

RobotShop M100RAK V3 Modular Robotic Arm Kit
Mechanical Assembly - June 2017

This guide is only available in English

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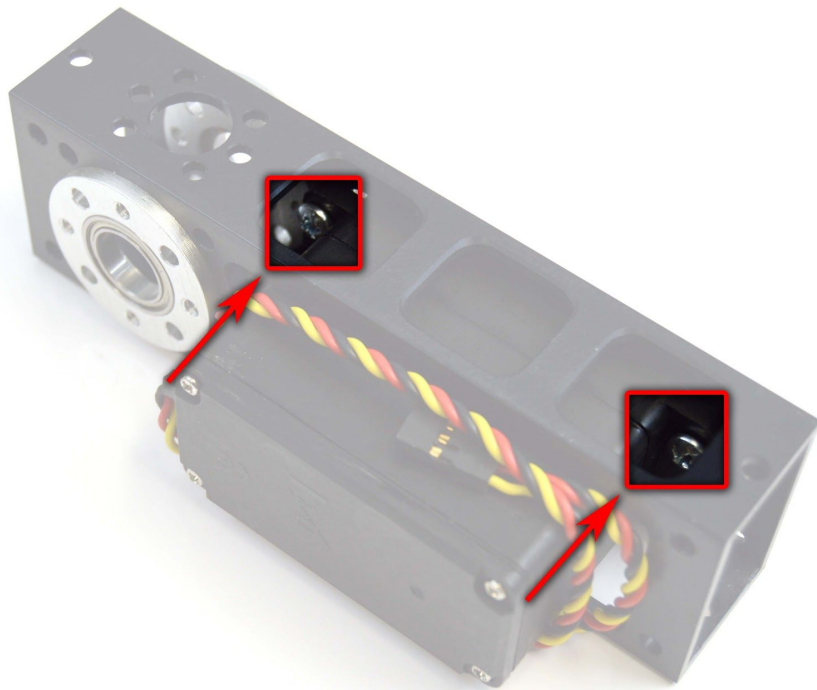
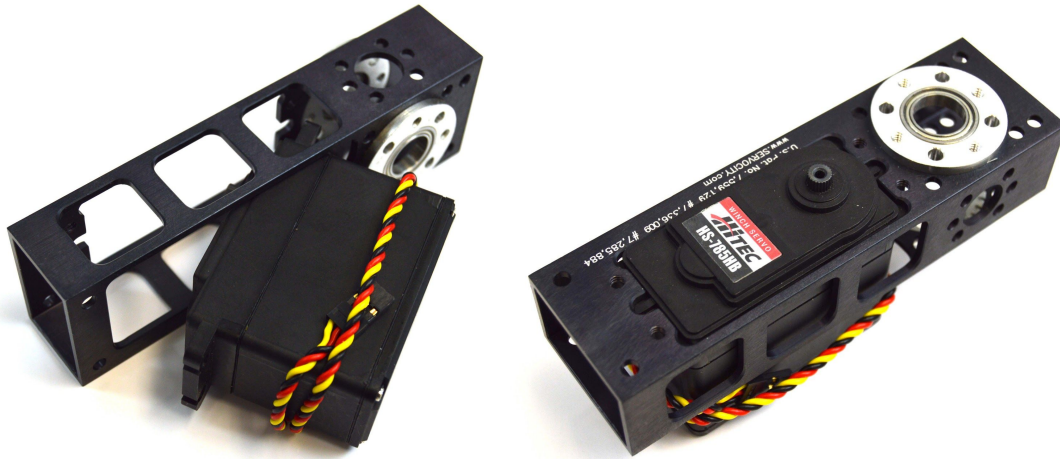
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1 - Servo Assembly

1.1 - Servo Assembly A

- 3x - Hitec HS-785HB Servos (horn can be left in place or removed)
- 3x - Aluminum channel servo box
- 12x - 6-32 x $\frac{3}{8}$ " (0.375" long) socket head screws

