Section 5

Coin-In Handling

The coin-in assembly is designed to electronically accept coins of the proper denomination and return unacceptable or invalid coins. The coin-in assembly discussed in this section uses a coin comparitor for single-denomination applications to check coin validity and reroute rejected coins to the coin tray. In multiple-denomination applications one of several multiple-denomination coin acceptors is used.

This section is organized as follows:

- **Section 5.1, Coin Handling Component Arrangement –** shows small and large coin single denomination components, a typical multiple-denomination arrangement, and the differences between them.
- **Section 5.2, Coin-In Assembly Inspection –** covers inspection of the various coin-in assembly components to determine their condition.
- **Section 5.3, Coin-In Cleaning –** covers typical cleaning operations required for the coin-in assembly.
- **Section 5.4, Coin Comparitor Adjustments –** covers adjustment for proper operation.
- **Section 5.5, Single-Denomination Electronic Coin Comparitor –** details specifications for the single-denomination coin comparitor used.
- **Section 5.6, Multiple-Denomination Electronic Coin Acceptor –** details the specifications for the multiple-denomination coin acceptor used.
- **Section 5.7, Coin-In Assembly Removal –** discusses removal of the entire coin-in assembly.

- **Section 5.8, Coin-In Disassembly and Assembly –** covers disassembly and assembly of the various coin-in components.
- **Section 5.9, Coin-In Installation –** covers installation of the entire coin-in assembly.
- **Section 5.10, Sample Coin –** discusses installation of the proper sample coin on comparitors that use this method of coin verification.
- **Section 5.11, Denomination Change –** covers the various steps involved in changing machine denomination.
- **Section 5.12, Coin-In Functional Verification –** refers to the IGT publication that provides instructions to test for proper functioning of the coin-in assembly.

5.1 Coin Handling Component Arrangement

A typical coin-in arrangement for small coins (up to 1.457″ in diameter) is shown in Figure 5-1. This differs from the large coin (see Figure 5-2) in the following areas:

- **Coin Entry –** The entry slot is on the right side of the entry head (viewed from the front of the machine) for small coin, and on the left for large coin.
- **Coin Comparitor –** Various units are used depending on the size of the coin. Small coin units are mounted as shown in Figure 5-1. Large coin units are installed with the opposite side facing out, as shown in Figure 5-2.
- **Optic Coin Encoder Assembly –** This unit has an insert that changes with coin size and the entire assembly is located in two different positions for small or large coins.
- **Comparitor Clips –** These are located in different positions for large or small coin comparitors.

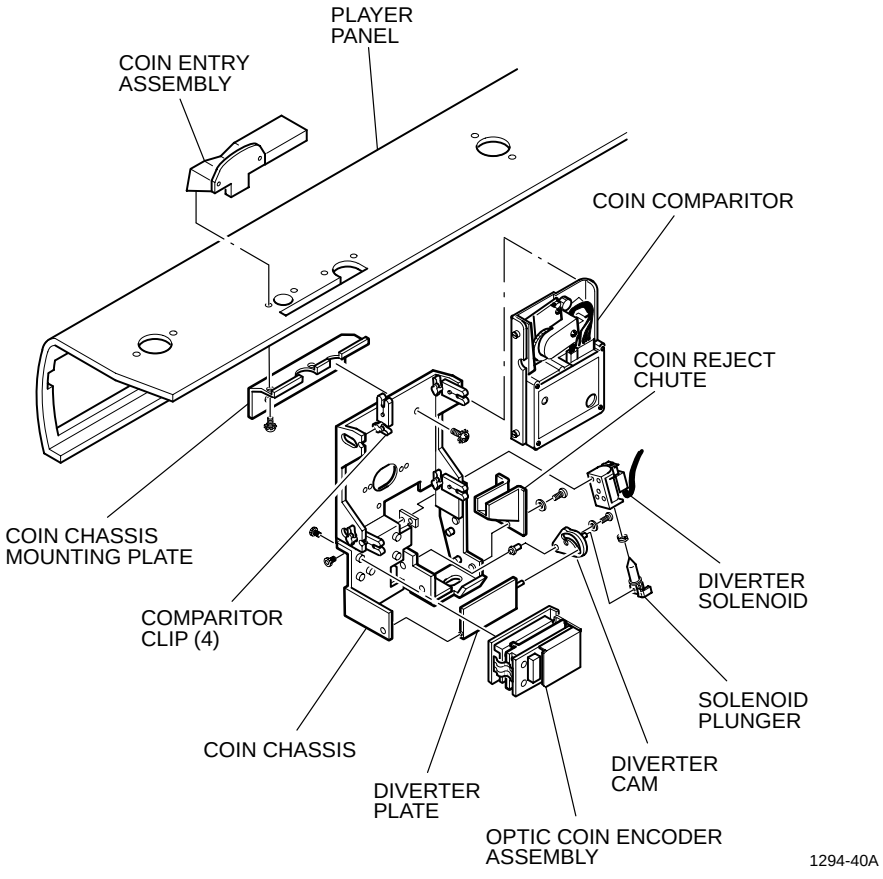

Figure 5-1. Coin-In Handling Components – Small Coin.

