

## Instructions for Assembly of 29mm Hybrid Motor

### List of Components:

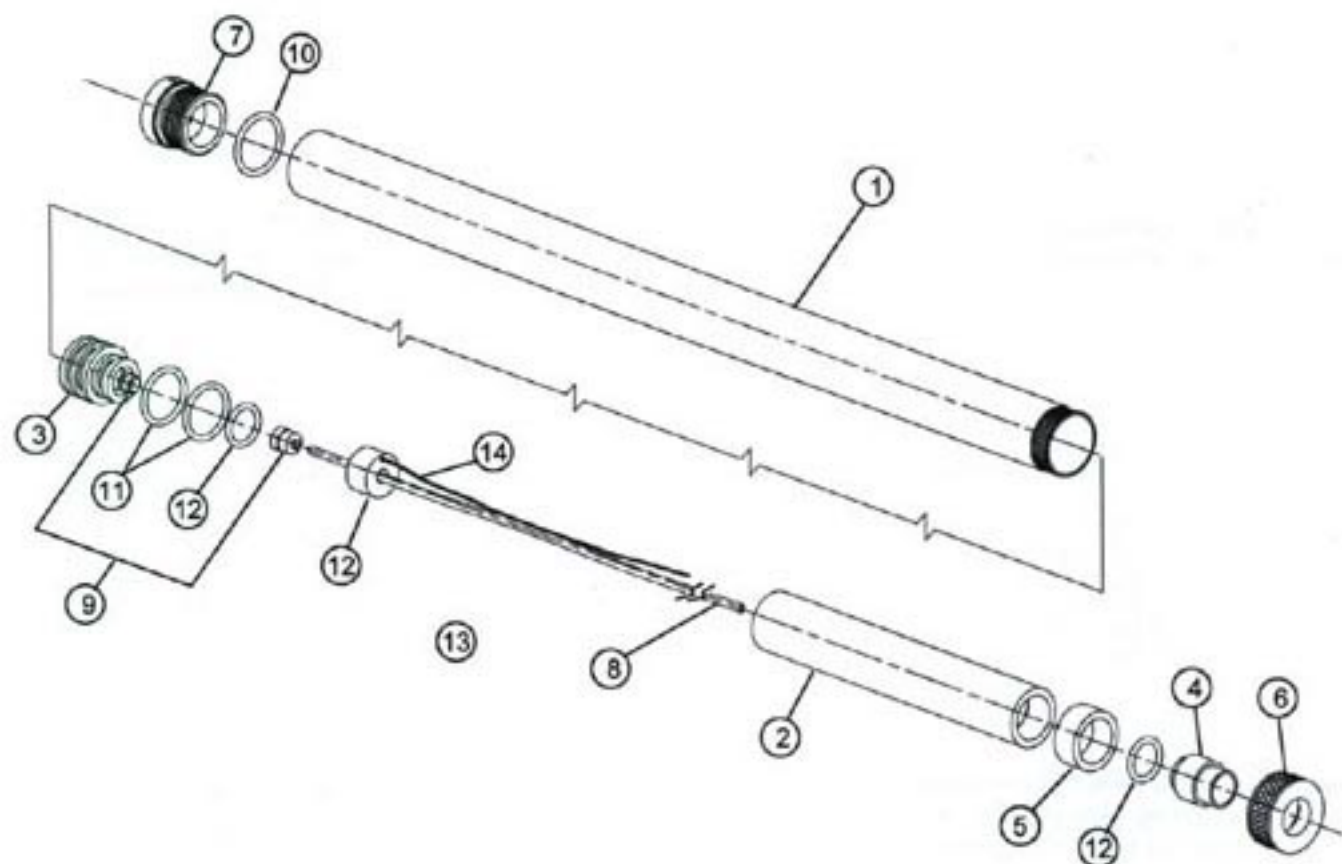
Item	Qty	Part Name
1	1	Oxidizer tank & Motor Tube (Monotube)
2	1	Plastic Fuel Grain
3	1	Floating Injector
4	1	Graphite Nozzle
5	1	Nozzle Insulator
6	1	Rear Nozzle Enclosure
7	1	Forward Bulkhead
8	1	Type H 1/8 inch Nylon Hose
9	1	1/16 inch Compression Fitting
10	1	O-ring- 1 1/16 OD x 3/32 thick
11	2	O-ring- 1" OD x 3/32 thick
12	2	O-ring- 3/4 OD x 3/32 thick

### Other Components NOT included:

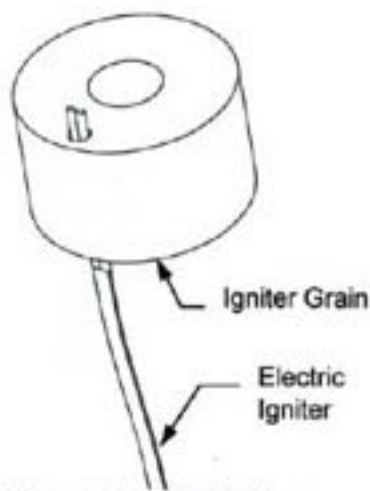
Item	Qty	Part Name
13	1	24mm Igniter Grain
14	1	Electric Igniter
-	1 Tube	Dupont Krytox® Lube

### Tools Required:

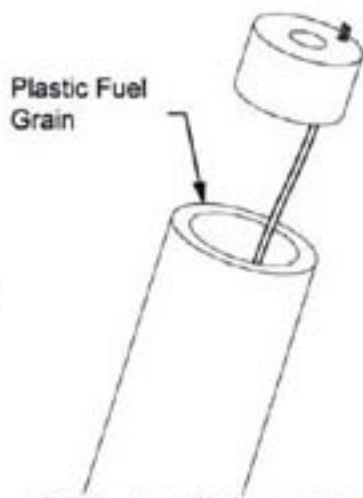
Qty	Tool
1	3/8 Open end Wrench
1	5/16 Hex Key
1	1/8 Dia x 2" long Pin, Drill Rod, or equivalent



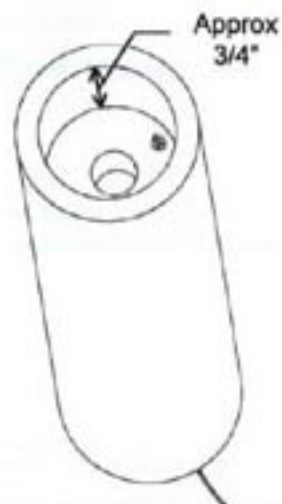
**Exploded View of Components**



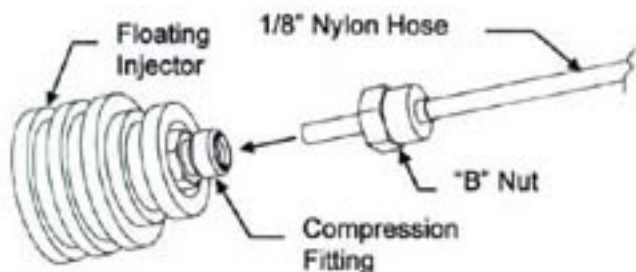
**Step 1.** Insert electric igniter into 5/64" hole in igniter grain. Ensure igniter tip is making contact with igniter grain.



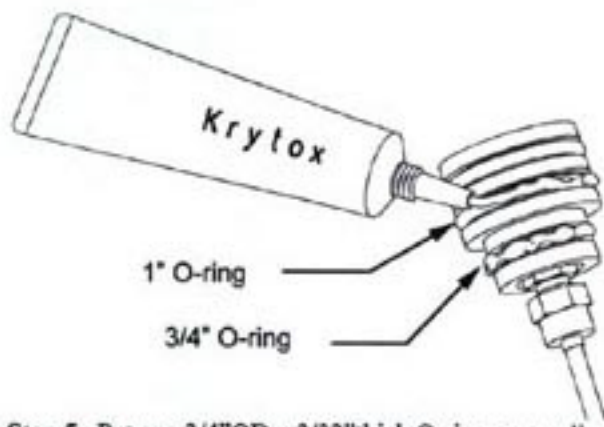
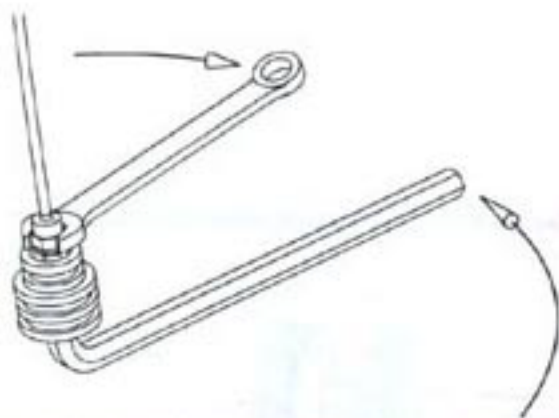
**Step 2.** Insert igniter assembly into plastic fuel grain. (The end with the deepest inside step.)



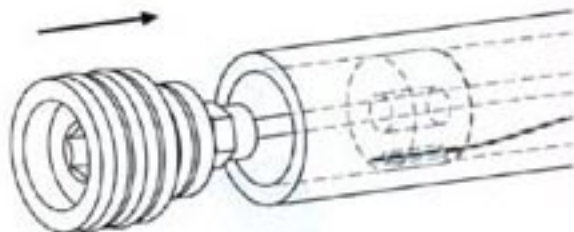
**Step 3.** Push igniter assembly in until it makes contact with the step inside fuel grain, about 3/4 of an inch.



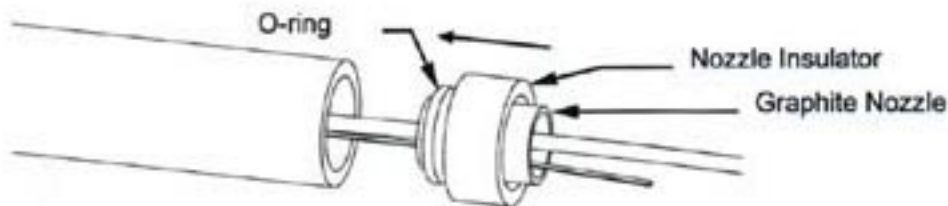
**Step 4.** Slip the "B" Nut over 1/8" nylon hose as shown. Insert nylon hose into the compression fitting of Floating Injector and tighten "B" Nut finger tight. Using a 5/16 Hex Key on one side of injector, and 3/8 wrench on "B" Nut, tighten the "B" Nut an additional 3/4 of a turn.



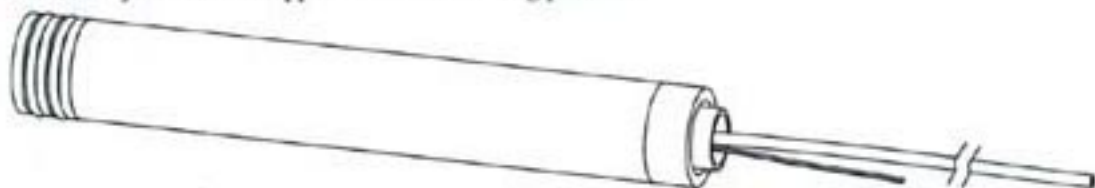
**Step 5.** Put one 3/4"OD x 3/32"thick O-ring on small diameter, and two 1" OD x 3/32"thick O-rings on large diameter of injector, apply Krytox® lube to all three Orings.



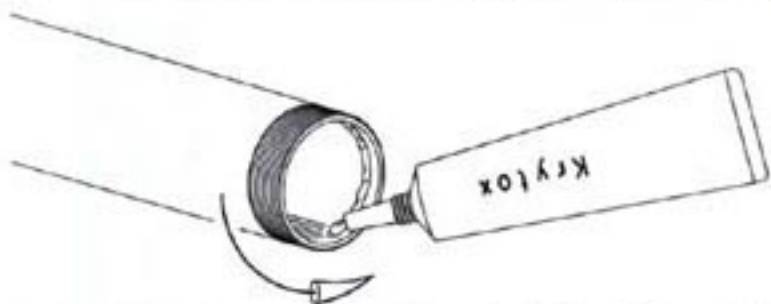
**Step 6.** Working from the Igniter fuel grain end, feed entire length of nylon hose through Plastic fuel grain and through the center hole of Igniter fuel grain. Insert injector into the Plastic fuel grain on top of Igniter grain.