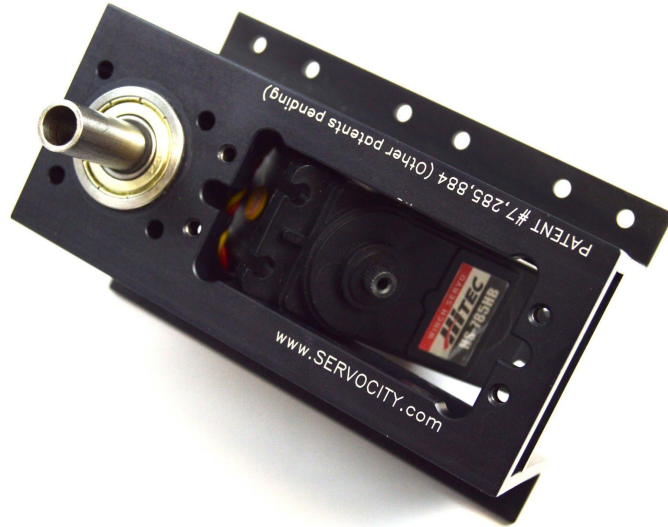
Insert the HS-785HB servo from the underside of the aluminum box and secure with the screws also from the inside. Same as before, do not tighten it all the way to let the servo move for gear mesh adjustment. Produce 3 identical sub-assemblies



1.2 - Servo Assembly B

- 1x - HS-785HB Servo (horn can be left in place or removed)
- 1x - Aluminum raised servo Box
- 4x - 6-32 x $\frac{3}{8}$ " (0.375") socket head screws

The servo will be inserted from underneath and needs to be secured by four 6-62 x $\frac{3}{8}$ " screws. Do not tighten the screws all the way to allow you adjust the gear meshing later on.

