Welcome to the world of high performance servo technology. Using your new servo and Hitec digital servo programming section, followed by the information on how to load any brand of servo.

This manual is split into two sections, the first being the Hitec digital servo programming section, followed by the information on how to load any brand of servo.

### HFP-20 OPERATION MANUAL

#### 1. Motor Protection
- The HFP-20 uses an internal 4.0 Flange Rechargeable battery to power the test and programming functions. This rechargeable battery needs to be charged for a full charge on this application. The minimum voltage required is 4.8v.
- The battery can be charged with any standard overnight wall charger. Before using the charger, charge for 24 hours using a charger from any modern wall charger. During charging the battery from the charger and charge it directly using any peak charger capable of charging a 4.0 cell 4.8v at about 1.5 Aamps.

#### 2. Low Battery Warning
- If the programmer is below 4 volts, the programmer LCD screen will flash "LOW BATT".
- Programming should be halted until it is recharged.

### General Hitec Servo Information
- All Hitec servos require 3-5 Peak-to-peak square wave pulse.
- All Hitec servos require 4.8v peak-to-peak square wave pulse.
- Pulse duration is from 900 \( \mu \)s to 2100 \( \mu \)s with 1500 \( \mu \)s as a center.
- The pulse reference at 50Hz (20Hz).

#### Voltage Range
- Most of Hitec Servos can be operated within a 4.0-6.0V rage.
- The HS-50 and some feather sized servo operate exclusively with 4 NiCad cells (4.8v).

#### Wire Color Meanings
- All Hitec servos have the following wire color code:
  - Black: Ground
  - Red: +12V
  - Gray: Receiver Enable
  - Beige: Sensor (2000U/revolution)

#### Direction of Rotation
- All Hitec servos in the Black wire is "ground".
- The Red wire is "+12V" and the Beige is "sensor".

### The following is the function chart of the Test/Programmers features

This instruction manual is formatted to follow the test/programmers software flow. To access the features listed below, the user will turn on the device and scroll through the screens using the UPL or DN button.

![Program Reset](image)

#### 1. To reset the servos please press the input button, at this point the programmer will search for the settings. The button will appear on the screen after it has finished searching.

#### 2. To reset the servos to factory default settings, please press the "UP" and "DN" buttons at the same time.

#### 3. After completing the screen will read "Reset Success." Now the servos are set to factory default and can be used without further programming, or is now ready for further programming with the HFP-20.

### Resolution
- If the servo is overtravel, and can't reach the destination position as it would be forced to do, it will not reach the destination position and it will not reach the "off" or "on" position of the servo.

### Section One: Hitec Digital Servo Programming
- Hitec Digital Servo Generation 4.0
- Hitec Digital Servo Generation 4.1
- Hitec Digital Servo Generation 5.0
- Hitec Digital Servo Generation 5.1
- Hitec Digital Servo Generation 5.2
- Hitec Digital Servo Generation 5.3

#### Program ow/ccw
- a. Press CNTR on the servo to cw (clockwise).
- b. Press CNTR to set the servo to ccw (counter clockwise).
- c. Press input to exit.

#### Program Speed
- a. Press the input button and the programmer will ask for the setting of speed.
- b. Press the input button to select the default speed value.
- c. The factory default value is always the fastest possible speed.
- d. The "Y" value is adjustable with the knob and it is used to adjust the speed value. 1 being the slowest and the servos default value."Y" being the fastest.
- e. Press the input button to exit the Program Speed mode.

#### Additional Warning on Early Production Digital Servos!
- Digital servos built prior to October 2007 will always show a default value of 40.
- The actual speed can be between 28 and 40 based on the following chart:

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Voltage Range</th>
<th>Normal-Mode</th>
<th>Suggested Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-5033MG</td>
<td>10-64</td>
<td>22</td>
<td>Low Speed</td>
</tr>
<tr>
<td>HS-5034MG</td>
<td>16-64</td>
<td>16</td>
<td>Medium Speed</td>
</tr>
<tr>
<td>HS-5035MG</td>
<td>22-64</td>
<td>10</td>
<td>High Speed</td>
</tr>
</tbody>
</table>

#### Neutral Point
- The "X" value may show "40" the true speed value could be lost based on the above chart and the "Y" value being the "actual max speed", as shown on the chart above to slow the servo down.

### Section Two: Transmitter and Servo Test Section

#### 1. Test Endpoints
- The following are test functions and can apply to any model of servo or transmitter.

#### Test the Endpoint
- The programmer will test the endpoint and the position of the endpoint.
- The endpoint will be the endpoint that is shown on the programmer and the endpoint will be the endpoint that is shown on the programmer.
- The endpoint will be the endpoint that is shown on the programmer.

#### Test the Center Point
- The programmer will test the center point and the position of the center point.
- The center point will be the center point that is shown on the programmer.
- The center point will be the center point that is shown on the programmer.

### Section Three: Taxonomy of the HFP-20

#### 1. Taxonomy of the HFP-20
- The HFP-20 is designed to allow for the programming of all Hitec digital servos.
- The HFP-20 is designed to allow for the programming of all Hitec digital servos.
- The HFP-20 is designed to allow for the programming of all Hitec digital servos.

### Section Four: Bibliography

#### 1. Bibliography
- The following is a list of references used to create this manual:

### Section Five: Glossary

#### 1. Glossary
- The following is a list of definitions used in this manual:

### Section Six: Index

#### 1. Index
- The following is a list of topics covered in this manual:

### Section Seven: Additional Information

#### 1. Additional Information
- The following is a list of additional information used in this manual:

### Section Eight: Conclusion

#### 1. Conclusion
- The following is a summary of the main points covered in this manual:

### Section Nine: Appendix

#### 1. Appendix
- The following is a list of appendices used in this manual:

### Section Ten: References

#### 1. References
- The following is a list of references used to create this manual:

### Section Eleven: Credits

#### 1. Credits
- The following is a list of contributors to this manual: