**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 KBA Loaded Motors and Reload Kits Only in Accordance with All Instructions. Review the parts list and become familiar with all parts before assembly. If Any Parts Are Missing or Damaged, Contact RCS at 1-435-865-7100.
- **Do not use any parts of the KBA system that are damaged in any way.** If in doubt, contact RCS at the number above for assistance.
- **Do not modify the motor in any way.** Modification of the motor or the reload kit parts could result in motor failure, leading to the destruction of both your rocket and motor and may cause personal injury, death and/or property damage. Modification of the motor or reload kit in any way will invalidate your motor warranty.
- **Use only KBA reload Kits and Motor parts to refurbish your Kosdon TRM motor.** The KBA reload kits have been designed specifically for use in your particular Kosdon TRM motor. Use of imitation components may destroy your motor, rocket and payload and will invalidate your motor warranty. Only use KBA reload kits intended for your specific Kosdon TRM motors. **Do not interchange parts!** Do not use KBA reload kits or motor components for any other purpose than to refurbish a Kosdon TRM motor.
- **Do not reuse any of the disposable parts of the KBA reload kit.** This includes the liner and o-rings. These components have been designed for one use only and must be discarded after firing. Reuse can result in motor failure during subsequent operation and will invalidate your motor warranty.
- Motors are hot after firing. Although the KBA motor operates at a lower temperature than most disposable motors, the higher 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 article.

**Chapter 1. Forward Bulkhead Assembly**

1-1. Apply a light coat of Syncro™ Super Lube™ or other grease to all three (3) o-rings. This will facilitate assembly and promotes proper sealing of the o-rings.

1-2. Fig.-1 & 2: Chamfer both inner edges of the delay insulator with your fingernail. Assemble the KBA delay element, delay insulator, aft delay spacer (if supplied) and delay o-ring as shown.

1-3. Fig.-3: Insert the forward delay spacer (7/8" O.D. neoprene washer) into the forward bulkhead delay cavity until it is seated against the forward end of the cavity. Apply a light film of grease to the inner circumference of the delay cavity (but not the forward end of the cavity).

1-4. Fig.-3: Insert the completed delay assembly shown in Fig.-2 into the forward bulkhead delay cavity, o-ring end first, until it is seated against the forward delay spacer. **Note:** If required, apply grease or masking tape on the outside of the delay assembly for a snug fit in the bulkhead.

1-5. Fig.-3: Install a greased 1" O.D. X 3/32" o-ring in the outside groove in the forward bulkhead.

**Chapter 2. Case Assembly**

2-1. Fig.-4: Place the greased nozzle o-ring (1" O.D. X 3/32") into the groove in the graphite nozzle.

2-2. Fig.-4: Put grease on your index finger and wipe a film of grease on the I.D. of both ends of the case. Using a twisting motion, install the nozzle into the end of the case that has the external snap ring groove (if applicable). **Note:** From the drawing the proper orientation of the nozzle.

2-3. Fig.-5: Install the steel nozzle washer in the case seat against the graphite nozzle.

2-4. Fig.-5: Using the snap ring pliers, install a 29mm snap ring into the internal groove on the nozzle end of the case. To prevent eye injury if a snap ring slips out of the pliers, wear eye protection and hold the motor casing at a right angle to yourself.

2-5. Fig.-6: Install the propellant grains into the paper liner tube. **Note:** Only three grains are shown in all illustrations for clarity. TRM-29-150 motors use three (3) grains, and TRM-29-250 motors use five (5) grains.

2-6. Fig.-7: Apply a light coat of grease to the outside surface of the liner. Install the liner assembly into the case until seated against the nozzle.

2-7. Fig.-8: Using a twisting motion, install the previously assembled forward bulkhead assembly into the forward end of the motor case until it is seated against the propellant grains. **Note:** From the drawing the proper orientation of the forward bulkhead.

2-8. Fig.-8: Using the snap ring pliers, install a 29mm snap ring into the internal groove on the bulkhead end of the case. To prevent eye injury if a snap ring slips out of the pliers, wear eye protection and hold the motor casing at a right angle to yourself. **Note:** It is normal if the grains rattle slightly inside the case.