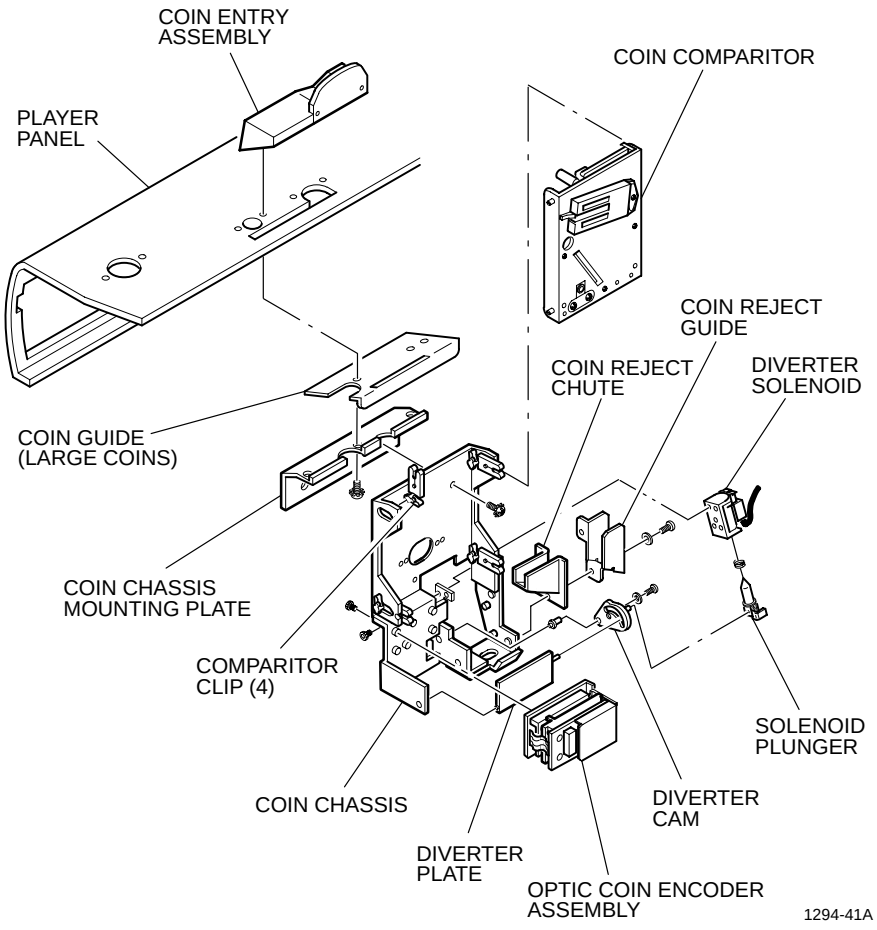

Figure 5-2. Coin-In Handling Components – Large Coin.

The large coin components also include an additional coin guide mounted inside the door between the chassis mounting plate and the entry assembly.

Multiple-denomination arrangements (see Figure 5-3) are similar to the single-denomination small coin configuration. The major differences are:

- The coin acceptor is a multiple-denomination model.
- The optics boards are eliminated and replaced by a power board.

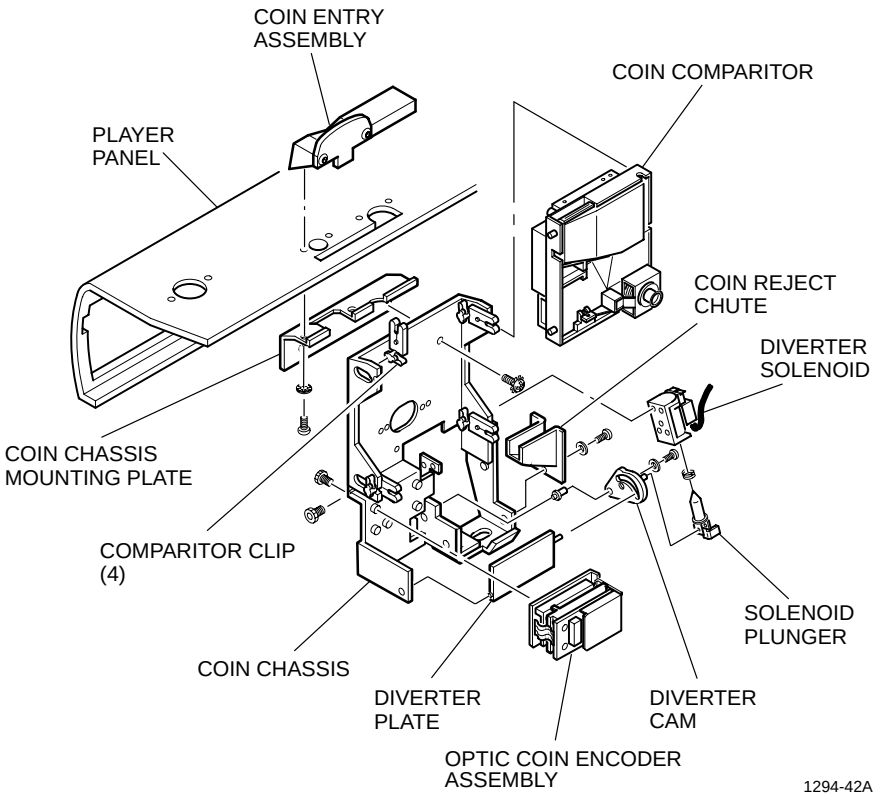

Figure 5-3. Coin-In Handling Components – Multiple Denomination.

5.2 Coin-In Assembly Inspection

See the figures in this section and proceed as follows to perform inspection procedures on the coin-in assembly.

5.2.1 Electronic Comparitor Inspection

See Figure 5-4 and proceed as follows.

1. Inspect the coin path for foreign deposits, film or dust.
2. Remove the comparitor from the coin-in assembly.
3. Check the rake on the back of the coin comparitor for smooth operation.
4. Check the damper lever (counterweight) for free movement. If the lever sticks, the machine will not accept coins.
5. Check the sliding sensor coil and extension spring for unobstructed action.

