

ANGEL™

OPERATORS MANUAL

W A R N I N G

The Angel is not a toy. Misuse / Careless use may cause serious injury or death. Industry standard head / face / and eye protection designed specifically for paintball use must be worn by user and any persons within 200 yards (183 meters). Must be at least 18 years old to purchase. Observe all local applicable laws regarding air powered markers. For use on professionally operated paintball fields where codes of safety are enforced. The Angel is designed to work with compressed air or nitrogen only. Do NOT USE CO₂. Use .68 caliber paintballs only. Read and understand Operation Manual before using. Observe strictly this warning and all warnings and safety rules within the manual.

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Rules for safe Marker handling

- **Treat every marker as if it were loaded.**
- **Insert barrel bung when not in use.**
- **Always remove gas source when not in use.**
- **NOTE: The Angel™ can hold a small gas charge, typically 2 shots. With the gas source removed, fire to remove this surplus gas.**
- **Ensure isolator switch is "off" when not in use.**
- **Only use 0.68" calibre paintballs.**
- **Never use CO2 as a propellant / gas source.**
- **Never shoot at velocities in excess of 300 FPS / 91.44 MS.**
- **Always wear approved eye, face and ear protection designed for paintball use.**
- **Never discharge the marker at persons not wearing protection.**
- **Only use the marker on fields approved for paintball games.**
- **Never put high pressure air directly against your skin.**

Operating Instructions: Charging

(See Figure 1)

Before initial use of the Angel™, it is necessary to give the power pack a full charging cycle of 14 hours prior to use as this will ensure the longevity of the power pack. Subsequent charges will be in the region of 3 hours for full charge.

Stage 1

Insert cigar lighter into a 13.8v negative earth socket as found in most motor vehicles (red light on charger will illuminate).

Stage 2

Ensure isolator switch on the Angel™ is in the forward position towards the barrel. (No charging can occur until this switch is in the forward position).

Stage 3

Insert remote plug from charger into the socket on the rear of the Angel™ (See Figure 2).

Warning

Care must be shown with the charger to ensure the remote plug is not pulled or twisted by the lead.

Shortening this lead can result in damage to your markers electronics.

Stage 4

The LED on the charger will indicate the status of the charging cycle on the Angel™.

- 1. NO LED:** power at cigar socket not present! Switch ignition on
- 2. DIM RED LED:** isolator switch on Angel™ is on ! Switch isolator off
- 3. BRIGHT RED LED FLASHING:** indicates battery conditioning from totally discharged battery
- 4. BRIGHT RED LED:** indicates rapid charging occurring
- 5. GREEN LED:** indicates trickle charging occurring, battery achieved 30% capacity

NOTE: The Angel™ may be left charging for prolonged periods without damage occurring to the battery pack.

Stage 5

Unplug the female socket from the Angel™.



Figure 1

Operating Instructions: Propellant Air/Nitrogen Supply

- **Ensure the Angel™ is switched off prior to commencing.**
- **Ensure gas isolator green button "off" is fully depressed.**
- **Ensure barrel bung is fitted.**
- **Ensure eye protection is worn.**
- **Adhere strictly to all warnings.**
- **Ensure only air / nitrogen is used.**
- **Ensure suitable regulator is used intended for a paintball marker.**

The Angel™ marker is designed to be operated on air or nitrogen only. This needs to be supplied to the Angel™ at a regulated pressure of 800 - 850 psi (55-59BAR). This can be achieved by the use of a suitable regulator such as the Govnair™.

Connection can be made by connecting the regulator gas outlet to the Angel™ front grip using the connector supplied a suitable 1/8 BSP connector. If using the Mamba Micro Line™ as supplied, the fittings may be removed by pulling back the collet to release the hose then shorten the hose to the length required before refitting. Alternatively, the Mamba™ remote hose may be fitted into the collet.

Operating Instructions: Gassing Up the Angel

(See Figure 3)

Stage 1

Ensure the gas isolator green button "off" is pressed fully home.

Stage 2

Switch on your regulated gas supply

Stage 3

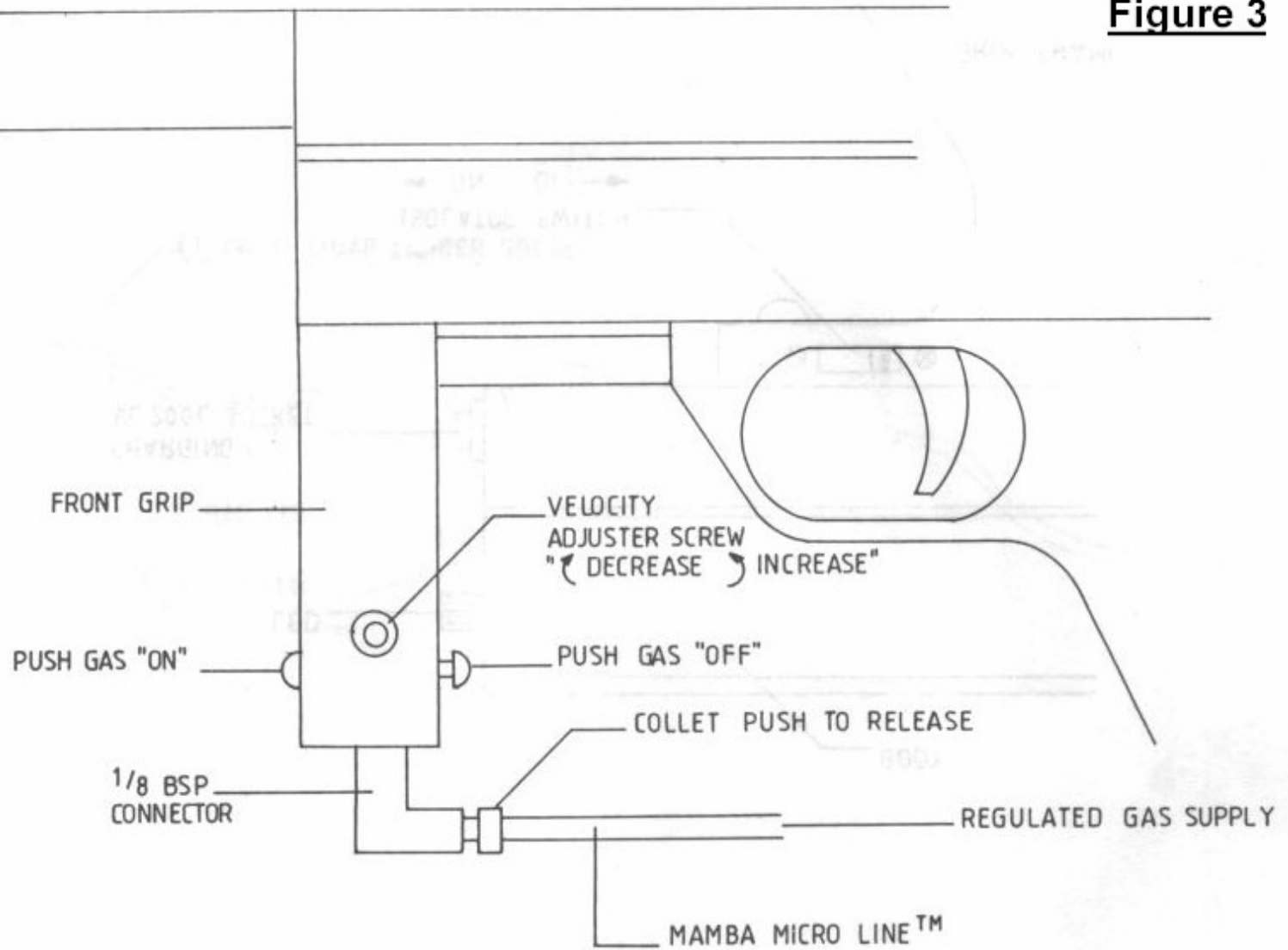
Press home the gas isolator red button "on".

NOTES

The gas isolator button must always be fully depressed. If pressed half way gas will be emitted around the buttons which may be done to bleed your gas supply system prior to disconnection.

WARNING - The Angel™ will hold sufficient gas for 2 shots after isolation.