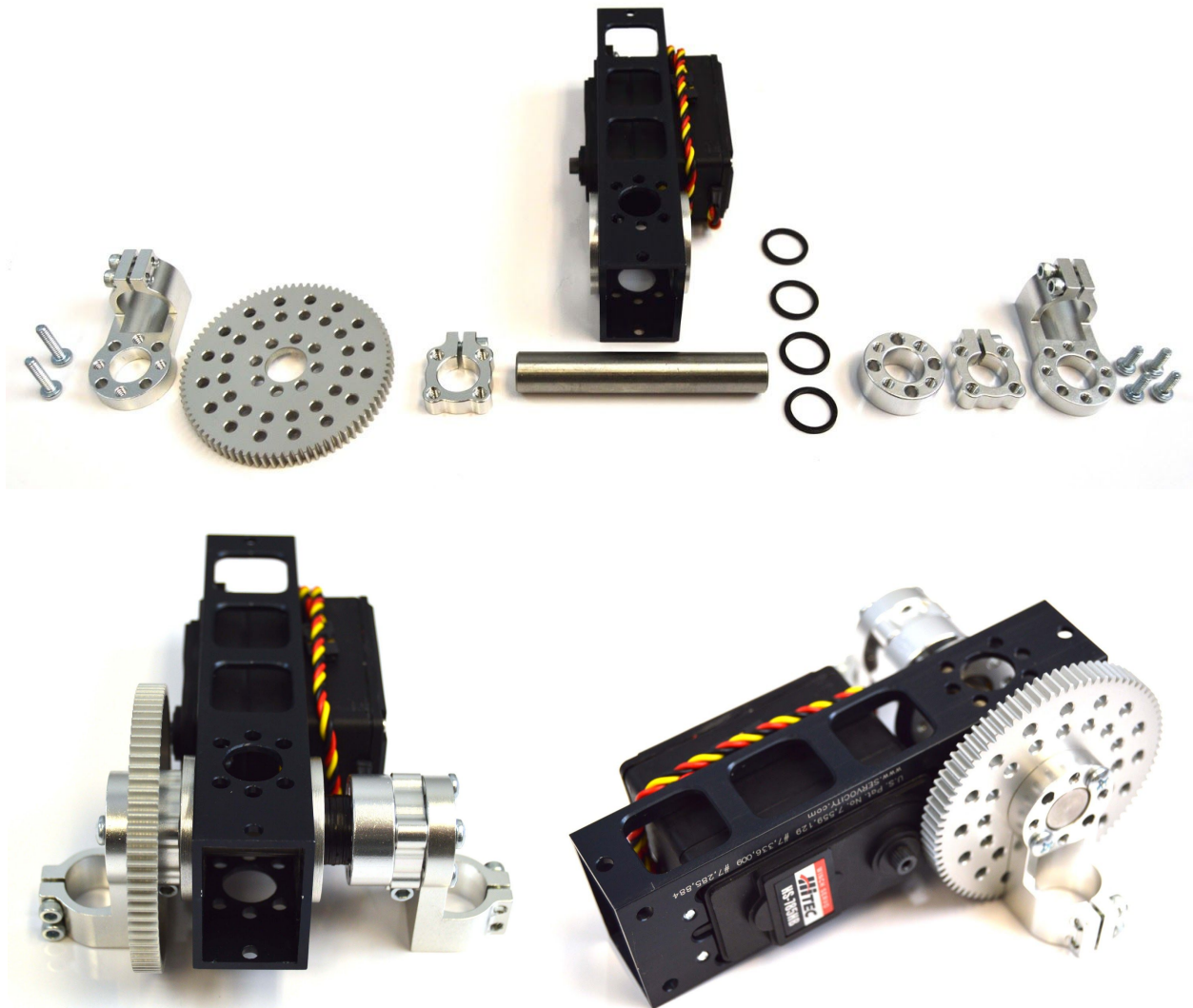


2 - Power Gearbox Assembly

2.1 - Gearbox Assembly (Shoulder & Elbow)

- 2x - Servo Assembly A
- 2x - 0.4997" Precision Ground 303 Stainless Steel Shaft - P/N 634228
- 4x - 0.500" Clamping Hub - P/N 545600
- 4x - 90deg Tube Clamping Hub - P/N 545368
- 2x - Aluminum Hub Spacer (3/8" thick) - P/N 545380
- 8x - 1/2" Bore Shafting and Tubing Spacers - P/N 633110
- 2x - 32 Pitch 80 Tooth 0.50" Bore Aluminum Hub Gear - P/N 615206
- 2x - 16T 32 Pitch Metal Servo Gear (24 Tooth Spline) - P/N 615278
- 8x - 6-32 x 5/8" (0.625") socket head screws
- 8x - 6-32 x 3/8" (0.375") socket head screws

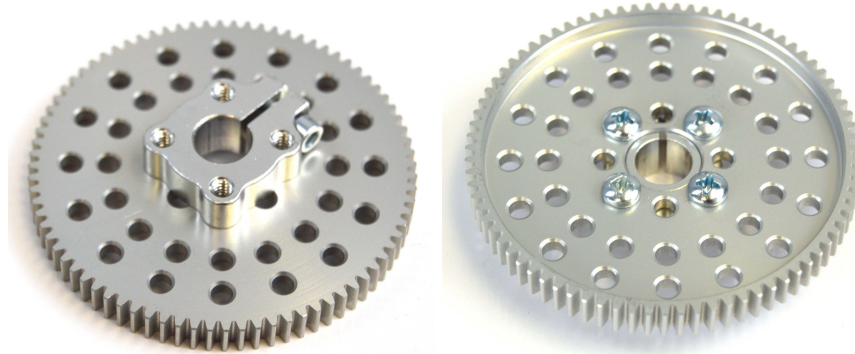
Two of the following sub-assemblies will need to be build. The layout is as displayed below



2.2 - Gearbox Assembly (Base)

- 1x - Servo Assembly B
- 1x - $\frac{3}{8}$ inch Bore Clamping Hub - P/N 545596
- 1x - 16T 32 Pitch Metal Servo Gear (24 Tooth Spline) - P/N 615278
- 1x - 32 Pitch 80 Tooth 0.50" Bore Aluminum Hub Gear - P/N 615206
- 1x - Aluminum Hub Spacer ($\frac{3}{8}$ thick) - P/N 545380
- 4x - 6-32 x $\frac{1}{4}$ " (0.250") socket head screws

Assemble the $\frac{3}{8}$ " clamp to the 80 tooth gear, paying attention to the side it is mounted to.



Add the 16 tooth pinion to the HS-7785HB servo and install the gear assembly over the gearbox shaft. Adjust the height to match the 16T pinion and secure it on the shaft with the clamp's side screw.

