

CONTENTS – ANGEL™ OPERATORS MANUAL



- This Operators and Users Manual is in English.
- It contains important safety guidelines and Instructions.
- Should you be unsure at any stage, or unable to understand the contents within this manual you must seek expert advice.



- Le mode d'emploi est en Anglais.
- Il contient des instructions et mesures de sécurité importantes.
- En cas de doute, ou s'il vous est impossible de comprendre le contenu du mode d'emploi, demandez conseil à un expert.



- Este manual de (operarios y) usuarios está en Inglés.
- Contiene importantes normas de seguridad e instrucciones.
- Si no esta seguro de algún punto o no entiende los contenidos de este manual debe consultar con un experto.



- Diese Bedienungs- und Benutzeranleitung ist in Englisch.
- Sie enthält wichtige Sicherheitsrichtlinien und -bestimmungen.
- Sollten Sie sich in irgendeiner Weise unsicher sein, oder den Inhalt dieses Heftes nicht verstehen, lassen Sie sich bitte von einem Experten beraten.

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WARNINGS – IMPORTANT SAFETY INSTRUCTIONS & GUIDELINES

WARNING

ADHERE STRICTLY TO THESE AND ALL OTHER SAFETY INSTRUCTIONS AND GUIDELINES

IMPORTANT SAFETY INSTRUCTIONS & GUIDELINES

WARNINGS FOR SAFE ANGEL™ HANDLING

- The ANGEL™ is not a toy.
- Careless or improper use, including failure to follow instructions and warnings within this Operator Manual and attached to the ANGEL™, could cause death or serious injury.
- Do not remove or deface any warnings attached to the ANGEL™.
- Paintball industry standard eye/face/ear and head protection designed specifically to stop paintballs and meeting ASTM standard F1776 (USA) or CE standard (Europe) must be worn by user and any person within range.
- Must be at least 18 years of age to purchase the ANGEL™.
- Persons under 18 years of age must have adult supervision when using or handling the ANGEL™.
- Observe all local and national laws, regulations and guidelines.
- Use only on professional paintball fields where codes of safety are strictly enforced.
- Use compressed air/nitrogen gas only. Do not use CO2.
- Do not exceed 850 psi (58 bar) input pressure.
- Always follow instructions, warnings and guidelines given with any first stage regulator you use with the ANGEL™.
- Use 0.68 calibre paintballs only.
- Keep the ANGEL™ switched off until ready to shoot.
- Treat every marker as if it is loaded.
- Never point the ANGEL™ at anything you do not intend to shoot.
- Do not shoot at persons at close range.
- Do not shoot at fragile objects such as windows.
- Always measure your markers velocity before playing paintball, using a suitable chronograph.
- Never shoot at velocities in excess of 300 feet (91.44 meters) per second, or at velocities greater than local or national laws allow.
- Do not fire the ANGEL™ with the breech open or without the bolt in the breech, as high pressure gas will be emitted.
- Do not fire the ANGEL™ with the pull knob in the unlocked position.
- Never look into the barrel or breech area of the ANGEL™ whilst the marker is switched on and able to fire.
- Never put your finger or any foreign objects into the paintball feed tube of the ANGEL™.
- Never allow pressurised gas to come into contact with any part of your body.
- Always switch off the ANGEL™ when not in use.
- Always fit a barrel blocking device to your ANGEL™ when not in use on the field of play.
- Always remove all paintballs from the ANGEL™ when not in use on the field of play.
- The Gated Feed is designed to retain a number of paintballs in the feed tube and breech area of the ANGEL™ Always ensure that these paintballs are removed from the ANGEL™ when it is not in use on the field of play.
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.
- Always remove first stage regulator and all residual gas pressure from the ANGEL™ for transport and storage.
- Always follow warnings and guidelines given with your first stage regulator for safe transport and storage.
- Only charge the ANGEL™ using the charger supplied.
- Only use 12 Volt negative earth vehicles as a power supply for the charger.
- Do not leave the ANGEL™ unattended whilst charging.
- Always store the ANGEL™ in a secure place.
- THIS OPERATOR MANUAL MUST ALWAYS ACCOMPANY THE PRODUCT IN THE EVENT OF RESALE OR NEW OWNERSHIP.
- SHOULD YOU BE UNSURE AT ANY STAGE YOU MUST SEEK EXPERT ADVICE.



OPERATION – CHARGING



OPERATING INSTRUCTIONS

CHARGING

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Paintball industry standard eye/face/ear and head protection designed specifically to stop paintballs and meeting ASTM standard F1776 (USA) or CE standard (Europe) must be worn by user and any person within range.
- This charger will become hot during use.
- Do not cover the charger.
- Do not leave unattended.
- Do not exceed 14.5 Volts input.
- Do not immerse in water.
- Do not use this charger for any purpose other than charging the ANGEL™ paintball marker.
- Check your vehicle handbook for voltage and current capabilities prior to use.
- Use only the charger supplied for charging the ANGEL™

Before initial use of the ANGEL™, it is necessary to give the power pack a full charging cycle of 4 hours prior to use as this will ensure a long life for the power pack.

Subsequent charges will be in the region of 3 hours for a full charge, the electronics will control the charging cycle and ensure that your battery is fully charged.

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

- A full charge will give sufficient power for approximately 150,000 consecutive shots.
- A 1-hour charge at 12.5V DC will give sufficient power for approximately 40,000 consecutive shots.

The ANGEL™ will continue to use power whilst it is switched ON.

To save the charge the isolator switch must be switched OFF to isolate the battery. We recommend the isolating switch be placed in the off position when the ANGEL™ is in storage, transit or not in use.

- Insert cigar lighter adaptor into a negative earth socket as found in most motor vehicles (red light on charger will illuminate to indicate that power is present).
- Insert remote plug from charger into the socket on the rear of the ANGEL™
The socket is located on the rear of the grip frame under a rubber protection grommet.
- Ensure the isolator switch is in the **ON** position at the rear panel of the ANGEL™. See SWITCHING ON YOUR ANGEL™ - page 4.
- The LED's on the ANGEL™ display will indicate the status of the charging cycle, the bar graph segments on the display will cascade to indicate charge is being taken.
- When a full charge has been taken the bar graph segments will remain illuminated for a short period of time, then a single Green LED will be illuminated. Removal of the charger before a full charge cycle has been completed will result in a short charge.
- Unplug the charger from the ANGEL™ and replace the rubber grommet cover on the rear of the grip frame to prevent the entry of dirt or debris.

IMPORTANT NOTES: For Battery Charging

• The insertion of the charger will make the ANGEL™ unable to fire and removal of the charger will cause the marker to remain in this state until the ON/OFF switch on the back panel is toggled to the off position then the on position to make the marker live.

• Supply voltage must be minimum 12V DC, maximum 24V DC, negative earth.

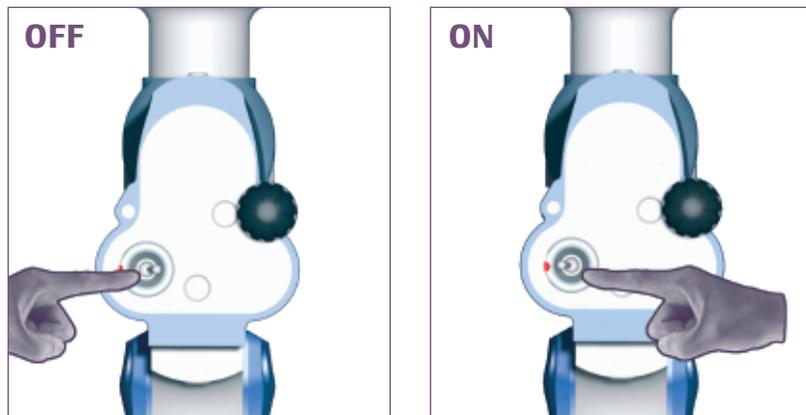
• The isolator switch on the back of the ANGEL™ must be in the ON position to charge the battery.

• The battery must be plugged into the circuit board.

• Removal of the charger before a full charge cycle has been completed will result in a short charge.



OPERATION – SWITCHING ON YOUR ANGEL™



SWITCHING ON YOUR ANGEL™

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Paintball industry standard eye/face/ear and head protection designed specifically to stop paintballs and meeting ASTM standard F1776 (USA) or CE standard (Europe) must be worn by user and any person within range.

- Ensure the battery is charged.
- Switch the isolator switch to the **ON** position.

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- THE ANGEL™ IS LIVE AND CAPABLE OF DISCHARGING.

- The LED display will now display a single Green LED.

OPERATION – PROPELLANT AIR / NITROGEN SUPPLY

PROPELLANT AIR / NITROGEN SUPPLY

WARNING

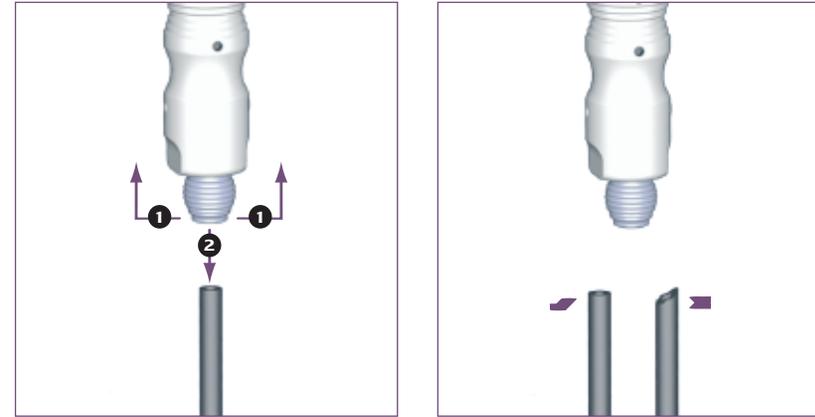
ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Ensure the ANGEL™ is switched off via the isolating switch at the rear of the marker prior to fitting your first stage regulator.
- Paintball industry standard eye/face/ear and head protection designed specifically to stop paintballs and meeting ASTM standard F1776 (USA) or CE standard (Europe) must be worn by user and any person within range.
- Always follow instructions, warnings and guidelines given with any first stage regulator you use with the ANGEL™
- Use compressed air/nitrogen gas only DO NOT USE CO2
- Only use a paintball regulator that has been designed for air or nitrogen gas.
- Do not exceed 850 psi (58bar) input pressure to the ANGEL™
- Take suitable precautions when using sharp cutting instruments.
- The Macro Line hose must be cut back cleanly and square prior to attachment or re-attachment to ensure secure fitment
- SHOULD YOU BE UNSURE AT ANY STAGE YOU MUST SEEK EXPERT ADVICE

The ANGEL™ is designed to operate on air/nitrogen gas. This needs to be supplied to the ANGEL™ at an ideal regulated pressure of 400 psi (27.5 BAR) using a suitable first stage paintball regulator, such as the ANGEL™ A.I.R.

MACRO LINE HOSE / CONNECTOR ATTACHMENT

- Connect the Macro Line connector to your first stage regulator outlet port using a suitable wrench or spanner
- If necessary shorten the Macro Line hose using a sharp knife to the required length to suit your ANGEL™ and first stage regulator set up.
- Push the free end of the hose firmly into the Macro Line connector attached to the ANGEL™ second stage regulator.



MACRO LINE HOSE REMOVAL AND RE-ATTACHMENT

WARNING

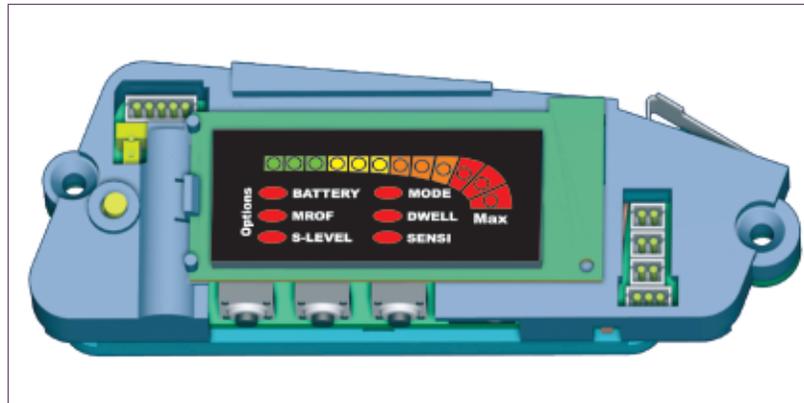
ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- All gas pressure must be relieved from the ANGEL™ and second stage regulator prior to the Macro Line hose removal.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.
- The Macro Line hose must be cut back cleanly and square prior to reattachment to ensure secure fitment.