Figure 3



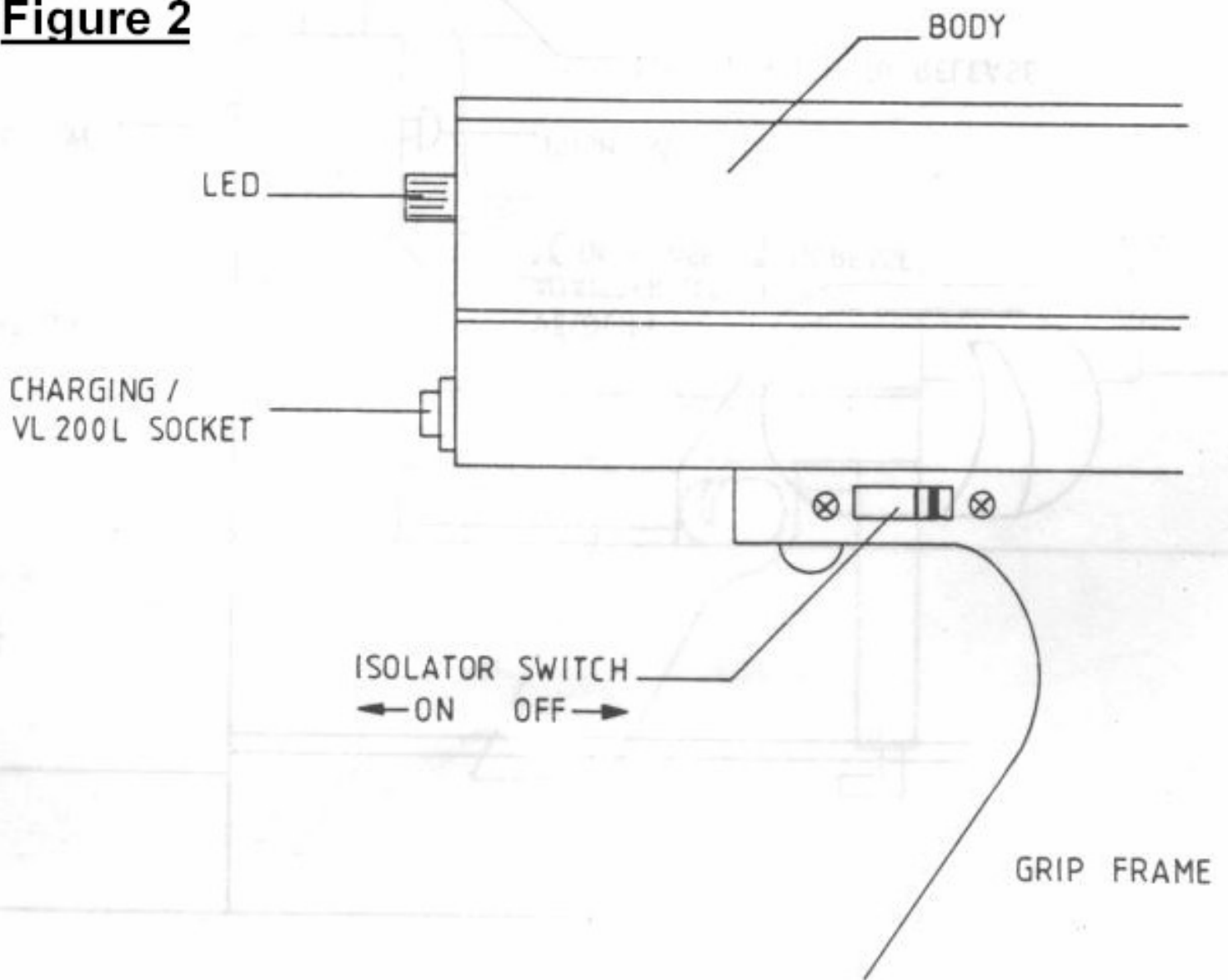
Operating Instructions: Switching the Angel - On

(See Figure 2)

The electrical isolator/safety switch may now be switched "on" toward the rear of the marker. A green LED will illuminate on the rear of marker.

WARNING - Adhere strictly to all safety warnings the Angel™ is now in an armed state.

Figure 2



Fitting the Hopper VL2001 Intelifeed™ Optional Extra Patents Applied for

(See Figure 4)

The Angel™ has the ability to power the VL2001 Viewloader™ with the agitation and electrical supply coming from the Angel™ direct. This Intelifeed™ system monitors your fire rate and switches on the agitator as necessary. This hopper will feed 40% faster than a standard shredder hopper.

Stage 1

Fit elbow as supplied to the Angel™.

Stage 2

Fit Viewloader VL2001 to the elbow as supplied.

Stage 3

Plug the female socket into the rear of the Angel™ plug.

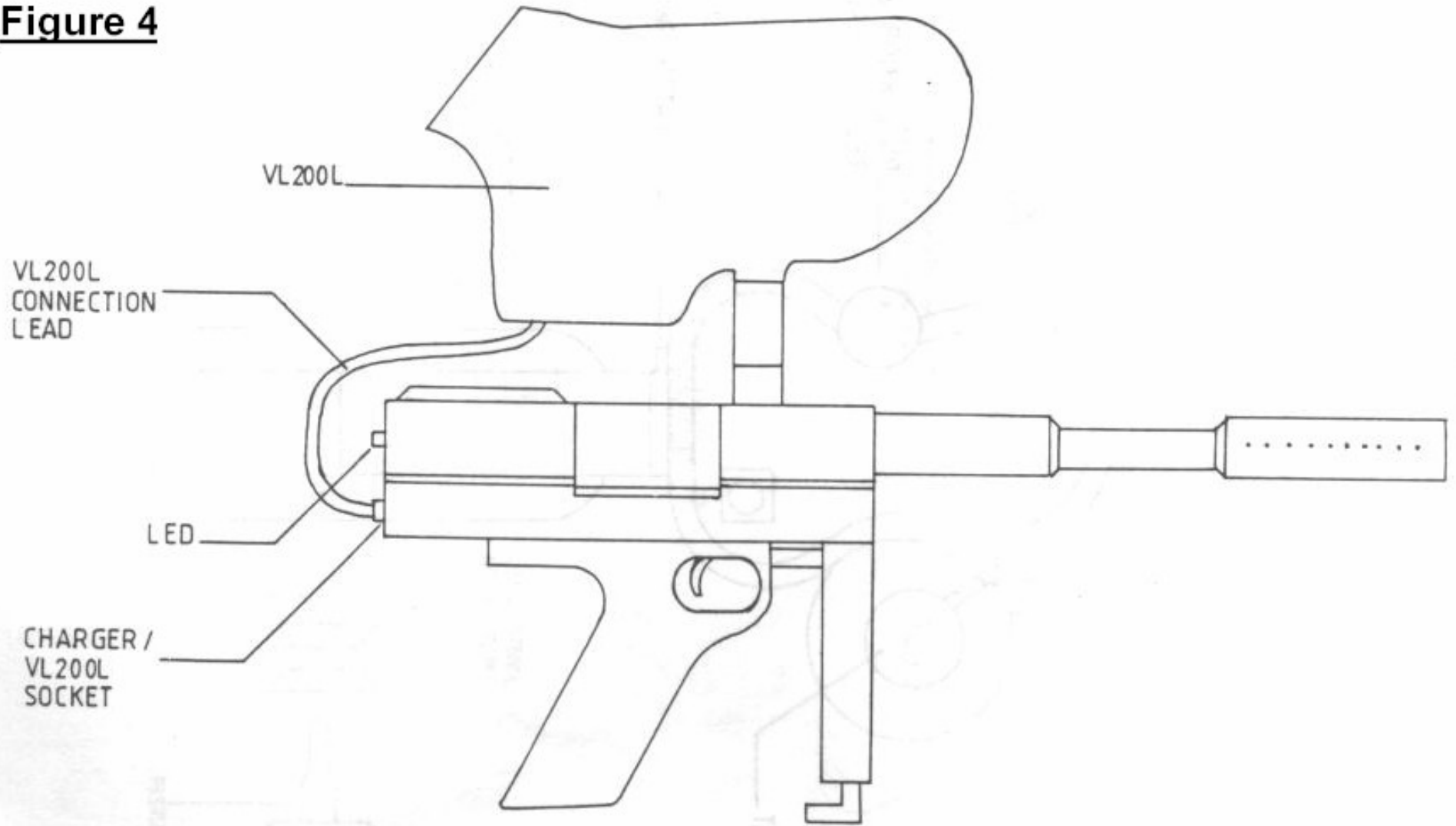
Stage 4

Switch electrical isolator "on". The agitator will agitate for 2 seconds, then stop.

NOTE:

On single shots less than 1 shot per second, the VL2001 will not agitate. On shots greater than 2 shots per second, the VL2001 will agitate for 2 seconds. This cycle will repeat as the trigger is pulled.

Figure 4



Bolt Removal Rotabreech™

(See Figure 5)

Stage 1

Ensure the electrical isolator switch is off. The LED on the rear of the Angel™ will not be illuminated.

Stage 2

Pull the "pull knob" and rotate 90 degrees so that the knob remains in the unlocked position.

Stage 3

Swing the breech block so that the bolt is exposed.

Stage 4

Retract the bolt.

Stage 5

Replace the bolt follow stages in reverse order.

NOTES

- **Caution, do not fire the Angel™ with the breech open or without the bolt in the breech.**
- **Caution, do not fire the Angel™ with the pull knob in the unlocked position.**

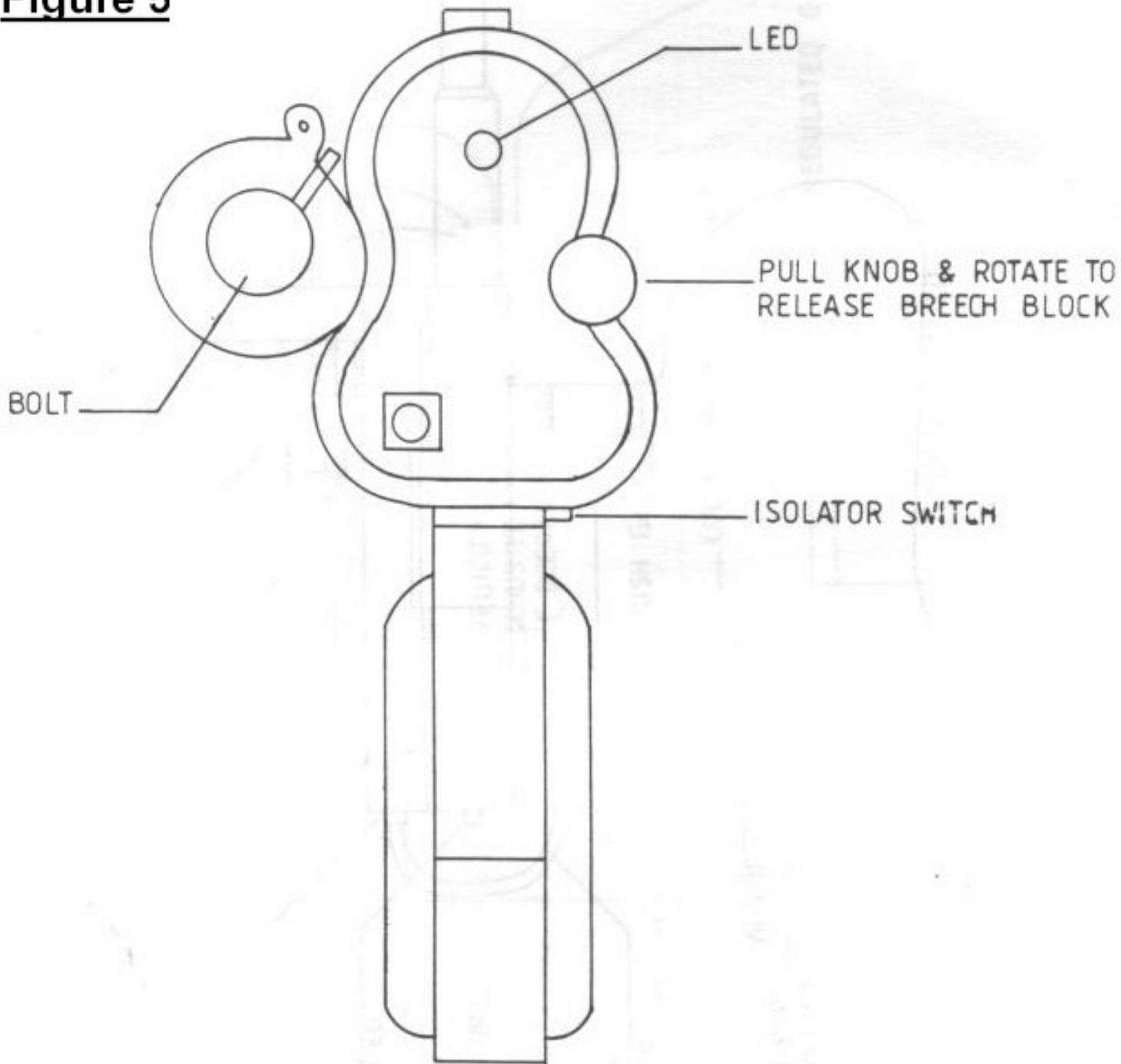
The breech will not open if the bolt is in the forward position, ensure it is retracted by either:

- **momentarily gassing the Angel™**

or

- **pushing the bolt back with a squeegee.**

Figure 5



Velocity Adjustments

(See Figure 3)

Velocity adjustment need to be carried out using a suitable chronograph, the maximum velocity to be set is 300 FPS.

The velocity adjusting screw is located on the front grip. Use a 3 mm A/F allen key to adjust.

Stage 1 - Decrease Velocity

To Decrease velocity, insert the allen key and rotate CLOCKWISE.

Note: when reducing velocity, allow 4 shots for the complete system to be at the new regulated pressure.

Stage 2 - Increase Velocity

To Increase velocity, insert the allen key and rotate ANTI-CLOCKWISE

Electronic Rate of Fire Adjustment

(See Figure 6)

The Angels™ rate of fire is adjustable so that it may be set up to suit your style of play. It is factory set at approximately 10-12 shots per second.

Stage 1

Remove grip cover screws to expose circuit board.

Stage 2 - Decrease rate of fire

Rotate the top pot on the circuit board anticlockwise to reduce the rate of fire. Minimum setting achievable is 6 shots per second.

Stage 3 - Increase rate of fire

Rotate the top pot on the circuit board clockwise to increase the rate of fire, maximum achievable is 15 shots per second. (The best results are achieved when using the Viewloader™ VL2001 Intelifeed™)

NOTE

If you set the rate of fire in excess of what the hopper can feed, you will experience ball chopping, therefore it is advisable to ensure that you adjust the pot in small movements.

The adjustment part should be rotated carefully to ensure damage does not occur to the part.

FIGURE 6

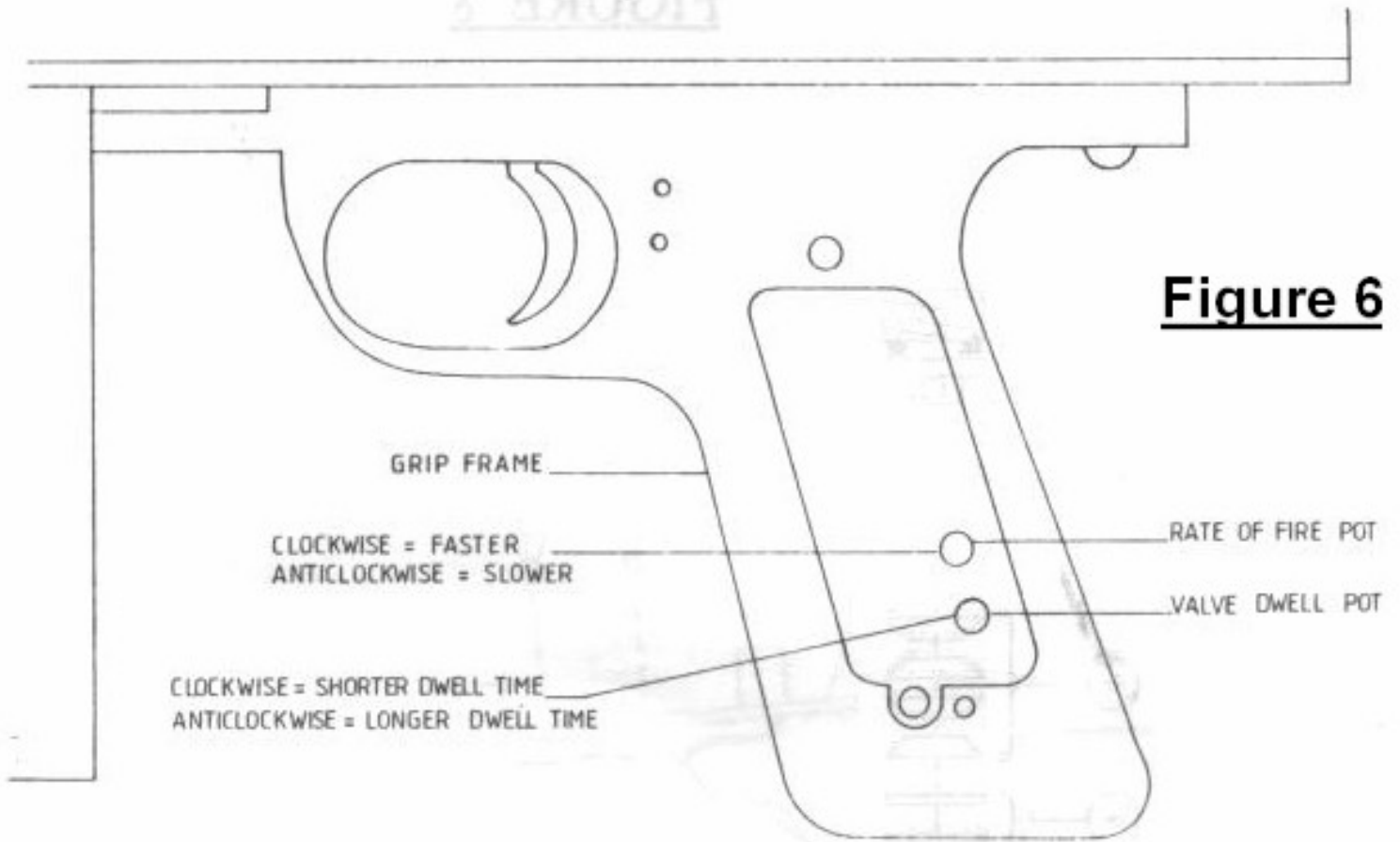


Figure 6

General Care & Cleaning

The Angel™ should be cleaned using a damp cloth only.

