

## About Semroc Astronautics Corporation

Semroc Astronautics Corporation was started by Carl McLawhorn in his college dorm at North Carolina State University in November, 1967. Convincing a small group of investors in his home town of Ayden, North Carolina to invest in a small corporation, the company was re-incorporated as Semroc Astronautics Corporation on December 31, 1969.

Semroc produced a full line of model rocket kits and engines. At its peak, Semroc had twenty-five full time employees working at two facilities. One was for research and development, printing, shipping, and administration. The other was outside town and handled all production and model rocket engine manufacturing. For several years, Semroc was successful selling model rocket kits, supplies, and engines by mail-order and in hobby shops. In early 1971, Semroc became insolvent and had to close its doors.

After 31 years of dreams and preparations, Semroc Astronautics Corporation was reincorporated on April 2, 2002 with a strong commitment to helping put the fun back into model rocketry.

## About the Centurion-F™

The Centuri Centurion was released in the 1970 American Rocketeer Volume 4 Number 1. It introduced the patented ejection baffle to eliminate recovery wadding. Slightly longer than the other "large" model rockets of the time, it was a great demo rocket. Slow liftoffs made the Centurion popular on small fields. The Centurion was designed with a longer nose cone that was changed at the last minute to accept one of the new plastic nose cones that were being released in 1970. The Centurion was introduced as Catalog #KC-2 for \$3.00.

The Semroc Centurion-F™ is a 112% upscale of the original design. The classic looks of the little brother is now available in a larger demo version featuring low altitudes and slow liftoff, sure to be a crowd pleaser. It was designed especially for the Estes 29mm black powder engines that are reminiscent of the long out-of-production Mini-Max engines from the 1960's. A converter is included that will allow it to fly with the standard 24mm engines on smaller fields. The Centurion-F™ is a great addition to your fleet.

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# CENTURION-F™



## Classic Design

## Precision Turned Balsa Nose Cone

## Laser Cut Balsa Fins

## Colorful Water-Slide Decal

## Designed for 29mm Motors Includes adapter to fly 24mm Motors

## Parachute Recovery





FLYING MODEL  
ROCKET KIT

Made in the U.S.A by Semroc - Dayton, Ohio

## CENTURION-F™ Kit No. KA-33

Specifications	Engine	Approx. Altitude
Body Diameter 1.84" (4.7 cm)	D12-5	800'
Length 29.4" (74.6 cm)	E12-6	1400'
Fin Span 7.1" (18.0 cm)	F15-8	2050'
Net Weight 3.3 oz. (93.6 g)		