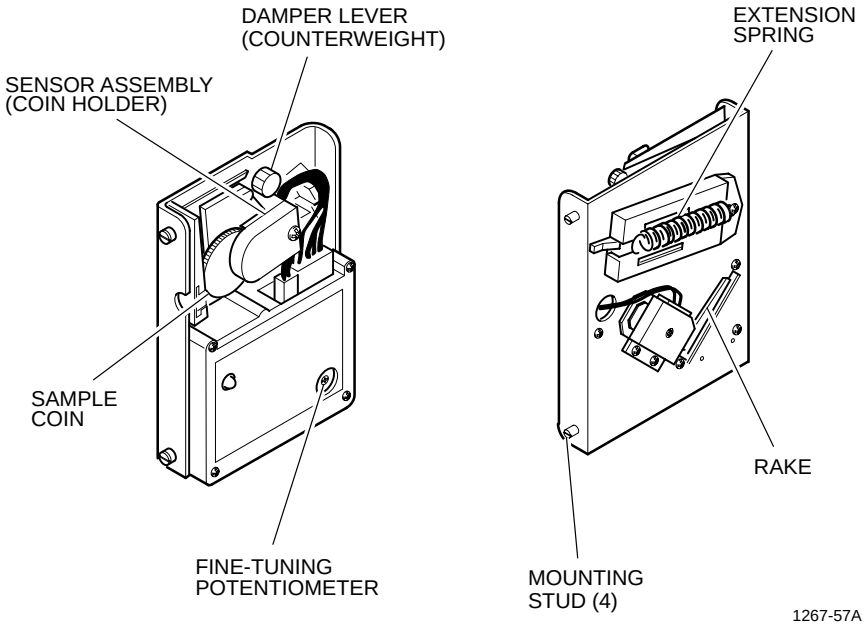

Figure 5-4. Electronic Coin Comparitor.

5.2.2 Multiple-Denomination Coin Acceptor Inspection

See Figure 5-5 and proceed as follows.

1. Inspect the coin path for foreign deposits, film or dust.
2. Check the reject lever on the back of the coin acceptor for smooth operation.
3. Check the accept solenoid plunger for free movement. If the plunger sticks, the machine will not accept coins.

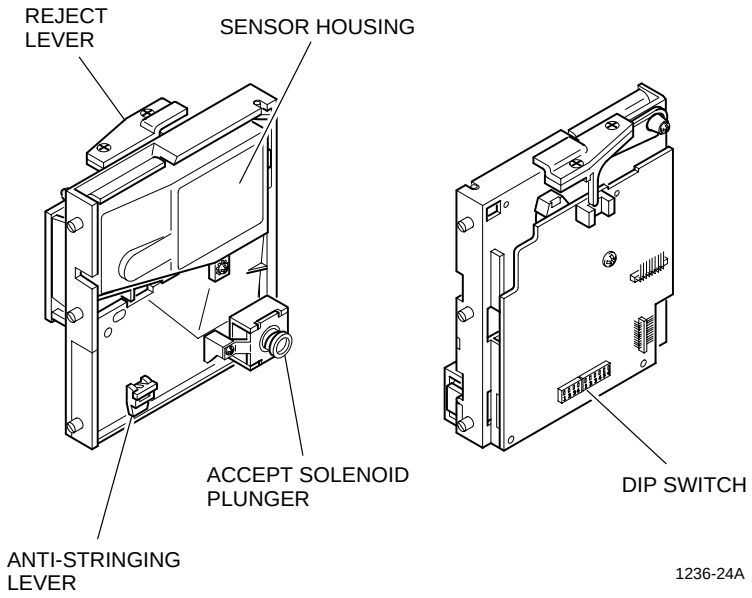

Figure 5-5. Typical Multiple Coin Acceptor.

5.2.3 Optic Coin Encoder Inspection

See Figure 5-6 and proceed as follows.

Note: *The two circuit boards that make up the coin encoder are connected by a delicate ribbon cable. Take care to avoid bending the cable more than necessary.*

1. Inspect the optics on both encoder boards for clean surfaces.
2. Inspect the encoder housing and the plastic denomination insert. Check for clean surfaces, making sure that the optic windows are free from dirt or other foreign material.
3. Inspect the ribbon cable connecting the front and rear encoder boards for damage.

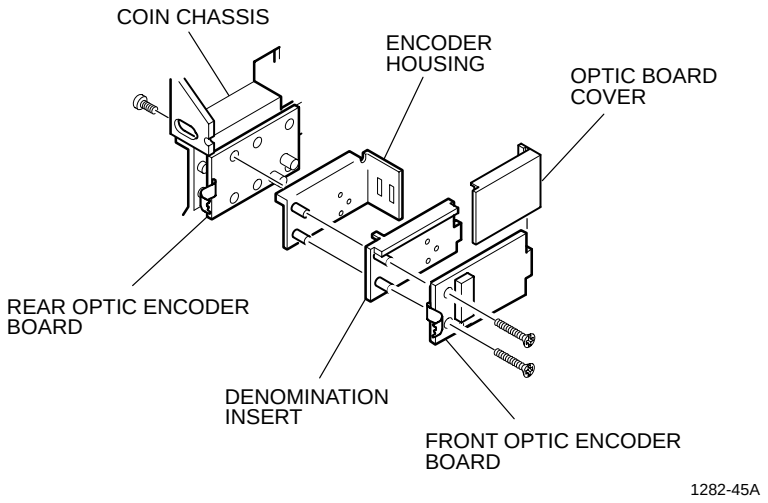

Figure 5-6. Optic Coin Encoder.

5.2.4 Diverter Solenoid Assembly Inspection

See Figure 5-7 and proceed as follows.

1. Check the diverter solenoid plunger, diverter cam and plate for smooth operation.

2. Make certain the solenoid and cam hardware are fastened securely.

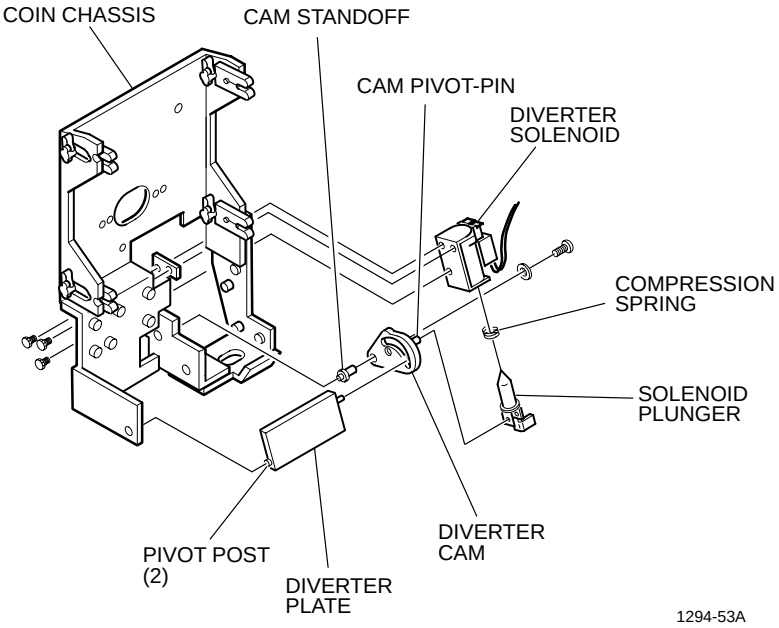

Figure 5-7. Diverter Solenoid Assembly.