No solvents or abrasive cleaning products should be used. All external moving parts should be lubricated using a light oil. The Angel™ should never be immersed into water, otherwise damage may occur to the electronics. The electronics are moisture / damp proof only. Ensure correct tools are used. All thread are metric except gun accessory mountings onto the grip frame which is industry standard 10/32 UNF at centres 3/4".

Low Pressure Regulator (LPR) Adjustment

(See Figure 7)

The low pressure regulator controls the pneumatics cycle of the Angel™ and is located in the left hand chamber in the front of the Angel's™ body. The pressure needs to be at 80-90psi (5.5 - 6.0 BAR) and adjustment is achieved by the addition or removal of shims, each shim equals approximately 3.5psi (0.2 BAR).

Stage 1

Ensure the Angel™ is degassed and the isolator switch is "off".

Stage 2

Remove the end cap.

NOTE: This end is a different design to the battery end cap.

Stage 3

Insert M3 screw into the brass piston and withdraw slowly.

CAUTION: ensure the springs or shims are not lost.

Stage 4

Insert / remove shims as necessary each shim equals approximately 3.5psi (0.2 BAR).

Stage 5

Replace springs in correct order onto the piston.

Stage 6

Re-insert the piston ensuring that it is located correctly and replace end-cap.

Stage 7

Gas up the Angel™ and check pressure.

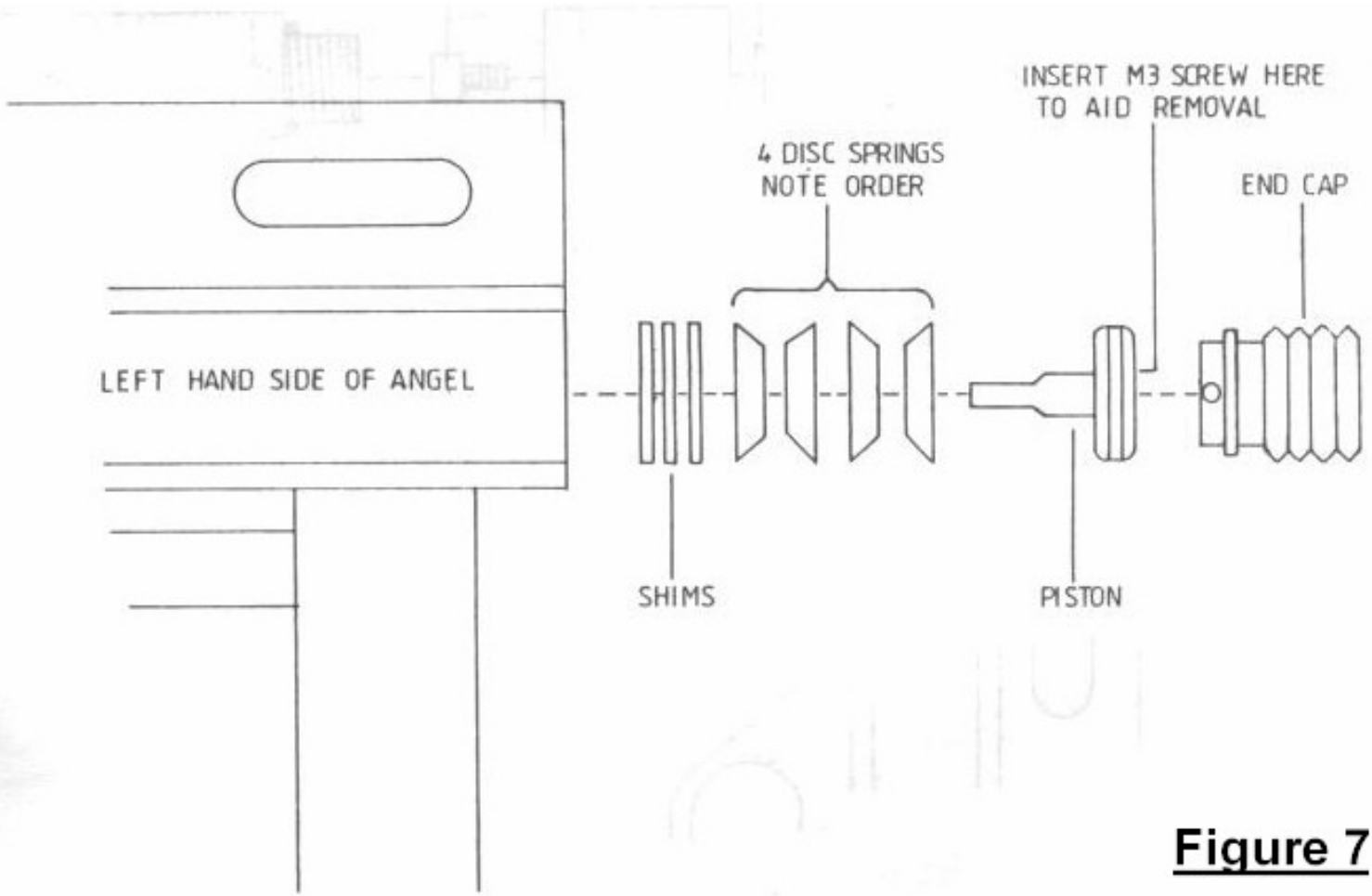


Figure 7

Exhaust Valve Removal

(See Figure 8)

Stage 1

Remove high pressure regulated gas supply.

Stage 2

Remove component in number order as per figure 8.

Item 1

Unscrew mini reg.

Item 2

Use metric allen key to remove screw.

Item 3

Slide flash tank forward.

Item 4

Remove "O" ring.

Item 5

Pull pin out.

Item 6, 7, 8, 9

Remove as per low pressure regulator (LPR) adjustment instructions.

Item 10

Using a suitable pick, slowly retract LPR. Care must be taken so that the bore or seals are not damaged.

Item 11

Remove valve spring.

Item 12

Remove exhaust valve.

Stage 3

Re-assembly of components - important notes.

Item 12

Ensure exhaust valve is located in exhaust body within the Angel™.

Item 11

Ensure the spring is located on to item 12.

Item 10

Ensure the hole for item 5 is in the correct orientation prior to refitting

Item 8

Ensure the springs are in the right order.

Item 5

Ensure the pin locates into the hole in item 10.

Item 5

Ensure O ring is present when item 3 is replaced.

