

Section 8

Holeywheel Hopper

The hopper is a microprocessor-controlled electromechanical assembly. The major electronic components of the hopper are: a 25 volt DC motor that runs when coins are to be paid out, an electronic optical sensor that counts the coins paid out, and an adjustable coin-level probe on the hopper bowl that informs the microprocessor when the coins reach a predetermined level.

Machines have either a pinwheel hopper or a holeywheel hopper. This section covers the holeywheel hopper. Refer to Section 7, Pinwheel Hopper, for information on that style hopper.

Topics covered in this section include:

- **Section 8.1, Holeywheel Hopper Removal and Installation** - provides instructions for removing the hopper from and installing it in the machine.
- **Section 8.2, Holeywheel Hopper Routine Maintenance** - details hopper maintenance procedures such as inspection, cleaning and adjustments.
- **Section 8.3, Holeywheel Hopper Coin Level Adjustments** - describes procedures for setting the appropriate hopper probe levels and filling the hopper.
- **Section 8.4, Holeywheel Hopper Bowl Disassembly and Assembly** - covers hopper bowl components and provides disassembly and assembly procedures for the hopper bowl.
- **Section 8.5, Holeywheel Hopper Motor Removal and Installation** - provides removal and installation procedures for the hopper motor.



- **Section 8.6, Holeywheel Hopper Main Housing Disassembly and Assembly** - details hopper main housing components and provides disassembly and assembly procedures for the main housing.
- **Section 8.7, Holeywheel Hopper Chassis Disassembly and Assembly** - describes the components that make up the hopper chassis, as well as disassembly and assembly procedures.
- **Section 8.8, Holeywheel Hopper Functional Verification** - describes functional verification procedures.



8.1 Holeywheel Hopper Removal and Installation

The hopper needs to be removed from the machine for inspection, cleaning and adjustment. To remove the hopper from the lower module or install it, see Figure 8-1 and proceed as follows. (Although a pinwheel hopper is shown, the procedure is the same for either holeywheel or pinwheel type hoppers.)

Removal

1. Open the machine door and turn the **power off**.
2. Firmly grip the hopper handle with one hand and support the hopper bowl with the other hand. Do not use the hopper bowl for a handle.
3. Pull the hopper straight out from the machine enclosure, taking care not to spill any coins.

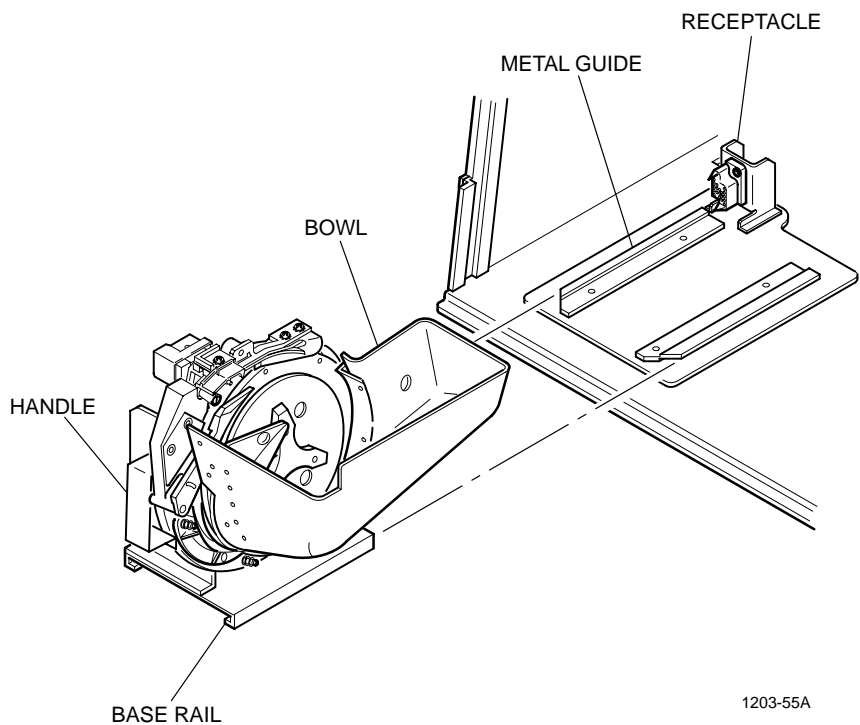


Figure 8-1. Typical Hopper Removal.

