Hitec Digital Servo Programmer & Servo Tester for ALL Servo Brands

HFP-25

HiTEC
www.hitecrcd.com

Welcome to the world of high performance servo technology.

Using your new servo tester and Hitec digital servo programmer, it will allow you to program the functions of Hitec digital servos.

Additionally you can test any brand of transmitter for the pulse sent to the receiver and any servo for voltage and proper movement.

HFP-25 is made for more affordable but it follows in the previous models great features.

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

Powering the HFP-25
- HFP-25 uses 4 cell 4.8V NiMh rechargeable battery pack to power the test and programming functions. (The rechargeable battery's capacity should be more than **1300mA** for optimal operation)
- HFP-25 does NOT support charging port. Therefore, remove the battery from HFP-25 and charge it directly using any peak charger capable of charging 4 cell 4.8V at about 0.6A-1.0A. (See pic.1) (Hitec RX NiMh battery pack : #54117 or 54121)
- Pay close attention to the POLARITY of the battery when it is inserted to the HFP-25. (See pic.2)

Low Battery Warning
- If the programmer's voltage becomes below 4 volts, the programmer's LCD screen will flash "LOW BATT". Programming should be avoided at low voltage warning status.

[Pic.2]

[Pic.1]
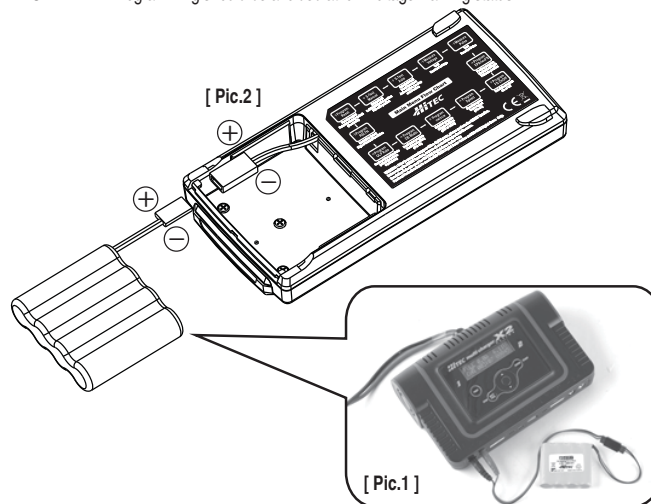
General Hitec Servo Information

Pulse Data
All Hitec servos require 3-5V peak-to-peak square wave pulse.
Hitec digital servos require 0.8-5V peak-to-peak square wave pulse.
Pulse duration is from 900μs to 2100μs with 1500μs as center.
The pulse refreshes at 50Hz (20ms).

Voltage Range
Most of Hitec Servos can be operated within a 4.8V-6.0V range.
The HS-45, HS-50 and some feather sized servos operate exclusively with 4 Ni-Cd cells (4.8 volt).

Wire Color Meanings
On all Hitec servo wires are in three different colors: Black, Red, and Yellow.
The Black wire is 'ground', the Red wire (center) is 'power' and the yellow wire is 'signal'.

Direction of Rotation
All Hitec servos set to rotate Clockwise (CW) as factory default.

The following is the function flow chart of the Tester/Programmers features;
This instruction manual is formatted to follow the tester/programmer software flow.
To access the features listed below; the user would turn on the device and scroll through the screens using the UP/R or DN/R button.

Text in the LCD display	Function
1. Program Reset	Reset to factory default
2. Program RSLTN	Select High or Low Resolution
3. Program OLP Rate	Protect Motor from Overrunning (Overload Protection)
4. Program DB Width	Sets the dead band width
5. Program cw/ccw	Sets the direction of rotation, clockwise / counter clockwise
6. Program Speed	Slows or speeds up the rotation speed
7. Program FS OnOff	Turns the Fail-Safe on or off
8. Program EPAneuFS	Sets the End points, Neutral point and Fail-safe point
9. Measure Pulse	Measures the receiver's pulse to the servo
10. Measure Voltage	Measures the receiver's voltage to the servo
11. S-Test Auto	Automatic Servo movement test program
12. S-Test Manual	Manual Servo movement procedure

Section One: Hitec Digital Servo Programming

Hitec Digital Servo General Information
Hitec digital servos can be used "out of the box" without any complicated programming procedure.

