WMS GAMING GAMESMAN side payout DC HOPPER Technical Manual Appendix

Money Controls

Contents

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1. Diary of Changes

Issue 1.0 ..... October 2003
- 1st Issue. Information based on TSP009 V4.0

Issue 1.2 ..... 20th February 2004
- Added 16, 17 & 18 to Figure 3.
- Updated the error generation timings Figure 1.

Issue 1.3 ..... 10th March 2004
- Added version 3 software details to section 3.2.

Issue 1.4 ..... 30th June 2004
- Changed footer

Issue 1.5 ..... 21st July 2004
- Updated section 3.2 Coin jam detection and clearing

Issue 1.6 ..... 26th January 2005
- Added section 10 Spare Parts.
- Ammended section 3.2 re V3.0 s/w.

Issue 1.7 ..... 19th August 2005
- Added Appendix 1 (Fitting the Bridge Plate).

2. Introduction

This appendix is intended for the use with a WMS Gaming machine and a Money Controls DC Gamesman side payout ONLY.

3. Control Board Operation

The control board performs all the functions required by a host WMS Gaming machine for correct payout of coins. There are four tasks, which the board must accomplish:-

3.1 Motor on/off control

The supply voltage can be permanently connected to the hopper but the motor will not run until the "MOTOR ON" signal is activated from the host. When "MOTOR ON" is switched to 0 Volts, the control board will activate the motor H-bridge to drive the motor in a forward direction.
When "MOTOR ON" is switched off, the H-bridge will be switched into its braked condition; i.e. both motor terminals are connected to 0 Volts. This will discharge the stored energy in the motor and ensure that the motor stops in the shortest time possible.

3.2 Coin jam detection and clearing

The control board monitors the current being drawn by the motor while it is running. A coin jam will cause a significant increase in motor current. If such an event occurs, the hopper sends a jam signal to the host machine (see Figure 1). The motor will then be braked for a short time, run in the reverse direction for a fixed period, then braked again before resuming running in the forward direction. If the jam fails to clear, the motor will continue to run forwards and backwards either, for 5.5 seconds (version 2 software), or 15 reverse cycles, (version 3 software).

Nb: There is a label on the processor which identifies the issue of software:
Version 1 = PRG/059-1
Version 2 = PRG/059-2
Version 3 = PRG/059-3