**Chapter 3. Ejection Charge Installation**

3-1. Fig.-9: Dispense enough FFFFG black powder into the threaded cavity of the forward bulkhead to reliably activate the recovery system in the rocket that the motor is going to be installed in. Seal the open end of the cavity with paper wadding and/or masking tape.

3-2. Fig.-9: With the motor held in a **NOZZLE DOWN** position, gently shake the motor to settle the ejection charge into the cavity above the delay element.
Chapter 4. Preparation For Flight

Install igniter against delay charge.

Chapter 5. Misfires

If a misfire occurs and a loaded KBA 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 reapproaching or allowing anyone else to approach the rocket. Keep your fingers and hands out from underneath the rocket and away from the possible path of the exhaust jet. Do not place any part of your body over the launch pad. Disconnect the igniter clips from the electrical igniter. Carefully remove the igniter from the motor, and install a new igniter and repeat the launching process.

Chapter 6. Post-Recovery Cleanup

NOTE: Perform motor clean-up as soon as possible after motor firing. Propellant and delay residues become difficult to remove after 24 hours and can lead to corrosion of the metal parts. Place the spent motor components in the reload kit plastic bag and dispose of properly.

6-1. After the motor has cooled down, remove the snap rings and the alt steel washer from the case.

6-2. Insert the 1/2-13 bolt into the threaded cavity of the forward bulkhead and remove the bulkhead using a twisting and pulling motion.

6-3. Using a wooden dowel or similar instrument inserted into the forward bulkhead end of the case, gently push the nozzle out of the casing.

6-4. Remove the spent grain cartridges from the case and discard. Remove the delay insulator, delay o-ring and forward delay spacer from the forward bulkhead and discard. Remove and discard the nozzle o-ring and the forward bulkhead o-ring. Using wet wipes or damp paper towels, wipe the inside of the casing, nozzle and forward bulkhead to remove all propellant, delay and ejection charge residue. WARNING: FAILURE TO COMPLETELY REMOVE DELAY RESIDUE FROM THE INSIDE OF THE FORWARD CLOSURE CAN LEAD TO GAS LEAKAGE ON A SUBSEQUENT FLIGHT AND DAMAGE TO YOUR KBA MOTOR FORWARD BULKHEAD AND ROCKET VEHICLE.

6-5. Apply a light coat of grease to the exterior of the forward closure and the inside of the motor case. Store motor parts in a dry place. DO NOT store ungreased nozzle in casing which can lead to severe corrosion of the case.

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 propellant, induce vomiting and see a physician as quickly as possible. The KBA reload kit composite propellant consists primarily of ammonium perchlorate and a rubber-like plastic elastomer.

Chapter 8. Disposal

Damaged or defective reload kits should be returned to RCS.

Chapter 9. Fire Safety

Tests show that the pyrotechnic components of KBA reload kits will not explode in fires and normally will not ignite unless subjected to direct flame and then will burn slowly. Use water to fight any fires in which KBA reload kit pyrotechnic components may become involved. Direct the water at the KBA reload kit pyrotechnic components to keep them below their 550 deg. F autoignition temperature. Foam and carbon dioxide fire extinguishers will NOT extinguish burning propellants of the type used in KBA reload kit pyrotechnic components. Keep reload kit pyrotechnic components away from flames, sources of heat and flammable materials.

Disclaimer and Warranty

NOTICE: As we cannot control the storage and use of our products, once sold we cannot assume any responsibility for product storage, transportation or usage. RCS and/or Kosdon Enterprises 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 accepts and uses RCS/KBA products on these conditions. No warranty either expressed or implied is made regarding RCS/KBA products, except for replacement or repair, at RCS's option, 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 warranty, please contact RCS. Proof of purchase will be required. Note: Your state may provide additional rights not covered by this warranty.

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Chapter 9BvFire Safety

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NOTICE: As we cannot control the storage and use of our products, once sold we cannot assume any responsibility for product storage, transportation or usage. RCS and/or Kosdon Enterprises 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 accepts and uses RCS/KBA products on these conditions. No warranty either expressed or implied is made regarding RCS/KBA products, except for replacement or repair, at RCS's option, 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 warranty, please contact RCS. Proof of purchase will be required. Note: Your state may provide additional rights not covered by this warranty.