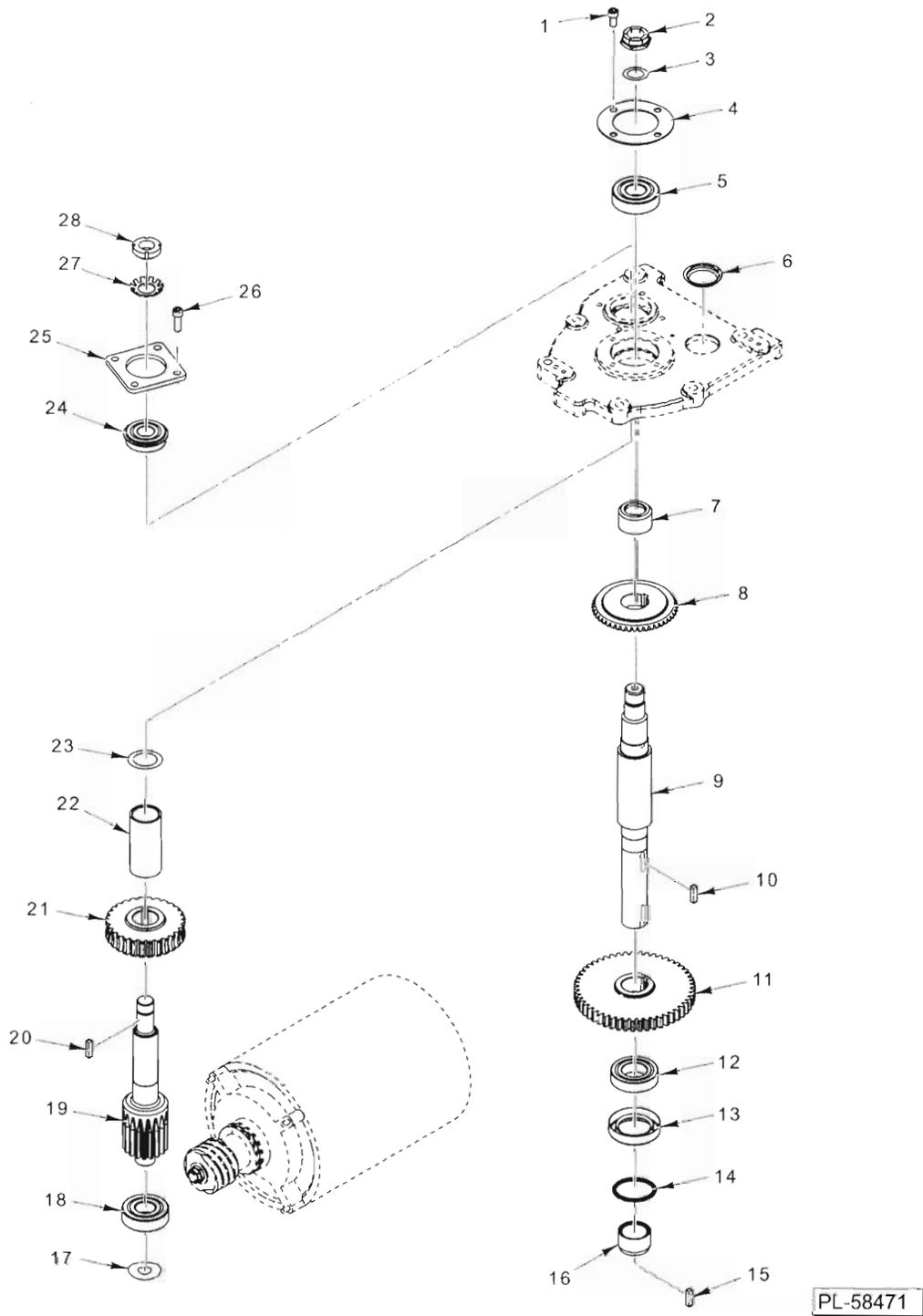
ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58469			
1	00-114824-00001	Plug - Attachment.....	1
2	SC-079-04	Mach. Screw 8-32 x 3/4 Phil. Oval Hd. (SST) (ML-134348).....	4
3	SC-128-85	Mach. Screw 8-32 x 3/4 Tx. Flat Hd. (SST) (ML-134359).....	4
4	00-873973-00002	Panel - Front.....	1
5	00-875813	Seal - Front Cover.....	1
6	SC-040-09	Cap Screw 1/4-20 x 1 1/4 Hex Socket Hd.....	4
7	00-916384-00002	Hub - Attachment.....	1
8	OR-001-09	O-Ring.....	1
9	00-916733	Seal - Attachment Hub.....	1
10	BN-005-11	Bearing - Needle.....	2
11	00-061920-00009	Washer.....	1
12	BB-013-03	Bearing - Ball.....	1
13	00-916601	Gear - Drive Attachment (Incls. Item 14).....	1
14	PL-003-17	Plug - Expansion.....	1
15	00-874925-00005	Seal - Neopreme.....	1
16	00-108197-00001	Screw - Thumb.....	1



