HOBART

SERVICE

SERVICE MANUAL

**** Updated technical documentation is attached to the end of this manual.***

H600 / L800 / P660 Classic Mixers

H600
H600T
P660
L800

- NOTICE -

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

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

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SERVICE UPDATES

SERVICE UPDATES - H600 / L800 / P660

September, 2018

- Deleted "Disassembling the Hobart PBL Motor from POWER BOWL LIFT MOTOR AND TRANSMISSION.
- Deleted "Reassembly of Hobart PBL Motor and Gear Case" from POWER BOWL LIFT MOTOR AND TRANSMISSION.

December 2014

DELETED TSBs

- TSB 998 Bevel Gear
- TSB 920 Optional Timer

ADDEDD INFORMATION

- TECHNICAL NOTES - BOWL GUARD
- Additional Troubleshooting Symptom - Attachment Stuck on Agitator Shaft - Step 1
- TECHNICAL NOTES - TIMER

GENERAL

INTRODUCTION

The Hobart H600, and L800 mixers are designed primarily to mix food products; however, they are often used for various industrial applications. A standard attachment hub provides versatility of operations through use of optional attachments and accessories.

On H600 and L800 mixers, the attachment hub and planetary shaft are driven by the four speed transmission.

The model L800TH (Tim Horton's) varies from the standard L800 slightly. The differences are listed below.

- The mixer comes with a bolt on bowl adapter set up to accept only 60 quart bowls and accessories.
- The motor has a cooling fan mounted on the motor shaft.
- It is built as a 200V/60Hz/3Ph only.
- A shield mounted on the inside of the pedestal protects wiring from the fan blades.
- Usage of an enhanced overload relay that can be identified by a red reset button. The standard L800 has a green button.

A timer and brake are available as an option on the H600, but are standard equipment on the L800.

The Hobart P660 is a heavy duty mixer available as a single or two speed mixer. Standard equipment on the P660 includes a #12 attachment hub and a 15 minute timer.

A manual bowl lift is standard on H600/L800/P660 mixers. A power bowl lift was available as an option on H600 and L800 mixers only.

SPECIFICATIONS

ELECTRICAL SPECIFICATIONS / MOTOR RATINGS			
Voltage/Hz./Phase	**H600**	**L800**	**P660**
	HORSEPOWER	**HORSEPOWER**	**HORSEPOWER**
115/60/1	1, 1-1/2 2	- - -	- - -
200/60/1	1-1/2, 2	1-1/2, 2	- - -
208/60/1	- - -	1-1/2	2-1/2
230/60/1	1-1/2, 2	1-1/2, 2	- - -
240/60/1	- - -	- - -	2-1/2
200-230/60/1	1	- - -	- - -
200/60/3	1-1/2, 2	2	- - -
208/60/3	- - -	2	- - -
220/60/3	- - -	2	- - -
230/60/3	1-1/2, 2	2	- - -
440/60/3	- - -	2	- - -
460/60/3	1, 1-1/2, 2	1-1/2, 2	- - -
550/60/3	- - -	1-1/2	- - -
200-208/60/3	- - -	1-1/2	2-1/2
200-230/60/3	1	- - -	- - -
208-240/60/3	- - -	- - -	- - -
220-230/60/3	- - -	1-1/2	- - -
380-400/60/3	1	- - -	- - -

ELECTRICAL SPECIFICATIONS / MOTOR RATINGS			
Voltage/Hz./Phase	**H600**	**L800**	**P660**
	HORSEPOWER	**HORSEPOWER**	**HORSEPOWER**
400-480/60/3	- - -	1-1/2	- - -
550-440/60/3	1	- - -	- - -

OPERATING SPEEDS (RPM)				
SPEED	**H600**		**L800**	
	AGITATOR	**ATTACHMENT**	**AGITATOR**	**ATTACHMENT**
First	70	79	60	68
Second	124	139	106	119
Third	206	232	177	199
Fourth	362	408	311	350

OPERATING SPEEDS (RPM)				
SPEED	**P660**		**P660 SBA**	
	AGITATOR	**ATTACHMENT**	**AGITATOR**	**ATTACHMENT**
First	56	175	78	294
Second	99	305	- - -	- - -
Third	- - -	- - -	- - -	- - -
Fourth	- - -	- - -	- - -	- - -

OVER-ALL DIMENSIONS AND WEIGHT W/ STANDARD BOWL			
	H600	**L800**	**P660**
Height	55 7/8"	55 7/8"	55 7/8"
Width	27 1/2"	27 1/2"	27 1/2"
Length	39 1/4"	41 1/2"	39 1/4"
Net Weight (LBS)	853/*675	875/*675	853
Net Wt w/Power Bowl Lift (LBS)	878/ *700	900/*700	- - -
* Represents weight of H600-D and L800-D mixers.			

LUBRICATION

⚠ WARNING

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

NOTE: Lubricants listed are those specified at time of printing this manual. Refer to LUBRICATION MANUAL for the latest lubrication requirements.

Transmission

NOTE: The oil level should not be below the oil level gauge line printed on sight glass while the mixer is off. Change the oil every three years or more frequently with heavy usage.

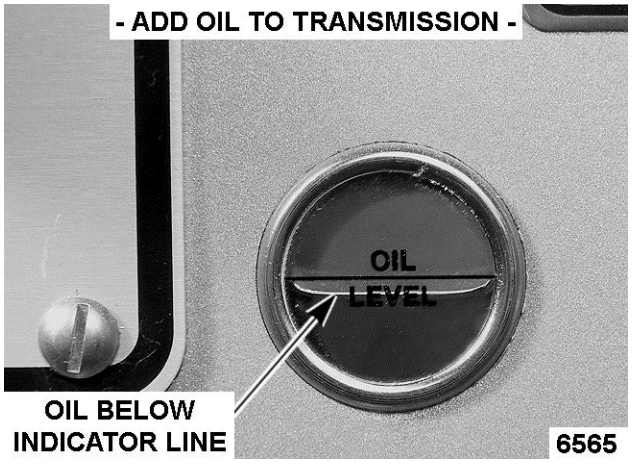


Fig. 1

NOTICE

Overfilling transmission case may result in oil leakage.

1. Drain the oil.
   A. Remove splash guard, if present.
   B. Remove top cover.
   C. Place a large pan under drain plug to catch old oil.
   D. Remove drain plug from transmission case and drain oil.

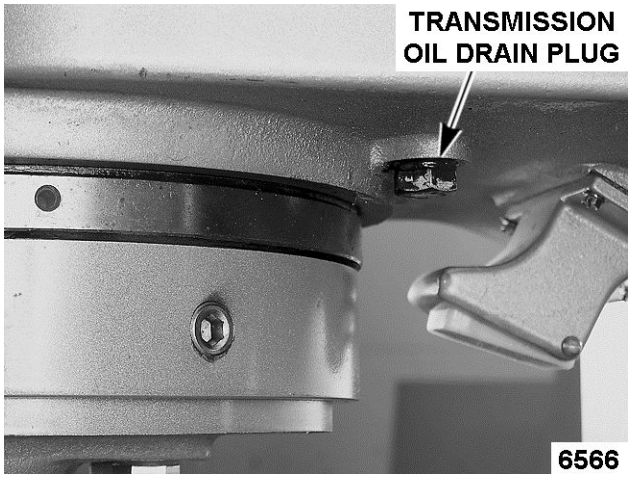


Fig. 2

   E. Replace drain plug.

2. Remove fill plug from top cover of transmission.

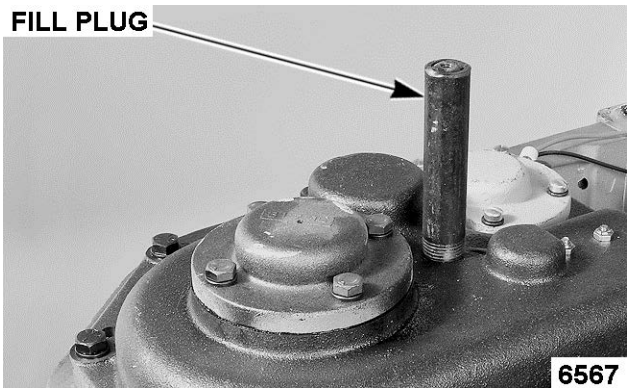


Fig. 3

3. Service mixer with oil (Mobile Gear 634).
   A. Verify oil level is correct by observing oil level through sight glass.
   B. Apply power and turn mixer ON. Look inside oil fill hole [1] Fig. 4.

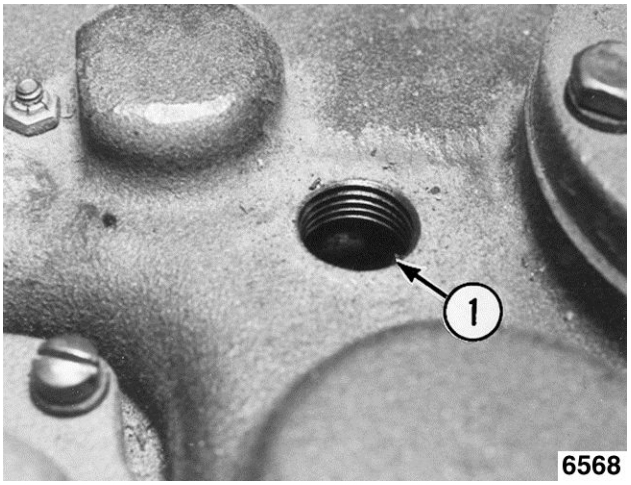


Fig. 4

   C. Make certain that oil is flowing from the oil delivery tube across the gear face [1] Fig. 5).

NOTE: If oil is not flowing, shut mixer OFF and refer to PLANETARY OIL PUMP found under PLANETARY.

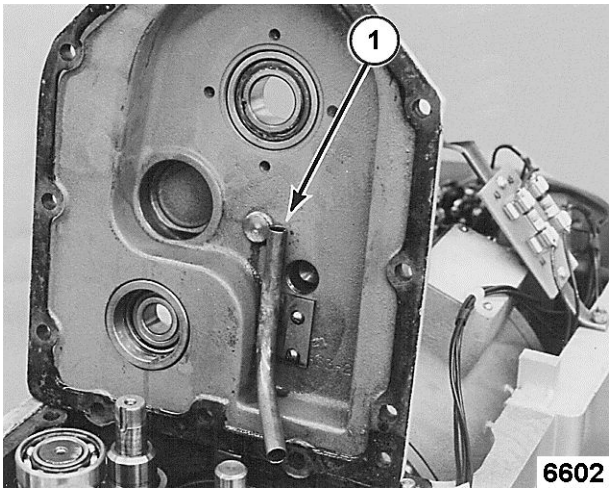


Fig. 5

D. Replace fill plug and top cover.

Planetary

⚠ WARNING

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

NOTE: On mixers manufactured with an oil pump, the planetary has its own oil supply. Due to the relatively small volume of oil (6 Fl. oz.), it is advisable to change it more frequently than the transmission oil depending on mixer usage.

1. Drain the oil.

   A. Remove bowl guard assembly (drip cup on mixers without bowl guard).

   B. Rotate planetary until drain plug is accessible.

   C. Place a container under planetary to collect used oil.

   D. Remove planetary oil drain plug and drain oil.

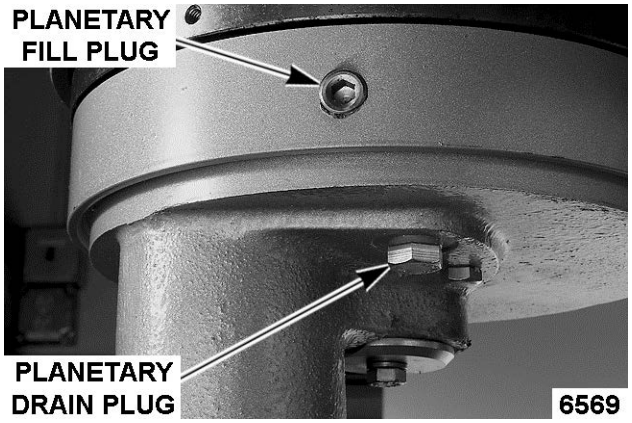


Fig. 6

   E. Replace drain plug.

2. Replacing oil.

   A. Remove oil fill plug.

   B. Pour 6 fl. oz. oil into the planetary through fill hole (Exxon Spartan EP150).

NOTE: The oil level should be even with the bottom of the fill hole.

   C. Replace oil fill plug and bowl guard assembly (or drip cup).

3. Check mixer for proper operation.

Manual Bowl Lift

⚠ WARNING

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

1. Lubricate the bowl lift gearing.

NOTE: The manual bowl lift gearing is located inside the pedestal below the mixer motor and should be lubricated annually depending on usage. It is not necessary to remove motor to lubricate or service manual bowl lift.

   A. Remove top cover.

   B. Coat gearing with the recommended lubricant (Chevron FM Grease ALC EP 2).

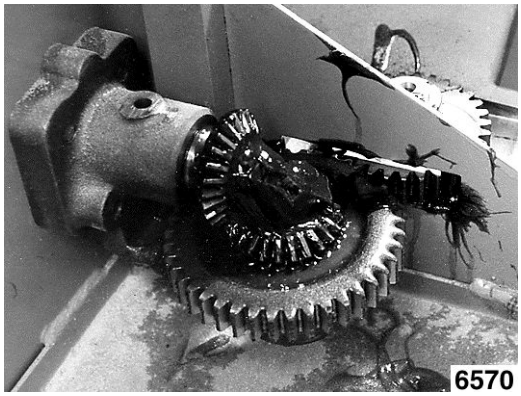


Fig. 7

   C. Replace top cover.

   D. Check for proper operation.

2. Lubricate the bowl lift screw assembly.

NOTE: The bowl lift screw assembly should be greased semi-annually or more often depending on usage with the recommended lubricant.

   A. Place bowl support in its lowest position.

B. Remove pedestal apron thumbscrews [1] Fig. 8 (qty. 4).

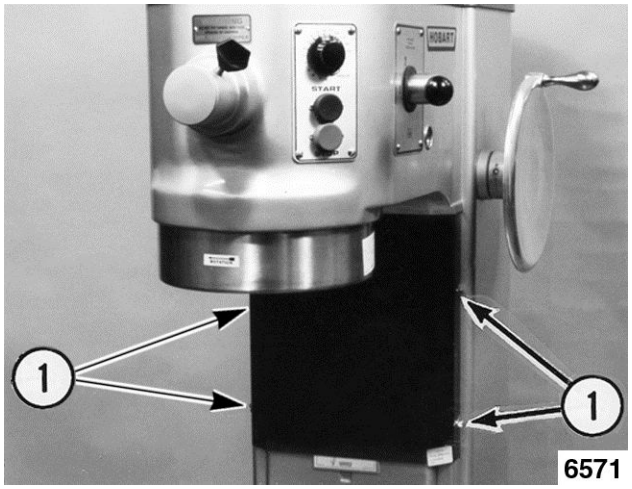


Fig. 8

C. Coat lift screw with Lubriplate 630AA [1] Fig. 9.

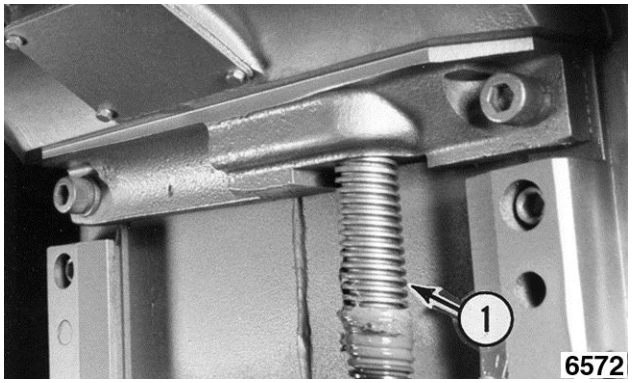


Fig. 9

D. Replace pedestal apron.

Slideways

1. Place bowl support in its lowest position.

⚠ WARNING

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

NOTE: The slideways should be lubricated semiannually or more often, depending on usage.

2. Remove pedestal apron (thumbscrews).
3. Lubricate slideways with Lubriplate 630AA.
4. Replace pedestal apron.

Mixer Motor

NOTE: The mixer motor front bearing receives oil from the transmission. An oil drain hole located below the bearing returns excess oil back to the transmission. When servicing the motor, make certain that the drain hole is located properly and the hole is open.

TOOLS

Shaft Alignment Tool - Part No. TL-82901. Use for alignment of motor.

Two - 5/16"x3-1/4" Eye bolt - P660 single phase motor removal.

One - 4' of 1/0 Machine twist chain or 6' 3/8" Nylon rope - P660 single phase motor removal.

Four foot 2x4 lumber - P660 single phase motor removal.

BOWL GUARD

TECHNICAL NOTES - BOWL GUARD

A bowl guard was added to H600, L800 and P660 mixers beginning with ML-104241 and higher. A kit exists to add a bowl guard to early mixers. It is recommended to install a bowl guard on mixers that were built prior to the ML number listed above. When installed and working properly, the bowl guard will prevent the mixer from operating unless the wire cage of the bowl guard is fully closed.

Two styles of bowl guard assembly have been used. The old style bowl guard assembly can be identified by a latch and a saddle with a slot used to secure the wire cage in the center (closed) position and a release knob to open the wire cage. The new style bowl guard assembly uses a pin mounted on the splash guard to provide a positive stop in order to align the wire cage in the closed position at the end of travel.

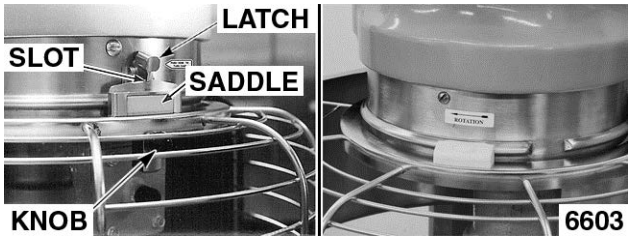


Fig. 10

Refer to TSB 895 and TSB 894 for information about selecting service kits for bowl guards, bowl height sensing and bowl lock kits.

H600/L800 Transformer Kit

This kit updates a mixer to handle the current load of the additional components in the bowl guard, bowl height sensing or bowl lock kit(s). Refer to TSB 992 for more information.

WIRE CAGE

⚠ WARNING

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

Old Style

1. Lower bowl support.
2. Remove agitator.
3. While holding wire cage assembly in one hand, push down on the release knob with free hand to release the saddle shoe.

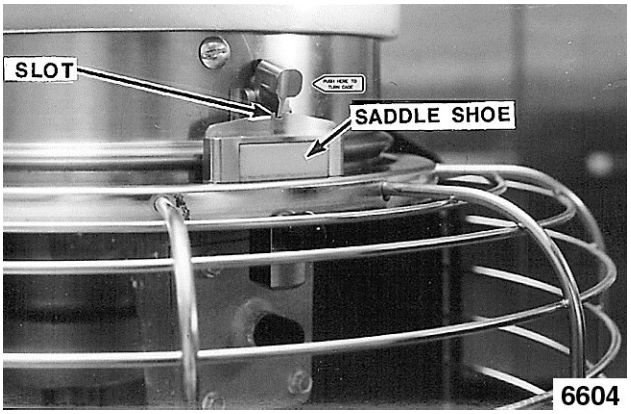


Fig. 11

4. Lower front of wire cage assembly slightly then move cage toward the rear to free fixed and adjustable shoes from rim of drip cup.
5. Reassemble in reverse order.

New Style

1. Lower bowl support.
2. Remove agitator.
3. Rotate cage clockwise (as looking down on cage) until saddle shoe aligns with opening of drip cup.

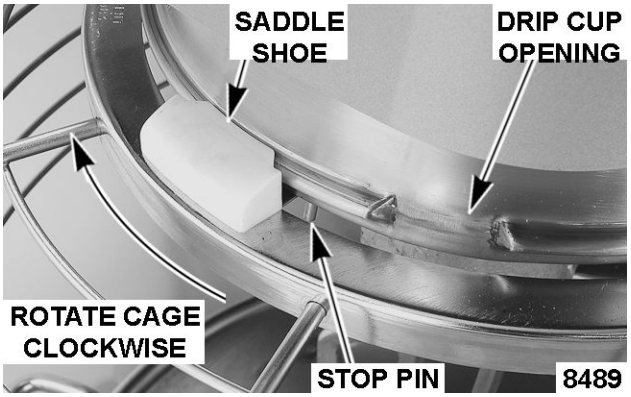


Fig. 12

4. Lower front of cage until saddle shoe clears opening of drip cup.
   A. Remove cage.
5. Reassemble in reverse order.

BOWL GUARD ASSEMBLY

⚠ WARNING

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

NOTE: Bowl guard assembly removal, check and adjustment procedures are the same for both styles of bowl guard

Removal

1. Lower bowl support.
2. Remove agitator and bowl.
3. Remove wire cage.
4. Support bowl guard and remove screws.

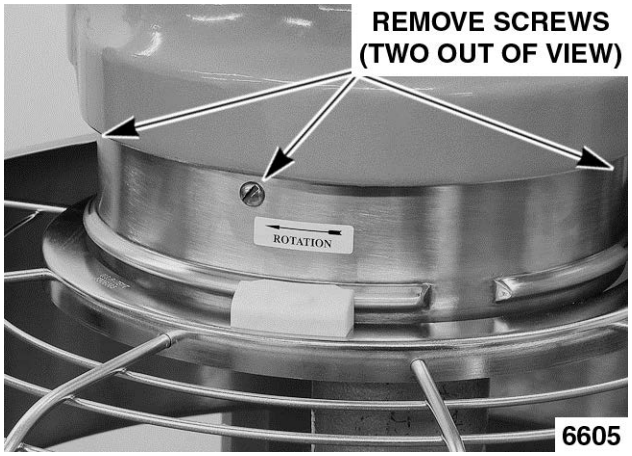


Fig. 13

5. Remove bowl guard assembly.
6. Reassemble in reverse order.
7. Check bowl guard switch and mixer for proper operation.

Check

1. Raise bowl support all the way up until it stops.
2. Rotate wire cage assembly within splash guard assembly checking for binding, being too loose, and clearance between splash guard and bowl. If any of the conditions stated earlier exist, adjustment is necessary.

Adjustment

1. If cage is binding on rim of drip cup, or it is too loose, loosen two screws holding adjustable shoe to cage assembly.
   A. Turn adjusting screw. Press the shoe to ensure it is against the screw, then tighten the mounting screws. Repeat this step until proper adjustment is achieved.

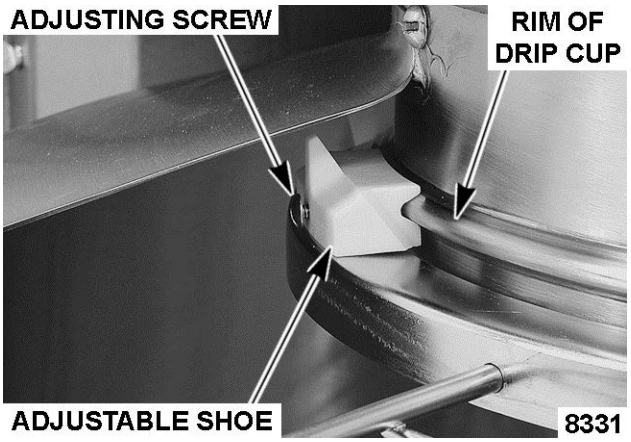


Fig. 14

   B. If, when the wire cage assembly is rotated, it rubs the splash guard assembly at the rear, the following steps should be performed to eliminate the rubbing.
      1) If there is clearance between the splash guard assembly bottom flange and the pedestal apron, place a hand on each side of splash guard assembly at front and gently squeeze hands together for cage clearance.
         a. Check to see if rubbing has been eliminated.
   C. If rubbing is still present and there is no clearance between the splash guard assembly bottom flange and the pedestal apron, remove and discard access opening cover on bowl support assembly.
      1) Check to see if rubbing has been eliminated.
   D. If rubbing is still present, mark the pedestal apron where it rubs, remove the apron, and cut a rectangular slot in apron to gain clearance for the splash guard assembly bottom flange.
2. Apply power to mixer.
3. Check BOWL GUARD SWITCH operation.

BOWL GUARD SWITCH

NOTE: There have been two types of bowl guard switch used on mixers equipped with a bowl guard assembly. Old style bowl guard reed switches are enclosed within a rectangular shaped housing and

have a pivoting plastic paddle that contacts the splash guard of the bowl guard assembly for switch actuation purposes. The new style bowl guard reed switch is encapsulated in a metal tube that is then inserted into a cylinder shaped housing. The tubular designed reed switch is positioned within close proximity to the splash guard and is activated by the opening and closing of the wire cage by a magnet that is attached to the wire cage.

⚠ WARNING

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

Old Style

1. Remove BOWL GUARD ASSEMBLY.
2. Remove TOP COVER.
   A. Disconnect bowl guard switch lead wires from overload OL-C and contactor CONC1.
   B. Clip any wires ties securing bowl guard switch wires.
   C. Remove bowl guard wires from P-Clip.
3. Remove screw and locknut securing reed switch to bowl guard housing.

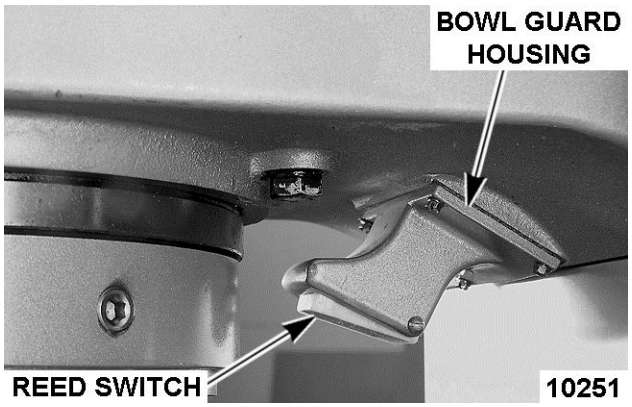


Fig. 15

4. Pull reed switch wiring partially from bowl guard housing.
   A. Clip one of the reed switch wires to aid in pulling new reed switch wiring into pedestal.
   B. Remove reed switch from mixer.

NOTE: If bowl guard housing is removed from mixer, note the number of gaskets used between reed switch housing and transmission case. Clean old gasket material from transmission case opening before reinstalling bowl guard housing.

New Style

1. Remove bowl guard switch housing and reed switch from transmission case as an assembly.

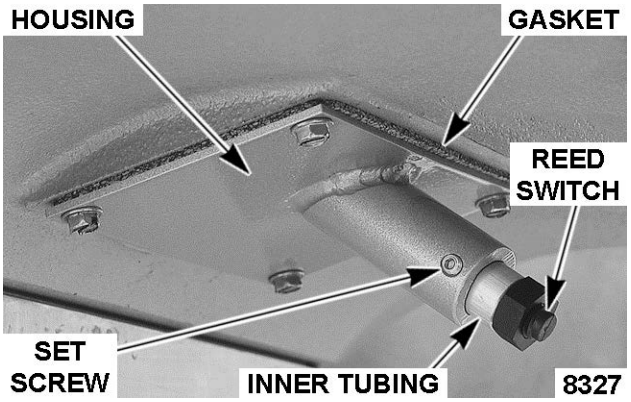


Fig. 16

2. Disconnect reed switch wires from wiring harness.
3. Remove gasket and clean old gasket material from transmission case inspection hole opening before reinstalling bowl guard housing.

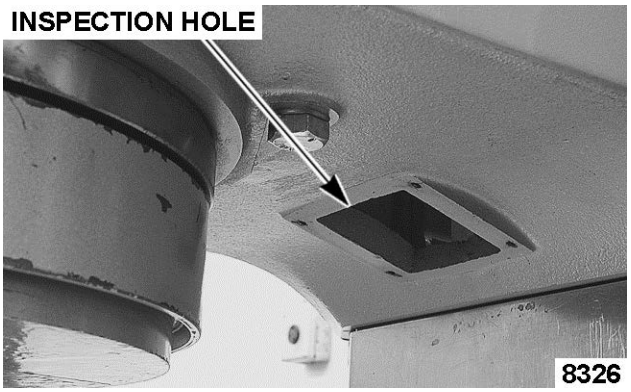


Fig. 17

4. Loosen set screw in reed switch housing and remove inner tube and reed switch.

Installation - Old Style

1. Remove BOWL GUARD ASSEMBLY.
2. Remove TOP COVER.
   A. Disconnect bowl guard switch lead wires from overload OL-C and contactor CONC1.
   B. Clip any wires ties securing bowl guard switch wires.
   C. Remove bowl guard wires from P-Clip.
3. Remove screw and locknut securing reed switch to bowl guard housing.

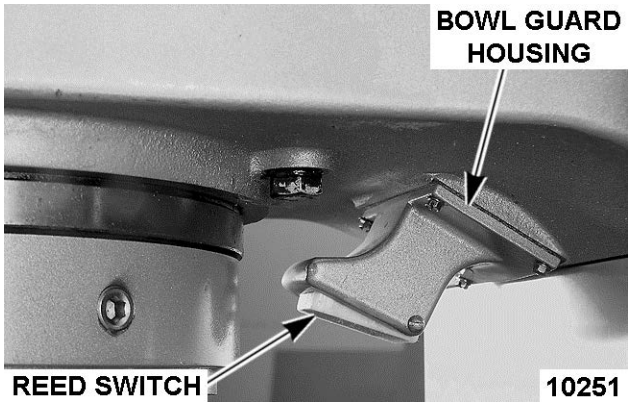


Fig. 18

4. Pull reed switch wiring partially from bowl guard housing.
   A. Clip one of the reed switch wires to aid in pulling new reed switch wiring into pedestal
   B. Remove reed switch from mixer.

NOTE: If bowl guard housing is removed from mixer, note the number of gaskets used between reed switch housing and transmission case. Clean old gasket material from transmission case opening before reinstalling bowl guard housing.

New Style

1. Remove bowl guard switch housing and reed switch from transmission case as an assembly.

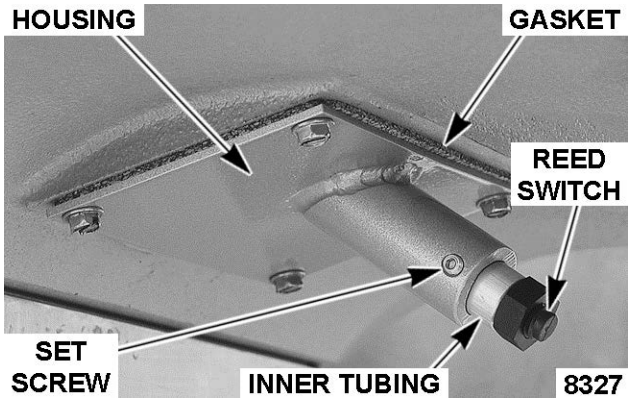


Fig. 19

2. Disconnect reed switch wires from wiring harness.
3. Remove gasket and clean old gasket material from transmission case inspection hole opening before reinstalling bowl guard housing.

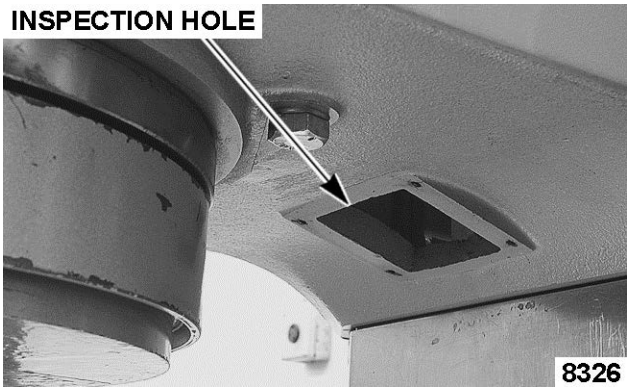


Fig. 20

4. Loosen set screw in reed switch housing and remove inner tube and reed switch.

Installation - Old Style

NOTE: If entire bowl guard switch assembly was removed, when installing assembly, use a gasket that is in good pliable condition free of cracks and cuts. Increasing the amount of gaskets between the old style reed switch housing and splash guard is the method used for adjusting reed switch actuation.

1. Pull replacement switch wires into pedestal area using wire that was left to be used as a pulling aid.
2. Route wiring up along side of pedestal and secure with P-Clip.
   A. Continue routing wires to controls.
3. Position reed switch into bowl guard housing and secure into place with screw and locknut. Do not over-tighten hardware.
4. Reinstall BOWL GUARD ASSEMBLY and perform Adjustment - Old Style Bowl Guard Switch as outlined in this section.
5. Connect RED wire of reed switch to CON-C1 and BLACK wire to OL-C.
6. Perform Check - Both Styles of Bowl Guard Switch as outlined in this section. Adjust if necessary.
7. Reinstall TOP COVER.
8. Check mixer for proper operation.

Installation - New Style

1. Feed wires of replacement reed switch up through tubing of reed switch housing.
2. Position reed switch high (almost flush) inside tubing and snug set screw.
3. Connect reed switch wires to mixer wiring harness.

4. Reinstall BOWL GUARD ASSEMBLY and perform Adjustment - New Style Bowl Guard Switch as outlined in this section.
5. Perform Check - Both Styles of Bowl Guard Switch as outlined in this section. Adjust if necessary.

Check - Both Styles of Bowl Guard Switch

- Mixer must stop when wire cage assembly is moved away from full closed position.
- Mixer must not run with wire cage assembly removed.
- Mixer must run only when wire cage assembly is fully closed (centered - lever in slot - for old style).
- For old style bowl guard switch:
  - The plastic switch plate must be in contact with the splash guard.
  - The metal housing of reed switch assembly must not touch the splash guard.

1. Raise bowl support up to stop (all the way up).
2. Close wire cage.
3. Apply power to mixer.
4. Start mixer.
5. Check bowl guard switch actuation.
   A. Old style bowl guard switch.
      1) Slowly open wire cage. The mixer must stop when the slot in the saddle of wire cage is more than 1/4" away from the lever mounted to the drip cup.
   B. New style bowl guard switch.
      1) Slowly open wire cage. The mixer must stop when the wire cage is moved away from the fully closed position.

Adjustment - Old Style Bowl Guard Switch

NOTE: The spring loaded plastic switch plate must be in contact with splash guard without the metal housing of bowl guard switch touching the splash guard.

1. Install the splash guard and wire cage assembly.
2. Close wire cage (lever in slot).
3. Disconnect bowl guard switch wiring from the overload (OL) and contactor (CON).
   A. With meter set to measure resistance, place meter leads across leads of reed switch.
      1) With wire cage closed, meter should indicate a closed circuit.

NOTE: If meter indicates an open reed switch regardless of wire cage position, check to see if magnet is present on wire cage.

4. Open wire cage while watching meter for change to an open circuit.
   A. Reed switch must open when the slot in the saddle of wire cage becomes greater than 1/4" away from the lever mounted to the drip cup.
      1) If necessary, add or remove gasket(s) behind the housing until correct bowl guard switch operation is achieved.

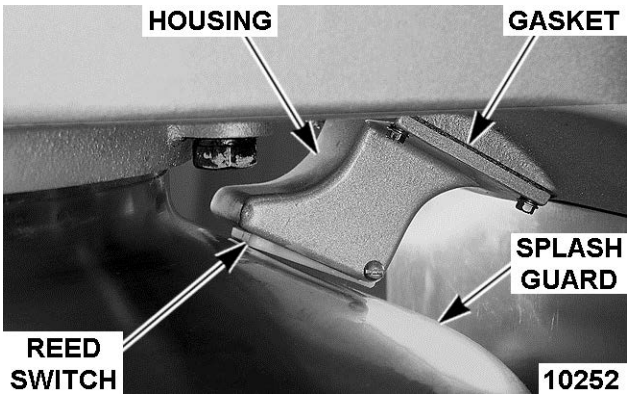


Fig. 21

5. Connect bowl guard reed switch wiring to mixer wiring harness.
6. Reinstall switch plate.
7. Check bowl guard switch actuation and mixer for proper operation.

Adjustment - New Style Bowl Guard Switch

1. Begin with end of reed switch 1/16" away from splash guard.
   A. Loosen set screw in tubing of reed switch housing.
   B. Move reed switch to obtain 1/16" clearance.

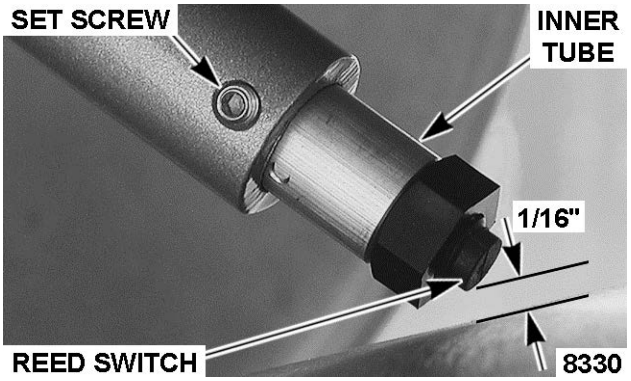


Fig. 22

   C. Tighten set screw.

2. Close wire cage fully.
3. Remove the start/stop switch plate from mixer.
4. Disconnect bowl guard switch wiring from wiring harness.
    A. With meter set to measure resistance, place meter leads across leads of reed switch.
        1) With wire cage closed, meter should indicate a closed circuit.

NOTE: If meter indicates an open reed switch regardless of wire cage position, check to see if magnet is present on wire cage.

5. Slowly open wire cage. Reed switch contacts should open as wire cage moves away from closed position (maximum 1/4" movement before switch contacts open allowed).
    A. Raise or lower reed switch inside bowl guard switch housing as necessary until correct bowl guard switch operation is achieved.
    B. Tighten bowl guard assembly set screw.
6. Connect bowl guard reed switch wiring to mixer wiring harness.
7. Reinstall switch plate.
8. Check bowl guard switch and mixer for proper operation.

TOP COVER ASSEMBLY

REMOVAL

⚠ WARNING

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

1. Remove the two screws and remove top cover. The longer of the two screws secures the back of the top cover to the mixer.

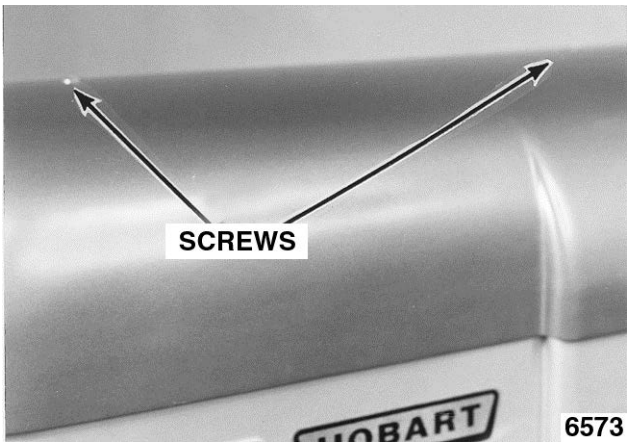


Fig. 23

2. Reassemble in reverse order.

PLANETARY

TECHNICAL NOTES - PLANETARY

The oil pump was removed from the planetary on late production mixers. Refer to the table below for ML number information. Those mixers without an oil pump are to be lubricated with 4 oz. Chevron FM Grease ALC EP 2 applied to the internal pinion gear and the internal gear on the planetary.

ML NUMBERS FOR MIXERS PRODUCED WITHOUT A PLANETARY OIL PUMP		
Model	**ML**	**Description**
H600	134189	Stainless Steel
	134191	Painted
	134203	Correctional
L800	134194	Painted
	134204	Correctional
	134205	Tim Horton
P660	134198	Painted
	134200	Sbarro

PLANETARY ASSEMBLY

⚠ WARNING

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

Removal

1. Lower bowl support.
2. Remove agitator, bowl and BOWL GUARD or drip cup if no bowl guard has been installed [1] Fig. 24.
3. Drain planetary oil by removing drain plug [2] Fig. 24.

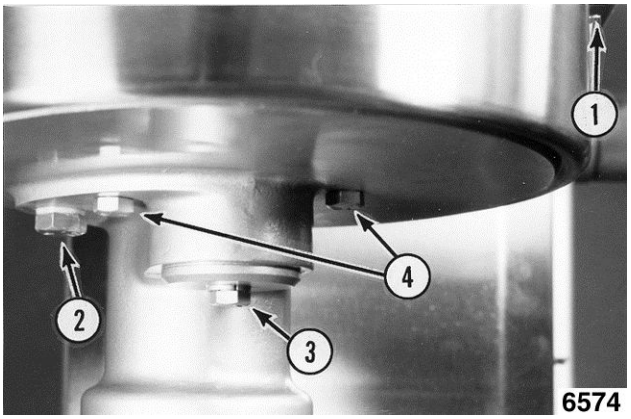


Fig. 24

NOTICE

Support planetary while removing retaining screw to prevent planetary from dropping.

NOTE: To keep planetary shaft from turning while removing the retaining screw, install an agitator attachment and hold it while loosening the retaining screw.

4. Remove retaining screw [3] Fig. 24.

NOTICE

If a pry bar is used between the planetary and internal gear, always pry down so that pressure is not applied directly to the cast iron lip of planetary [1] Fig. 25. Replace planetary if lip is damaged.

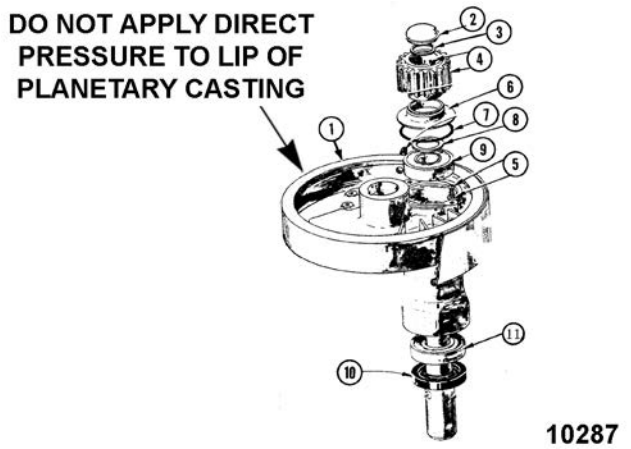


Fig. 25

NOTE: Should removal of planetary prove to be difficult, tapped holes [4] Fig. 24 (qty. 2) are provided on opposite sides of planetary center for use in anchoring a puller. Remove cap screws to gain access to the holes. Apply sealant to threads of cap screws

then reinstall cap screws during reassembly of planetary.

5. Carefully slide planetary from planetary shaft.
6. Remove the planetary washer (chamfer side up toward transmission housing) and key.

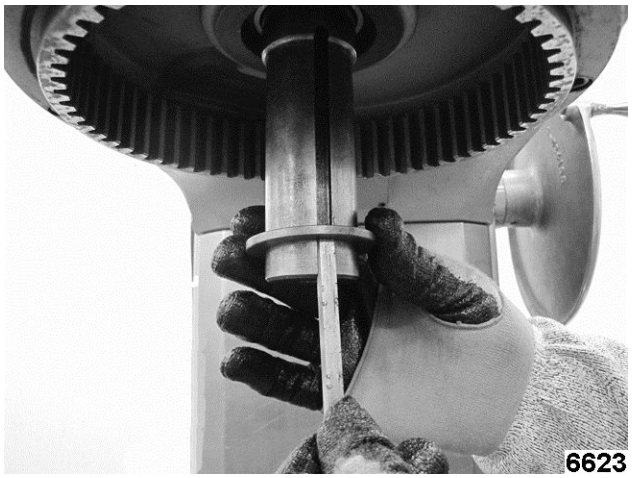


Fig. 26

AGITATOR SHAFT
Disassembly

1. Pry off oil retaining cap (1, Fig. 27).

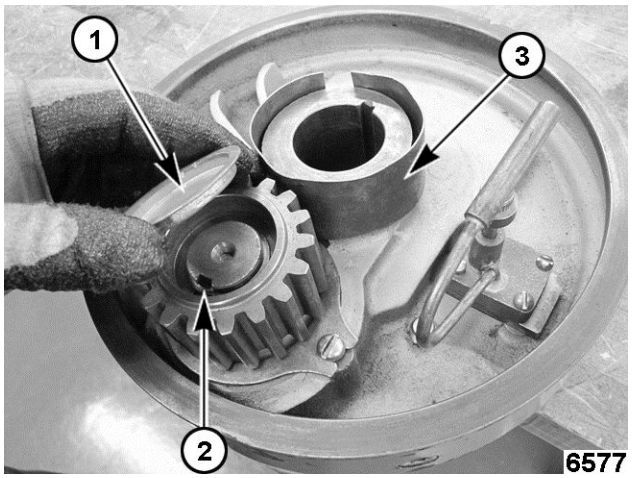


Fig. 27

2. Remove retaining ring (2, Fig. 27).
3. Remove pinion gear and key [4] Fig. 30.

NOTICE

Support planetary shaft while driving shaft from planetary. Shaft will fall freely when pressed out of bearings.

4. Using a rubber mallet, carefully drive the agitator shaft down and free of the planetary.

Fig. 28

5. Remove two screws and lock washers that hold special washer and oil baffle in place.

NOTE: The original oil baffle was made from carbon steel and was replaced with an oil baffle made of nylon. The nylon oil baffle requires a special washer to secure the oil baffle in position. Both oil baffles install the same way. Discard original washers when using special washer.

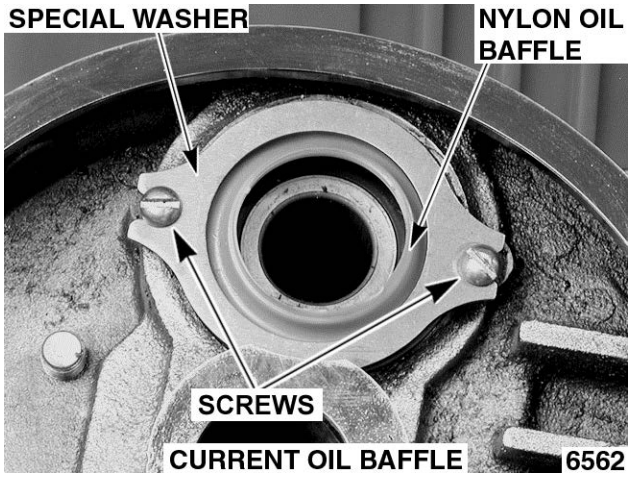


Fig. 29

6. Remove oil baffle O-ring [6], shim [7] and washer [8] Fig. 30.

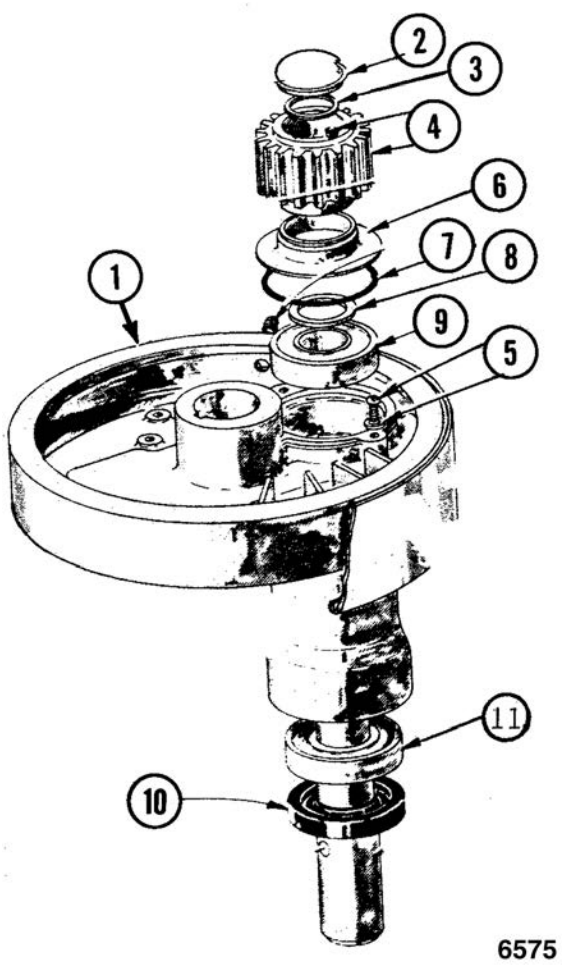


Fig. 30

NOTE: Check condition of O-ring [6] Fig. 30on the oil baffle. Replace if necessary.

7. Remove upper bearing [9] Fig. 30.
8. Remove oil seal [10] and lower bearing [11] Fig. 30 from bottom of planetary.

NOTE: Always install a new seal in bottom of planetary when reassembling. Place a light coating of lubricant on the seal lip to eliminate squealing.

9. Place a light coating of Permatex # 2, or similar sealer on seat of oil retaining cap [2] Fig. 30 before reassembling.
10. Reassemble agitator shaft in reverse order.

AGITATOR SHAFT PIN

⚠ WARNING

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

Disassembly

1. Remove plug screw [1] Fig. 31.
2. Remove set screws [2] Fig. 31 (qty. 2).

NOTE: When reassembling, make certain that the pointed set screw seats in hole of pin.

3. Remove pin [3] Fig. 31.
4. Reassemble in reverse order.

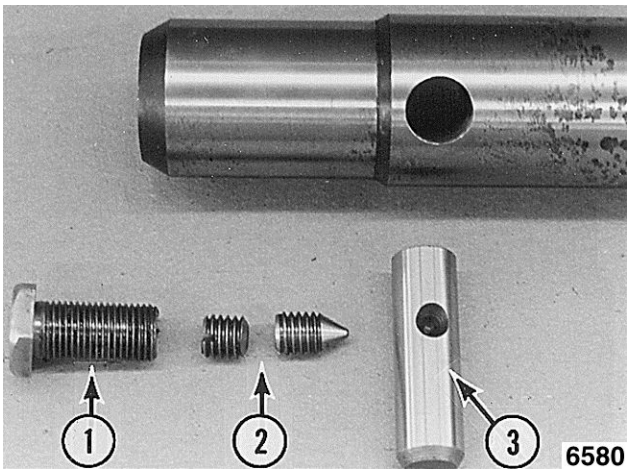


Fig. 31

PLANETARY OIL PUMP (Where Applicable)

NOTE: Check the oil pump inlet [7] and outlet [2] Fig. 32 holes to verify they are not clogged. If there is any oil in the planetary cavity, a small amount of it should flow from the outlet tube when the fiber conveying gear [3] Fig. 32 is turned by hand. A little oil should also come out of the small hole [8] Fig. 32 and drip on the conveying gear.

Disassembly

1. Remove oil pump assembly from planetary. For accessing the mounting screws, align the thru hole in conveying gear with screw to be removed [1] Fig. 32.

NOTE: Only two screws secure the oil pump assembly to the planetary casting. The screws are opposite each other on the oil pump assembly. As shown in photo , only one screw, number 6 can be seen.

