RMS/HYBRID™ 54/300-900 ROLOADABLE HYBRID MOTOR SYSTEM

READ THIS BEFORE YOU BEGIN:

- Study the illustrations and sequence of assembly. THE SEQUENCE OF ASSEMBLY IS EXTREMELY IMPORTANT. READ ALL INSTRUCTIONS BEFORE USE. USE RMS/HYBRID™ MOTORS ONLY IN ACCORDANCE WITH ALL INSTRUCTIONS. READ ALL PARTS LIST AND BECOME FAMILIAR WITH ALL PARTS BEFORE ASSEMBLY. IF ANY PARTS ARE MISSING OR DAMAGED, CONTACT AERO-Tech AT THE NUMBER ABOVE FOR ASSISTANCE.

- DO NOT MODIFY THE MOTOR IN ANY WAY. Modification of the motor, flight cylinder, or reload kit in any way will invalid your waranty.

- DO NOT USE ORDINARY "PAINTBALL" CYLINDERS AND VALVES IN THE RMS/HYBRID™ MOTOR SYSTEM. Commonly-available "paintballs" cylinders are designed for use with carbon dioxide (CO2) and are not suitable for use with nitrous oxide intended for N2O serving. Cylinders intended for N2O serving must be certified as "oxygen clean" to prevent ignition of contaminants. Paintball cylinders may contaminate the flight cylinder or reload kit with rust inhibiting chemical components which have been shown to ignite in the presence of liquid N2O, and are not able to deliver sufficient quantities of N2O to the combustion chamber to produce designed motor thrust levels.

- NEVER USE PETROLEUM-BASED OILS OR OILS IN THE FLIGHT CYLINDER, CYLINDER VALVE ASSEMBLY, CYLINDER FITTING ADAPTERS, OR ON ANY INSIDE SURFACES OF THE RMS/HYBRID™ PROTOTYPE/FORWARD CLOSURE ASSEMBLY. Use only Krytox™ or other fully-fluorinated grease specifically designed for use in oxygen systems in these areas. Ordinary greases are susceptible to spontaneous ignition and/or explosion when exposed to pressurized nitrous oxide (N2O). The only exception to this is that petroleum-based grease is acceptable for use in the N2O preheater charge well of the RMS/HYBRID™ forward closure.

- DO NOT ATTEMPT TO REMOVE THE PIN VALVE ASSEMBLY FROM THE RMS/HYBRID™ RELOAD KIT AND DO NOT REMOVE THE PRESSURE RELIEF VALVE ON THE CYLINDER VALVE ASSEMBLY. Tampering with or removal of these parts will render the device dangerous to use, possibly resulting in serious injury or death.

- DO NOT FILL THE FLIGHT CYLINDER BEYOND THE CAPACITY RATE OF FLOW. Exceeding the maximum fill rate may cause the motor to overheat or burn violently without warning at certain elevated temperatures.

- USE ONLY RMS/HYBRID™ RELOAD KIT AND MOTOR PARTS TO REFURBISH YOUR RMS/HYBRID™/HYBRID™ Motor. The Aero-Tech™ motor must be compatible with the forward closure you have ordered for your particular AeroTech™ RMS/Hybrid™ motor. Use of injection components in motors not compatible with the forward closure, motor, soda can, and will void your waranty. Only use Aero-Tech™ RMS/HYBRID™ reload kits intended for your specific AeroTech™ RMS/Hybrid™ motor. DO NOT INTERCHANGE PARTS. Do not use AeroTech™ RMS/Hybrid™ reload kits or motor components for any purpose other than to refurbish an AeroTech™ RMS/Hybrid™ motor.

- DO NOT REUSE ANY OF THE DISPOSABLE PARTS OF THE RMS/HYBRID™ RELOAD KIT. This includes the fuel grains, liners, nozzle, o-rings, and other parts. These components have been designed for use one time only and must be discarded after firing. Reuse can result in motor failure during subsequent operation and will invalidate your waranty.

- Motors are hot after firing. Although the rechargeable RMS/Hybrid™ motor operating at elevated temperatures is capable of solid propellant motor fire, the high thermal conductivity of the aluminum motor parts may make it seem otherwise. If necessary to handle a motor before it has cooled down, use a rag or similar means.