Installation

1. Align the hopper base rails with the metal guides on the lower module and slide the hopper into the machine enclosure.
2. Make sure the hopper is firmly plugged into the hopper receptacle.
3. Turn the **power on**; close and lock the machine door.



8.2 Holeywheel Hopper Routine Maintenance

These steps identify the areas that require inspection and cleaning. Refer to Table 8-1 for preventive maintenance information.

Inspection

1. Inspect the optic sensor for clean surfaces and any damage. Confirm that it is fastened securely.
2. Confirm that the coin level probe is straight and fastened securely.
3. Inspect the bowl for damage. Verify that the metal baffle is tight and that the screws that secure the bowl are tight.

Cleaning

The following information describes hopper cleaning procedures. Refer to Table 8-1 for cleaning recommendations. Refer to the applicable mechanical parts manual to identify hopper components.

1. Turn the **power off** before starting any cleaning procedure.

Note: *The optic sensor assembly may vary in some hoppers. The following instructions are intended as a general procedure when cleaning the optic sensor.*

2. Clean the inner surfaces of the optic coin sensor using a cotton swab soaked in isopropyl alcohol.



Table 8-1 Holeywheel Hopper Preventive Maintenance			
Maintenance Item	Service Interval (Months)*		
	1	3	6
Bowl			C
Optic Sensor	C		
Coin Level Probe			C
* C = Clean & Inspect A = Adjust			

3. Wipe the sensor dry with a lint-free cloth.
4. Clean the probe (brass screw) using a stiff short-haired brush and isopropyl alcohol.
5. Clean the inside of the bowl with compressed air (not to exceed 60 psi) and remove any foreign objects.

Caution: *Always wear eye protection when working with pressurized air or cleaning solvents.*



8.3 Holeywheel Hopper Coin Level Adjustments

The coin level probe on the hopper bowl informs the micro-processor of the approximate coin levels of the hopper bowl.

When the coins come in contact with the probe, the processor instructs the coin diverter assembly to divert all incoming coins away from the hopper bowl and channels them to the coin drop chute to prevent an overflow.

See Figure 8-2 and use the procedure that follows to set the appropriate hopper probe level.

1. Hold the probe (brass screw) with the screwdriver.
2. Remove the hex standoff from the inside of the bowl.
3. Remove the probe (brass screw) from the bowl and re-insert it into the appropriate hole location.
4. Fasten the probe (brass screw) to the bowl with the hex standoff. **Do not** overtighten.
5. Fill the hopper with a desired number of coins.

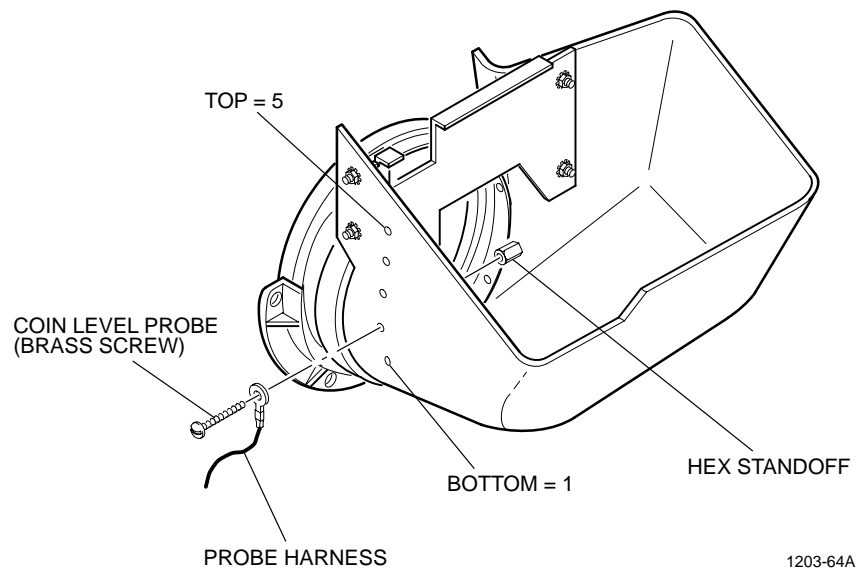


Figure 8-2. Hopper Probe Levels.



8.4 Holeywheel Hopper Bowl Disassembly and Assembly

The components that make up the hopper bowl include the bowl, the baffle and the coin level probe. See Figure 8-3 and use the following procedure to disassemble and assemble the hopper bowl.

Disassembly

1. Open the machine door and turn the **power off**.
2. Firmly grip the hopper handle with one hand and support the hopper bowl with the other hand. Do not use the hopper bowl for a handle.
3. Pull the hopper straight out from the machine enclosure, taking care not to spill any coins.

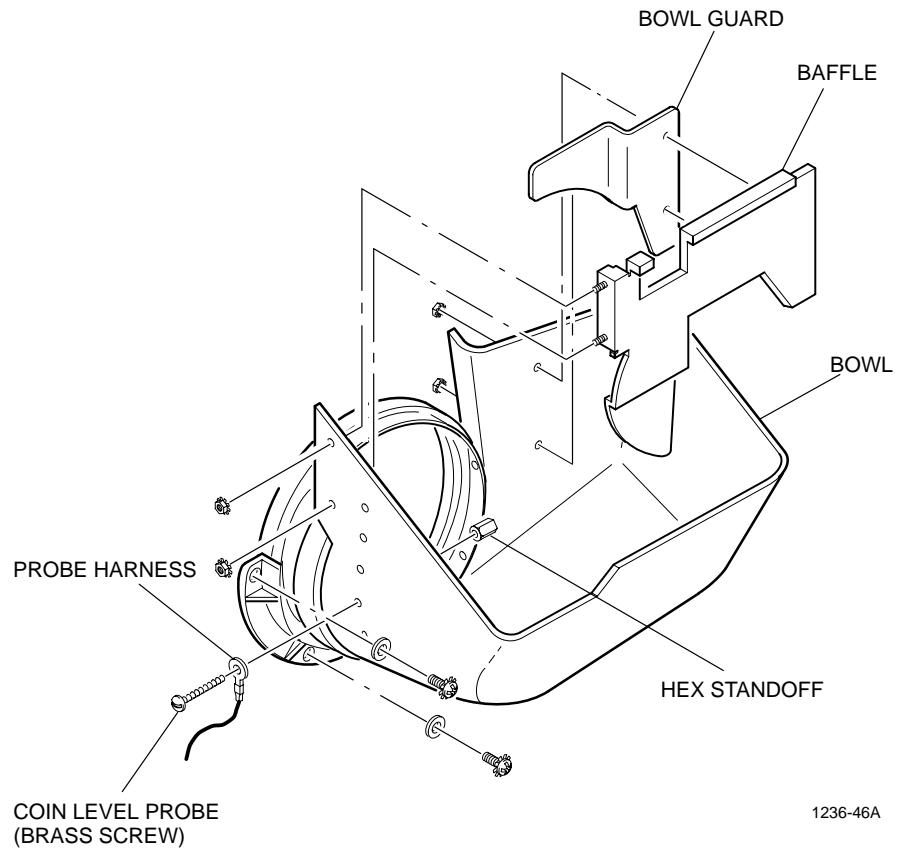


Figure 8-3. Holeywheel Hopper Bowl Components.



4. Empty the coins out and place the hopper on a flat surface.
5. Remove the hex standoff from the probe (brass screw) on the inner left side of the bowl and remove the probe (brass screw) and the probe harness.
6. Remove nuts that fasten the baffle to the bowl and remove the baffle.
7. Remove the screws and flat washers that fasten the bowl to the main housing and remove the hopper bowl from the main housing. The top right-hand screw is accessible via a hole in the hopper bowl.
8. Remove the bowl from the main housing.

Assembly

1. Align the four mounting holes on the bowl with the four mounting posts on the main housing and fit the two components together.
2. Secure the bowl to the main housing with the flat washers and screws.
3. Secure the baffle to the bowl, left end first.
4. Insert the probe (brass screw) and the probe harness into one of the five probe holes located on the left side of the bowl.
5. Position the probe harness so it points toward the main housing and tighten the hex standoff securely.