Also, Hitec expanded the capability of our digital servos to include the ability to program your own unique performance specification parameters.
Many of you will have modern computer radios that will allow you to program most of these functions; however, some features, like dead band width, are only programmable by using the servo tester/programmer device.

Programmable functions of the Hitec digital servos

- Factory Default Reset
- Dead Band Width Adjustment
- Direction of Rotation
- Speed of Rotation
- Fail-safe On/Off
- End Position
- Neutral Position
- Fail-safe Position Preset

*NOTE

1. Resolution control function is used for HS-7XXX Digital Servo Series Only.
2. Overload Protection Rate is used for HS-7XXX Digital Servo Series and HS-5055, 5056, 5065, 5082 and 5085MG Digital Servo Only.
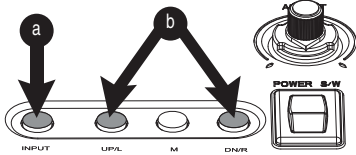
1. Reset:
The reset function will set your servo back to the factory default settings.
This should be done before programming your servo for the first time.

! WARNING !

REMOVE ALL CONTROL LINKAGES FROM THE SERVO BEFORE THE RESET PROCESS.

a. To reset the servo press the INPUT button, at this point the programmer will search for the settings; up down will appear on the screen after it finishes searching.
b. To reset the servo to factory default you will need to push the "UP/R" and "DN/R" buttons at the same time.
c. After completion the screen will read "Reset Success." Now the servo is set to factory default settings and can be used without further programming, or is now ready for further programming with the HFP-20.

! Warning on Early Production Hitec Digital Servos!

A very few early Hitec digital servo models will "lock" to one side and appear to die when the reset function is used; however, the servo has been reset and is ready for programming. Therefore, simply unplug the servo from HFP-25 and manually twist the servo horn to the approximant "center position".

2. RSLTN (Resolution) (For HS-7XXX Digital servo series only)

Select High or Normal Resolution
Traditionally the servos used for RC radio systems and have approximately 120 degrees of travel angle.
Also the Hitec HS-7XXX servos are adjusted 120 degrees as default setting; However, for some applications, a wider travel angle is desired. We heard the customers' wants, and made our servos to thavel up to 180 dogreesfor RC Applications and adjusted the maximum travel angle within 180 degrees using EPAneuFS function.
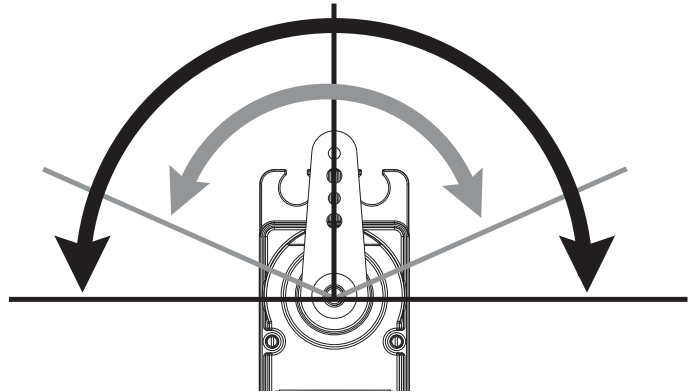
➡ **Normal Resolution**
180 degree travel angle but lower resolution

➡ *High Resolution:*
120 degree travel angle with finer resolution

Please note

Increasing the travel angle will decrease the servos' resolution.
There is a finite number of "steps of resolution" and widening the angle of travel will increase the distance of each step.

So you can choose one between high and low resolution for your application.
That is, maximum travel angle is 120 degrees in High Resolution mode, and 180 degrees in Low Resolution mode.

a. Press the INPUT button to enter the mode.
b. To select Normal resolution, push the UP/R button. To choose high resolution, push the DN/R button.
c. Press INPUT to save and exit.
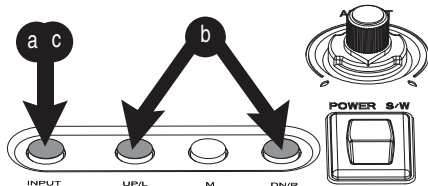
3. OLP Rate (Overload Protection Rate) (For HS-7XXX Digital servo series and HS-5055, 5056, 5065, 5082 and 5085MG Digital servo only)
This function allows you to set the amount of torque reduction to protect the motor from stress that would cause it to burn-up.

What is Overload Protection Rate?
If the servo is overloaded, and can't reach the destination position as it would be directed to do, the overload protection system is activated. In this case, the servo amp will reduce its output power by the value you set from the maximum power.
Increasing the overload protection rate is the same as limiting the output power, or torque.

That is, if you select a value of 10% by adjusting the knob, the servo amp will reduce the power by 10% and output only 90% of the maximum torque in overloaded situation.
You can set the value between 10% and 50%. If you select "Off" in this mode, overload protection will not be activated, and the servo will always produce maximum torque.
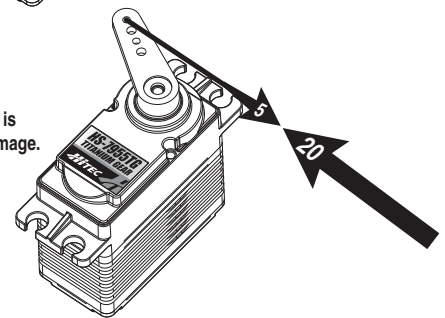When the overload is released, the protection mode is terminated and the servo will work normally.

Normal
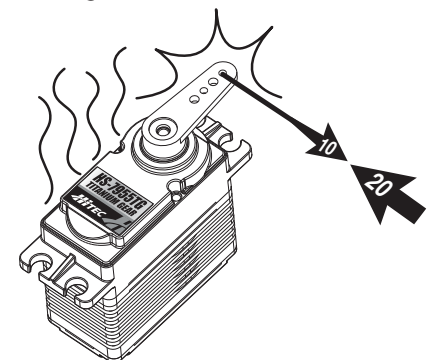when overload stresses a servo more than its max torgue limit.
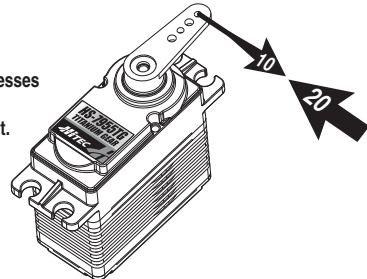
OLP ON
Reduced output at preset rate (50%) when overload is detected to prevenant damage.

OLP OFF
Full torque even against the overload which can cause severe damage to a servo

a. Press the INPUT button to enter, and the programmer will search for the settings;
   X:Y will appear with X being the current setting and Y is adjustable from Off to 50%.
b. Use the adjustable knob to select Y, the reduction rate.
c. Press the M button to change the setting.
d. Press INPUT to save and exit.

NOTE

* This function is used for HS-7XXX servo series and HS-5055, 5056, 5065, 5082, and 5085MG only. Factory default is off.
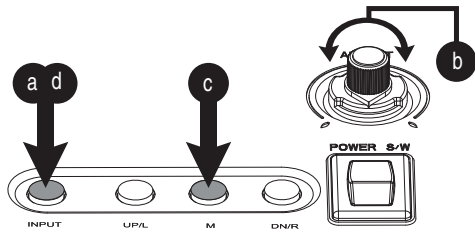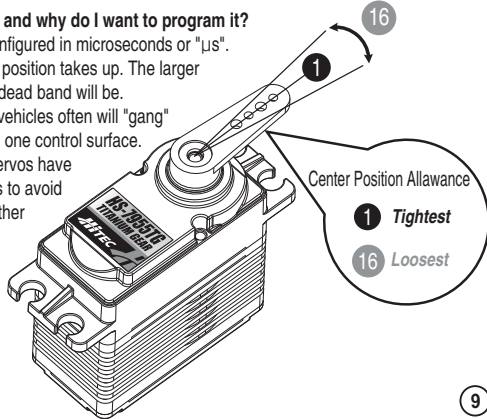
4. DB Width (Dead Band Width:)
This feature will allow you to change the width of the center position between 3µs and 48µs.

What is dead band width and why do I want to program it?
The dead band width is configured in microseconds or "µs".
It is the "space" the center position takes up. The larger
the number, the wider the dead band will be.
Large planes and surface vehicles often will "gang"
several servos together on one control surface.
It is important that these servos have
matched dead band widths to avoid
having them "fight" each other
at the center position.

Center Position Allawance

1 **Tightest**

16 *Loosest*

9

---

a. To enter the mode press the INPUT button and the HFP-25 will search for the settings;
   X:Y will appear with "X" being the current setting and "Y" is adjustable value from 1-16.
   The value of "1" is about 3µs and is the smallest dead band width setting available.
b. Use the knob to change "Y" (the new value).
   *"1" is the tightest dead band width setting and provides the best centering.
c. Press "M" to set the data.
d. Press INPUT to save and exit
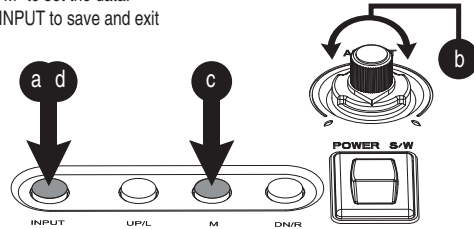
5. Rotation:(Servo reverse)
Select the servos rotation from either clockwise or counterclockwise.

CW   CCW   10

---
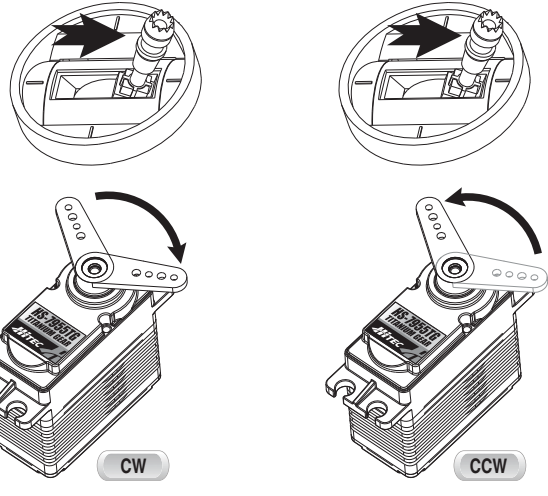
a. To enter press the mode the INPUT button and the programmer will search for the settings;
   ccw or cw will appear.
b. Press UP/L to set the servo to cw (clockwise).
c. Press DN/R to set the servo to ccw (counterclockwise).
d. Press INPUT to save and exit.
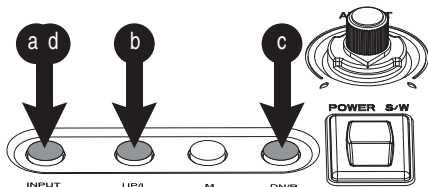
6. Speed:
The programmer allows you to slow the rotation speed of the digital servo only.

a. press the INPUT button to enter the mode.
   X:Y will appear with "X" being the default speed value, and "Y" being the adjustable
   speed value.
   "1" is being the slowest and the servos default value "64" being the fastest.
   *The factory default value is always the servos' fastest possible speed.
b. Use the knob to adjust the value "Y"
c. Press "M" to set the value.
d. Press INPUT to save and exit
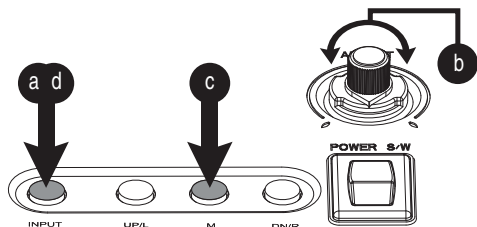
! Additional Warning on Early Production Digital Servos!

Digital servos built prior to October 2001 will always show a default value of "40".
The actual speed can be between 28 and 40 based on the following chart:

11

Model Number	Actual max speed	No speed change zone
HS-5625MG	22	22-64
HS-5645MG	12	12-64
HS-5925MG	16	16-64
HS-5945MG	10	10-64
HS-5735MG	10	10-64

While the "X" value may show "40" the actual speed value could be less, based on
the above chart.
so drop the "Y" value below the "actual maximum speed" as shown on the above
chart to slow the servo down.