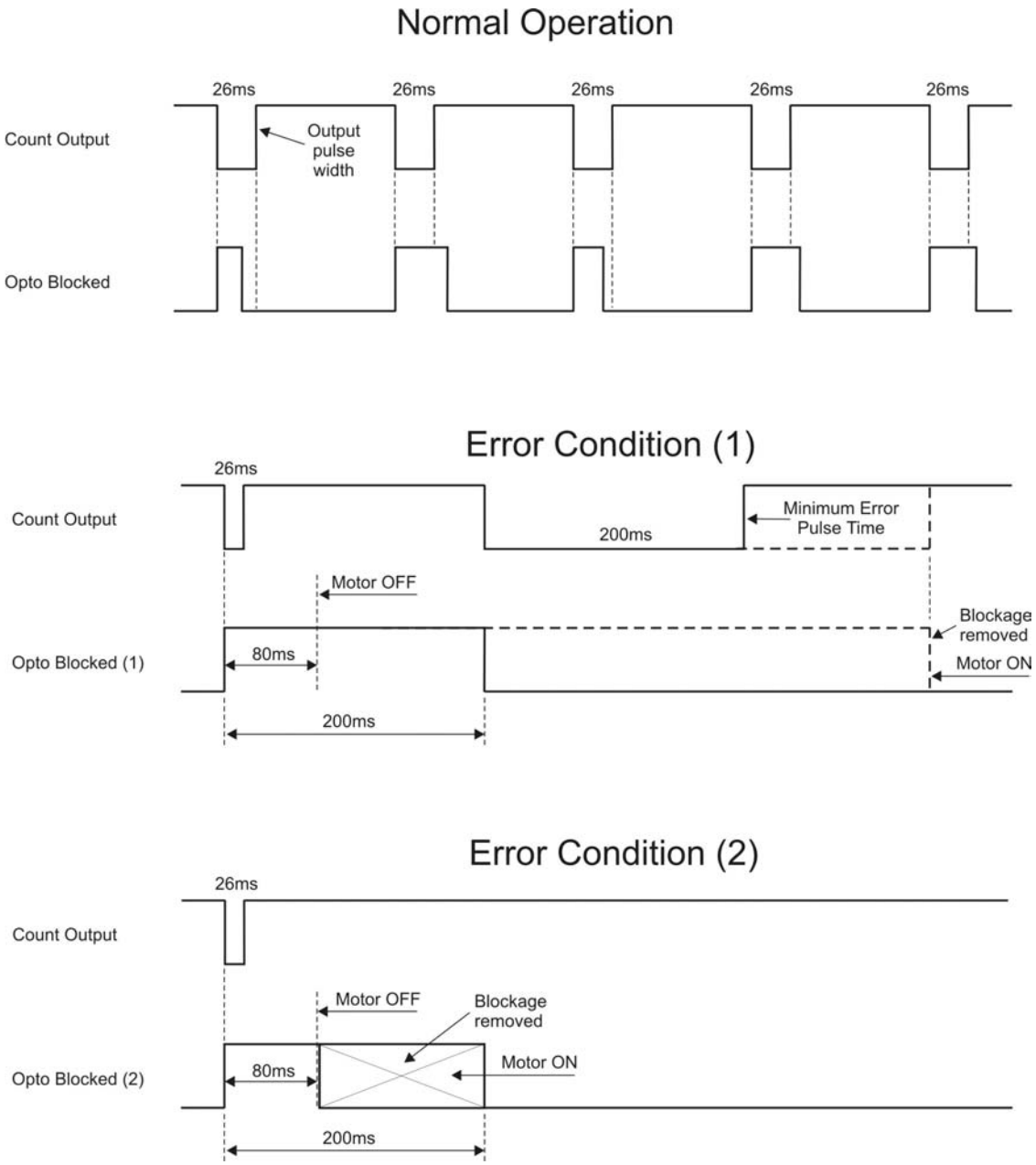
3.3 Coin counting

An optical sensor is used to detect coins as they leave the hopper. An LED generates a light beam across the coin exit path. The light is detected by a phototransistor. The coin counting circuit monitors the phototransistor and activates the signal "COUNT OUTPUT", whenever the light beam is blocked by a coin. In normal operation, the software, in the processor, creates a fixed duration pulse (see section 4.3 “Output pulse width”), regardless of the actual time that the coin blocks the light path.
The output signal is generated via an open-collector transistor and is active low, i.e. normally the transistor is switched off, and the output is at + Volts. The transistor will switch on for the duration of a coin pulse, see Figure 1.

3.4 Opto sensor security

The microprocessor performs two checks on the opto sensors in order to check that coins are being counted correctly. The LED is turned off for a short period, before the motor is set running, and the phototransistor is monitored for a corresponding change in state. The motor will not be started if the correct response is not received. This test is also performed periodically during a coin payout operation.
Also an extra COUNT OUTPUT signal will be generated, with a duration of at least 200ms, to indicate to the host machine that an error has occurred. The time that a coin blocks the opto is measured and if the opto should remain blocked for more than a pre-defined maximum period (see section 4.3 “Max. Opto blocked time”), the motor will be stopped. The error signal will be removed when the blockage/error is cleared and the motor will be re-started providing the “MOTOR ON” signal is still active.

Figure 1: Timing Diagrams



4. Electrical Specification

4.1 Power requirements

DC input voltage	24 Volts DC +/- 10%
Current	4.0 Amp peak – motor start/reverse. 500mA nominal – motor running (no coins).

4.2 Input/output signals

4.21 MOTOR ON

Can be driven from an open collector transistor.

Motor On	< 1.0 Volts DC @ 0.5 mA
Motor Off	> 4.0 Volts DC

4.22 COUNT OUTPUT

NPN open collector transistor

No coin	30 Volts DC maximum
Coin present	< 0.6 Volts DC @ 50 mA maximum

4.3 Timings

Reversing time	300 ms – typical
Braking time	50 ms – typical (during reverse)
Output pulse width	26 ms, +/- 2 ms
Max. Opto blocked time	80 ms – typical
Min. error pulse time	200 ms
Max. error pulse time	As long as error condition is true

5. Connector Details

5.1 Connector Type

25 way AMP Metrimate – part No. 211149-1, plus crimps 066180-1 and 164161-3

5.2 Pin-outs

Table 1: Pin-outs

Amp Pin No	Function	Wire Colour
1	Hopper Full	Red
4	Motor On	Red
7	Count Output	Blue
12	+24V	Grey
25	0V / Level Common	Black