5.3 Coin-In Cleaning

For light cleaning: remove dust with compressed air (not to exceed 60 psi).

For thorough cleaning, use the appropriate following procedure.

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

5.3.1 Electronic Coin Comparitor Cleaning

1. Remove the coin comparitor from the coin-in assembly (see Figure 5-8).
2. Clean the outside of the comparitor using a stiff short-haired brush and isopropyl alcohol.
3. Clean the damper lever using spray-on contact cleaner, or a pipe cleaner and isopropyl alcohol.
4. Install the coin comparitor in the coin-in assembly (refer to Section 5.8.1).

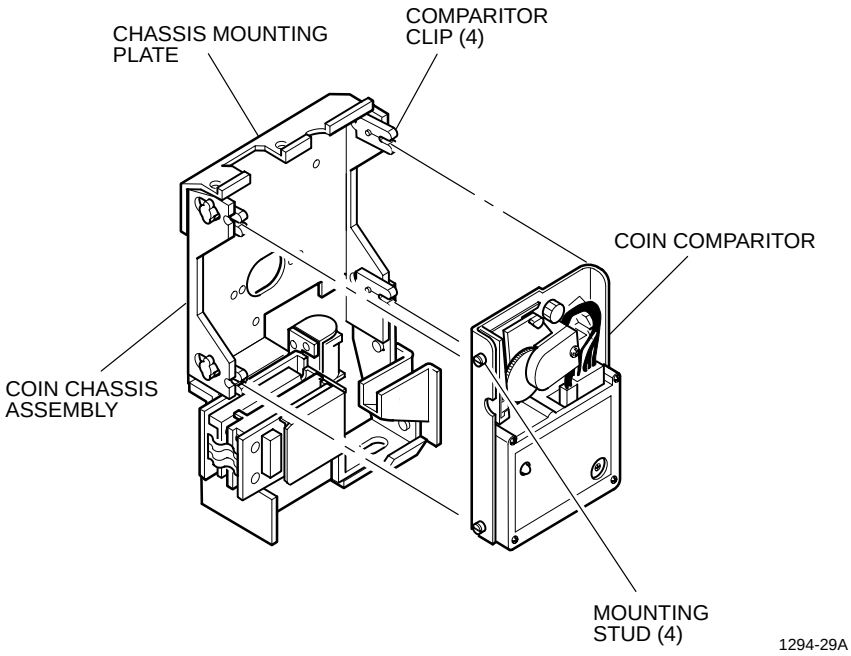

Figure 5-8. Coin-In Assembly – Coin Comparitor Removal.

5.3.2 Multiple-Denomination Acceptor Cleaning

See Figure 5-9 and proceed as follows.

1. Pull the sensor housing open and clean the coin path using a soft damp cloth and, if necessary, a mild detergent.

2. Check the reject lever, anti-stringing lever and accept solenoid plunger for free movement. Clean as necessary.

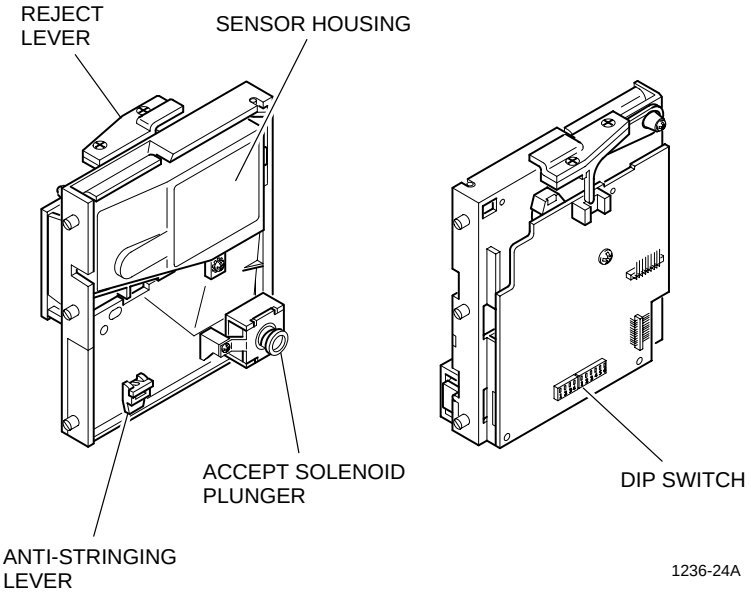

Figure 5-9. Typical Multiple-Coin Acceptor.

5.3.3 Optic Coin Encoder Cleaning

See Figure 5-6, Optic Coin Encoder.

1. Clean the surface of the optics on both encoder boards, the encoder housing and the denomination insert, using a soft cloth or cotton swab and isopropyl alcohol.

2. Clean the optic windows of the encoder housing and denomination insert, using a pipe cleaner or a stiff short-haired brush.

5.3.4 Diverter Solenoid Assembly Cleaning

See Figure 5-10 and proceed as follows.

