

## RELAYS (G-TYPE)

**PURPOSE:** When electrical current flows thru the coil, a magnetic field results. This field attracts the armature which is attached to the actuator which then actuates the switches. Thus, by a single action of completing the circuit to the relay coil, any number of individual circuits can be controlled thru the associated relay switches. A single pulse to the relay coil in conjunction with a lock-in switch can complete circuits until a certain function is completed. This is useful in cases of stepping up or resetting a unit or where a definite sequence of operation is necessary.

### ADJUSTMENTS

The gap and follow thru specifications should be used as a guide, and some judgement must be exercised to insure that the adjusted gap will perform properly under the use conditions. All switch adjustments must originate with the plastic switch actuator in the de-energized position. After the switch adjustments are completed, the actuator should automatically return to the reset position. All switch adjustments must be done with a stroking action of the adjusting tool and *no sharp bend* at the switch spacers. Before adjusting switches, make sure the tip of the long blades are centered in the slots of the switch actuator, otherwise they will hamper the movement of the switch actuator. Tighten down the screws that hold the switch assembly. This is suggested because the types of spacers in the switch stacks will occasionally shrink by drying out, causing a poor adjustment. When switches are properly adjusted, there should be about 1/32 inch follow thru, except in the case of lock in switches, which should be slightly more. This 'follow thru' action provides a wiping motion between contacts, keeping them clean.

### NORMALLY OPEN SWITCHES

Hold the switch actuator in the top position. Adjust the long blade so that the tip rests lightly (10 grams pressure) on the upper side of the slot in the plastic switch actuator. Adjust short blades to 1/64 inch clearance.

### NORMALLY CLOSED SWITCHES

Hold the switch actuator in the top position while adjusting the long blade so that the tip rests lightly (10 grams pressure) on the upper side of the slot in the plastic switch actuator. It may be necessary to adjust the short blade away from the long blade. Hold the switch actuator in the down position while adjusting the short blades to 1/32 inch clearance between contact points.

The armature spring should have enough tension to bring the armature up against the armature stop when the relay is not energized. See that pressure from poorly adjusted switches is not affecting the armature before attempting adjustment of the spring.

If a relay "chatters" or "hums", check to see that the switches located on it, are not out of adjustment and causing too much upward tension on the armature. In some cases, the trouble can be due to foreign matter in between the coil core plug and armature.