6. WMS Bowl Capacities

Table 2: WMS Bowl Capacities

Coin	Capacity
U.S. 5c coin	3,700
U.S. 25c coin	3,000
U.S. 50c coin	1,500
$1 Token	850

7. 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. Remove the top left hand M6 x 16 poz pan head screw and 5mm long metal spacers. Remove the top right hand M6 x 30 poz pan head screw, 26 long metal spacer and coloured spacer.
The bowl can then be lifted off the bottom two M6 x 25 shoulder screws.

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

iv. Disconnect the opto loom (item 32 Figure 3) from the control PCB.

v. Remove the 2 x M6[2] screws, which hold the bridge plate[3] in place.

vi. Lift the bridge clear of the disk.

vii. Using a soft brush, 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 **– SEE** Appendix 1 (Fitting the Bridge Plate).

ix. Re-assemble the opto loom, bowl and level sensors, making sure that the bowl spacers are replaced in the original positions as shown on the bowl label (item 38 Figure 3). Ensure that the screws are tightened to the correct torque's (where specified) see Figure 2.

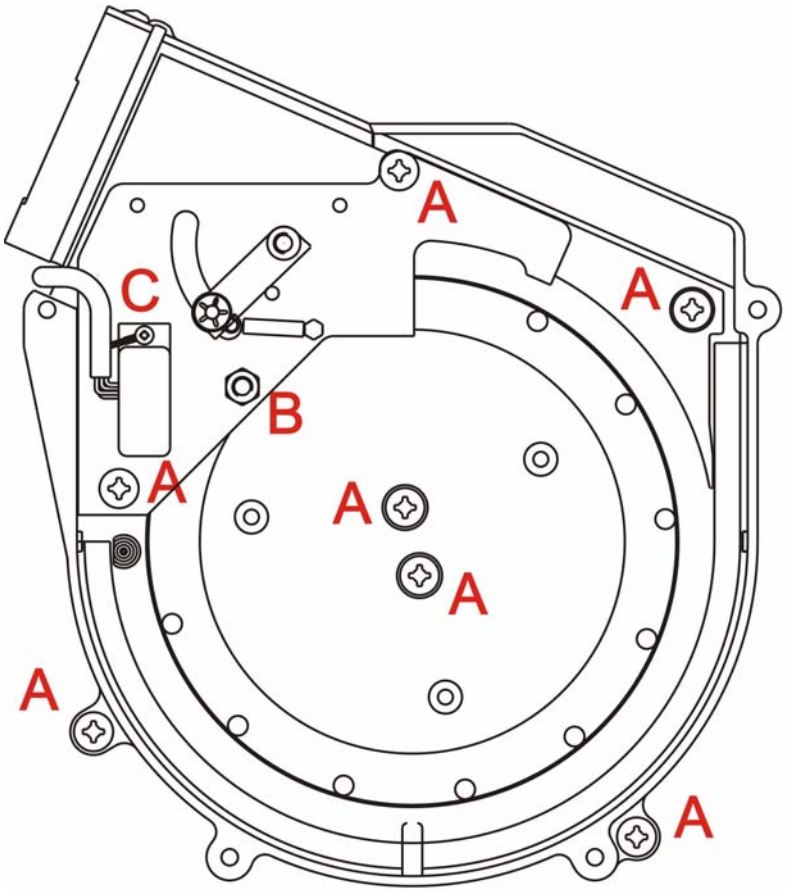
[1]. See Figure 3– screws 12 and 30.

[2]. See Figure 3– screws 9 and 7.

[3]. See Figure 3 – Bridge Plate assembly – item 6.