   A. Remove two mounting screws (only one location shown) [6] Fig. 32.

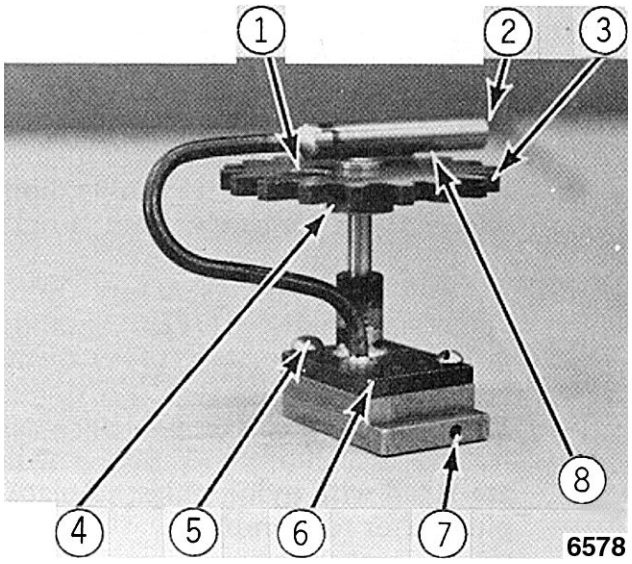


Fig. 32

2. Remove two screws [5] Fig. 32 that hold the top, body, and bottom plates together to gain access to pump gears.

NOTE: In later model oil pumps, the top and body sections of the three-piece oil pump body were combined into a single-piece construction for simplification.

3. Remove pin from shaft and remove gears.

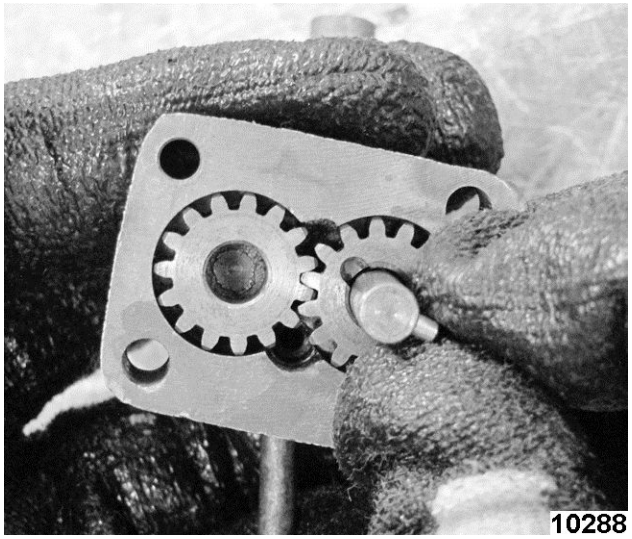


Fig. 33

4. Drive pin from hub of conveying gear.

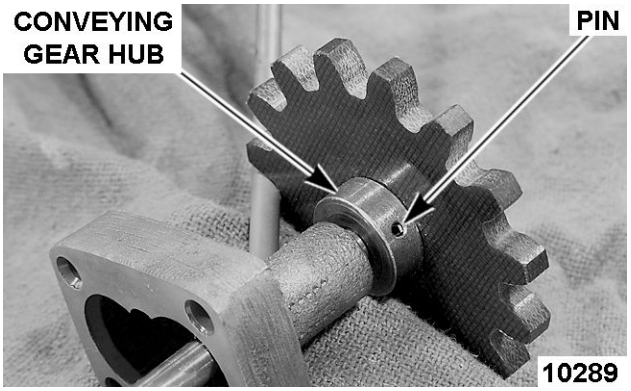


Fig. 34

Assembly

1. Install conveying gear (hub side down) onto oil pump shaft. Secure by driving pin into position. Fig. 34
2. Reinstall slotted and non-slotted oil pump gears into housing and tube assembly. Slotted gear is to be positioned over thru hole in housing and tube assembly with slotted surface visible.
3. Reinstall oil pump shaft into housing and tube assembly. Allow shaft to pass through slotted gear.
4. Reinstall pin into oil shaft. Pull conveying gear away from housing and tube assembly to seat pin into slotted gear. Fig. 33

NOTE: Different size screws are used on the oil pump to assure correct installation of bottom plate onto housing and tube assembly.

5. Reinstall oil pump bottom plate and secure with one 8-32 and one 10-32 screws.

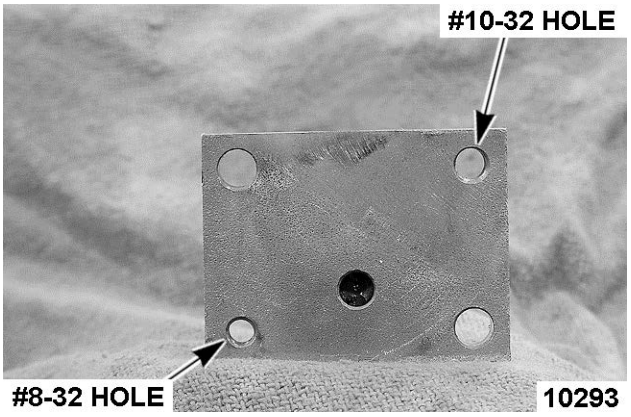


Fig. 35

6. Reinstall oil pump into planetary and secure with screws.

PLANETARY OIL SHIELD

NOTE: The planetary oil shield (3, Fig. 36) keeps oil from being sprayed onto the planetary shaft at high

speed from the pump conveying gear. Be sure to replace shield if it is removed. Install oil shield with opening facing away from conveying gear.

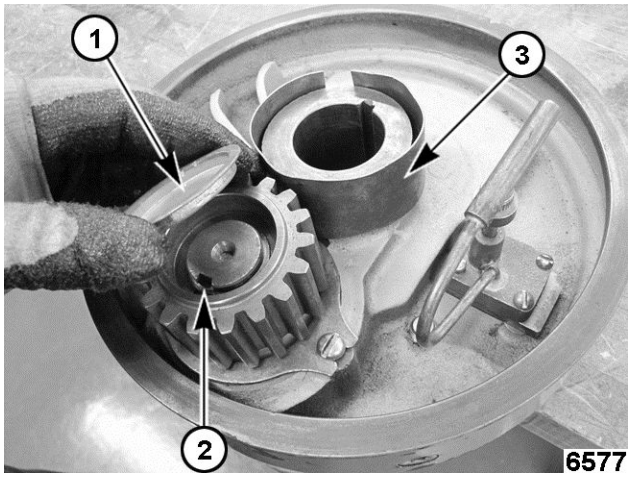


Fig. 36

INTERNAL GEAR
Removal

1. Perform PLANETARY ASSEMBLY REMOVAL as outlined in this section.
2. Loosen, but do not remove, the internal gear mounting bolts [1] Fig. 37.

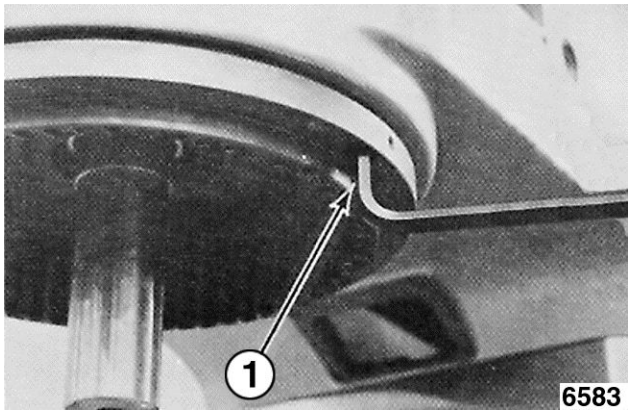


Fig. 37

3. Using a lead mallet, tap the outside of internal gear to loosen gear from transmission housing.
4. Supporting the internal gear, remove the mounting bolts and lock washers. Remove internal gear.

Installation

1. Thoroughly clean internal gear and gear seat in the bottom of transmission housing.
2. Coat top surface of internal gear with Permatex #2 or equivalent.
3. Place internal gear in position and loosely secure with mounting bolts and lock washers. Make sure the tapped bowl guard mounting holes are positioned as shown.

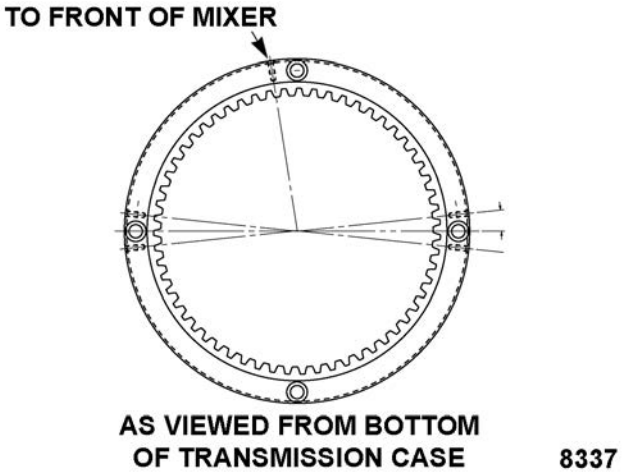


Fig. 38

4. Alternate the tightening of all mounting bolts while tapping the internal gear with a lead mallet to assure proper seating.
5. Perform PLANETARY INSTALLATION as outlined in this section.

PLANETARY INSTALLATION

NOTICE

Exercise care when reinstalling planetary on mixer, carefully mesh fiber conveying gear of the oil pump with the internal gear to prevent damage to the fiber gear.

1. If planetary oil pump is not present, apply 4 oz. Chevron FM Grease ALC EP 2 to the internal pinion gear and the internal gear on the planetary.
2. Install planetary assembly in reverse order of removal.
3. If an oil pump is present in planetary assembly, fill planetary with oil (6 Fl. oz., EXXON SPARTAN EP150) after planetary assembly is installed.

TRANSMISSION

TECHNICAL NOTES - TRANSMISSION

Refer to the beginning of CLUTCH SHAFT ASSEMBLY, PLANETARY SHAFT ASSEMBLY and #12 ATTACHMENT HUB ASSEMBLY for important changes that have occurred throughout the production period. Additional service information pertaining to oil leaking from the attachment hub is discussed in #12 ATTACHMENT HUB ASSEMBLY.

DISASSEMBLY OF TRANSMISSION

⚠ WARNING

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

1. Remove TOP COVER ASSEMBLY.

NOTE: Before proceeding, discharge the capacitor on mixers equipped with a power bowl lift.

2. Remove PLANETARY ASSEMBLY as outlined in PLANETARY.
3. Remove planetary key and washer.
4. Drain transmission oil by removing drain plug.

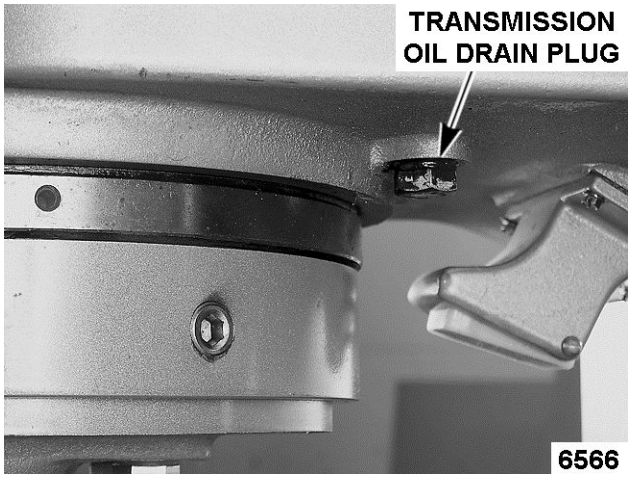


Fig. 39

5. Remove the worm shaft and planetary shaft bearing retainer covers [1] Fig. 40.

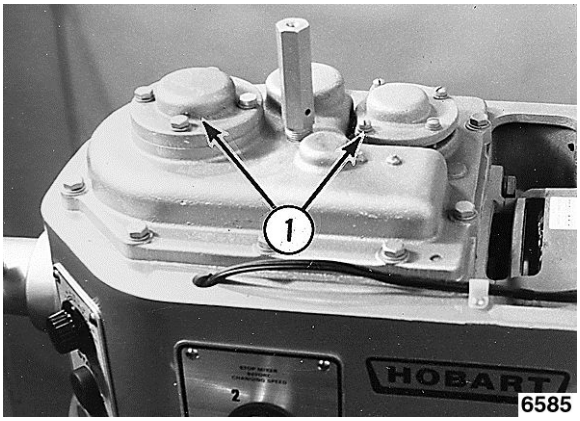


Fig. 40

6. Bend down the tabs on the worm shaft and planetary shaft lock washers [1] Fig. 41. Remove special bearing locknuts and washers.

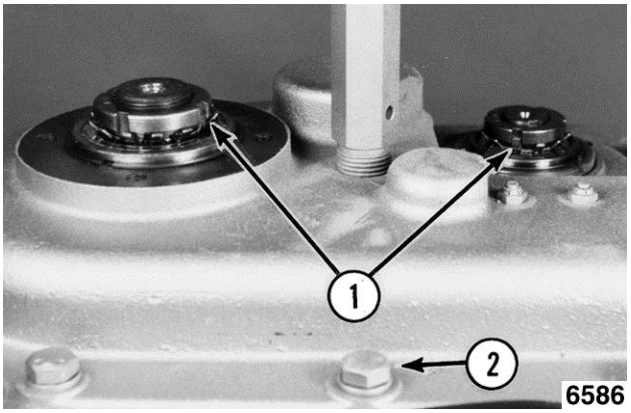


Fig. 41

NOTICE

Use care when prying cover off transmission case. Do not pinch or cut wires with pry tool.

7. Remove the bolts and lock washers holding down the transmission cover and carefully pry the cover off .

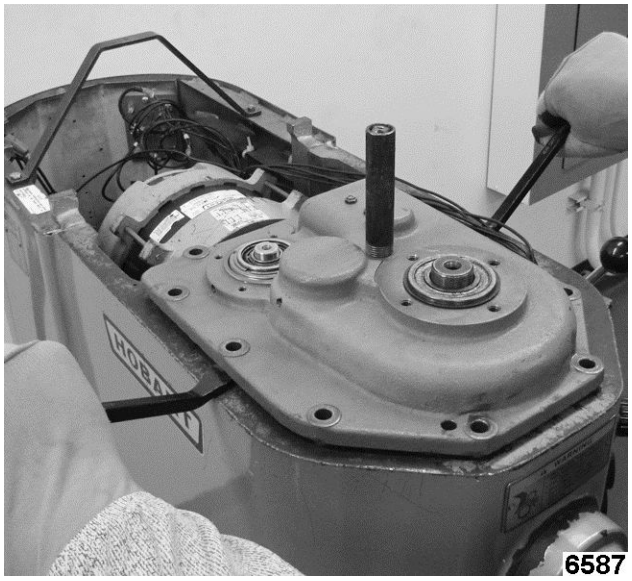


Fig. 42

8. Remove shift selector plate [1] Fig. 43.

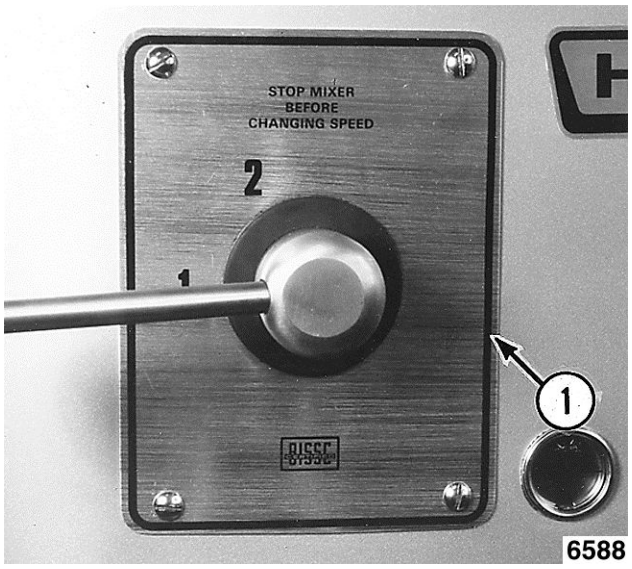


Fig. 43

9. On timer equipped mixers, remove the micro switch [1] Fig. 44 located above cam of speed selector.
10. Remove speed selector shifter assembly [2] Fig. 44.

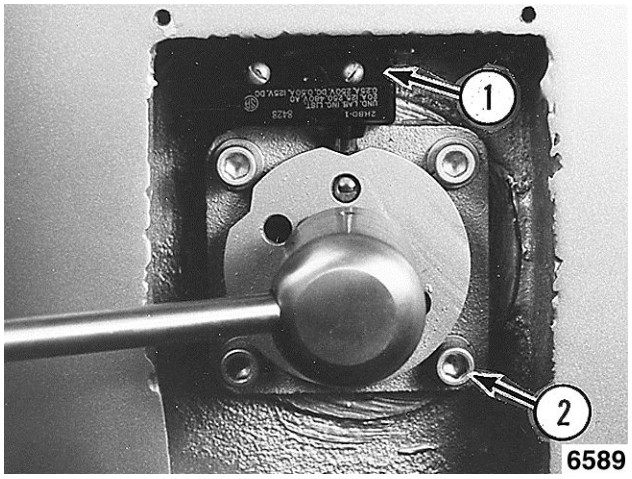


Fig. 44

11. Remove the ball bearing from clutch shaft [1] Fig. 45.

NOTE: Before removing top gear of the planetary shaft, mark it so that same side of gear will be up when reassembling.

12. Remove planetary shaft assembly shim [4] and top gear [2] Fig. 45.
13. Remove rod [3] Fig. 45.

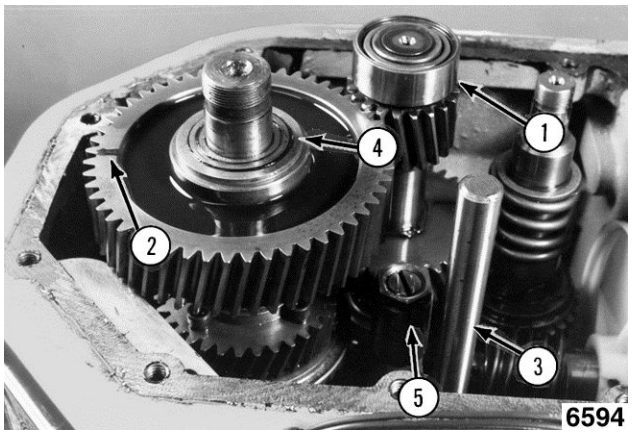


Fig. 45

14. Remove shifting yoke. Refer to step 14 A (H600 and L800) or step 14 B (P660) for model being serviced.
    A. Models H600 and L800.
        1) Carefully remove upper and lower shifting yokes.

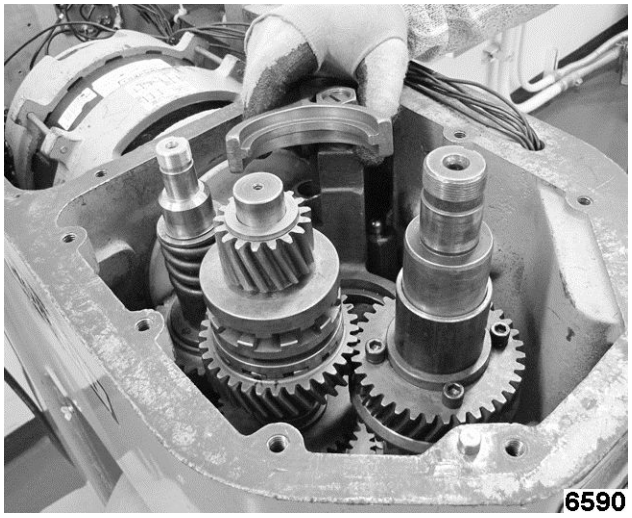


Fig. 46

B. Model P660.

1) Carefully remove lower shifting yoke [1] Fig. 47.

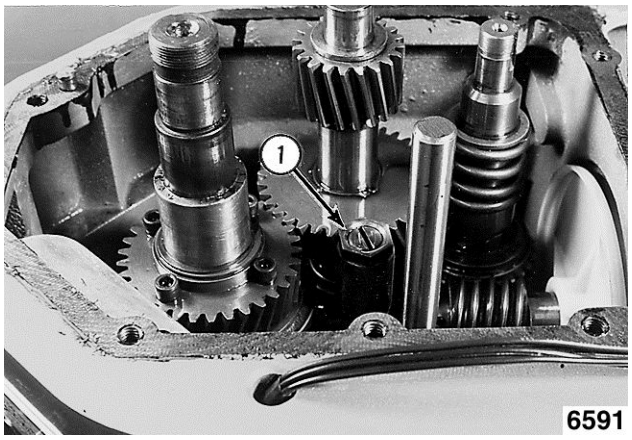


Fig. 47

15. Remove worm shaft and clutch shaft assemblies together (1,2, Fig. 48).

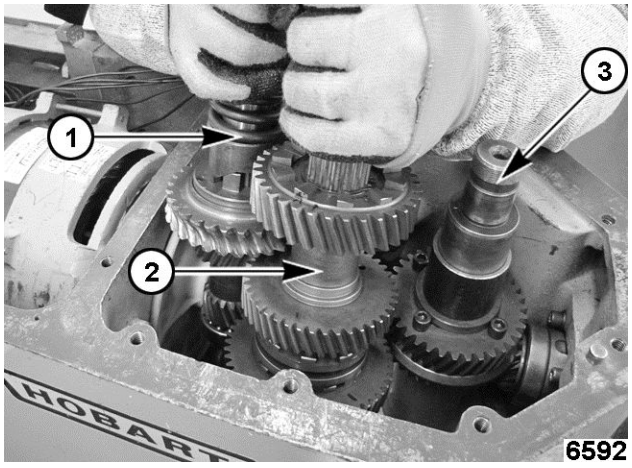


Fig. 48

16. Remove planetary shaft assembly (3, Fig. 48).

NOTICE

Do not use excessive force when removing the planetary shaft assembly because in late model mixers, the chimney is plastic and may crack. If shaft assembly cannot be removed with minimal pressure, remove snap ring if present, and slide the lower planetary and bevel gear from shaft. Remove chimney before pulling shaft.

NOTE: Once the chimney is removed, the attachment hub can be removed from the transmission housing by removing the attachment hub screws (3, Fig. 49). Refer to #12 ATTACHMENT HUB ASSEMBLY for complete removal procedure.

17. Remove chimney [1] Fig. 49 to gain access to lower ball bearing of planetary shaft [2] Fig. 49.

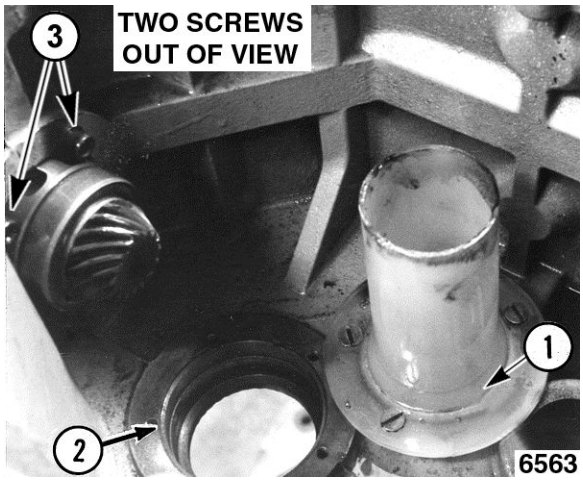


Fig. 49

ASSEMBLY OF TRANSMISSION

1. Thoroughly clean transmission case and reinstall drain plug.
2. Check each assembly prior to installation to verify there are no damaged, dirty or worn parts.
3. If attachment hub assembly was removed, install it at this time.

NOTE: The individual parts of the planetary shaft assembly are assembled in the transmission housing.

4. Perform ASSEMBLY - INSTALLATION/ ASSEMBLY of Planetary Shaft.

NOTE: The worm gear shaft assembly has a self-aligning lower bearing and must be installed carefully to prevent the bearing from cocking in its seat.

5. Install the worm gear shaft assembly.

6. Carefully raise the worm gear shaft assembly far enough to slip the clutch shaft assembly in place without pulling the self-aligning bearing out of its seat.

   A. Install the clutch shaft assembly.

7. Install the shifting yoke(s).

   A. H600/L800 - Install the upper and lower shifting yokes together and insert the shifter shaft.

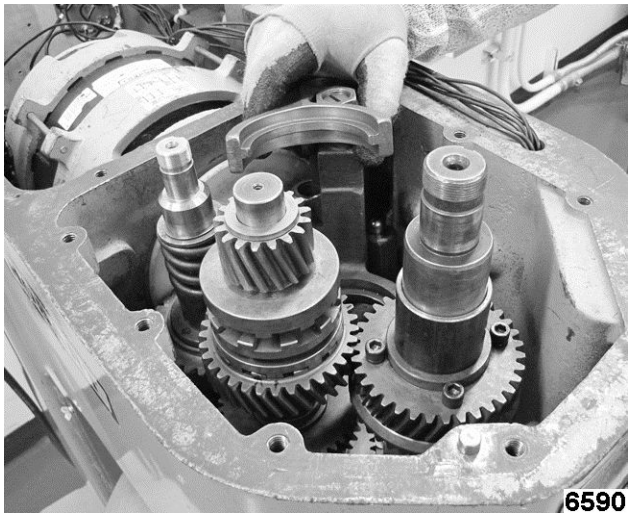


Fig. 50

   B. P660 - Install the lower shifting yoke [5] Fig. 51 and insert the shifter shaft [3] Fig. 51.

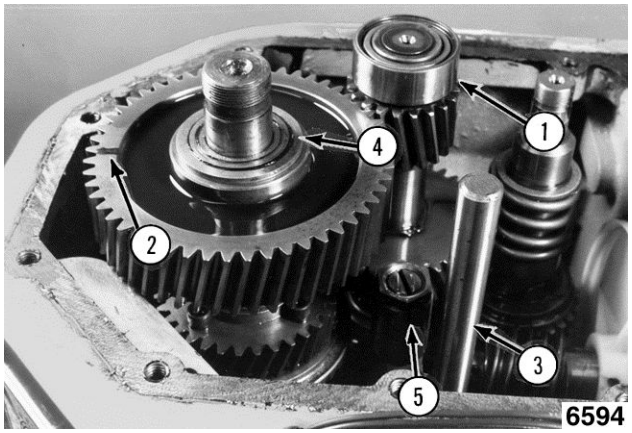


Fig. 51

8. Install the planetary upper gear and key, with tall part of hub (marked side) [2] Fig. 51 to the top of machine on the planetary shaft.

9. Install shim with shoulder side up to top of machine.

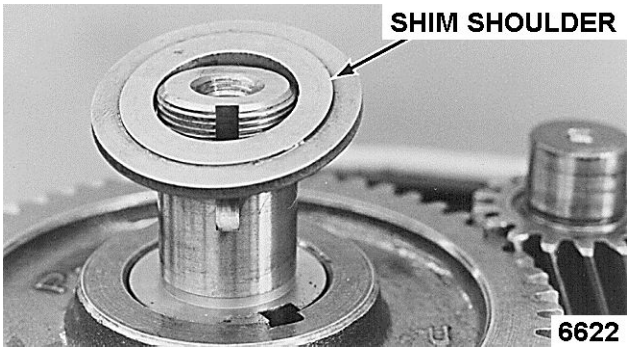


Fig. 52

10. Install upper ball bearing on clutch shaft assembly.

11. Turn the motor fan slowly by hand to check operation of transmission.

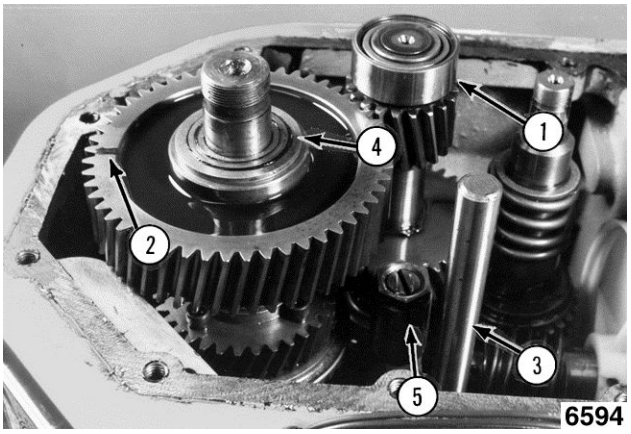


Fig. 53

12. Perform GEAR SELECTOR ASSEMBLY - INSTALLATION - H600/L800 or GEAR SELECTOR ASSEMBLY - INSTALLATION - P660 as outlined in this section.

NOTE: Before installing top cover, check the condition of the oil delivery tube.

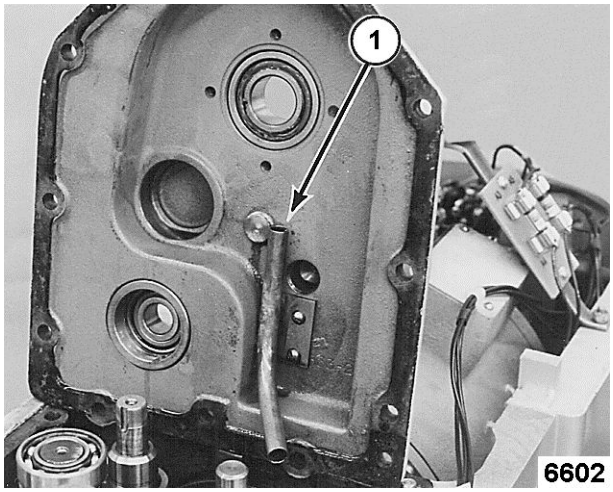


Fig. 54

13. Lightly coat lip of top cover with Permatex #2 or an equivalent sealer.
14. Verify fill plug (also used as a vent tube) in top cover is free of debris.

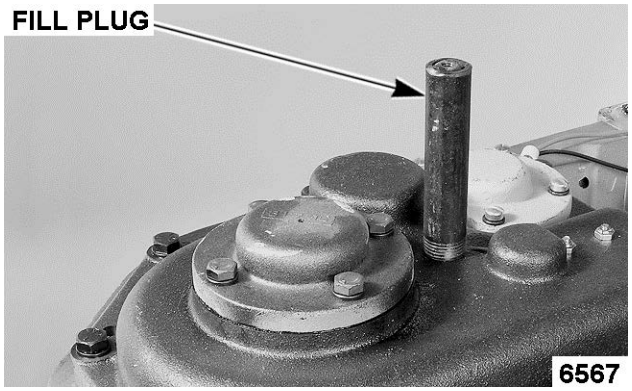


Fig. 55

15. Carefully seat top cover over the dowels locating it on the transmission housing.
16. Install lock washers and bolts. Tighten bolts in an alternating pattern.
17. If new parts have been installed on the worm gear shaft, vertical adjustment of the shaft is necessary. Refer to WORM GEAR SHAFT ASSEMBLY - VERTICAL ADJUSTMENT.
18. Service the transmission with oil.

NOTE: Inspect the condition of the planetary shaft and worm gear shaft locking washers. Make sure that inner lock tab of washer is present and in good condition. Replace if necessary.

19. Install the planetary shaft and worm gear shaft locking washers and special bearing locknuts.
    A. Tighten special bearing locknuts.
    B. Bend tab(s) of locking washer, more than one if possible, into notch(es) of special bearing locknut.
20. Reinstall planetary shaft and worm gear shaft bearing retainer covers.
21. Reinstall the planetary washer and key.
22. Install Planetary and install BOWL GUARD.
23. Check mixer for proper operation in all speeds.
24. Reinstall top cover.

WORM GEAR SHAFT ASSEMBLY

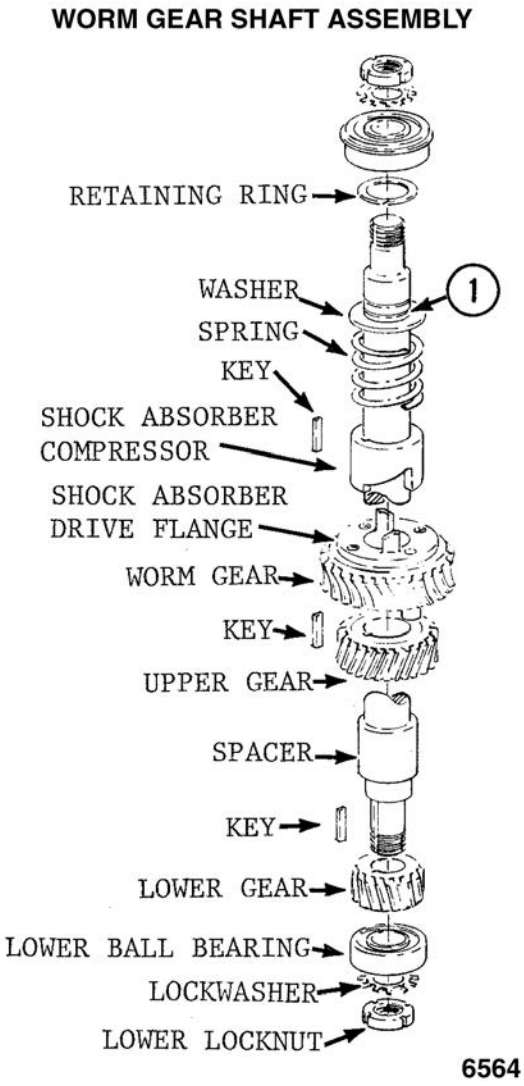


Fig. 56

⚠ WARNING

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

Disassembly

1. Disassemble TRANSMISSION as outlined in this section to access worm gear shaft assembly.

NOTE: Refer to Fig. 56.

2. Remove lower locknut and washer.
3. Remove lower ball bearing.
4. Remove lower gear and key.
5. Remove spacer, upper gear and key.

6. Remove worm gear and shock absorber drive flange.

NOTE: If necessary, remove the screws to separate the drive flange from the worm gear.

7. Slide shock absorber compressor and key off shaft.

NOTE: When reassembling, make certain that retaining ring is installed in the lower groove on the shaft [1] Fig. 56.

8. Remove shock absorber spring, washer, and retaining ring.

Assembly

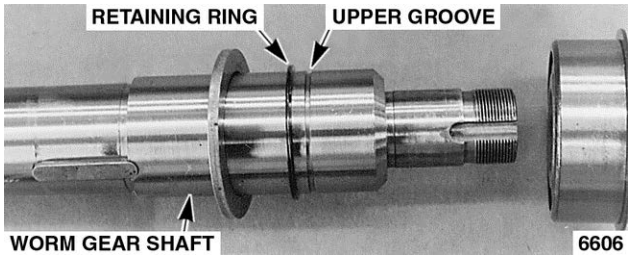
1. Assembly of the worm gear shaft assembly is the reverse order of removal.

NOTE: Make certain that the retaining ring is installed in the lower groove on shaft. Newer shafts will only have one groove machined into shaft.

SHOCK ABSORBER ADJUSTMENT

The shock absorber spring tension is factory set for normal loads. Varying loads could cause the shock absorber to bump and be mistaken as gear trouble. If bumping occurs, adjust the tension applied to the shock absorber as outlined below.

1. Dissassemble TRANSMISSION until worm shaft is removed.
2. Reposition shock absorber retaining ring from the lower groove to the upper groove.



UPPER GROOVE NOT PRESENT ON ALL

3. Assemble TRANSMISSION.
4. Check for proper operation.

VERTICAL ADJUSTMENT

1. Remove the two set screws that lock the adjusting sleeve into place.

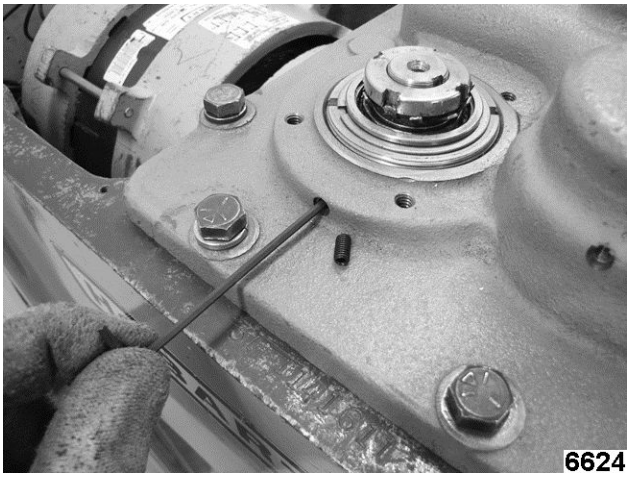


Fig. 58

2. Slowly turn the adjusting sleeve clockwise while turning the mixer motor fan by hand.
3. Mark the exact spot of the adjusting sleeve on the casting where the motor shaft begins to bind.
4. Turn the adjusting screw counterclockwise until the motor shaft begins to bind.
   A. Mark the exact spot of the adjusting sleeve on the casting.
5. Measure the distance between the two extremes and mark the halfway point on the casting.
6. Turn the adjusting screw midway between the top location and the halfway point. This will position the worm gear for best operation.

NOTICE

For the following step, be careful not to drill through the sleeve into the bearing.

7. Spot the adjusting sleeve for the set screw.
   A. Drill 1/32" into the sleeve using the set screw hole as a guide.
8. Reinstall the set screws to lock the adjusting sleeve in place.

CLUTCH SHAFT ASSEMBLY

CHANGES
Models H600/L800/P660

A stepped spacer contacting the inner race of the lower clutch bearing was used on H600/L800/P660 mixers from January 2000 to January 24, 2001. Mixers after this date were built using the original flat spacer. If found on a mixer, the stepped spacer should be replaced whenever servicing the clutch shaft assembly. Consult the parts catalog for correct part number.

Fig. 59

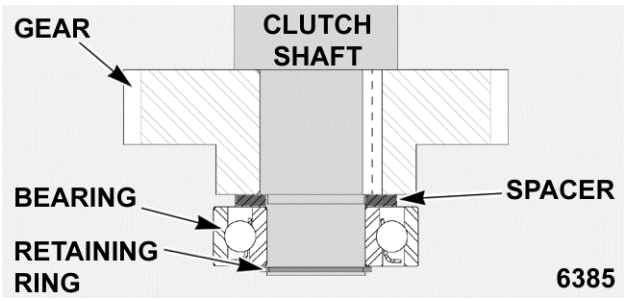
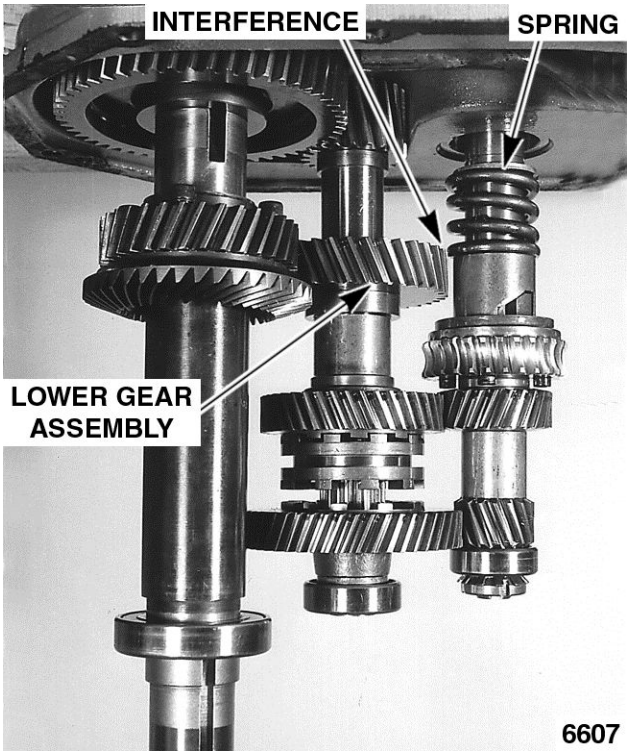


Fig. 60

Model P660

The lower gear assembly in early production P660 mixers was found to be rubbing the spring and producing an audible click in the transmission. Those early mixers had a washer added between the spring and shock absorber compressor to provide clearance between the gear and spring. The lower gear received a chamfer edge to provide the necessary clearance and also eliminate the extra washer. Should a lower gear with a chamfer edge be installed into a mixer that had the extra washer previously installed between the spring and shock absorber, remove the washer from the worm gear shaft assembly.



Model P660

The clutch shaft assembly was redesigned in February, 1994 to increase shaft strength. If an original or second design clutch shaft is ordered, a replacement kit will be sent for those parts that will not fit onto the last design shaft. Use the following illustration to identify the clutch shaft.

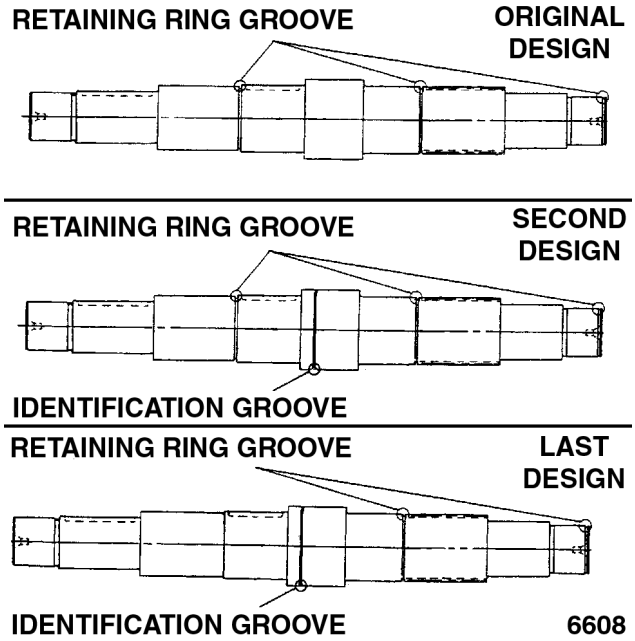


Fig. 62

Model P660

In March 1988 the key located at the top of the clutch shaft in the upper gear assembly was changed to a hardened key to eliminate nuisance shearing of the key. Keys listed in the parts catalog are of a hardened type.

DISASSEMBLY H600/L800

⚠ WARNING

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

1. Remove spacer [1] Fig. 63.
2. Remove upper clutch and upper gear assembly [2] Fig. 63.
3. Remove shifting clutch [3] Fig. 63.
4. Remove retaining ring, upper clutch, lower gear assembly, and washer [4] Fig. 63.
5. Remove lower retaining ring, ball bearing, and washer [5] Fig. 63.
6. Remove lower clutch and lower gear assembly [6] Fig. 63.
7. Remove shifting clutch [7] Fig. 63.
8. Remove retaining ring, lower spacer, and lower clutch. Also remove the upper gear assembly [8] Fig. 63.

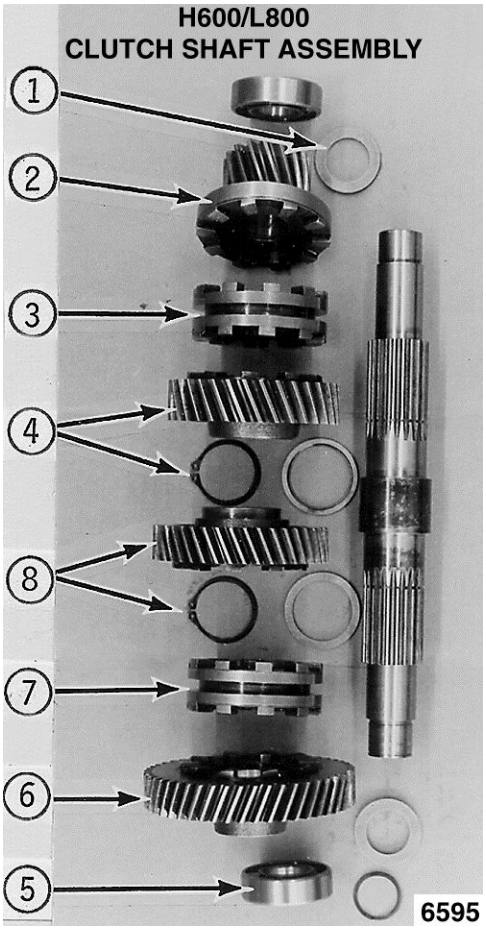


Fig. 63

9. Reassemble parts in reverse order of removal.

DISASSEMBLY P660 - TWO SPEED CLUTCH SHAFT

⚠ WARNING

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

NOTICE

Spacer Fig. 65 is stepped (inside area raised), and must be installed toward the upper gear. If not installed properly, damage to the clutch shaft could occur.

NOTE: Some large batch sizes for National Chains have been approved by Hobart Engineering in Troy, OH. If it is suspected that the batch size is too large, call Field Support and verify its size before indicating to the customer that the mixer may be overloaded

NOTE: In February 1994, the clutch shaft was redesigned on model P660 mixers. A gear clutch spacer is now used eliminating the retaining ring between the upper and lower gear assemblies. Whenever a replacement clutch shaft using a

retaining ring is ordered, a new clutch shaft assembly will be sent.

1. Remove the spacer.
2. Remove the upper gear assembly and key.
3. Remove the retaining ring, lower gear assembly and key.
4. Remove the lower retaining ring, ball bearing and washer.
5. Remove the lower clutch and lower gear assembly.
6. Remove the retaining ring, washer and lower clutch/upper gear assembly.

NOTICE

Spacer Fig. 65 is stepped (inside area raised), and must be installed toward the upper gear. If not installed properly, damage to the clutch shaft could occur.

7. Reassemble parts in reverse order of removal.

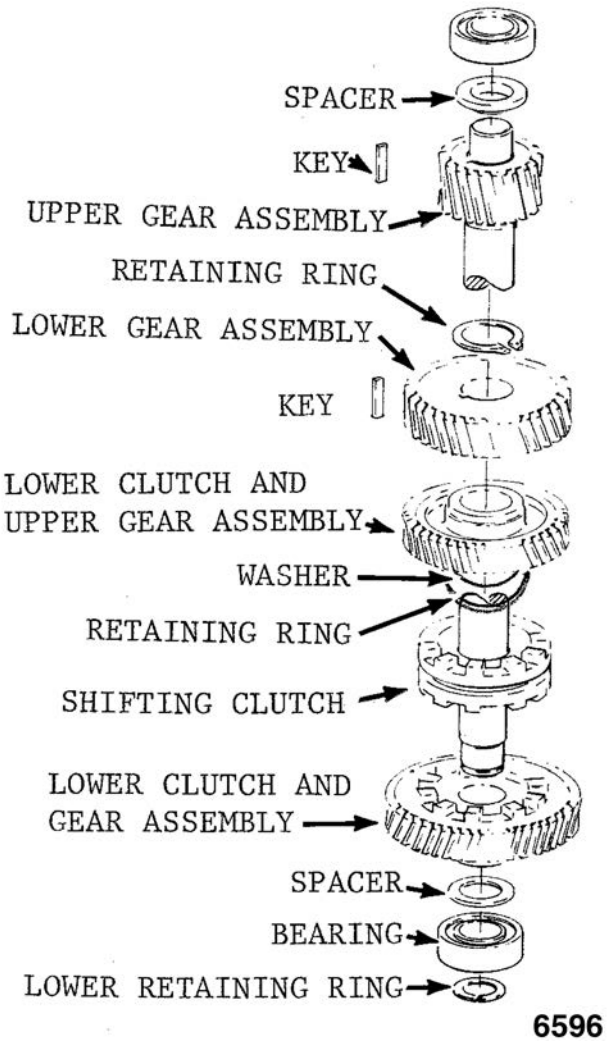


Fig. 64

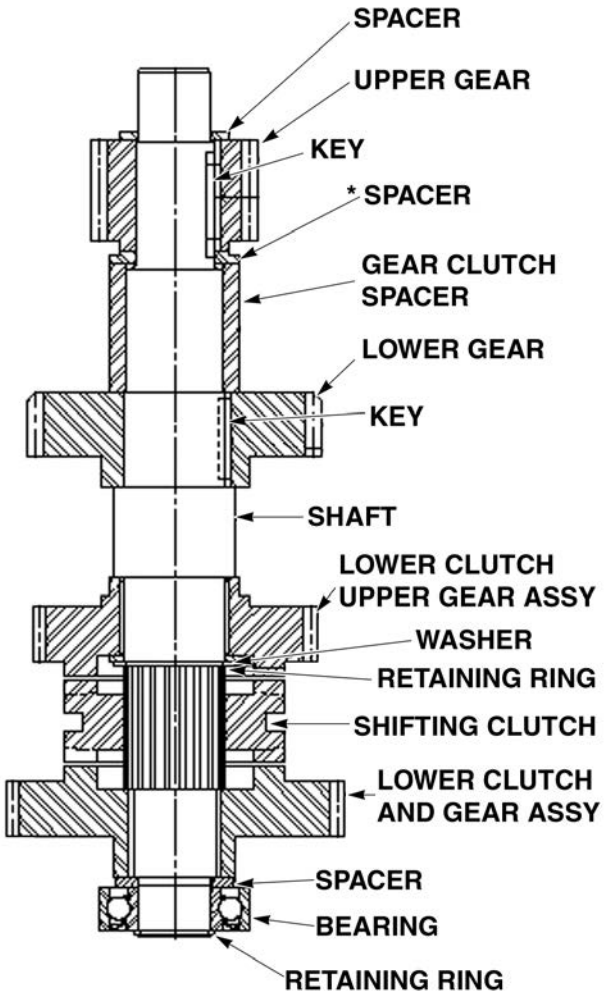


Fig. 65

DISASSEMBLY P660 - Single Speed Clutch Shaft

⚠ WARNING

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

NOTE: The function of the clutch shaft in the single speed mixer is to simply transfer power from the worm shaft to the planetary shaft.

1. Remove top spacer.
2. Remove upper pinion assembly and key.
3. Remove gear clutch spacer, attachment drive gear and key.
4. Remove lower retaining ring, ball bearing and washer.
5. Remove retaining ring, washer, lower clutch and upper gear assembly.

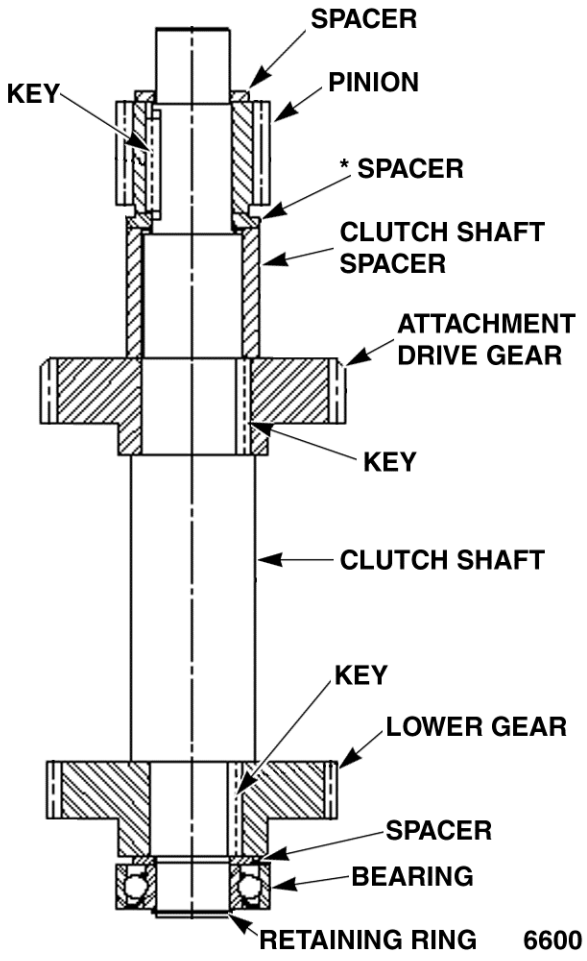


Fig. 66

NOTICE

Spacer Fig. 66 is stepped (inside area raised), and must be installed toward the upper gear. If not installed properly, damage to the clutch shaft could occur.

ASSEMBLY
Models H600/L800

NOTE: All gears on the clutch shaft assembly must be free to turn on the shaft and the clutches should slide freely up and down on the splines. Should a clutch seem to bind, take it off and turn it to a new position on the spline. Check movement again.

Model H600

1. Reassemble parts in reverse order of removal.

Model L800

NOTICE

If the angular contact ball bearing on model L800 is installed incorrectly, it will separate and result in premature bearing failure.

NOTE: The lower bearing must be installed to take downward thrust. The angular bearing must be

installed as shown with the visible ball section of the angular bearing toward the clutch shaft assembly. The cage of the bearing will be toward the retaining ring.

NOTE: Unlike a radial contact ball bearing whose inner to outer race contact point is a 90° angle to the shaft, the angular contact ball bearing's contact point is shifted downward at a 30° or 40° angle to allow for a heavier axial load.

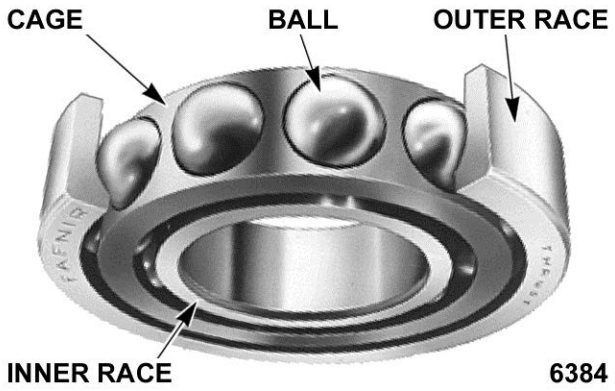


Fig. 67

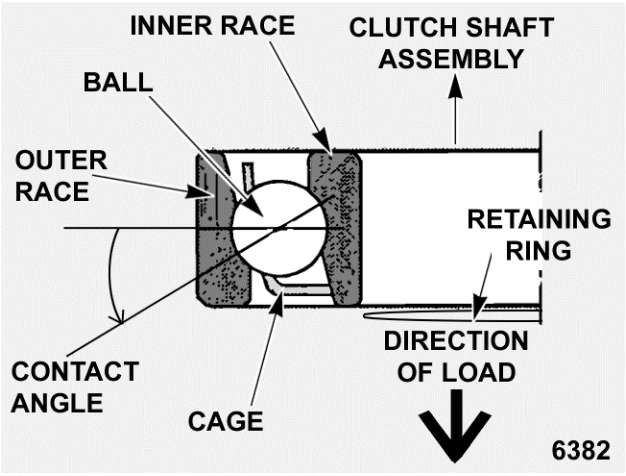


Fig. 68

1. Reassemble parts in reverse order of removal.

Model P660 - Two Speed Clutch Shaft

NOTE: The two lower gears on the clutch shaft assembly must be free to turn on the shaft and the clutch should slide freely up and down on the splines. Should the clutch seem to bind, take it off, turn it to a new position and check it again.

1. Reassemble parts in reverse order of removal.

Model P660 - Single Speed Clutch Shaft

1. Reassemble parts in reverse order of removal.

PLANETARY SHAFT ASSEMBLY

CHANGES
Model P660

The planetary shaft assembly was redesigned in February, 1994 to increase shaft strength. If an original, second or third design planetary shaft is ordered, a replacement kit will be sent for those parts that will not fit onto the last design shaft. Use the illustration below to identify the planetary shaft.

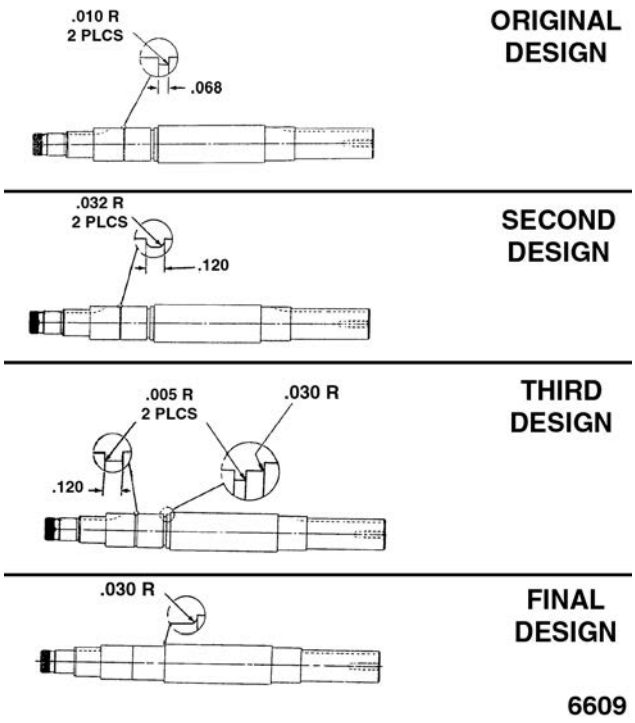


Fig. 69

REMOVAL/DISASSEMBLY

NOTE: In order to remove the planetary shaft assembly, the planetary must be removed, and the transmission completely disassembled.

NOTE: The planetary shaft redesign in February 1994 on model P660 mixers eliminated the retaining ring. Whenever a replacement planetary shaft using a retaining ring is ordered, a new planetary shaft assembly will be sent.

Models H600/L800/P660

1. Remove PLANETARY ASSEMBLY.
2. Disassemble TRANSMISSION.

NOTE: The upper bearing, shim, upper gear and key will have been removed during transmission disassembly

3. Remove the retaining ring, if present (P660 only).
4. Remove the spacer [1] Fig. 70.

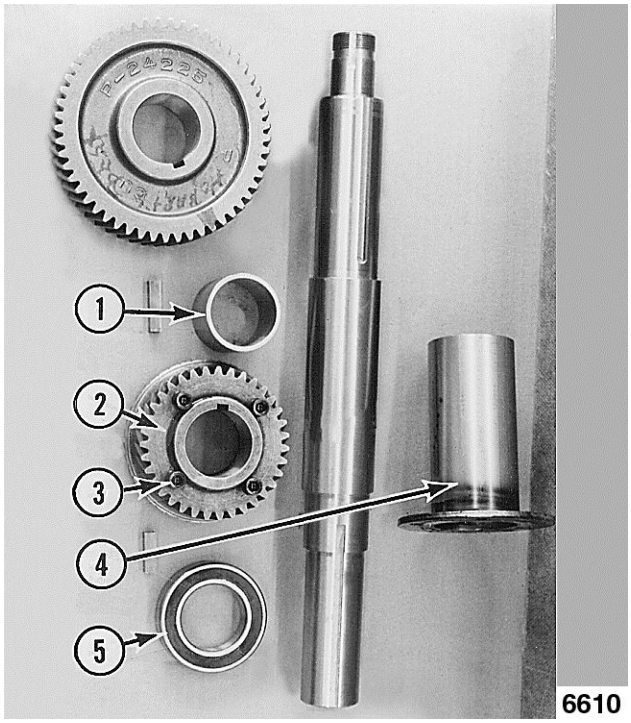


Fig. 70

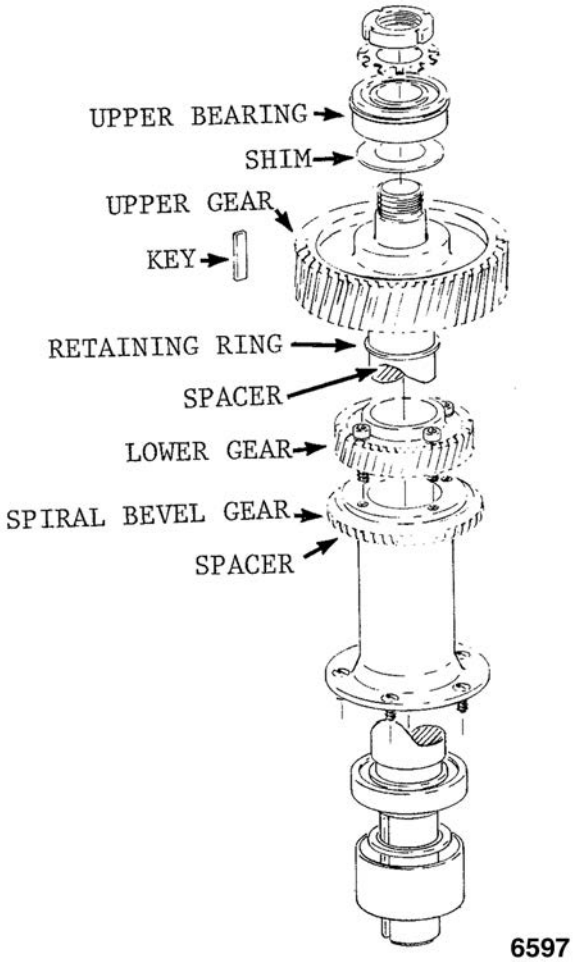
5. Remove the lower gear and spiral bevel gear [2] Fig. 70. Be careful not to lose the key.

NOTE: The lower gear and spiral bevel gear may be separated by removing the four socket head screws and lock washers [3] Fig. 70.

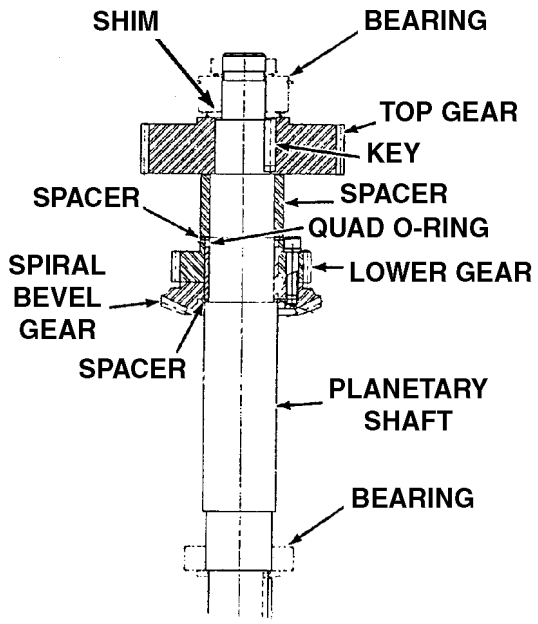
6. Remove the planetary shaft.

NOTE: Late production mixers used a plastic chimney with an O-ring.

7. Remove the chimney [4] Fig. 70.



ORIGINAL P660 PLANETARY SHAFT ASSEMBLY



CURRENT P660 PLANETARY SHAFT ASSEMBLY

8. Extract the lower bearing [5] Fig. 70 from its seat in the transmission housing [2] Fig. 73.

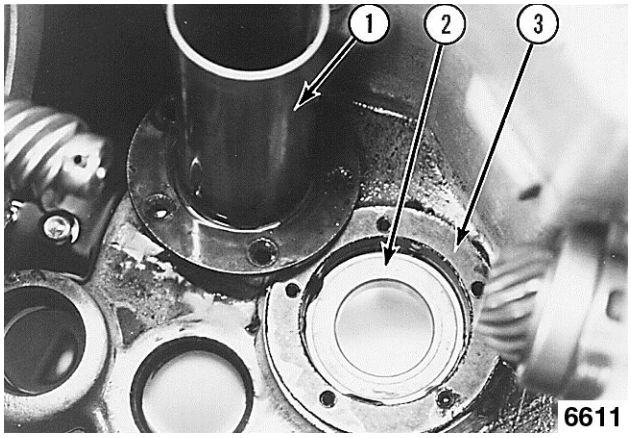


Fig. 73

9. Remove the retaining ring if present (P660 only).
10. Remove the spacer.

INSTALLATION/ASSEMBLY
Models H600/L800

1. Place the lower bearing in its seat in the transmission housing [2] Fig. 73.
2. Install chimney.
   A. For mixers using a metal chimney, place a light coat of Permatex #2, or equivalent, on both sides of the chimney gasket. Install the chimney gasket and chimney into the transmission housing.
   B. For mixers using a plastic chimney, inspect the O-ring for damage. If damaged, replace the O-ring then install chimney into the transmission housing.
3. Install planetary shaft.
4. Inspect condition of O-ring seal on the spiral bevel gear. Replace if nicked or otherwise damaged.

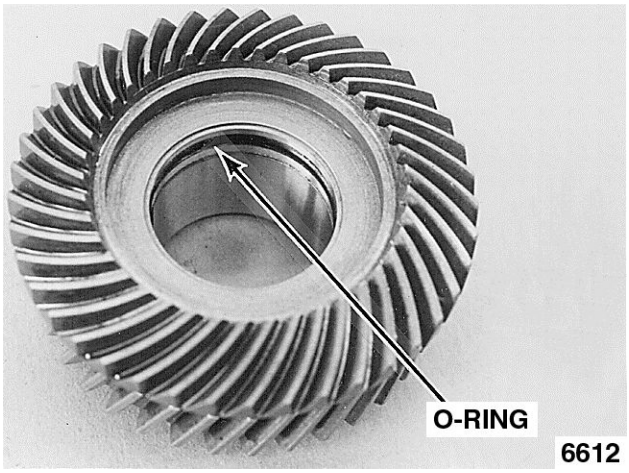


Fig. 74

5. Slide the lower gear and spiral bevel gear in place on the shaft. Be careful not to cut the O-ring seal on the key way of the shaft.
6. Install the spacer.

NOTE: The top gear [2] Fig. 75, key and planetary shaft assembly shim [4] Fig. 75 must be installed after the worm gear shaft and clutch shaft assemblies are installed into the transmission housing. The shouldered face of shim must be facing up when installing.

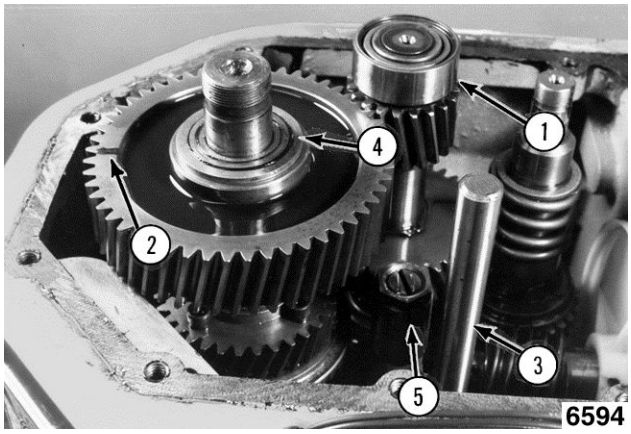


Fig. 75

Model P660

1. Place the lower bearing in its seat in the transmission housing [2] Fig. 73.
2. Install chimney.
   A. For mixers using a metal chimney, place a light coat of Permatex, or equivalent, on both sides of the chimney gasket. Install the chimney gasket and chimney into the transmission housing.

B. For mixers using a plastic chimney, inspect the O-ring for damage. If damaged, replace the O-ring then install chimney into the transmission housing.

3. Inspect condition of quad seal an the planetary shaft. Replace if damaged.

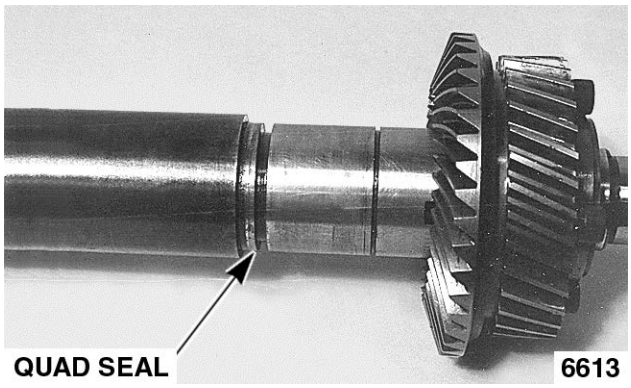


Fig. 76

4. Install planetary shaft.
5. Install spacer.
6. Slide the lower gear and spiral bevel gear in place on the shaft. Be careful not to cut the quad seal.

NOTE: The top gear [2] Fig. 75, key and planetary shaft assembly shim [4] Fig. 75 must be installed after the worm gear shaft and clutch shaft assemblies are installed into the transmission housing. The shouldered face of shim must be facing up when installing.

#12 ATTACHMENT HUB ASSEMBLY

CHANGES

For mixers produced June 1997 and newer and current replacement parts, the bevel pinion and gear are marked with the letters [MA]. The current replacement parts should not be intermixed with previous design parts.

SERVICE INFORMATION

NOTE: H600 mixers up to Serial No. 31-1074-648 with #12 attachment hubs may leak oil from the attachment hub drain hole. The cause is the front needle bearing in the hub assembly has been pressed in too far at the factory blocking the oil return cavity and oil discharge hole. With these blocked, oil cannot drain back into the transmission case, but instead, collects in the bearing area around the square drive shaft and eventually drains out into the hub and then out the drain hole.

The front needle bearing position can be checked by removing the square drive sleeve. Shine a light into the hub front opening while looking up into the hub drain hole and locate the edge of the needle bearing. It should not be blocking the oil return cavity. Refer to Fig. 81.

⚠ WARNING

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

NOTE: The attachment hub assembly contains a square drive with a special shear key. The special shear key can be replaced from the outside of the mixer through the attachment socket without disassembling the transmission

REPLACING THE SHEAR KEY

1. Remove the special left hand thread screw.

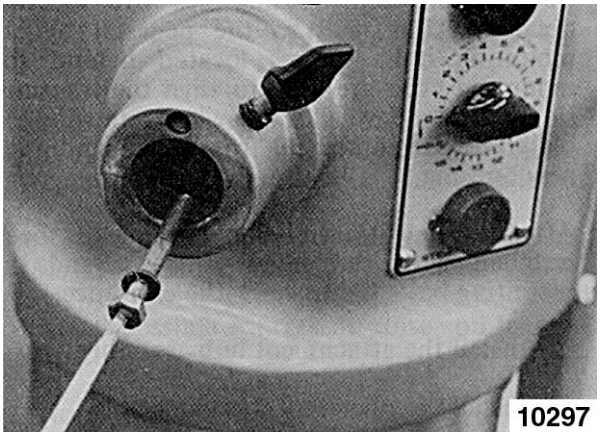


Fig. 77

2. Screw a Hobart T-bar, Part No. TL-58246, or standard 3/8-16 screw into the right-hand threads in the square drive sleeve of the attachment hub and extract the sleeve.
3. Remove all pieces of the old shear key from the attachment hub.

NOTE: Before installing a new key, insert the square drive sleeve into the attachment hub and check to be sure it turns freely.

4. Insert a new shear key on the drive sleeve and reinstall the sleeve into the hub.

Fig. 78

5. Install the left-hand screw.
6. Check mixer for proper operation.

REMOVAL

NOTE: The planetary must be removed and the transmission must be completely disassembled in order to remove the attachment hub assembly.

1. Remove PLANETARY ASSEMBLY.
2. Disassemble TRANSMISSION.
3. Slide the attachment hub shaft assembly out of the attachment hub.
   A. Remove the bearing (2, Fig. 79) from bevel pinion shaft.
   B. Remove the shim(s) (3, Fig. 79) from bevel pinion shaft.

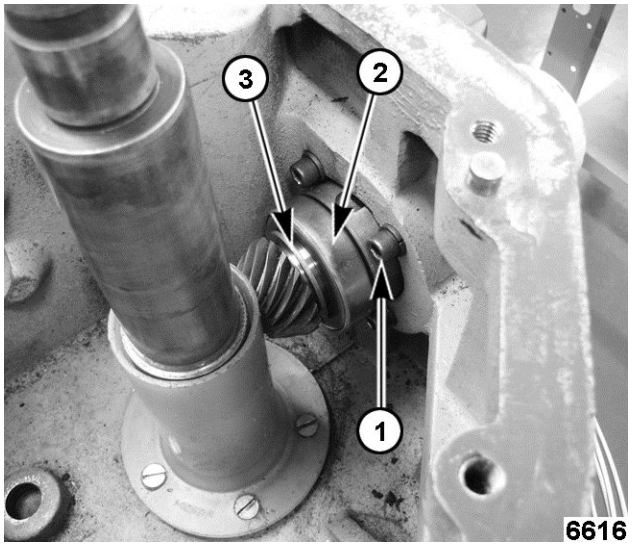


Fig. 79

4. Remove the needle bearings (H600 & P660) (2, Fig. 80) or the ball bearing (L800) from the attachment hub.

NOTE: It may be necessary to remove the attachment hub from the mixer in order to press out the bearings.

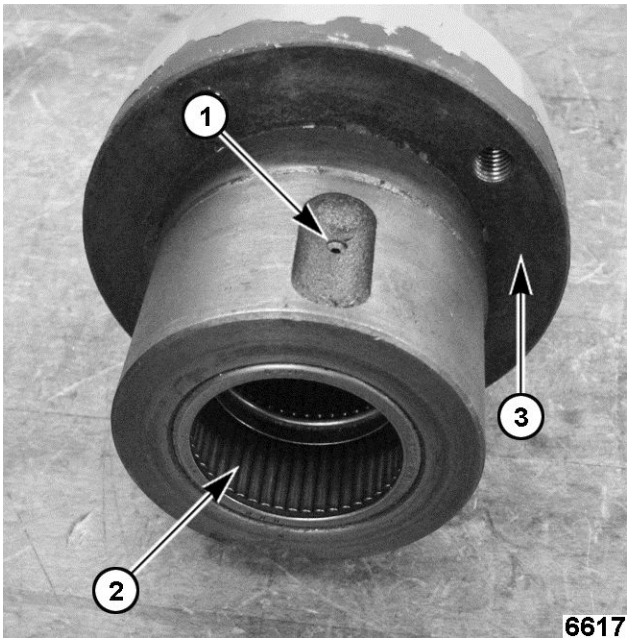


Fig. 80

5. Remove the attachment hub.
   A. Carefully and neatly cut the paint around the outside of the hub.
   B. Remove the socket head screws (1, Fig. 79) which secure the attachment hub to the transmission housing.
   C. Place a rag on the hub to protect the finish.
   D. Using a rubber or plastic mallet, rap the hub sharply to loosen it from the transmission housing.
   E. Pull the attachment hub out of the transmission housing.

INSTALLATION

1. Clean front of transmission housing making sure it is free of oil residue.
2. Check to be sure the oil inlet (1, Step 4) and drain holes (1, Fig. 81) of attachment hub are open before installing it into the transmission housing.

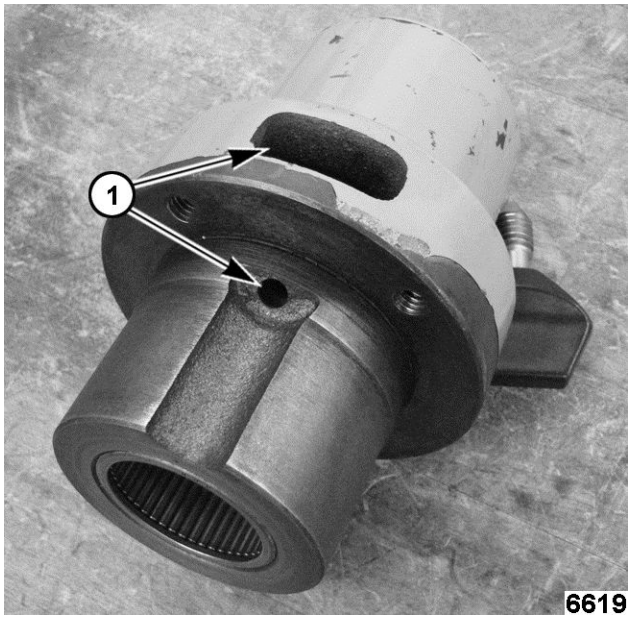


Fig. 81

3. Install the front needle bearing so that its rear edge is 15/16" from the casting as shown. Make certain that it does not extend into the oil return cavity.

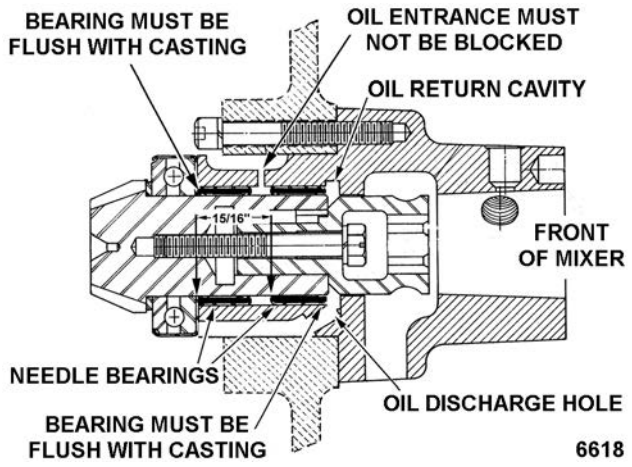


Fig. 82

4. Install the rear needle bearing until it is flush with edge of casting as shown.
5. Coat seat of attachment hub (3, Step 4) with Permatex #2, or equivalent.
6. Install attachment hub into transmission housing with drain hole (1, Fig. 81) facing down. Secure with socket head screws.
7. Install shim(s) and then bearing onto bevel pinion shaft.
8. Install attachment hub shaft assembly into attachment hub.
   A. Check that hub shaft assembly moves freely in the attachment hub.
9. Reassemble TRANSMISSION.

GEAR SELECTOR ASSEMBLY

⚠ WARNING

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

REMOVAL

NOTE: The gear selector assembly can be removed without draining the transmission oil or opening the transmission case.

1. Remove selector plate.
2. Remove the gear selector limit switch [1] Fig. 83, if present.
3. Remove the mounting screws [2] Fig. 83 and carefully remove gear selector assembly from transmission housing.

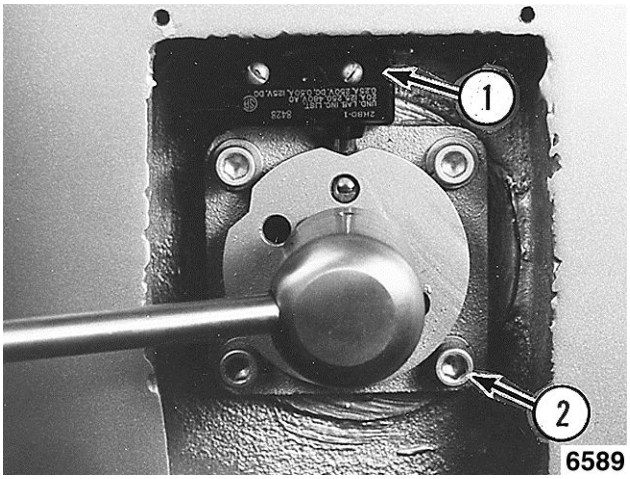


Fig. 83

DISASSEMBLY

1. Drive the pin from the handle hub and remove the hub.

NOTE: Be careful not to lose the two springs and balls located behind the switch cam when removing switch cam.

2. Remove pin from hub of switch cam and slide cam off shifter shaft.
3. Slide the gear shift bracket off the shifter shaft.
4. Remove the pin from gear shift cam assembly and remove cam from shifter shaft.

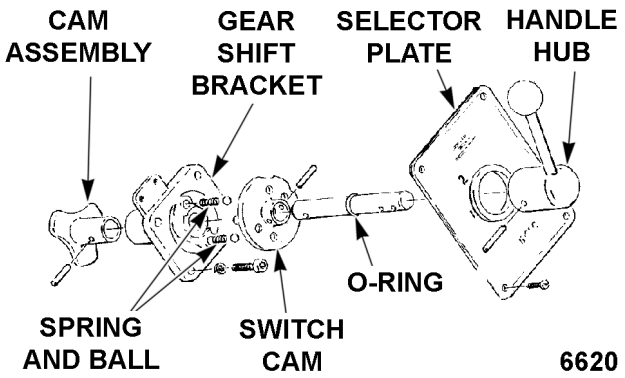


Fig. 84

ASSEMBLY

1. Check condition of O-ring on the shifter shaft and replace if necessary.
2. Clean gear shift bracket to remove old sealant and oil residue.
3. Reassemble parts removed in reverse order.

INSTALLATION - H600 / L800

NOTE: The shifting yokes move into 3rd speed position when the cams are removed from the transmission. operation.

1. Clean transmission housing where gear shift bracket mounts.
2. Place handle on speed selector to 3rd speed.
3. Apply a coat of Permatex #2, or equivalent sealer, around the surface of gear shaft bracket that contacts the transmission housing.
4. Carefully install speed selector assembly into the transmission housing and secure into place with hardware.
5. Reinstall the speed selector limit switch, if one was present.
6. Install selector plate.
7. Place speed selector on 1st speed and start mixer.
   A. Should mixer run on high speed at this setting:
      1) Shut mixer off.
      2) Remove speed select handle.
      3) Reinstall handle 180° from previous position.
8. Check mixer for proper.

INSTALLATION P660

NOTE: The shifting yokes move into 1st speed position when the cams are removed from the transmission.

1. Clean transmission housing where gear shift bracket mounts.
2. Place handle on speed selector to 1st speed.
3. Apply a coat of Permatex #2, or equivalent sealer, around the surface of gear shaft bracket that contacts the transmission housing.
4. Carefully install speed selector assembly into the transmission housing and secure into place with hardware.
5. Install the speed selector limit switch.
6. Install selector plate.
7. Check mixer for proper operation.

SHIFTER YOKES

⚠WARNING

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

NOTE: When servicing the shifting yokes it is not necessary to disassemble the rest of the transmission.

REMOVAL

1. Remove TOP COVER.
2. Remove GEAR SELECTOR.
3. Remove transmission cover.

NOTICE

Clean oil out of shifting rod positioning hole in transmission case to avoid a hydraulic effect when transmission is reassembled. Hydraulic effect will not allow shifting rod to seat fully into hole and may result in the top cover of transmission braking during reassembly.

4. Remove the shifting rod [3] Fig. 85.
5. Disengage the shifting yoke (P660) [5] Fig. 85 or upper and lower shifter yokes H600 & L800 then remove.

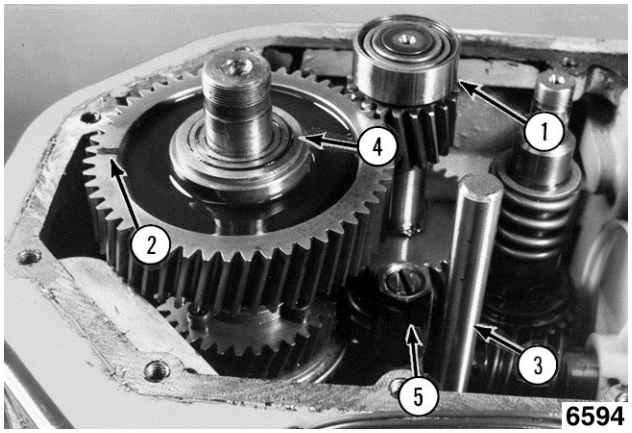
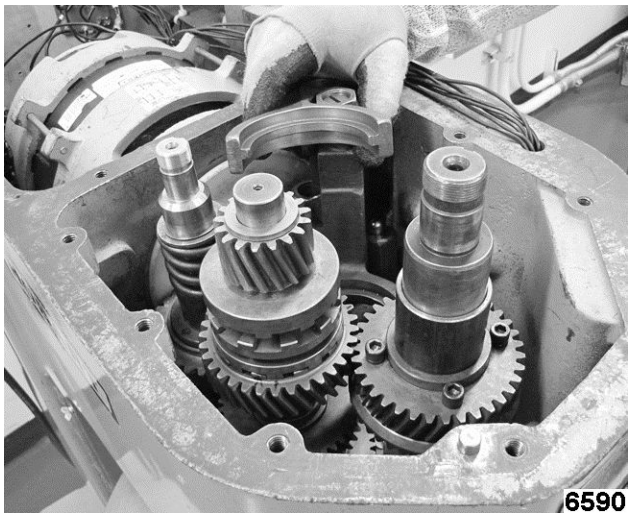


Fig. 85



H600/L800 SHOWN

PLUNGER ADJUSTMENT

NOTE: Each shifting yoke has two adjustable spring loaded plungers that provide flexible shifting. When the adjustment is not correct and the shifter handle is moved to a different speed, the clutch will hang in the previous speed. If an adjustment is necessary, check all plungers that are present on the mixer being serviced (up to four plungers for H600 & L800).

1. Loosen the locknut and adjust the screw so that total movement of plunger is between 3/16" to 7/32".
2. Tighten locknut while preventing screw movement.
3. Remove the cotter pin and adjust the screw so total movement of plunger is between 3/16" to 7/32".
4. Reinstall cotter pin.

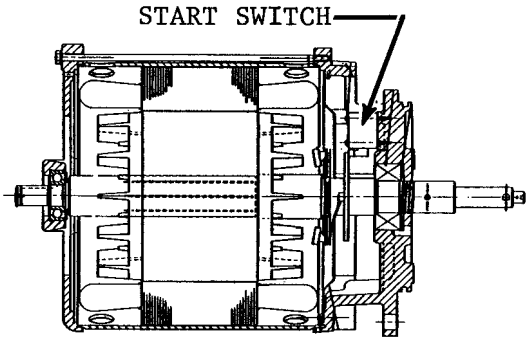
INSTALLATION

1. Install the shifting yoke(s) and rod.
   A. Verify that the shifting yoke(s) move freely on the shifting rod.
2. Follow GEAR SELECTOR ASSEMBLY - INSTALLATION to reinstall the gear selector.
3. Perform TRANSMISSION ASSEMBLY.
4. Check for proper operation of mixer in all speeds.
5. Reinstall TOP COVER.

MOTOR

TECHNICAL NOTES - MOTOR

P660 SINGLE PHASE MOTOR SERVICE
In May of 1986, P660 mixers became available as a single phase mixer in either 208 - 240 VAC. The motor is a capacitor start motor with two capacitors mounted above the motor. The start switch for the motor is located inside the front bearing bracket. Replacement of the start switch will require removing the motor from the mixer and the front bearing bracket from the motor.



10253

Fig. 87

OIL LEAK

NOTICE

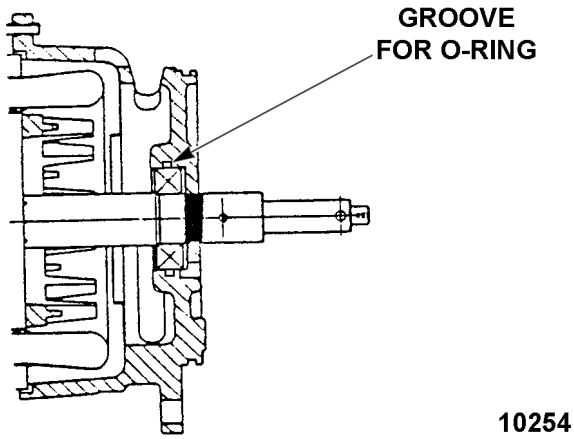
When installing the new front bearing bracket the weep hole must be located below the motor shaft. To prevent damaging the O-ring, lightly lubricate O-ring with transmission oil prior to installing the rotor.

Issue

H600, L800 and P660 mixers built prior to October 4, 1989 may experience oil leaking past the front motor bearing.

Resolve

A groove was machined into the bearing bore of the motor front bearing bracket bore of the motor front bearing bracket. In addition, an O-ring was installed into the grove to stop oil leakage.



10254

Fig. 88

Procedure

Install both the front motor bracket and O-ring to replace the old bearing bracket. Refer to the catalog of replacement parts for the front bearing bracket and O-ring part numbers.

MOTOR FAN REPLACEMENT - L800TH ONLY
NOTE: The fan is properly installed on the motor shaft when the raised ribs of fan face toward the motor. Looking at the rear of motor (fan end), the motor shaft should rotate clockwise.

⚠ WARNING

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

Procedure

1. Remove top cover.
2. Remove fan retaining nut from end of motor shaft and pull the fan off.

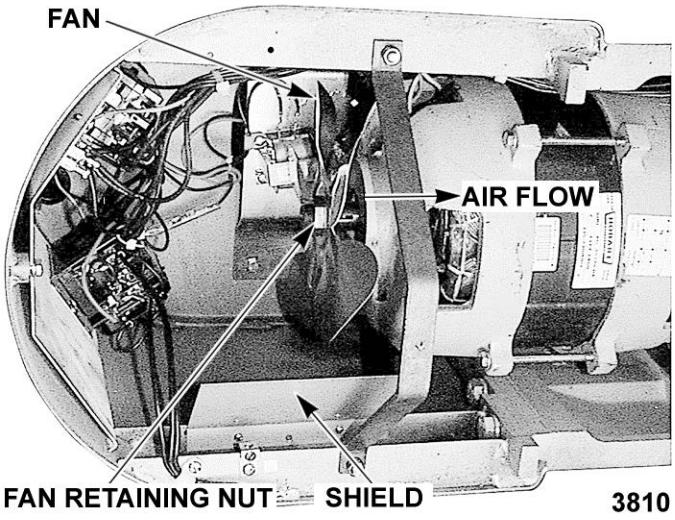


Fig. 89

3. Install replacement fan (raised ribs toward motor) and retaining nut.

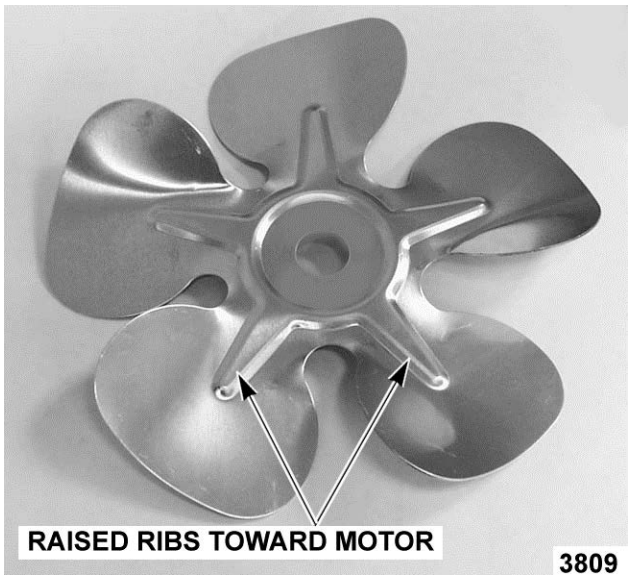


Fig. 90

4. Power mixer and check for proper operation.
5. Reinstall top cover.

REMOVAL OF MOTOR

⚠ WARNING

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

1. Remove top cover.

NOTICE

Always discharge a capacitor before disconnecting the leads.

2. Discharge the PBL capacitor (if present).
3. Discharge the mixer motor capacitors whenever applicable.
   A. Note wiring connection locations then disconnect capacitors.

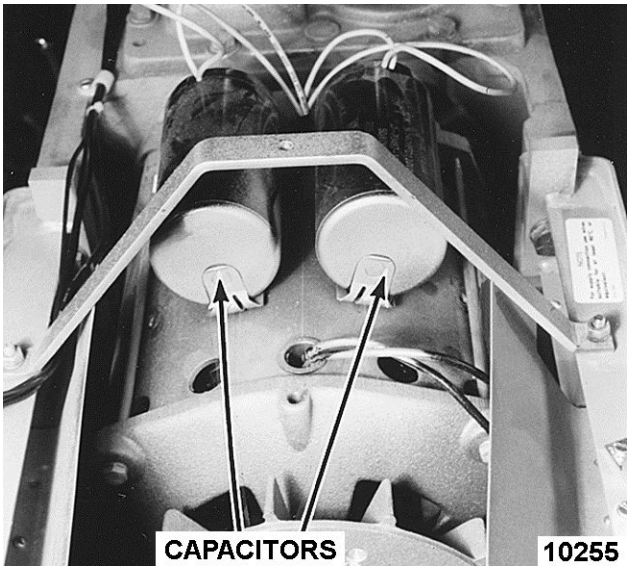


Fig. 91

   B. Remove capacitors.
4. Remove the shield(s) if present.
5. Drain the transmission oil as instructed under LUBRICATION outlined in the GENERAL section.
6. Remove P-clip on motor junction box [1] Fig. 92.
7. Remove the top cover support bracket [4] Fig. 92. If mixer has a power bowl lift, remove the fuse block on bracket [2] Fig. 92.

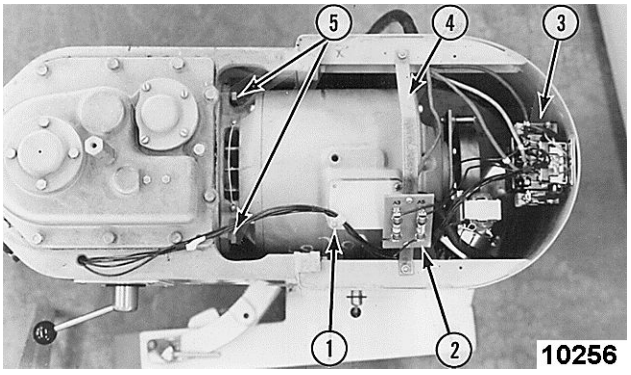


Fig. 92

8. If mixer is equipped with a brake, remove the leads to the brake solenoid.

9. Remove the bolt holding contactor (control panel - P660) to back of mixer [3] Fig. 93.

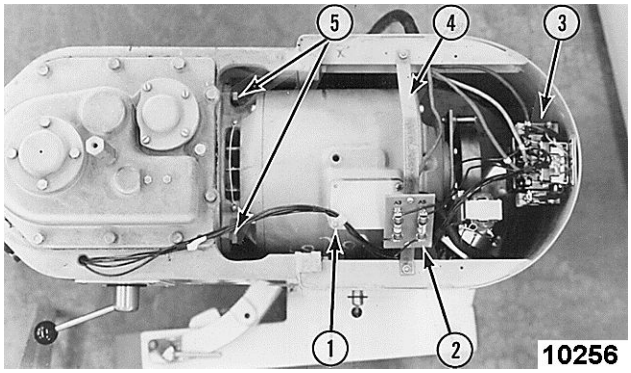


Fig. 93

   A. Note motor wiring connection locations then disconnect the motor leads at the heater and contactor.

   B. Let control panel hang over the side of mixer with a rag between control panel and mixer to prevent scratching mixer painted surface.

10. Remove two set screws and snap ring then remove fan from back of motor, if present.

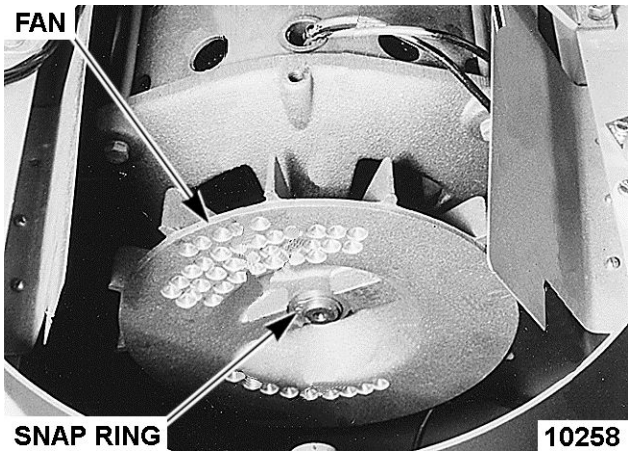


Fig. 94

11. Gain access to the lower motor mounting bolt.

   A. Remove the access cover or bowl guard reed switch housing, whichever is present.

   B. Remove gasket material. Replace gasket if cracked or otherwise damaged.

   C. Remove the lower motor mounting bolt.

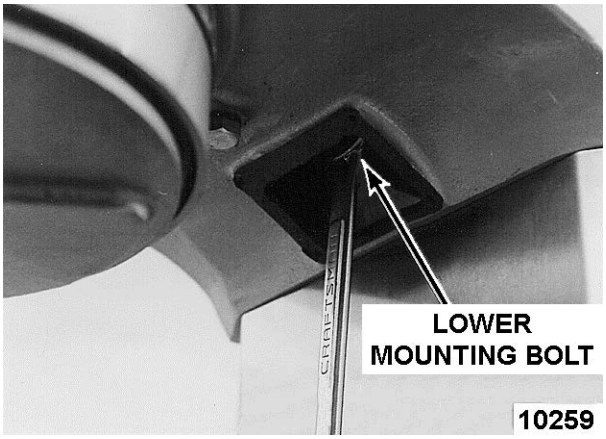


Fig. 95

12. Remove motor.

   A. For H600 and L800 mixers screw a T-bar (Hobart Tool No. TL-58246) in the tapped hole in motor housing near junction box - when applicable. This permits use of a hoist or helper to remove the motor.

   B. For P660 single phase mixers install two eye bolts into the bearing brackets.

      1) Thread chain or rope through eyebolts.

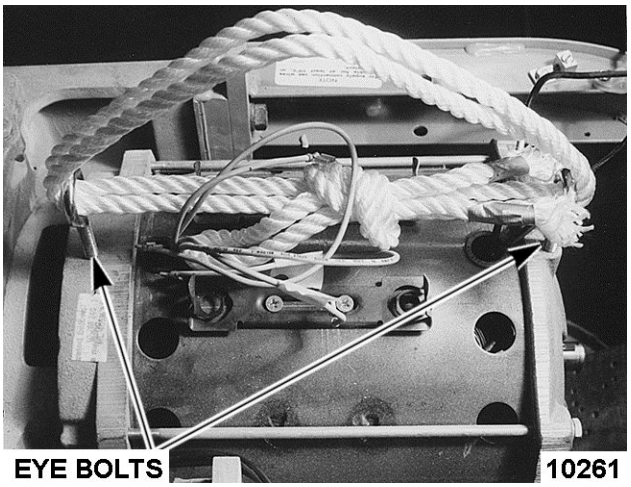


Fig. 96

   C. Support rear of motor under motor housing or brake assembly and remove the two upper motor mounting bolts [5] Fig. 97.

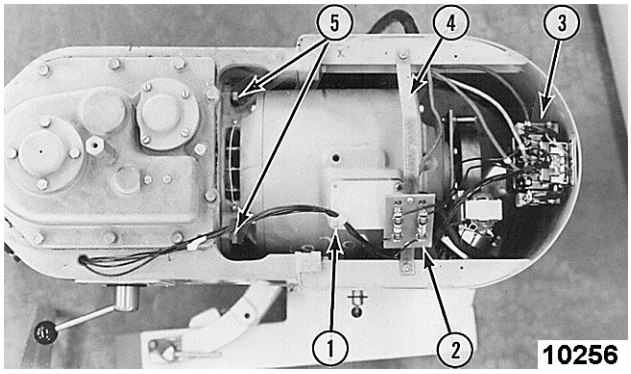


Fig. 97

NOTE: For P660 single phase mixers use a piece of 2x4 lumber through the chain or rope to aid in removing motor.

D. Carefully work the motor out of transmission housing and remove it from the pedestal.

DISASSEMBLY OF MOTOR

1. Prevent brake drum from moving then remove the locknut on motors equipped with a brake assembly and slide the brake drum off motor shaft (brake not offered on P660).

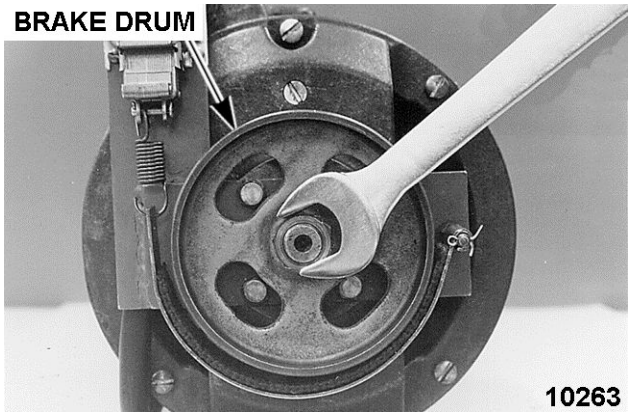


Fig. 98

A. Remove the brake mounting bracket assembly.

2. Remove retaining ring and ventilating fan (if present).

NOTICE

Be sure to support the shaft when removing roll pin holding worm and oil flinger in place so as not to damage motor bearings.

3. Drive the pin out of the shaft [1] Fig. 99 and remove the drive worm.

NOTE: The L-800 drive worm is cut on the shaft.

4. Drive the pin from the oil flinger and hub assembly [2] Fig. 99. Remove the assembly.

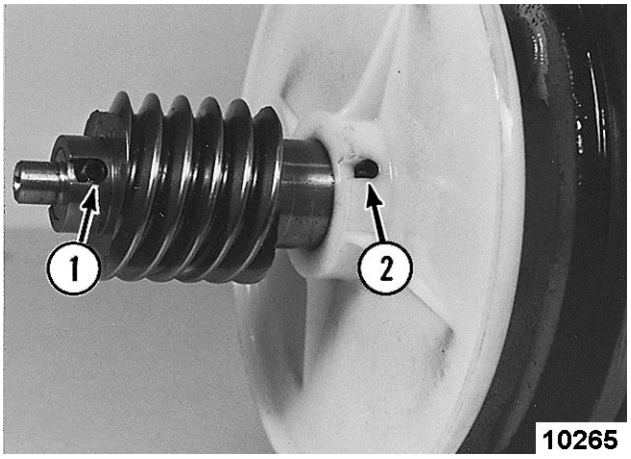


Fig. 99

5. Use a center punch to make alignment marks on motor housing and both bearing brackets (motor end caps).

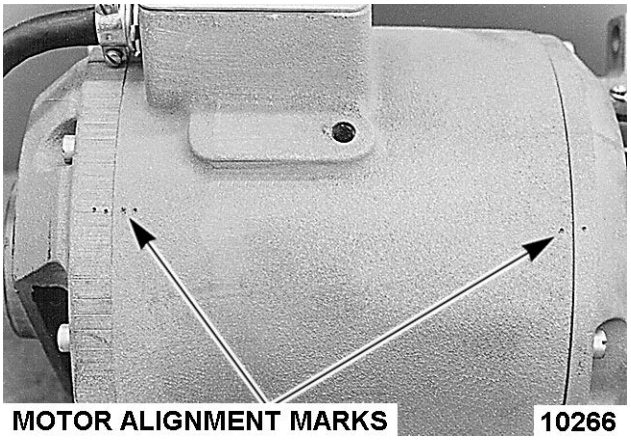


Fig. 100

NOTE: On motors equipped with a starting switch (AI 1736) disconnect all wires from the switch before removing the rear bearing bracket.

6. Remove bearing brackets from motor housing.

7. Carefully remove the rotor and fan assembly from the stator.

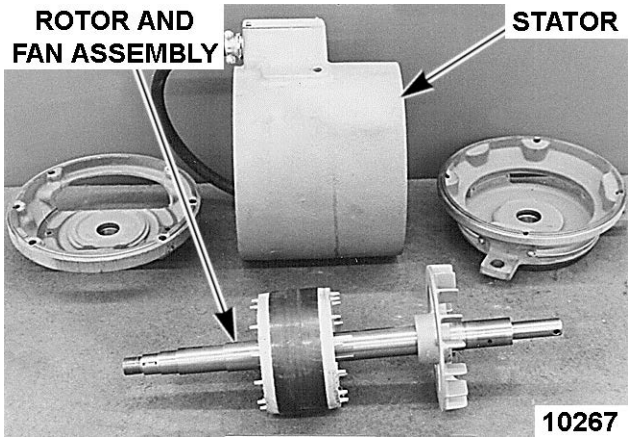


Fig. 101

8. Mark a face of the stator before removal as it must be reassembled facing the same direction.
9. Remove the stator from the housing, being careful not to damage the windings.
10. Inspect motor bearings and replace if necessary.

SERVICING SINGLE PHASE STARTING COMPONENTS

NOTE: Single phase motors have a starting circuit consisting of two start capacitors, centrifugal switch and start windings. The start windings assure rotation in the proper direction and the capacitors provide extra torque to bring the motor up to speed. As the motor RPM increases to near its running speed, the start windings and capacitors are no longer needed and the centrifugal switch opens, removing power to the start windings. The motor then runs on the main windings. Most single phase motor problems can be traced to the centrifugal switch or capacitors.