7. FS On/Off (Fail-safe):
Turn the fail-safe function on or off

What is the fail-safe function and how is it used?
Traditionally a PCM radio system would allow the user to program a "fail-safe" position that selected
servos would revert to if the plane or surface vehicle suffered a loss of signal from the transmitter.
With your programmer and a Hitec digital servo you can program a fail-safe point into the servo
and have the benefits of fail-safe without the expense and drawbacks associated with PCM
technology.
Suggested uses would include dropping the throttle servo to idle; slight deflections from the
neutral point for aircraft ailerons and or elevators. The following will arm or disarm the fail-safe
parameters you can program in step 6.

a. Press the INPUT button to enter the mode. HFP-25 will search for its current setting;
   it will show you if the fail-safe feature is turned "on" or "off".
b. To turn the fail-safe feature "on," push the DN/R button. To turn it "off", push the UP/R button.
   *The factory default setting is always "off".
c. Press INPUT to save and exit.
d. Go to the EPAneuFS screen to set the fail-safe position. (See step 6)

12
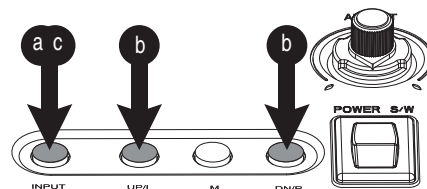
8. EPAneuFS (EPA, Neutral and Fail-safe):
This feature allows your servo's End Positions, Center position and Fail-safe position.
To set the End positions, Center position and Fail-safe position,

NOTE

* For purposes of calibration in respect to Hitec transmitters the values are -225 one direction from center and +225 the other direction.
  With the value of +100 or -100 being 40 degrees of servo travel from center and corresponding to the value of 100% travel on a Hitec radio.

! Note on the EPA (End Position Adjustment) Procedure!

So as to avoid overdriving your servo past its physical limits of travel, you cannot set a servo center position more than 15 degrees from its factory preset center position.
If the center position is set more than 15 degrees from the factory default center position, the EPA function will not work.

**! Important Note on the EPA set up procedure!**

For servo's proper operation, setup sequence is the one most important thing for EPA setup.
You must keep the following sequence:
Center(neutral) position -> "M" -> left end position -> "UP/R" -> right end position -> "DN/R".

a. Push the INPUT button to enter. The programmer will wait until you have set the adjustable knob to its center.
   The display shows you or when the knob is out of the center.
   The HFP-25 will search for the current settings and the servo movement will be controlled with the adjustable knob.
b. To set the center position, use the adjustable knob to set the servo to the desired position
c. Press the M button, "center" should appear on the screen.
!! IMPORTANT: If you change the center position, the each end position must be re-adjusted. !!
d. To set the left end position turn the adjust knob to the left and when the desired position is reached press the UP/L button.
e. To set the right end position, turn the adjustable knob to the left and when the desired position is reached, press the DN/R button.
f. Then to set the fail-safe position, turn the adjustable knob to the desired position and push the UP/R and DN/R buttons simultaneously.
* To turn the fail-safe function "on" or "off" within the servos programming, see step 5.
g. Push INPUT to save and exit.