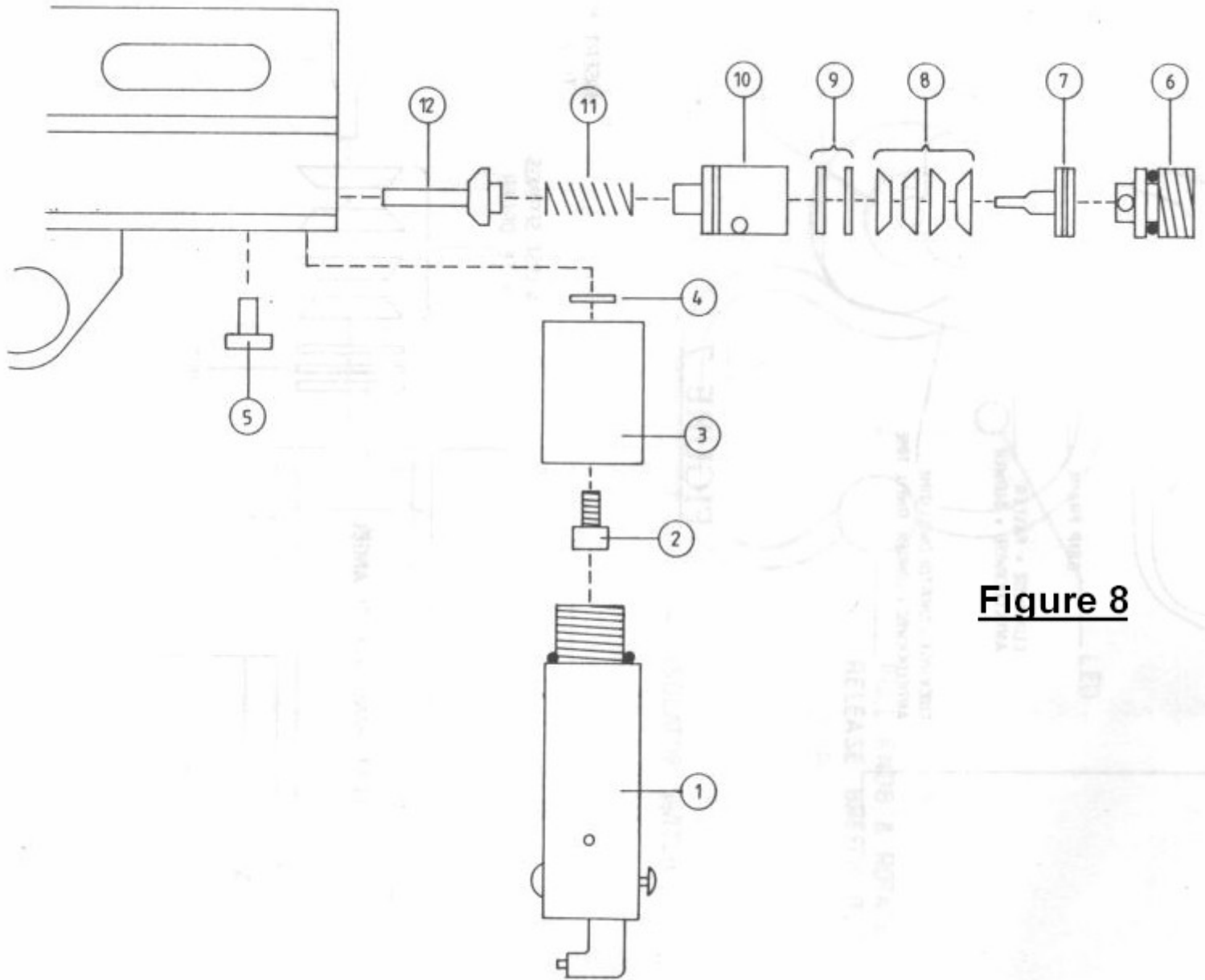


Figure 8

RAM Stroke Adjustment Patents Applied For

(See Figure 9)

Stage 1 See [Figure 2](#) and [Figure 3](#)

- **Ensure the gas supply is isolated.**
- **Ensure the electrical isolator switch is off.**
- **Ensure bolt is fully retracted.**

Stage 2

Remove components 1-5.

Item 1

Remove by gently pulling and unscrewing anti-clockwise.

Item 2

Remove screws using suitable metric allen key.

Item 3

Carefully lift item 3 as wires are attached. Care must be taken so that they are not pulled or trapped during maintenance.

Item 4/5

Retract lock pin and spring.

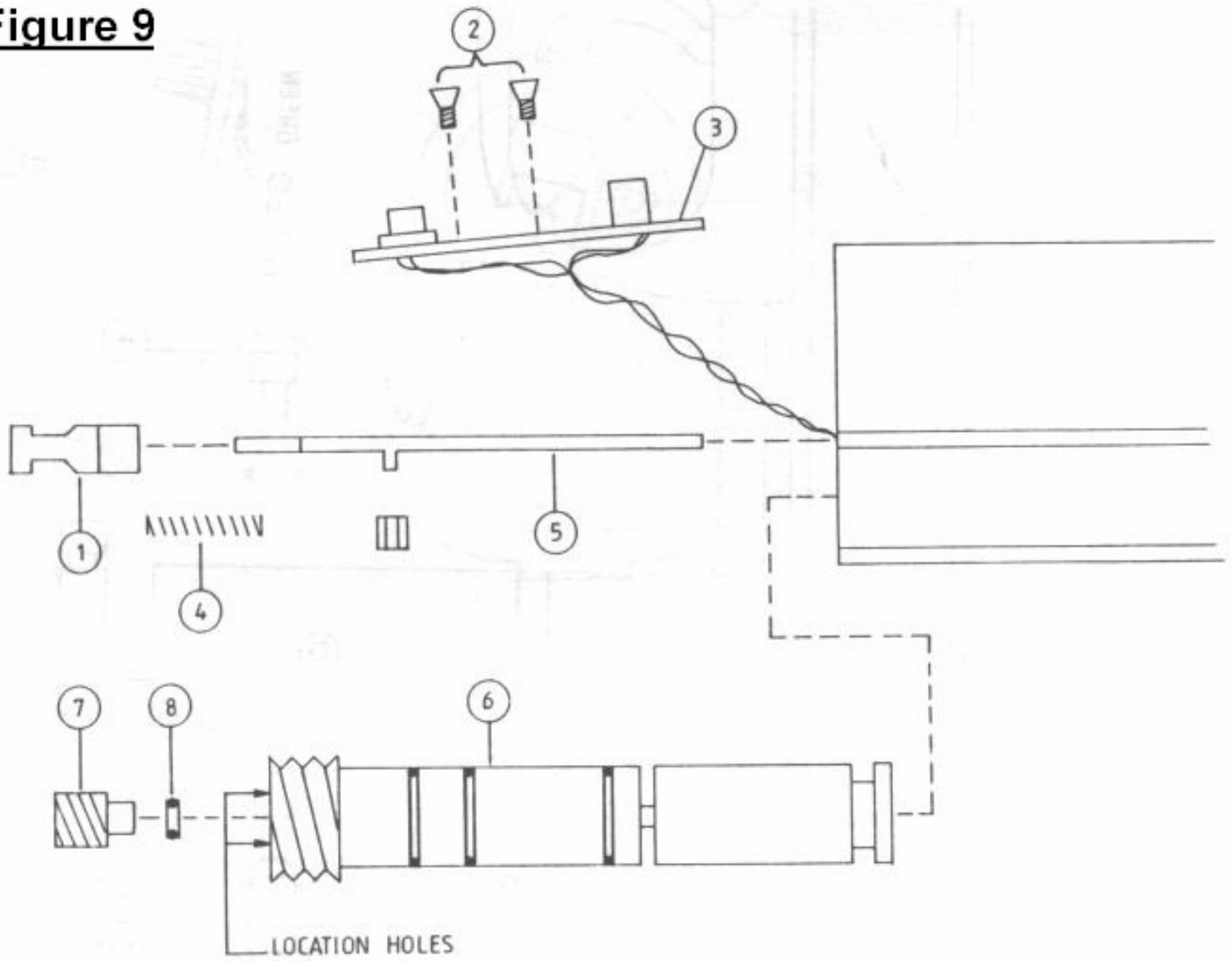
Stage 3

Using circlip pliers rotate ram / hammer item 6 clockwise until slight resistance is felt in opening the breech / bolt. If rotated too far the breech will not open so rotate anti-clockwise and repeat operation. Note the ram is always set by rotating item 6 clockwise.

Stage 4

- **Replace components in order 5 - 1.**
- **Ensure that no wires become trapped.**
- **Ensure that item 1 is screwed on so that when the pull knob is in the open position, the breech can open.**

Figure 9



RAM Snap Ring Adjustment / Replacement Patents Applied For

(See Figure 9)

Stage 1

Follow ram stroke adjustment procedure for disassembly and access.

Stage 2

Item 7

Remove snap ring nut using suitable metric allen key. Ensure that item 6 does not move by holding in place with circlip pliers.

Item 8

Remove with suitable pick, replace if worn or damaged.

Stage 3

Replace item 5, locking the breech/bolt in place.

Stage 4

Replace item 7 ensuring the ram/hammer assembly item 6 does not rotate (secure using circlip pliers) until slight resistance is felt.

Stage 5

Gas up the Angel™ and switch the electrical isolator switch on (See Figure 2 and Figure 3).

Stage 6

WARNING! - Adhere strictly to all safety instructions

Fire the Angel™ while rotating item 7 clockwise until the Angel™ ceases to fire, now rotate item 7 anticlockwise 1/4 of a turn and check the Angel™ to ensure it fires.

Stage 7

Replace the remaining parts as per ram stroke adjustment.

NOTE:

Ensure no wire becomes trapped.

Mini Reg On / Off Seal Replacement

(See Figure 10)

Stage 1

Ensure the gas supply is isolated at its source.

Stage 2

Unscrew item 1 from item 2 and retract the parts.

Stage 3

Replace any worn seals on items 3 and 4.

