

Caution! Motor is hot after firing! Allow motor to cool before handling.

FOR YOUR SAFETY ALWAYS WEAR EYE PROTECTION

After Firing Cleanup

Disassembly - Remove the forward retaining ring and bulkhead from the case and discard the o-rings. Remove the snap ring from the forward bulkhead. Using the tips of your snap ring pliers or a large flat blade screw driver, insert them angled into the spent tracking smoke grain, leveraging the tips against the inside bottom wall and the body against the opposite outside end wall of the smoke grain. Using a twisting motion, pull the smoke grain out far enough to grab a hold of it and remove completely. Using a long 1" wooden dowel placed in the end of the nozzle, push the nozzle and liner out through the top end of the motor case. Remove the 2-turn spiral retaining ring with a small jewelers screw driver. To insure you do not mark the edge of the case, fold a piece of paper over at least 2 times and then fold it over the edge of the case where the screw driver is leveraged before prying out the retaining ring. Properly discard all spent motor contents including the nozzle in a proper trash receptacle. Completely clean all retaining rings, the bulkhead and motor case. Lightly coat the components with WD-40 to help prevent any corrosion or rust.

Before firing again, remove large deposits of slag from the nozzle face with a razor blade and jeweler's screw driver. Small slag deposits can be ignored, but the nozzle throat hole must be clear. Slag often loosens on its own over several days. Please see www.lokiresearch.com for more information on nozzle maintenance and best practice.

Compare the two retaining rings and if their shape differs, replace both with new parts. Inspect the nozzle washer to ensure it is flat and not bent or warped.

Disposal

In the unlikely event that a Loki Research reload kit needs to be disposed of due to damage or defects, it should be returned to Loki Research. Please contact Loki Research prior to shipment for instructions in this regard.

Safety & First Aid

Keep all reload kits away from sources of heat and flames and out of reach of children. When ignited, Loki Research propellant will burn slowly and will not explode. In case of accidental ignition, fight any fires with water. Foam and carbon dioxide are not effective against propellant fires. In the case of minor burns, apply first aid techniques and consult a physician. For more serious burns: immerse in cold water and seek immediate medical attention. Do not eat any part of a reload kit. In case of accidental ingestion, induce vomiting and call a physician immediately. Propellant consists mainly of ammonium perchlorate dispersed in a polyurethane synthetic rubber.

Disclaimer

Loki Research states that it has taken reasonable care in the design and manufacture of its products. However, as we cannot control the storage and use of our products, Loki Research cannot be held responsible for any personal injury or property damage resulting from storage, handling, or use of its products. Purchasers of Loki Research products hereby acknowledge this, and will hold Loki Research, LLC, its owners, employees, and subcontractors, blameless and harmless for any and all actions of the purchaser and user.

Limited Warranty

What does this warranty cover? We warrant each reload to be free from defects in material and workmanship. Our obligation under this warranty is limited to replacement or repair, at our discretion, of the reload and/or the Loki Research motor hardware only. Proof of purchase required.

How long does the warranty last? This warranty runs for one year from the date of original purchase.

What does the warranty not cover? This warranty does not cover defects or damage to airframes, vehicles, or other devices in which a rocket motor may be used, or to any support equipment they may require. This warranty does not cover defects or damage which result from abuse, misuse, negligence, or accidents. Also, consequential and incidental damages resulting from the use of this product or arising out of any breach of contract or breach of this warranty are not recoverable under this warranty. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above may not apply to you.

BORN ON:

Loki Research, LLC

8 Karen Dr

Eldon, MO 65026

www.lokiresearch.com

Made in USA

REV C-9/19/2016



LOKI RESEARCH ROCKET MOTORS

High Power Reload Kit

This package contains one reload kit for use with Loki Research 54mm rocket motors or equivalent*

*see www.lokiresearch.com Tech Page for hardware specifications

M-1378

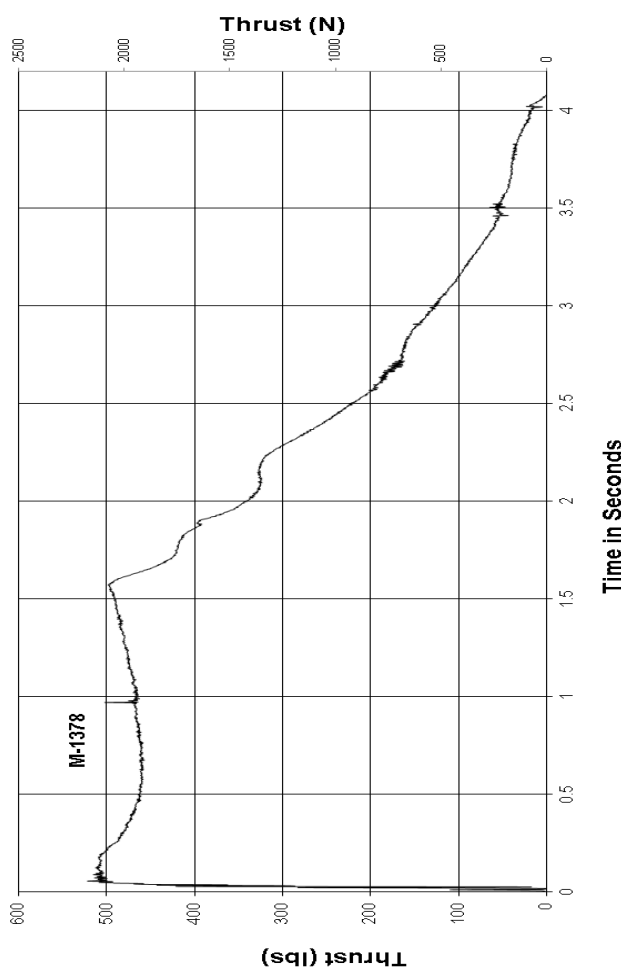
Loki Red Propellant: Red flame with little smoke

WARNING-FLAMMABLE

Keep out of reach of children. Do not use near open flame. Not for sale to persons under 21 years of age. For use by certified High-Power users only. Do not open until ready for use.

| Nozzle Size | Case Length | Total Impulse | Loaded Motor Weight | Propellant Weight | Delay Times (Seconds) |
|-------------|------------------------------|---------------|---------------------|-------------------|-----------------------|
| M-1378 | Gen 1 43.85" Gen 2 43.75" | 5363 N-sec | 4.455 Kg | 2.600 Kg | S M L XL |
| | | | | | Smoke Only |

Loki Red



Motor Assembly Instructions – For your safety always wear eye protection!

Before beginning the motor assembly, the propellant grains must be glued into the liner.

Please refer to the grain bonding instructions before continuing.

1. Check that all hardware pieces are clean and free of grease and soot. In particular, check and clean both retaining ring grooves on the motor case and the delay cavity in the bulkhead. Next, run your finger around the inside ends of the motor case. Feel for any nicks or sharp raised metal that may cut or tear the o-rings. If found, remove them with a sharp knife or small file prior to motor assembly.
2. Next, rub a very thin layer of grease on the inside of the bulkhead. Then apply a light film of grease to all o-rings and place them to the side where they are out of the way.
3. Place the smoke grain O-ring (1.25" OD x 3/32" thick) onto the external groove of the tracking smoke grain. Then apply a thin coat of grease to the back side of the smoke element. (Fig. 1).
4. Loosen the thumb screw air valve. Push the smoke element, greased end first, into the bulkhead until the forward face is past the internal retaining ring groove. (Fig. 2).
5. Tighten the thumb screw air valve and install the 1.25" retaining ring.
6. Install one Primary O-ring onto the main bulkhead O-ring groove and the liner shoulder o-ring onto the bulkhead shoulder groove. Install the second primary o-ring onto the single use phenolic/graphite nozzle provided with the reload kit.
7. Grease the liner. - Stand the liner up on end with the grains already bonded in place, nozzle end on the bottom, head end at the top. Coat the entire length of the liner with a thick coat of high temperature axle grease. Wipe a very thin layer of grease around the forward inside end of the liner. Slowly slide the motor case (thrust ring end first) down over the motor liner. There should be enough grease on the liner that excess grease is continually pushed off the entire way down. When only an inch or so of liner remains exposed, lay the motor down on its side, push the liner flush with the end of the motor case and clean off the excess grease.
8. Place the recessed shoulder of the single use nozzle in the end of the liner and continue pushing the liner and nozzle into the motor case until the entire nozzle is past the internal retaining ring groove. The forward end of the liner will push out through the forward end of the motor case.
9. Install the 2.05" OD 2-turn spiral retaining ring into the aft internal retaining ring groove.
10. With one hand holding the nozzle in position, place the forward bulkhead at the forward end of the liner and push the bulkhead shoulder and o-ring into the end of the liner. Then push the bulkhead and entire internal motor assembly into the motor case. If necessary, help guide the nozzle through the rear retaining ring. Once the forward bulkhead is seated below the forward retaining ring groove, install the ground down forward retaining ring, sharp edge out. It may be helpful to tilt the bulkhead slightly away from the pliers in order to give more clearance, or, you may use a small screw driver the help push the far side of the ring down into the case. If there is a gap of more than 1/16" between the bulkhead and retaining ring, stop. Do not fire the motor but contact Loki Research for a shim washer. The liner shoulder o-ring must be engaged into the liner. Otherwise, if the gap is less than 1/16", pull the bulkhead up flush against the retaining ring. (Note- the ears of the retaining ring must be ground down to within .025" of the eyelet in order for the retaining ring to fit around the bulkhead.)
11. Make a final physical inspection to ensure that both retaining rings are fully seated in their grooves. The motor can now be installed in the rocket. Use positive mechanical means to prevent the motor from being ejected during flight.
12. Install an electrical igniter only when at the launch pad or in a safe area designated by the range safety officer. Slide the igniter through the nozzle all the way up until it touches the smoke element, then pull back 1 inch. Secure in place with tape or use other means to prevent the igniter from sliding down.
13. DO NOT block the nozzle with a standoff. MAKE SURE that the nozzle exit is almost entirely unobstructed.
14. Fire from a safe distance in accordance with NFPA code 1127 and the rules of your launch site.

CAUTION! Motor will be hot after firing! Allow to cool before handling.

Parts List

Motor Hardware

- Motor Case with thrust ring – 1
- Extended Forward Bulkhead - 1
- Retaining Rings - 3
 - Ground eared snap ring (2.06" OD) - 1
 - Two-turn spiral ring (2.06" OD) – 1
 - Bulkhead snap ring (1.35" OD) - 1

Required, but not supplied:

- Scotch Tape
- Epoxy
- Internal retaining ring pliers*
- O-Ring lubricant**
- Electric Motor Igniter
- Protective Eyewear

Reload Kit

- Liner Tube - 1
- Propellant Grains – 4
- Primary O-Ring (1/8" thick) - 2
- Smoke Grain O-Ring (1.25" OD x 3/32" thick) – 1
- Liner Shoulder O-Ring (1.813" OD x 3/32" thick) - 1
- Smoke Grain Element – 1
- Single Use Nozzle - 1

* We recommend "Knipex" brand retaining ring pliers. These may be purchased from www.mcmaster.com, use part #5449A93.

** Use petroleum jelly, synthetic automotive grease, silicone based greases on O-Rings. Use high temperature low viscosity grease on liner such as axle grease.

Figure 1



Figure 2