PL-58470

TRANSMISSION CASE AND MOTOR

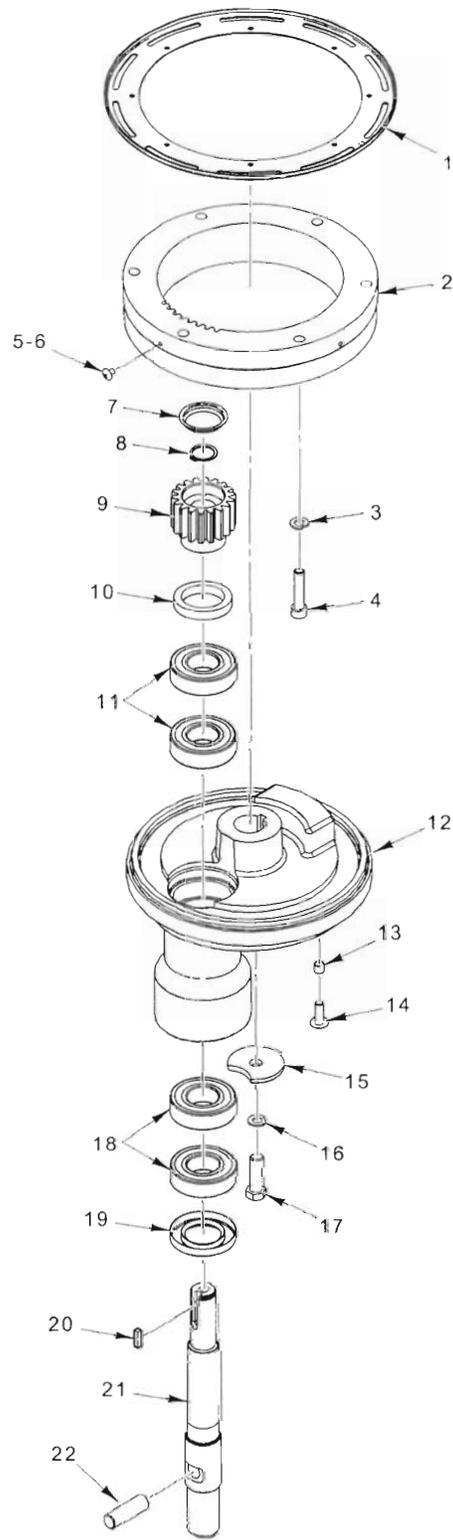
ILLUS. PL-58470	PART NO.	NAME OF PART	AMT.
1	SC-040-15	Cap Screw $\frac{5}{16}$ -18 x $1\frac{1}{4}$ Hex Socket Hd.....	6
2	SC-018-62	Mach. Screw 10-24 x $\frac{3}{8}$ Phil. Pan Hd.....	1
3	00-078752-00003	Clamp – Cable.....	1
4	00-916324-00002	Cover – Top.....	1
5	00-916447	Motor.....	1
6	00-087711-00352	Switch – Reed.....	1
7	00-916533	Holder – Reed Switch.....	1
8	00-012430-00069	Key $\frac{3}{16}$ x $\frac{3}{16}$ x $1\frac{39}{64}$	1
9	NS-032-23	Lock Nut $\frac{7}{16}$ -20 Special.....	1
10	WS-021-08	Washer.....	1
11	00-916338	Worm – Motor.....	1
12	00-916388	Deflector – Grease (LH).....	1
13	00-916445	Bushing – Motor.....	1
14	00-916326-00004	Transmission.....	1
15	00-011800-00187	Dowel.....	2