Note

- **item 3 is a hard seal**
- **item 4 is a soft seal**

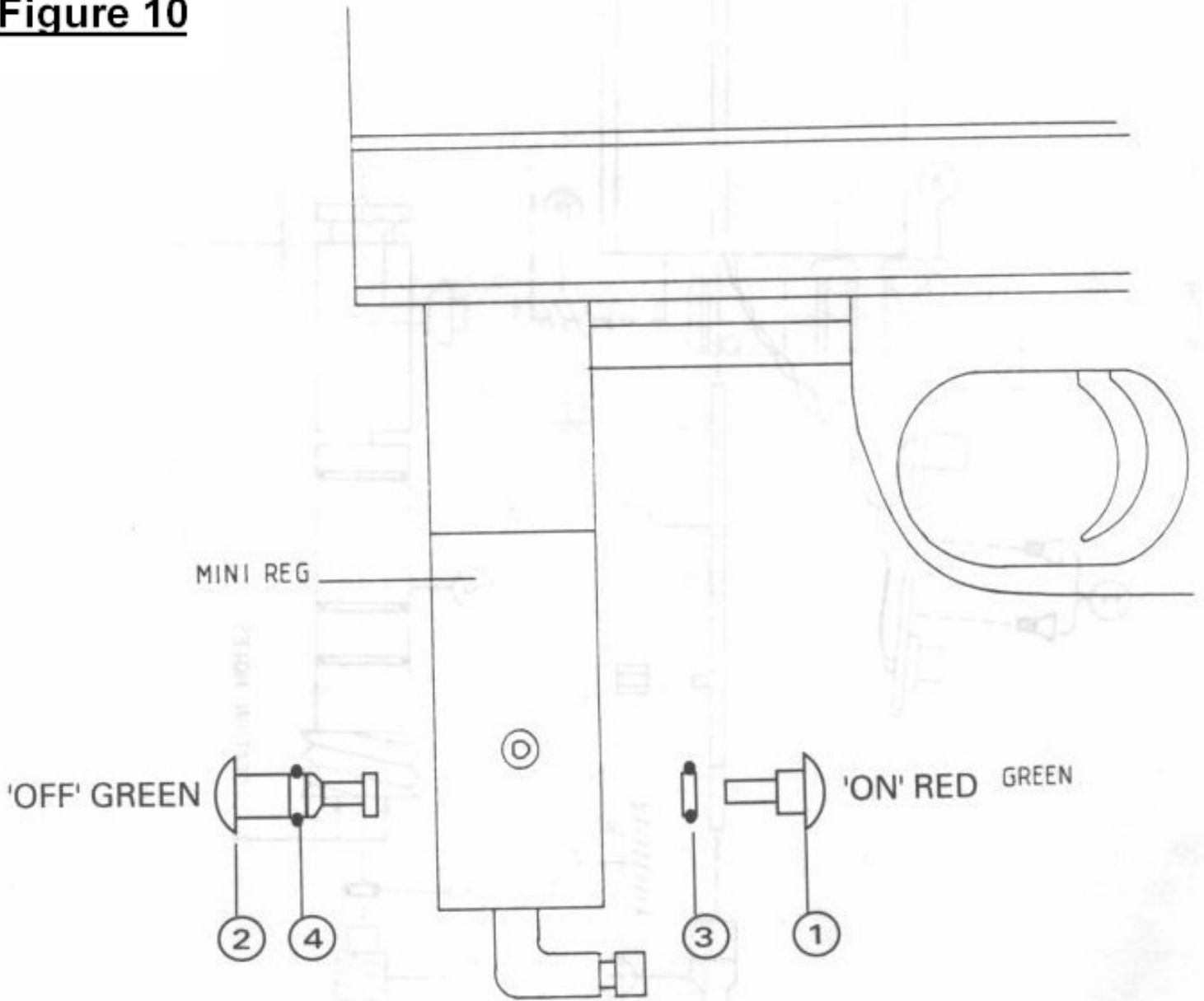
Stage 4

Replace items 4 - 1.

Stage 5

Re-gas system, check for leaks.

Figure 10



Electronic Valve Dwell Adjustment

(See Figure 6)

Stage 1

Remove grip, cover screws to expose circuit board.

Stage 2

Rotate valve dwell pot fully anti clockwise.

Stage 3

Set velocity at 300FPS (See Figure 3)

Stage 4

Rotate valve dwell pot clockwise until velocity starts to fall.

Stage 5

Re-assemble.

Note

The adjustment part should be rotated carefully to ensure damage does not occur to the part

Testing Pneumatics / Electronics

(See Figure 11)

The design of the Angels™ can be divided into 2 elements, which enable you to evaluate where a problem may have occurred. To evaluate the pneumatics follow the procedure listed.

Stage 1

Ensure the Angel™ is switched 'on' and gassed up.

Stage 2

Remove the 2 fixing screws item 1 using suitable metric allen key.

Stage 3

Gently lift off the cover plate item 2 and ensure the wires do not become snagged.

Stage 4

Using a sharp pencil press and hold the orange button item 4. The pneumatics will now operate as all the electronics are bypassed.

Stage 5

On removing the pencil the pneumatics will reset. This shows that pneumatics have functioned correctly.

Stage 6

Ensure the green LED is illuminated at the rear panel point 2.

Note: If gas is emitted from Item 3, this indicates excessive pressure is present. Do not adjust Item 4 as this is a factory set safety valve see LPR pressure adjustment.

Stage 7

Pull the trigger and a red LED item 5 will illuminate momentarily indicating the electronics are functioning correctly.

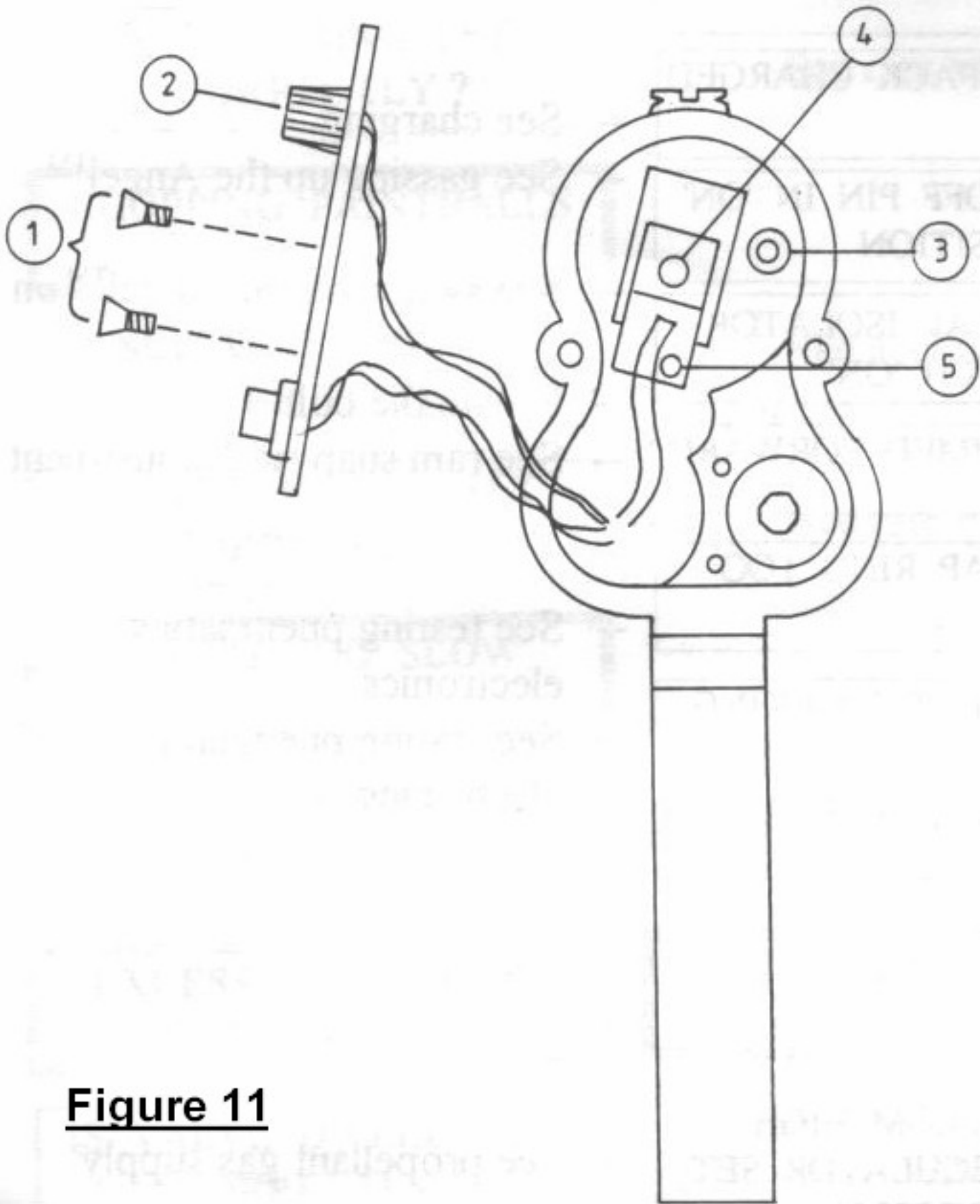
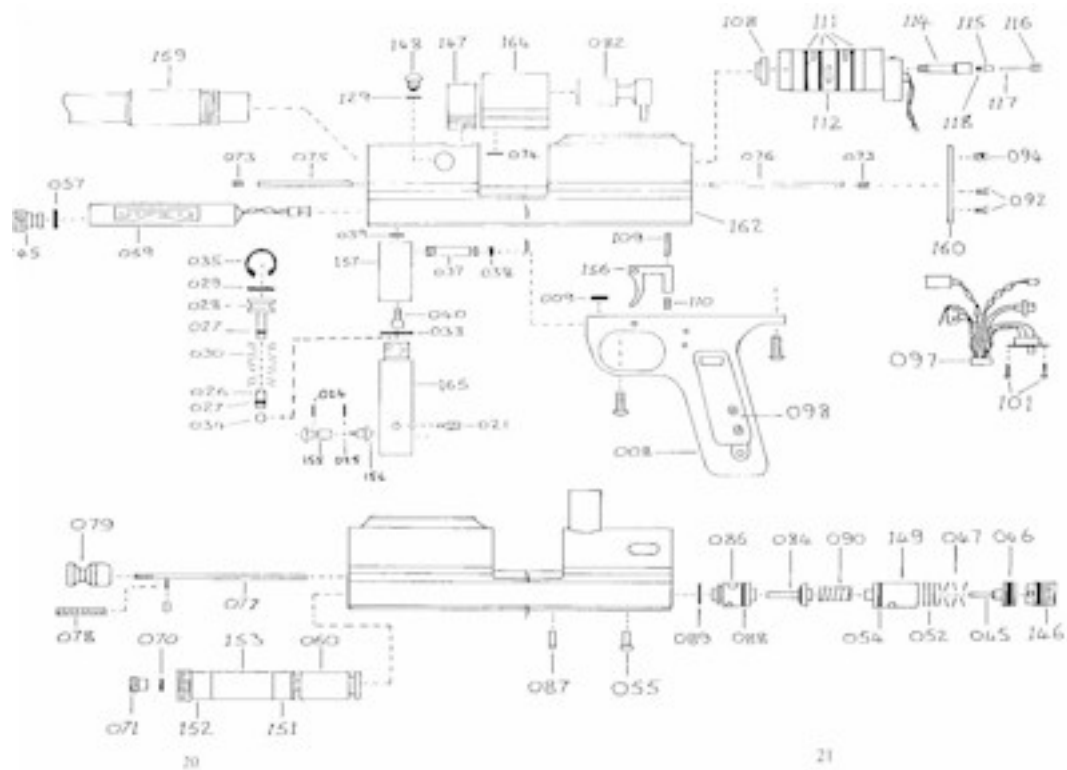