1. Clean the diverter plate using a cotton swab soaked in isopropyl alcohol.

2. Clean the diverter cam and the plunger pin using a stiff short-haired brush.

3. Clean the solenoid plunger and compression spring with isopropyl alcohol.

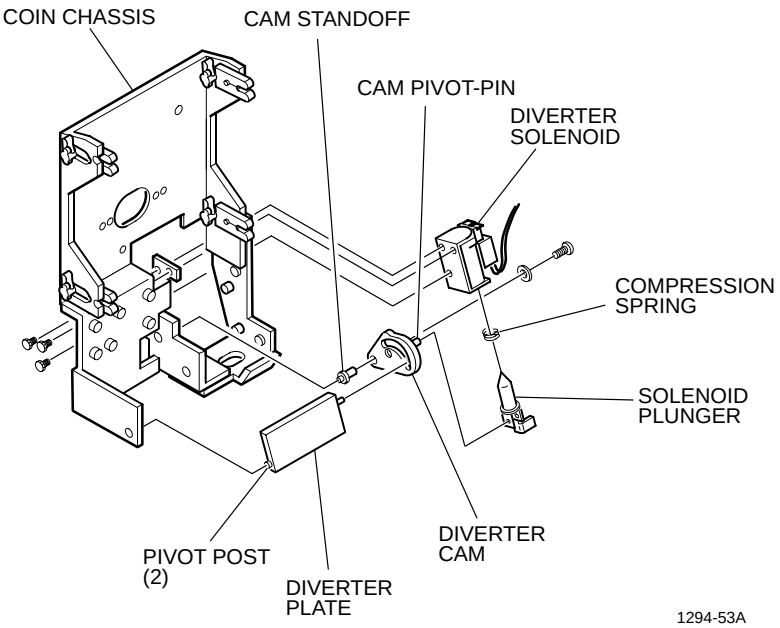

Figure 5-10. Diverter Solenoid Assembly.

5.4 Coin Comparitor Adjustments

Each coin comparitor is factory adjusted for excellent discrimination against slugs. However, finer adjustment of the coin comparitor may be necessary to detect certain high-quality slugs and ensure acceptance of valid coins (see Figure 5-4).

Note: *Multiple-denomination acceptors have no field adjustment capability.*

1. Adjust the fine-tuning potentiometer in the lower, right corner of the comparitor clockwise as far as possible, using a small flat-blade screwdriver.

2. Replace the coin comparitor (if removed) and insert a coin of the correct denomination to ensure accurate acceptance. If the coin comparitor rejects a valid coin, slightly adjust the fine-tuning potentiometer counterclockwise until the valid coin passes.

Note: *Turning the fine-tuning potentiometer fully counterclockwise can cause the comparitor to "chatter" and/or accept slugs.*

5.5 Single-Denomination Electronic Coin Comparitor

The coin comparitor is an electronic coin tester that analyzes the material content of an incoming coin, compares it to a sample coin and either accepts or rejects the coin. The coin comparitor uses a sample coin, placed within a magnetic field on the acceptor, to create a specific signal characteristic for comparison. The signal generated from the sample coin is important in distinguishing coins of similar material.

As an incoming coin or token passes through a separate magnetic field inside the coin comparitor, the signal generated from the incoming coin is electronically compared to the signal generated by the sample coin. If the two signals are alike, an internal lockout solenoid energizes and allows the coin to pass through the accept channel. If the two signals are different, the lockout solenoid remains inactive and diverts the coin to the reject channel.

5.6 Multiple-Denomination Electronic Coin Acceptor

The multiple-denomination coin acceptor is an electronic coin tester that analyzes the material content of up to six types of incoming coin, compares it to data stored in memory and either accepts or rejects the coin.

As an incoming coin or token passes through a separate magnetic field inside the coin acceptor, the signal generated from the incoming coin is electronically compared to data stored in the coin acceptor's memory. If the data matches, an internal lockout solenoid energizes and diverts the coin to the accept channel. If the data does not match, the lockout solenoid remains inactive and allows the coin to pass through the reject channel.

The internal sensing circuits trigger and send an output signal upon acceptance of a good or valid coin.

The multiple-denomination coin acceptor has a six-segment DIP switch that controls which coins are enabled for acceptance. An adhesive label, attached to each coin acceptor, provides specific settings for that unit.

5.7 Coin-In Assembly Removal

To remove the coin-in assembly from the machine, see Figure 5-11 and proceed as follows.

1. Unlock and open the machine door and turn the **power off**.

2. Remove the coin comparitor by disconnecting the harness from the side of the comparitor, then pulling out on the corners to release the mounting studs from the comparitor clips (see Figure 5-11).

3. Hold the coin chassis in place and remove the screws that secure the coin chassis to the coin chassis mounting plate.

4. Disconnect the coin chassis harness from the main door harness and remove the coin chassis from the machine.

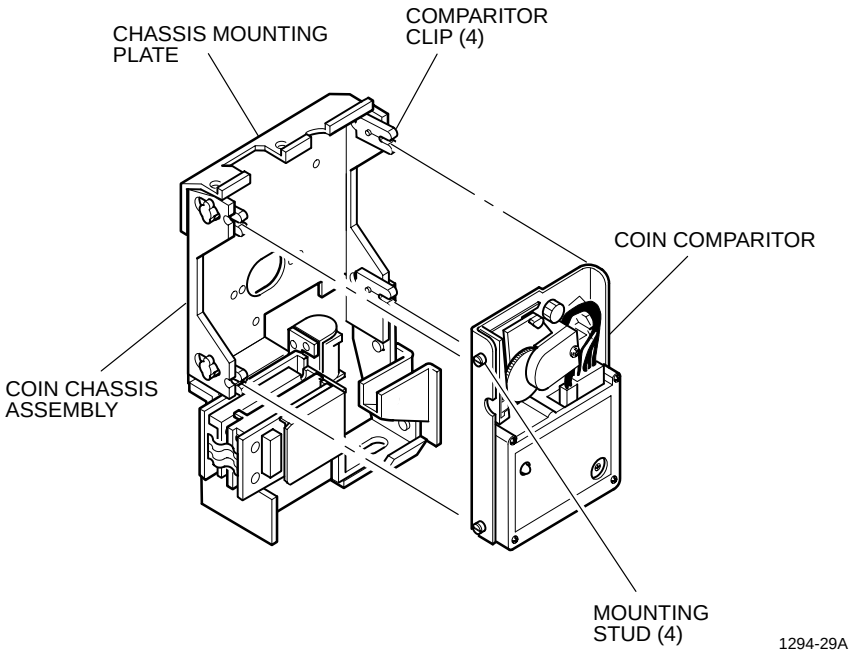

Figure 5-11. Coin-In Assembly Removal.

5.8 Coin-In Disassembly and Assembly

The following procedures describe how to completely disassemble and assemble the coin-in assembly for repair or to make a denomination change. See Figures 5-1 and 5-2 then proceed as follows.

5.8.1 Coin Comparitor Removal and Installation

The electronic coin comparitor is a replaceable unit. IGT does not recommend disassembly of the coin comparitor.

Removal

1. Unlock and open the machine door and turn the **power off**.
2. Disconnect the harness from the side of the coin comparitor.
3. Firmly grip the sides of the coin comparitor and pull out from the chassis to disengage the four comparitor clips.

Note: *Observe the orientation of the mechanism in the assembly (sample coin holder in front or in back) for reinstallation. The position depends on whether the machine is set up to accept small or large coins.*

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4. To remove the plastic comparitor clips, lightly push inward on the end of each clip and rotate the clip 1/4 turn (90 degrees). Remove the clip from the inside.

Installation

1. See Figure 5-12 and install the four comparitor clips (if removed) from the inside of the coin chassis by inserting each clip into a clip slot and rotating the clip 1/4 turn (90 degrees) until the tab on the clip snaps into the notch on the chassis. Make certain that all clips are at the same height.

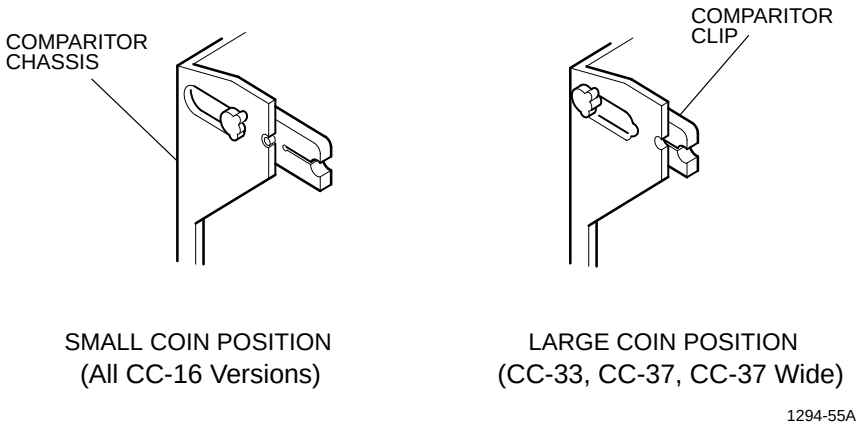

Figure 5-12. Comparitor Clip Positions.

2. Position the coin comparitor face up (sample coin holder on top) for small coin handling or face down (sample coin holder facing the coin chassis) for large coin handling. See that the four mounting tabs on the comparitor are against the four comparitor clips. Press in firmly on each corner to engage the clips.

Caution: *Do not press hard on the center of the comparitor, as this may cause damage to the mechanism's electronics.*

---

3. Connect the coin comparitor harness to the side of the coin comparitor.

5.8.2 Coin Chute Removal and Installation

The coin reject chute attaches to the coin chassis and channels incorrect or invalid coins to the coin tray. See Figure 5-1 or 5-2 and proceed as follows to remove or install the coin reject chute.

Removal

1. Remove the coin-in assembly from the machine and place it on a flat surface.

2. Remove the screws and washers that fasten the coin reject chute to the coin chassis and remove the chute.

Installation

1. Position the coin reject chute on the coin chassis so that the two holes in the chute flange align with the mounting holes in the chassis.
2. Attach the chute with screws and washers and tighten securely.

5.8.3 Optic Coin Encoder Disassembly and Assembly

The components that make up the optic coin encoder include the front and rear optic encoder boards, the denomination insert and the encoder housing. See Figure 5-6 and proceed as follows.

Disassembly

1. Disconnect the harness from the front optic coin-encoder board.
2. Remove the screws that fasten the encoder housing and encoder board to the comparitor channel, and remove these components (see Figure 5-6).
3. Remove the optic board cover.
4. Remove the screws that fasten the front optic encoder board and denomination insert to the encoder housing.
5. Carefully lift the encoder board away from the encoder housing and remove the black plastic denomination insert.

Note: *The two circuit boards that make up the coin encoder are connected by a delicate ribbon cable. Take care to avoid bending the cable any more than necessary.*

Observe which holes the encoder housing is attached through so that it can be reinstalled in the same position.

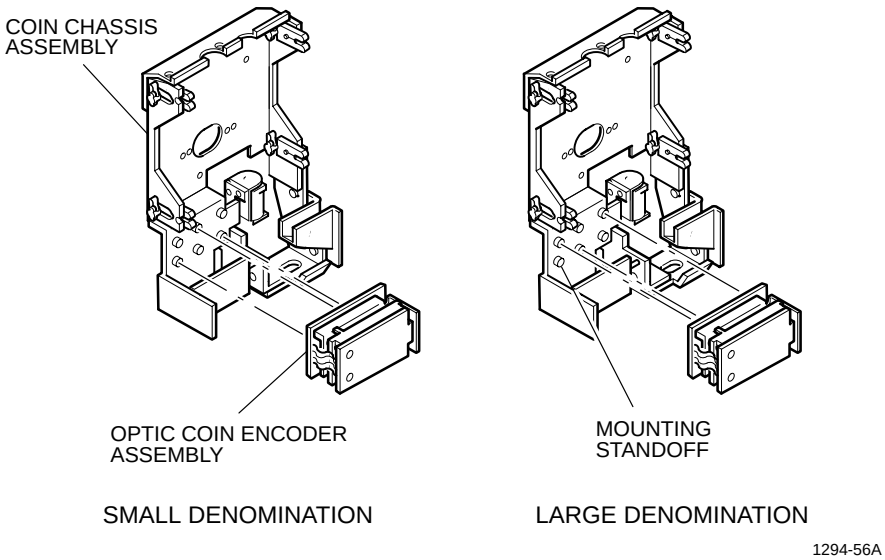

Figure 5-13. Optic Coin Encoder Positions.