TRANSMISSION

TRANSMISSION

ILLUS. PL-58471	PART NO.	NAME OF PART	AMT.
1	SC-089-01	Cap Screw 1/4-20 x 1/2 Hex Socket Hd.	4
2	NS-034-06	Lock Nut 31/32-32.....	1
3	WL-012-06	Lockwasher – Bearing	1
4	00-916439	Retainer – Planetary	1
5	BB-017-39	Bearing – Ball	1
6	00-064871	Plug – Friction.....	1
7	00-916356	Spacer – Upper Planetary	1
8	00-271234-00002	Gear – Planetary Shaft Bevel	1
9	00-916342	Shaft – Planetary	1
10	00-012430-00143	Key.....	1
11	00-916341	Gear – Helical (51T)	1
12	00-067500-00070	O-Ring	1
13	BB-015-36	Bearing – Ball	1
14	00-271341	Seal – Planetary	1
15	00-012430-00173	Key.....	1
16	00-437599	Seal – Hub	1
17	SL-005-04	Spring – Loading.....	1
18	BB-020-06	Bearing – Ball	1
19	00-916340	Shaft – Worm Gear.....	1
20	00-012430-00138	Key.....	1
21	00-916339	Gear – Worm	1
22	00-916358	Spacer – Upper Input Shaft	1
23	00-916357	Spacer – Input Shaft.....	1
24	BB-021-21	Bearing – Ball	1
25	00-916438	Retainer – Wormwheel	1
26	SC-089-02	Cap Screw 1/4-20 x 3/4 Hex Socket Hd.	4
27	WL-012-04	Lockwasher.....	1
28	NS-034-04	Lock Nut 3/4-16	1

