GAMESMAN side payout Hopper Technical Manual

Money Controls

Contents

Figures

Tables

1.   Diary of Changes

Issue 1.0 - First issue…………………………………………………………………9th February 2001

Issue 2.0 - Changes requested by Coin Inc.……………………..…………..12th February 2001
- ➢   Add spanner / wrench.
- ➢   Changed c/sk to countersunk.
- ➢   Changed dog point info.
- ➢   Updated Table 1.

Issue 3.0 …………………………………………………………………………..24th May 2001
- ➢   Fig 2a and 2b changed to match TSP011.
- ➢   Update to Table 6.

Issue 4.0 …………………………………………………………………...9th August 2001
- ➢   Fig 2a updated to show bridge plate components.
- ➢   Updated Table 6.
- ➢   Last page disclaimer added.

Issue 5.0 ..……………………………………………………..…………13th March 2002
- ➢   Re-paginated / formatted manual
- ➢   Added Money Controls logo.
- ➢   Corrected references in section 10.
- ➢   Applied TMWP v3.0

Issue 6.0 ..……………………………………………………..………….21st March 2002
- ➢   Expanded "Maintainable Life" section.

ssue 6.1 ..……………………………………………………..…………6th Sept 2002
- ➢   Modification to disclaimer.

2. Introduction

The Gamesman side payout hopper has been designed for use primarily in the casino slot machine industry. Its main features are:-

> ➢ A "Knifeless" coin pick-up system to reduce the likelihood of jams.
> ➢ A large capacity bowl to facilitate the payment of high value jackpots, in either coins or tokens.

Some parts of the hopper are specific to the size of coin/token being dispensed and therefore it is necessary to state the coin/token to be paid out when ordering a Gamesman.

There are several versions of the Gamesman, designed for compatibility with specific types of gaming machines. This manual describes the general features of Gamesman, which are common to all versions. Separate appendices will provide application specific details.

3. Theory of Operation

The motor/gearbox will cause the disc to rotate, when power is applied to the hopper and any control inputs are set into their active state. The coins in the bowl will flow, under gravity, past the regulator and on to the rotating disc. Pins on the disc will pick up the coins and carry them up to the bridge plate where the coins are lifted off the disc and fed into the ejector mechanism. The spring-loaded ejector arm will push the coin out of the exit slot. An optical sensor, mounted in the exit, will detect the coin as it leaves the hopper and generate an output signal which can be used by a host machine to record the number of coins dispensed.
All control boards have the ability to detect when a jam has occurred and will reverse the direction of the motor, for a short time to clear the obstruction.

4. Variants

There are several selectable features available on the Gamesman to suit most applications.

These must be specified when ordering, i.e. -

Coin/token size	-	within specified range, see Table 1.
Bowl type	-	application specific.
Level sensing	-	high, medium, low.
Control board & connector	-	application specific.
Base	-	application specific.
Power supply	-	24V DC or 110V to 240V AC.

5. Mechanical Description

5.1 Motor / gearbox.

The drive unit is mounted on the rear of the main housing and comprises the motor, gearbox and mounting plate. It is attached to the disc by 2 x M6 screws, which are visible in the centre of the disc. If the motor has to be removed, it is important to ensure that the two fixing screws are tightened to the correct torque upon replacement. See
Figure 1.

5.2 Disc.

The circumference of the disc is divided into segments by a series of pins/raised sections. The size of each segment is coin size specific, being greater than one coin diameter and smaller than two coin diameters.

5.3 Bridge plate.

The bridge plate is designed to lift a coin from the disc and guide it into the ejector. This is achieved by squeezing the coin between a disc pin and the bridge pin, as the disc rotates, forcing the coin upwards. A number of bridge plates are available to suit different coin sizes.

5.31 DOG POINT SCREW (BRIDGE PIN) ADJUSTMENT.

It is not normally necessary to alter the setting of the bridge pin. However, if it must be done, the following procedure must be followed :-
  i.   Screw the dog point screw into the bridge plate, with the dog point end towards the disc, until it is finger tight.
  ii. Secure the dog point screw in position, using the nut and washer. The nut should be tightened to the specified torque (*see Figure 1*).
  iii. Hold the nut in position with a spanner and back-off the screw by between half and three-quarters of a turn, using a 3mm Allen key.
  iv. Check that the disc can turn without being obstructed by the pin.