Figure 2: Torque Settings

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

8. Exploded Drawings

Figure 3: Exploded Drawing and parts list – Bowl and disk assembly

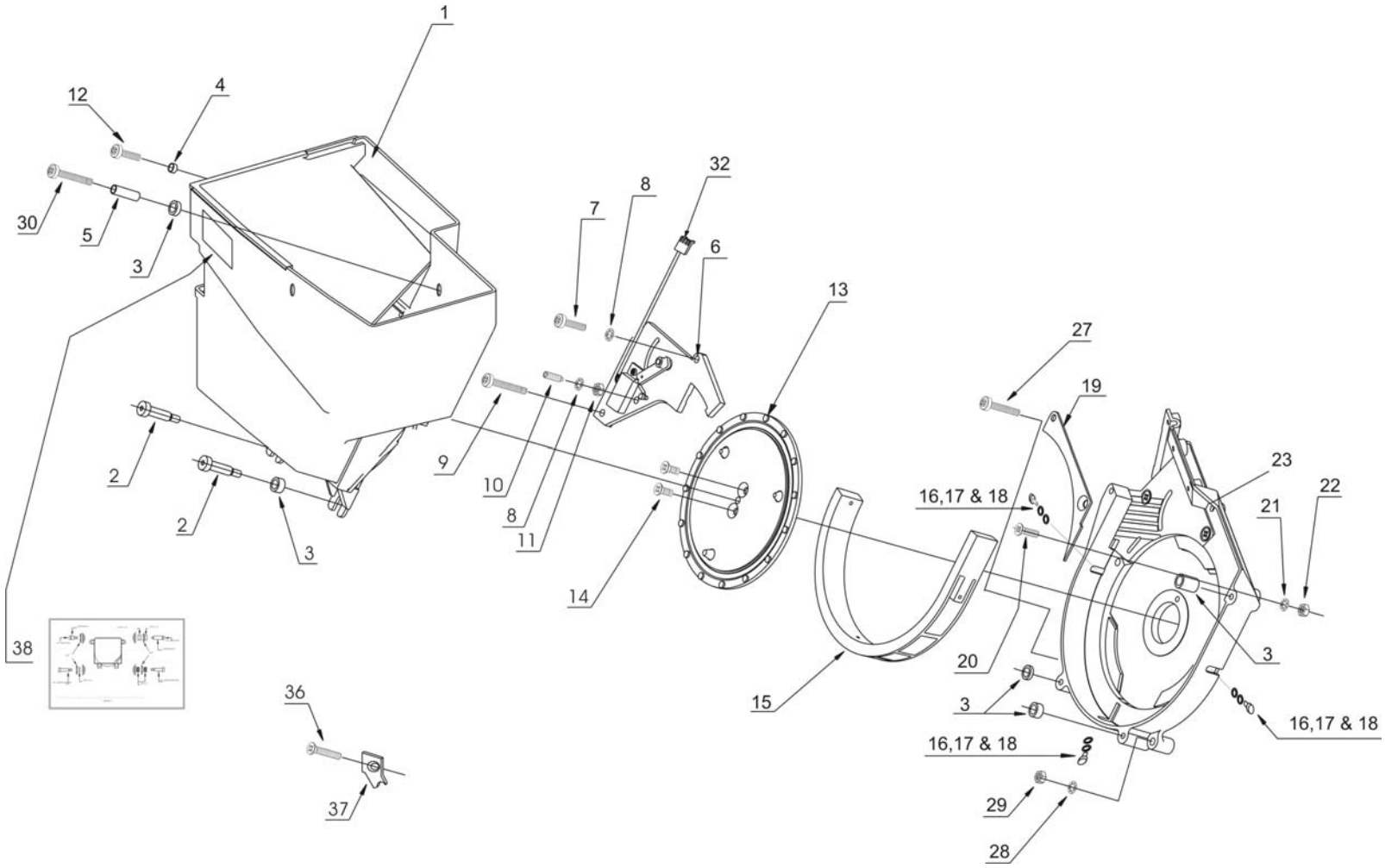
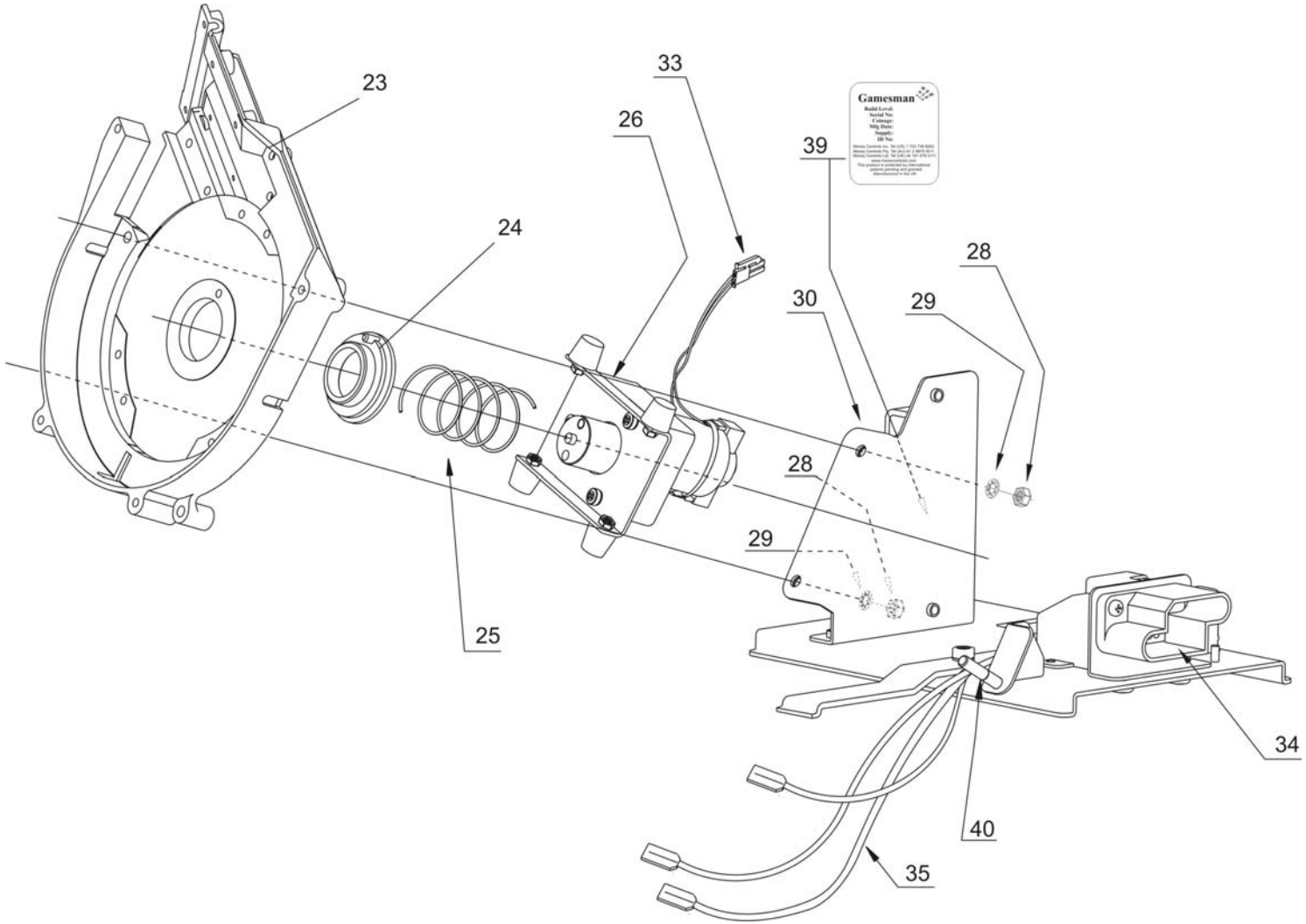