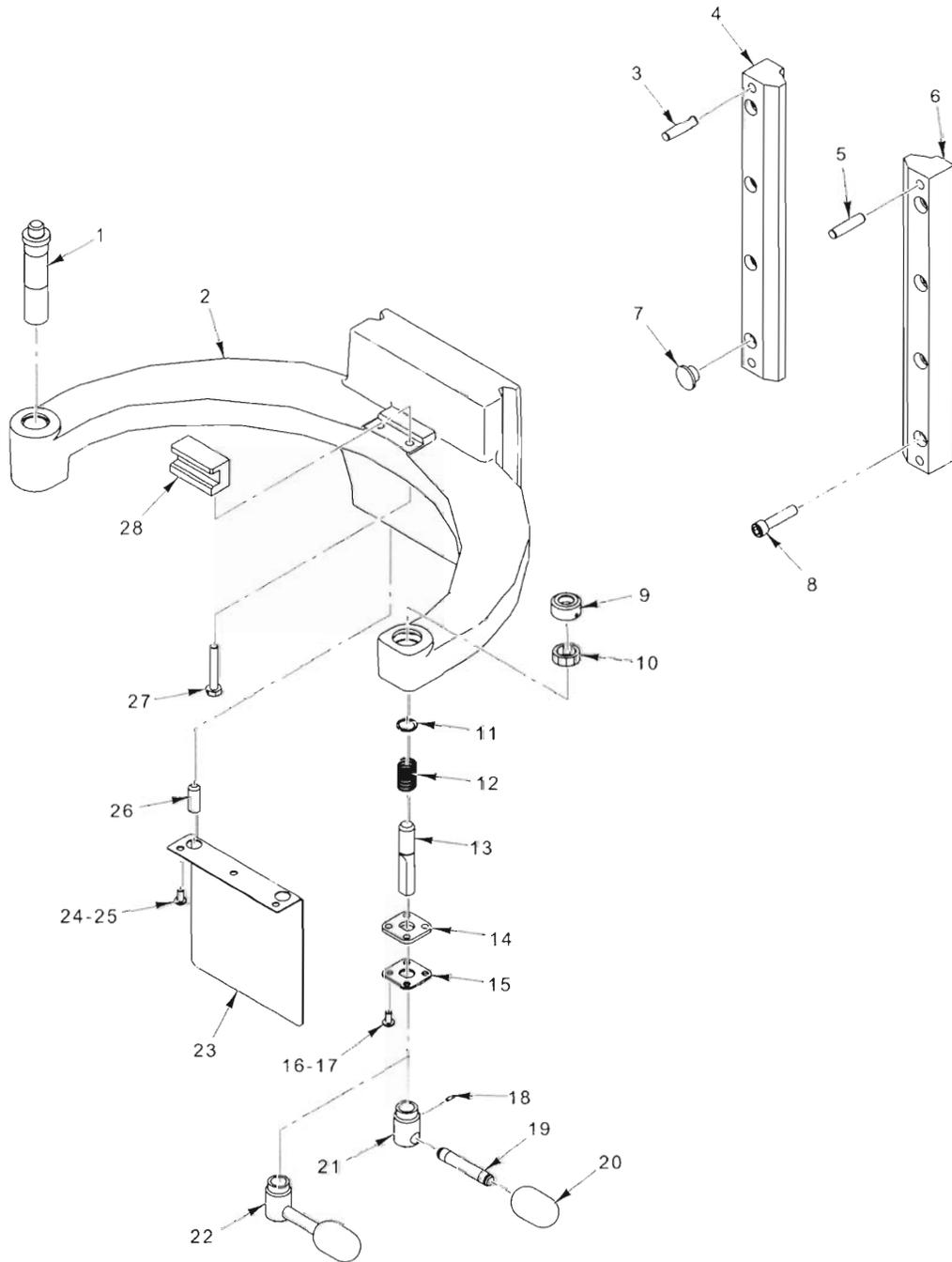


PL-58472

PLANETARY

PLANETARY

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58472			
1	00-916363	Flange – Dripcup	1
2	00-916416-00002	Gear – Internal.....	1
3	WL-003-48	Lockwasher ⁵ / ₁₆ Helical	6
4	SC-089-19	Cap Screw ⁵ / ₁₆ -18 x 1 ³ / ₈ Hex Socket Hd.	6
5	SC-066-13	Mach. Screw 8-32 x ¹ / ₄ Phil. Truss Hd. (SST) (ML-134348).....	3
6	SC-128-73	Mach. Screw 8-32 x ¹ / ₄ Tx. Button Hd. (ML-134359).....	3
7	00-064871	Plug – Friction.....	1
8	RR-012-26	Retaining Ring	1
9	00-916444	Pinion – Planetary.....	1
10	00-916455	Seal – Planetary Upper.....	1
11	BB-017-39	Bearing – Ball	2
12	00-916436	Planetary.....	1
13	00-874770	Spacer – Bowl Scraper.....	2
14	SC-053-46	Mach. Screw ¹ / ₄ -20 x ³ / ₄ Slotted Truss Hd. (SST).....	2
15	00-070047-00001	Washer – Planetary	1
16	WL-006-27	Lockwasher ³ / ₈ Helical.....	1
17	SC-062-58	Cap Screw ³ / ₈ -24 x 1 ¹ / ₄ Hex Socket Hd.	1
18	BB-017-26	Bearing – Ball	2
19	00-439286	Seal – Planetary	1
20	00-012430-00149	Key.....	1
21	00-916458	Shaft – Agitator	1
22	00-070019	Pin – Agitator	1