- The Macro Line hose may be removed from the Macro Line connectors to facilitate maintenance.
- Pull back the collet on the connector ① and keep the collet depressed.
- Pull the Macro Line hose ② out of the connector firmly.
- Cut back the Macro Line hose **cleanly and square**.
- Push the hose firmly into the Macro Line connector to re-attach.



OPERATION – OPTO™ BOARD / BOLT REMOVAL ROTOR BREECH



OPTO™ BOARD

⚠ WARNING

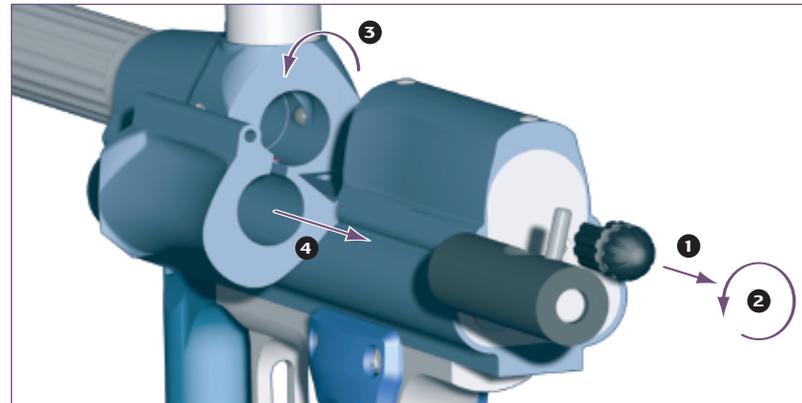
ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Do not attempt to modify the OPTO™ board assembly in any way as this will invalidate your warranty and could lead to safety concerns.

The ANGEL™ incorporates the OPTO™ board. This is the latest development in trigger sensing function. It achieves unsurpassed advancements in trigger repeatability and sensitivity, its non-mechanical switching results in faster, shorter and lighter trigger strokes that give the user higher prolonged achievable rates of fire.

IMPORTANT NOTES:

- When accessing the Internal Tournament LED menus the OPTO™ board should not be exposed to direct sunlight or strong external sources of light without the grip cheek fitted as this light will induce a safety feature, that will prevent the ANGEL™ from firing whilst it remains exposed to the strong external light.
- The OPTO™ board is a non-mechanical switch that is silent in its operation and no audible click is present.



BOLT REMOVAL ROTOR BREECH

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
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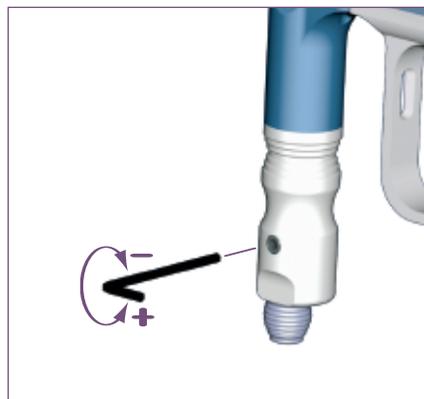
- Do not fire the ANGEL™ with the breech open or without the bolt in the breech, as high pressure gas will be admitted.
- Do not fire the ANGEL™ with the pull knob in the unlocked position.

- Ensure the ANGEL™ isolator switch is in the **OFF** position.
- Pull the Pull knob **1** and rotate 90 degrees **2** so that the knob remains in the unlocked position.
- Swing out the Rotor Breech block **3** so that the bolt is exposed. 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.
- Extract the bolt **4** by pulling rearwards.
- To replace the bolt follow the stages in reverse order.





OPERATION – VELOCITY ADJUSTMENT / GATED FEED™



VELOCITY ADJUSTMENT

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- The ANGEL™ is live and capable of discharging.
- Paintball industry standard eye/face/ear and head protection designed specifically to stop paintballs and meeting ASTM standard F1776 (USA) or CE standard (EU) must be worn by user and any person within range.
- Always measure your markers velocity before playing paintball, using a suitable chronograph.
- Never shoot at velocities in excess of 300ft (91.44 meters) per second, or at velocities greater than local or national laws allow.

DECREASING VELOCITY

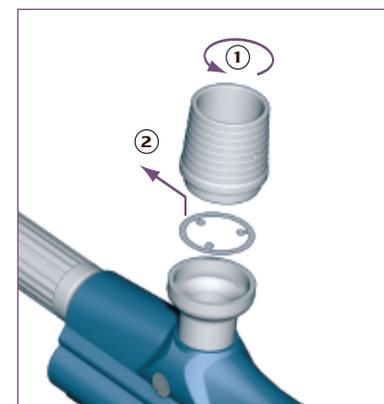
The velocity adjusting screw is located on the lower portion of the front grip.
· To decrease the velocity, insert 3.0mm A/F Allen key and rotate **CLOCKWISE**.

INCREASING VELOCITY

The velocity adjusting screw is located on the lower portion of the front grip.
· To increase the velocity, insert 3.0mm A/F Allen key and rotate **ANTI-CLOCKWISE**.

IMPORTANT NOTE:

· When reducing velocity, allow four shots for the complete system to be at the new regulated pressure.



GATED FEED™

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- The Gated Feed™ is designed to retain a number of paintballs in the feed tube and breech area of the ANGEL™. Always ensure that these paintballs are removed from the ANGEL™ when it is not in use on the field of play.

The Gated Feed™ is a feature that retains the paintballs in the breech to prevent them rolling back into the hopper. The Gated Feed™ uses a retention system that offers minimal resistance to a paintball as it travels into the breech and maximum resistance to a paintball returning up the feed tube. The retainer is a removable item that may be replaced if it becomes damaged.



EXTERNAL ELECTRONIC LED MENUS – SENSi™ TEST



EXTERNAL ELECTRONIC LED MENUS

SENSi™ Test

⚠ WARNING

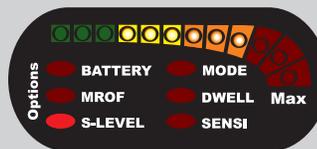
ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™

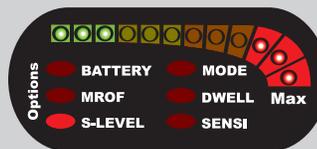
This allows you to test the SENSi™ sensor

- Switch the ANGEL™ **OFF**.
- Press and hold the GREEN ● button and Switch the ANGEL™ **ON**.
- The display will show the S-Level LED Illuminated and the Yellow and Orange LED's illuminated.
- Whilst you are in this test feature the ANGEL™ is **incapable** of firing.
- Drop a ball into the feed tube, onto the sensor.
- The Green and Red LED's will **flash** when a ball has been detected, this indicates a pass.
- If the Green and Red LED's **do not** illuminate, this indicates that the SENSi™ is damaged and needs replacement.
- This test may be repeated by simply dropping further paintballs into the feed tube.
- To exit this test feature, switch the ANGEL™ **OFF**.
- **WARNING: REMOVE ALL PAINTBALLS USED FOR THE TEST AFTER COMPLETION.**

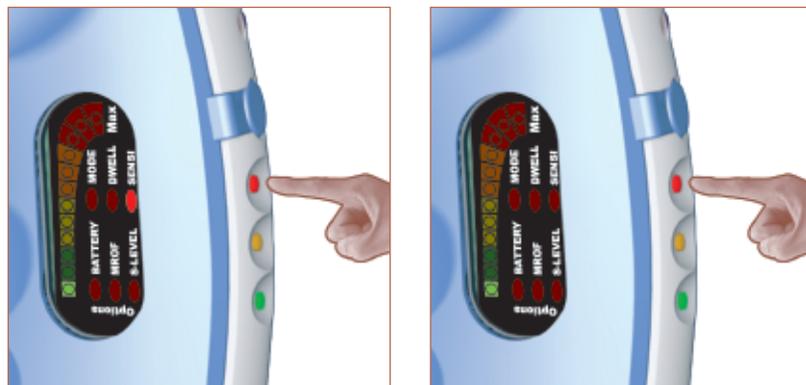
SENSi™ TEST STATE



BALL DETECTED (PASSED)



EXTERNAL ELECTRONIC LED MENUS – SWITCHING SENSi™ ON/OFF



EXTERNAL ELECTRONIC LED MENUS

SWITCHING SENSi™ ON/OFF

⚠ WARNING

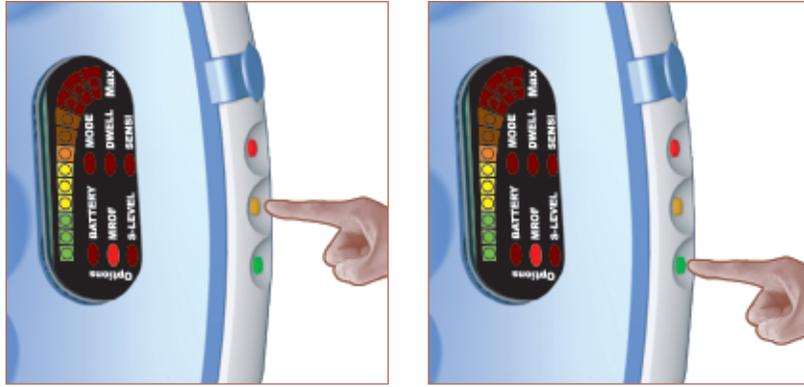
ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™

- Switch the ANGEL™ **ON**.
- Press the RED ● button to enable SENSi™ – the SENSi™ LED will illuminate.
- Press the RED ● button again to disable SENSi™ – the SENSi™ LED will extinguish.



EXTERNAL ELECTRONIC LED MENUS – MROF



MROF (Maximum Rate Of Fire limit with SENSI™ option OFF)

⚠ WARNING

ADHERE STRICTLY TO THESE AND ALL OTHER SAFETY INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™

This allows you to tune your maximum rate of fire to your style of play and feed system. Certain modes are capped or non-adjustable were applicable. The rate of fire should not be set greater than your feed system is capable of delivering. This may be changed by the external menu only when the SENSI™ feature is switched off; the range of adjustment is 11-22 shots per second.

- Switch the ANGEL™ **ON**.
- Press the ORANGE ● button to scroll the menu until the MROF LED illuminates.
- Press the GREEN ● button to adjust the MROF to the level required.

MROF - 11 shots/sec

MROF - 16 shots/sec

MROF - 22 shots/sec

EXTERNAL ELECTRONIC LED MENUS – BATTERY STATUS



BATTERY STATUS

WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™

The battery status can be checked by two methods, the LED display bar graph will indicate battery power remaining.

Method 1:

- Switch the ANGEL™ **ON**.
- During Boot-Up, the battery status will be displayed.

Method 2:

- Switch the ANGEL™ **ON**.
- Press the Orange button to scroll the display to the battery status menu.

Power is drawn whilst the ANGEL™ has power connected. A battery will last approximately 100 hours until it is discharged. To prevent this discharge ensure the isolator switch is in the OFF position at the end of the day or event. The last segment indicates that you have approximately 16,000 shots left.