Assembly

1. Place the denomination insert on the encoder housing, channel side down, and fit the plastic tab of the insert into the lower slot in the encoder housing.

2. Insert the tab on the front optic-encoder board into the upper slot in the encoder housing and align the two mounting holes with those of the denomination insert and the encoder housing.

3. Fasten the front encoder board and the denomination insert to the encoder housing with screws and tighten securely.

4. Replace the optic board cover.

5. Position the encoder housing on top of the rear encoder board so that the slotted side is on the right.

6. Align the mounting holes on the rear encoder board (the one with fewer components) with those on the coin chassis. Note that the small denomination position uses two holes on the bottom and one on the top, while the large denomination position uses two holes on the top and one on the bottom (see Figure 5-13).

7. Fasten the rear encoder board and the encoder housing to the comparitor channel with screws and tighten securely.

8. Connect the harness to the front optic coin-encoder board.

5.8.4 Diverter Disassembly and Assembly

The components that make up the coin diverter assembly include the solenoid, solenoid plunger, cam and diverter plate (see Figure 5-10).

Disassembly

1. Remove the screws that hold the coin reject chute to the chassis assembly.
2. Disconnect the diverter harness from the coin chassis harness.
3. Remove the screws that fasten the diverter solenoid to the coin channel bracket.
4. Pull the diverter solenoid away from the coin channel bracket and remove the solenoid plunger from the cam pivot pin.

Note: *Be careful not to lose the compression spring on the plunger.*

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5. Remove the screw that secures the diverter cam and cam standoff to the coin channel bracket.
6. Remove the diverter cam and cam standoff (or spring) from the coin channel bracket. If one or more washers are present, remove them. Remove the cam standoff (or spring) from the cam.
7. Place the coin handling assembly on a flat surface with the diverter toward the bottom and facing up.
8. Carefully spread the outer metal flange that retains the diverter and lift the left diverter pivot post away from the bracket.

Note: *For easy removal, insert a flat-blade screwdriver between the diverter and the coin channel bracket. Carefully twist the screwdriver until the pivot post clears the retaining hole in the bracket and lift the diverter up. Be careful not to permanently deform the diverter or the bracket during removal.*

Assembly

1. Place the coin handling assembly face up on a flat surface with the coin comparitor area toward the top.

2. Locate the right diverter pivot post (below the pivot point for the cam) and insert it into the lower right hole in the comparitor channel.

3. Carefully spread the outer metal flange and push the left end of the diverter inward, inserting the left pivot post into the left hole in the channel.

4. Ensure that the diverter moves freely.

5. Use the instructions below to install the diverter cam.

   a. Insert the cam standoff into the sleeve at the top of the diverter cam, from the back (flat) side.

   b. Position the diverter so that its pivot arm is close to the cam mounting hole.

   c. Place the diverter cam over the cam mounting hole so that the lip on the cam standoff fits into the hole. At the same time, position the diverter so that the pivot arm on the diverter inserts through the angular slot on the cam.

   d. Secure the cam standoff and diverter cam with a screw and a washer. Tighten securely.

6. Position the solenoid assembly on the flange by sliding the slotted end of the solenoid plunger over the cam pivot pin and then moving the solenoid up so that the three mounting holes in the solenoid bracket line up with those in the flange.

Note: *Be sure the small compression spring is present on the solenoid plunger.*

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7. Connect the diverter solenoid harness out through the back of the coin handling chassis and secure the harness with the harness retaining clip.

8. Connect the diverter harness to the coin chassis harness.

9. Install the coin reject chute and secure in place with screws.

5.8.5 Coin Entry and Chassis Mounting Plate

The coin entry consists of a coin entry base and a coin head. Coin entry bases are available in two sizes to accommodate large or small coins, and a different coin head is available for each coin size.

Note: *Multiple-denomination machines use the small coin configuration.*

Removal and Disassembly

1. Unlock and open the machine door and turn the **power off**. Locate the coin acceptor mechanism.
2. Remove the coin comparitor and coin chassis.
3. Remove the screws that fasten the coin chassis mounting plate, coin guide (large coin only) and the coin entry assembly to the machine door.
4. Remove the coin entry assembly from the door and place it on a flat surface.
5. Remove the screws and nuts that fasten the coin entry base.

Assembly and Installation

1. Fasten the coin head to the coin base with screws and nuts.
2. Position the coin guide (large coin only) and the coin chassis mounting plate on the inside of the machine door so that their mounting holes line up with the holes in the door.
3. Place the coin entry in position on the outside of the machine door and install the screws that fasten all three components to the door.
4. See Figure 5-12 and adjust the coin comparitor clips located on the sides of the coin chassis. Push the end of the clip slightly inward and rotate the clip 1/4 turn (90 degrees) to unlock. Move each clip forward or back to the correct position and rotate each clip again 1/4 turn (90 degrees) to lock into place.
5. Install the coin comparitor. Connect the harness to the comparitor and install the sample coin.

6. Make certain all harnesses are properly routed and secured away from all moving parts.

7. Turn the **power on** and refer to Section 5.12 for information on functional verification.

5.9 Coin-In Installation

1. If the coin entry assembly was removed, reinstall it according to the information in the preceding coin entry section. Verify that the optic coin encoder is correctly installed on the coin chassis (refer to Section 5.8.3).

2. Connect the optic coin encoder harness from the machine door to its connector on the coin-in assembly.

3. Position the coin chassis on the inside of the door so that the two mounting holes in the chassis line up with those in the coin chassis mounting plate. Attach the chassis to the mounting plate with screws and tighten securely.

4. Install the coin comparitor according to the information in Section 5.8.1 and connect the harness to the side of the comparitor.

5. Turn the **power on**; close and lock the machine door.

5.10 Sample Coin

The electronic coin comparitor utilizes a sample coin, against which incoming coins are compared for validity. Figure 5-8 shows the location of the coin comparitor in the coin-in assembly.