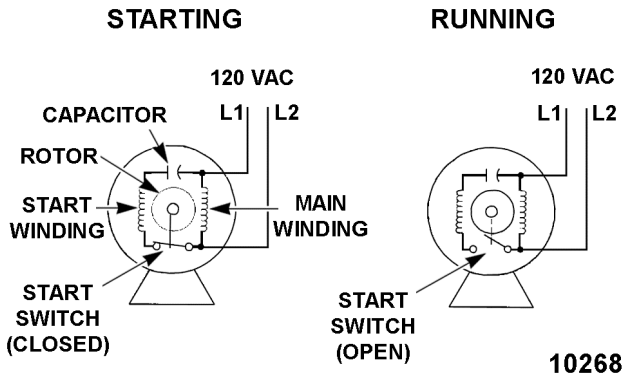


Fig. 102

1. Check capacitor by substituting a known good capacitor in its place. An alternate way to check the capacitor is with a meter set to measure resistance as follows, although this check is not always reliable.

NOTE: Always discharge the capacitor before making this check with an ohmmeter.

A. Discharge capacitor.

B. Remove the leads from the capacitor terminals.

C. Set a digital meter to read resistance (ohms). If possible, select the R x 1000 range.

D. Place meter leads across the two capacitor terminals while watching the meter.

1) If the capacitor is good, the meter should indicate some resistance (value not important) then the indicated resistance value will slowly rise.

2) If the capacitor is shorted, the meter will show a short circuit condition or low resistance value. This value is typically just a few ohms.

3) If the capacitor is open, the meter will indicate an open circuit (no resistance).

2. Check the centrifugal switch contacts [1] Fig. 103 on H600 and L800 mixers and the starting switch [5] Fig. 103) on P660 mixers.

A. The stationary part of starting switch [2] Fig. 103 is located in the rear bearing bracket.

B. If the contacts [1] Fig. 103 are pitted or burnt, replace the stationary part.

3. Check the rotating part of centrifugal switch.

A. The centrifugal weights [3] Fig. 103 should be free to move their full amount of travel without binding.

B. The Bakelite sleeve [4] Fig. 103 should slide freely on the rotor shaft and not be cracked.

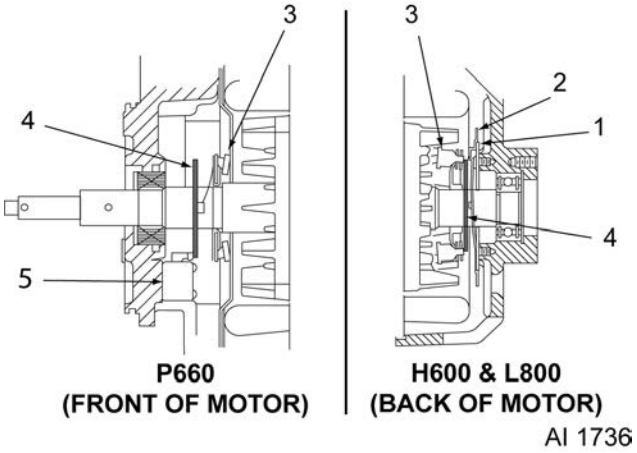


Fig. 103

4. Replacing the rotating part of switch.

A. Mark location of rotating part on rotor shaft with a scribe.

B. Remove rotating part from rotor shaft with a bearing puller.

C. Using a drive sleeve, press the new rotating part on rotor shaft and align it accurately to scribed mark.

5. To check motor field windings, refer to TESTING MOTOR STATOR WINDINGS.

REASSEMBLY OF MOTOR

NOTE: Be sure the stator is facing the same direction as when removed.

1. Verify that the oil drain hole [1[Fig. 104 is open.
2. Check the O-ring seal [2] Fig. 104. Replace if damaged.

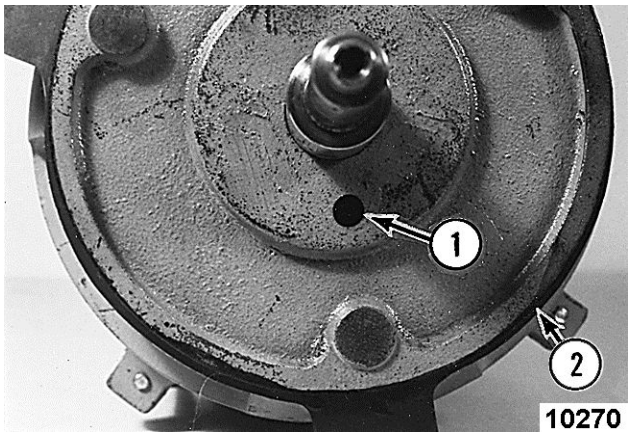


Fig. 104

3. Place front bearing bracket on blocks on a work surface and place the pre-loading spring in the recess in bearing bracket.
4. Position stator so laminations fit squarely into the seat. The stator must be located such that the four weld beads across laminations fit into any of the four recesses in bearing bracket.
5. Center the lead wires between any two of the four ears on the bracket so the wires will not be bent sharply coming out of rear bearing bracket when motor is assembled.

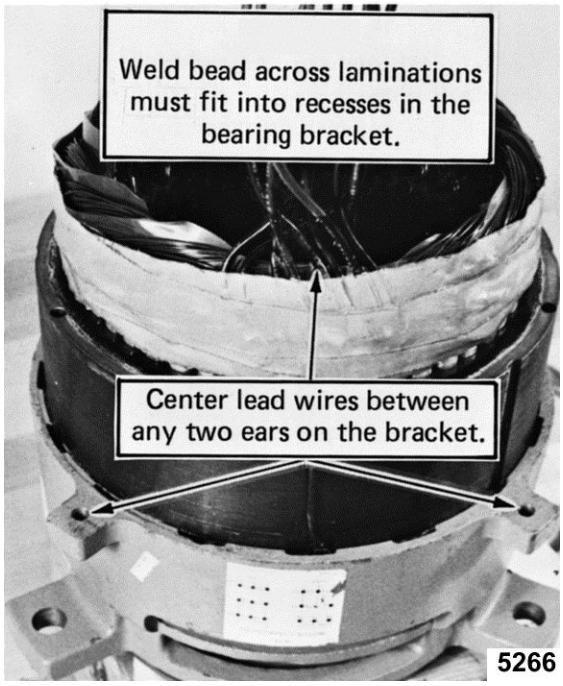


Fig. 105

6. Using a piece of wood or rubber mallet placed against the laminations, use a hammer to seat stator into bracket.

NOTICE

Exercise caution so not to damage laminations or windings.

7. Install rotor assembly.

   A. Place rear bearing bracket (opposite drive end) on rotor shaft. Thread lead wires through one of the holes. The weld beads should fit into four of the recesses in the bracket.

8. Install the four bearing bracket bolts and lock washers. Tighten hardware in a sequence of 1-3-2-4 as shown so stator seats squarely. Tighten bolts progressively to torque of 108 in*lb (9 ft*lb).

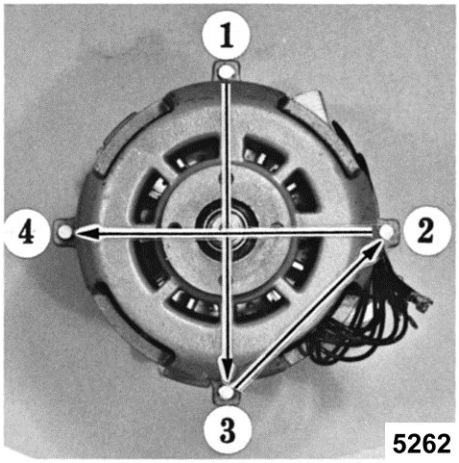


Fig. 106

9. Perform ROTOR SHAFT ALIGNMENT.

ROTOR SHAFT ALIGNMENT

NOTE: Anytime an exposed iron motor is removed for service, or if a new motor is to be installed, the rotor shaft alignment must be checked and shims added to the mounting ears as required before installation. Incorrect alignment will cause improper mesh of the worm and gear resulting in a noisy mixer and/or a damaged worm gear. The alignment tool, Part No. TL-82901, must be used.

1. Verify torque of motor bearing bracket bolts is 108 in*lb (9 ft*lb).
2. H600 and P660. Remove the worm. Be sure to support the shaft when removing roll pin holding worm in place so load of hammer impacts is not transferred to motor bearings.

NOTE: A motor stand can be made from four 9" pieces of 2x4 lumber to support the motor in vertical position.

3. Position motor so drive end is up.
4. Remove all shims from mounting ears.
5. Install alignment tool (TL-82901) on motor shaft.
   A. H600 and P660 - Place tool on motor shaft using the 3/4" hole and slide it tightly against shoulder on shaft. Tighten both clamping screws to secure the tool to the shaft. The measuring stud should be located in the outer 3/8" tapped hole.

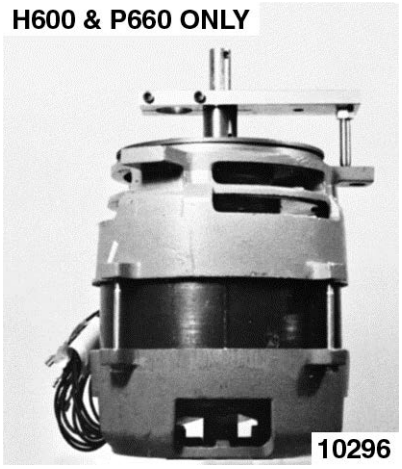


Fig. 107

   B. L800 - Place tool over worm using the 1-1/4" hole and slide on the shaft approximately 1-3/8". Tighten both clamping screws to secure tool to the shaft. The measuring stud should be located in the inner 3/8" tapped hole.

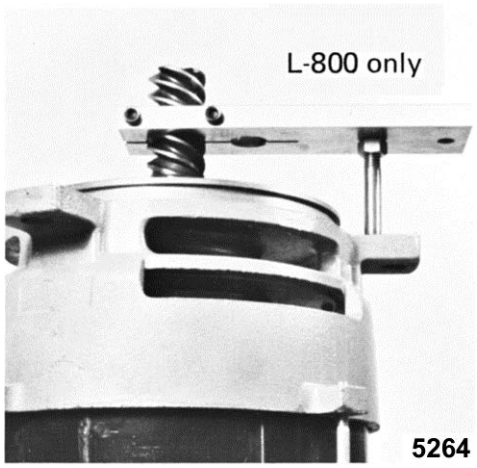


Fig. 108

6. Determine which ear is closest to end of measuring stud by rotating tool and shaft. Adjust the measuring stud until end of stud barely touches only one ear. Tighten the locknuts.

NOTE: Do not force gauge under the stud.

7. Rotate the tool to the other ears. Measure the gap between the ear and end of measuring stud with a feeler gauge.
   A. Add shims to each ear as necessary to achieve a clearance of 0.005" or less using self-adhesive 0.005" shims, Part No. 275152, as shown.

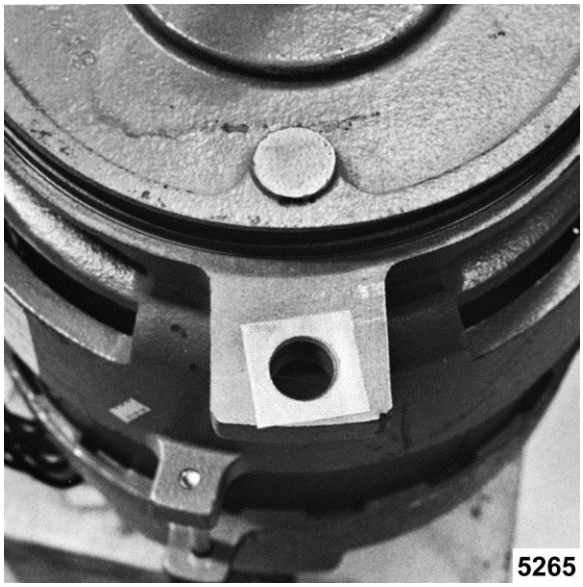


Fig. 109

8. Check gaps after shimming. Repeat shimming if necessary.
9. Install the oil flinger making certain that it is running true. If necessary, straighten it carefully by hand or tap lightly with a soft mallet.

NOTICE

Be sure to support the shaft when removing roll pin holding worm and oil flinger in place so as not to damage motor bearings.

10. H600 and P660. Install the drive worm.
11. Install the ventilating fan.

REINSTALLING THE MOTOR

NOTE: Apply a light coating of oil on the O-ring seal to prevent cutting the O-ring during motor installation.

1. Before installing the replacement motor, whether new or repaired, perform ROTOR SHAFT ALIGNMENT.

NOTE: If installing an exposed iron motor in place of an enclosed iron (single voltage) motor, refer to REPLACEMENT OF ENCLOSED IRON (SINGLE VOLTAGE) MOTOR WITH EXPOSED IRON MOTOR.

2. Reinstall motor in reverse order of removal.

NOTE: Make certain that all wires are clear of immediate area surrounding ventilating fan.

3. Connect motor leads. Refer to WIRING DIAGRAMS - H600 / L800 / P660 as outlined in ELECTRICAL OPERATION if necessary.
4. Check mixer for proper operation.
5. Reinstall top cover.

REPLACEMENT OF ENCLOSED IRON (SINGLE VOLTAGE) MOTOR - EXPOSED IRON MOTOR (H600 & L800 ONLY)

⚠ WARNING

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

1. Remove top cover.
2. Remove motor as outlined under MOTOR - REMOVAL.
3. Before installing the replacement motor, whether new or repaired, perform ROTOR SHAFT ALIGNMENT.
4. Assemble the terminal board, capacitor brackets and hardware as shown.

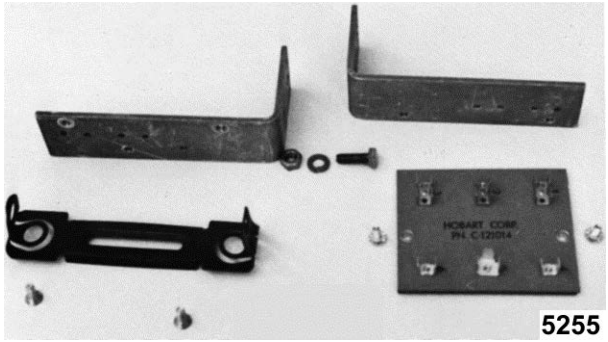


Fig. 110

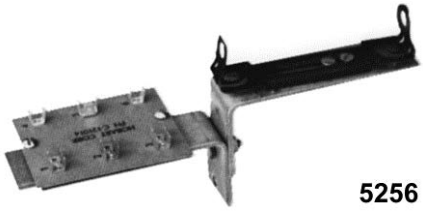


Fig. 111

5. Install the two short leads on capacitor.
6. Install capacitor cap and capacitor into the capacitor holder. Capacitor and terminal board assembly should look as shown.

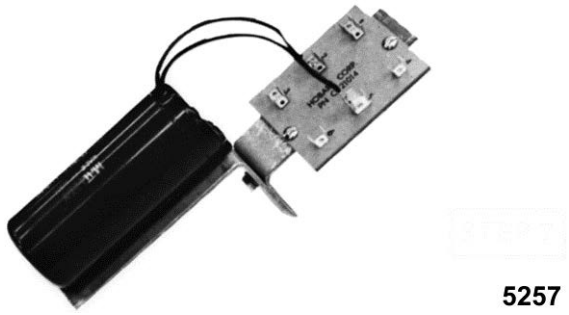


Fig. 112

7. Remove the left rear top cover support bolt.

NOTE: When installing the capacitor and terminal board assembly to mixer, make certain that it is clear of any moving motor parts and is positioned such that the top cover will clear it when reinstalled. As required, rotate the bottom portion (capacitor) of assembly to achieve desired clearance.

8. Secure capacitor and terminal board assembly, and the top cover support to the gusset with nuts, screws and lock washers.

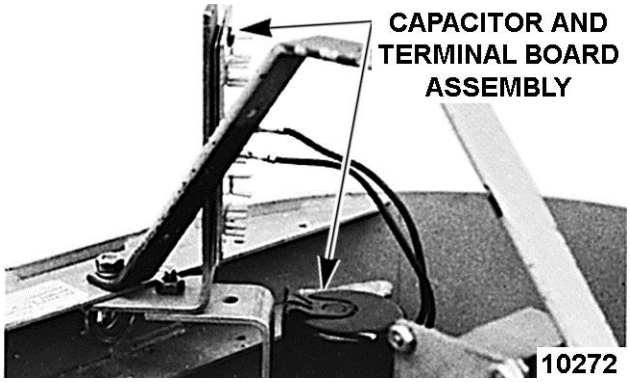


Fig. 113

9. Connect the motor and capacitor leads to the terminal board using the appropriate section of the motor/terminal board connection diagram Fig. 114.

10. Using the appropriate section of the motor/terminal board connection diagram Fig. 114, connect the two 30" lead wire assemblies branded T1 and T2 from the terminal board to T1 and T2 of contactor.

11. Wire tie motor leads to rear top cover support away from moving parts.

12. Install a new front cover support into the transmission cover.

13. Check mixer for proper operation. Affix motor/connection diagram to top cover then reinstall the cover.

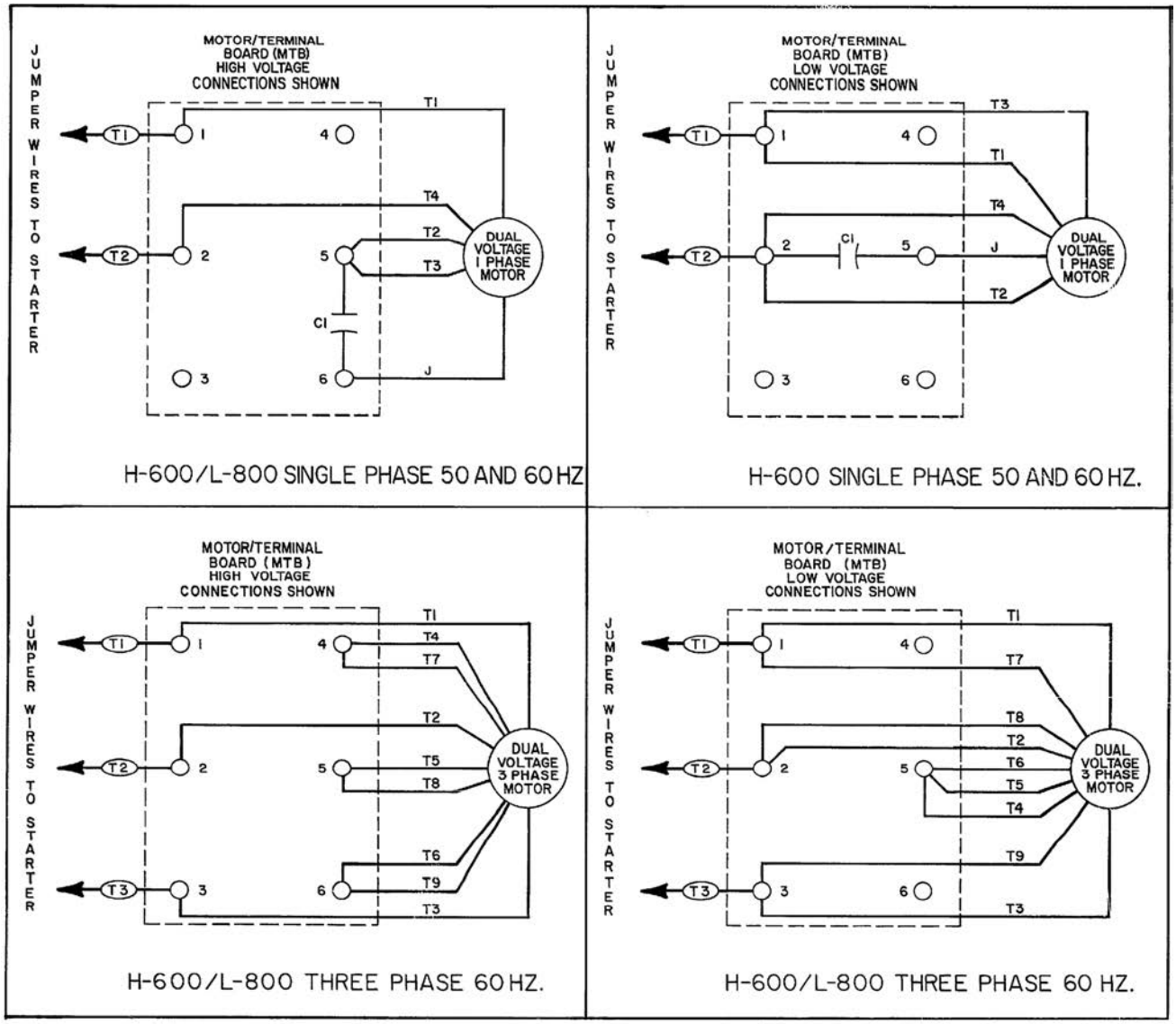


Fig. 114

BRAKE UNIT

NOTE: The brake was available on H600 and L800 mixers only. On late production mixers the brake was optional.

⚠ WARNING

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

Removal

1. Disconnect the electrical power to the mixer.
2. Remove the top cover.
3. Discharge the power bowl lift capacitor.
4. Remove the leads to the brake solenoid.
5. Loosen the screw holding the contactor to the back of the pedestal. Place the contactor on top of the mixer motor.
6. Holding the brake drum so it does not move, remove the locknut [1] Fig. 115 and slip the brake drum off the motor shaft.

NOTE: Do not lose the brake drum key.

7. Remove the brake mounting bracket assembly from the motor [2] Fig. 115 (qty. 4).

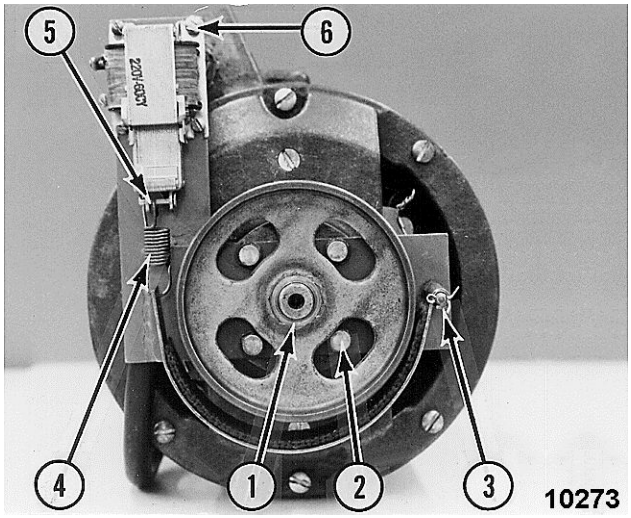


Fig. 115

SERVICING THE BRAKE UNIT

Replacement of Brake Band

1. Extract the cotter pin from the brake band stud on the pivot end of the brake band and remove the washer [3] Fig. 116.
2. Slide the brake band off the brake band stud and unhook the brake spring [4] Fig. 116.
3. Replace in reverse order of removal.

Replacement of Solenoid

1. Extract the cotter pin from the solenoid clevis pin [5] Fig. 116 and remove the pin and brake spring.
2. Remove the four mounting screws on the solenoid and remove the solenoid [6] Fig. 116.

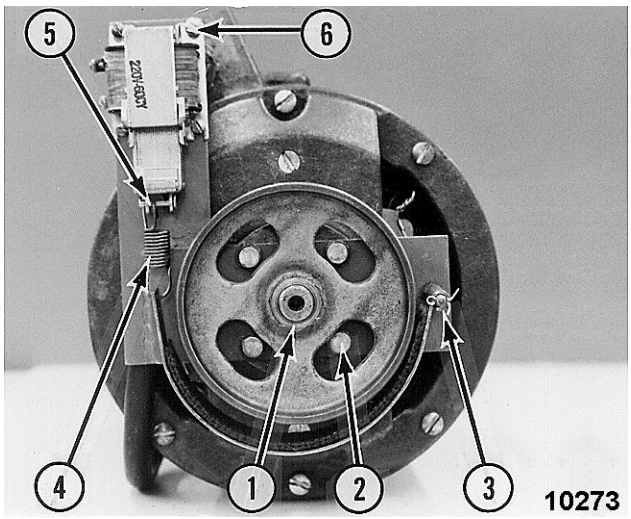


Fig. 116

3. Replace parts removed in reverse order of removal.

Replacement

1. Replace the brake unit in reverse order of removal and check BRAKE ADJUSTMENT.

BRAKE ADJUSTMENT

⚠ WARNING

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

NOTE: Place the speed selector on number 4 (HIGH) speed and start the mixer. With the mixer running, depress the stop button and hold. The brake should stop the planetary in approximately one revolution. Should the brake need adjusting to increase or decrease the brake action, use the following procedure

Increasing Braking Action

1. Remove the top cover.
2. Discharge the capacitor on power bowl lift (PBL) models.
3. Inspect the brake lining [1] Fig. 117 for excessive wear. Should the brake lining be worn through to the brake band, replace the brake band assembly (refer to MECHANICAL SERVICE, Brake Unit).
4. If there is sufficient brake lining, place the brake spring in the lowest hole [2] Fig. 117 of the brake band.
5. Should more braking action be required, loosen the four mounting screws [5] Fig. 117 on the solenoid and raise it.

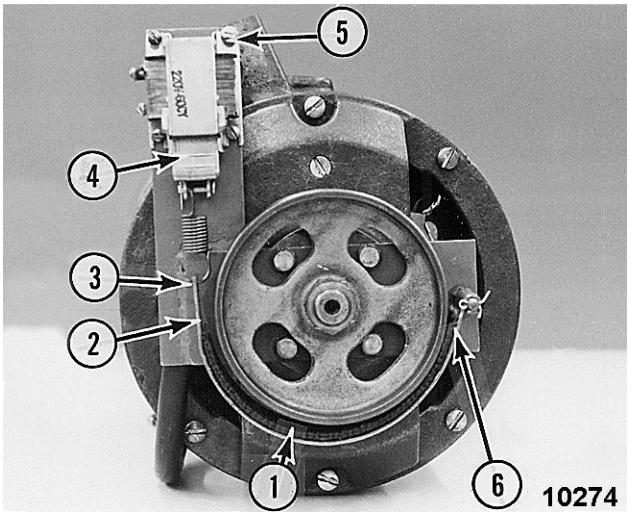


Fig. 117

6. Re-tighten the mounting screws and recheck the braking action.
7. If the above adjustments do not increase the braking action sufficiently, replace the brake spring.
8. Replace top cover.
9. Check mixer for proper operation.

Decreasing Braking Action

1. Remove top cover.
2. Discharge capacitor on power bowl lift (PBL) models.
3. Place the brake spring in the top hole on brake band [3] Fig. 118.

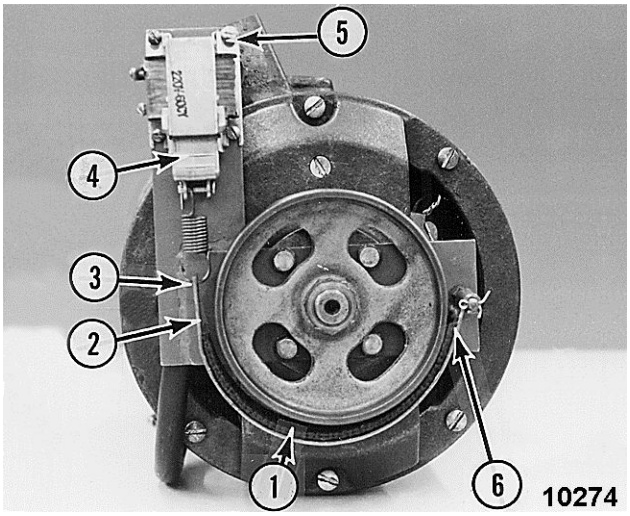


Fig. 118

4. Check braking action. If correct, adjustment is complete.
   A. If less braking action is desired, continue to next step.
5. Loosen the four mounting screws on the solenoid and move solenoid to its lowest position.
6. Check braking action. If correct, adjustment is complete.
   A. If further adjustment be needed, continue to next step.
7. Pull the solenoid armature [4] Fig. 118 up by hand until brake lining touches the brake drum. With no tension on brake spring, the remaining travel of the solenoid armature should be no more than 5/16".
8. Should remaining travel exceed 5/16", stretch the brake spring by holding solenoid armature closed and push down on the brake band, being careful not to over-stretch the brake spring.
9. Should none of the above steps decrease braking action enough, remove brake band and grind down brake lining near pivot end [6] Fig. 118 until it clears the brake drum.
10. Recheck braking action and replace the top cover.
11. Check mixer for proper operation.

ELECTRICAL CONNECTIONS

⚠ WARNING

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

MIXER MOTOR WIRING CONFIGURATION							
Motor Type		**Leads From Contactor**			**Tie Together Motor Leads (Dual Voltage Motors Only)**		
		T1	**T2**	**T3**			
Motor Connection Points	Single Phase	T1	T4	N/A			
	Three Phase - Single Voltage Motors	T1	T3	T3			
	Three Phase - Dual Voltage Motors						
	230VAC - (Low)	T1-T7	T2-T8	T3-T9	T4, T5, T6		
	460VAC - (High)	T1	T2	T3	T4-T7	T5-T8	T6-T9

TESTING MOTOR STATOR WINDINGS

⚠ WARNING

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

Single Phase

1. Note motor wiring connections and disconnect all motor leads.
2. Discharge start capacitors and remove motor leads from start capacitor and centrifugal start switch.
3. Set meter to measure resistance.
   A. Check each winding for continuity.
      1) A resistance reading less than listed in the table (H600/L800 Table, P660 Table) indicates a shorted stator winding.
      2) If there is no meter reading, the stator winding is open.

NOTE: Be aware that there have been variations in motor windings for the H600 and L800 mixers. The mixer motor being serviced may have winding connections that differ from those shown in the manual.

4. Check for grounded motor.
   A. Measure resistance between motor leads and chassis ground.
      1) Motor leads should not be grounded. Meter will indicate infinity (open circuit). However, any reading above 500 kΩ is acceptable.
   B. Check all motor leads for short to ground.
5. If windings are shorted, open or grounded, replace the stator.
6. Reconnect the start switch and start capacitors.
7. Wire the motor to the mixer wiring harness.
8. Check the mixer for proper operation.

SINGLE PHASE MOTOR WIRING - ENCLOSED IRON

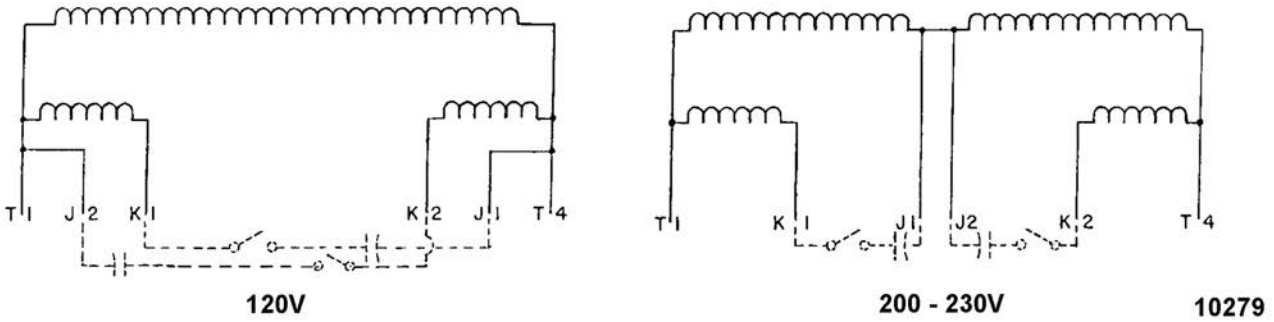


Fig. 119

H600/L800 SINGLE PHASE MOTOR STATOR WINDING RESISTANCE						
Model	**HP**	**Voltage**	**HZ.**	**Approximate Ohm Values**		
				T1 - T4	**T4 - J2 T4 - J1 T1 - J2 T1 - J1**	**T4 - K2 T1 - K1**
H600	1	120V	50-60	0.5 Ω	----	7.0 Ω
		230V		1.5 Ω	1.0 Ω	7.0 Ω
H600, L800	1-1/2 and 2	230V	60	1.5 Ω	1.0 Ω	4.0 Ω
		200V		1.5 Ω	0.5 Ω	4.0 Ω

MODEL P660: 208-240/60/1

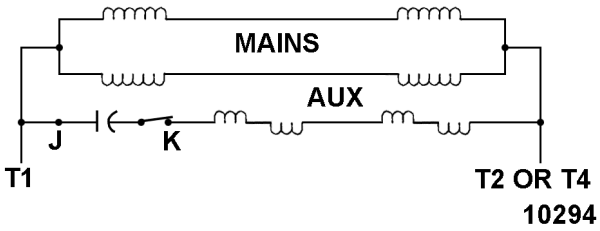


Fig. 120

P660 SINGLE PHASE MOTOR STATOR WINDING RESISTANCE				
HP	**Voltage**	**Hz.**	**Approximate Ohm Values**	
			T1 - T2 or T4	**T2 or T4 - K**
2-1/2	208V	60	0.39 Ω	1.86 Ω
	230V		0.45 Ω	2.33 Ω

Three Phase

1. Note motor wiring connections and disconnect all motor leads.
2. Set meter to measure resistance.
   A. Check each winding for continuity.
      1) A resistance reading less than listed in the table indicates a shorted stator winding.
      2) If there is no meter reading, the stator winding is open.

THREE PHASE MOTOR WIRING

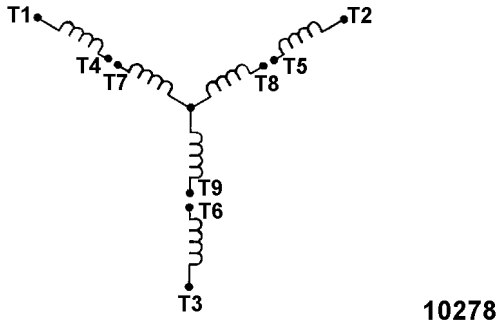


Fig. 121

THREE WIRE - THREE PHASE MOTOR STATOR WINDING RESISTANCE				
Model	**HP**	**Voltage**	**Hz.**	**Approximate Ohm Values**
				T1 - T2, T2 - T3, T1 - T3
H600	1	200V	50-60	4.5 Ω
		230V		5.0 Ω
		380V		12.5 Ω
		460V		18.0 Ω
H600, L800	1-1/2 and 2	200V		3.0Ω
		230V		3.5 Ω
		380V		8.5 Ω
		460V		13.0 Ω

THREE WIRE - THREE PHASE MOTOR STATOR WINDING RESISTANCE				
Model	**HP**	**Voltage**	**Hz.**	**Approximate Ohm Values**
				T1 - T2, T2 - T3, T1 - T3
P660	2-1/2	208V		8.8 Ω
		230V		6.56 Ω
		240V		8.22 Ω

NINE WIRE - THREE PHASE MOTOR STATOR WINDING RESISTANCE						
Model	**HP**	**Voltage**	**Hz.**	**Approximate Ohm Values**		
				T1 - T2 **T1 - T3** **T2 - T3**	**T1 - T4** **T2 - T5** **T3 - T6**	**T7 - T8** **T7 - T9** **T8 - T9**
H600	1	200V	50-60	4.5 Ω	14.0 Ω	2.3 Ω
		230V		5.0 Ω	1.2 Ω	2.5 Ω
		380V		12.5 Ω	3.0 Ω	6.3 Ω
		460V		18.0 Ω	4.5 Ω	9.0 Ω
H600, L800	1-1/2 and 2	200V		3.0 Ω	0.75 Ω	1.5 Ω
		230V		3.5 Ω	0.6 Ω	2.0 Ω
		380V		8.5 Ω	2.0 Ω	4.3 Ω
		460V		13.0 Ω	3.0 Ω	6.5 Ω
P660	2-1/2	208V		- -	1.6 Ω	2.8 Ω
		230V		- -	1.6 Ω	2.8 Ω

TESTING MOTOR CURRENT

⚠ WARNING

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

1. Disconnect power to mixer.
2. Remove top cover.
3. Locate the incoming voltage service leads to motor either at contactor or overloads.

NOTE: Three phase dual voltage motors have two leads connected to each incoming voltage lead. Make sure to clamp over the incoming lead.

   A. Clamp AC ammeter around one of the incoming leads.

   B. Set ammeter to highest scale, usually 300 amps.

NOTE: It may be necessary to adjust ammeter scale to achieve a more accurate reading.

4. Reconnect power to mixer. Start mixer and take amperage reading from meter.

NOTE: Should the motor overload protectors be open because of an overloaded motor, wait until overload thermal elements cool down before starting motor.

   A. Refer to the table for ampere ratings for the mixer being serviced.

NOTE: Intermittent short duration overload currents no greater than 20% of the rated current are acceptable. However, continuous currents above the rated current or intermittent overload currents greater than 20% of the rated current indicate an overloaded motor.

MOTOR CURRENTS - AMPERES							
Model	**HP**	**Single Phase**			**Three Phase**		
		120 VAC	**208 VAC**	**230 BAC**	**200 VAC**	**230 VAC**	**460 VAC**
H600	1	21.0A	- -	10.5A	5.9A	5.5A	2.8A
	2	19.0A	10.9A	9.5A	5.8A	5.0A	2.5A
L800	1-1/2	17.0A	- -	8.5A	4.2A	4.0A	2.0A
	2	- -	12.7A	11.0A	6.5A	5.6A	2.8A
P660	2-1/2	- -	20.0A	17.0A	8.6A	8.6A	- -

TESTING CAPACITORS

⚠ WARNING

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

1. Check capacitor by substituting a known good capacitor in its place. An alternate way to check the capacitor is with a meter set to measure resistance as follows, although this check is not always reliable.

NOTE: Always discharge the capacitor before making this check with an ohmmeter.

A. Discharge capacitor.

B. Remove the leads from the capacitor terminals.

C. Set a digital meter to read resistance (ohms). If possible, select the R x 1000 range.

D. Place meter leads across the two capacitor terminals while watching the meter.

1) If the capacitor is good, the meter should indicate some resistance (value not important) then the indicated resistance value will slowly rise.

2) If the capacitor is shorted, the meter will show a short circuit condition or low resistance value. This value is typically just a few ohms.

3) If the capacitor is open, the meter will indicate an open circuit (no resistance).

BOWL SUPPORT AND LIFT SYSTEM

TECHNICAL NOTES BOWL SUPPORT

In July 2003, the bowl lift nut changed on production H600/L800/P660 mixers to prevent the bowl support from back-driving (bowl creep) when the bowl support is raised and the mixer is in an idle state.

NOTE: The bowl lift nut assembly only addresses back driving when the mixer is idle. Should back driving occur during operation, service the bowl lock (if equipped) or install a bowl lock kit.

The bowl lift nut assembly can be identified by a slot cut through one side of the nut. A hole has been drilled and tapped and a cap screw and lock washer are installed to adjust tension. When the original bowl lift nut is ordered, the new bowl lift nut assembly will be sent. Refer to Bowl Lift Nut Assembly Adjustment after installing replacement bowl lift nut assembly.

BOWL SUPPORT

⚠ WARNING

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

Removal

1. Remove the pedestal apron.
2. Break the paint covering the heads of the three lower screws on the right-hand slideway.

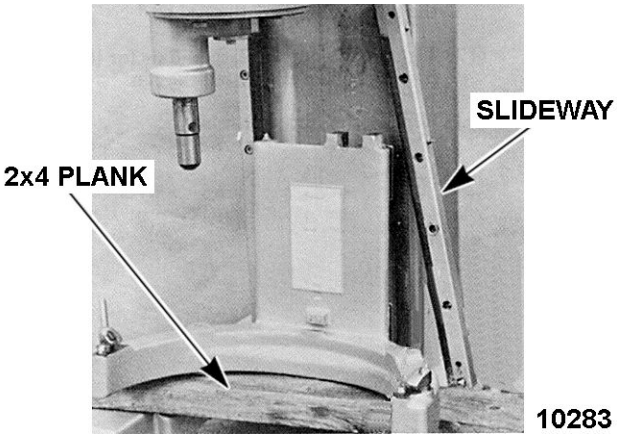


Fig. 122

3. Place a 2x4 plank across the base and lower the bowl support until it rests on the plank.
4. Remove the bowl lift nut retainer (1, Fig. 123) from the bowl support and run the nut up the lift screw.

NOTE: On L800, pry the spring seat up and off the pins.

NOTE: On some mixers, the bolt on the left side of the lift screw is longer, has a locking nut, and is used for bowl height adjustment.

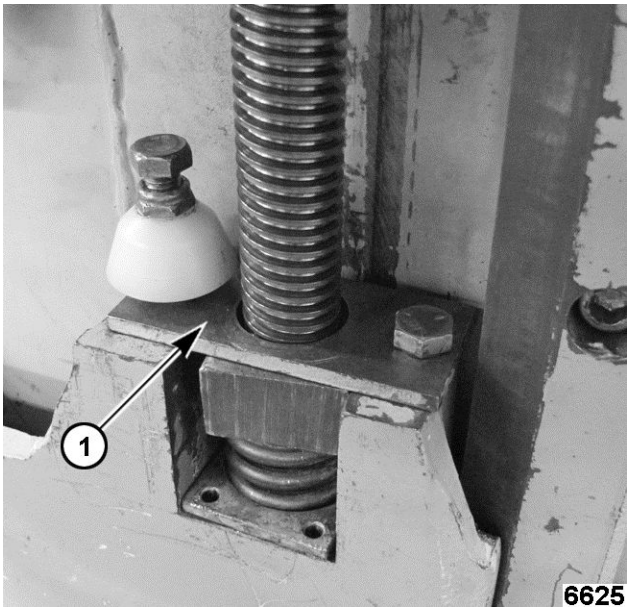


Fig. 123

5. Loosen the top screw and remove the lower five screws on the right-hand slideway.
6. Move the slideway to the side away from the bowl support to provide clearance for bowl support removal. Tighten the top screw holding the slideway in this position.

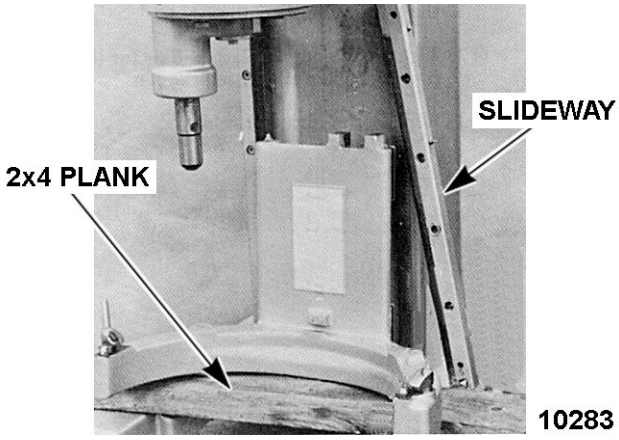


Fig. 124

7. Swing the bowl support clear of bowl lift screw by raising the front of bowl lift assembly.

Installation
NOTE: Lubricate internal threads of bowl lift nut with Lubriplate 630AA before reassembly.

1. Reinstall parts removed in reverse order. Do not install pedestal apron.
2. Perform SLIDEWAY ADJUSTMENT as outlined in this section.
3. Reinstall pedestal apron.

Slideway Clearance Adjustment
NOTE: The left-hand slideway is dowel pinned into position and cannot be adjusted.

NOTE: Clearance between slideways and bowl support should be held to a minimum without causing binding.

1. Remove bowl and agitator.
2. Remove pedestal apron.
3. Raise bowl support to its top position and remove the paint from the heads of the three bottom screws on the right-hand slideway [1] Fig. 125.
4. Slightly loosen all socket head screws that hold the right-hand slideway to the pedestal.

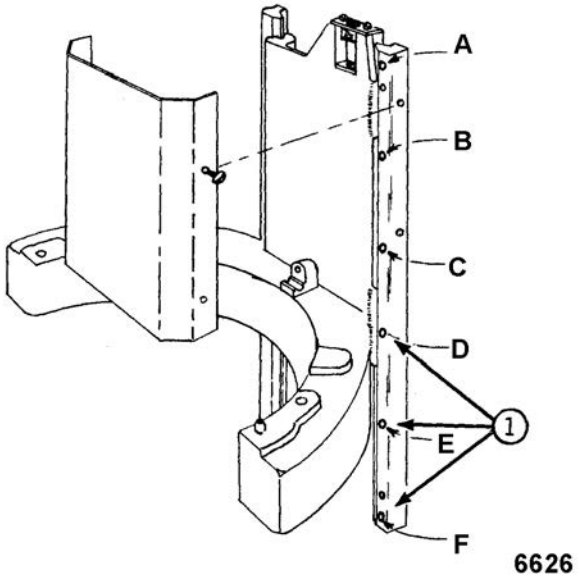


Fig. 125

NOTE: Hold a rag against slideway to protect the finish.

5. Tap slideway with a lead hammer until it is snug against bowl support.
6. Tighten the top slideway screw.
7. Lower bowl support until it is approximately 1-1/2" from its bottom position.
   A. A. Tap the bottom of slideway in toward support.
   B. Tighten bottom slideway screw.
8. Run bowl support up and down to check for binding. Re-adjust if necessary.
9. Tighten remaining slideway screws when adjustment is correct.
10. Verify slideway adjustment by running bowl support up and down checking for binding. Repeat adjustment if necessary.
11. Reinstall pedestal apron.

Bowl Lift Nut Assembly Adjustment
NOTE: Refer to TECHNICAL NOTES at the beginning of this section for bowl lift nut production change information.

1. Start with bowl support in its lowest position.
2. Snug bowl lift nut assembly cap screw.
3. Install bowl into place on bowl support.
4. Weight bowl to simulate a load and raise bowl support to its highest position.

NOTE: As threaded surface of bowl lift nut assembly wears, the tendency to back-drive will increase. Tighten cap screw as necessary to prevent back-driving.

5. With mixer in an idle state, check for bowl support back-driving by exerting downward force on bowl support.
   A. If back-driving exists, tighten bowl lift nut assembly cap screw until back-driving is eliminated. Do not over tighten cap screw.

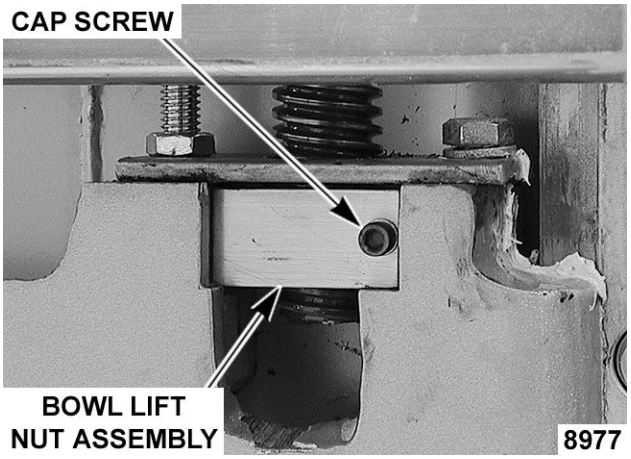


Fig. 126

6. Lower and raise bowl lift to check operation. Bowl support should raise and lower without too much resistance.

A. If bowl lift is difficult to operate, loosen bowl lift nut assembly cap screw slightly.

B. Raise bowl support and recheck for back-driving.

C. Repeat adjustment until bowl support can be raised and lowered without too much resistance and there is no back-driving.

7. Check BOWL TO BEATER clearance.
8. Reinstall pedestal apron.
9. Check mixer for proper operation.

Bowl Clamp Adjustment

NOTE: Bowl clamp tension is controlled by a spring washer and locknut. The tension of the bowl clamp should be tight enough to maintain its position while engaged.

1. Install spring washer (1, Fig. 127) cupped-side-up onto threaded shaft of bowl clamp.
2. Increase or decrease tension on the bowl clamps by tightening or loosening the locknuts (2, Fig. 127).

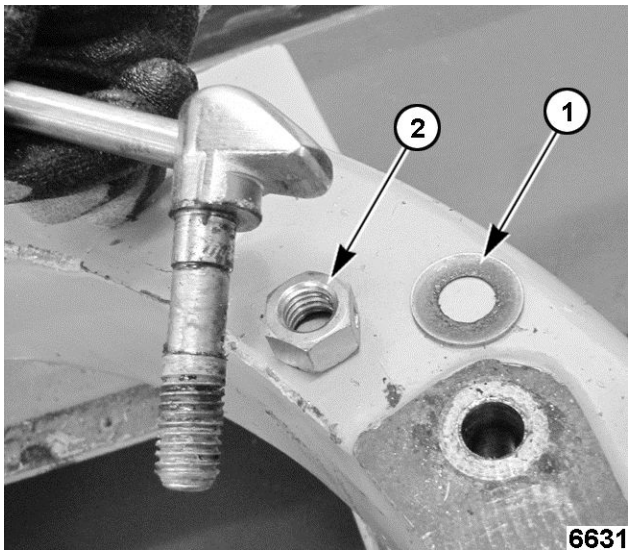


Fig. 127

BOWL TO BEATER CLEARANCE

NOTE: The presence of bowl height sensing does not affect the bowl to beater check or adjustment procedures. They are the same for all mixers.

Check

1. Install the bowl and securely lock it into position on the bowl support.

NOTE: If the customer is using both a flat B beater and an ED dough hook, use the flat B beater to check and set bowl to beater clearance to 1/8". However, if the customer uses only the ED dough hook, the clearance between bottom of arm and bowl is 3/16" to 5/16".

2. Install a flat B beater on agitator shaft.
3. Raise bowl support to the highest position.

⚠ WARNING

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

4. Check the clearance between the bottom of the beater and bowl with a feeler gauge. Clearance is 1/8".

Adjustment - Adjusting Screw Located Under Bowl Support

1. Remove the cap plug from the bumper stop and loosen the bump stop and jam nut [2] Fig. 129.

NOTE: On mixers equipped with a power bowl lift, raise or lower bowl support by turning the lift screw with a wrench on the machined hex area [2] Fig. 128 of lift screw.

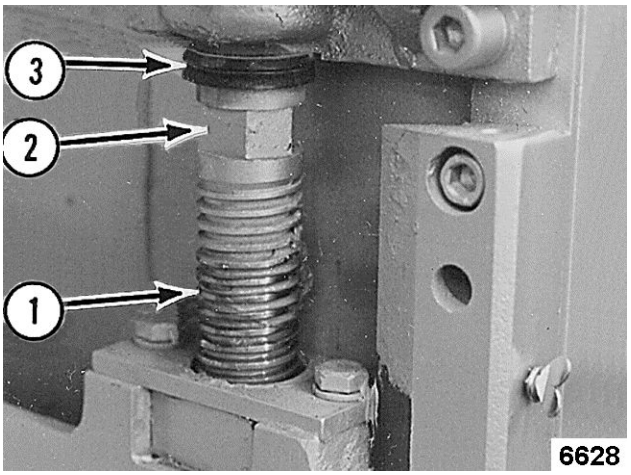


Fig. 128

2. Raise or lower bowl support so there is 1/8" clearance between bottom of beater and the bowl.
3. urn the stop screw [3] Fig. 129 until it is tight against the bowl support stop [4] Fig. 129.