5.4 Ejector.

The spring-loaded ejector arm is mounted on the outside of the bridge plate. A pin, fixed to the arm, protrudes through a slot in the bridge plate and into the coin path. As a coin is pushed off the disc it forces the arm upwards and puts the spring under tension. When the coin has travelled to a point where more than half of its diameter has passed the pin, the spring will cause the arm to return to its rest position and eject the coin through the exit slot.

5.5 Bowl assembly.

The plastic bowl is fastened to the yolk which, in turn, is attached to the main housing. A regulator is also fixed to the yolk. The shape of the bowls has been designed so that coins will migrate, under gravity, towards the disc. The regulator ensures that the number of coins reaching the disc is enough to prevent coin starvation, but not enough to flood the disc, which could cause jams or poor pick-up. There will be different regulators to suit different coin sizes.

5.6   Yolk spacers

The bowl assembly is free to move backwards and forwards to assist in the clearing of any jams. The amount of movement, as well as the clearance between bowl and disc, is coin specific and is determined by the yolk spacers. These plastic components are colour-coded for ease of identification.

If the bowl has to be removed, for any reason, it is important that the spacers are re-fitted correctly, otherwise the hopper will not run reliably.

Money Controls Technical Services department will be able to assist in identifying the correct spacers for a particular coin type.

REF No	TORQUE IN N-M	TORQUE IN FT-LBS
A	4 N-M	2.95 FT-LBS
B	4 N-M	2.95 FT-LBS
C	1 N-M	0.74 FT-LBS
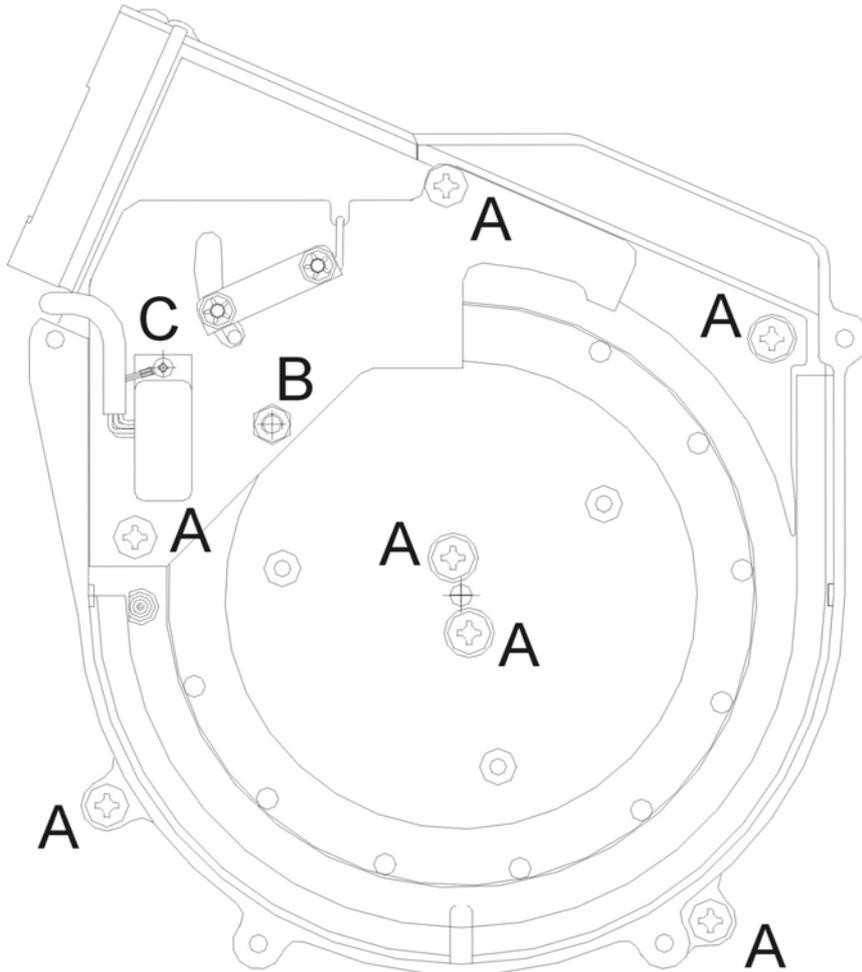
NOTE:

1] YOKE AND BOWL RIVETED TOGETHER

2] FRAMES TO BASEPLATE RIVETED

3] HANDLE TO FRAME RIVETED

4] ON HOPPERS THAT HAVE THE FRAMES BOLTED
   TOGETHER THEN TORQUE AS REF A

Figure 1: Torque Settings

6.   Level Sensors

Where fitted, level sensing will be achieved by the use of two round brass plates fitted inside the bowl. The lower plate will be connected to the 0-Volt line and the other plate will be connected to the host machine, either directly to the main connector or via the control board. An electrical connection between the plates, via the coins, will provide an indication of the level of coins in the hopper. Some bowls have a series of pre-drilled holes, which allow a user to move the position of the level sensor. This is achieved by unplugging the sensor wire, removing the nut and washer from the fixing stud, moving the sensor plate and stud to the new position, and re-attaching the nut and wire.

7.   Electronic Control

A range of control boards is available to suit different applications. Each board will start and stop the motor when instructed by input signals from a host machine, detect and clear coin jams, and provide an output signal whenever a coin is dispensed.

7.1   Input signals.

The type and polarity of the input signals are unique to each type of control board.
Refer to separate data sheets for further information.

7.2   Jam detection and clearing.

The current being drawn by the motor is monitored continuously by the control board. If the current rises above a pre-set threshold, it will indicate that a jam has occurred. The motor will then be run in the reverse direction, for a fixed time, before resuming its forward motion. If the obstruction is not cleared at the first attempt, the sequence will be repeated until either the jam is cleared or a thermal switch activates and removes the power from the motor.

The thermal switch is designed to protect the motor from overheating in the unlikely event of a hard jam. It can be reset by removing power from the hopper for approximately 60 seconds.

7.3   Coin sensors.

Each hopper is fitted with an optical sensor, which generates a beam of light across the coin exit path. When a coin blocks the light beam, the opto-detector changes state, causing the control board to generate an output signal to the host machine.

7.4   Coin output signals.

The type and polarity of the output signals are unique to each type of control board.
Refer to separate data sheets for further information.

8.   Power Supply

The motor and the control board are designed to operate from a 24 Volt DC supply. Some applications have only 110 Volt AC supplies available. For this reason, versions of Gamesman are available which incorporate a certified power supply to convert the AC supply into 24 Volts DC. The power supply is held in a bracket, which is usually attached to the hopper.

9.   Technical Specification

Table 1: Coin Dimensions

Diameter:	21mm – 45 mm	0.83" – 1.77"
Thickness:	1.7 mm - 3.5 mm	0.07" – 0.138"

Table 2: Power Supply

Voltage:	24V DC +/- 10% 110V AC with PSU fitted.

Table 3: Current Consumption

Running:	0.7 A Typical @ 24V DC
Reversing:	3.9 A Maximum @ 24V DC

Table 4: Environmental Ranges

Operating temperature range:	0°C to +50°C
Storage temperature range:	-20°C to +70°C
Operating Humidity:	10% to 75% RH non-condensing
Storage Humidity:	10% to 95% RH non-condensing

Table 5: Maximum Capacities

Coin & bowl dependant. e.g.	
Bowl No.1 (LH)	Typically 2000 coins 25.4mm (1") x 2.8mm (0.11")
Bowl No.4 (RH)	Typically 2000 coins 25.4mm (1") x 2.8mm (0.11")

9.1   Electrical Specification

Application specific – refer to individual appendices for details.

9.2   Overall dimensions

Application specific – refer to individual appendices for details.

9.3 Maintainable Life

5,000,000 coins/tokens.

After 5,000,000 the disk unit [Items 11 - *Figure 2*] and the bridge plate [Item 4 - *Figure 2*] should be replaced.

9.31 STRIP DOWN

Refer to *Figure 2* and *Figure 3* Exploded Diagram Pages *14* and *15*.

1) Disconnect the opto loom [Item 30 - *Figure 2*] from the control board.

2) Disconnect the motor loom [Item 31 - *Figure 3*].

3) Disconnect the level sense wires from the bowl [Item 32 - *Figure 3*].

4) Using the 4mm Allen Key, remove the two top M6 x 25 shoulder screws, [Item 2 - *Figure 2*] and coloured spacers, [Item 3 - *Figure 2*]. The bowl can then be lifted off the bottom two M6 x 25 shoulder screws.

5) Remove the bottom right hand M6 x 25 shoulder screw, [Item 2 - *Figure 2*] and coloured spacer/s, [Item 3 - *Figure 2*].