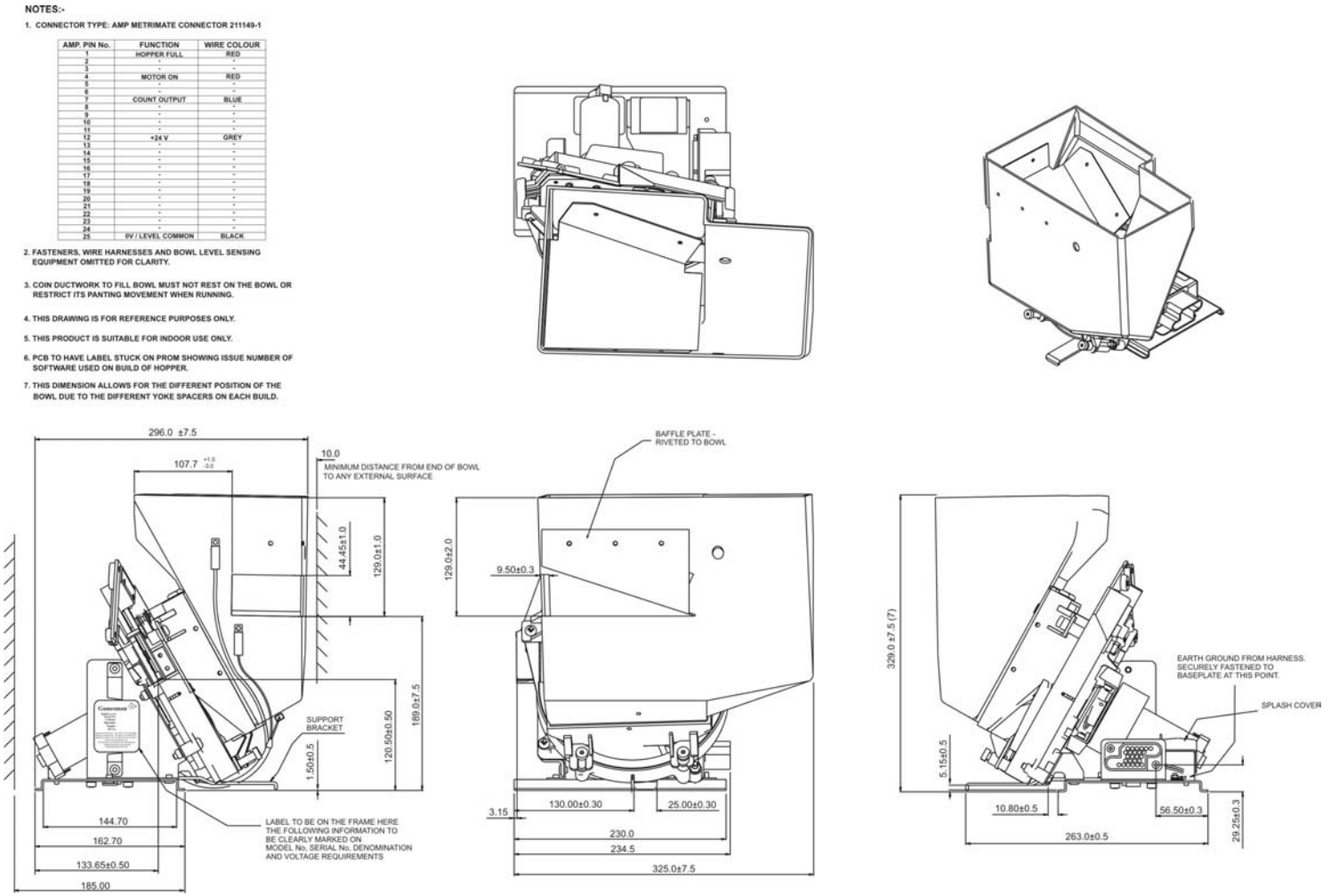
Figure 4: Exploded Drawing – Motor, frame and base assembly