## Skill Level 1

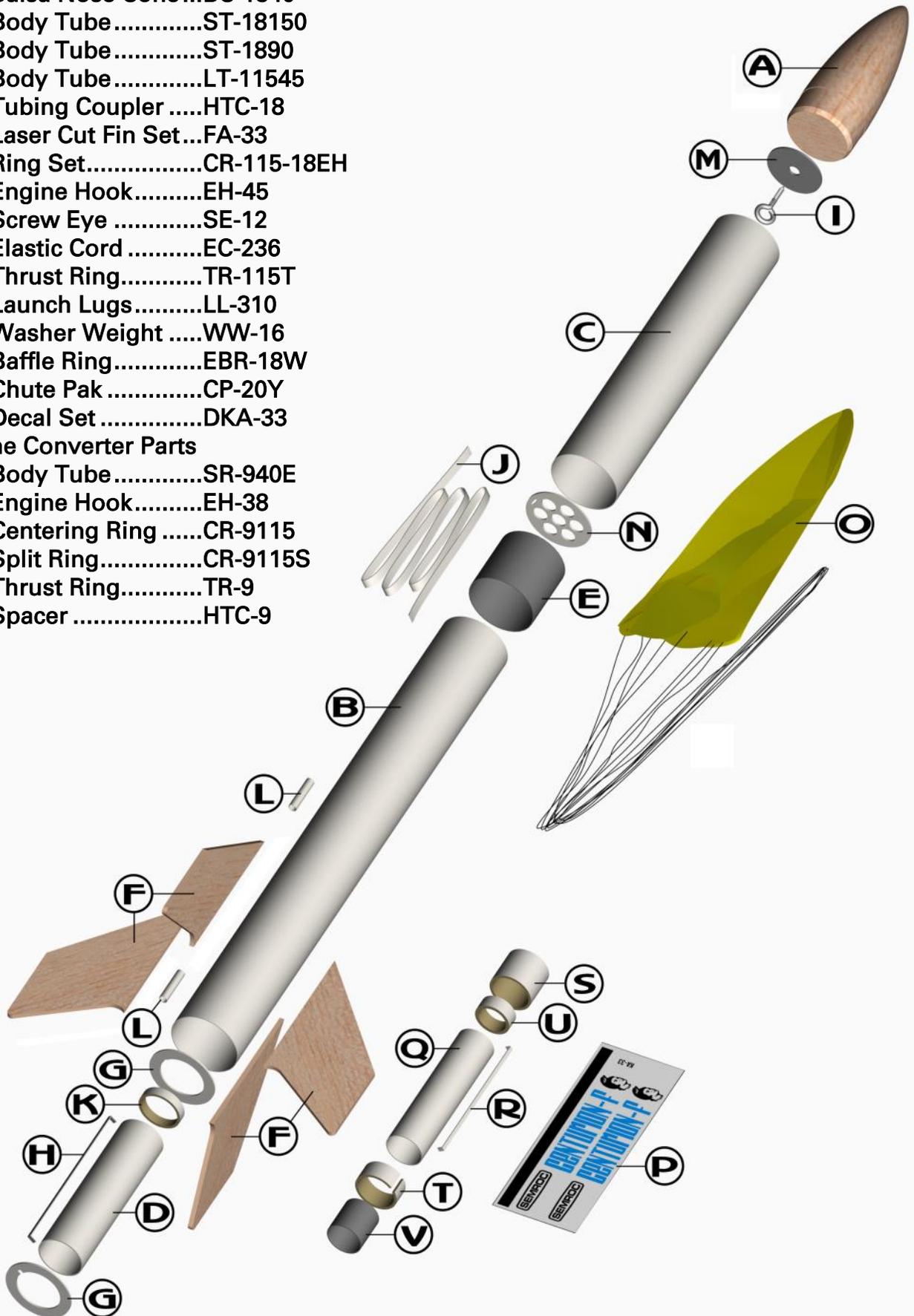
# Parts List

# EXPLODED VIEW

- A 1 Balsa Nose Cone...BC-1840
- B 1 Body Tube.....ST-18150
- C 1 Body Tube.....ST-1890
- D 1 Body Tube.....LT-11545
- E 1 Tubing Coupler .....HTC-18
- F 1 Laser Cut Fin Set...FA-33
- G 1 Ring Set.....CR-115-18EH
- H 1 Engine Hook.....EH-45
- I 1 Screw Eye .....SE-12
- J 1 Elastic Cord .....EC-236
- K 1 Thrust Ring.....TR-115T
- L 2 Launch Lugs.....LL-310
- M 1 Washer Weight .....WW-16
- N 1 Baffle Ring.....EBR-18W
- O 1 Chute Pak .....CP-20Y
- P 1 Decal Set .....DKA-33

## Engine Converter Parts

- Q 1 Body Tube.....SR-940E
- R 1 Engine Hook.....EH-38
- S 1 Centering Ring .....CR-9115
- T 1 Split Ring.....CR-9115S
- U 1 Thrust Ring.....TR-9
- V 1 Spacer .....HTC-9



## BEFORE YOU START!

Make sure you have all the parts included in this kit that are listed in the Parts List in these instructions. In addition to the parts included in this kit, you will also need the tools and materials listed below. Read the entire instructions before beginning to assemble your rocket. When you are thoroughly familiar with these instructions, begin construction. Read each step and study the accompanying drawings. Check off each step as it is completed. In each step, test-fit the parts together before applying any glue. It is sometimes necessary to sand lightly or build-up some parts to obtain a precision fit. If you are uncertain of the location of some parts, refer to the exploded view to the left. It is important that you always ensure that you have adequate glue joints.

## TOOLS

In addition to the parts supplied, you will need the following tools to assemble and finish this kit.

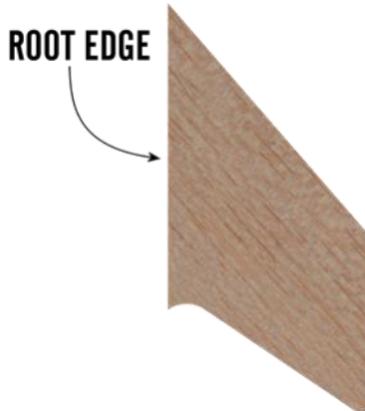


## ASSEMBLY

- ❑ 1. These instructions are presented in a logical order to help you put your Centurion-F™ together quickly and efficiently. Check off each step as you complete it and we hope you enjoy putting this kit together.