6) Remove the M6 x 20 poz pan head screw, [Item 5 - *Figure 2*]. Remove the M6 x 30 poz pan head screw, nut and shake-proof washer, [Items 7 - *Figure 2* and 26 & 27 - *Figure 3*]. The bridge plate unit, [Item 4 - *Figure 2*], can now be removed.

7) Take hold of the motor to keep it in position. Then remove the two M6 x 16 poz countersunk Anu-lok screws, [Item 12 - *Figure 2*], from the centre of the disc unit, [Item 11 - *Figure 2*]. With the two screws removed the drive assembly, spring, rotary bearing and disc unit can be removed, [Items 11 - *Figure 2* and 22, 23 & 24 - *Figure 3*].

8) Remove the M6 x 20 poz countersunk screw, nut and shake-proof washer, [Items 18, 19 & 20 - *Figure 2*], then remove the wiper spacer, [Item 17 - *Figure 2*].

9) (See note 1) Remove the two M6 x 30 poz pan screws, nuts and shake-proof washers, [Items 25- *Figure 2* and 26 & 27 - *Figure 3*], holding the hopper housing to the frame unit. Remove the housing, [Item 21 - *Figure 2*], from the frame unit, [Item 28 - *Figure 3*].

10) (See note 1) Remove the three M4 poz pan screws, 4mm plain washer and the 4mm – shake-proof washer, [Items 14, 15 & 16 - *Figure 2*], holding the horseshoe, [Item 13 - *Figure 2*], to the housing, [Item 21 - *Figure 2*].

Note 1:- Steps 9 and 10 are only carried out if the hopper is a build No 6, 7 or 8.
Hopper build No 8 is not fitted with a Horseshoe.
Step 9 is omitted when servicing a DC Hopper.

11) Clean the coin dust from ALL removed parts.
12) Ensure the optics are clean.
13) Re-build the hopper – See section *9.32*

9.32   RE-BUILD

Under NO circumstances, should any lubrication be used.

1) Place horseshoe, [Item 13 - *Figure 2*], in the housing, [Item 21 - *Figure 2*] and line up the holes in the housing with the 3 x M4 tapped holes in the horseshoe. Fix the horseshoe in place with the M4 screw, 4mm plain washer and the 4mm shake-proof washer, [Items 14, 15 & 16 - *Figure 2*]

2) Take the wiper spacer, [Item 17 - *Figure 2*], and with the M6 x 20 poz countersunk screw [Item 18, 19 & 20 - *Figure 2*] fit the wiper to the housing, [Item 21 - *Figure 2*]. At this stage leave the screw only hand tight so the bridge plate, [Item 4 - *Figure 2*], can be easily fitted.

3) Take the rotary bearing, spring and drive assembly previously removed, [Items 22, 23 & 24 - *Figure 3*] and locate the pin on the rotary bearing into the small hole in the housing. With the spring mounted on to the drive bush, locate the drive assembly into the rotary bearing.

4) Holding the drive assembly in place, place the **NEW** disc unit, [Item 11 - *Figure 2*], onto the locating pip on the end of the drive bush. Using the two M6 x 16 poz countersunk Anu-lok screws, [Item 12 - *Figure 2*], fix the disc to the drive bush.

5) Fit the housing unit, [Item 21 - *Figure 2*], to the frame unit, [Item 28 - *Figure 3*], with the 2 x M30 poz pan head screws, nuts and shake-proof washers, [Items 25 - *Figure 2* and 26 & 27 - *Figure 3*].

6) Take the **NEW** bridge plate unit, [Item 4 - *Figure 2*] and position the bridge plate unit on the housing so that the two 6.2mm mounting holes line up with the two mounting holes in the housing. Fix the bridge plate unit to the housing using the M6 x 20 poz pan head screw, [Item 5 - *Figure 2*] and 6mm shake-proof washer, [Item 6 - *Figure 2*], in the top right hand hole.

In the bottom left hand fixing hole, [See Note 2] fit the M6 x 30 poz pan head screw, nut and washer [Items 7 - *Figure 2* and 26 & 27 - *Figure 3*],

Note 2:- If the build is a No 6, 7 or 8 then the M6 x 35 poz countersunk screw [Item 34 - Figure 2] and filler piece extension [Item 33 - Figure 2] are fitted at this point.

7) All the M6 poz head screws should now be tightened to 4Nm [2.95 ft-lbs].