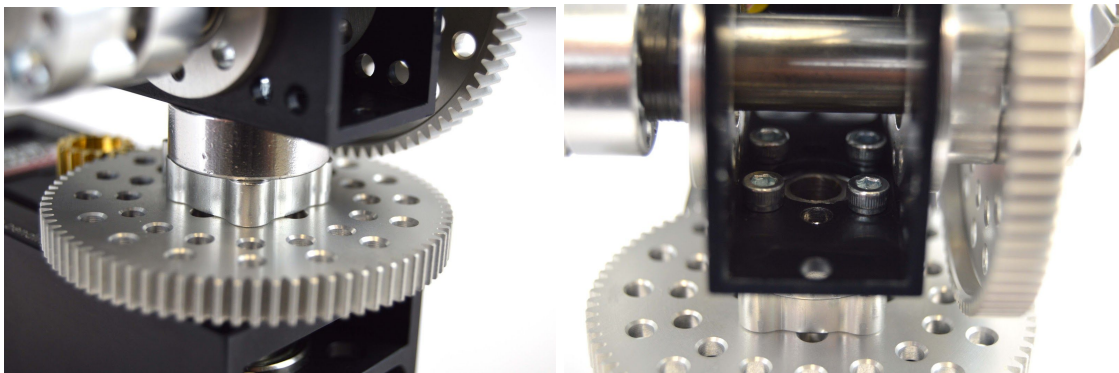


3 - Arm Assembly

3.1 - Arm Assembly (Step 1)

- 1x - Gearbox Assembly (Base)
- 1x - Gearbox Assembly (Shoulder)
- 1x - Aluminum Hub Spacer ($\frac{3}{8}$ " thick) - P/N 545380
- 4x - 6-32 x $\frac{5}{8}$ " (0.625") socket head screws

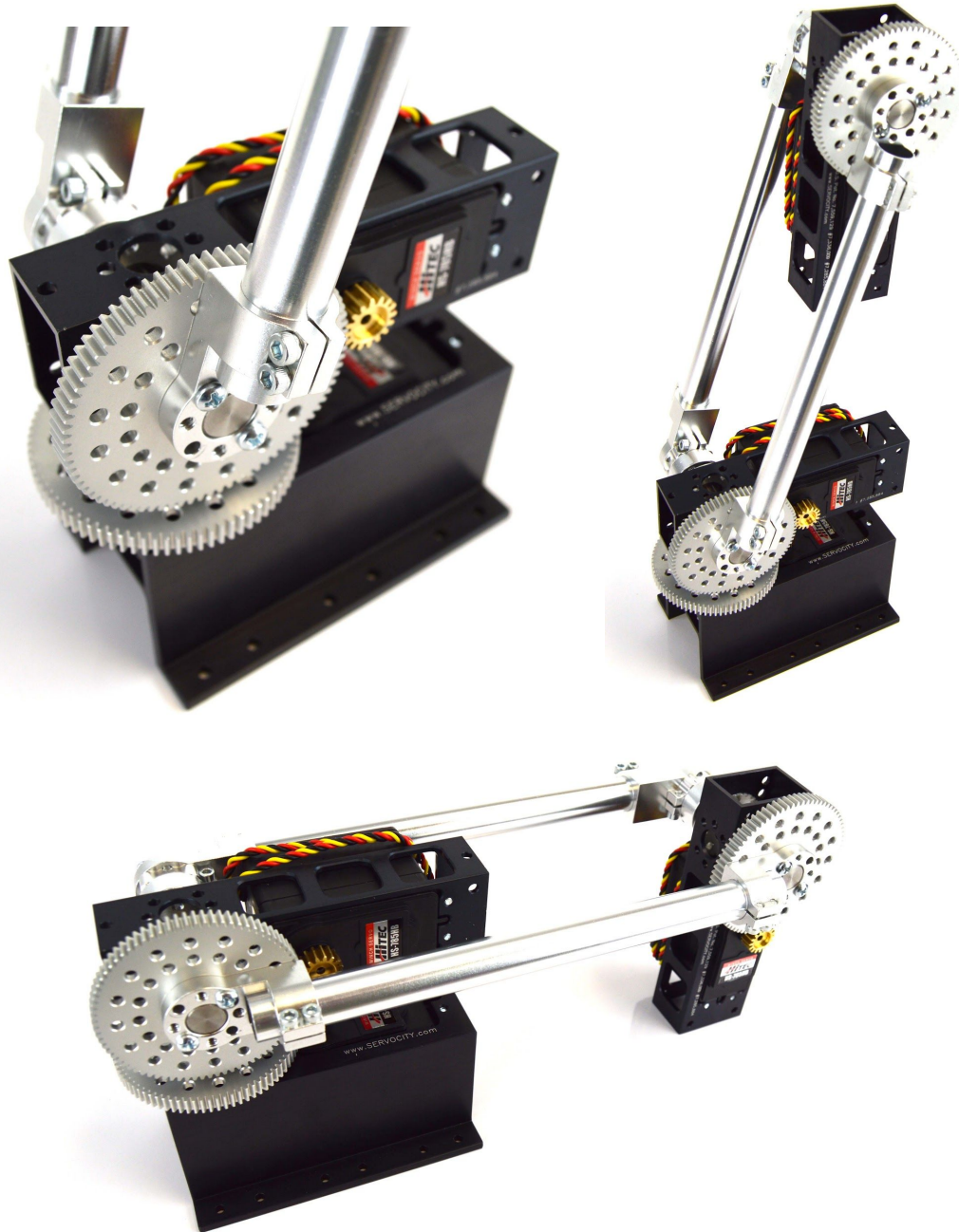
This step is a little tricky as you will need to work in a tight space. You have to assemble the two gearbox assemblies forming the arm base. Using four 6-32 x $\frac{5}{8}$ " screws, join shoulder assembly with the base assembly together with the hub spacer in between as shown in the pictures.