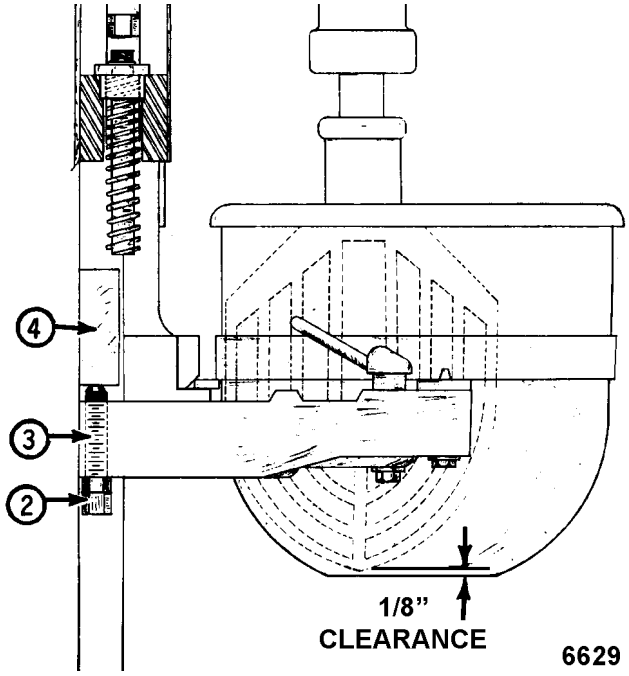


Fig. 129

4. Tighten jam nut and bumper stop and replace the cap plug.
5. Lower and then raise the bowl support until it is up against the stop.
   A. Recheck the bowl to beater clearance making sure the 1/8" clearance is maintained.

Adjustment - Stop Screw Located on Left Side of Lift Screw

1. Remove the pedestal apron.
2. Lower the bowl support slightly and loosen the jam nut.
3. Turn the stop screw CCW or CW to raise or lower bowl support.

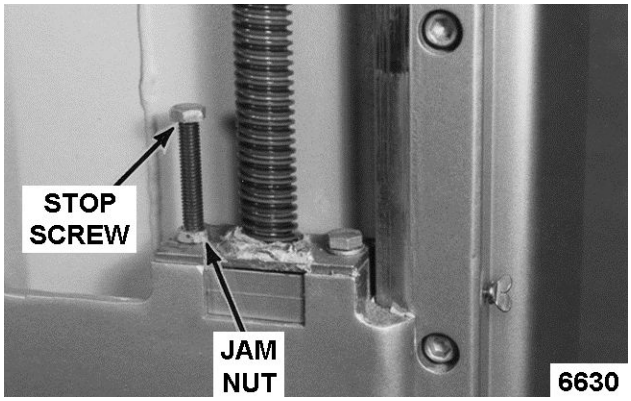


Fig. 130

4. Raise the bowl support and check the clearance.
5. When desired clearance is achieved, lock the stop screw with the jam nut and reinstall the pedestal apron.

BOWL HEIGHT SENSING

NOTE: When properly adjusted, the bowl height sensing feature insures that the bowl is fully up before the mixer will run unless the start switch is held in manually. If the bowl height sensing feature is added to a mixer using a kit, a bowl lock kit should also be added at the same time.

Check

NOTE: The bowl guard, if equipped, must be closed in order to perform the bowl height sensing check.

1. Lower the bowl support more than 1/4" from the maximum up position.
   A. Push and hold the start button - the mixer should run.
   B. Release the start button - the mixer should stop.
2. Raise bowl until it stops in the full up position.
   A. Push and release the start button - mixer should run.
   B. Lower bowl from up position while mixer is running. Mixer should stop running when bowl support is lowered more than 1/4" from full up position.

Adjustment - Stop Screw Located on Left Side of Lift Screw

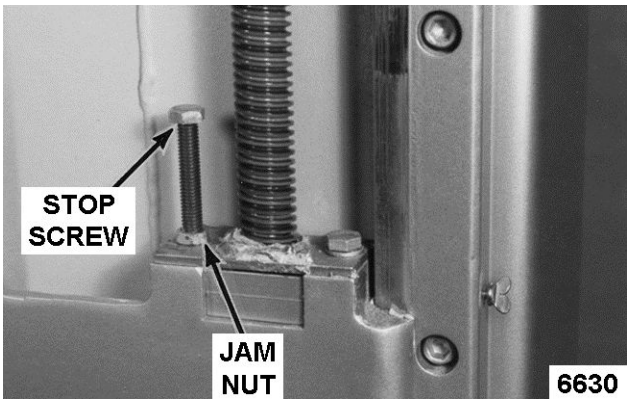


Fig. 131

1. Verify BOWL TO BEATER CLEARANCE is correct.
2. Remove pedestal apron.
3. Raise bowl lift up until top of stop screw is 1/4" from bottom of transmission housing.

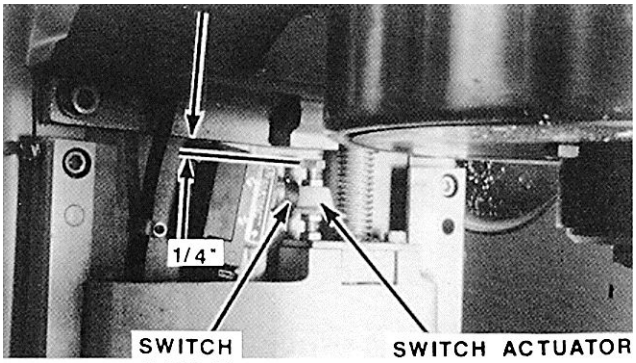


Fig. 132

A. H600/P660 - Adjust bowl switch actuator to operate the switch (closing the N.O. contacts) at this point. Snug the lock nuts.

B. L800 - Allow actuator to rest on jam nut and snug the locknut against the bowl switch actuator.

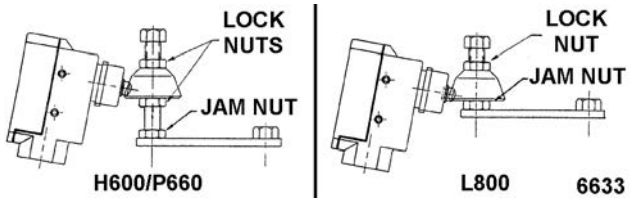


Fig. 133

4. Apply power to machine and perform BOWL HEIGHT SENSING - Check.

   A. Repeat adjustment if necessary.

5. Reinstall pedestal apron.

Adjustment - Stop Screw Located Under Bowl Support

1. Verify BOWL TO BEATER CLEARANCE is correct.
2. Remove pedestal apron.
3. Raise bowl lift until the stop screw hits the bowl support stop then lower bowl support 1/4" from full up position.

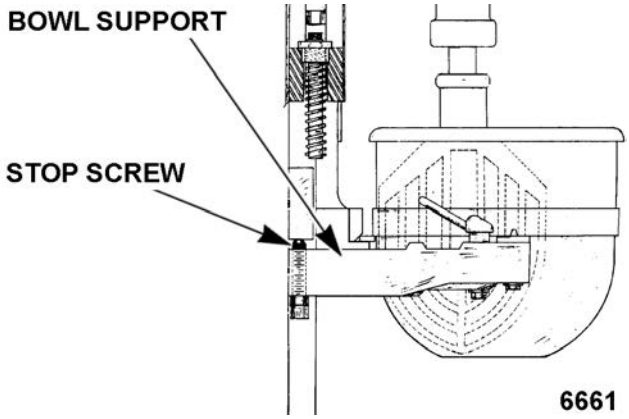


Fig. 134

A. H600 - With bowl switch actuator against the bottom of the head of the hex bolt and a locknut snugged against the actuator, adjust the hex head bolt until the bowl switch actuator operates the switch (closes the N.O. contacts).

B. Tighten the locknut against bowl lift nut retainer.

C. L800 - Allow actuator to rest on locknut. Snug the hex head bolt against actuator and tighten locknut against bowl lift nut retainer.

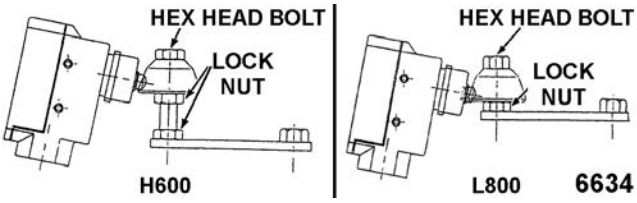


Fig. 135

4. Apply power to machine and perform BOWL HEIGHT SENSING - Check.

   A. Repeat adjustment if necessary.

5. Reinstall pedestal apron.

MANUAL BOWL LIFT

HANDWHEEL BRACKET ASSEMBLY

NOTE: If either the handwheel bracket/bearing assembly or handwheel clamping ring has malfunctioned, both parts are to be replaced due to the additional steps required to maintain the correct relationship between the handwheel bracket/bearing assembly, the frame, and the handwheel bracket clamping ring.

⚠ WARNING

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

Removal

1. Remove TOP COVER.
2. Lower bowl support to its lowest position.
3. Remove the pin from the handwheel hub and slide the handwheel off the shaft.
4. Remove the screws from the handwheel bracket clamping ring (1, Fig. 136) and carefully pry the clamping ring free from the pedestal.

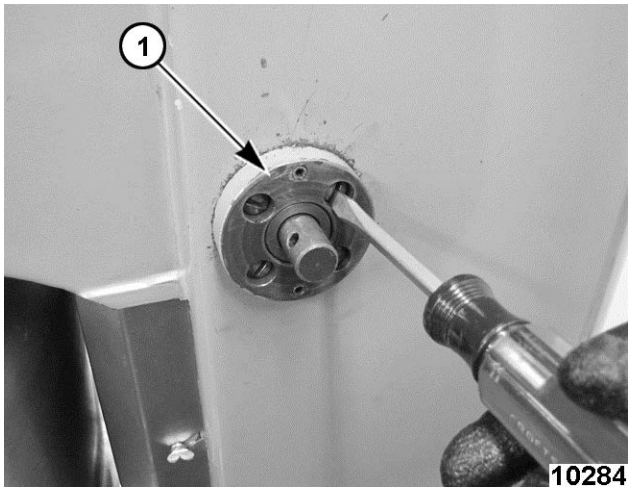


Fig. 136

5. Reach inside the pedestal under the motor and remove the handwheel bracket assembly from the mixer.

NOTICE

Be careful not to damage mixer finish.

Disassembly

1. Remove bowl lift miter pinion [2] Fig. 137.
   A. Remove the stop nut [1] Fig. 137 and slide miter pinion off the handwheel shaft.
   B. Remove the handwheel shaft [3] Fig. 137.

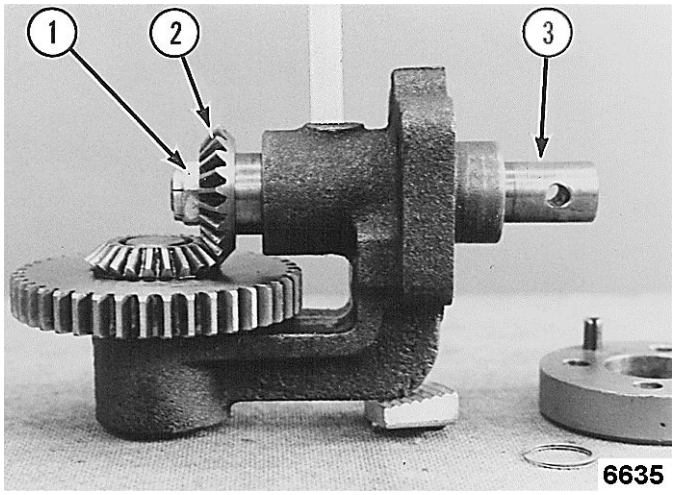


Fig. 137

2. Remove the bottom retaining ring from the miter gear shaft [1] Fig. 138 and remove the shaft from the handwheel bracket.
   A. Slide the bowl lift miter gear, bowl lift gear and space off the shaft.

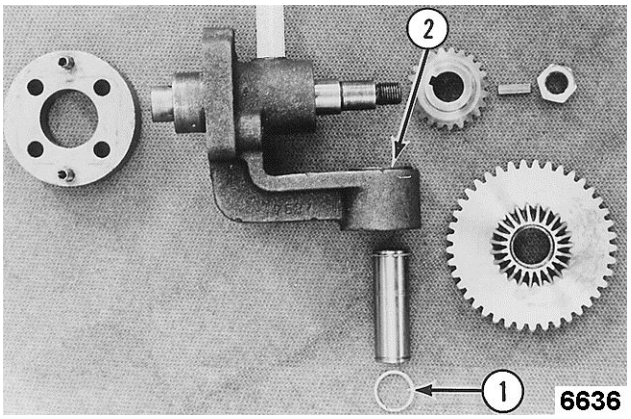


Fig. 138

Assembly

1. Reassemble parts removed in reverse order of removal.
2. Check gear spacing of miter gears. Proper end play is 1/64".

NOTE: A new spacer [2] Fig. 138 may be necessary when replacing either of the gears or bearing to obtain the gear spacing as shown in Fig. 139.

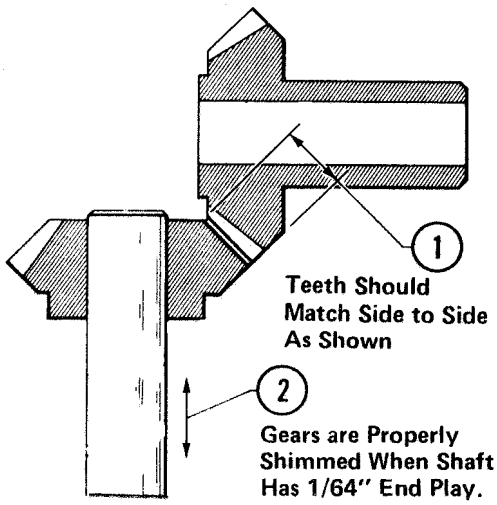


Fig. 139

Installation

NOTE: If the handwheel bracket/bearing assembly and handwheel bracket clamping ring are not being replaced, install the handwheel bracket assembly in reverse order of removal. However, if the handwheel bracket/bearing assembly and the handwheel bracket clamping ring are being replaced, additional steps are required to properly align these two parts. The replacement handwheel bracket/bearing assembly [2] Fig. 140 is not drilled with the two holes [1] Fig. 140 for the roll pins. The replacement handwheel bracket/bearing assembly and the handwheel bracket clamping ring [3] Fig. 140 are to be drilled after the parts are assembled into the mixer.

1. Install the replacement handwheel bracket/bearing assembly [2] Fig. 140 and the handwheel bracket clamping ring [3] Fig. 140 as they would normally be installed.
2. Align the two roll pin holes [4] Fig. 140 in the handwheel bracket clamping ring with the existing holes in the mixer column.
3. Tighten the four mounting bolts.
4. Using the 15/64" holes [4] Fig. 140in the handwheel bracket clamping ring [3] Fig. 140 as guides, drill two 1/4" holes thru the handwheel bracket clamping ring and the handwheel bracket/bearing assembly.

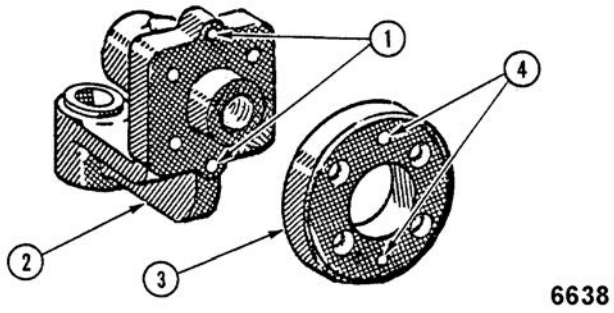


Fig. 140

5. Install the two roll pins in the previously drilled holes.
6. Complete installation of remaining parts in reverse order of removal.
7. Perform handwheel ADJUSTMENT.
8. Check mixer for proper operation.

Handwheel Adjustment

NOTE: The handwheel is adjusted by loosening or tightening the stop nut

1. Adjust stop nut until there is a 1/16" gap between handwheel hub and clamping ring.

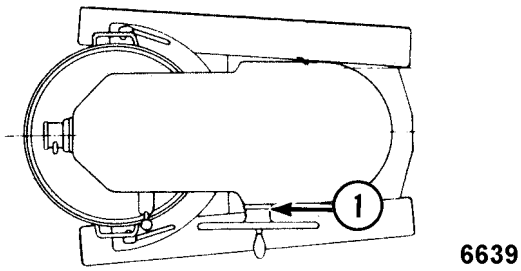


Fig. 141

MANUAL BOWL LIFT SCREW ASSEMBLY

⚠ WARNING

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

CAUTION

Lower the bowl support to its lowest position before attempting to remove the lift screw assembly.

Removal and Disassembly

1. Remove TOP COVER ASSEMBLY.
2. Remove pedestal apron.
3. Remove mixer MOTOR.
4. Bend down tab(s) on the lock washer that are fitted into the notches of special bearing locknut.

5. Hold the bowl lift handwheel to keep the lift screw from turning and remove the special bearing locknut.

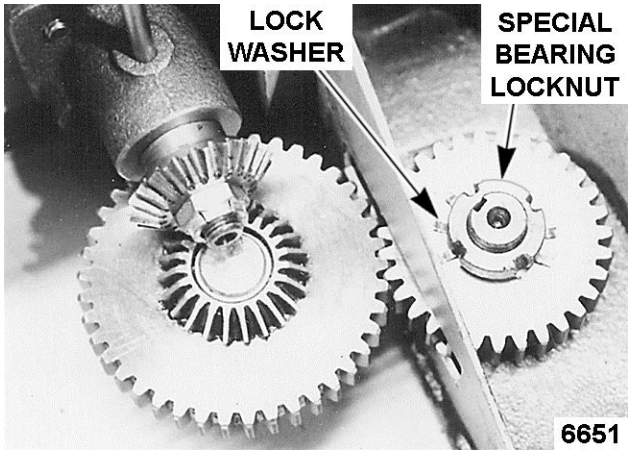


Fig. 142

6. Remove the bolts on the lift nut retainer (1, Fig. 143).

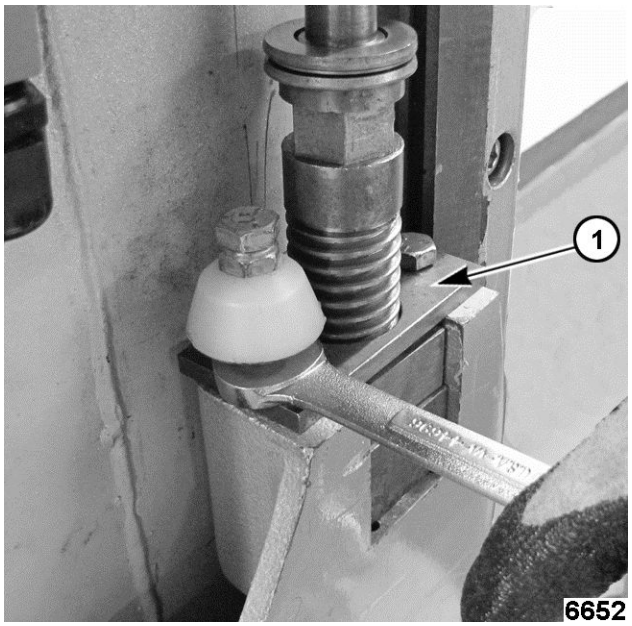


Fig. 143

7. Turn the lift screw down by hand until the top of the lift screw clears the transmission case and remove the lift screw.

8. Remove the lift screw gear, washer and bearing.

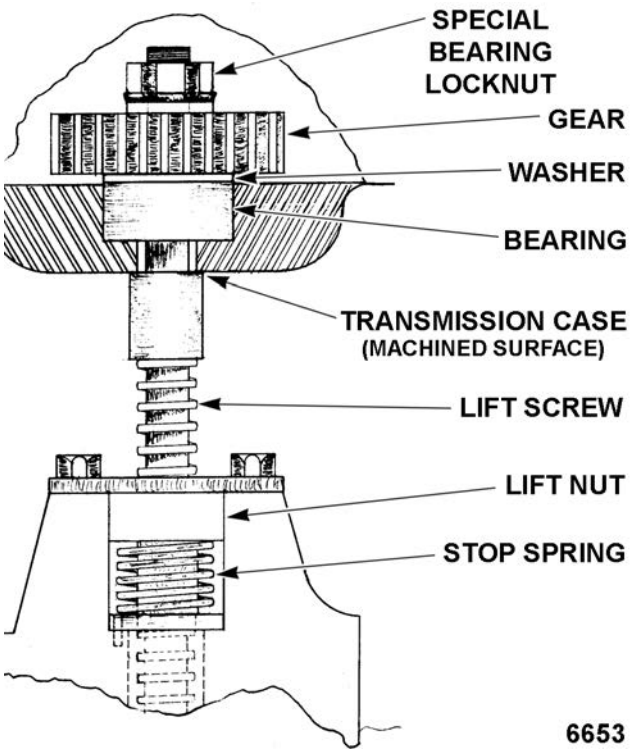


Fig. 144

Reassembly and Installation

1. Lubricate internal threads of bowl lift nut with Lubriplate 630AA before reassembly.

NOTE: If a bowl lift nut assembly is being installed, be certain that the head of the cap screw is facing out.

2. Reassemble lift screw assembly in reverse order.

NOTE: On L-800 mixers, be sure the bowl support stop spring is in place see Step 8.

3. Adjust end play of lift screw as outlined in LIFT SCREW ADJUSTMENT.

4. Lower bowl support to its lowest position.

   A. Coat lift screw with Lubriplate 630AA.

5. Reinstall mixer MOTOR.

NOTE: If bowl lift mechanism uses a bowl lift nut assembly, verify BOWL LIFT NUT ASSEMBLY ADJUSTMENT before installing pedestal apron.

6. Reinstall pedestal apron.

7. Reinstall TOP COVER ASSEMBLY.

8. Check mixer for proper operation.

Lift Screw Adjustment

NOTE: Refer to Fig. 144. The end play adjustment is provided by the locknut located on the top of the lift screw. The upward thrust is taken by the shoulder on the screw shaft. Downward thrust is taken by the bearing. A minimum of 0.005" end play should be

allowed between the shoulder on the lift screw shaft and the machined surface of the transmission case.

⚠ WARNING

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

1. Remove TOP COVER ASSEMBLY.
2. Remove mixer MOTOR.
3. Remove the pedestal apron.
4. Holding the handwheel to prevent the lift screw from turning, adjust the locknut Fig. 144 to get 0.005" clearance between the shoulder and the machined surface of the transmission case.
5. Check bowl lift for proper operation.
6. Reinstall mixer MOTOR, TOP COVER ASSEMBLY and pedestal apron.
7. Check mixer for proper operation.

Bowl Lift Nut Assembly Adjustment

1. Start with bowl support in its lowest position.
2. Snug bowl lift nut assembly cap screw.
3. Install bowl into place on bowl support.
4. Weight bowl to simulate a load and raise bowl support to its highest position.

NOTE: As threaded surface of bowl lift nut assembly wears, the tendency to back-drive will increase. Tighten cap screw as necessary to prevent back-driving.

5. With mixer in an idle state, check for bowl support back-driving by exerting downward force on bowl support.
   A. If back-driving exists, tighten bowl lift nut assembly cap screw until back-driving is eliminated. Do not over tighten cap screw.
6. Lower and raise bowl lift to check operation. Bowl support should raise and lower without too much resistance.
   A. If bowl lift is difficult to operate, loosen bowl lift nut assembly cap screw slightly.
   B. Raise bowl support and recheck for back-driving.
   C. Repeat adjustment until bowl support can be raised and lowered without too much resistance and there is no back-driving.
7. Check BOWL TO BEATER clearance.
8. Reinstall pedestal apron.
9. Check mixer for proper operation.

POWER BOWL LIFT MOTOR AND TRANSMISSION

CHANGES

The Hobart-built motor originally used for the power bowl lift is obsolete. Production started using either a General Electric or Howell Electric motor beginning in December 1987 for the bowl lift motor.

Removal

1. If possible, place bowl support in lowest possible position.

⚠ WARNING

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

2. Remove the TOP COVER.
3. Discharge the power bowl lift (PBL) capacitor.
4. Remove the mixer MOTOR.
5. Disconnect the leads from the PBL fuse board and capacitor.
6. Remove the gear case mounting bolts [2] Fig. 145.

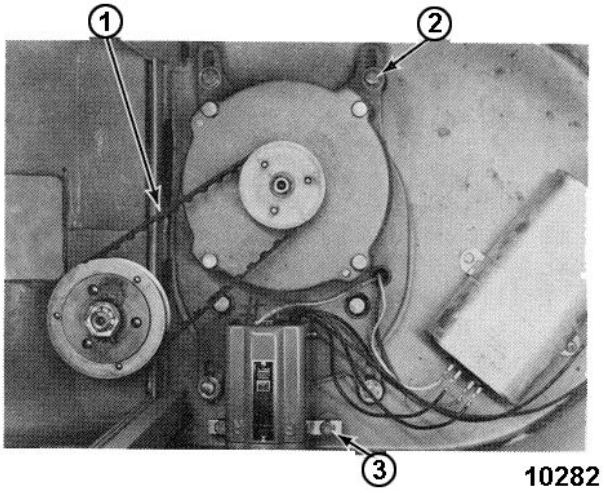


Fig. 145

7. Slide the bowl lift assembly towards the PBL switch and remove the Flexa-Gear belt.
8. Remove the two mounting bolts from the switch [3] Fig. 145, rotate the switch to pull the switch handle through the hole in the pedestal and lift the PBL and switch out of the pedestal.

Disassembling the PBL Transmission

1. Remove the cover from the PBL switch, disconnect the white lead from #6 terminal and set the switch aside.

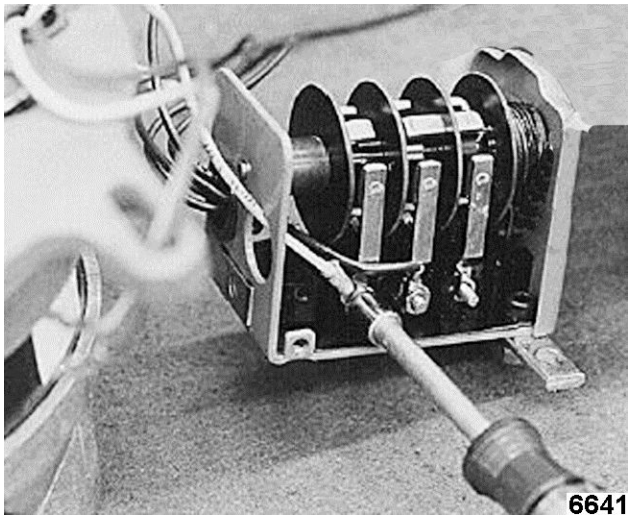


Fig. 146

2. Remove the retaining ring (1, Fig. 147) that holds the drive pulley in place. Remove the drive pulley and key.

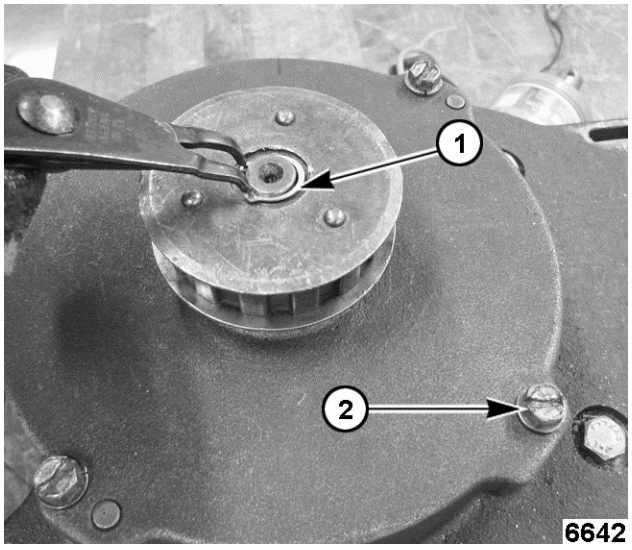


Fig. 147

3. Remove the bolts (2, Fig. 147) from the gear case cover. Tap the cover lightly to break the seal and pry it off the locating pins.

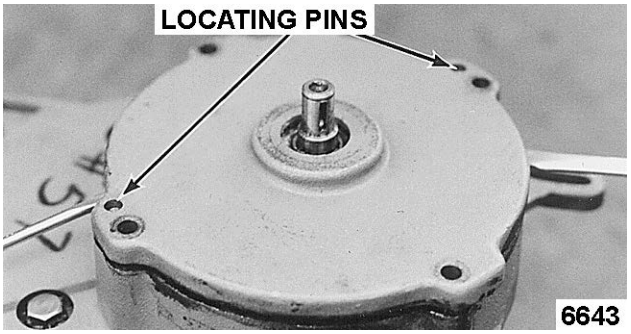


Fig. 148

4. Remove the PBL transmission shaft assembly and key (1, Fig. 149).

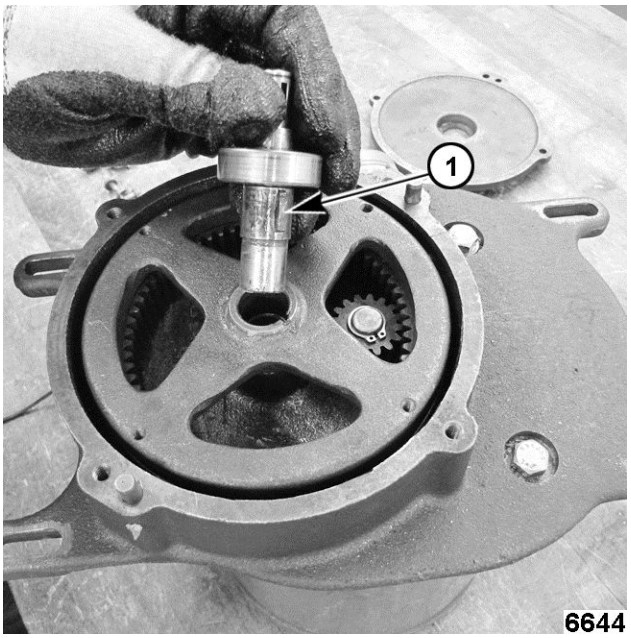


Fig. 149

5. Lift out the internal gear and hub assembly.
   A. Remove the socket head screws (1, Fig. 150) and remove the hub from the internal gear.
6. Remove the motor pinion retaining ring, gear and key (2, Fig. 150).
7. Remove the grease from the gear case.
8. Remove the motor mounting bolts (3, Fig. 150) and lock washers.

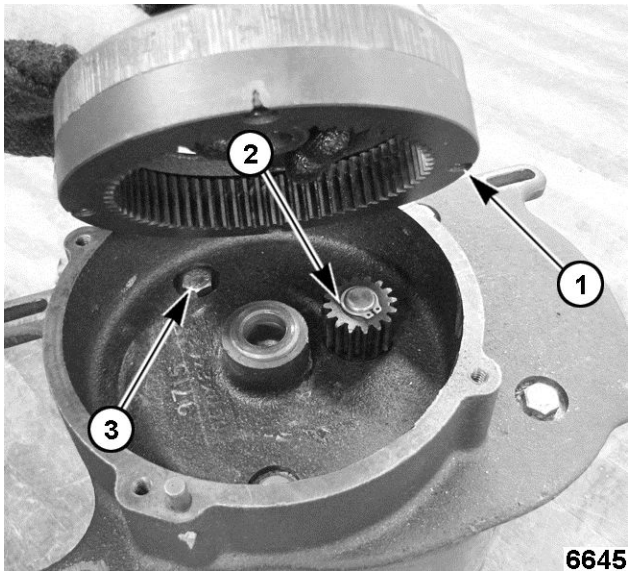


Fig. 150

9. Carefully pry the gear case housing off the locating pins on the PBL motor.
10. Remove the oil seal (1, Fig. 151) from the gear case housing.

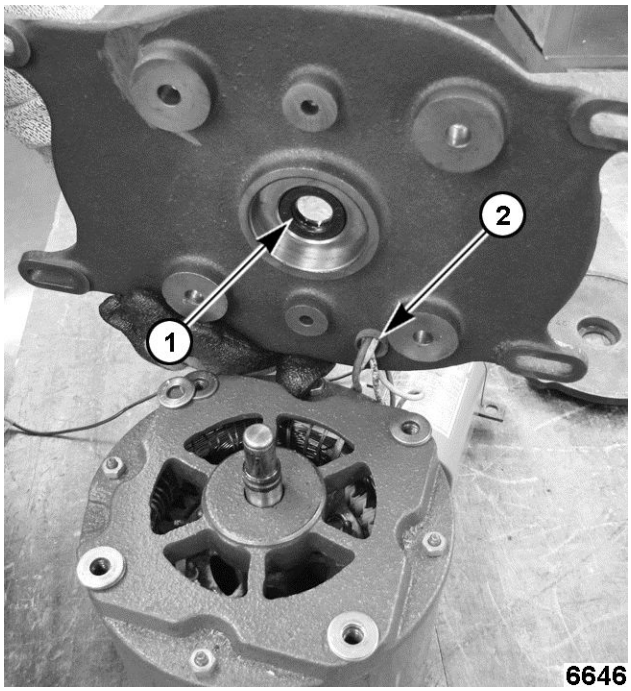


Fig. 151

Reinstalling the PBL Unit

1. Check condition of the seal and vibration mounts before installing the PBL into the pedestal. Replace components that are worn, cracked, or otherwise damaged.

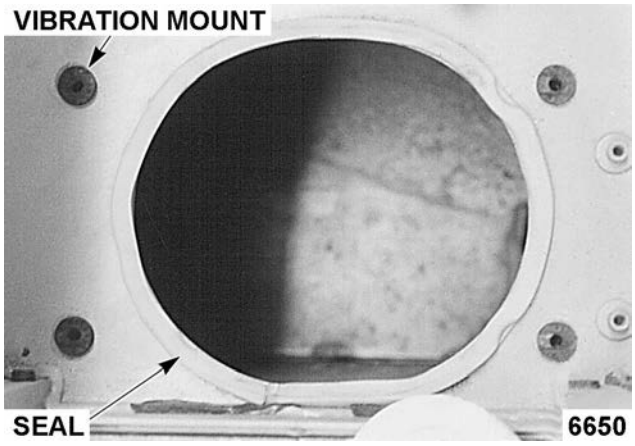


Fig. 152

2. Position the PBL in the pedestal and reinstall the PBL switch.
3. Reinstall the Flexa-Gear belt and perform FLEXA-GEAR BELT ADJUSTMENT.
4. Test the PBL mechanism to verify proper operation.
5. Reinstall mixer motor and reconnect all leads.
6. Replace top cover.
7. Check mixer for proper operation.

Flexa-Gear Belt Adjustment

NOTE: The Flexa-Gear belt on the power bowl lift must be adjusted so there is approximately ½" deflection at the midway point [1] Fig. 153 between the drive pulley and clutch assembly. If the Flexa-Gear belt is too tight, it may wear excessively and be noisy. If it is too loose, it may come off the pulley or slip.

⚠ WARNING

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

1. Remove TOP COVER ASSEMBLY.
2. Discharge the power bowl lift (PBL) capacitor.
3. Loosen the four PBL gear case mounting bolts.
4. Slide the PBL gear case away from the PBL switch until there is approximately ½" deflection of the Flexa-Gear belt midway between the clutch assembly and drive pulley [1] Fig. 153.

NOTE: If difficulty is encountered in making this adjustment, the mixer motor can be removed to gain access to the PBL gear case.

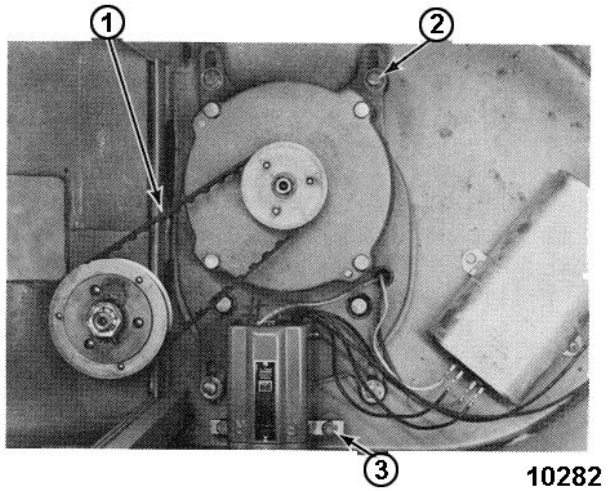


Fig. 153

5. Apply Loctite 242 or equivalent to threads of gear case mounting bolts and tighten bolts to a torque of 13-17 in*lb (approximately 4 turns from finger tight). Do not over tighten hardware.
6. Check PBL for proper operation.
7. Replace TOP COVER ASSEMBLY.
8. Check mixer for proper operation.

POWER BOWL LIFT SCREW ASSEMBLY

Removal

1. Lower bowl support to its lowest position before attempting to remove the lift screw assembly.

⚠ WARNING

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

2. Remove the TOP COVER ASSEMBLY.
3. Discharge the PBL capacitor.
4. Remove the mixer MOTOR.
5. Remove the Flexa-Gear belt.
6. Remove the pin (1, Fig. 154) from the detent plate and hub assembly (2, Fig. 154).

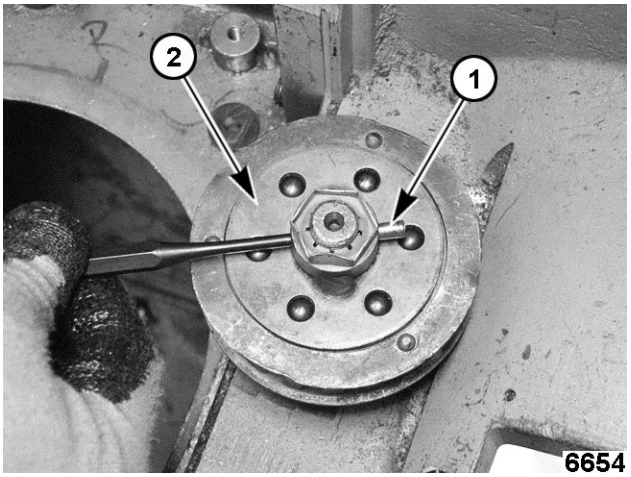


Fig. 154

7. Remove the pedestal apron.
8. Place a wrench on the machined hex surface of the lift screw to keep it from moving.

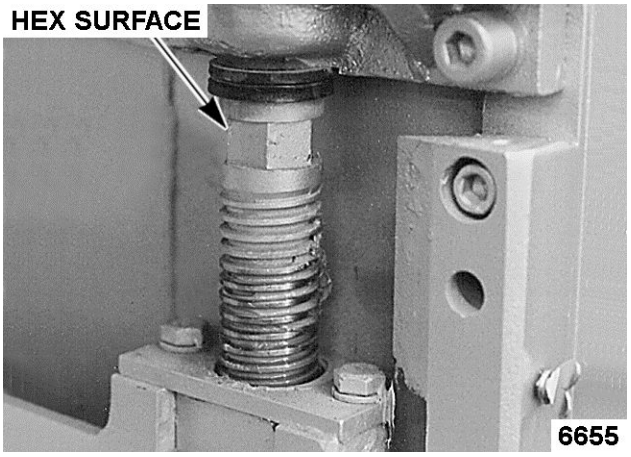


Fig. 155

   A. Slowly loosen the nut on top of the detent plate Fig. 154 to relieve the tension from the detent springs.
   B. Remove the nut while holding the plate against the pulley assembly.

9. Lift off the clutch assembly being careful not to lose the detent springs and balls.

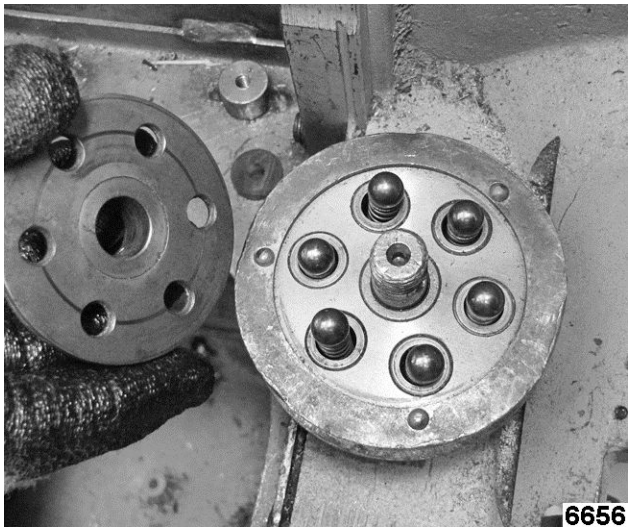


Fig. 156

10. Drive out the pin and remove the collar.
11. Bend down the locking washer tab and remove the special bearing locknut and locking washer by driving out pin (1, Fig. 157).

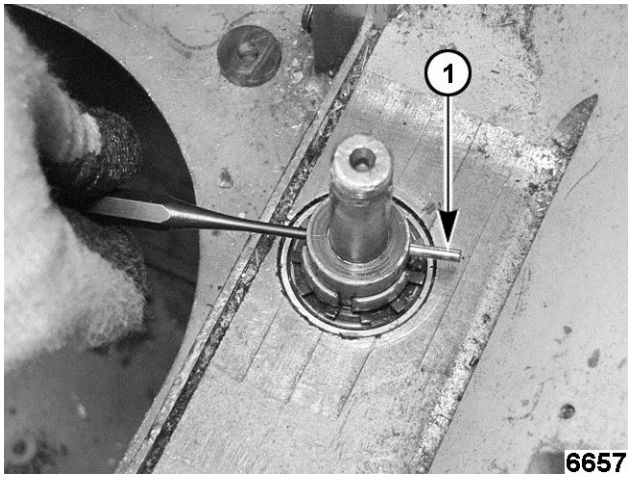


Fig. 157

12. Remove the bolts from the lift nut retainer (1, Fig. 158).

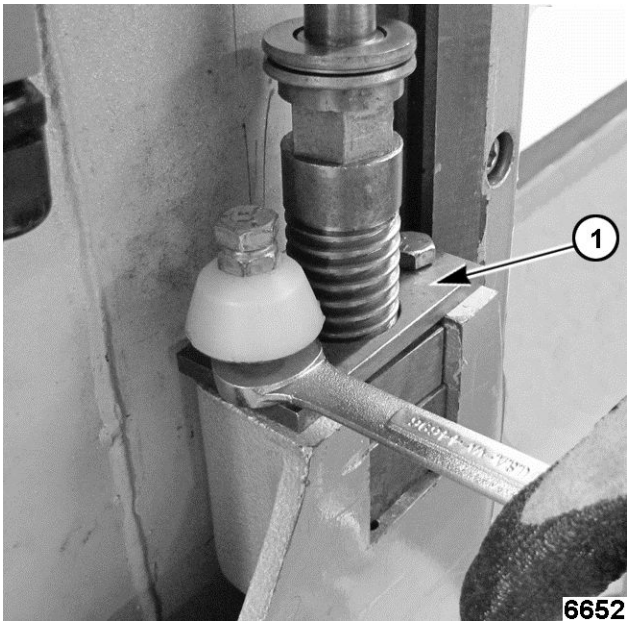


Fig. 158

13. Turn the lift screw down by hand until it is free of the transmission housing and remove the screw.

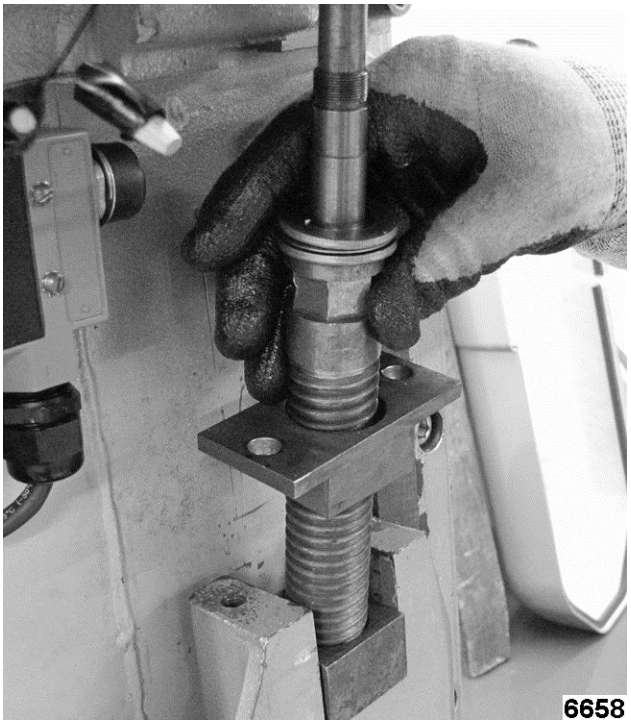


Fig. 159

14. Remove the lift screw bearing from its seat in the transmission housing.

Reassembly

NOTE: The L800 has a spacer nut located below the bowl lift screw nut on the bowl support. Be sure this is in place before installing the lift screw.

1. Install the lift screw bearing in its seat in the transmission housing.

2. Inspect the needle bearing for wear, replace if necessary and lubricate.

NOTE: The bowl lift nut is rectangular and the long side must be parallel to the front of the pedestal. In cases where a bowl lift nut assembly is used, make certain that the head of the cap screw faces out toward apron.

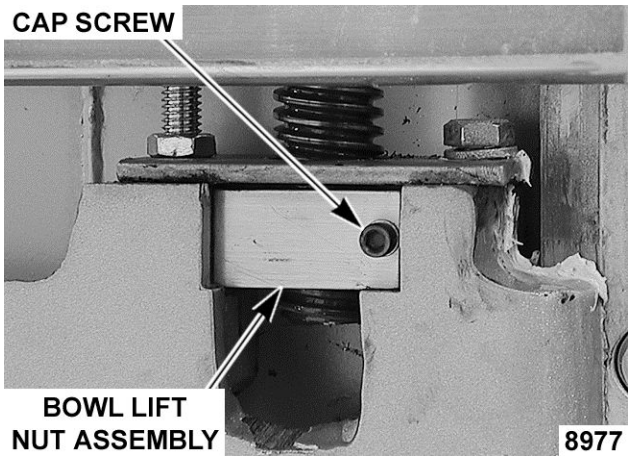


Fig. 160

3. Reassemble lift screw assembly in reverse order.
4. Position the lift screw in the bowl support.
5. Reinstall lift nut retainer.
6. With the lift screw in position, turn it by hand until the needle bearing is against the machined surface of the transmission case.
7. Reinstall the locking washer and special bearing locknut.

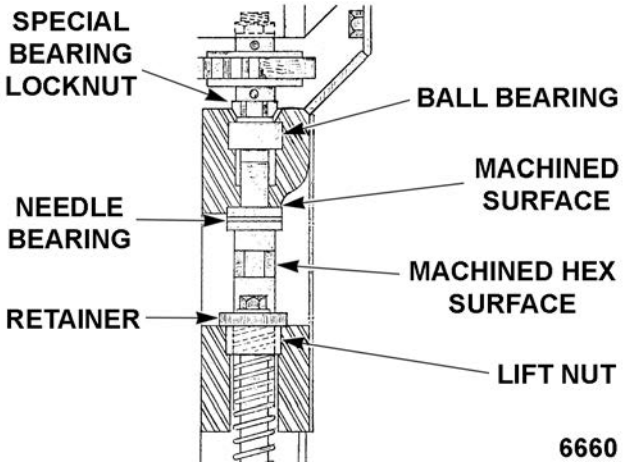


Fig. 161

8. Perform POWER LIFT SCREW ADJUSTMENT.
9. Reinstall the collar and pin.

NOTE: Before replacing the clutch assembly, make certain the six detent springs are located properly in the clutch.

10. Assemble the clutch assembly.
    A. Slide the hub assembly on the shaft.
    B. Install the three short springs in the holes of the clutch that are next to the pins of the clutch.
    C. Install the longer springs in the remaining open holes.
    D. Place the balls on top of the springs.
    E. Place the detent plate over the hub assembly. Press down on detent plate to compress springs enough to start the nut on the shaft threads.

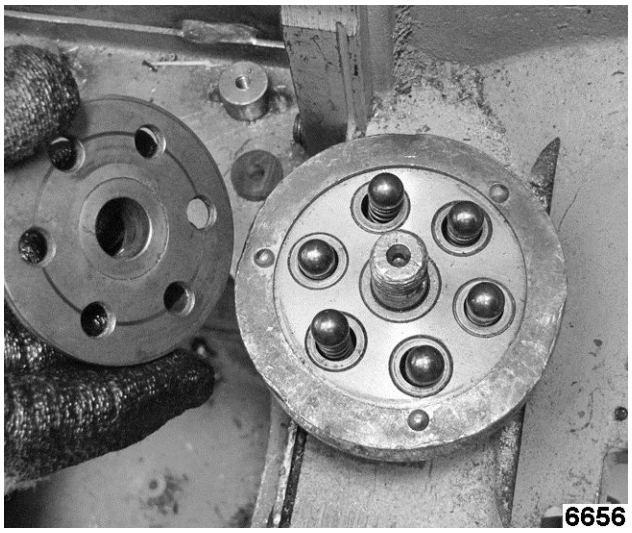


Fig. 162

    F. Tighten the nut until the holes for the pin are aligned and install the pin.
11. Reinstall the Flexa-Gear belt.
12. Perform FLEXA-GEAR BELT ADJUSTMENT.
13. Check PBL for proper operation.
14. Reinstall mixer MOTOR.
15. Reinstall TOP COVER ASSEMBLY.
16. Check mixer for proper operation.

Power Lift Screw Adjustment

NOTE: A special bearing locknut located below the clutch assembly on the lift screw provides the end play adjustment. Upward thrust is taken by a needle bearing while downward thrust is taken by a ball bearing. A minimum of 0.005" end play should be allowed between the needle bearing and the machined surface of the transmission housing.

⚠ WARNING

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

1. Remove TOP COVER ASSEMBLY and pedestal apron.
2. Discharge the PBL capacitor.
3. Remove the mixer MOTOR.
4. Remove the Flexa-Gear belt.
5. Remove the clutch assembly and collar.
6. Place a wrench on the machined hex surface of the lift screw to prevent movement and adjust the special bearing locknut to 0.005" clearance between the needle bearing and the machined surface of the transmission housing.

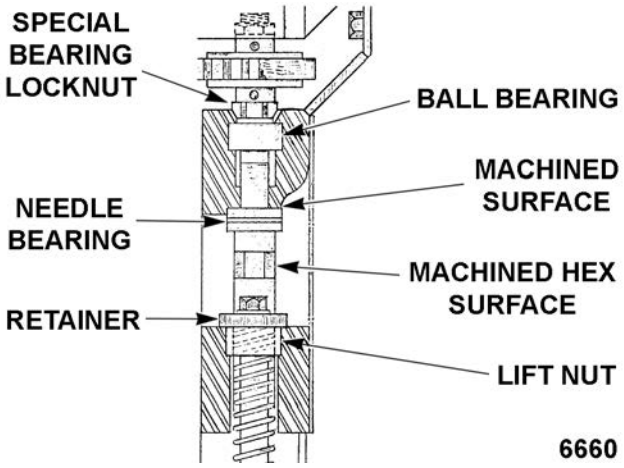


Fig. 163

7. Reinstall the collar and clutch assembly.
8. Reinstall and adjust the Flexa-Gear belt.
9. Reinstall the mixer MOTOR, TOP COVER ASSEMBLY and pedestal apron.
10. Check mixer for proper operation.