8.5 Holeywheel Hopper Motor Removal and Installation

The 25 volt DC hopper motor assembly is a replaceable unit. IGT does not recommend disassembly of the motor and its components. To remove or replace the hopper motor, see Figure 8-4 and proceed as follows.

Removal

1. Disconnect the motor harness from the motor controller board.
2. Disconnect the grounding harness at the lower left corner of the motor (as shown) and remove the nut for use on the replacement motor.

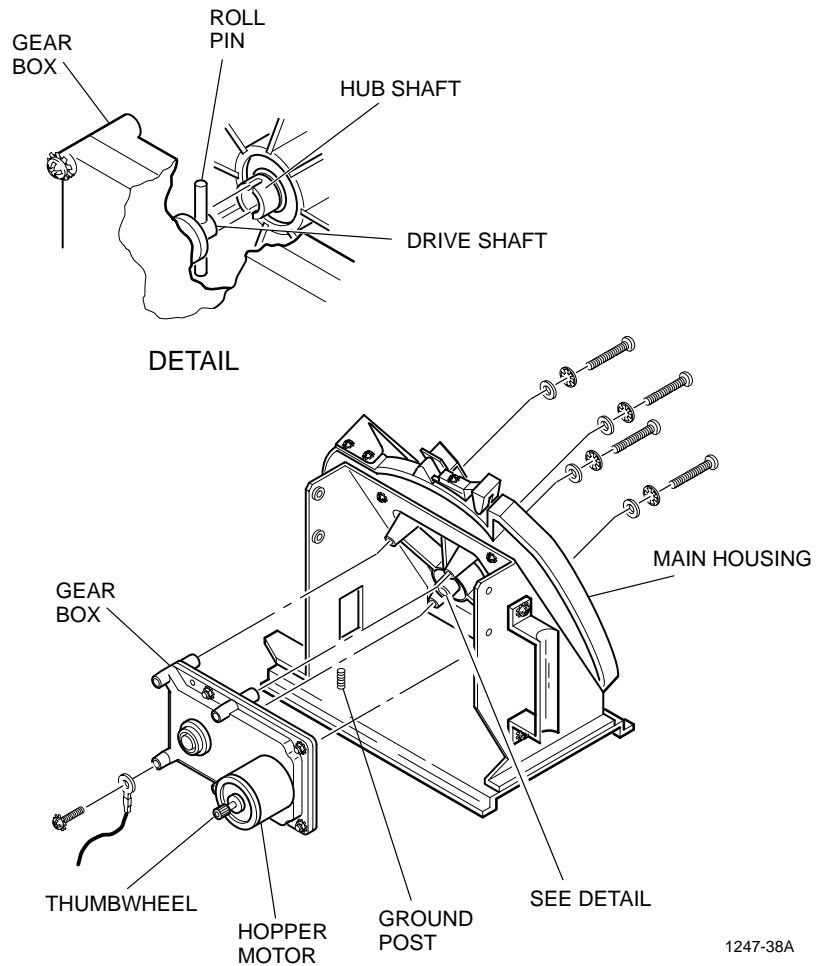


Figure 8-4. Hopper Motor.



3. Disconnect the grounding harness at the lower left corner of the motor (as shown) and remove the nut for use on the replacement motor.
4. Rotate the thumbwheel on the end of the motor shaft until the four access holes in the hub align with the screws.
5. Remove the screws that secure the pinwheel and shelfwheels to the main housing and then remove the pinwheel and shelfwheels.
6. Hold the motor in place and remove the screws, internal star-lock washers and flat washers that fasten the motor to the main housing.
7. Pull the motor straight away from the main housing.

Installation

Note: Be sure the replacement motor has a roll pin installed and centered in the drive shaft. If it does not, remove the pin from the old motor using either a press or a hammer and a 1/8" drift.

