INSTALLATION AND GENERAL GAME OPERATION INSTRUCTIONS

INSTALLATION

On all games there are certain items that should be checked after shipment. These are visual inspections which may avoid time consuming service work later. Minor troubles caused by abusive handling in shipment are unavoidable. Cable plugs and sockets may be loosened, switches (especially tilt switches) may go out of adjustment. Plumb bob tilt switch should always be adjusted after game is set on location and leg levelers are adjusted.

Visual inspections before plugging in line cord: -

1. Check that all cable plugs are firmly seated in proper sockets.
2. Check that cables are clear of all moving parts and relays.
3. Check for any wires that may have become disconnected.
4. Check switches for loose solder or other foreign material that may have come loose in shipment and could cause shorting of contacts.
5. Check wires on relay coils for proper soldering, especially the bare (common) wire connecting a row of relay coils. Cold solder connections may not show up in factory inspection, but vibration in shipment may break contact.
6. Check that fuses are firmly seated and making good contact.
7. Check (manually) the stepping and resetting of all step-up units. The wiper action should not be sluggish.
8. Check transformer for any foreign material shorting across wiring lugs.
9. Check wiring of transformer to correspond to location voltage. (Transformer wiring card in front cabinet).

Before line cord is plugged in: -

Check all plugs and sockets and dress cables:

(A) Plugs in correct sockets.
(B) Plugs securely seated in sockets.
(C) Dress cables away from relays.

Check adjustment of the three (normally open) tilt switches:

(A) Panel tilt on bottom of playfield panel.
(B) Plumb-bob tilt on left side of cabinet near front door.
(C) Ball tilt above plumb-bob tilt.
Insert the smaller ball (15/16" dia.) into the ball tilt assembly, and adjust the bracket so the ball will roll free to contact the switch blade, if front of cabinet is raised.

Plug in line cord:
Check adjustment of the (normally open) kick-off switch at rear of cabinet mounting board, near cable plugs. Check adjustment of the (normally open) anti-slam switch, on front door. If either of these switches is closed, the delay relay is energized momentarily.

GENERAL GAME OPERATION

Place ball into playfield by out hole.

Coin Game:
If coin should be rejected, move on-off master switch at bottom right front corner of cabinet to "on" position, then coin game. Coin lock-out device rejects all coins when power (master switch) is off. Also check the delay relay. If this relay is energized, the game will not accept coins.

1A. If coin is inserted in 1st (nickel) coin chute and game is conditioned for 1 play-5¢, it will energize the coin relay. If game is conditioned for 1 play-10¢, the first coin inserted will advance the 2 coin unit, then second coin inserted will energize the coin relay thru the 2 coin unit switch. (See 1st coin chute adjustment plug positions on game adjustments sheet).

1B. If coin is inserted in 2nd (dime) coin chute and game is conditioned for 1 play-10¢, it will energize the coin relay. If game is conditioned for 2 plays-10¢, it will energize the 2nd coin chute relay and 2nd coin chute relay will advance the credit unit (2 steps) thru the credit circuit. (See 2nd coin chute adjustment plug positions on game adjustments sheet).

1C. If coin is inserted in 3rd (quarter) coin chute and game is conditioned for 2-3-4-5 or 6 plays-25¢, it will energize the 3rd coin chute relay and the 3rd coin chute relay will advance the credit unit (2-3-4-5-6 steps) thru the credit circuit. (See 3rd coin chute adjustment plug positions on game adjustments sheet).

1D. When the credit unit has been advanced from 2nd or 3rd coin chute, (as described in section 1B and 1C) the front door credit button switch, (when actuated) will energize the credit relay and then the credit relay will energize coin relay.

2A. The coin relay, when energized by any of the ways described, (in sections 1A thru 1D) will stay energized thru its own hold-in switch and (normally closed) #8 score motor switch.

2B. The coin relay will energize the lock relay which stays energized thru its own hold-in switch and a delay relay switch.

2C. The coin relay will energize the reset relay thru a game over relay switch, operate the score motor and then thru normally open #2 and #11 score motor switches, energize the #1 and #2 score reset relays. The reset relay will operate the score motor. Both the reset and the score reset relays will be energized thru a normally closed #8 score motor switch, or until all score counter units are reset to zero position.

