

# Operating Instructions

## Hitec Receiver HSD-09RQ (FREEDOM 9S)

### 1. SPECIFICATION

HSD-09RQ (FREEDOM 9S)	
Part No.	
Reception system	FM/PPM dual Conversion
Dimensions	SYNTHESIZED PLL
L x W x H	2.1" x 1.3" x 0.7" or 52.5 x 32.5 x 18.5mm
Weight	1.3oz. or 38g
Channel Count	9
Current Drain	approx. 25mAh (excl. servos)
Operating voltage	4.8 ~ 8.4 V ⇒ 4 / 5 cell: Ni-Cd / Ni-MH 7.4V 2Cell Li-Po
Operating temp. range	5°F ~ 130°F or -15°C ~ 55°C

\* Low Battery Warning prevents a receiver to operate with a voltage below 4.8V for 4 cell and 5.7V for 5 cell for Ni-Cd or Ni-MH batteries

### 2. SAFETY NOTES

! Read the instructions before using the receiver for the first time

! Use the receiver for its intended application only

The HSD-09RQ/FREEDOM 9S receiver is designed exclusively for use as a radio control receiver for model sport applications. Its use in man-carrying vehicles or industrial apparatus is prohibited.

! Carry out regular range checks (see 13.)

! Keep strictly to the following sequence when switching on and off:

First switch the transmitter ON, then switch the receiver ON

First switch the receiver OFF, then switch the transmitter OFF

! Note regarding mixed operation

This receiver can also be operated with transmitters not using Synthesizer technology, i.e. those using conventional plug-in crystals. This receiver is compatible with most other makes of RC equipment.

Mixed operation with FM/PPM transmitters of other makes is possible in principle. However, we cannot guarantee that such a system will work perfectly, as there are too many possible combinations for us to check.

### 3. SPECIAL FEATURES

- PLL synthesizer receiver, requiring no plug-in crystals.
- Quick, simple change of RF channel using automatic channel search, with Lock-on security by confirmed channel acceptance from the transmitter.
- Auto shift (automatic shift switching) can be used with any brand of modern FM transmitter. (FREEDOM 9S 72MHz ONLY)
- Use of standardized FM/PPM transmission format ensures compatibility with other makes of equipment
- FAIL-SAFE functions
- Low battery warning

### 4. QUICK START (CHANNEL SETTING)

1. Switch the transmitter on.
2. Connect the receiver battery to the receiver, press and hold down the button turn the receiver's power LED ON.  
Release the set button after one second.  
⇒ LED flashes (RF channel search):



3. The RF channel search is concluded when the LED glows constantly:



4. Move channel 1 of transmitter stick two times to the right and left within five secs.



5. LED will be steady on when auto scan completes



6. Once HSD-09RQ (Freedom 9S) sets up completed turn the power OFF/ON

!When channel set up fails LED will be blinks 3 times every sec. . In that case, repeat step 1 through 5.



### 5. RECEIVER CONNECTIONS

The HSD-09RQ (FREEDOM 9S) receiver is fitted with universal UNI sockets which are compatible with the plugs used by most radio control manufacturers (Hitec, Futaba, JR, etc.).

Socket	Function
CH9/BATT	Socket for channel 9 and receiver battery
CH1 - 8	Servo sockets, channels 1 ... 8

! Check plug polarity carefully when connecting the receiver battery, servos, speed controllers etc. Check the pin configuration, especially with other brands of device. (See pin assignment symbol on the receiver)

### 6. POWER SUPPLY

The HSD-09RQ(Freedom 9S) receiver works with 7.4V (2 cell) Li-Po batteries or over a broad voltage range of 4.8V - 8.4V (4 - 5 cell) Ni-CD or Ni-MH receiver batteries. The receiver battery can be connected to the socket marked "CH9/BATT", or to any vacant servo socket 1 ... 8 (see 5)

! Check the maximum permissible operating voltage of all devices

connected to the receiver (servos, etc.)!

For example, some servos are only approved for use with 4 cells (4.8 V).

A battery in good condition and of adequate capacity for the purpose is indispensable for the safe operation of any model:

- Cables should be of adequate conductor cross-section. Keep all leads as short as possible, and avoid unnecessary connectors.
- If the system voltage falls below 3.5 V the receiving system may fail to work properly. Such voltage collapses may occur due to flat, poor quality or defective receiver batteries, cable conductors of inadequate cross-section, poor-quality connectors, or from overloading or faults in the BEC system.

### 7. USING THE RECEIVER / LED INDICATORS

The HSD-09RQ (FREEDOM 9S) receiver is fitted with one LED and one button (SET).

These are used as follows:

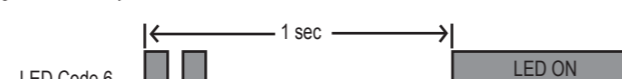
- To set the RF channel
- To indicate low battery warning
- To activate the FAIL-SAFE function and store the FAIL-SAFE positions
- The various operational states are indicated by the LED. The following section describes the receiver settings and corresponding LED CODES.

### 8. SWITCHING ON

1. If you have already set the receiver to an RF channel, the LED glows constantly to indicate HOLD mode on.



2. If you have already set the receiver to an RF channel, the LED blinks twice then glows constantly to indicate FAIL-SAFE mode on.