## FIN PREPARATION

- ❑ 2. Round all the edges of each fin, except the root edges. Leave them flat. Repeat for all four fins. The root edges will be glued to the body tube.



## ENGINE MOUNT

- ❑ 3. Bend the long engine hook (EH-45) slightly so it forms a slight bow in the direction shown.



- ❑ 4. Hold the thrust ring (TR-115T) even with the end of the large engine tube (LT-11545) and place a mark on the tube even with the edge of the thrust ring.



- ❑ 5. Using a hobby knife, place a small slit about 1/8" wide at the mark on the engine tube.



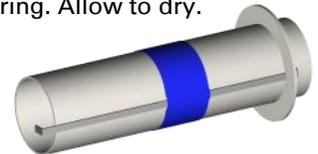
- ❑ 6. Insert one end of the engine hook in the slot punched in the engine tube.



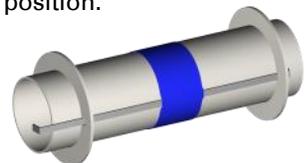
- ❑ 7. Punch out the two large centering rings (CR-115-18EH). Slide the one with the smaller notch over the engine hook until it holds the hook in place. It should be about 3/8" from the top of the engine tube.



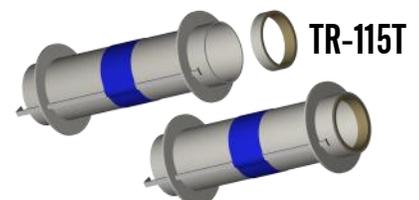
- ❑ 8. Wrap masking tape around the center of the engine tube to hold the engine hook in place and centered along its length. Run a bead of glue over the masking tape and along the engine hook between the tape and the ring. Allow to dry.



- ❑ 9. Select the remaining centering ring that has the wider notch. Align the notch over the engine hook and slide it from the bottom of the engine tube until it is 3/8" from the bottom. Apply a bead of glue around both sides of both centering rings and against the engine tube. Keep glue away from the outer edges of both rings and from the notch in the lower ring. Make sure the engine hook moves freely. Allow to dry in an upright position.

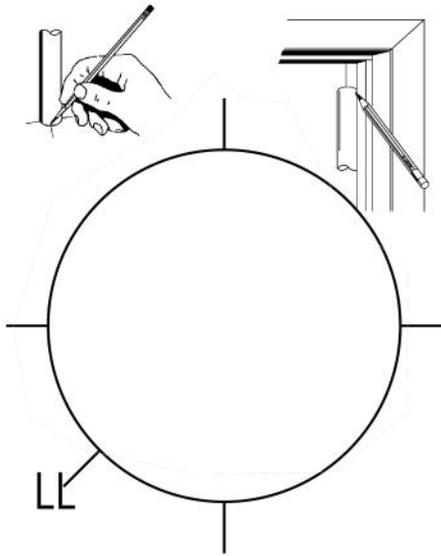


- ❑ 10. Glue the thrust ring (TR-115T) against the top of the engine hook. After the ring is in place, run a bead of glue around the inside of the ring to protect it from the ejection gases. Allow it to dry.



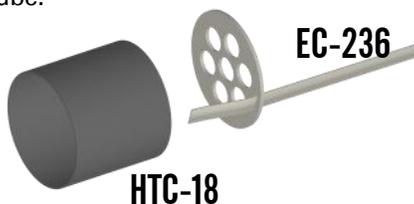
## MARK TUBE

❑ 11. Stand the large body tube (BT-18150) on the fin guide below and make the fin position marks on the sides of the tube. Mark the LL line for launch lug placement. Find a convenient channel or groove such as a partially open drawer, a door jamb (as shown,) or a piece of molding. Using the channel, extend all five marks 8" from the bottom of the tube.

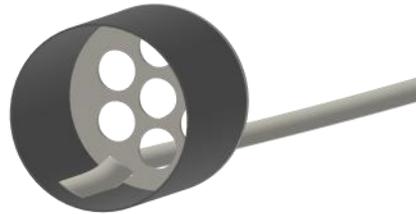


## EJECTION BAFFLE

❑ 12. Punch out all the holes from the baffle ring (EBR-18W). Insert one end of the elastic shock cord (EC-236) into the small slot near the edge of the ring. Tie a knot in the end and pull it until the knot is against the ring. Apply a generous bead of glue on the knot. Align the ring on one end of the coupler tube (HTC-18) and glue it in place so the outer edge of the baffle is even with the coupler tube.