Figure 11

Angel™ Parts Diagram

Click on the picture for a larger version.



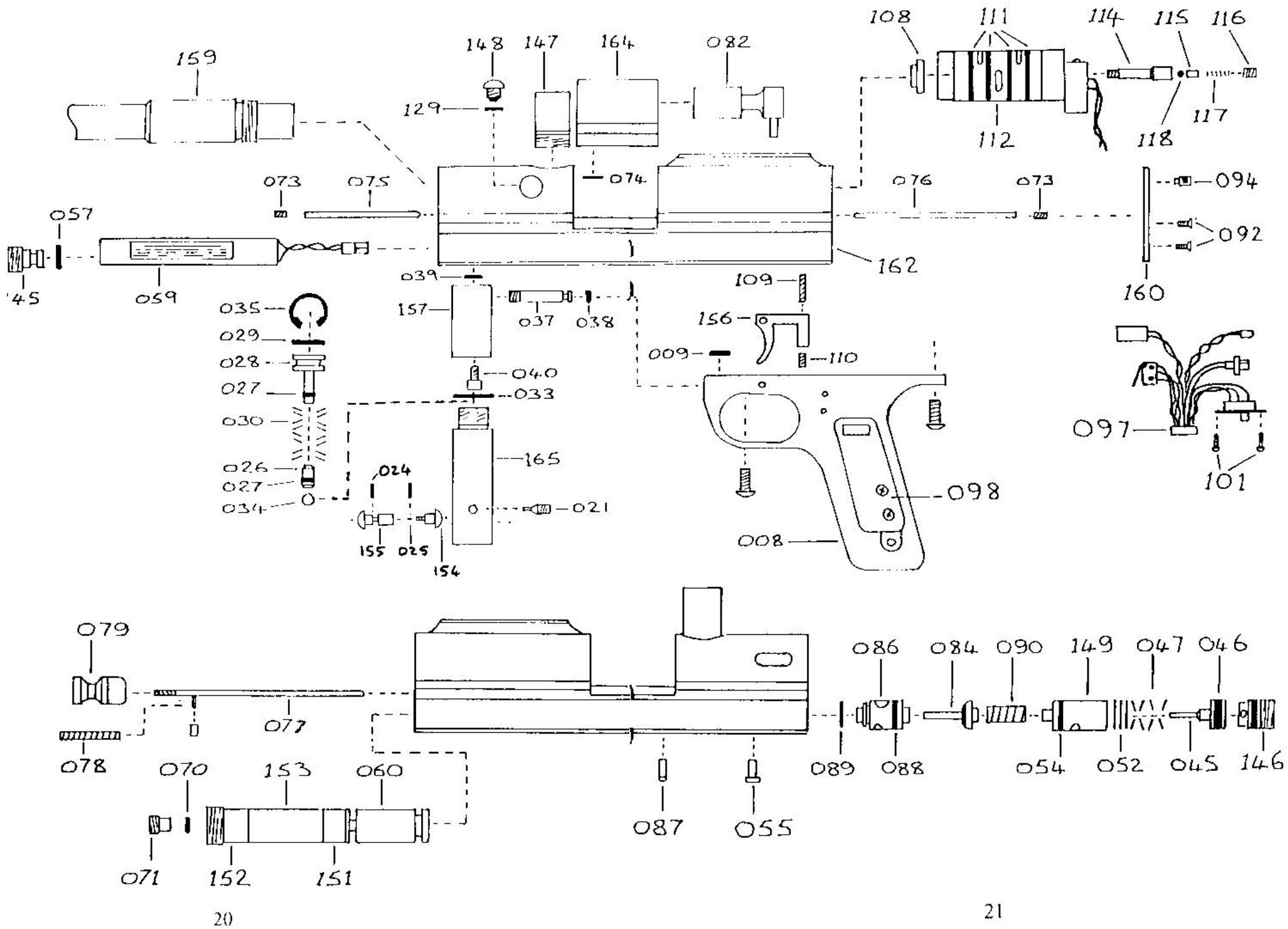
Part No.	Parts Description	Quant. Per Assembly	Part No.	Parts Description	Quant. Per Assembly
AL008	Grip Frame Anodized	1			
AL009	Grip Frame Seal	1	AL088	Exhaust Body Seal (REAR)	1
AL021	Mini Reg Velocity Adj Screw	1	AL089	Exhaust Body Seal (FRONT)	1
AL024	Mini Reg Dump Seal Front 70 S	1	AL090	Exhaust Valve Spring	1
AL025	Mini Reg Seal Rear 90 S	1	AL092	Back Plate Fixing Screws	2
AL026	Mini Reg Adjust Piston	1	AL094	LED Lens	1
			AL097	Wiring Loom	1
			AL098	Circuit Board	1
			AL099	Charger	1
			AL100	Circuit Board Fixing Screw	1

AL027	Mini Reg Adjust Piston Seal	1
AL028	Mini Reg Piston	1
AL029	Mini Reg Large Piston Seal	1
AL030	Mini Reg Spring Stack	10
AL033	Mini Reg to Flash Tank Seal	1
AL034	Mini Reg Ball Bearing	1
AL035	Mini Reg Circlip	1
AL037	Flash Tank Feed Pipe Anodized	1
AL038	Flash Tank Feed Pipe Seal	1
AL039	Flash Tank Fixing Screw	1
AL040	LPR Chamber Plug Seal	1
AL043	LPR Piston	1
AL045	LPR Piston Seal	1
AL046	LPR Spring Stack	1
AL047	LPR Shims	variable
AL052	LPR External Seals	2
AL054	Battery Chamber Plug	1
AL057	Battery Bumper	2
AL058	Battery Pack	1
AL059	Hammer	1