8) Set the "Dog Point" – See *Setting the "Dog Point"* section *9.33.*

9) Fit the bottom right hand shoulder screw, [Item 2 - *Figure 2*] and colour spacer, [Item 3 - *Figure 2*], to the housing according to the label on the bowl.

10) Fit the Bowl Unit [Item 1 - *Figure 2*] and secure in place with the two shoulder screws, [Item 2 - *Figure 2*] and colour spacers, [Item 3 - *Figure 2*]. Ensure the spacers are correct according to the bowl label.

11) Reconnect level sense wires to bowl.
12) Reconnect the plug on the motor loom to the socket on the loom fitted to the control board.
13) Reconnect the opto loom to the control board.
14) Test the hopper.

9.33   SETTING THE "DOG POINT"

Please refer to *Figure 2.*

1) Screw the dog point screw, [Item 8] into the M6 tapped hole in the bridge plate, with the dog point end towards the disc, until it is finger tight.

2) Fit the 6mm shake-proof washer, [Item 9], onto the dog point. Screw an M6 nut, [Item 10], onto the dog point screw. Secure the dog point screw to the bridge plate by placing the 10mm socket onto the M6 nut and tighten to 4Nm [2.95 ft-lbs].

3) Taking the 10mm spanner / wrench and the 3mm allen key, hold the nut with the spanner / wrench and with the allen Key in the dog point, turn the dog point anti-clockwise between half and three quarters of a turn.

4) Check that the disc can turn without being obstructed by the pin.

10. Service / Maintenance

Clean the optical sensor every 100,000 coins/tokens.

Under NO circumstances, should any solvent or foam type cleaner be used.

Under NO circumstances, should any lubrication be used.

Procedure:-

    i.   Disconnect the level sense wires from the bowl, if fitted;

Note: Make a note of the size and positions of the coloured spacers.

    ii.   Unscrew the top two M6 shoulder screws, which hold the bowl in place.

    iii.   Lift the bowl until it is clear of the bottom 2 screws and remove it from the hopper.

    iv.   Disconnect the opto loom from the control PCB.

    v.   Remove the 2 x M6[1] screws, which hold the bridge plate[2] in place.

    vi.   Lift the bridge clear of the disk.

    vii.   Using either a soft brush or compressed air supply, remove any dirt from the opto reflector in the waffle plate and from the opto shields in the bridge plate.

    viii.   Re-assemble the bridge plate, opto loom, bowl and level sensors, making sure that the bowl spacers are replaced in the original positions as shown on the bowl label. Ensure that the screws are tightened to the correct torque's (where specified) see Figure 1.

[1]. See *Figure 2*– screws 5 and 7.

[2]. See *Figure 2* – Bridge Plate assembly - parts 4 and 37 – 42.