**Step 7.** Install the Nozzle Insulator on the Graphite Nozzle. Put one 3/4" O-ring on nozzle, lubricate with Krytox®. Feed igniter wire and nylon hose through nozzle and insert nozzle into opposite end of plastic fuel grain until resting against step, -about 1/2". Assembly should now appear like the following picture:



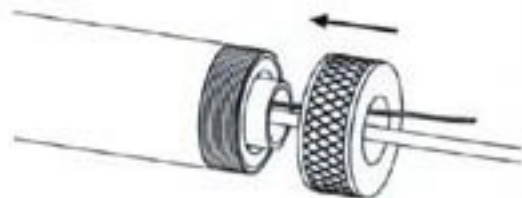
**Assembled Fuel Grain with Injector, Nozzle, Igniter Components, and Nylon Hose**



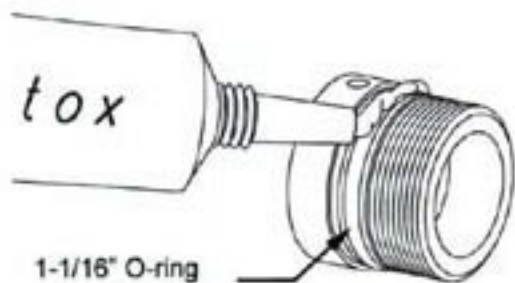
**Step 8.** Apply a liberal amount of Krytox® lube to the inside of the lower end of the Monotube (the end of tube with threads on outside).



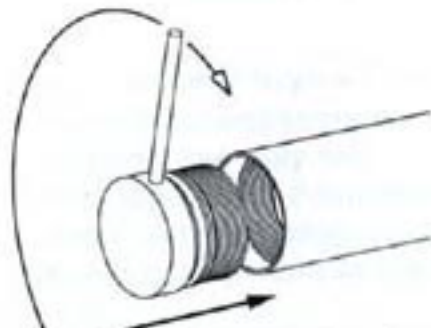
**Step 9.** Insert fuel grain assembly, injector end first, into the lower end of the Monotube until Plastic fuel grain is flush with the lower end.



**Step 10.** Secure grain and nozzle with rear nozzle enclosure. Feed igniter wire and nylon hose through enclosure and screw onto motor tube tightly.



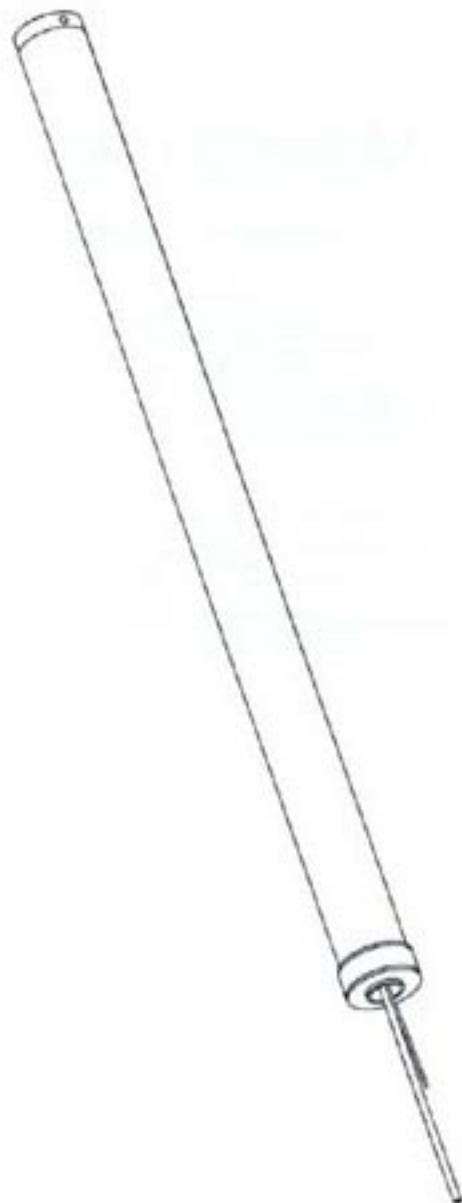
**Step 11.** Place 1 1/16" OD x3/32" thick O-ring on forward bulkhead and apply Krytox® lube to O-ring.



**Step 12.** Insert bulkhead into motor tube and screw in tight. An 1/8" pin inserted in vent opening is recommended to assist in tightening bulkhead.