Motor Current Test

⚠ WARNING

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

1. Lower bowl support, if possible.
2. Disconnect power to mixer.
3. Remove top cover.
4. Clamp ammeter around one of the power bowl lift motor leads.
5. Apply power to mixer.
6. Place a load on bowl support equivalent to an average mixing load.
7. Operate the PBL switch (raise and lower). Record meter reading for each direction of travel.
   A. Refer to the table for approximate ampere values.

POWER BOWL LIFT MOTOR CURRENT - AMPERES	
Voltage	**Ampere**
200 VAC	3.4A
230 VAC	2.65A

NOTE: Continuous currents above the rated current and intermittent overload currents greater than 20% of rated current indicate an overload.

TIMER AND SWITCH PLATE

TECHNICAL NOTES - TIMER

H600 / L800 Switch Plate Gasket
In July 1985 the switch plate gasket was changed to a thicker material in order to eliminate washers (spacers) between the START and STOP switches and switch plate.

Switch plates with thin gaskets require a washer on each mounting screw between the switch and switch plate. Failure to install the washers may result in the switches sticking. If the switch plate gasket is made of thick material, the gasket acts as the spacer between the switch and switch plate. The washers may be used, but are not required. Refer to the illustration to identify which gasket is present on the mixer being serviced.

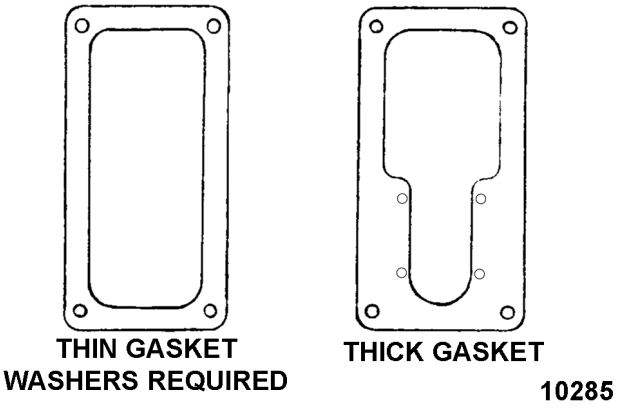


Fig. 164

Electronic Timer
The electronic timer became available as an option in October 1994. The timer can be programmed for two preset recipes. Each recipe has four time cycles. An upgrade kit is available to add the electronic timer to previously built mixers. Consult the Catalog of Replacement Parts - F18797 (H600 & L800) and F18835 (P660) for kit part number information. Refer to UPGRADE KIT INSTALLATION INSTRUCTIONS in this section for instructions.

Switch, Timer and Switch Plate Service Instructions
Refer to TSB 579 H-600 AND L-800 SERIES MIXERS - SWITCH, TIMER AND SWITCH PLATE SERVICE for more information.

H600 Cable Update Kit
This Kit updates H600 units built with a cable actuated switch to push button start and stop switches with a starter. Refer to TSB 972 H600 CABLE UPDATE KIT P/N 438754 (1PH & 3PH).

ELECTRONIC TIMER OPERATION / PROGRAMMING

NOTE: At idle, the timer display [- -:- -] shows that no time has been set.

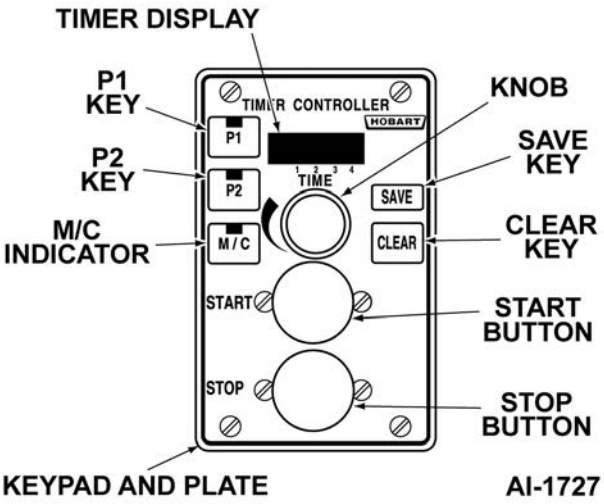


Fig. 165

Timer Keys	Programming Function (if mixer is not running)
P1	Contains up to four preset times. Displays each preset time sequentially.
P2	Contains up to four additional preset times. Displays each preset time sequentially.
Knob	Changes the time as indicated by the display.
Save	Replaces the preset time with the indicated time.
Clear	Returns to idle from a programming function.

Continuous Mixing

1. Begin from the idle display [- -:- -]. Turn knob if necessary to set display.
2. With bowl guard closed and the bowl in the up position, press START to begin mixing. The M/C indicator will be lit and the total mixing time will be indicated (minutes and seconds).
3. Press STOP when mixing is complete. The M/C indicator light goes off and the idle display [- -:- -].

Using Dial Timer to Set Mixing Time

1. Turn knob to desired mixing time. The M/C indicator will be lit.
2. Press START to begin mixing. The timer will countdown from the set time to [00:00].
   A. Pressing STOP will suspend the mixing and timer countdown.
      1) Press START to resume both mixing and timer countdown.
      2) Press CLEAR to return to idle display [- -:- -].
   B. When timer reaches [00:00]:
      1) The mixer stops.
      2) M/C indicator goes off.
      3) A beep tone sounds for two seconds.
      4) The mixer returns to idle display [- -:- -].

Using Preset Keys P1 or P2 to Set Mixing Time
NOTE: Each preset key has four time settings. The indicator LED above the number 1, 2, 3, 4 in the time display, and the P1 or P2 indicator LED identify which preset time is being displayed.

NOTE: The timer reverts to the factory programmed preset times after any power interruption.

FACTORY PROGRAMMED PRESET TIMES				
Preset Key	Indicator			
	1	2	3	4
P1	01:00	02:00	10:00	00:00
P2	02:00	01:00	05:00	03:00

1. Beginning from the idle display state [- -:- -], press P1 or P2 to display the No. 1 preset mixing time.

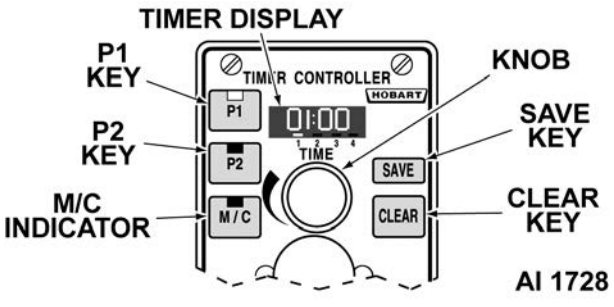


Fig. 166

EXAMPLE: An illuminated LED above P1 and 1 in timer display indicates the first preset time contained in P1.

   A. If the same preset key, P1 or P2 is pressed again, the next preset time will be displayed. Continually pressing the P1 or P2 key will advance thru the remaining preset settings.
      1) Turning the KNOB will adjust the time from the preset time that is displayed. Adjusting the time in this manner will only affect the current time and will not alter the programmed preset time.
2. Press START to begin mixing. The timer will countdown from the set time to [00:00].
   A. A. Pressing STOP will suspend the mixing and timer countdown.
      1) Press START to resume both mixing and timer countdown.
      2) Press CLEAR to return to idle display [- -:- -].
   B. When timer reaches [00:00],
      1) The mixer stops.
      2) A beep tone sounds for two seconds.
      3) The next preset mixing time displays.
      4) When the last preset time reaches [00:00], the P1 or P2 indicator goes off and the mixer returns to idle display [- -:- -].

Programming Preset Keys P1 and P2 Mixing Time
NOTE: Each preset key has four time settings. The indicator LED above numbers 1, 2, 3, 4 in the time display, and the P1 or P2 indicator LED identify which preset time is being displayed. The preset times can be programmed to different times from the default settings listed below.

NOTE: The timer reverts to the factory programmed preset times after any power interruption

FACTORY PROGRAMMED PRESET TIMES				
Preset Key	Indicator			
	1	2	3	4
P1	01:00	02:00	10:00	00:00
P2	02:00	01:00	05:00	03:00

1. Beginning from the idle display state [- -:- -], press P1 or P2 to display the No. 1 preset mixing time.

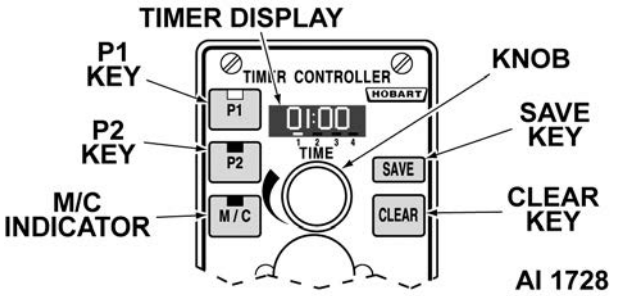


Fig. 167

EXAMPLE: An illuminated LED above P1 and 1 in timer display indicates the first preset time contained in P1.

A. If the same preset key, P1 or P2 is pressed again, the next preset time will be displayed. Continually pressing the P1 or P2 key will advance thru the remaining preset settings.

2. Turn the KNOB to change the time for the indicated preset time.
3. Press SAVE key to retain the revised times and return to the idle display [- -:- -].

A. If more preset times are to be revised, advance to the desired preset, enter the new time and press SAVE. Repeat as necessary until required times are entered.

NOTE: Pressing CLEAR key will retain saved time and return timer to the idle display [- -:- -].

4. Press START to begin mixing. The timer will countdown from the set time to [00:00].

A. Pressing STOP will suspend the mixing and timer countdown.

1) Press START to resume both mixing and timer countdown.

2) Press CLEAR to return to idle display [- -:- -].

B. When timer reaches [00:00]:

1) The mixer stops.

2) A beep tone sounds for two seconds.

3) The next preset mixing time displays.

4) When the last preset time reaches [00:00], the P1 or P2 indicator goes off and the mixer returns to idle display [- -:- -].

REMOVAL AND REPLACEMENT

⚠ WARNING

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

NOTE: If the timer control board is being replaced, set the jumpers on replacement board to match the board being replaced.

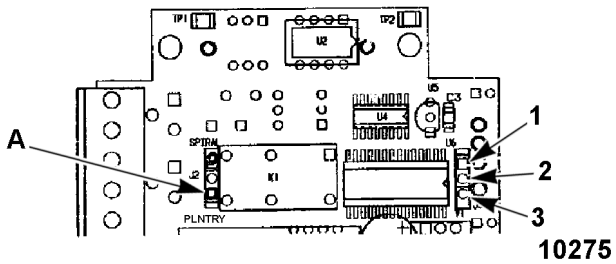


Fig. 168

TIMER CONTROL BOARD JUMPER CONFIGURATION	
Jumper Position	**Description**
Between middle pin and pin marked PLNTRY.	Reference A in illustration 10275.
Pin 1 to 2. (Standard position)	Fifteen minute timer with 10 second increment.
Pin 2 to 3.	Twenty-two minute timer with 15 second increment.
NOTE: If jumper location is changed, mixer must go from power off to power on to reset timer.	

1. Disassemble the switch plate assembly. Refer to Fig. 169.

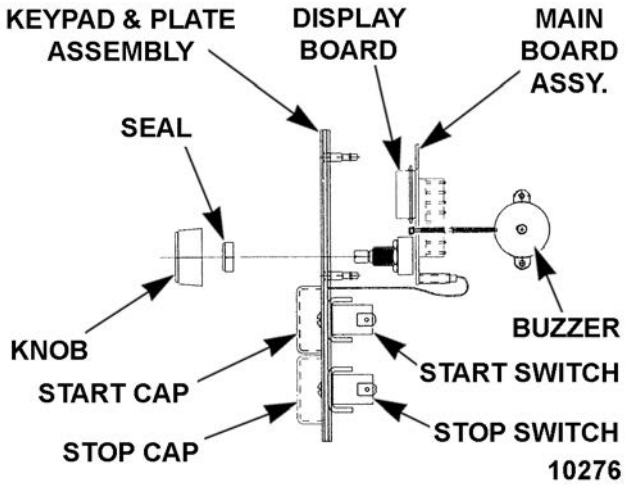


Fig. 169

2. Remove buzzer wires from main board assembly by loosening two terminal screws on board and pulling wires out.
3. Lift board off retaining studs.

NOTE: Apply a small amount of Lubriplate FGL-2 (Part No. 00-103881-00067) to inside of seal when reassembling.

4. Reassemble parts removed in reverse order.

KEYPAD TEST

⚠ WARNING

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

1. Disconnect keypad connector.
2. Set meter to measure resistance.
   A. Check continuity of key switches. Refer to Fig. 170. When contacts are closed, resistance should be 50 ohms or less.

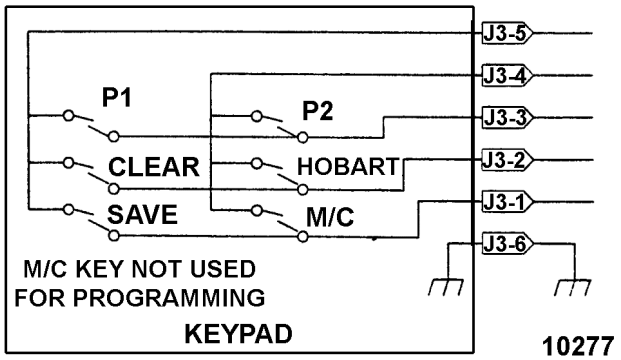


Fig. 170

TIMER SERVICE DIAGNOSTICS

⚠ WARNING

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

NOTE: The program will stop if a timer controller error is detected.

1. Remove the switch plate assembly from transmission case. Do not disconnect wiring.
2. Jump TP1 and TP2 on main control board.

Entering Service Diagnostics

⚠ WARNING

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

3. Turn power on.
4. Press CLEAR and HOBART keys simultaneously. The timer will beep twice, the display will show [tE:St], then the display goes into automatic scroll.

TIMER SERVICE DIAGNOSTICS				
Tested Area	**Display**	**Beeper**	**Technician Action**	**Note**
Display	00:00; 99:99	N/A	N/A	Automatic scroll from 00:00 to 99:99
	SE:On	Short Tone	N/A	After scrolling complete
Start Circuit	SE:On	N/A	Press Start	
		Short Tone	N/A	Pass
	tr:01	Short Tone	N/A	Mixer agitator turning
	tr:02	N/A	N/A	Mixer agitator turning
Keyboard LEDs	tr:02	N/A	N/A	Three timer LEDs turn on and stay on.
	Flashes SE: 00 once	Short Tone	N/A	
	turn	Short Tone	N/A	Pass
Time Selection	turn	N/A	Turn timer knob	
	xx:xx	N/A	N/A	xx:xx is whatever value knob is set to.
	01:00	Short Tone	N/A	Pass
M/C Key	02:01	N/A	Press M/C Key	While key is down.
	02:00	N/A	N/A	Pass
P2 Key	03:02	N/A	Press P2 Key	While key is down.
	03:00	N/A	N/A	Pass
P1 Key	04:03	N/A	Press P1 Key	While key is down.
	04:00	N/A	N/A	Pass
HOBART Key	05:04	N/A	Press HOBART Key	While key is down.
	05:00	N/A	N/A	Pass
CLEAR Key	06:05	N/A	Press CLEAR Key	While key is down.
	06:00	N/A	N/A	Pass
SAVE Key	06:00	N/A	Press SAVE Key	
	nn:nn	Short Tone	N/A	Three LEDs on timer turn off.
Test mode is automatically exited	- - - -	N/A	N/A	Pass
			Disable Service Diagnostics	

Disabling Service Diagnostics Mode

⚠ WARNING

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

1. Remove the switch plate assembly from transmission case. Do not disconnect wiring.
2. Remove jumper from TP1 to TP2.
3. Reinstall switch plate assembly.
4. Reapply power to mixer.

ELECTRONIC TIMER UPGRADE KIT INSTALLATION INSTRUCTIONS

⚠ WARNING

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

NOTICE

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

1. Remove TOP COVER.
2. Remove switch plate assembly from transmission case. Save screws.
   A. Disconnect wiring and discard switch plate assembly.
3. Remove the shifting unit interlock switch and disconnect the wires.
4. Pull the wires from switch cavity.
   A. Remove P-clamps on wiring harness and pull switch cavity wires and wires from shifting unit interlock switch to rear of unit.
   B. Remove control panel from pedestal to allow access to wire connections at bottom of contactor and overload relay.
   C. Disconnect switch cavity wires and shifting unit interlock switch wires from control panel components and discard wires.

NOTE: In some cases the switch cavity opening will not allow proper installation of switch plate assembly without reshaping cavity opening. A template is supplied in the kit to determine if reshaping is required.

5. Tape template in position over switch plate mounting holes in transmission case.
   A. Determine if any of the casting is inside the opening in the template.
      1) If none of the casting is present, remove the template and continue with procedure.
      2) If casting is inside opening, the transmission case must be modified.
         a. Place a shop cloth inside switch cavity opening and reshape opening until casting is not present inside template. Recommended tools consist of an electric hand drill and carbide rotary burr/file.
         b. Remove the template.
         c. Carefully remove the shop cloth and dispose of the removed material.
6. Feed kit wiring harness from switch cavity through the hole in transmission case. Route the wires to the control panel, except a ground wire that will be installed under the P-clamp at the top of transmission case and two branded wires that go to the shifting unit interlock switch area.
   A. Wire the control panel components per the branding on the wiring harness wires and supplemental wiring diagram from the kit. If a splice is not present, the wires marked splice go to the normally open (N.O.) Contacts on the contactor side switch.
   B. Fasten the rear ground wire to the grounding lug at the top of the pedestal.
   C. Install snubber assembly between C1 and C3 on contactor.
   D. Reinstall control panel to pedestal.
   E. Reinstall the P-clamps. Place a ground wire under the P-clamp at the top of the transmission case.
   F. Connect the wires to shifting unit interlock switch and reinstall switch.
7. Mount the buzzer assembly at the two lower gear shift bracket holes using the existing screws and lock washers.
   A. Route buzzer wires to switch cavity.
8. Plug the wiring harness into the switch plate assembly main circuit board.
   A. Connect branded wire to 2PB-C on start switch.
   B. Connect ground wire to threaded stud on assembly.
   C. Connect the buzzer wires.
9. Look at the jumpers on the main circuit board and discuss with the customer if they want a 15 minute or 22 minute timer, 10 second or 15 second increments and locate the jumpers as shown.

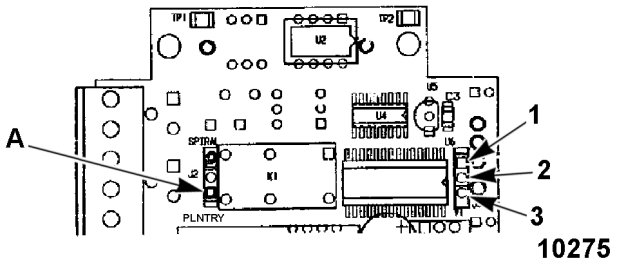


Fig. 171

TIMER CONTROL BOARD JUMPER CONFIGURATION	
Jumper Position	**Description**
Between middle pin and pin marked PLNTRY.	Reference A in Fig. 171.
Pin 1 to 2. (Standard position)	Fifteen minute timer with 10 second increment.
Pin 2 to 3.	Twenty-two minute timer with 15 second increment.

NOTE: If jumper location is changed, mixer must go from power off to power on to reset timer.

10. Reinstall the shift selector plate.
11. Install switch plate assembly onto transmission case using saved hardware.
12. Peel paper backing from supplemental wiring label and place label next to original wiring diagram in the top cover assembly.
13. Reinstall top cover.
14. Refer to operating instructions F19121 or OPERATION AND PROGRAMMING for instructions.
15. Power mixer and check for proper operation.
16. Leave operating instructions with customer.

ELECTRICAL OPERATION

COMPONENT FUNCTION - H600 / L800

Capacitor (1CAP) . . . . . Start capacitor for single phase mixer motor.

Capacitor (2CAP) . . . . . Start capacitor for single phase P660 mixer motor. Used as filter capacitor for bowl lift motor in H600 / L800 mixers.

Contactor (CON) . . . . . . Motor contactor controlling voltage to mixer motor.

Fuse, (1FU) . . . . . . Located on primary side (H1 connection) of transformer = 2.0 A.

Fuse, (2FU) . . . . . . Fuse, (2FU)

Fuse, (3FU)* . . . . . . Located on 2FB. Located in the bowl lift motor circuit. Hobart built or Howell Electric motors use 3.5 A fuses and General Electric motors use 5.6 A fuses.

Fuse, (4FU)* . . . . . . Located on 2FB. Located in the bowl lift motor circuit. Hobart built or Howell Electric motors use 3.5 A fuses and General Electric motors use 5.6 A fuses.

Fuse Board, (2FB)* . . . Located in the bowl lift motor circuit.

Motor, Mixer . . . . . . Motor that drives mixer transmission.

Motor, Power Bowl Lift* . . . . . . Motor that drives bowl support lift.

Overload (OL) . . . . . . Mixer motor overload with N.C. contacts in series with the contactor CON coil.

Solenoid (LOCK) . . . . . Bowl locking mechanism. Not available with power bowl lock feature.

Switch, Contactor Side (CON C/NO) . . . . . . N.O. contacts in latch circuit.

Switch, Bowl Guard (2LS) . . . . . . Switch is closed when the bowl guard is closed.

Switch, Bowl Height (3LS) . . . . . . Switch is closed when bowl support is lifted into the full up position.

Switch, Bowl Lift (3S)* . . . Controls lifting operation of power bowl lift circuit.

Switch, Limit (LS) . . . . . Switch is closed anytime the gear shift lever is in the detent for a gear. When the gear shift lever is out of the detent, the limit switch is open.

Switch, Start (2PB) . . . Located on switch plate. Momentary N.O. contacts, push to make. N.C. contacts complete circuit for bowl lock mechanism.

Switch, Stop (1PB) . . . . Located on switch plate. N.C. contacts, momentary push to break. Shuts machine off.

Terminal Block (TB) . . . . . . Interface used to connect mixer motor to wiring harness.

Timer . . . . . . Located in the control circuit, the electrically powered timer utilizes internal N.O. contacts to control flow of electricity through the timer controlling mixing time.

Transformer and Fuse Board (T) . . . . . . Transformer used to step-down supply voltage to control line voltage of 115 VAC. Fuse board located on primary side.

*** Power bowl lift was an available option on H600 and L800 mixers.**

SEQUENCE OF OPERATION - H600 / L800 / P660

NOTE: Sequence of operation based on Fig. 178 Mixer F-18823A. Sequence may vary depending on the components present on the mixer being serviced. Refer to the wiring diagram present on the mixer being serviced.

1. Conditions
    - A. Mixer connect to supply voltage.
    - B. Bowl guard open.
    - C. Bowl support down.
    - D. Mixer in 1st speed.
        1) L1 potential to START 2PB N.O. and contactor side switch CON-C.
    - E. Timer set to four minutes.

NOTE: For motor driven timers, to set timer for times below three minutes, turn timer knob past three minutes then adjust to desired time.

1) Timer N.O. contacts close.

2. Bowl guard cage closed.
    - A. Bowl guard switch 2LS contacts close.

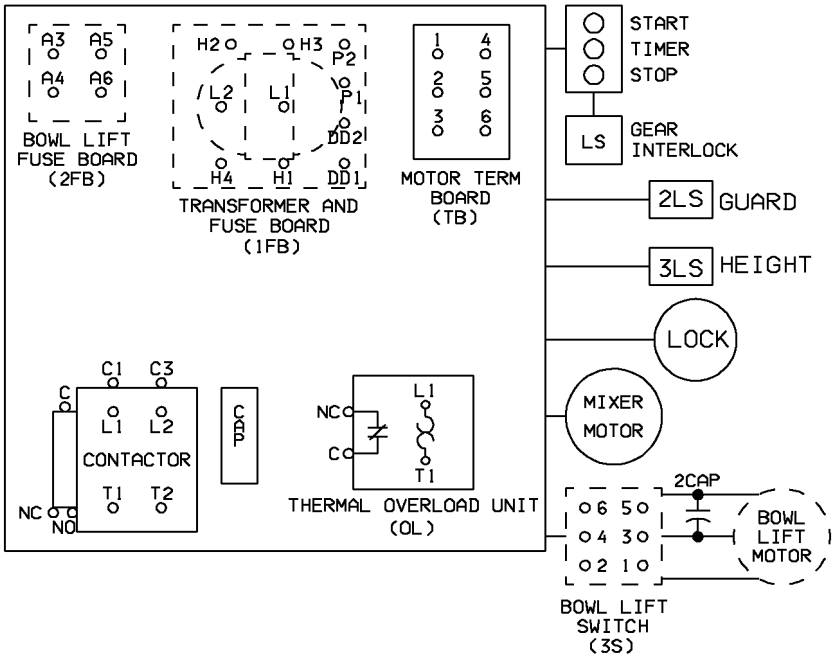
NOTE: Mixer can now be operated provided START switch is pushed and held in.

3. Bowl support raised to the full up position.
    - A. Height switch 3LS contacts close.
4. START button is pushed closing the momentary N.O. contacts.
    - A. Contactor CON coil is energized through timer N.O. closed contacts, N.C. overload contacts and guard switch 2LS.
        1) Contactor N.O. contacts close.
        2) Mixer motor energized.
        3) Timer motor energized beginning countdown operation.
        4) Contactor side switch N.O. contacts close creating a latch circuit around START switch contacts.
5. START button is released. Mixer continues to operate through latch circuit.
    - A. START switch N.C. contacts close energizing the LOCK solenoid through the latching circuit. Bowl support is locked in the full up position.
    - B. Mixer motor is energized until the following occurs.
        1) Timer reaches zero.
        2) Bowl guard is opened.
        3) STOP switch (1PB) is pressed.
        4) Gear selector shift is taken out of gear (LS contact open).
        5) Overload contacts open.
6. Timer counts down to zero.
    - A. Timer N.O. contacts open.
        1) Contactor CON coil is de-energized and N.O. contacts open.
            a. Mixer motor de-energizes.
            b. Latching circuit is disabled.
            c. LOCK solenoid de-energizes.

CONTROL PANEL LAYOUT

H600 AND L800 CONTOL PANEL LAYOUT

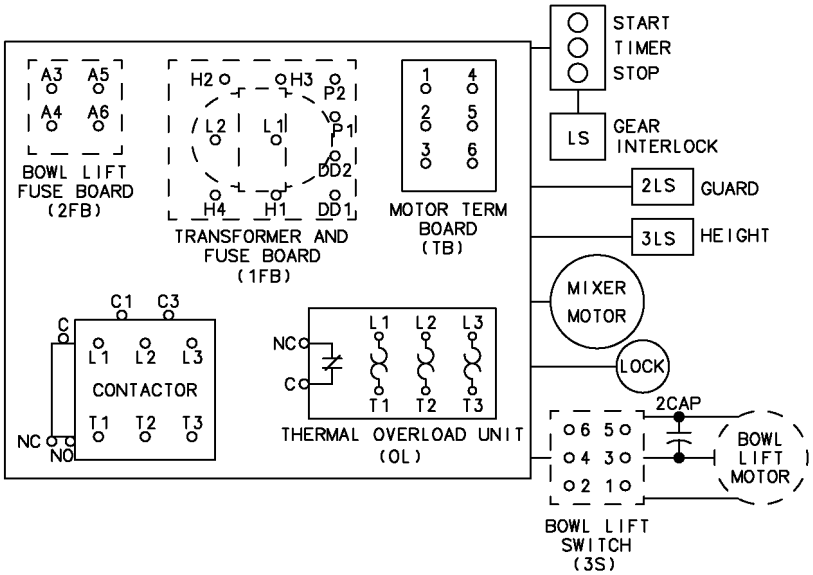
SINGLE PHASE



TRANSFORMER CONNECTIONS		
VOLTS	HZ	CONNECT
200-230	60	H3 TO L1 H2 TO L2
220-240	50	H3B TO L1 H2B TO L2

WHEN TRANSFORMER IS NOT USED:
CONNECT WIRE 1FB-P1 TO CON-L1
CONNECT WIRE 1FB-P2 TO CON-L2

THREE PHASE



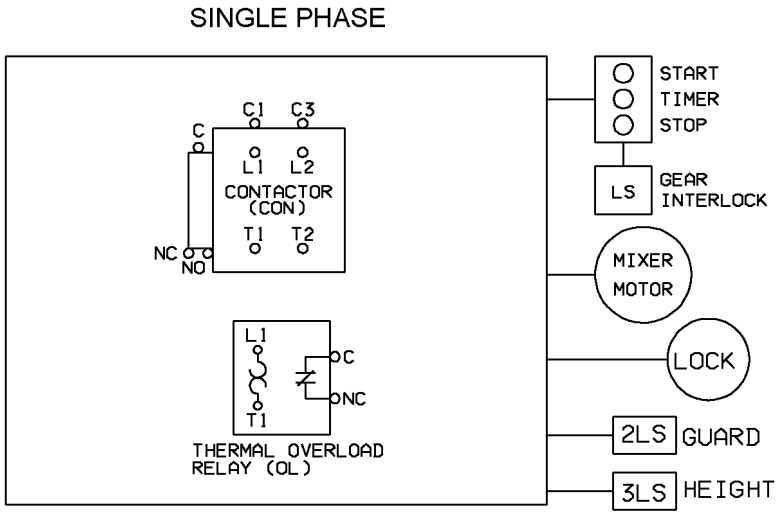
TRANSFORMER CONNECTIONS		
VOLTS	HZ	CONNECT
200-230	60	H3 TO L1 H2 TO L2
400-460	60	H3 TO H2
220	50	H3B TO L1 H2B TO L2
380-415	50	H2A TO H3A

WHEN TRANSFORMER IS NOT USED:
CONNECT WIRE 1FB-P1 TO CON-L1
CONNECT WIRE 1FB-P2 TO CON-L2

AI 1735

Fig. 172

P660 CONTROL PANEL LAYOUT



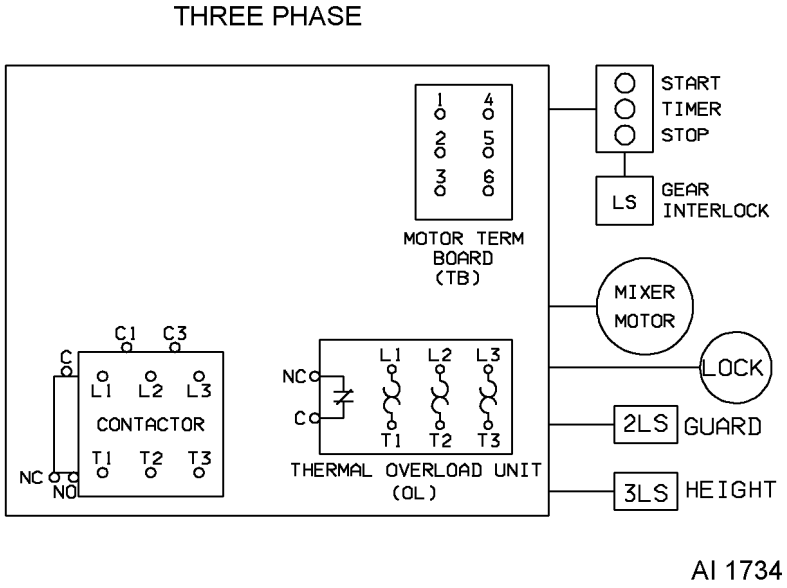


Fig. 173

WIRING DIAGRAMS - H600 / L800 / P660

Electrical Wiring Diagrams
H600 / L800 Single Phase
H600 / L800 Three Phase
P660 Single Phase
P660 Three Phase
H600 with Brake Early Mixers

SYMBOL DEFINITIONS

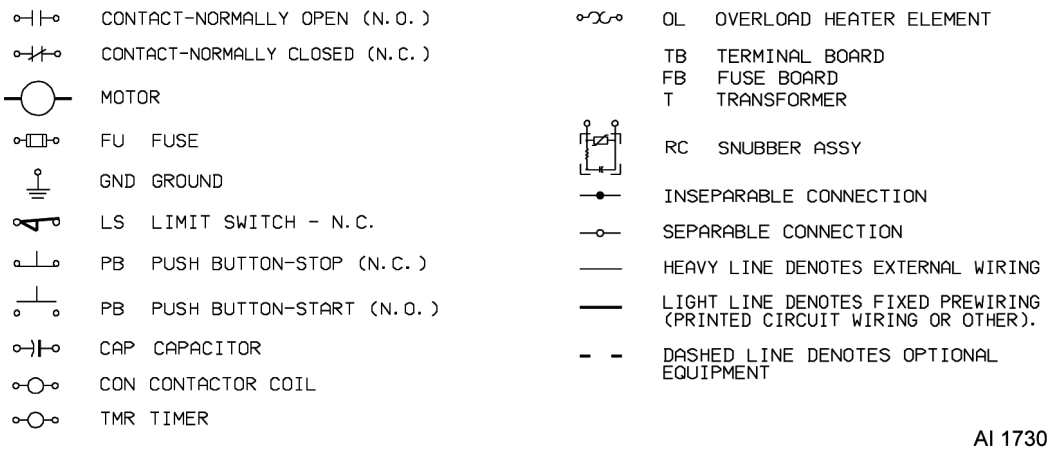
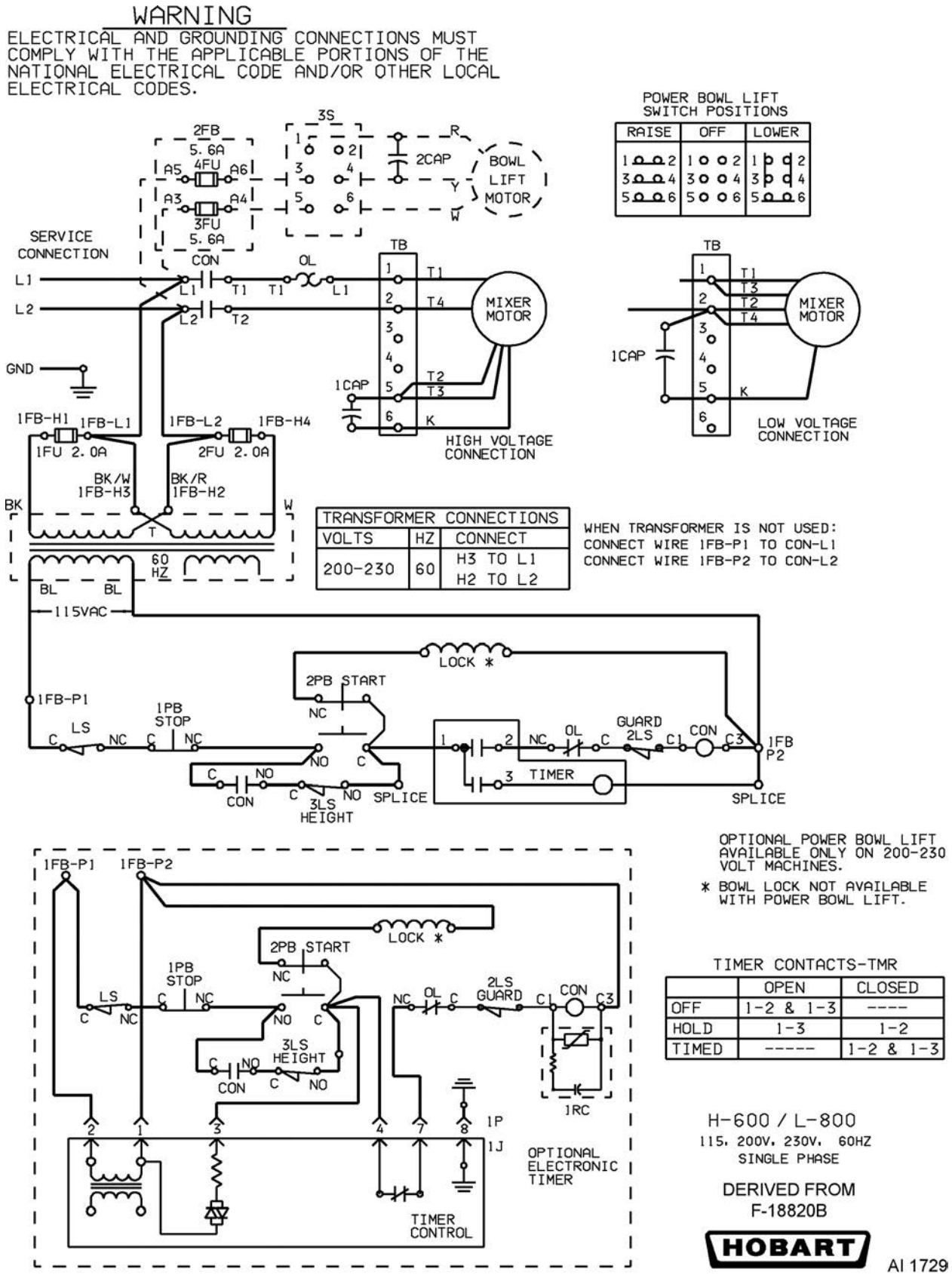
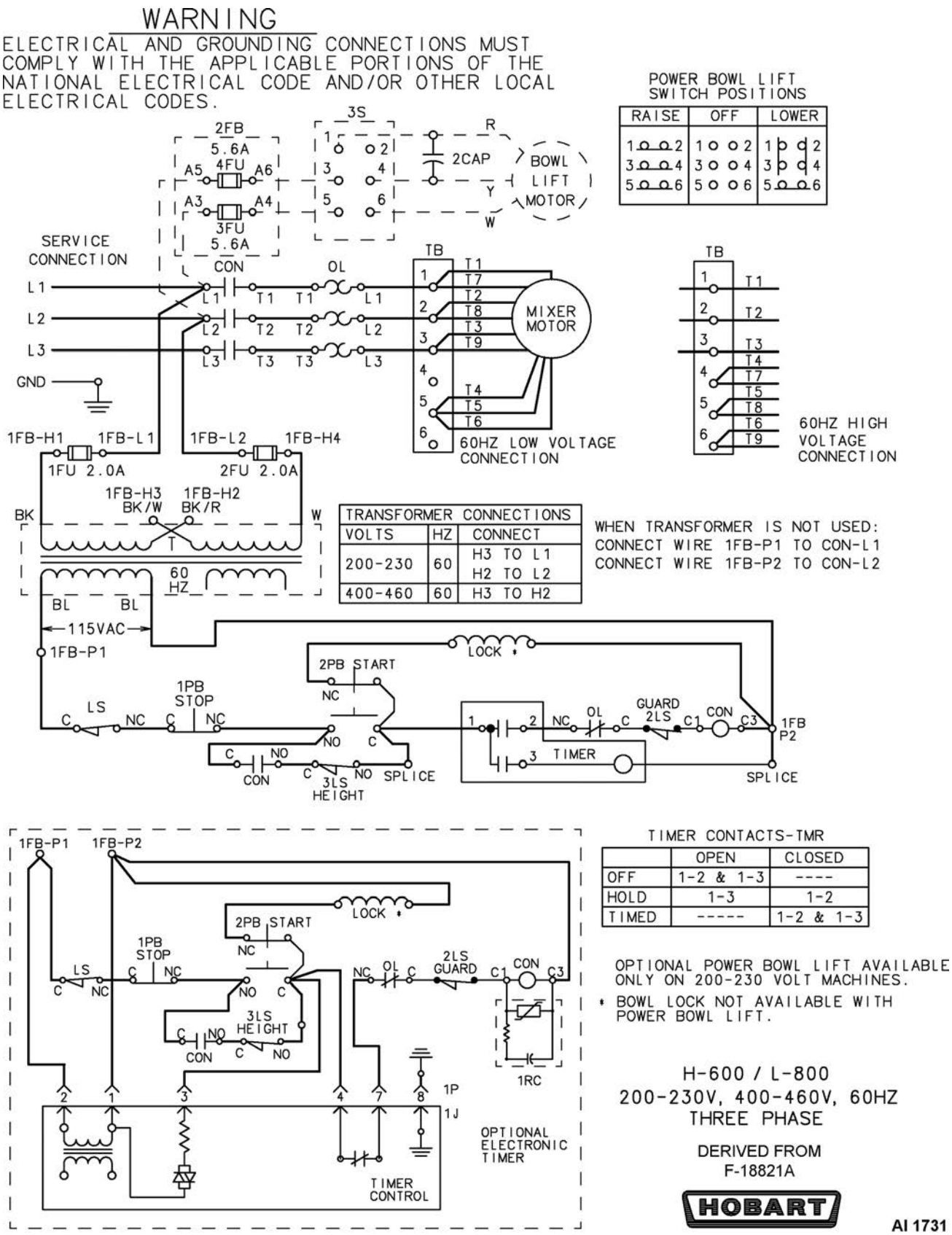


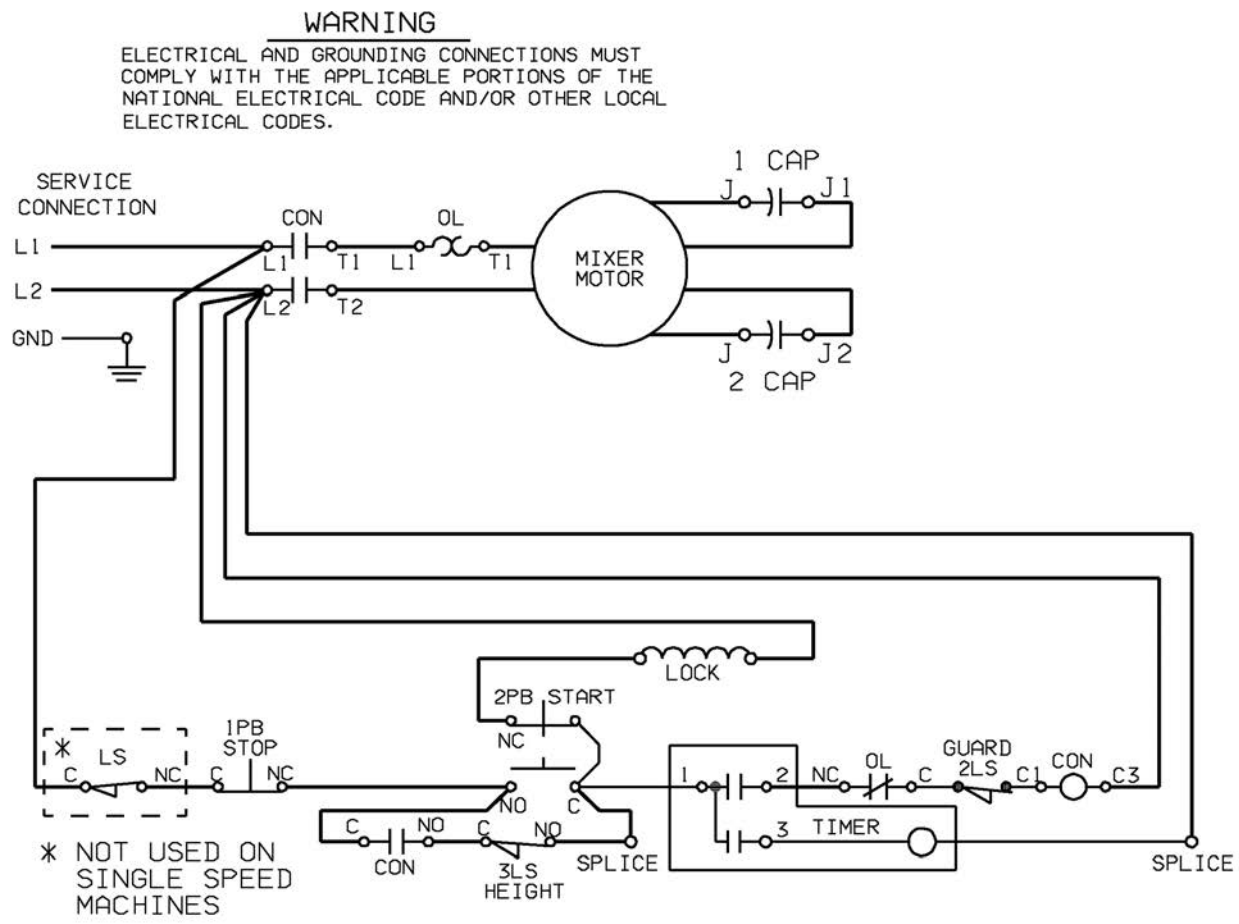
Fig. 174

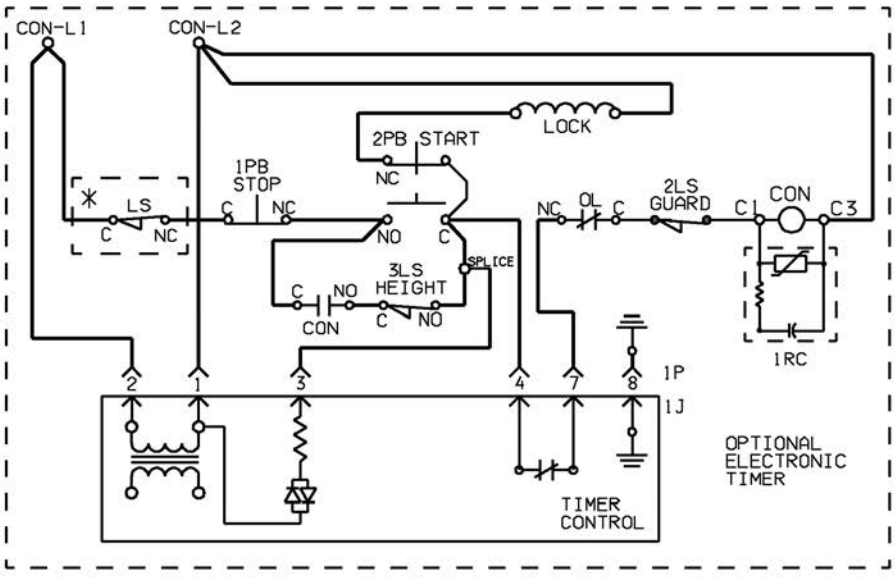


H600 / L800 Single Phase



H600 / L800 Three Phase





CONNECT WIRE 1FB-P1 TO CON-L1
CONNECT WIRE 1FB-P2 TO CON-L2
TIMER CONTACTS-TMR

	OPEN	CLOSED
OFF	1-2 & 1-3	----
HOLD	1-3	1-2
TIMED	-----	1-2 & 1-3

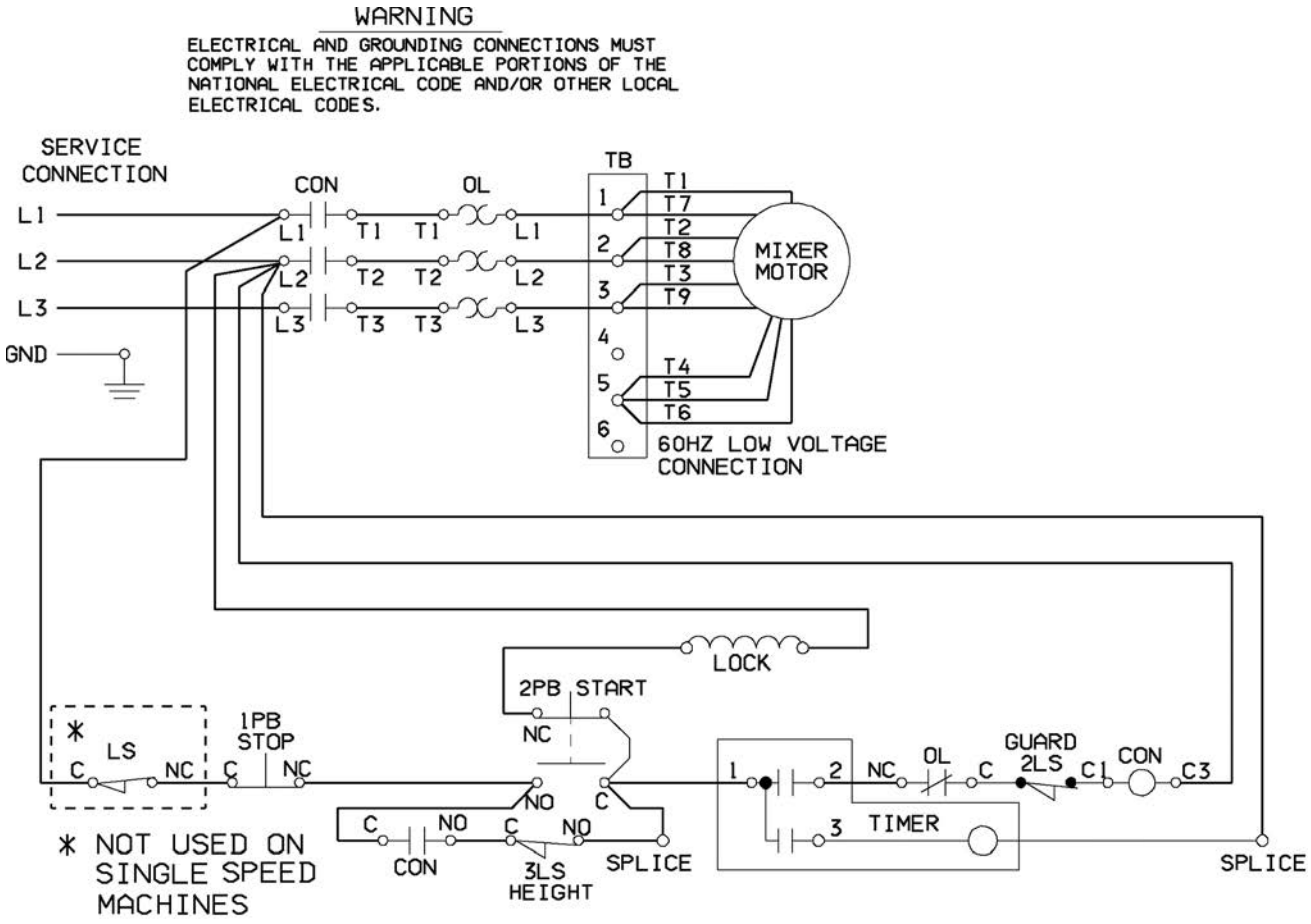
P-660 MIXER
208V/60 HZ/1 PHASE
240V/60 HZ/1 PHASE