3.1 - Arm Assembly Step 2

- 1x - Arm Assembly (Step 1)
- 1x Gearbox Assembly (Elbow)
- 2x - $\frac{1}{2}$ " Hollow Aluminum Tubing P/N 635268 or 635270
 - Either the 6" or 8" tube can be used as both are provided

Secure the tubes in place using the side screws



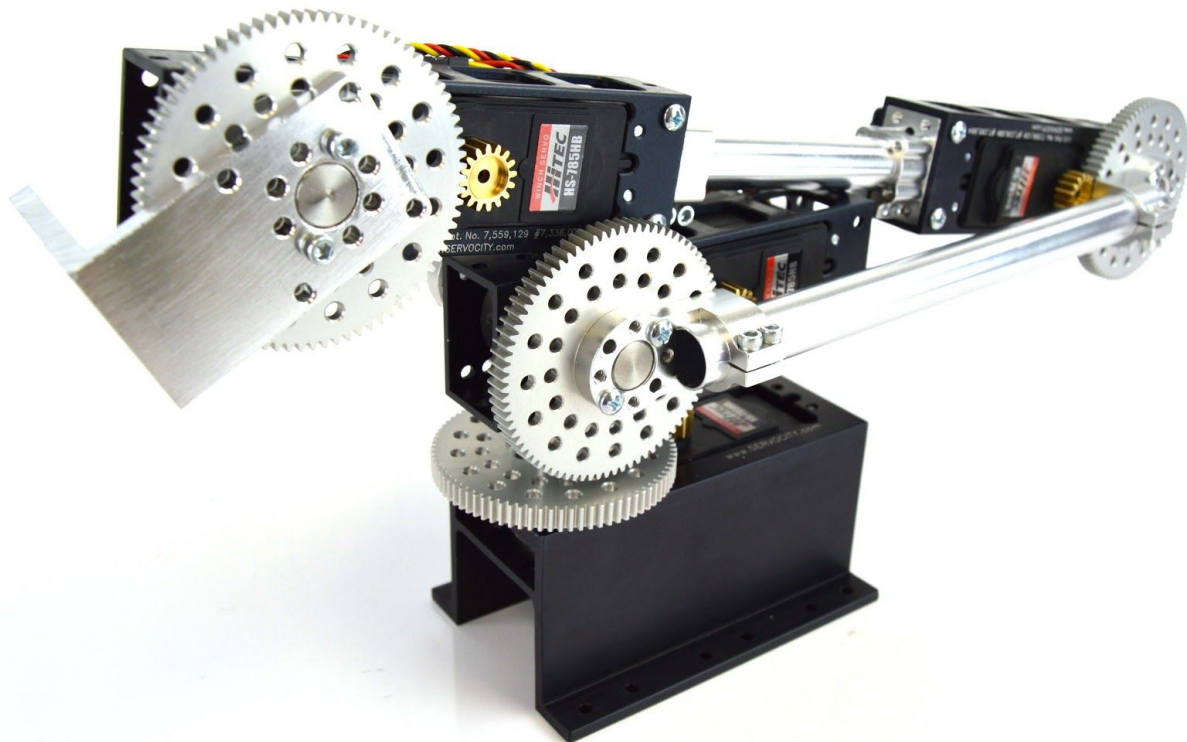
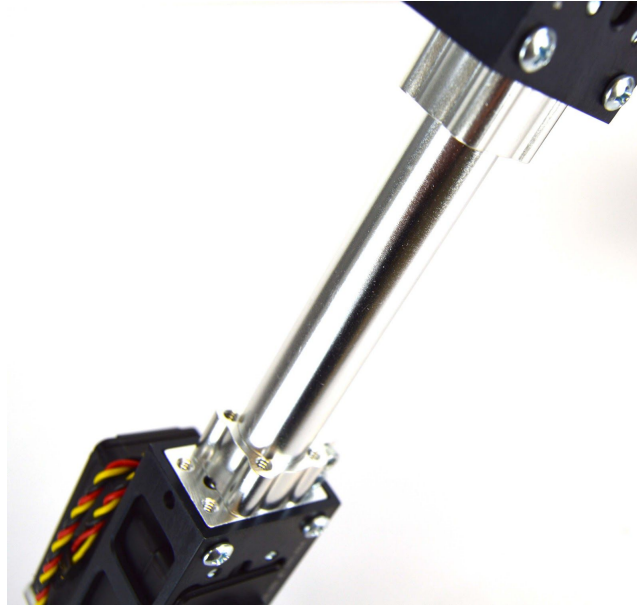
3.2 - Arm Assembly Step 3