Cut-Away View of Properly Assembled Motor

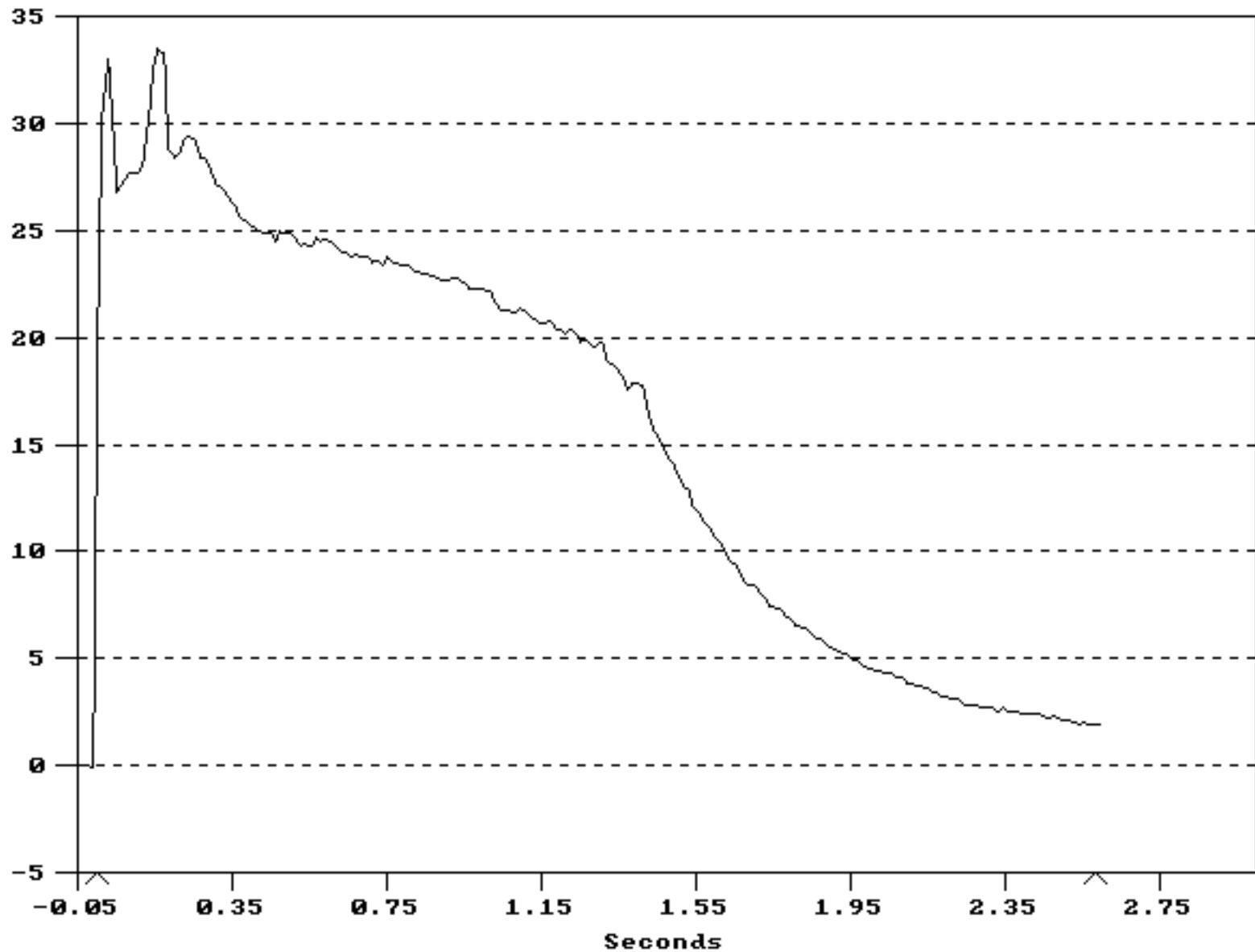


Assembled Motor

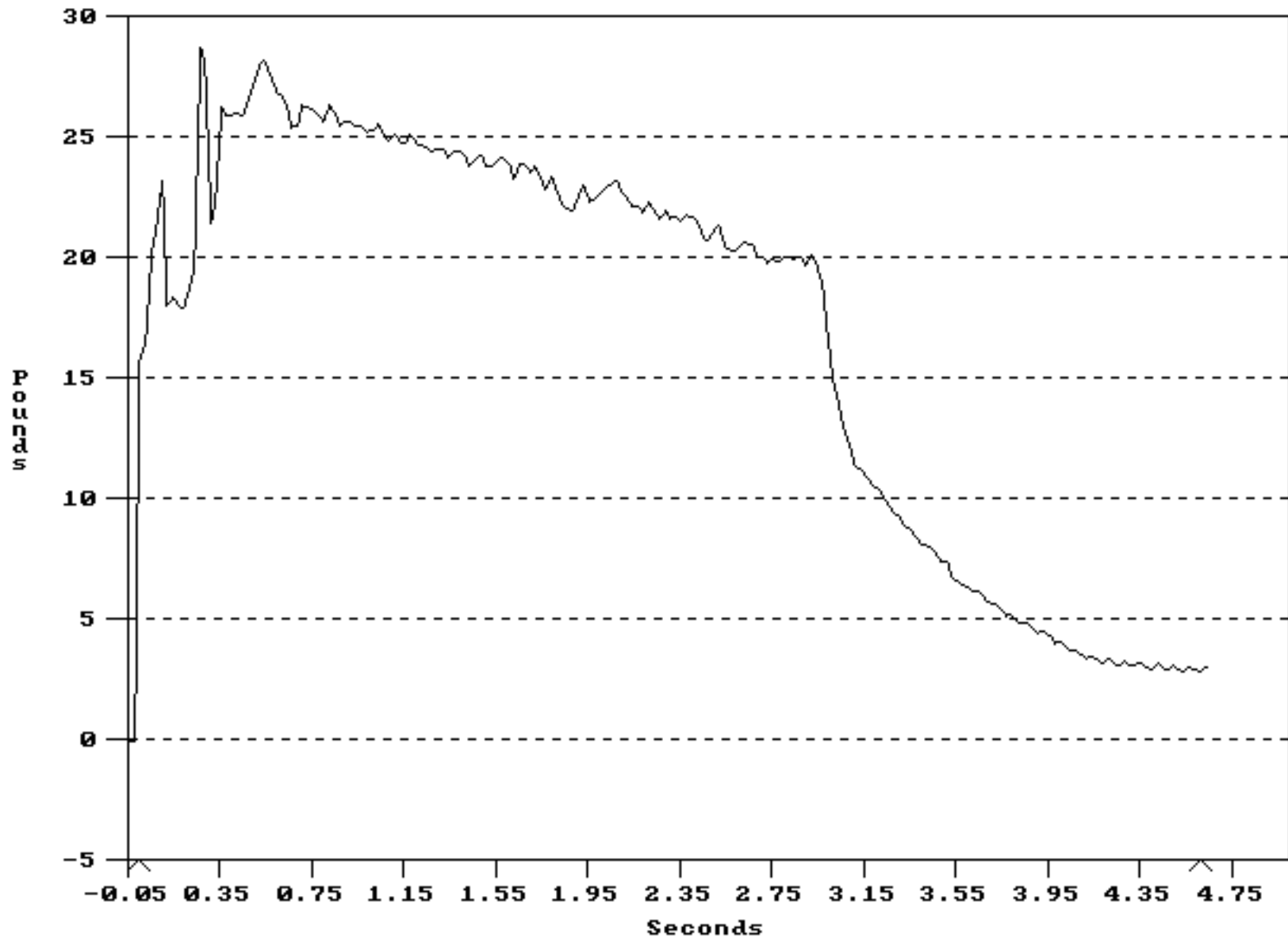
**CAUTION: Use only Krytox® lube when lubricating necessary parts. When cleaning use only non-flammable degreaser. Failure to follow these warnings may cause explosion during ignition or running of motor!!!**

R.A.T.T. WORKS H70H 1.125"x18" 06/03/00

RW000002 = H70-0 (14% H)



R.A.T.T. WORKS 180H 1.125"x28.75" 06/03/00  
RW000005 = 176-0 (9% I)



R.A.T.T. WORKS 190LH 1.125"x36.25" 06/03/00

RW000008 = 179-0 (56% I)