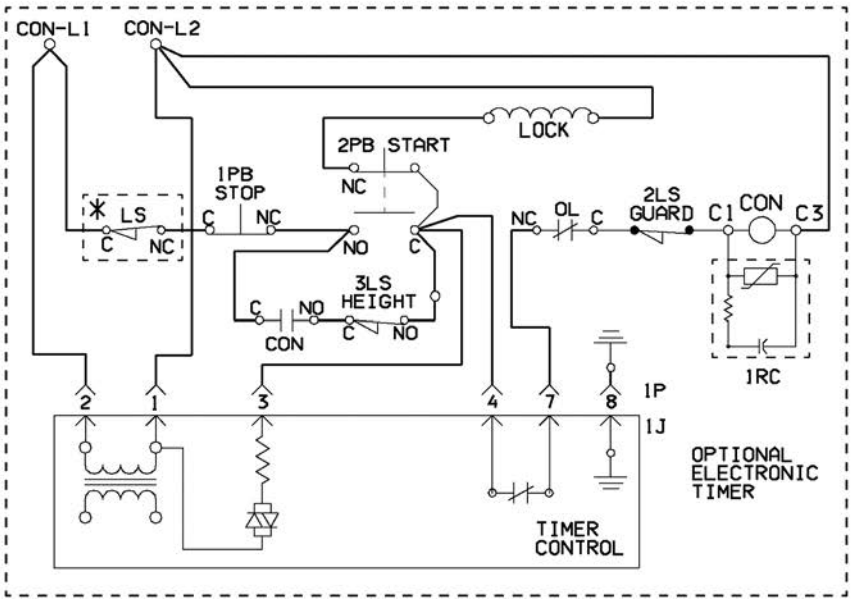
DERIVED FROM
F-18822A

HOBART

AI 1732

P660 Single Phase





CONNECT WIRE 1FB-P1 TO CON-L1
CONNECT WIRE 1FB-P2 TO CON-L2

TIMER CONTACTS-TMR

	OPEN	CLOSED
OFF	1-2 & 1-3	----
HOLD	1-3	1-2
TIMED	-----	1-2 & 1-3

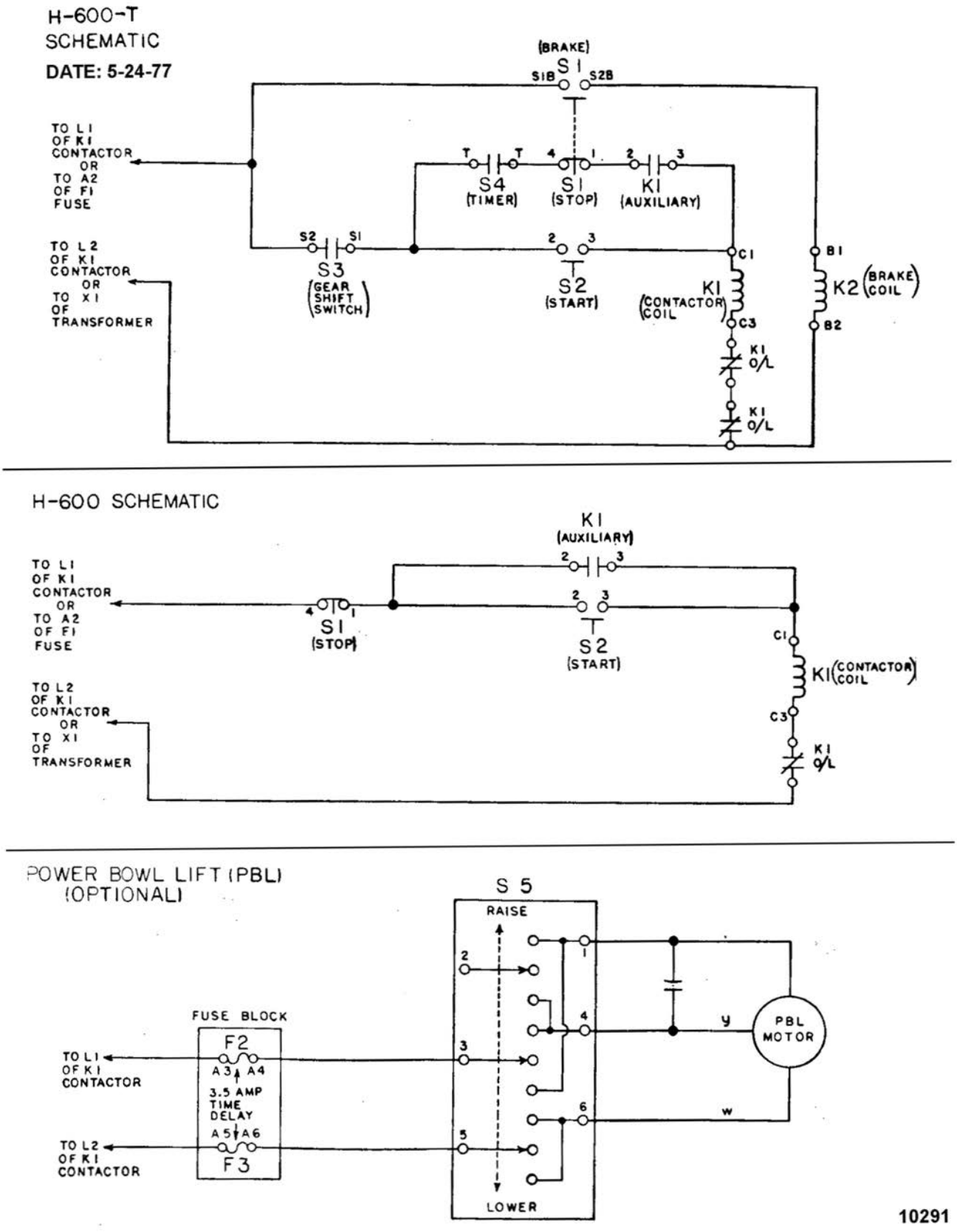
P-660 MIXER
208-240V. 60HZ
THREE PHASE

DERIVED FROM
F-18823A

HOBART

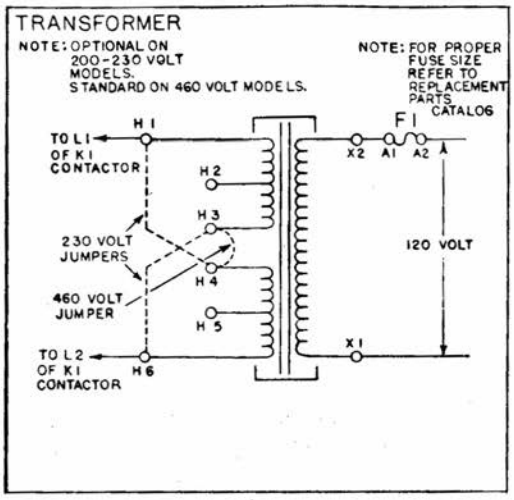
AI 1733

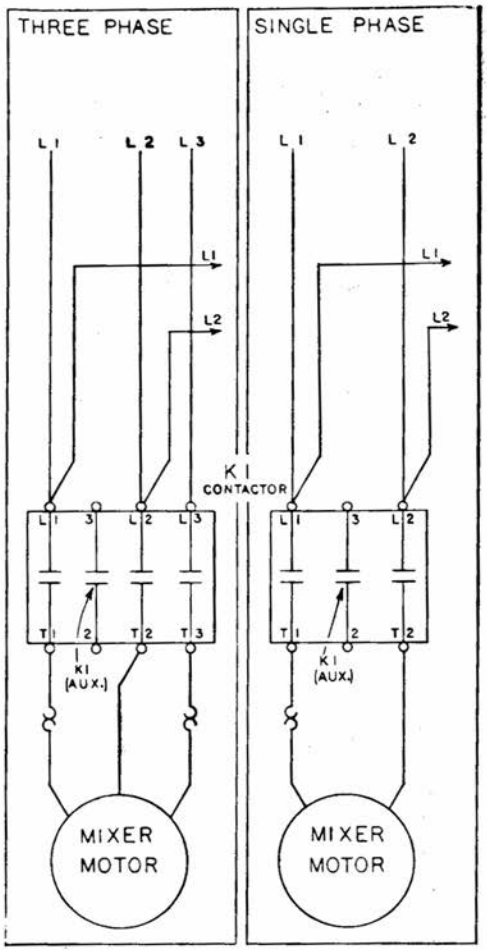
P660 Three Phase



H600 with Brake - Early Mixers

H600
DATE: 5-24-77





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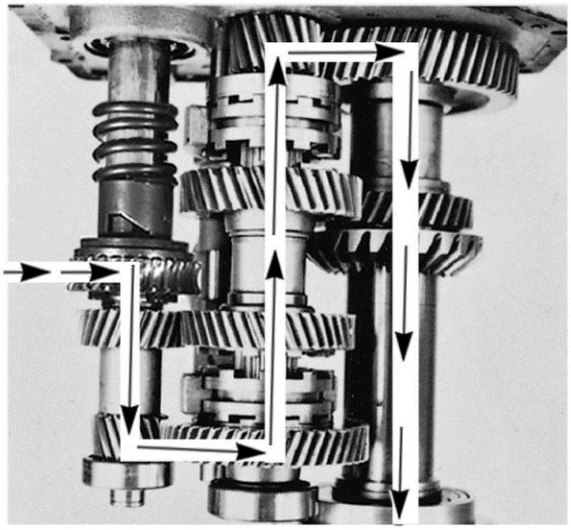
H600 with Brake cont'd. - Early Mixers

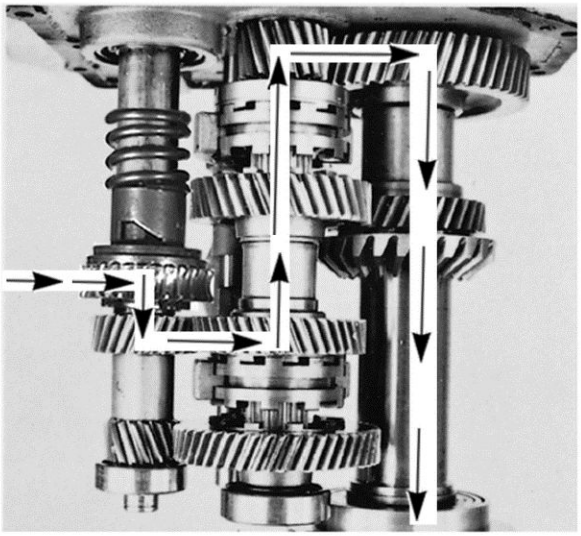
TROUBLESHOOTING

POWER FLOW

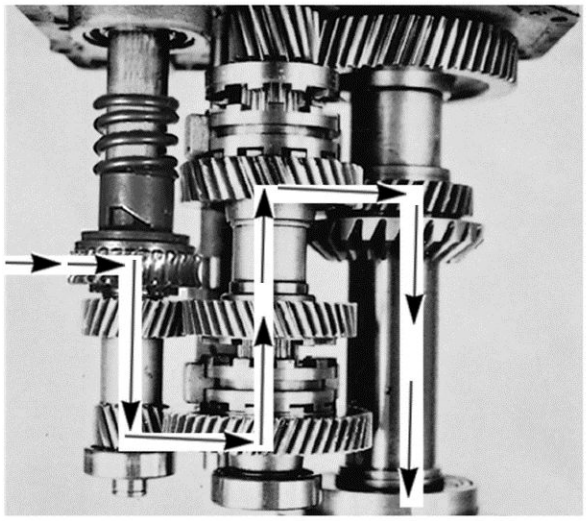
H600 AND L800 POWER FLOW



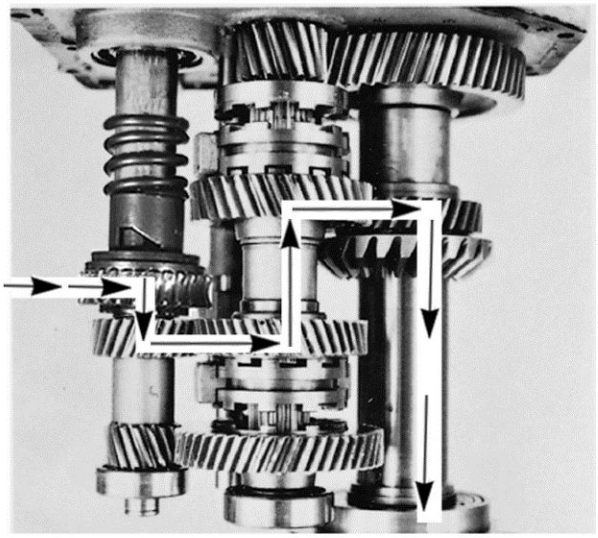
1st SPEED



2nd SPEED



3rd SPEED



4th SPEED

10286

Fig. 181

P660 POWER FLOW

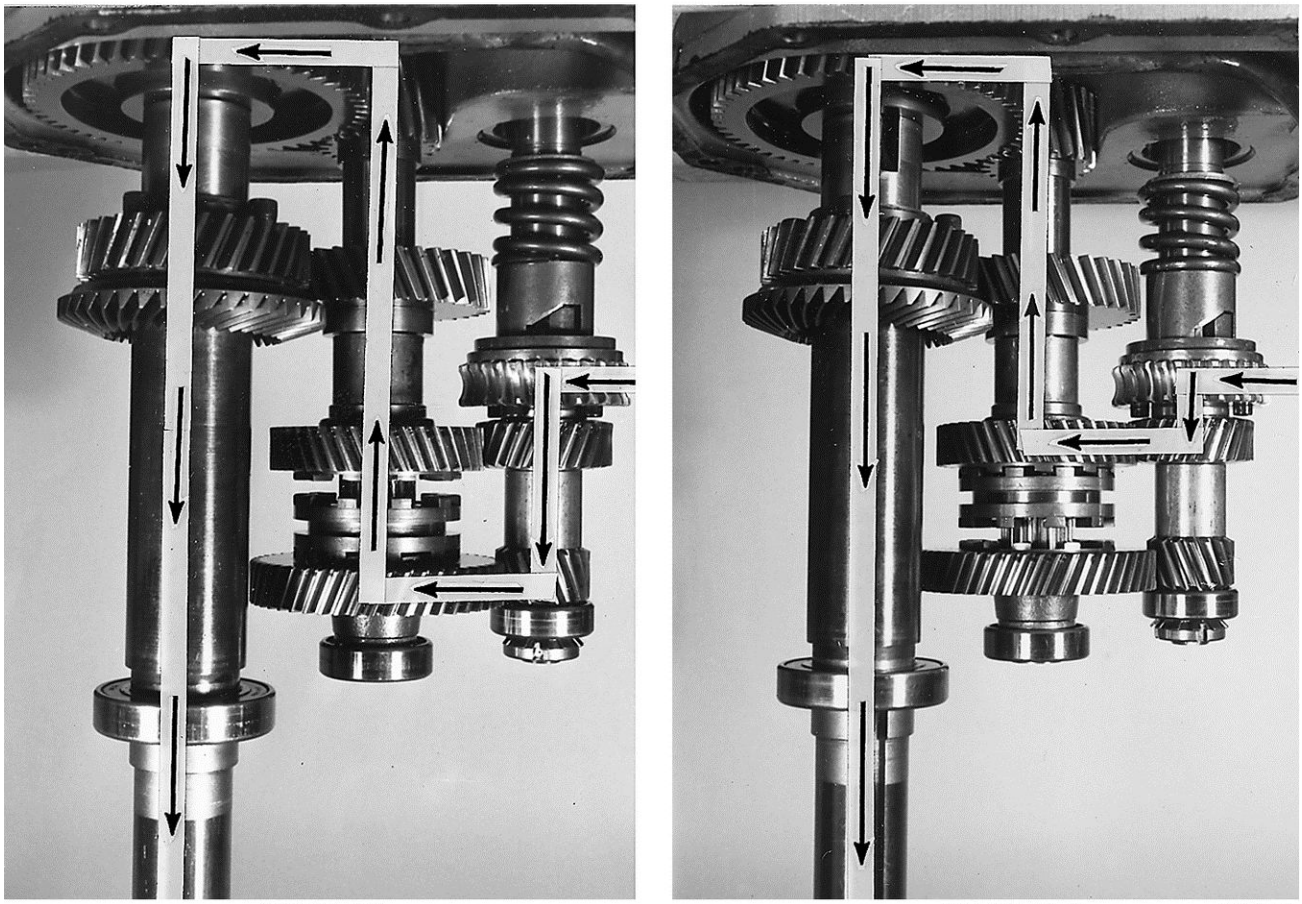


Fig. 182

MECHANICAL TROUBLESHOOTING

NOTE: Mechanical troubleshooting basically involves locating the source of a noise, an oil leak or determining the cause of a mixer malfunction. The following list of symptoms and their possible causes is intended only as a general guide for analyzing trouble problems and does not attempt to list all possible sources of noise, oil leakage or malfunctions.

MECHANICAL TROUBLESHOOTING	
Symptom	**Possible Causes**
Noise in transmission or planetary.	1. Worn or damaged gears. 2. Improperly meshed gears. 3. Worn or broken key(s). 4. Worn bearing. 5. Lack of lubrication.

MECHANICAL TROUBLESHOOTING	
Symptom	**Possible Causes**
Planetary does not turn in any speed.	1. Pin sheared on drive worm on motor shaft. 2. Key sheared on shock absorber compressor on worm gear shaft. 3. Key sheared on clutch shaft upper gear (P660s only). 4. Key sheared on planetary shaft upper planetary shaft gear.
Planetary does not turn in 1st and 2nd speeds (H600/L800).	1. Key sheared on upper gear of planetary shaft.
Planetary does not turn in 3rd and 4th speeds (H600/L800).	1. Key sheared on lower gear of planetary shaft.
Planetary does not turn in 2nd and 4th speeds (H600/L800).	1. Key sheared on upper gear of worm gear shaft.
Planetary does not turn in 1st and 3rd speeds (H600/L800).	1. Key sheared on lower gear of worm gear shaft.
Agitator will not turn.	1. Key sheared on pinion gear on agitator shaft.
Attachment stuck on agitator shaft.	1. Agitator pin contacting attachment on inside edge of bayonet mount instead of middle point of mounting area. Refer to TSB 1356.
Attachment drive does not turn (P660 single).	1. Key sheared on attachment drive. 2. Key sheared on clutch shaft lower gear assembly.
Transmission remains in previous speed after shifting.	1. Shifting yoke plungers out of adjustment. Refer to PLUNGER ADJUSTMENT.
Difficulty in shifting.	1. Clutch binding on clutch shaft. Refer to REASSEMBLY OF CLUTCH . 2. Yokes binding on shifter shaft. 3. O-ring on gear selector assembly breaking down. 4. Oil deposits collecting around springs and balls of gear selector assembly.
Oil leakage from planetary.	1. Oil level in planetary too high. 2. Drain plug not tight. 3. Oil retaining cap on internal pinion gear not seated properly. 4. Oil baffle O-ring pinched or cut. 5. Planetary oil shield not in place. 6. Planetary oil pump outlet not positioned properly. 7. Oil level in transmission too high. 8. Chimney O-ring leaking. 9. Chimney cracked. 10. Planetary lip cracked. 11. Bevel gear quad seal pinched or cut.
Oil leakage near front of motor.	1. Motor O-ring seal pinched or cut. 2. Motor oil drain hole clogged.

MECHANICAL TROUBLESHOOTING	
Symptom	**Possible Causes**
Bowl support slips down during mixing operation.	1. Refer to BOWL SUPPORT ADJUSTMENT.
Bowl creeps down during mixing.	1. Bowl lock mechanism not functioning properly.
Cannot lower bowl at end of mixing operation.	1. Back off on hand wheel slightly, then try again. **NOTE:** It is normal for the mechanism to be tight at the end of the mixing operation. 2. Bowl lock mechanism or circuit not functioning properly.

ELECTRICAL TROUBLESHOOTING

ELECTRICAL TROUBLESHOOTING	
Symptom	**Possible Causes**
Electrical service circuit breaker opening (or blown line fuses) when START switch is depressed.	1. Inadequately sized circuit breakers or line fuses. 2. Mixer motor leads shorted in junction box. 3. Mixer motor field windings shorted. Refer to TESTING MOTOR FIELD WINDINGS.
Mixer motor will not run when START switch is depressed.	1. Bowl guard not closed or magnet missing. 2. Bowl guard reed switch circuit malfunction. 3. Timer set on zero (0) position. 4. Gear shift switch (S3) contacts open. Verify gear shift is on a numbered position. 5. Incorrect or no supply power to mixer. 6. Fuse F1 blown. If fuse F1 blows again after replacing, check for shorts or overloads in control circuit. 7. Transformer open. 8. Mixer motor over-heated. Refer to TESTING MOTOR CURRENT. 9. Motor overloads open. 10. START switch (S2) malfunction. 11. Contactor coil (CON) malfunction. 12. STOP switch (S1) malfunction.
Mixer motor runs only while START switch is depressed.	1. Bowl support not up fully. 2. Bowl height switch malfunction. 3. Timer switch malfunction. 4. CON auxiliary switch malfunction.
Mixer does not shut off at the end of a timed cycle.	1. Timer malfunction.

ELECTRICAL TROUBLESHOOTING	
Symptom	**Possible Causes**
Mixer motor shuts off during operation.	1. Mixer overloaded. 2. Motor over-heating. Refer to TESTING MOTOR CURRENT. 3. Overload heater(s) malfunction.
Brake does not function when STOP (S1) is depressed.	1. Brake spring disconnected or broken. 2. Brake out of adjustment. 3. Brake solenoid coil open. 4. Brake band does not fit profile of brake drum. 5. Brake switch (S1) not operating properly. Refer to wiring diagram located on mixer.
Brake remains on during mixing operation.	1. Brake out of adjustment. 2. Brake switch (S1) shorted. Refer to wiring diagram located on mixer.
Power bowl lift (PBL) does not operate (H600/L800).	1. Fuse 3FU and/or 4FU blown. If fuse blows again after replacing, check the PBL motor and capacitor. Refer to TESTING MOTOR CURRENT and TESTING CAPACITORS. 2. PBL switch (3S) shorted. 3. PBL capacitor open. Refer to TESTING CAPACITOR. 4. PBL motor windings open. Refer to TESTING MOTOR FIELD WINDINGS. 5. Flexa-Gear belt broken or slipping.
Bowl support travels in reverse of PBL switch (3S) indicated position (H600/ L800).	**NOTE:** Discharge capacitor before removing leads. 1. Leads from PBL motor to capacitor reversed. Interchange red and yellow leads on capacitor terminals.

ELECTRONIC TIMER	
Symptom	**Possible Causes**
No display. Mixer works properly otherwise.	1. Display board malfunction.
No display. Nothing works.	Check input voltage to timer. 1. Correct voltage present. Main board assembly malfunction. 2. Voltage incorrect. Correct voltage problem.
Mixer runs after countdown time is finished.	Check output of main board assembly. 1. Output present. A. Is there voltage at 1FB-P2 to 1P-7? 1) Yes. Main board assembly malfunction. 2. No output present. . A. Check mixer contactor for mechanical bind, etc
No Buzzer.	1. Buzzer malfunction. 2. Main board assembly malfunction.

ELECTRONIC TIMER	
Symptom	**Possible Causes**
Knob turns, but time does not change.	1. Potentiometer shaft seal needs to be lubricated.. 2. Main board assembly malfunction.
Key switch push not recognized.	1. Keypad malfunction. Perform KEYPAD TEST. 2. Main board assembly malfunction, if keypad is good.

MIXERS
VOL. 1 NO. 537A
MARCH 31, 2000
Supercedes TSB 537

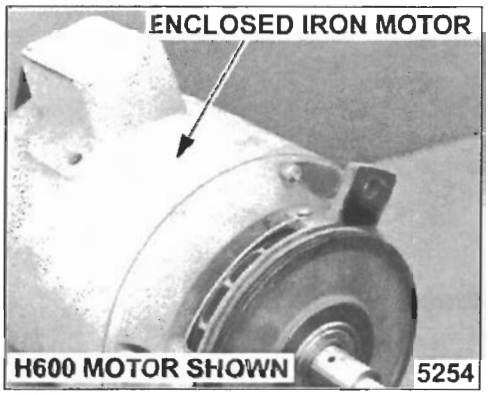
TECHNICAL SERVICE BULLETIN

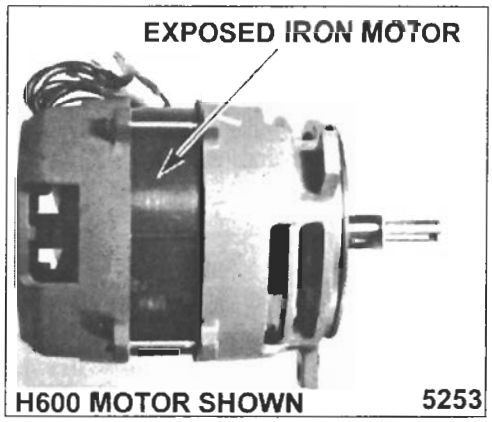
PRODUCT SERVICE DEPARTMENT TROY, OH. 45374-0001

MODELS H600 AND L800 - REPLACEMENT OF ENCLOSED IRON (SINGLE VOLTAGE) MOTORS/EXPOSED IRON SHAFT ALIGNMENT

Purpose

The enclosed iron (single voltage) motors, previously used in Model H600 and L800 mixers, are discontinued and replaced by exposed iron (dual voltage) motors. In order to install an exposed iron motor in a machine originally equipped with an enclosed iron motor, **additional parts and procedures are required**. Previously service kits were available to replace the enclosed iron motor. The kits are no longer available, the individual parts that made up the kits must be ordered.





Parts Information

When replacing an H600 or L800 enclosed iron motor order the appropriate motor outlined below.

Model	Motor To Be Replaced		Order Motor Assembly Part Number
	Part Number	Electrical Specification	
H600	ML 17755-A	115/60/1	120887-2
	ML 17755-B	200/60/1	120887-4
	ML 17755-C	230/60/1	120887-2
	ML 17755-F	200/60/3	120886-4
	ML 17755-G	230/60/3	120886-2
	ML 17755-H	460/60/3	120886-2
	ML 17755-L	115/50/1	120887-6
	ML 17755-M	220/50/1	120887-6
	ML 17755-N	220/50/3	120904-2
	ML 17755-P	380/50/3	120904-2
L800	ML 16119-B	200/60/1	ML 19330-DP
	ML 16119-C	230/60/1	ML 19330-DA
	ML 16119-M	220/50/1	120887-6
	ML 16120-F	200/60/3	ML 19330-DN
	ML 16120-G	230/60/3	ML 19330-DB
	ML 16120-H	460/60/3	ML 19330-DB
	ML 16120-N	220/50/3	120904-2
	ML 16120-P	380/50/3	120904-2
	ML 17110-S	550/60/3	ML 19330-AG

The required additional parts and form number shown in the following table are common to both models, all voltages, hertz and phase.

Part Number	Description	Quantity
275152	Shim	6
292642	Front Cover Support	1
SC 036-4	Screw 1/4-20x3/4"	2
WL 003-37	Lock Washer 1/4	2
NS 013-1	Hex Nut 1/4-20	2
121014	Terminal Board	1
123131	Serrated Screw 8-32x 3/8" (used to mount terminal board)	2
87525-575	Lead Wire Assembly (#12 wire, 30" long)	1
87525-576	Lead Wire Assembly (#12 wire, 30" long)	1
117550	Capacitor Holder (also holds Terminal Board)	1
F- 14104	Wiring Connection Diagram	1

The required additional part for Single Phase units is show in the following table.

Part Number	Description	Quantity
294462	Motor Kit	1

The required additional part for Three Phase units is show in the following table.

Part Number	Description	Quantity
87525-576	Lead Wire Assembly (#12 wire, 30" long) (branding on each end must be changed to T3)	1

Service Information

Refer to H600 and L800 service manual F-12536 (9-77). Motor Shaft Alignment Tool TL-82901, must be used for motor shaft alignment prior to installation of the exposed iron motor.

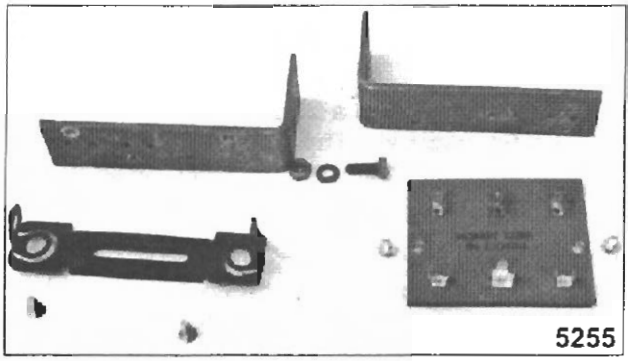
Single Phase Motor Replacement

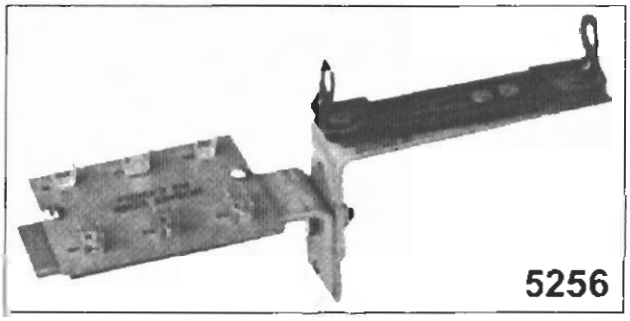
WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove the top cover.
2. Remove the motor as outlined in the service manual.

   NOTE: Before installing the replacement motor refer to "ALIGNMENT PROCEDURE" as outlined in this bulletin.

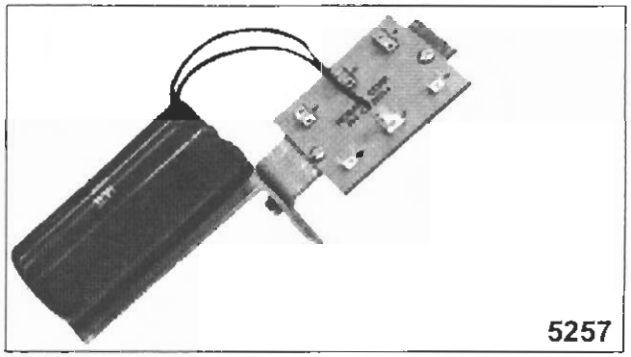
3. Assemble the terminal board, capacitor brackets, and hardware as shown.

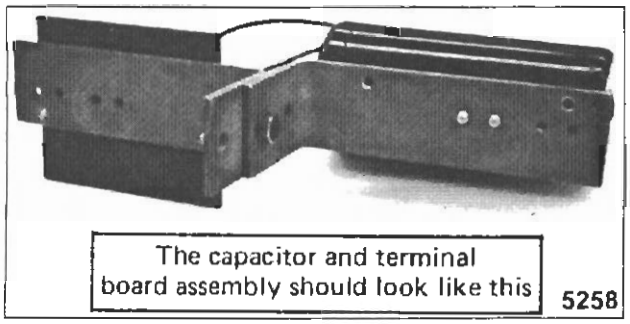




4. Install the two short leads on the capacitor.

5. Install the capacitor cap and capacitor into the capacitor holder. The capacitor and terminal board assembly should look as shown.



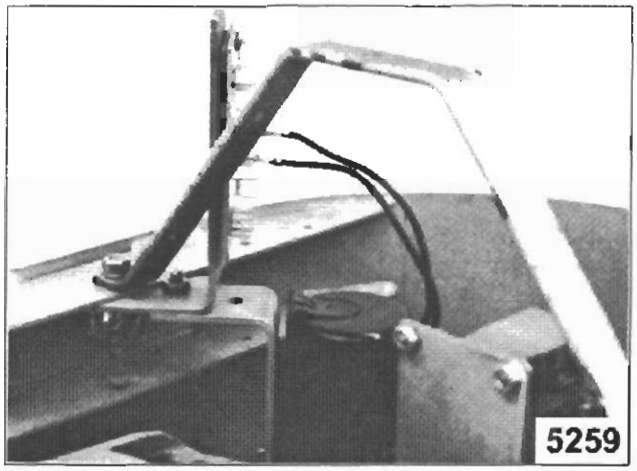


6. Remove the left rear top cover support bolt.

NOTE: When installing the capacitor and terminal board assembly to the unit make certain that it is clear of any moving motor parts and is positioned such that the top cover will clear it when reinstalled. As required, rotate the bottom portion (capacitor) of the assembly to achieve the desired clearance.

7. Secure the capacitor and terminal board assembly and the top cover support to the gusset with the (ordered) nuts, screws, and lockwashers.

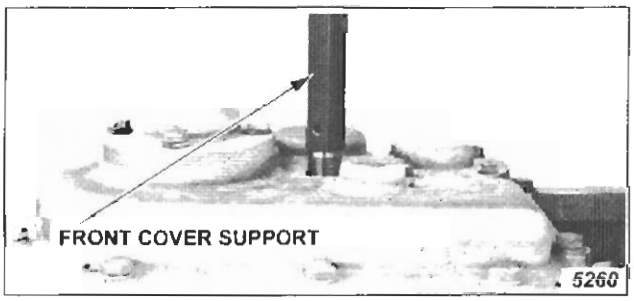
8. Connect the motor and capacitor leads to the terminal board using the appropriate section of the motor/terminal board connection diagram.



9. Using the appropriate section of the motor/terminal board connection diagram, connect the two 30" lead wire assemblies branded T1 and T2 from the terminal board to T1 and T2 of the contactor.

10. Secure the motor leads to the rear top cover support (away from any moving parts) using wire ties.

11. Install the new front cover support into the transmission cover.



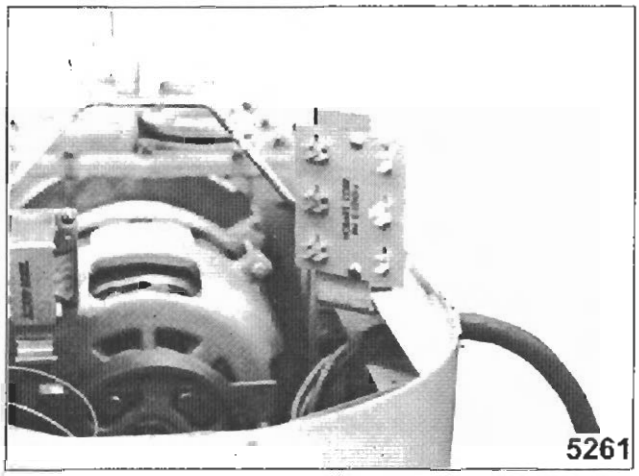
12. Reconnect electrical power and check for proper unit operation.

13. Affix the motor/connection diagram to the top cover and reinstall the cover.

Three Phase Motor Replacement

NOTE: Follow the steps as outlined in "SINGLE PHASE MOTOR REPLACEMENT" in this bulletin with the following exceptions. Ignore any references to the capacitor.

1. At step 3 assemble the terminal board to the mounting bracket using two serrated screws, 8-32 x 3/8", and go to step 6.

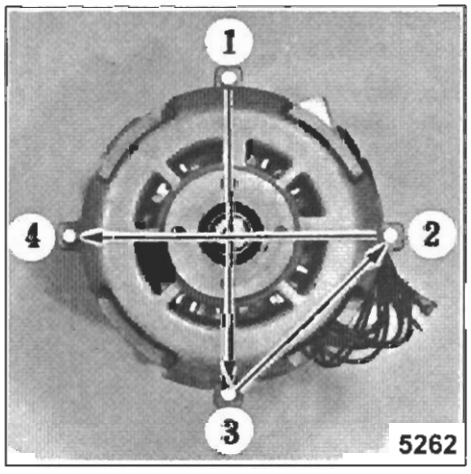


2. At step 9 three lead wire assemblies T1, T2, and T3 will be connected. There will be two identical lead wire assemblies branded T2, one of them must be re-identified as T3.
3. At step 12 also check for the proper direction of rotation of the motor.

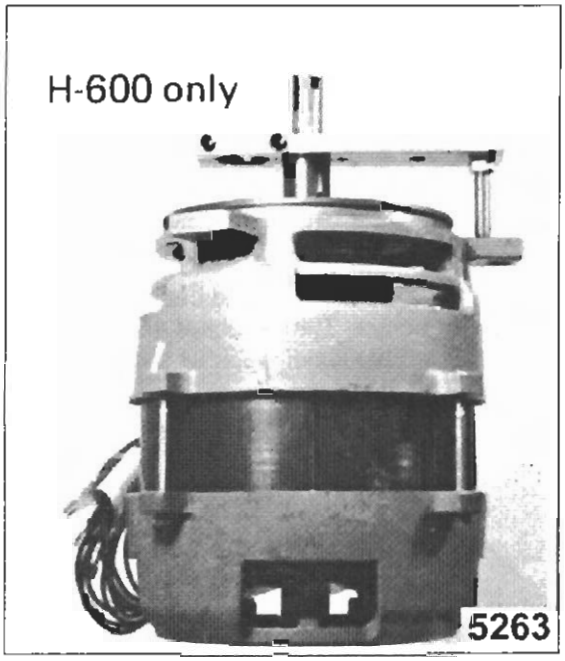
Alignment Procedure

NOTE: Anytime an exposed iron motor is removed from an H600 or L800 for service or if a new motor is to be installed, the motor shaft alignment must be checked and shims added to the mounting ears as required before installation. Incorrect alignment will cause improper mesh of the worm and gear resulting in a noisy mixer and/or a damaged worm gear. The alignment Tool part number TL-82901 must be used.

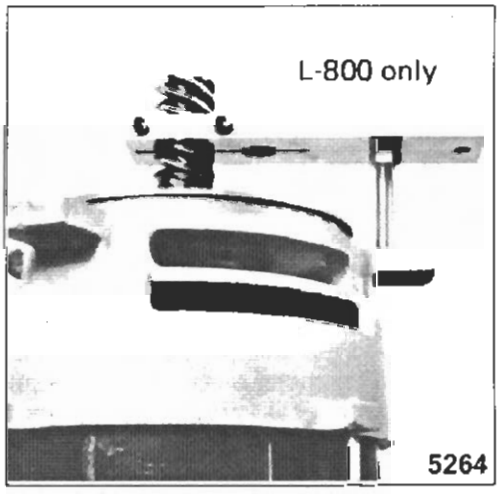
1. Check to assure that each of the four bearing bracket bolts are tightened to 108 inch-pounds (9 foot-pounds) of torque, following a sequence of 1-3-2-4 as shown.



2. H600 only, remove the worm. Be sure to support the shaft when removing the roll pin holding the worm in place so the load of any hammer impacts is not placed on the motor bearings.
3. Place the motor in a stand with the drive shaft end up, as shown. The stand can be made from four 9" pieces of 2x4.
4. Remove all shims from the mounting ears.
5. Install the alignment tool:
   A. (H600) Place the tool on the motor shaft using the 3/4" hole, and slide it tightly against the shoulder on the shaft. Tighten both clamping screws to secure the tool to the shaft. The measuring stud should be located in the outer 3/8" tapped hole.

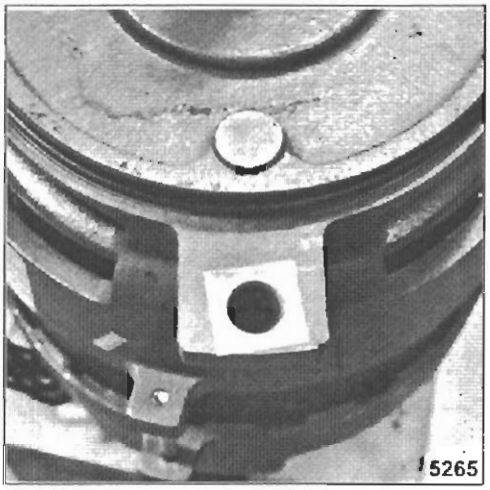


   B. (L800) Place the tool over the worm using the 1 1/4" hole and slide on the shaft approximately 1 3/8". Tighten both clamping screws to secure the tool to the shaft. The measuring stud should be located in the inner 3/8" tapped hole.



6. Determine which ear is closest to the end of the shaft by rotating the tool (and shaft) and adjusting the measuring stud until the end of the stud barely touches only one ear. Tighten the lock nut.

7. Rotate the tool to the other ears and, with a feeler gauge, measure the gap between the ear and the end of the measuring stud. Do not force the feeler gauge under the stud. Add shims to each ear as required to achieve a clearance of .005" or less using self-adhesive .005" shims, part number 275152.



8. Check the gaps after shimming. Repeat steps 6 and 7 as required.

9. H600 only, install the worm. Supporting the shaft as outlined in step 2.

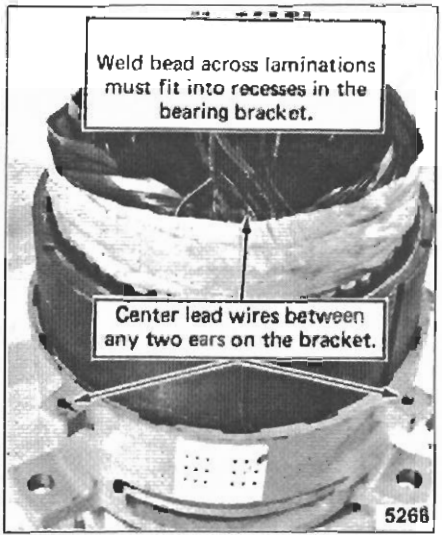
10. Install the motor in the mixer.

Motor Assembly

1. Place the drive shaft end (front) bearing bracket on a stand. The stand can be made from four 9" pieces of 2x4.

   A. Place the preloading spring in the recess in the bearing bracket.

2. Position the stator so the laminations fit squarely into the seat. The stator must be located such that the four weld beads across the laminations fit into any four of the recesses in the bearing bracket. Also center the lead wires between two of the four ears on the bracket so the wires will not be bent sharply coming out of the rear bearing bracket when the motor is assembled.

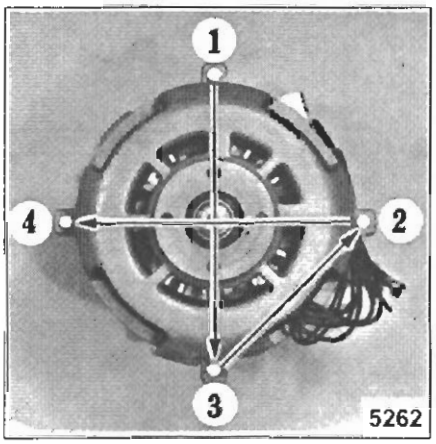


3. With a piece of wood or rubber mallet placed against the laminations, use a hammer to seat the stator in the bracket. Exercise caution not to damage the laminations or the windings.

4. Install the rotor assembly. Place the rear bearing bracket (opposite the drive end) on the rotor shaft, threading the lead wires through one of the holes. Again, the weld beads should fit into four of the recesses in the bracket.

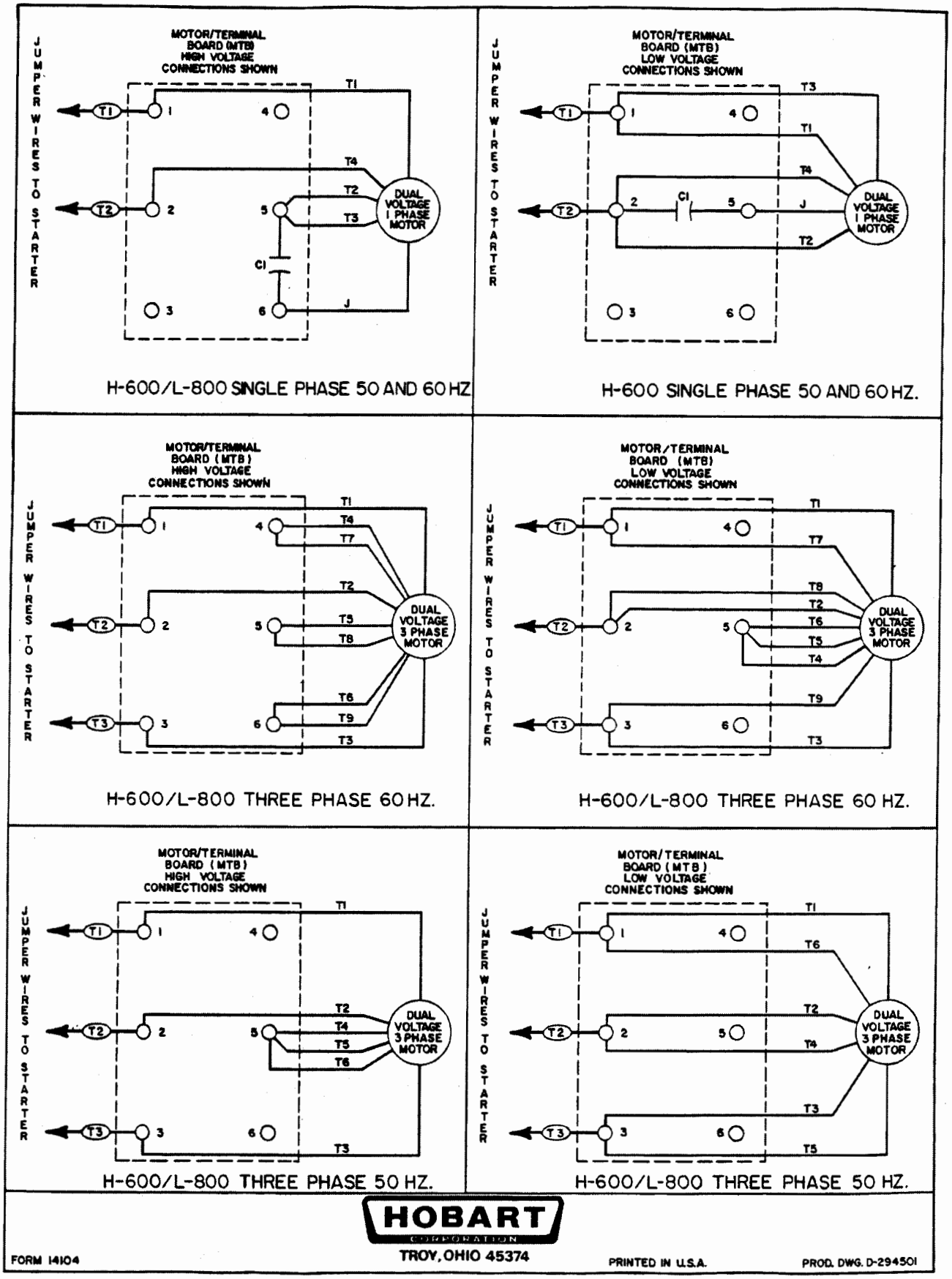
5. Install the four bolts and lockwashers and tighten in a sequence of 1-3-2-4 so the stator seats squarely.

   A. Tighten the bolts progressively to 108 inch-pounds (9 foot-pounds) of torque. (H600) Do not install the worm on the rotor shaft.



6. Perform the "ALIGNMENT PROCEDURE" as outlined in the bulletin, before installing the motor.

Wiring Connection Diagram



MISCELLANEOUS
VOL. 1 NO. 550B
August 2016

HOBART SERVICE

TECHNICAL SERVICE BULLETIN

HOBART SERVICE TROY, OHIO 45374-0001

MACHINE DATA CODE INFORMATION

INTRODUCTION

Since January 1, 2002, all Hobart equipment, except microwave ovens, have been marked with a three-letter date code to eliminate duplication at the end of the two-letter date code numbering cycle (i.e. 23 assigned letters for a 23 year date code numbering cycle). Microwave ovens are marked with the month and year as outlined under Manufacture Date (item 2).

Between January 1985 and January 2001 all Hobart equipment, *except* microwave ovens, were marked with a two letter date code.

Refer to manufacturing date code tables.

MANUFACTURE DATE

1. All Hobart equipment is marked with a manufacturing date code in the CODE or MD section on the machine data plate with the exception of microwave ovens. If the CODE or MD section is not available, the manufacturing date code should be marked in the far right of the serial number section. The manufacturing date code will not become part of the serial number.

   Exception: Refrigeration equipment is marked with the manufacturing date code directly following the serial number; or with the two-digit numerical date (Month & Year) in the DATE section.

2. Microwave ovens are marked with a manufacturing date code in the section designated on the machine data label per UL 923. The month and year of manufacture are both marked without abbreviation, with the year shown as a four-digit number on the machine data label. Example: January 2005.

MANUFACTURING DATE CODES AFTER JANUARY 1, 2002					
***First Letter = Month**	***Second and Third Letters = Year**				
A = JAN	AA = 2001	AN = 2013	BB = 2025	BP = 2037	CC = 2049
E = FEB	AB = 2002	AP = 2014	BC = 2026	BR = 2038	CD = 2050
R = MAR	AC = 2003	AR = 2015	BD = 2027	BS = 2039	CE = 2051
P = APR	AD = 2004	AS = 2016	BE = 2028	BT = 2040	CF = 2052
Y = MAY	AE = 2005	AT = 2017	BF = 2029	BU = 2041	CG = 2053
U = JUN	AF = 2006	AU = 2018	BG = 2030	BV = 2042	CH = 2054
L = JUL	AG = 2007	AV = 2019	BH = 2031	BW = 2043	
G = AUG	AH = 2008	AW = 2020	BJ = 2032	BX = 2044	
T = SEP	AJ = 2009	AX = 2021	BK = 2033	BY = 2045	
C = OCT	AK = 2010	AY = 2022	BL = 2034	BZ = 2046	
N = NOV	AL = 2011	AZ = 2023	BM = 2035	CA = 2047	
M = DEC	AM = 2012	BA = 2024	BN = 2036	CB = 2048	
* The letters I, O, and Q have been omitted for clarity.					

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NOTE: For the year 2001, each manufacturing facility had the option of using the last letter of Y in the two letter date code format or begin using the second and third letters of AA in the three-letter date code format (if space was available on the data plate).

MANUFACTURING DATE CODES BETWEEN JANUARY 1985 AND JANUARY 2001					
***First Letter = Month**		***Second Letter = Year**			
A = JAN	L = JUL	A = 1980	G = 1986	N = 1992	V = 1998
E = FEB	G = AUG	B =1981	H = 1987	P = 1993	W = 1999
R = MAR	T = SEP	C =1982	J = 1988	R = 1994	X= 2000
P = APR	C = OCT	D = 1983	K = 1989	S = 1995	Y = 2001
Y = MAY	N = NOV	E = 1984	L = 1990	T = 1996	
U = JUN	M = DEC	F = 1985	M = 1991	U = 1997	
* The letters I, O, and Q have been omitted for clarity.					

3. Before 1985, GE or Chicago Heights cooking equipment serial numbers included a manufacturing date code.

Serial number coding from 1962 to approximately 1984 for cooking equipment only.

M	C	A	0000*
Year of Manufacture	Class of Product	Month of Manufacture	Numerical Identification

*From 1962 to1963, the number of digits used may vary.

***First Letter = Month**		**YEAR OF MANUFACTURE**		**CLASS OF PRODUCT**		**MONTH OF MANUFACTURE**	
Year	Letter	Year	Letter	Product	Letter	Month	Letter
1962	K	1974	B	Cooking	C	JAN	A
1963	L	1975	C	Refrigeration	R	FEB	B
1964	M	1976	D	Sanitation	S	MAR	C
1965	N	1977	E			APR	D
1966	P	1978	F			MAY	E
1967	R	1979	G			JUN	F
1968	S	1980	H			JUL	G
1969	T	1981	J			AUG	H
1970	U	1982	K			SEP	J
1971	W	1983	L			OCT	K
1972	X	1984	M			NOV	L
1973	A					DEC	M

SERIAL NUMBER CODING BEFORE 1962 FOR GE OR CHICAGO HEIGHTS EQUIPMENT ONLY								
	1954	1955	1956	1957	1958	1959	1960	1961
COOKING								
Heavy Equipment	4-0000	B-0000	F-0000	E-0000	C-0000	D-0000	G-0000	H-0000
Counter Equipment	4-0000	B-0000						
Griddles			BG0000	EG0000	CG0000	DG0000	BGG0000	HG0000
Food Warmers			BF0000	EF0000	CF0000	DF0000	GF0000	HF0000
Fry Kettles			BK0000	EK0000	CK000	CK0000	GK0000	HK0000
Waffle Bakers			BW0000	EW0000	CW0000	DW0000	GW0000	HW0000

SERIAL NUMBER CODING BEFORE 1962 FOR GE OR CHICAGO HEIGHTS EQUIPMENT ONLY								
	1954	1955	1956	1957	1958	1959	1960	1961
REFRIGERATION								
Water Coolers	24600000 to 24999999	55400000 to 55807000	70060000 to 70099999	70190000 to 70199999	70230000 to 70239999	70300000 to 70335000	70335700 to 70359100	70359101 to 70386665
SANITATION		Sanitation serial numbers will vary prior to 1968.						