Be sure the sample coin is the exact denomination or token shown on the configuration work sheet and the machine glass.

1. Remove the electronic coin comparitor from the coin chassis by gripping the sides of the comparitor and pulling it straight off the assembly, disengaging the four comparitor clips. Do not disconnect the harness from the side of the comparitor.

2. Turn the coin comparitor over (large coin). Slide (without lifting) the sample coin holder toward the right side of the comparitor.

3. Insert a coin of the correct denomination into the sample coin holder and carefully release. The coin should rest firmly within the sample coin holder and against the rail insert.

4. Replace the coin comparitor on the coin chassis.

    a. Position the coin comparitor either with the sample coin face up in the upper left corner of the coin-in assembly (for small coin handling) or face down in the upper right corner of the coin-in assembly (for large coin handling).

    b. See that the four studs on the metal comparitor bracket rest against the four comparitor clips on the assembly.

    c. Press down firmly enough on each corner of the coin comparitor to engage the clips.

Note: *Press only on the corners of the comparitor. Pressing in the center can damage the mechanism's electronic components.*

5.11 Denomination Change

The following information provides instructions for changing the denomination in single-denomination machines. Table 5-1 lists the components and alignments affected. Refer to the appropriate mechanical parts manual for detailed illustrations and part numbers.

Note: *Denomination of game play is highly regulated in certain gaming jurisdictions. Some jurisdictions limit the denominations that are allowed or require the presence of a gaming agent during any change procedure. Before changing a denomination, verify state and local legal requirements.*

Multiple-denomination machines are not normally changed in the field. Contact IGT Customer Service for further details.

When large coins are used, IGT recommends using a metal housing in place of a plastic housing.

Table 5-1
Denomination Change

From	Electronic Comparitor			
	Large Coin		Small Coin	
To	**Large Coin**	**Small Coin**	**Large Coin**	**Small Coin**
Coin Guide	—	N	A	N
Coin Entry Base	*	C	C	—
Coin Entry Head	C	C	C	C
Coin Comparitor	C	C	C	—
Sample Coin	C	C	C	C
Comparitor Clips	—	M	M	—
Encoder Insert	C	C	C	C
Encoder Housing	**	M	M	—
Lockout Solenoid	N	N	N	N
Lockout Spacer	N	N	N	N
Coin Acceptor	N	N	N	N

A – ADD C – CHANGE M – MOVE N – NOT NEEDED DASH – NO CHANGE

** Recommendation: For large coins, use a metal housing in place of a plastic housing.

There are four areas of concern when changing machine denomination:

- Coin-in handling
- Hopper
- Glass
- Game program options

For additional information, contact IGT Customer Service (refer to the introductory pages of this manual).

5.11.1 Coin-In Denomination Adjustments

Coin Channel Removal

To remove the components of the coin channel for denomination change, refer to Table 5-1 and see Figure 5-1 then proceed as follows.

1. Unlock and open the machine door and turn the **power off**.
2. Remove the coin comparitor, coin chassis, coin chassis mounting plate, coin guide (large coin only) and the coin entry assembly. For additional information and illustrations of the coin channel assembly, refer to the instructions elsewhere in this section.

Note: *The coin chassis mounting plate, coin guide (if present) and coin entry assembly mount to the right for large coin as shown in Figure 5-2, and to the left for small coin as shown in Figure 5-1.*

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3. Remove the screw and washer that secures the solenoid assembly to the coin chassis.

Optic Coin Encoder Assembly

Refer to Section 5.8.3 for instructions on disassembly and assembly of the optic coin encoder assembly, including positioning for large and small coin.

Coin Channel Replacement

1. Install the coin entry assembly, coin guide and coin chassis mounting plates. For additional information and illustrations of the coin channel assembly, refer to Section 5.8.

Note: *The coin channel mounting plate, coin guide (if present) and coin entry assembly mount to the right for large coin as shown in Figure 5-2, and to the left for small coin as shown in Figure 5-1.*

2. Secure the solenoid assembly to the coin chassis with the screw and washer.

Note: *The coin lockout solenoid requires a removable plastic spacer for use with small denomination acceptors.*

3. Position the coin chassis on the inside of the machine door so that the two mounting holes in the chassis line up with those in the coin chassis mounting plate.

   Hold the coin chassis in place and secure it to the coin chassis mounting plate with screws.

4. Adjust the coin comparitor clips located on the sides of the coin chassis. Push the end of the clip slightly inward and rotate the clip 1/4 turn (90 degrees) to unlock. Move each clip forward or backward for position and rotate each clip again 1/4 turn (90 degrees) to lock into place. Figure 5-12 shows the comparitor clip positions. Make certain all comparitor clips are the same height.

5. Install the coin comparitor. Connect the harness to the comparitor and install the sample coin; see Figure 5-4.

6. Make certain all harnesses are properly routed and secured away from all moving parts.

7. Turn the **power on** and refer to the input and output test information in the product-specific software manual for functional verification.

5.11.2 Hopper Denomination Adjustments

To change the coin hopper denomination, remove the hopper and replace it with a hopper appropriate for the new denomination. Set the coin level probe and verify hopper functions using the information in the appropriate hopper section of this manual.

5.11.3 Machine Glass Denomination Adjustments

Change all machine glass that displays the old denomination or pay table. Some glass may use only a mylar insert for displaying the denomination.

Refer to the machine glass section of this manual for removal and replacement procedures for top box and top panel glass.

5.11.4 Game Program Options Denomination Adjustments

Refer to the set-up information in the product-specific software manual to complete the following steps, as applicable.

1. Set the correct denomination. This is important for correct statistical data metering.

2. Set the desired maximum hopper pay and hopper refill amount.

5.12 Coin-In Functional Verification

Refer to the product-specific manual for information about using the input and output tests for functional verification:

- **Inputs –** to verify correct operation of the optic coin encoder
- **Outputs –** to verify correct operation of the coin lockout assembly