1. Align the drive shaft and roll pin with the hub shaft on the main housing. Fit the pin into the notches on either side of the hub shaft.
2. Press the motor drive shaft into the hub shaft and rotate the motor until the four mounting posts of the main housing and motor align.
3. Fasten the motor to the main housing by starting each of the screws, lock washers and flat washers. **Do not** tighten until all four screws are started.
4. Tighten two of the screws that are located diagonally from each other by alternating between the two screws every two or three turns until the gearbox fits tightly against the main housing and the roll pin fits completely into the hub shaft.
5. Securely tighten the remaining two mounting screws and double check the tightness of the first two.
6. Place the shelfwheels, pinwheel and shim(s) onto the hub (refer to Section 8.6). Secure these with the appropriate fasteners.
7. Fasten the grounding harness to the lower left corner of the motor.
8. Connect the motor harness to the motor controller board.

Refer to Section 8.1 for hopper installation procedures.

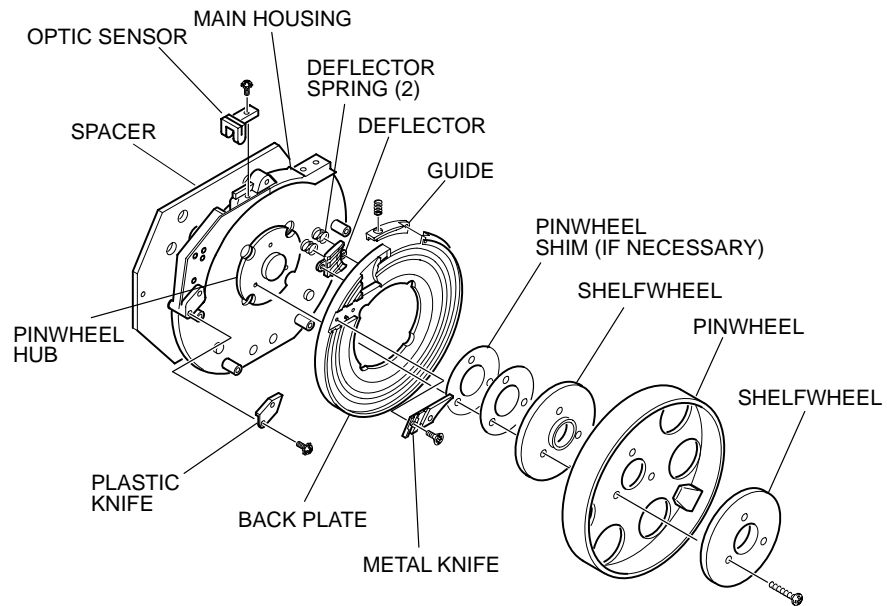


8.6 Holeywheel Hopper Main Housing Disassembly and Assembly

The components that make up the holeywheel main housing include a back plate, knives, deflector, pinwheel/shelfwheel assembly and optic sensor. See Figure 8-5 and proceed as follows to disassemble and reassemble the main housing.

Disassembly

1. Remove the hopper bowl and motor from the main housing (refer to Sections 8.4 and 8.5).
2. Remove the screws that secure the metal knife to the back plate and remove the knife.
3. Remove the screws retaining the plastic knife and remove the knife from the main housing.
4. Remove the screw that fastens the optic sensor to the top of the main housing and remove the sensor.



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Figure 8-5. Holeywheel Hopper Main Housing.



5. Remove the screws, located on the back of the chassis, that hold the main housing in place. Lift the main housing with pinwheel hub and the back plate off the chassis.
6. Remove the spacer from the main housing.
7. Remove the screws, located on the back of the main housing, that secure the back plate to the main housing. Remove the back plate. When removing the back plate, be careful not to remove the coin guide and the two guide springs.

Note: *The hub should not be removed from the wheel housing. If a problem occurs, replace the entire assembly.*

Assembly

1. Secure the back plate to the main housing from the back of the main housing, making sure the coin guide and two guide springs are in the appropriate locations.
2. Attach the spacer to the main housing.
3. Attach the main housing with pinwheel hub and the back plate to the chassis.
4. Secure the optic sensor to the top of the main housing.
5. Install the plastic knife on the main housing.
6. Secure the metal knife to the back plate.
7. Install the motor and hopper bowl to the main housing (refer to Sections 8.4 and 8.5).