- Read and follow the safety code of the Tripoli Rocketry Association (TRA) and comply with all federal, state, local laws, regulations and ordinances in all activities involving high power rockets.

PARTS:

RMS/HYBRID™ 54/300-900 ROLOADABLE HYBRID MOTOR SYSTEM:

- RMS/HYBRID™ 45.4 aft closure
- RMS/HYBRID™ 91 case
- RMS/HYBRID™ 183 closure with injector plate assembly & jet plugs
- 150, 300, or 480cc flight cylinder with valve assembly (package of 10) - $2.50 each

RMS/HYBRID™ RELOADABLE HYBRID MOTOR SYSTEM ACCESSORIES:

- Pyrovalve™ retainer key wrench (3/8"
- Nitrous oxide injector plate assembly (3/8" O.D. X 1-1/8" I.D.) - $0.50 each
- N2O cylinder fitting adapter & transfer hose assembly Krytox™ or other fully-fluorinated grease specifically designed for use
- Exhaust #LS5000 5000 gram electronic balance
- #25150-00 100 gram calibration weight

RMS/HYBRID™ 2.3-4.5 JET RELOAD KIT:

- Nozzle (Large black plastic part)
- Forward hybrid fuel grain (5/8" O.D. X 11/16" I.D. paper tube)
- Forward hybrid fuel grain (5/8" O.D. X 1" I.D. paper tube)
- Forward hybrid fuel grain (5/8" O.D. X 7/8" I.D. paper tube)
- Forward hybrid fuel grain (3/8" O.D. X 1" I.D. orange paper tube)
- Forward hybrid fuel grain (3/8" O.D. X 7/8" I.D. orange paper tube)
- Field Aft-o-rings (1" thick X 2" O.D.)

CAUTION: Do not use a Pyrovalve™ component with any visible defects.

Chapter 2. Pyrovalve™/Forward Closure Preparation

2-1. Check the forward closure to ensure that the proper length of jet plug (0.48" O.D. X 1.25" I.D. paper tube) is used. A Pyrovalve™ injector plate corresponding to the reload kit being used (2, 3 or 4 jet) is located in the injector plate assembly. Store any unused Pyrovalve™ injector plate assembly in a dry, cool location.

2-2. Apply a light coat of Krytox™ or grease to the Pyrovalve™ (3/32" X 3/8") O.D. ring to ensure that the Pyrovalve™ is seated against the aft fuel grain. If necessary, wrap the forward fuel grain with a large black plastic part to ensure that a 1/16" gap remains between the case and the closure.

2-3. Install the Pyrovalve™ retainer key wrench (3/8"
- Install the Pyrovalve™ retainer back-up washer (5/8" O.D. X 1/6" thick) for any holes, cuts or other defects.

Chapter 3. Combustion Chamber Assembly

3-1. Apply a light coat of petroleum-based grease to all casing threads and closure outer threads and both forward and aft o-rings. This will facilitate assembly and prevents the threads from seizing.

3-2. Use your fingernail or other blunt object, remove the burr (rough, raised edge) from both inside ends of the liner tube (2" O.D. X 1-7/8" O.D. paper tube)

Chapter 4. Fuel Grain Assembly

4-1. Place the greased forward (1/8" thick X 2" O.D.) o-ring into the case, thread the forward closure into the aft end of the motor, and tighten the o-ring.

Chapter 5. Igniter Guide Assembly

5-1. Install the aft end o-ring into the motor casing.

5-2. Insert the igniter guide (1/4" flat X 1/4" I.D. o-ring) into the igniter guide assembly. Use of a 1/16" thick X 2" O.D. o-ring will provide a snug fit.

5-3. Place the Pyrovalve™ retainer back-up washer (5/8" O.D. X 1/6" thick) into the Pyrovalve™ charge well.

5-4. Install the Pyrovalve™ retainer (4" O.D. X 1-7/8" I.D. orange paper tube) and forward o-ring into the Pyrovalve™ charge well.
4-3. After the motor has cooled down, remove the flight cylinder and the forward and aft closures. Replace the cylinder valve fitting over the valve fitting bottoms out against the forward closure and discard. Using wet wipes or damp paper towels, wipe the inside of the case to remove all combustion residues.