# 'G' TYPE RELAYS

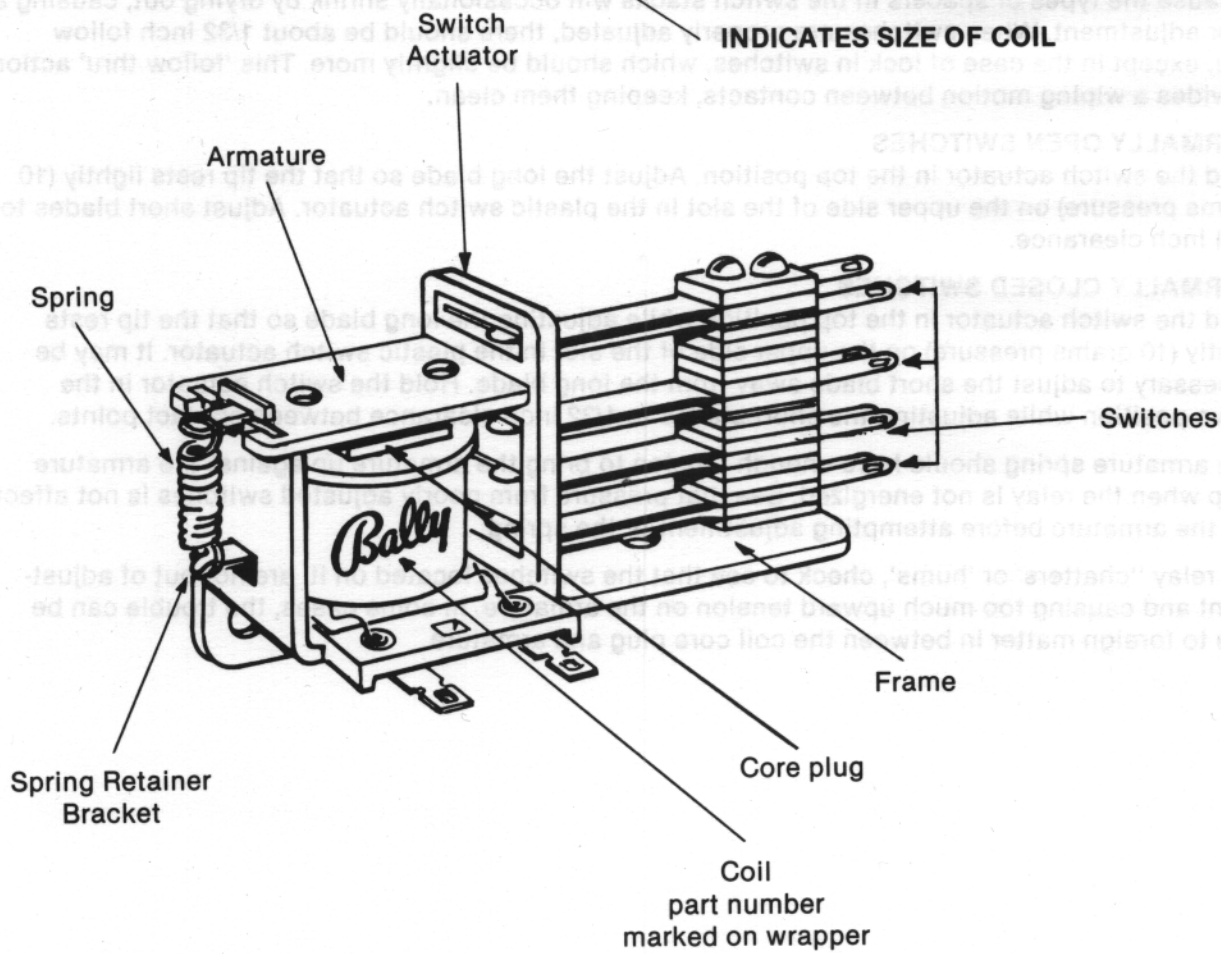
## COIL DESIGNATIONS

# G-31-2000

INDICATES NUMBER OF TURNS

INDICATES SIZE OF MAGNET WIRE

INDICATES SIZE OF COIL



# INTRODUCTION TO SERVICING MULTIPLE COIN GAMES

## PRINCIPLE OF OPERATION

### A. Standard coin entry system (refer to game schematic)

Note: For the purpose of illustration, a six-coin multiplier will be used as an example, although three- or five-line coin entry circuits are almost identical.

#### 1. First Coin

- A. The coin switch activated by the coin momentarily breaks the normally closed feed to the reel discs, coin lockout coil and handle release circuits. The normally open side is then made to the coin relay circuit, causing it to mechanically trip and break its own feed.

While this is occurring, the odds reset relay is energized and locked-in through its own switch until the odds unit is reset to zero position or first odds.

An additional switch on the odds reset relay adds one count to the total-in meter. When the coin relay is tripped, the coin accepted lamp lights, the path to the handle release circuit is complete, awaiting the return of the coin switch.

One of the paths to the coin lockout coil is opened and the feed to the reel discs is opened.

- B. Coin switch returns; the coin lockout coil is now re-energized, enabling entry of a second coin. The handle release mechanically trips, breaking its own feed to the handle release coil. Other switches change the path of the coin circuit to the odds step-up relay, and also further break the feed to the reel discs.

The game is now ready for the first coin/first odds play.

#### 2. Second Coin

- A. Coin switch again momentarily breaks the feed to the coin lockout coil.
- B. The odds relay is energized until the odds unit advances to the second odds, opening the end of stroke switch on the odds unit and also adds another count to the total in meter. This is equivalent to the first step on the odds unit.
- C. Return of the coin switch re-energizes the coin lockout coil, making a physical path for future coins, if so desired.

#### 3. Future Coins

The procedure in step #2 repeats itself until the highest odds have been attained which, in this example, is the sixth odds or the fifth step of the odds unit. At this point, the limit switches on the odds unit are now open, eliminating any electrical path to the coin lockout coil, thus preventing any further coins from operating the coin switch and also turning off the insert coin lamp.

### B. Handle Pull

As the handle is pulled slowly, the following sequence of events should be observed:

- A. The dashpot switch opens immediately, preventing further acceptance of coins until the handle is returned to its maximum upright position.
- B. The A-1 switch opens, preventing any feed to the reel discs, handle circuit and coin lockout circuit. The C-1 switch opens, acting as a timing back-up to the A-1 switch, insuring the feed is broken to the reel discs when the A-1 switch is closed at the reel spin.
- C. At this point, the handle mechanisms full stroke pawl is engaged with the rack lock lever, preventing return of the handle until the reels are spun.
- D. As the handle is pulled further, the coin relay latches.
- E. The handle release is mechanically latched.
- F. Each index arm is now all the way back. The snap switch is transferred by the first index arm; the toggle links should now be latched and the trip pawl should be touching the trip stop.