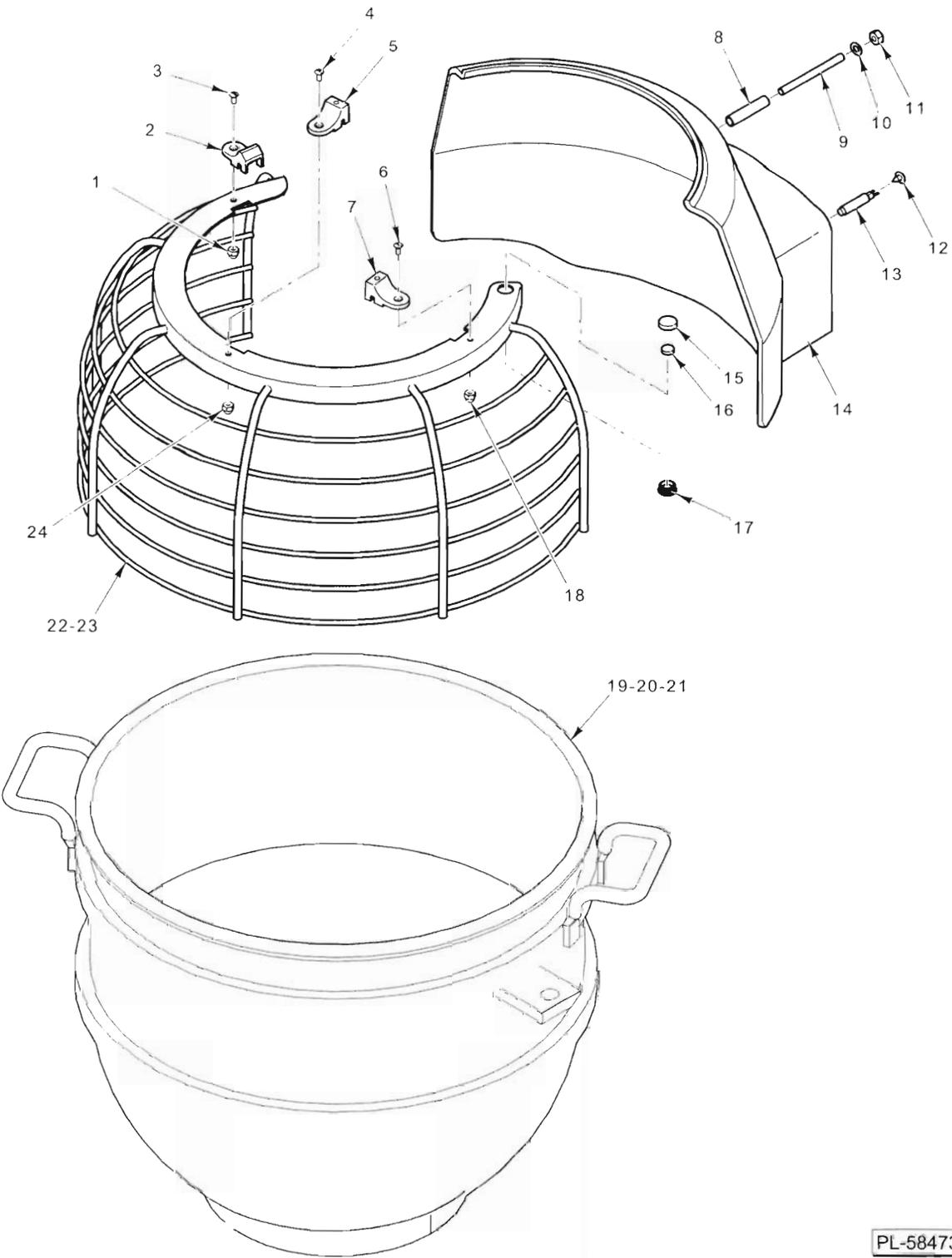


PL-58474

BOWL SUPPORT

BOWL SUPPORT

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58474			
1	00-916516	Pin – Bowl (LH).....	1
2	00-916497	Support – Bowl.....	1
3	00-011800-00141	Dowel 1/16 x 1 3/16.....	2
4	00-916365-00001	Slideway – Bowl Lift (LH).....	1
5	00-011800-00141	Dowel 1/16 x 1 3/16.....	2
6	00-916365-00002	Slideway – Bowl Lift (RH).....	1
7	PB-004-96	Cap.....	8
8	SC-089-18	Cap Screw 5/16-18 x 1 1/4 Hex Socket Hd.....	8
9	00-916501	Ramp.....	1
10	00-916502	Bushing – Split.....	1
11	RR-012-30	Retaining Ring.....	1
12	00-916488	Spring – Compression.....	1
13	00-916505	Pin – Bowl (RH).....	1
14	00-916550	Glide – Bowl Release.....	1
15	00-916506	Plate – Bowl Release.....	1
16	SC-093-23	Mach. Screw 10-24 x 3/8 Phil. Pan Hd. (SST) (ML-134348).....	3
17	SC-128-69	Mach. Screw 10-24 x 3/8 Tx. Button Hd. (SST) (ML-134359).....	3
18	SC-047-74	Set Screw 8-32 x 1/4 Hdls. Hex Hd. Cup Pt.....	1
19	00-916552	Shaft – Bowl Pin Handle (ML-134348).....	1
20	00-875356	Handle – Lift Lever (Microban) (ML-134348).....	1
21	00-916503	Block – Bowl Handle (ML-134348).....	1
22	00-916504-00002	Handle – Security Bowl Release (ML-134359).....	1
23	00-916470	Apron – Lower.....	1
24	SC-093-23	Mach. Screw 10-24 x 3/8 Phil. Pan Hd. (SST) (ML-134348).....	3
25	SC-128-69	Mach. Screw 10-24 x 3/8 Tx. Button Hd. (SST) (ML-134359).....	3
26	SC-129-59	Set Screw 3/8-16 x 1 Slotted Hdls., Flat Pt.....	2
27	SC-097-15	Cap Screw 1/4-20 x 1 3/8 Hex Hd.....	2
28	00-916515	Catch – Rear Bowl.....	1