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	Spacer 1	MER/280	
5	Spacer 2	MER/281	
6	Bridge Plate Unit		Coin/Token Dependent
7	M6 x 20 Pozi pan screw	HSC/363	
8	6mm Shakeproof Washer	HWA/037	
9	M6 x 35 Pozi pan screw	HSC/369	Coin/Token Dependent
10	M6 x 16 dog point screw	HSC/750	
11	M6 Hex Nut	HNT/026	
12	M6 x 20 Pozi Pan Screw	HSC/363	
13	Disc Unit		Coin/Token Dependent
14	M6 x 16 Pozi c/sk Anu-Lok Screw	HSC/389	
15	Horseshoe		Coin/Token Dependent
16	M4 Pozi pan screw	HSC/140	Coin/Token Dependent
17	4mm Washer	HWA/012	Coin/Token Dependent
18	4mm Shakeproof Washer	HWA/026	Coin/Token Dependent
19	Wiper Spacer		Coin/Token Dependent
20	M6 x 20 Pozi c/sk screw	HSC/390	
21	6mm Shakeproof Washer	HWA/037	
22	M6 Hex Nut	HNT/026	
23	Housing Unit	SUB/3492	
24	Rotary Bearing	PBL/620	
25	Spring	SPR/030	
26	Drive Assembly	SUB/4452	
27	M6 x 30 Pozi pan screw	HSC/361	
28	M6 Hex Nut	HNT/026	
29	6mm Shakeproof Washer	HWA/037	
30	Frame Assembly	SUB/3479	
31			
32	Opto Assembly	SUB/2660	This item is part of the Bridge Plate Unit.
33	Motor Loom		Ref. Only this item is Part of Main Harness
34	Main Harness	WMH/333	
35	Level Sense Wires		Ref. Only this item is Part of Main Harness
36	M6 x 35 Pozi c/sk screw	HSC/718	Coin/Token Dependent
37	Filler Pieces Extension	MER/169	Coin/Token Dependent
38	Yoke Colour Spacers Label		Coin/Token Dependent
39	Hopper Label	TPL/010	Coin/Token Dependent
40	M6 x 30 Hex Head Bolt	HSC/409	