AL101	Isolator Switch Fixing Screw	2
AL016	Grip Frame Fixing Screws	2
AL108	14 Way Valve Cover	1
AL109	Trigger Spring	1
AL110	Trigger Tensioning Screw	1
AL111	14 Way Seals	4
AL112	14 Way Body Anodized	1
AL113	14 Way Piston	1
AL114	14 Way Safety Vent Body	1
AL115	14 Way Safety Vent Piston	1
AL116	14 Way Safety Vent Nut	1
AL117	14 Way Safety Vent Spring	1
AL118	14 Way Safety Vent Ball Seal	1
AL129	Anti-Double Ball Seal	1
AL145	Battery Cap Anodized	1
AL146	LPR Chamber Plug Anodized	1
AL147	Feed Tube Anodized	1
AL148	Anti Double Ball Anodized	1
AL149	LPR Body Anodized	1
AL150	LPR Adjuster Anodized	1
AL151	RAM Cap Anodized	1
AL152	RAM Cap Anodized	1
AL153	RAM Body Anodized	1
AL154	Mini-Reg On Pin Anodized	1
AL155	Mini-Reg Off Pin Anodized	1
AL156	Trigger Anodized	1
AL157	Flash Tank Anodized	1

AL060	Ram Body Seals	3
AL061	Ram Snap Ring 90 Shore	1
AL070	Ram Snap Ring Screw	1
AL071	Breech Block Pivot Screws 4BA	2
AL073	Breech Block Pivot Pin (FRONT)	1
AL074	Breech Block Pivot Pin (REAR)	1
AL075	Breech Block Lock Pin	1
AL076	Breech Block Lock Pin Spring	1
AL077	Breech Block Release Knob	1
AL078	Bolt	1
AL079	Breech Block Release Knob	1
AL082	Bolt	1
AL084	Exhaust Valve	1
AL086	Exhaust Main Body	1
AL087	Exhaust Body Lock Pin	1

AL159	Barrel Anodized	1
AL160	Back Plate Anodized	1
AL164	Breech Block Anodized	1
AL165	Mini-Reg Anodized	1



Accessories - Full Auto Mode

The Angel™ is a semi auto paintball marker that may be converted to a full auto paintball marker by replacing the circuit board. This conversion is not switchable by any means other than replacing the circuit board.

WARNING- THIS ACCESSORY WILL ONLY BE SUPPLIED TO COUNTRIES WHERE A FULL AUTO PAINTBALL MARKER IS PERMITTED BY LAW. ALWAYS OBSERVE ALL LOCAL APPLICABLE LAWS REGULATING AIR POWERED GUNS.

Viewloader™ VL2001 Intellifeed™ Patents Applied For
The Angel™ has the ability to power and control the VL2001 which will greatly enhance the performance of the Angel™ with a 40% increase in feed rate over existing standard hoppers.

Note
Semi Auto board identification by "Blue" spot on the chip.

Full Auto board identification by "Red" spot on the chip.

Figure 1



Figure 2

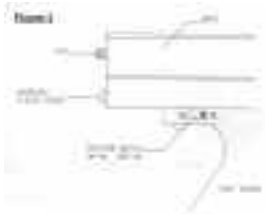


Figure 3



Figure 4



Figure 5



Figure 6



Figure 7

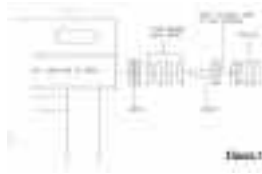


Figure 8



Figure 9

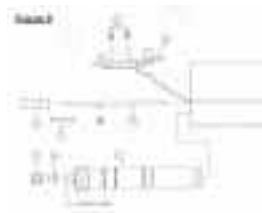


Figure 10

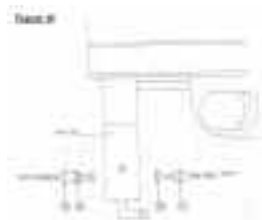
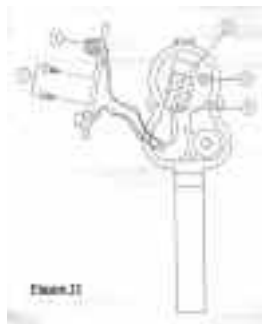


Figure 11



Fault Finding

Angel Will Not Fire

Is air / nitrogen present

see gassing up the angel

Is battery pack charged

see charging

Is gas on / off pin in "on" position

see gassing up the angel

Is electrical isolator switch "on"

see switching the angel on

Is bolt jammed forward

unjam the bolt

Is ram snap ring too tight

see ram snap ring adjustment

Is pneumatics working

see testing pneumatics/electronics

Is circuit board working

see testing pneumatics/electronics

Velocity too low/high

is inlet from regulator set coorectly?

see propellant gas supply

is velocity adjusted screw set correctly

see velocity adjustment

is bolt sticking

check movement

is LPR set correctly

see LPR adjustment

is valve dwell set correctly

see valve dwell adjustment

is ram set correctly

see ram stroke adjustment

is snap ring set correctly

see snap ring adjustment

Chopping Balls

is suitable working hopper fitted?

see accessories

is rate of fire set correctly?

see rate of fire adjustment

Firing too slow

is rate of fire set correctly?

see rate of fire adjustment

excess noise/gas consumption

is valve dwell set correctly

see electronic valve dwell adjustment

is lpr pressure set correctly

see LPR adjustment

is exhaust valve set correctly

see exhaust valve removal/replacement

Is Gas Leaking

mini reg on/off

see mini reg seal replacement

from back cover

see testing pneumatics/electronics

from gas joints

check all fittings

from exhaust valve

see exhaust valve removal

from RAM

see testing pneumatics

from top of front grip

is "o" ring present, see LPR

Terms of Warranty

- **Subject to the conditions set out below the company warrants that the Angel™ will correspond to its specification at the Time of delivery and will be free from defects in materials and workmanship for a period of six months from date of purchase.**

The above warranty is given by the company subject to the following conditions:

- **Proof of purchase is required in all warranty claims;**
- **Warranty is not transferable.**

The company shall be under no liability in respect of any defect arising from fair wear and tear.

- **Seals, batteries, wiring, indicator lamps and exhaust valves are not covered by this warranty. Willful damage, negligence, abnormal working conditions, weather, accident, tampering, failure to follow the manufactures instructions (whether oral or in writing), misuse or alteration or repair of the Angel™ without the company's written approval will invalidate this warranty and the company shall be under no obligation whatsoever to the purchaser in respect of any of the above breaches of this warranty.**
- **The above warranty does not extend to parts, materials or equipment not manufactured by the company, in respect of which the purchaser shall only be entitled to the benefit of any such warranty or guarantee as is given by the manufacturer to the company.**

Subject as expressly provided in these conditions, and except where the goods are sold to a person dealing as a consumer (within the meaning of the Unfair Contract Terms Act 1977) all warranties, conditions or other terms implied by statute or common law are excluded to the fullest extent permitted by law.

Where the goods are sold under a consumer transaction (as defined by the Unfair Terms in Consumer Contracts Regulations 1994 S13159) the statutory rights of the purchaser are not affected by these conditions.

Carriage charges in relation to warranty claims shall be born by the customer.

Where any valid claim in respect of the Angel™ is based in the quality or condition of the Angel™, or its failure to meet specification, and such valid claim is notified to the company in writing and is in accordance with the company's standard terms and conditions of sale the company shall be entitled to repair or replace the goods or the part in question free of charge or, at the company's sole discretion, refund to the purchaser the price of the goods (or a proportionate part of the price) but the company shall have no further liability to the purchaser.

Except in respect of death or personal injury caused by the company's negligence, the company SHALL NOT be liable to the purchaser by reason of any representation, or any implied warranty, condition or other term, or any duty at common law, or under the express terms of this guarantee, for any direct or indirect, special or consequential loss or damage whether to persons or property, costs, expenses, or other claims for compensation or damages whatsoever (whether caused by the negligence of the company, its employees or agents or otherwise) which arise out of or in connection with the supply of the Angel™, its use, or misuse, or resale by the purchaser, or any individual, and the entire liability of the company under or in connection with the purchase or the misuse of the Angel™ shall not exceed the purchase price of the Angel™.

Purchaser agrees to adhere strictly to all warnings and safety procedures.

This warranty shall be governed by the laws of England and the purchaser agrees to submit to the non exclusive jurisdiction of the English courts.

The supply and the purchase of the Angel™ is subject to the company's standard terms and conditions of sale, a copy of which is available upon request. Angel™ -patent applied for, design rights and all rights reserved. The Angel™ is marketed and distributed by WDP Ltd. A company registered in England

No.2114341

Tel: +44 121 328 2228 Fax: +44 212 327 3967

Issue No.2 Angel™ Users Guide.