❑ 13. Apply a generous bead of glue inside the coupler tube against the joint between the baffle ring and the coupler tube. Glue the end of the elastic cord to the coupler tube.

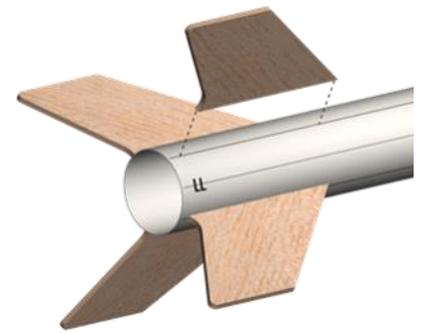


❑ 14. Test fit the ejection baffle in the top of the main tube. Sand the edges so it will slide freely in the tube. Apply a bead of glue inside the bottom of the upper body tube (ST-1890). Place a mark 3/4" from one end of the coupler. Orient the baffle assembly so the baffle and elastic cord are at the top end. Slide the ejection baffle in the tube until the mark is even with upper body tube. Allow the glue to set, but not dry. Apply a bead of glue inside the top of the lower body tube (ST-18150) (away from marked end) and slide it over the bottom of the coupler until the two tubes are flush. Rotate the main tube assembly as the glue is drying so it does not pool in one place. Allow to dry completely.



## ATTACH FINS

❑ 15. Apply glue to the root edge of one of the fins and position it along one of the lines drawn for the fins on the side of the main body tube and 1/8" from the bottom. Do not glue to the LL line marked for the launch lugs. Remove the fin, set it aside and allow it to almost dry, apply additional glue, and reposition. Repeat for the other three fins. If you follow these instructions, the fins will not require much additional work to keep them aligned. Allow the fins to completely dry, checking carefully to make sure they are parallel with the main body tube.



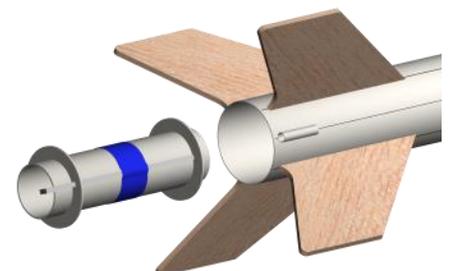
## LAUNCH LUGS

❑ 16. Apply a bead of glue to one of the launch lugs (LL-310) and apply it to the main body tube on the line marked LL and about 1/8" from the bottom of the tube. Apply a bead of glue to the other launch lug and apply it on the LL line and about 8" from the bottom of the tube. Sight from one end to make sure both are aligned with each other.



## ATTACH MOUNT

❑ 17. Apply a thick bead of glue inside the aft end of the main body tube and on the top side of the bottom ring, keeping glue away from the engine hook slot. Insert the engine mount assembly with the thrust ring end first into the main body tube until the engine tube is even with the main body tube and the engine hook is centered between two of the fins. Do not stop until it is in the correct place. Allow to dry completely in a vertical position.



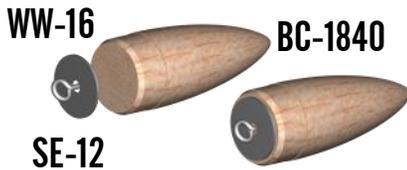
## APPLY FILLETS

❑ 18. After the fins are completely dry, run a small bead of glue along both sides of each fin-body tube joint. Using your forefinger, smooth the glue into fillets. Apply a fillet of glue on each side of the launch lugs. Allow this assembly to dry in a vertical position.

## NOSE CONE

❑ 19. Insert the nose cone (BC-1840) in the main body tube and check for proper fit. The nose cone should be snug to hold itself in alignment. If it is too loose, add masking tape. If it is too tight, sand the shoulder slightly.

❑ 20. Screw the screw eye (SE-12) into the base of the nose cone, remove and fill the hole with glue. Apply glue around the hole on the base of the nose cone, keeping it away from the shoulder. Insert the screw eye through the washer weight (WW-16) and reinsert the screw into the nose cone until the weight is against the nose cone and the eye is securely against the weight. Wipe any glue that comes out from the washer weight. Allow to dry.



## CONVERTER MOUNT

**NOTE.** Although this kit is designed for the new 29mm F-power engines, each kit is provided with an 24 mm converter to fly it on small fields with lower power. When completed, this converter is the same size as a standard F-power engine. When using it, insert a standard 24 mm engine and make sure the engine hook is securely locked on the end of the engine. Insert this assembly into the rocket and make sure the engine hook in the rocket secures the 29mm Converter. Use the included spacer for the shorter 24mm engines, like the D12.