2D. The coin relay, thru a normally open #3 score motor switch will advance the total play meter, and thru the reset relay will reset the coin unit, ball count unit and the player up unit. The coin relay will also reset the credit unit, (1 step) when energized by the credit button. Thru a normally open #4 score motor switch, it will energize the game over relay latch coil, and thru another normally open #4 score motor switch, it will energize the four 100,000 relay latch coils.

2E. The coin relay will energize the reset motor to reset all trip relays.

3A. A ball on the outhole switch, at the start of game will energize the outhole relay thru a normally closed #1 score motor switch, and it will stay energized thru its own hold-in and a normally closed #10 score motor switch. For operations after the first ball, see under heading "sequence of operation".

relay

3B. When the outhole is energized, it will operate the score motor and then energize the outhole kicker solenoid thru a normally open #7 score motor switch. The ball will be kicked thru the ball trough to the shooter alley. The game is ready for the first player to play.

3C. To condition the game for 2nd player, inserting coin (s) or use the credit button before the 1st ball is played, it will energize the coin relay again. This time, the coin relay <u>will not</u> energize the reset relay. It will operate the score motor, advance the total play meter, subtract a credit from credit unit, (if credit button was used) and <u>advance</u> the coin unit thru a normally open #3 score motor switch. The game is now set for 2 players; repeating this sequence will set game for 3rd player and 4th player.

SEQUENCE OF OPERATION:

1A. When a ball is played, the ball index relay will be energized by the 10 point, 100 point or 1000 point score relay and it will stay energized thru its own hold in switch, a normally closed out hole relay switch and normally closed #6 score motor switch.

1B. When the ball goes into the outhole: -

a. Before the 1st ball is played, the ball in the outhole will energize the outhole relay. See operation described previously under heading "General Game Operation" sub-heading 3A, 3B and 3C.

b. After the 1st ball is played, if no bonus score lite is lit, the game operation is the same as above except the operations under the following heading of 1C and 1D goes into operation.

c. If one or more bonus lites are lit, the ball in the outhole will first energize the bonus score relay and score whatever bonus score is earned after which the outhole relay is energized. (for bonus scoring, see under "Feature Operation and Scoring")

1C. The outhole relay operates the score motor, and if the game is set for single player, the ball count unit is advanced 1 step by a normally open #3 score motor switch, thru the coin unit "0" position. If the game is set for multiple players, (2 to 4) the player up unit is advanced 1 step thru normally open #4 score motor switch. The outhole relay then energizes the outhole kicker solenoid thru a normally open #7 score motor switch. The 1st ball is returned to shooter alley and game is now ready for either 1st player - 2nd ball or 2nd player - 1st ball. During a multiple player game; when the last eligible player's 1st ball returns to the outhole, the outhole relay advances the ball count unit 1 step thru a #3 score motor switch, the coin unit and/or player up unit, then the ball count unit, end of stroke switch, energizes the player reset relay. The player reset relay stays energized thru its own hold-in switch and a normally open #1 score motor switch, and resets the player-up unit thru a normally open #4 score motor switch. The game is set for 1st player - 2nd ball, or 2nd player - 1st ball.

1D. When the last eligible player's last ball returns to the outhole, the outhole relay switch will advance the ball count unit, thru the #3 score motor switch, and the game-over interlock relay trip coil will be energized thru the ball count unit disc and the game is completed.

Note: Ball to ball sequence of operation is interrupted when a player scores an extra ball or tilts a ball in play.

FEATURE OPERATION AND SCORING

Bonus Score Feature:
The idea of this game is to lite up as many bonus lites as possible during the play of a ball. The bonus lites are lit by the ball rolling over the roll-over buttons at the top of the playfield, also a ball in either hole will lite the bonus lite corresponding to the lite that is lit when the ball goes into the hole. When all even numbered bonus lites are lit, the evens hole "5000" lite will lite. The bonus lites #1 and #6, #2 and #7 and #4 and #9 may be paired thru the 1-10 feature adjustment plug. (Lightning #1 will also lite #6, or lightning #6 will also lite #1. See 1-10 feature adjustment plug under heading "game adjustment") Also the evens hole "extra ball" lite will lite until an extra ball is earned. When all odd numbered bonus lites are lit, the odds hole "5000" lite will lite. When a "5000" lite is lit, it indicates that a ball in that hole will score 5000 points instead of 500 points. When all bonus lites are lit, the top gate of the right alley is opened and the top gate "special" lite is lit. A ball thru the top gate when the "special" lite is lit will award a credit or an extra ball. (see hi-score adjustment plug under heading "game adjustment")
Bonus scores are registered when the ball goes into the outhole. 1000 points is scored for each bonus lite lit plus 5000 points super bonus if either all evens or all odds numbered bonus lites are lit or 10,000 points if all bonus lites are lit. After scoring, all bonus lites are turned off.