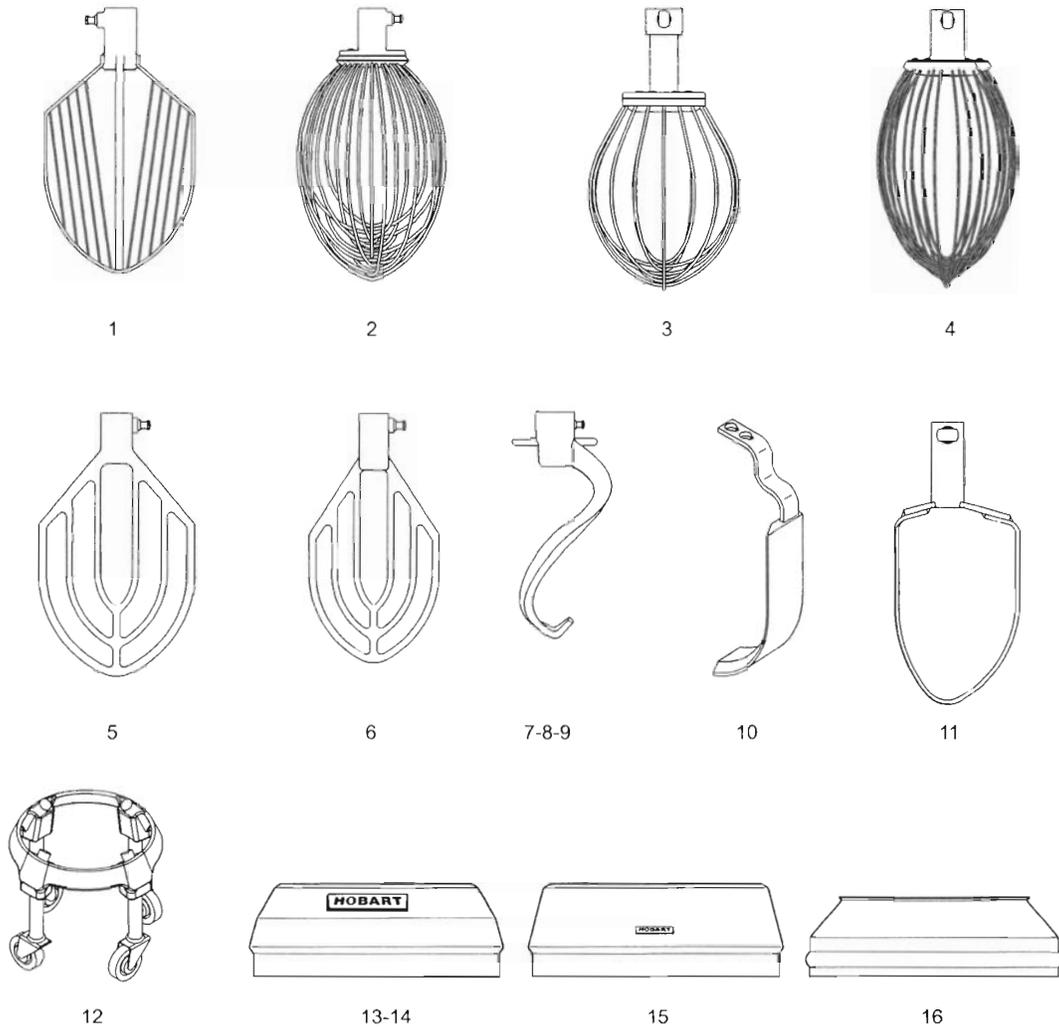
PL-58473

BOWL AND BOWL GUARD

BOWL AND BOWL GUARD

ILLUS.	PART NO.	NAME OF PART	AMT.
PL-58473			
1	NS-048-96	Crown Nut 6-32 (SST)	1
2	00-916424-00002	Carrier – Wire Cage Bypass	1
3	SC-129-39	Mach. Screw 6-32 x 5/16 Slotted Oval Hd. (SST)	1
4	SC-129-39	Mach. Screw 6-32 x 5/16 Slotted Oval Hd. (SST)	1
5	00-916424-00001	Carrier – Wire Cage Standard	1
6	SC-129-39	Mach. Screw 6-32 x 5/16 Slotted Oval Hd. (SST)	1
7	00-916424-00001	Carrier – Wire Cage Standard	1
8	00-916610	Spacer – Splash Guard	4
9	00-916671	Rod – Splash Guard	4
10	WS-003-19	Washer	8
11	NS-013-02	Nut 1/4-20 Hex	4
12	SD-034-19	Self-Tapping Screw 10-16 x 3/8 Phil. Truss Hd., Type AB	1
13	00-087711-00352	Switch – Reed	1
14	00-916407	Guard – Splash Back	1
15	00-874887	Holder – Upper Magnet	1
16	00-874875	Magnet – Disc	1
17	00-874886	Holder – Lower Magnet	1
18	NS-048-96	Crown Nut 6-32 (SST)	1
19	00-916617	Bowl Assy. (20 Qt.)	1
20	00-916616	Bowl Assy. (30 Qt.)	1
21	00-916615	Bowl Assy. (40 Qt.)	1
22	00-916422-00001	Cage Assy. – Wire (ML-134348)	1
23	00-916422-00002	Cage Assy. – Security (ML-134359)	1
24	NS-048-96	Crown Nut 6-32 (SST)	1