- 1x - Arm Assembly (Step 2)
- 1x - Gearbox Assembly (Wrist)
- 2x - 90 Degree Quad Hub Mount F - P/N 545448
- 2x - $\frac{5}{8}$ " Bore Tube Clamp Hub - P/N 545344
- 8x - 6-32 x $\frac{1}{4}$ " (0.240") socket head screws
- 8x - 6-32 x $\frac{3}{8}$ " (0.375") socket head screws
- 1x - $\frac{5}{8}$ " Hollow Aluminum Tubing - P/N 635264 or 635266
 - Either the 2" or 4" long version, both are provided

Assemble the clamp hubs to the 90 degree quad hubs. (2 need to be made) and attach them to the end of the Gearbox Assembly (Wrist) and Arm Assembly (Step 2).



Insert either the 2" or 4" aluminum tube into both ends and secure them using the clamp's side screws. Make sure you align the two gearboxes to make them parallel to one another.



4 - Notes

- Add the servo extension cables, ensuring the connectors are yellow to yellow, red to red and black to black.
- Should the servos not be centered, you can loosen the clamp collars and adjust the sub-assemblies, or remove and adjust the horn gears
- Replace the servo horn screws
- An RC servo controller is needed to drive the servos. There are many available on RobotShop.com
- A 4.8V to 6V power supply, capable of at least 5A needs to be used to power the servos. Many wall adapters and battery packs are available on RobotShop.com
- A selection of grippers are available on RobotShop.com

5 - Alternate Assembly

You are free to change the configuration to suit your application. Below is just one alternative style:



6 - What's included

Quantity	SKU	Description
1	BM-700-5	(5:1 MG - no servo - unassembled)
3	5.0-700-.5-5	(5:1 MG - no servo - unassembled)
2	545448	Aluminum end cap mount
3	545600	1/2" Aluminum Clamping Collar
3	545380	3/8" Hub Spacer
4	545368	90 degree Tube Clamp Hub
2	545344	5/8" Tube Clamp Hub
3	634206	1/2" x 3" Stainless Steel Precision Shaft
1	585494	90 degree Hub Mount Bracket A
1	635264	5/8" x 2" Hollow Tubing
1	635266	5/8" x 4" Hollow Tubing
2	635268	5/8" x 6" Hollow Tubing
2	635270	5/8" x 8" Hollow Tubing
1	SE2206S	6" Super-Duty Servo Extension
1	SE2212S	12" Super-Duty Servo Extension
1	SE2224S	24" Super-Duty Servo Extension
30	91251A146	6-32 x 3/8" Steel Socket Head Cap Screw (individual)
2	632118	6-32 x 5/8" Steel Socket Head Cap Screw (25pk)
20	91251A144	6-32 x 1/4" Steel Socket Head Cap Screw (individual)
1	57185A44	7/64" Extra Long SAE Hex Key
1	633110	1/2" spacers