8.7 Holeywheel Hopper Chassis Disassembly and Assembly

The components that make up the hopper chassis include the hopper plug, the driver board and the handle. To disassemble or assemble the hopper chassis, see Figure 8-6 and proceed as follows.

Disassembly

1. Remove the ty-rap that secures the coin-out sensor harness to the top of the chassis.
2. Note all harness locations before disconnecting them from the driver board.
3. Disconnect the ground terminal from the ground post on the chassis base by removing the nut.
4. Disconnect the probe harness from the coin-level probe on the side of the hopper bowl by removing the probe (brass screw) and hex standoff.

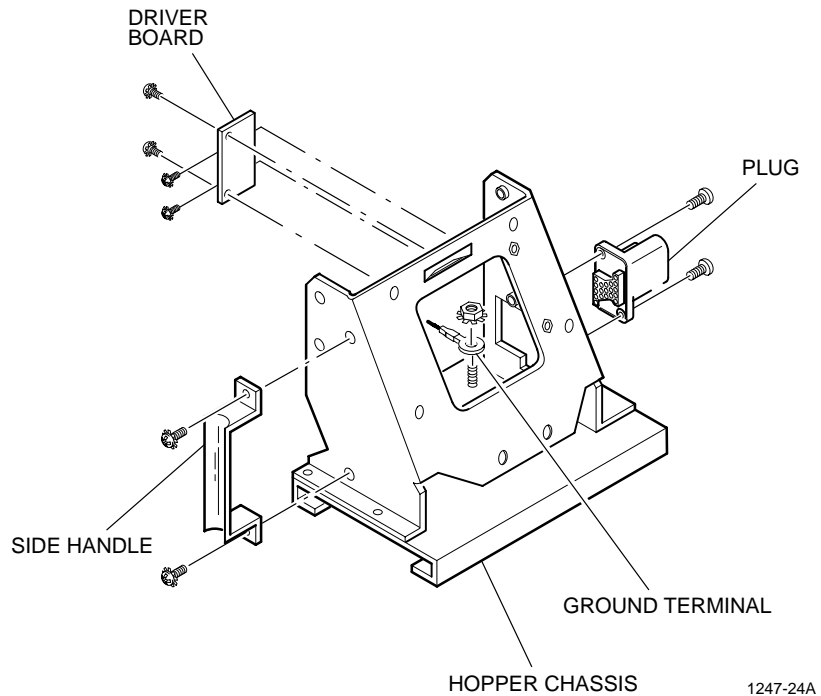


Figure 8-6. Holeywheel Hopper Chassis.



5. Remove the hopper bowl, motor and main housing.
6. Remove the screws that secure the hopper 19-pin plug to the hopper chassis and remove the plug.
7. Remove the screws that secure the handle to the side of the hopper chassis and remove the handle.
8. To remove the driver board, remove the screws that secure the driver board to the hopper chassis.

Assembly

1. To install a driver board onto the hopper chassis, place the board into the back of the chassis and align the two mounting holes on the driver board with the two mounting studs on the back of the chassis, and the two mounting holes on the side of the driver board with those in the side of the chassis. Secure the driver board to the chassis with the fasteners previously removed.
2. Secure the handle to the side of the hopper chassis.
3. From the outside of the hopper chassis, secure the 19-pin plug, ground pin toward the bottom, to the chassis.
4. Fasten the main housing to the chassis and the motor and hopper bowl to the main housing.
5. Connect the probe harness for the coin-level probe on the left side of the hopper bowl by securing it in place with a probe (brass screw) and hex standoff.
6. Connect the ground terminal to the ground post on the chassis base.
7. Plug all harnesses into the hopper driver board.
8. Secure the coin-out sensor harness to the top of the hopper chassis using a small ty-rap. Use small wire cutters to remove the excess ty-rap.



8.8 Holeywheel Hopper Functional Verification

1. Fill the hopper with the desired number of coins and turn the machine **power on**. Close and lock the machine door.
2. Refer to the *Game Software: Vision Slot Products* manual to perform the following procedures:
 - **Inputs** - to verify correct operation of the coin level probe and hopper motion sensor
 - **Hopper Tests** – to verify correct operation of the hopper motor and optic sensor