Extra Ball Feature:
An extra ball is awarded when a ball goes into the evens hole when the extra ball lite is lit. The game is adjustable (see hi-score feature adjustment under game adjustments) to award an extra ball or credit when predetermined hi-scores is recorded or when a ball goes thru the right alley top gate when the "special" lite is lit. Only one extra ball is awarded per ball in play.
Evens hole extra ball lite is lit when all even numbered bonus lites are lit.
Right alley top gate special lite is lit when all bonus lites are lit.

Right Alley Gates Feature:
The top gate is opened when a ball hits the top gate mushroom-bumper, also when all bonus lites are lit. The gate closes when the ball goes into the outhole or if the game is tilted.
The lower gate is opened when a ball hits the lower gate mushroom bumper. The gate remains open until the ball goes into the outhole or the game is tilted.

FEATURE OPERATION AND SCORING

Playmore Post (Up Post) Feature:
When a ball goes into the odds hole, it will raise the post located between the flippers which will stop the ball from going into the outhole. The post is lowered when the ball rolls over either down post roll-over button, when the ball goes into the outhole or whenever the game is tilted.

100,000 Score Feature:
There are four 100,000 score interlock relays, one for each player. When a player has scored 100,000 points, the 100,000 relay is tripped, lighting the 100,000 lite on the score glass. All 100,000 relays are latched at the start of a game.

Thumper-Bumper Lite Feature:
Thumper bumpers score 10 points or 100 points when lit. The left and right thumper bumpers are lit alternately thru the #12 score motor cam switch. The lower thumper-bumper is lit at all times.

GAME ADJUSTMENTS

PLAYFIELD PANEL POST ADJUSTMENTS:
Posts that control left and right outlane opening on panel (see panel sketch) can be moved to make access to outlanes easier or harder for ball to enter.
Easier entry will decrease playing time and scoring.
Harder entry will increase playing time and scoring.

HI-SCORE ADJUSTMENT PLUG:
Located on back box lite insert. This plug provides a wide range of coverage at which hi-score credits can be scored. (see the score adjustment card in back box for plug positions).

MATCH FEATURE ADJUSTMENT PLUG:
Located on front cabinet mounting board. This plug provides positions to operate match feature on or off.

HI-SCORE FEATURE ADJUSTMENT PLUG:
Located on front cabinet mounting board. This plug provides positions to award hi-score credit or extra ball.

BALLS PER GAME ADJUSTMENT PLUG:
Located on front cabinet mounting board. This plug provides positions to operate game on 5 ball or 3 ball play.

1ST COIN CHUTE ADJUSTMENT PLUG:
Located on the 2 coin unit, on front cabinet mounting board. This plug provides positions to give 1 play for 1 coin or 1 play for 2 coins thru the 1st (nickel) coin chute.

2ND COIN CHUTE ADJUSTMENT PLUG:
Located on front cabinet mounting board. This plug provides positions to give 1 play for 1 coin or 2 plays for 1 coin thru the 2nd (dime) coin chute. Note: When this plug is set for 2 plays - 1 coin, brown-white (male plug) wire on 3rd coin chute adjustment must be in position 2.

3RD COIN CHUTE ADJUSTMENT PLUG:
Located on front cabinet mounting board. This plug provides positions to give 2 to 6 plays for 1 coin thru the 3rd (quarter) coin chute. Use orange-white (male plug) wire to set number of credits.

1-10 FEATURE ADJUSTMENT PLUG:
Located on front cabinet mounting board. This plug provides pairing of #1 & #6, #2 & #7 and #4 & #9 trip relays.

Bonus Scoring Sequence:

Bonus scoring is awarded when one or more bonus lite is lit, and the ball goes into the outhole.