11. Exploded Drawings
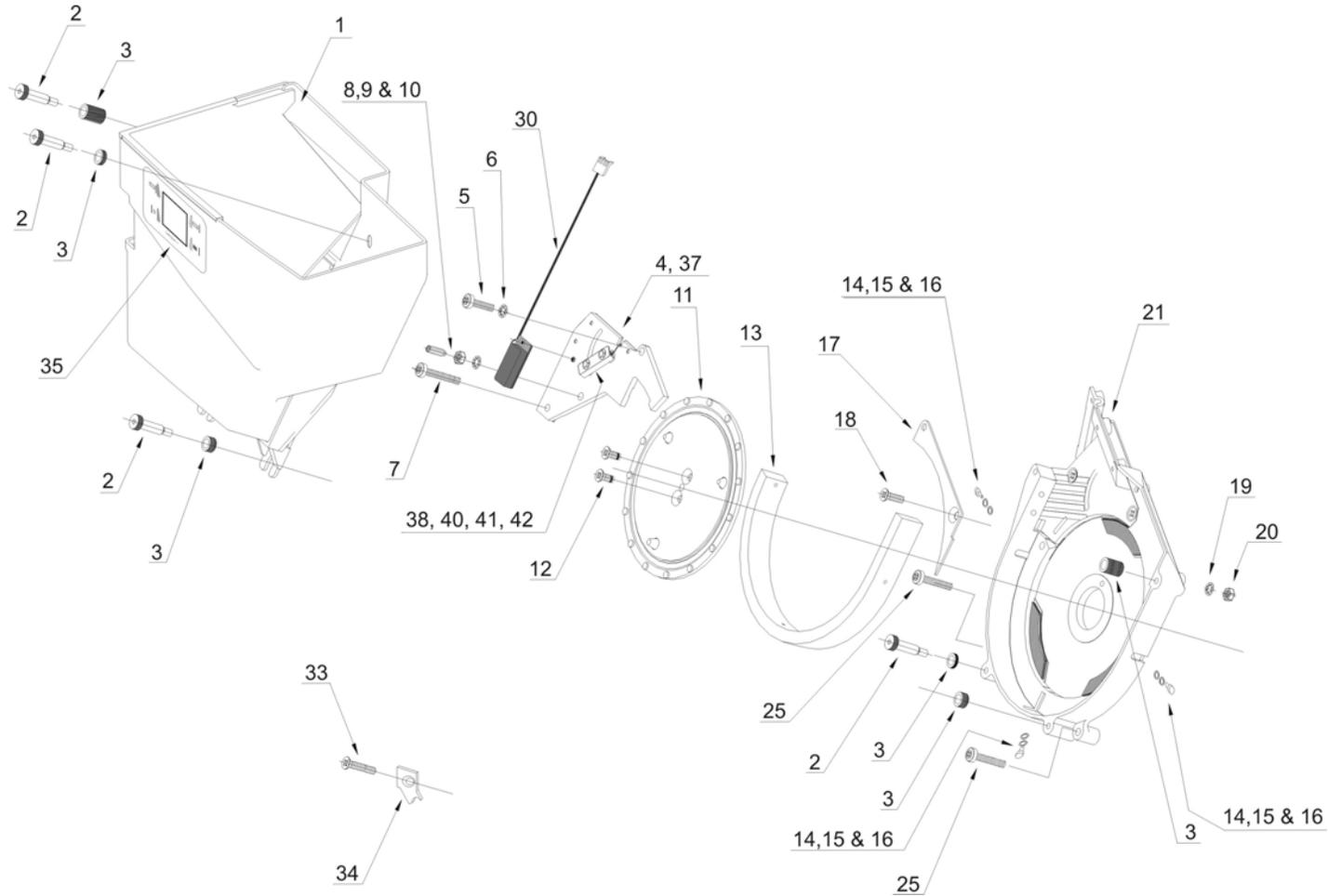
Figure 2: Exploded Drawing – Bowl and disk assembly
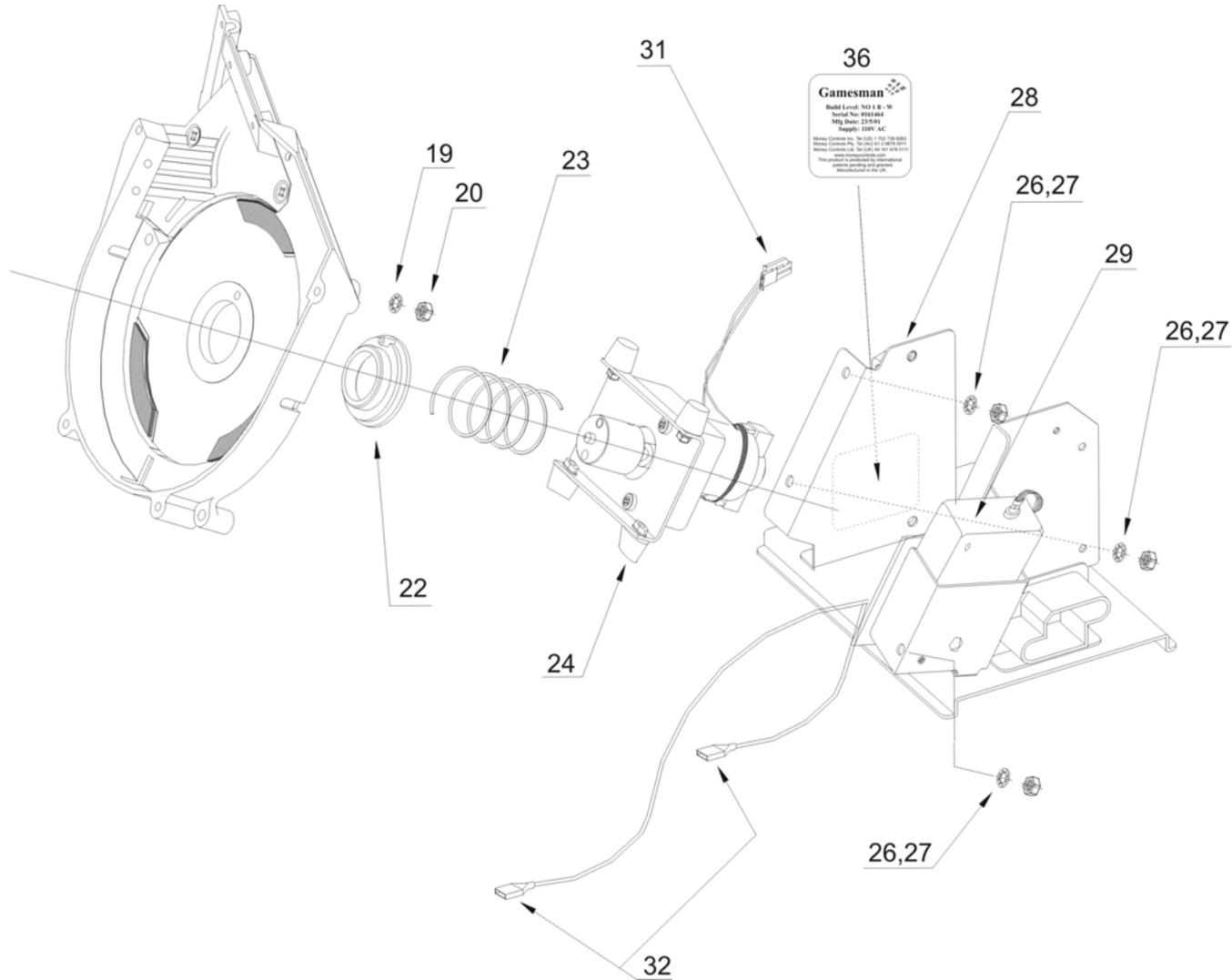
Figure 3: Exploded Drawing – Motor, frame and base assembly