(13)
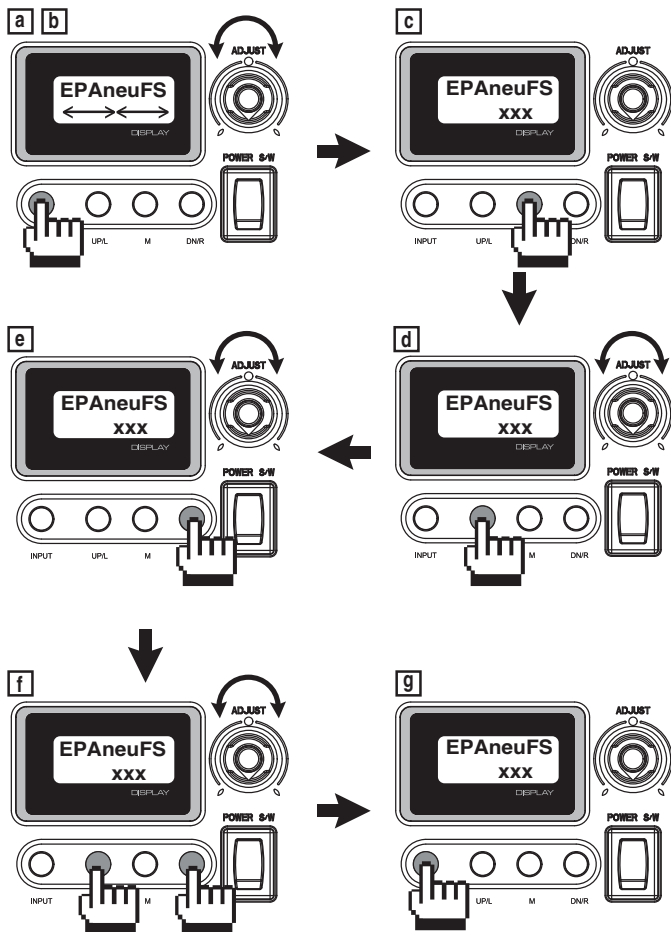
(14)

Section Two Transmitter and Servo Test Section

The following are test functions and can apply to any model of servo or transmitter.

Test function of HFP-25
• Transmitter Signal Pulse   • Servo Test Auto
• Voltage   • Servo Test Manual

9. Transmitter Signal Pulse:
See the pulse the receiver is supplying to the servo.

NOTE

* For this procedure the programmer must be plugged into the receiver channel that you want to test.

NOTE

there must be a 4.8 or 6V battery plugged into the receiver to power it.

a. Push the INPUT button to view the pulse from the transmitter.
b. Move the stick associated with the channel the programmer is plugged into to see the pulse range.
c. Press INPUT to exit.

10. Voltage:
View the voltage that is being supplied to the servo from the receiver.

* For this procedure the programmer must be plugged into any receiver channel.
a. Turn the transmitter on and then turn on the receiver switch.
   NOTE: there must be a 4.8 or 6V battery plugged into the receiver to power it.
b. Press the INPUT button and the voltage will appear. The lowest voltage level will be shown on the display.
c. When you press the M button, you will see the actual voltage level.
   The voltage level will drop down when you have servos connected to the receiver are moving.
   You also can connect one servo to HFP-25 and drive it with the knob.
d. Press the INPUT button to exit.

(15)

11. S-Test Auto (Servo Test Auto):
Test the servo movement automatically.

a. Press the INPUT button to enter.
b. Turn the adjustable knob to actuate the servo manually.
c. To test the end positions press the UP/R button to actuate the servo automatically.
   The normal parameters for this are 2100µs to 900µs.
d. Use the adjustable knob to set the sweep speed.
e. Press the INPUT button to stop.
f. To test the operation of the servo potentiometer, press M. The programmer will sweep the output pulse from 2100µs to 900µs and back. The servo will drive slowly from one end position to another.
   Observe the servo horn, if it moves smooth, things are fine. If the movement is jerky or stutters, the servo potentiometer could be dirty or defective.
g. Use the adjustable knob to set the sweep speed.
h. Press the INPUT button to stop.
i. To test the resolution of the servo and see the difference in dead band values between other servos, press the DN/R button.
j. Turn the adjustable knob to set the jitter value from 0µs -31µs.
k. Press INPUT twice to exit.

12. S-Test Manual (Servo Test Manual):
Test the servos movement manually.
a. Press the INPUT button to enter.
b. Turn the adjustable knob to actuate the servo manually.
c. To test the left end position, press the UP/R button. The value should be 900µs.
d. Press INPUT to exit.
e. To test the center position, press the M button. The value should be 1500µs.
f. Press INPUT to exit.
g. To test the right end position, press the DN/R button. The value should be 2100µs.
h. Press INPUT to exit.
i. To test the fail-safe position, push UP/R and DN/R simultaneously.
   The value should be 0µs (no pulse to the servo). After a second, the servo should drive into the fail-safe position, you enabled in step 5.
j. Press INPUT to exit.
k. To exit and back to the main menu, press INPUT again.

(16)