(1) Top roll-over buttons trip respective trip relays.
(2) A ball in evens or odds holes will trip relay corresponding to the lite which is lit by the hole.
(3) Any of above trip relays will energize the bonus control relay.
(4) A ball in the outhole will energize the bonus score relay when the bonus control relay is energized. The bonus score relay when energized will operate the score motor.
(5) During the first half cycle of the score motor, the cam switches will score 1000 points for each of #1 thru #5 trip relays that are tripped, after which the bonus 6-10 trip relay is tripped.
(6) If none of the #6 thru #10 trip relays are tripped, the bonus control relay will de-energize and the outhole relay will become energized since the bonus scoring is completed.
(7) If any of the #6 thru #10 trip relays are tripped, the bonus control relay will remain energized as will the bonus score relay. During the second half cycle of the score motor, the cam switches will score 1000 points for each #6 thru #10 trip relays that are tripped. At the end of the 2nd half cycle of the score motor, the odds super bonus trip relay is tripped.
(8) The bonus control relay will de-energize at this point unless the odd number trip relay is tripped or the all even number trip relay is tripped.
(9) If all odd number trip relays are tripped, the game will score 5000 points thru #2 score motor cam switch; if not, there will be no score in the 3rd half cycle of the score motor, in either case the evens super bonus trip relay will be tripped near the end of the 3rd half cycle.
(10) If all the even number trip relays are not tripped the bonus control relay will de-energize, but if they are all tripped the bonus control relay and the bonus score relay will remain energized and the score motor will make the 4th half cycle. The game will score 5000 points after which the end super bonus will be energized and the bonus scoring is completed.

MISCELLANEOUS	PART NO.
Transformer	E-122-95
Score Motor (Domestic)	E-119-354
Score Motor (Export)	E-119-411
Reset Motor	E-119-362
Reset Motor (Export)	E-119-385
Meter (Total Play)	E-130-10
Resistor (Coin Lockout) 8200 ohms, ½ watt	E-105-6

RELAY COILS	
Coin	G-31-2000
2nd coin chute	G-31-2000
3rd coin chute	G-31-2000
Credit	G-31-2000
Lock	G-33-2800
Delay	G-31-1600
Player Reset	G-31-2000
100,000 re. (trip) (4)	G-31-2000
100,000 re. (latch) (4)	G-31-2000
Evens hole	G-31-2000
Odds hole	G-31-2000
Game over re. (trip)	G-31-2000
Game over re. (latch)	G-31-2000
Reset	G-31-2000
Score reset (#1, #2)	G-30-1500
Down post	G-31-2000
Bonus score	G-31-2000
Outhole	G-31-2000
Ball index	G-32-2500
Extra ball	G-32-2500
Tilt trip	D-28-500
Top gate M-B	G-31-2000
Lower gate M-B	G-31-2000
Top gate	G-32-2500
Lower gate	G-32-2500
Thumper-bumper (3)	G-31-2000
Bonus control	G-32-2500
End super bonus	G-31-2000
Bonus 6-10 trip	D-28-500
Evens super bonus trip	D-28-500
Odds super bonus trip	D-28-500
All odds trip	D-28-500
All evens trip	D-28-500
1 thru 10 trips (10)	D-28-500
1000 point	G-31-2000
100 point	G-31-2000
10 point	G-31-2000

ASSEMBLY COILS	PART NO.
Coin lockout	FC-33-2600
Chimes (10,100 & 1000 points) (3)	CC-29-2000
Knocker	C-27-1000
Thumper-bumpers (3)	A-25-1000
Evens hole eject	A-27-1100
Odd hole eject	A-27-1100
Down post	A-26-1200
Post latch	G-31-2000
Sling-shots (2)	AP-26-1200
Flippers (2)	AF-26-650/28-800

UNIT COILS	
2 coin (step up)	CD-29-1600
Credit (step up)	B-26-1100
Credit (reset)	C-28-1100
Coin (step up)	B-26-1100
Coin (reset)	C-28-1100
Ball count (step up)	B-26-1100
Ball count (reset)	C-28-1100
Player up (step up)	B-26-1100
Player up (reset)	C-28-1100
00-90 (step up)	B-27-1300
Score drums (step up) (16)	CD-29-1600