25% (Quarter) POWER



50% (Half) POWER



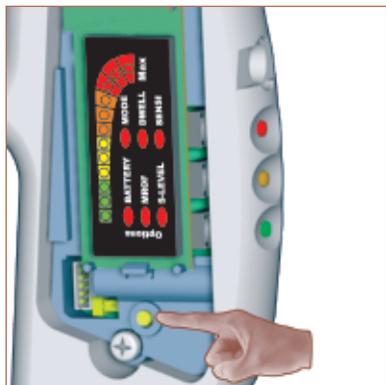
75% (Three-Quarters) POWER



100% (Full) POWER



INTERNAL ELECTRONIC LED MENUS – FACTORY SETTINGS



INTERNAL ELECTRONIC LED MENUS

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™

- The ANGEL™ has a number of features that can be adjusted to suit your individual needs. These features that can change the performance of the gun are only adjustable via the internal menu. This is to ensure that they pass tournament and field operator requirements.
- The settings you have selected may be viewed externally but cannot be adjusted externally.
- The menus can only be accessed when the marker is switched ON.
- Remove left hand grip cover screws to expose the circuit board.
- Follow the internal menu list diagrams for relevant settings.
- The ANGEL™ has the unique feature that allows you to return to the factory defaults settings by pressing and holding the internal menu button for 2 seconds.

FACTORY DEFAULT SETTING

- Press and hold the YELLOW ● until the whole display illuminates then release.
- The ANGEL™ default settings have now been loaded.

INTERNAL ELECTRONIC LED MENUS – DWELL



DWELL

WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™

· The ANGEL™ has a number of features that can be adjusted to suit your individual needs. These features that can change the performance of the gun are only adjustable via the internal menu. This is to ensure that they pass tournament and field operator requirements.

· The settings you have selected may be viewed externally but cannot be adjusted externally.

· The menus can only be accessed when the marker is switched ON.

· Remove left hand grip cover screws to expose the circuit board.

· Follow the internal menu list diagrams for relevant settings.

Dwell controls the valve opening time. Longer dwell uses more gas and generates pressure variables. Shorter dwell uses less gas and reduces noise, but is less tolerant of poor quality paint the range available is 8– 19 milliseconds.

- Switch the ANGEL™ ON.
- Press the YELLOW button to scroll the menu until the DWELL LED illuminates.
- Press the GREEN button to adjust the DWELL to the level required.

DWELL - 8 milliseconds



DWELL - 12 milliseconds



DWELL - 19 milliseconds



IMPORTANT NOTE:

· Adjustment is only recommended if you wish to fine-tune your marker to specific accessories.

INTERNAL ELECTRONIC LED MENUS – SENSi™ MODES



SENSi™ MODES

⚠ WARNING

ADHERE STRICTLY TO THESE AND ALL OTHER SAFETY INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™

- The ANGEL™ has a number of features that can be adjusted to suit your individual needs. These features that can change the performance of the gun are only adjustable via the internal menu. This is to ensure that they pass tournament and field operator requirements.
- The settings you have selected may be viewed externally but cannot be adjusted externally.
- The menus can only be accessed when the marker is switched ON.
- Remove left hand grip cover screws to expose the circuit board.
- Follow the internal menu list diagrams for relevant settings.
- Switch the ANGEL™ ON.
- Press the YELLOW ● button to scroll the menu until the MODE LED illuminates.
- Press the GREEN ● button to change the MODE.

The ANGEL™ is supplied with four SENSi™ MODES and one Non-SENSi™ MODE.

SENSi™ MODE 1

SENSi™ MODE 1 has the following features:

- This mode is Semi-Auto and has a **shorter** cycle time resulting in **higher** peak achievable rates of fire.
- This SENSi™ Mode works on the following principles:
- Should a ball be detected within the window of opportunity, the ANGEL™ will fire in response to a trigger pull.
 - Should a ball not be detected within the window of opportunity, the ANGEL™ will not fire and wait a small time period for the ball to be present.
 - This Mode will not allow the ANGEL™ to fire, unless a paintball is present, or arrives during the window of opportunity. In such cases, it is necessary to release and re-pull the trigger to initiate the next shot.

SENSi™ MODE 2

SENSi™ MODE 2 has the following features:

- This mode is Semi-Auto and has a **shorter** cycle time resulting in **higher** peak achievable rates of fire.
- This SENSi™ Mode works on the following principles:
- Should a ball be detected within the window of opportunity, the ANGEL™ will fire in response to a trigger pull.
 - Should a ball not be detected within the window of opportunity, a small delay will be added and the ANGEL™ will fire after this delay irrespective of whether or not a paintball is present.
 - This Mode carries a risk of chopping a paintball, but negates the need for a release and re-pull of the trigger to initiate the next shot.



SENSi™ MODE 3 has the following features:

- This mode is Semi-Auto and has a **longer** cycle time resulting in more **sustainable** rates of fire.

This SENSi™ Mode works on the following principles:

- Should a ball be detected within the window of opportunity, the ANGEL™ will fire in response to a trigger pull.
- Should a ball not be detected within the window of opportunity, the ANGEL™ will not fire and wait a small time period for the ball to be present.
- This Mode will not allow the ANGEL™ to fire, unless a paintball is present, or arrives during the window of opportunity. In such cases, it is necessary to release and re-pull the trigger to initiate the next shot.



SENSi™ MODE 4 has the following features:

- This mode is Semi-Auto and has a **longer** cycle time resulting in more **sustainable** rates of fire.

This SENSi™ Mode works on the following principles:

- Should a ball be detected within the window of opportunity, the ANGEL™ will fire in response to a trigger pull.
- Should a ball not be detected within the window of opportunity, a small delay will be added and the ANGEL™ will fire after this delay irrespective of whether a not a paintball is present.
- This Mode carries a risk of chopping a paintball, but negates the need for a release and re-pull of the trigger to initiate the next shot.

Non-SENSi™ OPTION

Whenever SENSi™ is switched OFF, the ANGEL™ will revert to Non-SENSi™ semi-automatic mode only. See SWITCHING SENSi™ ON/OFF - page 9.

Whenever the SENSi™ is switched ON, the ANGEL™ will revert to whatever semi-mode is selected by the user.

The user has the option of setting the MROF to suit their loader. See MROF - page 10.

MAINTENANCE – GENERAL CARE & CLEANING

MAINTENANCE

WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Always wear industrial standard eye protection when performing any maintenance on the ANGEL™

GENERAL CARE & CLEANING

WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

The ANGEL™ should be cleaned externally using a synthetic oil moistened cloth only. **Under no circumstances should you use hydrocarbon based oils, as these will cause irrevocable damage to the internal seals,** e.g.: WD40, Vaseline, Duck Oil, Engine oil, Plus Gas, 3in 1. The suitable oil is LOVE JUICE OIL™.

The ram shaft and internal parts that are accessible during disassembly and reassembly should be lubricated with LOVE JUICE EXTREME GREASE™. The frequency of lubrication should be at least every event or 8000 shots for oil lubrication and 20,000 shots for grease lubrication. The ANGEL™ should never be immersed into water otherwise damage may occur to the electronics. The electronics are moisture/damp proof to IP65. Ensure correct tools are used.

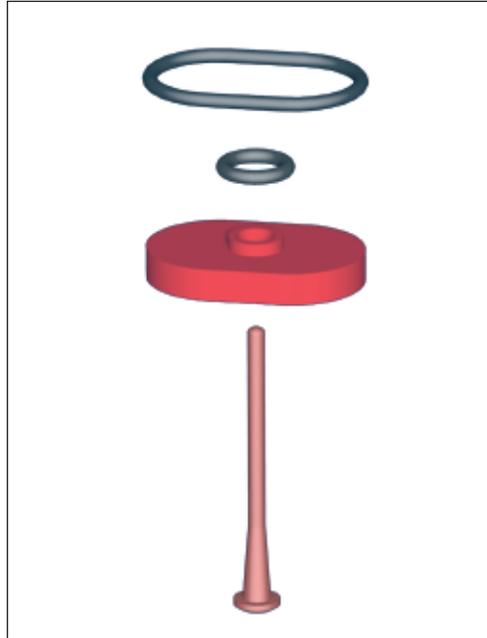
IMPORTANT NOTES: For General Maintenance

- No solvents or abrasive cleaning products should be used. All external and internal accessible moving parts should be lubricated using light synthetic oil only.
- All threads are metric except gun accessory mountings onto the grip frame, which is industry standard 10/32 UNF at centres 0.75 inches. The screw thread length must not exceed 0.375 inches (10mm) into the bottom of the frame otherwise damage will occur to the electronics. We recommend that you remove the left-hand cheek cover and ensure the screws do not project into the circuit board cavity when fitting.