3. If the receiver picks up an invalid signal, or no signal at all, when it is switched on, the LED glows constantly until a valid signal is received:



! Note:

The receiver checks the operating voltage: the value must be above 4.5 V immediately after it is switched on. If not, the receiver will not work until the voltage rises to a value above 4.8 V. If this happens, the LED lights up briefly.



### 9. Auto Shift switching (FREEDOM 9S only)

The FREEDOM 9S receiver can be operated with Positive Shift (e.g. JR, AIRTRONICS, MULTIPLEX) and Negative Shift (e.g. HITEC, Futaba). The receiver automatically sets itself to the appropriate shift while setting the channel. If you wish to use a transmitter with different shift, you must re-set the RF channel.

### 10. ACTIVATING FAIL-SAFE

The effect of FAIL-SAFE: When interference occurs the servos take up a pre-determined position, previously stored in the receiver. If FAIL-SAFE has not been activated the signal is switched off after the HOLD period (1 sec.). This means that the servos become "soft" and remain in their last commanded position under no load (this may equate to full-throttle!) until a valid signal is picked up again.

! Note:

In the interests of safety we recommend that FAIL-SAFE should always be activated, and the FAIL-SAFE settings should be selected so as to bring the model to a non-critical situation (e.g. motor idle / electric motor OFF, control surfaces neutral, airbrakes extended, aero-tow release open, ...).

### Sequence

1. Switch on the transmitter, then the receiver. The LED glows constantly:



2. Press and hold the button for three sec then LED will turn off to indicate FAIL-SAFE ON Also, FAILSAFE SETTING MODE ON



3. Move all the transmitter sticks and other controls to the desired FAIL-SAFE positions (e.g. motor idle, control surfaces neutral).

4. Press the button once (approx. 0.5 seconds); the LED goes out.

⇒ FAIL-SAFE is now active, and the FAIL-SAFE positions are stored.

! Note:

• If you hold the button pressed for more than 6 seconds; LED will blink three times then steady on to indicate FAILSAFE OFF.

• In this case FAIL-SAFE is not activated, and the FAIL-SAFE settings are not stored!

5. Testing the FAIL-SAFE settings

Move the sticks to positions other than the FAIL-SAFE settings, then switch off the transmitter. The servos should now move to the FAIL- SAFE settings previously stored, once the HOLD period (1 sec.) has elapsed.

! Note:

• The FAIL-SAFE settings must always be checked and brought up to date if, for example, you install the receiver in a new model, or make an accidental mistake in programming the receiver.

### 11. LOW BATTERY WARNING

1. HSD-09RQ (FREEDOM 9S) will recognize a battery type automatically between 4 cell and 5 cell
2. When battery level is high (4 cell: >4.6V, 5 cell: >5.7V): LED glows constantly



3. When battery level is low (4 cell:<4.6V, 5 cell:< 5.7V): LED will blink



! Note: Low Battery Warning function is available for the Ni-Cd and Ni-MH batteries only.

### 12. INSTALLATION NOTES

- You should pack your receiver loosely in foam or similar material to protect it from vibration - especially with internal combustion motors.
- Install the receiver at least 6" away from electric motors, ignition systems and other electronic components. The receiver aerial should not run immediately next to these components.
- Brushed electric motors must be effectively suppressed.
- Use separation filters if you are using servo extension leads longer than 24".
- Do not alter the length of the aerial.
- Route the aerial out of the model and extend it in as straight a line as possible. Do not leave it coiled up.
- Do not deploy the receiver aerial parallel to servo leads, high-current cables or electrically conductive components (e.g. pushrods).
- Do not deploy the aerial inside or over model components which are skinned or reinforced with conductive materials (e.g. carbon fibre, metallic paints etc.), as they have a shielding effect.

### 13. CARRYING OUT A RANGE CHECK

It is very important to carry out regular range checks to ensure that the radio control system works reliably. These checks also allow you to detect problems and sources of interference in good time. This applies in particular when:

- you are using new or altered components, or you have changed the arrangement of components in the model;
- you are using radio control system components which were involved in a previous hard landing or crash;
- irregularities or problems have arisen during previous flights.

! Important:

• For a range check install the telescopic transmitter aerial but leave it completely collapsed.

• The range of the HSD-09RQ(FREEDOM 9S) receiver with transmitter aerial collapsed down to a single segment should be at least 150'.

• You have reached the range limit when the servos begin to jitter and move uncontrollably.

! Important:

Carry out the initial range check with the motor or engine stopped. Repeat the check with the power system operating (all throttle settings): the range should not be significantly reduced. If it is much lower, seek out and eliminate the cause of the problem (motor interference, arrangement of the receiving system components and power supply, vibration, etc.).

### LED CODES

LED Code 0	LED OFF	→ 10.2
LED Code 1	LED ON	→ 4.3/4.5/ 8.1/10.1/11.2
LED Code 2	1 sec pulse train	→ 8.3
LED Code 3	1 sec pulse train	→ 4.2
LED Code 4	1 sec pulse train	→ 4.6
LED Code 5	1 sec pulse train	→ 4.4/11.3 → 8.NOTE
LED Code 6	1 sec pulse train	→ 8.2