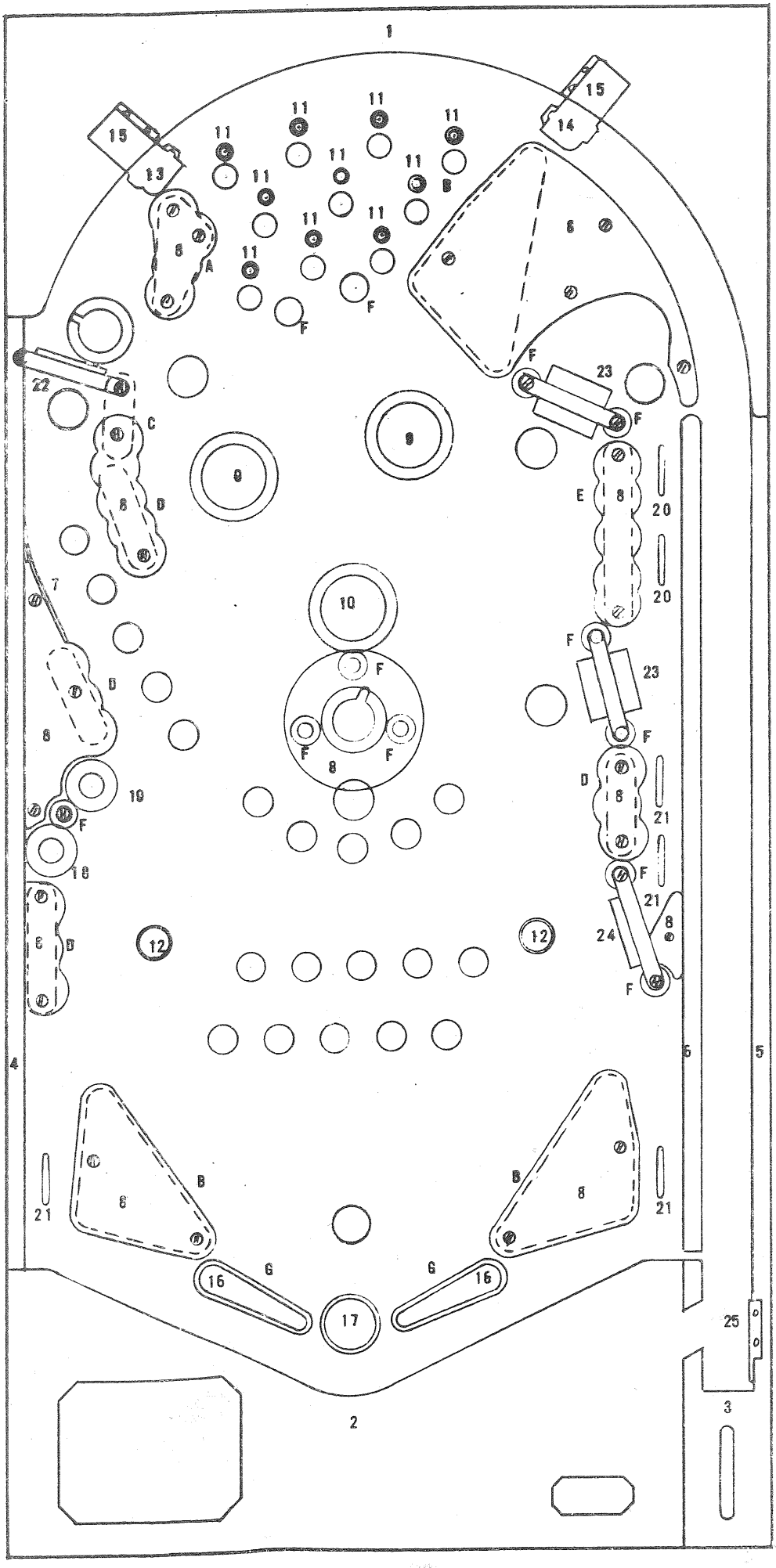
UNITS CONTACT DISC	
Coin	W- 923-260
Ball count	W- 1043-17
Player up	W- 923-207
00-90	W- 1123-17

UNITS WIPER ASS'Y	
Coin	AS- 1024-108
Ball count	AS- 1046-648
Player up	AS- 1046-620
oo-90	AS- 1046-614

