

# SG Series Robotic Arms

The SG series of robotic arms are a load balanced, robotic arm featuring all aluminum construction and the only fully expandable "smart grip" design components (detailed below). Feature for feature, the SG series presents the most powerful and sophisticated, all aluminum 5-axis robotic arm system available today.

## Key Features

- Exclusive **CrustCrawler Retract System (CRS)** - The CRS system is a custom manufactured spring and tension plate that effectively cancels the forward weight of the SG series robotic arm from the elbow to the gripper allowing the servo to use its entire torque curve for lifting objects. The CRS system also effectively increases lifting capacity and servo life. No other arm on the market features this critical feature.
- All parts are precision CNC machined from .063 ga. 5052 brushed, sheet aluminum
- The aluminum components are anodized to a smooth, scratch resistant, graphite finish using a type II anodizing process (the most impermeable finish next to military type III anodizing)
- All servo pivot points use integrated pem stud pivot points. Pem studs are cylindrically shaped aluminum spacers that are pressed into the aluminum with over 300 pounds of pressure. Unlike other manufactures we do not use tape or glue in these critical stress areas (if your not sure, simply read their construction manuals.)



- Integrated pem nuts for ease of construction. Pem nuts are nuts that are pressed into the aluminum with over 200 lbs. of pressure. This makes construction much easier and faster.
- Pass thru holes and slots strategically located throughout the arm assembly for convenient wire routing.
- 1 integrated SPST switches for convenient power routing to servos and supporting electronics.
- 3 integrated mounting tabs at the base of the arm for convenient attachment to your robotic platform

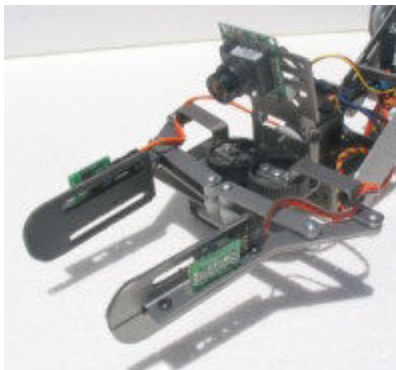


- Accommodates all of the Parallax microcontroller boards including the Board of education. Any microcontroller can be used for control of the SG series of arms.

## Sensor Engineered Grip Design

The most critical aspect of any robotic arm is in the design of the manipulator or gripper. A robotic arms usefulness and functionality is directly related to the arms ability to sense and successfully manipulate its immediate environment. We developed the gripper assembly to include the following critical design features:

- The gripper assembly contains an integrated, adjustable electronics stand located above the gripper assembly to accommodate an array of CCD cameras, infrared sensors and other sensing electronics.



- The gripper contains (4) integrated slots to accommodate multiple sensing optoelectronics components.
- The ends of the gripper are rounded for an even gripping surface area regardless of the gripper angle relative to the object being grasped.
- The gripper drive system consists of a high resolution, 60 tooth, heavy duty, resin gear train which can be driven by any high torque HiTec servo - All of these combined components are critical for firm, precise gripper manipulation of objects.
- The rounded gripper ends can conveniently accommodate the "Flexiforce" pressure sensor for precise gripper pressure measurement and control.

## Specifications at a Glance

<b>Specifications</b>					
<b>Gripper</b>	Inside width	3.25" (8.26cm)	<b>Max lift capability</b>  1.1 pounds (.499kg)		
	Depth	3.25" (8.26cm)			
	Height	1.12" (2.85cm)			
	Grip	2.50" (6.35cm)			
<b>Reach</b>	17.2" (43.6 cm) gripper open	<b>Joint Rotation</b>	~180 degrees		
	19.2" (48.8 cm) gripper closed				
		<b>Pivot Box Board holder</b>	4.6" (11.5cm) x 4.6" (11.5cm) 8.2" (20.5 cm) x 4.6" (11.5cm)		
<b>Bottom of the base to bicep joint</b>	2.4" (6cm)	<b>Bicep to elbow pivot holes C/L (center line) to C/L</b>	6.1" (15.5 cm)		
<b>Elbow to wrist pivot holes C/L to C/L</b>	4.8" (12.3 cm)	<b>Wrist pivot hole C/L to center of gripper</b>	4.8" (12.3cm) - open 6.9" (17.5cm) - closed		
<b>Wrist pivot hole C/L to end of gripper</b>	6.2" (15.8cm) - open 8.3" (21.0cm) - closed	<b>Weight (including servos)</b>	2.34 lbs (1.06kg)		
<b>HS-645MG Super Torque Gear Servo (Elbow)</b>	3 Pole Motor Metal Gear Dual Ball Bearings	<b>HS-485HB Standard Deluxe Servo (rotating base, wrist, &amp; gripper )</b>	3 Pole Motor KARBONITE Gear Ball Bearing		
	Torque at 4.8V		106.93 oz-in (7.7kg-cm)	Torque at 4.8V	66.65 oz-in (4.4 kg-cm)
	Torque at 6.0V		133.31 oz-in (9.6kg-cm)	Torque at 6.0V	83.32 oz-in (6.0 kg-cm)
	Speed at 6.0V		0.19 sec/60°	Speed at 4.8V	0.22 sec/60°
	Dimensions		1.59 x 0.77	Speed at 6.0V	0.18 sec/60°

	<p>x 1.48in. 40.6 x 19.8 x 37.8mm</p> <p>Weight 2.11oz (60g)</p>		<p>Dimensions 1.52 x 0.77 x 1.41in. 38.8 x 19.8 x 36mm</p> <p>Weight 1.41 ounce (40g)</p>
<b>HS-225MG servo (Rotating Wrist)</b>	<p>3 Pole Ferrite</p> <p>Torque at 4.8V 54.15 oz/in. (3.9kg.cm)</p> <p>Torque at 6.0V 66.65 oz/in. (4.8kg.cm)</p> <p>Speed at 4.8V 0.14sec/60°</p> <p>Speed at 6.0V 0.11sec/60°</p> <p>Dimensions 1.27" x 0.66"x 1.22" (32.4 x 16.8 x 31mm)</p> <p>Weight 0.99oz (27g)</p>	<b>Hitec HS-805BB (Bicep)</b>	<p>Hitec HS-805BB Mega 1/4 Scale</p> <p>Dual Ball Bearings</p> <p>Hitec Custom IC</p> <p>Water Tight Case (not water-proof)</p> <p>Torque at 4.8V 224 oz-in (16.0kg-cm)</p> <p>Torque at 6.0V 343 oz-in (24.7kg-cm)</p> <p>Speed at 4.8V 0.20 sec.</p> <p>Speed at 6.0V 0.14 sec</p> <p>Dimensions 2.6"x 1.2"x 2.3" 66 x 30 x 58 mm</p> <p>Weight 5.4 oz. 152 g.</p>
<b>Electronics</b>	<p>CrustCrawler designed the SG6-UT to accommodate all types of electronics and peripherals including all of Parallax's development boards and the new Parallax Servo controller (PSC). Any microcontroller can be used to control the SG series of robotic arms.</p>	<b>Accessories</b>	<p>Crustcrawler is always adding assesories to our line of robotic arms. Please see our SG product pages for more assessories.</p>