HOBART
SERVICE

Mixers
VOL. 1 NO. 579A
May 1988
SUPS. TSB 579 DATED 4/20/84

TECHNICAL SERVICE BULLETIN

HOBART SERVICE TROY, OHIO 45374-0001

H-600 AND L-800 SERIES MIXERS - SWITCH, TIMER AND SWITCH PLATE SERVICE

Increasing difficulties obtaining switches from our vendor (Arrow Hart) have caused us to find suitable replacements for these components from other manufacturers, During the same time these switch changes were made, a change from a spring-driven to a motor-driven timer was also made. The motor-driven timers are 15 minute timers, the 30 minute timer option has been discontinued. Because the new components are physically different, service kits are required to adapt these new components to existing machines. This bulletin will identify the changes which have been made and their service implications.

I. MODEL H-600 MIXERS, UNTIMED

Switch P/N 102230 (1, Fig. 1) and switch plate (2, Fig. 1) P/N 117850 are no longer available. To replace either of these components, order and install Switch Plate Kit P/N 291826.

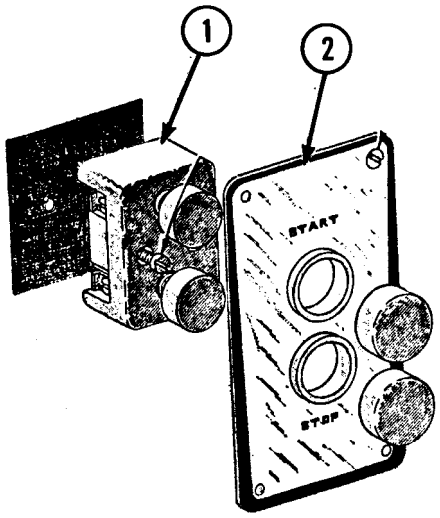

Fig. 1

The Switch Plate Kit (291826) consists of the following items:

SWITCH PLATE KIT (291826)		
QTY.	**PART NUMBER**	**DESCRIPTION**
1	291727	Switch Plate
1	87711-183-1	Switch Start
1	87711-183-2	Switch Stop
4	65890-233	Adapter Terminal
4	SC-13-12	#6 Screw
1	102467-1	Cap, Black
1	102467-2	Cap, Red
1	F14612	Electrical Diagram 1 Phase

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SWITCH PLATE KIT (291826)		
QTY.	**PART NUMBER**	**DESCRIPTION**
1	F14613	Electrical Diagram 3 Phase

1. Assemble the Switch Plate.
   A. Assemble the switches to the new switch plate. The black switch (START) must be installed in the upper hole and the red switch (STOP) should be installed in the lower hole. The common terminals of both switches must be to the left, when viewed from the front of the plate.
   B. Install the adapter terminals so the ring terminal connections are made behind the switch (adapter terminals facing the center of the switch).
   C. Install the rubber caps on the switch plate (red-stop; black-start).
2. Install the Switch Plate Kit.

⚠ WARNING DISCONNECT ELECTRICAL POWER TO THE MIXER AND PLACE A TAG ON THE CIRCUIT BREAKER INDICATING IT IS BEING SERVICED

   A. Remove the switch plate assembly by removing the mounting screws and disconnecting the wires. Discard the old switch plate assembly.
   B. Connect the leads to the new switch plate assembly as follows:
      1) Connect lead #1 to the STOP switch terminal COM.
      2) Connect lead #3 to the START switch terminal COM.
      3) Connect lead #2 and a jumper to the START switch terminal NO.
      4) Connect the other end of the jumper lead to terminal N.C. on the STOP switch.
   C. Install the switch plate assembly.
   D. Reconnect electrical power and check operation.

II. H-600T/DT AND L-800/D MIXERS

Switches (1, Fig. 2) P/N 102229, switch plate (2, Fig. 2) P/N 117853 and timers (3, Fig. 2) P/N 103228 and P/N 103229 are no longer available. To replace any of these components, order the appropriate switch and timer service kit listed below:

291827-1 115V 60 Hz.

291827-2 230V 60 Hz

291827-3 115V 50 Hz.

291827-4 230V 50 Hz

NOTE: The voltage specifications of these service kits depict the rated voltage of the new timer. The 115V service kits are used to service machines which have pilot circuits.

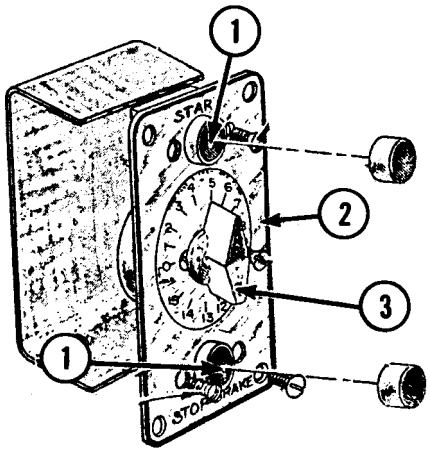

Fig. 2

These Switch and Timer Service Kits consist of one of the following timers.

294650-4-5 115V. 60 Hz,

294650-4-6 23OV 60 Hz,

294650-4-7 115V 50 Hz,

294650-4-8 23OV 50 Hz.

and the following other components:

SERVICE KIT COMMON PARTS		
QTY.	**PART NUMBER**	**DESCRIPTION**
1	291729	Switch Plate
1	87711-183-1	Start Switch
1	87711-183-3	Stop Switch
1	291750	Insulator
5	65890-233	Adapter Terminal
2	87532-151	Lead Wire Assembly
1	87532-152	Lead Wire Assembly
1	SC-27-28	#8 Screw
1	291748	Knob
4	SC-13-12	#6 Screw
1	WL-11-01	Lockwasher #8
1	NS-10-11	Nut #8
2	SC-13-07	Screw #5
1	102467-1	Cap, Black
1	102467-2	Cap, Red
1	65890-85	Line Splice
1	F14612	Electrical Diagram 1 Phase
1	F14613	Electrical Diagram 3 Phase

NOTE: Certain H-600T, DT and L-800 Mixers manufactured under the ML's listed below were of an interim design. These machines used the new switches, a spring-driven timer, and were manufactured without the brake assemblies.

INTERIM ML'S		
Models	**W/O Power Bowl Lift**	**W/Power Bowl Lift**
H-600T	33632	33636
H-600DT	33634	33638
L-800	33639	33641
L-800D	33640	33642

To replace the switches on these interim machines order and install 87711-183-1 (start switch) or 87711-183-3 (stop switch). To replace the timer or switch plate, order the appropriate switch and timer service kit listed in this section.

1. Assemble the Switch Plate.

   A. Assemble the switches to the new switch plate. The black switch (START) must be installed in the upper hole and the red switch (STOP) should be installed in the lower hole. The common terminals of both switches must be to the left, when viewed from the front of the plate.

   B. Install the adapter terminals so the ring terminal connections are made behind the switch (adapter terminals facing the center of the switch).

   C. Assemble the timer and insulator to the new switch plate using the #6 screws provided. The timer should be positioned so its terminals are toward the switches. The insulator is mounted between the timer and the plate so the mounting holes align and the folded up portion will be between the timer and switches (Fig. 3).

   D. Install the rubber caps on the switch plates (red-stop; black- start).

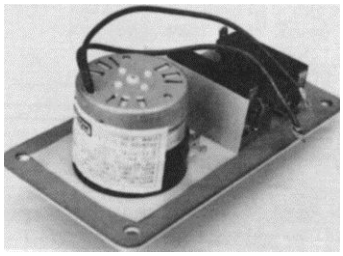

Fig. 3

2. Single and Three Phase Mixer - Leads to switches are black and have numbers.

⚠ WARNING DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX, PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

   A. Remove the switch plate assembly by removing the mounting screws and disconnect the following leads:

      1) #3 lead from the start switch.

      2) #2 lead from the start switch.

      3) #1 lead from the stop switch.

      4) #S2B lead from the stop switch.

      5) #S1B lead from the stop switch. Remove the lead and discard.

   B. Connect the leads, refer to Fig. 4, to the new switch plate assembly as follows:

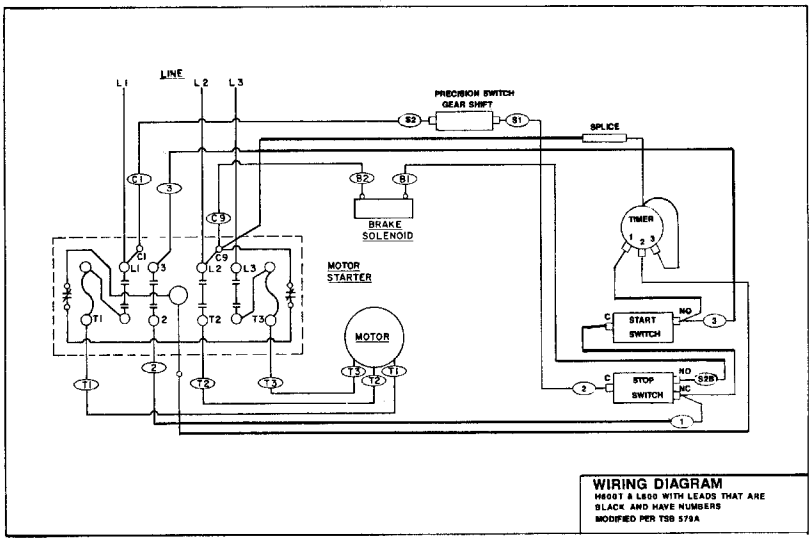

Fig. 4

1) Connect lead #2 (from the gear shift switch), to the STOP SWITCH terminal C.
2) Connect lead #S2B (from the brake solenoid), to the STOP SWITCH terminal N.O.
3) Connect lead #1, (from terminal 2 on contactor) and a four inch Jumper lead to the N.C. terminal on the STOP SWITCH.

NOTE: On some mixers this lead may be marked #2, The other end of the lead is connected to terminal #2 on the contactor.

4) Connect the other end of the four inch jumper lead, installed in step (3), to terminal C on the START SWITCH.
5) Connect a jumper (P/N 87532-151 in the kit) to terminal #1 on the timer.
6) Connect the other end of the jumper lead installed in step (5), and lead #3 to terminal NO on the START SWITCH.
7) Connect the timer motor lead with the spade connector to timer terminal #3.
8) Remove the contactor coil lead from terminal #3 on the contactor, Reinstall the screw and the other lead marked #3.
9) Install a lead between the contactor coil lead which was removed in step (8) and terminal #2 on the timer.
10) Connect a lead (P/N 87532-152 in the kit) to terminal C9 on the contactor and route the lead through the wiring harness to the switch plate assembly.
11) Use the line splice (P/N 65890-85 from the kit) and connect the timer motor lead to the lead installed in step 10.

C. Install the switch plate assembly.

D. Reconnect electrical power and check operation.

E. Use Fig. 7 for future troubleshooting.

3. Single Phase Mixer --- Leads to switches are color coded.

⚠ WARNING DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX, PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

A. Remove the switch plate assembly by removing the mounting screws and disconnect the leads. Discard the old switch plate assembly.

B. Connect the leads, refer to Fig. 5, to the new switch plate assembly as follows:

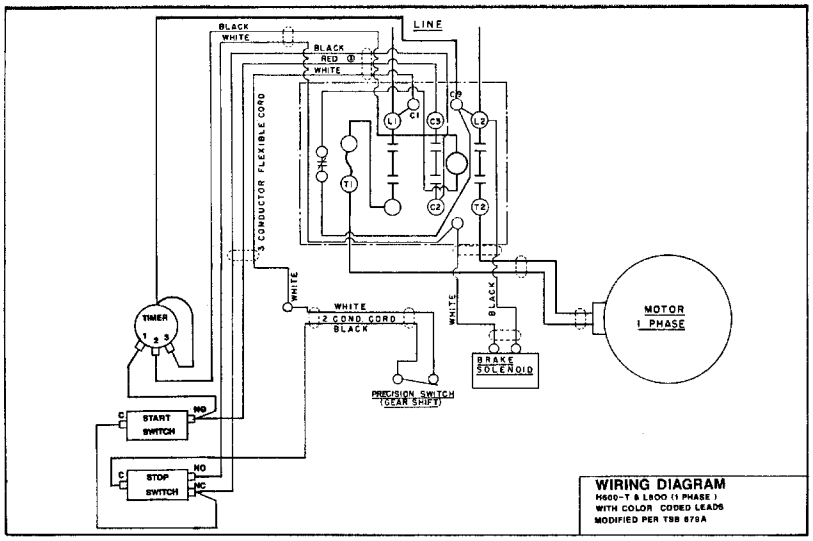

Fig. 5

1) Connect the white lead from the three conductor cord to the white lead from the precision switch. Tape the connection.
2) Connect the black lead from the precision switch to the common terminal on the STOP switch.
3) Connect the white lead from the brake solenoid to the NO terminal on the STOP switch.
4) Connect the black lead from terminal C2 on the contactor and one end of a four inch jumper lead to the N.C. terminal on the STOP switch.
5) Connect the other end of the jumper lead installed in step (4) to the C terminal on the START switch.
6) Connect the red lead from terminal C3 on the contactor and a jumper (P/N 87532-151 in the kit) to the N.O. terminal on the START switch.
7) Connect the other end of the jumper lead installed in step (6) to terminal #1 on the timer.
8) Connect one timer motor lead to terminal #3 on the timer.
9) Connect the black lead from the two conductor cord to timer terminal #2.
10) Connect a lead (P/N 87532-152 in the kit) to terminal C9 on the contactor and route the lead through the wiring harness to the switch plate assembly.
11) Use the line splice (P/N 65890-85 from the kit) and connect the timer motor lead to the lead installed in step (10).
12) Remove the contactor coil lead from terminal C3 on the contactor. Reinstall the C3 screw and the red lead.
13) Disconnect the black lead from terminal Ll on the contactor, Reinstall the Ll lead and the screw
14) Connect together the black lead removed in step (13) and the contactor coil lead which was removed in step (12). Tape the connection.

C. Install the switch plate assembly.

D. Reconnect electrical power and check operation.

E. Use Fig. 7 for future troubleshooting.

4. Three Phase Mixer --- Leads to switches are color coded.

⚠ WARNING DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX, PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

A. Remove the switch plate assembly by removing the mounting screws and disconnect the leads. Discard the old switch plate assembly.

B. Connect the leads, refer to Fig. 6, to the new switch plate assembly as follows:

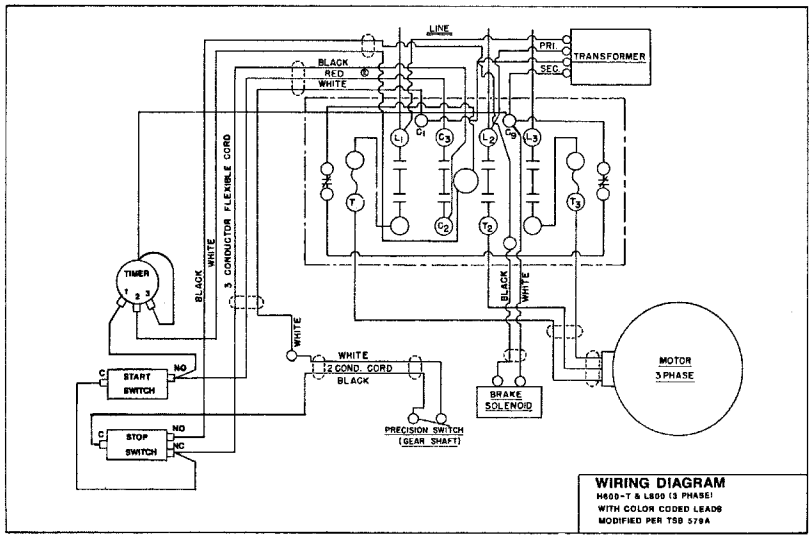

Fig. 6

1) Connect the white lead from the three conductor cord to the white lead from the precision switch. Tape the connection.

2) Connect the black lead from the precision switch to the common terminal on the STOP switch.

3) Connect the black lead from the brake solenoid to the NO terminal on the STOP switch.

4) Connect the black lead from terminal C2 on the contactor and one end of a four inch jumper lead to the N.C. terminal on the STOP switch.

5) Connect the other end of the jumper lead installed in step (4) to the C terminal on the START switch.

6) Connect the red lead from terminal C3 on the contactor coil and a jumper (P/N 87532-151 in the kit) to the N.O. terminal on the START switch.

7) Connect the other end of the jumper lead installed in step (6) to terminal #1 on the timer.

8) Connect one timer motor lead to terminal #3 on the timer.

9) Connect the white lead from the two conductor cord to timer terminal #2.

10) Connect a lead (P/N 87532-152 in the kit) to terminal C9 on the contactor and route the lead through the wiring harness to the switch plate assembly.

11) Use the line splice (P/N 65890-85 from the kit) and connect the timer motor lead to the lead installed in step (10).

12) Remove the contactor coil lead from terminal C3 on the contactor. Reinstall the C3 screw and the red lead.

13) Disconnect the white lead from terminal LI on the contactor. Reinstall the LI lead and the screw.

14) Connect together the white lead removed in step (13) and the contactor coil lead which was removed in step (12). Tape the connection.

C. Install the switch plate assembly.

D. Reconnect electrical power and check operation.

E. Use Fig. 7 for future troubleshooting.

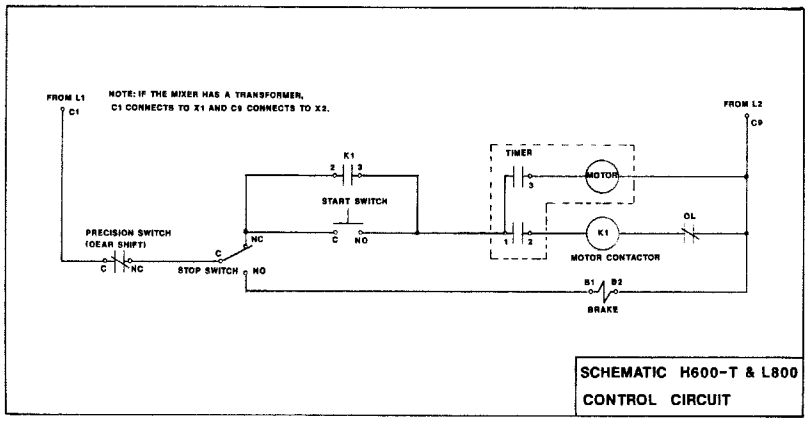

Fig. 7

HOBART CORPORATION

Miscellaneous
VOL. 1 **NO.** 630
DATE September 15, 1985

TECHNICAL SERVICE BULLETIN

NATIONAL SERVICE DEPARTMENT

TROY, OHIO 45374

ARROW HART OVERLOAD RELAY AND HEATER REPLACEMENT

Increasing difficulties in obtaining replacement parts from our vendor (Arrow Hart) has forced us to find a suitable replacement. Thermal Overload Relays, Part Numbers P-88196-1-1 and P-88196-2-1 are no longer available.

If you encounter a machine that is equipped with Arrow Hart Thermal Overload Relays, and either the Thermal Overload Relay or the Overload Relay Heater Element requires replacement, order and install a Furnas Thermal Overload Relay, Part Number P-88196-6-1 and the appropriate Overload Relay Heater Element from the chart below.

Furnas Overload Relay Heater Elements and Arrow Hart Overload Relay Heater Elements are not interchangeable.

FOR USE WITH THERMAL OVERLOAD RELAY PART #88196-6-1 ONLY

TYPE MOTOR AND HORSEPOWER	MOTOR/MACHINE NAMEPLATE VOLT - HZ-PH - AMPS		THERMAL OVERLOAD RELAY HEATER ELEMENT PART NO.
LM	100-115/60/1	4.4	C-112235-31
	200-230/60/1	2.2	-23
1/3 HP	200-230/60/3	1.25	-17
	400-460/60/3	0.63	-8
	550-600/60/3	0.50	-6
	110-120/50/1	4.94	-32
	220-240/50/1	2.58	-24
	200-240/50/3	1.25	-17
	346-415/50/3	0.70	-9
FTC	200-230/60/3	1.6	C-112235-19
	400-460/60/3	0.8	-11
1/2 HP	550-600/60/3	0.7	-9
	200-240/50/3	2.0-2.2	-23
	346-415/50/3	1.3	-17
SMRS	200-230/60/1	3.0	C-112235-26
	200-230/60/3	1.6	-19
1/2 HP	400-460/60/3	0.8	-11
	220-240/50/1	3.5	-28
	200-240/50/3	1.8	-20
	346-415/50/3	1.1	-16
VAC	200-230/60/1	3.5	C-112235-29
	200-230/60/3	2.2	-23
1/2 HP	400-460/60/3	1.1	-16
	220-240/50/1	3.4	-28
	200-240/50/3	1.7	-19
	346-415/50/3	1.0	-14
AM 8	100-115/60/1	11.1	C-112235-41
AM 9	200-230/60/1	5.5	-33
AM 10	200-230/60/3	2.8	-25
AM 11	400-460/60/3	1.4	-18
	550-600/60/3	1.1	-14
1 HP	110-120/50/1	11.5	-41
	220-240/50/1	5.75	-34
	200-240/50/3	3.1	-27
	346-415/50/3	2.0-1.6	-22

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FOR USE WITH THERMAL OVERLOAD RELAY PART #88196-6-1 ONLY

TYPE MOTOR AND HORSEPOWER	MOTOR/MACHINE NAMEPLATE VOLT - HZ-PH - AMPS		THERMAL OVERLOAD RELAY HEATER ELEMENT PART NO.
AM 12	200-230/60/1	7.8	C-112235-38
	200-230/60/3	4.0	-30
1 HP	400-460/60/3	2.0	-22
	550-600/60/3	1.5	-18
	220-240/50/1	8.4	-39
	200-240/50/3	4.4	-31
	346-415/50/3	2.6	-25
C 44	200-230/60/1	9.5	C-112235-40
	200-230/60/3	4.5	-31
1-1/2 HP	400-460/60/3	2.3	-23
	220-240/50/1	9.8	-40
	200-240/50/3	5.2	-33
	346-415/50/3	2.9	-26
C 44	200-230/60/1	11.3	C-112235-41
	200-230/60/3	5.4	-34
2 HP	400-460/60/3	2.7	-25
	550-600/60/3	2.2	-23
	220-240/50/1	11.3	-41
	200-240/50/3	6.0	-34
	346-415/50/3	3.3	-28
CS 120	200-230/60/3	4.3	C-112235-31
	400-460/60/3	2.2	-24
1-1/2 HP	550-600/60/3	1.7	-20
	200-240/50/3	5.6	-34
	346-415/50/3	3.2	-28
CS 120	200-230/60/3	5.5	C-112235-34
	400-460/60/3	2.7	-26
2 HP	550-600/60/3	2.2	-24
	200-240/50/3	6.4	-36
	346-415/50/3	3.7	-30
FTP	200-230/60/3	4.3	C-112235-30
	400-460/60/3	2.2	-23
1-1/2 HP	200-240/50/3	5.6	-33
	346-415/50/3	3.2	-27
FTP	200-230/60/3	5.5	C-112235-34
	400-460/60/3	2.7	-25
2 HP	550-600/60/3	2.2	-23
	200-240/60/3	6.4	-35
	346-415/50/3	3.7	-29
FTP	200-230/60/3	8.1	C-112235-38
	400-460/60/3	4.0	-30
3 HP	200-240/50/3	8.5	-39
	346-415/50/3	4.9	-32

FOR USE WITH THERMAL OVERLOAD RELAY PART #88196-6-1 ONLY

TYPE MOTOR AND HORSEPOWER	MOTOR/MACHINE NAME PLATE VOLT - HZ-PH- AMPS		THERMAL OVERLOAD RELAY HEATER ELEMENT PART NO.
4346	200-208/60/3	22.8-22.0	C-112235-47
	220-230/60/3	20.8-20.0	-46
7-1/2 HP	400/60/3	11.4	-41
	440-460/60/3	10.4-10.0	-59
	550-575/60/3	8.3-7.6	-38
	220/50/3	21.0	-46
	380/50/3	12.2	-42
4732	208/60/1	19.5	C-112235-46
	230/60/1	17.9	-45
3 HP	208/60/3	8.6	-40
	220/60/3	8.1	-39
	440/60/3	4.1	-31
	550/60/3	3.3	-29
	220/50/1	17.5	-45
	220/50/3	8.2	-39
	380/50/3	4.8	-32
	415/50/3	4.4	-31
4632	208-230/60/1	13.2-12.5	C-112235-42
	208-220/60/3	6.5-6.1	-35
2 HP	440/60/3	3.1	-27
	550/60/3	2.5	-25
	200-220/50/1	13.5-12.2	-42
	190-220/50/3	7.3-6.3	-35
	346-380/50/3	4.0-3.7	-30
	415/50/3	3.4	-29

DISPOSER MOTORS USED ON FR-FRC DISHWASHERS ONLY

FOR USE WITH THERMAL OVERLOAD RELAY PART #88196-6-1 ONLY

TYPE MOTOR AND HORSEPOWER	MOTOR/MACHINE NAMEPLATE VOLT - HZ-PH-AMPS		THERMAL OVERLOAD RELAY HEATER ELEMENT PART NO.
1-1/2 HP	208-220/50/3	4.8	C-112235-32
	440/50/3	2.4	-24
2 HP	208-220/50/3	6.0	-34
	440/50/3	3.0	-27
3 HP	208-220/50/3	8.8	-39
	440/50/3	4.4	-31
5 HP	208-220/50/3	14.2	-42
	440/50/3	7.1	-37

TECHNICAL SERVICE BULLETIN

PRODUCT SERVICE DEPARTMENT **TROY, OH. 45374-0001**

H600 CABLE UPDATE KIT PART NO. 438754 (1 PH AND 3PH)

Introduction

This kit was created to update H600 units built with a cable actuated switch. The kit updates to push button start and stop switches and a starter.

In addition to the kit, **three** of the appropriate thermal overload heater elements must be ordered per the chart shown in parts information.

The kit can be installed on units with the following ML or Spec. Number on the machine data plate.

USE ON ML OR SPEC NO.
ML-16427, ML-16429, Spec. No. 6345, Spec. No. 6360, Spec. No. 7760 and Spec. No. 7752

Parts Information

NOTE: Three elements are required for single phase and three phase units.

Heater elements must be ordered - not included in kit.

HEATER ELEMENT CHART						
MACHINE VOLTAGE	HZ.	PH.	MOTOR HP.	PART NO.	JOSLYN CLARK NO.	QTY.
115	60	1	1 or 1-1/2	294842-33	2445	3
200-230	60	1	1 or 1-1/2	294842-26	2437	3
200	50	1	1 or 1-1/2	294842-27	2438	3
200-230	60	3	1 or 1-1/2	294842-21	2432	3
460	60	3	1 or 1-1/2	294842-14	2424	3
200-208-220	50	3	1 or 1-1/2	294842-23	2434	3
380-400-415	50	3	1 or 1-1/2	294842-17	2427	3

Since this is a multi-use kit, depending on the application, all parts may not be used.

Units with 115VAC line voltage applied will not require the transformer and fuse circuit.

The following is a list of the parts contained in the kit. Once the kit has been installed the individual parts can be ordered for service.

- - - Not a service part

KIT PART NOS.

PART NO.	DESCRIPTION	QTY.
87712-48-2	Starter (120V Coil)	1
SD-034-59	Drive Screw 10-32	2
291727	Switch Plate	1
87711-183-1	Push Start Button Switch (NO)	1
87711-183-2	Push Stop Button Switch (NC)	1
102467-1	Cap Push Button Black (Start)	1
102467-2	Cap Push Button Red (Stop)	1
SC-013-12	Machine Screw 6-32 x 1/4	4
- - -	Wiring Diagram F-33684	1
502397	12 Awg 105˚C Wire	7 Ft.
502374	18 Awg 105˚C Wire	14 Ft.
65890-19	Ring Terminal	10
65890-14	Ring Terminal	7
65890-139	Female Terminal	10
65890-114	Piggy Back Terminal	2
477900	Control Panel	1
477892-1	Arm Bracket, Left	1
477892-2	Arm Bracket, Right	1
SC-036-14	Cap Screw 1/4-20 x ½	6
WL-003-37	Lockwasher 1/4	6
NS-046-53	Hex Nut 1/4-20	6
FE-009-32	Wire Nut Connector	4
SC-027-29	Machine Screw 8-32 x 3/8	1
WL-010-01	Lockwasher	1
NS-010-11	Hex Nut 8-32	1
522898	Wire Ties	2

Following parts in kit are not used on 115/60/1 line voltage unit

PART NO.	DESCRIPTION	QTY.
101935	Transformer	1
SD-009-39	Drive Screw 8-32 (for mounting transformer)	4
22376-1	Fuse Holder	1
FE-014-19	Fuse 125V 1-1/2 Amps	1
85432	Fuse Insulator	1
SD-009-23	Drive Screw 6-32 (for mounting fuse block)	1
- - -	Wiring Harness	1

Special Tools Required

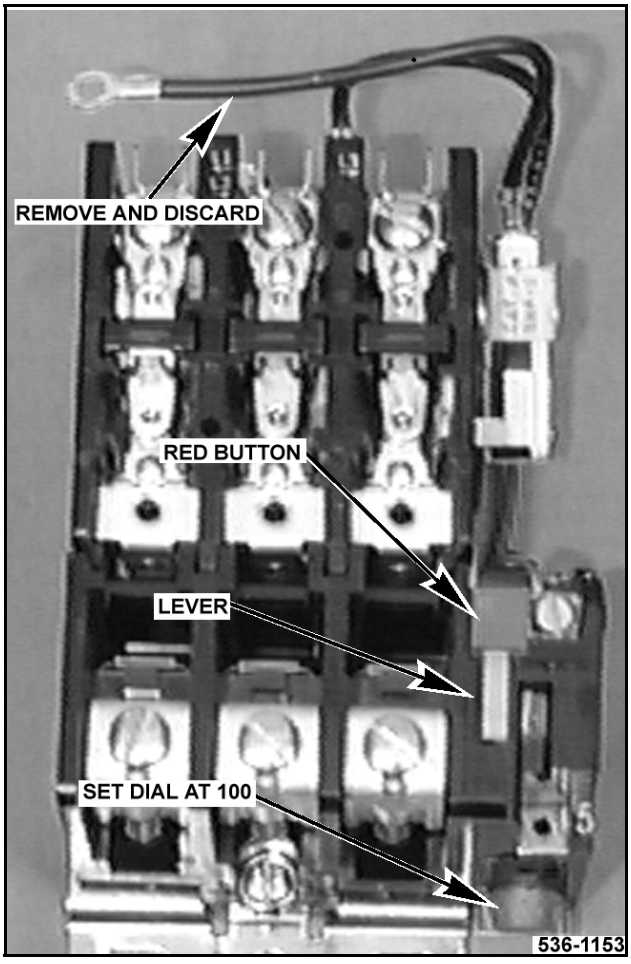
- Electric Hand Drill
- 9/32" Drill Bit
- Crimping Tool, part no. 516991
- Two sets of wire tags, nos. 1-12.

Kit Installation Instructions

1. Note the line voltage to the unit and select the proper parts from the kit. Check the heater element requirements.

2. Remove the black lead wire assembly from the starter side switch (CON-NO) and discard.

3. Press the red button down and move the lever to lock in the automatic position.
   A. Set the dial to 100.
   B. Install three thermal overload heaters on the starter.



WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

4. Remove top cover.

5. Remove and discard switch plate assembly. Save mounting screws.

6. Remove and discard any parts associated with the cable actuation of the switch.

7. Disconnect wiring to switch.

8. Remove the switch from the switch support assembly and discard.

9. Assemble the switches to the kit switch plate using four 6-32 x 1/4 screws. The black switch (start) must be installed in the upper hole and the red switch (stop) must be installed in the lower hole.

   A. Install the caps on the switches (red-stop; black-start).

   B. Set the assembly aside.

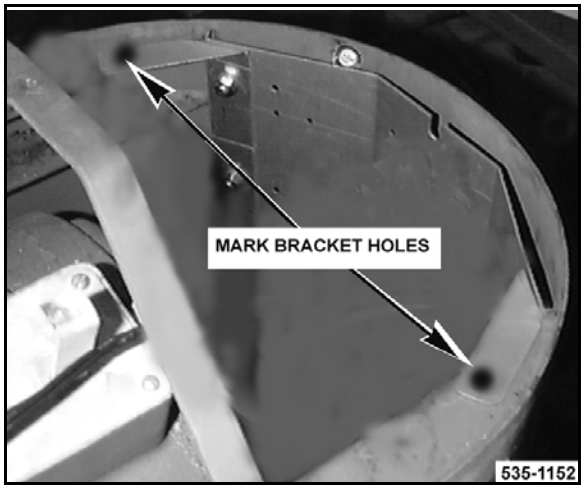
10. Assemble the arm brackets to the control panel using four ¼-20 x ½ cap screws, lockwashers and hex nuts.

   A. Position the control panel behind the motor against the pedestal with the arm brackets on top of pedestal top rail.

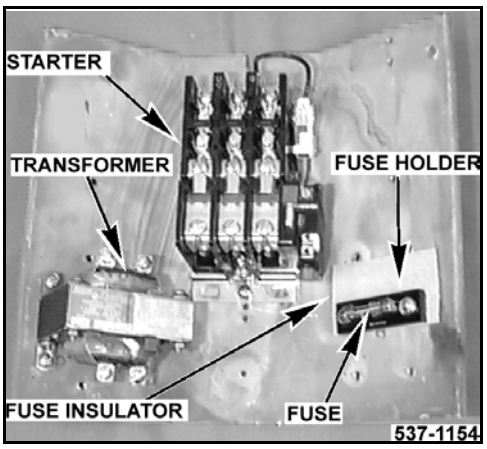
      1) Mark arm bracket holes on top rail for drilling.

      2) Remove control panel.

      3) Using a 9/32" drill bit, drill the two holes in the pedestal rail.



   B. Mount the components required on the control panel using the wiring diagram illustration and the hardware in the kit. 230/480 volt components shown.



NOTE: Transformer terminals X1 and X2 go toward the bottom.

   C. Using the wiring diagram lead assembly construction chart, create the wires required.

   D. Wire the control panel components per the wiring diagram.

   E. Tag the wires indicating the wire number shown on the wiring diagram.

11. Connect the motor leads per the wiring diagram.

12. Mount the control panel using two ¼ -20 x ½ cap screws, lockwashers and hex nuts.

13. Route the switch wires from the control panel, away from any moving objects, to the switch cavity.

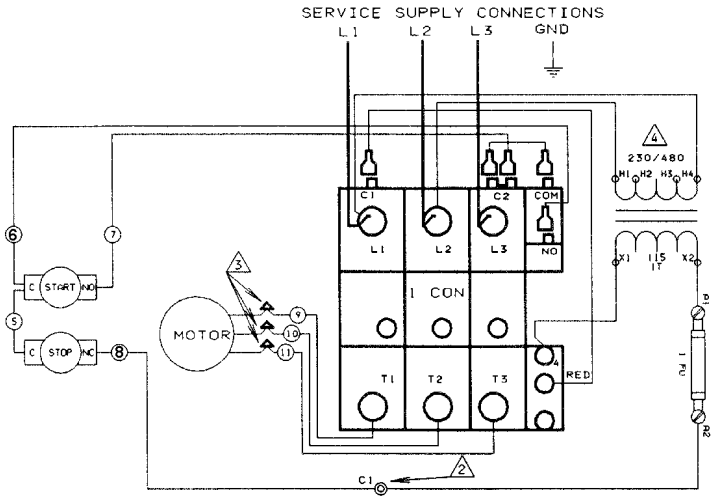
14. Connect the wires to the switch plate assembly per the wiring diagram.

15. Install the switch plate assembly using the screws previously saved. Secure wires with the wire ties.

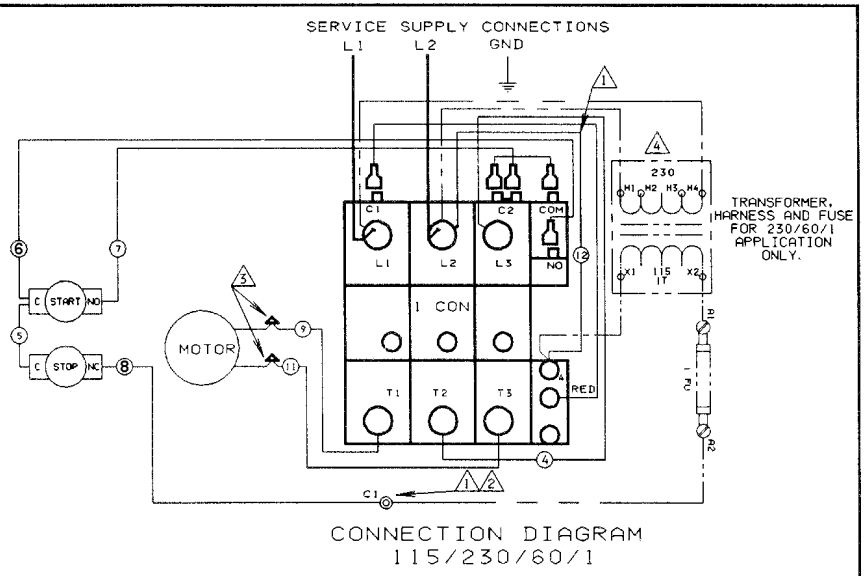
16. Peel the backing from the wiring diagram and place in the top cover over the original wiring diagram.

17. Restore power to the unit and check motor rotation.

18. Reinstall top cover and check machine operation.



CONNECTION DIAGRAM
230/480/60/3



CONNECTION DIAGRAM
115/230/60/1

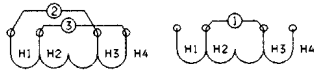
NOTES:

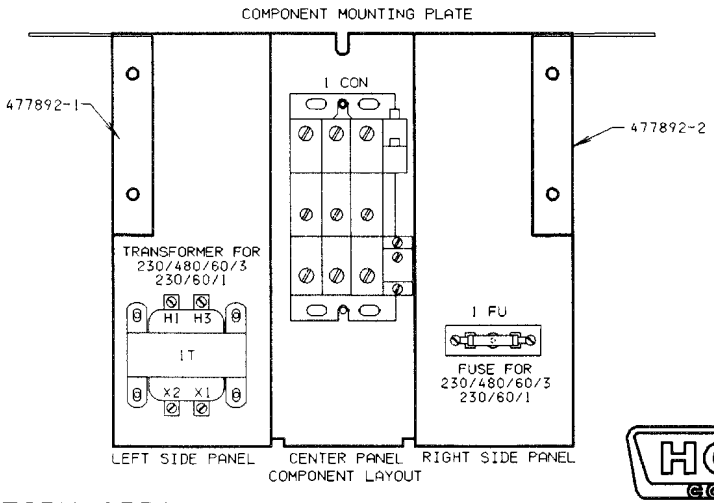
1. WHEN TRANSFORMER HARNESS AND FUSE IS NOT USED IN 115/60/1 CONNECTION, PLACE WIRE NUMBER 8 ON 1 CON L1 AND USE WIRE NUMBER 12 TO CONNECT 1 OL 4 TO 1 CON L2.

2. PLACE AN 8-32 X 3/8 BRASS SCREW (SC 027-29) THROUGH BOTH TERMINALS. PLACE A #8 SHAKEPROOF EXTERNAL TOOTH LOCKWASHER OVER THE THREADS AND AGAINST THE TERMINALS. SECURE WITH AN 8-32 BRASS HEX NUT. WRAP ENTIRE CONNECTION WITH AT LEAST TWO LAYERS OF THERMOPLASTIC OR FRICTION TAPE OR 1 LAYER OF RUBBER TAPE PER UL 763. 14.2.6 MOTOR OPERATED COMMERCIAL FOOD PREPARING MACHINES.

3. MAKE MOTER LEAD CONNECTION TO JUMPERS AS FOLLOWS:
   A) REMOVE ANY TERMINAL ON MOTOR LEADS. STRIP LEADS 0.375. PLACE STRIPPED ENDS OF WIRES TOGETHER AND TERMINATE WITH FE 009-32 WIRE NUT CONNECTORS (YELLOW).
   B) WRAP CONNECTION WITH TWO (2) LAYERS OF THERMOPLASTIC OR FRICTION TAPE OR ONE (1) LAYER OF FRICTION TAPE ON TOP OF ONE (1) LAYER OF RUBBER TAPE.

4. TRANSFORMER CONNECTION CHART.
   WIRE NUMBER IS IN REFERENCE TO LEAD ASSEMBLY CONSTRUCTION CHART.

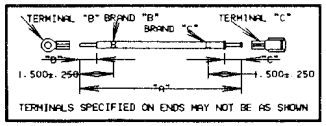




COMPONENT LAYOUT

LEAD ASSEMBLY CONSTRUCTION CHART

COLOR	AWG	CUT LENGTH "A"	BRAND "B"	TERMINAL "B"	BRAND "C"	TERMINAL "C"	VOLT/PHASE APPLICATION	TERMINAL "B" LOCATION	TERMINAL "C" LOCATION
BLACK	18	4.00	1	65890-19	1	65890-19	480/60/3	T1 H2	T1 H3
BLACK	18	4.00	2	65890-19	2	65890-19	230/60/3/1	T1 H1	T1 H3
BLACK	18	4.00	3	65890-19	3	65890-19	230/60/3/1	T1 H2	T1 H4
BLACK	12	18.00	4	65890-14	4	65890-14	230/115/60/1	1 CON L3	1 OL T2
BLACK	18	4.00	5	65890-114	5	65890-139	115/230/480/60/3/1	START SW. COM	STOP SW. COM
BLACK	18	46.00	6	65890-139	6	65890-139	115/230/480/60/3/1	START SW. COM	1 CON NO
BLACK	18	46.00	7	65890-139	7	65890-139	115/230/480/60/3/1	START SW. NO	1 CON C2
BLACK	18	46.00	8	65890-139	8	65890-139	230/480/60/3/1	STOP SW. NC	⚠2 HARNESS WIRE A-2
BLACK	12	12.00	9	65890-14	9	STRIP .375	115/230/480/60/3/1	1 OL T1	⚠3 1 MTR T1
BLACK	12	12.00	10	65890-14	10	STRIP .375	230/480/60/3	1 OL T2	⚠3 1 MTR T2
BLACK	12	12.00	11	65890-14	11	STRIP .375	115/230/480/60/3/1	1 OL T3	⚠3 1 MTR T3
BLACK	18	6.00	12	65890-139	12	STRIP .375	115/60/1	1 CON L2	1 OL 4



HOBART CORPORATION
TROY, OHIO 45374

FORM 033684

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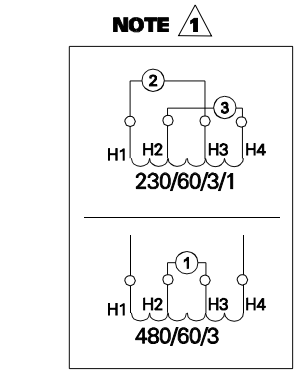
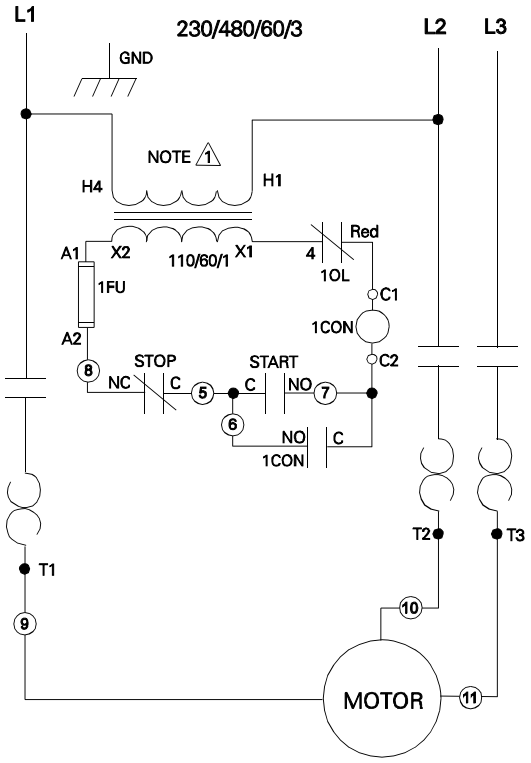
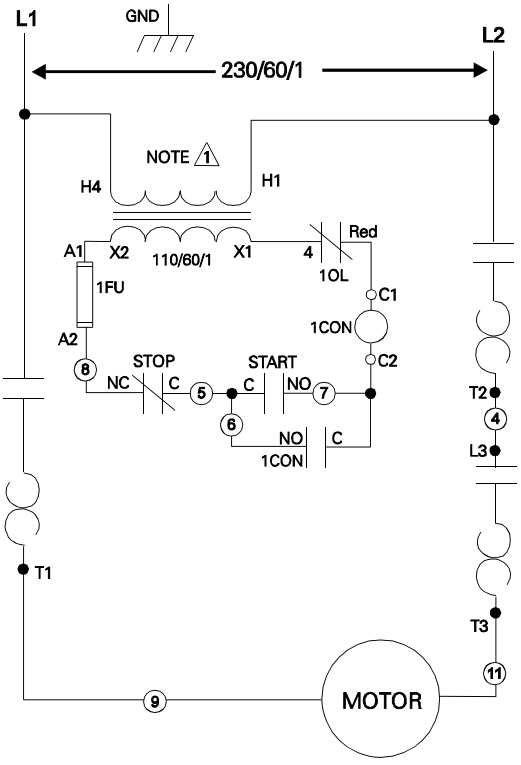
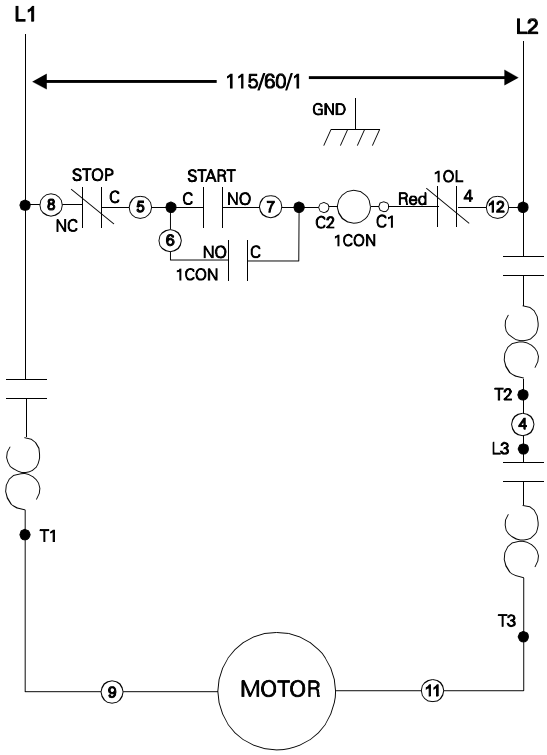


NOTE 2 : (X) = WIRE #







H600 WIRED PER UPDATE KIT 438754 TSP1116C

Mixers
VOL. 1 NO. 992
May 5, 1997

TECHNICAL SERVICE BULLETIN

PRODUCT SERVICE DEPARTMENT TROY, OH. 45374-0001

H600/L800 TRANSFORMER KIT PART NO. 438755

Introduction

The kit updates a mixer to handle the current load of the additional components in the bowl guard, bowl height sensing or bowl lock kit(s).

Parts Information

Once the kit has been installed the individual parts can be ordered for service.

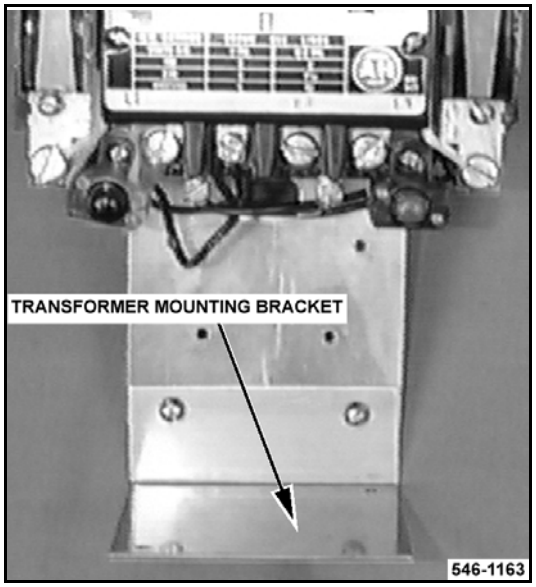
- - - Not a service part

CONTENTS OF KIT NO. 438755		
PART NO.	DESCRIPTION	QTY.
293555-2	Transformer	1
478202	Transformer mounting bracket	1
WL-010-01	Lockwasher	4
SC-009-65	Machine screw 8-32 x 1/4	4
65890-23	Splice	1
65890-19	#8 Ring terminal	2
65890-224	#10 Ring terminal	2
- - - -	Wiring Diagram F-33755	1

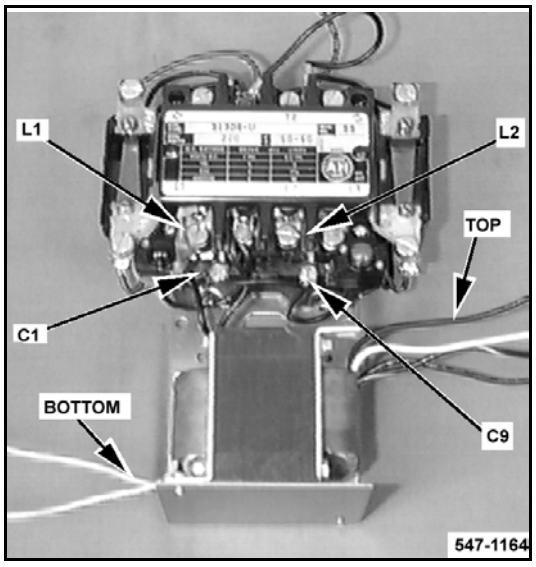
Kit Installation Instructions

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove top cover.
2. Free starter and transformer mounting plate from pedestal. Save hardware.
   A. Pull assembly to top of mixer.
3. Disconnect transformer and remove from mounting plate. Discard transformer and mounting hardware.
4. Assemble the transformer mounting bracket to the mounting plate using the bottom two mounting holes. Secure with two 8-32 x 1/4 machine screws and two lockwashers.



5. Position the transformer on the mounting bracket by locating the wires as shown.



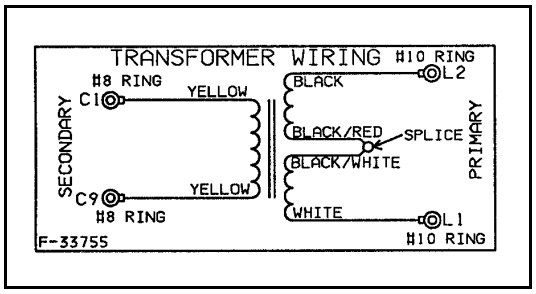
A. Mount the transformer to the mounting bracket using two 8-32 x 1/4 machine screws and two lockwashers.

6. Remove the terminals from the transformer as close to the end of the wires as possible.

   A. Splice the transformer primary wires per the wiring diagram.

   B. Add the ring terminals per the wiring diagram.

   C. Wire the transformer per the wiring diagram.



   D. Peel the backing from the wiring diagram and place it on the front of the transformer.

7. Install the assembly to the pedestal using the saved hardware.

8. Install the top cover.

9. Power unit and check for proper operation.