MAINTENANCE – SUB-ASSEMBLIES



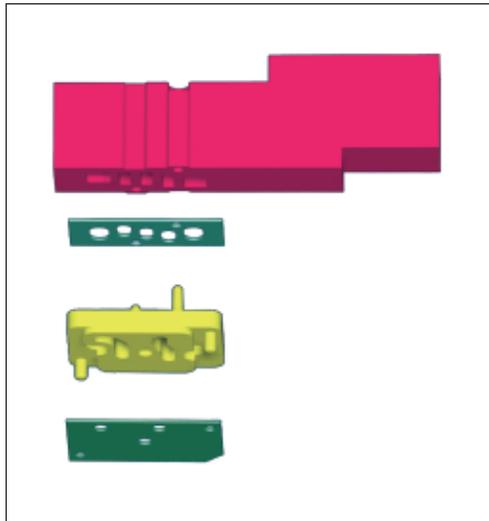
FLASH TANK ASSEMBLY



SENSI™ ASSEMBLY



SENSI™ SENSOR LOCATION

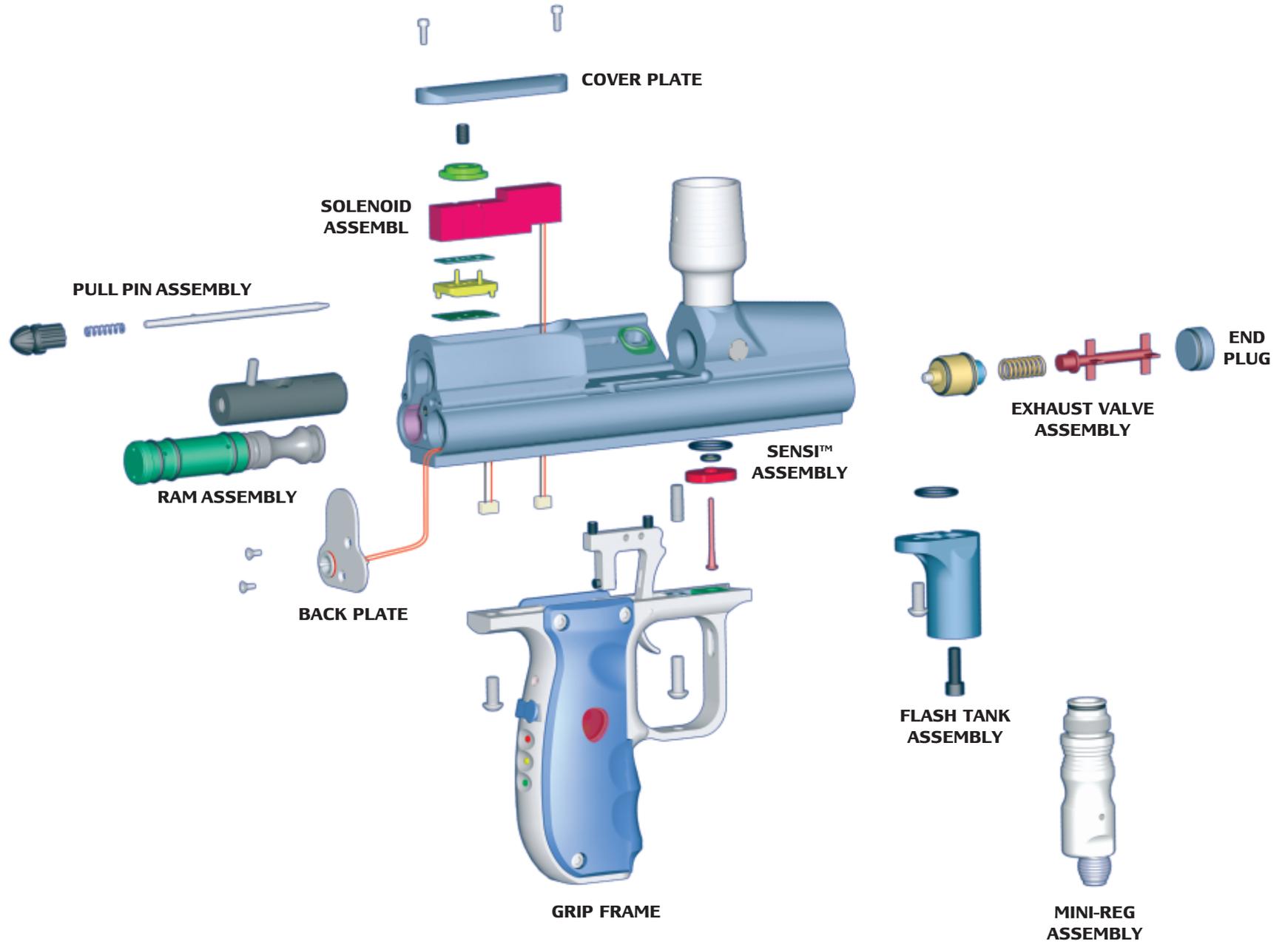


SOLENOID ASSEMBLY



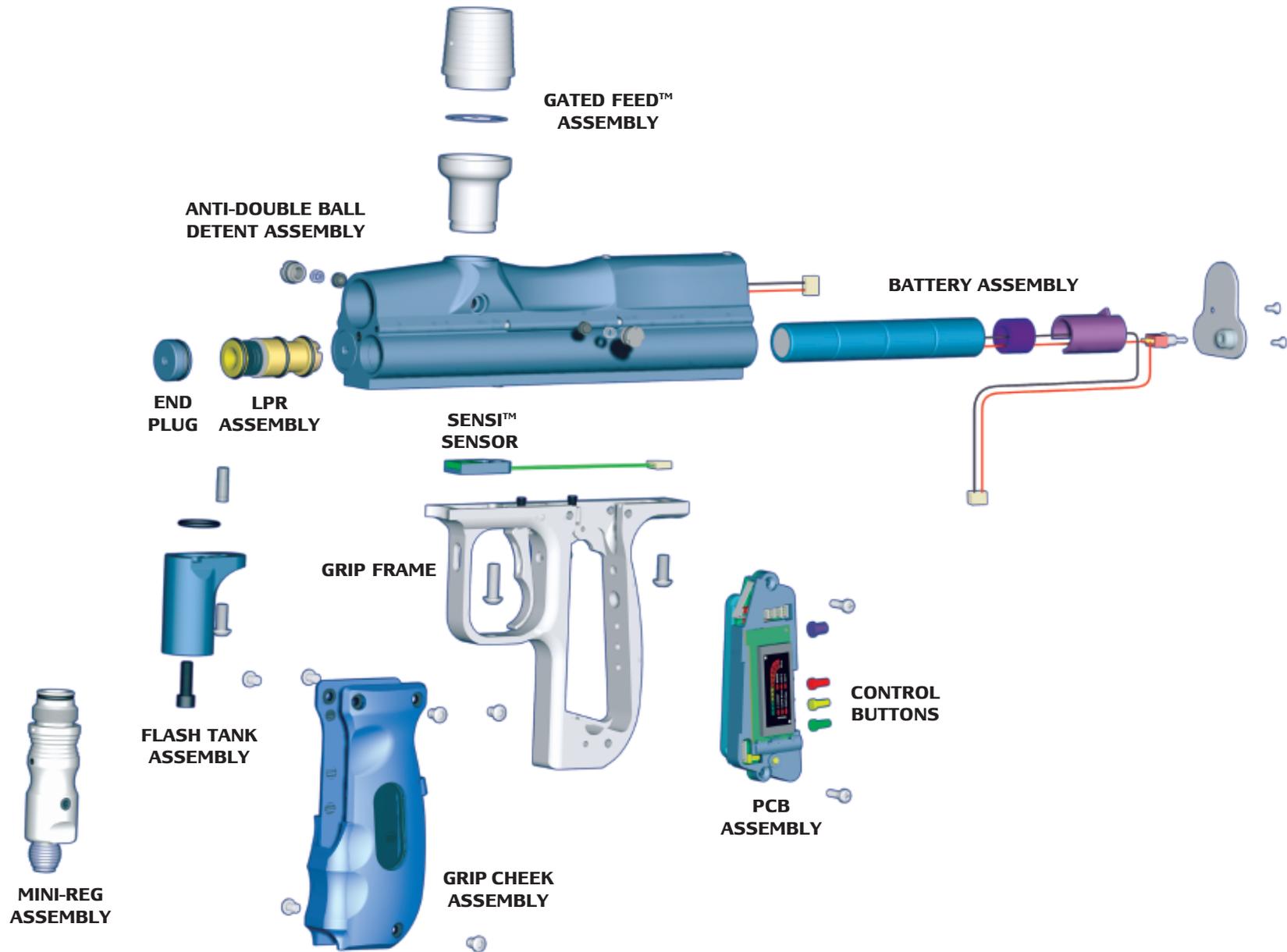


MAINTENANCE – GENERAL ASSEMBLY, LEFT HAND VIEW



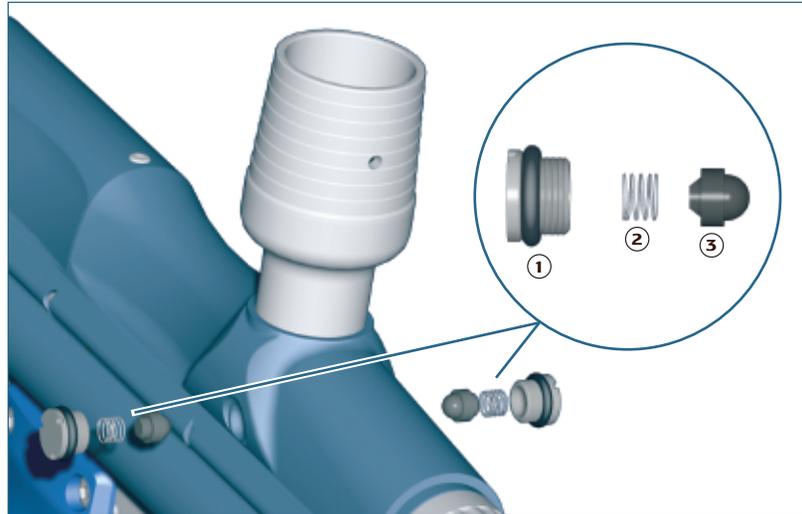


MAINTENANCE – GENERAL ASSEMBLY, RIGHT HAND VIEW





MAINTENANCE – ANTI-DOUBLE BALL DETENT SERVICE



- Repeat for other side.
- Inspect parts and replace if necessary.

IMPORTANT NOTES: For re-assembly of components

- Due care and attention must be shown to ensure you do not mark the anti-double ball case or ANGEL™ body whilst performing maintenance.
- Ensure the anti-double ball ③ is re-located correctly.
- Ensure the spring ② is located correctly onto the anti-double ball.
- Ensure the anti-double ball cases ① are inserted correctly into the ANGEL™ body.

ANTI-DOUBLE BALL DETENT SERVICE

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

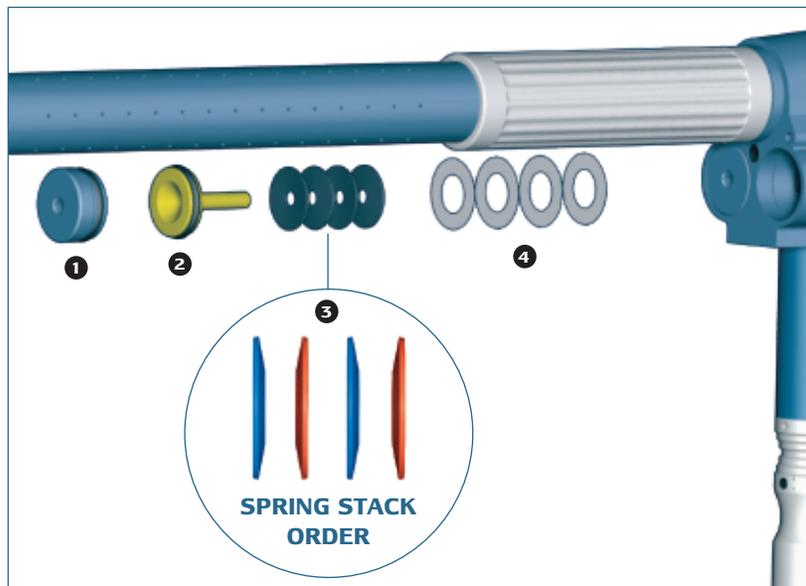
There are two anti-double ball assemblies that can be removed and the internal parts serviced if necessary. These are located on either side of the body below the feed tube.

- Using a coin, rotate the anti-double ball assembly counter-clockwise to remove the anti-double case ①.
- Remove the spring ②.
- Remove the anti-double ball ③.





MAINTENANCE – LPR ADJUSTMENT



LPR ADJUSTMENT

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

The low-pressure regulator controls the pneumatic cycle of the ANGEL™ and is located in the right-hand chamber at the front of the ANGEL™ body. The pressure needs to be at 82 PSI (5.7) output at a pressure of 350 PSI at the second stage regulator.

LPR adjustment is achieved by the removal of shims. Each shim equals approximately 5 PSI/0.35 BAR. We recommend the use of the optional service tools and lubrication of parts with Love Juice Extreme Grease™ only (see general assembly diagrams - pages 17-18).

- Ensure the ANGEL™ is de-gassed and switched **OFF**.
- Remove the left end cap **1** using suitable metric 4.0 A/F Allen key.
- Insert the optional pressure gauge adaptor into the hole that the end cap **1** was removed from.
- Re-Gas the ANGEL™ and switch the ANGEL™ **ON**.

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- The ANGEL™ is live and capable of discharging.

- Fire 6 shots with **NO** paintballs present to stabilize the LPR pressure.
Note the pressure reading. Should the reading be too high or low, proceed to the next stage.

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

- Ensure the ANGEL™ is degassed and switched **OFF**.
- Remove the pressure gauge adaptor and insert an M 2.5mm screw or the piston extracting tool (optional extra) into the brass piston **2** and withdraw slowly.
- Remove the four piston springs **3**.
- Add or subtract shims **4** as necessary, note the number of shims may vary from the diagram shown (maximum 20).
- Replace piston springs **3** in correct order onto the piston.
- Re-insert the piston **2** ensuring that it is located correctly.
- Insert the optional pressure gauge adaptor into the hole that the end cap was removed from.
- Re-Gas the ANGEL™ and switch the ANGEL™ **ON**.





LPR ADJUSTMENT Continued

WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- The ANGEL™ is live and capable of discharging.

- Verify the LPR pressure by following the procedure described above.
- Once the desired pressure has been achieved proceed to the next stage.

WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

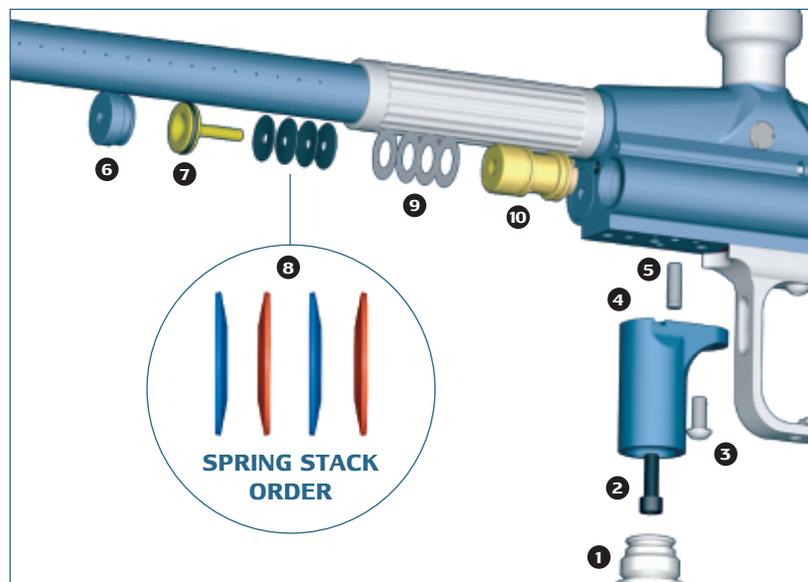
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

- Ensure the ANGEL™ is degassed and switched **OFF**.
- Remove the pressure gauge adaptor & replace the end cap **1**.