12. Gamesman Hopper Parts List Description

Table 6: Parts List

Item No	Description	Part No	Comments
1	Bowl Unit		Coin/Token Dependent
2	M6 x 25 Shoulder Screw	HSC/356	
3	Yoke Colour Spacers		Coin/Token Dependent
4	Bridge Plate		Coin/Token Dependent
5	M6 x 20 Pozi pan screw	HSC/363	
6	6mm Shakeproof Washer	HWA/037	
7	M6 x 30 Pozi pan screw	HSC/369	Coin/Token Dependent
8	M6 x 16 dog point screw	HSC/750	
9	M6 Hex Nut	HNT/026	
10	6mm Shakeproof Washer	HWA/037	
11	Disc Unit		Coin/Token Dependent
12	M6 x 16 Pozi c/sk Anu-Lok Screw	HSC/389	
13	Horseshoe		Coin/Token Dependent
14	M4 Pozi pan screw	HSC/140	Coin/Token Dependent
15	4mm Washer	HWA/012	Coin/Token Dependent
16	4mm Shakeproof Washer	HWA/026	Coin/Token Dependent
17	Wiper Spacer		Coin/Token Dependent
18	M6 x 20 Pozi c/sk screw	HSC/390	
19	6mm Shakeproof Washer	HWA/037	
20	M6 Hex Nut	HNT/026	
21	Housing Unit	SUB/3492	
22	Rotary Bearing	PBL/620	
23	Spring	SPR/030	
24	Drive Assembly	SUB/2342	
25	M6 x 30 Pozi pan screw	HSC/361	
26	M6 Hex Nut	HNT/026	
27	6mm Shakeproof Washer	HWA/037	
28	Frame Assembly	SUB/3479	
29	PSU Unit	PSU/003	
30	Opto Assembly	SUB/2660	
31	Motor Loom		Ref only. This item is Part of Main Harness
32	Level Sense Wires		Ref only. This item is Part of Main Harness
33	M6 x 35 Pozi c/sk screw	HSC/718	Coin/Token Dependent
34	Filler Pieces Extension	MER/169	Coin/Token Dependent
35	Yoke Colour Spacers Label		Coin/Token Dependent
36	Hopper Label	TPL/010	Coin/Token Dependent

This manual is intended only to assist the reader in the use of this product and therefore Money Controls shall not be liable for any loss or damage whatsoever arising form the use of any information or particulars in, or any incorrect use of the product. Money Controls reserve the right to change product specifications on any item without prior notice