HL400 SERIES LEGACY MIXER REPLACEMENT PARTS



PL-58475

AGITATORS AND ACCESSORIES

ILLUS. PL-58475	PART NO.	NAME OF PART	AMT.
1	00-916573	"C" Wire Whip (30 & 40 Qt.) (Packaged)	1
2	00-916598	"D" Wire Whip (20 Qt.) (Packaged)	1
3	00-916520	"I" Wire Whip (30 & 40 Qt.) (Packaged)	1
4	00-916421	"D" Wire Whip (30 & 40 Qt.) (Packaged)	1
5	00-916372	"B" Beater (30 & 40 Qt.) (Packaged)	1
6	00-916582	"B" Flat Beater (20 Qt.) (Packaged)	1
7	00-916827	"ED" Dough Arm (20 Qt.) (Packaged)	1
8	00-916618-00001	"ED" Hook (30 & 40 Qt.) (Packaged)	1
9	00-916618-00002	"ED" Hook (40 Qt.) (Packaged) (SST) (ML-134348)	1
10	00-916839	Bowl Scraper (40 Qt.) (Packaged)	1
11	00-916481	"P" Pastry Knife (30 & 40 Qt.) (Packaged)	1
12	00-916883	Bowl Truck Assy.	1
13	00-438079	Splash Cover (20 Qt.) (Lexan) (Packaged)	1
14	00-438080	Splash Cover (30 Qt.) (Lexan) (Packaged)	1
15	00-916897	Splash Cover (40 Qt.) (Lexan) (Packaged)	1
16	00-875677	Splash Cover (20 Qt.) (Packaged) (SST)	1
	00-438607	Chute - Ingredient (30 Qt.) (Packaged)	1
	00-916684	Chute - Ingredient (20 Qt.) (Packaged)	1
	00-439096	Chute - Ingredient (40 Qt.) (Packaged)	1

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