MAINTENANCE – LPR ASSEMBLY REMOVAL



LPR ASSEMBLY REMOVAL

WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

- Unscrew and remove the mini regulator ①.
- Remove the flash tank internal retaining screw ② using a 4.0mm A/F Allen key.
- Remove flash tank external retaining screw ③ using a 3.0mm A/F Allen key.
- Ensure O ring ④ is not lost.
- Remove LPR retaining pin ⑤ using suitable grips.

- Remove the right end cap ⑥ using suitable metric 4.0mm A/F Allen key.
- Insert an M 2.5mm screw or the piston extracting tool (optional extra) into the brass piston ⑦ and withdraw slowly.
- Remove the 4 piston spring stack ⑧.
- Remove the shims ⑨, **Note:** the number of shims may vary from shown diagram.
- Using a suitable blunt pick, carefully withdraw the LPR body ⑩.

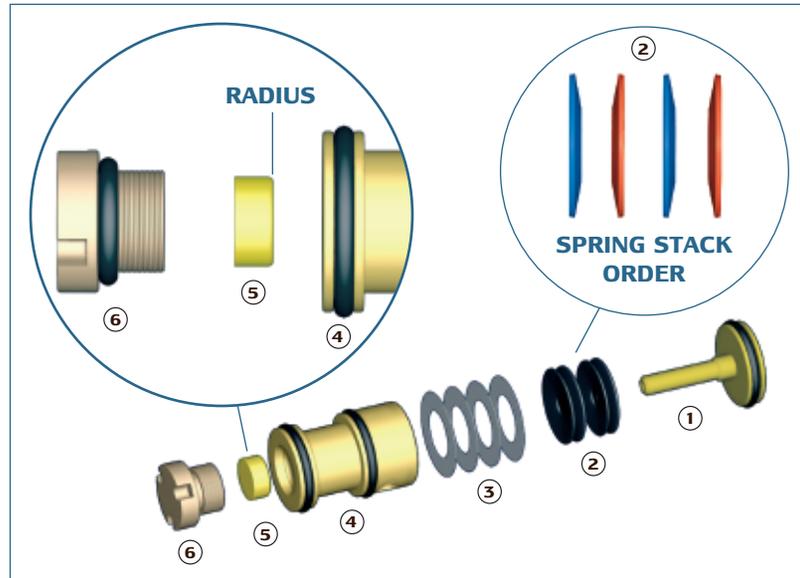
IMPORTANT NOTES: For re-assembly of components

- Care must be taken so that the bore is not scored or the seals damaged.
- Ensure the LPR's pin location hole is aligned with the pin retaining hole within the ANGEL™ body prior to insertion.
- Ensure the spring stack ⑧ is inserted in the correct order.
- We recommend that you verify your LPR pressure if it has been removed (see LPR ADJUSTMENT procedure - page 22).
- Ensure the end cap ⑥ is located correctly.
- Ensure the springs or shims are not lost (see LPR assembly). Insert or remove shims as necessary.
- Each shim equals approximately 5 PSI/0.35 BAR.





MAINTENANCE – LPR MAIN SEAL REPLACEMENT



- Remove the LPR shims (2), **Note:** the number of shims may vary from shown diagram.
- Remove the LPR main seal retainer (6) nut from the LPR body (4) using a suitable tool. To prevent the body from rotating in your hand you may insert the LPR lock pin into the LPR body to give some leverage.
- Remove the main seal (5) noting the radius on the edge of the seal.
- Discard the main seal (5) and replace with new item.

IMPORTANT NOTES: For re-assembly of components

- Ensure the new main seal (5) is replaced with the radius edge going in first.
- Ensure the seal retainer nut (6) is tight and flush with the LPR body (4).
- Ensure the spring stack (2) is in the correct order.
- Ensure that the LPR pressure is reset as per LPR ADJUSTMENT procedure - page 22.

LPR MAIN SEAL REPLACEMENT

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

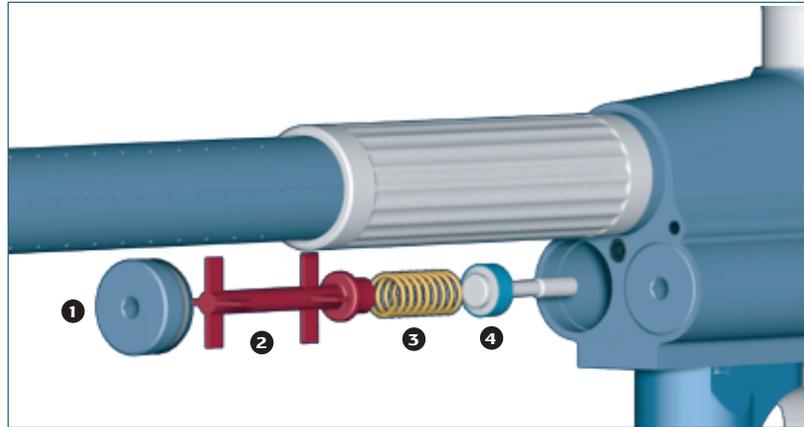
The LPR may be serviced once it has been removed by following the LPR ASSEMBLY REMOVAL procedure on page 24. The serviceable parts are the external O rings and the internal main seal.

- Remove the LPR piston (1).
- Remove the LPR spring stack noting the order (2).





MAINTENANCE – EXHAUST VALVE STEM REMOVAL



IMPORTANT NOTES: For re-assembly of components

- Ensure exhaust valve is located in exhaust body within the ANGEL™.
- Ensure the spring is located onto the exhaust valve stem.
- Ensure the spring is located onto the valve spring support bobbin.
- Ensure the end cap is located correctly.

EXHAUST VALVE STEM REMOVAL

WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

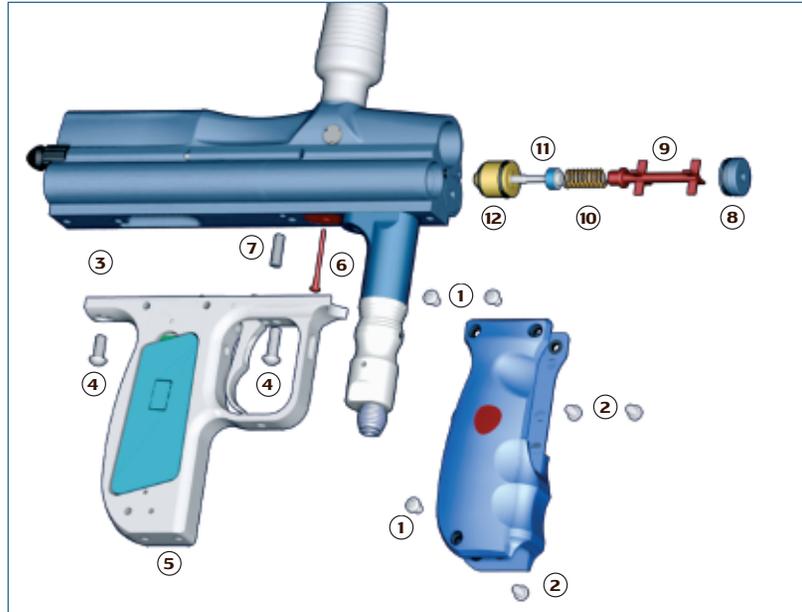
- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

- Unscrew and remove the mini regulator ①.
- Remove the left end cap ① using suitable metric 4.0mm A/F Allen key.
- Remove the valve spring support bobbin ②.
- Remove the valve spring ③.
- Remove exhaust valve stem ④.





MAINTENANCE – EXHAUST GUIDE REMOVAL



EXHAUST GUIDE REMOVAL

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

- Remove the grip cheek cover by removing the 6 retaining screws (1) and (2) using a metric 2.5mm A/F Allen key.
- Unplug the battery and solenoid plugs (3).

- Remove the 2 grip frame screws (4) holding the frame to the body using a suitable 3mm A/F Allen key.
- Remove the grip frame (5) from the body.
- Ensure the SENSi™ rod (6) is not lost.
- Pull out the exhaust valve retaining pin (7) located in the body using suitable grips.
- Remove the left end cap (8) using suitable metric 4.0mm A/F Allen key.
- Remove the valve spring support bobbin (9).
- Remove the valve spring (10).
- Remove exhaust valve stem (11).
- Using a suitable blunt hooked pick carefully retract exhaust valve guide (12) by inserting the pick into the exhaust valve hole that the exhaust valve stem located into.
- Inspect and service parts as necessary..

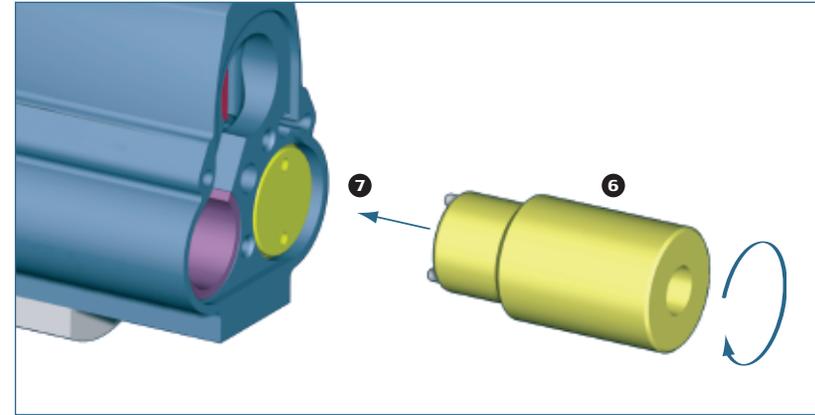
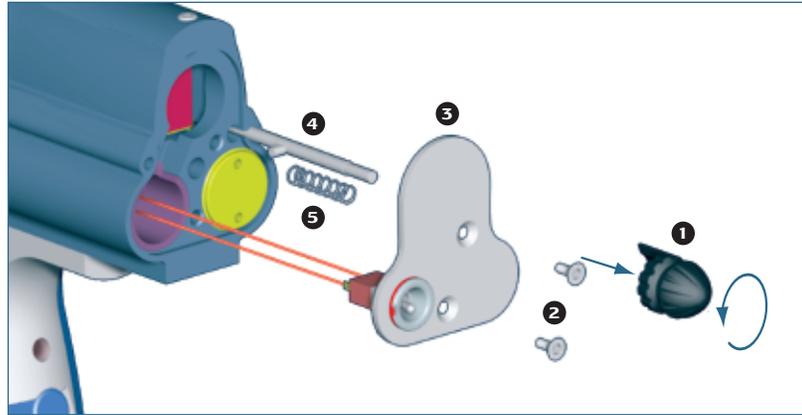
IMPORTANT NOTES: For re-assembly of components

- Care must be taken so that the bore is not scored or the seals damaged.
- Ensure the exhaust valve guide body is free from damage that may score the bore.
- Ensure you do not damage the exhaust valve guide sealing face.
- Ensure the location hole in the exhaust valve guide is in the correct orientation to the lock hole within the main body prior to refitting.
- Slowly insert the valve guide pushing it down with a blunt soft faced rod,
- When the holes line up insert the lock pin into the hole.
- Ensure the SENSi™ rod is re-inserted.
- Ensure no wires become trapped between the body and grip frame during re-assembly.
- Ensure the plugs are located in the correct sockets.





MAINTENANCE – RAM STROKE ADJUSTMENT



RAM STROKE ADJUSTMENT

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™

- Ensure the ANGEL™ is **gassed** and switched **OFF**.
- Ensure bolt is fully retracted.
- Remove the breech block pull knob **1** by gently pulling and unscrewing counter-clockwise.
- Remove the countersunk screws, **2** using a suitable 2.0mm A/F metric Allen key.
- Carefully lift the back plate **3** off.
- Retract the spring **4** and breech block lock pin **5**.
- Using circlip pliers or the ram location tool **6** optional accessory rotate ram assembly **7** clockwise until slight resistance is felt in opening the breech block. If rotated too far the breech will not open so rotate counter-clockwise and repeat operation. The ram must always be rotated clockwise when setting.

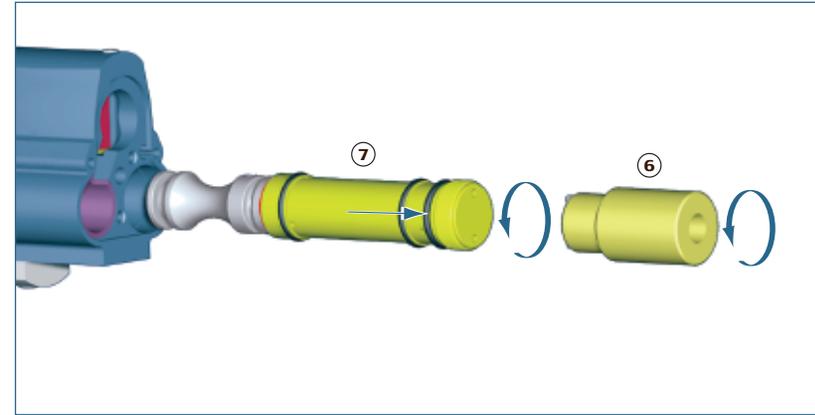
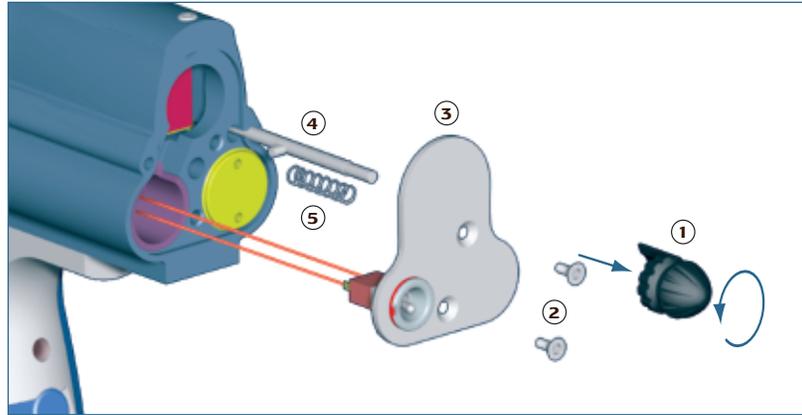
IMPORTANT NOTES: For re-assembly of components

- There are wires attached to the back plate and a spring is located under the back plate. Care must be taken so that the wires are not pulled or trapped during maintenance.
- The ram must always be rotated clockwise when setting.
- Ensure the spring is replaced correctly
- Ensure the breech block opens correctly after refitting the breech block knob **1**.
- Ensure that no wires become trapped during re-assembly.





MAINTENANCE – RAM REMOVAL



RAM REMOVAL

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

- Ensure the ANGEL™ is **degassed** and switched **OFF**.
- Open the breech block and remove the bolt.
- Remove the breech block pull knob ① by gently pulling and unscrewing counter-clockwise.
- Remove the countersunk screws, ② using a suitable 2.0mm A/F metric Allen key.
- Carefully lift the back plate ③ off.
- Retract the spring ④ and breech block lock pin ⑤.
- Using circlip pliers or the ram location tool ⑥ optional accessory rotate ram assembly ⑦ clockwise until slight resistance is felt in opening the breech block.

If rotated too far the breech will not open so rotate counter-clockwise and repeat operation. The ram must always be rotated clockwise when setting.

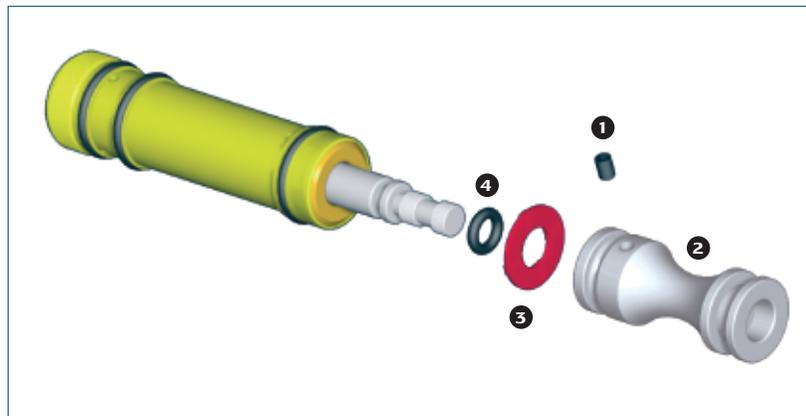
IMPORTANT NOTES: For re-assembly of components

- There are wires attached to the back plate and a spring is located under the back plate. Care must be taken so that the wires are not pulled or trapped during maintenance.
- Ensure the ram assembly is lubricated with Love juice Extreme Grease™ prior to re-fitment.
- Ensure the ram assembly external O rings are not damaged.
- Ensure the ram assembly is inserted slowly to prevent damage to the O rings.





MAINTENANCE – SERVICING



SERVICING

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

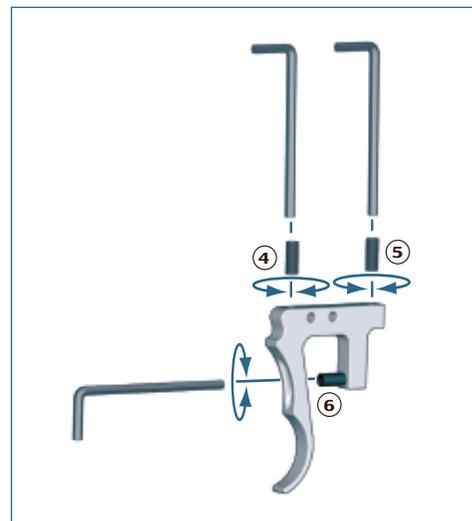
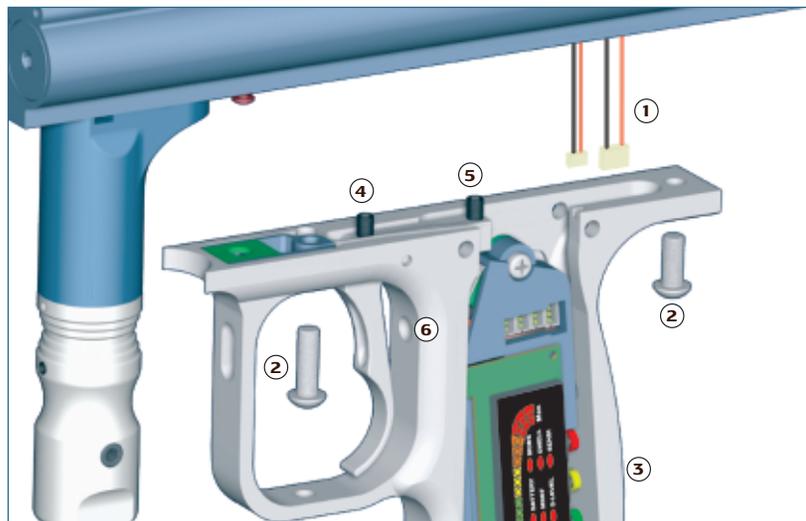
- The ram must be removed as per the RAM REMOVAL procedure - page 29, prior to servicing. The ram has three components that may be replaced these are the following: Hammer, Bumper, Ram clamp seal.
- Remove the ram hammer lock screw **1** using a suitable metric Allen key.
- Remove the hammer **2** from the ram rod using suitable **SOFT** faced grips
- Remove the bumper **3** and inspect for damage, replace if necessary.
- Remove the ram clamp seal **4** and replace.

IMPORTANT NOTES: For re-assembly of components

- The ram clamp seal **4** must be replaced with a new item if removed.
- We recommend that Loctite™ medium strength adhesive is applied to the hammer **2** if removed.
- We recommend that Loctite medium strength adhesive is applied to the hammer lock screw **1** if removed.
- We recommend that you lubricate the ram shaft with Love Juice Extreme Grease™.



MAINTENANCE – TRIGGER RETURN, OVER-TRAVEL & TOE ADJUSTMENTS



TRIGGER RETURN, OVER-TRAVEL & TOE ADJUSTMENTS

WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.
- Never adjust your trigger so fine that accidental discharge can occur due to shock loads or vibration.

The trigger return stroke, over-travel and toe adjustments should be carried out in the order shown and will enable the user to have total adjustment on the tactile feel and trigger movement.

- Ensure the ANGEL™ is degassed and switched off.
- Remove the left-hand side grip cheek cover by removing the 3 screws using a suitable metric Allen key.

- Unplug the battery and solenoid plugs ①.
- Remove the two grip frame screws holding the frame to the body using a suitable metric Allen key ②.
- Remove the frame from the body ③.
- Back off the trigger adjustment screws ④ and ⑤.
- The screw furthest from the finger location ⑤ that projects above the trigger controls the over-travel. Using a suitable metric Allen key adjust to suit. Counter clockwise reduces the over travel.
- The screw closest to the finger location ④ that projects above the trigger controls the return stroke. Using a suitable metric Allen key adjust to suit. Counter clockwise reduces the return-stroke.
- Replace the solenoid and battery connectors into the PCB.
- Switch the ANGEL™ on. Offer the frame to the body and ensure that the trigger operates by pulling the trigger.
- The LED display power bar will cascade when the trigger is pulled. Should this not occur see the important notes below.
- Replace grip frame screws and remaining wiring connections into the PCB.
- Further fine tuning can be achieved by adjusting the toe adjuster screw ⑥ within the limits set by adjuster screws ④ and ⑤.
- Verify the trigger is functioning correctly.
- Replace grip cheek cover screws using a suitable metric Allen key.



TRIGGER RETURN Continued



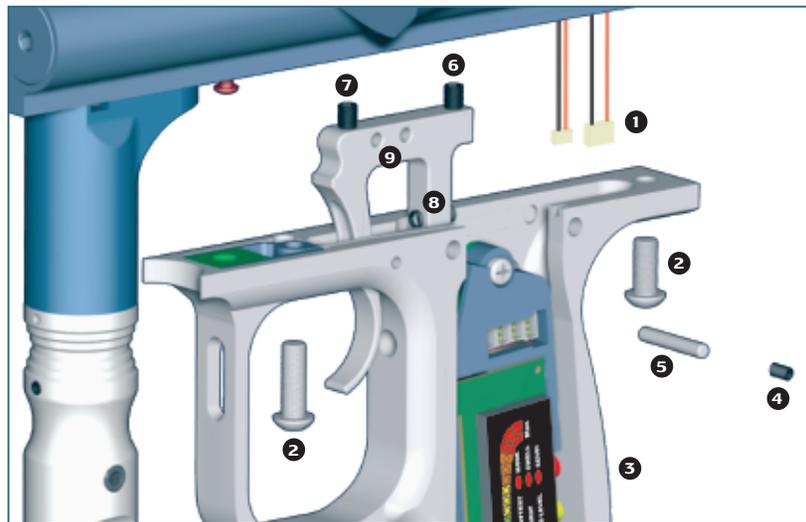
IMPORTANT NOTES: For re-assembly of components

- There must be sufficient over travel to activate the OPTO™ board, otherwise the opto-trigger will not operate correctly
- There must be sufficient return stroke to reset the OPTO™ board otherwise the opto-trigger will not operate correctly.
- Do not trap any wiring or damage could occur to the wiring resulting in a fault developing.
- Should the trigger be incorrectly adjusted, re-adjust the return stroke screw by repeating the procedures listed above or re-adjust the over travel screw by repeating the procedures listed above.
- When adjusting the trigger stroke screws ④, ⑤ and ⑥ we recommend you apply a small amount of Loctite low strength thread lock to prevent movement due to vibration prior to adjustment.
- The OPTO™ board is a non-mechanical switch that is silent in its operation and no audible click is present.
- The OPTO™ board should not be exposed to direct sunlight or external strong sources of light without the grip cheek fitted as this light will induce a safety feature, that will prevent the ANGEL™ from firing whilst it remains exposed to the external strong light.





MAINTENANCE – TRIGGER PIVOT POINT ADJUSTMENTS



TRIGGER PIVOT POINT ADJUSTMENT

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.
- Never adjust your trigger so fine that accidental discharge can occur due to shock loads or vibration.

The two pivot point adjustments should be carried out in the order shown and will enable the user to have total adjustment on the tactile feel and trigger movement.

- Ensure the ANGEL™ is degassed and switched **OFF**.
- Remove the left-hand side grip cheek cover.
- Unplug the battery and solenoid plugs **1**.
- Remove the two grip frame screws **2** using a suitable metric Allen key.

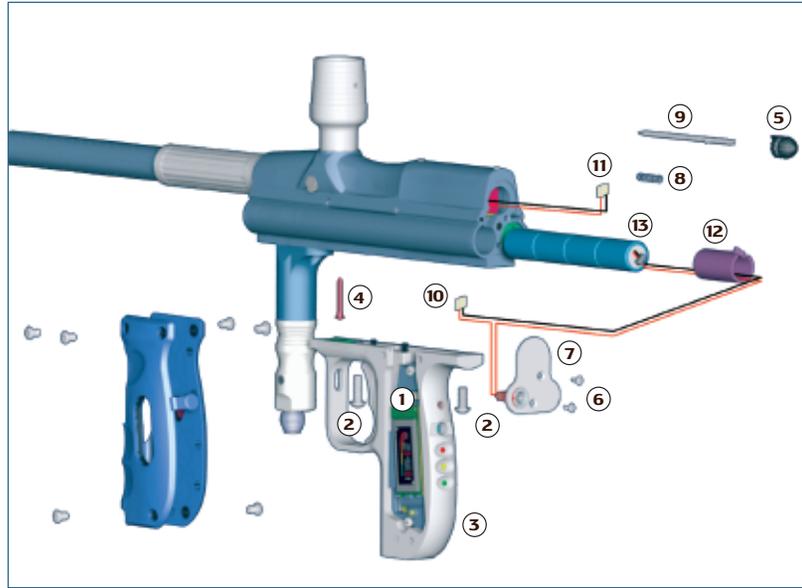
- Remove the frame **3** from the body.
- Remove the trigger pivot lock grub screw **4** using a suitable imperial 1/16 Allen key.
- Remove the trigger pivot pin **5** using a suitable punch on the opposite side that the pivot lock screw was removed from.
- Back off the adjustment screws **6**, **7** and **8**.
- Select the required pivot point **9** and re-insert the pivot pin **5** and the pivot pin lock screw **4**.
- The screw furthest from the finger location **6** that projects above the trigger controls the over-travel. Using a suitable metric Allen key adjust to suit. Counter-clockwise reduces the over travel.
- The screw closest to the finger location **7** that projects above the trigger controls the return stroke. Using a suitable metric Allen key adjust to suit. Counter-clockwise reduces the return-stroke.
- Replace the solenoid and battery connectors into the PCB.
- Switch the ANGEL™ **ON**. Offer the frame to the body and ensure that the trigger operates by pulling the trigger.
- The LED display power bar will cascade when the trigger is pulled. Should this not occur see the important notes below.
- Replace grip frame screws and remaining wiring connections into the PCB.
- Further fine tuning can be achieved by adjusting the toe adjuster screw **8** within the limits set by adjuster screws **6** and **7**.
- Verify the trigger is functioning correctly.
- Replace grip cheek cover screws using a suitable metric Allen key.

IMPORTANT NOTES: For re-assembly of components

- There must be sufficient over travel to activate the OPTO™ board, otherwise the OPTO-Trigger will not operate correctly.
- There must be sufficient return stroke to reset the OPTO™ board otherwise the OPTO-Trigger will not operate correctly.
- Do not trap any wiring or damage could occur to the wiring resulting in a fault developing.
- Should the trigger be incorrectly adjusted, re-adjust the return stroke screw or the over travel screw by repeating the procedures listed above.
- When adjusting the trigger stroke screws **6**, **7** and **8**, we recommend you apply a small amount of Loctite low strength thread lock to prevent movement due to vibration prior to adjustment.
- The OPTO™ board is a non-mechanical switch that is silent in its operation and no audible click is present.
- The OPTO™ board should not be exposed to direct sunlight or external strong sources of light without the grip cheek fitted as this light will induce a safety feature that prevents the ANGEL™ from firing whilst it remains exposed to the external strong light.



MAINTENANCE – BATTERY REMOVAL



BATTERY REMOVAL

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGEL™
- Ensure the hopper is removed from the ANGEL™
- Ensure that there are no paintballs in the ANGEL™
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGEL™ before disassembly.
- The ANGEL™ can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

The battery is a metal hydride 4.8 volt stick and is a item that will wear out with time dependant on the number of charges / discharges it has completed. An indication of a worn battery is that it will not charge fully or that it will not hold a charge for a prolonged period.

- Remove the grip cheek cover by removing the 6 retaining screws using a metric 2.5mm A/F Allen key.
- Unplug the battery and solenoid plugs from the PCB ①.
- Remove the 2 grip frame screws, ② holding the frame to the body using a suitable 3mm A/F Allen key.
- Remove the grip frame ③ from the body.
- Ensure the SENSI™ rod ④ is not lost.
- Remove the breech block pull knob ⑤ by gently pulling and unscrewing counter-clockwise.
- Remove the countersunk screws ⑥ holding the back plate in place using a suitable 2.0mm A/F metric Allen key.
- Carefully lift the back plate ⑦ off.
- Retract breech block lock pin ⑨ and spring ⑧.
- Carefully feed the battery plug ⑩ and the solenoid plug ⑪ that was inserted into the PCB though the ANGEL™ body and withdraw the wires from the rear of the ANGEL™
- Remove the battery spacer ⑫ from the battery cavity.
- Carefully withdraw the metal hydride battery ⑬ from the ANGEL™ body.
- Re-assemble in reverse order.

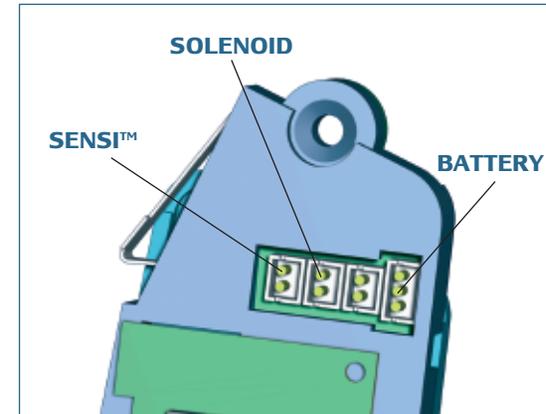
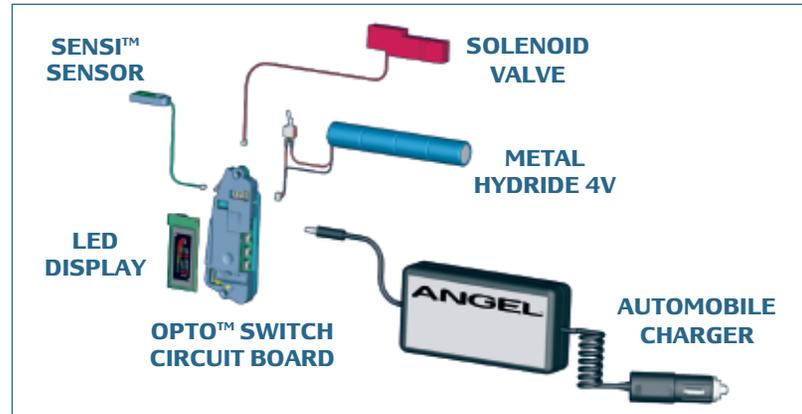
IMPORTANT NOTES: For re-assembly of components

- Do not pull or apply excessive force to the wires.
- Do not trap any wiring or damage will occur to the wiring resulting in a fault developing.
- Do not attempt to disassemble the battery stick.
- Ensure that when the switch is replaced that it is rotated so that the ON position is as per the diagram in the section SWITCHING ON YOUR ANGEL™ - page 4.





MAINTENANCE – WIRING CONNECTIONS



WIRING CONNECTIONS

⚠ WARNING

ADHERE STRICTLY TO THESE
AND ALL OTHER SAFETY
INSTRUCTIONS AND GUIDELINES

- Ensure a barrel blocking device is fitted to the ANGELOTM
- Ensure the hopper is removed from the ANGELOTM
- Ensure that there are no paintballs in the ANGELOTM
- Always remove the first stage regulator and relieve all residual gas pressure from the ANGELOTM before disassembly.
- The ANGELOTM can hold a small residual charge of gas, typically 2 shots, with the first stage regulator removed. Always discharge the marker in a safe direction to relieve this residual gas pressure.

- Ensure the ANGELOTM is **degassed** and switched **OFF**.
- Remove the left-hand side grip cheek cover by removing the 3 screws using a suitable metric Allen key.
- Access to the PCB connections is now gained.

IMPORTANT NOTES: For re-assembly of components

- Do not trap any wiring or damage could occur to the wiring resulting in a fault developing.
- Do not pull the plugs out from the PCB by the wiring use a suitable tool.



APPENDIX – FAULT FINDING TABLE

PROBLEM	SOLUTION	PAGE	PROBLEM	SOLUTION	PAGE
ANGEL™ WILL NOT FIRE			BREAKING PAINTBALLS		
No air or nitrogen present?	Propellant Air/Nitrogen Supply .	5	Is the paint too fragile?	Use less fragile paint.	-
Is the battery pack charged?	Charging the ANGEL™	3	Is the barrel bore correct for the paint?	Use suitable barrel.	-
The battery is not charging.	Check vehicle voltage.	-	Is the paint swollen, cold, hot?	Review your storage of paint.	-
Is the ANGEL™ in safe	Switching the ANGEL™ on.	4	Is the loader battery weak/dead?	Replace batteries.	-
Is the isolator switched off?	Switching the ANGEL™ on.	4	Is a suitable working loader fitted?	Replace loader.	-
Is the trigger not closing the switch?	Trigger Adjustment.	31-33	Is the rate of fire set too high?	MROF Adjustment.	9
Is the trigger not releasing the switch?	Trigger Adjustment.	31-33	Is the anti-double balls functioning?	Clean or replace.	21
Is the bolt jammed forward?	Clear the blockage from breech.	-	CHOPPING PAINTBALLS		
Is the LPR set correctly?	LPR Adjustment.	22	Is the loader battery weak/dead	Replace batteries.	-
Is the OPTO™ Trigger functioning?	OPTO™ Trigger Adjustment.	31-33	Is a suitable working loader fitted?	Replace loader.	-
Are the connectors plugged in correctly?	Circuit board layout.	35	Is the loader dirty?	Clean loader.	-
VELOCITY VARIATIONS			Is the Gated Feed™ damaged?	Replace the Gated Feed™ insert.	7
Are good quality paintballs been used?	Use good paintballs.	-	Are the paintballs swollen?	Replace the paintballs.	-
Is the barrel bore correct for the paint?	Use suitable barrel.	-	Is the SENSI™ on?	SENSI™ Test.	8
Is the paint swollen, cold or hot?	Review your storage of paint.	-	Rate of fire set too high	MROF Adjustment.	9
Is the barrel bore clean?	Clean the barrel.	-	Anti-double balls functioning?	Clean or replace.	21
Is the tank regulator choking on gas supply?	Check tank regulator assembly.	-	FIRING TOO SLOW		
Is the tank regulator operating correctly?	Check tank regulator assembly.	-	Is the rate of fire set correctly?	MROF Adjustment.	9
Is the mini-regulator operating correctly?	Mini-Regulator Service.	20	Is SENSI™ functioning correctly?	SENSI™ Adjustment.	8
Is the mini-regulator choking on gas supply?	Mini-Regulator Service.	20	EXCESSIVE NOISE / GAS CONSUMPTION		
Are non-suitable after market parts fitted?	Use genuine ANGEL™ parts.	-	Is the valve Dwell set correctly?	Dwell Adjustment.	13
Is the bolt worn?	Replace Bolt.	6	Is the LPR pressure set correctly?	LPR Adjustment.	20
Is the LPR set correctly?	LPR Adjustment.	22	Is the exhaust valve worn?	Exhaust Valve replacement.	24
Is the valve dwell set correctly?	Dwell Adjustment.	13	GAS LEAKING		
Is the ram set correctly?	Ram Stroke Adjustment.	28	From the back cover?	Check solenoid valve.	15
VELOCITY TOO LOW / HIGH			From the Ram assembly	Check ram body O rings.	28
Is the high pressure regulator set correctly?	Check at Gas source.	-	From the gas joints?	Check all fittings.	15-17
Is the velocity adjuster screw set correctly?	Velocity Adjustment.	7	From exhaust valve?	Check Exhaust valve stem.	24
Is the bolt sticking?	Check Anti-Double Ball.	21			
Is the LPR set correctly?	LPR Adjustment.	22			
Is the valve dwell set correctly?	Dwell Adjustment.	13			
Is the Ram set correctly?	Ram Stroke Adjustment.	28			



APPENDIX – USEFUL CONVERSIONS

USEFUL CONVERSIONS

Listed are some useful conversions relating to pressure, velocity, mass and distance.