9. Overall Dimensions

Figure 5: Overall Dimensions



10. Spare Parts

Table 3: Recommended Spare Parts

Item No	Part No	Description	No off	Config No
	MER/287	Support Bracket 2	1	SGPGMGXX00149
	SUB/4475	Control Board	1	GP2SPSXX00020
26	SUB/4452	Drive Assembly 4	1	SGPGMGXX00216
32	SUB/2660	Opto PCB Assembly	1	SGPGMGXX00148
30	MER/274	Frame No11	1	GP2SPSXX00025
40	HSC/409	Hex Head Bolt	1	SGPGMGXX00218

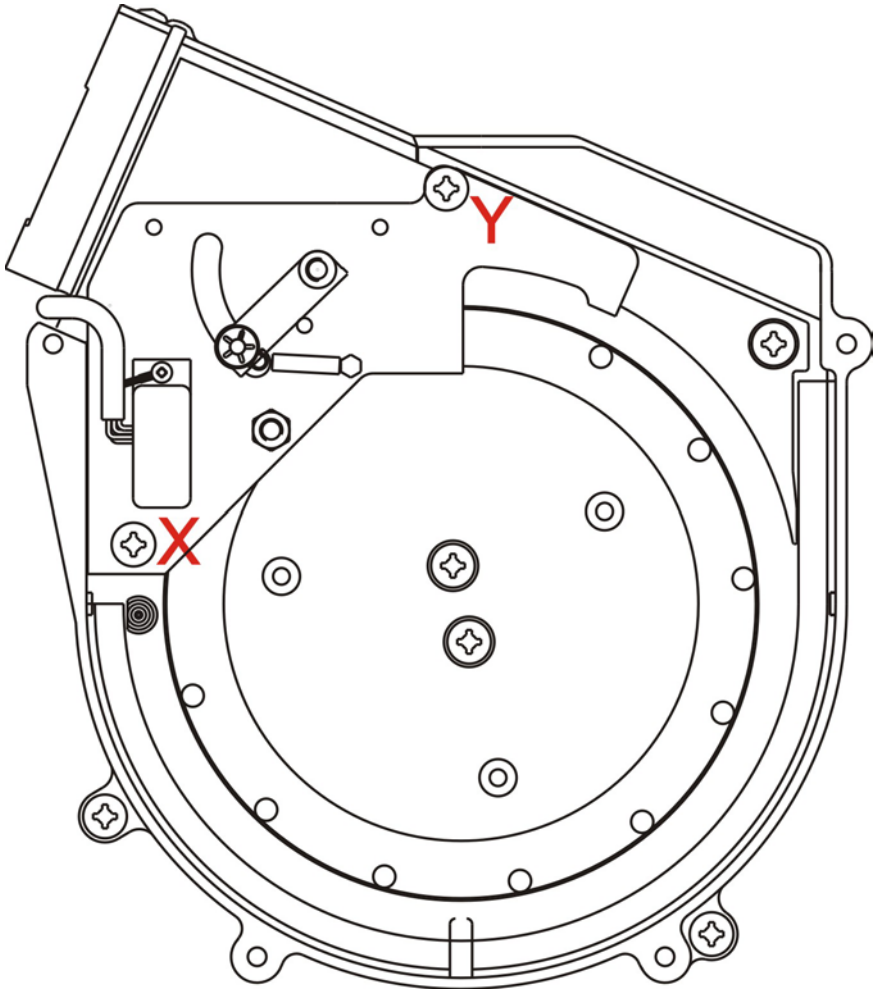
Appendix 1 (Fitting the Bridge Plate).

1. When fitting the Bridge plate to the housing, insert screws X & Y and HAND TIGHTEN.

2. Tighten the BOTTOM screw X to the torque settings shown in Figure 2: Torque Settings.

3. Tighten the TOP screw Y to the torque settings shown in Figure 2: Torque Settings.

Failure to follow the above steps may result in incorrect operation.



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