6-4. Apply a light coat of petroleum-based grease to casing threads, outer forward and aft closure threads and the inside of the motor case. Reassemble metal parts and store motor in a dry place.

Chapter 7. First Aid

For a minor burn, apply a burn ointment. For a severe burn, immerse the burned area in ice water at once and see a physician as quickly as possible. In the unlikely event of oral ingestion of the igniter propellant or Pyrovalve™ element, induce vomiting and see a physician as quickly as possible. The AeroTech RMS/Hybrid™ forward closure, and repeat the motor preparation and cleaning procedure before loading the Reload Kit. Note: the slimy propellant can be easily handled using leather gloves.

Chapter 8. Disposal

Damaged or defective reload kits should be returned to AeroTech™.

Chapter 9. Fire Safety

Tests show that the pyrotechnic ignition components of RMS/Hybrid™ reload kits will ignite only if exposed to an open flame and then will burn away. Use water to fight fires in which AeroTech™ Reload Kits are involved. Forcibly opening the Reload Kit’s case will not extinguish the fire. Aerosol fire extinguishers will NOT extinguish burning propellants of the type used in AeroTech™ Reload Kits. Fires will rise rapidly to the ceiling. Do not attempt to put out a Reload Kit fire. Quickly get everyone out of the area in cold water at once and see a physician as quickly as possible. In the unlikely event of oral ingestion of the igniter propellant or Pyrovalve™ element, induce vomiting and see a physician as quickly as possible. The AeroTech RMS/Hybrid™ exhaustion gases from fires, sources of heat and flammable materials.

Disclaimer and Warranty

NOTICE: AeroTech™ certifies that it has exercised reasonable care in the design, manufacture and testing of its products. As we cannot control the storage and use of our products, once sold we cannot assume any responsibility for product storage, transportation or use. AeroTech™ shall not be held responsible for any personal injury or property damage resulting from the handling, storage or use of our product. The buyer assumes all risks and liabilities therefrom and agrees to indemnify and hold harmless AeroTech™ from any claim or damage arising out of the use, misuse or unauthorized modification of this product. This warranty is not transferable. An AeroTech reload kit may be returned to AeroTech™ for replacement or repair, at AeroTech™ discretion, of those products which are proven to be defective in manufacture within one year from the date of original purchase. For repair or replacement under this warranty, please contact AeroTech™. Proof of purchase will be required. Note: Your state may provide additional rights not covered by this warranty.

Chapter 5. Misfires

5-1. If a misfire occurs and a loaded RMS/Hybrid™ motor does not ignite for any reason within five seconds of pressing the launch button, release the launch button and remove the safety key from the electrical launch controller. WAIT ONE MINUTE before approaching or allowing anyone else to approach the vehicle. CAUTION: Weak launch pads and approved eye protection during this operation. Keep your fingers and hands out of the engine compartment and from the exhaust of the motor exhaust. Do not place any part of your body in front of the vehicle. Disconnect the igniter clips (if) from the electric motor. Open the Reload Kit’s case and keep it sealed in a safe location. Keep the motor nozzle and flight cylinder pointed away from your face and body. Do not hold the Reload Kit’s case or the Reload Kit itself while the Reload Kit is exercising. Knock the Reload Kit’s case against the forward closure. Knock the Reload Kit’s case against the rear closure. Knock the Reload Kit’s case against the forward closure and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues.

Chapter 6. Post-Flight Motor Cleanup

NOTE: Perform motor clean-up as soon as possible after motor firing. Fuel combustion residues become difficult to remove after 24 hours and can lead to corrosion of the metal parts. Perform metal component residues in the reload to plastic bag and dispose of properly.

6-1. After the motor has cooled down, remove the flight cylinder and the forward and aft closures. Replace the cylinder valve fitting over the valve fitting bottoms out against the forward closure and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues. Knock the Reload Kit’s case against the Reload Kit’s case and discard. Using wet wipes or damp paper towels, wipe the inside of the Reload Kit’s case to remove all combustion residues.