PRESSURE

1 atm = 1.01325 bar
 1 atm = 14.6959 psi
 1 bar = 14.5038 psi
 1 psi = 0.0689476 bar

VELOCITY

1 Ft/s = 0.3048 m/s
 1 Ft/s = 0.6818180 Mph
 1 m/s = 3.28084 Ft/s
 1 m/s = 2.23694 Mph
 1 m/s = 3.6 Kph

MASS

1 g = 0.05274 oz
 1 Kg = 2.20462 lb
 1 oz = 0.0283495 Kg

DISTANCE

1 mm = 0.0393701 Inch
 1 Inch = 25.4mm
 1 thou = 25.4 micron
 1 micron = 0.0393701thou

FORMULA TO CONVERT FEET PER SECOND (Ft/s) TO FOOT lbs (Force)

1 foot lbs (force) = 1.35582 Joules
 1 Joule = 0.737562 foot lbs (force)
 1 Gram = 15.4324 Grains
 1 Grain = 0.000142857 lb
 1 lb = 7000 Grains

$$\frac{\text{Velocity squared} \times \text{Projectile weight}}{450240}$$

VELOCITY = Ft/s (feet per second)

PROJECTILE WEIGHT = GRAINS

Therefore a paintball @ 3.2grams @ 300Ft/s = 9.9 foot lbs (ftlb)



APPENDIX – TERMS OF WARRANTY - EEC/ROW (Exc USA/CAN)

TERMS OF WARRANTY - EEC/R.O.W. Excluding USA / CANADA

Subject to the conditions set out below WDP Ltd. 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 the date of purchase.

WDP Ltd gives this warranty 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, circuit boards, displays and exhaust valves are not covered by this warranty. Wilful damage, negligence, abnormal working conditions, weather, accident, tampering, failure to follow manufacturers 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 given by the manufacturer to the company.

This warranty does not cover the following:

- Repairs, alterations or replacements not authorised by the manufacturer.
- The gradual reduction in performance linked to the age of the ANGEL™ or usage.
- Anything caused directly or indirectly by vandalism or theft.
- Any damage to parts which are recalled by the Manufacturer.
- Any loss, damage or failure, which a qualified engineer appointed by the Manufacturer, believes could have been avoided or was totally or partly caused by a lack of maintenance.

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 S 13159) the statutory rights of the purchaser are not affected by these conditions. Carriage charges in relation to warranty claims shall be borne 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 use or misuse of the ANGEL™ shall not exceed the purchase price of the ANGEL™. Purchaser agrees to adhere strictly to all warnings and safety procedures and the contents of the Operators Manual.

The laws of England shall govern this warranty and the purchaser agrees to submit to the non-exclusive jurisdiction of the English courts.

The supply and purchase of the ANGEL™ is subject to the company's standard terms and conditions of sale, a copy of which is available on request. ANGEL™ patents applied for, design rights and all rights reserved. The ANGEL™ is marketed and distributed by WDP Ltd. company, registered in England No. 2114341.

No warranty is given to parts not manufactured by the manufacturer and all liability for loss damage or injury is excluded.

This warranty must be construed and read in conjunction with the products terms and conditions of sale.

To make a warranty claim, buyer must first contact the nearest authorised ANGEL™ Service Centre for instructions. A list of authorised ANGEL™ Service Centres may be obtained through WDP Ltd. website: www.wdp.tv, or by contacting WDP by mail at WDP Ltd., Metro Triangle, 221 Mount Street, Nechells, Birmingham, England, B7 5QT, or by fax at +(44) (0) 121 327 3967, or by calling +(44) (0) 121 328 2228.

APPENDIX – WDP LTD. EXPRESS WARRANTY - USA/CAN ONLY

WDP LTD. EXPRESS WARRANTY USA / CANADA ONLY

1. General Express Warranties.

WDP Ltd. warrants to the buyer who is purchasing to place into use (Buyer) only, that the ANGEL™ (Product) shall be free from material manufacturing defects in materials and workmanship for six months from the date

of purchase, subject to the requirements, disclaimers and limitations of this Warranty. This is not a Warranty of performance, but a limited Warranty as to the condition of the Product at the beginning of the Warranty period, this Warranty is only against such defects and not against any other failures such as, but not limited to, those due to wear and tear, exposure to the elements, unusual operating environments, misuse, negligence, accident, alteration or repair in any respect which, in the judgement of WDP Ltd., adversely affects the condition or operation of the Product. Normal maintenance and perishable items such as seals, batteries, wiring, indicator lamps and exhaust valves are excluded from this limited Warranty against defects. This Warranty is not transferable and it may not be waived or expanded except in writing signed by WDP Ltd. The terms and limitations of this Warranty shall also apply to any additional goods or information, which may be distributed by WDP Ltd., relating to the ANGEL™.

2. Disclaimer and Limitation of Express and Implied Warranties.

There are no express Warranties other than those contained in this Warranty. Whether or not the Product is to be used exclusively by Buyer, there shall be no third party beneficiaries to this Warranty herein. NO WARRANTY IS PROVIDED TO DISTRIBUTORS OR DEALERS EXCEPT AS MAY BE EXPRESSLY PROVIDED IN A SEPARATE AGREEMENT OF SALE. All descriptions, illustrations of the Product and other information in catalogues, brochures and price lists or otherwise provided by WDP or others are intended for general information only. WDP Ltd., is not responsible for any errors or omissions therein or for any loss or damage resulting from reliance on them. WDP Ltd., does not warrant that the Product is in compliance with any law or industry standards, guidelines or procedures. WDP Ltd. standard terms and conditions of sale also apply if Buyer is a direct purchaser from WDP Ltd. WDP LTD. DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING, BUT NOT LIMITED TO, THOSE OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY.

3. Remedy and Limitation of WDP Ltd. liability.

Defective or non-conforming Product or parts thereof discovered and returned to WDP Ltd. freight prepaid, with proof of purchase, during the Warranty period shall be repaired or replaced by WDP Ltd. without any additional charge and shipped to Buyer, FOB WDP Ltd. In lieu of repair or replacement, if WDP Ltd. elects, WDP Ltd. may, upon return of such product and making a determination of non-conformity or defect, keep the product and refund the purchase price paid

by Buyer. Buyer's remedies shall be limited (even in the event of WDP Ltd. default of its Warranty obligations) exclusively to those provided in this Warranty. UNDER NO CIRCUMSTANCES SHALL WDP LTD. OR ANY SUPPLIER, DISTRIBUTOR, DEALER, OR OTHER PERSON BE LIABLE FOR EXEMPLARY, PUNITIVE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, NOR FOR ANY AMOUNT IN EXCESS OF THE BUYER'S PURCHASE PRICE. Buyer waives any causes of action or theories of liability including, but not limited to, those arising under contract, tort, strict liability, Product liability, statutes, or otherwise, except as to those specifically provided by the Uniform Commercial Code (as adopted in Michigan) as excluded, modified and limited in this warranty.

4. Additional Consumer Protection.

The products are offered for sale for end use in supervised commercial establishments where professional safety codes are enforced, and not for personal, family or household use. Nevertheless, if the Product is determined in a transaction to be a customer Product under applicable law, the following provisions shall become applicable:

- (a) THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS OF THE PRODUCT FOR A PARTICULAR PURPOSE THAT CANNOT BE DISCLAIMED ARE LIMITED IN DURATION TO THE INITIAL EXPRESS WARRANTY PERIOD.
- (b) Some states do not allow limitations on how long an implied Warranty lasts, so the above limitation in (a) may not apply.
- (c) Some states do not allow the exclusion or limitation of incidental or consequential damages, so such limitations may not apply.
- (d) And this Warranty gives buyer specific legal rights, and buyer may also have other rights provided for by law.

5. Parts, Service and Training performed by WDD Ltd.

All Warranty and non-Warranty parts, labour and service, if any, provided by WDP Ltd. related to the product are subject to all limitations and disclaimers of warranties and remedies provided in this Warranty. The replacement or repair of a product by WDP Ltd. does not give rise to any new Warranty except the Warranty period provided for herein shall be extended by the length of any period in which defective or non-conforming product is in possession of WDP Ltd. WDP Ltd. may have access to the Product after purchase of the Product. WDP Ltd. is not under any duty to inspect the product for any defects or any improper use or modification of the Product, nor to correct or advise anyone of any such condition, use or modification, which is observed. Any notification, which may be given, is voluntary and subject to all limitations and disclaimers in this Warranty.

WDP LTD. EXPRESS WARRANTY USA / CANADA ONLY CONTINUED

6. User's Responsibility for Safety and Indemnification

It is Buyer's or other user's responsibility to obtain all training and means that may be necessary to effectively protect all individuals and property from damage and bodily injury, which otherwise may result from the use or maintenance of the Product, and to use the Product in accordance with operating instructions and due care.

If operating instructions are not provided with the Product or have been lost, a copy will be provided by WDP Ltd. without cost on request. Buyer shall use and shall require all others to use all safety devices and guards furnished with or intended to be used with the Product, and to follow proper safe operating procedures in accordance with general industry standards and as set forth in manuals and instruction information furnished by WDP Ltd. If Buyer fails to comply with the obligations set forth in this section, the buyer shall defend and indemnify WDP Ltd. harmless from any claim, liability or obligation incurred by WDP Ltd. or its suppliers, distributors, or dealers to persons injured directly or indirectly in connection with the use of the product contrary to this Warranty or any warning or instruction from WDP Ltd.

7. Law and Jurisdiction.

This Warranty shall be governed by the laws of Michigan, and Buyer irrevocably submits to the non-exclusive jurisdiction of courts sitting in Michigan to resolve all disputes arising from or related to this warranty or use of the Product.

8. Claims and information procedure.

To make a warranty claim, Buyer must first contact the nearest authorised ANGEL™ Service Centre for instructions. A list of authorised ANGEL™ Service Centres may be obtained through WDP Ltd. website: www.wdp.tv, or by contacting WDP Ltd. by mail at WDP Ltd., Metro Triangle, 221 Mount Street, Nechells, Birmingham, England, B7 5QT, or by fax at 011 44 121 327 3967, or by calling 011 44 121 328 2228.

UPDATES

The specification and photographs in this material are for general guidance purposes only. Our products are continuously updated and changes may be made to specifications, design, or appearance from time to time.

For the latest specification, virtual products and on line technical support we recommend that you visit our website: www.wdp.tv.



APPENDIX – YOUR PERSONAL DETAILS

Completing these details upon purchase will enable us to help you with your enquiries.

PURCHASE DETAILS

MODEL/COLOUR

BODY/BLOCK SERIAL No

UNIQUE ELECTRONIC ID No.

PURCHASED FROM

DATE

Street

CITY

STATE

COUNTRY

ZIP/POSTCODE

PHONE

YOUR DETAILS

NAME

STREET

CITY

STATE

COUNTRY

ZIP/POSTCODE

PHONE





NOTES







NOTES