❑ 21. Bend the remaining engine hook (EH-38) slightly so it forms a slight bow in the direction shown.



❑ 22. Place a mark 1/2" from one end of the small engine tube (ST-940E) near the small slit.

ST-940E

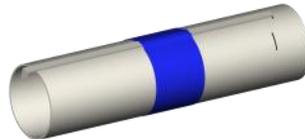


❑ 23. Insert one end of the engine hook (EH-38) into the punched slit.

EH-38



❑ 24. Wrap masking tape around the center of the engine tube to hold the engine hook in place and centered along its length.



❑ 25. Glue the engine block (TR-9) against the top of the engine hook and even with the engine tube. After the ring is in place, run a bead of glue around the inside of the ring to protect it from the ejection gases.

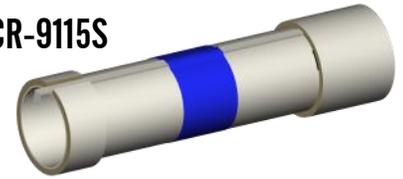


❑ 26. Slide the long centering ring (CR-9115) over the top of the engine tube and even with the 1/2" mark, capturing the top of the engine hook. This measurement is critical to end up with an exactly 4-1/2" long assembly to match the 29mm engines. Run a bead of glue over the masking tape and along the engine hook between the tape and the ring. Allow to dry.



❑ 27. Slide the remaining centering ring (CR-9115S) over the bottom of the engine tube and flush with the end, centering the engine hook in the slot.

CR-9115S



❑ 28. Check the alignment of all the centering rings and apply a bead of glue around each joint. Be sure to keep all glue off the outer edge of the rings and the engine hook slot! Apply a thick bead inside the top centering ring to protect it from the hot ejection gases.

## FINAL ASSEMBLY

❑ 29. Assemble the chute (CP-20) using the instructions provided with it. Pull the lines tight on the chute and make sure they are all of equal length. Attach the chute by tying them to the screw eye. Put a drop of glue on the joint to keep the lines from moving. Attach the free end of the elastic cord to the screw eye. Put a drop of glue on that joint as well.



## FINISHING

❑ **30.** When all the fillets have dried, prepare balsa surfaces for a smooth professional looking finish. Round the edges of the fins, then fill the wood grain with balsa fillercoat or sanding sealer. When dry, sand with fine sandpaper. Repeat until smooth.



1st coat of fillercoat



2nd coat of fillercoat



After 1st sanding



3rd coat of fillercoat



After 1st sanding

❑ **31.** After all balsa surfaces have been prepared, wipe off all balsa dust with a dry cloth. First spray the model with an enamel primer. Choose high visibility colors like white and black for the final colors. Spray painting your model with a fast-drying enamel will produce the best results. PATIENCE...is the most important ingredient. Use several thin coats, allowing each coat to completely dry before the next coat. Start each spray a few inches above the model and end a few inches below the model. Keep the can about 12" away and use quick light coats. The final coat can be a little heavier to give the model a glossy wet-looking finish.

❑ **32.** After the paint has dried, decals should be applied. The decals supplied with the Centurion-F™ are waterslide decals. Each decal should be cut separately from the sheet. Use the cover photo for suggested placement. Dip each decal in a small dish of water that has a drop of detergent. It will take about 30 seconds before the decal is loose enough to apply. Slide the decal in place and use the paper backing to work the bubbles out. Repeat for all the decals.

## FLIGHT PREPPING

❑ **33.** Mounting the engine: Insert the engine and make sure the engine hook keeps the engine in snugly. The hook may be slightly bent to make sure the engine is retained.

❑ **34.** Apply a few sheets of recovery wadding in the top of the main body tube. Although a baffle is used, wadding is suggested for extra safety. Fold the chute and pack it and the shock cord on top of the recovery wadding. Slide the nose cone into place, making sure it does not pinch the shock cord or chute.

❑ **35.** Refer to the model rocket engine manufacturer's instructions to complete the engine prepping. Different engines have different igniters and methods of hooking them up to the launch controllers.

❑ **36.** Carefully check all parts of your rocket before each flight as a part of your pre-flight checklist. **Launch the Centurion-F™ from a 3/16" diameter by 48" long launch rod. Only launch on calm days and nearly vertical since the liftoff velocity will be slower than usual with low thrust engines.**

❑ **37.** After each flight, promptly remove the spent engine casing and dispose of properly.