OLD COIL NUMBER	NEW BALLY COIL NUMBER
CO-25A-7	A-25-1050
CO-25GG-7	B-25-925
CO-25H-7	BC-25-925
CO-26A-9	A-26-1100
CO-26GG-9	B-26-1100
CO-27R-11	C-27-1000
CO-28R-15	C-28-1100
E-184-41	BF-27-1250
E-184-46	EA-30-1150
E-184-47	EA-32-1550
E-184-55	B-29-1200
E-184-56	A-27-1100
E-184-74	CF-28-1025
E-184-75	E-32-1700
E-184-112	EA-29-950
E-184-135	BA-25-925
E-184-155	D-27-425
E-184-156	D-28-500
E-184-160	B-25-750
E-184-175	AP-27-1300
E-184-180	CE-33-4800
E-184-190	AF-25-600/31-1000
E-184-204	AF-27-1000/32-1300
E-184-205	B-27-1300
E-184-206	CD-29-1600
E-184-207	A-27-1400
E-184-213	A-27-1300
E-184-218	F-31-1500
E-184-224	F-31-2100
E-184-231	CA-29-800/31-900
E-184-235	AK-25-1050
E-184-236	J-28-1100
E-184-237	BA-26-1040
E-184-241	AF-25-600/31-1000
E-184-243	A-26-1200
E-184-248	FC-30-1300
E-184-249	BF-28-1500
E-184-250	D-30-700
E-184-252	BB-26-655/32-1245
E-184-254	FC-30-1400
E-184-257	AP-25-1050
E-184-260	B-28-1600
E-184-261	AP-31-3000
E-184-262	A-26-1200
E-184-263	AF-27-775/31-861
E-184-264	A-28-1900
E-184-265	AF-25-600/31-1000
E-184-266	D-29-675
E-184-268	AF-26-750/31-900
E-184-269	FC-33-2600
E-184-270	AB-31-3000
E-184-271	AK-24-750
E-184-272	A-25-1000
E-184-274	FC-32-2100

NOTE:

THESE COILS MAY BE ORDERED BY THE OLD COIL NUMBER OR BY THE NEW COIL NUMBER OR BY BOTH.



RUBBER PARTS

A	R-521-3	2" (1)
B	R-521-5	3" (3)
C	R-521-1	1" (1)
D	R-521-2	1-1/2" (4)
E	R-521-4	2-1/2" (1)
F	R-243	5/16 (12)
G	R-466-3	FLIPPER (2)

PANEL TOP PARTS

1.	TOP ARCH	F-5638-63
2.	BOTTOM ARCH	P-5671-38
3.	SHOOTER GAGE	P-6358-10
4.	SIDE RAIL (L)	CA-1208-15
5.	SIDE RAIL (R)	CA-1208-1
6.	INNER RAIL	CA-1208-14
7.	GUIDE RAIL ASSY.	A-3032-17
8.	LITE SHIELDS	A-2680-90
9.	BUMPER CAP (BLUE)	C-718-16
10.	BUMPER CAP (YELLOW)	C-718-17
11.	ROLLOVER BUTTON (SMALL)	C-387-6
12.	ROLLOVER BUTTON (LARGE)	C-387-5
13.	BALL GATE (L)	A-1475-4
14.	BALL GATE (R)	A-1475-1
15.	BALL GATE COVER	P-2696-5
16.	FLIPPER	C-611-5
17.	BUMPER POST	C-810
18.	MUSHROOM ASSY. BLUE	AS-2281-18
19.	MUSHROOM ASSY. RED	AS-2281-16
20.	ROLLOVER WIRE	M-1336-10
21.	ROLLOVER WIRE	M-1336-2
22.	GATE & WIRE	AS-2250-30
23.	GATE & WIRE	AS-2250-4
24.	GATE & WIRE	AS-2250-24
25.	PROTECTIVE ANGLE	P-7639

TIME DELAY CIRCUIT

Purpose of the time delay circuit is to prevent unnecessary abuse of the machine it is installed in.

The time delay relay is energized anytime one of the slam switches are made to contact. There are two factory installed slam switches, one on the front door and one on the mechanism mounting board. (Any number of slam switches could be installed by the operator, to meet his individual requirement). The switches should be adjusted to have approximately 1/16" gap between the contacts. The weighted blade should be adjusted to attain the desired sensitivity. Decreasing the gap between contacts will make switch more sensitive. Opening the gap will reduce sensitivity.

The total time the delay relay is energized can be varied by changing the #455 lite bulb mounted on the delay relay frame. If unable to get a short enough time of delay, get a Westinghouse #455 bulb; these units are considerably faster. If still unable to bring the time down, check the location voltage. It should not be under 49.5 V.A.C. on the transformer secondary.