- G. The trip operating lever stop bracket (due to continued forward motion of the handle) causes the trip operating lever pawl to break away from the trip lever. The reels kick off and spin; the snap switch is still in the transferred position to provide an electrical path from the coin switch to the odds relay for possible stuck coins jarred loose from the coin mechanism by the shock of the kickoff. The A-1 switch closes immediately. As this occurs the trip lever is returned to the rest position by its related extension spring at the same time striking the actuating lever on the handle mechanism. This in turn depresses the lock link assembly which at that point releases the rack lock lever thus allowing the handle mechanism to return to its maximum upright position.
- H. The index arms set individually and are controlled by the timer latch link assembly via the clock.
- I. Prior to the last reel setting, the B switch is pulsed by the timer link and stud assembly, resetting the payout counter (win meter if applicable), if a win had occurred during the previous handle pull.
- J. The last reel indexes.
- K. The C-1 switch makes, providing a feed to the reel disc(s) and, further on, to the payout relay, should any win combination be encountered.
- L. For payout operation refer to: Payout Counter Unit and Hopper Unit.

## TROUBLE SHOOTING HINTS

### 1. Power Failure

- Check:**
- A) Power failure to the line cord.
  - B) Defective line cord.
  - C) Loose power line fuse or the fuse may be open.
  - D) Safety timer (N.C.) switch open (push reset bar if neon lamp is on).

### 2. Coin(s) Not Accepted

- Check:**
- A) Coin lockout coil de-energized.
  - B) Normally (N.C.) closed dashpot switch is open.
  - C) Reel mechanism switch adjustment(s).
  - D) Intermediary circuit between the coin lockout coil and the dashpot switch (refer to game schematic).
  - E) Coin switch adjustment.
  - F) Coin acceptor adjustment.

### 3. Coin(s) Jam in Hopper

- Check:**
- A) Knife adjustment (must be flat to the coin disc).
  - B) Pivot arm roller adjustment.
  - C) Coin(s) lying flat between the hopper scoop and the coin disc.
  - D) Incorrect sized coins.

### 4. No Payout

- Check:**
- A) Payout wiper adjustment.
  - B) Disc alignment.
  - C) Reel mechanism wiper adjustment.
  - D) Payout relay de-energized.
  - E) Payout relay circuit open (refer to game schematic).
  - F) Loose or contaminated plugs (as appropriate).

### 5. Incorrect Payout (Over Pay)

- Check:**
- A) Improper payout wiper adjustment.
  - B) Improper payout disc alignment.
  - C) Short in the payout circuit (refer to game schematic).
  - D) Open in the payout step-up circuit (refer to game schematic).
  - E) Payout unit step-up arm adjustment.

### 6. Incorrect Payout (Under Pay)

- Check:**
- A) Loose, dirty or improperly adjusted payout wiper(s).
  - B) Loose, dirty or mis-aligned payout disc.
  - C) Loose or cold solder connection(s) in the payout circuits. (refer to game schematic).
  - D) Payout unit step-up circuit/mechanics.

### 7. Game Shuts Off During Payout

- Check:**
- A) Ratchet cam switch adjustment.
  - B) Timer motor circuit (refer to game schematic).
  - C) Improper adjustment of the timer cam.

### 8. Relays

- Check:**
- Note: Cleaning contacts:  
Only use burnishing tool. Don't use a contact file, the contacts are silver.
- A) Switch adjustment:  
Adjustments should be made with a stroking action. Sharp bends fracture the blade.

## 9. Step-up Units

Step-up unit solenoids do not advance the units, they pull the drive arm to engage the next tooth on the ratchet. When the solenoid is de-energized, the extension spring which is attached to the drive arm causes the drive arm to advance the ratchet to the next position.

- Check:**
- A) Sluggish units:  
To check resetting units manually reset unit, then rotate the wiper assembly, it should turn freely.
  - B) Causes of sluggishness:  
The disc may be dirty with residue of old grease or oil. Too much tension on the wipers. The torsion spring is not properly adjusted.

Resetting unit with a zero switch should be able to reset when the unit has advanced only one step.

Too much tension of the zero switch against the ratchet pin may hold the ratchet from a complete reset.

Resetting units with a limit switch when the ratchet is manually turned past the limit position. The ratchet may hang up on the limit switch. This prevents the unit from resetting to zero position.

